ACCELERATOR CONTROL, FUEL & EXHAUST SYSTEMS

SECTION FE

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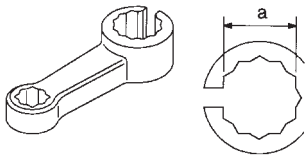
Special Service Tool

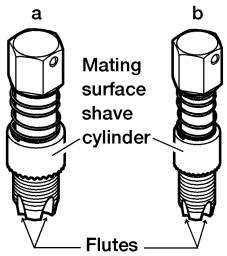
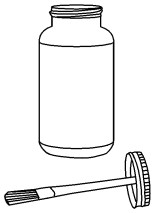
NFFE0001

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description	
KV10114400 (J-38365) Heated oxygen sensor wrench	 NT636	Loosening or tightening front and rear heated oxygen sensors **a: 22 mm (0.87 in)**

Commercial Service Tools

NFFE0008

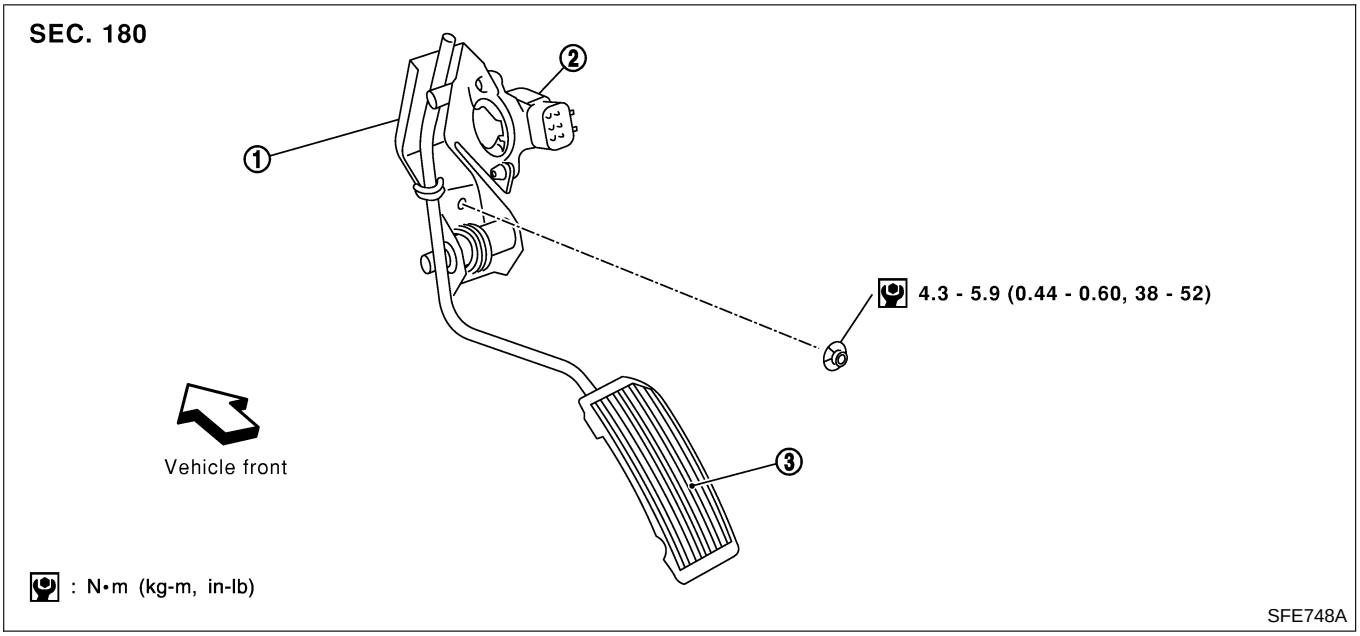
Tool number (Kent-Moore No.) Tool name	Description	
(J-43897-18) (J-43897-12) Oxygen sensor thread cleaner	 AEM488	Reconditioning the exhaust system threads before installing a new heated oxygen sensor (Use with anti-seize lubricant shown below.) **a: J-43897-18 (18 mm dia.) for zirconia oxygen sensor** **b: J-43897-12 (12 mm dia.) for titania oxygen sensor**
Anti-seize lubricant (Permatex 133AR or equivalent meeting MIL specification MIL-A-907)	 AEM489	Lubricating heated oxygen sensor thread cleaning tool when reconditioning exhaust system threads

Removal and Installation

NFFE0002

CAUTION:

- **Check that throttle valve opens when accelerator pedal is fully depressed. Also check that it returns to idle position when pedal is released when ignition switch is in "ON" position.**
- **Check accelerator control parts for improper contact with any adjacent parts.**



1. Accelerator pedal assembly
2. Accelerator pedal position sensor
3. Accelerator pedal

REMOVAL

NFFE0002S01

1. Remove harness connector.
2. Remove mounting nut then remove accelerator pedal assembly.

CAUTION:

- **Do not disassemble accelerator pedal or remove/install accelerator pedal position sensor.**
- **Do not drop or shock accelerator pedal assembly.**
- **Keep accelerator pedal assembly from getting wet.**

INSTALLATION

NFFE0002S02

Install in reverse order of removal.

INSPECTION AFTER INSTALLATION

NFFE0002S03

- Check if accelerator pedal moves smoothly within its range.
- Check if accelerator pedal returns securely to its original position.
- Perform "Accelerator Pedal Released Position Learning" when removing the accelerator pedal position sensor harness connector. Refer to EC-71, "BASIC SERVICE PROCEDURE".

Removal and Installation

NFFE0004

WARNING:

When replacing fuel line parts, be sure to observe the following.

- **Put a “CAUTION: FLAMMABLE” sign in workshop.**
- **Be sure to furnish workshop with a CO_2 fire extinguisher.**
- **Do not smoke while servicing fuel system. Keep open flames and sparks away from work area.**

CAUTION:

- **Before removing fuel line parts, carry out the following procedures:**

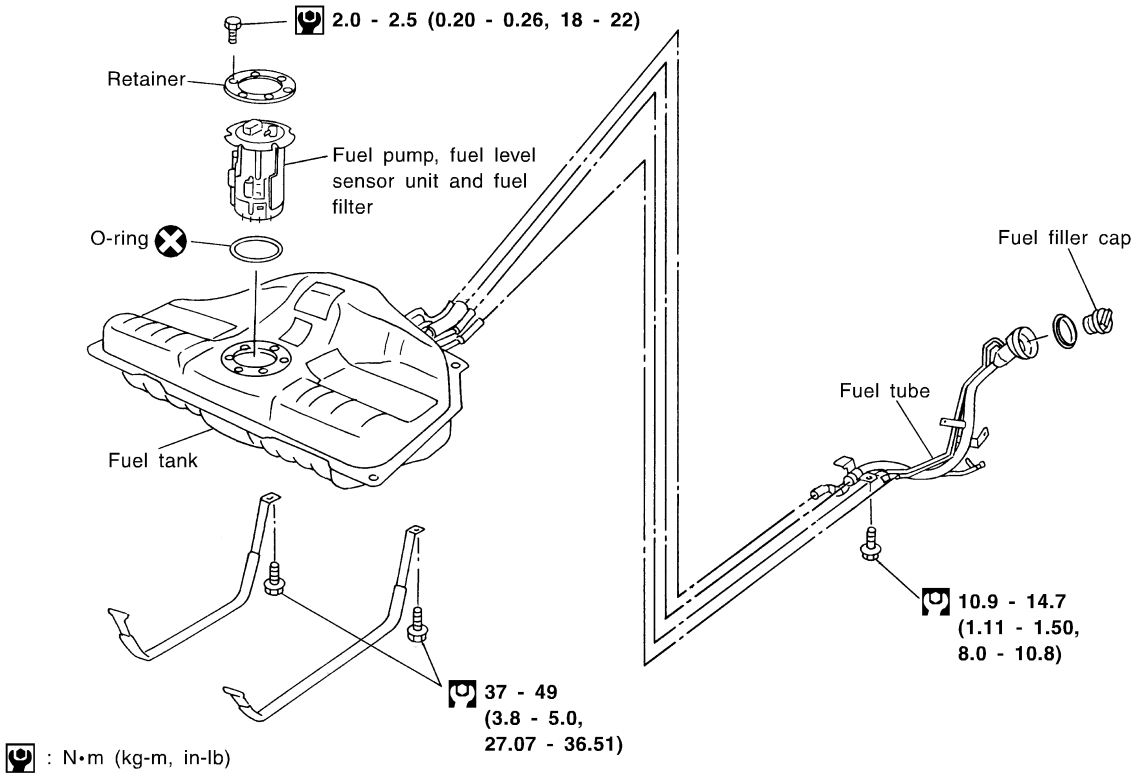
a) Put drained fuel in an explosion-proof container and put the lid on securely.

b) Release fuel pressure from fuel line. Refer to EC-56, “Fuel Pressure Release”.

c) Disconnect battery ground cable.

- **Always replace O-ring and clamps with new ones.**
- **Do not kink or twist tubes when they are being installed.**
- **Do not tighten hose clamps excessively to avoid damaging hoses.**
- **After installing tubes, run engine and check for fuel leaks at connections.**
- **Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.**
- **For inspection and installation of EVAP system parts, refer to EC-36, “Evaporative Emission System”.**
- **For inspection and installation of ORVR system parts, refer to EC-42, “On Board Refueling Vapor Recovery (ORVR)”.**

SEC. 172



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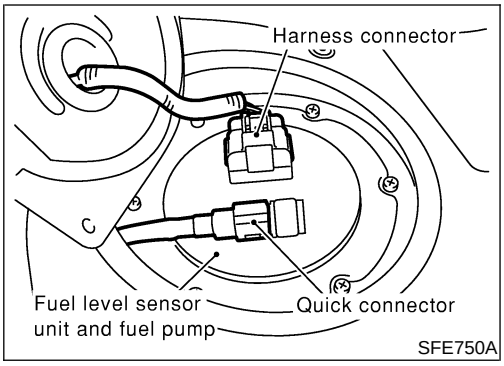
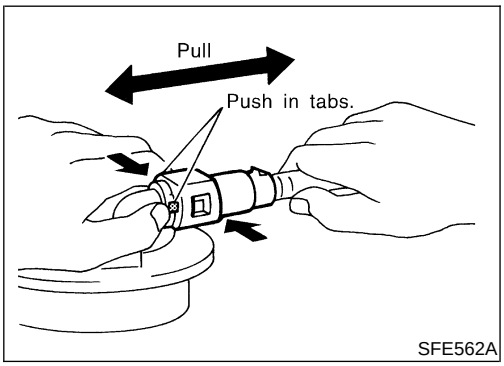
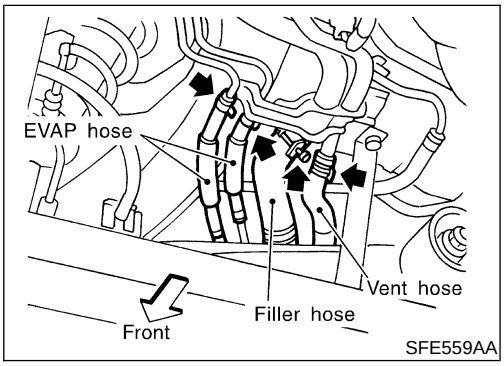
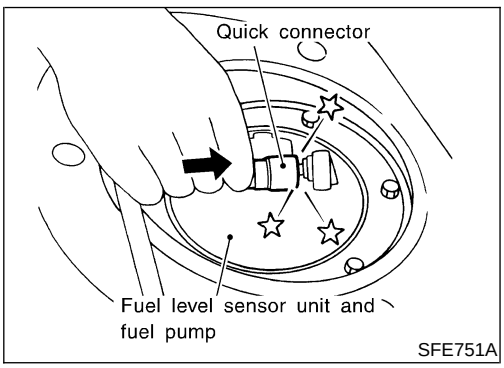
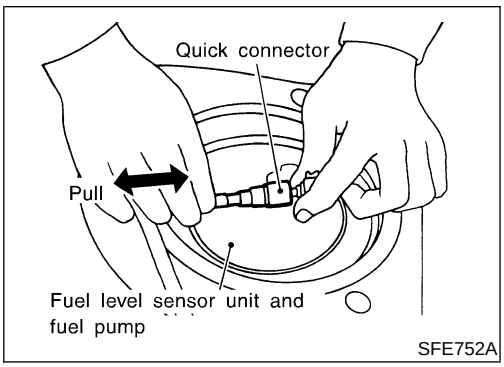










Fuel Tank

NFFE0006

REMOVAL

NFFE0006S01

1. Release fuel pressure from fuel line.
   Refer to EC-56, “Fuel Pressure Release”.
2. Disconnect battery ground cable.
3. Drain fuel from fuel tank.
4. Remove rear seat bottom. Refer to BT-52, “Removal and Installation”.
5. Disconnect electrical connector.
6. Remove the quick connector as follows.

a. Put mating marks on tubes and connectors for correct installation.

b. Hold the sides of the connector, push in tabs, and pull out the tube inserted in the retainer.

CAUTION:

- **The tube can be removed when the push in tabs are completely depressed. Do not twist it more than necessary.**
- **Do not use any tools to remove the quick connector.**
- **Keep clean the connecting portion of the tube and the quick connector.**

7. Disconnect filler hose, vent hose and EVAP hose at fuel tank side.
8. Remove exhaust heat insulators.
9. Remove fuel tank mounting band bolts while supporting fuel tank.
10. Remove fuel tank.

INSTALLATION

NFFE0006S02

To install, reverse the removal procedure. Connect the quick connector as follows:

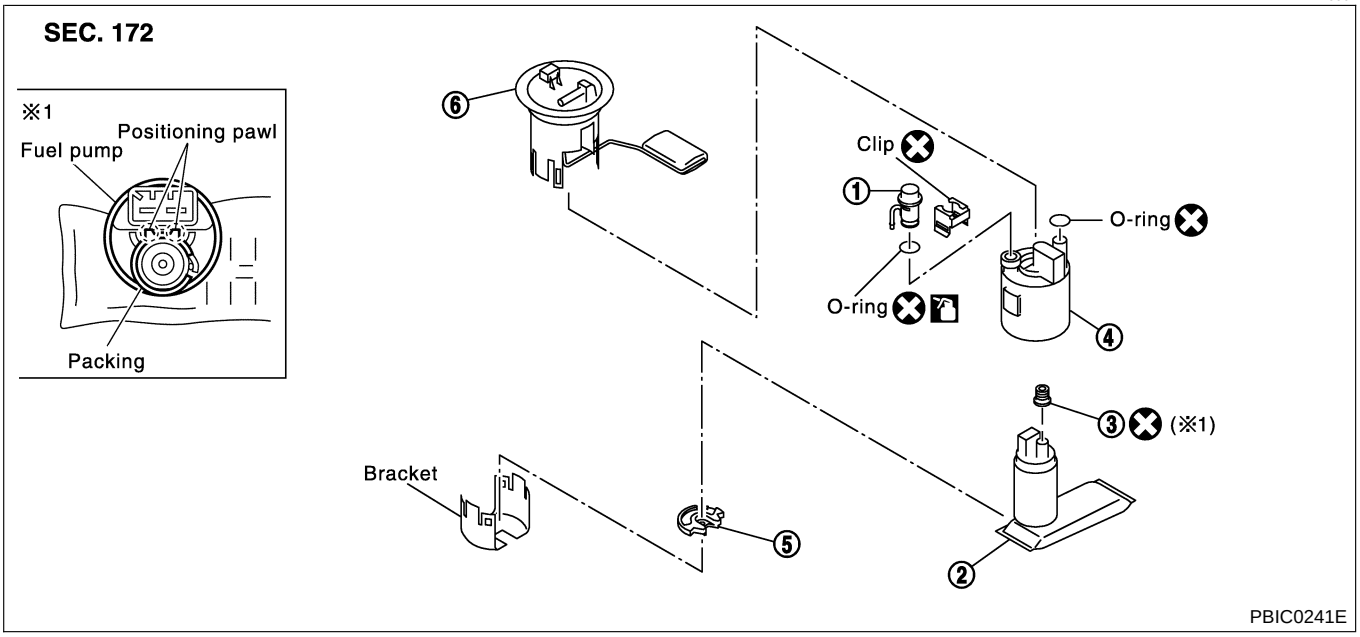
- Align mating marks on tubes and connectors for correct installation.
- Be sure that the connecting portion of the tube and the quick connectors is clean and smooth.
- Align push in tabs with retainer openings.
- Insert tube into the center of the connector until you hear a click.

After connecting quick connector, make sure the connection is firmly made using the following method.

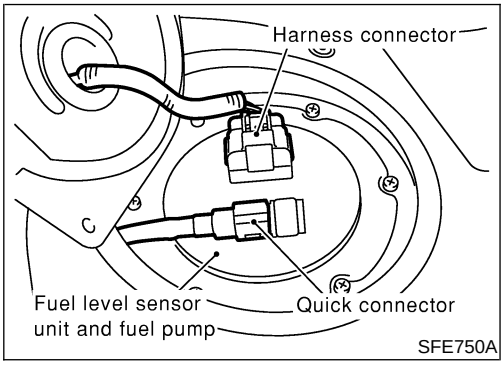
- Pull on the fuel tube and connector to make sure they are firmly connected.
  Make sure that there are no leakage at fuel line connections as follows.
- Apply fuel pressure to fuel lines with ignition switch turned ON (with engine stopped). Then check that there are no leaks.
- Start the engine, increase engine speed and verify that there are no leaks again.

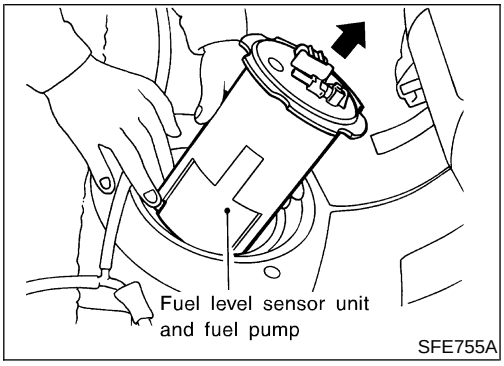
Fuel Pump, Fuel Level Sensor Unit and Fuel Filter

NFFE0007



1. Pressure regulator
2. Fuel pump
3. Packing
4. Fuel filter
5. Rubber
6. Fuel level sensor unit





REMOVAL

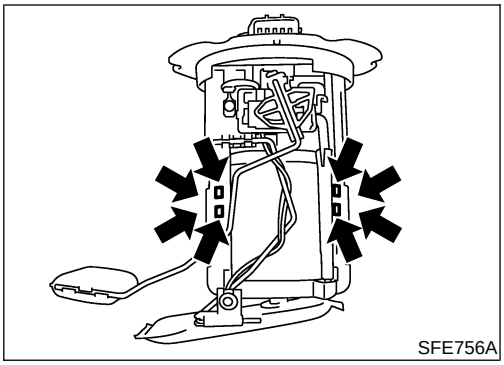
NFFE0007S01

1. Release fuel pressure from fuel line.
   Refer to EC-56, “Fuel Pressure Release”.
2. Remove rear seat bottom. Refer to BT-52, “Removal and Installation”.
3. Remove inspection hole cover located under the rear seat.
4. Disconnect electrical connector.
5. Remove the quick connectors.

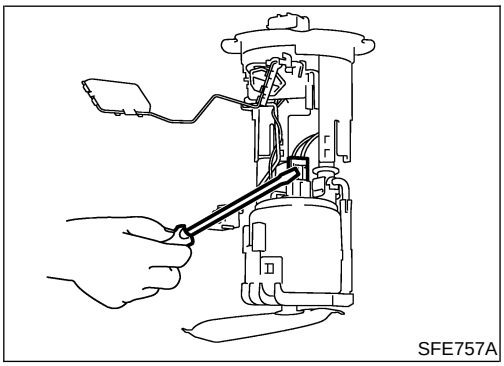
- For removal of quick connectors, refer to step 5. of “Fuel Tank Removal”.

6. Remove the six screws.
7. Pull out the fuel level sensor unit and fuel pump.

- **Do not damage the arm of the fuel level sensor and fuel tank temperature sensor.**


SFE756A

8. Remove flange of fuel level sensor unit and fuel pump.
- Using a screwdriver, remove the snap fit portion as shown in the figure.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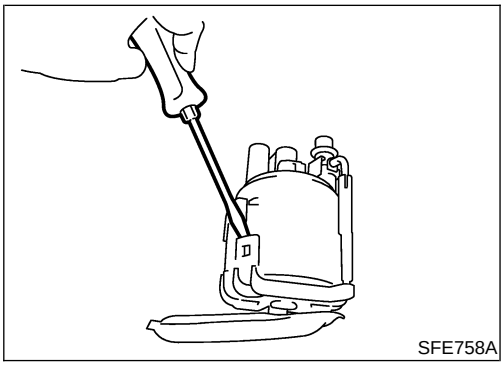
9. Push fuel level sensor flange.
- Using a screwdriver, remove the snap fit portion as shown in the figure.
10. Pull up the fuel level sensor.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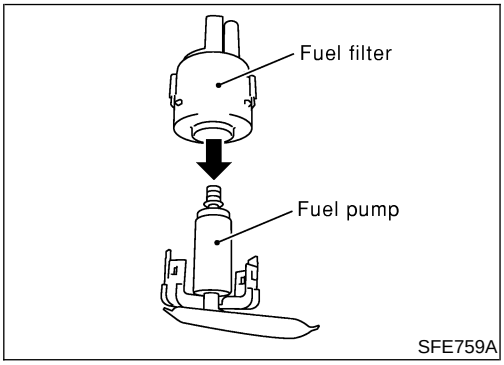
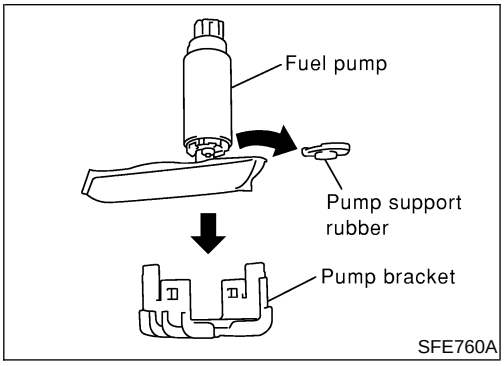
11. Remove fuel filter from chamber.
- Using a screwdriver, remove the snap fit portion as shown in the figure.
12. Remove pressure regulator clip, then pull out pressure regulator.



SFE759A

13. Remove fuel pump, then push down the fuel pump as shown in the figure.
14. Remove packing from fuel pump.



SFE760A

15. Remove the pump support rubber from the fuel pump.

INSTALLATION

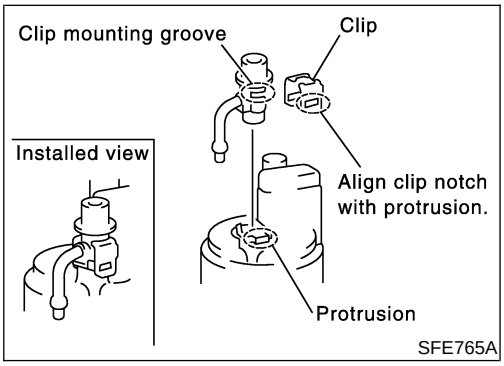
NFFE0007S02

Install in the reverse order of removal paying attention to the following.

- Install the fuel filter and fuel pump with the tabs aligned, make sure a click sound of secure engagement is heard.
- Securely connect the harness connector of the fuel pump.
- Install the pressure regulator O-ring as follows.

CAUTION:

- **When replacing, always use a new O-ring, packing and clip.**
- **Handle it with bare hands. (Do not use gloves.)**
- **Visually check the O-ring, mounting parts and mating parts for foreign materials and flaws.**
- **Before installing, apply new engine oil.**
- **To avoid damage, do not apply an excessive force (pulling or starching).**



- Install the pressure regulator as follows.

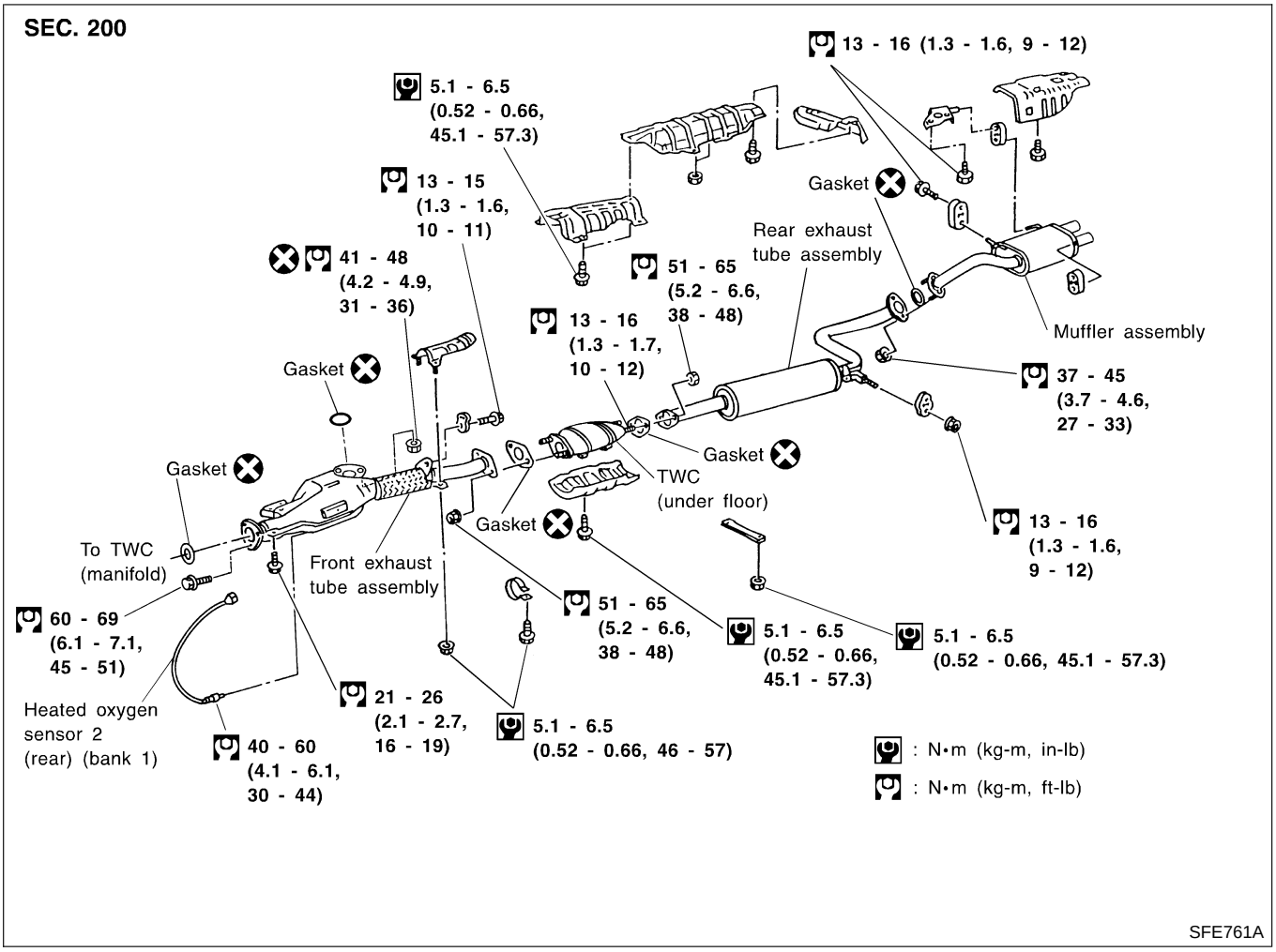
1. Insert the clip to the groove of the regulator.
2. With the clip installed, insert the regulator straight by matching the fuel filter protrusion and the clip notch.
3. Make sure that the fuel filter protrusion and clip notch are securely engaged.

Removal and Installation

NFFE0005

CAUTION:

- **Always replace exhaust gaskets with new ones when reassembling.**
- **With engine running, check all tube connections for exhaust gas leaks, and entire system for 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 or vibration.**
- **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 a new heated oxygen sensor, clean exhaust system threads using heated oxygen sensor thread cleaner tool, J-43897-18 or J-43897-12, and apply anti-seize lubricant.**
- **Do not overtorque the heated oxygen sensor. Doing so may cause damage to the heated oxygen sensor, resuiting in the MIL coming on.**



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L/PRESS SOL/CIRC	P0745	AT-168
O/R CLTCH SOL/CIRC	P1760	AT-191
PNP SW/CIRC	P0705	AT-104
SFT SOL A/CIRC*2	P0750	AT-174
SFT SOL B/CIRC*2	P0755	AT-179
TCC SOLENOID/CIRC	P0740	AT-153
TP SEN/CIRC A/T*2	P1705	AT-184
VEH SPD SEN/CIR AT*3	P0720	AT-116

*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

=NFAT0001S02

DTC CONSULT-II GST*1	Items (CONSULT-II screen terms)	Reference page
P0705	PNP SW/CIRC	AT-104
P0710	ATF TEMP SEN/CIRC	AT-110
P0720	VEH SPD SEN/CIR AT*3	AT-116
P0725	ENGINE SPEED SIG	AT-121
P0731	A/T 1ST GR FNCTN	AT-126
P0732	A/T 2ND GR FNCTN	AT-132
P0733	A/T 3RD GR FNCTN	AT-138
P0734	A/T 4TH GR FNCTN	AT-144
P0740	TCC SOLENOID/CIRC	AT-153
P0744	A/T TCC S/V FNCTN	AT-158
P0745	L/PRESS SOL/CIRC	AT-168
P0750	SFT SOL A/CIRC*2	AT-174
P0755	SFT SOL B/CIRC*2	AT-179
P1705	TP SEN/CIRC A/T*2	AT-184
P1760	O/R CLTCH SOL/CIRC	AT-191
U1000	CAN COMM CIRCUIT	AT-208

*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.

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

NFAT0002

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER” used along with a seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. The SRS system composition which is available to NISSAN MODEL A33 is as follows:

- For a frontal collision
  The Supplemental Restraint System consists of driver air bag module (located in the center of the steering wheel), front passenger air bag module (located on the instrument panel on passenger side), seat belt pre-tensioners, a diagnosis sensor unit, crash zone sensor, warning lamp, wiring harness and spiral cable.
- For a side collision
  The Supplemental Restraint System consists of front side air bag module (located in the outer side of front seat), satellite sensor, diagnosis sensor unit (one of components of air bags for a frontal collision), wiring harness, warning lamp (one of components of air bags for a frontal collision).

Information necessary to service the system safely is included in the **RS 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 should be performed by an authorized NISSAN 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 RS 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 harness connector.**

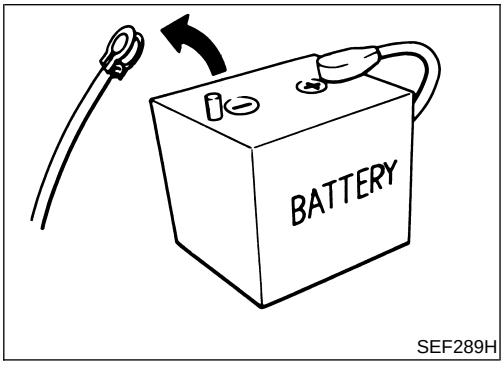
Precautions for On Board Diagnostic (OBD) System of A/T and Engine

NFAT0003

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 or ECM before returning the vehicle to the customer.**

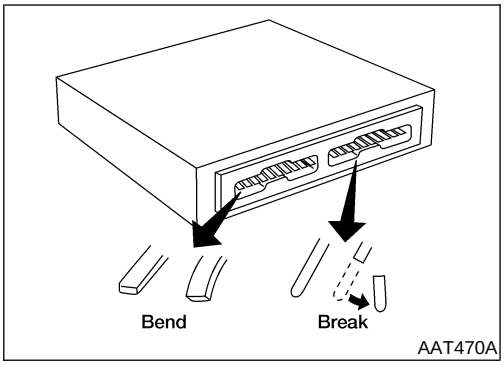


SEF289H

Precautions

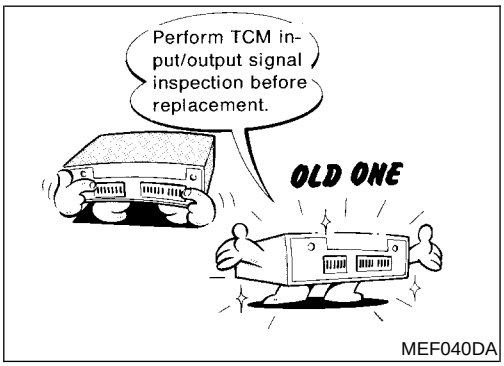
NFAT0004

- **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.**



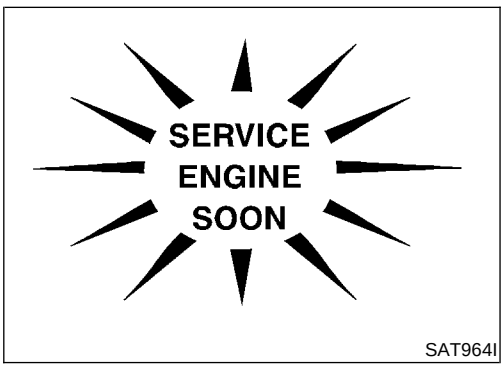
AAT470A

- **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.



MEF040DA

- **Before replacing TCM, perform TCM input/output signal inspection and make sure whether TCM functions properly or not. (See page AT-97.)**



SAT964I

- **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.
- 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.
- Replace ATF cooler if excessive foreign material is found in oil pan or clogging strainer. Refer to "ATF COOLER SERVICE" (Refer to AT-10).
- 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 MA-21, "Changing A/T Fluid" when changing A/T fluid.

Service Notice or Precautions

NFAT0005

FAIL-SAFE

NFAT0005S01

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 1st, 2nd or D. The customer may complain of sluggish or poor acceleration.
When the ignition key is turned ON following Fail-Safe operation, A/T CHECK indicator lamp blinks for about 8 seconds. [For "TCM Self-diagnostic Procedure (No Tools)", refer to AT-51.]
The blinking of the A/T CHECK 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-61).
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

NFAT0005S02

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 malfunction 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.

ATF COOLER SERVICE

NFAT0005S03

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 LC-20, "Radiator".

OBD-II SELF-DIAGNOSIS

NFAT0005S04

- 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 A/T CHECK indicator lamp or the malfunction indicator lamp (MIL). Refer to the table on AT-41 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-38 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 A/T CHECK indicator lamp does not indicate any malfunctions.

− park/neutral position (PNP) switch
− A/T 1st, 2nd, 3rd, or 4th gear function
− A/T TCC S/V function (lock-up).

*: For details of OBD-II, refer to EC-743, "ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION".

- **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 EL-6, "Description".

Wiring Diagrams and Trouble Diagnosis

NFAT0006

When you read wiring diagrams, refer to the following:

- GI-11, "HOW TO READ WIRING DIAGRAMS"
- EL-10, "POWER SUPPLY ROUTING" for power distribution circuit

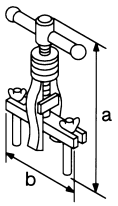
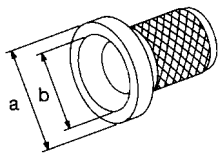
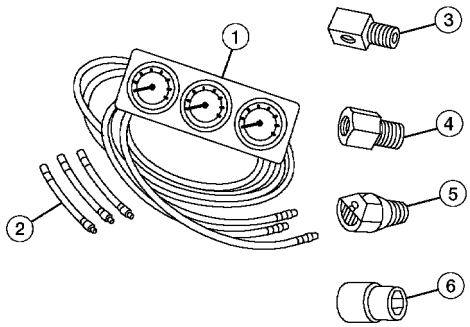
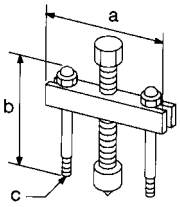
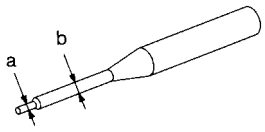
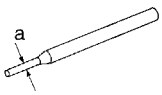
When you perform trouble diagnosis, refer to the following:

- GI-35, "HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES"
- GI-24, "HOW TO PERFORM EFFICIENT DIAGNOSIS FOR AN ELECTRICAL INCIDENT"

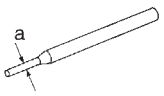
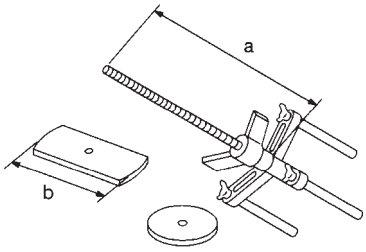
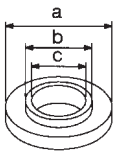
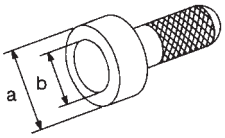
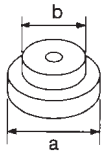
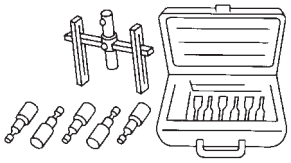
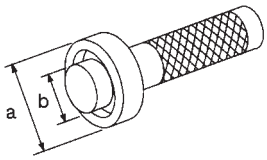
Special Service Tools

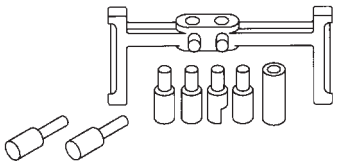
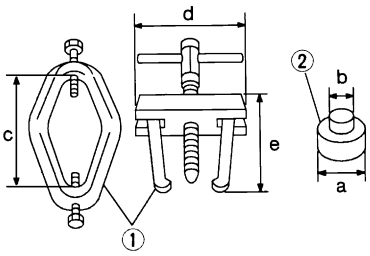
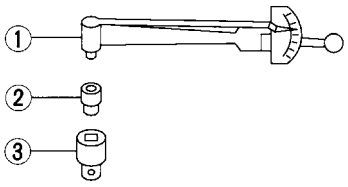
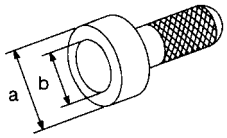
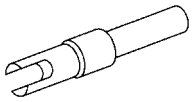
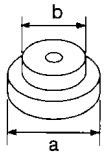
NFAT0007

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description	
KV381054S0 (J34286) 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)**
ST33400001 (J26082) Drift	 NT086	● Installing differential side oil seal ● Installing oil seal on oil pump housing **a: 60 mm (2.36 in) dia.** **b: 47 mm (1.85 in) dia.**
(J34301-C) Oil pressure gauge set 1 (J34301-1) Oil pressure gauge 2 (J34301-2) Hoses 3 (J34298) Adapter 4 (J34282-2) Adapter 5 (790-301-1230-A) 60° Adapter 6 (J34301-15) Square socket	 AAT896	● Measuring line pressure
ST27180001 (J25726-A) Puller	 NT424	● Removing idler gear **a: 100 mm (3.94 in)** **b: 110 mm (4.33 in)** **c: M8 x 1.25P**
ST23540000 (J25689-A) Pin punch	 NT442	● 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.**
ST25710000 (J25689-A) Pin punch	 NT410	● Aligning groove of manual shaft and hole of transmission case **a: 2 mm (0.08 in) dia.**

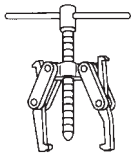
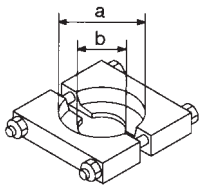
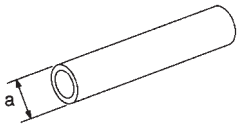
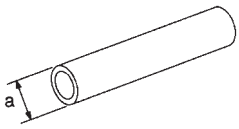
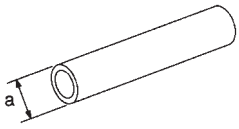
Special Service Tools (Cont'd)

Tool number (Kent-Moore No.) Tool name	Description	
KV32101000 (J25689-A) Pin punch	 NT410	● Removing and installing manual shaft retaining pin ● Removing and installing pinion mate shaft lock pin **a: 4 mm (0.16 in) dia.**
KV31102400 (J34285 and J34285-87) Clutch spring compressor	 NT423	● Removing and installing clutch return springs ● Installing low and reverse brake piston **a: 320 mm (12.60 in)** **b: 174 mm (6.85 in)**
KV40100630 (J26092) Drift	 NT107	● Installing reduction gear bearing inner race ● Installing idler gear bearing inner race **a: 67.5 mm (2.657 in) dia.** **b: 44 mm (1.73 in) dia.** **c: 38.5 mm (1.516 in) dia.**
ST30720000 (J25405 and J34331) Bearing installer	 NT115	● Installing idler gear bearing outer race **a: 77 mm (3.03 in) dia.** **b: 55.5 mm (2.185 in) dia.**
ST35321000 (—) Drift	 NT073	● Installing output shaft bearing **a: 49 mm (1.93 in) dia.** **b: 41 mm (1.61 in) dia.**
(J34291-A) Shim setting gauge set	 NT101	● Selecting oil pump cover bearing race and oil pump thrust washer ● Selecting side gear thrust washer
ST33230000 (J25805-01) Drift	 NT084	● Installing differential side bearing inner race **a: 51 mm (2.01 in) dia.** **b: 28.5 mm (1.122 in) dia.**

Tool number (Kent-Moore No.) Tool name	Description	
(J34290) Shim selecting tool set	 NT080	● Selecting differential side bearing adjusting shim
ST3306S001 (J22888-D) Differential side bearing puller set 1 ST33051001 (J22888-D) Puller 2 ST33061000 (J8107-2) Adapter	 AMT153	● Removing differential side bearing inner race **a: 38 mm (1.50 in) dia.** **b: 28.5 mm (1.122 in) dia.** **c: 130 mm (5.12 in)** **d: 135 mm (5.31 in)** **e: 100 mm (3.94 in)**
ST3127S000 (J25765-A) Preload gauge 1 GG91030000 (J25765-A) Torque wrench 2 HT62940000 (—) Socket adapter 3 HT62900000 (—) Socket adapter	 NT124	● Checking differential side bearing preload
ST35271000 (J26091) Drift	 NT115	● Installing idler gear **a: 72 mm (2.83 in) dia.** **b: 63 mm (2.48 in) dia.**
(J39713) Preload adapter	 NT087	● Selecting differential side bearing adjusting shim ● Checking differential side bearing preload
ST30613000 (J25742-3) Drift	 NT073	**a: 72 mm (2.83 in) dia.** **b: 48 mm (1.89 in) dia.**

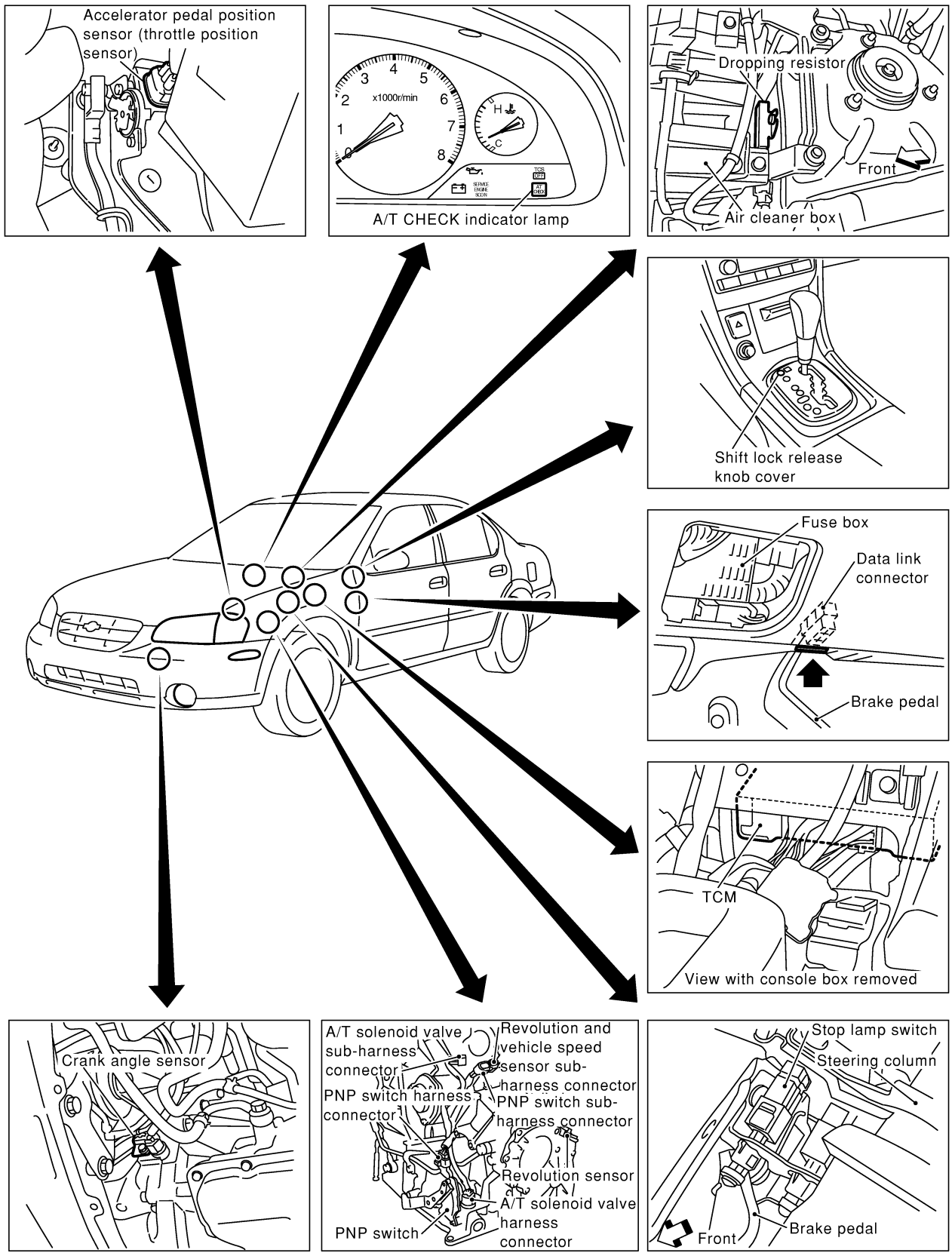
Commercial Service Tools

NFAT0008

Tool name	Description	
Puller	 NT077	● Removing idler gear bearing inner race ● Removing and installing band servo piston snap ring
Puller	 NT411	● Removing reduction gear bearing inner race **a: 60 mm (2.36 in) dia.** **b: 35 mm (1.38 in) dia.**
Drift	 NT083	● Installing needle bearing on bearing retainer **a: 36 mm (1.42 in) dia.**
Drift	 NT083	● Removing needle bearing from bearing retainer **a: 33.5 mm (1.319 in) dia.**
Drift	 NT083	● Installing differential side bearing outer race **a: 75 mm (2.95 in) dia.**

A/T Electrical Parts Location

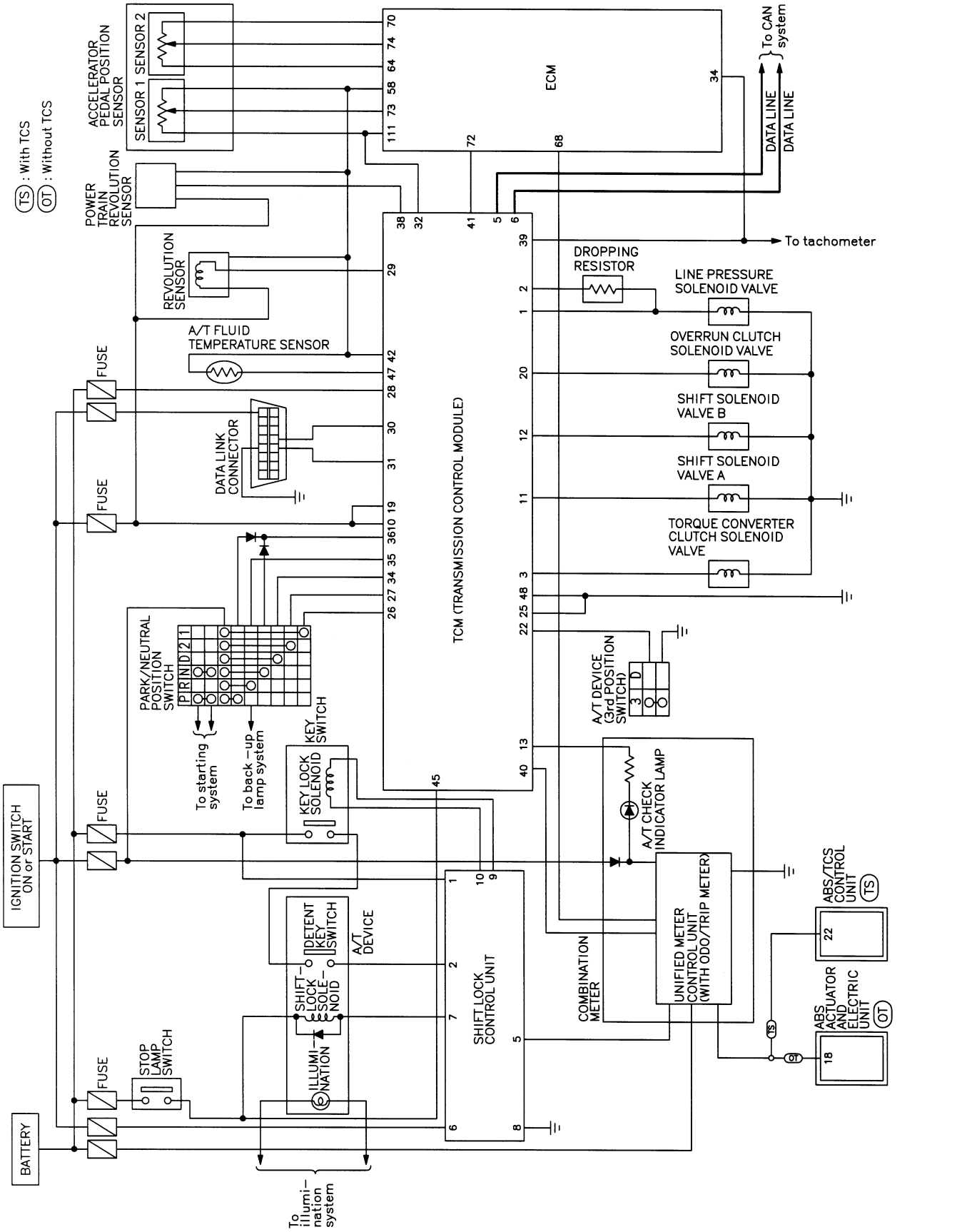
NFAT0009



SAT487KA

Circuit Diagram

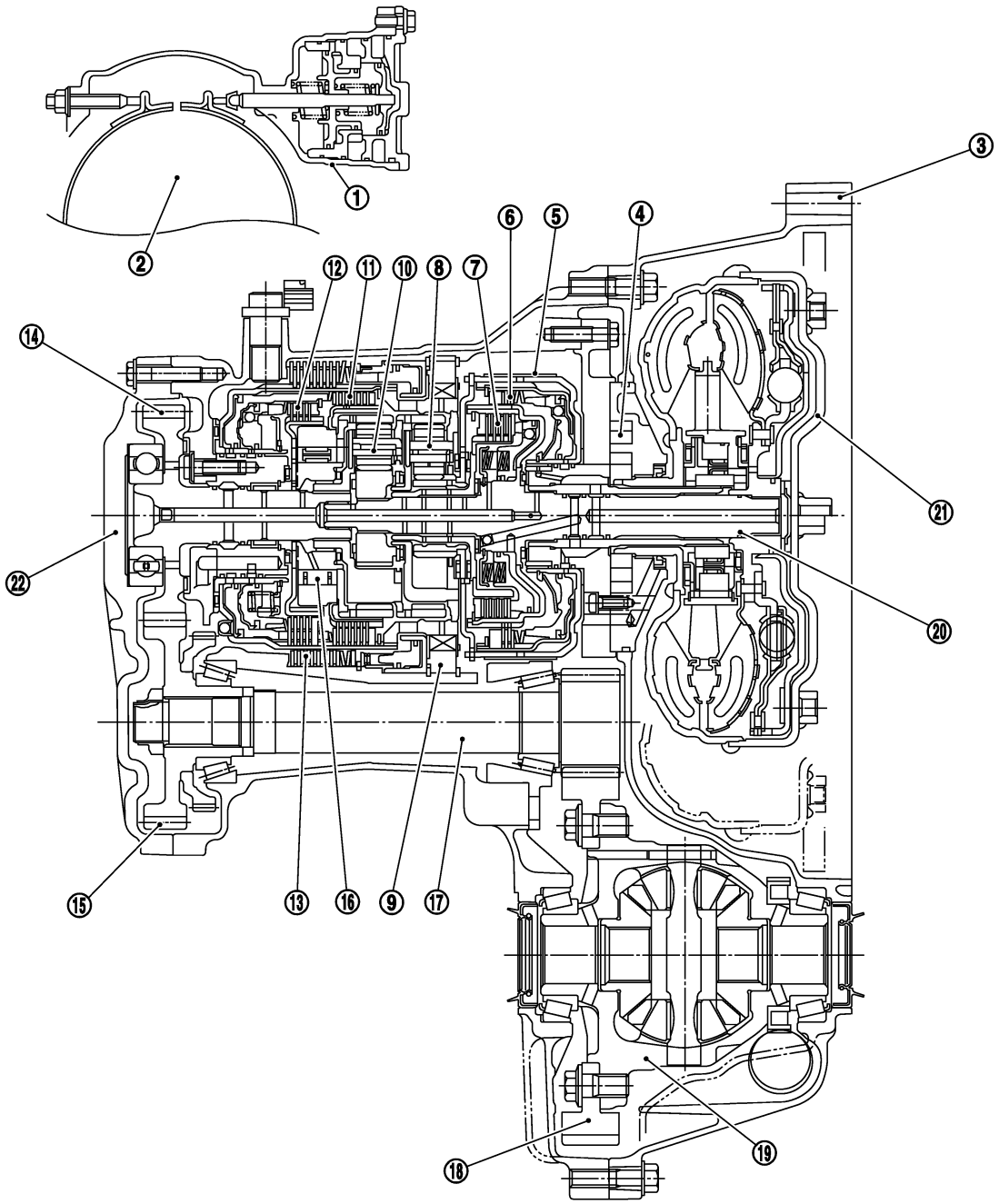
NFAT0010



MAT264B

Cross-sectional View

NFAT0011

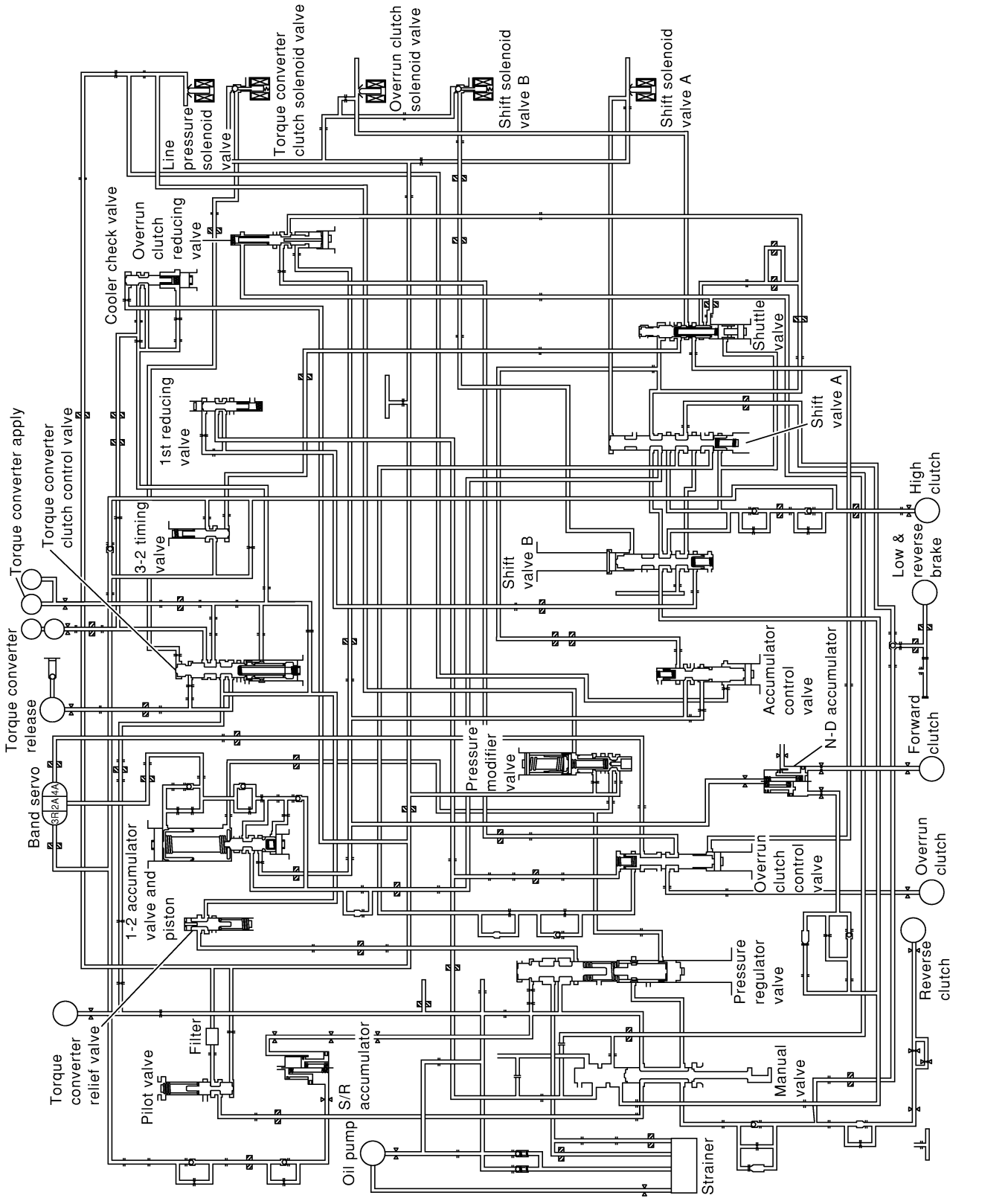


SAT488K

1. Band servo piston
2. Reverse clutch drum
3. Converter housing
4. Oil pump
5. Brake band
6. Reverse clutch
7. High clutch
8. Front planetary gear
9. Low one-way clutch
10. Rear planetary gear
11. Forward clutch
12. Overrun clutch
13. Low & reverse brake
14. Output gear
15. Idler gear
16. Forward one-way clutch
17. Pinion reduction gear
18. Final gear
19. Differential case
20. Input shaft
21. Torque converter
22. Side cover

Hydraulic Control Circuit

NFAT0012



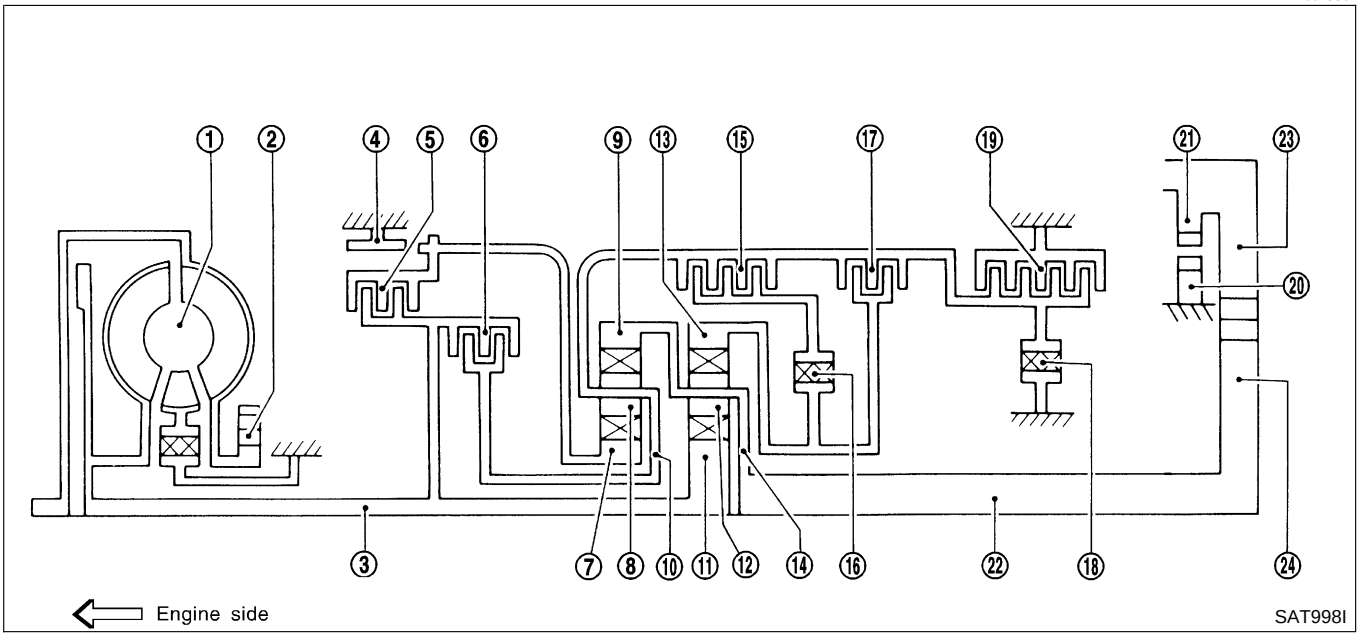
SAT489K

Shift Mechanism

NFAT0013

CONSTRUCTION

NFAT0013S01



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

NFAT0013S02

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

Shift Mechanism (Cont'd)

CLUTCH AND BAND CHART

NFAT0013S03

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			◯	*1 A	◯			B				
	3rd		◯	◯	*1 A	*2C	C		B			*5◯	
	4th		◯	C		*3C	C	◯				◯	
2	1st			◯	D				B	B			Automatic shift 1 ⇔ 2 ⇐ 3
	2nd			◯	A	◯			B				
1	1st			◯	◯				B		◯		Locks (held stationary) in 1st speed 1 ⇐ 2 ⇐ 3
	2nd			◯	◯	◯			B				

*1: Operates when selector lever is set in 3rd 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 selector lever is set in 3rd position.

*5: Operates when selector lever is set in 3rd position.

◯: Operates

A: Operates when throttle opening is less than 3.0/16, activating engine brake.

B: Operates during "progressive" acceleration.

C: Operates but does not affect power transmission.

D: Operates when throttle opening is less than 3.0/16, but does not affect engine brake.

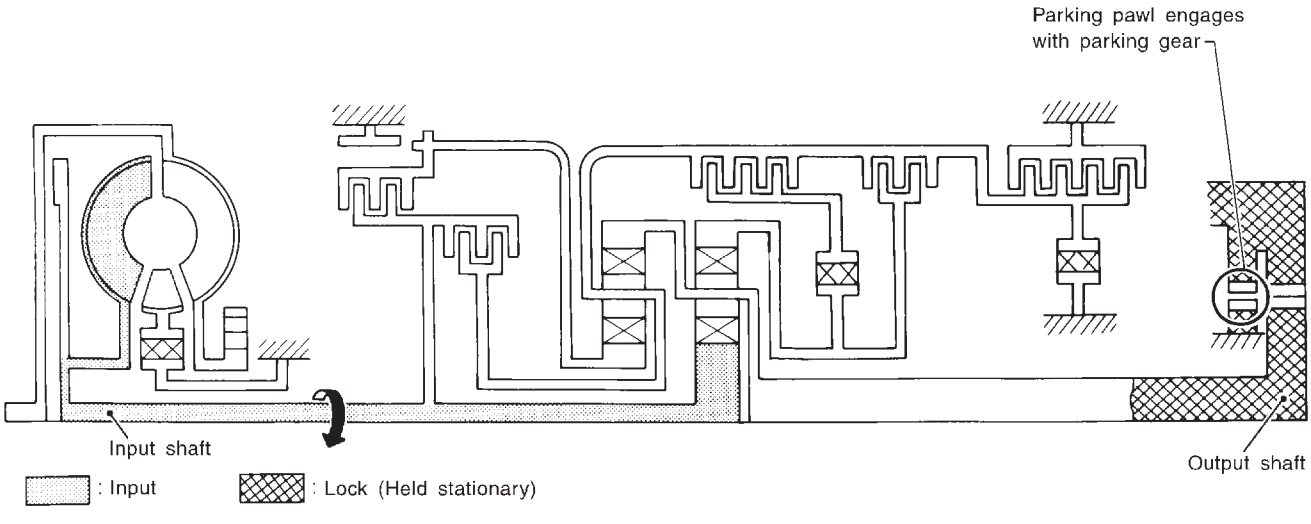
POWER TRANSMISSION

=NFAT0013S04

P and N Positions

NFAT0013S0401

- 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.
- N position
  Power from the input shaft is not transmitted to the output shaft because the clutches do not operate.

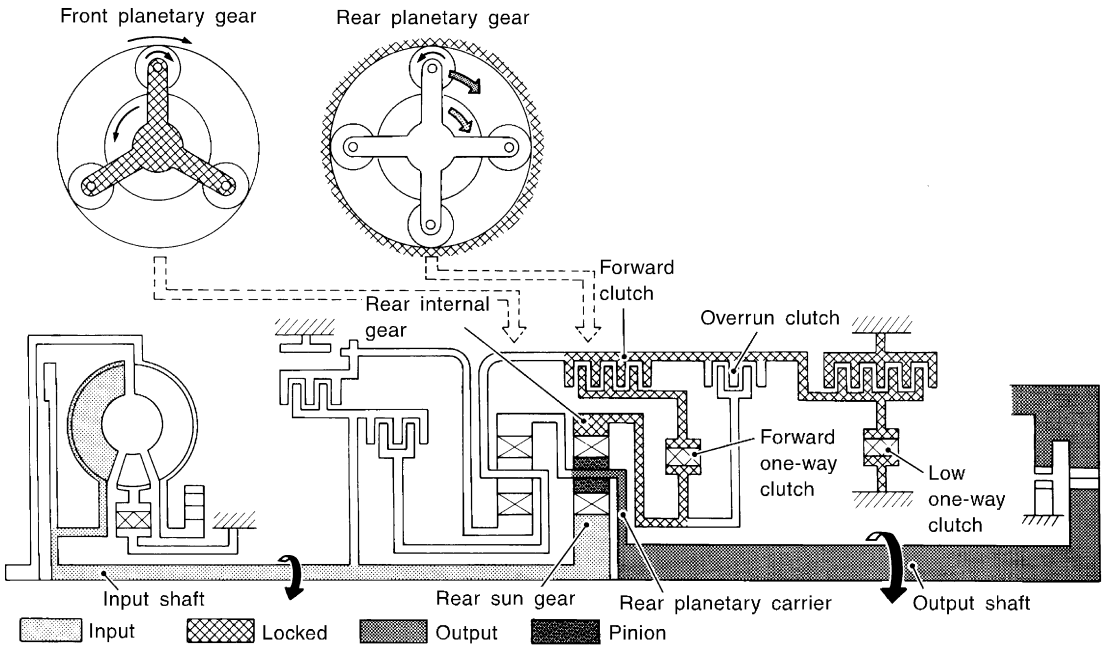


SAT991I

1_1 Position

=NFAT0013S0402

• **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 D_1, 2_1 and 3_1.
Engine brake	Overrun clutch always engages, therefore engine brake can be obtained when decelerating.



Power flow

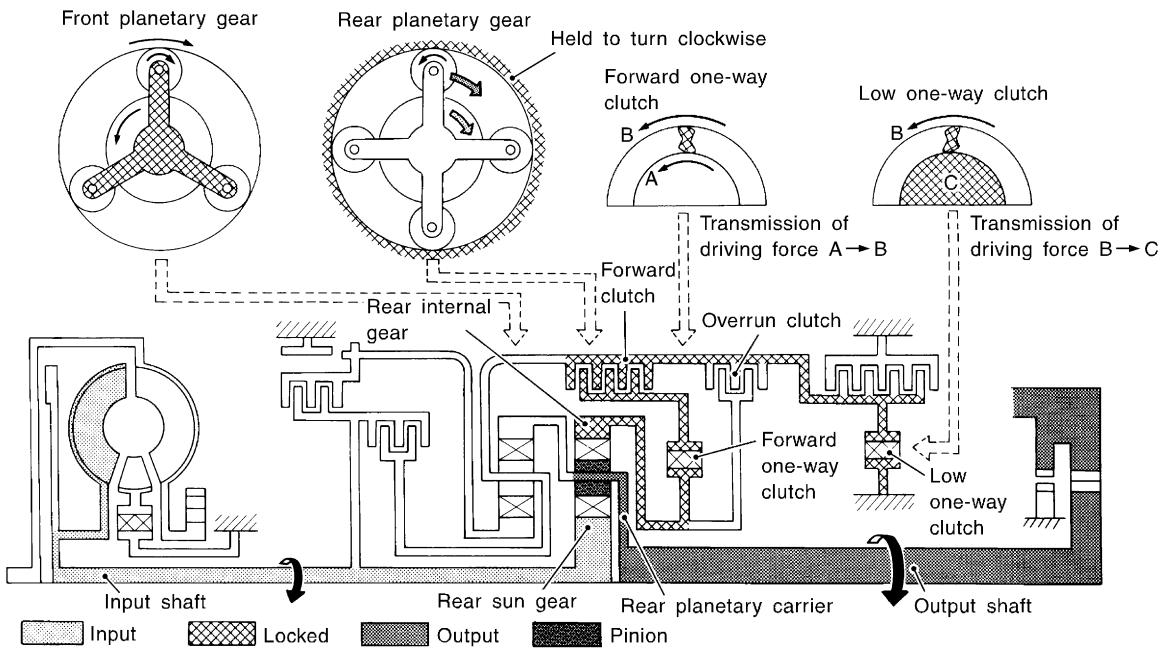
Input shaft
⇩
Rear sun gear
⇩
Rear planetary gear ⇨ Output shaft

AAT537A

D_1 and 2_1 Positions

=NFAT0013S0403

• **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)	D_1: Selector lever is set in 3rd position and throttle opening is less than 3.0/16 2_1: Always engaged At D_1, 2_1 and 3_1 positions, engine brake is not activated due to free turning of low one-way clutch.



Power flow

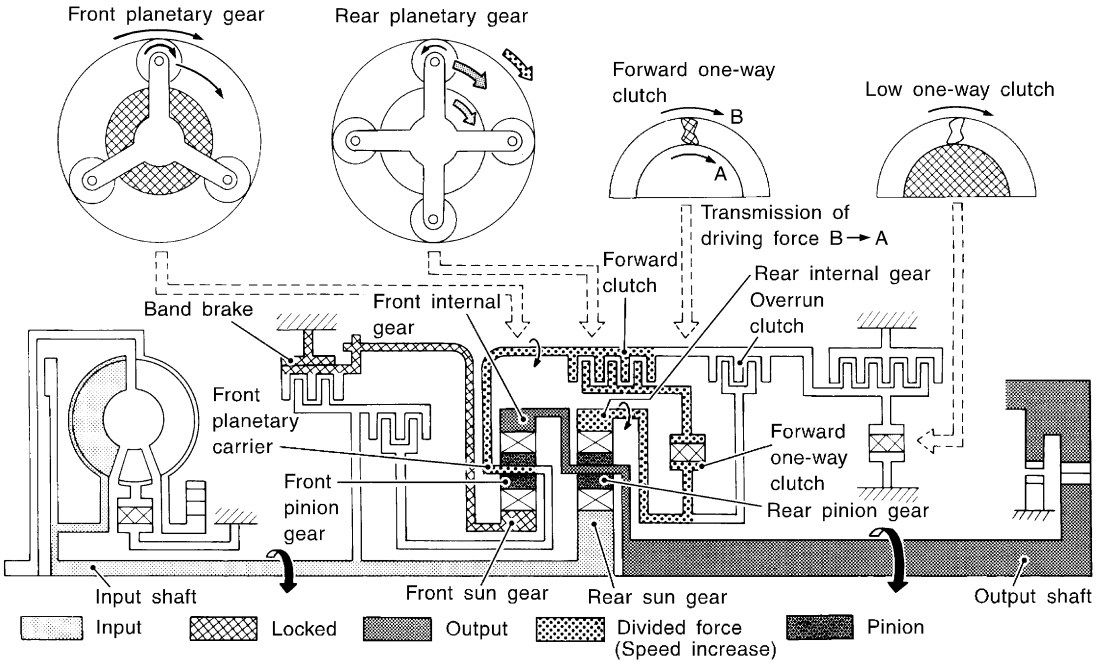
Input shaft
⇩
Rear sun gear
⇩
Rear pinion gear
⇩
Rear planetary carrier → Output shaft

AAT532A

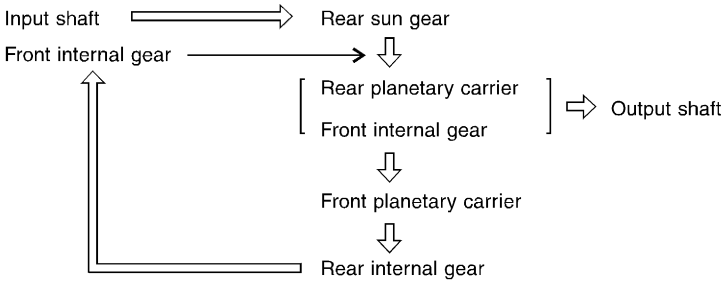
D_2, 2_2, 3_2 and 1_2 Positions

=NFAT0013S0404

• **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	D_2: Selector lever is set in 3rd position and throttle opening is less than 3.0/16 2_2, 3_2 and 1_2: Always engaged



Power flow

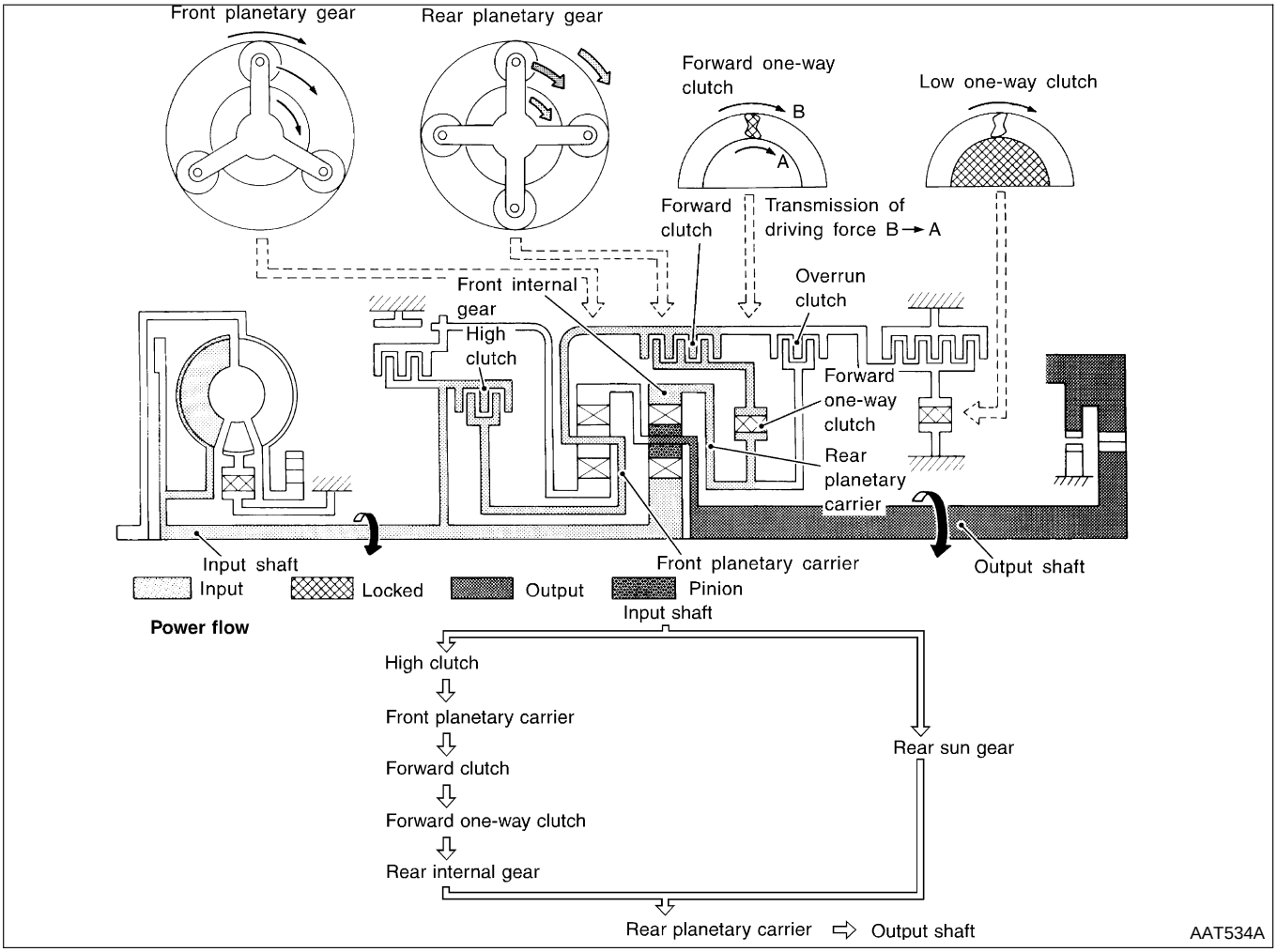


AAT533A

D_3, 3_3 Position

=NFAT0013S0405

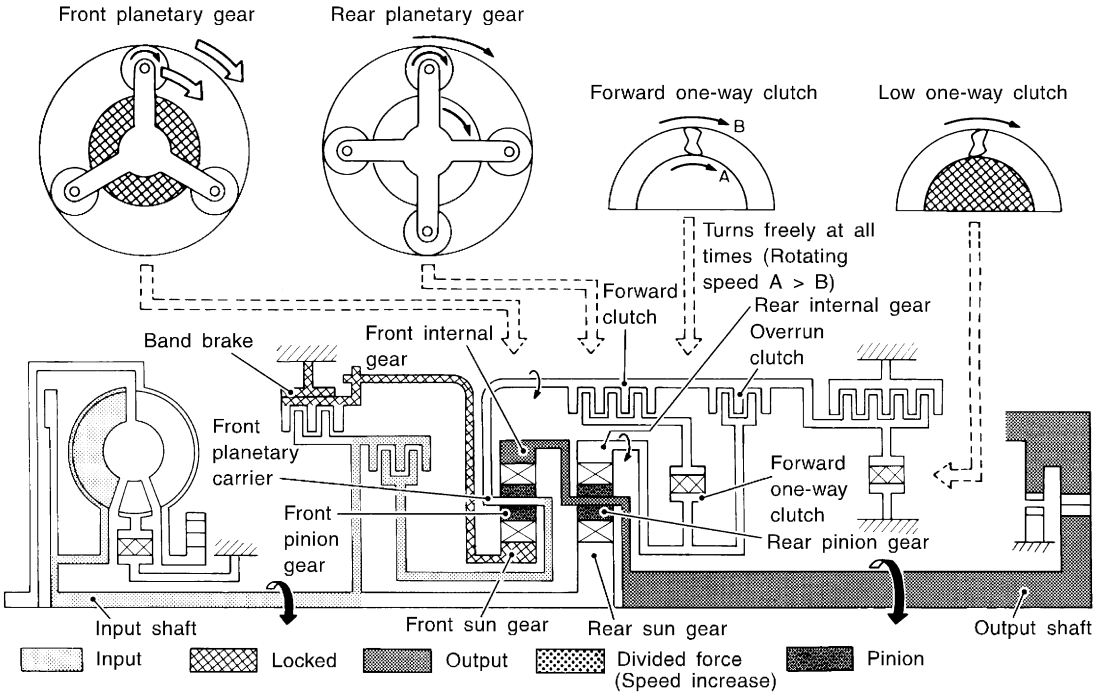
• **High clutch** • **Forward clutch** • **Forward one-way clutch**	Input power is transmitted to front planetary carrier through high clutch. And front planetary carrier is connected to rear internal gear by operation of forward clutch and forward one-way clutch. This rear internal gear rotation and another input (the rear sun gear) accompany rear planetary carrier to turn at the same speed.
Overrun clutch engagement conditions	D_3, 3_3: Selector lever is set in 3rd position and throttle opening is less than 3.0/16



D_4 Position

=NFAT0013S0406

• **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 D_4 position, there is no one-way clutch in the power transmission line and engine brake can be obtained when decelerating.



Power flow

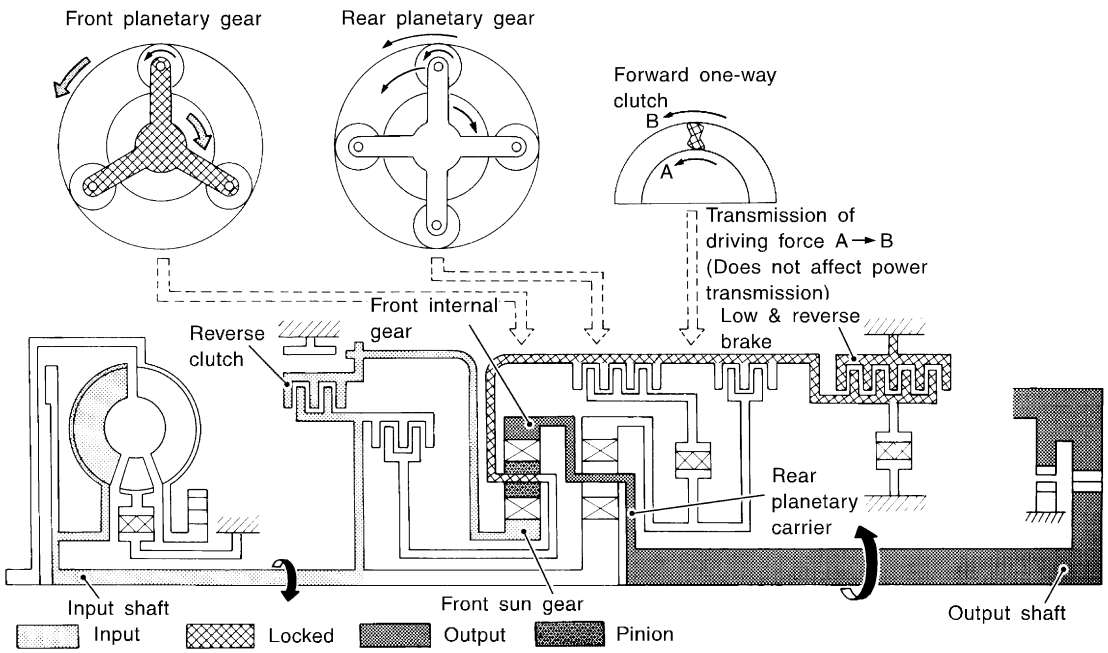
Input shaft
⇩
High clutch
⇩
Front planetary carrier
⇩
Front pinion gear
⇨
Front internal gear
⇩
Rear planetary carrier
⇩
Output shaft

AAT536A

R Position

=NFAT0013S0407

• **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.



Power flow

Input shaft
⇩
Reverse clutch
⇩
Front pinion gear ⇦ Front sun gear
⇩
Front internal gear ⇨ Output shaft

AAT535A

Control System

=NFAT0014

OUTLINE

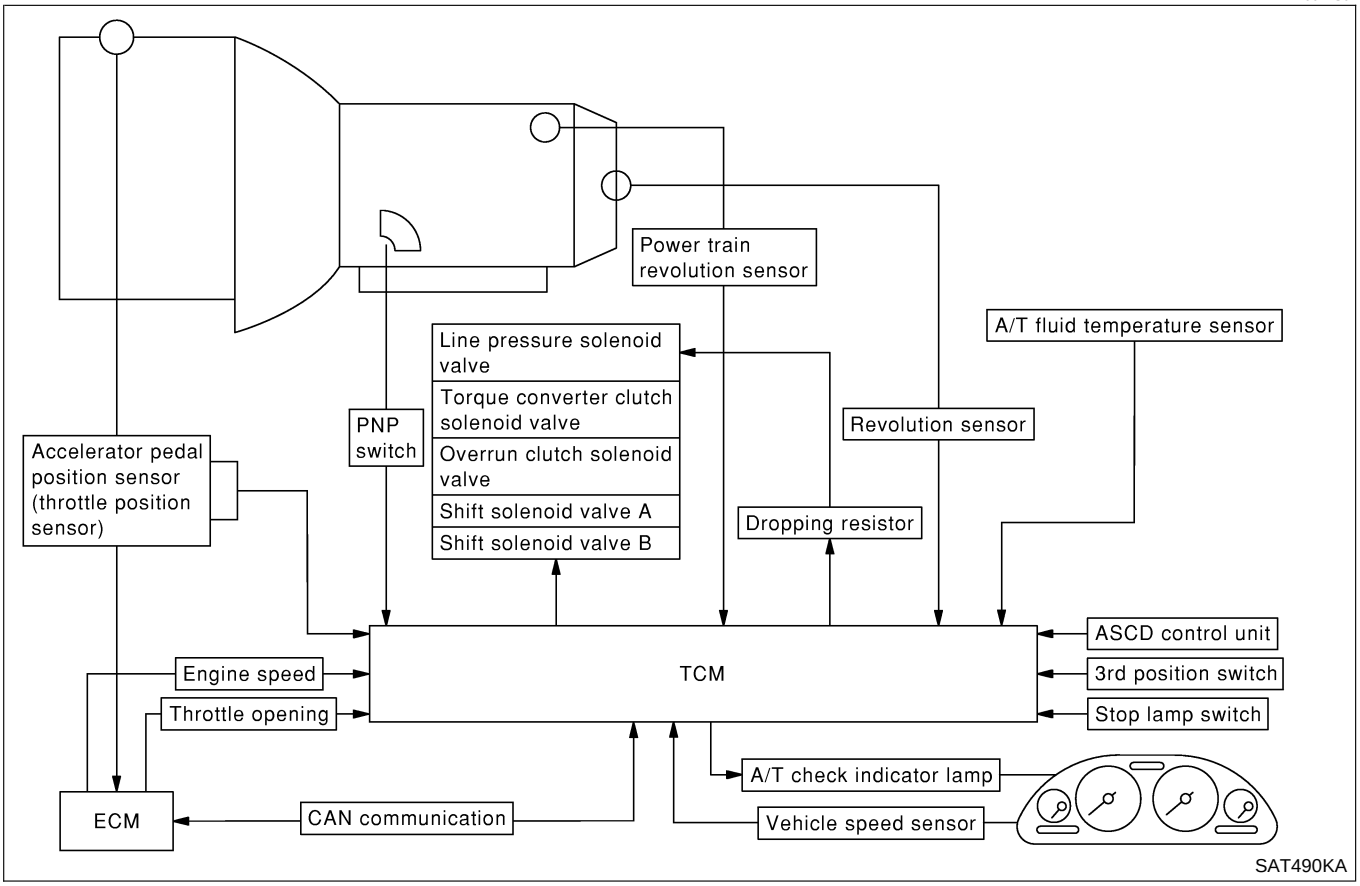
NFAT0014S01

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

SENSORS		TCM		ACTUATORS
Park/neutral position (PNP) switch Accelerator pedal position sensor (throttle position sensor) Engine speed signal A/T fluid temperature sensor Revolution sensor (VHCL/S SE-1) Vehicle speed sensor (VHCL/S SE-2) 3rd position switch ASCD control unit Stop lamp switch Power train revolution sensor	▶	Shift control Line pressure control Lock-up control Overrun clutch control Timing control Fail-safe control Self-diagnosis CAN communication line control	▶	Shift solenoid valve A Shift solenoid valve B Overrun clutch solenoid valve Torque converter clutch solenoid valve Line pressure solenoid valve A/T CHECK indicator lamp

CONTROL SYSTEM

NFAT0014S02



TCM FUNCTION

=NFAT0014S03

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

NFAT0014S04

	Sensors and solenoid valves	Function
Input	Park/neutral position (PNP) switch	Detects select lever position and sends a signal to TCM.
	Accelerator pedal position sensor (throttle position sensor)	Detects accelerator pedal position as throttle valve position signal, 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 (VHCL/S SE-1)	Detects output shaft rpm and sends a signal to TCM.
	Vehicle speed sensor (VHCL/S SE-2)	Used as an auxiliary vehicle speed sensor. Sends a signal when revolution sensor (installed on transmission) malfunctions.
	3rd position switch	Sends a signal, which prohibits a shift to D position, to the TCM.
	Power train revolution sensor	Detects forward clutch drum rpm and sends a signal to TCM.
	Stop lamp switch	Send the lock-up release signal to the TCM at time of D_4 (lock-up).
	CAN communication	In CAN communication, control units are connected to 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring.
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.
	A/T CHECK indicator lamp	Shows TCM faults, when A/T control components malfunction.

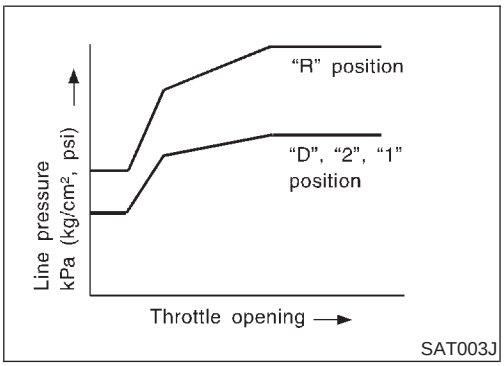
Control Mechanism

=NFAT0015

LINE PRESSURE CONTROL

NFAT0015S01

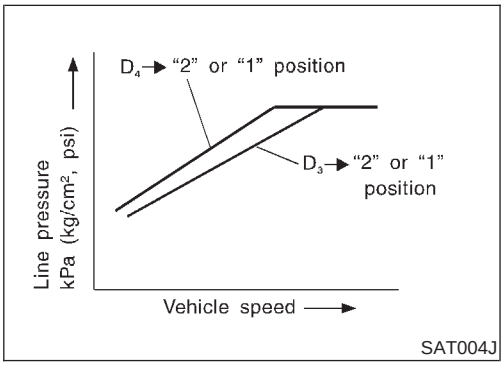
TCM has various line pressure control characteristics to meet the driving conditions.
An ON-OFF duty signal is sent to the line pressure solenoid valve based on TCM characteristics.
Hydraulic pressure on the clutch and brake is electronically controlled through the line pressure solenoid valve to accommodate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



Normal Control

NFAT0015S0101

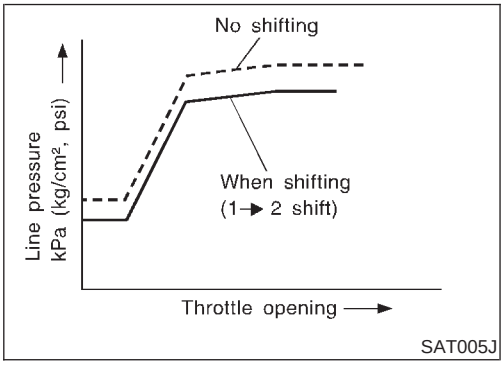
The line pressure to throttle opening characteristics is set for suitable clutch operation.



Back-up Control (Engine brake)

NFAT0015S0102

If the selector lever is shifted to 2nd position while driving in D_4 (O/D) 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

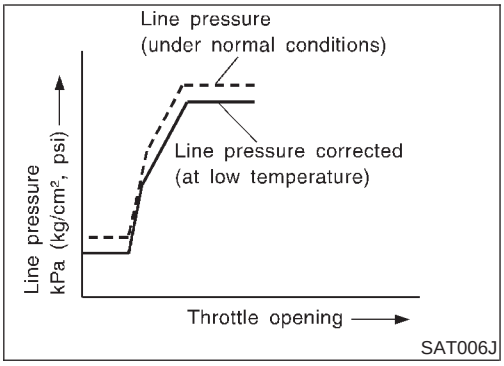
NFAT0015S0103

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.

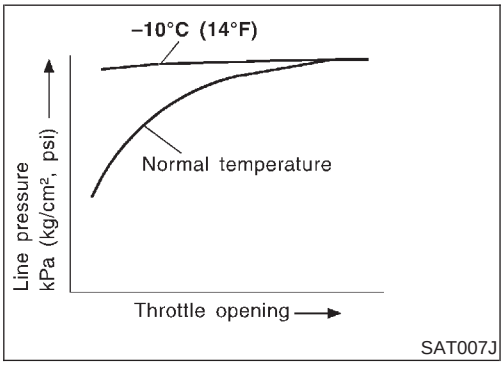
At Low Fluid Temperature

NFAT0015S0104

- 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.

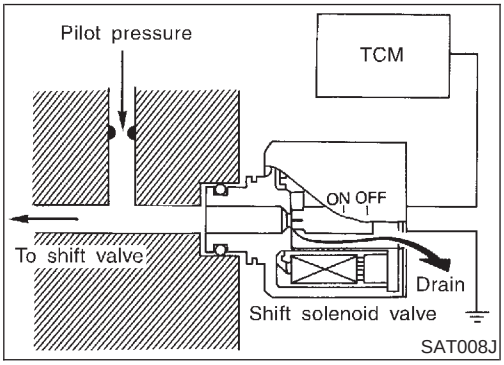


- Line pressure is increased to a maximum irrespective of the throttle opening when fluid temperature drops to −10°C (14°F). This pressure rise is adopted to prevent a delay in clutch and brake operation due to extreme drop of fluid viscosity at low temperature.

SHIFT CONTROL

NFAT0015S02

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

NFAT0015S0201

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.

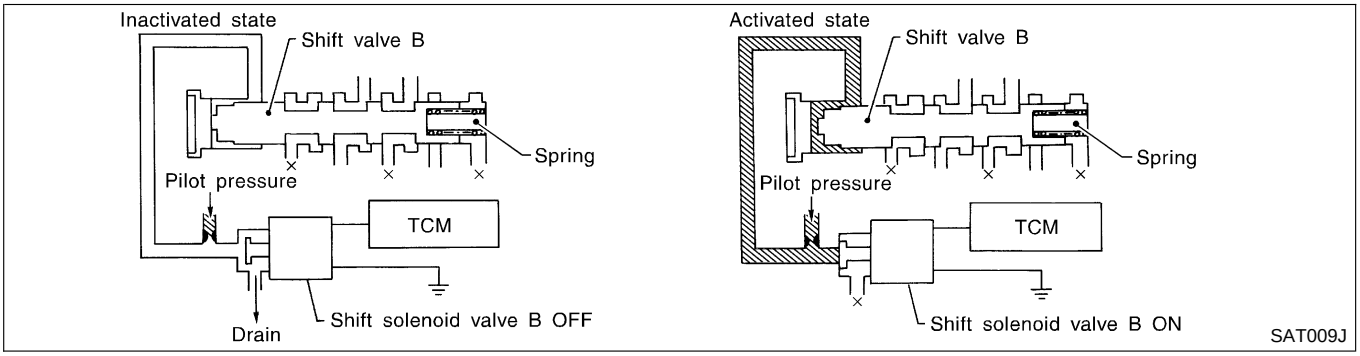
The shift solenoid valve performs simple ON-OFF operation. When set to ON, the drain circuit closes and pilot pressure is applied to the shift valve.

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 (O/D)	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

NFAT0015S0202



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

NFAT0015S03

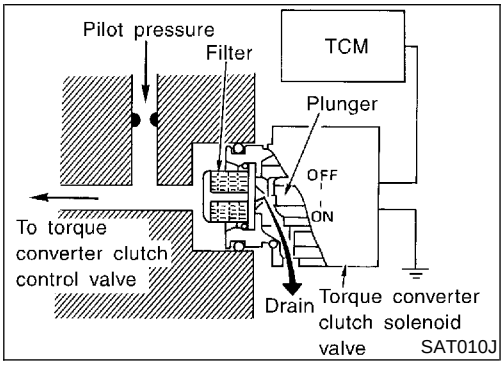
The torque converter clutch piston in the torque converter is locked to eliminate torque converter slip to increase power transmission efficiency. The solenoid valve is controlled by an ON-OFF duty signal sent from the TCM. The signal is converted to an oil pressure signal which controls the lock-up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

Conditions for Lock-up Operation

NFAT0015S0301

When vehicle is driven in 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.

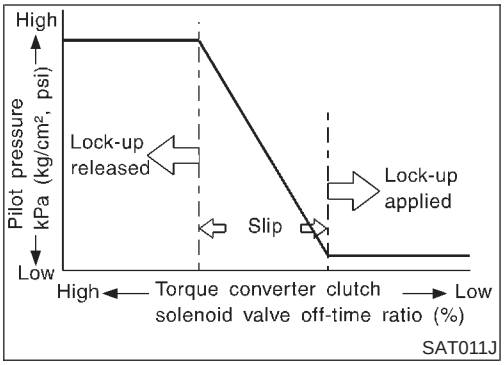
Selector lever	D position	3rd position
Gear position	D_4	D_3
Vehicle speed sensor	More than set value	
Throttle position sensor	Less than set opening	
Closed throttle position switch	OFF	
A/T fluid temperature sensor	More than 40°C (104°F)	



Torque Converter Clutch Solenoid Valve Control

NFAT0015S0302

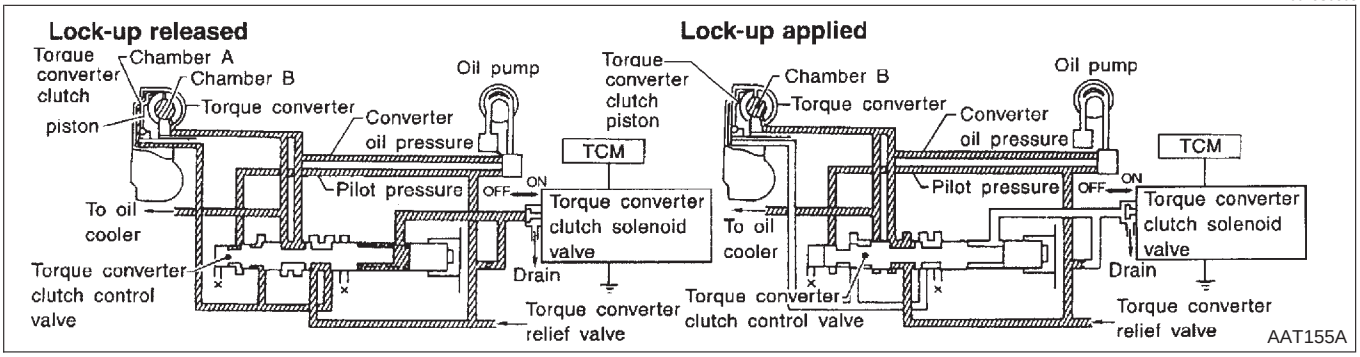
The torque converter clutch solenoid valve is controlled by the TCM. The plunger closes the drain circuit during the OFF period, and opens the circuit during the ON period. If the percentage of OFF-time increases in one cycle, the pilot pressure drain time is reduced and pilot pressure remains high.
The torque converter clutch 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

NFAT0015S0303



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)

NFAT0015S04

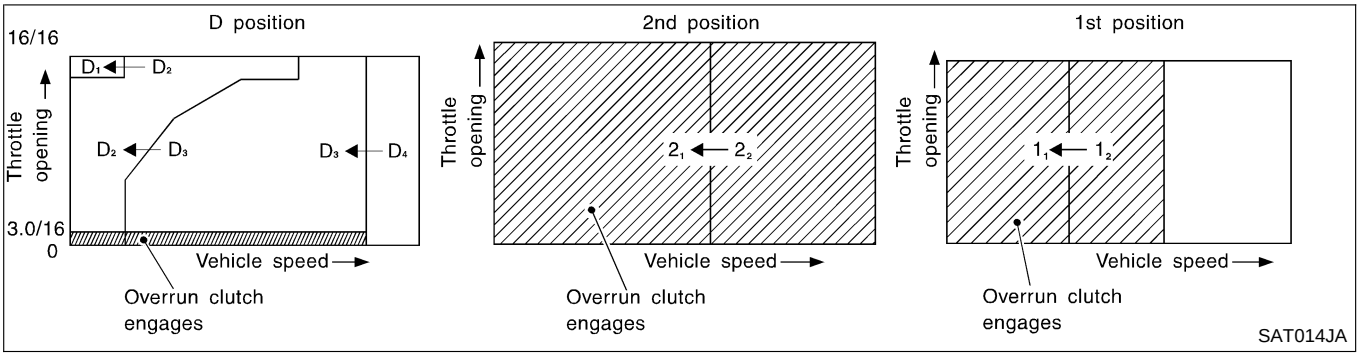
Forward one-way clutch is used to reduce shifting shocks in down-shifting operations. This clutch transmits engine torque to the wheels. However, drive force from the wheels is not transmitted to the engine because the one-way clutch rotates idle. This means the engine brake is not effective.

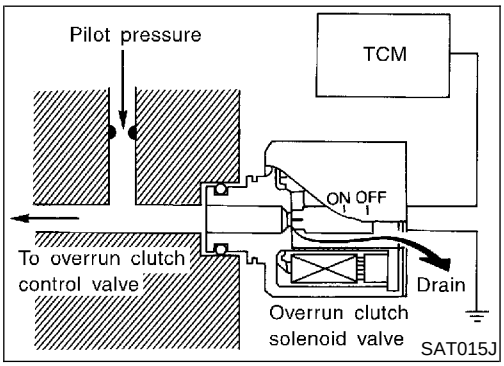
The overrun clutch operates when the engine brake is needed.

Overrun Clutch Operating Conditions

NFAT0015S0401

Selector lever position	Gear position	Throttle opening
D position	D_1, D_2, D_3 gear position	Less than 3.0/16
2nd position	2_1, 2_2 gear position	
1st position	1_1, 1_2 gear position	At any position





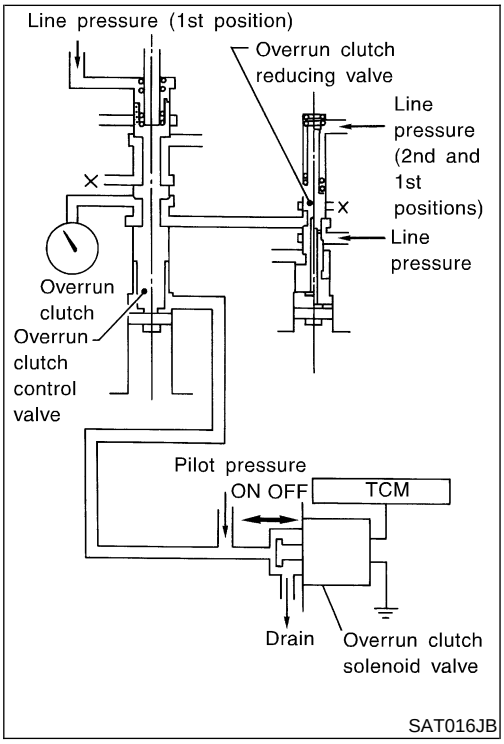
Overrun Clutch Solenoid Valve Control

NFAT0015S0402

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

NFAT0015S0403

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 1st position, the overrun clutch control valve remains pushed down so that the overrun clutch is engaged at all times.

Control Valve

NFAT0016

FUNCTION OF CONTROL VALVES

NFAT0016S01

Valve name	Function
Pressure regulator valve, plug and sleeve plug	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.

Valve name	Function
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 three 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 two 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.)
"1" reducing valve	Reduces low & reverse brake pressure to dampen engine-brake shock when downshifting from the 1st position 1_2 to 1_1.
Overrun clutch reducing valve	Reduces oil pressure directed to the overrun clutch and prevents engine-brake shock. In 1st and 2nd 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 the pace that oil pressure is released depending on vehicle speed; maximizes the high clutch release timing, and allows for soft down shifting.
Shuttle valve	Determines if the overrun clutch solenoid valve should control the 3-2 timing valve or the overrun clutch control valve and switches between the two.
Cooler check valve	At low speeds and with a small load when little heat is generated, saves the volume of cooler flow, and stores the oil pressure for lock up.

Introduction

NFAT0017

The A/T system has two self-diagnostic systems.
The first is the emission-related on board diagnostic system (OBD-II) performed by the TCM (transmission control module) 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 A/T CHECK indicator lamp. The malfunction is stored in the TCM memory. The detected items are overlapped with OBD-II self-diagnostic items. For detail, refer to AT-41.

OBD-II Function for A/T System

NFAT0018

The ECM provides emission-related on board diagnostic (OBD-II) functions for the A/T system. One function is to receive a signal from the TCM used with OBD-related parts of the A/T system. The signal is sent to the ECM when a malfunction occurs in the corresponding 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 OBD-II

NFAT0019

ONE TRIP DETECTION LOGIC

NFAT0019S01

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

NFAT0019S02

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 or switch — 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.

OBD-II Diagnostic Trouble Code (DTC)

NFAT0020

HOW TO READ DTC AND 1ST TRIP DTC

NFAT0020S01

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 and 1st trip 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.

SELECT SYSTEM
A/T
ENGINE

SAT014K

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

SELF-DIAG RESULTS	
DTC RESULTS	TIME
PNP SW/CIRC [P0705]	0

SAT015K

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

SELF-DIAG RESULTS	
DTC RESULTS	TIME
PNP SW/CIRC [P0705]	1 t

SAT016K

Freeze Frame Data and 1st Trip Freeze Frame Data

NFAT0020S0101

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".

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

NFAT0020S02

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 OBD-II. For details, refer to EC-76, "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)

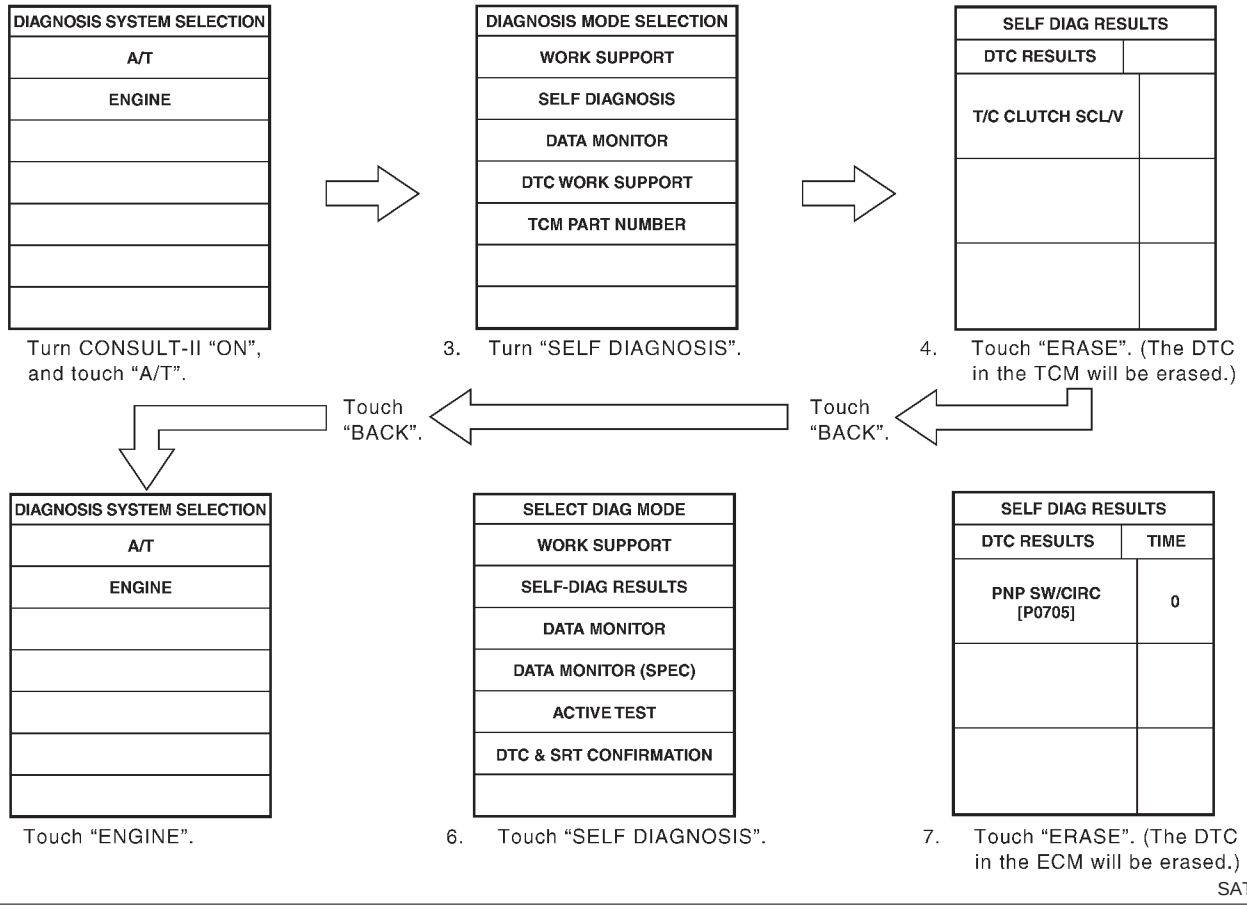
NFAT0020S03

- **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 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 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 10 seconds and then turn it "ON" (engine stopped) again.



SAT286K

HOW TO ERASE DTC (WITH GST)

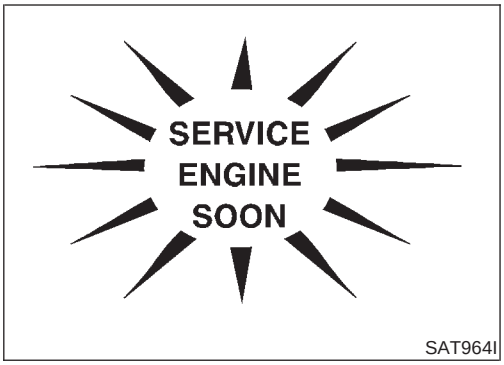
NFAT0020S04

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 "OBD-II SELF-DIAGNOSTIC PROCEDURE (No Tools)". Refer to AT-51. (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-117, "Generic Scan Tool (GST)".

HOW TO ERASE DTC (NO TOOLS)

NFAT0020S05

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 "TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)". Refer to AT-51. (The engine warm-up step can be skipped when performing the diagnosis only to erase the DTC.)



Malfunction Indicator Lamp (MIL)

=NFAT0021

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 lamp does not light up, refer to EL-136, “WARNING LAMPS”.
  [Or see EC-92, “Malfunction indicator lamp (MIL)” and EC-101, “CONSULT-II”.]

2. When the engine is started, the malfunction indicator lamp should go off.
   If the lamp remains on, the on board diagnostic system has detected an emission-related (OBD-II) malfunction. For detail, refer to EC-75, “ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION”.

CONSULT-II

NFAT0022

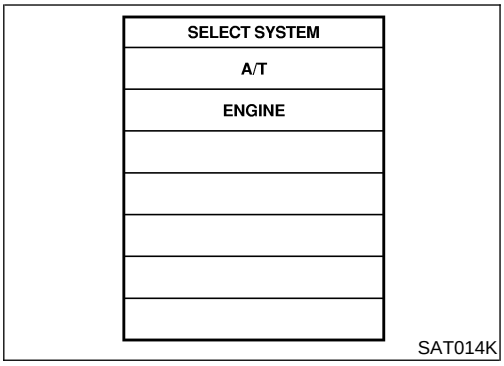
After performing “SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)” (AT-41), place check marks for results on the “Diagnostic Worksheet”, AT-59. Reference pages are provide following the items.

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.

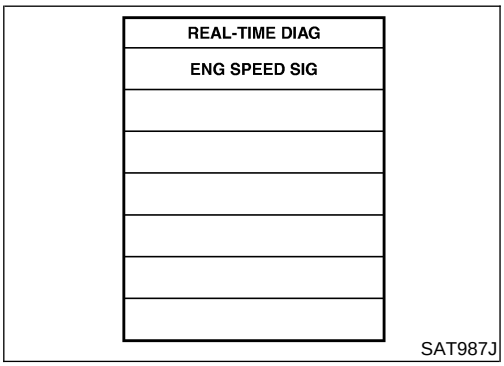
3) Shift solenoid valve “A” or “B” is displayed on CONSULT-II at the start of shifting. Gear position is displayed upon completion of shifting (which is computed by TCM).
4) Additional CONSULT-II information can be found in the Operation Manual supplied with the CONSULT-II unit.



SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)

NFAT0022S01

1. Turn on CONSULT-II and touch "ENGINE" for OBD-II 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-97. If result is NG, refer to EL-10, "POWER SUPPLY ROUTING".



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.

SELF-DIAGNOSTIC RESULT TEST MODE

NFAT0022S02

Detected items (Screen terms for CONSULT-II, "SELF DIAGNOSIS" test mode)		Malfunction is detected when ...	TCM self-diagnosis	OBD-II (DTC)
"A/T"	"ENGINE"		A/T CHECK indicator lamp or "A/T" on CONSULT-II	SERVICE ENGINE SOON malfunction indicator lamp*2, "ENGINE" on CONSULT-II or GST
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 AT			
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 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 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			

Detected items (Screen terms for CONSULT-II, "SELF DIAGNOSIS" test mode)		Malfunction is detected when ...	TCM self-diagnosis	OBD-II (DTC)
"A/T"	"ENGINE"		A/T CHECK indicator lamp: Available by A/T CHECK indicator lamp or "A/T" on CONSULT-II	SERVICE ENGINE SOON: Available by malfunction indicator lamp*2, "ENGINE" on CONSULT-II or GST
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 TCC S/V function (lock-up)		• A/T cannot perform lock-up even if electrical circuit is good.	—	P0744*1
—	A/T TCC S/V 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 sensor (throttle position 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			
Engine control		• The ECM-A/T communication line is open or shorted.	X	U1000
CAN COMM LINE	—			
Power train revolution sensor		• TCM does not receive the proper voltage signal from the sensor.	X	—
TURBINE REV	—			
TCM (RAM)		• TCM memory (RAM) is malfunctioning	—	—
CONTROL UNIT (RAM)	—			
TCM (ROM)		• TCM memory (ROM) is malfunctioning	—	—
CONTROL UNIT (ROM)	—			

Detected items (Screen terms for CONSULT-II, "SELF DIAGNOSIS" test mode)		Malfunction is detected when ...	TCM self-diagnosis	OBD-II (DTC)
"A/T"	"ENGINE"		Available by A/T CHECK indicator lamp or "A/T" on CONSULT-II	Available by malfunction indicator lamp*2, "ENGINE" on CONSULT-II or GST
TCM (EEP ROM)		• TCM memory (EEP ROM) is malfunctioning.	—	—
CONT UNIT (EEP ROM)	—			
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	—			
No failure (NO SELF DIAGNOSTIC FAILURE INDICATED FURTHER TESTING MAY BE REQUIRED**)		• No failure has been detected.	X	X

X: Applicable

−: Not applicable

*1: These malfunctions cannot be displayed by MIL if another malfunction is assigned to MIL.

*2: Refer to EC-92, "Malfunction Indicator Lamp (MIL)".

DATA MONITOR MODE (A/T)

NFAT0022S03

Item	Display	Monitor item				Description	Remarks
		TCM Input signals	CAN COMM signals	Main signals	Selection from menu		
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 kickdown SW, is displayed.	• This is displayed even when no kickdown switch is equipped.
Closed throttle position switch	CLOSED THL/SW [ON/OFF]	X	—	—	▼	• ON/OFF status, computed from signal of closed throttle position SW, is displayed.	• This is displayed even when no closed throttle position switch is equipped.
When open throttle position switch	W/O THRL/ P-SW [ON/OFF]	X	—	—	▼	• ON/OFF status, computed from signal of wide open throttle position SW, is displayed.	• This is displayed even when no wide open throttle position switch is equipped.
Stop lamp switch	BRAKE SW [ON/OFF]	X		—	▼	• ON/OFF status is displayed. ON ... Brake pedal is depressed. OFF ... Brake pedal is released.	

CONSULT-II (Cont'd)

Item	Display	Monitor item				Description	Remarks
		TCM Input signals	CAN COMM signals	Main signals	Selection from menu		
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.	
Throttle position (accelerator pedal position sensor)	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.
Gear position	GEAR	—	—	X	▼	• Gear position data used for computation by TCM, is displayed.	
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.	
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).

CONSULT-II (Cont'd)

Item	Display	Monitor item				Description	Remarks
		TCM Input signals	CAN COMM signals	Main signals	Selection from menu		
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.
Accelerator pedal position sensor (throttle position sensor)	THRTL POS SEN [V]	X	—	—	▼	• Accelerator pedal position sensor (throttle position sensor) signal voltage is displayed.	
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	X	—	—	▼	• This sensor checks the changing speed then perform the oil pressure control and the torque down control.	
3rd position switch	OVERDRIVE SW [ON/OFF]	X	—	—	▼	• ON/OFF state computed from signal of 3rd position 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.	

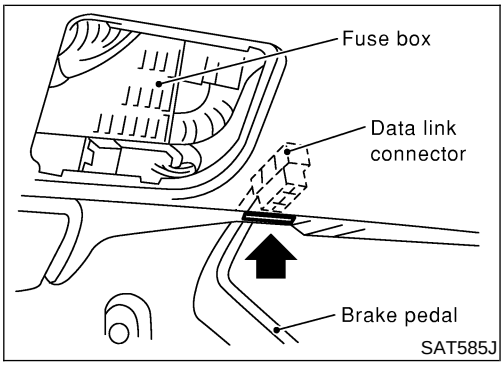
CONSULT-II (Cont'd)

Item	Display	Monitor item				Description	Remarks
		TCM Input signals	CAN COMM signals	Main signals	Selection from menu		
2nd position switch	2 POSITION SW [ON/OFF]	X	—	—	▼	• ON/OFF status, computed from signal of 2nd position SW, is displayed.	
1st position switch	1 POSITION SW [ON/OFF]	X	—	—	▼	• ON/OFF status, computed from signal of 1st position SW, is displayed.	
ASCD cruise signal	ASCD·CRUISE [ON/OFF]	X	—	—	▼	• Status of ASCD cruise signal is displayed. ON ... Cruising state OFF ... Normal running state	
Overrun clutch solenoid valve	OVERRUN/CS/V [ON/OFF]	—	—	X	▼	• Control value of overrun clutch solenoid valve computed by TCM from each input signal is displayed.	
Self-diagnosis display lamp (A/T CHECK indicator lamp)	SELF-D DP LMP [ON/OFF]	—	—	X	▼	• Control status of A/T CHECK indicator lamp is 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 0 rpm even if engine is stopped. But this isn't malfunction.
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		—	—	—	▼		

CONSULT-II (Cont'd)

Item	Display	Monitor item				Description	Remarks
		TCM Input signals	CAN COMM signals	Main signals	Selection from menu		
CAN communication	CAN COMM [OK/UNKWN]	—	X	—	▼		
CAN circuit 1	CAN CIRC 1 [OK/UNKWN]	—	X	—	▼		
CAN circuit 2	CAN CIRC 2 [OK/UNKWN]	—	X	—	▼		
CAN circuit 3	CAN CIRC 3 [OK/UNKWN]	—	X	—	▼		
CAN circuit 4	CAN CIRC 4 [OK/UNKWN]	—	X	—	▼		
CAN circuit 5	CAN CIRC 5 [OK/UNKWN]	—	X	—	▼		

X: Applicable —: Not applicable ▼: Option



SAT585J

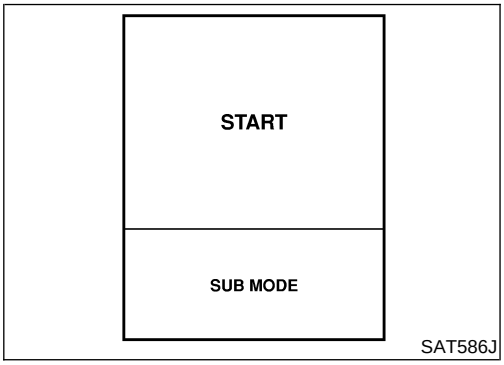
DTC WORK SUPPORT MODE WITH CONSULT-II

NFAT0022S04

CONSULT-II Setting Procedure

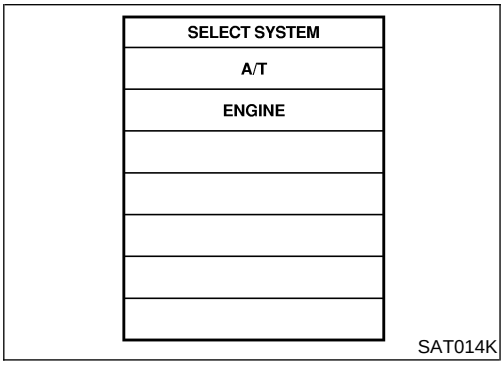
NFAT0022S0401

1. Turn ignition switch OFF.
2. Connect CONSULT-II to Data link connector, which is located in left side dash panel.



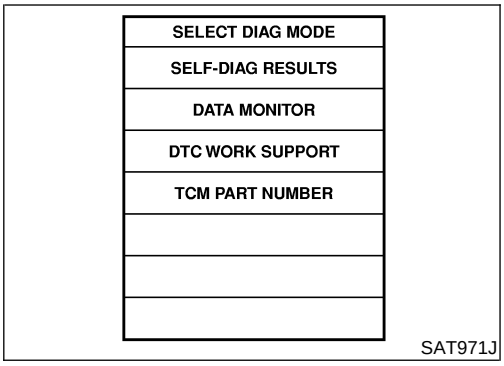
SAT586J

3. Turn ignition switch ON.
4. Touch "START".

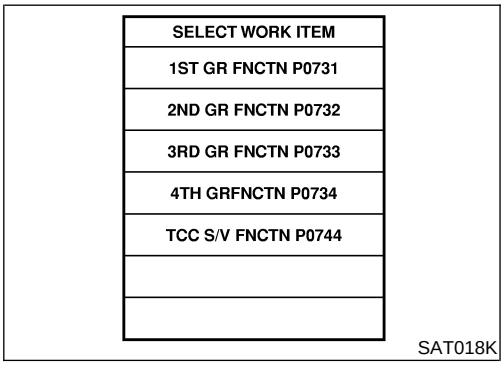


SAT014K

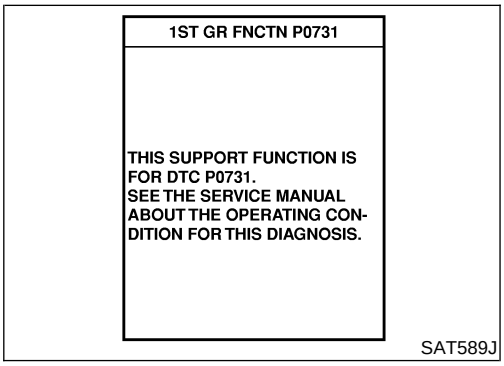
5. Touch "A/T".



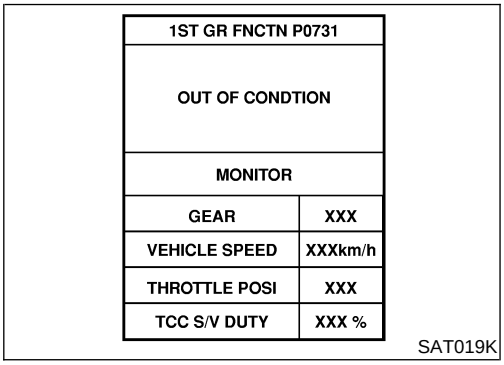
6. Touch "DTC WORK SUPPORT".



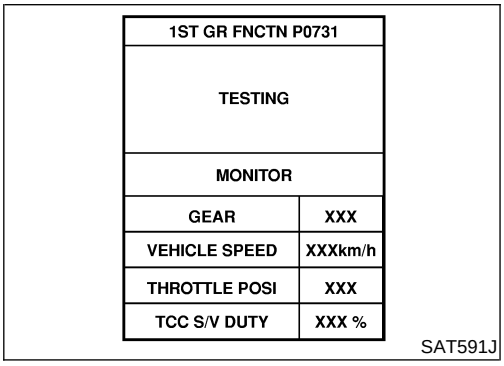
7. Touch select item menu (1ST, 2ND, etc.).



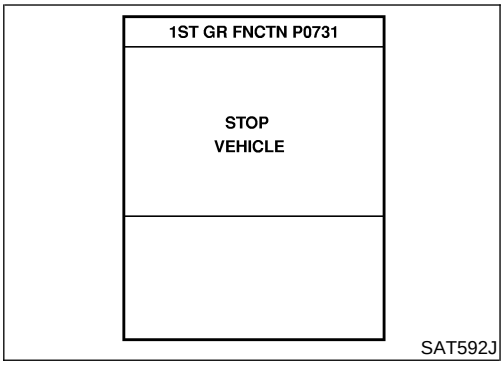
8. Touch "START".



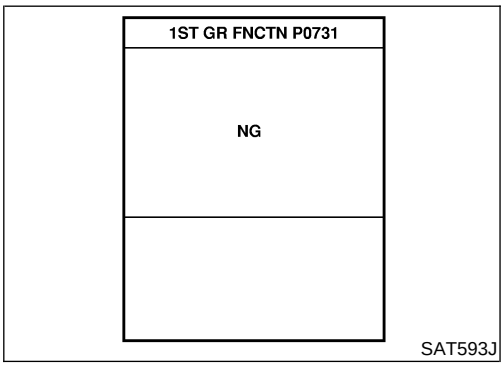
9. Perform driving test according to "DTC CONFIRMATION PROCEDURE" in "TROUBLE DIAGNOSIS FOR DTC".

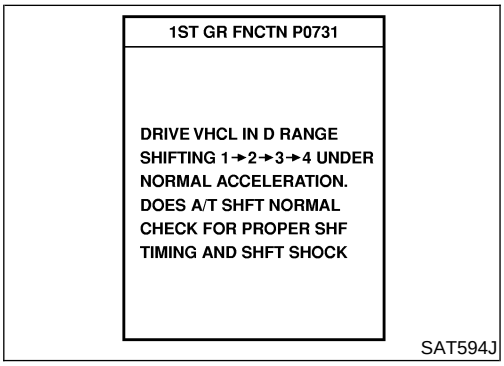


- **When testing conditions are satisfied, CONSULT-II screen changes from "OUT OF CONDITION" to "TESTING".**

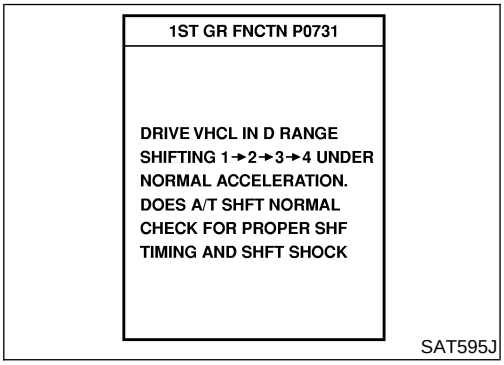


10. Stop vehicle. If "NG" appears on the screen, malfunction may exist. Go to "DIAGNOSTIC PROCEDURE".

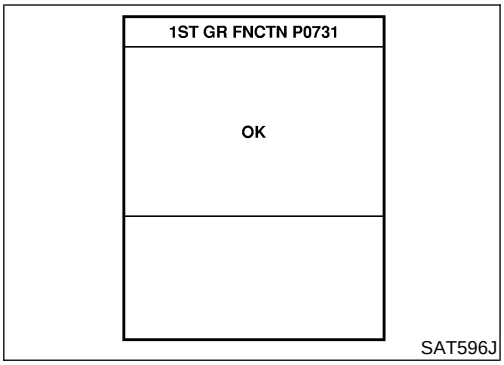




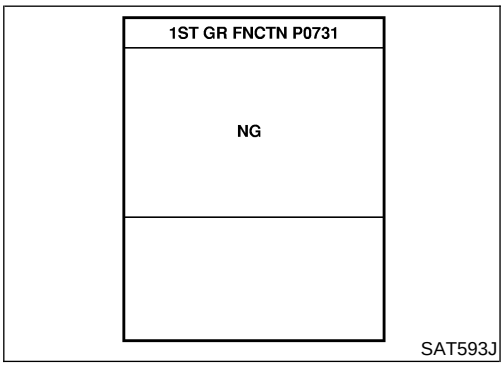
11. Perform test drive to check gear shift feeling in accordance with instructions displayed.



12. Touch "YES" or "NO".



SAT596J



SAT593J

13. CONSULT-II procedure ended.
    If "NG" appears on the screen, a malfunction may exist. Go to "DIAGNOSTIC PROCEDURE".

DTC WORK SUPPORT MODE

NFAT0022S05

DTC work support item	Description	Check item
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 ● Overrun clutch solenoid valve ● Line pressure solenoid valve ● Each clutch ● Hydraulic control circuit
TCC S/V FNCTN P0744	Following items for "A/T TCC S/V function (lock-up) (P0744)" can be confirmed. ● Self-diagnosis status (whether the diagnosis is being conducted or not) ● Self-diagnosis result (OK or NG)	● Torque converter clutch solenoid valve ● Each clutch ● Hydraulic control circuit

Diagnostic Procedure Without CONSULT-II

=NFAT0023

OBD-II SELF-DIAGNOSTIC PROCEDURE (WITH GST)

NFAT0023S01

Refer to EC-117, “Generic Scan Tool (GST)”.

OBD-II SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)

NFAT0023S02

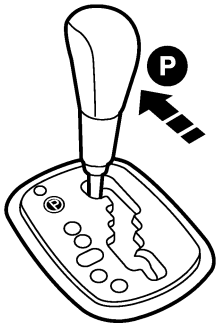
Refer to EC-92, “Malfunction Indicator Lamp (MIL)”.

TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)

NFAT0023S03

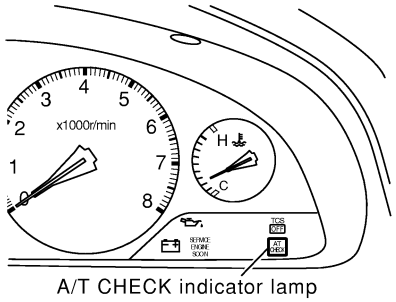
1	CHECK A/T CHECK INDICATOR LAMP

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



SAT491K

5. Does A/T CHECK indicator lamp come on for about 2 seconds?



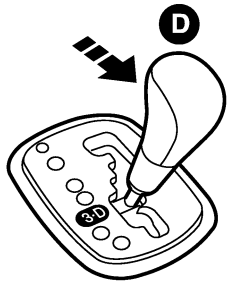
SAT492K

Yes or No

Yes	▶	GO TO 2.
No	▶	Stop procedure. Perform “1. A/T CHECK Indicator Lamp Does Not Come On”, AT-223 before proceeding.

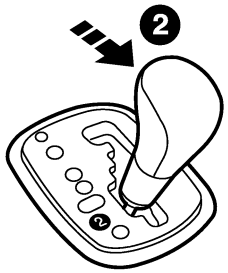
2	JUDGEMENT PROCEDURE STEP 1

1. Turn ignition switch to OFF position.
2. Turn ignition switch to ACC position.
3. Depress and hold accelerator pedal fully. Depress brake pedal, then move selector lever from P to D position.
4. Turn ignition switch to ON position.
   (Do not start engine.)



SAT493K

5. Wait 3 seconds.
6. Move selector lever to 2nd position.
7. Release brake pedal.

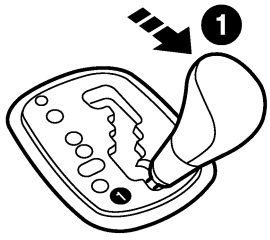


SAT494K

▶	GO TO 3.

3	JUDGEMENT PROCEDURE STEP 2

1. Move selector lever to 1st position.
2. Depress brake pedal.
3. Depress accelerator pedal fully and release it.
4. The A/T CHECK indicator lamp will begin to flash ON and OFF.

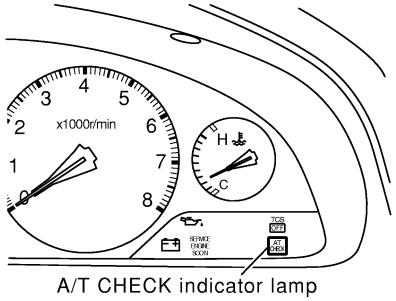


SAT495K

▶	GO TO 4.

4	CHECK SELF-DIAGNOSTIC CODE

Check A/T CHECK indicator lamp.
Refer to JUDGEMENT OF SELF-DIAGNOSIS CODE, AT-54.



SAT492K

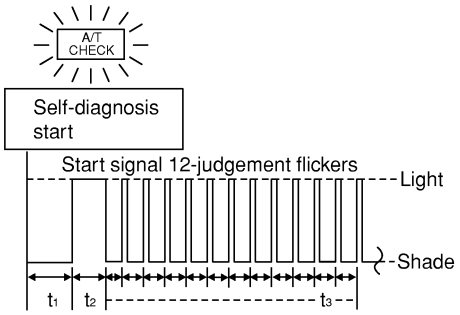
▶	DIAGNOSIS END

JUDGEMENT OF SELF-DIAGNOSIS CODE

=NFAT0023S04

A/T CHECK indicator lamp:

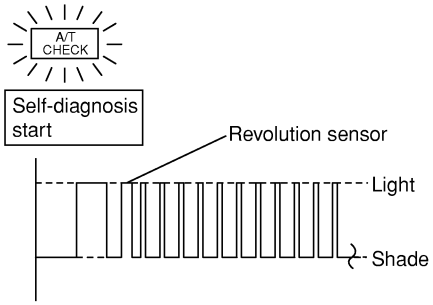
All judgement flickers are the same.



SAT518K

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

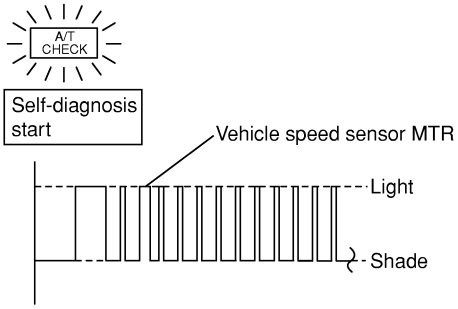
1st judgement flicker is longer than others.



SAT543K

Revolution sensor circuit is short-circuited or disconnected.
⇒ **Go to VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR), AT-116.**

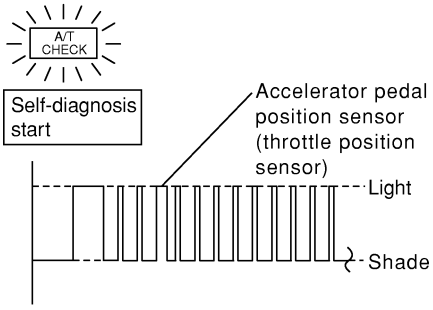
2nd judgement flicker is longer than others.



SAT544K

Vehicle speed sensor circuit is short-circuited or disconnected.
⇒ **Go to VEHICLE SPEED SENSOR·MTR, AT-203.**

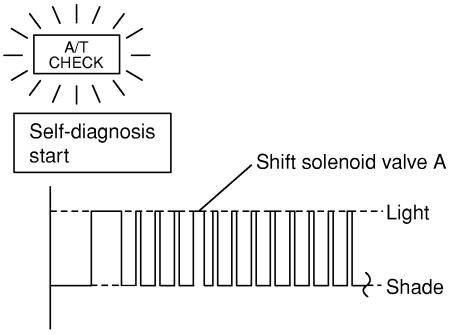
3rd judgement flicker is longer than others.



SAT545KB

Accelerator pedal position sensor (throttle position sensor) circuit is short-circuited or disconnected.
⇒ **GO TO ACCELERATOR PEDAL POSITION SENSOR (THROTTLE POSITION SENSOR), AT-184.**

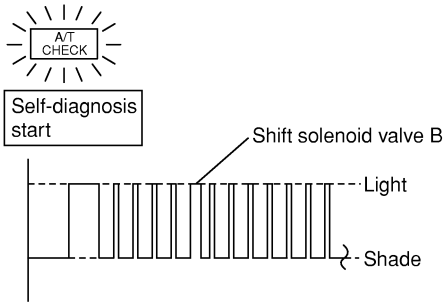
4th judgement flicker is longer than others.



SAT546K

Shift solenoid valve A circuit is short-circuited or disconnected.
⇒ **Go to SHIFT SOLENOID VALVE A, AT-174.**

5th judgement flicker is longer than others.

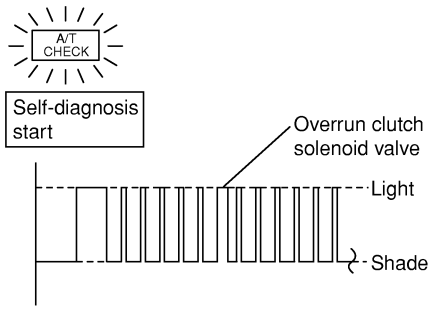


SAT547K

Shift solenoid valve B circuit is short-circuited or disconnected.
⇒ **Go to SHIFT SOLENOID VALVE B, AT-179.**

A/T CHECK indicator lamp:

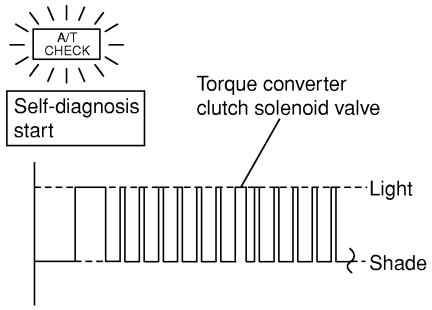
6th judgement flicker is longer than others.



SAT548K

Overrun clutch solenoid valve circuit is short-circuited or disconnected.
⇒ **Go to OVERRUN CLUTCH SOLENOID VALVE, AT-191.**

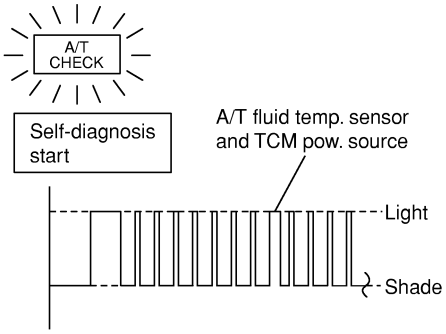
7th judgement flicker is longer than others.



SAT549K

Torque converter clutch solenoid valve circuit is short-circuited or disconnected.
⇒ **Go to TORQUE CONVERTER CLUTCH SOLENOID VALVE, AT-153.**

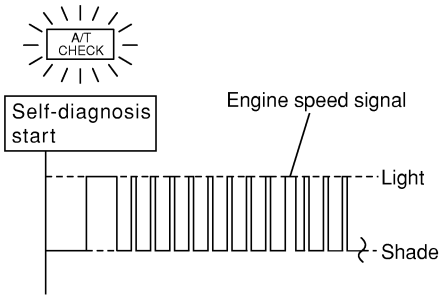
8th judgement flicker is longer than others.



SAT550K

A/T fluid temperature sensor is disconnected or TCM power source circuit is damaged.
⇒ **Go to A/T FLUID TEMPERATURE SENSOR AND TCM POWER SOURCE, AT-196.**

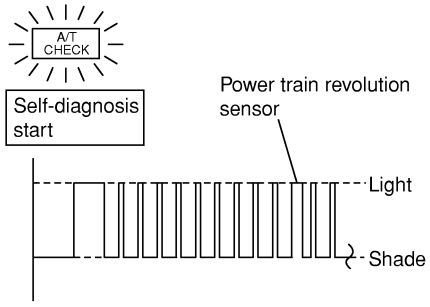
9th judgement flicker is longer than others.



SAT551K

Engine speed signal circuit is short-circuited or disconnected.
⇒ **Go to ENGINE SPEED SIGNAL, AT-121.**

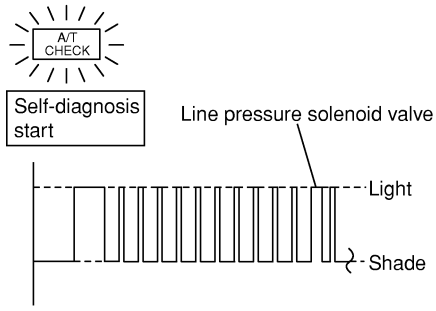
10th judgement flicker is longer than others.



SAT552K

Power train revolution circuit is short-circuited or disconnected.
⇒ **Go to POWER TRAIN REVOLUTION SENSOR, AT-212.**

11th judgement flicker is longer than others.

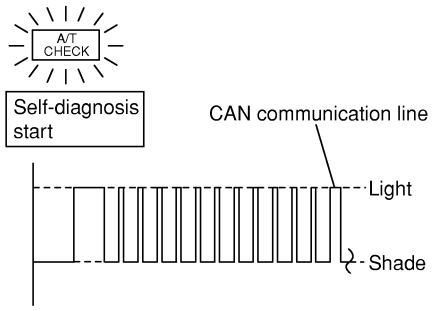


SAT553K

Line pressure solenoid valve circuit is short-circuited or disconnected.
⇒ **Go to LINE PRESSURE SOLENOID VALVE, AT-168.**

A/T CHECK indicator lamp:

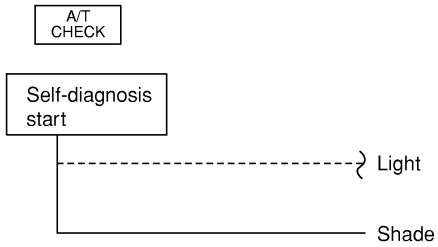
12th judgement flicker is longer than others.



SAT554K

The ECM-A/T communication line is open or shorted.
⇒ **Go to CAN COMMUNICATION LINE, AT-208.**

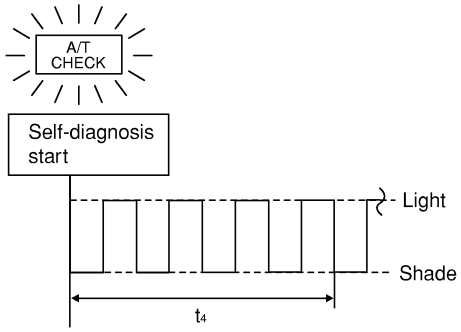
Lamp comes off.



SAT555K

Park/neutral position (PNP) switch, 3rd position switch or accelerator pedal position sensor (throttle position sensor) circuit is disconnected or TCM is damaged.
⇒ **Go to 21. TCM Self-diagnosis Does Not Activate [Park/neutral position (PNP) & 3rd position switches, and accelerator pedal position sensor (Throttle Position Sensor) Circuit Checks], AT-264.**

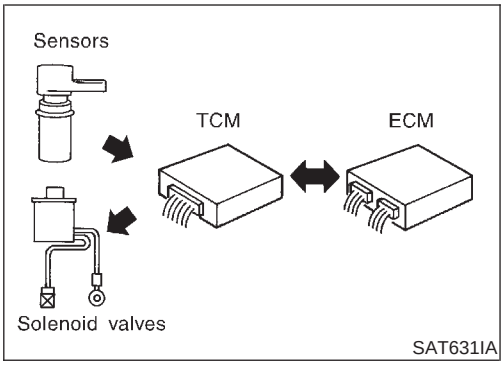
Flickers as shown below.



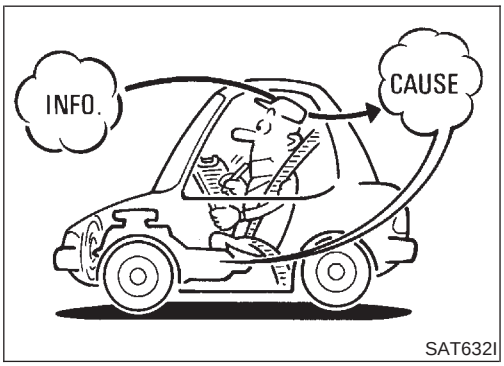
SAT556K

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.)

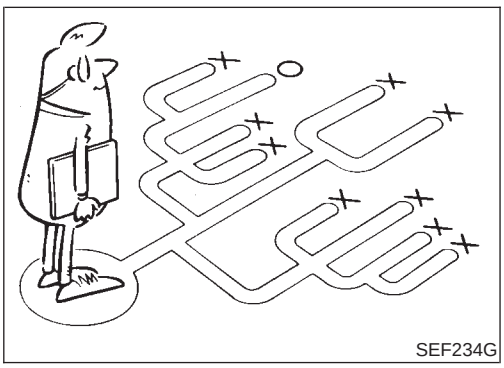
t_1 = 2.5 seconds t_2 = 2.0 seconds t_3 = 1.0 second t_4 = 1.0 second



SAT631IA



SAT632I


SEF234G

Introduction

NFAT0024

The TCM receives a signal from the vehicle speed sensor, electric throttle control actuator (throttle position sensor) or park/neutral position (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 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-61.

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 problems, especially intermittent ones. Find out what symptoms are present and under what conditions they occur. A “DIAGNOSITC WORKSHEET” like the example (AT-58) should be used.

Start your diagnosis by looking for “conventional” problems first. This will help troubleshoot driveability problems on an electronically controlled engine vehicle.

Also check related Service bulletins for information.

DIAGNOSTIC WORKSHEET

=NFAT0024S01

Information from Customer

NFAT0024S0101

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 kickdown	
	☐ No pattern select	
	☐ Others ( )	
A/T CHECK indicator lamp	Blinks for about 8 seconds.	
	☐ Continuously lit	☐ Not lit
Malfunction indicator lamp (MIL)	☐ Continuously lit	☐ Not lit

Diagnostic Worksheet

=NFAT0024S0102

1.	☐ Read the Fail-safe and listen to customer complaints.			AT-9
2.	☐ CHECK A/T FLUID			AT-63
		☐ Leakage (Follow specified procedure) ☐ Fluid condition ☐ Fluid level		
3.	☐ Perform STALL TEST and LINE PRESSURE TEST.			AT-63, 67
		☐ 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-68
	4-1.	Check before engine is started.		AT-69
		☐ SELF-DIAGNOSTIC PROCEDURE - Mark detected items.		
		☐ Park/neutral position (PNP) switch, AT-104. ☐ A/T fluid temperature sensor, AT-110. ☐ Vehicle speed sensor·A/T (Revolution sensor), AT-116. ☐ Engine speed signal, AT-121. ☐ Power train revolution sensor, AT-212. ☐ Torque converter clutch solenoid valve, AT-153. ☐ Line pressure solenoid valve, AT-168. ☐ Shift solenoid valve A, AT-174. ☐ Shift solenoid valve B, AT-179. ☐ Accelerator pedal position sensor (throttle position sensor), AT-184. ☐ Overrun clutch solenoid valve, AT-191. ☐ Park/neutral position (PNP) & 3rd position switches, and accelerator pedal position sensor (throttle position sensor), AT-264. ☐ A/T fluid temperature sensor and TCM power source, AT-196. ☐ Vehicle speed sensor·MTR, AT-203. ☐ CAN communication line, AT-208. ☐ Control unit (RAM), Control unit (ROM), AT-217. ☐ Control unit (EEP ROM), AT-219. ☐ Battery ☐ Others		
	4-2.	Check at idle		AT-70
		☐ 1. A/T CHECK Indicator Lamp Does Not Come On, AT-223. ☐ 2. Engine Cannot Be Started In P and N Positions, AT-226. ☐ 3. In P Position, Vehicle Moves Forward or Backward When Pushed, AT-227. ☐ 4. In N Position, Vehicle Moves, AT-228. ☐ 5. Large Shock. N → R Position, AT-231. ☐ 6. Vehicle Does Not Creep Backward In R Position, AT-233. ☐ 7. Vehicle Does Not Creep Forward In D, 2nd or 1st Position, AT-237.		

4.	4-3.	Cruise test	AT-73 AT-76
		Part-1	
		☐ 8. Vehicle Cannot Be Started From D_1, AT-240. ☐ 9. A/T Does Not Shift: $D_1 \rightarrow D_2$ or Does Not Kickdown: $D_4 \rightarrow D_2$, AT-243. ☐ 10. A/T Does Not Shift: $D_2 \rightarrow D_3$, AT-246. ☐ 11. A/T Does Not Shift: $D_3 \rightarrow D_4$, AT-249. ☐ 12. A/T Does Not Perform Lock-up, AT-252. ☐ 13. A/T Does Not Hold Lock-up Condition, AT-254. ☐ 14. Lock-up Is Not Released, AT-256. ☐ 15. Engine Speed Does Not Return To Idle (Light Braking $D_4 \rightarrow D_3$), AT-257.	
		Part-2	AT-80
		☐ 16. Vehicle Does Not Start From D_1, AT-260. ☐ 9. A/T Does Not Shift: $D_1 \rightarrow D_2$ or Does Not Kickdown: $D_4 \rightarrow D_2$, AT-243. ☐ 10. A/T Does Not Shift: $D_2 \rightarrow D_3$, AT-246. ☐ 11. A/T Does Not Shift: $D_3 \rightarrow D_4$, AT-249.	
		Part-3	AT-82
		☐ 17. A/T Does Not Shift: $D_4 \rightarrow D_3$ When selector lever is set in D → 3rd Position, AT-261. ☐ 15. Engine Speed Does Not Return To Idle (Engine Brake In D_3), AT-257. ☐ 18. A/T Does Not Shift: $D_3 \rightarrow 2_2$, When Selector Lever D → 2nd Position, AT-262. ☐ 15. Engine Speed Does Not Return To Idle (Engine Brake In 2_2), AT-257. ☐ 19. A/T Does Not Shift: $2_2 \rightarrow 1_1$, When Selector Lever 2nd → 1st Position, AT-263. ☐ 20. Vehicle Does Not Decelerate By Engine Brake, AT-264. ☐ SELF-DIAGNOSTIC PROCEDURE — Mark detected items.	
		☐ Park/neutral position (PNP) switch, AT-104. ☐ A/T fluid temperature sensor, AT-110. ☐ Vehicle speed sensor·A/T (Revolution sensor), AT-116. ☐ Engine speed signal, AT-121. ☐ Power train revolution sensor, AT-212. ☐ Torque converter clutch solenoid valve, AT-153. ☐ Line pressure solenoid valve, AT-168. ☐ Shift solenoid valve A, AT-174. ☐ Shift solenoid valve B, AT-179. ☐ Accelerator pedal position sensor (throttle position sensor), AT-184. ☐ Overrun clutch solenoid valve, AT-191. ☐ Park/neutral position (PNP) & 3rd position switches, and accelerator pedal position sensor (throttle position sensor), AT-264. ☐ A/T fluid temperature sensor and TCM power source, AT-196. ☐ Vehicle speed sensor·MTR, AT-203. ☐ CAN communication line, AT-208. ☐ Control unit (RAM), Control unit (ROM), AT-217. ☐ Control unit (EEP ROM), AT-219. ☐ Battery ☐ Others	
5.	☐ For self-diagnosis NG items, inspect each component. Repair or replace the damaged parts.		AT-41
6.	☐ Perform all ROAD TEST and re-mark required procedures.		AT-68
7.	☐ Perform DTC CONFIRMATION PROCEDURE for following MIL indicating items and check out NG items. Refer to EC-76, "Emission-related Diagnostic Information".		EC-76
	☐ DTC (P0731) A/T 1st gear function, AT-126. ☐ DTC (P0732) A/T 2nd gear function, AT-132. ☐ DTC (P0733) A/T 3rd gear function, AT-138. ☐ DTC (P0734) A/T 4th gear function, AT-144. ☐ DTC (P0744) A/T TCC S/V function (lock-up), AT-158.		
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-86 AT-97
9.	☐ Erase DTC from TCM and ECM memories.		AT-38

Work Flow

NFAT0025

HOW TO PERFORM TROUBLE DIAGNOSES FOR QUICK AND ACCURATE REPAIR

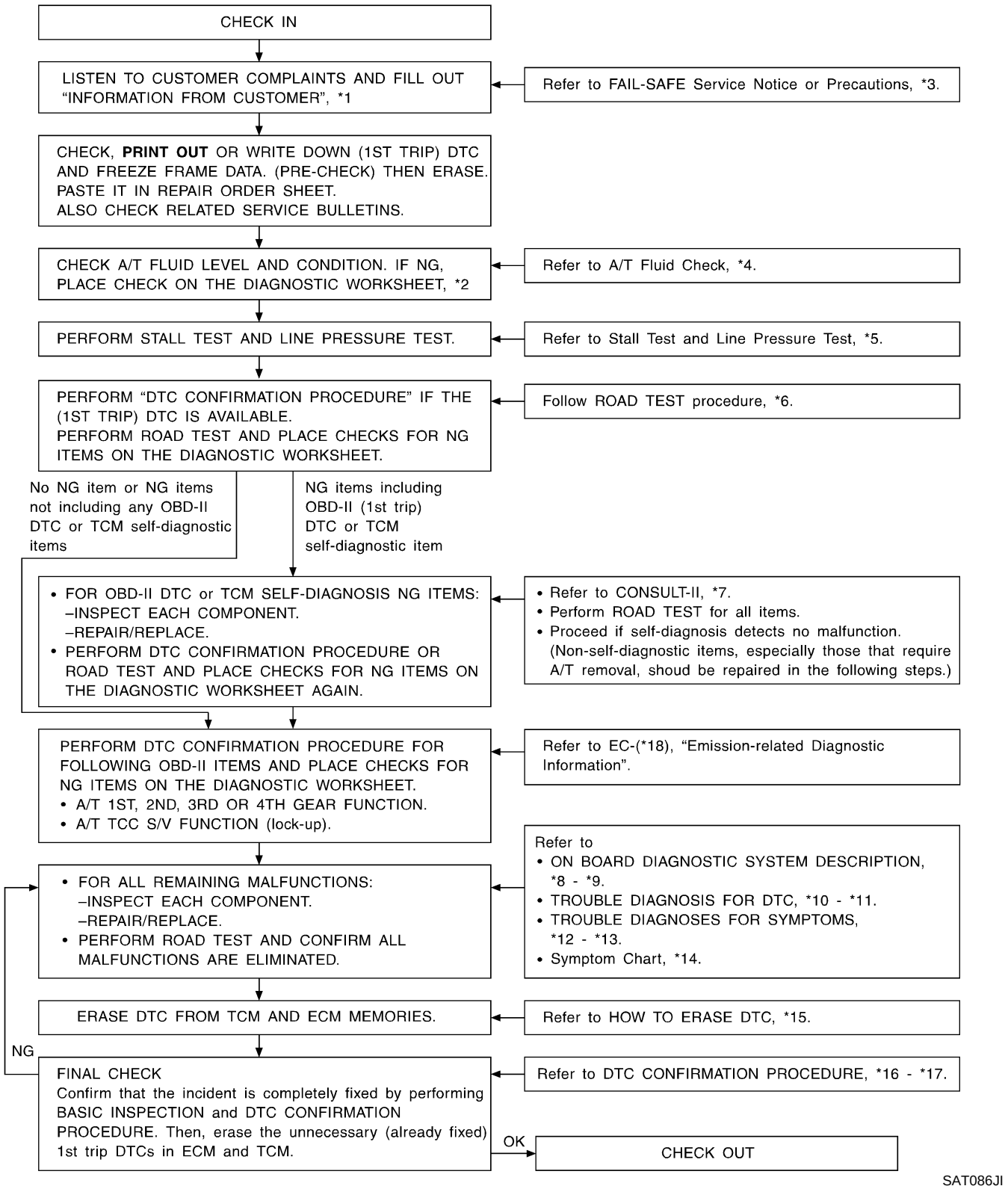
NFAT0025S01

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-58) and “Diagnostic Worksheet” (AT-59), to perform the best troubleshooting possible.

Work Flow (Cont'd)

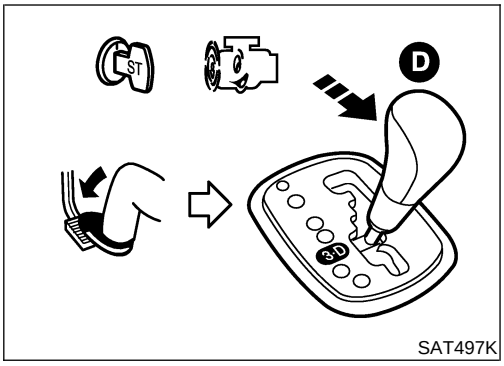
WORK FLOW CHART

=NFAT0025S02



SAT086JI

*1: AT-58
*2: AT-59
*3: AT-9
*4: AT-63
*5: AT-63, 63
*6: AT-68
*7: AT-40
*8: AT-36
*9: AT-54
*10: AT-105
*11: AT-219
*12: AT-221
*13: AT-264
*14: AT-86
*15: AT-38
*16: AT-105
*17: AT-219
*18: EC-76



SAT497K

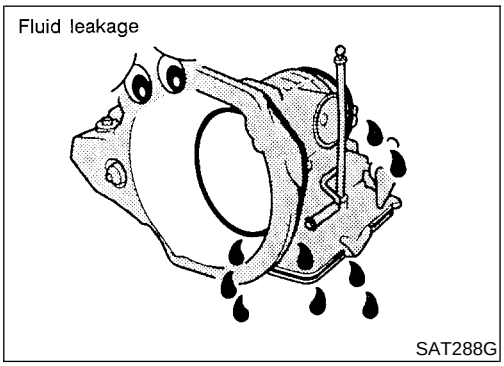
A/T Fluid Check

NFAT0026

FLUID LEAKAGE CHECK

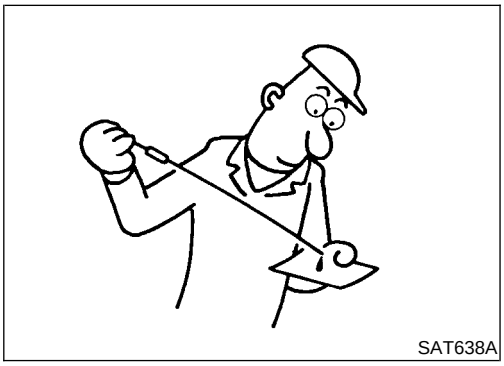
NFAT0026S01

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.



SAT288G

4. Check for fresh leakage.


SAT638A

FLUID CONDITION CHECK

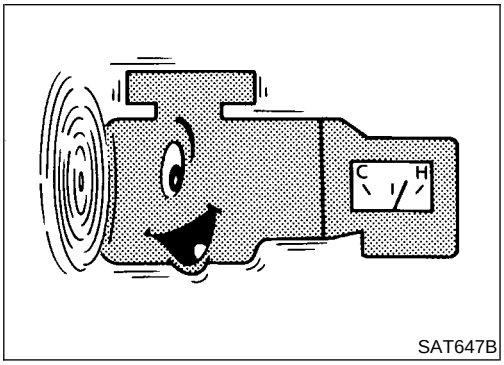
NFAT0026S02

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

NFAT0026S03

Refer to MA-21, “Checking A/T Fluid”.



SAT647B

Stall Test

NFAT0027

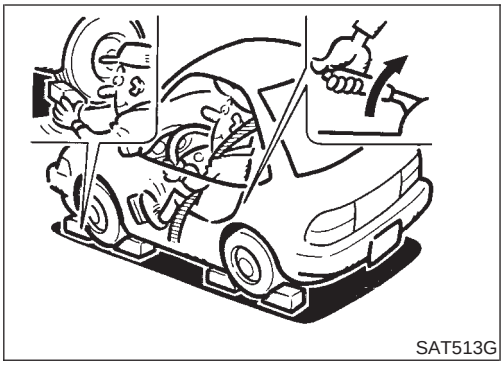
STALL TEST PROCEDURE

NFAT0027S01

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

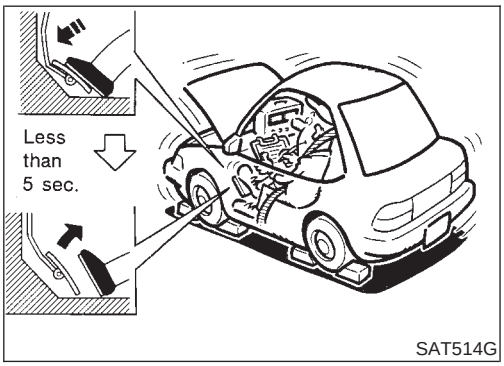
ATF operating temperature:
50 - 80°C (122 - 176°F)

Stall Test (Cont'd)


SAT513G

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.**

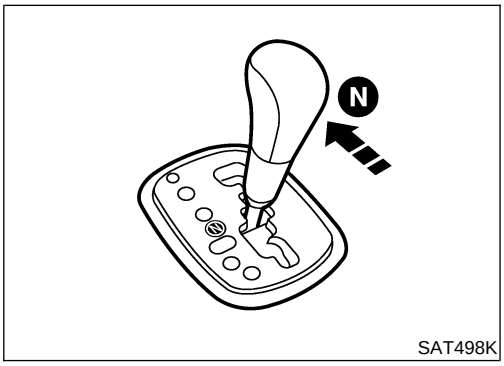


SAT514G

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.**

Stall revolution:
2,550 - 3,050 rpm



SAT498K

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 2nd , 1st and R positions.

JUDGEMENT OF STALL TEST

NFAT0027S02

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 CHART" shown in AT-62.

NOTE:
Stall revolution is too high in D, 2nd or 1st 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 2nd 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 1st position. ..... Low & reverse brake slippage
- Engine brake functions in 1st 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 2nd position, and 1st gear in 1st position.

Stall revolution less than specifications:

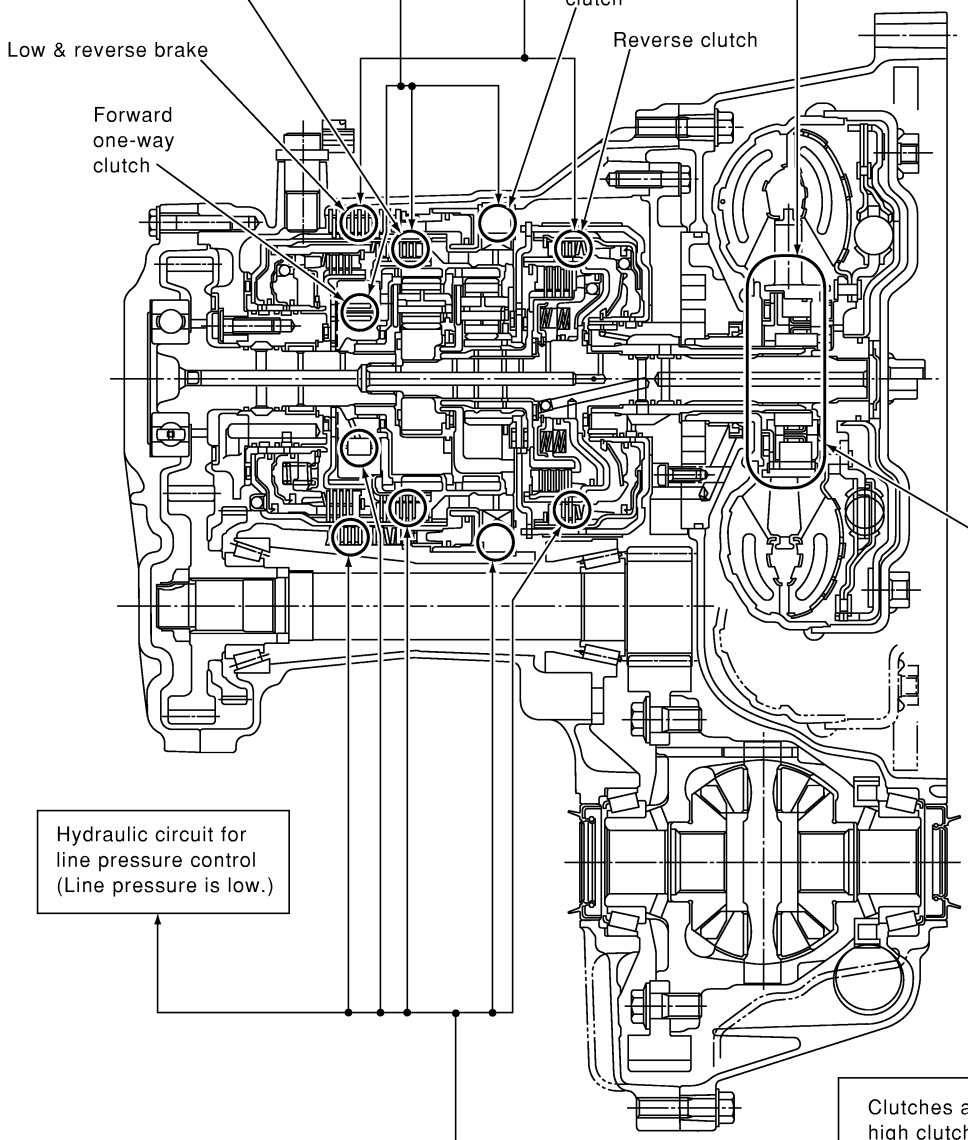
- Poor acceleration during starts. ..... One-way clutch seizure in torque converter

Stall Test (Cont'd)

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.

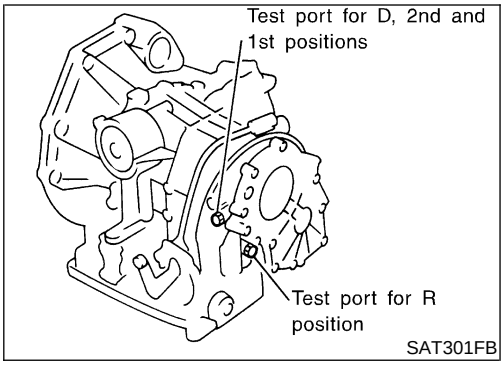
Damaged components



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

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

SAT499K



SAT301FB

Line Pressure Test

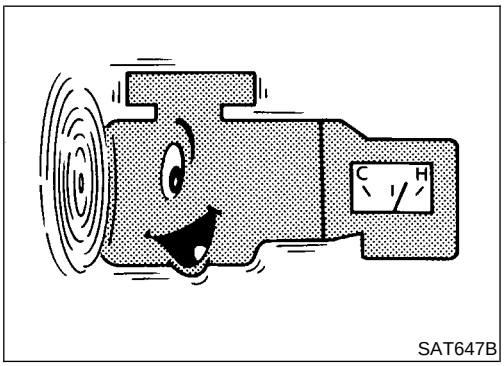
NFAT0028

LINE PRESSURE TEST PORTS

NFAT0028S01

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

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



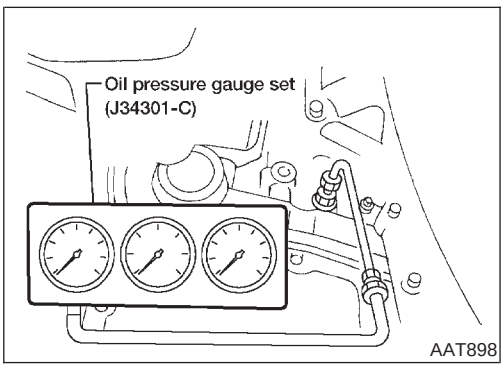
SAT647B

LINE PRESSURE TEST PROCEDURE

NFAT0028S02

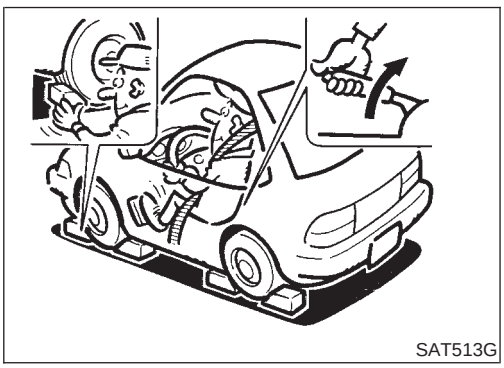
1. Check A/T fluid and engine oil levels. If necessary, add fluid and oil.
2. Drive vehicle for approx. 10 minutes or until fluid and oil reach operating temperature.

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

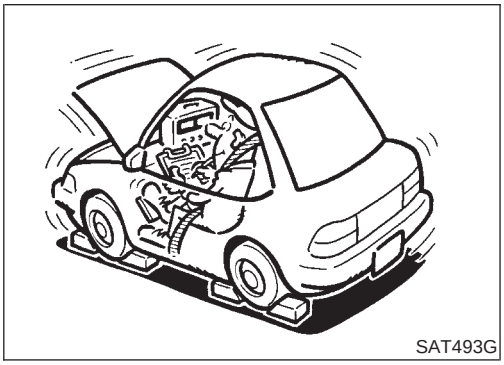


AAT898

3. Install pressure gauge to corresponding line pressure port.


SAT513G

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


SAT493G

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

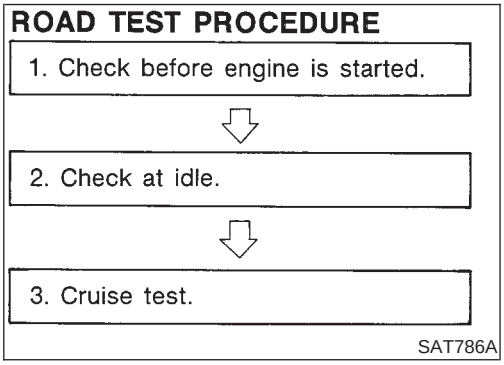
  Line pressure: Refer to SDS, AT-377.

Line Pressure Test (Cont'd)

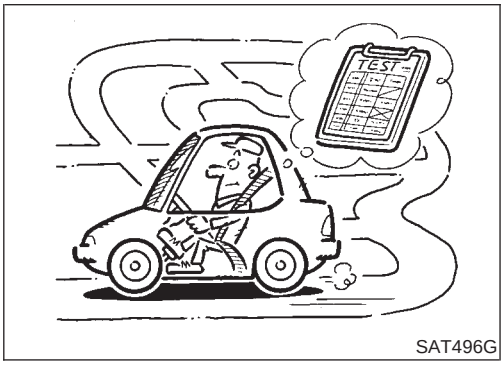
JUDGEMENT OF LINE PRESSURE TEST

NFAT0028S03

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 1st positions, but − Normal in D and 2nd positions. Therefore, fluid leakage exists at or around low and reverse brake circuit. Refer to "CLUTCH AND BAND CHART", AT-20.
	Line pressure is high.	• Maladjustment of accelerator pedal position sensor (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 accelerator pedal position sensor (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



SAT786A



SAT496G

Road Test

NFAT0029

DESCRIPTION

NFAT0029S01

- 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
3. Cruise test

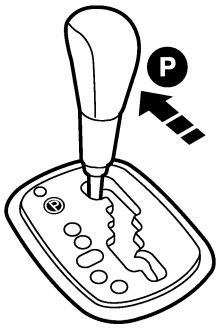
- Before road test, familiarize yourself with all test procedures and items to check.
- Conduct tests on all items until specified symptom is found. Troubleshoot items which check out No Good after road test. Refer to "ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION" and "TROUBLE DIAGNOSES FOR SYMPTOMS", AT-36 to AT-54 and AT-221 to AT-264.

1. CHECK BEFORE ENGINE IS STARTED

=NFAT0029S02

1	CHECK A/T CHECK INDICATOR LAMP

1. Park vehicle on flat surface.
2. Move selector lever to P position.



SAT491K

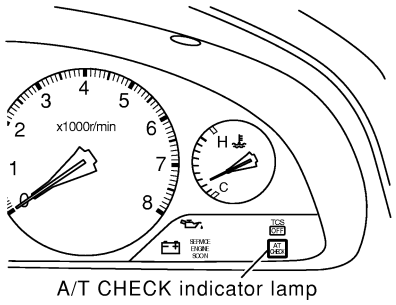
3. Turn ignition switch to OFF position. Wait at least 5 seconds.
4. Turn ignition switch to ON position. (Do not start engine.)
5. Does A/T CHECK indicator lamp come on for about 2 seconds?

Yes or No

Yes	▶	GO TO 2.
No	▶	Stop ROAD TEST. Go to "1. A/T CHECK Indicator Lamp Does Not Come On", AT-223.

2	CHECK A/T CHECK INDICATOR LAMP

Does A/T CHECK indicator lamp flicker for about 8 seconds?



SAT492K

Yes or No

Yes	▶	Perform self-diagnosis and check NG items on the DIAGNOSTIC WORKSHEET, AT-58. Refer to TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS), AT-51.
No	▶	1. Turn ignition switch to OFF position. 2. Perform self-diagnosis and note NG items. Refer to TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS), AT-51. 3. Go to "2. CHECK AT IDLE", AT-70.

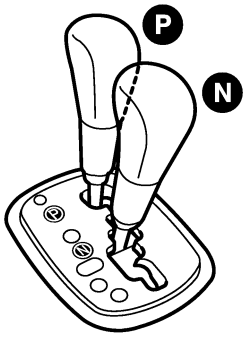
Road Test (Cont'd)

2. CHECK AT IDLE

NFAT0029S03

1	CHECK ENGINE START

1. Park vehicle on flat surface.
2. Move selector lever to P position.



SAT502K

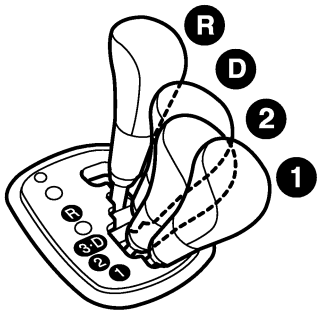
3. Turn ignition switch to OFF position.
4. Turn ignition switch to START position.
5. Is engine started?

Yes or No

Yes	▶	GO TO 2.
No	▶	Mark the box on the DIAGNOSTIC WORKSHEET. Go to "2. Engine Cannot Be Started In P and N Position", AT-226. Continue ROAD TEST.

2	CHECK ENGINE START

1. Turn ignition switch to ACC position.
2. Move selector lever to D, 1st, 2nd or R position.



SAT503K

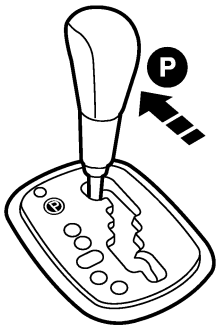
3. Turn ignition switch to START position.
4. Is engine started?

Yes or No

Yes	▶	Mark the box on the DIAGNOSTIC WORKSHEET. Mark the box on the DIAGNOSTIC WORKSHEET. Go to "2. Engine Cannot Be Started In P and N Position", AT-226. Continue ROAD TEST.
No	▶	GO TO 3.

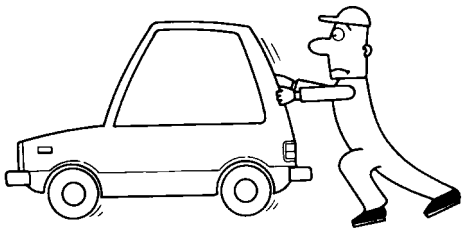
3	CHECK VEHICLE MOVE

1. Move selector lever to P position.



SAT491K

2. Turn ignition switch to OFF position.
3. Release parking brake.
4. Push vehicle forward or backward.



SAT796A

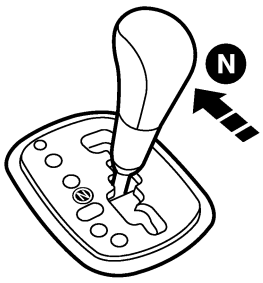
5. Does vehicle move when it is pushed forward or backward?
6. Apply parking brake.

Yes or No

Yes	▶	Mark the box on the DIAGNOSTIC WORKSHEET. Go to "3. In P Position, Vehicle Moves Forward Or Backward When Pushed", AT-227. Continue ROAD TEST.
No	▶	GO TO 4.

4	CHECK VEHICLE MOVE

1. Start engine.
2. Move selector lever to N position.



SAT498K

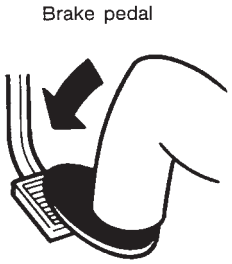
3. Release parking brake.
4. Does vehicle move forward or backward?

Yes or No

Yes	▶	Mark the box on the DIAGNOSTIC WORKSHEET. Go to "4. In N Position, Vehicle Moves", AT-228. Continue ROAD TEST.
No	▶	GO TO 5.

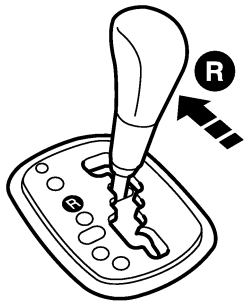
5	CHECK SHIFT LOCK

1. Apply foot brake.



SAT797A

2. Move selector lever to R position.



SAT506K

3. Is there large shock when changing from N to R position?

Yes or No

Yes	▶	Mark the box on the DIAGNOSTIC WORKSHEET. Go to "5. Large Shock N → R Position", AT-231. Continue ROAD TEST.
No	▶	GO TO 6.

6	CHECK VEHICLE MOVE

1. Release foot brake for several seconds.

SAT799A

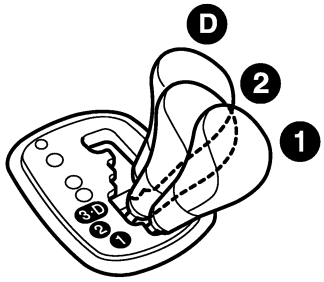
2. Does vehicle creep backward when foot brake is released?

Yes or No

Yes	▶	GO TO 7.
No	▶	Mark the box on the DIAGNOSTIC WORKSHEET. Go to "6. Vehicle Does Not Creep Backward In R Position", AT-233. Continue ROAD TEST.

7	CHECK VEHICLE MOVE

1. Move selector lever to D, 2nd and 1st positions and check if vehicle creeps forward.

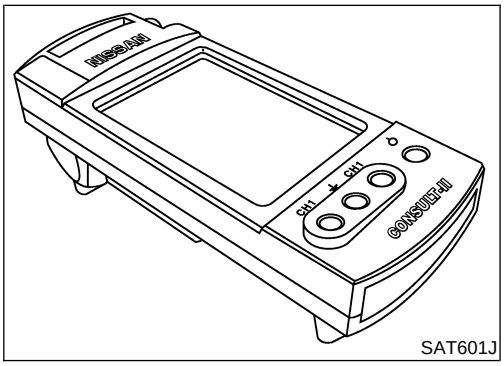


SAT507K

2. Does vehicle creep forward in all three positions?

Yes or No

Yes	▶	Go to 3. CRUISE TEST, AT-73.
No	▶	Mark the box on the DIAGNOSTIC WORKSHEET. Go to "7. Vehicle Does Not Creep Forward In D, 2nd Or 1st Position", AT-237. Continue ROAD TEST.



SAT601J

3. CRUISE TEST

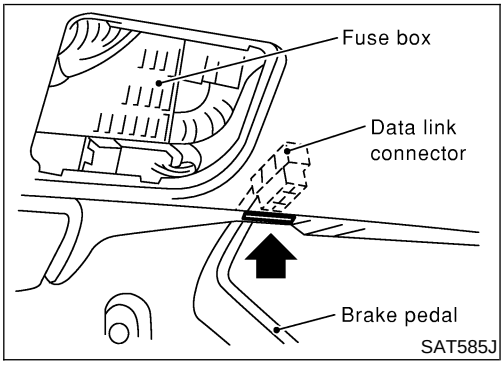
NFAT0029S04

- Check all items listed in Parts 1 through 3.

With CONSULT-II

NFAT0029S0401

- 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.

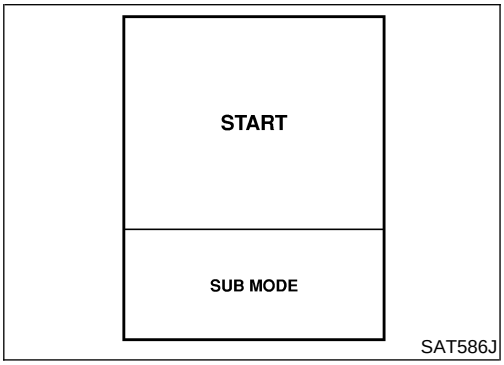


SAT585J

CONSULT-II Setting Procedure

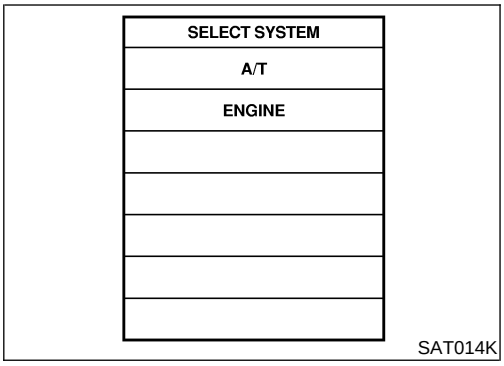
NFAT0029S0402

1. Turn ignition switch OFF.
2. Connect CONSULT-II to data link connector, which is located in left side dash panel.

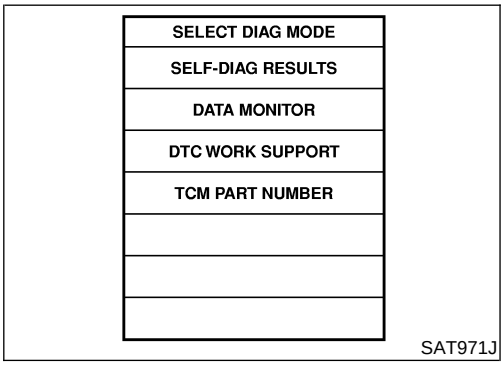


SAT586J

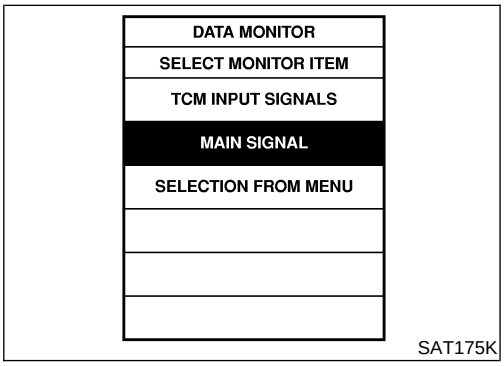
3. Turn ignition switch ON.
4. Touch "START".



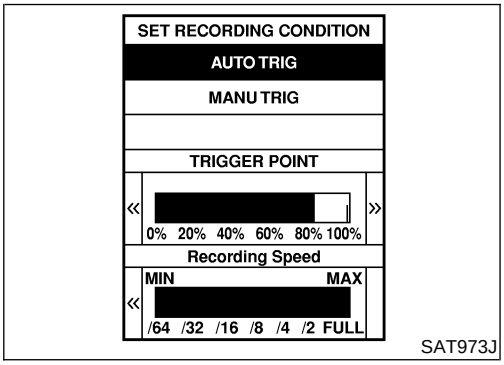
5. Touch "A/T".



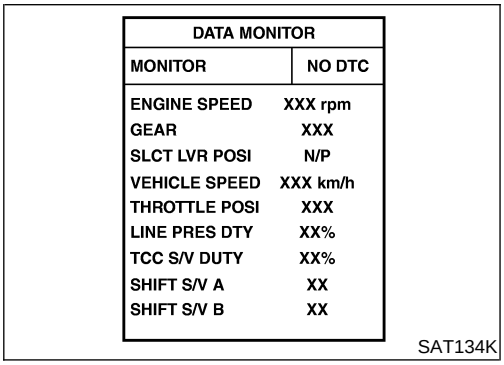
6. Touch "DATA MONITOR".



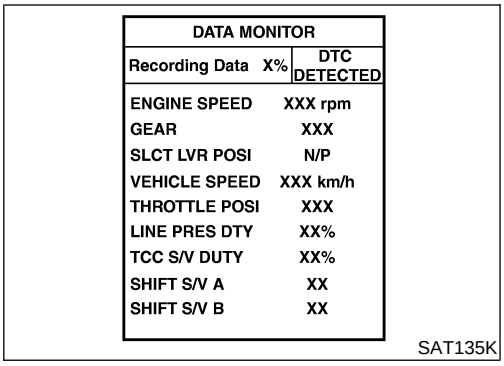
7. Touch "MAIN SIGNALS" or "TCM INPUT SIGNALS".
8. See "Numerical Display", "Barchart Display" or "Line Graph Display".



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

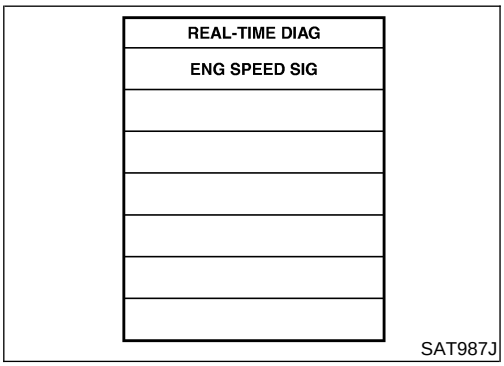


11. When performing cruise test, touch "RECORD".



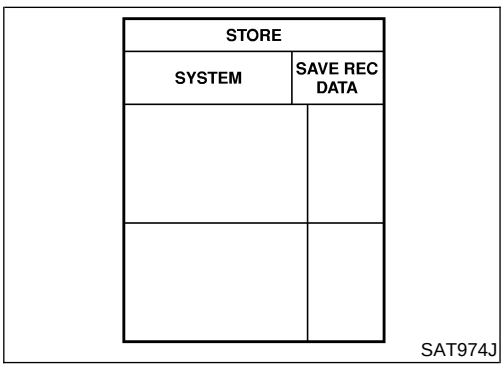
SAT135K

12. After finishing cruise test part 1, touch "STOP".

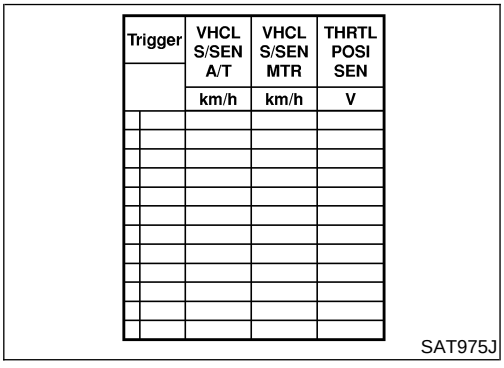


SAT987J

13. Touch "STORE" and touch "BACK".

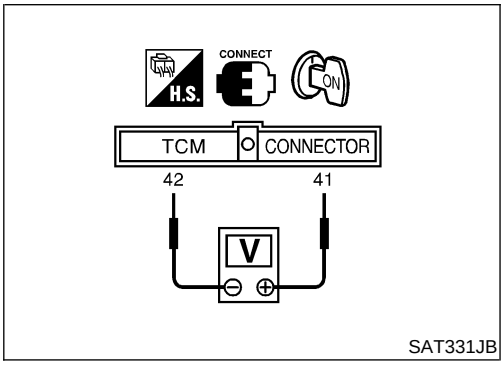


SAT974J



SAT975J

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



SAT331JB

⊗ Without CONSULT-II

NFAT0029S0403

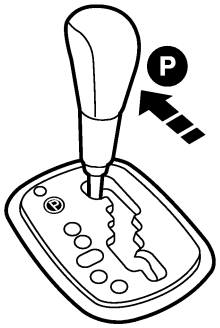
- Accelerator pedal position sensor (throttle position sensor) can be checked by voltage between terminals 41 (W) and 42 (B) of TCM.

Cruise Test — Part 1

=NFAT0029S0404

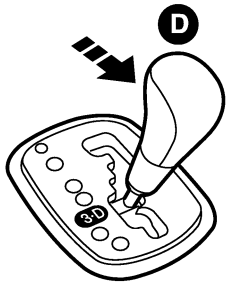
1	CHECK STARTING GEAR (D_1) POSITION

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 selector lever is in D position.
4. Move selector lever to P position.



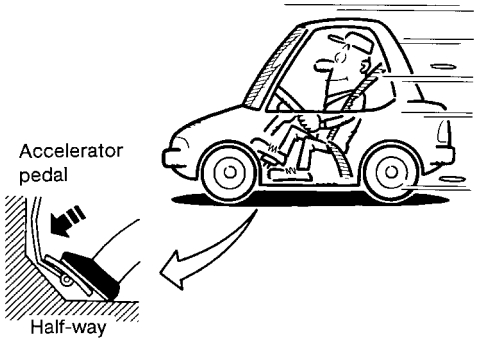
SAT491K

5. Start engine.
6. Move selector lever to D position.



SAT493K

7. Accelerate vehicle by constantly depressing accelerator pedal half-way.



SAT495G

8. Does vehicle start from D_1?
   Read gear position.

Yes or No

Yes	▶	GO TO 2.
No	▶	Go to "8. Vehicle Cannot Be Started From D_1", AT-240. Continue ROAD TEST.

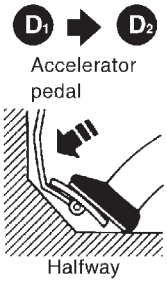
2	CHECK SHIFT UP (D_1 TO D_2)

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 Shift schedule, AT-376.



SAT954I

Yes or No

Yes	▶	GO TO 3.
No	▶	Go to "9. A/T Does Not Shift: $D_1 \rightarrow D_2$ Or Does Not Kickdown: $D_4 \rightarrow D_2$", AT-243. Continue ROAD TEST.

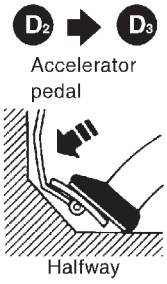
3	CHECK SHIFT UP (D_2 TO D_3)

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 Shift schedule, AT-376.



SAT955I

Yes or No

Yes	▶	GO TO 4.
No	▶	Go to "10. A/T Does Not Shift: $D_2 \rightarrow D_3$", AT-246. Continue ROAD TEST.

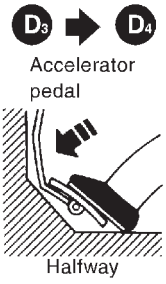
4	CHECK SHIFT UP (D_3 TO D_4)

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 shift schedule, AT-376.



SAT956I

Yes or No

Yes	▶	GO TO 5.
No	▶	Go to "11. A/T Does Not Shift: $D_3 \rightarrow D_4$", AT-249. Continue ROAD TEST.

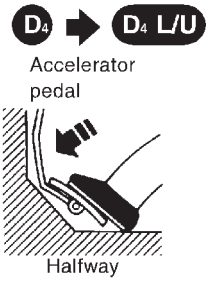
5	CHECK LOCK-UP (D_4 TO D_4L/U)

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 Shift schedule, AT-376.



SAT957I

Yes or No

Yes	▶	GO TO 6.
No	▶	Go to "12. A/T Does Not Perform Lock-up", AT-252. Continue ROAD TEST.

6	CHECK HOLD LOCK-UP

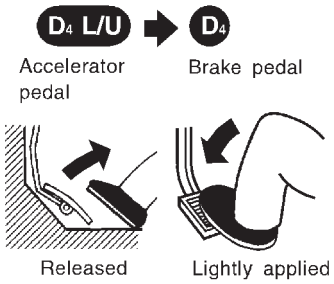
Does A/T hold lock-up condition for more than 30 seconds?

Yes or No

Yes	▶	GO TO 7.
No	▶	Go to "13. A/T Does Not Hold Lock-up Condition", AT-254.

7	CHECK SHIFT DOWN (D_4L/U TO D_4)

1. Release accelerator pedal.



SAT958I

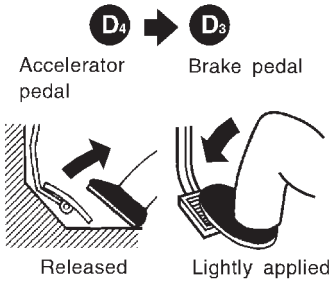
2. Is lock-up released when accelerator pedal is released?

Yes or No

Yes	▶	GO TO 8.
No	▶	Go to "14. Lock-up Is Not Released", AT-256. Continue ROAD TEST.

8	CHECK SHIFT DOWN (D_4 TO D_3)

1. Decelerate vehicle by applying foot brake lightly.



SAT959I

2. Does engine speed return to idle smoothly when A/T is shifted from D_4 to D_3?
   Read gear position and engine speed.

Yes or No

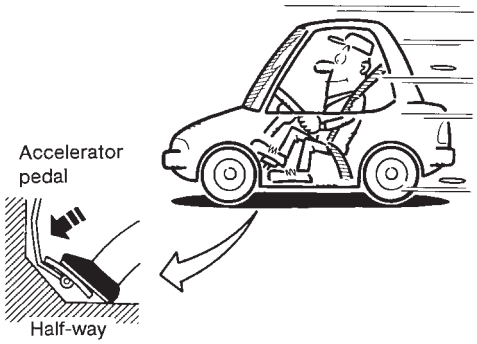
Yes	▶	1. Stop vehicle. 2. Go to "Cruise Test — Part 2", AT-80.
No	▶	Go to "15. Engine Speed Does Not Return To Idle (Light Braking $D_4 \rightarrow D_3$)", AT-257. Continue ROAD TEST.

Cruise Test — Part 2

=NFAT0029S0405

1	CHECK STARTING GEAR (D_1) POSITION

1. Confirm selector lever is in D position.
2. Accelerate vehicle by half throttle again.



SAT495G

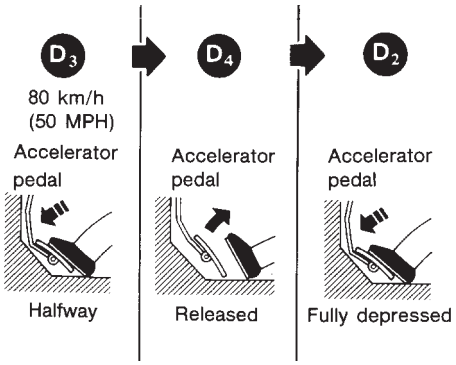
3. Does vehicle start from D_1?
   Read gear position.

Yes or No

Yes	▶	GO TO 2.
No	▶	Go to "16. Vehicle Does Not Start From D_1", AT-260. 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.



SAT404H

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	▶	Go to "9. A/T Does Not Shift: $D_1 \rightarrow D_2$ Or Does Not Kickdown: $D_4 \rightarrow D_2$", AT-243. Continue ROAD TEST.

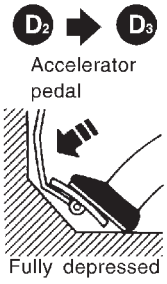
3	CHECK SHIFT UP (D_2 TO D_3)

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 Shift schedule, AT-376.



SAT960I

Yes or No

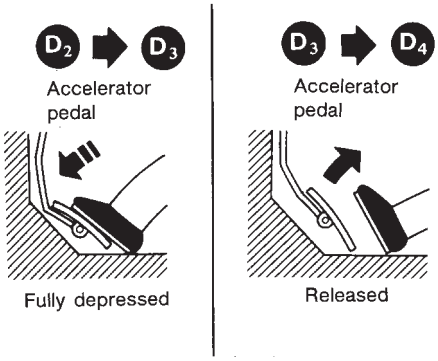
Yes	▶	GO TO 4.
No	▶	Go to "10. A/T Does Not Shift: $D_2 \rightarrow D_3$", AT-246. Continue ROAD TEST.

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.



SAT405H

Yes or No

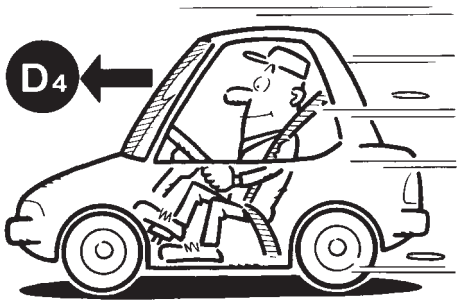
Yes	▶	1. Stop vehicle. 2. Go to "CRUISE TEST — Part 3", AT-82.
No	▶	Go to "11. A/T Does Not Shift: $D_3 \rightarrow D_4$", AT-249. Continue ROAD TEST.

Cruise Test — Part 3

=NFAT0029S0406

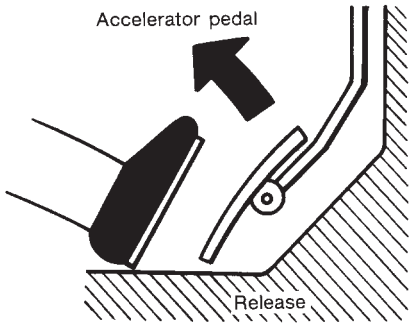
1	VEHICLE SPEED (D_4) POSITION

1. Confirm selector lever is in D position.
2. Accelerate vehicle using half-throttle to D_4.



SAT812A

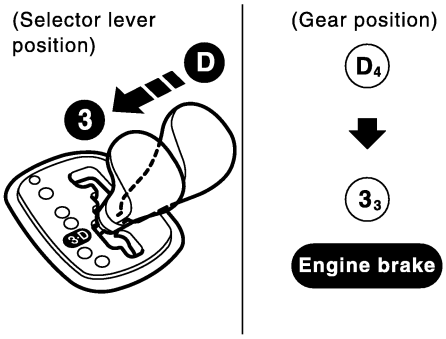
3. Release accelerator pedal.



SAT813A

4. Set selector lever sets in 3rd position while driving in D_4.
5. Does A/T shift from D_4 to D_3?

Read gear position and vehicle speed.



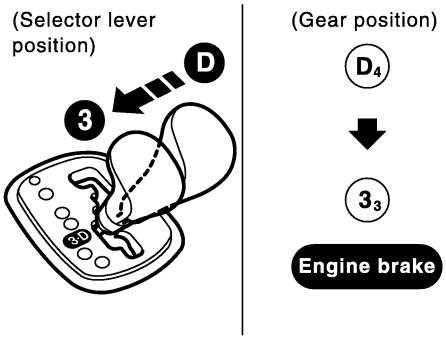
SAT510K

Yes or No

Yes	▶	GO TO 2.
No	▶	Go to "17. A/T Does Not Shift: $D_4 \rightarrow D_3$, When selector lever D → 3rd position, AT-261. Continue ROAD TEST.

2	CHECK ENGINE BRAKE

Does vehicle decelerate by engine brake?



SAT510K

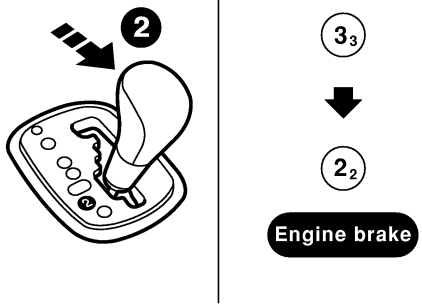
Yes or No

Yes	▶	GO TO 3.
No	▶	Go to "15. Engine Speed Does Not Return To Idle (Light Braking $D_4 \rightarrow D_3$)", AT-257. Continue ROAD TEST.

3	CHECK SHIFT DOWN (D_3 TO D_2)

1. Move selector lever from 3rd to 2nd position while driving in D_3.
2. Does A/T shift from D_3 to 2_2?

Read gear position.



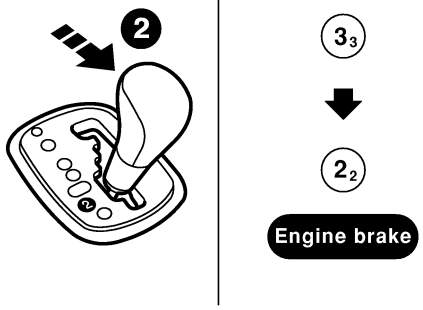
SAT512K

Yes or No

Yes	▶	GO TO 4.
No	▶	Go to "18. A/T Does Not Shift: $D_3 \rightarrow D_2$, When Selector Lever 3rd → 2nd Position", AT-262. Continue ROAD TEST.

4	CHECK ENGINE BRAKE

Does vehicle decelerate by engine brake?



SAT512K

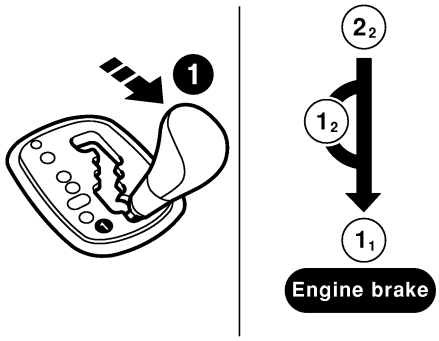
Yes or No

Yes	▶	GO TO 5.
No	▶	Go to "15. Engine Speed Does Not Return To Idle (Light Braking $D_4 \rightarrow D_3$)", AT-257. Continue ROAD TEST.

5	CHECK SHIFT DOWN (2_2 TO 1_1)

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

Read gear position.



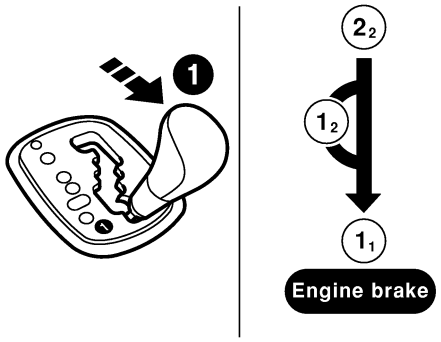
SAT514K

Yes or No

Yes	▶	GO TO 6.
No	▶	Go to "19. A/T Does Not Shift: $2_2 \rightarrow 1_1$, When Selector Lever 2nd → 1st Position", AT-263. Continue ROAD TEST.

6	CHECK ENGINE BRAKE

Does vehicle decelerate by engine brake?



SAT514K

Yes or No

Yes	▶	1. Stop vehicle. 2. Perform self-diagnosis. Refer to TCM Self-diagnostic Procedure (No Tools), AT-51.
No	▶	Go to "20. Vehicle Does Not Decelerate By Engine Brake", AT-264. Continue ROAD TEST.

Symptom Chart

NFAT0030

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

Items	Symptom	Condition	Diagnostic Item	Reference Page
No Lock-up Engagement/TCC Inoperative	Torque converter is not locked up.	ON vehicle	1. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-304
			2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-116, 203
			3. Park/neutral position (PNP) switch adjustment	AT-278
			4. Engine speed signal	AT-121
			5. A/T fluid temperature sensor	AT-196
			6. Line pressure test	AT-67
			7. Torque converter clutch solenoid valve	AT-153
			8. Control valve assembly	AT-277
		OFF vehicle	9. Torque converter	AT-280
	Torque converter clutch piston slip.	ON vehicle	1. Fluid level	AT-63
			2. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-304
			3. Line pressure test	AT-67
			4. Torque converter clutch solenoid valve	AT-153
			5. Line pressure solenoid valve	AT-168
			6. Control valve assembly	AT-277
		OFF vehicle	7. Torque converter	AT-280
	Lock-up point is extremely high or low. AT-252	ON vehicle	1. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-304
			2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-116, 203
			3. Torque converter clutch solenoid valve	AT-153
			4. Control valve assembly	AT-277
Shift Shock	Sharp shock in shifting from N to D position.	ON vehicle	1. Engine idling rpm	AT-68
			2. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-304
			3. Line pressure test	AT-67
			4. A/T fluid temperature sensor	AT-196
			5. Engine speed signal	AT-121
			6. Line pressure solenoid valve	AT-168
			7. Control valve assembly	AT-277
			8. Accumulator N-D	AT-277
		OFF vehicle	9. Forward clutch	AT-331

Symptom Chart (Cont'd)

Items	Symptom	Condition	Diagnostic Item	Reference Page
Shift Shock	Too sharp a shock in change from D_1 to D_2.	ON vehicle	1. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-304
			2. Line pressure test	AT-67
			3. Accumulator servo release	AT-277
			4. Control valve assembly	AT-277
			5. A/T fluid temperature sensor	AT-196
		OFF vehicle	6. Brake band	AT-280
	Too sharp a shock in change from D_2 to D_3.	ON vehicle	1. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-304
			2. Line pressure test	AT-67
			3. Control valve assembly	AT-277
		OFF vehicle	4. High clutch	AT-326
			5. Brake band	AT-280
	Too sharp a shock in change from D_3 to D_4.	ON vehicle	1. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-304
			2. Line pressure test	AT-67
			3. Control valve assembly	AT-277
		OFF vehicle	4. Brake band	AT-280
			5. Overrun clutch	AT-331
	Gear change shock felt during deceleration by releasing accelerator pedal.	ON vehicle	1. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-304
			2. Line pressure test	AT-67
			3. Overrun clutch solenoid valve	AT-191
			4. Control valve assembly	AT-277
	Large shock changing from 1_2 to 1_1 in 1st position.	ON vehicle	1. Control valve assembly	AT-277
		OFF vehicle	2. Low & reverse brake	AT-336
Improper Shift Timing	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-243, 246, 249	ON vehicle	1. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-304
			2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-116, 203
			3. Shift solenoid valve A	AT-174
			4. Shift solenoid valve B	AT-179
	Gear change directly from D_1 to D_3 occurs.	ON vehicle	1. Fluid level	AT-63
			2. Accumulator servo release	AT-277
		OFF vehicle	3. Brake band	AT-280
	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 sensor (throttle position sensor) adjustment	EC-304
			2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-116, 203

Symptom Chart (Cont'd)

Items	Symptom	Condition	Diagnostic Item	Reference Page
Improper Shift Timing	Kickdown does not operate when depressing pedal in D_4 within kick-down vehicle speed.	ON vehicle	1. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-304
			2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-116, 203
			3. Shift solenoid valve A	AT-174
			4. Shift solenoid valve B	AT-179
	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-116, 203
			2. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-304
			3. Shift solenoid valve A	AT-174
			4. Shift solenoid valve B	AT-179
	Gear change from 2_2 to 2_3 in 2nd position.	ON vehicle	1. Park/neutral position (PNP) switch adjustment	AT-278
	Gear change from 1_1 to 1_2 in 1st position.	ON vehicle	1. Park/neutral position (PNP) switch adjustment	AT-278
			2. Control cable adjustment	AT-279
No Down Shift	Failure to change gear from D_4 to D_3.	ON vehicle	1. Fluid level	AT-63
			2. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-304
			3. Overrun clutch solenoid valve	AT-191
			4. Shift solenoid valve A	AT-174
			5. Line pressure solenoid valve	AT-168
			6. Control valve assembly	AT-277
		OFF vehicle	7. Low & reverse brake	AT-336
			8. Overrun clutch	AT-331
	Failure to change gear from D_3 to D_2 or from D_4 to D_2.	ON vehicle	1. Fluid level	AT-63
			2. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-304
			3. Shift solenoid valve A	AT-174
			4. Shift solenoid valve B	AT-179
			5. Control valve assembly	AT-277
		OFF vehicle	6. High clutch	AT-326
			7. Brake band	AT-336

Symptom Chart (Cont'd)

Items	Symptom	Condition	Diagnostic Item	Reference Page
No Down Shift	Failure to change gear from D_2 to D_1 or from D_3 to D_1.	ON vehicle	1. Fluid level	AT-63
			2. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-304
			3. Shift solenoid valve A	AT-174
			4. Shift solenoid valve B	AT-179
			5. Control valve assembly	AT-277
		OFF vehicle	6. Low one-way clutch	AT-280
			7. High clutch	AT-326
			8. Brake band	AT-280
	Failure to change from D_3 to 2_2 when changing lever into 2nd position. AT-257	ON vehicle	1. Park/neutral position (PNP) switch adjustment	AT-278
			2. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-304
			3. Overrun clutch solenoid valve	AT-191
			4. Shift solenoid valve B	AT-179
			5. Shift solenoid valve A	AT-174
			6. Control valve assembly	AT-277
			7. Control cable adjustment	AT-279
		OFF vehicle	8. Brake band	AT-280
			9. Overrun clutch	AT-331
	Does not change from 1_2 to 1_1 in 1st position.	ON vehicle	1. Park/neutral position (PNP) switch adjustment	AT-278
			2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-116, 203
			3. Shift solenoid valve A	AT-174
			4. Control valve assembly	AT-277
			5. Overrun clutch solenoid valve	AT-191
		OFF vehicle	6. Overrun clutch	AT-331
			7. Low & reverse brake	AT-336
No Up Shift	Failure to change gear from D_1 to D_2.	ON vehicle	1. Park/neutral position (PNP) switch adjustment	AT-278
			2. Control cable adjustment	AT-279
			3. Shift solenoid valve A	AT-174
			4. Control valve assembly	AT-277
			5. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-116, 203
		OFF vehicle	6. Brake band	AT-280

Symptom Chart (Cont'd)

Items	Symptom	Condition	Diagnostic Item	Reference Page
No Up Shift	Failure to change gear from D_2 to D_3.	ON vehicle	1. Park/neutral position (PNP) switch adjustment	AT-278
			2. Control cable adjustment	AT-279
			3. Shift solenoid valve B	AT-179
			4. Control valve assembly	AT-277
			5. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-116, 203
		OFF vehicle	6. High clutch	AT-326
			7. Brake band	AT-280
	Failure to change gear from D_3 to D_4.	ON vehicle	1. Park/neutral position (PNP) switch adjustment	AT-278
			2. Control cable adjustment	AT-279
			3. Shift solenoid valve A	AT-174
			4. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-116, 203
			5. A/T fluid temperature sensor	AT-196
		OFF vehicle	6. Brake band	AT-280
	A/T does not shift to D_4 when driving with selector lever from 3rd to D position.	ON vehicle	1. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-304
			2. Park/neutral position (PNP) switch adjustment	AT-278
			3. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-116, 203
			4. Shift solenoid valve A	AT-174
			5. Overrun clutch solenoid valve	AT-191
			6. Control valve assembly	AT-277
			7. A/T fluid temperature sensor	AT-196
			8. Line pressure solenoid valve	AT-168
		OFF vehicle	9. Brake band	AT-280
			10. Overrun clutch	AT-331
Slips/Will Not Engage	Vehicle will not run in R position (but runs in D, 2nd and 1st positions). Clutch slips. Very poor acceleration. AT-233	ON vehicle	1. Control cable adjustment	AT-279
			2. Line pressure test	AT-67
			3. Line pressure solenoid valve	AT-168
			4. Control valve assembly	AT-277
		OFF vehicle	5. Reverse clutch	AT-323
			6. High clutch	AT-326
			7. Forward clutch	AT-331
			8. Overrun clutch	AT-331
			9. Low & reverse brake	AT-336

Symptom Chart (Cont'd)

Items	Symptom	Condition	Diagnostic Item	Reference Page
Slips/Will Not Engage	Vehicle will not run in D and 2nd positions (but runs in 1st and R positions).	ON vehicle	1. Control cable adjustment	AT-279
		OFF vehicle	2. Low one-way clutch	AT-280
	Vehicle will not run in D, 1st, 2nd positions (but runs in R position). Clutch slips. Very poor acceleration. AT-237	ON vehicle	1. Fluid level	AT-63
			2. Line pressure test	AT-67
			3. Line pressure solenoid valve	AT-168
			4. Control valve assembly	AT-277
			5. Accumulator N-D	AT-277
		OFF vehicle	6. Reverse clutch	AT-323
			7. High clutch	AT-326
			8. Forward clutch	AT-331
			9. Forward one-way clutch	AT-280
			10. Low one-way clutch	AT-280
	Clutches or brakes slip somewhat in starting.	ON vehicle	1. Fluid level	AT-63
			2. Control cable adjustment	AT-279
			3. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-304
			4. Line pressure test	AT-67
			5. Line pressure solenoid valve	AT-168
			6. Control valve assembly	AT-277
			7. Accumulator N-D	AT-277
		OFF vehicle	8. Forward clutch	AT-331
			9. Reverse clutch	AT-323
			10. Low & reverse brake	AT-336
			11. Oil pump	AT-305
			12. Torque converter	AT-280
	No creep at all. AT-233, 237	ON vehicle	1. Fluid level	AT-63
			2. Line pressure test	AT-67
			3. Control valve assembly	AT-277
		OFF vehicle	4. Forward clutch	AT-331
			5. Oil pump	AT-305
			6. Torque converter	AT-280

Symptom Chart (Cont'd)

Items	Symptom	Condition	Diagnostic Item	Reference Page
Slips/Will Not Engage	Almost no shock or clutches slipping in change from D_1 to D_2.	ON vehicle	1. Fluid level	AT-63
			2. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-304
			3. Line pressure test	AT-67
			4. Accumulator servo release	AT-277
			5. Control valve assembly	AT-277
		OFF vehicle	6. Brake band	AT-280
	Almost no shock or slipping in change from D_2 to D_3.	ON vehicle	1. Fluid level	AT-63
			2. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-304
			3. Line pressure test	AT-67
			4. Control valve assembly	AT-277
		OFF vehicle	5. High clutch	AT-326
			6. Forward clutch	AT-331
	Almost no shock or slipping in change from D_3 to D_4.	ON vehicle	1. Fluid level	AT-63
			2. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-304
			3. Line pressure test	AT-67
			4. Control valve assembly	AT-277
		OFF vehicle	5. High clutch	AT-326
			6. Brake band	AT-280
	Races extremely fast or slips in changing from D_4 to D_3 when depressing pedal.	ON vehicle	1. Fluid level	AT-63
			2. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-304
			3. Line pressure test	AT-67
			4. Line pressure solenoid valve	AT-168
			5. Control valve assembly	AT-277
		OFF vehicle	6. High clutch	AT-326
			7. Forward clutch	AT-331
	Races extremely fast or slips in changing from D_4 to D_2 when depressing pedal.	ON vehicle	1. Fluid level	AT-63
			2. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-304
			3. Line pressure test	AT-67
			4. Line pressure solenoid valve	AT-168
			5. Shift solenoid valve A	AT-174
			6. Control valve assembly	AT-277
		OFF vehicle	7. Brake band	AT-280
			8. Forward clutch	AT-331

Symptom Chart (Cont'd)

Items	Symptom	Condition	Diagnostic Item	Reference Page
Slips/Will Not Engage	Races extremely fast or slips in changing from D_3 to D_2 when depressing pedal.	ON vehicle	1. Fluid level	AT-63
			2. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-304
			3. Line pressure test	AT-67
			4. Line pressure solenoid valve	AT-168
			5. Control valve assembly	AT-277
			6. A/T fluid temperature sensor	AT-196
		OFF vehicle	7. Brake band	AT-280
			8. Forward clutch	AT-331
			9. High clutch	AT-326
	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-63
			2. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-304
			3. Line pressure test	AT-67
			4. Line pressure solenoid valve	AT-168
			5. Control valve assembly	AT-277
		OFF vehicle	6. Forward clutch	AT-331
			7. Forward one-way clutch	AT-280
			8. Low one-way clutch	AT-280
	Vehicle will not run in any position.	ON vehicle	1. Fluid level	AT-63
			2. Control cable adjustment	AT-279
			3. Line pressure test	AT-67
			4. Line pressure solenoid valve	AT-168
		OFF vehicle	5. Oil pump	AT-305
			6. High clutch	AT-326
			7. Brake band	AT-280
			8. Low & reverse brake	AT-336
			9. Torque converter	AT-280
			10. Parking components	AT-302
NOT USED	Engine cannot be started in P and N positions. AT-226	ON vehicle	1. Ignition switch and starter	EL-11, and SC-10
			2. Control cable adjustment	AT-279
			3. Park/neutral position (PNP) switch adjustment	AT-278
	Engine starts in positions other than P and N. AT-226	ON vehicle	1. Control cable adjustment	AT-279
			2. Park/neutral position (PNP) switch adjustment	AT-278

Symptom Chart (Cont'd)

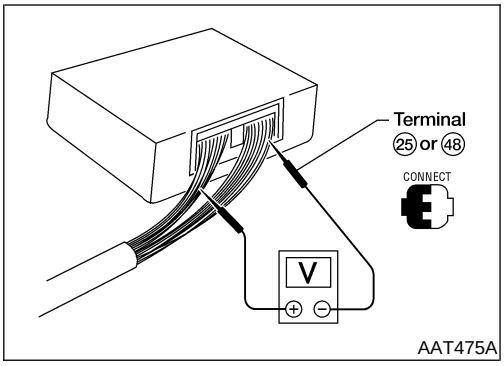
Items	Symptom	Condition	Diagnostic Item	Reference Page
NOT USED	Transaxle noise in P and N positions.	ON vehicle	1. Fluid level	AT-63
			2. Line pressure test	AT-67
			3. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-304
			4. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-116, 203
			5. Engine speed signal	AT-121
		OFF vehicle	6. Oil pump	AT-305
			7. Torque converter	AT-280
	Vehicle moves when changing into P position or parking gear does not disengage when shifted out of P position. AT-227	ON vehicle	1. Control cable adjustment	AT-279
		OFF vehicle	2. Parking components	AT-302
	Vehicle runs in N position. AT-228	ON vehicle	1. Control cable adjustment	AT-279
		OFF vehicle	2. Forward clutch	AT-331
			3. Reverse clutch	AT-323
			4. Overrun clutch	AT-331
	Vehicle braked when shifting into R position.	ON vehicle	1. Fluid level	AT-63
			2. Control cable adjustment	AT-279
			3. Line pressure test	AT-67
			4. Line pressure solenoid valve	AT-168
			5. Control valve assembly	AT-277
		OFF vehicle	6. High clutch	AT-326
			7. Brake band	AT-280
			8. Forward clutch	AT-331
			9. Overrun clutch	AT-331
	Excessive creep.	ON vehicle	1. Engine idling rpm	AT-68
	Engine stops when shifting lever into R, D, 2nd and 1st position.	ON vehicle	1. Engine idling rpm	AT-68
			2. Torque converter clutch solenoid valve	AT-153
			3. Control valve assembly	AT-277
		OFF vehicle	4. Torque converter	AT-280
	Vehicle braked by gear change from D_1 to D_2.	ON vehicle	1. Fluid level	AT-63
		OFF vehicle	2. Reverse clutch	AT-323
			3. Low & reverse brake	AT-336
			4. High clutch	AT-326
			5. Low one-way clutch	AT-280

Symptom Chart (Cont'd)

Items	Symptom	Condition	Diagnostic Item	Reference Page
NOT USED	Vehicle braked by gear change from D_2 to D_3.	ON vehicle	1. Fluid level	AT-63
		OFF vehicle	2. Brake band	AT-280
	Vehicle braked by gear change from D_3 to D_4.	ON vehicle	1. Fluid level	AT-63
		OFF vehicle	2. Overrun clutch	AT-331
			3. Forward one-way clutch	AT-280
			4. Reverse clutch	AT-323
	Maximum speed not attained. Acceleration poor.	ON vehicle	1. Fluid level	AT-63
			2. Park/neutral position (PNP) switch adjustment	AT-278
			3. Shift solenoid valve A	AT-174
			4. Shift solenoid valve B	AT-179
			5. Control valve assembly	AT-277
		OFF vehicle	6. Reverse clutch	AT-323
			7. High clutch	AT-326
			8. Brake band	AT-280
			9. Low & reverse brake	AT-336
			10. Oil pump	AT-305
			11. Torque converter	AT-280
	Transaxle noise in D, 2nd, 1st and R positions.	ON vehicle	1. Fluid level	AT-63
		ON vehicle	2. Torque converter	AT-280
	Engine brake does not operate in "1st" position. AT-260	ON vehicle	1. Park/neutral position (PNP) switch adjustment	AT-278
			2. Control cable adjustment	AT-279
			3. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-304
			4. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-116, 203
			5. Shift solenoid valve A	AT-174
			6. Control valve assembly	AT-277
			7. Overrun clutch solenoid valve	AT-191
		OFF vehicle	8. Overrun clutch	AT-331
			9. Low & reverse brake	AT-336

Symptom Chart (Cont'd)

Items	Symptom	Condition	Diagnostic Item	Reference Page
NOT USED	Transaxle overheats.	ON vehicle	1. Fluid level	AT-63
			2. Engine idling rpm	AT-68
			3. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-304
			4. Line pressure test	AT-67
			5. Line pressure solenoid valve	AT-168
			6. Control valve assembly	AT-277
		OFF vehicle	7. Oil pump	AT-305
			8. Reverse clutch	AT-323
			9. High clutch	AT-326
			10. Brake band	AT-280
			11. Forward clutch	AT-331
			12. Overrun clutch	AT-331
			13. Low & reverse brake	AT-336
			14. Torque converter	AT-280
	ATF shoots out during operation. White smoke emitted from exhaust pipe during operation.	ON vehicle	1. Fluid level	AT-63
		OFF vehicle	2. Reverse clutch	AT-323
			3. High clutch	AT-326
			4. Brake band	AT-280
			5. Forward clutch	AT-331
			6. Overrun clutch	AT-331
			7. Low & reverse brake	AT-336
	Offensive smell at fluid charging pipe.	ON vehicle	1. Fluid level	AT-63
		OFF vehicle	2. Torque converter	AT-278
			3. Oil pump	AT-305
			4. Reverse clutch	AT-323
			5. High clutch	AT-326
			6. Brake band	AT-280
			7. Forward clutch	AT-331
			8. Overrun clutch	AT-331
			9. Low & reverse brake	AT-336
	Engine is stopped at R, D, 2nd and 1st positions.	ON vehicle	1. Fluid level	AT-63
			2. Torque converter clutch solenoid valve	AT-153
			3. Shift solenoid valve B	AT-179
			4. Shift solenoid valve A	AT-174
			5. Control valve assembly	AT-277



TCM Terminals and Reference Value

NFAT0031

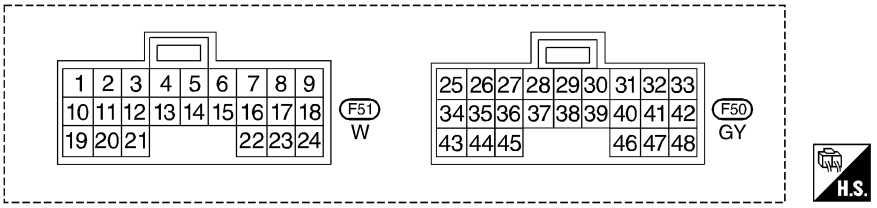
PREPARATION

NFAT0031S01

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

TCM HARNESS CONNECTOR TERMINAL LAYOUT

NFAT0031S02



SAT338JA

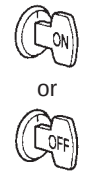
TCM INSPECTION TABLE

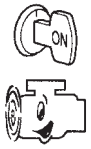
NFAT0031S03

(Data are reference values.)

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
1	G/R	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	W/B	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	G/B	Torque converter clutch solenoid valve		When A/T performs lock-up.	8 - 15V
				When A/T does not perform lock-up.	0V
5	L	CAN (high)	—	—	—
6	R	CAN (low)	—	—	—
10	R/Y	Power source	or	When turning ignition switch to ON.	Battery voltage
				When turning ignition switch to OFF.	0V

TCM Terminals and Reference Value (Cont'd)

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
11	R/Y	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	LG/B	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
13	G/Y	A/T CHECK indicator lamp		When AT CHECK indicator lamp is ON.	0V
				When AT CHECK indicator lamp is OFF.	Battery voltage
19	R/Y	Power source	Same as No. 10		
20	BR/Y	Overrun clutch solenoid valve		When overrun clutch solenoid valve operates.	Battery voltage
				When overrun clutch solenoid valve does not operate.	0V
22	G/Y	3rd position switch		When the selector lever is in a position other than 3rd position.	Battery voltage
				When the selector lever is in 3rd position.	0V
25	B	Ground	—	—	0V
26	PU/W	PNP switch 1st position		When setting selector lever to 1st position.	Battery voltage
				When setting selector lever to other positions.	0V
27	P/B	PNP switch 2nd position		When setting selector lever to 2nd position.	Battery voltage
				When setting selector lever to other positions.	0V
28	Y/R	Power source (Memory back-up)		When turning ignition switch to OFF.	Battery voltage
				When turning ignition switch to ON.	Battery voltage
29	W	Revolution sensor (VHCL/S SEN)		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.	450 Hz
				When vehicle parks.	0V

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
30*	BR/Y	Data link connector (RX)		—	—
31*	P	Data link connector (TX)		—	—
32	R	Sensor power		Ignition switch ON.	4.5 - 5.5V
				Ignition switch OFF.	0V
34	Y/PU	PNP switch D position		When setting selector lever to D position.	Battery voltage
				When setting selector lever to other positions.	0V
35	G/W	PNP switch R position		When setting selector lever to R position.	Battery voltage
				When setting selector lever to other positions.	0V
36	R/G	PNP switch P or N position		When setting selector lever to P or N position.	Battery voltage
				When setting selector lever to other positions.	0V
38	PU	Power train 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.	240 Hz
				When vehicle parks.	Under 1.3V or over 4.5V
39	W/G	Engine speed signal (TACHO)		Refer to EC-141, "ECM INSPECTION TABLE".	
40	PU/R	Vehicle speed sensor (MTR)		When moving vehicle at 2 to 3 km/h (1 to 2 MPH) for 1 m (3 ft) or more.	0V
41	W	Accelerator pedal position sensor (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	Sensor ground	—	—	0V
45	R/G	Stop lamp switch		When depressing brake pedal	Battery voltage
				When releasing brake pedal	0V
47	G	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	—	—	0V

*: These terminals are connected to the Data link connector.

System Description

NFAT0283

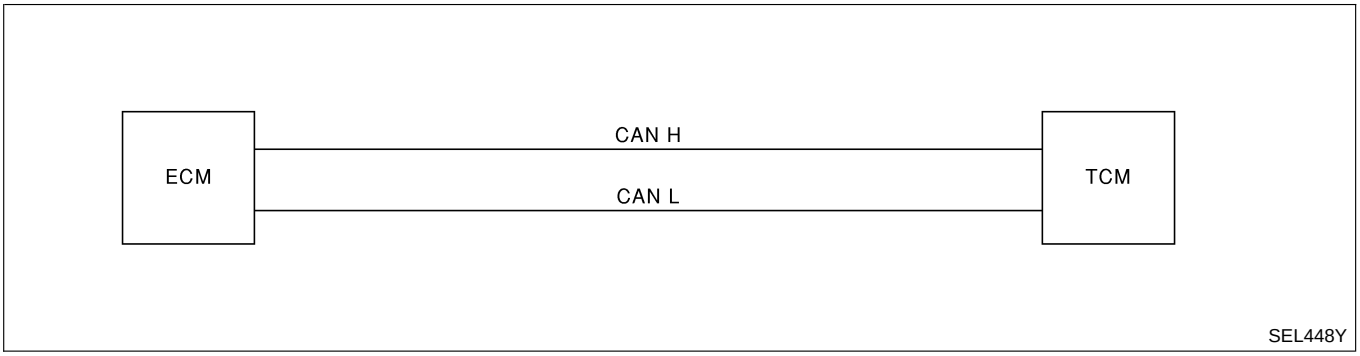
CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information 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 A/T MODELS

System Diagram

NFAT0283S01

NFAT0283S0101



Input/Output Signal Chart

T: Transmit R: Receive

NFAT0283S0102

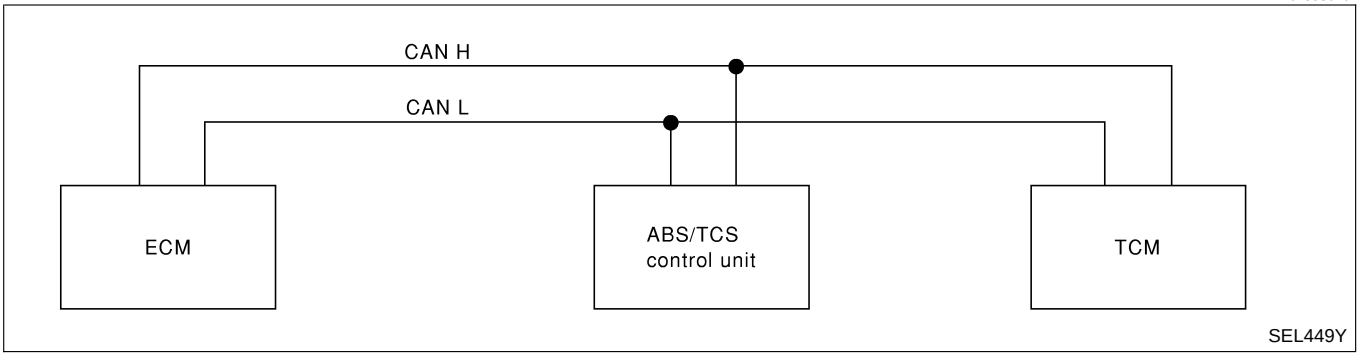
Signals	ECM	TCM
Accelerator pedal position (throttle position) signal	T	R
Output shaft revolution signal	R	T

FOR TCS MODELS

System Diagram

NFAT0283S02

NFAT0283S0201



Input/Output Signal Chart

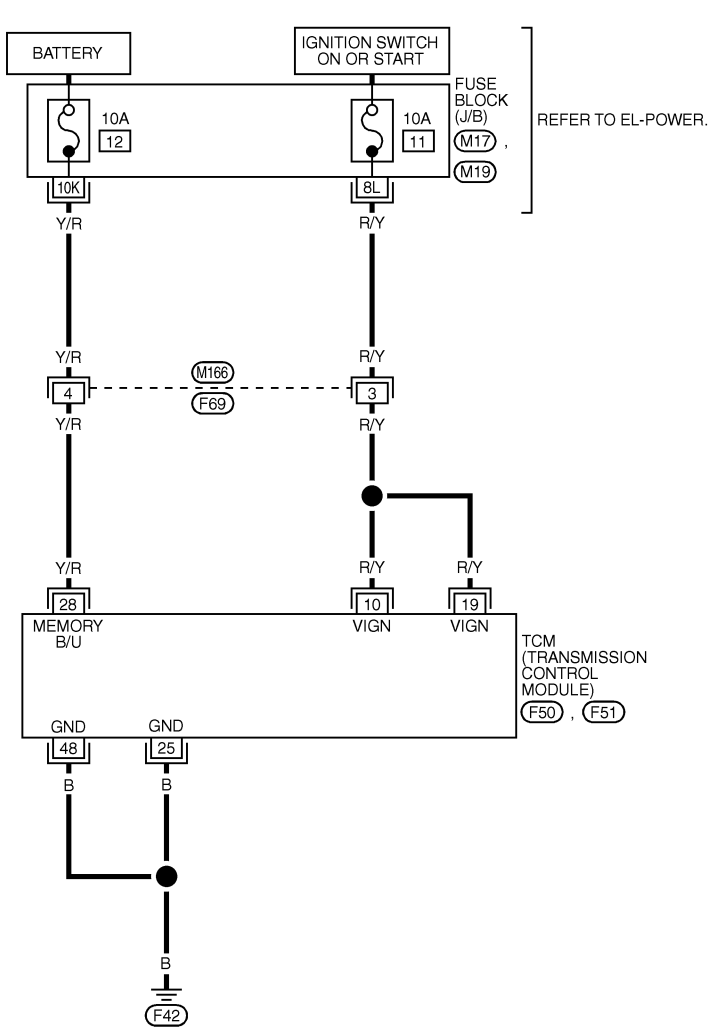
T: Transmit R: Receive

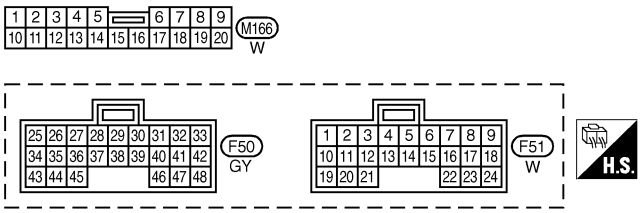
NFAT0283S0202

Signals	ECM	ABS/TCS control unit	TCM
Accelerator pedal position (throttle position) signal	T	R	R
Output shaft revolution signal	R		T

Wiring Diagram — AT — MAIN

NFAT0032





REFER TO THE FOLLOWING.
M17 , M19 - FUSE BLOCK - JUNCTION BOX (J/B)

MAT061B

TCM TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND 25 (B) OR 48 (B) (TCM GROUND)

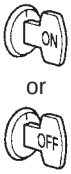
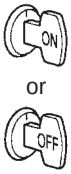
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
10	R/Y	POWER SOURCE	WHEN IGN ON	BATTERY VOLTAGE
			WHEN IGN OFF	0V
19	R/Y	POWER SOURCE	SAME AS NO. 10	
25	B	GROUND	—	0V
28	Y/R	POWER SOURCE (MEMOLY BACK-UP)	WHEN IGN ON	BATTERY VOLTAGE
			WHEN IGN OFF	BATTERY VOLTAGE
48	B	GROUND	—	0V

SAT292KB

Wiring Diagram — AT — MAIN (Cont'd)

TCM TERMINALS AND REFERENCE VALUE

=NFAT0032S01

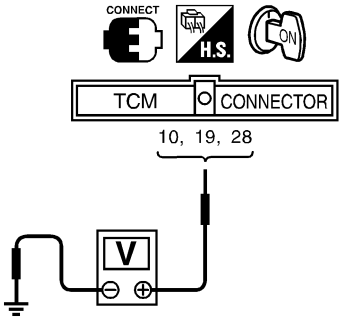
Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
10	R/Y	Power source		When turning ignition switch to ON.	Battery voltage
				When turning ignition switch to OFF.	0V
19	R/Y	Power source		Same as No. 10	
25	B	Ground	—	—	0V
28	Y/R	Power source (Memory back-up)		When turning ignition switch to OFF.	Battery voltage
				When turning ignition switch to ON.	Battery voltage
48	B	Ground	—	—	0V

Diagnostic Procedure

NFAT0033

1 CHECK TCM POWER SOURCE STEP 1

1. Turn ignition switch to ON position.
   (Do not start engine.)
2. Check voltage between TCM harness connectors F50, 51 terminals 10 (R/Y), 19 (R/Y), 28 (Y/R) and ground.



Voltage:
Battery voltage

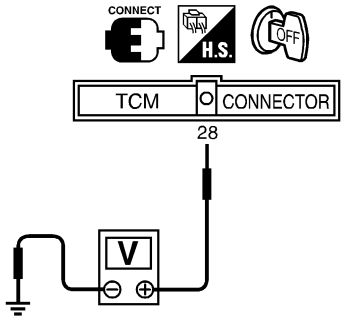
SAT611J

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 harness connector F50 terminal 28 (Y/R) and ground.



Voltage:
Battery voltage

SAT612JF

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 ignition switch and TCM harness connectors F50, F51 terminals 10 (R/Y), 19 (R/Y) and 28 (Y/R) (Main harness)
- Fuse
- Ignition switch
  Refer to EL-10, "POWER SUPPLY ROUTING".

OK or NG

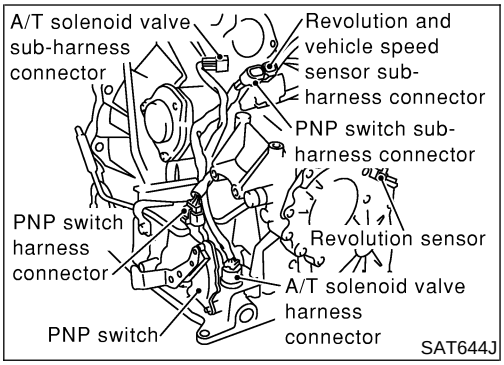
OK	▶	GO TO 4.
NG	▶	Repair or replace damaged parts.

4	CHECK TCM GROUND CIRCUIT

1. Turn ignition switch to OFF position.
2. Disconnect TCM harness connector.
3. Check continuity between TCM harness connector F51 terminals 25 (B), 48 (B) 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 open circuit or short to ground or short to power in harness or connectors.



Description

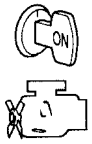
NFAT0034

- The park/neutral position (PNP) switch 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

NFAT0034S01

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
26	PU/W	PNP switch 1st position		When setting selector lever to 1st position.	Battery voltage
				When setting selector lever to other positions.	0V
27	P/B	PNP switch 2nd position		When setting selector lever to 2nd position.	Battery voltage
				When setting selector lever to other positions.	0V
34	Y/PU	PNP switch D position		When setting selector lever to D position.	Battery voltage
				When setting selector lever to other positions.	0V
35	G/W	PNP switch R position		When setting selector lever to R position.	Battery voltage
				When setting selector lever to other positions.	0V
36	R/G	PNP switch P or N position		When setting selector lever to P or N position.	Battery voltage
				When setting selector lever to other positions.	0V

On Board Diagnosis Logic

NFAT0201

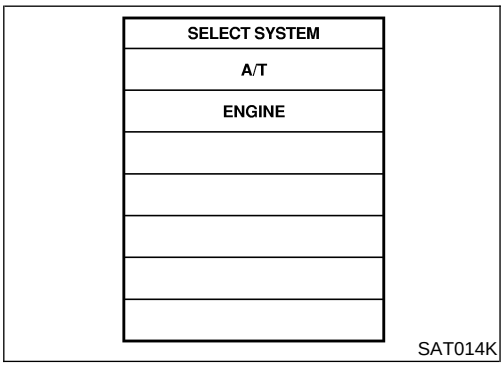
Diagnostic trouble code PNP SW/CIRC with CONSULT-II or P0705 without CONSULT-II is detected when TCM does not receive the correct voltage signal from the switch based on the gear position.

Possible Cause

NFAT0202

Check the following items.

- Harness or connectors
  (The park/neutral position (PNP) switch circuit is open or shorted.)
- Park/neutral position (PNP) switch



Diagnostic Trouble Code (DTC) Confirmation Procedure

NFAT0203

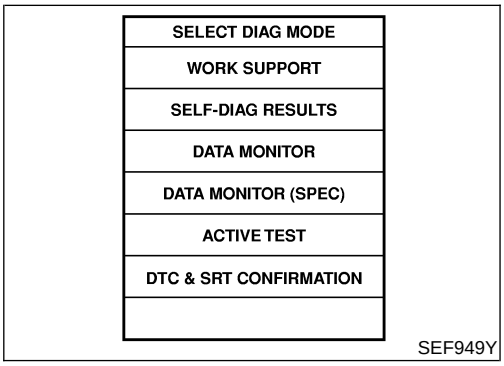
CAUTION:

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.

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



WITH CONSULT-II

NFAT0203S01

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: 3rd or D position

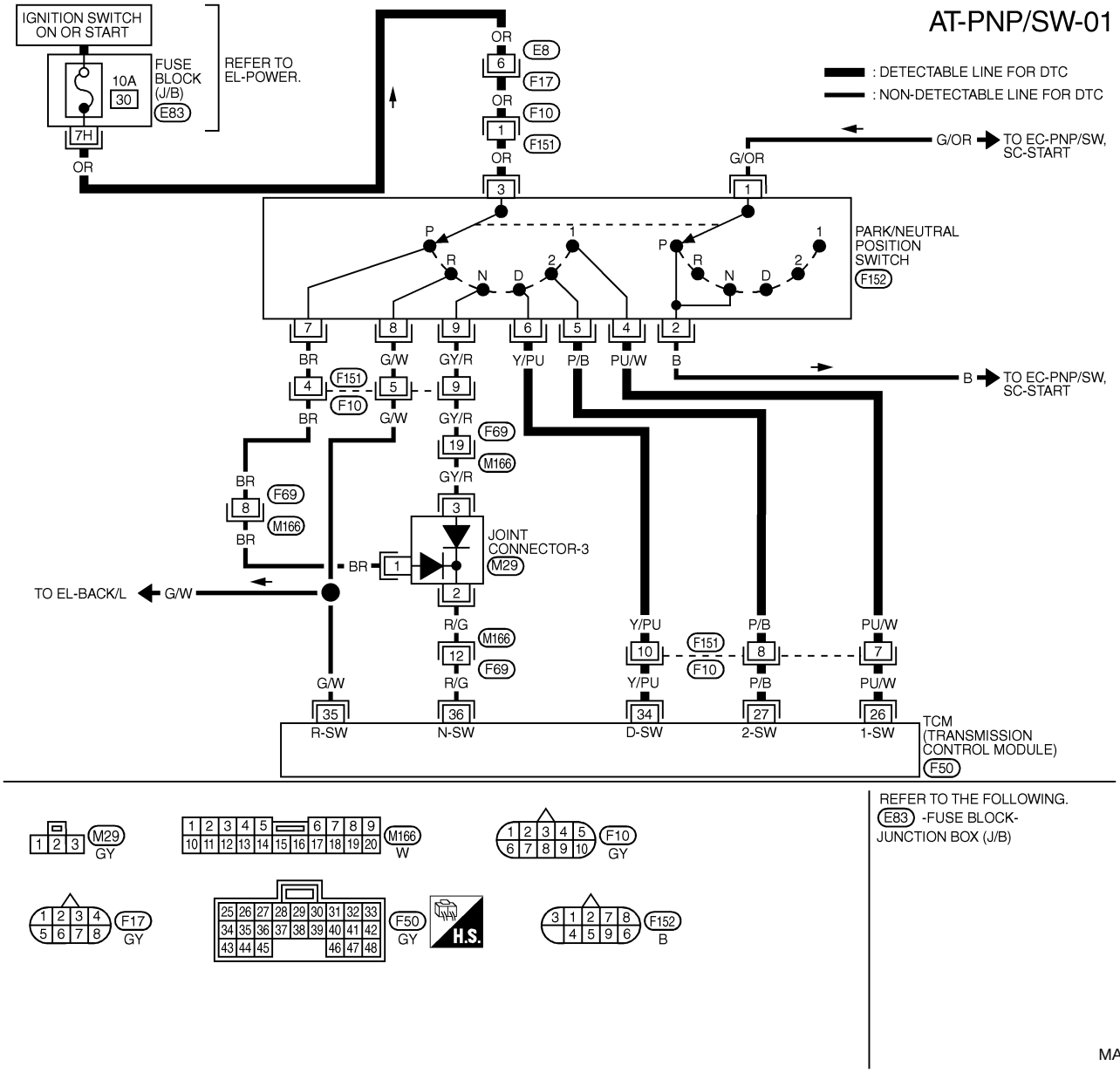
WITH GST

NFAT0203S02

Follow the procedure "With CONSULT-II".

Wiring Diagram — AT — PNP/SW

NFAT0035



MAT062B

TCM TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND 25 (B) OR 48 (B) (TCM GROUND)

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
26	PU/W	PNP SWITCH 1st POSITION	WHEN IGN ON AND SELECTOR LEVER 1st POSITION	BATTERY VOLTAGE
			WHEN IGN ON AND SELECTOR LEVER OTHER POSITIONS	0V
27	P/B	PNP SWITCH 2nd POSITION	WHEN IGN ON AND SELECTOR LEVER 2nd POSITION	BATTERY VOLTAGE
			WHEN IGN ON AND SELECTOR LEVER OTHER POSITIONS	0V
34	Y/PU	PNP SWITCH D POSITION	WHEN IGN ON AND SELECTOR LEVER D POSITION	BATTERY VOLTAGE
			WHEN IGN ON AND SELECTOR LEVER OTHER POSITIONS	0V
35	G/W	PNP SWITCH R POSITION	WHEN IGN ON AND SELECTOR LEVER R POSITION	BATTERY VOLTAGE
			WHEN IGN ON AND SELECTOR LEVER OTHER POSITIONS	0V
36	R/G	PNP SWITCH P OR N POSITION	WHEN IGN ON AND SELECTOR LEVER P POSITION	BATTERY VOLTAGE
			WHEN IGN ON AND SELECTOR LEVER OTHER POSITIONS	0V

SAT293KC

Diagnostic Procedure

NFAT0036

1	INSPECTION START

Do you have CONSULT-II?

Yes or No

Yes	▶	GO TO 2.
No	▶	GO TO 6.

2	CHECK PARK/NEUTRAL POSITION (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, R, N, D, 2nd and 1st position switches moving selector lever to each position.
   Check 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

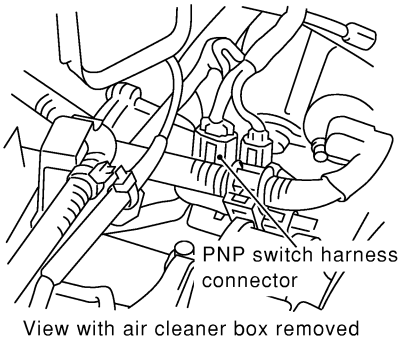
OK or NG

OK	▶	GO TO 7.
NG	▶	GO TO 3.

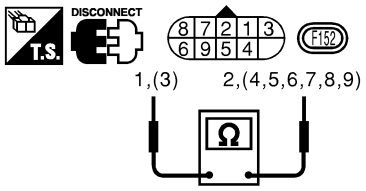
3	DETECT MALFUNCTIONING ITEM

Check the following item:

- Park/neutral position (PNP) switch
  Check continuity between terminals 1 (G/OR) and 2 (B) and between terminals 3 (OR) and 4 (PU/W) , 5 (P/B), 6 (Y/PU), 7 (BR), 8 (G/W), 9 (GY/R) while moving manual shaft through each position.



View with air cleaner box removed



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	

SAT615J

OK or NG

OK	▶	GO TO 5.
NG	▶	GO TO 4.

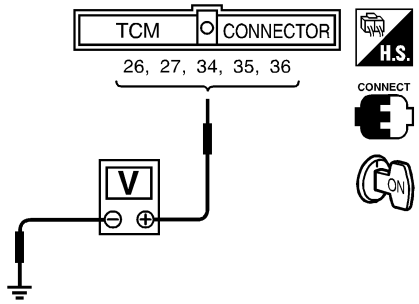
4	CHECK MANUAL CONTROL CABLE ADJUSTMENT	
Check PNP switch again with manual control cable disconnected from manual shaft of A/T assembly. Refer to test group 1.		
OK or NG		
OK	▶	Adjust manual control cable. Refer to AT-279.
NG	▶	Repair or replace PNP switch.

5	DETECT MALFUNCTIONING ITEM	
Check the following items: ● Harness for short or open between ignition switch and park/neutral position (PNP) switch (Main harness) ● Harness for short or open between park/neutral position (PNP) switch and TCM (Main harness) ● Fuse ● Joint connector-3 M29 ● Ignition switch Refer to EL-10, "POWER SUPPLY ROUTING".		
OK or NG		
OK	▶	GO TO 7.
NG	▶	Repair or replace damaged parts.

6	CHECK PARK/NEUTRAL POSITION (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 harness connector F50 terminals 26 (PU/W), 27 (P/B), 34 (Y/PU), 35 (G/W), 36 (R/G) and ground while moving selector lever through each position.



Voltage:
B: Battery voltage
0: 0V

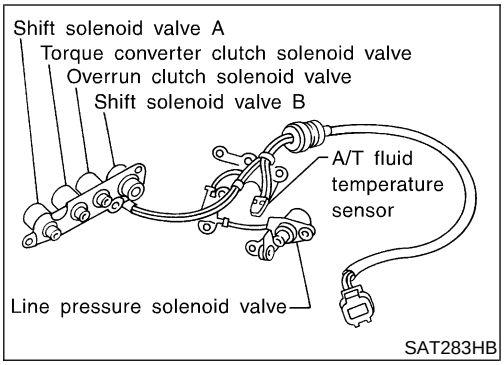
Lever position	Terminal No.				
	36	35	34	27	26
P, N	**B**	0	0	0	0
R	0	**B**	0	0	0
D	0	0	**B**	0	0
2	0	0	0	**B**	0
1	0	0	0	0	**B**

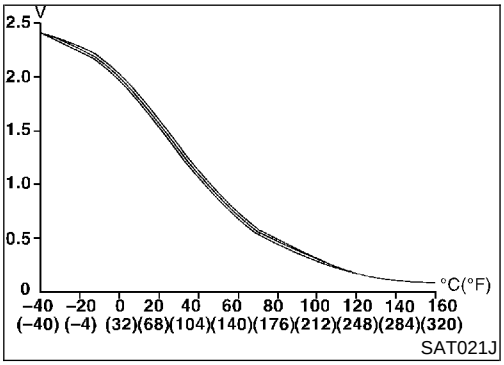
SAT840J

OK or NG		
OK	▶	GO TO 7.
NG	▶	GO TO 5.

7	CHECK DTC	
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-105.		
OK or NG		
OK	▶	**INSPECTION END**
NG	▶	GO TO 8.

8	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.





Description

NFAT0037

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

NFAT0037S01

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

NFAT0037S02

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
42	B	Sensor ground	—	—	0V
47	G	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

NFAT0204

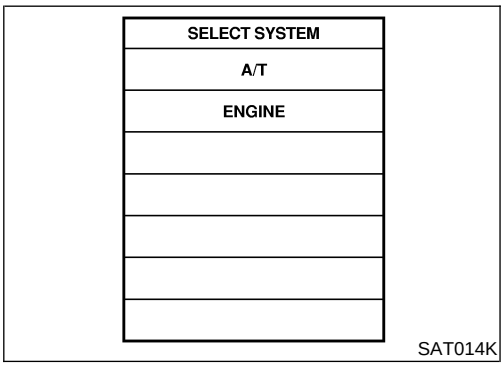
Diagnostic trouble code ATF TEMP SEN/CIRC with CONSULT-II or P0710 without CONSULT-II is detected when TCM receives an excessively low or high voltage from the sensor.

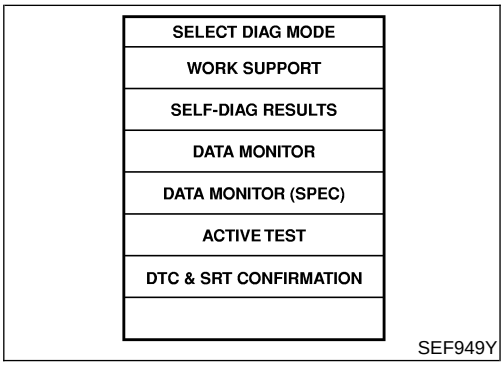
Possible Cause

NFAT0205

Check the following items.

- Harness or connectors
  (The sensor circuit is open or shorted.)
- A/T fluid temperature sensor





Diagnostic Trouble Code (DTC) Confirmation Procedure

NFAT0206

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.

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

WITH CONSULT-II

NFAT0206S01

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

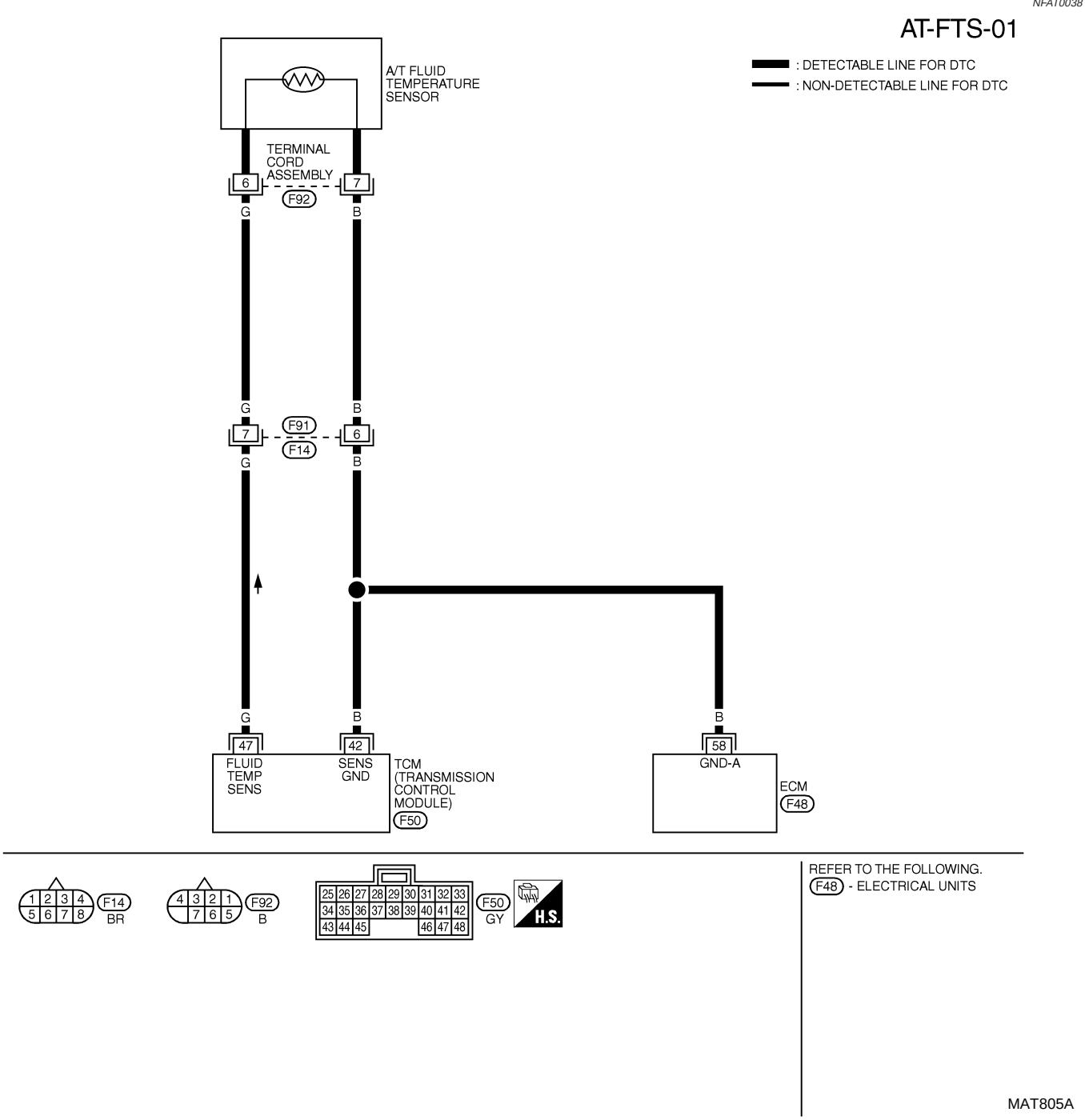
WITH GST

NFAT0206S02

Follow the procedure "With CONSULT-II".

Wiring Diagram — AT — FTS

NFAT0038



TCM TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND 25 (B) OR 48 (B) (TCM GROUND)

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
42	B	SENSOR GROUND	—	0V
47	G	A/T FLUID TEMPERATURE SENSOR	WHEN IGN ON AND ATF TEMPERTURE IS 20°C (68°F)	1.5V
			WHEN IGN ON AND ATF TEMPERTURE IS 80°C (176°F)	0.5V

SAT591KA

Diagnostic Procedure

=NFAT0039

1	INSPECTION START

Do you have CONSULT-II?

Yes or No

Yes	▶	GO TO 2.
No	▶	GO TO 6.

2	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”.

DATA MONITOR	
MONITORING	
VHCL/S SE-A/T	XXX km/h
VHCL/S SE-MTR	XXX km/h
THRTL POS SEN	XXX V
FLUID TEMP SE	XXX V
BATTERY VOLT	XXX V

SAT614J

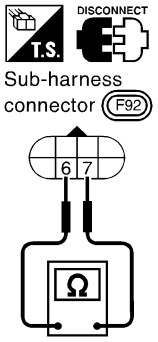
Voltage:
Cold [20°C (68°F)] → Hot [80°C (176°F)]:
Approximately 1.5V → 0.5V

OK or NG

OK	▶	GO TO 7.
NG	▶	GO TO 3.

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 (G) and 7 (B) when A/T is cold.



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

SAT616J

4. Reinstall any part removed.

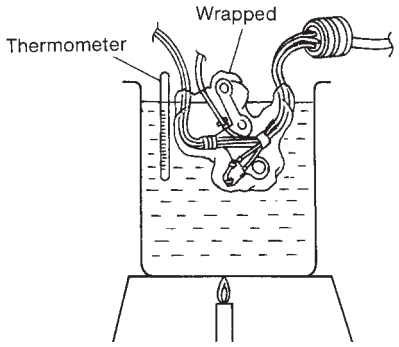
OK or NG

OK	▶	GO TO 4.
NG	▶	GO TO 5.

Diagnostic Procedure (Cont'd)

4	DETECT MALFUNCTIONING ITEM	
Check the following items: ● Harness for short to ground or short to power or open between TCM, ECM and terminal cord assembly (Main harness) ● Ground circuit for ECM Refer to EC-157, "TROUBLE DIAGNOSIS FOR POWER SUPPLY".		
OK or NG		
OK	▶	GO TO 7.
NG	▶	Repair or replace damaged parts.

5	DETECT MALFUNCTIONING ITEM	
1. Remove oil pan, refer to AT-277. 2. Check the following items: ● A/T fluid temperature sensor Check resistance between A/T fluid temperature sensor harness connector F92 terminals 6 (G) and 7 (B) while changing temperature as shown at below.		



SAT298F

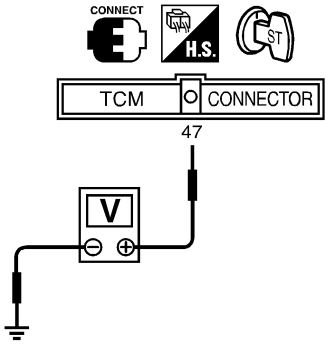
Temperature °C (°F)	Resistance
20 (68)	Approximately 2.5 kΩ
80 (176)	Approximately 0.3 kΩ

MTBL0210

● Harness of terminal cord assembly for short or open		
OK or NG		
OK	▶	GO TO 7.
NG	▶	Repair or replace damaged parts.

6	CHECK INPUT SIGNAL OF A/T FLUID TEMPERATURE SENSOR (Without CONSULT-II)

Without CONSULT-II
1. Start engine.
2. Check voltage between TCM harness connector F50 terminal 47 (G) and ground while warming up A/T.



SAT335JA

Voltage:
Cold [20°C (68°F)] → Hot [80°C (176°F)]:
Approximately 1.5V → 0.5V

OK or NG

OK	▶	GO TO 7.
NG	▶	GO TO 3.

7	CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-111.

OK or NG

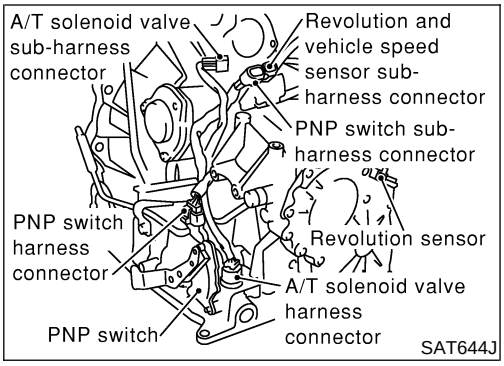
OK	▶	**INSPECTION END**
NG	▶	GO TO 8.

8	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.



Description

NFAT0040

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

NFAT0040S01

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
29	W	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.	450 Hz
				When vehicle parks.	0V
42	B	Sensor ground	—	—	0V

On Board Diagnosis Logic

NFAT0207

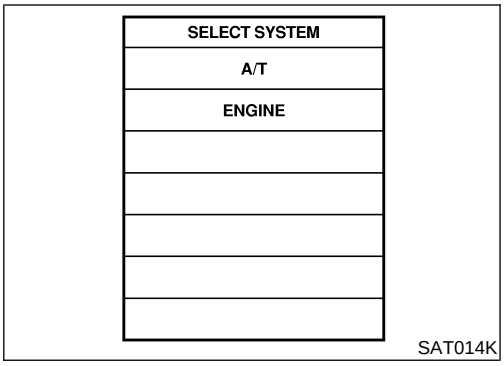
Diagnostic trouble code VEH SPD SEN/CIR AT with CONSULT-II or P0720 without CONSULT-II is detected when TCM does not receive the proper voltage signal from the sensor.

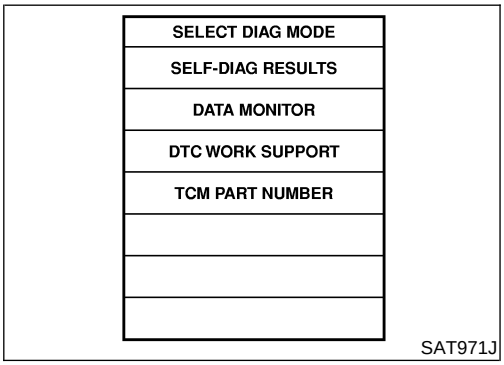
Possible Cause

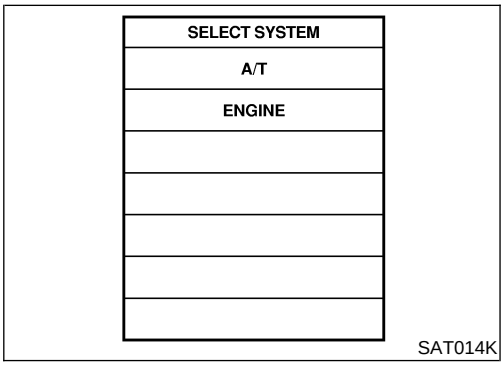
NFAT0208

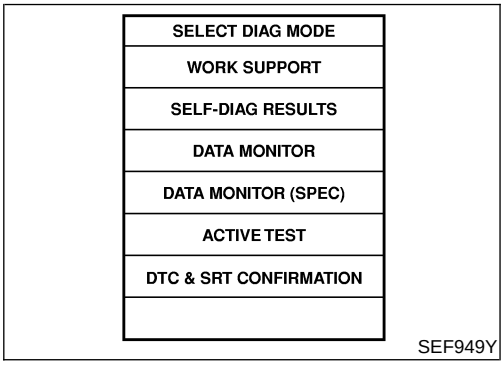
Check the following items.

- Harness or connectors
  (The sensor circuit is open or shorted.)
- Revolution sensor









Diagnostic Trouble Code (DTC) Confirmation Procedure

NFAT0209

CAUTION:

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

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.

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

WITH CONSULT-II

NFAT0209S01

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.
   If the check result is NG, go to "DIAGNOSTIC PROCEDURE", AT-204.
   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
   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 "DIAGNOSTIC PROCEDURE", AT-119.
   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
   Driving location: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.

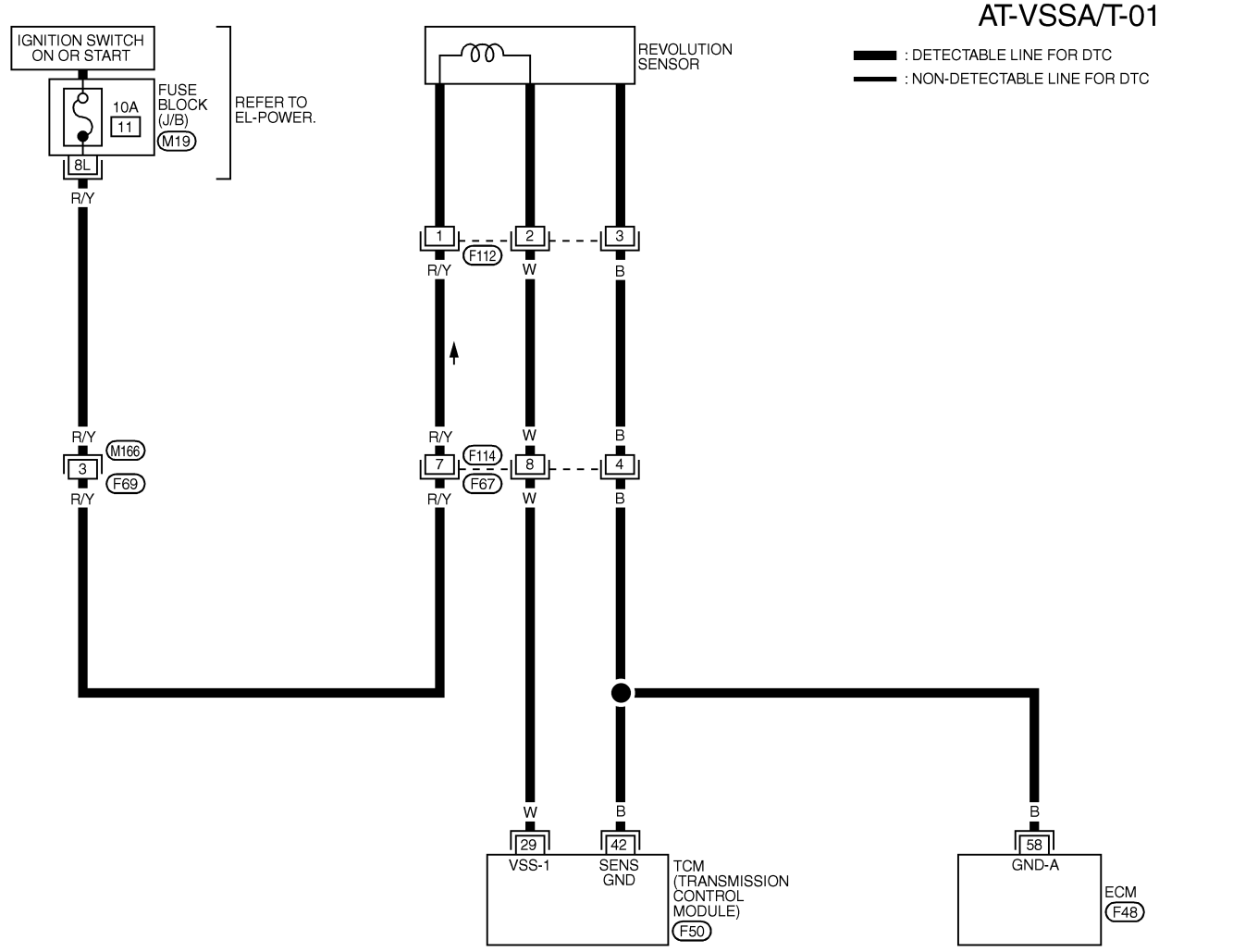
WITH GST

NFAT0209S02

Follow the procedure "With CONSULT-II".

Wiring Diagram — AT — VSSA/T

NFAT0041



TCM TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND 25 (B) OR 48 (B) (TCM GROUND)

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)(Approx.)
29	W	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.	450 Hz
			WHEN VEHICLE PARKS.	UNDER 1.3V OR OVER 4.5V
42	B	SENSOR GROUND	—	0V

SAT592KA

Diagnostic Procedure

NFAT0042

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.

DATA MONITOR	
MONITORING	
VHCL/S SE-A/T	XXX km/h
VHCL/S SE-MTR	XXX km/h
THRTL POS SEN	XXX V
FLUID TEMP SE	XXX V
BATTERY VOLT	XXX V

SAT614J

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.	450 Hz
When vehicle parks.	0V

MTBL1182

- Harness for short or open between TCM, ECM and revolution sensor (Main harness)

OK or NG

OK	▶	GO TO 3.
NG	▶	Repair or replace damaged parts.

3	CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-117.

OK or NG

OK	▶	**INSPECTION END**
NG	▶	GO TO 4.

Diagnostic Procedure (Cont'd)

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.

Description

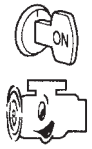
NFAT0043

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

TCM TERMINALS AND REFERENCE VALUE

NFAT0043S01

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
39	W/G	Engine speed signal		Refer to EC-141, “ECM INSPECTION TABLE”.	

On Board Diagnosis Logic

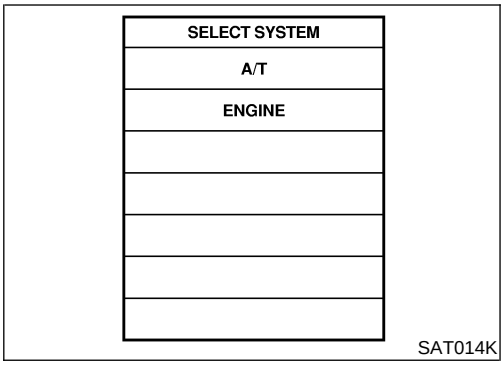
NFAT0210

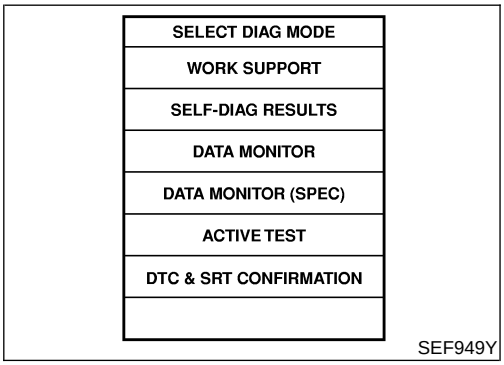
Diagnostic trouble code ENGINE SPEED SIG with CONSULT-II or P0725 without CONSULT-II is detected when TCM does not receive the proper voltage signal from ECM.

Possible Cause

NFAT0211

Check harness or connectors. (The sensor circuit is open or shorted.)





Diagnostic Trouble Code (DTC) Confirmation Procedure

NFAT0212

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.

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

WITH CONSULT-II

NFAT0212S01

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

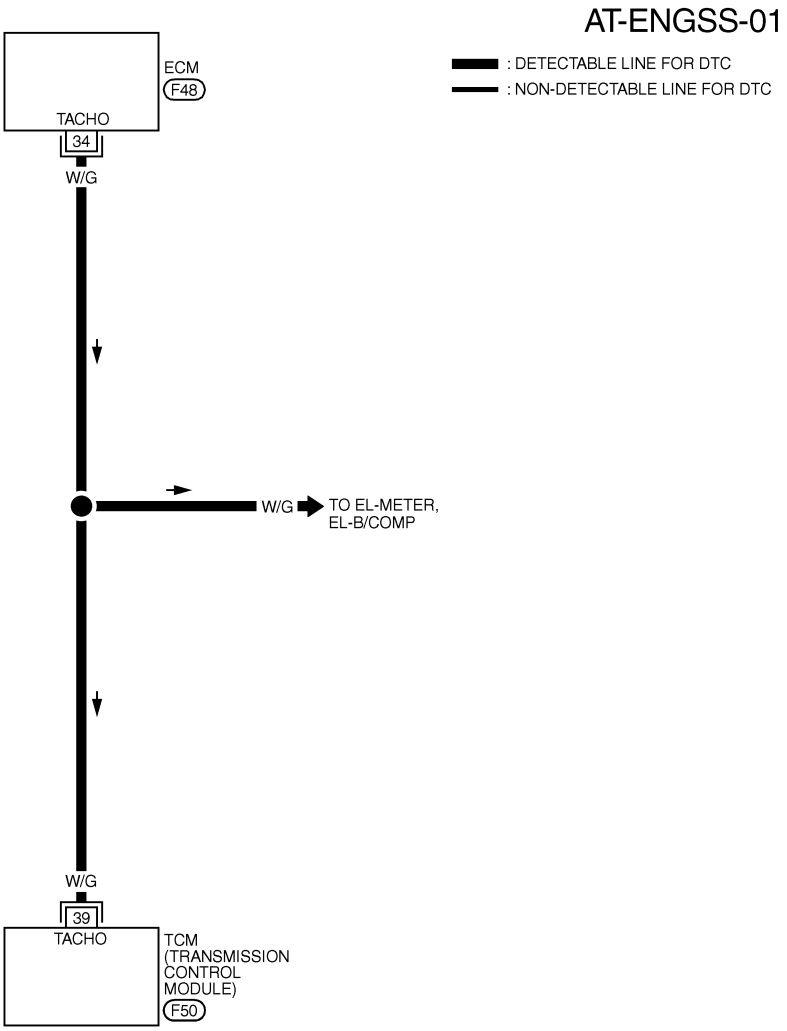
WITH GST

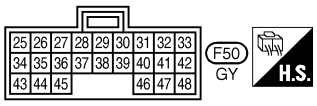
NFAT0212S02

Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — ENGSS

NFAT0044





REFER TO THE FOLLOWING.
F48 - ELECTRICAL UNITS

MAT064B

TCM TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND 25 (B) OR 48 (B) (TCM GROUND)

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
39	W/G	ENGINE SPEED SIGNAL.	REFER TO EC section, “ECM INSPECTION TABLE”.	

SAT296KB

Diagnostic Procedure

NFAT0045

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-92, “MALFUNCTION Indicator Lamp (MIL)”.

OK or NG

OK (with CONSULT-II)	▶	GO TO 2.
OK (without CONSULT-II)	▶	GO TO 4.
NG	▶	Check ignition signal circuit for engine control. Refer to EC-692, “DTC Ignition Signal”.

2	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 “ENGINE SPEED”.
   Check engine speed changes according to throttle position.

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 6.
NG	▶	GO TO 3.

3	DETECT MALFUNCTIONING ITEM

Check the following items:

- Harness for short or open between TCM and ECM
- Resistor and ignition coil
  Refer to EC-692, “DTC Ignition Signal”.

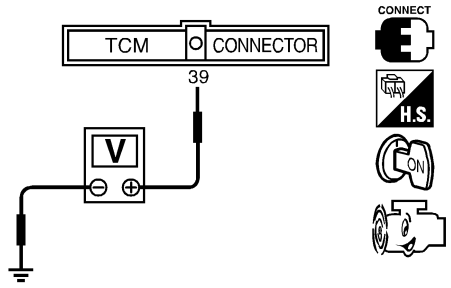
OK or NG

OK	▶	GO TO 6.
NG	▶	Repair or replace damaged parts.

4	CHECK INPUT SIGNAL (Without CONSULT-II)

Without CONSULT-II

1. Start engine.
2. Check voltage between TCM harness connector F50 terminal 39 (W/G) and ground.



SAT520JD

Voltage:
0.6 (Idle speed) - 2.2V (3,000 rpm)

OK or NG

OK	▶	GO TO 6.
NG	▶	GO TO 5.

5	DETECT MALFUNCTIONING ITEM

Check the following items:

- Harness for short or open between TCM and ECM
- Resistor and ignition coil
  Refer to EC-692, "DTC Ignition Signal".

OK or NG

OK	▶	GO TO 6.
NG	▶	Repair or replace damaged parts.

6	CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-122.

OK or NG

OK	▶	**INSPECTION END**
NG	▶	GO TO 7.

7	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.

Description

NFAT0046

- This is an OBD-II self-diagnostic item and not available in TCM self-diagnosis.
- This malfunction will not be detected while the A/T CHECK 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

NFAT0046S01

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
11	R/Y	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	LG/B	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

NFAT0213

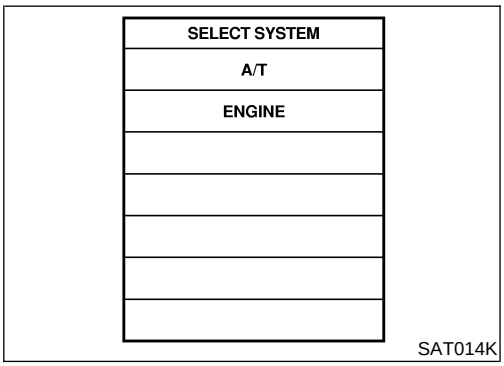
This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by TCM as follows:
Torque converter slip ratio = A x C/B
A: Output shaft revolution signal from revolution sensor
B: Engine speed signal from ECM
C: Gear ratio determined as gear position which TCM supposes
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 positions supposed by TCM are as follows.
In case of gear position with no malfunctions: **1**, 2, 3 and 4 positions
In case of gear position with shift solenoid valve A stuck open: **2***, 2, 3 and 3 positions
In case of gear position with shift solenoid valve B stuck open: **4***, 3, 3 and 4 positions to each gear position above
*: P0731 is detected.
Diagnostic trouble code A/T 1ST GR FNCTN with CONSULT-II or P0731 without CONSULT-II is detected when A/T cannot be shifted to the 1st gear position even if electrical circuit is good.

Possible Cause

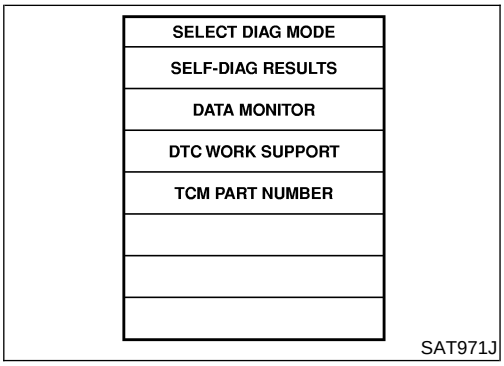
NFAT0214

Check the following items.

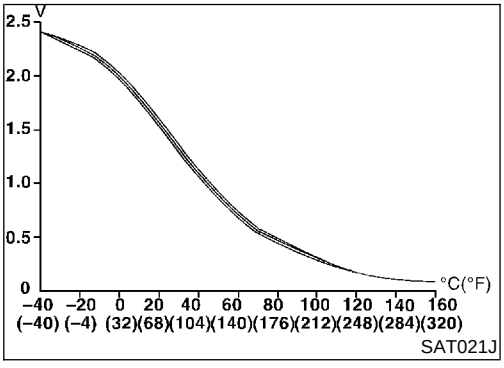
- Shift solenoid valve A
- Shift solenoid valve B
- Each clutch
- Hydraulic control circuit



SAT014K



SAT971J



SAT021J

Diagnostic Trouble Code (DTC) Confirmation Procedure

NFAT0215

CAUTION:

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

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 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

NFAT0215S01

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
   - **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 “DIAGNOSTIC PROCEDURE”, AT-130.
   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-DIAG RESULTS” 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 "DIAGNOSTIC PROCEDURE", AT-130.
Refer to shift schedule, AT-376.

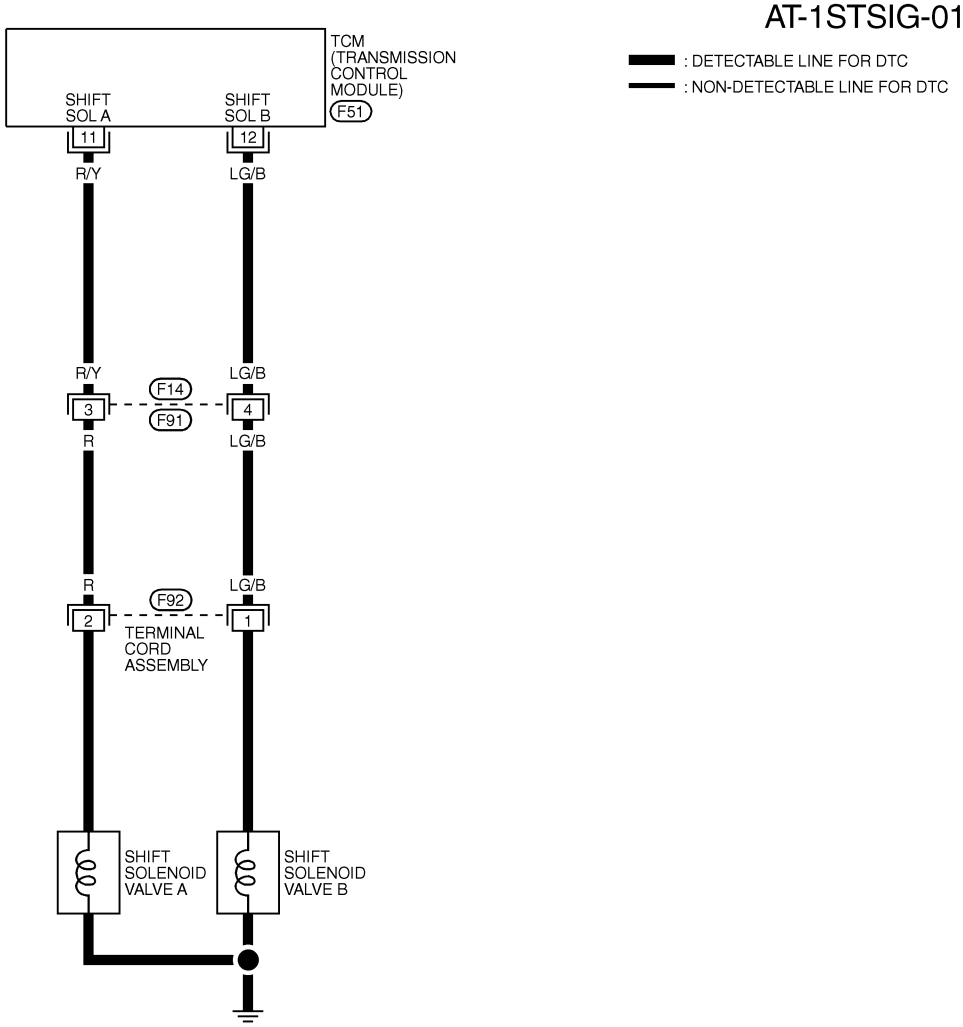
WITH GST

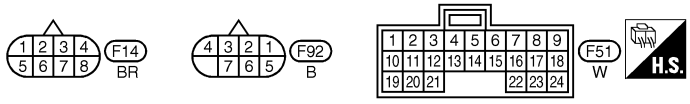
NFAT0215S02

Follow the procedure "With CONSULT-II".

Wiring Diagram — AT — 1ST

NFAT0047





MAT808A

TCM TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND 25 (B) OR 48 (B) (TCM GROUND)

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
11	R/Y	SHIFT SOLENOID VALVE A	WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE A OPERATES (WHEN DRIVING IN D1 OR D4)	BATTERY VOLTAGE
			WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE A DOES NOT OPERATE (WHEN DRIVING IN D2 OR D3)	0V
12	LG/B	SHIFT SOLENOID VALVE B	WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE B OPERATES (WHEN DRIVING IN D1 OR D2)	BATTERY VOLTAGE
			WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE B DOES NOT OPERATE (WHEN DRIVING IN D3 OR D4)	0V

SAT297KA

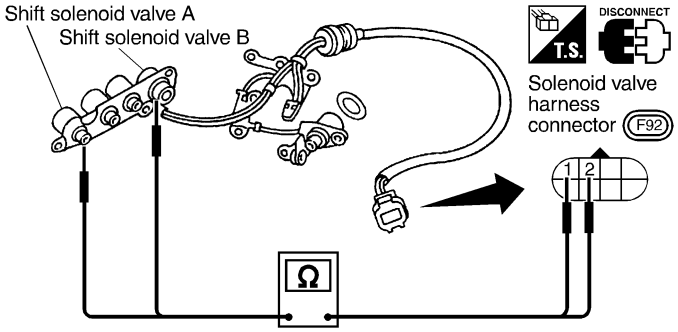
Diagnostic Procedure

NFAT0048

1	CHECK SHIFT SOLENOID VALVE RESISTANCE

1. Remove control valve assembly. Refer to AT-277.
- Shift solenoid valve A
- Shift solenoid valve B

2. Check resistance between two terminals.



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

SAT043KB

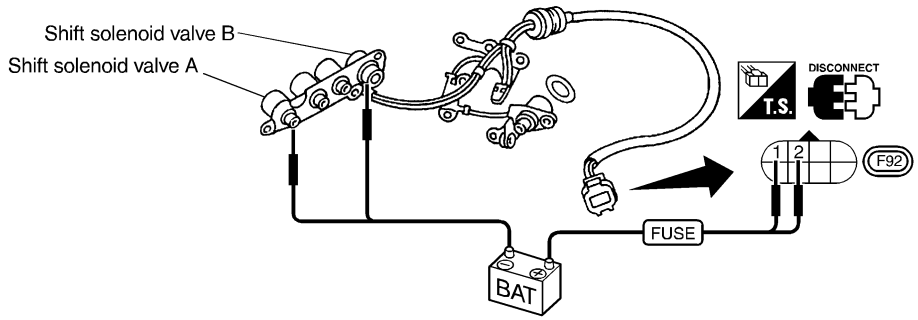
OK or NG

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

2	CHECK SHIFT SOLENOID VALVE OPERATION

1. Remove control valve assembly. Refer to AT-277.
- Shift solenoid valve A
- Shift solenoid valve B

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



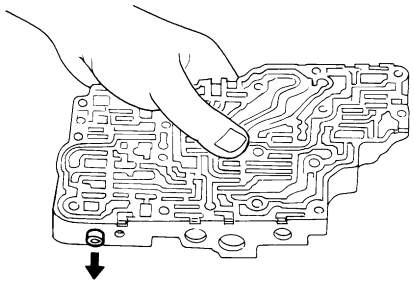
SAT044K

OK or NG

OK	▶	GO TO 3.
NG	▶	Repair or replace shift solenoid valve assembly.

3	CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to "Control Valve Assembly", AT-277.
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.



SAT367H

OK or NG

OK	▶	GO TO 4.
NG	▶	Repair control valve assembly.

4	CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-127.

OK or NG

OK	▶	**INSPECTION END**
NG	▶	Check control valve again. Repair or replace control valve assembly.

Description

NFAT0049

- This is an OBD-II self-diagnostic item and not available in TCM self-diagnosis.
- This malfunction will not be detected while the A/T CHECK 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

NFAT0049S01

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
12	LG/B	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

NFAT0216

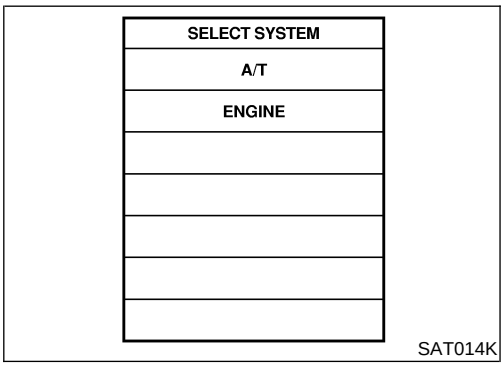
This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by TCM as follows:
Torque converter slip ratio = A x C/B
A: Output shaft revolution signal from revolution sensor
B: Engine speed signal from ECM
C: Gear ratio determined as gear position which TCM supposes
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 positions supposed by TCM are as follows.
In case of gear position with no malfunctions: 1, **2**, 3 and 4 positions
In case of gear position with shift solenoid valve B stuck open: 4, **3***, 3 and 4 positions to each gear position above
*: P0732 is detected.
Diagnostic trouble code A/T 2ND GR FNCTN with CONSULT-II or P0732 without CONSULT-II is detected when A/T cannot be shifted to the 2nd gear position even if electrical circuit is good.

Possible Cause

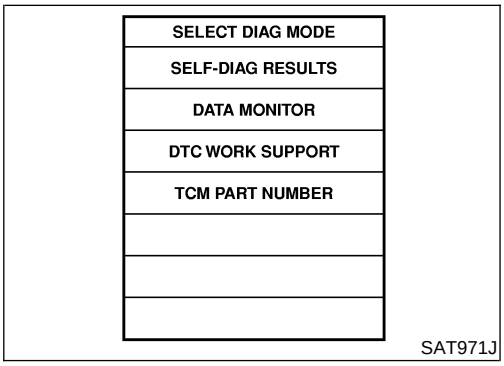
NFAT0217

Check the following items.

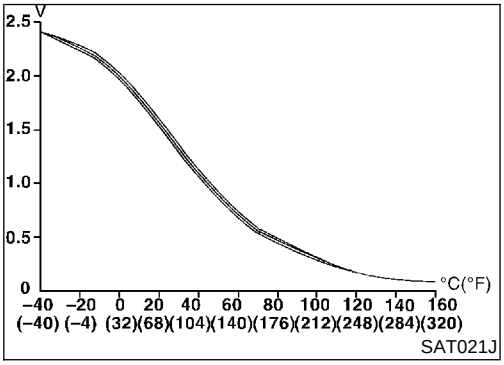
- Shift solenoid valve B
- Each clutch
- Hydraulic control circuit



SAT014K



SAT971J



SAT021J

Diagnostic Trouble Code (DTC) Confirmation Procedure

NFAT0218

CAUTION:

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

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 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

NFAT0218S01

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 45 to 50 km/h (28 to 31 MPH) under the following condition and release the accelerator pedal completely.
   THROTTLE POSI: Less than 1.0/8
   Selector lever: D position (O/D 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 45 to 50 km/h (28 to 31 MPH) until “TESTING” changes to “STOP VEHICLE” or “COMPLETE”. (It will take approximately 3 seconds.)
   If the check result NG appears on CONSULT-II screen, go to “DIAGNOSTIC PROCEDURE”, AT-136.
   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-DIAG RESULTS” 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 "DIAGNOSTIC PROCEDURE", AT-136.
   Refer to shift schedule, AT-376.

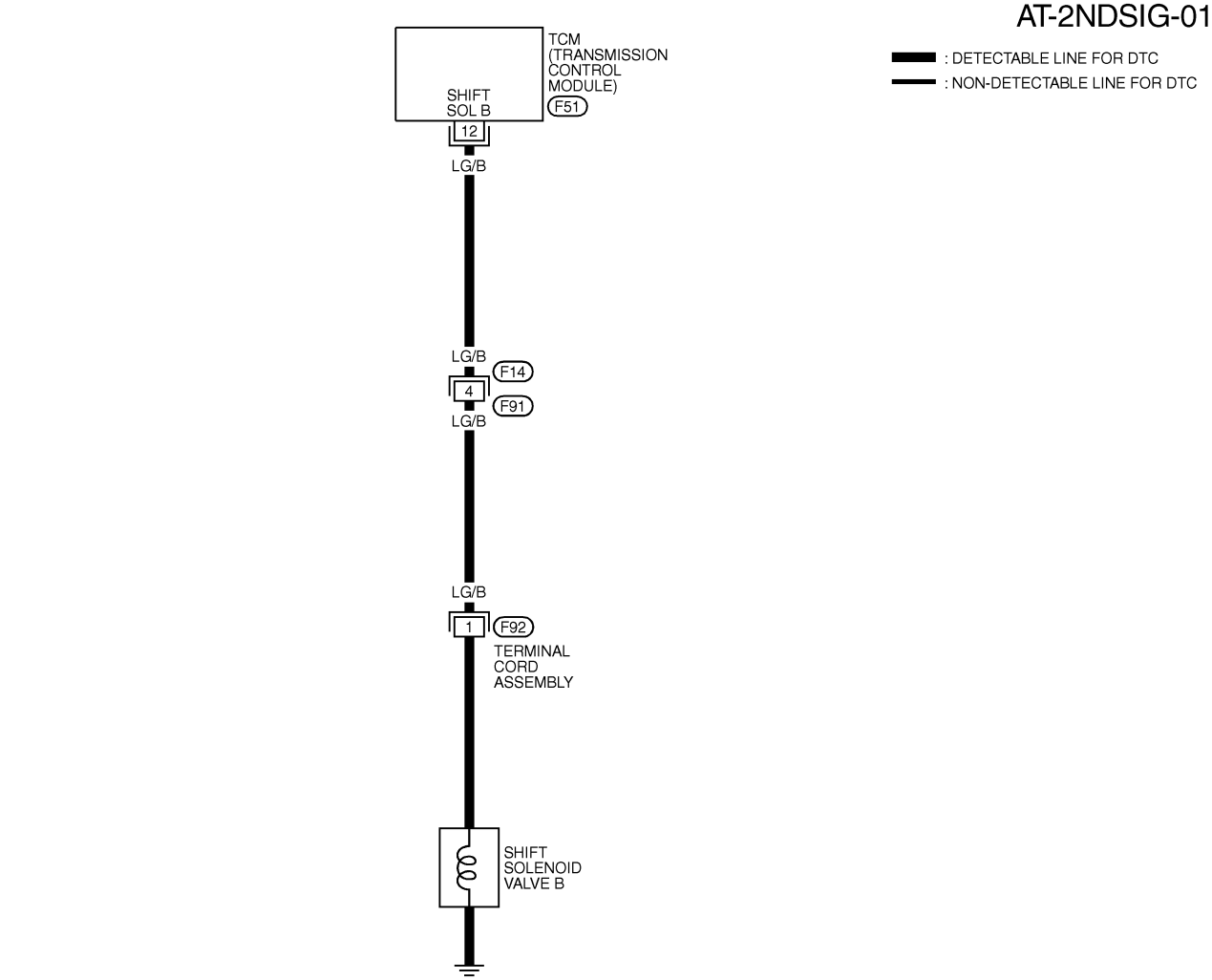
WITH GST

NFAT0218S02

Follow the procedure "With CONSULT-II".

Wiring Diagram — AT — 2ND

NFAT0050



MAT809A

TCM TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND 25 (B) OR 48 (B) (TCM GROUND)

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
12	LG/B	SHIFT SOLENOID VALVE B	WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE B OPERATES (WHEN DRIVING IN D1 OR D2)	BATTERY VOLTAGE
			WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE B DOES NOT OPERATE (WHEN DRIVING IN D3 OR D4)	0V

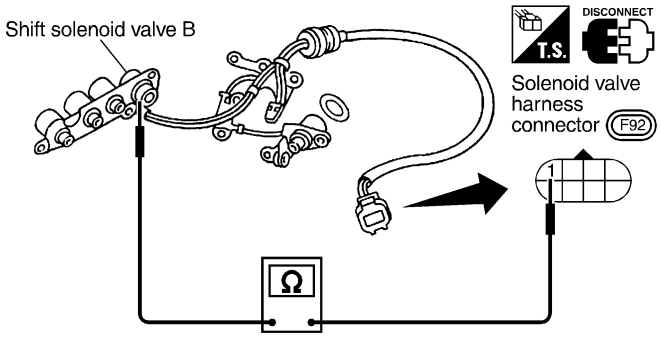
SAT298KA

Diagnostic Procedure

NFAT0051

1	CHECK SHIFT SOLENOID VALVE RESISTANCE

1. Remove control valve assembly. Refer to AT-277.
- Shift solenoid valve B
2. Check resistance to the terminal and ground.



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

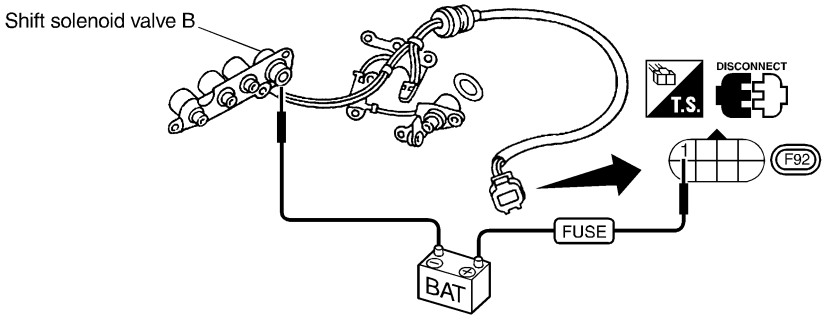
SAT045KB

OK or NG

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

2	CHECK SHIFT SOLENOID VALVE OPERATION

1. Remove control valve assembly. Refer to AT-277.
- Shift solenoid valve B
2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



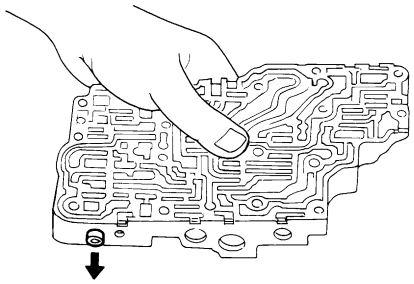
SAT036K

OK or NG

OK	▶	GO TO 3.
NG	▶	Repair or replace shift solenoid valve assembly.

3	CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to "Control Valve Assembly", AT-309.
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.



SAT367H

OK or NG

OK	▶	GO TO 4.
NG	▶	Repair control valve assembly.

4	CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-133.

OK or NG

OK	▶	**INSPECTION END**
NG	▶	Check control valve again. Repair or replace control valve assembly.

Description

NFAT0052

- This is an OBD-II self-diagnostic item and not available in TCM self-diagnosis.
- This malfunction will not be detected while the A/T CHECK 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

NFAT0052S01

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
11	R/Y	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

NFAT0219

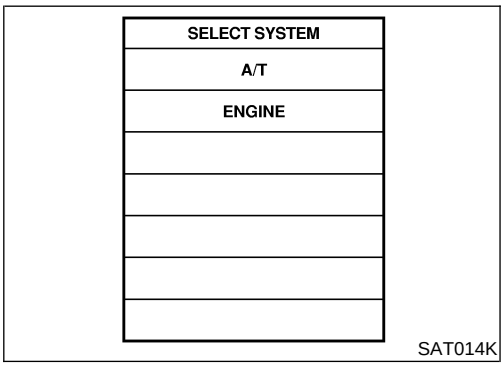
This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by TCM as follows:
Torque converter slip ratio = A x C/B
A: Output shaft revolution signal from revolution sensor
B: Engine speed signal from ECM
C: Gear ratio determined as gear position which TCM supposes
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 positions supposed by TCM are as follows.
In case of gear position with no malfunctions: 1, 2, **3** and 4 positions
In case of gear position with shift solenoid valve A stuck closed: 1, 1, **4*** and 4 positions to each gear position above
*: P0733 is detected.
Diagnostic trouble code A/T 3RD GR FNCTN with CONSULT-II or P0733 without CONSULT-II is detected when A/T cannot be shifted to the 3rd gear position even if electrical circuit is good.

Possible Cause

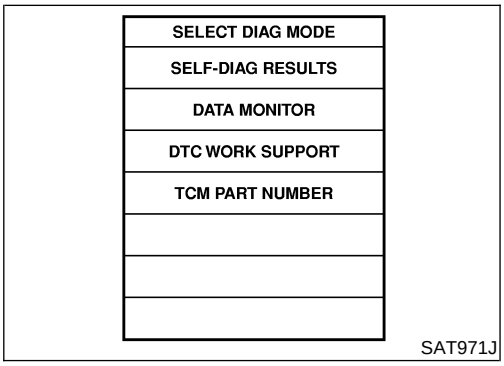
NFAT0220

Check the following items.

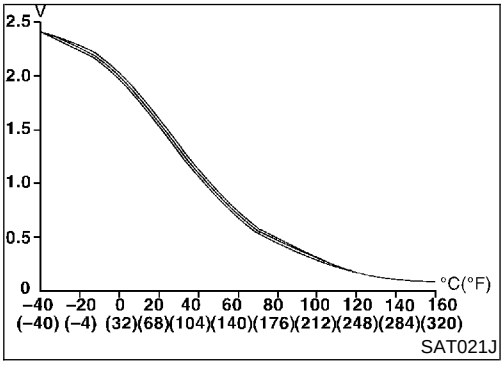
- Shift solenoid valve A
- Each clutch
- Hydraulic control circuit



SAT014K



SAT971J



SAT021J

Diagnostic Trouble Code (DTC) Confirmation Procedure

NFAT0221

CAUTION:

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

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 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

NFAT0221S01

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 60 to 75 km/h (37 to 47 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
   - **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 60 to 75 km/h (37 to 47 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 "DIAGNOSTIC PROCEDURE", AT-142.
   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-DIAG RESULTS" 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 "DIAGNOSTIC PROCEDURE".)
   Refer to "DIAGNOSTIC PROCEDURE", AT-142.
   Refer to shift schedule, AT-376.

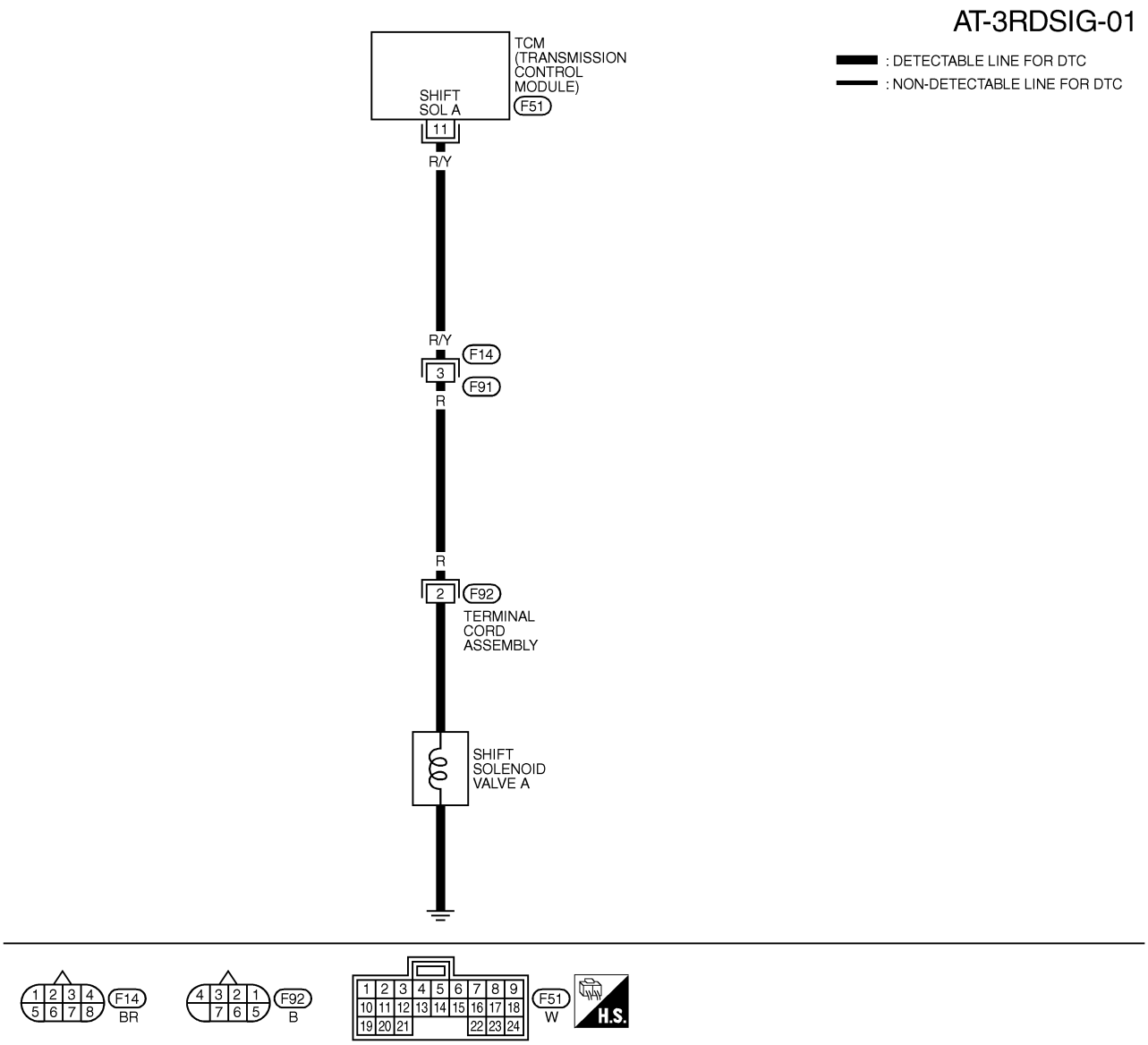
WITH GST

NFAT0221S02

Follow the procedure "With CONSULT-II".

Wiring Diagram — AT — 3RD

NFAT0053



MAT810A

TCM TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND 25 (B) OR 48 (B) (TCM GROUND)

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
11	R/Y	SHIFT SOLENOID VALVE A	WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE A OPERATES (WHEN DRIVING IN D1 OR D4)	BATTERY VOLTAGE
			WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE A DOES NOT OPERATE (WHEN DRIVING IN D2 OR D3)	0V

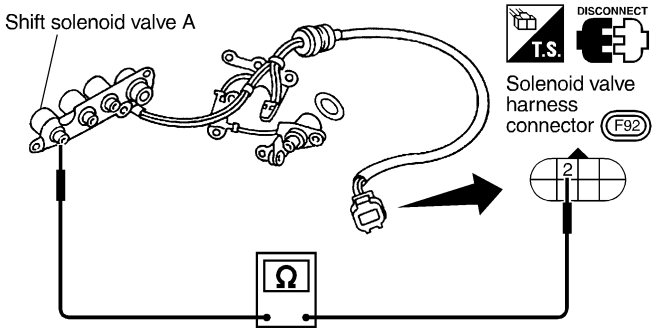
SAT299KA

Diagnostic Procedure

NFAT0054

1	CHECK SHIFT SOLENOID VALVE RESISTANCE

1. Remove control valve assembly. Refer to AT-277.
- Shift solenoid valve A
2. Check resistance to the terminal and ground.



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

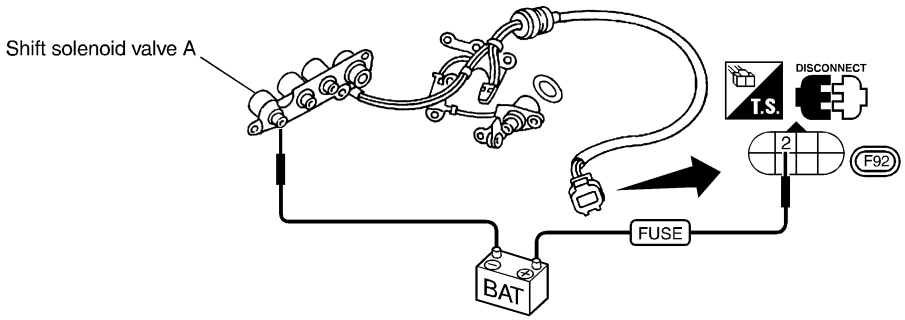
SAT046KB

OK or NG

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

2	CHECK SHIFT SOLENOID VALVE OPERATION

1. Remove control valve assembly. Refer to AT-277.
- Shift solenoid valve A
2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



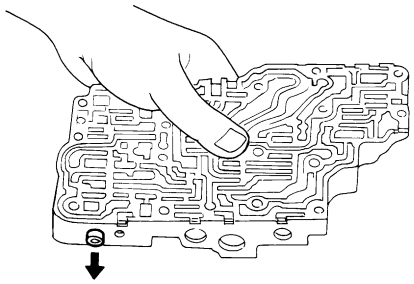
SAT035K

OK or NG

OK	▶	GO TO 3.
NG	▶	Repair or replace shift solenoid valve assembly.

3	CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to "Control Valve Assembly", AT-309.
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.



SAT367H

OK or NG

OK	▶	GO TO 4.
NG	▶	Repair control valve assembly.

4	CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-139.

OK or NG

OK	▶	**INSPECTION END**
NG	▶	Check control valve again. Repair or replace control valve assembly.

Description

NFAT0055

- This is an OBD-II self-diagnostic item and not available in TCM self-diagnosis.
- This malfunction will not be detected while the A/T CHECK indicator lamp is indicating another self-diagnosis malfunction.
- This malfunction is detected when the A/T does not shift into fourth gear position or the torque converter clutch does not lock up 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

NFAT0055S01

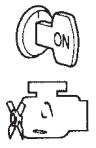
Remarks: Specification data are reference values.

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

NFAT0055S02

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
1	G/R	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	W/B	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
11	R/Y	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	LG/B	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

NFAT0222

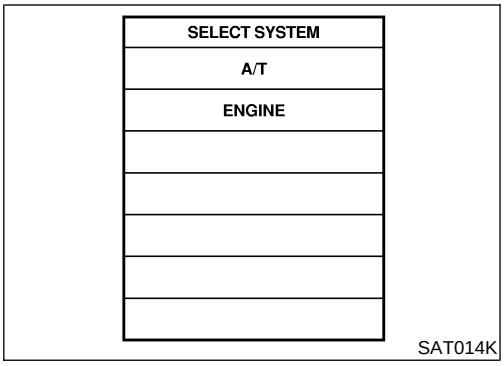
This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by TCM as follows:
Torque converter slip ratio = A x C/B
A: Output shaft revolution signal from revolution sensor
B: Engine speed signal from ECM
C: Gear ratio determined as gear position which TCM supposes
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 B is stuck closed.
Gear positions supposed by TCM are as follows.
In case of gear position with no malfunctions: 1, 2, 3 and **4** positions
In case of gear position with shift solenoid valve B stuck closed: 1, 2, 2 and **1*** positions to each gear position above
*: P0734 is detected.
Diagnostic trouble code A/T 4TH GR FNCTN with CONSULT-II or P0734 without CONSULT-II is detected when A/T cannot be shifted to the 4th gear position even if electrical circuit is good.

Possible Cause

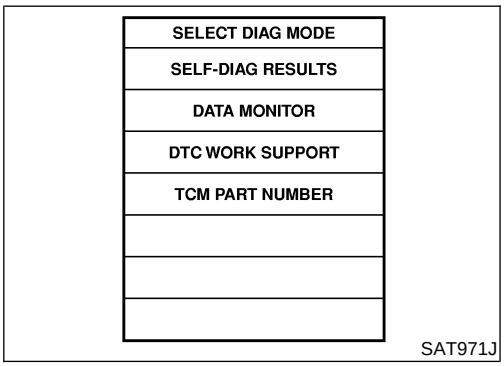
NFAT0223

Check the following items.

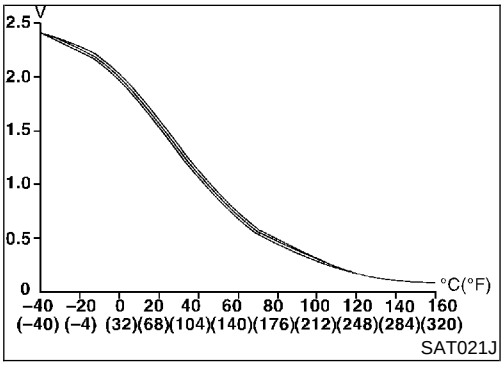
- Shift solenoid valve A
- Shift solenoid valve B
- Line pressure solenoid valve
- Each clutch
- Hydraulic control circuit



SAT014K



SAT971J



SAT021J

Diagnostic Trouble Code (DTC) Confirmation Procedure

NFAT0224

CAUTION:

- **Always drive vehicle at a safe speed.**
- **If conducting this "DTC CONFIRMATION PROCEDURE" again, always turn ignition switch OFF and wait at least 10 seconds before continuing.**
- **Be careful not to rev engine into the red zone on the tachometer.**

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 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

NFAT0224S01

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 55 to 65 km/h (34 to 40 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
   - **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 55 to 65 km/h (34 to 40 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 "DIAGNOSTIC PROCEDURE", AT-149.
   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-DIAG RESULTS" 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.	1 → 2 → 2 → 1

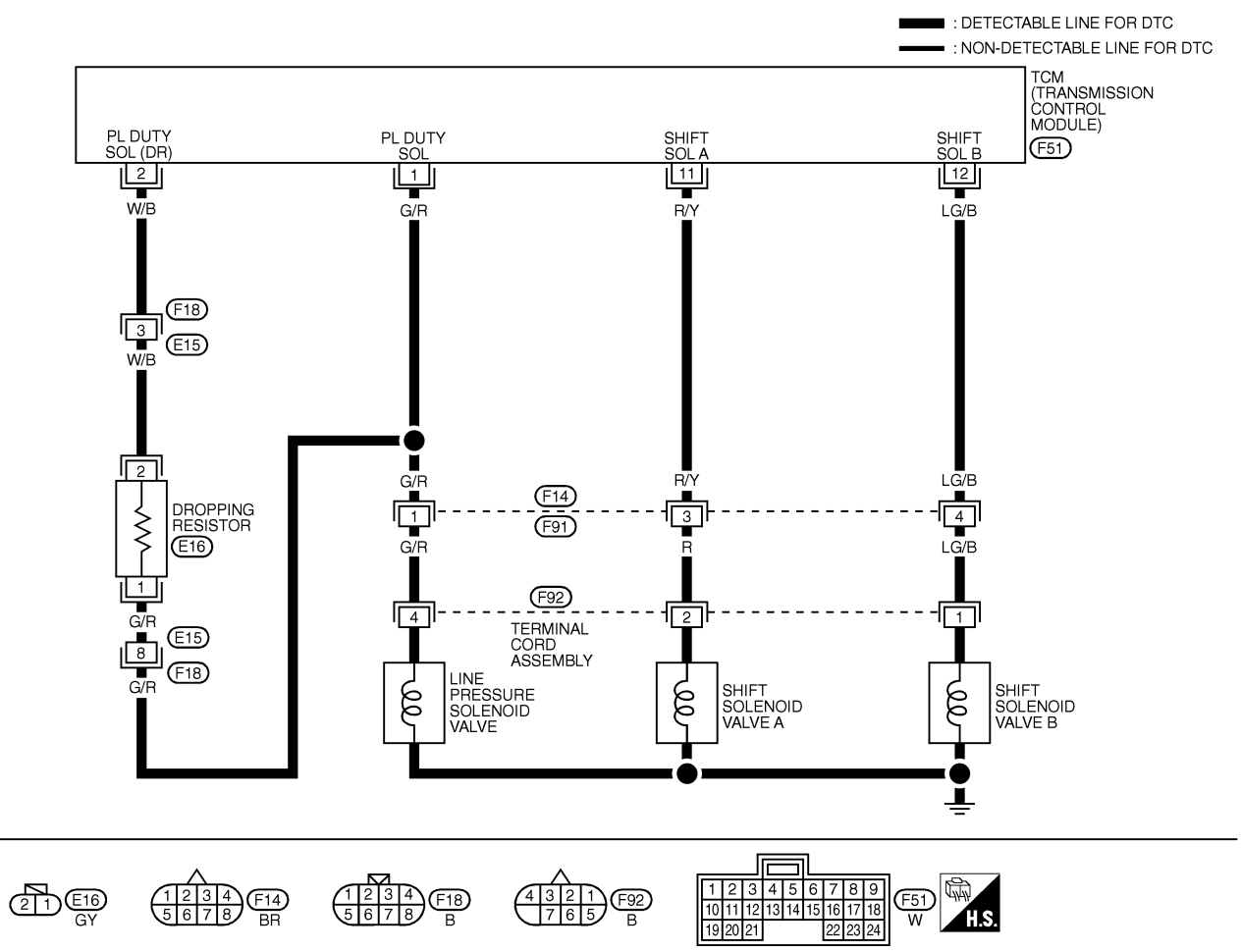
8) Make sure that "OK" is displayed. (If "NG" is displayed, refer to "DIAGNOSTIC PROCEDURE".)
   Refer to "DIAGNOSTIC PROCEDURE", AT-149.
   Refer to shift schedule, AT-376.

WITH GST NFAT0224S02

Follow the procedure "With CONSULT-II".

Wiring Diagram — AT — 4TH

NFAT0056



MAT065B

TCM TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND 25 (B) OR 48 (B) (TCM GROUND)

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
1	G/R	LINE PRESSURE SOLENOID VALVE	WHEN VEHICLE STARTS AND ACCELERATOR PEDAL IS RELEASED	1.5 - 3.0V
			WHEN VEHICLE STARTS AND ACCELERATOR PEDAL IS DEPRESSED	0V
2	W/B	LINE PRESSURE SOLENOID VALVE (DROPPING RESISTOR)	WHEN VEHICLE STARTS AND ACCELERATOR PEDAL IS RELEASED	4 - 14V
			WHEN VEHICLE STARTS AND ACCELERATOR PEDAL IS DEPRESSED	0V
11	R/Y	SHIFT SOLENOID VALVE A	WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE A OPERATES (WHEN DRIVING IN D1 OR D4)	BATTERY VOLTAGE
			WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE A DOES NOT OPERATE (WHEN DRIVING IN D2 OR D3)	0V
12	LG/B	SHIFT SOLENOID VALVE B	WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE B OPERATES (WHEN DRIVING IN D1 OR D2)	BATTERY VOLTAGE
			WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE B DOES NOT OPERATE (WHEN DRIVING IN D3 OR D4)	0V

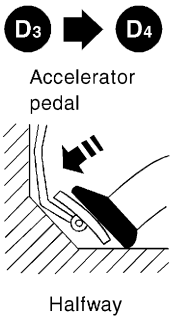
SAT300KA

Diagnostic Procedure

NFAT0057

1	CHECK SHIFT UP (D_3 TO D_4)

During “Cruise test − Part 1” (AT-76), does A/T shift from D_3 to D_4 at the specified speed?



SAT988H

Yes or No

Yes	▶	GO TO 11.
No	▶	GO TO 2.

2	CHECK LINE PRESSURE

Perform line pressure test.
Refer to AT-67.

Engine speed rpm	Line pressure kPa (kg/cm², psi)	
	D, 2 and 1 positions	R position
Idle	500 (5.1, 73)	778 (7.9, 113)
Stall	1,233 (12.6, 179)	1,918 (19.6, 278)

MTBL1183

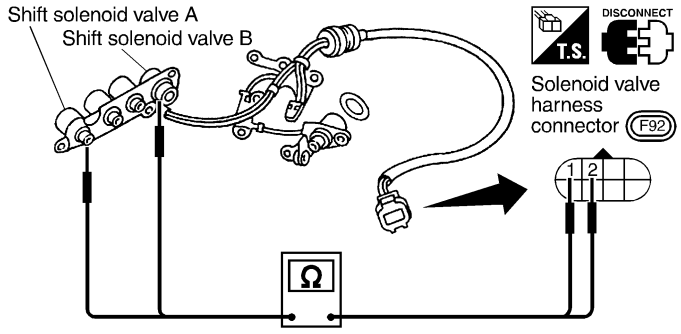
OK or NG

OK	▶	GO TO 3.
NG	▶	GO TO 7.

3	CHECK SHIFT SOLENOID VALVE RESISTANCE

1. Remove control valve assembly. Refer to AT-277.
- Shift solenoid valve A
- Shift solenoid valve B

2. Check resistance between two terminals.



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

SAT043KB

OK or NG

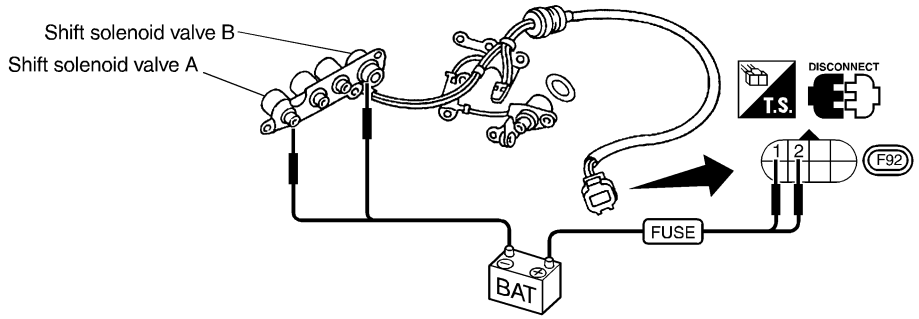
OK	▶	GO TO 5.
NG	▶	Replace shift solenoid valve assembly.

Diagnostic Procedure (Cont'd)

4	CHECK SHIFT SOLENOID VALVE OPERATION

1. Remove control valve assembly. Refer to AT-277.
- Shift solenoid valve A
- Shift solenoid valve B

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



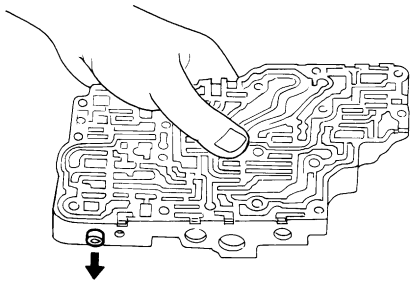
SAT044K

OK or NG

OK	▶	GO TO 5.
NG	▶	Replace shift solenoid valve assembly.

5	CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to AT-309.
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.



SAT367H

OK or NG

OK	▶	GO TO 6.
NG	▶	Repair control valve.

6	CHECK SHIFT UP (D_3 TO D_4)

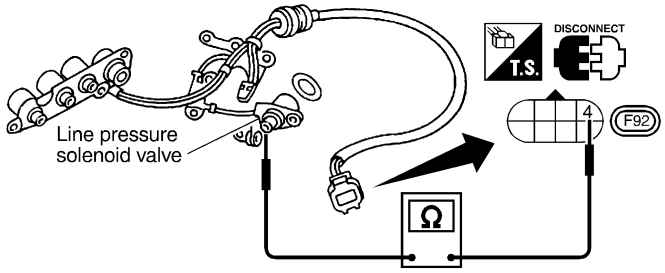
Does A/T shift from D_3 to D_4 at the specified speed?

OK or NG

OK	▶	GO TO 11.
NG	▶	Check control valve again. Repair or replace control valve assembly.

7	CHECK SOLENOID VALVE RESISTANCE

1. Remove control valve assembly. Refer to AT-277.
- Line pressure solenoid valves
2. Check resistance to the terminal and ground.



Solenoid valve	Terminal No. (Wire color)		Resistance (Approx.)
Line pressure solenoid valve	4 (G/R)	Ground	2.5 - 5Ω

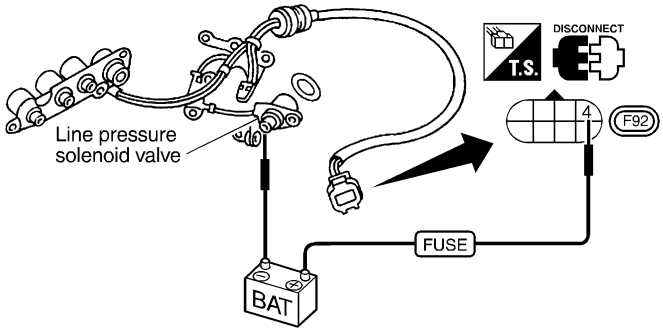
SAT625JA

OK or NG

OK	▶	GO TO 9.
NG	▶	Replace solenoid valve assembly.

8	CHECK SOLENOID VALVE OPERATION

1. Remove control valve assembly. Refer to AT-277.
- Line pressure solenoid valves
2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



SAT626J

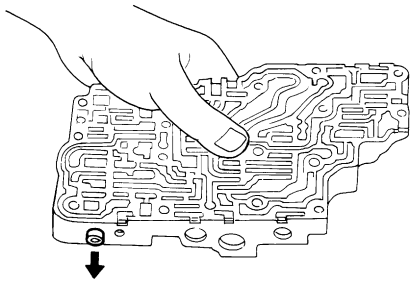
OK or NG

OK	▶	GO TO 9.
NG	▶	Replace solenoid valve assembly.

Diagnostic Procedure (Cont'd)

9	CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to AT-309.
2. Check line pressure circuit valves for sticking.
- Pressure regulator valve
- Pilot valve
- Pressure modifier valve



SAT367H

OK or NG

OK	▶	GO TO 10.
NG	▶	Repair control valve.

10	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

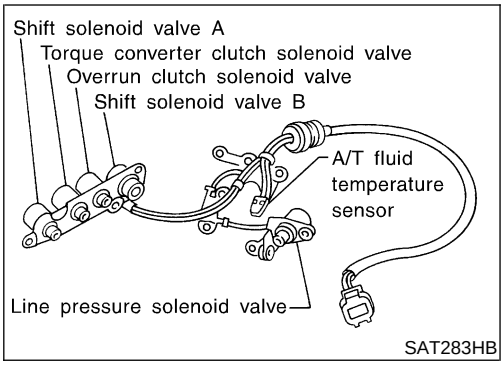
OK	▶	GO TO 11.
NG	▶	Check control valve again. Repair or replace control valve assembly.

11	CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-146.

OK or NG

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



Description

NFAT0058

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 2.0/8) 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

NFAT0058S01

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

NFAT0058S02

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
3	G/B	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

NFAT0225

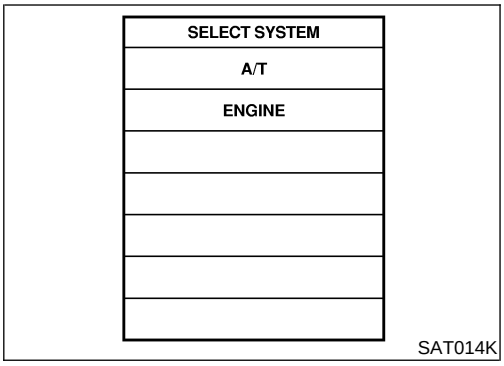
Diagnostic trouble code TCC SOLENOID/CIRC with CONSULT-II or P0740 without CONSULT-II is detected when TCM detects an improper voltage drop when it tries to operate the solenoid valve.

Possible Cause

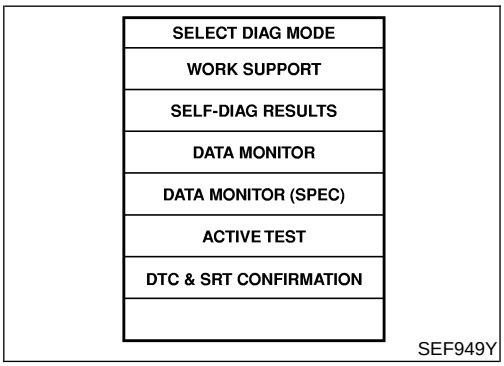
NFAT0226

Check the following items.

- Torque converter clutch solenoid valve
- Harness or connectors
  (The solenoid circuit is open or shorted.)



SAT014K



SEF949Y

Diagnostic Trouble Code (DTC) Confirmation Procedure

NFAT0227

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.

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

WITH CONSULT-II

NFAT0227S01

1) Turn ignition switch ON.
2) Select “DATA MONITOR” mode for “ENGINE” with CONSULT-II and wait at least 1 second.

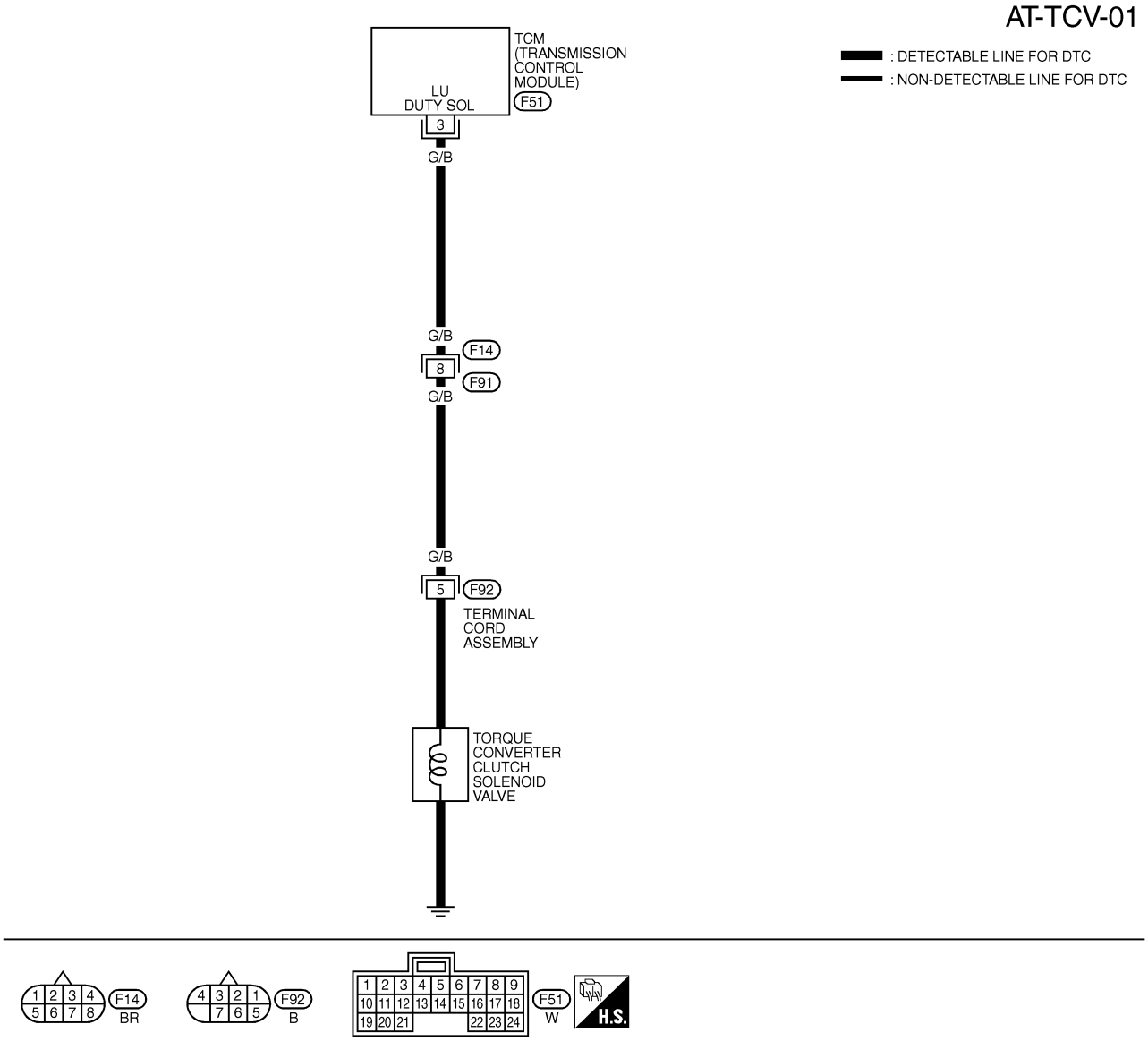
WITH GST

NFAT0227S02

Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — TCV

NFAT0059



MAT812A

TCM TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND 25 (B) OR 48 (B) (TCM GROUND)

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
3	G/B	TORQUE CONVERTER CLUTCH SOLENOID VALVE	VEHICLE STARTS AND A/T PERFORMS LOCK-UP	8 - 15V
			VEHICLE STARTS AND A/T DOES NOT PERFORM LOCK-UP	0V

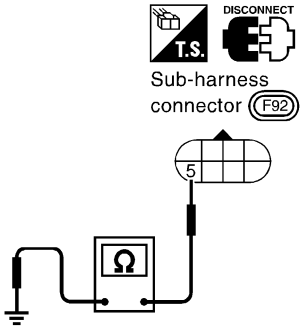
SAT305KA

Diagnostic Procedure

NFAT0060

1	CHECK SOLENOID VALVE RESISTANCE

1. Turn ignition switch to OFF position.
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminal 5 (G/B) and ground.



Resistance: 5 - 20Ω (Approx.)

SAT627JB

OK or NG

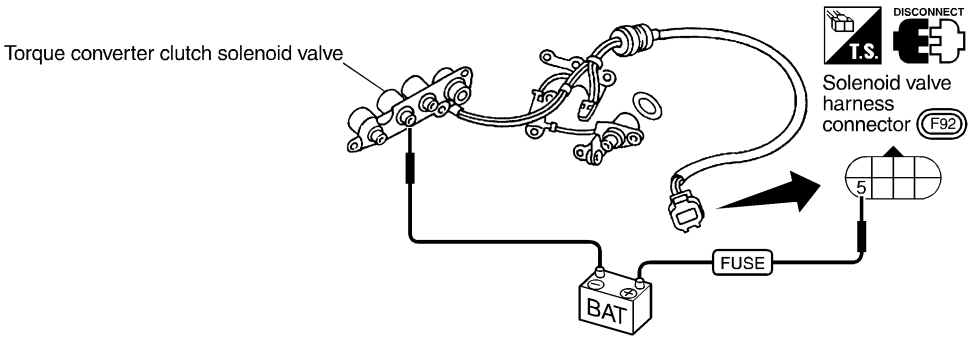
OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	CHECK SOLENOID VALVE OPERATION

1. Remove oil pan. Refer to AT-277.
2. Check the following items:

- Torque converter clutch solenoid valve

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



SAT037K

- Harness of terminal cord assembly for short or open

OK or NG

OK	▶	GO TO 3.
NG	▶	Repair or replace damaged parts.

3	CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to OFF position.
2. Disconnect TCM harness connector.
3. Check continuity between sub-harness connector terminal 5 (G/B) and TCM harness connector F51 terminal 3 (G/B). Refer to wiring diagram — AT — TCV.
   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 4.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

4	CHECK DTC	
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-154.		
OK or NG		
OK	▶	**INSPECTION END**
NG	▶	GO TO 5.

5	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.

Description

NFAT0061

- This is an OBD-II self-diagnostic item and not available in TCM self-diagnosis.
- This malfunction will not be detected while the A/T CHECK indicator lamp is indicating another self-diagnosis malfunction.
- This malfunction is detected when the A/T does not shift into fourth gear position or the torque converter clutch does not lock up 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.

CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

NFAT0061S01

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

NFAT0061S02

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
1	G/R	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	W/B	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	G/B	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

NFAT0228

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.

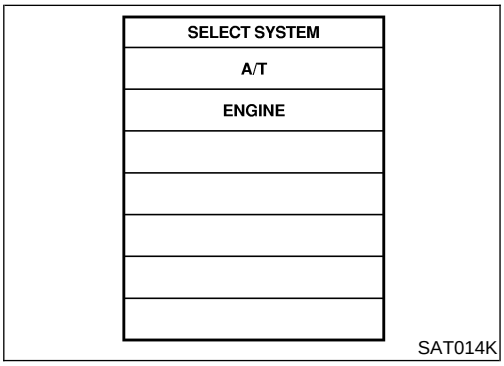
This malfunction will be caused when shift solenoid valve B is stuck closed.
Gear positions supposed by TCM are as follows.
In case of gear position with no malfunctions: 1, 2, 3 and 4 positions
In case of gear position with shift solenoid valve B stuck closed: 1, 2, 2 and 1* positions to each gear position above
*: P0744 is detected.
Diagnostic trouble code A/T TCC S/V FNCTN with CONSULT-II or P0744 without CONSULT-II is detected when A/T cannot perform lock-up even if electrical circuit is good.

Possible Cause

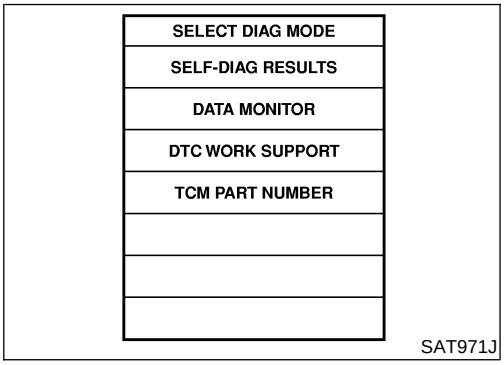
NFAT0229

Check the following items.

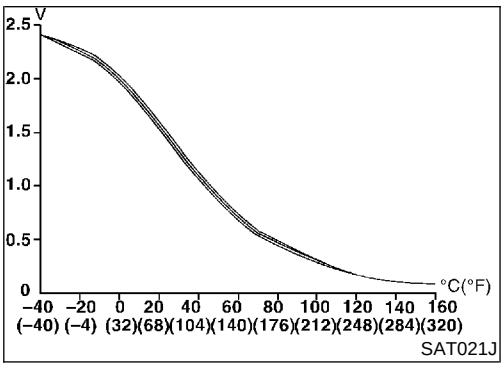
- Line pressure solenoid valve
- Torque converter clutch solenoid valve
- Each clutch
- Hydraulic control circuit



SAT014K



SAT971J



SAT021J

Diagnostic Trouble Code (DTC) Confirmation Procedure

NFAT0230

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.

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

WITH CONSULT-II

NFAT0230S01

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 vehicle to decrease voltage (warm up the fluid) or stop engine to increase voltage (cool down the fluid).
3) Select "TCC S/V FNCTN P0744" of "DTC WORK SUPPORT" mode for "A/T" with CONSULT-II and touch "START".
4) Accelerate vehicle to more than 80 km/h (50 MPH) and maintain the following condition continuously until "TESTING" has turned to "COMPLETE". (It will take approximately 30 seconds after "TESTING" shows.)
   THROTTLE POSI: 1.0/8 - 2.0/8 (at all times during step 4)
   Selector lever: D position
   TCC S/V DUTY: More than 94%
   VHCL/S SE·A/T: Constant speed of more than 80 km/h (50 MPH)

- **Check that "GEAR" shows "4".**
- **For shift schedule, refer to SDS, AT-376.**
- **If "TESTING" does not appear on CONSULT-II for a long time, select "SELF-DIAG RESULTS". In case a 1st trip DTC**

other than P0744 is shown, refer to applicable "TROUBLE DIAGNOSIS FOR DTC".

5) Make sure that "OK" is displayed. (If "NG" is displayed, refer to "DIAGNOSTIC PROCEDURE".)
   Refer to "DIAGNOSTIC PROCEDURE", AT-162.
   Refer to shift schedule, AT-376.

WITH GST

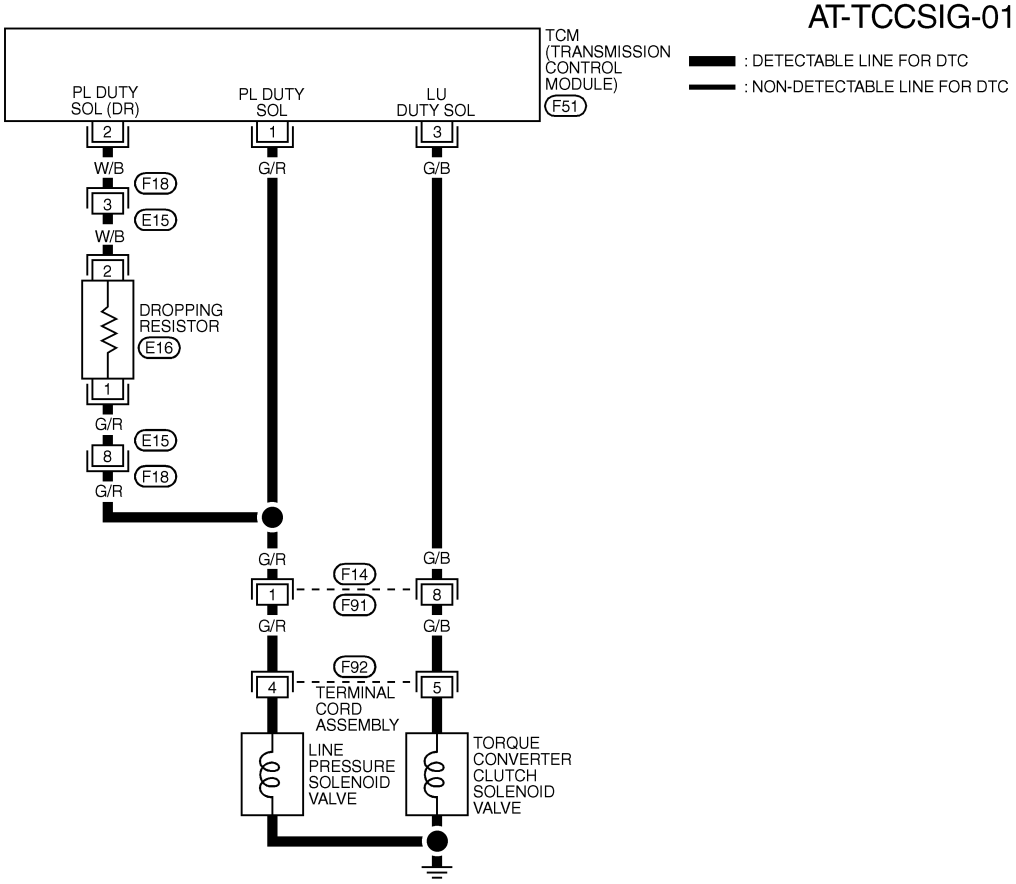
NFAT0230S02

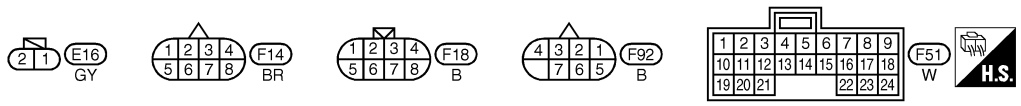
Follow the procedure "With CONSULT-II".

Wiring Diagram — AT — TCCSIG

=NFAT0062

AT-TCCSIG-01





MAT066B

TCM TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND 25 (B) OR 48 (B) (TCM GROUND)

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
1	G/R	LINE PRESSURE SOLENOID VALVE	WHEN VEHICLE STARTS AND ACCELERATOR PEDAL IS RELEASED	1.5 - 3.0V
			WHEN VEHICLE STARTS AND ACCELERATOR PEDAL IS DEPRESSED	0V
2	W/B	LINE PRESSURE SOLENOID VALVE (DROPPING RESISTOR)	WHEN VEHICLE STARTS AND ACCELERATOR PEDAL IS RELEASED	4 - 14V
			WHEN VEHICLE STARTS AND ACCELERATOR PEDAL IS DEPRESSED	0V
3	G/B	TORQUE CONVERTER CLUTCH SOLENOID VALVE	WHEN VEHICLE STARTS AND A/T PERFORMS LOCK-UP	8 - 15V
			WHEN VEHICLE STARTS AND A/T DOES NOT PERFORM LOCK-UP	0V

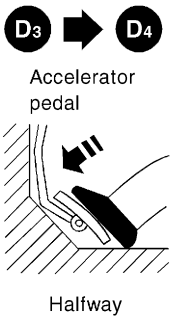
SAT306KA

Diagnostic Procedure

NFAT0063

1	CHECK SHIFT UP (D_3 TO D_4)

During “Cruise test — Part 1” (AT-76), does A/T shift from D_3 to D_4 at the specified speed?



SAT988H

Yes or No

Yes	▶	GO TO 11.
No	▶	GO TO 2.

2	CHECK LINE PRESSURE

Perform line pressure test.
Refer to AT-67.

Engine speed rpm	Line pressure kPa (kg/cm², psi)	
	D, 2 and 1 positions	R position
Idle	500 (5.1, 73)	778 (7.9, 113)
Stall	1,233 (12.6, 179)	1,918 (19.6, 278)

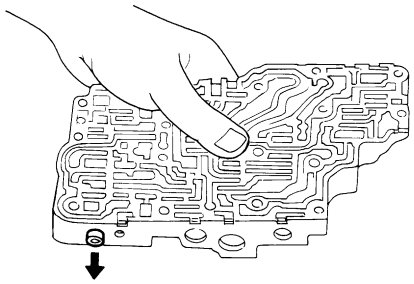
MTBL1183

OK or NG

OK	▶	GO TO 3.
NG	▶	GO TO 6.

3	CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to AT-309.
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.



SAT367H

OK or NG

OK	▶	GO TO 4.
NG	▶	Repair control valve.

4	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 5.
NG	▶	Check control valve again. Repair or replace control valve assembly.

5	CHECK DTC

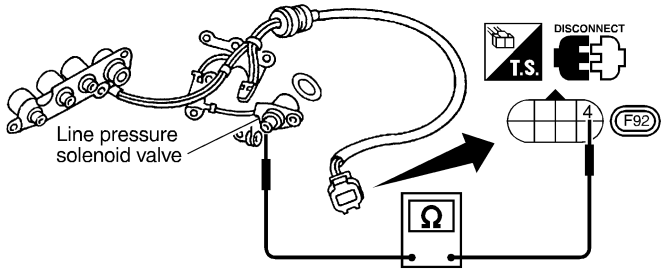
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-159.

OK or NG

OK	▶	**INSPECTION END**
NG	▶	GO TO 11. Check for proper lock-up.

6	CHECK SOLENOID VALVE RESISTANCE

1. Remove control valve assembly. Refer to AT-277.
- Line pressure solenoid valve
2. Check resistance to the terminal and ground.



Solenoid valve	Terminal No. (Wire color)		Resistance (Approx.)
Line pressure solenoid valve	4 (G/R)	Ground	2.5 - 5Ω

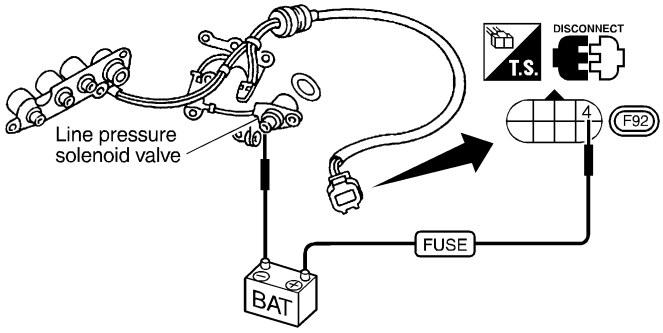
SAT625JA

OK or NG

OK	▶	GO TO 8.
NG	▶	Replace solenoid valve assembly.

7	CHECK SOLENOID VALVE OPERATION

1. Remove control valve assembly. Refer to AT-309.
- Line pressure solenoid valve
2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



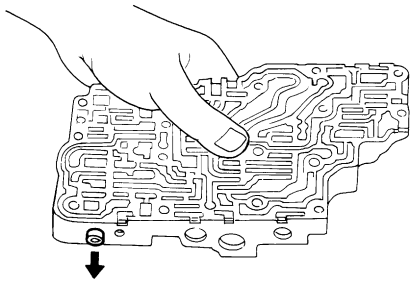
SAT626J

OK or NG

OK	▶	GO TO 8.
NG	▶	Replace solenoid valve assembly.

8	CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to AT-309.
2. Check line pressure circuit valves for sticking.
- Pressure regulator valve
- Pilot valve
- Pressure modifier valve



SAT367H

OK or NG

OK	▶	GO TO 9.
NG	▶	Repair control valve.

9	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 10.
NG	▶	Check control valve again. Repair or replace control valve assembly.

10	CHECK DTC

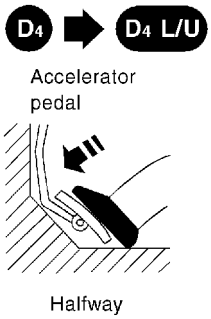
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-159.

OK or NG

OK	▶	**INSPECTION END**
NG	▶	GO TO 11.Check for proper lock-up.

11	CHECK LOCK-UP

During "Cruise test — Part 1" (AT-76), does A/T perform lock-up at the specified speed?



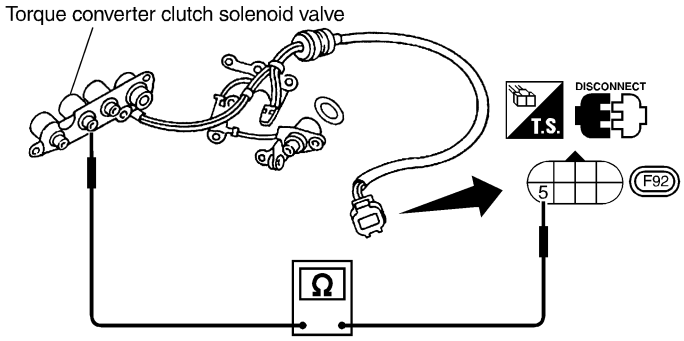
SAT989H

Yes or No

Yes	▶	Perform "Cruise test — Part 1" again and return to the start point of this test group.
No	▶	GO TO 12.

12	CHECK SOLENOID VALVE RESISTANCE

1. Remove control valve assembly. Refer to AT-277.
- Torque converter clutch solenoid valve
2. Check resistance to the terminal and ground.



Solenoid valve	Terminal No. (Wire color)		Resistance (Approx.)
Torque converter clutch solenoid valve	5 (G/B)	Ground	5 - 20Ω

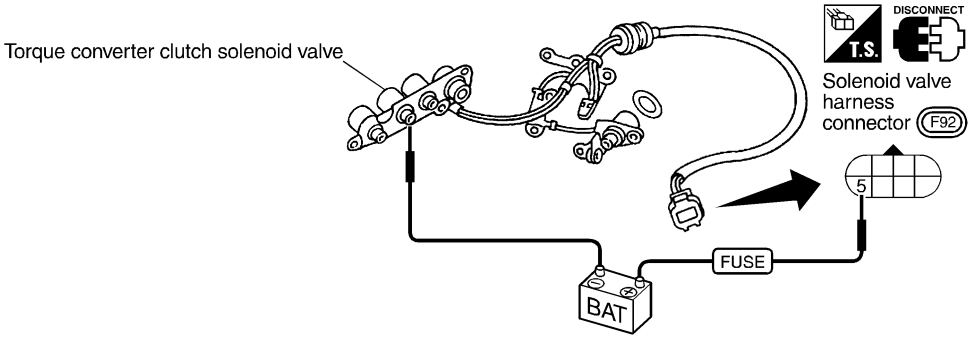
SAT047KB

OK or NG

OK	▶	GO TO 14.
NG	▶	Replace solenoid valve assembly.

13	CHECK SOLENOID VALVE OPERATION

1. Remove control valve assembly. Refer to AT-277.
- Torque converter clutch solenoid valve
2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



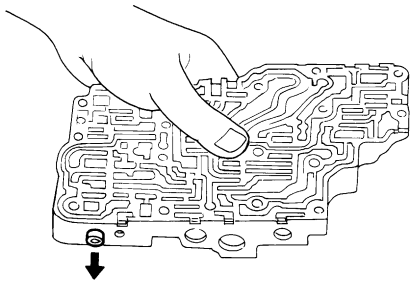
SAT037K

OK or NG

OK	▶	GO TO 14.
NG	▶	Replace solenoid valve assembly.

14	CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to AT-309.
2. Check control valves for sticking.
- Torque converter clutch control valve
- Torque converter clutch relief valve



SAT367H

OK or NG

OK	▶	GO TO 15.
NG	▶	Repair control valve.

15	CHECK LOCK-UP

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

Yes or No

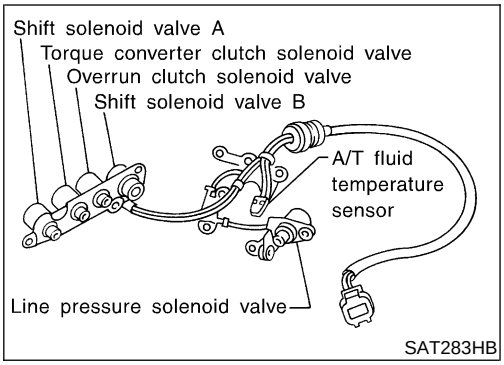
Yes	▶	GO TO 16.
No	▶	Check control valve again. Repair or replace control valve assembly.

16	CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-159.

OK or NG

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



Description

NFAT0064

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

NFAT0064S01

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%

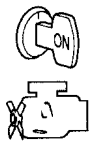
NOTE:

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

NFAT0064S02

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
1	G/R	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	W/B	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

NFAT0231

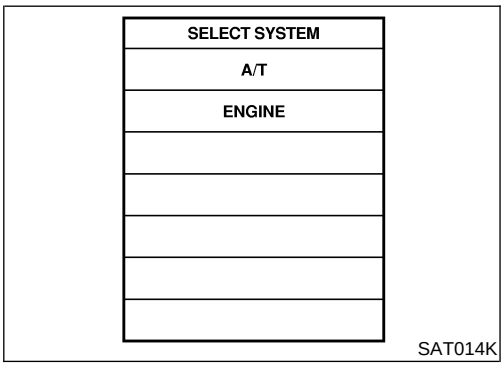
Diagnostic trouble code L/PRESS SOL/CIRC with CONSULT-II or P0745 without CONSULT-II is detected when TCM detects an improper voltage drop when it tries to operate the solenoid valve.

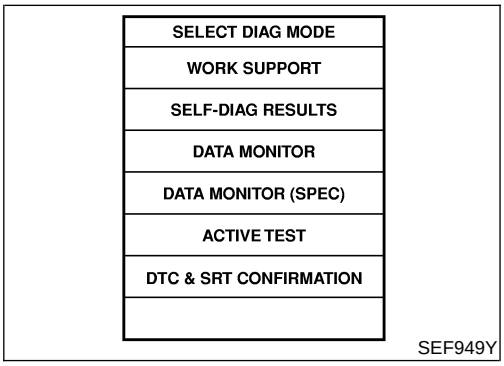
Possible Cause

NFAT0232

Check the following items.

- Harness or connectors
  (The solenoid circuit is open or shorted.)
- Line pressure solenoid valve





Diagnostic Trouble Code (DTC) Confirmation Procedure

NFAT0233

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.

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

WITH CONSULT-II

NFAT0233S01

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

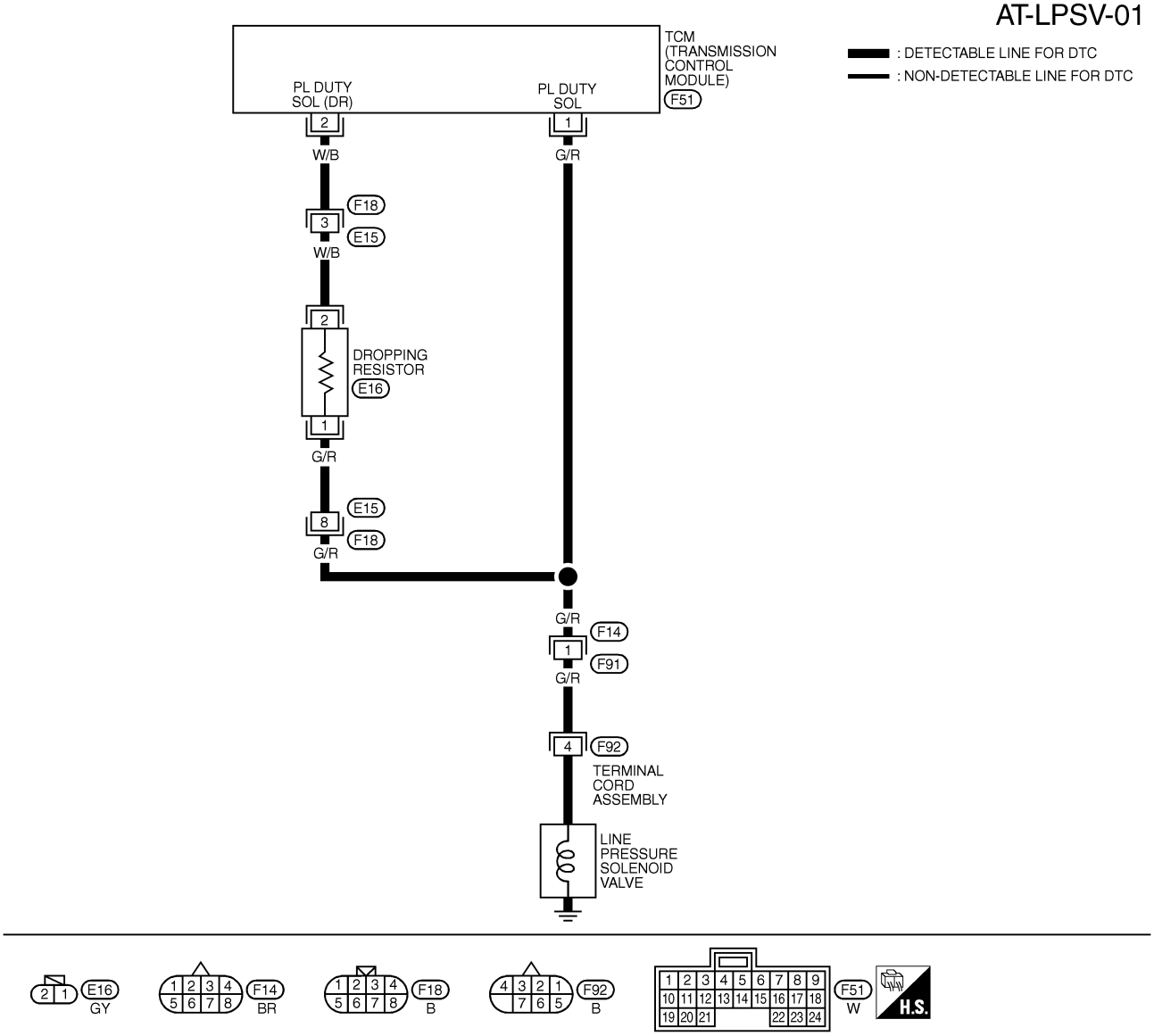
WITH GST

NFAT0233S02

Follow the procedure "With CONSULT-II".

Wiring Diagram — AT — LPSV

NFAT0065



MAT067B

TCM TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND 25 (B) OR 48 (B) (TCM GROUND)

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
1	G/R	LINE PRESSURE SOLENOID VALVE	WHEN VEHICLE STARTS AND ACCELERATOR PEDAL IS RELEASED	1.5 - 3.0V
			WHEN VEHICLE STARTS AND ACCELERATOR PEDAL IS DEPRESSED	0V
2	W/B	LINE PRESSURE SOLENOID VALVE (DROPPING RESISTOR)	WHEN VEHICLE STARTS AND ACCELERATOR PEDAL IS RELEASED	4 - 14V
			WHEN VEHICLE STARTS AND ACCELERATOR PEDAL IS DEPRESSED	0V

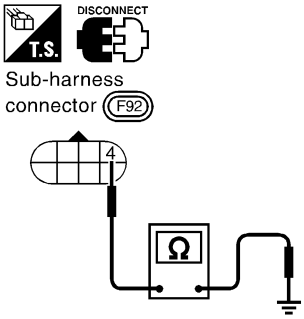
SAT307KA

Diagnostic Procedure

NFAT0066

1	CHECK SOLENOID VALVE RESISTANCE

1. Turn ignition solenoid switch to OFF position.
2. Disconnect terminal harness assembly connector in engine compartment.
3. Check resistance between terminal 4 (G/R) and ground.



Resistance: 2.5 - 5 Ω

SAT630J

OK or NG

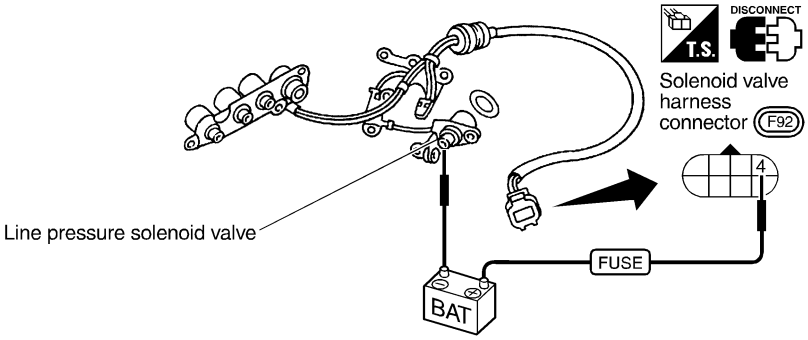
OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	CHECK SOLENOID VALVE OPERATION

1. Remove control valve assembly. Refer to AT-277.
2. Check the following items:

- Line pressure solenoid valve

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



SAT038K

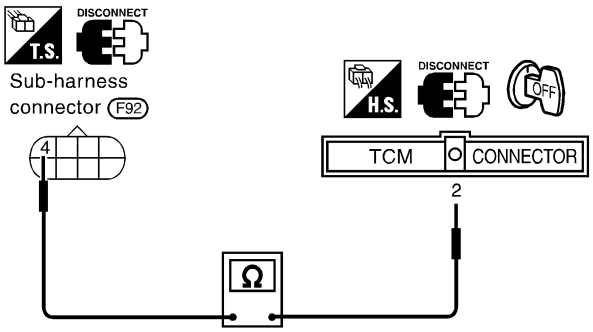
- Harness of terminal cord assembly for short or open

OK or NG

OK	▶	GO TO 3.
NG	▶	Repair or replace damaged parts.

3	CHECK POWER SOURCE AND DROPPING RESISTOR CIRCUIT

1. Turn ignition switch to OFF position.
2. Disconnect TCM harness connector.
3. Check resistance between terminal 4 (G/R) and TCM harness connector F51 terminal 2 (W/B).



Resistance: 10 - 15 Ω

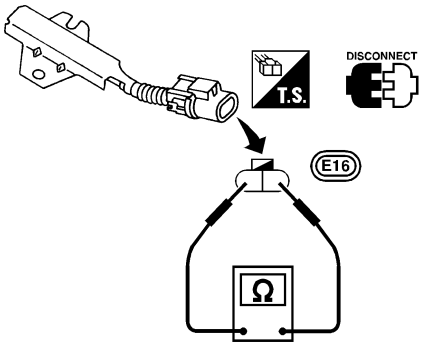
SAT631JC

OK or NG

OK	▶	GO TO 5.
NG	▶	GO TO 4.

4	DETECT MALFUNCTIONING ITEM

Check the following items:
- Dropping resistor
- Check resistance between two terminals.



SAT933IB

Resistance:
10 - 15Ω

- Harness for short or open between TCM harness connector F50 terminal 2 (W/B) and terminal cord assembly (Main harness)

OK or NG

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

5	CHECK POWER SOURCE CIRCUIT

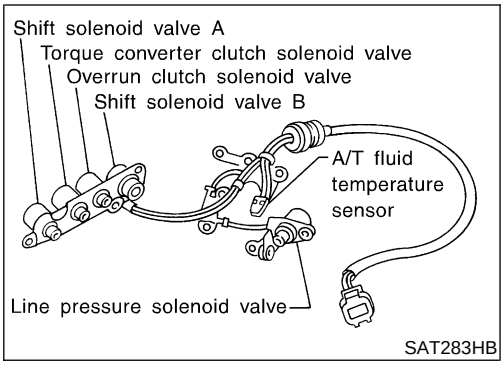
1. Turn ignition switch to OFF position.
2. Check continuity between sub-harness connector terminal 4 (G/R) and TCM harness connector F50 terminal 1 (G/R). Refer to wiring diagram — AT — LPSV.
   Continuity should exist.
   If OK, check harness for short to ground and short to power.
3. Reinstall any part removed.

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 DTC	
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-169.		
OK or NG		
OK	▶	**INSPECTION END**
NG	▶	GO TO 7.

7	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.



Description

NFAT0067

Shift solenoid valves A and B are turned ON or OFF by the TCM in response to signals sent from the park/neutral position (PNP) switch, vehicle speed and electric throttle control actuator (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

NFAT0067S01

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
11	R/Y	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

NFAT0234

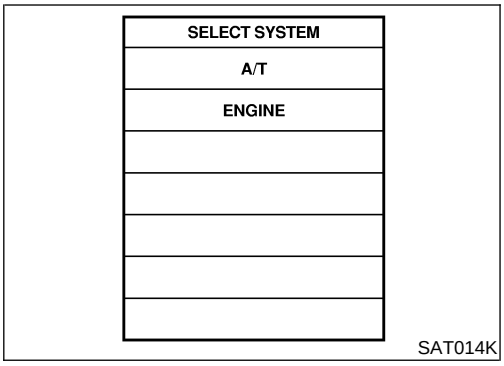
Diagnostic trouble code SFT SOL A/CIRC with CONSULT-II or P0750 without CONSULT-II is detected when TCM detects an improper voltage drop when it tries to operate the solenoid valve.

Possible Cause

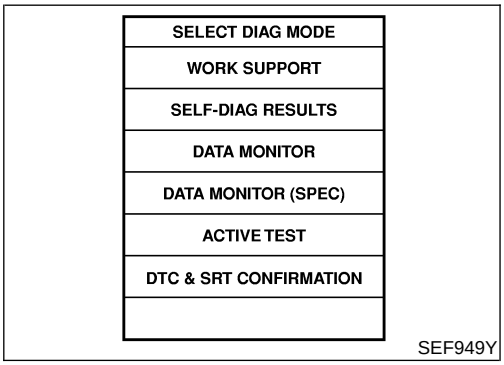
NFAT0235

Check the following items.

- Harness or connectors
  (The solenoid circuit is open or shorted.)
- Shift solenoid valve A



SAT014K



SEF949Y

Diagnostic Trouble Code (DTC) Confirmation Procedure

NFAT0236

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.

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

WITH CONSULT-II

NFAT0236S01

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

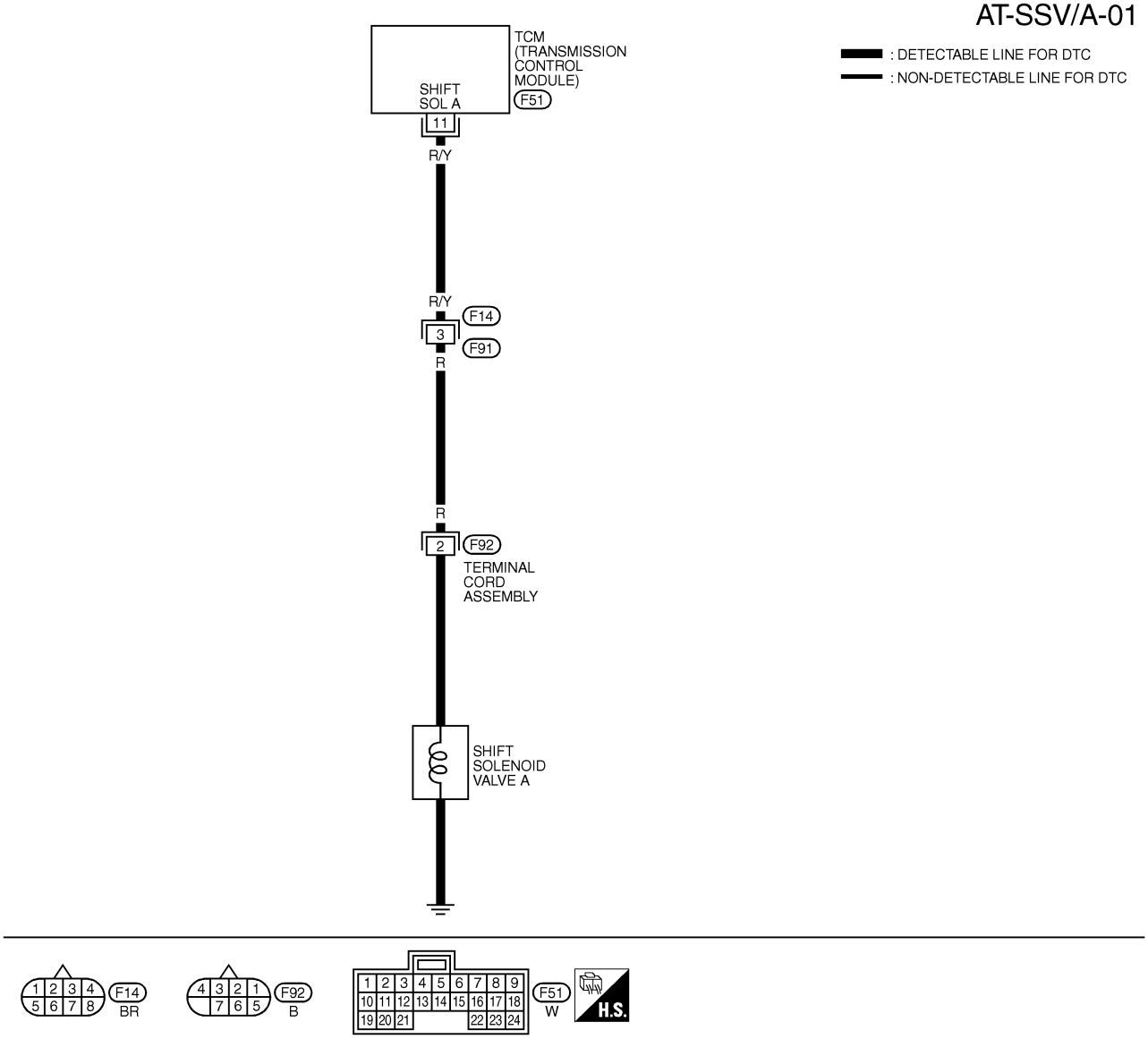
NFAT0236S02

Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — SSV/A

NFAT0068

AT-SSV/A-01



MAT815A

TCM TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND 25 (B) OR 48 (B) (TCM GROUND)

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
11	R/Y	SHIFT SOLENOID VALVE A	WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE A OPERATES (WHEN DRIVING IN D1 OR D4)	BATTERY VOTAGE
			WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE A DOES NOT OPERATE (WHEN DRIVING IN D2 OR D3)	0V

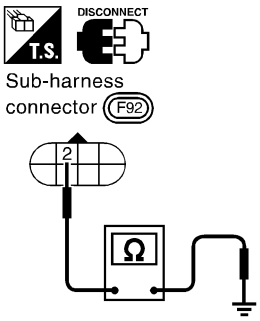
SAT308KA

Diagnostic Procedure

NFAT0069

1	CHECK SHIFT SOLENOID VALVE RESISTANCE

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



Resistance: 20 - 30 Ω

SAT632JB

OK or NG

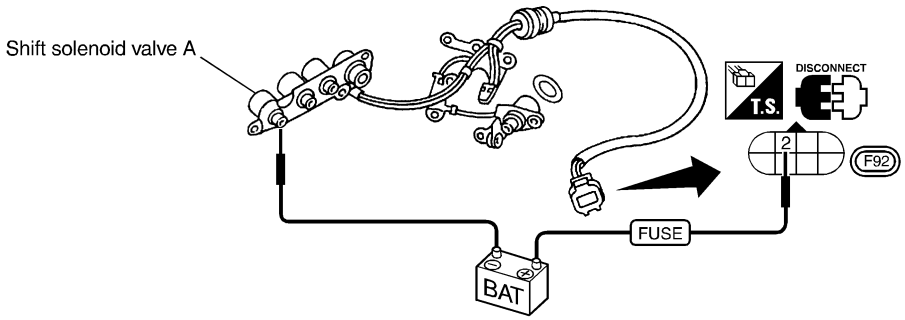
OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	CHECK SHIFT SOLENOID VALVE OPERATION

1. Remove control valve assembly. Refer to AT-277.
2. Check the following items:

- Shift solenoid valve A
- Operation check

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



SAT035K

- Harness of terminal cord assembly for short or open

OK or NG

OK	▶	GO TO 3.
NG	▶	Repair or replace damaged parts.

3	CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to OFF position.
2. Disconnect TCM harness connector.
3. Check continuity between sub-harness connector terminal 2 (R) and TCM harness connector F51 terminal 11 (R/Y). Refer to wiring diagram — AT — SSV/A.
   Continuity should exist.
   If OK, check harness for short to ground and short to power.
4. Reinstall any part removed.

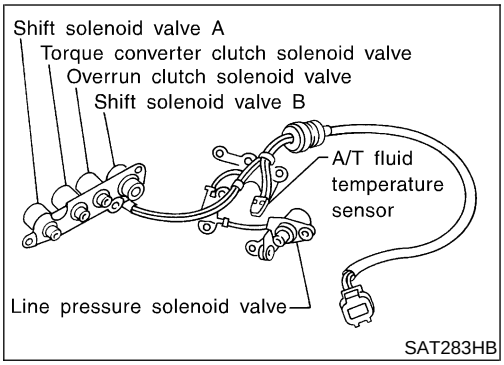
OK or NG

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

Diagnostic Procedure (Cont'd)

4	CHECK DTC	
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-175.		
OK or NG		
OK	▶	**INSPECTION END**
NG	▶	GO TO 5.

5	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.



Description

NFAT0070

Shift solenoid valves A and B are turned ON or OFF" by the TCM in response to signals sent from the park/neutral position (PNP) switch, vehicle speed and electric throttle control actuator (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

NFAT0070S01

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
12	LG/B	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

NFAT0237

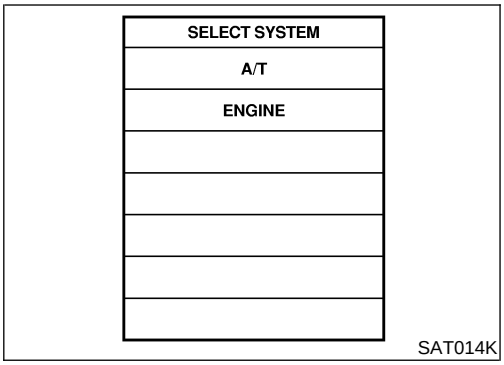
Diagnostic trouble code SFT SOL B/CIRC with CONSULT-II or P0755 without CONSULT-II is detected when TCM detects an improper voltage drop when it tries to operate the solenoid valve.

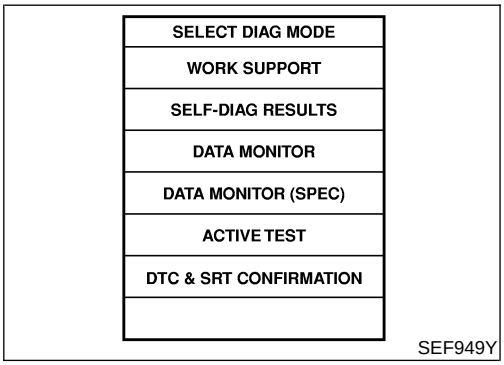
Possible Cause

NFAT0239

Check the following items.

- Harness or connectors
  (The solenoid circuit is open or shorted.)
- Shift solenoid valve B





Diagnostic Trouble Code (DTC) Confirmation Procedure

NFAT0238

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.

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

WITH CONSULT-II

NFAT0238S01

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”).

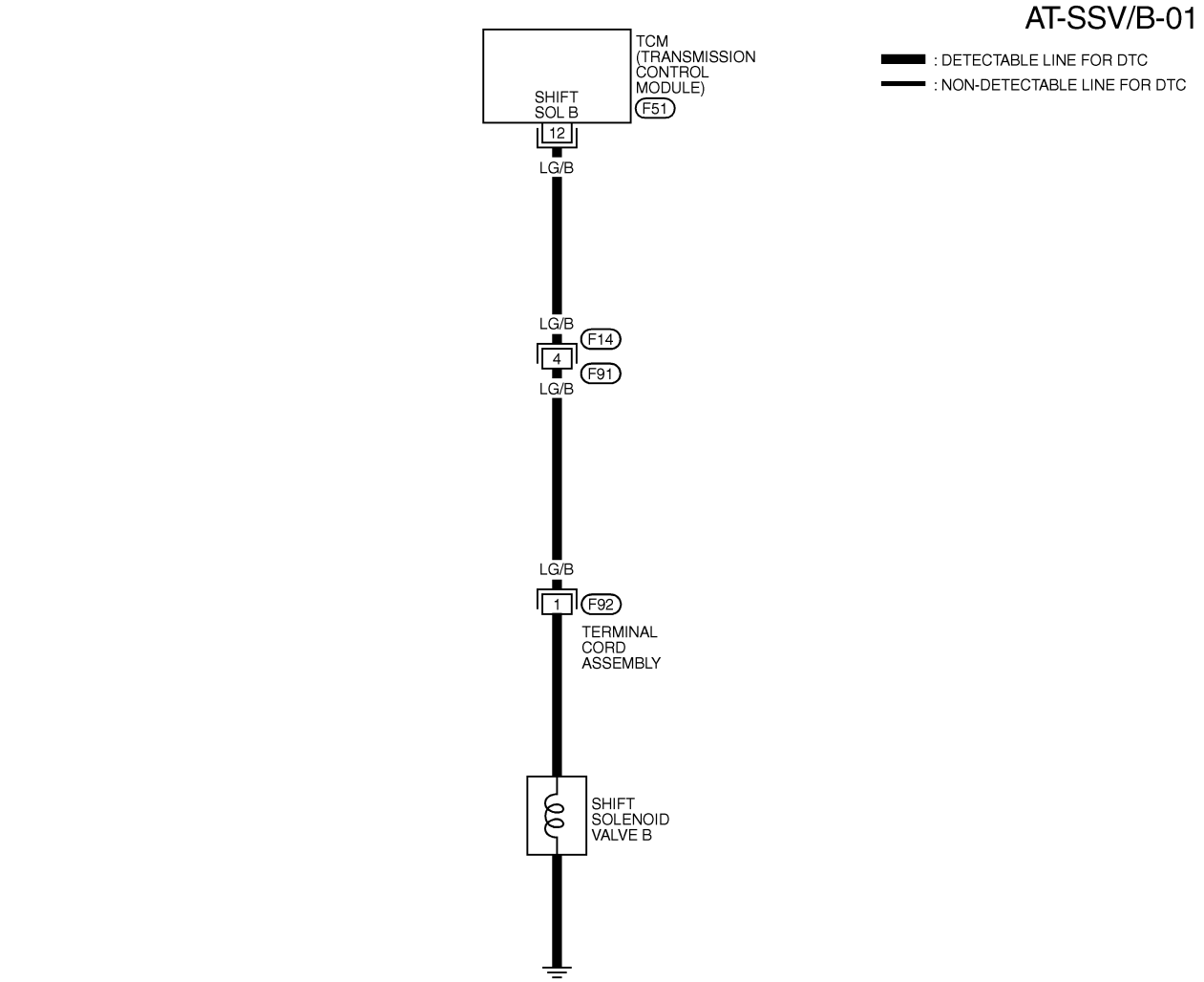
WITH GST

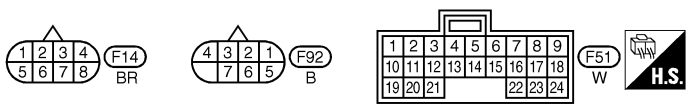
NFAT0238S02

Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — SSV/B

NFAT0071





MAT816A

TCM TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND 25 (B) OR 48 (B) (TCM GROUND)

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
12	LG/B	SHIFT SOLENOID VALVE B	WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE B OPERATES (WHEN DRIVING IN D1 OR D2)	BATTERY VOTAGE
			WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE B DOES NOT OPERATE (WHEN DRIVING IN D3 OR D4)	0V

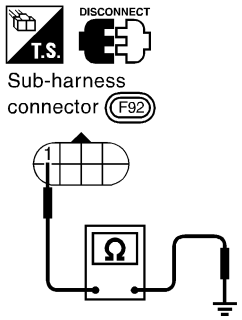
SAT309KA

Diagnostic Procedure

NFAT0072

1	CHECK SHIFT SOLENOID VALVE RESISTANCE

1. Turn ignition switch to OFF position.
2. Disconnect terminal harness assembly connector in engine compartment.
3. Check resistance between terminal 1 (LG/B) and ground.



Resistance: 5 - 20 Ω

SAT633JC

OK or NG

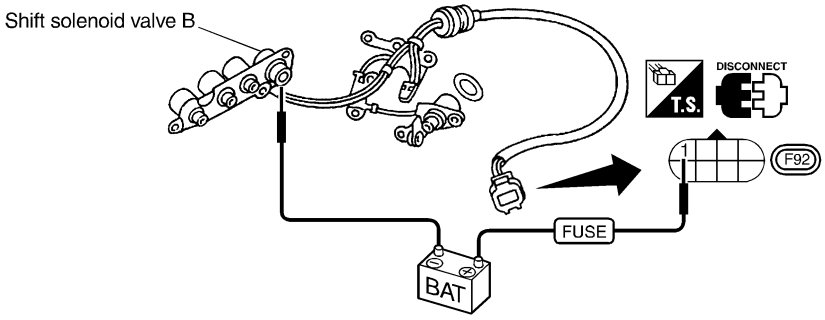
OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	CHECK SHIFT SOLENOID VALVE OPERATION

1. Remove control valve assembly. Refer to AT-277.
2. Check the following items:

- Shift solenoid valve B
- Operation check

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



SAT036K

- Harness of terminal cord assembly for short or open

OK or NG

OK	▶	GO TO 3.
NG	▶	Repair or replace damaged parts.

3	CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to OFF position.
2. Disconnect TCM harness connector.
3. Check continuity between sub-harness connector terminal 1 (LG/B) and TCM harness connector F51 terminal 12 (LG/B). Refer to wiring diagram — AT — SSV/B.

   Continuity should exist.

   If OK, check harness for short to ground and short to power.
4. Reinstall any part removed.

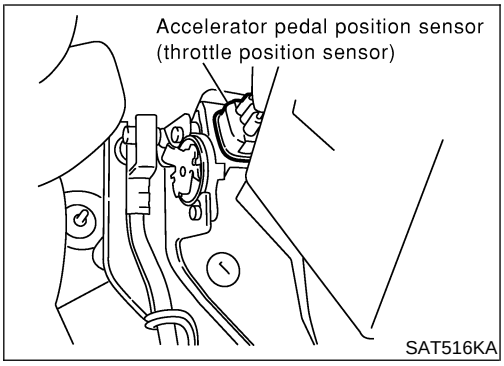
OK or NG

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

4	CHECK DTC
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-180.	
OK or NG	
OK ▶	**INSPECTION END**
NG ▶	GO TO 5.

5	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 P1705 ACCELERATOR PEDAL POSITION SENSOR (THROTTLE POSITION SENSOR)



Description

NFAT0073

The accelerator pedal position sensor (throttle position sensor) is part of the system that controls throttle position. Accelerator pedal position signal is sent to the ECM. And the signal is also sent to TCM as throttle valve position signal.

CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

NFAT0073S01

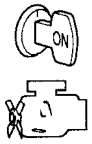
Remarks: Specification data are reference values.

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

TCM TERMINALS AND REFERENCE VALUE

NFAT0073S02

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
32	R	Sensor power		Ignition switch ON.	4.5 - 5.5V
				Ignition switch OFF.	0V
41	W	Accelerator pedal position sensor (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	Sensor ground	—	—	0V

On Board Diagnosis Logic

=NFAT0240

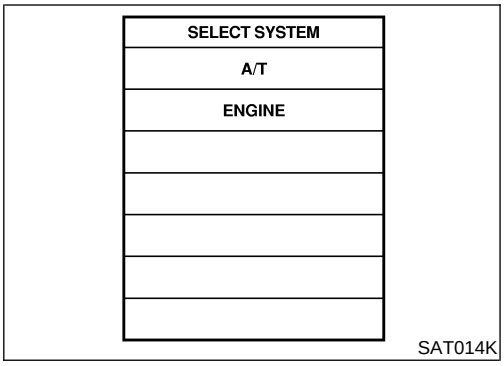
Diagnostic trouble code TP SEN/CIRC A/T with CONSULT-II or P1705 without CONSULT-II is detected when TCM receives an excessively low or high voltage from the sensor.

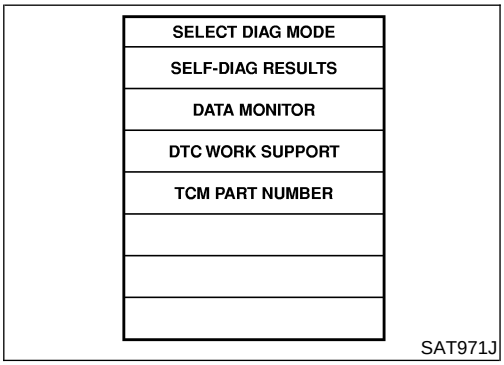
Possible Cause

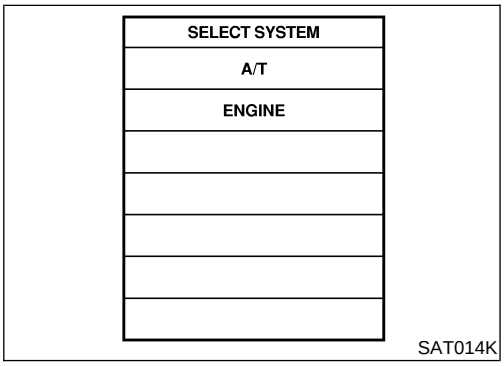
NFAT0241

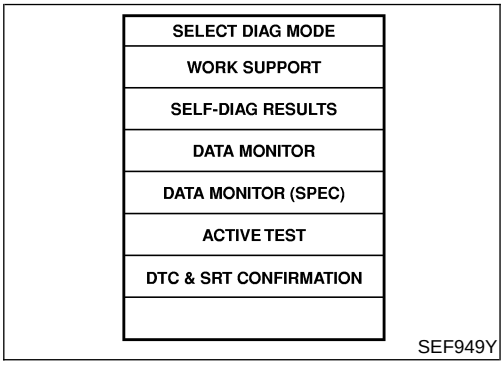
Check the following items.

- Harness or connectors
  (The sensor circuit is open or shorted.)
- Accelerator pedal position sensor (throttle position sensor)









Diagnostic Trouble Code (DTC) Confirmation Procedure

NFAT0242

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.

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

WITH CONSULT-II

NFAT0242S01

1) Turn ignition switch ON and select “DATA MONITOR” mode for “A/T” with CONSULT-II.

Accelerator pedal condition	Accelerator pedal position sensor (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 to “DIAGNOSTIC PROCEDURE”, AT-188.
If the check result is OK, go to following step.

2) Turn ignition switch ON and select “DATA MONITOR” mode for “ENGINE” with CONSULT-II.
3) 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 (accelerator pedal position sensor): Approximately 3V or less
Selector lever: D position
If the check result is NG, go to “DIAGNOSTIC PROCEDURE”, AT-188.
If the check result is OK, go to following step.
4) 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

WITH GST

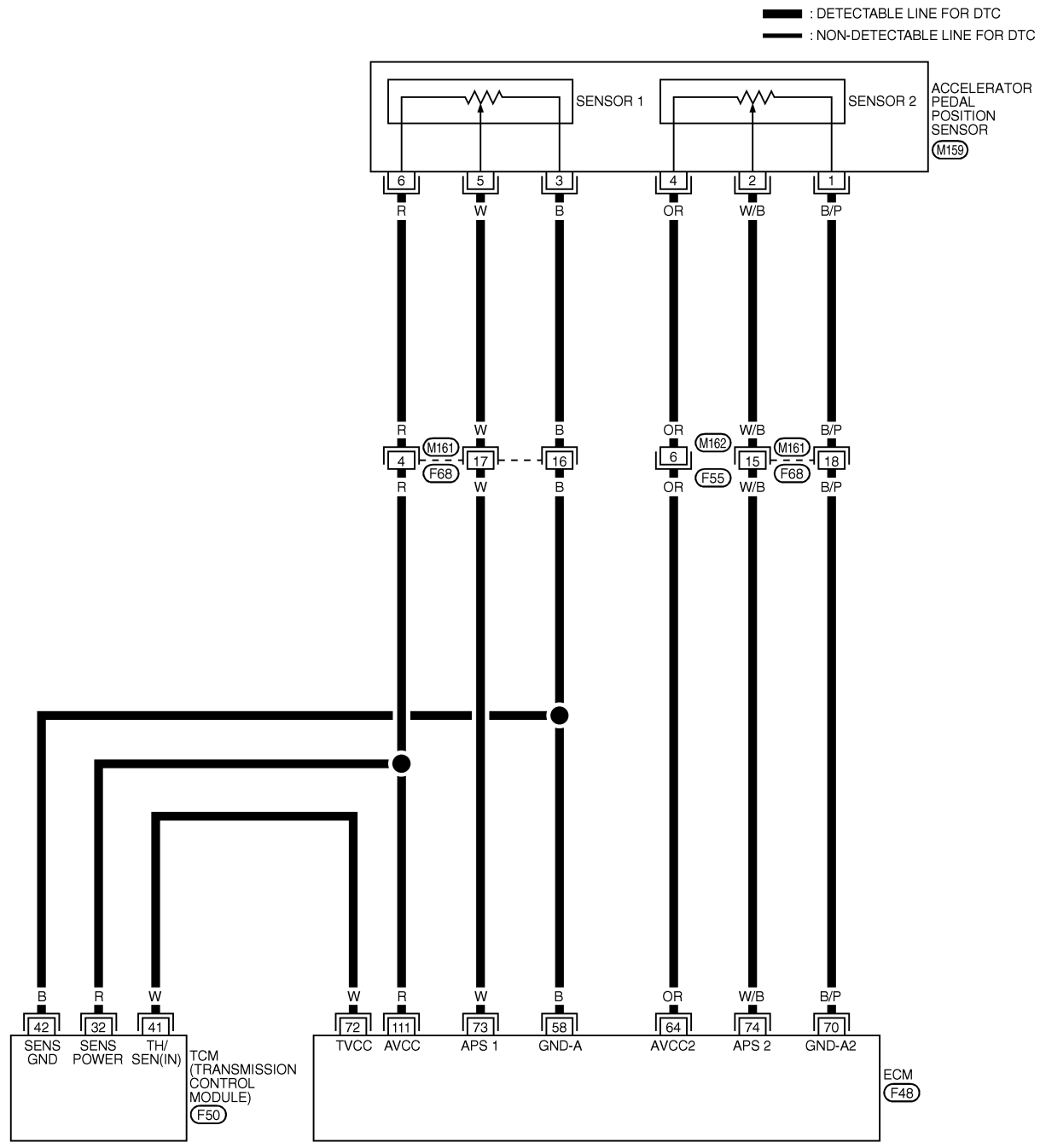
NFAT0242S02

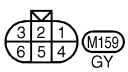
Follow the procedure “With CONSULT-II”.

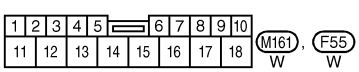
Wiring Diagram — AT — TPS

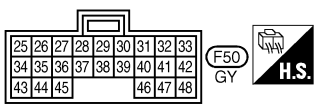
NFAT0074

AT-TPS-01









REFER TO THE FOLLOWING.
F48 -ELECTRICAL UNITS

MAT265B

Wiring Diagram — AT — TPS (Cont'd)

TCM TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND 25 (B) OR 48 (B) (TCM GROUND)

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
32	R	SENSOR POWER	WHEN IGN ON	4.5 - 5.5V
			WHEN IGN OFF	0V
41	W	ACCELERATOR PEDAL POSITION SENSOR	WHEN IGN ON AND ACCELERATOR PEDAL IS DEPRESSED SLOWLY AFTER WARMING UP ENGINE (VOLTAGE RISES GRADUALLY IN RESPONSE TO THROTTLE POSITION.)	FULLY-CLOSED THROTTLE: 0.5V FULLY-OPEN THROTTLE: 4V
42	B	SENSOR GROUND	—	0V

SAT310KC

Diagnostic Procedure

NFAT0075

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-92, "Malfunction Indicator Lamp (MIL)".		
OK or NG		
OK (with CONSULT-II)	▶	GO TO 2.
OK (without CONSULT-II)	▶	GO TO 3.
NG	▶	Check accelerator pedal position sensor (throttle position sensor) circuit for engine control. Refer to EC-304, "DTC P0226 APP sensor (throttle position sensor)".

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

DATA MONITOR	
MONITORING	
VHCL/S SE-A/T	XXX km/h
VHCL/S SE-MTR	XXX km/h
THRTL POS SEN	XXX V
FLUID TEMP SE	XXX V
BATTERY VOLT	XXX V

SAT614J

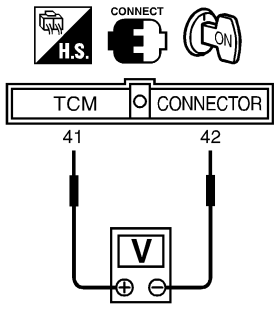
OK or NG

OK	▶	GO TO 4.
NG	▶	Check harness for short or open between ECM and TCM regarding accelerator pedal position sensor (throttle position sensor) circuit. (Main harness)

3	CHECK INPUT SIGNAL (Without CONSULT-II)

Without CONSULT-II

1. Turn ignition switch to ON position. (Do not start engine.)
2. Check voltage between TCM harness connector F50 terminals 41 (W) and 42 (B) while accelerator pedal is depressed slowly.



SAT349JC

Voltage:
Fully-closed throttle valve:
Approximately 0.5V
Fully-open throttle valve:
Approximately 4V
(Voltage rises gradually in response to throttle position.)

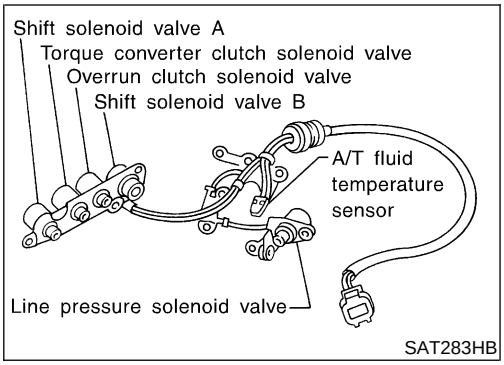
OK or NG

OK	▶	GO TO 4.
NG	▶	Check harness for short or open between ECM and TCM regarding accelerator pedal position sensor (throttle position sensor) circuit. (Main harness)

Diagnostic Procedure (Cont'd)

4	CHECK DTC	
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-186.		
OK or NG		
OK	▶	**INSPECTION END**
NG	▶	GO TO 5.

5	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.



Description

NFAT0076

The overrun clutch solenoid valve is activated by the TCM in response to signals sent from the park/neutral position (PNP) switch, 3rd position switch, vehicle speed and accelerator pedal position sensor (throttle position sensors). The overrun clutch operation will then be controlled.

TCM TERMINALS AND REFERENCE VALUE

NFAT0076S01

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
20	BR/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

NFAT0243

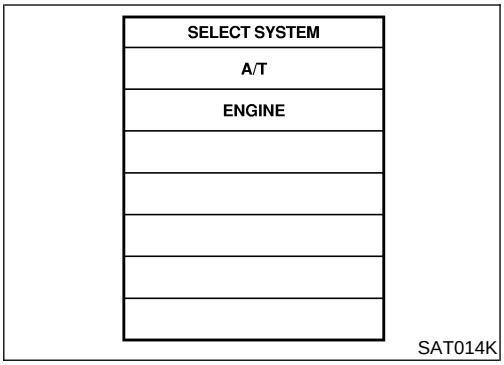
Diagnostic trouble code O/R CLTCH SOL/CIRC with CONSULT-II or P1760 without CONSULT-II is detected when TCM detects an improper voltage drop when it tries to operate the solenoid valve.

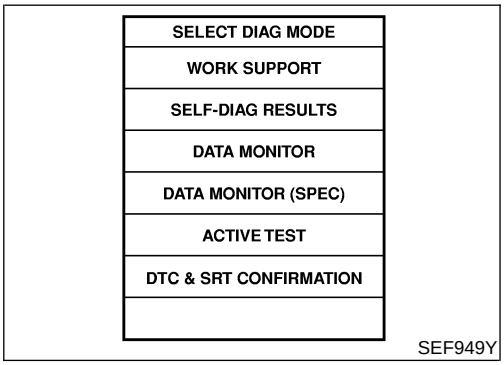
Possible Cause

NFAT0244

Check the following items.

- Harness or connectors
  (The solenoid circuit is open or shorted.)
- Overrun clutch solenoid valve





Diagnostic Trouble Code (DTC) Confirmation Procedure

NFAT0245

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 10 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

NFAT0245S01

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.
4) Release accelerator pedal completely with 3rd position.

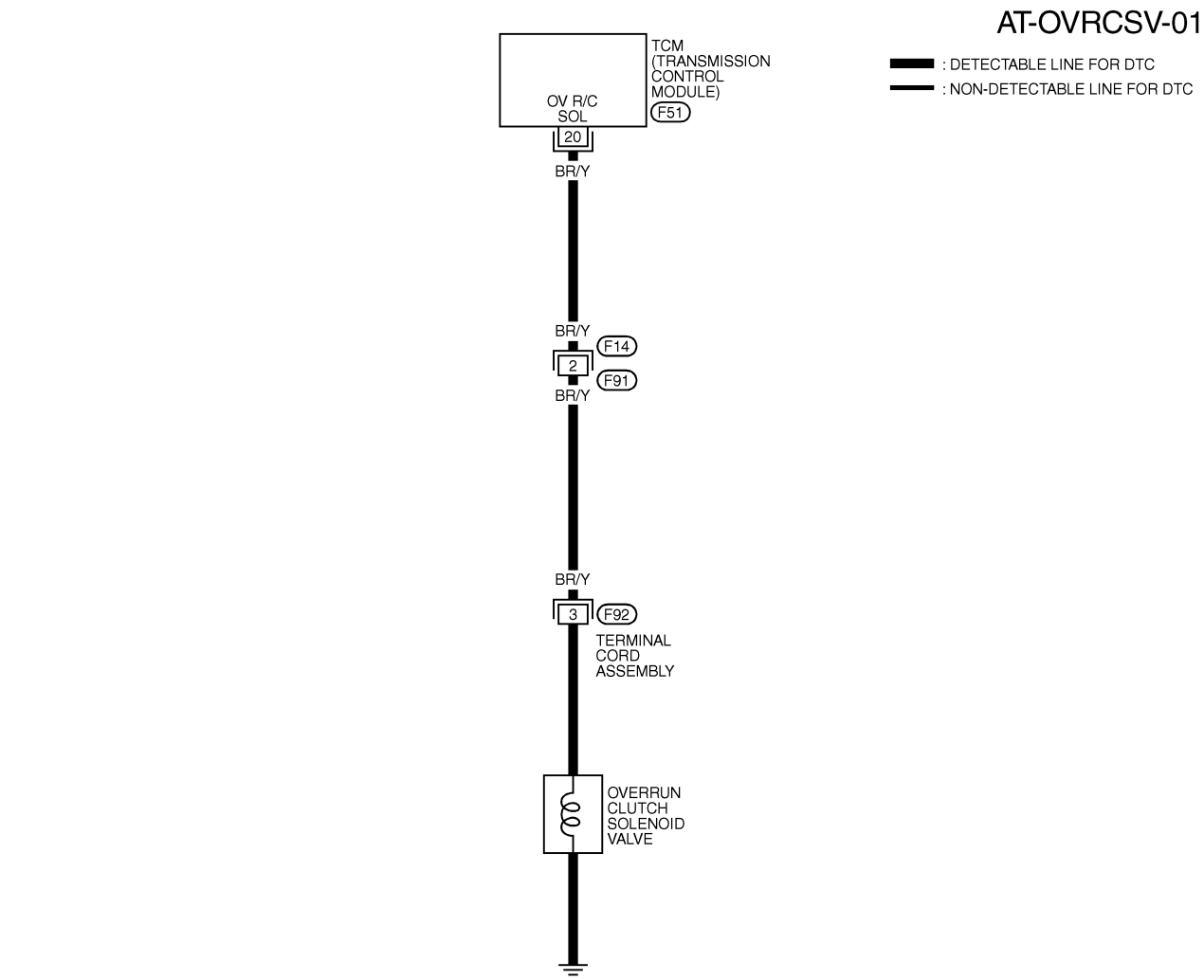
WITH GST

NFAT0245S02

Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — OVRCSV

NFAT0077



MAT818A

TCM TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND 25 (B) OR 48 (B) (TCM GROUND)

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
20	BR/Y	OVERRUN CLUTCH SOLENOID VALVE	WHEN VEHICLE STARTS AND OVERRUN CLUTCH S/V OPERATES	BATTERY VOTAGE
			WHEN VEHICLE STARTS AND OVERRUN CLUTCH S/V DOES NOT OPERATE	0V

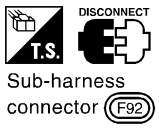
SAT311KA

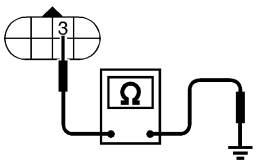
Diagnostic Procedure

NFAT0078

1	CHECK SOLENOID VALVE RESISTANCE

1. Turn ignition switch to OFF position.
2. Disconnect terminal harness assembly connector in engine compartment.
3. Check resistance between terminal 3 (BR/Y) and ground.





Resistance: 20 - 30Ω

SAT637JB

OK or NG

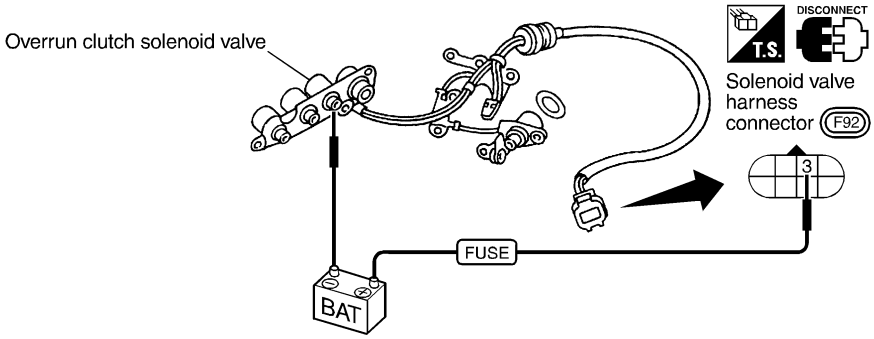
OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	CHECK SOLENOID VALVE OPERATION

1. Remove control valve assembly. Refer to AT-277.
2. Check the following items:

- Overrun clutch solenoid valve
- Operation check

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



SAT638J

- Harness of terminal cord assembly for short or open

OK or NG

OK	▶	GO TO 3.
NG	▶	Repair or replace damaged parts.

3	CHECK POWER SOURCE CIRCUIT

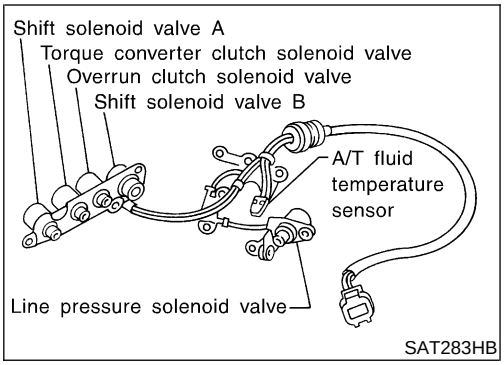
1. Turn ignition switch to OFF position.
2. Disconnect TCM harness connector.
3. Check continuity between sub-harness connector terminal 3 (BR/Y) and TCM harness connector F51 terminal 20 (BR/Y). Refer to wiring diagram — AT — OVRCVS.
   Continuity should exist.
   If OK, check harness for short to ground and short to power.
4. Reinstall any part removed.

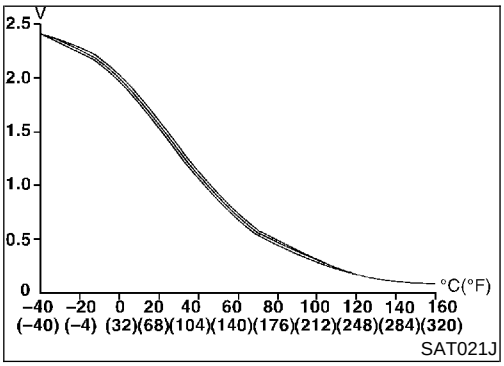
OK or NG

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

4	CHECK DTC	
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-192.		
OK or NG		
OK	▶	**INSPECTION END**
NG	▶	GO TO 5.

5	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.





Description

NFAT0079

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

NFAT0079S01

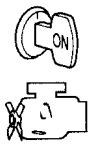
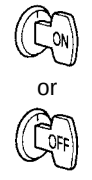
Remarks: Specification data are reference values.

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

NFAT0079S02

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
10	R/Y	Power source		When turning ignition switch to ON.	Battery voltage
				When turning ignition switch to OFF.	0V
19	R/Y	Power source	Same as No. 10		
28	Y/R	Power source (Memory back-up)		When turning ignition switch to OFF.	Battery voltage
				When turning ignition switch to ON.	Battery voltage
42	B	Sensor ground	—	—	0V
47	G	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

NFAT0246

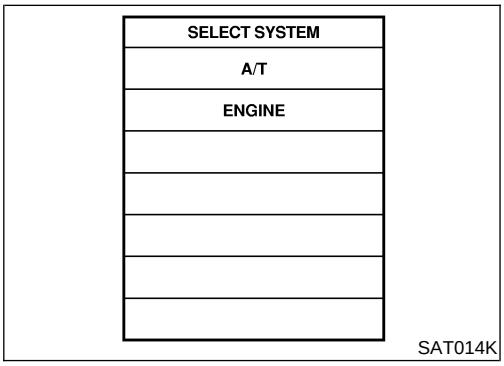
Diagnostic trouble code BATT/FLUID TEMP SEN with CONSULT-II or 8th judgement flicker without CONSULT-II is detected when TCM receives an excessively low or high voltage from the sensor.

Possible Cause

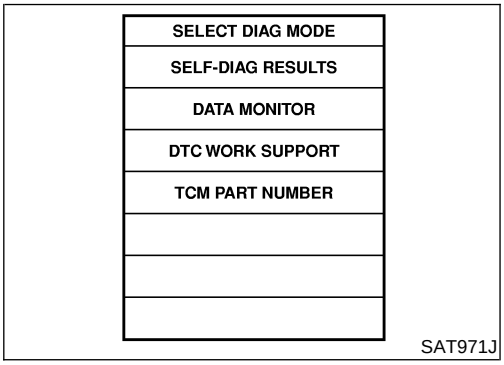
NFAT0247

Check the following items.

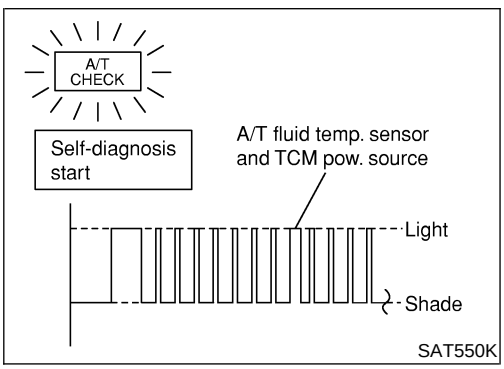
- Harness or connectors
  (The sensor circuit is open or shorted.)
- A/T fluid temperature sensor



SAT014K



SAT971J



SAT550K

Diagnostic Trouble Code (DTC) Confirmation Procedure

NFAT0248

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

WITH CONSULT-II

NFAT0248S01

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).

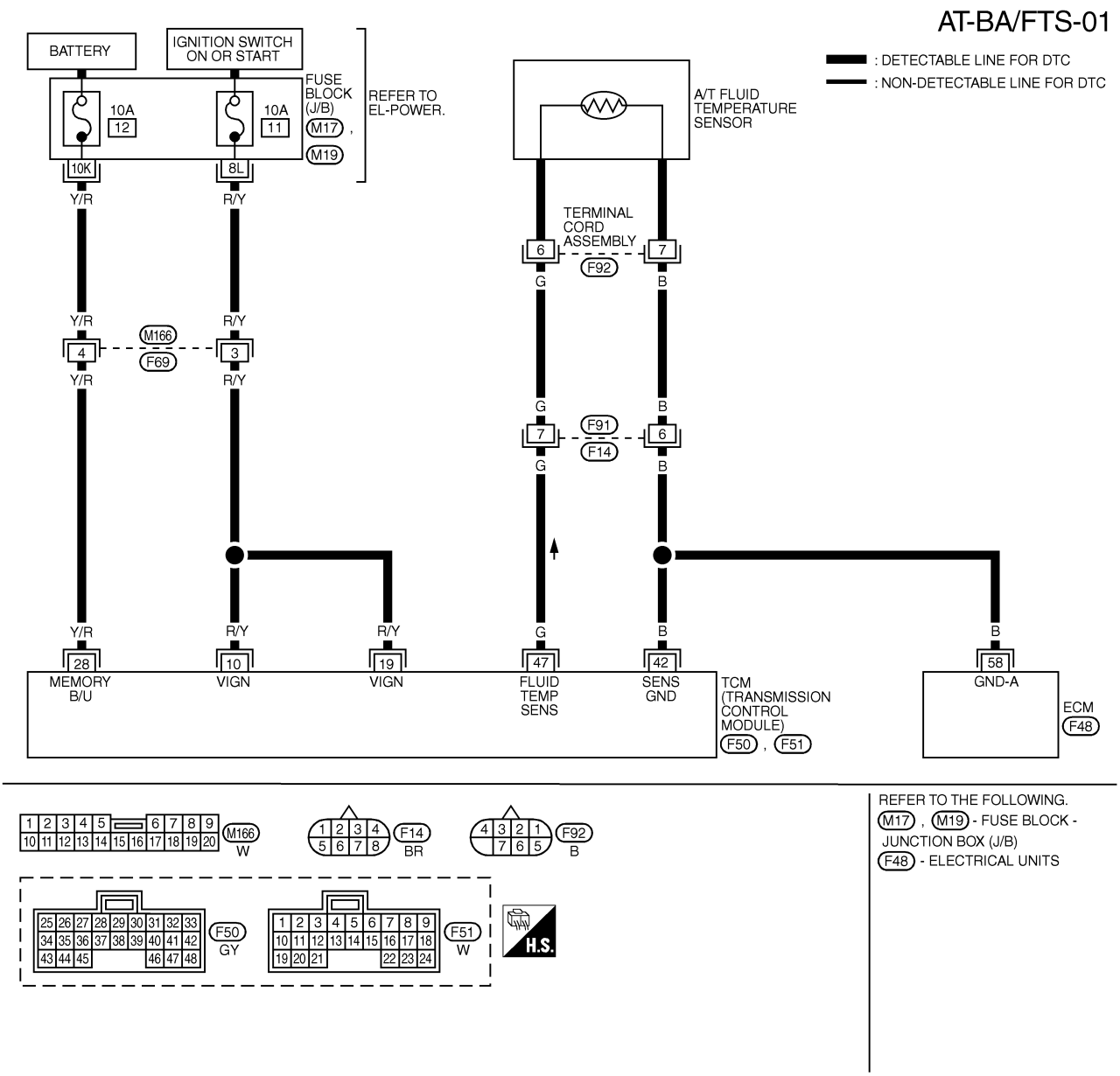
WITHOUT CONSULT-II

NFAT0248S02

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 TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS), AT-51.

Wiring Diagram — AT — BA/FTS

NFAT0080



MAT069B

TCM TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND (B) 25 OR 48 (B) (TCM GROUND)

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)(Approx.)
10	R/Y	POWER SOURCE	WHEN IGN ON	BATTERY VOLTAGE
			WHEN IGN OFF	0V
19	R/Y	POWER SOURCE	SAME AS NO. 10	
28	Y/R	POWER SOURCE (MEMORY BACK-UP)	WHEN IGN ON	BATTERY VOLTAGE
			WHEN IGN OFF	BATTERY VOLTAGE
42	B	SENSOR GROUND	—	0V
47	G	A/T FLUID TEMPERATURE SENSOR	WHEN IGN ON AND ATF TEMPERATURE IS 20°C (68°F)	1.5V
			WHEN IGN ON AND ATF TEMPERATURE IS 80°C (176°F)	0.5V

SAT599KA

Diagnostic Procedure

NFAT0081

1	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”.

DATA MONITOR	
MONITORING	
VHCL/S SE-A/T	XXX km/h
VHCL/S SE-MTR	XXX km/h
THRTL POS SEN	XXX V
FLUID TEMP SE	XXX V
BATTERY VOLT	XXX V

SAT614J

Voltage:
Cold [20°C (68°F)] → Hot [80°C (176°F)]:
Approximately 1.5V → 0.5V

OK or NG

OK	▶	GO TO 9.
NG	▶	GO TO 2.

2	DETECT MALFUNCTIONING ITEM

Check the following items:

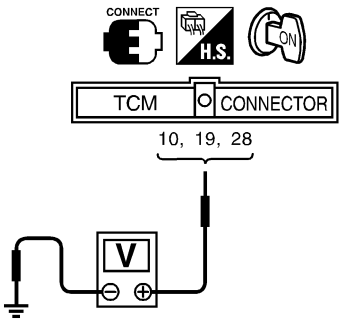
- Harness for short or open between TCM, ECM and terminal cord assembly (Main harness)
- Ground circuit for ECM
  Refer to EC-157, “TROUBLE DIAGNOSIS FOR POWER SUPPLY”.

OK or NG

OK	▶	GO TO 9.
NG	▶	Repair or replace damaged parts.

3	CHECK TCM POWER SOURCE STEP 1

1. Turn ignition switch to ON position.
   (Do not start engine.)
2. Check voltage between TCM harness connectors F50, F51 terminals 10 (R/Y), 19 (R/Y), 28 (Y/R) and ground.



Voltage:
Battery voltage

SAT611J

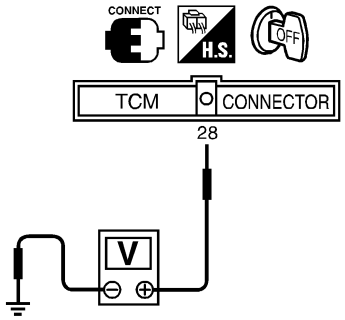
OK or NG

OK	▶	GO TO 4.
NG	▶	GO TO 5.

Diagnostic Procedure (Cont'd)

4	CHECK TCM POWER SOURCE STEP 2

1. Turn ignition switch to OFF position.
2. Check voltage between TCM harness connector F50 terminal 28 (Y/R) and ground.



Voltage:
Battery voltage

SAT612JG

OK or NG

OK	▶	GO TO 6.
NG	▶	GO TO 5.

5	DETECT MALFUNCTIONING ITEM

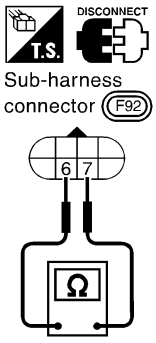
Check the following items:
- Harness for short or open between ignition switch and TCM (Main harness)
- Ignition switch and fuse
  Refer to EL-10, "POWER SUPPLY ROUTING".

OK or NG

OK	▶	GO TO 6.
NG	▶	Repair or replace damaged parts.

6	CHECK A/T FLUID TEMPERATURE SENSOR WITH TERMINAL CORD ASSEMBLY

1. Turn ignition switch to OFF position.
2. Disconnect terminal harness assembly connector in engine compartment.
3. Check resistance between terminals 6 (G) and 7 (B) when A/T is cold.



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

SAT616J

4. Reinstall any part removed.

OK or NG

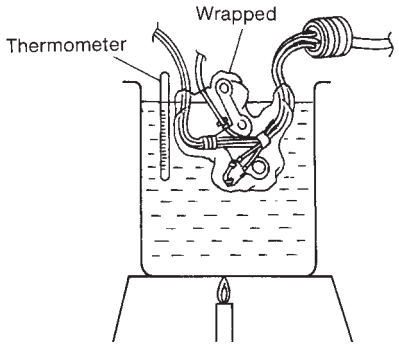
OK (without CONSULT-II)	▶	GO TO 8.
NG	▶	GO TO 7.

7	DETECT MALFUNCTIONING ITEM

1. Remove oil pan. Refer to AT-277.
2. Check the following items:

- A/T fluid temperature sensor

i. Check resistance between two terminals while changing temperature as shown below.



SAT298F

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

MTBL0210

- Harness of terminal harness assembly for short or open

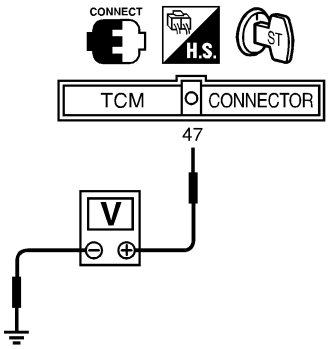
OK or NG

OK (without CONSULT-II)	▶	GO TO 8.
NG	▶	Repair or replace damaged parts.

8	CHECK INPUT SIGNAL OF A/T FLUID TEMPERATURE SENSOR (Without CONSULT-II)

Without CONSULT-II

1. Start engine.
2. Check voltage between TCM harness connector F50 terminal 47 (G) and ground while warming up A/T.



SAT354JB

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 TCM harness connector F50 terminal 42 (B) and ground. Refer to wiring diagram — AT — BA/FTS.

Continuity should exist.

OK or NG

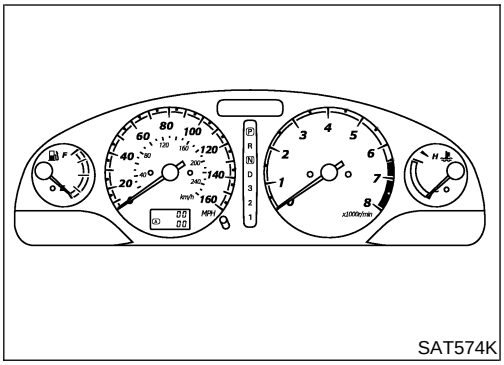
OK	▶	GO TO 10.
NG	▶	GO TO 9.

Diagnostic Procedure (Cont'd)

9	DETECT MALFUNCTIONING ITEM	
Check the following items: ● Harness for short or open between TCM, ECM and terminal cord assembly (Main harness) ● Ground circuit for ECM Refer to EC-157, "TROUBLE DIAGNOSIS FOR POWER SUPPLY".		
	OK or NG	
OK	▶	GO TO 10.
NG	▶	Repair or replace damaged parts.

10	CHECK DTC	
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-197.		
	OK or NG	
OK	▶	**INSPECTION END**
NG	▶	GO TO 11.

11	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.



Description

NFAT0082

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

NFAT0082S01

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
40	PU/R	Vehicle speed sensor		When moving vehicle at 2 to 3 km/h (1 to 2 MPH) for 1 m (3 ft) or more.	0V

On Board Diagnosis Logic

NFAT0249

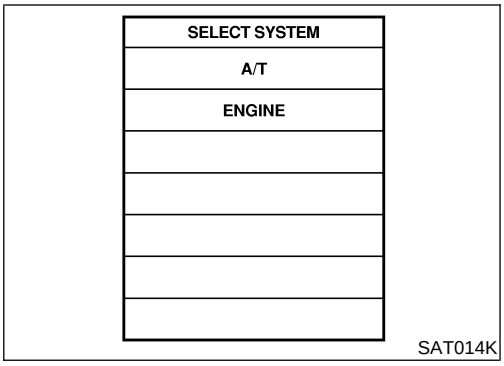
Diagnostic trouble code VHCL SPEED SEN·MTR with CONSULT-II or 2nd judgement flicker without CONSULT-II is detected when TCM does not receive the proper voltage signal from the sensor.

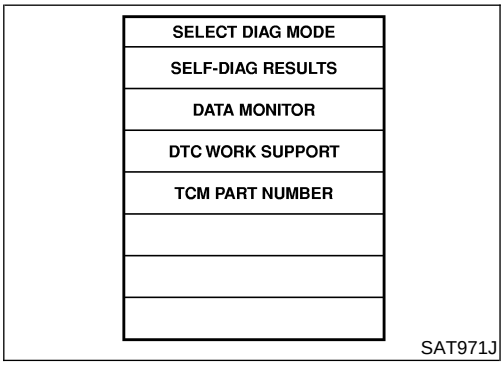
Possible Cause

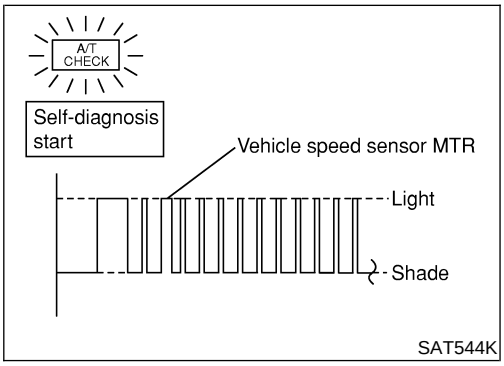
NFAT0250

Check the following items.

- Harness or connectors
  (The sensor circuit is open or shorted.)
- Vehicle speed sensor







Diagnostic Trouble Code (DTC) Confirmation Procedure

NFAT0251

CAUTION:

- **Always drive vehicle at a safe speed.**
- **If conducting this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.**

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

WITH CONSULT-II

NFAT0251S01

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

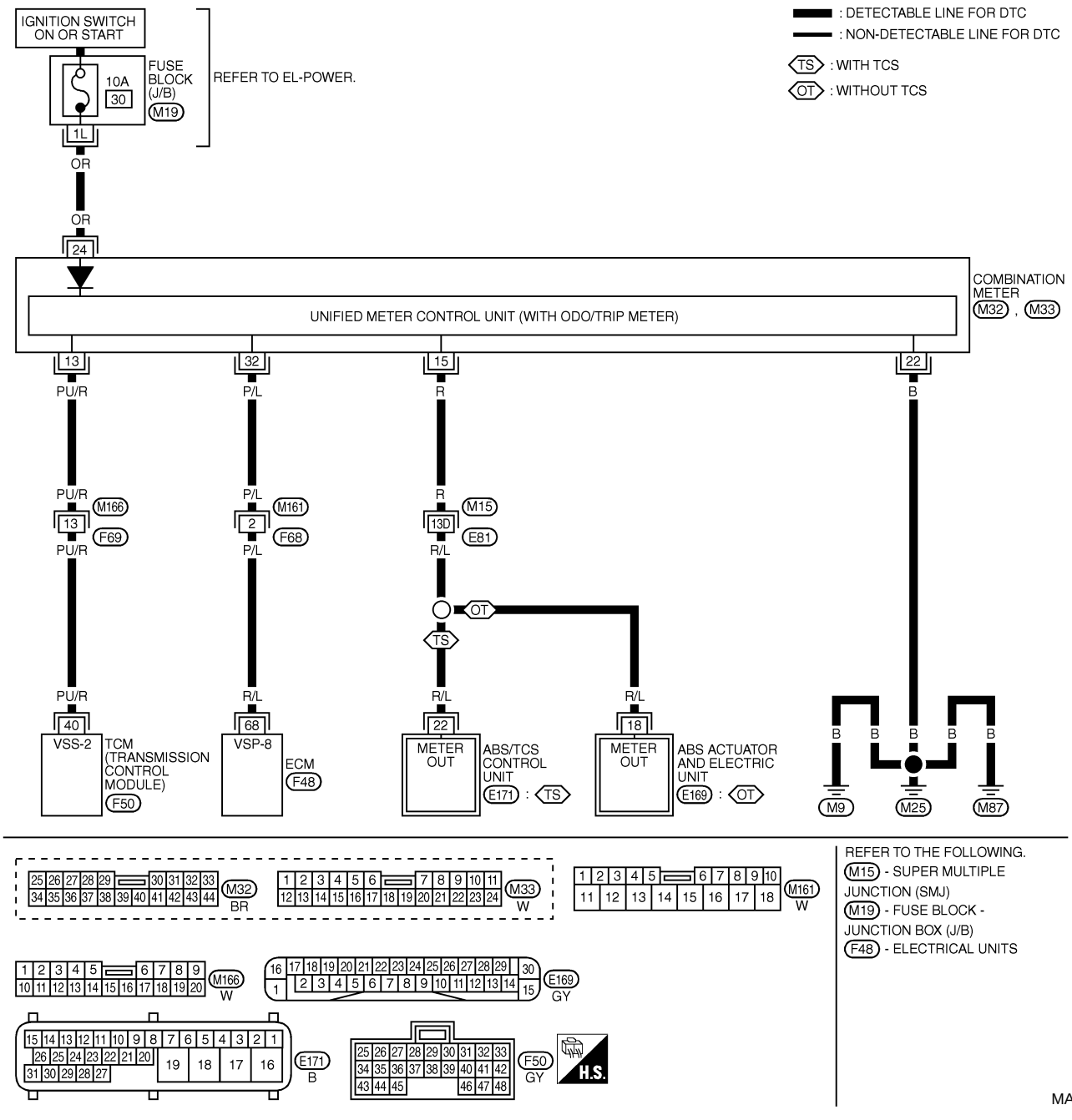
NFAT0251S02

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-51.

Wiring Diagram — AT — VSSMTR

NFAT0083

AT-VSSMTR-01



MAT282B

TCM TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND 25 (B) OR 48 (B) (TCM GROUND)

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
40	PU/R	VEHICLE SPEED SENSOR	WHEN MOVING VEHICLE AT 2 TO 3 KM/H (1 TO 2 MPH) FOR 1 M (3 FT)	0V

SAT313KB

Diagnostic Procedure

NFAT0084

1	CHECK INPUT SIGNAL

With CONSULT-II

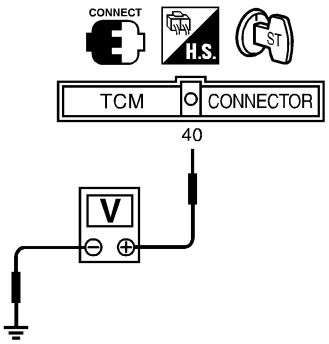
1. Start engine.
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out the value of “VHCL/S SE·MTR” while driving.
   Check the value changes according to driving speed.

DATA MONITOR	
MONITORING	
VHCL/S SE-A/T	XXX km/h
VHCL/S SE-MTR	XXX km/h
THRTL POS SEN	XXX V
FLUID TEMP SE	XXX V
BATTERY VOLT	XXX V

SAT614J

Without CONSULT-II

1. Start engine.
2. Check voltage between TCM harness connector F50 terminal 40 (PU/R) and ground while driving at 2 to 3 km/h (1 to 2 MPH) for 1 m (3 ft) or more.



SAT356JB

Voltage:
0V

OK or NG

OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	DETECT MALFUNCTIONING ITEM

Check the following items:

- Vehicle speed sensor and ground circuit for vehicle speed sensor
  Refer to EL-117, “METERS AND GAUGES”.
- Harness for short or open between TCM and vehicle speed sensor (Main harness)

OK or NG

OK	▶	GO TO 3.
NG	▶	Repair or replace damaged parts.

3	CHECK DTC	
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-204. **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.

Description

NFAT0252

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 units transmits/receives data but selectively reads required data only.

TCM TERMINALS AND REFERENCE VALUE

NFAT0252S01

Remarks: Specification data are reference values.

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

*: This terminal is connected to the ECM.

On Board Diagnosis Logic

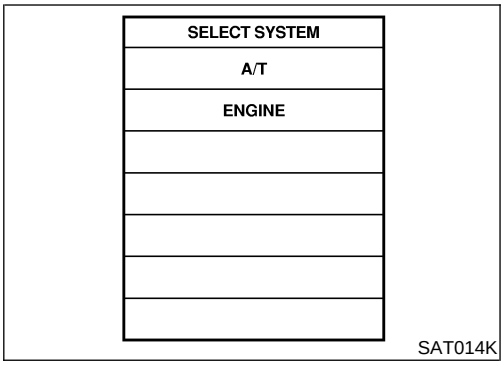
NFAT0253

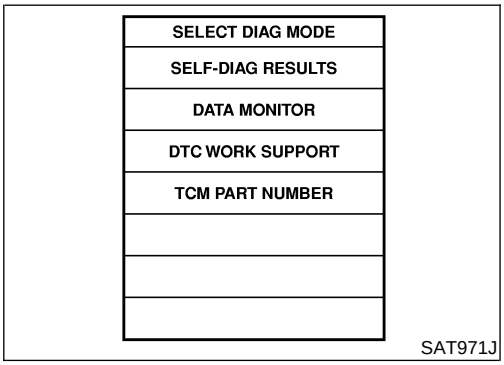
Diagnostic trouble code CAN COMM CIRCUIT or U1000 with CONSULT-II or 12th judgement flicker without CONSULT-II is detected when the ECM-A/T communication line is open or shorted.

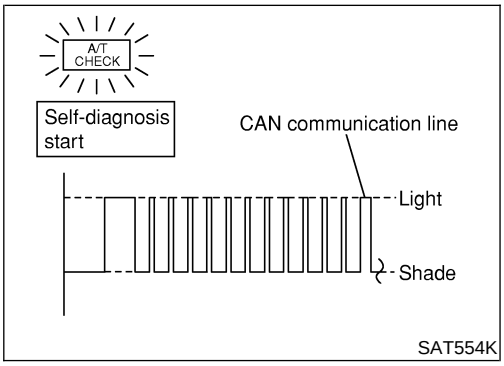
Possible Cause

NFAT0254

Check harness or connector.
(CAN communication line is open or shorted.)







Diagnostic Trouble Code (DTC) Confirmation Procedure

NFAT0255

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

WITH CONSULT-II

NFAT0255S01

1) Turn ignition switch “ON”.
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

NFAT0255S02

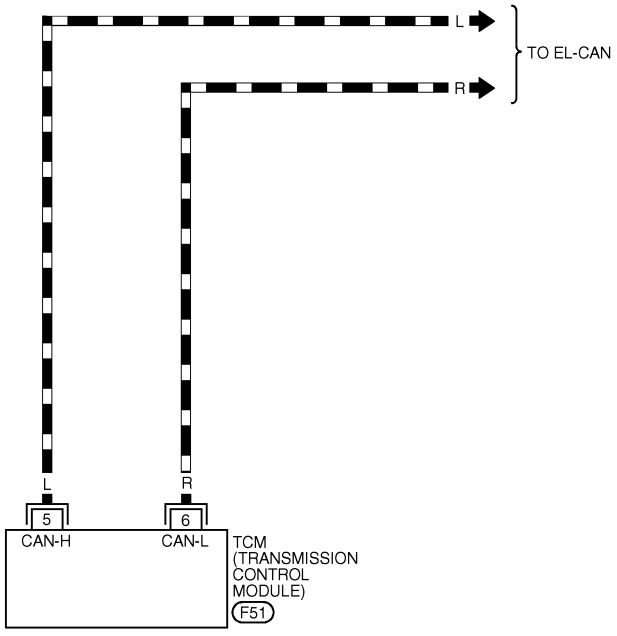
1) Turn ignition switch “ON”.
2) Wait at least 6 seconds or start engine and wait at least 6 seconds.
3) Perform self-diagnosis.
   Refer to TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS), AT-51.

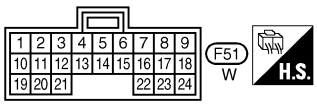
Wiring Diagram — AT — CAN

NFAT0256

AT-CAN-01

: DETECTABLE LINE FOR DTC
: NON-DETECTABLE LINE FOR DTC
: DATA LINE





MAT266B

TCM TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND 25 (B) OR 48 (B) (TCM GROUND)

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
5	L	CAN (HIGH)	—	0V
6	R	CAN (LOW)	—	0V

SAT594KA

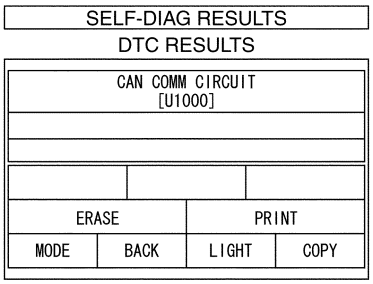
Diagnostic Procedure

NFAT0257

1 CHECK CAN COMMUNICATION CIRCUIT

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. The "CAN COMM CIRCUIT" is detected.



PCIA0061E

Yes or No?

Yes	▶	Print out CONSULT-II screen, GO TO 2.
No	▶	INSPECTION END

2 CHECK CAN COMMUNICATION SIGNALS

With CONSULT-II

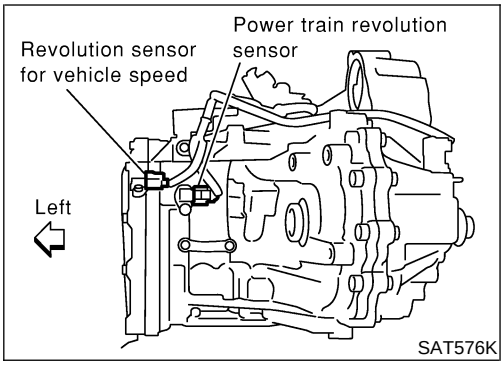
1. Turn ignition switch to "ON" position. (Do not start engine.)
2. Select "CAN COMM SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.

CAN Communication Signals

Normal conditions		Abnormal conditions (example)
Without TCS	With TCS	
CAN COMM : OK	CAN COMM : OK	CAN COMM : OK
CAN CIRC 1 : OK	CAN CIRC 1 : OK	CAN CIRC 1 : UNKWN
CAN CIRC 2 : OK	CAN CIRC 2 : OK	CAN CIRC 2 : UNKWN
CAN CIRC 3 : OK	CAN CIRC 3 : UNKWN	CAN CIRC 3 : UNKWN
CAN CIRC 4 : UNKWN	CAN CIRC 4 : UNKWN	CAN CIRC 4 : UNKWN
CAN CIRC 5 : UNKWN	CAN CIRC 5 : UNKWN	CAN CIRC 5 : UNKWN

MTBL1176

	▶	Print out CONSULT-II screen, go to EL-430 and EL-437, "CAN SYSTEM".



Description

NFAT0272

The power train revolution sensor detects foward clutch drum rpm (revolutions per minute). It is located on the input side of the automatic transmission. The vehicle speed sensor A/T (Revolution sensor) is located on the output side of the automatic transmission. With the two sensors, input and output shaft rpms are accurately detected. The result is optimal shift timing during deceleration and improved shifting.

TCM TERMINALS AND REFERENCE VALUE

NFAT0272S01

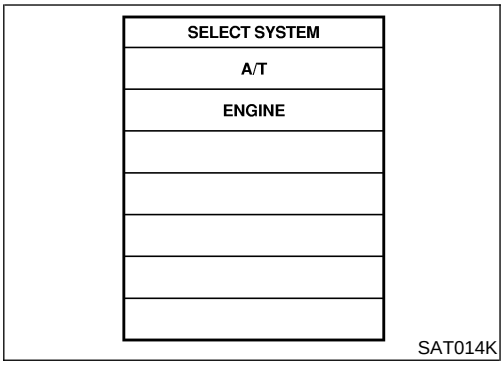
Remarks: Specification data are reference values.

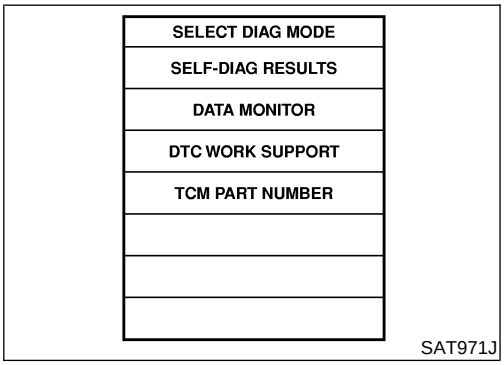
Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
38	PU	Power train revolution sensor		When moving at 20 km/h (12 MPH), use the CONSULT-II pulse frequency measuring function.*1 **CAUTION:** **Connect the diagnosis data link cable to the vehicle diagnosis connector.** *1: A circuit tester cannot be used to test this item.	240 Hz
				When vehicle parks.	Under 1.3V or over 4.5V
42	B	Sensor ground		—	0V

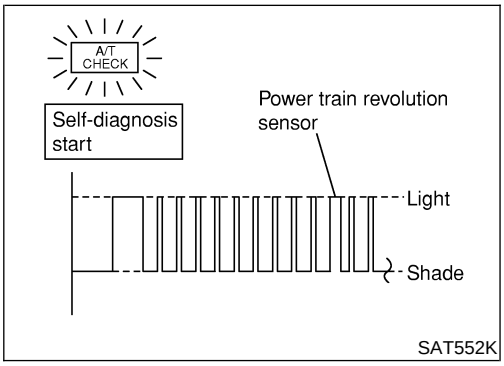
On Board Diagnosis Logic

NFAT0279

Diagnostic trouble code	Malfunction is detected when ...	Check item (Possible cause)
: TURBINE REV	TCM does not receive the proper voltage signal from the sensor.	• Harness or connectors (The sensor circuit is open or shorted.) • Power train revolution sensor
: 10th judgement flicker		







Diagnostic Trouble Code (DTC) Confirmation Procedure

=NFAT0277

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

NFAT0277S01

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 40 km/h (25 MPH), engine speed higher than 1,500 rpm, throttle opening greater than 1.0/8 of the full throttle position and driving for more than 5 seconds.

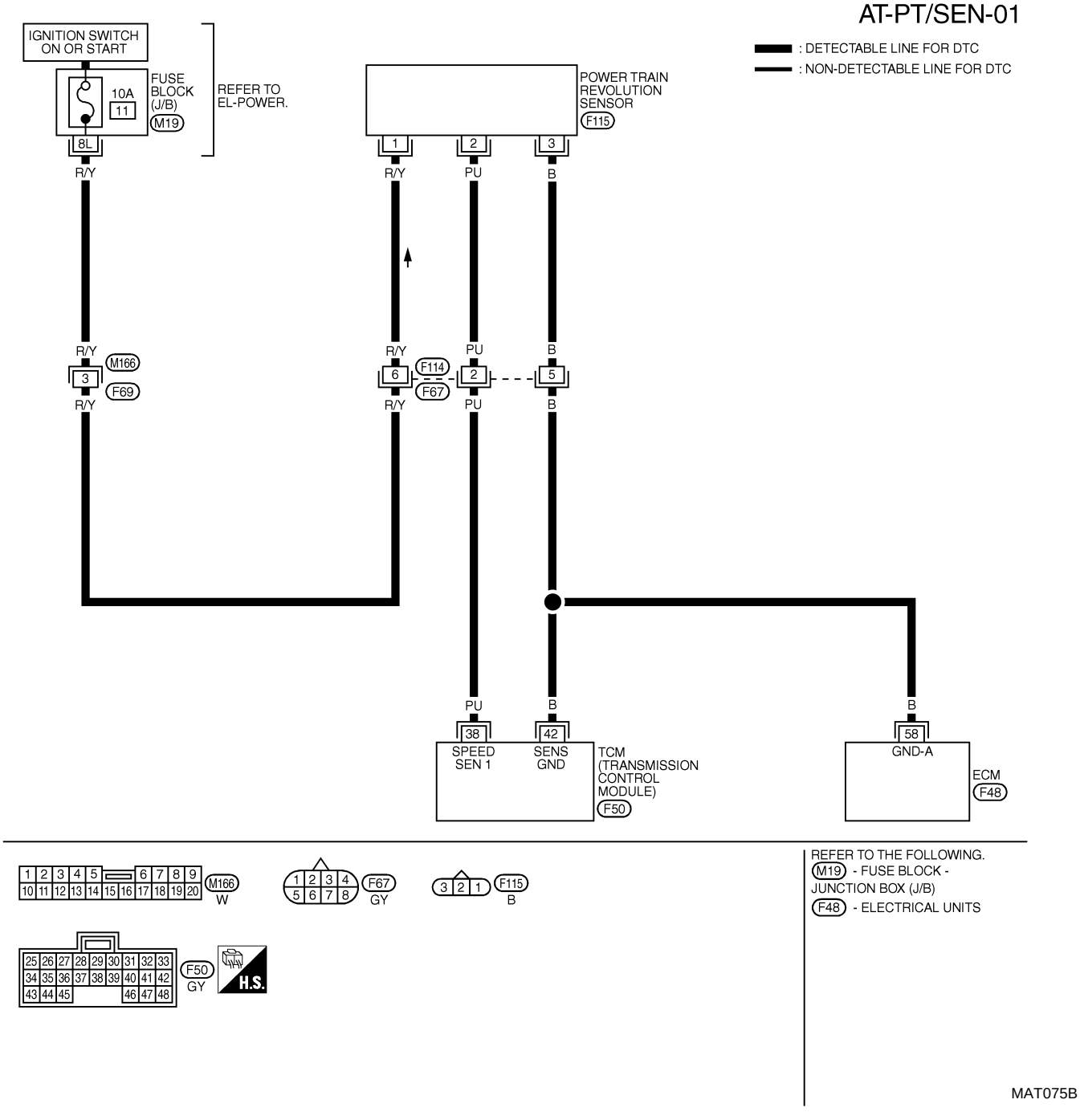
NO TOOLS

NFAT0277S02

1) Start engine.
2) Drive vehicle under the following conditions:
   Selector lever in "D", vehicle speed higher than 40 km/h (25 MPH), engine speed higher than 1,500 rpm, throttle opening greater than 1.0/8 of the full throttle position and driving for more than 5 seconds.
3) Perform self-diagnosis.
   Refer to "TCM SELF-DIAGNOSTIC PROCEDURE (No Tools)", AT-51.

Wiring Diagram — AT — P/T SEN-01

NFAT0276



TCM TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND 25 (B) OR 48 (B) (TCM GROUND)

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)(Approx.)
38	PU	POWER TRAIN 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.	240 Hz
			WHEN VEHICLE PARKS.	UNDER 1.3V OR OVER 4.5V
42	B	SENSOR GROUND	—	0V

SAT595KA

Diagnostic Procedure

NFAT0274

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 “TURBINE REV”. Check the value changes according to engine speed.

NOTE:
“TURBINE REV” in “TCM INPUT SIGNALS” means power train revolution sensor.

DATA MONITOR	
MONITORING	
ENGINE SPEED	XXX rpm
TURBINE REV	XXX rpm
OVERDRIVE SW	ON
PN POSI SW	OFF
R POSITION SW	OFF

SAT740J

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.	240 Hz
When vehicle parks.	Under 1.3V or over 4.5V

MTBL1177

- Harness for short or open between TCM, ECM and revolution sensor (Main harness)

OK or NG

OK	▶	GO TO 3.
NG	▶	Repair or replace damaged parts.

3	CHECK DTC

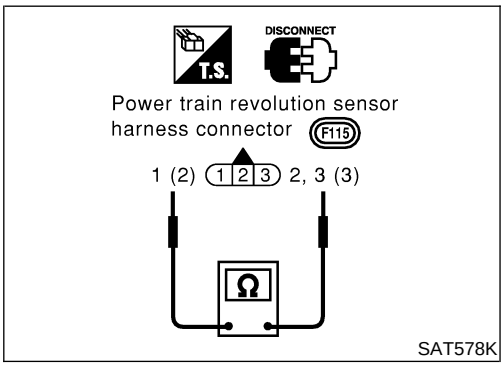
Perform “Diagnostic Trouble Code (DTC) confirmation procedure”, AT-213.

OK or NG

OK	▶	**INSPECTION END**
NG	▶	GO TO 4.

Diagnostic Procedure (Cont'd)

4	CHECK TCM INSPECTION	
1. Perform TCM input/output signal inspection. 2. If NG, recheck TCM pin terminal for damage or loose connection with harness connector.		
OK or NG		
OK	▶	**INSPECTION END**
NG	▶	Repair or replace damaged parts.



Component Inspection

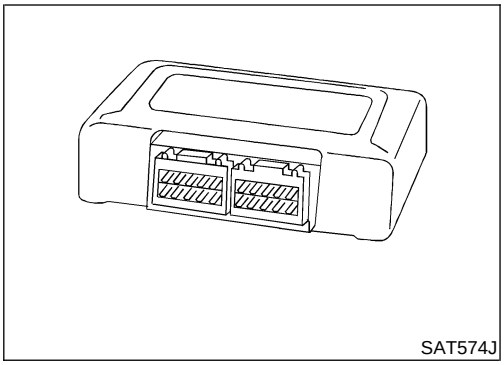
NFAT0275

POWER TRAIN REVOLUTION SENSOR

NFAT0275S01

- Check resistance between terminals 1 (R/Y), 2 (PU) and 3 (B).

Terminal No.		Resistance (Approx.)
1 (R/Y)	2 (PU)	No continuity
1 (R/Y)	3 (B)	No continuity
2 (PU)	3 (B)	2.4 - 2.8 kΩ


SAT574J

Description

NFAT0085

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

On Board Diagnosis Logic

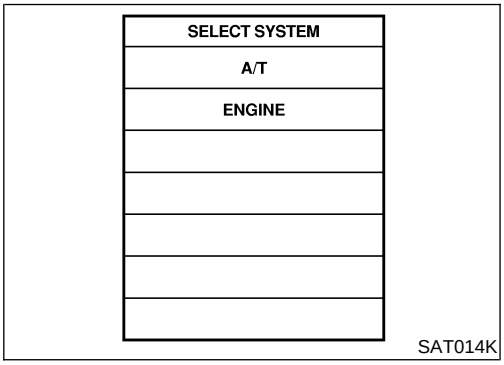
NFAT0258

Diagnostic trouble code CONTROL UNIT (RAM), CONTROL UNIT (ROM) with CONSULT-II is detected when TCM memory (RAM) or (ROM).

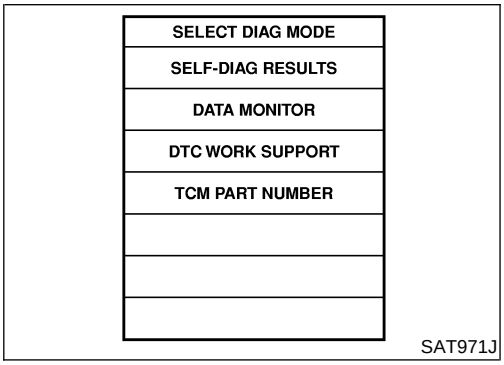
Possible Cause

NFAT0269

Check TCM.



SAT014K



SAT971J

Diagnostic Trouble Code (DTC) Confirmation Procedure

NFAT0259

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

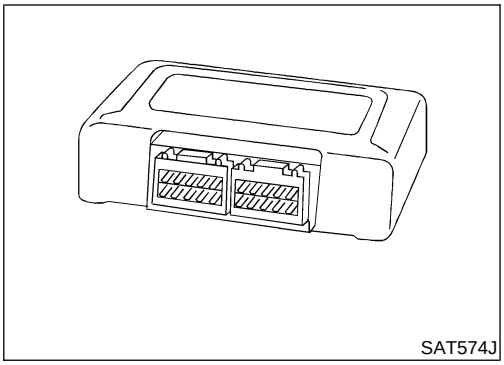
NFAT0259S01

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.

Diagnostic Procedure

NFAT0086

1	INSPECTION START	
With CONSULT-II 1. Turn ignition switch ON and select “SELF DIAGNOSIS” mode for A/T with CONSULT-II. 2. Touch “ERASE”. 3. Perform “Diagnostic Trouble Code (DTC) Confirmation Procedure”, AT-217. 4. Is the “CONTROL UNIT (RAM)” or “CONTROL UNIT (ROM)” displayed again?		
Yes or No		
Yes	▶	Replace TCM.
No	▶	**INSPECTION END**



SAT574J

Description

NFAT0199

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

On Board Diagnosis Logic

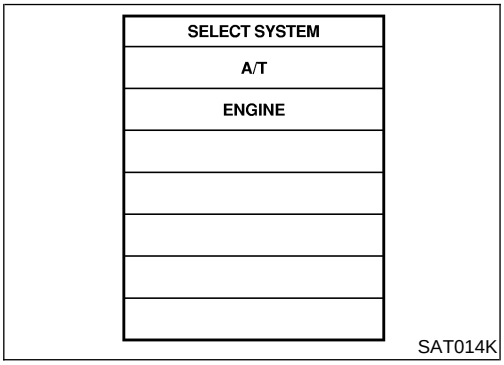
NFAT0260

Diagnostic trouble code CONTROL UNIT (EEP ROM) with CONSULT-II is detected when TCM memory (EEP ROM) is malfunctioning.

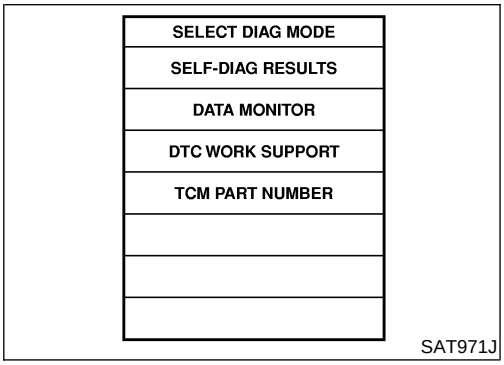
Possible Cause

NFAT0270

Check TCM.



SAT014K



SAT971J

Diagnostic Trouble Code (DTC) Confirmation Procedure

NFAT0261

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

NFAT0261S01

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.

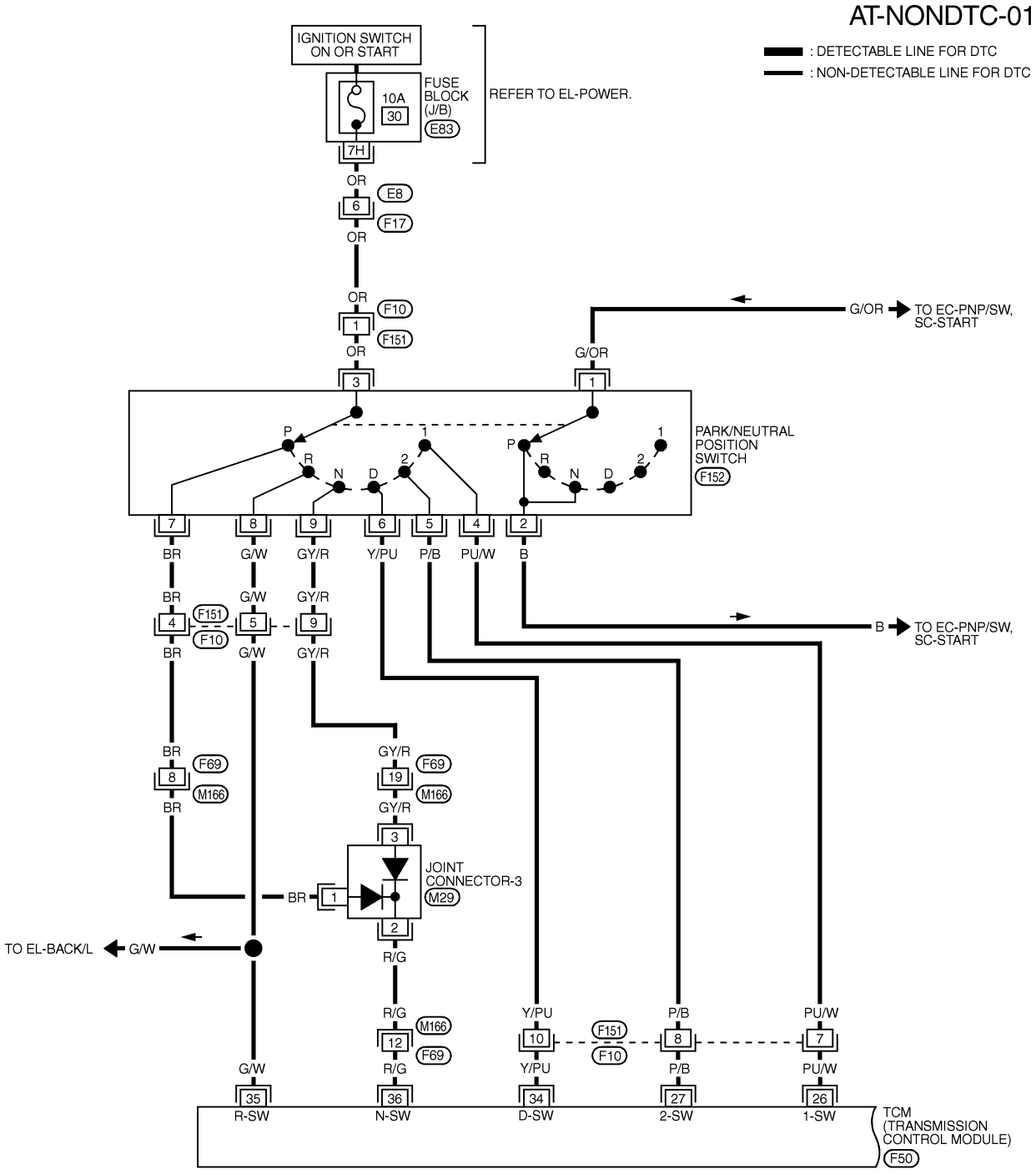
Diagnostic Procedure

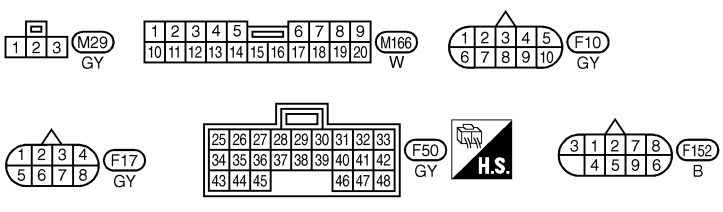
=NFAT0200

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 to “OFF” position for 10 seconds. 6. Perform “Diagnostic Trouble Code (DTC) Confirmation Procedure”, AT-219. **Is the “CONT UNIT (EEP ROM)” displayed again?**		
Yes	▶	Replace TCM.
No	▶	**INSPECTION END**

Wiring Diagram — AT — NONDTC

NFAT0087

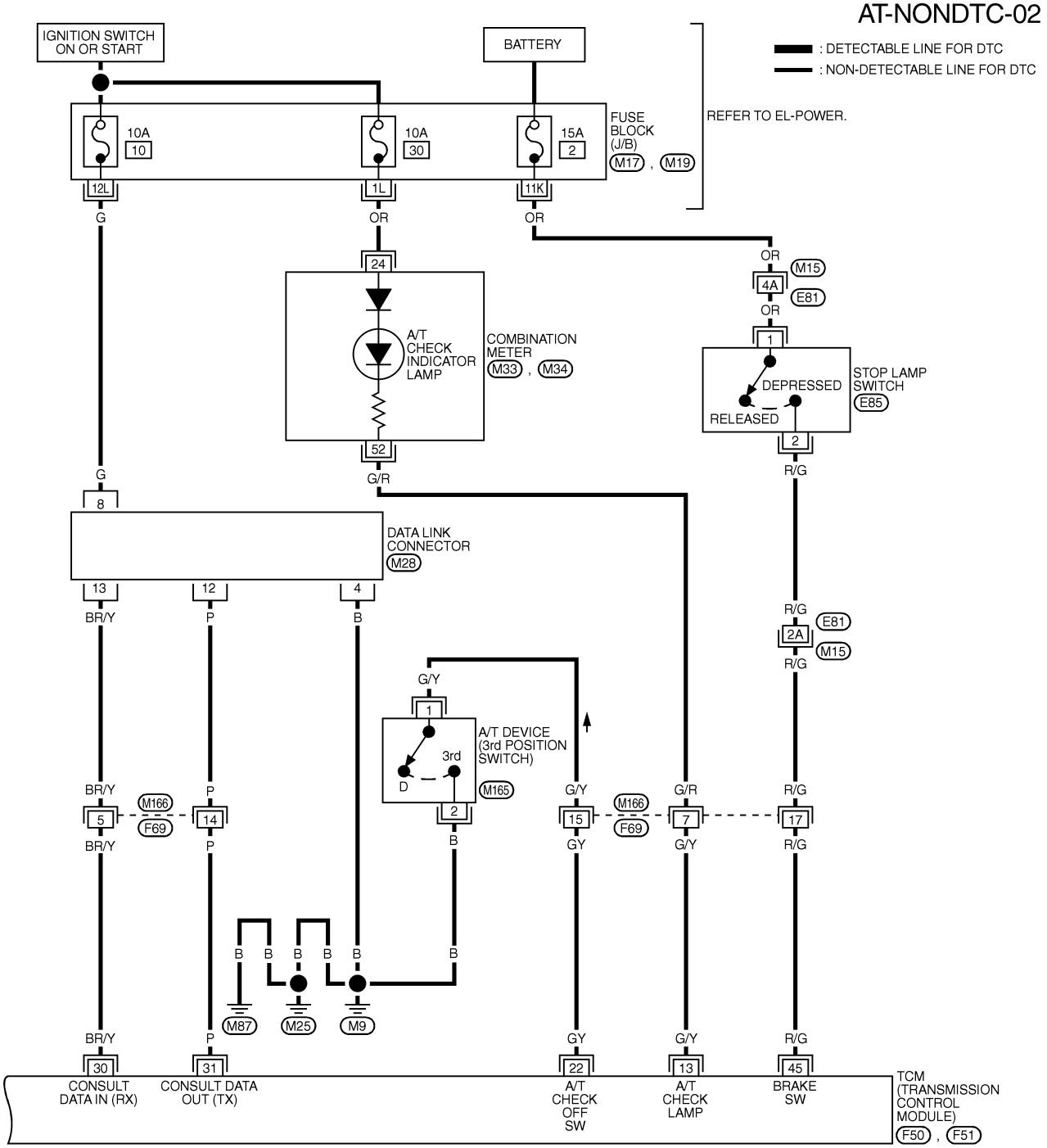


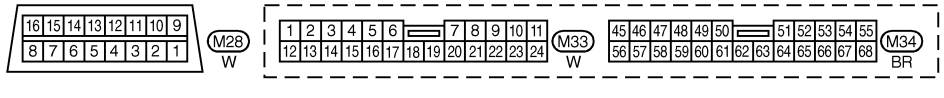


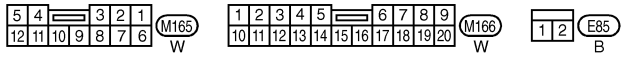
REFER TO THE FOLLOWING.
E83 -FUSE BLOCK-JUNCTION BOX (J/B)

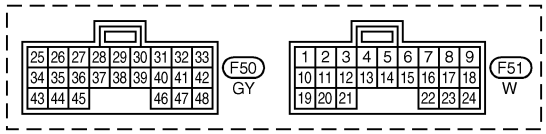
MAT071B

AT-NONDTC-02









REFER TO THE FOLLOWING.
M15 - SUPER MULTIPLE JUNCTION (SMJ)
M17 , M19 -FUSE BLOCK- JUNCTION BOX (J/B)

MAT267B

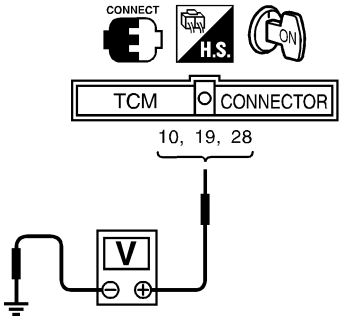
1. A/T CHECK Indicator Lamp Does Not Come On

NFAT0088

SYMPTOM:
A/T CHECK 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 harness connectors F50, F51 terminals 10 (R/Y), 19 (R/Y), 28 (Y/R) and ground.



Voltage:
Battery voltage

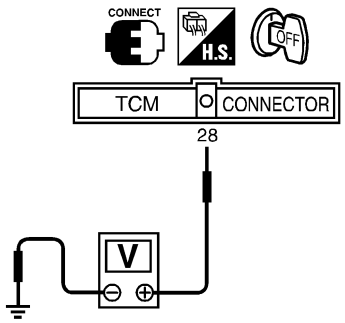
SAT611J

OK or NG

OK	▶	GO TO 2.
NG	▶	GO TO 3.

2	CHECK POWER SOURCE STEP 2

1. Turn ignition switch to OFF position.
2. Check voltage between TCM harness connector F50 terminal 28 (Y/R) and ground.



Voltage:
Battery voltage

SAT612JG

OK or NG

OK	▶	GO TO 4.
NG	▶	GO TO 3.

3	DETECT MALFUNCTIONING ITEM

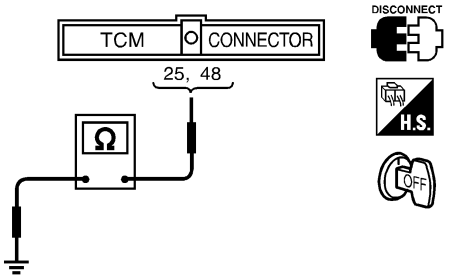
Check the following items:
- Harness for short or open between ignition switch and TCM (Main harness)
  Refer to “Wiring Diagram — AT — MAIN” in AT-101.
- Ignition switch and fuse
  Refer to EL-10, “POWER SUPPLY ROUTING”.

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 harness connector F50 terminals 25 (B), 48 (B) and ground.



SAT515J

Continuity should exist.

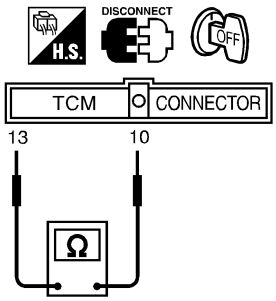
If OK, check harness for short to ground and short to power.

OK or NG

OK	▶	GO TO 5.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors. Refer to "Wiring Diagram — AT — MAIN" in AT-101.

5	CHECK LAMP CIRCUIT

1. Turn ignition switch to OFF position.
2. Check resistance between TCM harness connector F51 terminals 10 (R/Y) and 13 (G/Y).



SAT360JD

Resistance:
50 - 100Ω

3. Reinstall any part removed.

OK or NG

OK	▶	GO TO 7.
NG	▶	GO TO 6.

6	DETECT MALFUNCTIONING ITEM

Check the following items:

- Harness and fuse for short or open between ignition switch and A/T CHECK indicator lamp (Main harness) Refer to EL-10, "POWER SUPPLY ROUTING".
- Harness for short or open between A/T CHECK indicator lamp and TCM

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	▶	GO TO 8.

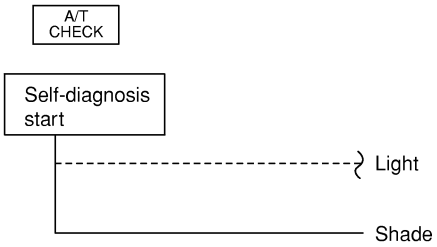
8	CHECK TCM INSPECTION	
1. Perform TCM input/output signal inspection. 2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector. **OK or NG**		
OK	▶	**INSPECTION END**
NG	▶	Repair or replace damaged parts.

2. Engine Cannot Be Started In P and N Position

=NFAT0089

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 PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT
With CONSULT-II Does “TCM INPUT SIGNALS” in “DATA MONITOR” show damage to park/neutral position (PNP) switch circuit?	
Without CONSULT-II Does self-diagnosis show damage to park/neutral position (PNP) switch circuit?  SAT555K	
Yes or No	
Yes ▶	Check park/neutral position (PNP) switch circuit. Refer to “DTC P0705”, AT-104.
No ▶	GO TO 2.

2	CHECK PARK/NEUTRAL POSITION (PNP) SWITCH
Check for short or open of park/neutral position (PNP) switch harness connector F152 terminals 1 (G/OR) and 2 (B). Refer to AT-106.	
OK or NG	
OK ▶	GO TO 3.
NG ▶	Repair or replace park/neutral position (PNP) switch.

3	CHECK STARTING SYSTEM
Check starting system. Refer to SC-10, “System Description”.	
OK or NG	
OK ▶	**INSPECTION END**
NG ▶	Repair or replace damaged parts.

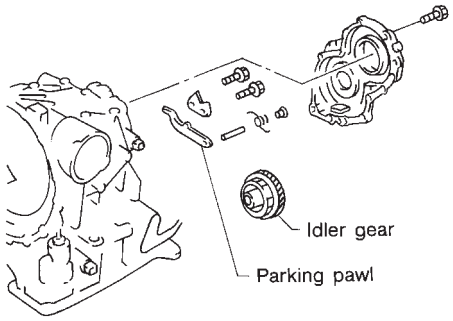
3. In P Position, Vehicle Moves Forward or Backward When Pushed

=NFAT0090

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

1	CHECK PARKING COMPONENTS

Check parking components. Refer to “Overhaul” and “Assembly”, AT-283, 357.



SAT282F

OK or NG

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

4. In N Position, Vehicle Moves

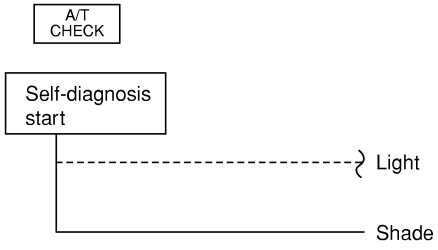
=NFAT0091

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

1	CHECK PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT

With CONSULT-II
Does “TCM INPUT SIGNALS” in “DATA MONITOR” show damage to park/neutral position (PNP) switch circuit?

Without CONSULT-II
Does self-diagnosis show damage to park/neutral position (PNP) switch circuit?



SAT555K

Yes or No

Yes	▶	Check park/neutral position (PNP) switch circuit. Refer to “DTC P0705”, AT-104.
No	▶	GO TO 2.

2	CHECK CONTROL LINKAGE

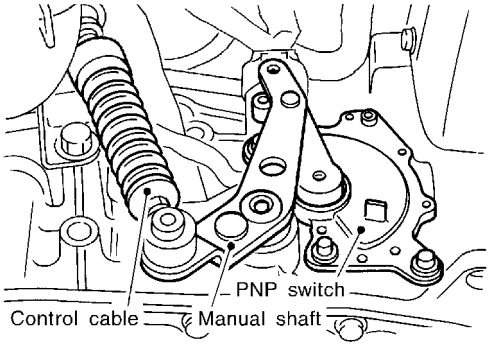
Check control cable. Refer to AT-279.

OK or NG

OK	▶	GO TO 4.
NG	▶	GO TO 3.

3	ADJUST CONTROL CABLE

Adjust control cable.



SAT023JA

	▶	Refer to AT-279.

4	CHECK A/T FLUID LEVEL

Check A/T fluid level again.

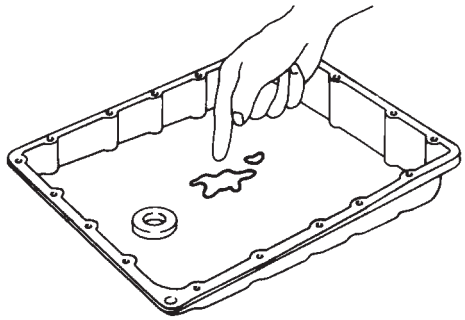
SAT638A

OK or NG

OK	▶	GO TO 5.
NG	▶	Refill ATF.

5	CHECK A/T FLUID CONDITION

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



SAT171B

OK or NG

OK	▶	GO TO 7.
NG	▶	GO TO 6.

6	DETECT MALFUNCTIONING ITEM

1. Disassemble A/T.
2. Check the following items:
- Forward clutch assembly
- Overrun clutch assembly
- Reverse clutch 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	▶	GO TO 8.

4. In N Position, Vehicle Moves (Cont'd)

8	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.

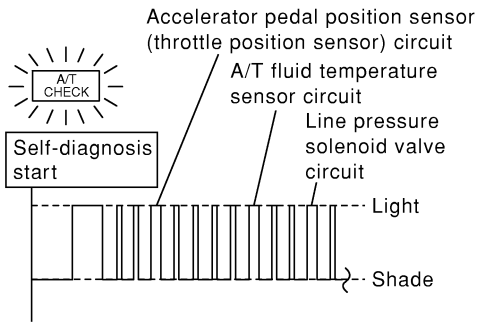
5. Large Shock. N → R Position

=NFAT0092

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 or accelerator pedal position sensor (throttle position sensor) circuit?



SAT582KA

Yes or No

Yes	▶	GO TO 2.
No	▶	GO TO 3.

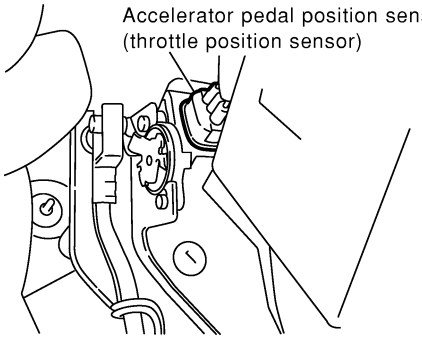
2	CHECK DAMAGED CIRCUIT

Check damaged circuit.

	▶	Refer to “DTC P0710, P0745 or P1705”, AT-110, 168 or 184.

3	CHECK ACCELERATOR PEDAL POSITION SENSOR (THROTTLE POSITION SENSOR)

Check accelerator pedal position sensor (throttle position sensor). Refer to EC-304, “DTC P0226 APP SENSOR (throttle position sensor)”.



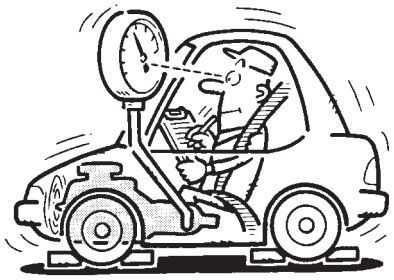
SAT516KA

OK or NG

OK	▶	GO TO 4.
NG	▶	Repair or replace accelerator pedal position sensor (throttle position sensor).

4	CHECK LINE PRESSURE

Check line pressure at idle with selector lever in D position. Refer to "LINE PRESSURE TEST", AT-67.



SAT494G

OK or NG

OK	▶	GO TO 6.
NG	▶	GO TO 5.

5	DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-277.
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

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	▶	GO TO 7.

7	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.

6. Vehicle Does Not Creep Backward In R Position

=NFAT0093

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

1	CHECK A/T FLUID LEVEL

Check A/T fluid level again.

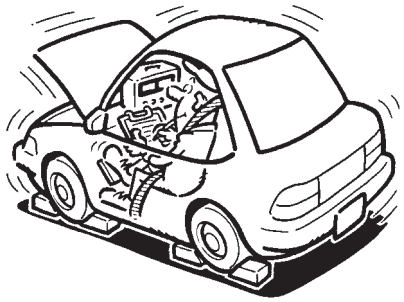
SAT638A

OK or NG

OK	▶	GO TO 2.
NG	▶	Refill ATF.

2	CHECK STALL REVOLUTION

Check stall revolution with selector lever in 1st and R positions.



SAT493G

OK or NG

OK (Refer to “Stall test”, AT-63.)	▶	GO TO 5.
OK in 1st position, NG in R position	▶	GO TO 3.
NG in both 1st and R positions	▶	GO TO 4.

3	DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to "ON-VEHICLE SERVICE", AT-277.
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
3. Disassemble A/T.
4. Check the following items:
- Oil pump assembly
- Torque converter
- Reverse clutch assembly
- High clutch assembly

OK or NG

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

4	DETECT MALFUNCTIONING ITEM

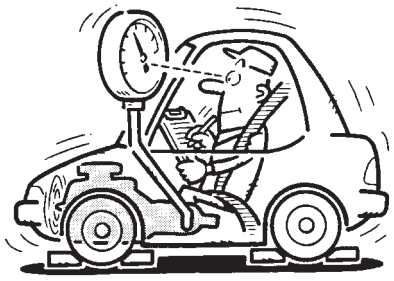
1. Remove control valve assembly. Refer to "ON-VEHICLE SERVICE", AT-277.
2. Check the following items:
- Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
- Line pressure solenoid valve
3. Disassemble A/T.
4. Check the following items:
- Oil pump assembly
- Torque converter
- Reverse clutch assembly
- High clutch assembly
- Low & reverse brake assembly
- Low one-way clutch

OK or NG

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

5	CHECK LINE PRESSURE

Check line pressure at idle with selector lever in R position. Refer to "LINE PRESSURE TEST", AT-67.



SAT494G

OK or NG

OK	▶	GO TO 7.
NG	▶	GO TO 6.

6	DETECT MALFUNCTIONING ITEM

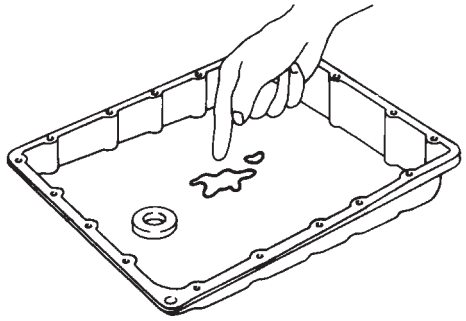
1. Remove control valve assembly. Refer to "ON-VEHICLE SERVICE", AT-277.
2. Check the following items:
- Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
- Line pressure solenoid valve
3. Disassemble A/T.
4. Check the following item:
- Oil pump assembly

OK or NG

OK	▶	GO TO 7.
NG	▶	Repair or replace damaged parts.

7	CHECK A/T FLUID CONDITION

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



SAT171B

OK or NG

OK	▶	GO TO 9.
NG	▶	GO TO 8.

8	DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to "ON-VEHICLE SERVICE", AT-277.
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
3. Disassemble A/T.
4. Check the following items:
- Oil pump assembly
- Torque converter
- Reverse clutch assembly
- High clutch assembly
- Low & reverse brake assembly
- Low one-way clutch

OK or NG

OK	▶	GO TO 9.
NG	▶	Repair or replace damaged parts.

9	CHECK SYMPTOM	
Check again. **OK or NG**		
OK	▶	**INSPECTION END**
NG	▶	GO TO 10.

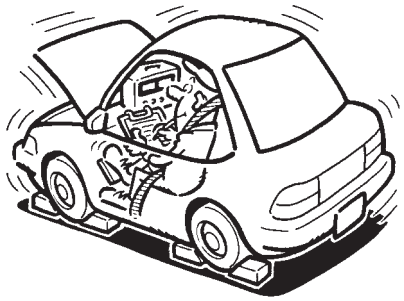
10	CHECK TCM INSPECTION	
1. Perform TCM input/output signal inspection. 2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector. **OK or NG**		
OK	▶	**INSPECTION END**
NG	▶	Repair or replace damaged parts.

7. Vehicle Does Not Creep Forward in D, 2nd or 1st Position

=NFAT0094

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

1	CHECK A/T FLUID LEVEL	
Check A/T fluid level again. SAT638A **OK or NG**		
OK	▶	GO TO 2.
NG	▶	Refill ATF.

2	CHECK STALL REVOLUTION	
Check stall revolution with selector lever in D position. Refer to “STALL TEST”, AT-63.  SAT493G **OK or NG**		
OK	▶	GO TO 4.
NG	▶	GO TO 3.

3	DETECT MALFUNCTIONING ITEM

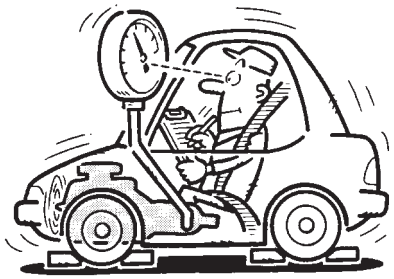
1. Remove control valve assembly. Refer to AT-277.
2. Check the following items:
- Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
- Line pressure solenoid valve
3. Disassemble A/T.
4. Check the following items:
- Oil pump assembly
- Forward clutch assembly
- Forward one-way clutch
- Low one-way clutch
- Low & reverse brake assembly
- Torque converter

OK or NG

OK	▶	GO TO 4.
NG	▶	Repair or replace damaged parts.

4	CHECK LINE PRESSURE

Check line pressure at idle with selector lever in D position. Refer to "LINE PRESSURE TEST", AT-67.



SAT494G

OK or NG

OK	▶	GO TO 6.
NG	▶	GO TO 5.

5	DETECT MALFUNCTIONING ITEM

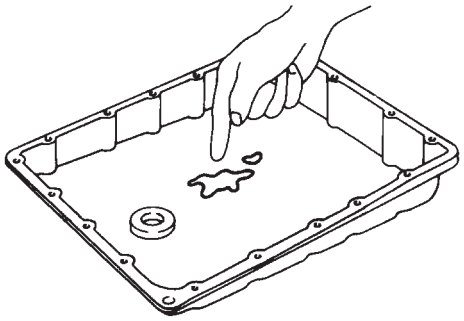
1. Remove control valve assembly. Refer to AT-277.
2. Check the following items:
- Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
- Line pressure solenoid valve
3. Disassemble A/T.
4. Check the following item:
- Oil pump assembly

OK or NG

OK	▶	GO TO 6.
NG	▶	Repair or replace damaged parts.

6	CHECK A/T FLUID CONDITION

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



SAT171B

OK or NG

OK	▶	GO TO 8.
NG	▶	GO TO 7.

7	DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-277.
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
3. Disassemble A/T.
4. Check the following items:
- Oil pump assembly
- Forward clutch assembly
- Forward one-way clutch
- Low one-way clutch
- Low & reverse brake assembly
- Torque converter

OK or NG

OK	▶	GO TO 8.
NG	▶	Repair or replace damaged parts.

8	CHECK SYMPTOM

Check again.

OK or NG

OK	▶	**INSPECTION END**
NG	▶	GO TO 9.

9	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

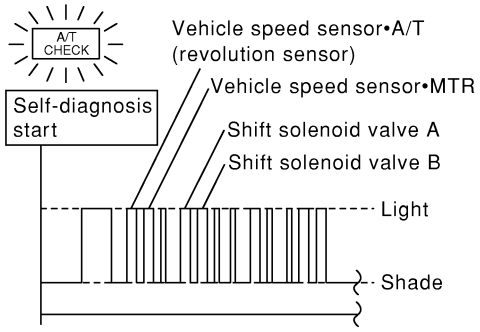
OK	▶	**INSPECTION END**
NG	▶	Repair or replace damaged parts.

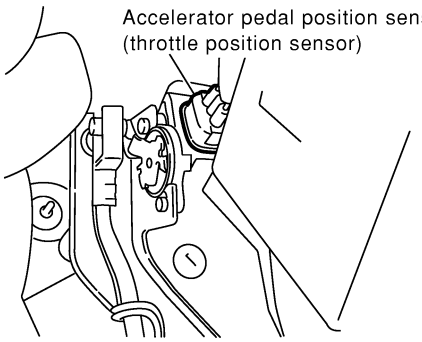
8. Vehicle Cannot Be Started From D_1

=NFAT0095

SYMPTOM:
Vehicle cannot be started from D_1 on Cruise test — Part 1.

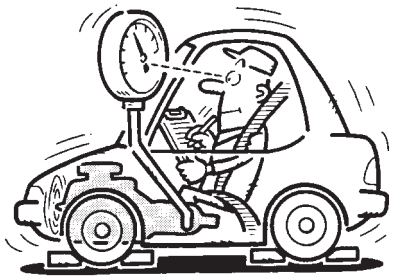
1	CHECK SYMPTOM	
Is “6. Vehicle Does Not Creep Backward In R Position” OK?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	Go to “6. Vehicle Does Not Creep Backward In R Position”, AT-233.

2	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?		
 SAT583K		
Yes or No		
Yes	▶	Check damaged circuit. Refer to “DTC P0720, P0750, P0755 or VHCL SPEED SEN·MTR”, AT-116, 174, 179 or 203.
No	▶	GO TO 3.

3	CHECK ACCELERATOR PEDAL POSITION SENSOR (THROTTLE POSITION SENSOR)	
Check accelerator pedal position sensor (throttle position sensor). Refer to EC-304, “DTC P0226 APP SENSOR (throttle position sensor)”.		
 SAT516KA		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Repair or replace accelerator pedal position sensor (throttle position sensor).

4	CHECK LINE PRESSURE

Check line pressure at stall point with selector lever in D position. Refer to "LINE PRESSURE TEST", AT-67.



SAT494G

OK or NG

OK	▶	GO TO 6.
NG	▶	GO TO 5.

5	DETECT MALFUNCTIONING ITEM

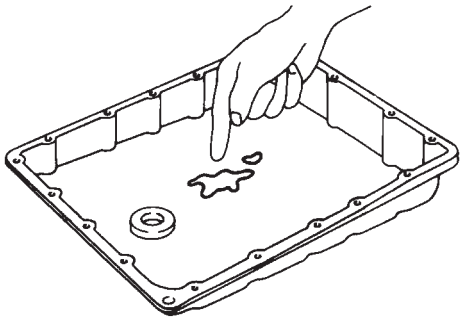
1. Remove control valve assembly. Refer to AT-277.
2. Check the following items:
- Shift valve A
- Shift valve B
- Shift solenoid valve A
- Shift solenoid valve B
- Pilot valve
- Pilot filter
3. Disassemble A/T.
4. Check the following items:
- Forward clutch assembly
- Forward one-way clutch
- Low one-way clutch
- High clutch assembly
- Torque converter
- Oil pump assembly

OK or NG

OK	▶	GO TO 8.
NG	▶	Repair or replace damaged parts.

6	CHECK A/T FLUID CONDITION

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



SAT171B

OK or NG

OK	▶	GO TO 7.
NG	▶	GO TO 5.

7	DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-277.
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 8.
NG	▶	Repair or replace damage parts.

8	CHECK SYMPTOM

Check again.

OK or NG

OK	▶	**INSPECTION END**
NG	▶	GO TO 9.

9	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

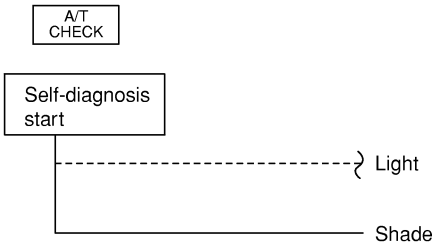
OK	▶	**INSPECTION END**
NG	▶	Repair or replace damaged parts.

9. A/T Does Not Shift: $D_1 \rightarrow D_2$ or Does Not Kickdown: $D_4 \rightarrow D_2$

=NFAT0096

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.

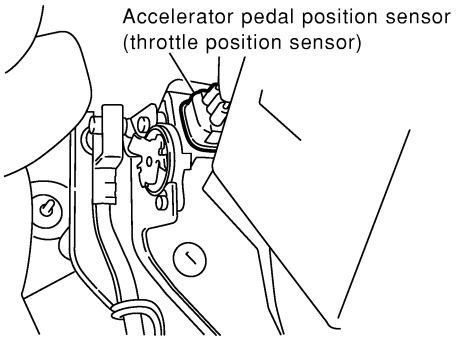
1	CHECK SYMPTOM	
Are "7. Vehicle Does Not Creep Forward In D, 2nd Or 1st Position" and "8. Vehicle Cannot Be Started From D_1" OK?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	Go to "7. Vehicle Does Not Creep Forward In D, 2nd Or 1st Position" and "8. Vehicle Cannot Be Started From D_1", AT-237, AT-240.

2	CHECK SELF-DIAGNOSTIC RESULTS	
With CONSULT-II Does "TCM INPUT SIGNALS" in "DATA MONITOR" show damage to park/neutral position (PNP) switch circuit?		
Without CONSULT-II Does self-diagnosis show damage to park/neutral position (PNP) switch circuit?		
 SAT555K		
Yes or No		
Yes	▶	Check park/neutral position (PNP) switch circuit. Refer to "DTC P0705", AT-104.
No	▶	GO TO 3.

3	CHECK VEHICLE SPEED SENSOR·A/T AND VEHICLE SPEED SENSOR·MTR CIRCUIT	
Check vehicle speed sensor·A/T (revolution sensor) and vehicle speed sensor·MTR circuit. Refer to "DTC P0720 and VHCL SPEED SEN·MTR", AT-116, AT-203.		
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 SENSOR (THROTTLE POSITION SENSOR)

Check accelerator pedal position sensor (throttle position sensor). Refer to EC-304, "DTC P0226 APP SENSOR (throttle position sensor)".



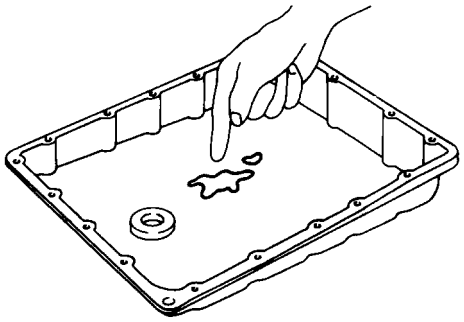
SAT516KA

OK or NG

OK	▶	GO TO 5.
NG	▶	Repair or replace accelerator pedal position sensor (throttle position sensor).

5	CHECK A/T FLUID CONDITION

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



SAT171B

OK or NG

OK	▶	GO TO 7.
NG	▶	GO TO 6.

6	DETECT MALFUNCTIONING ITEM

1. Remove control valve. Refer to AT-277.
2. Check the following items:
- Shift valve A
- Shift solenoid valve A
- Pilot valve
- Pilot filter
3. Disassemble A/T.
4. Check the following items:
- Servo piston assembly
- Brake band
- Oil pump assembly

OK or NG

OK	▶	GO TO 8.
NG	▶	Repair or replace damaged parts.

7	DETECT MALFUNCTIONING ITEM	
1. Remove control valve. Refer to AT-277. 2. Check the following items: ● Shift valve A ● Shift solenoid valve A ● Pilot valve ● Pilot filter		
OK or NG		
OK	▶	GO TO 8.
NG	▶	Repair or replace damaged parts.

8	CHECK SYMPTOM	
Check again.		
OK or NG		
OK	▶	**INSPECTION END**
NG	▶	GO TO 9.

9	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.

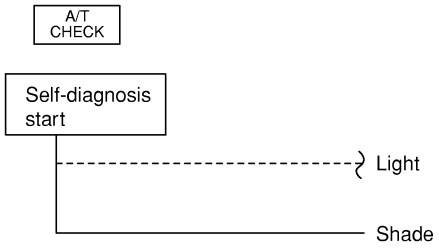
10. A/T Does Not Shift: $D_2 \rightarrow D_3$

=NFAT0097

SYMPTOM:
A/T does not shift from D_2 to D_3 at the specified speed.

1	CHECK SYMPTOM	
Are 7. Vehicle Does Not Creep Forward In D, 2nd Or 1st Position and 8. Vehicle Cannot Be Started From D_1 OK?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	Go to 7. Vehicle Does Not Creep Forward In D, 2nd Or 1st Position and 8. Vehicle Cannot Be Started From D_1, AT-237, AT-240.

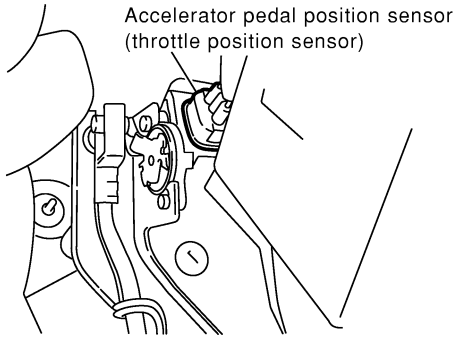
2	CHECK PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT	
With CONSULT-II Does “TCM INPUT SIGNALS” in “DATA MONITOR” show damage to park/neutral position (PNP) switch circuit?		
Without CONSULT-II Does self-diagnosis show damage to park/neutral position (PNP) switch circuit?		



SAT555K

Yes or No		
Yes	▶	Check park/neutral position (PNP) switch circuit. Refer to “DTC P0705”, AT-104.
No	▶	GO TO 3.

3	CHECK ACCELERATOR PEDAL POSITION SENSOR (THROTTLE POSITION SENSOR)	
Check accelerator pedal position sensor (throttle position sensor). Refer to EC-304, “DTC P0226 APP SENSOR (throttle position sensor)”.		

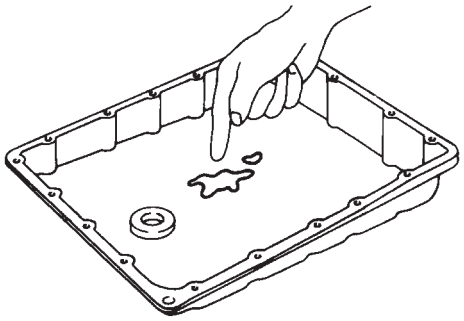


SAT516KA

OK or NG		
OK	▶	GO TO 4.
NG	▶	Repair or replace accelerator pedal position sensor (throttle position sensor).

4	CHECK A/T FLUID CONDITION

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



SAT171B

OK or NG

OK	▶	GO TO 6.
NG	▶	GO TO 5.

5	DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-277.
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
- Oil pump assembly

OK or NG

OK	▶	GO TO 7.
NG	▶	Repair or replace damaged parts.

6	DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-277.
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	▶	GO TO 8.

10. A/T Does Not Shift: $D_2 \rightarrow D_3$ (Cont'd)

8	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.

11. A/T Does Not Shift: $D_3 \rightarrow D_4$

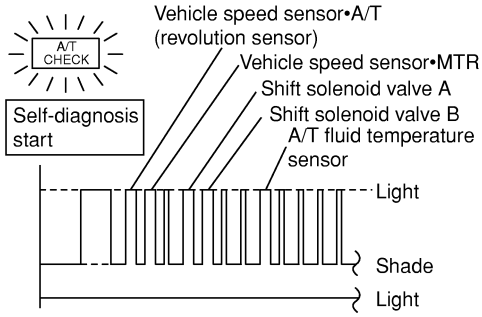
=NFAT0098

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 "7. Vehicle Does Not Creep Forward In D, 2nd Or 1st Position" and "8. Vehicle Cannot Be Started From D_1" OK?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	Go to "7. Vehicle Does Not Creep Forward In D, 2nd Or 1st Position" and "8. Vehicle Cannot Be Started From D_1", AT-237, AT-240.

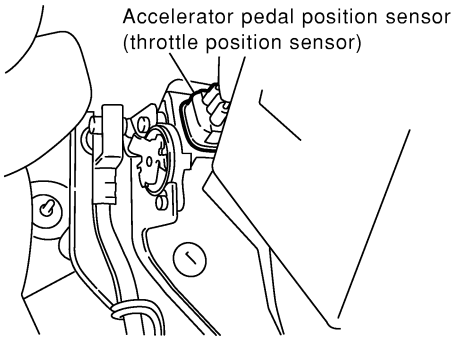
2	CHECK SELF-DIAGNOSTIC RESULTS	
With CONSULT-II Does self-diagnosis, after cruise test, show damage to any of the following circuits? • Park/neutral position (PNP) switch • 3rd position switch • A/T fluid temperature sensor • Vehicle speed sensor·A/T (revolution sensor) • Shift solenoid valve A or B • Vehicle speed sensor·MTR		
Yes or No		
Yes	▶	Check damaged circuit. Refer to "DTC P0705, P0710, P0720, P0750, P0755 or VHCL SPEED SEN·MTR", AT-104, AT-110, AT-116, AT-174, AT-179 or AT-203.
No	▶	GO TO 3.



SAT586K

3	CHECK ACCELERATOR PEDAL POSITION SENSOR (THROTTLE POSITION SENSOR)

Check accelerator pedal position sensor (throttle position sensor). Refer to EC-304, "DTC P0226 APP SENSOR (throttle position sensor)".



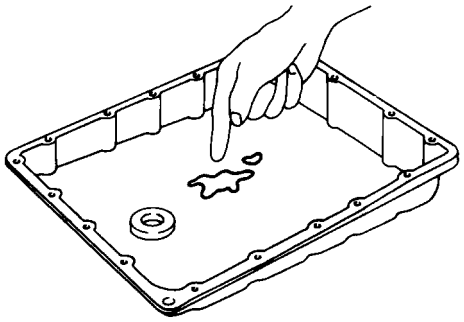
SAT516KA

OK or NG

OK	▶	GO TO 4.
NG	▶	Repair or replace accelerator pedal position sensor (throttle position sensor).

4	CHECK A/T FLUID CONDITION

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



SAT171B

OK or NG

OK	▶	GO TO 6.
NG	▶	GO TO 5.

5	DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-277.
2. Check the following items:
- Shift valve B
- Overrun clutch control valve
- Shift solenoid valve B
- Pilot valve
- Pilot filter
3. Disassemble A/T.
4. Check the following items:
- Servo piston assembly
- Brake band
- Torque converter
- Oil pump assembly

OK or NG

OK	▶	GO TO 7.
NG	▶	Repair or replace damaged parts.

6	DETECT MALFUNCTIONING ITEM	
1. Remove control valve assembly. Refer to AT-277. 2. Check the following items: ● Shift valve B ● Overrun clutch control valve ● 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	▶	GO TO 8.

8	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.

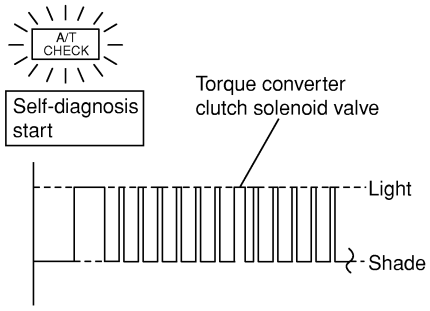
12. A/T Does Not Perform Lock-up

=NFAT0099

SYMPTOM:
A/T does not perform lock-up at the specified speed.

1	CHECK SELF-DIAGNOSTIC RESULTS

Does self-diagnosis show damage to torque converter clutch solenoid valve circuit after cruise test?



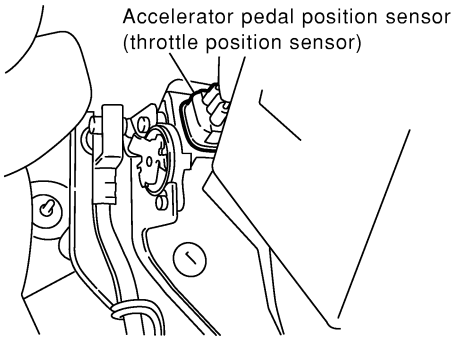
SAT549K

Yes or No

Yes	▶	Check torque converter clutch solenoid valve circuit. Refer to “DTC P0740”, AT-153.
No	▶	GO TO 2.

2	CHECK ACCELERATOR PEDAL POSITION SENSOR (THROTTLE POSITION SENSOR)

Check accelerator pedal position sensor (throttle position sensor). Refer to EC-304, “DTC P0226 APP SENSOR (throttle position sensor)”.



SAT516KA

OK or NG

OK	▶	GO TO 3.
NG	▶	Repair or replace accelerator pedal position sensor (throttle position sensor).

3	DETECT MALFUNCTIONING ITEM

1. Remove control valve. Refer to AT-277.
2. Check following items:

- Torque converter clutch control valve
- Torque converter relief valve
- Torque converter clutch solenoid 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	▶	GO TO 5.

5	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.

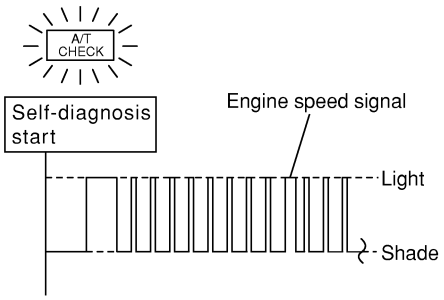
13. A/T Does Not Hold Lock-up Condition

=NFAT0100

SYMPTOM:
A/T does not hold lock-up condition for more than 30 seconds.

1	CHECK SELF-DIAGNOSTIC RESULTS

Does self-diagnosis show damage to engine speed signal circuit after cruise test?



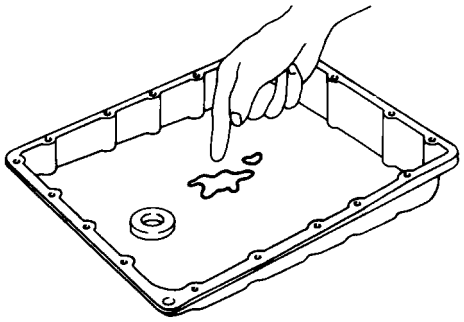
SAT551K

Yes or No

Yes	▶	Check engine speed signal circuit. Refer to “DTC P0725”, AT-121.
No	▶	GO TO 2.

2	CHECK A/T FLUID CONDITION

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



SAT171B

OK or NG

OK	▶	GO TO 4.
NG	▶	GO TO 3.

3	DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-277.
2. Check the following items:
- Torque converter clutch control valve
- Pilot valve
- Pilot filter
3. Disassemble A/T.
4. Check torque converter and oil pump assembly.

OK or NG

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

4	DETECT MALFUNCTIONING ITEM	
1. Remove control valve assembly. Refer to AT-277. 2. Check the following items: ● Torque converter clutch control valve ● Pilot valve ● Pilot filter		
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	▶	GO TO 6.

6	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.

14. Lock-up Is Not Released

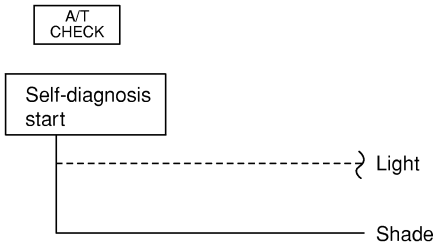
=NFAT0101

SYMPTOM:
Lock-up is not released when accelerator pedal is released.

1	CHECK ACCELERATOR PEDAL POSITION SENSOR (THROTTLE POSITION SENSOR) CIRCUIT

With CONSULT-II
Does “TCM INPUT SIGNALS” in “DATA MONITOR” show damage to accelerator pedal position sensor (throttle position sensor) circuit?

Without CONSULT-II
Does self-diagnosis show damage to accelerator pedal position sensor (throttle position sensor) circuit?



SAT555K

Yes or No

Yes	▶	Check accelerator pedal position sensor (throttle position sensor) circuit. Refer to “DTC P1705”, AT-184.
No	▶	GO TO 2.

2	CHECK SYMPTOM

Check again.

OK or NG

OK	▶	**INSPECTION END**
NG	▶	GO TO 3.

3	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.

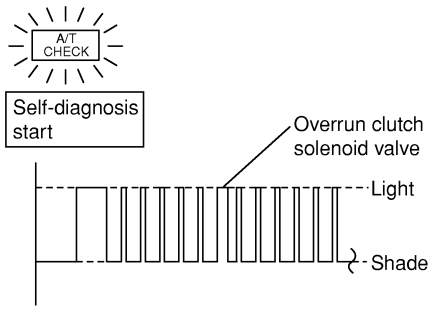
15. Engine Speed Does Not Return To Idle (Light Braking $D_4 \rightarrow D_3$)

=NFAT0102

SYMPTOM:

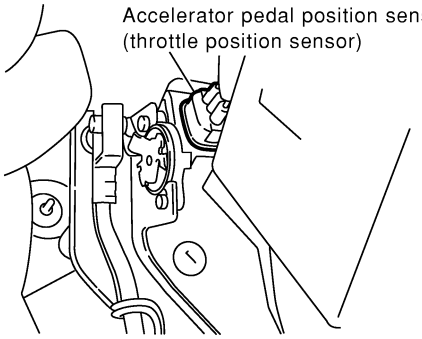
- **Engine speed does not smoothly return to idle when A/T shifts from D_4 to D_3.**
- **Vehicle does not decelerate by engine brake when turning A/T selector lever D to 3rd position.**
- **Vehicle does not decelerate by engine brake when shifting A/T from D to 2nd position.**

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 “DTC P1760”, AT-192.
No	▶	GO TO 2.



SAT548K

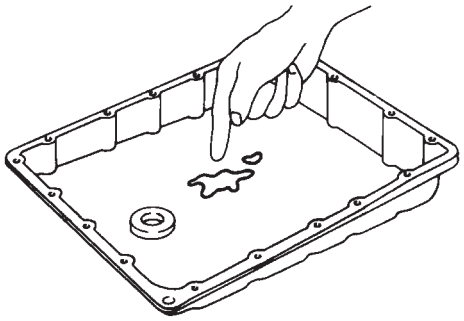
2	CHECK ACCELERATOR PEDAL POSITION SENSOR (THROTTLE POSITION SENSOR)	
Check accelerator pedal position sensor (throttle position sensor). Refer to EC-304, “DTC P0226 APP SENSOR (throttle position sensor)”.		
OK or NG		
OK	▶	GO TO 3.
NG	▶	Repair or replace accelerator pedal position sensor (throttle position sensor).



SAT516KA

3	CHECK A/T FLUID CONDITION

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



SAT171B

OK or NG

OK	▶	GO TO 5.
NG	▶	GO TO 4.

4	DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-277.
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 items:
- Overrun clutch assembly
- Oil pump assembly

OK or NG

OK	▶	GO TO 6.
NG	▶	Repair or replace damaged parts.

5	DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-277.
2. Check the following items:
- Overrun clutch control valve
- Overrun clutch reducing valve
- Overrun clutch solenoid valve

OK or NG

OK	▶	GO TO 6.
NG	▶	Repair or replace damaged parts.

6	CHECK SYMPTOM

Check again.

OK or NG

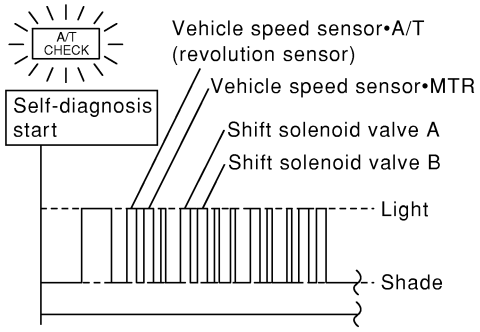
OK	▶	**INSPECTION END**
NG	▶	GO TO 7.

7	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.

16. Vehicle Does Not Start From D_1

=NFAT0103

SYMPTOM:
Vehicle does not start from D_1 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?  SAT583K		
Yes or No		
Yes	▶	Check damaged circuit. Refer to “DTC P0720, P0750, P0755 or VHCL SPEED SEN·MTR”, AT-116, 174, 179 or 203.
No	▶	GO TO 2.

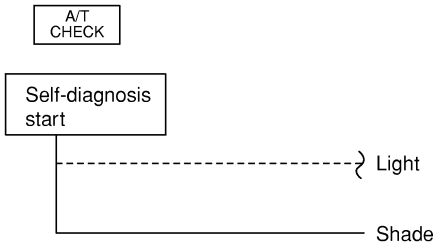
2	CHECK SYMPTOM	
Check again.		
OK or NG		
OK	▶	Go to 8. Vehicle Cannot Be Started From D_1, AT-240.
NG	▶	GO TO 3.

3	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.

17. A/T Does Not Shift: $D_4 \rightarrow D_3$, When 3rd Position Switch ON → OFF

=NFAT0104

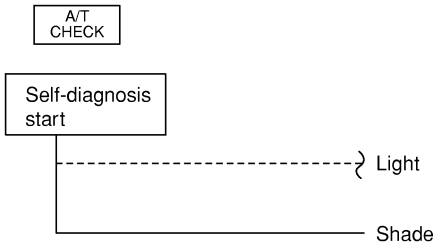
SYMPTOM:
A/T does not shift from D_4 to D_3 when changing selector lever from D to 3rd position.

1	CHECK 3RD POSITION SWITCH CIRCUIT	
With CONSULT-II Does “TCM INPUT SIGNALS” in “DATA MONITOR” show damage to 3rd position switch circuit?		
Without CONSULT-II Does self-diagnosis show damage to 3rd position switch circuit?  SAT555K		
Yes or No		
Yes	▶	Check 3rd position switch circuit. Refer to 21. TCM Self-diagnosis Does Not Activate [PNP & 3rd Position Switches, and APPS (TPS) Circuit Checks], AT-264.
No	▶	Go to 10. A/T Does Not Shift: $D_2 \rightarrow D_3$, AT-246.

18. A/T Does Not Shift: $D_3 \rightarrow 2_2$, When Selector Lever D $\rightarrow$ 2nd Position

=NFAT0105

SYMPTOM:
A/T does not shift from D_3 to 2_2 when changing selector lever from D to 2nd position.

1	CHECK PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT	
With CONSULT-II Does “TCM INPUT SIGNALS” in “DATA MONITOR” show damage to park/neutral position (PNP) switch circuit? **Without CONSULT-II** Does self-diagnosis show damage to park/neutral position (PNP) switch circuit?  SAT555K		
Yes or No		
Yes	▶	Check park/neutral position (PNP) switch circuit. Refer to “DTC P0705”, AT-104.
No	▶	Go to 9. A/T Does Not Shift: $D_1 \rightarrow D_2$ Or Does Not Kickdown: $D_4 \rightarrow D_2$, AT-243.

19. A/T Does Not Shift: $2_2 \rightarrow 1_1$, When Selector Lever 2nd → 1st Position

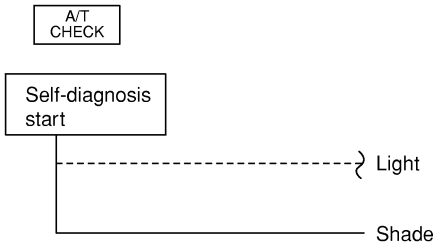
=NFAT0106

SYMPTOM:
A/T does not shift from 2_2 to 1_1 when changing selector lever from 2nd to 1st position.

1	CHECK PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT

With CONSULT-II
Does “TCM INPUT SIGNALS” in “DATA MONITOR” show damage to park/neutral position (PNP) switch circuit?

Without CONSULT-II
Does self-diagnosis show damage to park/neutral position (PNP) switch circuit?



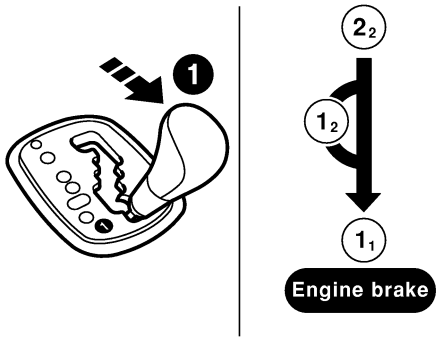
SAT555K

Yes or No

Yes	▶	Check park/neutral position (PNP) switch circuit. Refer to “DTC P0705”, AT-104.
No	▶	GO TO 2.

2	CHECK SYMPTOM

Check again.



SAT514K

OK or NG

OK	▶	**INSPECTION END**
NG	▶	GO TO 3.

3	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.

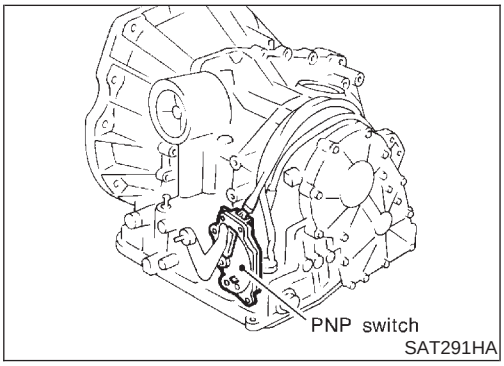
20. Vehicle Does Not Decelerate By Engine Brake

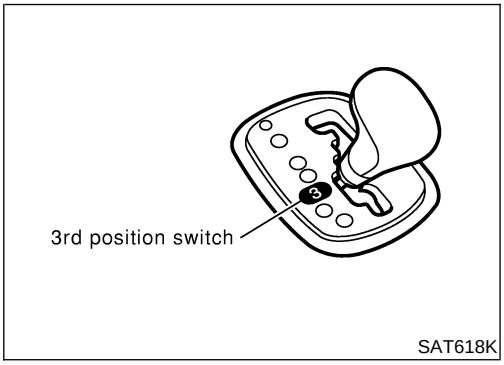
=NFAT0107

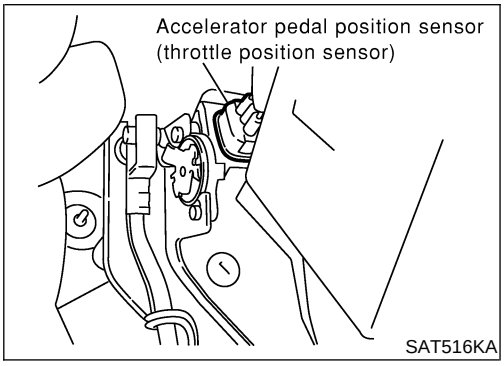
SYMPTOM:

Vehicle does not decelerate by engine brake when shifting from 2_2 (1_2) to 1_1.

1	CHECK SYMPTOM	
Is “6. Vehicle Does Not Creep Backward In R Position” OK?		
Yes or No		
Yes	▶	Go to “15. Engine Speed Does Not Return To Idle (Light Braking $D_4 \rightarrow D_3$)”, AT-257.
No	▶	Go to “6. Vehicle Does Not Creep Backward In R Position”, AT-233.







21. TCM Self-diagnosis Does Not Activate [PNP & 3rd Position Switches, and APPS (TPS)* Circuit Checks]

NFAT0108

SYMPTOM:

A/T CHECK indicator lamp does not come on in TCM self-diagnostic procedure even if the lamp circuit is good.

*: Accelerator pedal position sensor (throttle position sensor)

DESCRIPTION

NFAT0108S01

- Park/neutral position (PNP) switch
  The park/neutral (PNP) switch includes a transmission range switch. The transmission range switch detects the selector lever position and sends a signal to the TCM.
- 3rd position switch
  Detects the 3rd position and sends a signal to the TCM.
- Accelerator pedal position sensor (throttle position sensor)
  ECM judges throttle opening based on a signal from accelerator pedal position sensor, and sends the signal via CAN communication to TCM.

DIAGNOSTIC PROCEDURE

=NFAT0108S02

NOTE:
The diagnostic procedure includes inspections for the 3rd position switch and accelerator pedal position sensor (throttle position sensor) circuits.

1 CHECK PARK/NEUTRAL POSITION (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, 2nd and 1st 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

OK or NG

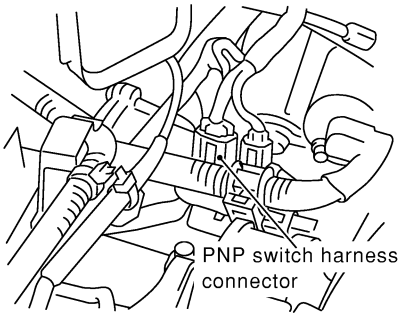
OK	▶	GO TO 5.
NG	▶	GO TO 2.

2 DETECT MALFUNCTIONING ITEM

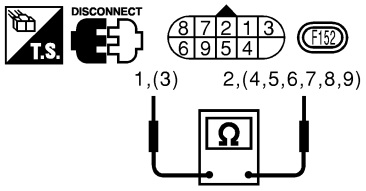
Check the following items:

- Park/neutral position (PNP) switch

a. Check continuity between terminals 1 (G/OR) and 2 (B) and between terminals 3 (OR) and 4 (PU/W), 5 (P/B), 6 (Y/PU), 7 (BR), 8 (G/W), 9 (GY/R) while moving manual shaft through each position.



View with air cleaner box removed



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	

SAT615J

b. If NG, check again with manual control cable disconnected from manual shaft of A/T assembly. Refer to step a.
c. If OK on step b, adjust manual control cable. Refer to AT-279.
d. If NG on step b, remove park/neutral position (PNP) switch from A/T and check continuity of park/neutral position (PNP) switch terminals. Refer to step a.
e. If OK on step d, adjust park/neutral position (PNP) switch. Refer to AT-278.
f. If NG on step d, replace park/neutral position (PNP) switch.

- Harness for short or open between ignition switch and park/neutral position (PNP) switch (Main harness)
- Harness for short or open between park/neutral position (PNP) switch and TCM (Main harness)

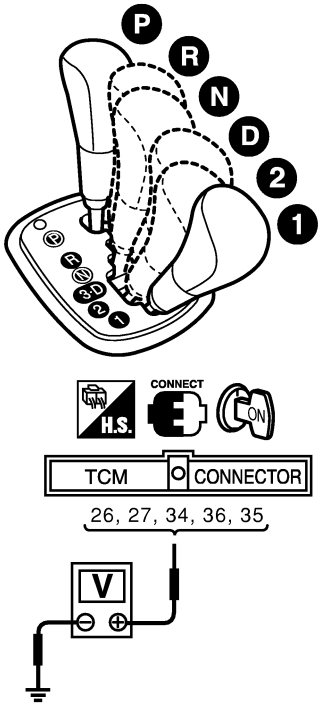
OK or NG

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

3	CHECK PARK/NEUTRAL POSITION (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 harness connector F50 terminals 26 (PU/W), 27 (P/B), 34 (Y/PU), 35 (G/W), 36 (R/G) and ground while moving selector lever through each position.



SAT588K

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**

MTBL0119

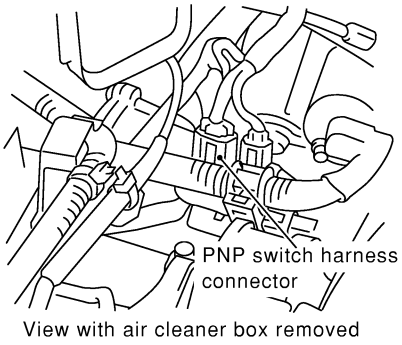
OK or NG

OK	▶	GO TO 7.
NG	▶	GO TO 4.

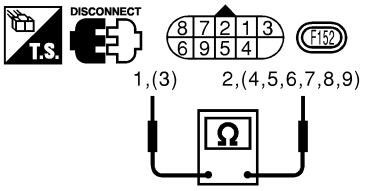
4 DETECT MALFUNCTIONING ITEM

Check the following items:
- Park/neutral position (PNP) switch

a. Check continuity between terminals 1 (G/OR) and 2 (B) and between terminals 3 (OR) and 4 (PU/W), 5 (P/B), 6 (Y/PU), 7 (BR), 8 (G/W), 9 (GY/R) while moving manual shaft through each position.



View with air cleaner box removed



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	

SAT615J

b. If NG, check again with manual control cable disconnected from manual shaft of A/T assembly. Refer to step a.
c. If OK on step b, adjust manual control cable. Refer to AT-279.
d. If NG on step b, remove park/neutral position (PNP) switch from A/T and check continuity of park/neutral position (PNP) switch terminals. Refer to step a.
e. If OK on step d, adjust park/neutral position (PNP) switch. Refer to AT-278.
f. If NG on step d, replace park/neutral position (PNP) switch.
- Harness for short or open between ignition switch and park/neutral position (PNP) switch (Main harness)
- Harness for short or open between park/neutral position (PNP) switch and TCM (Main harness)

OK or NG

OK	▶	GO TO 7.
NG	▶	Repair or replace damaged parts.

5 CHECK 3RD POSITION 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 SW"*. Check the signal of the overdrive control switch is indicated properly. (Overdrive control switch "ON" displayed on CONSULT-II means overdrive "OFF".)
   *: "OVERDRIVE SW" means 3rd position switch

DATA MONITOR	
MONITORING	
ENGINE SPEED	XXX rpm
TURBINE REV	XXX rpm
OVERDRIVE SW	ON
PN POSI SW	OFF
R POSITION SW	OFF

SAT645J

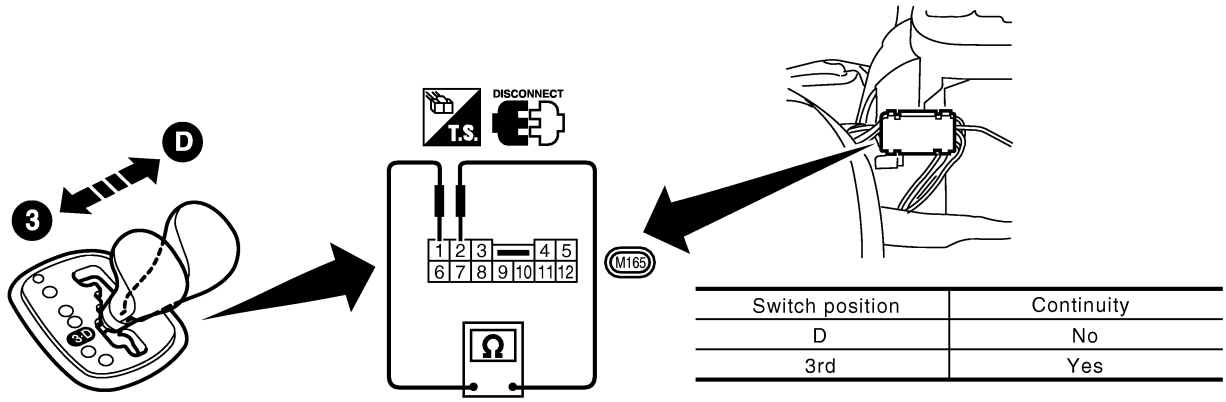
OK or NG

OK	▶	GO TO 9.
NG	▶	GO TO 6.

6	DETECT MALFUNCTIONING ITEM

Check the following items:
- 3rd position switch.

a. Check continuity between A/T device (3rd position switch) harness connector M165 terminals 1 (G/Y) and 2 (B).



Switch position	Continuity
D	No
3rd	Yes

SAT616K

- Harness for short or open between TCM and 3rd position switch (Main harness)
- Harness of ground circuit for 3rd position switch (Main harness) for short or open

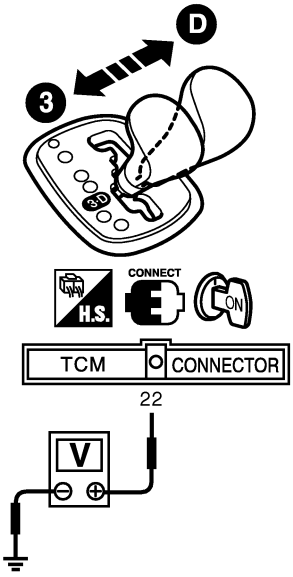
OK or NG

OK	▶	GO TO 9.
NG	▶	Repair or replace damaged parts.

7	CHECK 3RD POSITION SWITCH CIRCUIT (Without CONSULT-II)

Without CONSULT-II

1. Turn ignition switch to ON position.
   (Do not start engine.)
2. Check voltage between TCM harness connector F50 terminal 22 (GY) and ground when 3rd position switch is ON and OFF.



Switch position	Voltage
D	Battery voltage
3rd	1V or less

SAT617K

Terminal No.	Wire color	Item	Condition
22	G/Y	3rd position switch	When the selector lever is in a position other than 3rd position: Battery voltage
			When the selector lever is in 3rd position: 1V or less

MTBL1184

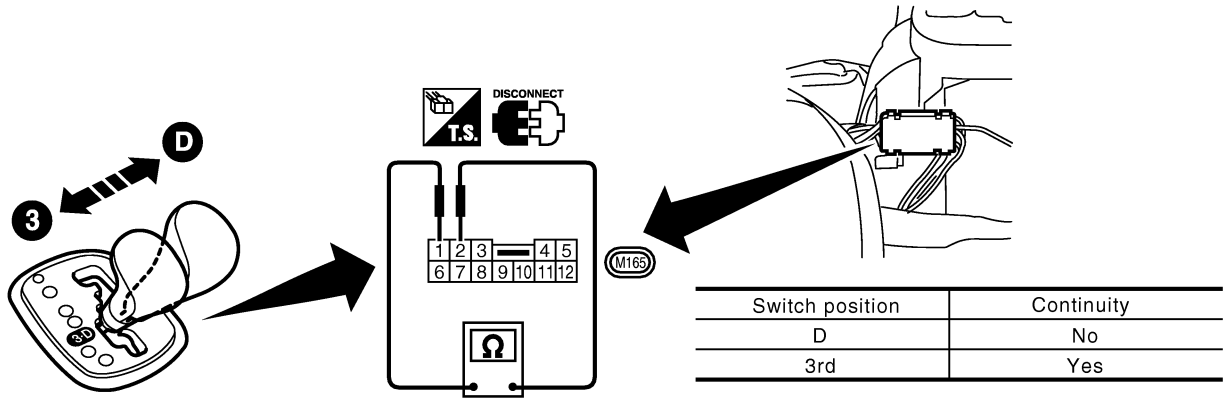
OK or NG

OK	▶	GO TO 9.
NG	▶	GO TO 8.

8	DETECT MALFUNCTIONING ITEM

Check the following items:
- 3rd position switch.

a. Check continuity between A/T device (3rd positions witch) harness connector M165 terminals 1 (G/Y) and 2 (B).



Switch position	Continuity
D	No
3rd	Yes

SAT616K

- Harness for short or open between TCM and 3rd position switch (Main harness)
- Harness of ground circuit for 3rd position switch (Main harness) for short or open

OK or NG

OK	▶	GO TO 9.
NG	▶	Repair or replace damaged parts.

9	CHECK ACCELERATOR PEDAL POSITION SENSOR (THROTTLE POSITION SENSOR)

Check accelerator pedal position sensor (throttle position sensor) circuit (with CONSULT-II)

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

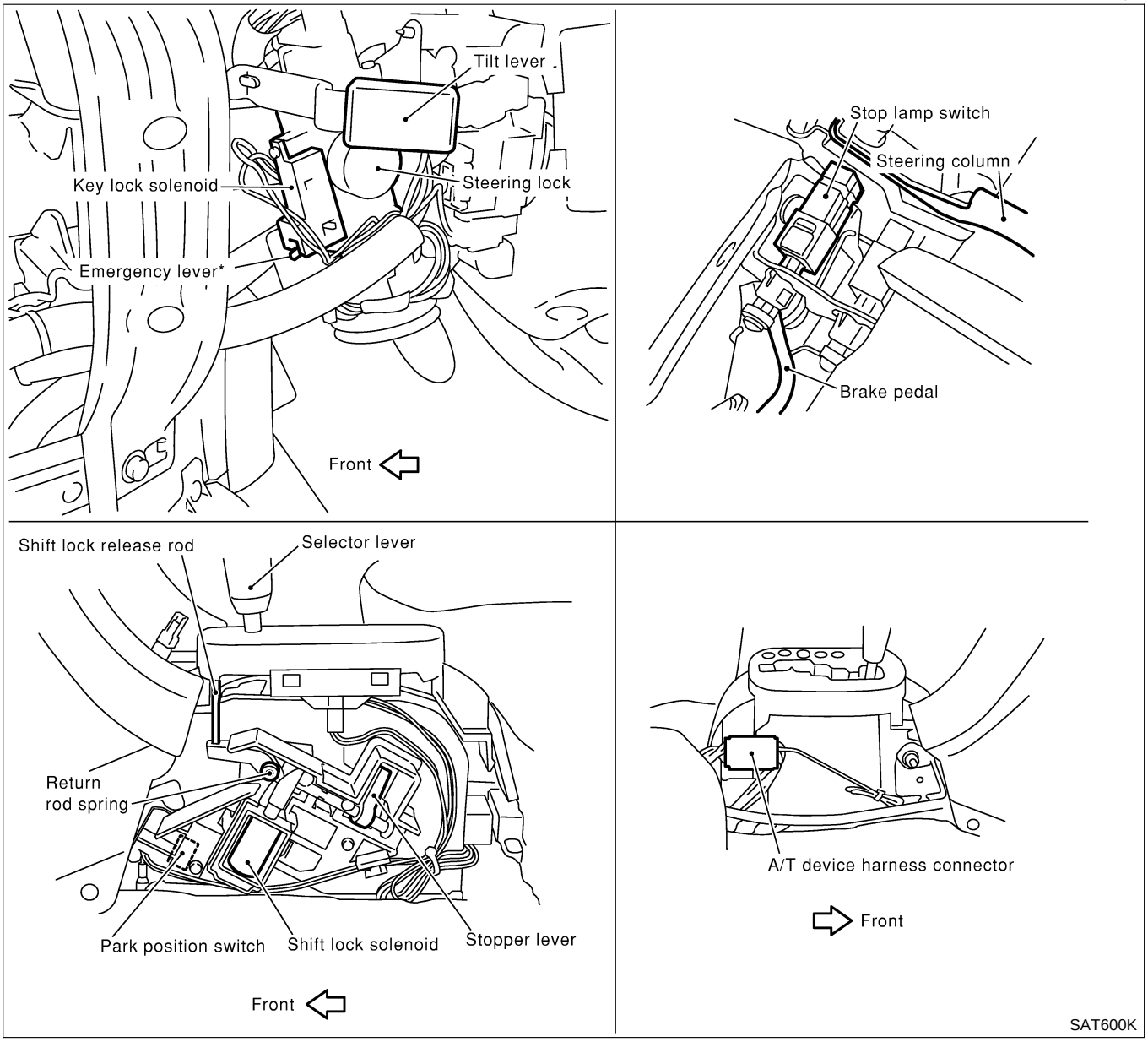
Description

NFAT0109

- 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, respectively.

Shift Lock System Electrical Parts Location

NFAT0111

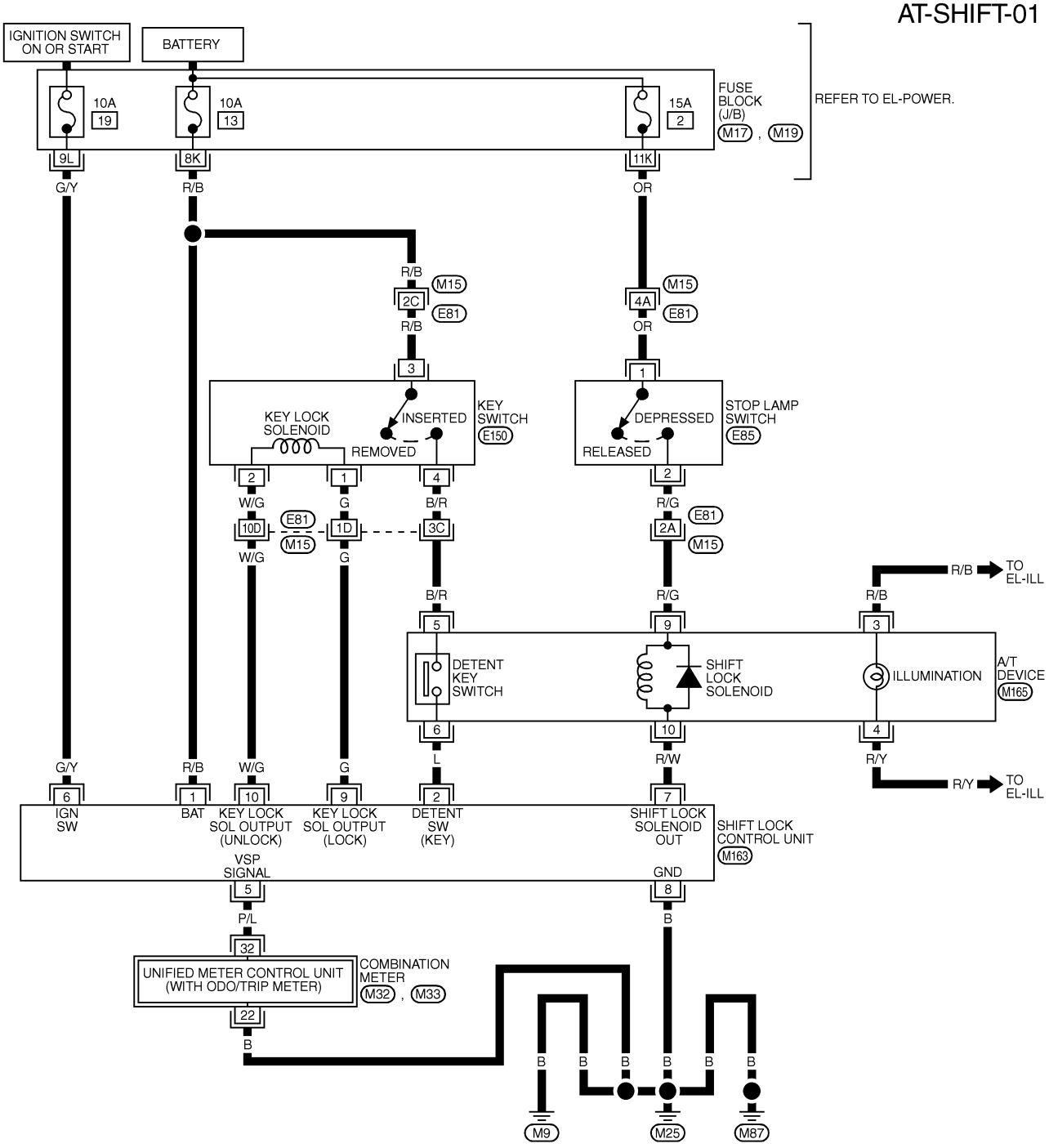


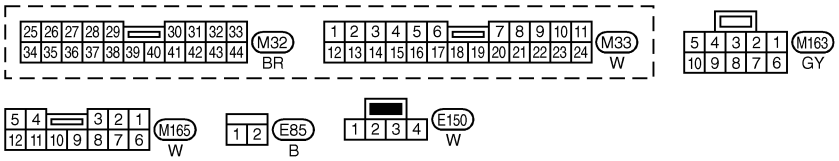
*: This emergency lever insures that when battery is off ignition key cannot be removed. In the situation like this, by operating this lever, ignition key can be removed.

Wiring Diagram — SHIFT —

NFAT0110

AT-SHIFT-01





REFER TO THE FOLLOWING.
M15 - SUPER MULTIPLE JUNCTION (SMJ)
M17 , M19 -FUSE BLOCK-JUNCTION BOX (J/B)

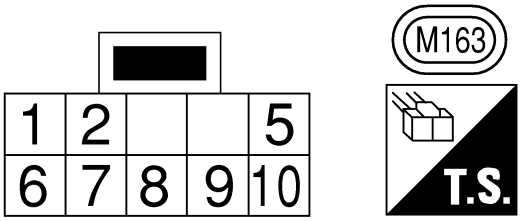
MAT268B

Shift Lock Control Unit Reference Values

NFAT0281

SHIFT LOCK HARNESS CONNECTOR TERMINAL LAYOUT

NFAT0281S01



SAT581K

SHIFT LOCK CONTROL UNIT INSPECTION TABLE

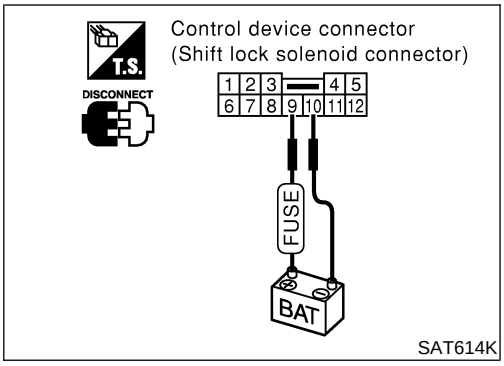
NFAT0281S02

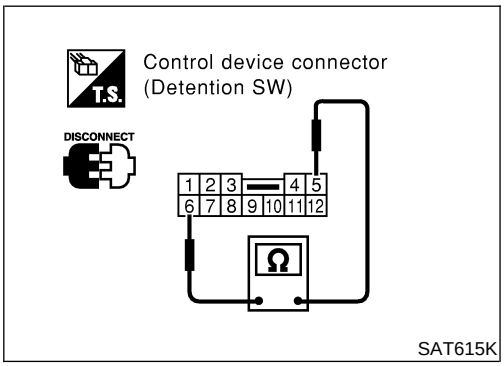
Data are reference values.

Terminal No. (+)	Terminal No. (−)	Item	Condition	Judgement standard
1 (R/B)	8 (B)	Power source	IGN SW: “ON”	Battery voltage
			IGN SW: “OFF”	
2 (L)	8 (B)	Detention SW (for key)	The position when the key is inserted and the selector lever is set to a position other than the “P” position.	Battery voltage
			Except the above	Approx. 0V
5 (P/L)	8 (B)	Vehicle speed signal	When the vehicle speed is 20 km/h (12 MPH).	Approx. 28 Hz
			When the vehicle sped is 0 km/h (0 MPH).	No pulse
6 (G/Y)	8 (B)	IGN signal	IGN SW: “ON”	Battery voltage
			IGN SW: “OFF”	Approx. 0V
7 (R/W)	8 (B)	Shift lock solenoid	When the brake pedal is depressed.	Battery voltage
			When IGN SW is ON and the vehicle speed is 8 km/h (5 MPH) or less.	Approx. 0V
8 (B)	—	Ground	IGN SW: “ON”	Approx. 0V
10 (W/G)	8 (B)	Key lock signal	When the selector lever is set to a position other than the “P” position and the ignition switch is turned from “ON” to “OFF”.	–12 voltage for approx. 30 msec.
			Except the above	Approx. 0V
10 (W/G)	8 (B)	Key unlock signal	At the moment selector is set to the “P” position from any position other than “P”. The unlock signal generates only once after the lock signal is output.	Battery voltage for approx. 150 msec.
			Except the above	Approx. 0V

CAUTION:

Confirm that the pointer swings only momentarily because the output time is so short. If the inspection is done with an oscilloscope, it should be observed that the power source voltage lasts for 3.5 to 10 ms.





Component Inspection

NFAT0280

SHIFT LOCK SOLENOID

NFAT0280S01

- Check operation by applying battery voltage to control device connector.

CAUTION:

Be sure to apply the voltage of the correct polarity to the respective terminals. Otherwise, the part may be damaged.

Connector No.	Terminal No.
M165	9 (R/G) (Battery voltage) - 10 (R/W) (Ground)

DETENTION SWITCH

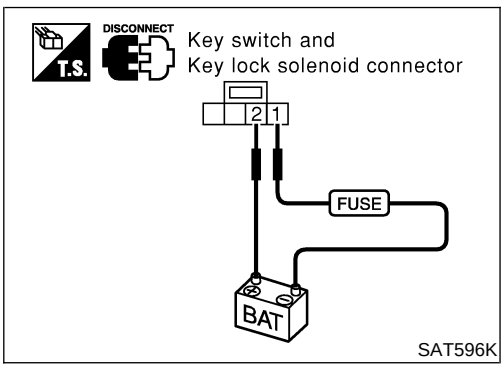
NFAT0280S02

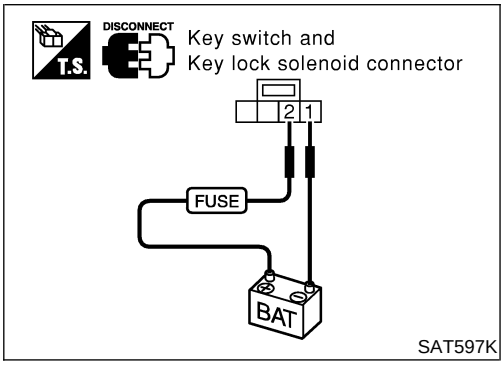
For Key:

NFAT0280S0201

- Check continuity between terminals of the control device connector.

Condition	Connector No.	Terminal No.	Continuity
The position when the selector lever is set to a position other than the “P” position, or when it is shifted from the “R” to the “P” position	M165	5 (B/R) - 6 (L)	Yes
Except the above			No





KEY LOCK SOLENOID

NFAT0280S03

Key Lock

NFAT0280S0301

- Check operation by applying battery voltage to key switch and key lock solenoid connector.

CAUTION:

Be careful not to cause burnout of the harness.

Connector No.	Terminal No.
E150	1 (G) (Battery voltage) - 2 (W/G) (Ground)

Key Unlock

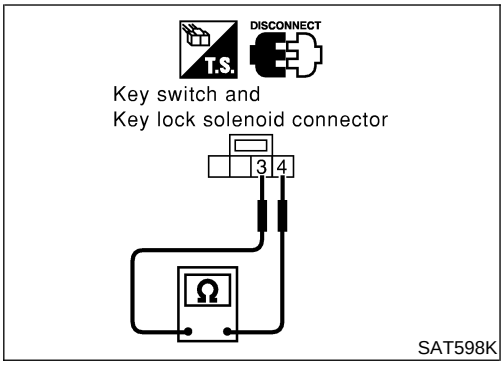
NFAT0280S0302

- Check operation by applying battery voltage to key switch and key lock solenoid connector.

CAUTION:

Be careful not to cause burnout of the harness.

Connector No.	Terminal No.
E150	2 (W/G) (Battery voltage) - 1 (G) (Ground)

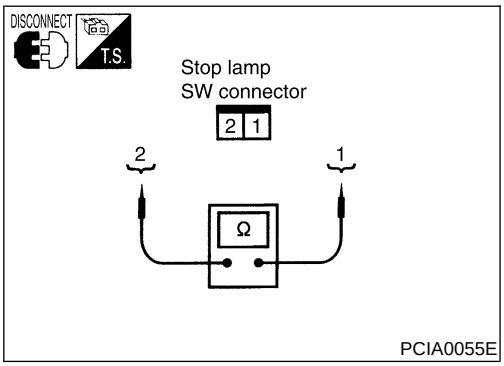


KEY SWITCH

NFAT0280S04

- Check continuity between terminals of the key switch and key lock solenoid connector.

Condition	Connector No.	Terminal No.	Continuity
Key inserted	E150	3 (R/B) - 4 (B/R)	Yes
Key withdrawn			No



STOP LAMP SWITCH

NFAT0280S05

- Check continuity between terminals of the stop lamp switch connector.

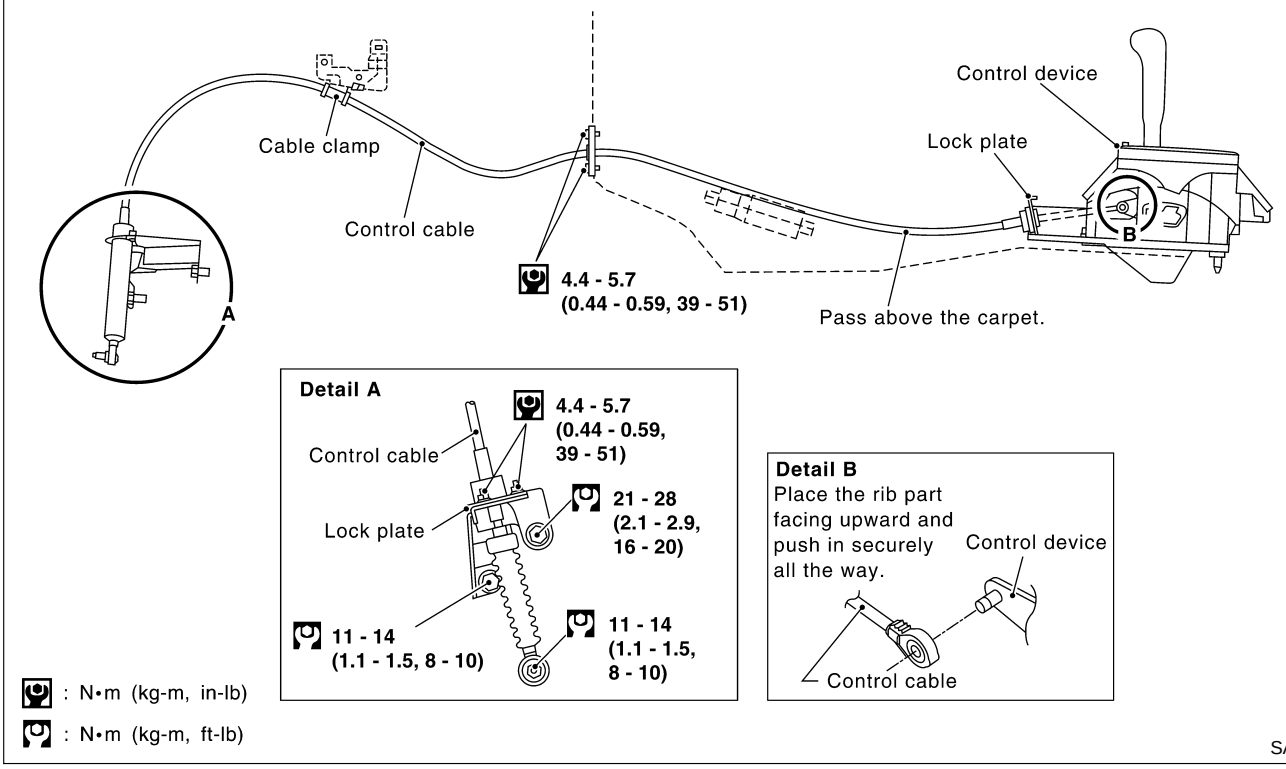
Condition	Connector No.	Terminal No.	Continuity
When brake pedal is depresed	E85	1 (OR) - 2 (R/G)	Yes
When brake pedal is released			No

Check stop lamp switch after adjusting brake pedal. Refer to BR-12, "BRAKE PEDAL".

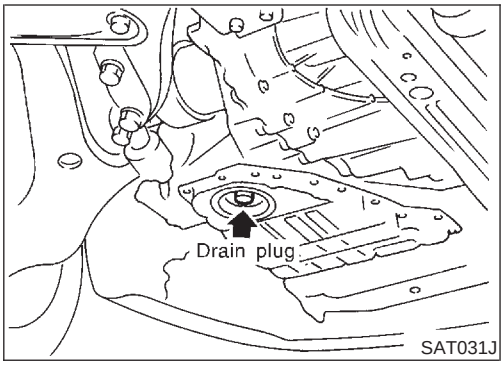
Control Cable

NFAT0263

SEC. 349



SAT754J



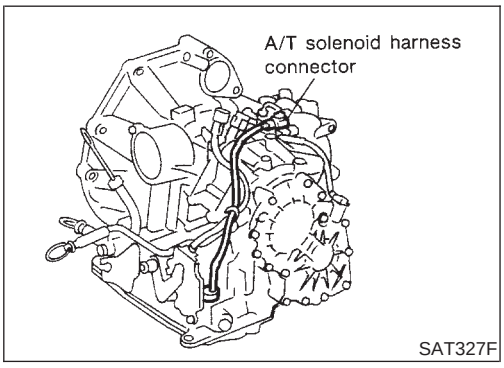
Control Valve Assembly and Accumulators

NFAT0114

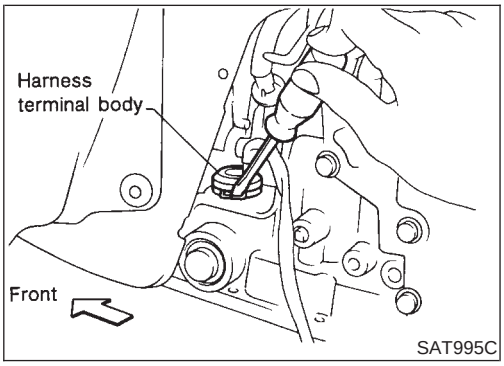
REMOVAL

NFAT0114S01

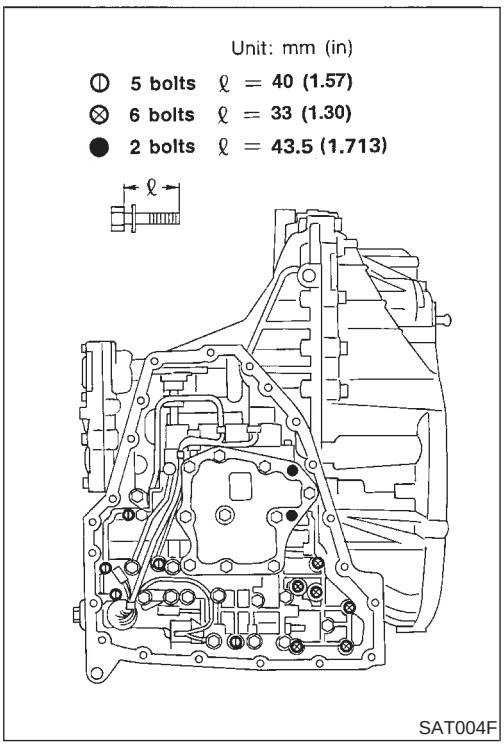
1. Drain ATF from transaxle.
2. Remove oil pan and gasket.



3. Disconnect A/T solenoid harness connector.



4. Remove stopper ring from terminal cord assembly harness terminal body.
5. Remove terminal cord assembly harness from transmission case by pushing on terminal body.

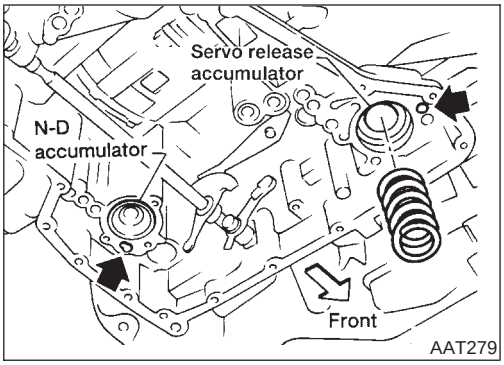


6. Remove control valve assembly by removing fixing bolts **I**, **X** and ●.

Bolt length, number and location are shown in the illustration.

- **Be careful not to drop manual valve and servo release accumulator return spring.**

7. Disassemble and inspect control valve assembly if necessary. Refer to AT-309.

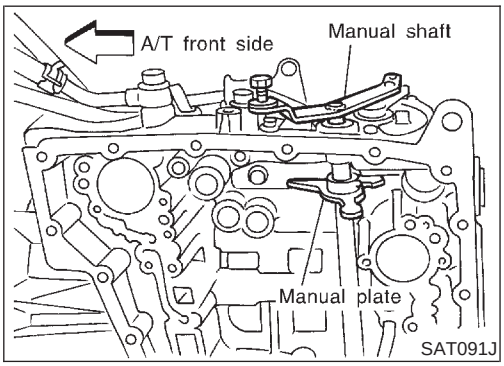


8. Remove servo release and N-D accumulators by applying compressed air if necessary.
- **Hold each piston with a rag.**

INSTALLATION

NFAT0114S02

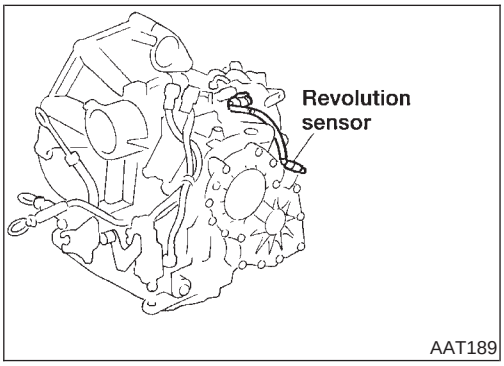
- **Set manual shaft in Neutral, then align manual plate with groove in manual valve.**
- **After installing control valve assembly, make sure that selector lever can be moved to all positions.**



Revolution Sensor Replacement

NFAT0115

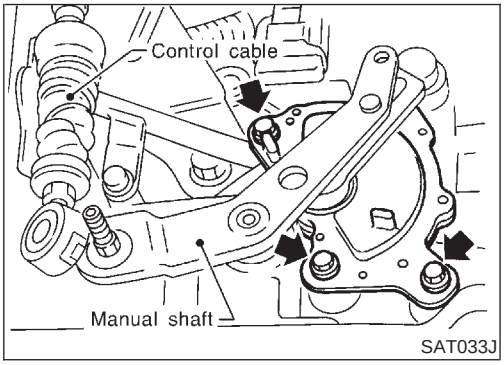
1. Remove under cover.
2. Remove revolution sensor from A/T.
3. Reinstall any part removed.
- **Always use new sealing parts.**

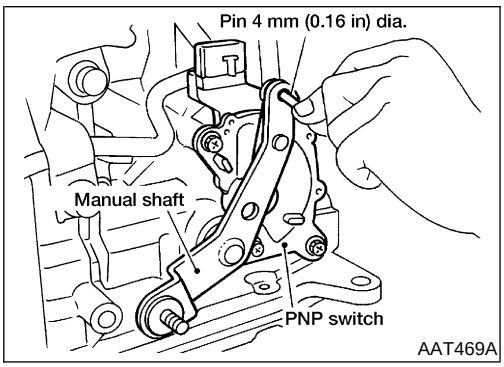


Park/Neutral Position (PNP) Switch Adjustment

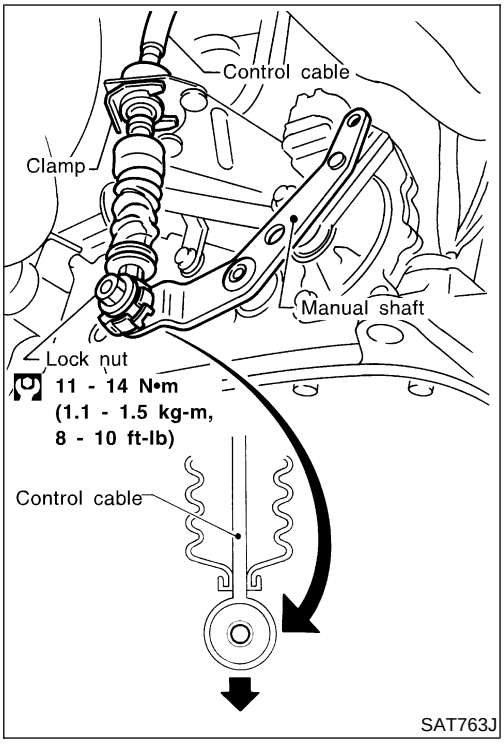
NFAT0116

1. Remove control cable from manual shaft.
2. Set manual shaft in N position.
3. Loosen park/neutral position (PNP) switch fixing bolts.





4. Insert pin into adjustment holes in both park/neutral position (PNP) switch and manual shaft as near vertical as possible.
5. Reinstall any part removed.
6. Check continuity of park/neutral position (PNP) switch. Refer to AT-104.



Control Cable Adjustment

NFAT0117

Move selector lever from the P position to the 1 position. You should be able to feel the detents in each position. If the detents cannot be felt or the pointer indicating the position is improperly aligned, the control cable needs adjustment.

1. Place selector lever in P position.
2. Loosen control cable lock nut and place manual shaft in P position.

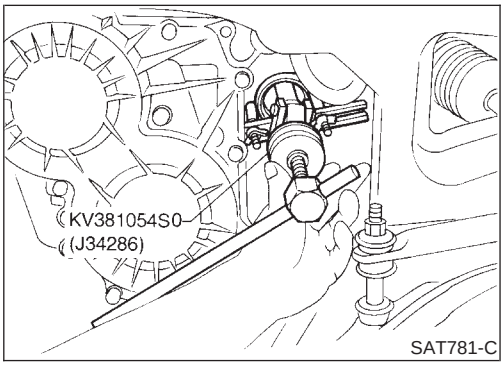
CAUTION:

Turn wheels more than 1/4 rotations and apply the park lock.

3. Push control cable in the direction of the arrow shown in the illustration by specified force.

   Specified force: 4.9 - 9.8 N (0.5 - 1.0 kg, 1.1 - 2.2 lb)
4. Tighten control cable lock nut.
5. Move selector lever from P to 1 position again. Make sure that selector lever moves smoothly.

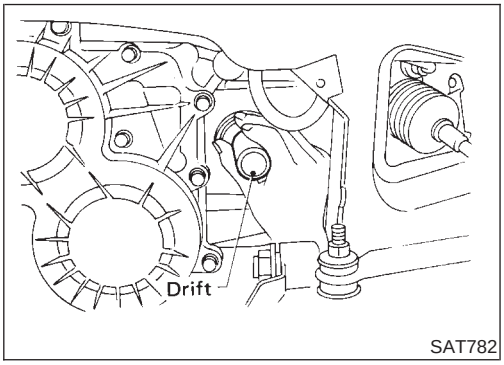
- **Make sure that the starter operates when the selector lever is placed in the N or P position.**
- **Make sure that the transmission is locked properly when the selector lever is placed in the P position.**



Differential Side Oil Seal Replacement

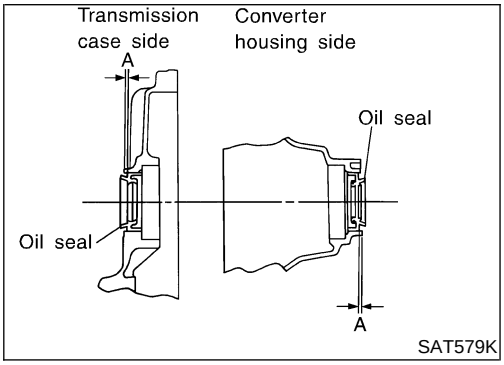
NFAT0118

1. Remove drive shaft assembly. Refer to AX-9, “Drive Shaft”.
2. Remove oil seal.



3. Install oil seal.

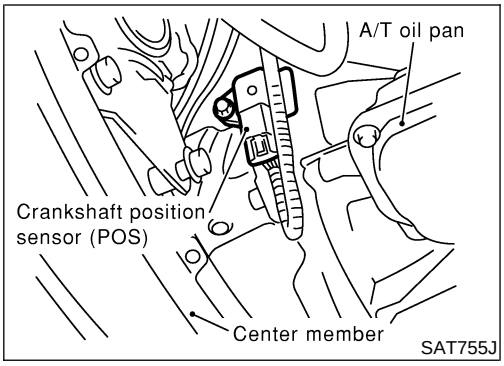
- **Apply ATF before installing.**

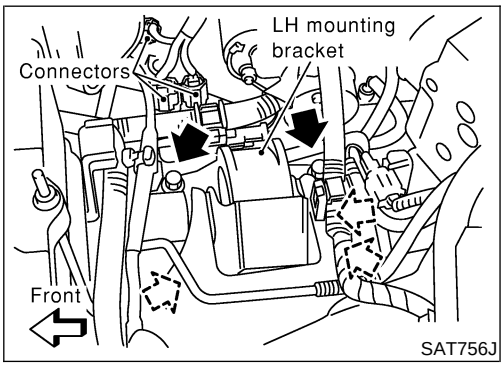


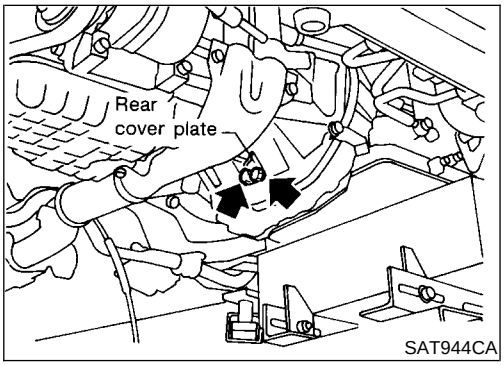
- **Install oil seals so dimension A is within specification**

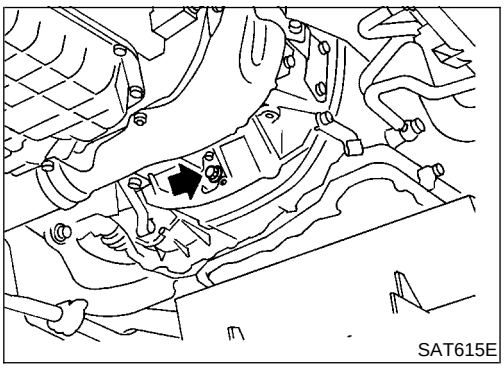
  A: −0.5 mm (−0.02 in) to 0.5 mm (0.02 in)

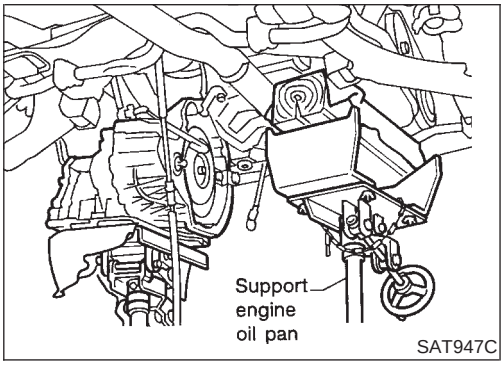
4. Reinstall any part removed.











Removal

NFAT0119

CAUTION:

When removing the transaxle assembly from engine, first remove the crankshaft position sensor (POS) from the assembly.

Be careful not to damage sensor edge.

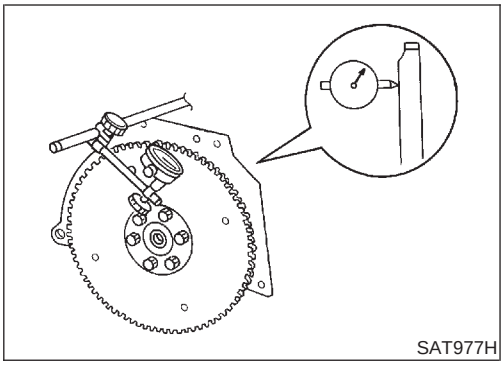
1. Remove battery and bracket.
2. Remove air cleaner and resonator.
3. Disconnect terminal cord assembly harness connector and park/neutral position (PNP) switch harness connectors.
4. Disconnect harness connectors of revolution sensor, ground and vehicle speed sensor.
5. Remove crankshaft position sensor (POS) from transaxle.
6. Remove LH mounting bracket from transaxle and body.
7. Disconnect control cable at transaxle side.
8. Drain ATF.
9. Remove exhaust front tube.
10. Remove drive shafts. Refer to AX-9, “Drive Shaft”.
11. Disconnect fluid cooler hoses.
12. Remove starter motor from transaxle.
13. Support engine by placing a jack under oil pan.

- **Do not place jack under oil pan drain plug.**

14. Remove center member.
15. Remove rear cover plate and bolts securing torque converter to drive plate.

- **Rotate crankshaft for access to securing bolts.**

16. Support transaxle with a jack.
17. Remove bolts fixing A/T to engine.
18. Lower transaxle while supporting it with a jack.


SAT977H

Installation

NFAT0120

- Drive plate runout

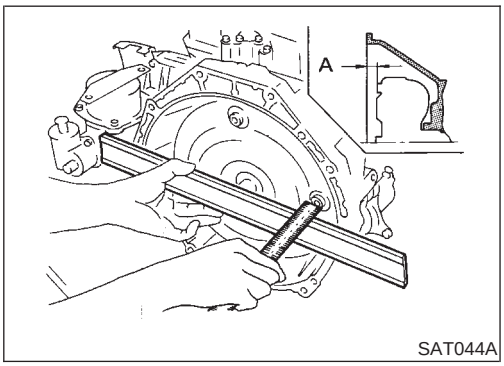
CAUTION:

Do not allow any magnetic materials to contact the ring gear teeth.

Maximum allowable runout:

Refer to EM-73, “Drive Plate Runout”.

- If this runout is outside the standard, replace drive plate and ring gear.

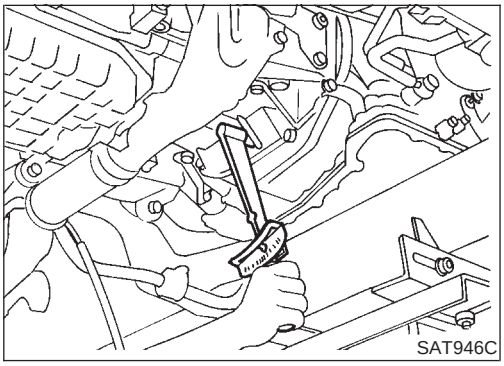


SAT044A

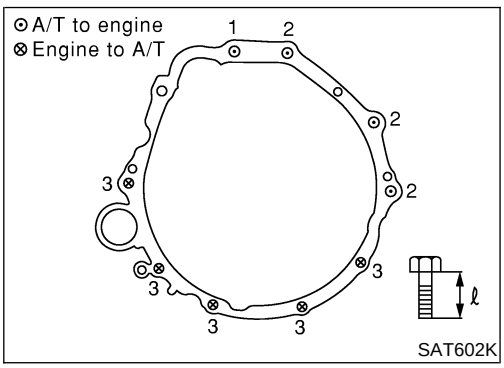
- When connecting torque converter to transaxle, measure distance “A” to be certain that they are correctly assembled.

Distance “A”:

14 mm (0.55 in) or more


SAT946C

- Install bolts fixing converter to drive plate.
- **With converter installed, rotate crankshaft several turns to check that transaxle rotates freely without binding.**



SAT602K

- Tighten bolts securing transaxle.
- Tighten LH mounting bracket bolts to the specified torque. Refer to EM-60, “Removal and Installation”.
- Tighten center member bolts to the specified torque. Refer to EM-60, “Removal and Installation”.
- Tighten rear plate cover bolts to the specified torque. Refer to EM-14, “OIL PAN”.

Bolt No.	Tightening torque N·m (kg-m, ft-lb)	ℓ mm (in)
1	69.6 - 79.4 (7.1 - 8.0, 52 - 58)	65 (2.56)
2	69.6 - 79.4 (7.1 - 8.0, 52 - 58)	52 (2.05)
3	69.6 - 79.4 (7.1 - 8.0, 52 - 58)	40 (1.57)

- Reinstall any part removed.

Installation (Cont'd)

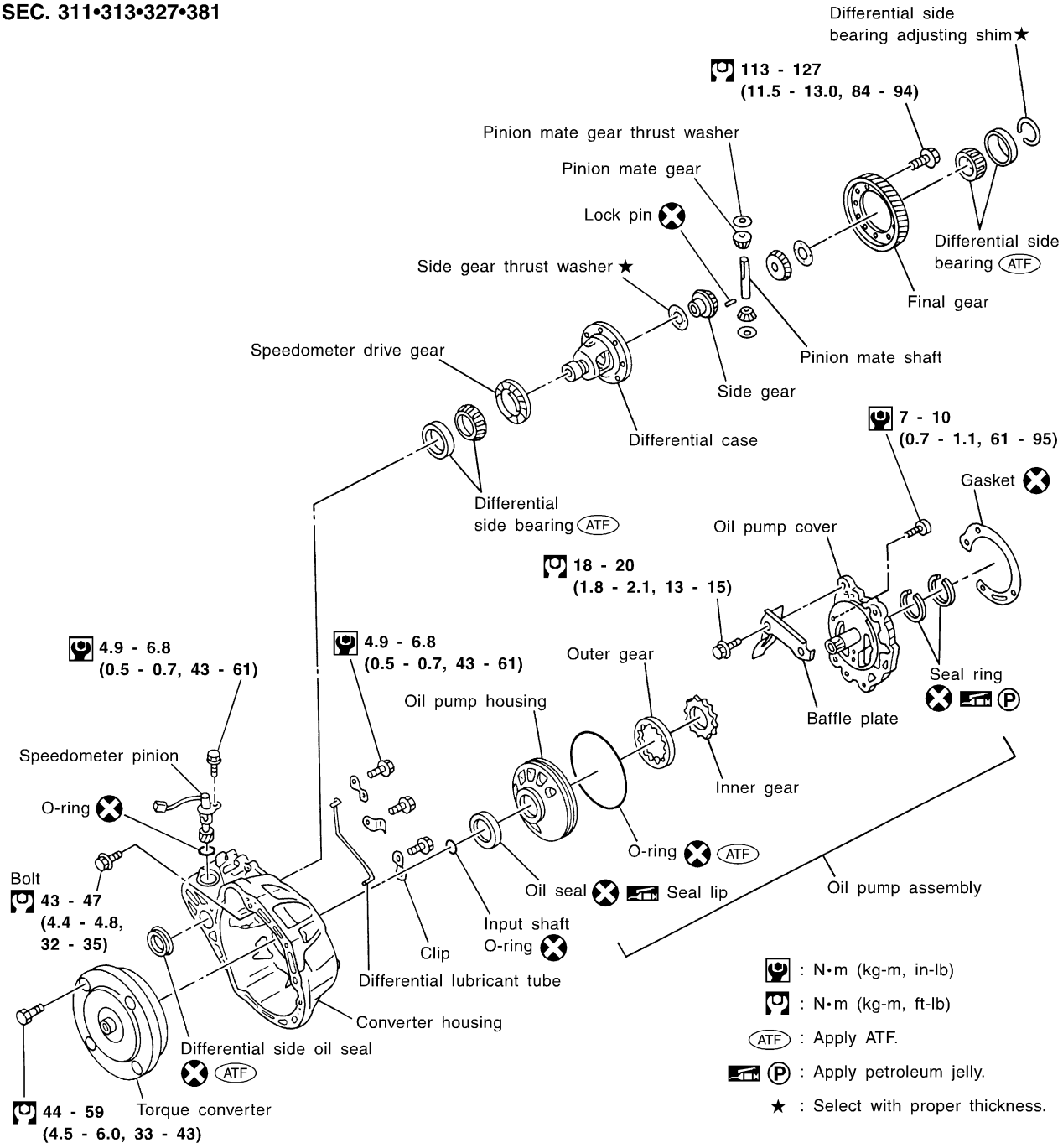
SAT638A

- Check fluid level in transaxle.
- Move selector lever through all positions to be sure that transaxle operates correctly.
  With parking brake applied, rotate engine at idling. Move selector lever through N to D, to 3, to 2, to 1 and to R position. A slight shock should be felt by hand gripping selector each time transaxle is shifted.
- Perform road test. Refer to AT-68.

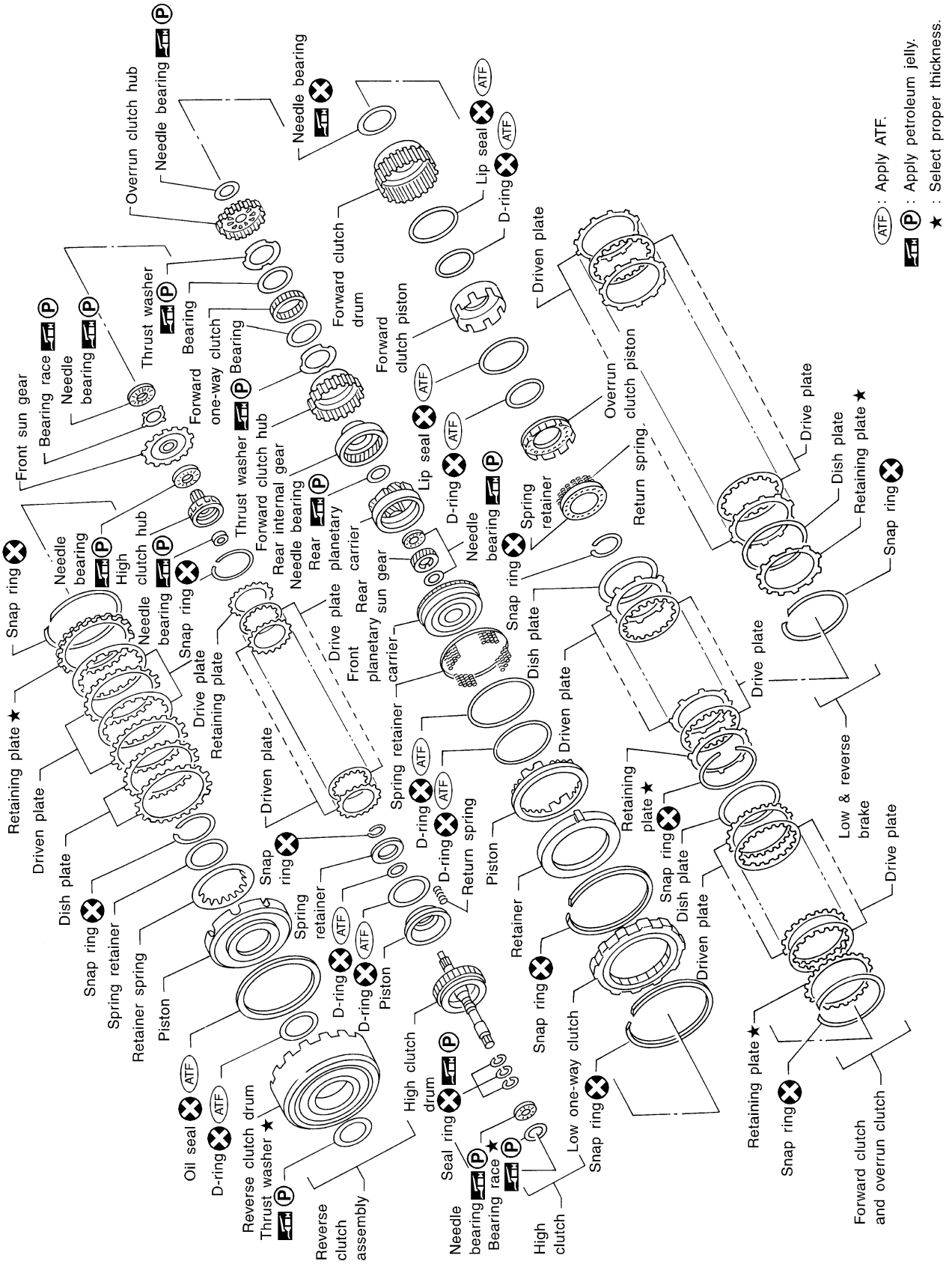
Components

NFAT0121

SEC. 311•313•327•381

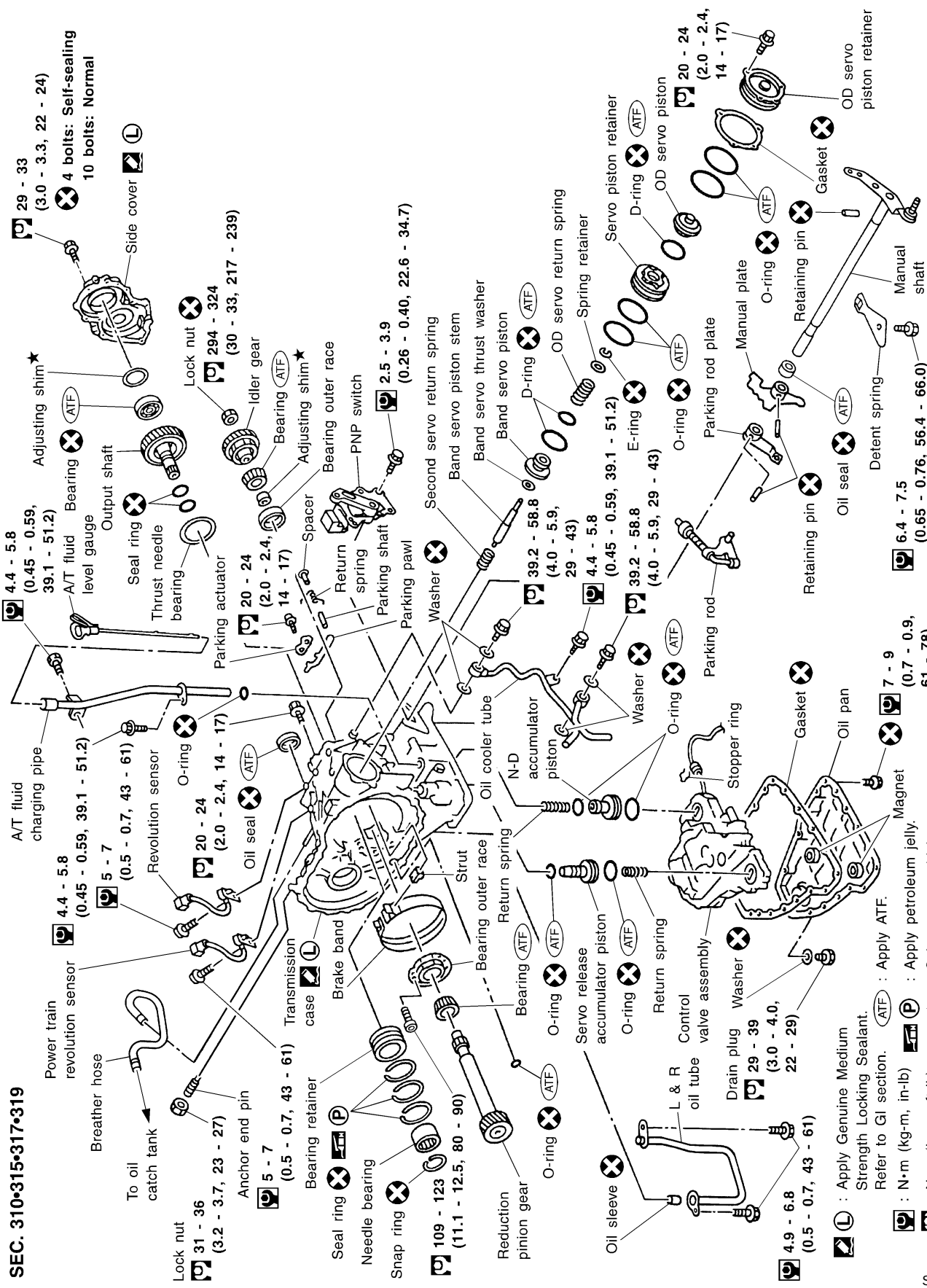


SAT536K



SEC. 315

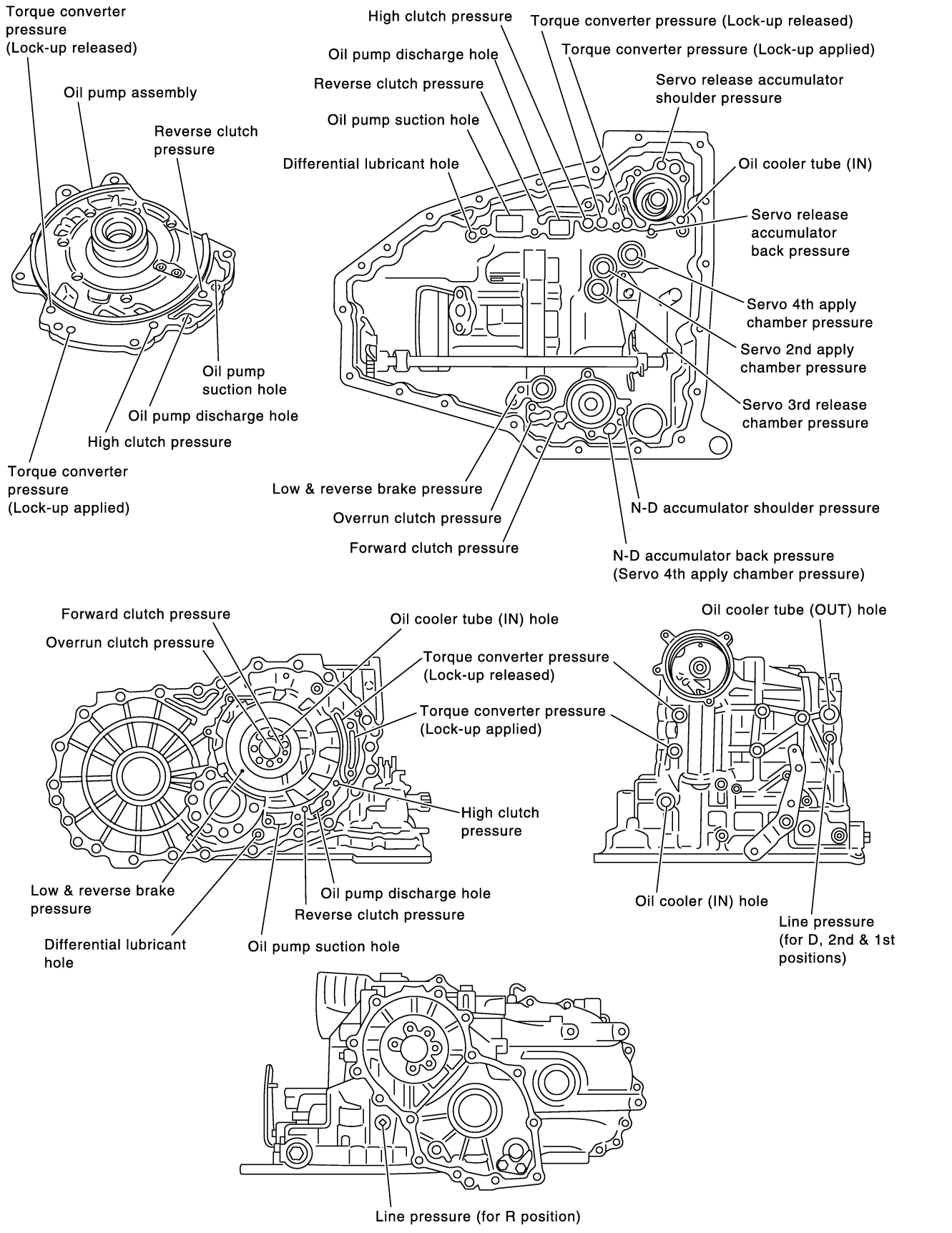
SAT949IA


SEC. 310•315•317•319
29 - 33 (3.0 - 3.3, 22 - 24)
4 bolts: Self-sealing
10 bolts: Normal
Side cover
Adjusting shim
Bearing (ATF)
Output shaft
A/T fluid level gauge
4.4 - 5.8 (0.45 - 0.59, 39.1 - 51.2)
A/T fluid charging pipe
Power train revolution sensor
Breather hose
To oil catch tank
Lock nut 31 - 36 (3.2 - 3.7, 23 - 27)
Anchor end pin
5 - 7 (0.5 - 0.7, 43 - 61)
Seal ring
Thrust needle bearing
Revolution sensor
Oil seal (ATF)
20 - 24 (2.0 - 2.4, 14 - 17)
Parking actuator
Lock nut 294 - 324 (30 - 33, 217 - 239)
Idler gear
Bearing (ATF)
Adjusting shim
Spacer
Bearing outer race
PNP switch
2.5 - 3.9 (0.26 - 0.40, 22.6 - 34.7)
Return spring
Parking shaft
Parking pawl
Second servo return spring
Band servo piston stem
Band servo thrust washer
Band servo piston
D-ring (ATF)
OD servo return spring
Spring retainer
Servo piston retainer
D-ring (ATF)
OD servo piston
20 - 24 (2.0 - 2.4, 14 - 17)
OD servo piston retainer
Gasket
Manual plate
O-ring (ATF)
Retaining pin
Parking rod plate
Parking rod
Oil seal (ATF)
Detent spring
Manual shaft
6.4 - 7.5 (0.65 - 0.76, 56.4 - 66.0)
39.2 - 58.8 (4.0 - 5.9, 29 - 43)
4.4 - 5.8 (0.45 - 0.59, 39.1 - 51.2)
E-ring
Washer (ATF)
O-ring (ATF)
Oil cooler tube
N-D accumulator piston
Transmission case
Brake band
Strut
Bearing outer race
Return spring
Bearing (ATF)
O-ring (ATF)
Servo release accumulator piston
Control valve assembly
Stopper ring
Gasket
Oil pan
7 - 9 (0.7 - 0.9, 61 - 78)
Magnet
Drain plug 29 - 39 (3.0 - 4.0, 22 - 29)
Washer
L & R oil tube
Oil sleeve
4.9 - 6.8 (0.5 - 0.7, 43 - 61)
Reduction pinion gear
Needle bearing
Snap ring
109 - 123 (11.1 - 12.5, 80 - 90)
Seal ring (P)
Bearing retainer
: Apply Genuine Medium Strength Locking Sealant. Refer to GI section.
: Apply ATF.
: Apply petroleum jelly.
: Select proper thickness.
: N•m (kg-m, in-lb)
: N•m (kg-m, ft-lb)

SAT601K

Oil Channel

NFAT0122



SAT573K

Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings

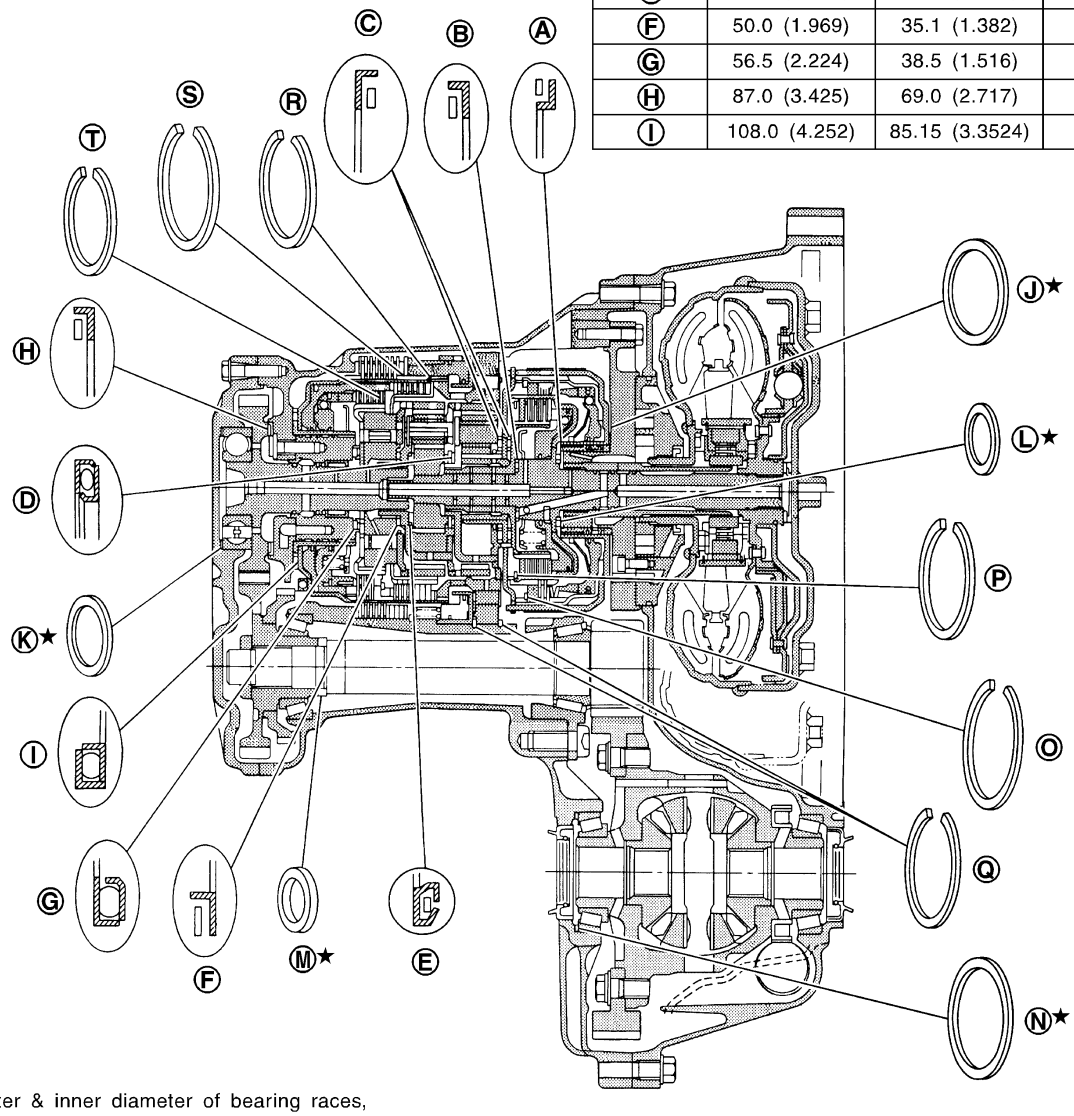
NFAT0123

Outer diameter of thrust washers

Item number	Outer diameter mm (in)	Parts number*
Ⓙ★	76.0 (2.992)	31508 80X13 - 31508 80X20
Ⓚ★	80.0 (3.150)	31438 80X60 - 31438 80X70

Outer and inner diameter of needle bearings

Item number	Outer diameter mm (in)	Inner diameter mm (in)	Parts number*
Ⓐ	50.0 (1.969)	35.1 (1.382)	31407 80X10
Ⓑ	42.0 (1.654)	23.7 (0.933)	31407 80X01
Ⓒ	70.0 (2.756)	50.0 (1.969)	31407 80X09
Ⓓ	51.0 (2.008)	33.1 (1.303)	31407 80X02
Ⓔ	48.0 (1.890)	30.0 (1.181)	31407 80X03
Ⓕ	50.0 (1.969)	35.1 (1.382)	31407 80X10
Ⓖ	56.5 (2.224)	38.5 (1.516)	31407 80X08
Ⓗ	87.0 (3.425)	69.0 (2.717)	31407 80X07
Ⓘ	108.0 (4.252)	85.15 (3.3524)	31407 80X06



Outer & inner diameter of bearing races, adjusting shims and adjusting spacer

Item number	Outer diameter mm (in)	Inner diameter mm (in)	Parts number*
Ⓛ★	51.0 (2.008)	36.0 (1.417)	31435 80X00 - 31439 80X14
Ⓜ★	38.0 (1.496)	28.1 (1.106)	31439 85X01 - 31439 85X06 31439 83X11 - 31439 83X24 31439 81X00 - 31439 81X24 31439 81X46 - 31439 81X49 31439 81X60 - 31439 81X74
Ⓝ★	75.0 (2.953)	67.0 (2.638)	31438 80X00 - 31439 80X11

★ : Select proper thickness.

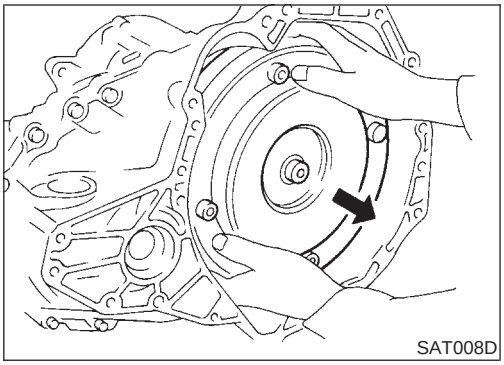
* : Always check with the Parts Department for the latest parts information.

Outer diameter of snap rings

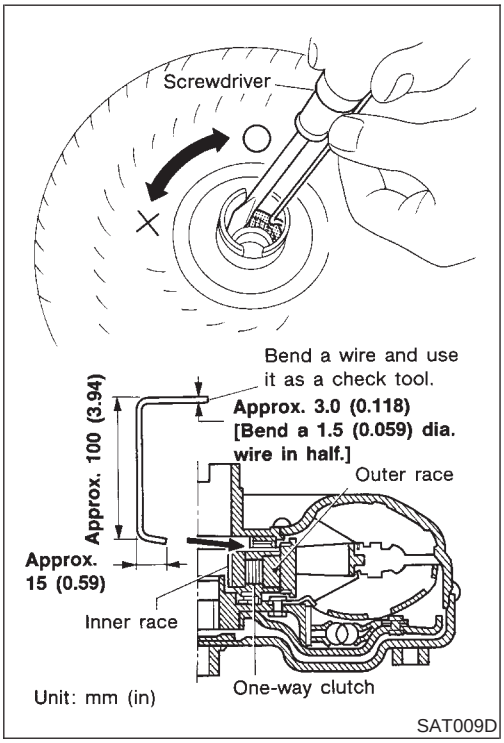
Item number	Outer diameter mm (in)	Parts number*
Ⓞ	150 (5.91)	31506 80X13
Ⓟ	119.1 (4.689)	31506 80X06
Ⓠ	182.8 (7.197)	31506 80X08
Ⓡ	144.8 (5.701)	31506 80X03
Ⓢ	173.8 (6.843)	31506 80X09
Ⓣ	133.9 (5.272)	31506 80X01

SAT565K

DISASSEMBLY


SAT008D

1. Drain ATF through drain plug.
2. Remove torque converter.



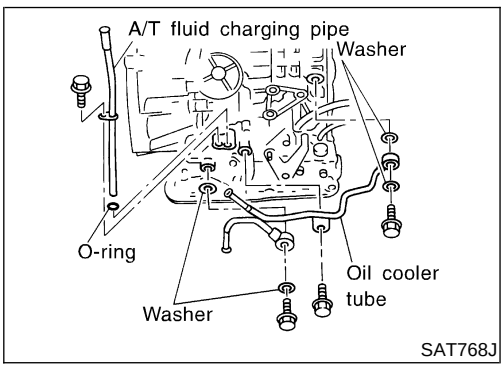
SAT009D

3. Check torque converter one-way clutch using check tool as shown at left.

a. Insert check tool into the groove of bearing support built into one-way clutch outer race.

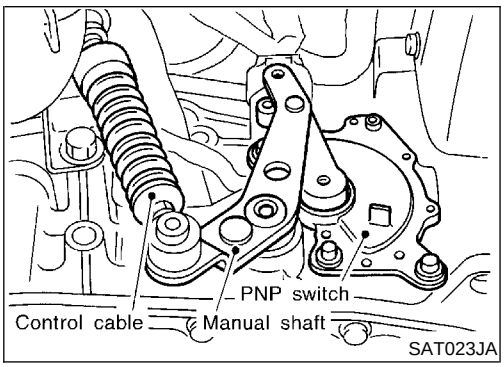
b. When fixing bearing support with check tool, rotate one-way clutch spline using screwdriver.

c. Check that inner race rotates clockwise only. If not, replace torque converter assembly.



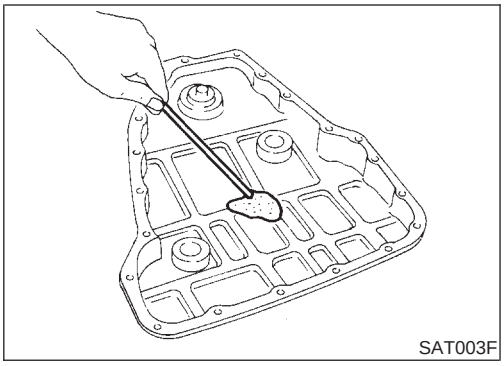
SAT768J

4. Remove A/T fluid charging pipe and fluid cooler tube.

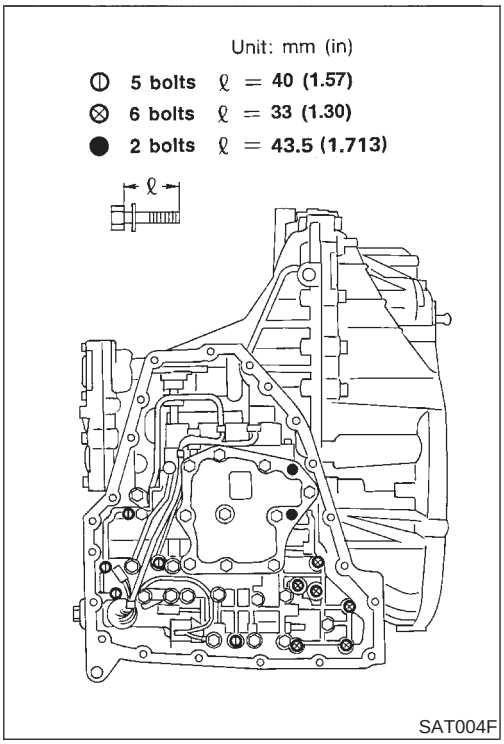


SAT023JA

5. Set manual shaft to position P.
6. Remove park/neutral position (PNP) switch.


SAT003F

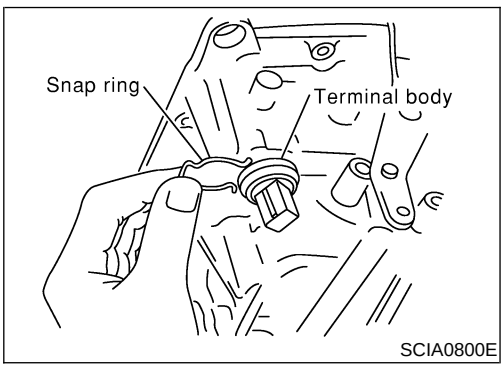
7. Remove oil pan and oil pan gasket.
- **Do not reuse oil pan bolts.**
8. Check foreign materials in oil pan to help determine causes of malfunction. If the fluid is very dark, smells burned, or contains foreign particles, the frictional material (clutches, band) may need replacement. A tacky film that 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 LC-20, "Radiator".**



SAT004F

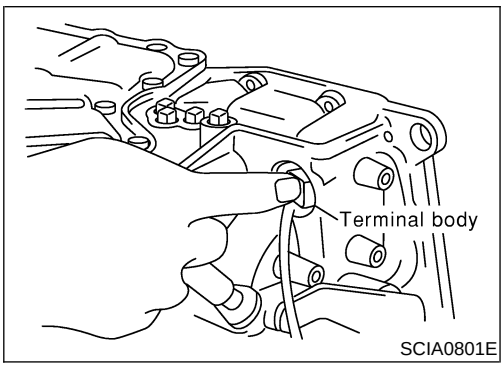
9. Remove control valve assembly according to the following procedures.

a. Remove control valve assembly mounting bolts **I**, **X** and ●.



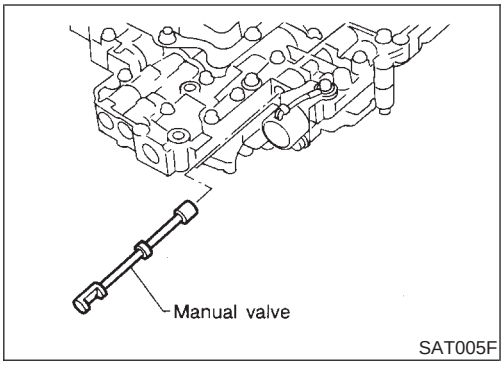
SCIA0800E

b. Remove snap ring from terminal body.

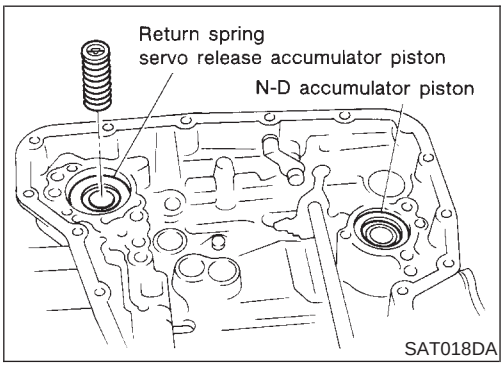


SCIA0801E

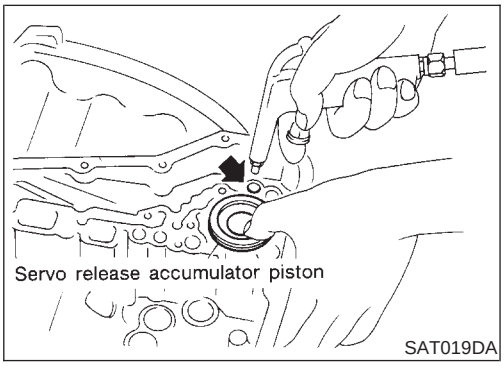
c. Push terminal body into transmission case and draw out solenoid harness.



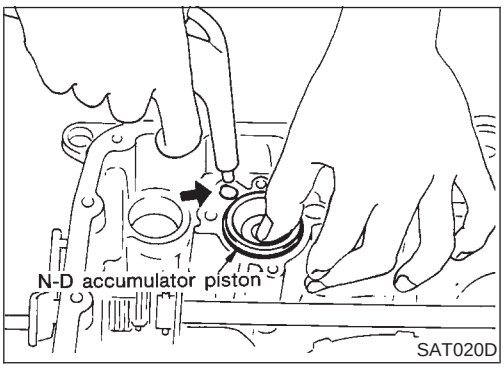
10. Remove manual valve from control valve assembly.



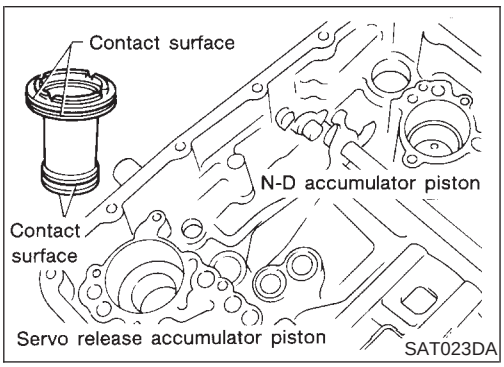
11. Remove return spring from servo release accumulator piston.



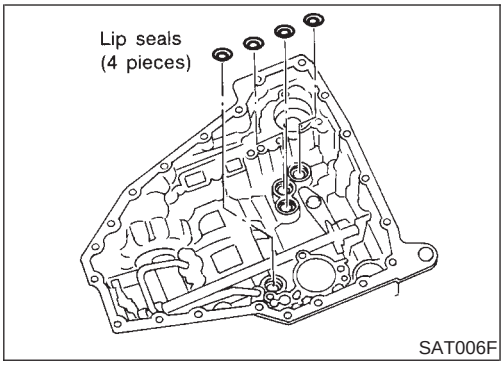
12. Remove servo release accumulator piston with compressed air.
13. Remove O-rings from servo release accumulator piston.



14. Remove N-D accumulator piston and return spring with compressed air.
15. Remove O-rings from N-D accumulator piston.

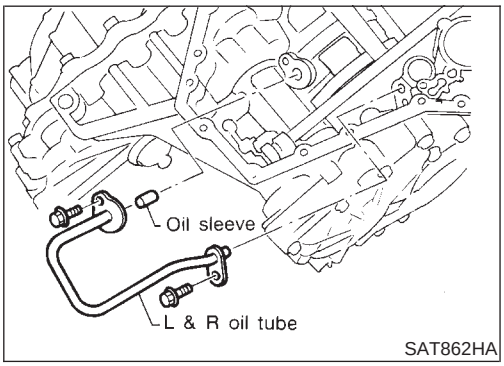


16. Check accumulator pistons and contact surface of transmission case for damage.
17. Check accumulator return springs for damage and free length.



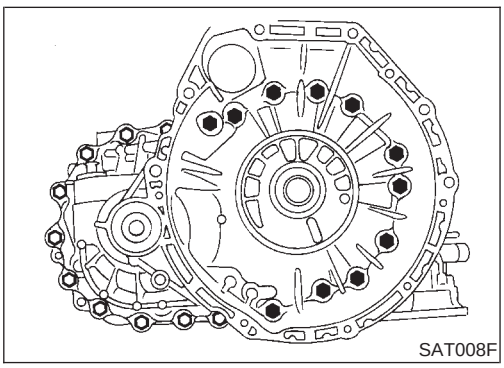
SAT006F

18. Remove lip seals.

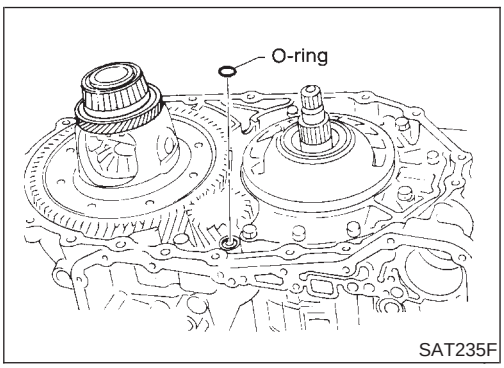


SAT862HA

19. Remove L & R oil tube and oil sleeve.

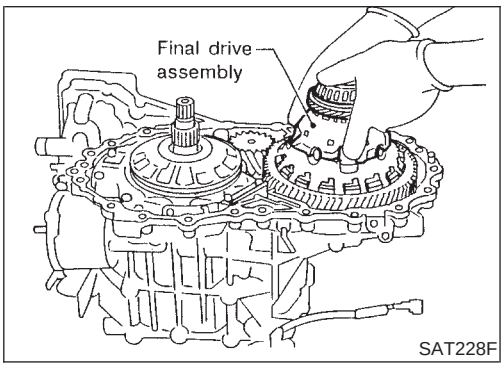

SAT008F

20. Remove converter housing according to the following procedures.
a. Remove converter housing mounting bolts.
b. Remove converter housing by tapping it lightly.



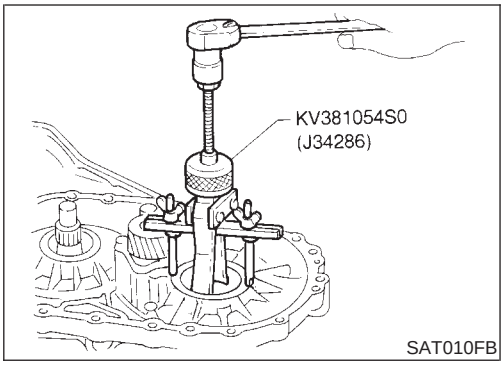
SAT235F

c. Remove O-ring from differential oil port.

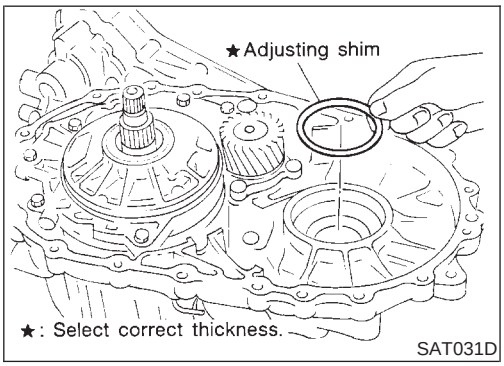


SAT228F

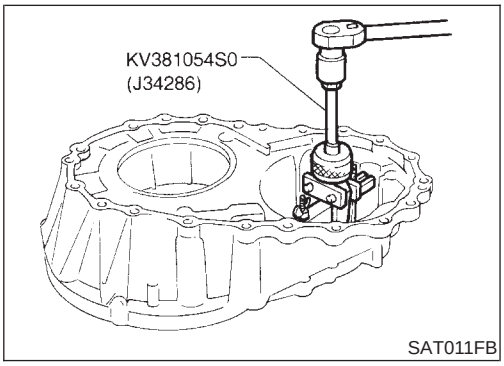
21. Remove final drive assembly from transmission case.



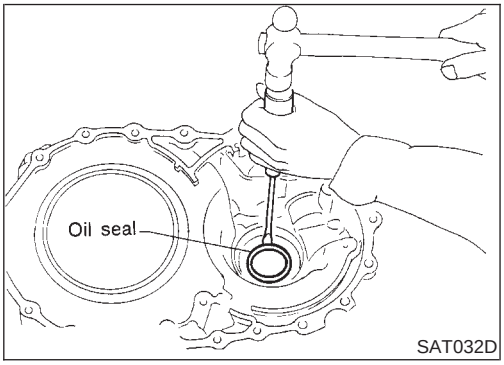
22. Remove differential side bearing outer race and side bearing adjusting shim from transmission case.



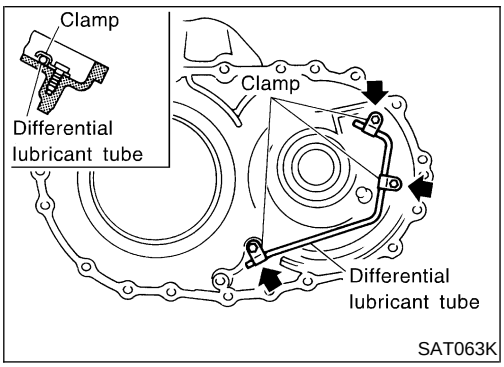
23. Remove differential side bearing adjusting shim from transmission case.



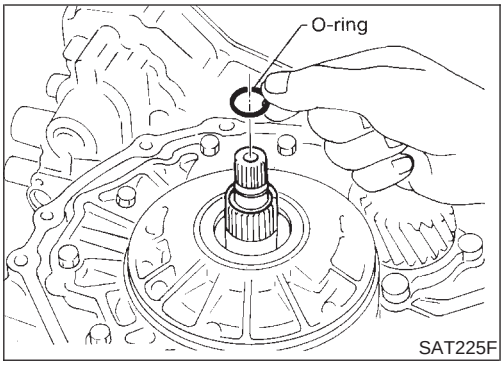
24. Remove differential side bearing outer race from converter housing.



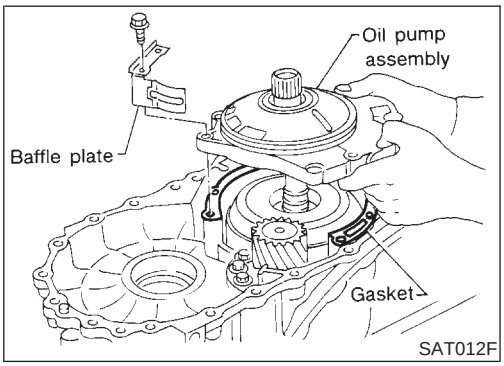
25. Remove oil seal with screwdriver from converter housing.
- **Be careful not to damage case.**



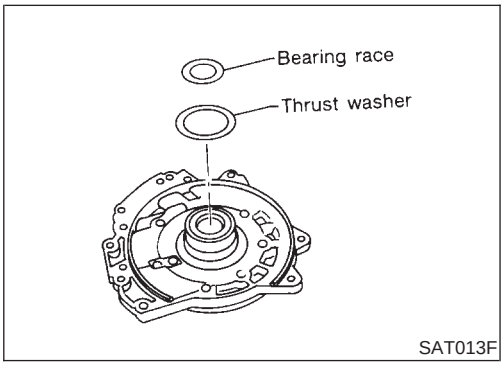
26. Remove differential lubricant tube from converter housing.



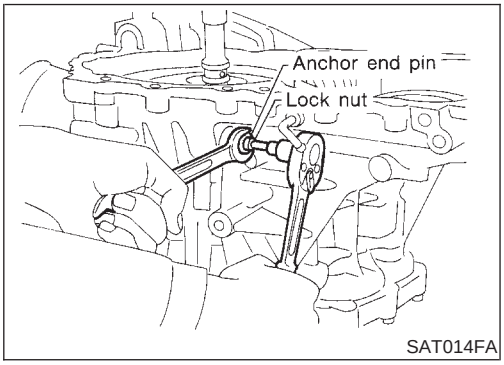
27. Remove oil pump according to the following procedures.
a. Remove O-ring from input shaft.



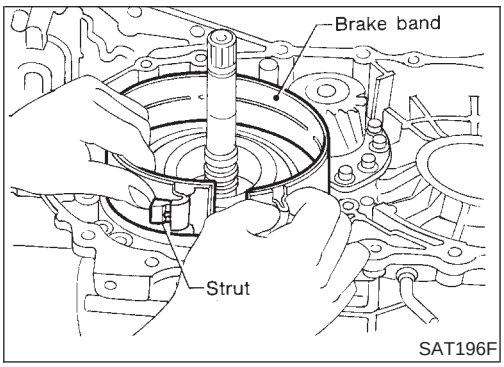
b. Remove oil pump assembly, baffle plate and gasket from transmission case.



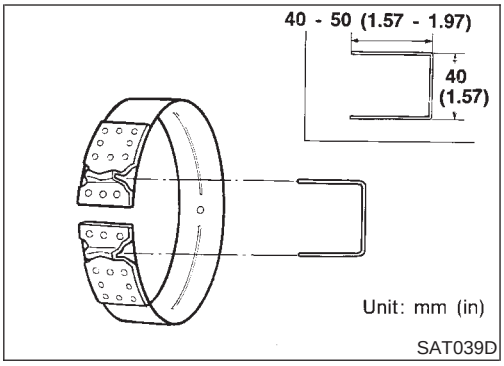
c. Remove thrust washer and bearing race from oil pump assembly.



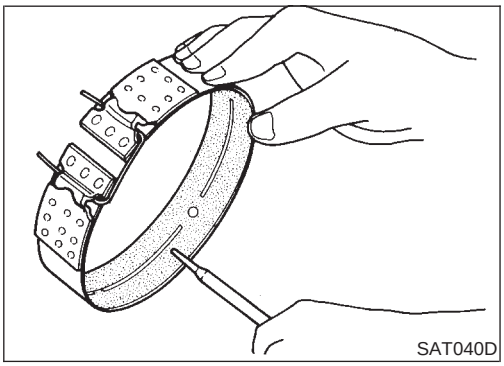
28. Remove brake band according to the following procedures.
a. Loosen lock nut, then back off anchor end pin.
- **Do not reuse anchor end pin.**



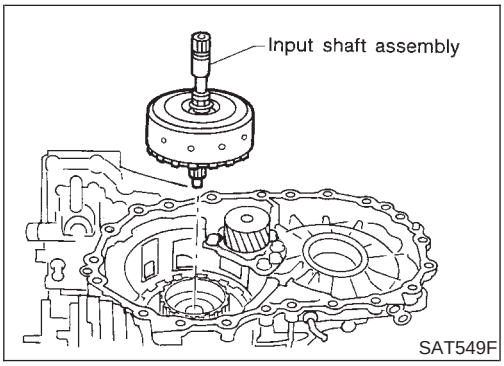
b. Remove brake band and strut from transmission case.



- **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 left.**
  Leave the clip in position after removing the brake band.

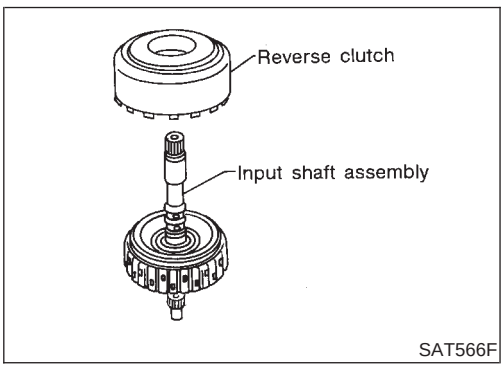


c. Check brake band facing for damage, cracks, wear or burns.

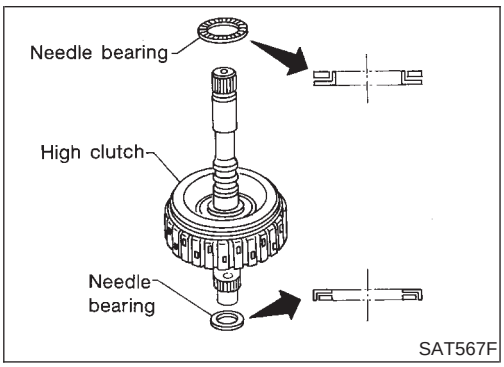


29. Remove input shaft assembly (high clutch) and reverse clutch according to the following procedures.

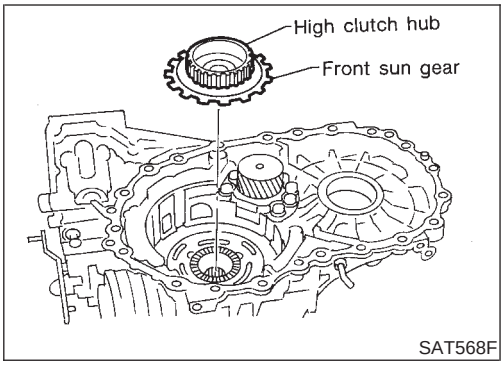
a. Remove input shaft assembly (high clutch) with reverse clutch.



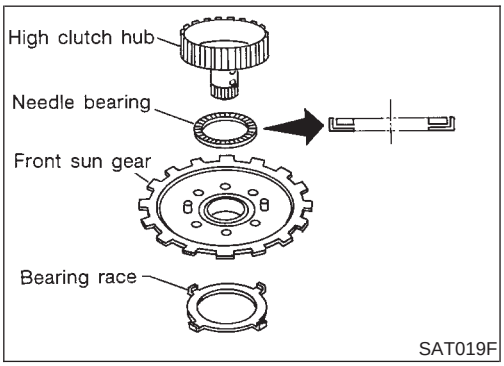
b. Remove input shaft assembly (high clutch) from reverse clutch.



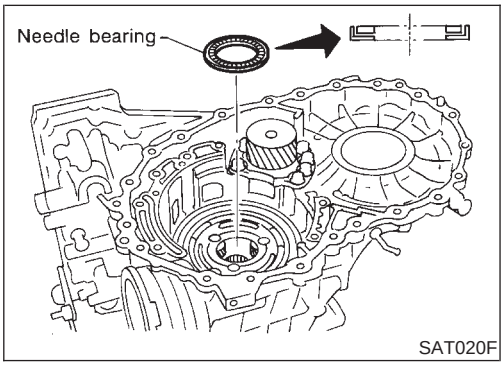
c. Remove needle bearings from high clutch drum and check for damage or wear.



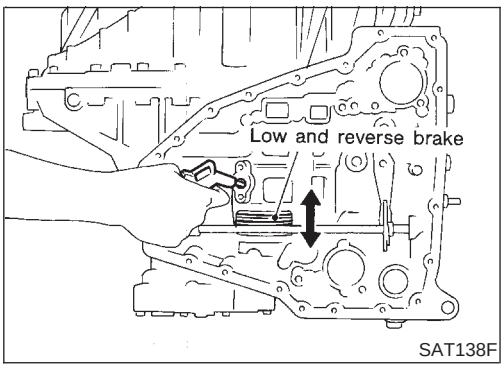
d. Remove high clutch hub and front sun gear from transmission case.



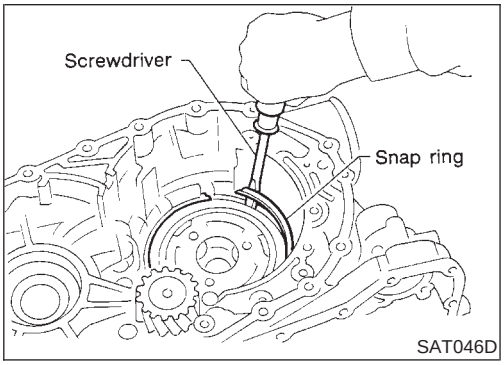
e. Remove front sun gear and needle bearing from high clutch hub and check for damage or wear.
f. Remove bearing race from front sun gear and check for damage or wear.



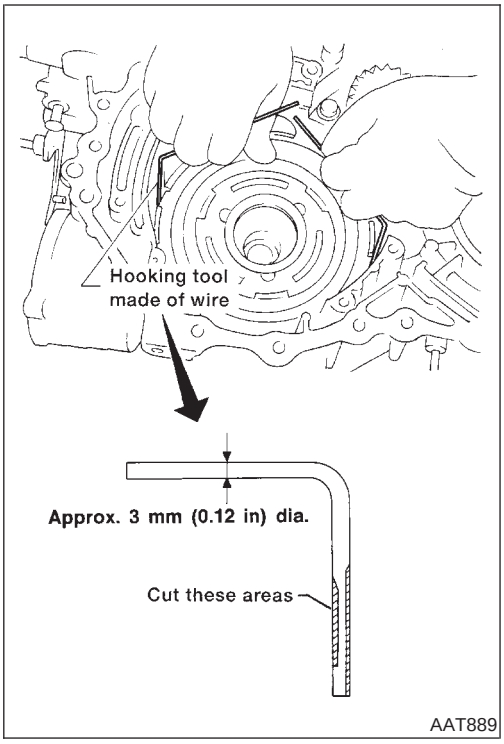
30. Remove needle bearing from transmission case and check for damage or wear.



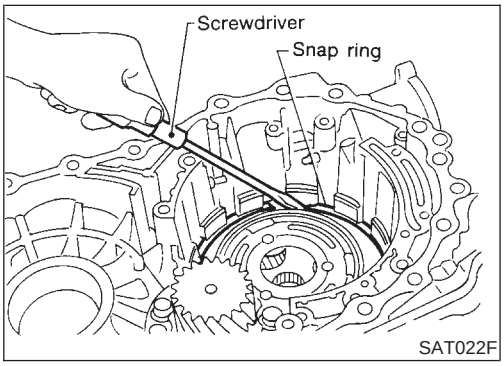
31. Apply compressed air and check to see that low and reverse brake operates.



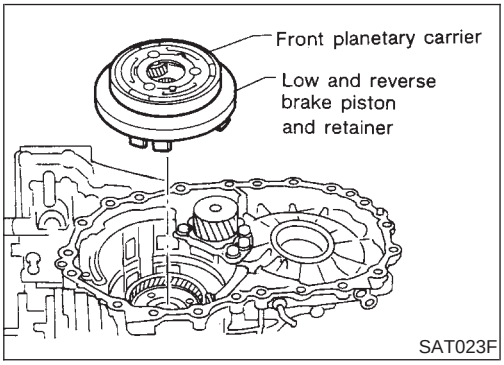
32. Remove low one-way clutch and front planetary carrier assembly according to the following procedures.
a. Remove snap ring with flat-bladed screwdriver.



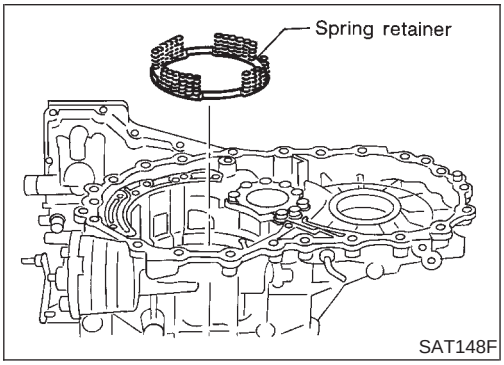
b. Remove low one-way clutch with a hook made of wire.



c. Remove snap ring with flat-bladed screwdriver.

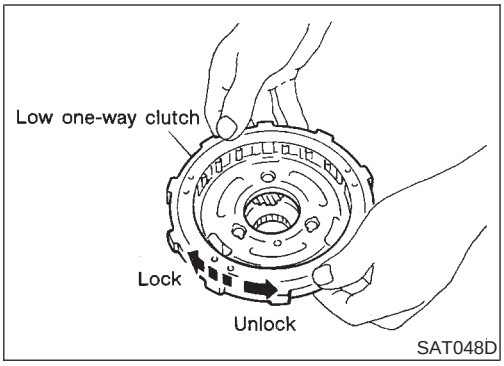


d. Remove front planetary carrier with low and reverse brake piston and retainer.

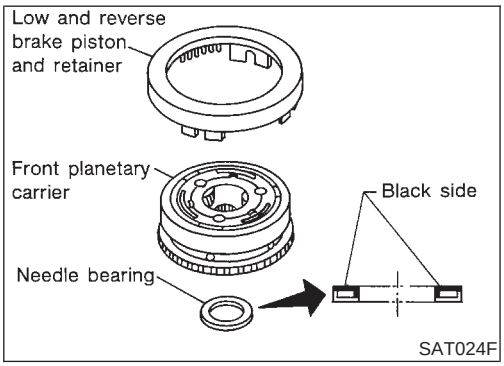


e. Remove low and reverse brake spring retainer.

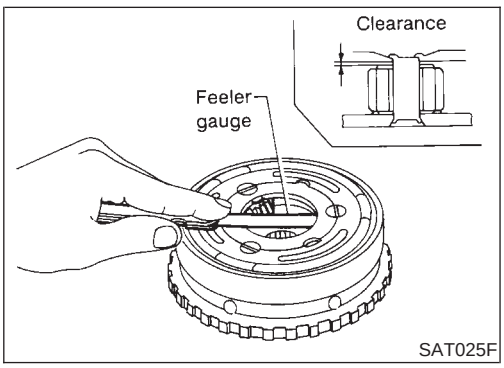
- **Do not remove return springs from spring retainer.**



f. Check that low one-way clutch rotates in the direction of the arrow and locks in the opposite direction.



g. Remove needle bearing, low and reverse brake piston and retainer from front planetary carrier.



h. Check front planetary carrier, low one-way clutch and needle bearing for damage or wear.

i. Check clearance between planetary gears and planetary carrier with feeler gauge.

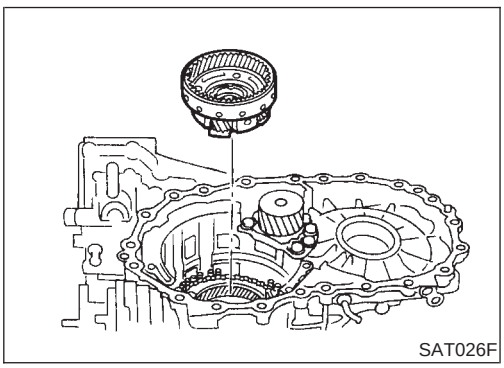
Standard clearance:

0.20 - 0.70 mm (0.0079 - 0.0276 in)

Allowable limit:

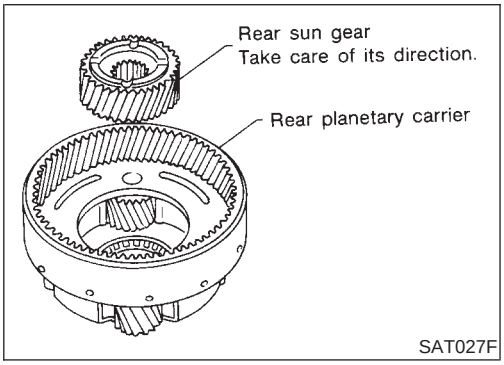
0.80 mm (0.0315 in)

Replace front planetary carrier if the clearance exceeds allowable limit.

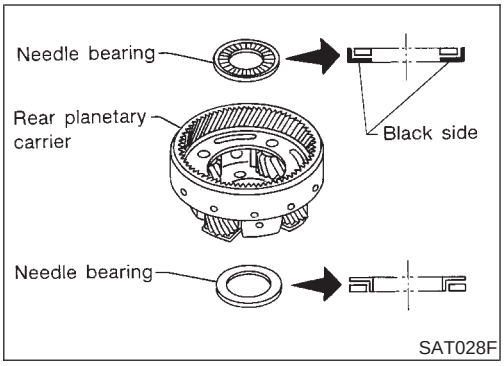


33. Remove rear planetary carrier assembly and rear sun gear according to the following procedures.

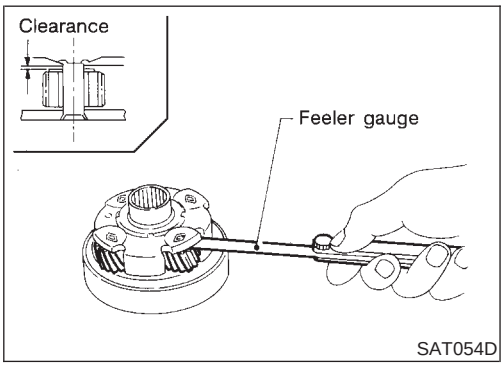
a. Remove rear planetary carrier assembly from transmission case.



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.

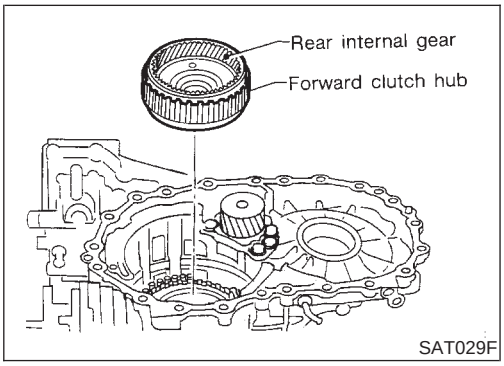
Standard clearance:

0.20 - 0.70 mm (0.0079 - 0.0276 in)

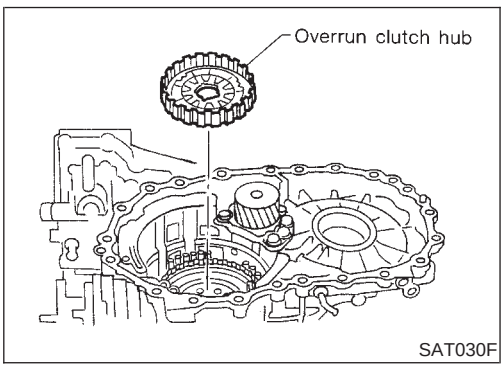
Allowable limit:

0.80 mm (0.0315 in)

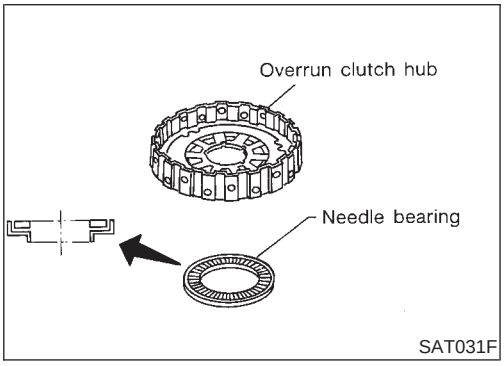
Replace rear planetary carrier if the clearance exceeds allowable limit.



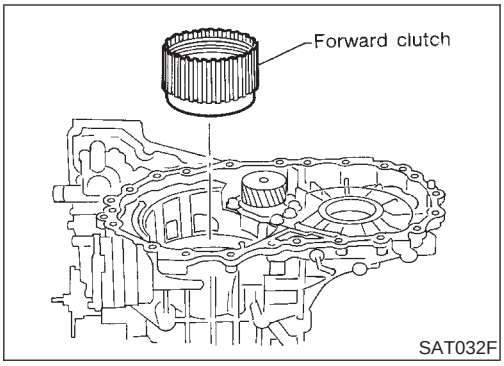
34. Remove rear internal gear and forward clutch hub from transmission case.



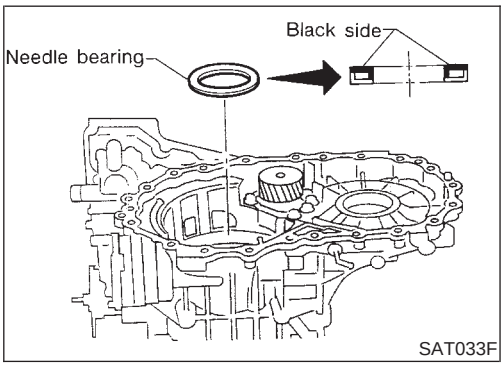
35. Remove overrun clutch hub from transmission case.



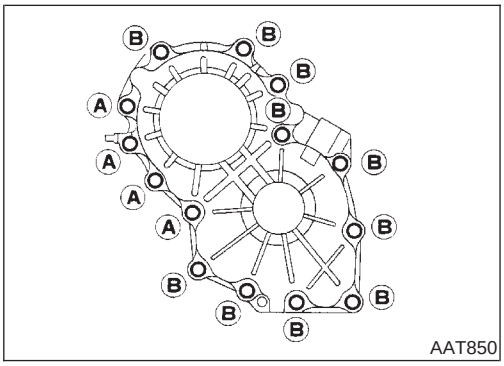
36. Remove needle bearing from overrun clutch hub and check for damage or wear.



37. Remove forward clutch assembly from transmission case.



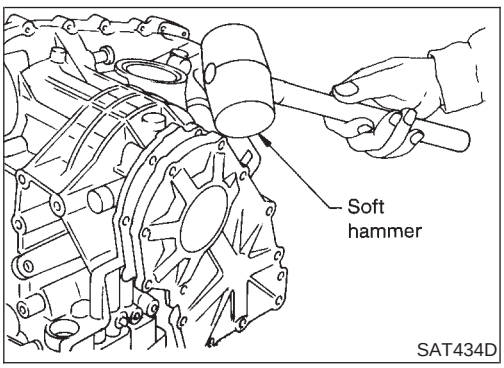
38. Remove needle bearing from transmission case.



39. Remove output shaft assembly according to the following procedures.

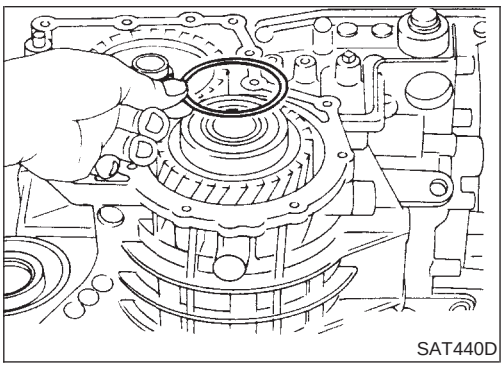
a. Remove side cover bolts.

- **Do not mix bolts A and B.**
- **Always replace bolts A as they are self-sealing bolts.**

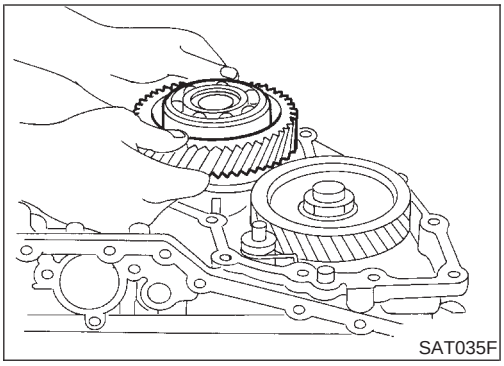


b. Remove side cover by lightly tapping it with a soft hammer.

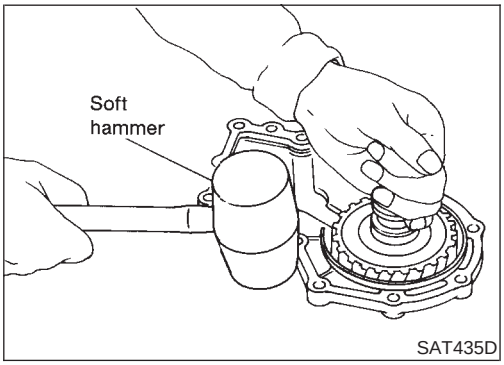
- **Be careful not to drop output shaft assembly. It might come out when removing side cover.**



c. Remove adjusting shim.

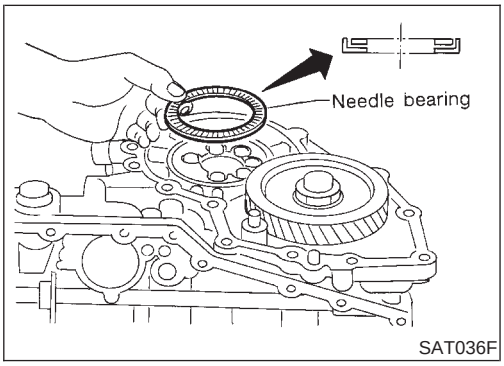

SAT035F

d. Remove output shaft assembly.



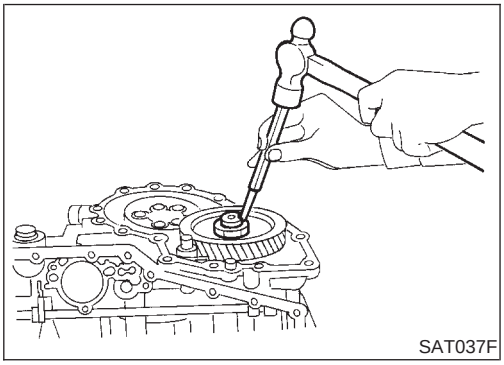
SAT435D

- If output shaft assembly comes off with side cover, tap cover with a soft hammer to separate.

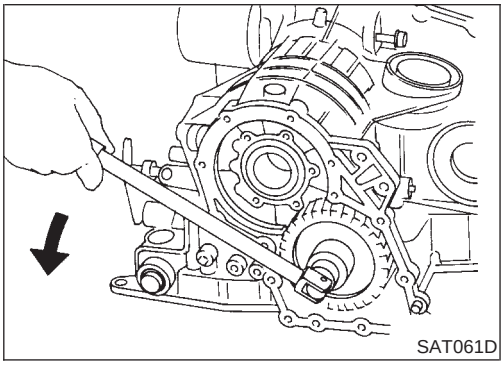


SAT036F

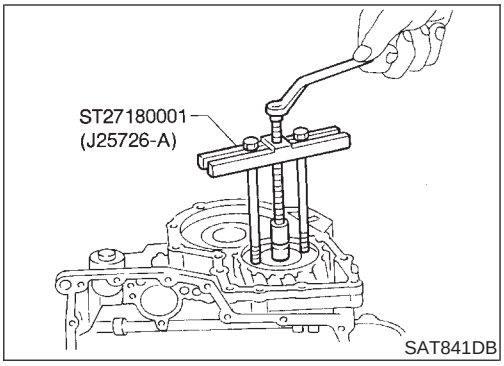
e. Remove needle bearing.


SAT037F

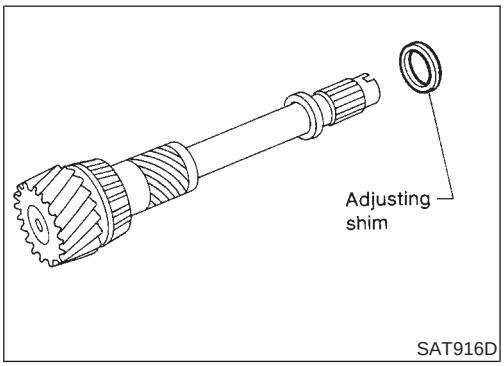
40. Disassemble reduction pinion gear according to the following procedures.
a. Set manual shaft to position P to fix idler gear.
b. Unlock idler gear lock nut using a pin punch.


SAT061D

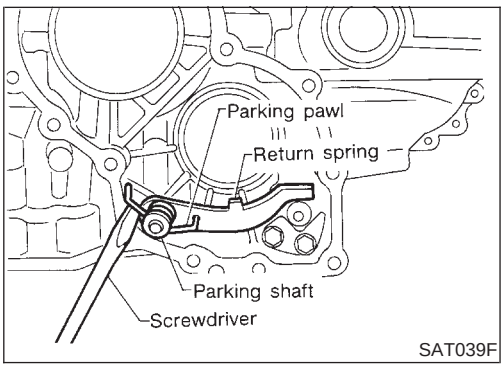
c. Remove idler gear lock nut.
- **Do not reuse idler gear lock nut.**



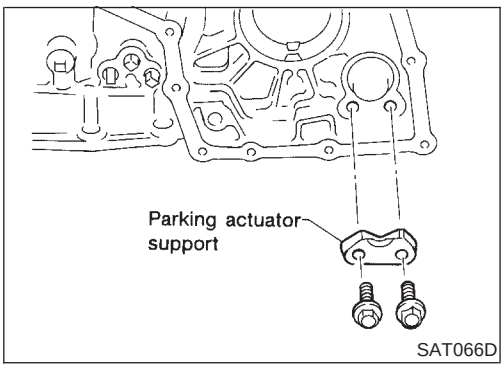
d. Remove idler gear with puller.



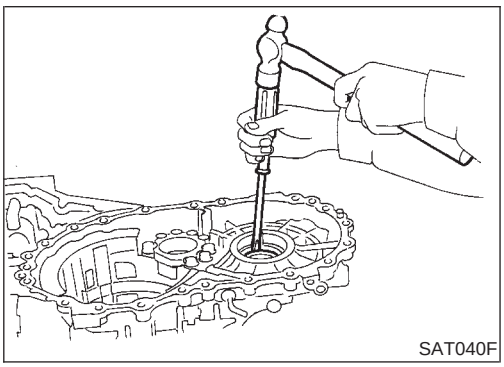
e. Remove reduction pinion gear.
f. Remove adjusting shim from reduction pinion gear.



41. Remove return spring from parking shaft with screwdriver.
42. Draw out parking shaft and remove parking pawl from transmission case.
43. Check parking pawl and shaft for damage or wear.



44. Remove parking actuator support from transmission case.
45. Check parking actuator support for damage or wear.

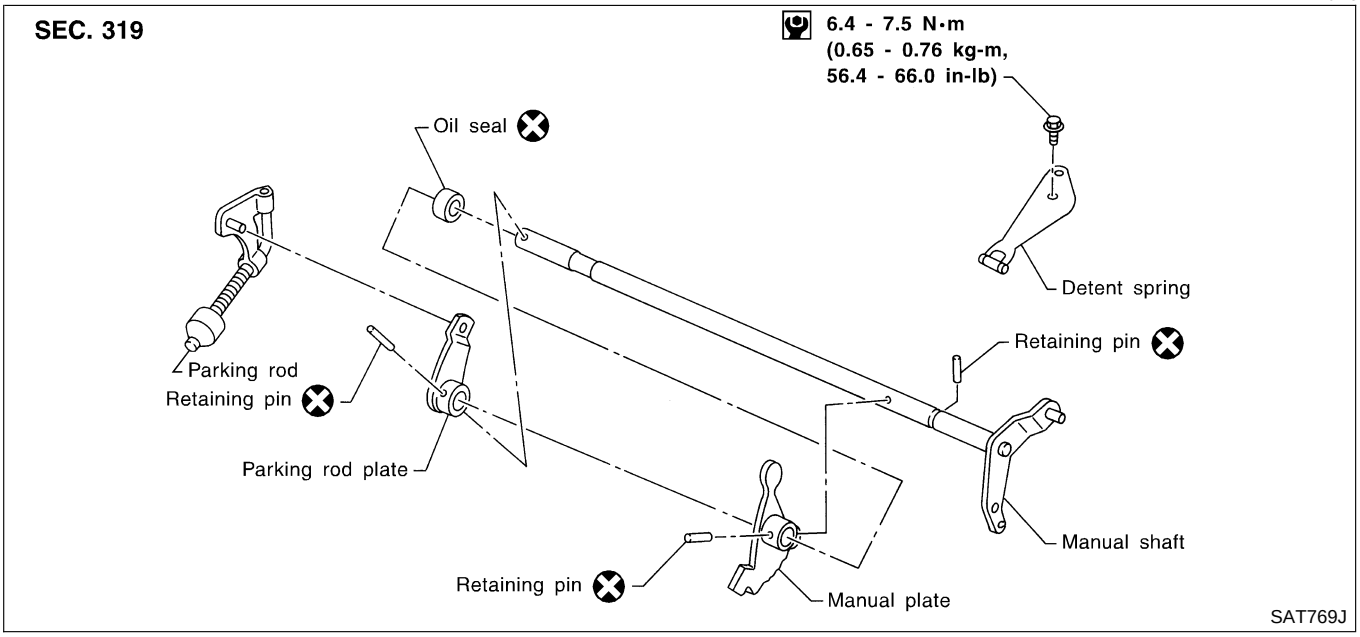


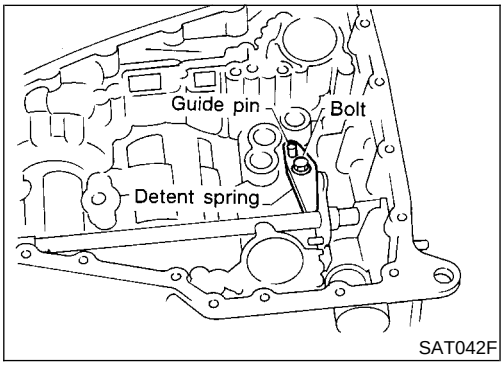
46. Remove side oil seal with screwdriver from transmission case.

Manual Shaft

COMPONENTS

NFAT0125

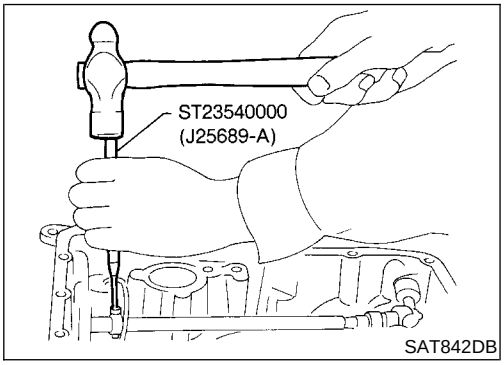




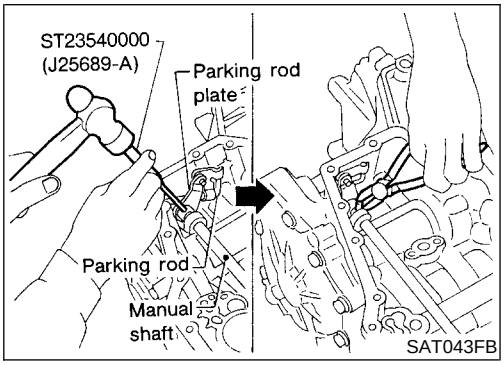
REMOVAL

NFAT0126

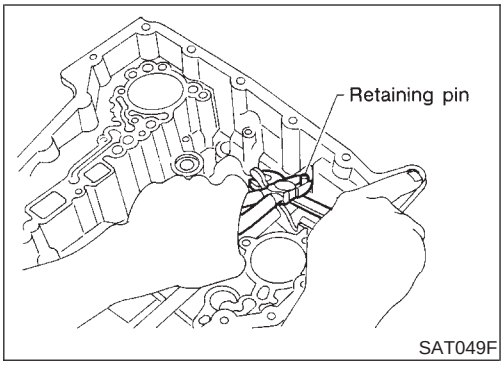
1. Remove detent spring from transmission case.



2. Drive out manual plate retaining pin.

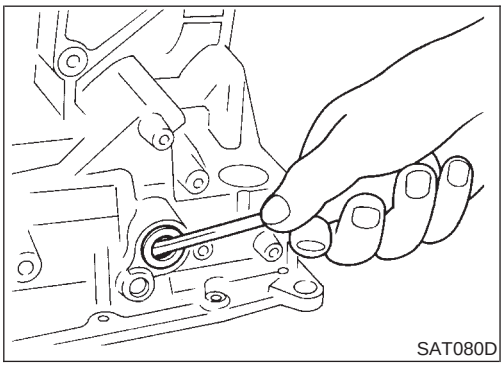


3. Drive and pull out parking rod plate retaining pin.
4. Remove parking rod plate from manual shaft.
5. Draw out parking rod from transmission case.



SAT049F

6. Pull out manual shaft retaining pin.
7. Remove manual shaft and manual plate from transmission case.


SAT080D

8. Remove manual shaft oil seal.

INSPECTION

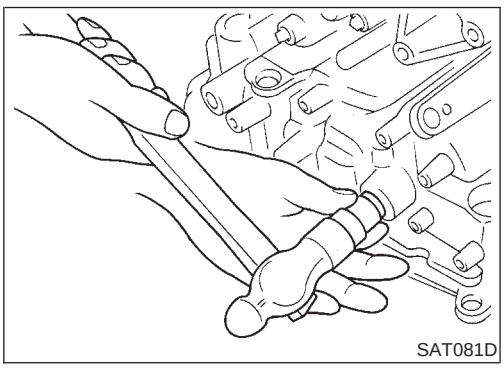
NFAT0127

- Check component parts for wear or damage. Replace if necessary.

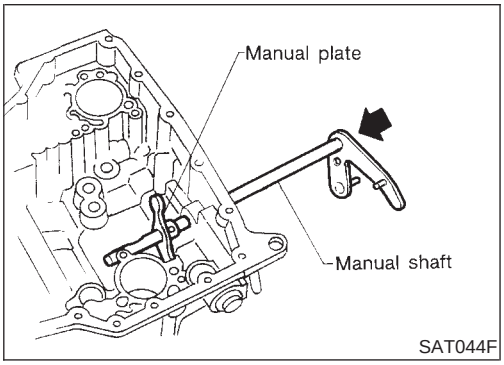
INSTALLATION

NFAT0128

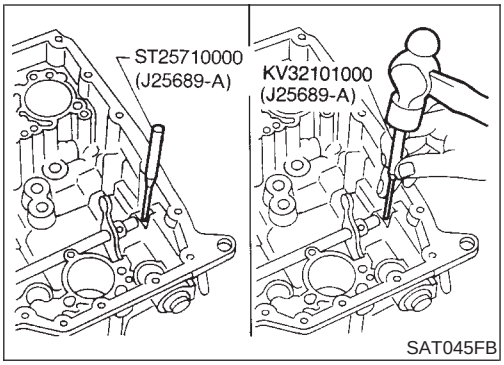
1. Install manual shaft oil seal.
- **Apply ATF to outer surface of oil seal.**


SAT081D

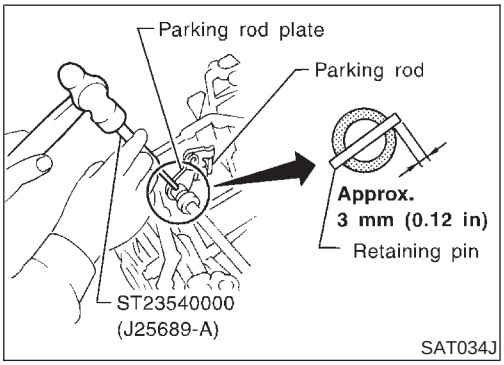
2. Install manual shaft and manual plate.



SAT044F

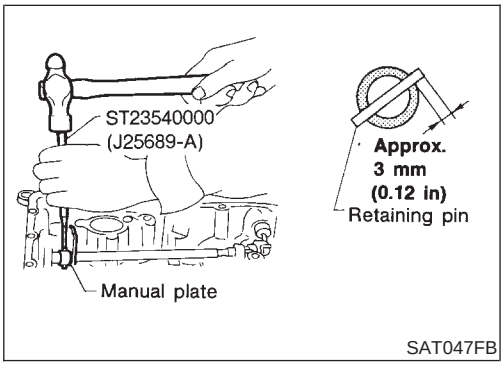


3. Align groove of manual shaft and hole of transmission case.
4. Install manual shaft retaining pin up to bottom of hole.



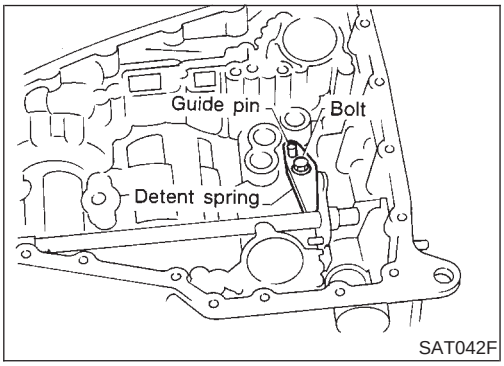
5. Install parking rod to parking rod plate.
6. Set parking rod assembly onto manual shaft and drive retaining pin.

- **Both ends of pin should protrude.**



7. Drive manual plate retaining pin.

- **Both ends of pin should protrude.**

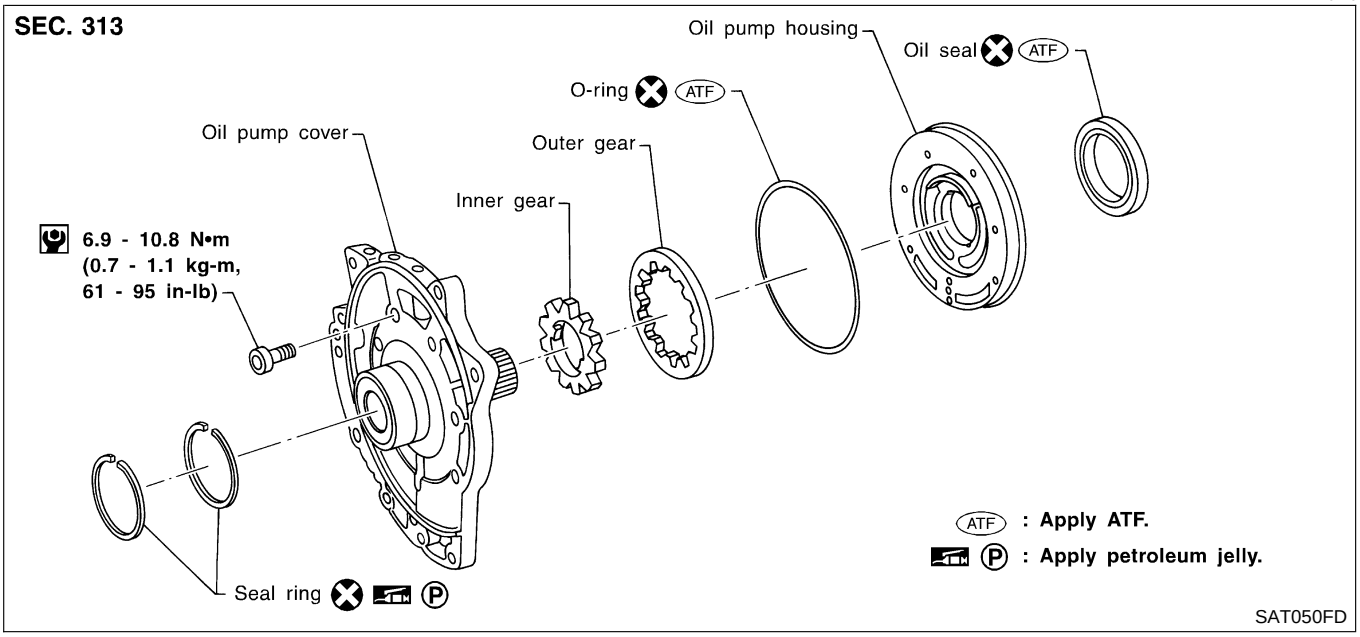


8. Install detent spring. Tighten detent spring bolts to the specified torque. Refer to AT-302.

Oil Pump

COMPONENTS

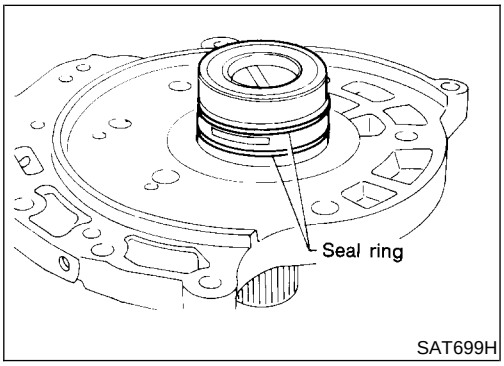
NFAT0129



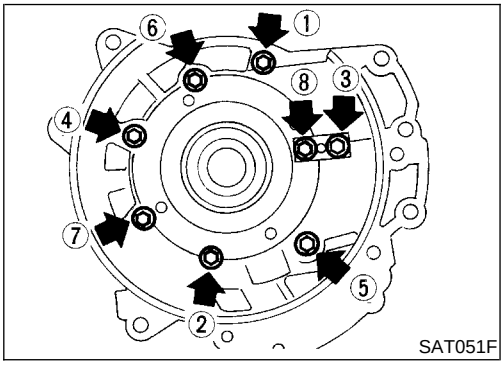
DISASSEMBLY

NFAT0130

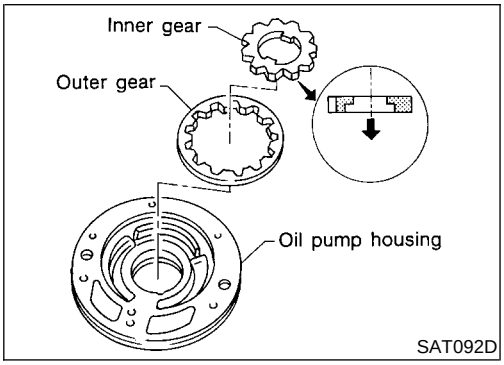
1. Remove seal rings.

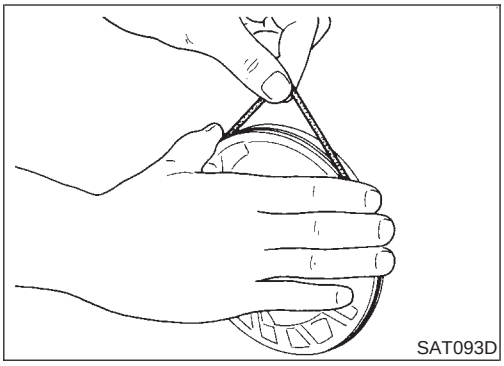


2. Loosen bolts in a crisscross pattern and remove oil pump cover.

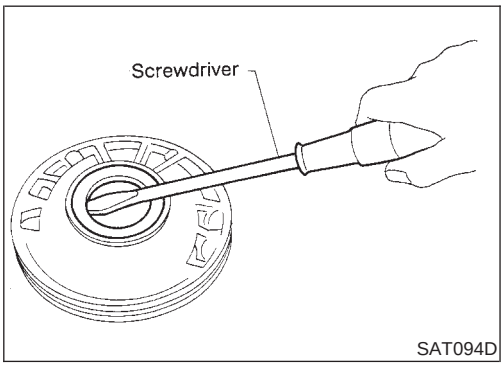


3. Remove inner and outer gear from oil pump housing.




SAT093D

4. Remove O-ring from oil pump housing.



SAT094D

5. Remove oil pump housing oil seal.

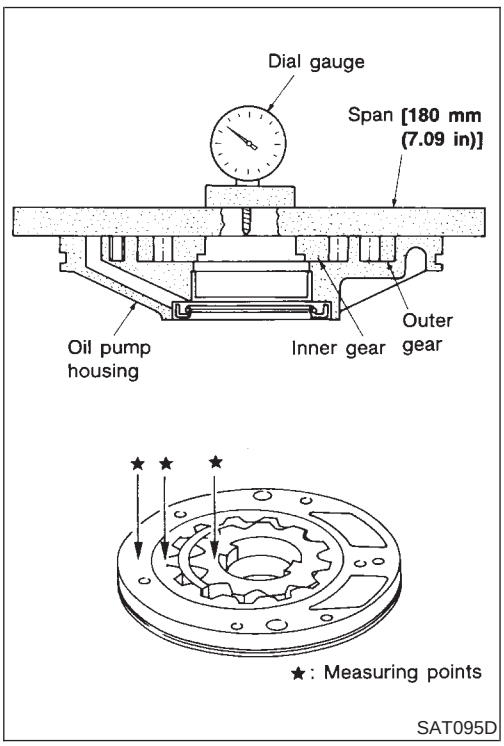
INSPECTION

NFAT0131

Oil Pump Housing, Oil Pump Cover, Inner Gear and Outer Gear

NFAT0131S01

- Check for wear or damage.



SAT095D

Side Clearances

NFAT0131S02

- 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:

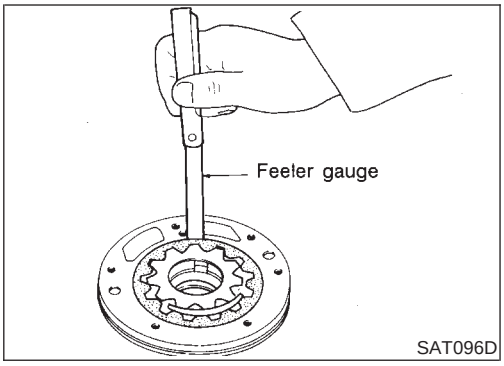
  0.030 - 0.050 mm (0.0012 - 0.0020 in)

- If clearance is less than standard, select inner and outer gear as a set so that clearance is within specifications.

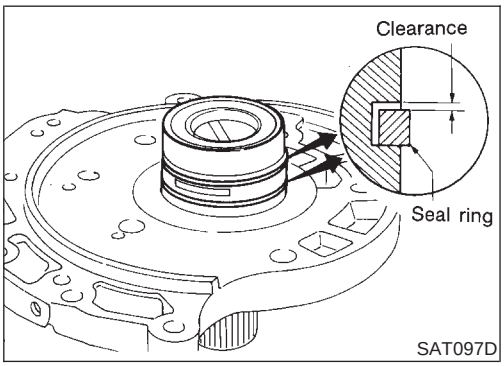
  Inner and outer gear:

  Refer to SDS, AT-382.

- 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:
  0.111 - 0.181 mm (0.0044 - 0.0071 in)
  Allowable limit:
  0.181 mm (0.0071 in)
- If not within allowable limit, replace whole oil pump assembly except oil pump cover.



Seal Ring Clearance

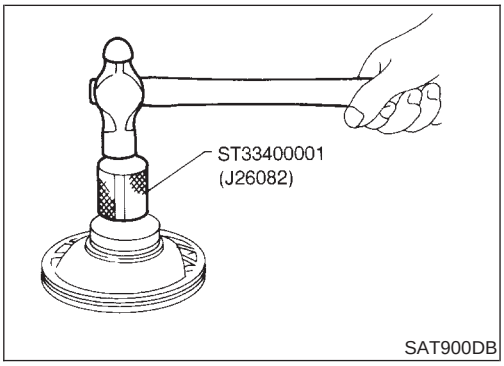
NFAT0131S03

- 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.

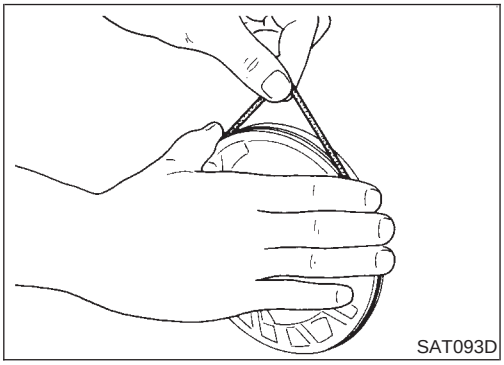
ASSEMBLY

NFAT0132

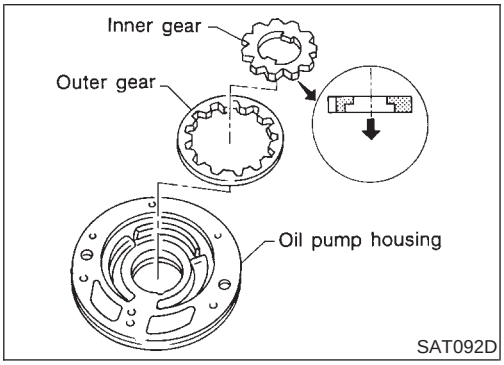
1. Install oil seal on oil pump housing.

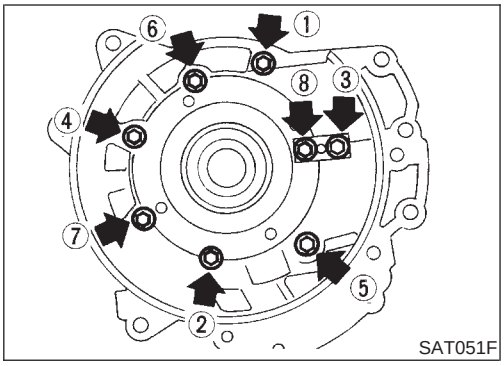


2. Install O-ring on oil pump housing.
- **Apply ATF to O-ring.**



3. Install inner and outer gears on oil pump housing.
- **Be careful of direction of inner gear.**



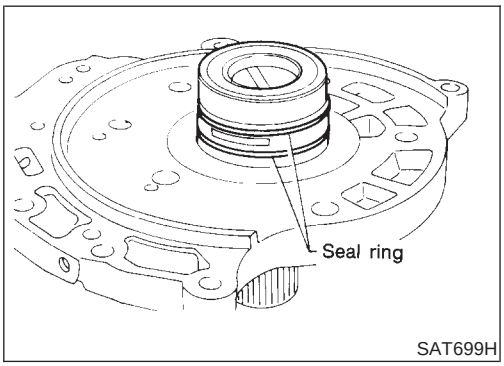


SAT051F

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-305.



SAT699H

5. Install new seal rings carefully after packing ring groove with petroleum jelly.

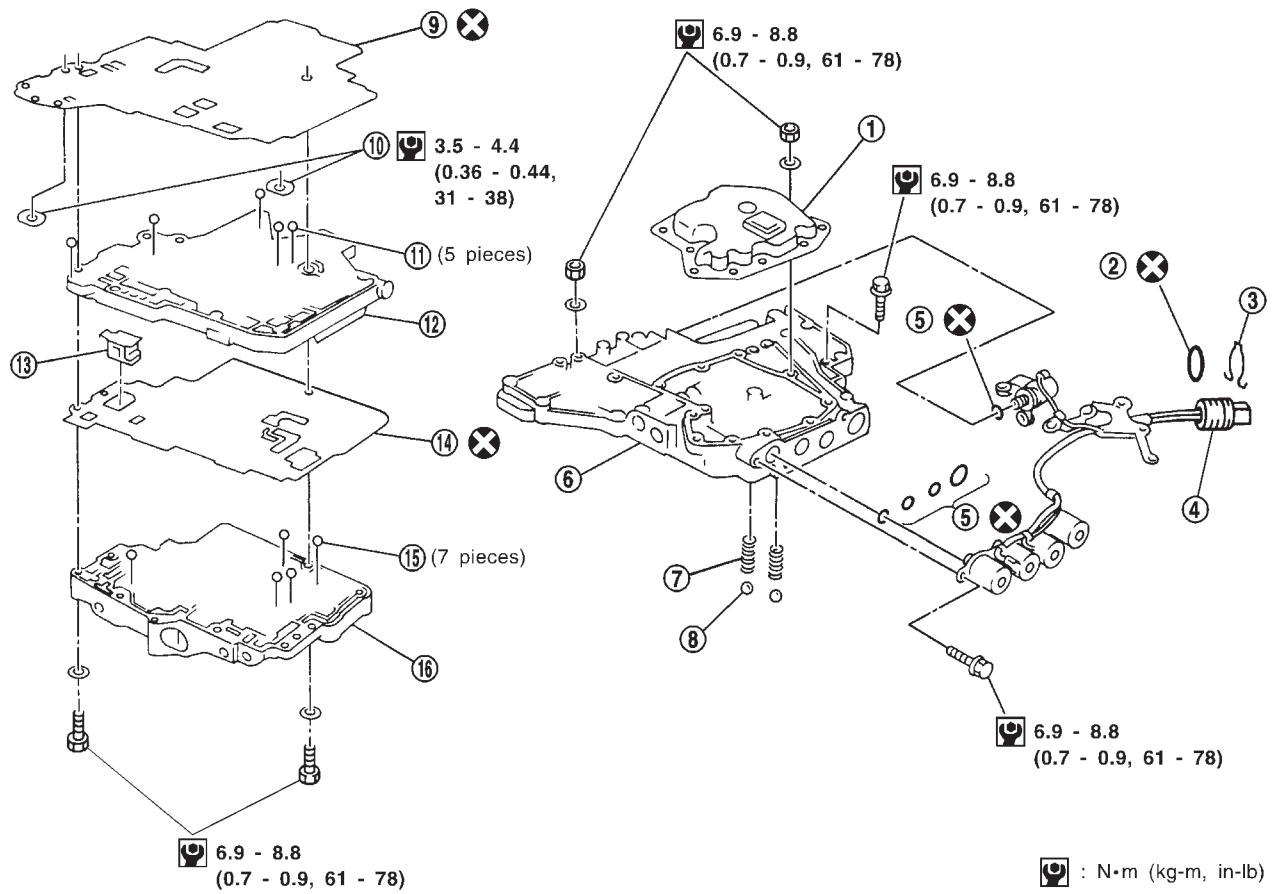
- **Do not spread gap of seal ring excessively while installing. The ring may be deformed.**

Control Valve Assembly

COMPONENTS

=NFAT0133

SEC. 317



1. Oil strainer
2. O-ring
3. Snap ring
4. Terminal body
5. O-rings
6. Control valve lower body
7. Oil cooler relief valve spring
8. Check ball
9. Separating plate
10. Support plate
11. Steel ball
12. Control valve inter body
13. Pilot filter
14. Separating plate
15. Steel ball
16. Control valve upper body

DISASSEMBLY

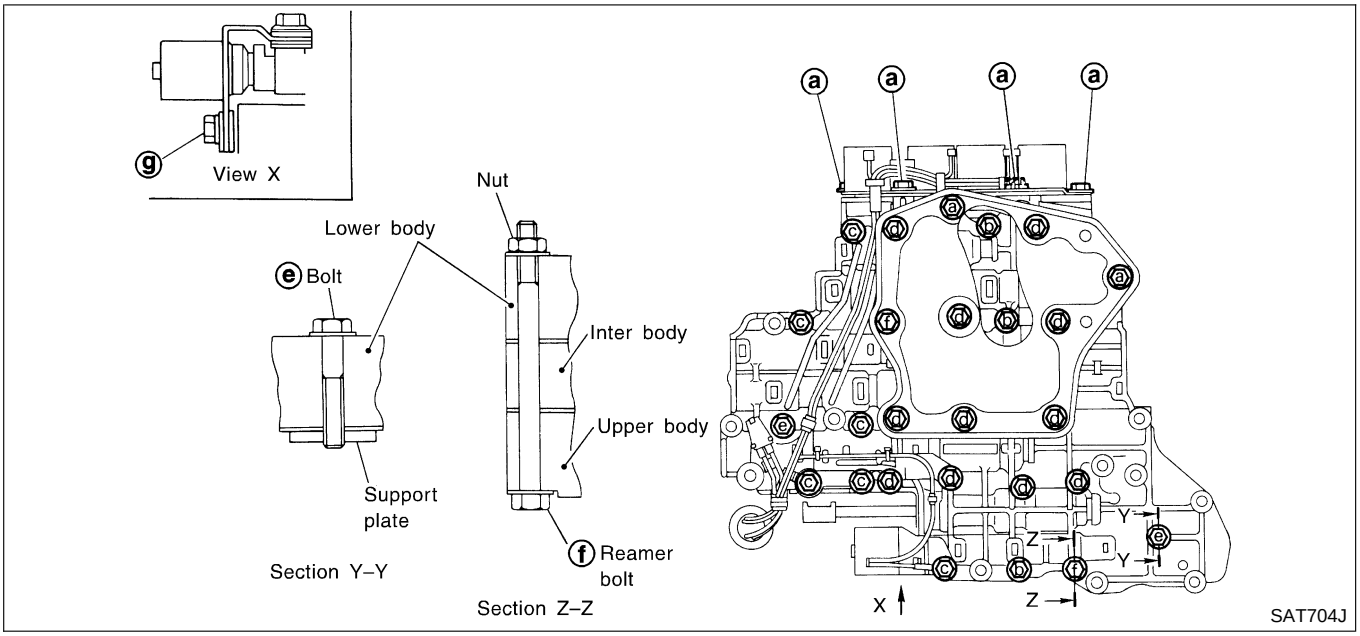
NFAT0134

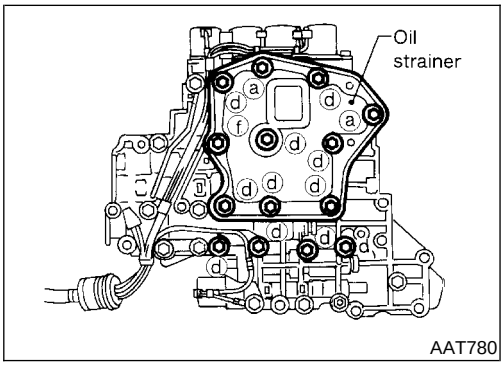
Disassemble upper, inter and lower bodies.

Bolt length, number and location:

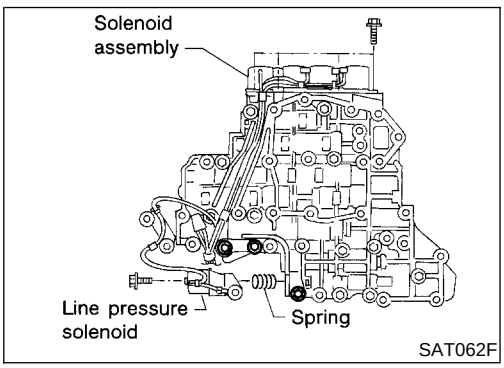
Bolt symbol	a	b	c	d	e	f	g
Bolt length "ℓ" mm (in)	13.5 (0.531)	58.0 (2.283)	40.0 (1.575)	66.0 (2.598)	33.0 (1.299)	78.0 (3.071)	18.0 (0.709)
Number of bolts	6	3	6	11	2	2	1

f: Reamer bolt and nut.

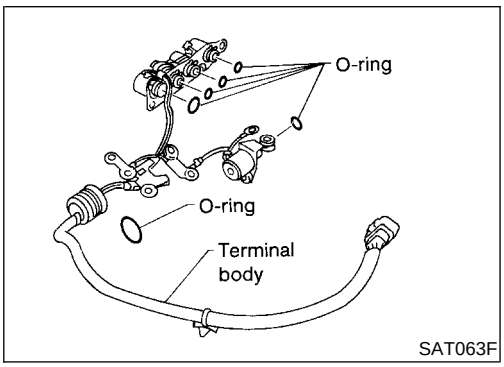




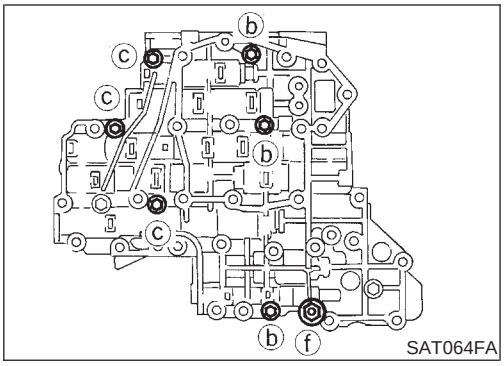
1. Remove bolts **a**, **d** and nut **f** and remove oil strainer from control valve assembly.



2. Remove solenoid valve assembly and line pressure solenoid valve from control valve assembly.

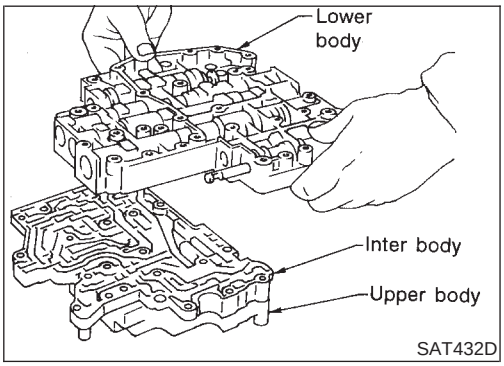


3. Remove O-rings from solenoid valves and terminal body.



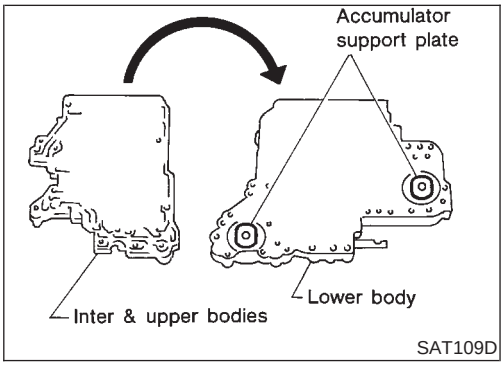
SAT064FA

4. Place upper body facedown, and remove bolts **b**, **c** and nut **f**.



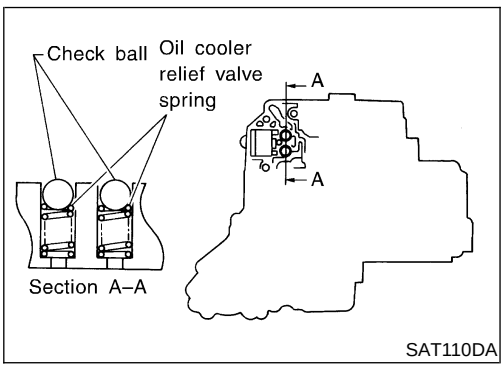
SAT432D

5. Remove inter body from lower body.



SAT109D

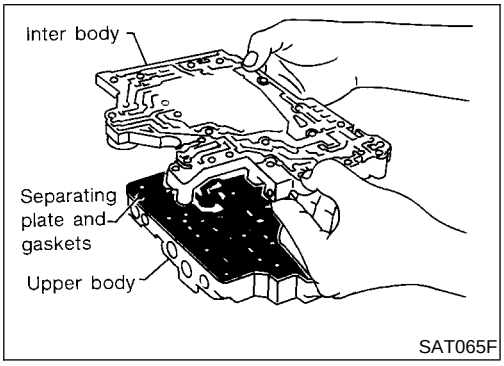
6. Turn over lower body, and remove accumulator support plate.



SAT110DA

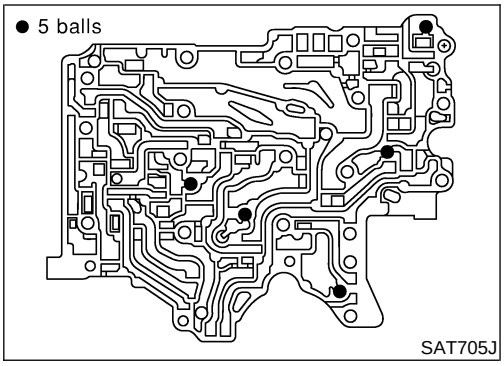
7. Remove bolts **e**, separating plate and separating gasket from lower body.
8. Remove check balls and oil cooler relief valve springs from lower body.

- **Be careful not to lose check balls and oil cooler relief valve springs.**

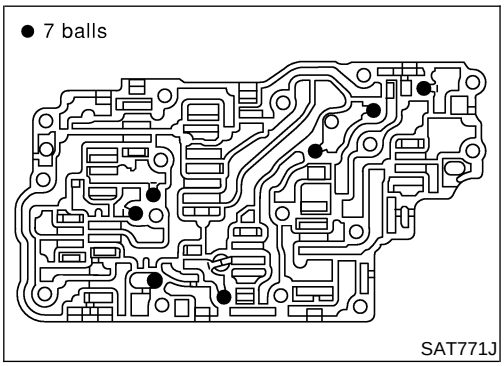


SAT065F

9. Remove inter body from upper body.



10. Check to see that steel balls are properly positioned in inter body and then remove them.
- **Be careful not to lose steel balls.**



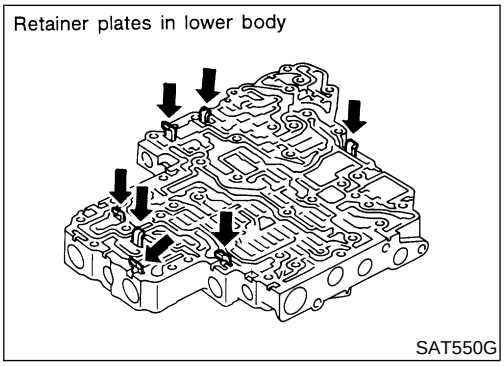
11. Check to see that steel balls are properly positioned in upper body and then remove them.
- **Be careful not to lose steel balls.**

INSPECTION

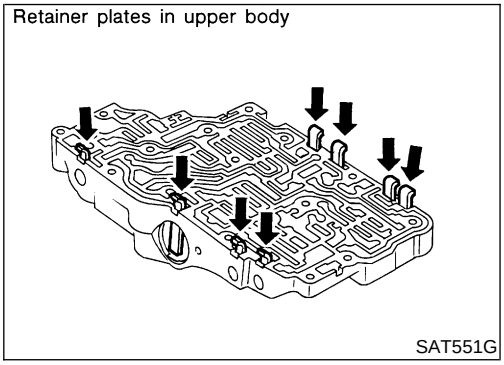
NFAT0135

Lower and Upper Bodies

NFAT0135S01



- Check to see that retainer plates are properly positioned in lower body.

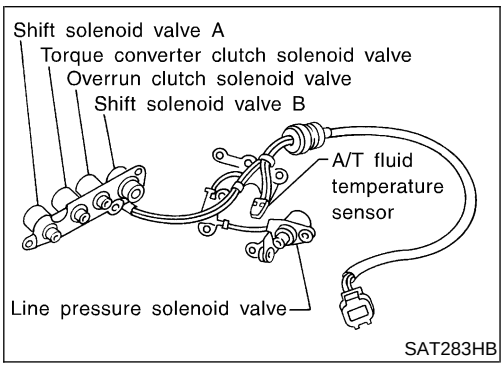


- Check to see that retainer plates are properly positioned in upper body.
- **Be careful not to lose these parts.**

Oil Strainer

NFAT0135S02

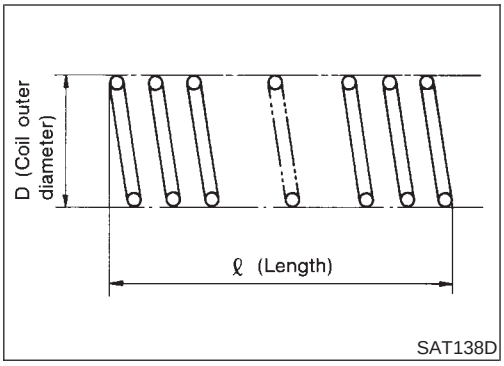
- Check wire netting of oil strainer for damage.



Shift Solenoid Valves "A" and "B", Line Pressure Solenoid Valve, Torque Converter Clutch Solenoid Valve and Overrun Clutch Solenoid Valve

NFAT0135S03

- Measure resistance.
- For shift solenoid valve A, refer to AT-174.
- For shift solenoid valve B, refer to AT-179.
- For line pressure solenoid valve, refer to AT-168.
- For torque converter clutch solenoid valve, refer to AT-153.
- For overrun clutch solenoid valve, refer to AT-191.



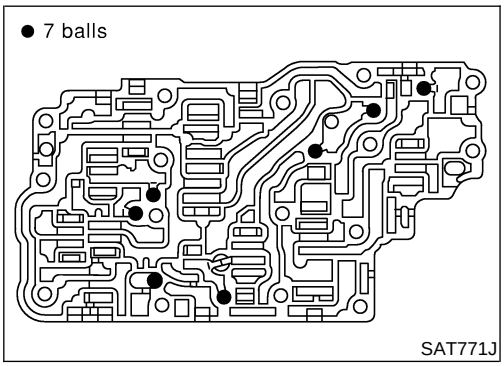
SAT138D

Oil Cooler Relief Valve Spring

NFAT0135S04

- Check springs for damage or deformation.
- Measure free length and outer diameter.

Inspection standard:
Refer to SDS, AT-377.



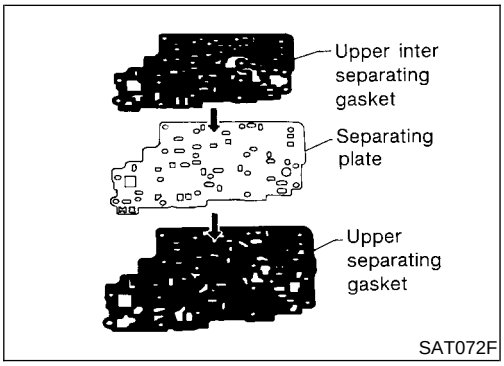
SAT771J

ASSEMBLY

NFAT0136

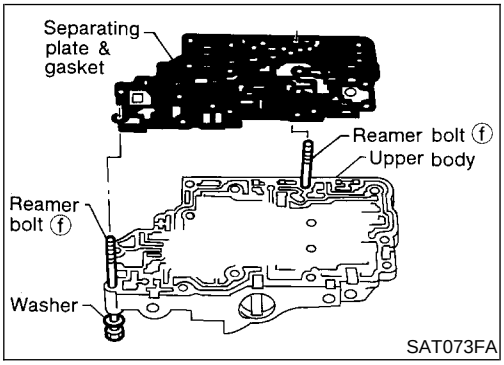
1. Install upper, inter and lower body.

a. Place oil circuit of upper body face up. Install steel balls in their proper positions.



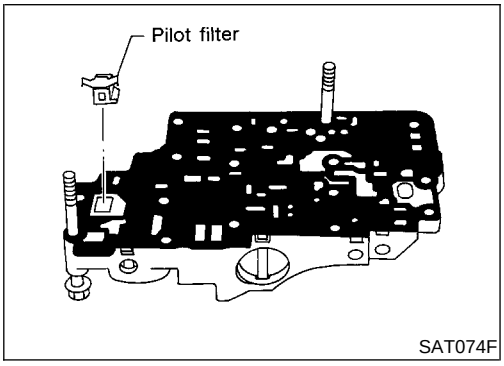
SAT072F

b. Install upper separating gasket, upper inter separating gasket and upper separating plate in order shown in illustration.



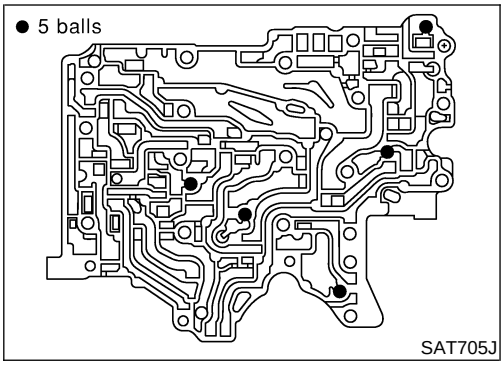
SAT073FA

c. Install reamer bolts **f** from bottom of upper body. Using reamer bolts as guides, install separating plate and gaskets as a set.

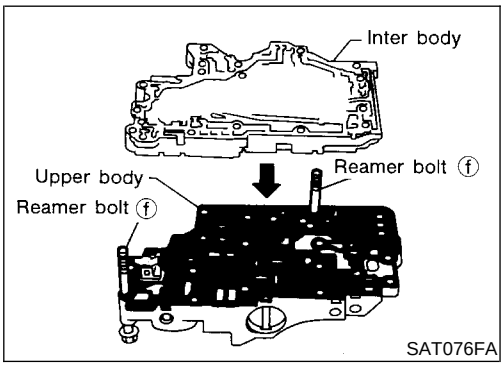


SAT074F

d. Install pilot filter.

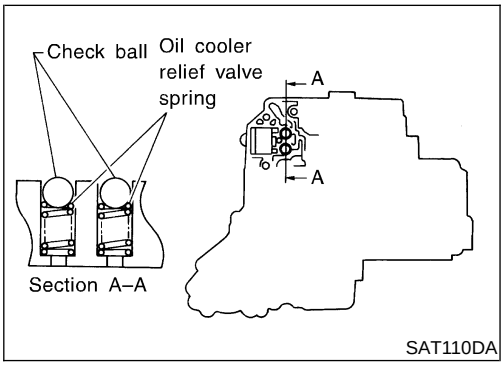


e. Place lower body as shown in illustration (side of inter body face up). Install steel balls in their proper positions.

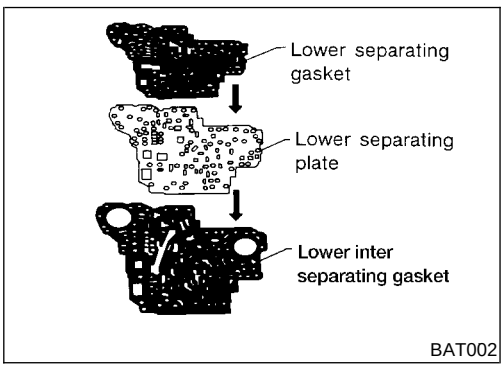


f. Install inter body on upper body using reamer bolts **f** as guides.

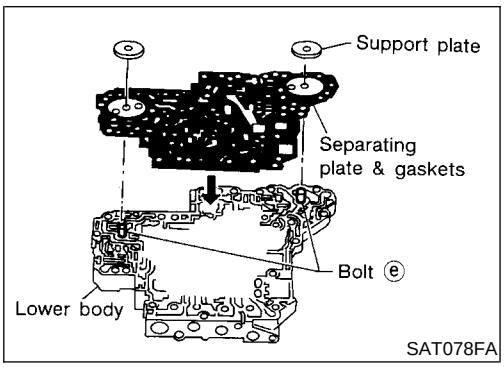
- **Be careful not to dislocate or drop steel balls.**



g. Install check balls and oil cooler relief valve springs in their proper positions in lower body.

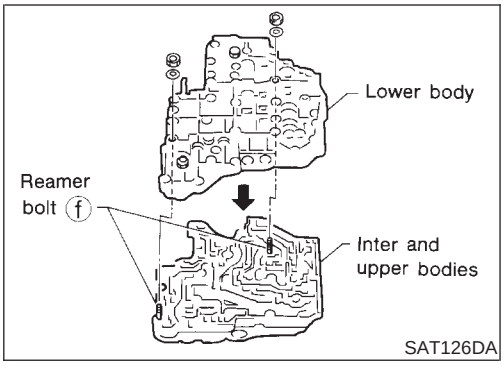


h. Install lower separating gasket, lower inter separating gasket and lower separating plate in order shown in illustration.

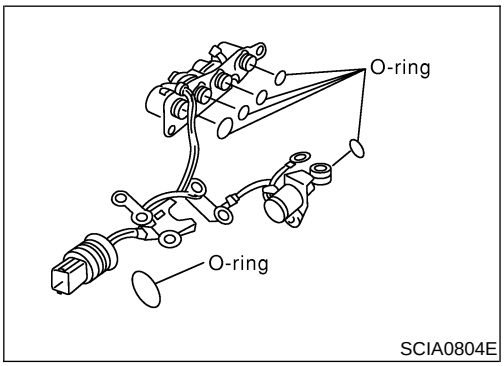


i. Install bolts **e** from bottom of lower body. Using bolts **e** as guides, install separating plate and gaskets as a set.

j. Temporarily install support plates on lower body.



k. Install lower body on inter body using reamer bolts **f** as guides and tighten reamer bolts **f** slightly.



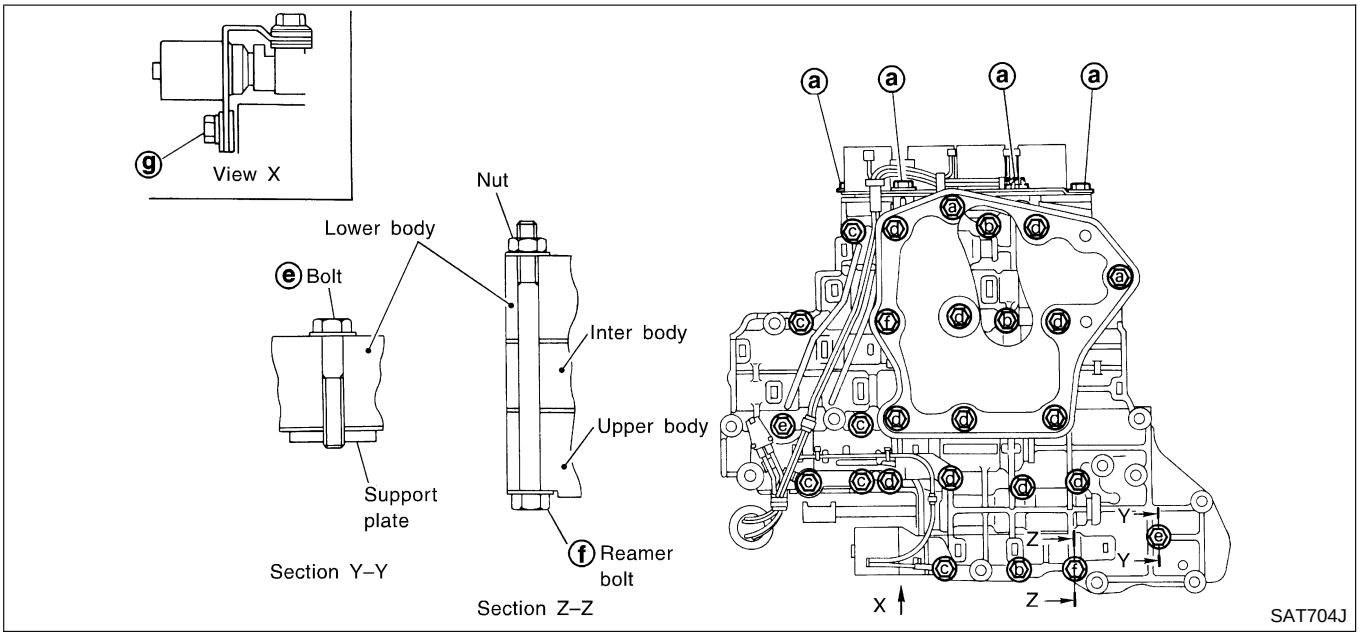
2. Install O-rings to solenoid valves and terminal body.

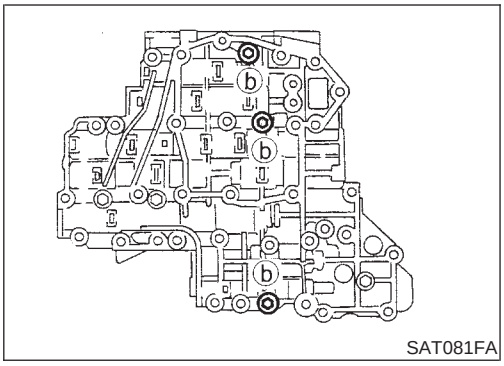
- **Apply ATF to O-rings.**

3. Install and tighten bolts.

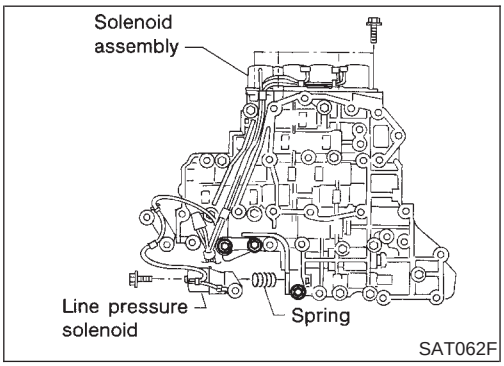
Bolt length, number and location:

Bolt symbol	a	b	c	d	e	f	g
Bolt length "ℓ" mm (in)	13.5 (0.531)	58.0 (2.283)	40.0 (1.575)	66.0 (2.598)	33.0 (1.299)	78.0 (3.071)	18.0 (0.709)
Number of bolts	6	3	6	11	2	2	1

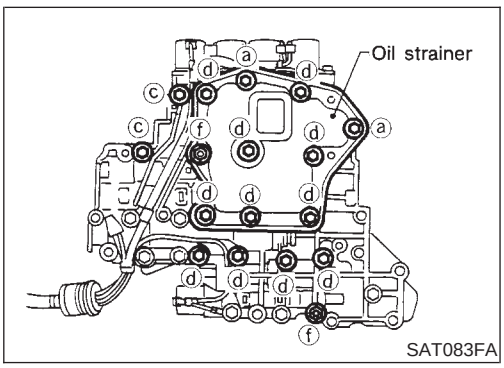




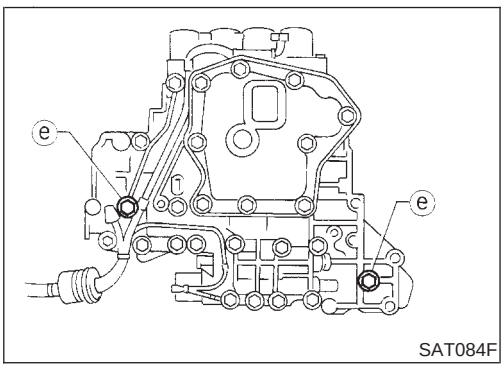
a. Install and tighten bolts **b** to specified torque.
: 7 - 9 N·m (0.7 - 0.9 kg-m, 61 - 78 in-lb)



b. Install solenoid valve assembly and line pressure solenoid valve to lower body.



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, 30.4 - 39.1 in-lb)

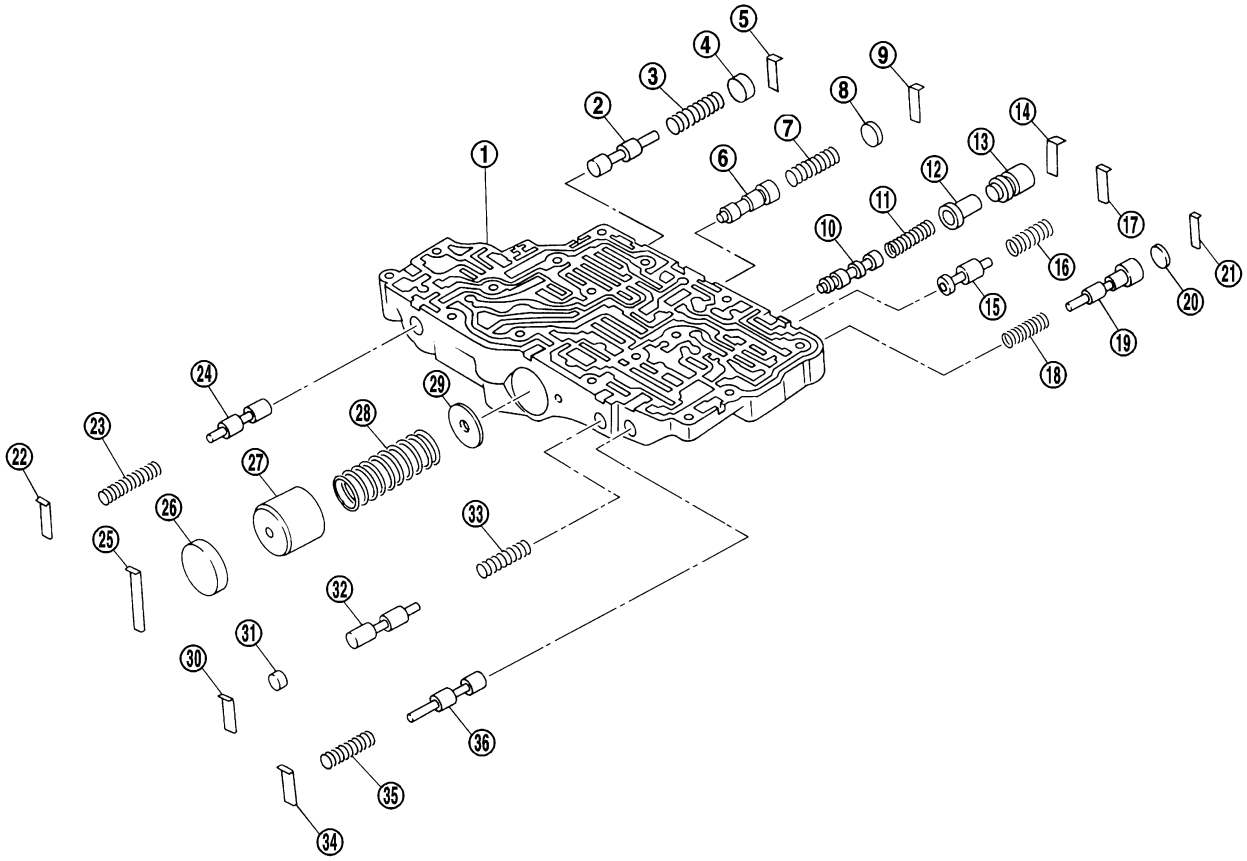
Control Valve Upper Body

COMPONENTS

=NFAT0137

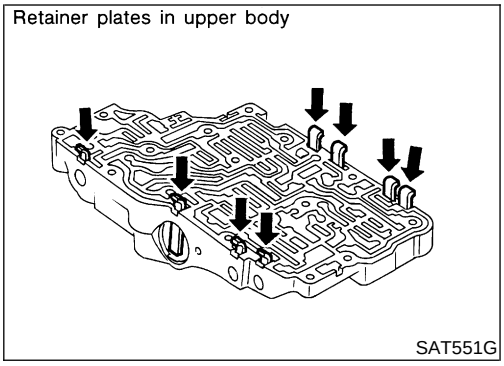
Apply ATF to all components before installation.

SEC. 317



SAT772J

1. Upper body
2. Cooler check valve
3. Return spring
4. Plug
5. Retainer plate
6. 1-2 accumulator valve
7. Return spring
8. Plug
9. Retainer plate
10. Torque converter clutch control valve
11. Return spring
12. Torque converter clutch control plug
13. Torque converter clutch control sleeve
14. Retainer plate
15. Torque converter relief valve
16. Return spring
17. Retainer plate
18. Return spring
19. Overrun clutch reducing valve
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

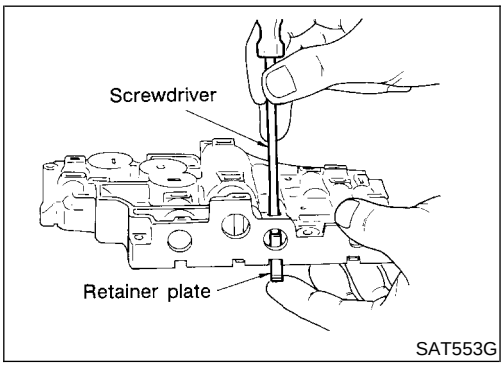


DISASSEMBLY

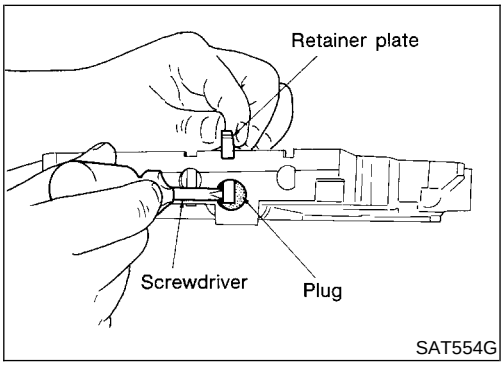
NFAT0138

1. Remove valves at retainer plates.

- **Do not use a magnetic pick-up tool.**

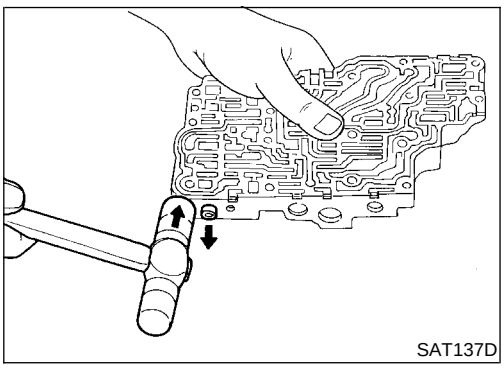


a. Use a screwdriver to remove retainer plates.



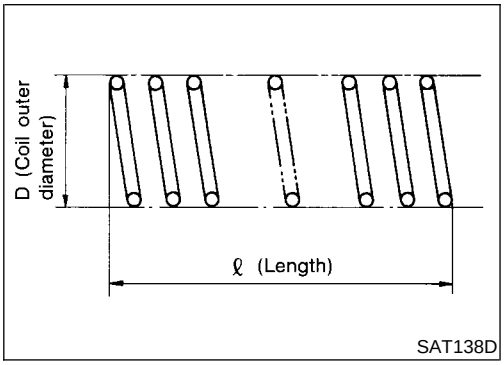
b. Remove retainer plates while holding spring, plugs or sleeves.

- **Remove plugs slowly to prevent internal parts from jumping out.**



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

NFAT0139

Valve Spring

NFAT0139S01

- Measure free length and outer diameter of each valve spring. Also check for damage or deformation.

  Inspection standard:

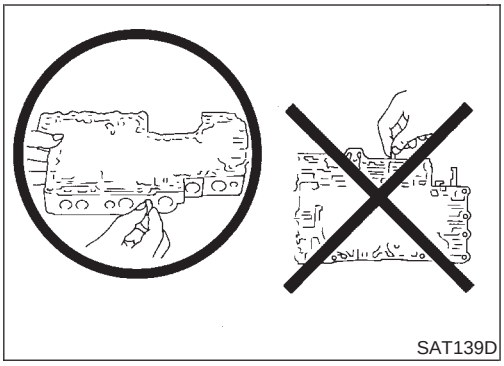
  Refer to SDS, AT-377.

- Replace valve springs if deformed or fatigued.

Control Valves

NFAT0139S02

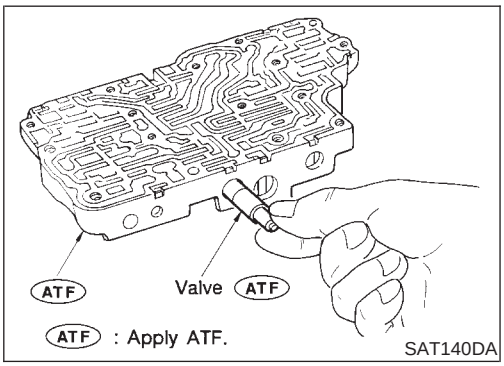
- Check sliding surfaces of valves, sleeves and plugs.


SAT139D

ASSEMBLY

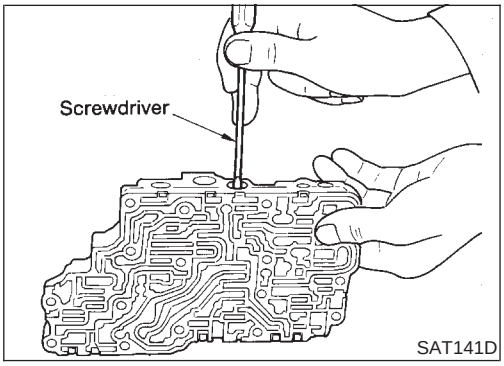
NFAT0140

- **Lay control valve body down when installing valves. Do not stand the control valve body upright.**



SAT140DA

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.**



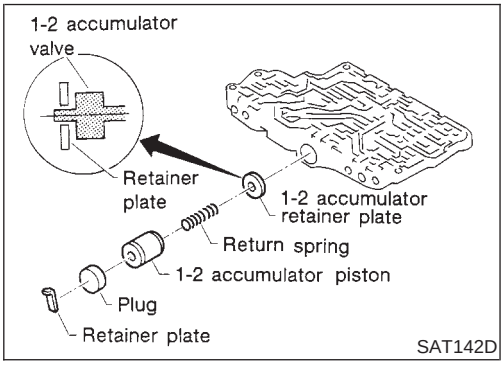
SAT141D

- Wrap a small screwdriver with vinyl tape and use it to insert the valves into their proper positions.

1-2 Accumulator Valve

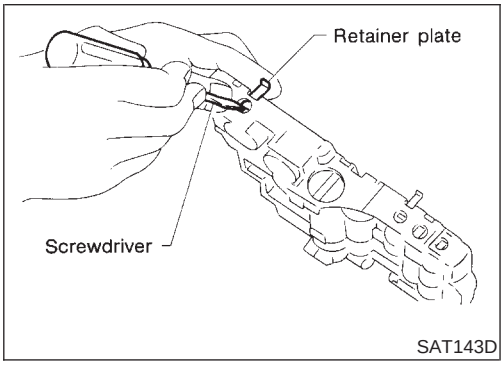
NFAT0140S01

- 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.

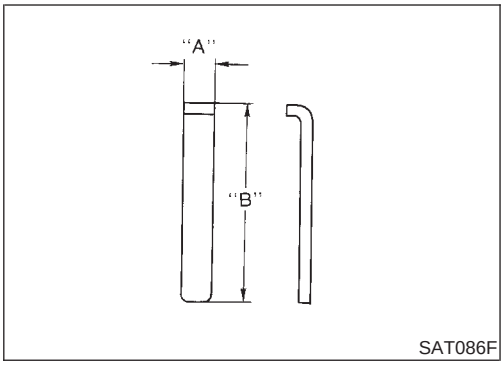


SAT142D

1. Install retainer plates.
- While pushing plug or return spring, install retainer plate.



SAT143D



Retainer Plate (Upper body)

NFAT0140S02

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		
17	Torque converter relief valve		
9	1-2 accumulator valve		38.5 (1.516)
25	1-2 accumulator piston valve		
21	Overrun clutch reducing valve		24.0 (0.945)
5	Cooler check valve		
14	Torque converter clutch control valve		28.0 (1.102)

- Install proper retainer plates.
  Refer to "Control Valve Upper Body", AT-317.

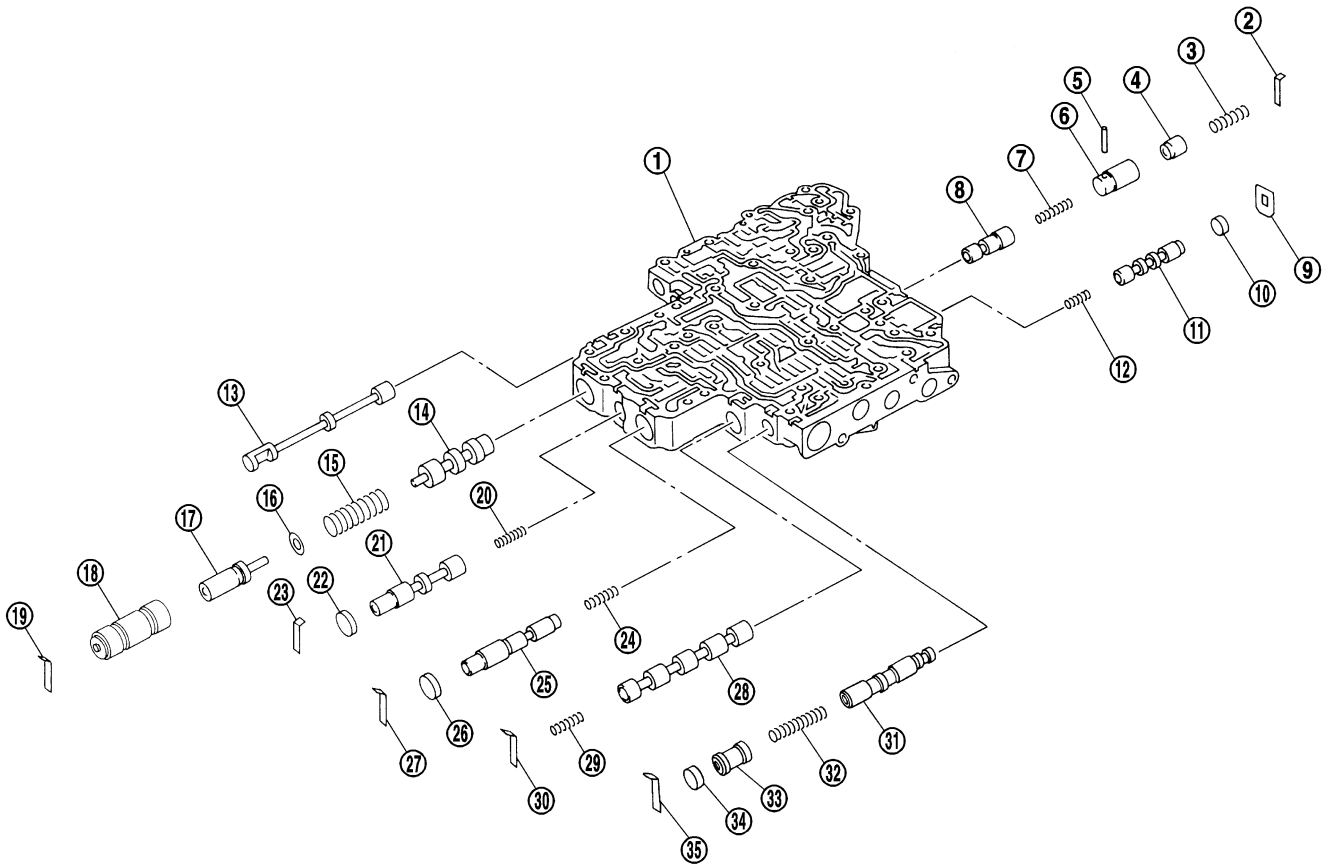
Control Valve Lower Body

COMPONENTS

=NFAT0141

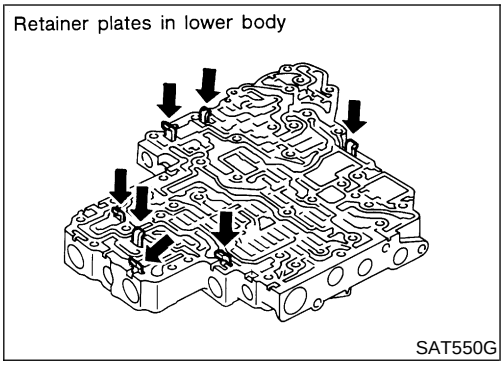
Apply ATF to all components before installation.

SEC. 317



SAT773J

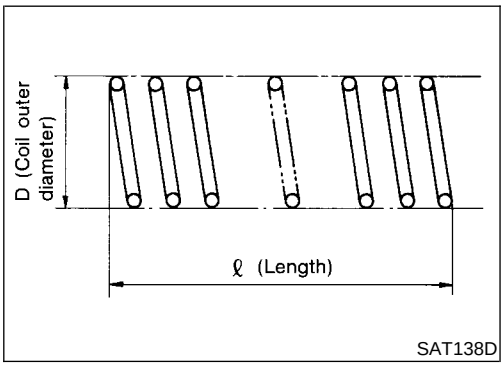
1. Lower body
2. Retainer plate
3. Return spring
4. Piston
5. Parallel pin
6. Sleeve
7. Return spring
8. Pressure modifier valve
9. Retainer plate
10. Plug
11. Shift valve B
12. Return spring
13. Manual valve
14. Pressure regulator valve
15. Return spring
16. Spring seat
17. Plug
18. Sleeve
19. Retainer plate
20. Return spring
21. Overrun clutch control valve
22. Plug
23. Retainer plate
24. Return spring
25. Accumulator control valve
26. Plug
27. Retainer plate
28. Shift valve A
29. Return spring
30. Retainer plate
31. Shuttle valve
32. Return spring
33. Plug
34. Plug
35. Retainer plate



DISASSEMBLY

NFAT0142

- Remove valves at retainer plate.
  For removal procedures, refer to "DISASSEMBLY", "Control Valve Upper Body", AT-318.



INSPECTION

NFAT0143

Valve Springs

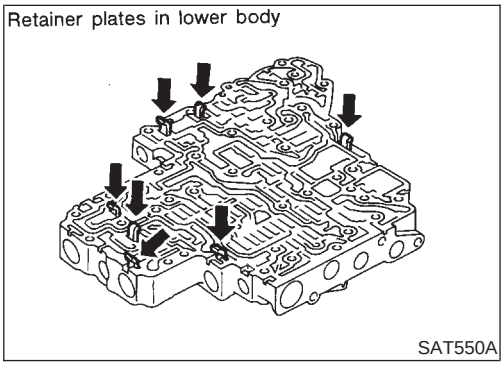
NFAT0143S01

- Check each valve spring for damage or deformation. Also measure free length and outer diameter.
  Inspection standard:
  Refer to SDS, AT-377.
- Replace valve springs if deformed or fatigued.

Control Valves

NFAT0143S02

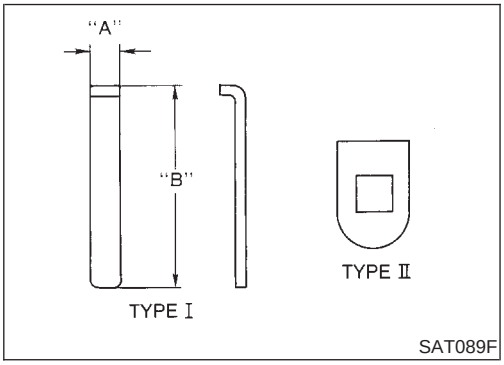
- Check sliding surfaces of control valves, sleeves and plugs for damage.



ASSEMBLY

NFAT0144

- Install control valves.
  For installation procedures, refer to "ASSEMBLY", "Control Valve Upper Body", AT-319.



Retainer Plate (Lower body)

NFAT0144S01

Unit: mm (in)

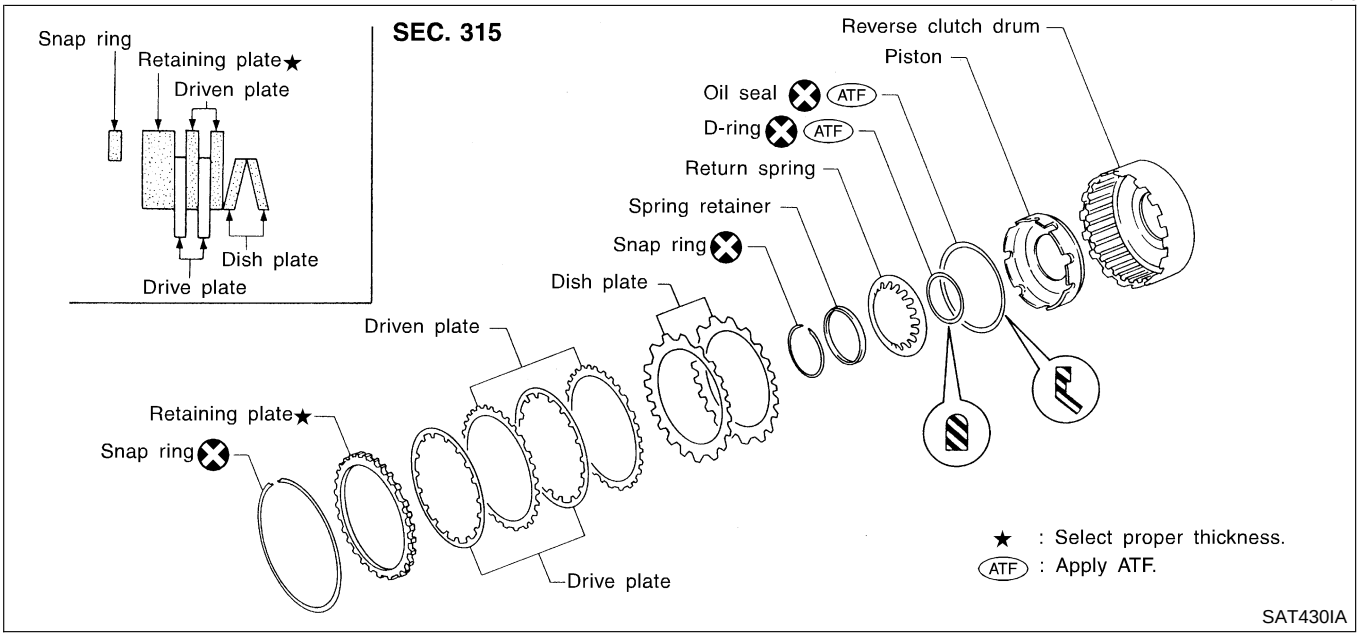
No.	Name of control valve and plug	Width A	Length B	Type
19	Pressure regulator valve	6.0 (0.236)	28.0 (1.102)	I
27	Accumulator control valve			
30	Shift valve A			
23	Overrun clutch control valve			
2	Pressure modifier valve			
35	Shuttle valve			
9	Shift valve B	—	—	II

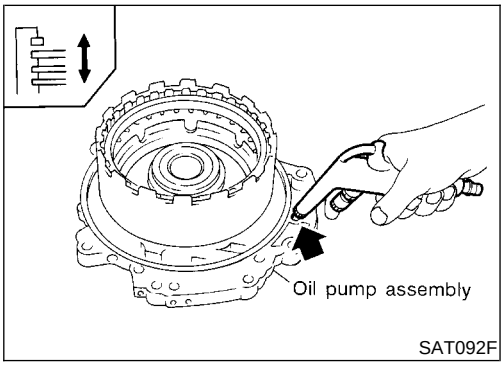
- Install proper retainer plates.
  Refer to "Control Valve Lower Body", AT-321.

Reverse Clutch

COMPONENTS

NFAT0145





DISASSEMBLY

NFAT0146

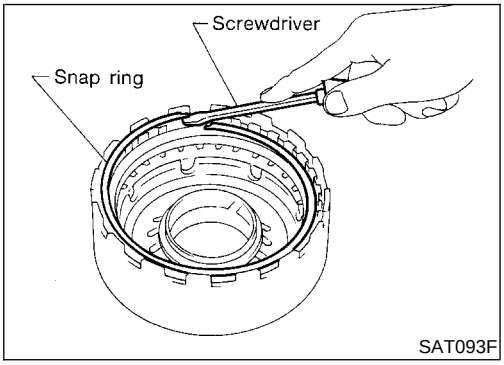
1. Check operation of reverse clutch

a. Install seal ring onto drum support of oil pump cover and install reverse clutch assembly. Apply compressed air to oil hole.

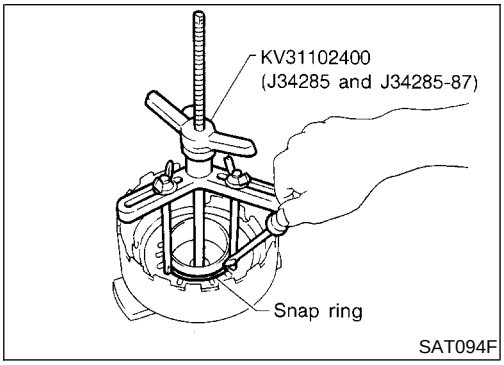
b. Check to see that retaining plate moves to snap ring.

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.



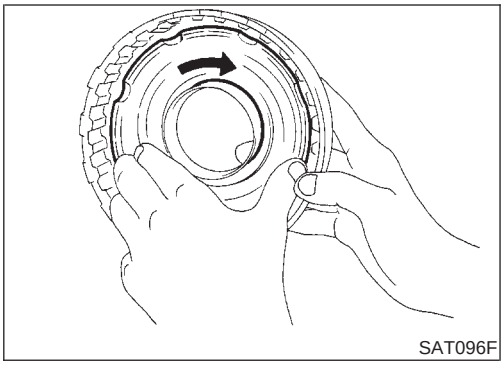
2. Remove snap ring.
3. Remove drive plates, driven plates, retaining plate, and dish plates.



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.


SAT096F

6. Remove piston from reverse clutch drum by turning it.
7. Remove D-ring and oil seal from piston.

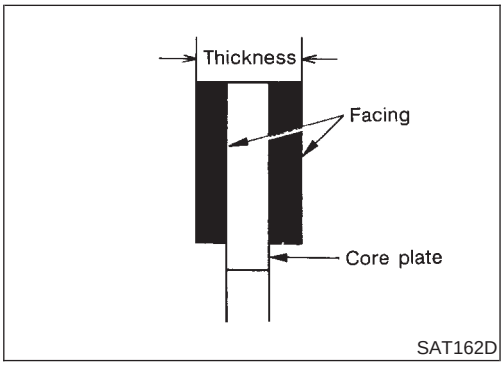
INSPECTION

NFAT0147

Reverse Clutch Snap Ring, Spring Retainer and Return Springs

NFAT0147S01

- Check for deformation, fatigue or damage.
  If necessary, replace.

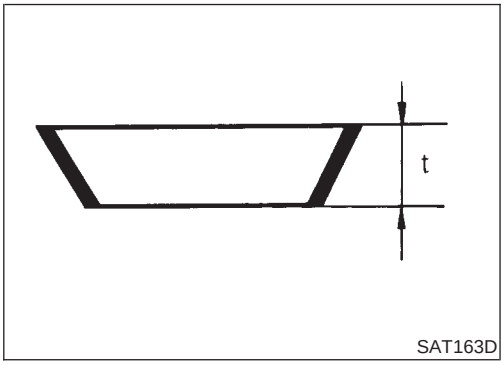


SAT162D

Reverse Clutch Drive Plates

NFAT0147S02

- Check facing for burns, cracks or damage.
- Measure thickness of facing.
  Thickness of drive plate:
  Standard value: 1.6 mm (0.063 in)
  Wear limit: 1.4 mm (0.055 in)
- If not within wear limit, replace.



SAT163D

Reverse Clutch Dish Plates

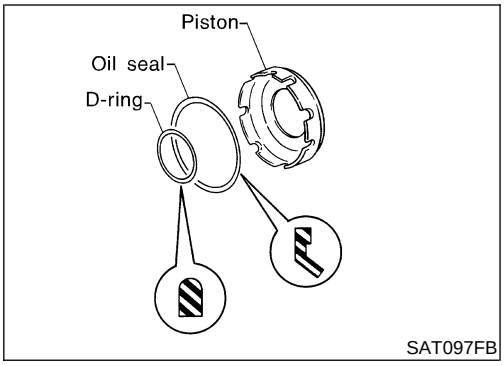
NFAT0147S03

- Check for deformation or damage.
- Measure thickness of dish plate.
  Thickness of dish plate: 3.08 mm (0.1213 in)
- If deformed or fatigued, replace.

Reverse Clutch Piston

NFAT0147S04

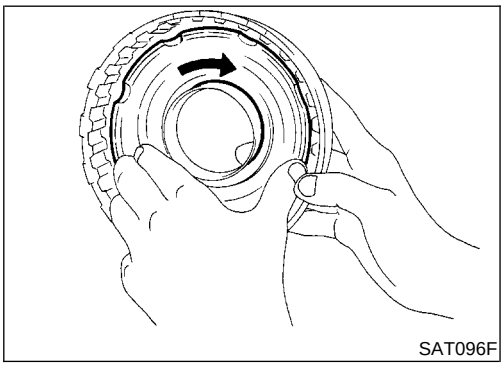
- Make sure that check balls are not fixed.
- Apply compressed air to check ball oil hole opposite the return spring. Make sure there is no air leakage.
- Apply compressed air to oil hole on return spring side to make sure that air leaks past ball.



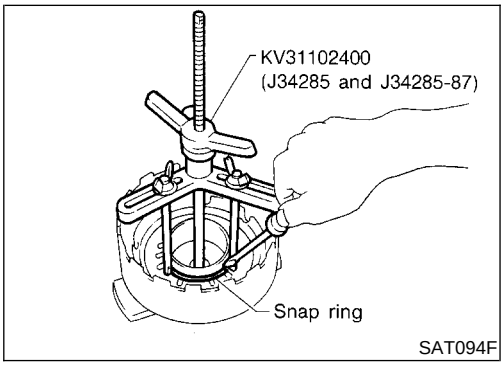
ASSEMBLY

NFAT0148

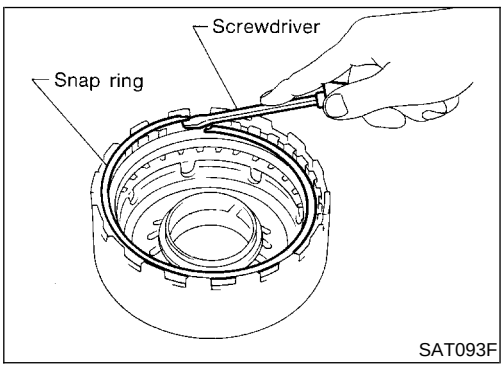
1. Install D-ring and oil seal on piston.
- **Take care with the direction of oil seal.**
- **Apply ATF to both parts.**



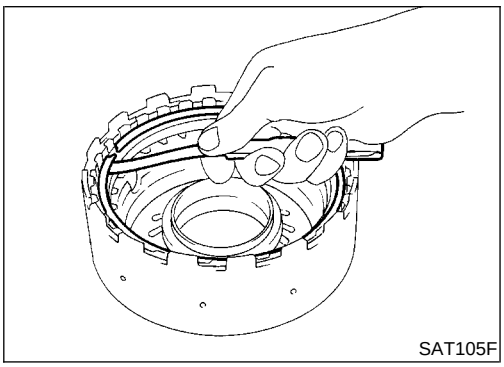
2. Install piston assembly by turning it slowly.
- **Apply ATF to inner surface of drum.**



3. Install return springs and spring retainer on piston.
4. Set Tool on spring retainer and install snap ring while compressing return springs.
- **Set Tool directly over return springs.**

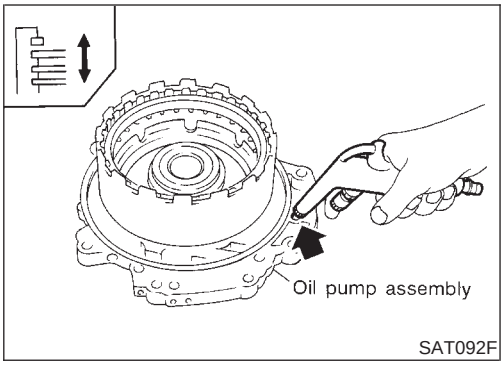


5. Install drive plates, driven plates, retaining plate and dish plates.
- **Take care with order of plates.**
6. Install snap ring.



7. Measure clearance between retaining plate and snap ring. If not within allowable limit, select proper retaining plate.

Specified clearance:
Standard 0.5 - 0.8 mm (0.020 - 0.031 in)
Allowable limit 1.2 mm (0.047 in)
Retaining plate:
Refer to SDS, AT-378.

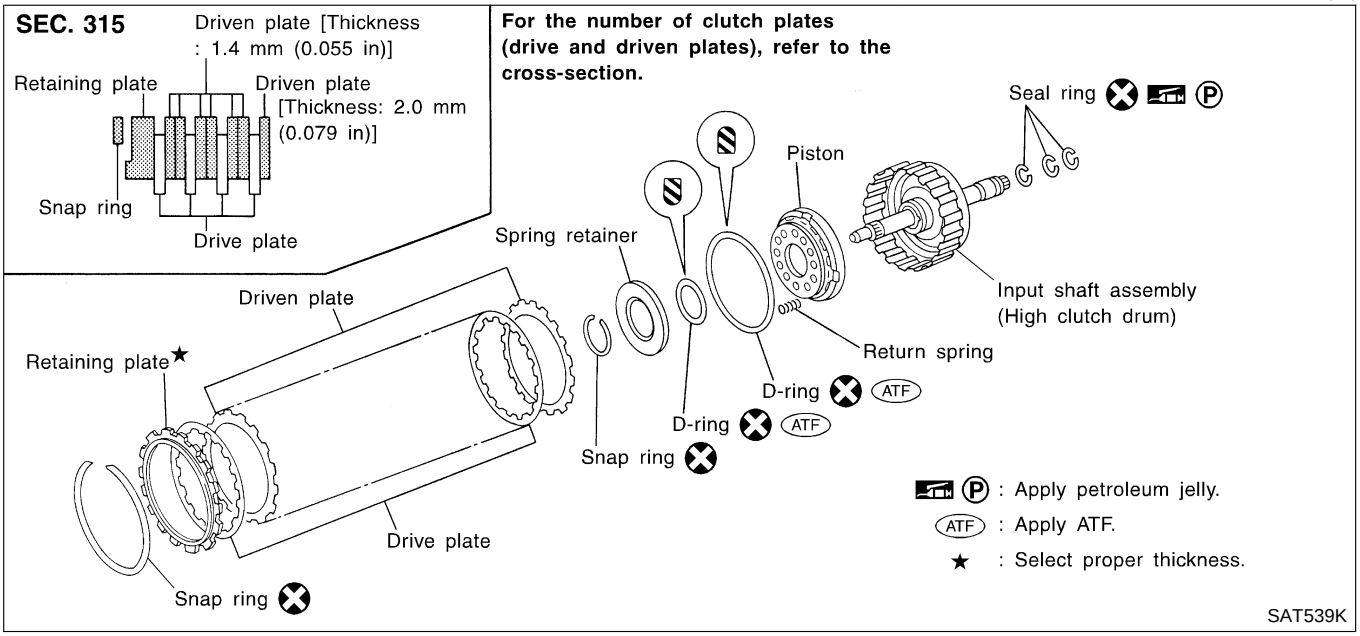


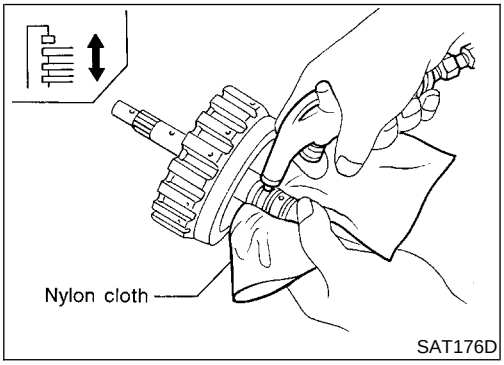
8. Check operation of reverse clutch.
   Refer to "DISASSEMBLY", "Reverse Clutch", AT-323.

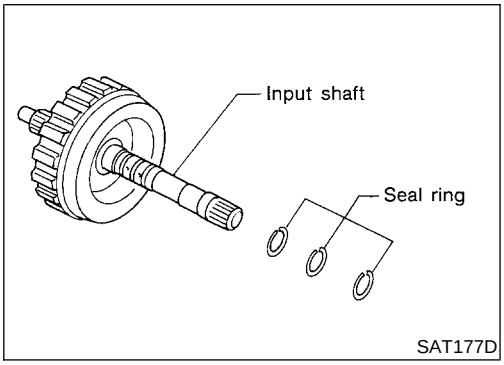
High Clutch

COMPONENTS

NFAT0149







DISASSEMBLY

NFAT0150

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.**

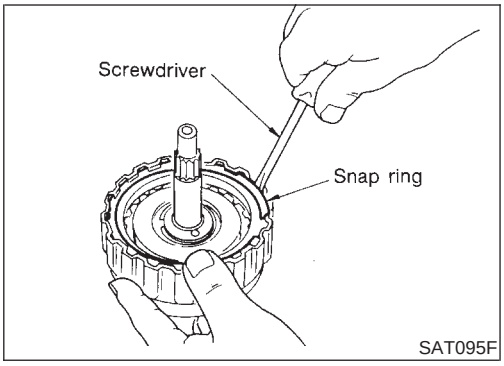
b. Check to see that retaining plate moves to snap ring.

c. If retaining plate does not contact snap ring:

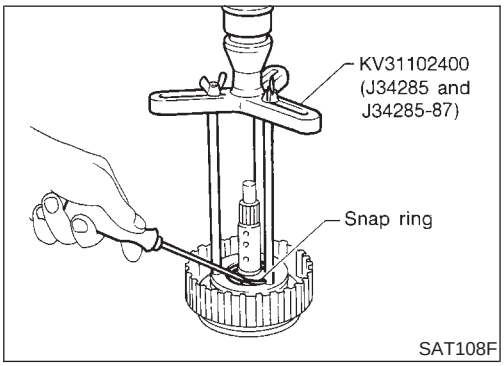
- D-ring might be damaged.
- Oil seal might be damaged.
- Fluid might be leaking past piston check ball.

2. Remove seal rings from input shaft.

- **Always replace when removed.**

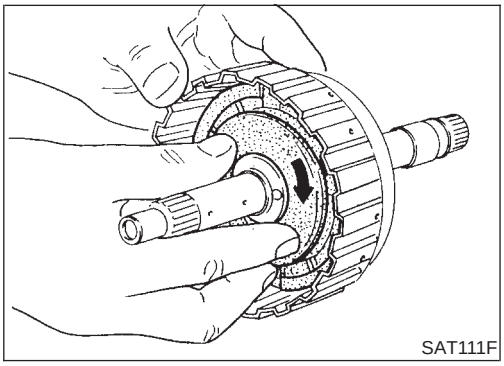


3. Remove snap ring.
4. Remove drive plates, driven plates and retaining plate.

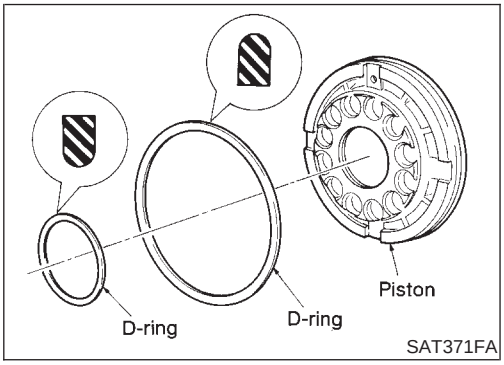


5. Set Tool on spring retainer and remove snap ring from high clutch drum while compressing return springs.
- **Set Tool directly over springs.**
- **Do not expand snap ring excessively.**

6. Remove spring retainer and return springs.



7. Remove piston from high clutch drum by turning it.



8. Remove D-rings from piston.

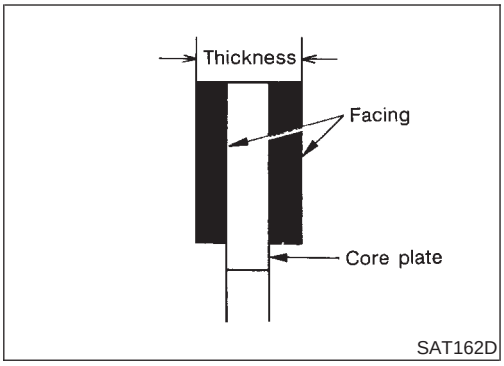
INSPECTION

NFAT0151

High Clutch Snap Ring, Spring Retainer and Return Springs

NFAT0151S01

- Check for deformation, fatigue or damage.
  If necessary, replace.
- **When replacing spring retainer and return springs, replace them as a set.**



SAT162D

High Clutch Drive Plates

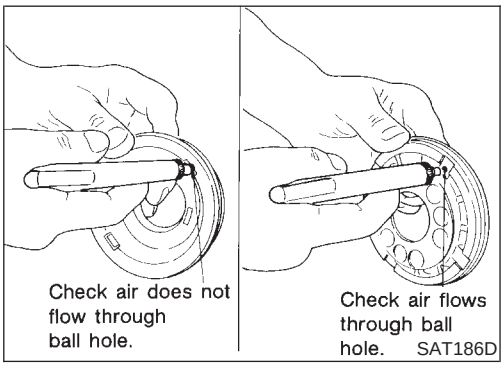
NFAT0151S02

- Check facing for burns, cracks or damage.
- Measure thickness of facing.

  Thickness of drive plate:

  Standard value 1.6 mm (0.063 in)

  Wear limit 1.4 mm (0.055 in)
- If not within wear limit, replace.

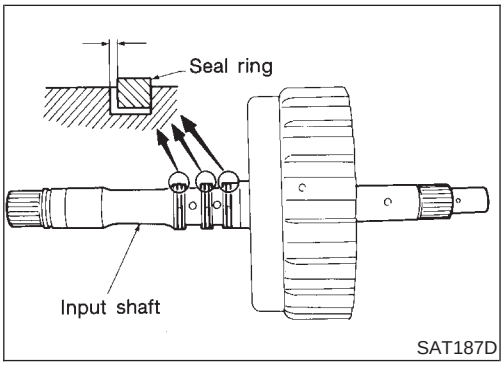


SAT186D

High Clutch Piston

NFAT0151S03

- 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.



SAT187D

Seal Ring Clearance

NFAT0151S04

- 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)

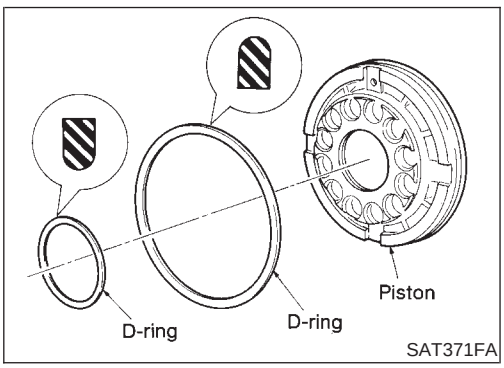
  Allowable limit:

  0.23 mm (0.0091 in)
- If not within allowable limit, replace input shaft assembly.

ASSEMBLY

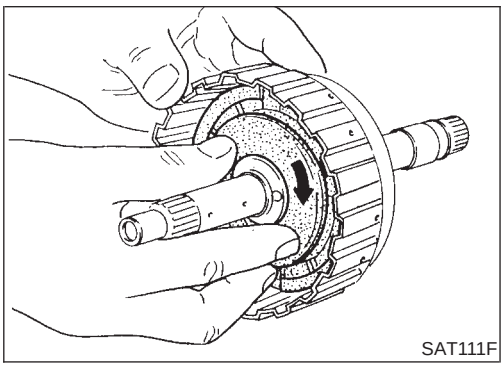
NFAT0152

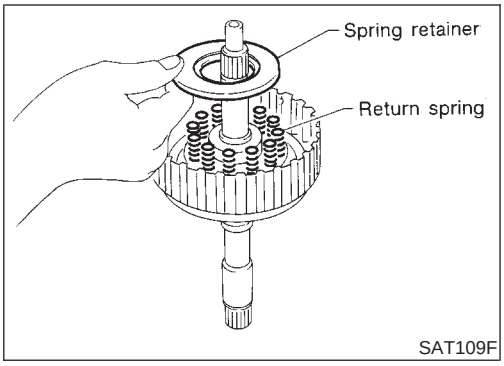
1. Install D-rings on piston.
- **Apply ATF to both parts.**



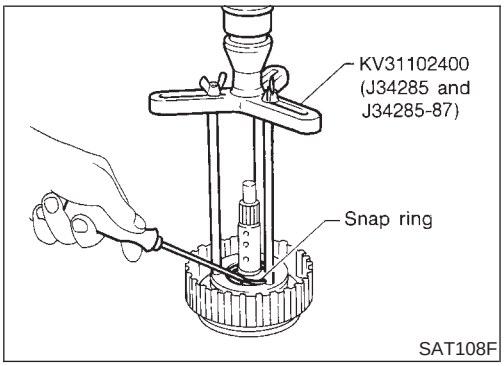
SAT371FA

2. Install piston assembly by turning it slowly.
- **Apply ATF to inner surface of drum.**

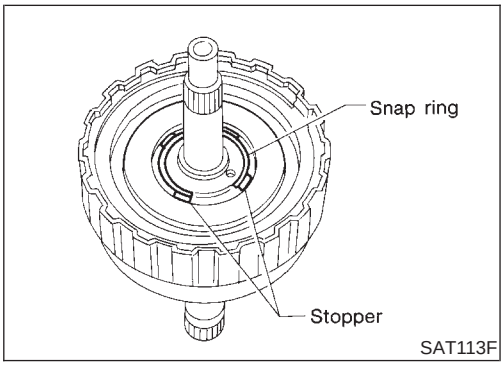

SAT111F



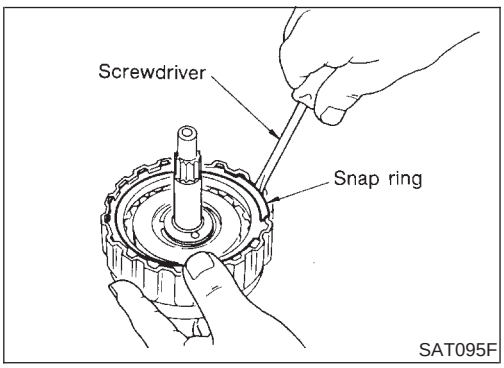
3. Install return springs and spring retainer on piston.



4. Set Tool on spring retainer and install snap ring while compressing return springs.
- **Set Tool directly over return springs.**

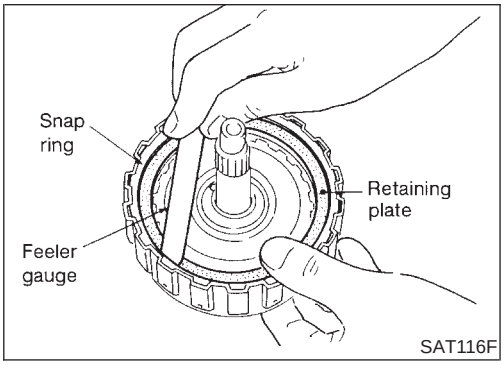


- **Do not align snap ring gap with spring retainer stopper.**



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.

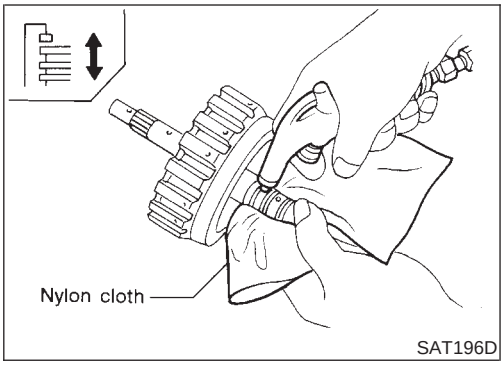
Specified clearance:

Standard 1.8 - 2.2 mm (0.071 - 0.087 in)

Allowable limit 2.8 mm (0.110 in)

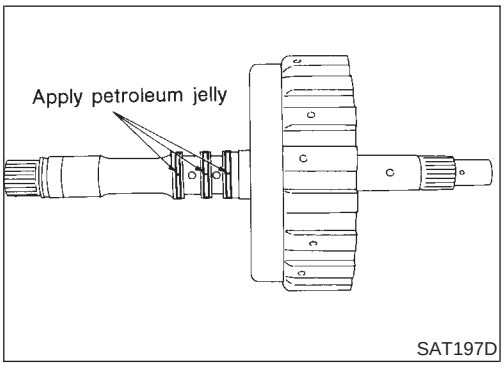
Retaining plate:

Refer to SDS, AT-378.



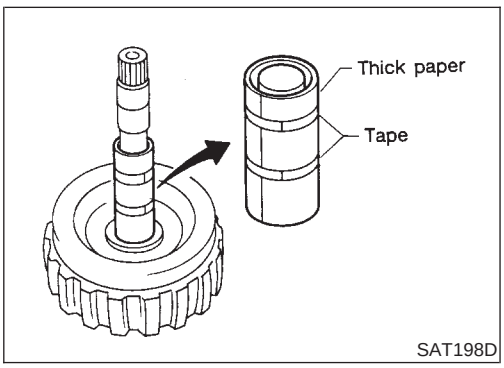
SAT196D

8. Check operation of high clutch.
Refer to "DISASSEMBLY", "High Clutch", AT-326.



SAT197D

9. Install seal rings to input shaft.
- **Apply petroleum jelly to seal rings.**
- **Always replace when removed.**



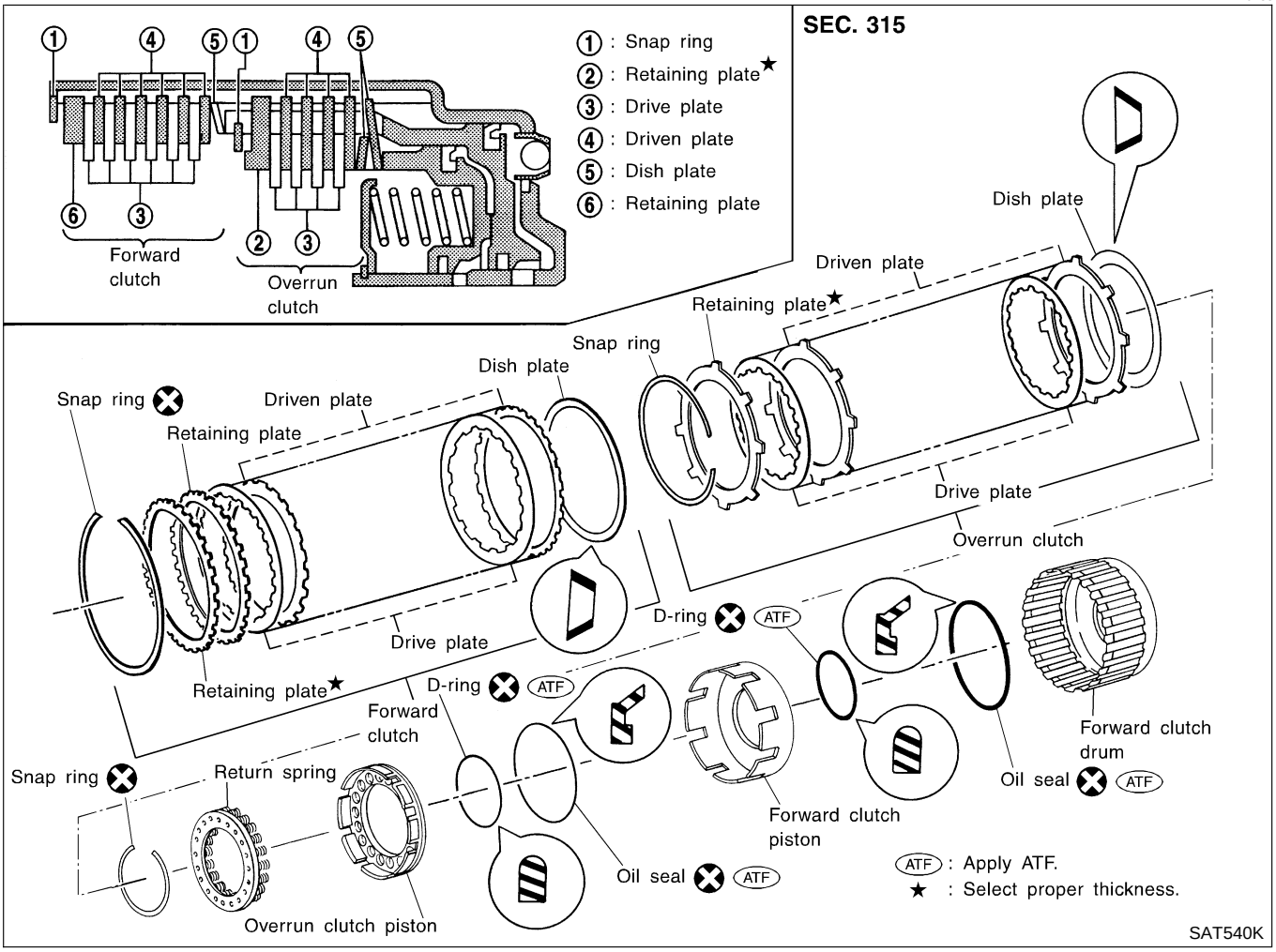
SAT198D

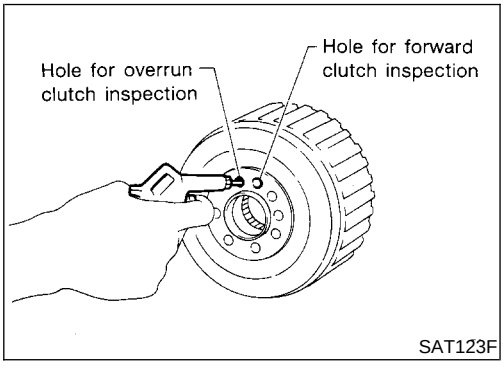
- **Roll paper around seal rings to prevent seal rings from spreading.**

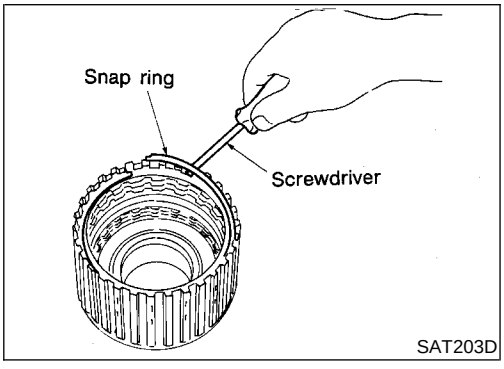
Forward and Overrun Clutches

COMPONENTS

NFAT0153







DISASSEMBLY

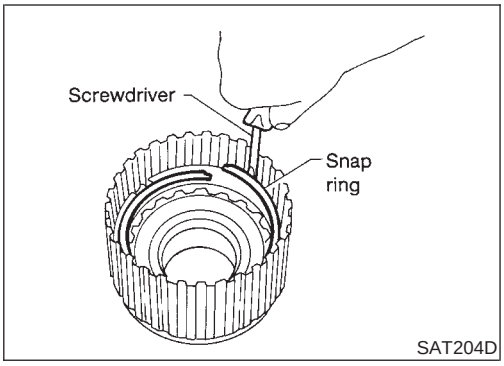
NFAT0154

1. Check operation of forward clutch and overrun clutch.

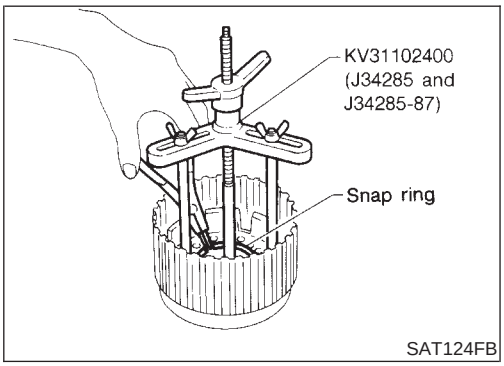
a. Install bearing retainer on forward clutch drum.
b. Apply compressed air to oil hole of forward clutch drum.
c. Check to see that retaining plate moves to snap ring.
d. If retaining plate does not contact snap ring:

- 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.

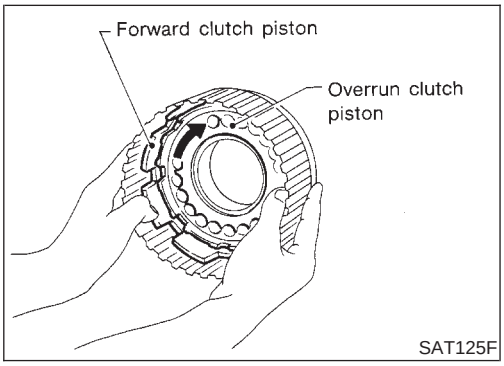


4. Remove snap ring for overrun clutch.
5. Remove drive plates, driven plates, retaining plate and dish plate for overrun clutch.

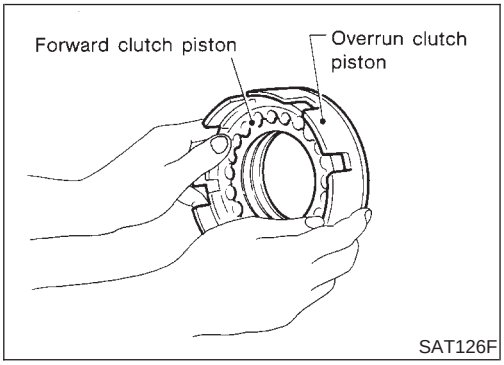


6. Set Tool on spring retainer and remove snap ring from forward clutch drum while compressing return springs.
- **Set Tool directly over return springs.**
- **Do not expand snap ring excessively.**

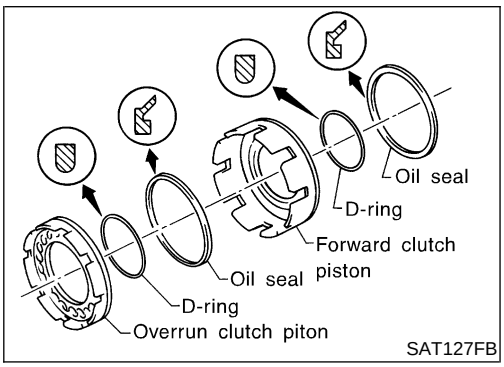
7. Remove spring retainer and return springs.
- **Do not remove return springs from spring retainer.**



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.

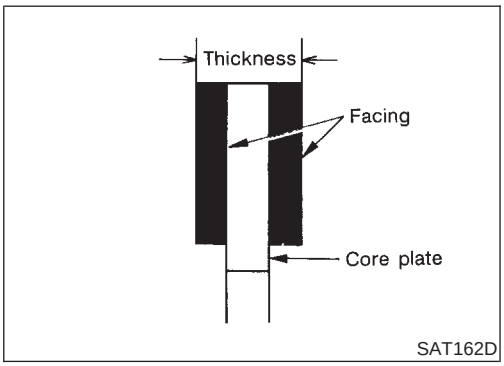
INSPECTION

NFAT0155

Snap Rings, Spring Retainer and Return Springs

NFAT0155S01

- Check for deformation, fatigue or damage.
- Replace if necessary.
- **When replacing spring retainer and return springs, replace them as a set.**



SAT162D

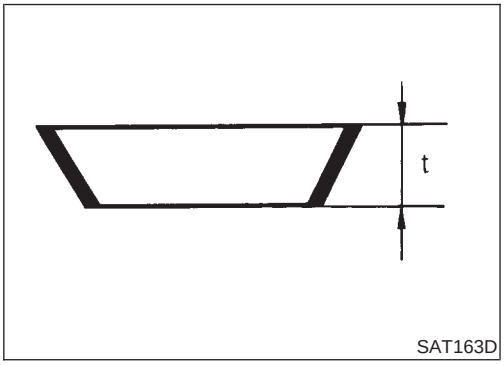
Forward Clutch and Overrun Clutch Drive Plates

NFAT0155S02

- Check facing for burns, cracks or damage.
- Measure thickness of facing.

Thickness of drive plate:
Forward clutch
Standard value: 1.6 mm (0.063 in)
Wear limit: 1.4 mm (0.055 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.



SAT163D

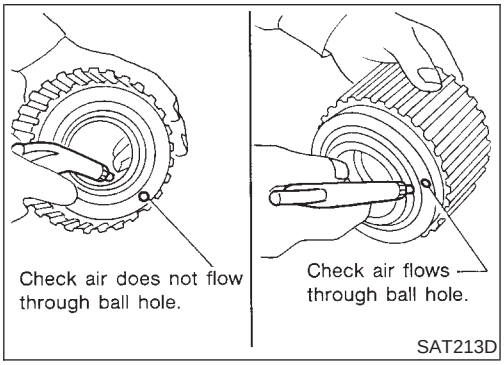
Forward Clutch and Overrun Clutch Dish Plates

NFAT0155S03

- Check for deformation or damage.
- Measure thickness of dish plate.

Thickness of dish plate:
Forward clutch 2.7 mm (0.106 in)
Overrun clutch 2.7 mm (0.106 in)

- If deformed or fatigued, replace.

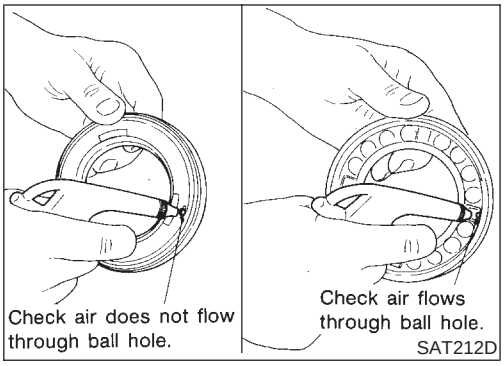


SAT213D

Forward Clutch Drum

NFAT0155S04

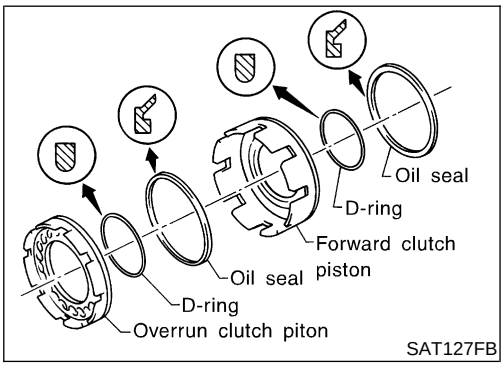
- Make sure that check balls are not fixed.
- Apply compressed air to check ball oil hole from outside of forward clutch drum. Make sure air leaks past ball.
- Apply compressed air to oil hole from inside of forward clutch drum. Make sure there is no air leakage.



Overrun Clutch Piston

NFAT0155S05

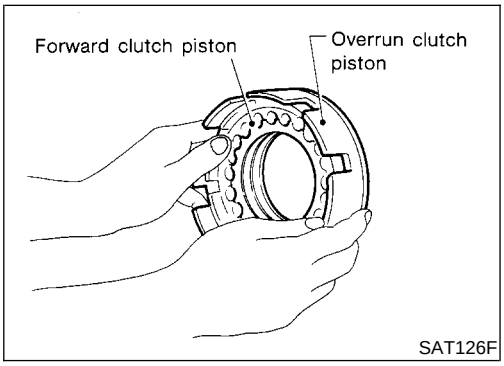
- Make sure that check balls are not fixed.
- Apply compressed air to check ball oil hole opposite the return spring. Make sure there is no air leakage.
- Apply compressed air to oil hole on return spring side. Make sure that air leaks past ball.



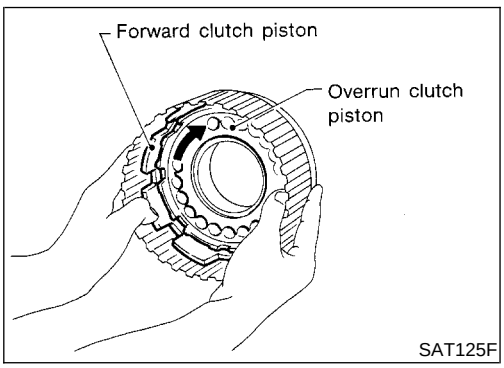
ASSEMBLY

NFAT0156

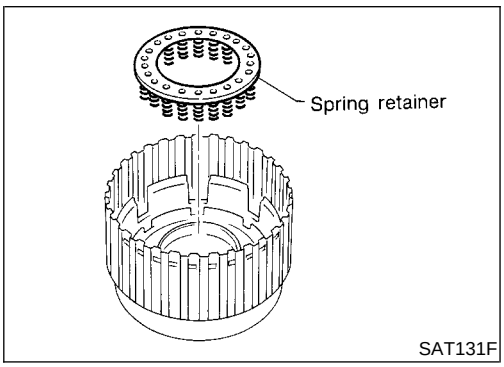
1. Install D-rings and oil seals on forward clutch piston and overrun clutch piston.
- **Take care with direction of oil seal.**
- **Apply ATF to both parts.**



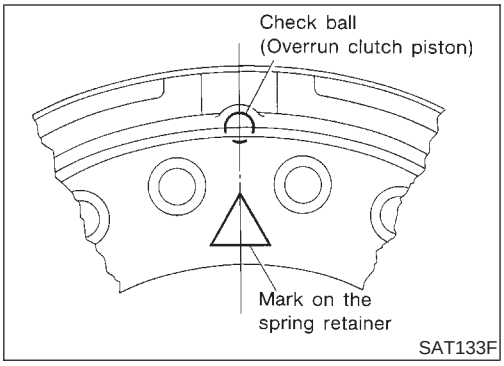
2. Install overrun clutch piston assembly on forward clutch piston by turning it slowly.
- **Apply ATF to inner surface of forward clutch piston.**



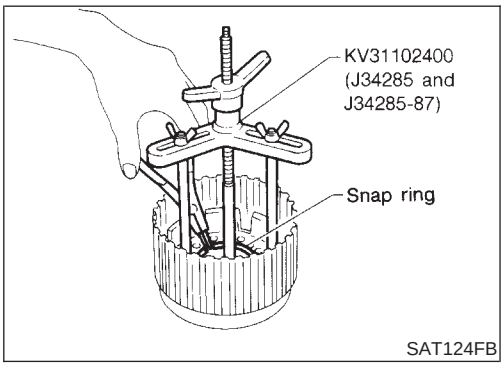
3. Install forward clutch piston assembly on forward clutch drum by turning it slowly.
- **Apply ATF to inner surface of drum.**



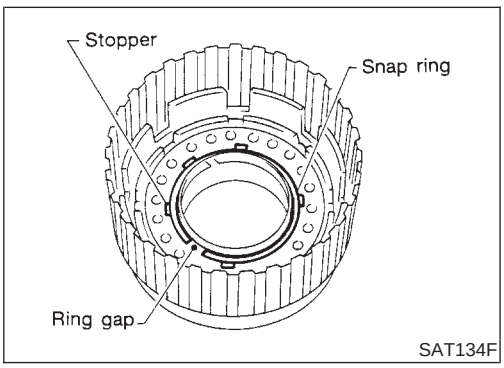
4. Install return spring on overrun clutch piston.



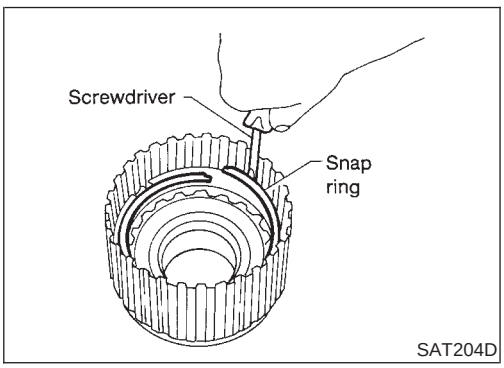
- Align the mark on spring retainer with check ball in overrun clutch piston.



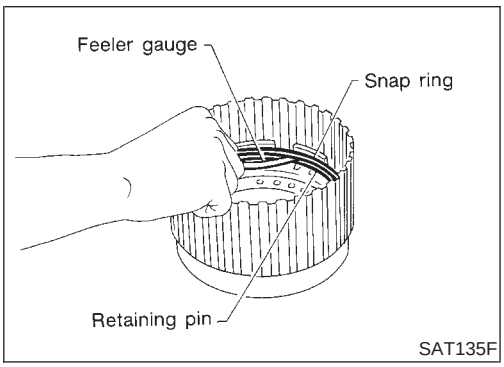
5. Set Tool on spring retainer and install snap ring while compressing return springs.
- **Set Tool directly over return springs.**



- **Do not align snap ring gap with spring retainer stopper.**

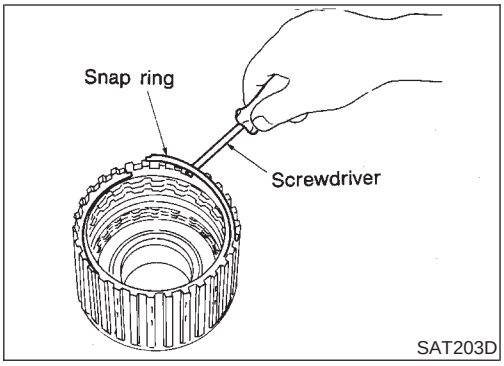


6. Install drive plates, driven plates, retaining plate and dish plate for overrun clutch.
- **Take care with order of plates.**
7. Install snap ring for overrun clutch.



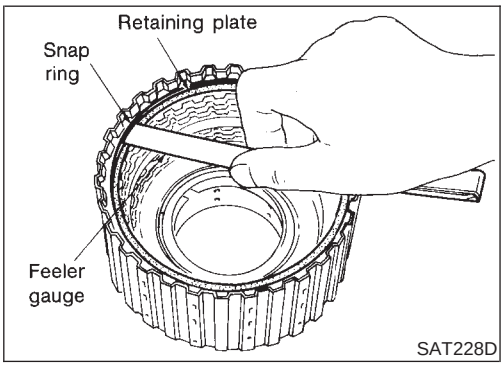
8. Measure clearance between overrun clutch retaining plate and snap ring.
If not within allowable limit, select proper retaining plate.

Specified clearance:
Standard 0.7 - 1.1 mm (0.028 - 0.043 in)
Allowable limit 1.7 mm (0.067 in)
Overrun clutch retaining plate:
Refer to SDS, AT-379.



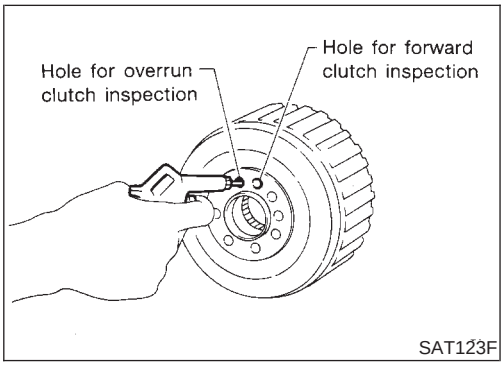
9. Install drive plates, driven plates, retaining plate and dish plate for forward clutch.
- **Take care with order of plates.**

10. Install snap ring for forward clutch.



11. 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 SDS, AT-379.



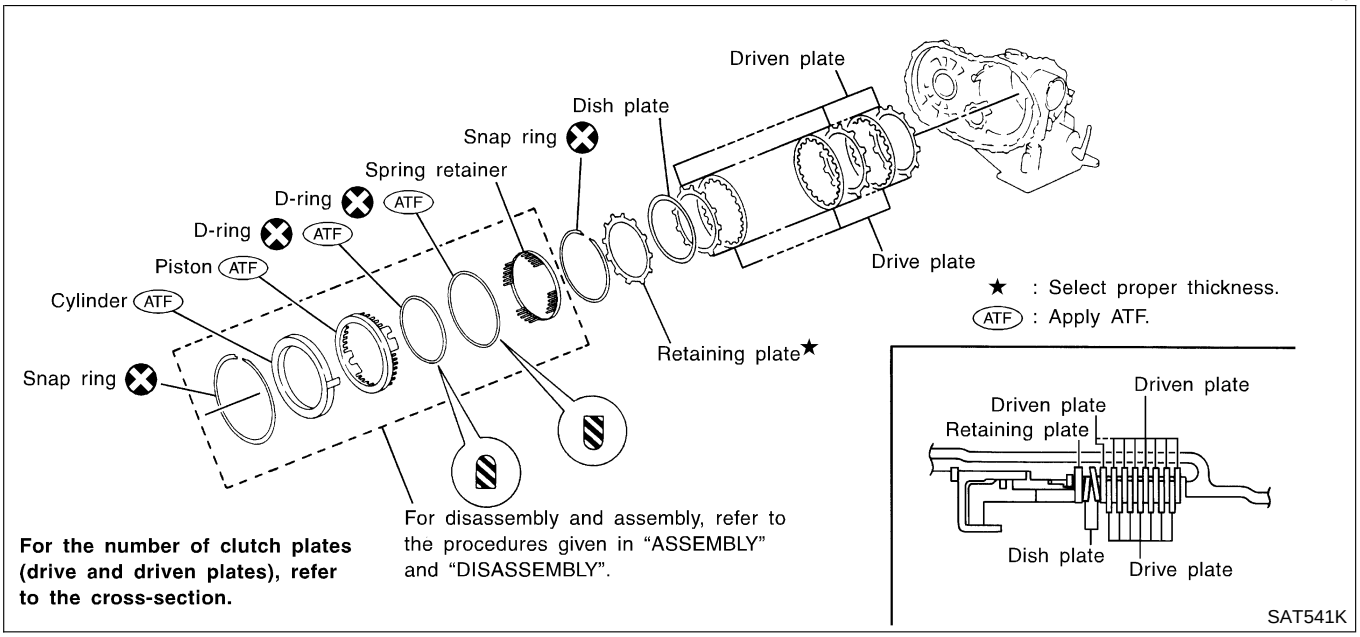
12. Check operation of forward clutch.
Refer to "DISASSEMBLY", "Forward Clutch and Overrun Clutch", AT-331.

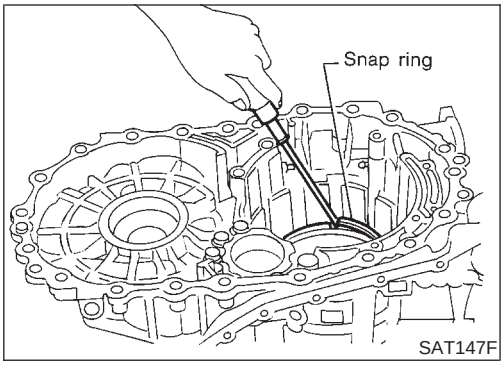
13. Check operation of overrun clutch.
Refer to "DISASSEMBLY", "Forward Clutch and Overrun Clutch", AT-331.

Low & Reverse Brake

COMPONENTS

NFAT0157

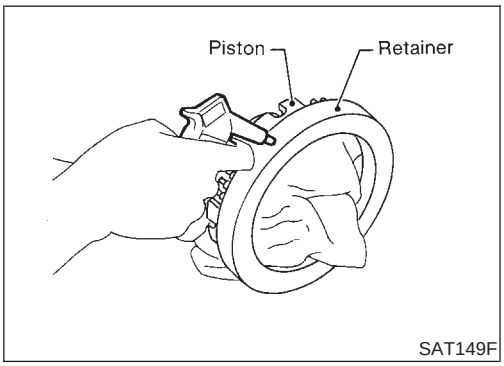




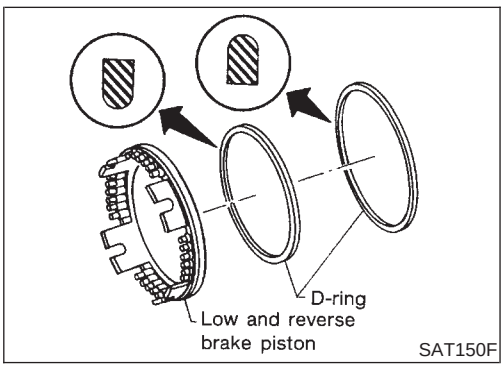
DISASSEMBLY

NFAT0158

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.
- Fluid might be leaking past piston check ball.



2. In order to remove piston, apply compressed air to oil hole of retainer while holding piston.
- **Apply air gradually and allow piston to come out evenly.**



3. Remove D-rings from piston.

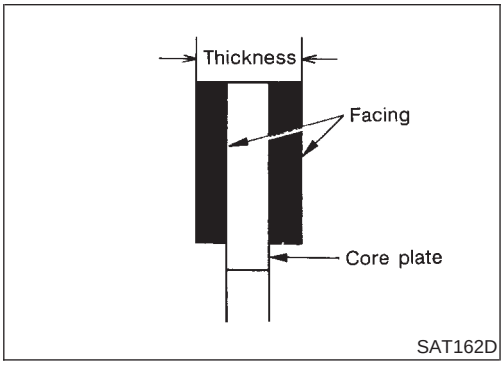
INSPECTION

NFAT0159

Low and Reverse Brake Snap Ring, Spring Retainer and Return Springs

NFAT0159S01

- Check for deformation, fatigue or damage. If necessary, replace.
- **When replacing spring retainer and return springs, replace them as a set.**



Low and Reverse Brake Drive Plate

NFAT0159S02

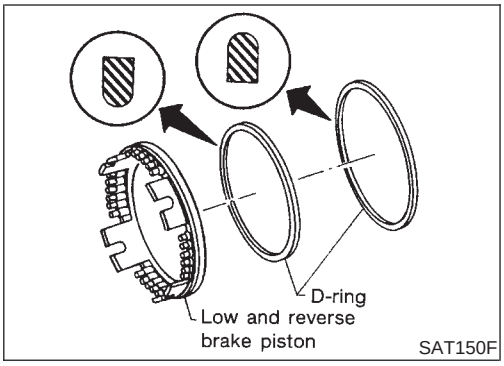
- Check facing for burns, cracks or damage.
- Measure thickness of facing.

Thickness of drive plate:
Standard value 1.8 mm (0.071 in)
Wear limit 1.6 mm (0.063 in)

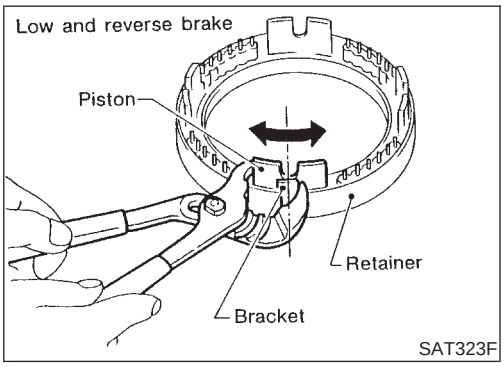
- If not within wear limit, replace.

ASSEMBLY

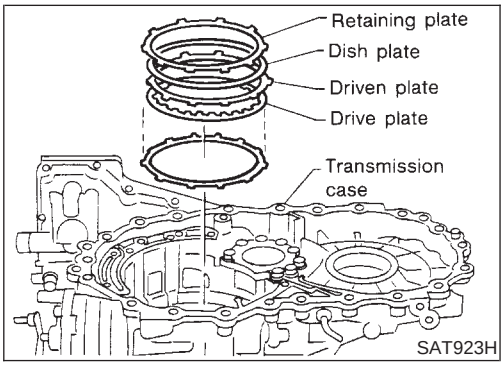
NFAT0160



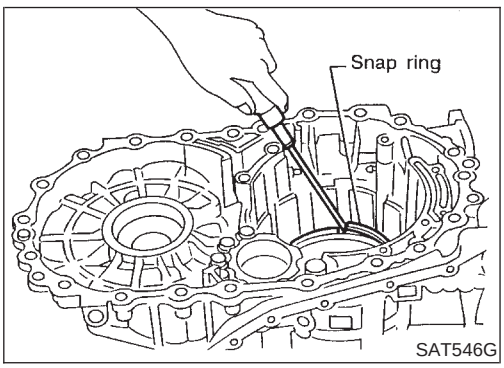
1. Install D-rings on piston.
- **Apply ATF to both parts.**



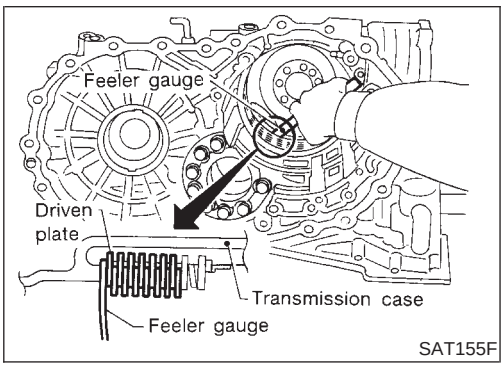
2. Set and align piston with retainer.
- **This operation is required in order to engage the protrusions of piston to return springs correctly.**
Further procedures are given in "ASSEMBLY".



3. Install driven plates, drive plates, retaining plate and dish plate on transmission case.
- **Take care with order of plates and direction of dish plate.**



4. Install snap ring.



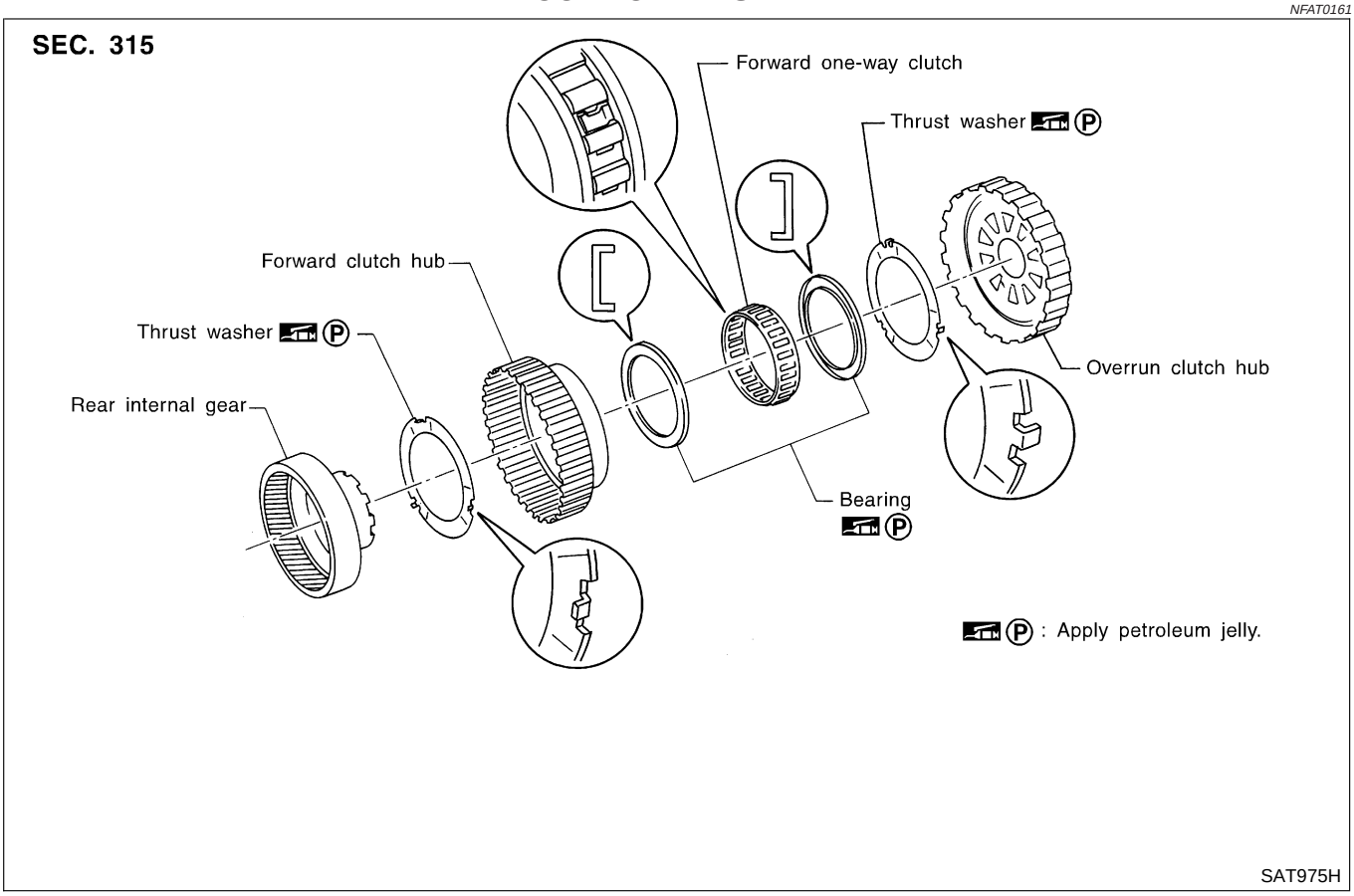
5. Measure clearance between driven plate and transmission case. If not within allowable limit, select proper retaining plate. (front side)

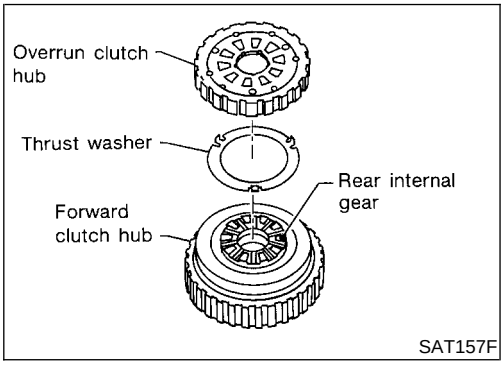
Specified clearance:
Standard 1.7 - 2.1 mm (0.067 - 0.083 in)
Allowable limit 3.3 mm (0.130 in)
Retaining plate:
Refer to SDS, AT-380.

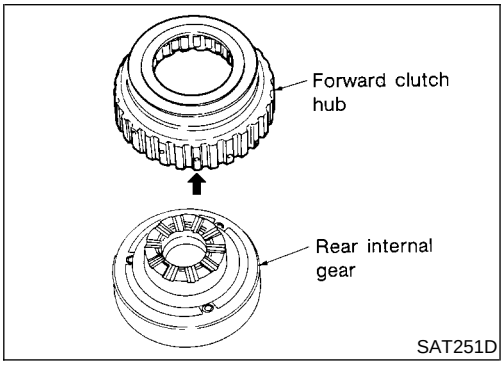
Rear Internal Gear, Forward Clutch Hub and Overrun Clutch Hub

COMPONENTS

NFAT0161





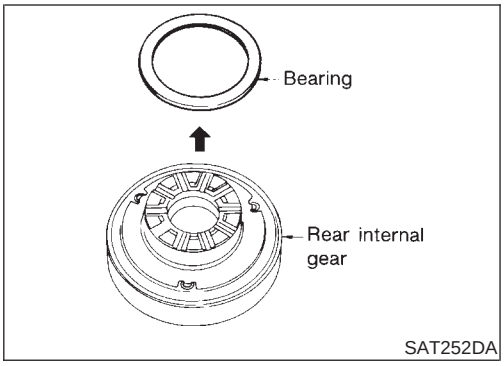


DISASSEMBLY

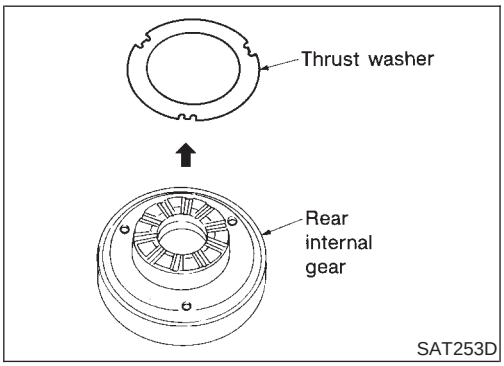
NFAT0162

1. Remove overrun clutch hub and thrust washer from forward clutch hub.

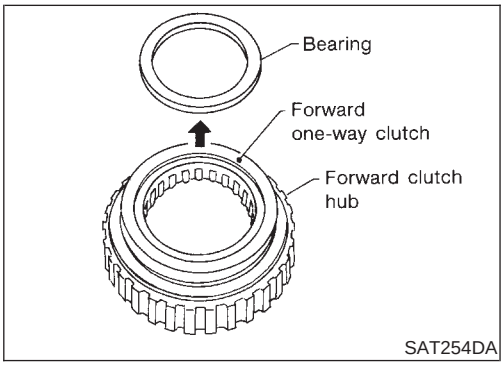
2. Remove forward clutch hub from rear internal gear.



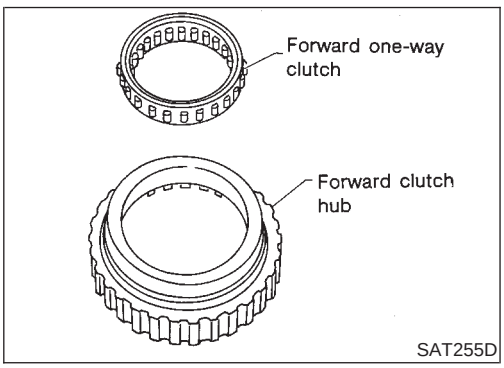
3. Remove bearing from rear internal gear.



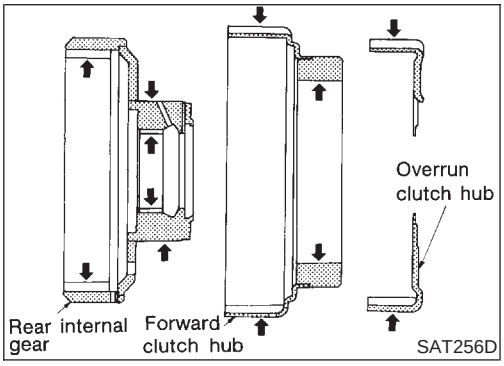
4. Remove thrust washer from rear internal gear.



5. Remove bearing from forward one-way clutch.



6. Remove forward one-way clutch from forward clutch hub.



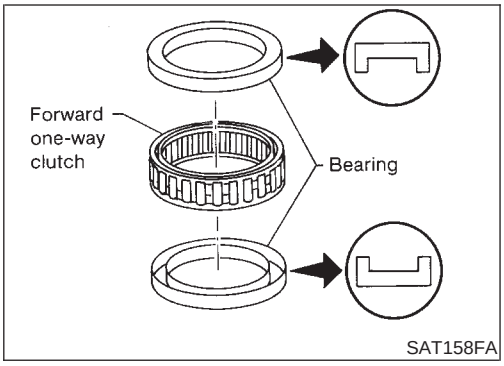
INSPECTION

NFAT0163

Rear Internal Gear, Forward Clutch Hub and Overrun Clutch Hub

NFAT0163S01

- Check rubbing surfaces for wear or damage.

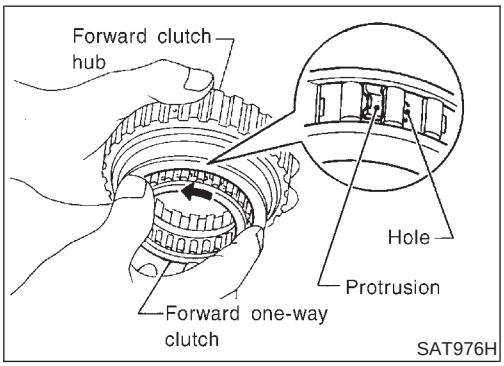


SAT158FA

Bearings and Forward One-way Clutch

NFAT0163S02

- Check bearings for deformation and damage.
- Check forward one-way clutch for wear and damage.

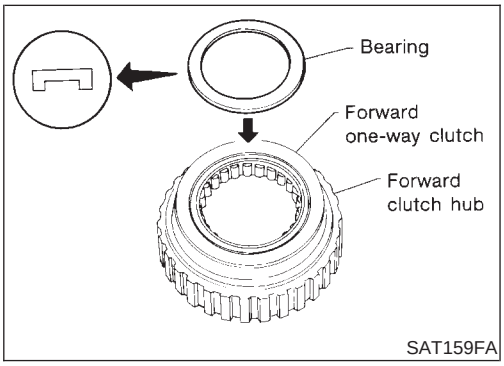


SAT976H

ASSEMBLY

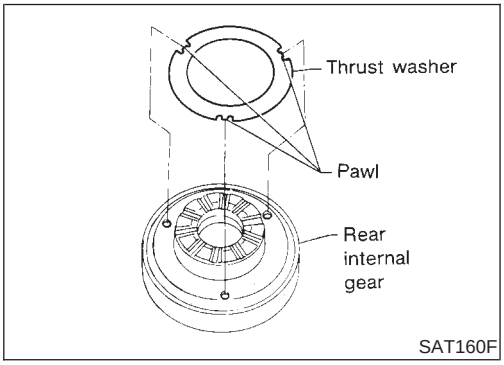
NFAT0164

1. Install forward one-way clutch on forward clutch.
- **Take care with the direction of forward one-way clutch.**



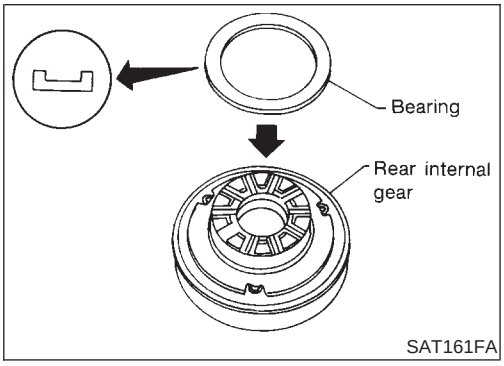
SAT159FA

2. Install bearing on forward one-way clutch.
- **Apply petroleum jelly to bearing.**



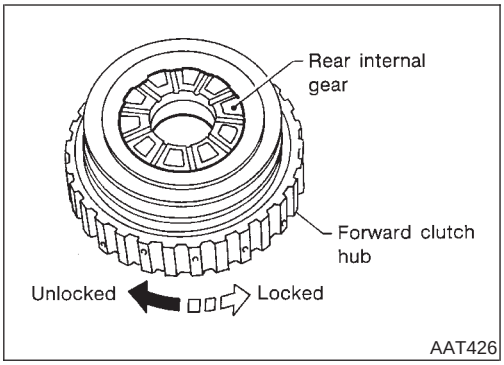
SAT160F

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.**

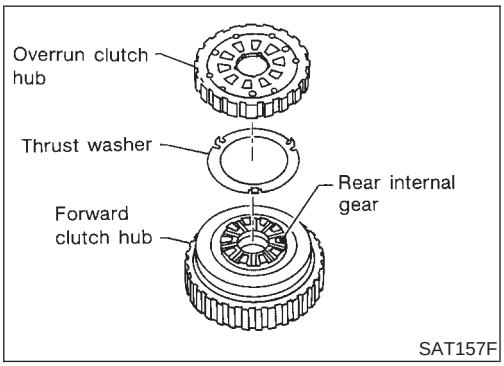


SAT161FA

4. Install bearing on rear internal gear.
- **Apply petroleum jelly to 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.**

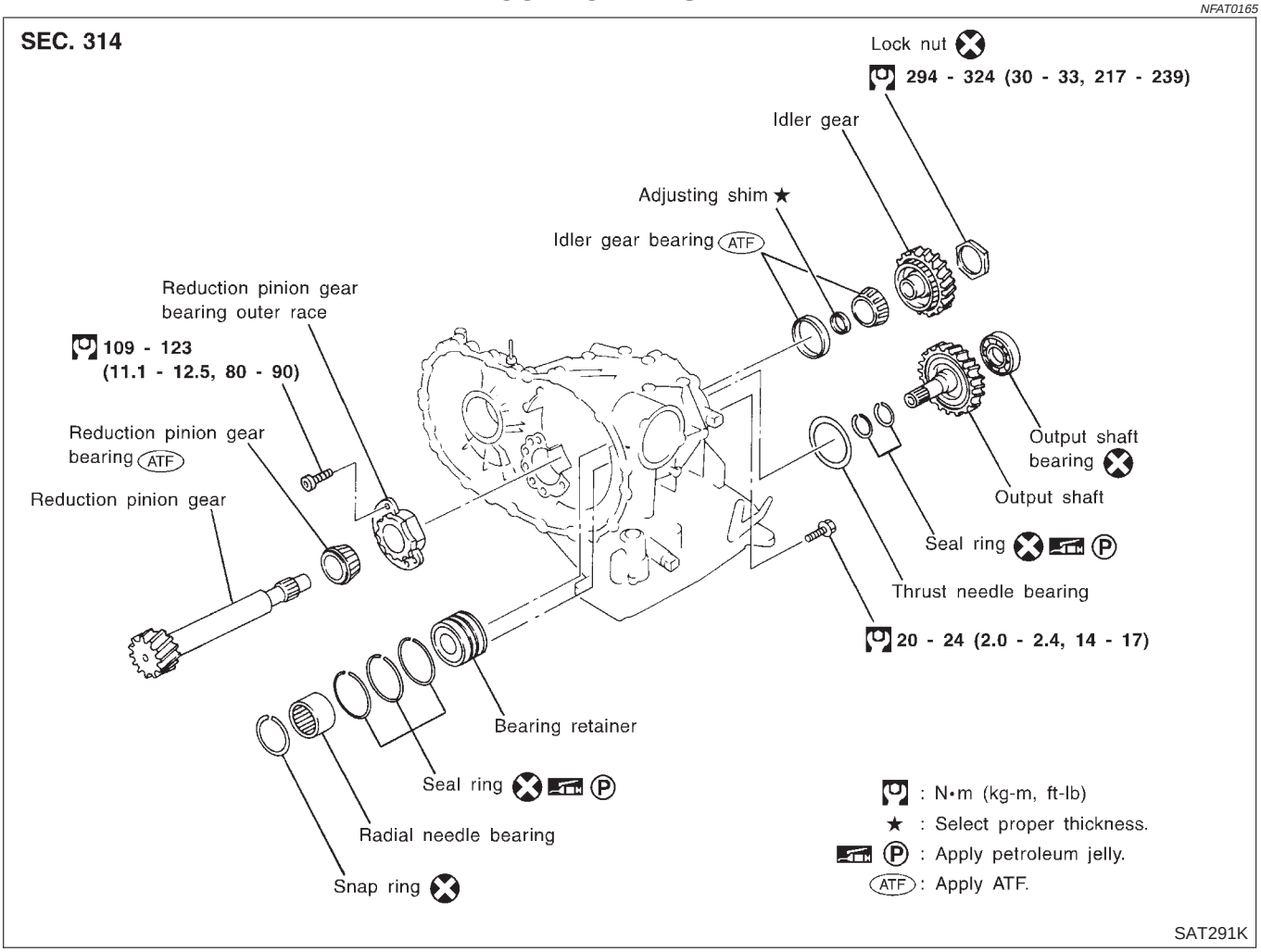


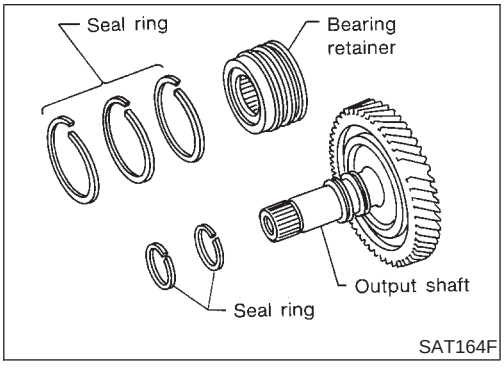
6. Install thrust washer and overrun clutch hub.
- **Apply petroleum jelly to thrust washer.**
- **Align hooks of thrust washer with holes of overrun clutch hub.**
- **Align projections of rear internal gear with holes of overrun clutch hub.**

Output Shaft, Idler Gear, Reduction Pinion Gear and Bearing Retainer

COMPONENTS

NFAT0165

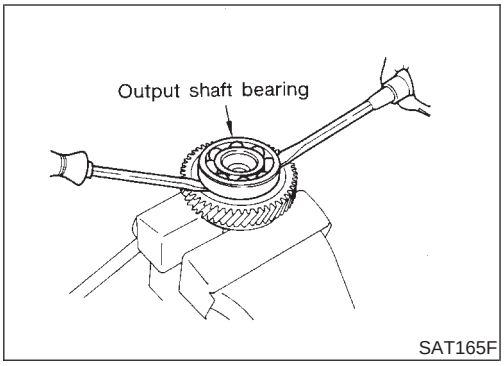




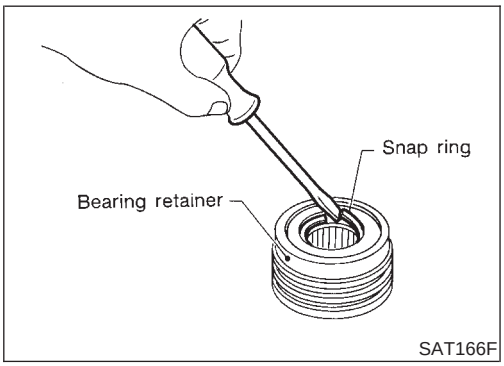
DISASSEMBLY

NFAT0166

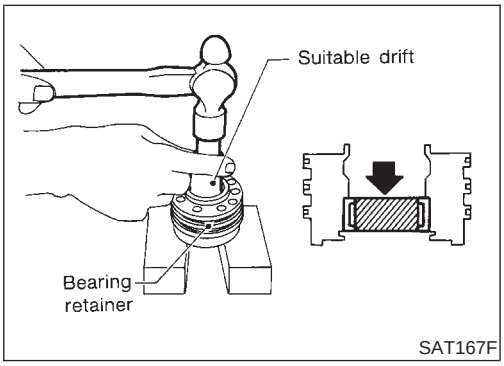
1. Remove seal rings from output shaft and bearing retainer.



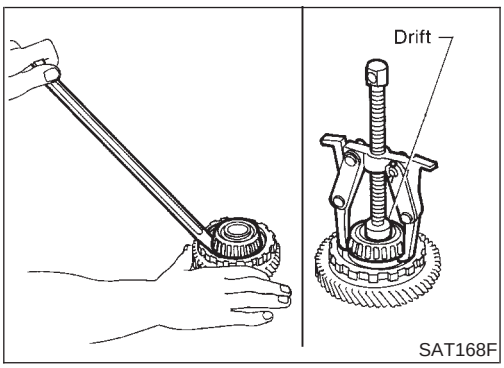
2. Remove output shaft bearing with screwdrivers.
- **Always replace bearing with a new one when removed.**
- **Do not damage output shaft.**



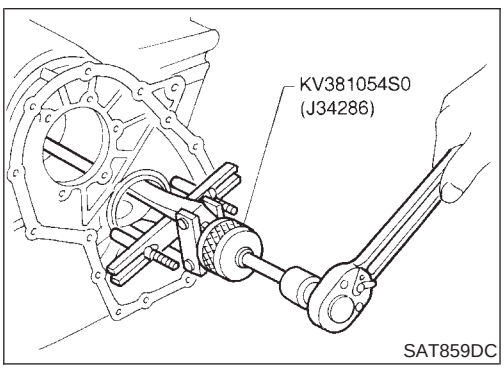
3. Remove snap ring from bearing retainer.



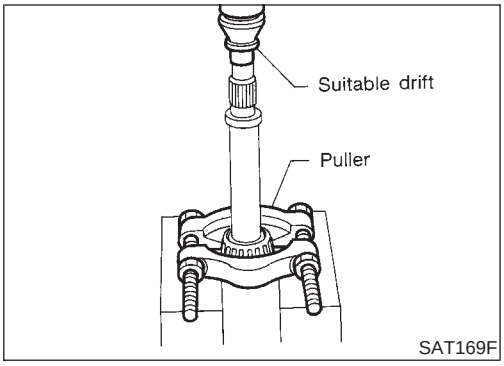
4. Remove needle bearing from bearing retainer.



5. Remove idler gear bearing inner race from idler gear.

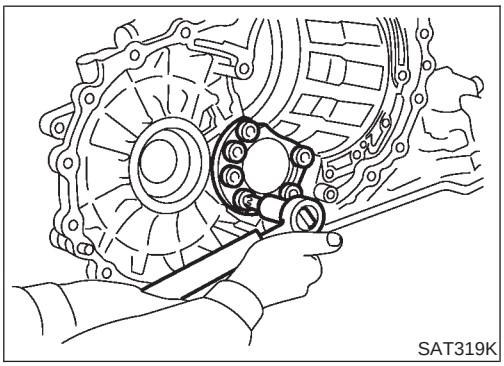


6. Remove idler gear bearing outer race from transmission case.



SAT169F

7. Press out reduction pinion gear bearing inner race from reduction pinion gear.


SAT319K

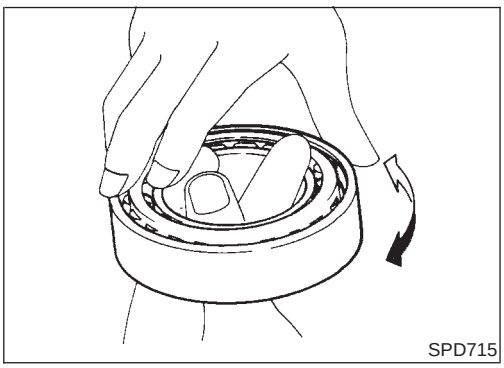
8. Remove reduction pinion gear bearing outer race from transmission case.

INSPECTION

Output Shaft, Idler Gear and Reduction Pinion Gear

NFAT0167
NFAT0167S01

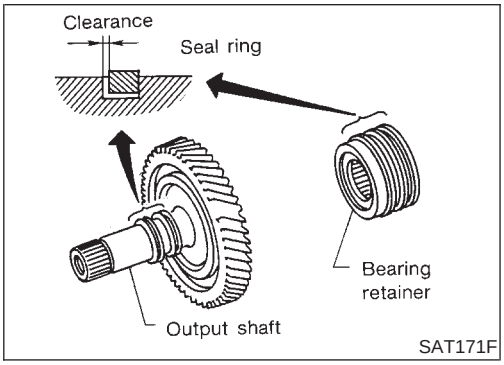
- Check shafts for cracks, wear or bending.
- Check gears for wear, chips and cracks.


SPD715

Bearing

NFAT0167S02

- 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.**



SAT171F

Seal Ring Clearance

NFAT0167S03

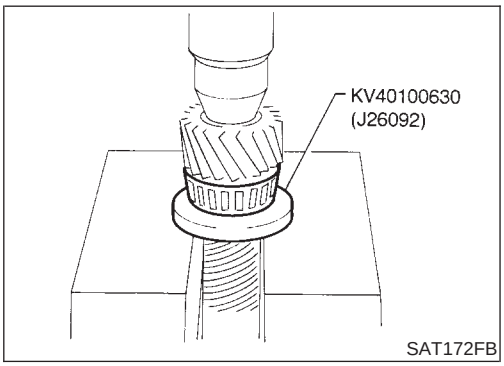
- Install new seal rings to output shaft.
- Measure clearance between seal ring and ring groove of output shaft.

  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.

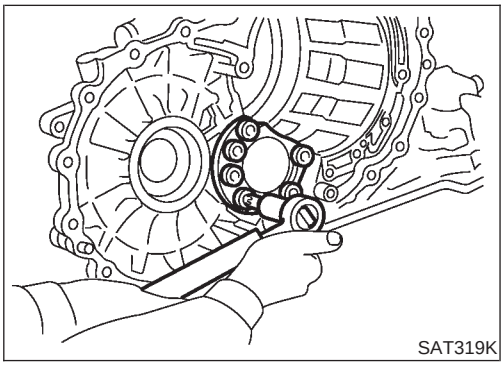
- Measure clearance between seal ring and ring groove of bearing retainer.
  Standard clearance:
  0.10 - 0.30 mm (0.0039 - 0.0118 in)
  Allowable limit:
  0.30 mm (0.0118 in)
- If not within allowable limit, replace bearing retainer.

ASSEMBLY

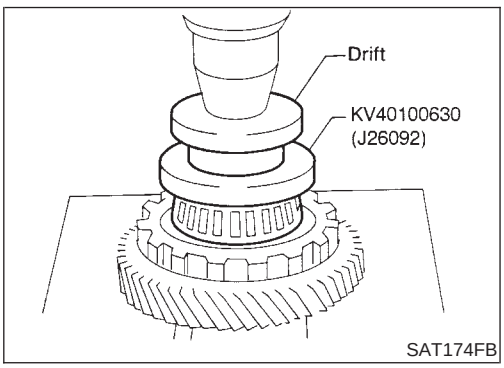
NFAT0168



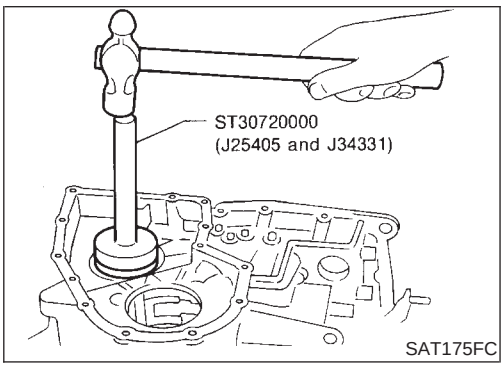
1. Press reduction pinion gear bearing inner race on reduction pinion gear.



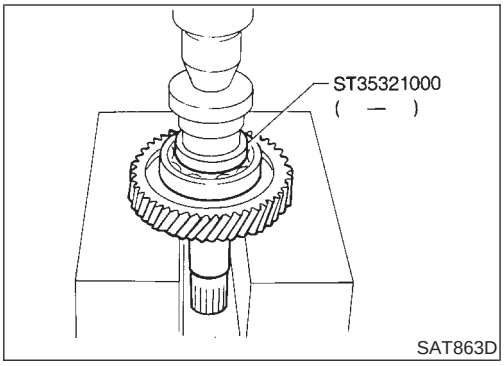
2. Install reduction pinion gear bearing outer race on transmission case.
   : 109 - 123 N·m (11.1 - 12.5 kg-m, 80 - 90 ft-lb)



3. Press idler gear bearing inner race on idler gear.

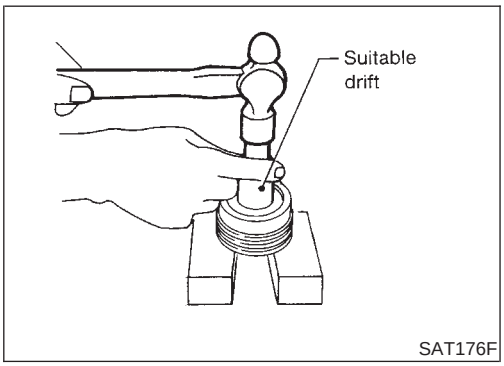


4. Install idler gear bearing outer race on transmission case.



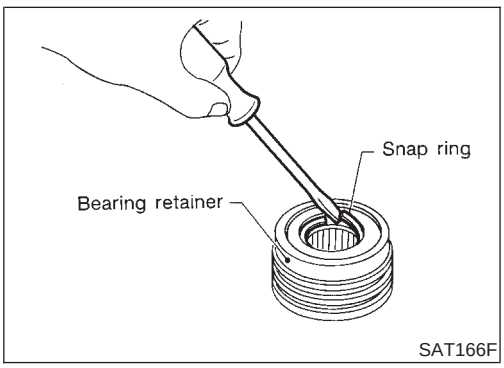
SAT863D

5. Press output shaft bearing on output shaft.



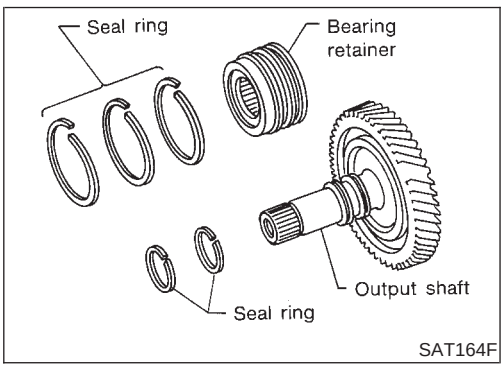
SAT176F

6. Press needle bearing on bearing retainer.



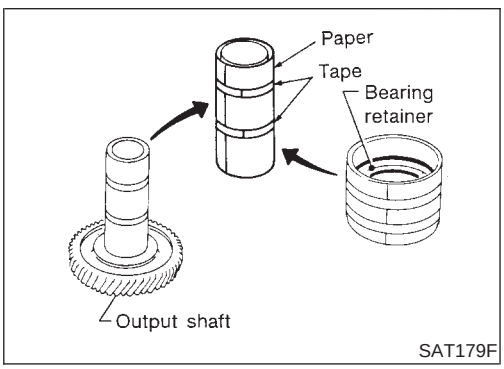
SAT166F

7. Install snap ring to bearing retainer.



SAT164F

8. After packing ring grooves with petroleum jelly, carefully install new seal rings on output shaft and bearing retainer.



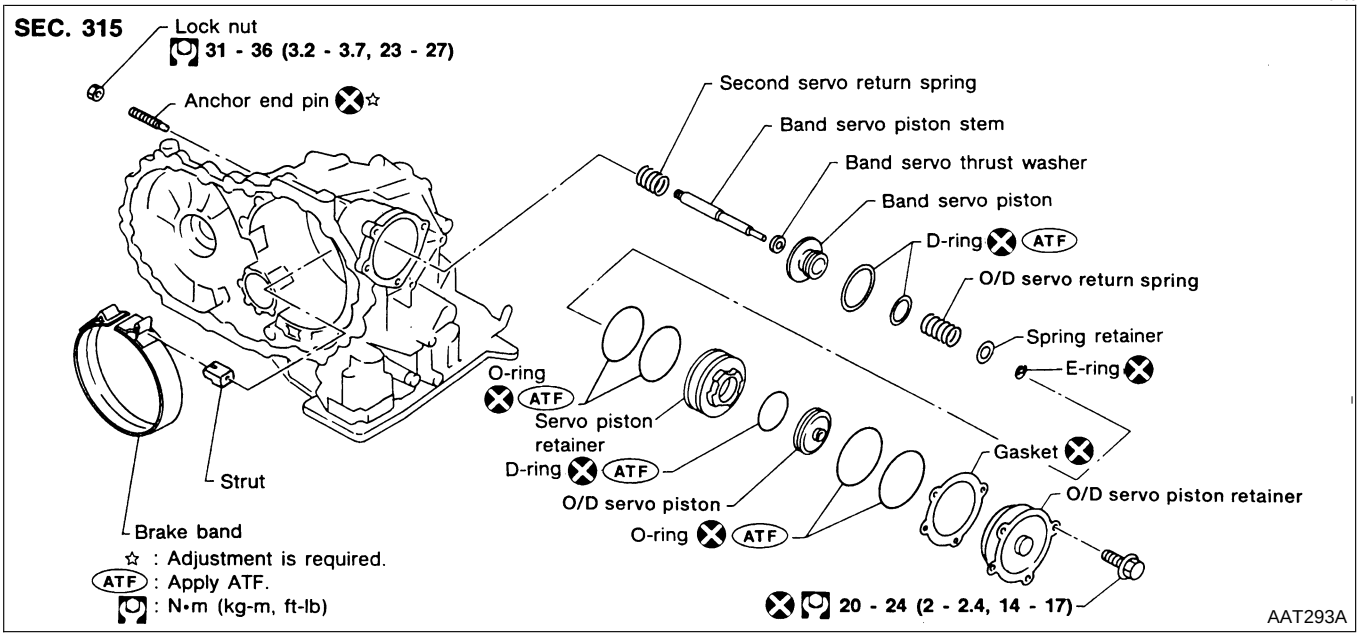
SAT179F

- **Roll paper around seal rings to prevent seal rings from spreading.**

Band Servo Piston Assembly

COMPONENTS

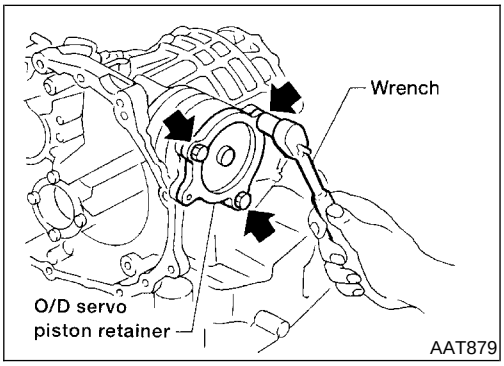
NFAT0169



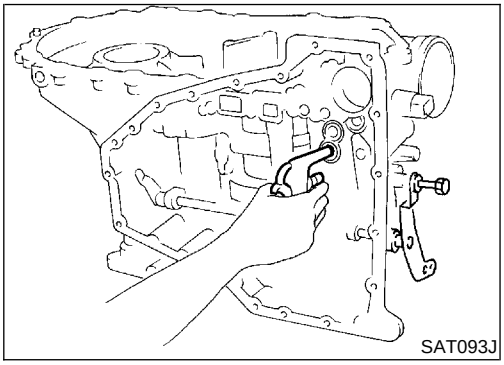
DISASSEMBLY

NFAT0170

1. Remove band servo piston fixing bolts.

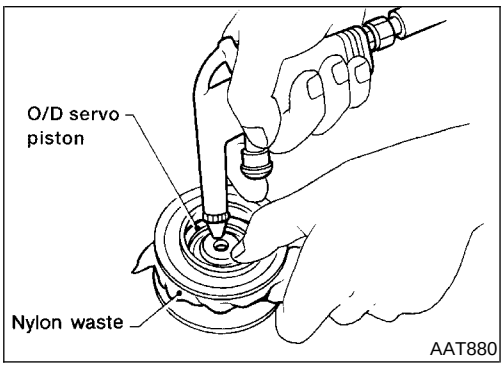


2. Apply compressed air to oil hole in transmission case to remove O/D servo piston retainer and band servo piston assembly.

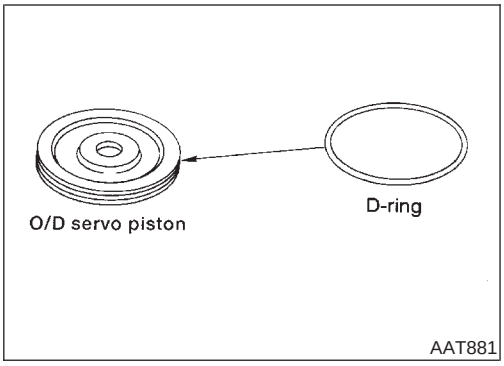


- **Hold band servo piston assembly with a rag or nylon waste.**

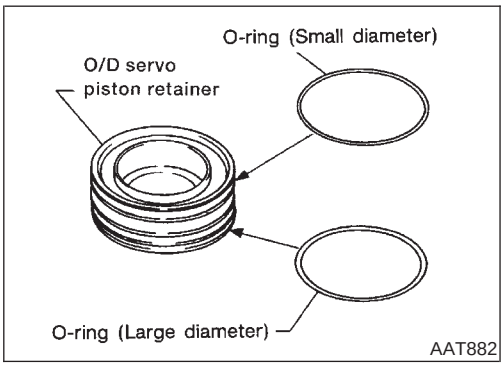
3. Apply compressed air to oil hole in O/D servo piston retainer to remove O/D servo piston from retainer.



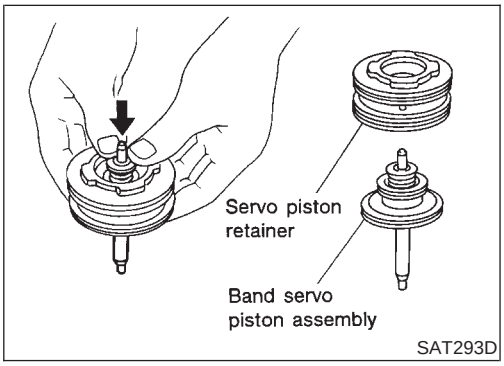
- **Hold O/D band servo piston while applying compressed air.**



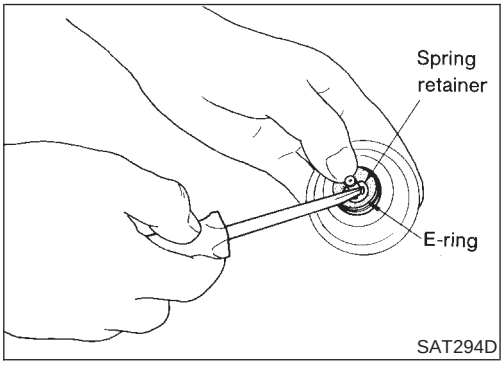
4. Remove D-ring from O/D servo piston.



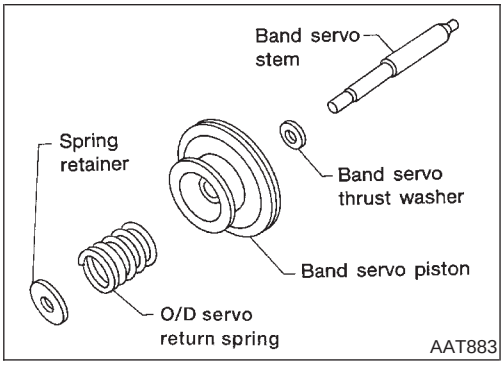
5. Remove O-rings from O/D servo piston retainer.



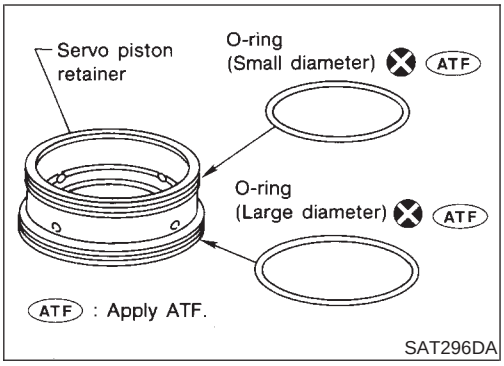
6. Remove band servo piston assembly from servo piston retainer by pushing it forward.



7. Place piston stem end on a wooden block. While pushing servo piston spring retainer down, remove E-ring.

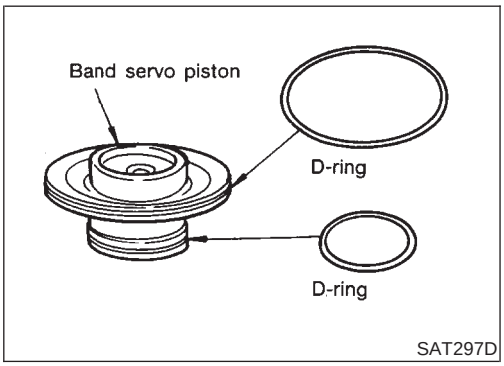


8. Remove O/D servo return spring, band servo thrust washer and band servo piston stem from band servo piston.



SAT296DA

9. Remove O-rings from servo piston retainer.



SAT297D

10. Remove D-rings from band servo piston.

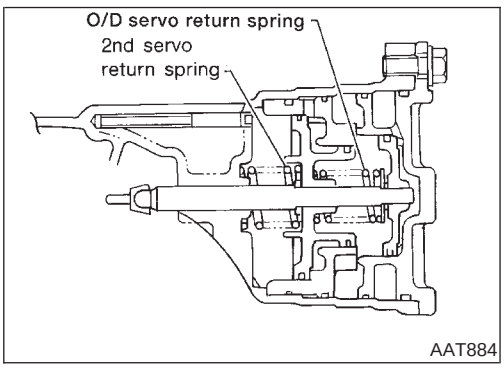
INSPECTION

NFAT0171

Pistons, Retainers and Piston Stem

NFAT0171S01

- Check frictional surfaces for abnormal wear or damage.



AAT884

Return Springs

NFAT0171S02

- Check for deformation or damage.
- Measure free length and outer diameter.

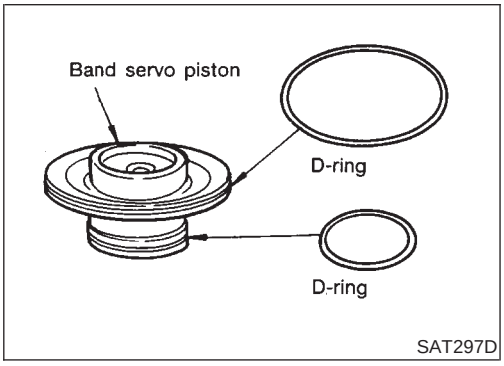
Inspection standard:
Refer to SDS, AT-383.

ASSEMBLY

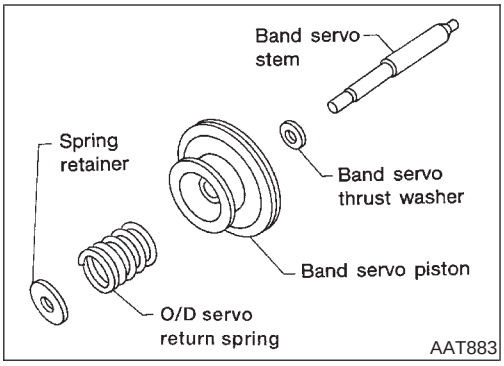
NFAT0172

1. Install D-rings to servo piston retainer.

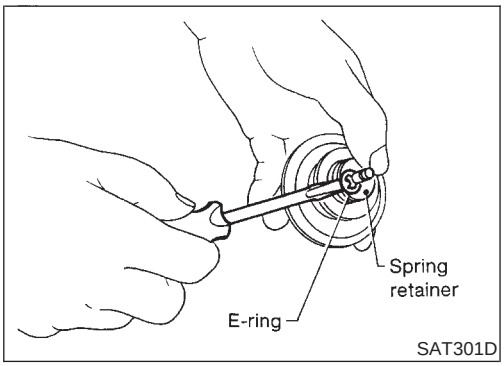
- **Apply ATF to D-rings.**
- **Pay attention to position of each O-ring.**



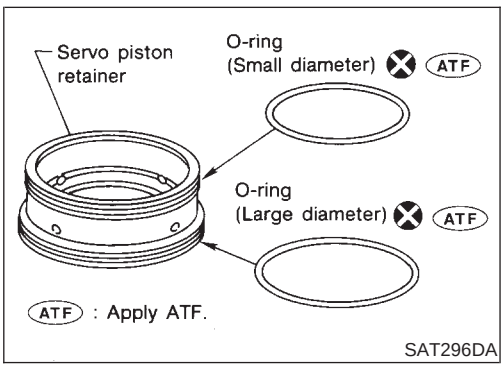
SAT297D



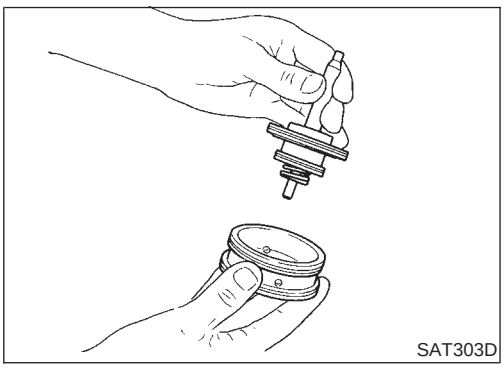
2. Install band servo piston stem, band servo thrust washer, O/D servo return spring and spring retainer to band servo piston.



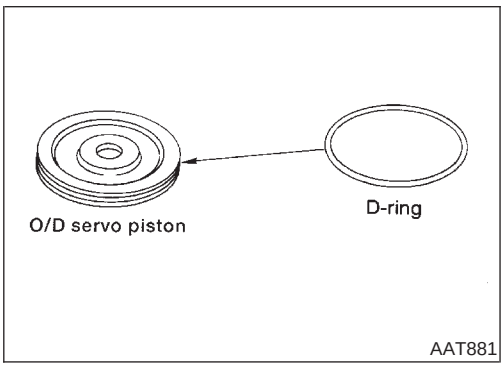
3. Place piston stem end on a wooden block. While pushing servo piston spring retainer down, install E-ring.



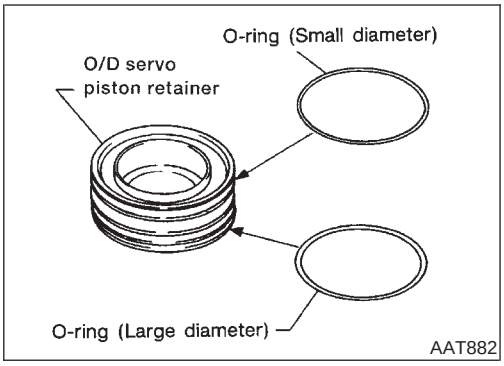
4. Install O-rings to servo piston retainer.
- **Apply ATF to O-rings.**
- **Pay attention to position of each O-ring.**



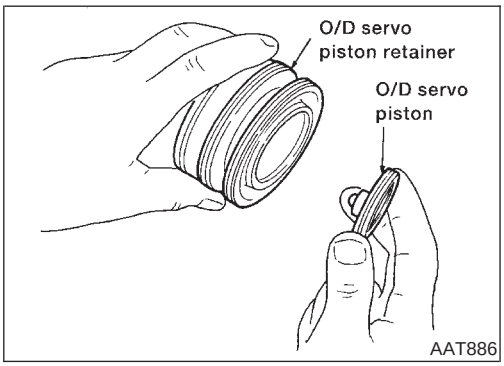
5. Install band servo piston assembly to servo piston retainer by pushing it inward.



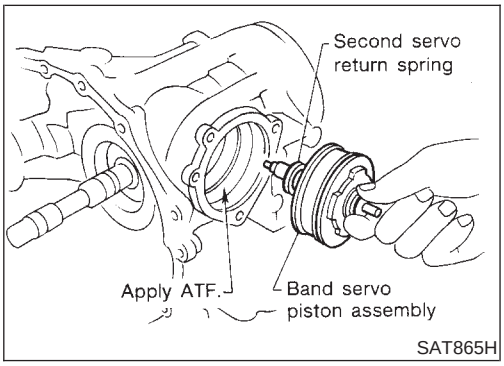
6. Install D-ring to O/D servo piston.
- **Apply ATF to D-ring.**



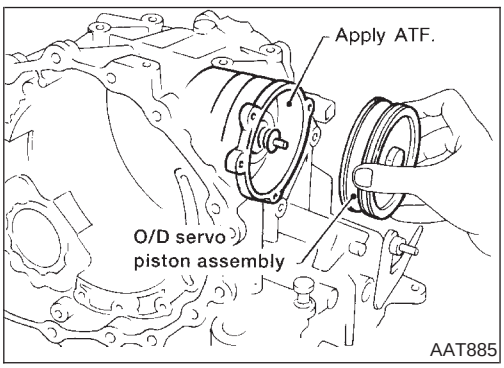
7. Install O-rings to O/D servo piston retainer.
- **Apply ATF to O-rings.**
- **Pay attention to position of each O-ring.**



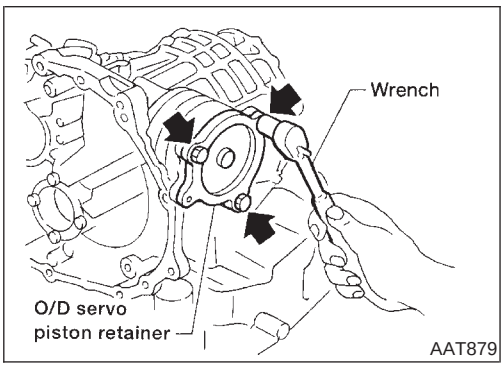
8. Install O/D servo piston to O/D servo piston retainer.



9. Install band servo piston assembly and 2nd servo return spring to transmission case.
- **Apply ATF to O-ring of band servo piston and transmission case.**



10. Install O/D servo piston assembly to transmission case.
- **Apply ATF to O-ring of band servo piston and transmission case.**

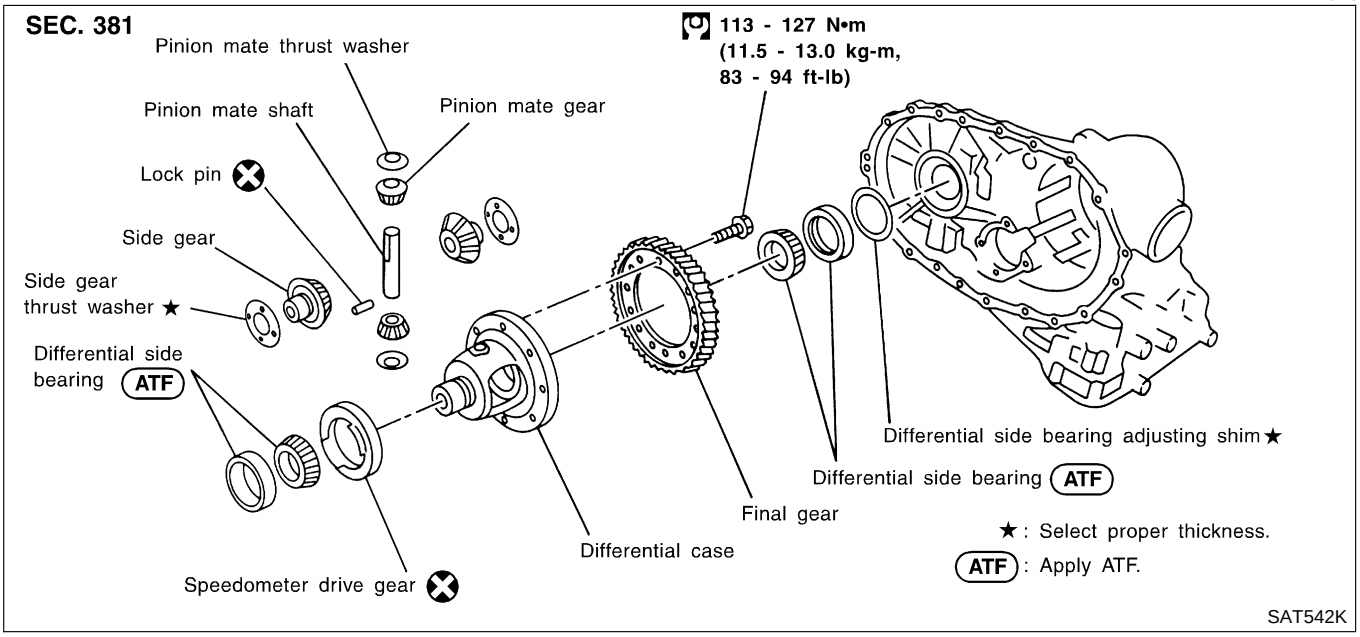


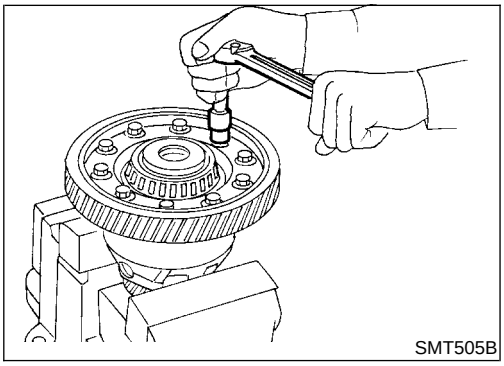
11. Install O/D servo piston retainer to transmission case. Refer to AT-348.

Final Drive

COMPONENTS

NFAT0173

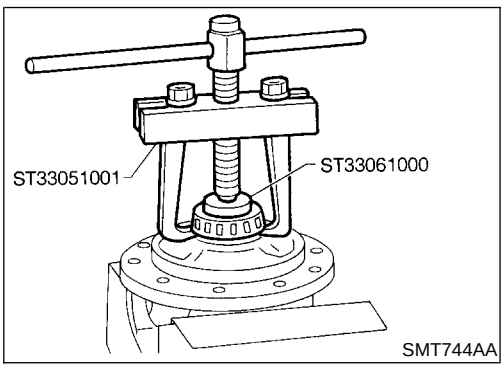




DISASSEMBLY

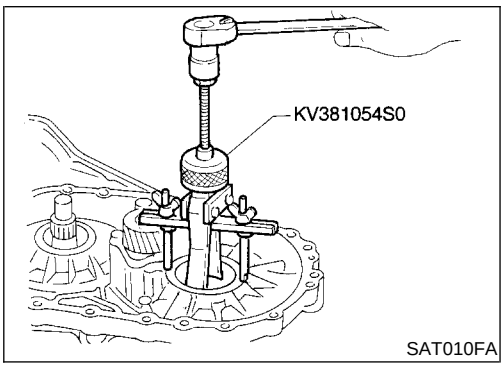
NFAT0174

1. Remove final gear.

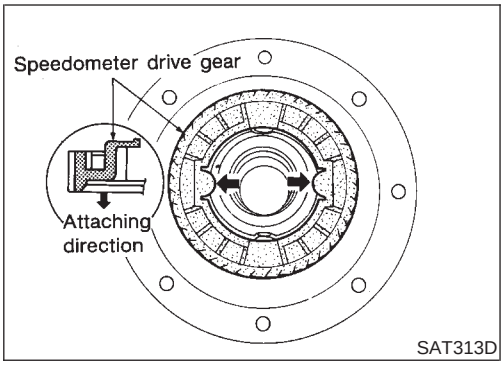


2. Press out differential side bearings.

- **Be careful not to mix up the right and left bearings.**

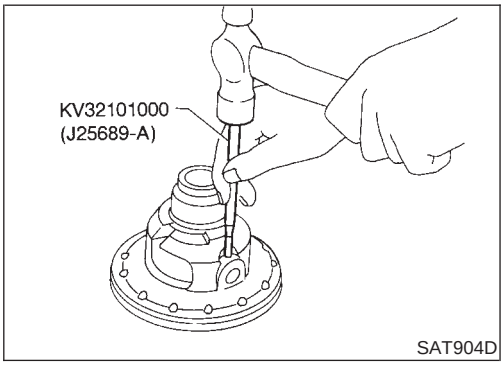


3. Remove differential side bearing outer race, and side bearing adjusting shim from transmission case.



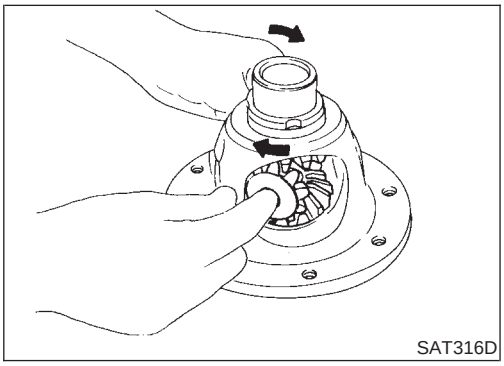
SAT313D

4. Remove speedometer drive gear.



SAT904D

5. Drive out pinion mate shaft lock pin.


SAT316D

6. Draw out pinion mate shaft lock pin.
7. Remove pinion mate gears and side gears.

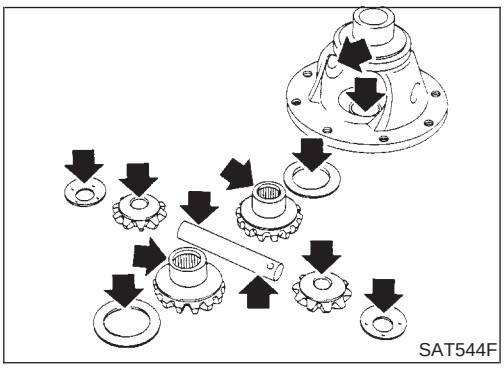
INSPECTION

NFAT0175

Gear, washer, shaft and case

NFAT0175S01

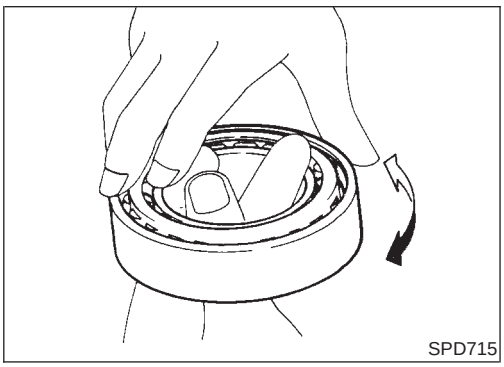
- Check mating surfaces of differential case, side gears and pinion mate gears.
- Check washers for wear.

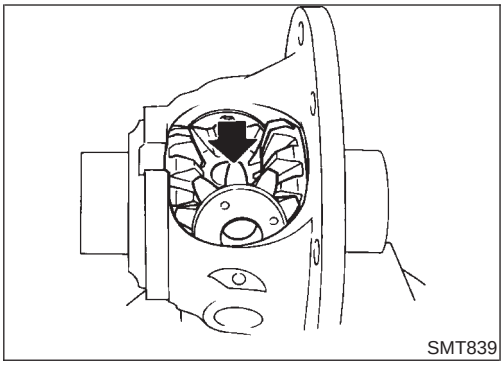

SAT544F

Bearings

NFAT0175S03

- 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.**

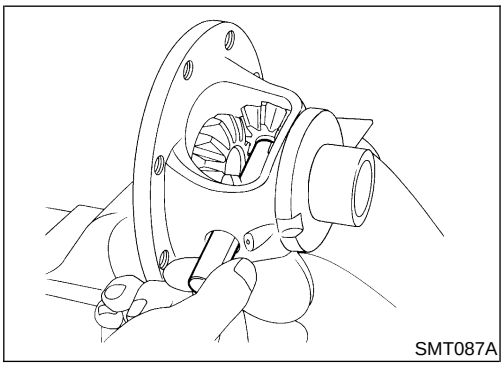

SPD715


SMT839

ASSEMBLY

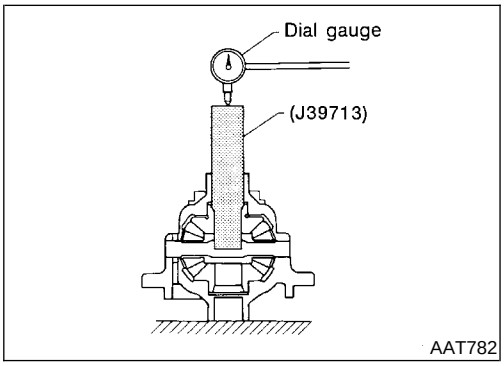
NFAT0176

1. Attach side gear thrust washers to side gears, then install pinion mate thrust washers and pinion mate gears in place.


SMT087A

2. Insert pinion mate shaft.

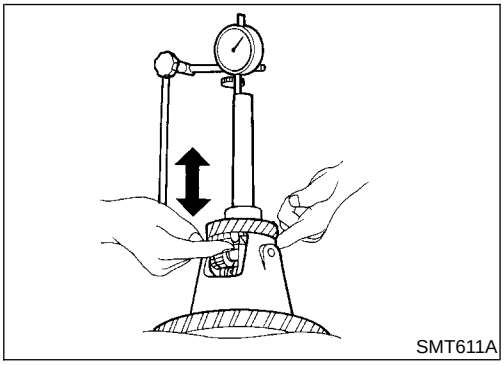
- **When inserting, be careful not to damage pinion mate thrust washers.**



AAT782

3. Measure clearance between side gear and differential case with washers following the procedure below:

a. Set Tool and dial indicator on side gear.


SMT611A

b. Move side gear up and down to measure dial indicator deflection. Always measure indicator deflection on both side gears.

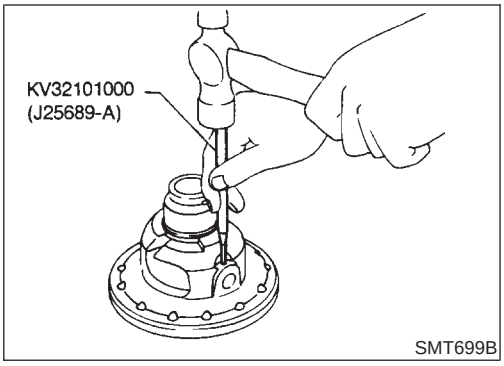
Clearance between side gear and differential case with washers:

0.1 - 0.2 mm (0.004 - 0.008 in)

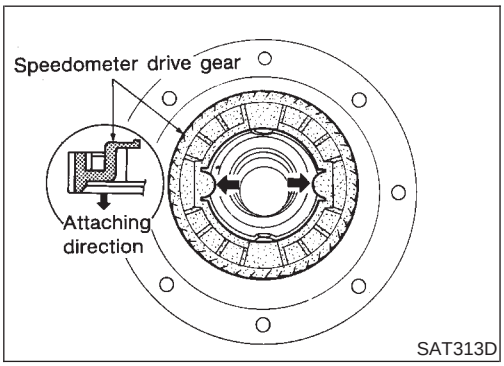
c. If not within specification, adjust clearance by changing thickness of side gear thrust washers.

Side gear thrust washer:

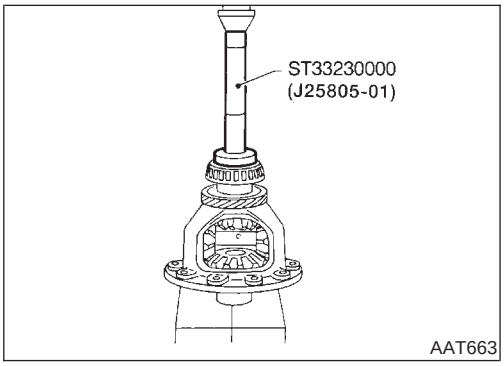
Refer to SDS, AT-380.



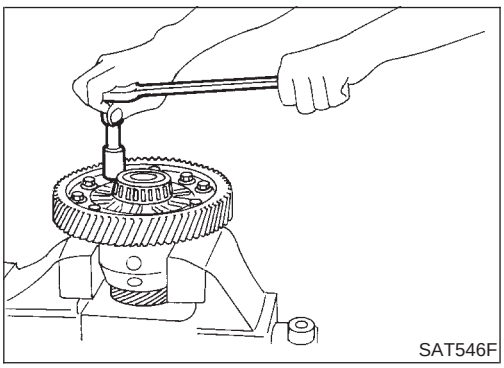
4. Install lock pin.
- **Make sure that lock pin is flush with case.**



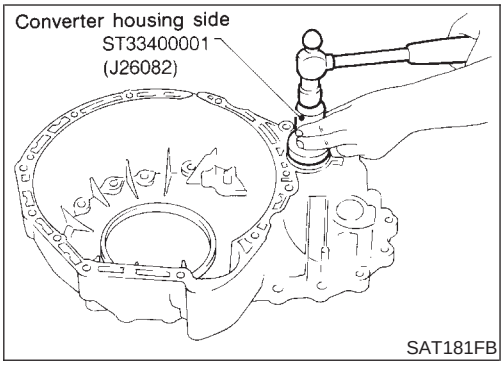
5. Install speedometer drive gear on differential case.
- **Align the projection of speedometer drive gear with the groove of differential case.**



6. Press on differential side bearings.



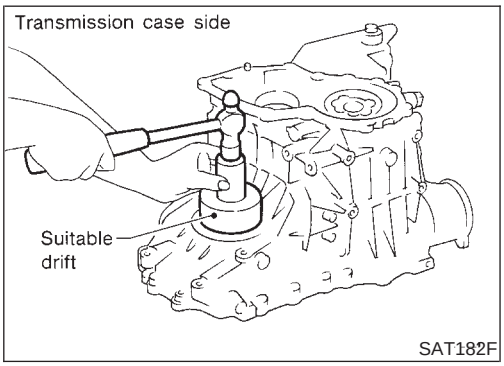
7. Install final gear and tighten fixing bolts in a crisscross pattern.

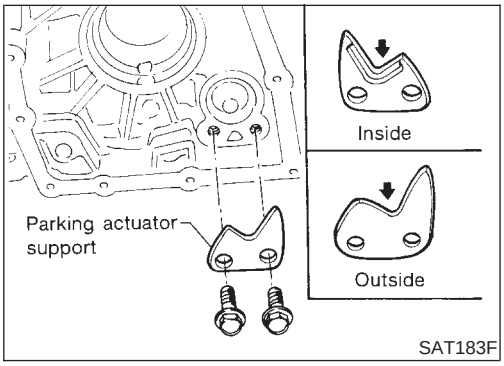


Assembly (1)

NFAT0177

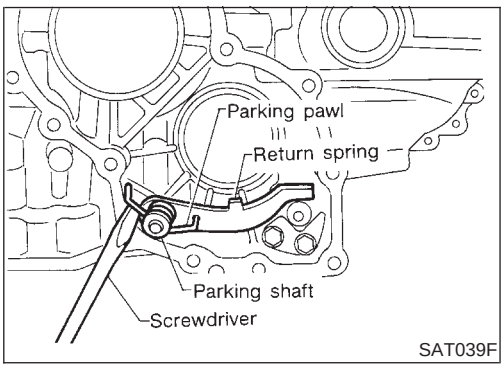
1. Install differential side oil seals on transmission case and converter housing.



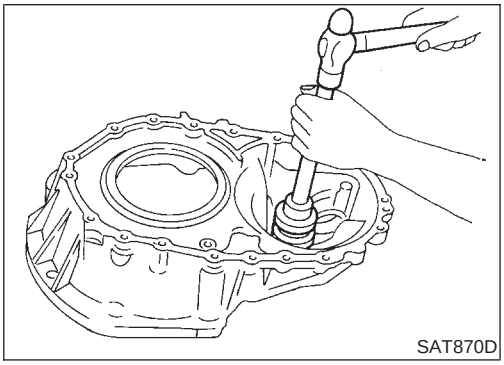


2. Install parking actuator support to transmission case. Tighten parking actuator support bolts to the specified torque. Refer to AT-283.

- **Pay attention to direction of parking actuator support.**



3. Install parking pawl on transmission case and fix it with parking shaft.
4. Install return spring.



Adjustment (1)

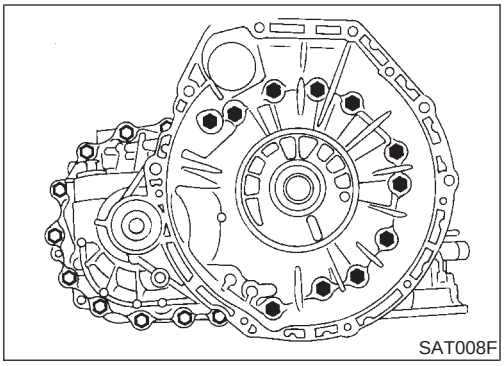
NFAT0178

DIFFERENTIAL SIDE BEARING PRELOAD

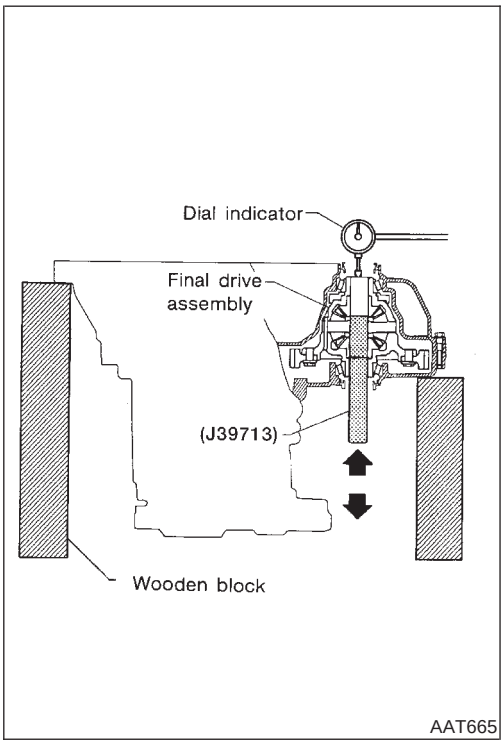
NFAT0178S01

1. Install differential side bearing outer race without adjusting shim on transmission case.
2. Install differential side bearing outer race on converter housing.

Adjustment (1) (Cont'd)

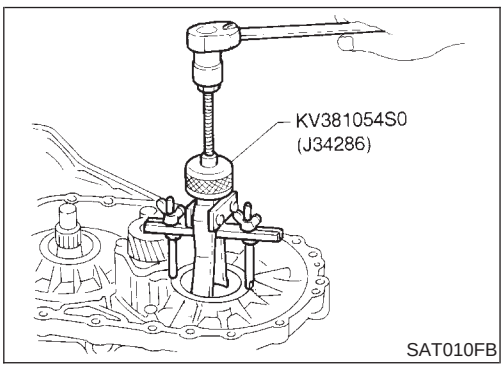

SAT008F

3. Place final drive assembly on transmission case.
4. Install transmission case on converter housing. Tighten transmission case fixing bolts to the specified torque. Refer to AT-283.



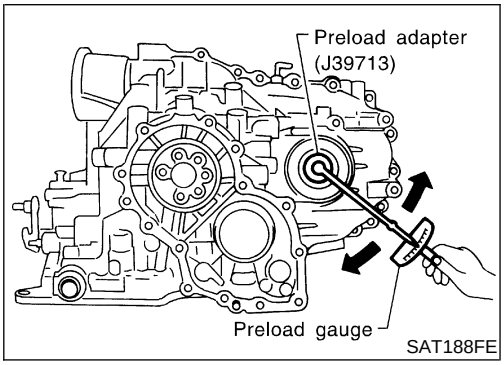
AAT665

5. Attach dial indicator on differential case at converter housing side.
6. Insert Tool into differential side gear from transmission case side.
7. Move Tool up and down and measure dial indicator deflection.
8. Select proper thickness of differential side bearing adjusting shim(s).
   Suitable shim thickness = Dial indicator deflection + Specified bearing preload
   Differential side bearing preload adjusting shim:
   Refer to SDS, AT-381.
   Bearing preload:
   0.05 - 0.09 mm (0.0020 - 0.0035 in)



SAT010FB

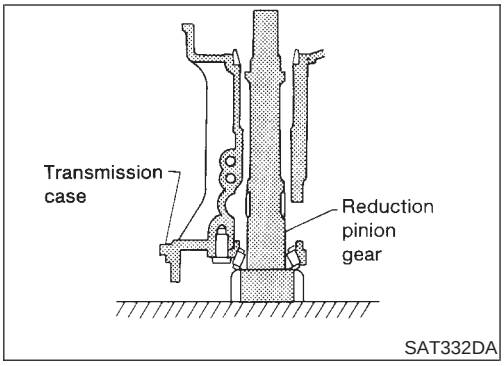
9. Remove converter housing from transmission case.
10. Remove final drive assembly from transmission case.
11. Remove differential side bearing outer race from transmission case.
12. Reinstall differential side bearing outer race and shim(s) selected from SDS table on transmission case.
13. Reinstall converter housing on transmission case and tighten transmission case fixing bolts to the specified torque. Refer to AT-283.



SAT188FE

14. Insert Tool and measure turning torque of final drive assembly.

- **Turn final drive assembly in both directions several times to seat bearing rollers correctly.**
  Turning torque of final drive assembly (New bearing):
  0.78 - 1.37 N·m (8.0 - 14.0 kg-cm, 6.9 - 12.2 in-lb)
- **When old bearing is used again, turning torque will be slightly less than the above.**
- **Make sure torque is close to the specified range.**
  Preload adapter:
  RE4F04B-(J39713)

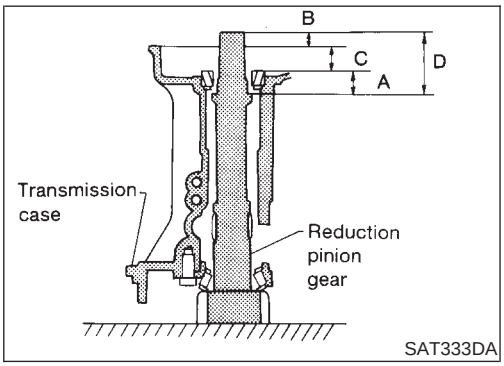


REDUCTION PINION GEAR BEARING PRELOAD

NFAT0178S02

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.

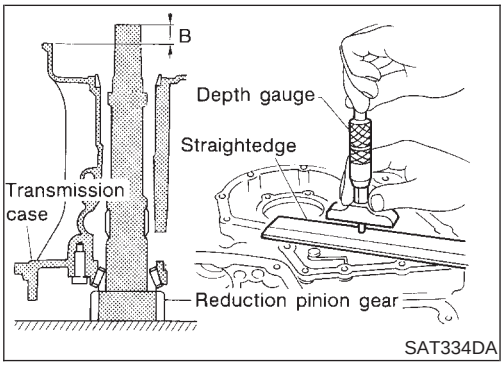


b. Place idler gear bearing on transmission case.

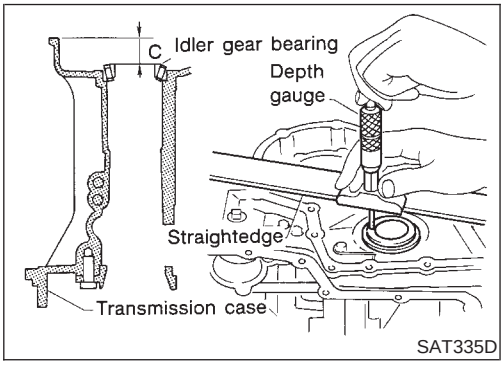
c. Measure dimensions "B" "C" and "D" and calculate dimension "A".

A = D − (B + C)

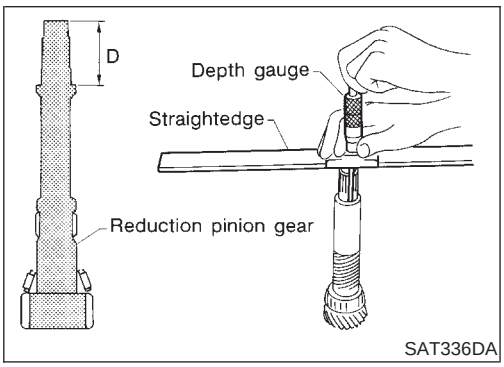
"A": Distance between the surface of idler gear bearing inner race and the adjusting shim mating surface of reduction pinion gear.



- Measure dimension "B" between the end of reduction pinion gear and the surface of transmission case.
- **Measure dimension "B" in at least two places.**



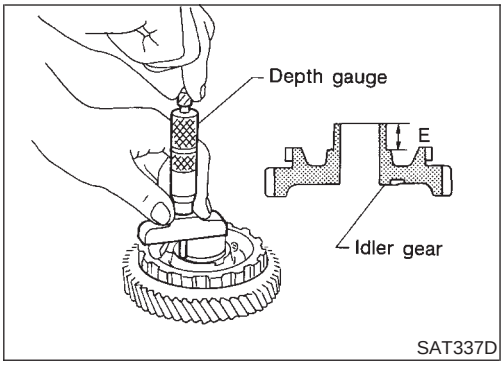
- Measure dimension "C" between the surface of idler gear bearing inner race and the surface of transmission case.
- **Measure dimension "C" in at least two places.**



- 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)

Adjustment (1) (Cont'd)

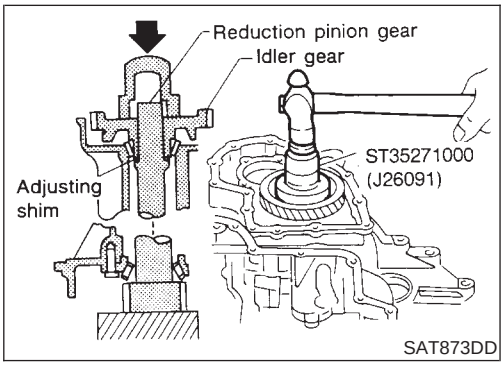


d. Measure dimension "E" between the end of idler gear and the idler gear bearing inner race mating surface of idler gear.

- **Measure dimension "E" in at least two places.**

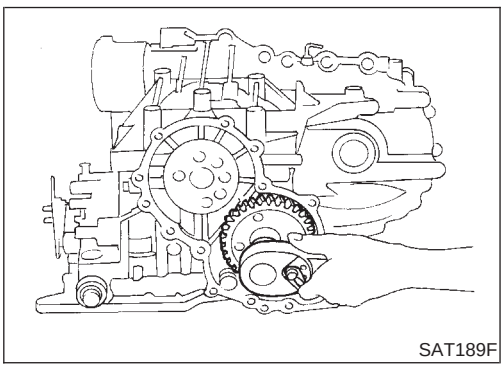
e. Select proper thickness of reduction pinion gear bearing adjusting shim.

Proper shim thickness = A − E − 0.05 mm (0.0020 in)*
(* ... Bearing preload)
Reduction pinion gear bearing adjusting shim:
Refer to SDS, AT-382.



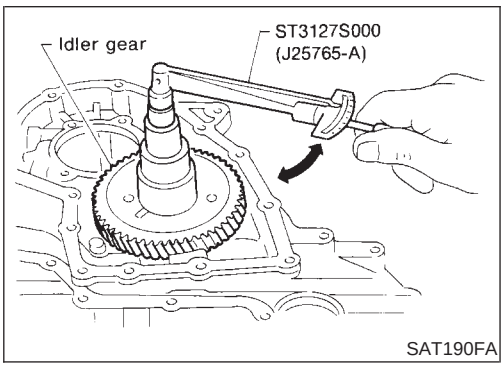
3. Install reduction gear and reduction gear bearing adjusting shim selected in step 2-e on transmission case.
4. Press idler gear bearing inner race on idler gear.
5. Press idler gear on reduction gear.

- **Press idler gear until idler gear fully contacts adjusting shim.**



6. Tighten idler gear lock nut to the specified torque. Refer to AT-343.

- **Lock idler gear with parking pawl when tightening lock nut.**

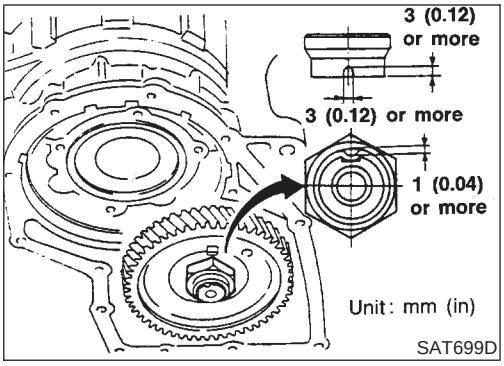


7. Measure turning torque of reduction pinion gear.

- **When measuring turning torque, turn reduction pinion gear in both directions several times to seat bearing rollers correctly.**

Turning torque of reduction pinion gear:
0.05 - 0.39 N·m (0.5 - 4.0 kg-cm, 0.43 - 3.47 in-lb)

- **If turning torque is out of specification, decrease or increase thickness of reduction pinion gear bearing adjusting shim.**

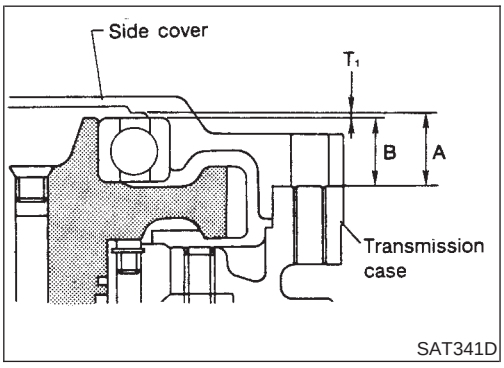


8. After properly adjusting turning torque, clinch idler gear lock nut as shown.

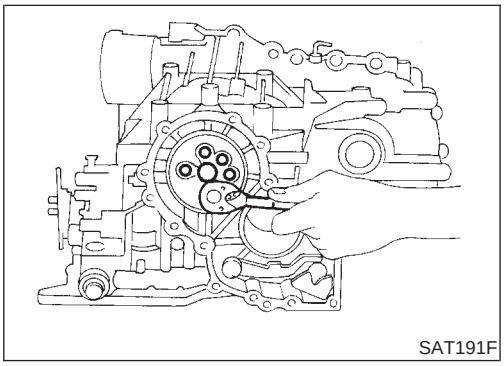
OUTPUT SHAFT END PLAY

NFAT0178S03

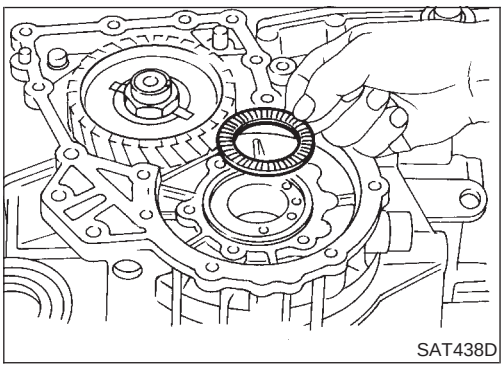
- Measure clearance between side cover and the end of the output shaft bearing.
- Select proper thickness of adjusting shim so that clearance is within specifications.



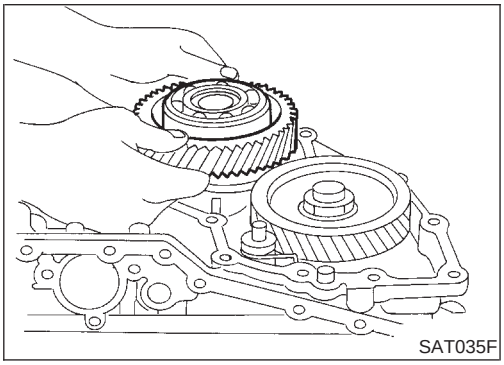
1. Install bearing retainer for output shaft.



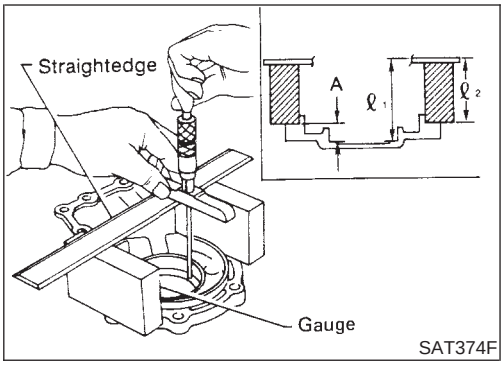
2. Install output shaft thrust needle bearing on bearing retainer.



3. Install output shaft on transmission case.



Adjustment (1) (Cont'd)



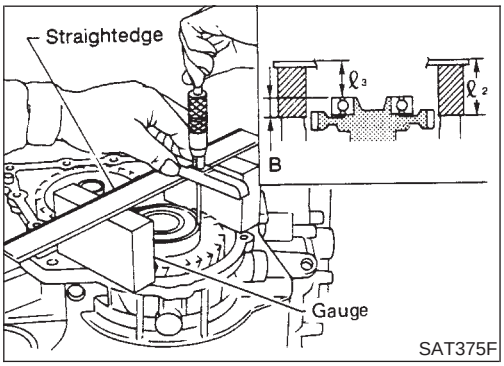
4. Measure dimensions "ℓ_1" and "ℓ_2" at side cover and then calculate dimension "A".

- **Measure dimension "ℓ_1" and "ℓ_2" in at least two places.**

"A": Distance between transmission case fitting surface and adjusting shim mating surface.

$A = \ell_1 - \ell_2$

ℓ_2: Height of gauge



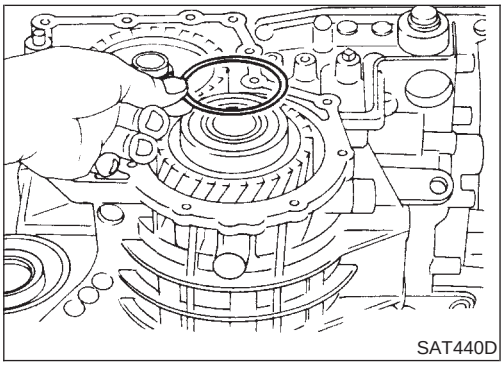
5. Measure dimensions "ℓ_2" and "ℓ_3" and then calculate dimension "B".

- **Measure "ℓ_2" and "ℓ_3" in at least two places.**

"B": Distance between the end of output shaft bearing outer race and the side cover fitting surface of transmission case.

$B = \ell_2 - \ell_3$

ℓ_2: Height of gauge



6. Select proper thickness of adjusting shim so that output shaft end play (clearance between side cover and output shaft bearing) is within specifications.

Output shaft end play (A − B):

0 - 0.15 mm (0 - 0.0059 in)

Output shaft end play adjusting shims:

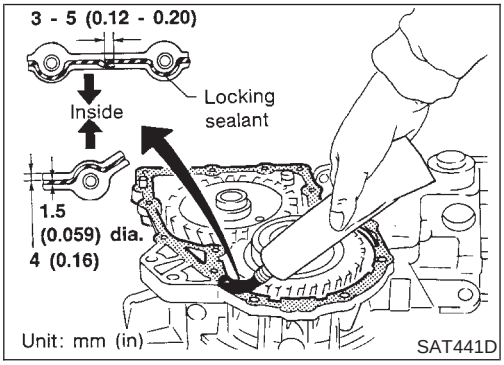
Refer to SDS, AT-384.

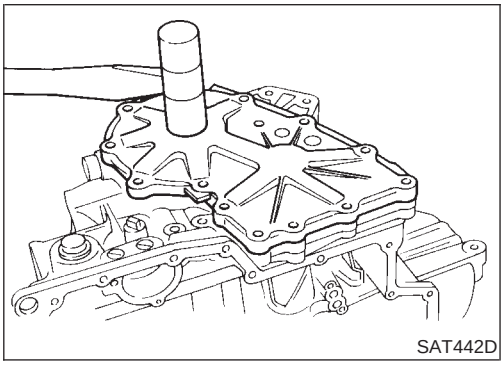
7. Install adjusting shim on output shaft bearing.

Assembly (2)

NFAT0179

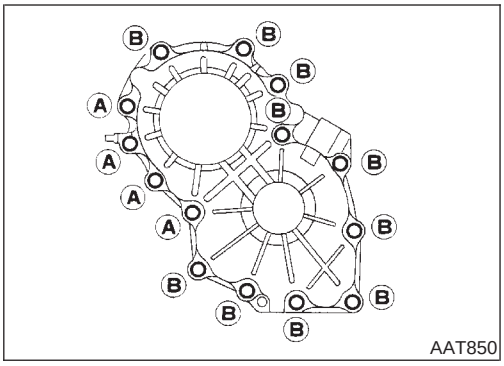
1. Apply Genuine Medium Strength Locking Sealant* to transmission case as shown in illustration.
*: Refer to GI section.





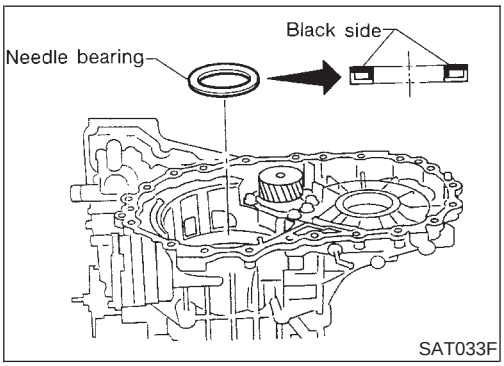
2. Set side cover on transmission case.

- **Apply locking sealant to the mating surface of transmission case.**



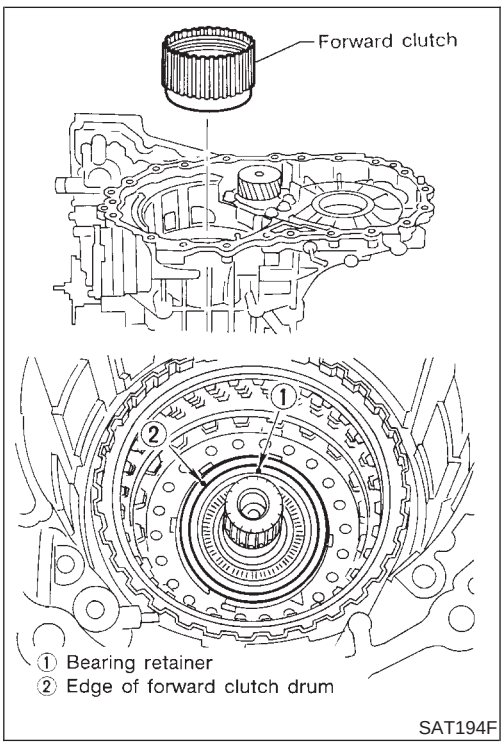
AAT850

3. Tighten side cover fixing bolts to specified torque. Refer to AT-283.
- **Do not mix bolts A and B.**
- **Always replace bolts A as they are self-sealing bolts.**



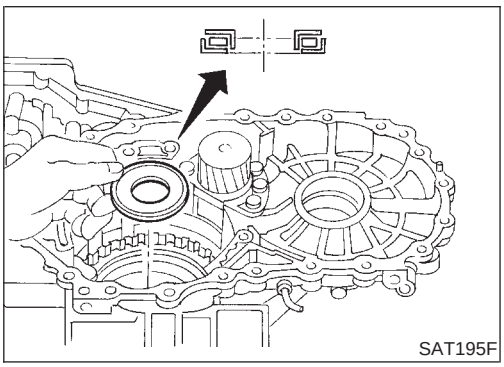
SAT033F

4. Remove paper rolled around bearing retainer.
5. Install thrust washer on bearing retainer.
- **Apply petroleum jelly to thrust washer.**

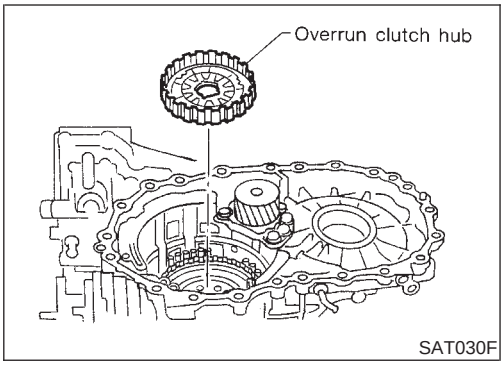


SAT194F

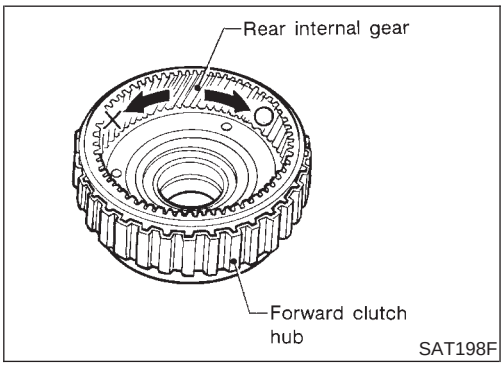
6. Install forward clutch assembly.
- **Align teeth of low & reverse brake drive plates before installing.**
- **Make sure that bearing retainer seal rings are not spread.**
- **If forward clutch assembly is correctly seated, points 1 and 2 are at almost same level.**


SAT195F

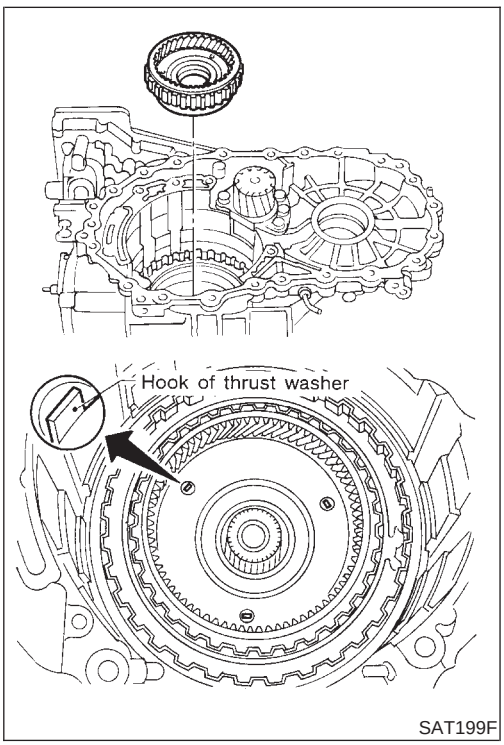
7. Install thrust needle bearing on bearing retainer.
- **Apply petroleum jelly to thrust needle bearing.**
- **Pay attention to direction of thrust needle bearing.**



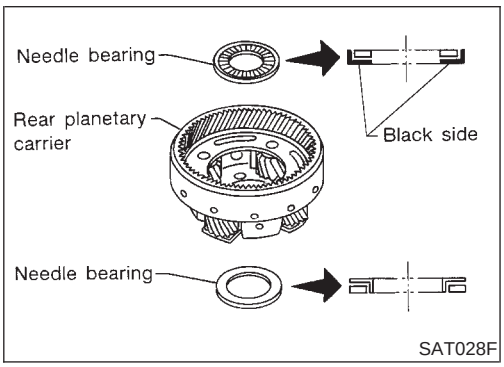
8. Install overrun clutch hub.
- **Apply petroleum jelly to thrust washers.**
- **Align teeth of overrun clutch drive plates before installing.**



9. Hold forward clutch hub and turn rear internal gear.
Check overrun clutch hub for correct directions of lock and unlock.
- **If not shown as illustrated, check installed direction of forward one-way clutch.**

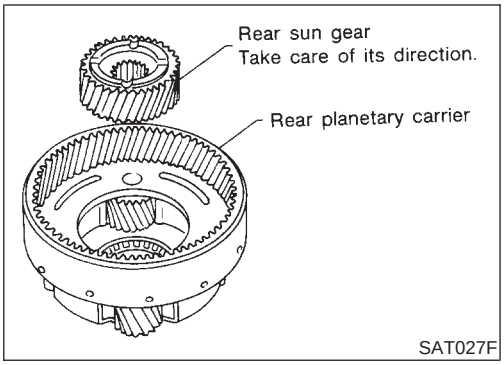


10. Install forward clutch hub and rear internal gear assembly.
- **Align teeth of forward clutch drive plates before installing.**
- **Check that three hooks of thrust washer are correctly aligned after installing.**



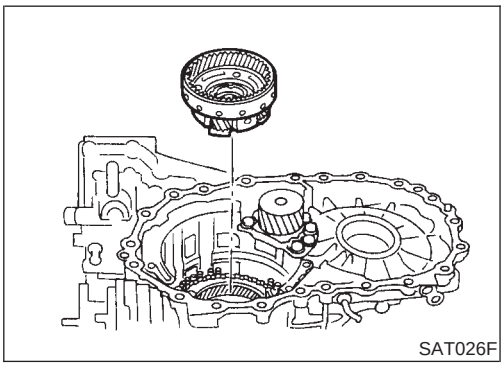
11. Install rear planetary carrier assembly and rear sun gear according to the following procedures.

a. Install needle bearings on rear planetary carrier.
- **Apply petroleum jelly to needle bearings.**
- **Pay attention to direction of needle bearings.**

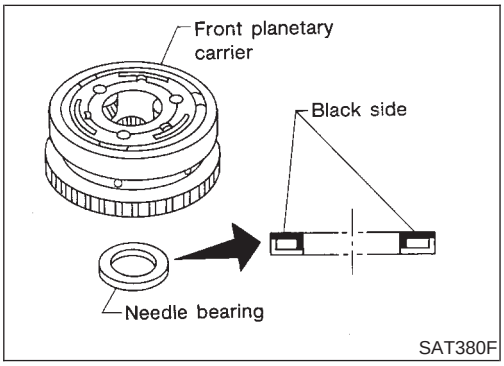


b. Install rear sun gear on rear planetary carrier.

- **Pay attention to direction of rear sun gear.**

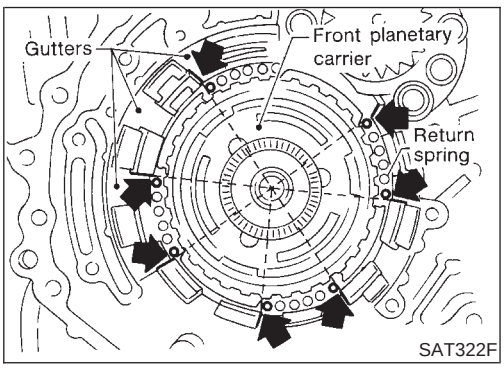


c. Install rear planetary carrier on transmission case.



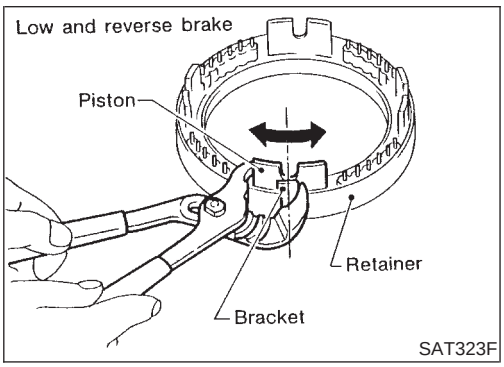
12. Install thrust needle bearing on front planetary carrier, then install them together on transmission case.

- **Apply petroleum jelly to thrust needle bearing.**
- **Pay attention to direction of thrust needle bearing.**

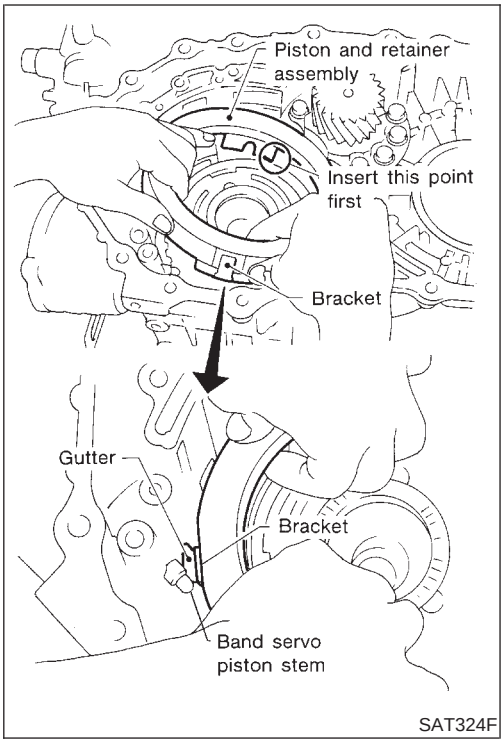


13. Install low and reverse brake piston according to the following procedures.

a. Set and align return springs to transmission case gutters as shown in illustration.

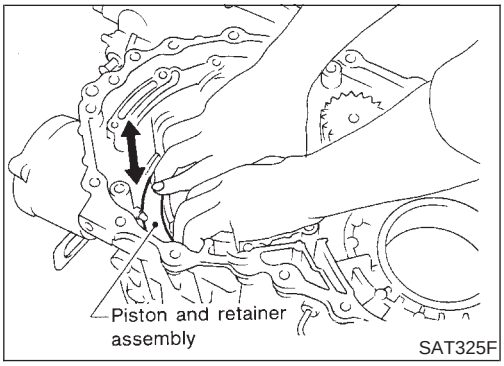


b. Set and align piston with retainer.



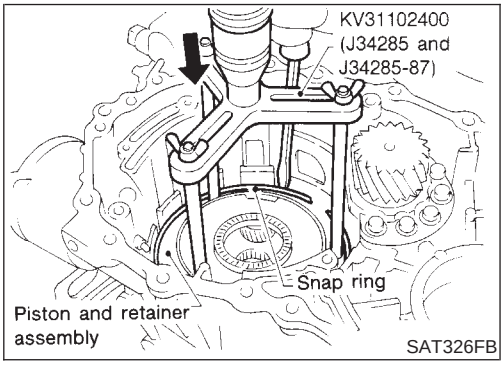
c. Install piston and retainer assembly on the transmission case.

- **Align bracket to specified gutter as indicated in illustration.**

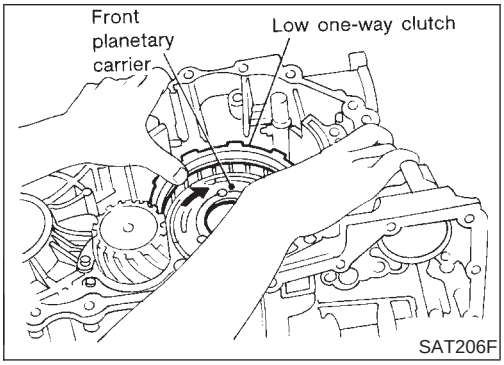


d. Check that each protrusion of piston is correctly set to corresponding return spring as follows.

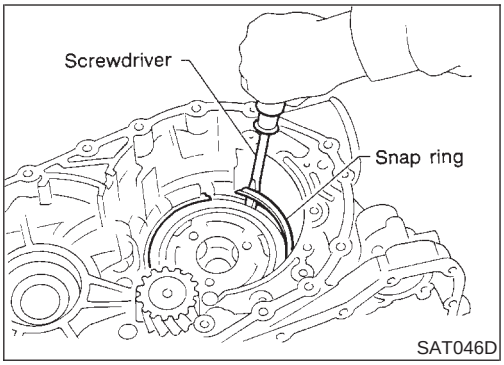
- **Push piston and retainer assembly evenly and confirm they move smoothly.**
- **If they can not move smoothly, remove piston and retainer assembly and align return spring correctly as instructed in step "a".**



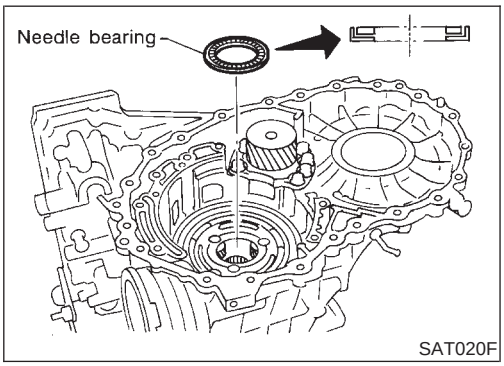
e. Push down piston and retainer assembly and install snap ring.



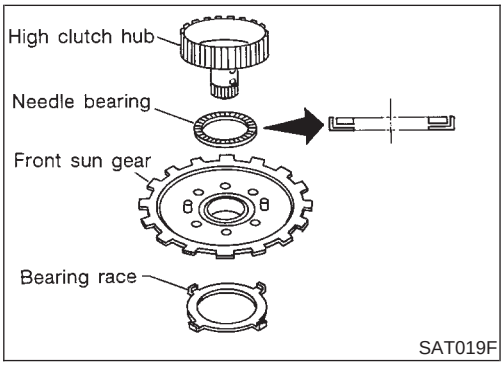
14. Install low one-way clutch to front planetary carrier by turning carrier in the direction of the arrow shown.



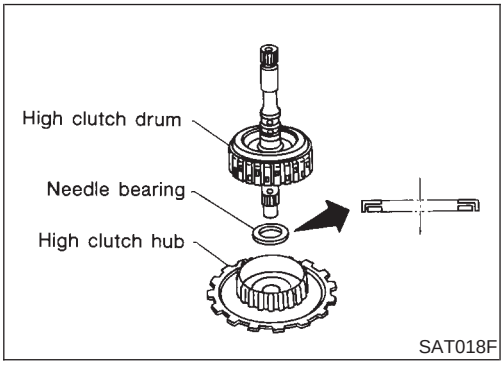
15. Install snap ring with screwdriver.
- **Forward clutch and bearing must be correctly installed for snap ring to fit into groove of transmission case.**



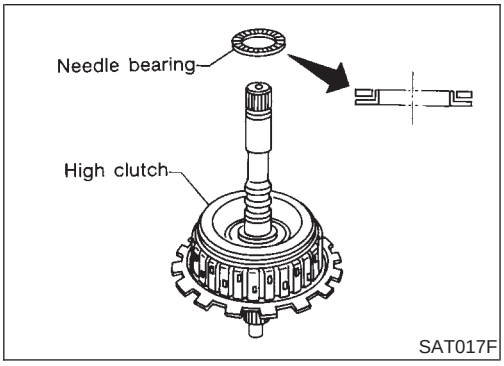
16. Install needle bearing on transmission case.
- **Apply petroleum jelly to needle bearing.**
- **Pay attention to direction of needle bearing.**



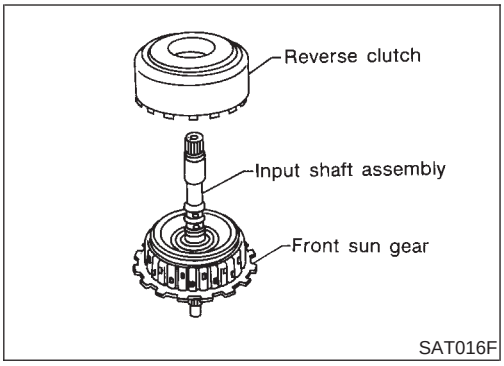
17. Install bearing race, needle bearing and high clutch hub on front sun gear.
- **Apply petroleum jelly to needle bearing.**
- **Pay attention to direction of needle bearing.**



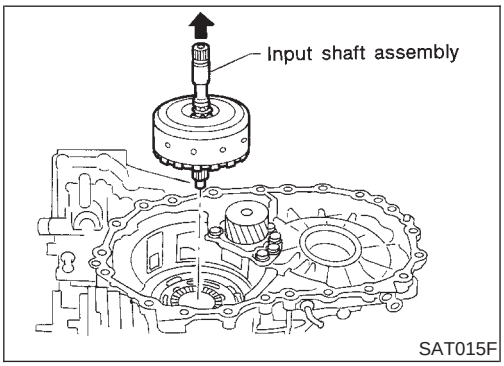
18. Install needle bearing and high clutch drum on high clutch hub.



19. Install needle bearing on high clutch drum.
- **Apply petroleum jelly to needle bearing.**
- **Pay attention to direction of needle bearing.**



20. Remove paper rolled around input shaft.
21. Install input shaft assembly in reverse clutch.
- **Align teeth of reverse clutch drive plates before installing.**



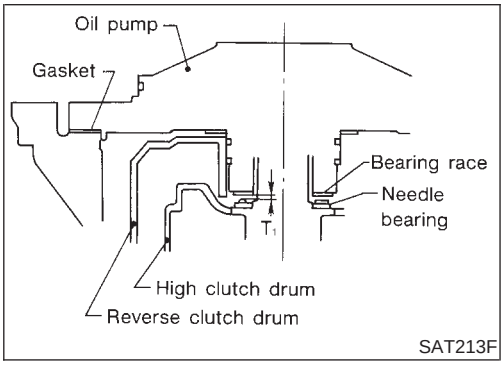
22. Install reverse clutch assembly on transmission case.
- **Align teeth of high clutch drive plates before installing.**

Adjustment (2)

NFAT0180

When any parts listed below are replaced, adjust total end play and reverse clutch end play.

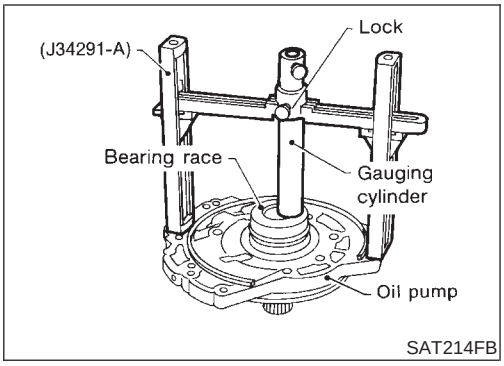
Part name	Total end play	Reverse clutch end play
Transmission case	●	●
Overrun clutch hub	●	●
Rear internal gear	●	●
Rear planetary carrier	●	●
Rear sun gear	●	●
Front planetary carrier	●	●
Front sun gear	●	●
High clutch hub	●	●
High clutch drum	●	●
Oil pump cover	●	●
Reverse clutch drum	—	●



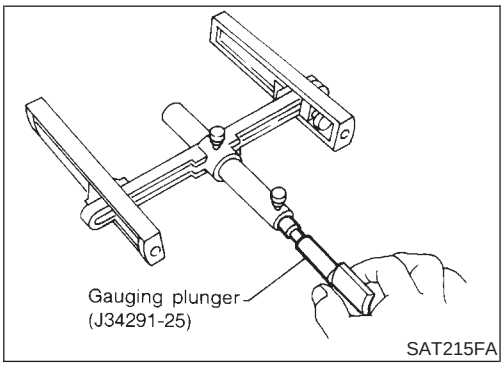
TOTAL END PLAY

NFAT0180S01

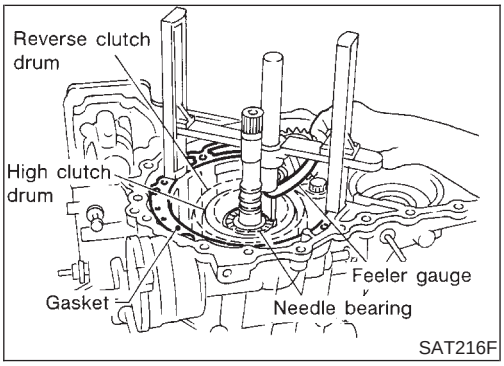
1. Adjust total end play "T_1".



a. With original bearing race installed, place Tool onto oil pump. The long ends of legs should be placed firmly on machined surface of oil pump assembly. The gauging cylinder should rest on top of bearing race. Lock gauging cylinder in place with set screw.



b. Install gauging plunger into cylinder.



c. With needle bearing installed on high clutch drum, place Tool legs on machined surface of transmission case (with gasket). Then allow plunger to rest on needle bearing.

d. Measure gap between cylinder and plunger. This measurement should give exact total end play.

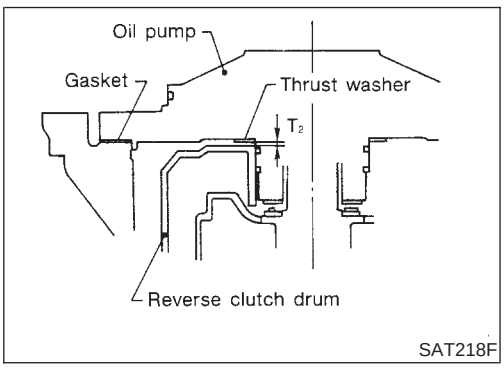
Total end play "T_1":

0.25 - 0.55 mm (0.0098 - 0.0217 in)

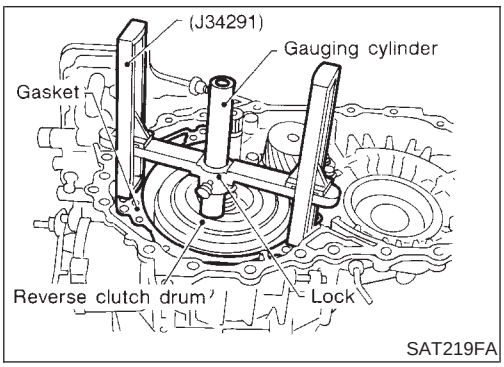
- If end play is out of specification, decrease or increase thickness of bearing race as necessary.

Available bearing race for adjusting total end play:

Refer to SDS, AT-384.

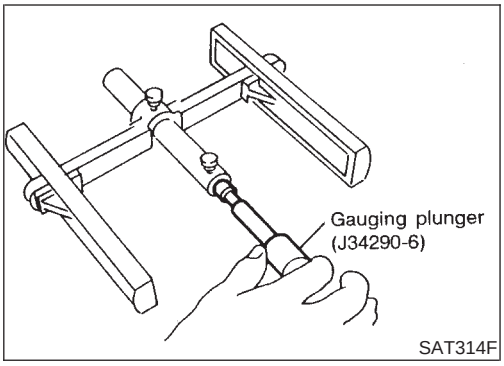


2. Adjust reverse clutch drum end play "T_2".



a. Place Tool on machined surface of transmission case (with gasket). Then allow gauging cylinder to rest on reverse clutch drum. Lock cylinder in place with set screw.

Adjustment (2) (Cont'd)



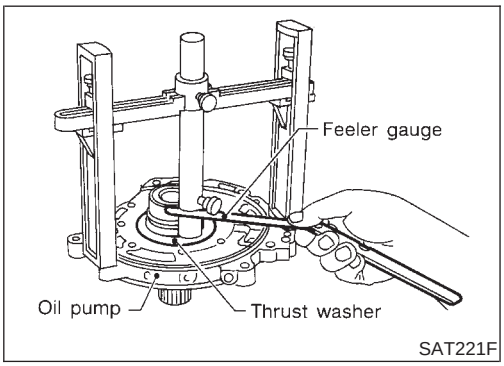
SAT314F

b. Install gauging plunger into cylinder.
c. With original thrust washer installed on oil pump, place Tool legs onto machined surface of oil pump assembly. Then allow plunger to rest on thrust washer.
d. Measure gap between cylinder and plunger with feeler gauge. This measurement should give exact reverse clutch drum end play.

Reverse clutch drum end play "T_2":
0.55 - 0.90 mm (0.0217 - 0.0354 in)

- If end play is out of specification, decrease or increase thickness of thrust washer as necessary.

Available thrust washer for adjusting reverse clutch drum end play:
Refer to SDS, AT-384.

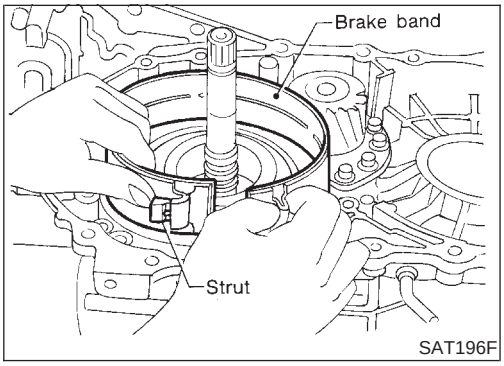


SAT221F

Assembly (3)

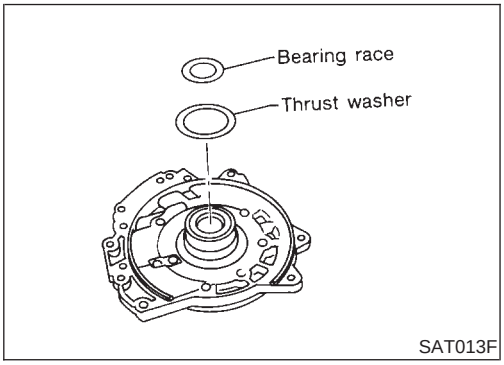
NFAT0181

1. Install anchor end pin and lock nut on transmission case.
2. 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.



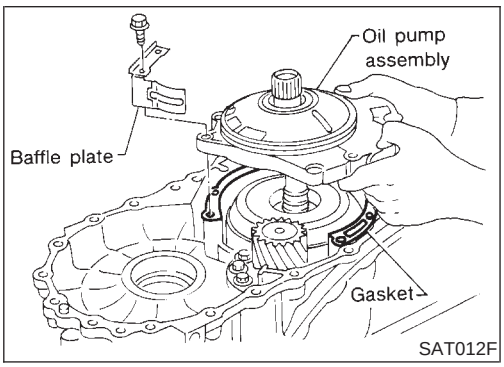
SAT196F

3. Place bearing race selected in total end play adjustment step on oil pump cover.
- **Apply petroleum jelly to bearing race.**
4. Place thrust washer selected in reverse clutch end play step on reverse clutch drum.
- **Apply petroleum jelly to thrust washer.**

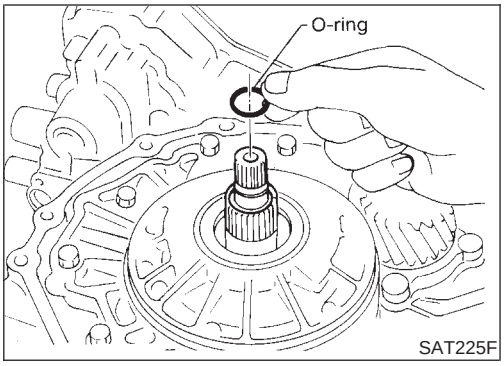


SAT013F

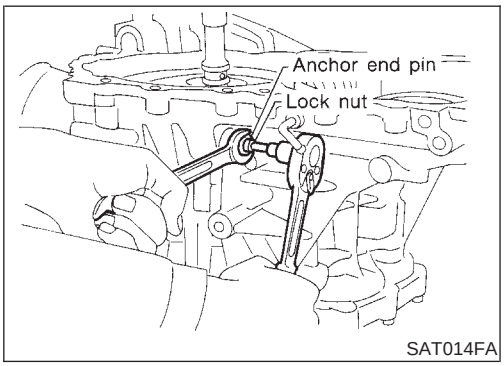
5. Install oil pump assembly, baffle plate and gasket on transmission case.
6. Tighten oil pump fixing bolts to the specified torque.



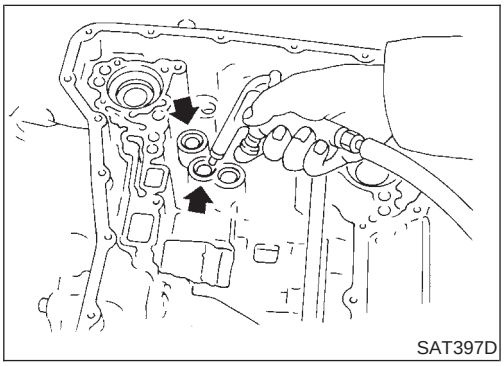
SAT012F



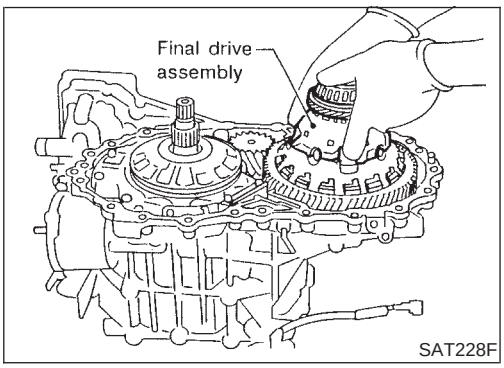
7. Install O-ring to input shaft.
- **Apply ATF to O-ring.**



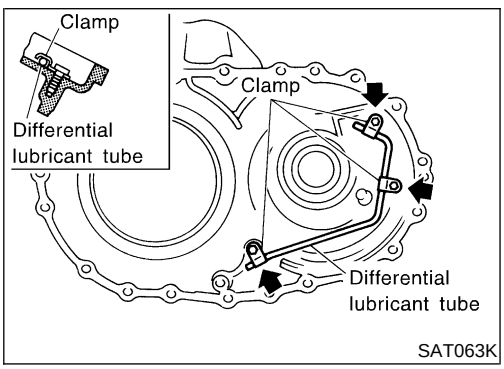
8. Adjust brake band.
a. Tighten anchor end pin to the specified torque.
Anchor end pin:
Refer to SDS, AT-380.
b. Back off anchor end pin two and a half turns.
c. While holding anchor end pin, tighten lock nut.
Lock nut:
Refer to SDS, AT-380.



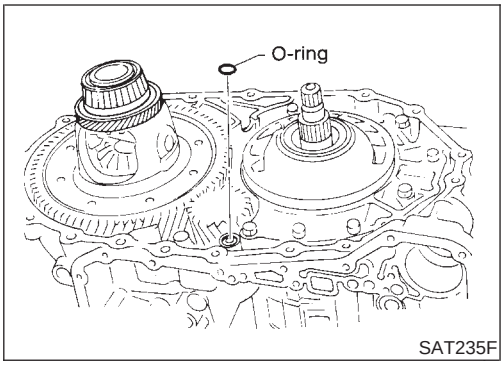
9. Apply compressed air to oil holes of transmission case and check operation of brake band.



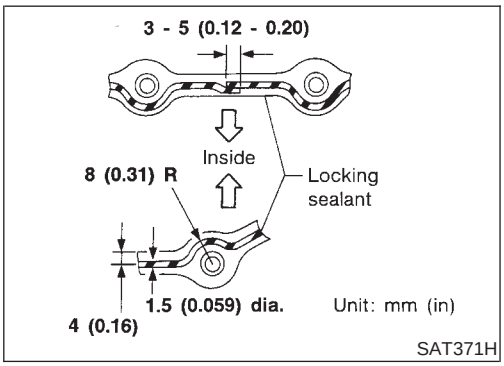
10. Install final drive assembly on transmission case.



11. Install differential lubricant tube on converter housing. Tighten differential lubricant tube bolts to the specified torque. Refer to AT-283.

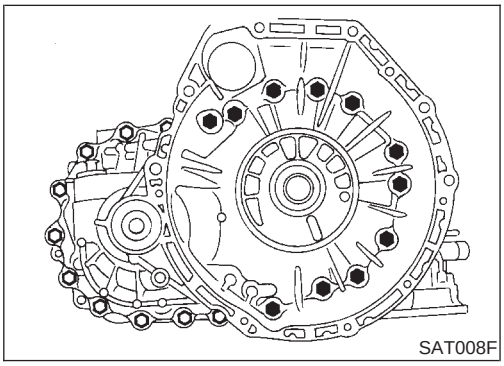


12. Install O-ring on differential oil port of transmission case.

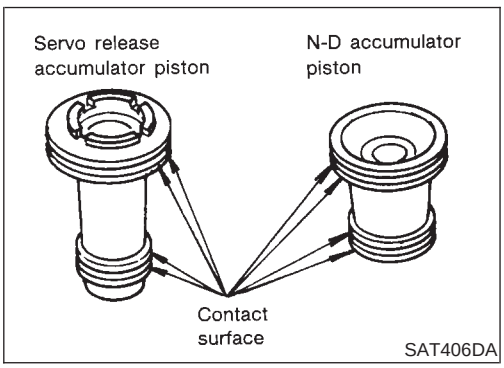


13. Install converter housing on transmission case.

- **Apply locking sealant (Loctite #518) to mating surface of converter housing.**

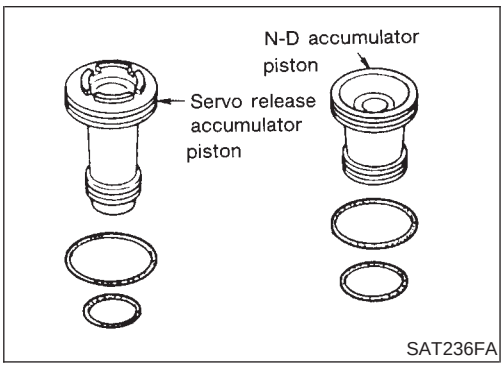


- **Tighten converter housing bolts to the specified torque. Refer to AT-283.**



14. Install accumulator piston.

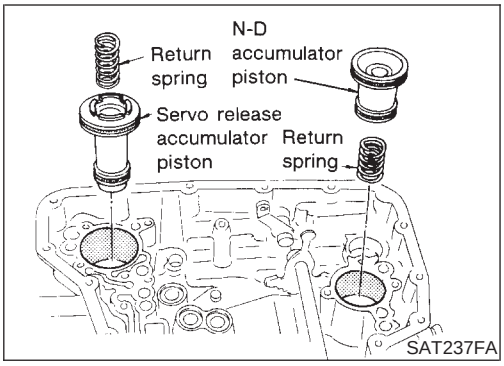
a. Check contact surface of accumulator piston for damage.



b. Install O-rings on accumulator piston.

- **Apply ATF to O-rings.**

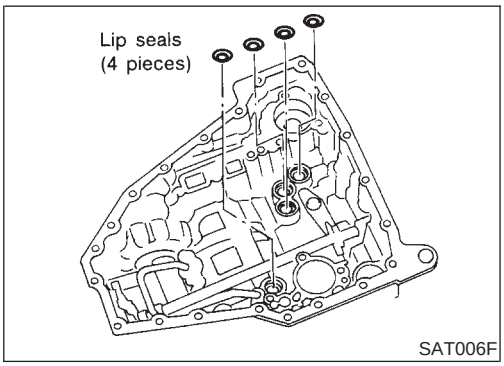
Accumulator piston O-rings:
Refer to SDS, AT-377.



c. Install accumulator pistons and return springs on transmission case.

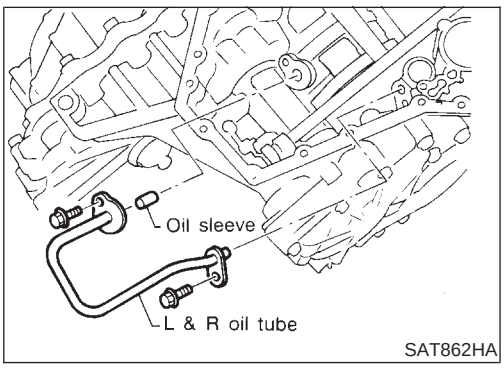
- **Apply ATF to inner surface of transmission case.**

Return springs:
Refer to SDS, AT-378.

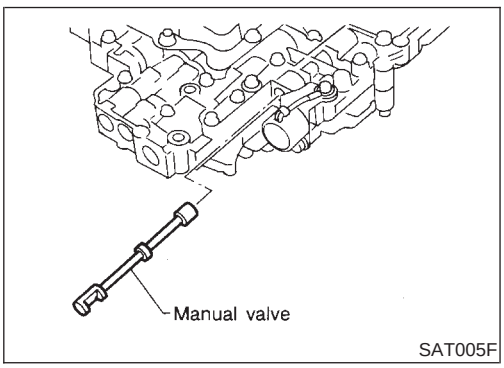


15. Install lip seals for band servo oil holes on transmission case.

- **Apply petroleum jelly to lip seals.**



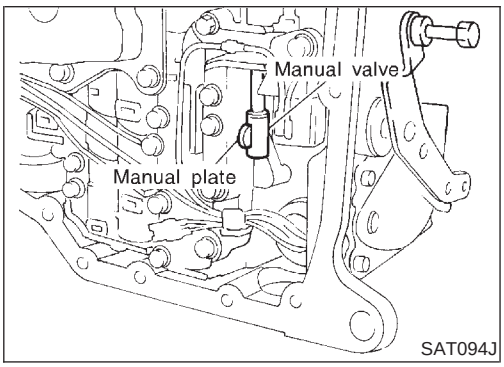
16. Install L & R oil tube and oil sleeve. Tighten L & R oil tube bolts to the specified torque. Refer to AT-283.



17. Install control valve assembly.

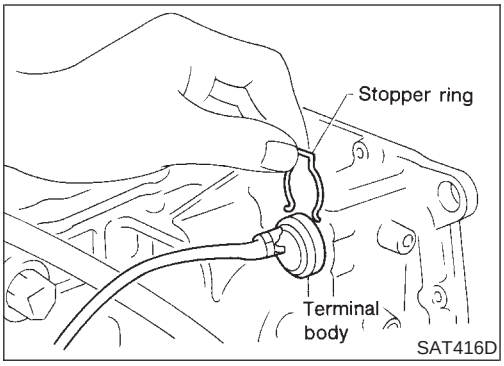
a. Insert manual valve into control valve assembly.

- **Apply ATF to manual valve.**



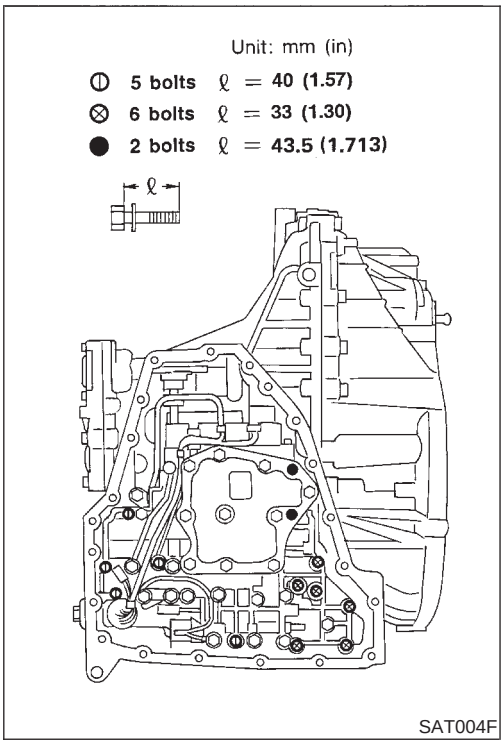
b. Set manual shaft in Neutral position.

c. Install control valve assembly on transmission case while aligning manual valve with manual plate.



SAT416D

d. Pass solenoid harness through transmission case and install terminal body on transmission case by pushing it.
e. Install stopper ring to terminal body.

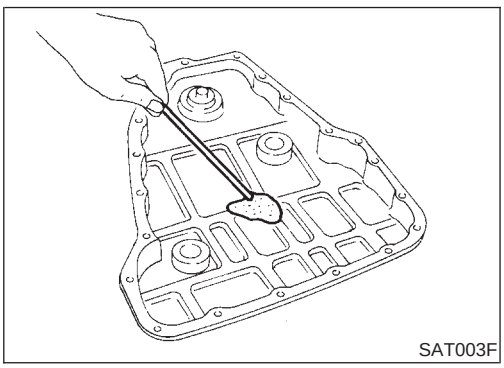


SAT004F

f. Tighten bolts **I**, **X** and ●.

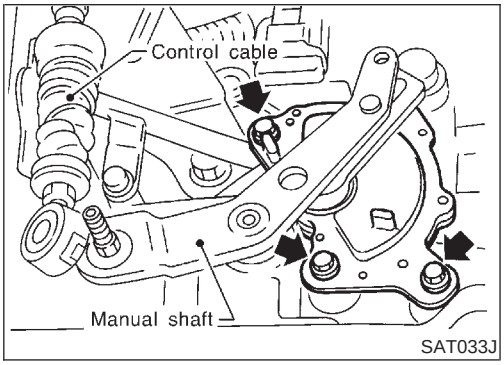
Bolt length, number and location:

Bolt	I	X	●
Bolt length "ℓ" ℓ mm (in)	40 (1.57)	33 (1.30)	43.5 (1.713)
Number of bolts	5	6	2


SAT003F

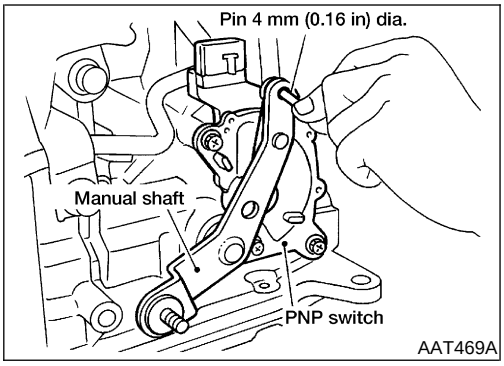
18. Install oil pan.
a. Attach a magnet to oil pan.
b. Install new oil pan gasket on transmission case.
c. Install oil pan on transmission case.
- **Always replace oil pan bolts as they are self-sealing bolts.**
- **Tighten four bolts in a criss-cross pattern to prevent dislocation of gasket.**

d. Tighten oil pan bolts and drain plug to the specified torque. Refer to AT-283.

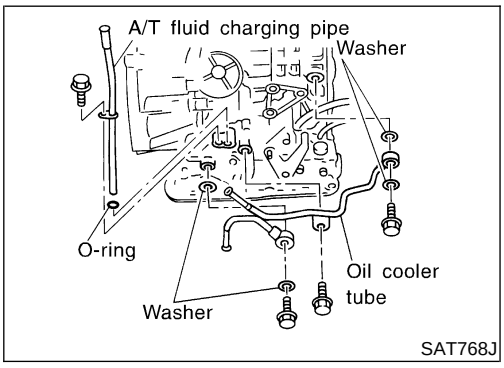


SAT033J

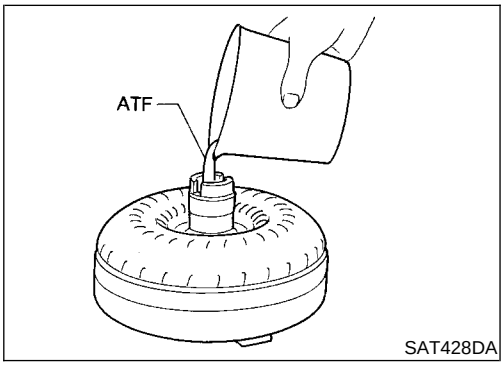
19. Install park/neutral position (PNP) switch.
a. Set manual shaft in P position.
b. Temporarily install park/neutral position (PNP) switch on manual shaft.
c. Move selector lever to N position.



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-283.
f. Remove pin from adjustment hole after adjusting park/neutral position (PNP) switch.

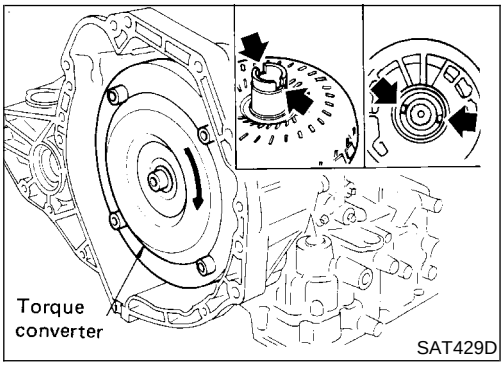


20. Install A/T fluid charging pipe and fluid cooler tube to transmission case. Tighten A/T fluid charging pipe and fluid cooler tube bolts to the specified torque. Refer to AT-283.

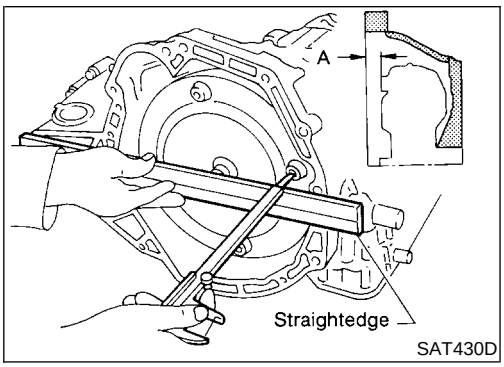


21. Install torque converter.
a. Pour ATF into torque converter.

- **Approximately 1 liter (1-1/8 US qt, 7/8 Imp qt) 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 SDS, AT-385.

General Specifications

NFAT0182

Engine		VQ35DE
Automatic transaxle model		RE4F04B
Automatic transaxle assembly	Model code number	88X04
Transaxle gear ratio	1st	2.785
	2nd	1.545
	3rd	1.000
	4th	0.694
	Reverse	2.272
	Final drive	3.789
Recommended fluid		Nissan Matic “D” (Continental U.S. and Alaska) or Canada Nissan Automatic Transmission Fluid (Canada)*1
Fluid capacity ℓ (US qt, Imp qt)		8.5 (9, 7-1/2)

*1: Refer to MA-11, “Fluids and Lubricants”.

Shift Schedule

NFAT0183

VEHICLE SPEED WHEN SHIFTING GEARS THROTTLE POSITION

NFAT0183S01

Throttle position	Shift pattern	Vehicle speed km/h (MPH)					
		$D_1 \rightarrow D_2$	$D_2 \rightarrow D_3$	$D_3 \rightarrow D_4$	$D_4 \rightarrow D_3$	$D_3 \rightarrow D_2$	$D_2 \rightarrow D_1$
Full throttle	Comfort	59 - 67 (37 - 42)	110 - 118 (68 - 73)	173 - 181 (108 - 112)	169 - 177 (105 - 110)	100 - 108 (62 - 67)	41 - 49 (25 - 30)
	Auto power	59 - 67 (37 - 42)	110 - 118 (68 - 73)	173 - 181 (108 - 112)	169 - 177 (105 - 110)	100 - 108 (62 - 67)	41 - 49 (25 - 30)
Half throttle	Comfort	45 - 53 (28 - 33)	77 - 85 (48 - 53)	133 - 141 (83 - 88)	84 - 92 (52 - 57)	46 - 54 (29 - 34)	15 - 23 (9 - 14)
	Auto power	45 - 53 (28 - 33)	77 - 85 (48 - 53)	134 - 142 (83 - 88)	121 - 129 (75 - 80)	54 - 62 (34 - 39)	16 - 24 (10 - 15)

VEHICLE SPEED WHEN PERFORMING AND RELEASING LOCK-UP

NFAT0183S02

Unit: km/h (MPH)

Throttle position	Selector lever position	Shift patern	Vehicle speed Km/h (MPH)	
			Lock-up ″ON″	Lock-up ″OFF″
2.0/8	D position	Comfort	99 - 107 (62 - 66)	62 - 70 (39 - 43)
		Auto Power	99 - 107 (62 - 66)	62 - 70 (39 - 43)
	3rd position	Comfort	86 - 94 (53 - 58)	83 - 91 (52 - 57)
		Auto Power	86 - 94 (53 - 58)	83 - 91 (52 - 57)

NOTE:

- Lock-up vehicle speed indicates the speed in D_4 position.
- Perform lock-up inspection after warming up engine.
- Lock-up vehicle speed may vary depending on the driving conditions and circumstances.

Stall Revolution

NFAT0184

Engine	Stall revolution rpm
VQ35DE	2,550 - 3,050

Line Pressure

NFAT0185

Engine speed rpm	Line pressure kPa (kg/cm^2, psi)	
	D, 2nd and 1st positions	R position
Idle	500 (5.1, 73)	778 (7.9, 113)
Stall	1,233 (12.6, 179)	1,918 (19.6, 278)

Control Valves

NFAT0186

CONTROL VALVE AND PLUG RETURN SPRINGS

NFAT0186S01

Unit: mm (in)

Parts			Item		
			Part No.*	Free length	Outer diameter
Upper body	23	Pilot valve spring	31742-3AX03	38.98 (1.535)	8.9 (0.350)
	7	1-2 accumulator valve spring	31742-3AX00	20.5 (0.807)	6.95 (0.274)
	28	1-2 accumulator piston spring	31742-3AX09	55.66 (2.191)	19.6 (0.772)
	33	1st reducing valve spring	31742-85X05	26.0 (1.024)	7.0 (0.276)
	35	3-2 timing valve spring	31736-01X00	23.0 (0.906)	6.65 (0.262)
	18	Overrun clutch reducing valve spring	31742-80X15	37.5 (1.476)	6.9 (0.272)
	16	Torque converter relief valve spring	31742-80X07	31.0 (1.220)	9.0 (0.354)
	11	Torque converter clutch control valve	31742-85X00	56.98 (2.243)	6.5 (0.256)
	3	Cooler check valve spring	31742-85X01	29.4 (1.157)	6.0 (0.236)
Lower body	15	Pressure regulator valve spring	31742-80X13	45.0 (1.772)	15.0 (0.591)
	20	Overrun clutch control valve spring	31762-80X00	21.7 (0.854)	7.0 (0.276)
	24	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)
	32	Shuttle valve spring	31762-41X04	51.0 (2.008)	5.65 (0.222)
	12	Shift valve B spring	31762-80X00	21.7 (0.854)	7.0 (0.276)
	7	Pressure modifier valve spring	31742-41X15	30.5 (1.201)	9.8 (0.386)
	3		31742-80X16	32.0 (1.260)	6.9 (0.272)
	—	Oil cooler relief valve spring	31872-31X00	17.02 (0.670)	8.0 (0.315)

*: Always check with the Parts Department for the latest parts information.

Accumulator

NFAT0187

O-RING

NFAT0187S01

Unit: mm (in)

Accumulator	Part No.*	Inner diameter (Small)	Part No.*	Inner diameter (Large)
Servo release accumulator	31526-41X03	26.9 (1.059)	31526-41X02	44.2 (1.740)
N-D accumulator	31526-31X08	34.6 (1.362)	31672-21X00	39.4 (1.551)

*: Always check with the Parts Department for the latest parts information.

Accumulator (Cont'd)

RETURN SPRING

=NFAT0187S02

Unit: mm (in)

Accumulator	Part number*	Free length	Outer diameter
Servo release accumulator	31605-80X00	52.5 (2.067)	20.1 (0.791)
N-D accumulator	31605-85X01	45.01 (1.772)	28.0 (1.102)

*: Always check with the Parts Department for the latest parts information.

Clutch and Brakes

NFAT0188

REVERSE CLUTCH

NFAT0188S01

Model code number		88X04	
Number of drive plates		2	
Number of driven plates		2	
Drive plate thickness mm (in)	Standard	1.6 (0.063)	
	Allowable limit	1.4 (0.055)	
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*
		6.6 (0.260) 6.8 (0.268) 7.0 (0.276) 7.2 (0.283) 7.4 (0.291) 7.6 (0.299) 7.8 (0.307)	31537-80X05 31537-80X06 31537-80X07 31537-80X08 31537-80X09 31537-80X20 31537-80X21

*: Always check with the Parts Department for the latest parts information.

HIGH CLUTCH

NFAT0188S02

Model code number		88X04	
Number of drive plates		4	
Number of driven plates		6 + 1	
Drive plate thickness mm (in)	Standard	1.6 (0.063)	
	Allowable limit	1.4 (0.055)	
Clearance mm (in)	Standard	1.8 - 2.2 (0.071 - 0.087)	
	Allowable limit	2.8 (0.110)	
Thickness of retaining plates		Thickness mm (in)	Part number*
		3.0 (0.118) 3.2 (0.126) 3.4 (0.134) 3.6 (0.142) 3.8 (0.150) 4.0 (0.157)	31537-81X10 31537-81X11 31537-81X12 31537-81X13 31537-81X14 31537-81X15

*: Always check with the Parts Department for the latest parts information.

FORWARD CLUTCH

NFAT0188S03

Model code number		88X04	
Number of drive plates		6	
Number of driven plates		6	
Drive plate thickness mm (in)	Standard	1.6 (0.063)	
	Allowable limit	1.4 (0.055)	
Clearance mm (in)	Standard	0.45 - 0.85 (0.0177 - 0.0335)	
	Allowable limit	1.85 (0.0728)	
Thickness of retaining plates		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) 4.2 (0.165) 4.4 (0.173)	31537-80X76 31537-80X75 31537-80X70 31537-80X71 31537-80X72 31537-80X73 31537-80X74

*: Always check with the Parts Department for the latest parts information.

OVERRUN CLUTCH

NFAT0188S04

Model code number		88X04	
Number of drive plates		4	
Number of driven plates		4	
Drive plate thickness mm (in)	Standard	1.6 (0.063)	
	Allowable limit	1.4 (0.055)	
Clearance mm (in)	Standard	0.7 - 1.1 (0.028 - 0.043)	
	Allowable limit	1.7 (0.067)	
Thickness of retaining plates		Thickness mm (in)	Part number*
		3.0 (0.118) 3.2 (0.126) 3.4 (0.134) 3.6 (0.142) 3.8 (0.150)	31537-80X65 31537-80X66 31537-80X67 31537-80X68 31537-80X69

*: Always check with the Parts Department for the latest parts information.

Clutch and Brakes (Cont'd)

LOW & REVERSE BRAKE

NFAT0188S05

Model code number		88X04	
Number of drive plates		7	
Number of driven plates		7	
Drive plate thickness mm (in)	Standard	1.8 (0.071)	
	Allowable limit	1.6 (0.063)	
Clearance mm (in)	Standard	1.7 - 2.1 (0.067 - 0.083)	
	Allowable limit	3.3 (0.130)	
Thickness of retaining plates		Thickness mm (in)	Part number*
		2.0 (0.079)	31667-80X00
		2.2 (0.087)	31667-80X01
		2.4 (0.094)	31667-80X02
		2.6 (0.102)	31667-80X03
		2.8 (0.110)	31667-80X04
		3.0 (0.118)	31667-80X05
		3.2 (0.126)	31667-80X06
		3.4 (0.134)	31667-80X07

*: Always check with the Parts Department for the latest parts information.

BRAKE BAND

NFAT0188S06

Anchor end pin tightening torque N·m (kg-m, in-lb)	4.0 - 5.8 (0.41 - 0.59, 36 - 51)
Number of returning revolutions for anchor end pin	2.5
Lock nut tightening torque N·m (kg-m, ft-lb)	32 - 36 (3.2 - 3.7, 23 - 27)

CLUTCH AND BRAKE RETURN SPRINGS

NFAT0188S07

Unit: mm (in)

Parts	Part number*	Free length	Outer diameter
Forward clutch (Overrun clutch) (22 pcs)	31505-80X02	21.4 (0.843)	10.3 (0.406)
High clutch (10 pcs)	31505-80X05	22.5 (0.886)	10.8 (0.425)
Low & reverse brake (24 pcs)	31505-80X07	24.1 (0.949)	6.6 (0.260)

*: Always check with the Parts Department for the latest parts information.

Final Drive

NFAT0189

DIFFERENTIAL SIDE GEAR CLEARANCE

NFAT0189S01

Clearance between side gear and differential case with washer mm (in)	0.1 - 0.2 (0.004 - 0.008)

DIFFERENTIAL SIDE GEAR THRUST WASHERS

NFAT0189S02

Thickness mm (in)	Part number*
0.75 (0.0295)	38424-81X00
0.80 (0.0315)	38424-81X01
0.85 (0.0335)	38424-81X02
0.90 (0.0354)	38424-81X03
0.95 (0.0374)	38424-81X04

*: Always check with the Parts Department for the latest parts information.

DIFFERENTIAL SIDE BEARING PRELOAD ADJUSTING SHIMS

NFAT0189S03

Thickness mm (in)	Part number*
0.48 (0.0189)	31438-80X00
0.52 (0.0205)	31438-80X01
0.56 (0.0220)	31438-80X02
0.60 (0.0236)	31438-80X03
0.64 (0.0252)	31438-80X04
0.68 (0.0268)	31438-80X05
0.72 (0.0283)	31438-80X06
0.76 (0.0299)	31438-80X07
0.80 (0.0315)	31438-80X08
0.84 (0.0331)	31438-80X09
0.88 (0.0346)	31438-80X10
0.92 (0.0362)	31438-80X11

*: Always check with the Parts Department for the latest parts information.

BEARING PRELOAD

NFAT0189S04

Differential side bearing preload mm (in)	0.05 - 0.09 (0.0020 - 0.0035)

TURNING TORQUE

NFAT0189S05

Turning torque of final drive assembly N·m (kg-cm, in-lb)	0.78 - 1.37 (8.0 - 14.0, 6.9 - 12.2)

CLUTCH AND BRAKE RETURN SPRINGS

NFAT0189S06

Unit: mm (in)

Parts	Part number*	Free length	Outer diameter
Forward clutch (Overrun clutch) (22 pcs)	31505-80X02	21.4 (0.843)	10.3 (0.406)
High clutch (10 pcs)	31505-80X05	22.5 (0.886)	10.8 (0.425)
Low & reverse brake (24 pcs)	31505-80X07	24.1 (0.949)	6.6 (0.260)

*: Always check with the Parts Department for the latest parts information.

Planetary Carrier and Oil Pump

NFAT0190

PLANETARY CARRIER

NFAT0190S01

Clearance between planetary carrier and pinion washer mm (in)	Standard	0.20 - 0.70 (0.0079 - 0.0276)
	Allowable limit	0.80 (0.0315)

OIL PUMP

NFAT0190S02

Oil pump side clearance mm (in)		0.030 - 0.050 (0.0012 - 0.0020)	
Thickness of inner gears and outer gears		Inner gear	
		Thickness mm (in)	Part number*
		11.99 - 12.0 (0.4720 - 0.4724) 11.98 - 11.99 (0.4717 - 0.4720) 11.97 - 11.98 (0.4713 - 0.4717)	31346-80X00 31346-80X01 31346-80X02
		Outer gear	
		Thickness mm (in)	Part number*
		11.99 - 12.0 (0.4720 - 0.4724) 11.98 - 11.99 (0.4717 - 0.4720) 11.97 - 11.98 (0.4713 - 0.4717)	31347-80X00 31347-80X01 31347-80X02
Clearance between oil pump housing and outer gear mm (in)	Standard	0.111 - 0.181 (0.0044 - 0.0071)	
	Allowable limit	0.181 (0.0071)	
Oil pump cover seal ring clearance mm (in)	Standard	0.1 - 0.25 (0.0039 - 0.0098)	
	Allowable limit	0.25 (0.0098)	

*: Always check with the Parts Department for the latest parts information.

Input Shaft

NFAT0191

SEAL RING CLEARANCE

NFAT0191S01

Input shaft seal ring clearance mm (in)	Standard	0.08 - 0.23 (0.0031 - 0.0091)
	Allowable limit	0.23 (0.0091)

SEAL RING

NFAT0191S02

Outer diameter mm (in)	Inner diameter mm (in)	Width mm (in)	Part number*
26.01 (1.024)	22.4 (0.882)	1.971 (0.078)	31525-80X02

*: Always check with the Parts Department for the latest Parts information.

Reduction Pinion Gear

NFAT0192

TURNING TORQUE

NFAT0192S01

Turning torque of reduction pinion gear N·m (kg-cm, in-lb)	0.05 - 0.39 (0.5 - 4.0, 0.43 - 3.47)

REDUCTION PINION GEAR BEARING ADJUSTING SHIMS

NFAT0192S02

NO.	Thickness mm (in)	Part number	NO.	Thickness mm (in)	Part number*
1	5.00 (0.1969)	31439-81X00	30	5.58 (0.2197)	31439-81X60
2	5.02 (0.1976)	31439-81X01	31	5.60 (0.2205)	31439-81X61
3	5.04 (0.1984)	31439-81X02	32	5.62 (0.2213)	31439-81X62
4	5.06 (0.1992)	31439-81X03	33	5.64 (0.2220)	31439-81X63
5	5.08 (0.2000)	31439-81X04	34	5.66 (0.2228)	31439-81X64
6	5.10 (0.2008)	31439-81X05	35	5.68 (0.2236)	31439-81X65
7	5.12 (0.2016)	31439-81X06	36	5.70 (0.2244)	31439-81X66
8	5.14 (0.2024)	31439-81X07	37	5.72 (0.2252)	31439-81X67
9	5.16 (0.2031)	31439-81X08	38	5.74 (0.2260)	31439-81X68
10	5.18 (0.2039)	31439-81X09	39	5.76 (0.2268)	31439-81X69
11	5.20 (0.2047)	31439-81X10	40	5.78 (0.2276)	31439-81X70

Reduction Pinion Gear (Cont'd)

NO.	Thickness mm (in)	Part number	NO.	Thickness mm (in)	Part number*
12	5.22 (0.2055)	31439-81X11	41	5.80 (0.2283)	31439-81X71
13	5.24 (0.2063)	31439-81X12	42	5.82 (0.2291)	31439-81X72
14	5.26 (0.2071)	31439-81X13	43	5.84 (0.2299)	31439-81X73
15	5.28 (0.2079)	31439-81X14	44	5.86 (0.2307)	31439-81X74
16	5.30 (0.2087)	31439-81X15	45	4.72 (0.1858)	31439-83X11
17	5.32 (0.2094)	31439-81X16	46	4.74 (0.1866)	31439-83X12
18	5.34 (0.2102)	31439-81X17	47	4.76 (0.1874)	31439-83X13
19	5.36 (0.2110)	31439-81X18	48	4.78 (0.1882)	31439-83X14
20	5.38 (0.2118)	31439-81X19	49	4.80 (0.1890)	31439-83X15
21	5.40 (0.2126)	31439-81X20	50	4.82 (0.1898)	31439-83X16
22	5.42 (0.2134)	31439-81X21	51	4.84 (0.1906)	31439-83X17
23	5.44 (0.2142)	31439-81X22	52	4.86 (0.1913)	31439-83X18
24	5.46 (0.2150)	31439-81X23	53	4.88 (0.1921)	31439-83X19
25	5.48 (0.2157)	31439-81X24	54	4.90 (0.1929)	31439-83X20
26	5.50 (0.2165)	31439-81X46	55	4.92 (0.1937)	31439-83X21
27	5.52 (0.2173)	31439-81X47	56	4.94 (0.1945)	31439-83X22
28	5.54 (0.2181)	31439-81X48	57	4.96 (0.1953)	31439-83X23
29	5.56 (0.2189)	31439-81X49	58	4.98 (0.1961)	31439-83X24

*: Always check with the Parts Department for the latest parts information.

Band Servo

RETURN SPRING

NFAT0193

NFAT0193S01

Unit: mm (in)

Return spring	Part number*	Free length	Outer diameter
2nd servo return spring	31605-31X20	32.5 (1.280)	25.9 (1.020)
O/D servo return spring	31605-80X07	62.6 (2.465)	31.7 (1.248)

*: Always check with the Parts Department for the latest parts information.

Output Shaft

NFAT0194

SEAL RING CLEARANCE

NFAT0194S01

Output shaft seal ring clearance mm (in)	Standard	0.10 - 0.25 (0.0039 - 0.0098)
	Allowable limit	0.25 (0.0098)

SEAL RING

NFAT0194S04

Outer diameter mm (in)	Inner diameter mm (in)	Width mm (in)	Part number*
33.711 (1.3272)	30.2 (1.189)	1.951 (0.0768)	31525-80X09

*: Always check with the Parts Department for the latest Parts information.

END PLAY

NFAT0194S02

Output shaft end play mm (in)	0 - 0.15 (0 - 0.0059)

Output Shaft (Cont'd)

OUTPUT SHAFT ADJUSTING SHIMS

NFAT0194S03

Thickness mm (in)	Part number*
0.80 (0.0315)	31438-80X60
0.84 (0.0331)	31438-80X61
0.88 (0.0346)	31438-80X62
0.92 (0.0362)	31438-80X63
0.96 (0.0378)	31438-80X64
1.00 (0.0394)	31438-80X65
1.04 (0.0409)	31438-80X66
1.08 (0.0425)	31438-80X67
1.12 (0.0441)	31438-80X68
1.16 (0.0457)	31438-80X69
1.20 (0.0472)	31438-80X70

*: Always check with the Parts Department for the latest parts information.

Bearing Retainer

NFAT0195

SEAL RING CLEARANCE

NFAT0195S01

Bearing retainer seal ring clearance mm (in)	Standard	0.10 - 0.30 (0.0039 - 0.0118)
	Allowable limit	0.30 (0.0118)

Total End Play

NFAT0196

Total end play mm (in)	0.25 - 0.55 (0.0098 - 0.0217)

BEARING RACE FOR ADJUSTING TOTAL END PLAY

NFAT0196S01

Thickness mm (in)	Part number*
0.8 (0.031)	31435-80X00
1.0 (0.039)	31435-80X01
1.2 (0.047)	31435-80X02
1.4 (0.055)	31435-80X03
1.6 (0.063)	31435-80X04
1.8 (0.071)	31435-80X05
2.0 (0.079)	31435-80X06
0.9 (0.035)	31435-80X09
1.1 (0.043)	31435-80X10
1.3 (0.051)	31435-80X11
1.5 (0.059)	31435-80X12
1.7 (0.067)	31435-80X13
1.9 (0.075)	31435-80X14

*: Always check with the Parts Department for the latest parts information.

Reverse Clutch End Play

NFAT0197

Reverse clutch end play mm (in)	0.55 - 0.90 (0.0217 - 0.0354)

THRUST WASHERS FOR ADJUSTING REVERSE CLUTCH DRUM END PLAY

NFAT0197S01

Thickness mm (in)	Part number*
0.80 (0.0315)	31508-80X13
0.95 (0.0374)	31508-80X14
1.10 (0.0433)	31508-80X15
1.25 (0.0492)	31508-80X16
1.40 (0.0551)	31508-80X17
1.55 (0.0610)	31508-80X18
1.70 (0.0669)	31508-80X19
1.85 (0.0728)	31508-80X20

*: Always check with the Parts Department for the latest parts information.

Removal and Installation

NFAT0198

Unit: mm (in)

Distance between end of converter housing and torque converter	14 (0.55)

Shift Solenoid Valves

NFAT0264

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)

Solenoid Valves

NFAT0265

Solenoid valves	Resistance (Approx.) Ω	Terminal No.
Shift solenoid valve A	20 - 30	2
Shift solenoid valve B	5 - 20	1
Overrun clutch solenoid valve	20 - 30	3
Line pressure solenoid valve	2.5 - 5	4
Torque converter clutch solenoid valve	5 - 20	5

A/T Fluid Temperature Sensor

NFAT0266

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 (For Speed Sensor)

NFAT0267

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.	450 Hz (Approx.)
When vehicle parks.	0V

Dropping Resistor

NFAT0268

Resistance	Approx. 12Ω

Power Train Revolution Sensor

NFAT0271

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.	240 Hz (Approx.)
When vehicle parks.	Under 1.3V or over 4.5V

NOTES

BODY & TRIM

SECTION BT

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Service Notice

NFBT0001

- When removing or installing various parts, place a cloth or padding onto the vehicle body to prevent scratches.
- Handle trim, molding, instruments, grille, etc. carefully during removing or installing. Be careful not to soil or damage them.
- Apply sealing compound where necessary when installing parts.
- When applying sealing compound, be careful that the sealing compound does not protrude from parts.
- When replacing any metal parts (for example body outer panel, members, etc.), be sure to take rust prevention measures.

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

NFBT0002

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER” used along with a seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. The SRS system composition which is available to NISSAN MODEL A33 is as follows (The composition varies according to optional equipment.):

- For a frontal collision
  The Supplemental Restraint System consists of driver air bag module (located in the center of the steering wheel), front passenger air bag module (located on the instrument panel on passenger side), seat belt pre-tensioners, a diagnosis sensor unit, crash zone sensor, warning lamp, wiring harness and spiral cable.
- For a side collision
  The Supplemental Restraint System consists of front side air bag module (located in the outer side of front seat), satellite sensor, diagnosis sensor unit (one of components of air bags for a frontal collision), wiring harness, warning lamp (one of components of air bags for a frontal collision).

Information necessary to service the system safely is included in the **RS section** of this Service Manual.

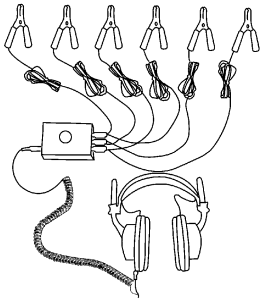
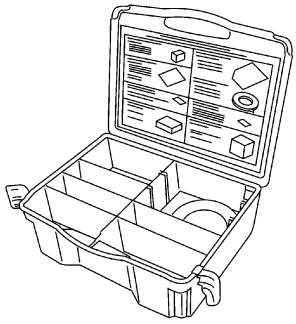
WARNING:

- **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 should be performed by an authorized NISSAN 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 RS 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 harness connector (and by yellow harness protector or yellow insulation tape before the harness connectors).**

Special Service Tools

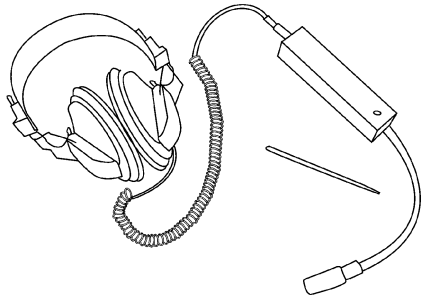
NFBT0027

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
— (J-39570) Chassis ear	Locating the noise  SBT839
— (J-43980) Nissan Squeak and Rattle kit	Repairing the cause of noise  SBT840

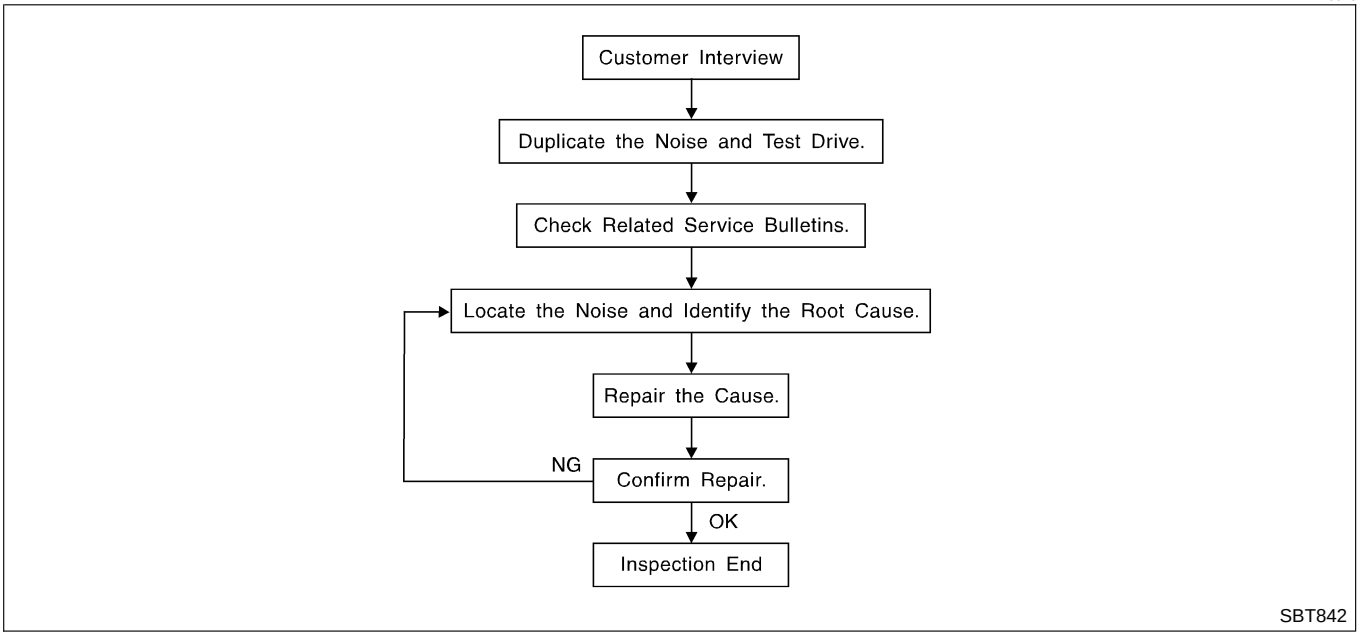
Commercial Service Tools

NFBT0028

Tool name	Description
Engine ear	Locating the noise  SBT841

Work Flow

NFBT0029



CUSTOMER INTERVIEW

NFBT0029S01

Interview the customer, if possible, to determine the conditions that exist when the noise occurs. Use the Diagnostic Worksheet during the interview to document the facts and conditions when the noise occurs and any customer's comments; refer to BT-9. This information is necessary to duplicate the conditions that exist when the noise occurs.

- The customer may not be able to provide a detailed description or the location of the noise. Attempt to obtain all the facts and conditions that exist when the noise occurs (or does not occur).
- If there is more than one noise in the vehicle, be sure to diagnose and repair the noise that the customer is concerned about. This can be accomplished by test driving the vehicle with the customer.
- After identifying the type of noise, isolate the noise in terms of its characteristics. The noise characteristics are provided so the customer, service adviser and technician are all speaking the same language when defining the noise.
- Squeak — (Like tennis shoes on a clean floor)
  Squeak characteristics include the light contact/fast movement/brought on by road conditions/hard surfaces = higher pitch noise/softer surfaces = lower pitch noises/edge to surface = chirping
- Creak — (Like walking on an old wooden floor)
  Creak characteristics include firm contact/slow movement/twisting with a rotational movement/pitch dependent on materials/often brought on by activity.
- Rattle — (Like shaking a baby rattle)
  Rattle characteristics include the fast repeated contact/vibration or similar movement/loose parts/missing clip or fastener/incorrect clearance.
- Knock — (Like a knock on a door)
  Knock characteristics include hollow sounding/sometimes repeating/often brought on by driver action.
- Tick — (Like a clock second hand)
  Tick characteristics include gentle contacting of light materials/loose components/can be caused by driver action or road conditions.
- Thump — (Heavy, muffled knock noise)
  Thump characteristics include softer knock/dead sound often brought on by activity.
- Buzz — (Like a bumble bee)
  Buzz characteristics include high frequency rattle/firm contact.
- Often the degree of acceptable noise level will vary depending upon the person. A noise that you may judge as acceptable may be very irritating to the customer.
- Weather conditions, especially humidity and temperature, may have a great effect on noise level.

Work Flow (Cont'd)

DUPLICATE THE NOISE AND TEST DRIVE

NFBT0029S02

If possible, drive the vehicle with the customer until the noise is duplicated. Note any additional information on the Diagnostic Worksheet regarding the conditions or location of the noise. This information can be used to duplicate the same conditions when you confirm the repair.
If the noise can be duplicated easily during the test drive, to help identify the source of the noise, try to duplicate the noise with the vehicle stopped by doing one or all of the following:

1) Close a door.
2) Tap or push/pull around the area where the noise appears to be coming from.
3) Rev the engine.
4) Use a floor jack to recreate vehicle "twist".
5) At idle, apply engine load (electrical load, half-clutch on M/T model, drive position on A/T model).
6) Raise the vehicle on a hoist and hit a tire with a rubber hammer.

- Drive the vehicle and attempt to duplicate the conditions the customer states exist when the noise occurs.
- If it is difficult to duplicate the noise, drive the vehicle slowly on an undulating or rough road to stress the vehicle body.

CHECK RELATED SERVICE BULLETINS

NFBT0029S03

After verifying the customer concern or symptom, check ASIST for Technical Service Bulletins (TSBs) related to that concern or symptom.
If a TSB relates to the symptom, follow the procedure to repair the noise.

LOCATE THE NOISE AND IDENTIFY THE ROOT CAUSE

NFBT0029S04

1. Narrow down the noise to a general area. To help pinpoint the source of the noise, use a listening tool (Chassis Ear: J-39570, Engine Ear: J-39565 and mechanics stethoscope).
2. Narrow down the noise to a more specific area and identify the cause of the noise by:

- removing the components in the area that you suspect the noise is coming from.
  Do not use too much force when removing clips and fasteners, otherwise clips and fastener can be broken or lost during the repair, resulting in the creation of new noise.
- tapping or pushing/pulling the component that you suspect is causing the noise.
  Do not tap or push/pull the component with excessive force, otherwise the noise will be eliminated only temporarily.
- feeling for a vibration with your hand by touching the component(s) that you suspect is (are) causing the noise.
- placing a piece of paper between components that you suspect are causing the noise.
- looking for loose components and contact marks.

  Refer to "Generic Squeak and Rattle Troubleshooting", BT-7.

REPAIR THE CAUSE

NFBT0029S05

- If the cause is a loose component, tighten the component securely.
- If the cause is insufficient clearance between components:

− separate components by repositioning or loosening and retightening the component, if possible.
− insulate components with a suitable insulator such as urethane pads, foam blocks, felt cloth tape or urethane tape. A Nissan Squeak and Rattle Kit (J-43980) is available through your authorized Nissan Parts Department.

CAUTION:
Do not use excessive force as many components are constructed of plastic and may be damaged.
Always check with the Parts Department for the latest parts information.

The following materials are contained in the Nissan Squeak and Rattle Kit (J-43980). Each item can be ordered separately as needed.
URETHANE PADS [1.5 mm (0.059 in) thick]
Insulates connectors, harness, etc.
76268-9E005: 100 x 135 mm (3.94 x 5.31 in)/76884-71L01: 60 x 85 mm (2.36 x 3.35 in)/76884-71L02: 15 x 25 mm (0.59 x 0.98 in)
INSULATOR (Foam blocks)
Insulates components from contact. Can be used to fill space behind a panel.
73982-9E000: 45 mm (1.77 in) thick, 50 x 50 mm (1.97 x 1.97 in)/73982-50Y00: 10 mm (0.39 in) thick, 50 x 50 mm (1.97 x 1.97 in)
INSULATOR (Light foam block)

80845-71L00: 30 mm (1.18 in) thick, 30 x 50 mm (1.18 x 1.97 in)
FELT CLOTH TAPE
Used to insulate where movement does not occur. Ideal for instrument panel applications.
68370-4B000: 15 x 25 mm (0.59 x 0.98 in) pad/68239-13E00: 5 mm (0.20 in) wide tape roll
The following materials, not found in the kit, can also be used to repair squeaks and rattles.
UHMW (TEFLON) TAPE
Insulates where slight movement is present. Ideal for instrument panel applications.
SILICONE GREASE
Used in place of UHMW tape that will be visible or not fit.
Note: Will only last a few months.
SILICONE SPRAY
Use when grease cannot be applied.
DUCT TAPE
Use to eliminate movement.

CONFIRM THE REPAIR

NFBT0029S06

Confirm that the cause of a noise is repaired by test driving the vehicle. Operate the vehicle under the same conditions as when the noise originally occurred. Refer to the notes on the Diagnostic Worksheet.

Generic Squeak and Rattle Troubleshooting

NFBT0030

Refer to Table of Contents for specific component removal and installation information.

INSTRUMENT PANEL

NFBT0030S01

Most incidents are caused by contact and movement between:

1. The cluster lid A and instrument panel
2. Acrylic lens and combination meter housing
3. Instrument panel to front pillar garnish
4. Instrument panel to windshield
5. Instrument panel mounting pins
6. Wiring harnesses behind the combination meter
7. A/C defroster duct and duct joint

These incidents can usually be located by tapping or moving the components to duplicate the noise or by pressing on the components while driving to stop the noise. Most of these incidents can be repaired by applying felt cloth tape or silicon spray (in hard to reach areas). Urethane pads can be used to insulate wiring harness.

CAUTION:

Do not use silicone spray to isolate a squeak or rattle. If you saturate the area with silicone, you will not be able to recheck the repair.

CENTER CONSOLE

NFBT0030S02

Components to pay attention to include:

1. Shifter assembly cover to finisher
2. A/C control unit and cluster lid C
3. Wiring harnesses behind audio and A/C control unit

The instrument panel repair and isolation procedures also apply to the center console.

DOORS

NFBT0030S03

Pay attention to the:

1. Finisher and inner panel making a slapping noise
2. Inside handle escutcheon to door finisher
3. Wiring harnesses tapping
4. Door striker out of alignment causing a popping noise on starts and stops

Tapping or moving the components or pressing on them while driving to duplicate the conditions can isolate many of these incidents. You can usually insulate the areas with felt cloth tape or insulator foam blocks from the Nissan Squeak and Rattle Kit (J-43980) to repair the noise.

TRUNK

=NFBT0030S04

Trunk noises are often caused by a loose jack or loose items put into the trunk by the owner.
In addition look for:

1. Trunk lid bumpers out of adjustment
2. Trunk lid striker out of adjustment
3. The trunk lid torsion bars knocking together
4. A loose license plate or bracket

Most of these incidents can be repaired by adjusting, securing or insulating the item(s) or component(s) causing the noise.

SUNROOF/HEADLINER

NFBT0030S05

Noises in the sunroof/headliner area can often be traced to one of the following:

1. Sunroof lid, rail, linkage or seals making a rattle or light knocking noise
2. Sunvisor shaft shaking in the holder
3. Front or rear windshield touching headliner and squeaking

Again, pressing on the components to stop the noise while duplicating the conditions can isolate most of these incidents. Repairs usually consist of insulating with felt cloth tape.

SEATS

NFBT0030S06

When isolating seat noises it's important to note the position the seat is in and the load placed on the seat when the noise is present. These conditions should be duplicated when verifying and isolating the cause of the noise.
Cause of seat noise include:

1. Headrest rods and holders
2. A squeak between the seat pad cushion and frame
3. The rear seat back lock and bracket

These noises can be isolated by moving or pressing on the suspected components while duplicating the conditions under which the noise occurs. Most of these incidents can be repaired by repositioning the component or applying urethane tape to the contact area.

UNDERHOOD

NFBT0030S07

Some interior noises may be caused by components under the hood or on the engine wall. The noise is then transmitted into the passenger compartment.
Causes of transmitted underhood noises include:

1. Any component mounted to the engine wall
2. Components that pass through the engine wall
3. Engine wall mounts and connectors
4. Loose radiator mounting pins
5. Hood bumpers out of adjustment
6. Hood striker out of adjustment

These noises can be difficult to isolate since they cannot be reached from the interior of the vehicle. The best method is to secure, move or insulate one component at a time and test drive the vehicle. Also, engine RPM or load can be changed to isolate the noise. Repairs can usually be made by moving, adjusting, securing, or insulating the component causing the noise.

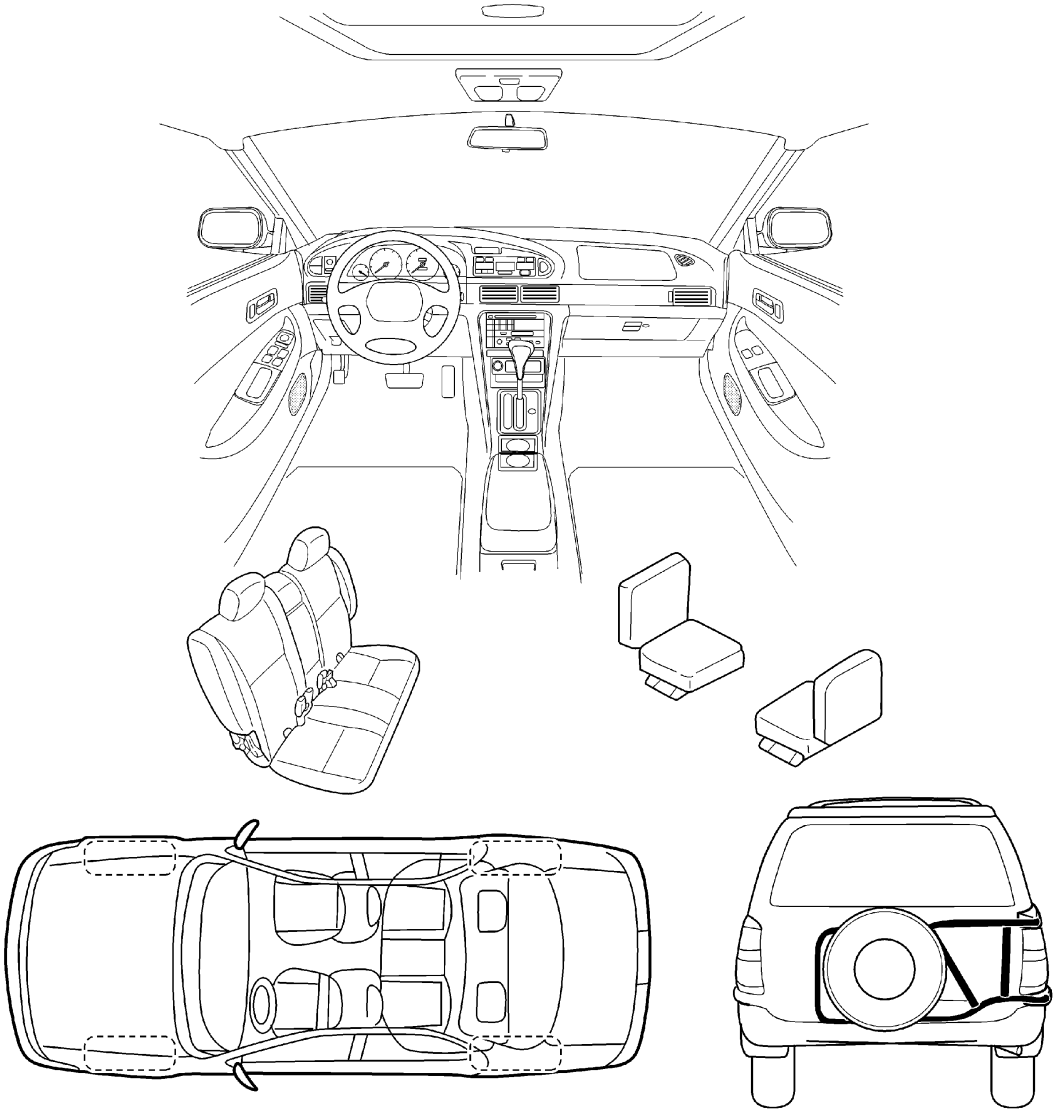
Diagnostic Worksheet

NFBT0031

SQUEAK & RATTLE DIAGNOSTIC WORKSHEET

Dear Nissan Customer:
We are concerned about your satisfaction with your Nissan vehicle. Repairing a squeak or rattle sometimes can be very difficult. To help us fix your Nissan right the first time, please take a moment to note the area of the vehicle where the squeak or rattle occurs and under what conditions. You may be asked to take a test drive with a service advisor or technician to ensure we confirm the noise you are hearing.

I. WHERE DOES THE NOISE COME FROM? (circle the area of the vehicle)
The illustrations are for reference only, and may not reflect the actual configuration of your vehicle.



Continue to the back of the worksheet and briefly describe the location of the noise or rattle. In addition, please indicate the conditions which are present when the noise occurs.

SBT843

SQUEAK & RATTLE DIAGNOSTIC WORKSHEET- page 2

Briefly describe the location where the noise occurs:

_____

_____

II. WHEN DOES IT OCCUR? (check the boxes that apply)

❑ anytime
❑ 1st time in the morning
❑ only when it is cold outside
❑ only when it is hot outside
❑ after sitting out in the sun
❑ when it is raining or wet
❑ dry or dusty conditions
❑ other: _____

III. WHEN DRIVING:

❑ through driveways
❑ over rough roads
❑ over speed bumps
❑ only at about ____ mph
❑ on acceleration
❑ coming to a stop
❑ on turns : left, right or either (circle)
❑ with passengers or cargo
❑ other: _____
❑ after driving ____ miles or ____ minutes

IV. WHAT TYPE OF NOISE?

❑ squeak (like tennis shoes on a clean floor)
❑ creak (like walking on an old wooden floor)
❑ rattle (like shaking a baby rattle)
❑ knock (like a knock on a door)
❑ tick (like a clock second hand)
❑ thump (heavy, muffled knock noise)
❑ buzz (like a bumble bee)

TO BE COMPLETED BY DEALERSHIP PERSONNEL
Test Drive Notes:

_____

_____

	YES	NO	Initials of person performing
Vehicle test driven with customer	❑	❑	_____
- Noise verified on test drive	❑	❑	
- Noise source located and repaired	❑	❑	_____
- Follow up test drive performed to confirm repair	❑	❑	_____

VIN: _____ Customer Name: _____

W.O. #: _____ Date: _____

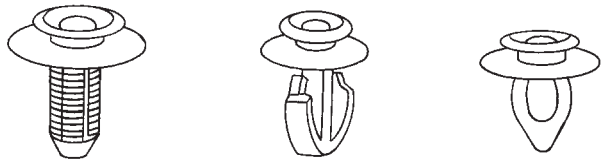
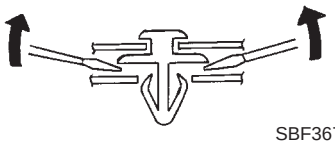
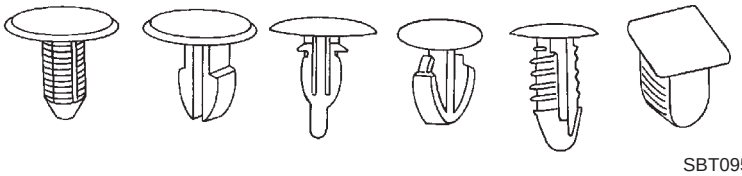
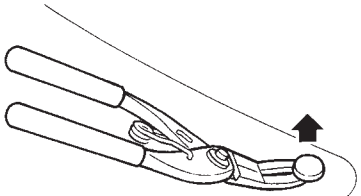
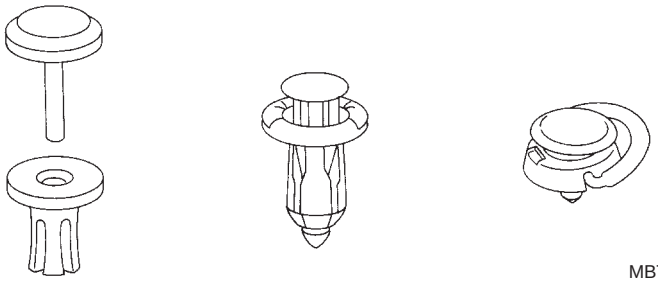
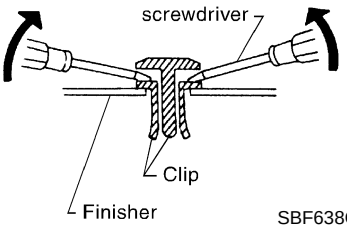
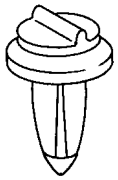
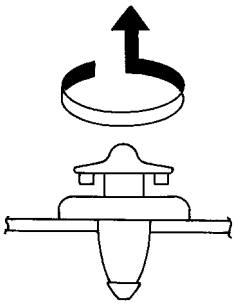
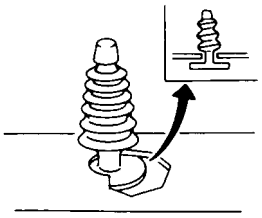
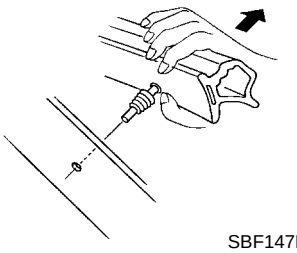
This form must be attached to Work Order

SBT844

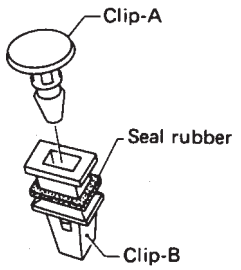
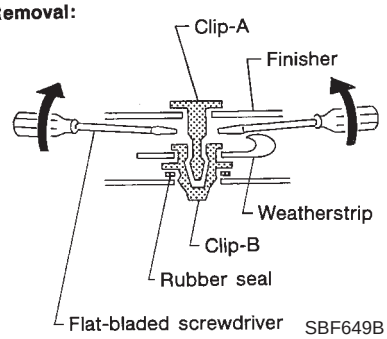
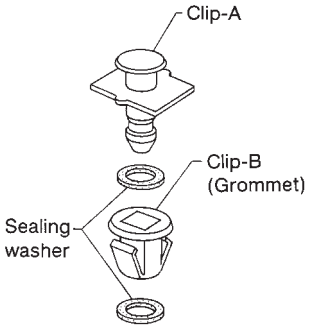
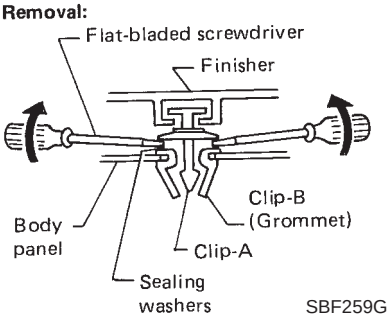
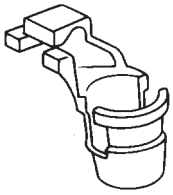
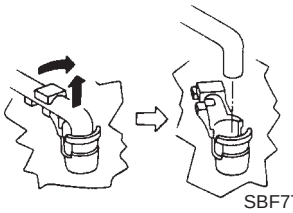
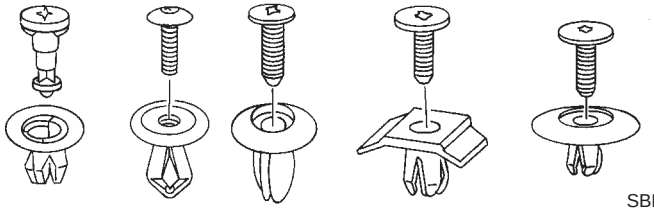
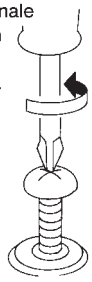
Description

NFBT0003

- Clips and fasteners in BT section correspond to the following numbers and symbols.
- Replace any clips and/or fasteners which are damaged during removal or installation.

Symbol No.	Shapes	Removal & Installation
C101	 SBF302H	**Removal:** Remove by bending up with flat-bladed screwdrivers or clip remover.  SBF367BA
C103	 SBT095	 **Removal:** Remove with a clip remover. SBF423H
C205	 MBT080A	**Removal:** Flat-bladed screwdriver  Clip Finisher SBF638CA
C206	 MBF519B	 MBF520B
CE103	 SBF104B	**Removal:**  SBF147B

Description (Cont'd)

Symbol No.	Shapes	Removal & Installation
CF110	 SBF648B	**Removal:**  SBF649B
CF118	 SBF151D	**Removal:**  SBF259G
CR103	 SBF768B	**Removal:** Holder portion of clip must be spread out to remove rod.  SBF770B
CS101	 SBF078B	**Removal:** 1. Screw out with a Phillips screwdriver. 2. Remove female portion with flat-bladed screwdriver.  SBF992G

Removal and Installation

NFBT0004

- When removing or installing hood, place a cloth or other padding on hood. This prevents vehicle body from being scratched.
- Bumper fascia is made of plastic. Do not use excessive force and be sure to keep oil away from it.
- Hood adjustment: Adjust at hinge portion.
- Hood lock adjustment: After adjusting, check hood lock control operation. Apply a coat of grease to hood locks engaging mechanism.
- Hood opener: Do not attempt to bend cable forcibly. Doing so increases effort required to unlock hood.

WARNING:

- **Be careful not to scratch hood stay when installing hood. A scratched stay may cause gas leakage.**
- **The contents of the hood stay are under pressure. Do not take apart, puncture, apply heat or allow fire near it.**

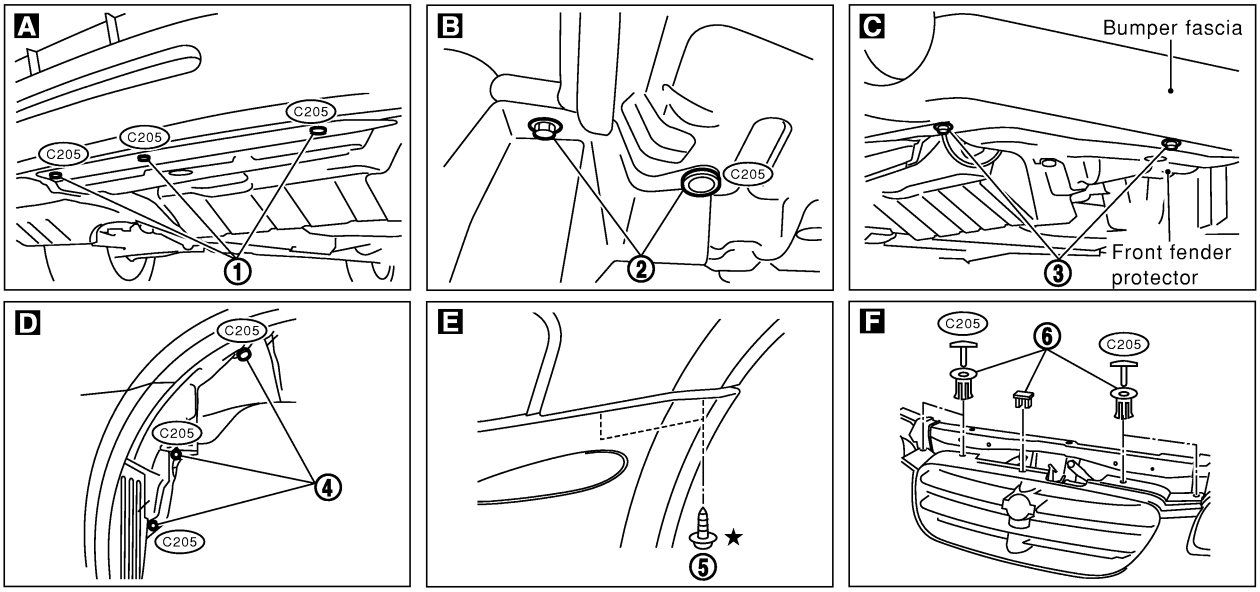
FRONT BUMPER ASSEMBLY

NFBT0004S01

1. Remove clips securing engine undercover from front side. A
2. Remove clip and bolt securing left and right sides of front fender protectors. B
3. Remove screws securing left and right sides of front fender protectors. C
4. Remove clips securing left and right sides of front fender protectors in wheelhouse. D
5. Remove screws securing left and right front fenders to bumper fascia. E
6. Remove clips and protector securing bumper fascia. F
7. Extract bumper fascia assembly, then disconnect fog lamp and side marker lamp harness connectors.
8. Remove energy absorber.
9. Remove bolts, hook and pawl securing headlamp assembly, then disconnect harness connectors. G
10. Remove bolt and nuts securing bumper upper retainer. H
11. Remove bolts and nuts securing bumper bracket. J
12. Remove nuts securing bumper reinforcement to left and right bumper stays. K
13. Extract bumper reinforcement.
14. Remove bolts and nut securing bumper stays, then remove the bumper stays. L

Fog lamp assembly

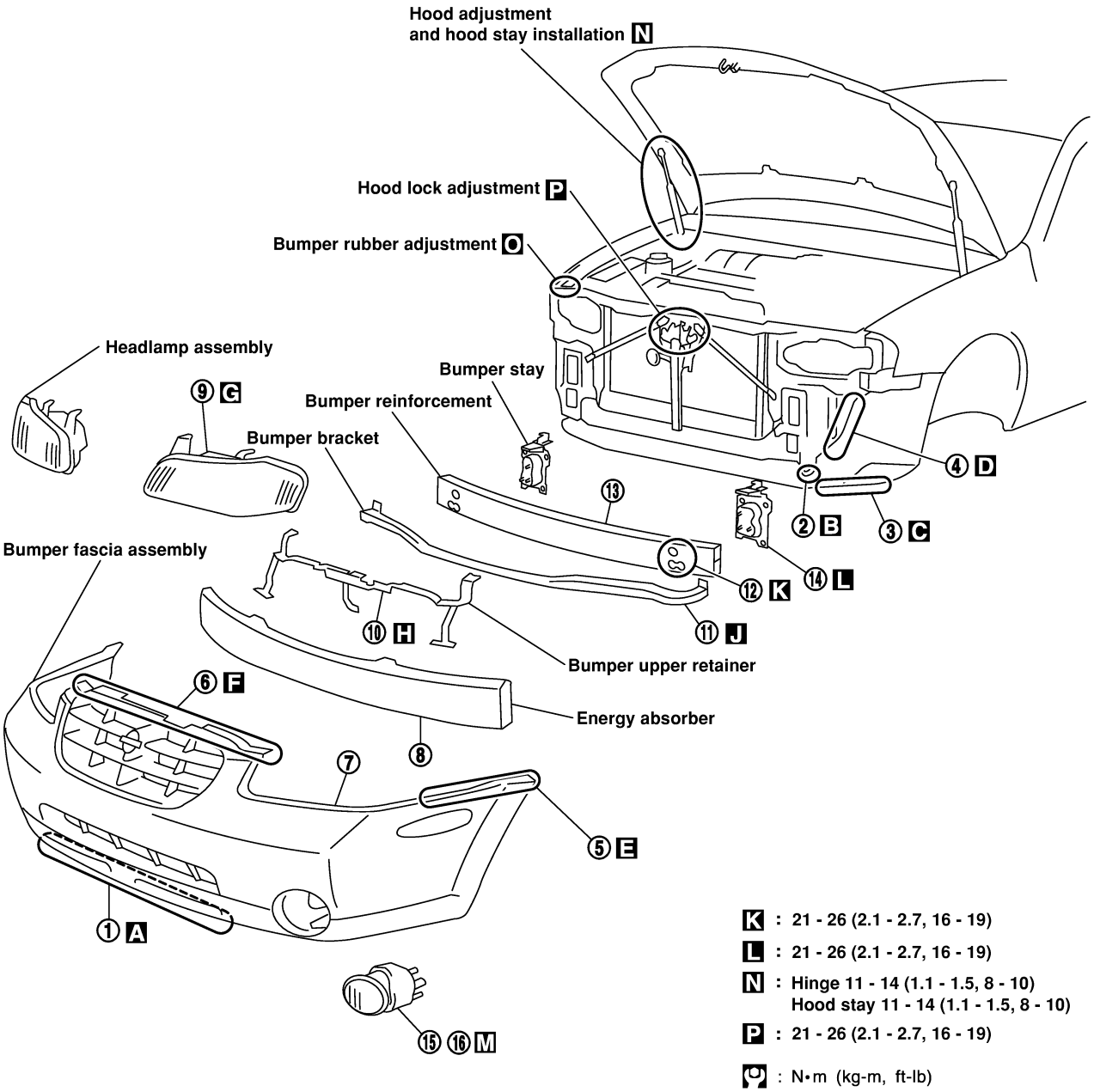
15. Remove bolt securing fog lamp assembly. M
16. Extract fog lamp assembly. M



★ : Bumper assembly mounting screws

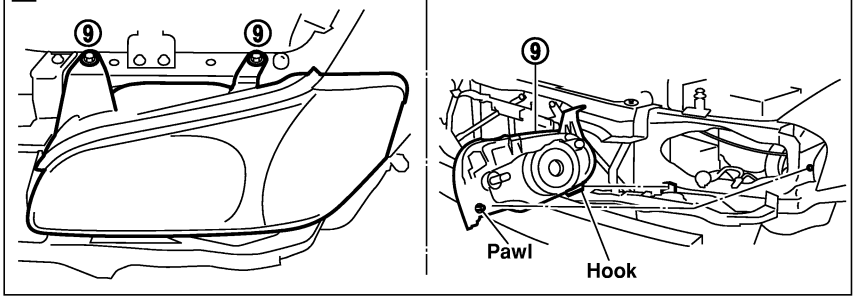
SBT765

SEC. 260•261•262•620•630•650



SBT766

G



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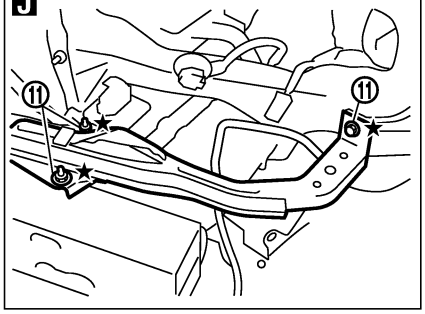

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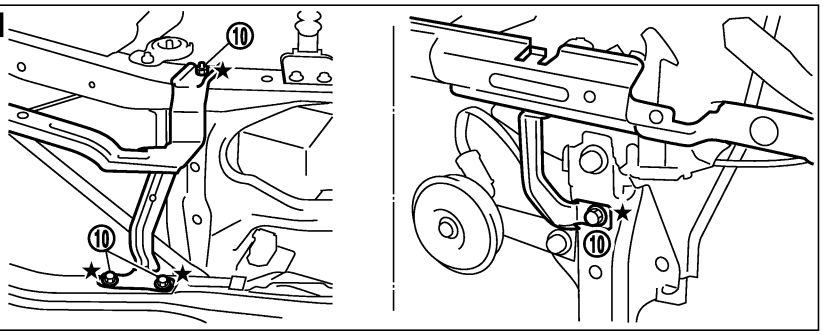

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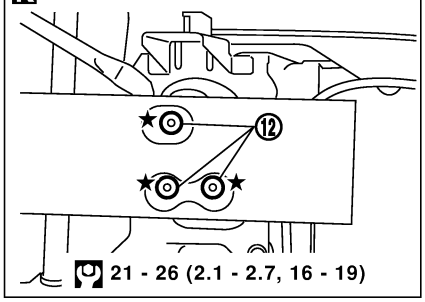

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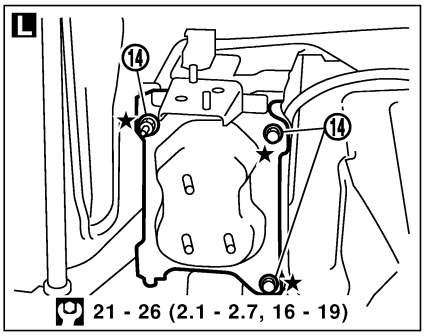

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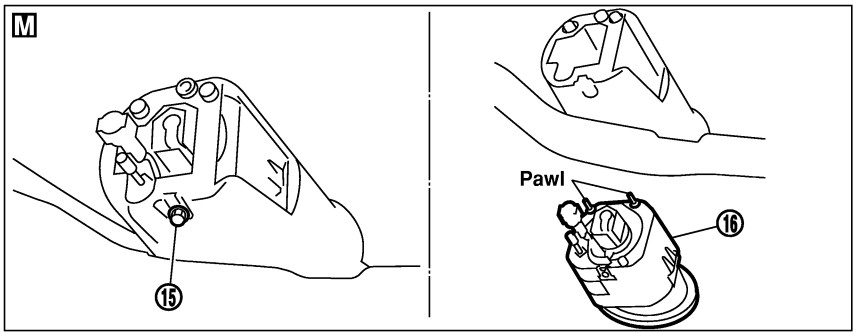

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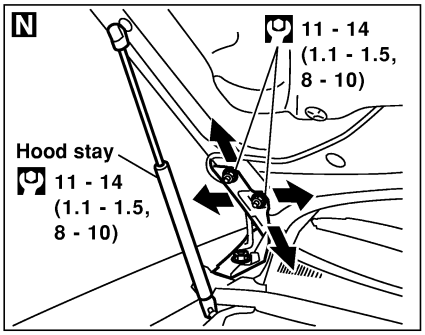


O

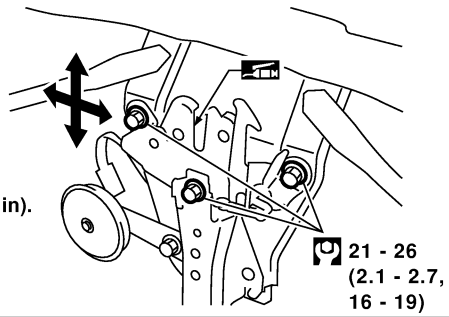
Bumper rubber adjustment

- Remove hood lock. Rotate bumper rubber so that hood is 1 to 1.5 mm (0.039 to 0.059 in) lower than fender.
- Temporarily tighten hood lock. After making sure that there is no striker free play, tighten hood lock securing bolts to specified torque.
- Adjust bumper rubber so that hood is flush with fender, or the surface difference between the two is 0 mm (0 in).

P

Hood lock adjustment

- Move hood lock either to the left or right so that striker center is vertically aligned with hood lock center (when viewed from vehicle front).
- Allow hood to close under its own weight from a height of approximately 200 mm (7.87 in) or push it down with a force of approximately 29 N (3 kg, 7 lb). Make sure that secondary latch properly engages with secondary striker when hood is lowered all the way.
  CAUTION: Do not allow hood to close from a height of more than 300 mm (11.81 in).
- Close hood. Move hood lock up or down as required so that striker properly engages with hood lock.
- After adjusting hood lock, tighten hood lock securing bolts to specified torque.



★ : Bumper assembly mounting bolts and nuts

: N•m (kg-m, ft-lb)

SBT767

Removal and Installation

NFBT0005

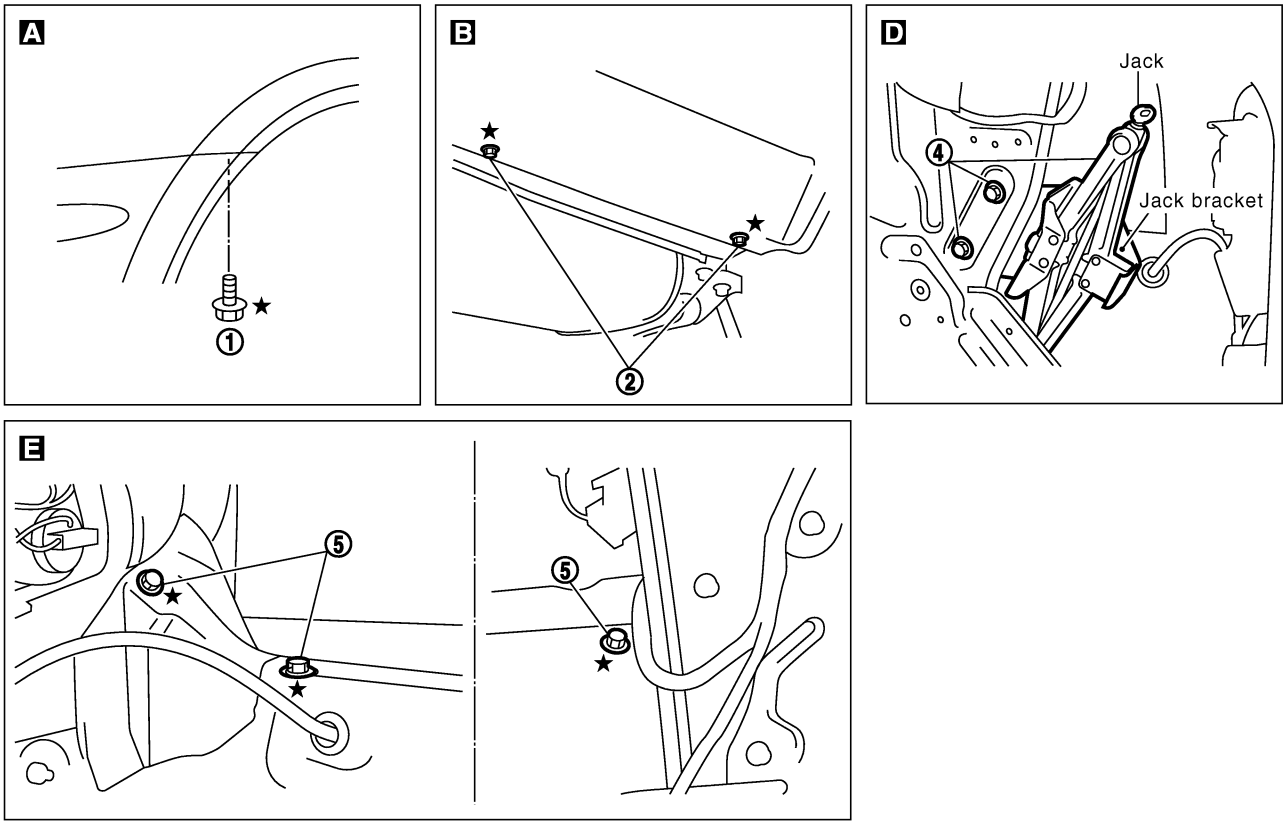
- When removing or installing trunk lid, place a cloth or other padding on trunk lid. This prevents vehicle body from being scratched.
- Bumper fascia is made of plastic. Do not use excessive force and be sure to keep oil away from it.
- Trunk lid adjustment: Adjust at hinge-trunk lid portion for proper trunk lid fit.
- Trunk lid lock system adjustment: Adjust striker so that it is in the center of the lock. After adjustment, check trunk lid lock operation.
- After installation, make sure that trunk lid and fuel filler lid open smoothly.

★ For Wiring Diagram, refer to EL-203, “TRUNK LID AND FUEL FILLER LID OPENER”.

REAR BUMPER ASSEMBLY

NFBT0005S01

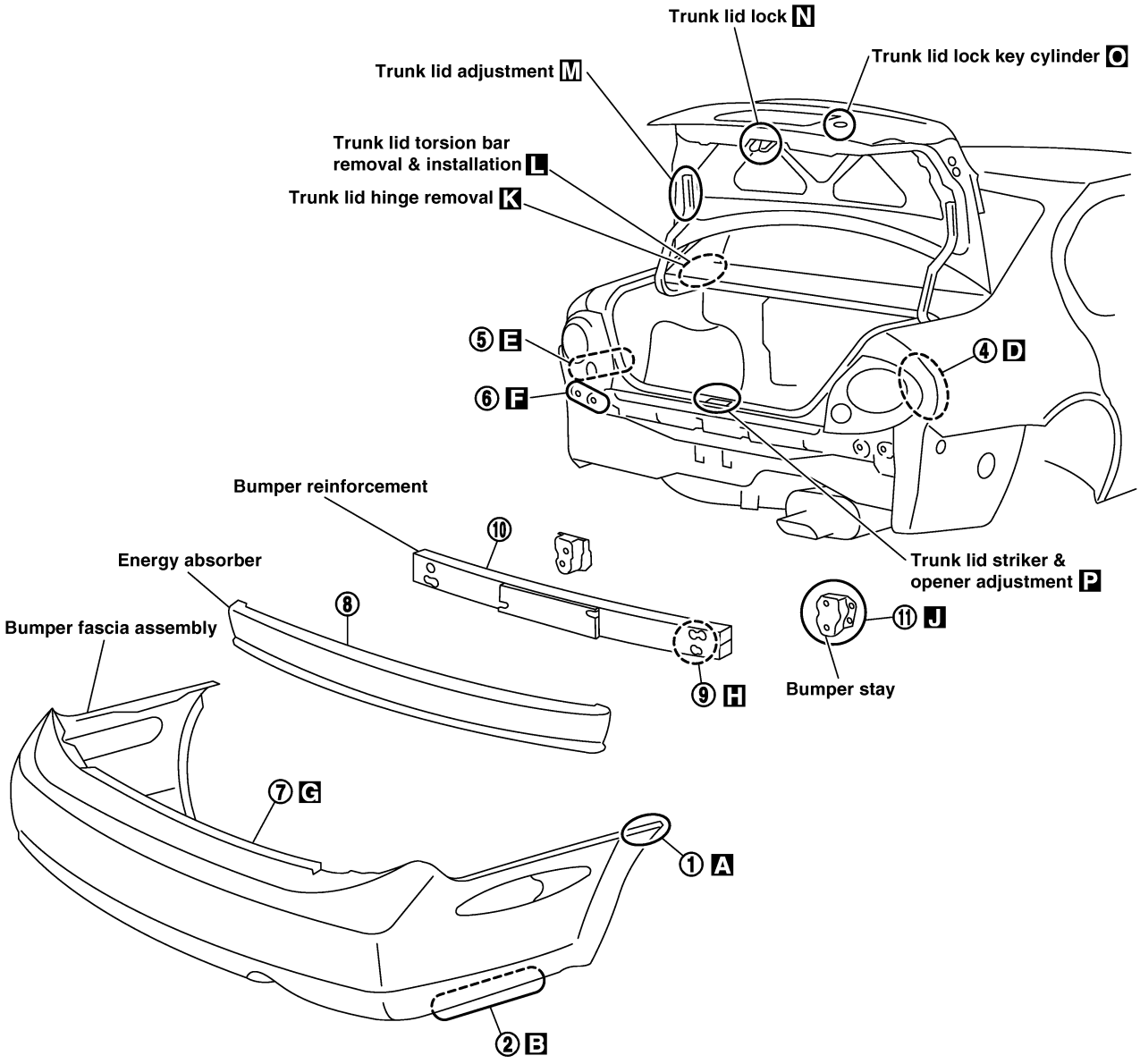
1. Remove screws securing left and right rear fenders to bumper fascia. A
2. Remove screws securing left and right rear fenders to bumper fascia lower side. B
3. Remove trunk room trim. Refer to “TRUNK ROOM TRIM” for details, BT-41.
4. Working from inside trunk, remove jack then remove nuts securing jack bracket. D
5. Working from inside trunk, remove bolts securing left and right rear fenders to bumper fascia. E
6. Working from inside trunk, remove nuts securing rear panel to bumper fascia. F
7. Extract bumper fascia assembly after removing the clamps securing it. G
8. Remove energy absorber.
9. Remove nuts securing bumper reinforcement to left and right bumper stays. H
10. Extract bumper reinforcement.
11. Remove nuts securing bumper stays, then remove the bumper stays. J



★ : Bumper assembly mounting clips & bolts

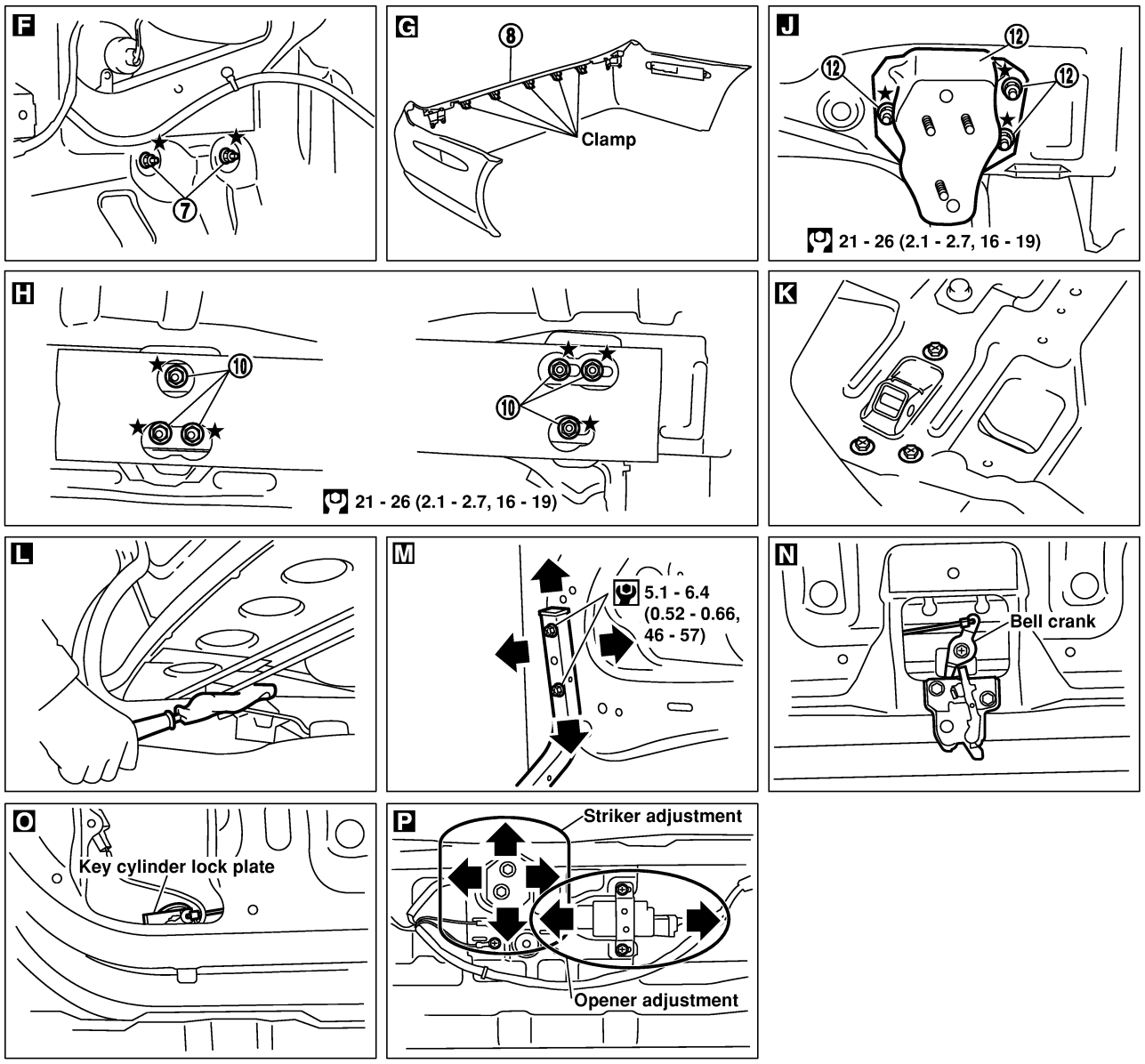
SBT084A

SEC. 843•850



SBT085A

Removal and Installation (Cont'd)



★ : Bumper assembly mounting nuts

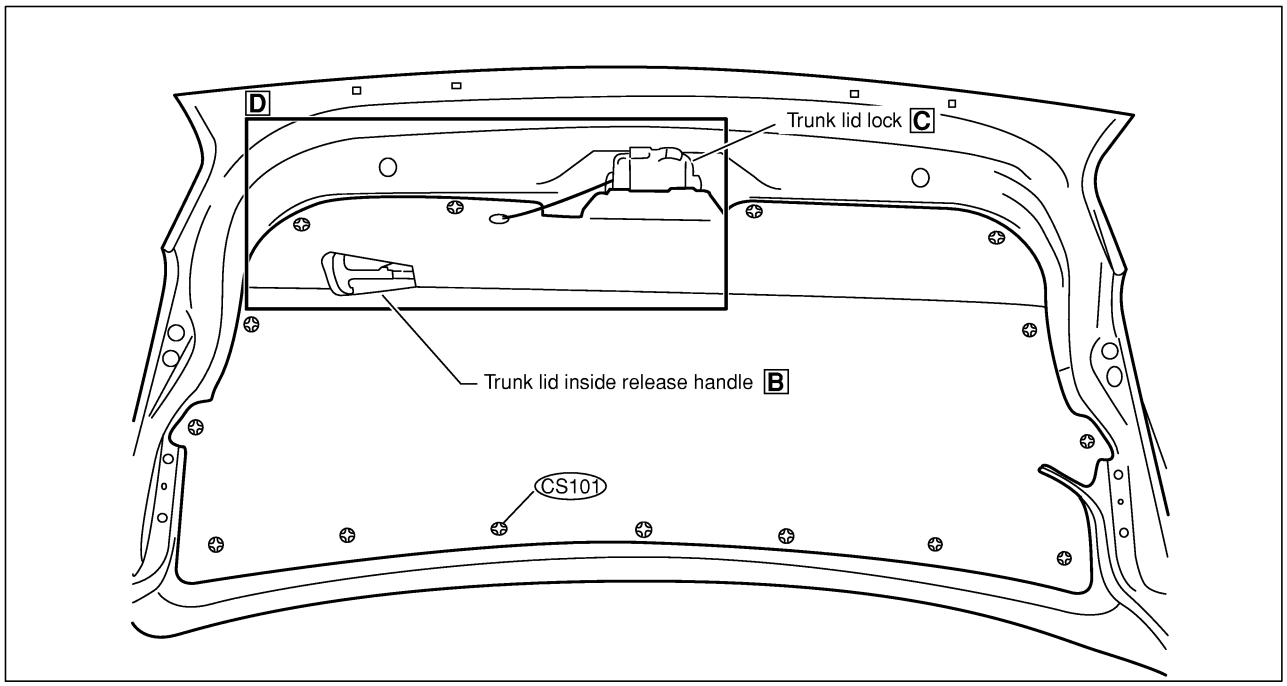
: N•m (kg-m, ft-lb)

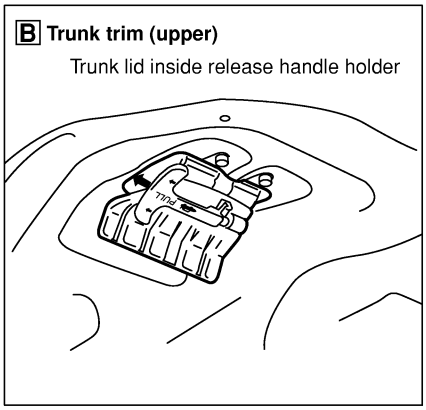
: N•m (kg-m, in-lb)

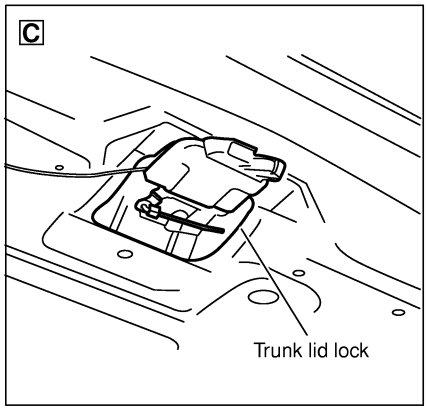
SBT770

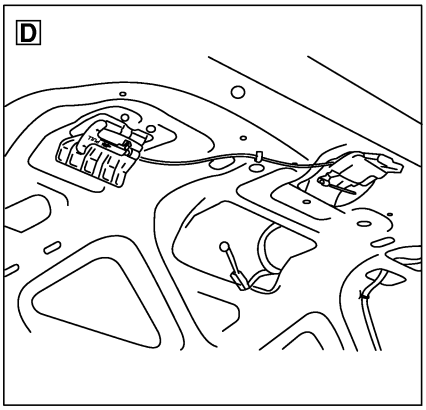
TRUNK LID INSIDE RELEASE HANDLE

NFBT0005S02





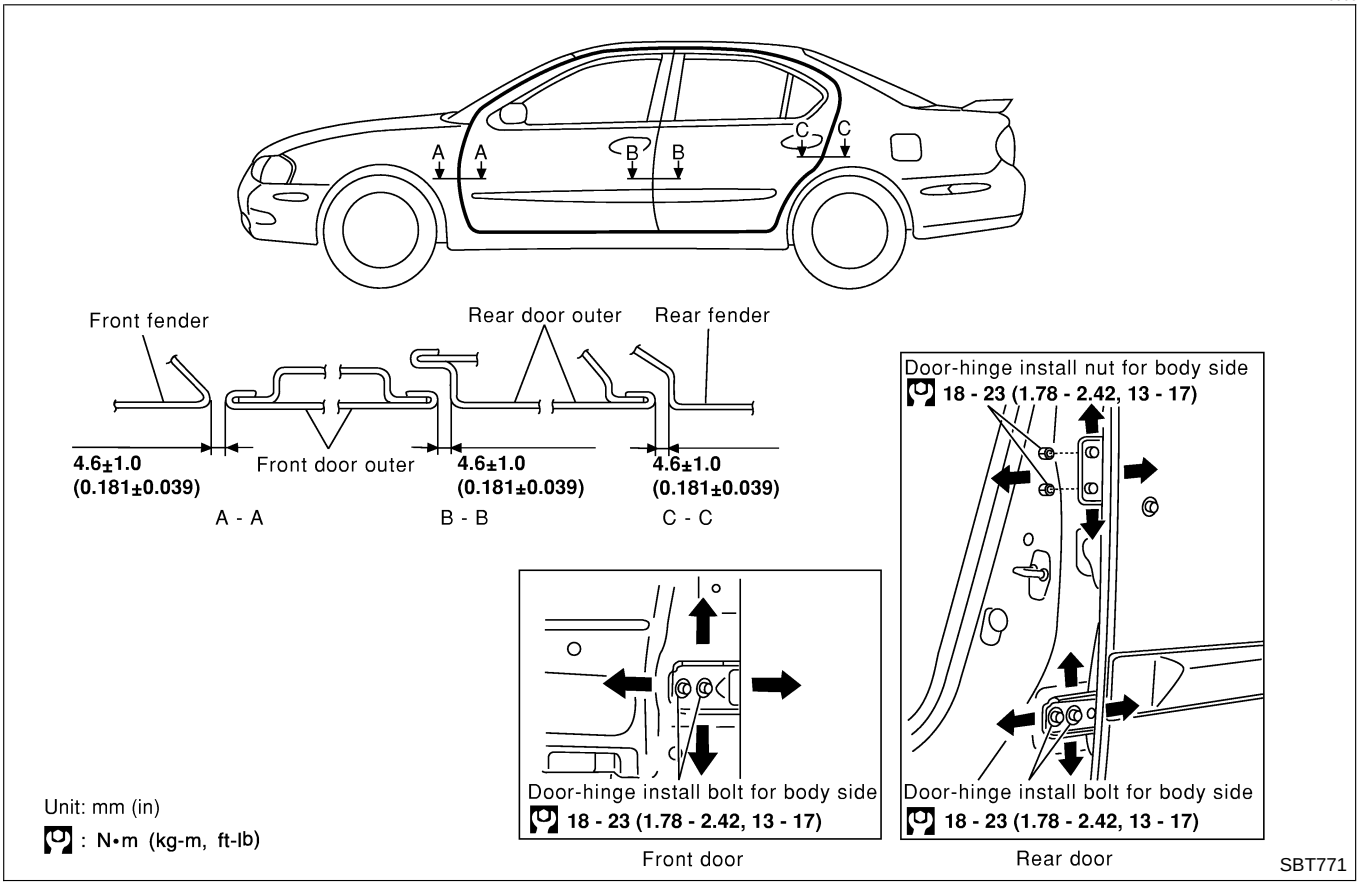


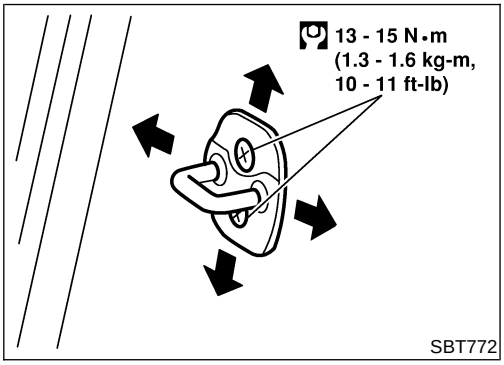


SBT253AA

Adjustment

NFBT0006





STRIKER ADJUSTMENT

NFBT0006S01

Adjust striker so that it is parallel with advancing direction of door lock.

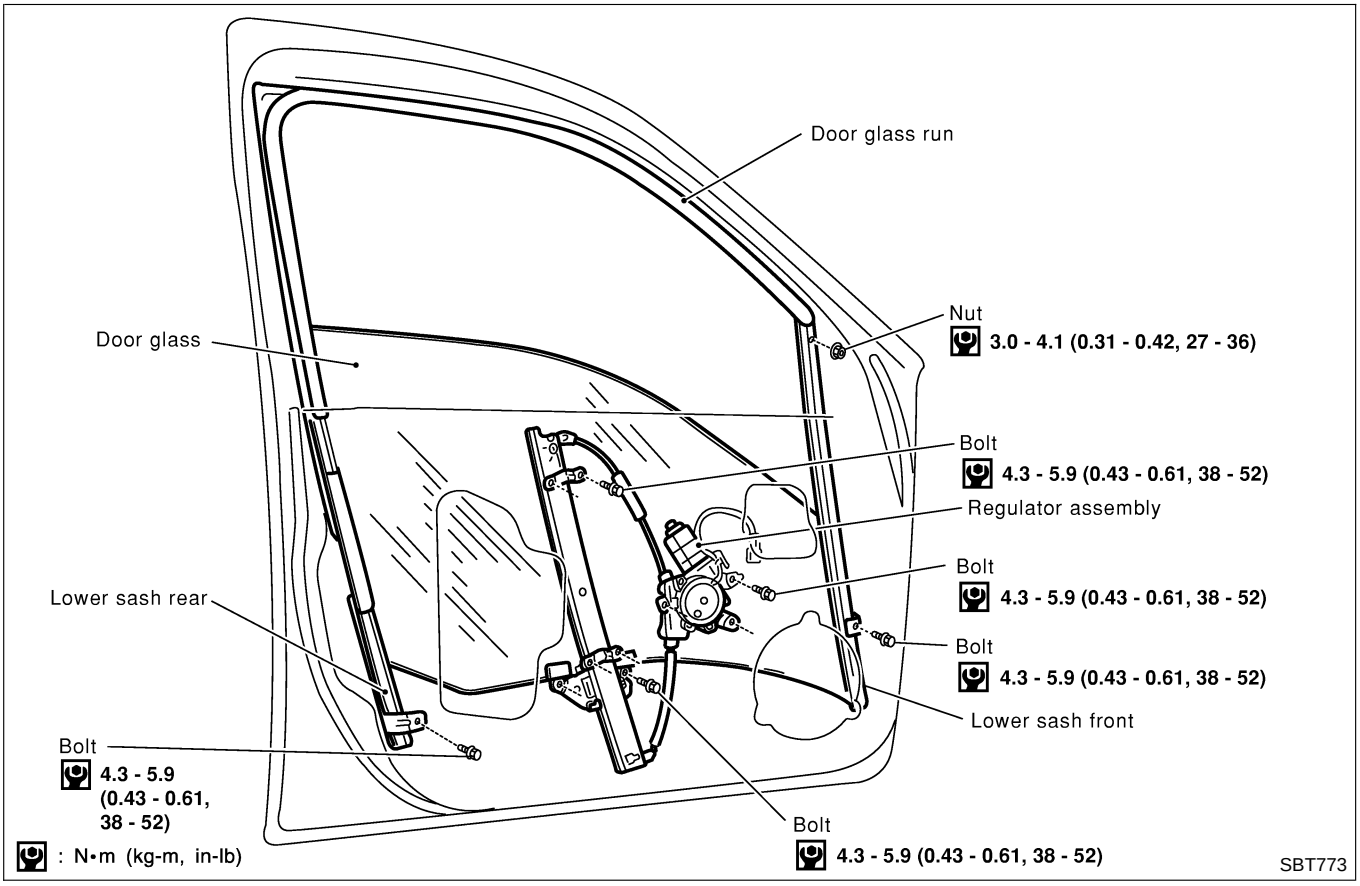
Front Door Glass

=NFBT0007

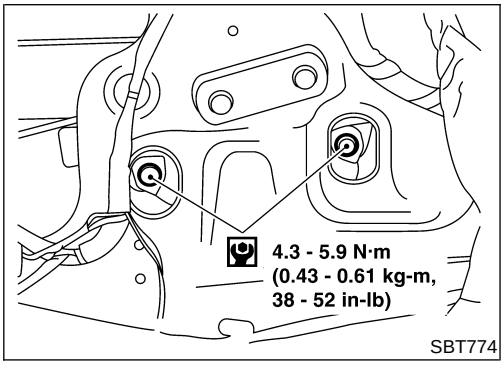
- Make sure that door glass is positioned in glass run groove.
- Make sure that there is no abnormality when door glass is raised or lowered.

FRONT DOOR GLASS AND REGULATOR

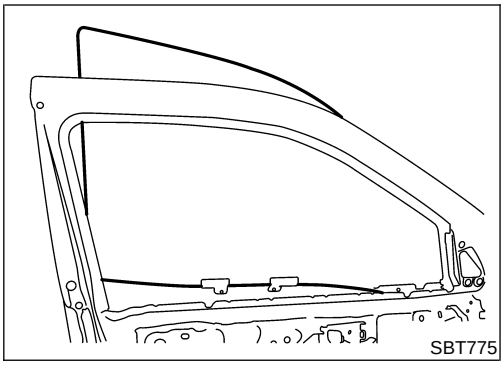
NFBT0007S01



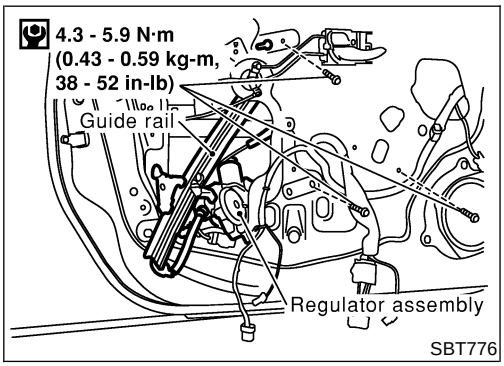
- For removal of front door trim, refer to “DOOR TRIM”, BT-37.
- For removal of door mirror, refer to “DOOR MIRROR”, BT-63.
- For removal of door outside molding, refer to “EXTERIOR”, BT-42.
- Remove sealing screen.



1. Using power window main switch, raise or lower door glass until carrier plate securing bolts are visible.
2. Remove bolts securing carrier plate.

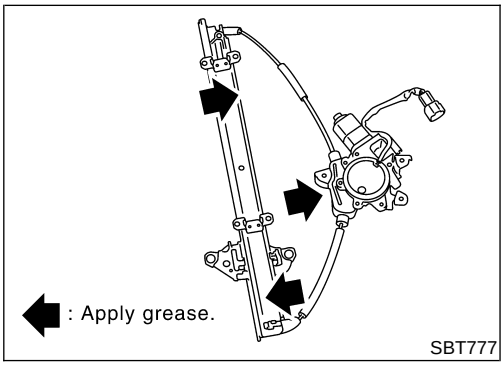

SBT775

3. Hold door glass with both hands. While raising rear end of door glass, remove door glass from sash and away from outside the door.



SBT776

4. Disconnect regulator assembly connector.
5. Remove bolts securing regulator assembly and guide rail, then remove regulator assembly and guide rail.



SBT777

Inspection

NFBT0007S0101

Check regulator assembly for the following parts. Replace faulty parts with new ones.

- Wire for wear
- Regulator for deformation
- Sliding parts for lubrication

Front Door Limit Switch Reset

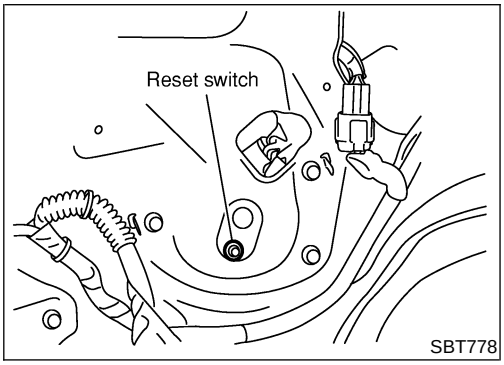
NFBT0008

RESET CONDITIONS

NFBT0008S01

After each of the following operations are performed, reset the limit switch (with built-in motor).

- Regulator removal and installation
- Removal of motor from regulator
- Operation of regulator as a single unit
- Door glass removal and installation
- Glass run removal and installation



SBT778

RESET PROCEDURES

NFBT0008S02

After installing parts, proceed as follows:

1. Close the door window completely.
2. Press the reset switch and open the door window completely.
3. Release the reset switch. After making sure the reset switch has returned to the original position, close the door window completely.
4. The limit switch is now reset.

CAUTION:

Be sure to manually open or close the door window. (Do not use the automatic open-close procedures.)

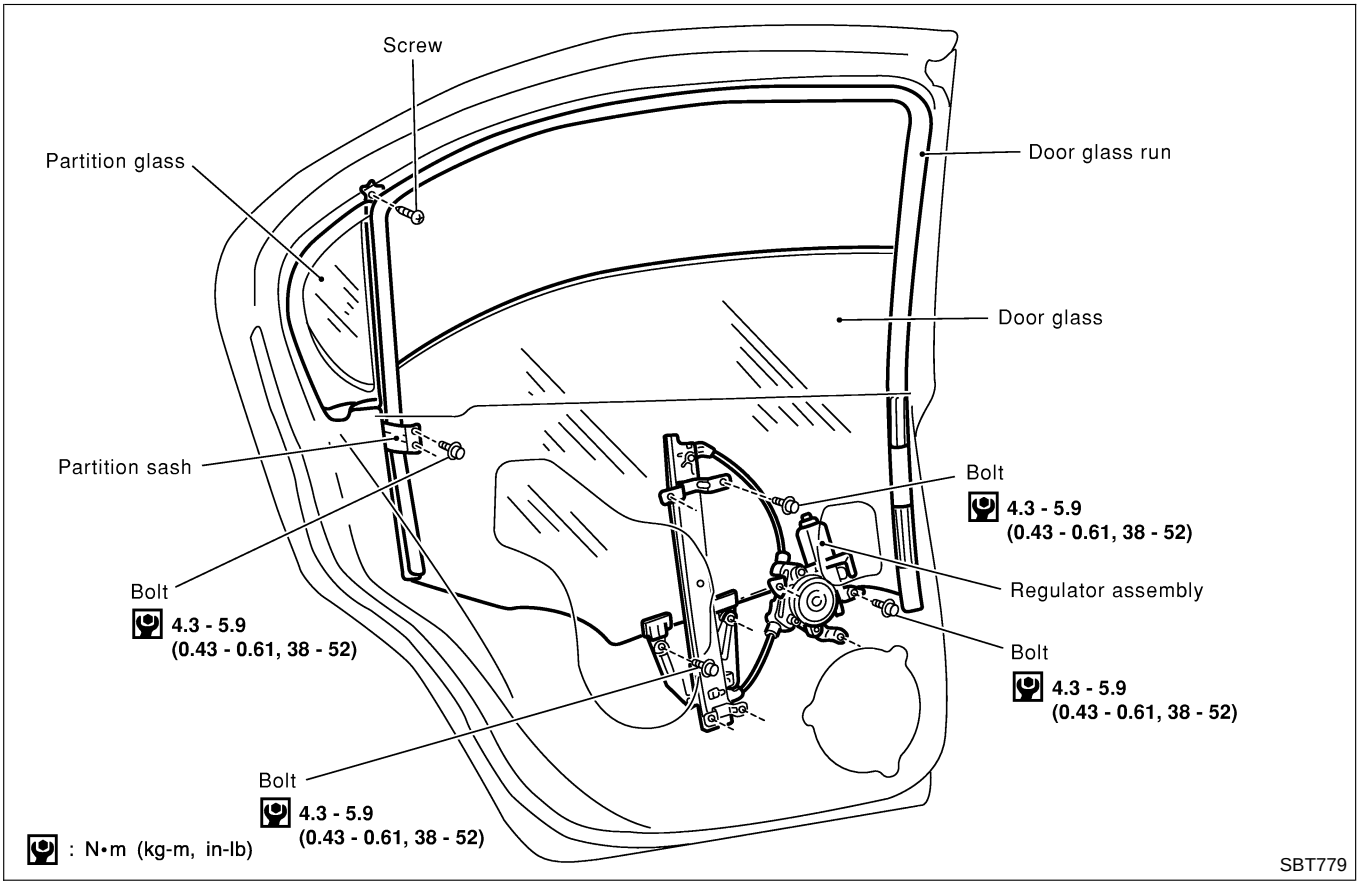
Rear Door Glass

NFBT0009

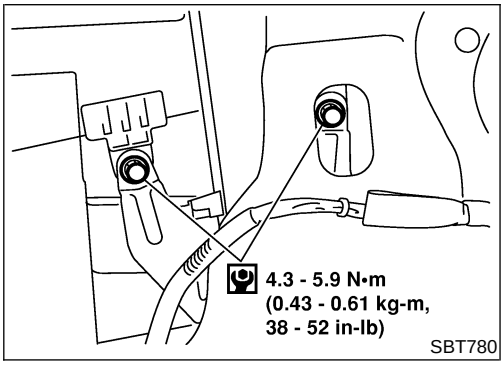
- Make sure that door glass is positioned in glass run groove.
- Make sure that there is no abnormality when door glass is raised or lowered.

REAR DOOR GLASS AND REGULATOR

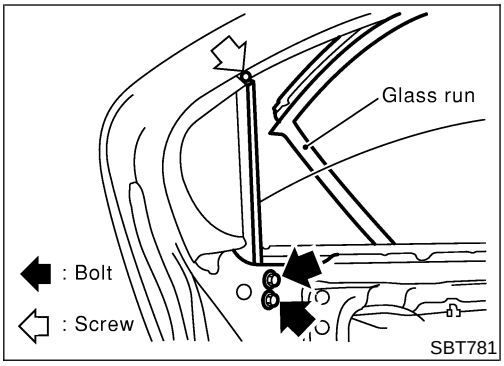
NFBT0009S01



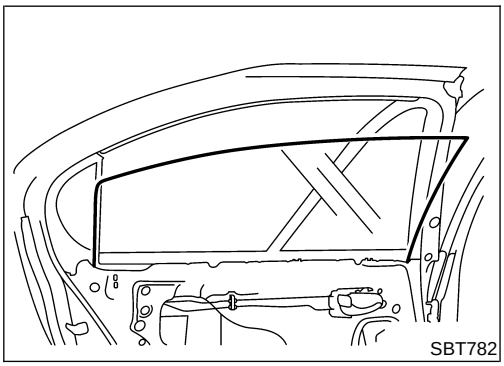
- For removal of rear door trim, refer to “DOOR TRIM”, BT-37.
- For removal of door outside molding, refer to “EXTERIOR”, BT-42.
- Remove sealing screen.



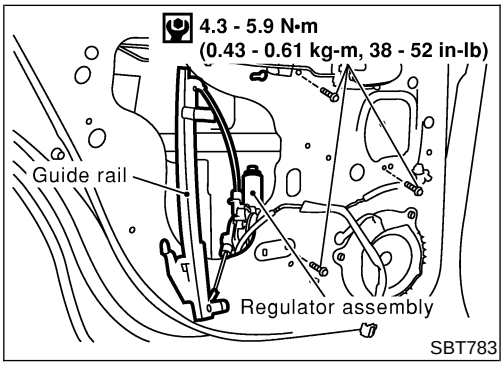
1. Using power window main switch, raise or lower door glass until carrier plate securing bolts are visible.
2. Remove bolts securing carrier plate.



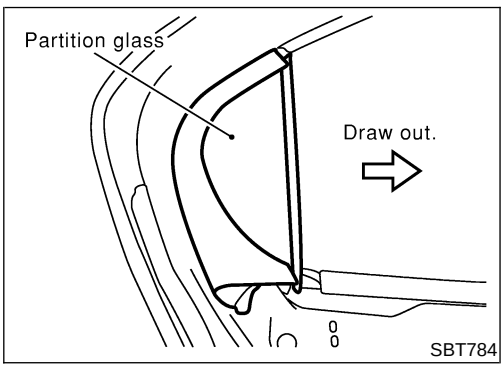
3. Remove partition sash at glass run.
4. Remove bolts and screw securing partition sash.



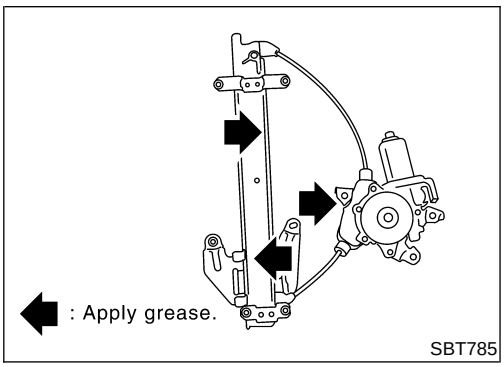
5. Hold door glass with both hands. While raising rear end of door glass, remove door glass from sash and away from inside the door.



6. Disconnect regulator assembly connector.
7. Remove bolts securing regulator assembly and guide rail, then remove regulator assembly and guide rail.



8. Remove partition glass.



Inspection

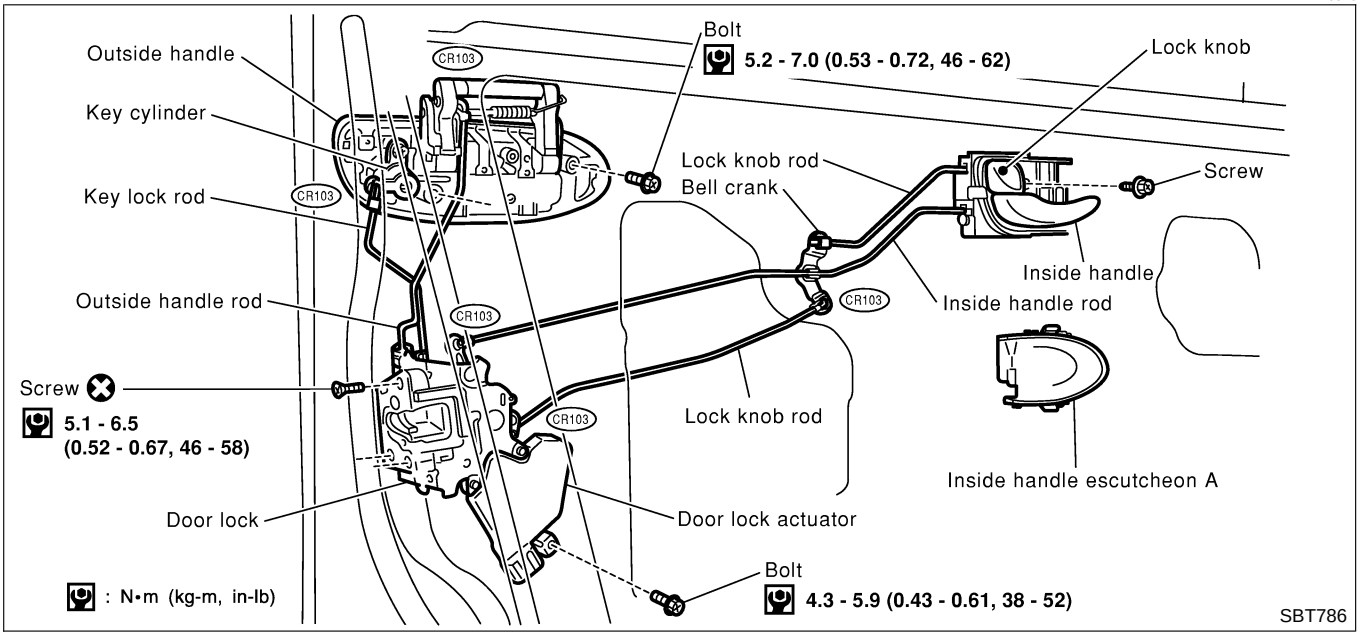
NFBT0009S0101

Check regulator assembly for the following parts. Replace faulty parts with new ones.

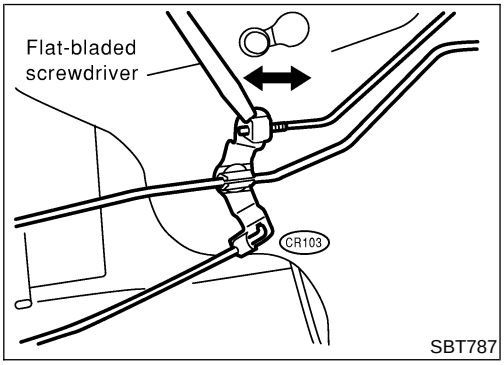
- Wire for wear
- Regulator for deformation
- Sliding parts for lubrication

Front Door Lock

NFBT0010



- For removal of front door trim, refer to “DOOR TRIM”, BT-37.
- Remove sealing screen.



BELL CRANK ADJUSTMENT

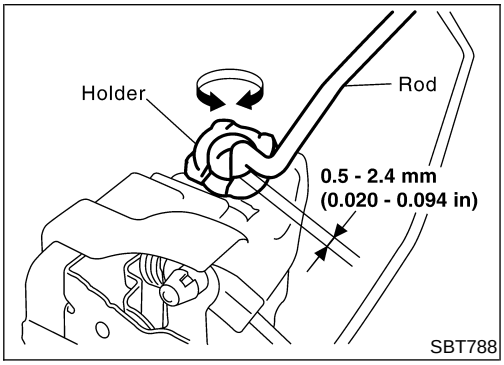
NFBT0010S01

CAUTION:

Before adjusting bell crank, make sure that rod is installed to inside handle.

After installing door lock and inside handle, set them in the lock position. Using a flat-bladed screwdriver, expand rod holder. Remove rod free play at joining area and set rod in position.

After adjusting bell crank adjustments have been made, operate door lock knob, door lock switch and door key to make sure that they lock and unlock properly.



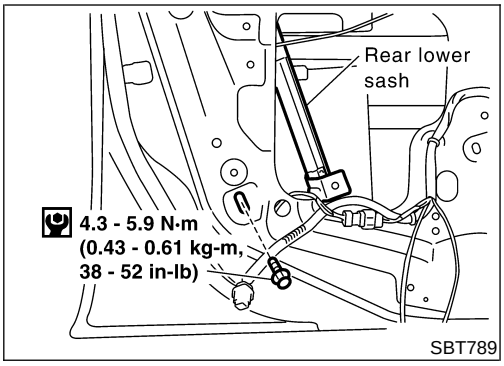
OUTSIDE HANDLE ROD ADJUSTMENT

NFBT0010S02

Rotate rod holder so that rod-to-holder clearance is adjusted as shown in the figure at left.

CAUTION:

Make sure that rod-to-holder clearance is not “0” mm (0 in), and that rod is not held pressed.

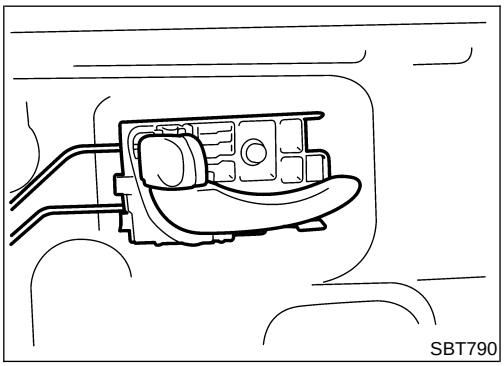


REMOVAL

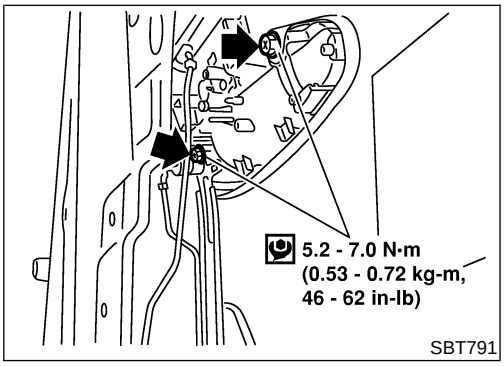
NFBT0010S03

- For removal of front door trim, refer to "DOOR TRIM", BT-37.
- Remove sealing screen.
- For removal of front door glass, refer to "Front Door Glass", BT-21.

1. Remove rear lower sash (unitized with glass run) securing bolts. Remove rear lower sash from door panel and away from door lock.



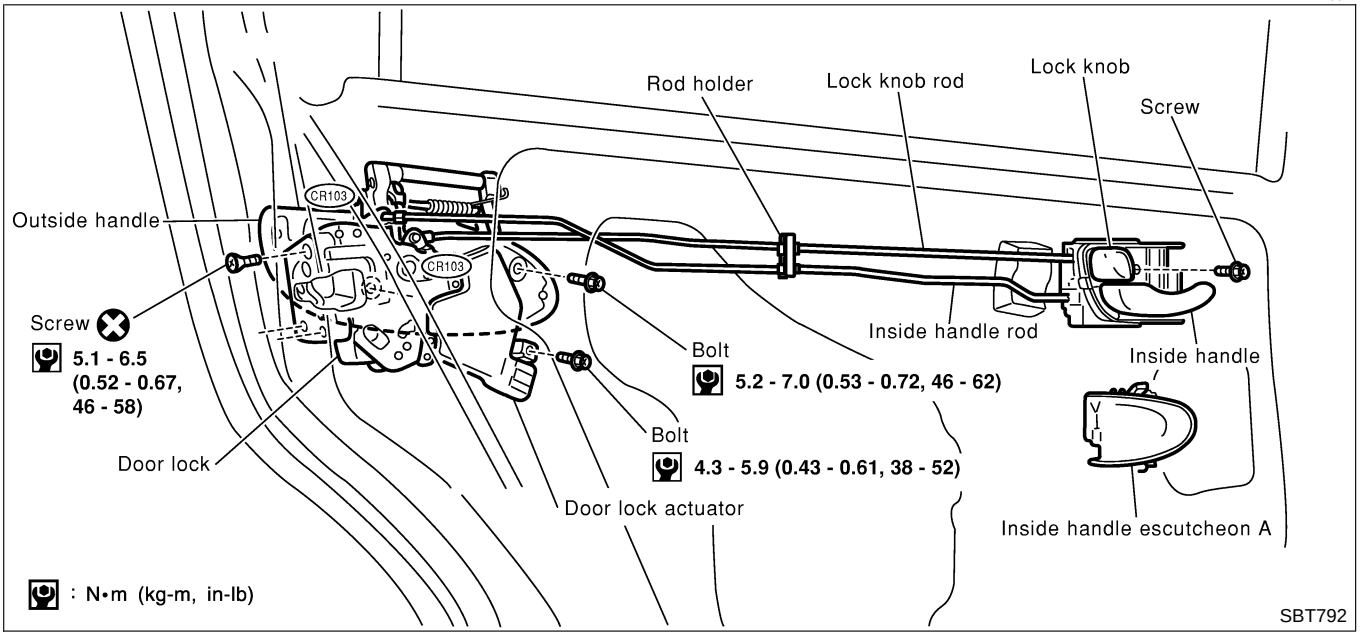
2. Remove inside handle escutcheon A.
3. Remove screw securing inside handle.
4. Detach bell crank at lock knob joining area.
5. Detach inside handle rod on the door lock assembly side.
6. Slide inside handle backward and remove inside handle.
7. Remove rod from inside handle.



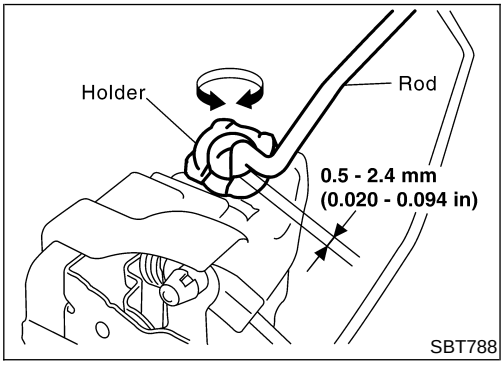
8. Detach key lock rod and outside handle rod at joining area (on the outside handle side).
9. Disconnect door lock actuator connector.
10. Remove screws securing door lock assembly, then remove door lock assembly.
11. Remove bolts securing outside handle, then remove outside handle assembly.

Rear Door Lock

=NFBT0011



- For removal of rear door trim, refer to “DOOR TRIM”, BT-37.
- Remove sealing screen.



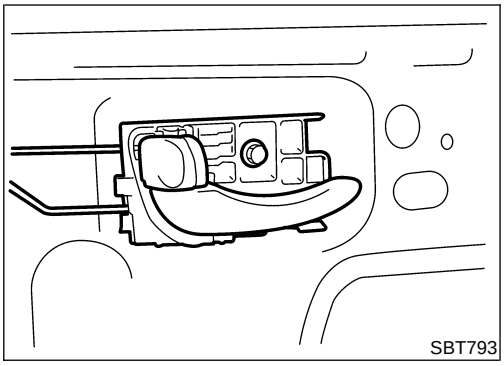
OUTSIDE HANDLE ROD ADJUSTMENT

NFBT0011S01

Rotate rod holder so that rod-to-holder clearance is adjusted as shown in the figure at left.

CAUTION:

Make sure that rod-to-holder clearance is not “0” mm (0 in), and that rod is not held pressed.

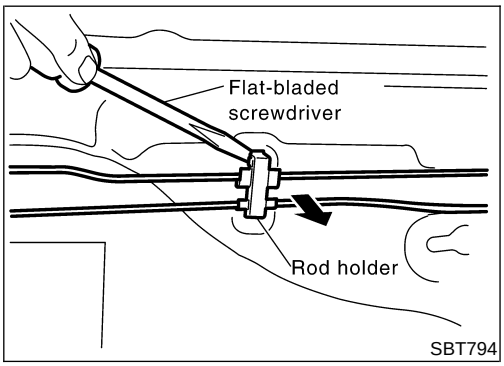

SBT793

REMOVAL

=NFBT0011S02

- For removal of rear door trim, refer to "DOOR TRIM", BT-37.
- Remove sealing screen.
- For removal of rear door glass, refer to "Rear Door Glass", BT-23.

1. Remove inside handle escutcheon A.
2. Remove screw securing inside handle.
3. Detach inside handle rod on the door lock assembly side.



SBT794

4. Detach lock knob rod (on the door lock assembly side).
5. Using a flat-bladed screwdriver, expand rod holder. Remove rod from rod holder.
6. Slide inside handle backward and remove inside handle.
7. Remove rod from inside handle.
8. Disconnect door lock actuator connector.
9. Remove screws securing door lock assembly, then remove door lock assembly.
10. Remove bolts securing outside handle, then remove outside handle.

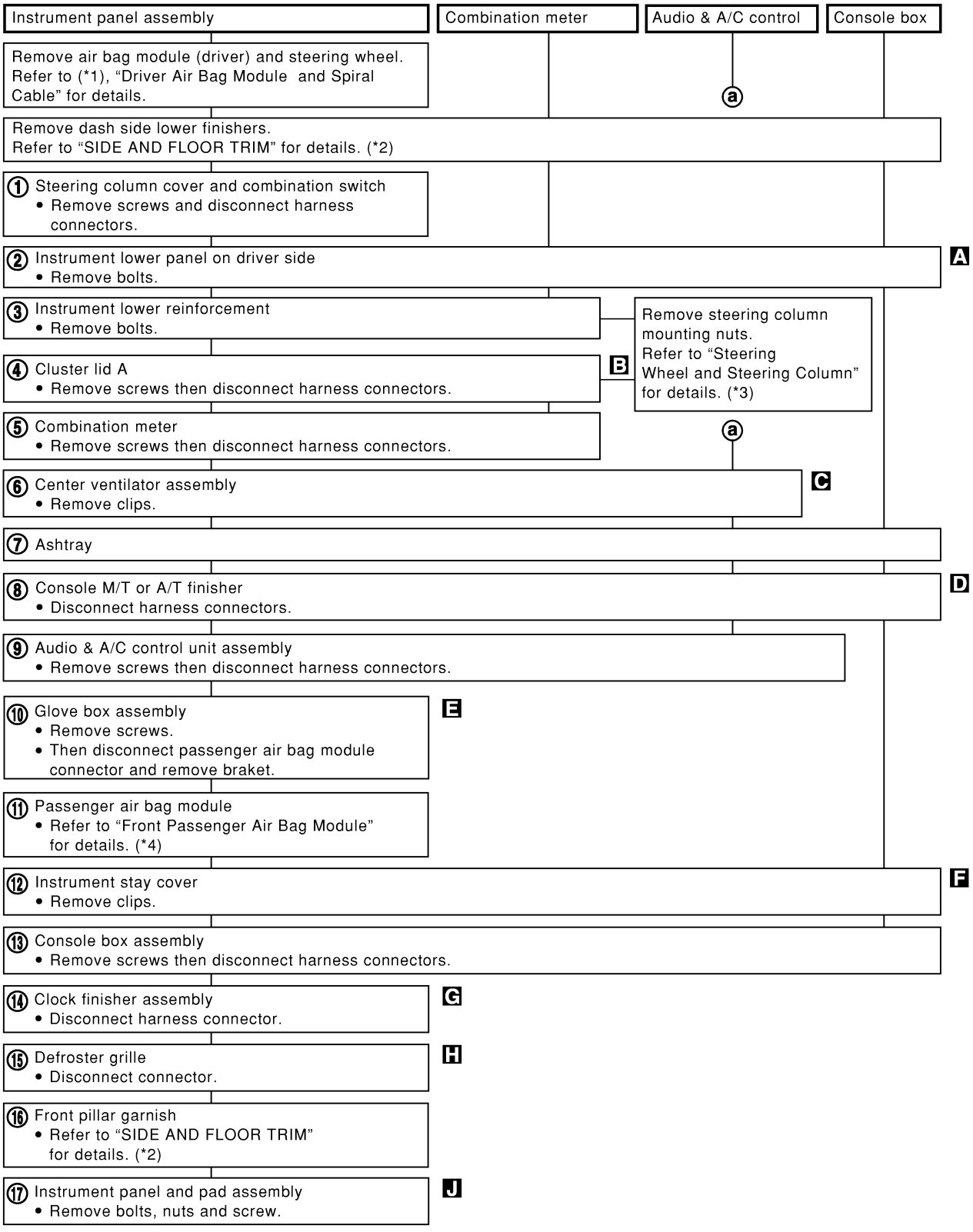
Removal and Installation

NFBT0012

CAUTION:

- **Disconnect ground terminal from battery 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.**

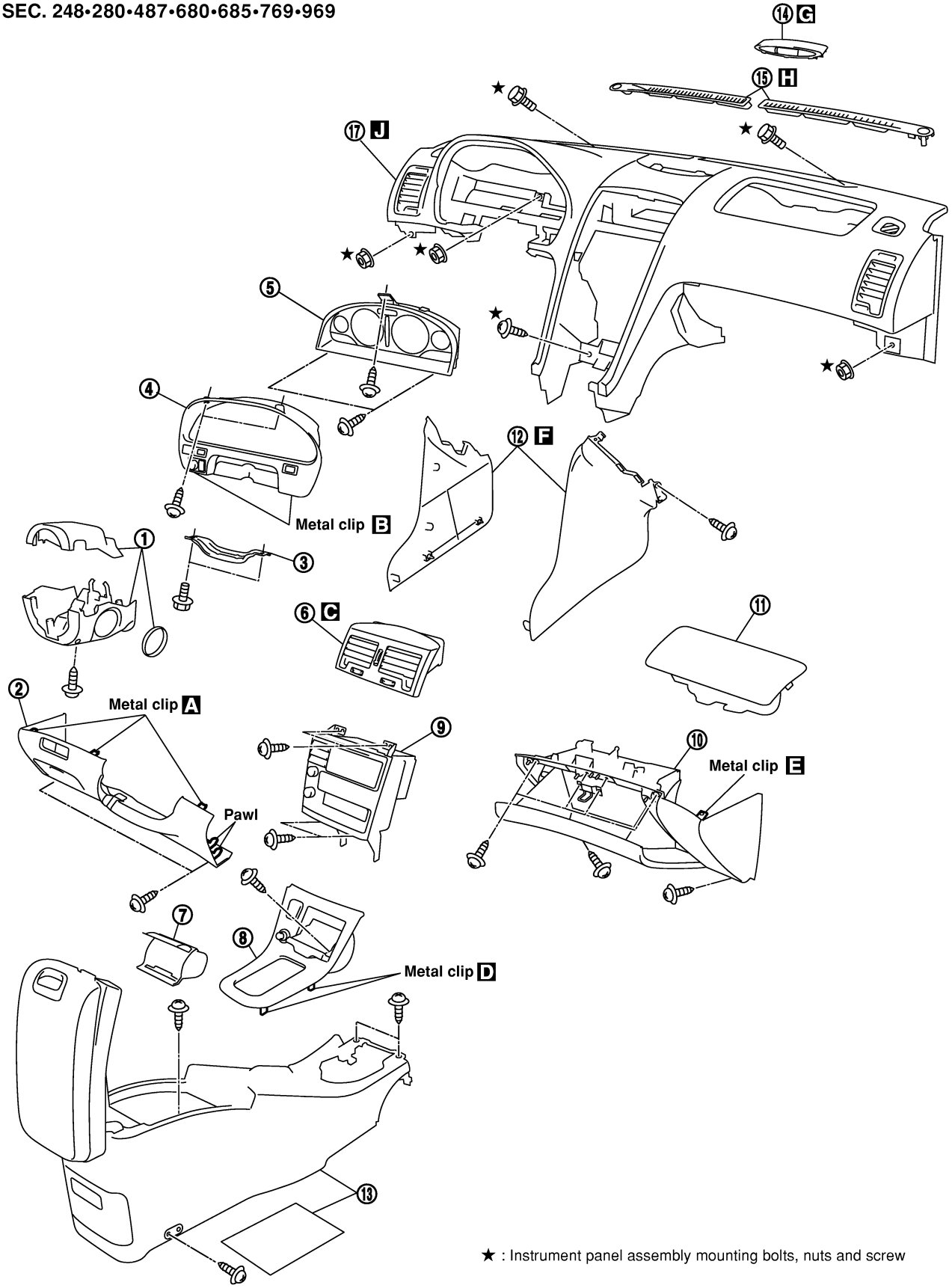
Removal and Installation (Cont'd)



SBT274A

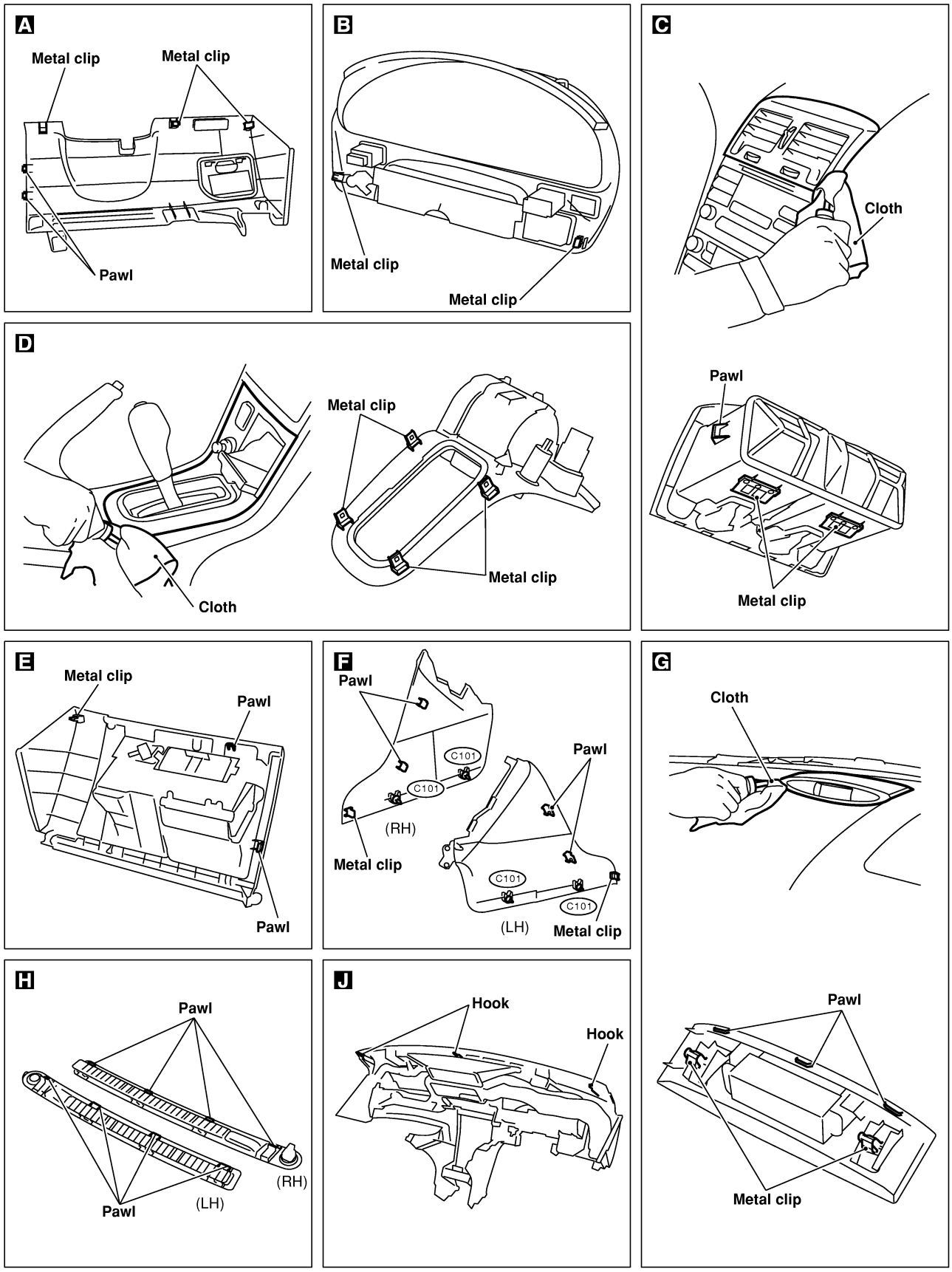
*1 RS-20
*2 BT-34
*3 ST-10
*4 RS-22

SEC. 248•280•487•680•685•769•969



★ : Instrument panel assembly mounting bolts, nuts and screw

SBT796


A
Metal clip
Metal clip
Pawl
B
Metal clip
Metal clip
C
Cloth
Pawl
Metal clip
D
Cloth
Metal clip
Metal clip
E
Metal clip
Pawl
Pawl
F
Pawl
C101
C101
(RH)
Metal clip
Pawl
C101
C101
(LH)
Metal clip
G
Cloth
H
Pawl
(RH)
Pawl
(LH)
J
Hook
Hook
Pawl
Metal clip

SBT797

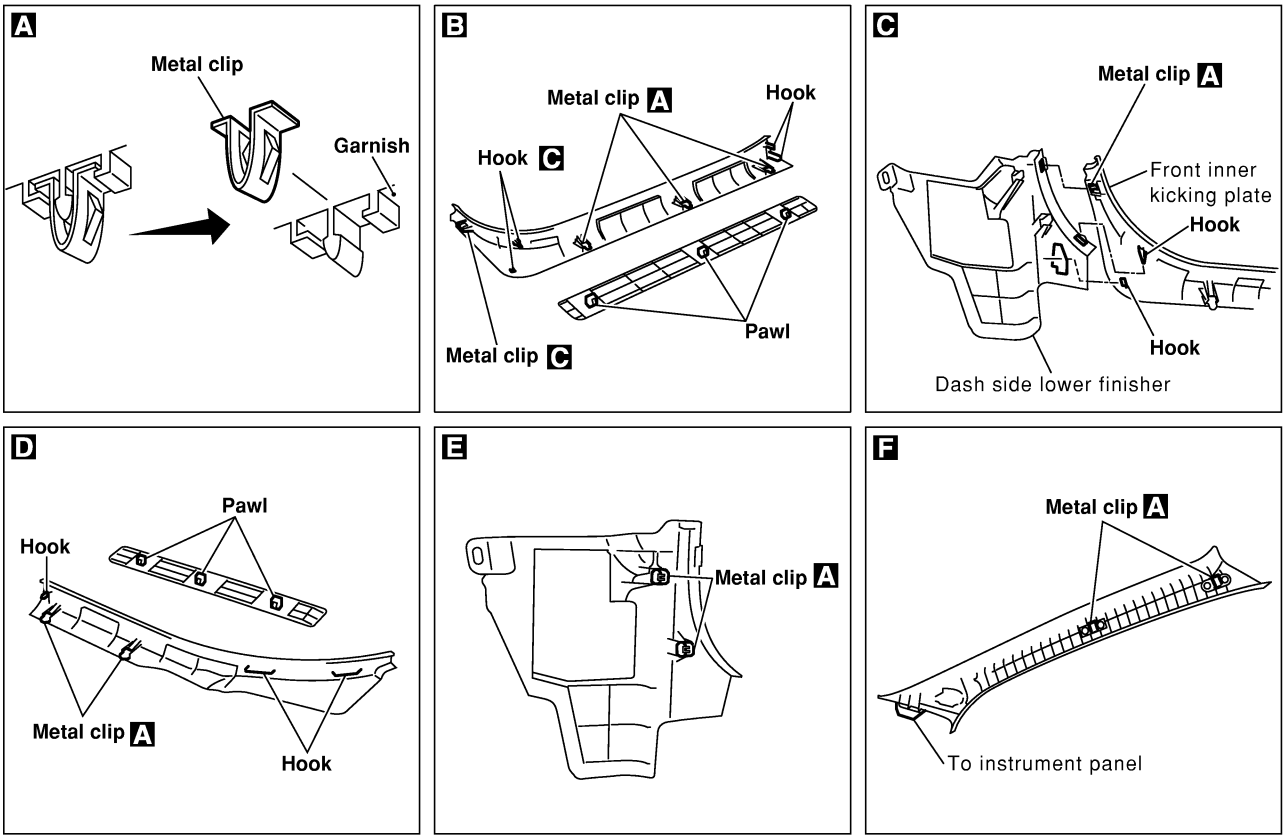
Removal and Installation

NFBT0013

CAUTION:

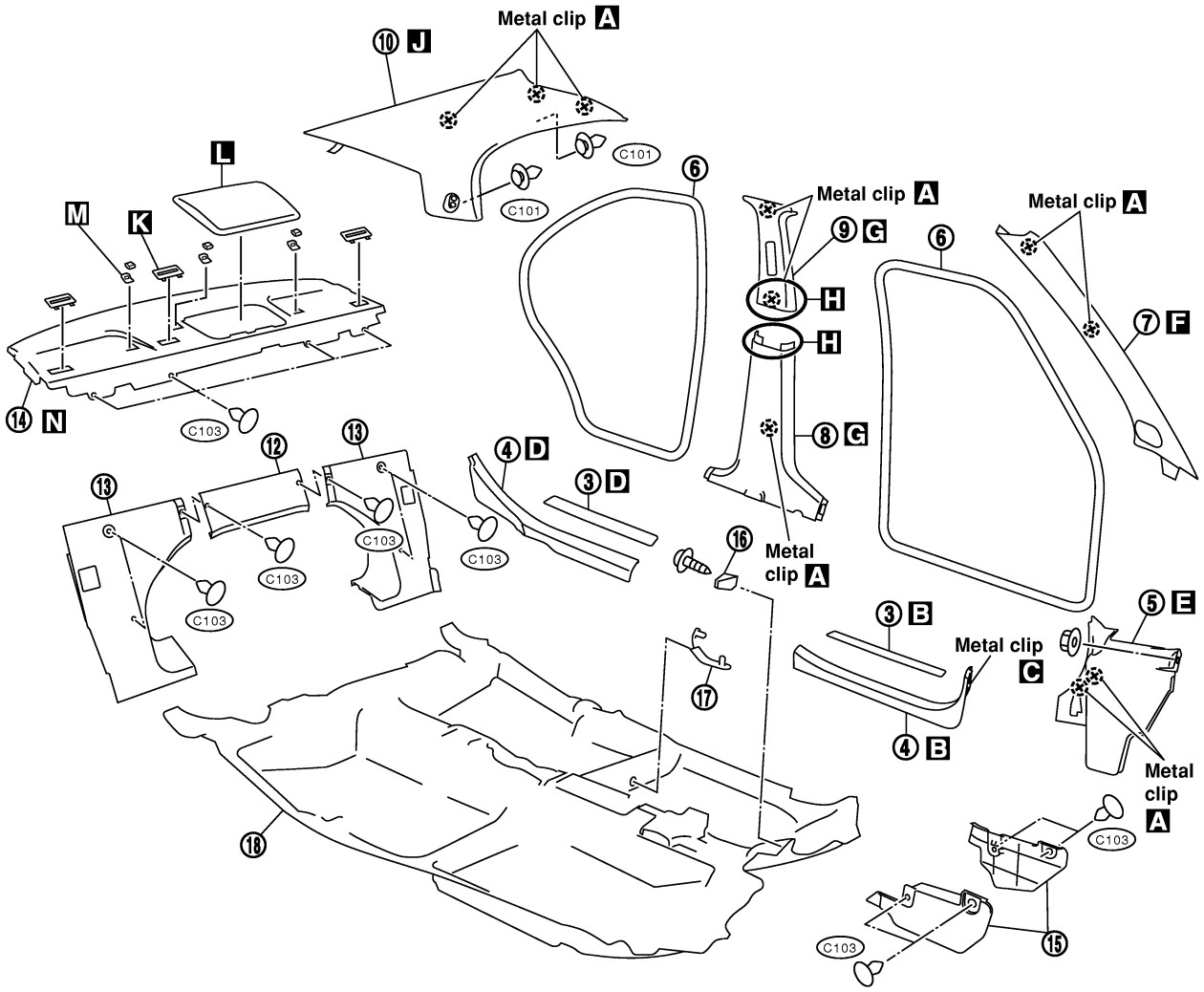
- **Wrap the tip of flat-bladed screwdriver with a cloth when removing metal clips from garnishes.**
- **When removing or installing body side welts, do not allow butyl seal to come in contact with pillar garnish.**

1. Remove front and rear seats. Refer to “FRONT SEAT” and “REAR SEAT” for details, BT-48 and BT-52.
2. Remove front and rear seat belts. Refer to RS-4 and RS-6, ”Front Seat Belt” and “Rear Seat Belt” for details.
3. Remove front and rear outer kicking plates. B D
4. Remove front and rear inner kicking plates. B C D
5. Remove dash side lower finisher. E
6. Remove front and rear body side welts.
7. Remove front pillar garnishes. F
8. Remove center pillar lower garnishes. G
9. Remove center pillar upper garnishes. G
10. Remove rear pillar garnishes. J
11. Remove high-mounted stop lamp. (Model without rear air spoiler)
12. Remove seatback center finisher.
13. Remove seatback side finishers.
14. Remove rear parcel shelf finisher. K L M N
15. Remove instrument lower covers.
16. Remove accelerator pedal stopper.
17. Remove carpet hook.
18. Remove floor carpet.

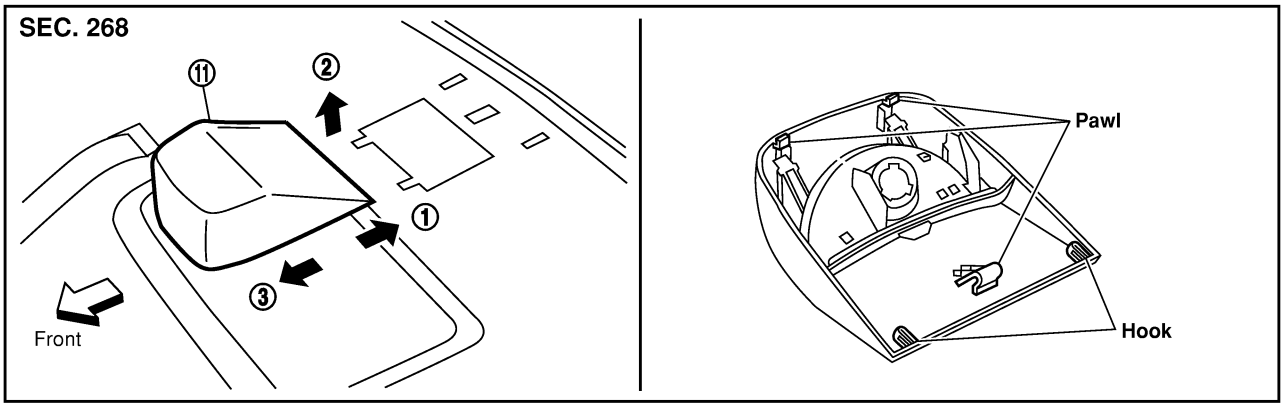


SBT837-A

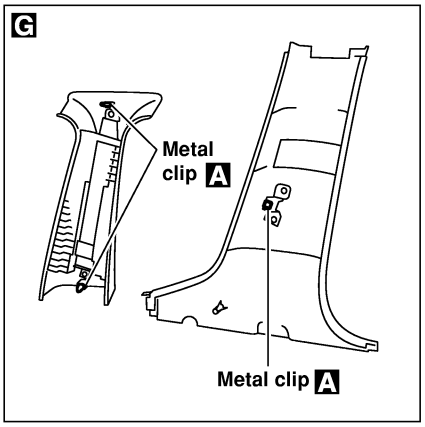
SEC. 678•749•769•799

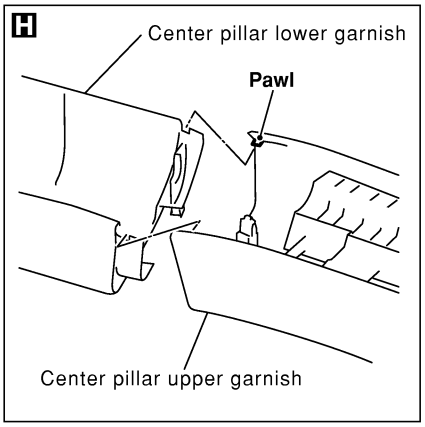


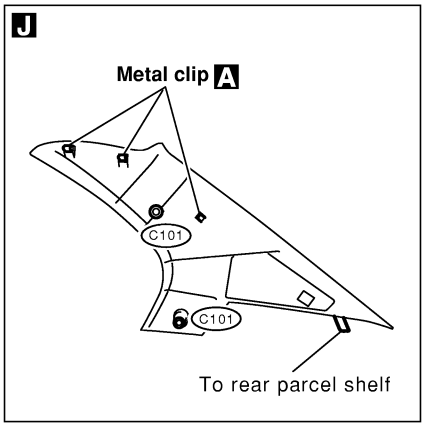
Remove high-mounted stop lamp. (Models without rear air spoiler)

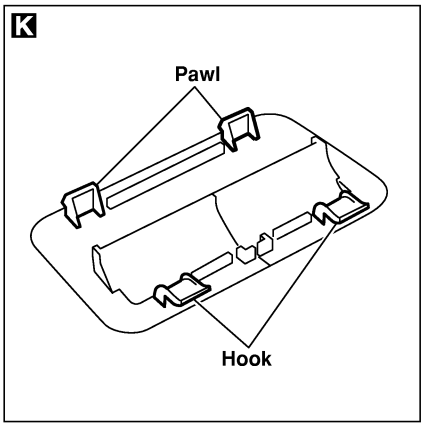


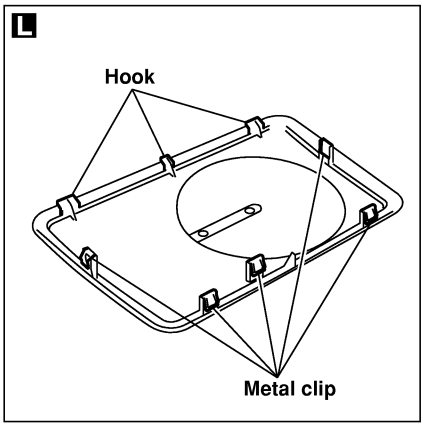
SBT798-A

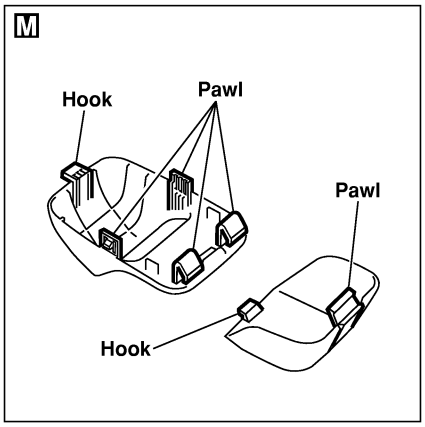

G
Metal clip A
Metal clip A

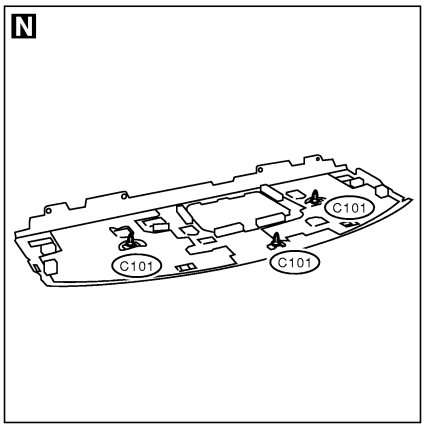

H
Center pillar lower garnish
Pawl
Center pillar upper garnish


J
Metal clip A
C101
C101
To rear parcel shelf


K
Pawl
Hook


L
Hook
Metal clip


M
Hook
Pawl
Pawl
Hook


N
C101
C101
C101

SBT799

Removal and Installation

NFBT0014

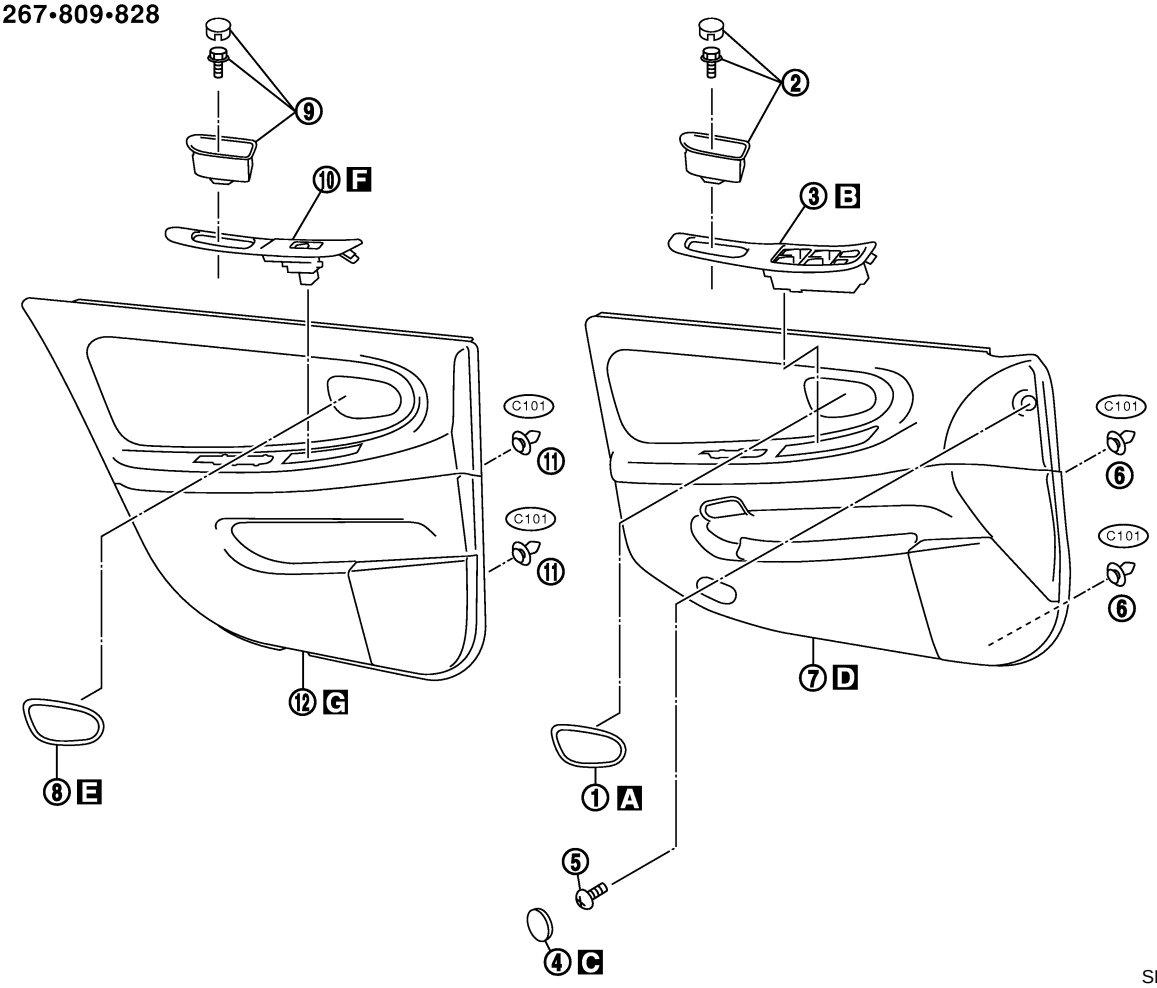
Front door finisher

1. Remove inside handle escutcheon. A
2. Remove screw securing pull handle, and then remove pull handle.
3. Remove power window switch finisher, then disconnect the connectors. B
4. Remove mask. C
5. Remove screw securing front door finisher.
6. Remove clips securing front door finisher.
7. Lift out front door finisher. Disconnect harness connectors. D

Rear door finisher

8. Remove inside handle escutcheon. E
9. Remove screw securing pull handle, and then remove pull handle.
10. Remove power window switch finisher, then disconnect the connector. F
11. Remove clips securing rear door finisher.
12. Lift out rear door finisher. G

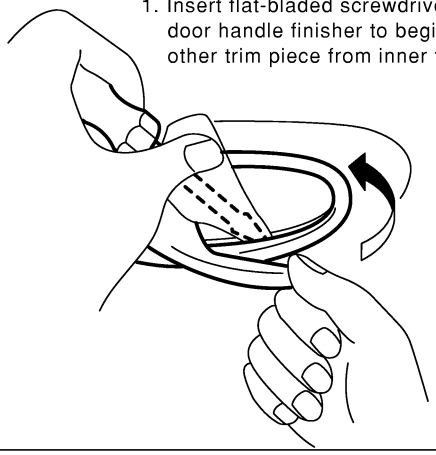
SEC. 251•267•809•828

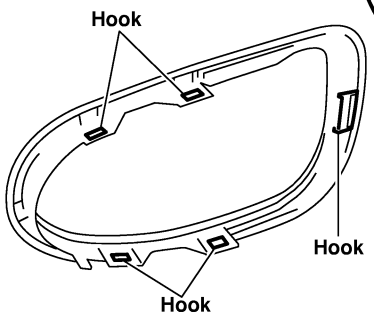


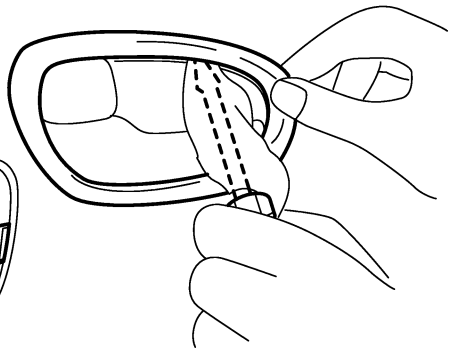
SBT800

A E

1. Insert flat-bladed screwdriver at bottom of door handle finisher to begin separating other trim piece from inner trim piece.

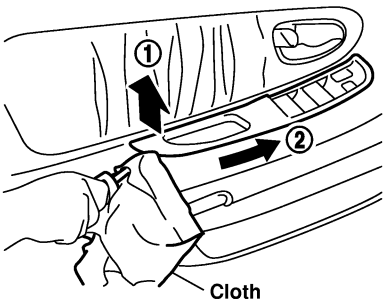






2. Move the flat-bladed screwdriver to the top part of the door handle trim, continuing separation from the inner trim.

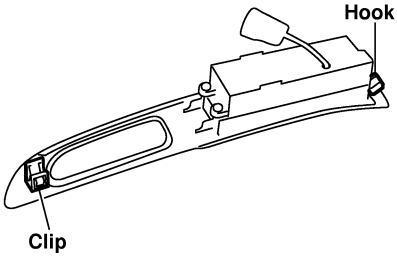
B F



Front:
Insert removal tool wrapped in clean cloth at rear of power window switch finisher and lift up the rear of the switch finisher.

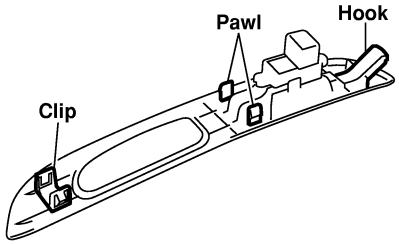
Rear:
1. Insert removal tool wrapped in clean cloth at rear of power window switch finisher.
2. Move the removal tool around to the front part of the door finisher.

Front

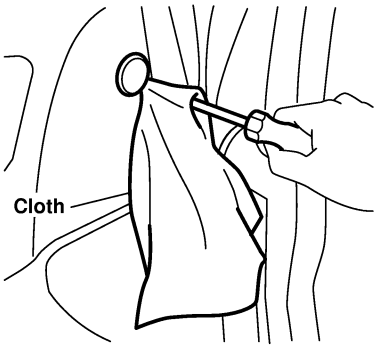


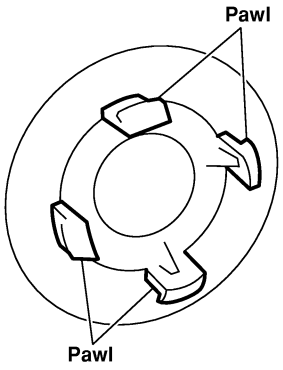
Front

Rear

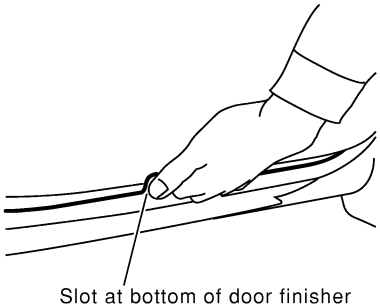


C





D G



- Remove all screws that hold the door finisher to the door.
- Insert your fingers in the slot located at the bottom of the door finisher.
- Pull away and remove door finisher.

SBT086AA

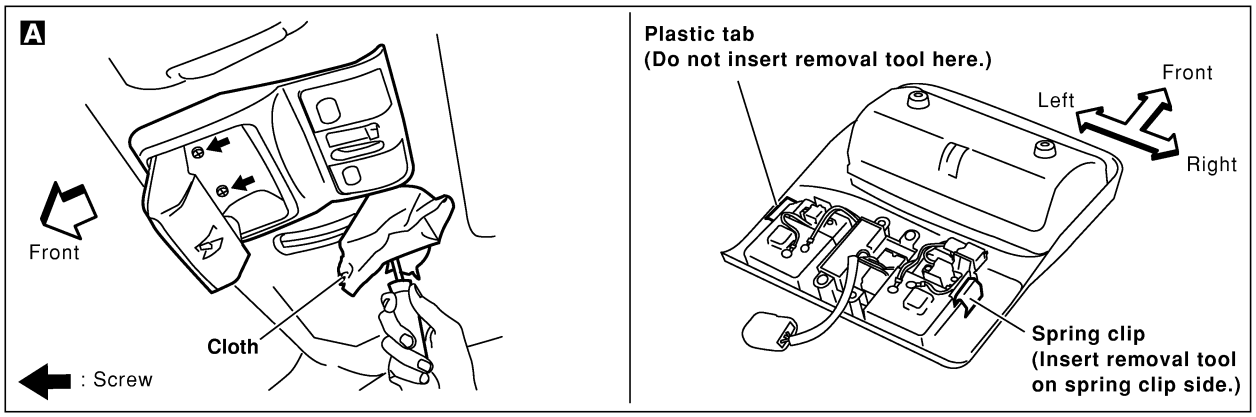
Removal and Installation

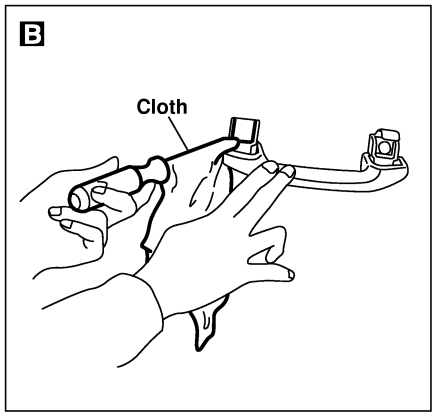
NFBT0015

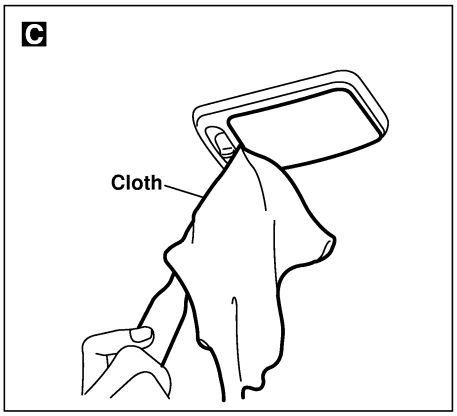
CAUTION:

When removing or installing body side welts, do not allow butyl seal to come in contact with pillar garnish and headlining.

1. Remove rear seats. Refer to “REAR SEAT” for details, BT-52.
2. Remove shoulder anchor bolts. Refer to RS-4, “Front Seat Belt” for details.
3. Remove front pillar garnishes, center pillar upper garnishes and rear pillar garnishes. Refer to “SIDE AND FLOOR TRIM” for details, BT-34.
4. Remove steering wheel. Refer to RS-20, “Driver Air Bag Module and Spiral Cable” for details.
5. Push back the front seat back.
6. Remove two screws from the roof console of map lamp, and insert a removal tool wrapped in clean cloth between the right-hand side of the map lamp and headlining, then remove the roof console and disconnect connectors. A
7. Remove sun visors.
8. Remove assist grips. B
9. Remove interior lamp assembly, then disconnect connectors. C
10. Remove metal clip securing headlining, then remove headlining from vehicle through front passenger side.

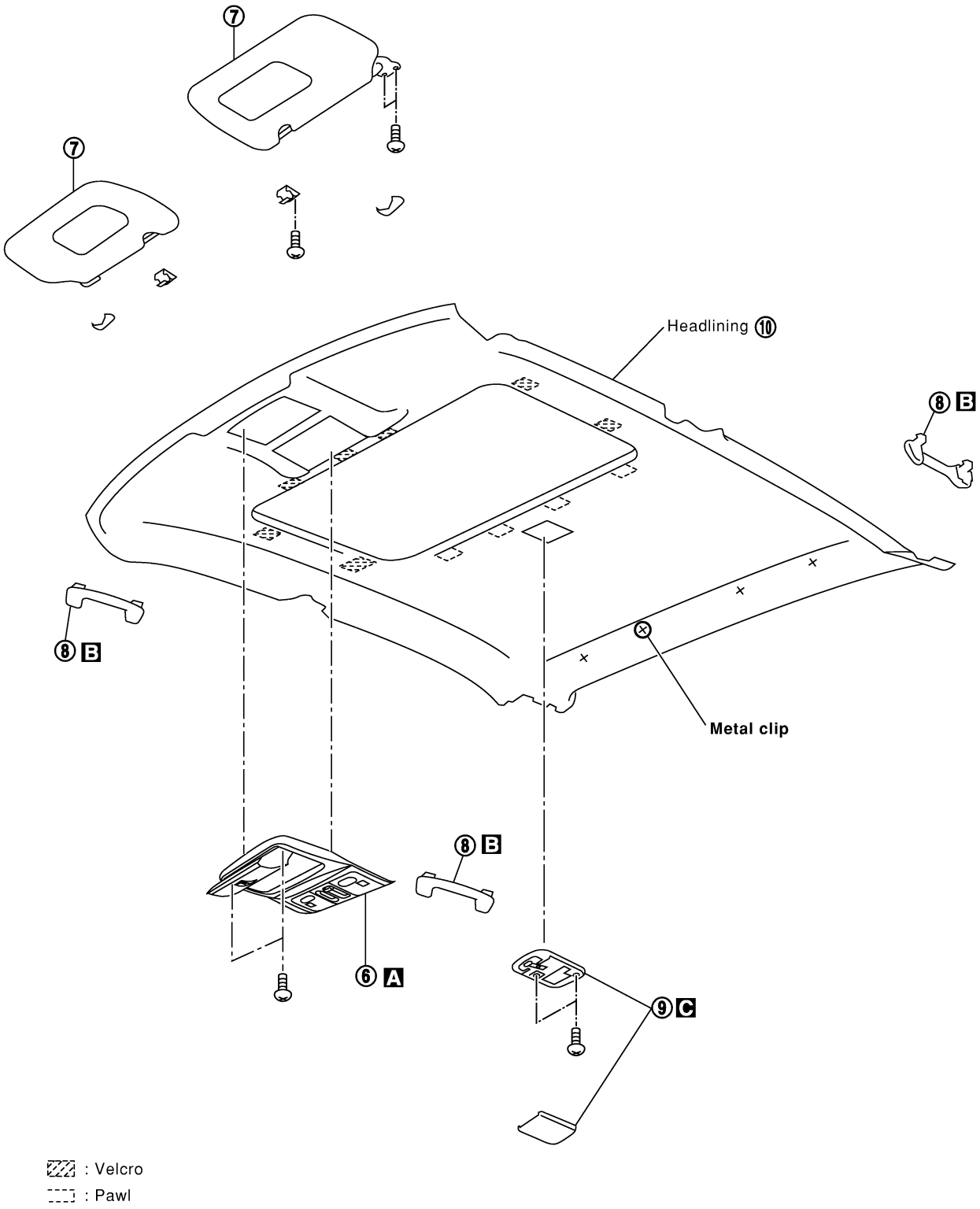






SBT247A

SEC. 264•738•964

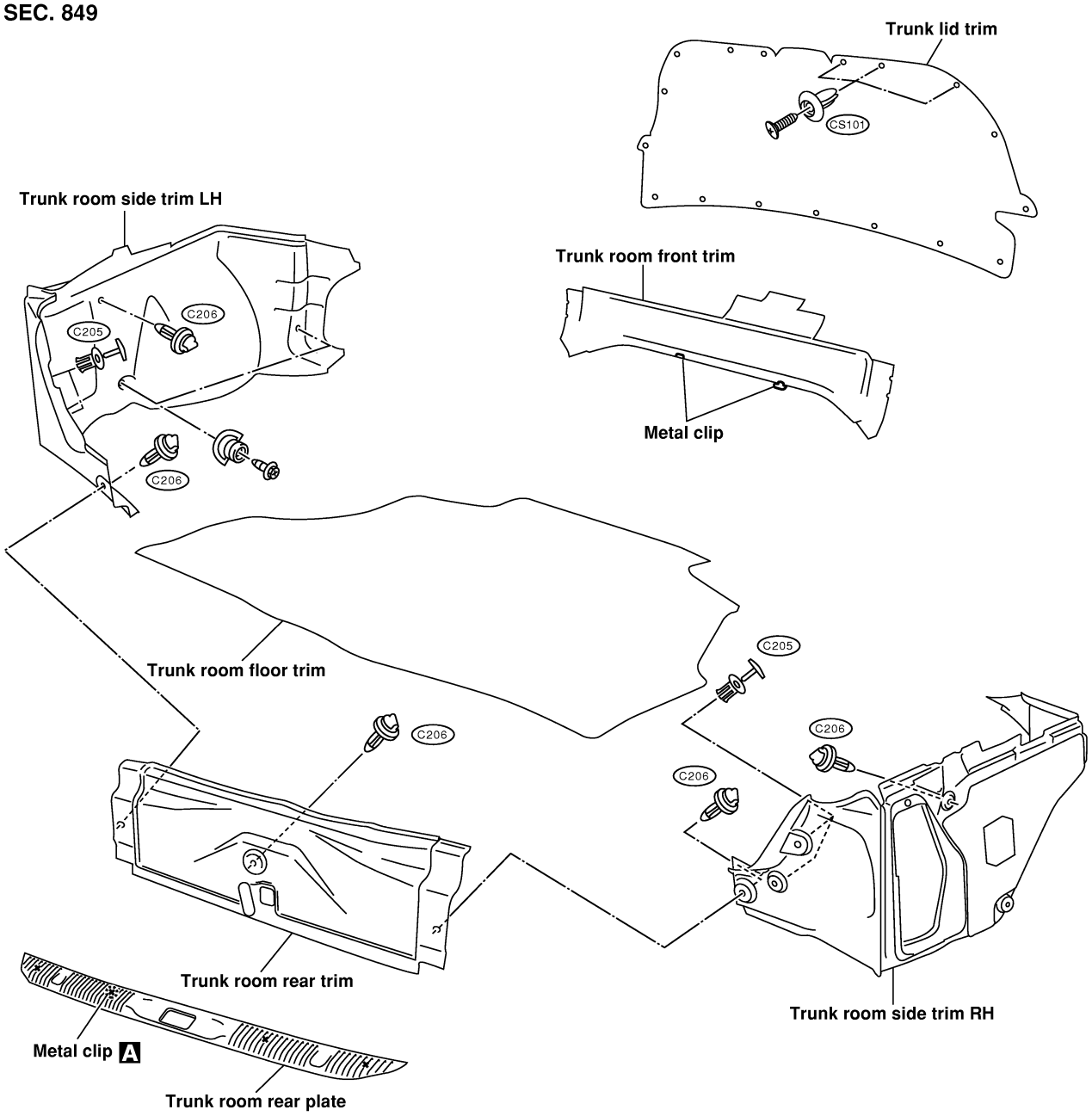


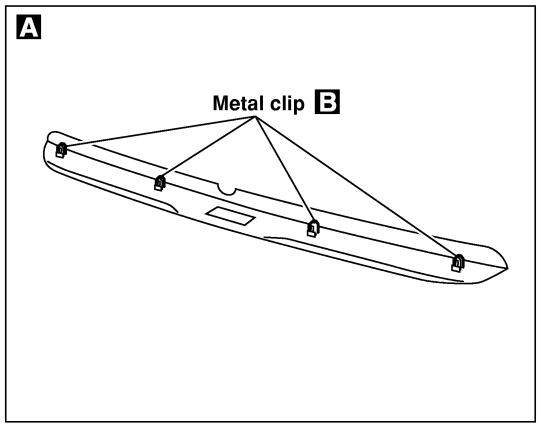
SBT248AA

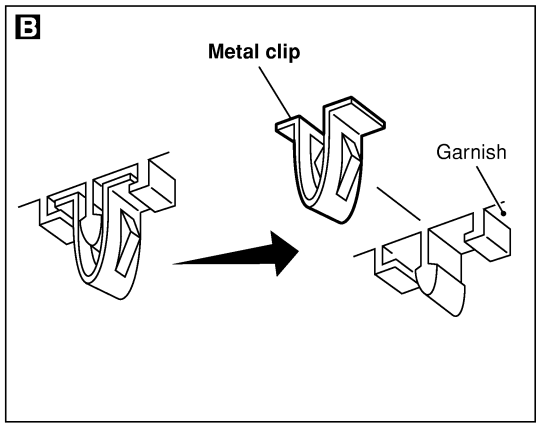
Removal and Installation

NFBT0016

SEC. 849



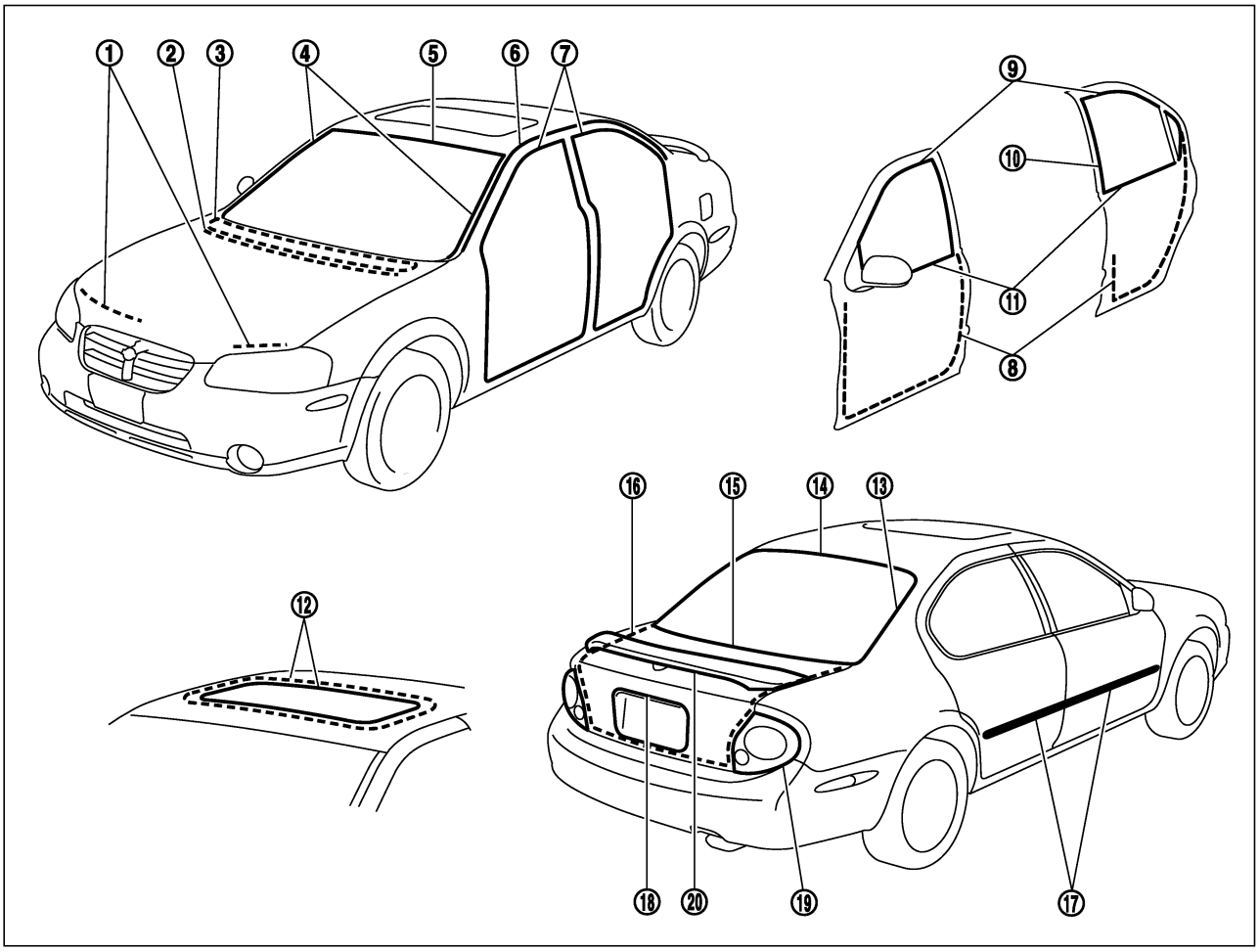




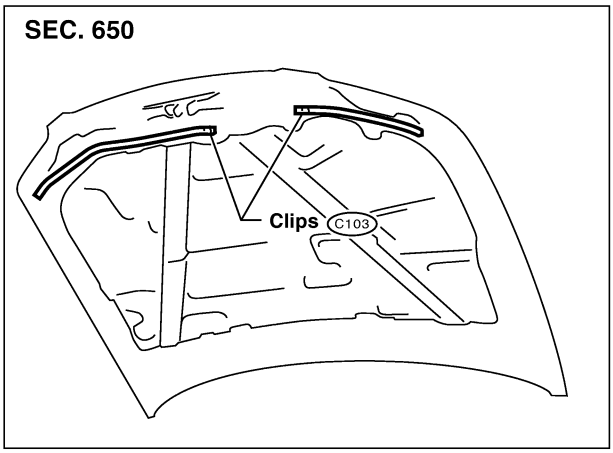
SBT255A

Removal and Installation

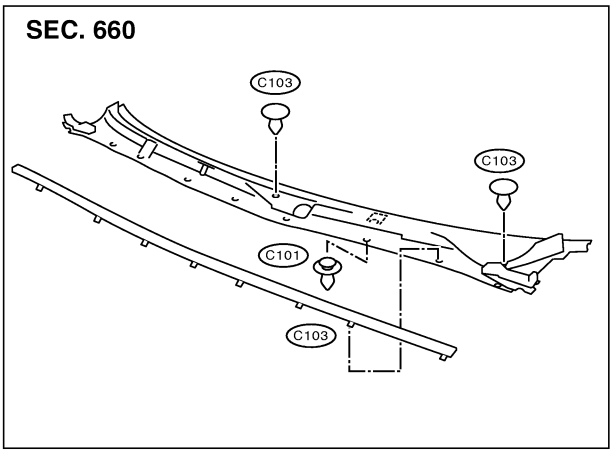
NFBT0017



① Radiator core support sealing rubber



② ③ Cowl top seal and cowl top grille



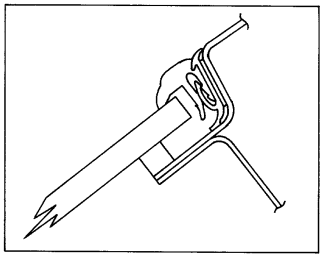
④ Windshield side molding
Mounted with screws.

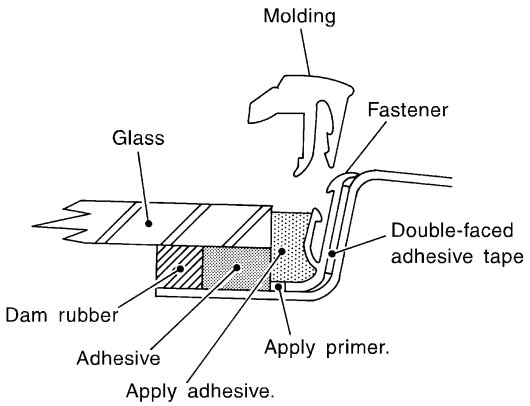
SBT805

⑤ Windshield upper molding

SEC. 720

1. Cut off adhesive at glass end.
2. Remove old adhesive from panel surface.
3. Set molding fastener and apply primer to body panel, and apply adhesive to body.

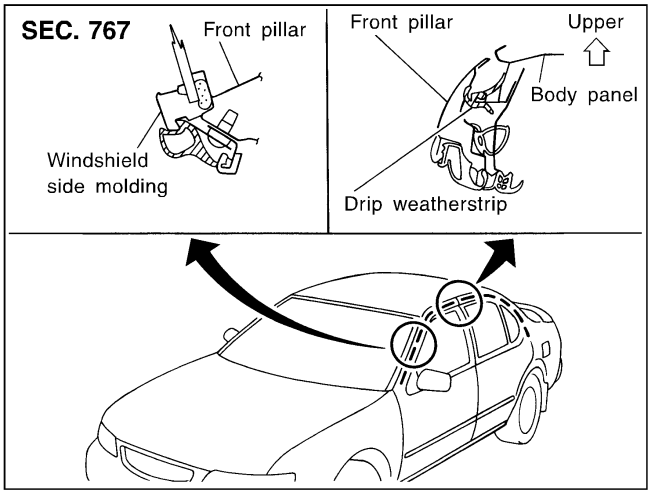




4. Install molding by aligning the molding mark located on center with vehicle center.
   Be sure to install tightly so that there is no gap around the corner.

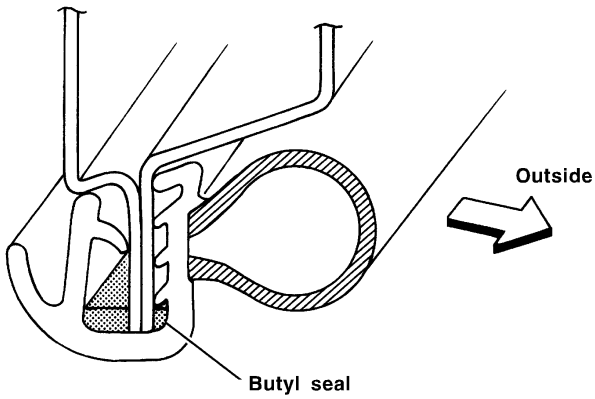
⑥ Drip weatherstrip

SEC. 767



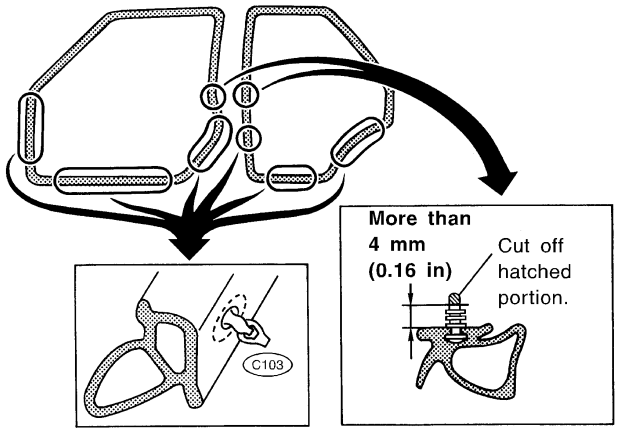
⑦ Body side welt

SEC. 767



⑧ Door weatherstrip

SEC. 800•820

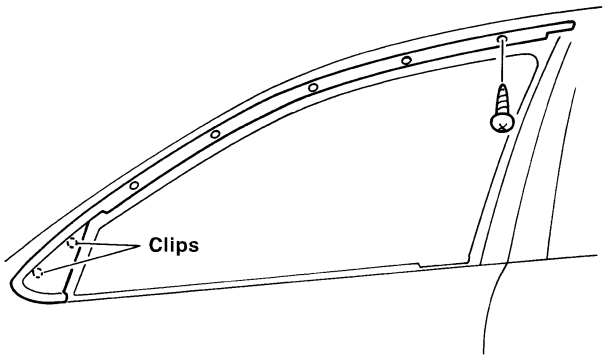


SBT806

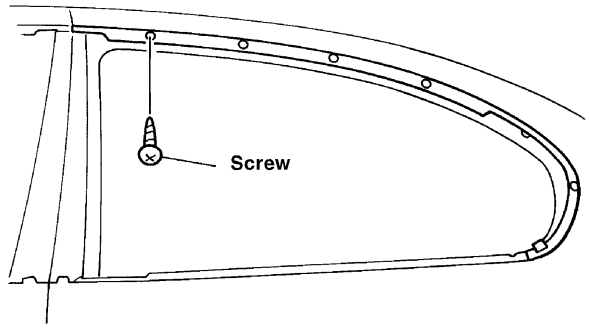
⑨ Door sash molding

SEC. 800•820

Front



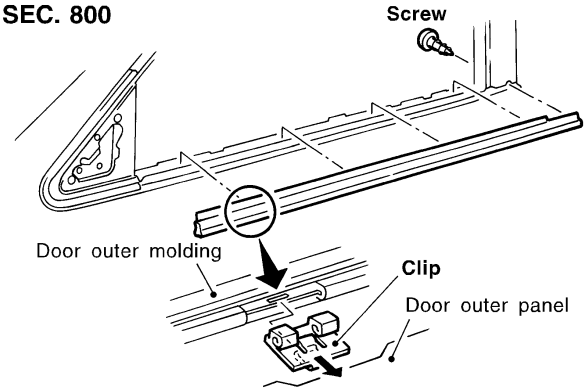
Rear



⑪ Door outside molding

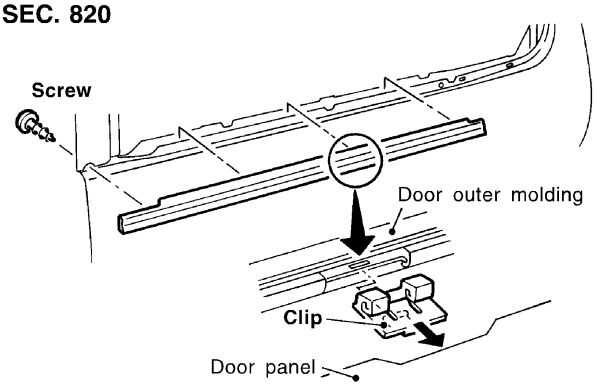
Front door

SEC. 800



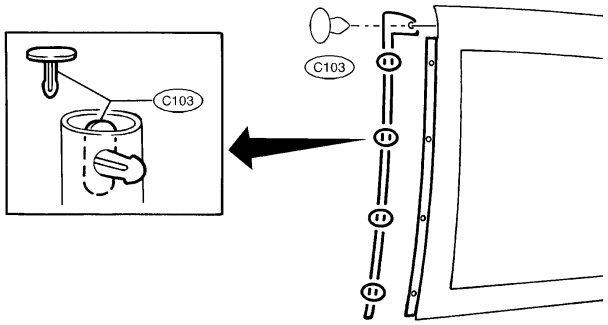
Rear door

SEC. 820



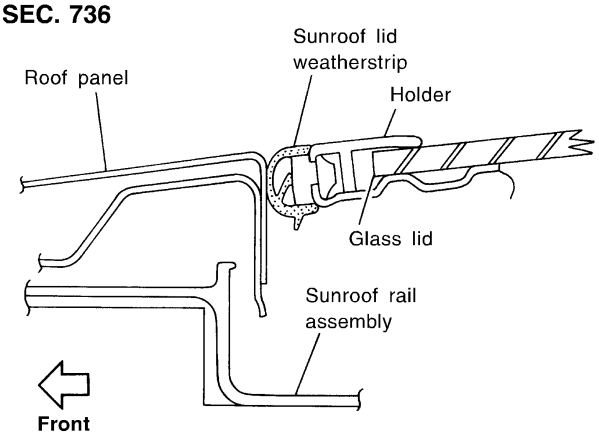
⑩ Front door parting seal

SEC. 800



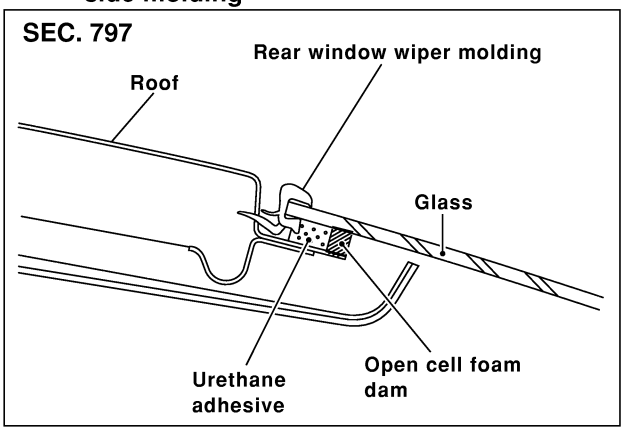
⑫ Sunroof lid weatherstrip

SEC. 736

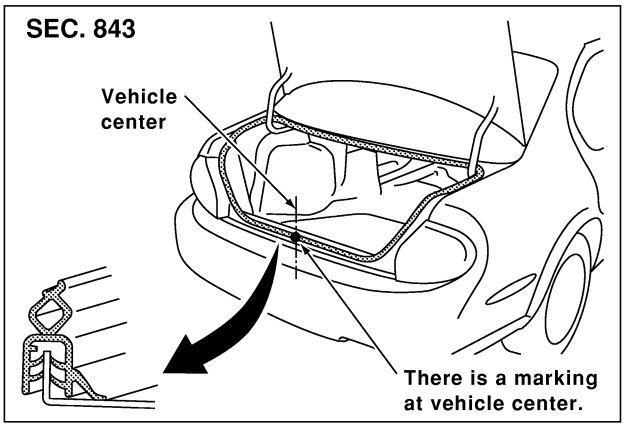


SBT275A

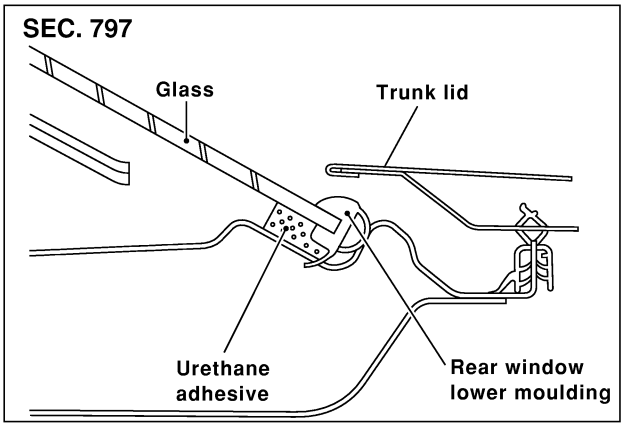
⑬ ⑭ Rear window upper molding and side molding



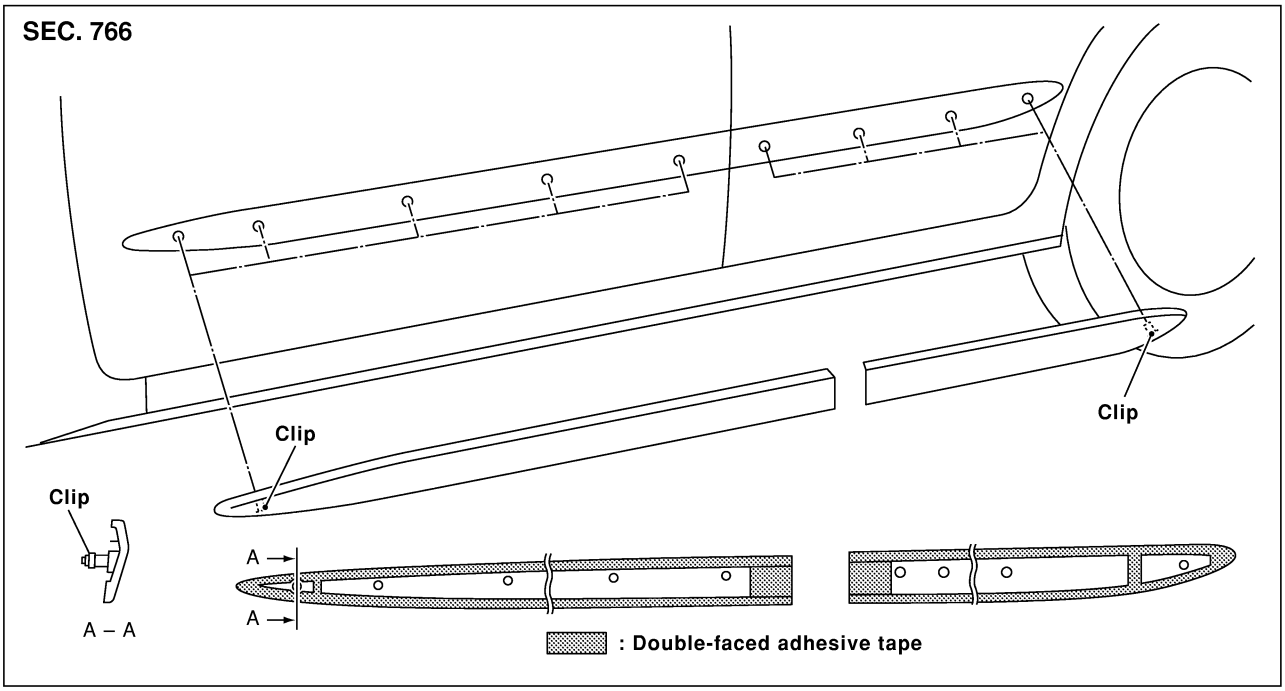
⑯ Trunk lid weatherstrip



⑮ Rear window lower molding

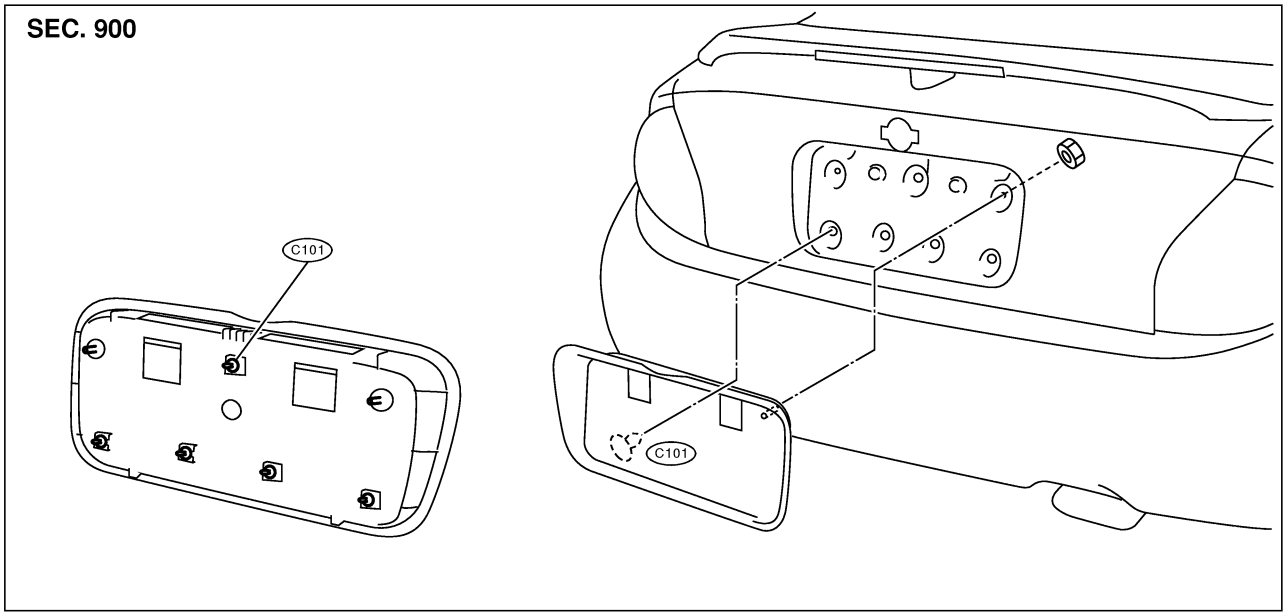


⑰ Side guard molding



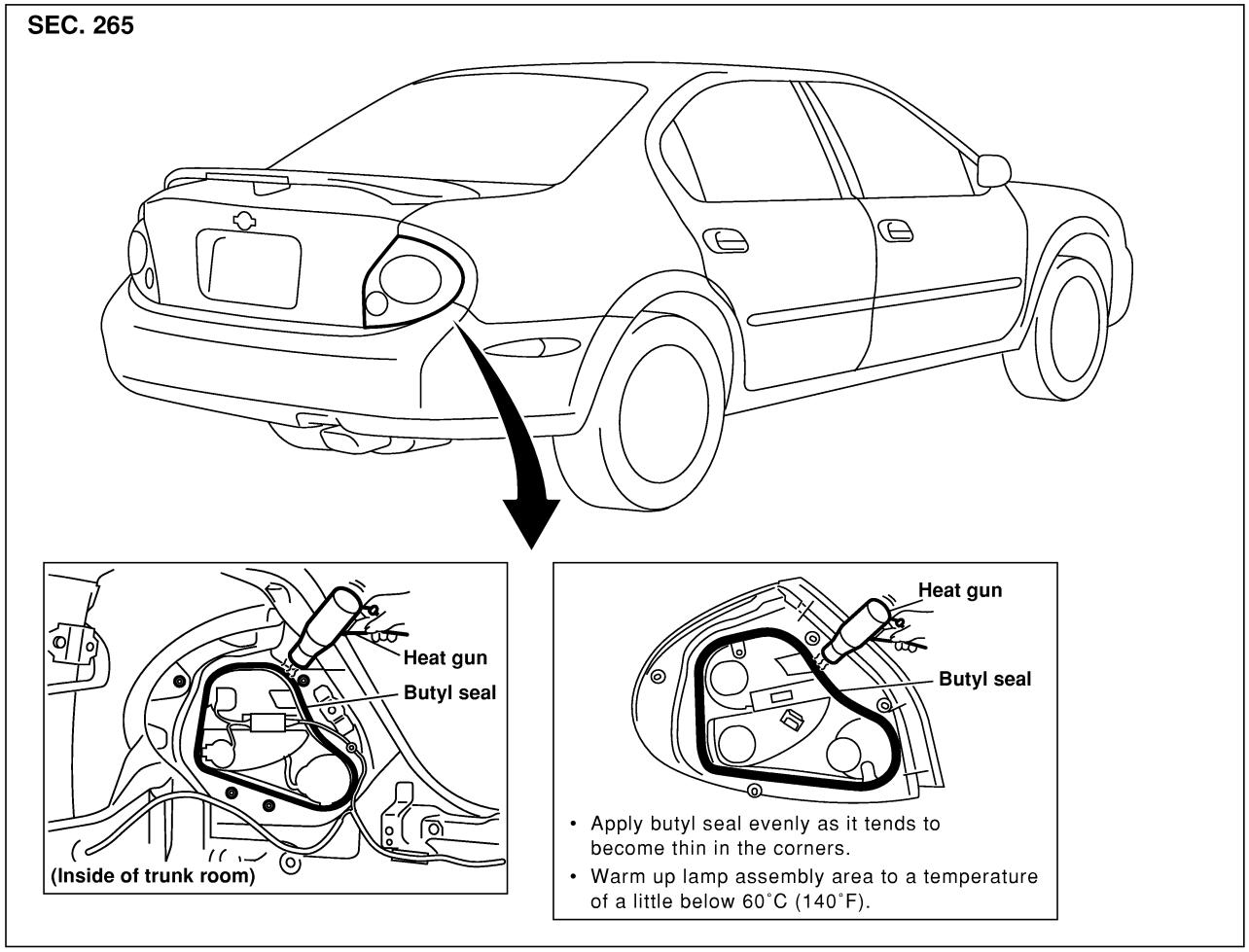
SBT808

⑱ License plate finisher



⑲ Rear combination lamp

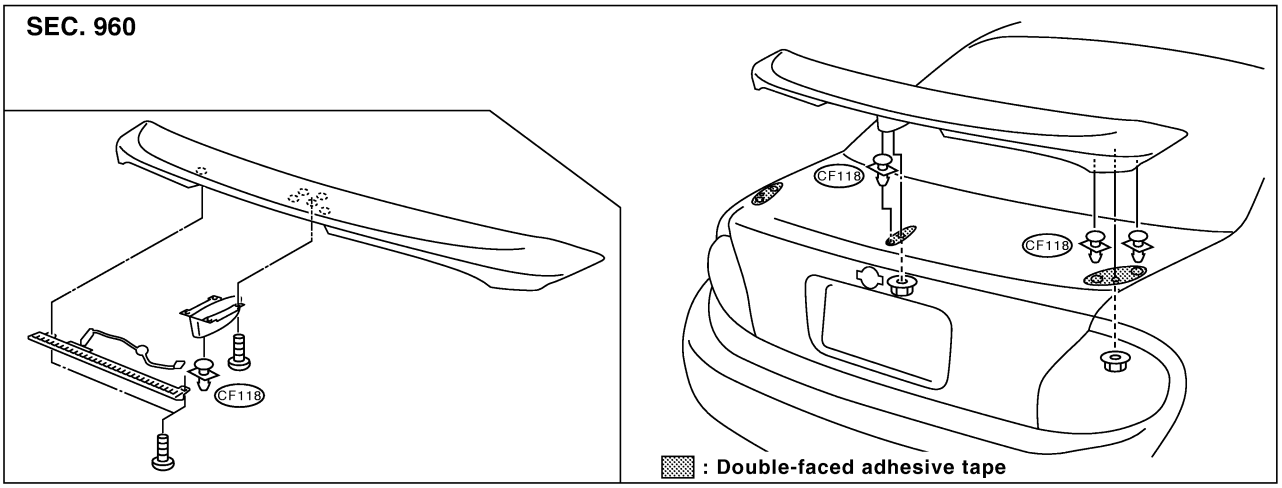
- Rear combination lamps are installed with nuts and butyl seal.



SBT814

⑳ Rear air spoiler

- When removing, first disconnect high-mounted stop lamp connector located on the back of trunk lid, then remove air spoiler taking care the stop lamp harness does not get caught.
- When installing, make sure that there are not gaps or waves at ends of air spoiler.
- Before installing spoiler, clean and remove oil from surface where spoiler will be mounted.



SBT087A

Removal and Installation

NFBT0018

- When removing or installing the seat trim, carefully handle it to keep dirt out and avoid damage.

★ For Wiring Diagram, refer to EL-205, “POWER SEAT” for details.

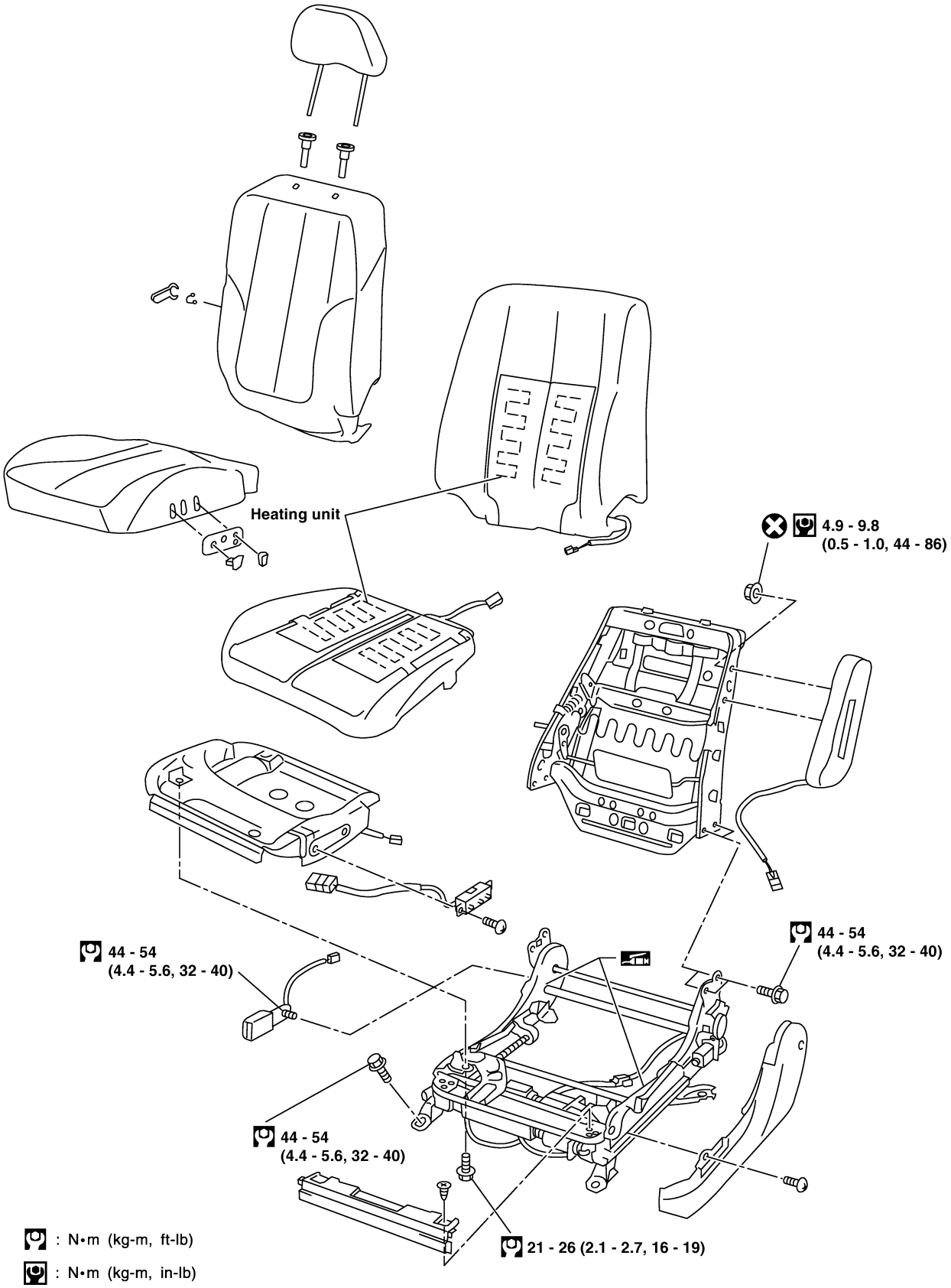
CAUTION:

- **Before removing the front seat, turn the ignition switch off, disconnect battery ground cable and wait at least 3 minutes.**
- **When checking the power seat circuit for continuity using a circuit tester, do not confuse its connector with the side air bag module connector. Such an error may cause the air bag to deploy.**
- **Do not drop, tilt, or bump the side air bag module installed in the seat. Always handle it with care.**

POWER SEAT

NFBT0018S01

SEC. 870

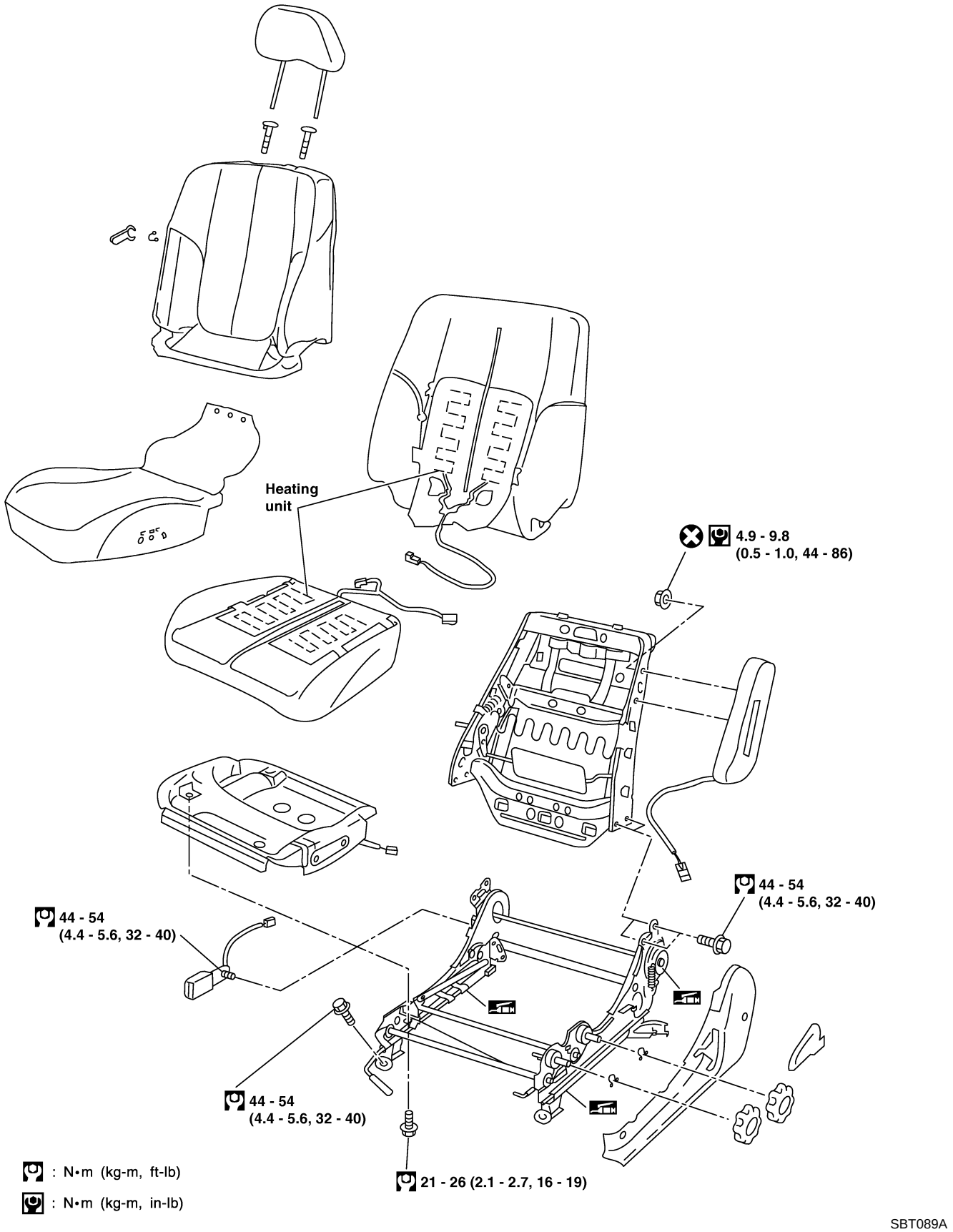


SBT088A

MANUAL SEAT

NFBT0018S02

SEC. 870



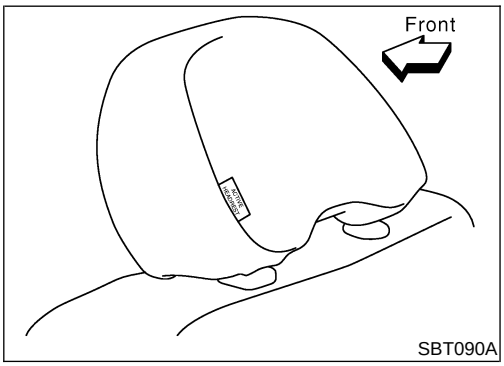
SBT089A

HEATED SEAT

NFBT0018S03

- 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, gasoline, etc. to clean trims.

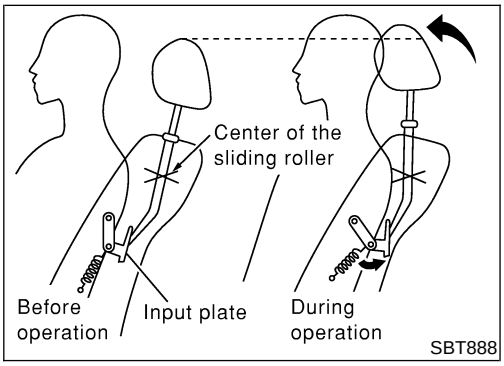
★ **For Wiring Diagram, refer to EL-208, "HEATED SEAT" for details.**



Active Head Restraint

NFBT0032

The active head restraint system is designed so that the headrest instantaneously moves towards the front upper direction by utilizing the force at the seatback during a rear-end collision.
As a result, the occupant's head is protected from being overextended, reducing the chance for neck injury as much as possible.
Seat with active head restraint have the labels shown in figures at left.



OPERATION OUTLINE

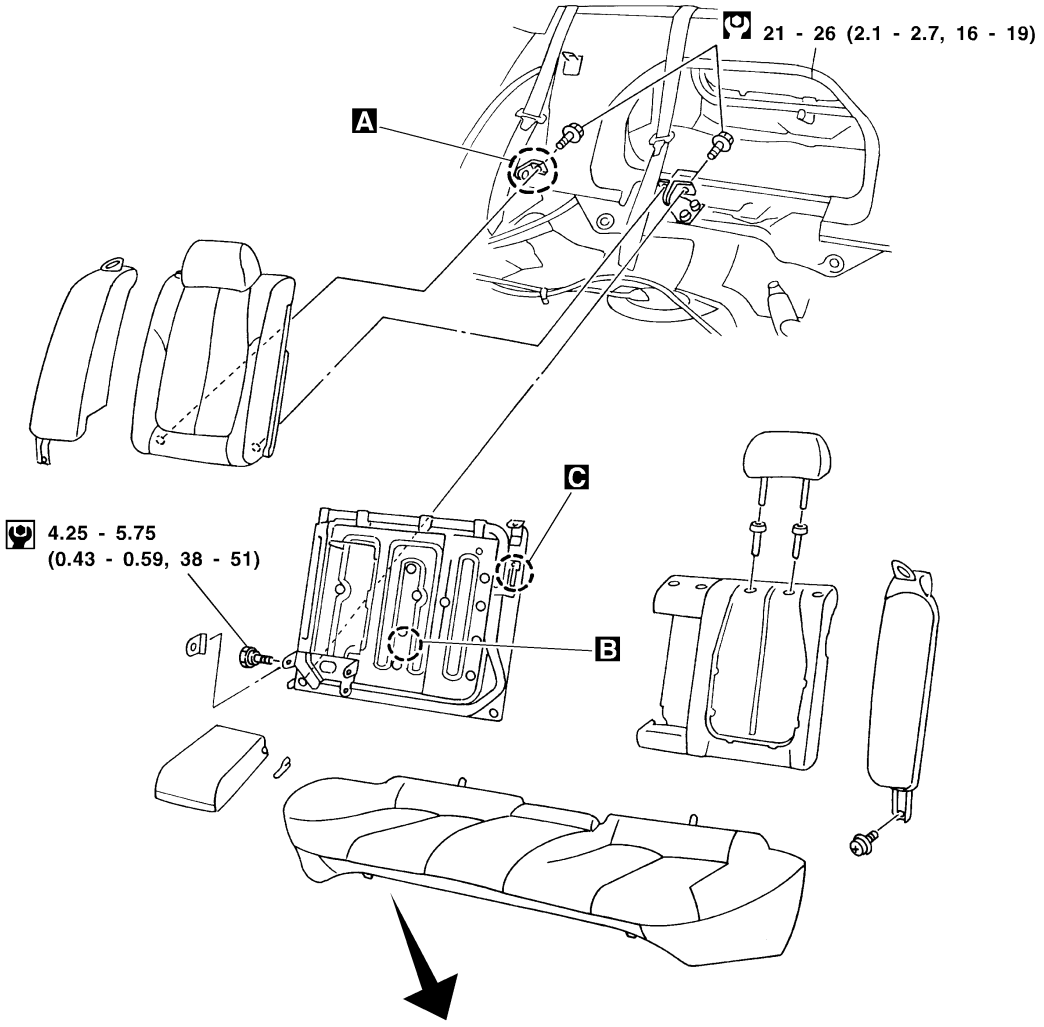
NFBT0032S01

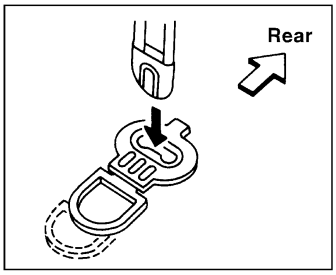
When the seatback receives a sharp backward force during a rear-end collision, the input plate moves with the link rotating center as a pivot. The headrest will then move towards the front upper direction with the center of the sliding roller as a pivot.
As the backward force on the seat back is eliminated, spring tension returns the headrest to its original position.

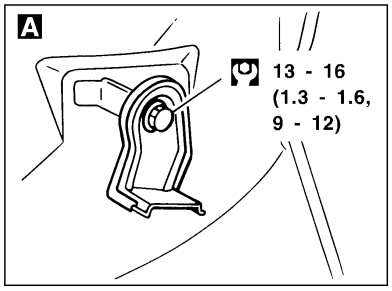
Removal and Installation

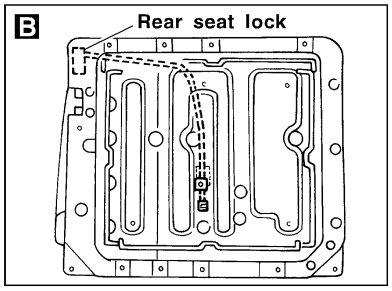
NFBT0019

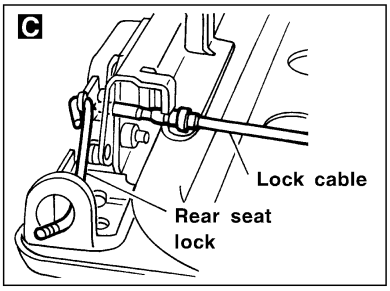
SEC. 880











: N•m (kg-m, ft-lb)

: N•m (kg-m, in-lb)

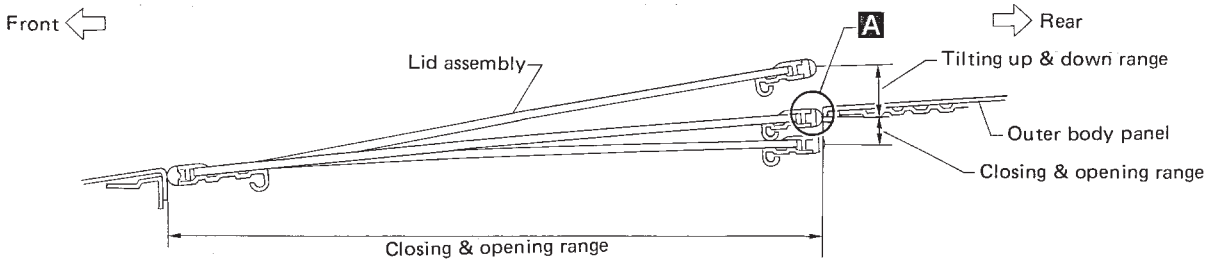
SBT079A

Adjustment

NFBT0020

Install motor & limit SW assembly and sunroof rail assembly in the following sequence:

1. Arrange equal lengths of link and wire assemblies on both sides of sunroof opening.
2. Connect sunroof connector to vehicle harness.
3. Set lid assembly to fully closed position A by operating OPEN switch and TILT switch, after the lid has closed all the way, keep pushing the tilting switch toward tilt DOWN for more than 1 second.
4. Fit outer side of lid assembly to the surface of roof on body outer panel.
5. Press TILT-UP switch to check lid assembly for normal tilting.
6. Check sunroof lid assembly for normal operations (tilt-up, tilt-down, open, and close).



SBF920F

Removal

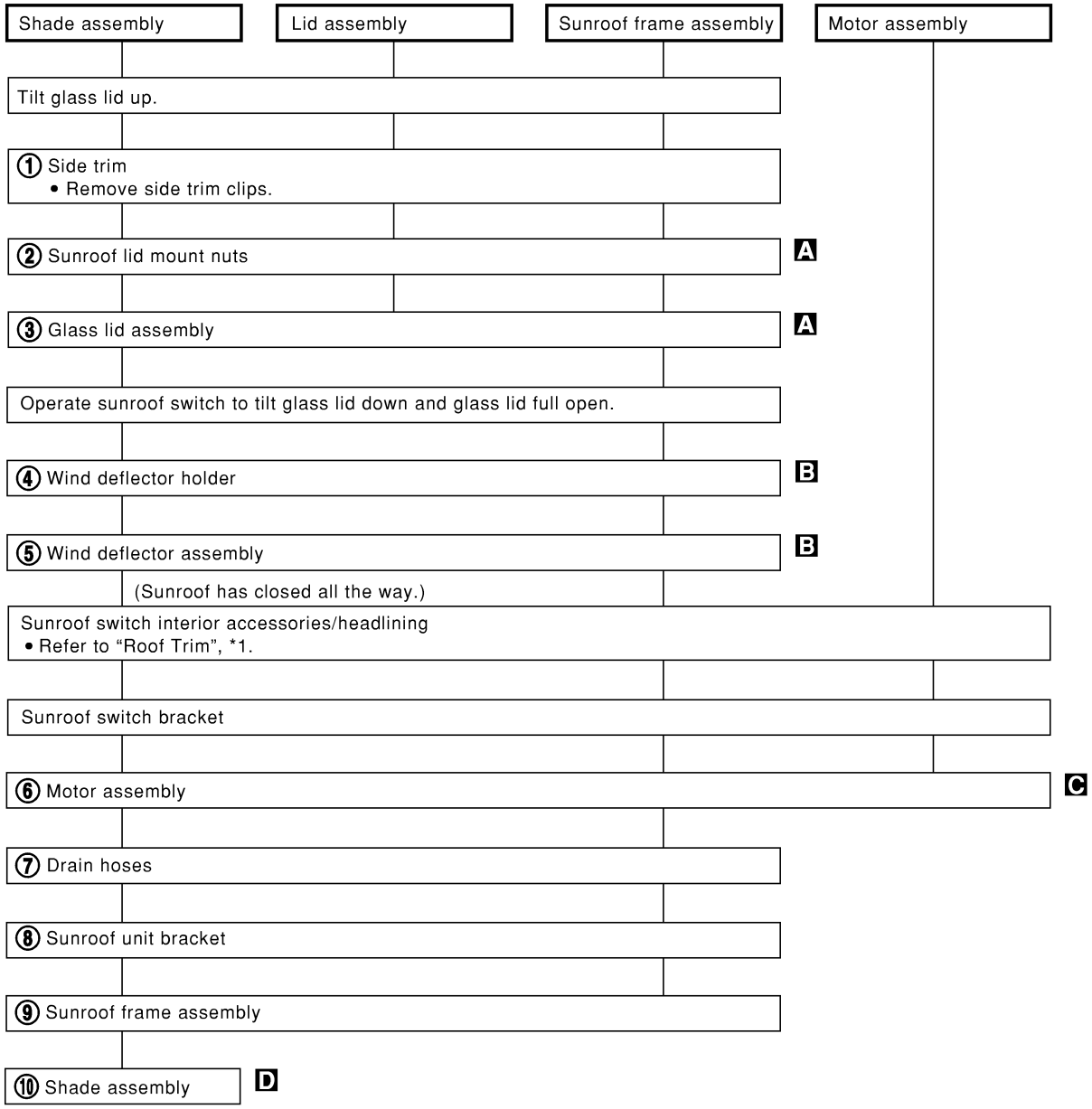
NFBT0021

- After any adjustment, check sunroof operation and lid alignment.
- Handle finisher plate and glass lid with care so not to cause damage.
- It is desirable for easy installation to mark each point before removal.

CAUTION:

- **Always work with a helper.**
- **Before removal, fully close the glass lid assembly, then after removal, do not move motor assembly.**

Removal (Cont'd)

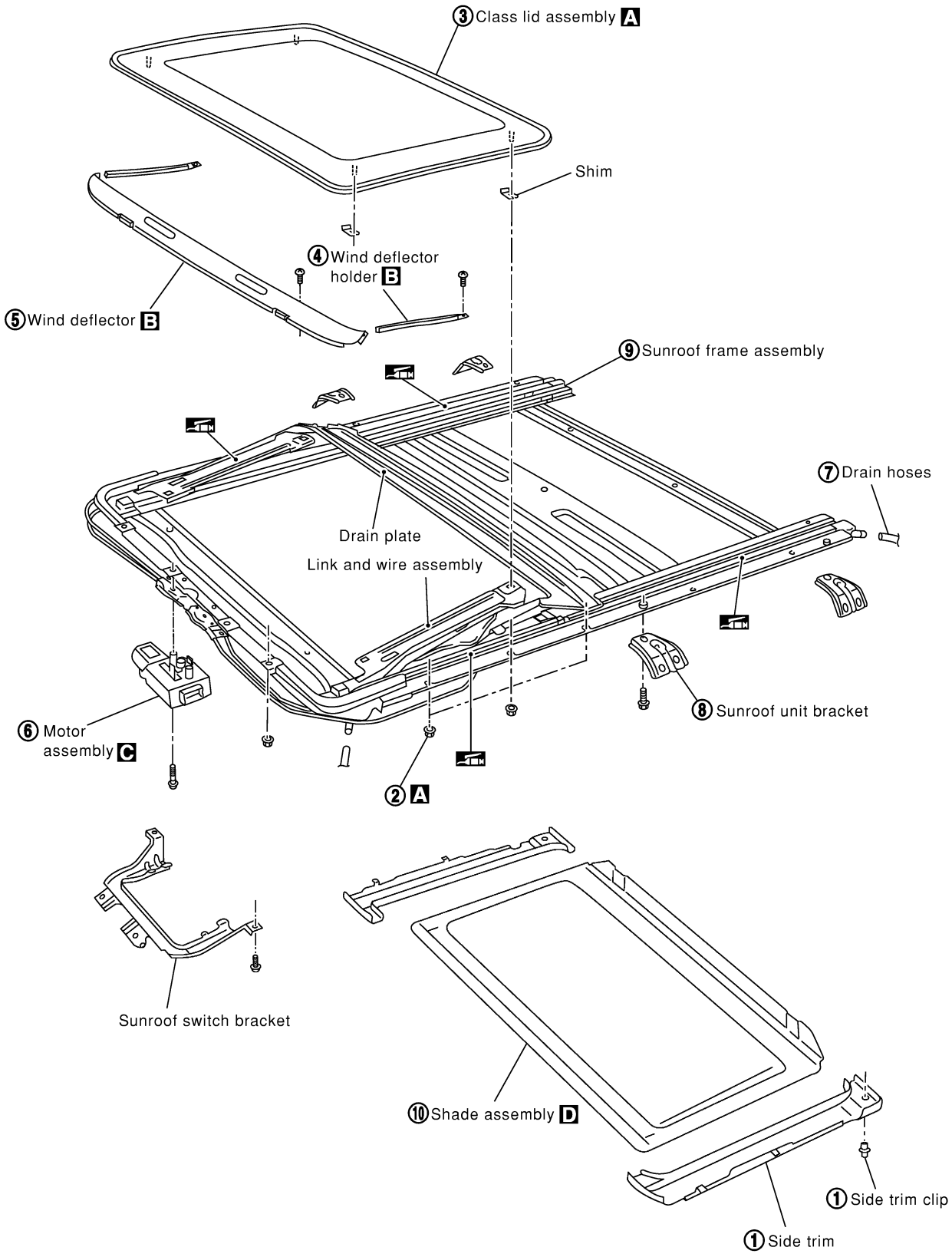


★ For Wiring Diagram, refer to (*2), "POWER SUNROOF" for details.

SBT276A

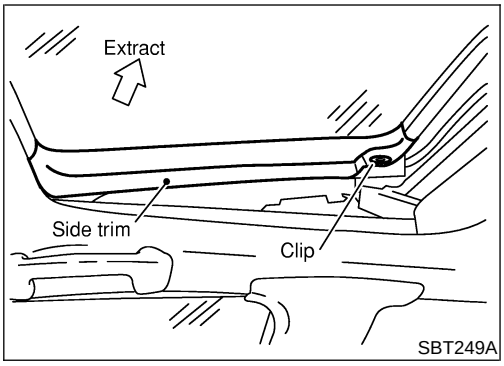
*1 BT-39

*2 EL-197

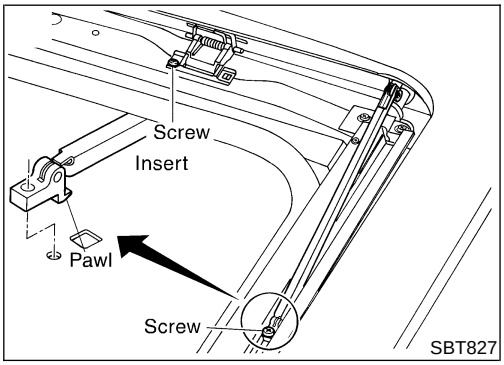

3 Class lid assembly A
Shim
4 Wind deflector holder B
5 Wind deflector B
9 Sunroof frame assembly
7 Drain hoses
Drain plate
Link and wire assembly
8 Sunroof unit bracket
6 Motor assembly C
2 A
Sunroof switch bracket
10 Shade assembly D
1 Side trim clip
1 Side trim

SBT252A

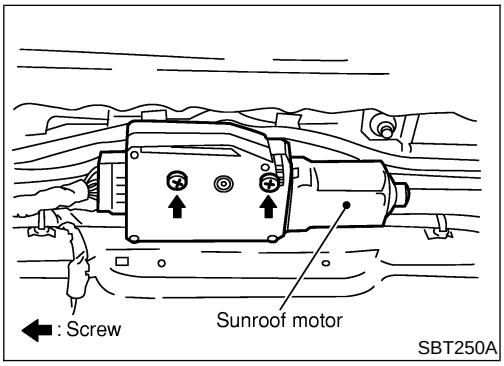
Removal (Cont'd)



A Record the number of shims placed between glass lid assembly and link and wire assembly. Remove securing nuts and glass lid assembly.



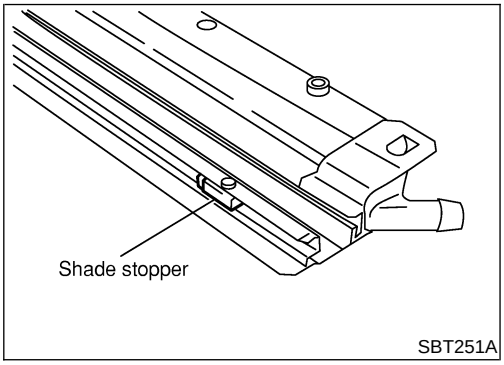
B Remove screws from left and right sides of each wind deflector holder. Extract pawls through rail holes, then remove left and right sides of wind deflector holder. Remove screws from front end of sunroof unit. Extract pawls through frame holes, then remove wind deflector from frame assembly.



C

CAUTION:

- **Before removing sunroof motor, make sure that sunroof is fully closed.**
- **After removing sunroof motor, never attempt to rotate sunroof motor as a single unit.**
- **Power supply to the motor is off when removing sunroof motor and vehicle harness or battery. Initialize at starting position.**



D Remove shade stoppers (2 points) from rear end of sunroof frame assembly. Remove sun shade from rear end of sunroof frame assembly.

Trouble Diagnoses

=NFBT0022

DIAGNOSTIC TABLE

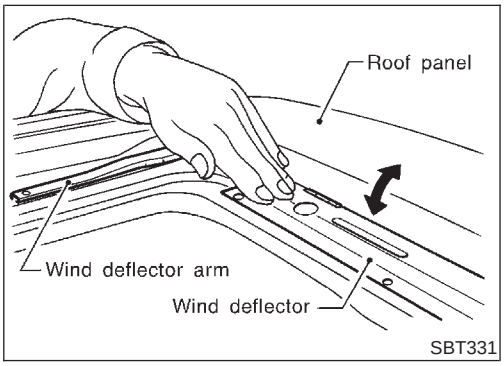
NFBT0022S01

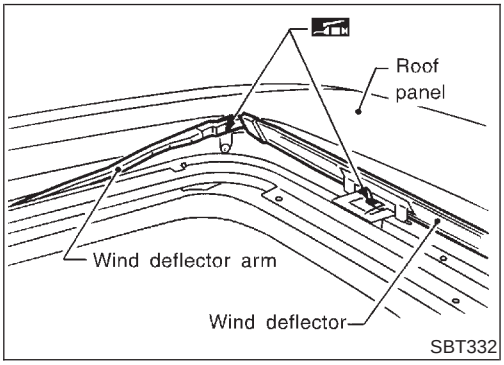
NOTE:

For diagnosing electric problem, refer to EL-197, “POWER SUNROOF”.

		Check items (Components)				
		Wind deflector	Adjustment	Drain hoses	Weatherstrip	Link and wire assembly
	Reference page	BT-57	BT-58	BT-59	BT-59	BT-60
Symptom	Excessive wind noise	1	2		3	
	Water leaks		1	2	3	
	Sunroof rattles		1	4	2	3
	Excessive operation noise		1		2	3

The numbers in this table mean checking order.





WIND DEFLECTOR

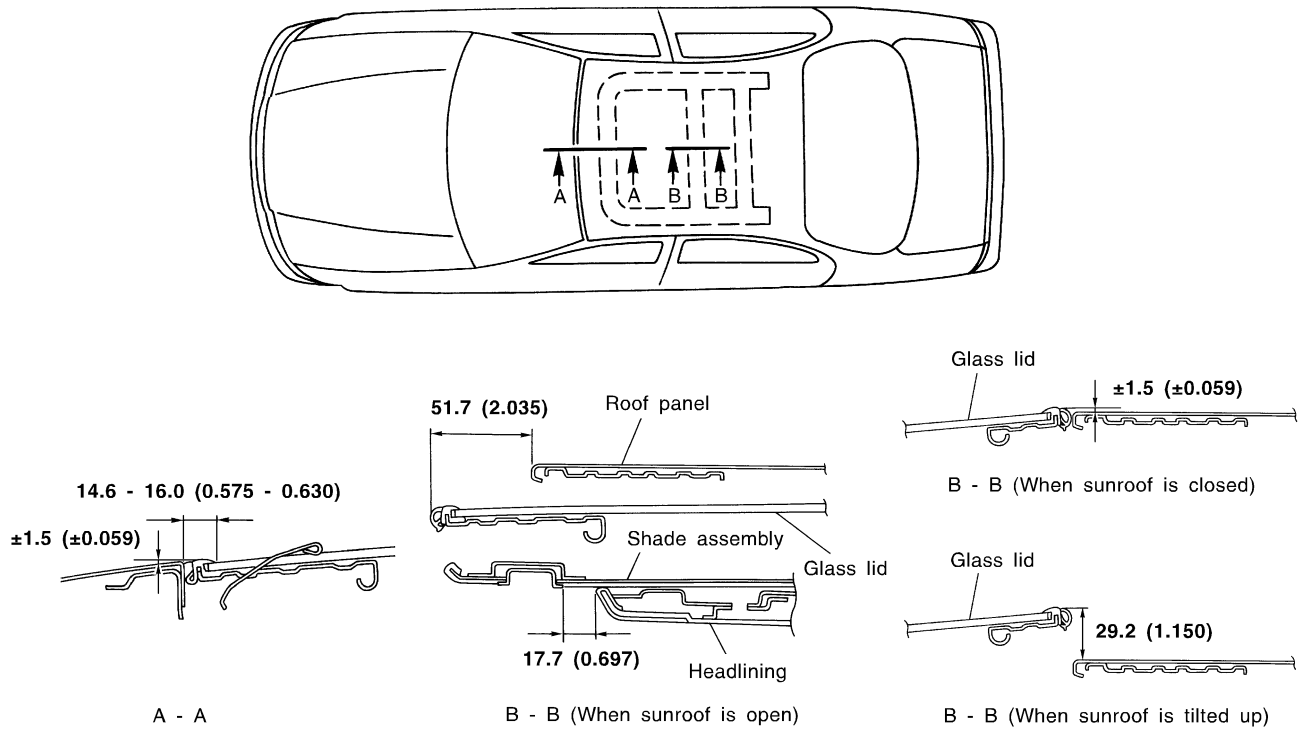
NFBT0022S02

1. Open lid.
2. Check visually for proper installation.
3. Check to ensure a proper amount of petroleum jelly has been applied to wind deflector connection points; apply if necessary.
4. Check that wind deflector is properly retracted by hand. If it is not, remove and visually check condition. (Refer to removal procedures, BT-53.) If wind deflector is damaged, replace with new one. If wind deflector is not damaged, re-install properly.

ADJUSTMENT

NFBT0022S03

SEC. 736



Unit: mm (in)

SBT256A

If any gap or height difference between glass lid and roof is found, check glass lid fit and adjust as follows:

Gap Adjustment

NFBT0022S0301

1. Open shade assembly.
2. Tilt glass lid up then remove side trim.
3. Loosen glass lid securing nuts (2 each on left and right sides), then tilt glass lid down.
4. Adjust glass lid from outside of vehicle so it resembles "A-A" as shown in the figure above.
5. Tilt glass lid up and down until it is adjusted to "B-B" (when sunroof is closed) as shown in the figure above.
6. After adjusting glass lid, tilt glass lid up and tighten nuts.
7. Tilt glass lid up and down several times to check that it moves smoothly.

Height Difference Adjustment

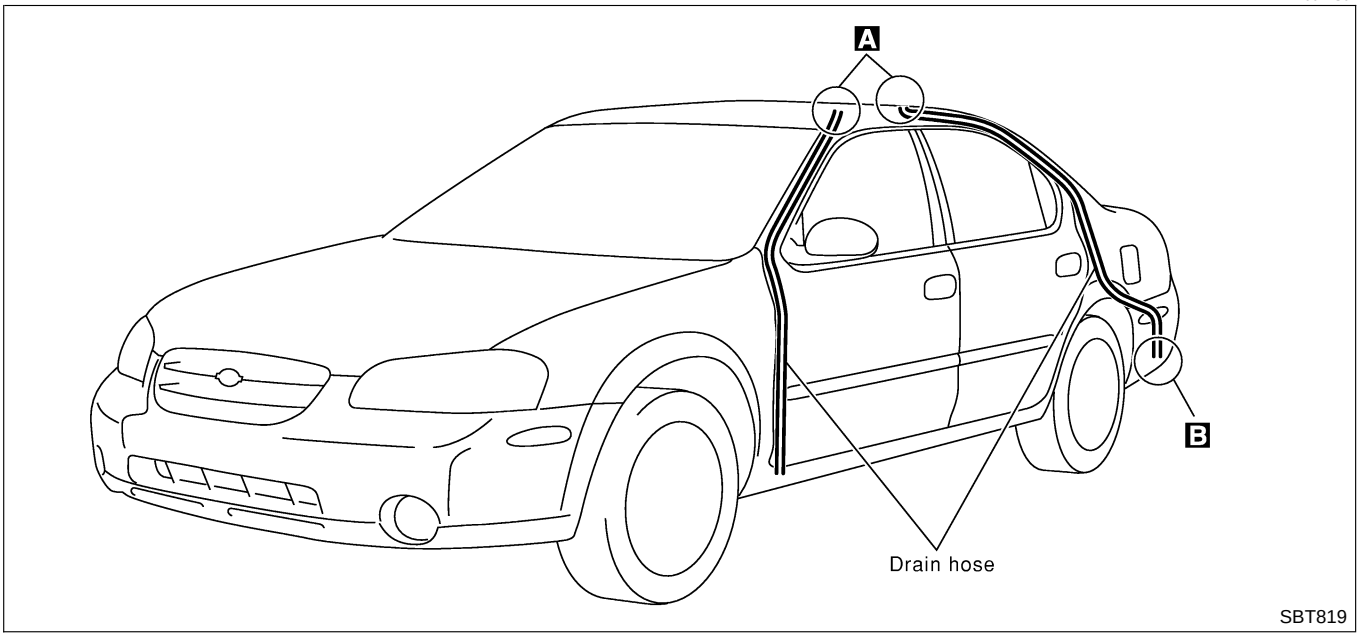
NFBT0022S0302

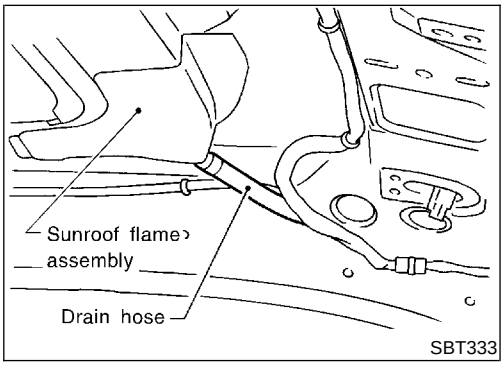
1. Tilt glass lid up and down.
2. Check height difference between roof panel and glass lid to see if it is as "A-A" as shown in the figure above.
3. If necessary, adjust it by using one of following procedures.

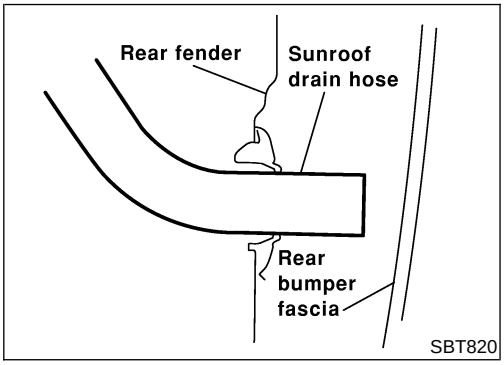
- Adjust by adding or removing adjustment shim(s) between glass lid and link assembly.
- If glass lid protrudes above roof panel, add shim(s) or plain washer(s) at sunroof mounting bracket or stud bolt locations to adjust sunroof installation as required.

DRAIN HOSES

NFBT0022S04







1. Remove headlining to access drain hose connections. (Refer to "ROOF TRIM", BT-39, for detail.)
2. Check visually for proper connections, damage or deterioration. A (The figure shows only the front side.)
3. If leakage occurs around luggage room, remove luggage room side trim and check connecting area. Check for proper connection, damage or tear. B
4. Remove drain hoses and check visually for any damage, cracks, or deterioration.
5. Pour water into drain hoses and find damaged portion.

- If any damaged portion is found at each step, replace the damaged part.

WEATHERSTRIP

NFBT0022S05

Check weatherstrip visually for any damage, deterioration, or flattening.

- In the case of leakage around glass lid, close glass lid and pour water over glass lid to find damaged or gap portion, remove glass lid assembly. (Refer to removal procedures, BT-53, for details.)
- If any damage is found, replace weatherstrip.

CAUTION:

Do not remove weatherstrip except when replacing, or filling up butyl seal.

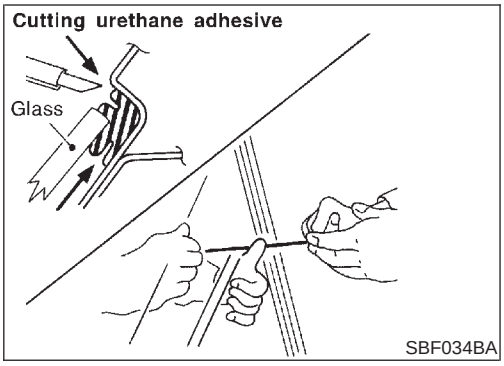
LINK AND WIRE ASSEMBLY

NFBT0022S06

NOTE:

Before replacing a suspect part, carefully ensure it is the source of noise being experienced.

1. Visually check to determine if a sufficient amount of petroleum jelly has been applied to wire or rail groove. If not, add petroleum jelly as required.
2. Check wire for any damage or deterioration. If any damage is found, remove rear guide (refer to removal procedures, BT-53, for details), then replace wire.



Removal and Installation

NFBT0023

REMOVAL

NFBT0023S01

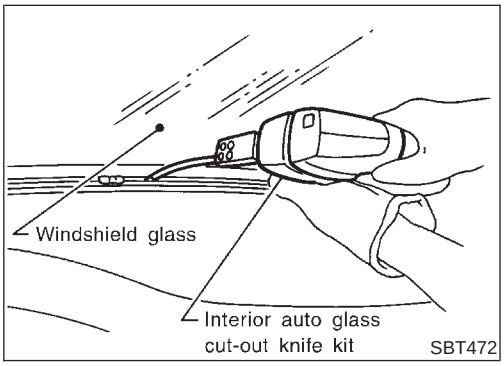
After removing moldings, remove glass using piano wire or power cutting tool and an inflatable pump bag.

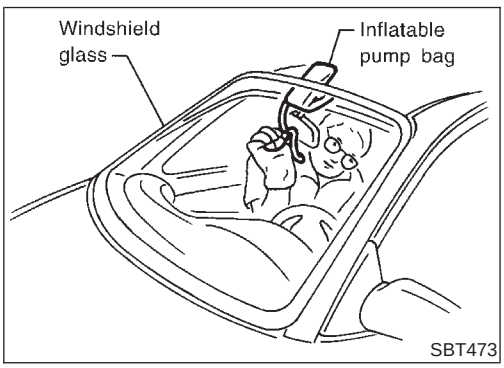
WARNING:

When cutting the glass from the vehicle, always wear safety glasses and heavy gloves to help prevent glass splinters from entering your eyes or cutting your hands.

CAUTION:

- **Be careful not to scratch the glass when removing.**
- **Do not set or stand the glass on its edge. Small chips may develop into cracks.**





INSTALLATION

NFBT0023S02

- **Use a genuine Nissan Urethane Adhesive Kit or equivalent and follow the instructions furnished with it.**
- **While the urethane adhesive is curing, open a door window. This will prevent the glass from being forced out by passenger compartment air pressure when a door is closed.**
- **The molding must be installed securely so that it is in position and leaves no gap.**
- **Inform the customer that the vehicle should remain stationary until the urethane adhesive has completely cured (preferably 24 hours). Curing time varies with temperature and humidity.**

WARNING:

- **Keep heat and open flames away as primers and adhesive are flammable.**
- **The materials contained in the kit are harmful if swallowed, and may irritate skin and eyes. Avoid contact with the skin and eyes.**
- **Use in an open, well ventilated location. Avoid breathing the vapors. They can be harmful if inhaled. If affected by vapor inhalation, immediately move to an area with fresh air.**
- **Driving the vehicle before the urethane adhesive has completely cured may affect the performance of the windshield in case of an accident.**

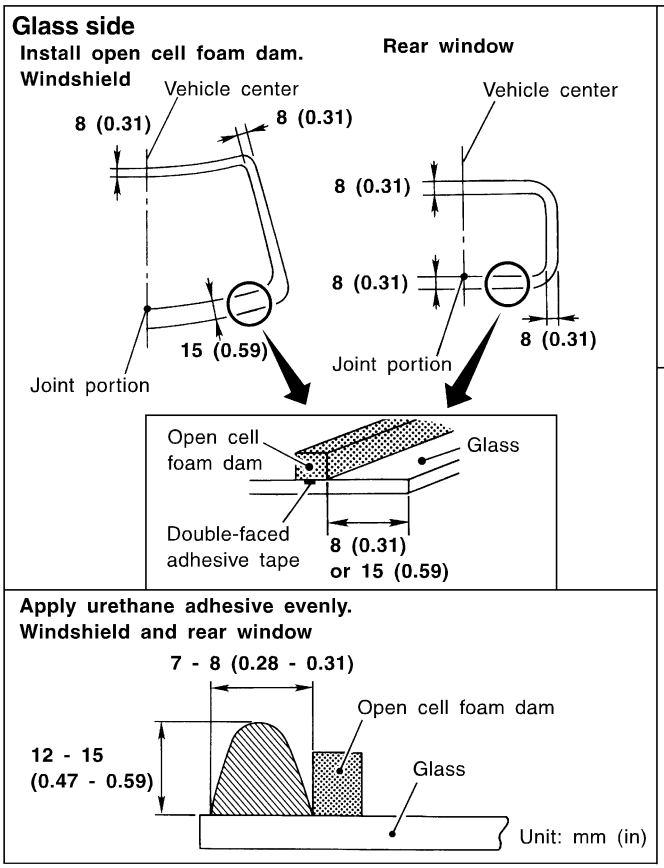
CAUTION:

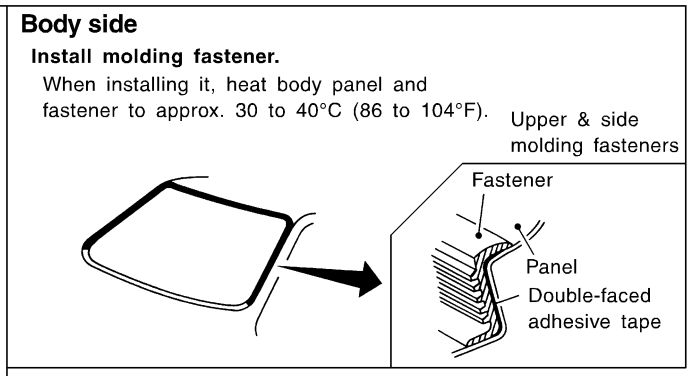
- **Do not use an adhesive which is past its usable term. Shelf life of this product is limited to six months after the date of manufacture. Carefully adhere to the expiration or manufacture date printed on the box.**
- **Keep primers and adhesive in a cool, dry place. Ideally, they should be stored in a refrigerator.**

- **Do not leave primers or adhesive cartridge unattended with their caps open or off.**
- **The vehicle should not be driven for at least 24 hours or until the urethane adhesive has completely cured. Curing time varies depending on temperature and humidities. The curing time will increase under higher temperatures and lower humidities.**

WINDSHIELD

NFBT0023S03





SBT823

Repairing Water Leaks for Windshield

NFBT0023S0301

Leaks can be repaired without removing and reinstalling glass.
If water is leaking between the urethane adhesive material and body or glass, determine the extent of leakage. This can be done by applying water to the windshield area while pushing glass outward.
To stop the leak, apply primer (if necessary) and then urethane adhesive to the leak point.

Removal and Installation

NFBT0024

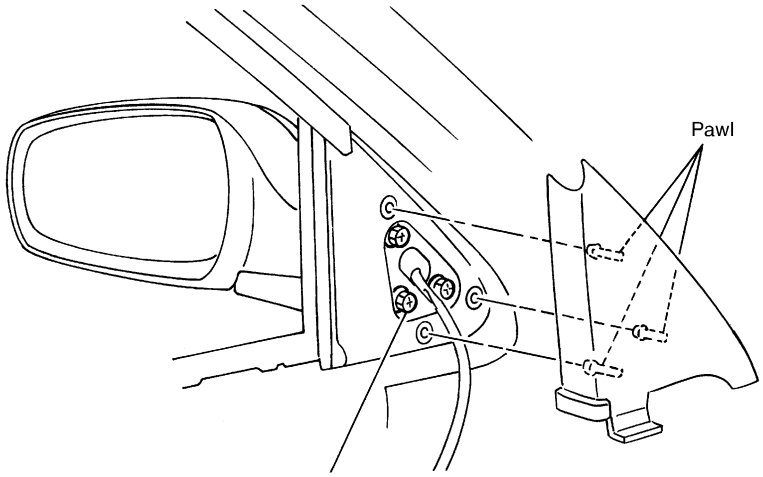
CAUTION:

Be careful not to scratch door rearview mirror body.

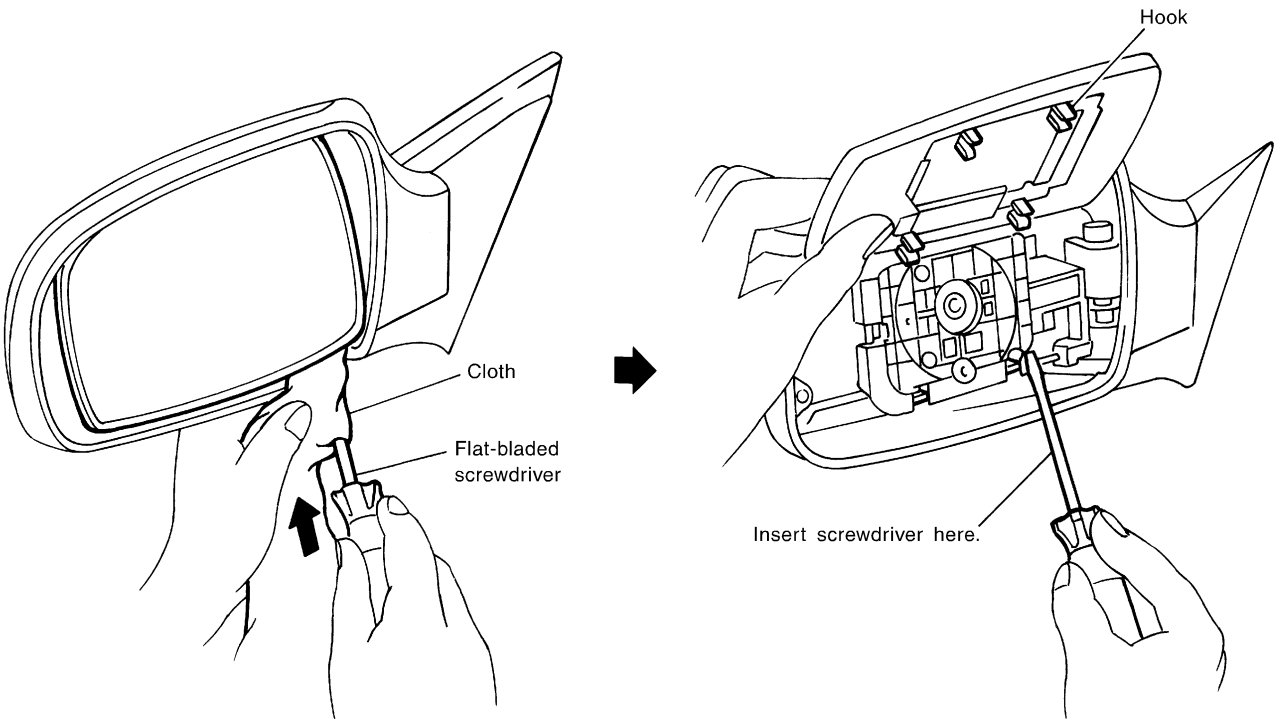
★ For Wiring Diagram, refer to EL-201, “DOOR MIRROR” for details.

1. Remove door trim. Refer to “DOOR TRIM” for details, BT-37.
2. Remove inner cover front corner of door.
3. Disconnect door mirror harness connector.
4. Remove door mirror harness clips.
5. Remove bolts securing door mirror assembly.
6. Remove the mirror glass. Do not insert screwdriver too far.

SEC. 963



2.9 - 4.1 N•m (0.30 - 0.42 kg-m, 26.0 - 36.5 in-lb)



SBT813

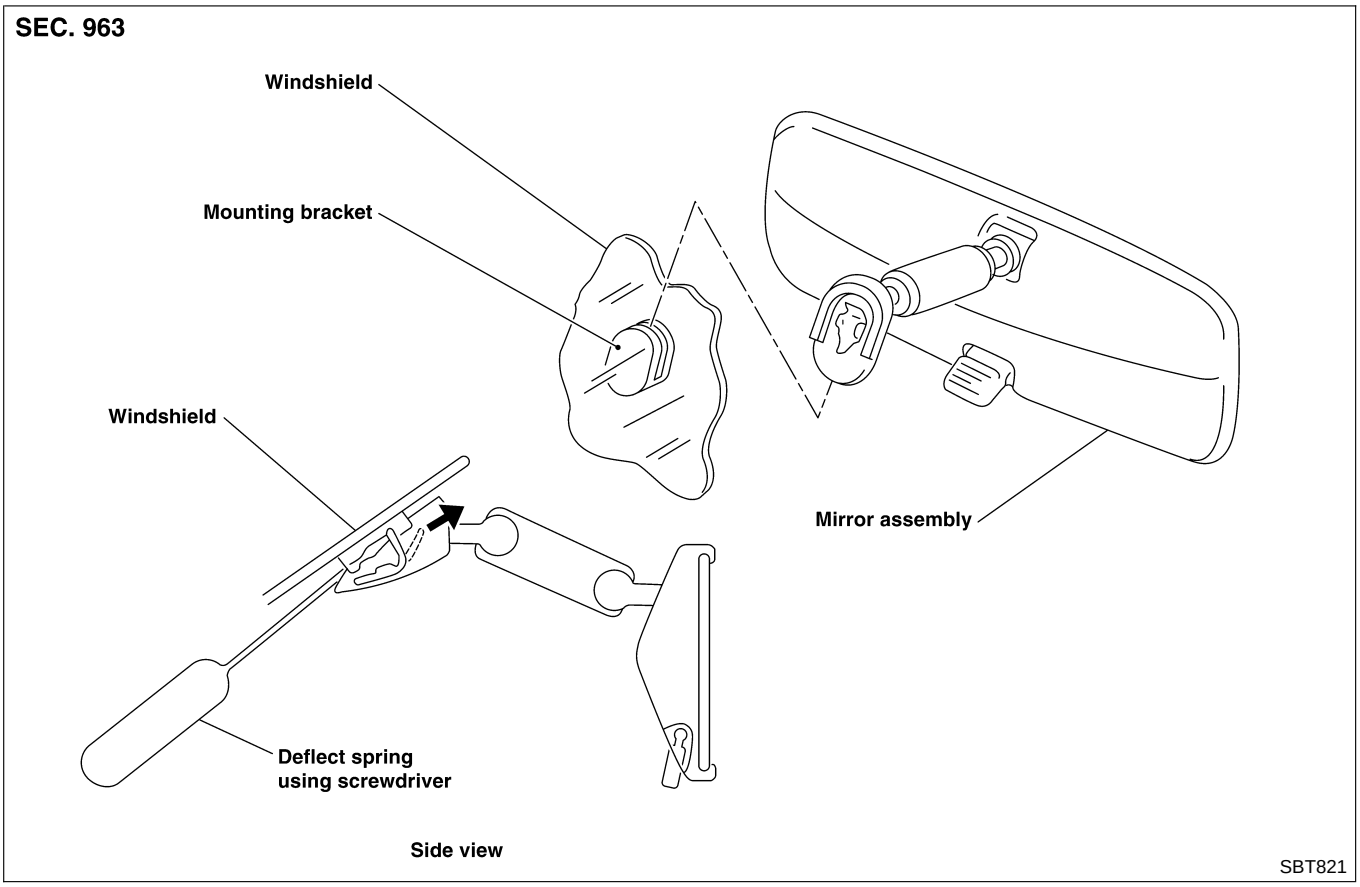
Removal and Installation

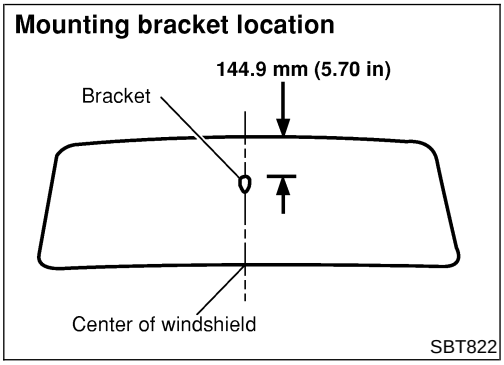
NFBT0025

REMOVAL

NFBT0025S01

Remove rearview mirror by pushing deflect spring with screwdriver as shown in the figure.





INSTALLATION

NFBT0025S02

1. Install mounting bracket as follows:

a. Determine mounting bracket position on windshield by measuring from top of windshield to top of mounting bracket as shown in the figure.

b. Mark location on outside of windshield with wax pencil or equivalent.

c. Clean attaching point on inside of windshield with an alcohol-saturated panel towel.

d. Sand bonding surface of mounting bracket with sandpaper (No. 320 or No. 360).

e. Clean bonding surface of mounting bracket with an alcohol-saturated paper towel.

f. Apply Genuine Mirror Adhesive. Refer to GI-50, “Recommended Chemical Products and Sealants” or equivalent to bonding surface of mounting bracket.

g. Install mounting bracket at premarked position and press mounting bracket against glass for 30 to 60 seconds.

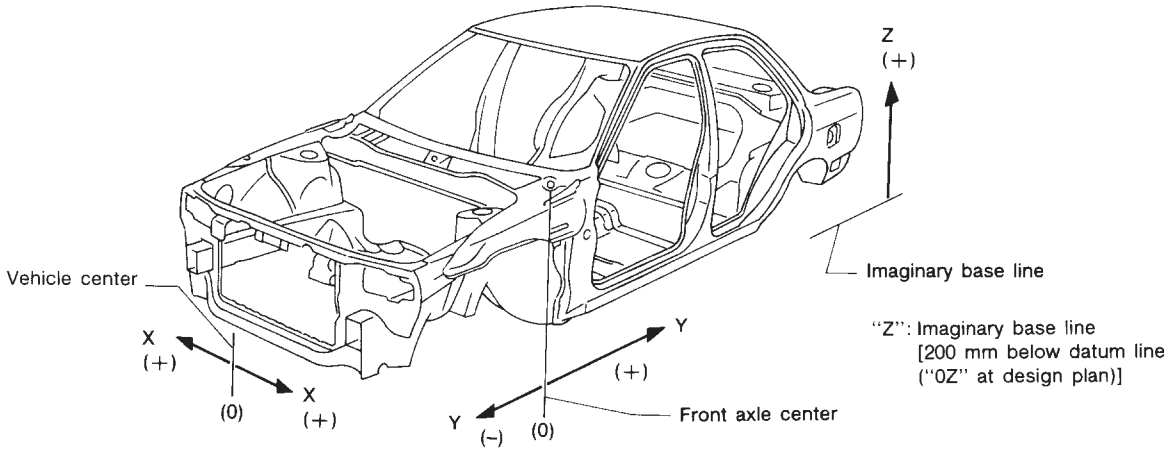
h. After five minutes, wipe off excess adhesive with an alcohol-moistened paper towel.

2. Install rearview mirror.

Alignment

NFBT0026

- All dimensions indicated in figures are actual ones.
- When using a tracking gauge, adjust both pointers to equal length. Then check the pointers and gauge itself to make sure there is no free play.
- When a measuring tape is used, check to be sure there is no elongation, twisting or bending.
- Measurements should be taken at the center of the mounting holes.
- An asterisk (*) following the value at the measuring point indicates that the measuring point on the other side is symmetrically the same value.
- The coordinates of the measurement points are the distances measured from the standard line of “X”, “Y” and “Z”.



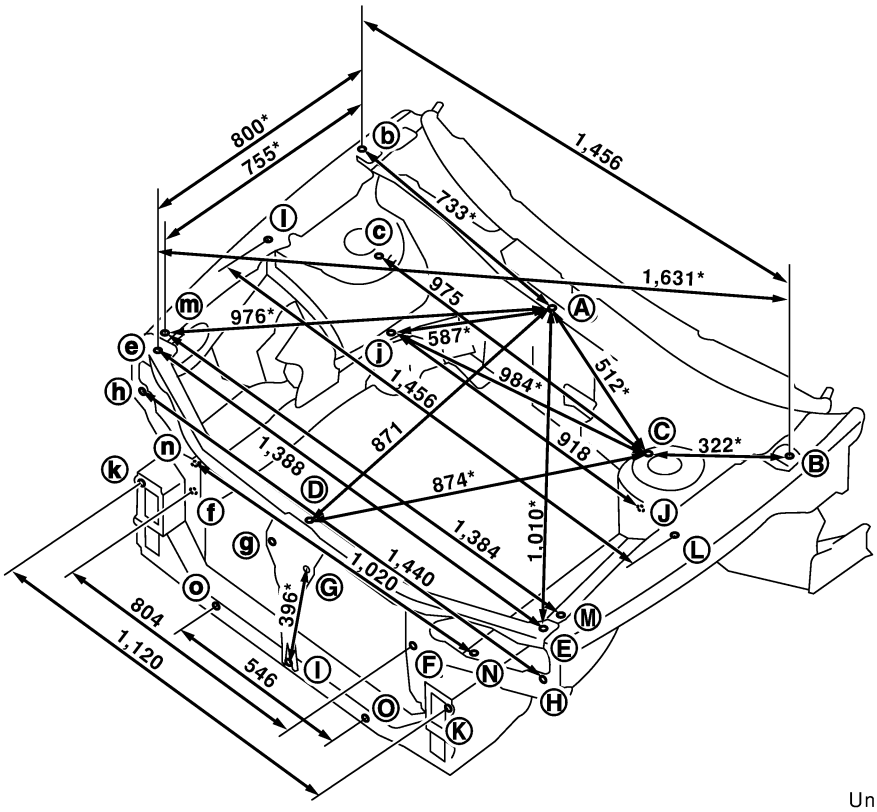
SBF874GB

ENGINE COMPARTMENT

NFBT0026S01

Measurement

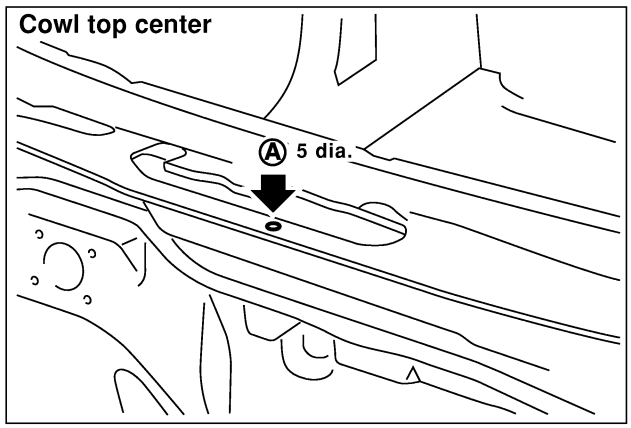
NFBT0026S0101

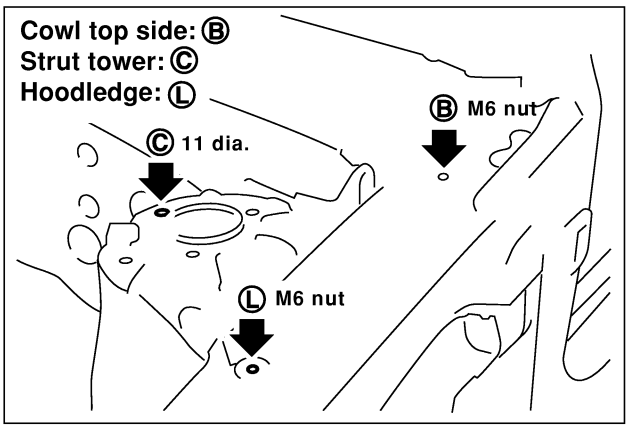


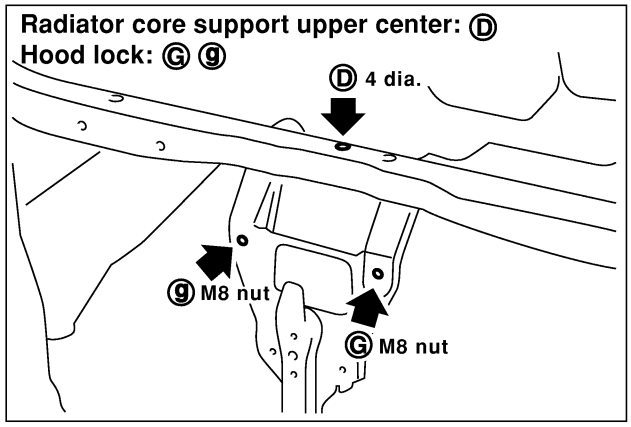
SBT815

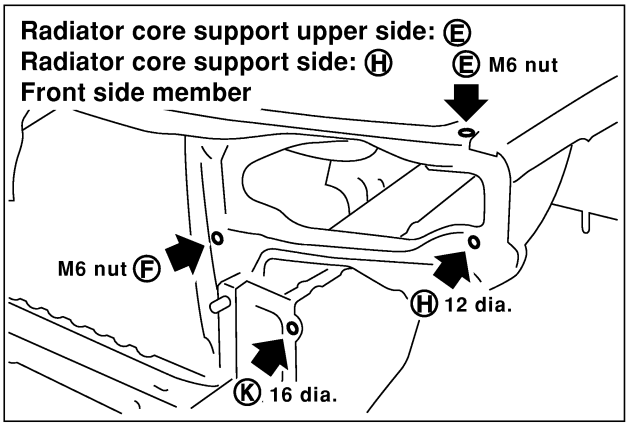
Measurement Points

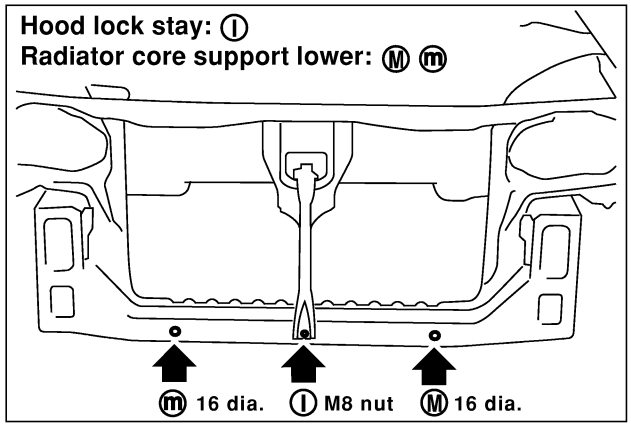
NFBT0026S0102

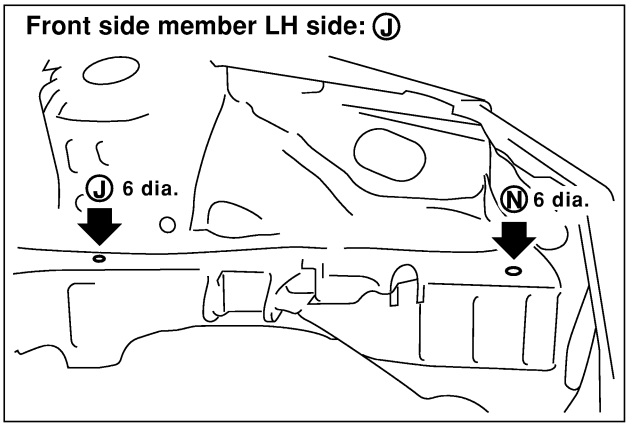


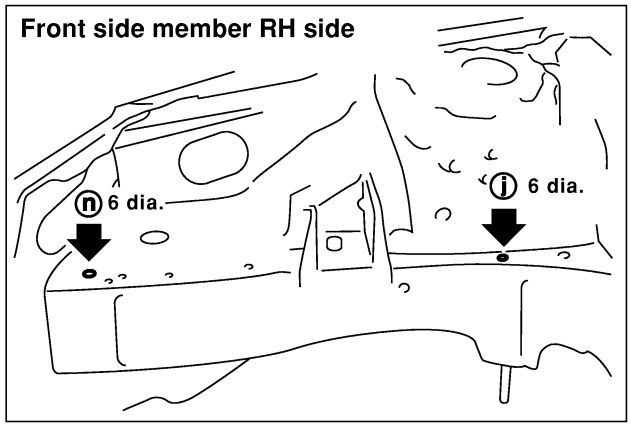












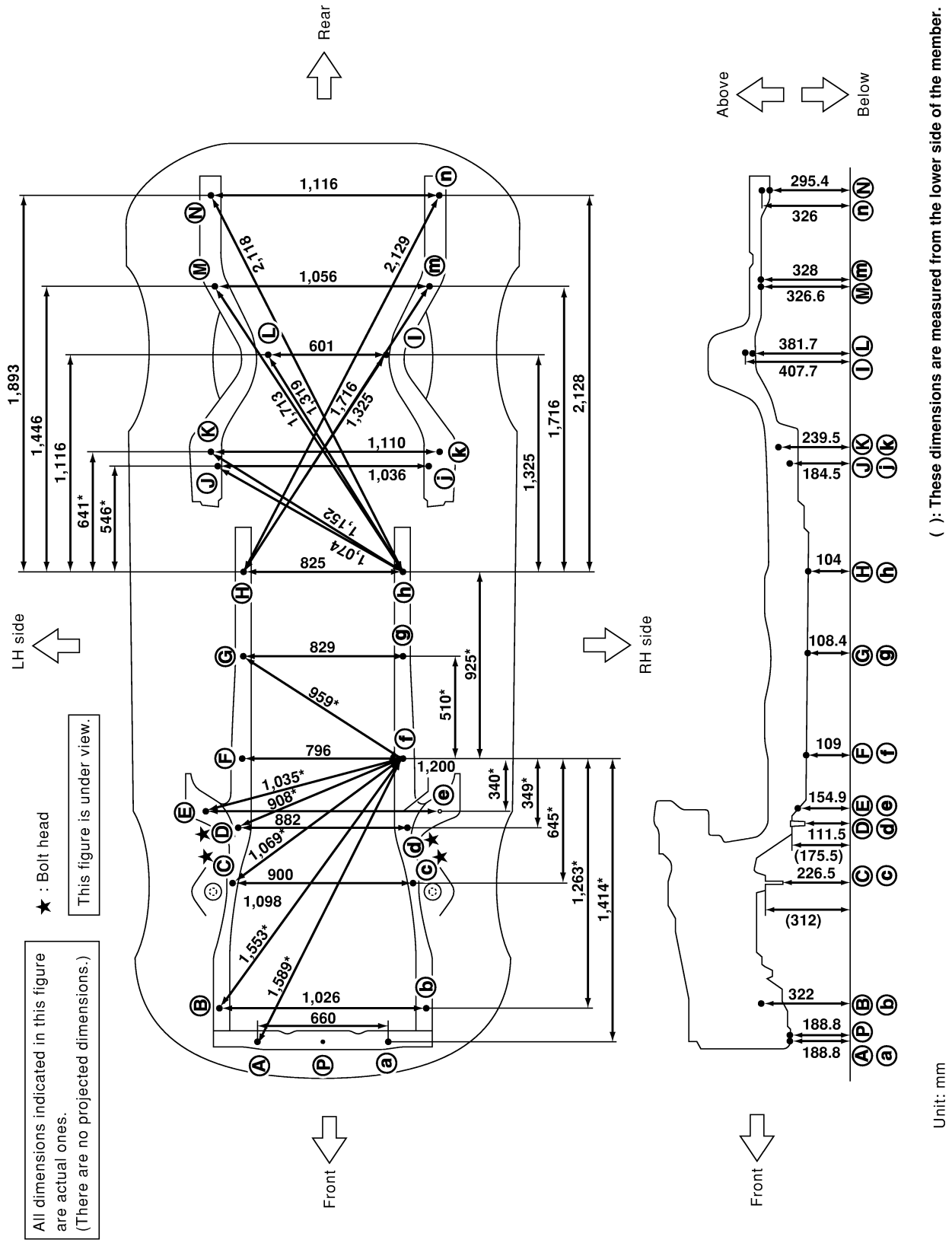
SBT816

UNDERBODY

Measurement

NFBT0026S02

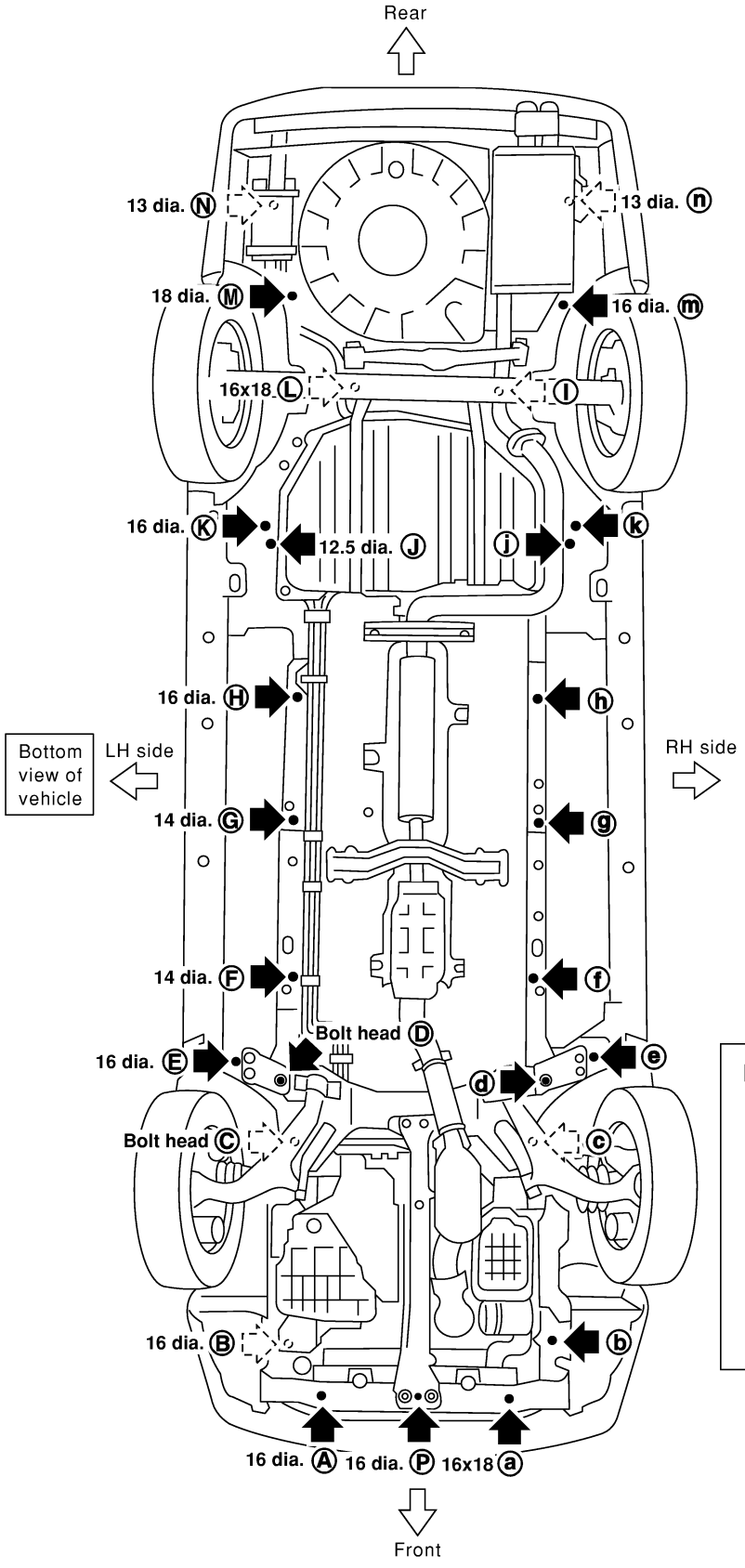
NFBT0026S0201



SBT817

Measurement Points

NFBT0026S0202



Coordinates

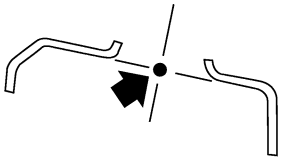
Ⓐ, ⓐ		Ⓚ, ⓚ	
X	: 330	X	: 555
Y	: –710	Y	: 2,235
Z	: 188.8	Z	: 239.5
Ⓑ, ⓑ		Ⓛ	
X	: 513	X	: 300
Y	: –540	Y	: 2,700
Z	: 322	Z	: 381.7
Ⓒ, ⓒ		Ⓘ	
X	: 450	X	: –300
Y	: 68	Y	: 2,700
Z	: 226.5	Z	: 407.7
Ⓓ, ⓓ		Ⓜ	
X	: 441	X	: 512
Y	: 354	Y	: 3,050
Z	: 111.5	Z	: 326.6
Ⓔ, ⓔ		ⓜ	
X	: 600	X	: –544
Y	: 430	Y	: 3,032
Z	: 154.9	Z	: 328.2
Ⓕ, ⓕ		Ⓝ	
X	: 398	X	: 546
Y	: 700	Y	: 3,504
Z	: 109	Z	: 295.4
Ⓖ, ⓖ		ⓝ	
X	: 414	X	: –570.5
Y	: 1,210	Y	: 3,500
Z	: 108.4	Z	: 326.6
Ⓗ, ⓗ		Ⓟ	
X	: 412.5	X	: 0
Y	: 1,625	Y	: –700.5
Z	: 104	Z	: 188.8
Ⓙ, ⓙ			
X	: 518.2		
Y	: 2,155		
Z	: 184.5		

Front and rear strut tower centers

Coordinates:

Ⓞ, ⓞ
X : 548.8
Y : 28.7
Z : 779.3

Ⓠ, ⓠ
X : 490.1
Y : 2,671
Z : 538.5



Front: Ⓞ, ⓞ 87 dia.

Rear: Ⓠ, ⓠ 61.4 dia.

Unit: mm

SBT818

NOTES

FOREWORD

This Body Repair Manual contains information and instructions for repairing the body structure of the 2000 NISSAN MAXIMA (A33) model. In order to achieve reliable repair work and ensure customer satisfaction, the technician should study this manual and become familiar with appropriate sections before starting repair and rebuilding work.

This Body Repair Manual is prepared for technicians who have attained a high level of skill and experience in repairing collision-damaged vehicles and also use modern service tools and equipment. Persons unfamiliar with body repair techniques should not attempt to repair collision-damaged vehicles by using this manual.

Technicians are also encouraged to read Body Repair Manual (Fundamentals) and the 2000 NISSAN MAXIMA (A33) Service Manual in order to ensure that the original functions and quality of the vehicle can be maintained. The Body Repair Manual (Fundamentals) contains additional information, including cautions and warnings, that are not included in this manual. Technicians should refer to both manuals to ensure proper repairs.

Please note that these manuals are prepared for worldwide usage, and as such, certain procedures might not apply in some regions or countries. In the U.S.A. it is recommended that a MIG welder be used by a trained technician.

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.

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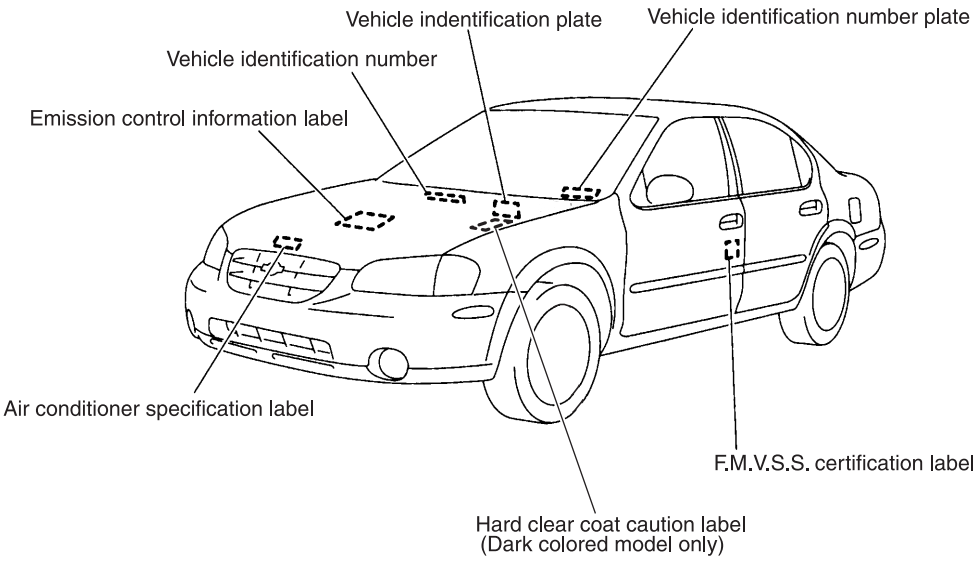
Identification Number

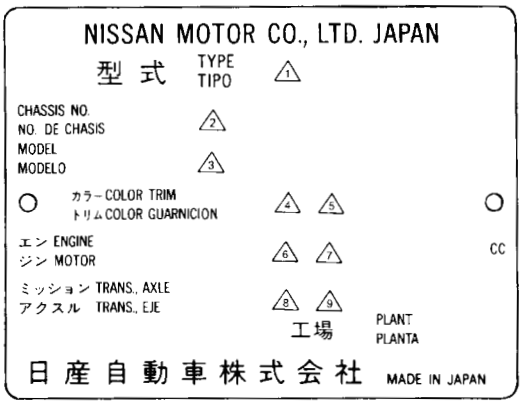


VEHICLE IDENTIFICATION NUMBER ARRANGEMENT

JN1 C A 3 1 A * Y T 000001(With SRS side air bags)
500001(Without SRS side air bags)

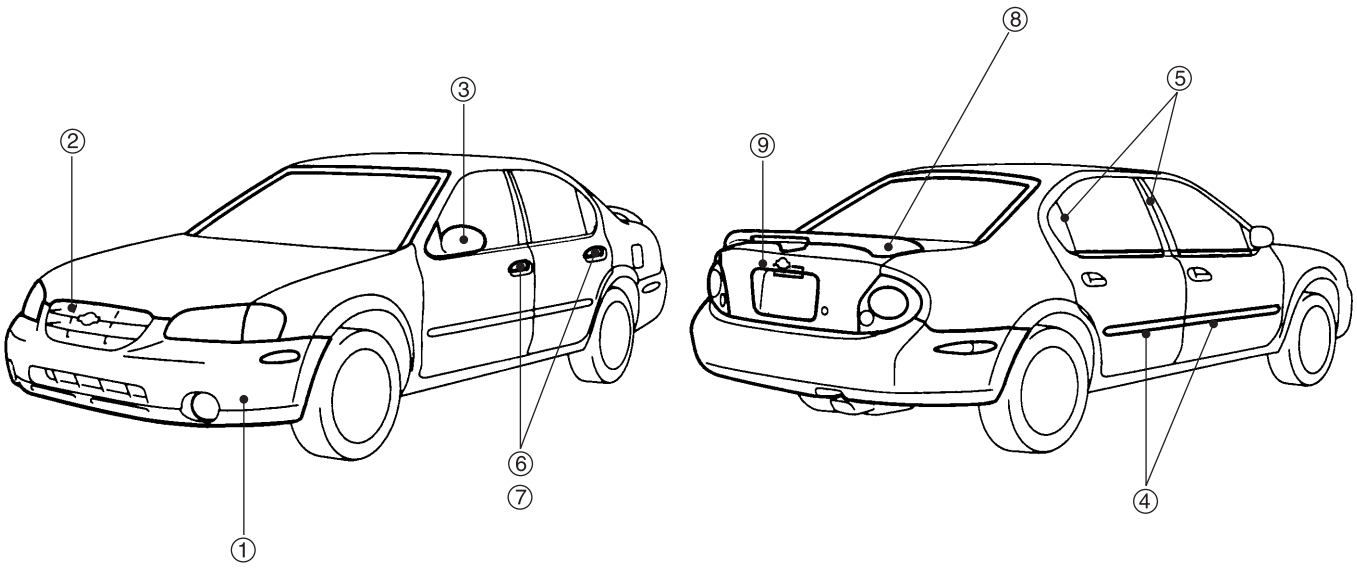
- Vehicle serial number
- Manufacturing plant
  T: Oppama
- Model year
  Y: 2000 model year
- Check digit (0 to 9 or X)
  The code for the check digit is determined by mathematical computation.
- Restraint system
  A: Driver and front passenger SRS air bags, SRS side air bags & 3-point manual seat belts
  D: Driver and front passenger SRS air bags & 3-point manual seat belts
- Body type
  1: Sedan
- Model change
- Vehicle line
  A: Nissan Maxima
- Engine type
  C: VQ30DE
- Manufacturer
  JN1: Nissan, Passenger vehicle

Identification Plate



1.Type
2.Vehicle indentification number (Chassis number)
3.Model
4.Body color code
5.Trim color code
6.Engine model
7.Engine displacement
8.Transmission model
9.Axle model

Body Exterior Paint Color



Component			Color code	BBV3	BCP2	BDR2	BEV0	BKH3	BKT3	BKV3	BQT1
			Description	Light blue	Brown	Green	Beige	Black	Silver	Greenish gray	White
			Paint type	TM	2P	2P	M	2S	M	M	3P
			Hard clear coat	-	X	X	-	X	-	X	-
①	Bumper fascia		Body color	BBV3	BCP2	BDR2	BEV0	BKH3	BKT3	BKV3	BQT1
②	Radiator grill		Chromium-plate	Cr	Cr	Cr	Cr	Cr	Cr	Cr	Cr
③	Outside mirror	Body	Body color	BBV3	BCP2	BDR2	BEV0	BKH3	BKT3	BKV3	BQT1
		Base	Black	AG01	AG01	AG01	AG01	AG01	AG01	AG01	AG01
④	Side guard molding		Body color	BBV3	BCP2	BDR2	BEV0	BKH3	BKT3	BKV3	BQT1
⑤	Door sash	Center	Black tape	-	-	-	-	-	-	-	-
		Rear	Black	AG01	AG01	AG01	AG01	AG01	AG01	AG01	AG01
⑥	Outside handle escutcheon		Body color	BBV3	BCP2	BDR2	BEV0	BKH3	BKT3	BKV3	BQT1
⑦	Outside handle		Body color	BBV3	BCP2	BDR2	BEV0	BKH3	BKT3	BKV3	BQT1
⑧	Rear air spoiler		Body color	BBV3	BCP2	BDR2	BEV0	BKH3	BKT3	BKV3	BQT1
⑨	Trunk lid finisher		Gray metallic	AG05	AG05	AG05	AG05	AG05	AG05	AG05	AG05

S: Solid, 2S: Solid+Clear, M: Metallic, 2P: 2 Coat pearl, 3P: 3 Coat pearl, FPM: Iron oxide pearl metallic,
TM: Micro titanium metallic

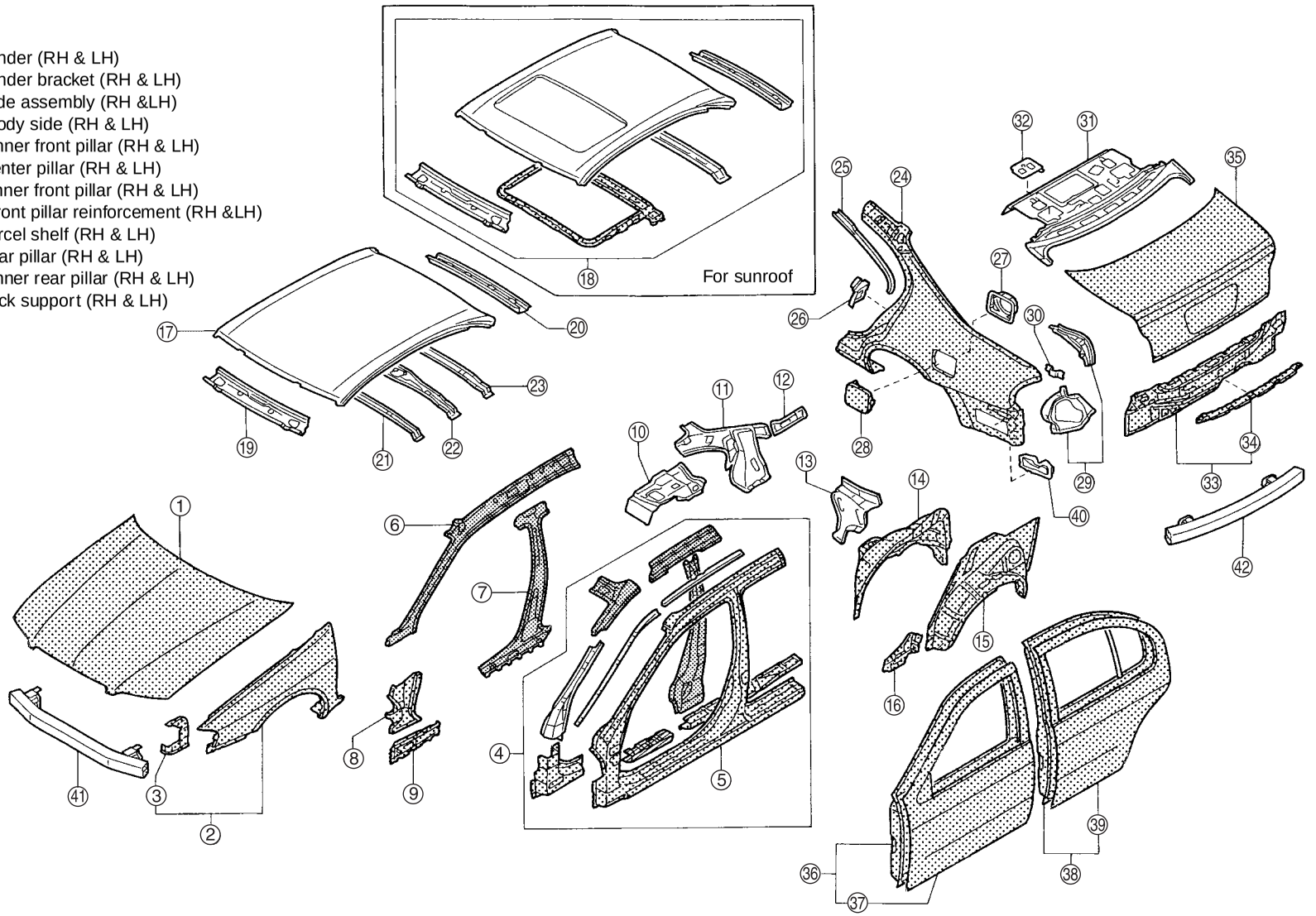
Underbody Component Parts

: Indicates two-side anti-corrosive precoated steel portions
: Indicates high strength steel (HSS) portions
: Indicates two-side anti-corrosive steel and HSS portions

1 Radiator core support assembly
2 Upper radiator core support
3 Side radiator core support
4 Lower radiator core support
5 Hood lock stay
6 Hoodledge assembly (RH & LH)
7 Upper hoodledge (RH & LH)
8 Lower front hoodlege (RH & LH)
9 Battery mounting reinforcement (LH only)
10 Engine mounting reinforcement (RH only)
11 Hoodledge reinforcement assembly (RH & LH)
12 Front hoodlege reinforcement (RH & LH)
13 Air box assembly
14 Center cowl top
15 Upper dash
16 Side cowl top
17 Side cowl top brace
18 Lower dash assembly
19 Front floor
20 2nd crossmember assembly
21 Parking brake and seat belt reinforcement
22 Exhaust mounting bracket
23 Inner sill (RH & LH)
24 Bolt
25 Outer front seat mounting bracket (RH & LH)
26 Rear floor front
27 Rear floor rear
28 Rear seat belt anchor reinforcement
29 Rear floor side (RH & LH)
30 Spare wheel clamp bracket
31 Muffler mounting bracket
32 Front side member assembly (RH & LH)
33 Front side member closing plate assembly (RH & LH)
34 Front side member front closing plate (RH & LH)
35 Front side member (RH & LH)
36 Battery support bracket (LH only)
37 Front side member center extension (RH & LH)
38 Front side member rear extension (RH & LH)
39 Rear side member assembly (RH & LH)
40 Rear side member extension (RH & LH)
41 Rear seat crossmember
42 Center rear crossmember assembly
43 Rear towing hook bracket assembly (LH only)
44 Rear tie-down hook (RH only)

Body Component Parts

: Indicates two-side anti-corrosive precoated steel portions
: Indicates high strength steel (HSS) portions
: Indicates two-side anti-corrosive steel and HSS portions



1 Hood
2 Front fender (RH & LH)
3 Front fender bracket (RH & LH)
4 Body side assembly (RH &LH)
5 Outer body side (RH & LH)
6 Upper inner front pillar (RH & LH)
7 Inner center pillar (RH & LH)
8 Lower inner front pillar (RH & LH)
9 Lower front pillar reinforcement (RH &LH)
10 Side parcel shelf (RH & LH)
11 Inner rear pillar (RH & LH)
12 Lower inner rear pillar (RH & LH)
13 Seat back support (RH & LH)
14 Inner rear wheelhouse (RH & LH)
15 Outer rear wheelhouse (RH & LH)
16 Outer rear wheelhouse extension (RH & LH)
17 Roof
18 Roof assembly (with sunroof)
19 Front roof rail
20 Rear roof rail
21 Roof bow No.1
22 Roof bow No.2
23 Roof bow No.3
24 Rear fender (RH & LH)
25 Rear fender drip (RH & LH)
26 Striker retainer (RH & LH)
27 Filler lid base
28 Fuel filler lid
29 Rear combination lamp base (RH & LH)
30 Jack bracket reinforcement (LH only)
31 Parcel shelf with rear waist
32 Parcel shelf trim bracket
33 Upper rear panel assembly
34 Upper rear panel stiffener
35 Trunk lid
36 Front door assembly (RH & LH)
37 Outer front door panel (RH & LH)
38 Rear door assembly (RH & LH)
39 Outer rear door panel (RH & LH)
40 Patch rear fender (RH & LH)
41 Front bumper armature
42 Rear bumper armature

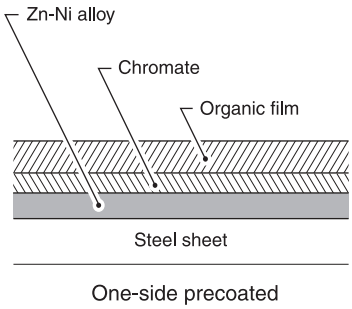
Description

To provide improved corrosion prevention, the following anti-corrosive measures have been implemented in our production plants. When repairing or replacing body panels, it is necessary to use these same anti-corrosive measures.

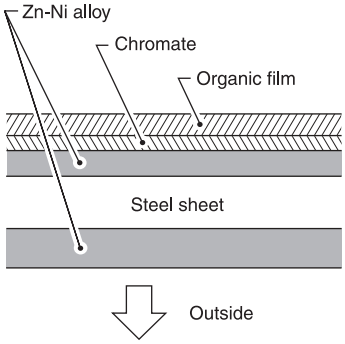
ANTI-CORROSIVE PRECOATED STEEL (DURASTEEL)

To improve repairability and corrosion resistance, a new type of anti-corrosive precoated steel sheet has been adopted replacing conventional zinc-coated steel sheet.
Durasteel is electroplated, zinc-nickel alloy under organic film, which provides excellent corrosion resistance.

Durasteel is classified as either one-side precoated steel or two-side precoated steel. The two side precoated steel provides excellent corrosion resistance.



One-side precoated



Two-side precoated

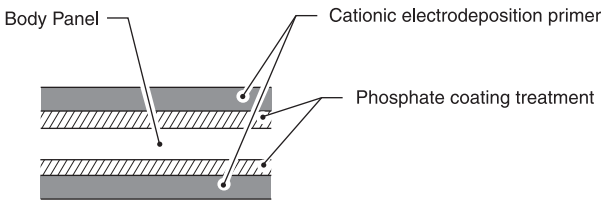
Nissan Genuine Service Parts are fabricated from durasteel sheets. Therefore, it is recommended that GENUINE NISSAN PARTS or equivalent be used for panel replacement to maintain the anti-corrosive performance built into the vehicle at the factory.

PHOSPHATE COATING TREATMENT AND CATIONIC ELECTRODEPOSITION PRIMER

A phosphate coating treatment and a cationic electrodeposition primer, which provide an excellent corrosion protection, are employed on all body components.

Caution:

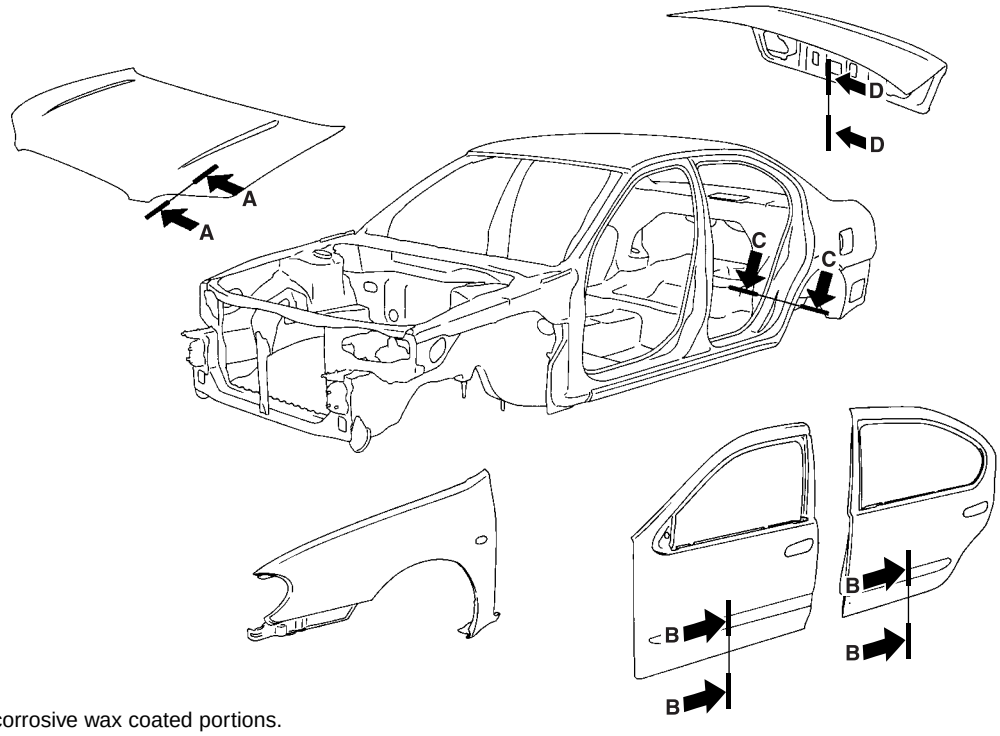
Confine paint removal during welding operations to an absolute minimum.



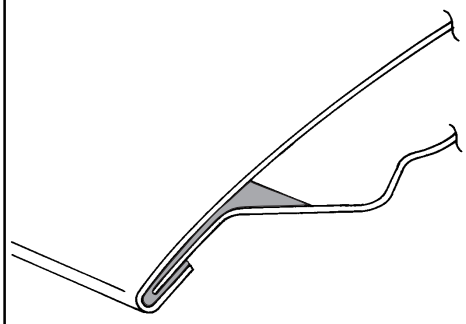
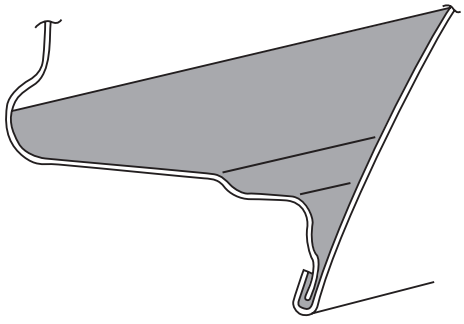
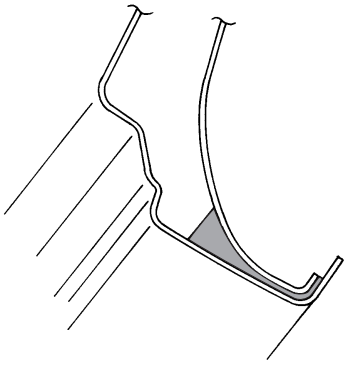
Nissan Genuine Service Parts are also treated in the same manner. Therefore, it is recommended that GENUINE NISSAN PARTS or equivalent be used for panel replacement to maintain anti-corrosive performance built into the vehicle at the factory.

Anti-Corrosive Wax

To improve corrosion resistance, anti-corrosive wax is applied inside the body sill and inside other closed sections. Accordingly, when replacing these parts, be sure to apply anti-corrosive wax to the appropriate areas of the new parts. Select an excellent anti-corrosive wax which will penetrate after application and has a long shelf life.



:Indicates anti-corrosive wax coated portions.

Section A-A	Section B-B	Section C-C
		

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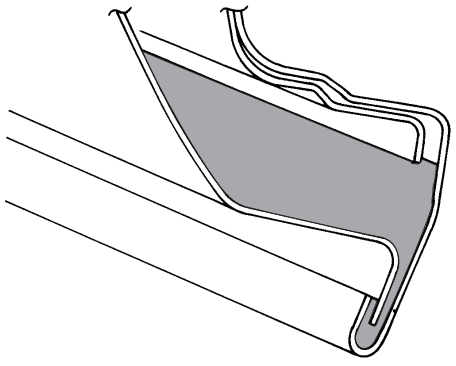


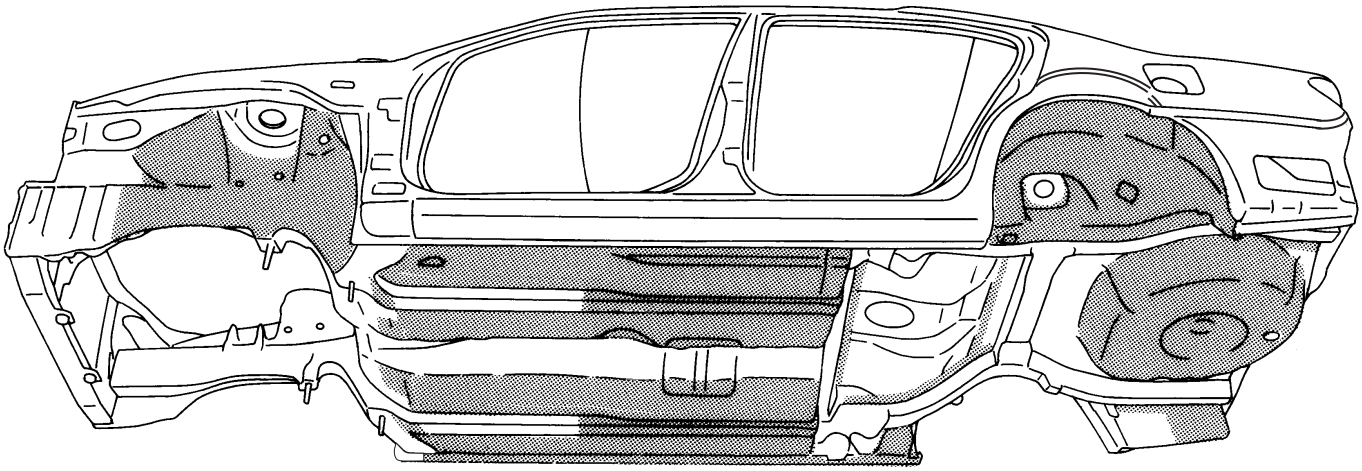
Undercoating

The underside of the floor and wheelhouse are undercoated to prevent rust, vibration, noise and stone chipping. Therefore, when such a panel is replaced or repaired, apply undercoating to that part. Use an undercoating which is rust preventive, soundproof, vibration-proof, shock-resistant, adhesive, and durable.

Precautions in undercoating

1. Do not apply undercoating to any place unless specified (such as the areas above the muffler and three way catalyst which are subjected to heat).
2. Do not undercoat the exhaust pipe or other parts which become hot.
3. Do not undercoat rotating parts.
4. Apply bitumen wax after applying undercoating.

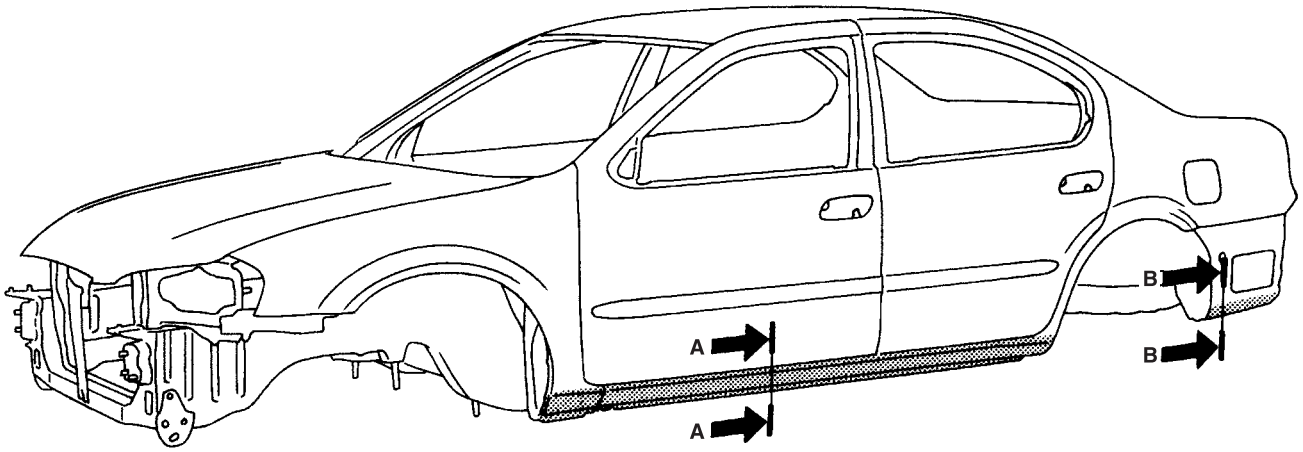
: Indicates undercoated portions.

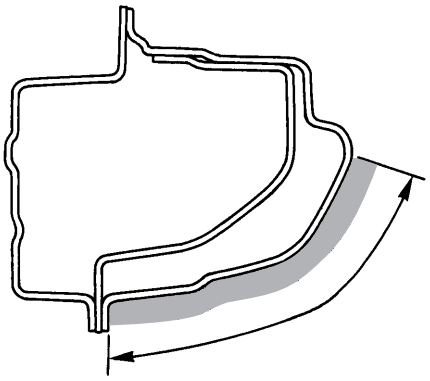


Stone Guard Coat

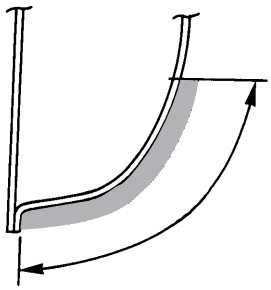
To prevent damage caused by stones, the lower outer body panel (fender, door, etc.) have an additional layer of Stone Guard Coating over the ED primer coating. When replacing or repairing these panels, apply Stone Guard coating to the same portions as before. Use a coating which is rust preventive, durable, shock-resistant and has a long shelf life.

: Indicates stone guard coated portions.





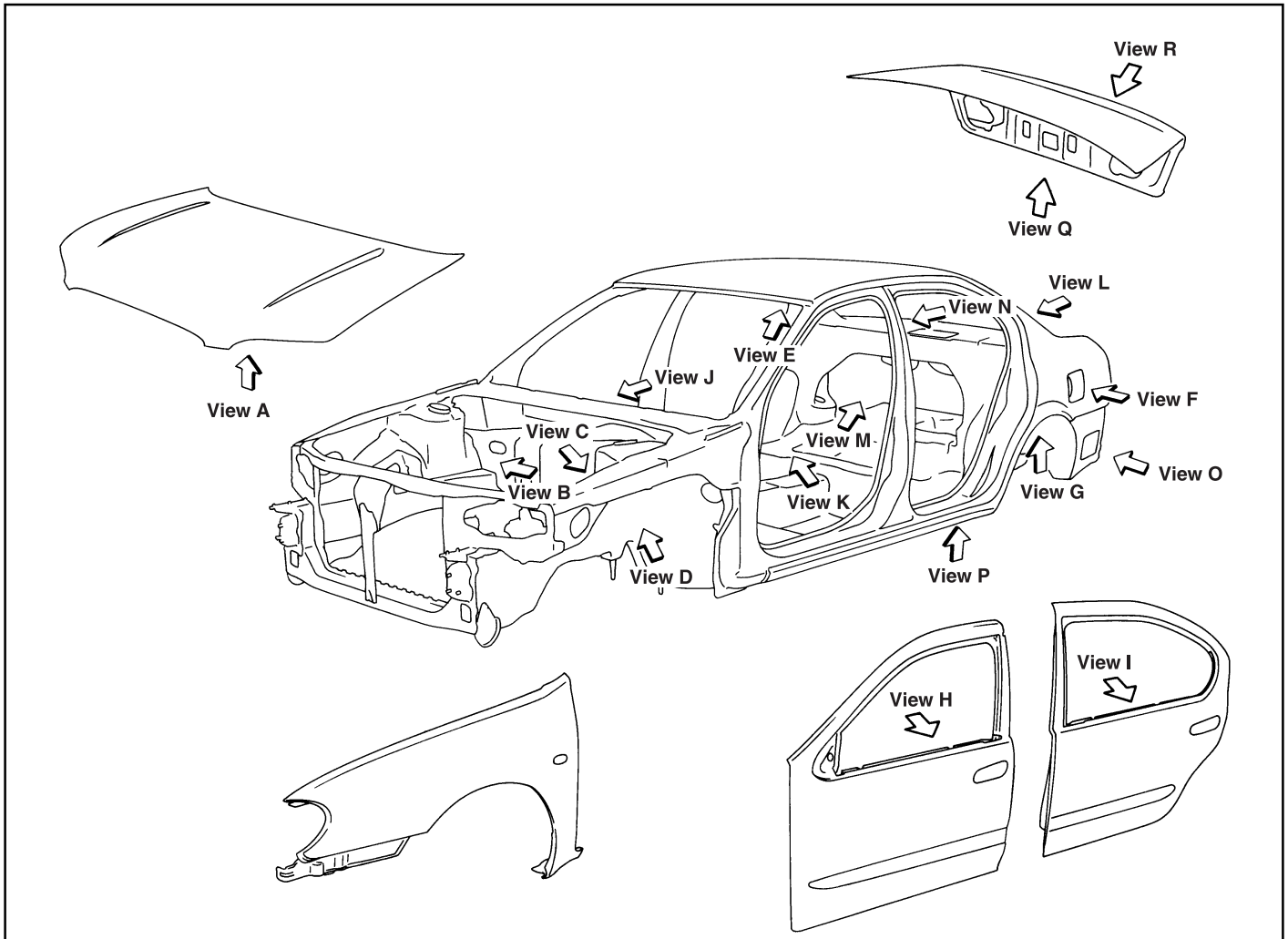
Section A-A

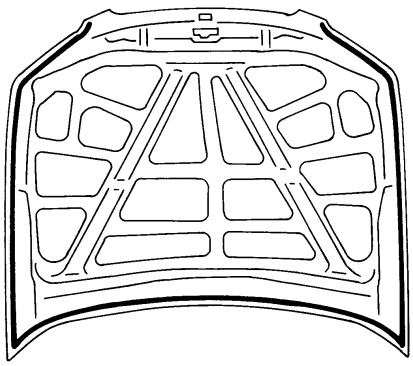
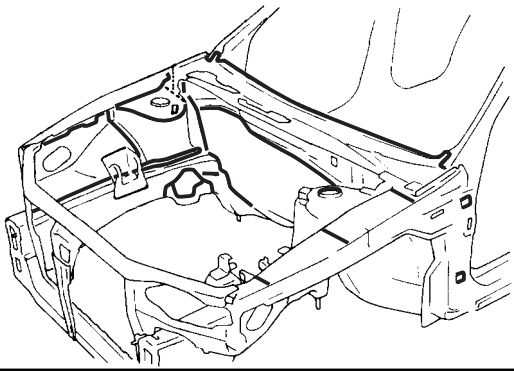


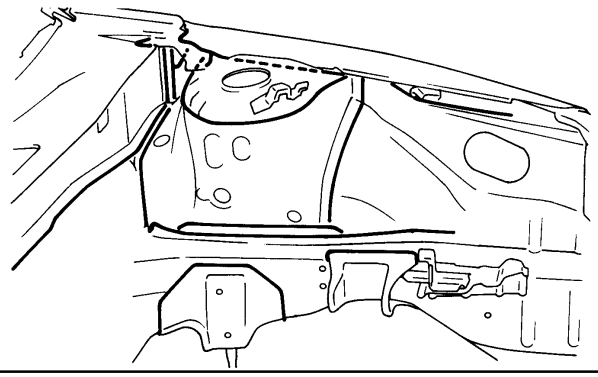
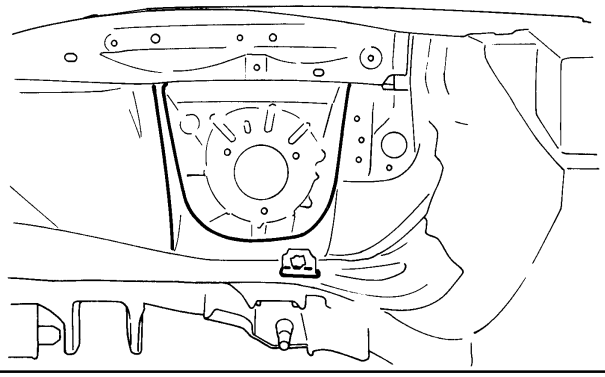
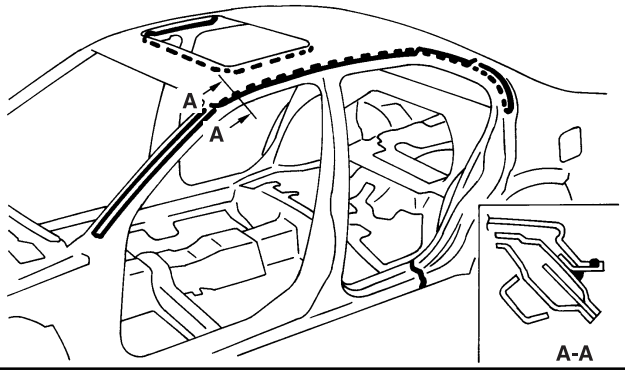
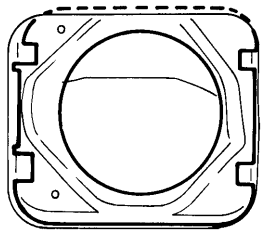
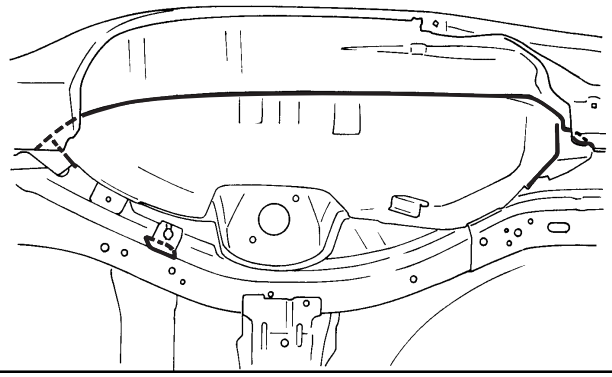
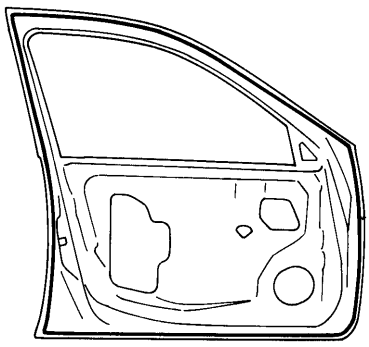
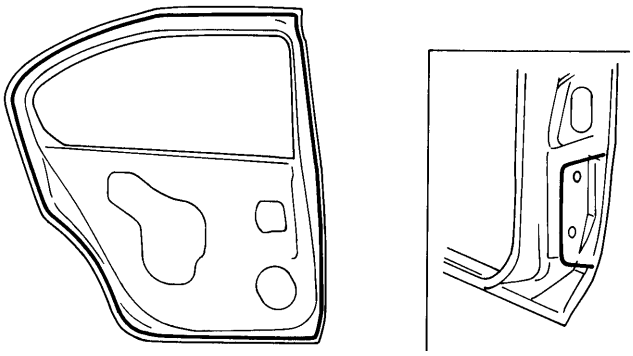
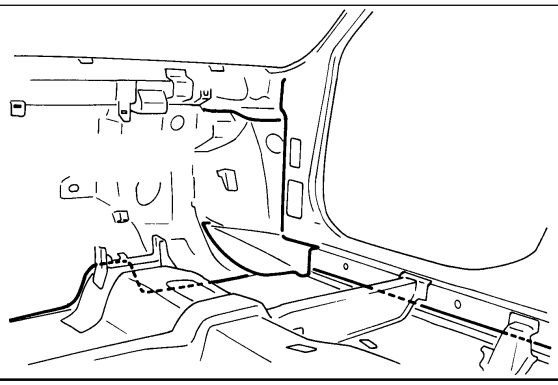
Section B-B

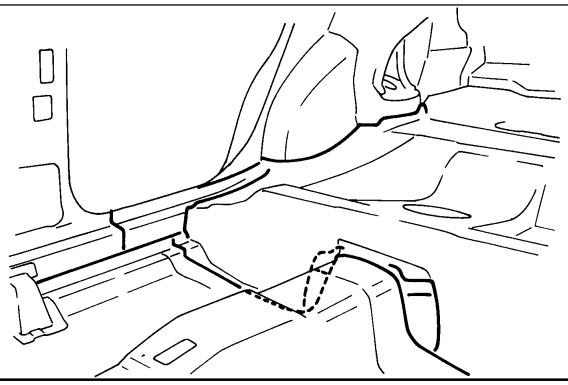
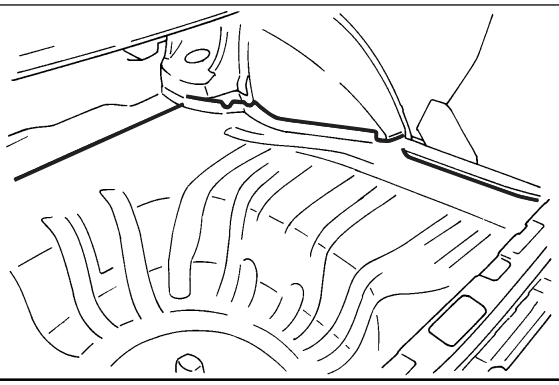
Description

The following figure shows the areas which are sealed at the factory. Sealant which has been applied to these areas should be smooth and free from cuts or gaps.
Care should be taken not to apply an excess amount of sealant and not to allow other unaffected parts to come into contact with the sealant.



View A	View B
	

View C	View D
	
View E	View F
	
View G	View H
	
View I	View J
	

View K	View L
	
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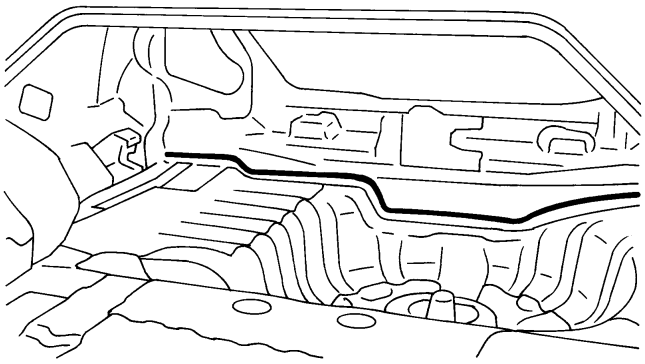
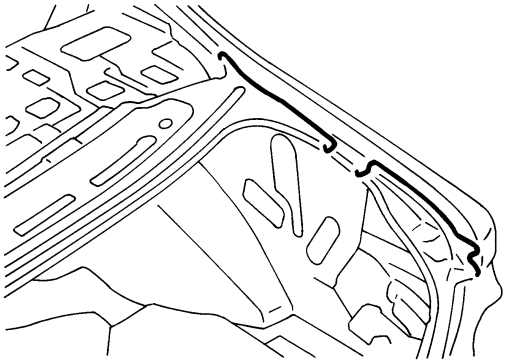
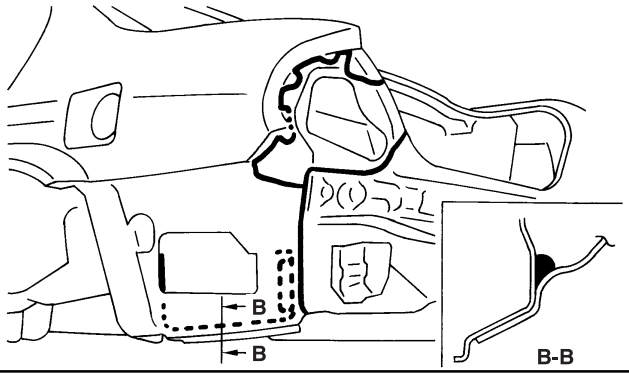
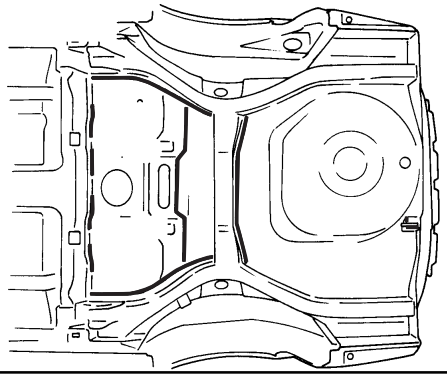
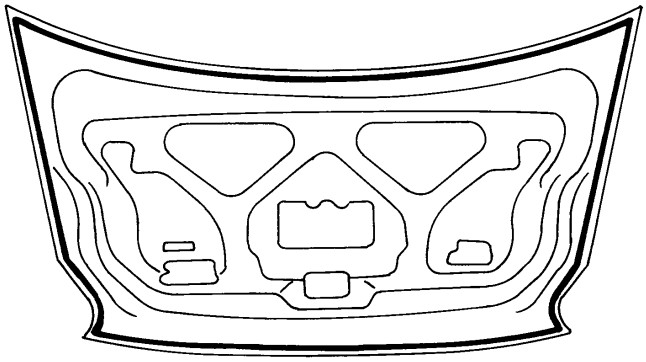
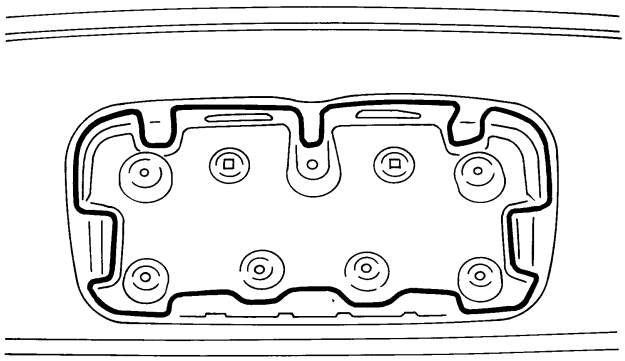
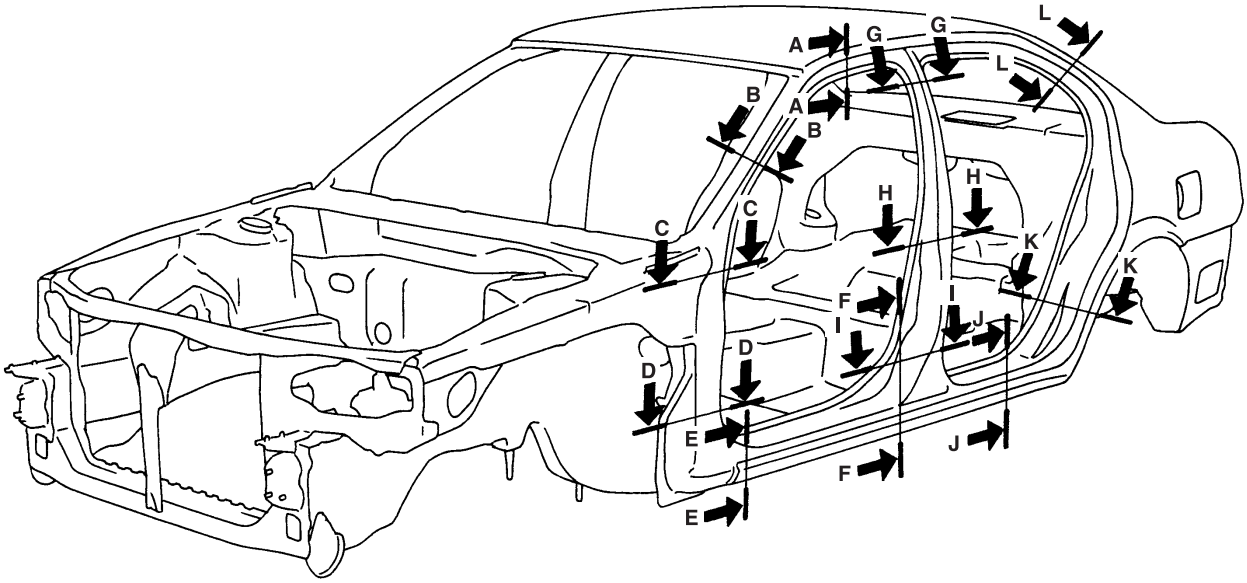
	
View O	View P
	
ViewQ	ViewR
	

Body Construction



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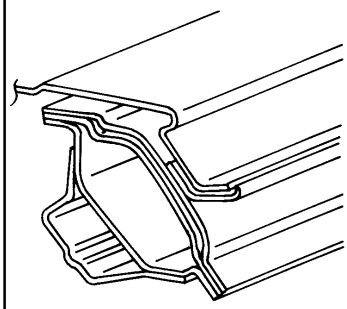	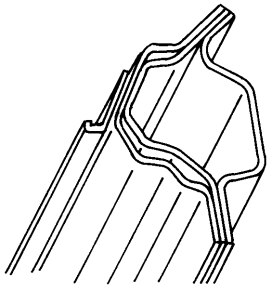	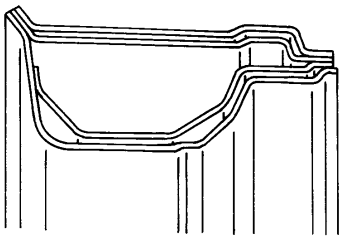	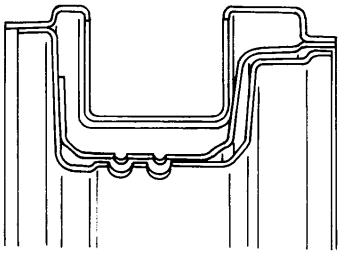
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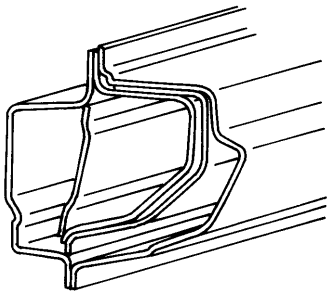	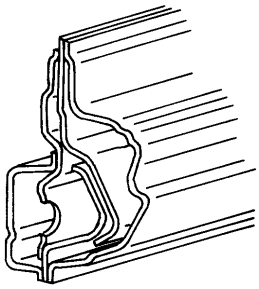	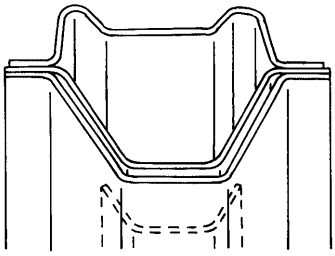	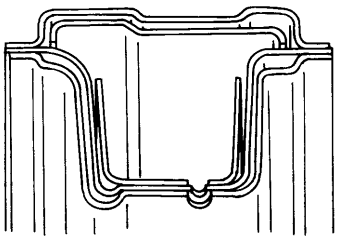
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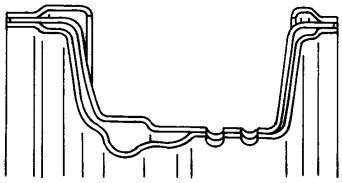
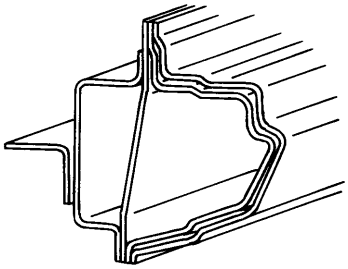
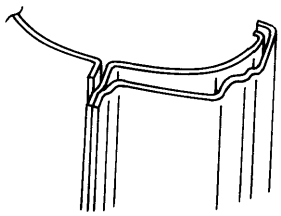
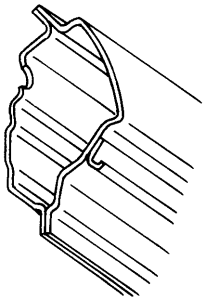
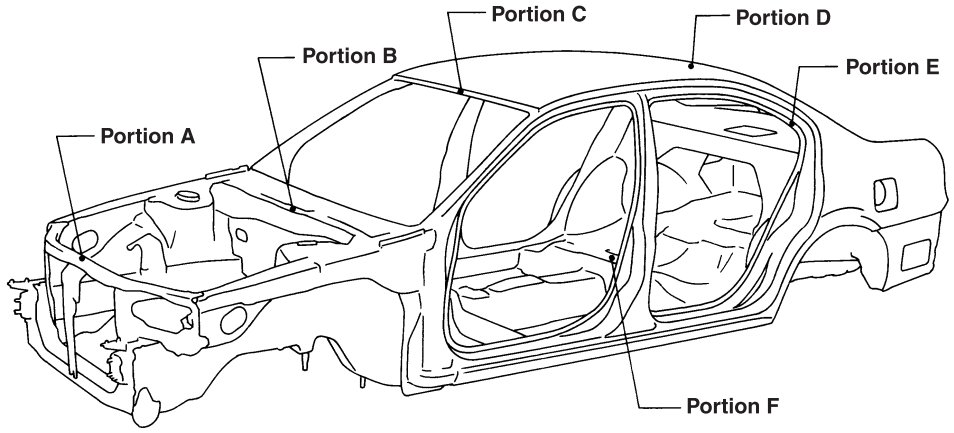
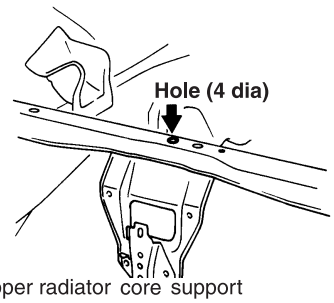
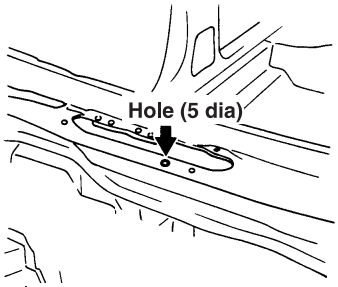
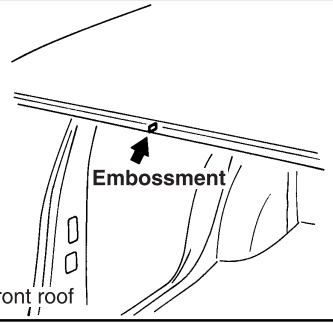
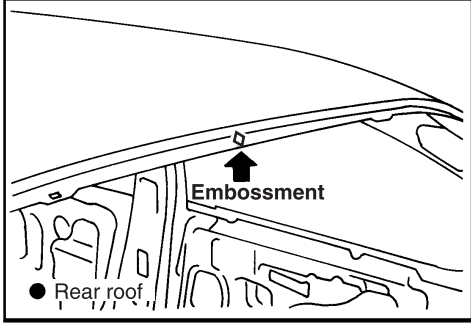
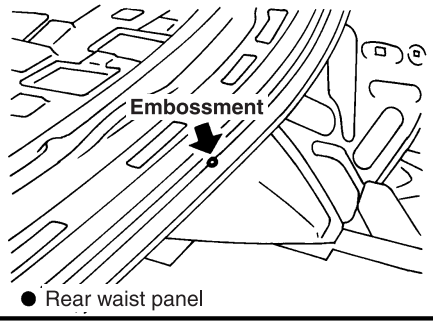
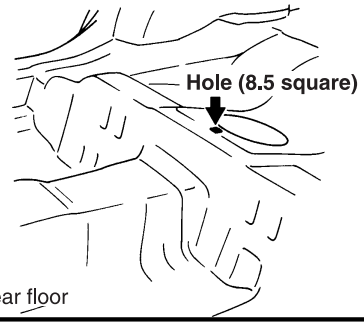
			

Body Center Marks

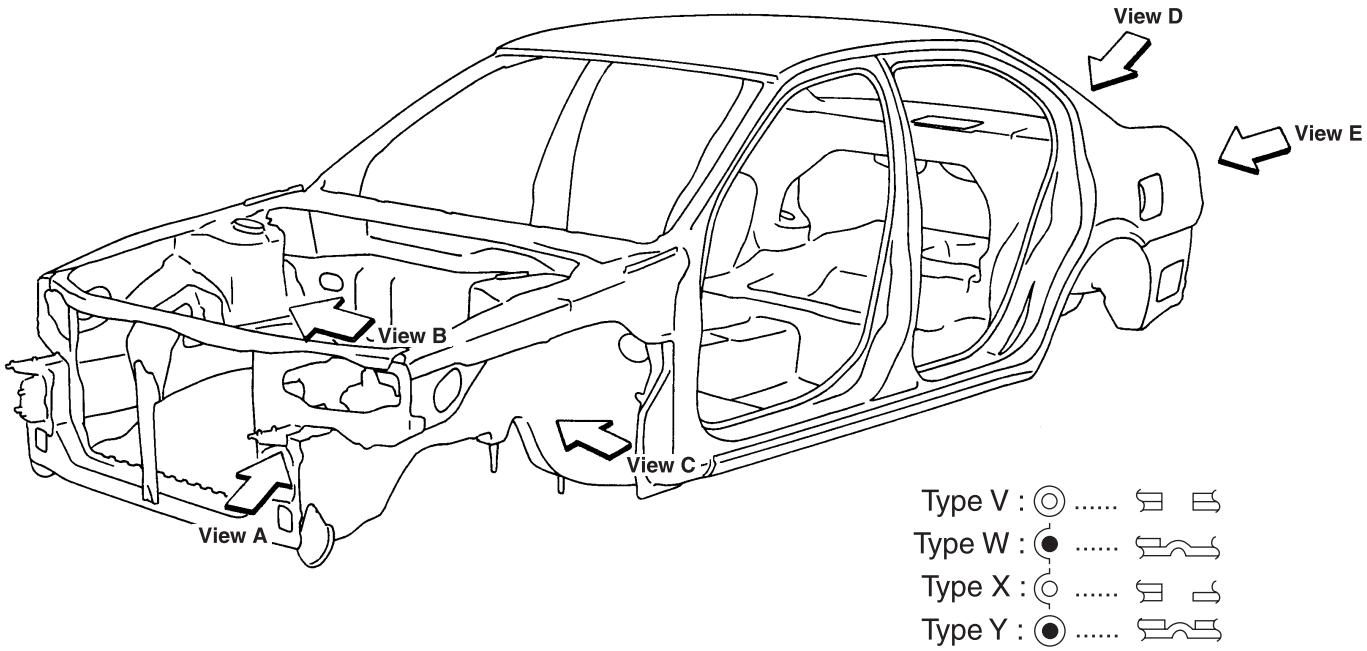
A mark has been placed on each part of the body to indicate the vehicle center. When repairing parts damaged by an accident which might affect the vehicle frame (members, pillars, etc.), more accurate and effective repair will be possible by using these marks together with body alignment specifications.

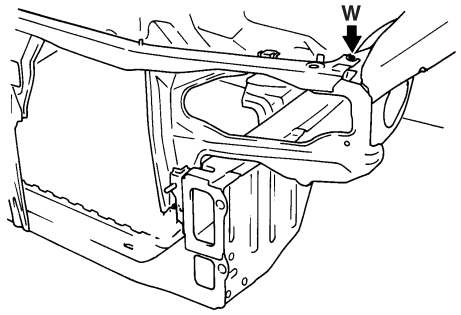
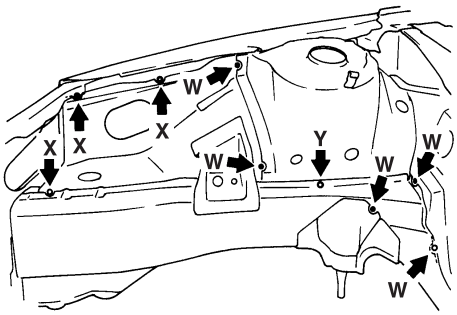
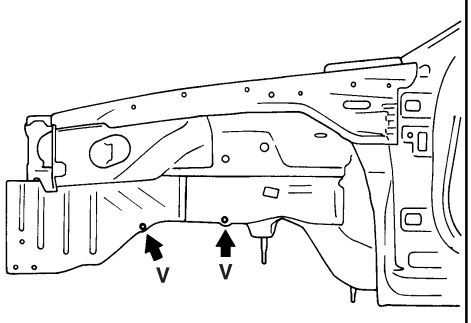


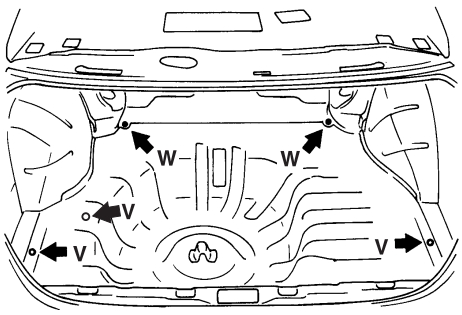
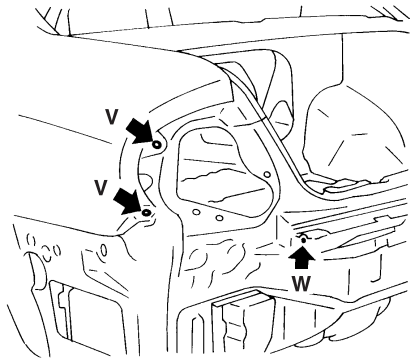
Portion A	Portion B	Portion C
 ● Upper radiator core support	 ● Cowl top	 ● Front roof
Portion D	**Portion E**	**Portion F**
 ● Rear roof	 ● Rear waist panel	 ● Rear floor

Panel Parts Matching Marks

A mark has been placed on each body panel to indicate the parts matching positions. When repairing parts damaged by an accident which might affect the vehicle structure (members, pillars, etc.), more accurate and effective repair will be possible by using these marks together with body alignment specifications.

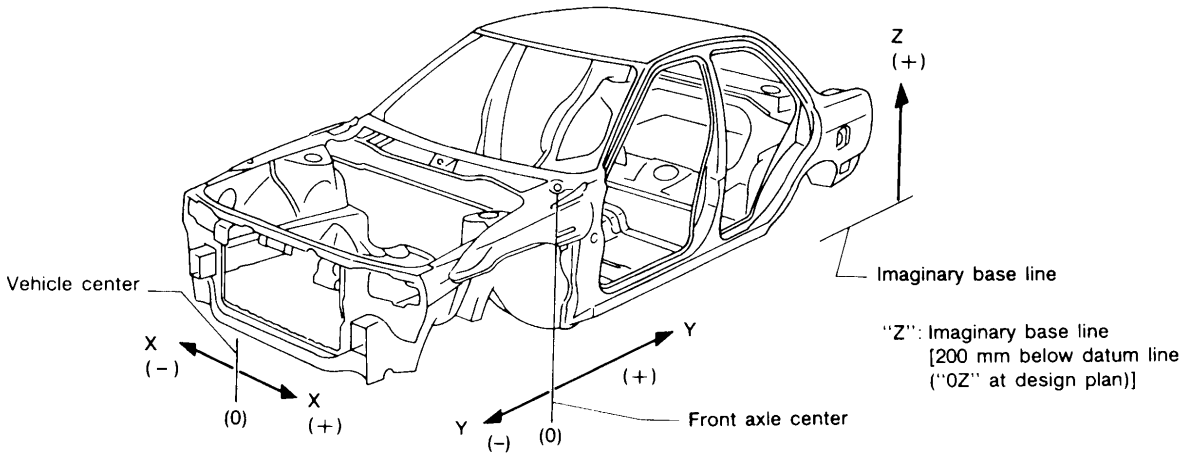


View A	View B	View C
		

View D	View E
	

Description

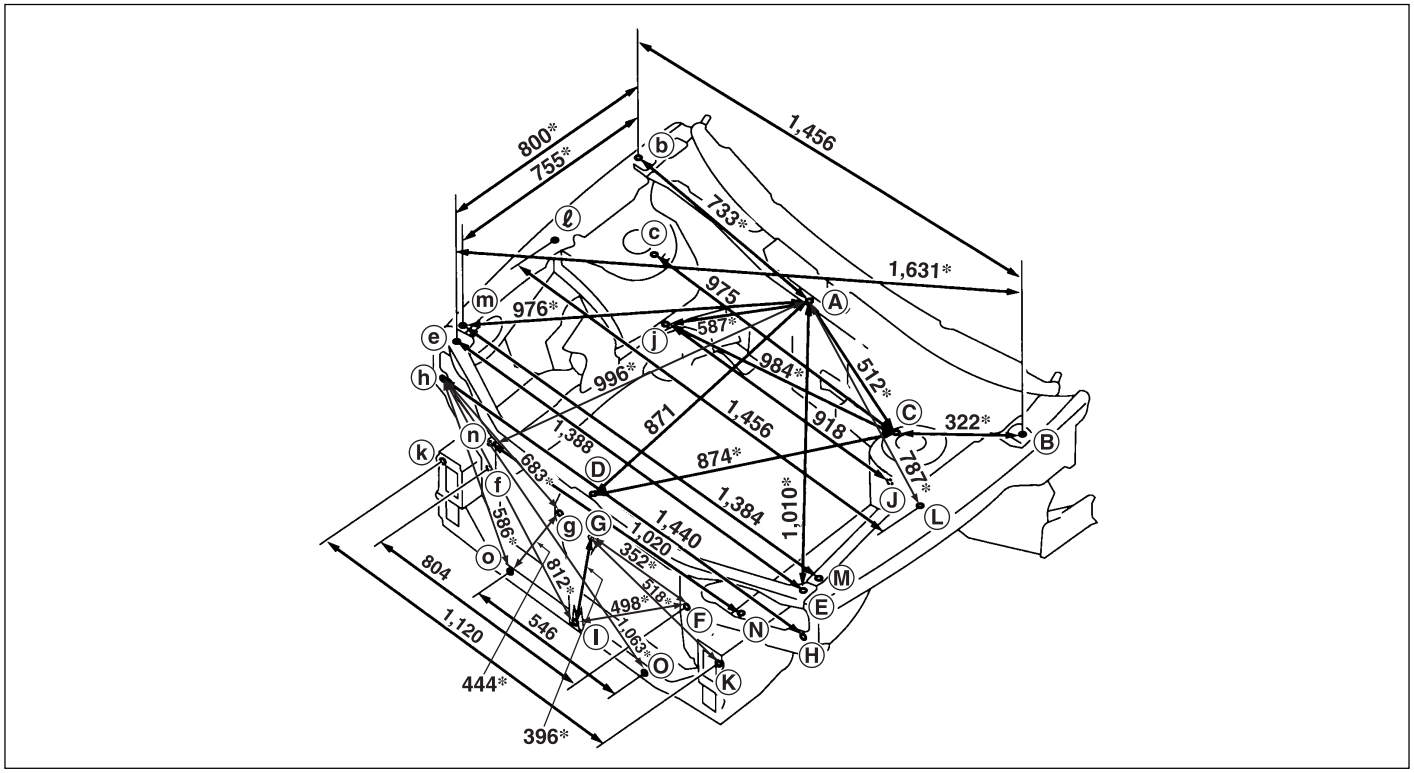
- All dimensions indicated in the figures are actual.
- When using a tracking gauge, adjust both pointers to equal length. Then check the pointers and gauge itself to make sure there is no free play.
- When a measuring tape is used, check to be sure there is no elongation, twisting or bending.
- Measurements should be taken at the center of the mounting holes.
- An asterisk (*) following the value at the measuring point indicates that the measuring point on the other side is symmetrically the same value.
- The coordinates of the measurement points are the distances measured from the standard line of “X”, “Y” and “Z”.



Engine Compartment

MEASUREMENT

Unit: mm

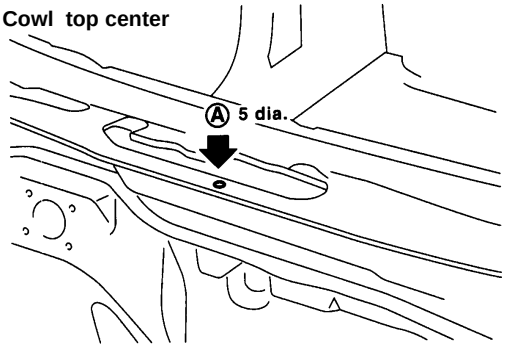


Engine Compartment (Cont'd)

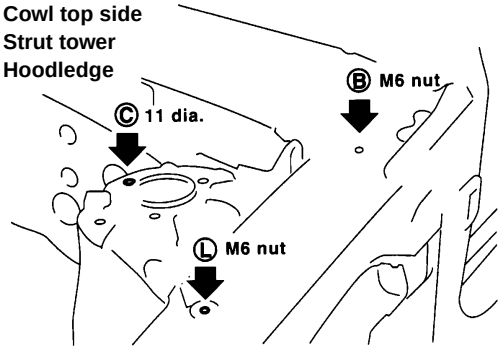
MEASUREMENT POINTS

Unit: mm

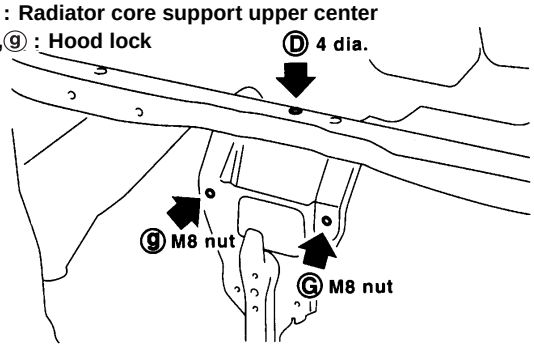
Ⓐ : Cowl top center



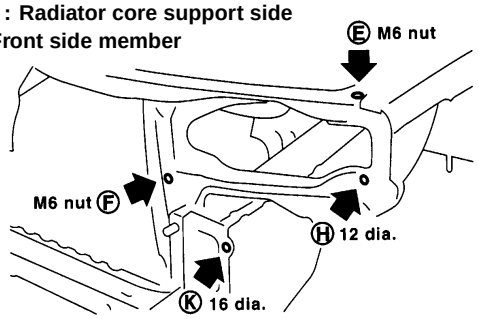
Ⓑ : Cowl top side
Ⓒ : Strut tower
Ⓛ : Hoodledge



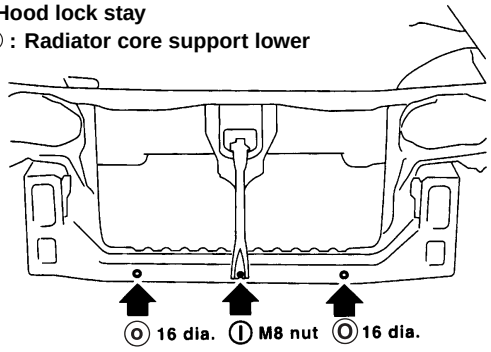
Ⓓ : Radiator core support upper center
Ⓖ,ⓖ : Hood lock



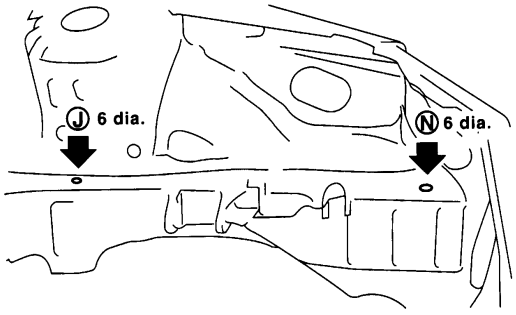
Ⓔ : Radiator core support upper side
Ⓕ,Ⓗ : Radiator core support side
Ⓚ : Front side member



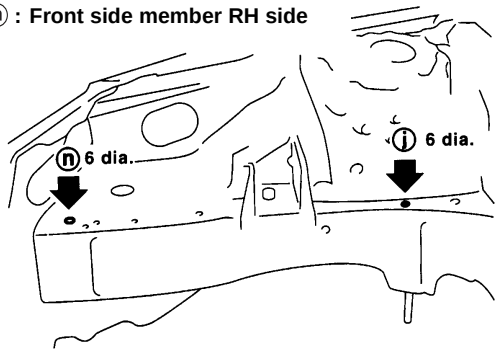
Ⓘ : Hood lock stay
Ⓞ,ⓞ : Radiator core support lower



Ⓙ,Ⓝ : Front side member LH side



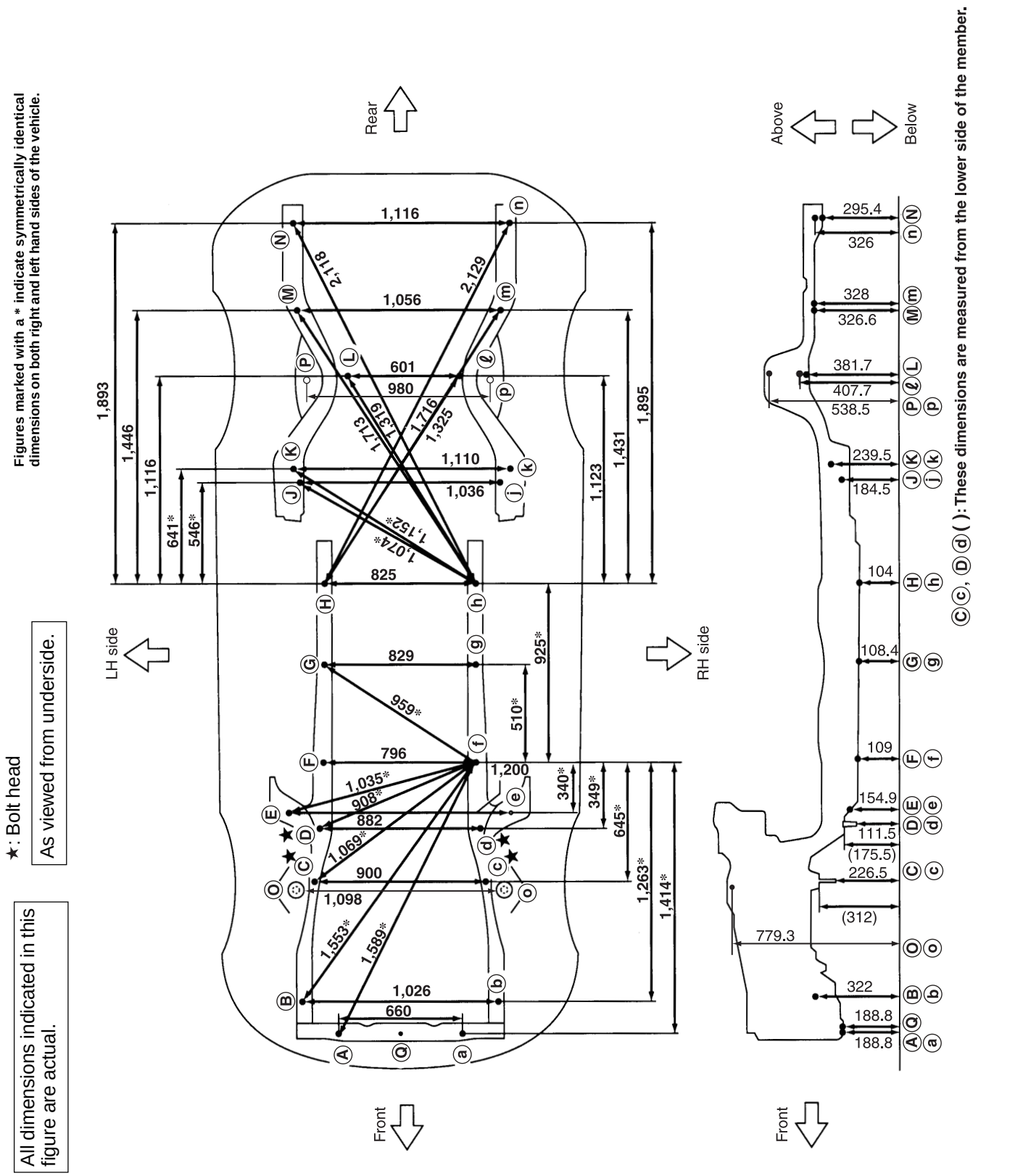
ⓙ,ⓝ : Front side member RH side



Underbody

MEASUREMENT

Unit: mm

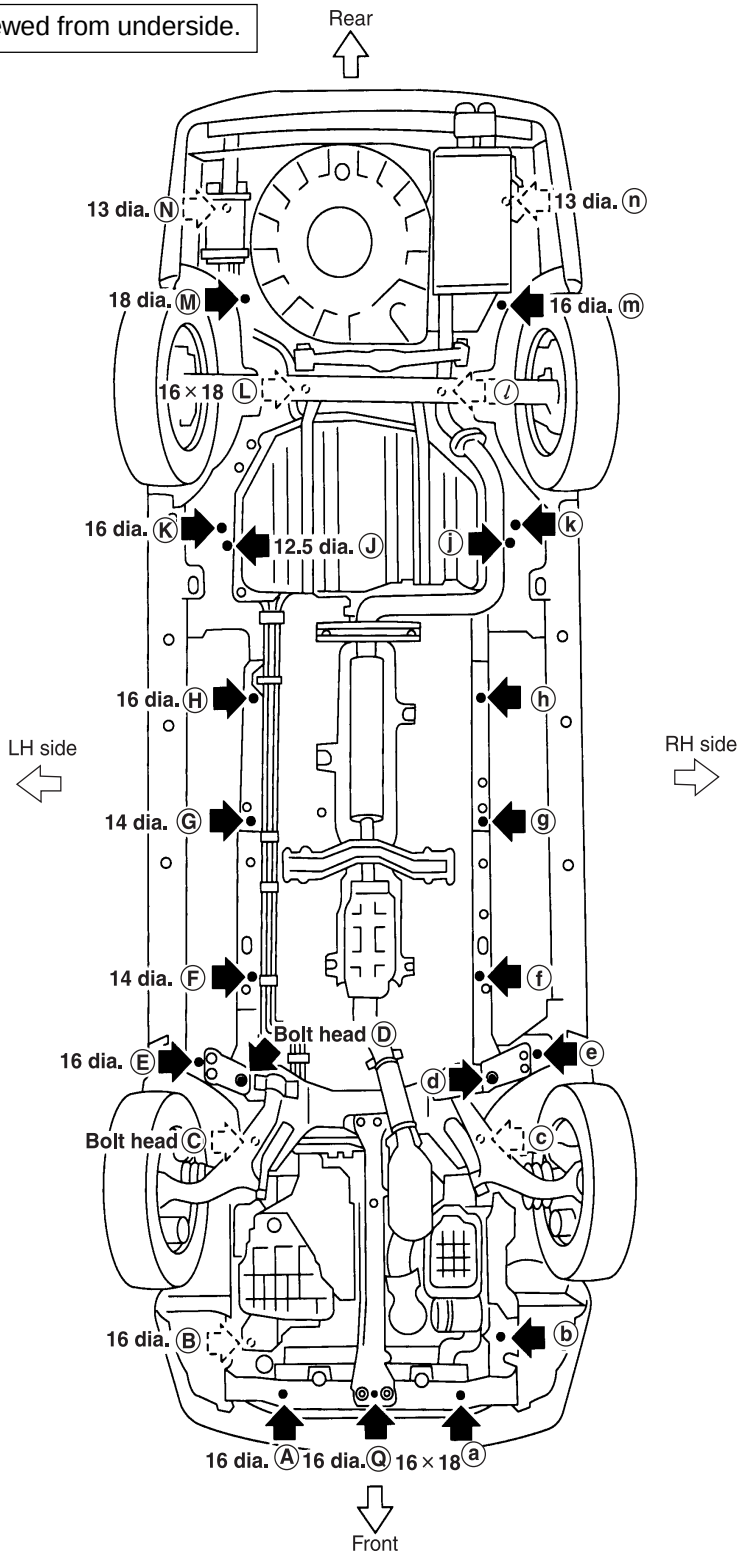


Underbody (Cont'd)

MEASUREMENT POINTS

Unit: mm

As viewed from underside.



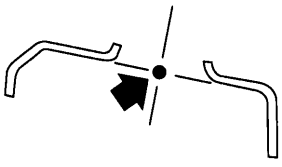
Coordinates:

Ⓐ,ⓐ	Ⓚ,ⓚ
X:330	X:555
Y:-710	Y:2,235
Z:188.8	Z:239.5
Ⓑ,ⓑ	Ⓛ
X:513	X:300
Y:-540	Y:2,700
Z:322	Z:381.7
Ⓒ,ⓒ	ⓛ
X:450	X:-300
Y:68	Y:2,700
Z:226.5	Z:407.7
Ⓓ,ⓓ	Ⓜ
X:441	X:512
Y:354	Y:3,050
Z:111.5	Z:326.6
Ⓔ,ⓔ	ⓜ
X:600	X:-544
Y:430	Y:3,032
Z:154.9	Z:328.2
Ⓕ,ⓕ	Ⓝ
X:398	X:546
Y:700	Y:3,504
Z:109	Z:295.4
Ⓖ,ⓖ	ⓝ
X:414	X:-570.5
Y:1,210	Y:3,500
Z:108.4	Z:326.6
Ⓗ,ⓗ	Ⓠ
X:412.5	X:0
Y:1,625	Y:-700.5
Z:104	Z:188.8
Ⓙ,ⓙ	
X:518.2	
Y:2,155	
Z:184.5	

Front and rear strut tower centers

Coordinates:

Ⓞ,ⓞ
X:548.8
Y:28.7
Z:779.3



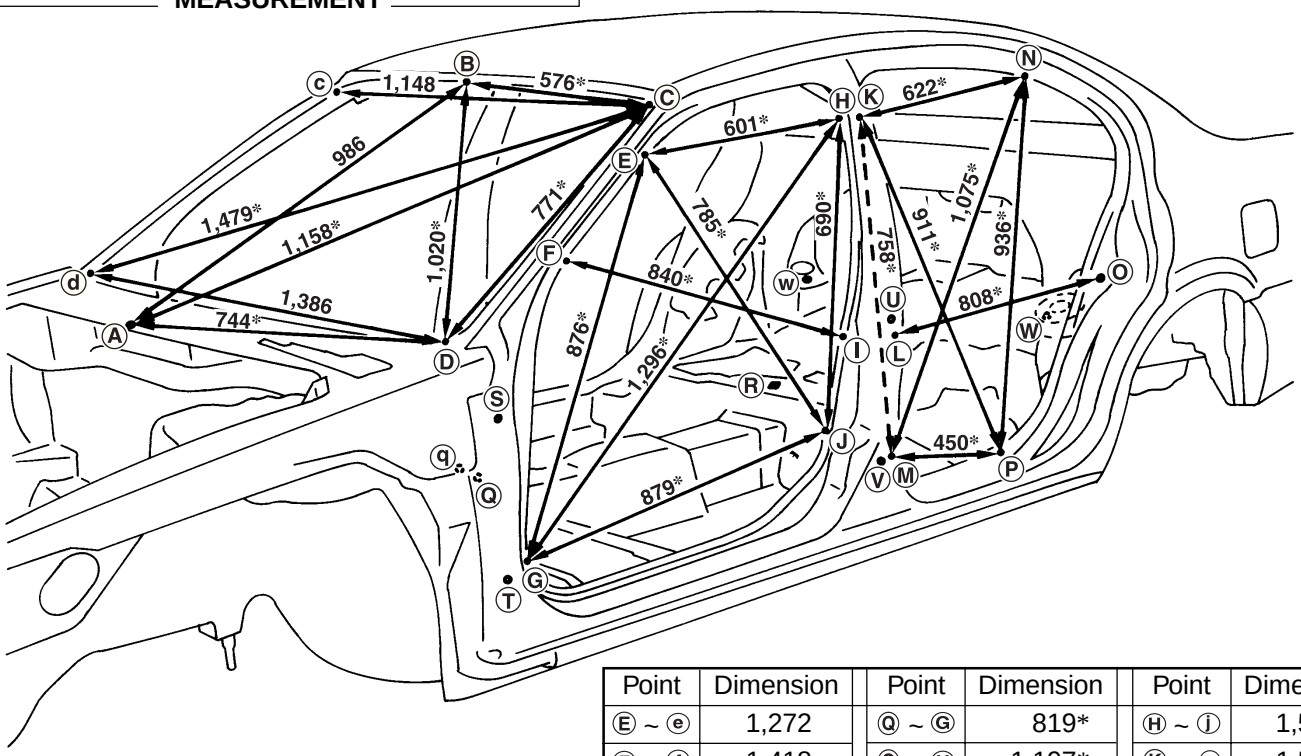
Ⓟ,ⓟ
X:490.1
Y:2,671
Z:538.5

Front:Ⓞ,ⓞ **87 dia**
Rear:Ⓟ,ⓟ **61.4 dia**

Passenger Compartment

MEASUREMENT

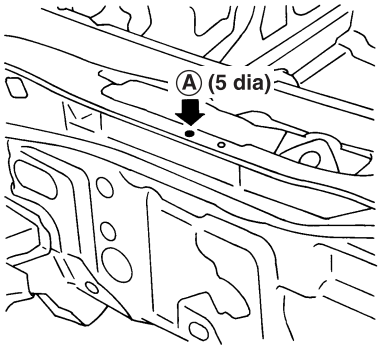
Unit: mm



Point	Dimension	Point	Dimension	Point	Dimension
Ⓔ ~ ⓔ	1,272	Ⓠ ~ Ⓖ	819*	Ⓗ ~ ⓙ	1,527*
Ⓕ ~ ⓕ	1,418	Ⓠ ~ Ⓗ	1,197*	Ⓚ ~ ⓜ	1,560*
Ⓖ ~ ⓖ	1,449	Ⓠ ~ Ⓘ	931*	Ⓚ ~ ⓝ	1,389*
Ⓗ ~ ⓗ	1,272	Ⓠ ~ Ⓙ	830*	Ⓜ ~ Ⓟ	1,518*
Ⓘ ~ ⓘ	1,473	Ⓡ ~ Ⓚ	1,059*	Ⓝ ~ Ⓟ	1,619*
Ⓙ ~ ⓙ	1,459	Ⓡ ~ Ⓛ	897*	Ⓟ ~ ⓚ	1,638*
Ⓚ ~ ⓚ	1,280	Ⓡ ~ Ⓜ	839*	Ⓢ ~ Ⓤ	1,128*
Ⓛ ~ ⓛ	1,473	Ⓡ ~ Ⓝ	1,063*	Ⓢ ~ Ⓥ	1,127*
Ⓜ ~ ⓜ	1,452	Ⓡ ~ Ⓞ	901*	Ⓣ ~ Ⓤ	1,173*
Ⓝ ~ ⓝ	1,205	Ⓡ ~ Ⓟ	727*	Ⓣ ~ Ⓥ	1,086*
Ⓞ ~ ⓞ	1,479	Ⓔ ~ ⓖ	1,616*	Ⓠ ~ Ⓦ	1,660*
Ⓟ ~ Ⓟ	1,448	Ⓔ ~ ⓗ	1,407*	Ⓡ ~ Ⓦ	736*
Ⓠ ~ Ⓔ	1,027*	Ⓖ ~ ⓗ	1,877*		
Ⓠ ~ Ⓕ	980*	Ⓖ ~ ⓙ	1,699*		

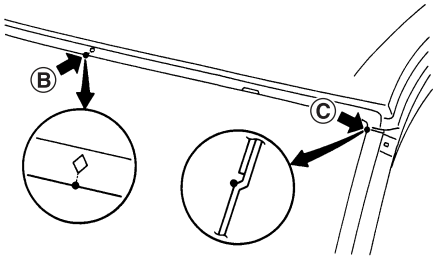
Figures marked with a * indicate symmetrically identical dimensions on both right and left hand sides of the vehicle.

Ⓐ : Cowl top center (5 dia)

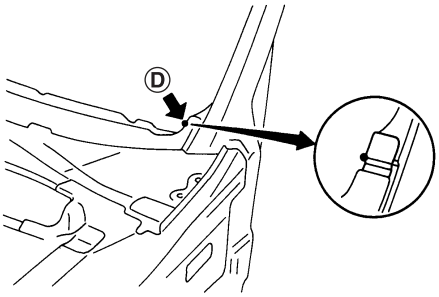


Ⓑ : Front roof flange end of center positioning mark

Ⓒ,ⓒ : Outer front pillar joggle



Ⓓ,ⓓ : Upper dash joggle

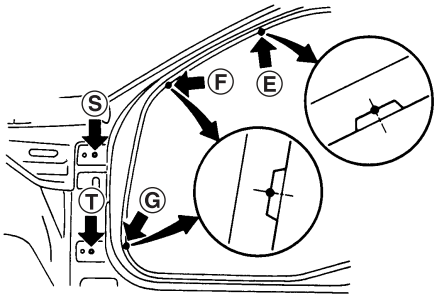


Passenger Compartment (Cont'd)

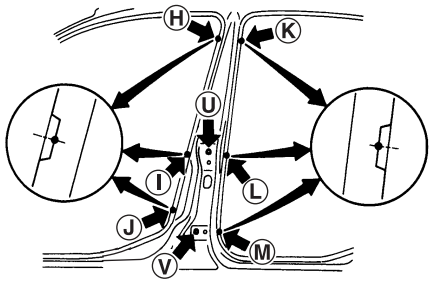
MEASUREMENT

Unit: mm

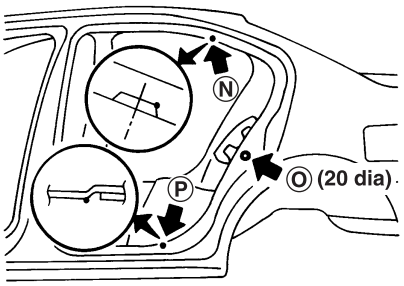
Ⓔ,ⓔ,Ⓕ,ⓕ,Ⓖ,ⓖ: Outer front pillar indention
Ⓢ,ⓢ,Ⓣ,ⓣ : Door hinge installing nut center



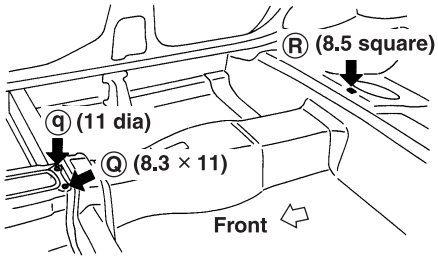
Ⓗ,ⓗ,Ⓘ,ⓘ,Ⓙ,ⓙ,
Ⓚ,ⓚ,Ⓛ,ⓛ,Ⓜ,ⓜ : Outer center pillar indention
Ⓤ,ⓤ,Ⓥ,ⓥ : Door hinge installing nut center



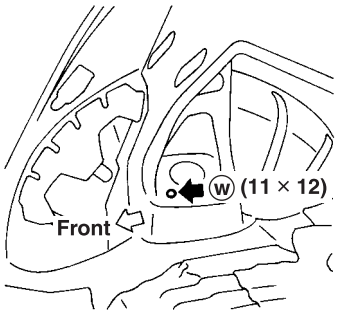
Ⓝ,ⓝ : Rear fender indention rear
Ⓞ,ⓞ : Door switch installing hole center (20 dia)
Ⓟ,ⓟ : Outer sill joggle



Ⓠ,ⓠ : Transmission control reinforcement hole center
Ⓡ : Fuel tank cover installing hole center of center positioning mark



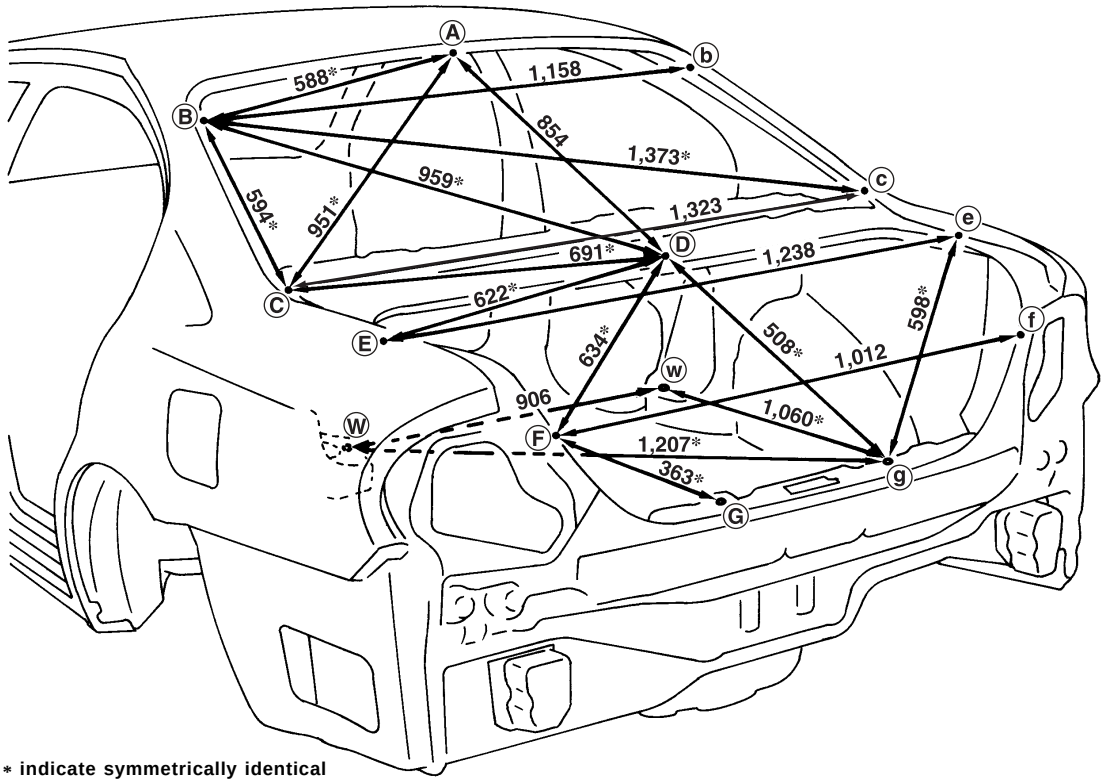
Ⓦ,ⓦ : Rear suspension installing hole center (11 × 12)



Rear Body

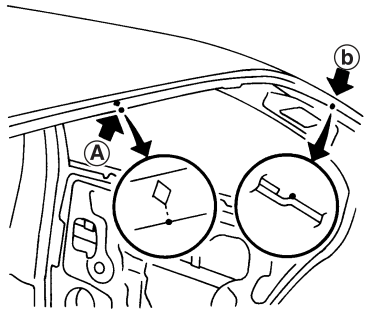
MEASUREMENT

Unit: mm

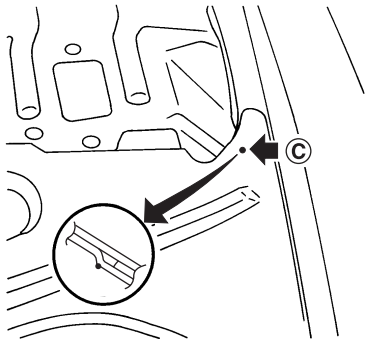


Figures marked with a ∗ indicate symmetrically identical dimensions on both right and left hand sides of the vehicle.

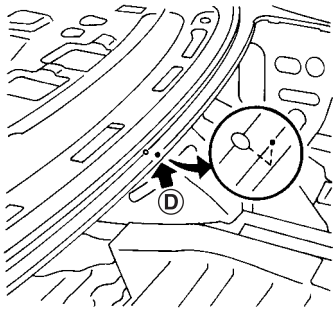
Ⓐ : Rear roof flange end of center positioning mark
Ⓑ,ⓑ : Rear fender joggle



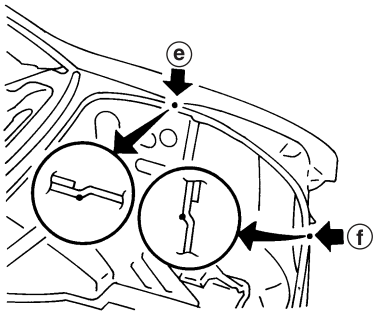
Ⓒ,ⓒ : Rear fender joggle



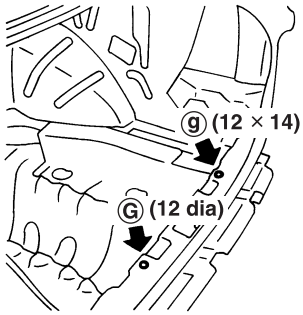
Ⓓ : Rear waist flange end of center positioning mark



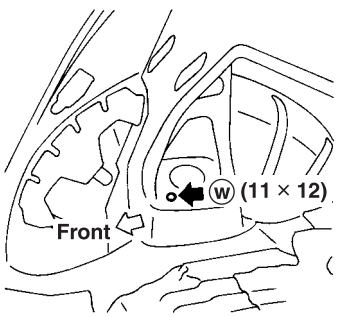
Ⓔ,ⓔ : Rear fender joggle
Ⓕ,ⓕ : Rear combination lamp base joggle



Ⓖ,ⓖ : Rear panel upper reinforcement hole center



Ⓦ,ⓦ : Rear suspension installing hole center (11 × 12)

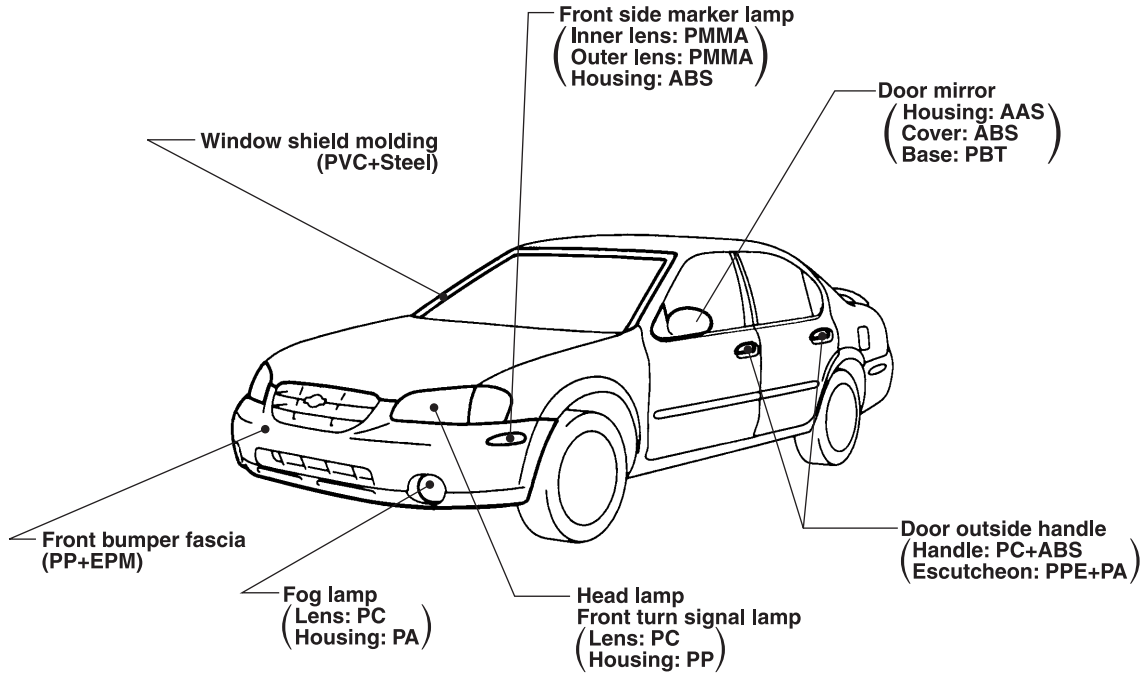


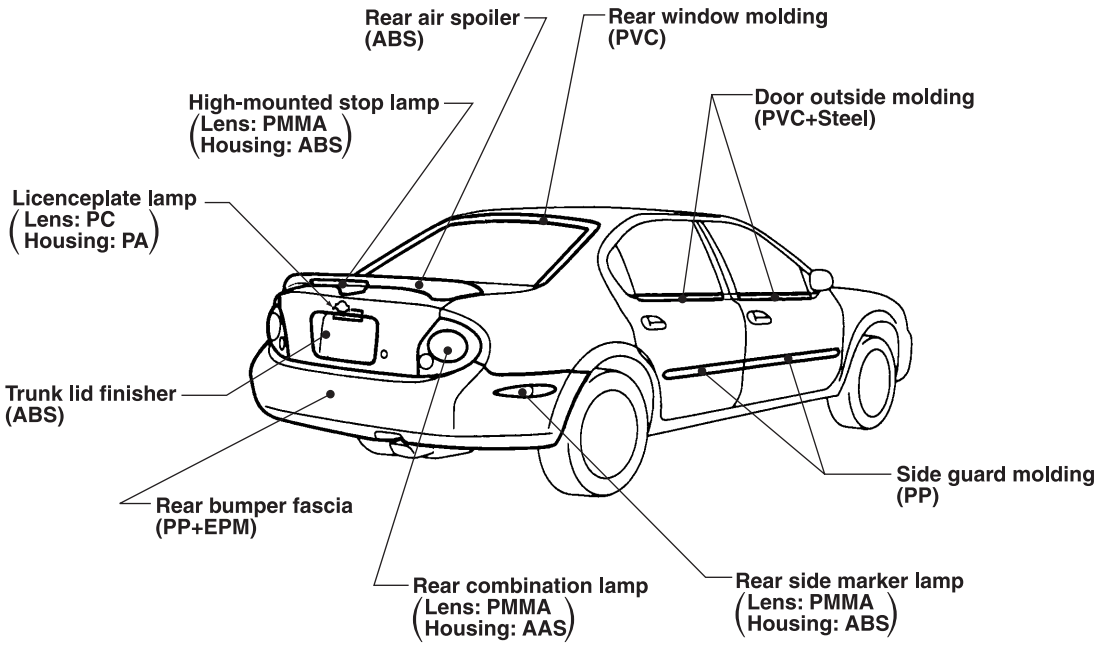
Handling Precautions for Plastics

Abbreviation	Material name	Heat resisting temperature °C(°F)	Resistance to gasoline and solvents	Other cautions
PVC	Polyvinyl chloride	80(176)	Gasoline and most solvents are harmless if applied for a very short time(wipe up quickly).	Poison gas is emitted when burned.
PP	Polypropylene	90(194)	Same as above.	Flammable,avoid battery acid.
EPM/EPDM	Ethylene Propylene (Diene) rubber	80(176)	Same as above.	Flammable
UP	Polyester thermoset	90(194)	Same as above.	Flammable
TPO/TPR	Thermoplastic olefine/ Thermoplastic rubber	80(176)	Same as above.	Flammable
ABS	Acrylonitrile butadiene styrene resin	80(176)	Avoid gasoline and solvents.	
AAS	Acrylonitrile acrylic styrene	85(185)	Avoid gasoline and solvents.	
ASA	Acrylonitrile styrene acrylate	100(222)	Avoid gasoline and solvents.	Flammable
AS	Acrylonitrile styrene	85(185)	Avoid gasoline and solvents.	
AES	Acrylonitrile ethylene styrene	80(176)	Avoid gasoline and solvents.	
PMMA	Polymethyl methacrylate	85(185)	Avoid gasoline and solvents.	
EVA	Polyvinyl ethyl acetate	90(194)	Avoid gasoline and solvents.	
PPO/PPE	Polyphenylene oxide/ether	110(230)	Avoid gasoline and solvents.	
PC	Polycarbonate	120(248)	Avoid gasoline and solvents.	
L-LDPE	Lenear low density polyethylene	45(100)	Gasoline and most solvents are harmless.	Flammable
PUR	Polyurethane	90(194)	Same as above.	
PPC	Polypropylene composite	115(239)	Same as above.	Flammable
POM	Polyacetal	120(248)	Same as above.	Avoid battery acid.
PA	Polyamide(Nylon)	140(284)	Same as above.	Avoid immersing in water.
PET	Polyethylene terephthalate	180(356)	Same as above.	
PBT	Polybutylene terephthalate	140(284)	Same as above.	

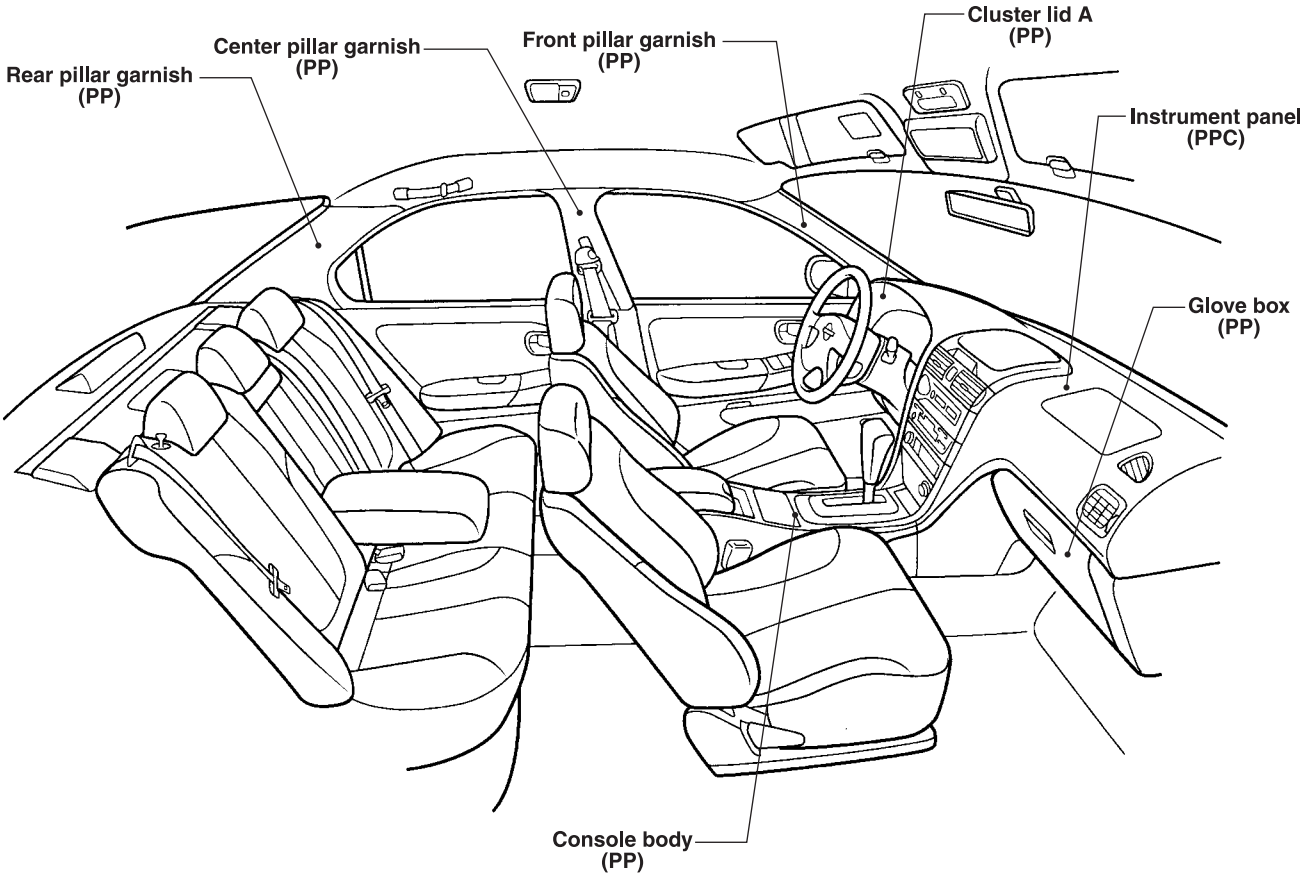
1. When repairing and painting a portion of the body adjacent to plastic parts, consider their characteristics (influence of heat and solvent) and remove them if necessary or take suitable measures to protect them.
2. Plastic parts should be repaired and painted using methods suiting the materials characteristics.

Location of Plastic Parts





Location of Plastic Parts (Cont'd)



Precautions in Repairing High Strength Steel

High strength steel is used for body panels in order to reduce vehicle weight.
Accordingly, precautions in repairing automotive bodies made of high strength steel are described below:

HIGH STRENGTH STEEL (HSS) USED IN NISSAN VEHICLES

Tensile strength	Nissan designation	Major applicable parts
373 N/mm^2 (38 kg/mm^2, 54 klb/sq in)	SP130	●Front side member ●Hoodledge ●Inner sill ●2nd crossmember assembly ●Rear side member extension
785-981 N/mm^2 (80-100 kg/mm^2 114-142 klb/sq in)	SP150	●Door guard beam

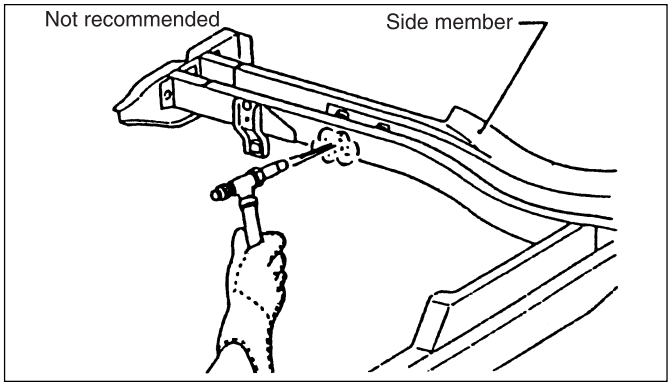
- SP130 is the most commonly used HSS.
  SP150 HSS is used only on parts that require much more strength.

Precautions in Repairing High Strength Steel (Cont'd)

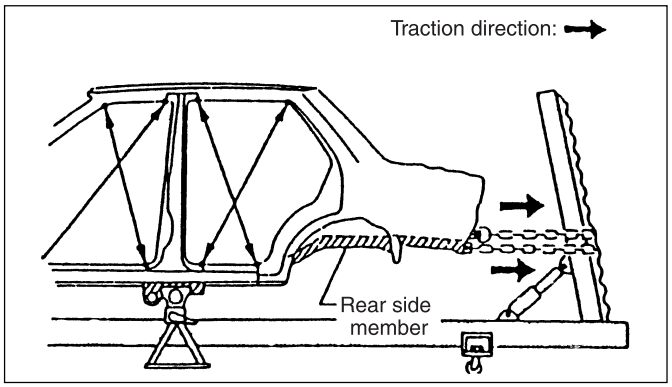
Read the following precautions when repairing HSS:

1. Additional points to consider

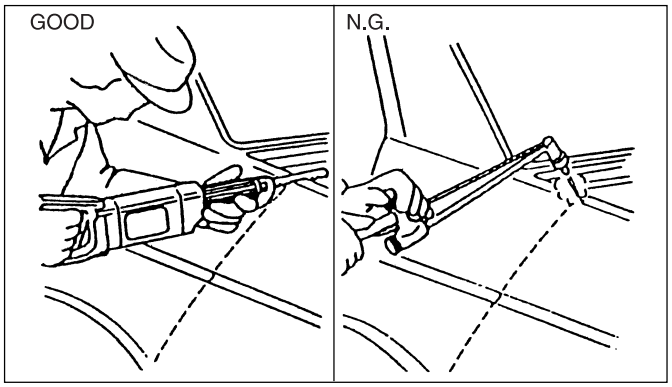
- The repair of reinforcements (such as side members) by heating is not recommended since it may weaken the component. When heating is unavoidable, do not heat HSS parts above 550°C (1, 022°F)
  Verify heating temperature with a thermometer. (Crayon-type and other similar type thermometer are available.)



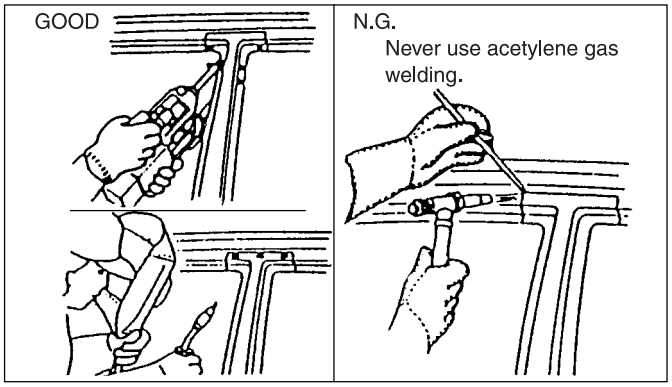
- When straightening body panels, use caution in pulling any HSS panel. Because HSS is very strong, pulling may cause deformation in adjacent portions of the body. In this case, increase the number of measuring points, and carefully pull the HSS panel.



- When cutting HSS panels, avoid gas (torch) cutting if possible. Instead, use a saw to avoid weakening surrounding areas due to heat. If gas (torch) cutting is unavoidable, allow a minimum margin of 50 mm (1.97 in).

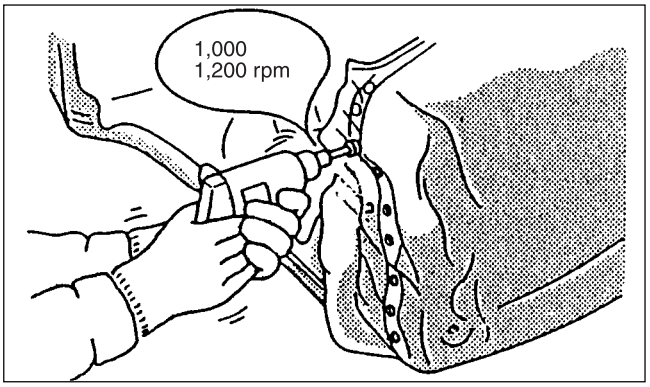


- When welding HSS panels, use spot welding whenever possible in order to minimize weakening surrounding areas due to heat.
  If spot welding is impossible, use M.I.G. welding. Do not use gas (torch) welding because it is inferior in welding strength.



Precautions in Repairing High Strength Steel (Cont'd)

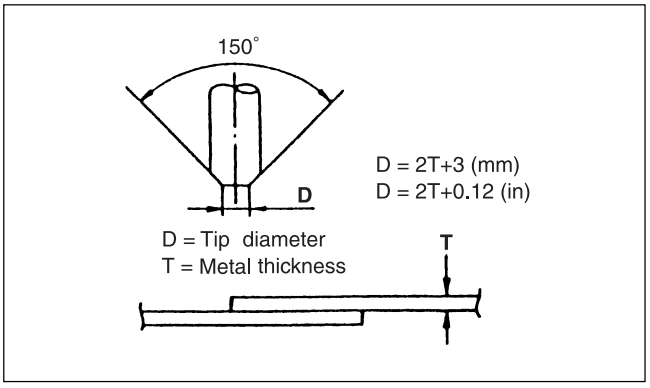
- The spot weld on HSS panels is harder than that of an ordinary steel panel.
  Therefore, when cutting spot welds on a HSS panel, use a low speed high torque drill (1,000 to 1,200 rpm) to increase drill bit durability and facilitate the operation.



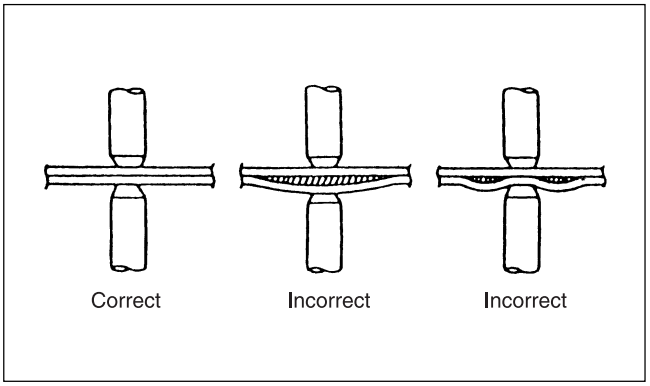
- SP150 HSS panels with a tensile strength of 785 to 981 N/mm^2 (80 to 100 kg/mm^2, 114 to 142 klb/sq in), used as reinforcement in the door guard beams and in the bumper, is too strong to repair. When these HSS parts are damaged, the outer panels also sustain substantial damage; therefore, the door assembly or bumper assembly must be replaced.

2. Precautions in spot welding HSS
   This work should be performed under standard working conditions. Always note the following when spot welding HSS:

- The electrode tip diameter must be sized properly according to the metal thickness.



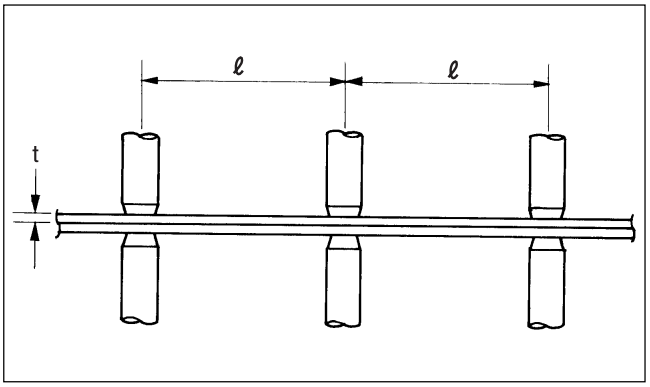
- The panel surfaces must fit flush to each other, leaving no gaps.



- Follow the specifications for the proper welding pitch.

Unit:mm

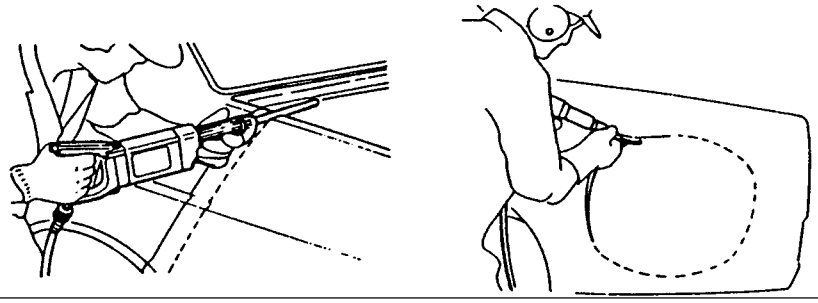
Thickness (t)	Minimum pich (ℓ)
0.6 (0.024)	10 (0.39) or over
0.8 (0.031)	12 (0.47) or over
1.0 (0.039)	18 (0.71) or over
1.2 (0.047)	20 (0.79) or over
1.6 (0.063)	27 (1.06) or over
1.8 (0.071)	31 (1.22) or over



Description

The symbols used in this manual for cutting and welding / brazing operations are shown below.

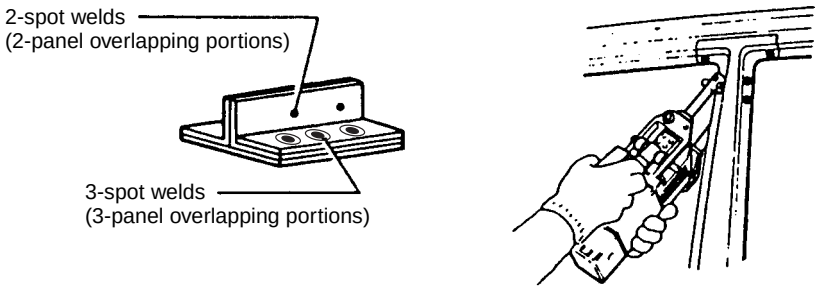
Saw cut or air chisel cut



Spot weld

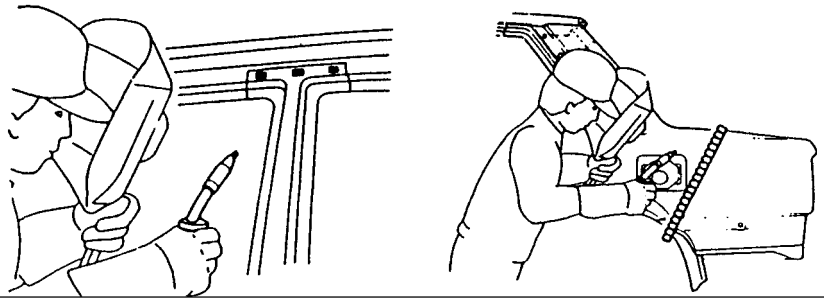
2-spot welds

3-spot welds

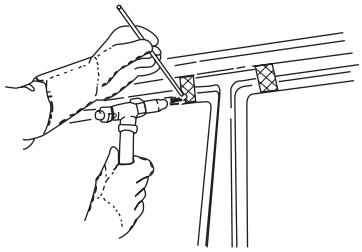


MIG plug weld

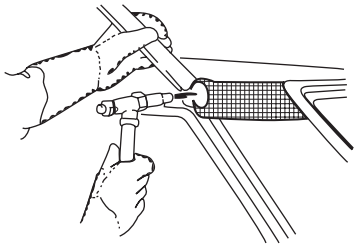
MIG seam weld/
Point weld



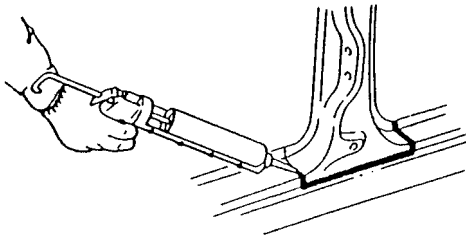
Brazing



Soldering



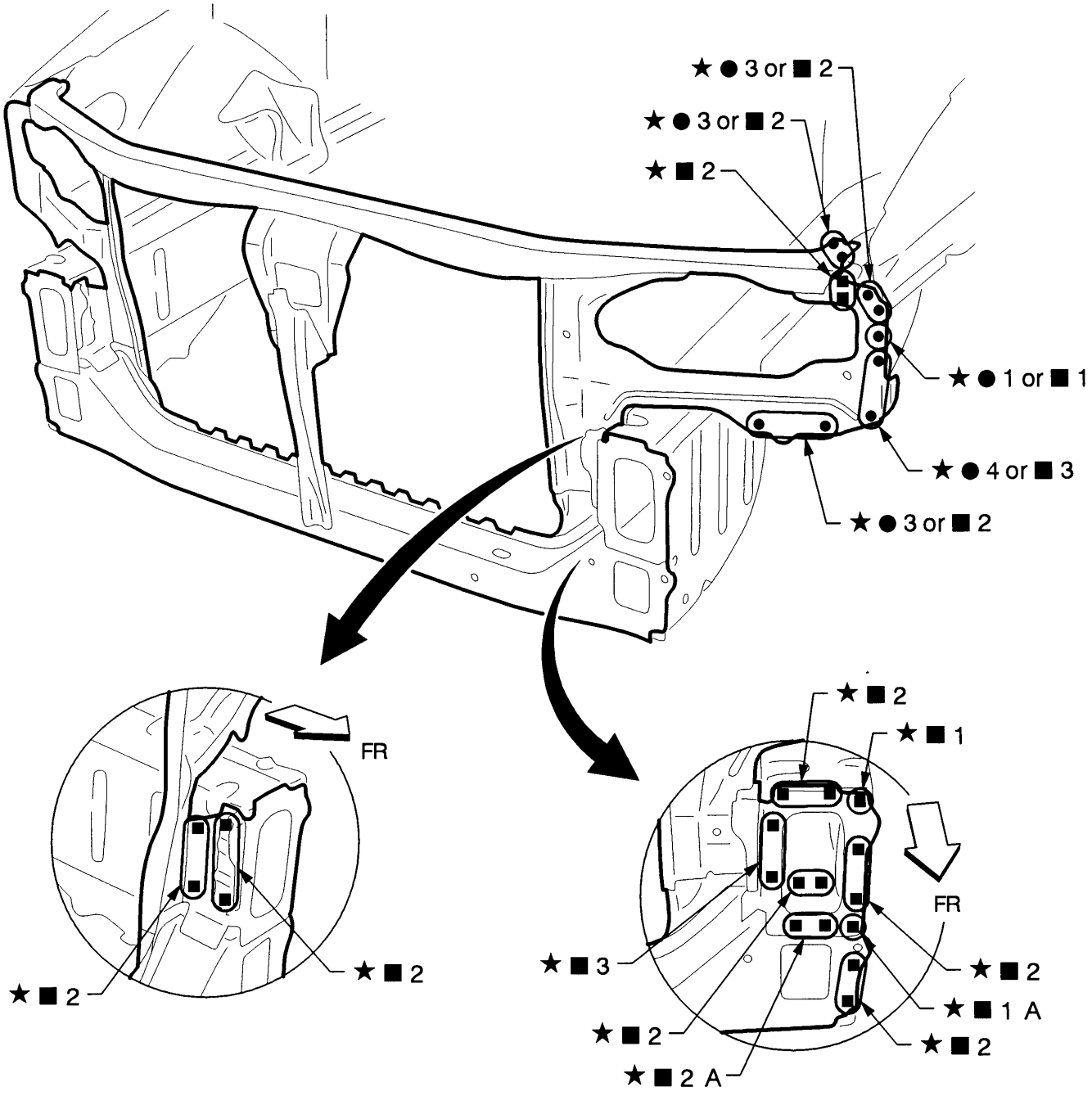
Sealing



Radiator Core Support

Service Joint

★ **Indicates that there is an equivalent welding portion with the same dimensions on the opposite side.**



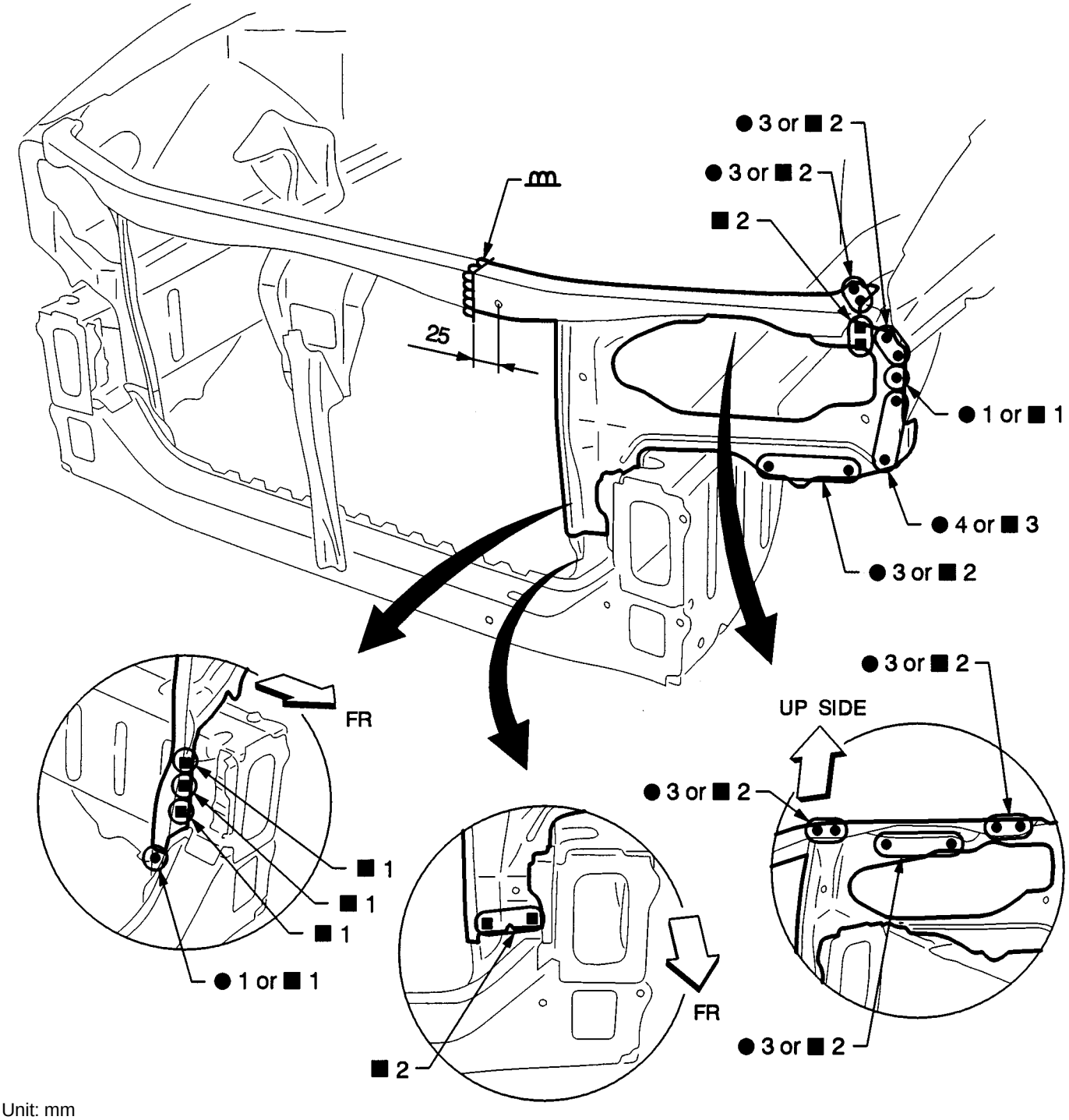
2-spot welds ● 3-spot welds ◉ MIG plug weld ■

For 3 panels plug weld method ■ A ■ B

MIG seam weld / Point weld

Radiator Core Support (Partial Replacement)

Service Joint



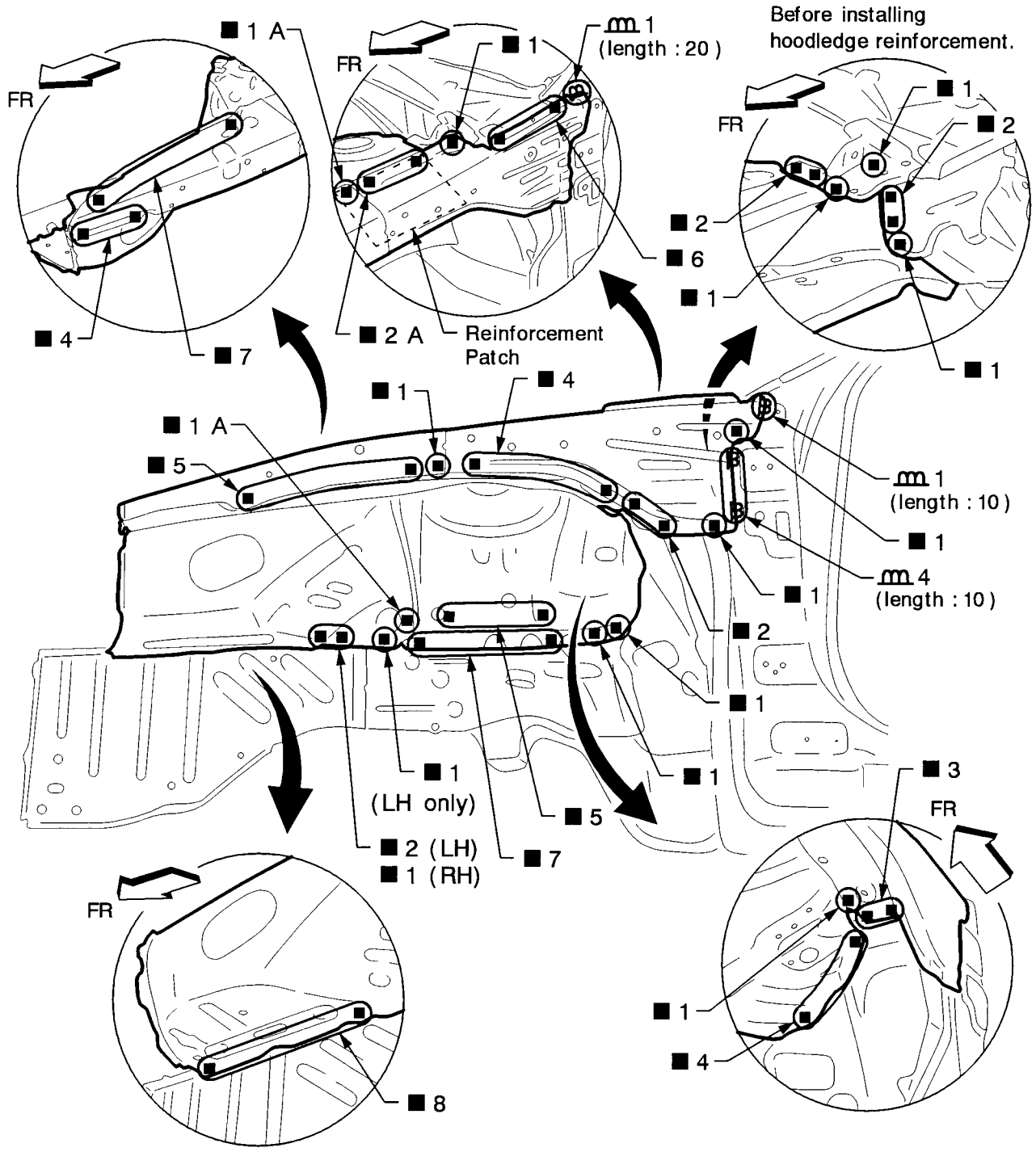
Unit: mm

2-spot welds 3-spot welds MIG plug weld For 3 panels plug weld method MIG seam weld / Point weld

Hoodledge

● **Work after radiator core support has been removed.**

Service Joint



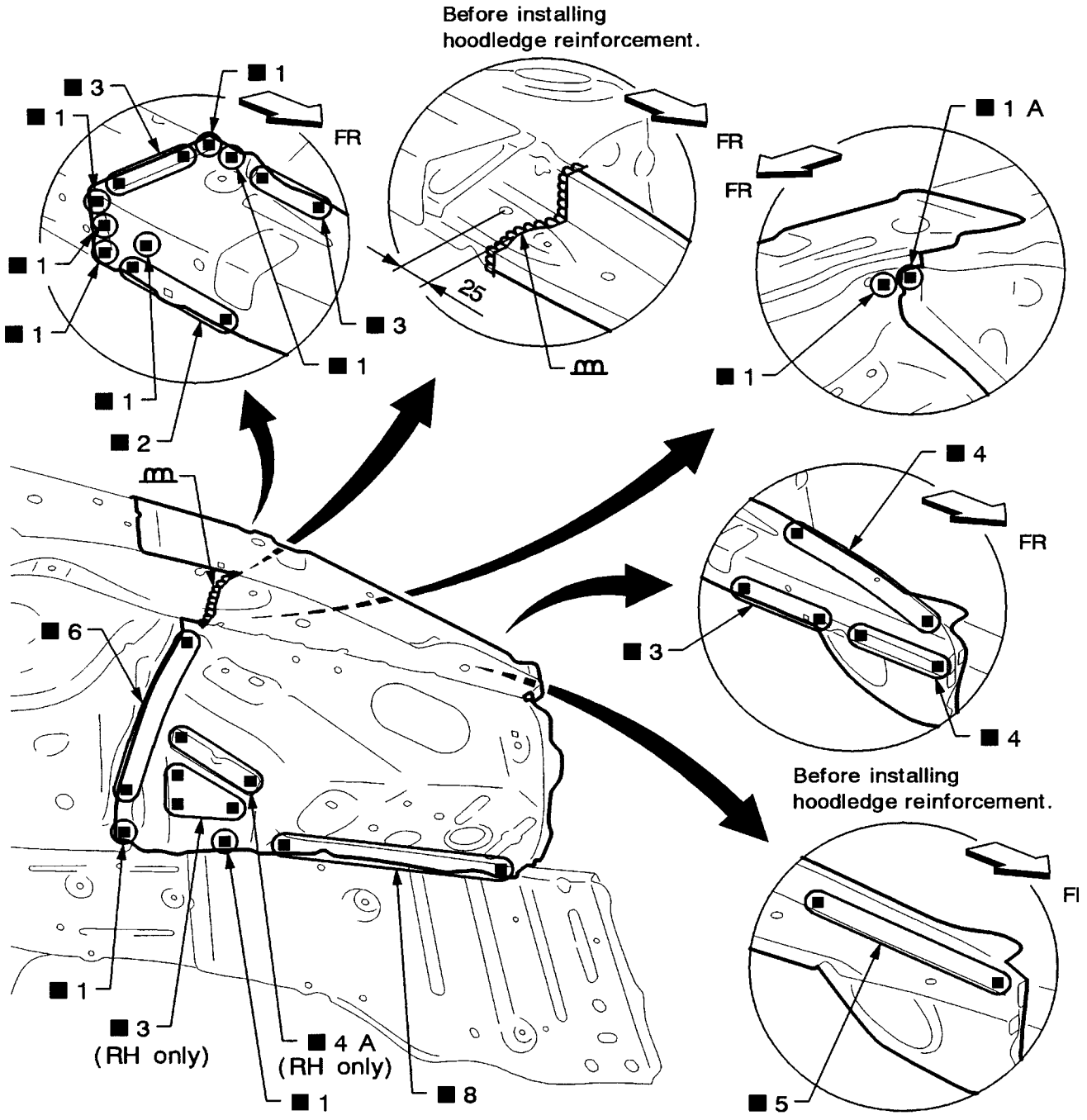
Unit: mm

2-spot welds 3-spot welds MIG plug weld For 3 panels plug weld method ■ A ■ B MIG seam weld / Point weld

Hoodledge (Partial Replacement)

● **Work after radiator core support has been removed.**

Service Joint
(This figure shows right side hoodledge)



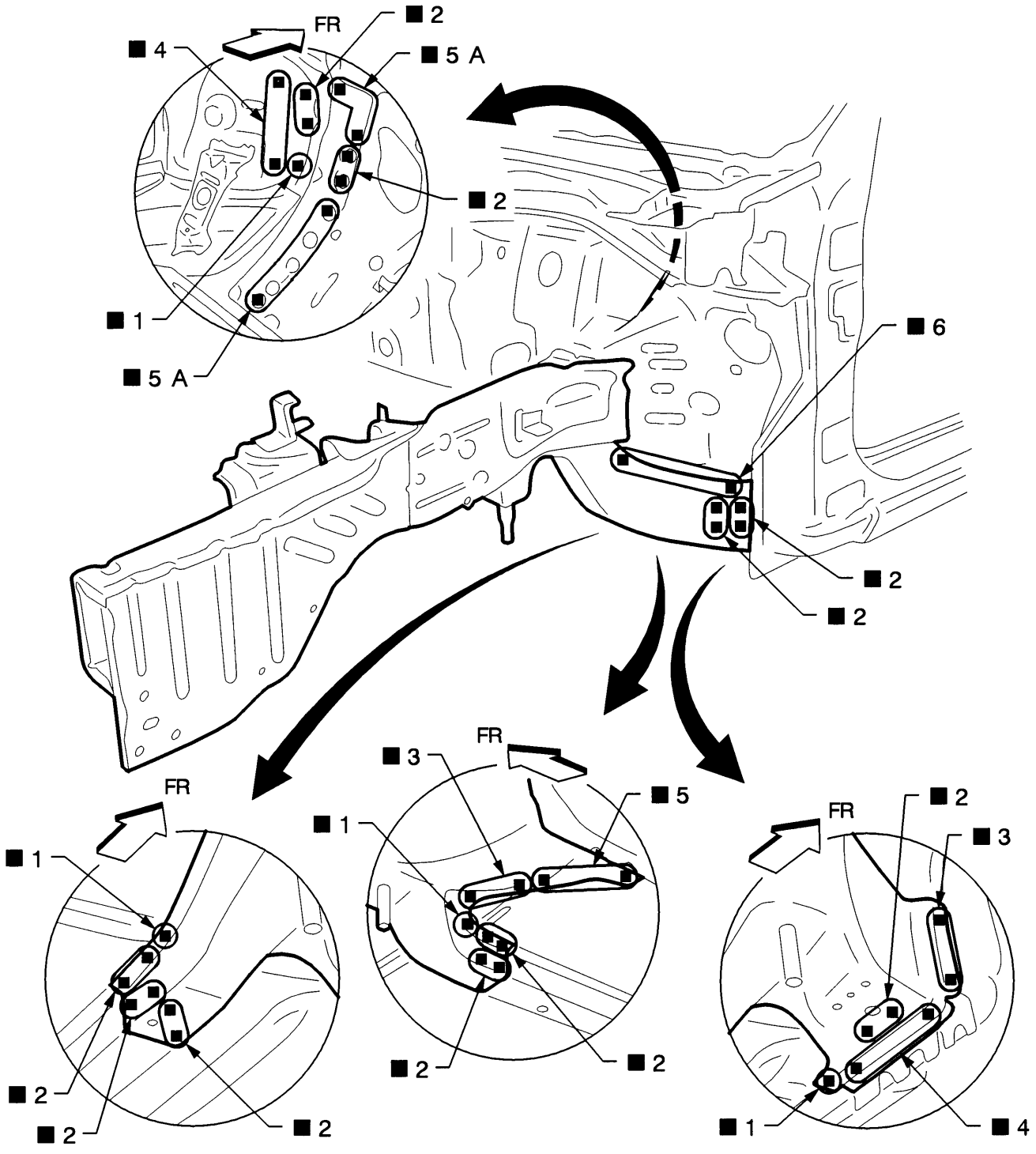
Unit: mm

2-spot welds 3-spot welds MIG plug weld For 3 panels plug weld method A B MIG seam weld / Point weld

Front Side Member

● **Work after hoodledge and radiator core support have been removed.**

Service Joint

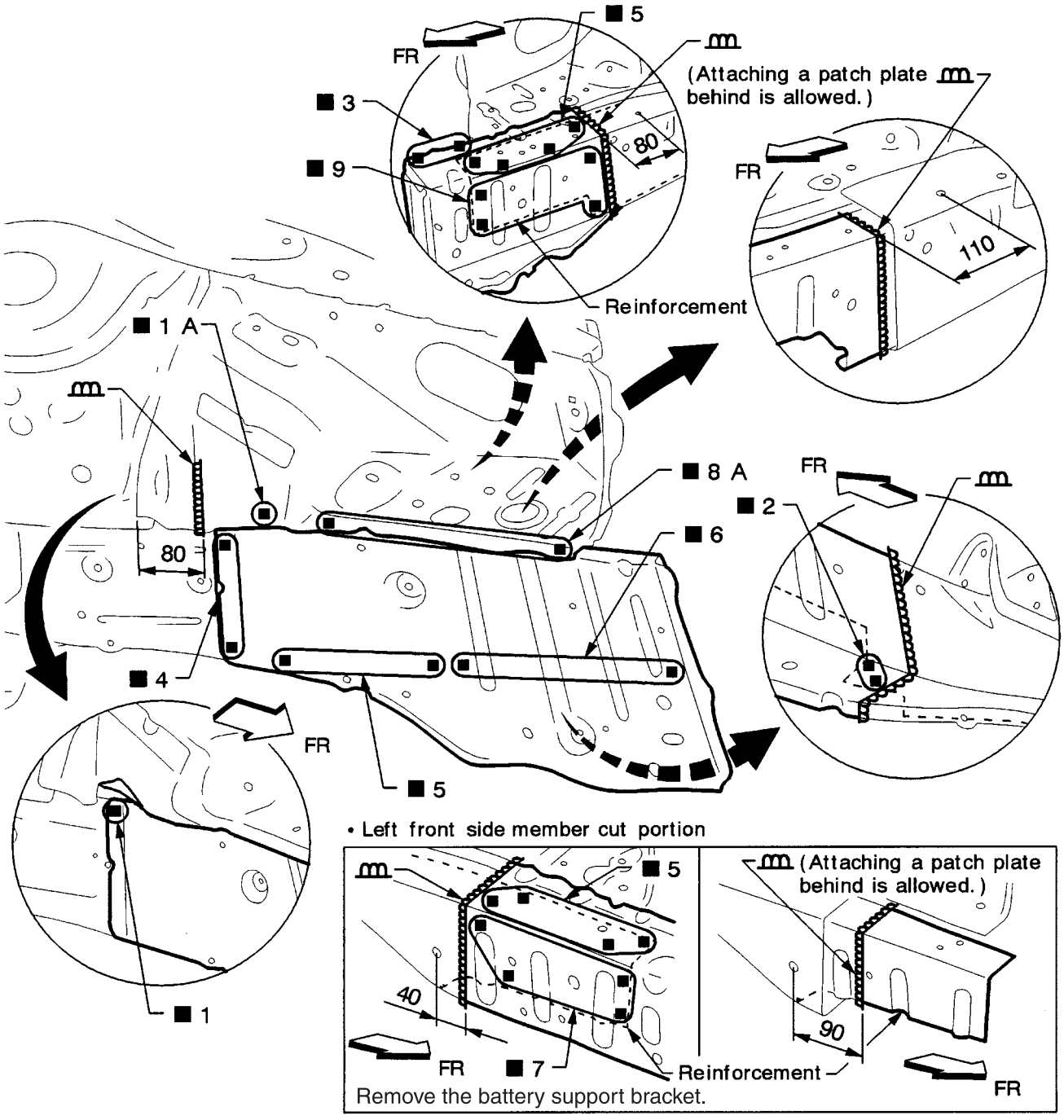


2-spot welds 3-spot welds MIG plug weld For 3 panels plug weld method ■ A ■ B MIG seam weld / Point weld

Front Side Member (Partial Replacement)

● **Work after radiator core support has been removed.**

Service Joint (This figure shows right front side member)



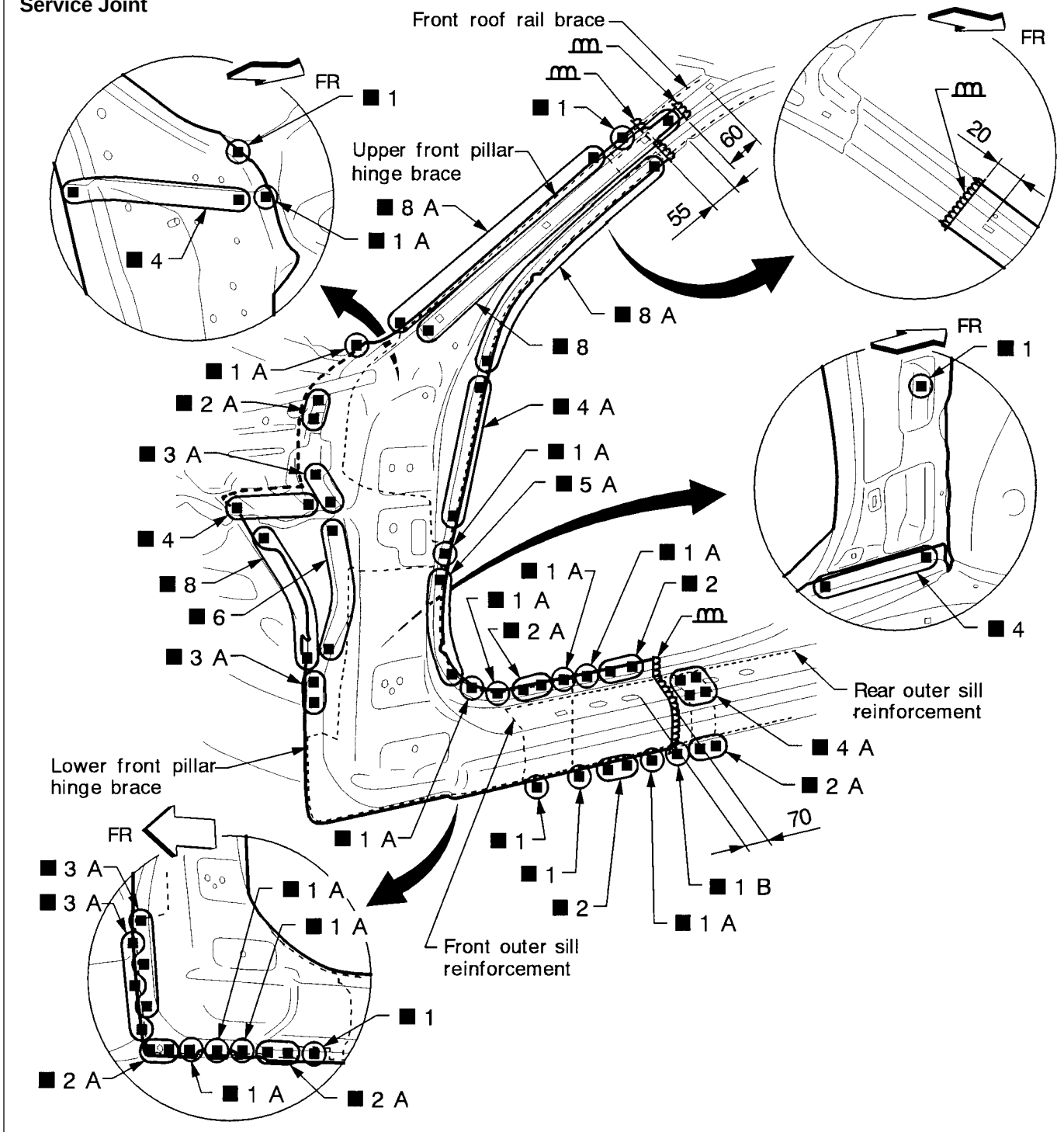
Unit: mm

2-spot welds 3-spot welds MIG plug weld For 3 panels plug weld method ■ A ■ B MIG seam weld / Point weld

Front Pillar

- **See REPLACEMENT NOTES.**
- **Work after hoodledge reinforcement has been removed.**

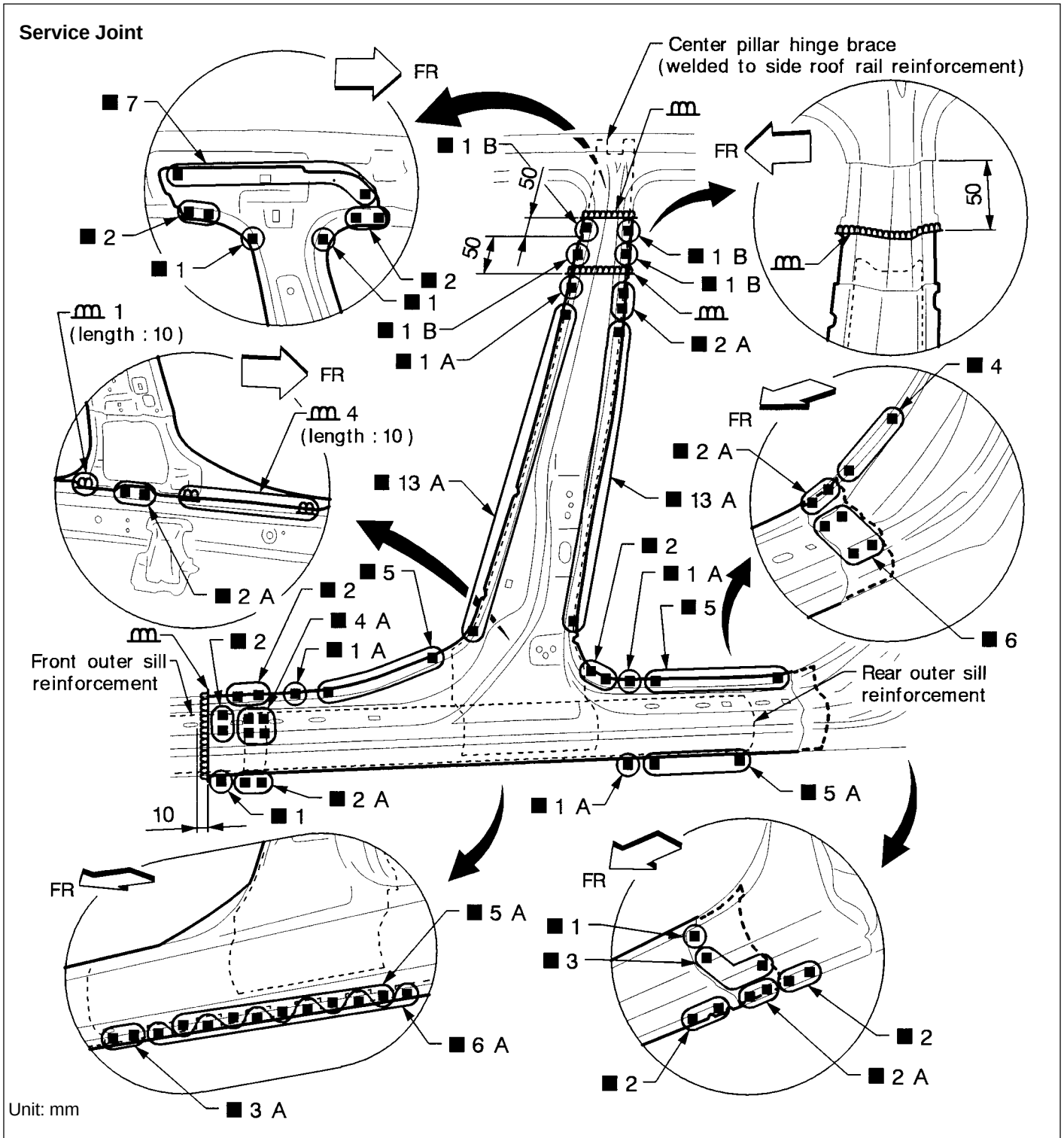
Service Joint



Unit: mm

2-spot welds 3-spot welds MIG plug weld For 3 panels plug weld method ■ A ■ B MIG seam weld / Point weld

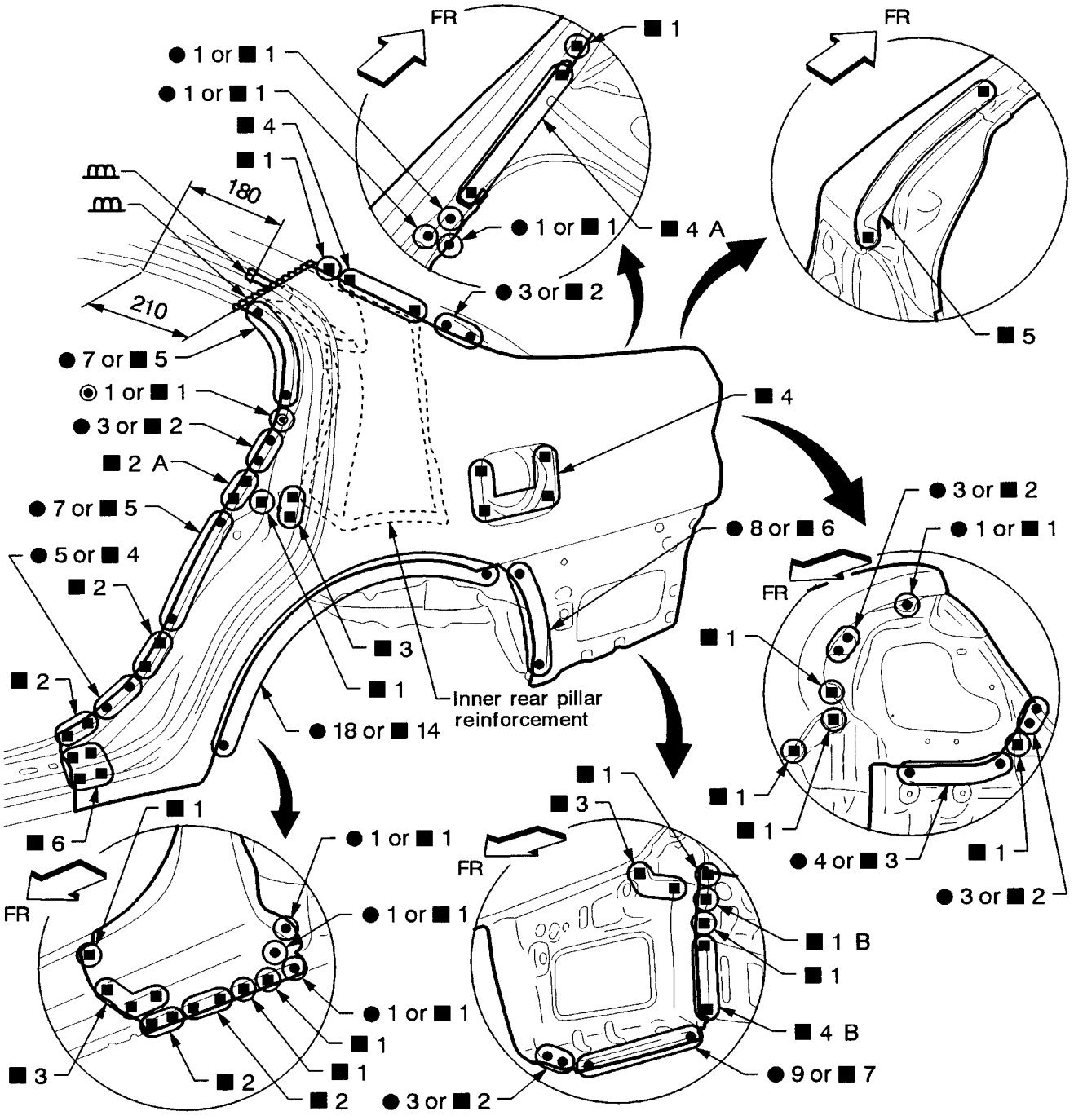
Center Pillar



2-spot welds 3-spot welds MIG plug weld For 3 panels plug weld method A B MIG seam weld / Point weld

Rear Fender

Service Joint



Unit: mm

2-spot welds 3-spot welds MIG plug weld For 3 panels plug weld method MIG seam weld / Point weld

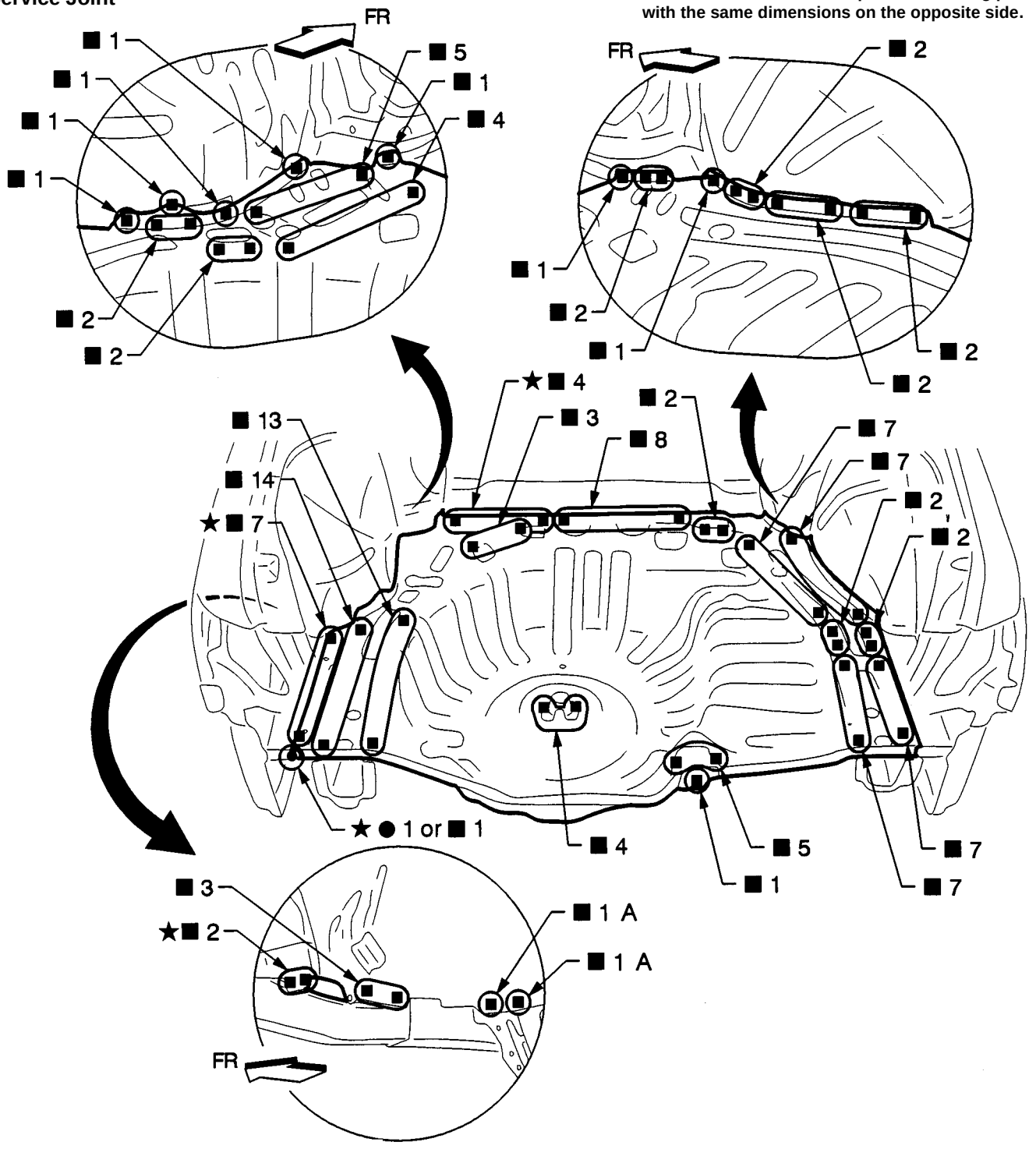
■ A ■ B

Rear Floor Rear

● **Work after rear panel has been removed.**

Service Joint

★ **Indicates that there is an equivalent welding portion with the same dimensions on the opposite side.**

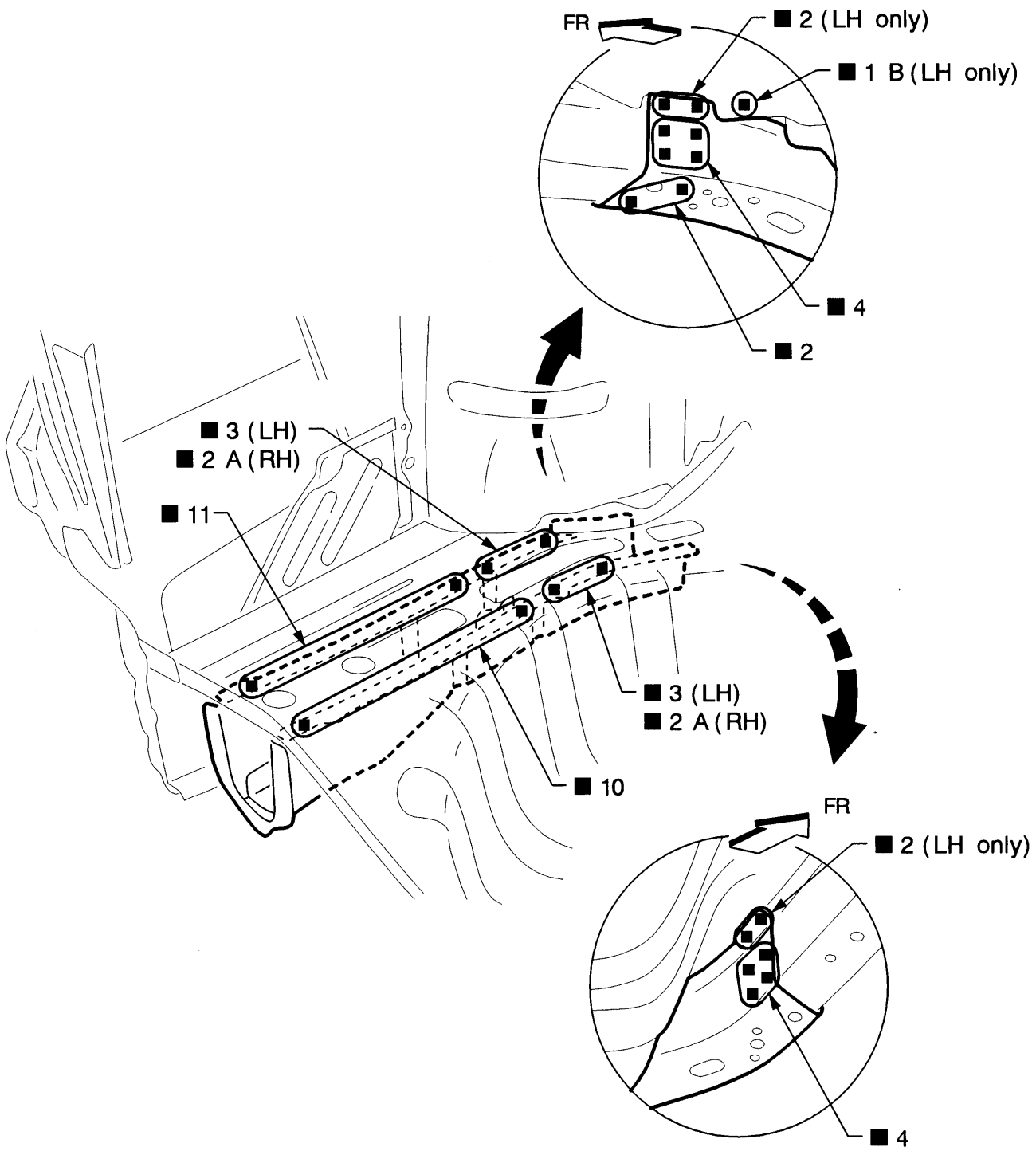


2-spot welds 3-spot welds MIG plug weld For 3 panels plug weld method ■ A ■ B MIG seam weld / Point weld

Rear Side Member Extension

● **Work after rear panel has been removed.**

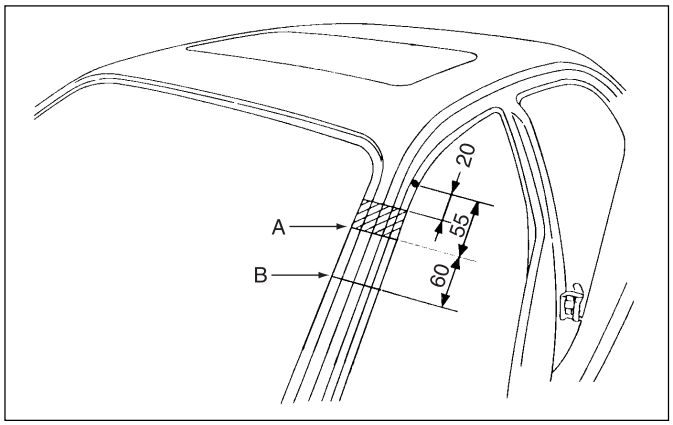
Service Joint



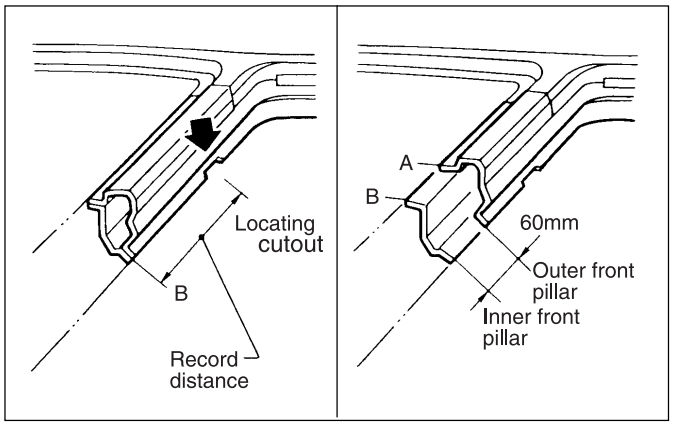
2-spot welds ● 3-spot welds ◉ MIG plug weld ■ For 3 panels plug weld method ■ A ■ B MIG seam weld / Point weld

Front Pillar

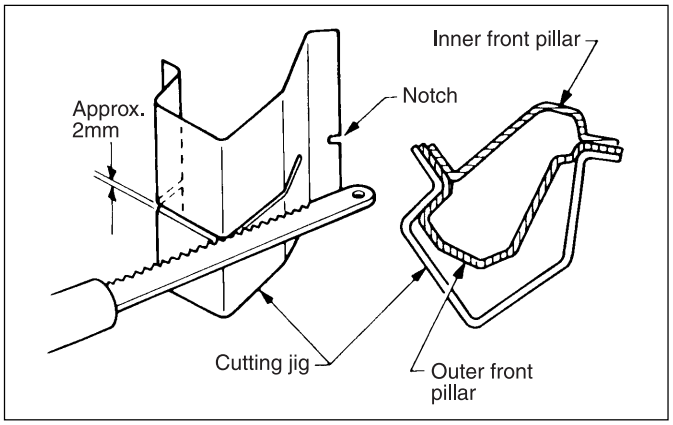
- Front pillar butt joint can be determined anywhere within shaded area as shown in the figure.
  The best location for the butt joint is at position A due to the construction of the vehicle.



- Determine cutting position and record distance from location cutout. Use this distance when cutting service part. Cut outer front pillar 60 mm above inner front pillar cut position.

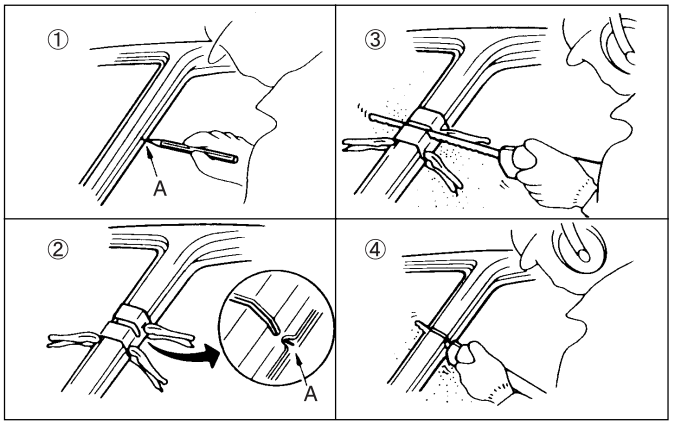


- Prepare a cutting jig to make outer pillar easier to cut. Also, this will permit service part to be accurately cut at joint position.



- An example of cutting operation using a cutting jig is as follows:

① Mark cutting lines.
  A: Cut position of outer pillar
  B: Cut position of inner pillar
② Align cutting line with notch on jig. Clamp jig to pillar.
③ Cut outer pillar along groove of jig. (At position A)
④ Remove jig and cut remaining portions.
⑤ Cut inner pillar at position B in same manner.



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BRAKE SYSTEM

SECTION BR

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

NFBR0127

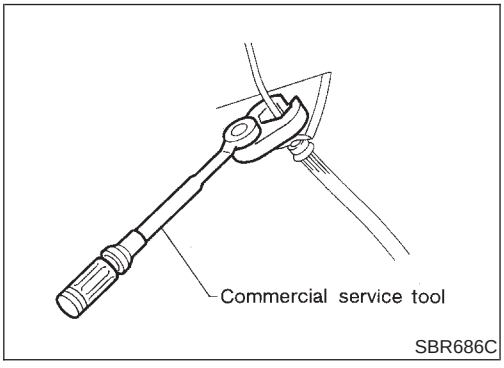
The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER” used along with a seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. The SRS system composition which is available to NISSAN MODEL A33 is as follows:

- For a frontal collision
  The Supplemental Restraint System consists of driver air bag module (located in the center of the steering wheel), front passenger air bag module (located on the instrument panel on passenger side), seat belt pre-tensioners, a diagnosis sensor unit, crash zone sensor, warning lamp, wiring harness and spiral cable.
- For a side collision
  The Supplemental Restraint System consists of front side air bag module (located in the outer side of front seat), satellite sensor, diagnosis sensor unit (one of components of air bags for a frontal collision), wiring harness, warning lamp (one of components of air bags for a frontal collision).

Information necessary to service the system safely is included in the **RS 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 should be performed by an authorized NISSAN 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 RS 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 harness connector.**



Precautions for Brake System

NFBR0002

- **Recommended fluid is brake fluid “DOT 3”.**
- **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 torque brake lines when installing.**
- **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 “Brake Burnishing Procedure”, “ON-VEHICLE SERVICE”, BR-8.

WARNING:

- **Clean brake pads and shoes with a waste cloth, then wipe with a dust collector.**

Wiring Diagrams and Trouble Diagnosis

NFBR0003

When you read wiring diagrams, refer to the following:

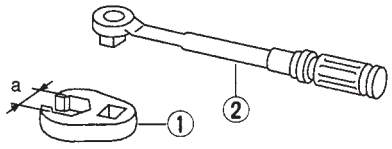
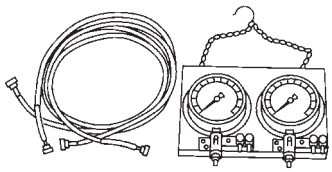
- “HOW TO READ WIRING DIAGRAMS” in GI section
- “POWER SUPPLY ROUTING” for power distribution circuit in EL section

When you perform trouble diagnosis, refer to the following:

- “HOW TO FOLLOW TEST GROUP IN TROUBLE DIAGNOSIS” in GI section
- “HOW TO PERFORM EFFICIENT DIAGNOSIS FOR AN ELECTRICAL INCIDENT” in GI section
- For trouble diagnoses of models with ABS, refer to BR-39.
- For trouble diagnoses of models with TCS, refer to BR-86.

Commercial Service Tools

NFBR0004

Tool name	Description	
1 Flare nut crowfoot 2 Torque wrench	 NT360	Removing and installing each brake piping **a: 10 mm (0.39 in)**
Brake fluid pressure gauge	 NT151	Measuring brake fluid pressure

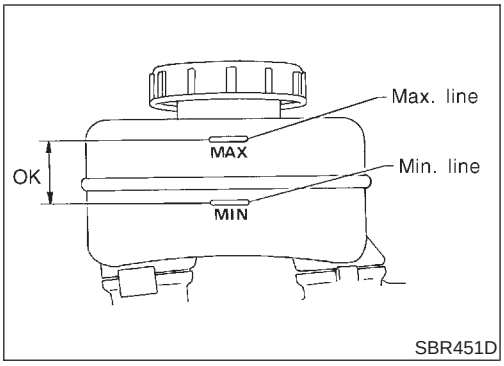
NVH Troubleshooting Chart

NFBR0005S01

Use the chart below to help you find the cause of the symptom. If necessary, repair or replace these parts.

Reference page			BR-23, 27	BR-23, 27	BR-23, 27	—	—	BR-25, 31	—	—	—	BR-26, 32	NVH in AX section	NVH in AX section	NVH in SU section	NVH in SU section	NVH in SU section	NVH in ST section
Possible cause and SUSPECTED PARTS			Pads - damaged	Pads - uneven wear	Shims damaged	Rotor imbalance	Rotor damage	Rotor runout	Rotor deformation	Rotor deflection	Rotor rust	Rotor thickness variation	DRIVE SHAFT	AXLE	SUSPENSION	TIRES	ROAD WHEEL	STEERING
Symptom	BRAKE	Noise	X	X	X								X	X	X	X	X	X
		Shake				X							X	X	X	X	X	X
		Shimmy, Judder				X	X	X	X	X	X	X		X	X	X	X	X

X: Applicable

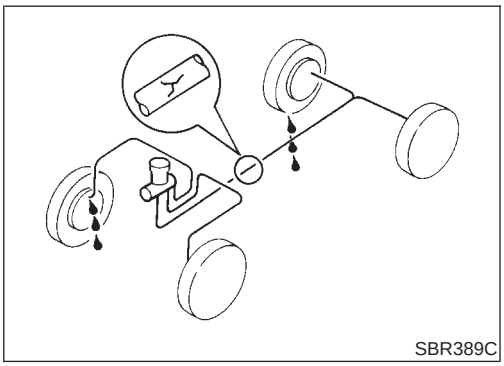


SBR451D

Checking Brake Fluid Level

NFBR0006

- Check fluid level in reservoir tank. It should be between Max and Min lines on reservoir tank.
- If fluid level is extremely low, check brake system for leaks.
- Release parking brake lever and see if brake warning lamp goes off. If not, check brake system for leaks.


SBR389C

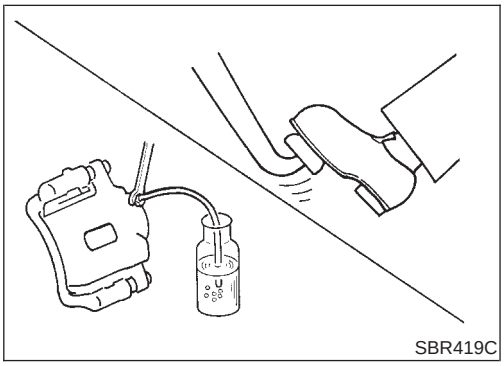
Checking Brake Line

NFBR0007

CAUTION:

If leakage occurs around joints, retighten or, if necessary, replace damaged parts.

1. Check brake lines (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.


SBR419C

Changing Brake Fluid

NFBR0008

CAUTION:

- **Refill with new brake fluid “DOT 3”.**
- **Always keep fluid level higher than minimum line on reservoir tank.**
- **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. Clean inside of reservoir tank, and refill with new brake fluid.
2. Connect a vinyl tube to each air bleeder valve.
3. Drain brake fluid from each air bleeder valve by depressing brake pedal.
4. Refill until brake fluid comes out of each air bleeder valve. Use same procedure as in bleeding hydraulic system to refill brake fluid. Refer to “Bleeding Brake System”, BR-9.

Brake Burnishing Procedure

NFBR0036

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.

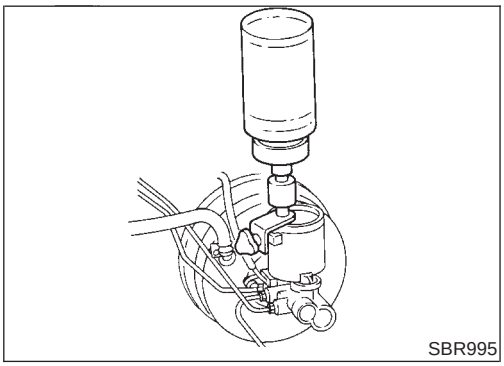
CAUTION:

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 (31 MPH).
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.

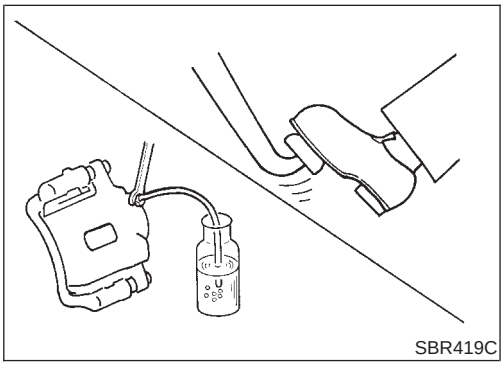

SBR995

Bleeding Brake System

NFBR0009

CAUTION:

- **Carefully monitor brake fluid level at master cylinder during bleeding operation.**
- **Fill reservoir with new brake fluid "DOT 3". Make sure it is full at all times while bleeding air out of system.**
- **Place a container under master cylinder to avoid spillage of brake fluid.**
- **For models with ABS, turn ignition switch OFF and disconnect ABS actuator connectors or battery ground cable.**


SBR419C

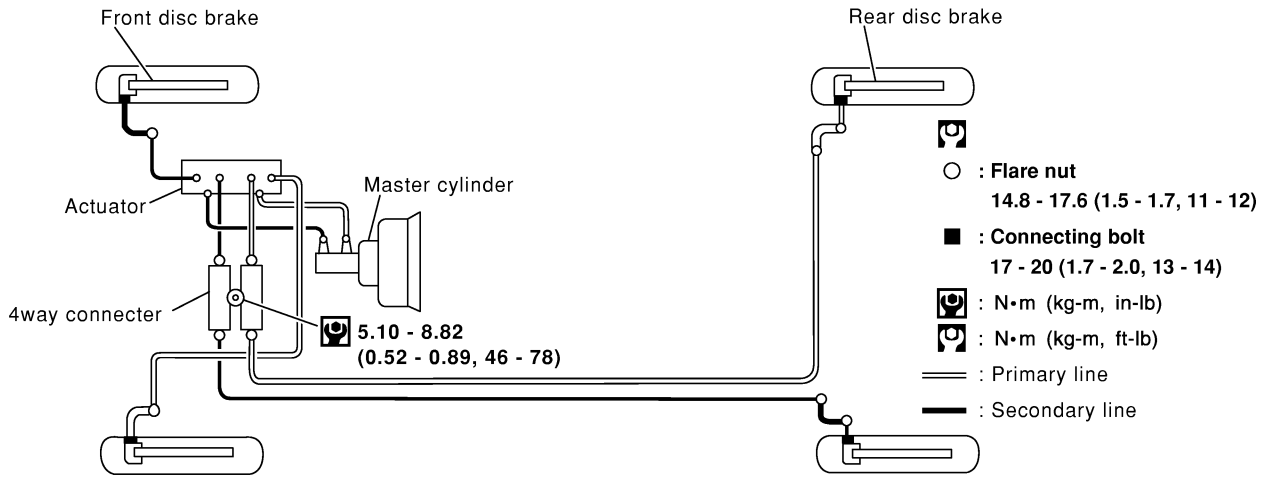
- Bleed air in the following order.
  Right rear brake → Left front brake → Left rear brake → Right front brake

1. Connect a transparent vinyl tube to air bleeder valve.
2. Fully depress brake pedal several times.
3. With brake pedal depressed, open air bleeder valve to release air.
4. Close air bleeder valve.
5. Release brake pedal slowly.
6. Repeat steps 2. through 5. until clear brake fluid comes out of air bleeder valve.

Hydraulic Circuit

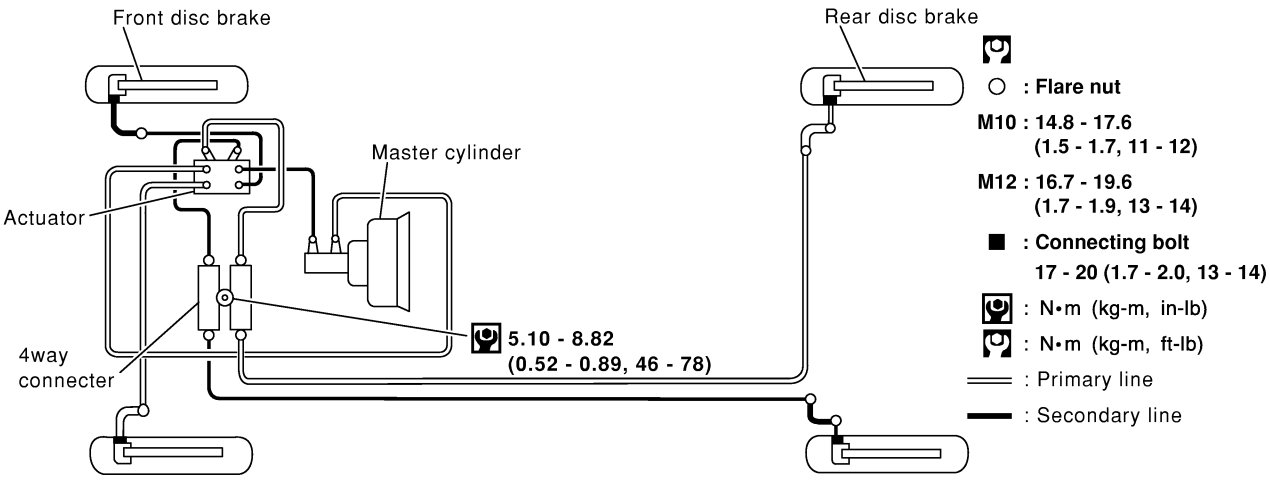
NFBR0010

Without TCS

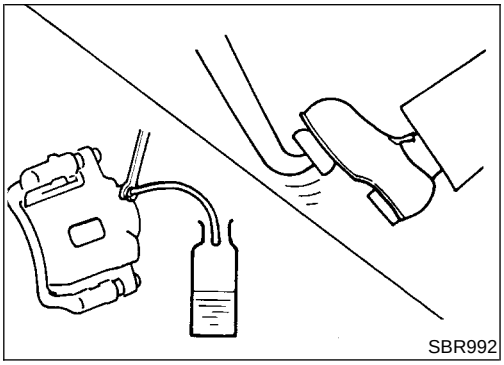


SBR896E

With TCS



SBR885E



SBR992

Removal

NFBR0011

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 hoses must be free from excessive bending, twisting and pulling.**

1. Connect vinyl tube to air bleeder valve.
2. Drain brake fluid from each air bleeder valve by depressing brake pedal.

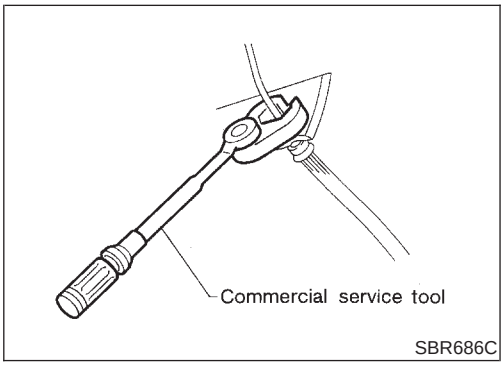
Removal (Cont'd)

3. Remove flare nut connecting brake tube and hose, then withdraw lock spring.
4. Cover openings to prevent entrance of dirt whenever disconnecting brake line.

Inspection

NFBR0012

Check brake lines (tubes and hoses) for cracks, deterioration or other damage. Replace any damaged parts.



SBR686C

Installation

NFBR0013

CAUTION:

- **Refill with new brake fluid "DOT 3".**
- **Never reuse drained brake fluid.**

1. Tighten all flare nuts and connecting bolts.

Specification:

Flare nut

M10: 14.8 - 17.6 N·m (1.5 - 1.7 kg-m, 11 - 12 ft-lb)

M12: 16.7 - 19.6 N·m (1.7 - 1.9 kg-m, 13 - 14 ft-lb)

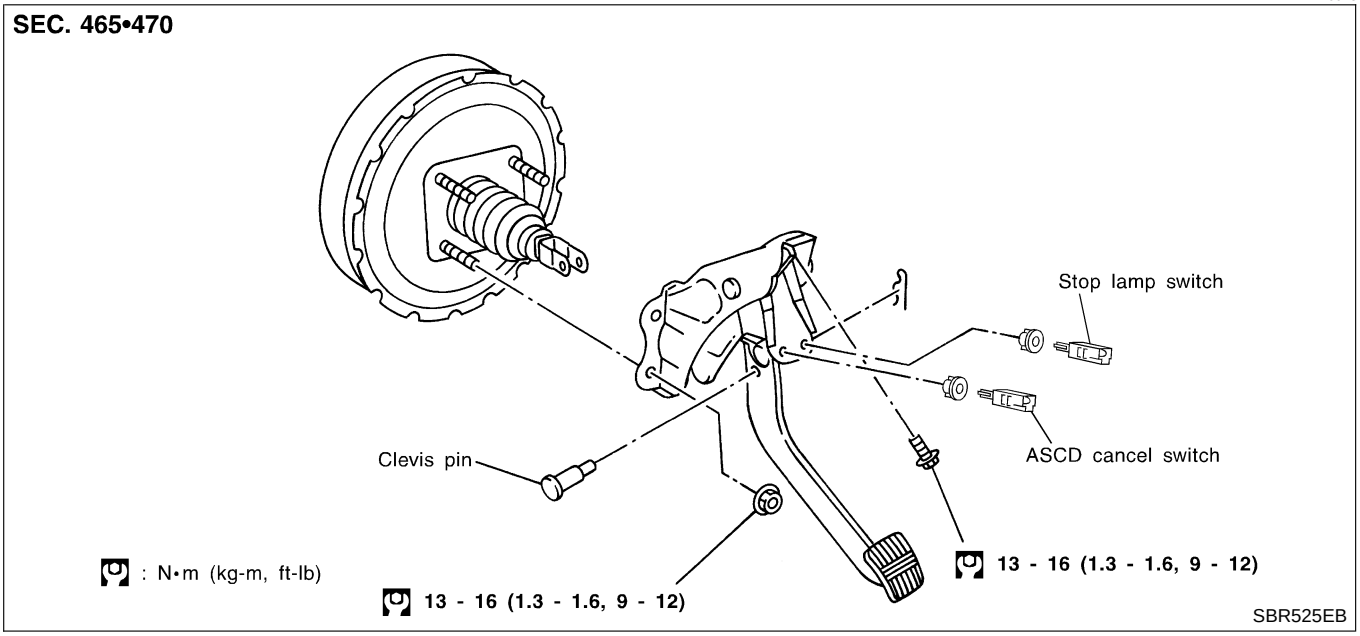
Connecting bolt

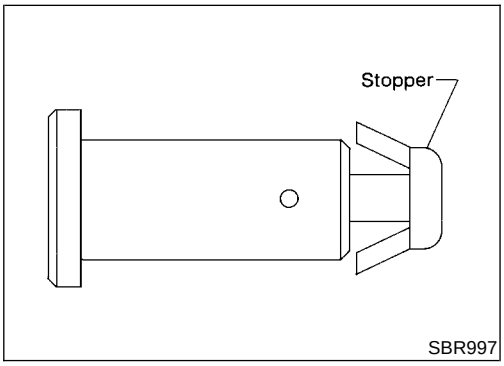
17 - 20 N·m (1.8 - 2.0 kg-m, 13 - 14 ft-lb)

2. Refill until new brake fluid comes out of each air bleeder valve.
3. Bleed air. Refer to "Bleeding Brake System", BR-9.

Removal and Installation

NFBR0015



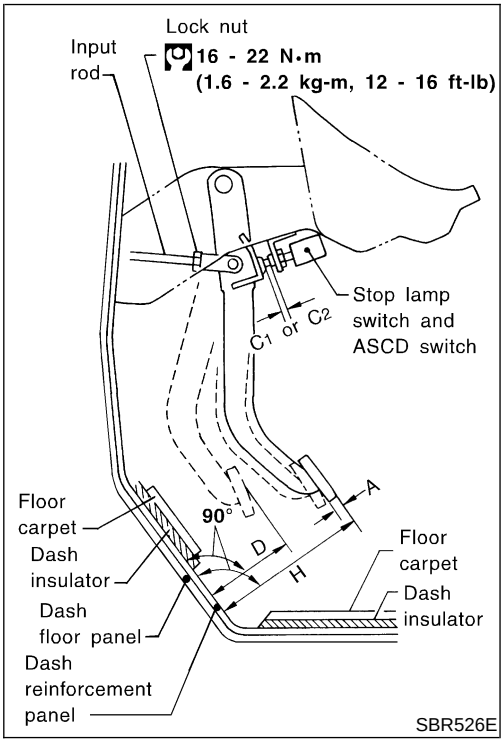


Inspection

NFBR0016

Check brake pedal for following items.

- Brake pedal bend
- Clevis pin deformation
- Crack of any welded portion
- Crack or deformation of clevis pin stopper



Adjustment

NFBR0017

Check brake pedal free height from metal panel. Adjust if necessary.

H: Free height

Refer to SDS, BR-140.

C_1, C_2: Clearance between pedal stopper and threaded end of stop lamp switch and ASCD switch

0.74 - 1.96 mm (0.0291 - 0.0772 in)

D: Depressed height

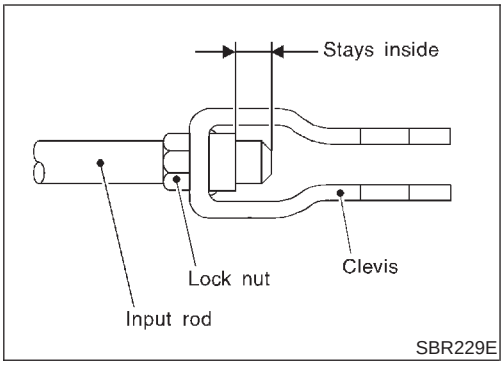
82.5 mm (3.248 in)

Under force of 490 N (50 kg, 110 lb) with engine running.

A: Pedal play

3 - 11 mm (0.12 - 0.43 in)

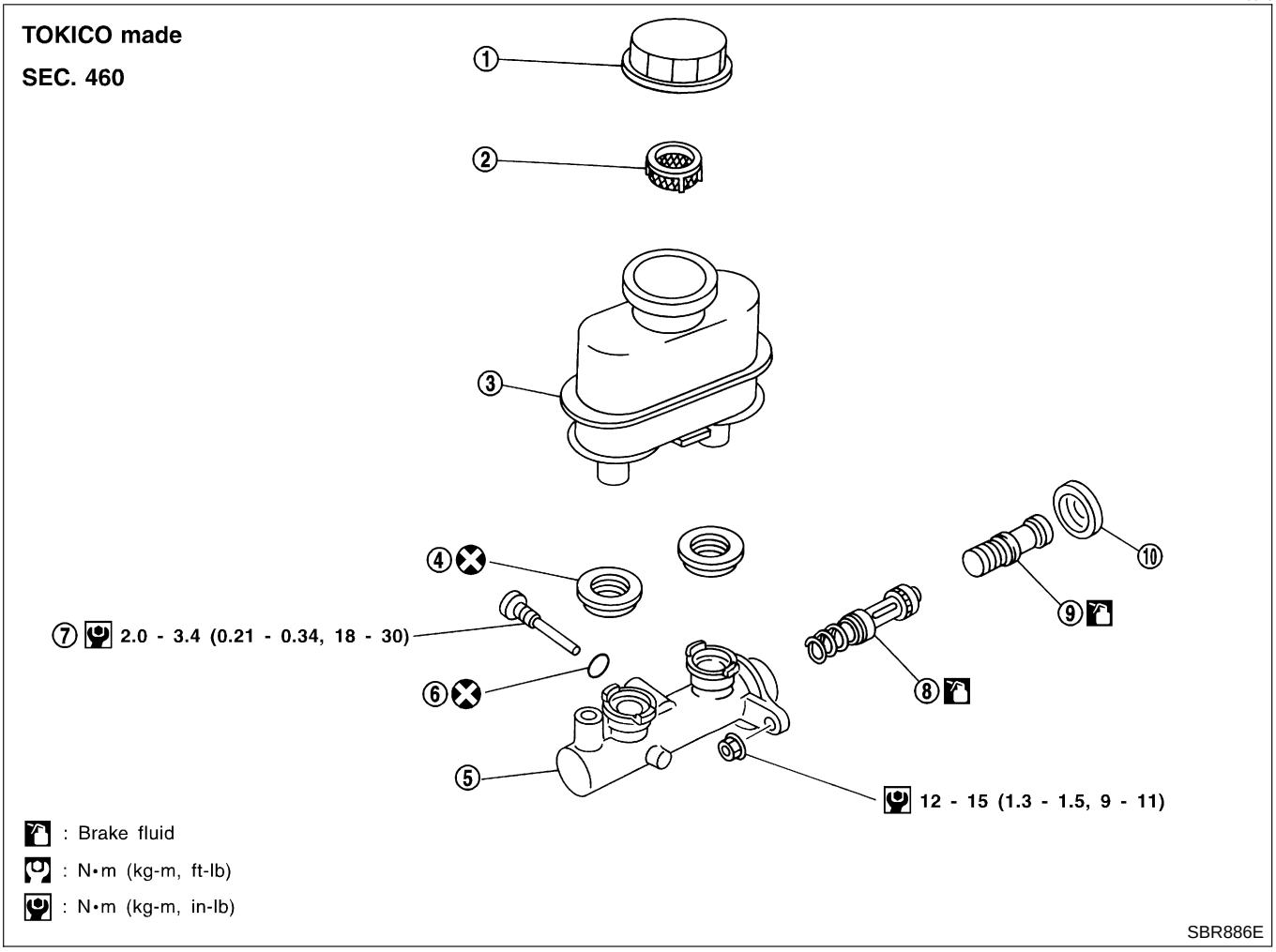
Adjustment (Cont'd)



1. Loosen lock nut and adjust pedal free height by turning brake booster input rod. Then tighten lock nut.
2. Check pedal free play.
   Make sure that stop lamps go off when pedal is released.
3. Check brake pedal's depressed height while engine is running. If lower than specification, check brake system for leaks, accumulation of air or any damage to components (master cylinder, wheel cylinder, etc.); then make necessary repairs.

Removal

NFBR0018

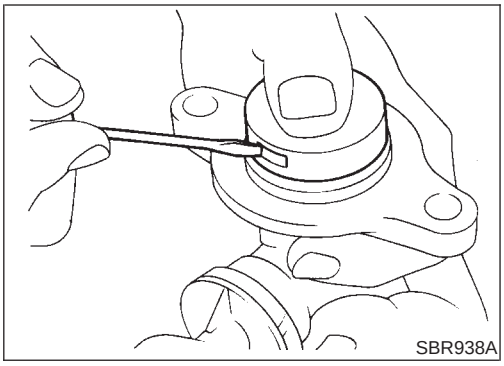


1. Reservoir cap
2. Oil filter
3. Reservoir tank
4. Seal
5. Cylinder body
6. O-ring
7. Piston stopper
8. Secondary piston assembly
9. Primary piston assembly
10. Stopper cap

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.

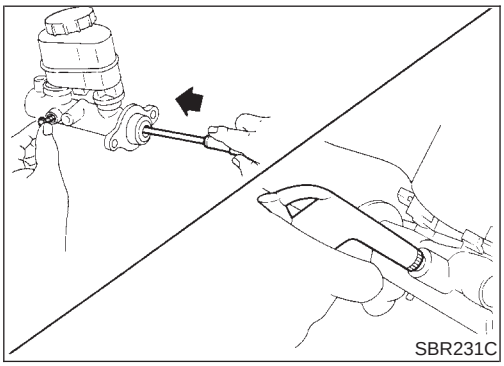
1. Connect a vinyl tube to air bleeder valve.
2. Drain brake fluid from each air bleeder valve, depressing brake pedal to empty fluid from master cylinder.
3. Remove brake pipe flare nuts.
4. Remove master cylinder mounting nuts.


SBR938A

Disassembly

NFBR0019

1. Bend claws of stopper cap outward and remove stopper cap.


SBR231C

2. Remove valve stopper while piston is pushed into cylinder.
3. Remove piston assemblies.
   If it is difficult to remove secondary piston assembly, gradually apply compressed air through fluid outlet.
4. Draw out reservoir tank.

Inspection

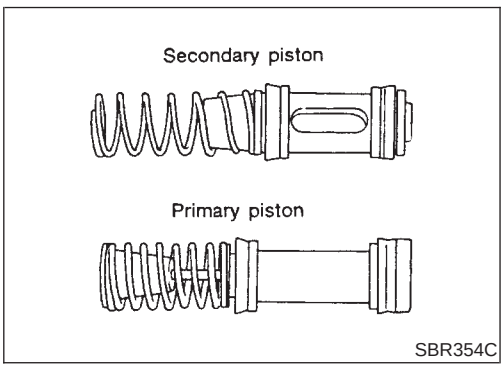
NFBR0020

Check for the following items.
Replace any part if damaged.
Master cylinder:

- Pin holes or scratches on inner wall.

Piston:

- Deformation of or scratches on piston cups.

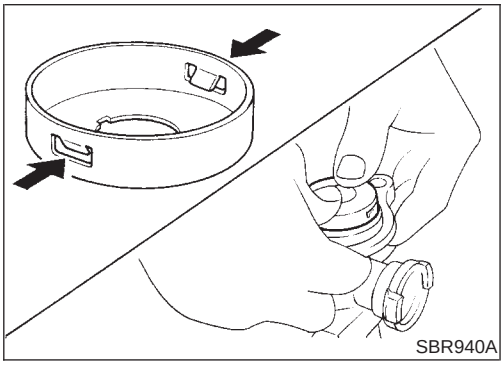


SBR354C

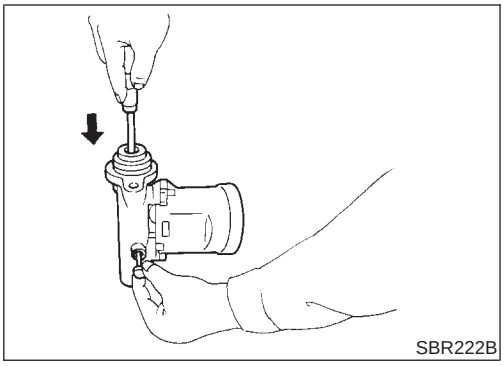
Assembly

NFBR0021

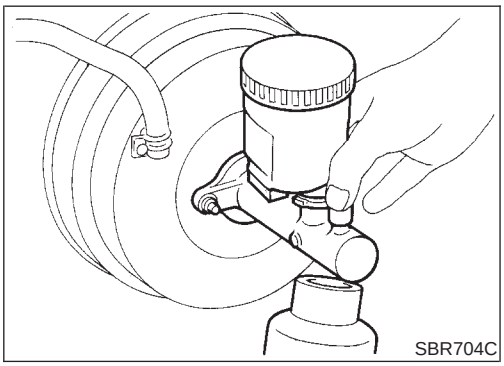
1. Insert secondary piston assembly. Then insert primary piston assembly.
   - Pay attention to alignment of secondary piston slit with valve stopper mounting hole of cylinder body.


SBR940A

2. Install stopper cap.
   Before installing stopper cap, ensure that claws are bent inward.
3. Push reservoir tank seals into cylinder body.
4. Push reservoir tank into cylinder body.


SBR222B

5. Install valve stopper while piston is pushed into cylinder.


SBR704C

Installation

NFBR0022

CAUTION:

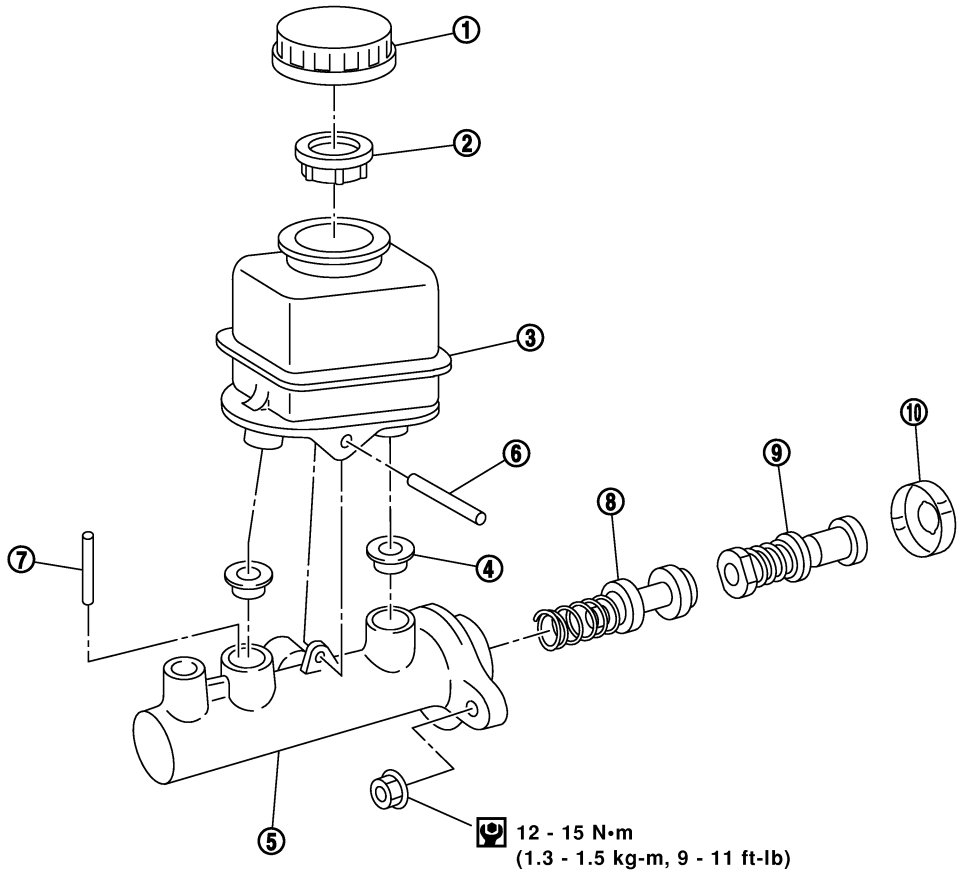
- **Refill with new brake fluid "DOT 3".**
- **Never reuse drained brake fluid.**

1. Place master cylinder onto brake booster and secure mounting nuts lightly.
2. Torque mounting nuts.
   : 12 - 15 N·m (1.3 - 1.5 kg-m, 9 - 11 ft-lb)
3. Fill up reservoir tank with new brake fluid.
4. Plug all ports on master cylinder with fingers to prevent air suction while releasing brake pedal.
5. Have driver depress brake pedal slowly several times until no air comes out of master cylinder.
6. Fit brake lines to master cylinder.
7. Tighten flare nuts.
   M10: 14.8 - 17.6 N·m (1.5 - 1.7 kg-m, 11 - 12 ft-lb)
   M12: 16.7 - 19.6 N·m (1.7 - 1.9 kg-m, 13 - 14 ft-lb)
8. Bleed air from brake system. Refer to "Bleeding Brake System", BR-9.

Removal

NFBR0095

BOSCH (NABCO) made
SEC. 460

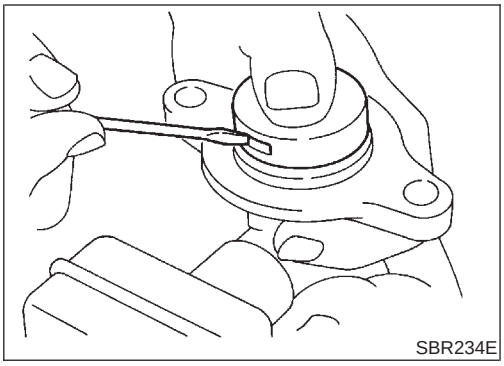


SBR976E

1. Reservoir cap
2. Oil filter
3. Reservoir tank
4. Seal
5. Cylinder body
6. Spring pin
7. Piston stopper pin
8. Secondary piston assembly
9. Primary piston assembly
10. Stopper cap

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.

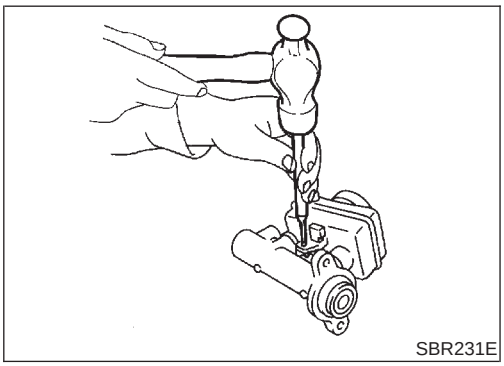
1. Connect a vinyl tube to air bleeder valve.
2. Drain brake fluid from each air bleeder valve, depressing brake pedal to empty fluid from master cylinder.
3. Remove brake pipe flare nuts.
4. Remove master cylinder mounting nuts.


SBR234E

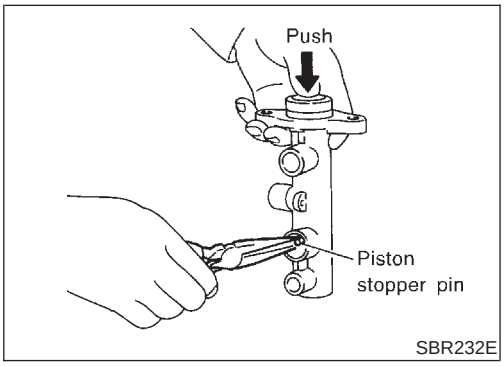
Disassembly

NFBR0096

1. Bend claws of stopper cap outward and remove stopper cap.


SBR231E

2. Drive out spring pin from cylinder body.
3. Draw out reservoir tank and seals.



SBR232E

4. Remove piston stopper pin while piston is pushed into cylinder.
5. Remove piston assemblies.
   If it is difficult to remove secondary piston assembly, gradually apply compressed air through fluid outlet.

Inspection

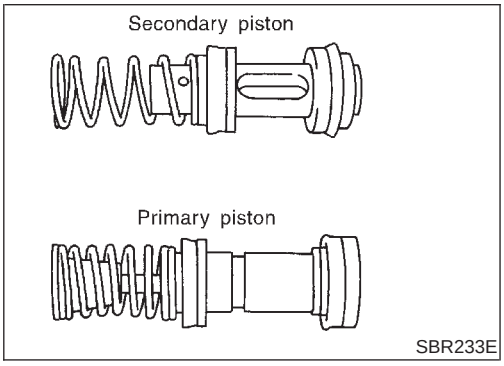
NFBR0097

Check for the following items.
Replace any part if damaged.
Master cylinder:

- Pin holes or scratches on inner wall.

Piston:

- Deformation of or scratches on piston cups.



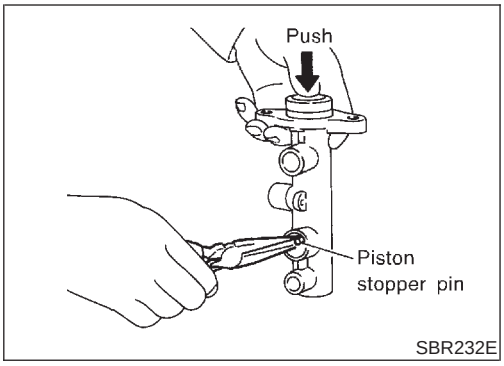
SBR233E

Assembly

NFBR0098

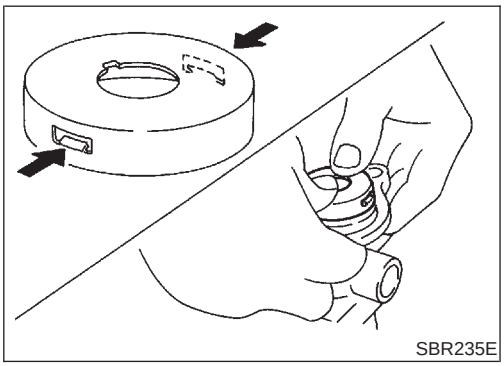
1. Insert secondary piston assembly. Then insert primary piston assembly.

- **Pay attention to alignment of secondary piston slit with valve stopper mounting hole of cylinder body.**



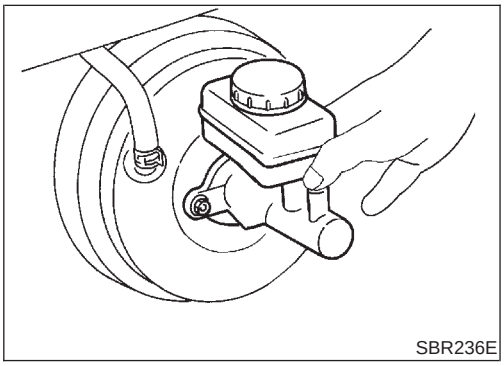
SBR232E

2. Install piston stopper pin while piston is pushed into cylinder.
3. Push reservoir tank seals and reservoir tank into cylinder body.
4. Install spring pin.


SBR235E

5. Install stopper cap.

Before installing stopper cap, ensure that claws are bent inward.


SBR236E

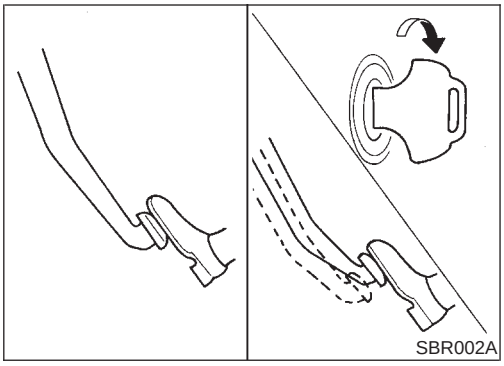
Installation

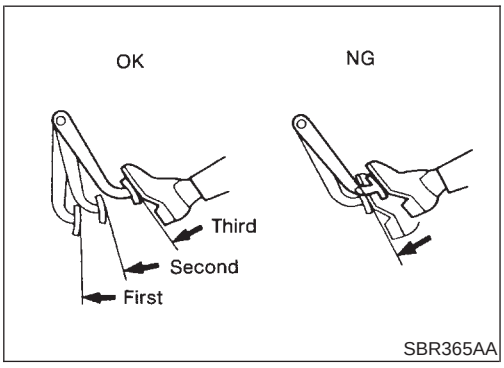
NFBR0099

CAUTION:

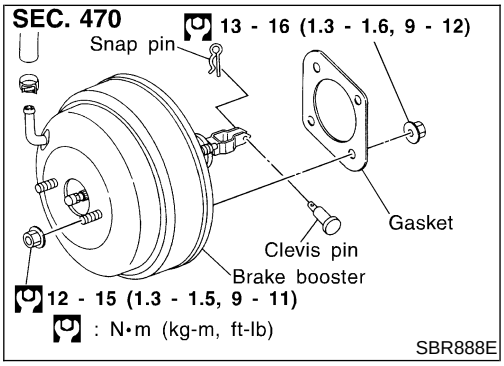
- **Refill with new brake fluid "DOT 3".**
- **Never reuse drained brake fluid.**

1. Place master cylinder onto brake booster and secure mounting nuts lightly.
2. Torque mounting nuts.
   : 12 - 15 N·m (1.3 - 1.5 kg-m, 9 - 11 ft-lb)
3. Fill up reservoir tank with new brake fluid.
4. Plug all ports on master cylinder with fingers to prevent air suction while releasing brake pedal.
5. Have driver depress brake pedal slowly several times until no air comes out of master cylinder.
6. Fit brake lines to master cylinder.
7. Tighten flare nuts.
   M10: 14.8 - 17.6 N·m (1.5 - 1.7 kg-m, 11 - 12 ft-lb)
   M12: 16.7 - 19.6 N·m (1.7 - 1.9 kg-m, 13 - 14 ft-lb)
8. Bleed air from brake system.

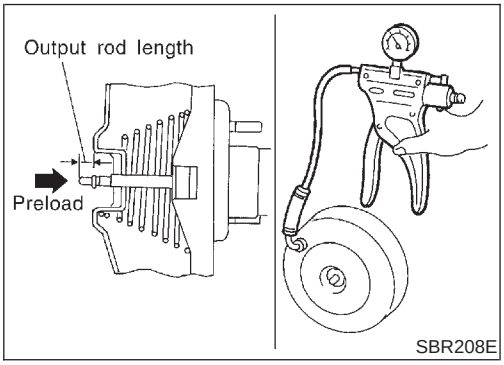

SBR002A



SBR365AA



SBR888E



SBR208E

On-vehicle Service

NFBR0023

OPERATING CHECK

NFBR0023S01

1. Stop engine and depress brake pedal several times. Check that pedal stroke does not change.
2. Depress brake pedal, then start engine. If pedal goes down slightly, operation is normal.

AIRTIGHT CHECK

NFBR0023S02

1. Start engine, and stop it after one or two minutes. Depress brake pedal several times slowly. The pedal should go further down the first time, and then it should gradually rise thereafter.
2. Depress brake pedal while engine is running, and stop engine with pedal depressed. The pedal stroke should not change after holding pedal down for **30 seconds.**

Removal

NFBR0024

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.**
- **Be careful not to deform or bend brake pipes, during removal of booster.**

Inspection

NFBR0025

OUTPUT ROD LENGTH CHECK

NFBR0025S01

1. Apply vacuum of −66.7 kPa (−500 mmHg, −19.69 inHg) to brake booster with a handy vacuum pump.
2. Add preload of 19.6 N (2 kg, 4.4 lb) to output rod.
3. Check output rod length.

Specified length:

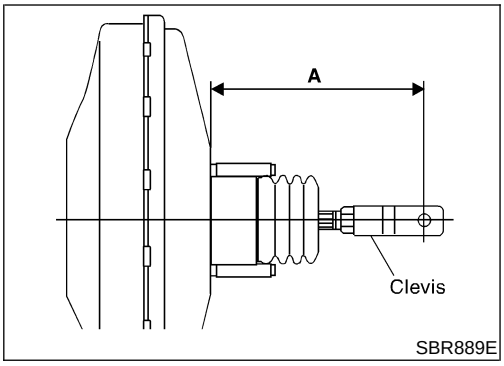
10.275 - 10.525 mm (0.4045 - 0.4144 in)

Installation

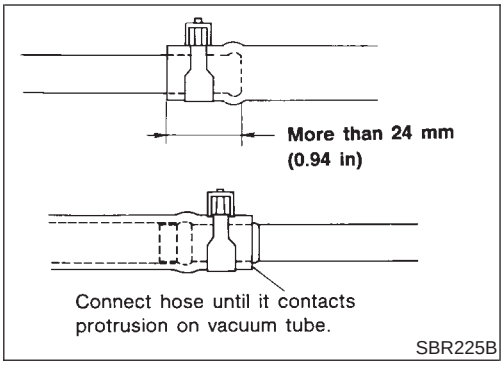
NFBR0026

CAUTION:

- **Be careful not to deform or bend brake pipes, during installation of booster.**
- **Replace clevis pin if damaged.**
- **Refill with new brake fluid “DOT 3”.**
- **Never reuse drained brake fluid.**
- **Take care not to damage brake booster mounting bolt thread when installing. Due to the acute angle of installation, the threads can be damaged with the dash panel.**



1. Before fitting booster, temporarily adjust clevis to dimension "A" shown.
   Specification:
   130 mm (5.12 in)
2. Fit booster, then secure mounting nuts (brake pedal bracket to master cylinder) lightly.
3. Connect brake pedal and booster input rod with clevis pin.
4. Secure mounting nuts.
   Specification:
   15.7 - 21.6 N·m (1.6 - 2.2 kg-m, 12 - 15 ft-lb)
5. Install master cylinder. Refer to "Installation" in "MASTER CYLINDER", BR-16 or BR-19.
6. Bleed air. Refer to "Bleeding Brake System", BR-9.



Removal and Installation

NFBR0027

CAUTION:

When installing vacuum hoses, pay attention to the following points.

- **Do not apply any oil or lubricants to vacuum hose and check valve.**
- **Insert vacuum tube into vacuum hose as shown.**
- **Install check valve, paying attention to its direction.**

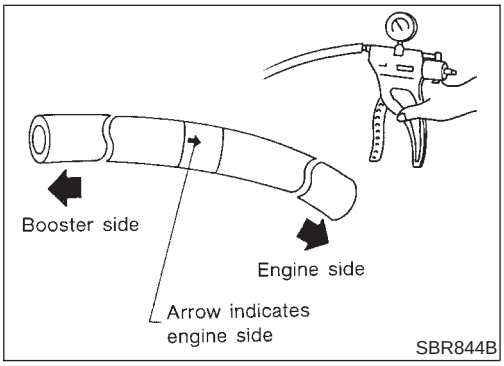
Inspection

NFBR0028

HOSES AND CONNECTORS

NFBR0028S01

Check vacuum lines, connections and check valve for airtightness, improper attachment chafing and deterioration.



CHECK VALVE

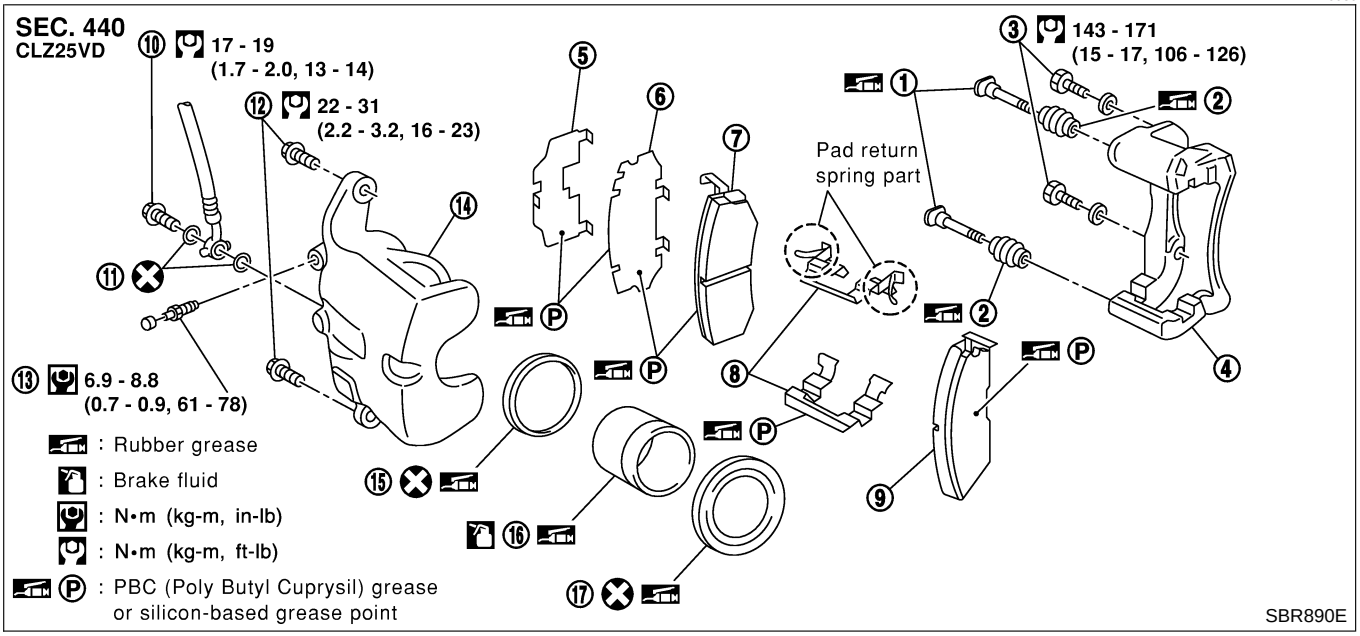
NFBR0028S02

Check vacuum with a vacuum pump.

Connect to booster side	Vacuum should exist.
Connect to engine side	Vacuum should not exist.

Component

NFBR0030



1. Main pin
2. Pin boot
3. Torque member fixing bolt
4. Torque member
5. Shim cover
6. Inner shim
7. Inner pad
8. Pad retainer
9. Outer pad
10. Connecting bolt
11. Copper washer
12. Main pin bolt
13. Bleed valve
14. Cylinder body
15. Piston seal
16. Piston
17. Piston boot

Pad Replacement

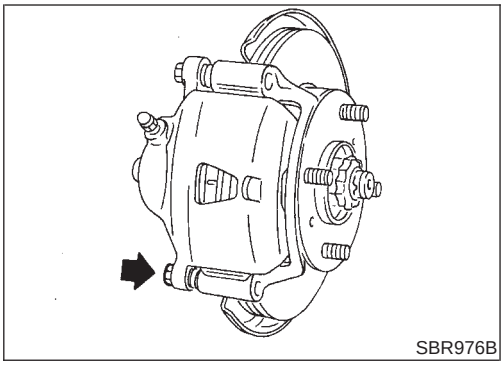
NFBR0029

WARNING:

Clean brake pads with a vacuum dust collector to minimize the hazard of airborne particles or other materials.

CAUTION:

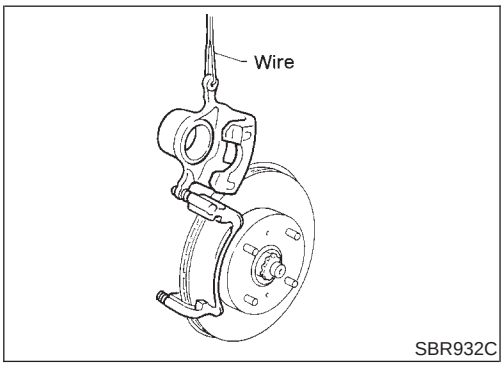
- **When cylinder body is open, do not depress brake pedal because piston will pop out.**
- **Be careful not to damage piston boot or get oil on rotor. Always replace shims when replacing pads.**
- **If shims are rusted or show peeling of the rubber coat, replace them with new shims.**
- **It is not necessary to remove connecting bolt except for disassembly or replacement of caliper assembly. In this case, suspend cylinder body with wire so as not to stretch brake hose.**
- **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 “Brake Burnishing Procedure”, “ON-VEHICLE SERVICE”, BR-8.


SBR976B

1. Remove master cylinder reservoir cap.
2. Remove pin bolt.
3. Open cylinder body upward. Then remove pad with retainers, inner shim.

Standard pad thickness:
9.5 mm (0.374 in)
Pad wear limit:
2.0 mm (0.079 in)

Carefully monitor brake fluid level because brake fluid will return to reservoir when pushing back piston.



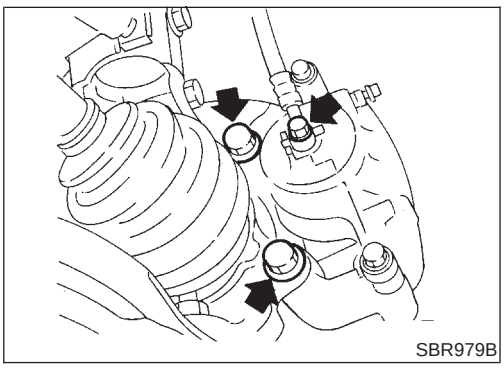
SBR932C

Removal

NFBR0031

WARNING:
Clean brake pads with a vacuum dust collector to minimize the hazard of airborne particles or other materials.

Remove torque member fixing bolts and connecting bolt.
It is not necessary to remove connecting bolt except for disassembly or replacement of caliper assembly. In this case, suspend caliper assembly with wire so as not to stretch brake hose.


SBR979B

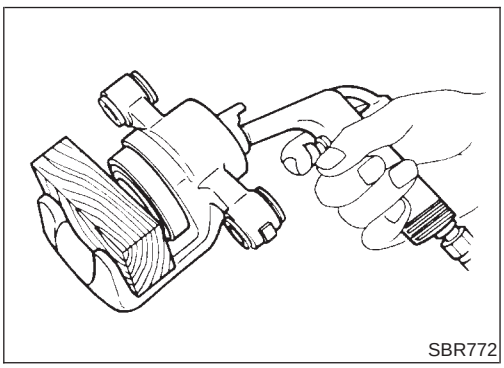
Disassembly

NFBR0032

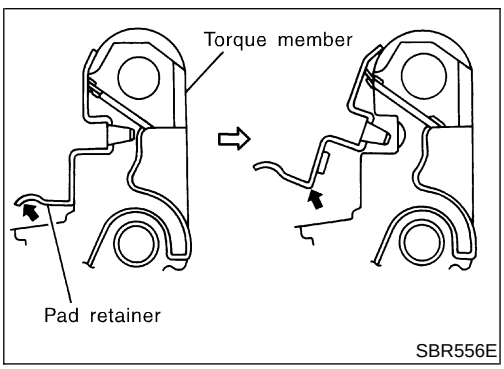
WARNING:
Do not place your fingers in front of piston.

CAUTION:
Do not scratch or score cylinder wall.

1. Push out piston with piston boot with compressed air.
2. Remove piston seal with a suitable tool.


SBR772

CAUTION:
When removing the pad retainer from the torque member, lift it up and out in the direction of the arrows in the figure.



SBR556E

Inspection

NFBR0033

CALIPER

NFBR0033S01

Cylinder Body

NFBR0033S0101

- Check inside surface of cylinder for score, rust, wear, damage or presence of foreign materials. If any of the above conditions are observed, replace cylinder body.
- Minor damage from rust or foreign materials may be eliminated by polishing surface with a fine emery paper. Replace cylinder body if necessary.

CAUTION:
Use brake fluid to clean. Never use mineral oil.

Piston

NFBR0033S0102

CAUTION:
Piston sliding surface is plated. Do not polish with emery paper even if rust or foreign materials are stuck to sliding surface.

Check piston for score, rust, wear, damage or presence of foreign materials. Replace if any of the above conditions are observed.

Slide Pin, Pin Bolt and Pin Boot

NFBR0033S0103

Check for wear, cracks or other damage. Replace if any of the above conditions are observed.

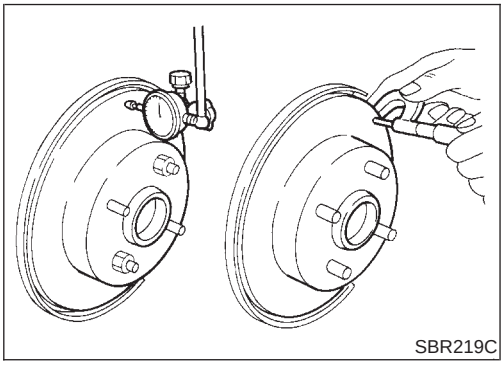
ROTOR

NFBR0033S02

Rubbing Surface

NFBR0033S0201

Check rotor for roughness, cracks or chips.


SBR219C

Runout

NFBR0033S0202

1. Secure rotor to wheel hub with at least two nuts (M12 x 1.25).
2. Check runout using a dial indicator.
   Make sure that wheel bearing axial end play is within the specifications before measuring. Refer to AX section (“Front Wheel Bearing”, “ON-VEHICLE SERVICE”).
   Maximum runout:
   0.07 mm (0.0028 in)
3. If the runout is out of specification, find minimum runout position as follows:

a. Remove nuts and rotor from wheel hub.
b. Shift the rotor one hole and secure rotor to wheel hub with nuts.
c. Measure runout.
d. Repeat steps a. to c. so that minimum runout position can be found.

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).

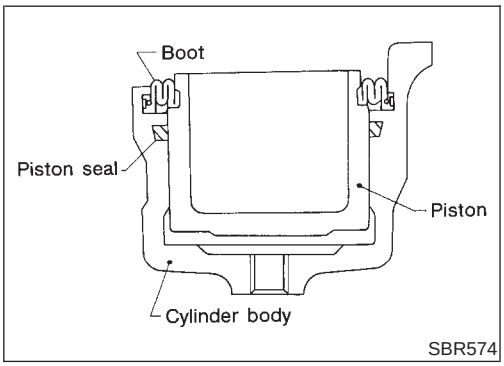
Thickness

NFBR0033S0203

Thickness variation (At least 8 positions):
Maximum 0.01 mm (0.0004 in)

If thickness variation exceeds the specification, turn rotor with on-car brake lathe.

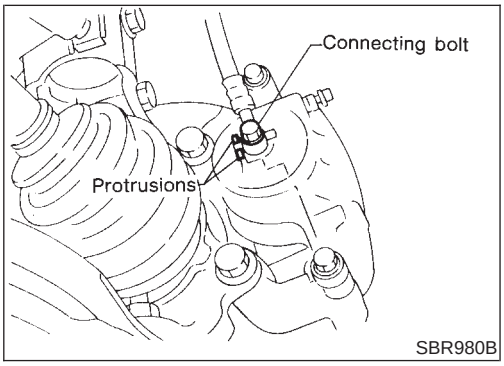
Rotor repair limit:
22.0 mm (0.866 in)



Assembly

NFBR0034

1. Insert piston seal into groove on cylinder body.
2. With piston boot fitted to piston, insert piston boot into groove on cylinder body and install piston.
3. Properly secure piston boot.



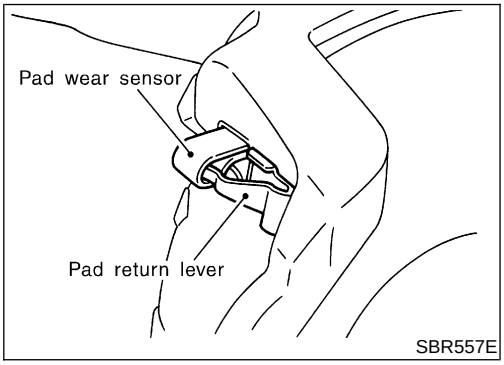
Installation

NFBR0035

CAUTION:

- **Refill with new brake fluid "DOT 3".**
- **Never reuse drained brake fluid.**

1. Install brake hose to caliper securely.
2. Install all parts and secure all bolts.
3. Bleed air. Refer to "Bleeding Brake System", BR-9.

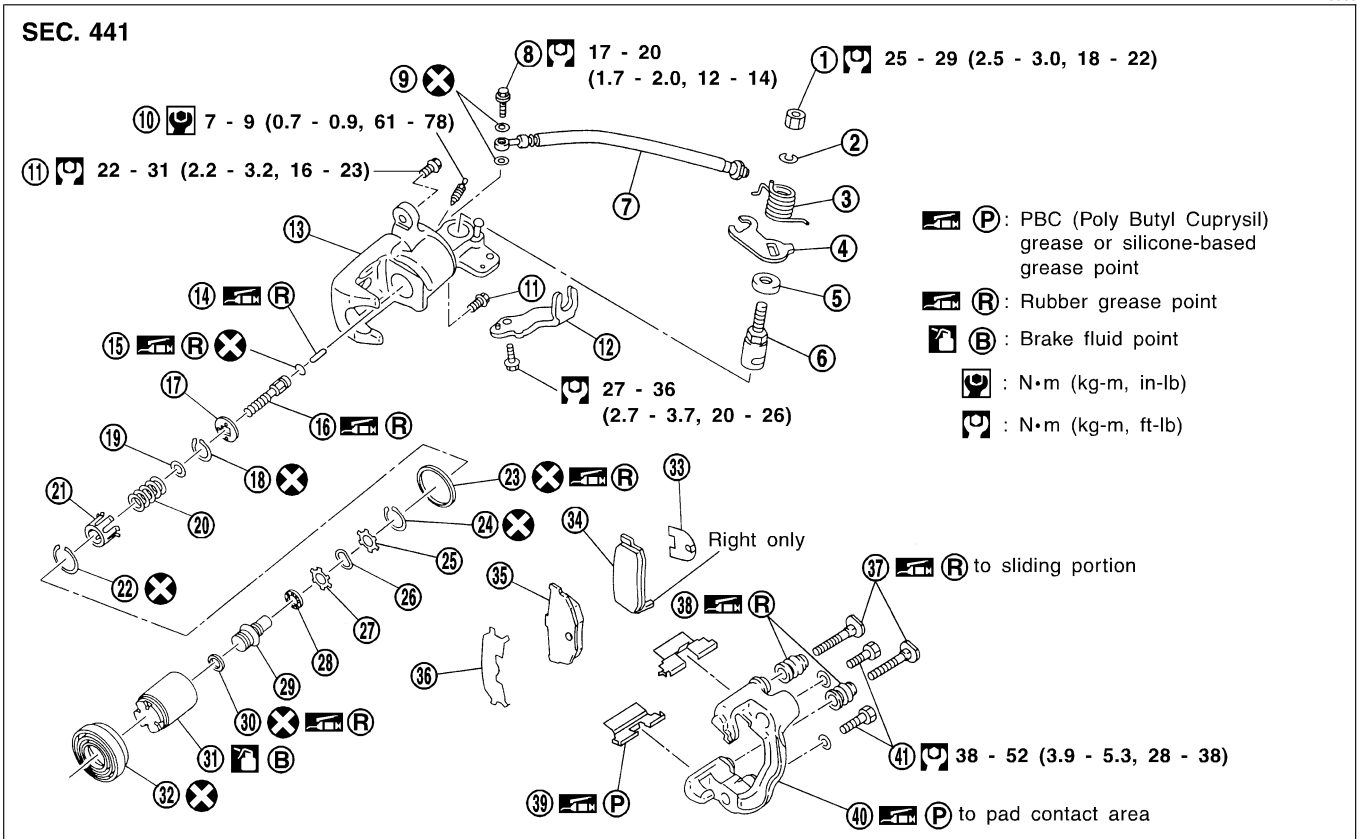


CAUTION:

The upper pad retainer is built so the pad returns to its original position. Be careful to install the pad-return lever securely to the pad wear sensor, as shown in the left figure.

Component

NFBR0038



1. Nut
2. Washer
3. Return spring
4. Toggle lever
5. Cam boot
6. Cam
7. Brake hose
8. Connecting bolt
9. Copper washer
10. Bleed screw
11. Pin bolt
12. Cable mounting bracket
13. Cylinder
14. Strut
15. O-ring
16. Push rod
17. Key plate
18. Ring C
19. Seat
20. Spring
21. Spring cover
22. Ring B
23. Piston seal
24. Ring A
25. Spacer
26. Wave washer
27. Spacer
28. Ball bearing
29. Adjust nut
30. Cup
31. Piston
32. Dust seal
33. Inner shim
34. Inner pad
35. Outer pad
36. Outer shim
37. Pin
38. Pin boot
39. Pad retainer
40. Torque member
41. Torque member fixing bolt

Pad Replacement

NFBR0037

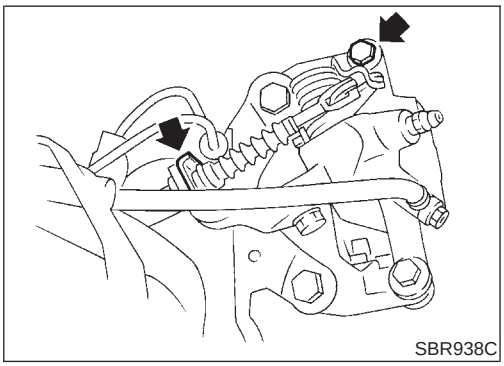
WARNING:

Clean brake pads with a vacuum dust collector to minimize the hazard of airborne particles or other materials.

CAUTION:

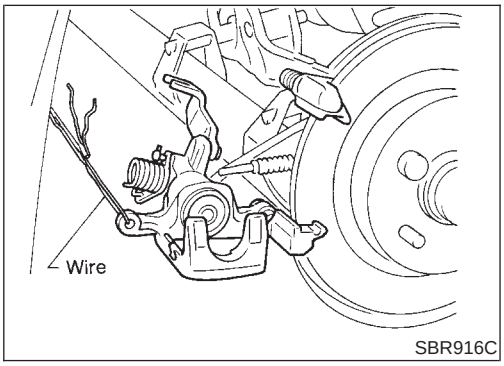
- **When cylinder body is open, do not depress brake pedal because piston will pop out.**
- **Be careful not to damage piston boot or get oil on rotor. Always replace shims in replacing pads.**
- **If shims are rusted or show peeling of rubber coat, replace them with new shims.**

- **It is not necessary to remove connecting bolt except for disassembly or replacement of caliper assembly. In this case, suspend cylinder body with wire so as not to stretch brake hose.**
- **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 "Brake Burnishing Procedure", "ON-VEHICLE SERVICE", BR-8.

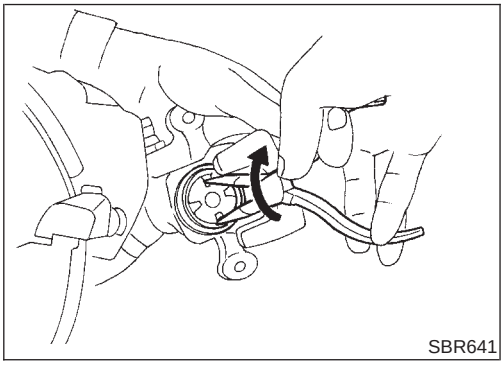

SBR938C

1. Remove master cylinder reservoir cap.
2. Remove brake cable mounting bolt and lock spring.
3. Release parking brake control lever, then disconnect cable from the caliper.
4. Remove upper pin bolt.
5. Open cylinder body downward. Then remove pad with retainers and inner and outer shims.

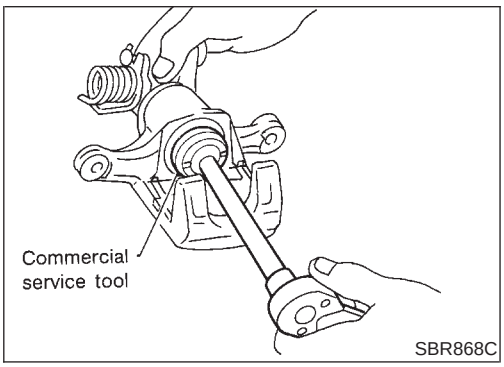
   Standard pad thickness:
   10 mm (0.39 in)
   Pad wear limit:
   1.5 mm (0.059 in)



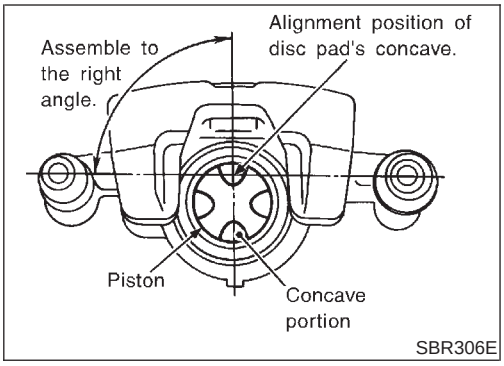
SBR916C


SBR641

6. When installing new pads, push piston into cylinder body by gently turning piston clockwise, as shown.
   Carefully monitor brake fluid level because brake fluid will return to reservoir when pushing back piston.

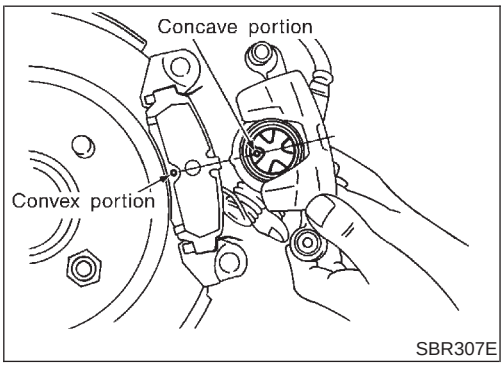


SBR868C



SBR306E

7. Adjust the piston to the right angle as shown in the figure.



SBR307E

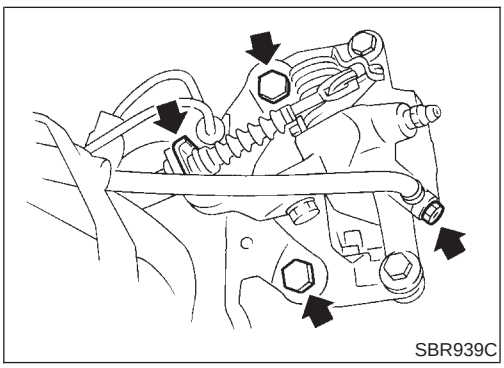
8. As shown in the figure, align the piston's concave portion to the pad's convex portion, then install the cylinder body to the torque member.

Removal

NFBR0039

WARNING:

Clean brake pads with a vacuum dust collector to minimize the hazard of airborne particles or other materials.

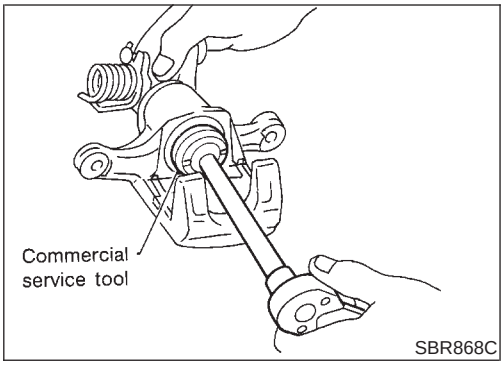

SBR939C

1. Remove brake cable mounting bolt and lock spring.
2. Release parking brake control lever, then disconnect cable from the caliper.
3. Remove torque member fixing bolts and connecting bolt.

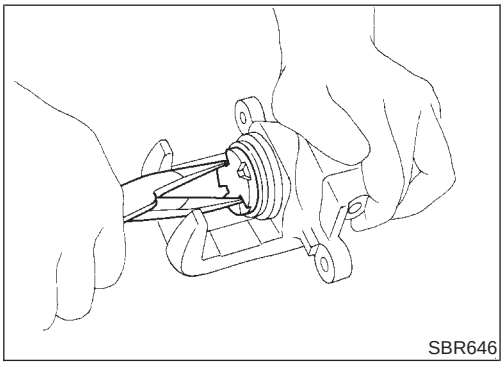
It is not necessary to remove connecting bolt except for disassembly or replacement of caliper assembly. In this case, suspend caliper assembly with wire so as not to stretch brake hose.

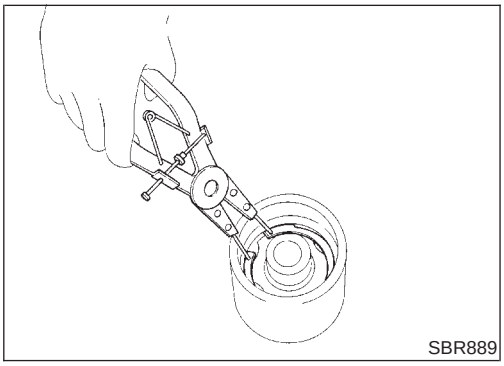
Disassembly

NFBR0040

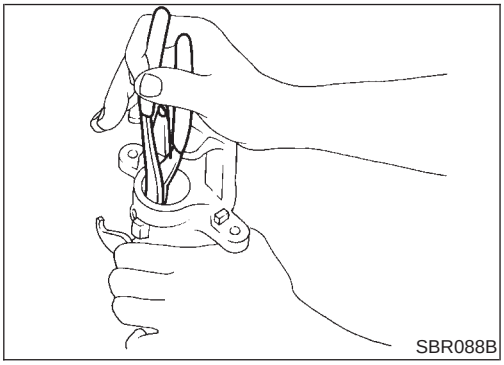


1. Remove piston by turning it counterclockwise with suitable commercial service tool or long nose pliers.





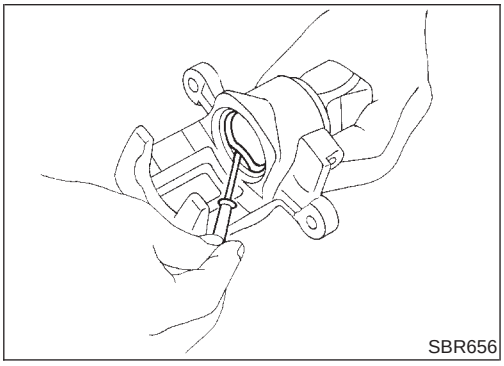
2. Pry off ring A from piston with suitable pliers and remove adjusting nut.



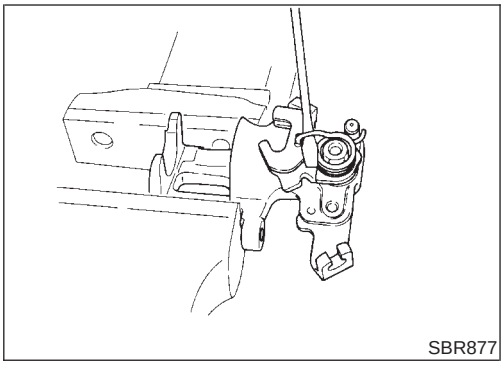
3. Disassemble cylinder body.

a. Pry off ring B with suitable pliers, then remove spring cover, spring and seat.

b. Pry off ring C, then remove key plate, push rod and rod.



c. Remove piston seal.
Be careful not to damage cylinder body.



SBR877

4. Remove return spring, toggle lever and cable guide.

Inspection

NFBR0041

CALIPER

NFBR0041S01

CAUTION:

Use brake fluid to clean cylinder. Never use mineral oil.

Cylinder Body

NFBR0041S0101

- Check inside surface of cylinder for score, rust, wear, damage or presence of foreign materials. If any of the above conditions are observed, replace cylinder body.
- Minor damage from rust or foreign materials may be eliminated by polishing surface with a fine emery paper.
  Replace cylinder body if necessary.

Torque Member

NFBR0041S0102

Check for wear, cracks or other damage. Replace if necessary.

Piston

NFBR0041S0103

CAUTION:

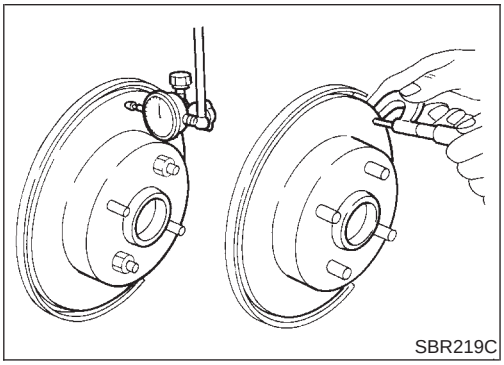
Piston sliding surface is plated. Do not polish with emery paper even if rust or foreign matter is stuck to sliding surface.

Check piston for score, rust, wear, damage or presence of foreign materials.
Replace if any of the above conditions are observed.

Pin and Pin Boot

NFBR0041S0104

Check for wear, cracks or other damage.
Replace if any of the above conditions are observed.



SBR219C

ROTOR

NFBR0041S02

Rubbing Surface

NFBR0041S0201

Check rotor for roughness, cracks or chips.

Runout

NFBR0041S0202

1. Secure rotor to wheel hub with two nuts (M12 x 1.25).
2. Check runout using a dial indicator.

Make sure that axial end play is within the specifications before measuring. Refer to AX section ("REAR WHEEL BEARING", "On-vehicle Service").

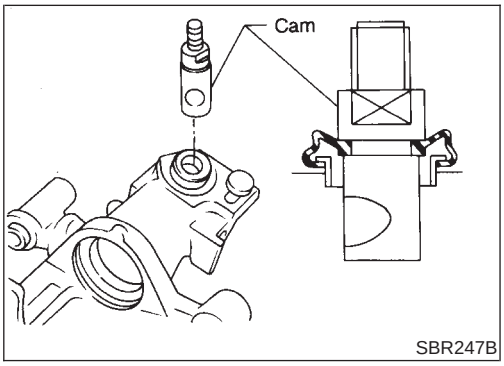
3. Change relative positions of rotor and wheel hub so that runout is minimized.

Maximum runout:
0.07 mm (0.0028 in)

Thickness

NFBR0041S0203

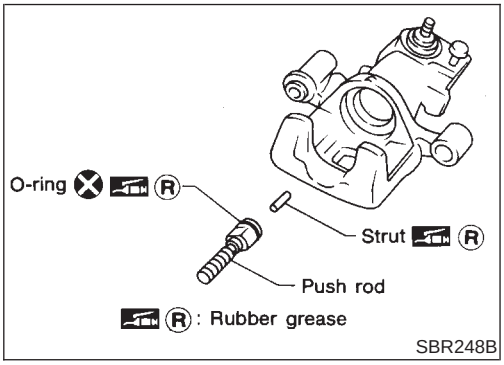
Rotor repair limit:
Standard thickness
9 mm (0.35 in)
Minimum thickness
8 mm (0.315 in)
Thickness variation (At least 8 portions)
Maximum 0.02 mm (0.0008 in)



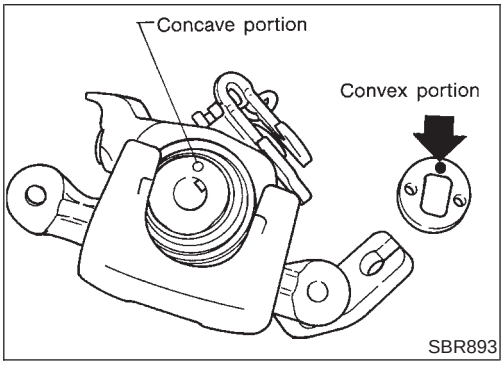
Assembly

NFBR0042

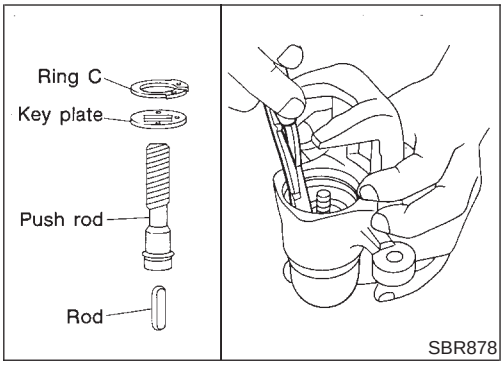
1. Insert cam with depression facing towards open end of cylinder.



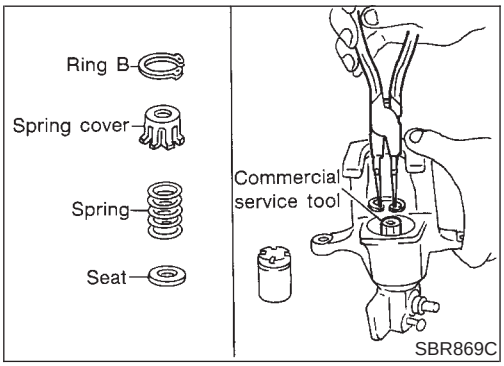
2. Generously apply rubber grease to strut and push rod to make insertion easy.



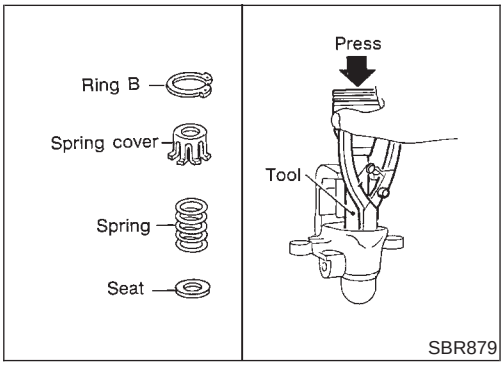
3. Fit push rod into square hole in key plate. Also match convex portion of key plate with concave portion of cylinder.

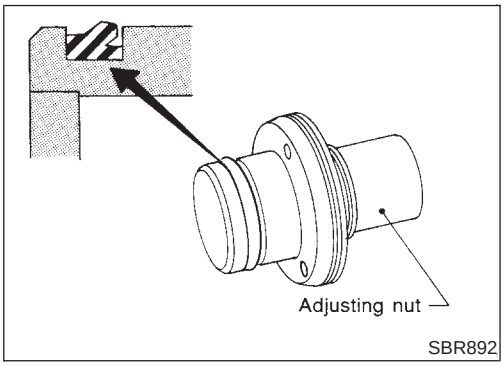


4. Install ring C with a suitable tool.

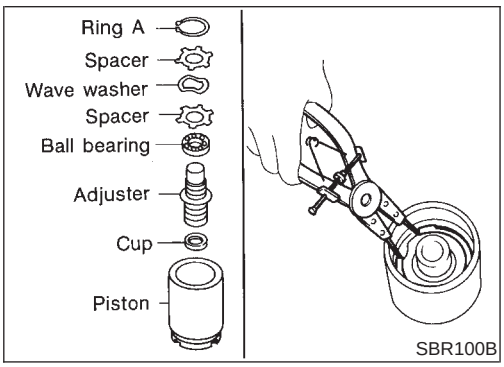


5. Install seat, spring, spring cover and ring B with suitable press and drift.



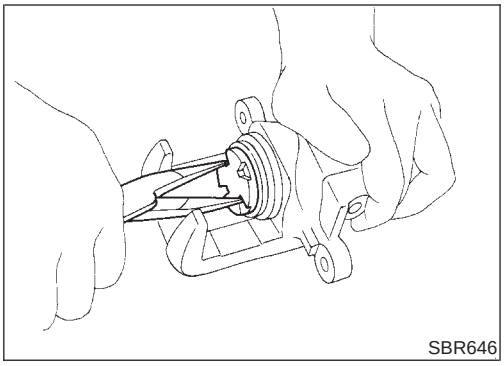


6. Install cup in the specified direction.

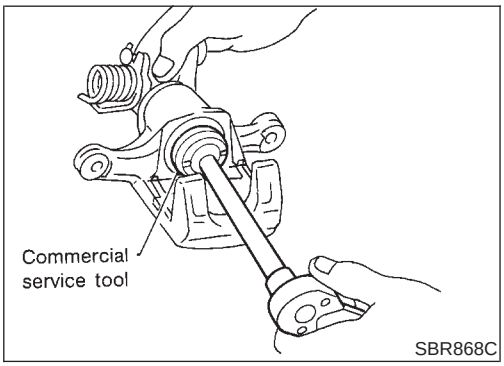


7. Install cup, adjuster, bearing, spacers, washers and ring A with a suitable tool.

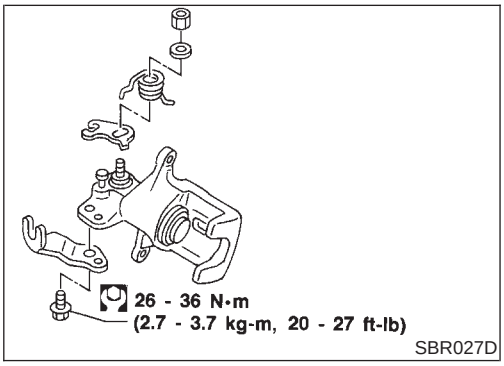
Assembly (Cont'd)


SBR646

8. Insert piston seal into groove on cylinder body.
9. With piston boot fitted to piston, insert piston boot into groove on cylinder body and fit piston by turning it clockwise with long nose pliers, or suitable tool.

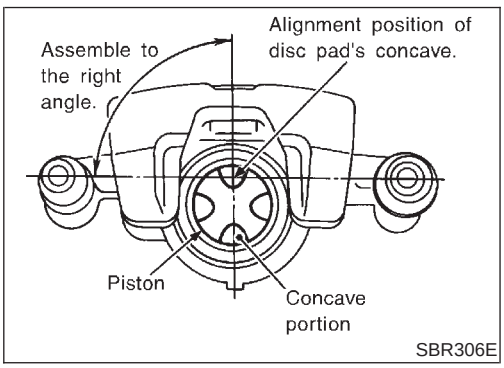


SBR868C



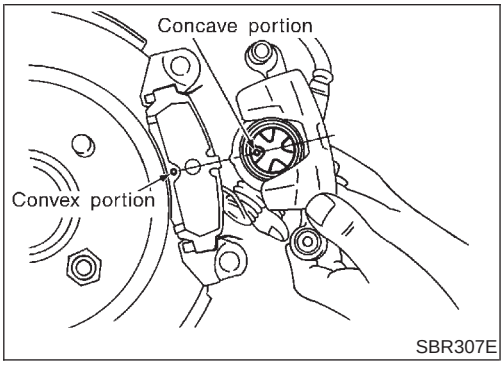
SBR027D

10. Fit toggle lever, return spring and cable guide.



SBR306E

11. Adjust the piston to the right angle as shown in the figure.



SBR307E

Installation

NFBR0043

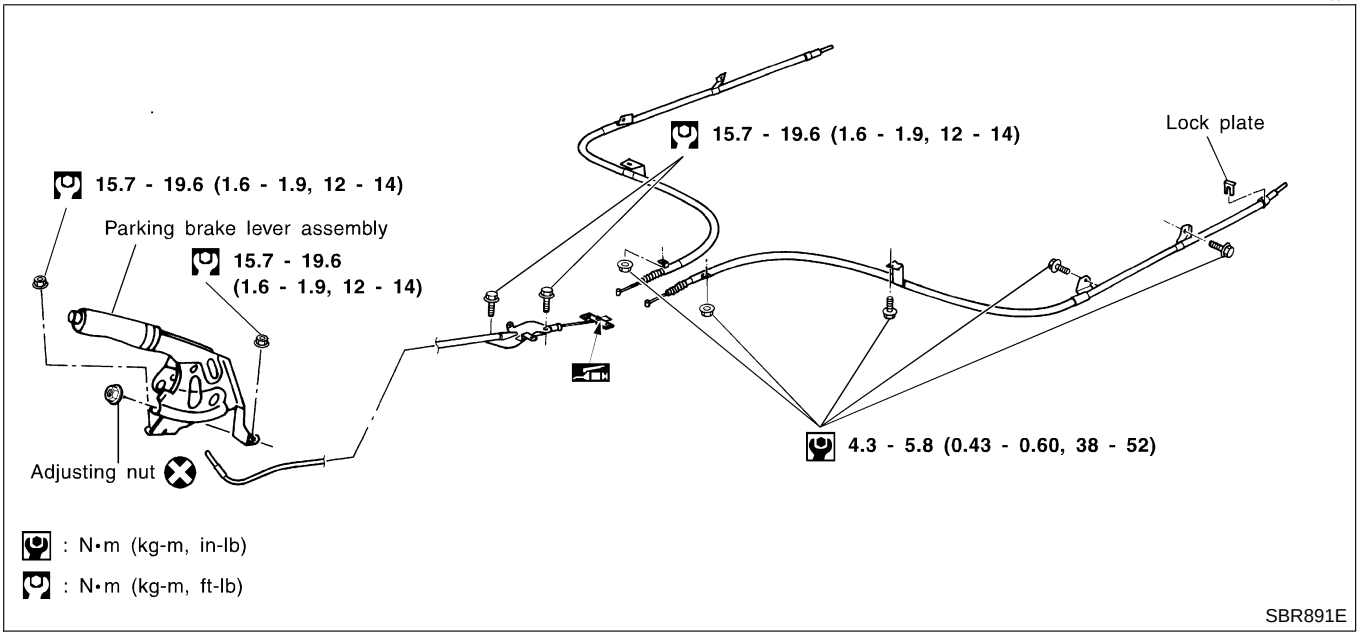
CAUTION:

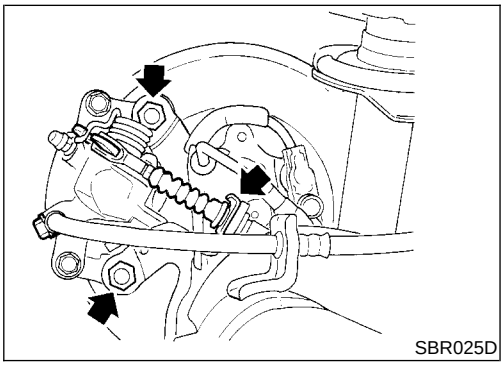
- **Refill with new brake fluid "DOT 3".**
- **Never reuse drained brake fluid.**

1. Install caliper assembly.
   - Align the piston's concave portion to the pad's convex portion, then install the cylinder body to the torque member.
2. Install brake hose to caliper securely.
3. Install all parts and secure all bolts.
4. Bleed air. Refer to "Bleeding Brake System", BR-9.

Components

NFBR0044





Removal and Installation

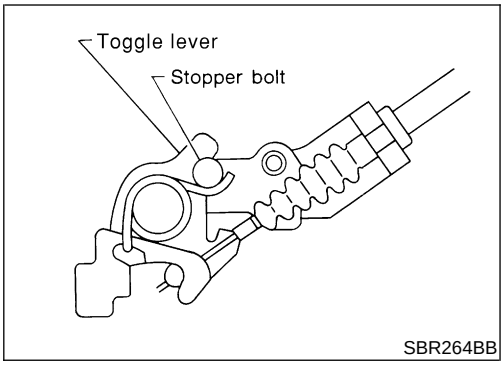
NFBR0045

1. To remove parking brake cable, first remove center console.
2. Disconnect warning switch connector.
3. Remove bolts and nuts, slacken off and remove adjusting nut.
4. Remove lock plate and disconnect cable.

Inspection

NFBR0046

1. Check control lever assembly for wear or other damage. Replace if necessary.
2. Check wires for discontinuity or deterioration. Replace if necessary.
3. Check warning lamp and switch. Replace if necessary.
4. Check parts at each connecting portion and, if found deformed or damaged, replace.



Adjustment

=NFBR0047

Pay attention to the following points after adjustment.

1) There is no drag when control lever is being released.
2) Be sure that toggle lever returns to stopper when parking brake lever is released.

1. Loosen parking brake cable.
2. Depress brake pedal fully more than five times.
3. Operate control lever 10 times or more with a full stroke [203.5 mm (8.01 in)].
4. Adjust control lever or pedal by turning adjusting nut.
5. Pull control lever with specified amount of force. Check lever stroke and ensure smooth operation.

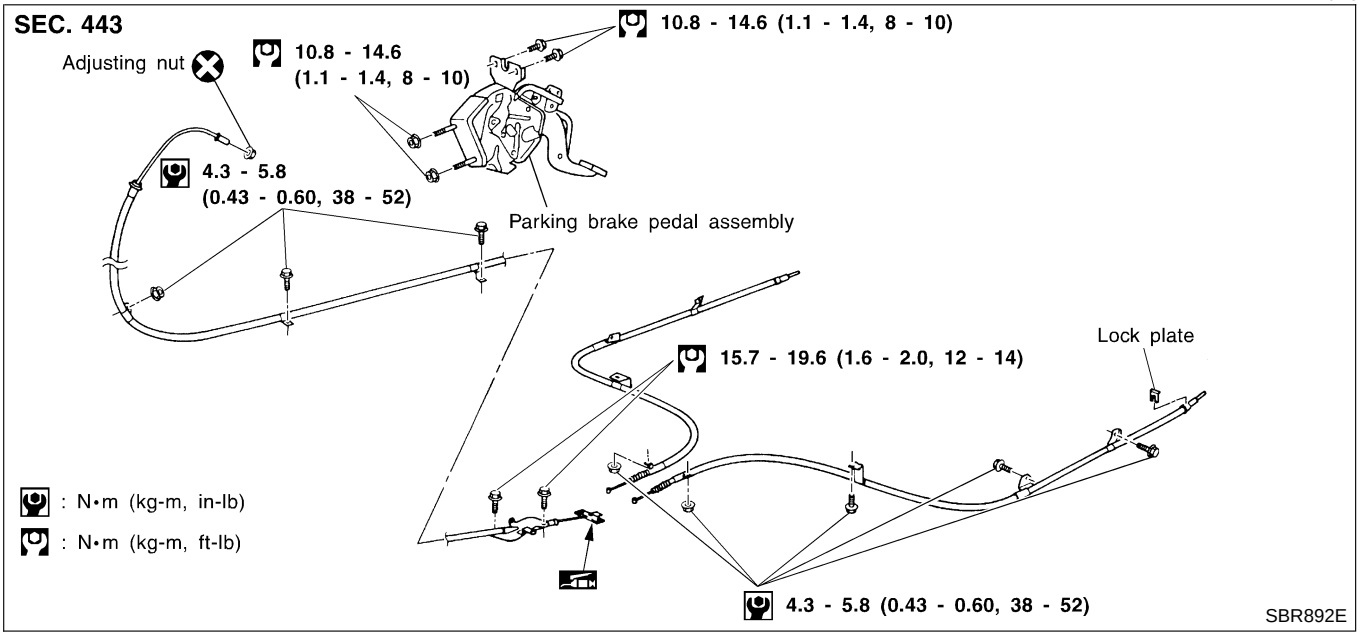
   Number of notches:

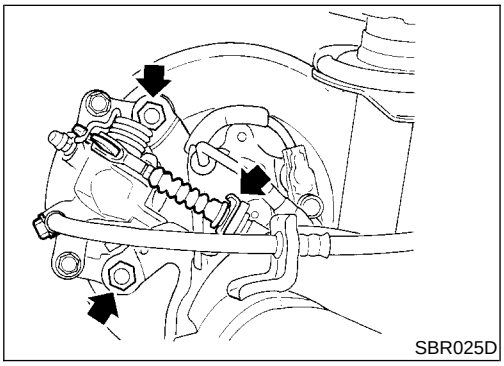
   10 - 11 [196 N (20 kg, 44 lb)]
6. Bend warning lamp switch plate. Warning lamp should come on when lever is pulled “A” notches. It should go off when the lever is fully released.

   Number of “A” notches: 1

Components

NFBR0128





Removal and Installation

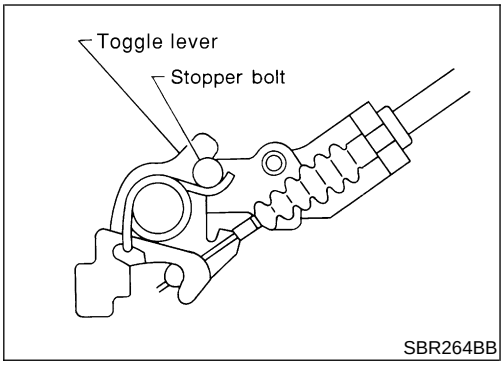
NFBR0129

1. To remove parking brake cable, first remove center console.
2. To remove parking brake pedal, remove lower instrument panel on driver side.
3. Disconnect warning switch connector.
4. Remove bolts and nuts, slacken off and remove adjusting nut.
5. Remove lock plate and disconnect cable.

Inspection

NFBR0130

1. Check parking brake pedal assembly for wear or other damage. Replace if necessary.
2. Check wires for discontinuity or deterioration. Replace if necessary.
3. Check warning lamp and switch. Replace if necessary.
4. Check parts at each connecting portion and, if found deformed or damaged, replace.



Adjustment

=NFBR0131

Pay attention to the following points after adjustment.

1) There is no drag when parking brake pedal is being released.
2) Be sure that toggle lever returns to stopper when parking brake pedal is released.

1. Loosen parking brake cable.
2. Depress brake pedal fully more than five times.
3. Operate parking brake pedal 10 times or more with a full stroke [203.5 mm (8.01 in)].
4. Adjust parking brake pedal by turning adjusting nut.
5. Depress pedal with specified amount of force. Check pedal stroke and ensure smooth operation.

   Number of notches:

   4 - 5 [196 N (20 kg, 44 lb)]
6. Bend warning lamp switch plate. Warning lamp should come on when pedal is depressed “A” notches. It should go off when the lever is fully released.

   Number of “A” notches: 1

Purpose

NFBR0100

The ABS consists of electronic and hydraulic components. It allows for control of braking force so that locking of the wheels can be avoided.
The ABS:

1) Ensures proper tracking performance through steering wheel operation.
2) Enables obstacles to be avoided through steering wheel operation.
3) Ensures vehicle stability by preventing flat spins.

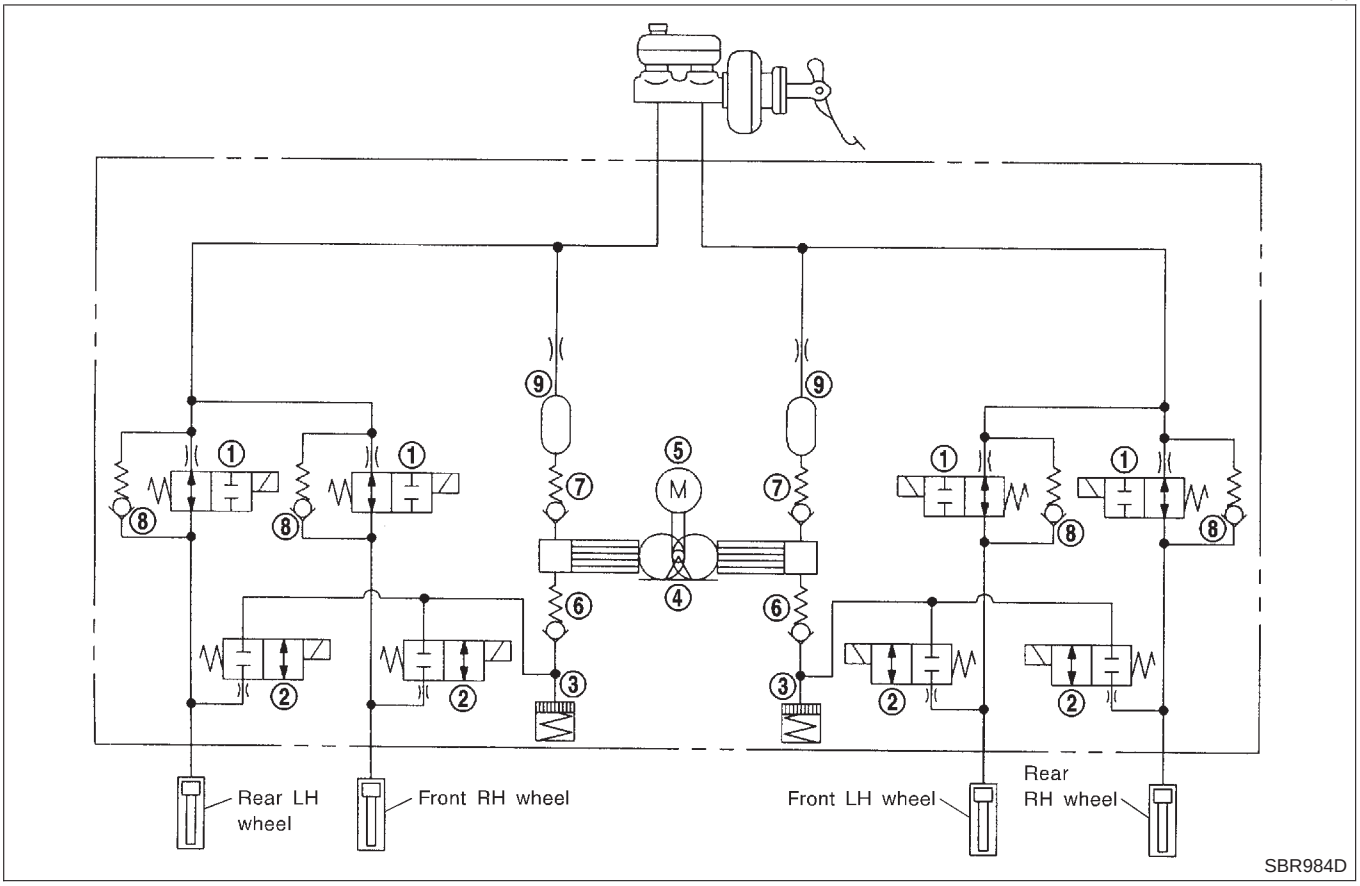
ABS (Anti-Lock Brake System) Operation

NFBR0101

- When the vehicle speed is less than 10 km/h (6 MPH) this system does not work.
- The Anti-Lock Brake System (ABS) has self-test capabilities. The system turns on the ABS warning lamp for 1 second after turning the ignition switch ON. The system performs another test the first time the vehicle reaches 6 km/h (4 MPH). A mechanical noise may be heard as the ABS performs a self-test. This is a normal part of the self-test feature. If a malfunction is found during this check, the ABS warning lamp will come on.
- During ABS operation, a mechanical noise may be heard. This is a normal condition.

ABS Hydraulic Circuit

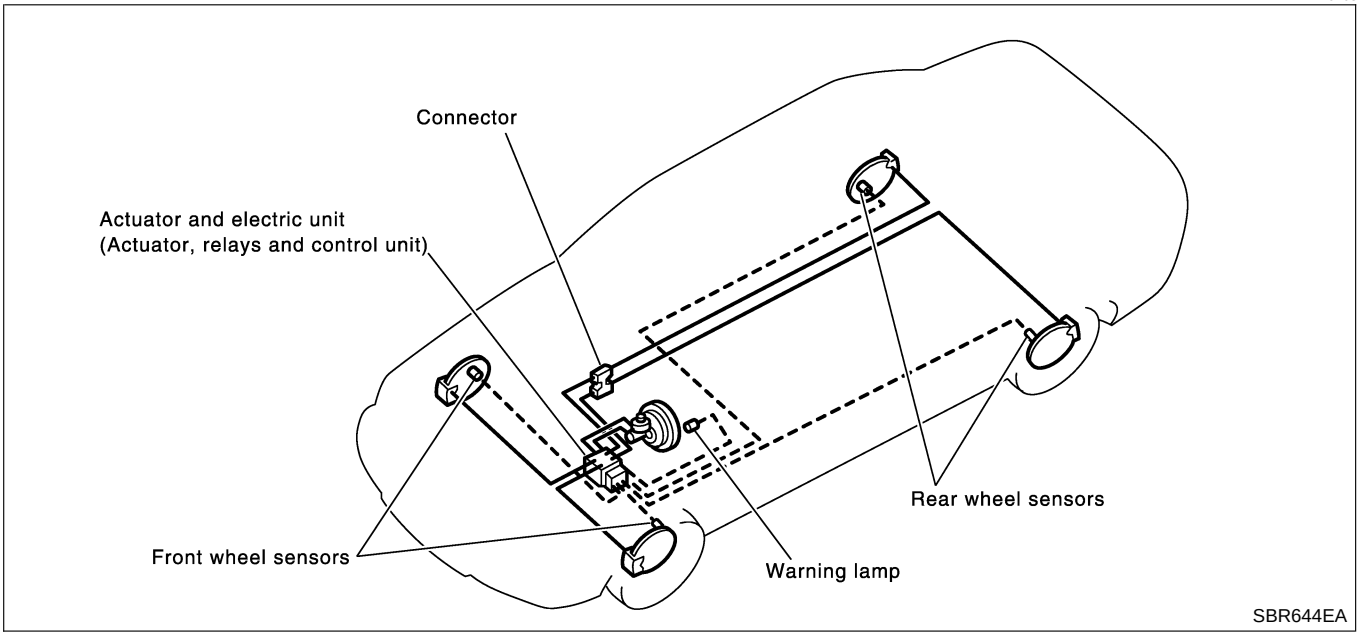
NFBR0102

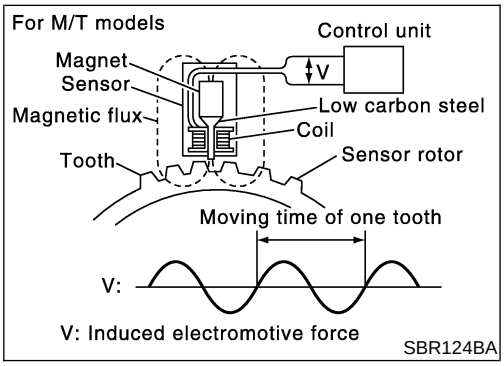


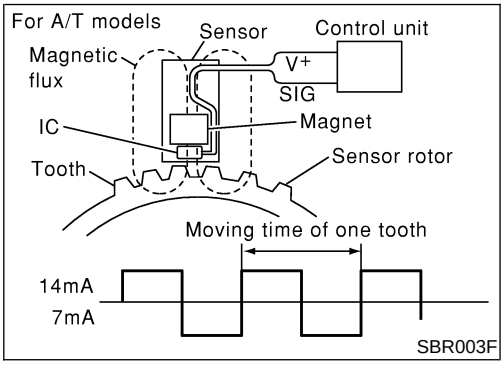
1. Inlet solenoid valve
2. Outlet solenoid valve
3. Reservoir
4. Pump
5. Motor
6. Inlet valve
7. Outlet valve
8. Bypass check valve
9. Damper

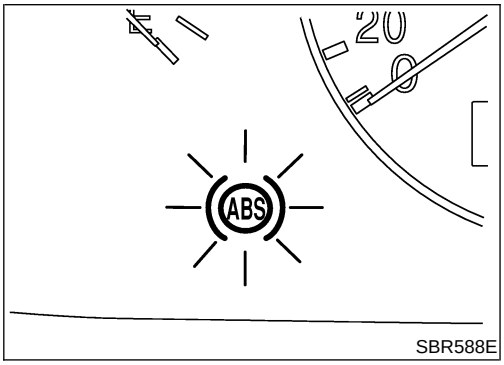
System Components

NFBR0103









System Description

NFBR0104

SENSOR

NFBR0104S01

For M/T models:

The sensor unit consists of a gear-shaped sensor rotor and a sensor element. The element contains a bar magnet around which a coil is wound. The sensor is installed on the back side of the brake rotor. Sine-wave current is generated by the sensor as the wheel rotates. The frequency and voltage increase(s) as the rotating speed increases.

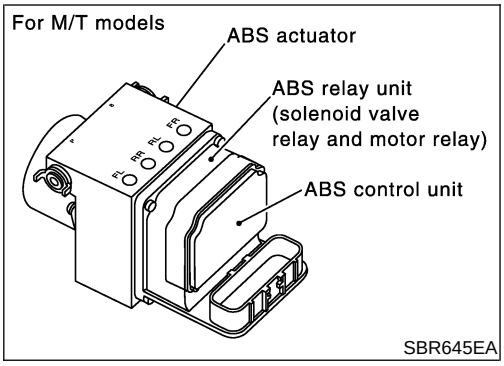
For A/T models:

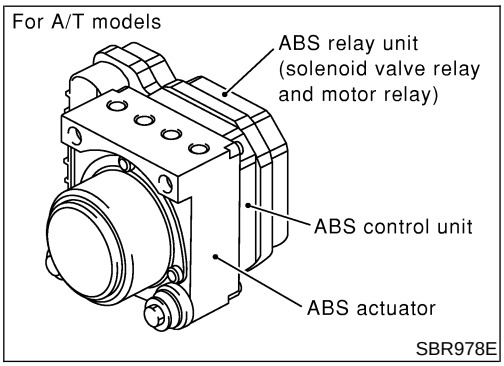
The front sensor units consist of a gear-shaped sensor rotor and a sensor element. The element contains a magnet and IC. The front wheel sensors are installed on the front of the wheel knuckles. As the wheel rotates, the sensor generates a square-wave signal. The frequency increase as the wheel speed increase.

CONTROL UNIT

NFBR0104S02

The control unit computes the wheel rotating speed by the signal current sent from the sensor. Then it supplies a DC current to the actuator solenoid valve. It also controls ON-OFF operation of the valve relay and motor relay. If any electrical malfunction should be detected in the system, the control unit causes the warning lamp to light up. In this condition, the ABS will be deactivated by the control unit, and the vehicle's brake system reverts to normal operation.





ABS ACTUATOR AND ELECTRIC UNIT

NFBR0104S03

The ABS actuator and electric unit contains:

- An electric motor and pump
- Two relays
- Eight solenoid valves, each inlet and outlet for
  — LH front
  — RH front
  — LH rear
  — RH rear
- ABS control unit

This components controls the hydraulic circuit and increases, holds or decreases hydraulic pressure to all or individual wheels. The ABS actuator and electric unit are not disassemble.

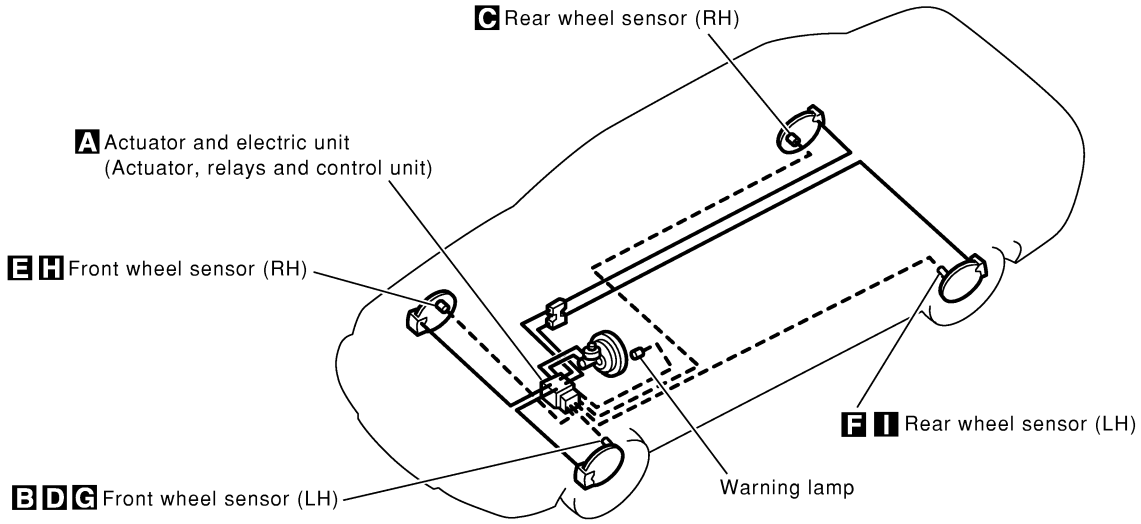
ABS Actuator Operation

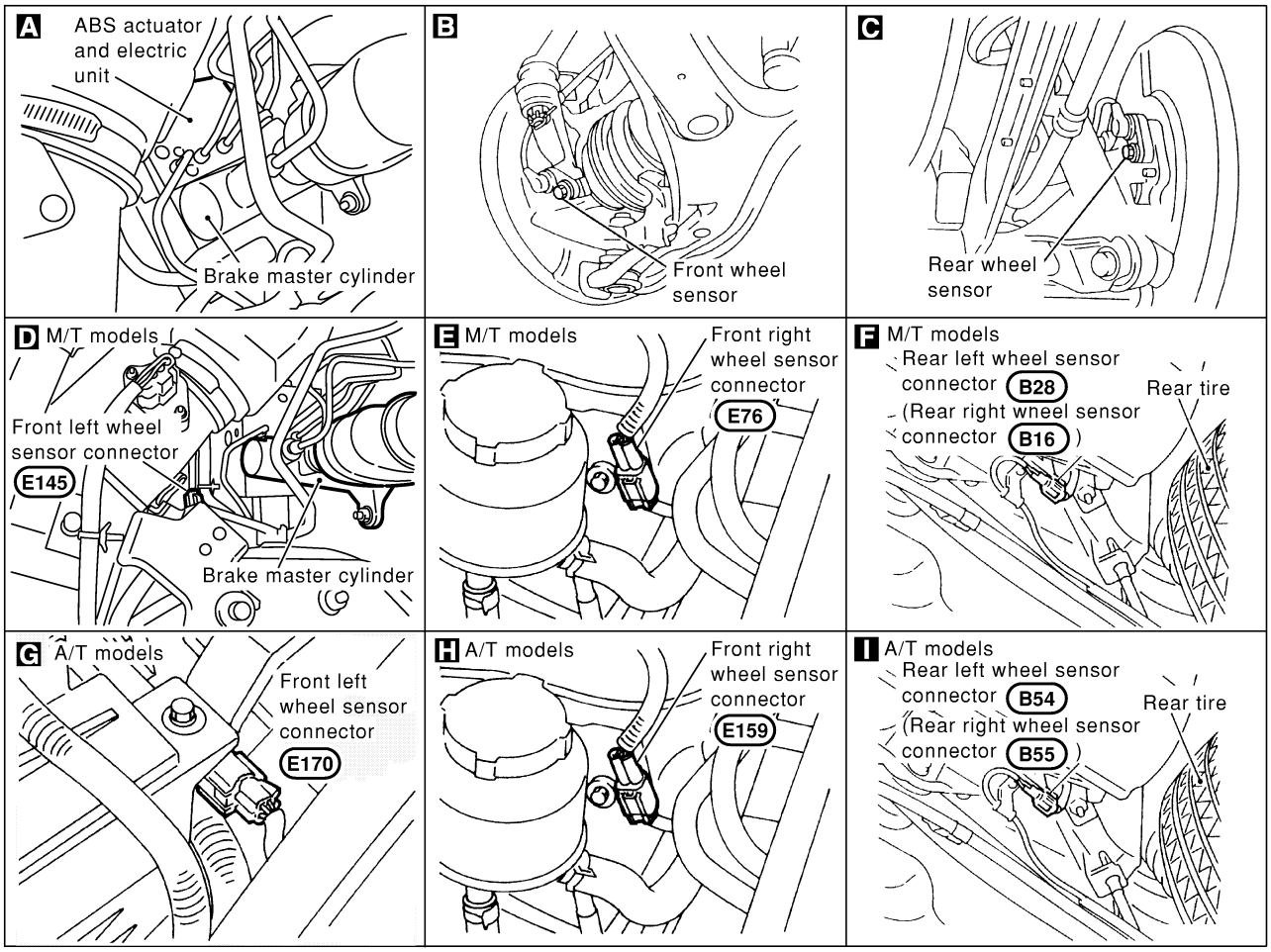
NFBR0104S0301

		Inlet solenoid valve	Outlet solenoid valve	
Normal brake operation		OFF (Open)	OFF (Closed)	Master cylinder brake fluid pressure is directly transmitted to caliper via the inlet solenoid valve.
ABS operation	Pressure hold	ON (Closed)	OFF (Closed)	Hydraulic circuit is shut off to hold the caliper brake fluid pressure.
	Pressure decrease	ON (Closed)	ON (Open)	Caliper brake fluid is sent to reservoir via the outlet solenoid valve. Then it is pushed up to the master cylinder by pump.
	Pressure increase	OFF (Open)	OFF (Closed)	Master cylinder brake fluid pressure is transmitted to caliper.

Component Parts and Harness Connector Location

NFBR0105

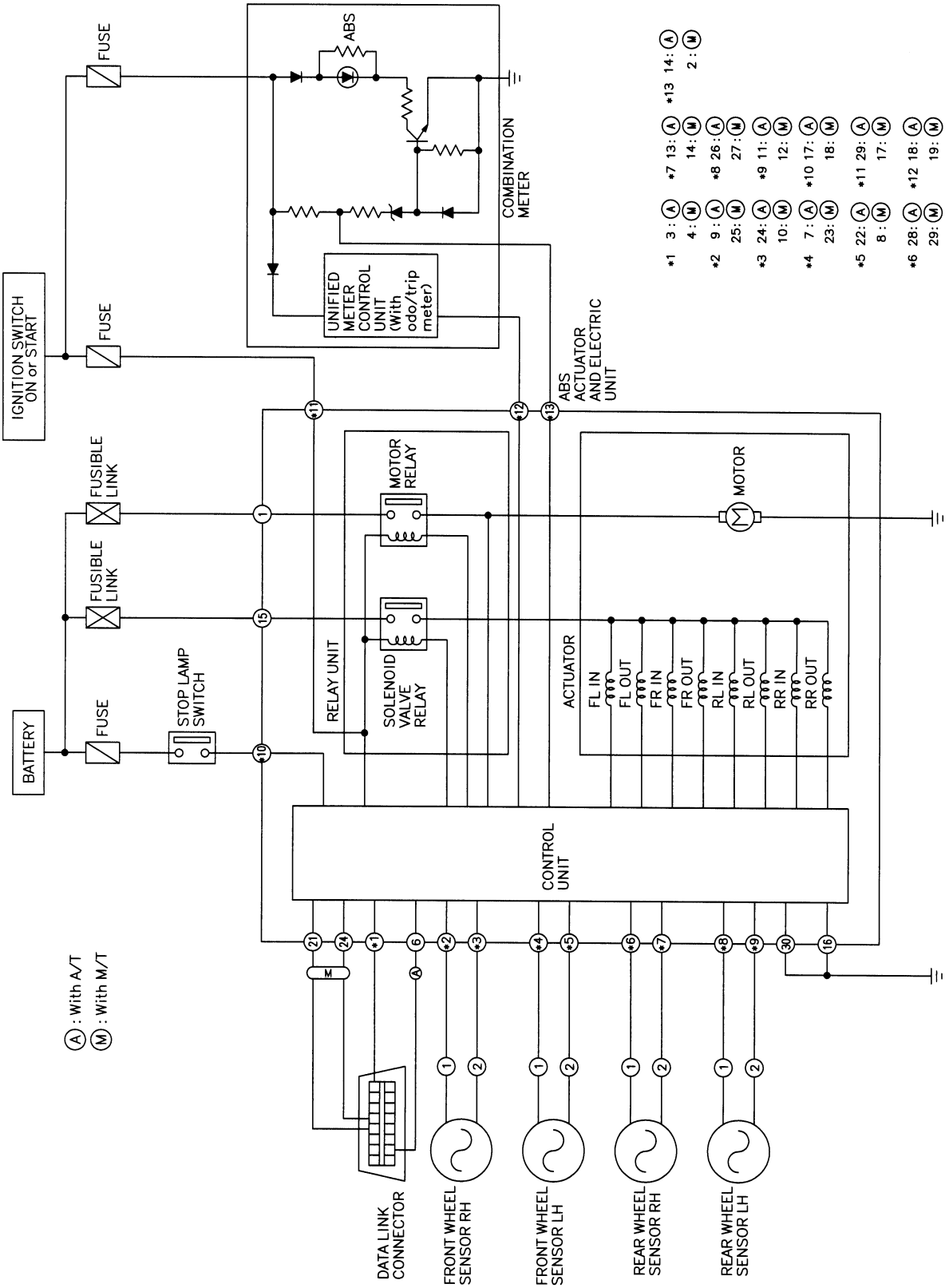




SBR043F

Schematic

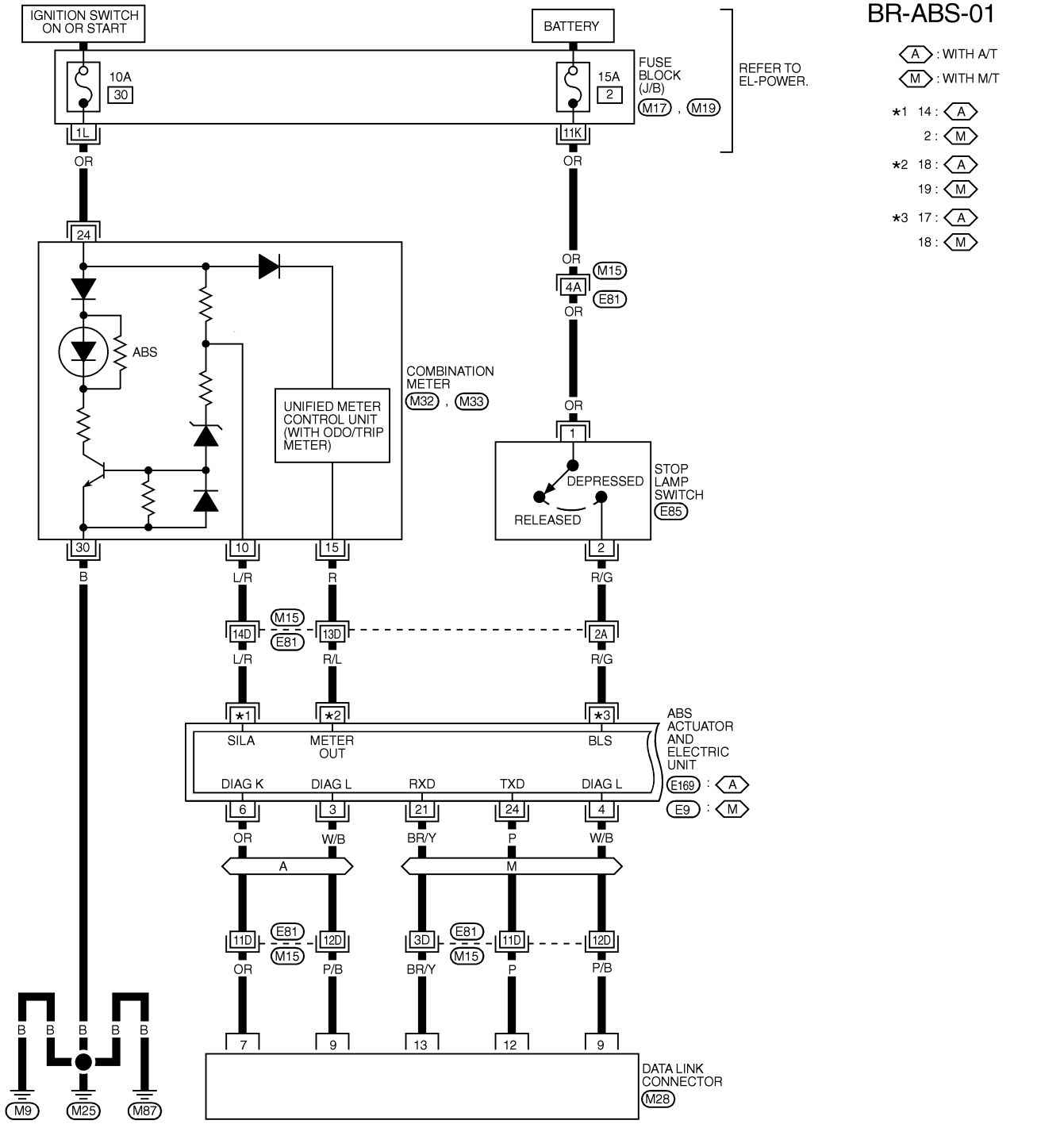
NFBR0106

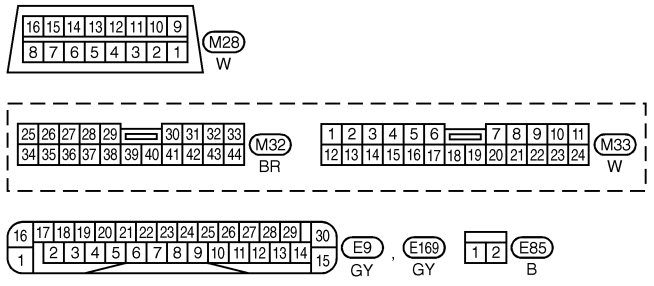


MBR509A

Wiring Diagram — ABS —

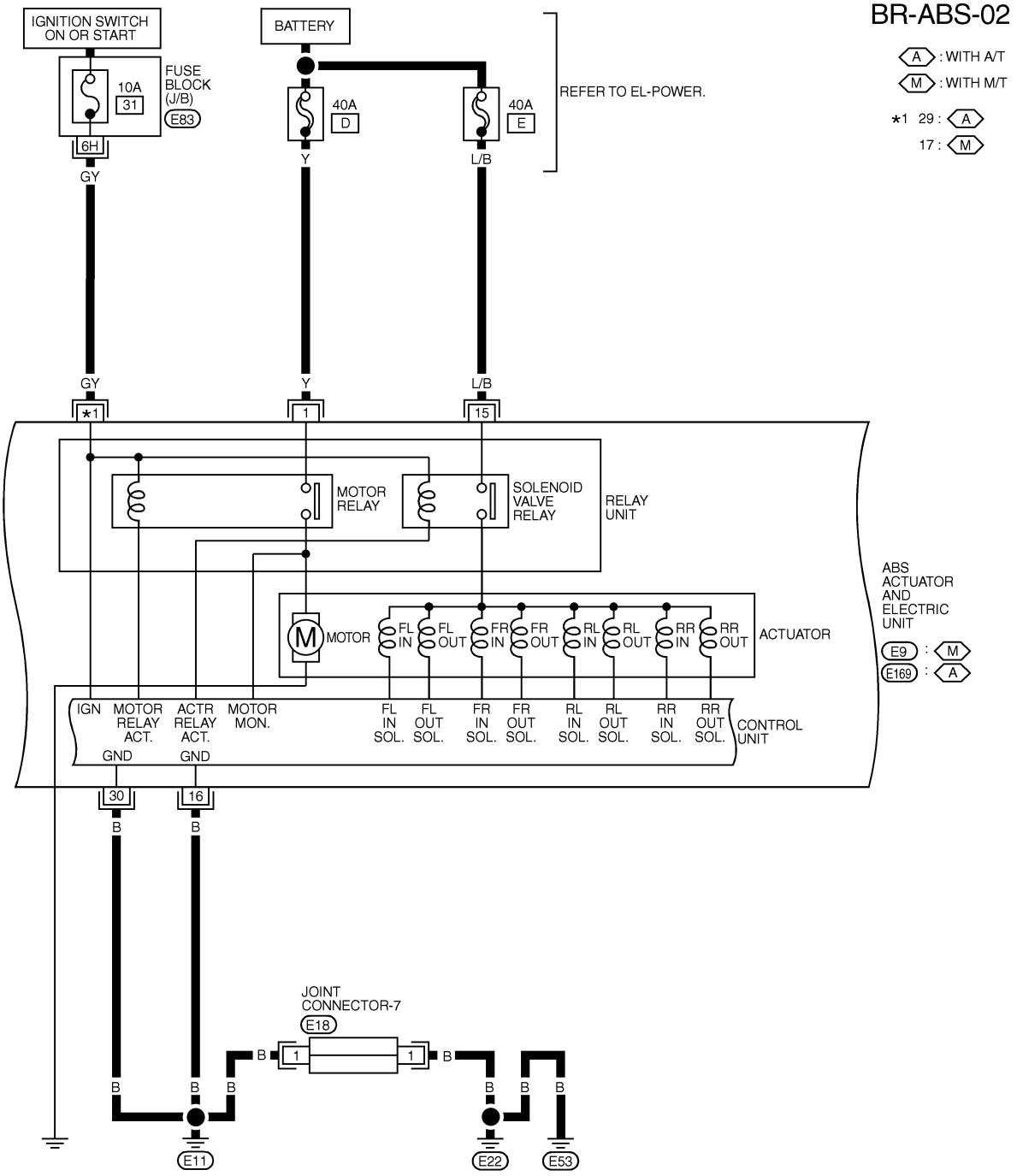
NFBR0107





REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)
M17 , M19 -FUSE BLOCK-JUNCTION BOX (J/B)

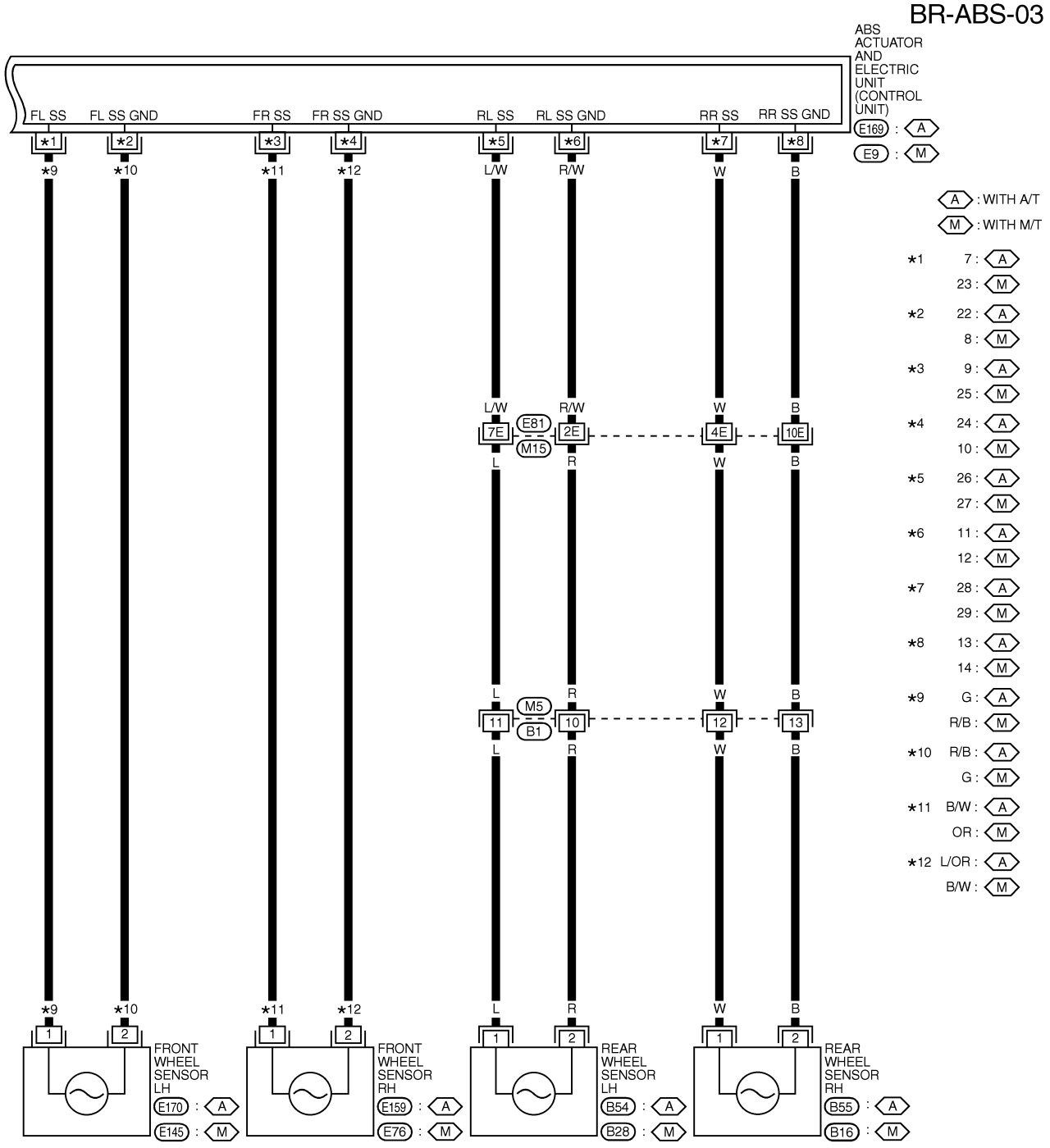
MBR606A

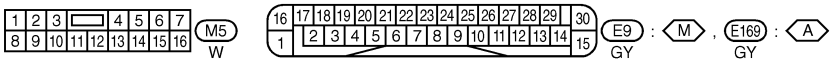


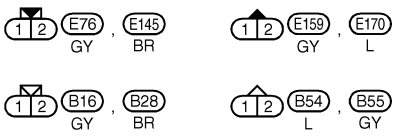
REFER TO THE FOLLOWING.
E83 -FUSE BLOCK-JUNCTION BOX (J/B)

MBR511A

BR-ABS-03







REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)

MBR607A

For M/T models

ABS ACTUATOR AND ELECTRIC UNIT TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND 16 OR 30).

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
1	Y	POWER SOURCE	–	BATTERY VOLTAGE
2	L/R	ABS WARNING LAMP IN COMBINATION METER	WHEN ABS WARNING LAMP IS ACTIVE	BATTERY VOLTAGE
			WHEN ABS WARNING LAMP IS NOT ACTIVE	APPROX. 0V
4	P/B	DATA LINK CONNECTOR	–	–
8	G	FRONT WHEEL SENSOR LH	WHEN VEHICLE CRUISES AT 30 KM/H (19 MPH)	PULSE FRONT: APPROX. 190 HZ REAR: APPROX. 190 HZ
10	B/P	FRONT WHEEL SENSOR RH		
12	B/P	REAR WHEEL SENSOR LH		
14	P	REAR WHEEL SENSOR RH		
23	R	FRONT WHEEL SENSOR LH		
25	OR	FRONT WHEEL SENSOR RH		
27	OR	REAR WHEEL SENSOR LH		
29	L	REAR WHEEL SENSOR RH		
15	BR	POWER SOURCE	–	BATTERY VOLTAGE
16	B	GROUND	–	–
17	GY	POWER SOURCE	IGN ON	BATTERY VOLTAGE
			IGN OFF	APPROX. 0V
18	R/G	STOP LAMP SWITCH	WHEN BRAKE PEDAL DEPRESSED	BATTERY VOLTAGE
			WHEN BRAKE PEDAL RELEASED	APPROX. 0V
21	BR/Y	DATA LINK CONNECTOR	–	–
24	P	DATA LINK CONNECTOR	–	–
30	B	GROUND	–	–

SBR930E

For A/T models

ABS ACTUATOR AND ELECTRIC UNIT TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND 16 OR 30).

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
1	Y	POWER SOURCE	–	BATTERY VOLTAGE
3	W/B	DATA LINK CONNECTOR	–	–
14	L/R	ABS WARNING LAMP IN COMBINATION METER	WHEN ABS WARNING LAMP IS ACTIVE	BATTERY VOLTAGE
			WHEN ABS WARNING LAMP IS NOT ACTIVE	APPROX. 0V
15	BR	POWER SOURCE	–	BATTERY VOLTAGE
16	B	GROUND	–	–
29	GY	POWER SOURCE	IGN ON	BATTERY VOLTAGE
			IGN OFF	APPROX. 0V
17	R/G	STOP LAMP SWITCH	WHEN BRAKE PEDAL DEPRESSED	BATTERY VOLTAGE
			WHEN BRAKE PEDAL RELEASED	APPROX. 0V
6	OR	DATA LINK CONNECTOR	–	–
30	B	GROUND	–	–

SBR044F

CONSULT-II

NFBR0207

CONSULT-II APPLICATION TO ABS

NFBR0207S01

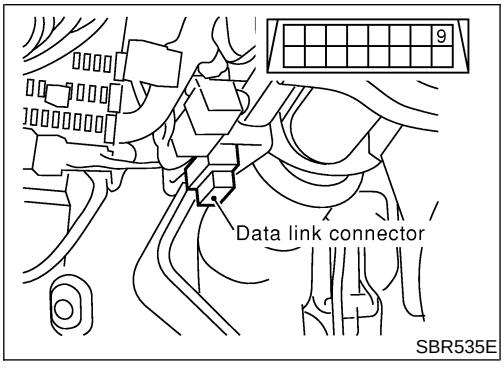
ITEM	SELF-DIAGNOSTIC RESULTS	DATA MONITOR	ACTIVE TEST
Front right wheel sensor	X	X	—
Front left wheel sensor	X	X	—
Rear right wheel sensor	X	X	—
Rear left wheel sensor	X	X	—
Stop lamp switch	—	X	—
Front right inlet solenoid valve	X	X	X
Front right outlet solenoid valve	X	X	X
Front left inlet solenoid valve	X	X	X
Front left outlet solenoid valve	X	X	X
Rear right inlet solenoid valve	X	X	X
Rear right outlet solenoid valve	X	X	X
Rear left inlet solenoid valve	X	X	X
Rear left outlet solenoid valve	X	X	X
Actuator solenoid valve relay	—	X	—
Actuator motor relay (ABS MOTOR is shown on the ACTIVE TEST screen.)	X	X	X
ABS warning lamp	—	X	—
Battery voltage	X	X	—
Control unit	X	—	—
EBD operation (For A/T models)	—	X	—
ABS operation (For A/T models)	—	X	—
EBD fail safe (For A/T models)	—	X	—
ABS fail safe (For A/T models)	—	X	—

X: Applicable
—: Not applicable

ECU (ABS CONTROL UNIT) PART NUMBER MODE

NFBR0207S02

Ignore the ECU part number displayed in the ECU PART NUMBER MODE. Refer to parts catalog to order the ABS actuator and electric unit.



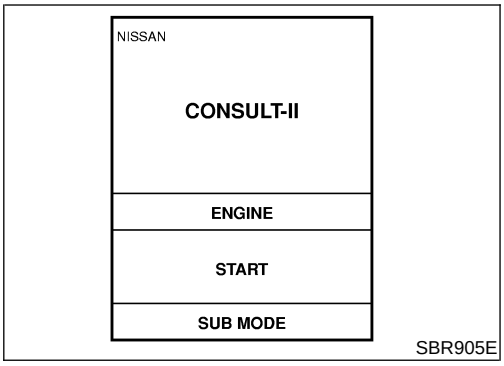
CONSULT-II Inspection Procedure

NFBR0110

SELF-DIAGNOSIS PROCEDURE

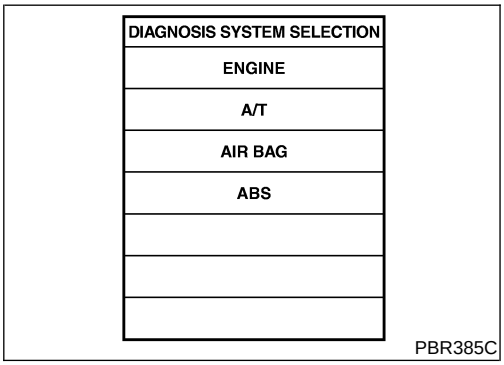
NFBR0110S01

1. Turn ignition switch OFF.
2. Connect CONSULT-II to Data Link Connector.
3. Start engine.
4. Drive vehicle over 30 km/h (19 MPH) for at least one minute.



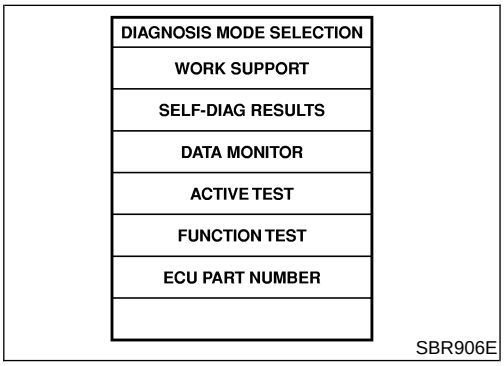
SBR905E

5. Stop vehicle with engine running and touch "START" on CONSULT-II screen.



PBR385C

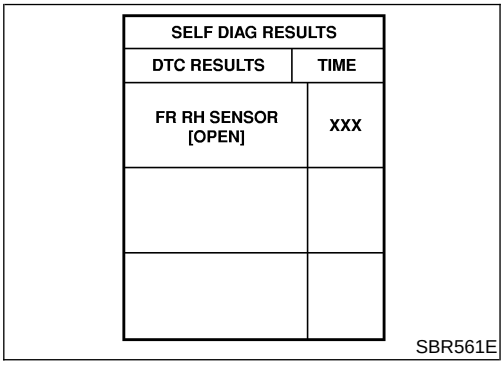
6. Touch "ABS".



SBR906E

7. Touch "SELF-DIAG RESULTS".
- The screen shows the detected malfunction and how many times the ignition switch has been turned since the malfunction.

8. Make the necessary repairs following the diagnostic procedures.



SBR561E

9. After the malfunctions are repaired, erase the self-diagnostic results stored in the control unit by touching "ERASE".
10. Check ABS warning lamp for deactivation after driving vehicle over 30 km/h (19 MPH) for at least one minute.

NOTE:
"SELF-DIAG RESULTS" screen shows the detected malfunction and how many times the ignition switch has been turned since the malfunction.

SELF-DIAGNOSTIC RESULTS MODE (FOR M/T MODELS)

=NFBR0110S02

Diagnostic item	Diagnostic item is detected when ...	Reference Page
FR RH SENSOR [OPEN]*1	• Circuit for front right wheel sensor is open. (An abnormally high input voltage is entered.)	BR-61
FR LH SENSOR [OPEN]*1	• Circuit for front left wheel sensor is open. (An abnormally high input voltage is entered.)	BR-61
RR RH SENSOR [OPEN]*1	• Circuit for rear right sensor is open. (An abnormally high input voltage is entered.)	BR-61
RR LH SENSOR [OPEN]*1	• Circuit for rear left sensor is open. (An abnormally high input voltage is entered.)	BR-61
FR RH SENSOR [SHORT]*1	• Circuit for front right wheel sensor is shorted. (An abnormally low input voltage is entered.)	BR-61
FR LH SENSOR [SHORT]*1	• Circuit for front left wheel sensor is shorted. (An abnormally low input voltage is entered.)	BR-61
RR RH SENSOR [SHORT]*1	• Circuit for rear right sensor is shorted. (An abnormally low input voltage is entered.)	BR-61
RR LH SENSOR [SHORT]*1	• Circuit for rear left sensor is shorted. (An abnormally low input voltage is entered.)	BR-61
FR RH IN ABS SOL [OPEN]	• Circuit for front right inlet solenoid valve is open. (An abnormally low output voltage is entered.)	BR-66
FR LH IN ABS SOL [OPEN]	• Circuit for front left inlet solenoid valve is open. (An abnormally low output voltage is entered.)	BR-66
RR RH IN ABS SOL [OPEN]	• Circuit for rear right inlet solenoid valve is open. (An abnormally low output voltage is entered.)	BR-66
RR LH IN ABS SOL [OPEN]	• Circuit for rear left inlet solenoid valve is open. (An abnormally low output voltage is entered.)	BR-66
FR RH IN ABS SOL [SHORT]	• Circuit for front right inlet solenoid valve is shorted. (An abnormally high output voltage is entered.)	BR-66
FR LH IN ABS SOL [SHORT]	• Circuit for front left inlet solenoid valve is shorted. (An abnormally high output voltage is entered.)	BR-66
RR RH IN ABS SOL [SHORT]	• Circuit for rear right inlet solenoid valve is shorted. (An abnormally high output voltage is entered.)	BR-66
RR LH IN ABS SOL [SHORT]	• Circuit for rear left inlet solenoid valve is shorted. (An abnormally high output voltage is entered.)	BR-66
FR RH OUT ABS SOL [OPEN]	• Circuit for front right outlet solenoid valve is open. (An abnormally low output voltage is entered.)	BR-66
FR LH OUT ABS SOL [OPEN]	• Circuit for front left outlet solenoid valve is open. (An abnormally low output voltage is entered.)	BR-66
RR RH OUT ABS SOL [OPEN]	• Circuit for rear right outlet solenoid valve is open. (An abnormally low output voltage is entered.)	BR-66
RR LH OUT ABS SOL [OPEN]	• Circuit for rear left outlet solenoid valve is open. (An abnormally low output voltage is entered.)	BR-66
FR RH OUT ABS SOL [SHORT]	• Circuit for front right outlet solenoid valve is shorted. (An abnormally high output voltage is entered.)	BR-66
FR LH OUT ABS SOL [SHORT]	• Circuit for front left outlet solenoid valve is shorted. (An abnormally high output voltage is entered.)	BR-66

Diagnostic item	Diagnostic item is detected when ...	Reference Page
RR RH OUT ABS SOL [SHORT]	• Circuit for rear right outlet solenoid valve is shorted. (An abnormally high output voltage is entered.)	BR-66
RR LH OUT ABS SOL [SHORT]	• Circuit for rear left outlet solenoid valve is shorted. (An abnormally high output voltage is entered.)	BR-66
ABS ACTUATOR RELAY [ABNORMAL]	• Actuator solenoid valve relay is ON, even control unit sends off signal. • Actuator solenoid valve relay is OFF, even control unit sends on signal.	BR-66
ABS MOTOR RELAY [ABNORMAL]	• Circuit for actuator motor is open or shorted. • Actuator motor relay is stuck.	BR-70
BATTERY VOLT [ABNORMAL]	• Power source voltage supplied to ABS control unit is abnormally low.	BR-73
CONTROL UNIT*2	• Function of calculation in ABS control unit has failed.	BR-75

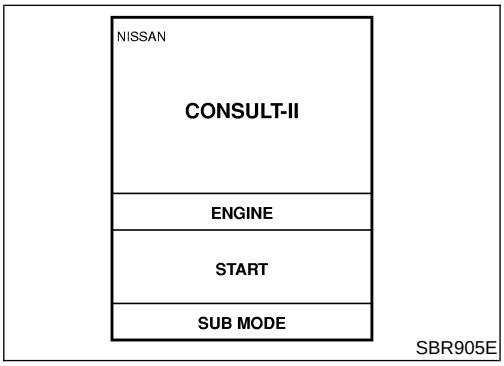
*1: Be sure to confirm the ABS warning lamp illuminates when the ignition switch is turned ON after repairing the shorted sensor circuit, but the lamp goes out when driving the vehicle over 30 km/h (19 MPH) for one minute in accordance with SELF-DIAGNOSIS PROCEDURE.

*2: When "CONTROL UNIT 5" is displayed, check to see if the ABS warning lamp is burned out, and check the circuit between the ABS warning lamp and ABS actuator/electric unit for open or short. Then check the ABS actuator/electric unit and circuit. When "CONTROL UNIT XX (exept "CONTROL UNIT 5")" is displayed, "CONTROL UNIT DIAGNOSTIC PROCEDURE" (BR-75).

DATA MONITOR PROCEDURE

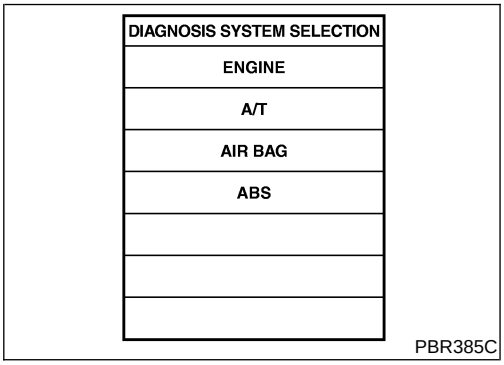
NFBR0110S03

1. Turn ignition switch OFF.
2. Connect CONSULT-II to data link connector.
3. Turn ignition switch ON.
4. Touch "START" on CONSULT-II screen.



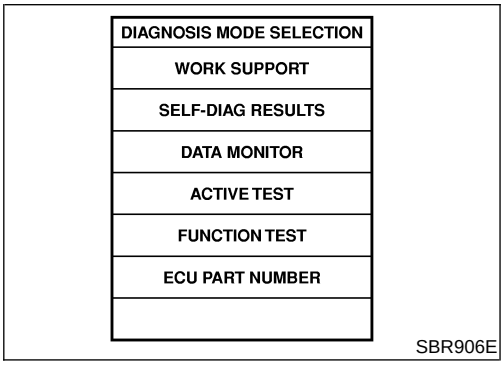
SBR905E

5. Touch "ABS".



PBR385C

6. Touch "DATA MONITOR".
7. Touch "SETTING" on "SELECT MONITOR ITEM" screen.
8. Touch "START" on "SELECT MONITOR ITEM".



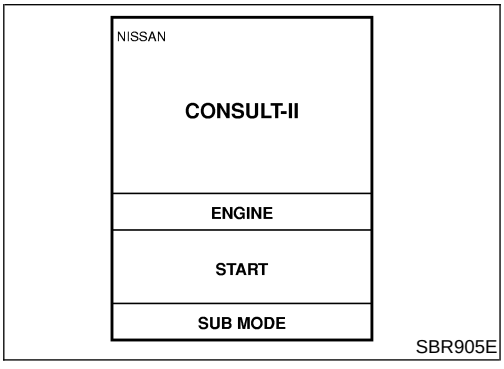
SBR906E

SELF-DIAGNOSTIC RESULTS MODE (FOR A/T MODELS)

=NFBR0110S07

Diagnostic item	Diagnostic item is detected when ...	Reference Page
FR RH SENSOR	• Circuit for front right wheel sensor is open.	BR-61
FR LH SENSOR	• Circuit for front left wheel sensor is open.	BR-61
RR RH SENSOR	• Circuit for rear right sensor is open.	BR-61
RR LH SENSOR	• Circuit for rear left sensor is open.	BR-61
FR RH SENSOR	• Power supply for sensors is out of specification. • Control unit cannot confirm pulse from sensors.	BR-61
FR LH SENSOR	• Power supply for sensors is out of specification. • Control unit cannot confirm pulse from sensors.	BR-61
RR RH SENSOR	• Power supply for sensors is out of specification. • Control unit cannot confirm pulse from sensors.	BR-61
RR LH SENSOR	• Power supply for sensors is out of specification. • Control unit cannot confirm pulse from sensors.	BR-61
FR RH IN ABS SOL	• Control unit detects malfunction on FR RH inlet solenoid.	BR-66
FR LH IN ABS SOL	• Control unit detects malfunction on FR LH inlet solenoid.	BR-66
RR RH IN ABS SOL	• Control unit detects malfunction on RR RH inlet solenoid.	BR-66
RR LH IN ABS SOL	• Control unit detects malfunction on RR LH inlet solenoid.	BR-66
FR RH OUT ABS SOL	• Control unit detects malfunction on FR RH outlet solenoid.	BR-66
FR LH OUT ABS SOL	• Control unit detects malfunction on FR LH outlet solenoid.	BR-66
RR RH OUT ABS SOL	• Control unit detects malfunction on RR RH outlet solenoid.	BR-66
RR LH OUT ABS SOL	• Control unit detects malfunction on RR LH outlet solenoid.	BR-66
ABS ACTUATOR RELAY [ABNORMAL]	• Control unit detects malfunction on ABS actuator relay.	BR-66
PUMP MOTOR	• Control unit detects malfunction on ABS motor and/or ABS motor relay.	BR-70
BATTERY VOLT [ABNORMAL]	• Power source voltage supplied to ABS control unit is abnormally low.	BR-73
CONTROL UNIT	• Function of calculation in ABS control unit has failed.	BR-75

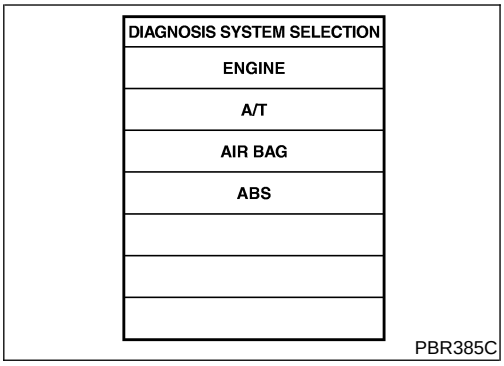
*1: Be sure to confirm the ABS warning lamp illuminates when the ignition switch is turned ON after repairing the shorted sensor circuit, but the lamp goes out when driving the vehicle over 30 km/h (19 MPH) for one minute in accordance with SELF-DIAGNOSIS PROCEDURE.



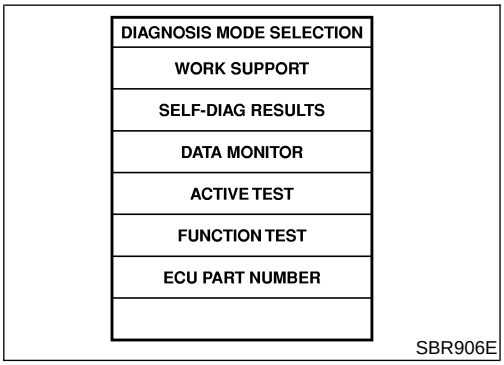
DATA MONITOR PROCEDURE

NFBR0110S08

1. Turn ignition switch OFF.
2. Connect CONSULT-II to data link connector.
3. Turn ignition switch ON.
4. Touch "START" on CONSULT-II screen.



5. Touch "ABS".



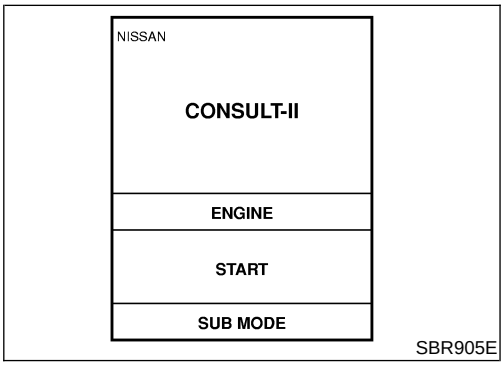
6. Touch "DATA MONITOR".
7. Touch "SETTING" on "SELECT MONITOR ITEM" screen.
8. Touch "START" on "SELECT MONITOR ITEM".

ACTIVE TEST PROCEDURE

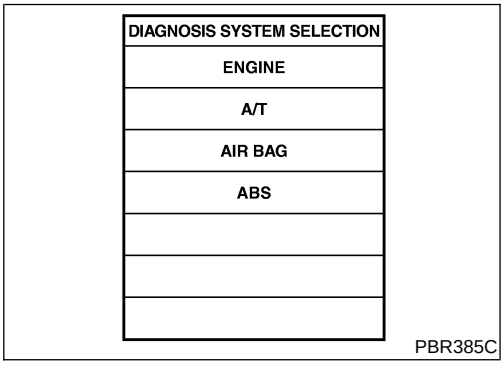
NFBR0110S04

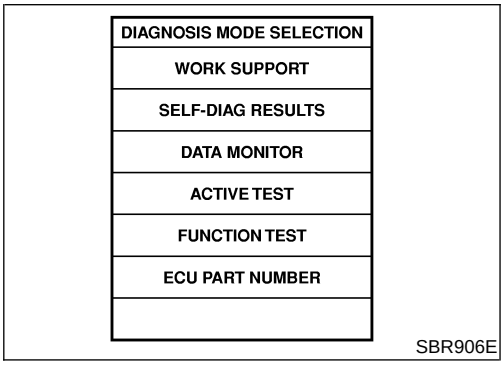
- When conducting Active test, vehicle must be stationary.
- When ABS warning lamp stays on, never conduct Active test.

1. Turn ignition switch OFF.
2. Connect CONSULT-II to Data Link Connector.
3. Start engine.
4. Touch "START" on CONSULT-II screen.

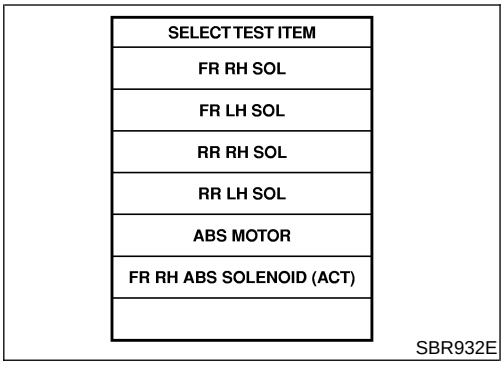


5. Touch "ABS".

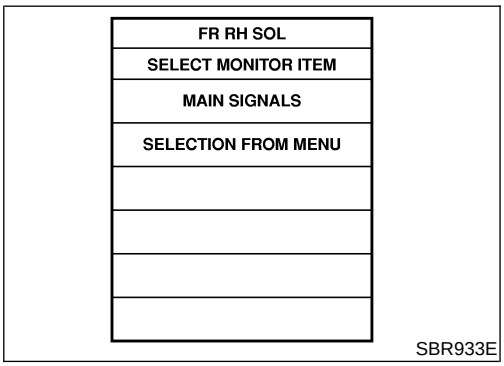




6. Touch "ACTIVE TEST".



7. Select active test item by touching screen.



8. Touch "START".
9. Carry out the active test by touching screen key.

DATA MONITOR MODE

NFBR0110S05

MONITOR ITEM	CONDITION	SPECIFICATION
FR RH SENSOR FR LH SENSOR RR RH SENSOR RR LH SENSOR	Drive vehicle. (Each wheel is rotating.)	Displays computed vehicle speed from wheel sensor signal. Almost the same speed as speedometer.
STOP LAMP SW	Turn ignition switch ON and depress brake pedal.	Depress the pedal: ON Release the pedal: OFF
FR RH IN SOL FR RH OUT SOL FR LH IN SOL FR LH OUT SOL RR RH IN SOL RR RH OUT SOL RR LH IN SOL RR LH OUT SOL	Ignition switch is turned ON or engine is running.	Operating conditions for each solenoid valve are indicated. ABS is not operating: OFF
ACTUATOR RLY	Ignition switch is turned ON or engine is running.	Displays ON/OFF condition of ABS actuator relay. When turning ignition switch ON, ABS actuator relay is operated.
MOTOR RELAY		ABS is not operating: OFF ABS is operating: ON
ABS WARNING LAMP		Warning lamp is turned on: ON Warning lamp is turned off: OFF
BATTERY VOLT		Power supply voltage for control unit

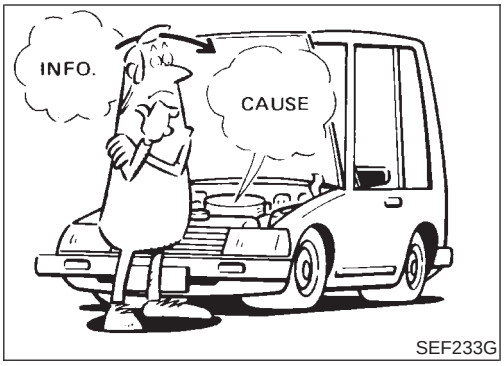
MONITOR ITEM	CONDITION	SPECIFICATION
EBD SIGNAL (12 For A/T models)	Ignition switch is turned ON.	EBD is operating: ON EBD is not operating: OFF
ABS SIGNAL (12 For A/T models)		ABS is operating: ON ABS is not operating: OFF
EBD FAIL SIG (12 For A/T models)		EBD system fails: ON EBD system does not fail: OFF
ABS FAIL SIG (12 For A/T models)		ABS fails: ON ABS does not fail: OFF

ACTIVE TEST MODE

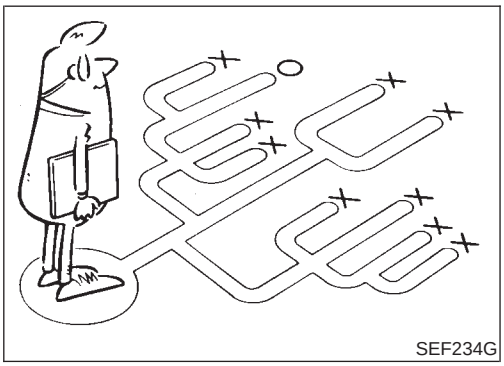
NFBR0110S06

TEST ITEM	CONDITION	JUDGEMENT		
FR RH SOLENOID FR LH SOLENOID RR RH SOLENOID RR LH SOLENOID	Ignition switch is turned ON.	Brake fluid pressure control operation		
			IN SOL	OUT SOL
		UP (Increase):	OFF	OFF
		KEEP (Hold):	ON	OFF
		DOWN (Decrease):	ON	ON
ABS MOTOR		ABS actuator motor ON: Motor runs OFF: Motor stops		

NOTE:
Active test will automatically stop ten seconds after the test starts. (TEST IS STOPPED monitor shows ON.)



SEF233G


SEF234G

How to Perform Trouble Diagnoses for Quick and Accurate Repair

NFBR0111

INTRODUCTION

NFBR0111S01

The ABS system has an electronic control unit to control major functions. The control unit accepts input signals from sensors and instantly drives actuator. It is essential that both kinds of signals are proper and stable. It is also important to check for conventional problems: such as air leaks in the booster or lines, lack of brake fluid, or other problems with the brake system.

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 faulty wiring. In this case, careful checking of suspicious circuits may help prevent the replacement of good parts.

A visual check only may not find the cause of the problems, so a road test should be performed.

Before undertaking actual checks, take just a few minutes to talk with a customer who approaches with a ABS complaint. The customer is a very good source of information on such problems; especially intermittent ones. Through the talks with the customer, find out what symptoms are present and under what conditions they occur.

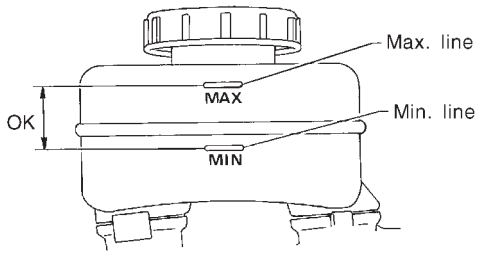
Start your diagnosis by looking for “conventional” problems first. This is one of the best ways to troubleshoot brake problems on an ABS controlled vehicle. Also check related Service Bulletins for information.

Preliminary Check

NFBR0112

1	CHECK BRAKE FLUID LEVEL

Check brake fluid level in reservoir tank.
Low fluid level may indicate brake pad wear or leakage from brake line.



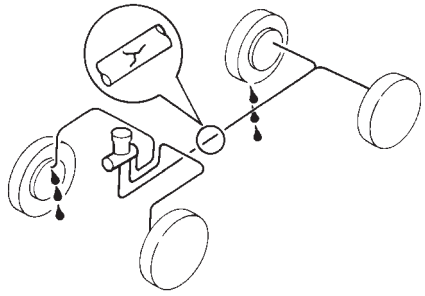
SBR451D

Is brake fluid filled between MAX and MIN lines on reservoir tank and/or has brake fluid been contaminated?

Yes	▶	GO TO 2.
No	▶	Repair. GO TO 2.

2	CHECK BRAKE LINE

Check brake line for leakage.



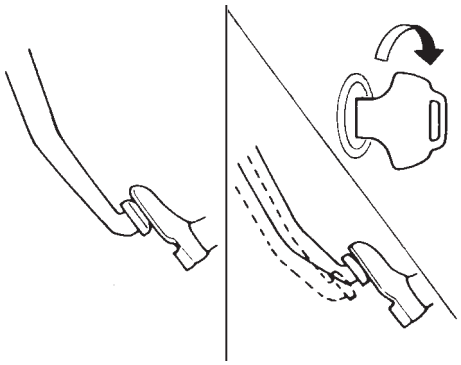
SBR389C

Is leakage present at or around brake lines, tubes or hoses or are any of these parts cracked or damaged?

Yes	▶	Repair. GO TO 3.
No	▶	GO TO 3.

3	CHECK BRAKE BOOSTER OPERATION

Check brake booster for operation and air tightness.
Refer to BR-20.



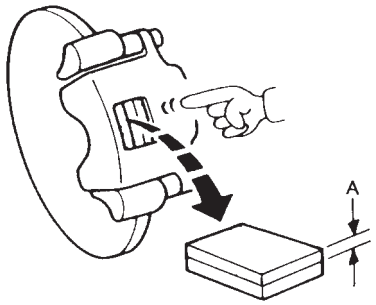
SBR058C

Is brake booster airtight and functioning properly?

Yes	▶	GO TO 4.
No	▶	Replace. GO TO 4.

4	CHECK BRAKE PAD AND ROTOR

Check brake pad and rotor.
Refer to BR-23, BR-25, BR-27, BR-31.



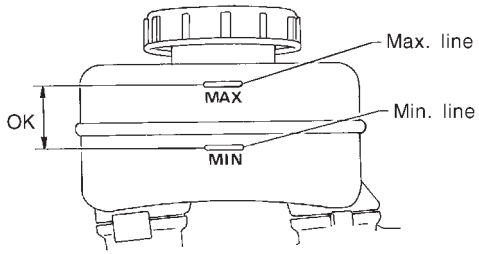
SBR059C

Are brake pads and rotors functioning properly?

Yes	▶	GO TO 5.
No	▶	Replace.

5	RECHECK BRAKE FLUID LEVEL

Check brake fluid level in reservoir tank again.



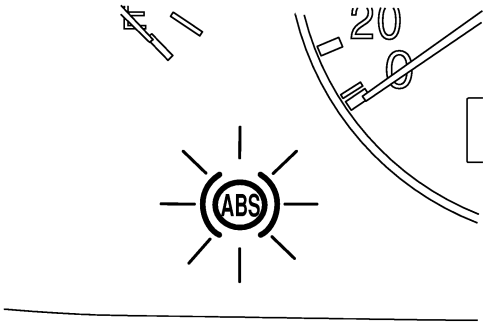
SBR451D

Is brake fluid filled between MAX and MIN lines on reservoir tank and/or has brake fluid been contaminated?

Yes	▶	GO TO 6.
No	▶	Fill up brake fluid.

6	CHECK WARNING LAMP ACTIVATION

Check warning lamp activation.



SBR588E

Does warning lamp turn on when ignition switch is turned "ON"?

Yes	▶	GO TO 7.
No	▶	Check fuse, warning lamp bulb and warning lamp circuit.

7	CHECK WARNING LAMP DEACTIVATION

Check warning lamp for deactivation after engine is started.

Does warning lamp turn off when engine is started?

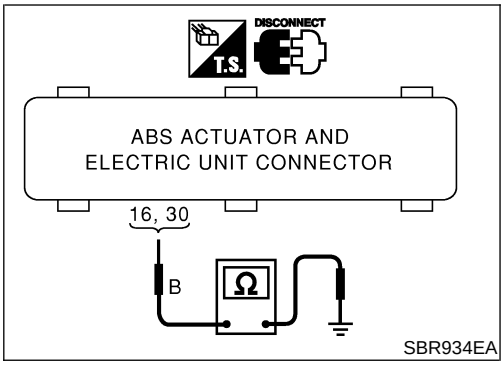
Yes	▶	GO TO 8.
No	▶	Go to Self-diagnosis. Refer to BR-48.

8	DRIVE VEHICLE

Drive vehicle at speeds over 30 km/h (19 MPH) for at least one minute.

Does warning lamp remain off after vehicle has been driven at 30 km/h (19 MPH) for at least one minute?

Yes	▶	END
No	▶	Go to Self-diagnosis. Refer to BR-48.



Ground Circuit Check

NFBR0113

ABS ACTUATOR AND ELECTRIC UNIT GROUND

NFBR0113S01

- Check continuity between ABS actuator and electric unit harness connector E9 (M/T models), E169 (A/T models) terminals 16 (B), 30 (B) and ground.

  Continuity should exist.

Wheel Sensor or Rotor

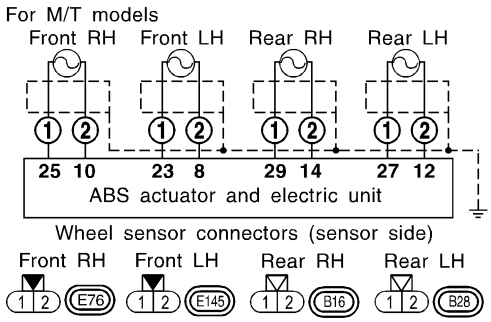
NFBR0136

DIAGNOSTIC PROCEDURE

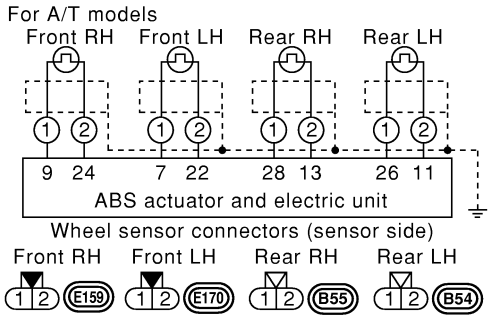
NFBR0136S01

1	INSPECTION START

Wheel sensor inspection



SBR047F



SBR981E

	▶	GO TO 2.

2	CHECK CONNECTOR

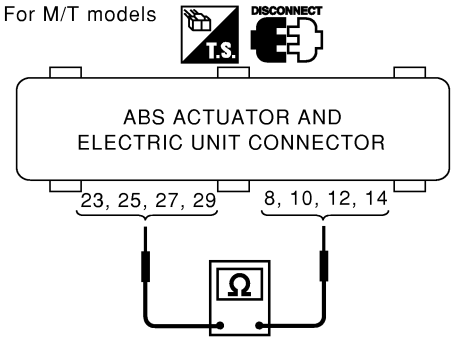
1. Disconnect connectors from control unit and wheel sensor of malfunction detected. Check terminals for damage or loose connections. Then reconnect connectors.
2. Carry out self-diagnosis again.

Does warning lamp activate again?

Yes	▶	For M/T models: GO TO 3.
	▶	For A/T models: GO TO 4.
No	▶	**INSPECTION END**

3	CHECK WHEEL SENSOR CIRCUIT FOR M/T MODELS

1. Disconnect control unit connector.
2. Check resistance between control unit harness connector E9 terminals.
   Front RH wheel
   Terminals 10 (B/W) and 25 (OR)
   Front LH wheel
   Terminals 8 (G) and 23 (R/B)
   Rear RH wheel
   Terminals 14 (B) and 29 (W)
   Rear LH wheel
   Terminals 12 (R/W) and 27 (L/W)
   Resistance: 0.8 - 1.85 kΩ



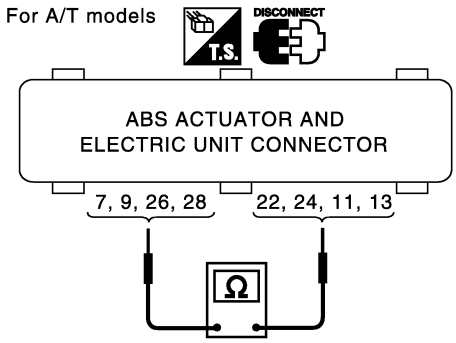
SBR936EA

Is resistance 0.8 - 1.85 kΩ?

Yes	▶	GO TO 6.
No	▶	GO TO 5.

4	CHECK WHEEL SENSOR CIRCUIT FOR A/T MODELS

1. Disconnect control unit connector.
2. Check resistance between control unit connector terminals.
   Front RH wheel
   Terminals 9 (B/W) and 24 (L/OR)
   Front LH wheel
   Terminals 7 (G) and 22 (R/B)
   Rear RH wheel
   Terminals 28 (W) and 13 (B)
   Rear LH wheel
   Terminals 26 (L/W) and 11 (R/W)
   Resistance: 0.8 - 1.85 kΩ



SBR045F

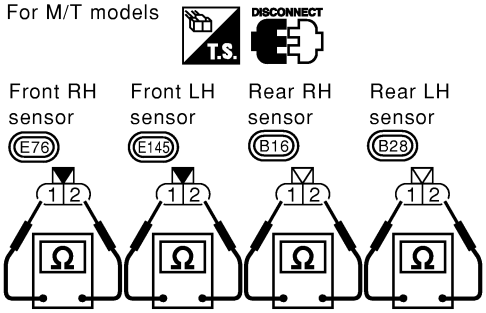
Is resistance 0.8 - 1.85 kΩ?

Yes	▶	GO TO 6.
No	▶	GO TO 5.

5	CHECK WHEEL SENSOR

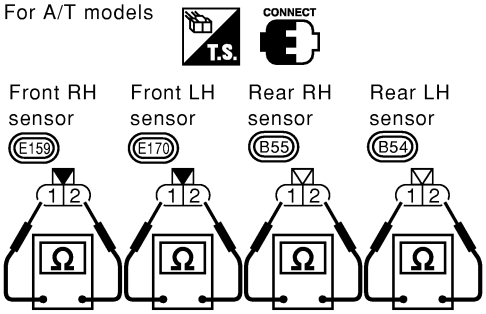
- Check resistance of each sensor. (See NOTE.)
  Resistance: 0.8 - 1.85 kΩ (For M/T model)
- Check signal from sensors by "Simple oscilloscope" function of CONSULT-II (For A/T model) (Scale: 0.2 V/Div, 20 ms/Div)

For M/T models



SBR937E

For A/T models



SBR050F

Is resistance 0.8 - 1.85 kΩ? (For M/T model)/Does the wave appear on screen when wheel is rotated? (For A/T model)

Yes	▶	Repair harness and connectors between control unit connector and wheel sensor connector.
No	▶	Replace wheel sensor.

6	CHECK TIRE

Check for inflation pressure, wear and size of each tire.

Are tire pressure and size correct and is tire wear within specifications?

Yes	▶	GO TO 7.
No	▶	Adjust tire pressure or replace tire(s).

7	CHECK WHEEL BEARING

Check wheel bearing axial end play.
Check clearance between sensor and rotor.

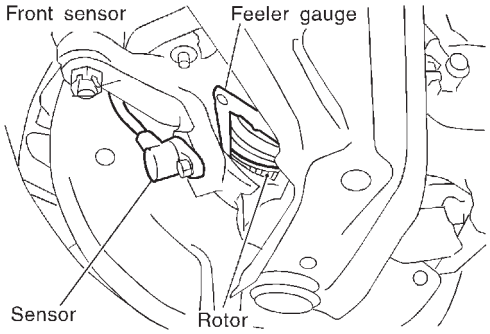
Clearance:

Front

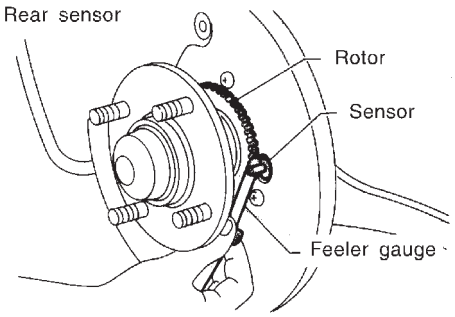
0.273 - 0.925 mm (0.0107 - 0.0364 in)

Rear

0.385 - 0.973 mm (0.0152 - 0.0383 in)



SBR333E



SBR069CA

Is axial end play and clearance within specifications?

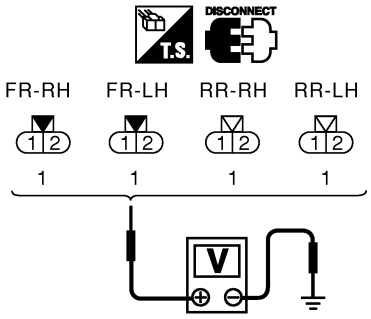
Yes	▶	GO TO 8.
No	▶	Clean sensor fixing portion, or replace sensor.

8	CHECK SENSOR ROTOR

Check sensor rotor for teeth damage.

Is sensor rotor free from damage?

Yes	▶	For M/T models: Check control unit pin terminals for damage or the connection of control unit harness connector. Reconnect control unit harness connector. Then retest. For A/T models: GO TO 9.
No	▶	Replace sensor rotor.

9	CHECK POWER SUPPLY	
1. Disconnect wheel sensor connector. 2. Check voltage between body side terminal of wheel sensor connectors and body ground.  SBR984E **Is voltage more than 8V?**		
Yes	▶	Replace wheel sensor.
No	▶	Replace ABS control unit.

ABS Actuator Solenoid Valve or Solenoid Valve Relay

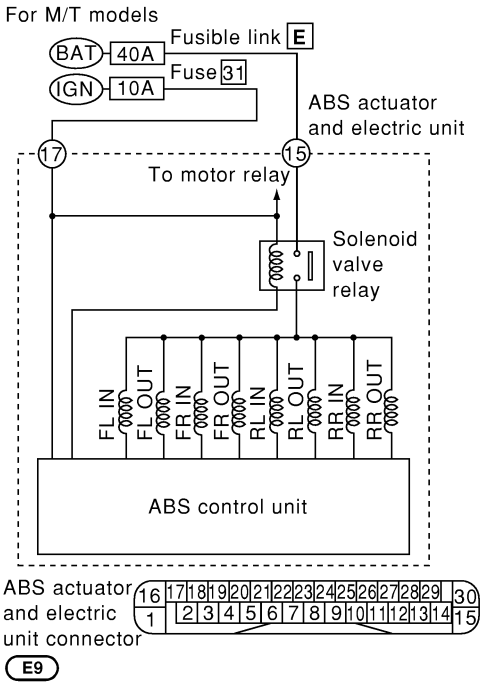
=NFBR0116

DIAGNOSTIC PROCEDURE

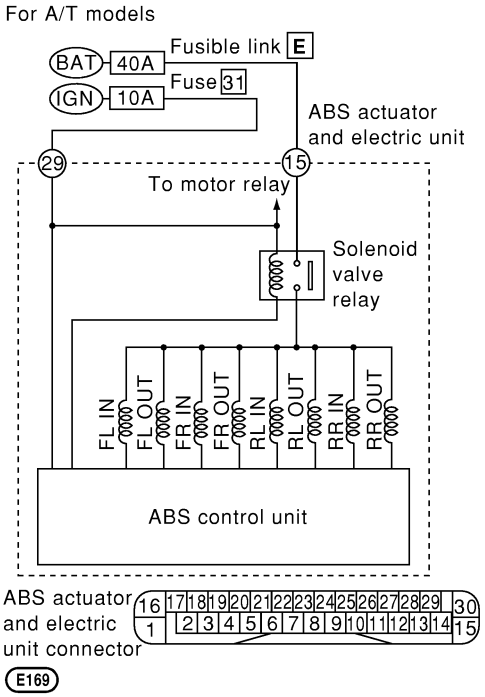
NFBR0116S01

1	INSPECTION START

Solenoid valve relay inspection



SBR938E



SBR987E

▶	GO TO 2.

2	CHECK SOLENOID VALVE POWER SUPPLY CIRCUIT	
Check 40A [**E**] fusible link (ABS ACTR) for ABS solenoid valve relay. For fusible link layout, refer to POWER SUPPLY ROUTING in EL section. **Is fusible link OK?**		
Yes	▶	GO TO 3.
No	▶	GO TO 7.

3	CHECK FUSE	
Check 10A fuse No. 31. For fuse layout, refer to "POWER SUPPLY ROUTING" in EL section. **Is fuse OK?**		
Yes	▶	GO TO 4.
No	▶	GO TO 9.

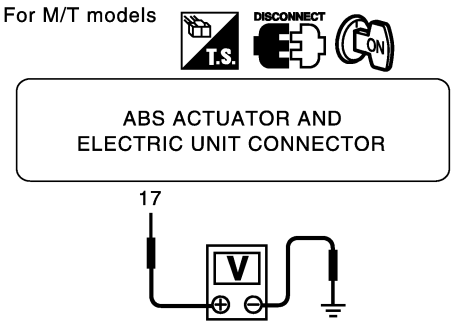
4	CHECK CONNECTOR	
1. Disconnect connectors from control unit and ABS actuator. Check terminals for damage or loose connection. Then reconnect connectors. 2. Carry out self-diagnosis again. **Does warning lamp activate again?**		
Yes	▶	GO TO 5.
No	▶	**INSPECTION END**

5	CHECK GROUND CIRCUIT	
Refer to ABS ACTUATOR AND ELECTRIC UNIT in Ground Circuit Check, BR-60. **Is ground circuit OK?**		
Yes	▶	GO TO 6.
No	▶	Repair harness and connectors.

6	CHECK SOLENOID VALVE POWER SUPPLY CIRCUIT

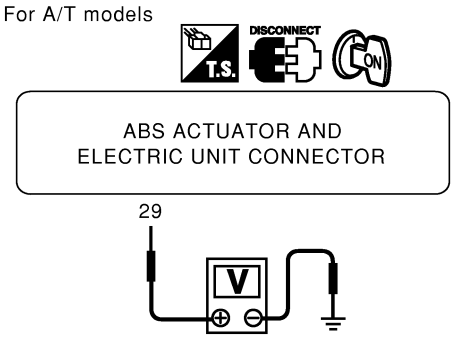
1. Disconnect ABS actuator and electric unit connector.
2. Check voltage between ABS actuator and electric unit harness connector E9 for M/T models/E169 for A/T models, terminals 17 (GY) for M/T models/29 (GY) for A/T models and ground.

For M/T models



SBR049F

For A/T models



SBR993EA

Does battery voltage exist when ignition switch is turned ON?

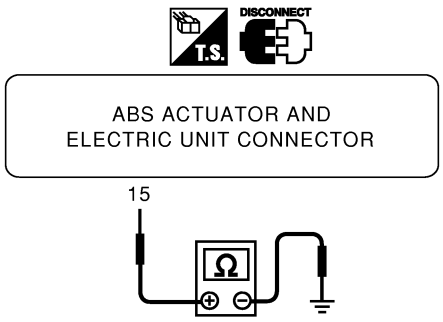
Yes	▶	Replace ABS actuator and electric unit.
No	▶	**Check the following.** ● Harness connector E9 for M/T models and E169 for A/T models. ● Harness for open or short between ABS actuator and electric unit and fusible link If NG, repair harness or connectors.

7	REPLACE FUSIBLE LINK

Replace fusible link.

Does the fusible link blow out when ignition switch is turned "ON"?

Yes	▶	GO TO 8.
No	▶	**INSPECTION END**

8	CHECK RELAY UNIT POWER SUPPLY CIRCUIT FOR SHORT	
1. Disconnect battery cable and ABS actuator and electric unit connector. 2. Check continuity between ABS actuator and electric unit harness connector E9 for M/T models/E169 for A/T models, terminal 15 (L/B) and ground.  SBR940EA **Does continuity exist?**		
Yes	▶	**Check the following.** ● Harness connector E9 for M/T models and E169 for A/T models. ● Harness for open or short between ABS actuator and electric unit and fusible link If NG, repair harness or connectors.
No	▶	Replace ABS actuator and electric unit.

9	REPLACE FUSE	
Replace fuse. **Does the fuse blow out when ignition switch is turned "ON"?**		
Yes	▶	**Check the following.** ● Harness connector E9 for M/T models and E169 for A/T models. ● Harness for open or short between ABS actuator and electric unit and fuse If NG, repair harness or connectors.
No	▶	**INSPECTION END**

Motor Relay or Motor

=NFBR0117

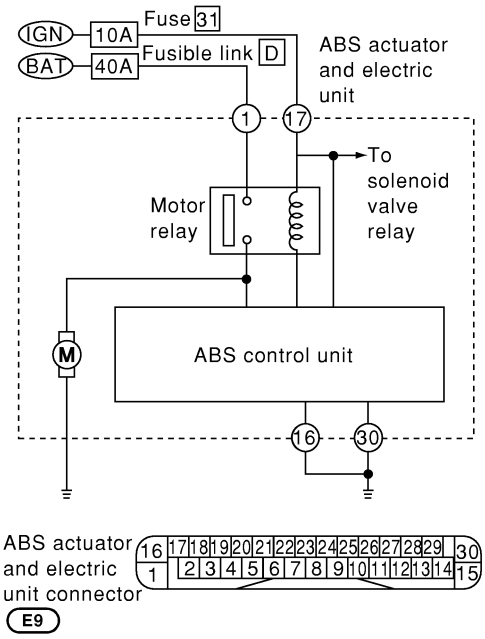
DIAGNOSTIC PROCEDURE

NFBR0117S01

1	INSPECTION START

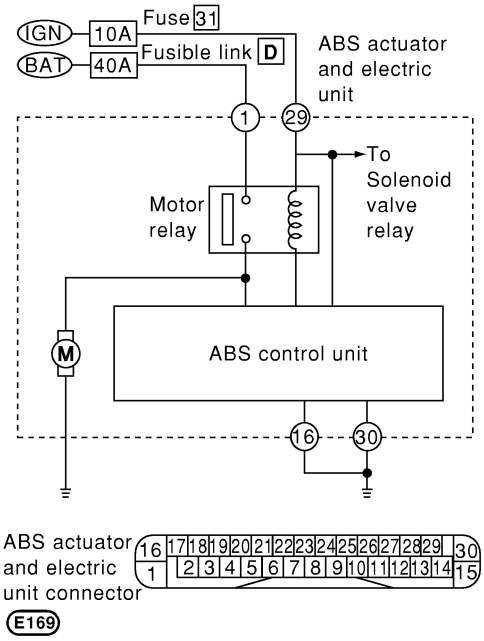
ABS motor relay inspection

For M/T models



SBR990E

For A/T models

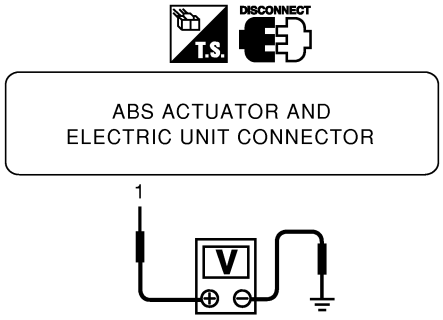


SBR941E

▶	GO TO 2.

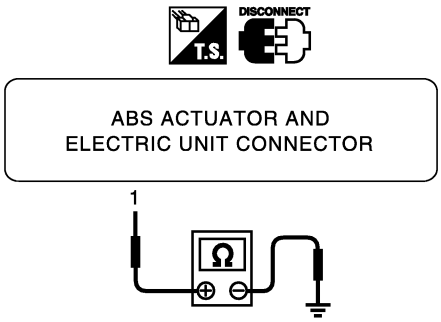
2	CHECK MOTOR POWER SUPPLY CIRCUIT	
Check 40A [**D**] fusible link (ABS MTR) for ABS motor relay. For fusible link layout, refer to POWER SUPPLY ROUTING in EL section. **Is fusible link OK?**		
Yes	▶	GO TO 3.
No	▶	GO TO 6.

3	CHECK CONNECTOR	
1. Disconnect ABS actuator and electric unit connector. Check terminals for damage or loose connection. Then reconnect connectors. 2. Carry out self-diagnosis again. **Does warning lamp activate again?**		
Yes	▶	GO TO 4.
No	▶	**INSPECTION END**

4	CHECK MOTOR RELAY POWER SUPPLY CIRCUIT	
1. Disconnect ABS actuator and electric unit connector. 2. Check voltage between ABS actuator and electric unit harness connector E9 for M/T models/E169 for A/T models, terminal 1 (Y) and ground.		
 SBR942EA **Does battery voltage exist?**		
Yes	▶	GO TO 5.
No	▶	**Check the following.** ● Harness connector E9 for M/T models and E169 for A/T models. ● Harness for open or short between ABS actuator and electric unit and fusible link If NG, repair harness or connectors.

5	CHECK ABS ACTUATOR AND ELECTRIC UNIT GROUND CIRCUIT	
Refer to ABS ACTUATOR AND ELECTRIC UNIT GROUND in Ground Circuit Check, BR-60. **Is ground circuit OK?**		
Yes	▶	Replace ABS actuator and electric unit.
No	▶	**Check the following.** ● Harness connector E9 for M/T models and E169 for A/T models. ● Harness for open or short between ABS actuator and electric unit and ground If NG, repair harness or connectors.

6	REPLACE FUSIBLE LINK	
Replace fusible link. **Does the fusible link blow out when ignition switch is turned "ON"?**		
Yes	▶	GO TO 7.
No	▶	**INSPECTION END**

7	CHECK ABS ACTUATOR MOTOR POWER SUPPLY CIRCUIT	
1. Disconnect battery cable and ABS actuator and electric unit connector. 2. Check continuity between ABS actuator and electric unit harness connector E9 for M/T models/E169 for A/T models, terminal 1 (Y) and ground.  SBR037F **Does continuity exist?**		
Yes	▶	Check ABS actuator and electric unit pin terminals for damage or the connection of ABS actuator and electric unit harness connector. Reconnect ABS actuator and electric unit harness connector. Then retest.
No	▶	**Check the following.** ● Harness connector E9 for M/T models and E169 for A/T models. ● Harness for open or short between ABS actuator and electric unit and fusible link If NG, repair harness or connectors.

Low Voltage

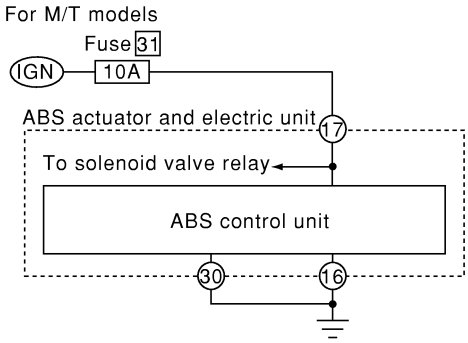
NFBR0154

DIAGNOSTIC PROCEDURE

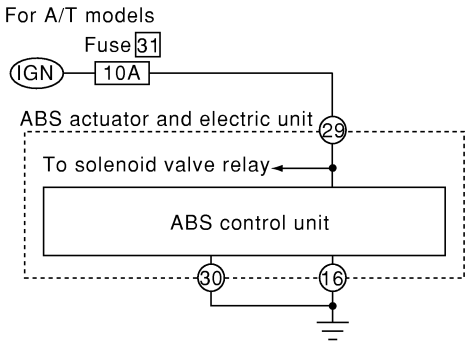
NFBR0154S01

1	INSPECTION START

ABS actuator and electric unit power supply and ground circuit inspection



SBR943E



SBR992E

	▶	GO TO 2.

2	CHECK CONNECTOR

1. Disconnect ABS actuator and electric unit connector. Check terminals for damage or loose connections. Then reconnect connector.
2. Carry out self-diagnosis again.

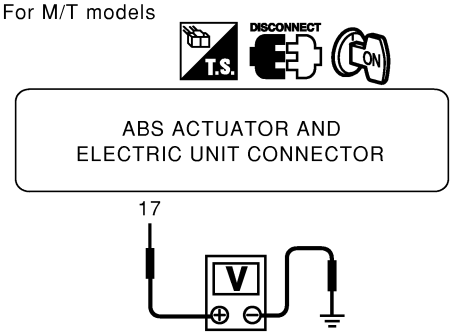
Does warning lamp activate again?

Yes	▶	GO TO 3.
No	▶	**INSPECTION END**

3	CHECK ABS ACTUATOR AND ELECTRIC UNIT POWER SUPPLY CIRCUIT

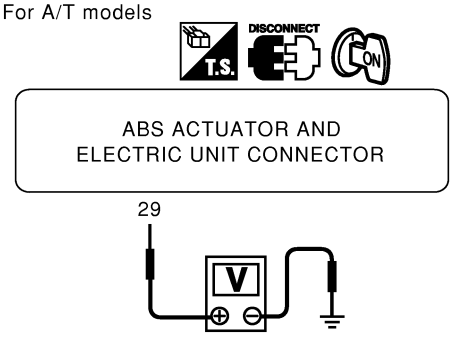
1. Disconnect ABS actuator and electric unit connector.
2. Check voltage between ABS actuator and electric unit harness connector E9 for M/T models/E169 for A/T models, terminal 17 (GY) for M/T models/29 (GY) for A/T models and ground.

For M/T models



SBR944EA

For A/T models



SBR993EA

Does battery voltage exist when ignition switch is turned ON?

Yes	▶	GO TO 4.
No	▶	GO TO 5.

4	CHECK ABS ACTUATOR AND ELECTRIC UNIT GROUND

Refer to ABS ACTUATOR AND ELECTRIC UNIT GROUND in Ground Circuit Check, BR-60.

Is ground circuit OK?

OK	▶	Check ABS actuator and electric unit pin terminals for damage or the connection of ABS actuator and electric unit harness connector. Reconnect ABS actuator and electric unit harness connector. Then retest.
NG	▶	**Check the following.** ● Harness connector E9 for M/T models and E169 for A/T models. ● Harness for open or short between ABS actuator and electric unit and ground If NG, repair harness or connectors.

5	CHECK FUSE

Check 10A fuse 31 (Engine control) for control unit. Refer to POWER SUPPLY ROUTING in EL section.

Is fuse OK?

Yes	▶	GO TO 6.
No	▶	Replace fuse.

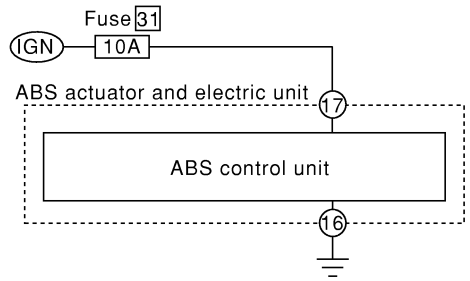
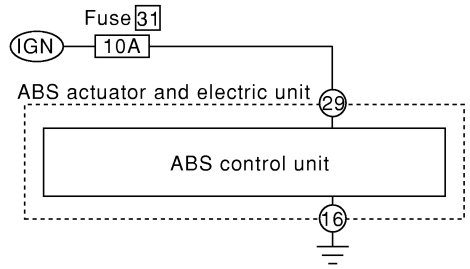
6	CHECK ABS ACTUATOR AND ELECTRIC UNIT POWER SUPPLY CIRCUIT	
Check continuity between battery and ABS actuator and electric unit connector terminal 17 for M/T models/29 for A/T models. **Does continuity exist?**		
Yes	▶	Check battery. Refer to BATTERY in EL section.
No	▶	**Check the following.** ● Harness connector E9 for M/T models and E169 for A/T models. ● Harness for open or short between ABS actuator and electric unit and fuse If NG, repair harness or connectors.

Control Unit

NFBR0137

DIAGNOSTIC PROCEDURE

NFBR0137S01

1	INSPECTION START	
ABS actuator and electric unit power supply and ground circuit inspection For M/T models  SBR945E For A/T models  SBR994E		
	▶	GO TO 2.

2	CHECK CONNECTOR	
1. Disconnect ABS actuator and electric unit connector. Check terminals for damage or loose connections. Then reconnect connectors. 2. Carry out self-diagnosis again. **Does warning lamp activate again?**		
Yes	▶	GO TO 3.
No	▶	**INSPECTION END**

3	CHECK ABS ACTUATOR AND ELECTRIC UNIT POWER SUPPLY CIRCUIT	
Check voltage. Refer to "3. CHECK ABS ACTUATOR AND ELECTRIC UNIT POWER SUPPLY CIRCUIT" in "Low Voltage", BR-73. **Does battery voltage exist when ignition switch is turned ON?**		
Yes	▶	GO TO 4.
No	▶	Repair.

4	CHECK SELF-DIAGNOSIS RESULT	
Is "Control unit" indicated on SELF-DIAGNOSIS RESULT again?		
Yes	▶	Replace ABS actuator and electric unit.
No	▶	Inspect the system according to the SELF-DIAGNOSIS RESULT.

1. ABS Works Frequently

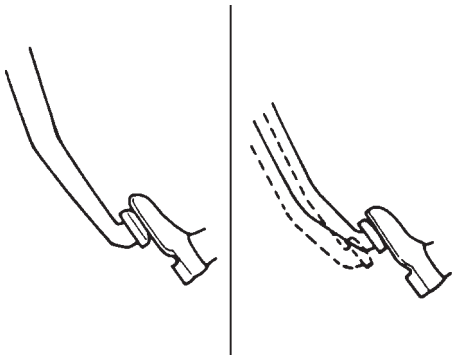
NFBR0138

1	CHECK WHEEL SENSOR	
1. Check wheel sensor connector for terminal damage or loose connections. 2. Perform wheel sensor mechanical check. Refer to “Wheel Sensor or Rotor”, BR-61. **Are wheel sensors functioning properly?**		
Yes	▶	GO TO 2.
No	▶	Repair.

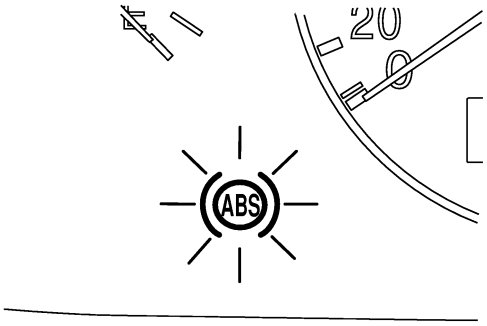
2	CHECK FRONT AND REAR AXLES	
Check front and rear axles for excessive looseness. Refer to AX section, “Front Wheel Bearing”, “ON-VEHICLE SERVICE” and “Rear Wheel Bearing”, “ON-VEHICLE SERVICE”. **Is front axle installed properly?**		
Yes	▶	Go to “3. CHECK WARNING LAMP INDICATION” in “2. Unexpected Pedal Action”, BR-77.
No	▶	Repair.

2. Unexpected Pedal Action

NFBR0139

1	CHECK BRAKE PEDAL STROKE	
Check brake pedal stroke. Is stroke excessively large?  SBR540A		
Yes	▶	Perform Preliminary Check. Refer to BR-57.
No	▶	GO TO 2.

2	CHECK CONNECTOR AND PERFORMANCE	
1. Disconnect ABS actuator and electric unit connector. 2. Check whether brake is effective. **Yes or No?**		
Yes	▶	GO TO 3.
No	▶	Perform Preliminary Check. Refer to BR-57.

3	CHECK WARNING LAMP INDICATION	
Ensure warning lamp remains off while driving.  SBR588E **Is warning lamp turned off?**		
Yes	▶	GO TO 4.
No	▶	Carry out self-diagnosis. Refer to BR-48.

4	CHECK WHEEL SENSOR	
1. Check wheel sensor connector for terminal damage or loose connection. 2. Perform wheel sensor mechanical check. **Is wheel sensor mechanism OK?**		
Yes	▶	Check ABS actuator and electric unit pin terminals for damage or the connection of ABS actuator and electric unit harness connector. Reconnect ABS actuator and electric unit harness connector. Then retest.
No	▶	Repair.

3. Long Stopping Distance

NFBR0140

1	CHECK CONNECTOR AND PERFORMANCE	
1. Cancel ABS by disconnecting ABS actuator and electric unit connector. 2. Check whether stopping distance is still long. **OK or NG**		
OK	▶	Perform Preliminary Check and air bleeding.
NG	▶	Go to "3. CHECK WARNING LAMP INDICATION" in "2. Unexpected Pedal Action", BR-77.

NOTE:
Stopping distance may be longer than vehicles without ABS when road condition is slippery.

4. ABS Does Not Work

NFBR0141

1	CHECK WARNING LAMP INDICATION	
Does the ABS warning lamp activate?		
Yes	▶	Carry out self-diagnosis. Refer to BR-48.
No	▶	Go to “3. CHECK WARNING LAMP INDICATION” in “2. Unexpected Pedal Action”, BR-77.

NOTE:
ABS does not work when vehicle speed is under 10 km/h (6 MPH).

5. Pedal Vibration and Noise

=NFBR0142

1	INSPECTION START	
Pedal vibration and noise inspection Brake pedal SAT797A		
	▶	GO TO 2.

2	CHECK SYMPTOM	
1. Apply brake. 2. Start engine. **Does the symptom appear only when engine is started?**		
Yes	▶	Carry out self-diagnosis. Refer to BR-48.
No	▶	GO TO 3.

3	RECHECK SYMPTOM	
Does the symptom appear when electrical equipment switches (such as headlamp) are operated?		
Yes	▶	**INSPECTION END**
No	▶	Go to “3. CHECK WARNING LAMP INDICATION” in “2. Unexpected Pedal Action”, BR-77.

NOTE:
ABS may operate and cause vibration under any of the following conditions.

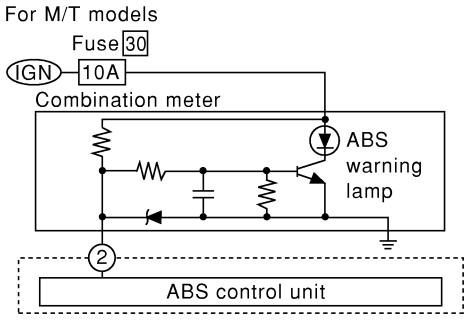
- Applying brake gradually when shifting or operating clutch.
- Low friction (slippery) road.
- High speed cornering.
- Driving over bumps and pot holes.
- Engine speed is over 5,000 rpm with vehicle stopped.

6. ABS Warning Lamp Does Not Come On When Ignition Switch Is Turned On

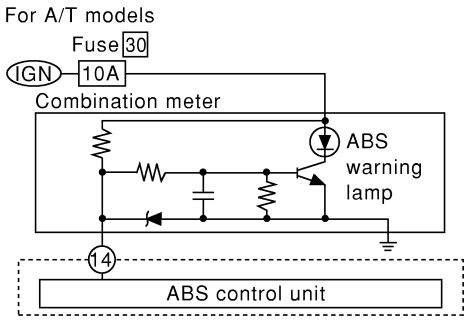
=NFBR0143

1	INSPECTION START

Warning lamp circuit inspection



SBR946E



SBR996E

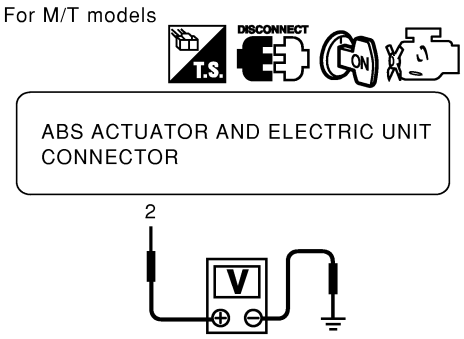
	▶	GO TO 2.

2	CHECK FUSE	
Check 10A fuse No. 30 for warning lamp. For fuse layout, refer to “POWER SUPPLY ROUTING” in EL section.		
Is fuse OK?		
Yes	▶	GO TO 3.
No	▶	Replace fuse.

3	CHECK ABS CONTROL UNIT POWER SUPPLY CIRCUIT

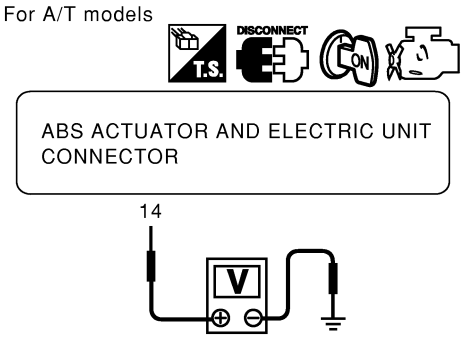
1. Install 10A fuse.
2. Check voltage between control unit harness connector E9 for M/T models/E169 for A/T models, terminal 2 (L/Y) for M/T models/14 (L/Y) for A/T models and ground after turning ignition switch "ON".

For M/T models



SBR947EA

For A/T models



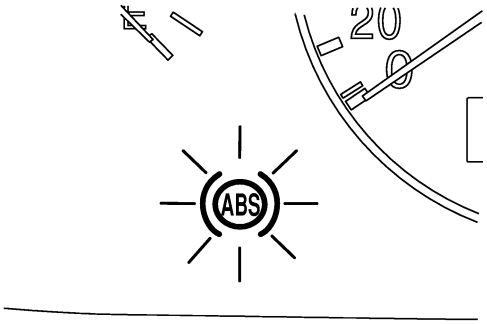
SBR995EA

Does battery voltage exist after turning ignition switch "ON"?

Yes	▶	GO TO 5.
No	▶	GO TO 4.

4	CHECK WARNING LAMP INDICATION

Disconnect ABS actuator and electric unit connector.



SBR588E

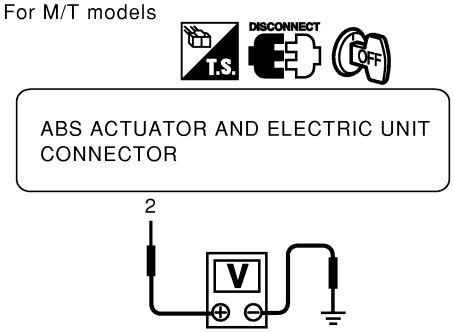
Does the ABS warning lamp activate?

Yes	▶	GO TO 6.
No	▶	GO TO 5.

5	CHECK HARNESS FOR SHORT

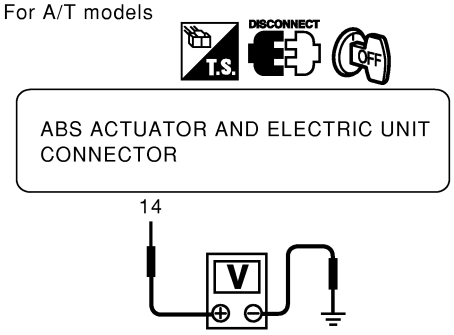
1. Disconnect ABS actuator and electric unit connector.
2. Check voltage between ABS actuator and electric unit harness connector E9 for M/T models/E169 for A/T models, terminal 2 (L/R) for M/T models/14 (L/R) for A/T models and ground.

For M/T models



SBR948EA

For A/T models



SBR997EA

Does battery voltage exist?

Yes	▶	Check combination meter. Refer to WARNING LAMPS in EL section.
No	▶	Repair harness and connectors between fuse and ABS actuator and electric unit connector terminal 2 for M/T models and 14 for A/T models.

6	CHECK HARNESS CONNECTOR

Check ABS actuator and electric unit pin terminals for damage or connection of ABS actuator and electric unit harness connector. Reconnect ABS actuator and electric unit harness connector. Then reset.

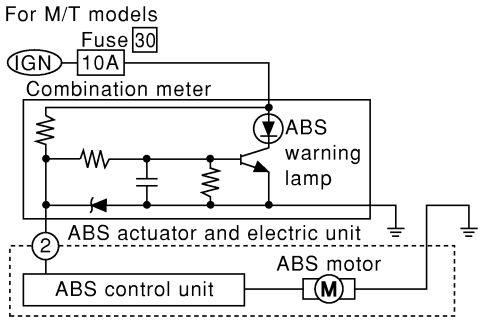
OK	▶	**INSPECTION END**
NG	▶	Replace ABS actuator and electric unit.

7. ABS Warning Lamp Stays On When Ignition Switch Is Turned On

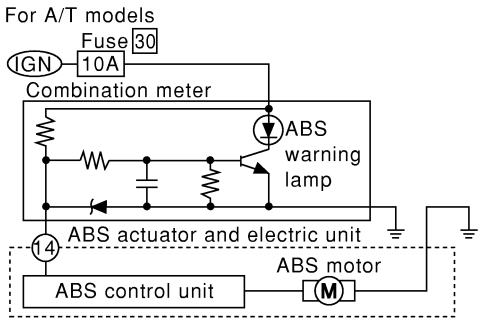
=NFBR0144

1	INSPECTION START

ABS control unit inspection



SBR949E



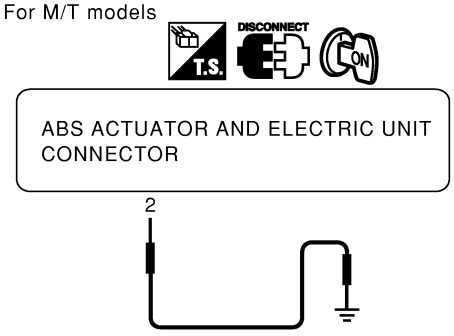
SBR998E

▶	GO TO 2.

2	CHECK WARNING LAMP

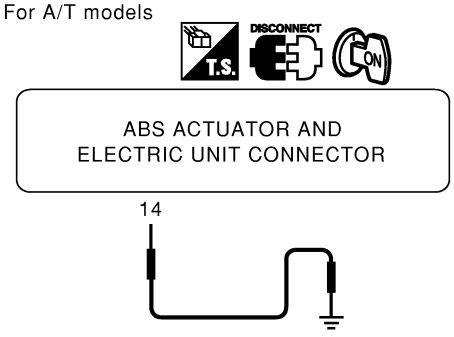
1. Disconnect ABS actuator and electric unit connector.
2. Connect suitable wire between ABS actuator and electric unit harness connector E9 for M/T models/E169 for A/T models, terminal 2 (L/R) for M/T models/14 (L/R) for A/T models and ground.

For M/T models



SBR950EA

For A/T models



SBR999EA

Does warning lamp activate?

Yes	▶	GO TO 3.
No	▶	**Repair combination meter. Check the following.** ● Harness connector E9 for M/T models/14 for A/T models. ● Harness for open or short between ABS actuator and electric unit and fuse If NG, repair harness or connector.

3	CHECK HARNESS CONNECTOR

Check ABS actuator and electric unit pin terminals for damage or the connection of ABS actuator and electric unit harness connector. Reconnect ABS actuator and electric unit harness connector. Then retest.

OK	▶	**INSPECTION END**
NG	▶	GO TO 4.

4	CHECK ABS MOTOR GROUND

1. Turn ignition switch "OFF".
2. Check continuity between ABS motor and ground.

Does continuity exist?

Yes	▶	Replace ABS actuator and electric unit.
No	▶	**Check the following.** ● ABS motor ground harness ● ABS motor ground harness for open or short between ABS motor and ground If NG, repair harness.

Purpose

NFBR0048

The ABS consists of electronic and hydraulic components. It allows for control of braking force so that locking of the wheels can be avoided.
The ABS:

1) Ensures proper tracking performance through steering wheel operation.
2) Enables obstacles to be avoided through steering wheel operation.
3) Ensures vehicle stability by preventing flat spins.

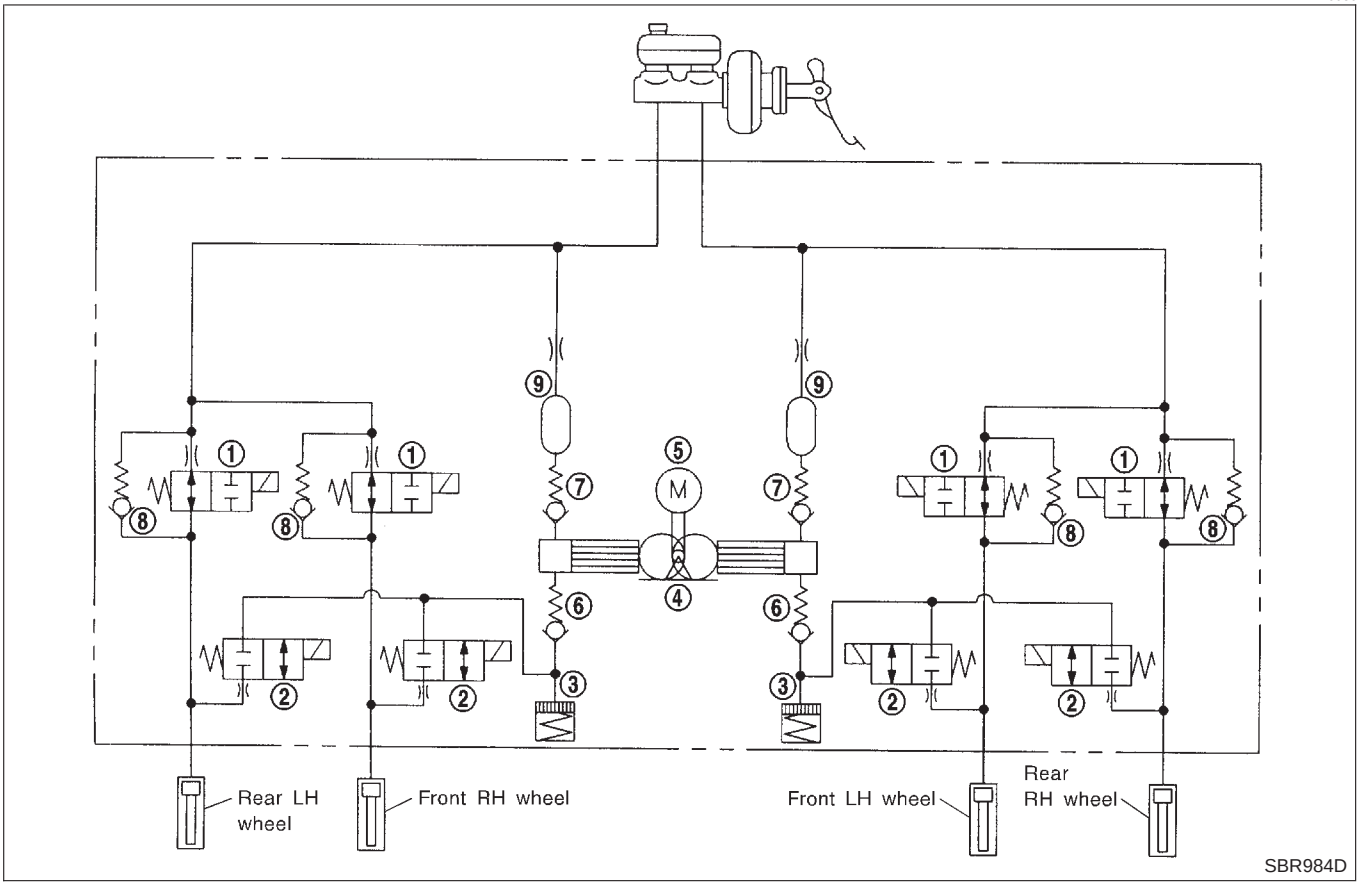
ABS (Anti-Lock Brake System) Operation

NFBR0049

- When the vehicle speed is less than 10 km/h (6 MPH) this system does not work.
- The Anti-Lock Brake System (ABS) has self-test capabilities. The system turns on the ABS warning lamp for 1 second after turning the ignition switch ON. The system performs another test the first time the vehicle reaches 6 km/h (4 MPH). A mechanical noise may be heard as the ABS performs a self-test. This is a normal part of the self-test feature. If a malfunction is found during this check, the ABS warning lamp will come on.
- During ABS operation, a mechanical noise may be heard. This is a normal condition.

ABS Hydraulic Circuit

NFBR0050



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

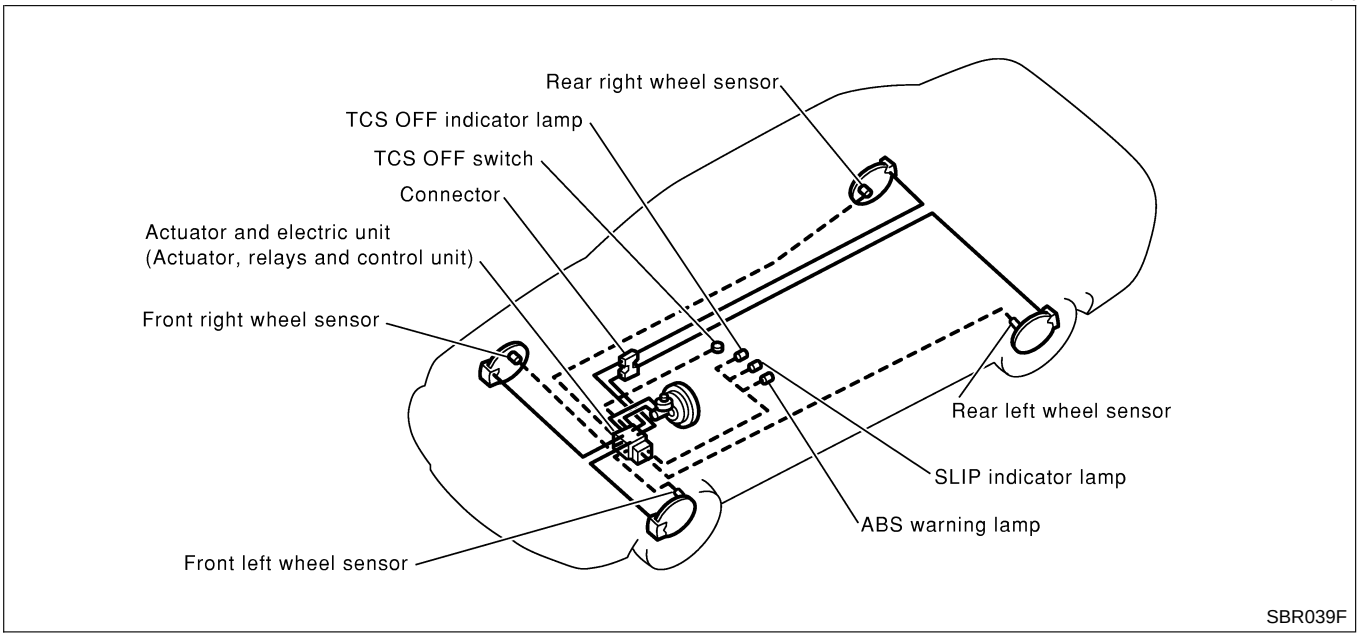
TCS (Traction Control System) Operation

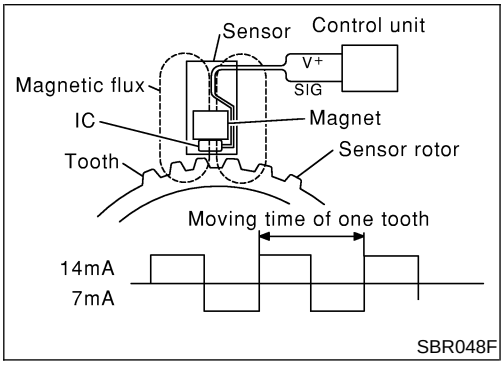
=NFBR0145

- This system is designed to limit wheel slip during acceleration by cutting fuel to selected cylinders and changing transmission shift schedule.
  The ABS/TCS control unit monitors wheel speed slips through the ABS wheel sensors and determines the desired torque reduction needed to minimize wheel spin.
  The torque reduction by the ABS/TCS control unit may result in a combination of fuel cutoff, throttle control, and change shift timing of the transmission.
  The torque reduction is sent from the ABS/TCS control unit through the data link to the ECM and TCM. The ECM will cut off fuel and/or close throttle valve little bit, and/or TCM change shift schedule to achieve torque reduction.
  The TCS will be enabled when the TCS switch is in the ON position (TCS OFF indicator not illuminated), and if the catalytic converter temperature is within normal operating range.
- This system has a self-diagnostic function. When the ignition switch is initially turned “ON”, the SLIP indicator lamp and TCS OFF indicator lamp light. If there is no problem with the ABS and TCS, both indicator lamps will go out as soon as the engine starts.
- The TCS OFF switch cancels the TCS function. The TCS OFF indicator lamp then lights to indicate that the TCS is not operating.
- This system utilizes a fuel-cut function to control drive torque. If fuel cut continues for an extended period of time during high-speed operations, the catalyst may melt and deteriorate. During continued TCS operations, the system will sometimes suspend the drive torque control function, preventing catalyst melting and deterioration.

System Components

NFBR0146





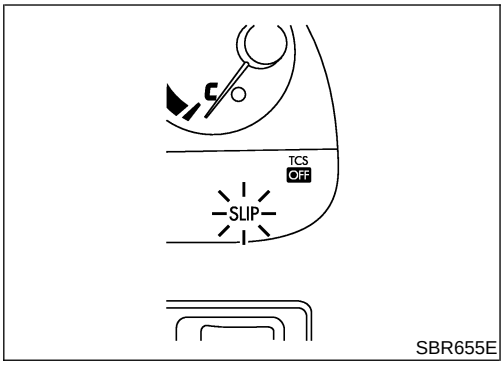
System Description

NFBR0147

SENSOR

NFBR0147S01

The front sensor units consist of a gear-shaped sensor rotor and a sensor element. the element contains a magnet and IC. The front wheel sensors are installed on the front of the wheel knuckles. As the wheel rotates, the sensor generates a square-wave signal. The frequency increase as the wheel speed increases.



SBR655E

CONTROL UNIT

NFBR0147S02

ABS Function

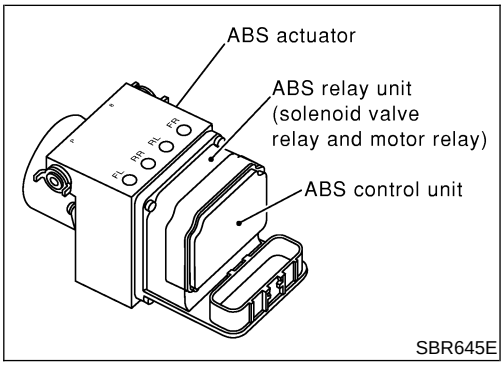
NFBR0147S0201

The control unit computes the wheel rotating speed by the signal current sent from the sensor. Then it supplies a DC current to the actuator solenoid valve. It also controls ON-OFF operation of the valve relay and motor relay. If any electrical malfunction should be detected in the system, the warning lamp is turned on. In this condition, the ABS will be deactivated, and the vehicle's brake system reverts to normal operation.

TCS Function

NFBR0147S0202

Drive wheel slippage is detected by the 4-wheel rotating speed signal. When the wheel slip becomes excessive, the TCS operates, causing the SLIP indicator lamp to flash. And, at the same time, fuel-cut and throttle opening signals are sent to the ECM and a signal requiring a change in the shift schedule is sent to the TCM. When the TCS OFF switch is used to cancel TCS function, the TCS OFF indicator lamp will light. (TCS does not activate.) In case of a malfunction in the TCS, both the SLIP indicator lamp and the TCS OFF indicator lamp will light, while shutting down the TCS system operation. The vehicle will operate in the same way as a vehicle not equipped with the TCS.



SBR645E

ACTUATOR

NFBR0147S03

The actuator contains:

- An electric motor and pump
- Two relays
- Eight solenoid valves, each inlet and outlet for
  - — LH front
  - — RH front
  - — LH rear
  - — RH rear

These components control the hydraulic circuit. The ABS control unit directs the actuator to increase, hold or decrease hydraulic pressure to all or individual wheels.

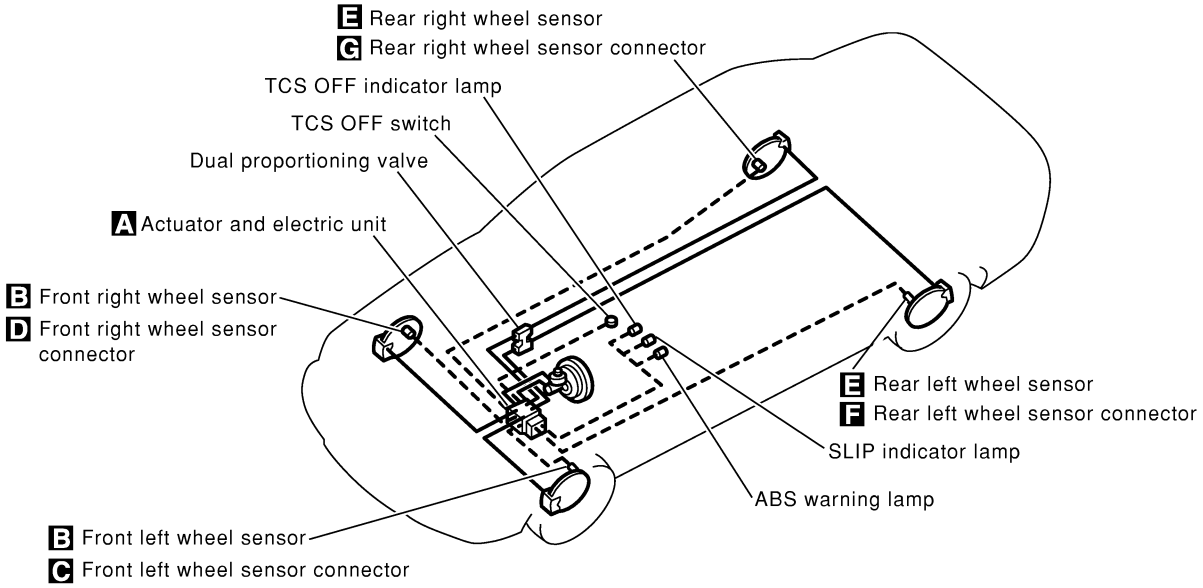
ABS Actuator Operation

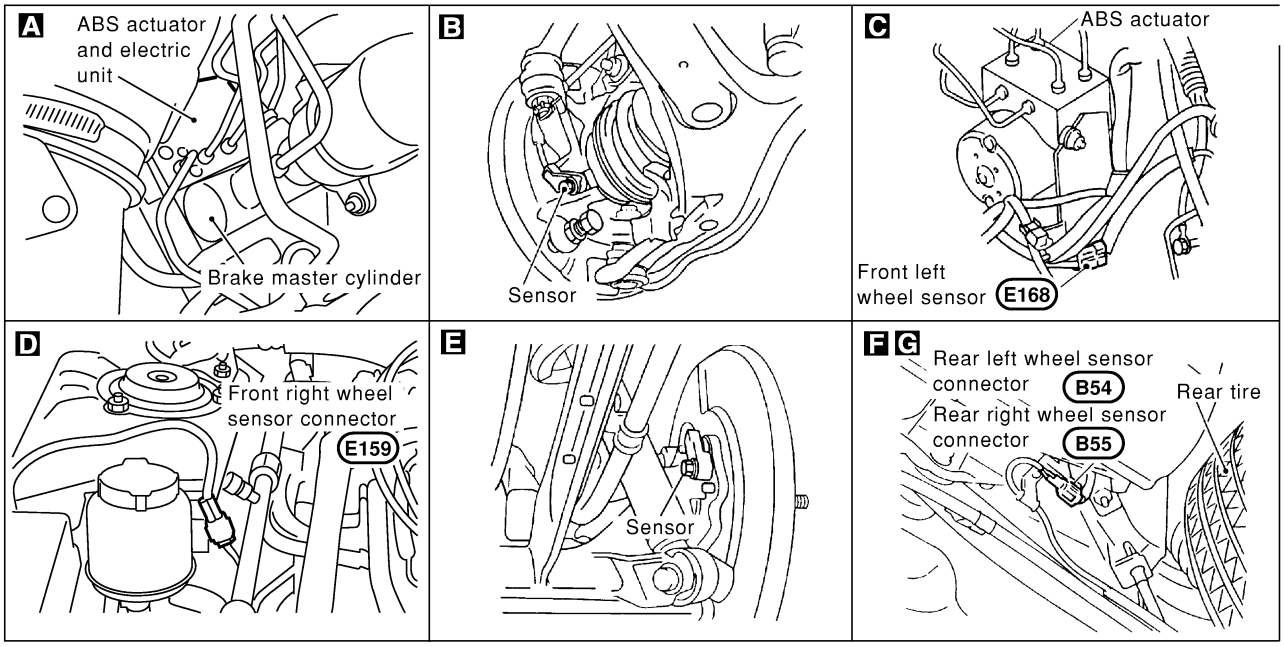
NFBR0147S0301

		Inlet solenoid valve	Outlet solenoid valve	
Normal brake operation		OFF (Open)	OFF (Closed)	Master cylinder brake fluid pressure is directly transmitted to caliper via the inlet solenoid valve.
ABS operation	Pressure hold	ON (Closed)	OFF (Closed)	Hydraulic circuit is shut off to hold the caliper brake fluid pressure.
	Pressure decrease	ON (Closed)	ON (Open)	Caliper brake fluid is sent to reservoir via the outlet solenoid valve. Then it is pushed up to the master cylinder by pump.
	Pressure increase	OFF (Open)	OFF (Closed)	Master cylinder brake fluid pressure is transmitted to caliper.

Component Parts and Harness Connector Location

NFBR0053

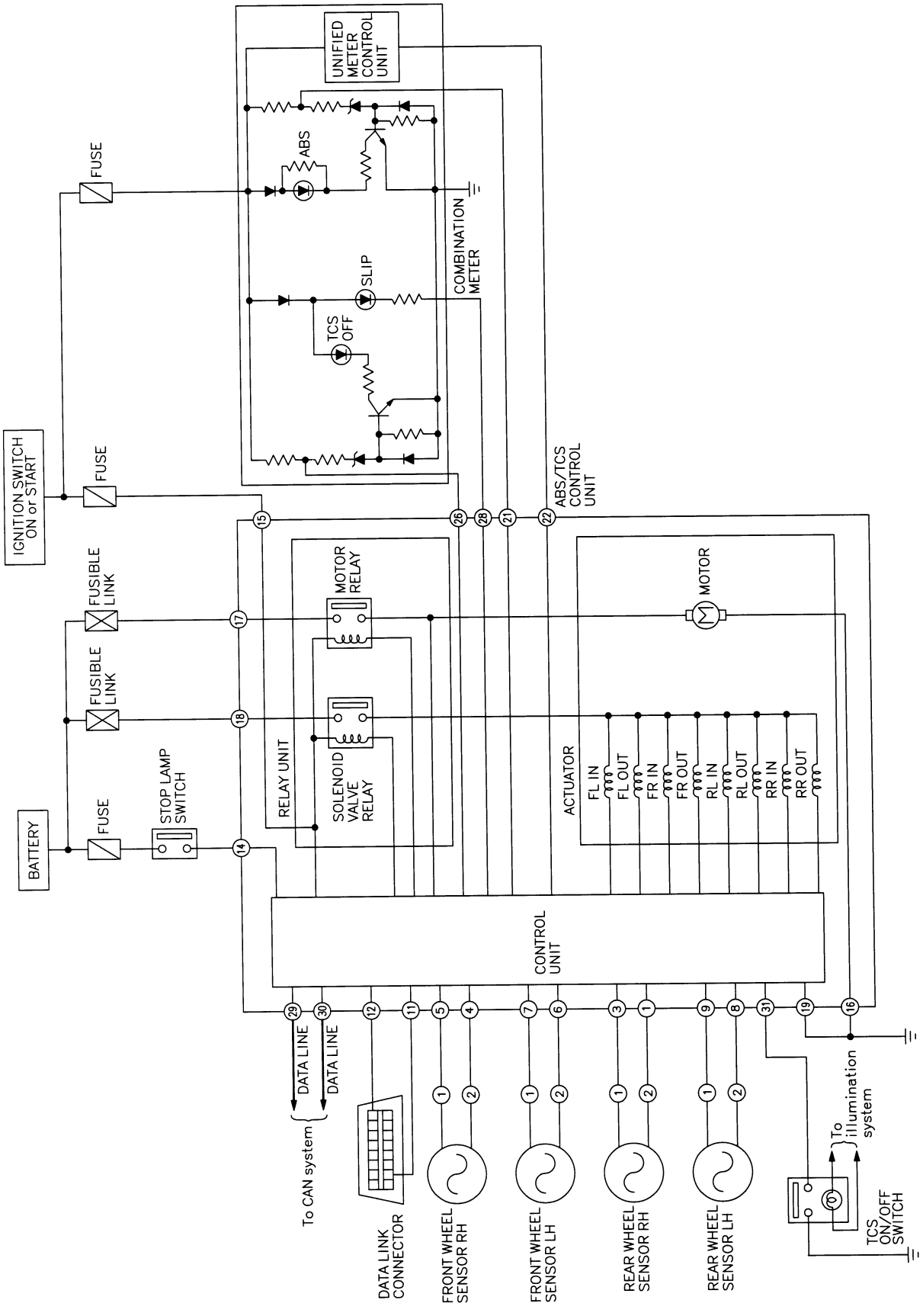




SBR903E

Schematic

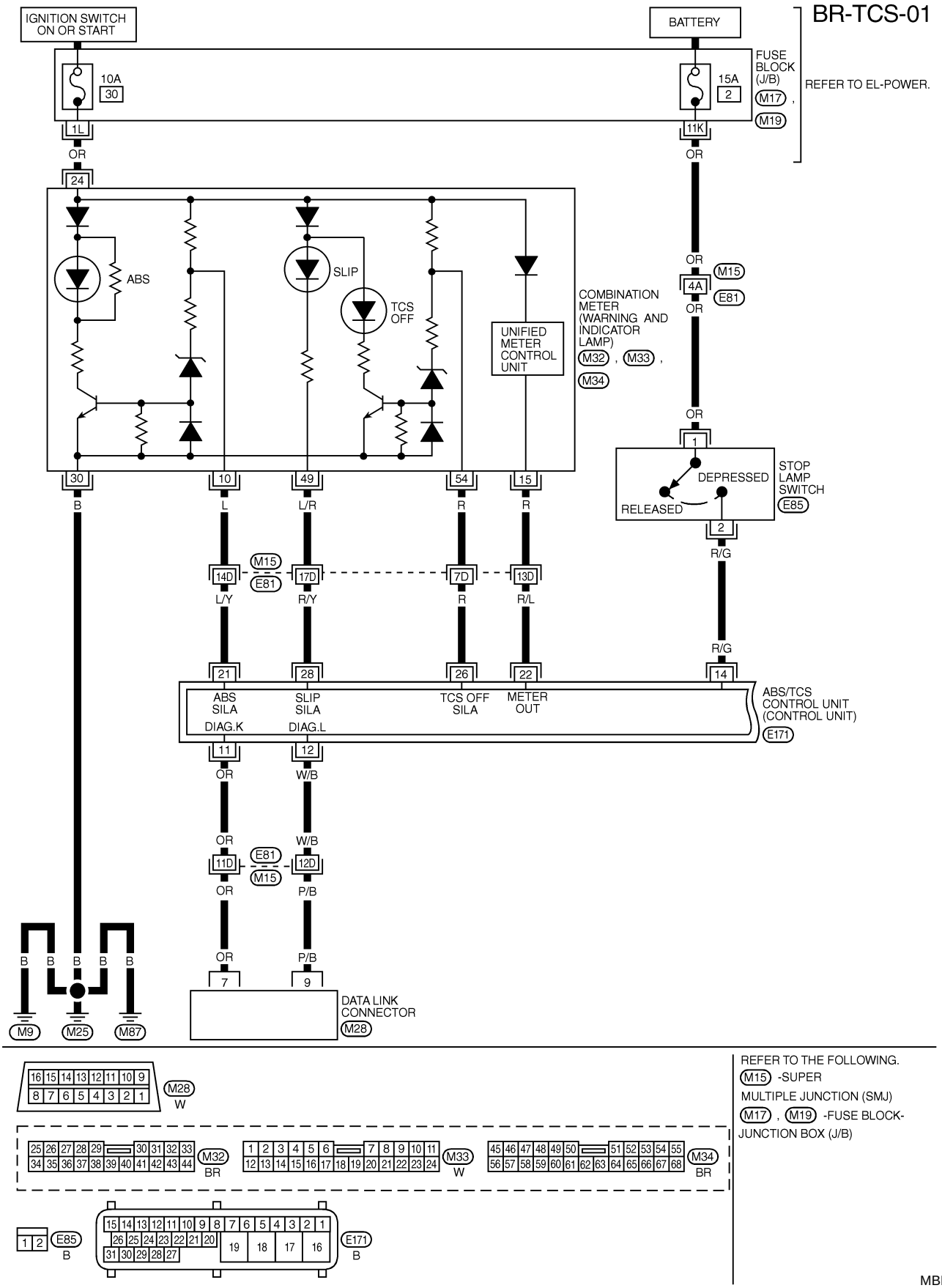
NFBR0148



MBR602A

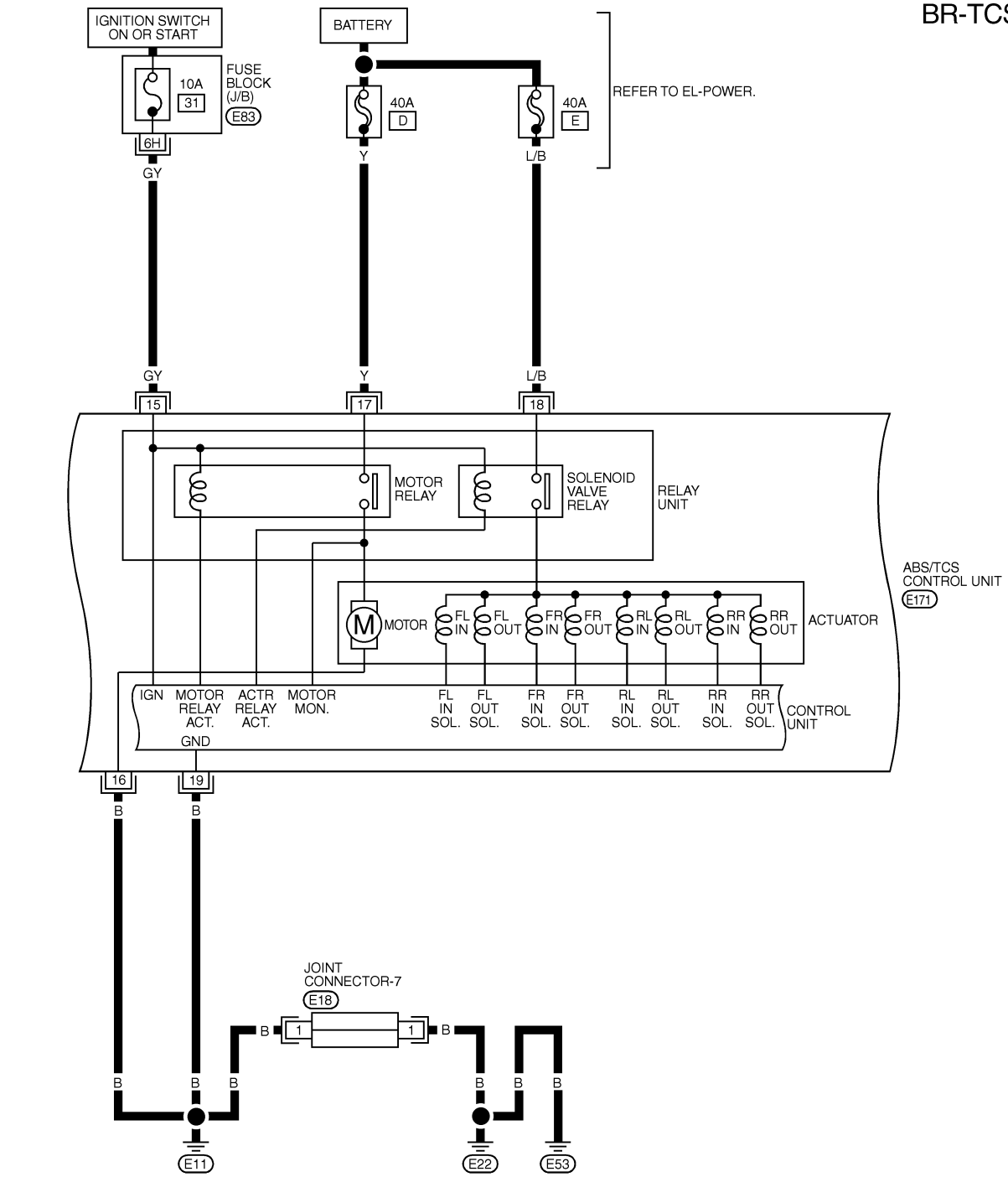
Wiring Diagram — TCS —

NFBR0149



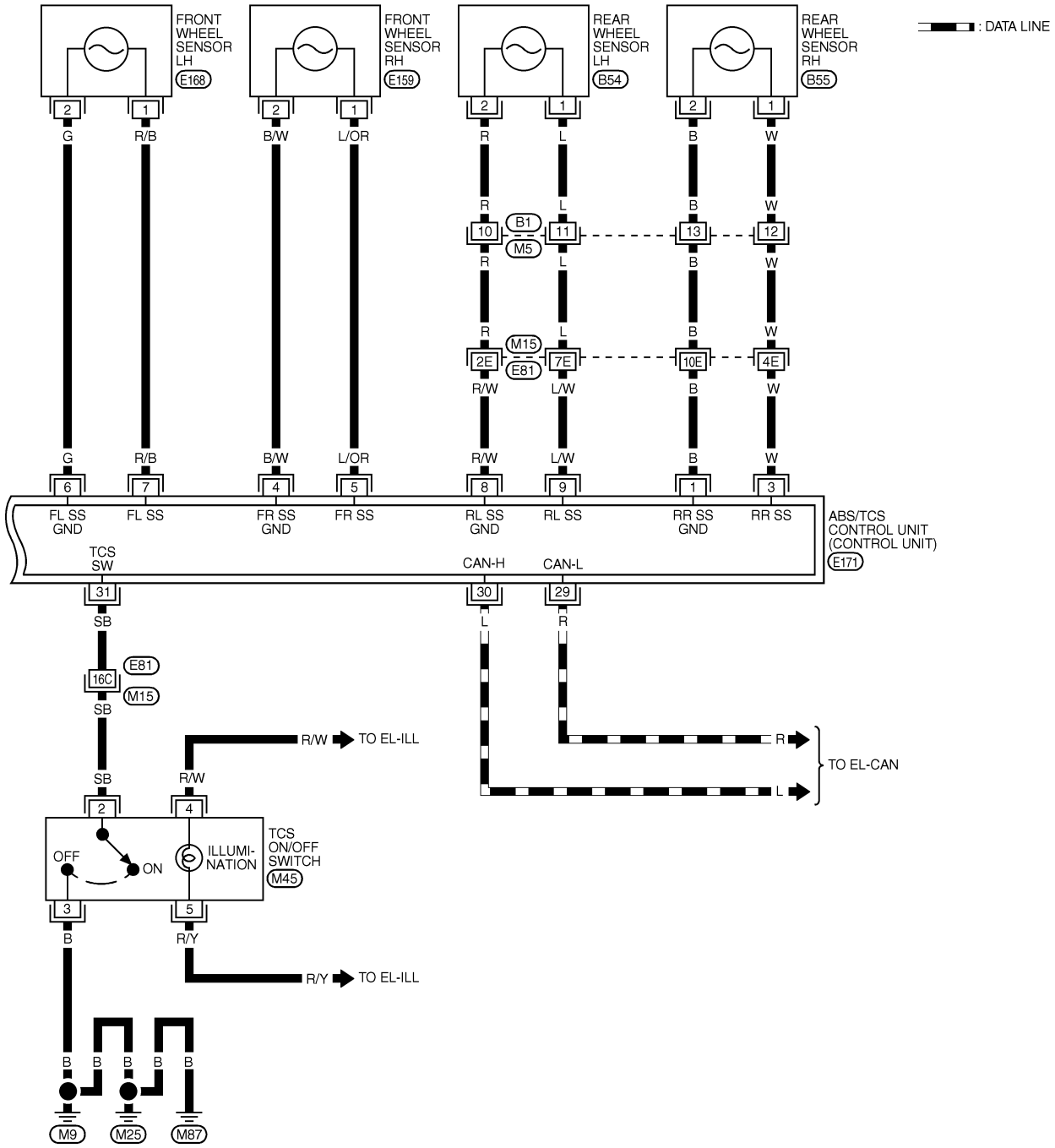
MBR603A

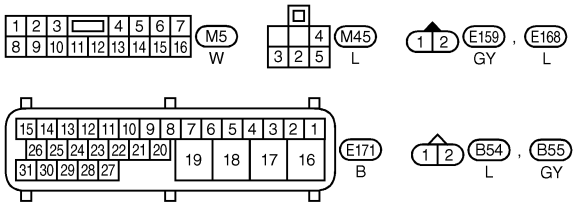
BR-TCS-02



MBR515A

BR-TCS-03





REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)

MBR605A

WIRING DIAGRAM -TCS- (CONT'D)

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
1	B	REAR WHEEL SENSOR RH	WHEN VEHICLE CRUISE AT 30 KM/H (19 MPH)	PULSE FRONT: APPROX. 190 HZ REAR: APPROX. 190 HZ
3	W	REAR WHEEL SENSOR RH		
4	B/W	FRONT WHEEL SENSOR RH		
5	L/OR	FRONT WHEEL SENSOR RH		
6	G	FRONT WHEEL SENSOR LH		
7	R/B	FRONT WHEEL SENSOR LH		
8	R/W	REAR WHEEL SENSOR LH		
9	L/W	REAR WHEEL SENSOR LH		
11	OR	DATA LINK CONNECTOR	–	–
12	W/B	DATA LINK CONNECTOR	–	–
14	R/G	STOP LAMP SWITCH	WHEN BRAKE PEDAL DEPRESSED	BATTERY VOLTAGE
			WHEN BRAKE PEDAL RELEASED	APPROX. 0V
15	GY	POWER SOURCE	IGN ON	BATTERY VOLTAGE
			IGN OFF	APPROX. 0V
16	B	GROUND	–	–
17	Y	POWER SOURCE	–	BATTERY VOLTAGE
18	L/B	POWER SOURCE	–	BATTERY VOLTAGE
19	B	GROUND	–	–
21	L/Y	ABS WARNING LAMP IN	WHEN ABS WARNING LAMP IS ACTIVE	APPROX. 0V
			WHEN ABS WARNING LAMP IS NOT ACTIVE	BATTERY VOLTAGE
22	R/L	UNIFIED METER CONTROL UNIT	–	–
26	R	TCS OFF INDICATOR LAMP IN	WHEN TCS OFF INDICATOR LAMP IS ACTIVE	APPROX. 0V
			WHEN TCS OFF INDICATOR LAMP IS NOT ACTIVE	BATTERY VOLTAGE
28	R/Y	SLIP INDICATOR LAMP	WHEN SLIP INDICATOR LAMP IS ACTIVE	APPROX. 0V
			WHEN SLIP INDICATOR LAMP IS NOT ACTIVE	BATTERY VOLTAGE
29	R	CAN COMMUNICATION INPUT/OUTPUT SIGNAL (L)	IGNITION SWITCH ON	PBIA0224J
30	L	CAN COMMUNICATION INPUT/OUTPUT SIGNAL (H)	IGNITION SWITCH ON	PBIA0223J
31	SB	TCS ON/OFF SWITCH	WHEN TCS OFF SWITCH IS "ON (TCS IS CANCELED)"	APPROX. 0V
			WHEN TCS OFF SWITCH IS "OFF (TCS CAN BE OPERATED)"	APPROX. 4.5V

SBR904E

CONSULT-II

NFBR0151

CONSULT-II APPLICATION TO TCS

NFBR0151S01

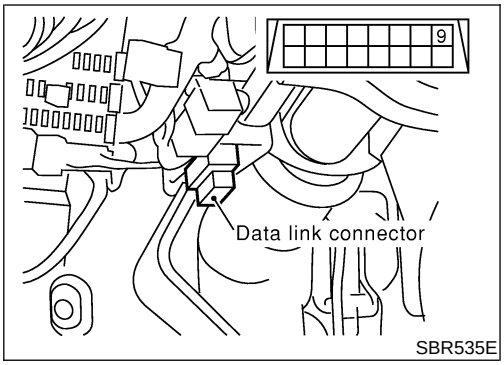
ITEM	SELF-DIAGNOSTIC RESULTS	DATA MONITOR	ACTIVE TEST
Front right wheel sensor	X	X	—
Front left wheel sensor	X	X	—
Rear right wheel sensor	X	X	—
Rear left wheel sensor	X	X	—
ABS sensor	X	—	—
Stop lamp switch	—	X	—
Front right inlet solenoid valve	X	X	X
Front right outlet solenoid valve	X	X	X
Front left inlet solenoid valve	X	X	X
Front left outlet solenoid valve	X	X	X
Rear right inlet solenoid valve	X	X	X
Rear right outlet solenoid valve	X	X	X
Rear left inlet solenoid valve	X	X	X
Rear left outlet solenoid valve	X	X	X
Actuator solenoid valve relay	—	X	—
Actuator motor relay (ABS MOTOR is shown on the ACTIVE TEST screen.)	X	X	X
ABS warning lamp	—	X	—
Battery voltage	X	X	—
Control unit	X	—	—
Engine speed signal	—	X	—
ABS motor	X	—	X
A/T gear position signal	—	X	—
TCS OFF indicator lamp	—	X	—
SLIP indicator lamp	—	X	—
CAN communication	X	X	—

X: Applicable
—: Not applicable

ECU (ABS/TCS CONTROL UNIT) PART NUMBER MODE

NFBR0151S02

Ignore the ECU part number displayed in the ECU PART NUMBER MODE. Refer to parts catalog to order the ECU.



SBR535E

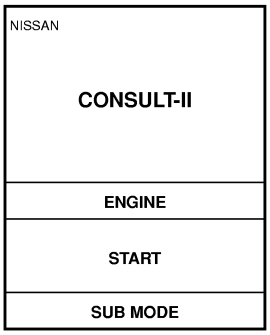
CONSULT-II Inspection Procedure

NFBR0152

SELF-DIAGNOSIS PROCEDURE

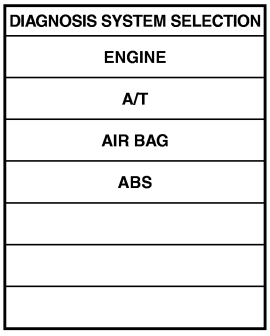
NFBR0152S01

1. Turn ignition switch OFF.
2. Connect CONSULT-II to Data Link Connector.
3. Start engine.
4. Drive vehicle over 30 km/h (19 MPH) for at least one minute.



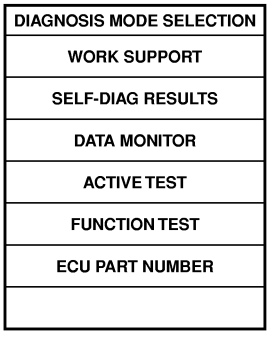
SBR905E

5. Stop vehicle with engine running and touch “START” on CONSULT-II screen.



PBR385C

6. Touch “ABS”.

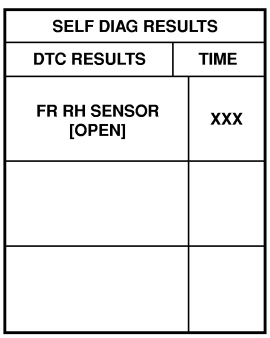


SBR906E

7. Touch “SELF DIAGNOSIS RESULTS”.

- The screen shows the detected malfunction and how many times the ignition switch has been turned since the malfunction.

8. Make the necessary repairs following the diagnostic procedures.



SBR561E

9. After the malfunctions are repaired, erase the self-diagnostic results stored in the control unit by touching “ERASE”.
10. Check ABS warning lamp, SLIP indicator lamp, TCS OFF indicator lamp for deactivation after driving vehicle over 30 km/h (19 MPH) for at least one minute.

NOTE:
“SELF-DIAG RESULTS” screen shows the detected malfunction and how many times the ignition switch has been turned since the malfunction.

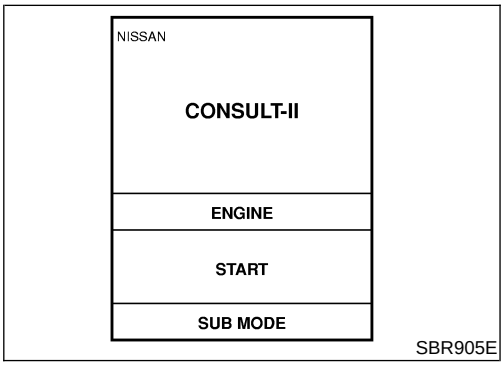
SELF-DIAGNOSTIC RESULTS MODE

=NFBR0152S02

Diagnostic item	Diagnostic item is detected when ...	Reference Page
FR RH SENSOR-1	• Circuit for front right wheel sensor is open. (An abnormally high input voltage is entered.)	BR-110
FR LH SENSOR-1	• Circuit for front left wheel sensor is open. (An abnormally high input voltage is entered.)	BR-110
RR RH SENSOR-1	• Circuit for rear right sensor is open. (An abnormally high input voltage is entered.)	BR-110
RR LH SENSOR-1	• Circuit for rear left sensor is open. (An abnormally high input voltage is entered.)	BR-110
FR RH SENSOR-2	• Circuit for front right wheel sensor is shorted. (An abnormally low input voltage is entered.)	BR-110
FR LH SENSOR-2	• Circuit for front left wheel sensor is shorted. (An abnormally low input voltage is entered.)	BR-110
RR RH SENSOR-2	• Circuit for rear right sensor is shorted. (An abnormally low input voltage is entered.)	BR-110
RR LH SENSOR-2	• Circuit for rear left sensor is shorted. (An abnormally low input voltage is entered.)	BR-110
ABS SENSOR [ABNORMAL SIGNAL]	• Teeth damage on sensor rotor or improper installation of wheel sensor. (Abnormal wheel sensor signal is entered.)	BR-110
FR RH IN ABS SOL	• Circuit for front right inlet solenoid valve is open. (An abnormally low output voltage is entered.)	BR-114
FR LH IN ABS SOL	• Circuit for front left inlet solenoid valve is open. (An abnormally low output voltage is entered.)	BR-114
RR RH IN ABS SOL	• Circuit for rear right inlet solenoid valve is open. (An abnormally low output voltage is entered.)	BR-114
RR LH IN ABS SOL	• Circuit for rear left inlet solenoid valve is open. (An abnormally low output voltage is entered.)	BR-114
FR RH OUT ABS SOL	• Circuit for front right outlet solenoid valve is open. (An abnormally low output voltage is entered.)	BR-114
FR LH OUT ABS SOL	• Circuit for front left outlet solenoid valve is open. (An abnormally low output voltage is entered.)	BR-114
RR RH OUT ABS SOL	• Circuit for rear right outlet solenoid valve is open. (An abnormally low output voltage is entered.)	BR-114
RR LH OUT ABS SOL	• Circuit for rear left outlet solenoid valve is open. (An abnormally low output voltage is entered.)	BR-114
ABS ACTUATOR RELAY [ABNORMAL]	• Actuator solenoid valve relay is ON, even control unit sends off signal. • Actuator solenoid valve relay is OFF, even control unit sends on signal.	BR-114
PUMP MOTOR	• Circuit for actuator motor is open or shorted. • Actuator motor relay is stuck.	BR-117
BATTERY VOLTAGE [ABNORMAL]	• Power source voltage supplied to ABS/TCS control unit is abnormally low or high.	BR-119
CONTROLER FAILURE	• Function of calculation in ABS/TCS control unit has failed.	BR-121
FR LH IN ABS SOL	• Circuit of the front LH wheel inlet solenoid valve is open or short, or the control line is open or short to the power supply or the ground.	BR-114
FR LH OUT ABS SOL	• Circuit of the front LH wheel outlet solenoid valve is open or short, or the control line is open or short to the power supply or the ground.	BR-114

Diagnostic item	Diagnostic item is detected when ...	Reference Page
RR RH IN ABS SOL	● Circuit of the front LH wheel inlet solenoid valve is open or short, or the control line is open or short to the power supply or the ground.	BR-114
RR RH OUT ABS SOL	● Circuit of the front LH wheel outlet solenoid valve is open or short, or the control line is open or short to the power supply or the ground.	BR-114
FR RH IN ABS SOL	● Circuit of the front LH wheel inlet solenoid valve is open or short, or the control line is open or short to the power supply or the ground.	BR-114
FR RH OUT ABS SOL RR LH IN ABS SOL RR LH OUT ABS SOL	● Circuit of the front LH wheel outlet solenoid valve is open or short, or the control line is open or short to the power supply or the ground.	BR-114
ENGINE SIGNAL 1, 2, 3, 4	Engine related part has malfunction.	EC-141
CAN COMM CIRCUIT*2	● CAN communication line is open or short. ● TCS/ABS control unit internal malfunction. ● Power supply for ECM is interrupted instantaneously for approx. 0.5 seconds or more.	EL-437
A/T SIGNAL	CAN communication with TCM is not normal.	AT-208

*1: When "## ## SENSOR 2" is displayed, check power supply for TCS/ABS control unit in addition to wheel sensor circuit.
*2: When any diagnosis results is detested with "CAN COMM CIRCUIT" CAN communication circuit first.

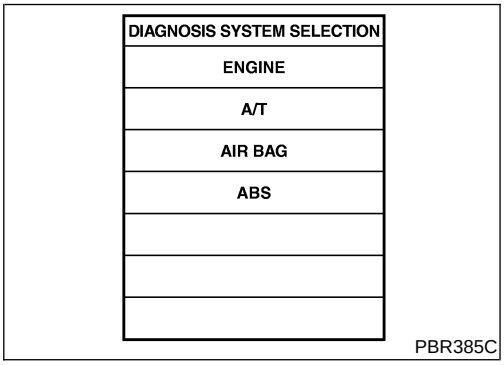


SBR905E

DATA MONITOR PROCEDURE

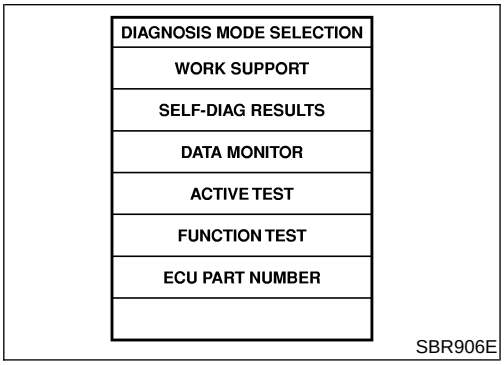
NFBR0152S03

1. Turn ignition switch OFF.
2. Connect CONSULT-II to data link connector.
3. Turn ignition switch ON.
4. Touch "START" on CONSULT-II screen.



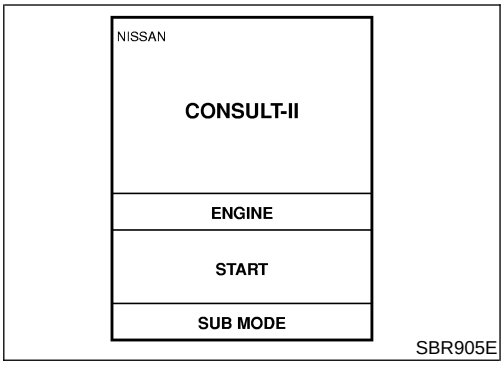
PBR385C

5. Touch "ABS".



SBR906E

6. Touch "DATA MONITOR".
7. Touch "SETTING" on "SELECT MONITOR ITEM" screen.
8. Touch "START" on "SELECT MONITOR ITEM".



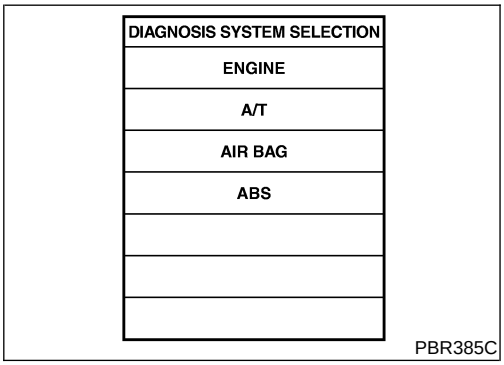
SBR905E

ACTIVE TEST PROCEDURE

NFBR0152S04

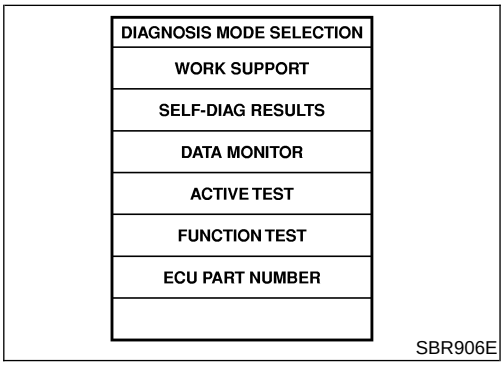
- When conducting Active test, vehicle must be stationary.
- When ABS warning lamp or SLIP indicator lamp stays on, never conduct Active test.

1. Turn ignition switch OFF.
2. Connect CONSULT-II to Data Link Connector.
3. Start engine.
4. Touch "START" on CONSULT-II screen.



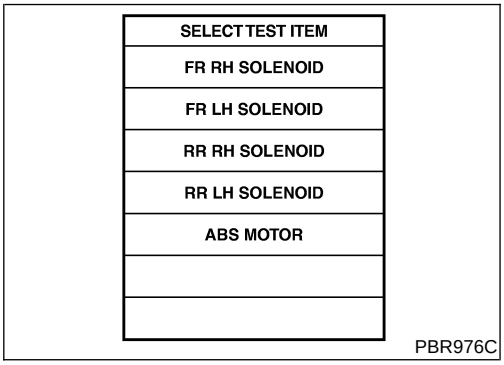
PBR385C

5. Touch "ABS".



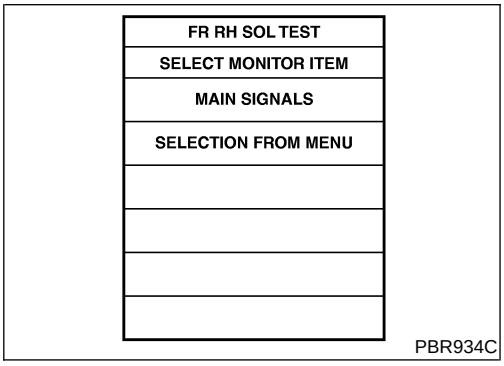
SBR906E

6. Touch "ACTIVE TEST".



PBR976C

7. Select active test item by touching screen.



PBR934C

8. Touch "START".
9. Carry out the active test by touching screen key.

DATA MONITOR MODE

NFBR0152S05

MONITOR ITEM	CONDITION	SPECIFICATION
FR RH SENSOR FR LH SENSOR RR RH SENSOR RR LH SENSOR	Drive vehicle. (Each wheel is rotating.)	Displays computed vehicle speed from wheel sensor signal. Almost the same speed as speedometer.
STOP LAMP SW	Turn ignition switch ON and depress brake pedal.	Depress the pedal: ON Release the pedal: OFF
ENGINE SPEED	Engine is running. (rpm)	Engine speed: 0 - 12,800 (rpm)
FR RH IN SOL FR RH OUT SOL FR LH IN SOL FR LH OUT SOL RR RH IN SOL RR RH OUT SOL RR LH IN SOL RR LH OUT SOL	Ignition switch is turned ON or engine is running.	Operating conditions for each solenoid valve are indicated. ABS is not operating: OFF
ACTUATOR RLY	Ignition switch is turned ON or engine is running.	Displays ON/OFF condition of ABS actuator relay. When turning ignition switch ON, ABS actuator relay is operated.
MOTOR RELAY		ABS is not operating: OFF ABS is operating: ON
ABS WARN LAMP		Warning lamp is turned on: ON Warning lamp is turned off: OFF
BATTERY VOLT		Power supply voltage for control unit
GEAR	A/T gear position signal detected by TCM is displayed.	Gear position: 1st: 1 2nd: 2 3rd: 3 4th: 4
NEXT GR POSI	A/T next gear position is displayed.	Gear position: 1st: 1 2nd: 2 3rd: 3 4th: 4
OFF SW	ON/OFF condition of signal from TCS switch is displayed.	TCS OFF S/W (all the time switch is pressed): ON TCS OFF S/W (released): OFF
OFF LAMP	• TCS OFF condition is displayed. • The condition of malfunctioning TCS is displayed.	TCS OFF indicator "OFF": OFF TCS OFF indicator "ON": ON
SLIP LAMP	The TCS functioning state is displayed by detecting rear wheel slip.	SLIP indicator "ON": ON SLIP indicator "OFF": OFF
CAN COMM	CAN communication signal status is displayed.	In normal communication: OK In improper communication: NG
CAN CIRC1	CAN communication signal status is displayed.	In normal signal sending: OK In improper signal sending: UNKWN
CAN CIRC2	CAN communication signal status is displayed.	In normal communication with ECM: OK In improper communication with ECM: UNKWN
CAN CIRC3	CAN communication signal status is displayed.	In normal communication with TCM: OK In improper communication with TCM: UNKWN

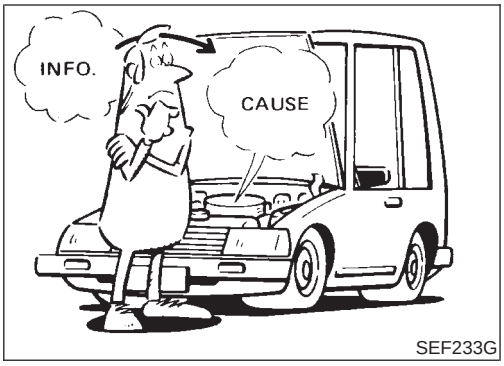
MONITOR ITEM	CONDITION	SPECIFICATION
SLCT LVR POSI	Shift lever position detected through TCM is displayed.	1st: 1 2nd: 2 3rd: 3 4th: 4 D range: D N range: N R range: R P range: P

ACTIVE TEST MODE

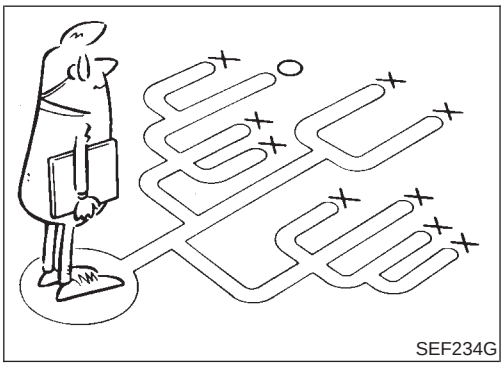
NFBR0152S06

TEST ITEM	CONDITION	JUDGEMENT		
FR RH SOL FR LH SOL RR RH SOL RR LH SOL	Ignition switch is turned ON.	Brake fluid pressure control operation		
			IN SOL	OUT SOL
		UP (Increase):	OFF	OFF
		KEEP (Hold):	ON	OFF
		DOWN (Decrease):	ON	ON*
ABS MOTOR		ABS actuator motor ON: Motor runs OFF: Motor stops		

NOTE:
Active test will automatically stop ten seconds after the test starts. (TEST IS STOPPED monitor shows ON.)
*: "ON" lasts for 1 to 2 seconds after toutching screen, then it goes to "OFF".



SEF233G


SEF234G

How to Perform Trouble Diagnoses for Quick and Accurate Repair

NFBR0153

INTRODUCTION

NFBR0153S01

The ABS/TCS system has an electronic control unit to control major functions. The control unit accepts input signals from sensors and instantly drives actuator. It is essential that both kinds of signals are proper and stable. It is also important to check for conventional problems: such as air leaks in the booster or lines, lack of brake fluid, or other problems with the brake system.

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 faulty wiring. In this case, careful checking of suspicious circuits may help prevent the replacement of good parts.

A visual check only may not find the cause of the problems, so a road test should be performed.

Before undertaking actual checks, take just a few minutes to talk with a customer who approaches with an ABS/TCS complaint. The customer is a very good source of information on such problems; especially intermittent ones. Through the talks with the customer, find out what symptoms are present and under what conditions they occur.

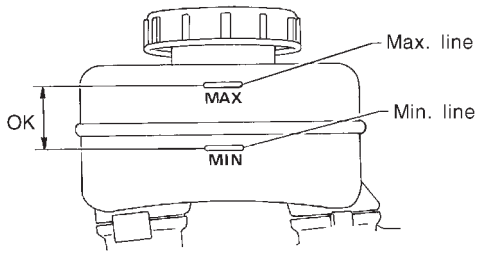
Start your diagnosis by looking for “conventional” problems first. This is one of the best ways to troubleshoot brake problems on an ABS/TCS controlled vehicle. Also check related Service Bulletins for information.

Preliminary Check

NFBR0155

1	CHECK BRAKE FLUID LEVEL

Check brake fluid level in reservoir tank.
Low fluid level may indicate brake pad wear or leakage from brake line.



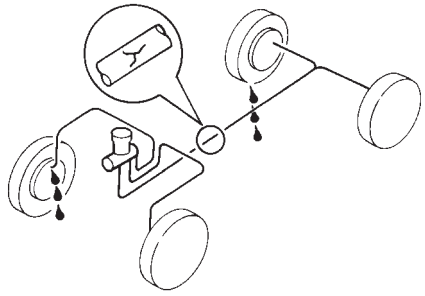
SBR451D

Is brake fluid filled between MAX and MIN lines on reservoir tank and/or has brake fluid been contaminated?

Yes	▶	GO TO 2.
No	▶	Repair. GO TO 2.

2	CHECK BRAKE LINE

Check brake line for leakage.



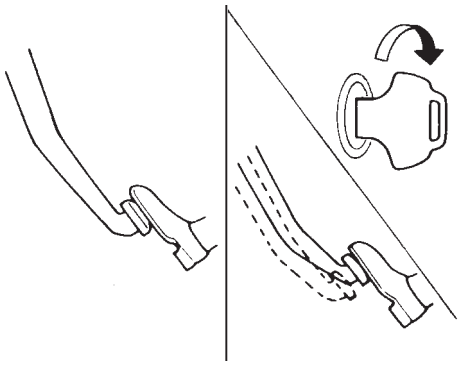
SBR389C

Is leakage present at or around brake lines, tubes or hoses or are any of these parts cracked or damaged?

Yes	▶	Repair. GO TO 3.
No	▶	GO TO 3.

3	CHECK BRAKE BOOSTER OPERATION

Check brake booster for operation and air tightness.
Refer to BR-20.



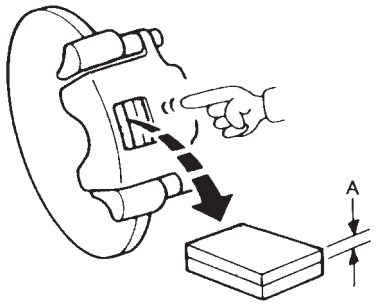
SBR058C

Is brake booster airtight and functioning properly?

Yes	▶	GO TO 4.
No	▶	Replace. GO TO 4.

4	CHECK BRAKE PAD AND ROTOR

Check brake pad and rotor.
Refer to BR-23, 25, 27, 31.



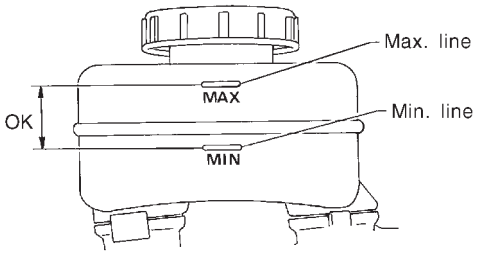
SBR059C

Are brake pads and rotors functioning properly?

Yes	▶	GO TO 5.
No	▶	Replace.

5	RECHECK BRAKE FLUID LEVEL

Check brake fluid level in reservoir tank again.



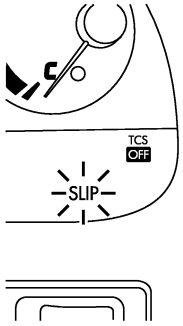
SBR451D

Is brake fluid filled between MAX and MIN lines on reservoir tank and/or has brake fluid been contaminated?

Yes	▶	GO TO 6.
No	▶	Fill up brake fluid.

6	CHECK WARNING LAMP ACTIVATION

Check warning lamp activation.



SBR655E

Does warning lamp turn on when ignition switch is turned "ON"?

Yes	▶	GO TO 7.
No	▶	Check fuse, warning lamp bulb and warning lamp circuit.

7	CHECK WARNING LAMP DEACTIVATION

Check warning lamp for deactivation after engine is started.

Does warning lamp turn off when engine is started?

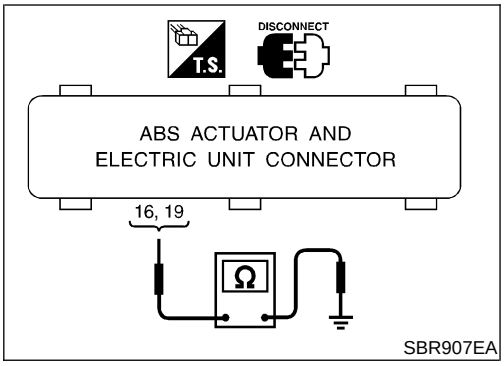
Yes	▶	GO TO 8.
No	▶	Go to Self-diagnosis. Refer to BR-96.

8	DRIVE VEHICLE

Drive vehicle at speeds over 30 km/h (19 MPH) for at least one minute.

Does warning lamp remain off after vehicle has been driven at 30 km/h (19 MPH) for at least one minute?

Yes	▶	END
No	▶	Go to Self-diagnosis. Refer to BR-96.



Ground Circuit Check

NFBR0157

ABS ACTUATOR AND ELECTRIC UNIT GROUND

NFBR0157S01

- Check continuity between ABS actuator and electric unit harness connector E171 terminals 16 (B), 19 (B) and ground.

Continuity should exist.

Malfunction Code/Symptom Chart

NFBR0158

Code No. (FAIL CODE No.)	Malfunctioning part	Warning lamp	Indicator		Fail-safe	Reference Page
		ABS	TCS OFF	SLIP		
U1000	CAN communication system failure	ON or OFF	ON	ON	X	BR-122
C1101	Rear right sensor (open-circuit)	ON	ON	ON	X	BR-110
C1102	Rear left sensor (open-circuit)	ON	ON	ON	X	BR-110
C1103	Front right sensor (open-circuit)	ON	ON	ON	X	BR-110
C1104	Front left sensor (open-circuit)	ON	ON	ON	X	BR-110
C1105	Rear right sensor (short-circuit)*2	ON	ON	ON	X	BR-110
C1106	Rear left sensor (short-circuit)*2	ON	ON	ON	X	BR-110
C1107	Front right sensor (short-circuit)*2	ON	ON	ON	X	BR-110
C1108	Front left sensor (short-circuit)*2	ON	ON	ON	X	BR-110
C1109	Power supply (Low or high voltage)	ON	ON	ON	—*1	BR-119
C1110	Control unit	ON	ON	ON	X	BR-121
C1111	Actuator motor or motor relay	ON	ON	ON	X	BR-117
C1114	Solenoid valve relay	ON	ON	ON	X	BR-114
C1120	Actuator front left inlet solenoid valve	ON	ON	ON	X	BR-114
C1121	Actuator front left outlet solenoid valve	ON	ON	ON	X	BR-114
C1122	Actuator front right inlet solenoid valve	ON	ON	ON	X	BR-114
C1123	Actuator front right outlet solenoid valve	ON	ON	ON	X	BR-114
C1124	Actuator rear left inlet solenoid valve	ON	ON	ON	X	BR-114
C1125	Actuator rear left outlet solenoid valve	ON	ON	ON	X	BR-114
C1126	Actuator rear right inlet solenoid valve	ON	ON	ON	X	BR-114
C1127	Actuator rear right outlet solenoid valve	ON	ON	ON	X	BR-114
C1130	CAN communication line or ECM*4	—*3	X	X	X	BR-122
C1131	CAN communication line or ECM*4	—*3	X	X	X	BR-122
C1132	CAN communication line or ECM*4	—*3	X	X	X	BR-122
C1133	CAN communication line or ECM*4	—*3	X	X	X	BR-122
C1135	CAN communication line or TCM*5	—*3	X	X	X	BR-122
C1155	Wheel sensor or the circuit	X	X	X	X	BR-110

X: Available —: Not available

*1: Fail-safe operation does not activate. A signal from control unit suspends TCS and ABS control operation. Brakes operate conventionally. After specified power supply voltage resumes, TCS OFF and SLIP indicator and ABS warning lamp go out, allowing for TCS and ABS control operation.

*2: If a wheel or wheels spin on bad or slippery road surfaces for a period of approximately 10 to 80 seconds, the ABS warning lamp and the TCS OFF indicator lamp light. But this is not a malfunction. When the ignition switch is turned “ON” after a shorted wheel sensor circuit has been repaired, the ABS warning lamp and the TCS OFF indicator lamp light. Drive the vehicle at about 30 km/h (19 MPH) to ensure these lamps go out within 1 minute.

*3: TCS control stops due to fail safe operation, however ABS keeps operation.

*4: For more detail, refer to BR-122.

*5: For more detail, refer to BR-123.

Malfunction Code/Symptom Chart (Cont'd)

NOTE:

When a system part have electric malfunction, ABS warning lamp is illuminated by fail safe function. According to malfunctioning condition, both ABS and EBD system become in following conditions.

1) ABS is not operated. EBD is opereated.
2) Both ABS and EBD are operated. (Same condition as the vehicle without ABS and EBD)

On the condition 1), some sound for ABS system self diagnosis can be heard same as usual, when kye smith is turned ON or first starting.

System Description

NFBR0209

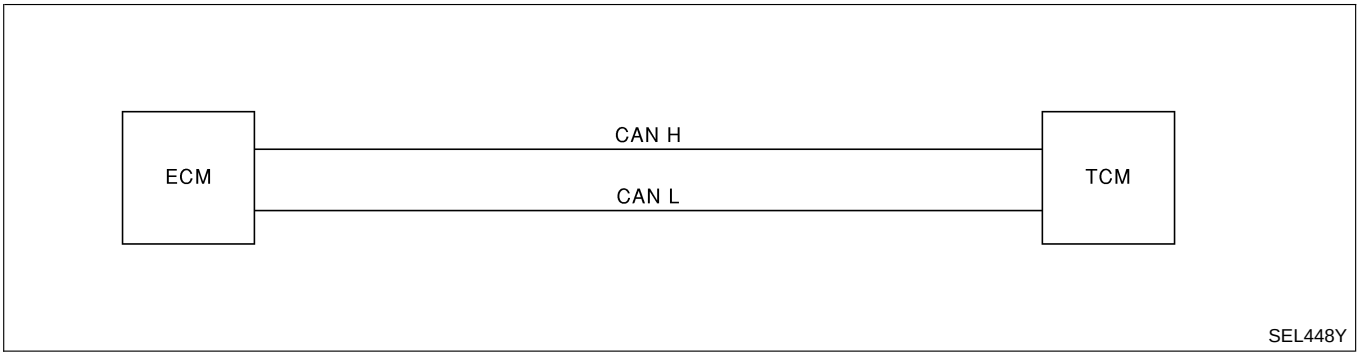
CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information 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 A/T MODELS

NFBR0209S01

System Diagram

NFBR0209S0101



Input/Output Signal Chart

NFBR0209S0102

T: Transmit R: Receive

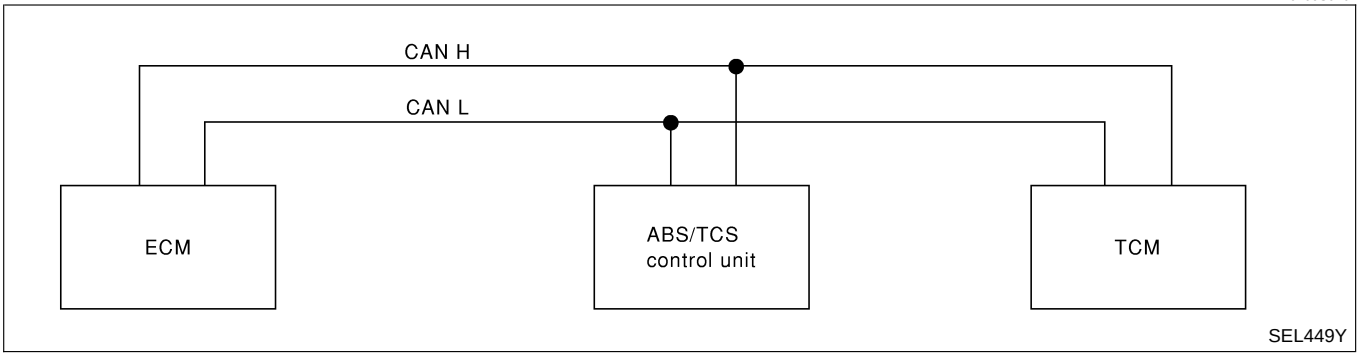
Signals	ECM	TCM
Accelerator pedal position signal	T	R
Output shaft revolution signal	R	T

FOR TCS MODELS

NFBR0209S02

System Diagram

NFBR0209S0201



Input/Output Signal Chart

NFBR0209S0202

T: Transmit R: Receive

Signals	ECM	ABS/TCS control unit	TCM
Accelerator pedal position signal	T	R	R
Output shaft revolution signal	R		T

Wheel Sensor or Rotor

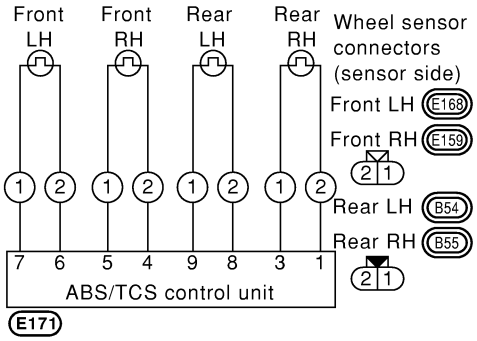
NFBR0159

DIAGNOSTIC PROCEDURE

NFBR0159S01

1	INSPECTION START

Wheel sensor inspection



SBR046F

	▶	GO TO 2.

2	CHECK CONNECTOR

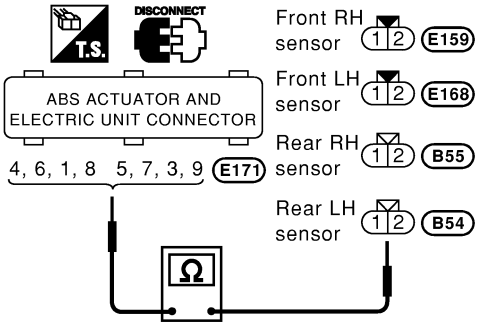
1. Disconnect connectors from control unit and wheel sensor of malfunction code No. Check terminals for damage or loose connections. Then reconnect connectors.
2. Carry out self-diagnosis again.

Does warning lamp activate again?

Yes	▶	GO TO 3.
No	▶	**INSPECTION END**

3	CHECK WHEEL SENSOR CIRCUIT

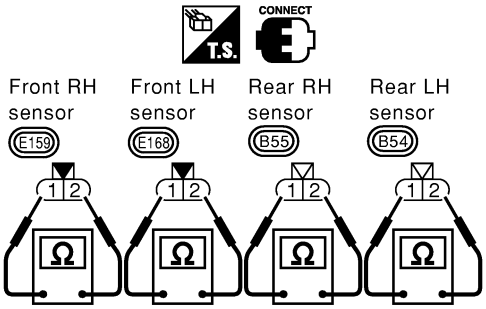
1. Disconnect control unit connector.
2. Check resistance between control unit connector terminals.
   Front RH wheel
   Terminals 4 (B/W) and 5 (L/OR)
   Front LH wheel
   Terminals 6 (G) and 7 (R/B)
   Rear RH wheel
   Terminals 1 (B) and 3 (W)
   Rear LH wheel
   Terminals 8 (R/W) and 9 (L/W)
   Resistance: 0.8 - 1.85 kΩ



SBR909E

Is resistance 0.8 - 1.85 kΩ?

Yes	▶	GO TO 5.
No	▶	GO TO 4.

4	CHECK WHEEL SENSOR	
Check signal from sensors by "Simple oscilloscope" function of CONSULT-II (Scale: 0.2 V/Div, 20 ms/Div)  SBR051F **Does the wave appear on screen when wheel is rotated?**		
Yes	▶	Repair harness and connectors between control unit connector and wheel sensor connector.
No	▶	Replace wheel sensor.

5	CHECK TIRE	
Check for inflation pressure, wear and size of each tire. **Are tire pressure and size correct and is tire wear within specifications?**		
Yes	▶	GO TO 6.
No	▶	Adjust tire pressure or replace tire(s).

6	CHECK WHEEL BEARING

Check wheel bearing axial end play.
Check clearance between sensor and rotor.

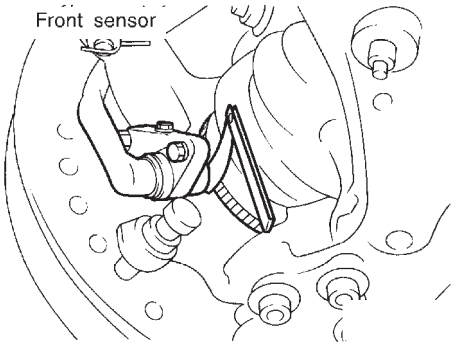
Clearance:

Front

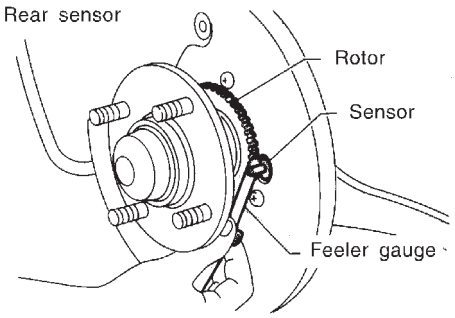
0.273 - 0.925 mm (0.0107 - 0.0364 in)

Rear

0.387 - 0.992 mm (0.0152 - 0.0391 in)



SBR605AA



SBR069CA

Is axial end play and clearance within specifications?

Yes	▶	GO TO 7.
No	▶	Clean sensor fixing portion, or replace sensor.

7	CHECK SENSOR ROTOR

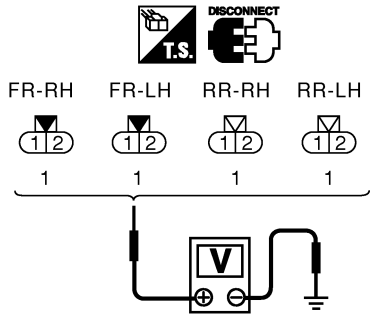
Check sensor rotor for teeth damage.

Is sensor rotor free from damage?

Yes	▶	Check control unit pin terminals for damage or the connection of control unit harness connector. Reconnect control unit harness connector. Then retest.
No	▶	Replace sensor rotor.

8	CHECK POWER SUPPLY

1. Disconnect wheel sensor connector.
2. Check voltage between body side terminal of wheel sensor connectors and body ground.



SBR984E

Is voltage more than 8V?

Yes	▶	Replace wheel sensor.
No	▶	Replace ABS control unit.

ABS Actuator Solenoid Valve or Solenoid Valve Relay

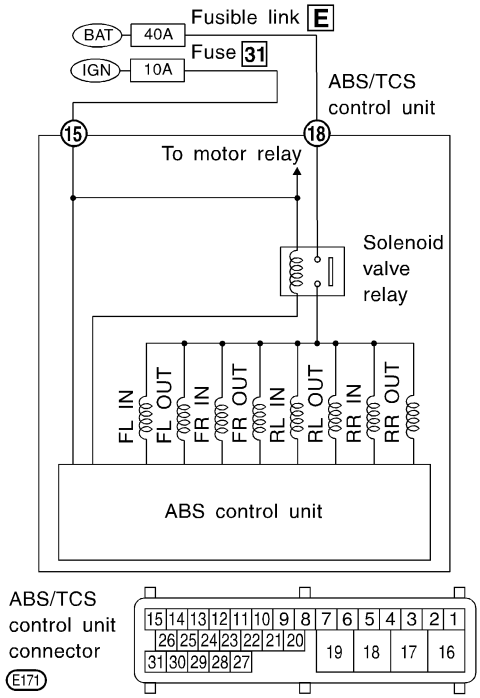
=NFBR0171

DIAGNOSTIC PROCEDURE

NFBR0171S01

1	INSPECTION START

Solenoid valve relay inspection



SBR952E

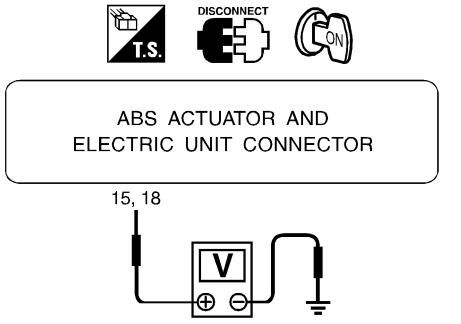
	▶	GO TO 2.

2	CHECK SOLENOID VALVE POWER SUPPLY CIRCUIT	
Check 40A [**E**] fusible link (ABS ACTR) for ABS solenoid valve relay. For fusible link layout, refer to POWER SUPPLY ROUTING in EL section.		
Is fusible link OK?		
Yes	▶	GO TO 3.
No	▶	GO TO 7.

3	CHECK FUSE	
Check 10A fuse No. 31. For fuse layout, refer to “POWER SUPPLY ROUTING” in EL section.		
Is fuse OK?		
Yes	▶	GO TO 4.
No	▶	GO TO 9.

4	CHECK CONNECTOR	
1. Disconnect connectors from control unit and ABS actuator. Check terminals for damage or loose connection. Then reconnect connectors. 2. Carry out self-diagnosis again. **Does warning lamp activate again?**		
Yes	▶	GO TO 5.
No	▶	**INSPECTION END**

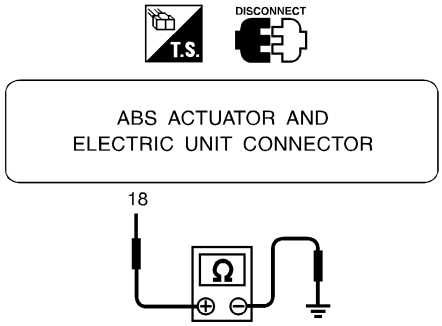
5	CHECK GROUND CIRCUIT	
Refer to ABS ACTUATOR AND ELECTRIC UNIT in Ground Circuit Check, BR-106. **Is ground circuit OK?**		
Yes	▶	GO TO 6.
No	▶	Repair harness and connectors.

6	CHECK SOLENOID VALVE POWER SUPPLY CIRCUIT	
1. Disconnect ABS actuator and electric unit connector. 2. Check voltage between ABS actuator and electric unit harness connector E171 terminals 15 (GY) and 18 (L/B) and ground.		
 SBR040F **Does battery voltage exist when ignition switch is turned ON?**		
Yes	▶	Replace ABS actuator and electric unit.
No	▶	**Check the following.** ● Harness connector E171 ● Harness for open or short between ABS actuator and electric unit and fusible link or fuse If NG, repair harness or connectors.

7	REPLACE FUSIBLE LINK	
Replace fusible link. **Does the fusible link blow out when ignition switch is turned "ON"?**		
Yes	▶	GO TO 8.
No	▶	**INSPECTION END**

8	CHECK RELAY UNIT POWER SUPPLY CIRCUIT FOR SHORT

1. Disconnect battery cable and ABS actuator and electric unit connector.
2. Check continuity between ABS actuator and electric unit harness connector E171 terminal 18 (L/B) and ground.



SBR041F

Does continuity exist?

Yes	▶	**Check the following.** ● Harness connector E171 ● Harness for open or short between ABS actuator and electric unit and fusible link If NG, repair harness or connectors.
No	▶	Replace ABS actuator and electric unit.

9	REPLACE FUSE

Replace fuse.

Does the fuse blow out when ignition switch is turned "ON"?

Yes	▶	**Check the following.** ● Harness connector E171 ● Harness for open or short between ABS actuator and electric unit and fuse If NG, repair harness or connectors.
No	▶	**INSPECTION END**

Motor Relay or Motor

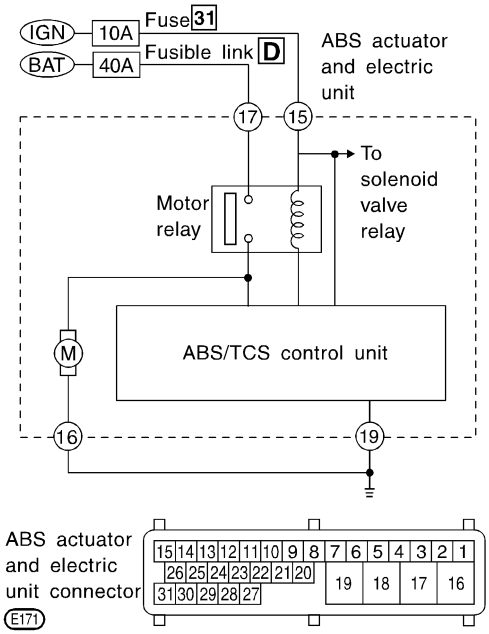
DIAGNOSTIC PROCEDURE

=NFBR0172

NFBR0172S01

1	INSPECTION START

ABS motor relay inspection

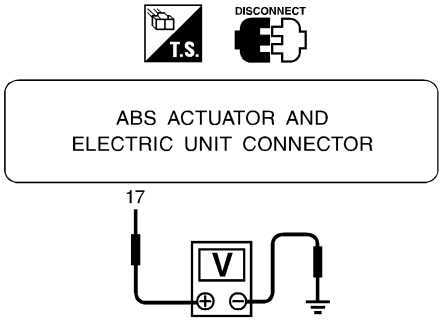


SBR953E

	▶	GO TO 2.

2	CHECK MOTOR POWER SUPPLY CIRCUIT	
Check 40A [**D**] fusible link (ABS MTR) for ABS motor relay. For fusible link layout, refer to POWER SUPPLY ROUTING in EL section.		
Is fusible link OK?		
Yes	▶	GO TO 3.
No	▶	GO TO 6.

3	CHECK CONNECTOR	
1. Disconnect ABS/TCS CONTROL UNIT connector. Check terminals for damage or loose connection. Then reconnect connectors. 2. Carry out self-diagnosis again.		
Does warning lamp activate again?		
Yes	▶	GO TO 4.
No	▶	**INSPECTION END**

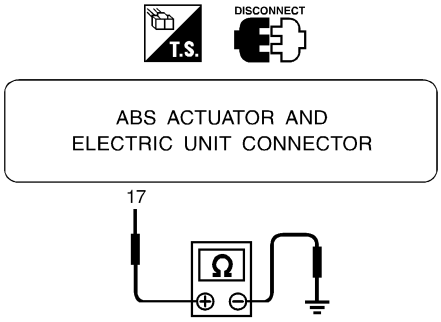
4	CHECK MOTOR RELAY POWER SUPPLY CIRCUIT	
1. Disconnect ABS actuator and electric unit connector. 2. Check voltage between ABS actuator and electric unit harness connector E171 terminal 17 (Y) and ground.  SBR898EB **Does battery voltage exist?**		
Yes	▶	GO TO 5.
No	▶	**Check the following.** ● Harness connector E171 ● Harness for open or short between ABS actuator and electric unit and fusible link If NG, repair harness or connectors.

5	CHECK ABS ACTUATOR AND ELECTRIC UNIT GROUND CIRCUIT	
Refer to ABS ACTUATOR AND ELECTRIC UNIT GROUND in Ground Circuit Check, BR-106. **Is ground circuit OK?**		
Yes	▶	Replace ABS actuator and electric unit.
No	▶	**Check the following.** ● Harness connector E171 ● Harness for open or short between ABS actuator and electric unit and ground If NG, repair harness or connectors.

6	REPLACE FUSIBLE LINK	
Replace fusible link. **Does the fusible link blow out when ignition switch is turned "ON"?**		
Yes	▶	GO TO 7.
No	▶	**INSPECTION END**

7	CHECK ABS ACTUATOR MOTOR POWER SUPPLY CIRCUIT FOR SHORT

1. Disconnect battery cable and ABS actuator and electric unit connector.
2. Check continuity between ABS actuator and electric unit harness connector E171 terminal 17 (Y) and ground.



SBR042F

Does continuity exist?

Yes	▶	Check ABS actuator and electric unit pin terminals for damage or the connection of ABS actuator and electric unit harness connector. Reconnect ABS actuator and electric unit harness connector. Then retest.
No	▶	**Check the following.** ● Harness connector E171 ● Harness for open or short between ABS actuator and electric unit and fusible link If NG, repair harness or connectors.

Low Voltage

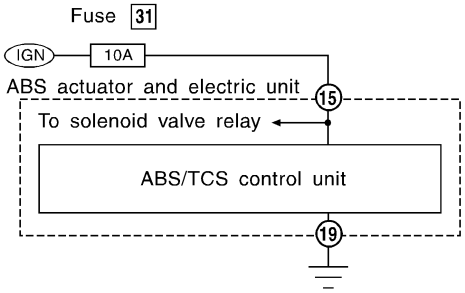
NFBR0173

DIAGNOSTIC PROCEDURE

NFBR0173S01

1	INSPECTION START

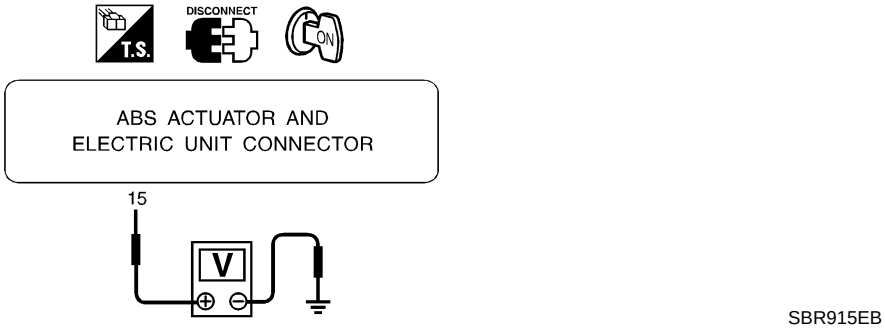
ABS actuator and electric unit power supply and ground circuit inspection



SBR914E

	▶	GO TO 2.

2	CHECK CONNECTOR	
1. Disconnect ABS actuator and electric unit connector. Check terminals for damage or loose connections. Then reconnect connector. 2. Carry out self-diagnosis again. **Does warning lamp activate again?**		
Yes	▶	GO TO 3.
No	▶	**INSPECTION END**

3	CHECK ABS ACTUATOR AND ELECTRIC UNIT POWER SUPPLY CIRCUIT	
1. Disconnect ABS actuator and electric unit connector. 2. Check voltage between ABS actuator and electric unit harness connector E171 terminal 15 (GY) and ground.  SBR915EB **Does battery voltage exist when ignition switch is turned ON?**		
Yes	▶	GO TO 4.
No	▶	GO TO 5.

4	CHECK ABS ACTUATOR AND ELECTRIC UNIT GROUND	
Refer to ABS ACTUATOR AND ELECTRIC UNIT GROUND in Ground Circuit Check, BR-106. **Is ground circuit OK?**		
OK	▶	Check ABS actuator and electric unit pin terminals for damage or the connection of ABS actuator and electric unit harness connector. Reconnect ABS actuator and electric unit harness connector. Then retest.
NG	▶	**Check the following.** ● Harness connector E171 ● Harness for open or short between ABS actuator and electric unit and ground If NG, repair harness or connectors.

5	CHECK FUSE	
Check 10A fuse 31 (Engine control) for control unit. Refer to POWER SUPPLY ROUTING in EL section. **Is fuse OK?**		
Yes	▶	GO TO 6.
No	▶	Replace fuse.

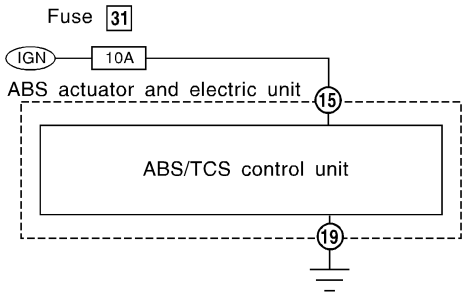
6	CHECK ABS ACTUATOR AND ELECTRIC UNIT POWER SUPPLY CIRCUIT	
Check continuity between battery and ABS actuator and electric unit connector terminal 15. **Does continuity exist?**		
Yes	▶	Check battery. Refer to BATTERY in EL section.
No	▶	**Check the following.** ● Harness connector E171 ● Harness for open or short between ABS actuator and electric unit and fuse If NG, repair harness or connectors.

Control Unit

DIAGNOSTIC PROCEDURE

NFBR0174

NFBR0174S01

1	INSPECTION START	
ABS actuator and electric unit power supply and ground circuit inspection  SBR916E		
	▶	GO TO 2.

2	CHECK CONNECTOR	
1. Disconnect ABS actuator and electric unit connector. Check terminals for damage or loose connections. Then reconnect connectors. 2. Carry out self-diagnosis again. **Does warning lamp activate again?**		
Yes	▶	GO TO 3.
No	▶	**INSPECTION END**

3	CHECK ABS ACTUATOR AND ELECTRIC UNIT POWER SUPPLY CIRCUIT	
Check voltage. Refer to "3. CHECK ABS ACTUATOR AND ELECTRIC UNIT POWER SUPPLY CIRCUIT" in "Low Voltage", BR-119. **Does battery voltage exist when ignition switch is turned ON?**		
Yes	▶	GO TO 4.
No	▶	Repair.

4	CHECK WARNING LAMP INDICATION	
Check "SELF DIAGNOSIS RESULTS", if "CONTROLLER FAILRE" is indicated on the screen.		
Yes	▶	Replace ABS actuator and electric unit.
No	▶	Inspect the system according to the code No.

CAN Communication Line

NFBR0175

DIAGNOSTIC PROCEDURE

NFBR0175S01

1	SELF-DIAGNOSIS RESULT CHECK

Check the self-diagnosis results.

Normal	Abnormal (example)
CAN_COMM: OK	CAN_COMM: OK
CAN_CIRC_1: OK	CAN_CIRC_1: UNKWN
CAN_CIRC_2: OK	CAN_CIRC_2: UNKWN
CAN_CIRC_3: OK	CAN_CIRC_5: UNKWN

MTBL1187

Is the other item exept above indicated in self-diagnois results?

Yes	▶	Repair or replace related parts.
No	▶	GO TO 2.

2	CAN COMMUNICATION SYSTEM CHECK

Check “CAN diagnosissupport monitor” of the data monitor items.

Self-diagnosis results
D000 CAN_COMM_CIRCUIT

MTBL1188

	▶	After printing the monitor items, go to CAN SYSTEM. Refer to EL-437, “CHECK SHEET”.

Engine System

NFBR0176

DIAGNOSTIC PROCEDURE

NFBR0176S01

1	SELF-DIAGNOSIS RESULT CHECK 1

Check the self-diagnosis results.

Self-diagnosis results
ENGINE_SIGNAL_1
ENGINE_SIGNAL_2
ENGINE_SIGNAL_3

MTBL1189

Are any items other than above indicated in self-diagnosis results?

Yes	▶	Repair or replace harness or connector.
No	▶	GO TO 2.

2	SELF-DIAGNOSIS RESULT CHECK 2	
1. Perform the ECM self-diagnosis, and repair or replace harness or connector, then perform the ECM self-diagnosis again. 2. Perform the TCS/ABS control unit self-diagnosis again. **Is inspection result OK?**		
OK	▶	**INSPECTION END**
NG	▶	Repair or replace harness or connector. Perform the self-diagnosis again.

A/T System

DIAGNOSTIC PROCEDURE

NFBR0208

NFBR0208S01

1	SELF-DIAGNOSIS RESULT CHECK 1	
Check the self-diagnosis results. Self-diagnosis results A/T_SIGNAL MTBL1190 **Are any items other than above indicated in self-diagnosis results?**		
Yes	▶	Repair or replace related parts.
No	▶	GO TO 2.

2	SELF-DIAGNOSIS RESULT CHECK 2	
1. Perform the TCM self-diagnosis, and replace harness or connector, then perform the TCM self-diagnosis again. 2. Perform the ABS/TCS control unit self-diagnosis again. **Is inspection result OK?**		
OK	▶	**INSPECTION END**
NG	▶	Repair or replace related parts.

1. ABS Works Frequently

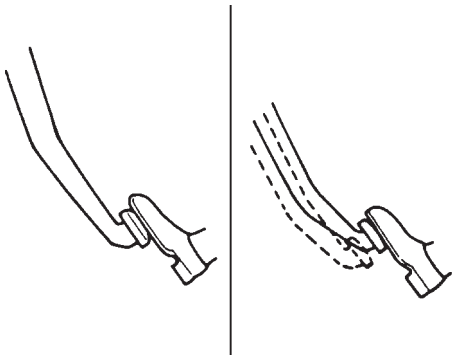
NFBR0188

1	CHECK WHEEL SENSOR	
1. Check wheel sensor connector for terminal damage or loose connections. 2. Perform wheel sensor mechanical check. Refer to “Wheel Sensor or Rotor”, BR-110. **Are wheel sensors functioning properly?**		
Yes	▶	GO TO 2.
No	▶	Repair.

2	CHECK FRONT AXLE	
Check front and rear axles for excessive looseness. Refer to AX section, “Front Wheel Bearing”, “ON-VEHICLE SERVICE” and “Rear Wheel Bearing”, “ON-VEHICLE SERVICE”. **Is front axle installed properly?**		
Yes	▶	Go to “3. CHECK WARNING LAMP INDICATION” in “2. Unexpected Pedal Action”, BR-124.
No	▶	Repair.

2. Unexpected Pedal Action

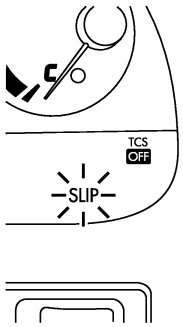
NFBR0189

1	CHECK BRAKE PEDAL STROKE	
Check brake pedal stroke. Is stroke excessively large?  SBR540A		
Yes	▶	Perform Preliminary Check. Refer to BR-103.
No	▶	GO TO 2.

2	CHECK CONNECTOR AND PERFORMANCE	
1. Disconnect ABS actuator and electric unit connector. 2. Check whether brake is effective. **Yes or No?**		
Yes	▶	GO TO 3.
No	▶	Perform Preliminary Check. Refer to BR-103.

3	CHECK WARNING LAMP INDICATION

Ensure warning lamp remains off while driving.



SBR655E

Is warning lamp turned off?

Yes	▶	GO TO 4.
No	▶	Carry out self-diagnosis. Refer to BR-96.

4	CHECK WHEEL SENSOR

1. Check wheel sensor connector for terminal damage or loose connection.
2. Perform wheel sensor mechanical check. Refer to "Wheel Sensor Rotor", BR-110.

Is wheel sensor mechanism OK?

Yes	▶	Check control unit pin terminals for damage or the connection of control unit harness connector. Reconnect control unit harness connector. Then retest.
No	▶	Repair.

3. Long Stopping Distance

NFBR0190

1	CHECK CONNECTOR AND PERFORMANCE

1. Cancel ABS by removing 40A [**E**] fusible link (ABS ACTR) for ABS solenoid valve relay.
2. Check stopping distance.

OK or NG

OK	▶	Perform Preliminary Check and air bleeding.
NG	▶	Go to "3. CHECK WARNING LAMP INDICATION" in "2. Unexpected Pedal Action", BR-124.

NOTE:
Stopping distance may be longer than vehicles without ABS when road condition is slippery.

4. ABS Does Not Work

NFBR0191

1	CHECK WARNING LAMP INDICATION	
Does the ABS warning lamp activate?		
Yes	▶	Carry out self-diagnosis. Refer to BR-96.
No	▶	Go to “3. CHECK WARNING LAMP INDICATION” in “2. Unexpected Pedal Action”, BR-124.

NOTE:
ABS does not work when vehicle speed is under 10 km/h (6 MPH).

5. Pedal Vibration and Noise

=NFBR0192

1	INSPECTION START
Pedal vibration and noise inspection Brake pedal SAT797A	
▶	GO TO 2.

2	CHECK SYMPTOM
1. Apply brake. 2. Start engine. **Does the symptom appear only when engine is started?**	
Yes ▶	Carry out self-diagnosis. Refer to BR-96.
No ▶	GO TO 3.

3	RECHECK SYMPTOM
Does the symptom appear when electrical equipment switches (such as headlamp) are operated?	
Yes ▶	Check control unit pin for damage or the connection of control unit harness connector. Then reconfirm the continuity.
No ▶	Go to “3. CHECK WARNING LAMP INDICATION” in “2. Unexpected Pedal Action”, BR-124.

NOTE:
ABS may operate and cause vibration under any of the following conditions.

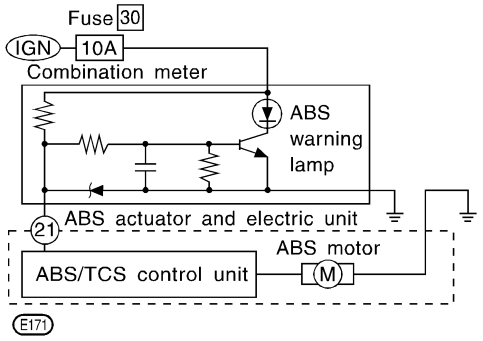
- Applying brake gradually when shifting or operating clutch.
- Low friction (slippery) road.
- High speed cornering.
- Driving over bumps and pot holes.
- Engine speed is over 5,000 rpm with vehicle stopped.

6. ABS Warning Lamp Does Not Come On When Ignition Switch Is Turned On

=NFBR0193

1	INSPECTION START

Warning lamp circuit inspection



SBR917E

	▶	GO TO 2.

2	CHECK FUSE

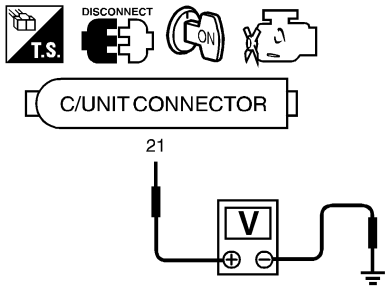
Check 10A fuse No. 30 for warning lamp. For fuse layout, refer to “POWER SUPPLY ROUTING” in EL section.

Is fuse OK?

Yes	▶	GO TO 3.
No	▶	Replace fuse.

3	CHECK ABS CONTROL UNIT POWER SUPPLY CIRCUIT

1. Install 10A fuse.
2. Check voltage between control unit harness connector E171 terminal 21 (LY) and ground after turning ignition switch “ON”.



SBR918EB

Does battery voltage exist after turning ignition switch “ON”?

Yes	▶	GO TO 4.
No	▶	Repair.

4	CHECK WARNING LAMP

Check warning lamp bulb.

Is warning lamp bulb OK?

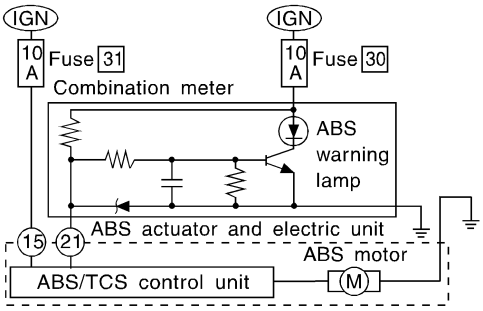
Yes	▶	Repair harness and connectors between fuse and control unit connector terminal 30 (including combination meter).
No	▶	Replace bulb.

7. ABS Warning Lamp Stays On When Ignition Switch Is Turned On

=NFBR0194

1	INSPECTION START

ABS control unit inspection



SBR919E

▶ GO TO 2.

2	CHECK FUSE

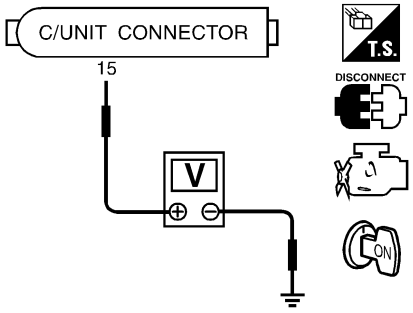
Check 10A fuse No. 31 for control unit. For fuse layout, refer to “POWER SUPPLY ROUTING” in EL section.

Is fuse OK?

Yes	▶	GO TO 3.
No	▶	GO TO 5.

3	CHECK ABS/TCS CONTROL UNIT POWER SUPPLY CIRCUIT

1. Disconnect connector from control unit.
2. Check voltage between control unit harness connector E171 terminal 15 (GY) and ground after turning ignition switch “ON”.



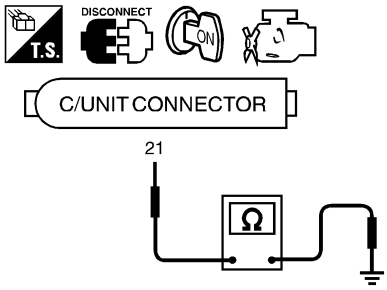
SBR920EA

Does battery voltage exist?

Yes	▶	GO TO 4.
No	▶	**Check the following.** ● Harness connector E171 ● Harness for open or short between control unit and fuse If NG, repair harness or connectors.

4	CHECK WARNING LAMP GROUND CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect connectors from control unit.
3. Check continuity between control unit harness connector E171 terminal 21 (LY) and body ground.



SBR921EB

Does continuity exist?

Yes	▶	**Check the following.** ● Harness connector E171 ● Harness for open or short between control unit and fuse If NG, repair harness or connectors.
No	▶	Check control unit pin terminals for damage or the connection of control unit harness connector. Reconnect control unit harness connector. Then retest.

5	REPLACE FUSE

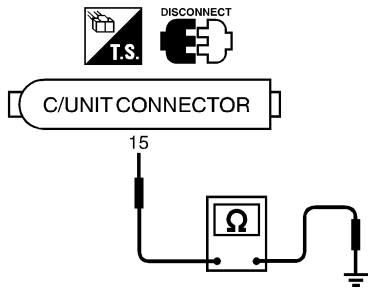
Replace 10A fuse No. 31.

Does the fuse blow out when ignition switch is turned "ON"?

Yes	▶	GO TO 6.
No	▶	**INSPECTION END**

6	CHECK ABS/TCS CONTROL UNIT POWER SUPPLY CIRCUIT FOR SHORT

1. Disconnect control unit connector.
2. Check continuity between control unit harness connector E171 terminal 15 (GY) and body ground.



SBR922EB

Does continuity exist?

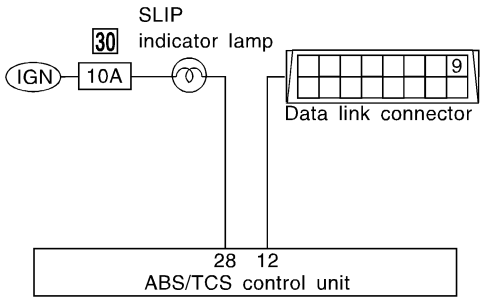
Yes	▶	**Check the following.** ● Harness connector E171 ● Harness for open or short between control unit and fuse If NG, repair harness or connectors.
No	▶	Check control unit pin terminals for damage or the connection of control unit harness connector. Reconnect control unit harness connector. Then retest.

8. SLIP Indicator Lamp Does Not Come On When Ignition Switch Is Turned On

=NFBR0195

1	INSPECTION START

Indicator lamp circuit inspection



SBR923E

▶ GO TO 2.

2	CHECK FUSE

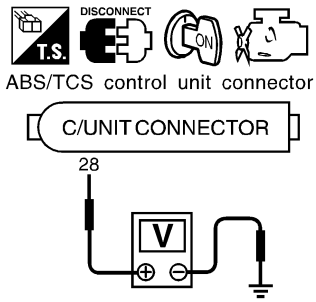
Check 10A fuse No. 30 for control unit. For fuse layout, refer to “POWER SUPPLY ROUTING” in EL section.

Is fuse OK?

Yes	▶	GO TO 3.
No	▶	Replace fuse.

3	CHECK CONTROL UNIT POWER SUPPLY CIRCUIT

1. Install 10A fuse.
2. Disconnect connector from control unit.
3. Check voltage between control unit harness connector E171 terminal 28 (R/Y) and ground after turning ignition switch “ON”.



SBR924EB

Does battery voltage exist?

Yes	▶	GO TO 5.
No	▶	GO TO 4.

4	CHECK INDICATOR LAMP

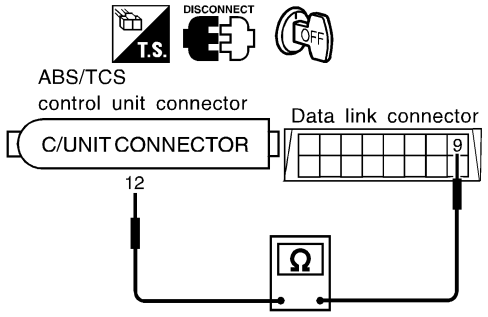
Check indicator lamp bulb.

Is indicator lamp bulb OK?

Yes	▶	Repair harness and connectors between fuse and control unit harness connector M32 (including combination meter harness connector M34).
No	▶	Replace bulb.

5	CHECK CIRCUIT

1. Disconnect control unit connector.
2. Check continuity between control unit harness connector E171 terminal 12 (W/B) and data link harness connector M28 terminal 9 (P/B).



SBR925EB

Does continuity exist?

Yes	▶	GO TO 6.
No	▶	**Check the following.** ● Harness connectors E171, M28 ● Harness for open or short between control unit and data link connector

6	CHECK CONNECTOR

1. Disconnect connector from control unit. Check terminals for damage or loose connection. Then reconnect connector.
2. Carry out self-diagnosis again.

Does warning lamp activate again?

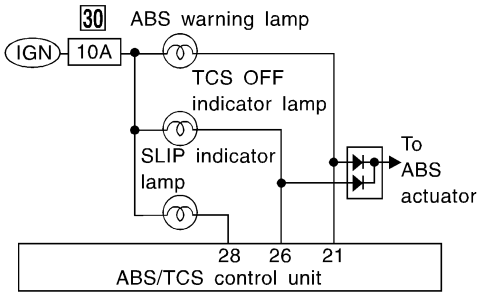
Yes	▶	Check items the self-diagnosis detected as faulty.
No	▶	**INSPECTION END**

9. TCS OFF Indicator Lamp Does Not Come On When Ignition Switch Is Turned On

NFBR0196

1	INSPECTION START

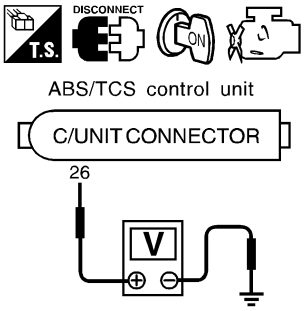
Indicator lamp circuit inspection



SBR926E

	▶	GO TO 2.

2	CHECK FUSE	
Check 10A fuse No. 30 for control unit. For fuse layout, refer to "POWER SUPPLY ROUTING" in EL section. **Is fuse OK?**		
Yes	▶	GO TO 3.
No	▶	Replace fuse.

3	CHECK CONTROL UNIT POWER SUPPLY CIRCUIT	
1. Install 10A fuse. 2. Disconnect connector from control unit. 3. Check voltage between control unit harness connector E171 terminal 26 (R) and ground after turning ignition switch "ON".		
 SBR927EB **Does battery voltage exist?**		
Yes	▶	GO TO 5.
No	▶	GO TO 4.

4	CHECK INDICATOR LAMP	
Check indicator lamp bulb. **Is indicator lamp bulb OK?**		
Yes	▶	Repair harness and connectors between control unit harness connector terminal 26 (R) and fuse box (including combination meter harness connector M32).
No	▶	Replace bulb.

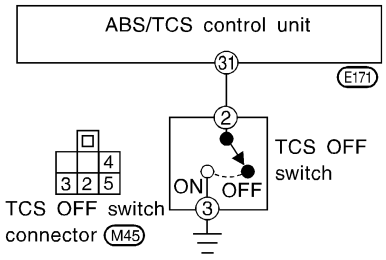
5	CHECK CONNECTOR	
1. Disconnect connector from control unit. Check terminals for damage or loose connection. Then reconnect connector. 2. Carry out self-diagnosis again. **Does warning lamp activate again?**		
Yes	▶	Check items the self-diagnosis detected as faulty.
No	▶	**INSPECTION END**

10. TCS OFF Switch Is Inoperative

=NFBR0197

1	INSPECTION START

Inspect TCS OFF switch.

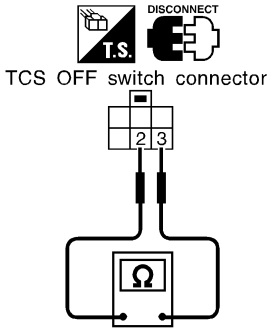


SBR928E

	▶	GO TO 2.

2	CHECK TCS OFF SWITCH

1. Remove TCS OFF switch and disconnect TCS OFF switch connector.
2. Check continuity between terminal 2 and 3 for TCS OFF switch connector M45.



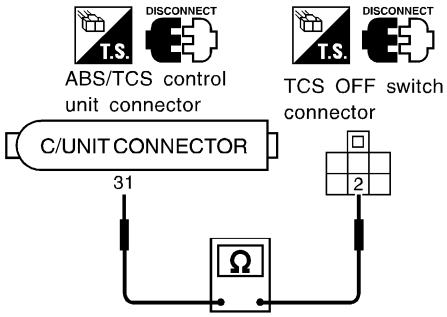
SBR544EA

When TCS OFF switch is pressed:
Continuity should exist.
When TCS OFF switch is released:
Continuity should not exist.

OK	▶	GO TO 3.
NG	▶	Replace TCS OFF switch.

3	CHECK TCS OFF SWITCH POWER SUPPLY CIRCUIT

- Disconnect connector from control unit.
- Check continuity between control unit harness connector E171 terminal 31 (SB) and TCS OFF switch harness connector M45 terminal 2 (SB).



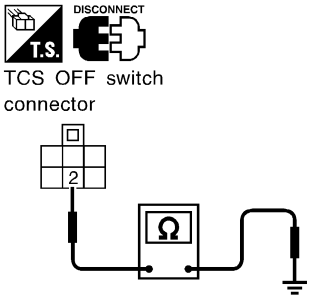
SBR929EB

Does continuity exist?

Yes	▶	GO TO 4.
No	▶	**Check the following.** • Harness connectors E171, M45 • Harness for open or short between TCS OFF switch terminal (body side) and control unit If NG, repair harness or connectors.

4	CHECK TCS OFF SWITCH POWER SUPPLY

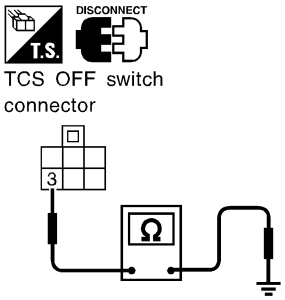
Check continuity between TCS OFF switch harness connector M45 terminal 2 (SB) and ground.



SBR546EA

Does continuity exist?

Yes	▶	GO TO 5.
No	▶	Repair harness and connectors.

5	CHECK TCS OFF SWITCH GROUND CIRCUIT	
Check continuity between TCS OFF switch harness connector M45 terminal 3 (B) and ground.  SBR547EA **Does continuity exist?**		
Yes	▶	Connect TCS OFF switch connector and check switch operation.
No	▶	Repair harness and connectors.

11. Poor Acceleration

=NFBR0198

1	INSPECTION START
Engine acceleration is poor while TCS is operating. Vehicle instability is caused by unstable engine rpm operation. (Engine is shaking.)	
▶	GO TO 2.

2	CHECK PERFORMANCE
1. Cancel TCS operation using TCS OFF switch. (TCS OFF indicator lamp lights.) 2. Drive vehicle or accelerate engine. **Is engine acceleration poor or does automatic transaxle shift when TCS is not operating?**	
Yes ▶	Go to “TROUBLE DIAGNOSES” in BR section.
No ▶	GO TO 3.

3	CHECK SELF-DIAGNOSIS
Perform self-diagnostic procedures for TCM. **Does any of the following self-diagnostic items appear on the display?**	
Yes ▶	Go to “TROUBLE DIAGNOSES” in AT section.
No ▶	GO TO 4.

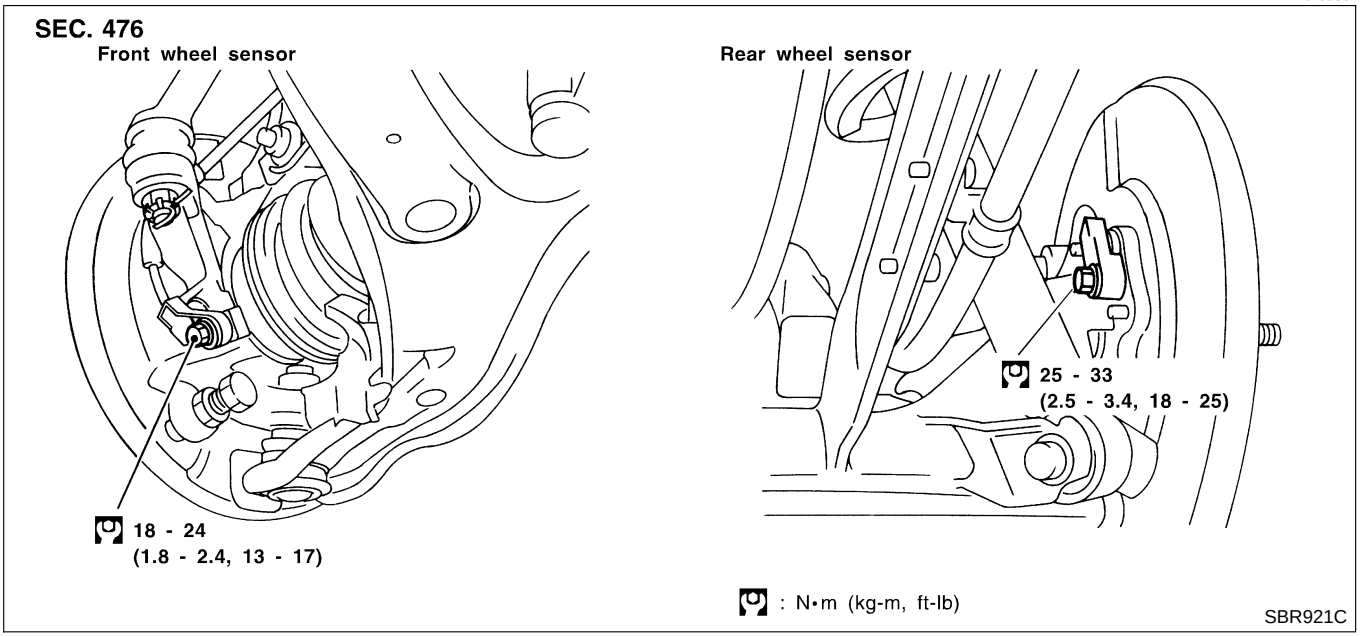
4	CHECK SELF-DIAGNOSIS
Perform self-diagnostic procedures for ABS/TCS. **Does any of the following self-diagnostic items appear on the display?**	
Yes ▶	Go to “TROUBLE DIAGNOSES” in BR section.
No ▶	GO TO 5.

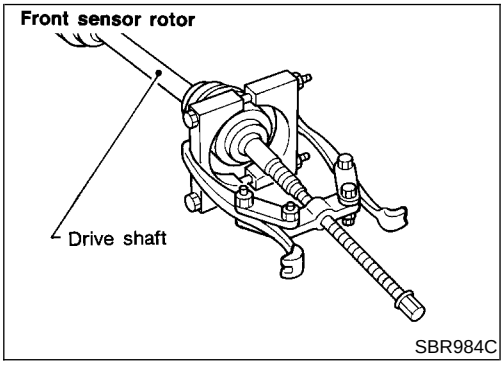
5	CHECK SELF-DIAGNOSIS
Perform self-diagnostic procedures for ECM. **Does any of the following self-diagnostic items appear on the display?**	
Yes ▶	Go to “TROUBLE DIAGNOSES” in EC section.
No ▶	**INSPECTION END**

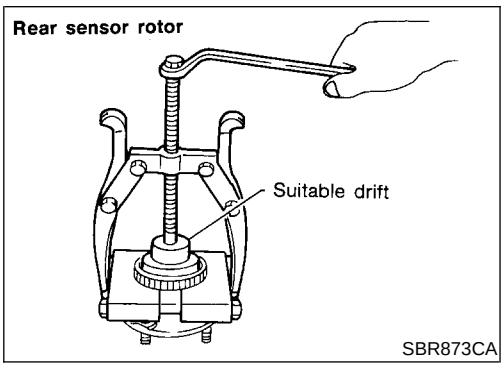
CAUTION:
Be careful not to damage sensor edge and sensor rotor teeth. When removing the front or rear wheel hub assembly, first remove the ABS wheel sensor from the assembly. Failure to do so may result in damage to the sensor wires making the sensor inoperative.

Wheel Sensors

NFBR0199S01







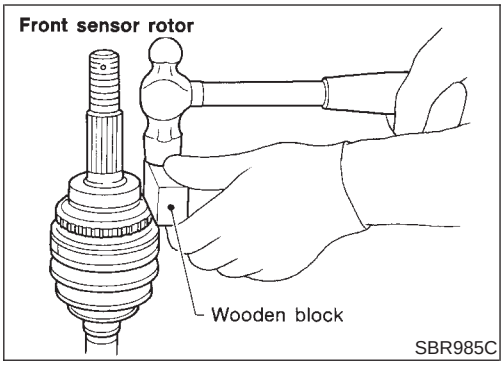
Sensor Rotor

NFBR0199S02

REMOVAL

NFBR0199S0201

1. Remove the drive shaft and rear wheel hub. Refer to “Drive Shaft” and “Wheel Hub” in AX section.
2. Remove the sensor rotor using suitable puller, drift and bearing replacer.

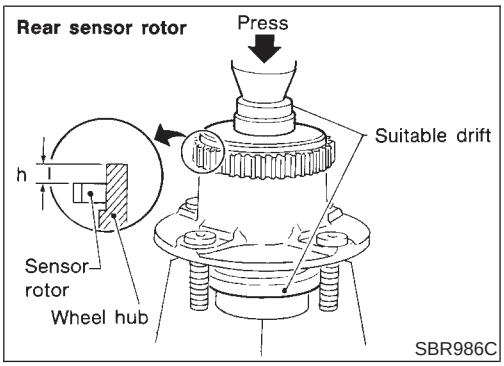


INSTALLATION

NFBR0199S0202

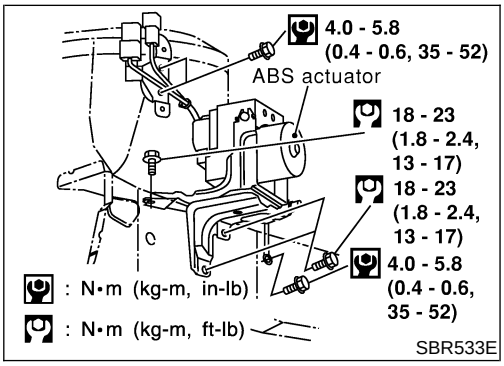
Install the sensor rotor. For front sensor rotor, use hammer and wooden block. For rear sensor rotor, use suitable drift and press.

- Always replace sensor rotor with new one.



- Pay attention to the dimension of rear sensor rotor as show in figure.

  h: 12.5 - 13.5 mm (0.492 - 0.531 in)



ABS Actuator and Electric Unit

REMOVAL

NFBR0199S04

NFBR0199S0401

1. Disconnect battery cable.
2. Drain brake fluid. Refer to "Changing Brake Fluid" (BR-8).
3. Remove air cleaner and duct.
4. Apply different colored paint to each pipe connector and actuator to prevent incorrect connection.
5. Disconnect harness connectors and brake pipes, then remove ABS actuator and electric unit and remove fixing nuts and actuator ground cable.

INSTALLATION

NFBR0199S0402

CAUTION:

- **After installation, refill brake fluid. Then bleed air. Refer to "Bleeding Brake System" (BR-9).**

1. Temporarily install actuator on the bracket.
2. Tighten actuator ground cable.
3. Connect brake pipes temporarily.
4. Tighten fixing nuts.
5. Tighten brake pipes.
6. Connect harness connectors and battery cable.
7. Install air cleaner and duct.

General Specifications

NFBR0200
Unit: mm (in)

Front brake	Brake model		CLZ25VD disc brake
	Cylinder bore diameter		57.2 (2.252)
	Pad Length × width × thickness		125.6 × 46 × 9.5 (4.94 × 1.81 × 0.374)
	Rotor outer diameter × thickness		296 × 24 (11.65 × 0.94)
Rear brake	Brake model		CL9HE disc brake
	Cylinder bore diameter		33.96 (1.3370)
	Pad Length × width × thickness		89.1 × 39.5 × 10 (3.508 × 1.555 × 0.39)
	Rotor outer diameter × thickness		278 × 9 (10.94 × 0.35)
Master cylinder	Cylinder bore diameter		23.81 (15/16)
Brake booster	Booster model		M215T
	Diaphragm diameter	Primary	230 (9.06)
		Secondary	205 (8.07)
Recommended brake fluid			DOT 3

Disc Brake

NFBR0201
Unit: mm (in)

Brake model		CLZ25VD	CL9HE
Pad wear limit	Minimum thickness	2.0 (0.079)	1.5 (0.059)
Rotor repair limit	Maximum runout	0.07 (0.0028)	0.07 (0.0028)
	Minimum thickness	22.0 (0.866)	8.0 (0.315)

Brake Pedal

NFBR0202
Unit: mm (in)

Pedal play	3 - 11 (0.12 - 0.43)
Free height “H”*	167 - 174 (6.57 - 6.85)
Clearance “C” between pedal stopper and threaded end of stop lamp switch or ASCD switch	0.74 - 1.96 (0.0291 - 0.0772)

*: Measured from surface of dash reinforcement panel to surface of pedal pad

Parking Brake

NFBR0203

Control type	Center lever	Foot lever
Number of notches [under force of 196 N (20 kg, 44 lb)]	10 - 11	4 - 5
Number of notches when warning lamp switch comes on	1	

Brake Booster

NFBR0205
Unit: mm (in)

Output rod length	10.275 - 10.525 (0.4045 - 0.4144)
Clevis length (Dimension “A”)	130 (5.12)

ABS Wheel Sensor

NFBR0206

Clearance	Front		0.273 - 0.925 mm (0.0107 - 0.0364 in)
	Rear		0.385 - 0.973 mm (0.0252 - 0.0383 in)
Resistance	Front	M/T	0.8 - 1.85Ω
		A/T	—
	Rear	M/T	0.8 - 1.85Ω
		A/T	—
Dimension of rear sensor rotor			12.5 - 13.5 mm (0.4921 - 0.5315 in)

NOTES

SECTION CL

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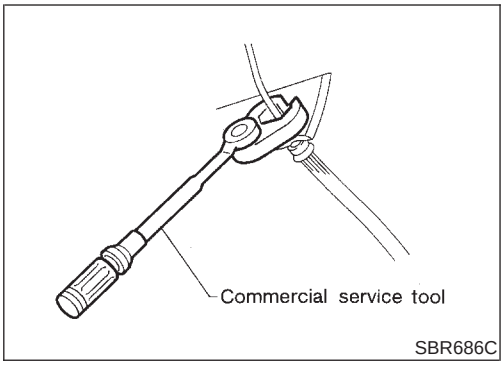


Precautions

NFCL0001

- **Recommended fluid is brake fluid “DOT 3”.**
- **Never reuse drained brake fluid.**
- **Be careful not to splash brake fluid on painted areas.**
- **When removing and installing clutch piping, use Tool.**
- **Use new brake fluid to clean or wash all parts of master cylinder and operating cylinder.**
- **Never use mineral oils such as gasoline or kerosene. It will ruin the rubber parts of the hydraulic system.**

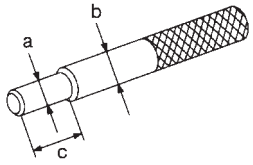
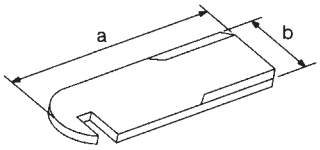
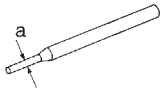
WARNING:

After cleaning clutch disc, wipe it with a dust collector. Do not use compressed air.

Special Service Tools

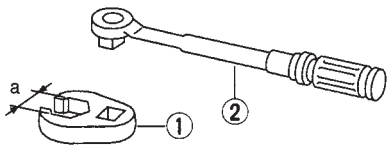
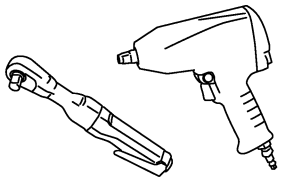
NFCL0002

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description	
ST20630000 (J26366) Clutch aligning bar	 NT405	Installing clutch cover and clutch disc **a: 15.8 mm (0.622 in) dia.** **b: 22.9 mm (0.902 in) dia.** **c: 45.0 mm (1.772 in)**
ST20050240 (—) Diaphragm spring adjusting wrench	 NT404	Adjusting unevenness of diaphragm spring of clutch cover **a: 150 mm (5.91 in)** **b: 25 mm (0.98 in)**
KV32101000 (J25689-A) Pin punch	 NT410	Removing and installing spring pin **a: 4 mm (0.16 in) dia.**

Commercial Service Tools

NFCL0003

Tool name	Description	
1 Flare nut crowfoot 2 Torque wrench	 NT360	Removing and installing clutch piping **a: 10 mm (0.39 in)**
Power tool	 PBIC0190E	Loosening bolts and nuts

NVH Troubleshooting Chart

NFCL0004S01

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

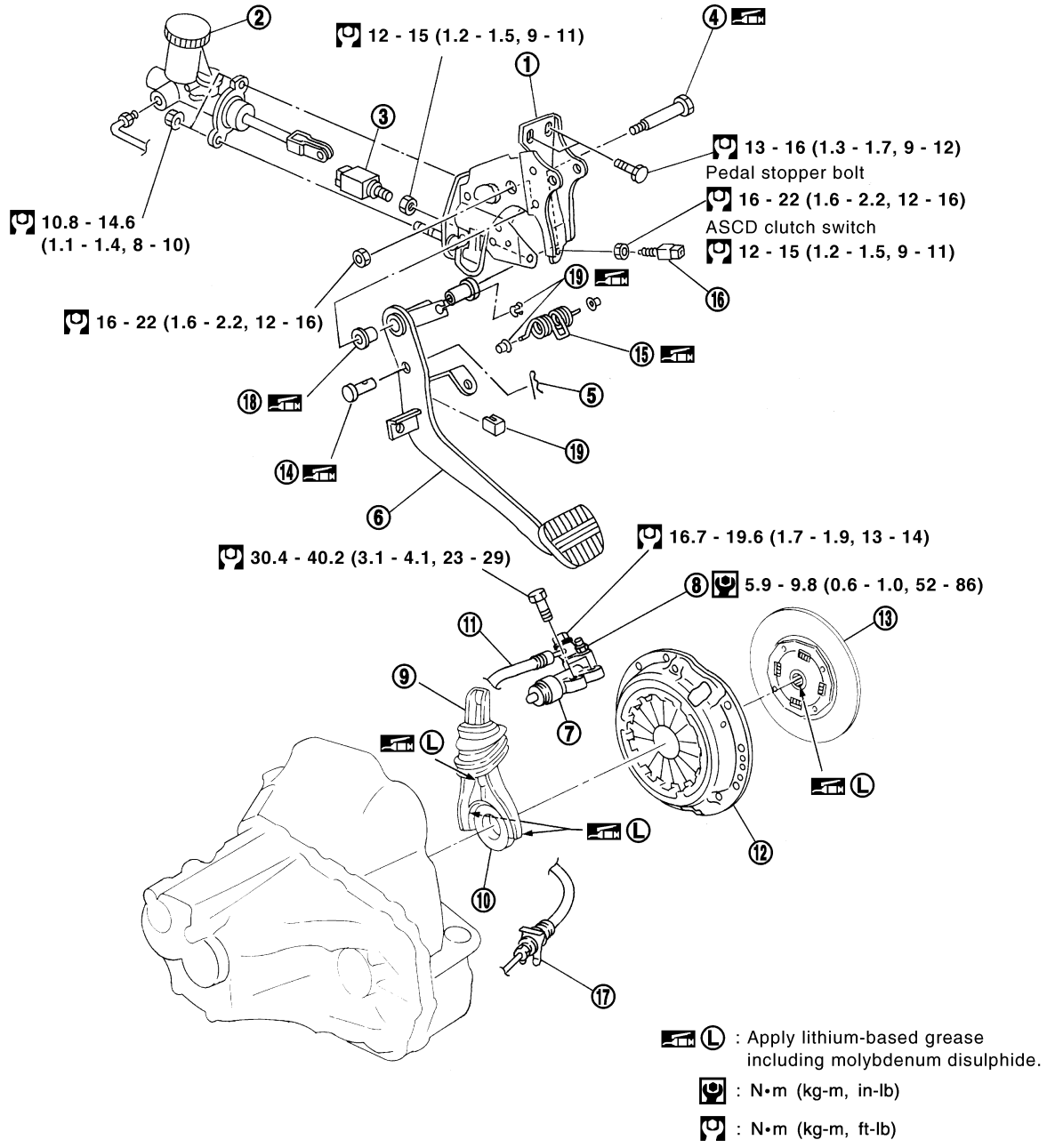
NFCL0004S0101

		Reference page	CL-6	CL-7	CL-8	CL-10	Refer to EM-60, "Removal and Installation".	CL-13	CL-15	CL-15	CL-15	CL-15	CL-15	CL-15	CL-15	CL-15	CL-15	CL-15	CL-15	CL-16
		SUSPECTED PARTS (Possible cause)	CLUTCH PEDAL (Free play out of adjustment)	CLUTCH LINE (Air in line)	MASTER CYLINDER PISTON CUP (Damaged)	OPERATING 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	2															
	Clutch noisy							1												
	Clutch slips	1											2	2			3		4	5
	Clutch does not disengage	1	2	3	4			5	5	5	5	5			5	6	6	7		

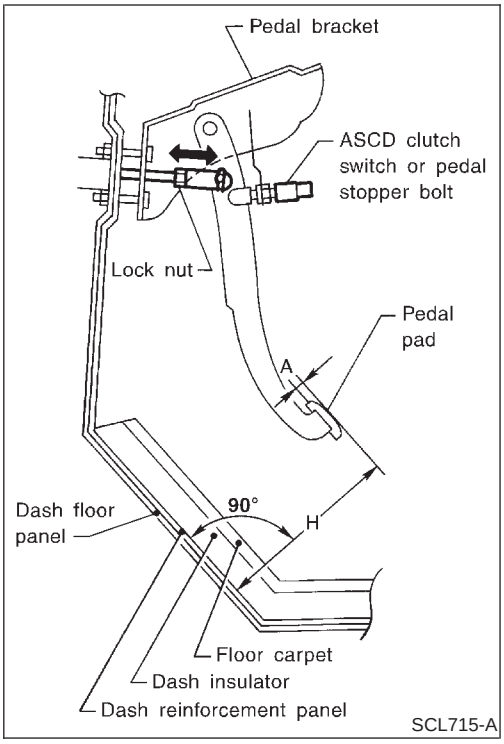
Components

NFCL0005

SEC. 300•305•306•465



1. Pedal bracket
2. Clutch master cylinder
3. Clutch interlock switch
4. Fulcrum pin
5. Pin
6. Clutch pedal
7. Operating cylinder
8. Air bleeder valve
9. Withdrawal lever
10. Release bearing
11. Clutch hose
12. Clutch cover
13. Clutch disc
14. Clevis pin
15. Assist spring
16. ASCD clutch switch
17. Lock plate
18. Bushing
19. Stopper rubber



Inspection and Adjustment

NFCL0006

ADJUSTING CLUTCH PEDAL

NFCL0006S01

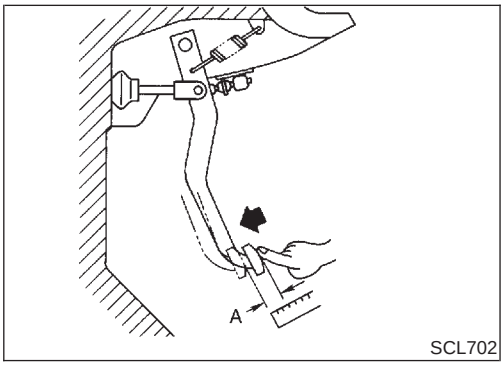
Pedal Height

NFCL0006S0101

1. Adjust pedal height with ASCD clutch switch or pedal stopper bolt.

   Pedal height “H”:

   179.5 - 189.5 mm (7.07 - 7.46 in)

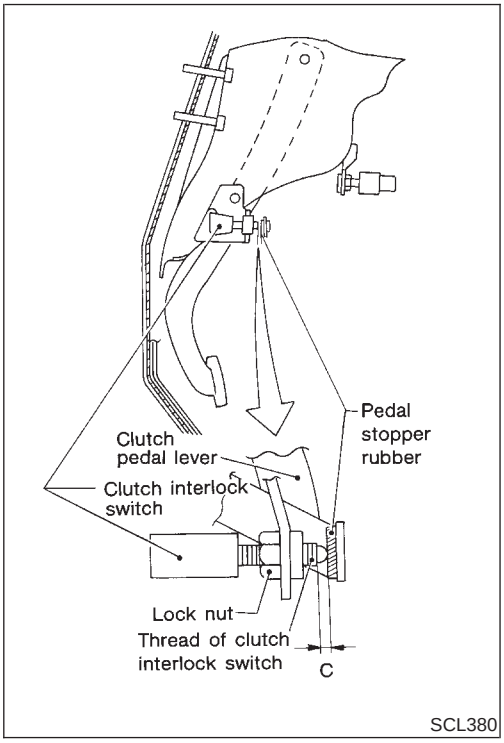


2. Adjust pedal free play with master cylinder push rod. Then tighten lock nut.

   Pedal free play “A”:

   9 - 16 mm (0.35 - 0.63 in)

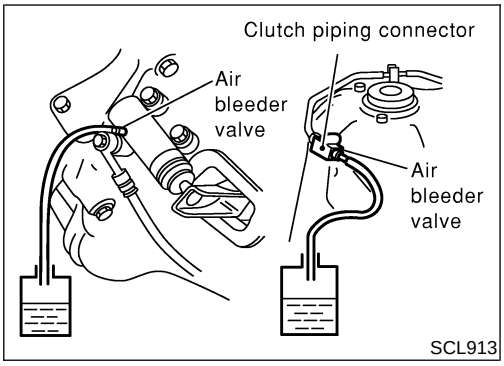
- Push or step on clutch pedal until resistance is felt, and check the distance the pedal moves.



3. Adjust clearance “C” shown in the figure while fully depressing clutch pedal fully.

   Clearance “C”:

   0.1 - 1.5 mm (0.004 - 0.059 in)



AIR BLEEDING PROCEDURE

NFCL0006S02

1. Bleed air from clutch piping connector and operating cylinder according to the following procedure.

- **Carefully monitor fluid level at master cylinder during air bleeding operation.**
- **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.**

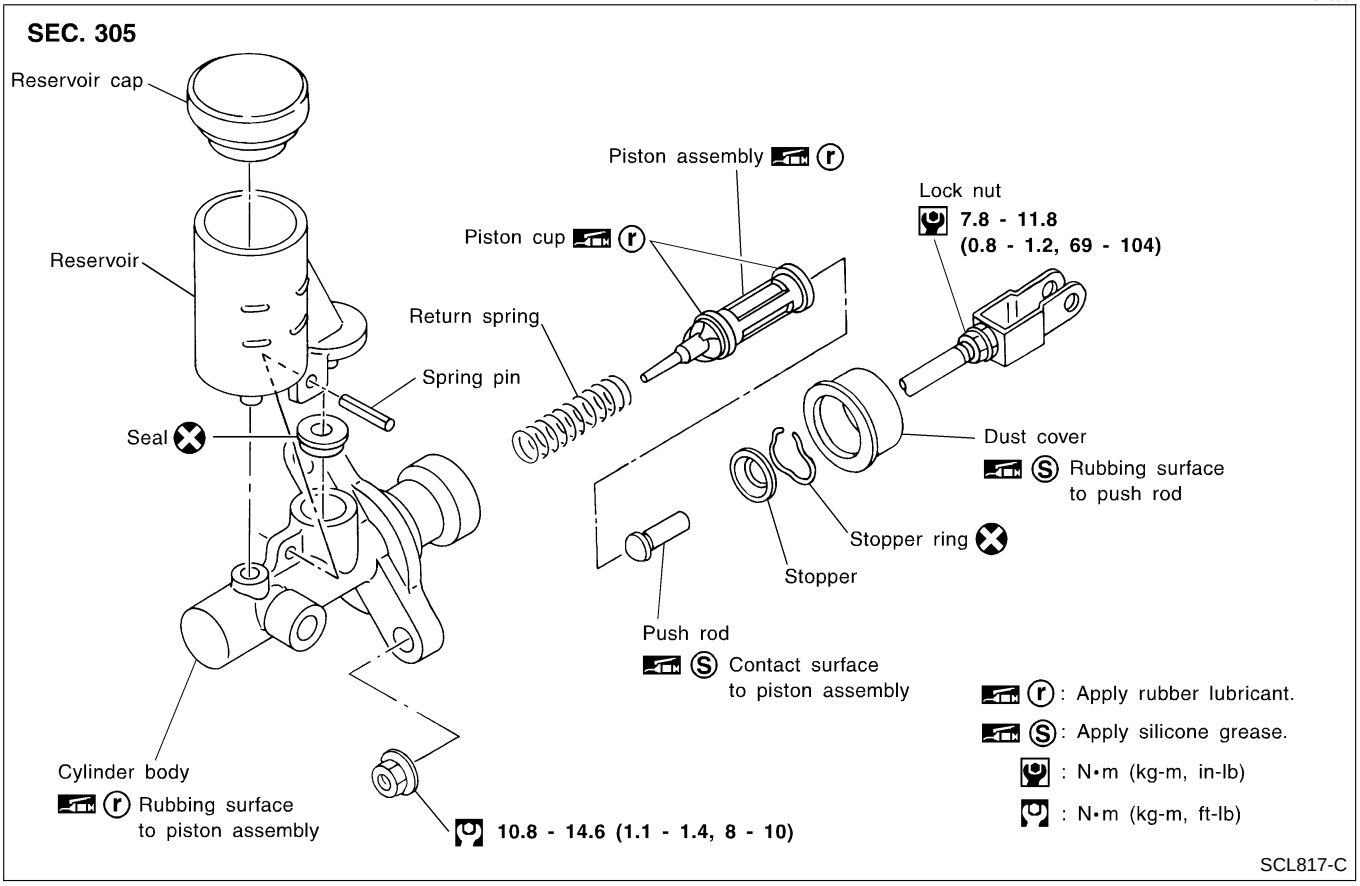
a. Top up reservoir of master cylinder with recommended brake fluid.
b. Connect a transparent vinyl tube to air bleeder valve.
c. Slowly depress clutch pedal to its full stroke and release it completely. Repeat this operation several times at 2 to 3 second intervals.
d. Holding clutch pedal depressed, open air bleeder valve to release air.
e. Close air bleeder valve.
f. Release clutch pedal and wait at least 5 seconds.
g. Repeat steps c through f above until brake fluid flows from air bleeder valve without air bubbles.

2. Bleed air from clutch operating cylinder according to the above same procedure.
3. Repeat the above air bleeding procedures 1 and 2 several times.

Tightening torque of air bleeder valve:
: 5.9 - 9.8 N·m (0.6 - 1.0 kg-m, 52 - 86 in-lb)

Components

NFCL0007



Removal

NFCL0008

1. Drain brake fluid.

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.

2. Remove clutch tube using a flare nut wrench.
3. Remove snap pin between clutch pedal and push rod, and remove clevis pin.
4. Unscrew master cylinder assembly mounting nuts and remove master cylinder assembly from vehicle.

Installation

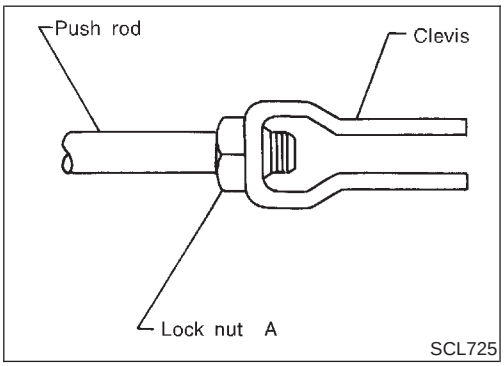
NFCL0009

1. Connect clutch tube to master cylinder assembly, and hand-tighten flare nut.
2. Install master cylinder assembly to vehicle, and tighten mounting nuts to the specified torque.

   : 10.8 - 14.6 N·m (1.1 - 1.4 kg-m, 8 - 10 ft-lb)
3. Tighten clutch tube flare nut using a flare nut torque wrench.

   : 15 - 17 N·m (1.5 - 1.7 kg-m, 11 - 12 ft-lb)
4. After installing clevis pin, install snap pin to connect clutch pedal to push rod.

5. After finishing the operation, bleed air from clutch piping connector and operating cylinder. (Refer to "Air Bleeding Procedure", CL-7.)



Disassembly

NFCL0010

1. Loosen push rod lock nut A to remove clevis and lock nut A.
2. Remove dust cover.
3. Remove stopper ring and stopper, and remove push rod from cylinder body. During removal, keep push rod depressed, to prevent piston inside master cylinder from popping out.
4. Remove piston assembly from cylinder body.

Inspection

NFCL0011

Check the following items, and replace if necessary.

- Rubbing surface of cylinder and piston, for uneven wear, rust or damage
- Piston with piston cup, for wear or damage
- Return spring, for wear or damage
- Dust cover, for cracks, deformation or damage
- Reservoir, for deformation or damage

Assembly

NFCL0012

1. Apply rubber lubricant to the sliding part of piston assembly, and insert piston assembly.
2. After installing stopper to push rod, install stopper ring while keeping piston assembly depressed by hand, so that piston assembly will not pop out.

CAUTION:

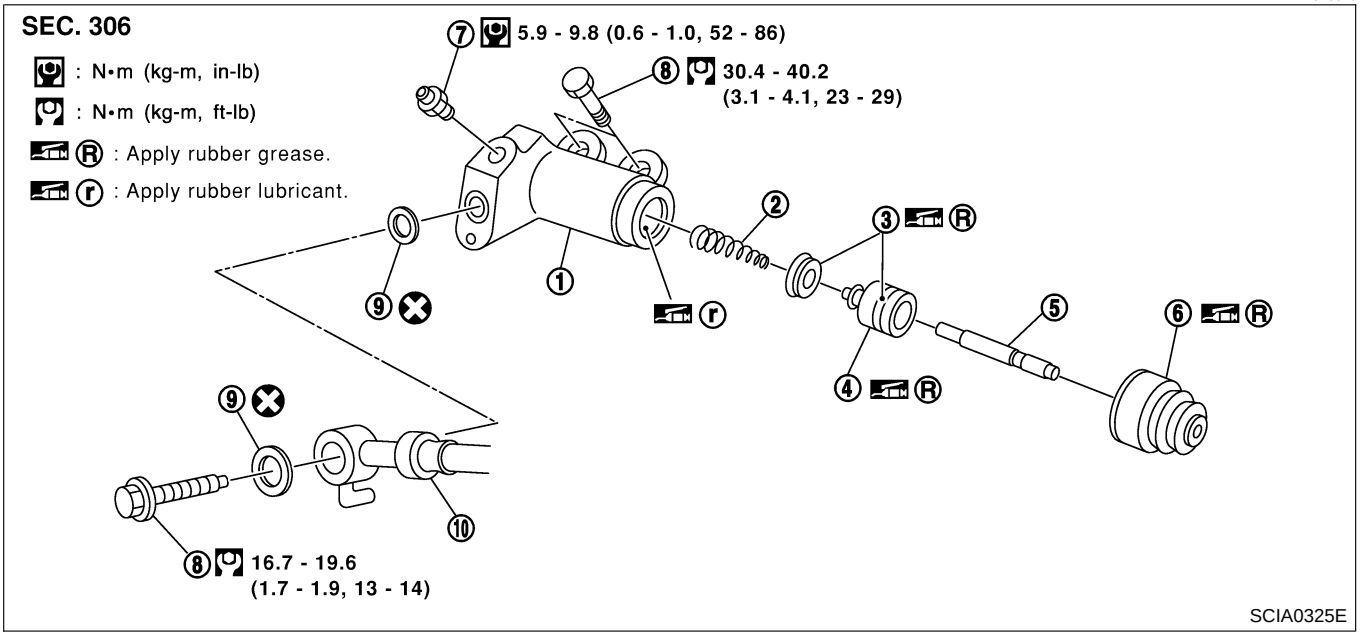
Stopper ring cannot be reused. Always use a new stopper ring for assembly.

3. Install dust cover.
4. Install clevis to push rod, and tighten lock nut A to the specified torque.

   : 7.8 - 11.8 N·m (0.8 - 1.2 kg-m, 69 - 104 in-lb)
5. Install spring pin using a pin punch.

Components

NFCL0019



1. Cylinder body
2. Piston spring
3. Piston cup
4. Piston assembly
5. Push rod
6. Dust cover
7. Air bleeder valve
8. Union bolt
9. Copper washer
10. Clutch hose

Removal

NFCL0020

1. Drain brake fluid.

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.

2. Remove union bolt and clutch hose from operating cylinder.
3. Remove operating cylinder mounting bolts, and remove cylinder from vehicle.

Disassembly

NFCL0021

Remove dust cover, push rod, remove piston assembly and piston spring from cylinder body.

Inspection

NFCL0022

Inspect for following, and replace parts if necessary.

- Damage, foreign material, wear, rust, and pinholes on the cylinder inner surface, piston, and sliding part of piston cup
- Weak spring
- Crack and deformation of dust cover

Assembly

NFCL0023

1. Install piston spring.
2. Apply recommended rubber grease to piston cup and piston, and insert piston assembly.
3. Install push rod.
4. Install dust cover.

Installation

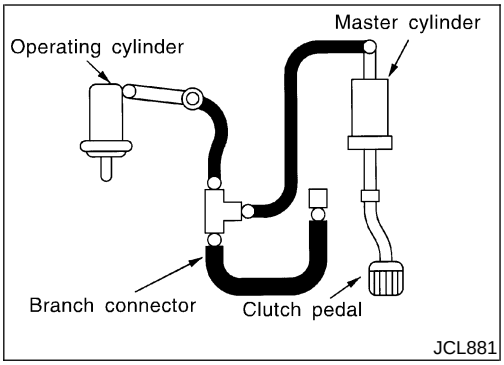
NFCL0024

Install the components in the reverse order of removal. Adhere to the operations described below.

CAUTION:

Install the hose without twisting it.

- **The copper washer of the union bolt should not be reused. Always use a new copper washer for installation.**
- **After finishing the operation, bleed air from the clutch piping connector and operating cylinder. Refer to "Air Bleeding Procedure", CL-7.**



Removal

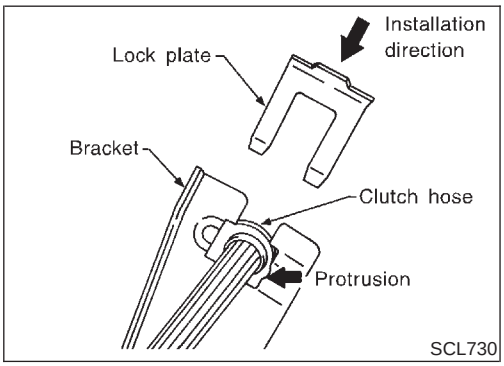
NFCL0025

1. Remove air cleaner and air duct.
2. Drain brake fluid.

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.

3. Remove flare nut using a flare nut wrench.
4. Remove clutch hose and clutch tube.



Installation

NFCL0026

1. When installing clutch hose to bracket, face lock plate in the correct direction as shown to secure clutch hose.

CAUTION:

Install clutch hose without twisting or bending it.

2. Tighten flare nut to the specified torque, using a flare nut wrench.

   : 15 - 17 N·m (1.5 - 1.7 kg-m, 11 - 12 ft-lb)

CAUTION:

Be careful not to damage flare nut and clutch tube.

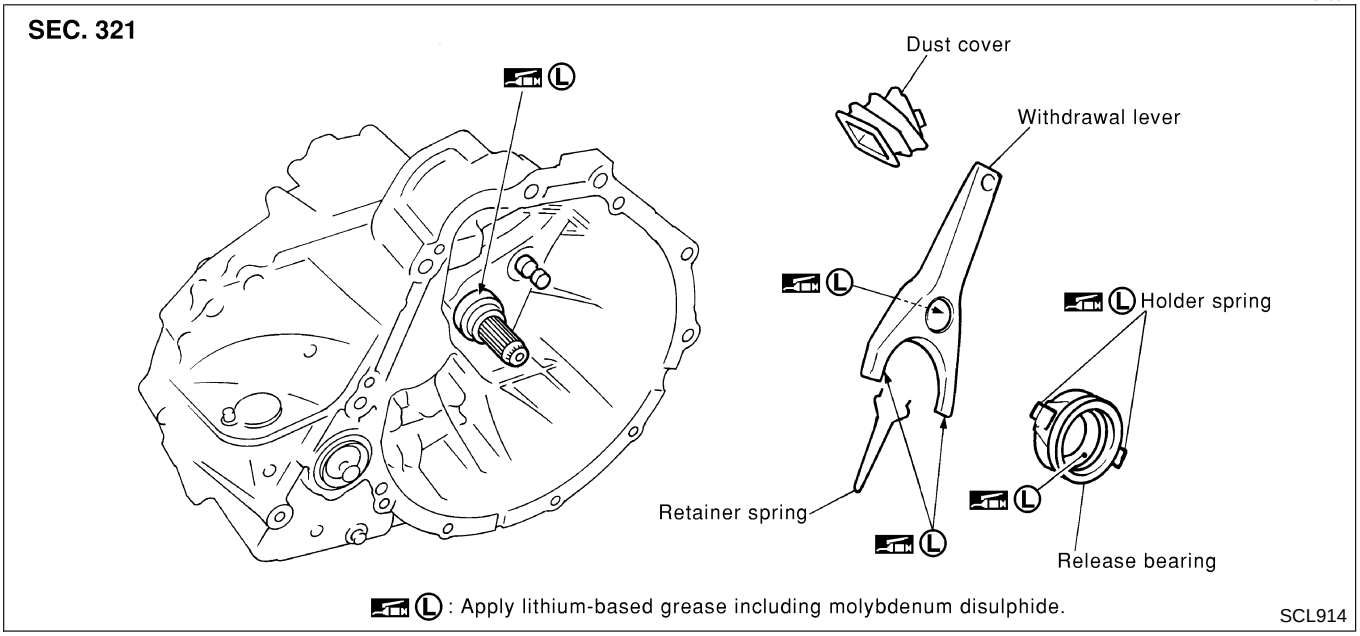
3. Install clutch hose to operating cylinder, and tighten mounting bolts to the specified torque.

   : 16.7 - 19.6 N·m (1.7 - 1.9 kg-m, 13 - 14 ft-lb)

4. After finishing the operation, bleed air from the clutch piping connector and operating cylinder. Refer to “Air Bleeding Procedure”, CL-7.

Components

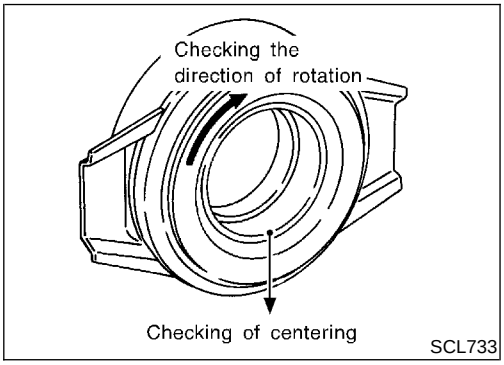
NFCL0027



Removal

NFCL0028

1. Remove manual transaxle from vehicle. Refer to MT-13, “Removal”.
2. Move withdrawal lever enough to remove release bearing, and remove release bearing from clutch withdrawal lever.
3. Remove dust cover.
4. Remove retainer spring from withdrawal lever.



Inspection

NFCL0029

- Replace the release bearing if it is seized, damaged, faulty in rotation direction, or has poor aligning function.
- Replace the withdrawal lever if its contact surface is worn abnormally.
- Replace the dust cover if it is deformed or cracked.

Installation

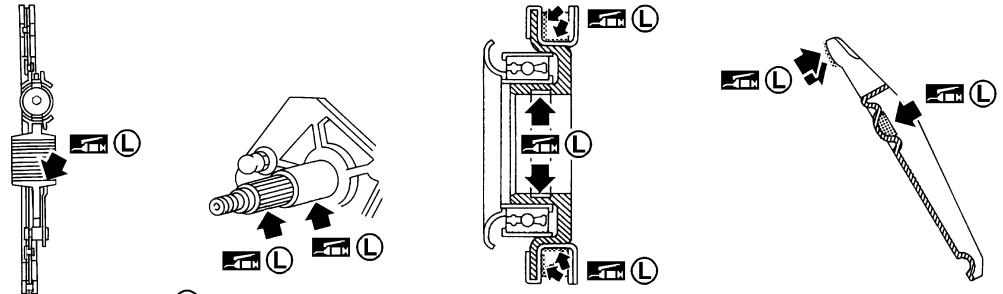
NFCL0030

1. Apply a coat of grease to parts as instructed in the following cautions and notes before installation.

CAUTION:

- **Be sure to apply grease to the clutch components. Otherwise, abnormal noise, poor clutch disengagement, or clutch damage may occur. Wipe the excess grease off completely, because it may cause the clutch components to slip and shudder.**
- **Keep the clutch disc facing, pressure plate, and flywheel free of oil and grease.**

- **Clean old grease and abrasive materials off the grease application area.**



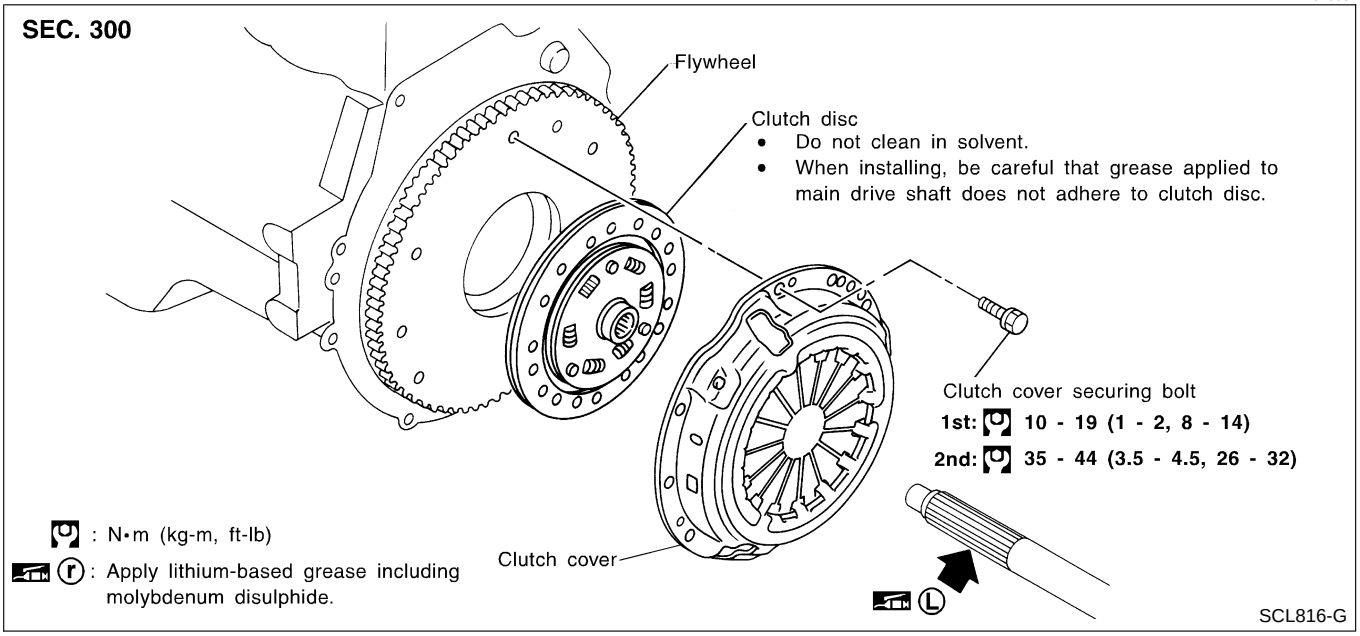
NOTE:

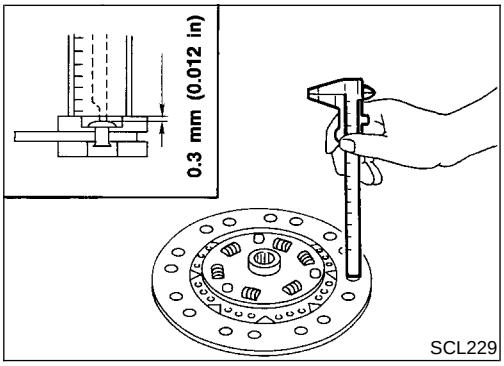
- Equally apply a coat [approximately 1 mm (0.04 in) thick] of clutch sleeve grease to withdrawal lever and holder spring frictional surfaces.
- Apply a coat of clutch sleeve grease to the grooves on contact surfaces of the withdrawal lever ball pin and inner surface of release bearing so that grease application, make sure that grease is flush with grooves.
- Equally apply a thin coat of clutch sleeve grease to release bearing frictional surface. After grease application, install release bearing. Wipe off excess grease forced out during bearing installation. Remove release bearing.

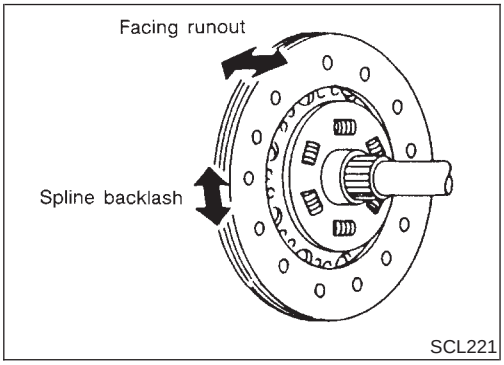
2. Installation is in the reverse order of removal.

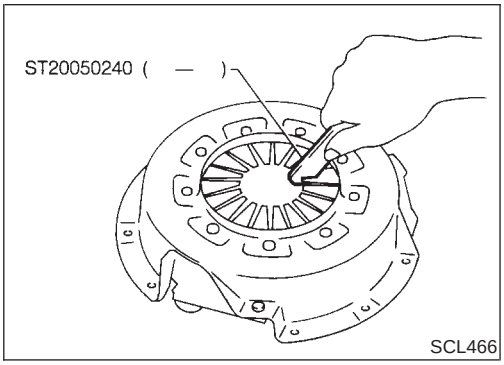
Components

NFCL0031









Inspection and Adjustment

CLUTCH DISC

NFCL0032

NFCL0032S01

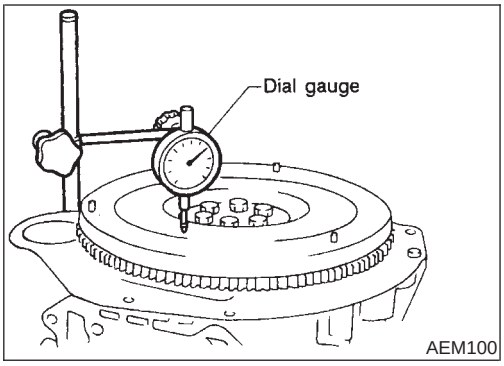
- Check clutch disc for wear of facing.
  Wear limit of facing surface to rivet head:
  0.3 mm (0.012 in)

- Check clutch disc for backlash of spline and runout of facing.
  Maximum spline backlash (at outer edge of disc):
  1.0 mm (0.039 in)
  Runout limit:
  1.0 mm (0.039 in)
  Distance of runout check point (from hub center):
  120 mm (4.72 in)
- Check clutch disc for burns, discoloration or oil or grease leakage. Replace if necessary.

CLUTCH COVER

NFCL0032S02

- Check clutch cover installed on vehicle for unevenness of diaphragm spring toe height.
  Uneven limit:
  0.5 mm (0.020 in)
- If out of limit, adjust the height with Tool.



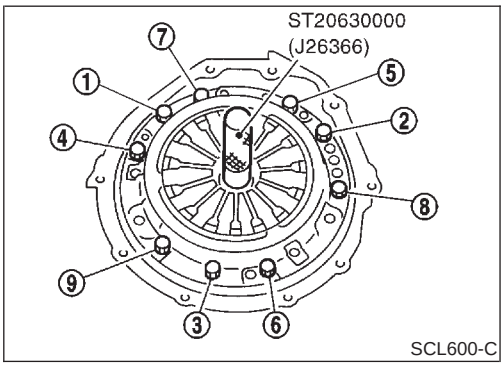
FLYWHEEL

NFCL0032S03

- Check contact surface of flywheel for slight burns or discoloration. Repair flywheel with emery paper.
- Check flywheel runout.

Maximum allowable runout:

Refer to EM-73, "Flywheel/drive plate runout".



Installation

NFCL0033

- Insert Tool into clutch disc hub when installing clutch cover and disc.
- **Be careful not to allow grease to contaminate clutch facing.**
- Tighten bolts in numerical order.

First step:

: 10 - 19 N·m (1 - 2 kg-m, 8 - 14 ft-lb)

Final step:

: 35 - 44 N·m (3.5 - 4.5 kg-m, 26 - 32 ft-lb)

Clutch Control System

NFCL0034

Type of clutch control	Hydraulic

Clutch Master Cylinder

NFCL0035
Unit: mm (in)

Inner diameter	15.87 (5/8)

Clutch Operating Cylinder

NFCL0036
Unit: mm (in)

Inner diameter	19.05 (3/4)

Clutch Disc

NFCL0038

Model	250
Facing size (Outer dia. × inner dia. × thickness)	250 mm × 160 mm × 3.5 mm (9.84 in × 6.30 in × 0.138 in)
Thickness of disc assembly With load	8.1 - 8.5 mm (0.319 - 0.335 in) with 4,903 N (500 kg, 1,102 lb)
Wear limit of facing surface to rivet head	0.3 mm (0.012 in)
Facing runout limit	1.0 mm (0.039 in)
Distance of runout check point (from the hub center)	120 mm (4.72 in)
Maximum spline backlash (at outer edge of disc)	1.0 mm (0.039 in)

Clutch Cover

NFCL0039

Model	250
Set load	7,355 N (750 kg, 1,653 lb)
Uneven limit of diaphragm spring toe height	0.5 mm (0.020 in)

Clutch Pedal

NFCL0040
Unit: mm (in)

Pedal height “H”*	179.5 - 189.5 (7.07 - 7.46)
Pedal free play “A”	9 - 16 (0.35 - 0.63)
Clearance “C” between pedal stopper rubber and clutch interlock switch threaded end while clutch pedal is fully depressed.	0.1 - 1.5 (0.004 - 0.059)

*: Measured from surface of dash reinforcement panel to surface of pedal pad

NOTES

ELECTRICAL SYSTEM

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

NFEL0001

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER” used along with a seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. The SRS system composition which is available to NISSAN MODEL A33 is as follows:

- For a frontal collision
  The Supplemental Restraint System consists of driver air bag module (located in the center of the steering wheel), front passenger air bag module (located on the instrument panel on passenger side), seat belt pre-tensioners, a diagnosis sensor unit, crash zone sensor, warning lamp, wiring harness and spiral cable.
- For a side collision
  The Supplemental Restraint System consists of front side air bag module (located in the outer side of front seat), satellite sensor, diagnosis sensor unit (one of components of air bags for a frontal collision), wiring harness, warning lamp (one of components of air bags for a frontal collision).

Information necessary to service the system safely is included in the **RS 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 should be performed by an authorized NISSAN 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 RS 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 harness connector.**

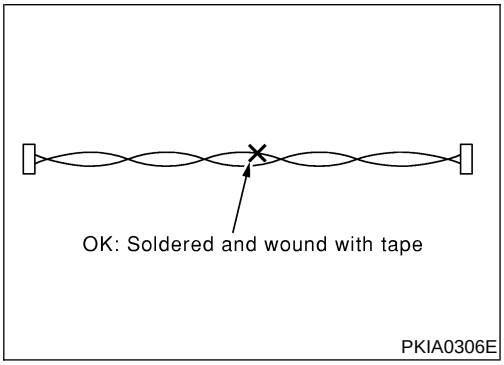
Precautions for Trouble Diagnosis

NFEL0265

CAN SYSTEM

NFEL0265S01

- 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.



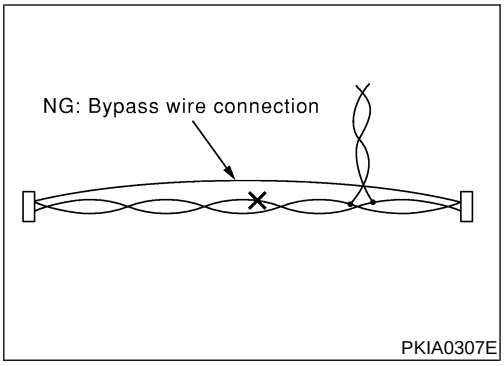
Precautions for Harness Repair

NFEL0266

CAN SYSTEM

NFEL0266S01

- 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

NFEL0002

When you read wiring diagrams, refer to the following:

- GI-11, "HOW TO READ WIRING DIAGRAMS"
- EL-10, "POWER SUPPLY ROUTING" for power distribution circuit

When you perform trouble diagnosis, refer to the following:

- GI-35, "HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES"
- GI-24, "HOW TO PERFORM EFFICIENT DIAGNOSIS FOR AN ELECTRICAL INCIDENT"

Check for any Service bulletins before servicing the vehicle.

Description

NFEL0003

HARNESS CONNECTOR (TAB-LOCKING TYPE)

NFEL0003S01

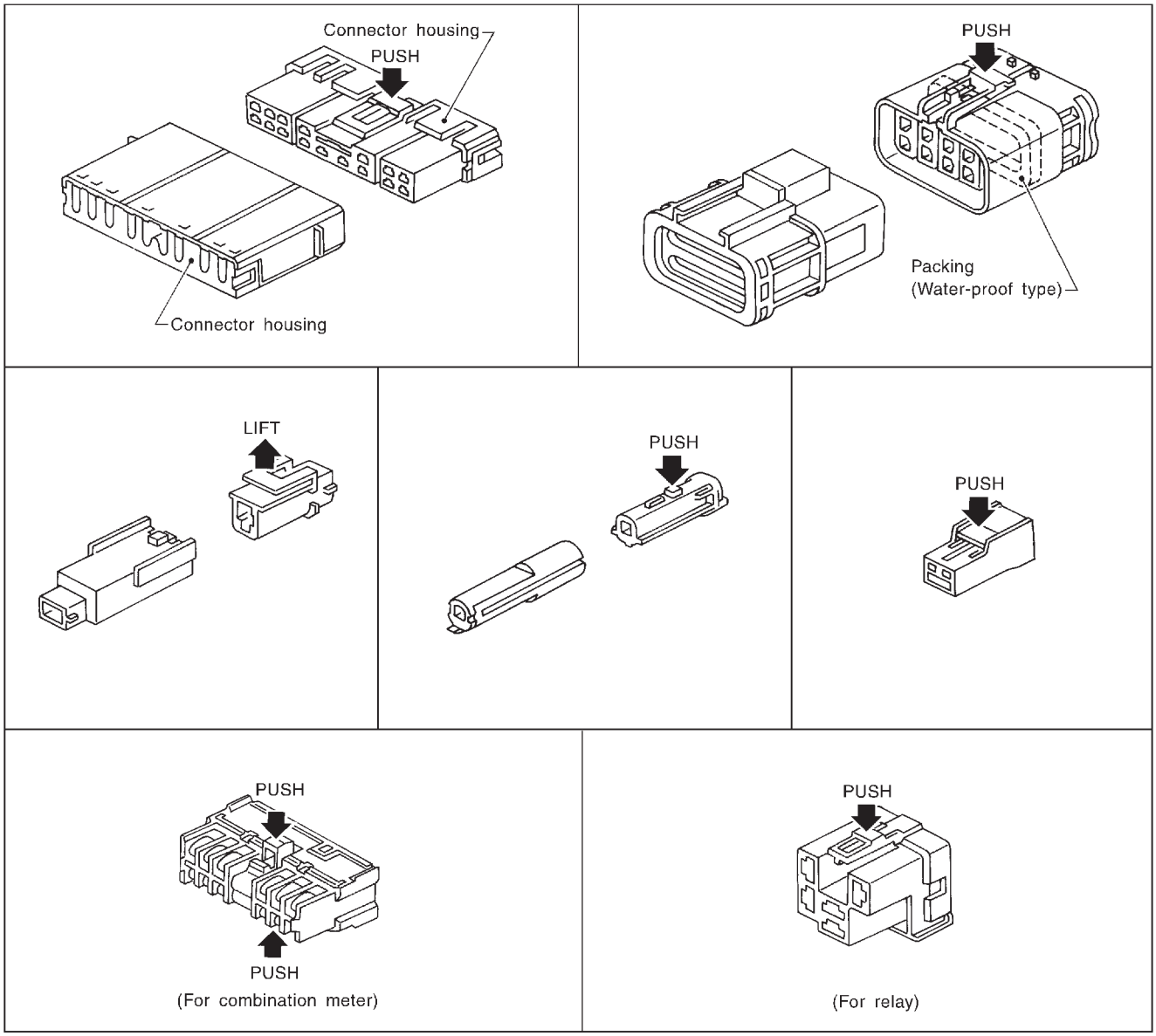
- The tab-locking type connectors help prevent accidental looseness or disconnection.
- The tab-locking type connectors are disconnected by pushing or lifting the locking tab(s). Refer to the illustration below.

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)

=NFEL0003S02

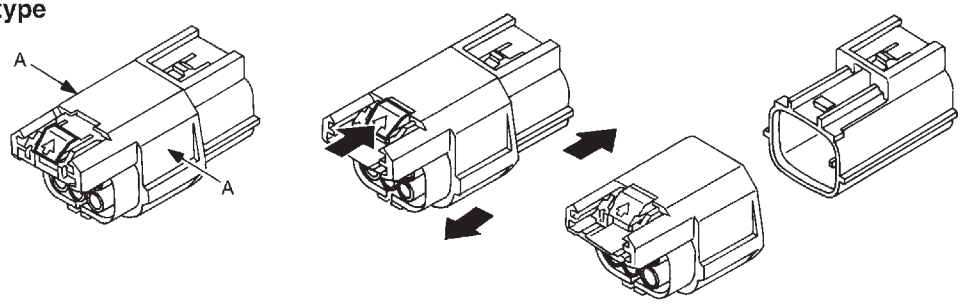
- A new style slide-locking type connector is used on certain systems and components, especially those related to OBD.
- The slide-locking type connectors help prevent incomplete locking and accidental looseness or disconnection.
- The slide-locking type connectors are disconnected by pushing or pulling 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]

Waterproof type

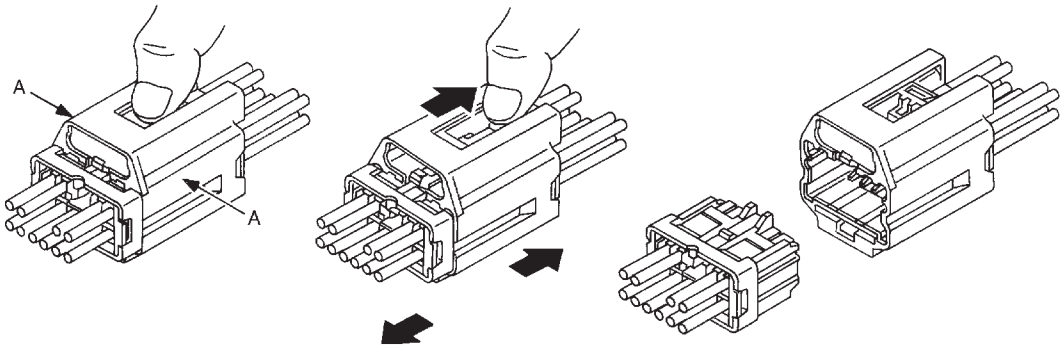


① Firmly grasp shell of connector housing at A.

② Push slider until connector pops or snaps apart.

③ Disconnect harness connector.

Non-waterproof type



① Firmly grasp shell of connector housing at A.

② Pull back on the slider while pulling apart male and famale halves of connector.

③ Disconnect harness connector.

SEL769V

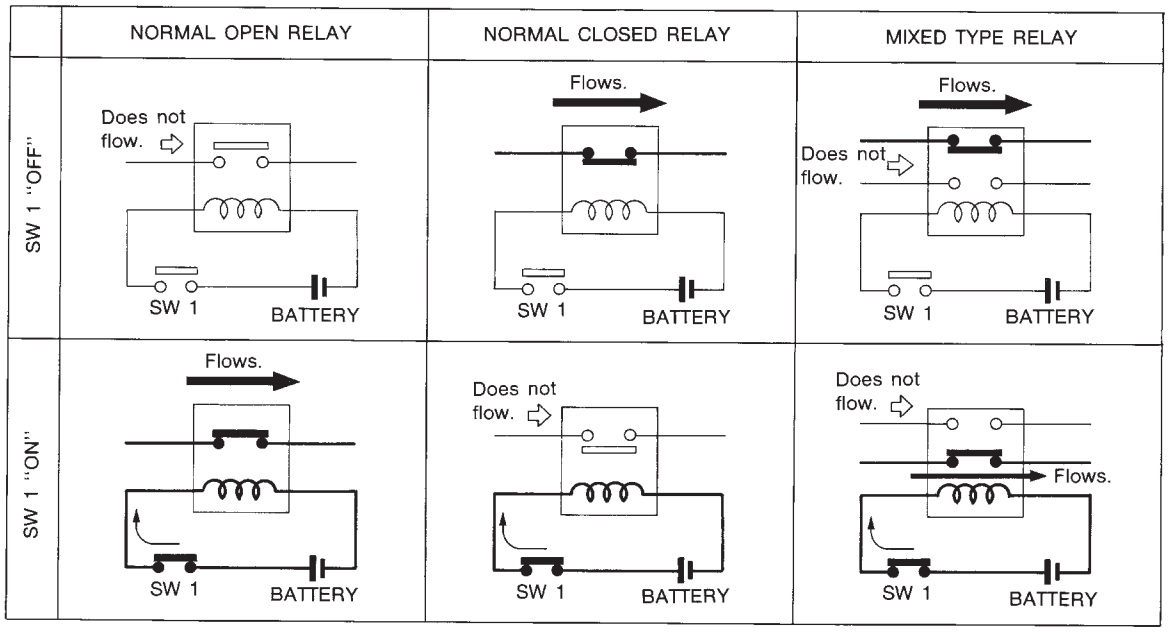
Description

NFEL0004

NORMAL OPEN, NORMAL CLOSED AND MIXED TYPE RELAYS

NFEL0004S01

Relays can mainly be divided into three types: normal open, normal closed and mixed type relays.

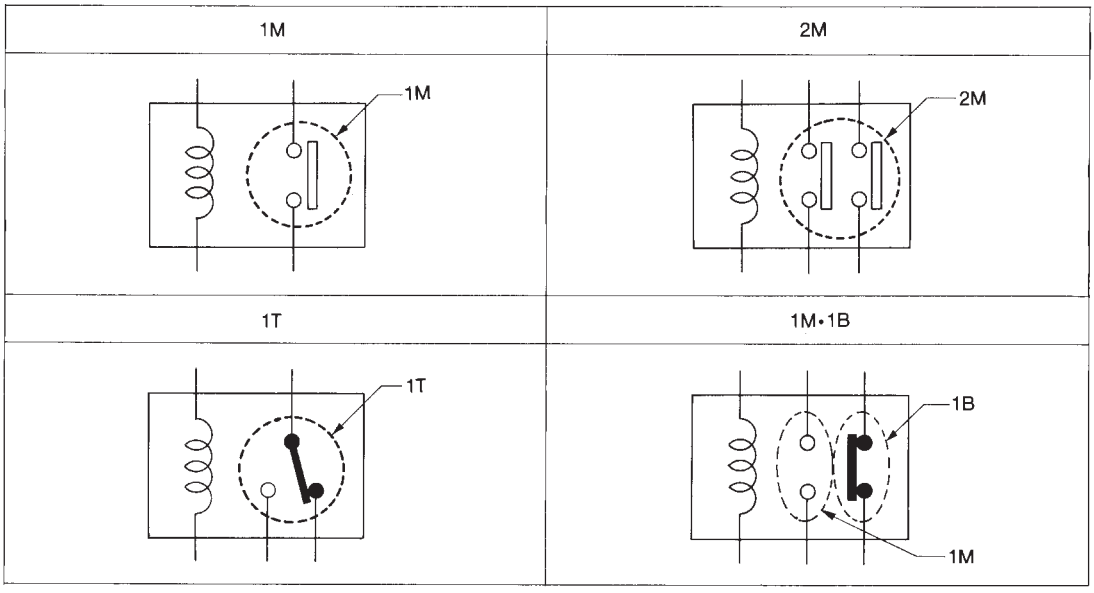


SEL881H

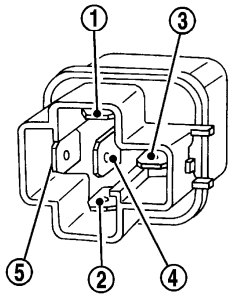
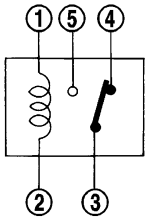
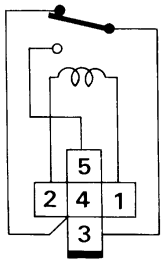
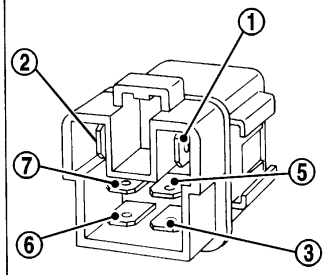
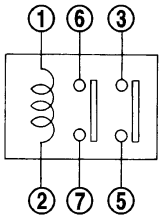
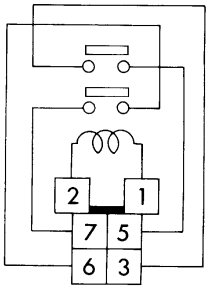
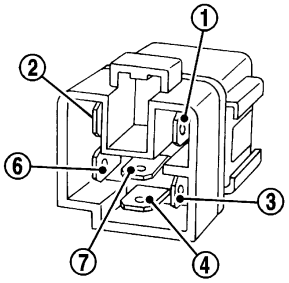
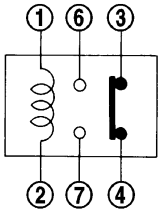
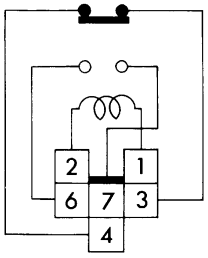
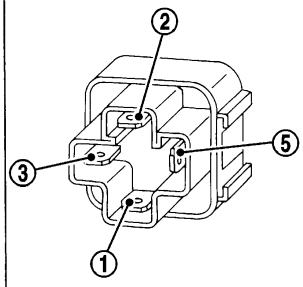
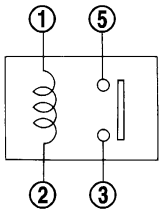
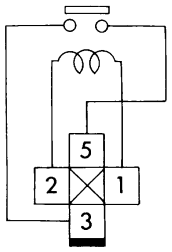
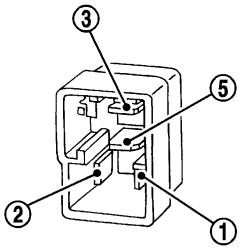
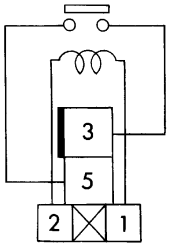
TYPE OF STANDARDIZED RELAYS

NFEL0004S02

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
				

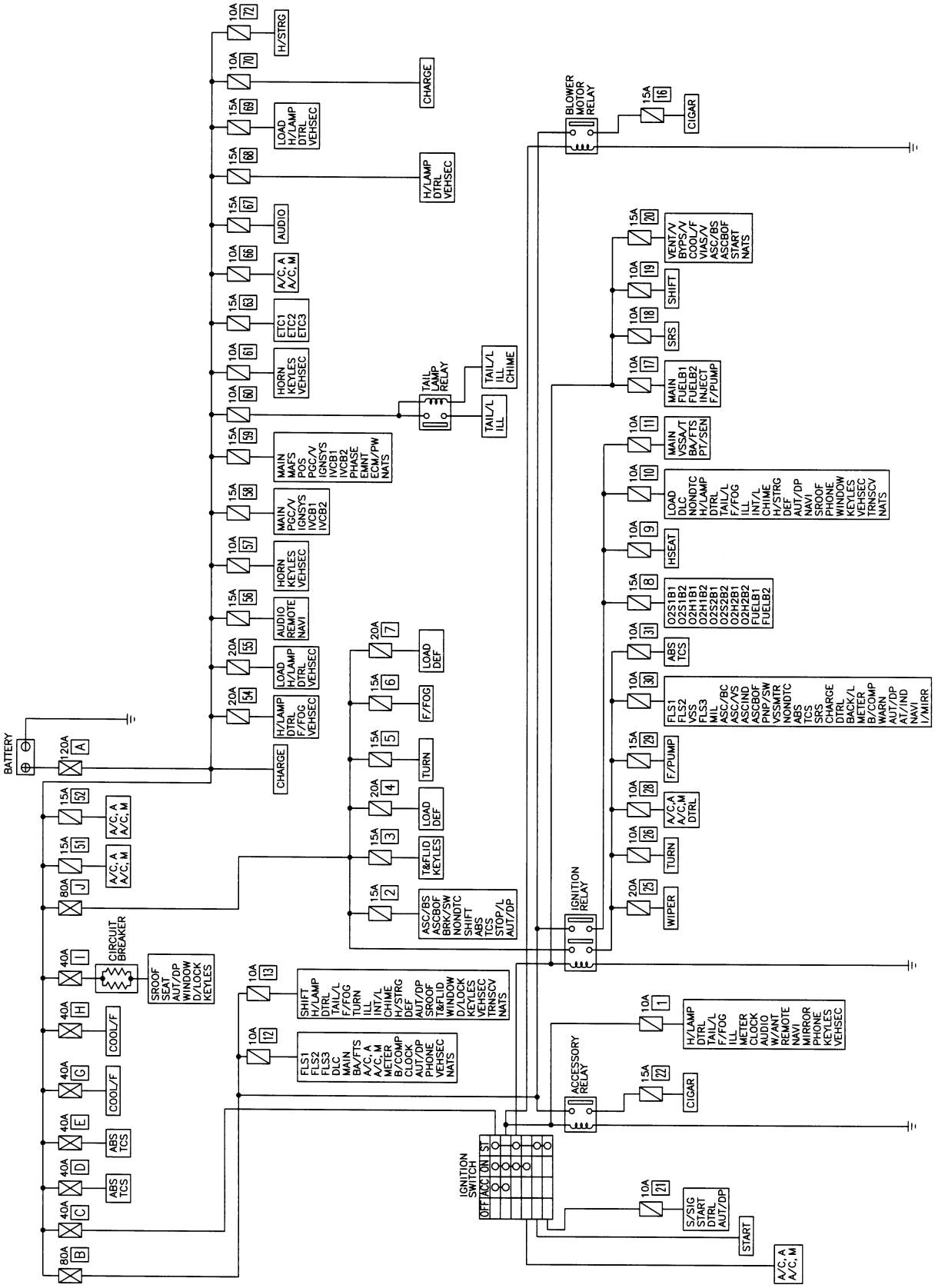
The arrangement of terminal numbers on the actual relays may differ from those shown above.

SEL188W

Schematic

NFEL0005

For detailed ground distribution information, refer to “GROUND DISTRIBUTION”, EL-19.



MEL712P

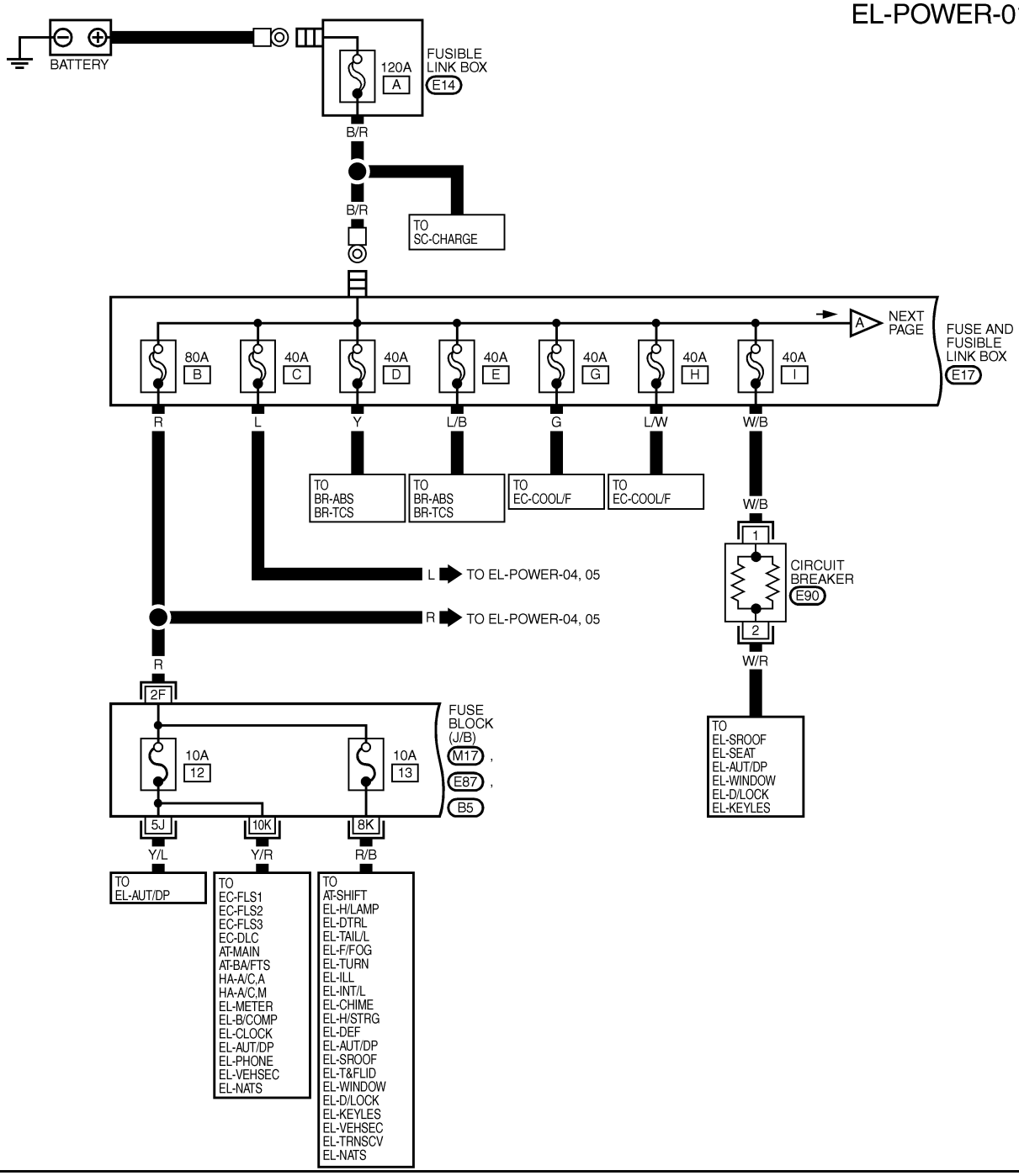
Wiring Diagram — POWER —

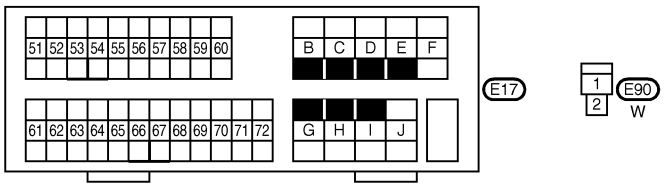
NFEL0006

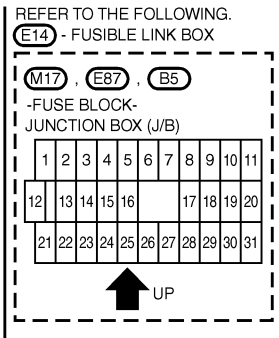
BATTERY POWER SUPPLY — IGNITION SW. IN ANY POSITION

NFEL0006S01

EL-POWER-01

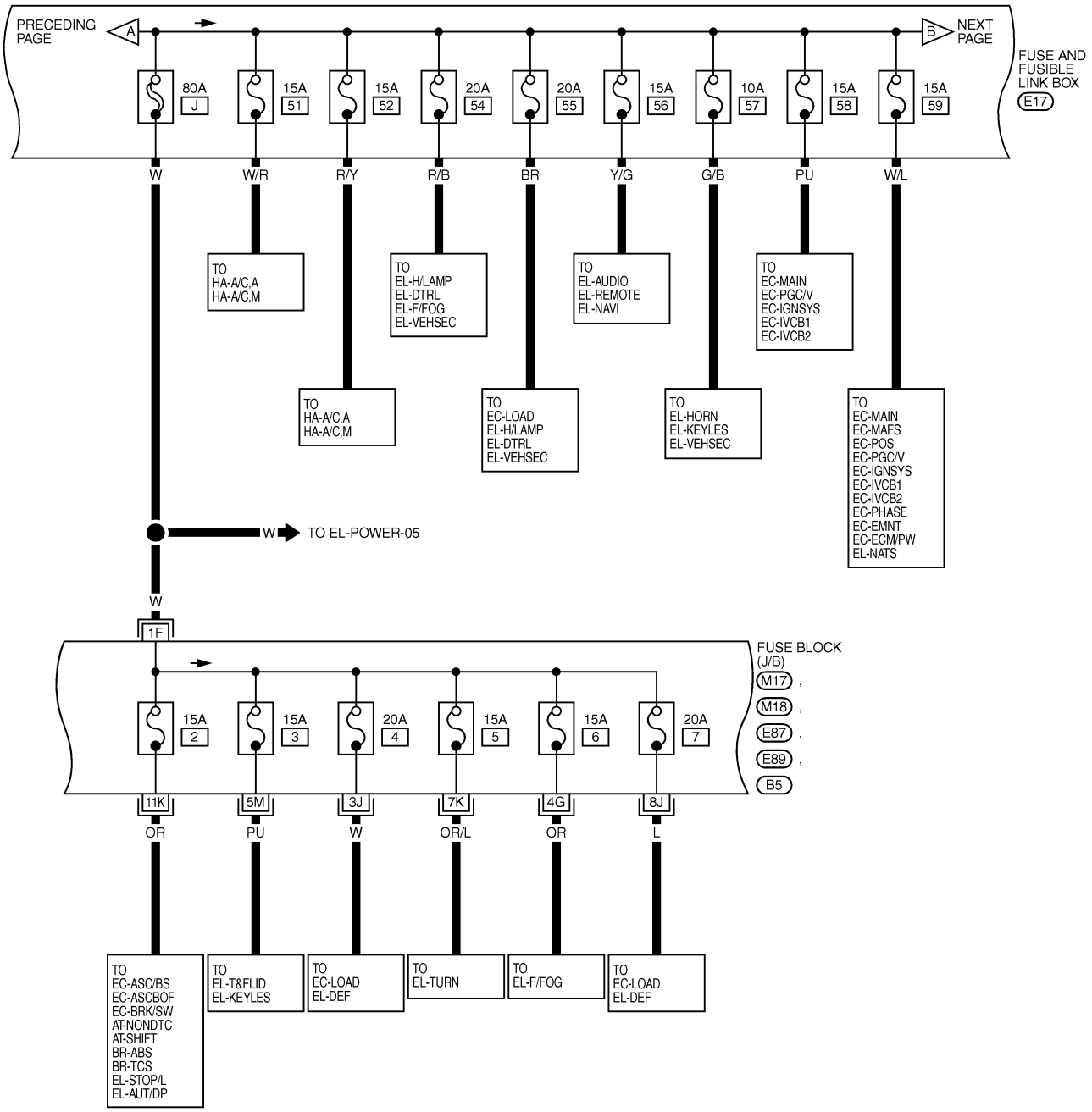


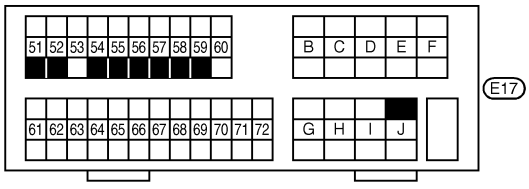


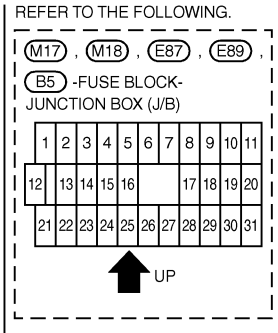


MEL083O

EL-POWER-02

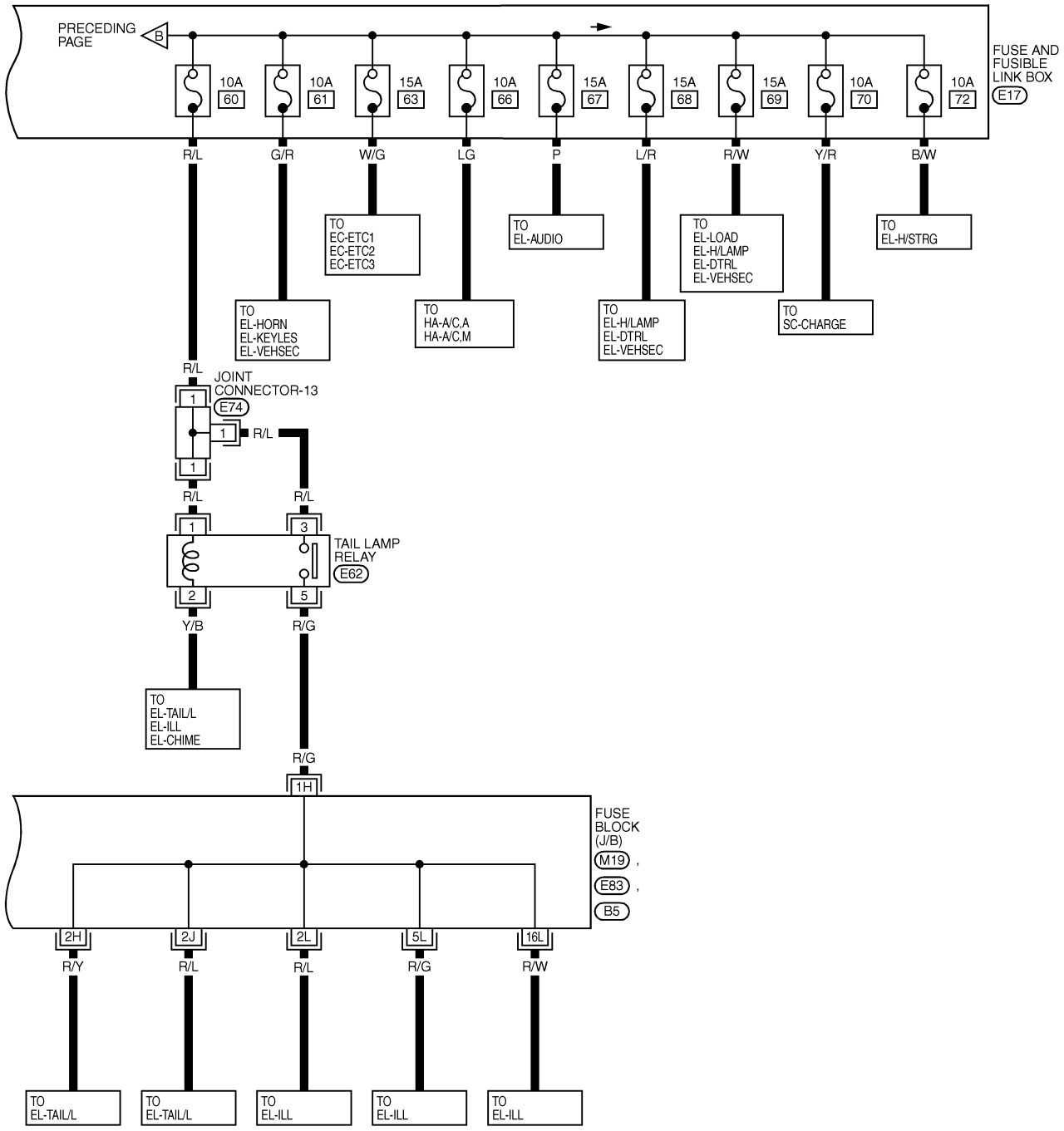


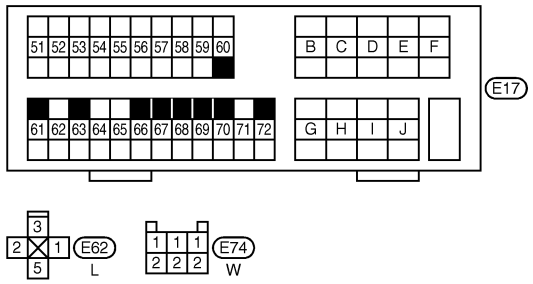




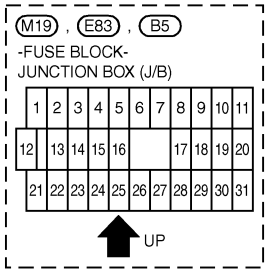
MEL713P

EL-POWER-03





REFER TO THE FOLLOWING.



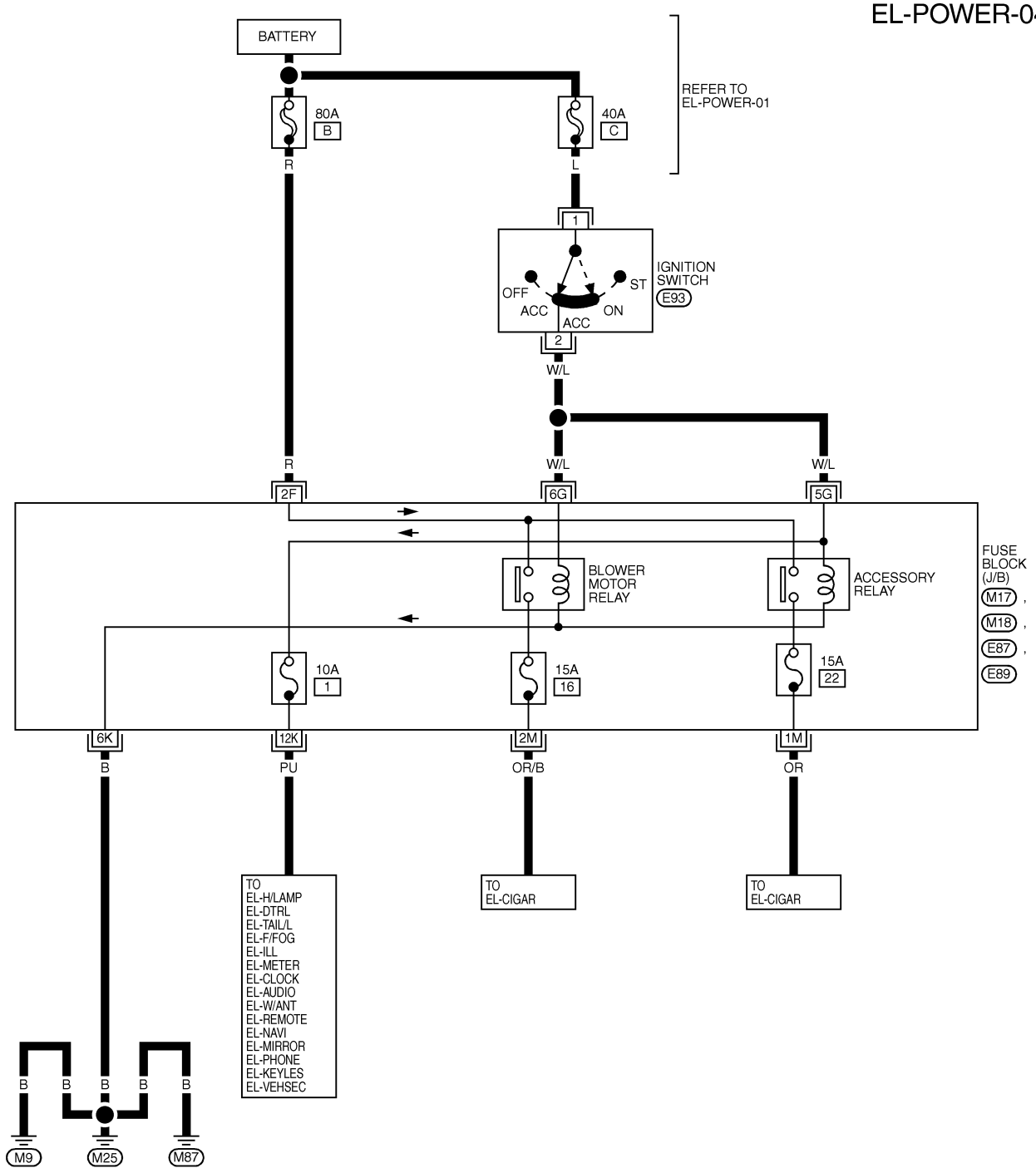
MEL085O

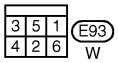
Wiring Diagram — POWER — (Cont'd)

ACCESSORY POWER SUPPLY — IGNITION SW. IN "ACC" OR "ON"

NFEL0006S02

EL-POWER-04

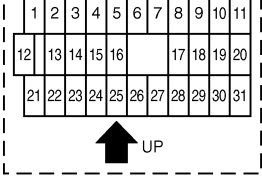




REFER TO THE FOLLOWING.

M17 , M18 , E87 , E89

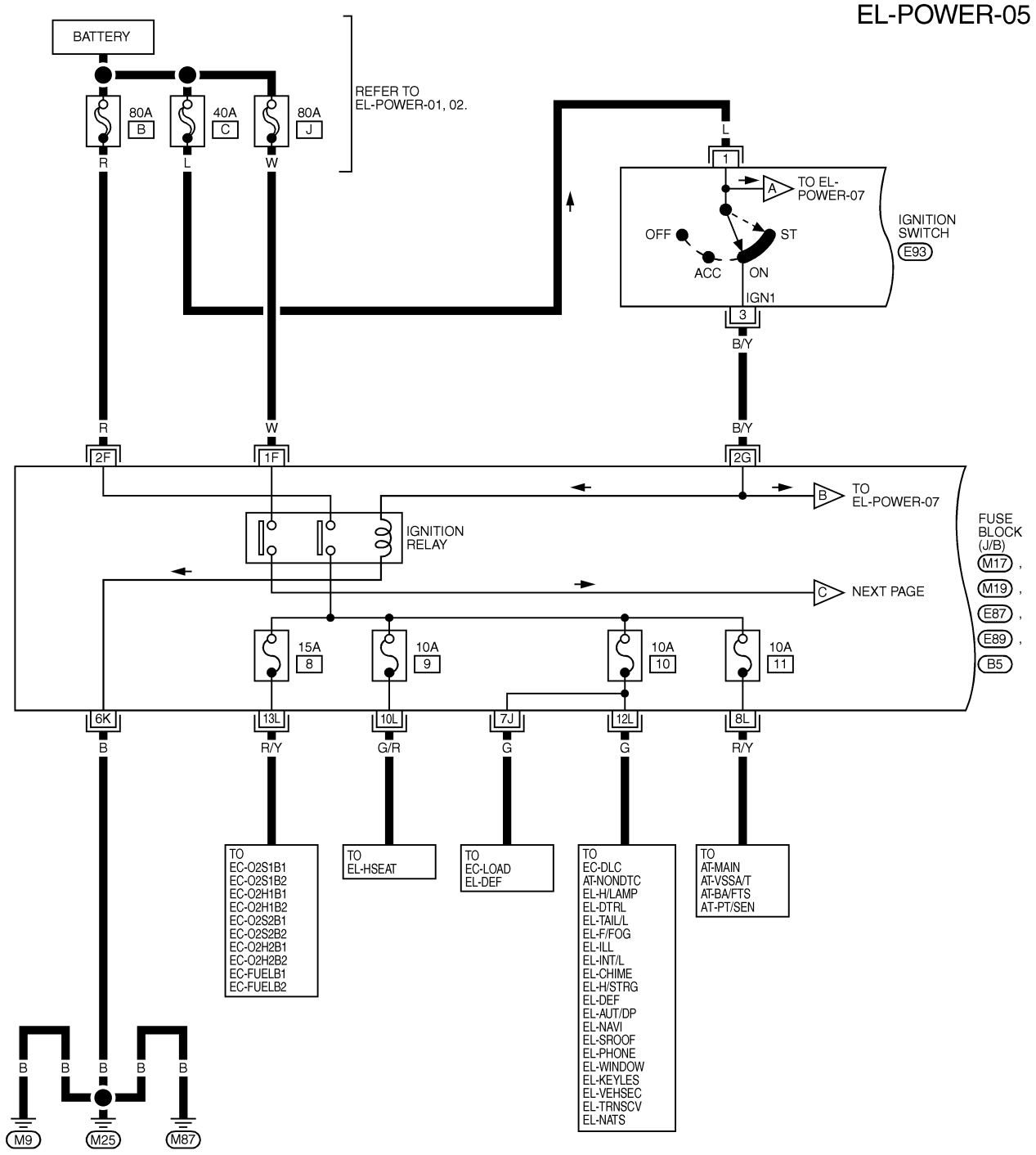
-FUSE BLOCK-
JUNCTION BOX (J/B)

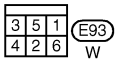


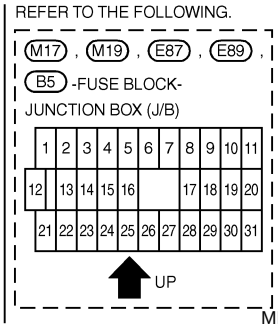
MEL086O

IGNITION POWER SUPPLY — IGNITION SW. IN "ON" AND/OR "START"

NFEL0006S03

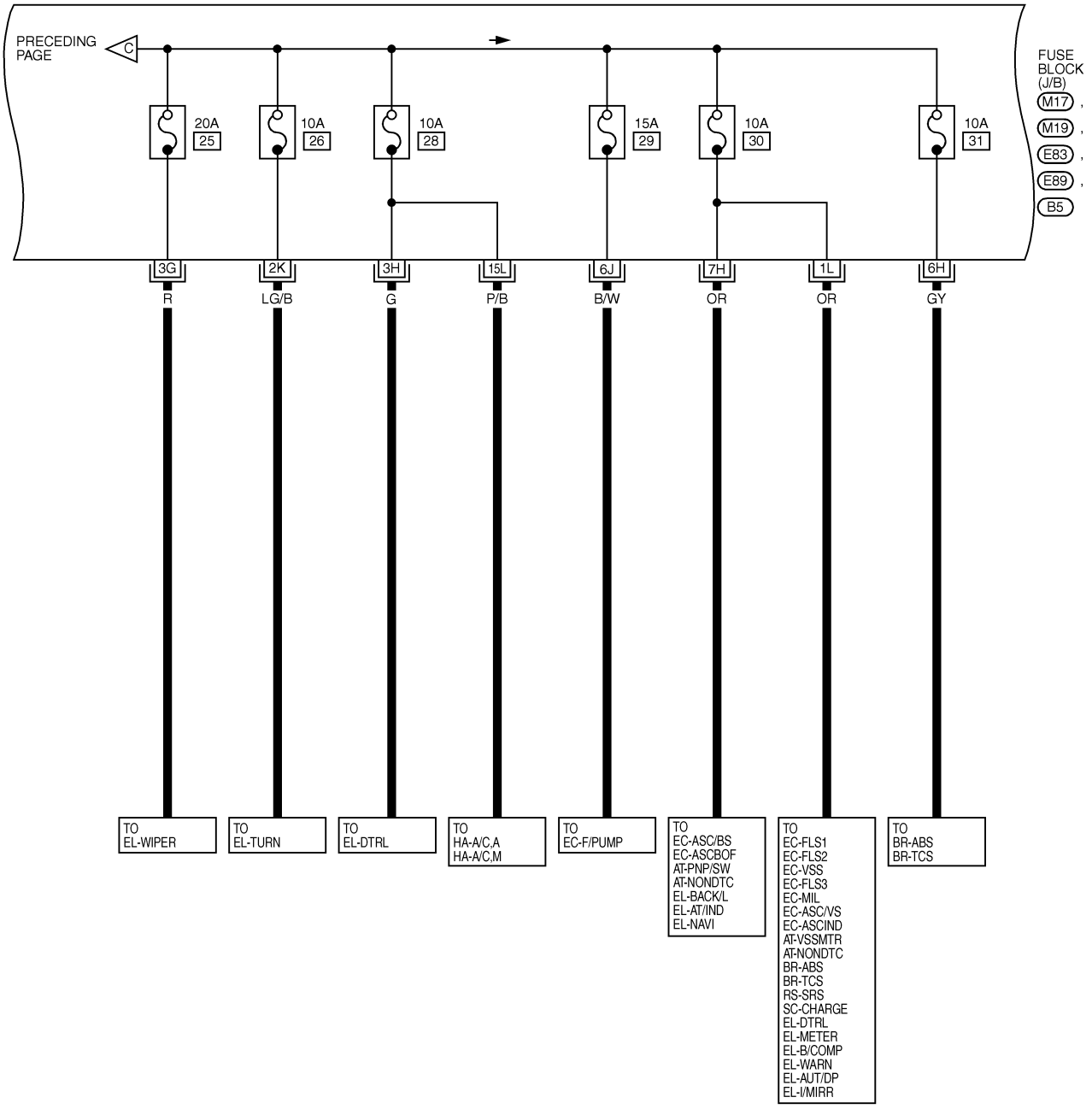


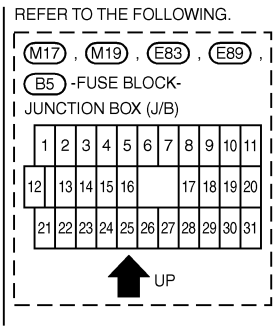




MEL087O

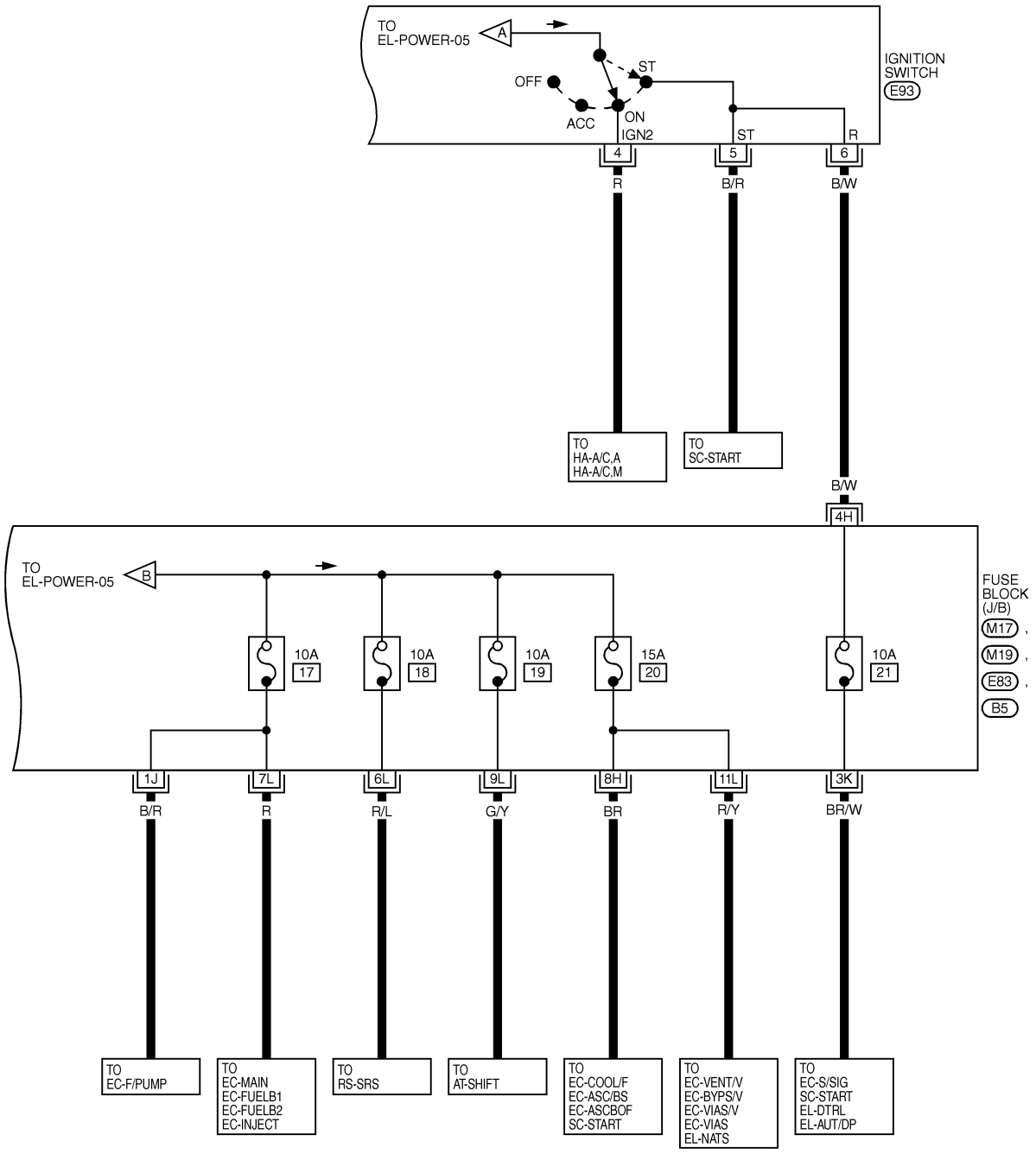
EL-POWER-06

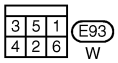




MEL088O

EL-POWER-07

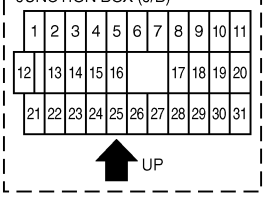




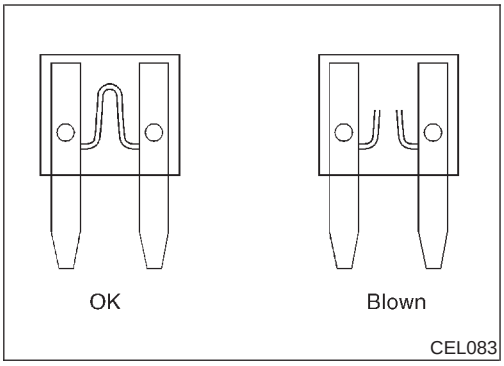
REFER TO THE FOLLOWING.

M17 , M19 , E83 , B5

-FUSE BLOCK-
JUNCTION BOX (J/B)



MEL089O



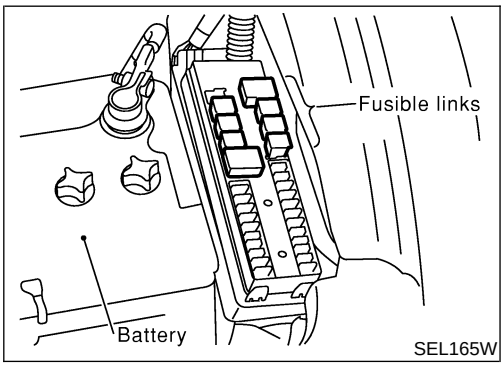
Inspection

NFEL0007

FUSE

NFEL0007S01

- **If fuse is blown, be sure to eliminate cause of problem 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.**



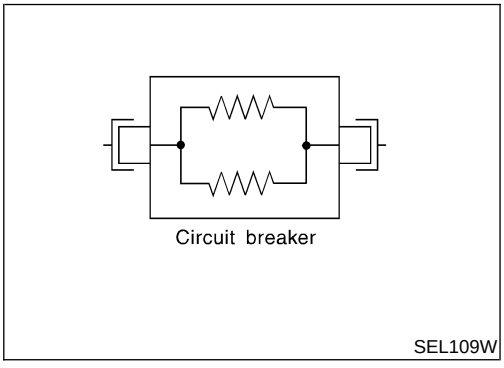
FUSIBLE LINK

NFEL0007S02

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 problem.**
- **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 (PTC THERMISTOR TYPE)

NFEL0007S03

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.

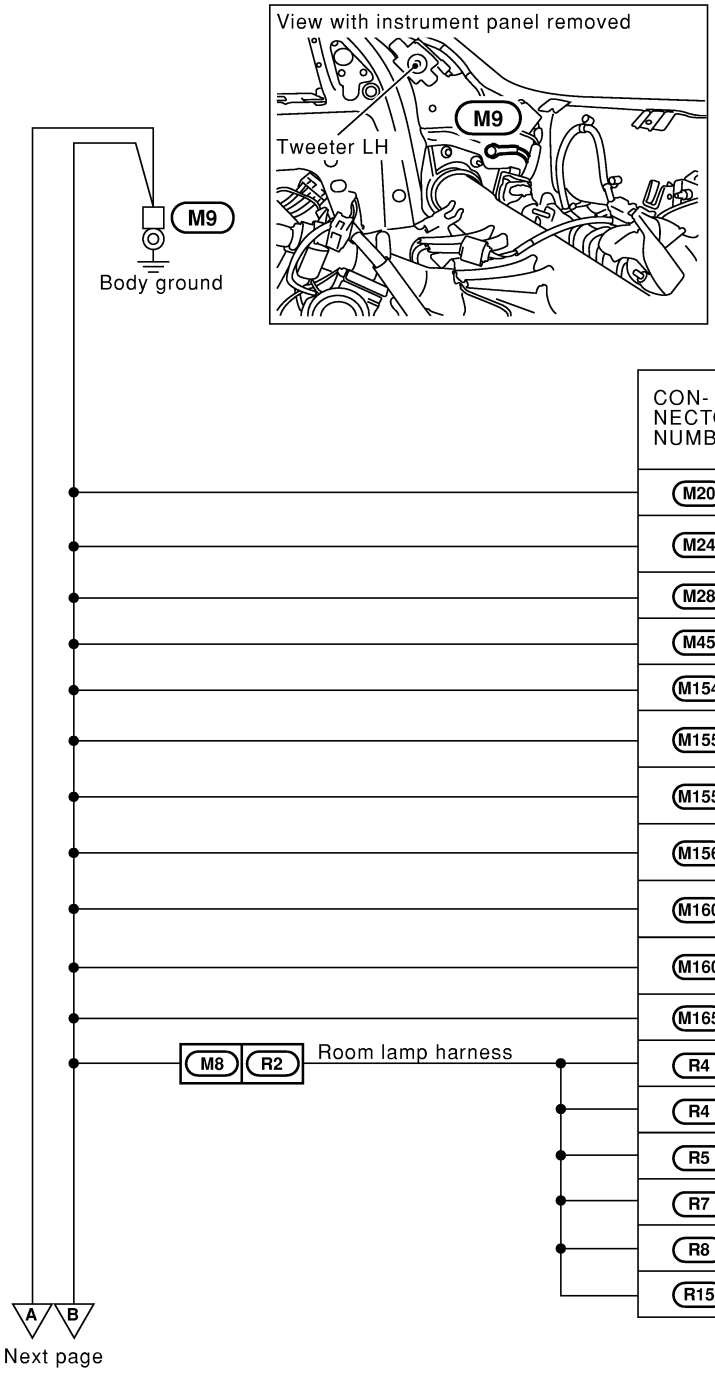
Reduced current flow will cause the element to cool. Resistance falls accordingly and normal circuit current flow is allowed to resume.

Ground Distribution

NFEL0008

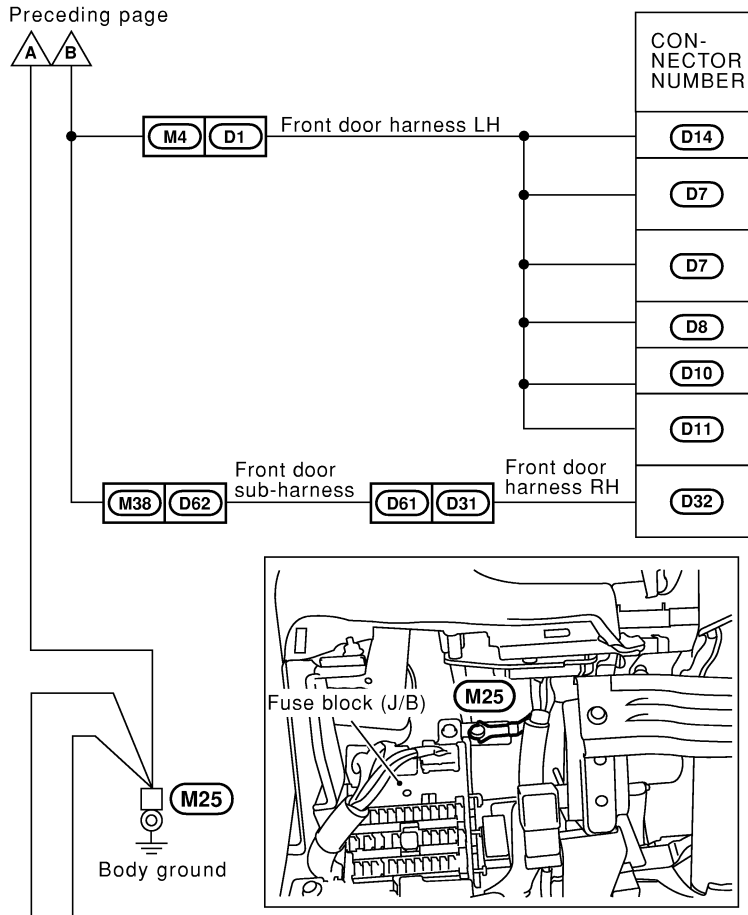
MAIN HARNESS

NFEL0008S01



CON-NECTOR NUMBER	CONNECT TO
M20	Power window relay
M24	Door mirror remote control switch (Illumination)
M28	Data link connector (Terminal No. 4)
M45	TCS ON/OFF switch (With TCS)
M154	Memory seat cancel switch (With memory seat)
M155	Heated steering switch (With heated steering) (Terminal No. 2)
M155	Heated steering switch (With heated steering) (Terminal No. 5)
M156	Combination switch (With heated steering) (Terminal No. 2)
M160	Rear window defogger switch (With navigation system) (Terminal No. 2)
M160	Rear window defogger switch (With navigation system) (Terminal No. 5)
M165	A/T device (With A/T) (Terminal No. 2)
R4	Vanity mirror LH (Illumination)
R4	Homelink universal transceiver
R5	Sunroof motor (With sunroof)
R7	Spot lamp
R8	Vanity mirror RH (Illumination)
R15	Auto anti-dazzling inside mirror

MEL736P



CONNECTOR NUMBER	CONNECT TO
D14	Memory seat switch
D7	Trunk and fuel lid opener switch (Terminal No. 2)
D7	Trunk and fuel lid opener switch (Terminal No. 4)
D8	Front door key cylinder switch LH
D10	Front power window main switch
D11	Door mirror actuator LH (With door mirror defogger)
D32	Door mirror actuator RH (With door mirror defogger)

CONNECTOR NUMBER	CONNECT TO
M16	Telephone
M17	Fuse block (J/B) (Terminal No. 6K) • Accessory relay • Blower motor relay • Ignition relay
M21	Combination flasher unit
M23	Illumination control switch
M32	Combination meter (Terminal No. 30) • ABS indicator • A/T indicator (With A/T) • Turn signal indicator
M33	Combination meter (Terminal No. 22) • Air bag warning lamp • Fuel gauge • Odo/trip meter • Speedometer • Tachometer • Water temp. gauge • Board computer
M53	Cigarette lighter

MEL062O

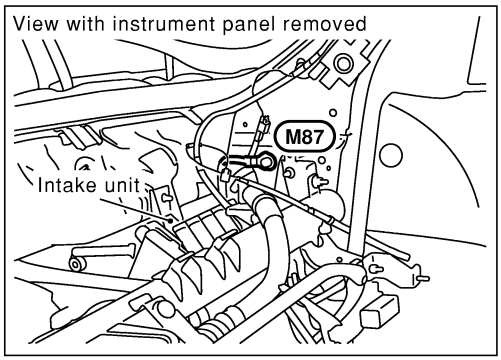
Preceding page

C D

M30 M151 Main sub-harness-1

CON-NECTOR NUMBER	CONNECT TO
M72	Ashtray illumination
M78	Power socket
M144	Smart entrance control unit (Terminal No. 43)
M146	Air bag diagnosis sensor unit (Terminal No. 2)
M152	Clock
M163	Shift lock control unit (With A/T)
M168	Display and NAVI control unit (Terminal No. 3)
M168	Display and NAVI control unit (Terminal No. 4)
M169	Display and NAVI control unit (Terminal No. 33)

View with instrument panel removed



M87

Body ground

CON-NECTOR NUMBER	CONNECT TO
M31	Fan control amp. (With auto A/C)
M58	Fan switch (With manual A/C)
M34	Combination meter (Terminal No. 59) • Board computer
M44	In-vehicle sensor (With auto A/C)
M48	Mode door motor (With manual A/C)
M49	Mode door motor (With auto A/C)
M50	Air mix door motor (With manual A/C)
M51	Air mix door motor (With auto A/C)
M56	A/C control unit (With manual A/C)
M60	A/C auto amp. (With auto A/C) (Without navigation system)
M74	Heated seat switch LH
M75	Heated seat switch RH
M80	Intake sensor (With auto A/C)
M82	Glove box lamp
M83	Intake door motor (With manual A/C)
M84	Intake door motor (With auto A/C)
M85	Sunload sensor (With auto A/C)
M145	Smart entrance control unit (Terminal No. 64)
M171	A/C auto amp. (With auto A/C) (With navigation system)
E55	Ambient sensor (With auto A/C)
D33	Front power window switch RH

M15 E81 Engine room harness

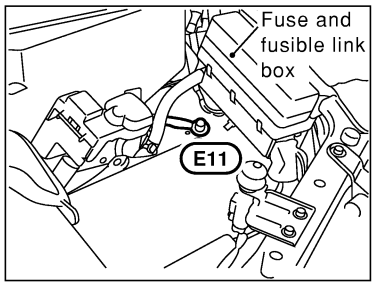
M39 D63 Door sub-harness

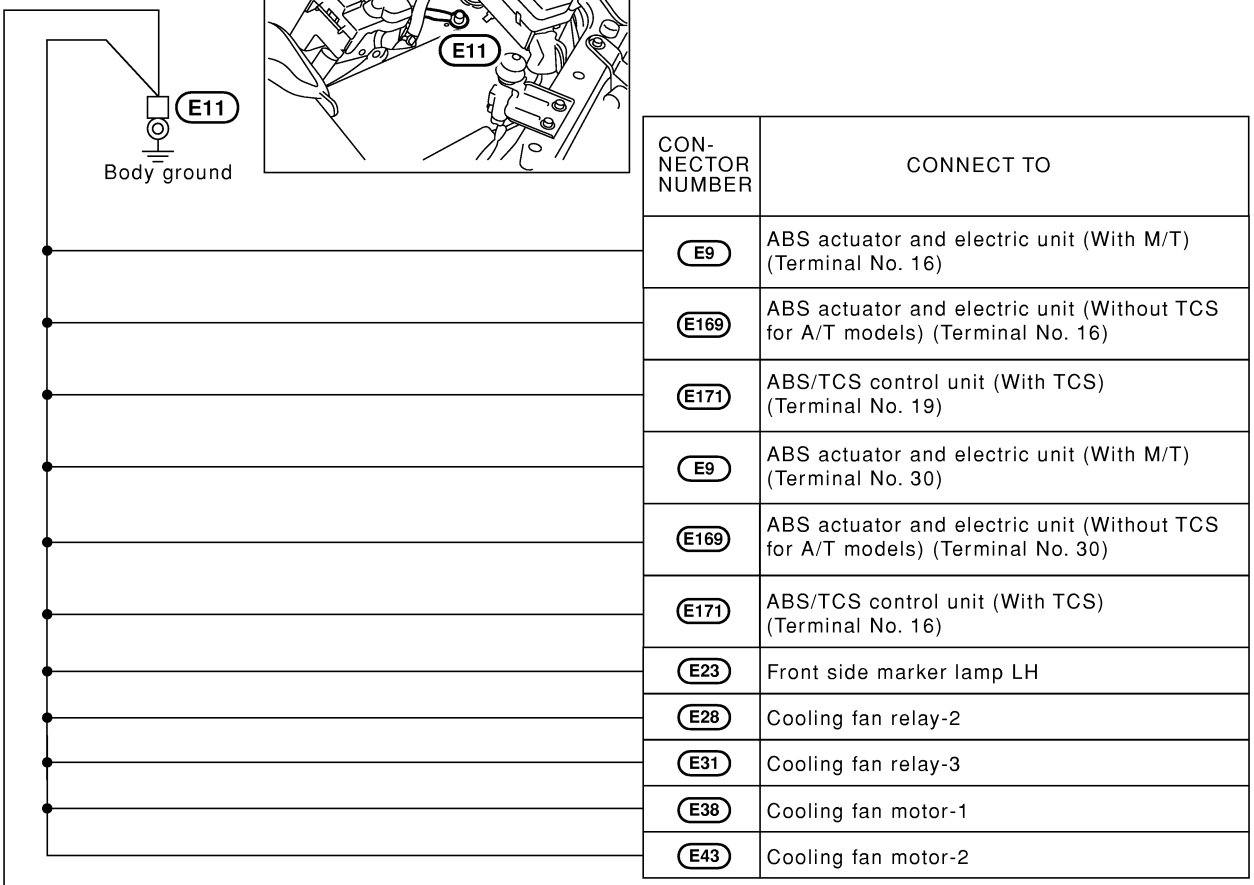
D61 D31 Door harness front RH

MEL063O

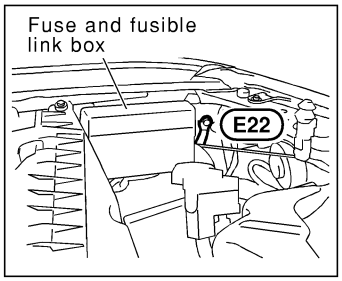
ENGINE ROOM HARNESS

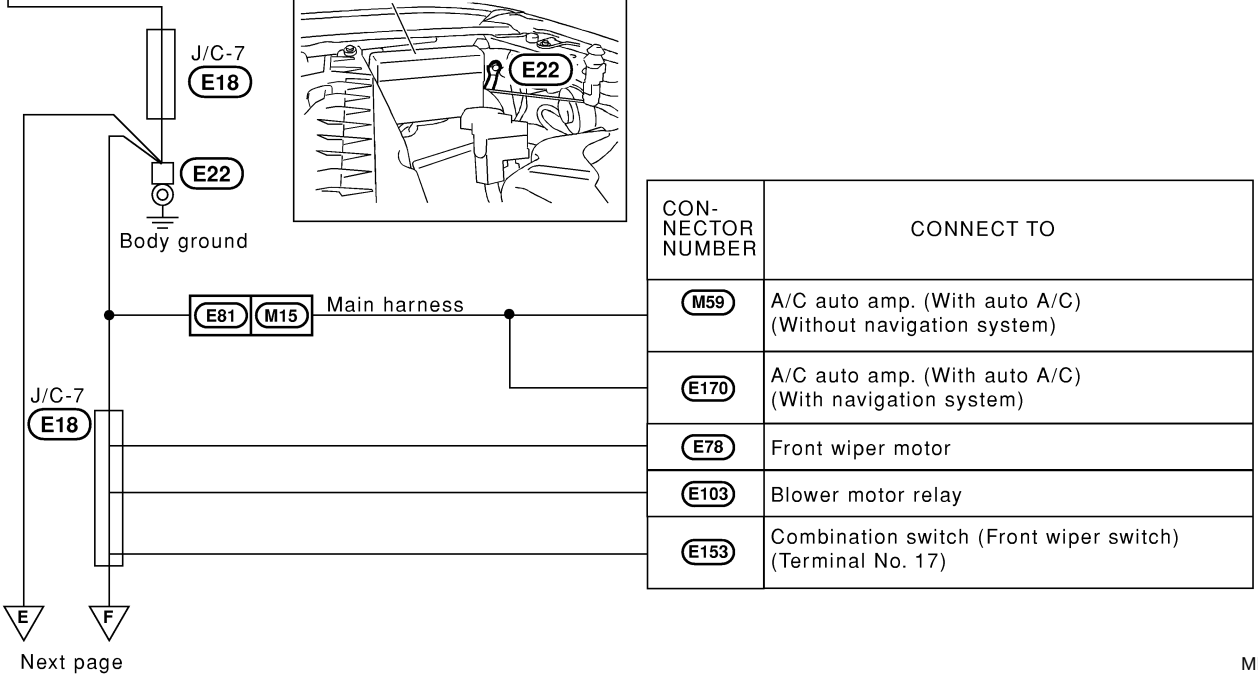
NFEL0008S02





CONNECTOR NUMBER	CONNECT TO
E9	ABS actuator and electric unit (With M/T) (Terminal No. 16)
E169	ABS actuator and electric unit (Without TCS for A/T models) (Terminal No. 16)
E171	ABS/TCS control unit (With TCS) (Terminal No. 19)
E9	ABS actuator and electric unit (With M/T) (Terminal No. 30)
E169	ABS actuator and electric unit (Without TCS for A/T models) (Terminal No. 30)
E171	ABS/TCS control unit (With TCS) (Terminal No. 16)
E23	Front side marker lamp LH
E28	Cooling fan relay-2
E31	Cooling fan relay-3
E38	Cooling fan motor-1
E43	Cooling fan motor-2





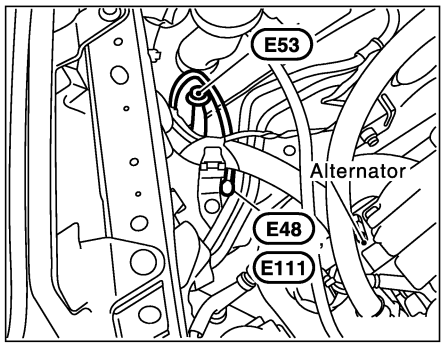
CONNECTOR NUMBER	CONNECT TO
M59	A/C auto amp. (With auto A/C) (Without navigation system)
E170	A/C auto amp. (With auto A/C) (With navigation system)
E78	Front wiper motor
E103	Blower motor relay
E153	Combination switch (Front wiper switch) (Terminal No. 17)

MEL064O

Preceding page

E F

CON-NECTOR NUMBER	CONNECT TO
E63	Vehicle security horn relay-2
E84	Clutch interlock switch (With M/T)
E151	Combination switch (Lighting switch) (Terminal No. 5)
E164	Front turn signal lamp LH
E165	Headlamp LH (Low and parking lamp)
E167	Front fog lamp LH

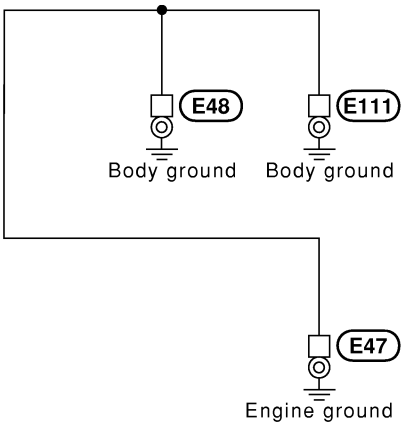


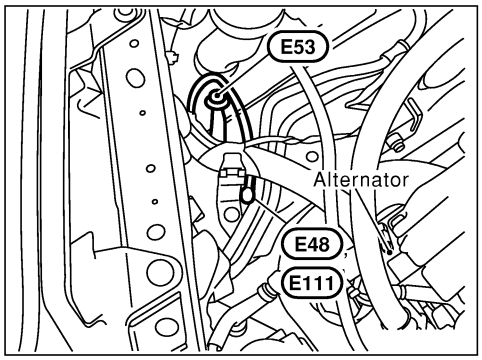
E53

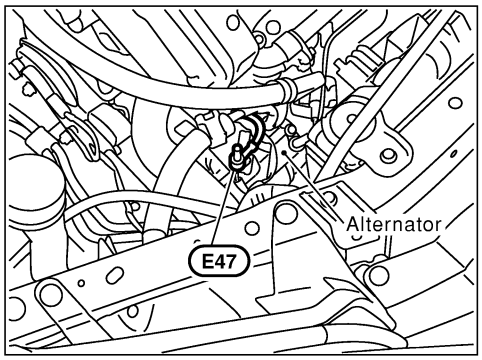
Body ground

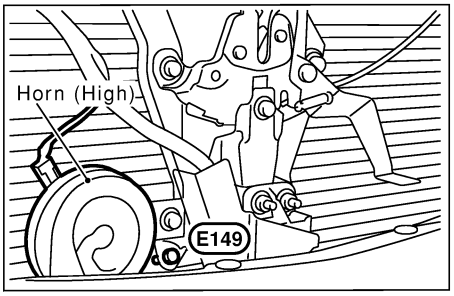
CON-NECTOR NUMBER	CONNECT TO
E1	Brake fluid level switch
E26	Hood switch
E42	Washer level switch
E49	Front side marker lamp RH
E59	Daytime light control unit (For Canada) (Terminal No. 16)
E69	Door mirror defogger relay (With door mirror defogger)
E151	Combination switch (Lighting switch) (Terminal No. 8)
E154	Front fog lamp RH
E160	Front turn signal lamp RH
E161	Headlamp RH (Low and parking lamp)

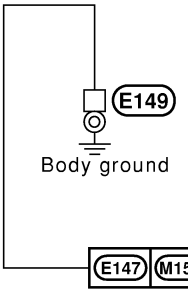
MEL065O









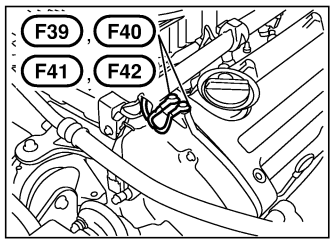


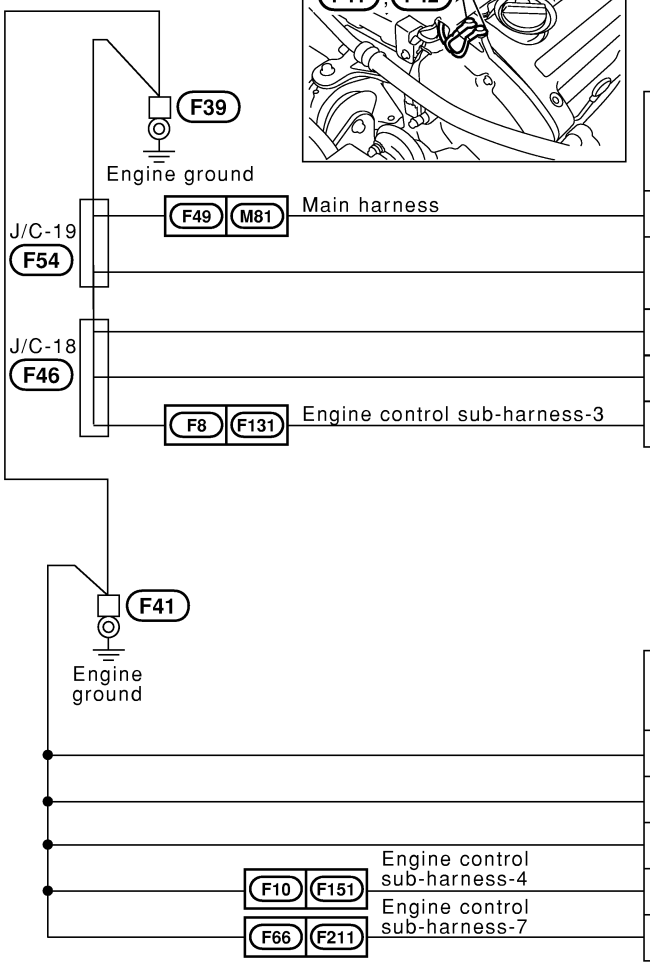
CON-NECTOR NUMBER	CONNECT TO
M146	Shield wire (Air bag diagnosis sensor unit) (Terminal No. 16)

MEL066O

ENGINE CONTROL HARNESS

NFEL0008S03

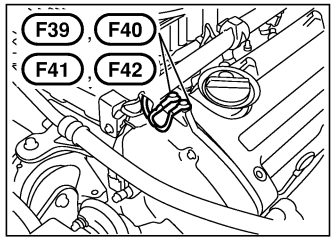


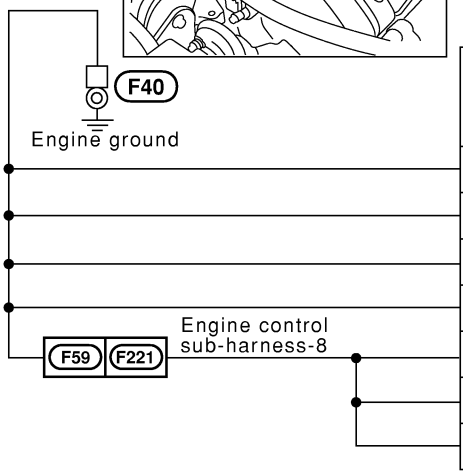


CONNECTOR NUMBER	CONNECT TO
M28	Data link connector (Terminal No. 5)
F64	Shield wire (Electric throttle control actuator) (Throttle control motor)
F62	Heated oxygen sensor 2 (Bank 2)
F63	Heated oxygen sensor 2 (Bank 1)
F132	Shield wire (Knock sensor)

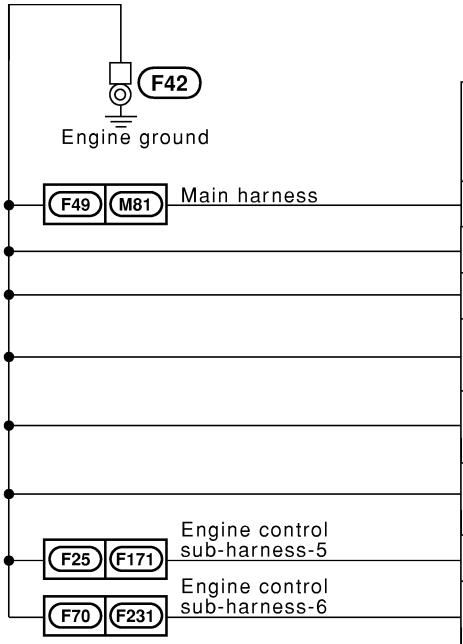
CONNECTOR NUMBER	CONNECT TO
F48	ECM (Terminal No. 106)
F48	ECM (Terminal No. 107)
F48	ECM (Terminal No. 108)
F152	Park/Neutral position switch (With A/T)
F213	Park/Neutral position switch (With M/T)

MEL067O





CON-NECTOR NUMBER	CONNECT TO
F30	Ignition coil No. 6
F31	Ignition coil No. 4
F35	Ignition coil No. 2
F34	Condenser
F222	Ignition coil No. 1
F223	Ignition coil No. 3
F224	Ignition coil No. 5

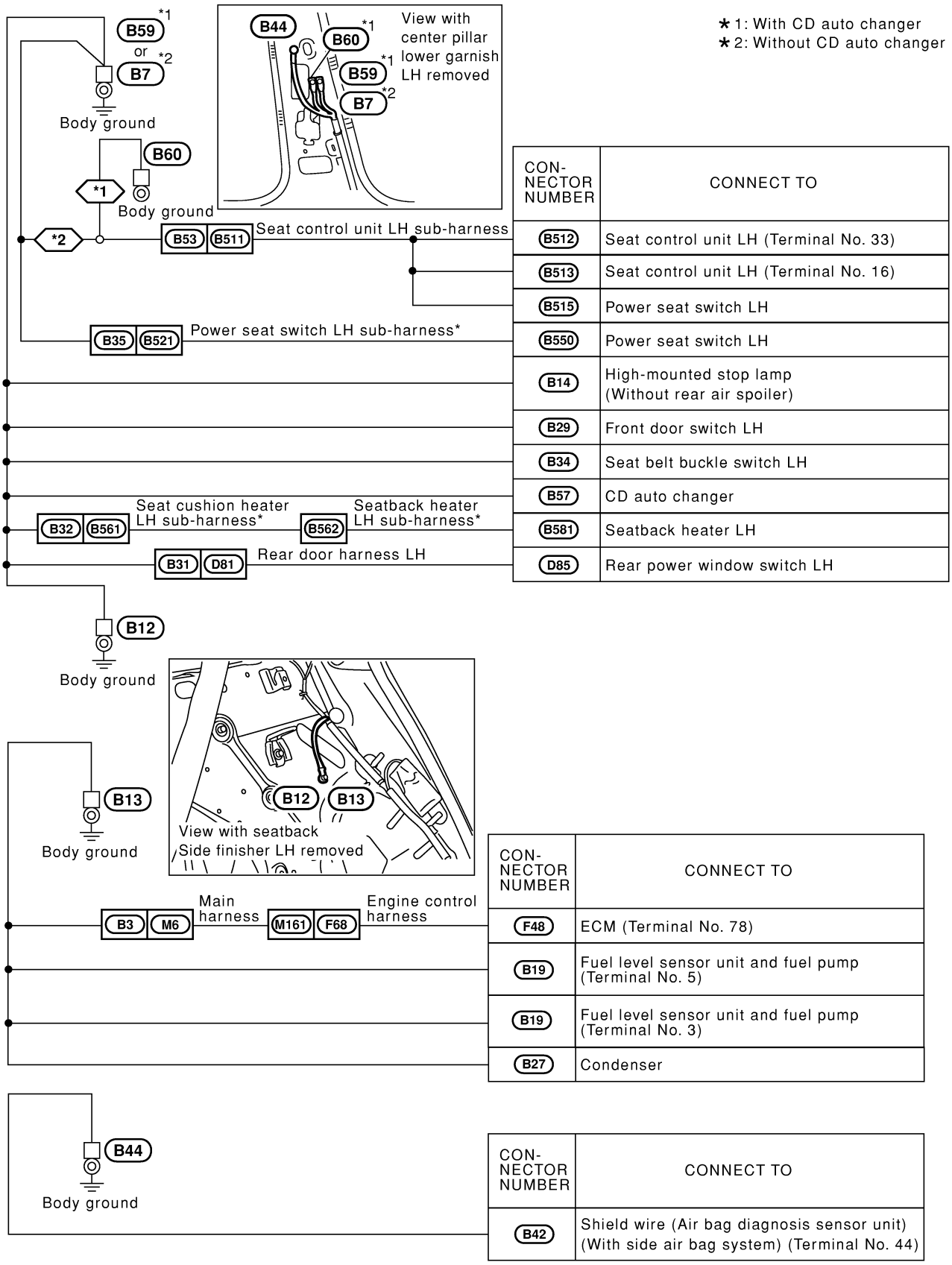


CON-NECTOR NUMBER	CONNECT TO
M42	NVIS (NATS) IMMU
F48	ECM (Terminal No. 48)
F48	ECM (Terminal No. 57)
F50	TCM (Transmission control module) (Terminal No. 25)
F50	TCM (Transmission control module) (Terminal No. 48)
F65	Camshaft position sensor (PHASE) (Bank 2)
F173	Crankshaft position sensor (POS)
F232	Camshaft position sensor (PHASE) (Bank 1)

MEL068O

BODY HARNESS

NFEL0008S04



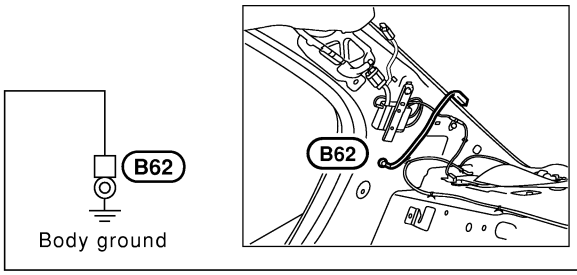
CONNECTOR NUMBER	CONNECT TO
B512	Seat control unit LH (Terminal No. 33)
B513	Seat control unit LH (Terminal No. 16)
B515	Power seat switch LH
B550	Power seat switch LH
B14	High-mounted stop lamp (Without rear air spoiler)
B29	Front door switch LH
B34	Seat belt buckle switch LH
B57	CD auto changer
B581	Seatback heater LH
D85	Rear power window switch LH

CONNECTOR NUMBER	CONNECT TO
F48	ECM (Terminal No. 78)
B19	Fuel level sensor unit and fuel pump (Terminal No. 5)
B19	Fuel level sensor unit and fuel pump (Terminal No. 3)
B27	Condenser

CONNECTOR NUMBER	CONNECT TO
B42	Shield wire (Air bag diagnosis sensor unit) (With side air bag system) (Terminal No. 44)

*: This sub-harness is not shown in "Harness layout", EL section.

MEL833P

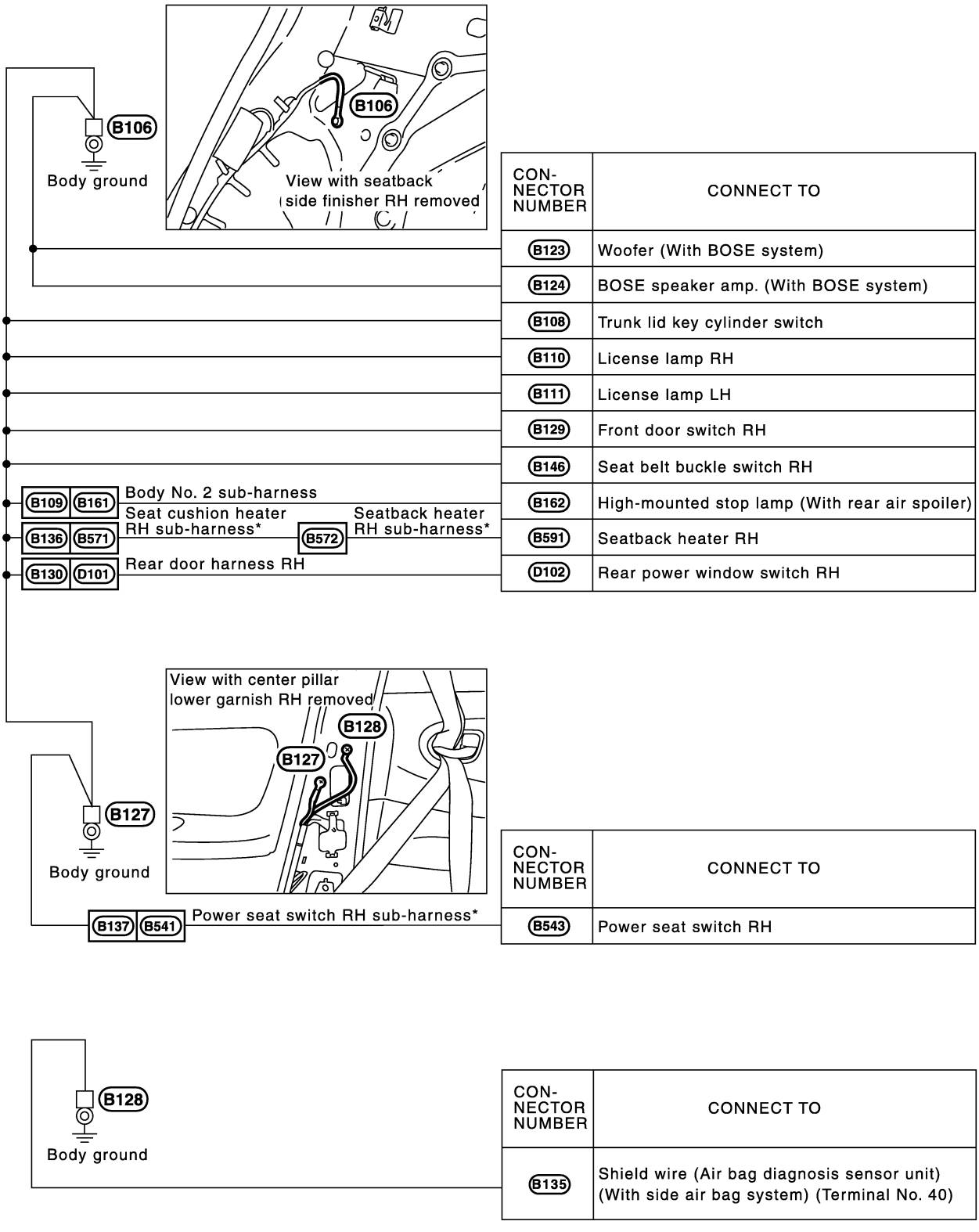


CON-NECTOR NUMBER	CONNECT TO
B61	Rear window defogger (–)

MEL347K

BODY NO. 2 HARNESS

=NFEL0008S05



CONNECTOR NUMBER	CONNECT TO
B123	Woofer (With BOSE system)
B124	BOSE speaker amp. (With BOSE system)
B108	Trunk lid key cylinder switch
B110	License lamp RH
B111	License lamp LH
B129	Front door switch RH
B146	Seat belt buckle switch RH
B162	High-mounted stop lamp (With rear air spoiler)
B591	Seatback heater RH
D102	Rear power window switch RH

CONNECTOR NUMBER	CONNECT TO
B543	Power seat switch RH

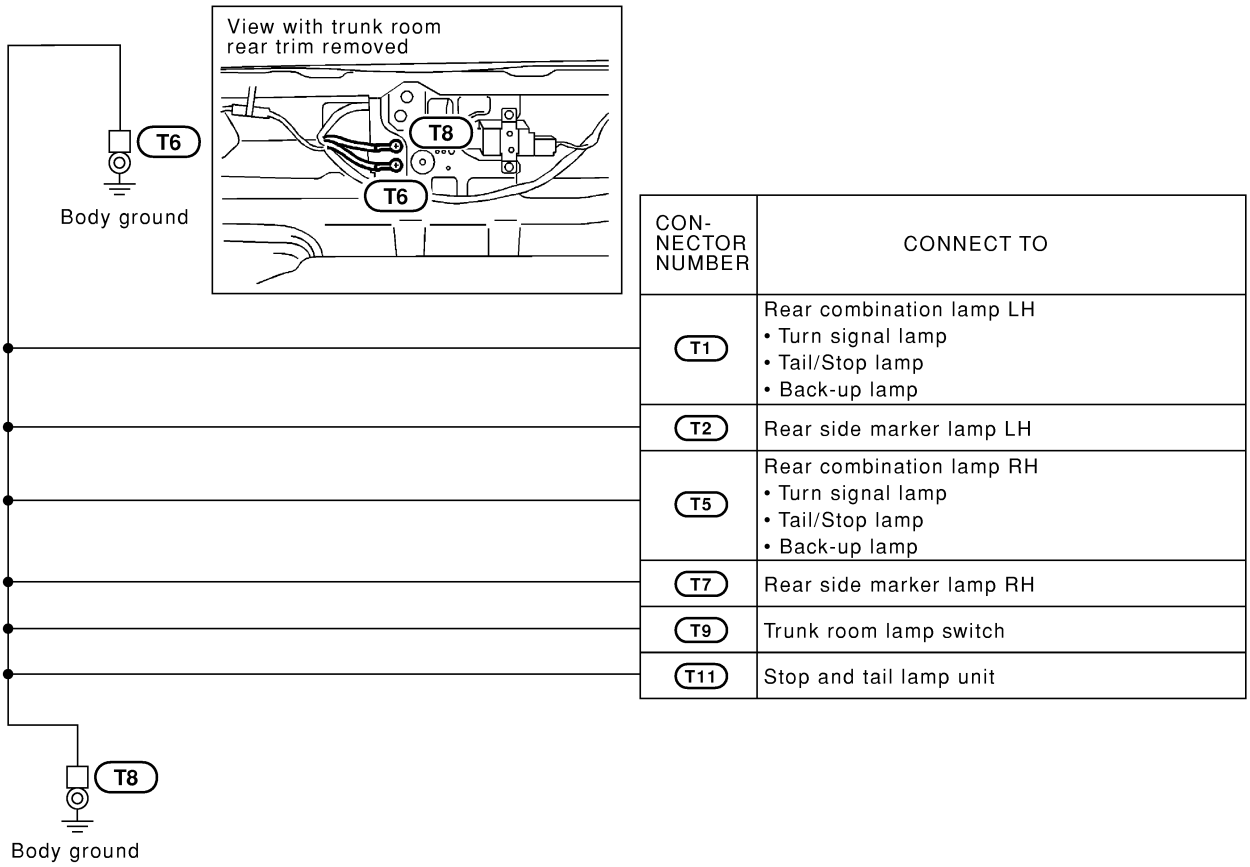
CONNECTOR NUMBER	CONNECT TO
B135	Shield wire (Air bag diagnosis sensor unit) (With side air bag system) (Terminal No. 40)

*: This sub-harness is not shown in "Harness layout", EL section.

MEL070O

TAIL HARNESS

NFEL0008S06

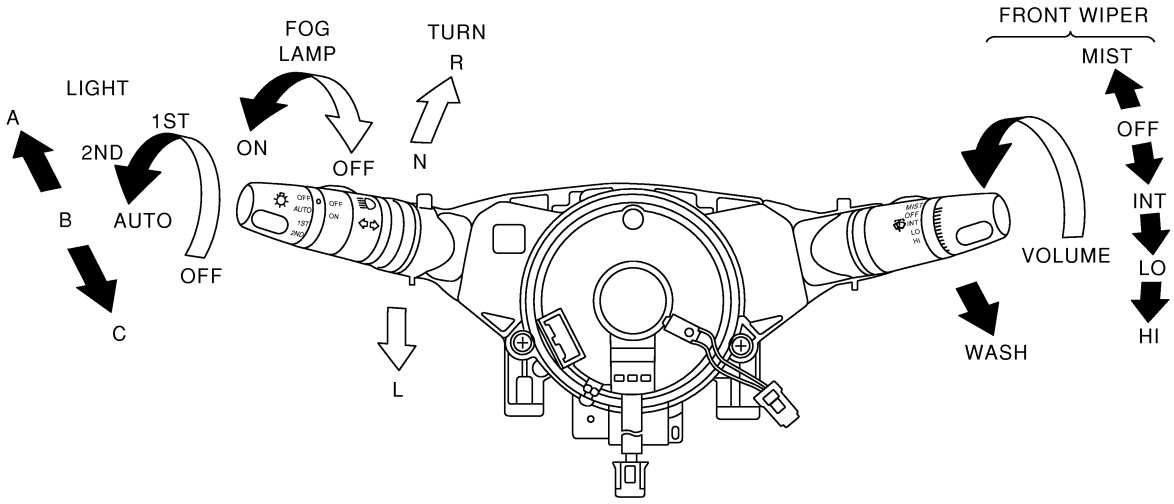


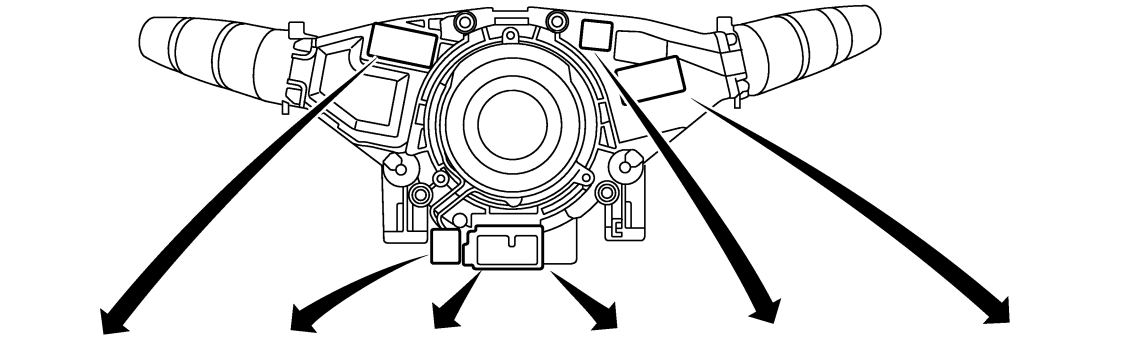
CON-NECTOR NUMBER	CONNECT TO
T1	Rear combination lamp LH • Turn signal lamp • Tail/Stop lamp • Back-up lamp
T2	Rear side marker lamp LH
T5	Rear combination lamp RH • Turn signal lamp • Tail/Stop lamp • Back-up lamp
T7	Rear side marker lamp RH
T9	Trunk room lamp switch
T11	Stop and tail lamp unit

MEL203O

Check

NFEL0009





LIGHTING SWITCH

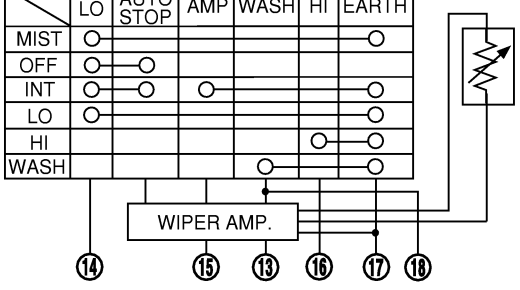
	OFF	AUTO	1ST	2ND
5			○	○
11			○	○
8				○
12				○
42		○		
(8)		○		

	A	B	C
(5)	○	○	○
7	○	○	
6	○		○
(8)	○	○	○
10		○	
9	○		○
(12)			○

FRONT WIPER AND WASHER SWITCH

	LO	AUTO STOP	AMP	WASH	HI	EARTH
MIST	○					○
OFF	○	○				
INT	○	○	○			○
LO	○					○
HI					○	○
WASH				○		○

VARIABLE INTERMITTENT WIPER VOLUME



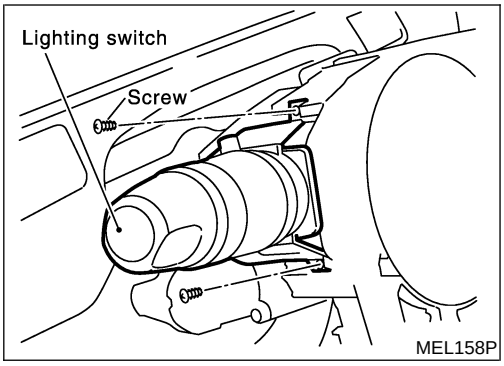
FRONT FOG LAMP SWITCH

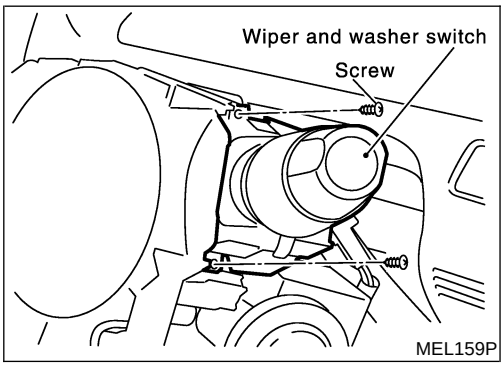
	OFF	ON
31		○
32		○

TURN SIGNAL LAMP SWITCH

	L	N	R
1	○		○
2			○
3	○		

MEL078O





Replacement

NFEL0010

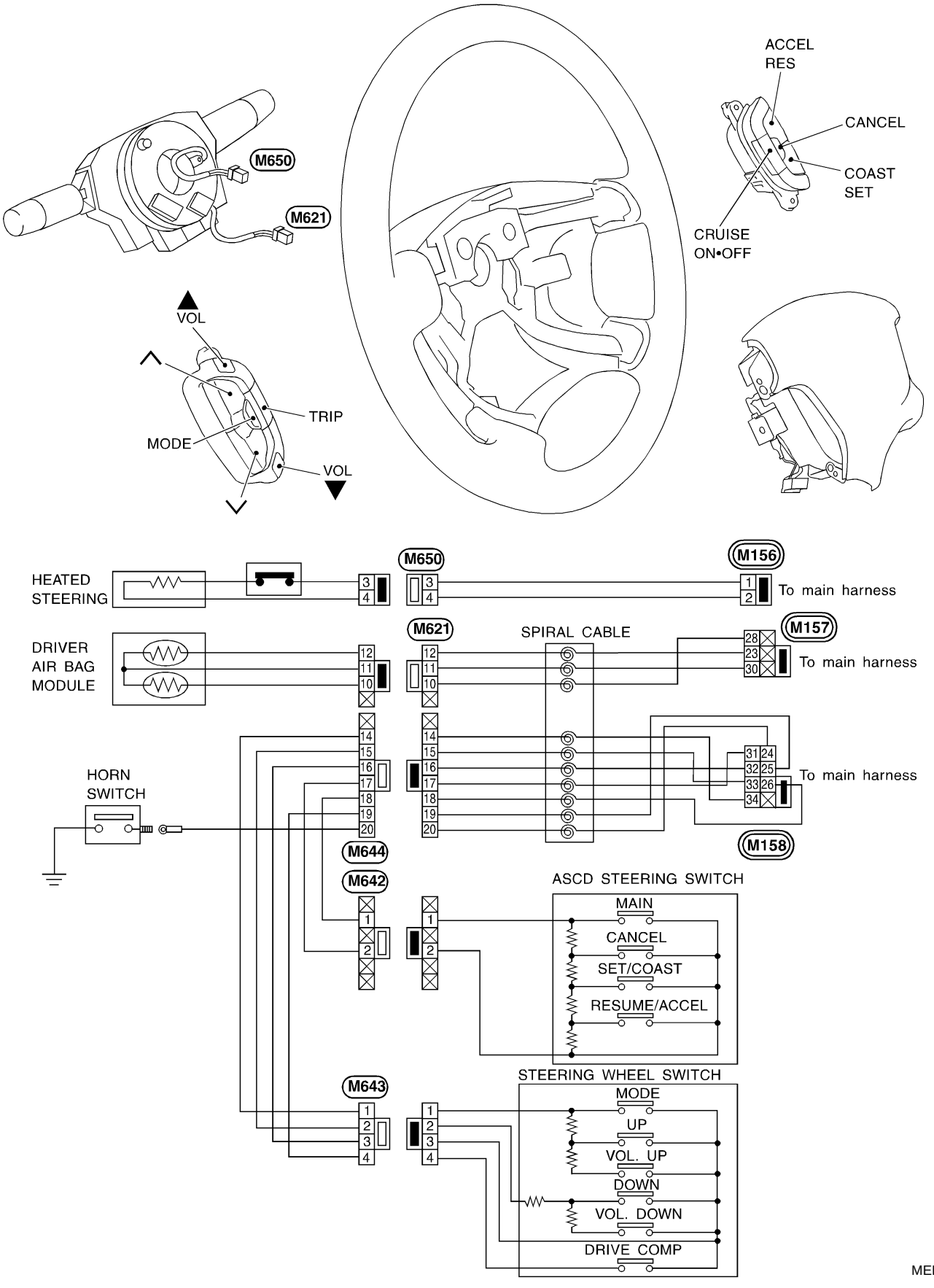
For removal and installation of spiral cable, refer to RS-20, "Installation — Air Bag Module and Spiral Cable".

- Each switch can be replaced without removing spiral cable.

1. Remove the instrument lower panel on driver side.
2. Remove the steering column cover.
3. Remove lighting switch or wiper and washer switch mounting screw.
4. Remove lighting switch or wiper and washer switch from the spiral cable.
5. Disconnect lighting switch or wiper and washer switch connector.

Check

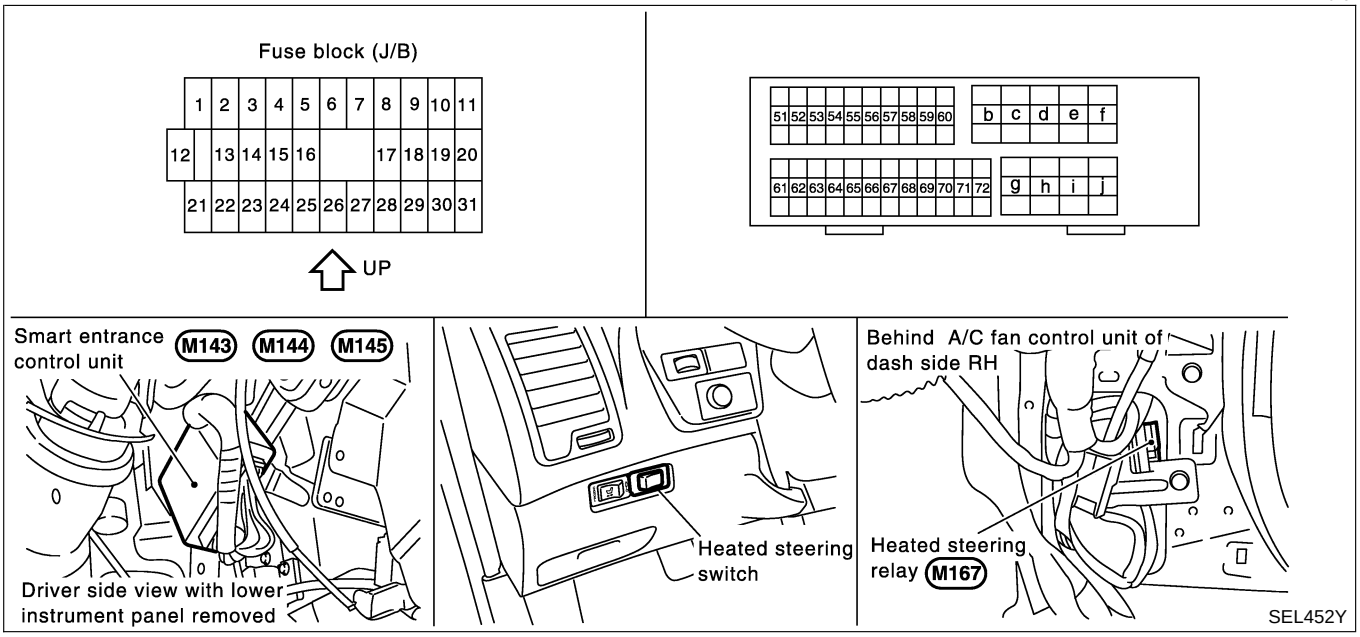
NFEL0011



MEL079O

Component Parts and Harness Connector Location

NFEL0281



System Description

NFEL0282

The heated steering system is controlled by the smart entrance control unit. The heated steering system operates only for approximately 30 minutes after heated steering switch is turned “ON”.
Then the heated steering system is turned “OFF” when the heated steering switch is turned “ON” again or ignition switch “OFF” within 30 minutes after heated steering system “ON”.
Power is supplied at all times

- to smart entrance control unit terminal 49
- through 10A fuse [No. 13, located in the fuse block (J/B)]
- to heated steering relay terminal 3
- through 10A fuse (No. 72, located in the fuse and fusible link box)

With the ignition switch in the ON or START position, power is supplied.

- through 10A fuse [No. 10, located in the fuse block (J/B)]
- to the heated steering relay terminal 1 and
- to smart entrance control unit terminal 27.

Ground is supplied

- to terminal 2 and 5 of heated steering switch and
- to combination switch (heated steering switch) terminal 2
- through body grounds M9, M25 and M87.

When the heated steering switch is turned ON, ground is supplied

- through terminal 1 of heated steering switch
- to smart entrance control unit terminal 4.

Terminal 40 of the smart entrance control unit then supplies ground to the heated steering relay terminal 2.
With power and ground supplied, the heated steering relay is energized.
Power is supplied

- through terminal 5 of heated steering relay
- to heated steering switch terminal 4 and
- to combination switch (heated steering switch) terminal 1.
- through terminal 3 of combination switch (heated steering switch)
- to the heated steering (thermostat).

Ground is supplied for heated steering

- through heated steering

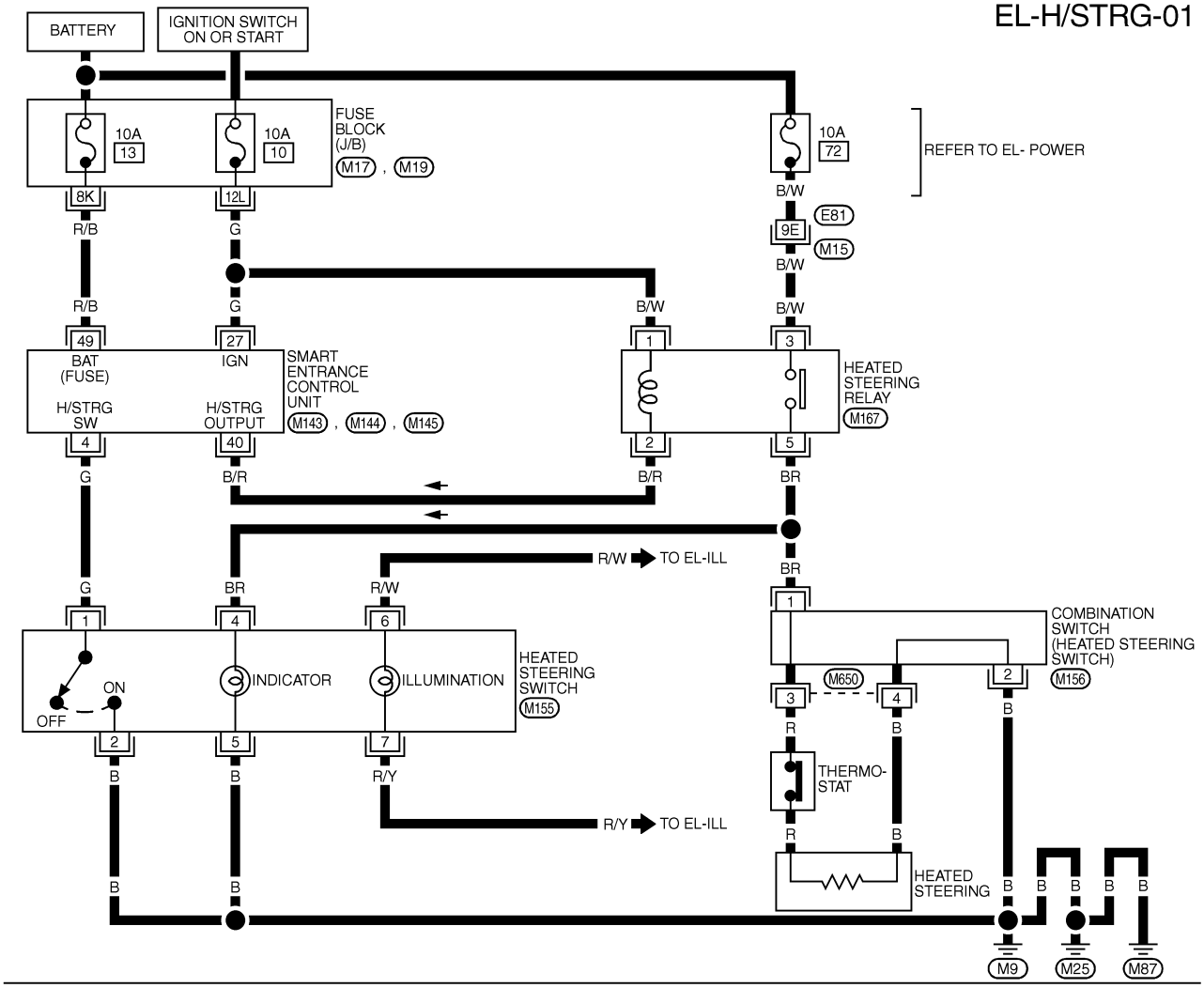
- to combination switch (heated steering switch) terminal 4.

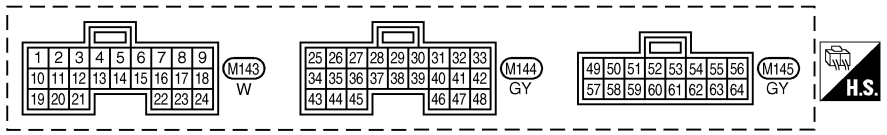
With power and ground supplied, the heated steering heats.
When the system is activated, the heated steering indicator lamp illuminates in the heated steering switch.

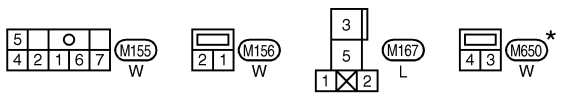
Wiring Diagram — H/STRG —

=NFEL0267

EL-H/STRG-01







REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)
M17 , M19 -FUSE BLOCK-JUNCTION BOX (J/B)

MEL133O

* : THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT" , EL SECTION.

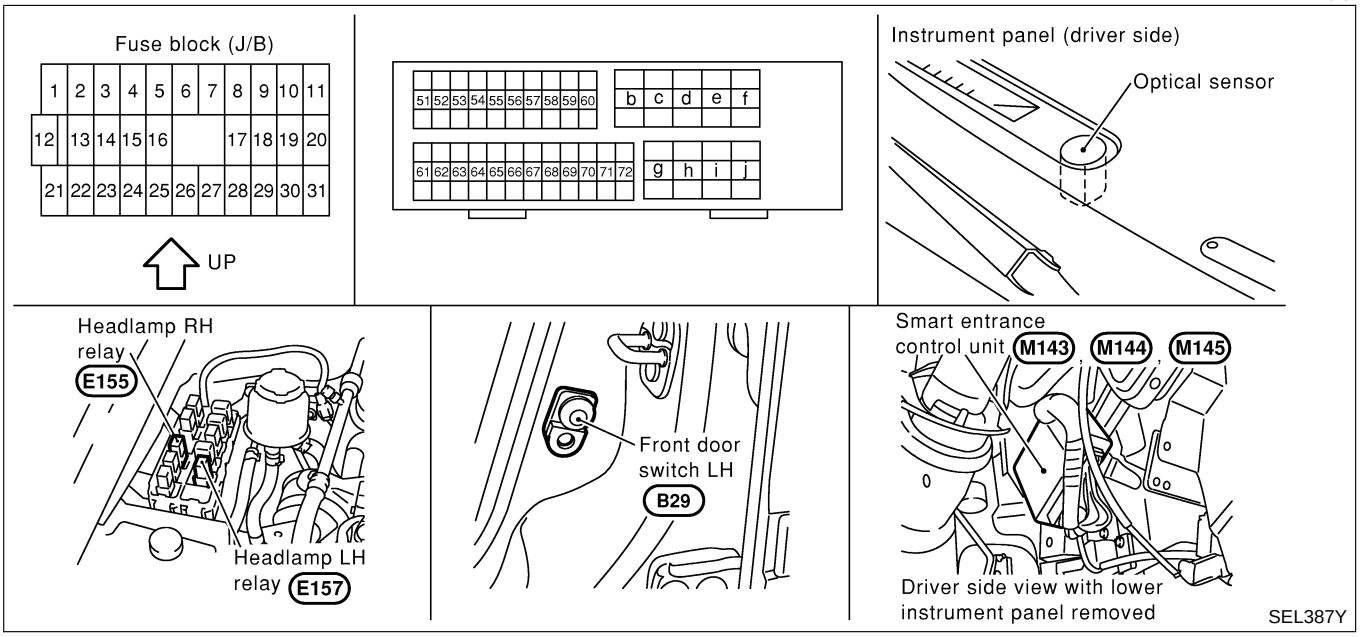
SMART ENTRANCE CONTROL UNIT TERMINALS AND REFERENCE VALUE BETWEEN EACH TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
4	G	HEATED STEERING SWITCH	OFF → ON (ONLY WHEN PUSHED)	5V → 0V
27	G	IGNITION SWITCH (ON)	IGNITION SWITCH IS IN "ON" POSITION	12V
40	B/R	HEATED STEERING RELAY	OFF → ON (IGNITION KEY IS IN "ON" POSITION)	12V → 0V
49	R/B	POWER SOURCE (FUSE)	–	12V

SEL478Y

Component Parts and Harness Connector Location

NFEL0197



System Description

NFEL0198

The headlamp operation is controlled by the lighting switch which is built into the combination switch and smart entrance control unit. And the headlamp battery saver system is controlled by the smart entrance control unit.

OUTLINE

NFEL0198S01

Power is supplied at all times

- to headlamp LH relay terminals 1 and 6
- through 20A fuse (No. 54, located in the fuse and fusible link box), and
- to headlamp LH relay terminal 3
- through 15A fuse (No. 68, located in the fuse and fusible link box), and
- to headlamp RH relay terminals 1 and 6
- through 20A fuse (No. 55, located in the fuse and fusible link box), and
- to headlamp RH relay terminal 3
- through 15A fuse (No. 69, located in the fuse and fusible link box), and
- to smart entrance control unit terminal 49
- through 10A fuse [No. 13, located in the fuse block (J/B)].

When the ignition switch is in the ON or START position, power is supplied

- to smart entrance control unit terminal 27
- through 10A fuse [No. 10, located in the fuse block (J/B)].

When the ignition switch is in the ACC or ON position, power is supplied

- to smart entrance control unit terminal 26
- through 10A fuse [No. 1, located in the fuse block (J/B)]

Ground is supplied

- to smart entrance control unit terminals 43 and 64
- through body grounds M9, M25 and M87.

POWER SUPPLY TO LOW BEAM AND HIGH BEAM

NFEL0198S07

When lighting switch is in 2ND or PASS position, ground is supplied

- to headlamp LH relay terminal 2 from smart entrance control unit terminal 21
- through smart entrance control unit terminal 22,
- from lighting switch terminal 12, and
- to headlamp RH relay terminal 2 from smart entrance control unit terminal 59

- through smart entrance control unit terminal 60,
- from lighting switch terminal 12.

Headlamp relays (LH and RH) are energized and then power is supplied to headlamps (LH and RH).

LOW BEAM OPERATION

NFEL0198S02

When the lighting switch is turned to the 2ND position and placed in LOW ("B") position, power is supplied

- from terminal 7 of each headlamp relay
- to terminal 1 of each headlamp

Ground is supplied

- to headlamp LH terminal 2
- through body grounds E11, E22 and E53, and
- to headlamp RH terminal 2
- through body grounds E11, E22 and E53.

With power and ground supplied, the headlamp(s) will illuminate.

HIGH BEAM OPERATION/FLASH-TO-PASS OPERATION

NFEL0198S03

When the lighting switch is turned to the 2ND position and placed in HIGH ("A") position or PASS ("C") position, power is supplied

- from terminal 5 of each headlamp relay
- to terminal 4 of each headlamp, and
- to combination meter terminal 26 for the HIGH BEAM indicator.

Ground is supplied

- to headlamp LH terminal 5
- through lighting switch terminals 6 and 5
- through body grounds E11, E22 and E53, and
- to headlamp RH terminal 5
- to combination meter terminal 27 for the HIGH BEAM indicator
- through lighting switch terminals 9 and 8
- through body grounds E11, E22 and E53.

With power and ground supplied, the high beams and the high beam indicator illuminate.

EXTERIOR LAMP BATTERY SAVER CONTROL

NFEL0198S04

While the headlamp is turned ON by "2ND" of light switch, the 5 minute timer is activated when the ignition switch is turned from ON (or START) to OFF (ACC OFF).
Continuity between terminals 21 and 22, and between terminals 59 and 60 of smart entrance control unit will be disturbed after 5 minutes, then the headlamps will be turned off.
While the headlamp is turned ON by "AUTO" of light switch, the 5 minutes timer is activated when the ignition switch signal changes from ON (or START) to OFF (ACC OFF), and either one of LH or RH front door switch ON signal is input.
The auto light delay off timer is activated as the following:

- When the door switch signal changes from ON to OFF while the timer is activated, the timer in operation is discontinued and the 45 second timer is reset.
- When the door switch signal changes from OFF to ON while the timer is activated, the timer is discontinued and the 45 second timer is reset.
- When the one of four door switch signals changes from OFF to ON while the timer is activated, the timer is discontinued and the 5 minute timer is reset.
- When all the door switch ON signals are input while the timer is activated, the timer is discontinued and the 45 second timer is reset.

Exterior lamp battery saver control mode and auto light delay off timer period can be changed by the function setting of CONSULT-II (EL-46).
When the lighting switch is turned from OFF to 2ND after headlamps are turned to off by the battery saver control, ground is supplied

- to smart entrance control unit terminals 20 and 58 from lighting switch terminal 11, and then,
- to headlamp LH and RH relays terminal 2 from smart entrance control unit terminals 21 and 59,
- through smart entrance control unit terminals 22 and 60 and
- through lighting switch terminal 12.

Then headlamps illuminate again.

AUTO LIGHT OPERATION

NFEL0198S06

The auto light control system has an auto light sensor inside it that detects outside brightness.
When lighting switch is in "AUTO" position, ground is supplied

- to smart entrance control unit terminal 23
- from lighting switch terminal 42.

When ignition switch is turn to "ON" or "START" position and
Outside brightness is darker than prescribed level.
Ground is supplied

- to headlamp relay LH and RH terminals 2
- through smart entrance control unit terminal 21, 59 and 43, 64.

Then both headlamp relays and tail lamp relay are energized, headlamps (low or high) and tail lamps are illuminate according to switch position.
Auto light operation allows headlamps and tail lamps to go off when outside brightness is brighter than prescribed level.

NOTE:
The delay time changes (maximum of 20 seconds) as the outside brightness changes.

For parking license and tail lamp auto operation, refer to "PARKING, LICENSE AND TAIL LAMPS".

VEHICLE SECURITY SYSTEM

NFEL0198S05

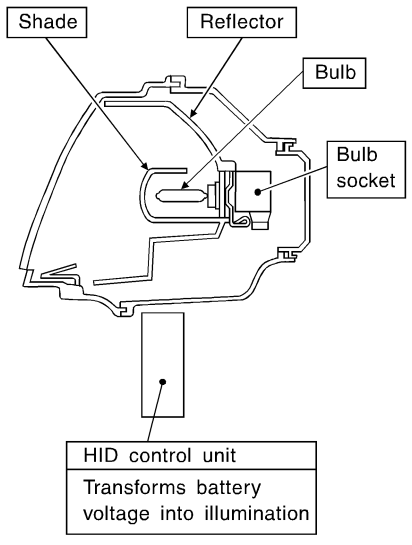
The vehicle security system will flash the low beams if the system is triggered. Refer to "VEHICLE SECURITY (THEFT WARNING) SYSTEM" (EL-311).

XENON HEADLAMP

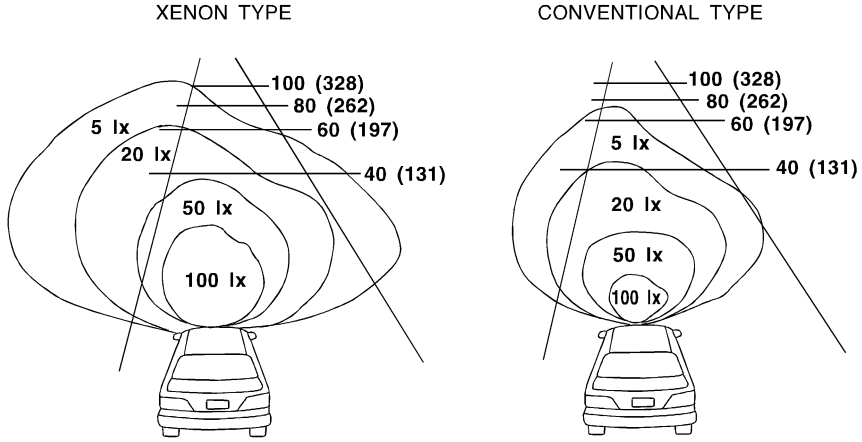
NFEL0198S08

Xenon type headlamp is adopted to the low beam headlamps. Xenon bulbs do not use a filament. Instead, they produce light when a high voltage current is passed between two tungsten electrodes through a mixture of xenon (an inert gas) and certain other metal halides. In addition to added lighting power, electronic control of the power supply gives the headlamps stable quality and tone color.
Following are some of the many advantage of the xenon type headlamp.

- The light produced by the headlamps is white color approximating sunlight that is easy on the eyes.
- Light output is nearly double that of halogen headlamps, affording increased area of illumination.
- The light features a high relative spectral distribution at wavelengths to the human eye is most sensitive, which means that even in the rain, more light is reflected back from the road surface toward the vehicle, for added visibility.
- Power consumption is approximately 25 percent less than halogen headlamps, reducing battery load.



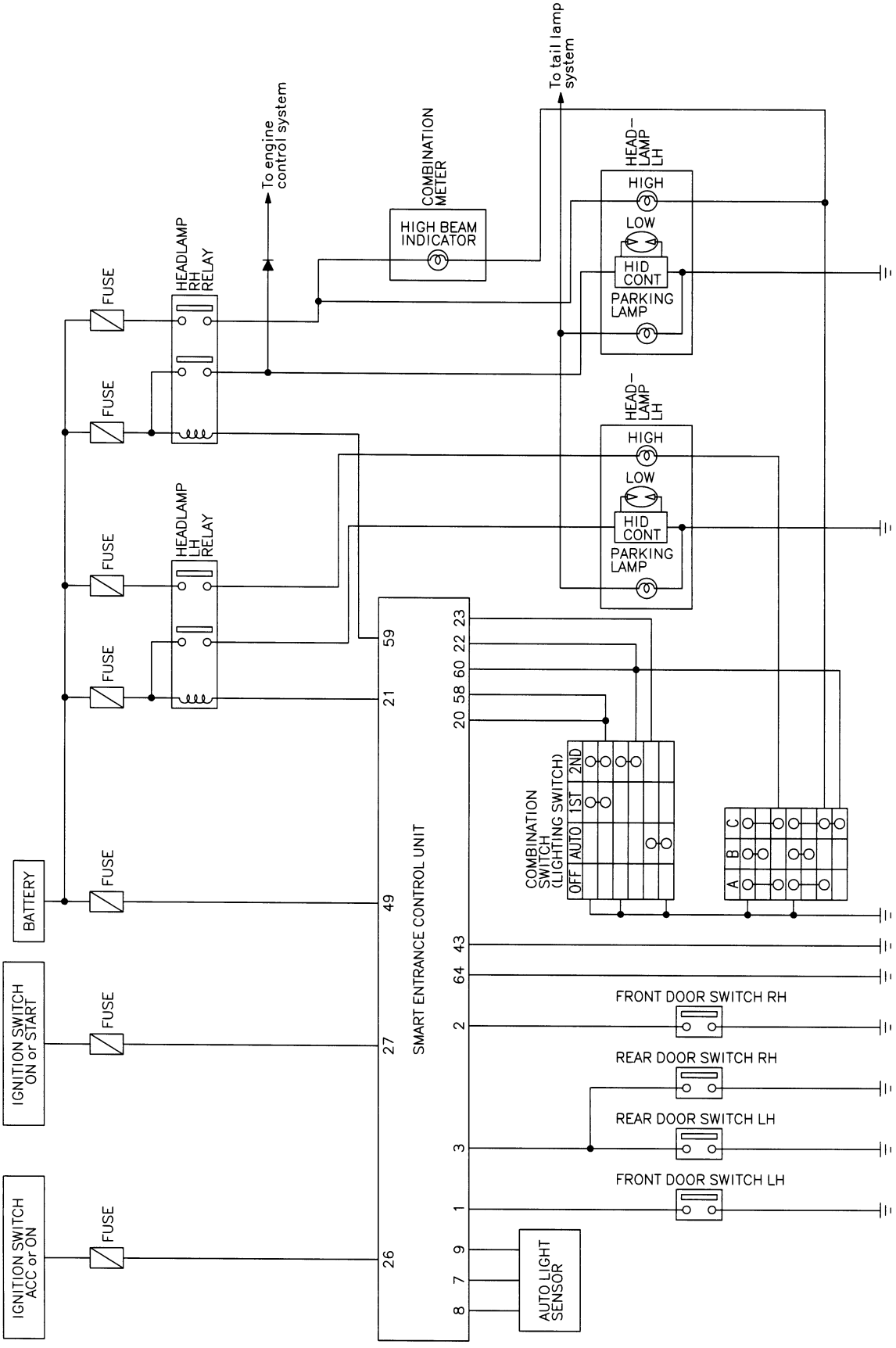
Structure of the new xenon headlamp
HID: High Intensity Discharge



SEL477Y

Schematic

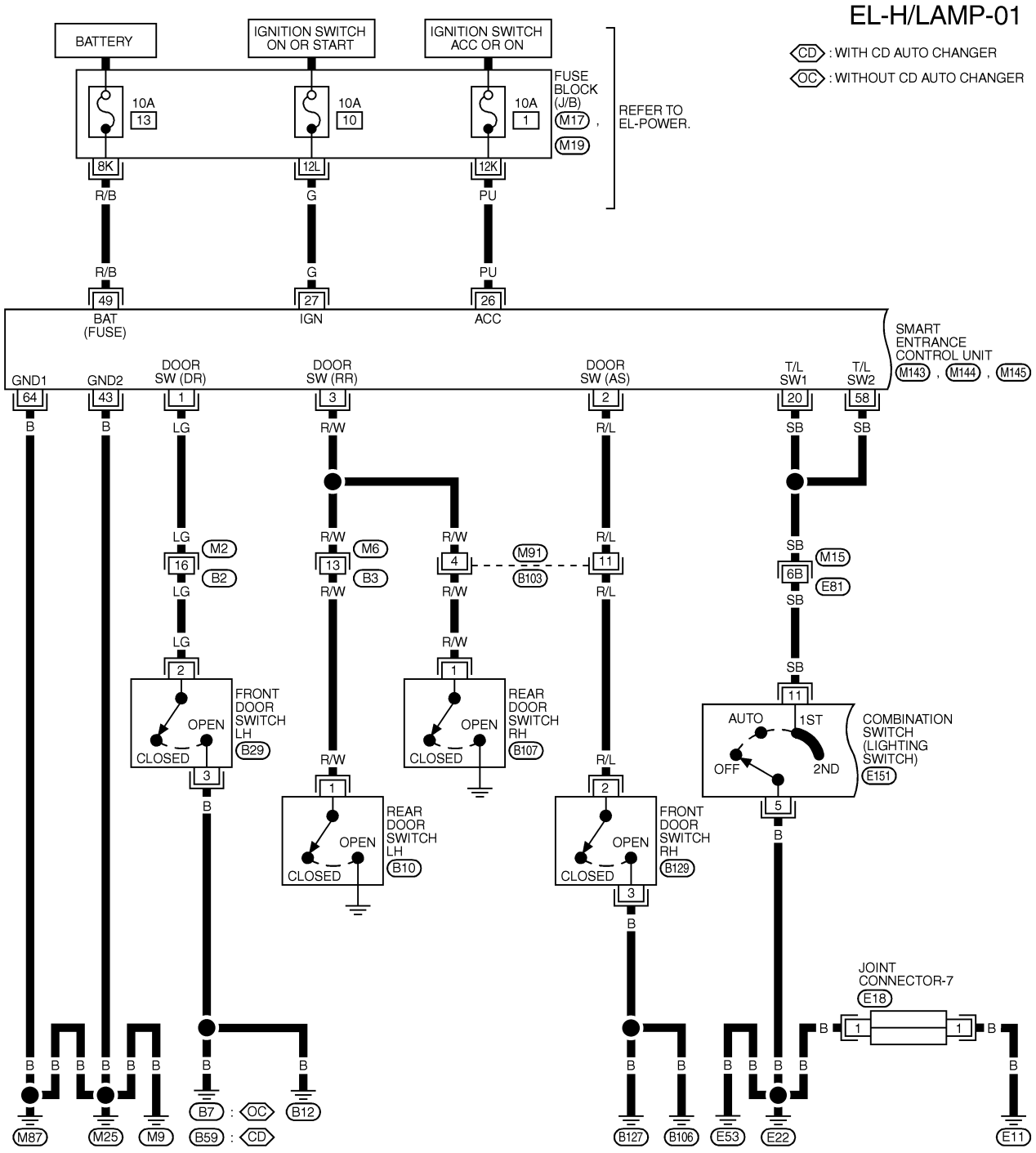
NFEL0199

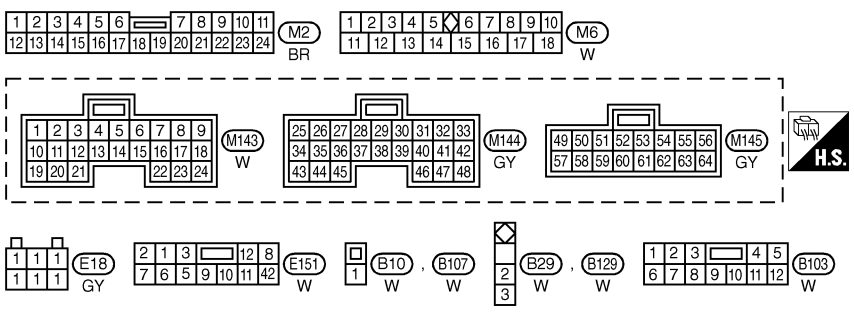


MEL714P

Wiring Diagram — H/LAMP —

NFEL0013

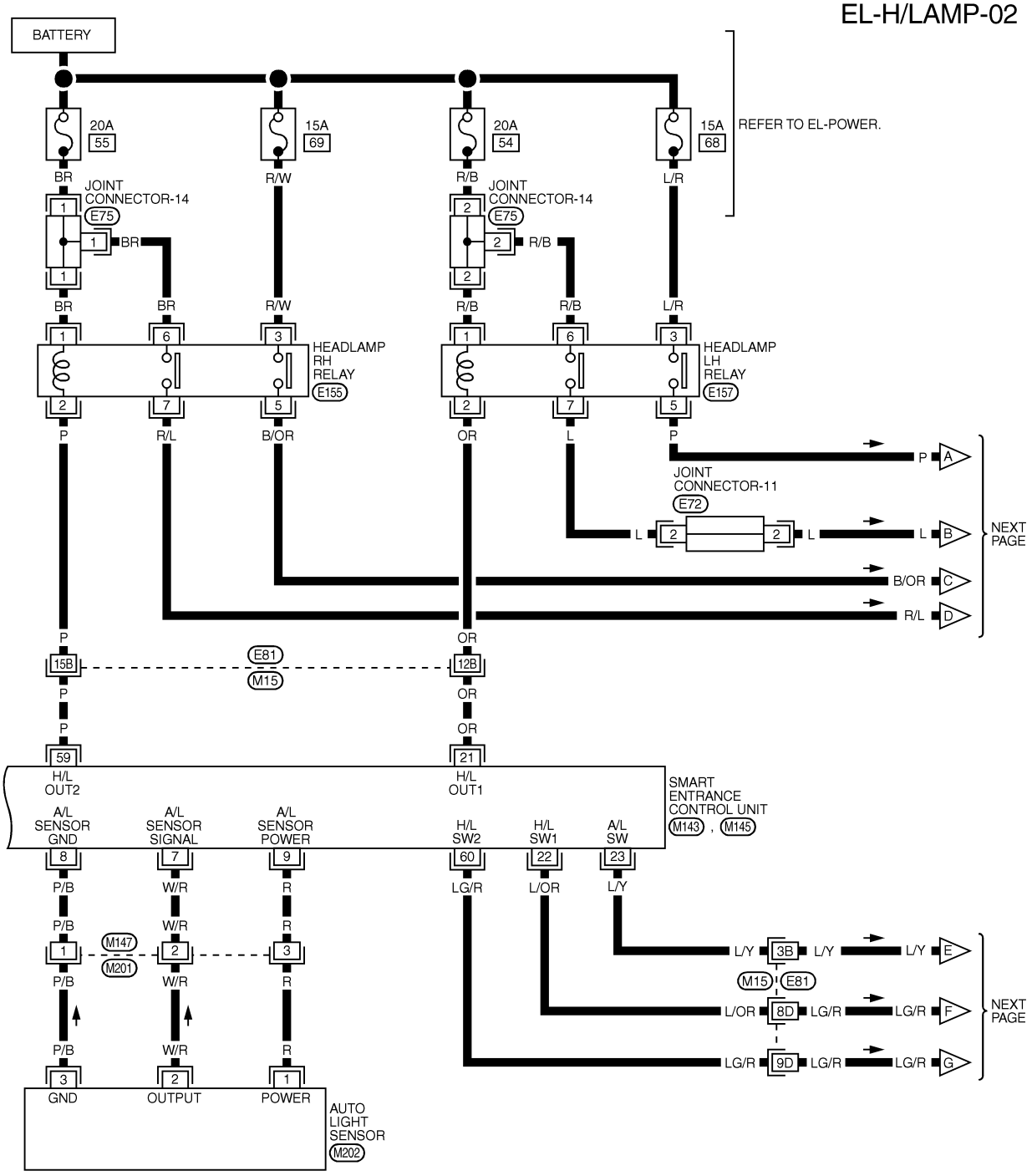


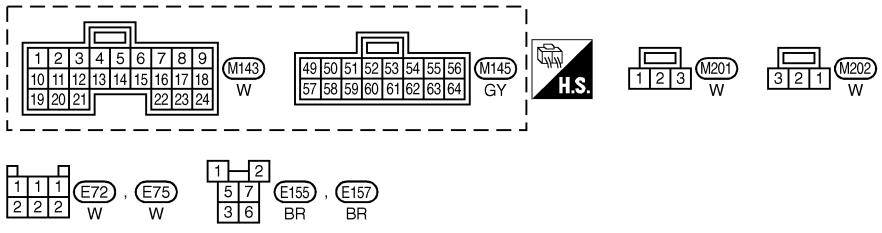


REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)
M17 , M19 -FUSE BLOCK-JUNCTION BOX (J/B)

MEL715P

EL-H/LAMP-02

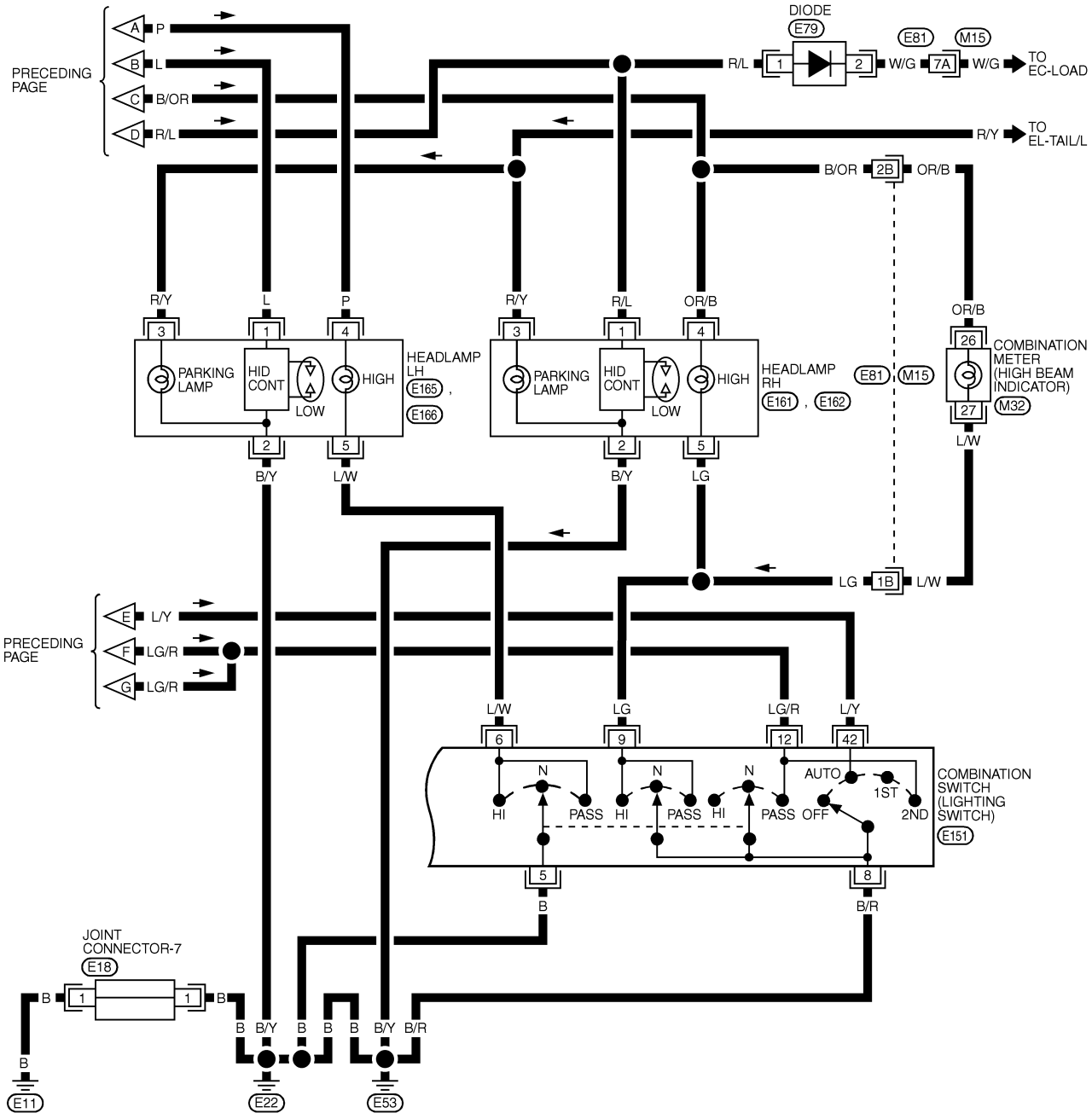


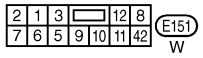


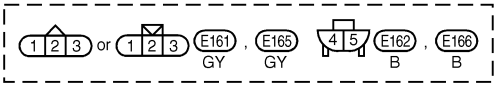
REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)

MEL092O

EL-H/LAMP-03



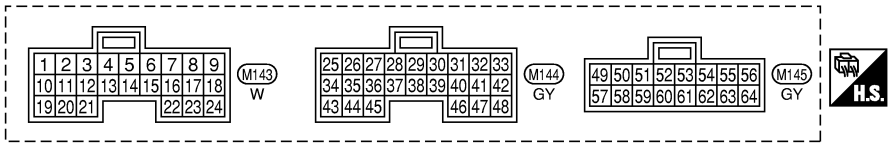




REFER TO THE FOLLOWING.
M15 - SUPER MULTIPLE JUNCTION (SMJ)

MEL826P

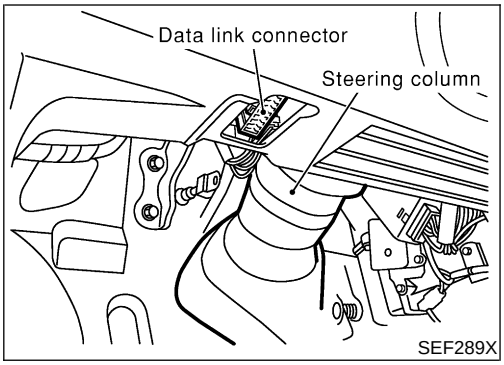
SMART ENTRANCE CONTROL UNIT CONNECTOR



SMART ENTRANCE CONTROL UNIT TERMINALS AND REFERENCE VALUE BETWEEN EACH TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION			DATA (DC)
1	LG	DRIVER DOOR SWITCH	OFF (CLOSED) → ON (OPEN)			12V → 0V
2	R/L	PASSENGER DOOR SWITCH	OFF (CLOSED) → ON (OPEN)			5V → 0V
3	R/W	REAR DOOR SWITCH	OFF (CLOSED) → ON (OPEN)			5V → 0V
7	W/R	AUTO LIGHT SENSOR (SIGNAL)	IGNITION SWITCH "ON" POSITION	LIGHT IS APPLIED TO AUTO LIGHT SENSOR		1 TO 5V
				LIGHT IS NOT APPLIED TO AUTO LIGHT SENSOR		LESS THAN 1V
8	P/B	AUTO LIGHT SENSOR (GND)	–			–
9	R	AUTO LIGHT SENSOR (POWER)	IGNITION SWITCH (OFF → ON)			0V → 5V
20	SB	TAIL LAMP SWITCH	LIGHTING SWITCH (OFF OR AUTO → 1ST OR 2ND POSITION)			12V → 0V
21	OR	HEADLAMP LH RELAY	IGNITION SWITCH (WITH LIGHTING SWITCH 2ND)	ON OR START → OFF	MORE THAN 5 MINUTES	12V
					WITHIN 5 MINUTES	0V
				ON OR START		0V
			HEADLAMPS ILLUMINATE BY AUTO LIGHT CONTROL			0V
22	L/OR	HEADLAMP SWITCH	LIGHTING SWITCH	EXCEPT PASS OR 2ND POSITION		12V
				PASS OR 2ND POSITION		0V
			HEADLAMPS ILLUMINATE BY AUTO LIGHT CONTROL (OPERATE → NOT OPERATE)			10V → 12V
23	L/Y	HEADLAMP SWITCH	IGNITION SWITCH "ON" POSITION	LIGHTING SWITCH (EXCEPT AUTO → AUTO POSITION)		12V → 0V
26	PU	IGNITION SWITCH (ACC)	"ACC" POSITION			12V
27	G	IGNITION SWITCH (ON)	IGNITION SWITCH IS IN "ON" POSITION			12V
43	B	GROUND	–			–
49	R/B	POWER SOURCE (FUSE)	–			12V
58	SB	TAIL LAMP SWITCH	LIGHTING SWITCH (OFF OR AUTO → 1ST OR 2ND POSITION)			12V → 0V
59	P	HEADLAMP RH RELAY	IGNITION SWITCH (WITH LIGHTING SWITCH 2ND)	ON OR START → OFF	MORE THAN 5 MINUTES	12V
					WITHIN 5 MINUTES	0V
				ON OR START		0V
			HEADLAMPS ILLUMINATE BY AUTO LIGHT CONTROL (OPERATE → NOT OPERATE)			LESS THAN 1V → 12V
60	LG/R	HEADLAMP SWITCH	LIGHTING SWITCH	EXCEPT PASS OR 2ND POSITION		12V
				PASS OR 2ND POSITION		0V
			HEADLAMPS ILLUMINATE BY AUTO LIGHT CONTROL (OPERATE → NOT OPERATE)			10V → 12V
64	B	GROUND	–			–

SEL583Y



SEF289X

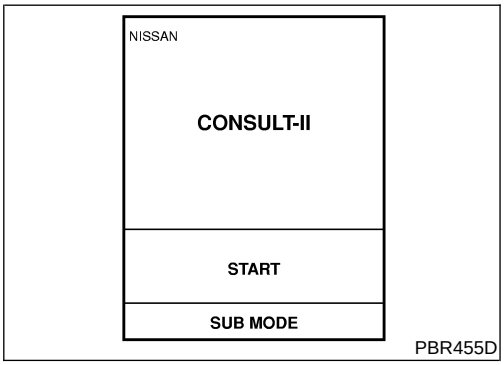
CONSULT-II Inspection Procedure

NFEL0200

“HEAD LAMP”

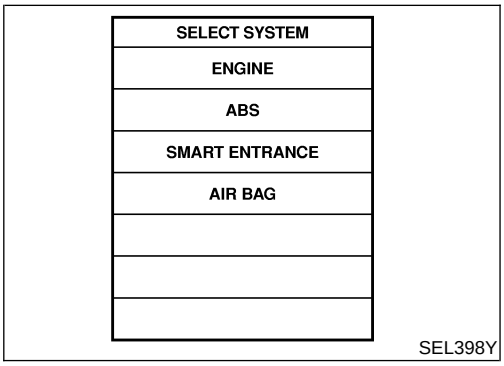
NFEL0200S01

1. Turn ignition switch “OFF”.
2. Connect “CONSULT-II” to the data link connector.



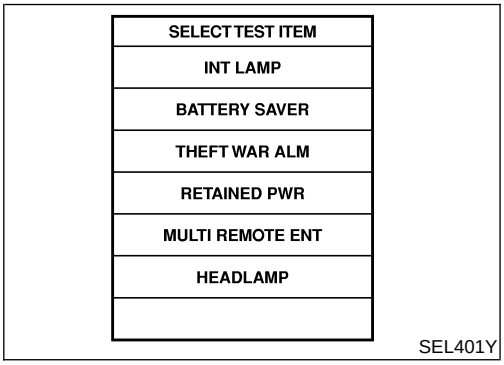
PBR455D

3. Turn ignition switch “ON”.
4. Touch “START”.



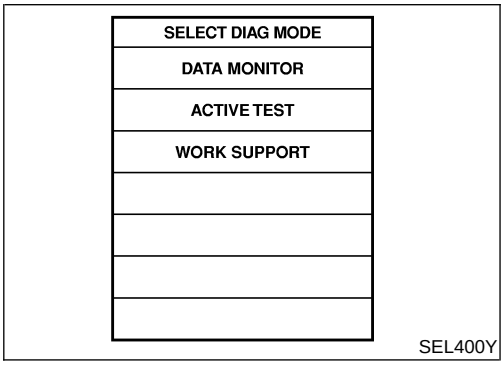
SEL398Y

5. Touch “SMART ENTRANCE”.



SEL401Y

6. Touch “HEAD LAMP”.



SEL400Y

7. Select diagnosis mode.
   “DATA MONITOR”, “ACTIVE TEST” and “WORK SUPPORT” are available.

CONSULT-II Application Items

NFEL0201

"HEAD LAMP"

NFEL0201S02

Data Monitor

NFEL0201S0201

Monitored Item	Description
IGN ON SW	Indicates [ON/OFF] condition of ignition switch in ON position.
ACC ON SW	Indicates [ON/OFF] condition of ignition switch in ACC position.
AUTO LIGT SW	Displays status of the lighting switch as judged from the lighting switch signal. (AUTO position: ON/Other than AUTO position: OFF)
AUTO LIGT SENS	Displays "Illumination outside of the vehicle (close to 5V when light/close to 0V when dark)" as judged from the optical sensor signal.
LIGHT SW 1ST	Displays status of the lighting switch as judged from the lighting switch signal. (1ST or 2ND position: ON/Other than 1ST and 2ND position: OFF)
LIGHT SW 2ND	Displays status of the lighting switch as judged from the lighting switch signal. (2ND position: ON/Other than 2ND position: OFF)
DOOR SW-DR	Indicates [ON/OFF] condition of front door switch LH.
DOOR SW-AS	Indicates [ON/OFF] condition of door switch RH.
DOOR SW-RR	Indicates [ON/OFF] condition of rear door switch.

Active Test

NFEL0201S0202

Test Item	Description
TAIL LAMP	Tail lamp relay can be operated by on-off operation of the tail lamp.
HEAD LAMP	Headlamp relay can be operated by on-off operation of the headlamp.
AUTO LIGHT	Night time dimming signal can be operated by on-off operation.

Work Support

NFEL0201S0203

Work Item	Description
AUTO LIGHT SET	Auto light sensitivity can be changed in this mode. Sensitivity can be adjusted in four modes. ● MODE 1 (Normal)/MODE 2 (Sensitive)/MODE 3 (Desensitized)/MODE 4 (Insensitive)
BATTERY SAVER SET	Exterior lamp battery saver control mode can be changed in this mode. Selects exterior lamp battery saver control mode between two modes. ● MODE 1 (ON)/MODE 2 (OFF)
ILL DELAY SET	Auto light delay off timer period can be changed in this mode. Selects auto light delay off timer period among eight modes. ● MODE 1 (45 sec.)/MODE 2 (OFF)/MODE 3 (30 sec.)/MODE 4 (60 sec.)/ MODE 5 (90 sec.)/ MODE 6 (120 sec.)/MODE 7 (150 sec.)/MODE 8 (180 sec.)

Trouble Diagnoses

NFEL0268

WARNING:

- **The xenon headlamp has a high-tension current generating area. Be extremely careful when removing and installing. Be certain to disconnect the battery negative cable prior to removing or installing.**
- **When the xenon headlamp is lit, do not touch the harness (covered with red or amber insulation), bulb itself or the bulb socket with your bare hands.**
- **Never service a xenon headlamp with wet hands.**
- **When checking body side harness with a circuit tester, be certain to disconnect the harness connector from the xenon headlamp.**
- **When the xenon headlamp is lit, the xenon bulb must be installed in the headlamp housing. (Never turn on xenon headlamp, if the bulb is out of the headlamp housing.)**

CAUTION:

Make sure to install the bulb securely; if the xenon bulb is improperly installed in its socket, high-tension current leaks occur. This may lead to a melted bulb and/or bulb socket.

Symptom	Possible cause	Repair order
Neither headlamp operates.	1. 10A fuse 2. Lighting switch 3. Smart entrance control unit	1. Check 10A fuse [No. 13, located in fuse block (J/B)]. Verify battery positive voltage is present at terminal 49 of smart entrance control unit. 2. Check Lighting switch. 3. Check smart entrance control unit. (EL-350)
LH headlamp (low and high beam) does not operate, but RH headlamp (low and high beam) does operate.	1. 20A fuse 2. Headlamp LH relay 3. Headlamp LH relay circuit 4. Lighting switch circuit 5. Smart entrance control unit	1. Check 20A fuse (No. 54, located in fuse and fusible link box). Verify battery positive voltage is present at terminals 1 and 6 of headlamp LH relay. 2. Check headlamp LH relay. 3. Check harness between headlamp LH relay and smart entrance control unit. 4. Check harness between smart entrance control unit and lighting switch. 5. Check smart entrance control unit. (EL-350)
RH headlamp (low and high beam) does not operate, but LH headlamp (low and high beam) does operate.	1. 20A fuse 2. Headlamp RH relay 3. Headlamp RH relay circuit 4. Lighting switch circuit 5. Smart entrance control unit	1. Check 20A fuse (No. 55, located in fuse and fusible link box). Verify battery positive voltage is present at terminals 1 and 6 of headlamp RH relay. 2. Check headlamp RH relay. 3. Check harness between headlamp RH relay and smart entrance control unit. 4. Check harness between smart entrance control unit and lighting switch. 5. Check smart entrance control unit. (EL-350)
LH high beam does not operate, but LH low beam operates.	1. Bulb 2. 15A fuse 3. Headlamp LH relay 4. Open in the LH high beams circuit 5. Lighting switch 6. Lighting switch ground circuit	1. Check bulb. 2. Check 15A fuse (No. 68, located in fuse and fusible link box). Verify battery positive voltage is present at terminal 3 of headlamp LH relay. 3. Check headlamp LH relay. 4. Check the following. a. Harness between headlamp relay LH terminal 5 and LH headlamp for open circuit b. Harness between LH headlamp and lighting switch for open circuit 5. Check lighting switch. 6. Check harness between lighting switch and ground.
LH low beam does not operate, but LH high beam operates.	1. Headlamp relay LH 2. Open in the LH low beam circuit 3. LH low beam ground circuit 4. Xenon bulb 5. HID control unit	1. Check headlamp relay LH 2. Check harness between headlamp relay LH terminal 7 and LH headlamp for open circuit. 3. Check harness between LH headlamp and ground. 4. Replace the xenon bulb with other side bulb or new one. (If headlamps illuminate correctly, replace the bulb.) 5. Replace the HID control unit with other side control unit or new one. (If headlamps illuminate correctly, replace the control unit.)
RH high beam does not operate, but RH low beam operates.	1. Bulb 2. 15A fuse 3. Headlamp RH relay 4. Open in the RH high beams circuit 5. Lighting switch 6. Lighting switch ground circuit	1. Check bulb. 2. Check 15A fuse (No. 69, located in fuse and fusible link box). Verify battery positive voltage is present at terminal 3 of headlamp RH relay. 3. Check headlamp RH relay. 4. Check the following. a. Harness between headlamp relay RH terminal 5 and RH headlamp for open circuit b. Harness between RH headlamp and lighting switch for open circuit 5. Check lighting switch. 6. Check harness between lighting switch and ground.

Symptom	Possible cause	Repair order
RH low beam does not operate, but RH high beam operates.	1. Headlamp relay RH 2. Open in the RH low beam circuit 3. RH low beam ground circuit 4. Xenon bulb 5. HID control unit	1. Check headlamp relay RH 2. Check harness between headlamp relay RH terminal 7 and RH headlamp for open circuit. 3. Check harness between RH headlamp and ground. 4. Replace the xenon bulb with other side bulb or new one. (If headlamps illuminate correctly, replace the bulb.) 5. Replace the HID control unit with other side control unit or new one. (If headlamps illuminate correctly, replace the control unit.)
High beam indicator does not work.	1. Bulb 2. Open in high beam circuit	1. Check bulb in combination meter. 2. Check the following. a. Harness between headlamp RH relay and combination meter for an open circuit b. Harness between high beam indicator and lighting switch
Exterior lamp battery saver control does not operate properly.	1. Door switch LH or RH circuit 2. Smart entrance control unit	1. Check the following. a. Harness between smart entrance control unit and LH or RH door switch for open or short circuit b. LH or RH door switch ground circuit c. LH or RH door switch 2. Check smart entrance control unit. (EL-350)

Bulb Replacement

NFEL0269

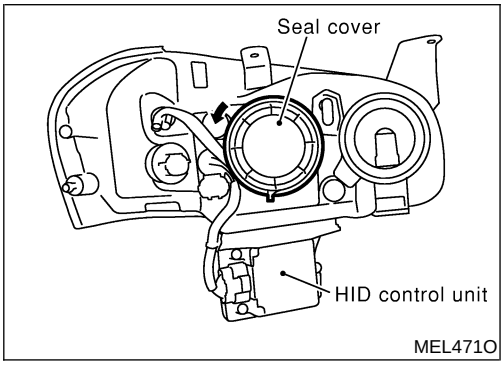
CAUTION:

- **After replacing a new xenon bulb, be sure to make aiming adjustments.**
- **Hold only the plastic base when handling the bulb. Never touch the glass envelope.**
- **Do not leave headlamp reflector without bulb for a long period of time. Dust, moisture, smoke, etc. entering headlamp body may affect the performance of the headlamp. Remove headlamp bulb from the headlamp reflector just before a replacement bulb is installed.**

1. Disconnect negative battery cable.
2. Disconnect headlamp connector.

WARNING:

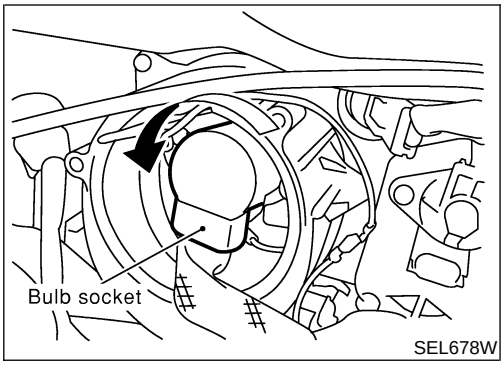
Never service a xenon headlamp without disconnecting negative battery cable and with wet hands.



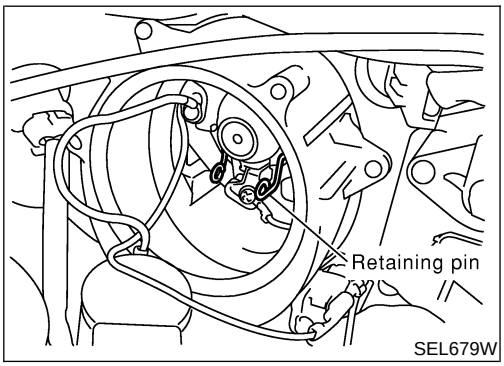
XENON BULB (LOW BEAM)

NFEL0269S01

1. Remove headlamp seal cover by turning it counterclockwise.



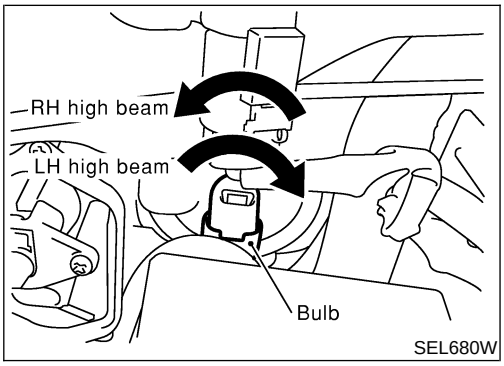
2. Turn bulb socket counterclockwise with keep pushing, then remove it.



3. Release retaining pin.
4. Remove the xenon bulb.
5. Install in the reverse order of removal.

CAUTION:

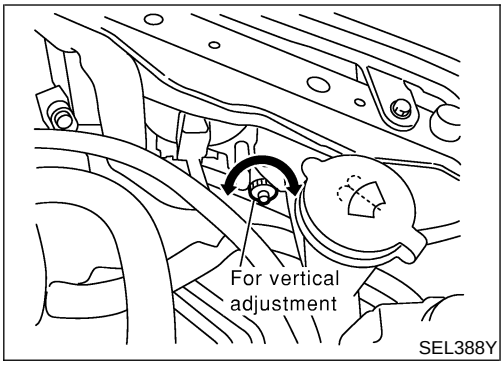
- **When disposing of the xenon bulb, do not break it; always dispose of it as is.**
- **Make sure to install the bulb securely; if the xenon bulb is improperly installed in its socket, high-tension current leaks occur. This may lead to a melted bulb and/or bulb socket.**



HIGH BEAM

NFEL0269S02

1. Turn the bulb clockwise (LH high beam) or counterclockwise (RH high beam).
2. Remove the bulb.
3. Install in the reverse order of removal.



Aiming Adjustment

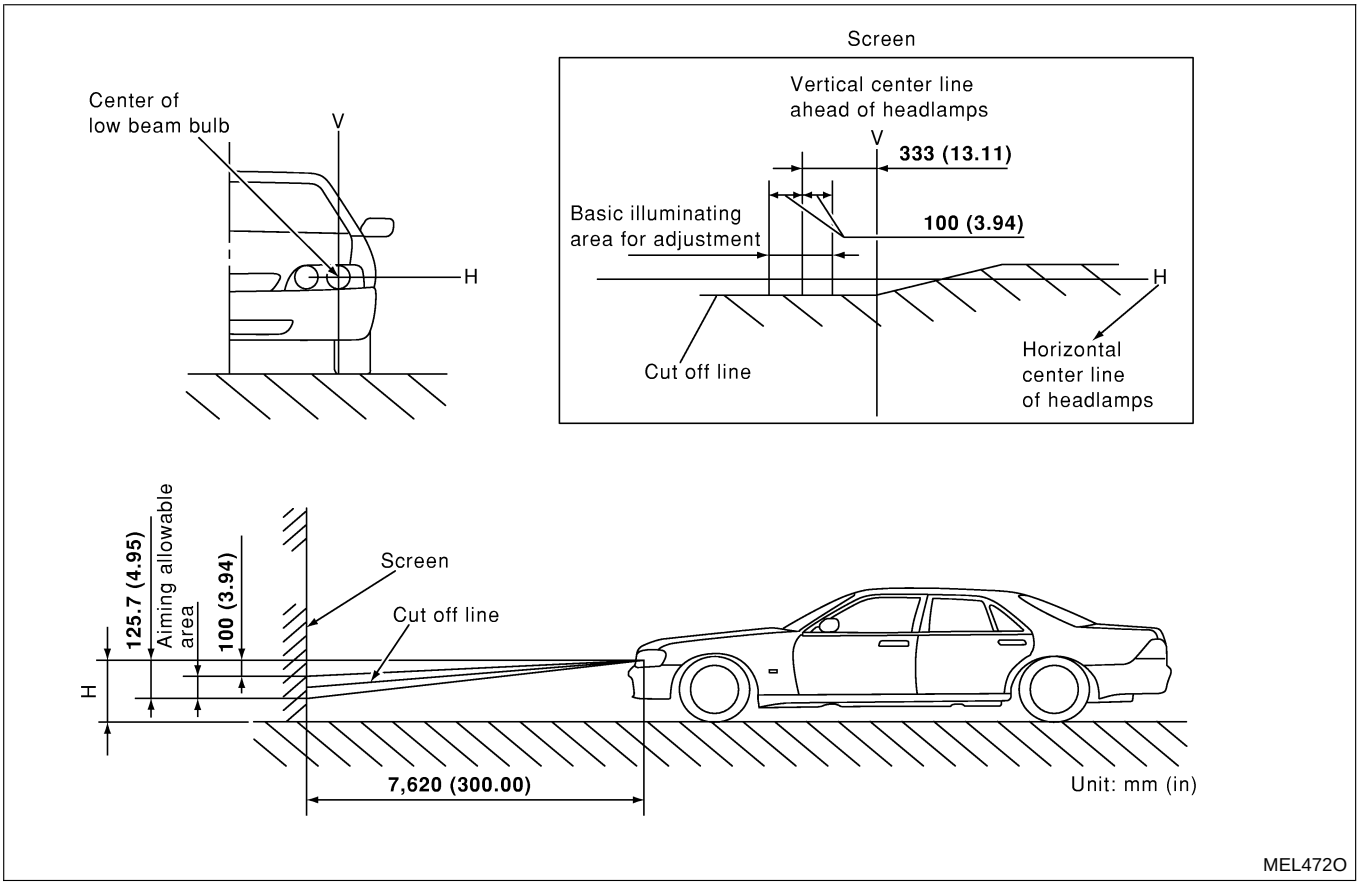
=NFEL0270

LOW BEAM

NFEL0270S01

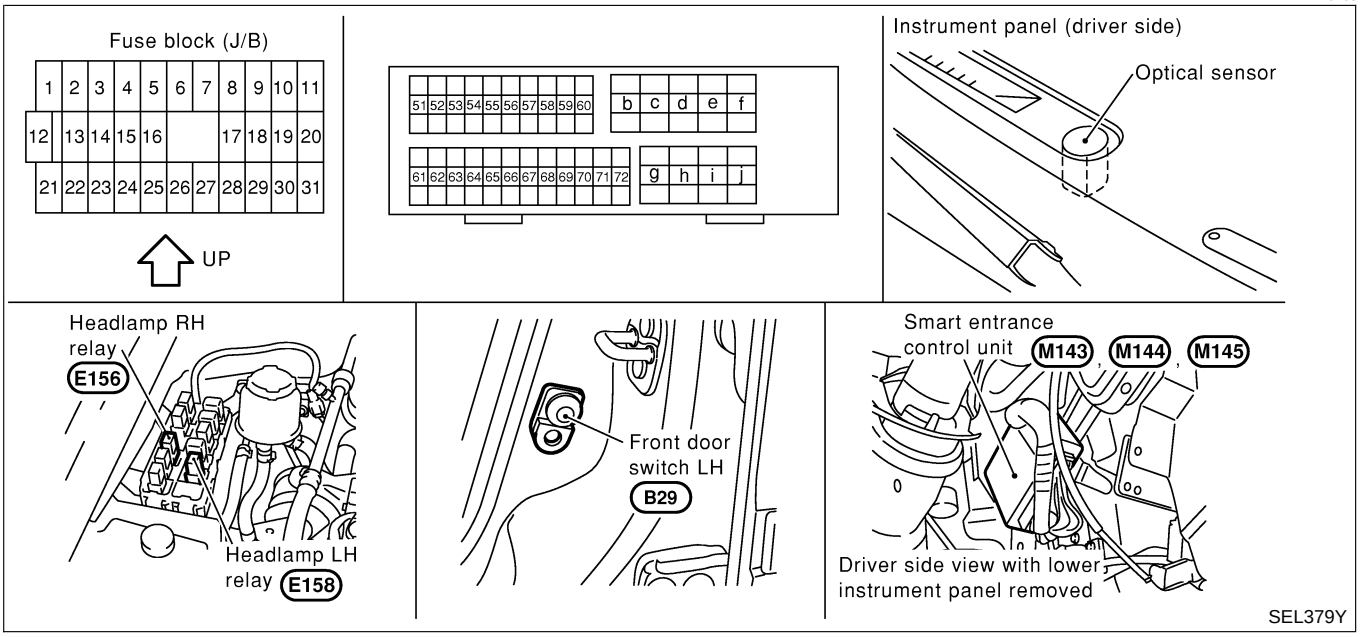
1. Turn headlamp low beam on.
2. Use adjusting screw to perform aiming adjustment.

- **First tighten the adjusting screw all the way and then make adjustment by loosening the screw.**



Component Parts and Harness Connector Location

NFEL0203



System Description

NFEL0204

The headlamp system for Canada vehicles contains a daytime light control unit that activates the high beam headlamps at approximately half illumination whenever the engine is running. If the parking brake is applied before the engine is started the daytime lights will not be illuminated. The daytime lights will illuminate once the parking brake is released. Thereafter, the daytime lights will continue to operate when the parking brake is applied.

And battery saver system is controlled by the smart entrance control unit.

Power is supplied at all times

- to headlamp LH relay terminals 1 and 6
- through 20A fuse (No. 54, located in the fuse and fusible link box), and
- to headlamp RH relay terminals 1 and 6
- through 20A fuse (No. 55, located in the fuse and fusible link box), and
- to smart entrance control unit terminal 49
- through 10A fuse [No. 13, located in the fuse block (J/B)].

Ground is supplied

- to daytime light control unit terminal 16
- through body grounds E11, E22 and E53, and
- to smart entrance control unit terminals 43 and 64
- through body grounds M9, M25 and M87.

When the ignition switch is in the ON or START position, power is also supplied

- to daytime light control unit terminal 3
- through 10A fuse [No. 28, located in the fuse block (J/B)], and
- to smart entrance control unit terminal 27
- through 10A fuse [No. 10, located in the fuse block (J/B)].

When the ignition switch is in the ACC or ON position, power is supplied

- to smart entrance control unit terminal 26
- through 10A fuse [No. 1, located in the fuse block (J/B)].

When the ignition switch is in the START position, power is supplied

- to daytime light control unit terminal 2
- through 10A fuse [No. 21, located in the fuse block (J/B)].

HEADLAMP OPERATION

NFEL0204S01

Power Supply to Low Beam and High Beam

NFEL0204S0107

When lighting switch is in 2ND or PASS position, ground is supplied

- to headlamp LH relay terminal 2 from smart entrance control unit terminal 21
- through smart entrance control unit terminal 22
- from lighting switch terminal 12, and
- to headlamp RH relay terminal 2 from smart entrance control unit terminal 59
- through smart entrnace control unit terminal 60
- from lighting switch terminal 12.

Headlamp relays (LH and RH) are energized and then power is supplied to headlamps (LH and RH).

Low Beam Operation

NFEL0204S0103

When the lighting switch is turned to 2ND and LOW ("B") positions, ground is supplied

- to terminal 2 of the headlamp LH
- through body grounds E11, E22 and E53.

Ground is also supplied

- to terminal 2 of the headlamp RH
- through body grounds E11, E22 and E53.

With power and ground supplied, the low beam headlamps illuminate.

High Beam Operation/Flash-to-pass Operation

NFEL0204S0104

When the lighting switch is turned to 2ND and HIGH ("A") or PASS ("C") positions, ground is supplied

- to terminal 5 of LH headlamp
- through daytime light control unit terminals 10 and 14, and
- to combination meter terminal 27 for the HIGH BEAM indicator
- through lighting switch terminals 9 and 8
- through body grounds E11, E22 and E53.

Ground is also supplied

- to terminal 5 of RH headlamp
- through daytime light control unit terminals 9 and 13
- through lighting switch terminals 6 and 5
- through body grounds E11, E22 and E53.

With power and ground supplied, the high beam headlamps and HIGH BEAM indicator illuminate.

EXTERIOR LAMP BATTERY SAVER CONTROL

NFEL0204S02

While the headlamp is turned ON by "2ND" of light switch, the 5 minute timer is activated when the ignition switch is turned from ON (or START) to OFF (ACC OFF).
Continuity between terminals 21 and 22, and between terminals 59 and 60 of smart entrance control unit will be disturbed after 5 minutes, then the headlamps will be turned off.
While the headlamp is turned ON by "AUTO" of light switch, the 5 minute timer is activated when the ignition switch signal changes from ON (or START) to OFF (ACC OFF), and either one of LH or RH front door switch ON signal is input.
The auto light delay off timer is activated as the following:

- When the door switch signal changes from ON to OFF while the timer is activated, the timer in operation is discontinued and the 45 second timer is reset.
- When the door switch signal changes from OFF to ON while the timer is activated, the timer is discontinued and the 45 second timer is reset.
- When the one of four door switch signals changes from OFF to ON while the timer is activated, the timer is discontinued and the 5 minute timer is reset.
- When all the door switch ON signals are input while the timer is activated, the timer is discontinued and the 45 second timer is reset.

Exterior lamp battery saver control mode and auto light delay off timer period can be changed by the function setting of CONSULT-II (EL-46).
When the lighting switch is turned from OFF to 2ND after headlamps are turned to off by the battery saver control, ground is supply

- to smart entrance control unit terminals 20 and 58 from lighting switch terminal 11, and then
- to headlamp LH and RH relays terminal 2 from headlamp battery saver control unit terminals 21 and 59
- through smart entrance control unit terminals 22 and 60, and
- through lighting switch terminal 12.

Then headlamps illuminate again.

AUTO LIGHT OPERATION

NFEL0204S05

For auto light operation, refer to "HEADLAMP" (EL-39).

DAYTIME LIGHT OPERATION

NFEL0204S03

With the engine running, the lighting switch in the OFF or 1ST position and parking brake released, power is supplied

- through daytime light control unit terminal 7
- to terminal 4 of RH headlamp
- through terminal 5 of RH headlamp
- to daytime light control unit terminal 9
- through daytime light control unit terminal 6
- to terminal 4 of LH headlamp.

Ground is supplied to terminal 5 of LH headlamp.

- through daytime light control unit terminal 16
- through body grounds E11, E22 and E53.

Because the high beam headlamps are now wired in series, they operate at half illumination.

OPERATION

NFEL0204S04

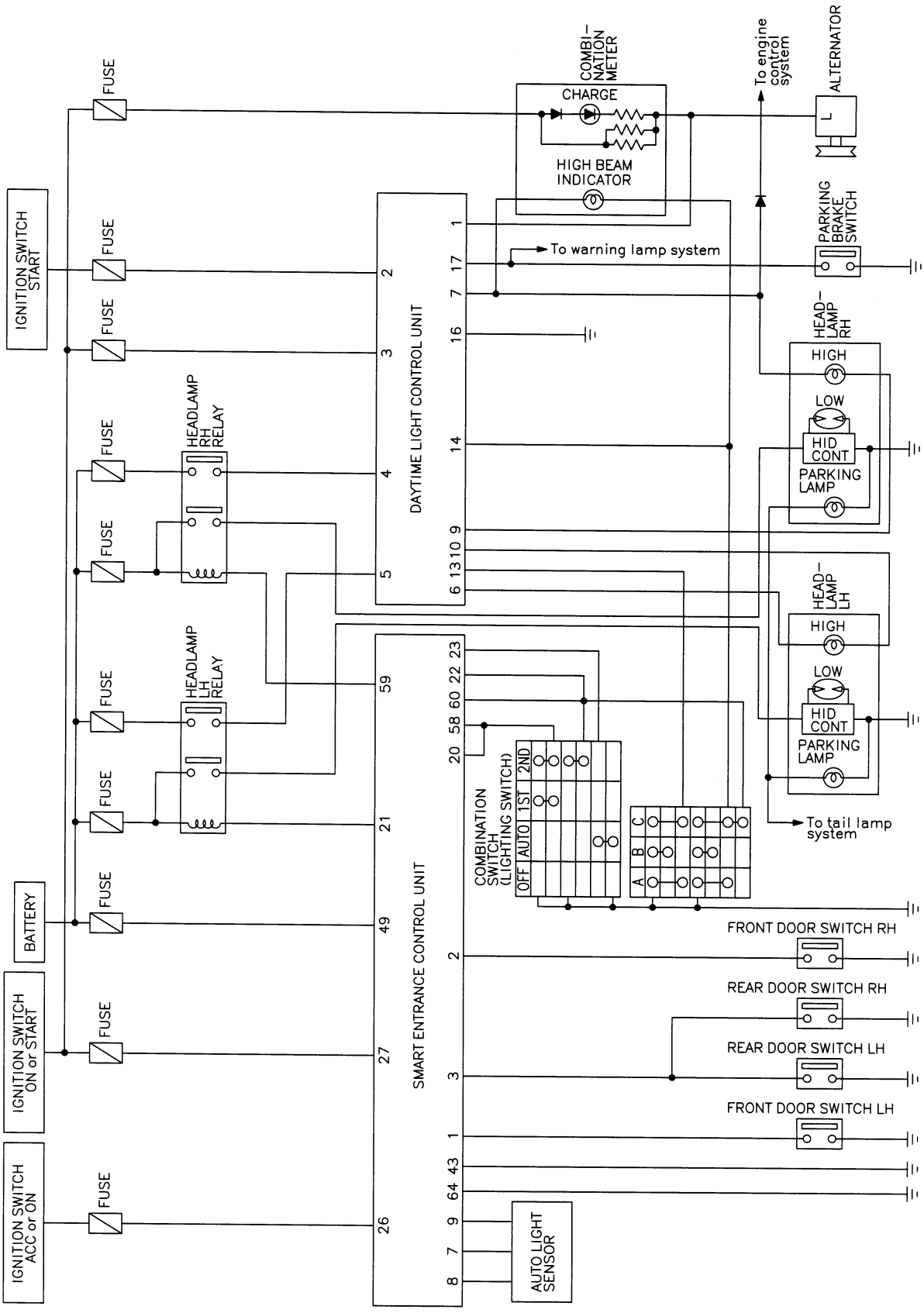
After starting the engine with the lighting switch in the "OFF" or "1ST" position, the headlamp high beam automatically turns on. Lighting switch operations other than the above are the same as conventional light systems.

Engine		With engine stopped									With engine running								
Lighting switch		OFF			1ST			2ND			OFF			1ST			2ND		
		A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Headlamp	High beam	X	X	X	X	X	O	O	X	O	△*	△*	O	△*	△*	O	O	X	O
	Low beam	X	X	X	X	X	O	O	O	O	X	X	X	X	X	O	O	O	O
Clearance and tail lamp		X	X	X	O	O	O	O	O	O	X	X	X	O	O	O	O	O	O
License and instrument illumination lamp		X	X	X	O	O	O	O	O	O	X	X	X	O	O	O	O	O	O

A: "HIGH BEAM" position
B: "LOW BEAM" position
C: "FLASH TO PASS" position
O : Lamp "ON"
X : Lamp "OFF"
△ : Lamp dims. (Added functions)
*: When starting the engine with the parking brake released, the daytime light will come ON.
When starting the engine with the parking brake pulled, the daytime light won't come ON.

Schematic

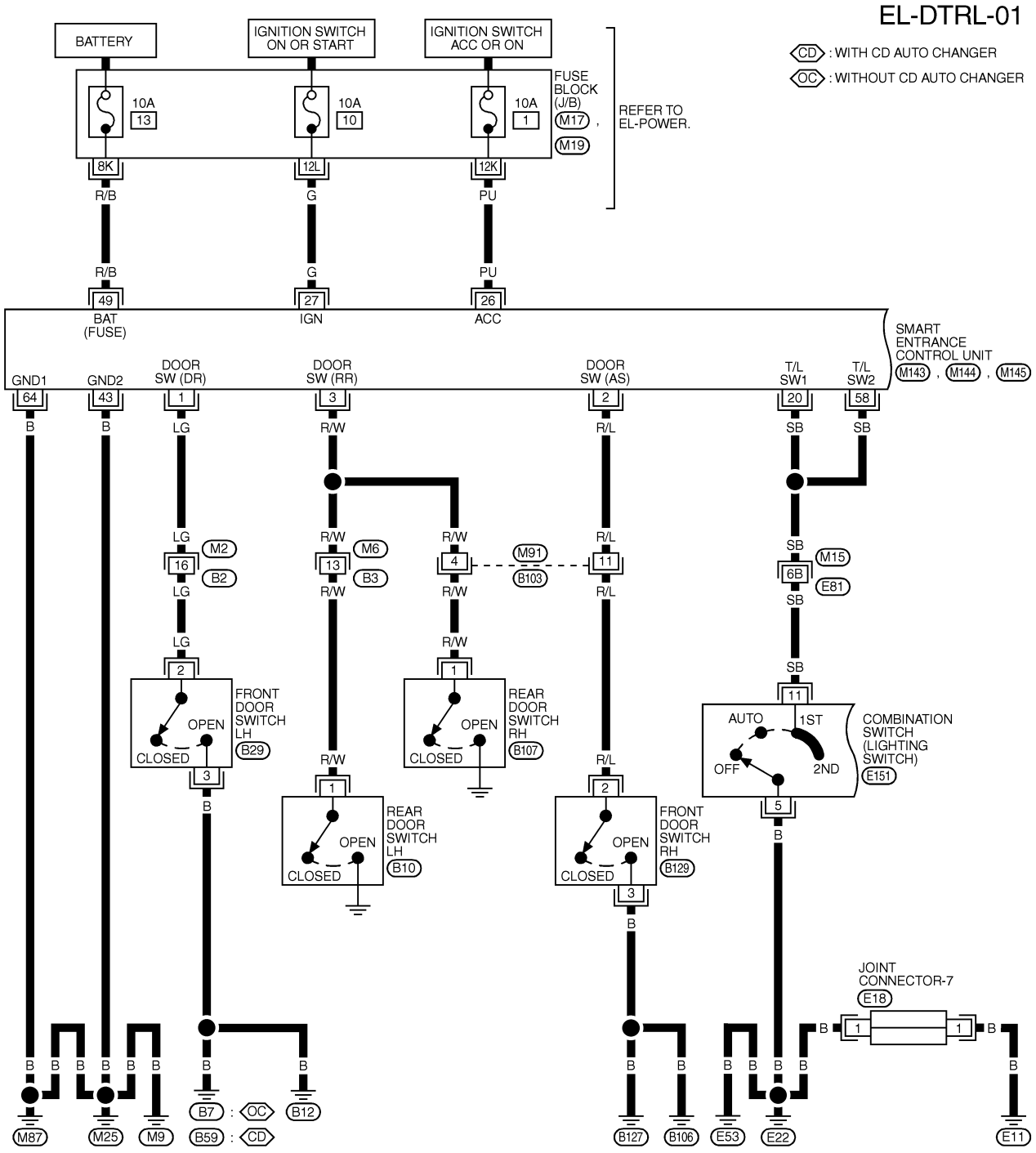
NFEL0205

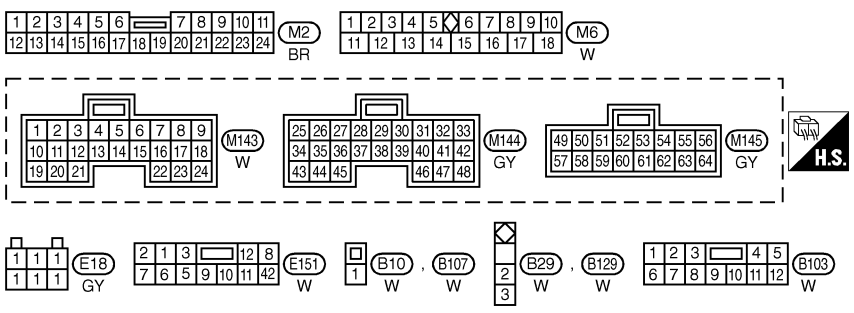


MEL717P

Wiring Diagram — DTRL —

NFEL0020



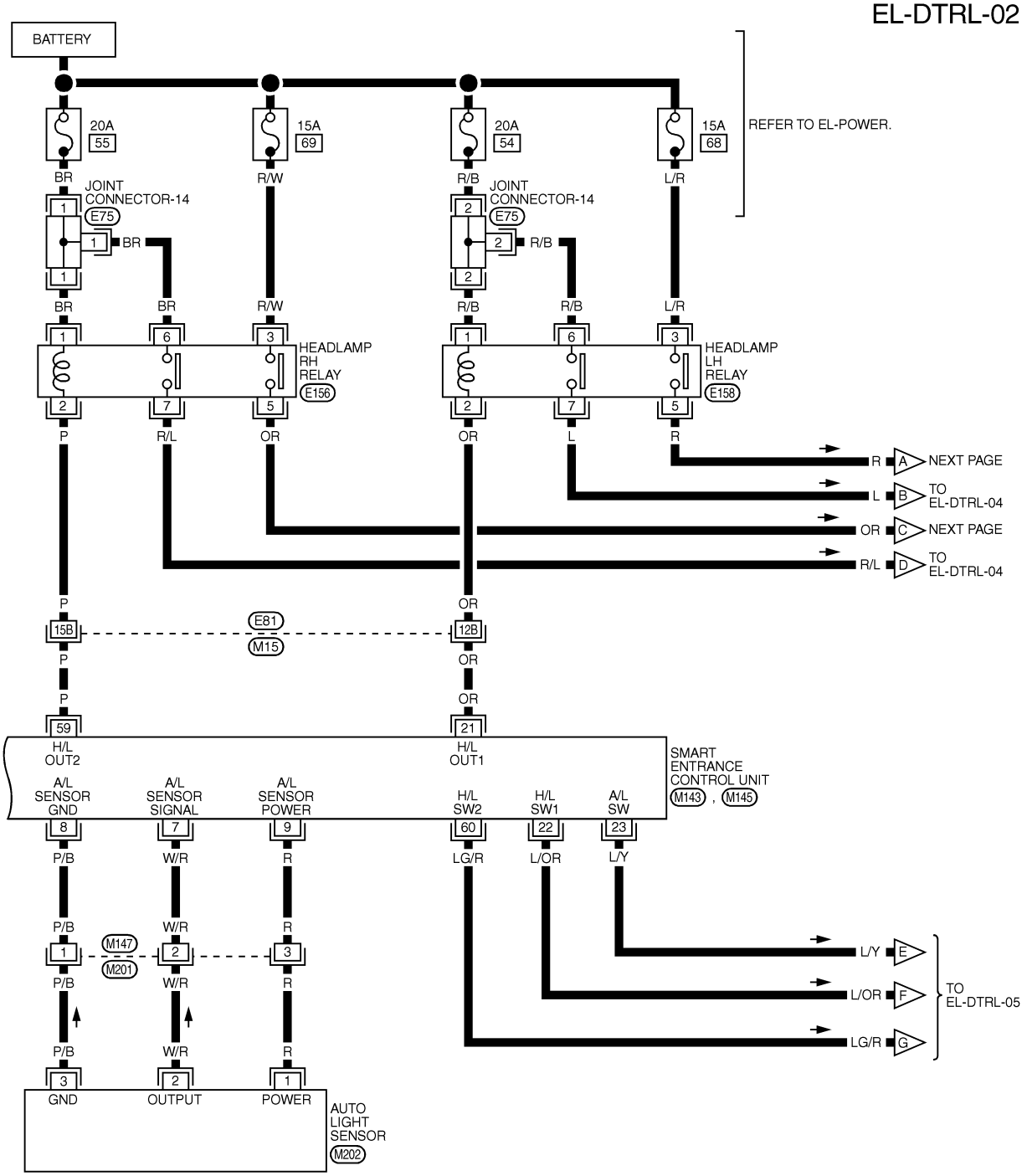


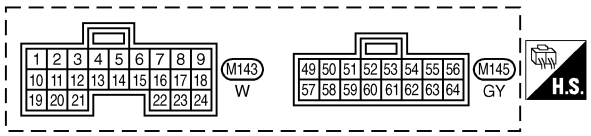
REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)
M17 , M19 -FUSE BLOCK-JUNCTION BOX (J/B)

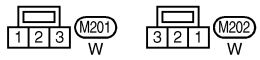
MEL718P

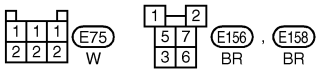
Wiring Diagram — DTRL — (Cont'd)

EL-DTRL-02





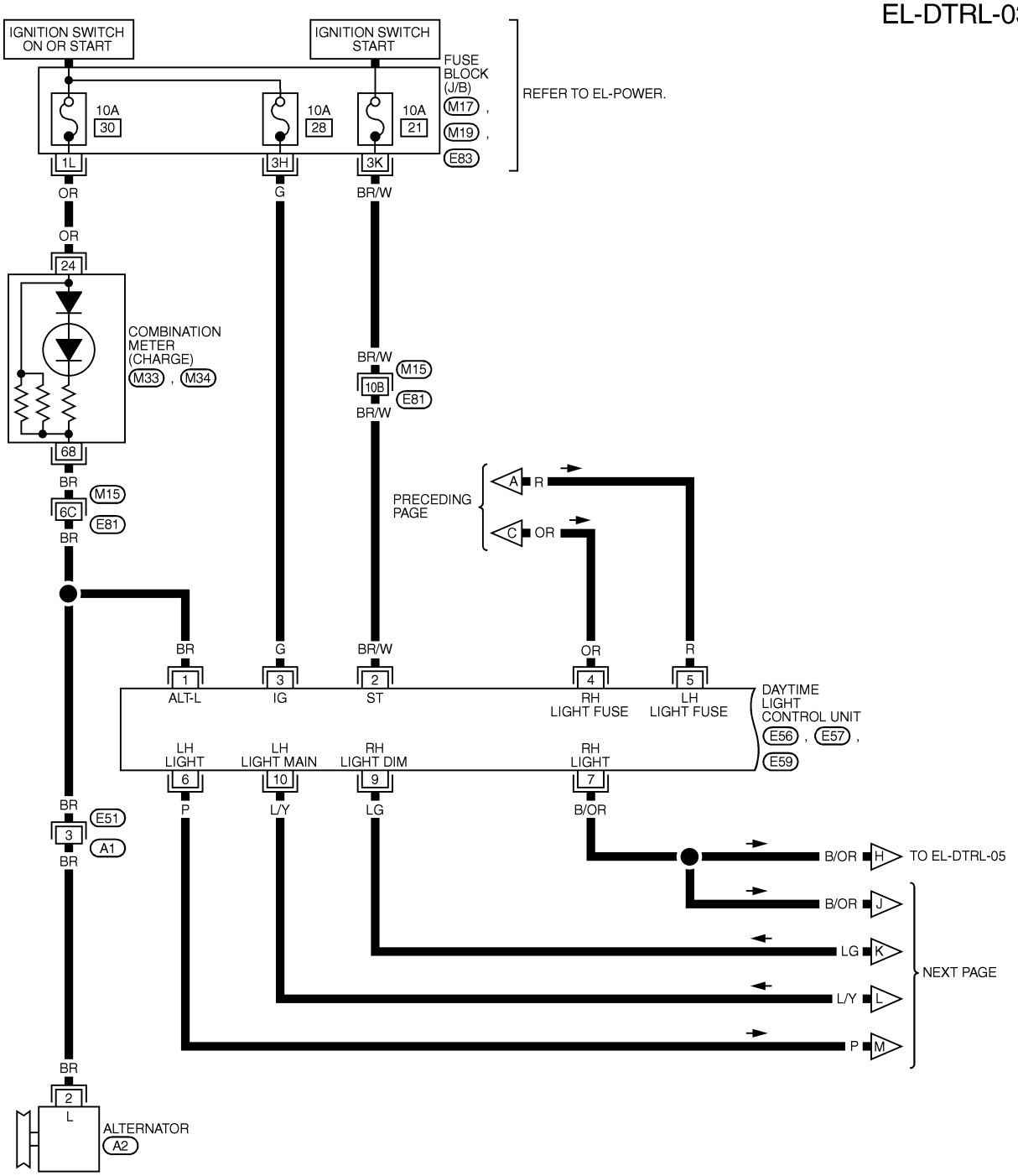


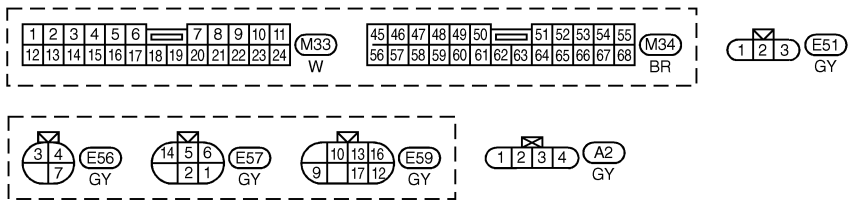


REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)

MEL096O

EL-DTRL-03

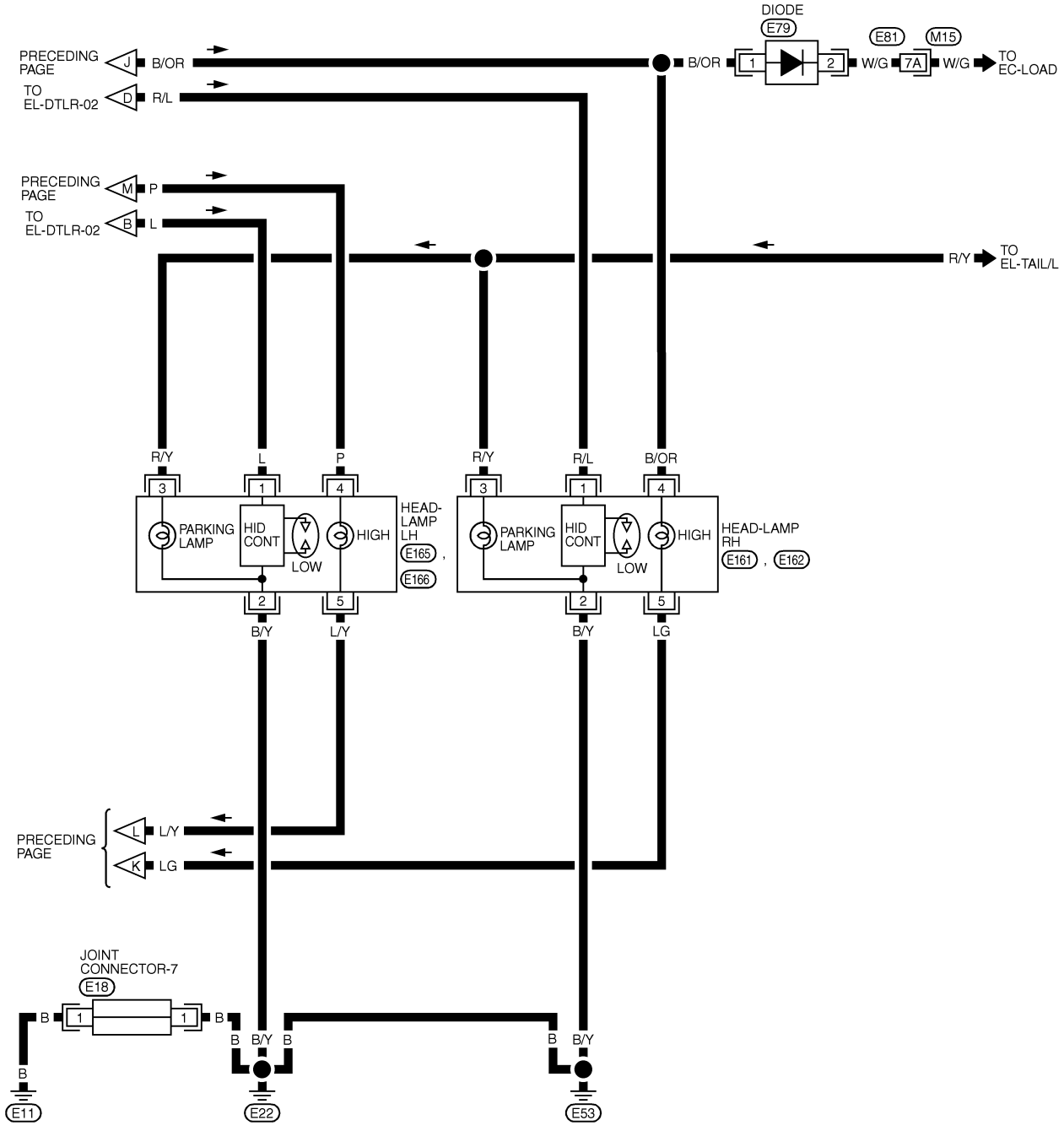


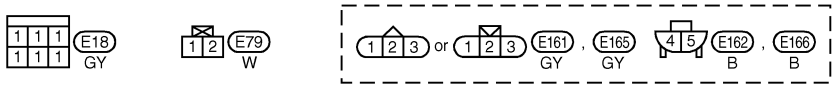


REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)
M17 , M19 , E83
-FUSE BLOCK- JUNCTION BOX (J/B)

MEL719P

EL-DTRL-04

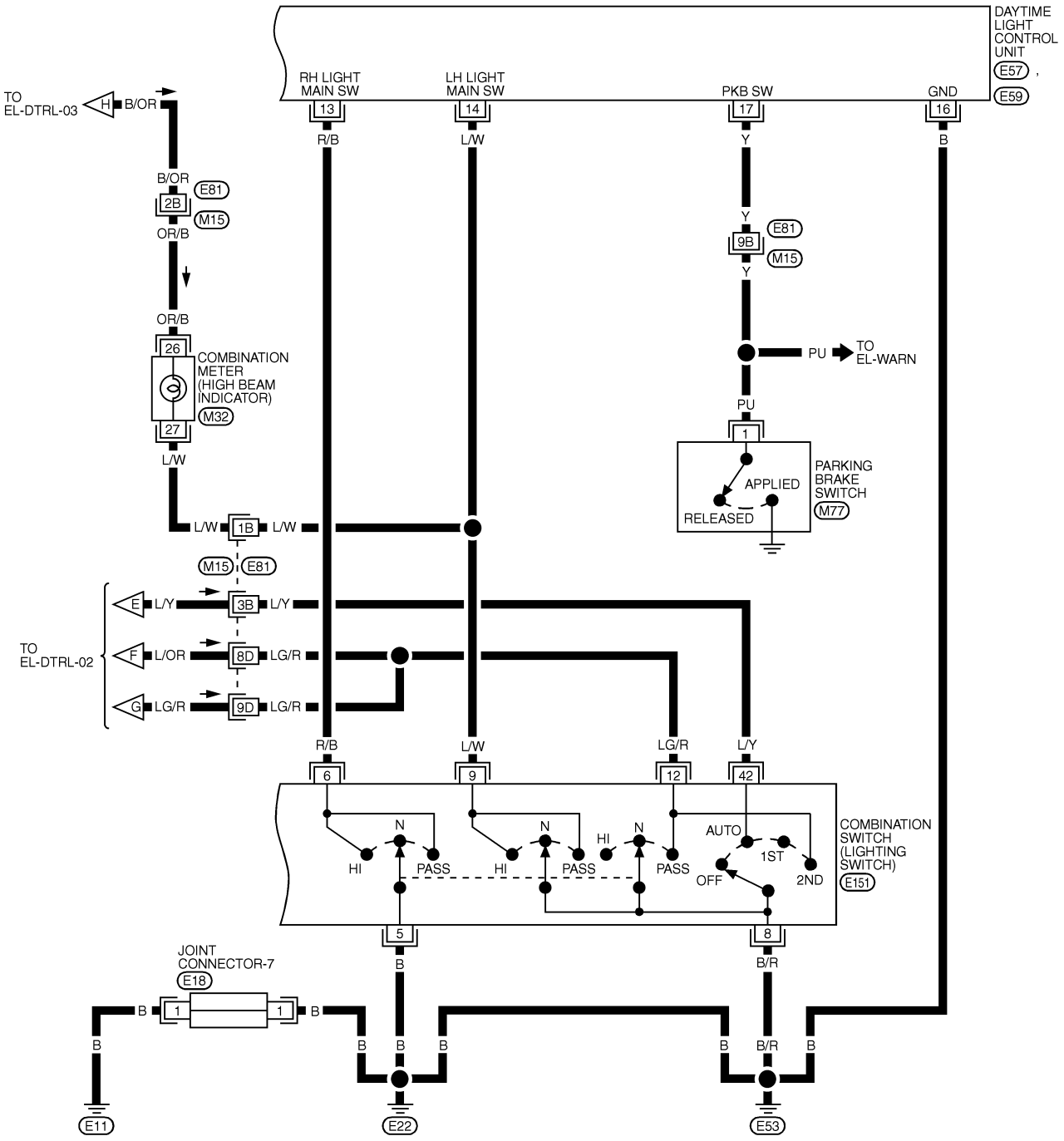


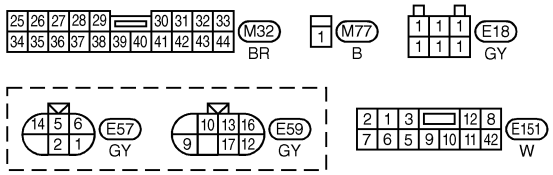


REFER TO THE FOLLOWING.
M15 - SUPER MULTIPLE JUNCTION (SMJ)

MEL827P

EL-DTRL-05





REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)

MEL757P

Trouble Diagnoses

NFEL0206

WARNING:

- **The xenon headlamp has a high-tension current generating area. Be extremely careful when removing and installing. Be certain to disconnect the battery negative cable prior to removing or installing.**
- **When the xenon headlamp is lit, do not touch the harness (covered with red or amber insulation), bulb itself or the bulb socket with your bare hands.**
- **Never service a xenon headlamp with wet hands.**
- **When checking body side harness with a circuit tester, be certain to disconnect the harness connector from the xenon headlamp.**
- **When the xenon headlamp is lit, the xenon bulb must be installed in the headlamp housing. (Never turn on xenon headlamp, if the bulb is out of the headlamp housing.)**

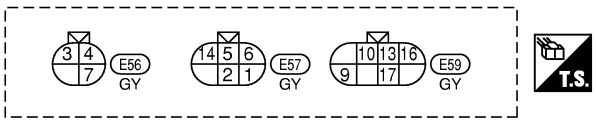
CAUTION:

Make sure to install the bulb securely; if the xenon bulb is improperly installed in its socket, high-tension current leaks occur. This may lead to a melted bulb and/or bulb socket.

Symptom	Possible cause	Repair order
Neither headlamp operates.	1. 10A fuse 2. Lighting switch 3. Smart entrance control unit	1. Check 10A fuse [No. 13, located in fuse block (J/B)]. Verify battery positive voltage is present at terminal 49 of smart entrance control unit. 2. Check Lighting switch. 3. Check smart entrance control unit. (EL-350)
LH headlamp (low and high beam) does not operate, but RH headlamp (low and high beam) does operate.	1. 20A fuse 2. Headlamp LH relay 3. Headlamp LH relay circuit 4. Lighting switch circuit 5. Smart entrance control unit	1. Check 20A fuse (No. 54, located in fuse and fusible link box). Verify battery positive voltage is present at terminals 1 and 6 of headlamp LH relay. 2. Check headlamp LH relay. 3. Check harness between headlamp LH relay and smart entrance control unit. 4. Check harness between smart entrance control unit and lighting switch. 5. Check smart entrance control unit. (EL-350)
RH headlamp (low and high beam) does not operate, but LH headlamp (low and high beam) does operate.	1. 20A fuse 2. Headlamp RH relay 3. Headlamp RH relay circuit 4. Lighting switch circuit 5. Smart entrance control unit	1. Check 20A fuse (No. 55, located in fuse and fusible link box). Verify battery positive voltage is present at terminals 1 and 6 of headlamp RH relay. 2. Check headlamp RH relay. 3. Check harness between headlamp RH relay and smart entrance control unit. 4. Check harness between smart entrance control unit and lighting switch. 5. Check smart entrance control unit. (EL-350)
LH high beam does not operate, but LH low beam operates.	1. Bulb 2. 15A fuse 3. Headlamp LH relay 4. Headlamp LH relay circuit 5. Headlamp LH high beams circuit 6. Lighting switch 7. Lighting switch circuit 8. Daytime light control unit	1. Check bulb. 2. Check 15A fuse (No. 68, located in fuse and fusible link box). Verify battery positive voltage is present at terminal 3 of headlamp LH relay. 3. Check headlamp LH relay. 4. Check harness between headlamp LH relay and daytime light control unit. 5. Check harness between LH headlamp and lighting switch. 6. Check lighting switch. 7. Check the following. a. Harness between daytime light control unit and lighting switch b. Harness between lighting switch and ground 8. Check daytime light control unit.

Symptom	Possible cause	Repair order
LH low beam does not operate, but LH high beam operates.	1. Headlamp relay LH 2. Open in the LH low beam circuit 3. LH low beam ground circuit 4. Xenon bulb 5. HID control unit	1. Check headlamp relay LH. 2. Check harness between headlamp relay LH terminal 7 and LH headlamp for open circuit. 3. Check harness between LH headlamp and ground. 4. Replace the xenon bulb with other side bulb or new one. (If headlamps illuminate correctly, replace the bulb.) 5. Replace the HID control unit with other side control unit or new one. (If headlamps illuminate correctly, replace the control unit.)
RH high beam does not operate, but RH low beam operates.	1. Bulb 2. 15A fuse 3. Headlamp RH relay 4. Headlamp RH relay circuit 5. Open in the RH high beams circuit 6. Lighting switch 7. Lighting switch circuit 8. Daytime light control unit	1. Check bulb. 2. Check 15A fuse (No. 69, located in fuse and fusible link box). Verify battery positive voltage is present at terminal 3 of headlamp RH relay. 3. Check headlamp RH relay. 4. Check harness between headlamp RH relay and daytime light control unit. 5. Check harness between RH headlamp and lighting switch. 6. Check lighting switch. 7. Check the following. a. Harness between daytime control unit and lighting switch b. Harness between lighting switch and ground 8. Check daytime light control unit.
RH low beam does not operate, but RH high beam operates.	1. Headlamp relay RH 2. Open in the RH low beam circuit 3. RH low beam ground circuit 4. Xenon bulb 5. HID control unit	1. Check headlamp relay RH. 2. Check harness between headlamp relay RH terminal 7 and RH headlamp for open circuit. 3. Check harness between RH headlamp and ground. 4. Replace the xenon bulb with other side bulb or new one. (If headlamps illuminate correctly, replace the bulb.) 5. Replace the HID control unit with other side control unit or new one. (If headlamps illuminate correctly, replace the control unit.)
High beam indicator does not work.	1. Bulb 2. Open in high beam circuit	1. Check bulb in combination meter. 2. Check the following. a. Harness between daytime light control unit and combination meter for an open circuit b. Harness between high beam indicator and lighting switch
Exterior lamp battery saver control does not operate properly.	1. Door switch LH or RH circuit 2. Smart entrance control unit	1. Check the following. a. Harness between smart entrance control unit and LH or RH door switch for open or short circuit b. LH or RH door switch ground circuit c. LH or RH door switch 2. Check smart entrance control unit. (EL-350)
Daytime light control does not operate properly.	1. Bulb 2. Fuse check 3. Parking brake switch 4. Parking brake switch circuit 5. Daytime control unit	1. Check bulb. 2. Check the following. a. 10A fuse [No. 28, located in fuse block (J/B)]. Verify battery positive voltage is present at terminal 3 of daytime light control unit. b. 10A fuse [No. 21, located in fuse block (J/B)]. Verify battery positive voltage is present at terminal 2 of daytime light control unit. 3. Check parking brake switch. 4. Check harness between parking brake switch and daytime light control unit. 5. Check daytime light control unit. (EL-62)

DAYTIME LIGHT CONTROL UNIT CONNECTOR



SEL584Y

DAYTIME LIGHT CONTROL UNIT INSPECTION TABLE

NFEL0206S01

Terminal No.	Wire color	Item	Condition		Voltage (Approximate values)
1	BR	Alternator		When turning ignition switch to "ON"	Less than 1V
				When engine is running	Battery voltage
				When turning ignition switch to "OFF"	Less than 1V
2	BR/W	Start signal		When turning ignition switch to "ST"	Battery voltage
				When turning ignition switch to "ON" from "ST"	Less than 1V
				When turning ignition switch to "OFF"	Less than 1V
3	G	Power source		When turning ignition switch to "ON"	Battery voltage
				When turning ignition switch to "ST"	Battery voltage
				When turning ignition switch to "OFF"	Less than 1V
4	OR	Power source		When turning ignition switch to "ON"	Battery voltage
				When turning ignition switch to "OFF"	Battery voltage
5	R	Power source		When turning ignition switch to "ON"	Battery voltage
				When turning ignition switch to "OFF"	Battery voltage

Terminal No.	Wire color	Item	Condition		Voltage (Approximate values)
6	P	LH hi beam		When lighting switch is turned to the 2ND position with "HI BEAM" position	Battery voltage
				When releasing parking brake with engine running and turning lighting switch to "OFF" (daytime light operation) **CAUTION:** **Block wheels and ensure selector lever is in N or P position.**	Approx. half battery voltage
7	B/OR	RH hi beam		When lighting switch is turned to the 2ND position with "HI BEAM" position	Battery voltage
				When releasing parking brake with engine running and turning lighting switch to "OFF" (daytime light operation) **CAUTION:** **Block wheels and ensure selector lever is in N or P position.**	Approx. half battery voltage
9	LG	RH hi beam (ground)		When lighting switch is turned to the 2ND position with "HI BEAM" position	Less than 1V
				When releasing parking brake with engine running and turning lighting switch to "OFF" (daytime light operation) **CAUTION:** **Block wheels and ensure selector lever is in N or P position.**	Approx. half battery voltage
10	L/Y	LH hi beam (ground)		When lighting switch is turned to the 2ND position with "HI BEAM" position	Less than 1V
				When releasing parking brake with engine running and turning lighting switch to "OFF" (daytime light operation) **CAUTION:** **Block wheels and ensure selector lever is in N or P position.**	Approx. half battery voltage
13 14	R/B L/W	Lighting switch (Hi beam)		When turning lighting switch to "HI BEAM"	Battery voltage
				When turning lighting switch to "FLASH TO PASS"	Battery voltage
16	B	Ground		—	—
17	Y	Parking brake switch		When parking brake is released	Battery voltage
				When parking brake is set	Less than 1.5V

Bulb Replacement

NFEL0022

Refer to "HEADLAMP (FOR USA)" (EL-48).

Aiming Adjustment

NFEL0023

Refer to “HEADLAMP (FOR USA)” (EL-50).

System Description

NFEL0256

The parking, license and tail lamp operation is controlled by the lighting switch which is built into the combination switch and smart entrance control unit. The battery saver system is controlled by the smart entrance control unit.

Power is supplied at all times

- to tail lamp relay terminals 1 and 3
- through 10A fuse (No. 60, located in the fuse and fusible link box), and
- to smart entrance control unit terminal 49
- through 10A fuse [No. 13, located in the fuse block (J/B)].

When ignition switch is in ON or START position, power is supplied

- to smart entrance control unit terminal 27
- through 10A fuse [No. 10, located in the fuse block (J/B)].

When the ignition switch is in the ACC or ON position, power is supplied

- to smart entrance control unit terminal 26
- through 10A fuse [No. 1, located in the fuse block (J/B)].

Ground is supplied to smart entrance control unit terminals 43 and 64

- through body grounds M9, M25 and M87.

LIGHTING OPERATION BY LIGHTING SWITCH

NFEL0256S01

When lighting switch is in 1ST (or 2ND) position, ground is supplied

- to tail lamp relay terminal 2 from smart entrance control unit terminals 19 and 57
- through smart entrance control unit terminals 20 and 58, and
- through lighting switch and body grounds E11, E22 and E53.
- to stop and tail lamp unit terminal 6
- through body grounds T6 and T8.

Tail lamp relay is energized and power is supplied

- to stop and tail lamp unit terminal 4
- through tail lamp relay terminal 5
- to each rear combination lamp terminals 1
- through stop and tail lamp unit terminal 3.

When the tail lamp illuminates, ground is supplied

- through body grounds T6 and T8
- to each rear combination lamp terminal 6.

Tail lamp relay is then energized and the parking, license, side marker and tail lamps illuminate.

LIGHTING OPERATION BY AUTO LIGHT CONTROL SYSTEM

NFEL0256S02

When lighting switch is in AUTO position, ground is supplied

- to tail lamp relay terminal 2 from smart entrance control unit terminals 19 and 57
- through smart entrance control unit terminals 43 and 64, and
- to body grounds M9, M25 and M87.

Tail lamp relay is then energized and the parking, license, side marker and tail lamps illuminate.

EXTERIOR LAMP BATTERY SAVER CONTROL

NFEL0256S03

While parking, license, side maker and tail lamps are turned ON by “1ST” or “2ND” of lighting switch, the 5 minutes timer is activated when the ignition switch is turned from ON (or START) to OFF (ACC OFF).

Continuity between terminals 19 and 20, and between terminals 57 and 58 of smart entrance control unit will be disturbed after 5 minutes, then the headlamps will be turned off.

Then the parking, license, side marker and tail lamps are turned off.

While the headlamp is turned ON by “AUTO” of lighting switch, the 5 minute timer is activated when the ignition switch signal changes from ON (or START) to OFF (ACC OFF), and either one of LH or RH front door switch ON signal is input.

The auto light delay off timer is activated as the following:

- When the door switch signal changes from ON to OFF while the timer is activated, the timer in operation is discontinued and the 45 second timer is reset.

- When the door switch signal changes from OFF to ON while the timer is activated, the timer is discontinued and the 45 second timer is reset.
- When the one of four door switch signals changes from OFF to ON while the timer is activated, the timer is discontinued and the 5 minute timer is reset.
- When all the door switch ON signals are input while the timer is activated, the timer is discontinued and the 45 second timer is reset.

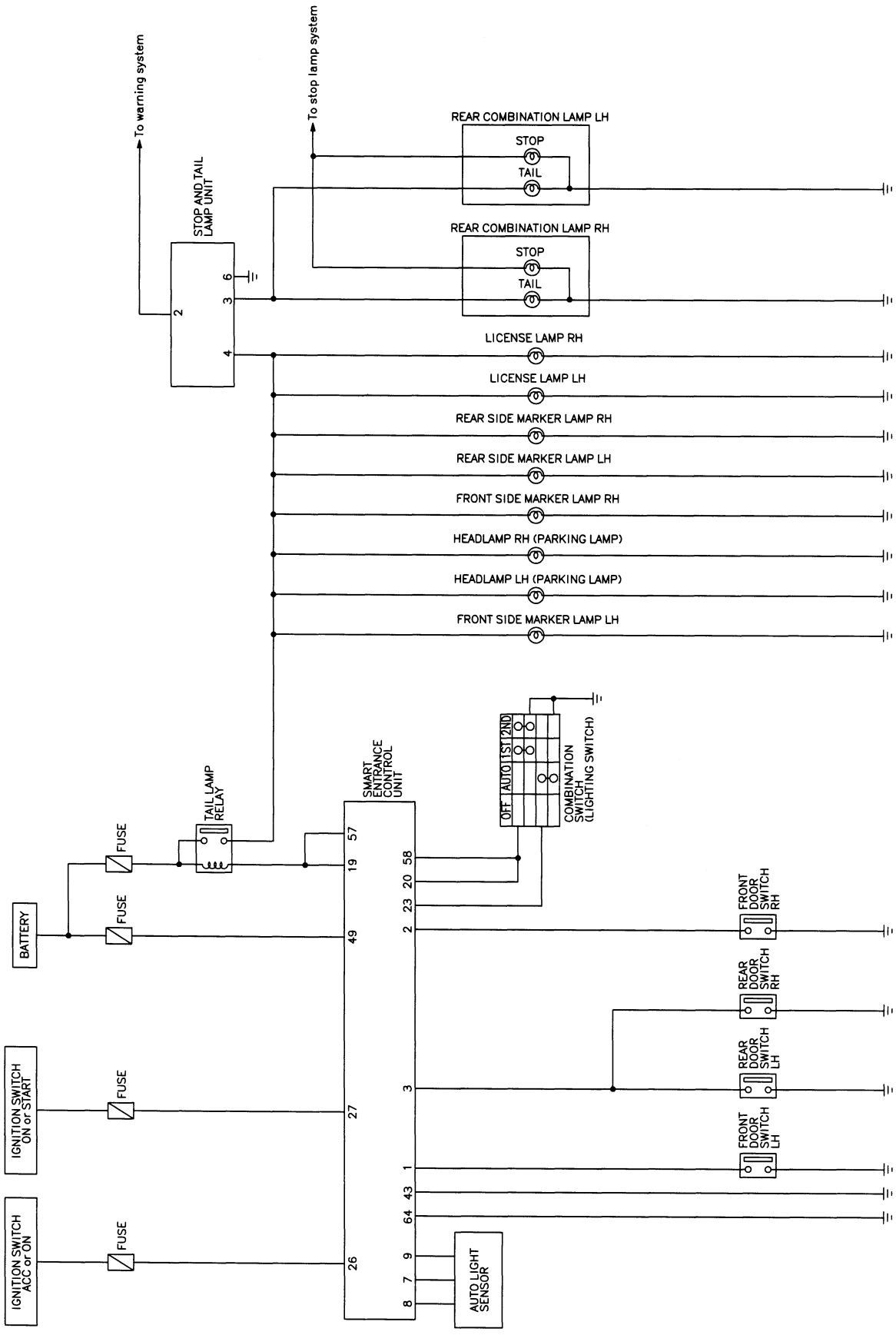
Exterior lamp battery saver control mode and auto light delay off timer period can be changed by the function setting of CONSULT-II (EL-46).
When the lighting switch is turned from OFF to 1ST (or 2ND) after the parking, license, side marker and tail lamps are turned off by the battery saver control, ground is supplied.

- to smart entrance control unit terminals 20 and 58 from lighting switch terminal 11, and
- to tail lamp relay terminal 2 from smart entrance control unit terminals 19 and 57.

Then the parking, license, side marker and tail lamps illuminate again.

Schematic

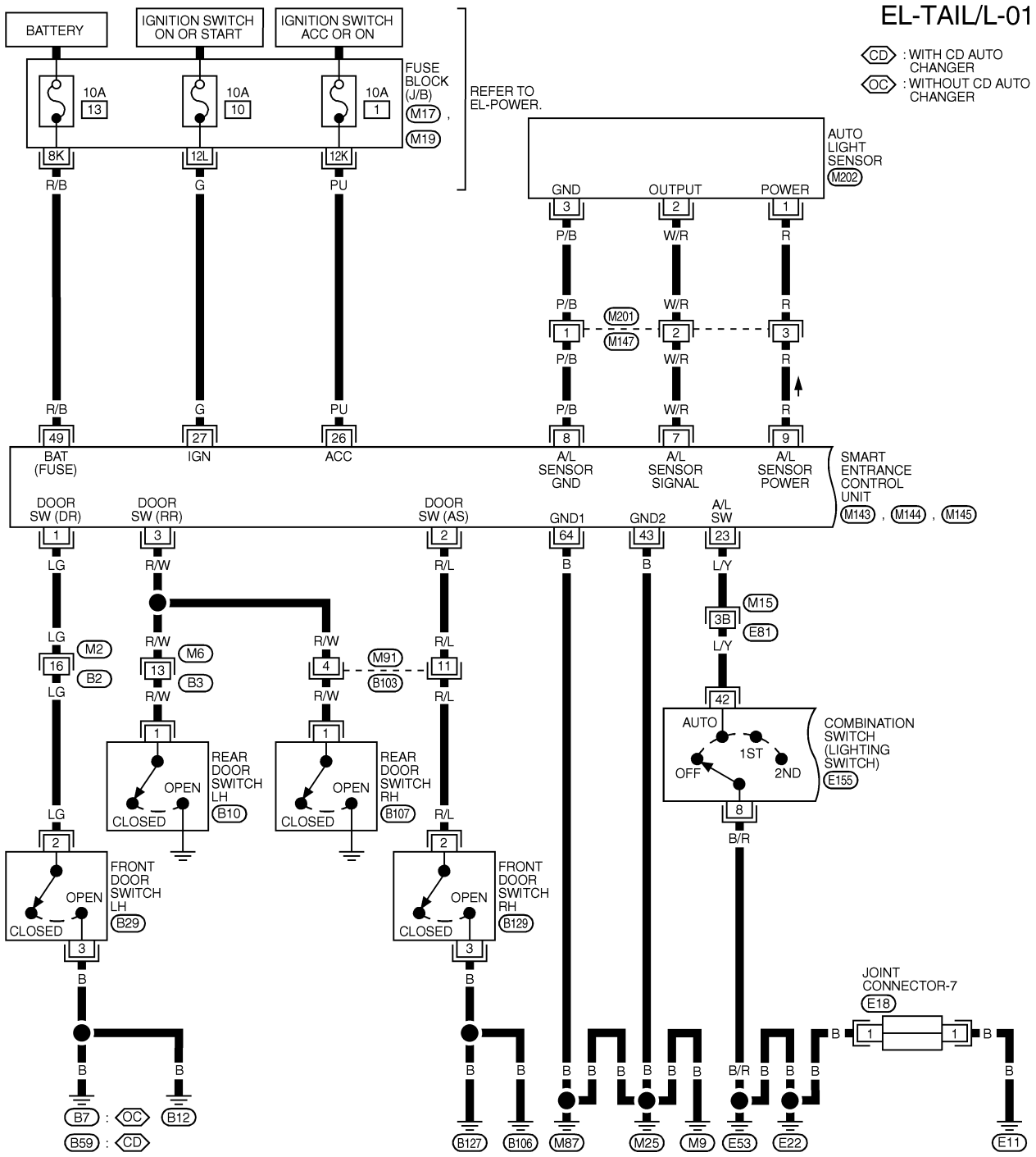
NFEL0208

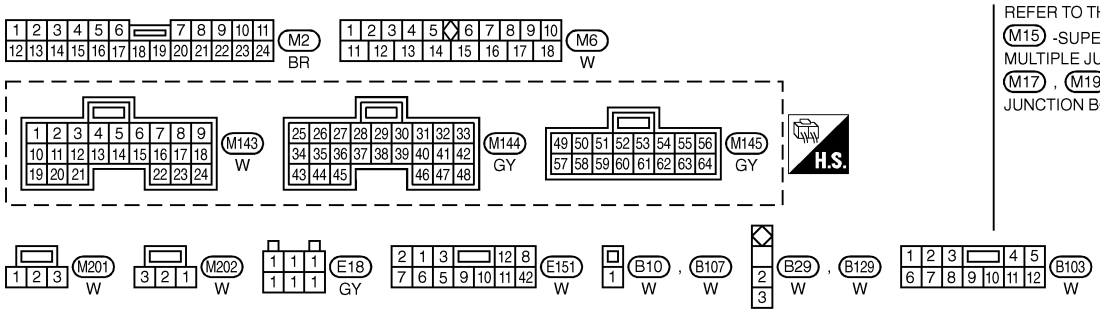


MEL721P

Wiring Diagram — TAIL/L —

NFEL0024

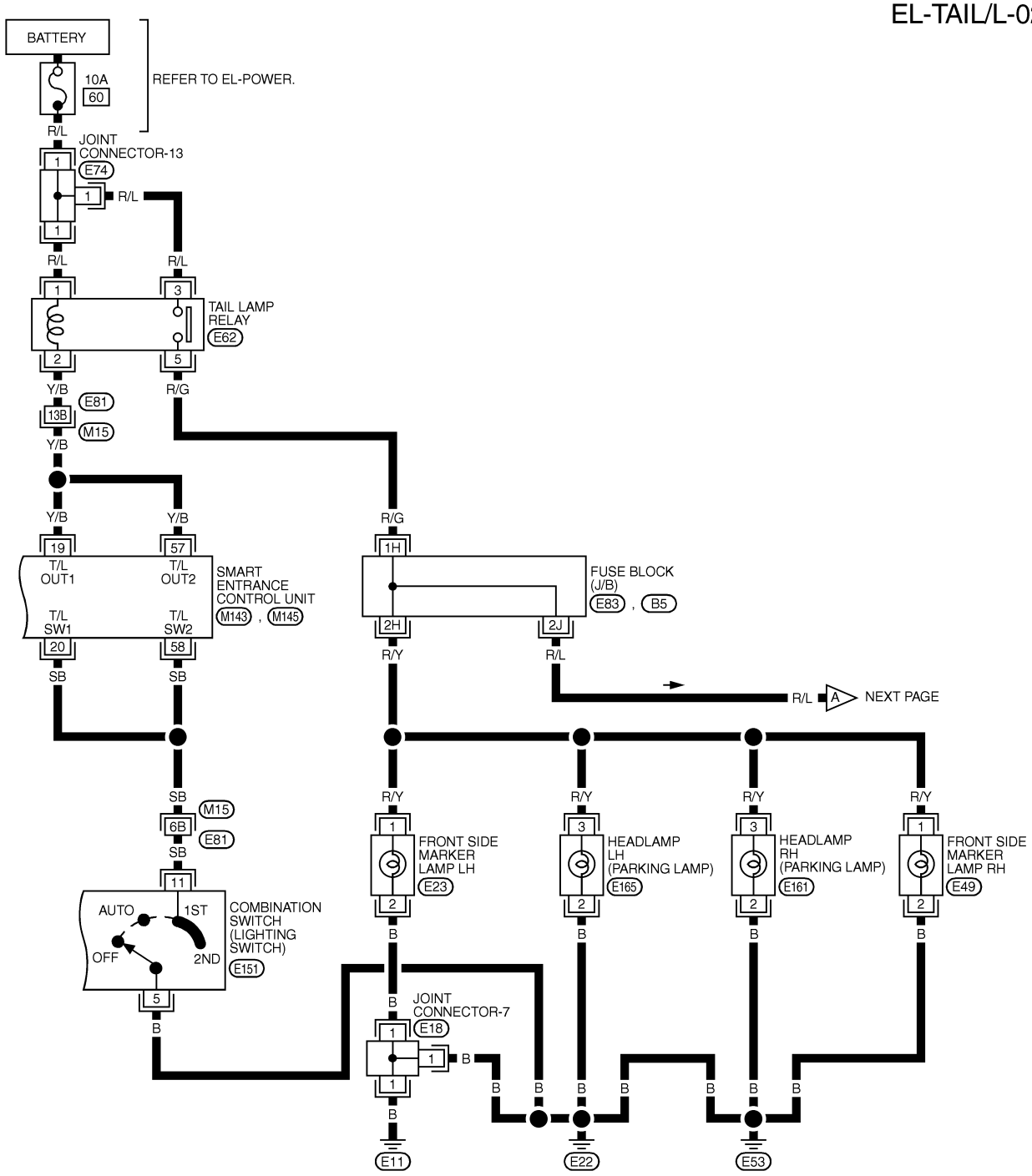


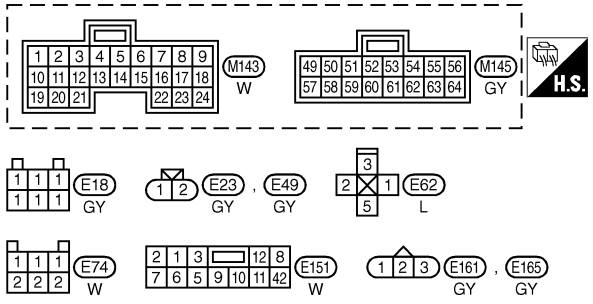


REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)
M17 , M19 -FUSE BLOCK-JUNCTION BOX (J/B)

MEL722P

EL-TAIL/L-02



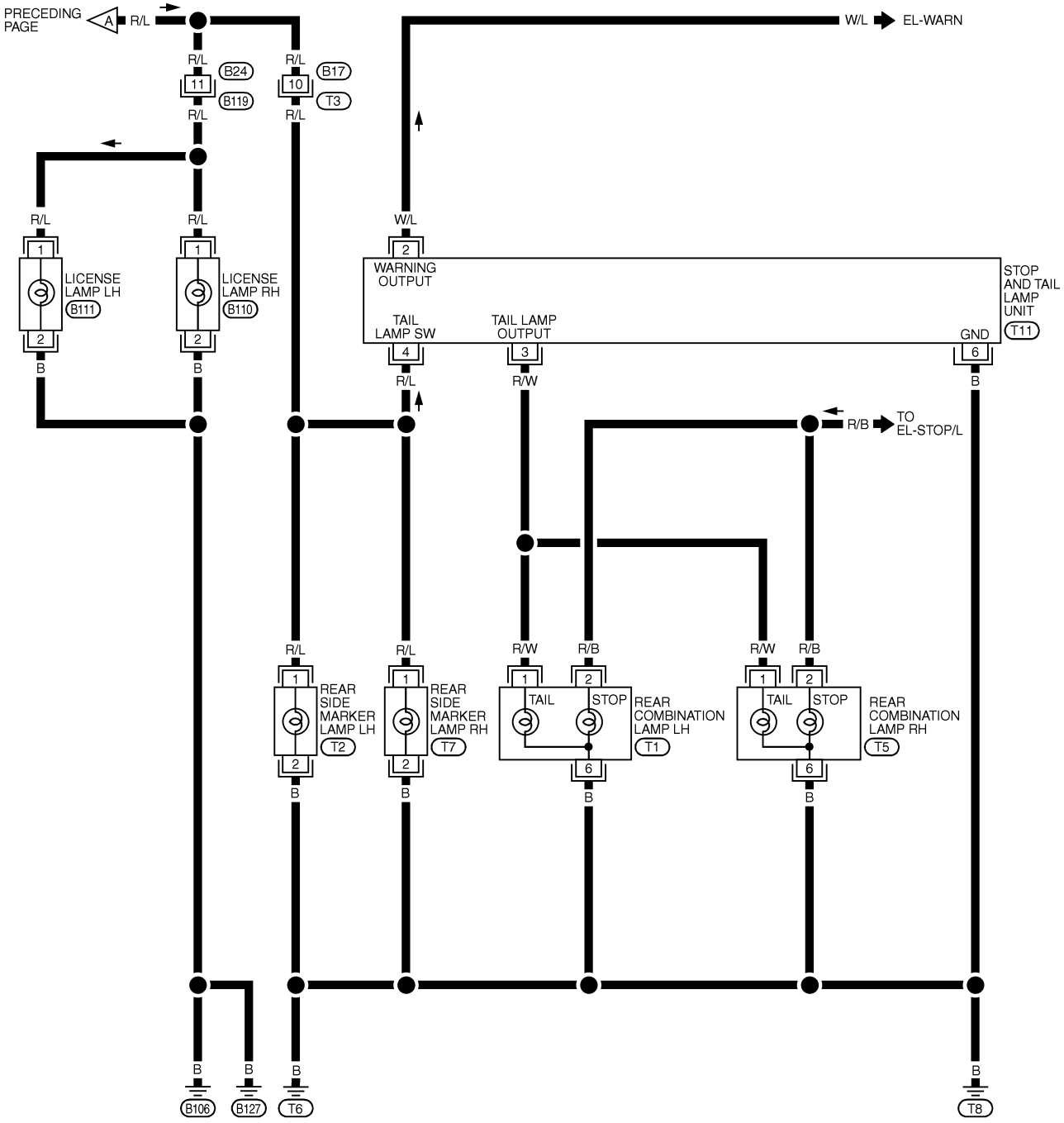


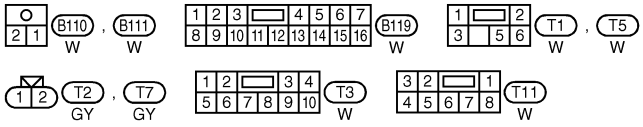
REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)
E83 , B5 -FUSE BLOCK-JUNCTION BOX (J/B)

MEL102O

Wiring Diagram — TAIL/L — (Cont'd)

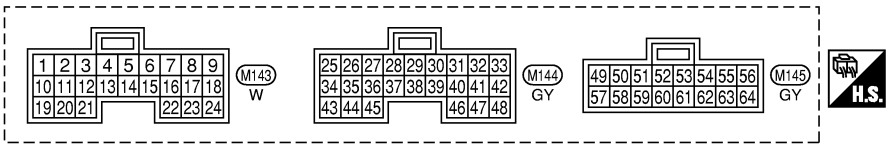
EL-TAIL/L-03





MEL103O

SMART ENTRANCE CONTROL UNIT CONNECTOR



SMART ENTRANCE CONTROL UNIT TERMINALS AND REFERENCE VALUE BETWEEN EACH TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION			DATA (DC)
1	LG	DRIVER DOOR SWITCH	OFF (CLOSED) → ON (OPEN)			12V → 0V
2	R/L	PASSENGER DOOR SWITCH	OFF (CLOSED) → ON (OPEN)			5V → 0V
3	R/W	REAR DOOR SWITCH	OFF (CLOSED) → ON (OPEN)			5V → 0V
7	W/R	AUTO LIGHT SENSOR (SIGNAL)	IGNITION SWITCH "ON" POSITION	LIGHT IS APPLIED TO AUTO LIGHT SENSOR		1 TO 5V
				LIGHT IS NOT APPLIED TO AUTO LIGHT SENSOR		LESS THAN 1V
8	P/B	AUTO LIGHT SENSOR (GND)	–			–
9	R	AUTO LIGHT SENSOR (POWER)	IGNITION SWITCH (OFF → ON)			0V → 5V
19	Y/B	TAIL LAMP RELAY (Out put)	IGNITION SWITCH (WITH LIGHTING SWITCH 1ST OR 2ND)	ON OR START → OFF	MORE THAN 5 MINUTES	12V
					WITHIN 5 MINUTES	0V
				ON OR START		0V
			HEADLAMPS ILLUMINATE BY AUTO LIGHT CONTROL (OPERATE → NOT OPERATE)			LESS THAN 1V → 12V
20	SB	TAIL LAMP SWITCH	LIGHTING SWITCH (OFF OR AUTO → 1ST OR 2ND POSITION)			12V → 0V
23	L/Y	HEADLAMP SWITCH	IGNITION SWITCH "ON" POSITION	LIGHTING SWITCH (EXCEPT AUTO → AUTO POSITION)		12V → 0V
26	PU	IGNITION SWITCH (ACC)	"ACC" POSITION			12V
27	G	IGNITION SWITCH (ON)	IGNITION SWITCH IS IN "ON" POSITION			12V
43	B	GROUND	–			–
49	R/B	POWER SOURCE (FUSE)	–			12V
57	Y/B	TAIL LAMP RELAY	IGNITION SWITCH (WITH LIGHTING SWITCH 1ST OR 2ND)	ON OR START → OFF	MORE THAN 5 MINUTES	12V
					WITHIN 5 MINUTES	0V
				ON OR START		0V
			HEADLAMPS ILLUMINATE BY AUTO LIGHT CONTROL (OPERATE → NOT OPERATE)			LESS THAN 1V → 12V
58	SB	TAIL LAMP SWITCH	LIGHTING SWITCH (OFF OR AUTO → 1ST OR 2ND POSITION)			12V → 0V
64	B	GROUND	–			–

SEL585Y

NOTE:
For CONSULT-II Inspection Procedure, refer to "HEADLAMP (FOR USA)" (EL-45).
For CONSULT-II Application Items, refer to "HEADLAMP (FOR USA)" (EL-46).

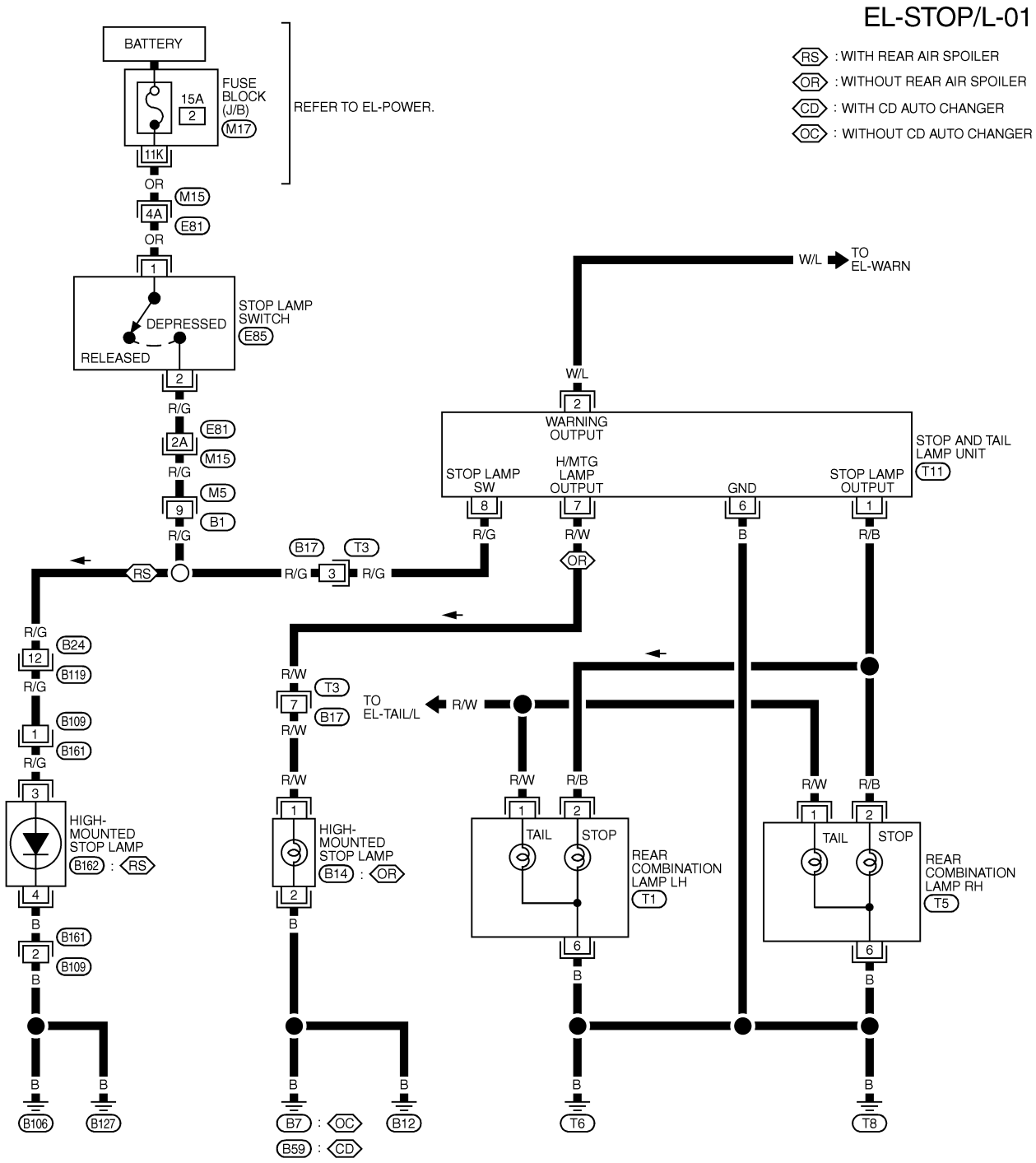
Trouble Diagnoses

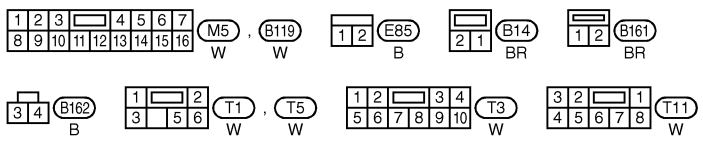
=NFEL0257

Symptom	Possible cause	Repair order
No lamps operate (including headlamps).	1. 10A fuse 2. Lighting switch 3. Smart entrance control unit	1. Check 10A fuse [No. 13, lacated in fuse block (J/B)]. Verify battery positive voltage is present at terminal 49 of smart entrance control unit. 2. Check lighting switch. 3. Check smart entrance control unit. (EL-350)
No parking, side marker, license and tail lamps operate, but headlamps do operate.	1. 10A fuse 2. Tail lamp relay 3. Tail lamp relay circuit 4. Lighting switch 5. Lighting switch circuit 6. Smart entrance control unit	1. Check 10A fuse (No. 60, located in fuse and fusible link box). Verify battery positive voltage is present at terminals 1 and 3 of tail lamp relay. 2. Check tail lamp relay. 3. Check harness between smart entrance control unit terminals 19 and 57 and tail lamp relay terminal 2. Check harness between tail lamp relay terminal 5 and ground. 4. Check lighting switch. 5. Check harness between lighting switch terminal 11 and smart entrance control unit terminals 20 and 58. Check harness between lighting switch terminal 5 and ground. 6. Check smart entrance control unit. (EL-350)
Tail lamp only does not operate.	1. Tail lamp relay circuit 2. Rear combination lamp circuit 3. Stop and tail lamp unit	1. Check harness between tail lamp relay terminal 5 and stop and tail lamp unit terminal 4. 2. Check harness between each rear combination lamp terminal 1 and stop and tail lamp unit terminal 3. 3. Check stop and tail lamp unit.
Exterior lamp battery saver control does not operate properly.	1. Door switch LH or RH circuit 2. Smart entrance control unit	1. Check the following. a. Harness between smart entrance control unit and LH or RH door switch for open or short circuit b. LH or RH door switch ground circuit c. LH or RH door switch 2. Check smart entrance control unit. (EL-350)

Wiring Diagram — STOP/L —

NFEL0025



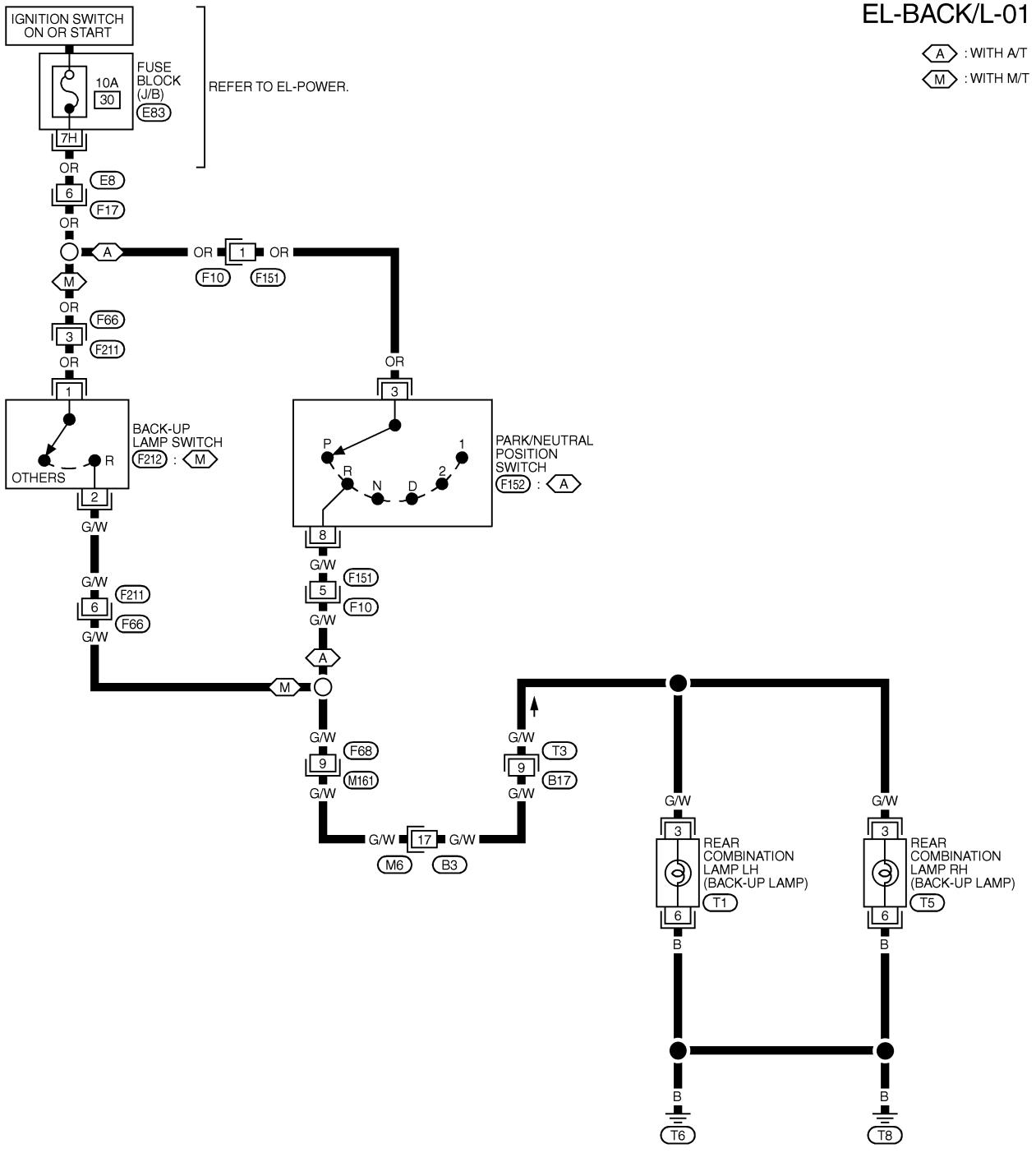


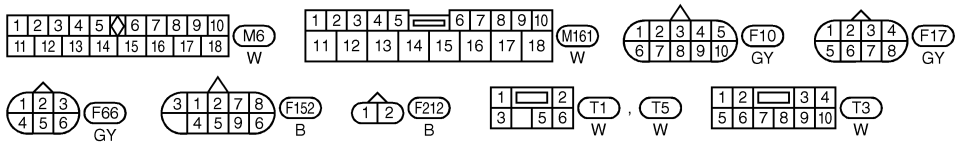
REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)
M17 -FUSE BLOCK-JUNCTION BOX (J/B)

MEL104O

Wiring Diagram — BACK/L —

NFEL0026





REFER TO THE FOLLOWING.
E83 -FUSE BLOCK-JUNCTION BOX (J/B)

MEL723P

System Description

NFEL0164

OUTLINE

NFEL0164S01

Power is supplied at all times
- to headlamp LH relay terminals 1 and 6
- through 20A fuse (No. 54, located in the fuse and fusible link box) and
- to smart entrance control unit terminal 49
- through 10A fuse [No. 13, located in the fuse block (J/B)], and
- to front fog lamp relay terminal 3
- through 15A fuse [No. 6, located in the fuse block (J/B)].

When ignition switch is in ON or START position, power is supplied
- to smart entrance control unit terminal 27
- through 10A fuse [No. 10, located in the fuse block (J/B)].

When the ignition switch is in the ACC or ON position, power is supplied
- to smart entrance control unit terminal 26
- through 10A fuse [No. 1, located in the fuse block (J/B)].

Ground is supplied to smart entrance control unit terminals 43 and 64.
When lighting switch is in 2ND position, ground is supplied
- to headlamp LH relay terminal 2 from smart entrance control unit terminal 21.
- through smart entrance control unit terminals 22 and 60, and
- through lighting switch, and body grounds E11, E22 and E53.

Headlamp LH relay is then energized.

FOG LAMP OPERATION

NFEL0164S02

The fog lamp switch is built into the combination switch. The lighting switch must be in the 2ND position for fog lamp operation.
With the fog lamp switch in the ON position, ground is supplied
- to fog lamp relay terminal 2
- through the fog lamp switch and body grounds E11, E22 and E53.

The fog lamp relay is energized and power is supplied
- from fog lamp relay terminal 5
- to terminal 2 of each fog lamp.

Ground is supplied to terminal 1 of each fog lamp through body grounds E11, E22 and E53.
With power and ground supplied, the fog lamps illuminate.

EXTERIOR LAMP BATTERY SAVER CONTROL

NFEL0164S03

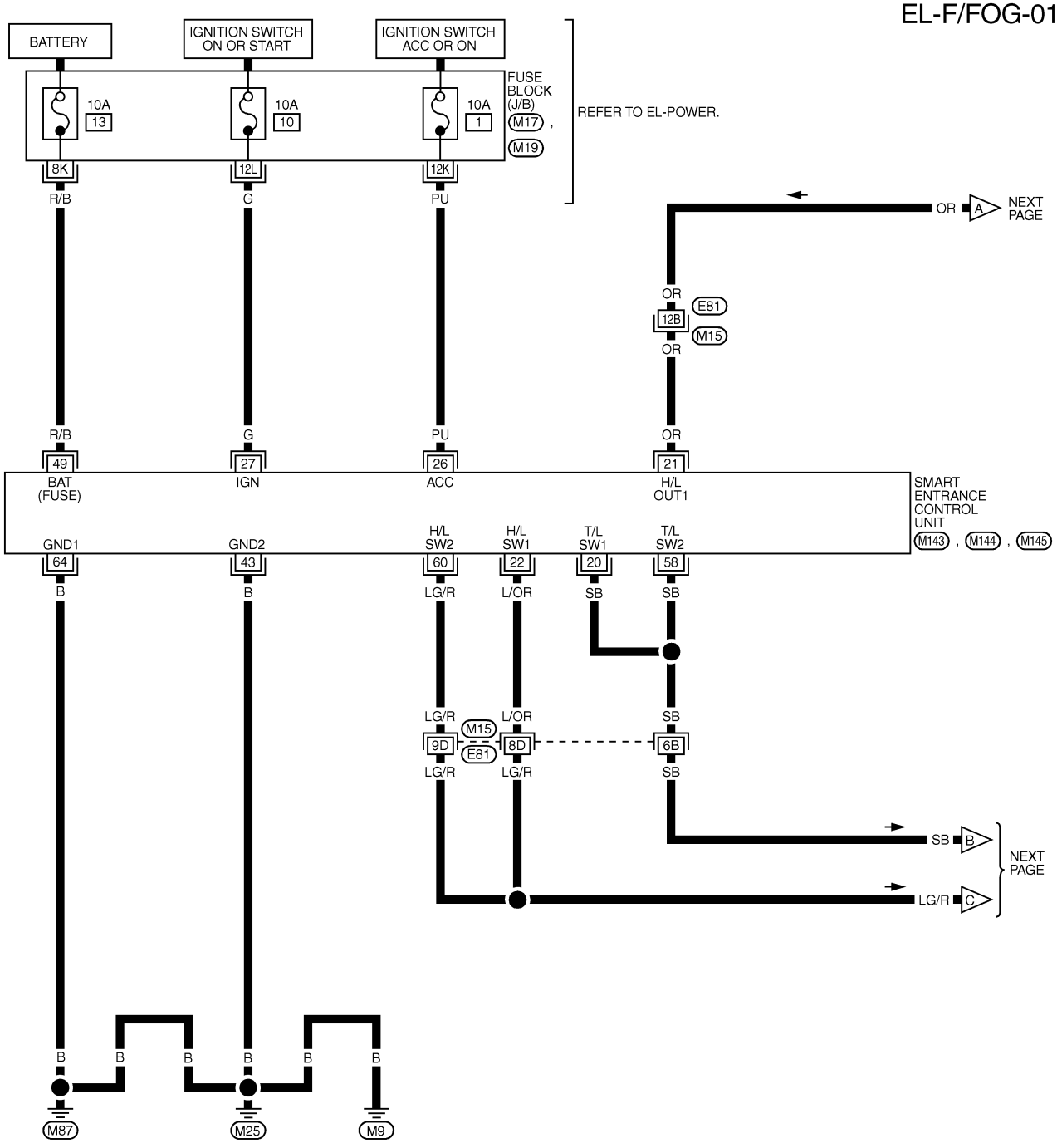
Fog lamps will remain on for a short while after the ignition switch is turned OFF (ACC OFF) from ON (or START).
Continuity between terminals 21 and 60 of smart entrance control unit will be disturbed after 5 minutes, then the headlamps will be turned off.
Then fog lamps are turned to off.
Exterior lamp battery saver control mode can be changed by the function setting of CONSULT-II (EL-46).
When the lighting switch is turned from OFF to 2ND after fog lamps are turned off by the battery saver control, ground is supplied
- to smart entrance control unit terminals 20 and 58 from lighting switch terminal 11, and then
- to headlamp LH relay terminal 2 from smart entrance control unit terminal 21
- through smart entrance control unit terminals 22 and 60 from lighting switch terminal 12.

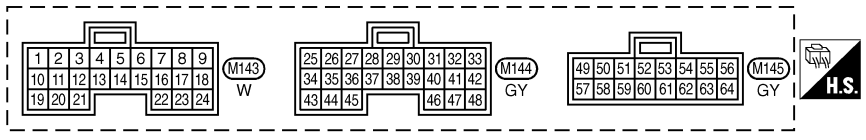
Then the fog lamps illuminate again.

Wiring Diagram — F/FOG —

NFEL0028

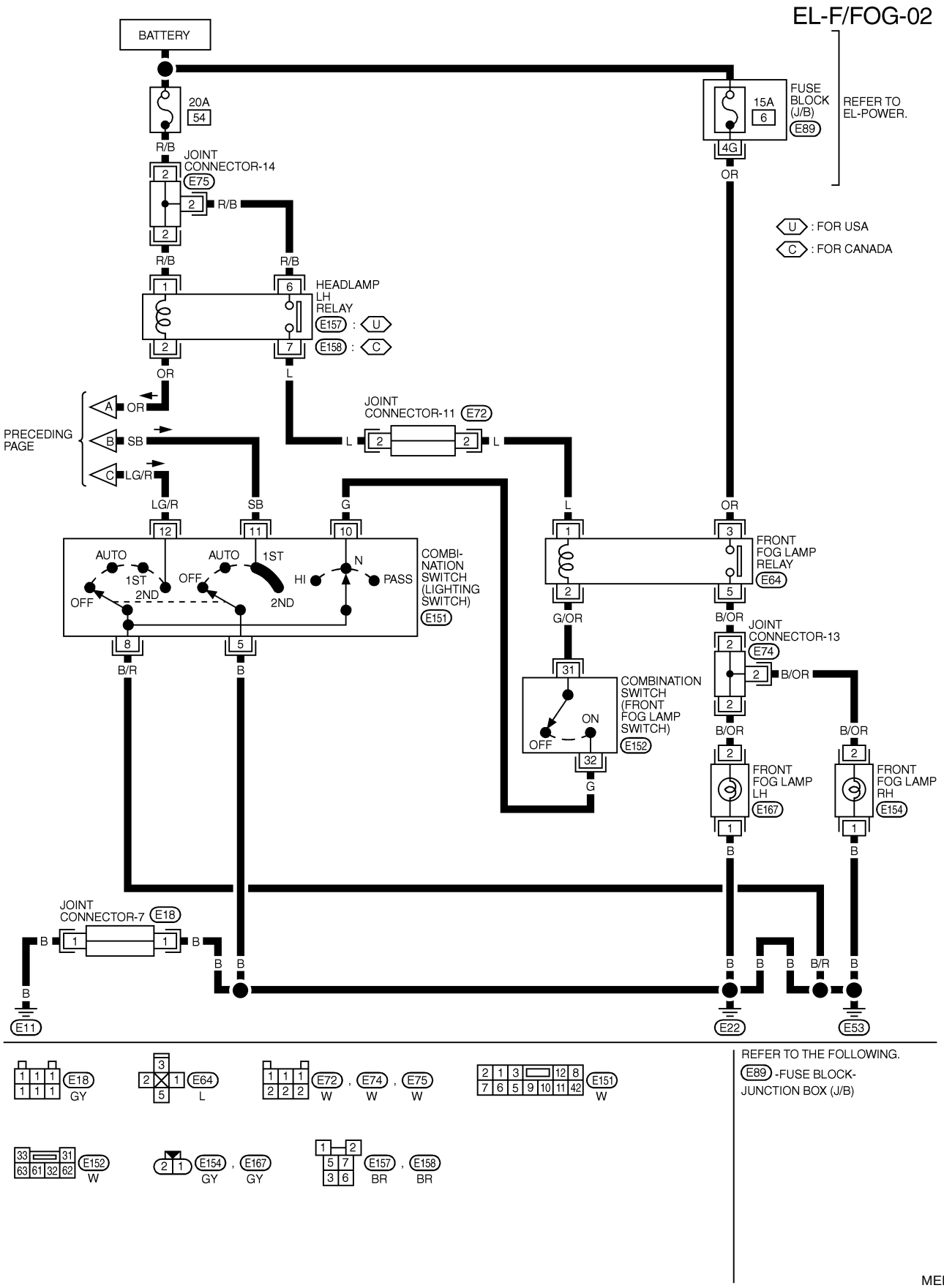
EL-F/FOG-01



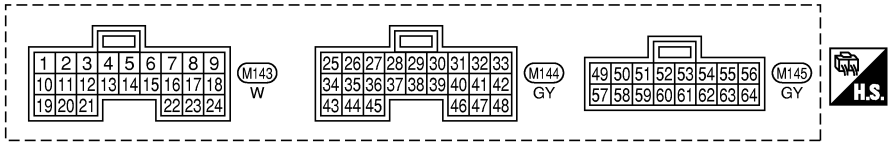


REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)
M17 , M19 -FUSE BLOCK-JUNCTION BOX (J/B)

MEL106O


EL-F/FOG-02
BATTERY
20A
54
R/B
JOINT CONNECTOR-14
E75
FUSE BLOCK (J/B)
E89
15A
6
4G
OR
REFER TO EL-POWER.
U : FOR USA
C : FOR CANADA
HEADLAMP LH RELAY
E157 : U
E158 : C
PRECEDING PAGE
A OR
B SB
C LG/R
JOINT CONNECTOR-11 E72
COMBI-NATION SWITCH (LIGHTING SWITCH)
E151
AUTO
1ST
2ND
OFF
HI
N
PASS
FRONT FOG LAMP RELAY
E64
G/OR
B/OR
JOINT CONNECTOR-13
E74
COMBINATION SWITCH (FRONT FOG LAMP SWITCH)
E152
ON
FRONT FOG LAMP LH
E167
FRONT FOG LAMP RH
E154
JOINT CONNECTOR-7 E18
E11
E22
E53
E18 GY
E64 L
E72 , E74 , E75 W W W
E151 W
E152 W
E154 , E167 GY GY
E157 , E158 BR BR
REFER TO THE FOLLOWING.
E89 -FUSE BLOCK-JUNCTION BOX (J/B)
MEL107O

SMART ENTRANCE CONTROL UNIT CONNECTOR

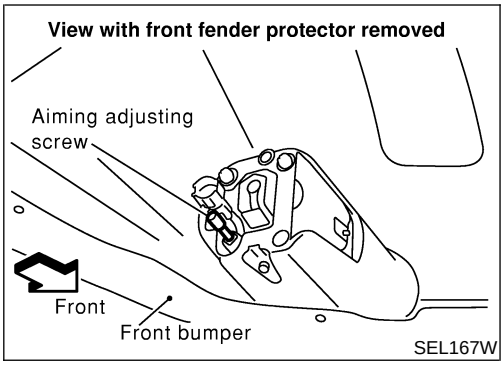


SMART ENTRANCE CONTROL UNIT TERMINALS AND REFERENCE VALUE BETWEEN EACH TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION			DATA (DC)
1	LG	DRIVER DOOR SWITCH	OFF (CLOSED) → ON (OPEN)			12V → 0V
2	R/L	PASSENGER DOOR SWITCH	OFF (CLOSED) → ON (OPEN)			5V → 0V
20	SB	TAIL LAMP SWITCH	LIGHTING SWITCH (OFF OR AUTO→1ST OR 2ND POSITION)			12V → 0V
21	OR	HEADLAMP LH RELAY	IGNITION SWITCH (WITH LIGHTING SWITCH OFF OR 1ST)	ON OR START → OFF	MORE THAN 5 MINUTES	12V
					WITHIN 5 MINUTES	0V
				ON OR START		0V
			HEADLAMPS ILLUMINATE BY AUTO LIGHT CONTROL			0V
22	L/OR	HEADLAMP SWITCH	LIGHTING SWITCH	EXCEPT PASS OR 2ND POSITION		12V
				PASS OR 2ND POSITION		0V
			HEADLAMPS ILLUMINATE BY AUTO LIGHT CONTROL (OPERATE → NOT OPERATE)			10V → 12V
26	PU	IGNITION SWITCH (ACC)	"ACC" POSITION			12V
27	G	IGNITION SWITCH (ON)	IGNITION SWITCH IS IN "ON" POSITION			12V
43	B	GROUND	–			–
49	R/B	POWER SOURCE (FUSE)	–			12V
58	SB	TAIL LAMP SWITCH	LIGHTING SWITCH (OFF OR AUTO → 1ST OR 2ND POSITION)			12V → 0V
60	LG/R	HEADLAMP SWITCH	LIGHTING SWITCH	EXCEPT PASS OR 2ND POSITION		12V
				PASS OR 2ND POSITION		0V
			HEADLAMPS ILLUMINATE BY AUTO LIGHT CONTROL (OPERATE → NOT OPERATE)			10V → 12V
64	B	GROUND	–			–

SEL586Y

NOTE:
For CONSULT-II Inspection Procedure, refer to "HEADLAMP (FOR USA)" (EL-45).
For CONSULT-II Application Items, refer to "HEADLAMP (FOR USA)" (EL-46).
Trouble Diagnoses for exterior lamp battery saver control, refer to "HEADLAMP (FOR USA)" (EL-46).



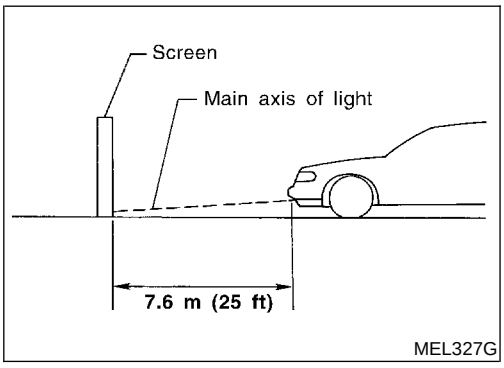
Aiming Adjustment

=NFEL0029

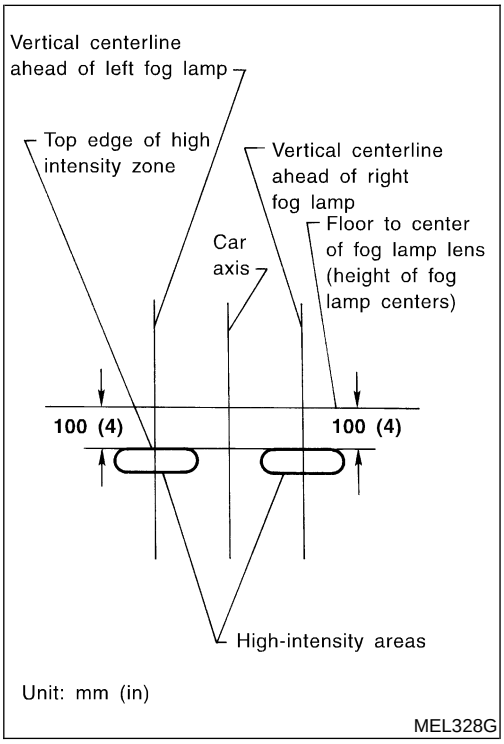
Before performing aiming adjustment, make sure of the following.

1) Keep all tires inflated to correct pressure.
2) Place vehicle on level ground.
3) See that vehicle is unloaded (except for full levels of coolant, engine oil and fuel, and spare tire, jack, and tools). Have the driver or equivalent weight placed in driver's seat.

Adjust aiming in the vertical direction by turning the adjusting screw.



1. Set the distance between the screen and the center of the fog lamp lens as shown at left.
2. Remove front fog lamp rim. For detail, refer to "BODY END" in BT section.
3. Turn front fog lamps ON.



4. Adjust front fog lamps so that the top edge of the high intensity zone is 100 mm (4 in) below the height of the fog lamp centers as shown at left.

- When performing adjustment, if necessary, cover the headlamps and opposite fog lamp.

System Description

NFEL0030

TURN SIGNAL OPERATION

NFEL0030S01

With the hazard switch in the OFF position and the ignition switch in the ON or START position, power is supplied

- through 10A fuse [No. 26, located in the fuse block (J/B)]
- to hazard switch terminal 2
- through terminal 1 of the hazard switch
- to combination flasher unit terminal 1
- through terminal 3 of the combination flasher unit
- to turn signal switch terminal 1.

Ground is supplied to combination flasher unit terminal 2 through body grounds M9, M25 and M87.

LH Turn

NFEL0030S0101

When the turn signal switch is moved to the LH position, power is supplied from turn signal switch terminal 3 to

- front turn signal lamp LH terminal 1
- combination meter terminal 25
- rear combination lamp LH terminal 5.

Ground is supplied to the front turn signal lamp LH terminal 2 through body grounds E11, E22 and E53.
Ground is supplied to the rear combination lamp LH terminal 6 through body grounds T6 and T8.
Ground is supplied to combination meter terminal 30 through body grounds M9, M25 and M87.
With power and ground supplied, the combination flasher unit controls the flashing of the LH turn signal lamps.

RH Turn

NFEL0030S0102

When the turn signal switch is moved to the RH position, power is supplied from turn signal switch terminal 2 to

- front turn signal lamp RH terminal 1
- combination meter terminal 29
- rear combination lamp RH terminal 5.

Ground is supplied to the front turn signal lamp RH terminal 2 through body grounds E11, E22 and E53.
Ground is supplied to the rear combination lamp RH terminal 6 through body grounds T6 and T8.
Ground is supplied to combination meter terminal 30 through body grounds M9, M25 and M87.
With power and ground supplied, the combination flasher unit controls the flashing of the RH turn signal lamps.

HAZARD LAMP OPERATION

NFEL0030S02

Power is supplied at all times to hazard switch terminal 3 through:

- 15A fuse [No. 5, located in the fuse block (J/B)].

With the hazard switch in the ON position, power is supplied

- through terminal 1 of the hazard switch
- to combination flasher unit terminal 1
- through terminal 3 of the combination flasher unit
- to hazard switch terminal 4.

Ground is supplied to combination flasher unit terminal 2 through body grounds M9, M25 and M87.
Power is supplied through terminal 5 of the hazard switch to

- front turn signal lamp LH terminal 1
- combination meter terminal 25
- rear combination lamp LH terminal 5.

Power is supplied through terminal 6 of the hazard switch to

- front turn signal lamp RH terminal 1
- combination meter terminal 29
- rear combination lamp RH terminal 5.

Ground is supplied to terminal 2 of each front turn signal lamp through body grounds E11, E22 and E53.
Ground is supplied to terminal 6 of each rear combination lamp through body grounds T6 and T8.
Ground is supplied to combination meter terminal 30 through body grounds M9, M25 and M87.
With power and ground supplied, the combination flasher unit controls the flashing of the hazard warning lamps.

REMOTE KEYLESS ENTRY SYSTEM OPERATION

NFEL0030S03

Power is supplied at all times.

- to smart entrance control unit terminal 49
- through 10A fuse [No. 13, located in the fuse block (J/B)].

Ground is supplied to smart entrance control unit terminal 43 and 64.
Refer to "REMOTE KEYLESS ENTRY SYSTEM", EL-277.
When smart entrance control unit receives LOCK or UNLOCK siganl from keyfob with all doors closed, power is supplied

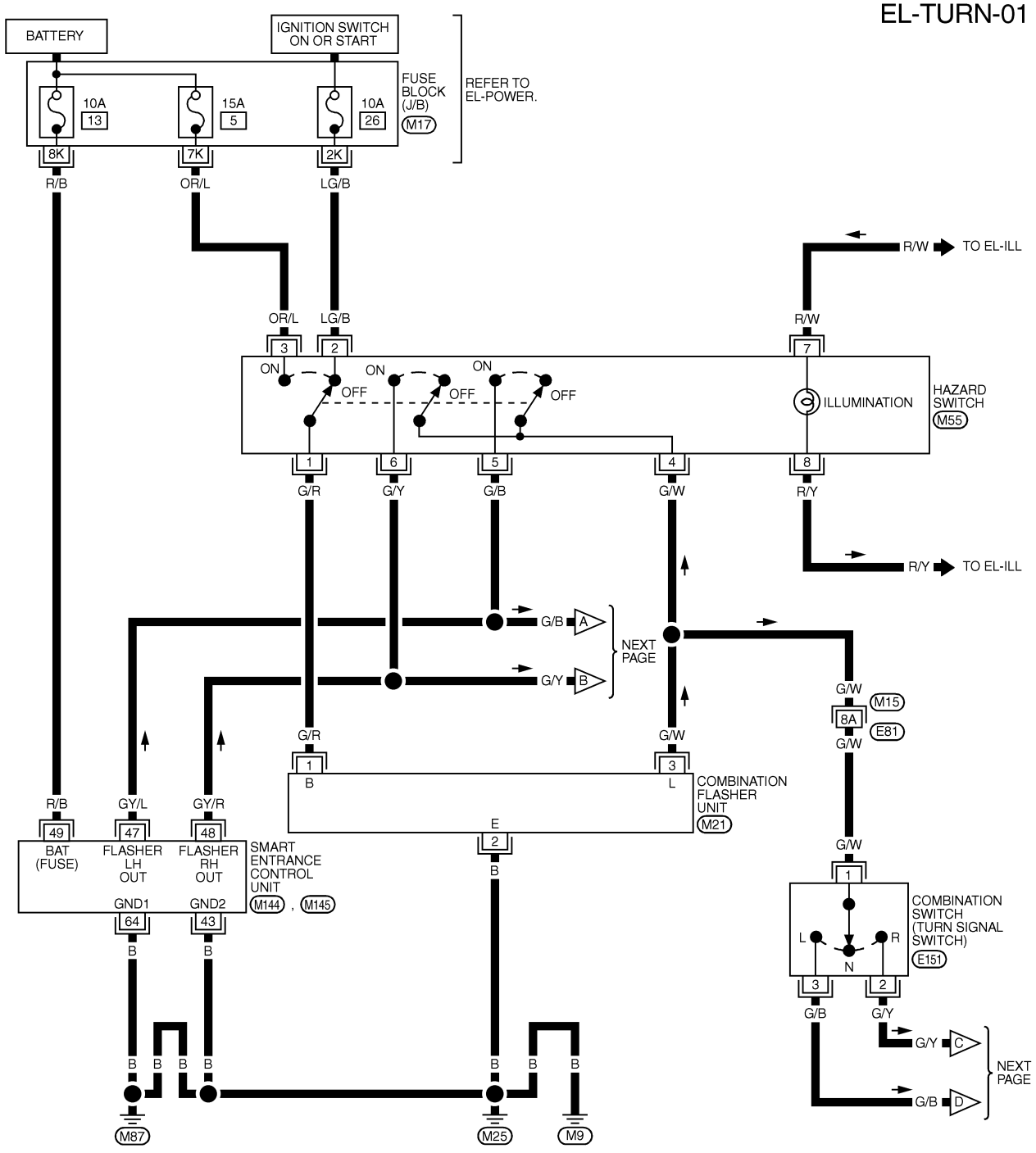
- through smart entrance control unit terminal 47
- to front turn signal lamp LH terminal 1 and
- to combination meter terminal 25 and
- to rear combination lamp LH terminal 5, and
- through smart entrance control unit terminal 48
- to front turn signal lamp RH terminal 1 and
- to combination meter terminal 29 and
- to rear combination lamp RH terminal 5

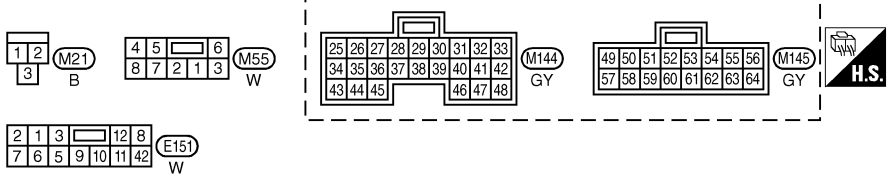
Ground is supplied to terminal 2 of each front turn signal lamp through body grounds E11, E22 and E53.
Ground is supplied to terminal 6 of each rear combination lamp through body grounds T6 and T8.
Ground is supplied to combination meter terminal 30 through body grounds M9, M25 and M87.
With power and ground supplied, the smart entrance control unit controls the flashing of the hazard warning lamps.

Wiring Diagram — TURN —

NFEL0032

EL-TURN-01

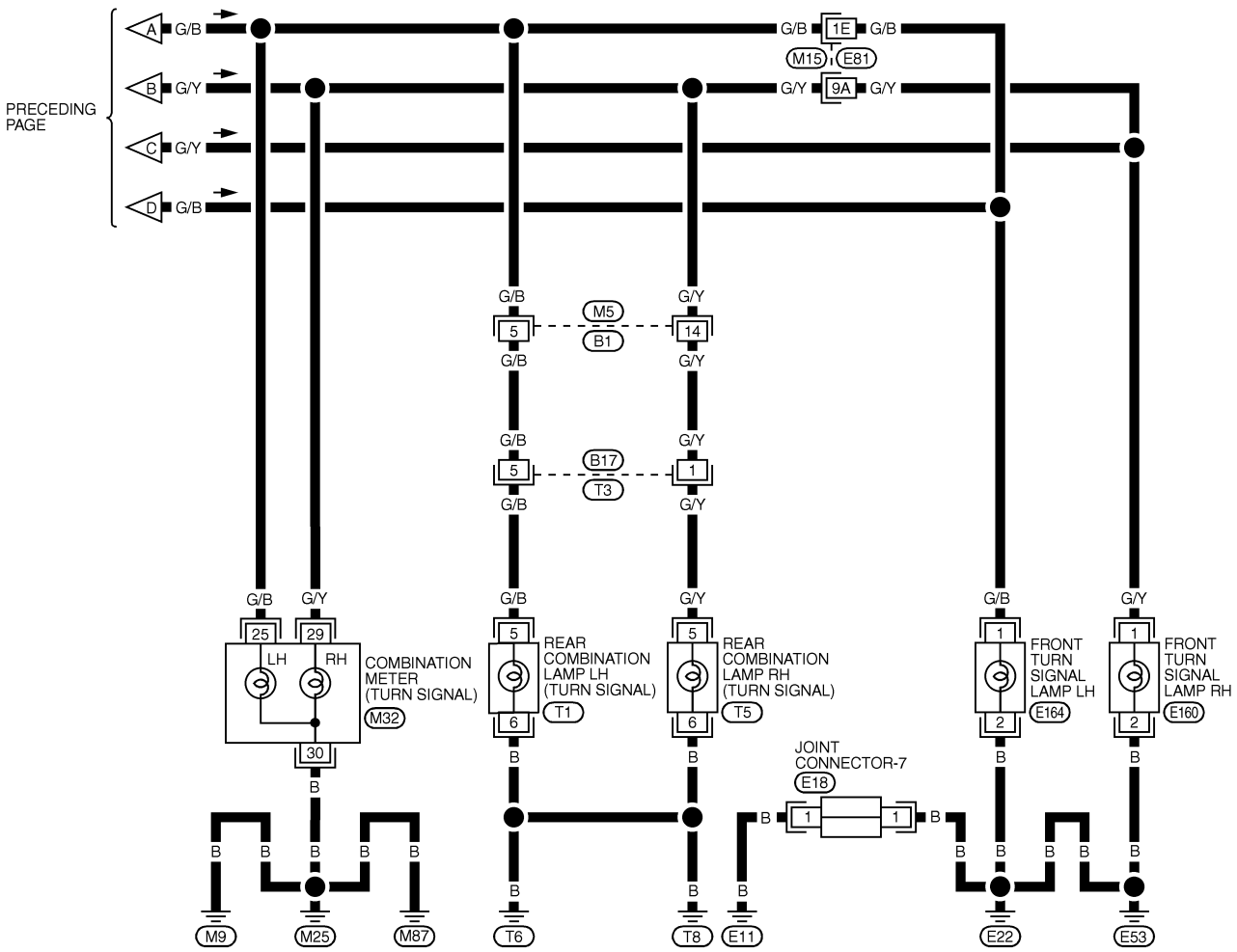




REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)
M17 -FUSE BLOCK-JUNCTION BOX (J/B)

MEL108O

EL-TURN-02



MEL109O

SMART ENTRANCE CONTROL UNIT TERMINALS AND REFERENCE VALUE BETWEEN EACH TERMINAL AND GROUND

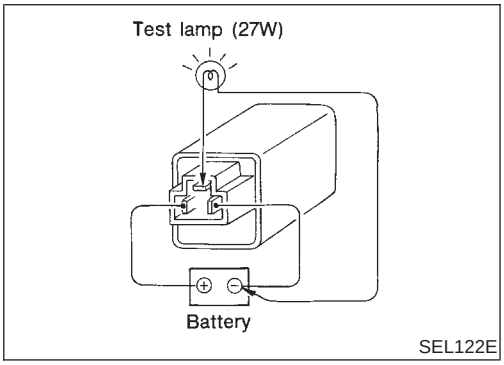
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
43	B	GROUND	–	–
47	GY/L	LH TURN SIGNAL LAMP	WHEN DOOR LOCK OR UNLOCK IS OPERATED USING KEYFOB (ON → OFF)	12V → 0V
48	GY/R	RH TURN SIGNAL LAMP	WHEN DOOR LOCK OR UNLOCK IS OPERATED USING KEYFOB (ON → OFF)	12V → 0V
49	R/B	POWER SOURCE (FUSE)	–	12V
64	B	GROUND	–	–

SEL392Y

Trouble Diagnoses

NFEL0033

Symptom	Possible cause	Repair order
Turn signal and hazard warning lamps do not operate.	1. Hazard switch 2. Combination flasher unit 3. Open in combination flasher unit circuit	1. Check hazard switch. 2. Refer to combination flasher unit check. 3. Check wiring to combination flasher unit for open circuit.
Turn signal lamps do not operate but hazard warning lamps operate.	1. 10A fuse 2. Hazard switch 3. Turn signal switch 4. Open in turn signal switch circuit	1. Check 10A fuse [No. 26, located in fuse block (J/B)]. Turn ignition switch ON and verify battery positive voltage is present at terminal 2 of hazard switch. 2. Check hazard switch. 3. Check turn signal switch. 4. Check the wire between combination flasher unit terminal 3 and turn signal switch terminal 1 for open circuit.
Hazard warning lamps do not operate but turn signal lamps operate.	1. 15A fuse 2. Hazard switch 3. Open in hazard switch circuit	1. Check 15A fuse [No. 5, located in fuse block (J/B)]. Verify battery positive voltage is present at terminal 3 of hazard switch. 2. Check hazard switch. 3. Check the wire between combination flasher unit terminal 3 and hazard switch terminal 4 for open circuit.
Front turn signal lamp LH or RH does not operate.	1. Bulb 2. Grounds E11, E22 and E53 3. Front turn signal lamp circuit	1. Check bulb. 2. Check grounds E11, E22 and E53. 3. Check the wire between combination switch and front turn signal lamp.
Rear turn signal lamp LH or RH does not operate.	1. Bulb 2. Grounds T6 and T8 3. Rear turn signal lamp circuit	1. Check bulb. 2. Check grounds T6 and T8. 3. Check the wire between combination switch and rear turn signal lamp.
LH and RH turn indicators do not operate.	1. Ground	1. Check grounds M9, M25 and M87.
LH or RH turn indicator does not operate.	1. Bulb 2. Turn indicator circuit	1. Check bulb in combination meter. 2. Check the wire between hazard switch and combination meter.



Electrical Components Inspection

NFEL0034

COMBINATION FLASHER UNIT CHECK

NFEL0034S01

- Before checking, ensure that bulbs meet specifications.
- Connect a battery and test lamp to the combination flasher unit, as shown. Combination flasher unit is properly functioning if it blinks when power is supplied to the circuit.

System Description

NFEL0258

The illumination lamp operation is controlled by the lighting switch which is built into the combination switch and smart entrance control unit. The battery saver system is controlled by smart entrance control unit.
Power is supplied at all times

- to tail lamp relay terminals 1 and 3
- through 10A fuse (No. 60, located in the fuse and fusible link box), and
- to smart entrance control unit terminal 49
- through 10A fuse [No. 13, located in the fuse block (J/B)].

When ignition switch is in ON or START position, power is supplied

- to smart entrance control unit terminal 27
- through 10A fuse [No. 10, located in the fuse block (J/B)], and

When the ignition switch is in ACC or ON position, power is supplied

- to smart entrance control unit terminal 26
- through 10A fuse [No. 1, located in the fuse block (J/B)].

Ground is supplied to smart entrance control unit terminals 43 and 64 from body grounds M9, M25 and M87.

LIGHTING OPERATION BY LIGHTING SWITCH

NFEL0258S01

When lighting switch is 1ST (or 2ND) position, ground is supplied

- to tail lamp relay terminal 2 from smart entrance control unit terminals 19 and 57
- through smart entrance control unit terminals 20 and 58, and
- through lighting switch and body grounds E11, E22 and E53.

Tail lamp relay is then energized and illumination lamps illuminate.
The lighting switch must be in the 1ST or 2ND position for illumination.
The illumination control switch that controls the amount of current to the illumination system. As the amount of current increases, the illumination becomes brighter.
The ground for all of the components except for door mirror remote control switch, clock and grove box lamp ashtray are controlled through terminals 2 and 3 of the illumination control switch and body grounds M9, M25 and M87.

EXTERIOR LAMP BATTERY SAVER CONTROL

NFEL0258S02

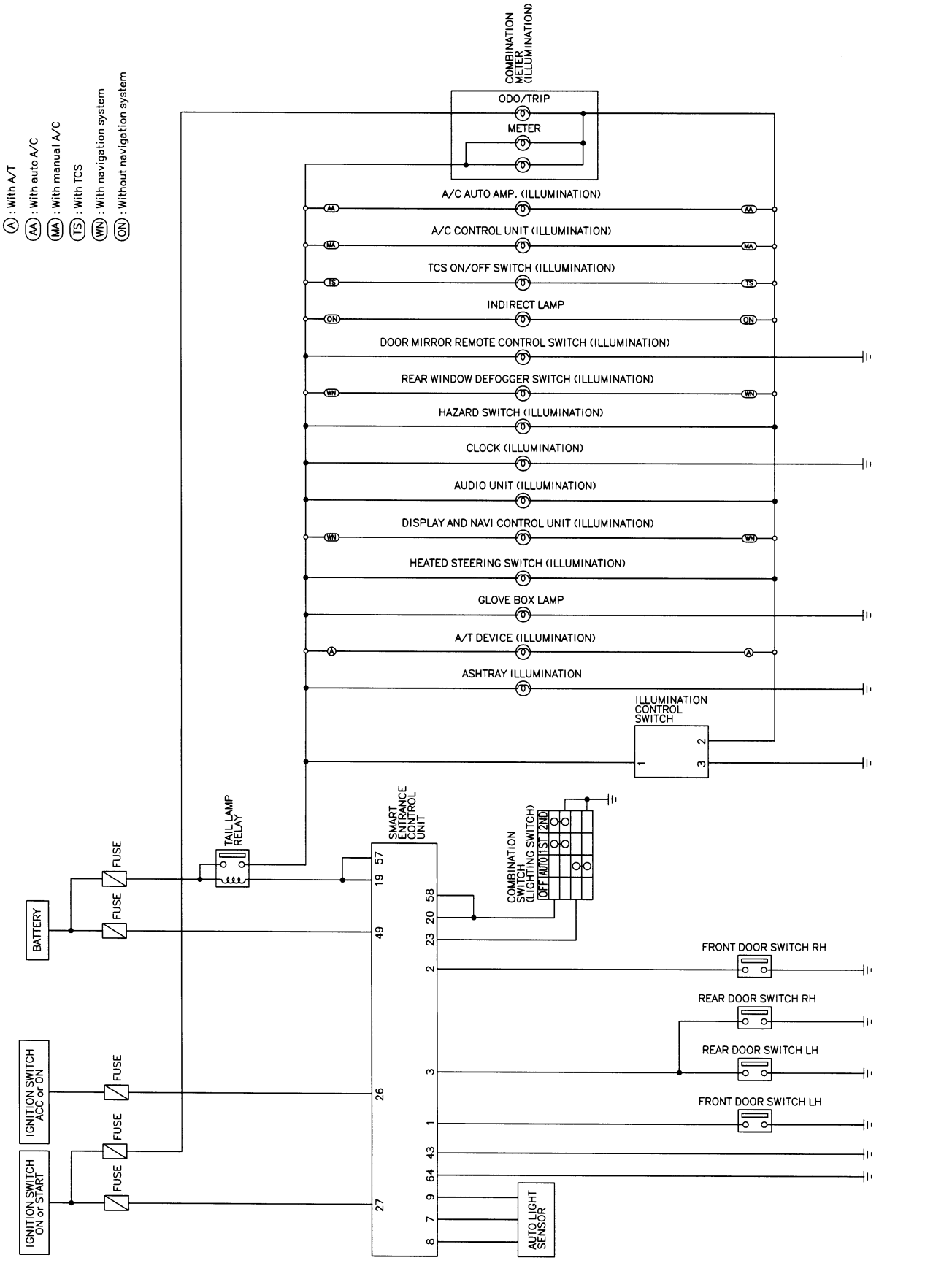
Illumination lamps will remain on for a short while after the ignition switch is turned OFF (ACC OFF) from ON (or START).
Continuity between terminals 19 and 20, and between terminals 57 and 58 of smart entrance control unit will be disturbed after 5 minutes, then the headlamps will be turned off.
Then illumination lamps are turned off.
Exterior lamp battery saver control mode can be changed by the function setting of CONSULT-II (EL-46).
When the lighting switch is turned from OFF to 1ST (or 2ND) after illumination lamps are turned off by the battery saver control, ground is supplied

- to smart entrance control unit terminals 20 and 58 from lighting switch terminal 11, and
- to tail lamp relay terminal 2 from smart entrance control unit terminals 19 and 57.

Then illumination lamps illuminate again.

Schematic

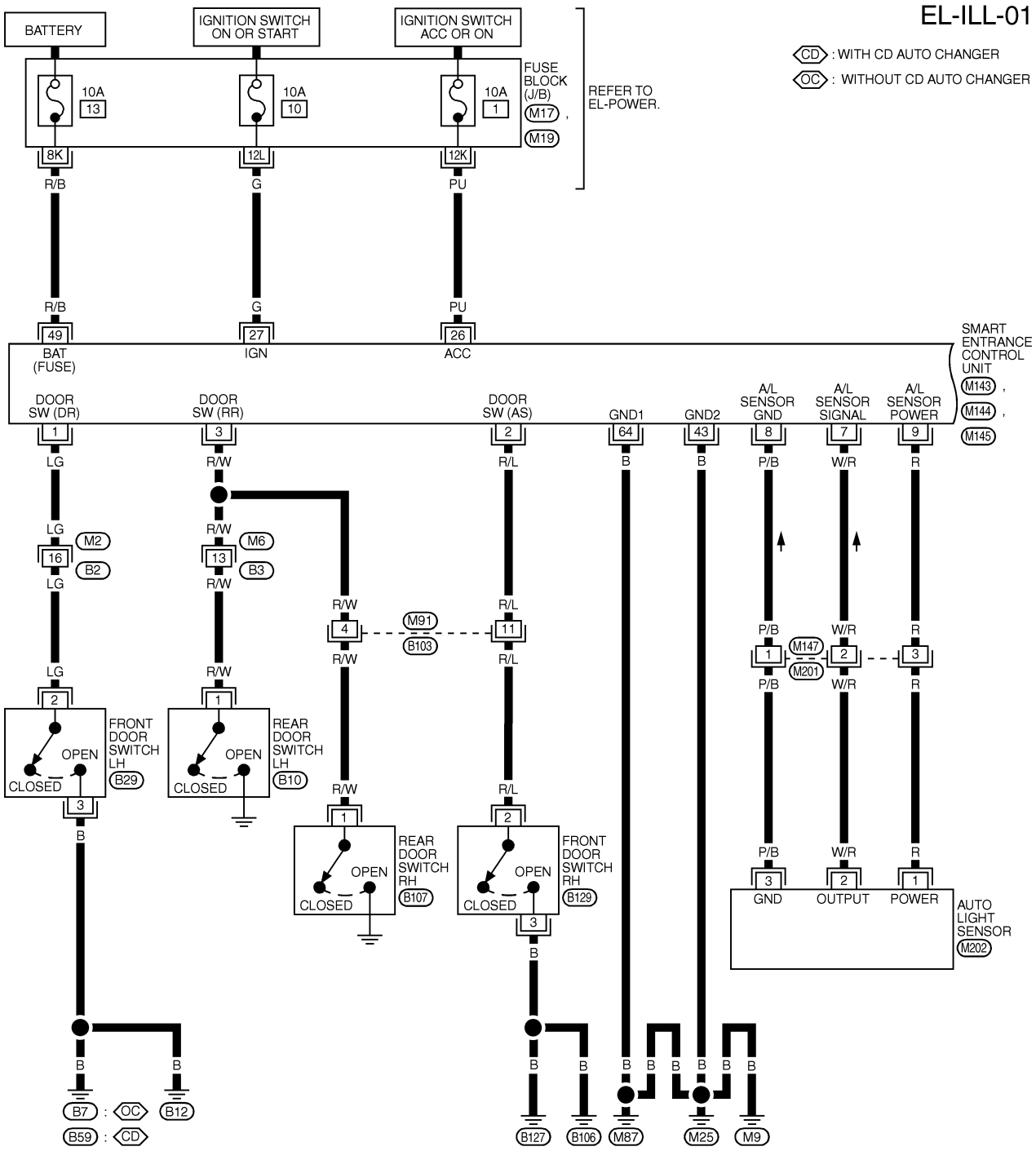
NFEL0036

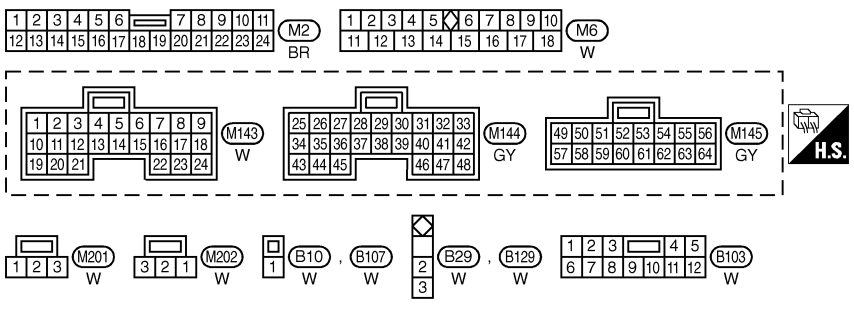


MEL724P

Wiring Diagram — ILL —

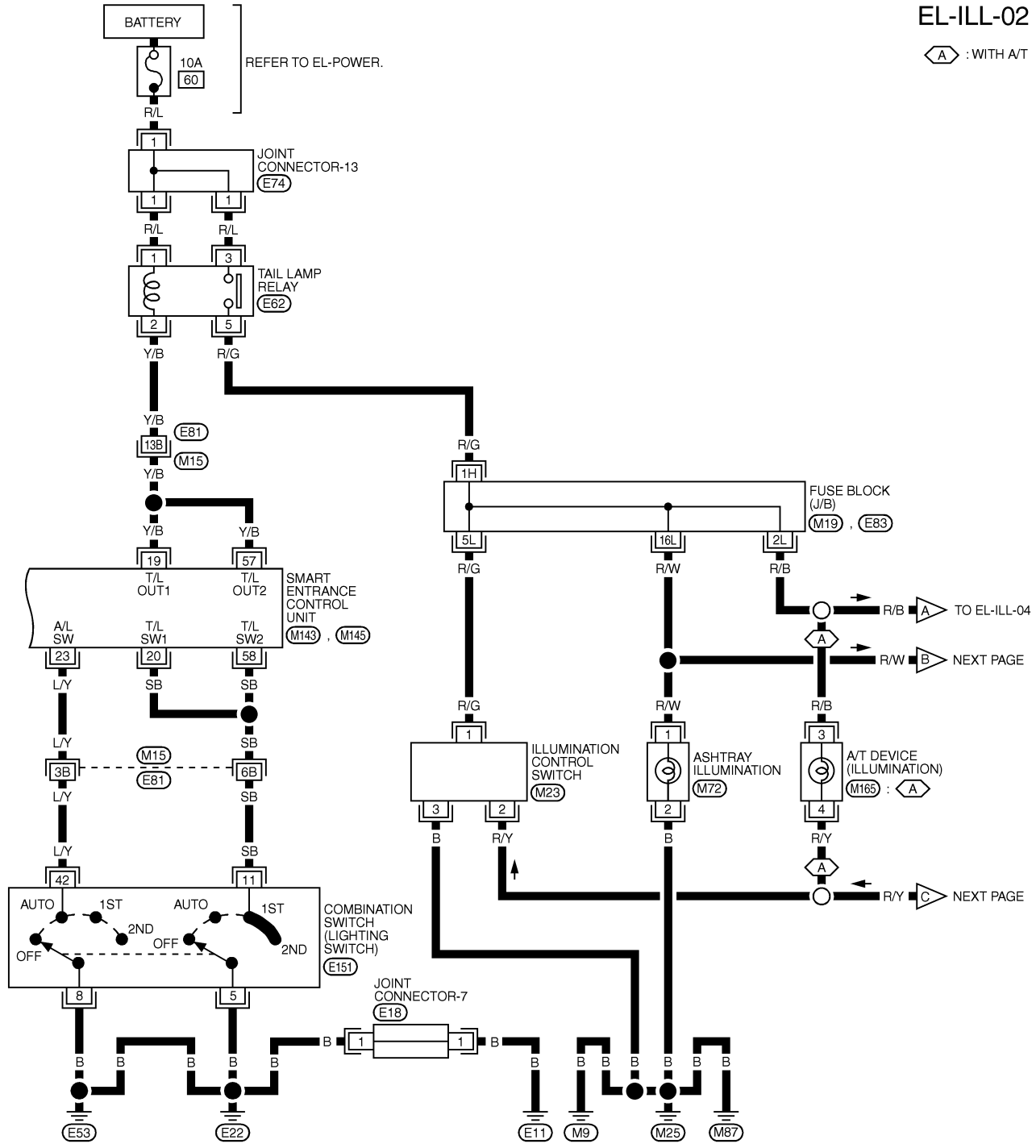
NFEL0037

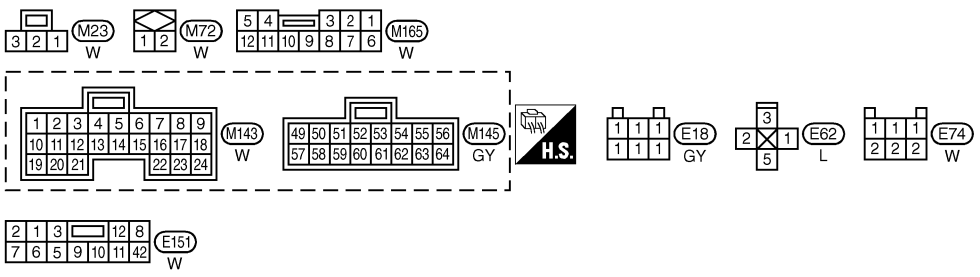




REFER TO THE FOLLOWING.
M17 , M19 -FUSE BLOCK-JUNCTION BOX (J/B)

MEL725P



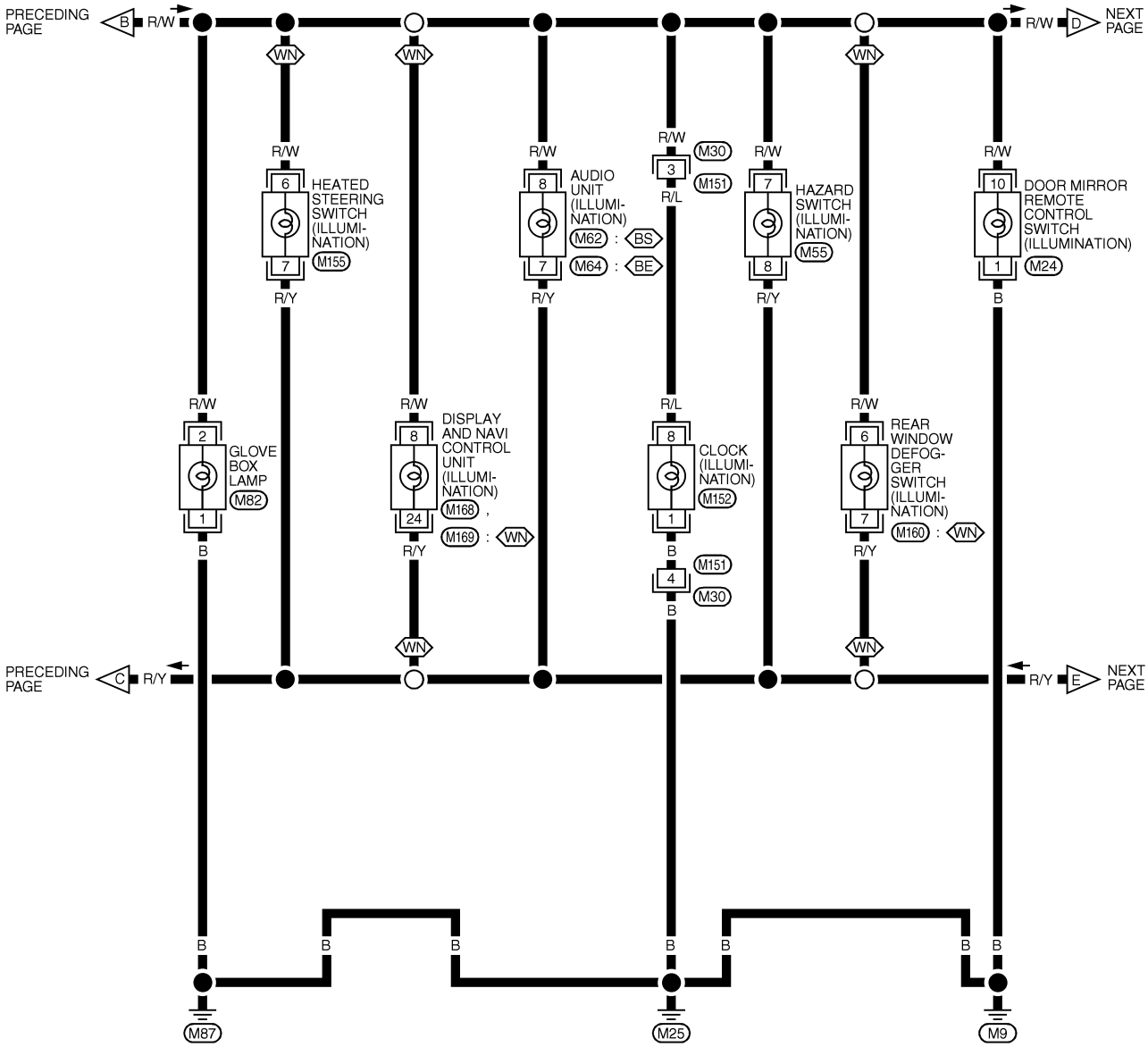


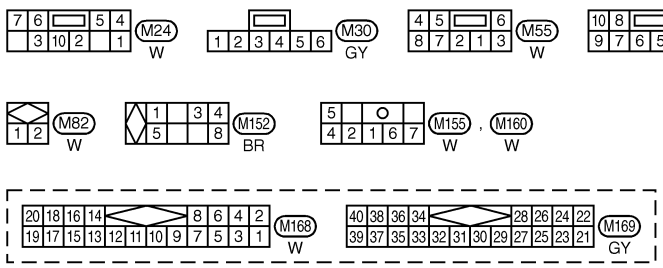
REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)
M19 , E83 -FUSE BLOCK-JUNCTION BOX (J/B)

MEL112O

EL-ILL-03

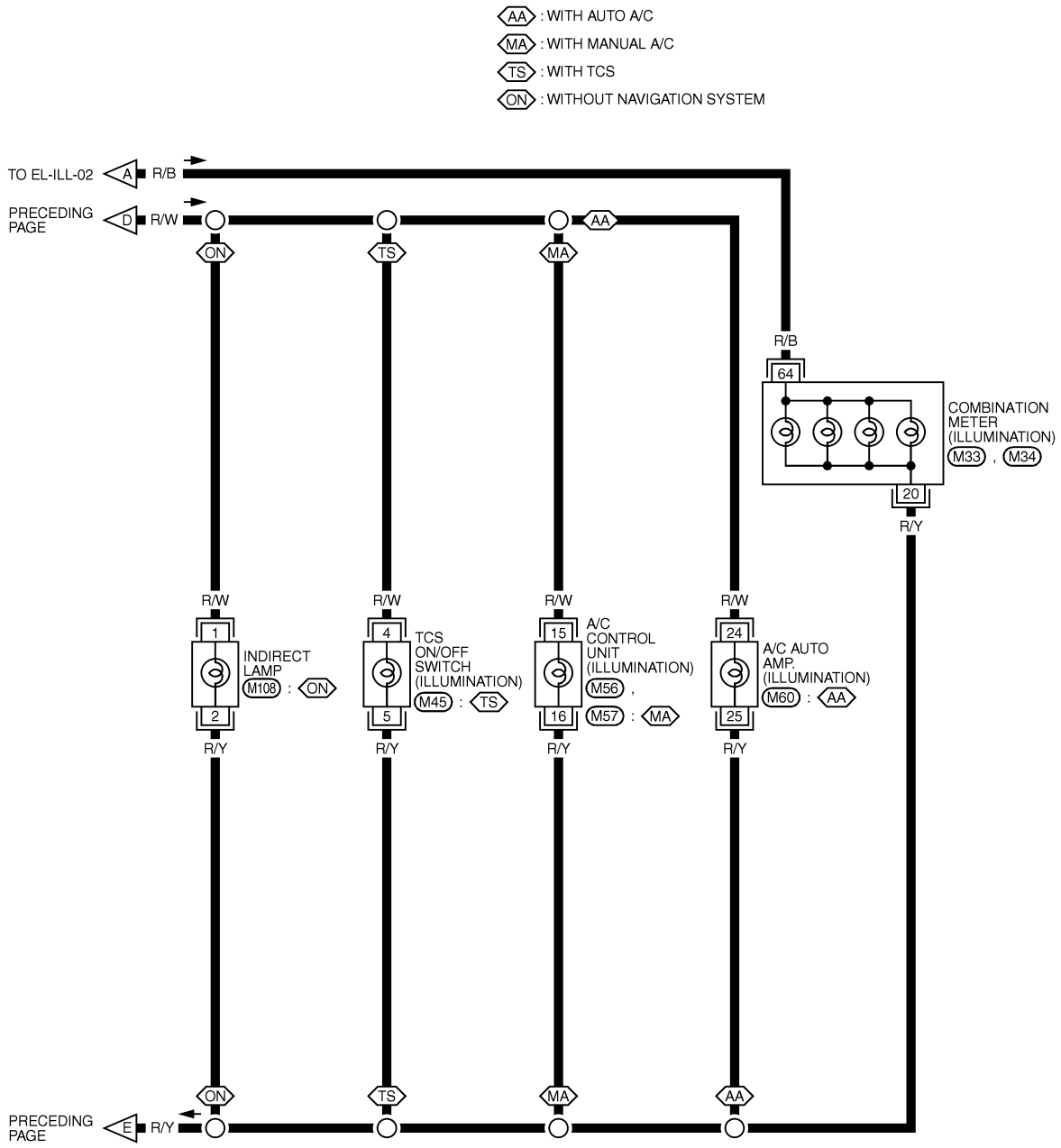
BS : WITH BOSE SYSTEM
BE : WITH BASE SYSTEM
WN : WITH NAVIGATION SYSTEM

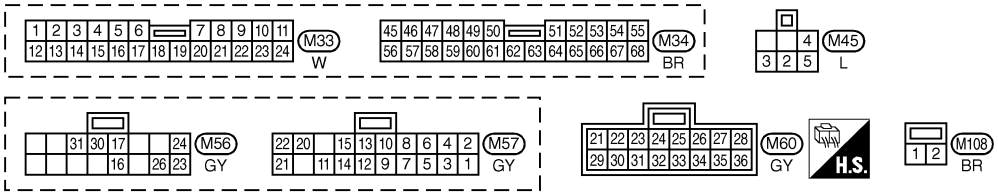




MEL726P

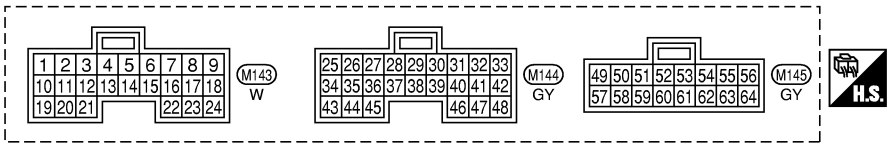
EL-ILL-04





MEL114O

SMART ENTRANCE CONTROL UNIT CONNECTOR



SMART ENTRANCE CONTROL UNIT TERMINALS AND REFERENCE VALUE BETWEEN EACH TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION			DATA (DC)
1	LG	DRIVER DOOR SWITCH	OFF (CLOSED) → ON (OPEN)			12V → 0V
2	R/L	PASSENGER DOOR SWITCH	OFF (CLOSED) → ON (OPEN)			5V → 0V
3	R/W	REAR DOOR SWITCH	OFF (CLOSED) → ON (OPEN)			5V → 0V
7	W/R	AUTO LIGHT SENSOR (SIGNAL)	IGNITION SWITCH "ON" POSITION	LIGHT IS APPLIED TO AUTO LIGHT SENSOR		1 TO 5V
				LIGHT IS NOT APPLIED TO AUTO LIGHT SENSOR		LESS THAN 1V
8	P/B	AUTO LIGHT SENSOR (GND)	–			–
9	R	AUTO LIGHT SENSOR (POWER)	IGNITION SWITCH (OFF → ON)			0V → 5V
19	Y/B	TAIL LAMP RELAY (Out put)	IGNITION SWITCH (WITH LIGHTING SWITCH 1ST OR 2ND)	ON OR START → OFF	MORE THAN 5 MINUTES	12V
					WITHIN 5 MINUTES	0V
				ON OR START		0V
			HEADLAMPS ILLUMINATE BY AUTO LIGHT CONTROL (OPERATE → NOT OPERATE)			0V → 12V
20	SB	TAIL LAMP SWITCH	LIGHTING SWITCH (OFF OR AUTO → 1ST OR 2ND POSITION)			12V → 0V
23	L/Y	HEADLAMP SWITCH	IGNITION SWITCH "ON" POSITION	LIGHTING SWITCH (EXCEPT AUTO → AUTO POSITION)		12V → 0V
26	PU	IGNITION SWITCH (ACC)	"ACC" POSITION			12V
27	G	IGNITION SWITCH (ON)	IGNITION SWITCH IS IN "ON" POSITION			12V
43	B	GROUND	–			–
49	R/B	POWER SOURCE (FUSE)	–			12V
57	Y/B	TAIL LAMP RELAY	IGNITION SWITCH (WITH LIGHTING SWITCH 1ST OR 2ND)	ON OR START → OFF	MORE THAN 5 MINUTES	12V
					WITHIN 5 MINUTES	0V
				ON OR START		0V
			HEADLAMPS ILLUMINATE BY AUTO LIGHT CONTROL (OPERATE → NOT OPERATE)			LESS THAN 1V → 12V
58	SB	TAIL LAMP SWITCH	LIGHTING SWITCH (OFF OR AUTO → 1ST OR 2ND POSITION)			12V → 0V
64	B	GROUND	–			–

SEL587Y

NOTE:
For CONSULT-II Inspection Procedure, refer to "HEADLAMP (FOR USA)" (EL-45).
For CONSULT-II Application Items, refer to "HEADLAMP (FOR USA)" (EL-46).
Trouble Diagnoses for exterior lamp battery saver control, refer to "HEADLAMP (FOR USA)" (EL-46).

System Description

NFEL0165

POWER SUPPLY AND GROUND

NFEL0165S01

Power is supplied at all times:

- through 10A fuse [No. 13, located in the fuse block (J/B)]
- to key switch terminals 2 (M/T) or 3 (A/T) and
- to smart entrance control unit terminal 49.

When the key is removed from ignition key cylinder, power is interrupted:

- through key switch terminals 1 (M/T) or 4 (A/T)
- to smart entrance control unit terminal 25.

With the ignition switch in the ON or START position, power is supplied:

- through 10A fuse [No. 10, located in the fuse block (J/B)]
- to smart entrance control unit terminal 27.

Ground is supplied:

- to smart entrance control unit terminal 43 and 64
- through body grounds terminals M9, M25 and M87.

When the front driver side door is opened, ground is supplied:

- through body grounds B12 and B7 (without CD auto changer), or B59 (with CD auto changer)
- to front door switch LH terminal 3
- from front door switch LH terminal 2
- to smart entrance control unit terminal 1.

When the front passenger side door is opened, ground is supplied:

- through body grounds B106 and B127
- to front door switch RH terminal 3
- from front door switch RH terminal 2
- to smart entrance control unit terminal 2.

When any other door (except front door) is opened, ground is supplied to smart entrance control unit terminal 3 in the same manner as the front door switch.
When the front driver side door is unlocked by the door lock and unlock switch, the smart entrance control unit receives a ground signal:

- through body grounds terminals M9, M25 and M87
- to front power window switch terminal 5 (LH) or 7 (RH)
- from front power window switch terminal 8 (LH) or 11 (RH)
- to smart entrance control unit terminal 33.

When the front driver side door is unlocked by the front door key cylinder switch, the smart entrance control unit receives a ground signal:

- through body grounds terminals M9, M25 and M87
- to front door key cylinder switch LH terminal 2
- from front door key cylinder switch LH terminal 1
- to front power window main switch terminal 19
- from front power window main switch terminal 8
- to smart entrance control unit terminal 33.

When a signal, or combination of signals is received by the smart entrance control unit, ground is supplied:

- through smart entrance control unit terminal 31
- to interior lamp terminal 2.

With power and ground supplied, the interior lamp illuminates.

SWITCH OPERATION

NFEL0165S02

When interior lamp switch is ON, ground is supplied:

- through case grounds of interior lamp
- to interior lamp.

And power is supplied:

- to interior lamp terminal 1

- from smart entrance control unit terminal 50.

When spot lamp (LH and/or RH) is ON, ground is supplied:

- through body grounds M9, M25 and M87
- to spot lamp terminal 2.

And power is supplied:

- to spot lamp terminal 1
- from smart entrance control unit terminal 50.

When vanity mirror illumination (LH and/or RH) is ON, ground is supplied:

- through body grounds M9, M25 and M87
- to vanity mirror illuminations (LH and RH) terminal 2.

And power is supplied:

- to vanity mirror illuminations (LH and RH) terminal 1
- from smart entrance control unit terminal 50.

When rear door switch LH and/or RH is ON (door is opened), the smart entrance control unit receives a ground signal:

- through case ground of the rear door switch
- from the rear door switch terminal 1
- to smart entrance control unit terminal 3.
- from smart entrance control unit terminal 32
- to front step lamp LH and RH terminal 1.

And power is supplied:

- to front step lamp LH and RH terminal 2
- from smart entrance control unit terminal 50.

When front door switch LH and/or RH is ON (door is opened), ground is supplied:

- through body grounds B12 and B7 (without CD auto changer), or B57 (with CD auto changer), and/or B106 and B127
- to the front door switch terminal 3
- from the front door switch terminal 2
- to smart entrance control unit terminal 1 and/or 2
- from smart entrance control unit terminal 32
- to front step lamp LH and RH terminal 1.

And power is supplied:

- to front step lamp LH and RH terminal 2
- from smart entrance control unit terminal 50.

When trunk room lamp switch is ON (trunk lid is opened), ground is supplied:

- through body grounds T6 and T8
- to trunk room lamp switch terminal 2
- from trunk room lamp switch terminal 1
- to trunk room lamp terminal 1

And power is supplied:

- to trunk room lamp terminal 2
- through 10A fuse [No. 13, located in the fuse block (J/B)].

With power and ground supplied, interior lamps turn ON.

INTERIOR LAMP TIMER OPERATION

NFEL0165S03

When interior lamp switch is in the "DOOR" position, the smart entrance control unit keeps the interior lamp illuminated for about 30 seconds when:

- unlock signal is supplied from driver's door unlock sensor while all doors are closed and key is out of ignition key cylinder
- unlock signal is supplied from keyfob or door key cylinder while driver's door is locked and all doors are closed
- key is removed from ignition key cylinder while all doors are closed

- driver's door is opened and then closed while key is out of the iginition key cylinder. (However, if the driver's door is closed with the key inserted in the ignition key cylinder after the driver's door is opened with the key removed, the timer is operated.)

The timer is canceled when:

- driver's door is locked,
- driver's door is opened, or
- ignition switch is turned ON.

When driver's door is locked, interior room lamp timer is canceled as described before.
However, ignition key hole illumination remains on for about 30 seconds after driver's door has been locked.

ON-OFF CONTROL

NFEL0165S04

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.
When any door is opened, step lamps turn ON.

INTERIOR LAMP BATTERY SAVER CONTROL

NFEL0165S05

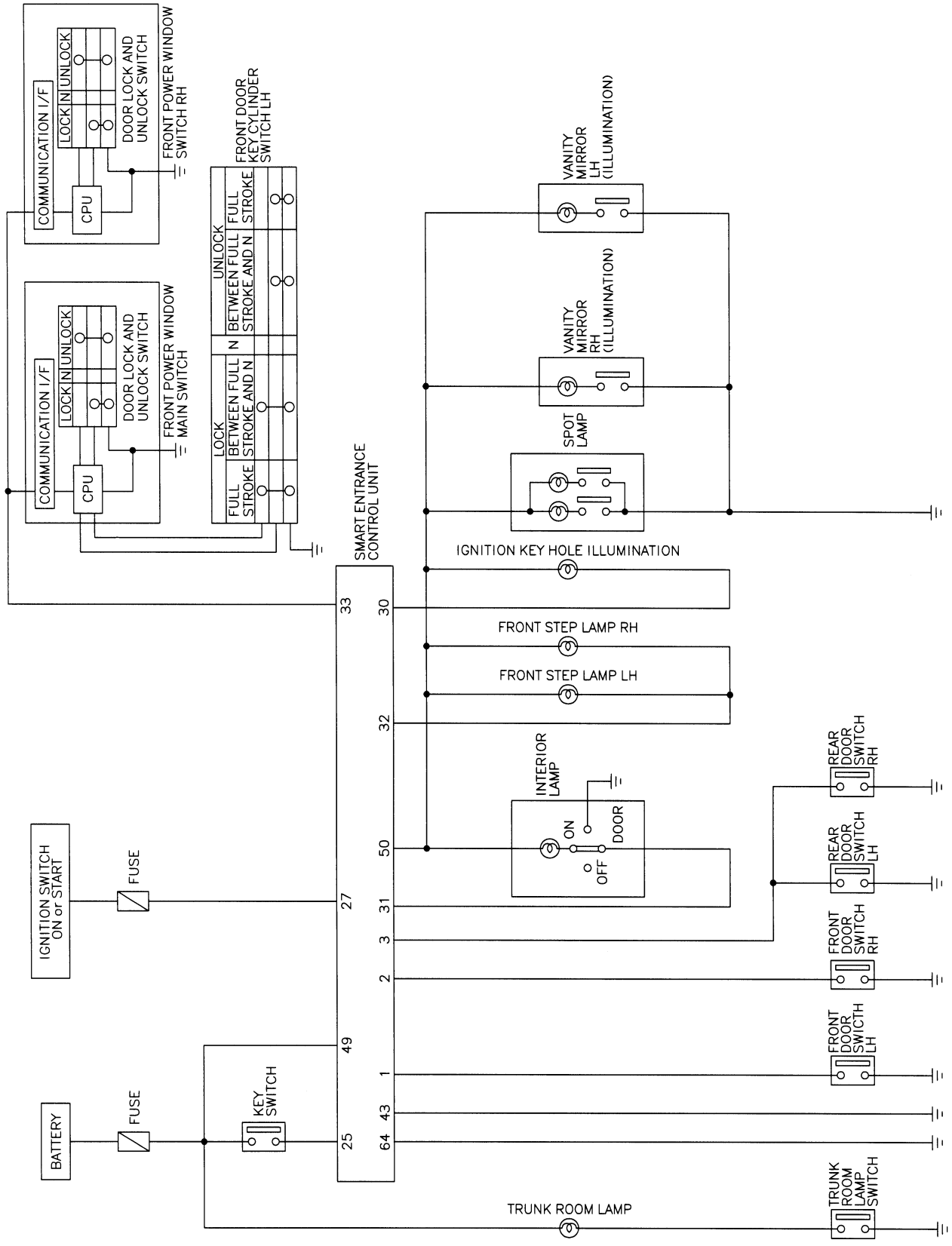
The lamp turns off automatically when interior lamp, step lamp, spot lamp and/or vanity mirror illumination is illuminated with the ignition key is in OFF position, if the lamp remains lit by the door switch open signal or if the lamp switch is in ON position for more than 30 minutes.
After lamps turn OFF by the battery saver system, the lamps illuminate again when:

- driver's door is locked or unlocked,
- door is opened or closed,
- key is removed from ignition key cylinder or inserted in ignition key cylinder.

Interior lamp battery saver control period can be changed by the function setting of CONSULT-II (EL-102).

Schematic

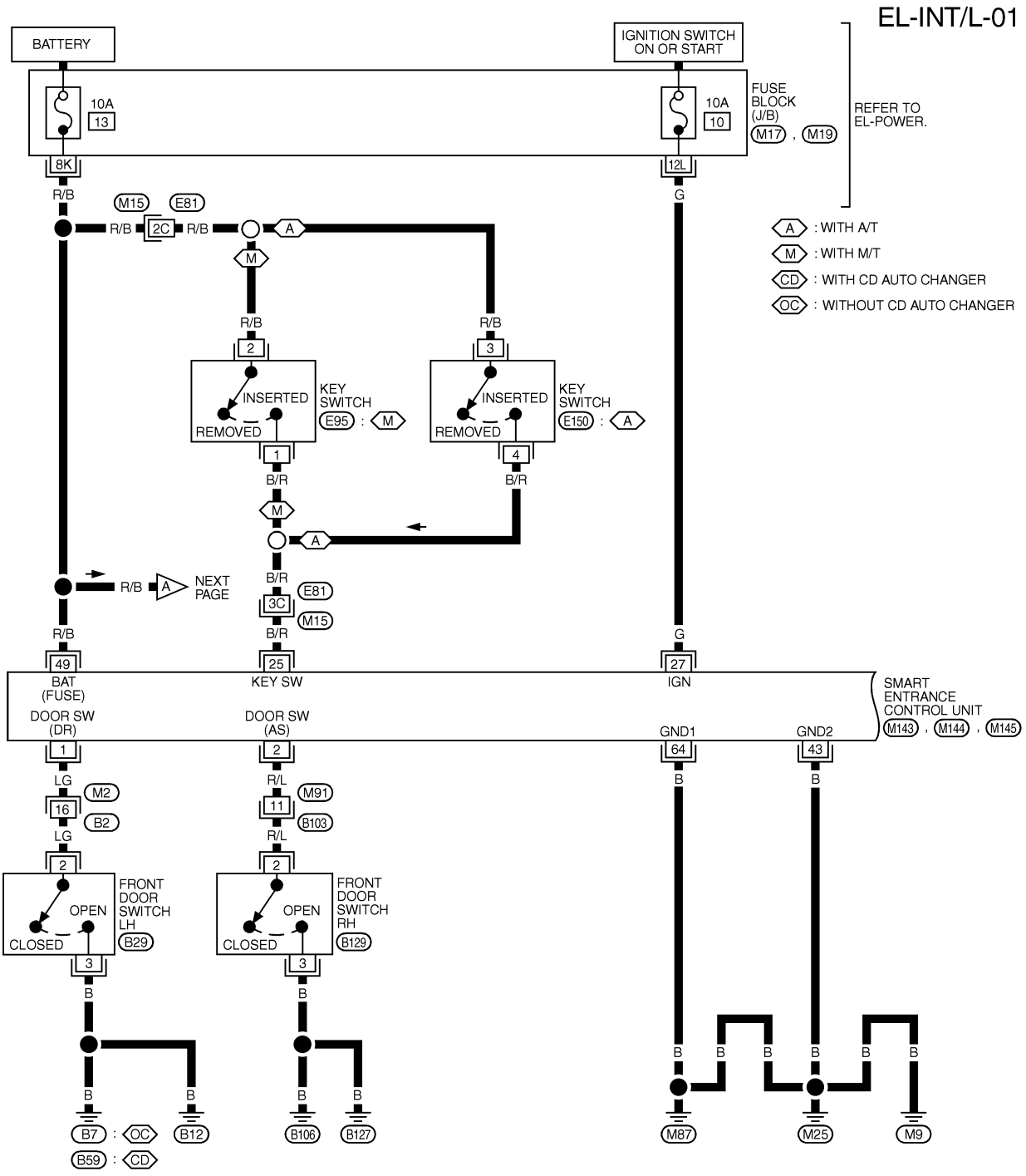
NFEL0212

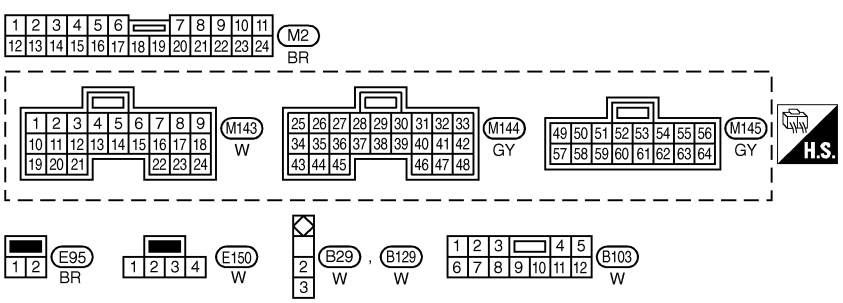


MEL115O

Wiring Diagram — INT/L —

NFEL0163

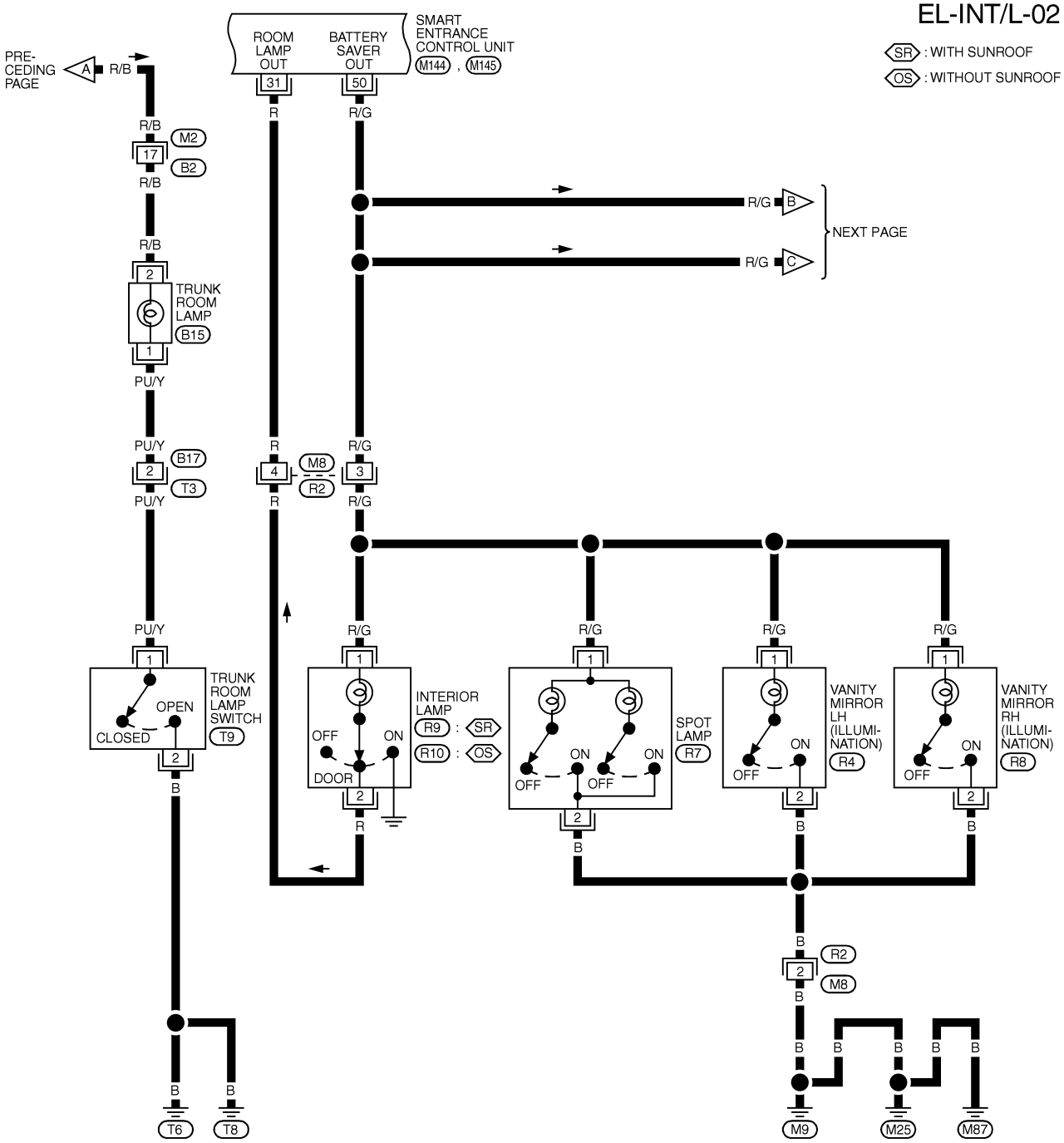


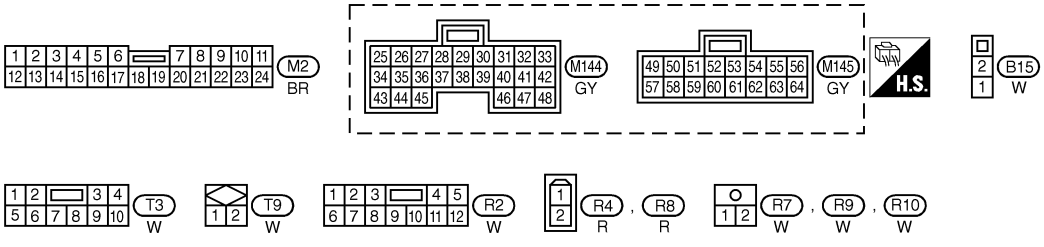


REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)
M17 , M19 -FUSE BLOCK-JUNCTION BOX (J/B)

MEL740P

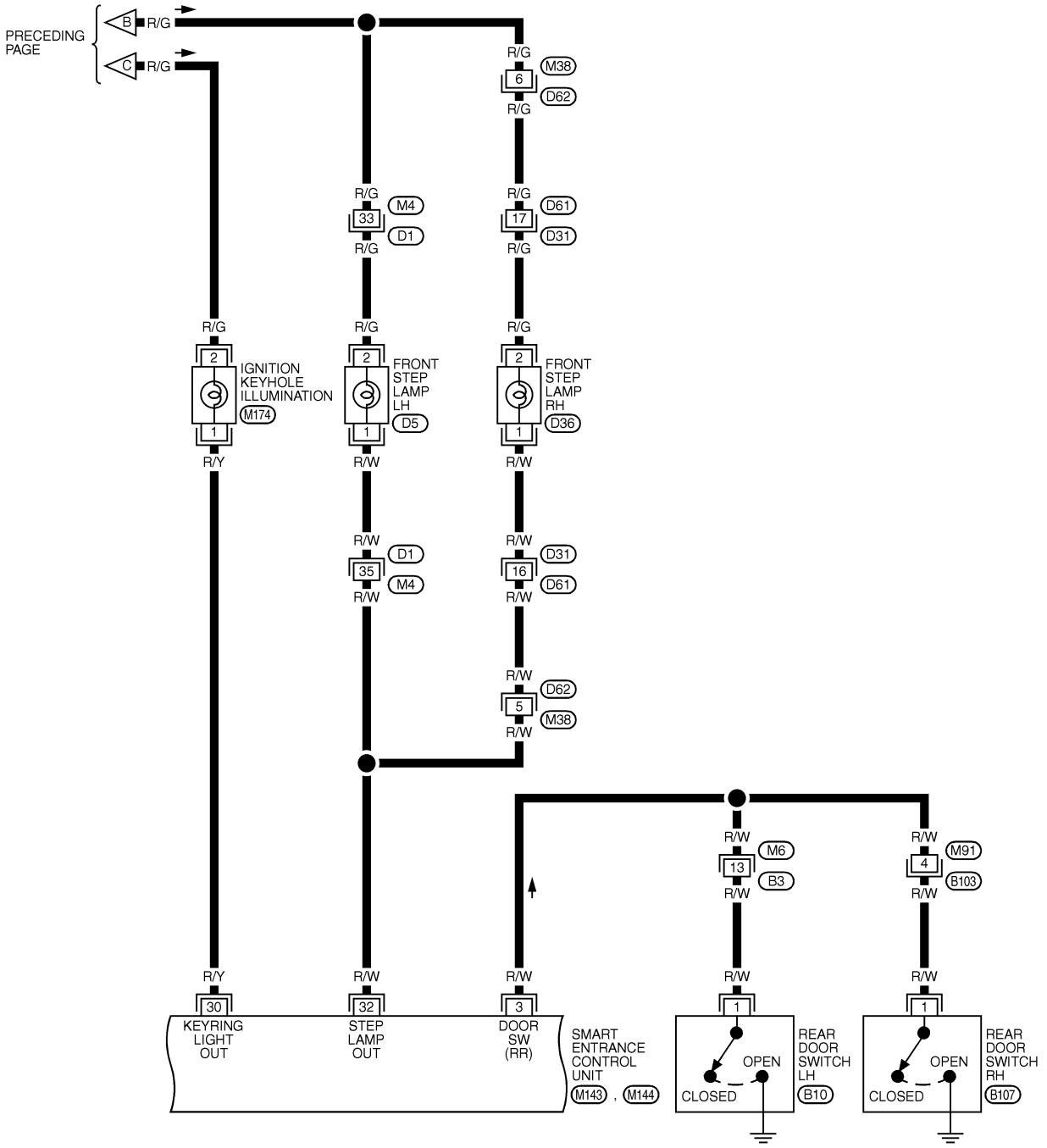
EL-INT/L-02

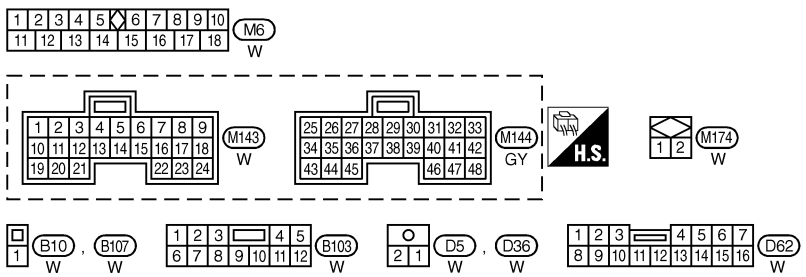




MEL117O

EL-INT/L-03

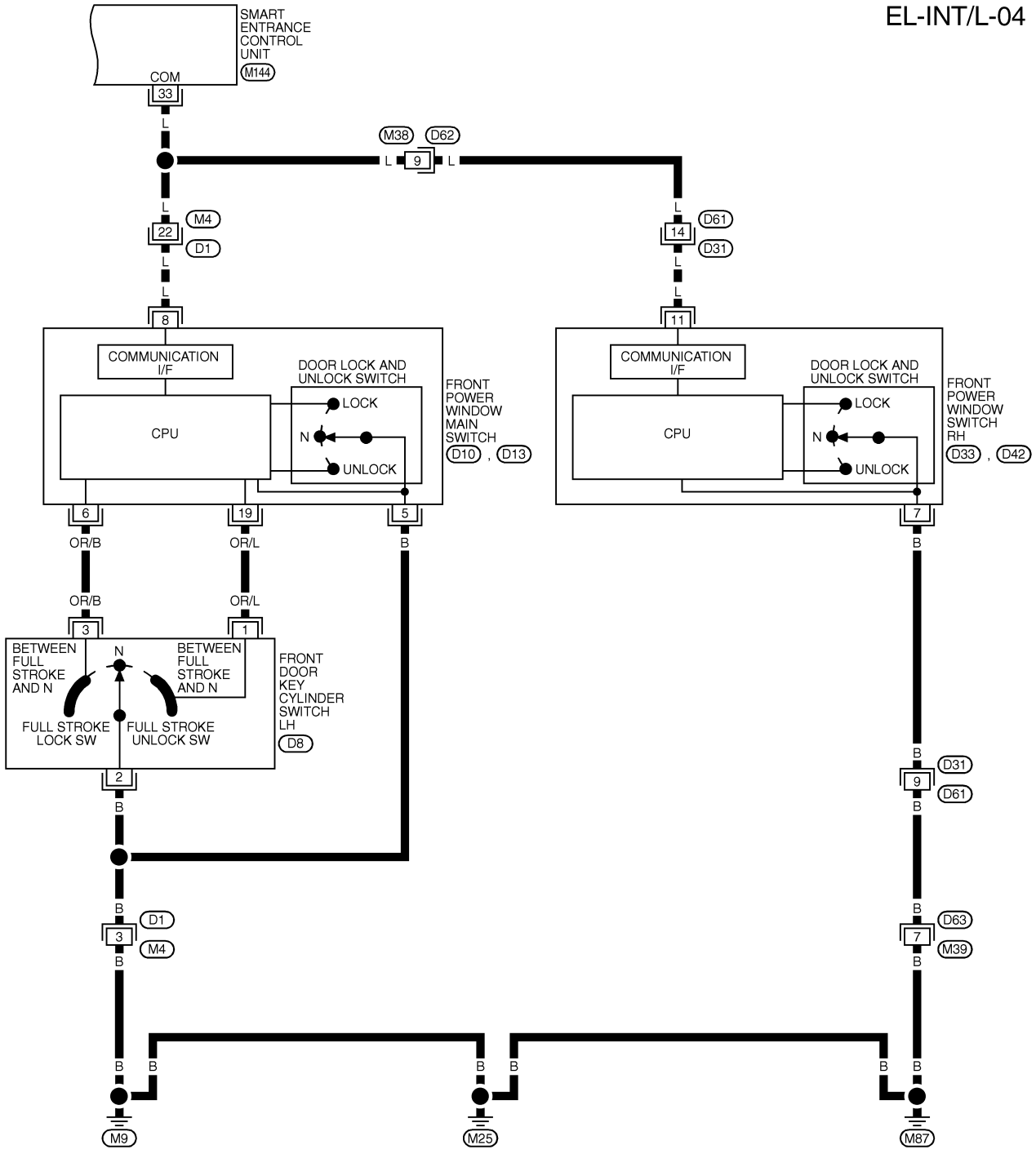


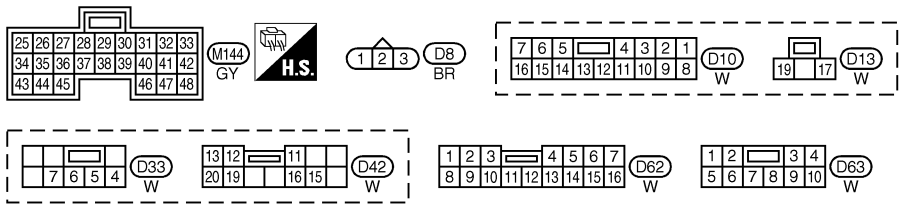


REFER TO THE FOLLOWING.
D1 , D31 -SUPER MULTIPLE JUNCTION (SMJ)

MEL751O

EL-INT/L-04

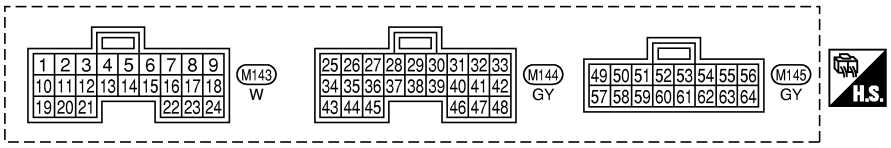




REFER TO THE FOLLOWING.
D1 , D31 -SUPER MULTIPLE JUNCTION (SMJ)

MEL118O

SMART ENTRANCE CONTROL UNIT CONNECTOR

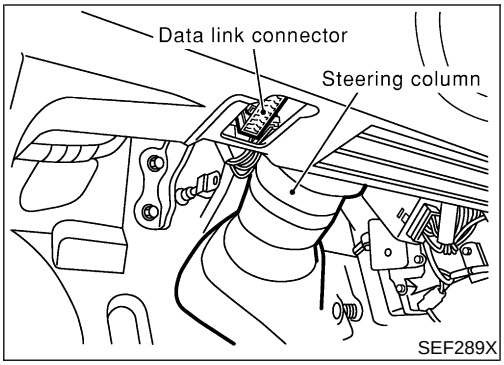


SMART ENTRANCE CONTROL UNIT TERMINALS AND REFERENCE VALUE BETWEEN EACH TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
1	LG	DRIVER DOOR SWITCH	OFF (CLOSED) → ON (OPEN)	12V → 0V
2	R/L	PASSENGER DOOR SWITCH	OFF (CLOSED) → ON (OPEN)	5V → 0V
3	R/W	REAR DOOR SWITCH	OFF (CLOSED) → ON (OPEN)	5V → 0V
25	B/R	IGNITION KEY SWITCH (INSERT)	KEY INSERTED → KEY REMOVED FROM IGN KEY CYLINDER	12V → 0V
27	G	IGNITION SWITCH (ON)	IGNITION SWITCH IS IN "ON" POSITION	12V
30	R/Y	IGNITION KEYHOLE ILLUMINATION	WHEN DOORS ARE UNLOCKED USING KEYFOB (OFF → UNLOCK)	12V → 0V
31	R	INTERIOR LAMP	WHEN DOORS ARE LOCKED USING KEYFOB (UNLOCK → LOCK WITH LAMP SWITCH IN "DOOR" POSITION)	12V
32	R/W	FRONT STEP LAMP	ANY DOOR SWITCH: ON (OPEN) → OFF (CLOSED)	0V → 12V
33	L	COMMUNICATION INTERFACE	DOOR LOCK & UNLOCK SWITCHES (NEUTRAL → LOCK/UNLOCK) FRONT DOOR KEY CYLINDER SWITCH LH (NEUTRAL → LOCK/UNLOCK)	*1
43	B	GROUND	–	–
49	R/B	POWER SOURCE (FUSE)	–	12V
50	R/G	BATTERY SAVER (INTERIOR LAMP)	BATTERY SAVER DOSE OPERATE → DOES NOT OPERATE (ON → OFF)	12V → 0V
64	B	GROUND	–	–

*1: REFER TO "SMART ENTRANCE CONTROL UNIT INSPECTION TABLE" IN "SMART ENTRANCE CONTROL UNIT".

SEL588Y



SEF289X

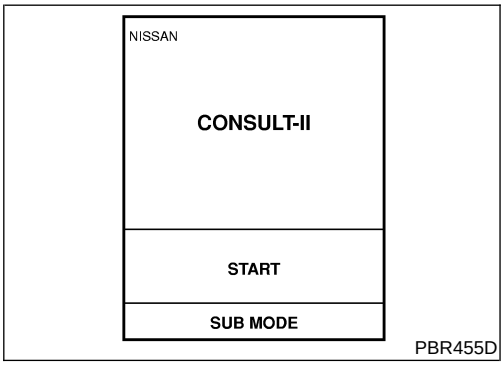
CONSULT-II Inspection Procedure

=NFEL0213

"INT LAMP"/"BATTERY SAVER"

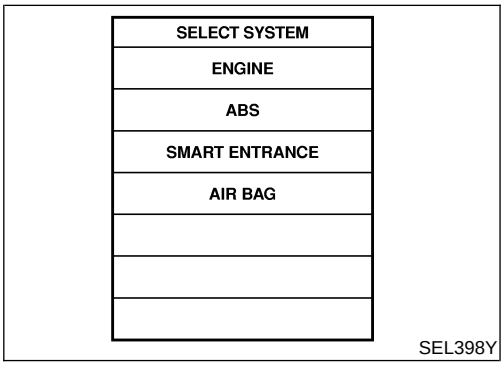
NFEL0213S01

1. Turn ignition switch "OFF".
2. Connect "CONSULT-II" to the data link connector.



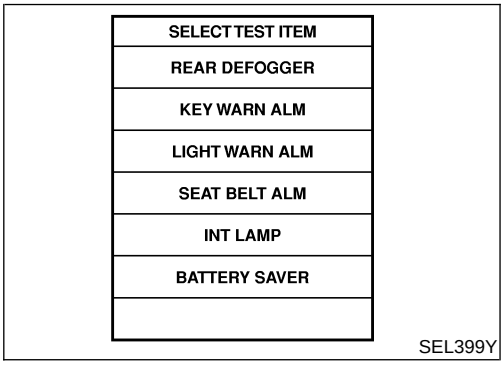
PBR455D

3. Turn ignition switch "ON".
4. Touch "START".



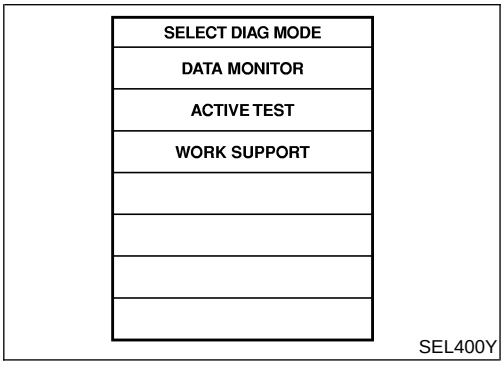
SEL398Y

5. Touch "SMART ENTRANCE".



SEL399Y

6. Touch "INT LAMP" or "BATTERY SAVER".



SEL400Y

7. Select diagnosis mode.
   "DATA MONITOR", "ACTIVE TEST" and "WORK SUPPORT" are available for "INT LAMP" and "BATTERY SAVER".

CONSULT-II Application Items

NFEL0259

"INT LAMP"
Data Monitor

NFEL0259S01

NFEL0259S0101

Monitored Item	Description
IGN ON SW	Indicates [ON/OFF] condition of ignition switch.
DOOR SW-RR	Indicates [ON/OFF] condition of ignition switch.
KEY ON SW	Indicates [ON/OFF] condition of key switch.
DOOR SW-DR	Indicates [ON/OFF] condition of front door switch LH.
DOOR SW-AS	Indicates [ON/OFF] condition of front door switch RH.
LOCK SW DR/AS	Indicates [ON/OFF] condition of front door lock switch.
UNLK SW DR/AS	Indicates [ON/OFF] condition of front door lock switch.
KEY CYL LK-SW	Indicates [ON/OFF] condition of front door key cylinder switch.
KEY CYL UN-SW	Indicates [ON/OFF] condition of front door key cylinder switch.
LK BUTTON/SIG	Indicates [ON/OFF] condition of unlock signal from keyfob.
UN BUTTON/SIG	Indicates [ON/OFF] condition of unlock signal from keyfob.

Active Test

NFEL0259S0102

Test Item	Description
INT LAMP	This test enables to check interior lamp operation. When "ON" on CONSULT-II screen is touched: ● Interior lamp turns on when the switch is at DOOR. (Smart entrance control unit supplies power and ground to interior lamp.)
IGN ILLUM	This test enables to check ignition key hole illumination operation. The illumination turns on when "ON" on CONSULT-II screen is touched.
STEP LAMP	This test enables to check step lamp operation. The illumination turns on when "ON" on CONSULT-II screen is touched.

Work Support

NFEL0259S0103

Work Item	Description
ROOM LAMP TIMER SET	Interior lamp timer mode can be changed by mode setting. Selects ON-OFF of the room lamp illumination at the time the driver door is unlocked.

"BATTERY SAVER"
Data Monitor

NFEL0259S02

NFEL0259S0201

Monitored Item	Description
IGN ON SW	Indicates [ON/OFF] condition of ignition switch.
DOOR SW-RR	Indicates [ON/OFF] condition of ignition switch.
KEY ON SW	Indicates [ON/OFF] condition of key switch.
DOOR SW-DR	Indicates [ON/OFF] condition of front door switch LH.
DOOR SW-AS	Indicates [ON/OFF] condition of front door switch RH.
LOCK SW DR/AS	Indicates [ON/OFF] condition of front door lock switch.
UNLK SW DR/AS	Indicates [ON/OFF] condition of front door lock switch.
KEY CYL LK-SW	Indicates [ON/OFF] condition of front door key cylinder switch.

Monitored Item	Description
KEY CYL UN-SW	Indicates [ON/OFF] condition of front door key cylinder switch.
LK BUTTON/SIG	Indicates [ON/OFF] condition of unlock signal from keyfob.
UN BUTTON/SIG	Indicates [ON/OFF] condition of unlock signal from keyfob.

Active Test

NFEL0259S0202

Test Item	Description
BATTERY SAVER	This test enables to check interior lamp, front step lamps, spot lamp and vanity mirror illuminations operations. When touching "ON" on CONSULT-II screen. ● Interior lamp turns on when the switch is in ON. (Smart entrance control unit supplies power to interior lamp.) ● Front step lamps turn on when any doors are open. (Smart entrance control unit supplies power to front step lamps.) ● Spot lamp, vanity mirror illuminations turn on when the switch is in ON. (Smart entrance control unit supplies power to Spot lamp, vanity mirror illuminations.)

Work Support

NFEL0259S0203

Work Item	Description
ROOM LAMP BAT SAV SET	Interior lamp battery saver control period can be changed by mode setting. Selects interior lamp battery saver control period between two modes. ● MODE 1 (30 minutes)/MODE 2 (60 minutes)

Trouble Diagnoses for Interior Lamp Timer

=NFEL0215

DIAGNOSTIC PROCEDURE 1

NFEL0215S01

SYMPTOM: Interior lamp timer does not operate.

1	CHECK IGNITION ON SIGNAL

With CONSULT-II

Check ignition switch ON signal (“IGN ON SW”) in “DATA MONITOR” mode with CONSULT-II.

DATA MONITOR	
MONITOR	
IGN ON SW	ON

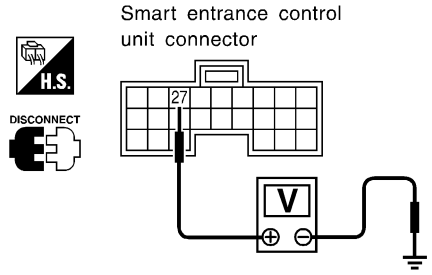
When ignition switch is ON:
IGN ON SW ON

When ignition switch is OFF:
IGN ON SW OFF

SEL318W

Without CONSULT-II

Check voltage between smart entrance control unit harness connector M144 terminal 27 (G) and ground.



Terminals		Ignition switch position		
(+)	(–)	OFF	ACC	ON
27	Ground	0V	0V	Battery voltage

SEL003Y

OK or NG

OK	▶	GO TO 2.
NG	▶	**Check the following.** ● 10A fuse [No. 10, located in fuse block (J/B)] ● Harness for open or short between smart entrance control unit and fuse

2	CHECK FRONT LH DOOR SWITCH INPUT SIGNAL

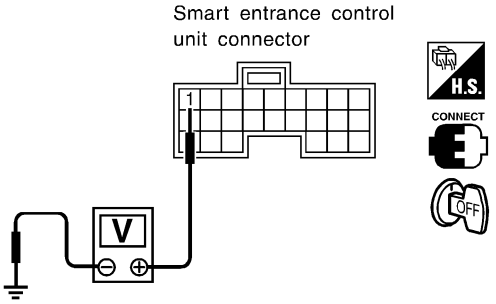
With CONSULT-II
Check driver door switch signal ("DOOR SW-DR") in "DATA MONITOR" mode with CONSULT-II.

DATA MONITOR	
MONITOR	
DOOR SW-DR	OFF

When front LH door is open:
DOOR SW-DR ON
When driver's door is closed:
DOOR SW-DR OFF

SEL319WA

Without CONSULT-II
Check voltage between smart entrance control unit harness connector M143 terminal 1 (LG) and ground.



Voltage [V]:
Condition of driver's door: CLOSED
Approx. 5
Condition of driver's door: OPENED
0

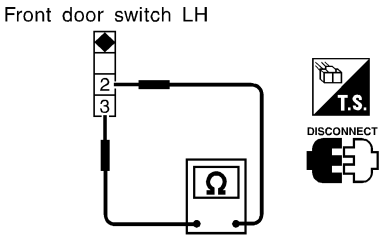
SEL004Y

OK or NG

OK	▶	GO TO 4.
NG	▶	GO TO 3.

3	CHECK FRONT LH DOOR SWITCH

Check continuity between door switch connector B29 terminals 2 and 3.



Continuity:
Door switch is pushed.
No
Door switch is released.
Yes

SEL325WB

OK or NG

OK	▶	**Check the following.** • Front LH door switch ground circuit and condition • Harness for open or short between smart entrance control unit and front LH door switch
NG	▶	Replace front LH door switch.

4	CHECK FRONT RH DOOR SWITCH INPUT SIGNAL

With CONSULT-II

Check driver door switch signal ("DOOR SW-AS") in "DATA MONITOR" mode with CONSULT-II.

DATA MONITOR	
MONITOR	
DOOR SW-AS	OFF

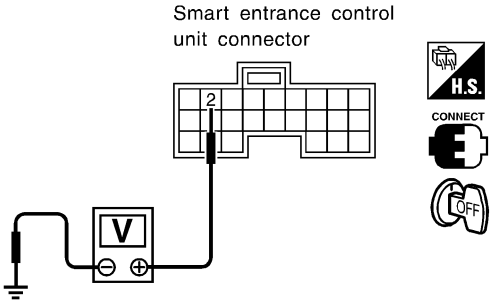
When front RH door is open:
DOOR SW-AS ON

When driver's door is closed:
DOOR SW-AS OFF

SEL153Y

Without CONSULT-II

Check voltage between smart entrance control unit harness connector M143 terminal 2 (R/L) and ground.



Voltage [V]:
Condition of front RH door: CLOSED
Approx. 5
Condition of front RH door: OPENED
0

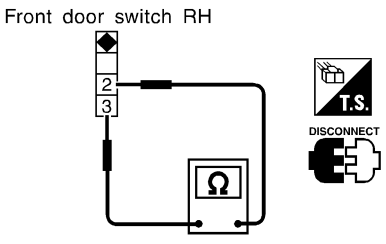
SEL152Y

OK or NG

OK	▶	GO TO 6.
NG	▶	GO TO 5.

5	CHECK FRONT RH DOOR SWITCH

Check continuity between door switch connector B129 terminals 2 and 3.



Continuity:
Door switch is pushed.
No
Door switch is released.
Yes

SEL325WC

OK or NG

OK	▶	**Check the following.** • Front RH door switch ground circuit and condition • Harness for open or short between smart entrance control unit and front RH door switch
NG	▶	Replace front RH door switch.

6 CHECK REAR LH AND RH DOOR SWITCHES INPUT SIGNAL

With CONSULT-II
Check door switches ("DOOR SW-RR") in "DATA MONITOR" mode with CONSULT-II.

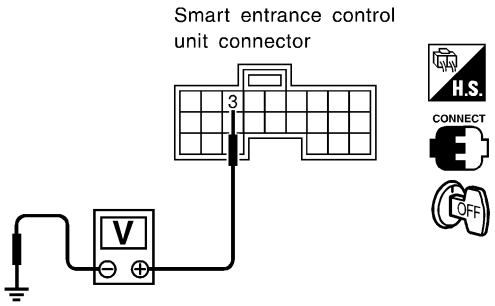
DATA MONITOR	
MONITOR	
DOOR SW-RR	OFF

When rear door LH and/or RH is open:
DOOR SW-RR ON

When driver's door is closed:
DOOR SW-RR OFF

SEL154Y

Without CONSULT-II
Check voltage between smart entrance control unit harness connector M143 terminals 3 (R/W) and ground.



Voltage [V]:
Condition of rear LH and/or RH door: CLOSED
Approx. 5
Condition of rear LH and/or RH door: OPENED
0

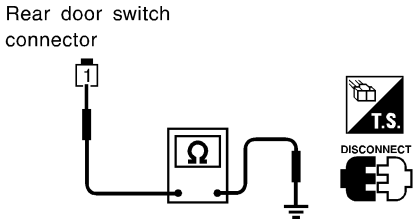
SEL155Y

OK or NG

OK	▶	GO TO 8.
NG	▶	GO TO 7.

7 CHECK REAR LH AND RH DOOR SWITCHES

1. Disconnect door switch harness connector.
2. Check continuity between door switch terminal 1 and ground.



Continuity:
Door switch is pushed.
No
Door switch is released.
Yes

SEL156Y

OK or NG

OK	▶	**Check the following.** • Rear LH and/or RH door switch ground circuit or door switch ground condition • Harness for open or short between smart entrance control unit and rear LH and/or RH door switch
NG	▶	Replace rear LH and/or RH door switch.

8	CHECK KEY SWITCH INPUT SIGNAL

With CONSULT-II

Check key switch ("KEY ON SW") in "DATA MONITOR" mode with CONSULT-II.

DATA MONITOR	
MONITOR	
KEY ON SW	ON

When key is inserted to ignition key cylinder:

KEY ON SW ON

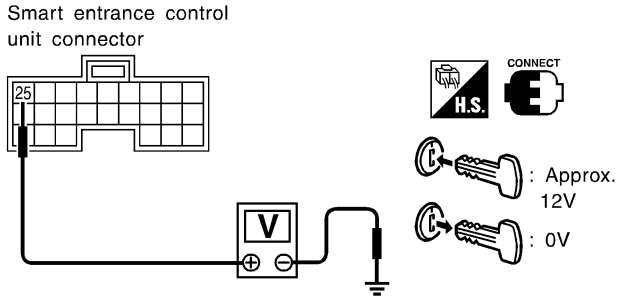
When key is removed from ignition key cylinder:

KEY ON SW OFF

SEL315W

Without CONSULT-II

Check voltage between smart entrance control unit harness connector M144 terminal 25 (B/R) and ground.



Voltage [V]:

Condition of key switch: Key is inserted.

Approx. 12

Condition of key switch: Key is removed.

0

SEL011Y

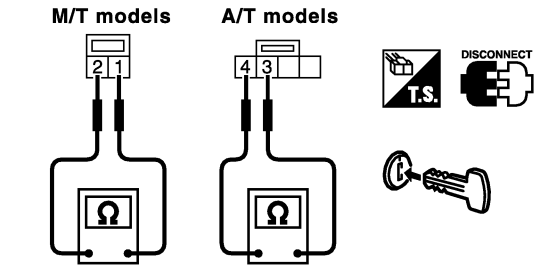
OK or NG

OK	▶	GO TO 10.
NG	▶	GO TO 9.

9	CHECK KEY SWITCH (INSERT)

Check the following.

- Continuity between key switch harness connector E95 terminals 1 and 2 (M/T models)
- Continuity between key switch harness connector E150 terminals 3 and 4 (A/T models)



Continuity:

Condition of key switch: Key is inserted.

Yes

Condition of key switch: Key is inserted.

No

SEL395Y

OK or NG

OK	▶	**Check the following.** • 10A fuse [No. 13, located in fuse block (J/B)] • Harness for open or short between key switch and fuse • Harness for open or short between smart entrance control unit and key switch
NG	▶	Replace key switch.

10	CHECK DOOR LOCK/UNLOCK SWITCH INPUT SIGNAL

With CONSULT-II

Check door lock/unlock switch ("LOCK SW DR/AS"/"UNLK SW DR/AS") in "DATA MONITOR" mode with CONSULT-II.

DATA MONITOR	
MONITOR	
LOCK SW DR/AS	OFF
UNLK SW DR/AS	OFF

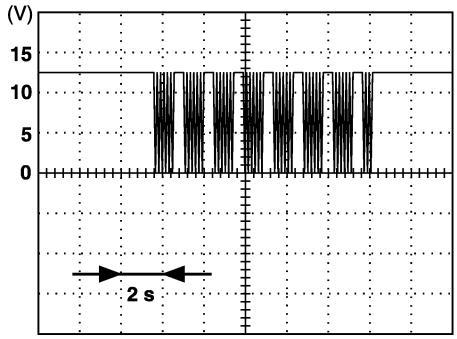
When lock/unlock switch is turned to LOCK:
LOCK SW DR/AS ON

When lock/unlock switch is turned to UNLOCK:
UNLK SW DR/AS ON

SEL341W

Without CONSULT-II

1. Remove key from ignition switch.
2. Check the signal between smart entrance control unit harness connector M144 terminal 33 (L) and ground with oscilloscope when door lock/unlock switch is turned "LOCK" or "UNLOCK".
3. Make sure signals which are shown in the figure below can be detected during 10 sec. just after door lock/unlock switch is turned "LOCK" or "UNLOCK".



Voltage:
12V → 9V (10 sec.) measurement by analog circuit tester.

SEL396Y

OK or NG

OK	▶	GO TO 11.
NG	▶	**Check the following.** ● Ground circuit for each front power window switch ● Harness for open or short between each front power window switch and smart entrance control unit connector If above systems are normal, replace the front power window switch.

11	CHECK DOOR KEY CYLINDER SWITCH INPUT SIGNAL (LOCK/UNLOCK SIGNAL)

With CONSULT-II

Check front door key cylinder switch ("KEY CYL LK-SW"/"KEY CYL UN-SW") in "DATA MONITOR" mode with CONSULT-II.

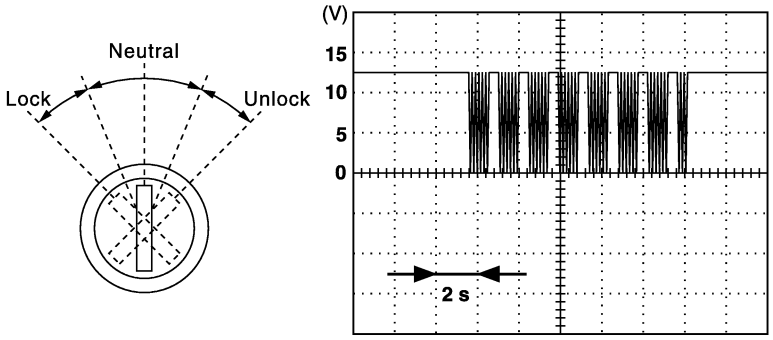
DATA MONITOR	
MONITOR	
KEY CYL LK-SW	OFF
KEY CYL UN-SW	OFF

When key inserted in front key cylinder is turned to LOCK:
KEY CYL LK-SW ON
When key inserted in front key cylinder is turned to UNLOCK:
KEY CYL UN-SW ON

SEL342W

Without CONSULT-II

1. Check the signal between smart entrance control unit harness connector M144 terminal 33 (L) and ground with oscilloscope when key inserted in front key cylinder is turned "LOCK" or "UNLOCK".
2. Make sure signals which are shown in the figure below can be detected during 10 sec. just after key is turned "LOCK" or "UNLOCK".



Voltage:
12V → 9V (10 sec.) measurement by analog circuit tester.

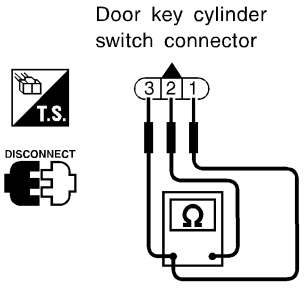
SEL397Y

OK or NG

OK	▶	Replace smart entrance control unit.
NG	▶	GO TO 12.

12 CHECK DOOR KEY CYLINDER SWITCH

1. Disconnect door key cylinder switch harness connector D8.
2. Check continuity between door key cylinder switch terminals.



① : Door unlock switch terminal
② : Ground terminal
③ : Door lock switch terminal

Terminals	Key position	Continuity
③ - ②	Neutral/Unlock	No
	Lock	Yes
① - ②	Neutral/Lock	No
	Unlock	Yes

SEL187Y

OK or NG

OK	▶	**Check the following.** ● Door key cylinder switch ground circuit ● Harness for open or short between front power window main switch and door key cylinder switch If above systems are normal, replace the front power window mian switch.
NG	▶	Replace door key cylinder switch.

DIAGNOSTIC PROCEDURE 2

NFEL0215S02

SYMPTOM: Interior lamp timer does not cancel properly.

1 CHECK IGNITION ON SIGNAL

With CONSULT-II

Check ignition switch ON signal ("IGN ON SW") in "DATA MONITOR" mode with CONSULT-II.

DATA MONITOR	
MONITOR	
IGN ON SW	ON

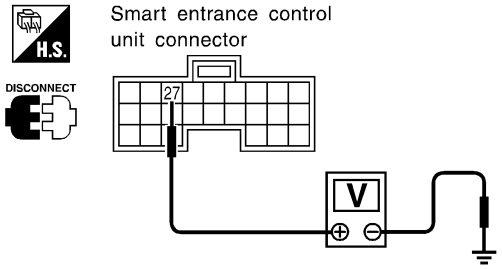
When ignition switch is ON:
IGN ON SW ON

When ignition switch is OFF:
IGN ON SW OFF

SEL318W

Without CONSULT-II

Check voltage between smart entrance control unit harness connector M144 terminal 27 (G) and ground.



Terminals		Ignition switch position		
(+)	(–)	OFF	ACC	ON
27	Ground	0V	0V	Battery voltage

SEL995X

OK or NG

OK	▶	GO TO 2.
NG	▶	**Check the following.** ● 10A fuse [No. 10, located in fuse block (J/B)] ● Harness for open or short between smart entrance control unit and fuse

2 CHECK FRONT LH DOOR SWITCH INPUT SIGNAL

With CONSULT-II

Check driver door switch signal ("DOOR SW-DR") in "DATA MONITOR" mode with CONSULT-II.

DATA MONITOR	
MONITOR	
DOOR SW-DR	OFF

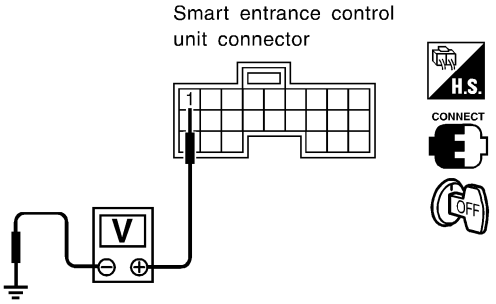
When front LH door is open:
DOOR SW-DR ON

When driver's door is closed:
DOOR SW-DR OFF

SEL319WA

Without CONSULT-II

Check voltage between smart entrance control unit harness connector M143 terminal 1 (LG) and ground.



Voltage [V]:
Condition of driver's door: CLOSED
Approx. 5
Condition of driver's door: OPEN
0

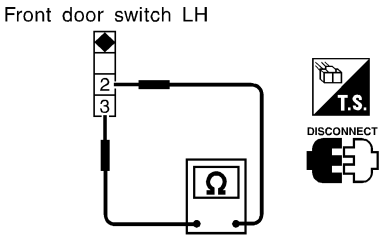
SEL004YA

OK or NG

OK	▶	GO TO 4.
NG	▶	GO TO 3.

3 CHECK FRONT LH DOOR SWITCH

Check continuity between door switch connector B29 terminals 2 and 3.



Continuity:
Door switch is pushed.
No
Door switch is released.
Yes

SEL325WB

OK or NG

OK	▶	**Check the following.** • Front LH door switch ground circuit and condition • Harness for open or short between smart entrance control unit and front LH door switch
NG	▶	Replace front LH door switch.

4	CHECK DOOR LOCK/UNLOCK SWITCH INPUT SIGNAL

With CONSULT-II

Check door lock/unlock switch ("LOCK SW DR/AS"/"UNLK SW DR/AS") in "DATA MONITOR" mode with CONSULT-II.

DATA MONITOR	
MONITOR	
LOCK SW DR/AS	OFF
UNLK SW DR/AS	OFF

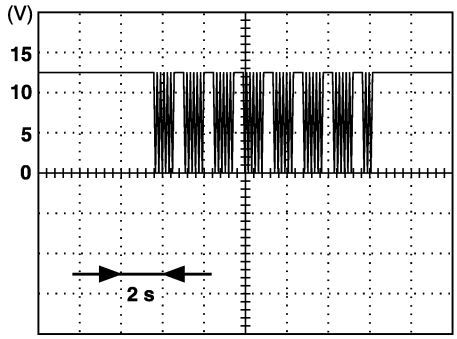
When lock/unlock switch is turned to LOCK:
LOCK SW DR/AS ON

When lock/unlock switch is turned to UNLOCK:
UNLK SW DR/AS ON

SEL341W

Without CONSULT-II

1. Remove key from ignition switch.
2. Check the signal between smart entrance control unit harness connector M144 terminal 33 (L) and ground with oscilloscope when door lock/unlock switch is turned "LOCK" or "UNLOCK".
3. Make sure signals which are shown in the figure below can be detected during 10 sec. just after door lock/unlock switch is turned "LOCK" or "UNLOCK".



Voltage:
12V → 9V (10 sec.) measurement by analog circuit tester.

SEL396Y

OK or NG

OK	▶	GO TO 5.
NG	▶	**Check the following.** ● Ground circuit for each front power window switch ● Harness for open or short between each front power window switch and smart entrance control unit connector If above systems are normal, replace the front power window switch.

5	CHECK DOOR KEY CYLINDER SWITCH INPUT SIGNAL (LOCK/UNLOCK SIGNAL)

With CONSULT-II

Check front door key cylinder switch ("KEY CYL LK-SW"/"KEY CYL UN-SW") in "DATA MONITOR" mode with CONSULT-II.

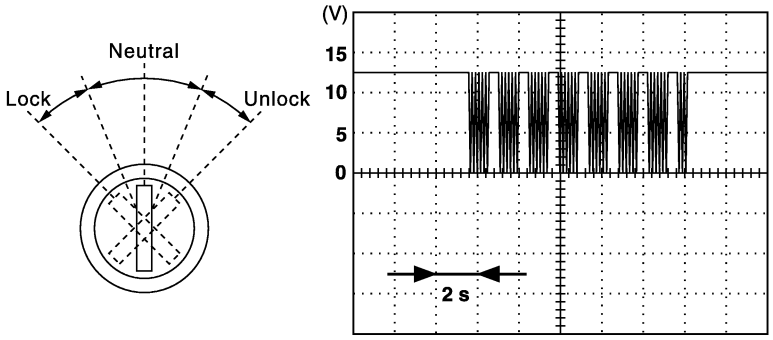
DATA MONITOR	
MONITOR	
KEY CYL LK-SW	OFF
KEY CYL UN-SW	OFF

When key inserted in front key cylinder is turned to LOCK:
KEY CYL LK-SW ON
When key inserted in front key cylinder is turned to UNLOCK:
KEY CYL UN-SW ON

SEL342W

Without CONSULT-II

1. Check the signal between smart entrance control unit harness connector M144 terminal 33 (L) and ground with oscilloscope when key inserted in front key cylinder is turned "LOCK" or "UNLOCK".
2. Make sure signals which are shown in the figure below can be detected during 10 sec. just after key is turned "LOCK" or "UNLOCK".



Voltage:
12V → 9V (10 sec.) measurement by analog circuit tester.

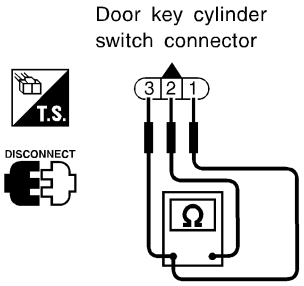
SEL397Y

OK or NG

OK	▶	Replace smart entrance control unit.
NG	▶	GO TO 6.

6 CHECK DOOR KEY CYLINDER SWITCH

1. Disconnect door key cylinder switch harness connector D8.
2. Check continuity between door key cylinder switch terminals.



① : Door unlock switch terminal
② : Ground terminal
③ : Door lock switch terminal

Terminals	Key position	Continuity
③ - ②	Neutral/Unlock	No
	Lock	Yes
① - ②	Neutral/Lock	No
	Unlock	Yes

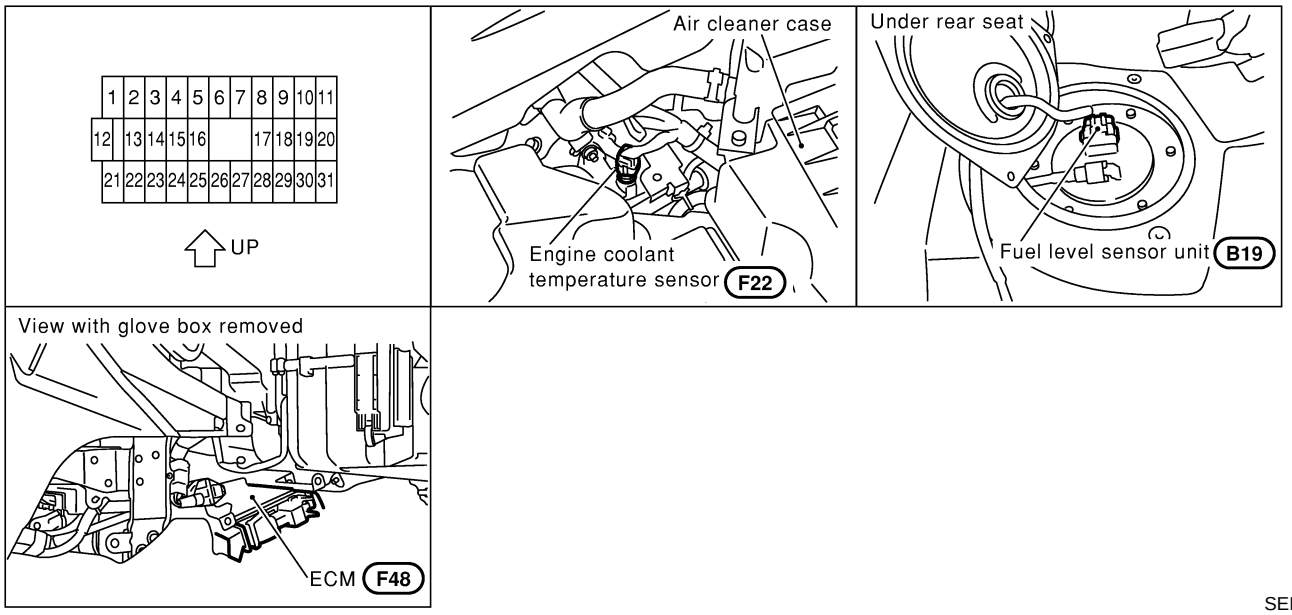
SEL187Y

OK or NG

OK	▶	**Check the following.** ● Door key cylinder switch ground circuit ● Harness for open or short between front power window main switch and door key cylinder switch If above systems are normal, replace the front power window main switch.
NG	▶	Replace door key cylinder switch.

Component Parts and Harness Connector Location

NFEL0041



SEL380Y

System Description

NFEL0042

UNIFIED CONTROL METER

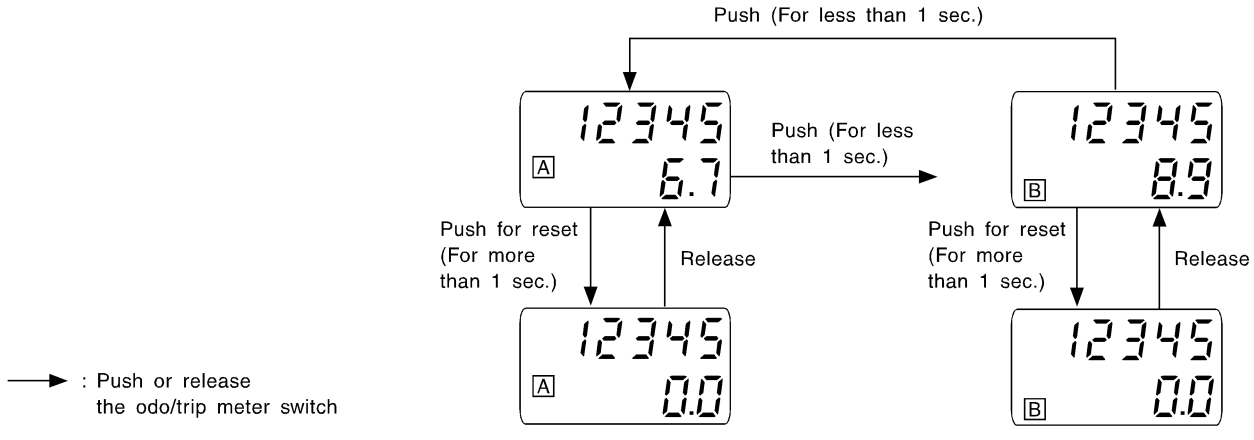
NFEL0042S06

- Speedometer, odo/trip meter, tachometer, fuel gauge and water temperature gauge are controlled totally by control unit built-in combination meter.
- Digital meter is adopted for odo/trip meter.*
  *The record of the odo meter 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 segment can be checked in diagnosis mode.
- Meter/gauge can be checked in diagnosis mode.

HOW TO CHANGE THE DISPLAY FOR ODO/TRIP METER

NFEL0042S07

The display is changed by pushing the odo/trip meter switch.



SEL175W

NOTE:
Turn ignition switch to the “ON” position to operate odo/trip meter.

System Description (Cont'd)

POWER SUPPLY AND GROUND CIRCUIT

NFEL0042S08

Power is supplied at all times

- through 10A fuse [No. 12, located in the fuse block (J/B)]
- to combination meter terminal 23.

With the ignition switch in the ACC or ON position, power is supplied.

- through 10A fuse [No. 1, located in the fuse block (J/B)]
- to combination meter terminal 31.

With the ignition switch in the ON or START position, power is supplied

- through 10A fuse [No. 30, located in the fuse block (J/B)]
- to combination meter terminal 24.

Ground is supplied

- to combination meter terminal 22
- through body grounds M9, M25 and M87.

WATER TEMPERATURE GAUGE

NFEL0042S01

The water temperature gauge indicates the engine coolant temperature. The reading on the gauge is received engine coolant temperature signal from ECM. ECM is detected by water temperature sensor.
The water temperature gauge is received by a signal

- from ECM terminal 18
- to combination meter terminal 18

The needle on the gauge moves from "C" to "H"

TACHOMETER

NFEL0042S02

The tachometer indicates engine speed in revolutions per minute (rpm).
The tachometer is regulated by a signal

- from terminal 34 of the ECM
- to combination meter terminal 16 for the tachometer.

FUEL GAUGE

NFEL0042S03

The fuel gauge indicates the approximate fuel level in the fuel tank.
The fuel gauge is regulated by a variable ground signal supplied

- to combination meter terminal 17 for the fuel gauge
- from terminal 2 of the fuel level sensor unit
- through terminal 5 of the fuel level sensor unit and
- through body ground B13.

SPEEDOMETER

NFEL0042S04

The combination meter provides a voltage signal to the vehicle speed sensor for the speedometer.
The voltage is supplied

- from combination meter terminal 15 for the speedometer
- to terminal 22 of ABS/TCS control unit (with TCS).
- to terminal 18 (A/T) or 19 (M/T) of ABS actuator and electric unit (without TCS).

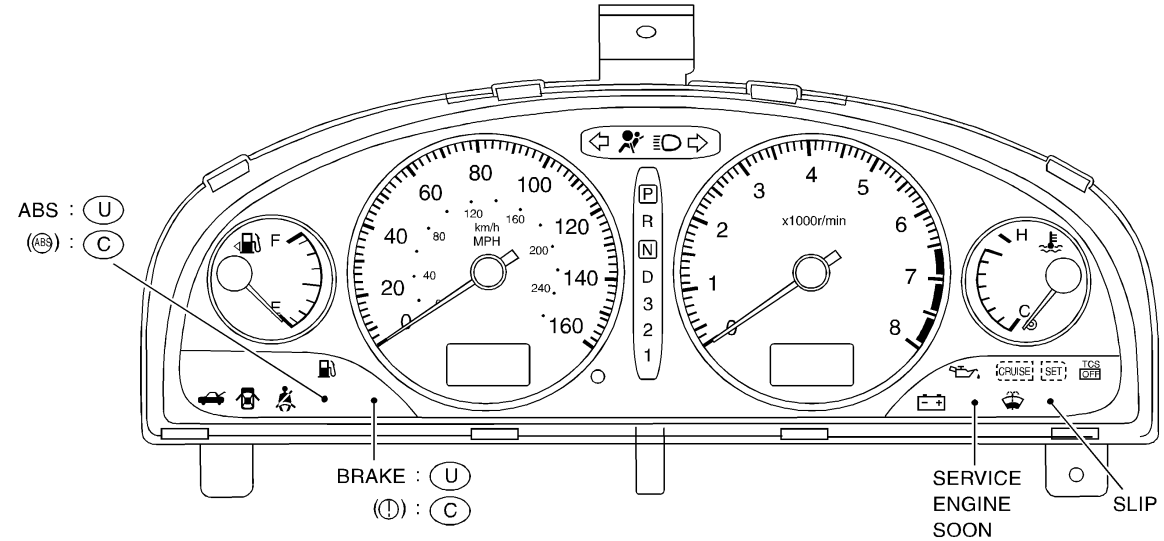
The speedometer converts the voltage into the vehicle speed displayed.

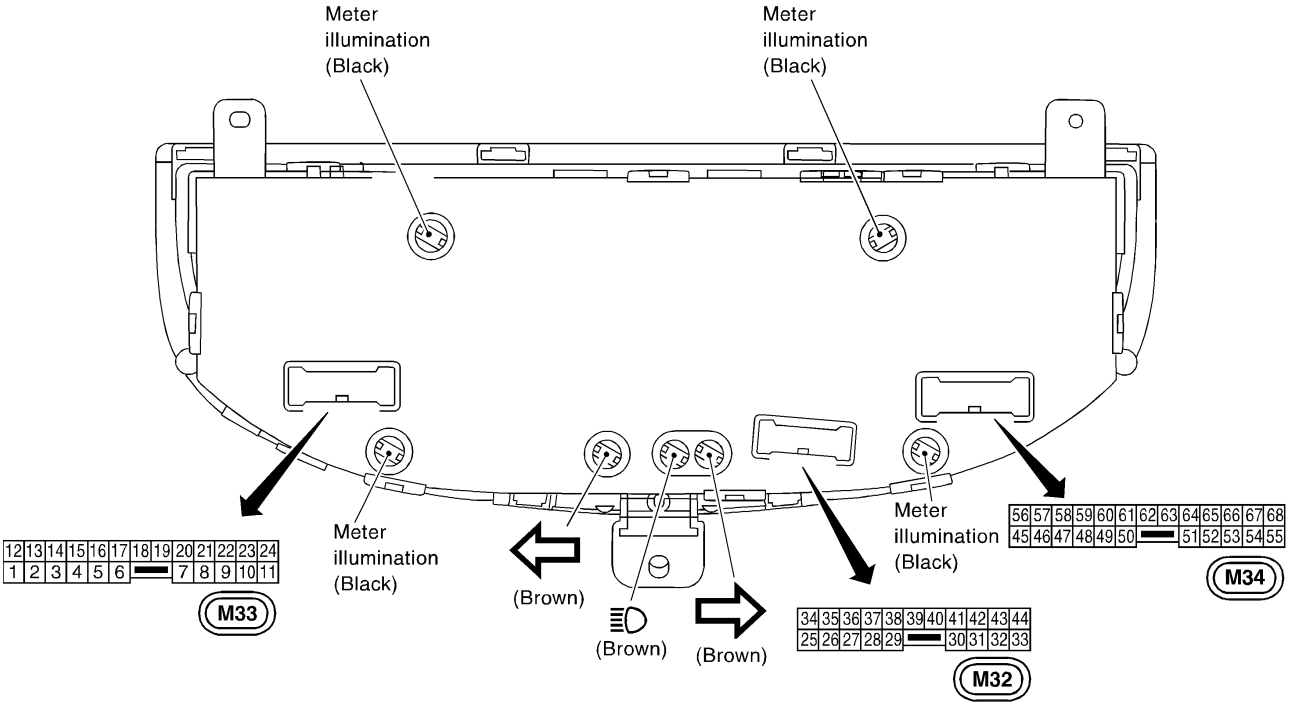
Combination Meter

NFEL0043

CHECK

NFEL0043S01





Bulb socket color	Bulb wattage
Brown	1.4W
Black	3W

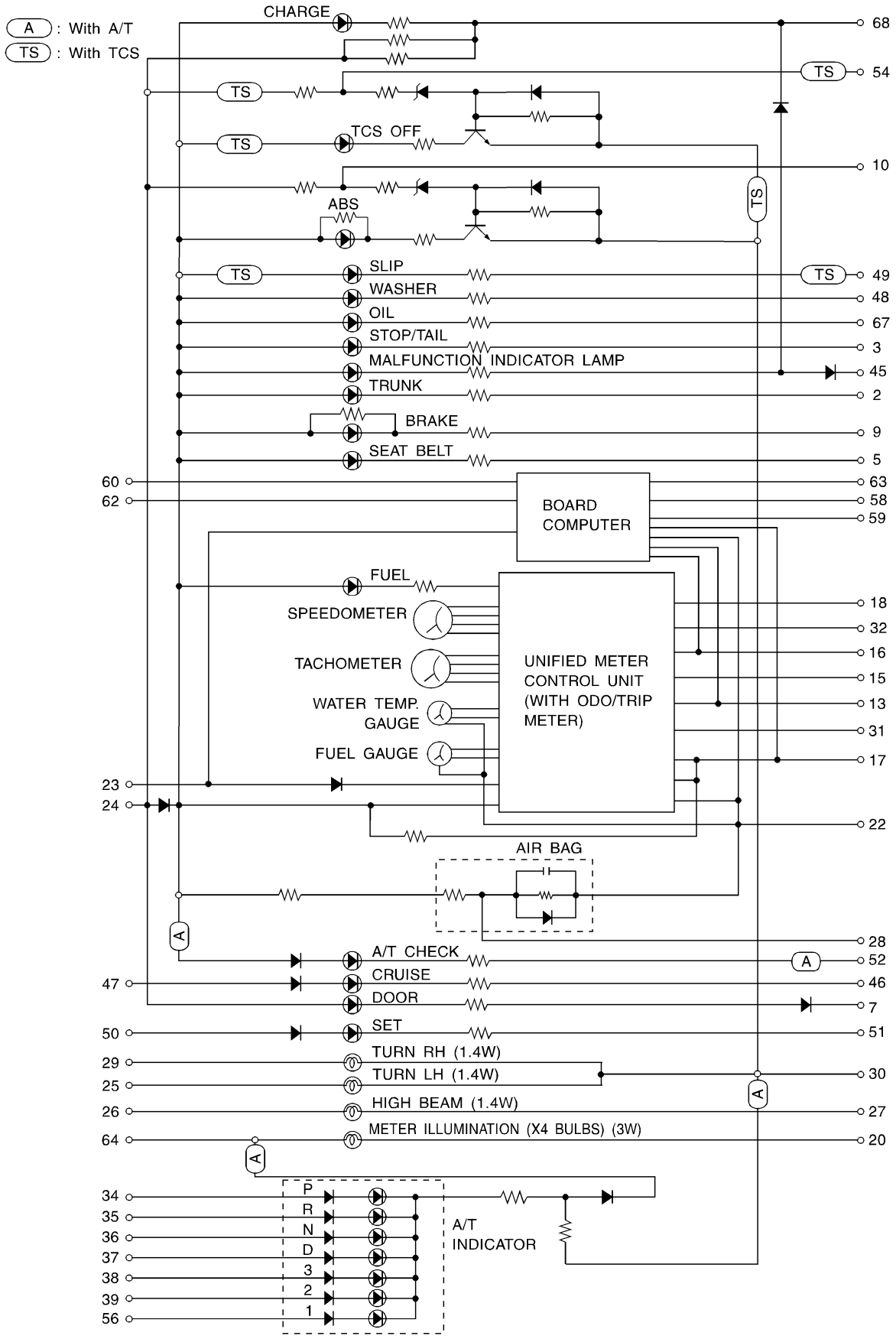
( ): Bulb socket color

U : For USA
C : For Canada

MEL080O

Schematic

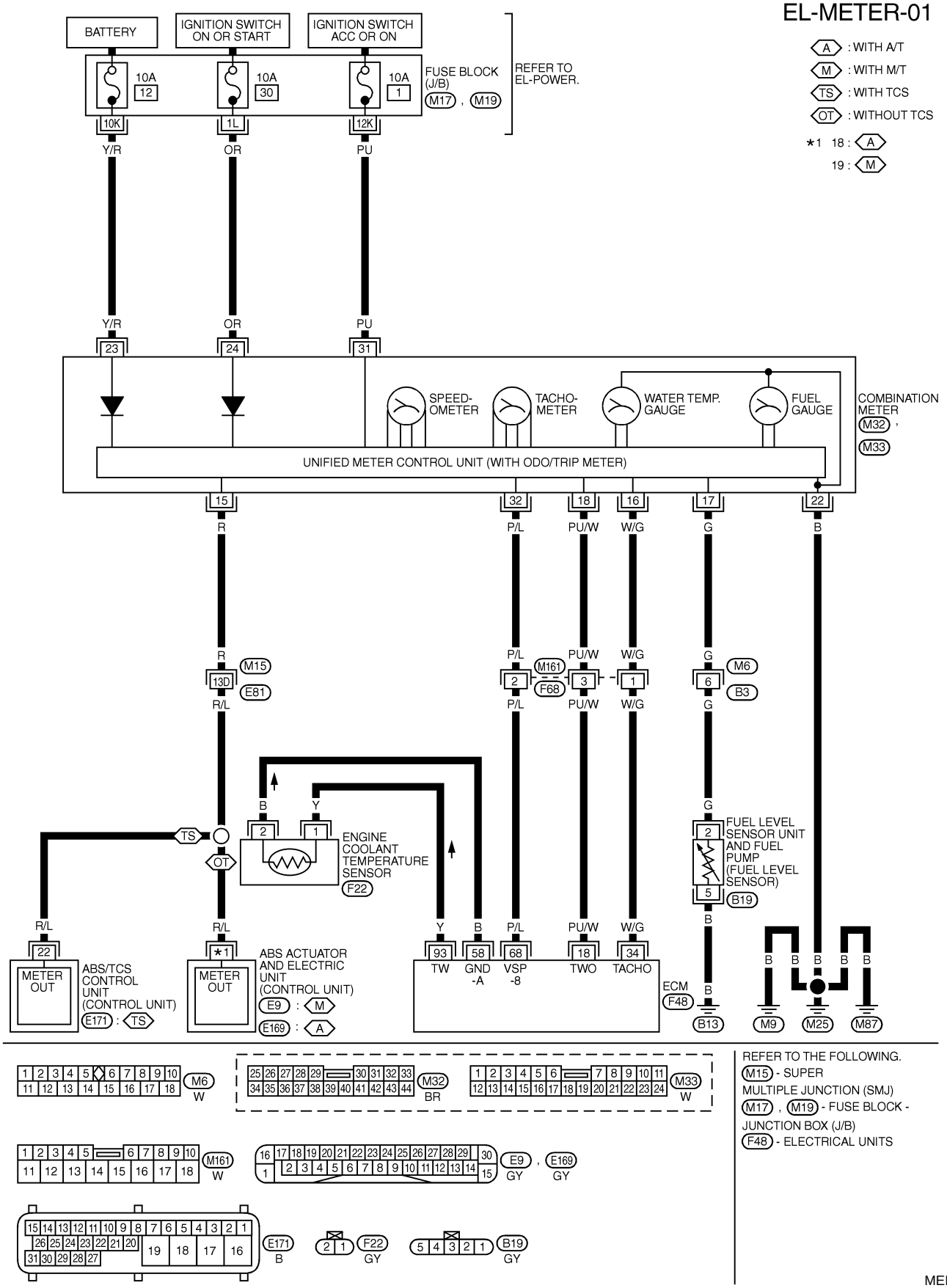
NFEL0254



MEL081O

Wiring Diagram — METER —

NFEL0045



Meter/Gauge Operation and Odo/Trip Meter Segment Check in Diagnosis Mode

NFEL0151

DIAGNOSIS FUNCTION

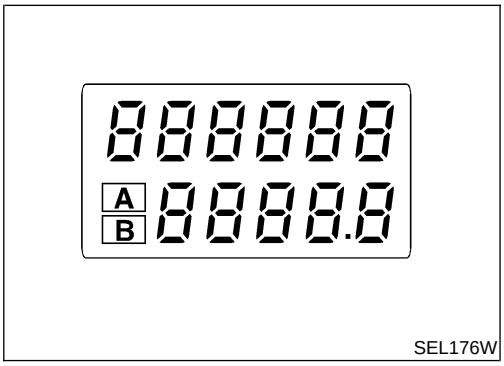
NFEL0151S01

- Odo/trip meter segment can be checked in diagnosis mode.
- Meters/gauges can be checked in diagnosis mode.

HOW TO ALTERNATE DIAGNOSIS MODE

NFEL0151S02

1. Turn ignition switch to ON and change odo/trip meter to “TRIP”.
2. Turn ignition switch to OFF.
3. Turn ignition switch to ON when pushing odo/trip meter switch.
4. Release odo/trip meter switch 1 second after ignition switch is turned ON.
5. Push odo/trip meter switch more than three times within 7 seconds.

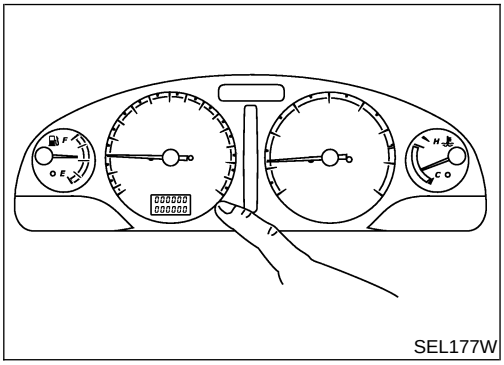


SEL176W

6. All odo/trip meter segments should be turned on.

NOTE:
If some segments are not turned on, unified meter control unit assembly should be replaced.

At this point, the unified control meter is turned to diagnosis mode.


SEL177W

7. Push odo/trip meter switch. Indication of each meter/gauge should be as shown left during pushing odo/trip meter switch if it is no malfunctioning.

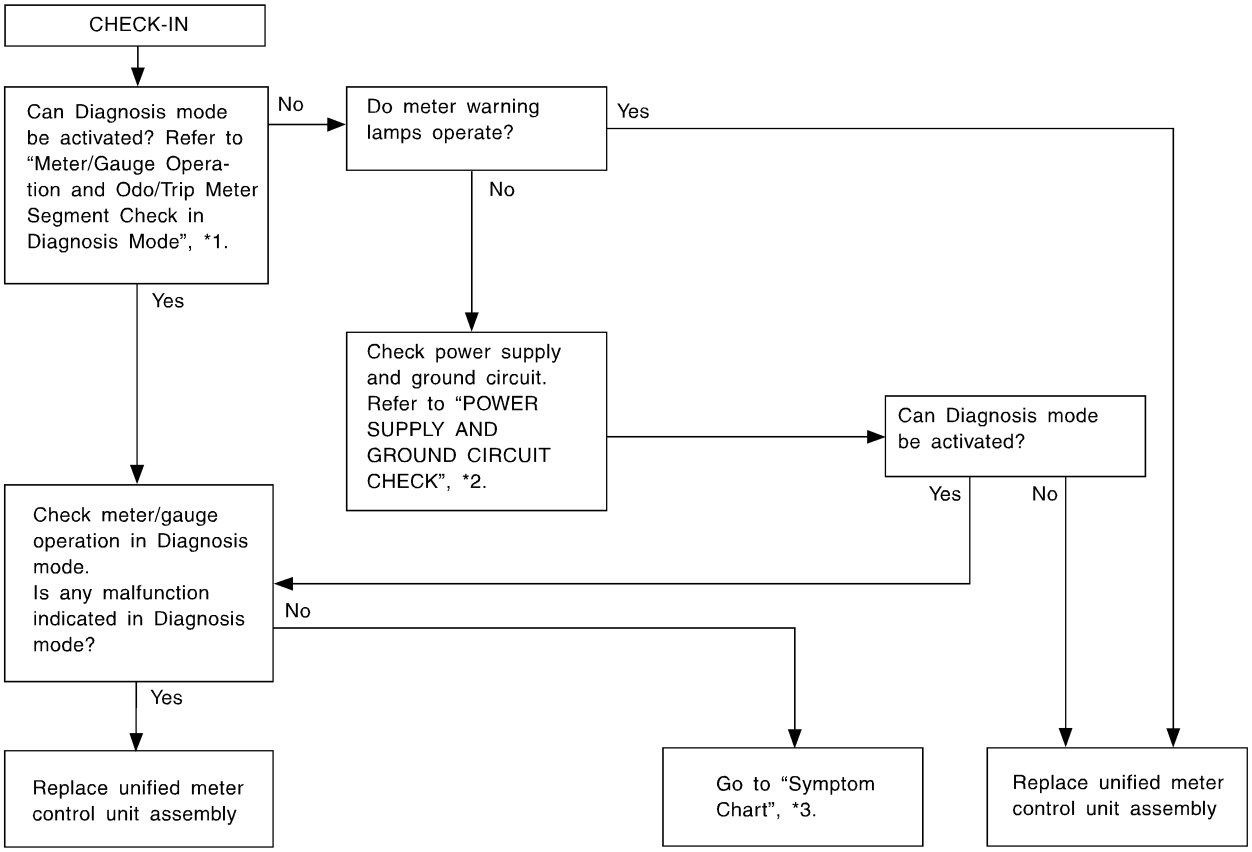
NOTE:
It takes about a few seconds for indication of fuel gauge and water temperature gauge to become stable.

Trouble Diagnoses

PRELIMINARY CHECK

NFEL0046

NFEL0046S04



SEL479Y

*1: Meter/Gauge Operation and Odo/Trip Meter Segment Check in Diagnosis Mode (EL-122)

*2: POWER SUPPLY AND GROUND CIRCUIT CHECK (EL-124)

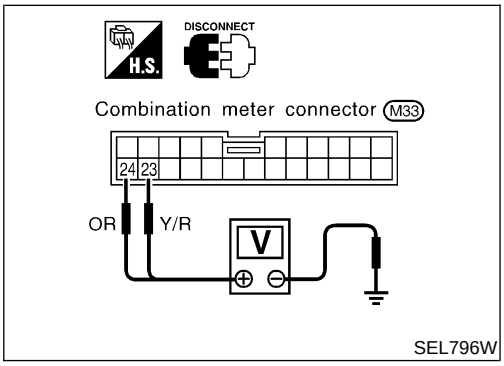
*3: Symptom Chart (EL-124)

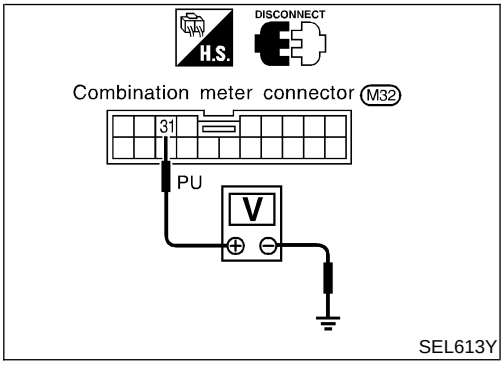
SYMPTOM CHART

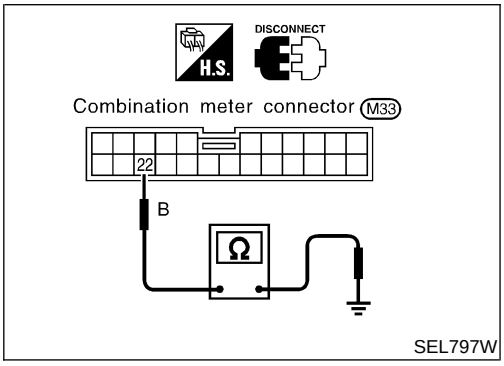
NFEL0046S10

Symptom	Possible causes	Repair order
One of speedometer/ tachometer/fuel gauge/ water temp. gauge is malfunctioning.	1. Sensor signal - Vehicle speed signal - Engine revolution signal - Fuel gauge - Water temp. gauge 2. Unified meter control unit	1. Check the sensor for malfunctioning meter/gauge. INSPECTION/VEHICLE SPEED SENSOR (Refer to EL-125.) INSPECTION/ENGINE REVOLUTION SIGNAL (Refer to EL-126.) INSPECTION/FUEL LEVEL SENSOR UNIT (Refer to EL-127.) INSPECTION/THERMAL TRANSMITTER (Refer to EL-128.) 2. Replace unified meter control unit assembly.
Multiple meter/gauge are malfunctioning. (except odo/trip meter)	Unified meter control unit	

Before starting trouble diagnoses below, perform PRELIMINARY CHECK, EL-123.







POWER SUPPLY AND GROUND CIRCUIT CHECK

NFEL0046S07

Power Supply Circuit Check

NFEL0046S0701

Terminals		Ignition switch position		
(+)	(−)	OFF	ACC	ON
23	Ground	Battery voltage	Battery voltage	Battery voltage
24	Ground	0V	0V	Battery voltage
31	Ground	0V	Battery voltage	Battery voltage

If NG, check the following.

- 10A fuse [No. 12, located in fuse block (J/B)]
- 10A fuse [No. 30, located in fuse block (J/B)]
- 10A fuse [No. 1, located in fuse block (J/B)]
- Harness for open or short between fuse and combination meter

Ground Circuit Check

NFEL0046S0702

Terminals	Continuity
22 - Ground	Yes

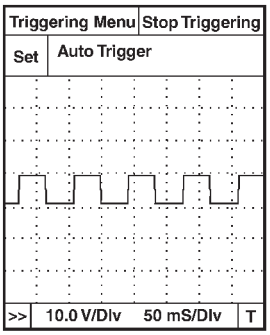
INSPECTION/VEHICLE SPEED SENSOR

=NFEL0046S03

1	CHECK ABS CONTROL UNIT OUTPUT SIGNAL

With CONSULT-II

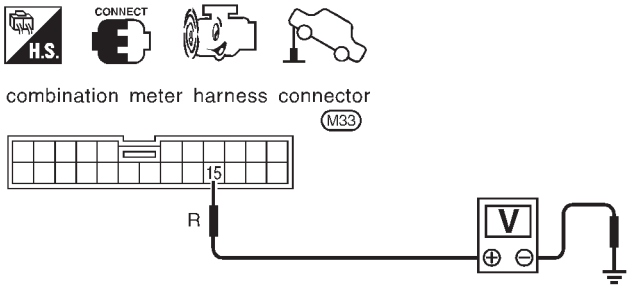
1. Lift up drive wheels.
2. Start engine and drive vehicle at more than 20 km/h (12 MPH).
3. Check signal between combination meter terminal 15 and ground when rotating wheels with engine at idle. (Use "SIMPLE OSCILLOSCOPE" in "SUB MODE" with CONSULT-II.)



SEL938W

Without CONSULT-II

1. Lift up drive wheels.
2. Start engine and drive vehicle at more than 20 km/h (12 MPH).
3. Check voltage between combination meter terminal 15 and ground when rotating wheels with engine at idle.



Voltage: Approx. 0 - 5V

SEL939W

OK or NG

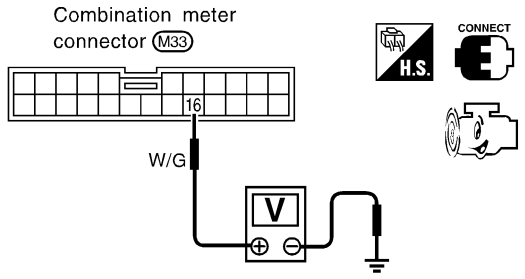
OK	▶	ABS/TCS control unit or ABS actuator and electric unit is OK.
NG	▶	**Check the following.** ● Harness for open or short between ABS/TCS control unit or ABS actuator and electric unit and combination meter. ● ABS/TCS control unit or ABS actuator and electric unit. Refer to BR-110 (with TCS), BR-61 (without TCS), "Wheel Sensor or Rotor".

INSPECTION/ENGINE REVOLUTION SIGNAL

NFEL0046S02

1	CHECK ECM OUTPUT

1. Start engine.
2. Check voltage between combination meter terminals 16 and ground at idle and 2,000 rpm.



Higher rpm = Higher voltage
Lower rpm = Lower voltage
Voltage should change with rpm.

SEL364W

OK or NG

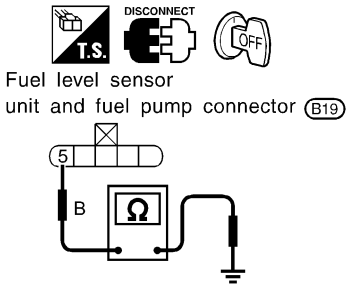
OK	▶	Engine revolution signal is OK.
NG	▶	Harness for open or short between ECM and combination meter

INSPECTION/FUEL LEVEL SENSOR UNIT

=NFEL0046S08

1	CHECK GROUND CIRCUIT FOR FUEL LEVEL SENSOR UNIT

Check harness continuity between fuel level sensor unit and fuel pump connector terminal 5 and ground.



Continuity should exist.

SEL182W

OK or NG

OK	▶	GO TO 2.
NG	▶	Repair harness or connector.

2	CHECK FUEL LEVEL SENSOR UNIT

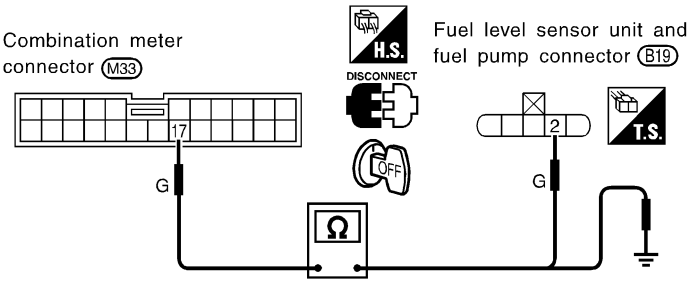
Refer to "FUEL LEVEL SENSOR UNIT CHECK" (EL-129).

OK or NG

OK	▶	GO TO 3.
NG	▶	Replace fuel level sensor unit.

3	CHECK HARNESS FOR OPEN OR SHORT

1. Disconnect combination meter connector and fuel level sensor unit and fuel pump connector.
2. Check continuity between combination meter terminal 17 and fuel level sensor unit and fuel pump connector terminal 2.
   Continuity should exist.
3. Check continuity between combination meter terminal 17 and ground.
   Continuity should not exist.



SEL183W

OK or NG

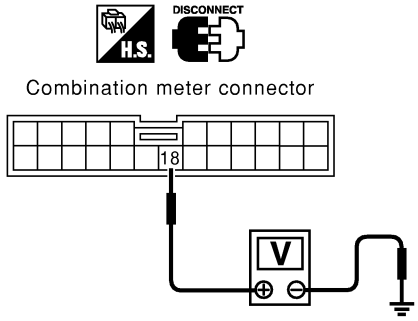
OK	▶	Fuel level sensor unit is OK.
NG	▶	Repair harness or connector.

INSPECTION/THERMAL TRANSMITTER

=NFEL0046S09

1 CHECK ECM OUTPUT

1. Disconnect combination meter.
2. Check voltage between combination meter harness connector M33 terminal 18 (PU/W) and ground.
   Battery voltage should exist.



Terminals		Ignition switch position		
(+)	(−)	OFF	ACC	ON
18	Ground	0V	0V	Battery voltage

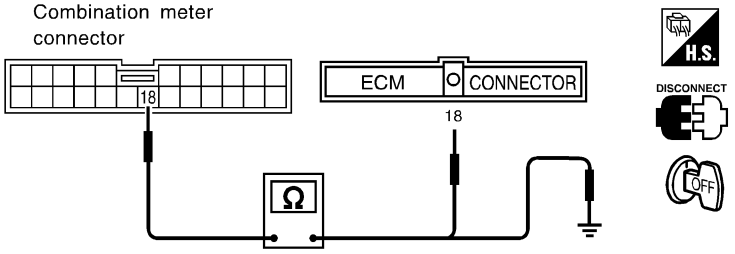
SEL413Y

OK or NG

OK	▶	GO TO 2.
NG	▶	Replace.

2 CHECK HARNESS FOR OPEN OR SHORT

1. Disconnect combination meter connector and ECM connector.
2. Check continuity between combination meter terminal 18 and ECM terminal 18.
   Continuity should exist.
3. Check continuity between combination meter terminal 18 and ground.
   Continuity should not exist.



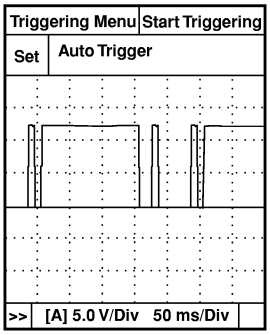
SEL417Y

OK or NG

OK	▶	Thermal transmitter is OK.
NG	▶	Repair harness or connector.

3	CHECK WATER TEMPERATURE OUTPUT SIGNAL

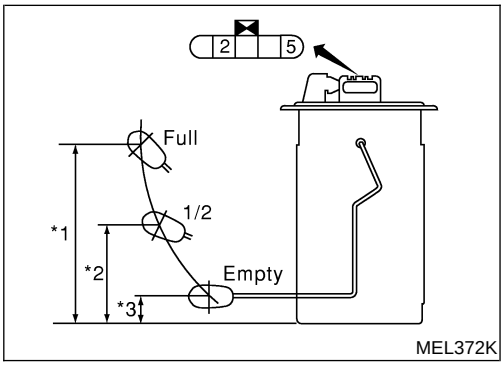
1. Connect combination meter connector and ECM connector.
2. Start engine.
3. Check output signal between combination meter harness connector M33 terminal 18 (PU/W) and ground. (Use "SIMPLE OSCILLOSCOPE" in "SUB MODE" with CONSULT-II.



SEL414Y

OK or NG

OK	▶	Replace combination meter.
NG	▶	Check ECM.



MEL372K

Electrical Components Inspection

NFEL0047

FUEL LEVEL SENSOR UNIT CHECK

NFEL0047S01

- For removal, refer to FE-6.

Check the resistance between terminals 2 and 5.

Ohmmeter (+)	Ohmmeter (−)	Float position mm (in)			Resistance value Ω
2	5	*1	Full	158 (6.22)	Approx. 4.5 - 5.5
		*2	1/2	89.7 (3.531)	31.5 - 33.5
		*3	Empty	22.1 (0.870)	80.0 - 80.3

*1 and *3: When float rod is in contact with stopper.

System Description

NFEL0283

FUNCTION

NFEL0283S01

This board computer can indicate following items.

- Outside air temperature
- Range (Cruising possible distance)
- Journey time (hour meter)
- Average fuel consumption
- Average vehicle speed

Outside air temperature indication

- This indicator shows indication of outside air temperature while ignition switch is in ON position.
- Ambient sensor is used commonly by auto air conditioner and this board computer. When auto air conditioner operates, board computer will correct ambient sensor signal based on positive voltage signal to terminal 60 of board computer from A/C auto amp.
- Indication range is between −30 and +55°C (−22 and 131°F). (When outside temperature is less than −30°C (−22°F) or more than +55°C (131°F), display shows "- - - -".)
- When outside temperature is less than 3°C (37°F) continuously, display will blink as a warning. In this case, the display will change to the OUTSIDE AIR TEMPERATURE mode even though the display is showing a different item. (See NOTE.)
- The indicated temperature is not affected by engine heat. It changes only when one of the following condition exists.

a) When vehicle speed is more than 20 km/h (12 MPH).
b) The ignition key has been turned to OFF position for more than 3.5 hours.
c) When outside temperature is lower than indicated temperature.

Range (Cruising possible distance) indication

- The range indication provides driver with an estimation of the distance that can be driven before refueling. The range is conducted by fuel tank gauge unit (fuel remaining), ECM pulse signal (fuel consumption) and vehicle speed signal.
- Indication will be refreshed every 30 seconds.
- When fuel remaining is less than approx. 10.8 ℓ (11-3/8 US qt, 9-1/2 Imp qt), indication will blink as a warning. If the fuel remaining less than approx. 10.5 ℓ (11-1/8 US qt, 9-1/4 Imp qt), indication will show "- - - -". In this case, the display will change to the RANGE mode automatically even though the display is showing a different item. (See NOTE.)

Average fuel consumption

- Average fuel consumption indication is conducted by ECM pulse signal and vehicle speed signal after system is reset.
- Indication will be refreshed every 30 seconds.
- After reset operation, the display shows "...." until the vehicle is driven 500 m (1,600 ft) and 30 seconds has passed.

Average vehicle speed

- Average vehicle speed indication is conducted by running distance and running time.
- Indication will be refreshed every 30 seconds.
- After reset operation, the displays shows "...." for 30 seconds.

Journey time

- Journey time indication is conducted by integration of ignition ON time.

HOW TO CHANGE/RESET INDICATION

NFEL0283S02

- Indication can be changed by in following order by pushing board computer steering switch "TRIP".
  OUTSIDE AIR TEMPERATURE → RANGE → AVERAGE FUEL CONSUMPTION → AVERAGE VEHICLE SPEED → JOURNEY TIME
- Continuous pushing the switch (more than 0.8 second) can reset the indication of journey time (hour meter), average vehicle speed and average fuel consumption.

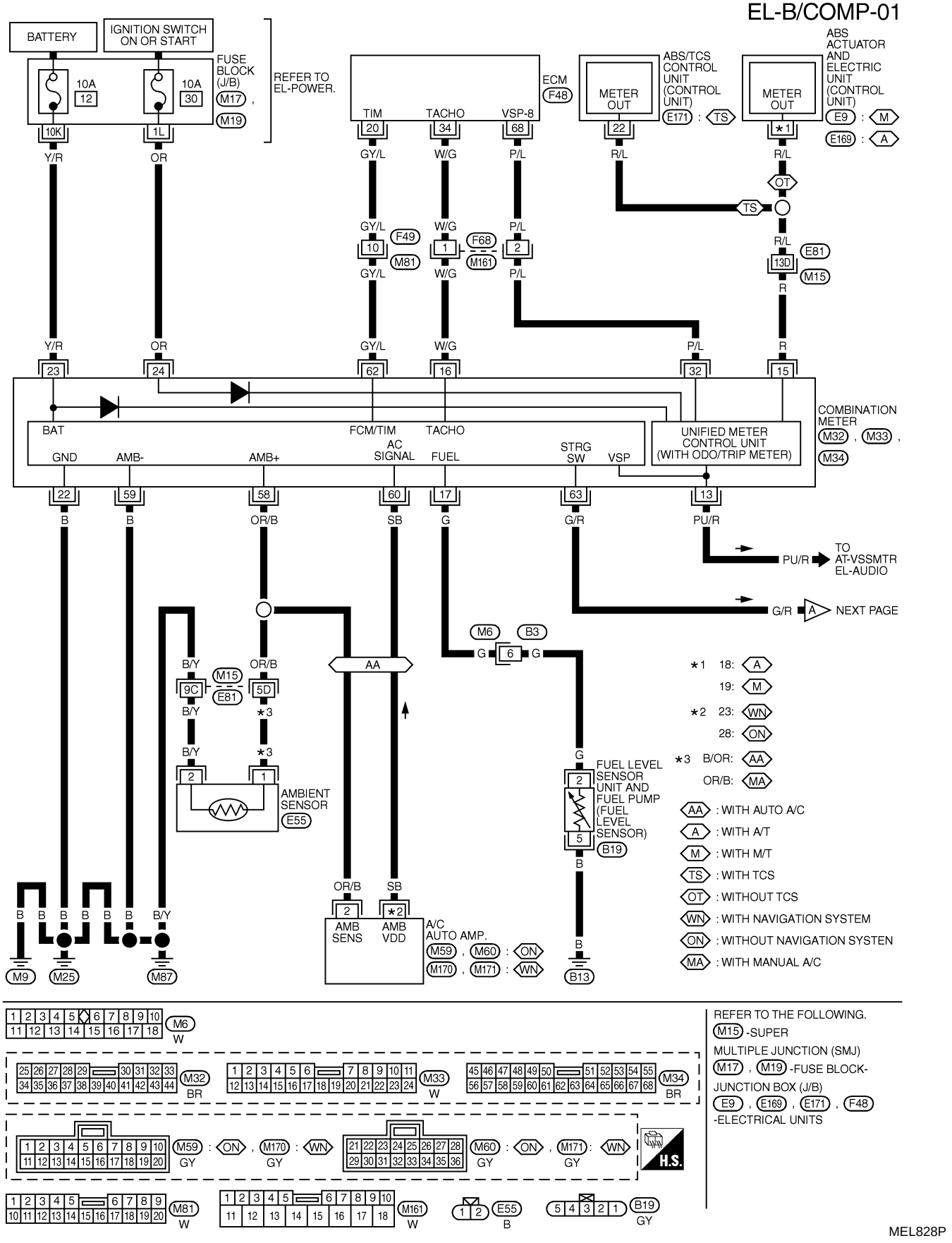
NOTE:

- **After the display changes automatically, the indication can be changed to the last mode by pushing the board computer steering switch. In this case, the cursor ("▲") will blink as a warning.**

- **When the OUTSIDE AIR TEMPERATURE warning and the RANGE warning match warning conditions at the same time, the display automatically indicates the OUTSIDE AIR TEMPERATURE.**

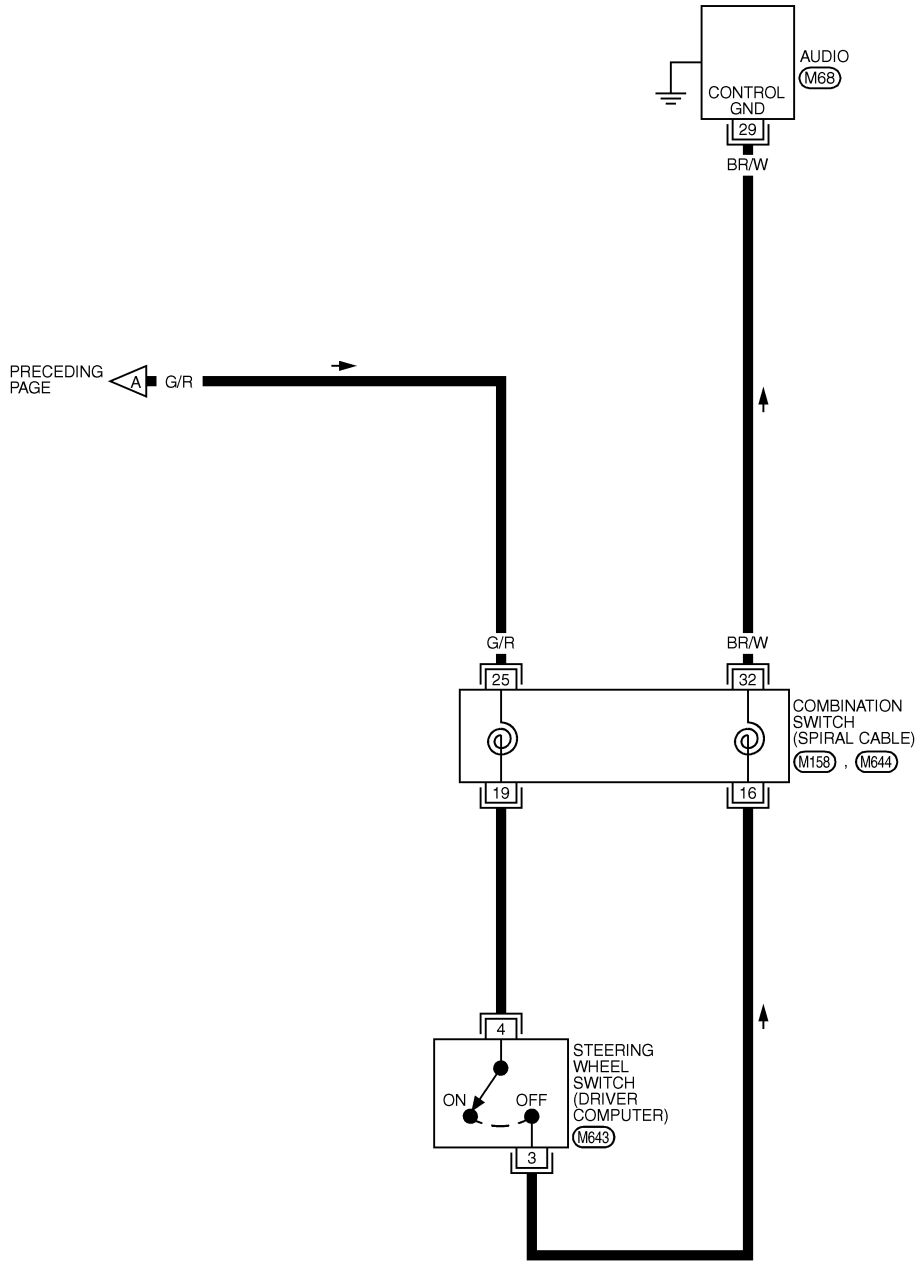
Wiring Diagram — B/COMP —

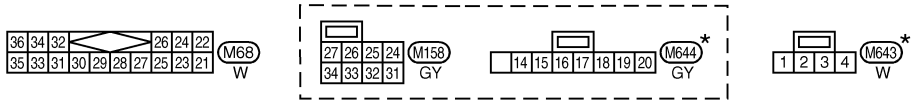
NFEL0284



MEL828P

EL-B/COMP-02





* : THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT" , EL SECTION.

MEL727P

Trouble Diagnoses

=NFEL0285

SEGMENT CHECK

NFEL0285S01

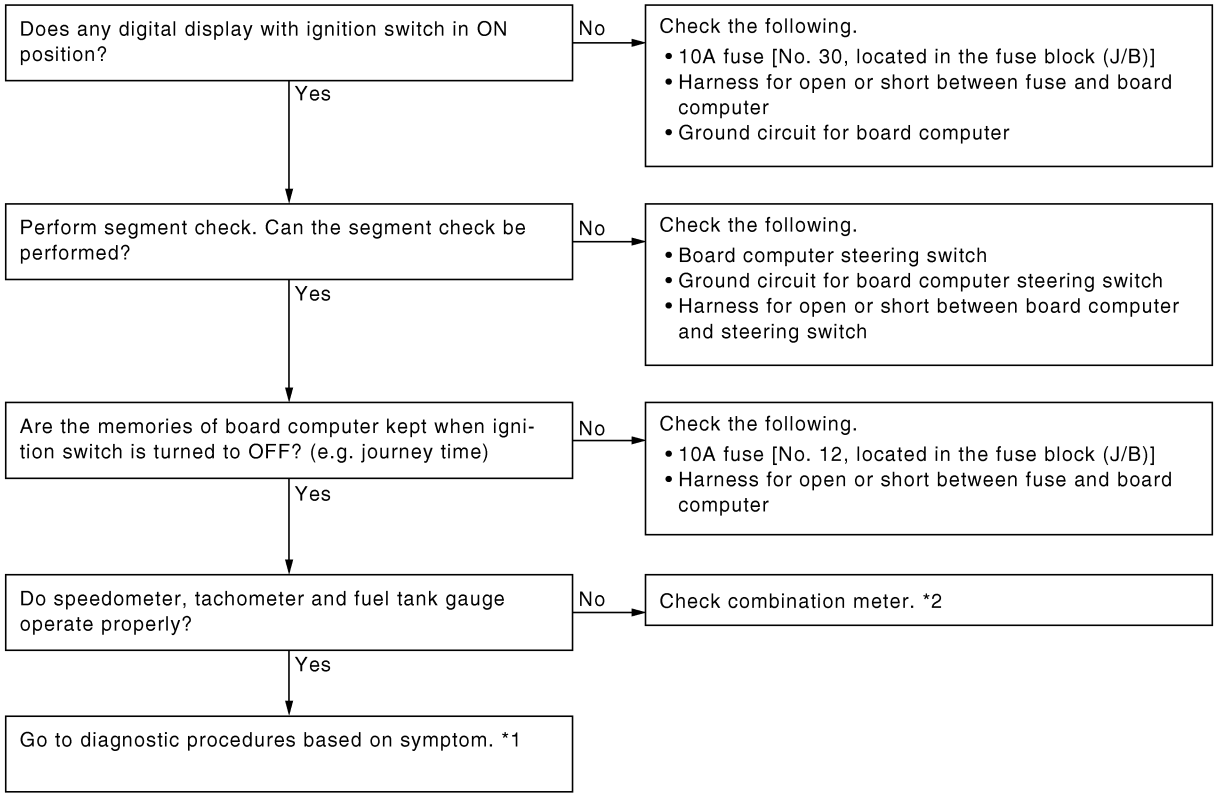
Board computer display segment can be checked by the procedure shown below.

1. Turn ignition switch to ON position with pushing board computer steering switch “TRIP”. Then segment check will start.
2. Segment check will end after 1 cycle of segment check is performed or any of following conditions exists.

- Ignition switch is returned to ACC or OFF position.
- Vehicle speed signal is input.

PRELIMINARY CHECK

NFEL0285S02



SEL831W

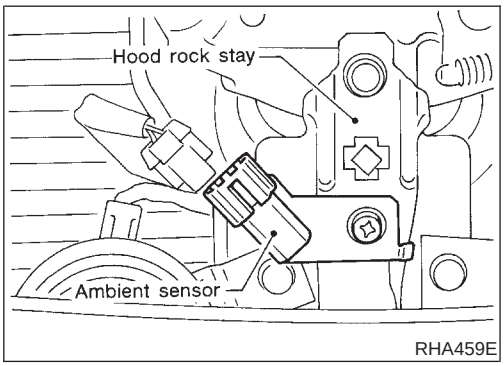
*1 EL-134 *2 EL-122

DIAGNOSES PROCEDURE

NFEL0285S03

Symptom	Possible cause	Repair order
Outside air temperature is not displayed properly. (It may take a short time to steady the indication after ignition switch is turned to ON.)	1. Ambient sensor 2. Ambient sensor circuit 3. A/C on signal (For models with auto A/C) 4. Vehicle speed sensor signal	1. Check ambient sensor. Refer to “Electrical Components Inspection”, EL-135. 2. Check harness for open or short between ambient sensor and board computer. 3. Verify more than 4V is present at terminal 60 of board computer when A/C is operated. 4. Make sure journey distance (trip) is displayed properly. If NG, check journey distance (trip) display.
Range (Cruising possible distance) is not displayed properly.	1. Average fuel consumption display 2. Fuel tank gauge signal circuit	1. Make sure fuel consumption is displayed properly. If NG, check fuel consumption display. 2. Make sure fuel gauge operates properly. If NG, check fuel gauge. Refer to EL-127.

Symptom	Possible cause	Repair order
Journey time (hour meter) is not indicated properly.	1. 10A fuse	1. 10A fuse [No. 12, located in the fuse block (J/B)]. Verify battery voltage is present at terminal 23 of combination meter.
Average fuel consumption is not displayed properly.	Fuel consumption signal	Check harness for open or short between ECM terminals (20, 34) and combination meter terminals (62, 16).
Average vehicle speed is not indicated properly.	Journey time (hour meter) display	Make sure journey time is displayed properly. If NG, check journey time display.



Electrical Components Inspection

NFEL0286

AMBIENT SENSOR

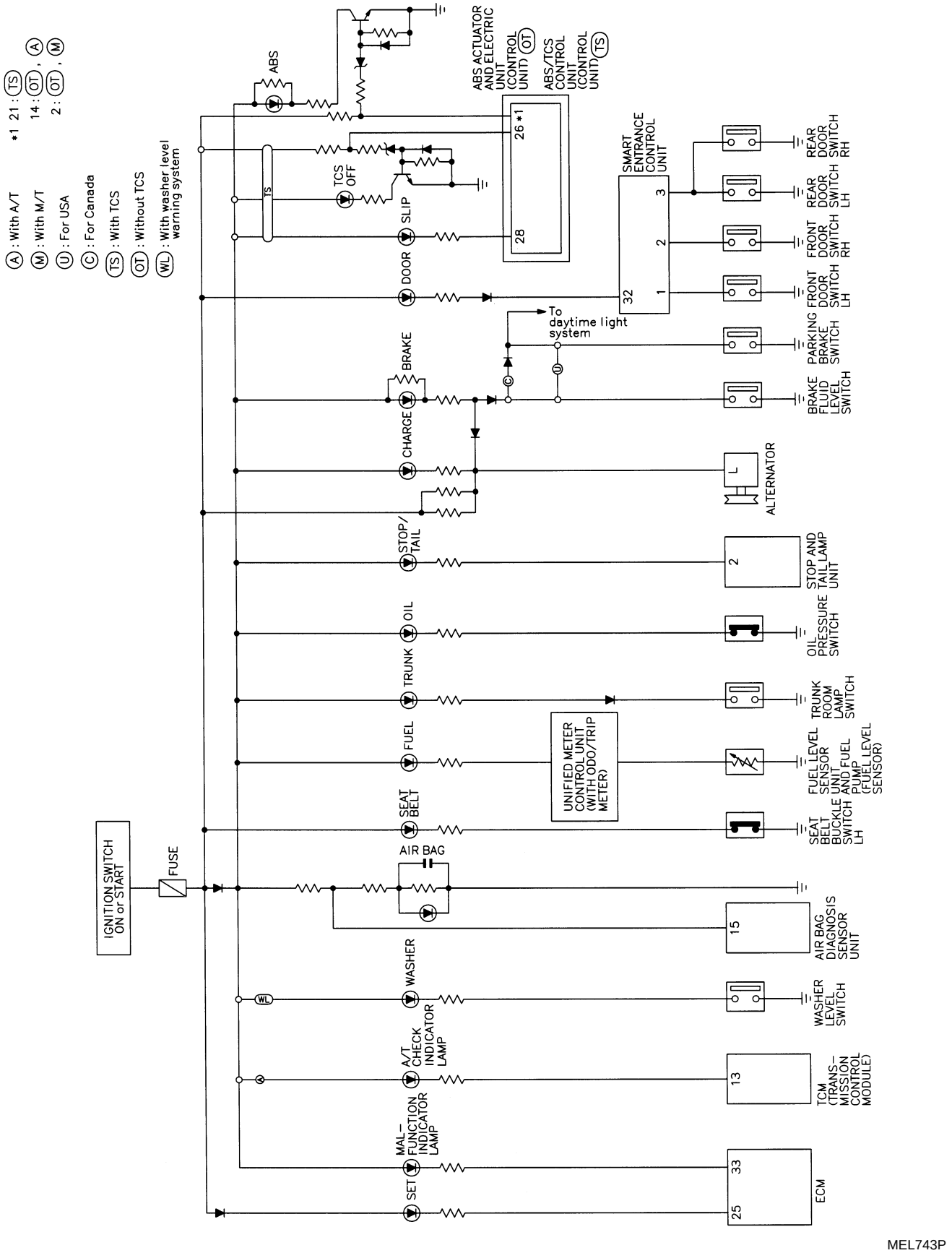
NFEL0286S01

The ambient sensor is attached to the radiator core support. It detects ambient temperature and converts it into a resistance value which is then input to A/C auto amp. and board computer.
After disconnecting ambient sensor harness connector, measure resistance between terminals 1 and 2, using the table below.

Temperature °C (°F)	Resistance kΩ
−15 (5)	12.73
−10 (14)	9.92
−5 (23)	7.80
0 (32)	6.19
5 (41)	4.95
10 (50)	3.99
15 (59)	3.24
20 (68)	2.65
25 (77)	2.19
30 (86)	1.81
35 (95)	1.51
40 (104)	1.27
45 (113)	1.07

Schematic

NFEL0049

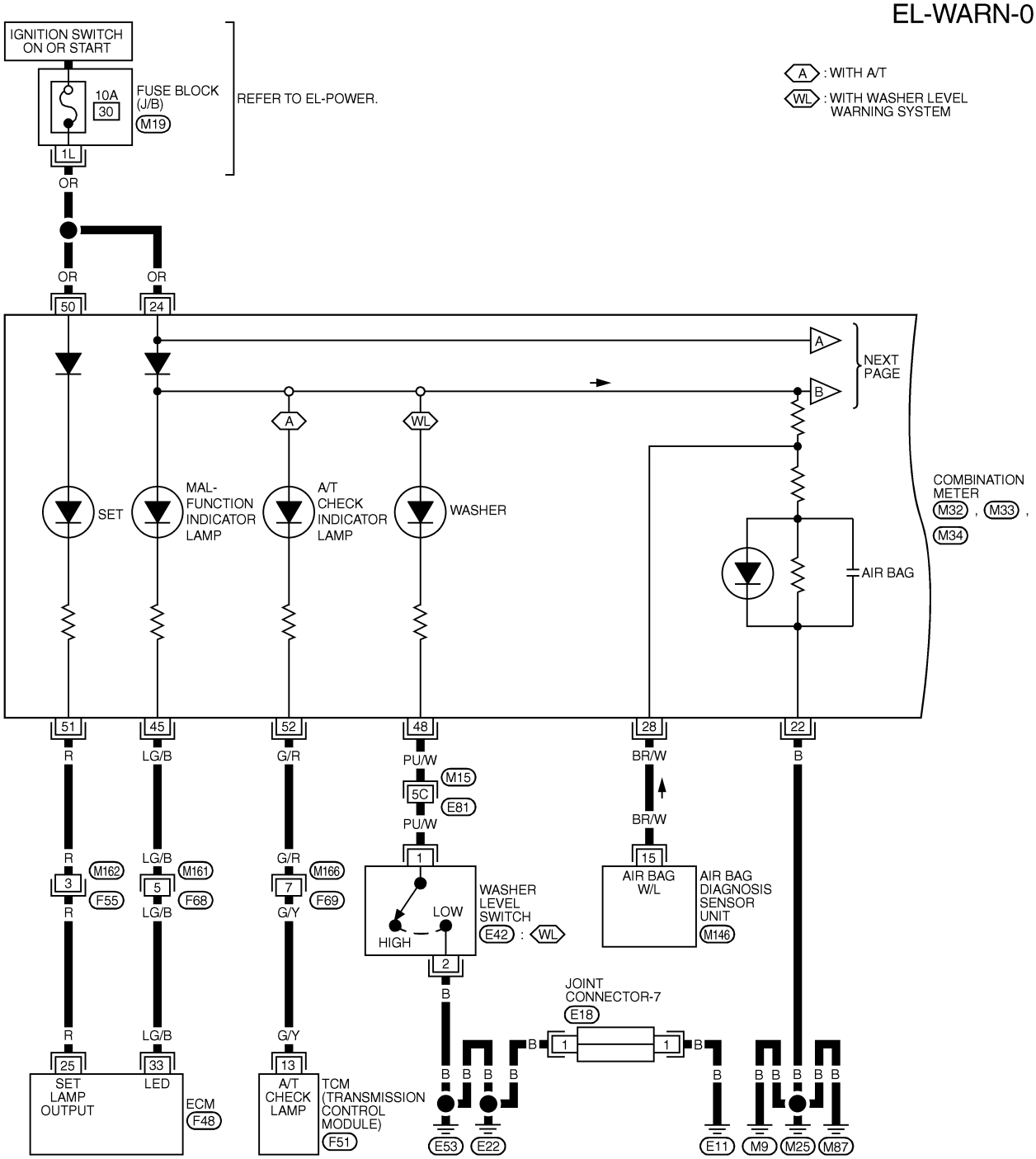


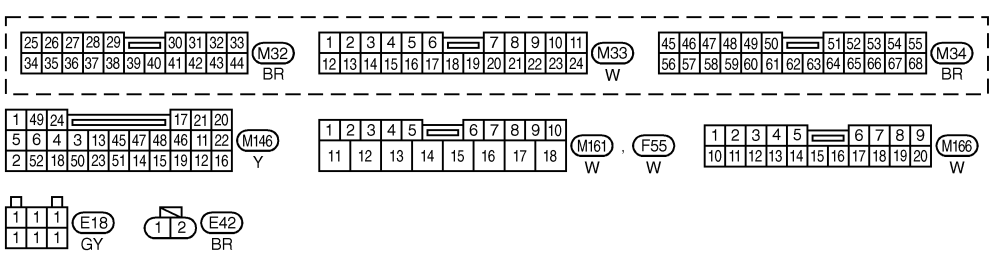
MEL743P

Wiring Diagram — WARN —

NFEL0050

EL-WARN-01





REFER TO THE FOLLOWING.

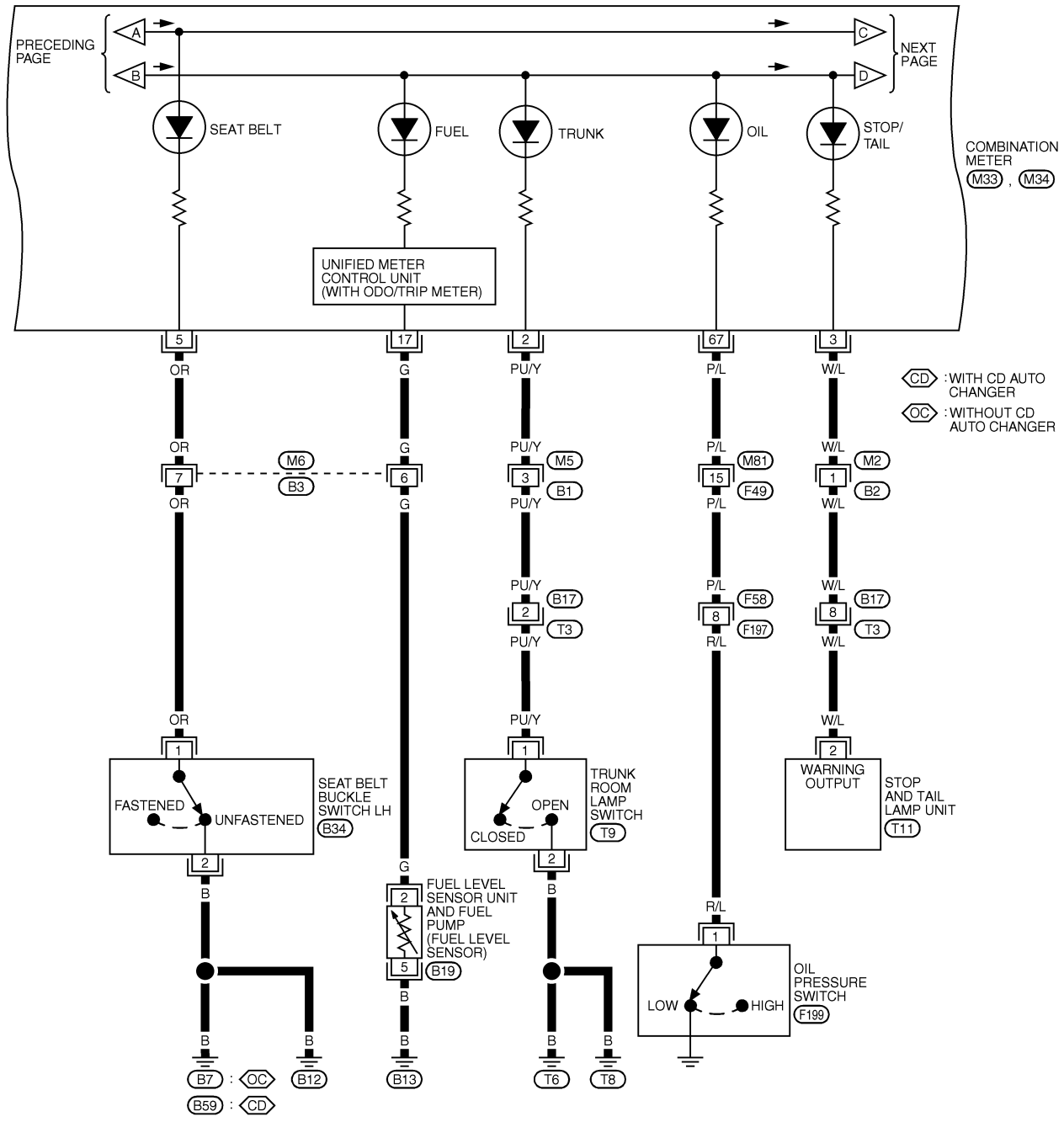
M15 -SUPER MULTIPLE JUNCTION (SMJ)

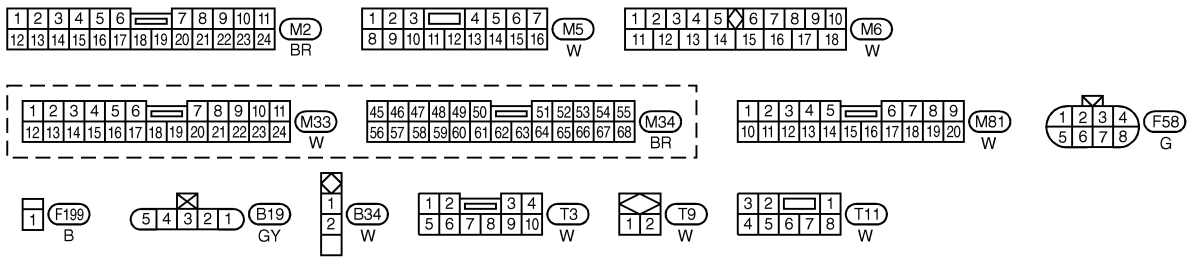
M19 -FUSE BLOCK-JUNCTION BOX (J/B)

F48 , F51 -ELECTRICAL UNITS-

MEL123O

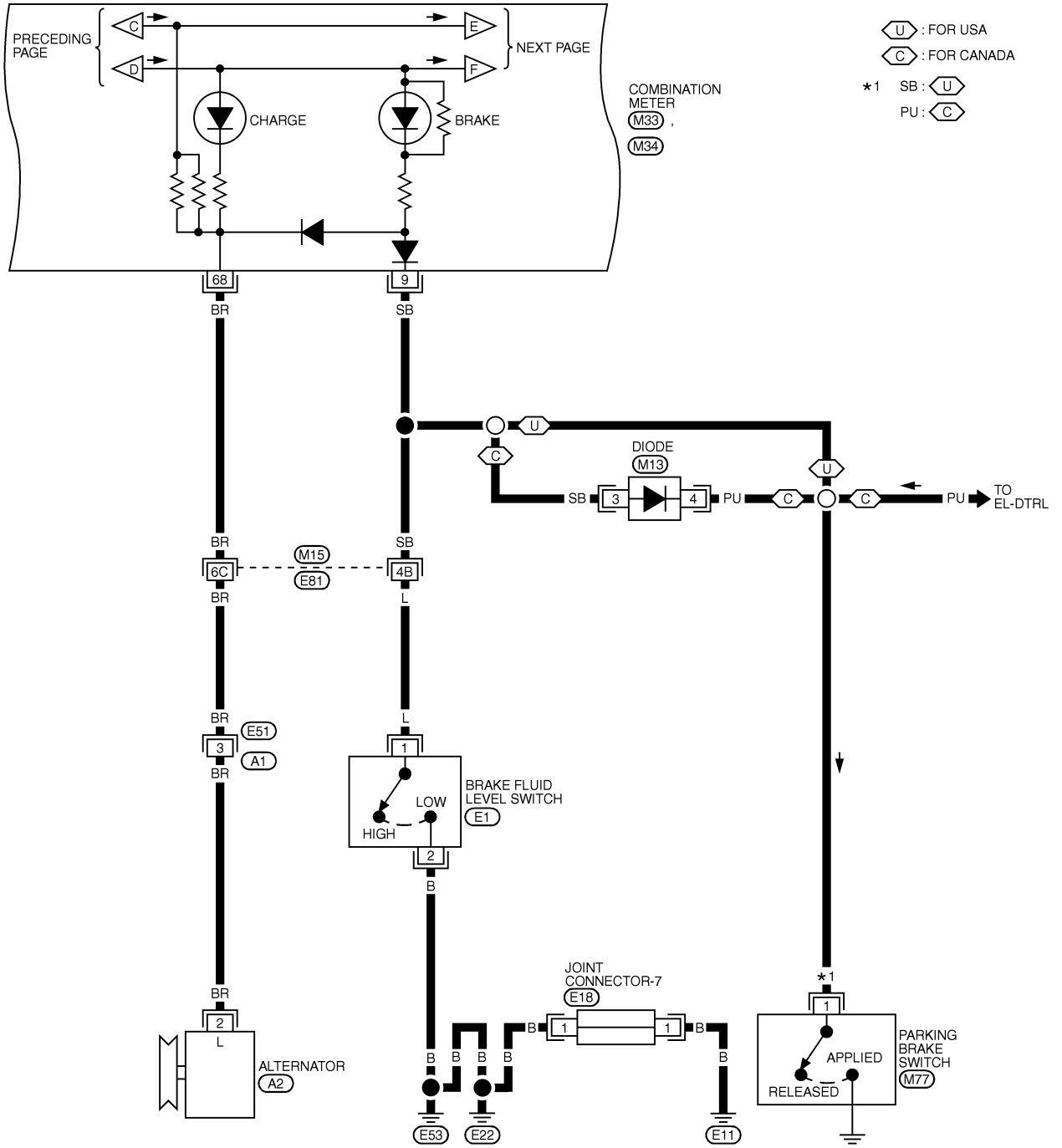
EL-WARN-02

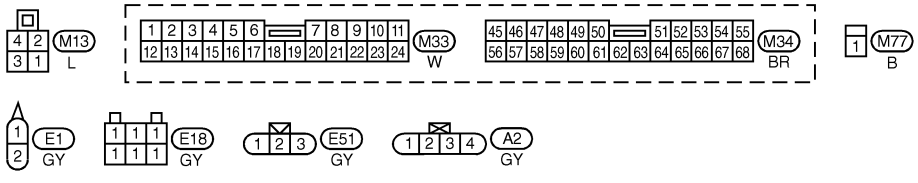




MEL744P

EL-WARN-03

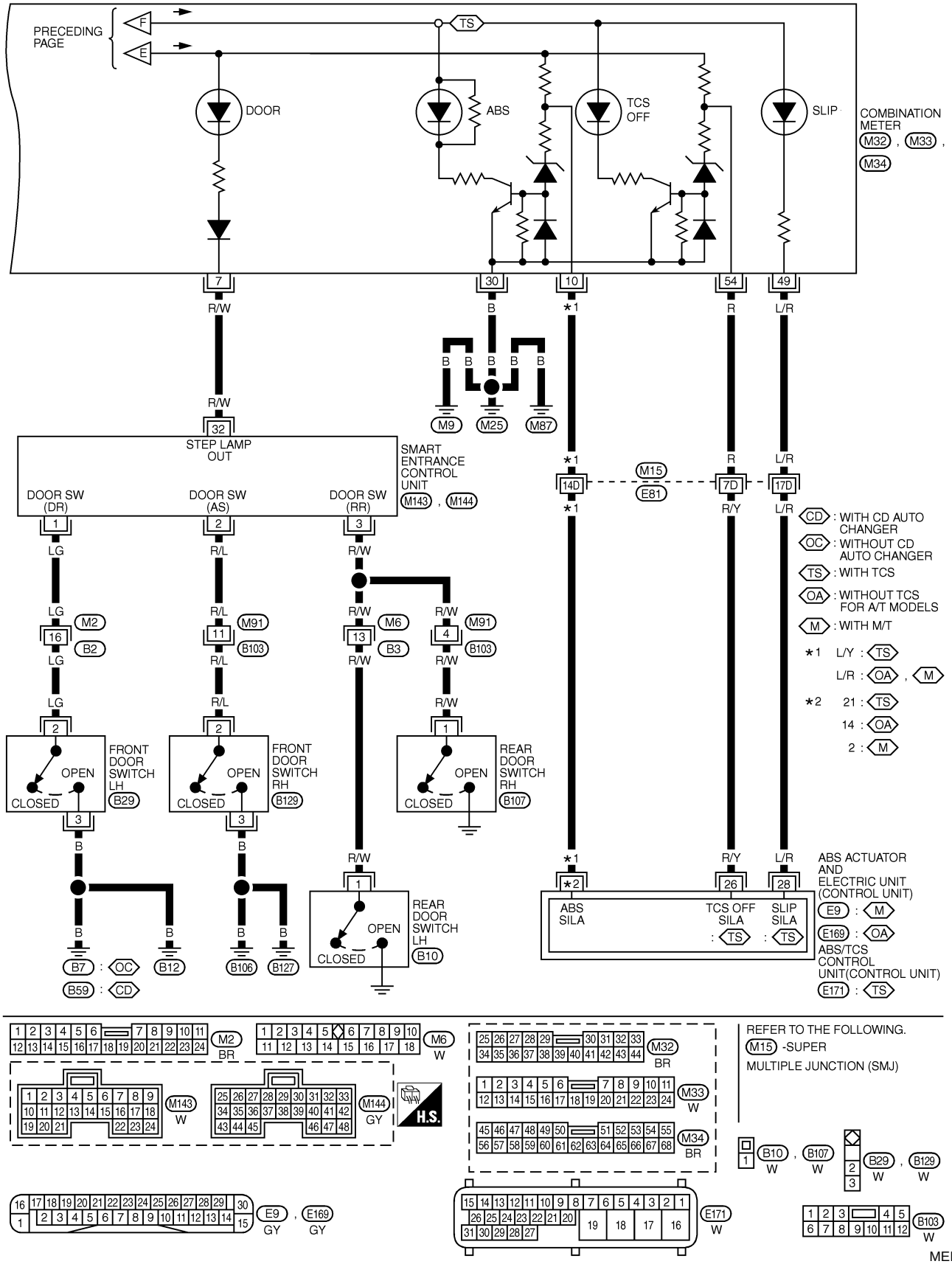


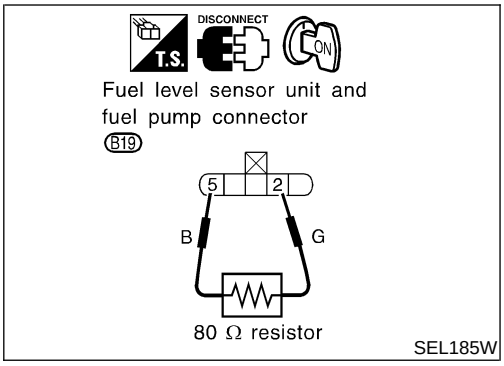


REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)

MEL125O

EL-WARN-04


PRECEDING PAGE
F
E
TS
DOOR
ABS
TCS OFF
SLIP
COMBINATION METER
M32 , M33 , M34
7
30
10
54
49
R/W
B
*1
R
L/R
B B B B B
M9
M25
M87
R/W
32
STEP LAMP OUT
SMART ENTRANCE CONTROL UNIT
M143 , M144
DOOR SW (DR)
DOOR SW (AS)
DOOR SW (RR)
1
2
3
LG
R/L
R/W
M2
16
B2
M91
11
B103
M6
13
B3
M91
4
B103
2
FRONT DOOR SWITCH LH
B29
FRONT DOOR SWITCH RH
B129
REAR DOOR SWITCH RH
B107
OPEN
CLOSED
3
1
REAR DOOR SWITCH LH
B10
B
B7 : OC
B59 : CD
B12
B106
B127
14D
7D
17D
M15
E81
R/Y
CD : WITH CD AUTO CHANGER
OC : WITHOUT CD AUTO CHANGER
TS : WITH TCS
OA : WITHOUT TCS FOR A/T MODELS
M : WITH M/T
*1 L/Y : TS
L/R : OA , M
*2 21 : TS
14 : OA
2 : M
*2
26
28
ABS SILA
TCS OFF SILA : TS
SLIP SILA : TS
ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
E9 : M
E169 : OA
ABS/TCS CONTROL UNIT(CONTROL UNIT)
E171 : TS
M2 BR
M6 W
M143 W
M144 GY
H.S.
M32 BR
M33 W
M34 BR
REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)
B10 W
B107 W
B29 W
B129 W
E9 GY
E169 GY
E171 W
B103 W
MEL745P



Electrical Components Inspection

NFEL0051

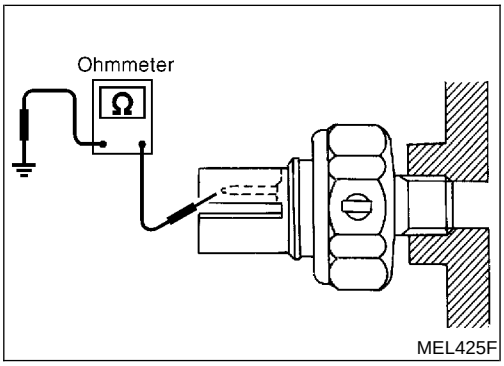
FUEL WARNING LAMP OPERATION CHECK

NFEL0051S01

1. Turn ignition switch “OFF”.
2. Disconnect fuel level sensor unit and fuel pump harness connector B19.
3. Connect a resistor (80Ω) between fuel level sensor unit and fuel pump harness connector terminals 2 and 5.
4. Turn ignition switch “ON”.

The fuel warning lamp should come on.

NOTE:
ECM might store the 1st trip DTC P0180 and the 1st trip DTC P0464 during this inspection.
If the DTC is stored in ECM memory, erase the DTC after reconnecting fuel level sensor unit and fuel pump harness connector.
Refer to EC-91, “HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION”.

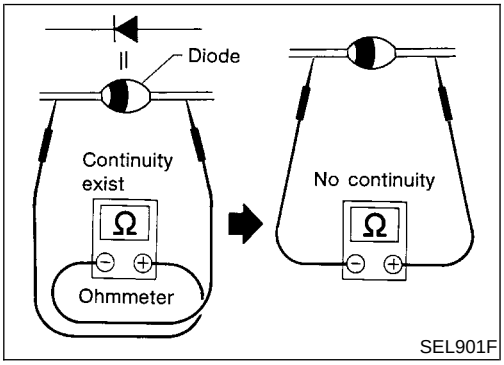


OIL PRESSURE SWITCH CHECK

NFEL0051S02

	Oil pressure kPa (kg/cm^2, psi)	Continuity
Engine running	More than 10 - 20 (0.1 - 0.2, 1 - 3)	No
Engine not running	Less than 10 - 20 (0.1 - 0.2, 1 - 3)	Yes

Check the continuity between the terminals of oil pressure switch and body ground.



DIODE CHECK

NFEL0051S03

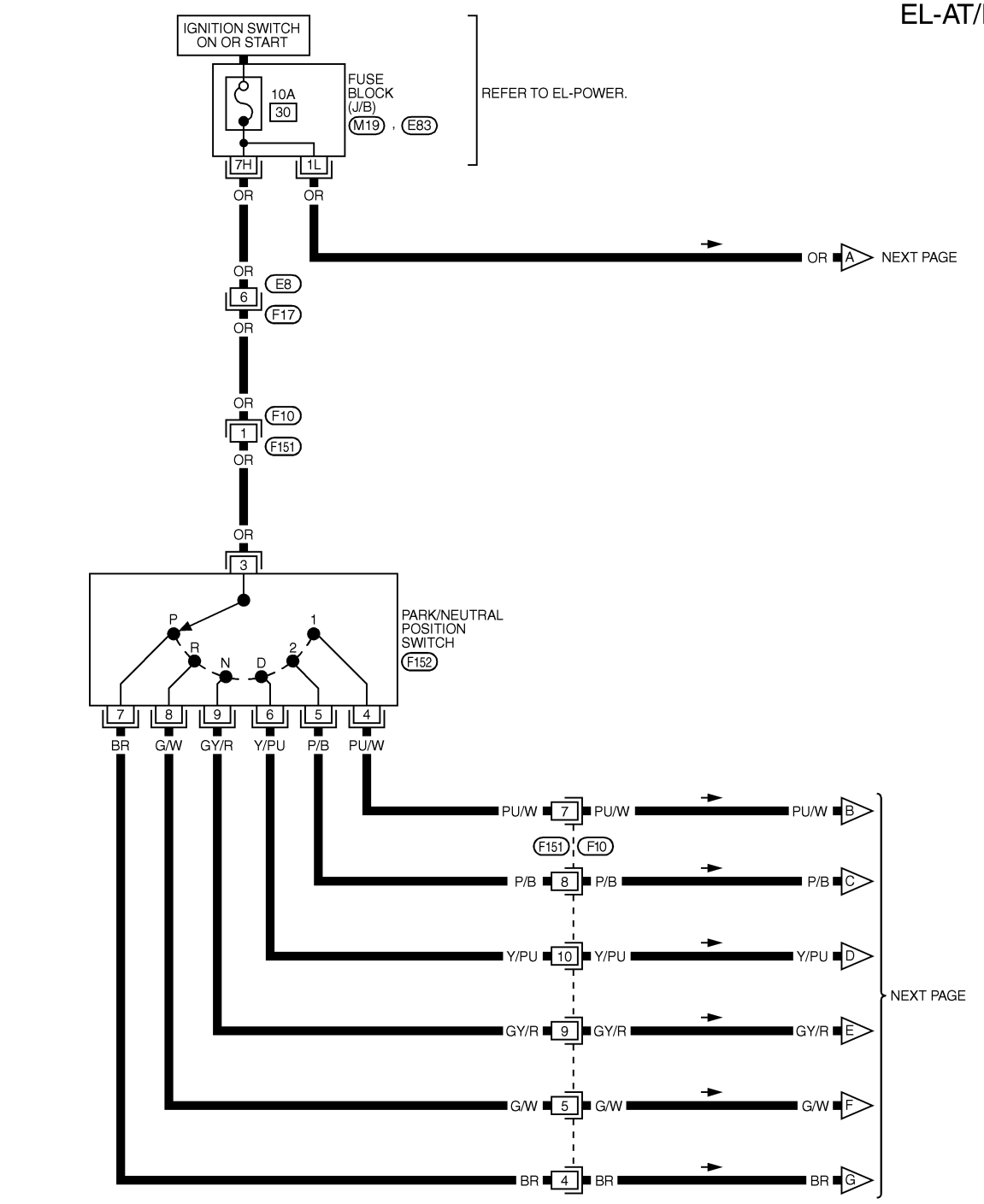
- Check continuity using an ohmmeter.
- Diode is functioning properly if test results are as shown in the figure at left.
- Check diodes at the combination meter harness connector instead of on the combination meter assembly. Refer to EL-137, “WARNING LAMP” wiring diagrams.

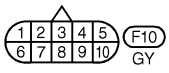
NOTE:
Specification may vary depending on the type of tester. Before performing this inspection, be sure to refer to the instruction manual for the tester to be used.

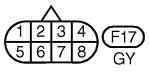
Wiring Diagram — AT/IND —

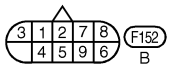
NFEL0159

EL-AT/IND-01



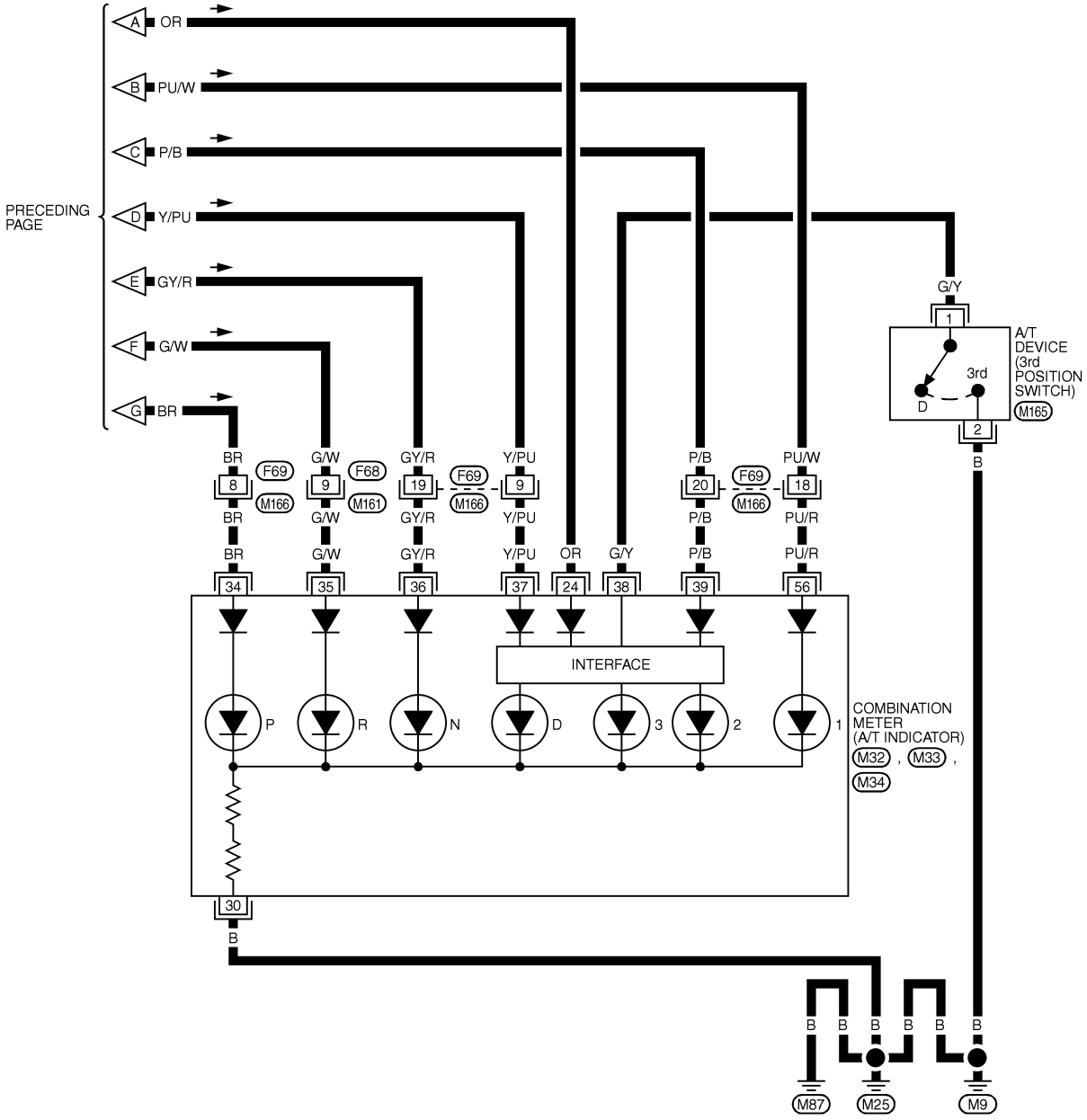


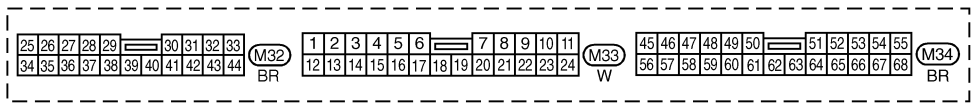


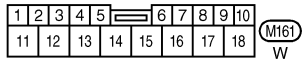


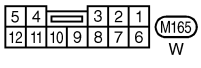
REFER TO THE FOLLOWING.
M19 , E83 -FUSE BLOCK-JUNCTION BOX (J/B)

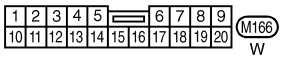
MEL728P

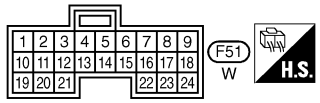

PRECEDING PAGE
A OR
B PU/W
C P/B
D Y/PU
E GY/R
F G/W
G BR
G/Y
1
A/T DEVICE (3rd POSITION SWITCH)
M165
3rd
D
2
B
BR F69 8 M166
G/W F68 9 M161
GY/R F69 19 M166
Y/PU F69 9 M166
P/B F69 20 M166
PU/W 18
BR 34
G/W 35
GY/R 36
Y/PU 37
OR 24
G/Y 38
P/B 39
PU/R 56
INTERFACE
P
R
N
D
3
2
1
COMBINATION METER (A/T INDICATOR)
M32 , M33 , M34
30
B
B B B B B B
M87
M25
M9


M32 BR
M33 W
M34 BR


M161 W


M165 W

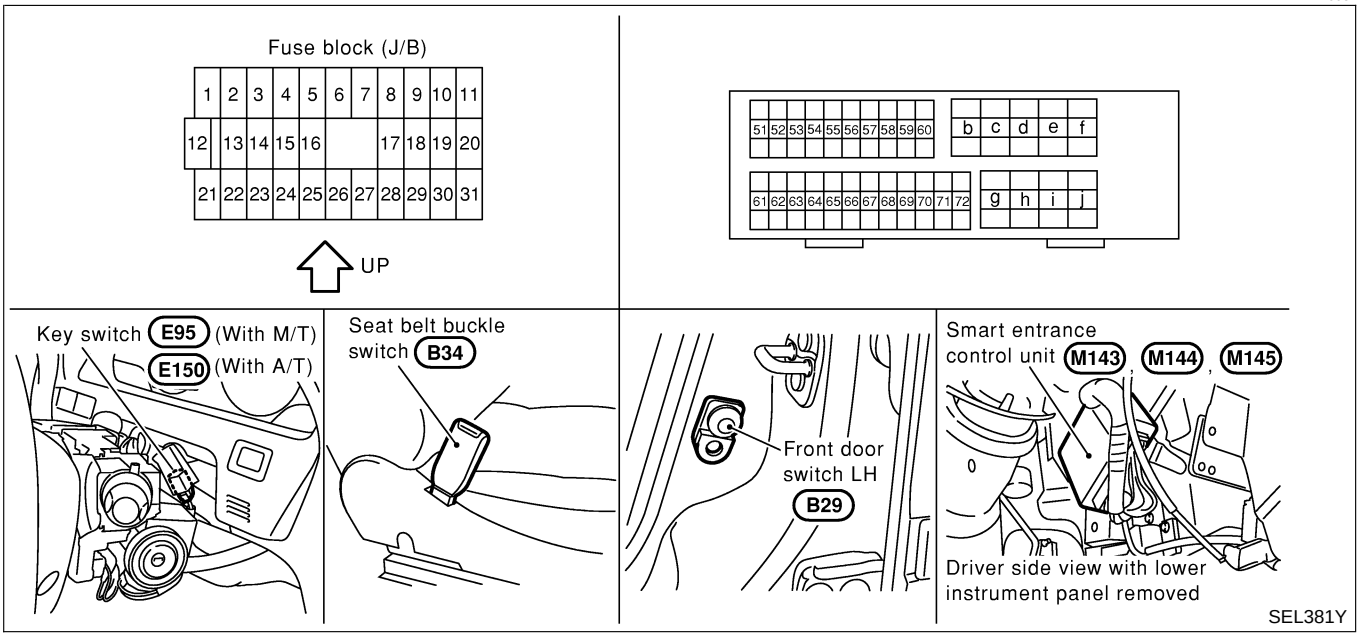

M166 W


F51 W
H.S.

MEL756P

Component Parts and Harness Connector Location

NFEL0052



System Description

NFEL0053

The warning chime is controlled by the smart entrance control unit.
The warning chime is located in the smart entrance control unit.
Power is supplied at all times

- through 10A fuse [No. 13, located in fuse block (J/B)]
- to smart entrance control unit terminal 49 and
- to key switch terminal 2 (M/T) or 3 (A/T)
- through 10A fuse (No. 60, located in the fuse and fusible link box)
- to tail lamp relay terminals 1 and 3.

With the ignition switch in the ON or START position, power is supplied

- through 10A fuse [No. 10, located in the fuse block (J/B)]
- to smart entrance control unit terminal 27.

Ground is supplied to smart entrance control unit terminals 43 and 64 through body grounds M9, M25 and M87.
When a signal, or combination of signals, is received by the smart entrance control unit, the warning chime will sound.

IGNITION KEY WARNING CHIME

NFEL0053S01

With the key in the ignition switch in the OFF position, and the driver's door open, the warning chime will sound.
Power is supplied

- from key switch terminal 1 (M/T) or 4 (A/T)
- to smart entrance control unit terminal 25.

Ground is supplied

- from front door switch LH (driver side) terminal 2
- to smart entrance control unit terminal 1.

Front door switch LH (driver side) terminal 3 is grounded through body grounds B7 (without CD auto changer) or B59 (with CD auto changer) and B12.

LIGHT WARNING CHIME

NFEL0053S02

With ignition switch OFF, driver's door open, and lighting switch in 1ST or 2ND position, warning chime will sound. Power is supplied.

- from tail lamp relay terminal 2
- to smart entrance control unit terminals 19 and 57.

Ground is supplied

- from front door switch LH (driver side) terminal 2
- to smart entrance control unit terminal 1.

Front door switch LH (driver side) terminal 3 is grounded through body grounds B7 (without CD auto changer) or B59 (with CD auto changer) and B12.

SEAT BELT WARNING CHIME

NFEL0053S03

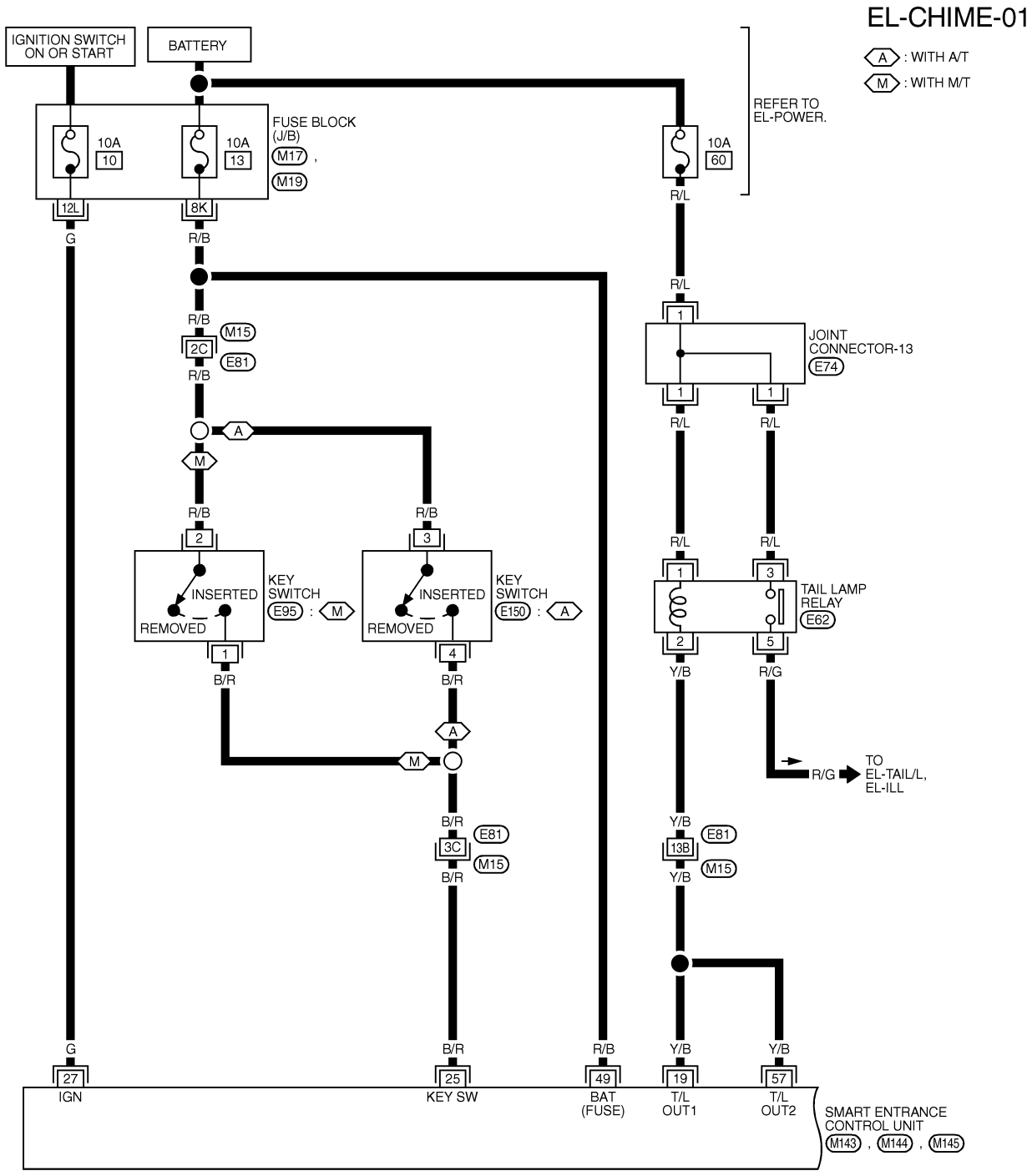
With ignition switch turned ON and seat belt unfastened (seat belt switch ON), warning chime will sound for approximately 6 seconds.
Ground is supplied

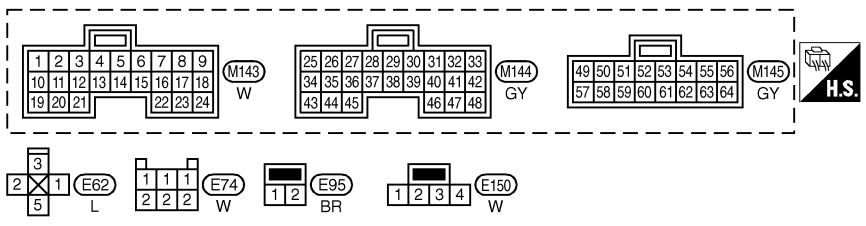
- from seat belt switch terminal 1
- to smart entrance control unit terminal 28.

Seat belt switch terminal 2 is grounded through body grounds B7 (without CD auto changer) or B59 (with CD auto changer) and B12.

Wiring Diagram — CHIME —

NFEL0054

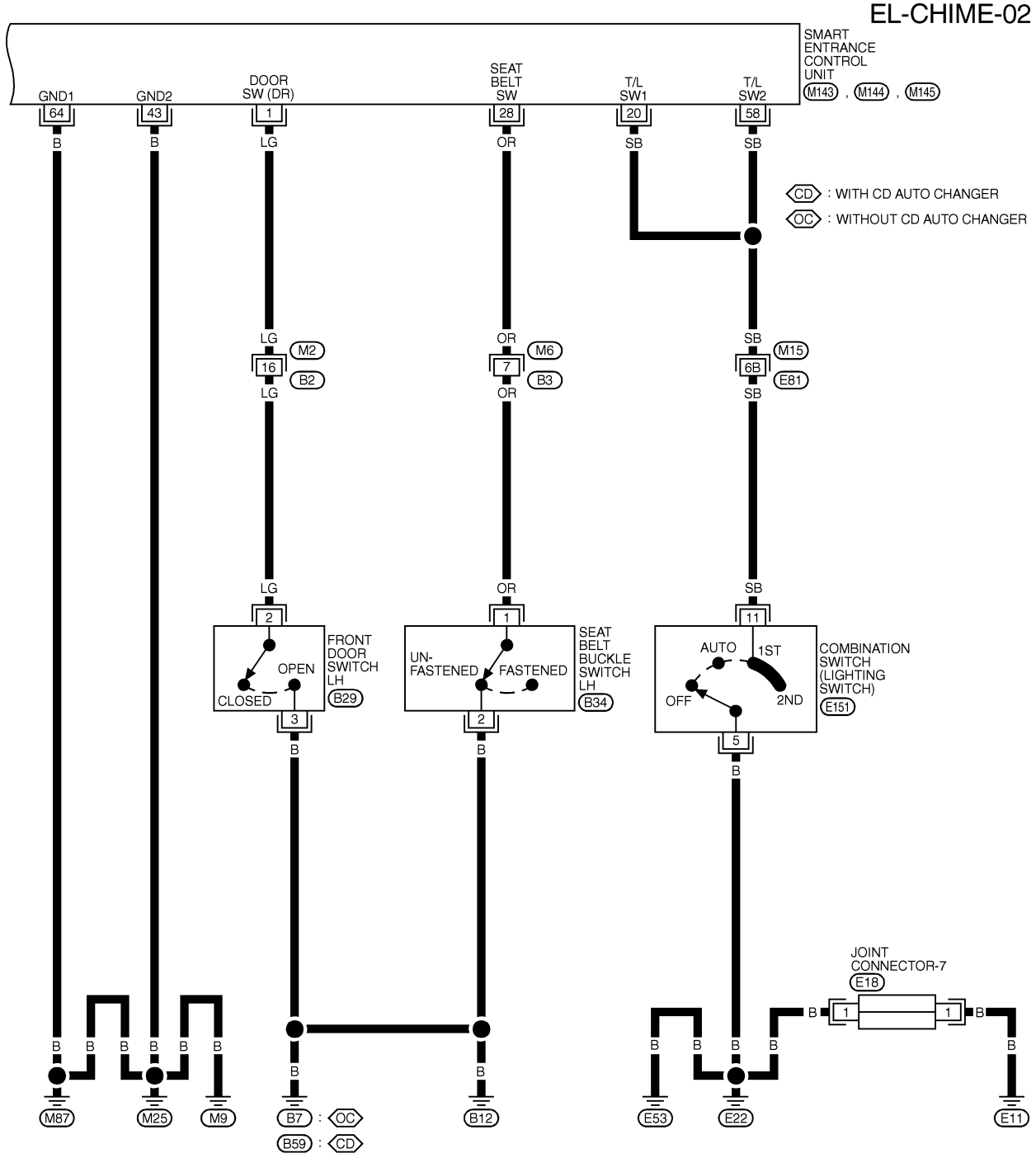


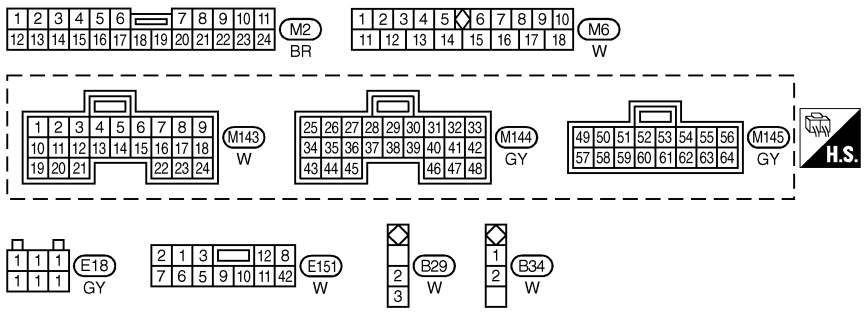


REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)
M17 , M19 -FUSE BLOCK-JUNCTION BOX (J/B)

MEL129O

EL-CHIME-02

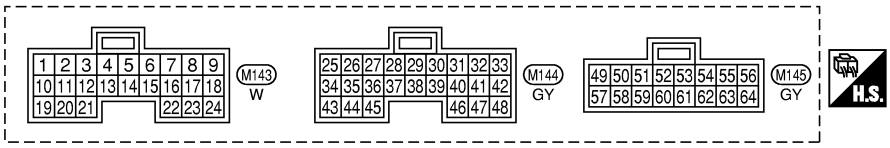




REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)

MEL130O

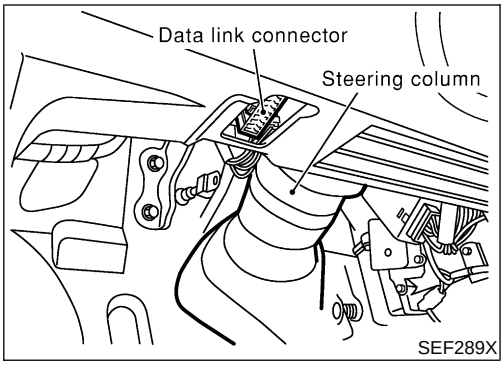
SMART ENTRANCE CONTROL UNIT CONNECTOR



SMART ENTRANCE CONTROL UNIT TERMINALS AND REFERENCE VALUE BETWEEN EACH TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION			DATA (DC)
1	LG	DRIVER DOOR SWITCH	OFF (CLOSED) → ON (OPEN)			12V → 0V
19	Y/B	TAIL LAMP RELAY	IGNITION SWITCH (WITH LIGHTING SWITCH 1ST OR 2ND)	ON OR START → OFF	MORE THAN 5 MINUTES	12V
					WITHIN 5 MINUTES	0V
				ON OR START		0V
			HEADLAMPS ILLUMINATE BY AUTO LIGHT CONTROL (OPERATE → NOT OPERATE)			LESS THAN 1V → 12V
20	SB	TAIL LAMP SWITCH	LIGHTING SWITCH (OFF OR AUTO → 1ST OR 2ND POSITION)			12V → 0V
25	B/R	IGNITION KEY SWITCH (INSERT)	KEY INSERTED → KEY REMOVED FROM IGN KEY CYLINDER			12V → 0V
27	G	IGNITION SWITCH (ON)	IGNITION SWITCH IS IN "ON" POSITION			12V
28	OR	SEAT BELT BUCKLE SWITCH	UNFASTENED → FASTENED (IGNITION SWITCH IS IN "ON" POSITION)			0V → 12V
43	B	GROUND	–			–
49	R/B	POWER SOURCE (FUSE)	–			12V
57	Y/B	TAIL LAMP RELAY	IGNITION SWITCH (WITH LIGHTING SWITCH 1ST OR 2ND)	ON OR START → OFF	MORE THAN 5 MINUTES	12V
					WITHIN 5 MINUTES	0V
				ON OR START		0V
			HEADLAMPS ILLUMINATE BY AUTO LIGHT CONTROL (OPERATE → NOT OPERATE)			LESS THAN 1V → 12V
58	SB	TAIL LAMP SWITCH	LIGHTING SWITCH (OFF OR AUTO → 1ST OR 2ND POSITION)			12V → 0V
64	B	GROUND	–			–

SEL589Y



SEF289X

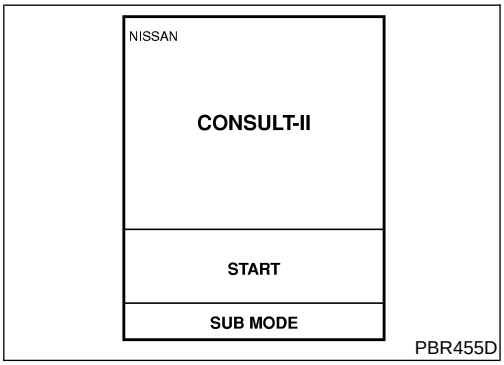
CONSULT-II Inspection Procedure

=NFEL0216

"KEY WARN ALM"/"LIGHT WARN ALM"/"SEAT BELT ALM"

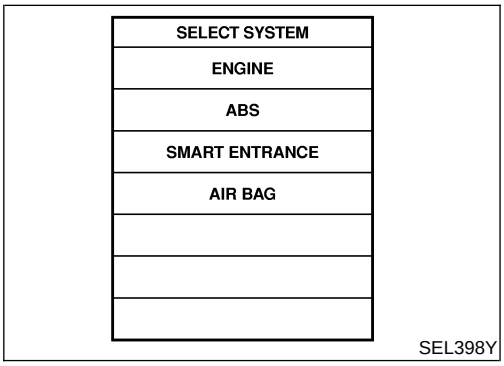
NFEL0216S01

1. Turn ignition switch "OFF".
2. Connect "CONSULT-II" to the data link connector.



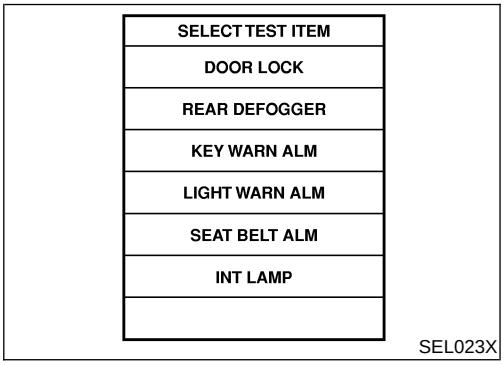
PBR455D

3. Turn ignition switch "ON".
4. Touch "START".



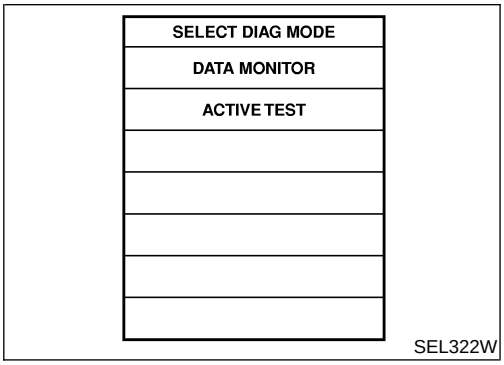
SEL398Y

5. Touch "SMART ENTRANCE".



SEL023X

6. Touch "KEY WARN ALM", "LIGHT WARN ALM" or "SEAT BELT ALM".



SEL322W

- DATA MONITOR and ACTIVE TEST are available for the warning chime.

CONSULT-II Application Items

NFEL0217

"KEY WARNING ALARM"
Data Monitor

NFEL0217S01

NFEL0217S0101

Monitored Item	Description
IGN ON SW	Indicates [ON/OFF] condition of ignition switch.
KEY ON SW	Indicates [ON/OFF] condition of key switch.
DOOR SW DR	Indicates [ON/OFF] condition of front door switch LH.

Active Test

NFEL0217S0102

Test Item	Description
CHIME	This test is able to check key warning chime operation. Key warning chime sounds for 2 seconds after touching "ON" on CONSULT-II screen.

"LIGHT WARN ALM"
Data Monitor

NFEL0217S02

NFEL0217S0201

Monitored Item	Description
LIGHT SW 1ST	Indicates [ON/OFF] condition of lighting switch.
IGN ON SW	Indicates [ON/OFF] condition of ignition switch.
DOOR SW-DR	Indicates [ON/OFF] condition of front door switch LH.

Active Test

NFEL0217S0202

Test Item	Description
CHIME	This test is able to check light warning chime operation. Light warning chime sounds for 2 seconds after touching "ON" on CONSULT-II screen.

"SEAT BELT WARM ALM"
Data Monitor

NFEL0217S03

NFEL0217S0301

Monitored Item	Description
IGN ON SW	Indicates [ON/OFF] condition of ignition switch.
SEAT BELT SW	Indicates [ON/OFF] condition of seat belt switch.

Active Test

NFEL0217S0302

Test Item	Description
CHIME	This test is able to check seat belt warning chime operation. Seat belt warning chime sounds for 2 seconds after touching "ON" on CONSULT-II screen.

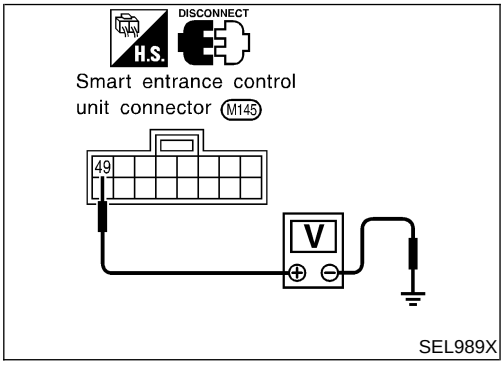
Trouble Diagnoses

SYMPTOM CHART

NFEL0055

NFEL0055S01

REFERENCE PAGE (EL-)	151	153	154	155	156
SYMPTOM	POWER SUPPLY AND GROUND CIRCUIT CHECK	DIAGNOSTIC PROCEDURE 1 (LIGHTING SWITCH INPUT SIGNAL CHECK)	DIAGNOSTIC PROCEDURE 2 (KEY SWITCH INSERT SIGNAL CHECK)	DIAGNOSTIC PROCEDURE 3 (SEAT BELT BUCKLE SWITCH CHECK)	DIAGNOSTIC PROCEDURE 4
Light warning chime does not activate.	X	X			X
Ignition key warning chime does not activate.	X		X		X
Seat belt warning chime does not activate.	X			X	X
All warning chimes do not activate.	X				X



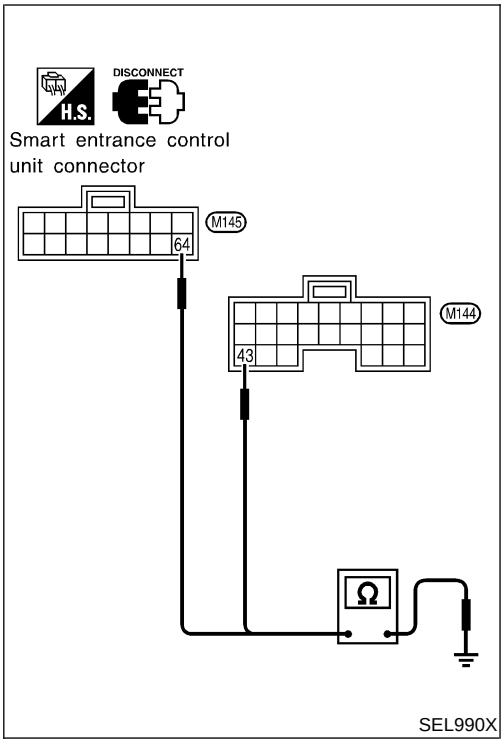
POWER SUPPLY AND GROUND CIRCUIT CHECK

NFEL0055S02

Power Supply Circuit Check

NFEL0055S0201

Terminals (Wire color)	Voltage
49 (R/B) - Ground	Battery voltage



Ground Circuit Check

NFEL0055S0202

Terminals (Wire color)	Continuity
43 (B) - Ground	Yes
64 (B) - Ground	Yes

DIAGNOSTIC PROCEDURE 1 (LIGHTING SWITCH INPUT SIGNAL CHECK)

=NFEL0055S03

1	CHECK LIGHTING SWITCH INPUT SIGNAL

With CONSULT-II

Check lighting switch ("LIGHT SW 1ST") in "DATA MONITOR" mode with CONSULT-II.

DATA MONITOR	
MONITOR	
LIGHT SW 1ST	OFF

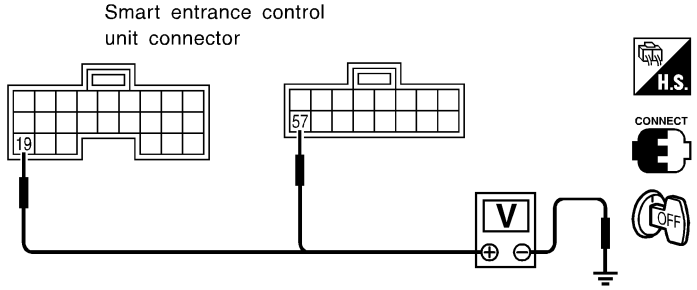
When lighting switch is in 1st or 2nd position:
LIGHT SW 1ST ON

When lighting switch is in OFF position:
LIGHT SW 1ST OFF

SEL991X

Without CONSULT-II

Check voltage between smart entrance control unit harness connector M143 terminal 19 (Y/B), connector M145 terminal 57 (Y/B) and ground.



Voltage [V]:
Condition of lighting switch: 1ST or 2ND
0
Condition of lighting switch: OFF
Approx. 12

SEL992XA

OK or NG

OK	▶	Lighting switch is OK.
NG	▶	**Check the following.** ● 10A fuse (No. 60, located in the fuse and fusible link box) ● Harness for open or short between smart entrance control unit and tail lamp relay

DIAGNOSTIC PROCEDURE 2 (KEY SWITCH INSERT SIGNAL CHECK)

=NFEL0055S04

1	CHECK KEY SWITCH INPUT SIGNAL

With CONSULT-II

Check key switch ("KEY ON SW") in "DATA MONITOR" mode with CONSULT-II.

DATA MONITOR	
MONITOR	
KEY ON SW	ON

When key is inserted to ignition key cylinder:

KEY ON SW ON

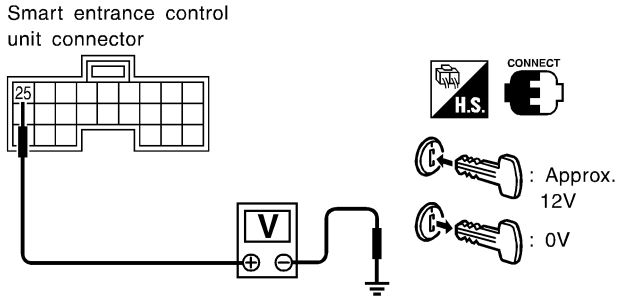
When key is removed from ignition key cylinder:

KEY ON SW OFF

SEL315W

Without CONSULT-II

Check voltage between smart entrance control unit harness connector M144 terminal 25 (B/R) and ground.



Voltage [V]:

Condition of key switch: Key is inserted.

Approx. 12

Condition of key switch: Key is removed.

0

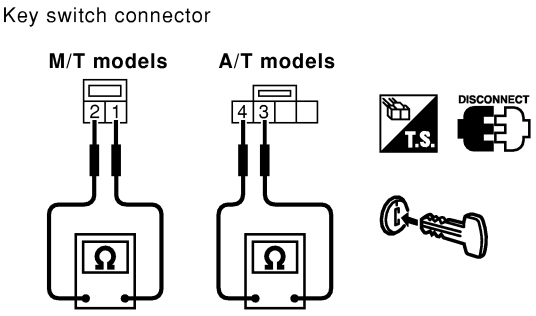
SEL011Y

OK or NG

OK	▶	Key switch is OK.
NG	▶	GO TO 2.

2	CHECK KEY SWITCH (INSERT)

Check continuity between connector E95 terminals 1 and 2 or connector E150 terminals 3 and 4.



Continuity:

Condition of key switch: Key is inserted.

Yes

Condition of key switch: Key is removed.

No

SEL614Y

OK or NG

OK	▶	**Check the following.** ● 10A fuse [No. 13, located in fuse block (J/B)] ● Harness for open or short between key switch and fuse ● Harness for open or short between smart entrance control unit and key switch
NG	▶	Replace key switch.

DIAGNOSTIC PROCEDURE 3 (SEAT BELT BUCKLE SWITCH CHECK)

=NFEL0055S05

1	CHECK SEAT BELT BUCKLE SWITCH INPUT SIGNAL

With CONSULT-II

Check seat belt buckle switch ("SEAT BELT SW") in "DATA MONITOR" mode with CONSULT-II.

DATA MONITOR	
MONITOR	
SEAT BELT SW	ON

When seat belt is fastened:
SEAT BELT SW ON

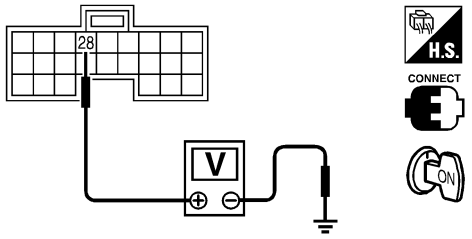
When seat belt is released:
SEAT BELT SW OFF

SEL317W

Without CONSULT-II

1. Turn ignition switch "ON".
2. Check voltage between smart entrance control unit harness connector M144 terminal 28 (OR) and ground.

Smart entrance control unit connector



Voltage [V]:
Condition of seat belt buckle switch: Fastened
Approx. 12
Condition of seat belt buckle switch: Unfastened
0

SEL994XA

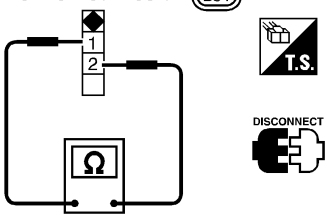
OK or NG

OK	▶	Seat belt buckle switch is OK.
NG	▶	GO TO 2.

2	CHECK SEAT BELT BUCKLE SWITCH

Check continuity between terminals 1 and 2 when seat belt is fastened and unfastened.

Seat belt buckle switch connector B34



Continuity:
Seat belt is fastened.
No
Seat belt is unfastened.
Yes

SEL313W

OK or NG

OK	▶	**Check the following.** • Seat belt buckle switch ground circuit • Harness for open or short between smart entrance control unit and seat belt buckle switch
NG	▶	Replace seat belt buckle switch.

DIAGNOSTIC PROCEDURE 4

NFEL0055S06

1 CHECK IGNITION ON SIGNAL

With CONSULT-II

Check ignition switch ON signal ("IGN ON SW") in "DATA MONITOR" mode with CONSULT-II.

DATA MONITOR	
MONITOR	
IGN ON SW	ON

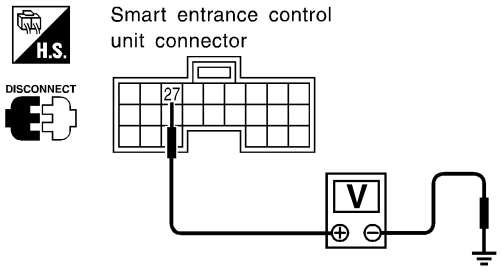
When ignition switch is ON:
IGN ON SW ON

When ignition switch is OFF:
IGN ON SW OFF

SEL318W

Without CONSULT-II

Check voltage between smart entrance control unit harness connector M144 terminal 27 (G) and ground.



Terminals		Ignition switch position		
(+)	(–)	OFF	ACC	ON
27	Ground	0V	0V	Battery voltage

SEL995X

OK or NG

OK	▶	GO TO 2.
NG	▶	**Check the following.** ● 10A fuse [No. 10, located in fuse block (J/B)] ● Harness for open or short between smart entrance control unit and fuse

2	CHECK DOOR SWITCH INPUT SIGNAL

With CONSULT-II

Check driver door switch signal ("DOOR SW-DR") in "DATA MONITOR" mode with CONSULT-II.

DATA MONITOR	
MONITOR	
DOOR SW-DR	OFF

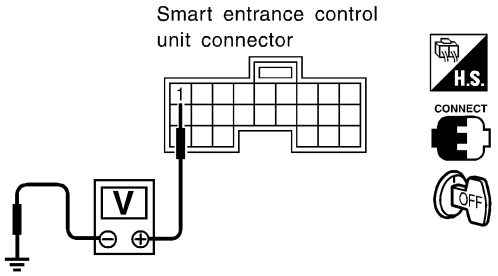
When driver's door is open:
DOOR SW-DR ON

When driver's door is closed:
DOOR SW-DR OFF

SEL319W

Without CONSULT-II

Check voltage between smart entrance control unit harness connector M143 terminal 1 (LG) and ground.



Voltage [V]:
Condition of driver's door: CLOSED
Approx. 12
Condition of driver's door: OPENED
0

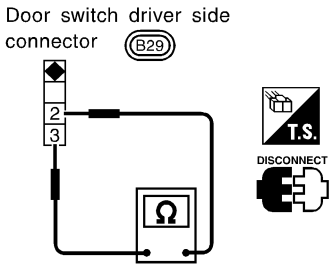
SEL996XA

OK or NG

OK	▶	GO TO 4.
NG	▶	GO TO 3.

3	CHECK DRIVER SIDE DOOR SWITCH

Check continuity between terminals 2 and 3.



Continuity:
Door switch is pushed.
No
Door switch is released.
Yes

SEL325W

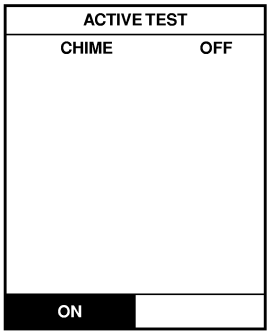
OK or NG

OK	▶	**Check the following.** • Driver side door switch ground circuit and condition • Harness for open or short between smart entrance control unit and driver side door switch
NG	▶	Replace driver side door switch.

4	CHECK WARNING CHIME

With CONSULT-II

Perform "CHIME" in "ACTIVE TEST" mode with CONSULT-II.



Warning chime should operate.

SEL320W

OK or NG

OK	▶	System is OK.
NG	▶	Replace smart entrance control unit.

System Description

NFEL0057

WIPER OPERATION

NFEL0057S01

The wiper switch is controlled by a lever built into the combination switch.
There are three wiper switch positions:

- LO speed
- HI speed
- INT (Intermittent)

With the ignition switch in the ON or START position, power is supplied

- through 20A fuse [No. 25, located in the fuse block (J/B)]
- to wiper motor terminal 4 and
- to wiper switch terminal 15.

Low (Mist) and High Speed Wiper Operation

NFEL0057S0101

Ground is supplied to wiper switch terminal 17 through body grounds E11, E22 and E53.
When the wiper switch is placed in the LO or MIST position, ground is supplied

- through terminal 14 of the wiper switch
- to wiper motor terminal 3.

With power and ground supplied, the wiper motor operates at low speed.
When the wiper switch is placed in the HI position, ground is supplied

- through terminal 16 of the wiper switch
- to wiper motor terminal 1.

With power and ground supplied, the wiper motor operates at high speed.

Auto Stop Operation

NFEL0057S0102

With wiper switch turned OFF, wiper motor will continue to operate until wiper arms reach windshield base.
When wiper arms are not located at base of windshield with wiper switch OFF, ground is provided

- from terminal 14 of the wiper switch
- to wiper motor terminal 3, in order to continue wiper motor operation at low speed.

Ground is also supplied

- through terminal 13 of the wiper switch
- to wiper motor terminal 2
- through terminal 6 of the wiper motor, and
- through body grounds E11, E22 and E53.

When wiper arms reach base of windshield, wiper motor terminals 2 and 4 are connected instead of terminals 2 and 6. Wiper motor will then stop wiper arms at the STOP position.

Intermittent Operation

NFEL0057S0103

The wiper motor operates the wiper arms one time at low speed at a set interval of approximately 3 to 13 seconds. This feature is controlled by the wiper amplifier (INT SW) combined with wiper switch.
When the wiper switch is placed in the INT position, ground is supplied to wiper amplifier.
The desired interval time is input to wiper amplifier (INT VR) from wiper volume switch combined with wiper switch.
Then intermittent ground is supplied

- to wiper motor terminal 3
- from terminal 14 of wiper switch
- through wiper amplifier (OUTPUT).

The wiper motor operates at low speed at the desired interval.

WASHER OPERATION

NFEL0057S02

With the ignition switch in the ON or START position, power is supplied

- through 20A fuse [No. 25, located in the fuse block (J/B)]
- to washer motor terminal 1.

When the lever is pulled to the WASH position, ground is supplied

- to washer motor terminal 2, and
- from terminal 18 of the wiper switch

System Description (Cont'd)

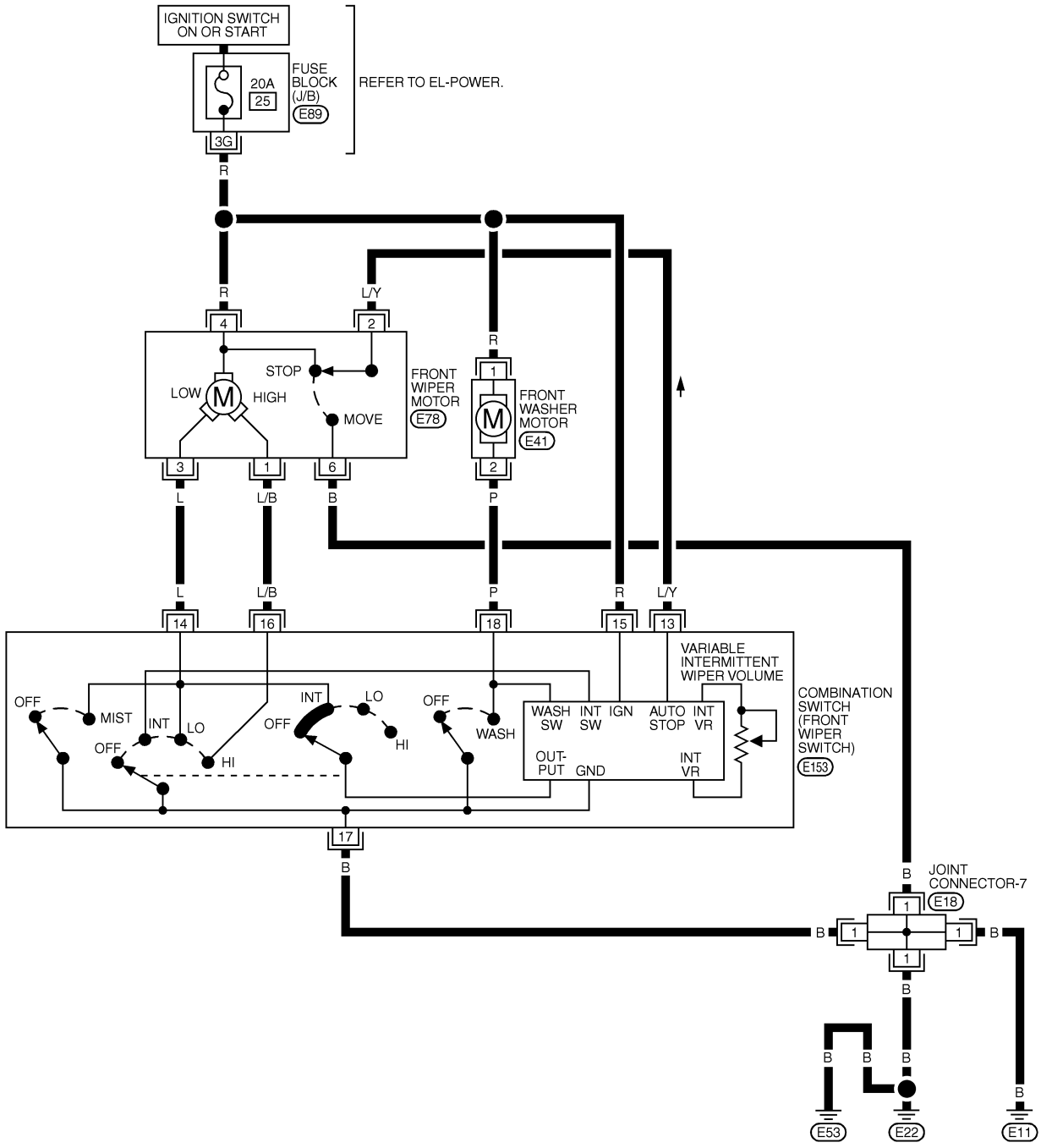
- through terminal 17 of the wiper switch, and
- through body grounds E11, E22 and E53.

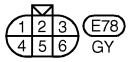
With power and ground supplied, the washer motor operates.
When the lever is pulled to the WASH position for one second or more, the wiper motor operates at low speed for approximately 3 seconds to clean windshield. This feature is controlled by the wiper amplifier in the same manner as the intermittent operation.

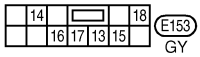
Wiring Diagram — WIPER —

NFEL0058

EL-WIPER-01

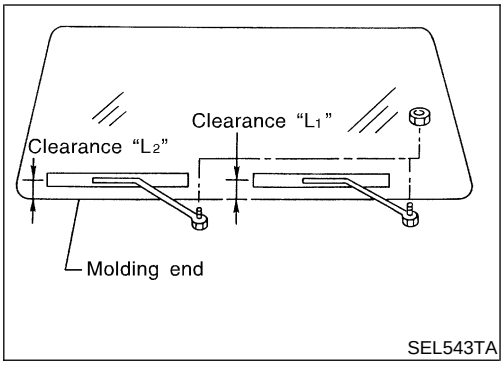






REFER TO THE FOLLOWING.
E89 -FUSE BLOCK-JUNCTION BOX (J/B)

MEL131O



SEL543TA

Removal and Installation

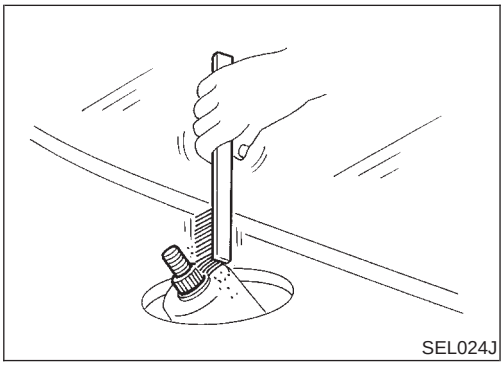
NFEL0060

WIPER ARMS

NFEL0060S01

1. Prior to wiper arm installation, turn on wiper switch to operate wiper motor and then turn it "OFF" (Auto Stop).
2. Lift the blade up and then set it down onto glass surface to set the blade center to clearance "L_1" & "L_2" immediately before tightening nut.
3. Eject washer fluid. Turn on wiper switch to operate wiper motor and then turn it "OFF".
4. Ensure that wiper blades stop within clearance "L_1" & "L_2".
   Clearance "L_1": 48 - 64 mm (1.89 - 2.52 in)
   Clearance "L_2": 40 - 56 mm (1.57 - 2.20 in)

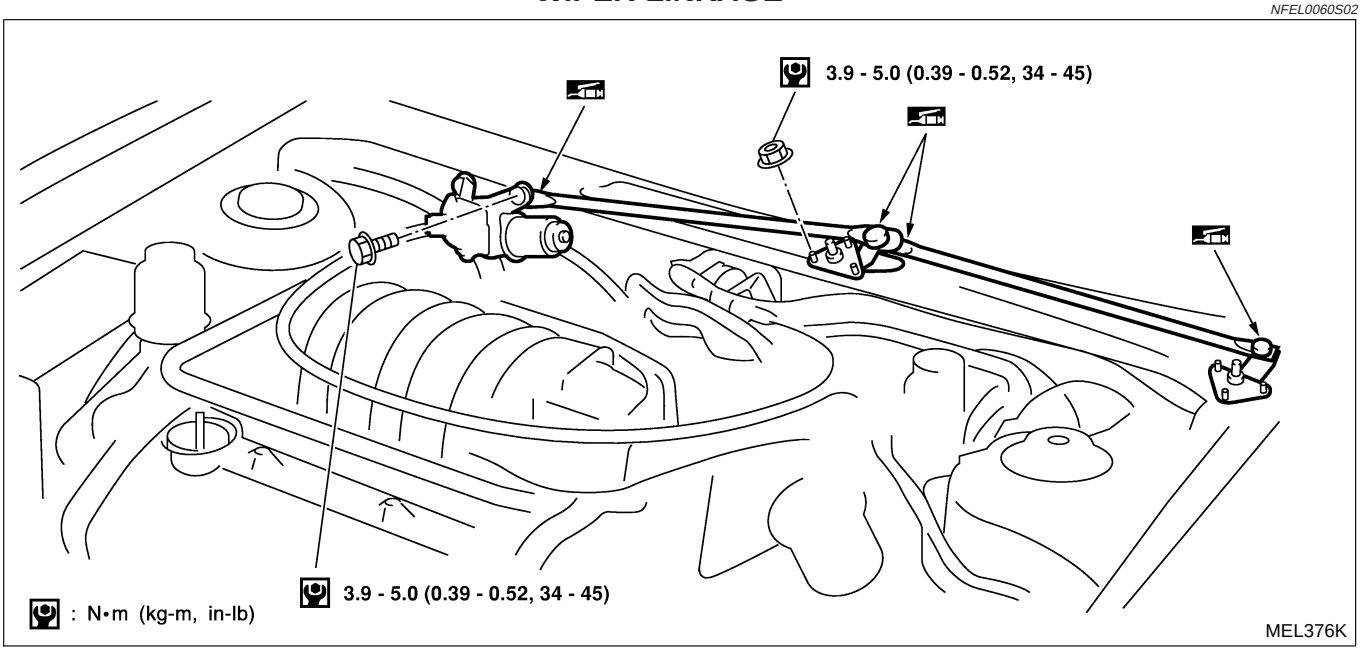
- Tighten wiper arm nuts to specified torque.
  Front wiper: 21 - 26 N·m (2.1 - 2.7 kg-m, 16 - 19 ft-lb)


SEL024J

- **Before reinstalling wiper arm, clean up the pivot area as illustrated. This will reduce possibility of wiper arm looseness.**

WIPER LINKAGE

NFEL0060S02



MEL376K

Removal

NFEL0060S0201

1. Remove 4 bolts that secure wiper motor.
2. Detach wiper motor from wiper linkage at ball joint.
3. Remove wiper linkage.

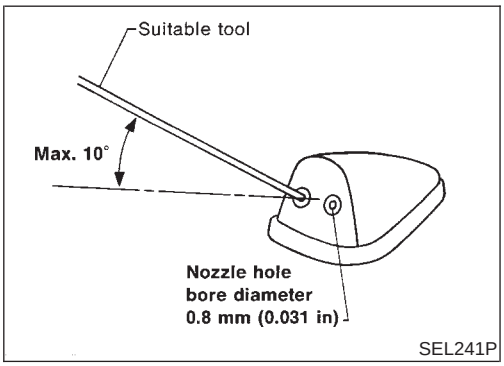
Be careful not to break ball joint rubber boot.

Installation

NFEL0060S0202

- Grease ball joint portion before installation.

1. Installation is the reverse order of removal.



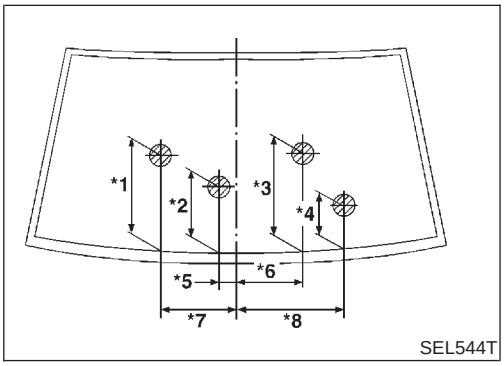
SEL241P

Washer Nozzle Adjustment

NFEL0061

- Adjust washer nozzle with suitable tool as shown in the figure at left.

Adjustable range: ±10°



SEL544T

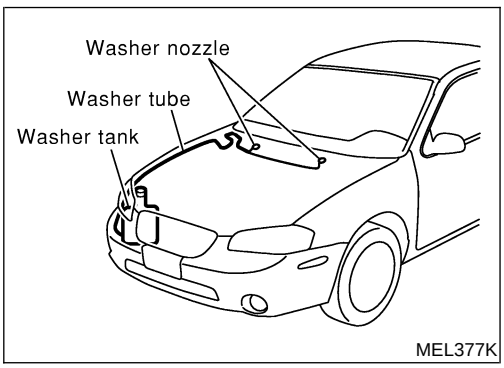
Unit: mm (in)

*1	341 (13.43)	*5	154 (6.06)
*2	286 (11.26)	*6	203 (7.99)
*3	285 (11.22)	*7	382 (15.04)
*4	152 (5.98)	*8	385 (15.16)

*: The diameters of these circles are less than 80 mm (3.15 in).

Washer Tube Layout

NFEL0062

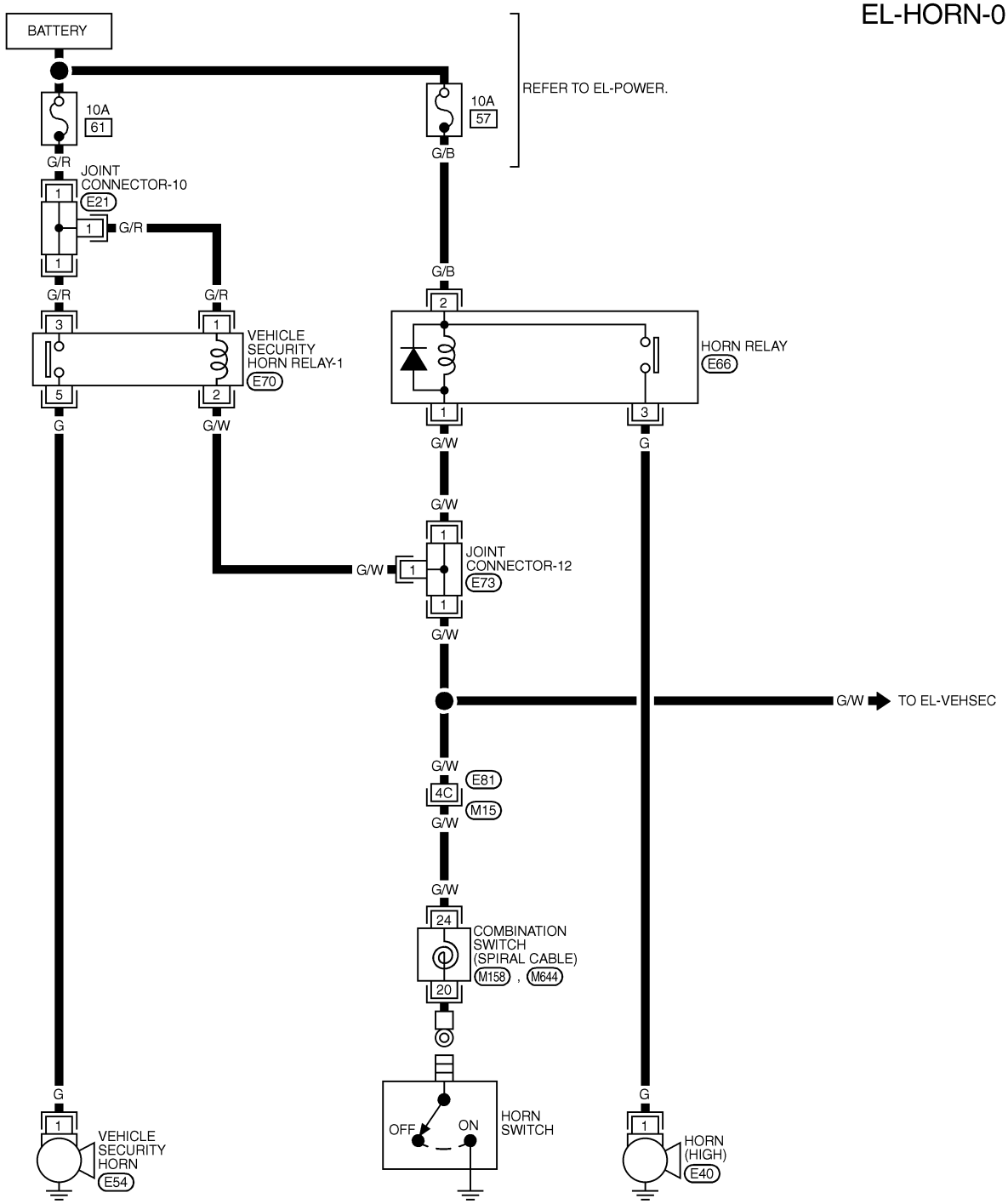


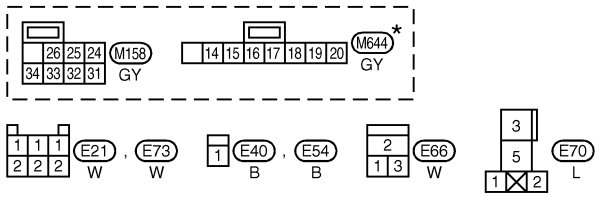
MEL377K

Wiring Diagram — HORN —

NFEL0071

EL-HORN-01





★: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", EL SECTION

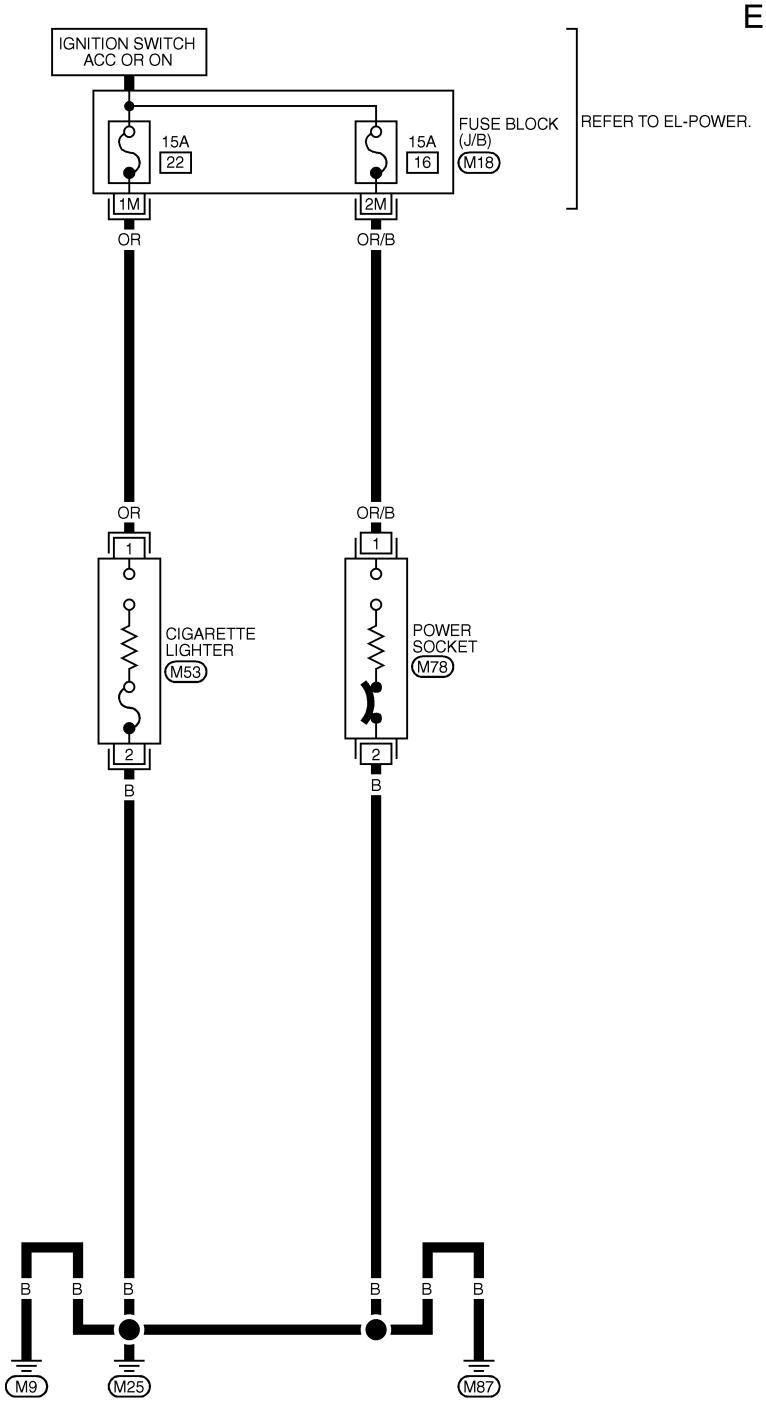
REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)

MEL729P

Wiring Diagram — CIGAR —

NFEL0156

EL-CIGAR-01



REFER TO THE FOLLOWING.
M18 -FUSE BLOCK-
JUNCTION BOX (J/B)

2
1
M53
B

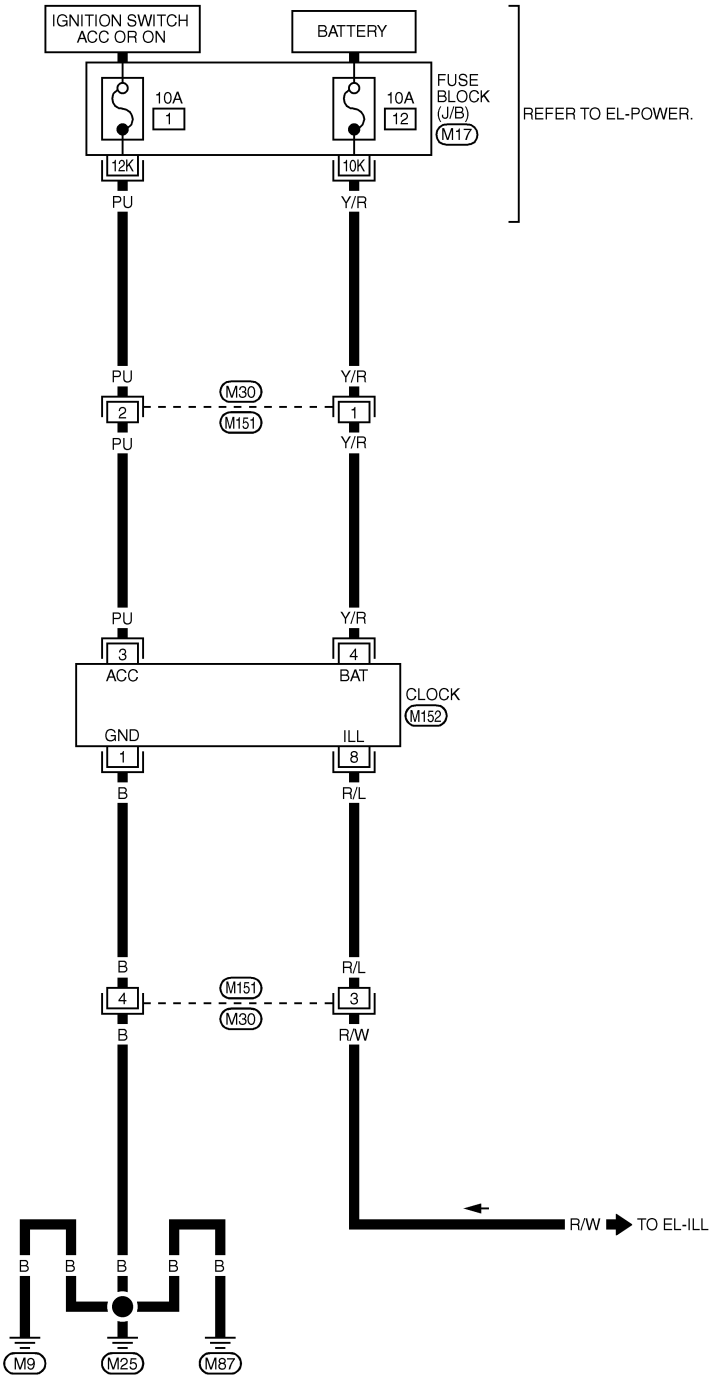
1 2
M78
B

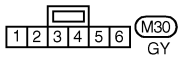
MEL204O

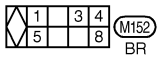
Wiring Diagram — CLOCK —

NFEL0166

EL-CLOCK-01





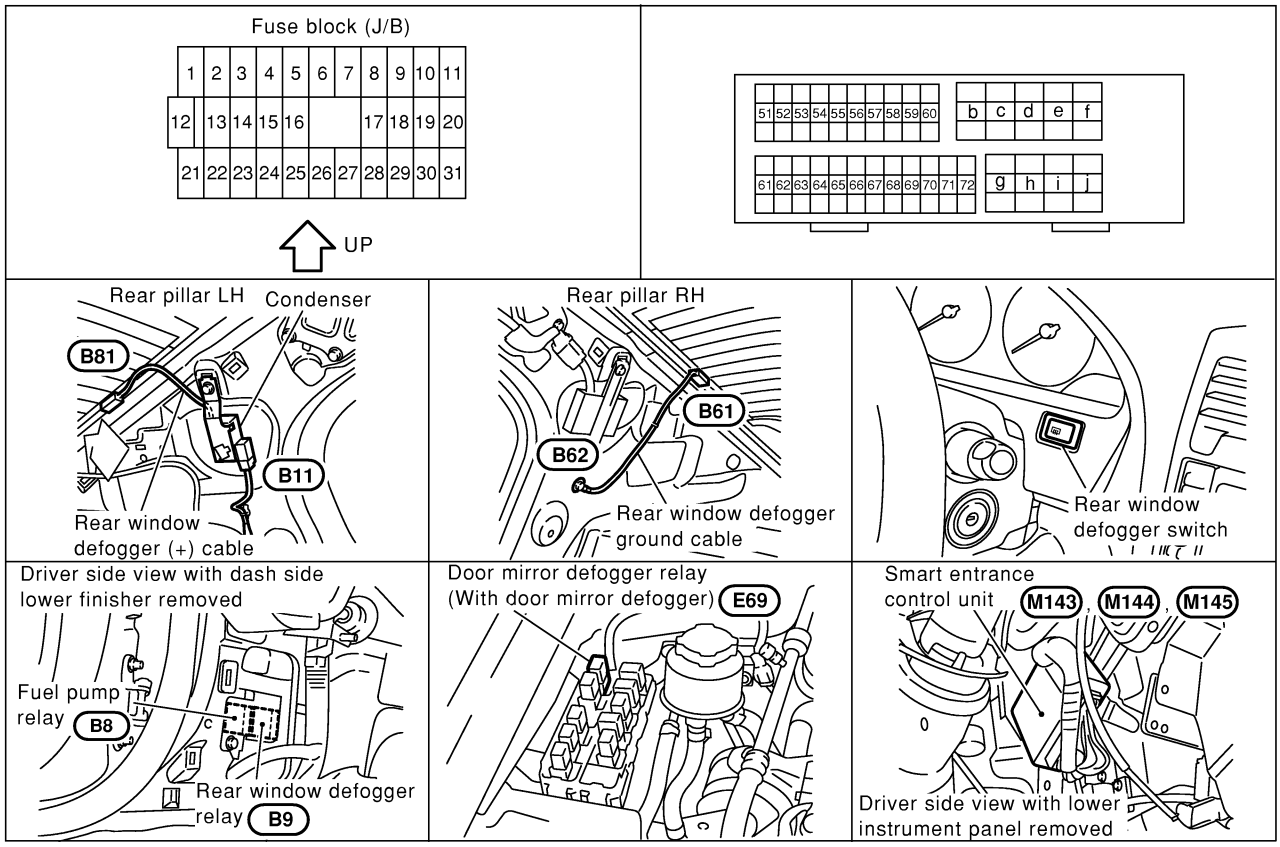


REFER TO THE FOLLOWING.
M17 -FUSE BLOCK-
JUNCTION BOX (J/B)

MEL277K

Component Parts and Harness Connector Location

NFEL0072



SEL382Y

System Description

NFEL0073

The rear window defogger system is controlled by the smart entrance control unit. The rear window defogger operates only for approximately 15 minutes.

Power is supplied at all times

- to rear window defogger relay terminal 3
- through 20A fuse [No. 7, located in the fuse block (J/B)] and
- to rear window defogger relay terminal 6
- through 20A fuse [No. 4, located in the fuse block (J/B)].
- to smart entrance control unit terminal 49
- through 10A fuse [No. 13, located in the fuse block (J/B)].

With the ignition switch in the ON or START position, power is supplied

- through 10A fuse [No. 10, located in the fuse block (J/B)]
- to the rear window defogger relay terminal 1 and
- to smart entrance control unit terminal 27.

Ground is supplied

- to terminals 2 and 5 of the rear window defogger switch
- through body grounds M9, M25 and M87 (with navigation system),
- to terminal 32 of the A/C auto amp. (with auto A/C) or
- to terminal 17 of the A/C control unit (with manual A/C)
- through body grounds M9, M25 and M87 (without navigation system).
- to smart entrance control unit terminals 43 and 64 and rear window defogger switch terminal 5

- through body grounds M9, M25 and M87.

When the rear defogger switch is turned ON, ground is supplied

- through terminal 1 of the rear window defogger switch (with navigation system),
- through terminal 31 of the A/C auto amp. or 9 of the A/C control unit (with manual A/C)
- to smart entrance control unit terminal 14.

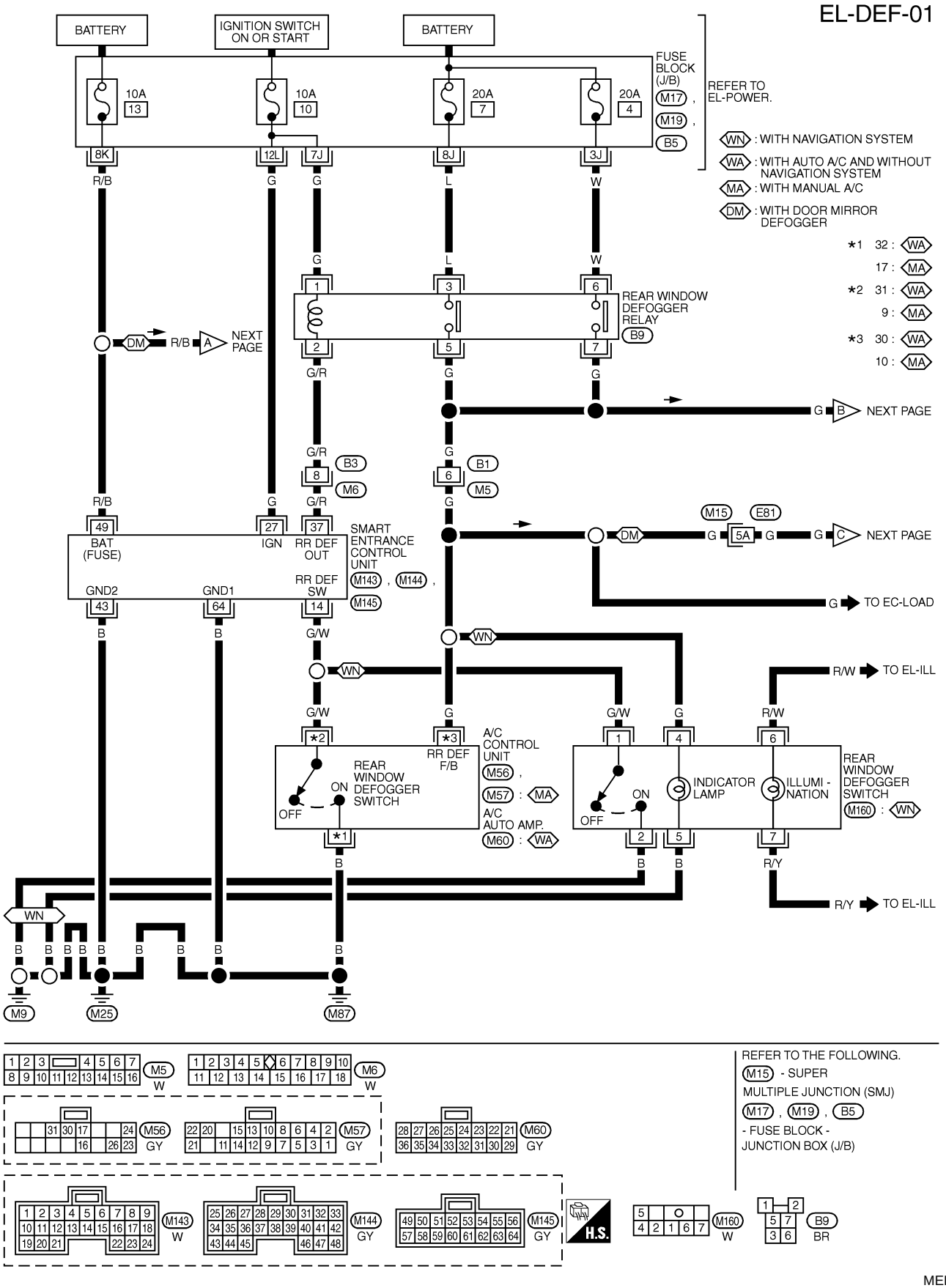
Terminal 37 of the smart entrance control unit then supplies ground to the rear window defogger relay terminal 2.
With power and ground supplied, the rear window defogger relay is energized.
Power is supplied

- through terminals 5 and 7 of the rear window defogger relay
- to the rear window defogger and
- to terminal 30 of the A/C auto amp. (with auto A/C) or
- to terminal 10 of the A/C control unit (with manual A/C)
- to rear window defogger switch terminal 4 (with navigation system).

The rear window defogger has an independent ground.
With power and ground supplied, the rear window defogger filaments heat and defog the rear window.
When the system is activated, the rear window defogger indicator illuminates in the rear window defogger switch.

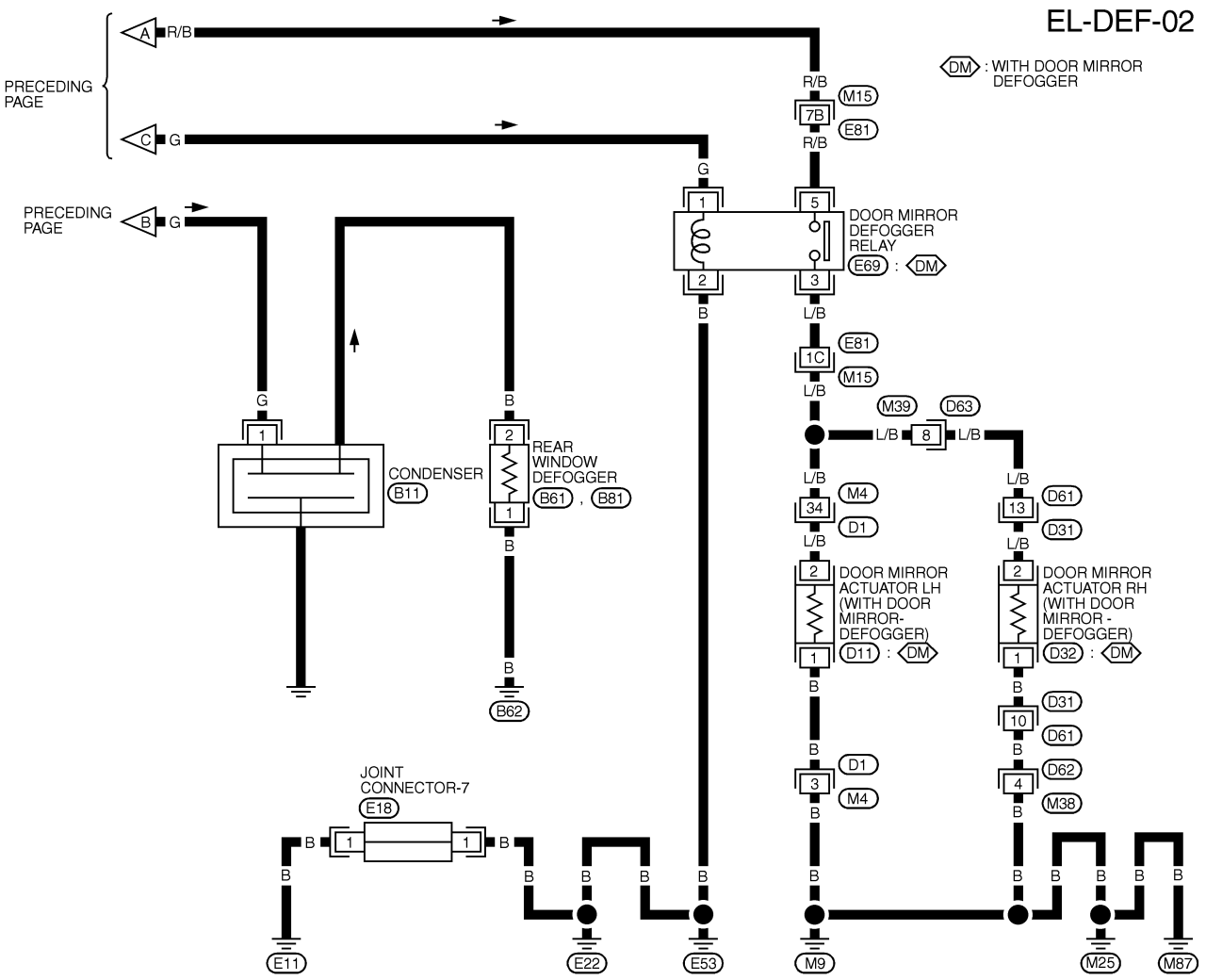
Wiring Diagram — DEF —

=NFEL0074



MEL135O

Wiring Diagram — DEF — (Cont'd)



REFER TO THE FOLLOWING.
M15 , D1 , D31 -SUPER MULTIPLE JUNCTION (SMJ)

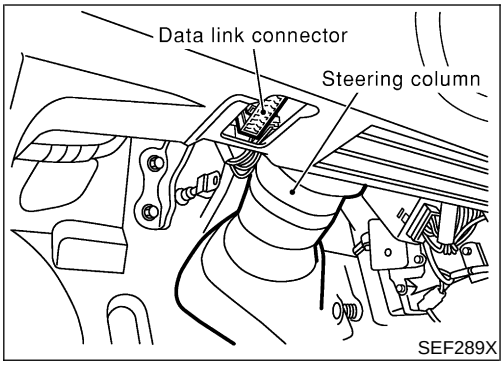
* : THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", EL SECTION.

MEL136O

SMART ENTRANCE CONTROL UNIT TERMINALS AND REFERENCE VALUE BETWEEN EACH TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
14	G/W	REAR WINDOW DEFOGGER SWITCH	OFF → ON (WHEN ONLY PUSHED)	5V → 0V
27	G	IGNITION SWITCH (ON)	IGNITION SWITCH IS IN "ON" POSITION	12V
37	G/R	REAR WINDOW DEFOGGER RELAY	OFF → ON (IGNITION SWITCH IS IN "ON" POSITION)	12V → 0V
43	B	GROUND	–	–
49	R/B	POWER SOURCE (FUSE)	–	12V
64	B	GROUND	–	–

SEL199YA



SEF289X

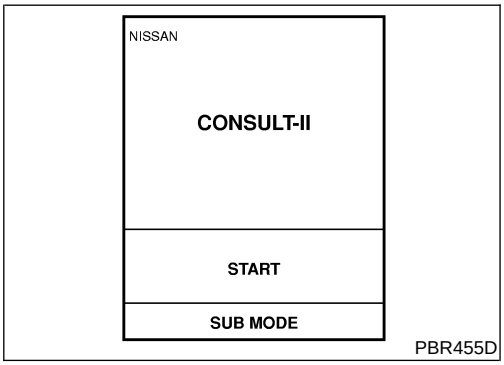
CONSULT-II Inspection Procedure

NFEL0218

“REAR DEFOGGER”

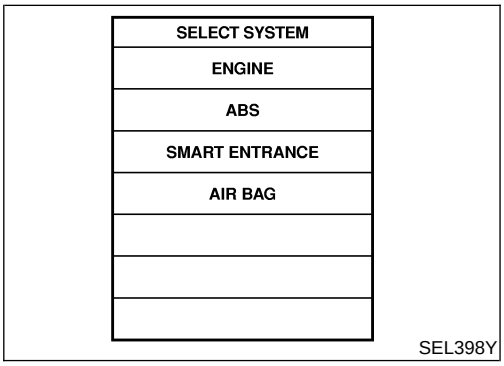
NFEL0218S01

1. Turn ignition switch “OFF”.
2. Connect “CONSULT-II” to the data link connector.



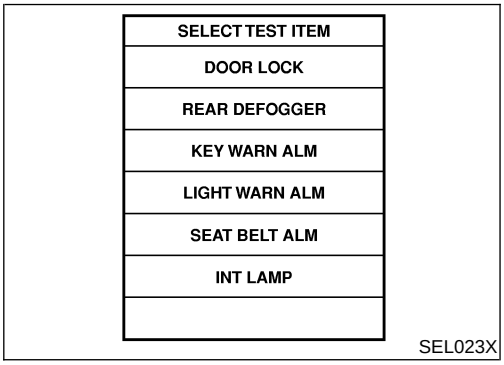
PBR455D

3. Turn ignition switch “ON”.
4. Touch “START”.



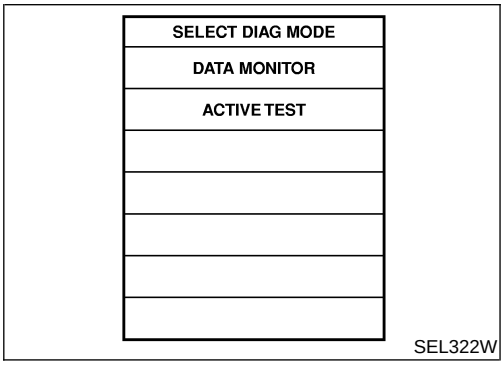
SEL398Y

5. Touch “SMART ENTRANCE”.



SEL023X

6. Touch “REAR DEFOGGER”.



SEL322W

7. Select diagnosis mode.
   “DATA MONITOR” and “ACTIVE TEST” are available.

CONSULT-II Application Items

NFEL0219

“REAR DEFOGGER”

NFEL0219S01

Data Monitor

NFEL0219S0101

Monitored Item	Description
IGN ON SW	Indicates [ON/OFF] condition of ignition switch.
REAR DEF SW	Indicates [ON/OFF] condition of rear window defogger switch.

Active Test

NFEL0219S0102

Test Item	Description
REAR DEFOGGER	This test is able to check rear window defogger operation. Rear window defogger activates when “ON” on CONSULT-II screen is touched.

Trouble Diagnoses

NFEL0075

DIAGNOSTIC PROCEDURE

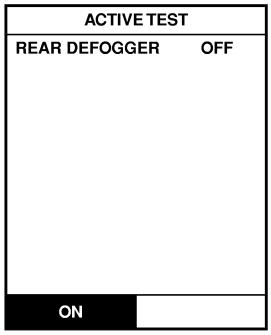
NFEL0075S01

SYMPTOM: Rear window defogger does not activate, or does not go off after activating.

1	CHECK REAR WINDOW DEFOGGER OUTPUT SIGNAL

With CONSULT-II

Select “ACTIVE TEST” in “REAR DEFOGGER” with CONSULT-II.

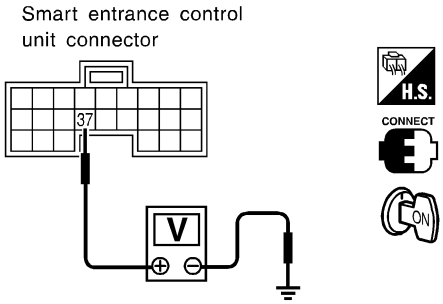


Rear window defogger and rear window defogger switch indicator should operate when the “ON” button on the CONSULT-II screen is touched.

SEL353W

Without CONSULT-II

1. Turn ignition switch to ON position.
2. Check voltage between smart entrance control unit harness connector M144 terminal 37 (G/R) and ground.



Voltage [V]:

Rear window defogger switch is “OFF”.

Approx. 12

Rear window defogger switch is “ON”.

0

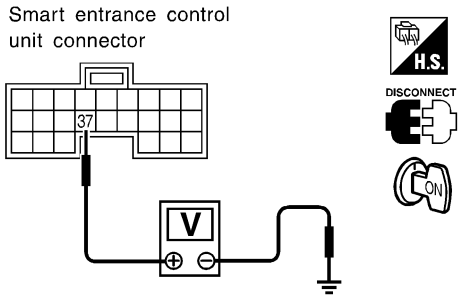
SEL997X

OK or NG

OK	▶	**Check the following.** ● Rear window defogger relay (Refer to EL-177.) ● Rear window defogger circuit ● Rear window defogger filament (Refer to EL-178.)
NG	▶	GO TO 2.

2	CHECK DEFOGGER RELAY COIL SIDE CIRCUIT

1. Disconnect control unit connector.
2. Turn ignition switch to ON position.
3. Check voltage between smart entrance control unit harness connector M144 terminal 37 (G/R) and ground.



Battery voltage should exist.

SEL998X

OK or NG

OK	▶	GO TO 3.
NG	▶	**Check the following.** ● 10A fuse [No. 10, located in the fuse block (J/B)] ● Rear window defogger relay ● Harness for open or short between 10A fuse [No. 10, located in the fuse block (J/B)] and rear window defogger relay ● Harness for open or short between rear window defogger relay and smart entrance control unit

3	CHECK REAR WINDOW DEFOGGER SWITCH INPUT SIGNAL

With CONSULT-II

Select "REAR DEF SW" in "DATA MONITOR" mode with CONSULT-II.

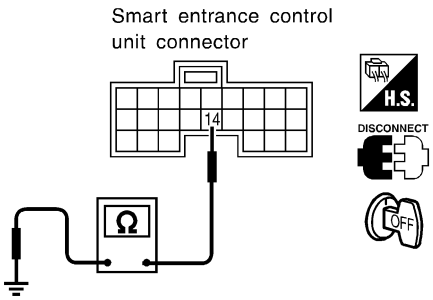
DATA MONITOR	
MONITOR	
REAR DEF SW	ON

When rear window defogger switch is pushed:
REAR DEF SW should be ON.

SEL352W

Without CONSULT-II

Check continuity between smart entrance control unit harness connector M143 terminal 14 (G/W) and ground.



Continuity:
Rear window defogger switch is pushed.
Continuity should exist.
Rear window defogger switch is released.
Continuity should not exist.

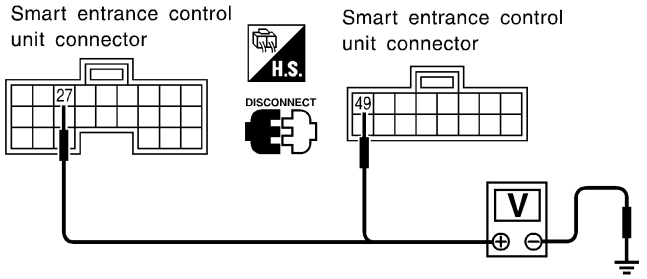
SEL999X

OK or NG

OK	▶	GO TO 4.
NG	▶	**Check the following.** ● Rear window defogger switch (Refer to EL-177.) ● Harness for open or short between smart entrance control unit and rear window defogger switch ● Rear window defogger switch ground circuit

4	CHECK POWER SUPPLY AND IGNITION INPUT SIGNAL

Check voltage between smart entrance control unit harness connector M144 terminal 27 (G), M145 terminal 49 (R/B) and ground.



Terminals		Ignition switch position		
(+)	(−)	OFF	ACC	ON
49	Ground	Battery voltage	Battery voltage	Battery voltage
27	Ground	0V	0V	Battery voltage

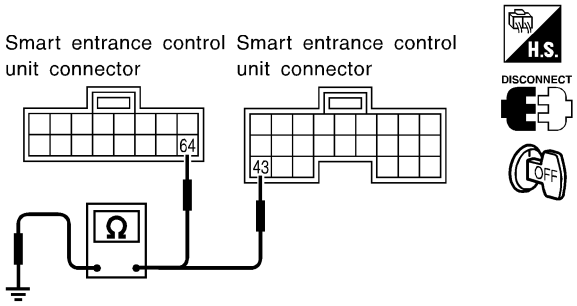
SEL001Y

OK or NG

OK	▶	GO TO 5.
NG	▶	**Check the following.** ● 10A fuse [No. 10 or No. 13, located in the fuse block (J/B)] ● Harness for open or short between smart entrance control unit and fuse

5	CHECK CONTROL UNIT GROUND CIRCUIT

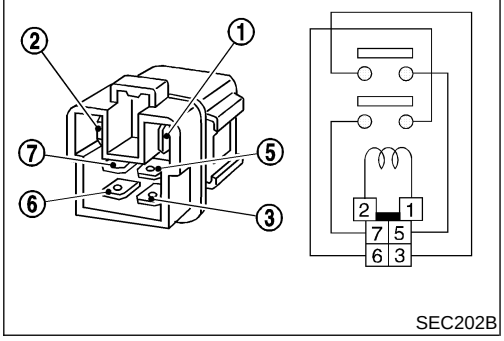
Check continuity between smart entrance control unit harness connector M144 terminal 43 (B), M145 terminal 64 (B) and ground.



Continuity should exist.

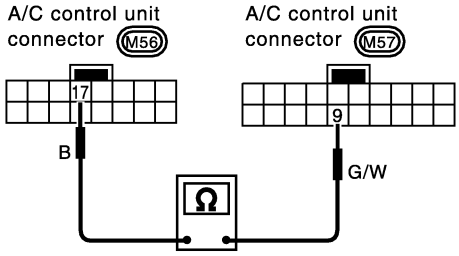
SEL002Y

Yes	▶	Replace smart entrance control unit.
No	▶	Repair harness or connectors.

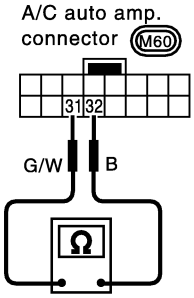


SEC202B

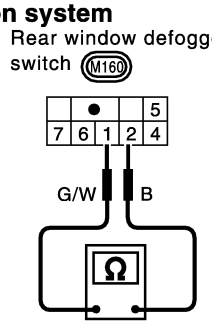
With manual A/C



With auto A/C and without navigation system



With auto A/C and navigation system



MEL474O

Electrical Components Inspection

=NFEL0076

REAR WINDOW DEFOGGER RELAY

NFEL0076S01

Check continuity between terminals 3 and 5, 6 and 7.

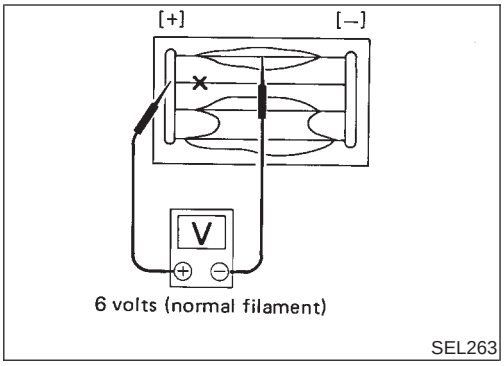
Condition	Continuity
12V direct current supply between terminals 1 and 2	Yes
No current supply	No

REAR WINDOW DEFOGGER SWITCH

NFEL0076S02

Check continuity between terminals when rear window defogger switch is pushed and released.

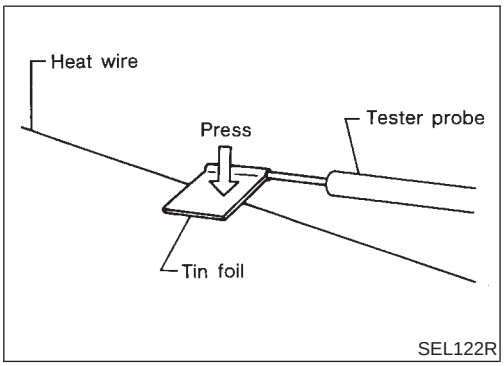
Terminals	Condition	Continuity
9 - 17 (with manual A/C) 31 - 32 (with auto A/C and without navigation system) 1 - 2 (with auto A/C and navigation system)	Rear window defogger switch is pushed.	Yes
	Rear window defogger switch is released.	No



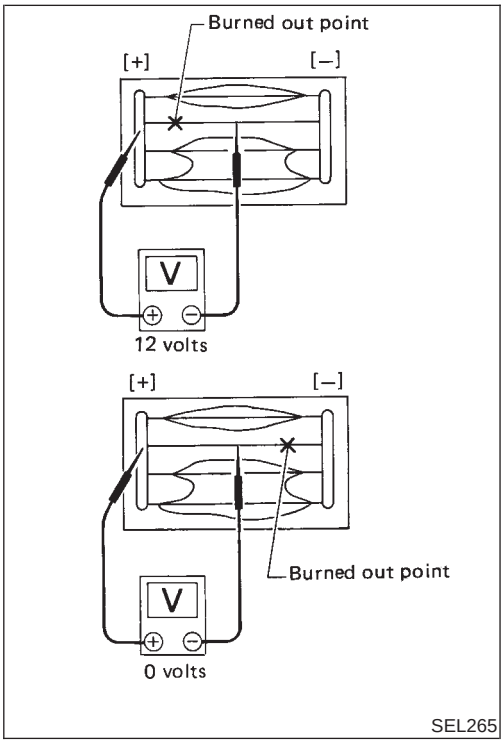
Filament Check

=NFEL0077

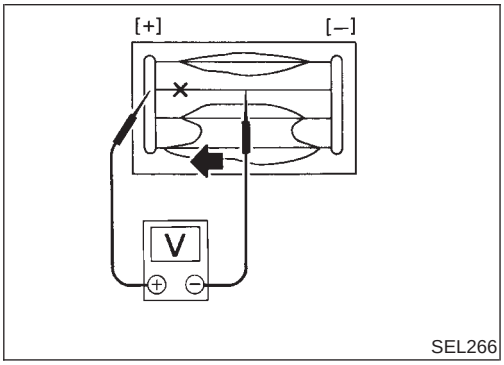
1. Attach probe circuit tester (in volt range) to middle portion of each filament.



- **When measuring voltage, wrap tin foil around the top of the negative probe. Then press the foil against the wire with your finger.**



2. If a filament is burned out, circuit tester registers 0 or 12 volts.



3. To locate burned out point, move probe to left and right along filament. Test needle will swing abruptly when probe passes the point.

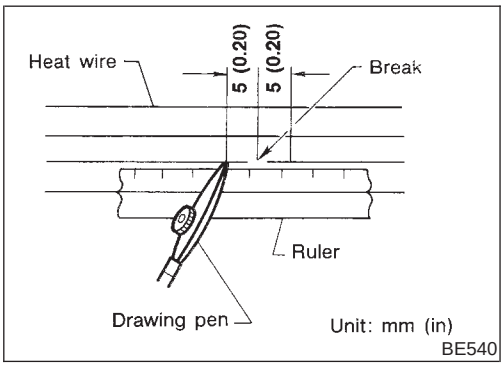
Filament Repair

NFEL0078

REPAIR EQUIPMENT

NFEL0078S01

1) Conductive silver composition (Dupont No. 4817 or equivalent)
2) Ruler 30 cm (11.8 in) long
3) Drawing pen
4) Heat gun
5) Alcohol
6) Cloth



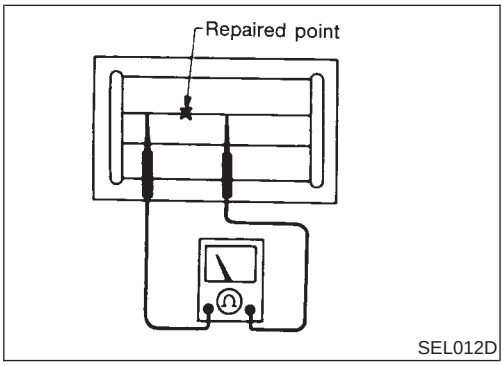
REPAIRING PROCEDURE

NFEL0078S02

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.

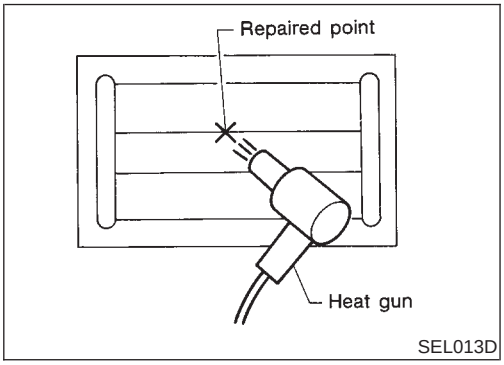
Shake silver composition container before use.

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.

System Description

NFEL0079

BASE SYSTEM

NFEL0079S01

Refer to Owner's Manual for audio system operating instructions.
Power is supplied at all times

- through 15A fuse (No. 56, located in the fuse and fusible link box)
- to audio unit terminal 6.

With the ignition switch in the ACC or ON position, power is supplied

- through 10A fuse [No. 1, located in the fuse block (J/B)]
- to audio unit terminal 10.

Ground is supplied through the case of the audio unit.
Audio signals are supplied

- through audio unit terminals 1, 2, 3, 4, 13, 14, 15 and 16
- 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 (with 6 speakers).

BOSE SYSTEM

NFEL0079S02

Refer to Owner's Manual for audio system operating instructions.
Power is supplied at all times

- through 15A fuse (No. 56, located in the fuse and fusible link box)
- to Bose speaker amp. terminal 27, and
- to CD auto changer terminal 3 (with CD auto changer)
- to audio unit terminal 6.
- through 15A fuse (No. 67, located in the fuse and fusible link box)
- to woofer terminal 48.

With the ignition switch in the ACC or ON position, power is supplied

- through 10A fuse [No. 1, located in the fuse block (J/B)]
- to CD auto changer terminal 1 (with CD auto changer) and
- to audio unit terminal 10.

Ground is supplied through the case of the audio unit.
Ground is supplied

- to Bose speaker amp. terminal 40, and
- to woofer terminal 47
- through body grounds B106 and B127.
- to CD auto changer terminal 7 (with CD auto changer)
- through body grounds B12 and B59.

When the audio unit POWER button is pressed, power is supplied to BOSE speaker amp. terminal 25 and woofer terminal 45 from audio unit terminal 12.
CD (audio) signals are supplied (with CD auto changer)

- through CD auto changer terminals 16, 6, 15 and 5
- to terminals 41, 42, 43 and 44 of the audio unit.

Audio signals are supplied

- through audio unit terminals 2, 1, 4, 3, 14, 13, 16 and 15
- to Bose speaker amp. terminals 33, 20, 35, 22, 34, 21, 36 and 23.
- through audio unit terminal 12
- to Bose speaker amp. terminal 25 and
- to woofer terminal 45.

Audio signals are amplified by the Bose speaker amp.
The amplified audio signals are supplied

- through Bose speaker amp. terminals 30, 31, 28, 29, 18, 17, 41 and 42
- to terminals 1 and 2 of the front door speaker LH and RH
- to terminals 1 and 2 of the tweeter LH and RH,
- to terminals 1 and 2 of the rear speaker LH and RH.

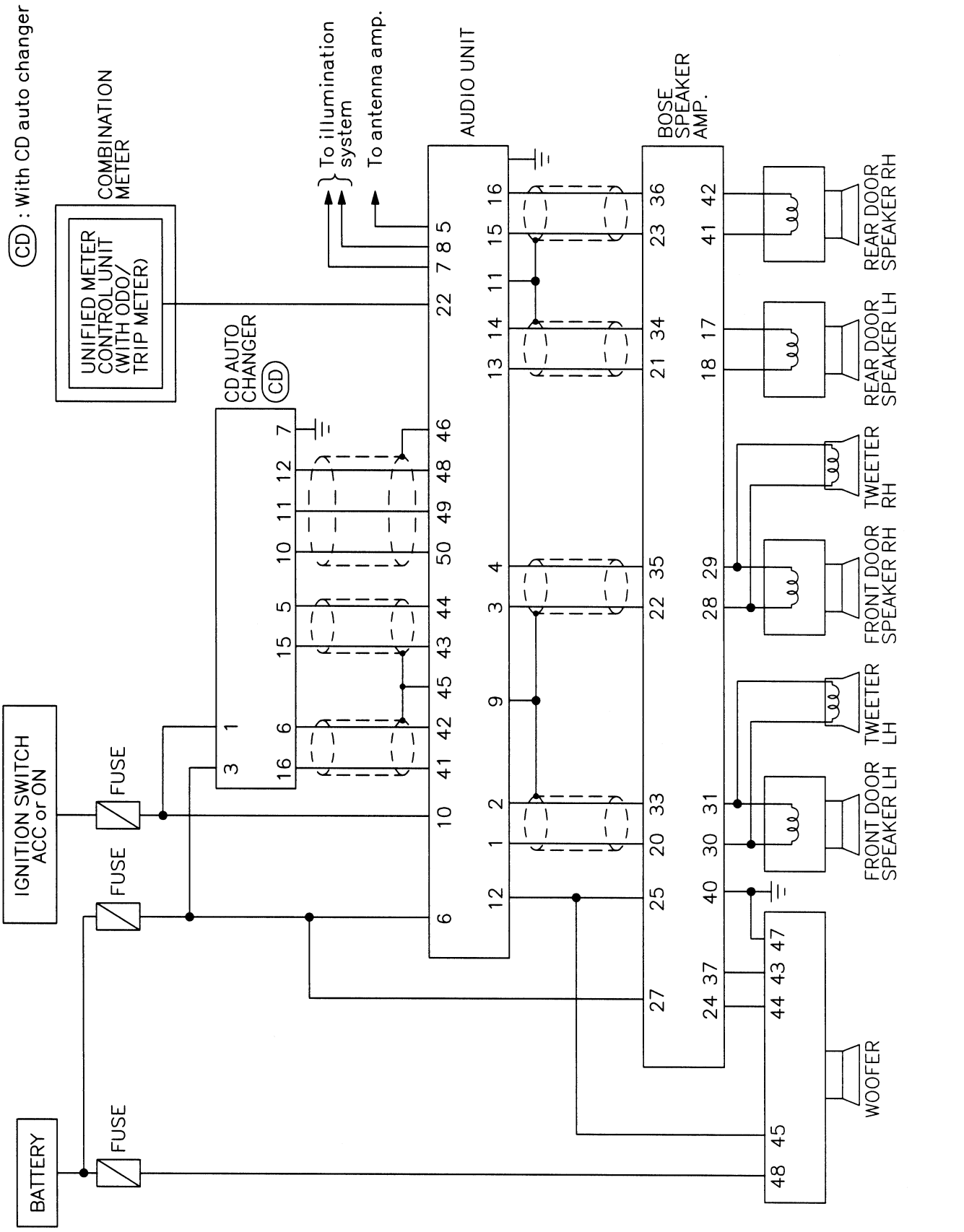
- through Bose speaker amp. terminals 24 and 37
- to terminal 44 and 43 of the woofer.

Schematic

NFEL0167

BOSE SYSTEM

NFEL0167S01



MEL138O

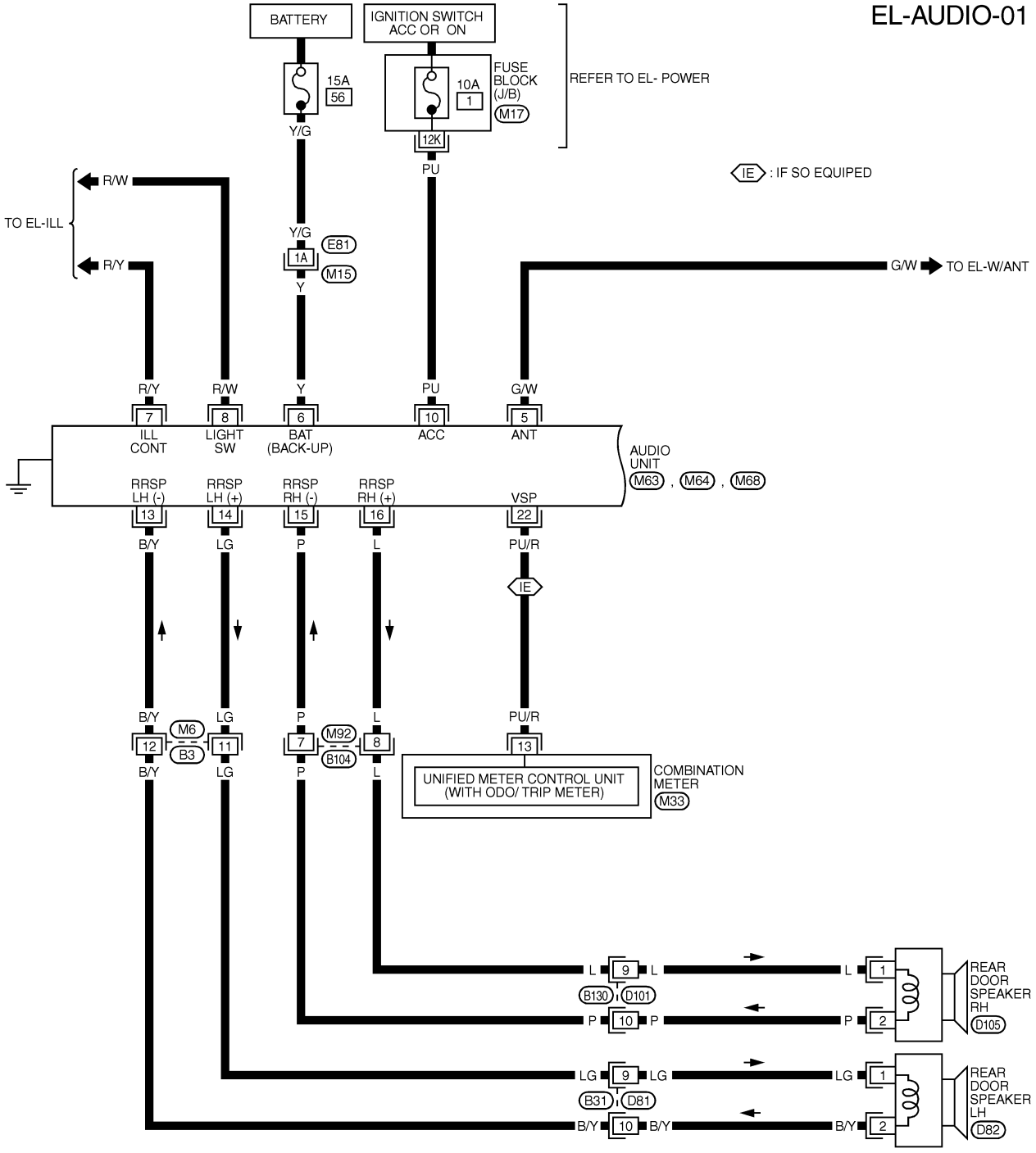
Wiring Diagram — AUDIO —

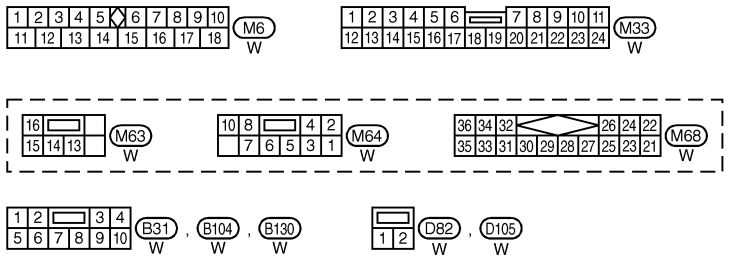
NFEL0081

BASE SYSTEM

NFEL0081S01

EL-AUDIO-01

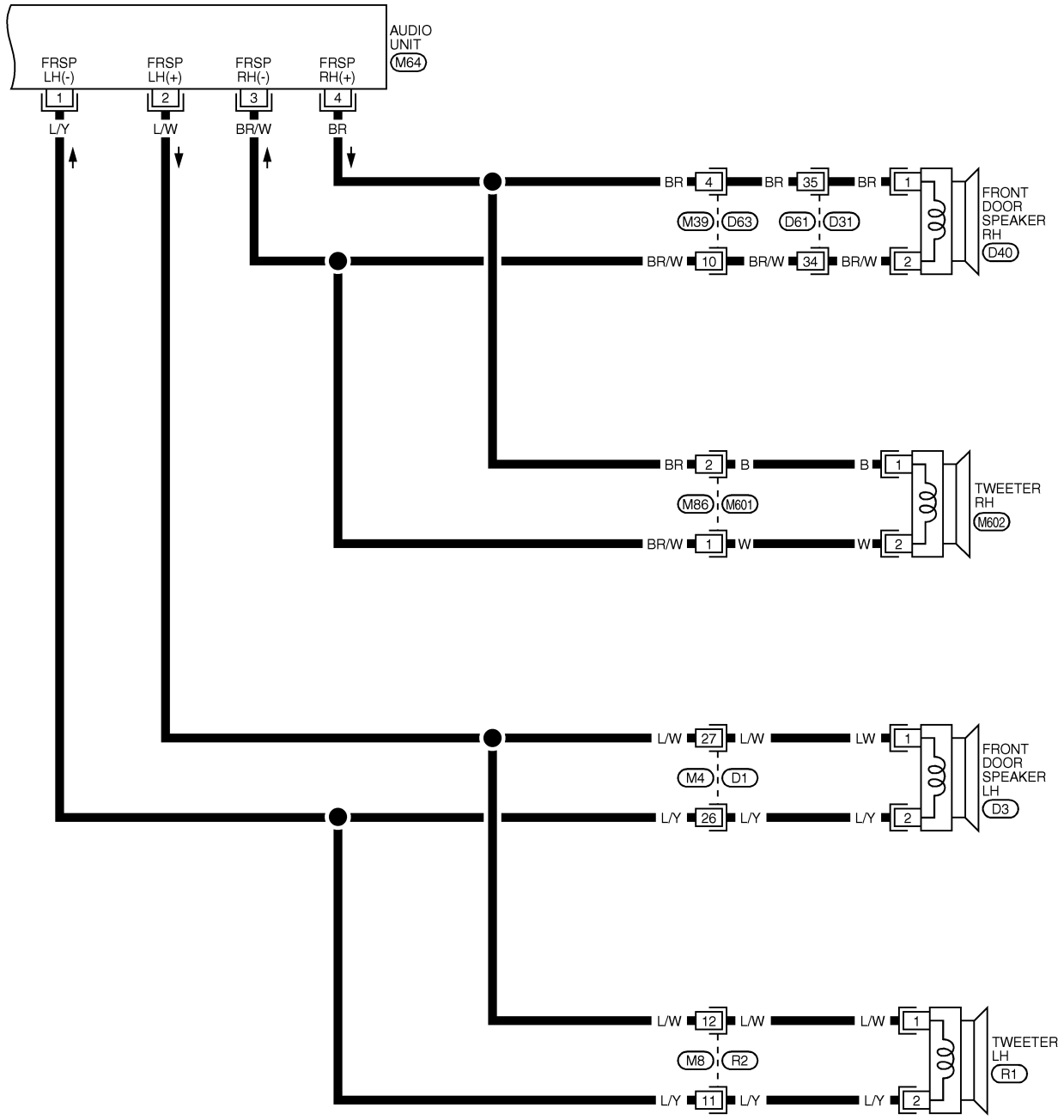




REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)
M17 -FUSE BLOCK-JUNCTION BOX (J/B)

MEL829P

EL-AUDIO-02



M64 W

M601 BR, M602 BR, R1 BR, D3 W, D40 W

R2 W

D63 W

* : THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT",EL SECTION.

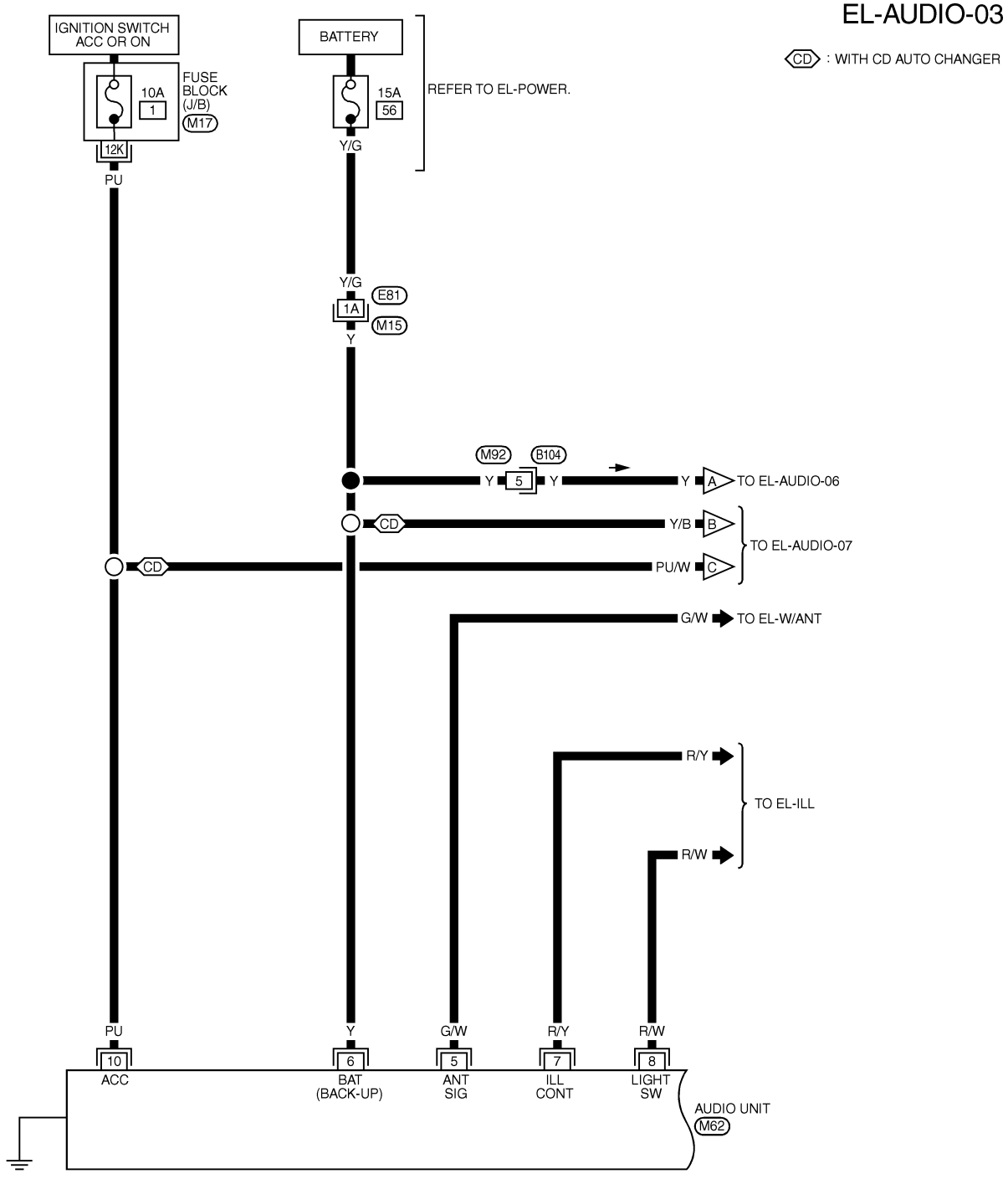
REFER TO THE FOLLOWING.
D1, D31 - SUPER MULTIPLE JUNCTION (SMJ)

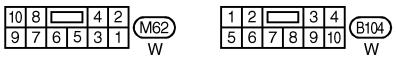
MEL140O

BOSE SYSTEM

NFEL0081S02

EL-AUDIO-03

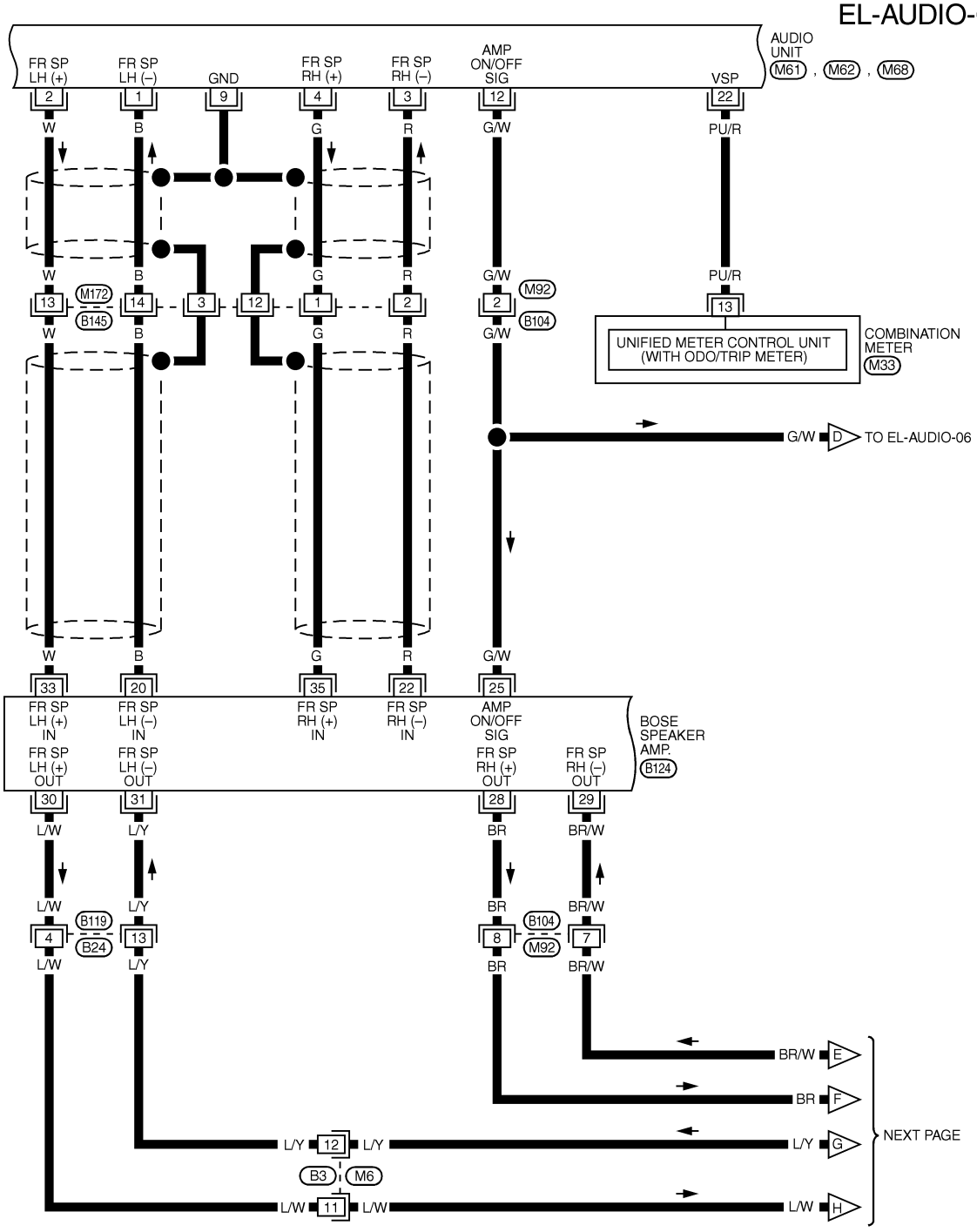


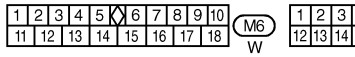


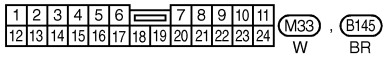
REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)
M17 -FUSE BLOCK-JUNCTION BOX (J/B)

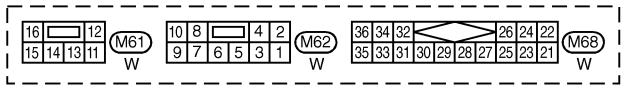
MEL137O

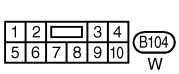
EL-AUDIO-04

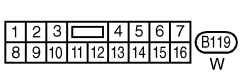


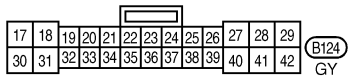






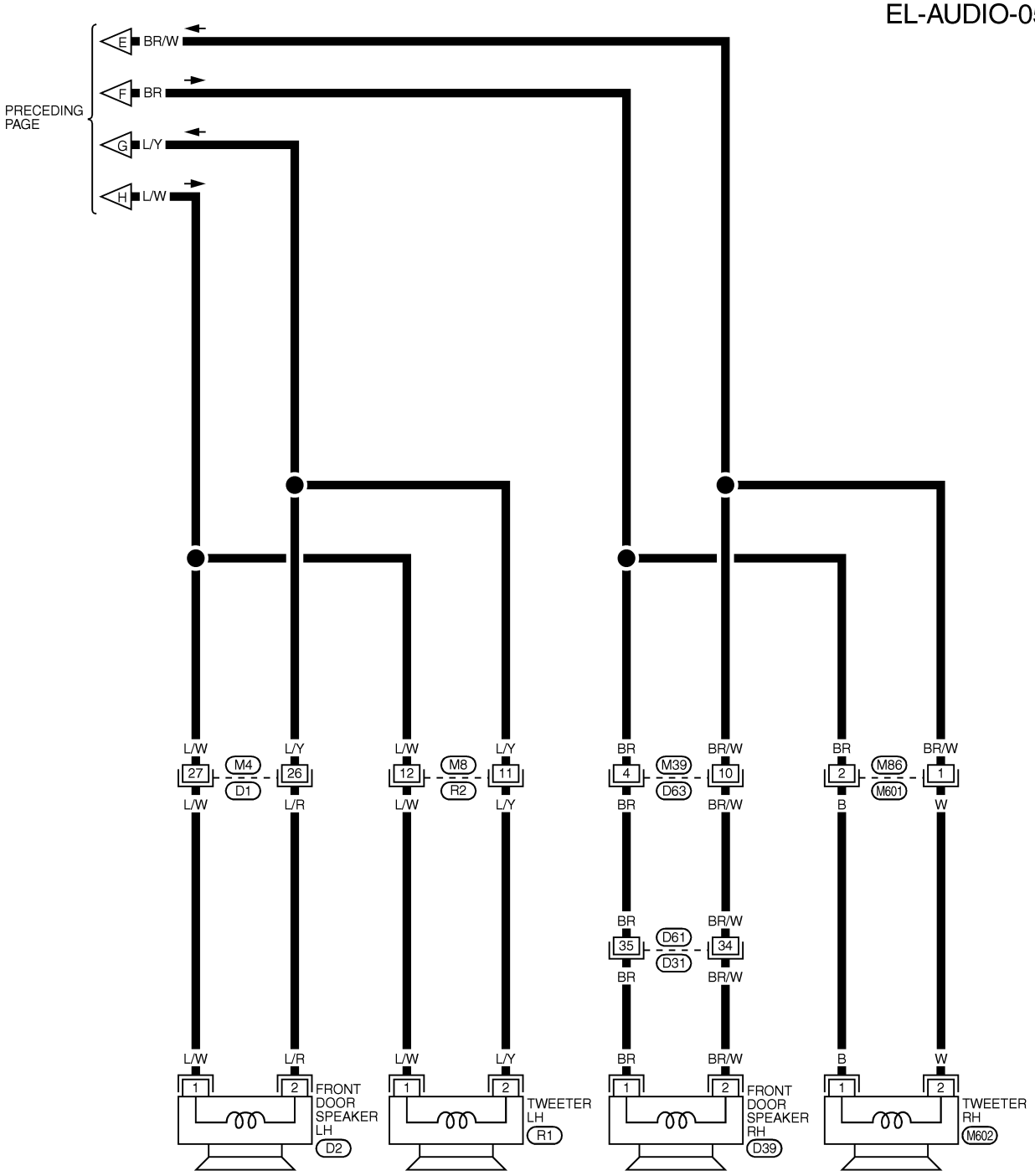






MEL830P

EL-AUDIO-05



M601 BR *, M602 BR *, R1 BR

R2 W

D2 BR, D39 BR

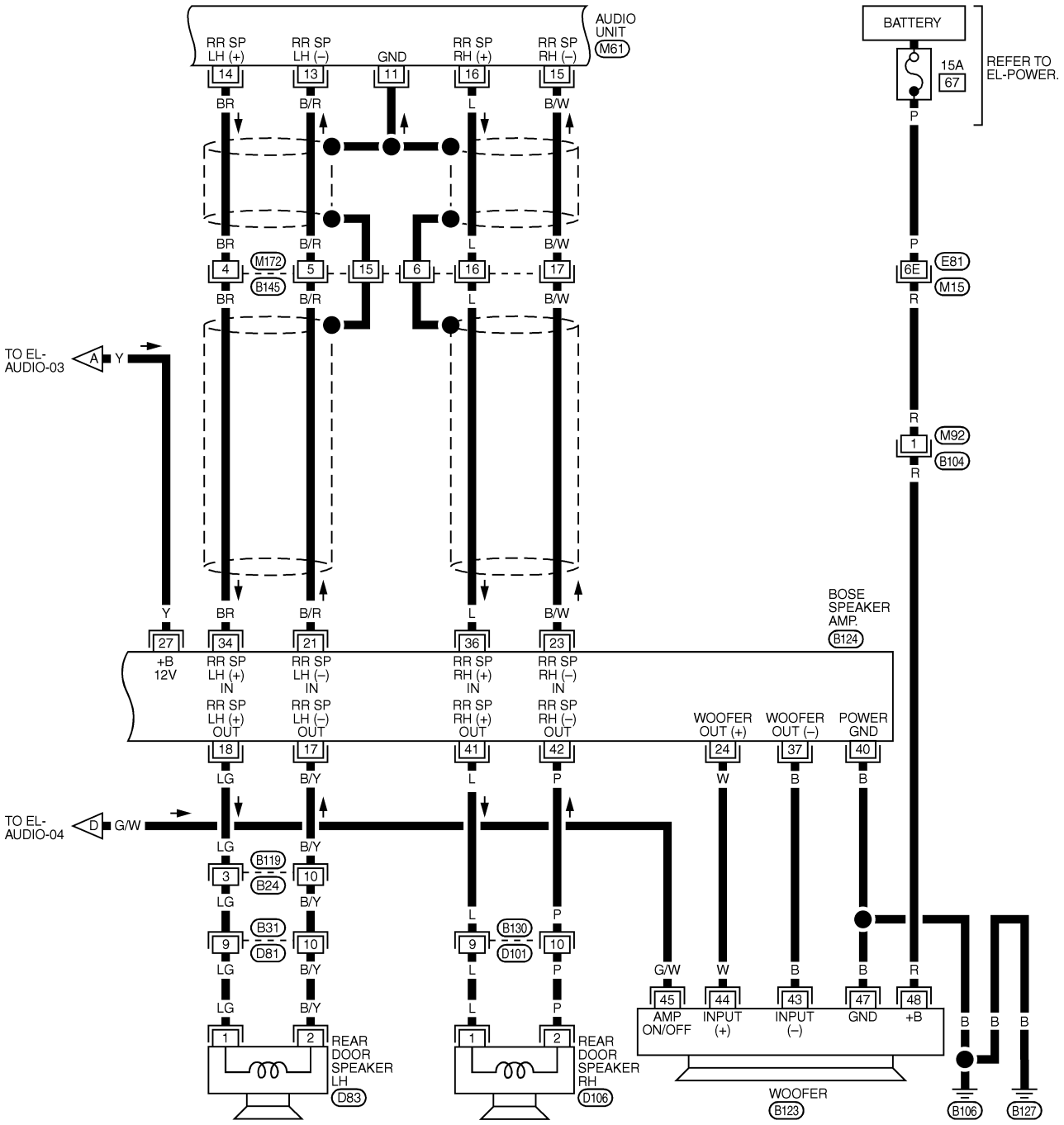
D63 W

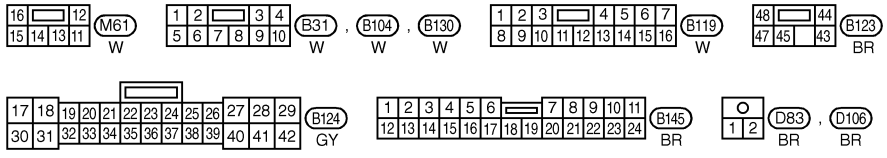
REFER TO THE FOLLOWING.
D1, D31 -SUPER MULTIPLE JUNCTION (SMJ)

* : THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", EL SECTION.

MEL141O

EL-AUDIO-06

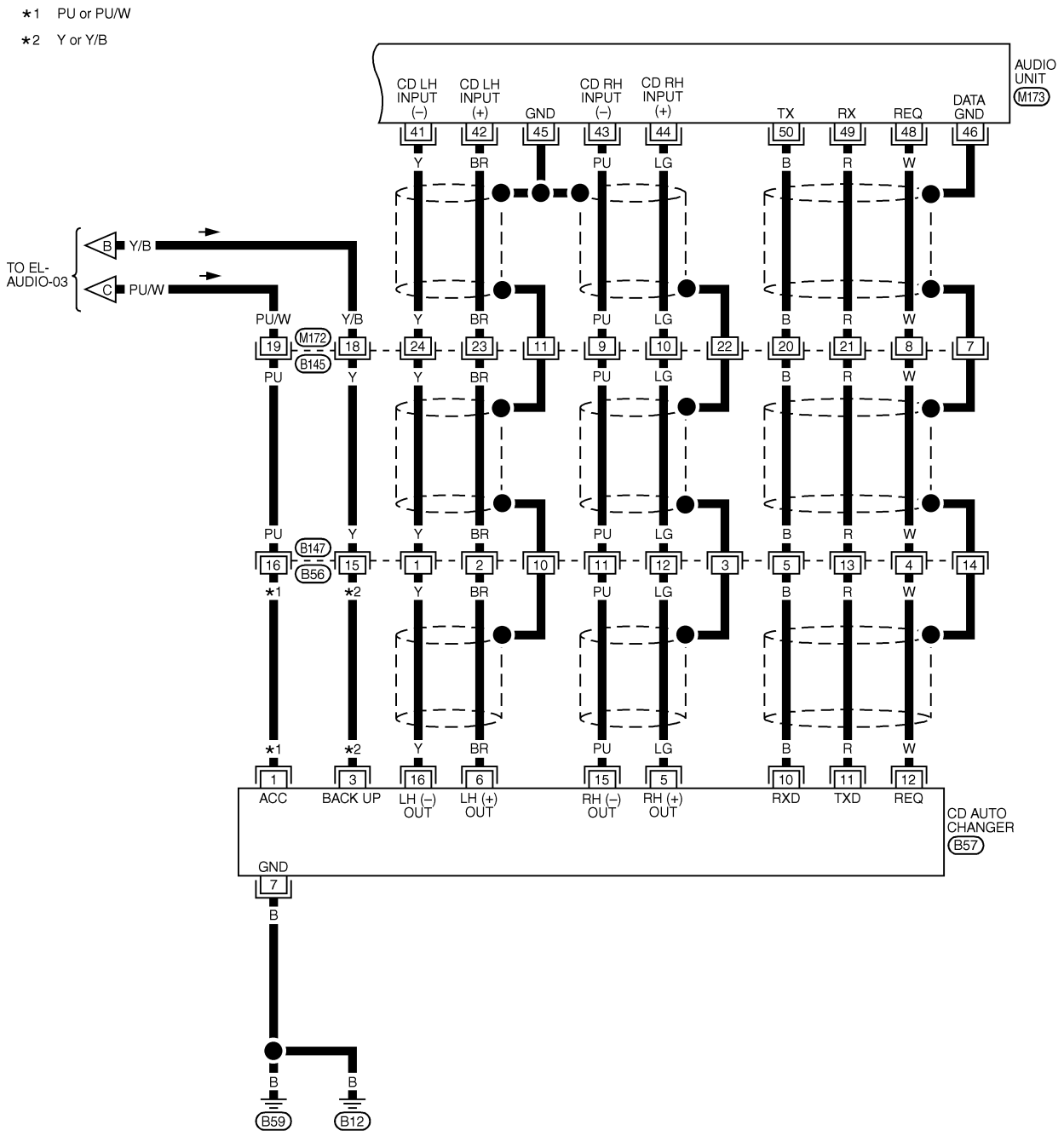


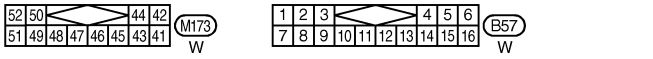


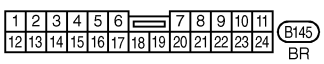
REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)

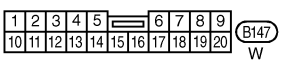
MEL143O

EL-AUDIO-07









MEL831P

Trouble Diagnoses

NFEL0220

AUDIO UNIT

NFEL0220S01

Symptom	Possible causes	Repair order
Audio unit inoperative (no digital display and no sound from speakers).	1. 10A fuse 2. Poor audio unit case ground 3. Audio unit	1. Check 10A fuse [No. 1, located in fuse block (J/B)]. Turn ignition switch ON and verify that battery positive voltage is present at terminal 10 of audio unit. 2. Check audio unit case ground. 3. Remove audio unit for repair.
Audio unit presets are lost when ignition switch is turned OFF.	1. 15A fuse 2. Audio unit	1. Check 15A fuse (No. 56, located in fuse and fusible link box) and verify that battery positive voltage is present at terminal 6 of audio unit. 2. Remove audio unit for repair.
AM/FM stations are weak or noisy.	1. Window antenna 2. Audio unit ground 3. Audio unit	1. Check window antenna. 2. Check audio unit ground condition. 3. Remove audio unit for repair.
Audio unit generates noise in AM and FM modes with engine running.	1. Poor audio unit ground 2. Loose or missing ground bonding straps 3. Ignition condenser or rear window defogger noise suppressor condenser 4. Ignition coil or secondary wiring 5. Audio unit	1. Check audio unit ground. 2. Check ground bonding straps. 3. Replace ignition condenser or rear window defogger noise suppressor condenser. 4. Check ignition coil and secondary wiring. 5. Remove audio unit for repair.
Audio unit generates noise in AM and FM modes with accessories on (switch pops and motor noise).	1. Poor audio unit ground 2. Antenna 3. Accessory ground 4. Faulty accessory	1. Check audio unit ground. 2. Check antenna. 3. Check accessory ground. 4. Replace accessory.

BASE SYSTEM

NFEL0220S02

Symptom	Possible causes	Repair order
Individual speaker is noisy or inoperative.	1. Speaker 2. Audio unit output 3. Speaker circuit 4. Audio unit	1. Check speaker. 2. Check audio unit output voltages. 3. Check wires for open or short between audio unit and speaker. 4. Remove audio unit for repair.

BOSE SYSTEM

NFEL0220S03

Symptom	Possible causes	Repair order
Audio unit controls are operational, but no sound is heard from any speaker.	1. 15A fuse 2. Amp. ON/OFF signal circuit 3. Speaker amp. ground	1. Check 15A fuse (No. 56, located in fuse and fusible link box). Verify battery positive voltage is present at terminal 27 of speaker amp. 2. Check harness continuity between audio unit terminal 12 and speaker amp. terminal 25. 3. Check harness continuity between speaker amp. terminal 40 and ground.
Individual rear speaker is noisy or inoperative.	1. Each speaker 2. Output circuit to each speaker	1. Check speaker. 2. Check the output circuits to each speaker ● between audio unit and speaker amp. ● between speaker amp. and each speaker.
Woofer does not operate.	1. Power supply to woofer 2. Amp. ON/OFF signal circuit 3. Speaker amp. ground 4. Output circuit to woofer	1. Check 15A fuse [No. 67, located in fuse block (J/B)]. Verify battery positive voltage is present at terminal 48 of woofer. 2. Check harness continuity between audio unit terminal 12 and woofer terminal 45. 3. Check harness continuity between woofer terminal 47 and ground. 4. Check the output circuits to woofer from speaker amp.

Inspection

NFEL0221

AUDIO UNIT AND AMP.

NFEL0221S01

All voltage inspections are made with:

- Ignition switch ON or ACC
- Audio unit ON
- Audio unit and amps. connected (If audio unit or amp. is removed for inspection, supply a ground to the case using a jumper wire.)

ANTENNA

NFEL0221S02

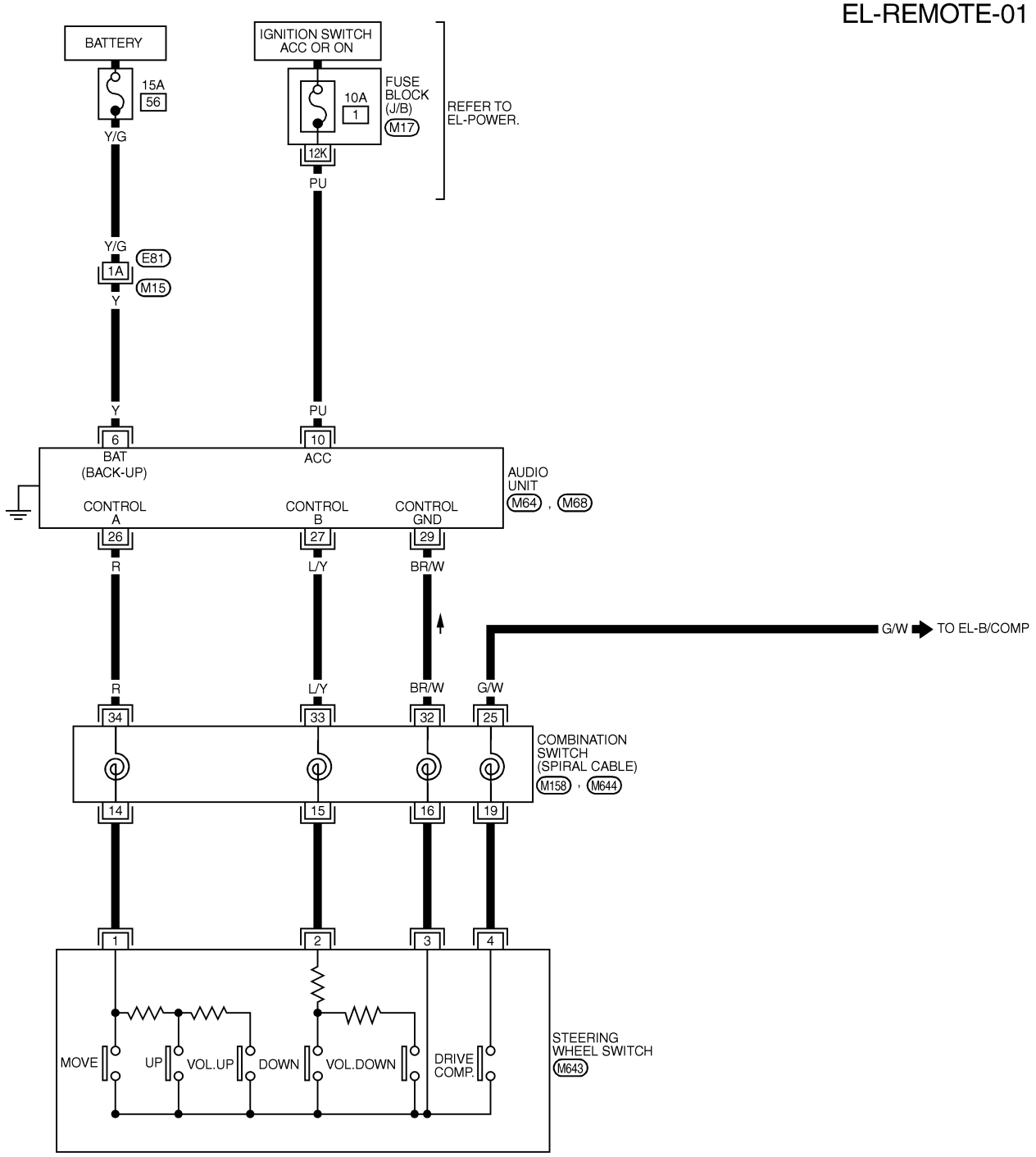
Using a jumper wire, clip an auxiliary ground between antenna and body.

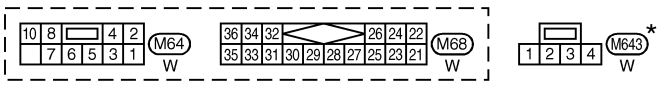
- If reception improves, check antenna ground (at body surface).
- If reception does not improve, check main feeder cable for short circuit or open circuit.

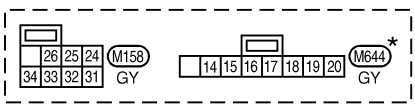
Wiring Diagram — REMOTE —

NFEL0260

EL-REMOTE-01







*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", EL SECTION.

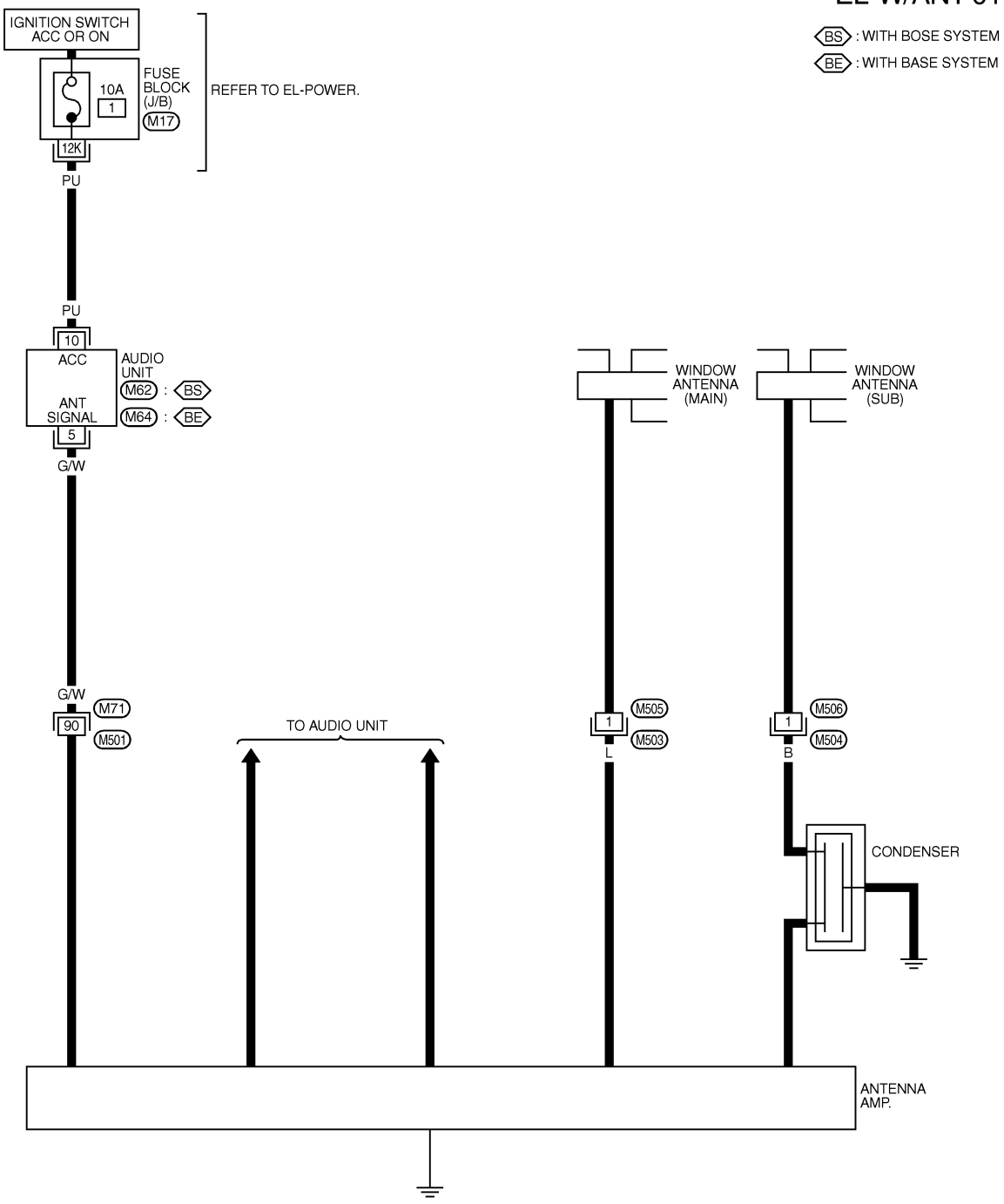
REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)
M17 -FUSE BLOCK-JUNCTION BOX (J/B)

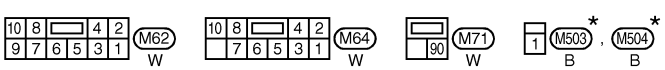
MEL730P

Wiring Diagram — W/ANT —

NFEL0085

EL-W/ANT-01





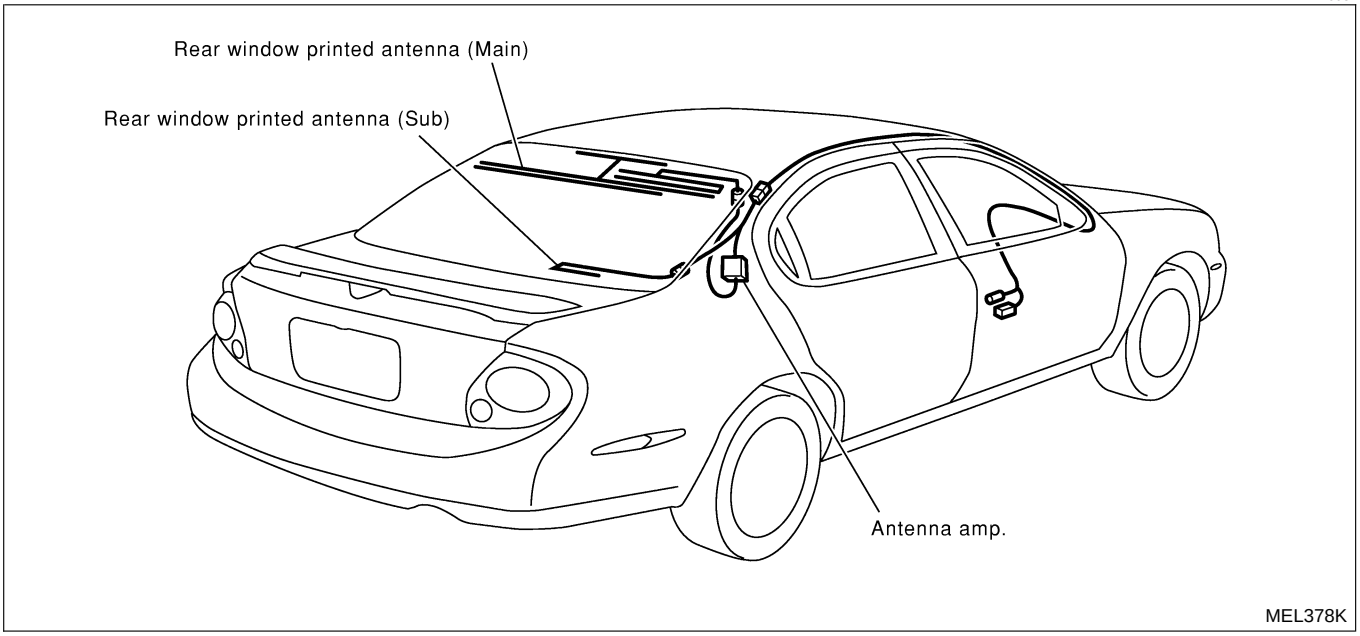
★: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", EL-SECTION.

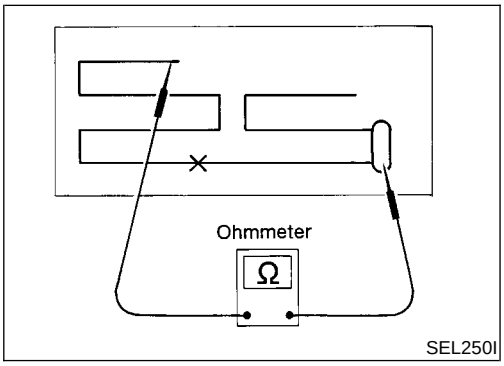
REFER TO THE FOLLOWING.
M17 -FUSE BLOCK-JUNCTION BOX (J/B)

MEL145O

Location of Antenna

NFEL0087





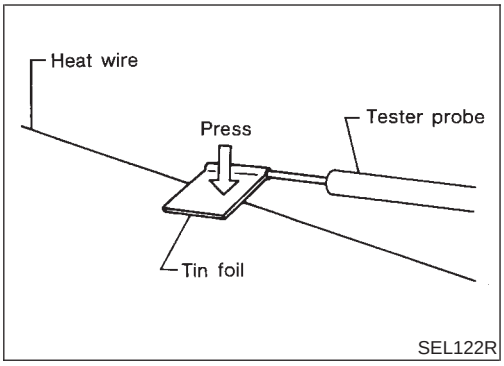
Window Antenna Repair

NFEL0250

ELEMENT CHECK

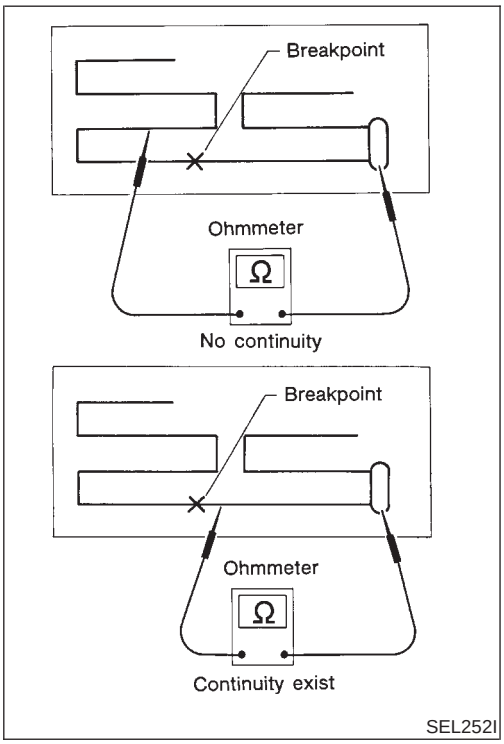
NFEL0250S01

1. Attach probe circuit tester (in ohm range) to antenna terminal on each side.
   If an element is OK, continuity should exist.
   If an element is broken, no continuity should exist. Go to step 2.



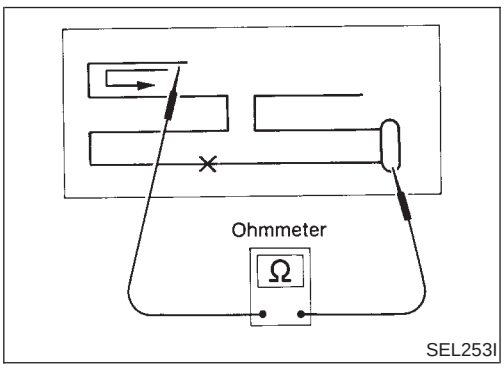
SEL122R

- **When measuring continuity, wrap tin foil around the top of probe. Then press the foil against the wire with your finger.**



SEL252I

2. To locate broken point, move probe along element. Tester needle will swing abruptly when probe passes the point.



SEL253I

ELEMENT REPAIR

NFEL0250S02

Refer to "Filament Repair", "REAR WINDOW DEFOGGER" (EL-178).

System Description

NFEL0222

OUTLINE

NFEL0222S01

Electric sunroof system consists of

- Sunroof switch
- Sunroof motor
- Smart entrance control unit

Smart entrance control unit controls retained power operation.

OPERATION

NFEL0222S03

The sunroof can be opened or closed and tilted up or down with the sunroof switch.

RETAINED POWER OPERATION

NFEL0222S02

When the ignition switch is turned to OFF position from ON or START position, power is supplied for 45 seconds.

- to sunroof motor terminal 6
- from smart entrance control unit terminal 46.

When power is supplied, the electrical sunroof can be operated.
The retained power operation is canceled when the driver or passenger side door is opened.
RAP signal period can be changed by CONSULT-II (EL-199).

INTERRUPTION DETECTION FUNCTION

NFEL0222S04

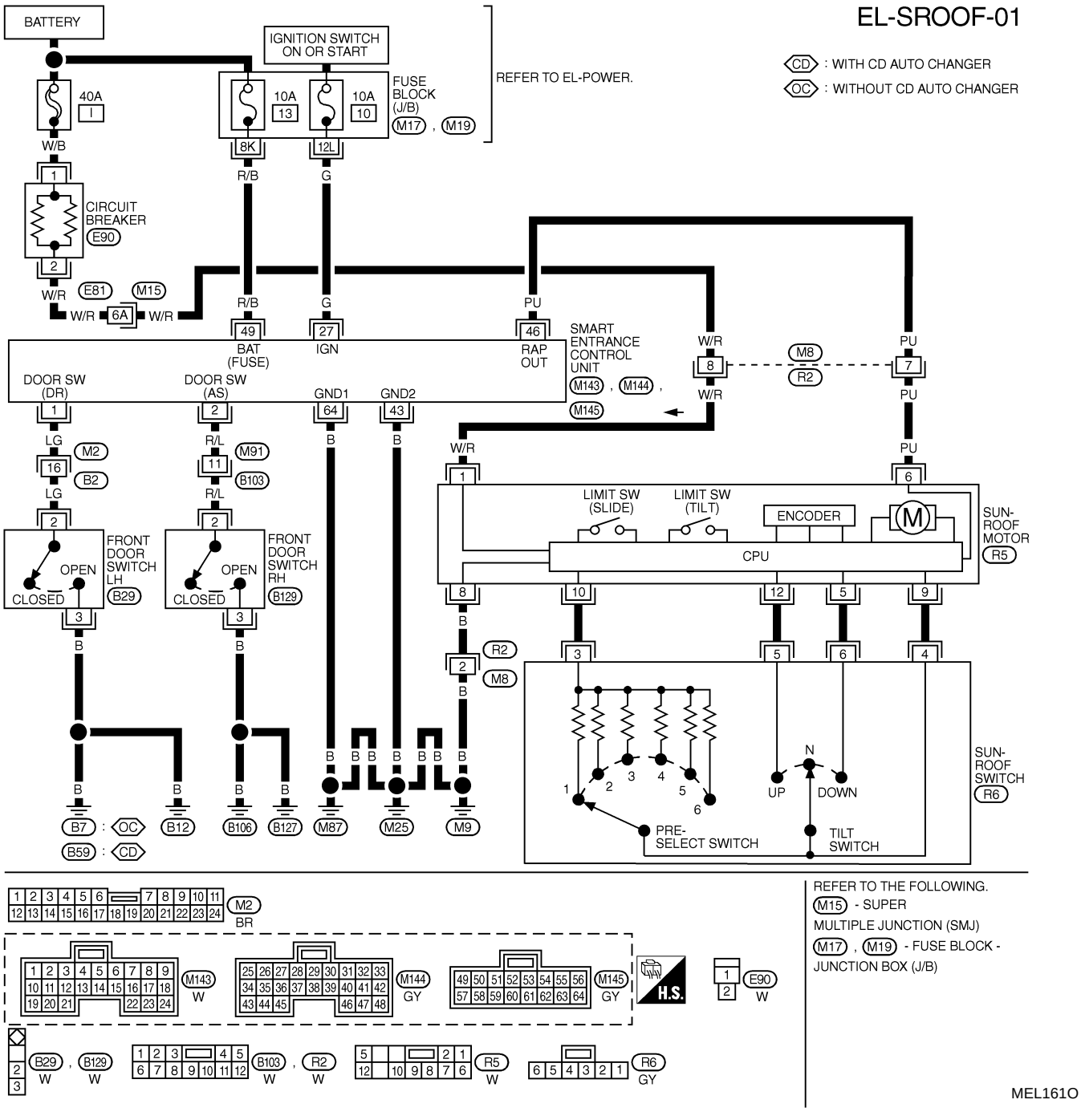
The CPU of sunroof motor monitors the sunroof motor operation and the sunroof position (full closed or other) for sunroof by the signals from encoder and limit switch in sunroof motor.
When sunroof motor detects interruption during the following close operation,

- automatic close operation when ignition switch is in the “ON” position
- automatic close operation during retained power operation

sunroof switch controls the motor for open and the sunroof will operate about 150 mm (5.91 in).

Wiring Diagram — SROOF —

NFEL0089

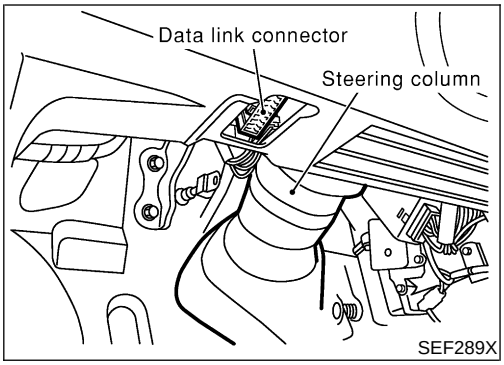


MEL161O

SMART ENTRANCE CONTROL UNIT TERMINALS AND REFERENCE VALUE BETWEEN EACH TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
1	LG	DRIVER DOOR SWITCH	OFF (CLOSED) → ON (OPEN)	12V → 0V
2	R/L	PASSENGER DOOR SWITCH	OFF (CLOSED) → ON (OPEN)	5V → 0V
27	G	IGNITION SWITCH (ON)	IGNITION SWITCH IS IN “ON” POSITION	12V
43	B	GROUND	–	–
46	PU	SUNROOF MOTOR	RETAIND POWER OPERATION IS OPERATED (ON → OFF)	12V →0V
49	R/B	POWER SOURCE (FUSE)	–	12V
64	B	GROUND	–	–

SEL986XB



SEF289X

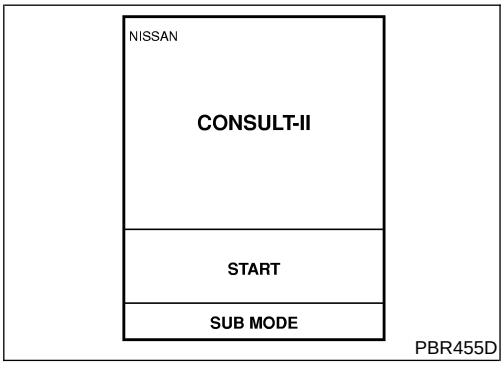
CONSULT-II Inspection Procedure

=NFEL0223

“RETAINED PWR”

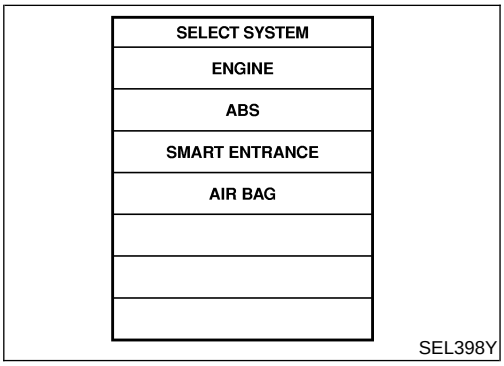
NFEL0223S01

1. Turn ignition switch “OFF”.
2. Connect “CONSULT-II” to the data link connector.



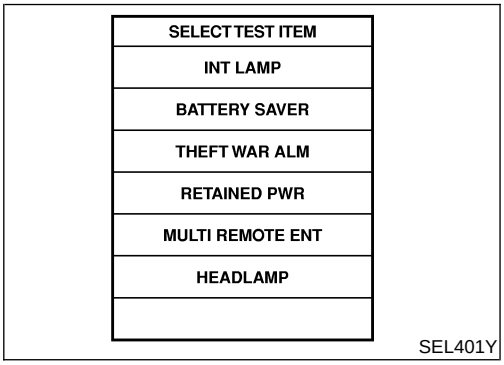
PBR455D

3. Turn ignition switch “ON”.
4. Touch “START”.



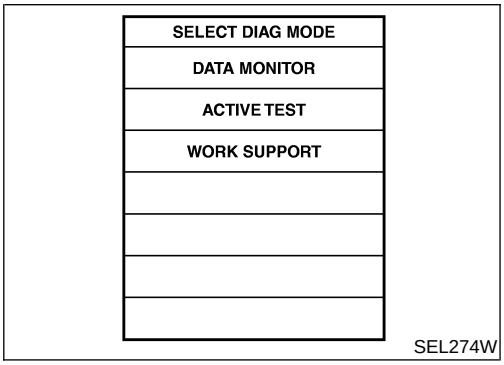
SEL398Y

5. Touch “SMART ENTRANCE”.



SEL401Y

6. Touch “RETAINED PWR”.



SEL274W

7. Select diagnosis mode.
   “DATA MONITOR”, “ACTIVE TEST” and “WORK SUPPORT” are available.

CONSULT-II Application Items

NFEL0224

"RETAINED PWR" Data Monitor

NFEL0224S01

NFEL0224S0101

Monitored Item	Description
IGN ON SW	Indicates [ON/OFF] condition of ignition switch.
DOOR SW-DR	Indicates [ON/OFF] condition of front door switch LH.
DOOR SW-AS	Indicates [ON/OFF] condition of front door switch RH.

Active Test

NFEL0224S0102

Test Item	Description
RETAINED PWR	This test is able to supply RAP signal (power) from smart entrance control unit to power window system, power sunroof system. Those systems can be operated when turning on "RETAINED PWR" on CONSULT-II screen even if the ignition switch is tuned OFF. **NOTE:** **During this test, CONSULT-II can be operated with ignition switch "OFF" position. "RETAINED PWR" should be turned "ON" or "OFF" on CONSULT-II screen when ignition switch is ON. Then turn ignition switch OFF for checking retained power operation. CONSULT-II might be stuck if "RETAINED PWR" is turned "ON" or "OFF" on CONSULT-II screen when ignition switch is OFF.**

Work Support

NFEL0224S0103

Work Item	Description
RETAINED PWR SET	RAP signal's power supply period can be changed by mode setting. Selects RAP signal's power supply period between two steps. ● MODE 1 (45 sec.)/MODE 2 (OFF)/MODE 3 (2 min.)

Trouble Diagnoses

NFEL0225

Symptom	Possible cause	Repair order
Power sunroof cannot be operated using any switch.	1. 10A fuse, 40A fusible link and E90 circuit breaker 2. Grounds M9, M25 and M87 3. Sunroof switch 4. Sunroof switch circuit 5. Sunroof motor	1. Check 10A fuse [No. 10, located in fuse block (J/B)], 40A fusible link (letter **I**, located in fuse and fusible link box) and E90 circuit breaker. Turn ignition switch "ON" and verify battery positive voltage is present at terminals 1 and 6 of sunroof motor. 2. Check grounds M9, M25, M87. 3. Check sunroof switch. 4. Check harness between sunroof switch and sunroof motor. 5. Replace sunroof motor.
Power sunroof cannot be operated using one of the sunroof switches.	1. Sunroof switch 2. Sunroof switch circuit	1. Check sunroof switch. 2. Check the harness between sunroof motor and sunroof switch.

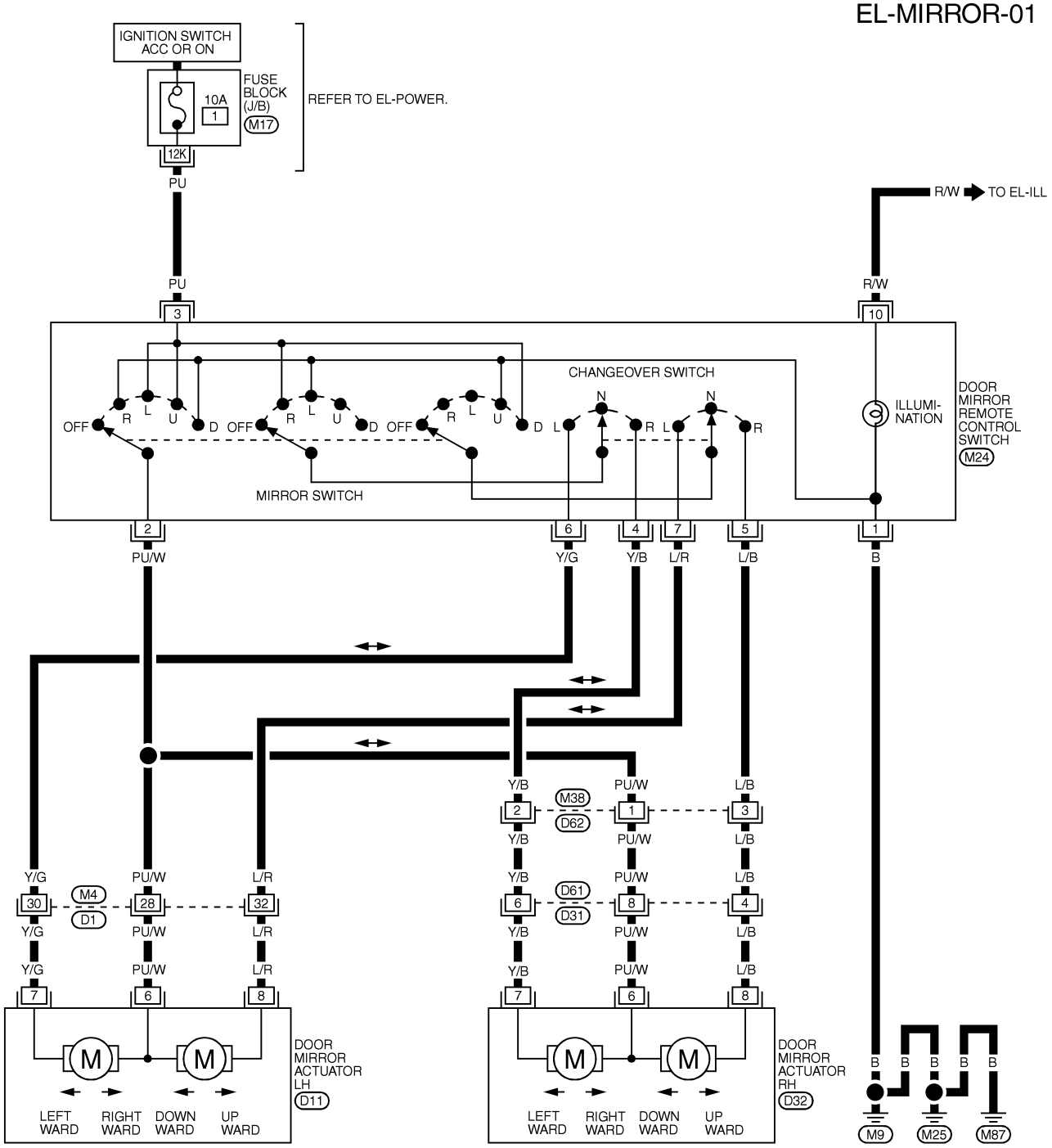
Trouble Diagnoses (Cont'd)

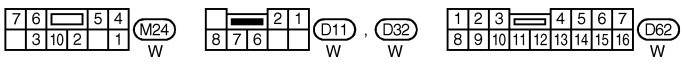
Symptom	Possible cause	Repair order
Power sunroof cannot be opened or closed fully.	1. Full closed position not initialized 2. Sunroof slide mechanism 3. Sunroof switch 4. Sunroof switch circuit 5. Sunroof motor	1. Initialize full closed position. 2. Check the following. a. Check obstacles in sunroof, etc. b. Check worn or deformed sunroof. c. Check sunroof sash tilted too far inward or outward. 3. Check sunroof switch. 4. Check harness between sunroof motor and sunroof switch. 5. Replace sunroof motor.
Retained power operation does not operate properly.	1. RAP signal circuit 2. Driver or passenger side door switch circuit 3. Smart entrance control unit	1. Check RAP signal. a. (With CONSULT-II) Check RAP signal with CONSULT-II. Use "ACTIVE TEST" mode, "RETAINED PWR" in "SMART ENTRANCE". (Refer to EL-198.) If NG, go to the step b. below. b. Verify 12 positive voltage from smart entrance control unit is present at terminal 6 of sunroof motor: ● Within 45 seconds after ignition switch turns off. ● When front door LH and RH is closed. 2. Check harness between smart entrance control unit and driver or passenger side door switch. Check driver or passenger side door switch. 3. Check smart entrance control unit. (EL-350)

Wiring Diagram — MIRROR —

NFEL0090

EL-MIRROR-01





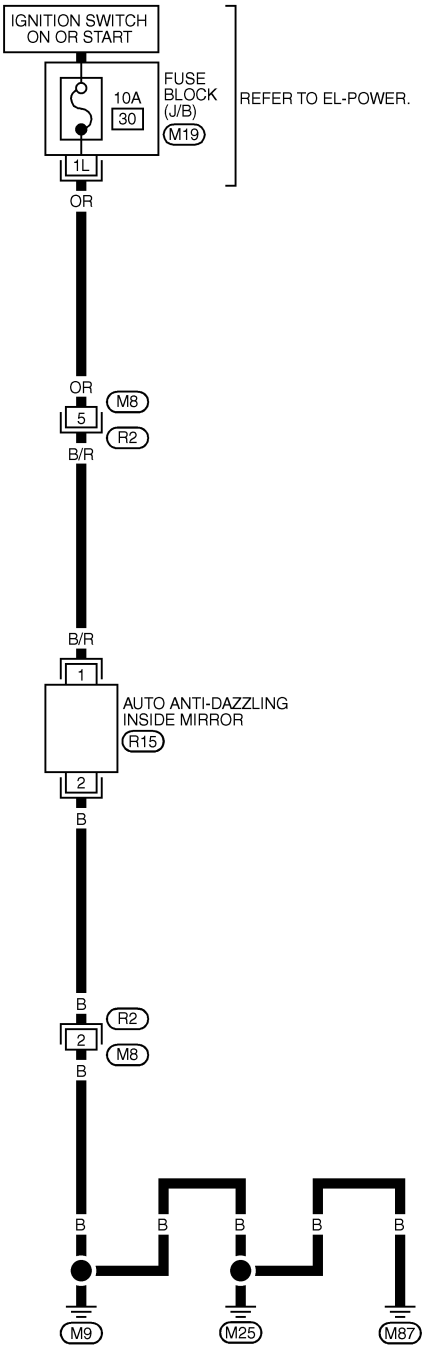
REFER TO THE FOLLOWING.
D1 , D31 -SUPER MULTIPLE JUNCTION (SMJ)
M17 -FUSE BLOCK-JUNCTION BOX (J/B)

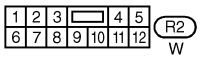
MEL747P

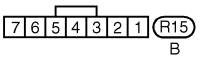
Wiring Diagram — I/MIRR —

NFEL0264

EL-I/MIRR-01







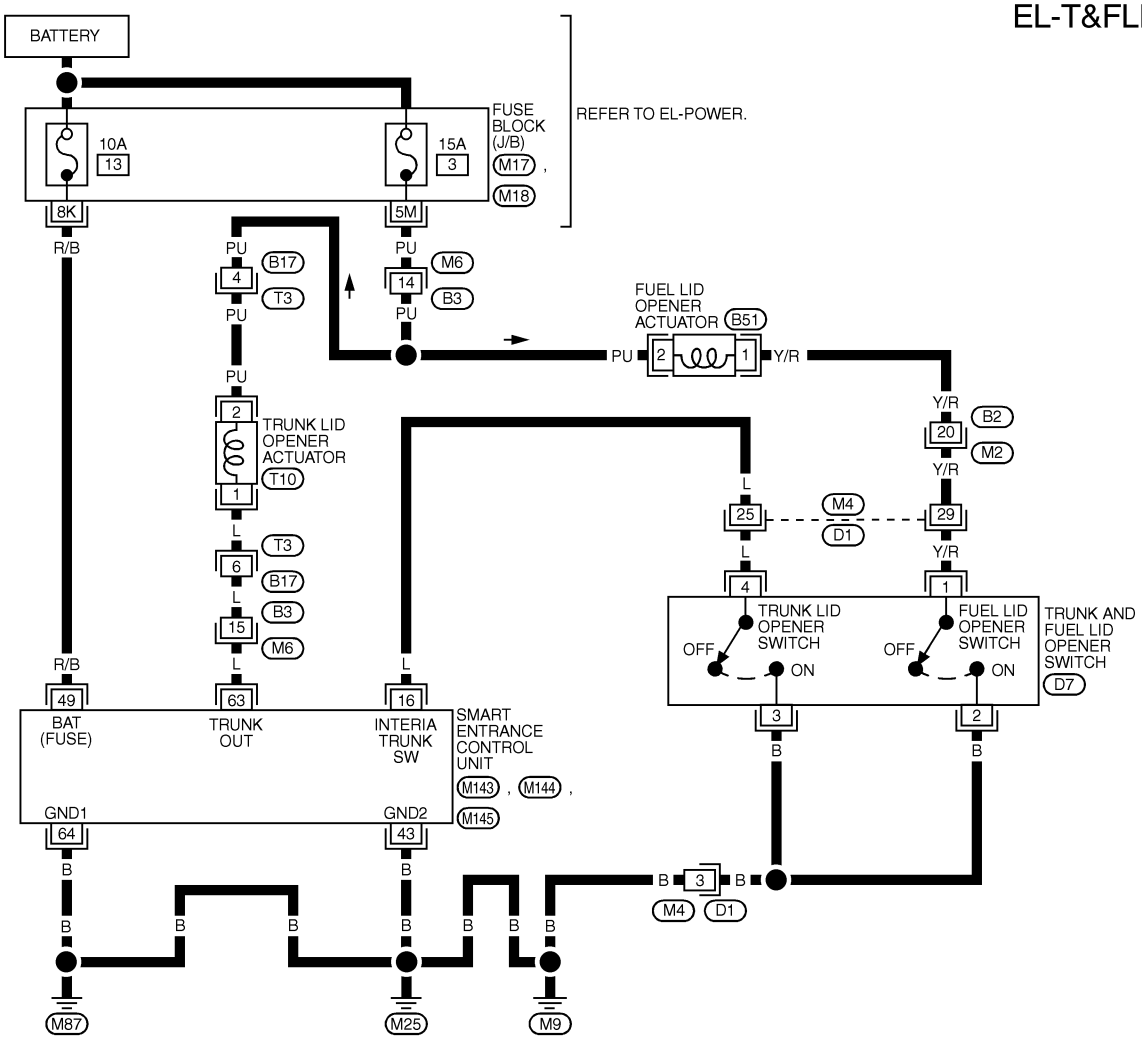
REFER TO THE FOLLOWING.
M19 - FUSE BLOCK -
JUNCTION BOX (J/B)

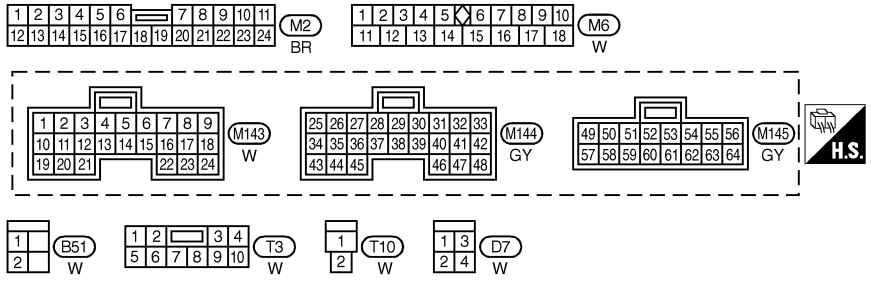
MEL162O

Wiring Diagram — T&FLID —

NFEL0168

EL-T&FLID-01





REFER TO THE FOLLOWING.
D1 -SUPER MULTIPLE JUNCTION (SMJ)
M17, M18 -FUSE BLOCK-JUNCTION BOX (J/B)

MEL163O

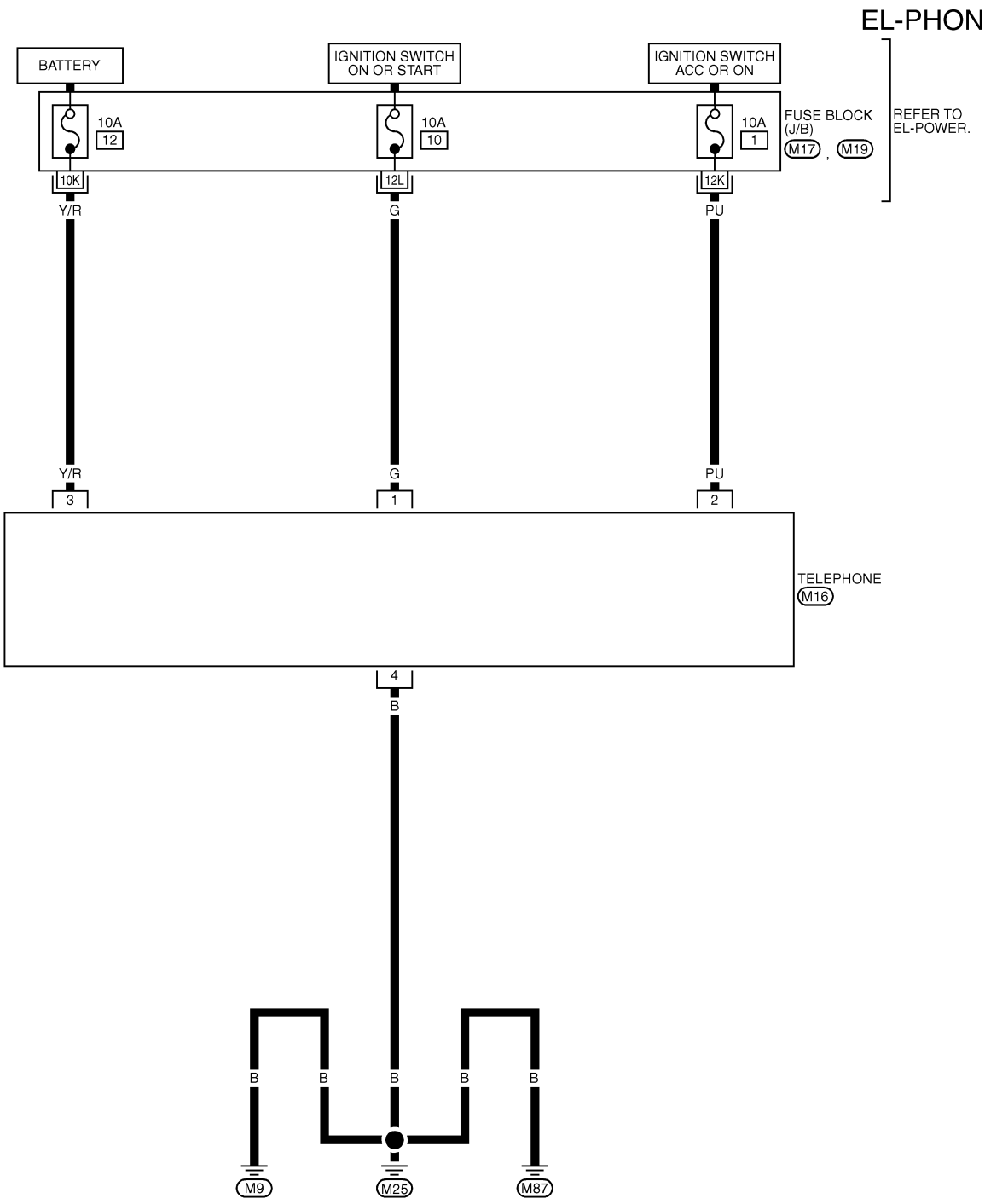
SMART ENTRANCE CONTROL UNIT TERMINALS AND REFERENCE VALUE BETWEEN EACH TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
16	L	TRUNK AND FUEL LID OPENER SWITCH	OFF → ON (when only pulled)	12V→ 0V
43	B	GROUND	–	–
49	R/B	POWER SOURCE (FUSE)	–	12V
63	L	TRUNK LID OPENER ACTUATOR	WHEN TRUNK LID OPENER ACTUATOR IS OPERATED USING KEYFOB (ON →OFF)	0V→12V
64	B	GROUND	–	–

SEL987XA

Wiring Diagram — PHONE —

NFEL0170



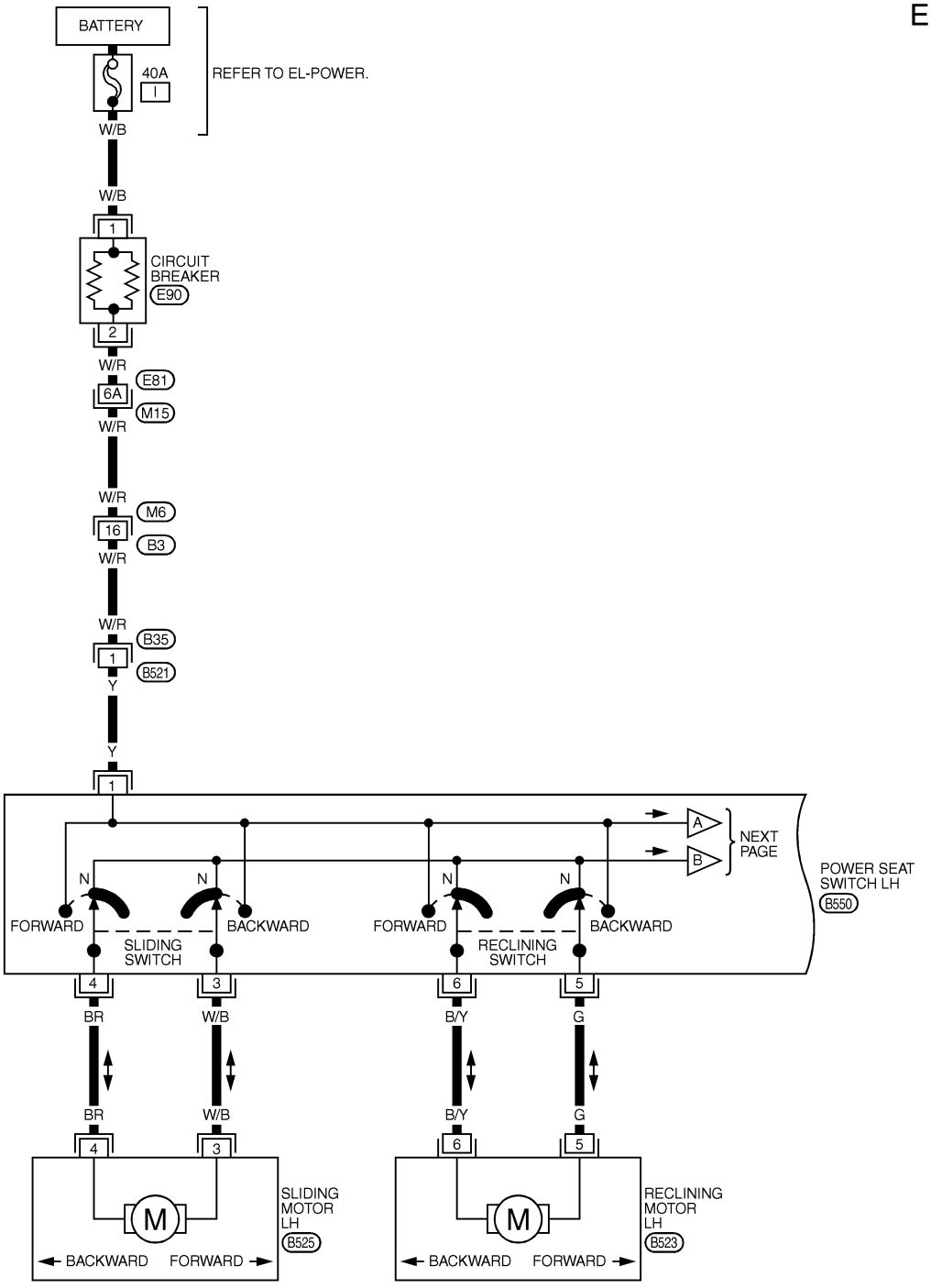
REFER TO THE FOLLOWING.
M17 -FUSE BLOCK-JUNCTION BOX (J/B)
M19 -FUSE BLOCK-JUNCTION BOX (J/B)

MEL295K

Wiring Diagram — SEAT —

NFEL0092

EL-SEAT-01



M6 W

E90 W , B35 W

B523 W *

B525 B *

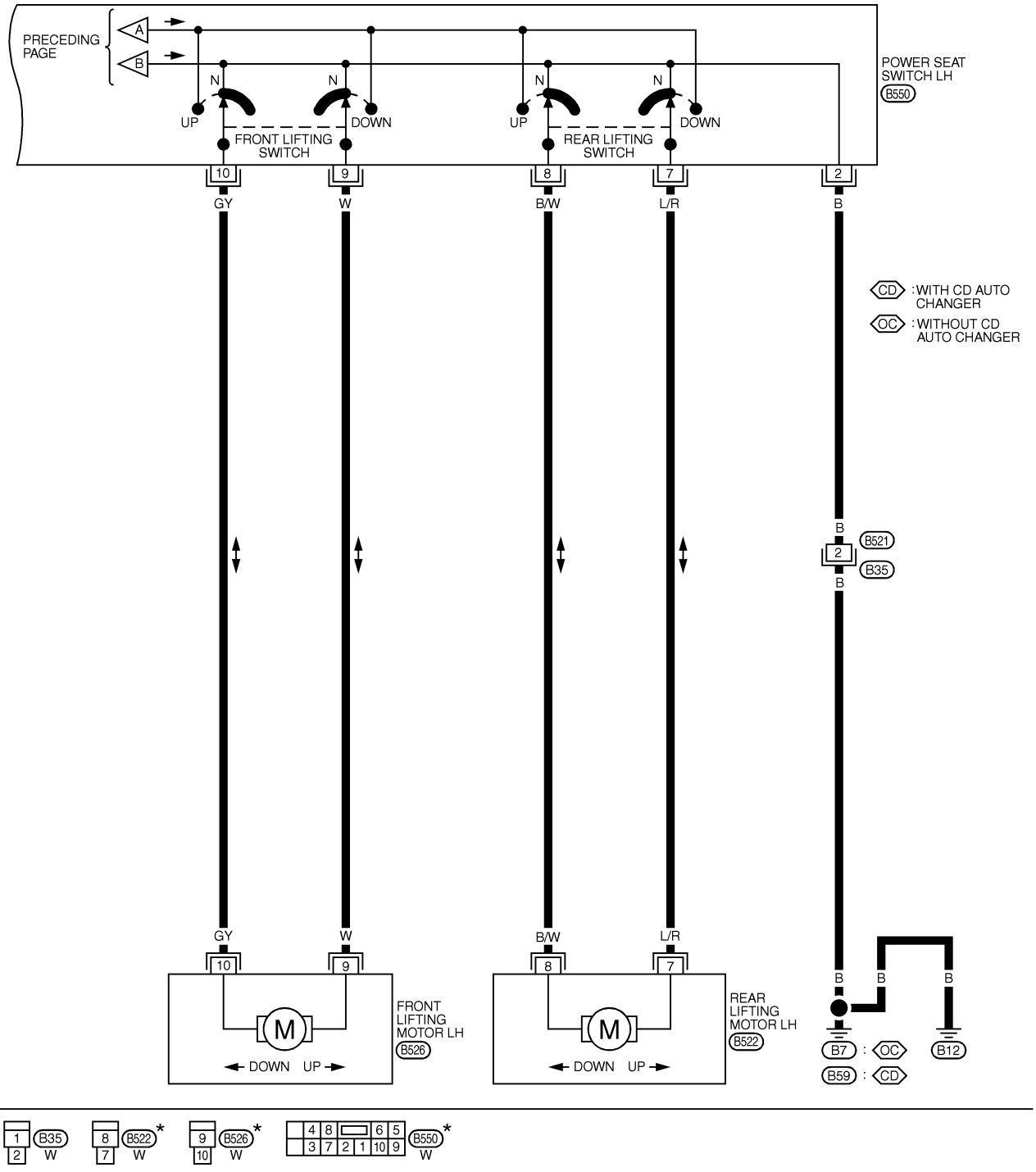
B550 W *

* : THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", EL-SECTION.

REFER TO THE FOLLOWING.
M15 - SUPER MULTIPLE JUNCTION (SMJ)

MEL154O

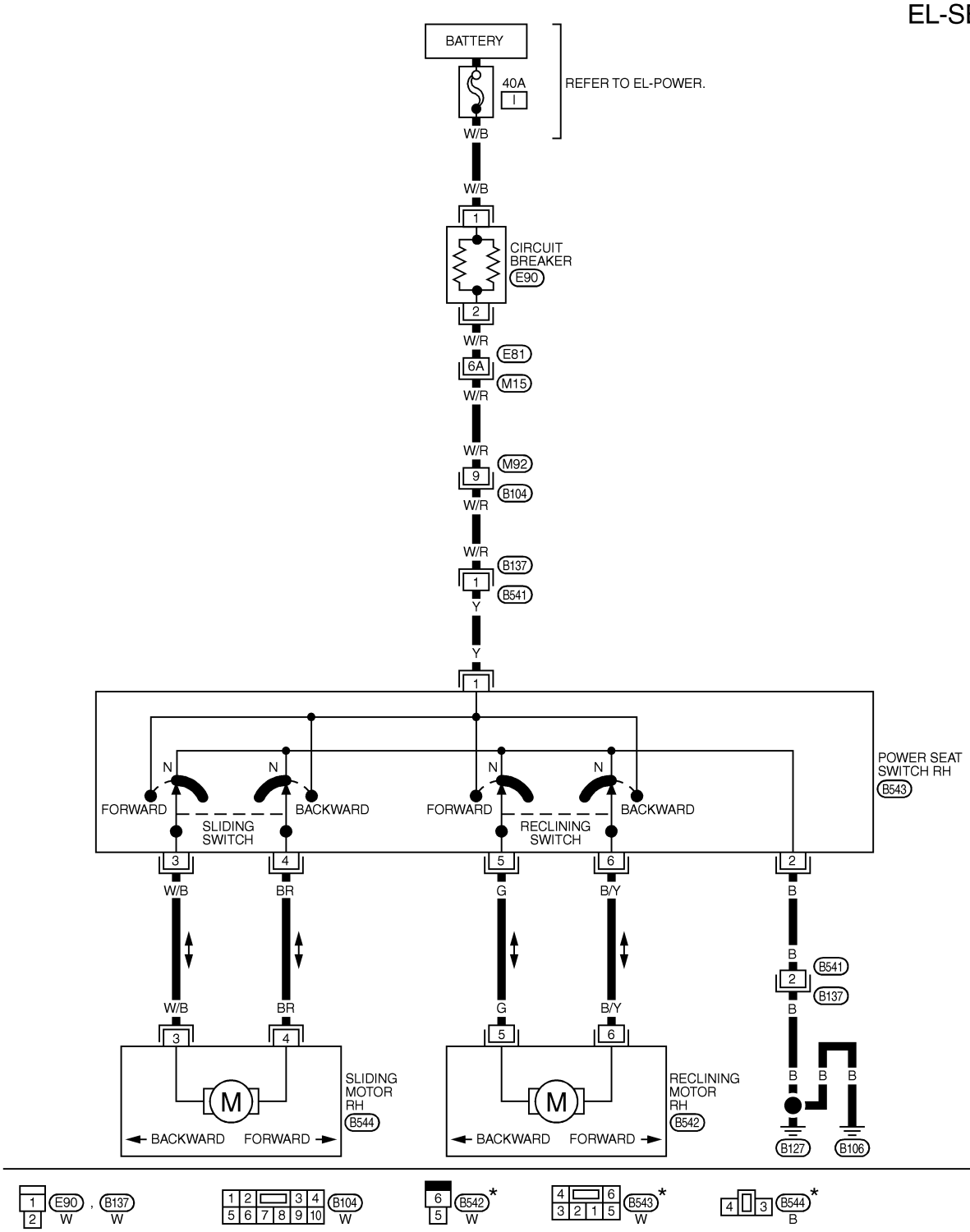
EL-SEAT-02



* : THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", EL SECTION.

MEL155O

EL-SEAT-03



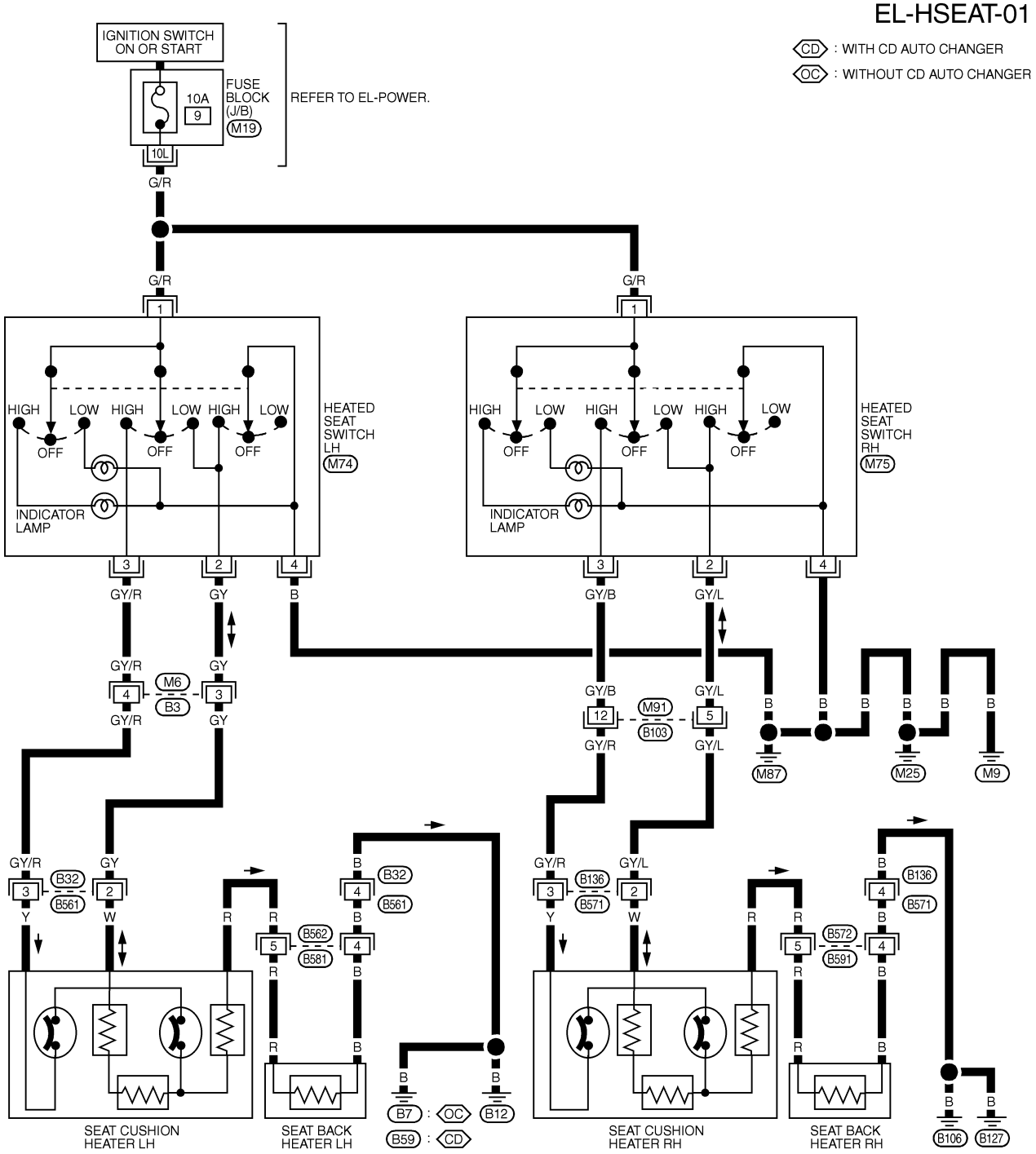
* : THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", EL SECTION.

MEL156O

Wiring Diagram — HSEAT —

NFEL0093

EL-HSEAT-01



M6 W · M74 L, M75 W · B32 W, B136 W · B103 W · B562* L, B572* L

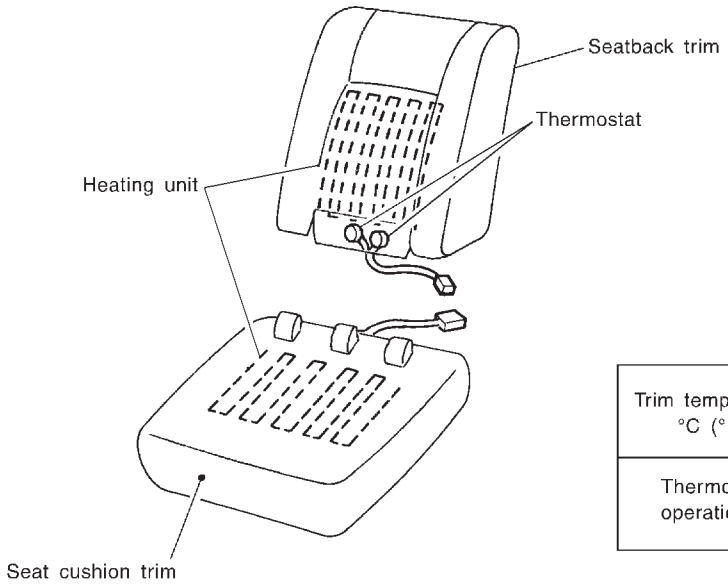
*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", EL SECTION.

REFER TO THE FOLLOWING.
M19 -FUSE BLOCK-JUNCTION BOX (J/B)

MEL748P

Seatback Heating Unit

NFEL0261

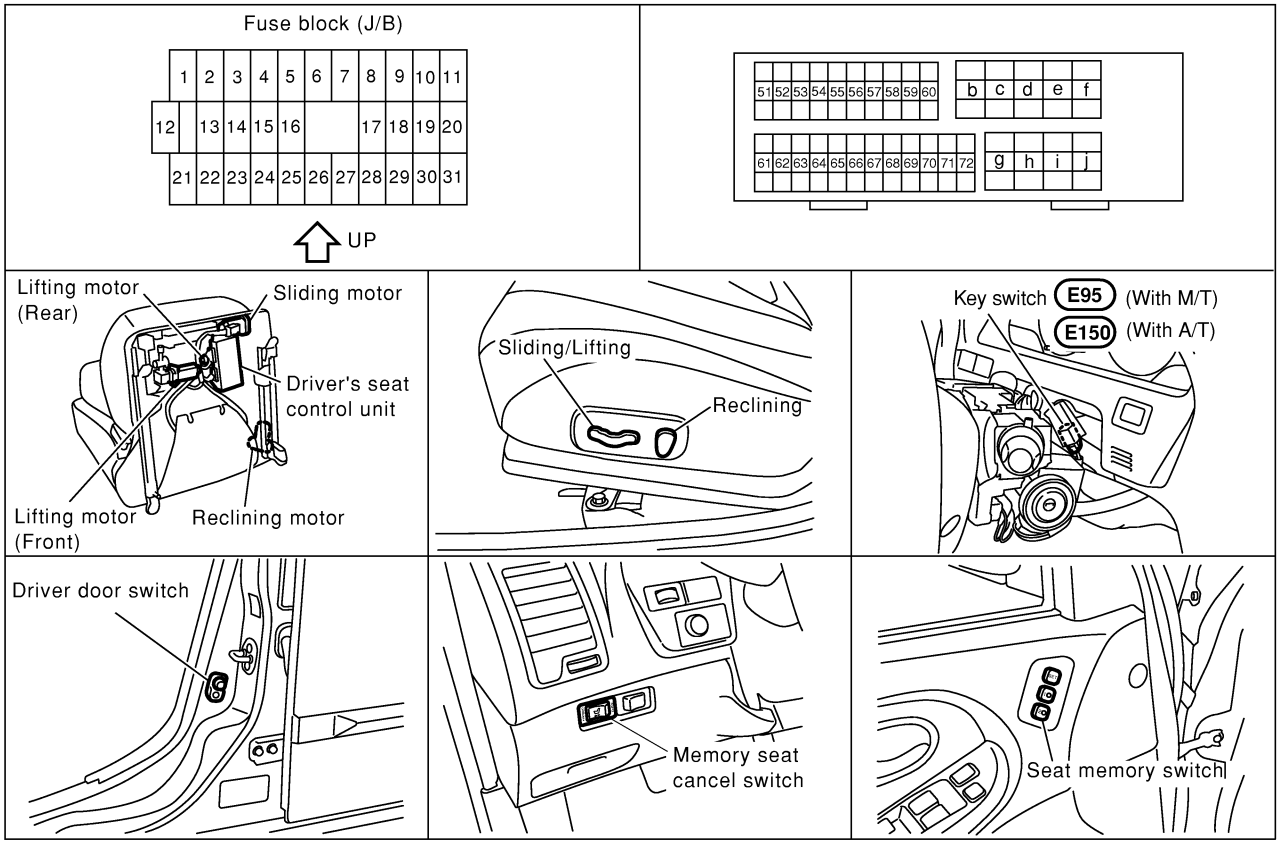


Trim temperature °C (°F)	Increasing to 35 - 45 (95 - 113)	Decreasing to 25 - 35 (77 - 95)
Thermostat operation	OFF	ON

SBT314

Component Parts and Harness Connector Location

NFEL0287



SEL383Y

System Description

=NFEL0288

OPERATIVE CONDITION

NFEL0288S01

The drive position can be set in 2 ways, manually and automatically.

Manual Operation

NFEL0288S0101

The driver's seat can be adjusted for sliding, reclining, front cushion height and rear cushion height with the LH power seat switches. The manual operation can be adjusted with the IGN key in any position.

Automatic Operation

NFEL0288S0102

The driver's seat is adjusted to the proper positions for the driver automatically, in 3 different ways: MEMORY AUTOMATIC SET, AUTOMATIC EXITING SETTING and AUTOMATIC SET RETURN. (Automatic Drive Positioner = ADP)

CONDITIONS INHIBITING AUTOMATIC OPERATION

NFEL0288S02

Automatic memory setting procedures are suspended under any of the following conditions:

1) When vehicle speed is more than 7 km/h (4 MPH).
2) When driver's side power seat switch is turned on.
3) When any two of the switches (set switch and memory switches 1 and 2) are turned ON.
4) When cancel switch is turned on.
5) When selector lever is in any position other than "P" (A/T) or parking brake is released (M/T).
6) When ignition switch is turned to "START" position.
   (Operation resumes when ignition switch is returned to "ON".)
7) When detention switch malfunction is detected:

- Detention switch failure is sensed when detention switch remains off for at least 2 seconds at a vehicle speed of greater than 7 km/h (4 MPH).

FAIL-SAFE SYSTEM

NFEL0288S03

Output Failure

NFEL0288S0301

When the ignition switch is in the ON position, if any of the parts (indicated in the following chart) move more than the specified amount within a period "T2" when no "ON" input is sent from any of the switches (indicated in the following chart), or an output from the automatic drive positioner is not produced, an output failure is sensed. Motor operation will be suspended automatically, and all automatic operations will be ineffective. (In this case, the motor will not operate manually.)

OPERATED PORTION	T2	Allowable measurement
Seat sliding	Approx. 2.5 sec.	Within 6 mm (0.24 in)
Seat reclining	Same as above	Change angle within 1°

Absolving

NFEL0288S0302

When moving selector lever back to "P" position after having moved it to any position except "P" (A/T) or applying parking brake after having released it (M/T), fail-safe operation will be canceled.

INITIALIZATION (A/T MODEL ONLY)

NFEL0288S04

After reconnecting battery cable, perform initialization procedure A or B. If initialization has not been performed, automatic drive positioner will not operate.

PROCEDURE A

1) Insert key in the ignition key cylinder. (Ignition switch is in "OFF" position.)
2) Open → close → open driver side door. (Do not perform with the door switch operation.)
3) End

PROCEDURE B

1) Drive the vehicle at more than 25 km/h (16 MPH).
2) End

MEMORY AUTOMATIC SET

=NFEL0288S05

Two drive positions can be retained in the memory. Press memory switch to set driver's seat to preset position.

PROCEDURE FOR STORING MEMORY

Adjust the position of driver's seat with manual set operations.

↓ Ignition switch "ON".

	Indicator LEDs
Touch set switch.	(1) Indicator LED for which driver's seat positions are already retained in memory illuminates for 5 seconds.
	(2) Indicator LED for which driver's seat positions are not entered in memory illuminates for 0.5 seconds.

↓ Within 5 seconds.

	Indicator LEDs
Press memory switch for which driver's seat positions are to be entered in memory for more than 0.5 seconds. (2 driver's seat positions can be memorized.)	(1) To modify driver's seat positions, press memory switch. Indicator LED will then go out for 0.5 seconds and then illuminate for 5 seconds.
	(2) To enter driver's seat positions in blank memory, indicator LED illuminates for 5 seconds after memory switch is pressed.

↓

END OF MEMORY SETTING

SEL592W

NOTE:

- When memory switch for which driver's seat positions are already retained in memory is pressed, new seat positions will be retained in memory in place of the previously set positions.
- Drive position is erased from the memory when battery cable is disconnected more than 30 seconds. After connecting battery cable, perform initialization procedures.

SELECTING THE MEMORIZED POSITION

PROCEDURE-A
Turn ignition switch "ON" and press desired memory switch for more than 0.3 seconds. (Indicator LED illuminates.)

PROCEDURE-B (A/T model only)
• Open driver's door and withdraw key from ignition key cylinder. Then press desired memory switch for more than 0.3 seconds. (Indicator LED illuminates.) (See NOTE 2.)

(See NOTE 1.)

↓ Within 1 minute

• Insert key into ignition key cylinder. (Memory indicator illuminates.)

↓

The driver's seat will move to the memorized position. (During adjustments, indicator LED flashes, then illuminates for 5 seconds after adjustment.)

(See NOTE 3.)

SEL425Y

NOTE:

1) Do not keep cancel switch pressed as it will not operate.
2) Automatic exiting setting will be performed.
3) The driver's seat position (see the following Table) operates in the order of priority.

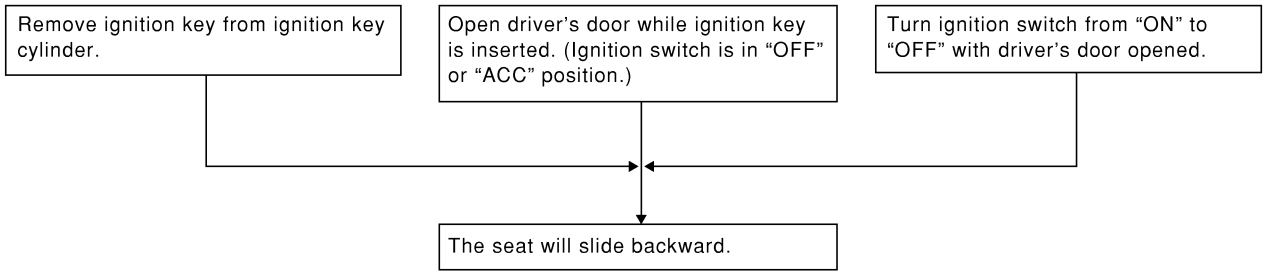
The order of priority	Operated portion
1	Seat sliding
2	Seat reclining
3	Seat front lifting
4	Seat rear lifting

AUTOMATIC EXITING SETTING (A/T MODEL ONLY)

NFEL0288S06

"Exiting" positions:

Driver's seat ... Slides about 40 mm (1.57 in) rear from normal sitting position.

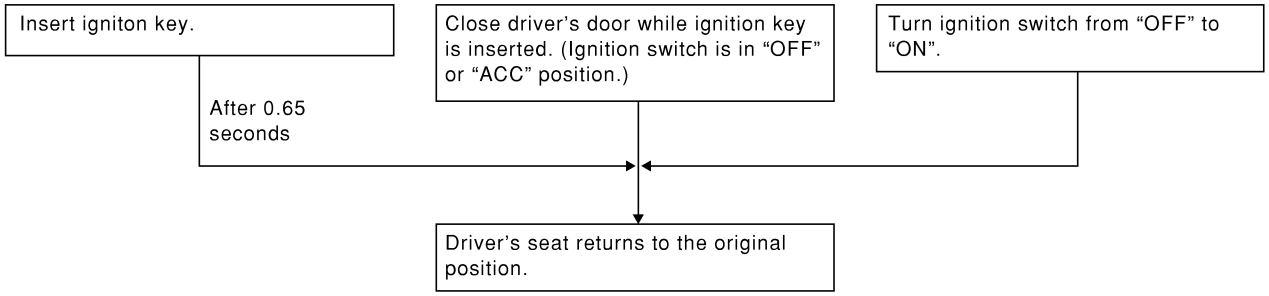


SEL594W

AUTOMATIC SET RETURN (A/T MODEL ONLY)

NFEL0288S07

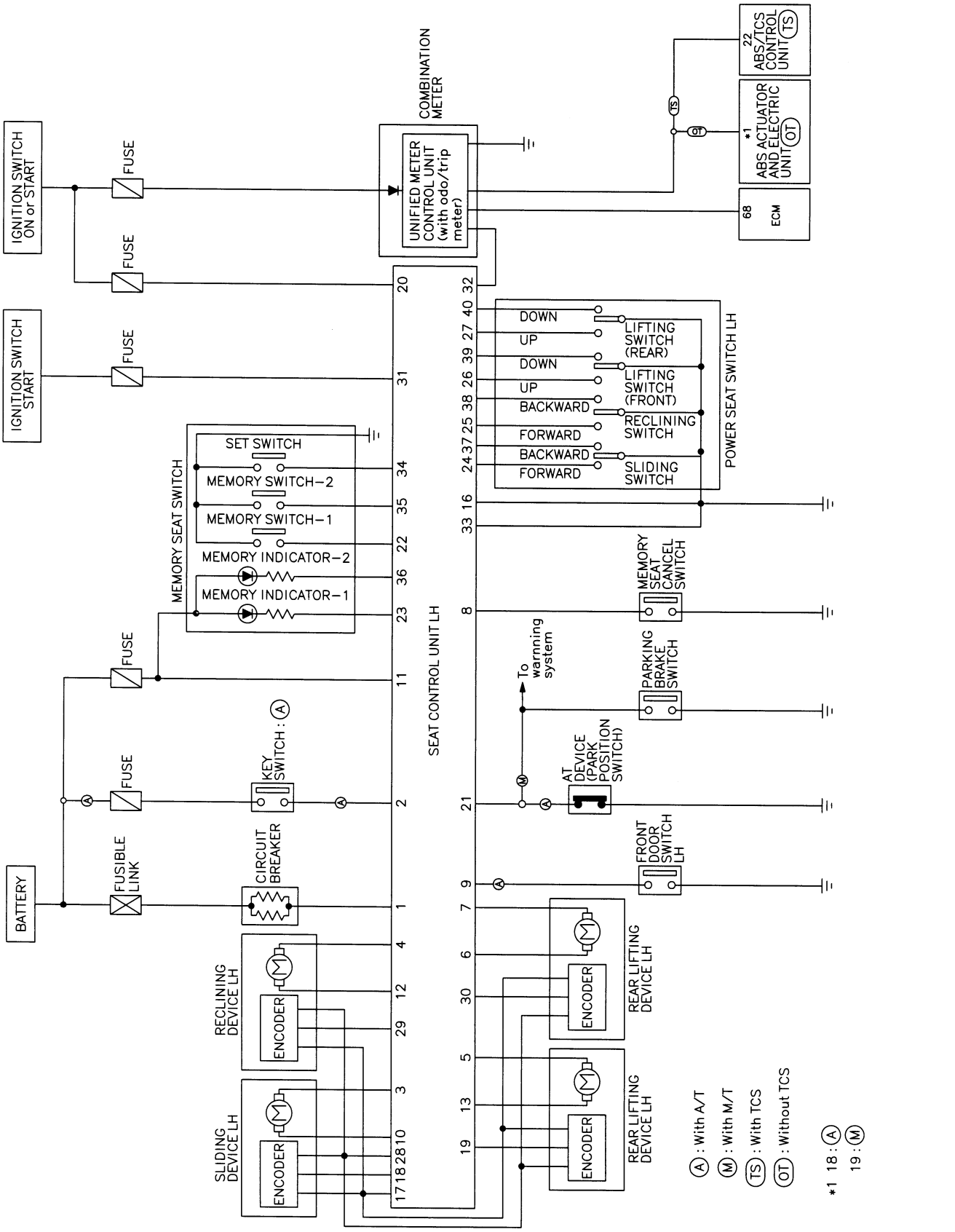
With driver's seat set to the "exiting" position, operating one of the following procedures moves it to the position previously retained in memory.



SEL595W

Schematic

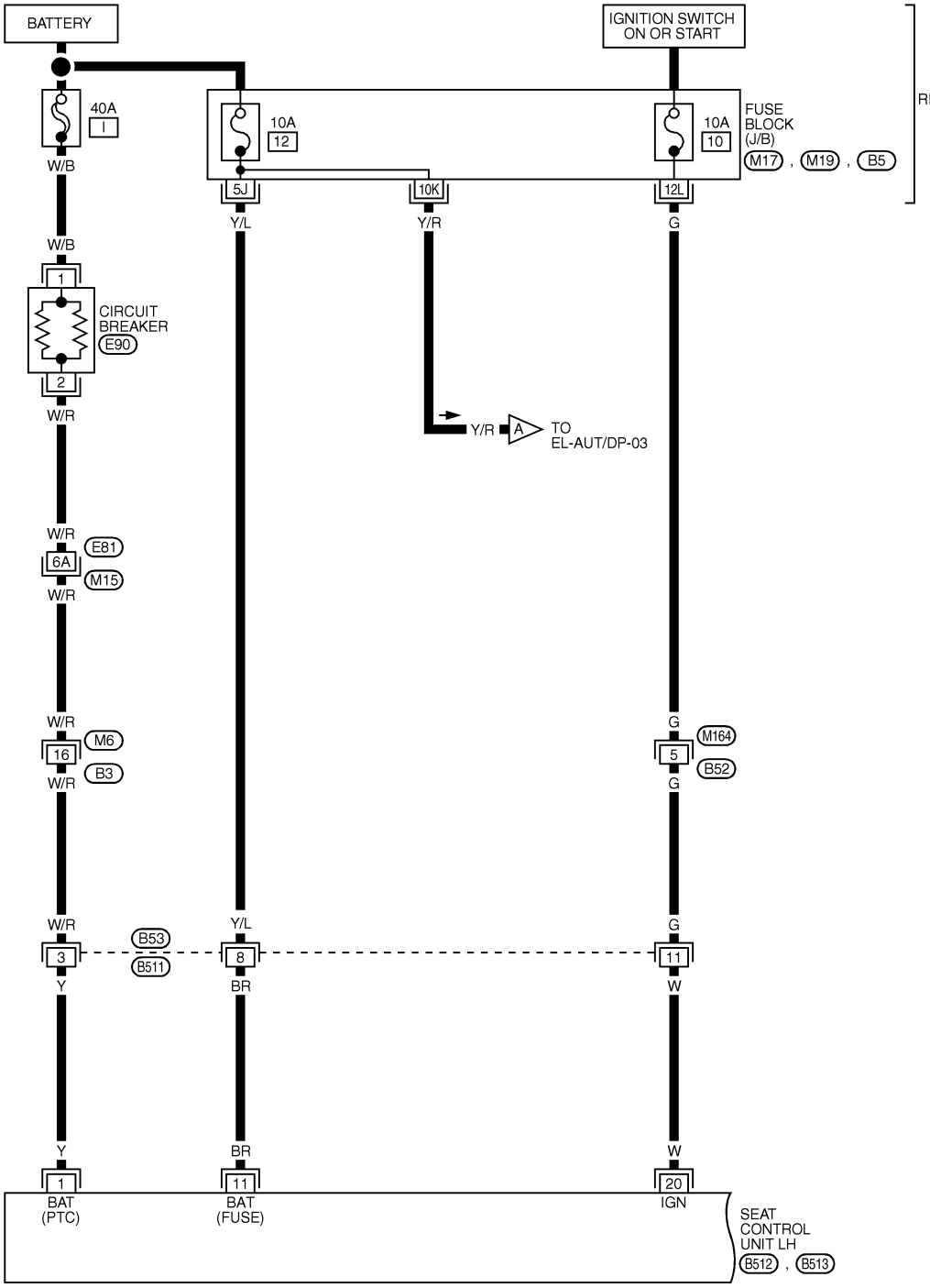
NFEL0289

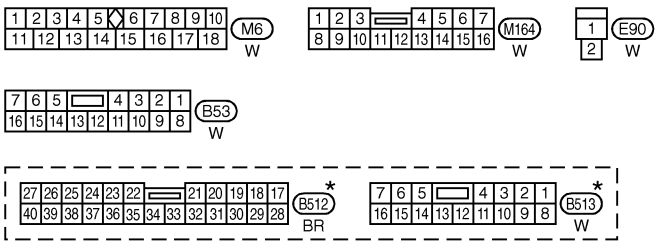


MEL749P

Wiring Diagram — AUT/DP —

NFEL0290



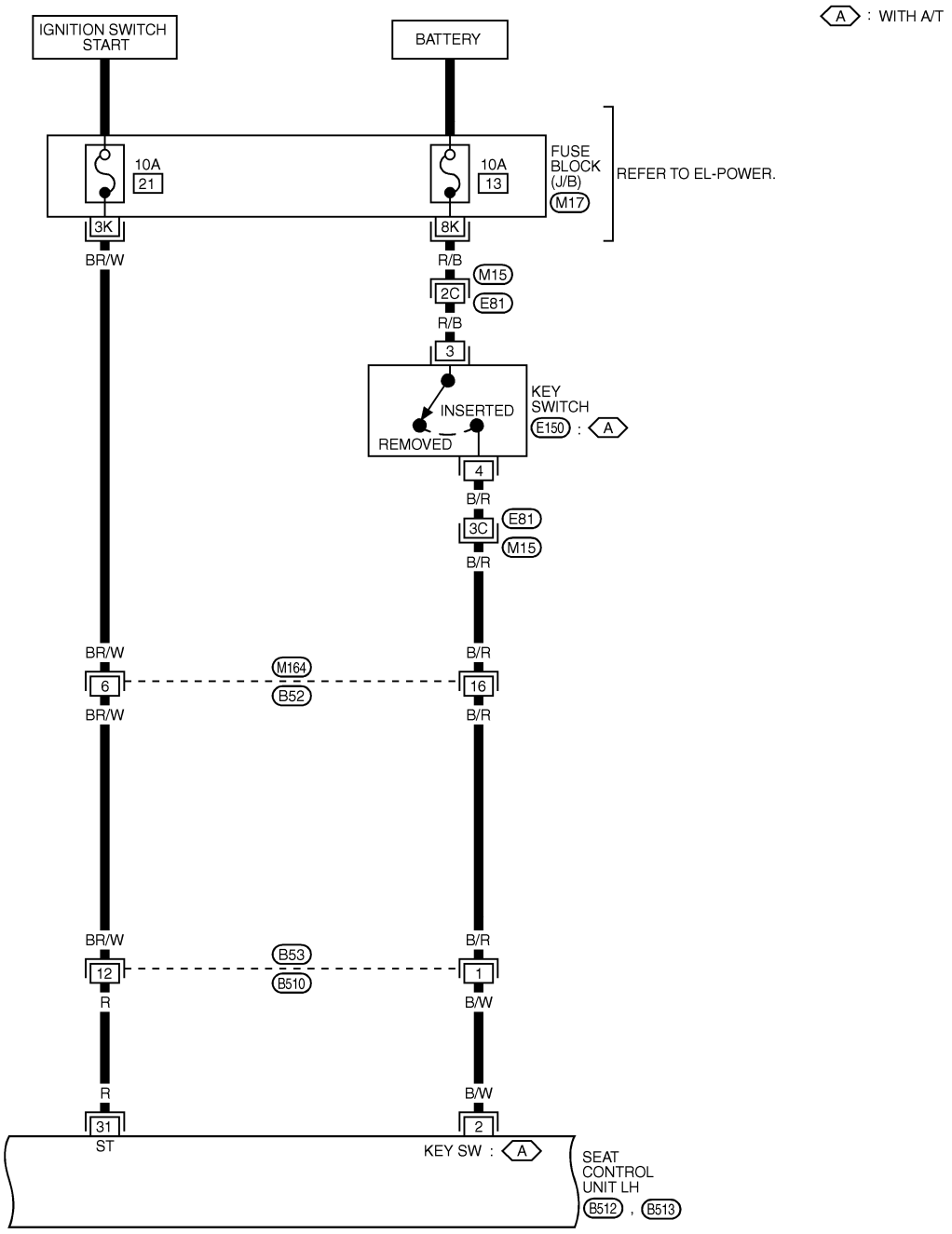


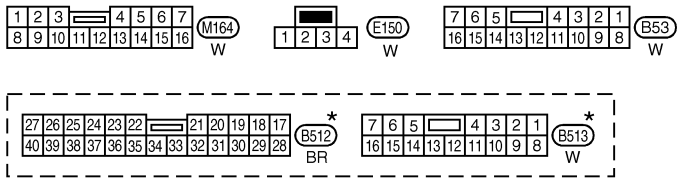
REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)
M17 , M19 , B5
-FUSE BLOCK- JUNCTION BOX (J/B)

★ : THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", EL SECTION

MEL147O

EL-AUT/DP-02



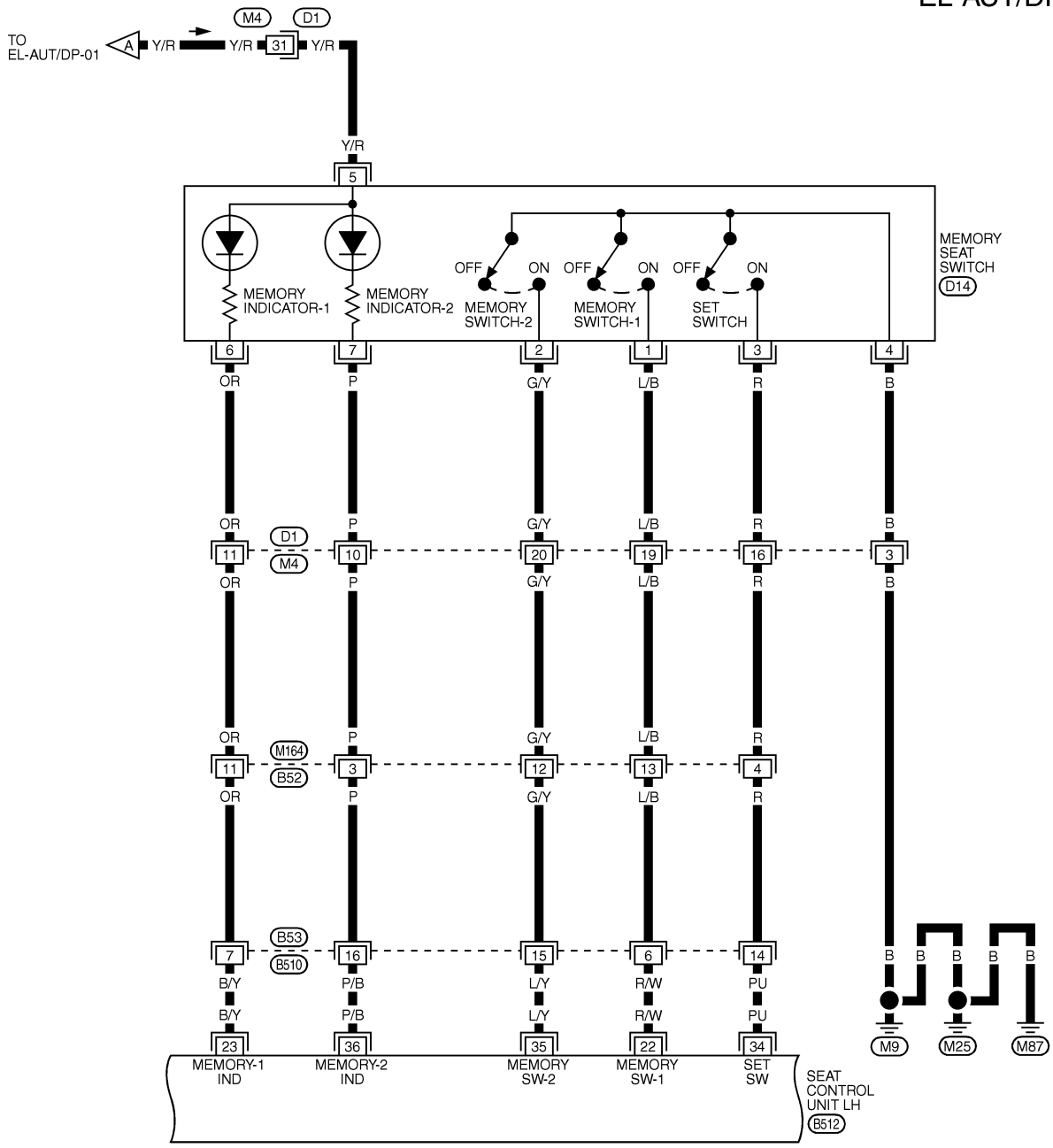


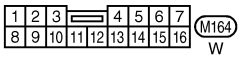
*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", EL SECTION.

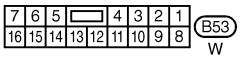
REFER TO THE FOLLOWING.
M15 - SUPER MULTIPLE JUNCTION (SMJ)
M17 - FUSE BLOCK - JUNCTION BOX (J/B)

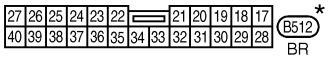
MEL148O

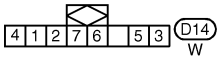
EL-AUT/DP-03









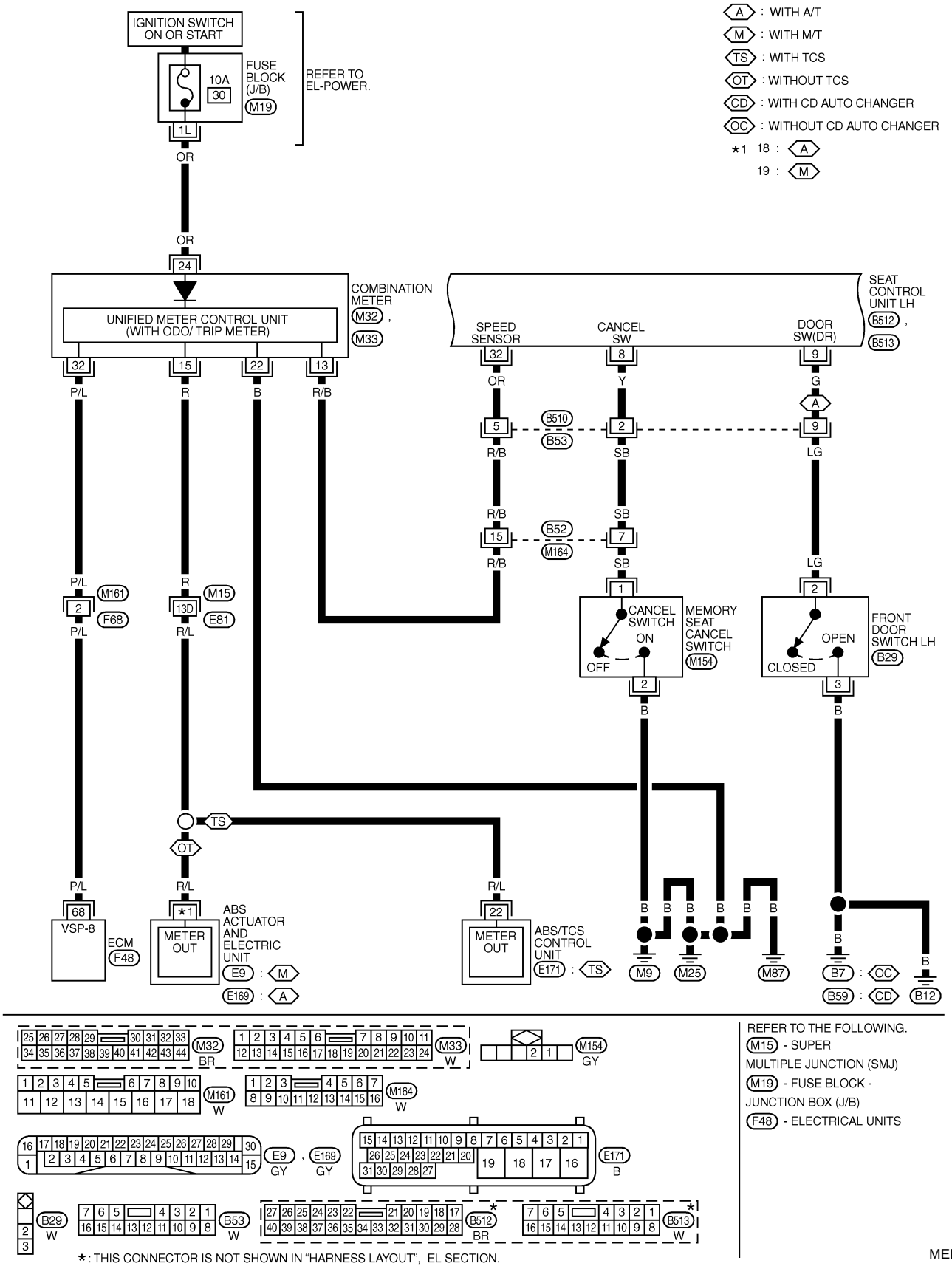


★ : THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", EL SECTION.

REFER TO THE FOLLOWING.
D1 -SUPER MULTIPLE JUNCTION (SMJ)

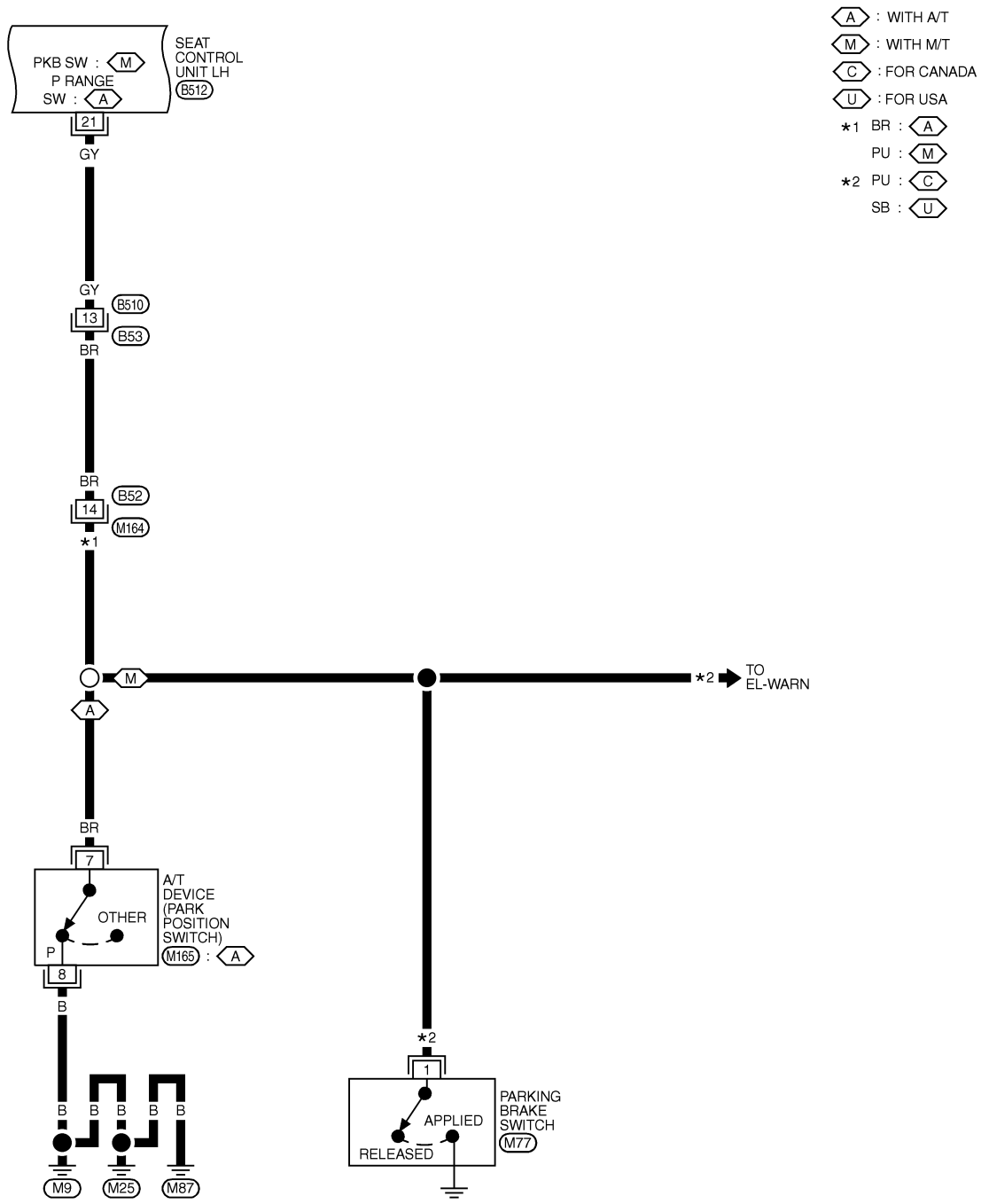
MEL149O

EL-AUT/DP-04



MEL150O

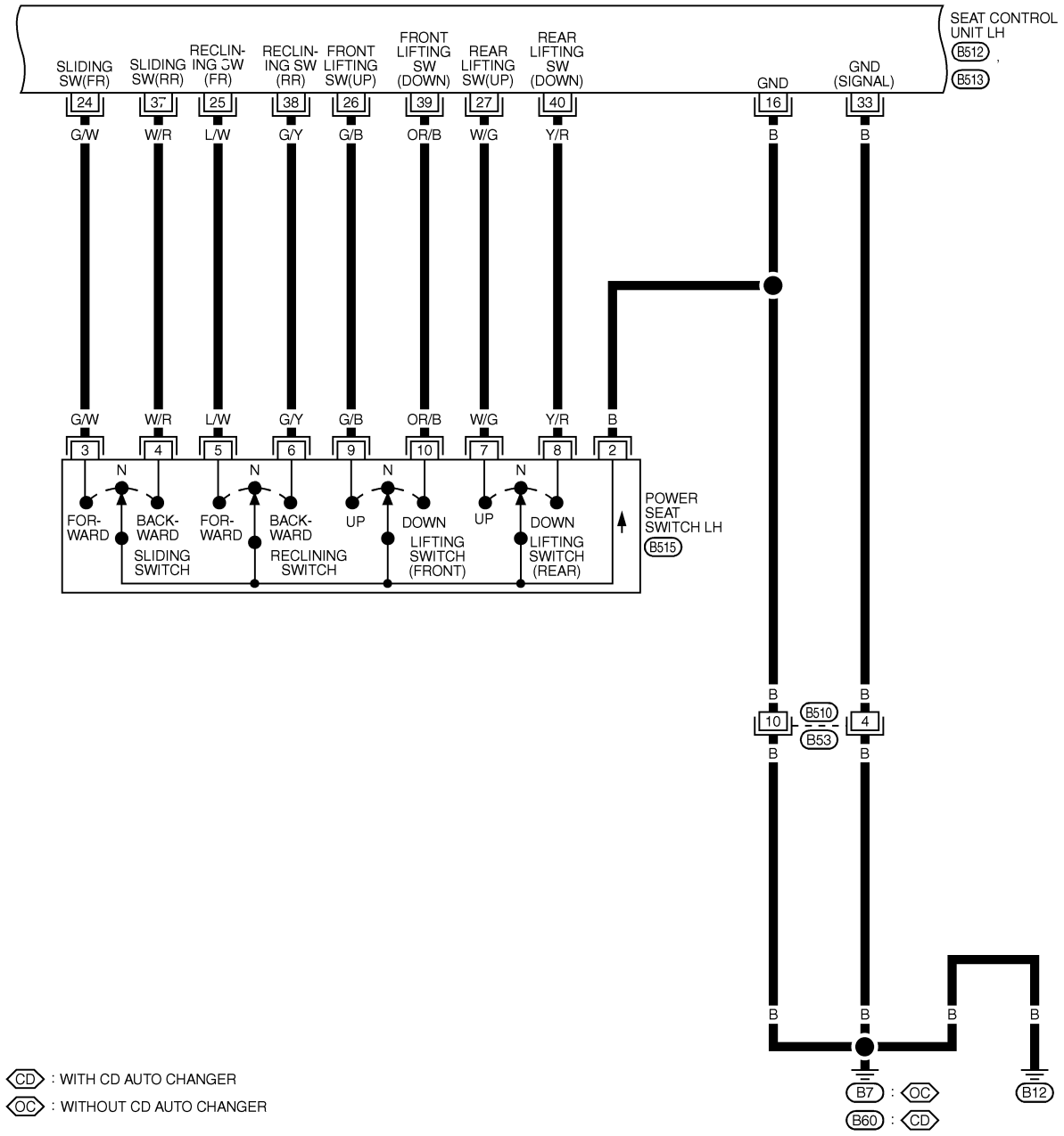
EL-AUT/DP-05

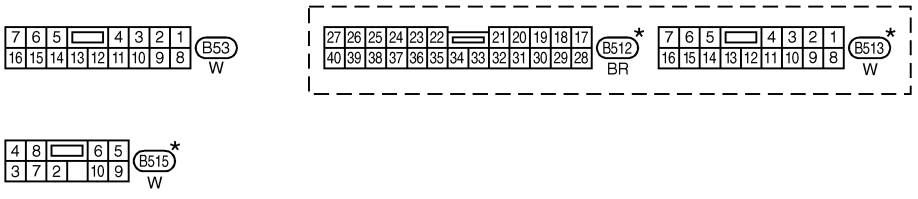


*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", EL SECTION.

MEL151O

EL-AUT/DP-06

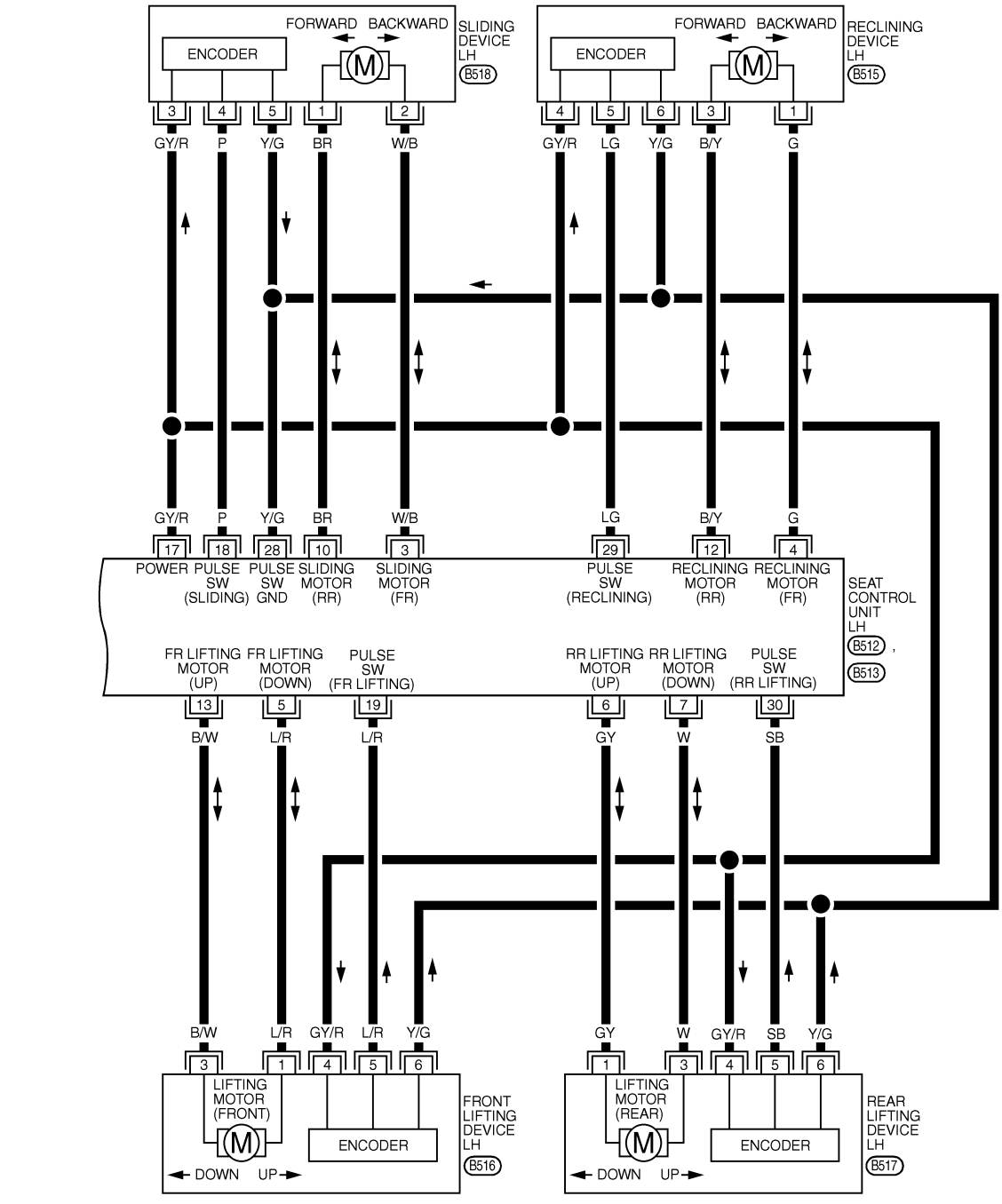


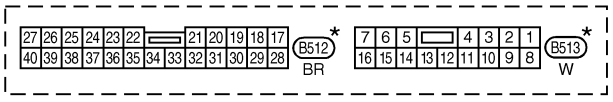


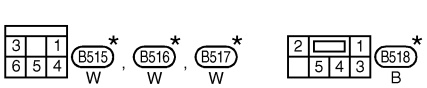
*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", EL SECTION.

MEL152O

EL-AUT/DP-07





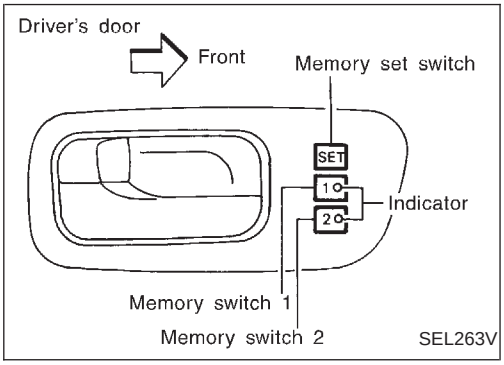


*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", EL SECTION.

MEL750P

On Board Diagnosis

NFEL0291



HOW TO PERFORM SELF-DIAGNOSIS

NFEL0291S01

Condition
- Ignition switch: OFF
- Selector lever: "P" range

↓

Turn ignition switch "ON".

↓ Within 5 seconds

Push memory set switch and two memory switches at the same time for more than 2 seconds.

↓

Self-diagnosis should be performed.
– Two indicator lamps should go on. (At the same time, driver's seat move automatically.)

↓

As soon as the indicator lamps go on and off by turns, start engine.

↓ Within 15 seconds

Drive the vehicle more than 7 km/h (4 MPH) and stop.
Do not stop engine.

↓

If a circuit malfunctions, a malfunction code should be indicated.*1

↓

Turn ignition switch "OFF".
or
Touch front driver's side power seat switch.

↓

DIAGNOSIS END*2

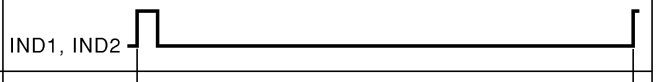
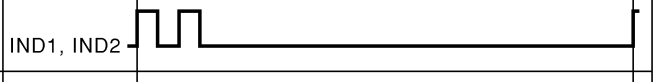
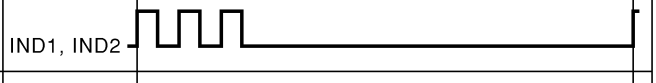
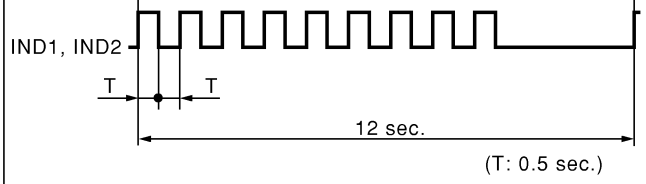
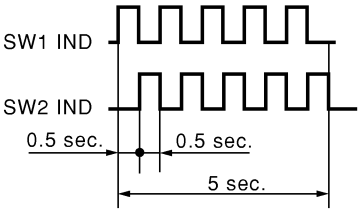
SEL596W

*1: If no malfunction is indicated, self-diagnosis will end after the vehicle speed sensor diagnosis is performed.
*2: Diagnosis ends after self-diagnostic results have been indicated for 10 minutes if left unattended.

MALFUNCTION CODE TABLE

=NFEL0291S02

In this mode, a malfunction code is indicated by the number of flashes from the automatic drive positioner indicator lamps (indicator lamp 1, indicator lamp 2) as shown below.

Code No.	Detected items	Indication of seat memory switches 1 and 2	Explanation
1	Seat sliding		While the seat motors are moving for 2.5 seconds, if the number of seat sliding/reclining/lifting encoder pulses changes 2 times or less, the seat device is determined to be malfunctioning.
2	Seat reclining		
3	Seat lifting front		
4	Seat lifting rear		
9	Vehicle speed sensor circuit		If the vehicle speed sensor output of less than 7 km/h (4 MPH) is detected, the vehicle speed sensor is determined to be malfunctioning.
–	No malfunction in the above items		—

SEL597W

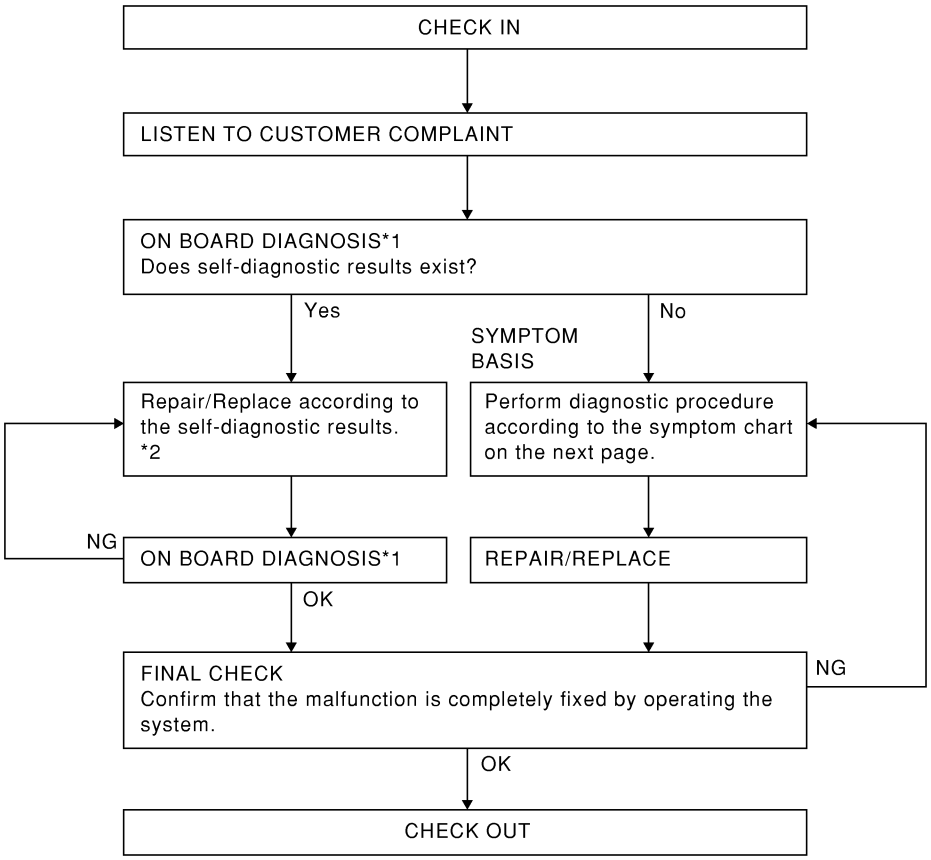
Code No.	Detected items	Diagnostic procedure	Reference page	Code No.	Detected items	Diagnostic procedure	Reference page
1	Seat sliding	PROCEDURE 2 (Sliding encoder check) PROCEDURE 6 (Sliding motor check)	EL-229 EL-237	4	Seat lifting rear	PROCEDURE 5 [Lifting encoder (rear) check] PROCEDURE 9 [Lifting motor (rear) check]	EL-235 EL-240
2	Seat reclining	PROCEDURE 3 (Reclining encoder check) PROCEDURE 7 (Reclining motor check)	EL-231 EL-238	9	Vehicle speed sensor	PROCEDURE 12 (Vehicle speed sensor check)	EL-242
3	Seat lifting front	PROCEDURE 4 [Lifting encoder (front) check] PROCEDURE 8 [Lifting motor (front) check]	EL-233 EL-239				

Trouble Diagnoses

NFEL0292

WORK FLOW

NFEL0292S01

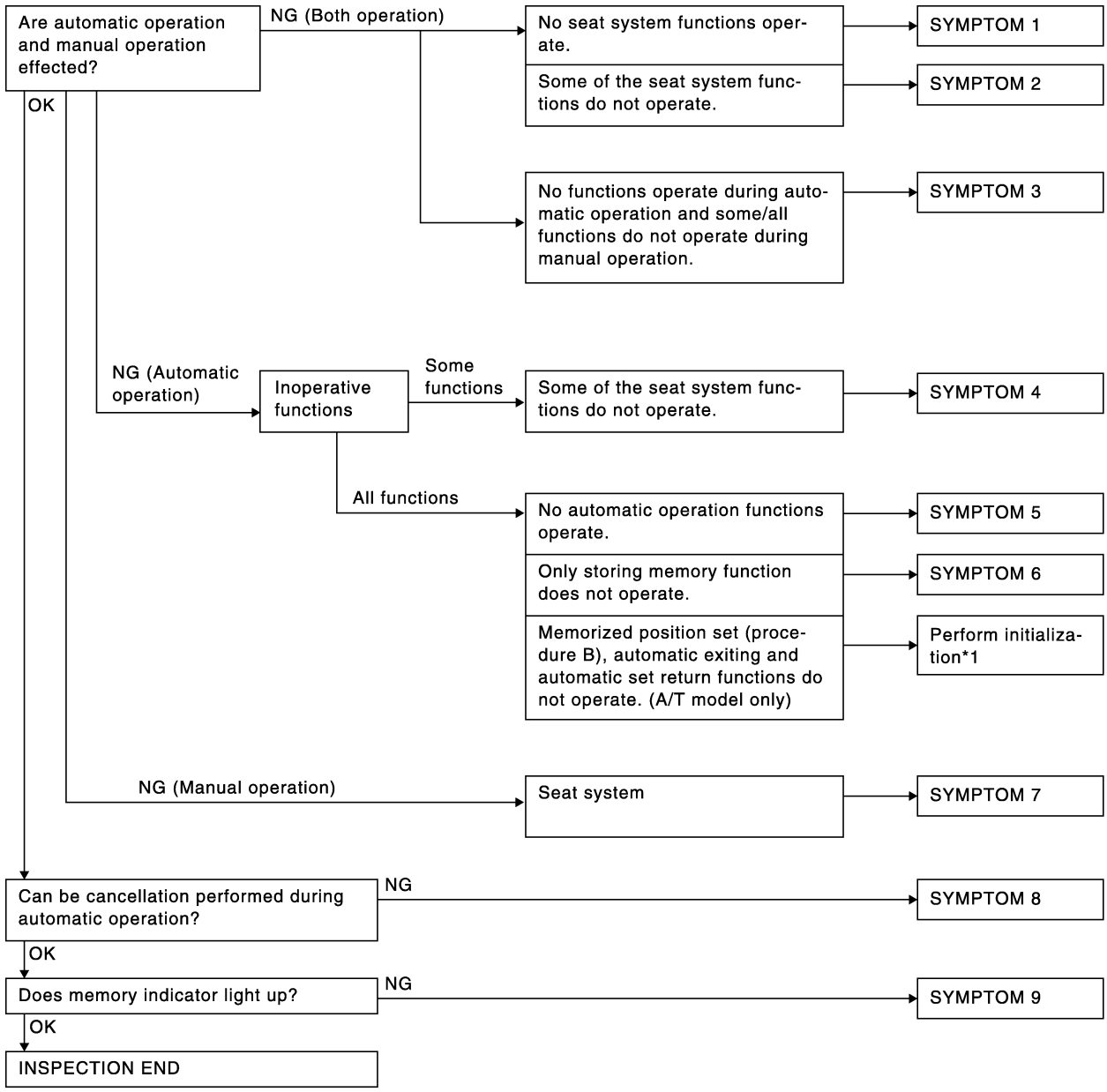


SEL599W

*1 EL-222 *2 EL-223

PRELIMINARY CHECK

NFEL0292S02



SEL600WA

*1: After reconnecting battery cable, perform initialization procedure A or B.
If initialization has not been performed, automatic drive positioner will not operate.

PROCEDURE A

1) Insert key in the ignition key cylinder. (Ignition switch is in "OFF" position.)
2) Open → close → open driver side door. (Do not perform with the door switch operation.)
3) End

PROCEDURE B

1) Drive the vehicle at more than 25 km/h (16 MPH).

2) End

After performing preliminary check, go to symptom chart below.

Before starting trouble diagnoses below, perform preliminary check, EL-225. Symptom numbers in the symptom chart correspond with those of preliminary check.

SYMPTOM CHART

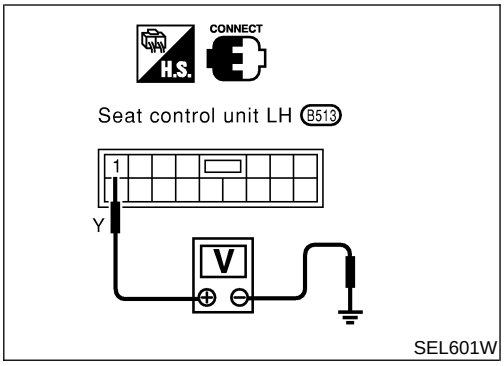
NFEL0292S03

PROCEDURE			Diagnostic procedure						
REFERENCE PAGE (EL-)			228	229	231	233	235	237	238
SYMPTOM			DIAGNOSTIC PROCEDURE 1 (Power supply and ground circuit for Driver's seat control unit)	DIAGNOSTIC PROCEDURE 2 (Sliding encoder check)	DIAGNOSTIC PROCEDURE 3 (Reclining encoder check)	DIAGNOSTIC PROCEDURE 4 [Lifting encoder (front) check]	DIAGNOSTIC PROCEDURE 5 [Lifting encoder (rear) check]	DIAGNOSTIC PROCEDURE 6 (Sliding motor check)	DIAGNOSTIC PROCEDURE 7 (Reclining motor check)
1	No seat system functions operate.		X						
2	Some of the seat system functions do not operate during automatic/ manual operation.	Sliding						X	
		Reclining							X
		Lifting (Front)							
		Lifting (Rear)							
3	No functions operate during automatic operation, and some/all functions do not during manual operation.								
4	Some of the seat system functions do not operate during automatic operation.	Sliding		X					
		Reclining			X				
		Lifting (Front)				X			
		Lifting (Rear)					X		
5	No automatic operation functions operate.								
6	Drive position cannot be retained in the memory.								
7	Does not operate during manual operation. (Operates during automatic operation.)	Sliding							
		Reclining							
		Lifting (Front)							
		Lifting (Rear)							
8	Automatic operation cannot be canceled.								
9	Memory indicator does not light up.								

X : Applicable

PROCEDURE			Diagnostic procedure						
REFERENCE PAGE (EL-)			239	240	241	241	242	244	245
SYMPTOM			DIAGNOSTIC PROCEDURE 8 [Lifting motor (front) check]	DIAGNOSTIC PROCEDURE 9 [Lifting motor (rear) check]	DIAGNOSTIC PROCEDURE 10 (Power seat switch check)	DIAGNOSTIC PROCEDURE 11 (Cencel switch check)	DIAGNOSTIC PROCEDURE 12 (Key, park position, parking brake, door switch and vehicle speed sensor check)	DIAGNOSTIC PROCEDURE 13 (Seat memory switch check)	DIAGNOSTIC PROCEDURE 14 (Memory indicator check)
1	No seat system functions operate.								
2	Some of the seat system functions do not operate during automatic/ manual operation.	Sliding							
		Reclining							
		Lifting (Front)	X						
		Lifting (Rear)		X					
3	No functions operate during automatic operation, and some/all functions do not during manual operation.				X		X (ACC, ON START signal)		
4	Some of the seat system functions do not operate during automatic operation.	Sliding							
		Reclining							
		Lifting (Front)							
		Lifting (Rear)							
5	No automatic operation functions operate.					X	X		
6	Drive position cannot be retained in the memory.						X (IGN ON signal)	X	
7	Does not operate during manual operation. (Operates during automatic operation.)	Sliding			X				
		Reclining			X				
		Lifting (Front)			X				
		Lifting (Rear)			X				
8	Automatic operation cannot be canceled.					X			
9	Memory indicator does not light up.								X

X : Applicable



DIAGNOSTIC PROCEDURE 1

=NFEL0292S04

(Power supply and ground circuit for driver's seat control unit)

Power Supply Circuit Check

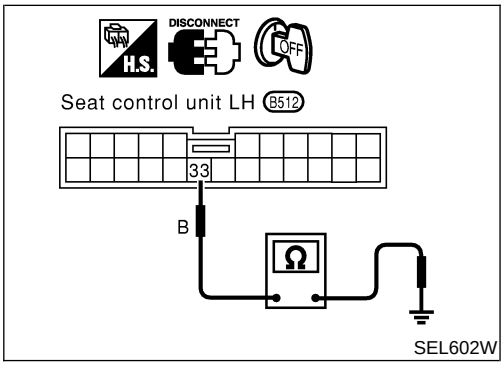
NFEL0292S0401

Check voltage between seat control unit LH terminal 1 and ground.
(Refer to wiring diagram in EL-215.)

Terminals	Ignition switch position			
	OFF	ACC	ON	START
1 - Ground	Battery voltage			

If NG, check the following.

- Circuit breaker
- Harness for open or short between circuit breaker and seat control unit LH



Ground Circuit Check

NFEL0292S0402

Check continuity between seat control unit LH terminal 33 and ground.
(Refer to wiring diagram in EL-215.)

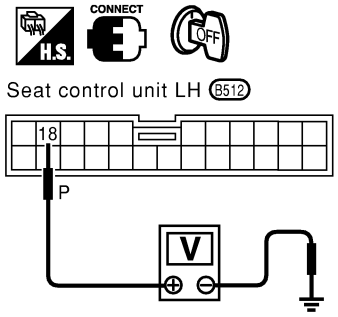
Terminals	Continuity
33 - Ground	Yes

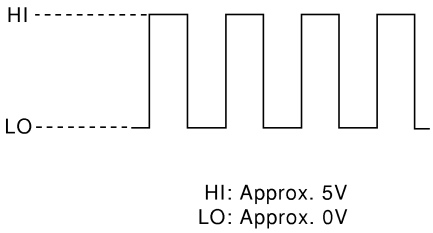
DIAGNOSTIC PROCEDURE 2
(Sliding encoder check)

=NFEL0292S05

1	CHECK SLIDING ENCODER OUTPUT SIGNAL

Measure voltage between seat control unit LH terminal 18 and ground with CONSULT-II or oscilloscope when power seat slide is operated.





HI: Approx. 5V
LO: Approx. 0V

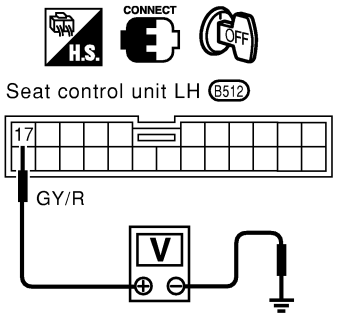
SEL603W

OK or NG

OK	▶	Sliding encoder is OK.
NG	▶	GO TO 2.

2	CHECK SLIDING ENCODER INPUT SIGNAL

Check voltage between seat control unit LH terminal 17 and ground.



Battery voltage should exist.

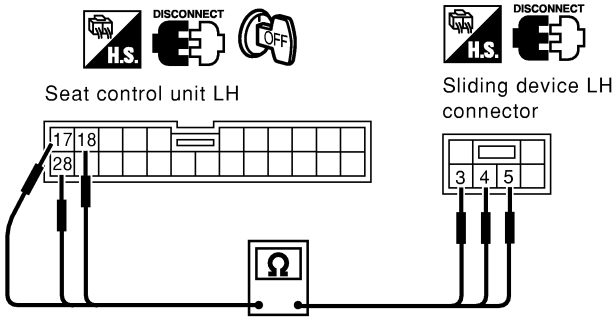
SEL604W

OK or NG

OK	▶	GO TO 3.
NG	▶	Replace seat control unit LH.

3	CHECK SLIDING ENCODER OPEN CIRCUIT

1. Disconnect seat control unit LH connector and sliding device LH connector.
2. Check harness continuity between seat control unit LH connector B512 terminals 17 (GY/R), 18 (P), 28 (Y/G) and sliding device LH connector B518 terminals 3 (GY/R), 4 (P), 5 (Y/G).



Terminals		Continuity
Seat control unit LH	Sliding device LH (Sliding encoder)	
17	3	Yes
18	4	
28	5	

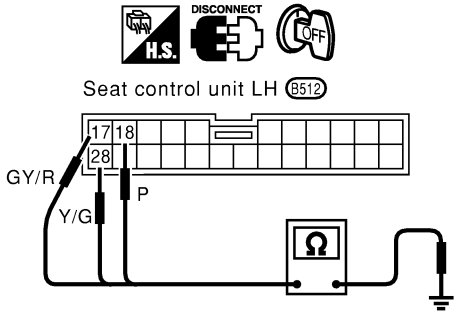
SEL605WB

OK or NG

OK	▶	GO TO 4.
NG	▶	Repair harness.

4	CHECK SLIDING ENCODER SHORT CIRCUIT

Check harness continuity between seat control unit LH connector and ground.



Terminals	Continuity
17 - Ground	No
18 - Ground	
28 - Ground	

SEL606W

OK or NG

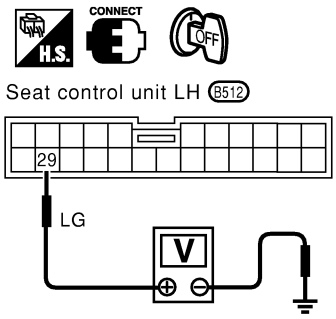
OK	▶	Replace sliding encoder.
NG	▶	Repair harness.

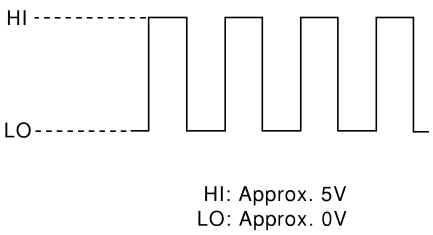
DIAGNOSTIC PROCEDURE 3
(Reclining encoder check)

=NFEL0292S06

1	CHECK RECLINING ENCODER OUTPUT SIGNAL

Measure voltage between seat control unit LH terminal 29 and ground with CONSULT-II or oscilloscope when power seat reclining is operated.





HI: Approx. 5V
LO: Approx. 0V

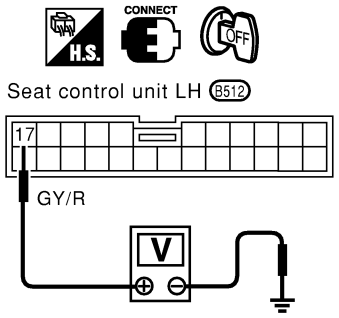
SEL607W

OK or NG

OK	▶	Reclining encoder is OK.
NG	▶	GO TO 2.

2	CHECK RECLINING ENCODER INPUT SIGNAL

Check voltage between seat control unit LH terminal 17 and ground.



Battery voltage should exist.

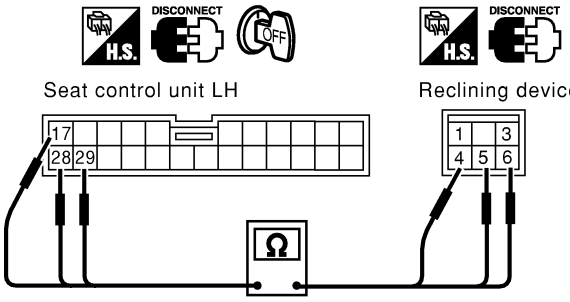
SEL608W

OK or NG

OK	▶	GO TO 3.
NG	▶	Replace seat control unit LH.

3	CHECK RECLINING ENCODER OPEN CIRCUIT

1. Disconnect seat control unit LH connector and reclining device LH connector.
2. Check harness continuity between seat control unit LH connector B512 terminal 17 (GY/R), 28 (Y/G), 29 (LG) and reclining LH connector B515 terminals 4 (GY/R), 6 (Y/G), 5 (LG).



Terminals		Continuity
Seat control unit LH	Reclining device LH (Reclining encoder)	
17	4	Yes
28	6	
29	5	

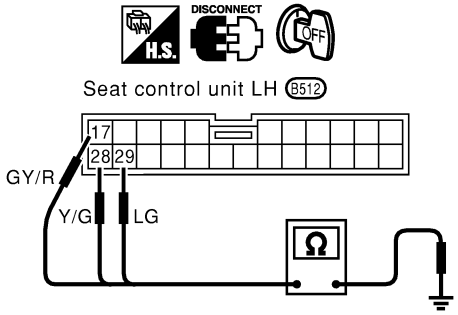
SEL609WB

OK or NG

OK	▶	GO TO 4.
NG	▶	Repair harness.

4	CHECK RECLINING ENCODER SHORT CIRCUIT

Check harness continuity between seat control unit LH connector and ground.



Terminals	Continuity
17 - Ground	No
28 - Ground	
29 - Ground	

SEL610W

OK or NG

OK	▶	Replace reclining encoder.
NG	▶	Repair harness.

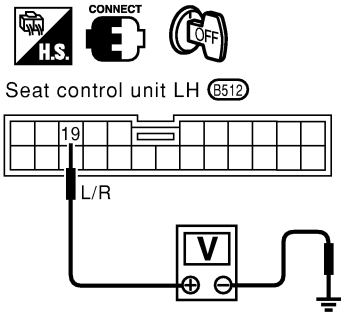
DIAGNOSTIC PROCEDURE 4

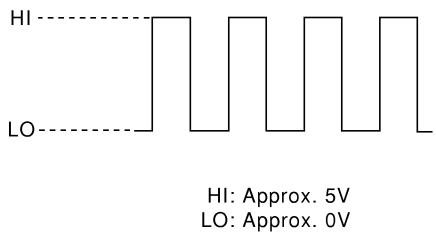
=NFEL0292S07

[Lifting encoder (front) check]

1	CHECK LIFTING ENCODER (FRONT) OUTPUT SIGNAL

Measure voltage between seat control unit LH terminal 19 and ground with CONSULT-II or oscilloscope when power seat lifting (front) is operated.





HI: Approx. 5V
LO: Approx. 0V

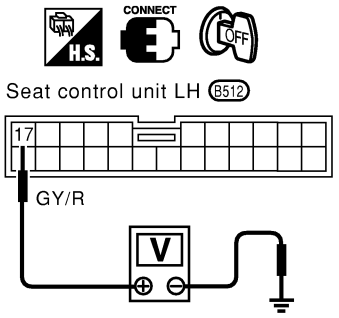
SEL611W

OK or NG

OK	▶	Lifting encoder (front) is OK.
NG	▶	GO TO 2.

2	CHECK LIFTING ENCODER (FRONT) INPUT SIGNAL

Check voltage between seat control unit LH terminal 17 and ground.



Battery voltage should exist.

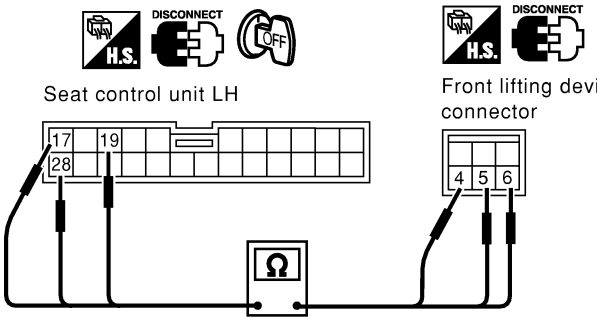
SEL612W

OK or NG

OK	▶	GO TO 3.
NG	▶	Replace seat control unit LH.

3	CHECK LIFTING ENCODER (FRONT) OPEN CIRCUIT

1. Disconnect seat control unit LH connector and front lifting device LH connector.
2. Check harness continuity between seat control unit LH connector B512 terminals 17 (GY/R), 19 (L/R), 28 (Y/G) and front lifting device LH connector B516 terminals 4 (G/Y), 5 (L/R), 6 (Y/G).



Terminals		Continuity
Seat control unit LH	Front lifting device LH Lifing encoder (front)	
17	4	Yes
19	5	
28	6	

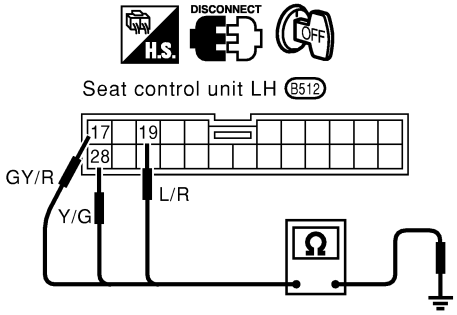
SEL613WB

OK or NG

OK	▶	GO TO 4.
NG	▶	Repair harness.

4	CHECK LIFTING ENCODER (FRONT) SHORT CIRCUIT

Check harness continuity between seat control unit LH connector and ground.



Terminals	Continuity
17 - Ground	No
19 - Ground	
28 - Ground	

SEL614W

OK or NG

OK	▶	Replace lifting encoder (front).
NG	▶	Repair harness.

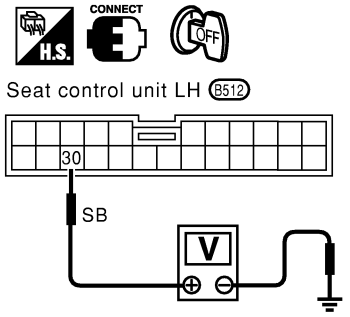
DIAGNOSTIC PROCEDURE 5

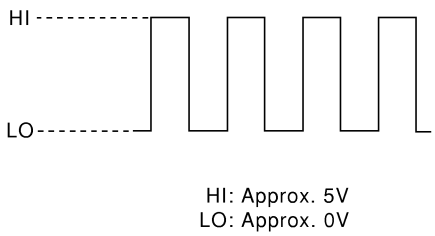
=NFEL0292S08

[Lifting encoder (rear) check]

1	CHECK LIFTING ENCODER (REAR) OUTPUT SIGNAL

Measure voltage between seat control unit LH terminal 30 and ground with CONSULT-II or oscilloscope when power seat lifting (rear) is operated.





HI: Approx. 5V
LO: Approx. 0V

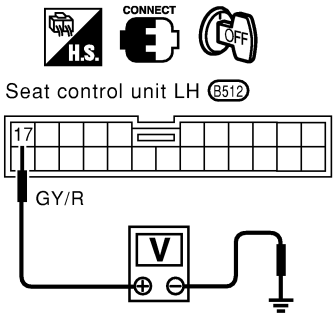
SEL615W

OK or NG

OK	▶	Lifting encoder (rear) is OK.
NG	▶	GO TO 2.

2	CHECK LIFTING ENCODER (REAR) INPUT SIGNAL

Check voltage between seat control unit LH terminal 17 and ground.



Battery voltage should exist.

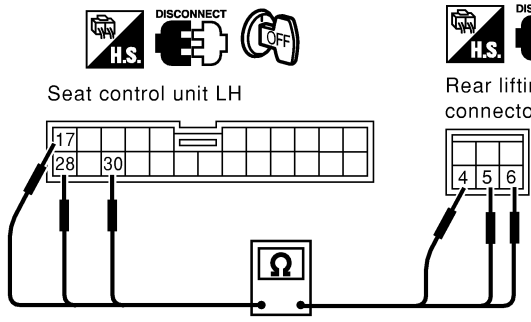
SEL616W

OK or NG

OK	▶	GO TO 3.
NG	▶	Replace seat control unit LH.

3	CHECK LIFTING ENCODER (REAR) OPEN CIRCUIT

1. Disconnect seat control unit LH connector and rear lifting device LH connector.
2. Check harness continuity between seat control unit LH connector B512 terminals 17 (GY/R), 28 (Y/G), 30 (SB) and rear lifting device LH connector B517 terminals 4 (GY/R), 6 (Y/G), 5 (SB).



Terminals		Continuity
Seat control unit LH	Rear lifting device LH Lifing encoder (rear)	
17	4	Yes
28	6	
30	5	

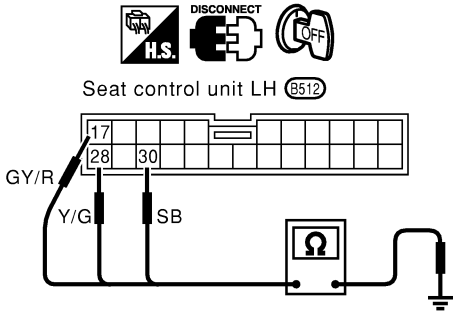
SEL617WB

OK or NG

OK	▶	GO TO 4.
NG	▶	Repair harness.

4	CHECK LIFTING ENCODER (REAR) SHORT CIRCUIT

Check harness continuity between seat control unit LH connector and ground.



Terminals	Continuity
17 - Ground	No
28 - Ground	
30 - Ground	

SEL618W

OK or NG

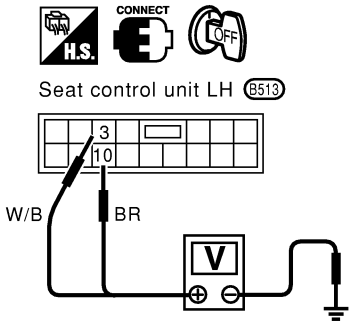
OK	▶	Replace lifting encoder (rear).
NG	▶	Repair harness.

DIAGNOSTIC PROCEDURE 6
(Sliding motor check)

=NFEL0292S09

1	CHECK OUTPUT SIGNAL TO SLIDING MOTOR

Check voltage between seat control unit LH terminals 3 or 10 and ground.



Condition of sliding switch	Terminals +	Terminals –	Voltage [V]
Forward	3	Ground	Approx. 12
Backward	10	Ground	Approx. 12

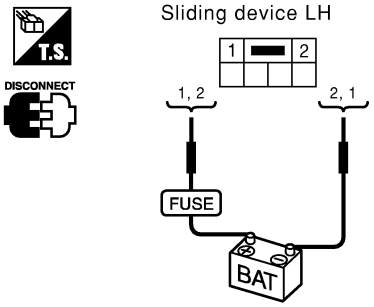
SEL619W

OK or NG

OK	▶	GO TO 2.
NG	▶	Replace seat control unit LH.

2	CHECK SLIDING MOTOR

1. Disconnect sliding device LH connector B518.
2. Apply 12V DC direct current to motor and check operation.



Terminals +	Terminals –	Operation
2	1	Forward
1	2	Backward

SEL620WB

OK or NG

OK	▶	Check harness for operation between seat control unit LH and sliding motor.
NG	▶	Replace sliding motor.

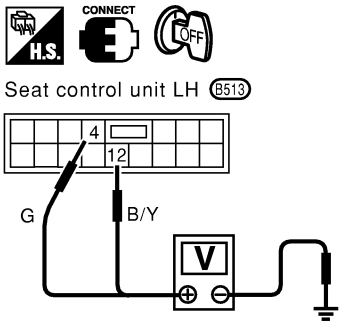
DIAGNOSTIC PROCEDURE 7

=NFEL0292S10

(Reclining motor check)

1	CHECK OUTPUT SIGNAL TO RECLINING MOTOR

Check voltage between seat control unit LH terminals 4 or 12 and ground.



Condition of reclining switch	Terminals		Voltage [V]
	+	–	
Forward	4	Ground	Approx. 12
Backward	12	Ground	Approx. 12

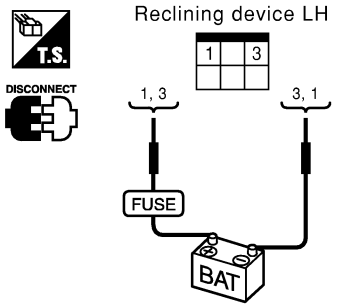
SEL621W

OK or NG

OK	▶	GO TO 2.
NG	▶	Replace seat control unit LH.

2	CHECK RECLINING MOTOR

1. Disconnect reclining device LH connector B515.
2. Apply 12V DC direct current to motor and check operation.



Terminals		Operation
+	–	
1	3	Forward
3	1	Backward

SEL622WB

OK or NG

OK	▶	Check harness for operation between seat control unit LH and reclining motor.
NG	▶	Replace reclining motor.

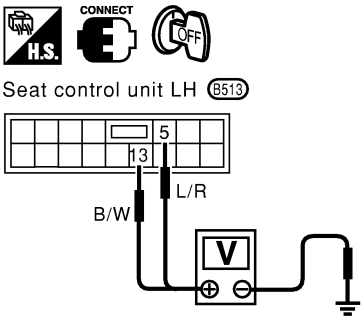
DIAGNOSTIC PROCEDURE 8

=NFEL0292S11

[Lifting motor (front) check]

1	CHECK OUTPUT SIGNAL TO LIFTING MOTOR (FRONT)

Check voltage between seat control unit LH terminals 5 or 13 and ground.



Condition of lifting switch (front)	Terminals		Voltage [V]
	+	–	
Up	13	Ground	Approx. 12
Down	5	Ground	Approx. 12

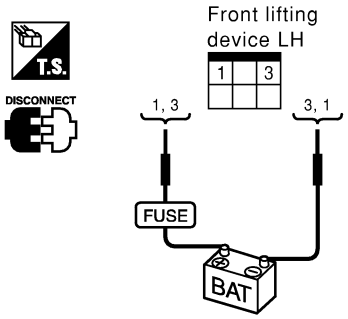
SEL623W

OK or NG

OK	▶	GO TO 2.
NG	▶	Replace seat control unit LH.

2	CHECK LIFTING MOTOR (FRONT)

1. Disconnect front lifting device LH connector B516.
2. Apply 12V DC direct current to motor and check operation.



Terminals		Operation
+	–	
3	1	Up
1	3	Down

SEL624WB

OK or NG

OK	▶	Check harness for operation between seat control unit LH and lifting motor (front).
NG	▶	Replace lifting motor (front).

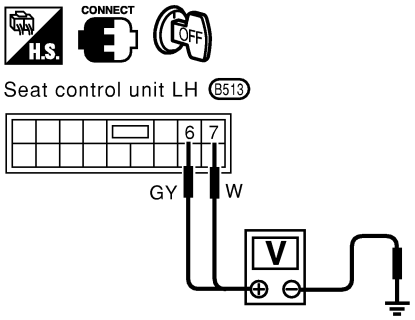
DIAGNOSTIC PROCEDURE 9

=NFEL0292S12

[Lifting motor (rear) check]

1	CHECK OUTPUT SIGNAL TO LIFTING MOTOR (REAR)

Check voltage between seat control unit LH terminals 6 or 7 and ground.



Condition of lifting switch (rear)	Terminals		Voltage [V]
	+	–	
Up	6	Ground	Approx. 12
Down	7	Ground	Approx. 12

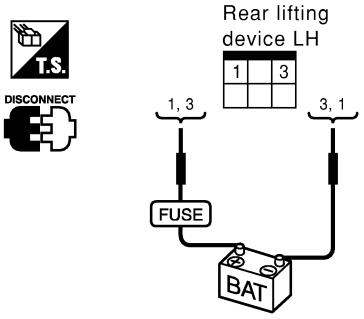
SEL625W

OK or NG

OK	▶	GO TO 2.
NG	▶	Replace seat control unit LH.

2	CHECK LIFTING MOTOR (REAR)

1. Disconnect rear lifting device LH connector B517.
2. Apply 12V DC direct current to motor and check operation.



Terminals		Operation
+	–	
1	3	Up
3	1	Down

SEL626WB

OK or NG

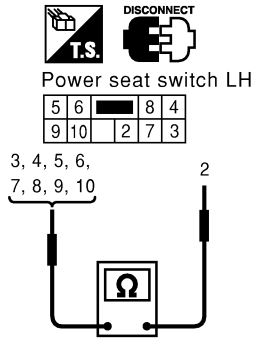
OK	▶	Check harness for operation between seat control unit LH and lifting motor (rear).
NG	▶	Replace lifting motor (rear).

DIAGNOSTIC PROCEDURE 10
(Power seat switch check)

=NFEL0292S13

1	CHECK POWER SEAT SWITCH

1. Disconnect power seat switch LH connector.
2. Check continuity between power seat switch terminals (B515).



Switch	Condition	Terminals								
		2	5	6	8	4	9	10	7	3
Sliding	Forward	○								○
	Backward	○				○				
Reclining	Forward	○	○							
	Backward	○		○						
Lifting (Front)	Up	○					○			
	Down	○						○		
Lifting (Rear)	Up	○							○	
	Down	○			○					

SEL615Y

OK or NG

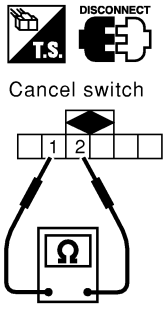
OK	▶	**Check the following.** ● Ground circuit for power seat switch ● Harness for open or short between seat control unit LH and power seat switch
NG	▶	Replace power seat switch.

DIAGNOSTIC PROCEDURE 11
(Cancel switch check)

NFEL0292S14

1	CHECK CANCEL SWITCH

1. Disconnect cancel switch connector.
2. Check continuity between cancel switch terminals (M154).



Terminals	Cancel switch condition	Continuity
1-2	ON	Yes
	OFF	No

SEL628WB

OK or NG

OK	▶	**Check the following.** ● Ground circuit for cancel switch ● Harness for open or short between seat control unit LH and cancel switch
NG	▶	Replace cancel switch.

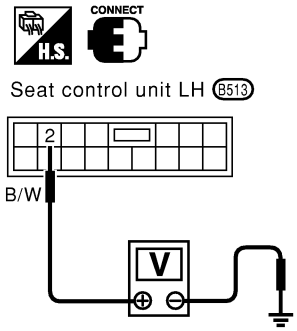
DIAGNOSTIC PROCEDURE 12

=NFEL0292S15

(Key, detention, stop lamp, parking brake, door switch and vehicle speed sensor check)

1	CHECK KEY SWITCH INPUT SIGNAL (A/T MODEL ONLY)

Check voltage between seat control unit LH terminal 2 (BW) and ground.



Condition	Voltage [V]
Key is inserted	Approx. 12
Key is removed	0

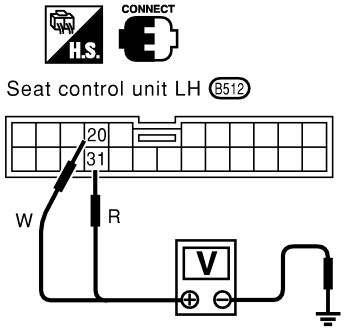
SEL629W

OK or NG

OK	▶	GO TO 2.
NG	▶	**Check the following.** ● 10A fuse [No. 13, located in fuse block (J/B)] ● Key switch ● Harness for open or short between key switch and fuse ● Harness for open or short between seat control unit LH and key switch

2	CHECK IGNITION SWITCH INPUT SIGNAL (ON AND START)

Check voltage between seat control unit LH terminals and ground.



Terminals		Ignition switch position		
+	–	OFF	ON	START
20	Ground	Approx. 0V	Battery voltage	
31	Ground	Approx. 0V		Battrery voltage

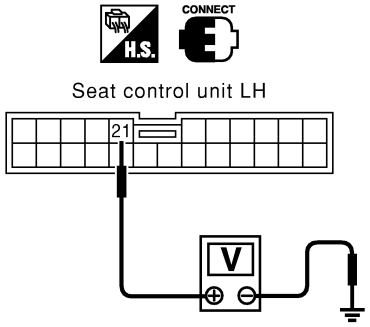
SEL630W

OK or NG

OK	▶	GO TO 3.
NG	▶	**Check the following.** ● 10A fuse [No. 10, located in fuse block (J/B)] ● 10A fuse [No. 21, located in fuse block (J/B)] ● Harness for open or short between seat control unit LH and fuse

3	CHECK PARK POSITION SWITCH (A/T) OR PARKING BRAKE SWITCH (M/T) INPUT SIGNAL

Check voltage between seat control unit LH harness connector B512 terminal 21 (GY) and ground.



	Condition	Voltage [V]
A/T	Selector lever is in "P" position	0
	Except above	Approx. 12
M/T	Parking brake is applied	0
	Parking brake is released	Approx. 12

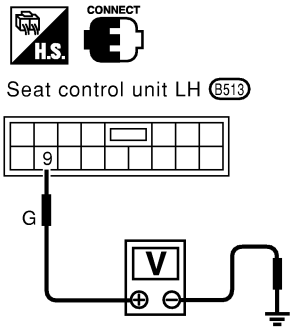
SEL416Y

OK or NG

OK	▶	GO TO 4.
NG	▶	**Check the following.** ● Park position switch (A/T) or parking brake switch (M/T) ● Park position switch ground circuit (A/T) ● Harness for open or short between seat control unit LH and park position switch (A/T) or parking brake switch (M/T)

4	CHECK DRIVER DOOR SWITCH INPUT SIGNAL (A/T MODEL ONLY)

Check voltage between seat control unit LH terminal 9 and ground.



Condition	Voltage [V]
Driver's door is open	0
Driver's door is closed	Approx. 12

SEL632W

OK or NG

OK	▶	GO TO 5.
NG	▶	**Check the following.** ● Driver door switch ● Driver door switch ground circuit ● Harness for open or short between seat control unit LH and driver door switch

5	CHECK VEHICLE SPEED SENSOR

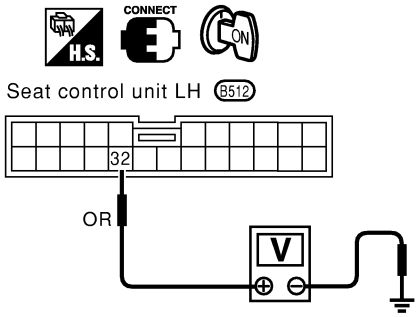
Does speedometer operate normally?

Yes or No

OK	▶	GO TO 6.
NG	▶	Check speedometer and vehicle speed sensor circuit. Refer to EL-125.

6	CHECK VEHICLE SPEED SENSOR PULL UP VOLTAGE

1. Turn ignition switch "ON".
2. Check voltage between seat control unit LH terminal 32 and ground.



Approx. 5V should exist.

SEL633W

OK or NG

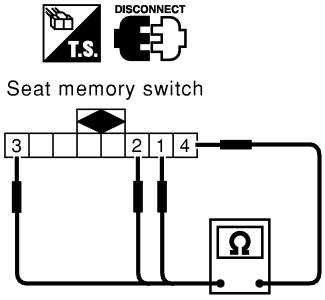
OK	▶	Harness for open or short between seat control unit LH and combination meter.
NG	▶	Repair harness.

DIAGNOSTIC PROCEDURE 13
(Seat memory switch check)

NFEL0292S16

1	CHECK SEAT MEMORY SWITCH

1. Disconnect seat memory switch connector.
2. Check continuity between seat memory switch terminals (D14).



Switch	Condition	Terminals			
		1	2	3	4
Memory-1	ON	○			○
Memory-2	ON		○		○
Set	ON			○	○

SEL634WB

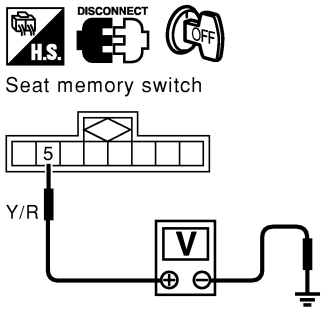
OK or NG

OK	▶	**Check the following.** ● Ground circuit for seat memory switch ● Harness for open or short between seat control unit LH and seat memory switch
NG	▶	Replace seat memory switch.

DIAGNOSTIC PROCEDURE 14
(Memory indicator check)

=NFEL0292S17

1	CHECK INDICATOR LAMP	
Check indicator lamp illumination. **OK or NG**		
OK	▶	GO TO 2.
NG	▶	Replace seat memory switch (indicator lamp).

2	CHECK POWER SUPPLY CIRCUIT FOR INDICATOR LAMP	
1. Disconnect seat memory switch connector (D14). 2. Check voltage between seat memory switch terminal 5 and ground.  **Battery voltage should exist.** SEL635WB **OK or NG**		
OK	▶	Check harness for open or short between seat control unit LH and seat memory switch
NG	▶	**Check the following.** ● 10A fuse [No. 12 located in the fuse block (J/B)] ● Harness for open or short between fuse and indicator lamp

System Description

NFEL0190

Refer to EC-53, “Automatic Speed Control Device (ASCD) System” in “ENGINE AND EMISSION BASIC DESCRIPTION CONTROL SYSTEM”.

System Description

NFEL0191

Power is supplied at all times
- from 40A fusible link (letter **I**, located in the fuse and fusible link box)
- to circuit breaker terminal 1
- through circuit breaker terminal 2
- to power window relay terminal 3 and
- to front power window main switch terminal 4
- to front power window switch RH terminal 6.

With ignition switch in ON or START position, power is supplied
- through 10A fuse [No. 10, located in the fuse block (J/B)]
- to rear power window switch LH and RH terminal 6
- to smart entrance control unit terminal 27.

Ground is supplied to power window relay terminal 1
- through body grounds M9, M25 and M87.

Ground is supplied to rear power window switch LH terminal 7
- through body ground B12 and B7 (without CD auto changer), or B59 (with CD auto changer).

Ground is supplied to rear power window switch RH terminal 7
- through body grounds B106 and B127.

The power window relay is energized and power is supplied
- through power window relay terminal 5
- to front power window main switch terminal 11,
- to front power window switch RH terminal 13,
- to rear power window switch LH and RH terminal 5.

MANUAL OPERATION

NFEL0191S01

Front Door LH

NFEL0191S0101

Ground is supplied
- to front power window main switch terminal 5
- through body grounds M9, M25 and M87.

WINDOW UP
When the front LH switch in the front power window main switch is pressed in the up position, power is supplied
- to front power window regulator LH terminal 1
- through front power window main switch terminal 2.

Ground is supplied
- to front power window regulator LH terminal 3
- through front power window main switch terminal 3.

Then, the motor raises the window until the switch is released.

WINDOW DOWN
When the LH switch in the power window main switch is pressed in the down position, power is supplied
- to front power window regulator LH terminal 3
- through front power window main switch terminal 3.

Ground is supplied
- to front power window regulator LH terminal 1
- through front power window main switch terminal 2.

Then, the motor lowers the window until the switch is released.

Front Door RH

NFEL0191S0102

Ground is supplied
- to front power window switch RH terminal 5
- through body grounds M9, M25 and M87.

WINDOW UP
When the front RH switch in the front power window switch is pressed in the UP position, power is supplied

- to front power window regulator RH terminal 1
- through front power window switch RH terminal 5.

Ground is supplied

- to front power window regulator RH terminal 3
- through front power window switch RH terminal 4.

Then, the motor raises the window until the switch is released.
WINDOW DOWN
When the RH switch in the front power window switch is pressed in the DOWN position, power is supplied

- to front power window regulator RH terminal 3
- through front power window switch RH terminal 4.

Ground is supplied

- to front power window regulator RH terminal 1
- through front power window switch RH terminal 5.

Then, the motor lowers the window until the switch is released.

Rear Door

NFEL0191S0103

REAR DOOR
MAIN SWITCH OPERATION
Rear Door LH
Power is supplied

- through front power window main switch terminal (13, 12)
- to rear power window switch LH terminal (3, 4)

The subsequent operation is the same as front power window switch RH operation.
REAR POWER WINDOW SWITCH LH OPERATION
Power is supplied

- through rear power window switch LH terminal (1, 2)
- to rear power window regulator LH terminal (1, 2)

Ground is supplied

- to rear power window regulator LH terminal (2, 1)
- through rear power window switch LH terminal (2, 1)
- to rear power window switch LH terminal (4, 3)
- through front power window main switch terminal (12, 13)

Then, the motor raises or lowers the window until the switch is released.
Rear Door RH
Power is supplied

- through front power window main switch terminal (9, 10)
- to rear power window switch RH terminal (3, 4)
- through rear power window switch RH terminal (1, 2)
- to rear power window regulator RH terminal (1, 2)

Ground is supplied

- to rear power window regulator RH terminal (2, 1)
- through rear power window switch RH terminal (2, 1)
- to rear power window switch RH terminal (4, 3)
- through front power window main switch terminal (10, 9)

Then, the motor raises or lowers the window until the switch is released.

Power Window Opened/Closed Operation

NFEL0191S0104

- When ignition key switch is OFF, front power window can be opened or closed by turning the front door key cylinder to UNLOCK/LOCK direction.
- Power window can be opened as the door key cylinder is kept fully turning to the UNLOCK direction.
- Power window can be closed as the door key cylinder is kept fully turning to the LOCK direction.

The power window opening stops when the following operations are carried out:

- While performing open/close the window, power window is stopped at the position as the door key cylinder is placed on Neutral.

- When the ignition switch is turned ON while the power window opening is operated.

AUTO OPERATION

NFEL0191S02

The power window AUTO feature enables the driver to open or close the driver's and passenger's side windows without holding the window switch in the down or up position.
The AUTO feature only operates on the driver's and passenger's side windows.

POWER WINDOW LOCK

NFEL0191S03

The power window lock is designed to lock operation of all windows except for driver's door window.
When the lock switch is pressed to lock position, ground of the front and rear power window switches in the power window main switch is disconnected. This prevents the power window motors from operating.

RETAINED POWER OPERATION

NFEL0191S04

When the ignition switch is turned to OFF position from ON or START position, power is supplied for 45 seconds

- to power window relay terminal 2
- from smart entrance control unit terminal 46.

Ground is always supplied

- to power window relay terminal 1
- through body grounds M9, M25 and M87.

When power and ground are supplied, the power window relay continues to be energized, and the power window can be operated.
The retained power operation is canceled when the driver or passenger side door is opened.
RAP signal's period can be changed by CONSULT-II. (Refer to EL-257.)

INTERRUPTION DETECTION FUNCTION

NFEL0191S05

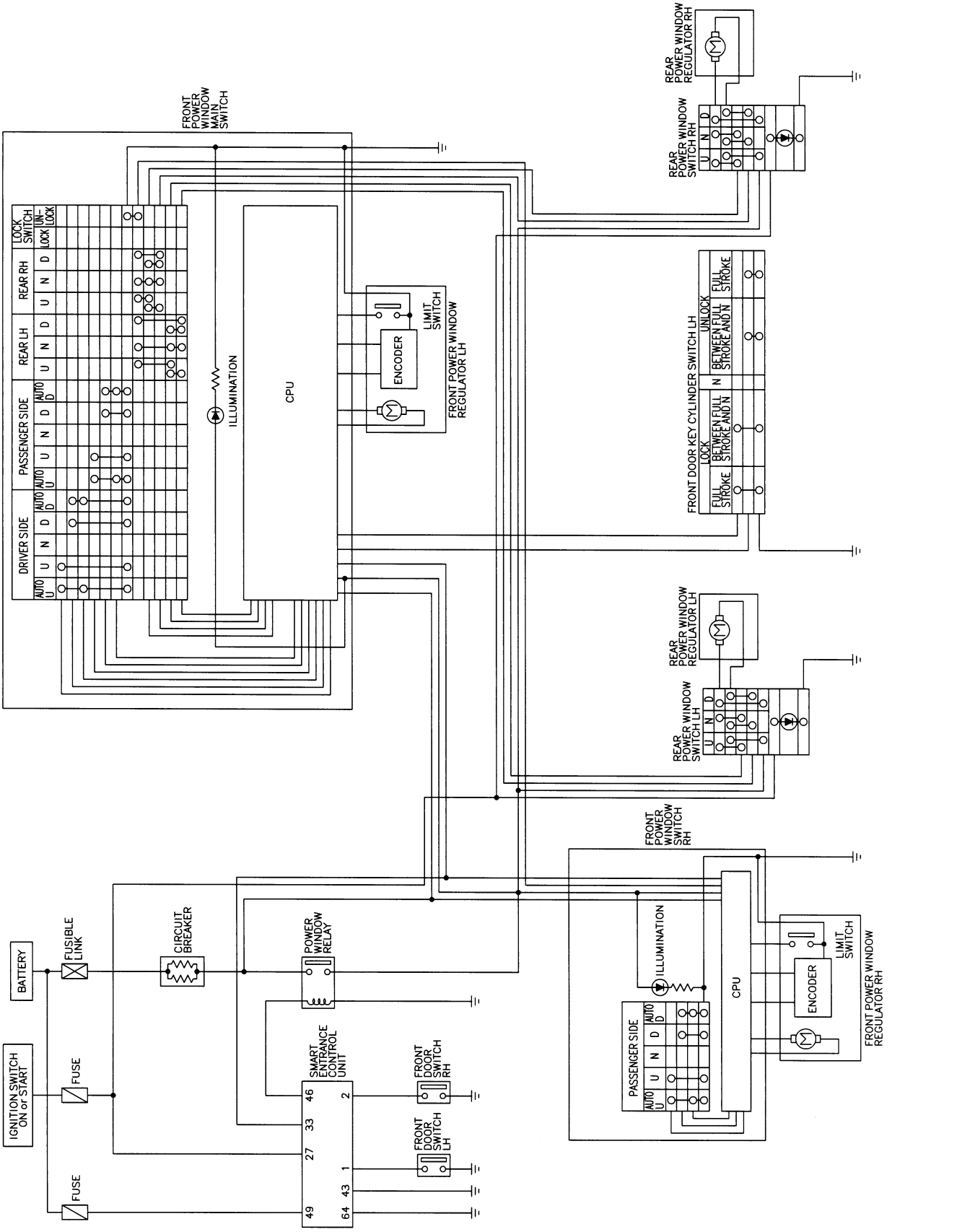
Power window main switch monitors the power window regulator motor operation and the power window position (full closed or other) for driver's and passenger's side power window by the signals from encoder and limit switch in front power window regulator (driver's and passenger's side).
When power window main switch detects interruption during the following close operation in the driver's side door,

- automatic close operation when ignition switch is in the "ON" position
- automatic close operation during retained power operation
- manual close operation during retained power operation

power window main switch controls driver's and passenger's side power window regulator motor for open and the power window will be lowered about 150 mm (5.91 in).

Schematic

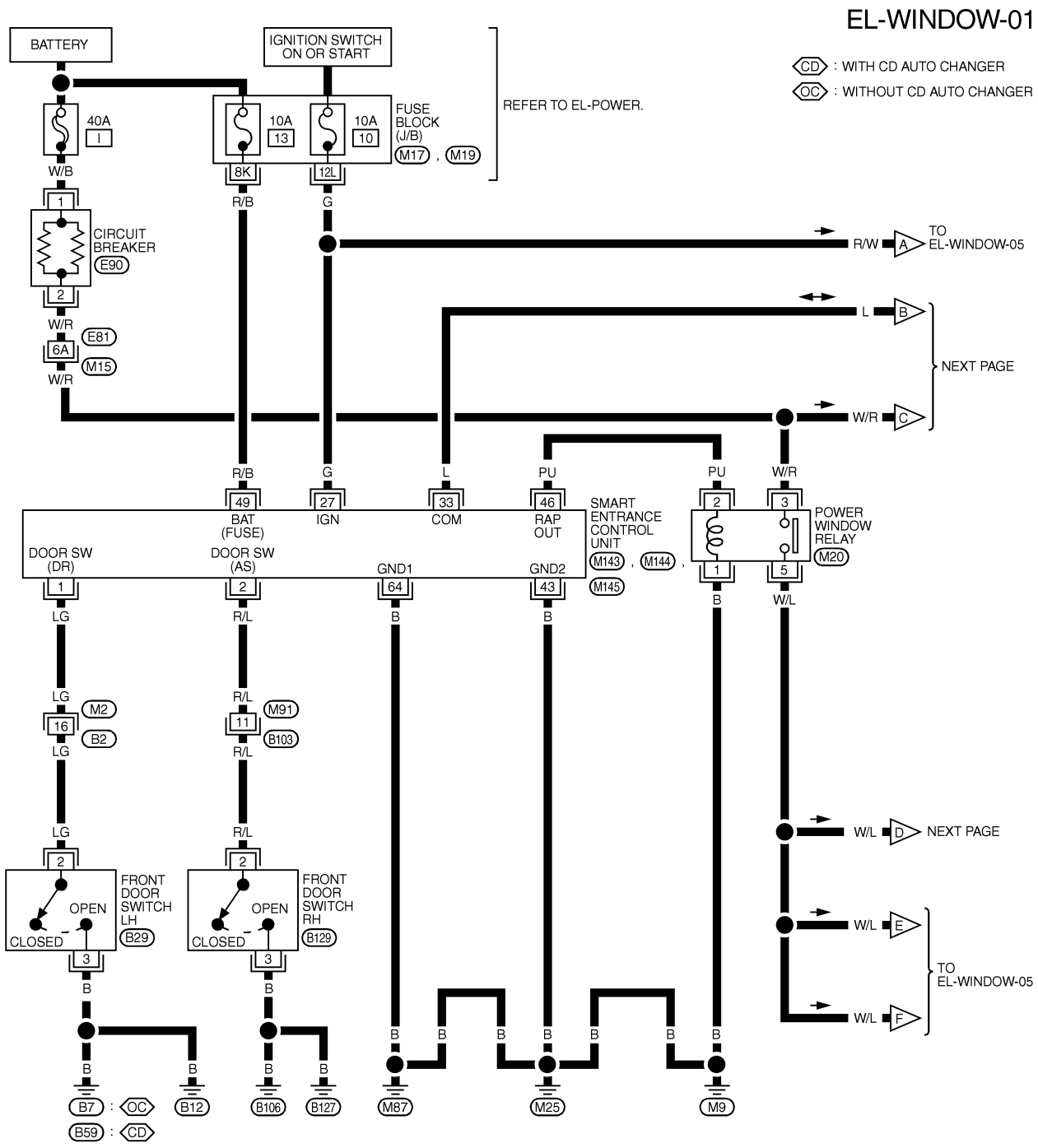
NFEL0103

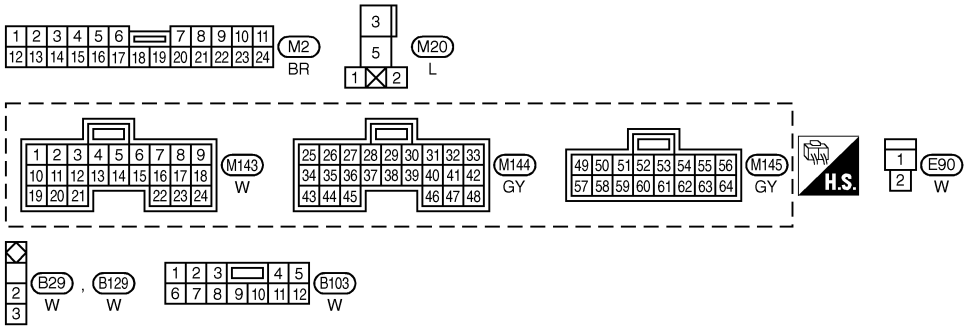


MEL751P

Wiring Diagram — WINDOW —

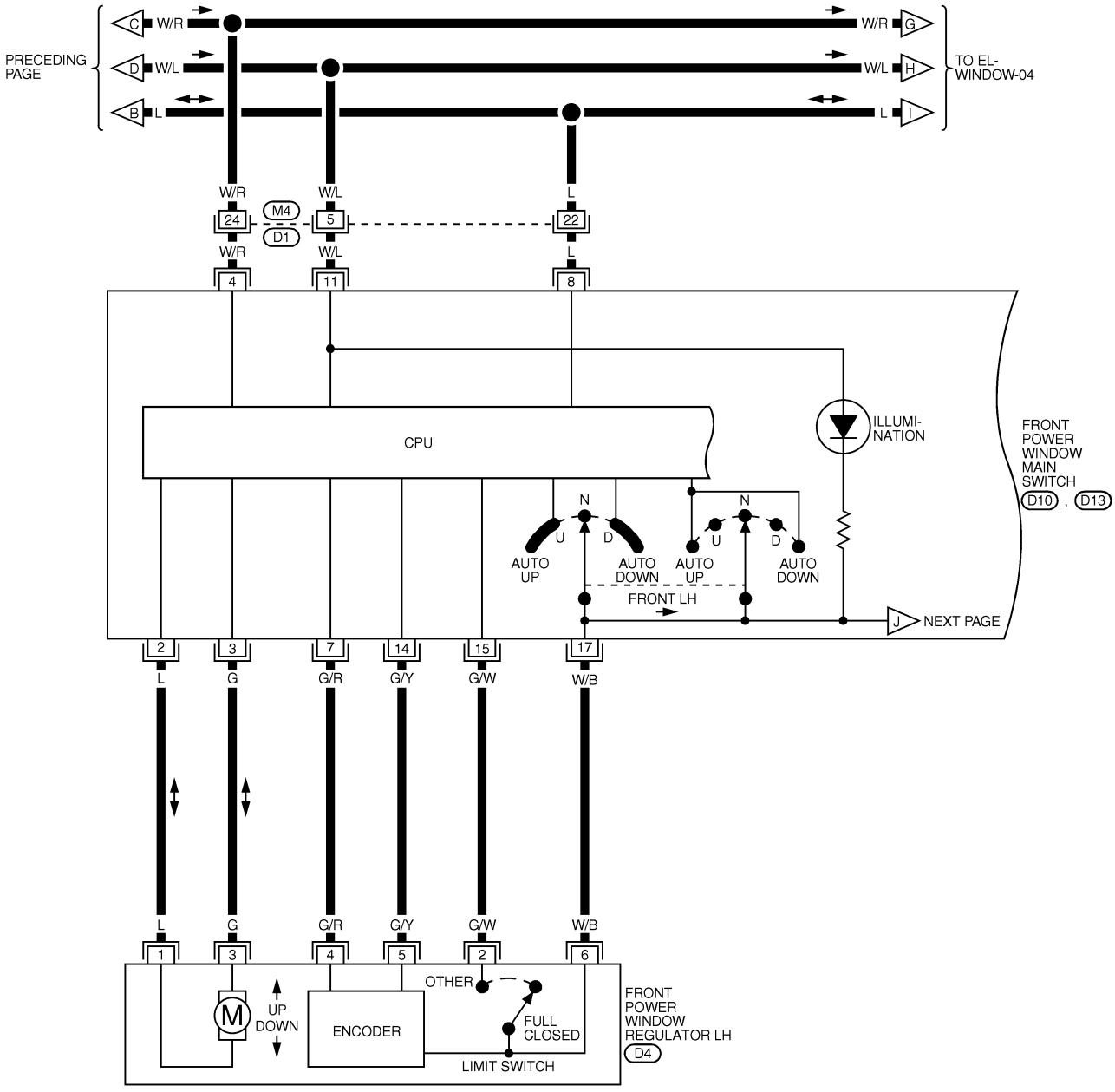
NFEL0104

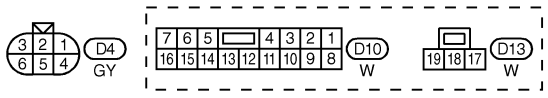




REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)
M17 , M19 -FUSE BLOCK-JUNCTION BOX (J/B)

MEL170O

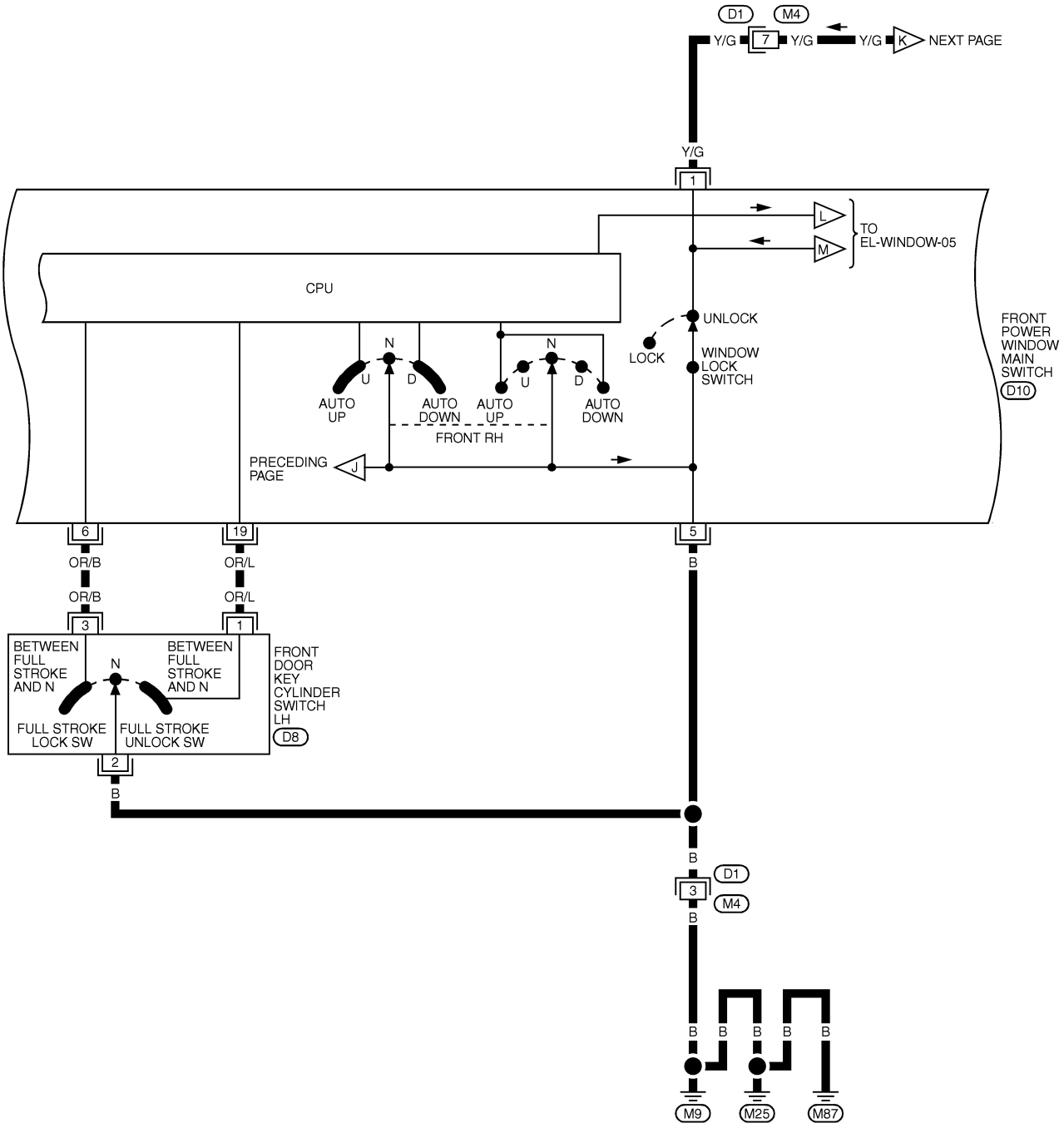


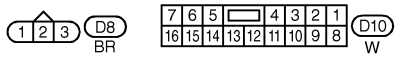


REFER TO THE FOLLOWING.
(D1) -SUPER MULTIPLE JUNCTION (SMJ)

MEL731P

EL-WINDOW-03

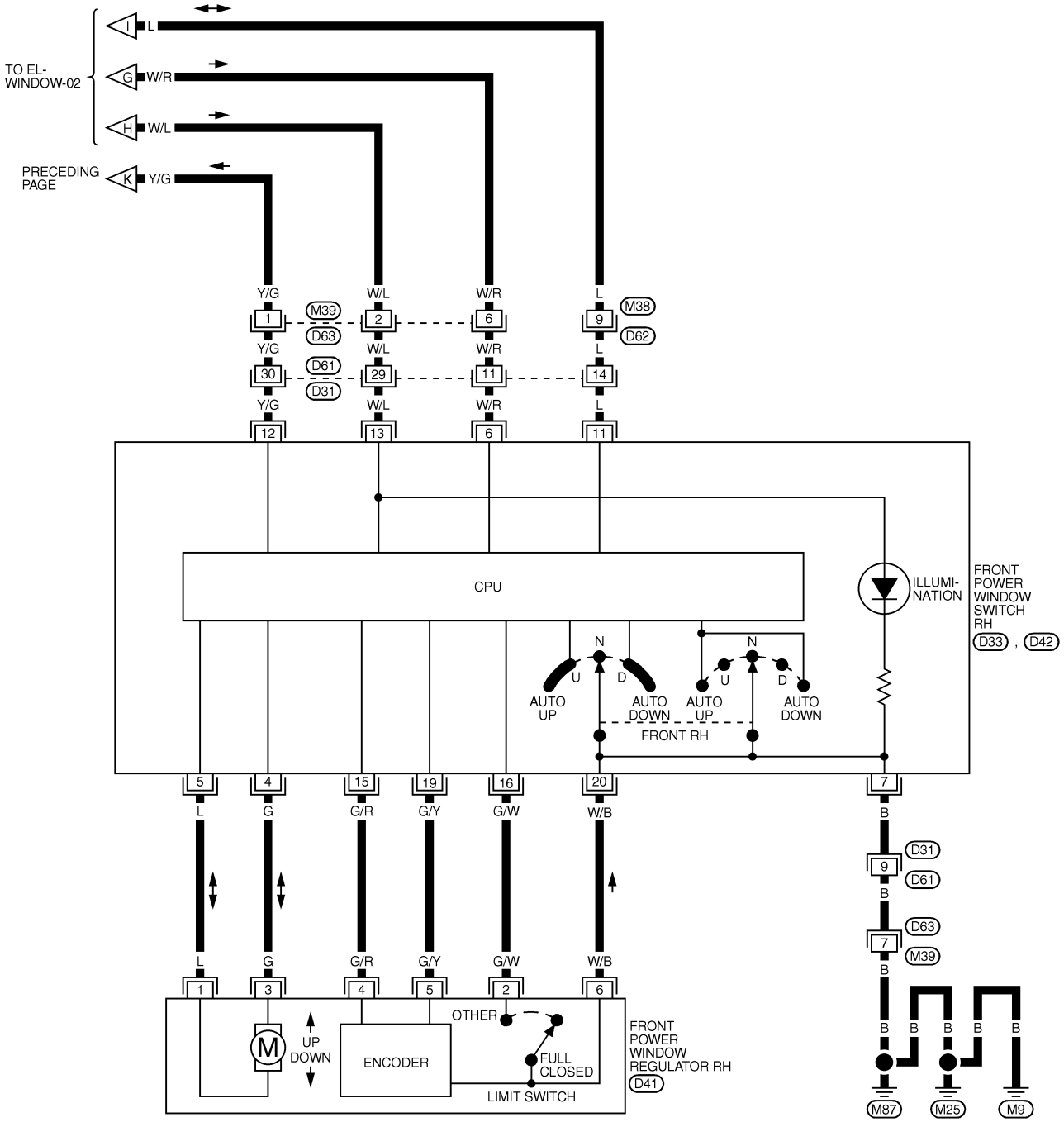


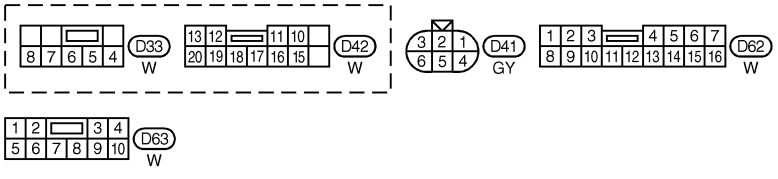


REFER TO THE FOLLOWING.
D1 -SUPER
MULTIPLE JUNCTION (SMJ)

MEL172O

EL-WINDOW-04

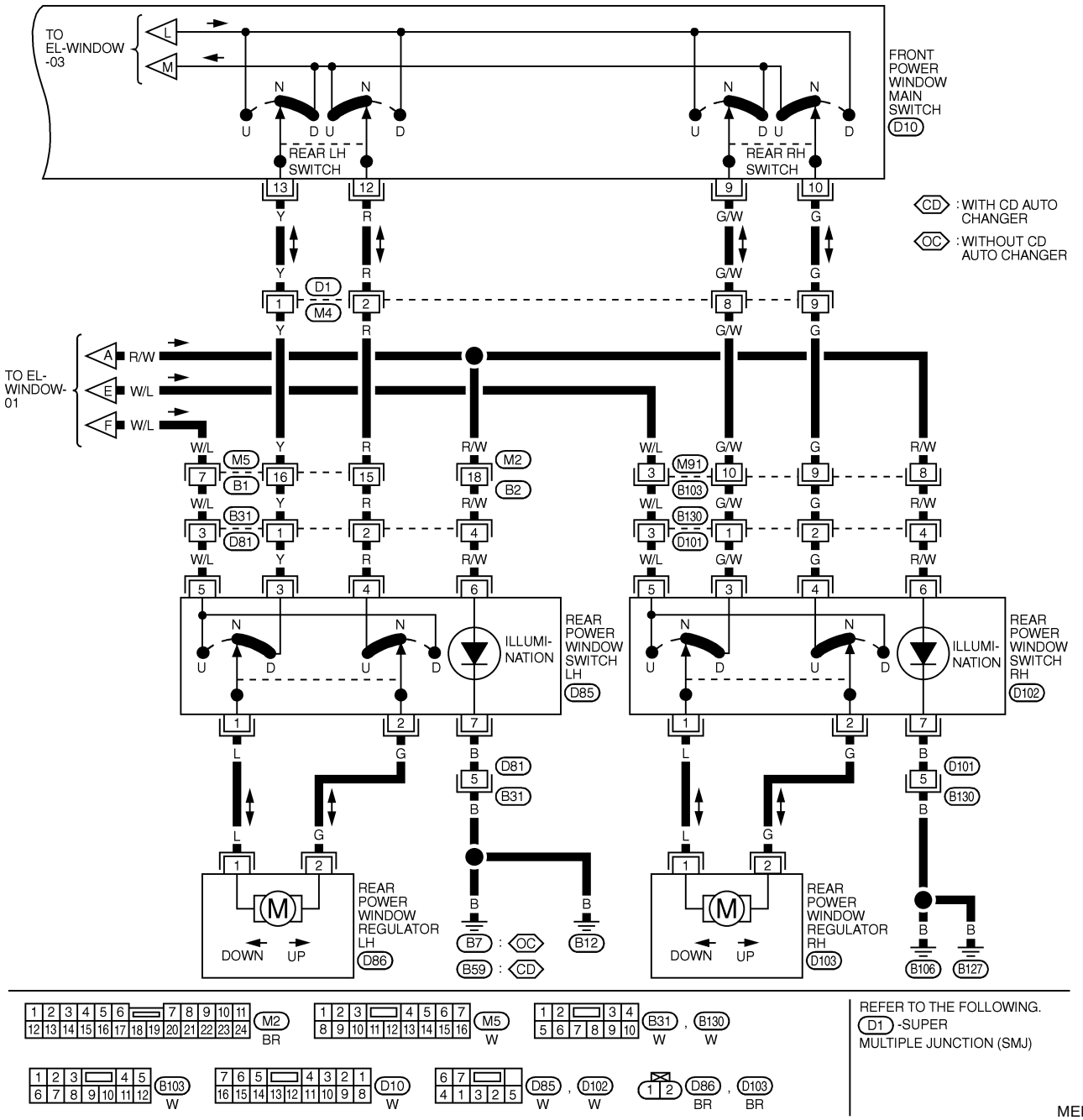




REFER TO THE FOLLOWING.
D31 -SUPER MULTIPLE JUNCTION (SMJ)

MEL732P

EL-WINDOW-05



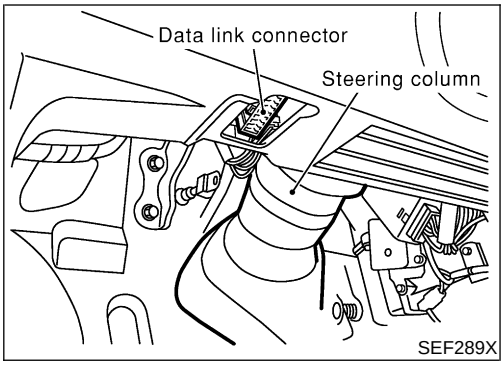
MEL174O

SMART ENTRANCE CONTROL UNIT TERMINALS AND REFERENCE VALUE BETWEEN EACH TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
1	LG	DRIVER DOOR SWITCH	OFF (CLOSED) → ON (OPEN)	12V → 0V
2	R/L	PASSENGER DOOR SWITCH	OFF (CLOSED) → ON (OPEN)	5V → 0V
27	G	IGNITION SWITCH (ON)	IGNITION KEY IS IN "ON" POSITION	12V
33	L	COMMUNICATION INTERFACE	DOOR LOCK & UNLOCK SWITCHES (NEUTRAL → LOCK/UNLOCK) FRONT DOOR KEY CYLINDER SWITCH LH (NEUTRAL → LOCK/UNLOCK)	*1
43	B	GROUND	–	–
46	PU	POWER WINDOW RELAY	RETAIND POWER OPERATION IS OPERATED (ON → OFF)	12V → 0V
49	R/B	POWER SOURCE (FUSE)	–	12V
64	B	GROUND	–	–

*1: REFER TO "SMART ENTRANCE CONTROL UNIT INSPECTION TABLE" IN "SMART ENTRANCE CONTROL UNIT".

SEL480Y



SEF289X

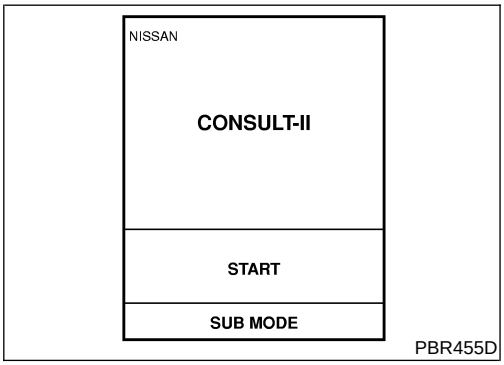
CONSULT-II Inspection Procedure

NFEL0235

“RETAINED PWR”

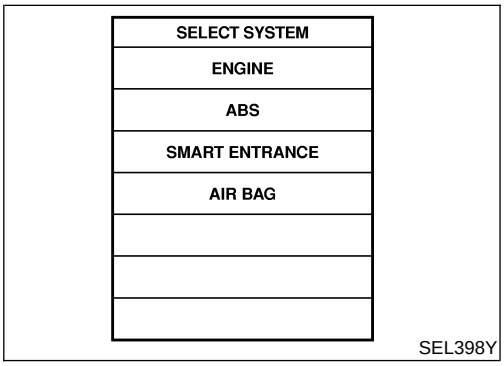
NFEL0235S01

1. Turn ignition switch “OFF”.
2. Connect “CONSULT-II” to the data link connector.



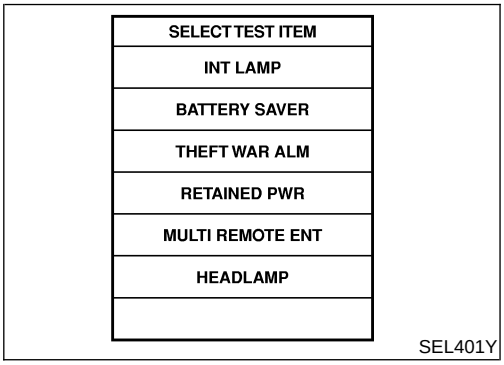
PBR455D

3. Turn ignition switch “ON”.
4. Touch “START”.



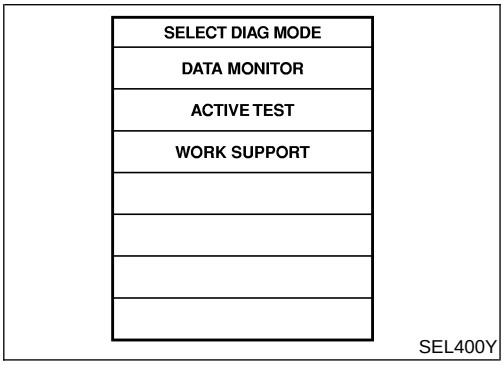
SEL398Y

5. Touch “SMART ENTRANCE”.



SEL401Y

6. Touch “RETAINED PWR”.



SEL400Y

7. Select diagnosis mode.
   “DATA MONITOR”, “ACTIVE TEST” and “WORK SUPPORT” are available.

CONSULT-II Application Items

NFEL0236

"RETAINED PWR" Data Monitor

NFEL0236S01

NFEL0236S0101

Monitored Item	Description
IGN ON SW	Indicates [ON/OFF] condition of ignition switch.
DOOR SW-DR	Indicates [ON/OFF] condition of front door switch LH.
DOOR SW-AS	Indicates [ON/OFF] condition of front door switch RH.

Active Test

NFEL0236S0102

Test Item	Description
RETAINED PWR	This test is able to supply RAP signal (power) from smart entrance control unit to power window system, power sunroof system and headlamp battery saver control unit. Those systems can be operated when turning on "RETAINED PWR" on CONSULT-II screen even if the ignition switch is tuned OFF. **NOTE:** **During this test, CONSULT-II can be operated with ignition switch in "OFF" position. "RETAINED PWR" should be turned "ON" or "OFF" on CONSULT-II screen when ignition switch is ON. Then turn ignition switch OFF to check retained power operation. CONSULT-II might be stuck if "RETAINED PWR" is turned "ON" or "OFF" on CONSULT-II screen when ignition switch is OFF.**

Work Support

NFEL0236S0103

Work Item	Description
RETAINED PWR SET	Rap signal's power supply period can be changed by mode setting. Selects rap signal's power supply period between two steps. ● MODE 1 (45 sec.)/MODE 2 (OFF)

Trouble Diagnoses

NFEL0105

Symptom	Possible cause	Repair order
None of the power windows can be operated using any switch.	1. 10A fuse, 40A fusible link 2. E90 circuit breaker 3. Power window relay 4. E90 circuit breaker circuit 5. Power window relay circuit 6. Ground circuit 7. Front power window main switch	1. Check 10A fuse [No. 13 located in fuse block (J/B)], 40A fusible link (letter **I**, located in fuse and fusible link box). 2. Check E90 circuit breaker. 3. Check power window relay. 4. Check the following. a. Check harness between E90 circuit breaker and 40A fusible link (letter **I**, located in fuse and fusible link box). b. Check harness between E90 circuit breaker and power window main switch. 5. Check the following. a. Check harness between E90 circuit breaker and power window relay. b. Check harness between fuse and power window relay. 6. Check the following. a. Check ground circuit of front power window main switch terminal 5. b. Check power window relay ground circuit. 7. Check front power window main switch.

Trouble Diagnoses (Cont'd)

Symptom	Possible cause	Repair order
Driver side power window cannot be operated but other windows can be operated.	1. Driver side power window regulator circuit 2. Driver side power window regulator 3. Front power window main switch	1. Check harness between front power window main switch and driver side power window regulator for open or short circuit. 2. Check driver side power window regulator. 3. Check front power window main switch.
One or more power windows except driver's side window cannot be operated.	1. Power window switches 2. Power window regulators 3. Power window main switch 4. Power window circuit	1. Check power window switch. 2. Check power window regulator. 3. Check power window main switch. 4. Check the following. a. Check harness between the rear power window switch (LH and RH) terminal 5 and power window relay terminal 5. b. Check harnesses between power window main switch and power window switch for open/short circuit. c. Check harnesses between power window switch and power window regulator for open/short circuit.
Power windows except driver's side window cannot be operated using power window main switch but can be operated by power window switch.	1. Power window main switch	1. Check front power window main switch.
Driver side power window automatic operation does not function properly.	1. Front power window main switch 2. Encoder and limit switch	1. Check front power window main switch. 2. Check encoder and limit switch. (EL-259)
Retained power operation does not operate properly.	1. RAP signal circuit 2. Driver or passenger side door switch circuit 3. Smart entrance control unit	1. Check RAP signal. a. (With CONSULT-II) ● Check RAP signal with CONSULT-II. Use "WORK SUPPORT" mode, "RETAINED PWR" in "SMART ENTRANCE". (Refer to EL-256.) ● Check RAP signal with CONSULT-II. Use "ACTIVE TEST" mode, "RETAINED PWR" in "SMART ENTRANCE". (Refer to EL-256.) If NG, go to the step b. below. b. Verify 12 positive voltage from smart entrance control unit is present at terminal 2 of power window relay: ● Within 45 seconds after ignition switch turns off.*1 ● When front door LH and RH is closed. 2. Check harness between smart entrance control unit and driver or passenger side door switch for short circuit. Check driver or passenger side door switch ground circuit. Check driver or passenger side door switch. 3. Check smart entrance control unit. (EL-350)
Interruption detection function does not operate properly.	1. Encoder and limit switch	1. Check encoder and limit switch. (EL-259)

NOTE: *1 RAP signal's period can be changed by CONSULT-II. (EL-257)

ENCODER AND LIMIT SWITCH CHECK

=NFEL0105S01

1	CHECK DOOR WINDOW SLIDE MECHANISM

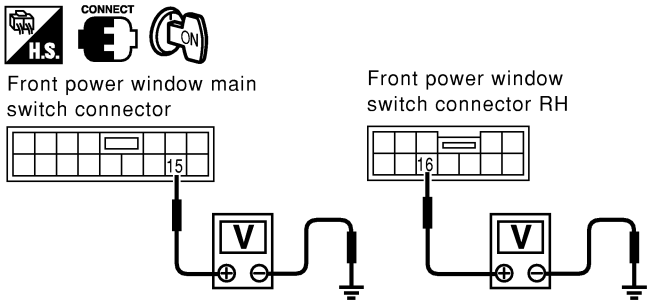
Check the following.
- Obstacles in window, glass molding, etc.
- Worn or deformed glass molding
- Door sash tilted too far inward or outward
- Door window regulator

OK or NG

OK	▶	GO TO 2.
NG	▶	Remove obstacles or repair door window slide mechanism.

2	CHECK POWER SUPPLY TO LIMIT SWITCH

Check voltage between front power window main switch harness connector D10 terminal 15 (G/W) and ground or front power window switch RH harness connector D42 terminal 16 (G/W) and ground.



Voltage: 5V

NOTE: Check voltage when front power window regulator LH or RH harness connector is disconnected.

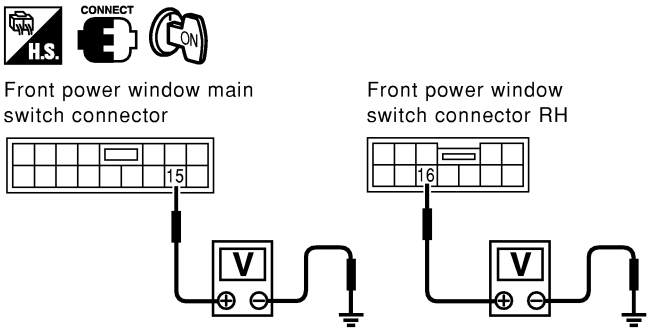
SEL418Y

OK or NG

OK	▶	GO TO 3.
NG	▶	Replace front power window main switch or front power window switch RH.

3	CHECK LIMIT SWITCH OPERATION

Check voltage between front power window main switch harness connector D10 terminal 15 (G/W) and ground or front power window switch RH harness connector D42 terminal 16 (G/W) and ground during power window closing operation.



Terminal No. (+)	Terminal No. (−)	Condition	Voltage (DCV)
15 or 16	Ground	Approx. 15 mm (0.59 in)-below the full closed position to full closed position	Approx. 5
		Other positions	Approx. 0

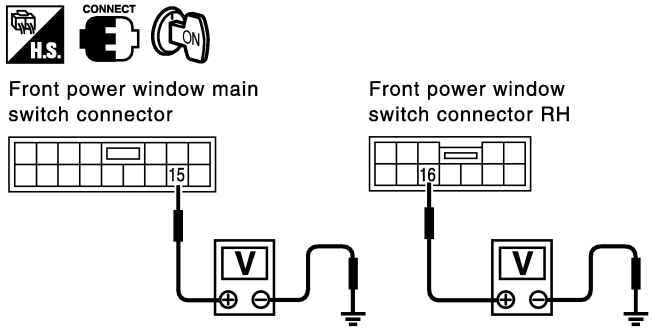
SEL419Y

OK or NG

OK	▶	GO TO 5.
NG	▶	GO TO 4.

4	RESET LIMIT SWITCH

Reset limit switch. Refer to BT-22, "Front Door Glass Limit Switch Reset". Then check voltage between front power window main switch harness connector D10 terminal 15 (G/W) and ground or front power window switch RH harness connector D42 terminal 16 (G/W) and ground during power window closing operation at least ten times.



Terminal No. (+)	Terminal No. (–)	Condition	Voltage (DCV)
15 or 16	Ground	Approx. 15 mm (0.59 in)-below the full closed position to full closed position	Approx. 5
		Other positions	Approx. 0

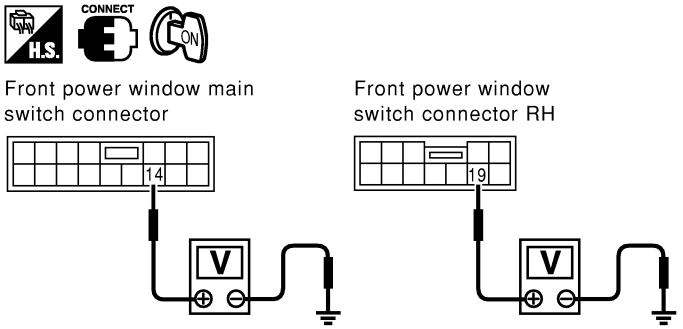
SEL420Y

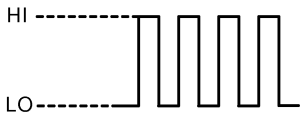
OK or NG

OK	▶	GO TO 5.
NG	▶	Replace power window regulator motor (front driver side or passenger side).

5	CHECK ENCODER

Measure voltage between front power window main switch harness connector D10 terminal 14 (G/Y) and ground or front power window switch RH harness connector D42 terminal 19 (G/Y) and ground with oscilloscope when power window is in automatic closing operation.





HI: Approx. 5V
LO: Approx. 0V

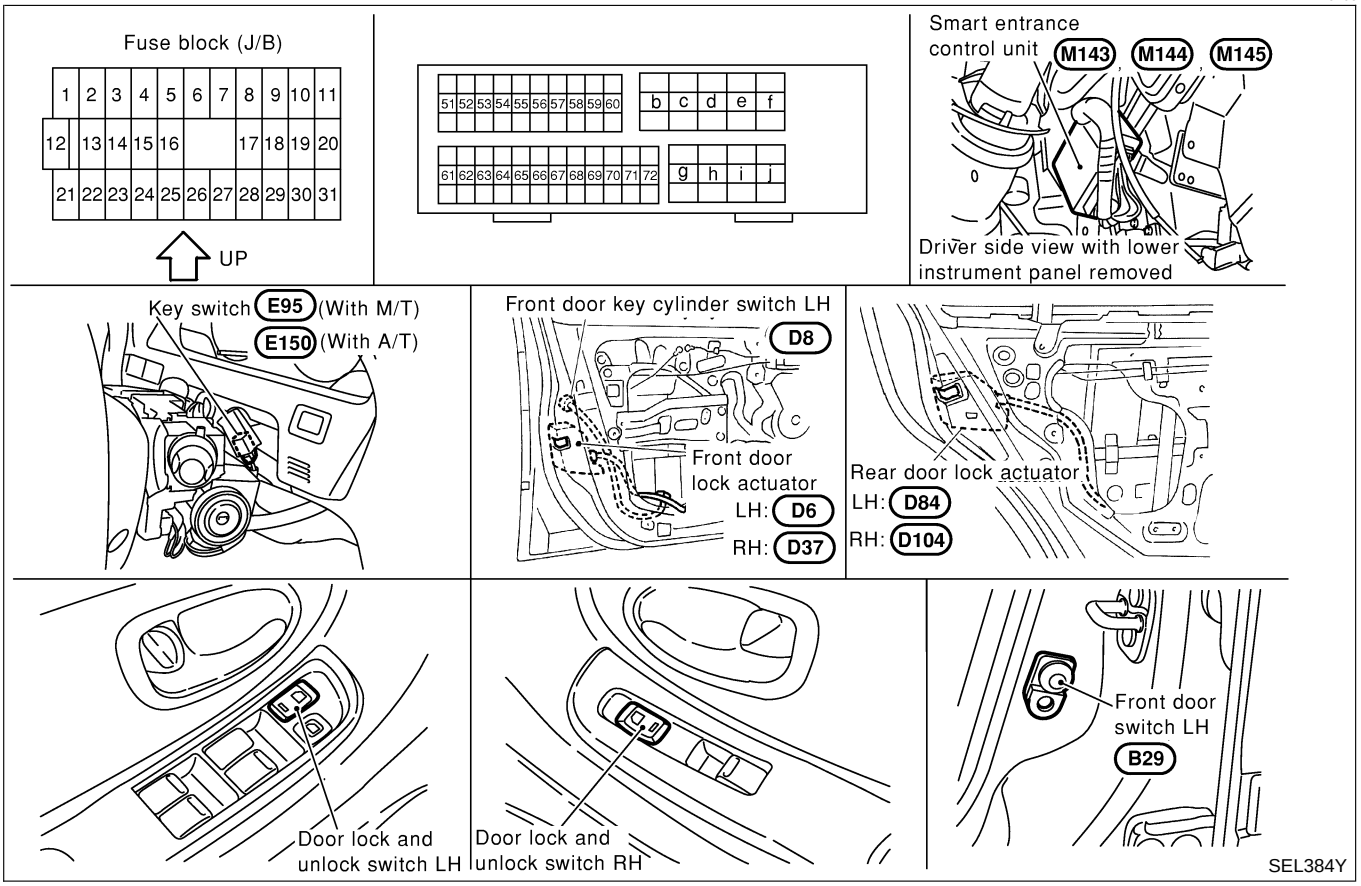
SEL421Y

OK or NG

OK	▶	Replace power window main switch.
NG	▶	Replace power window regulator motor (front driver side or passenger side).

Component Parts and Harness Connector Location

NFEL0106



System Description

NFEL0107

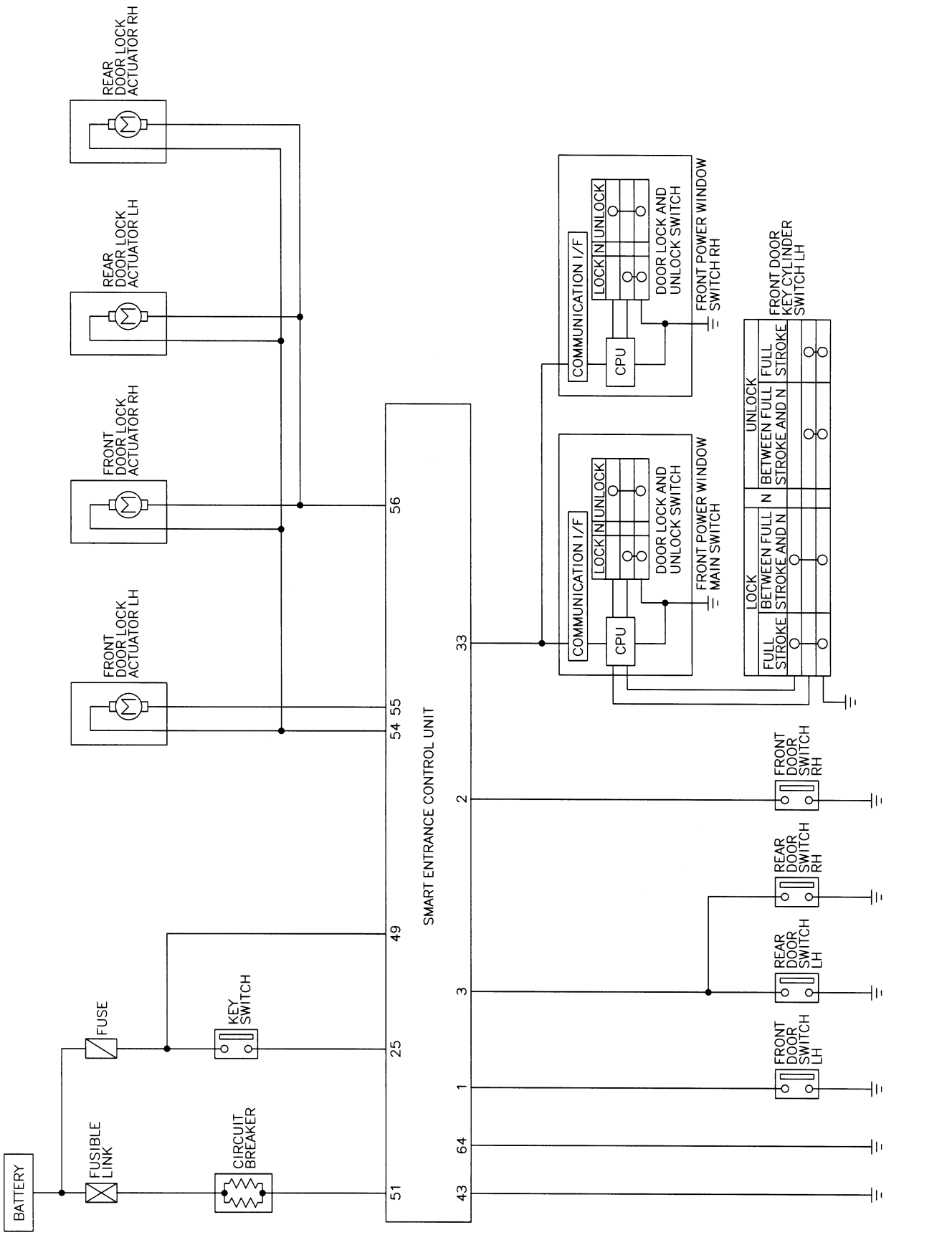
OPERATION

NFEL0107S04

- The lock/unlock switches (LH and RH) on door trim can lock and unlock all doors.
- With the door key inserted in the key cylinder on front LH, turning it to “LOCK”, will lock all doors; turning it to “UNLOCK” once unlocks the corresponding door; turning it to “UNLOCK” again within 5 seconds after the first unlock operation unlocks all of the other doors. (Signals from door key cylinder switch)
  Select unlock mode can be changed by CONSULT-II (EL-268).
- If the ignition key is in the ignition key cylinder and one or more of the doors are open, setting the lock/unlock switch to “LOCK” locks the doors once but then immediately unlocks them. Key reminder door mode can be changed by CONSULT-II (EL-268).

Schematic

NFEL0108



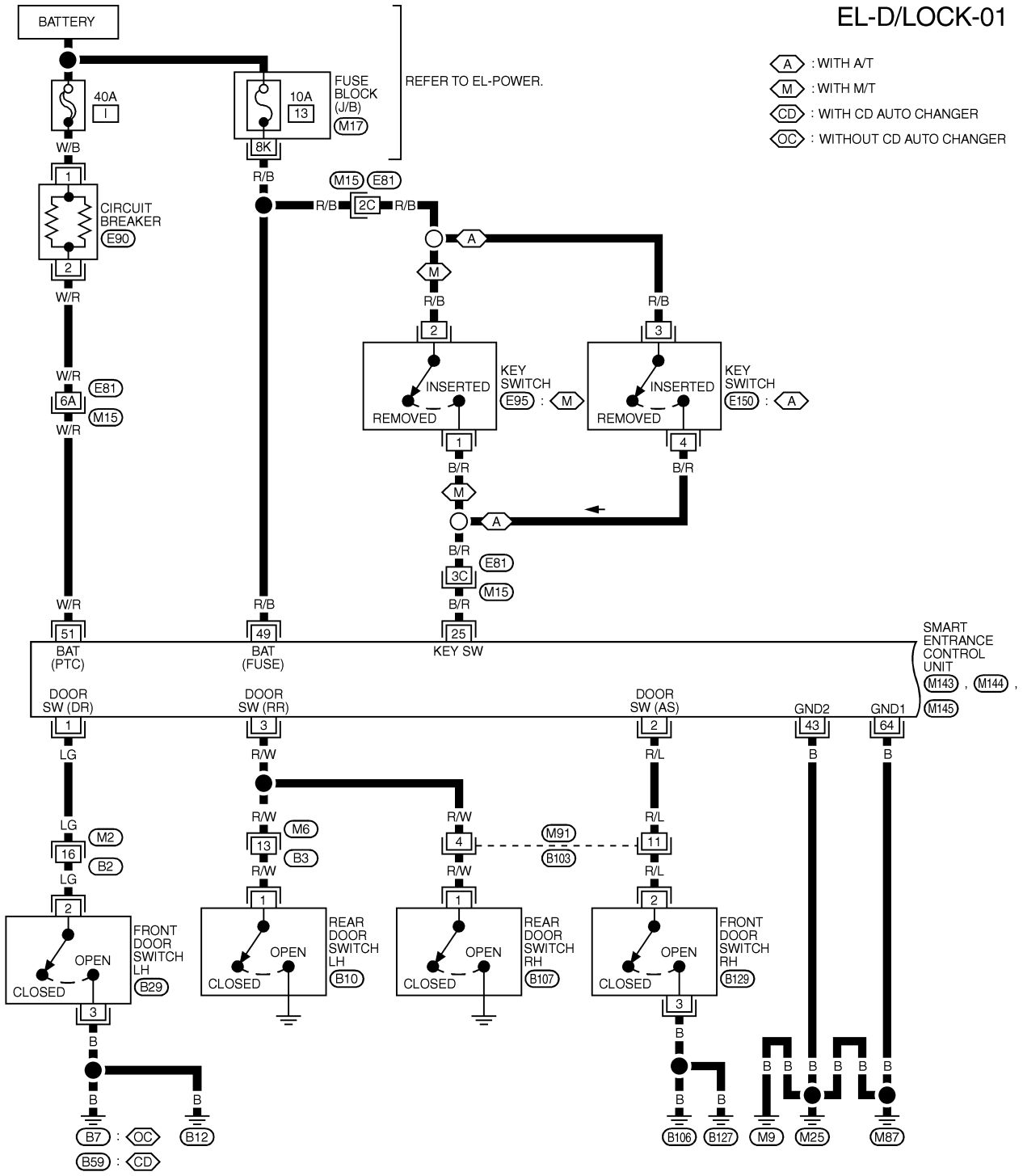
MEL175O

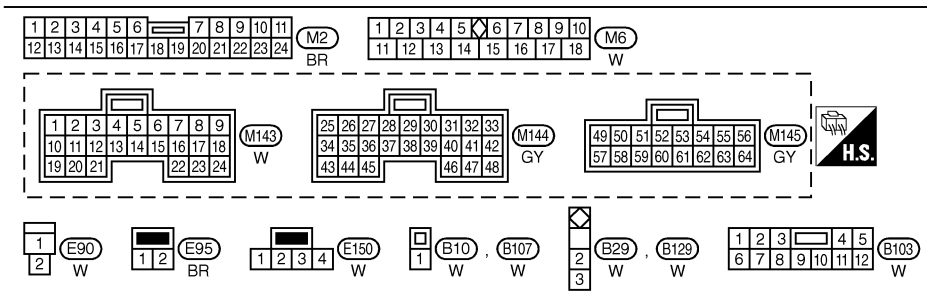
Wiring Diagram — D/LOCK —

NFEL0109

FIG. 1

NFEL0109S01





REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)
M17 -FUSE BLOCK-JUNCTION BOX (J/B)

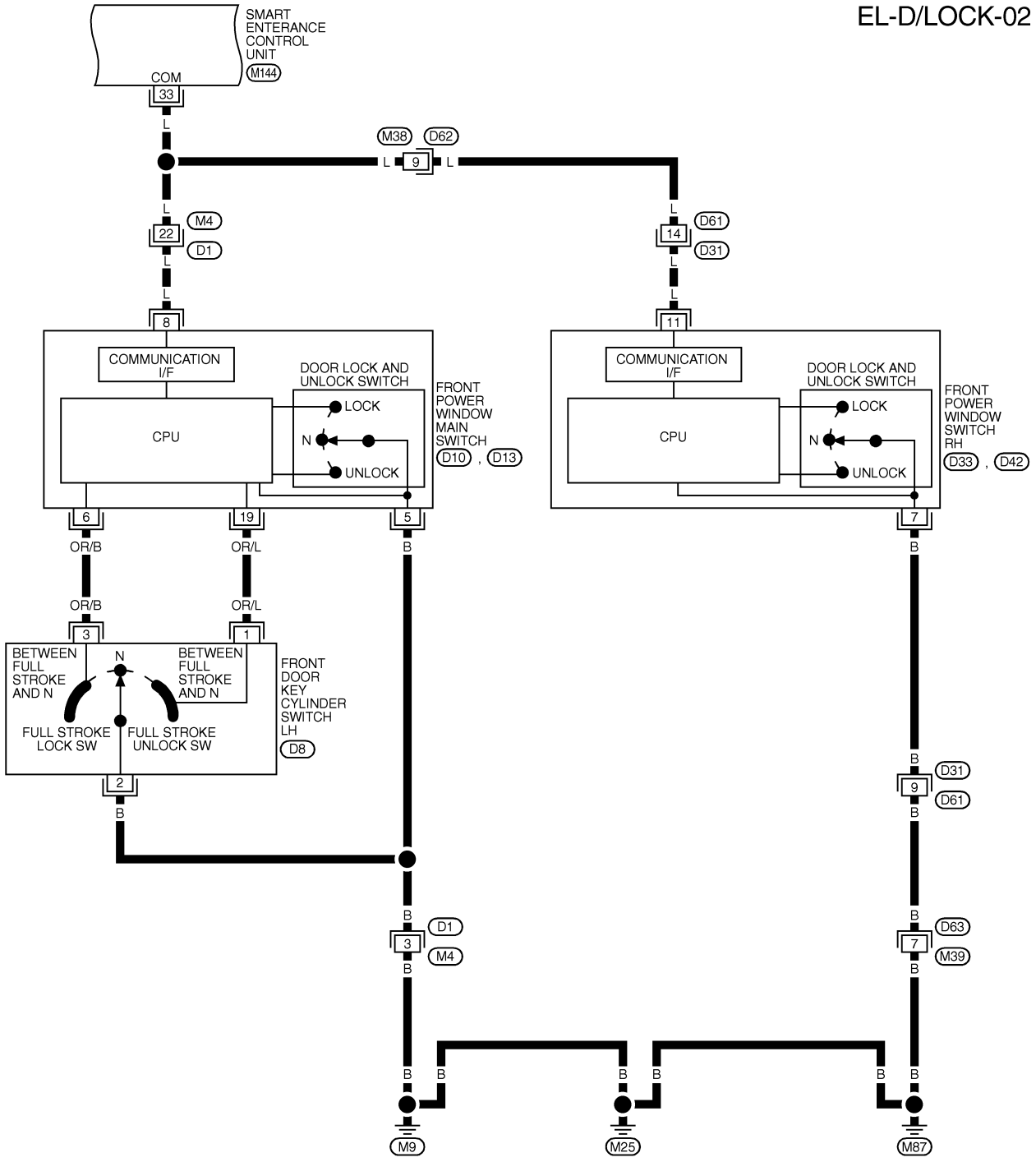
MEL176O

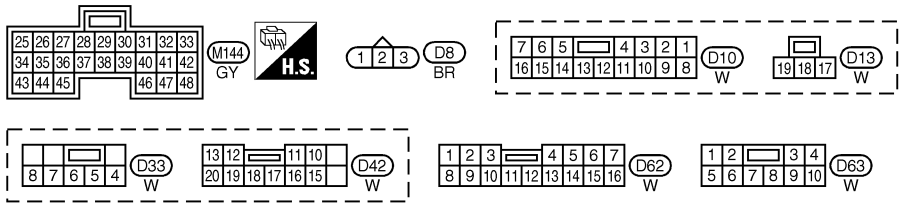
Wiring Diagram — D/LOCK — (Cont'd)

FIG. 2

NFEL0109S02

EL-D/LOCK-02





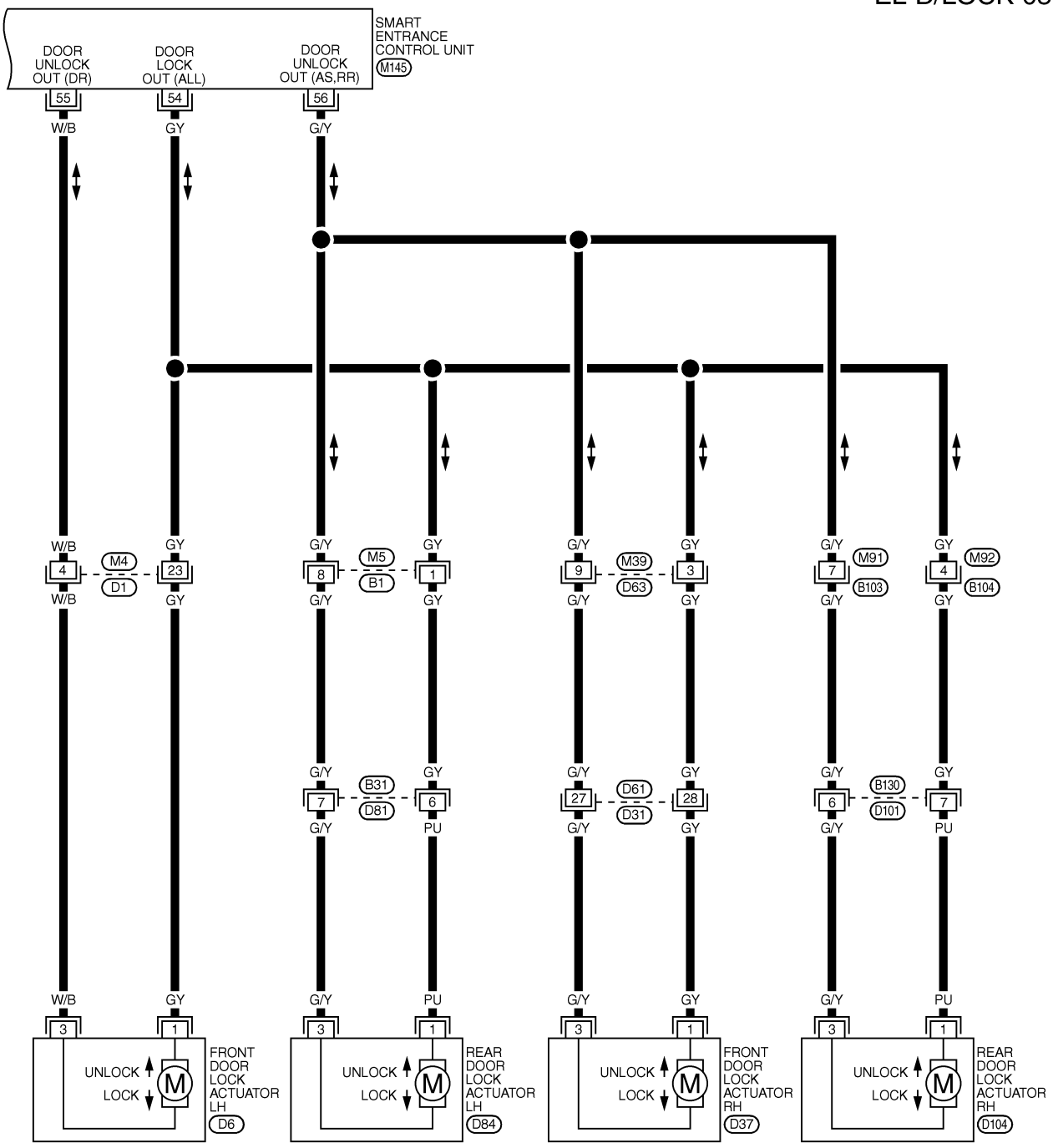
REFER TO THE FOLLOWING.
D1 , D31 -SUPER MULTIPLE JUNCTION (SMJ)

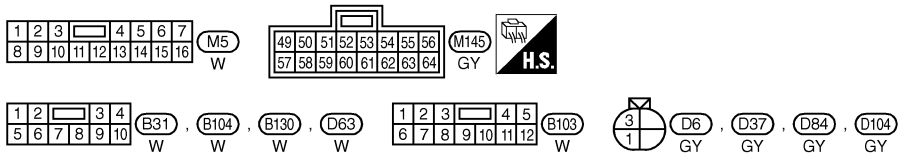
MEL177O

FIG. 3

NFEL0109S03

EL-D/LOCK-03

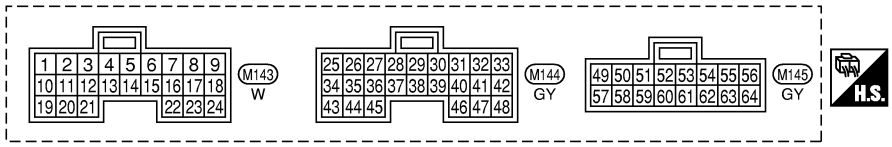




REFER TO THE FOLLOWING.
D1 , D31 -SUPER MULTIPLE JUNCTION (SMJ)

MEL178O

SMART ENTRANCE CONTROL UNIT CONNECTOR

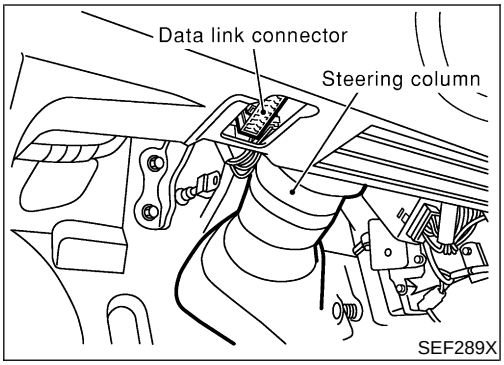


SMART ENTRANCE CONTROL UNIT TERMINALS AND REFERENCE VALUE BETWEEN EACH TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
1	LG	DRIVER DOOR SWITCH	OFF (CLOSED) → ON (OPEN)	12V → 0V
2	R/L	PASSENGER DOOR SWITCH	OFF (CLOSED) → ON (OPEN)	5V → 0V
3	R/W	REAR DOOR SWITCH	OFF (CLOSED) → ON (OPEN)	5V → 0V
25	B/R	IGNITION KEY SWITCH (INSERT)	KEY INSERTED → KEY REMOVED FROM IGN KEY CYLINDER	12V → 0V
33	L	COMMUNICATION INTERFACE	DOOR LOCK & UNLOCK SWITCHES (NEUTRAL → LOCK/UNLOCK)	*1
			FRONT DOOR KEY CYLINDER SWITCH LH (NEUTRAL → LOCK/UNLOCK)	
43	B	GROUND	–	–
49	R/B	POWER SOURCE (FUSE)	–	12V
51	W/R	POWER SOURCE (PTC)	–	12V
54	GY	DOOR LOCK ACTUATORS	DOOR LOCK & UNLOCK SWITCH (FREE → LOCK)	0V → 12V
55	W/B	DRIVER DOOR LOCK ACTUATOR	DOOR LOCK & UNLOCK SWITCH (FREE → UNLOCK)	0V → 12V
56	GY	PASSENGER AND REAR DOORS LOCK ACTUATOR	DOOR LOCK & UNLOCK SWITCH (FREE → UNLOCK)	0V → 12V
64	B	GROUND	–	–

*1: REFER TO "SMART ENTRANCE CONTROL UNIT INSPECTION TABLE" IN "SMART ENTRANCE CONTROL UNIT".

SEL590Y



SEF289X

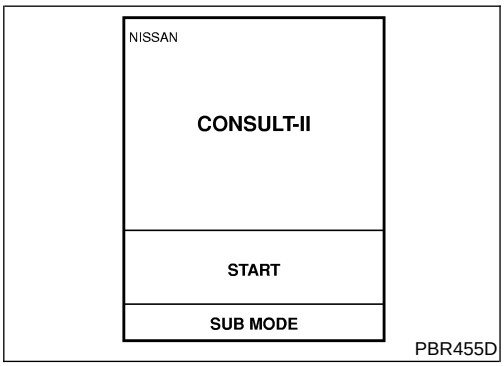
CONSULT-II Inspection Procedure

=NFEL0238

“DOOR LOCK”

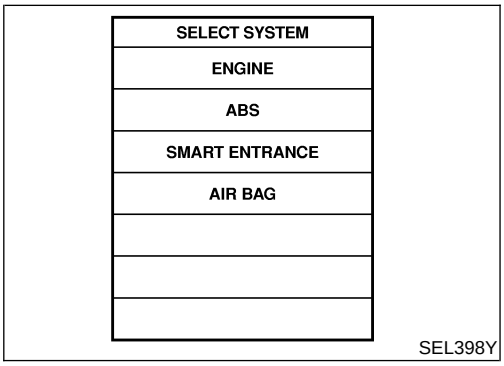
NFEL0238S01

1. Turn ignition switch “OFF”.
2. Connect “CONSULT-II” to the data link connector.



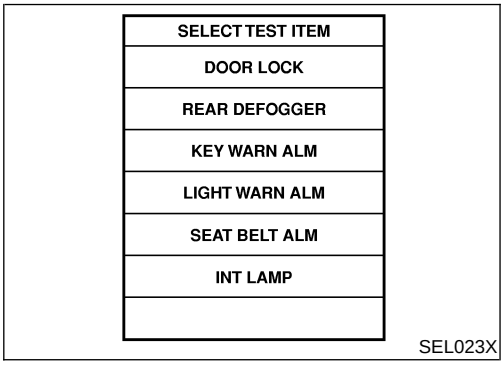
PBR455D

3. Turn ignition switch “ON”.
4. Turn “START”.



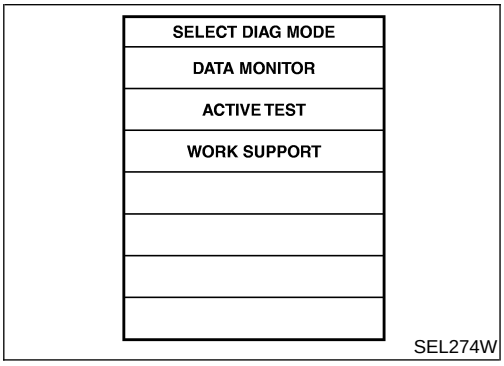
SEL398Y

5. Touch “SMART ENTRANCE”.



SEL023X

6. Touch “DOOR LOCK”.



SEL274W

7. Select diagnosis mode.
   “DATA MONITOR”, “ACTIVE TEST” and “WORK SUPPORT” are available.

CONSULT-II Application Items

NFEL0239

"DOOR LOCK"

NFEL0239S01

Data Monitor

NFEL0239S0101

Monitored Item	Description
KEY ON SW	Indicates [ON/OFF] condition of key switch.
LOCK SW DR/AS	Indicates [ON/OFF] condition of lock signal from lock/unlock switch LH and RH.
DOOR SW-RR	Indicates [ON/OFF] condition of door switch (Rear).
UNLK SW DR/AS	Indicates [ON/OFF] condition of unlock signal from lock/unlock switch LH and RH.
KEY CYL LK-SW	Indicates [ON/OFF] condition of lock signal from key cylinder.
KEY CYL UN-SW	Indicates [ON/OFF] condition of unlock signal from key cylinder.
LK BUTTON/SIG	Indicates [ON/OFF] condition of lock signal from keyfob.
UN BUTTON/SIG	Indicates [ON/OFF] condition of unlock signal from keyfob.
IGN ON SW	Indicates [ON/OFF] condition of ignition switch.
DOOR SW-DR	Indicates [ON/OFF] condition of front door switch LH.
DOOR SW-AS	Indicates [ON/OFF] condition of front door switch RH.

Active Test

NFEL0239S0102

Test Item	Description
ALL D/LK MTR	This test is able to check all door lock actuators lock operation. These actuators lock when "ON" on CONSULT-II screen is touched.
DR D/UN MTR	This test is able to check front door lock actuator LH unlock operation. The actuator unlocks when "ON" on CONSULT-II screen is touched.
NON DR D/UN	This test is able to check door lock actuators (except front door lock actuator LH) unlock operation. These actuators unlock when "ON" on CONSULT-II screen is touched.

Work Support

NFEL0239S0103

Work Item	Description
DOOR LOCK-UNLOCK SET	Select unlock mode can be changed in this mode. Selects ON-OFF of select unlock mode.
ANTI-LOCK OUT SET	Key reminder door mode can be changed in this mode. Selects ON-OFF of key reminder door mode.

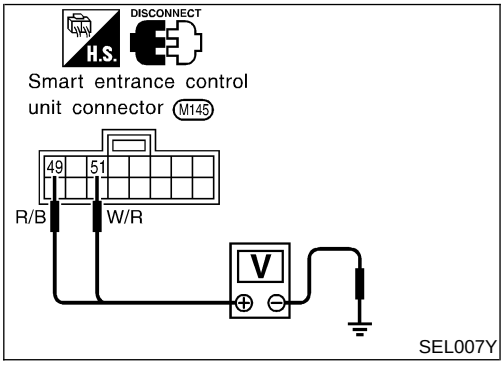
Trouble Diagnoses

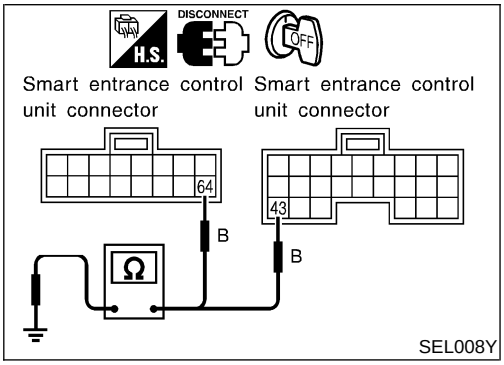
SYMPTOM CHART

=NFEL0193

NFEL0193S01

REFERENCE PAGE (EL-)	269	270	271	273	274	275
SYMPTOM	MAIN POWER SUPPLY AND GROUND CIRCUIT CHECK	DOOR SWITCH CHECK	KEY SWITCH (INSERT) CHECK	DOOR LOCK/UNLOCK SWITCH CHECK	FRONT DOOR KEY CYLINDER SWITCH CHECK	DOOR LOCK ACTUATOR CHECK
Key reminder door system does not operate properly.	X	X	X			X
Specific door lock actuator does not operate.	X					X
Power door lock does not operate with door lock and unlock switch (LH and RH) on door trim.	X			X		
Power door lock does not operate with front door key cylinder operation.	X				X	





MAIN POWER SUPPLY AND GROUND CIRCUIT CHECK

NFEL0193S02

Main Power Supply Circuit Check

NFEL0193S0201

Terminals		Ignition switch		
(+)	(–)	OFF	ACC	ON
49	Ground	Battery voltage	Battery voltage	Battery voltage
51				

Ground Circuit Check

NFEL0193S0202

Terminals	Continuity
43 - Ground	Yes
64 - Ground	Yes

DOOR SWITCH CHECK

=NFEL0193S03

1 CHECK DOOR SWITCHES INPUT SIGNAL

With CONSULT-II

Check door switches ("DOOR SW-DR", "DOOR SW-AS", "DOOR SW-RR") in "DATA MONITOR" mode with CONSULT-II.

DATA MONITOR	
MONITOR	
DOOR SW-RR	OFF
DOOR SW-DR	OFF
DOOR SW-AS	OFF

When any doors are open:
DOOR SW-DR ON
DOOR SW-AS ON
DOOR SW-RR ON

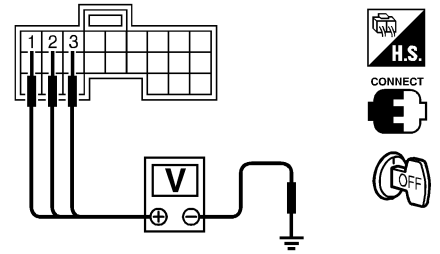
When any doors are closed:
DOOR SW-DR OFF
DOOR SW-AS OFF
DOOR SW-RR OFF

SEL009Y

Without CONSULT-II

Check voltage between smart entrance control unit harness connector M143 terminals 1 (LG), 2 (R/L) or 3 (R/W) and ground.

Smart entrance control unit connector



	Terminals (+)	Terminals (–)	Condition	Voltage [V]
Front LH door switch	1	Ground	Open	0
			Closed	Approx. 5
Front RH door switch	2	Ground	Open	0
			Closed	Approx. 5
Rear door switches	3	Ground	Open	0
			Closed	Approx. 5

SEL010Y

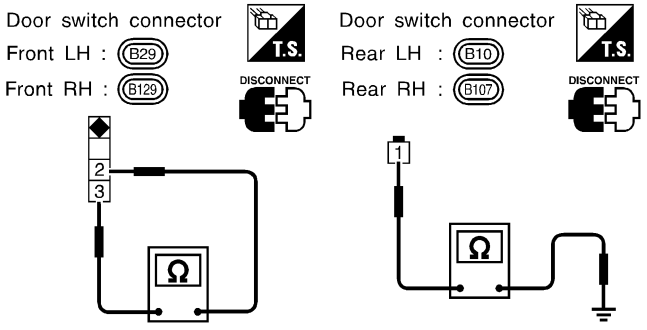
Refer to wiring diagram in EL-263.

OK or NG

OK	▶	Door switch is OK.
NG	▶	GO TO 2.

2 CHECK DOOR SWITCHES

1. Disconnect door switch harness connector.
2. Check continuity between door switch connector terminals.



	Terminals	Condition	Continuity
Front door switches	2 - 3	Closed	No
		Open	Yes
Rear door switches	1 - Ground	Closed	No
		Open	Yes

SEL192W

OK or NG

OK	▶	**Check the following.** ● Door switch ground circuit or door switch ground condition ● Harness for open or short between smart entrance control unit and door switch
NG	▶	Replace door switch.

KEY SWITCH (INSERT) CHECK

=NFEL0193S04

1 **CHECK KEY SWITCH INPUT SIGNAL**

With CONSULT-II

Check key switch ("KEY ON SW") in "DATA MONITOR" mode with CONSULT-II.

DATA MONITOR	
MONITOR	
KEY ON SW	ON

When key is inserted to ignition key cylinder:

KEY ON SW ON

When key is removed from ignition key cylinder:

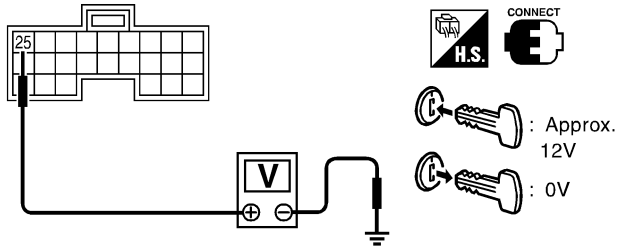
KEY ON SW OFF

SEL315W

Without CONSULT-II

Check voltage between smart entrance control unit harness connector M144 terminal 25 (B/R) and ground.

Smart entrance control unit connector



Voltage [V]:

Condition of key switch: Key is inserted.

Approx. 12

Condition of key switch: Key is removed.

0

SEL011Y

Refer to wiring diagram in EL-263.

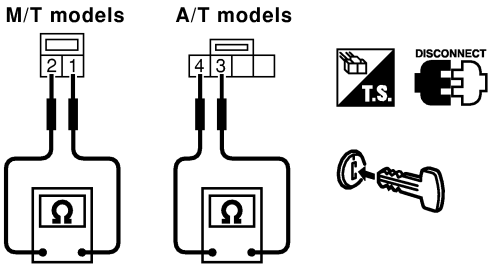
OK or NG

OK	▶	Key switch is OK.
NG	▶	GO TO 2.

2	CHECK KEY SWITCH (INSERT)

Check the following.
- Continuity between key switch harness connector E95 terminals 1 and 2. (M/T models)
- Continuity between key switch harness connector E150 terminals 3 and 4. (A/T models)

Key switch connector



Continuity:
Condition of key switch: Key is inserted.
Yes
Condition of key switch: Key is removed.
No

SEL614Y

OK or NG

OK	▶	**Check the following.** ● 10A fuse [No. 13, located in fuse block (J/B)] ● Harness for open or short between key switch and fuse ● Harness for open or short between smart entrance control unit and key switch
NG	▶	Replace key switch.

DOOR LOCK/UNLOCK SWITCH CHECK

=NFEL0193S05

1 **CHECK DOOR LOCK/UNLOCK SWITCH INPUT SIGNAL**

With CONSULT-II

Check door lock/unlock switch ("LOCK SW DR/AS"/"UNLK SW DR/AS") in "DATA MONITOR" mode with CONSULT-II.

DATA MONITOR	
MONITOR	
LOCK SW DR/AS	OFF
UNLK SW DR/AS	OFF

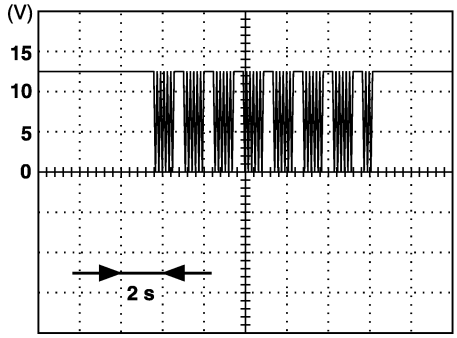
When lock/unlock switch is turned to LOCK:
LOCK SW DR/AS ON

When lock/unlock switch is turned to UNLOCK:
UNLK SW DR/AS ON

SEL341W

Without CONSULT-II

1. Remove key from ignition switch.
2. Check the signal between smart entrance control unit harness connector M144 terminal 33 (L) and ground with oscilloscope when door lock/unlock switch is turned "LOCK" or "UNLOCK".
3. Make sure signals which are shown in the figure below can be detected during 10 sec. just after door lock/unlock switch is turned "LOCK" or "UNLOCK".



Voltage:
12V → 9V (10 sec.) measurement by analog circuit tester.

SEL396Y

Refer to wiring diagram in EL-264.

OK or NG

OK	▶	Door lock/unlock switch is OK.
NG	▶	**Check the following.** ● Ground circuit for each front power window switch ● Harness for open or short between each front power window switch and smart entrance control unit connector If above systems are normal, replace the front power window switch.

FRONT DOOR KEY CYLINDER SWITCH CHECK

=NFEL0193S06

1	CHECK DOOR KEY CYLINDER SWITCH INPUT SIGNAL (LOCK/UNLOCK SIGNAL)

With CONSULT-II

Check front door key cylinder switch ("KEY CYL LK-SW"/"KEY CYL UN-SW") in "DATA MONITOR" mode with CONSULT-II.

DATA MONITOR	
MONITOR	
KEY CYL LK-SW	OFF
KEY CYL UN-SW	OFF

When key inserted in front key cylinder is turned to LOCK:

KEY CYL LK-SW ON

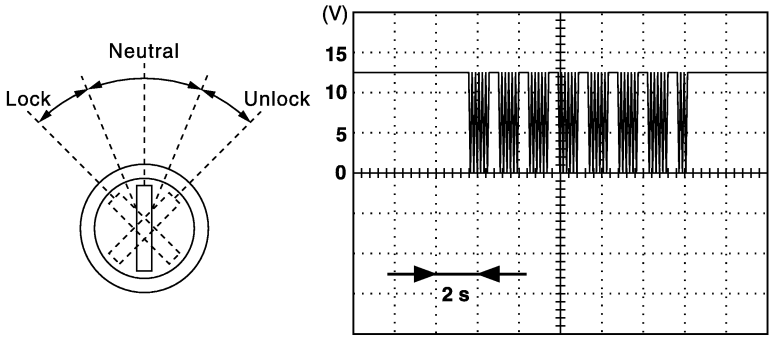
When key inserted in front key cylinder is turned to UNLOCK:

KEY CYL UN-SW ON

SEL342W

Without CONSULT-II

1. Check the signal between smart entrance control unit harness connector M144 terminal 33 (L) and ground with oscilloscope when key inserted in front key cylinder is turned "LOCK" or "UNLOCK".
2. Make sure signals which are shown in the figure below can be detected during 10 sec. just after key is turned "LOCK" or "UNLOCK".



Voltage:

12V → 9V (10 sec.) measurement by analog circuit tester.

SEL397Y

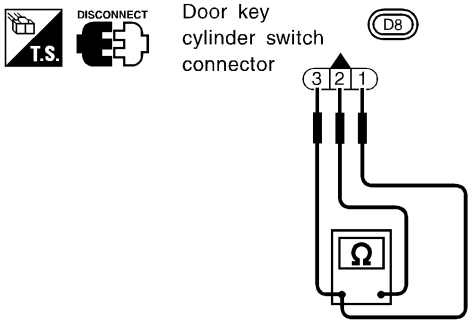
Refer to wiring diagram in EL-264.

OK or NG

OK	▶	Door key cylinder switch is OK.
NG	▶	GO TO 2.

2	CHECK DOOR KEY CYLINDER SWITCH

1. Disconnect door key cylinder switch harness connector.
2. Check continuity between door key cylinder switch terminals.



① : Door unlock switch terminal
② : Ground terminal
③ : Door lock switch terminal

Terminals	Key position	Continuity
③ - ②	Neutral/Unlock	No
	Lock	Yes
① - ②	Neutral/Lock	No
	Unlock	Yes

SEL034X

OK or NG

OK	▶	**Check the following.** ● Door key cylinder switch ground circuit ● Harness for open or short between front power window main switch and door key cylinder switch If above systems are normal, replace the front power window main switch.
NG	▶	Replace door key cylinder switch.

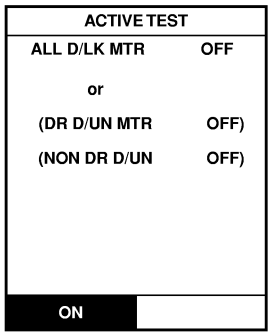
DOOR LOCK ACTUATOR CHECK

NFEL0193S08

1	CHECK DOOR LOCK ACTUATOR OPERATION

With CONSULT-II

1. Select "ACTIVE TEST" in "DOOR LOCK" with CONSULT-II.
2. Select "ALL D/LK MTR" and touch "ON".
3. Then, select "DR D/UN MTR" and touch "ON".
4. Select "NON DR D/UN" and touch "ON".



Door lock motor should operate.

SEL343W

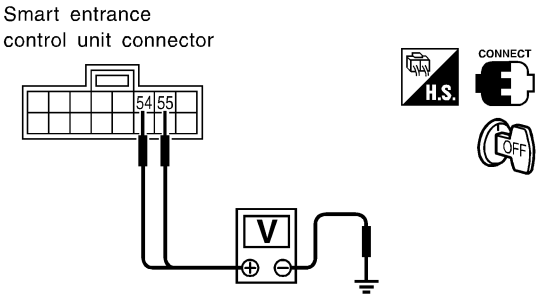
NOTE:
If CONSULT-II is not available, skip this procedure and go to the next step.

OK or NG

OK	▶	Door lock actuator is OK.
NG	▶	GO TO 2.

2	CHECK DOOR LOCK ACTUATOR CIRCUIT

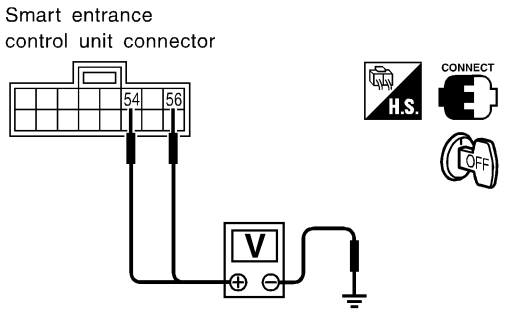
- Door lock actuator front LH
  Check voltage between smart entrance control unit harness connector M145 terminal 54 (GY), 55 (W/B) and ground.



Door lock/unlock switch condition	Terminal No. (+)	Terminal No. (–)	Voltage V
Lock	54	Ground	Approx. 12
Unlock	55	Ground	

SEL014Y

- Door lock actuator front RH and rear
  Check voltage between smart entrance control unit harness connector M145 terminal 54 (GY), 56 (G/Y) and ground.



Door lock/unlock switch condition	Terminal No. (+)	Terminal No. (–)	Voltage V
Lock	54	Ground	Approx. 12
Unlock	56	Ground	

SEL015Y

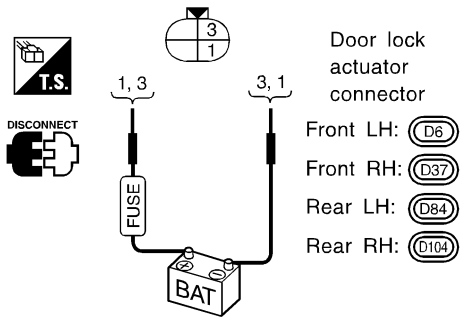
Refer to wiring diagram in EL-265.

OK or NG

OK	▶	GO TO 3.
NG	▶	Replace smart entrance control unit. (Before replacing the control unit, perform "DOOR LOCK/UNLOCK SWITCH CHECK".)

3	CHECK DOOR LOCK ACTUATOR

1. Disconnect door lock actuator harness connector.
2. Apply 12V direct current to door lock actuator and check operation.



Door lock actuator operation:
Terminals between (+): 1 and (–): 3
Unlocked → Locked
Terminals between (+): 3 and (–): 1
Locked → Unlocked

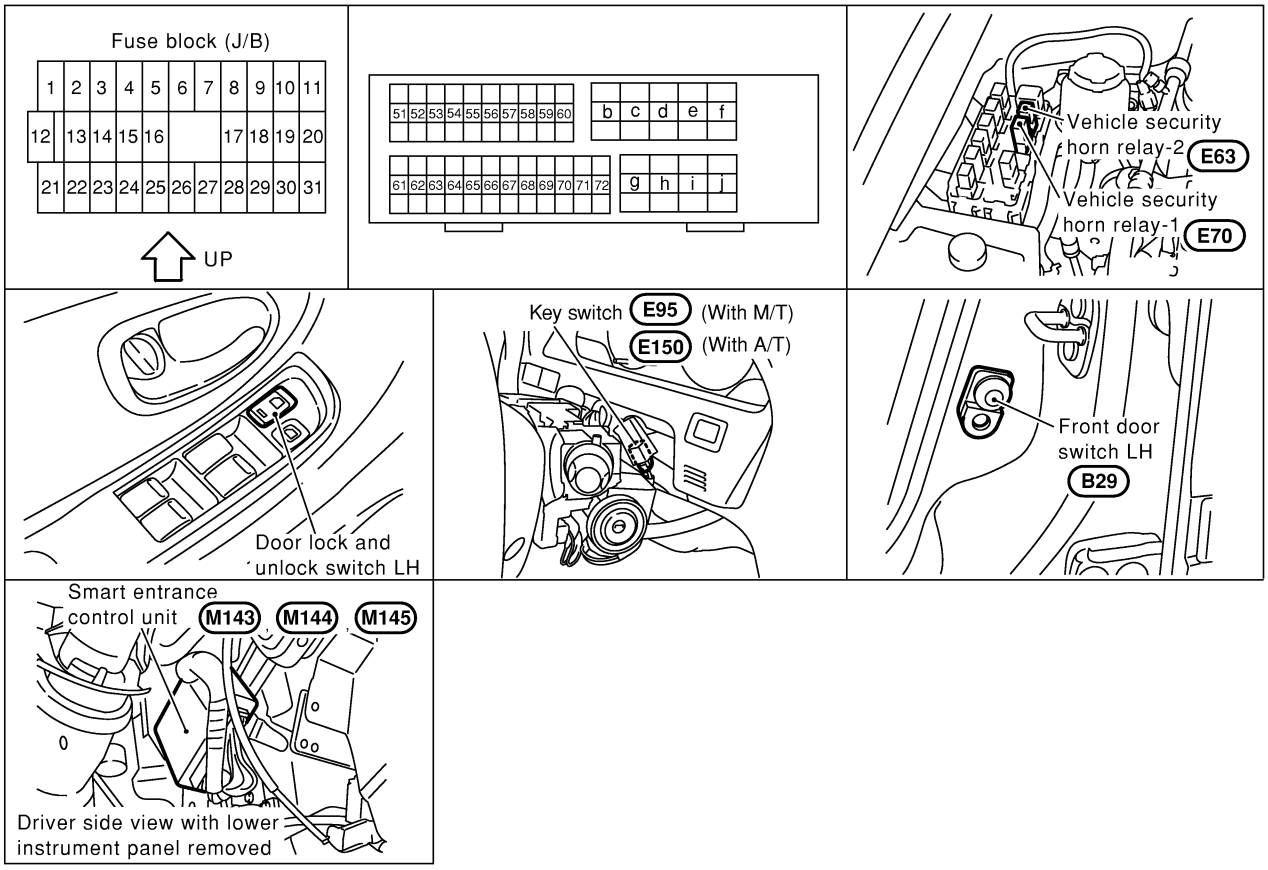
SEL222W

OK or NG

OK	▶	Check harness for open or short between smart entrance control unit connector and door lock actuator.
NG	▶	Replace door lock actuator.

Component Parts and Harness Connector Location

NFEL0111



SEL385Y

System Description

NFEL0194

NFEL0194S01

INPUTS

Power is supplied at all times

- from 40A fusible link (letter **I**, located in the fuse and fusible link box)
- to circuit breaker terminal 1
- through circuit breaker terminal 2
- to smart entrance control unit terminal 51
- to smart entrance control unit terminal 49 and
- to key switch terminal 2 (M/T models) or 3 (A/T models)
- through 10A fuse [No. 13, located in the fuse block (J/B)].

When the key switch is ON (ignition key is inserted in key cylinder), power is supplied

- through key switch terminal 1 (M/T models) or 4 (A/T models)
- to smart entrance control unit terminal 25.

When the front door switch LH is ON (door is OPEN), ground is supplied

- to smart entrance control unit terminal 1
- through front door switch LH terminal 2
- to front door switch LH terminal 3
- through body grounds B7 (without CD auto changer) or B59 (with CD auto changer) and B12.

When the front door switch RH is ON (door is OPEN), ground is supplied

- to smart entrance control unit terminal 2

- through front door switch RH terminal 2, and
- to front door switch RH terminal 3
- through body grounds B106 and B127.

When the rear door switches are ON (door is OPEN), ground is supplied

- to smart entrance control unit terminal 3
- through rear door switches terminal 1
- to rear door switches case grounds.

When door lock/unlock switch of front power window main switch is LOCK/UNLOCK, ground is supplied

- to smart entrance control unit terminal 33
- through front power window main switch terminals 8 and 5, and
- through body grounds M9, M25 and M87.

Keyfob signal is inputted to smart entrance control unit (The antenna of the system is combined with smart entrance control unit).
The remote keyless entry system controls operation of the

- power door lock
- auto door lock
- trunk lid opener
- interior lamp
- panic alarm
- hazard and horn reminder
- power window opener

OPERATED PROCEDURE

NFEL0194S02

Power Door Lock Operation

NFEL0194S0201

Smart entrance control unit receives a LOCK signal from keyfob. Smart entrance control unit locks all doors with input of LOCK signal from keyfob.
When an UNLOCK signal is sent from keyfob once, driver's door will be unlocked.
Then, if an UNLOCK signal is sent from keyfob again within 5 seconds, all other door will be unlocked.
Select unlock mode can be changed by CONSULT-II (EL-288).

Auto Door Lock Operation

NFEL0194S0206

Auto lock function signal is sent for operation when any of the following signals are not sent within 5 minutes after the unlock signal is sent from the keyfob:

- when door switch is turned ON for open.
- when the ignition switch is turned ON.
- when the lock signal is sent from the keyfob.

Auto door lock mode can be changed by CONSULT-II (EL-288).

Hazard and Horn Reminder

NFEL0194S0202

Power is supplied at all times

- to vehicle security horn relay-1 terminals 1 and 3, and
- to vehicle security horn relay-2 terminal 1
- through 10A fuse (No. 61, located in the fusible link and fuse box), and
- to horn relay terminal 2
- through 10A fuse (No. 57, located in the fusible link and fuse box)

When smart entrance control unit receives LOCK or UNLOCK signal from keyfob with all doors closed, ground is supplied

- to vehicle security horn relay-2 terminal 2
- through smart entrance control unit terminal 42

Vehicle security horn relay-2 is then energized

- to horn relay terminal 1, and
- to vehicle security horn relay-1 terminal 2
- through vehicle security horn relay-2 terminals 5 and 3, and
- through body ground E11, E22 and E53

- to smart entrance control unit terminals 47 and 48 from hazard warning lamp system.

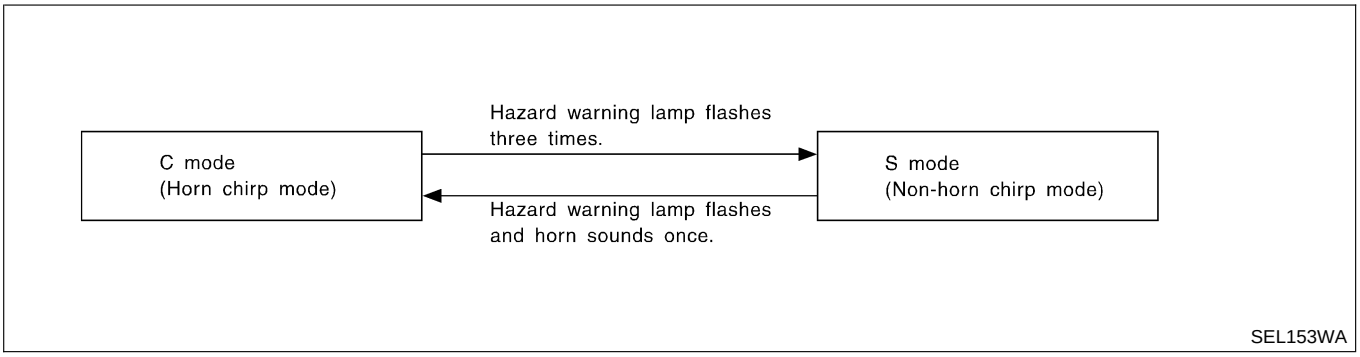
Vehicle security horn relay-1 and horn relay are now energized, and hazard warning lamp flashes and horn sounds as a reminder.
The hazard and horn reminder has six steps.

Operating function of hazard and horn reminder

	Lock		Unlock	
	Hazard warning lamp flash	Horn sound	Hazard warning lamp flash	Horn sound
C MODE	Twice	Once	Once	—
S MODE	Twice	—	—	—
MODE 3	—	—	—	—
MODE 4	Twice	—	Once	—
MODE 5	Twice	Once	—	—
MODE 6	—	Once	Once	—

How to change hazard and horn reminder mode

With CONSULT-II
Hazard and horn reminder can be changed by CONSULT-II (EL-288).
Without CONSULT-II
When LOCK and UNLOCK signals are sent from the keyfob for more than 2 seconds at the same time, the hazard and horn reminder mode is changed and hazard warning lamp flashes and horn sounds as follows:



NOTE:
Reminder mode setting cannot be changed without CONSULT-II for MODES 3,4, 5, and 6. However, C and S MODES can be changed without CONSULT-II.

Interior Lamp Operation

NFEL0194S0203

When the following input signals are both supplied:

- door switch CLOSED (when all the doors are closed);
- driver's door LOCKED;

remote keyless entry system turns on interior lamp and key hole illumination (for 30 seconds) with input of UNLOCK signal from keyfob.
For detailed description, refer to "INTERIOR, STEP, SPOT, VANITY MIRROR AND TRUNK ROOM LAMPS" (EL-92).

Panic Alarm Operation

NFEL0194S0204

When key switch is OFF (when ignition key is not inserted in key cylinder), remote keyless entry system turns on and off horn and headlamp intermittently with input of PANIC ALARM signal from keyfob.
The alarm automatically turns off after 25 seconds or when smart entrance control unit receives any signal from keyfob.
For detailed description, refer to "VEHICLE SECURITY SYSTEM" (EL-312).
The panic alarm button's pressing time on keyfob can be changed by CONSULT-II (EL-288).

Trunk Lid Opener Operation

NFEL0194S0205

Power is supplied at all times

- through 15A fuse [No. 3, located in the fuse block (J/B)]
- to trunk lid opener actuator terminal 2.

When a TRUNK OPEN signal is sent with key OFF (ignition key removed from key cylinder) from keyfob, ground is supplied

- to trunk lid opener actuator terminal 1
- through smart entrance control unit terminal 63.

Then power and ground are supplied, trunk lid opener actuator opens trunk lid.
The trunk lid opener button's pressing time on keyfob can be changed by CONSULT-II (EL-288).

Power Window Opener Operation

NFEL0194S0207

The front power windows open when the unlock button on keyfob is activated and kept pressed for more than 3 seconds with the ignition key OFF. The windows keep opening if the unlock button is continuously pressed. The power window opening stops when the following operations are carried out:

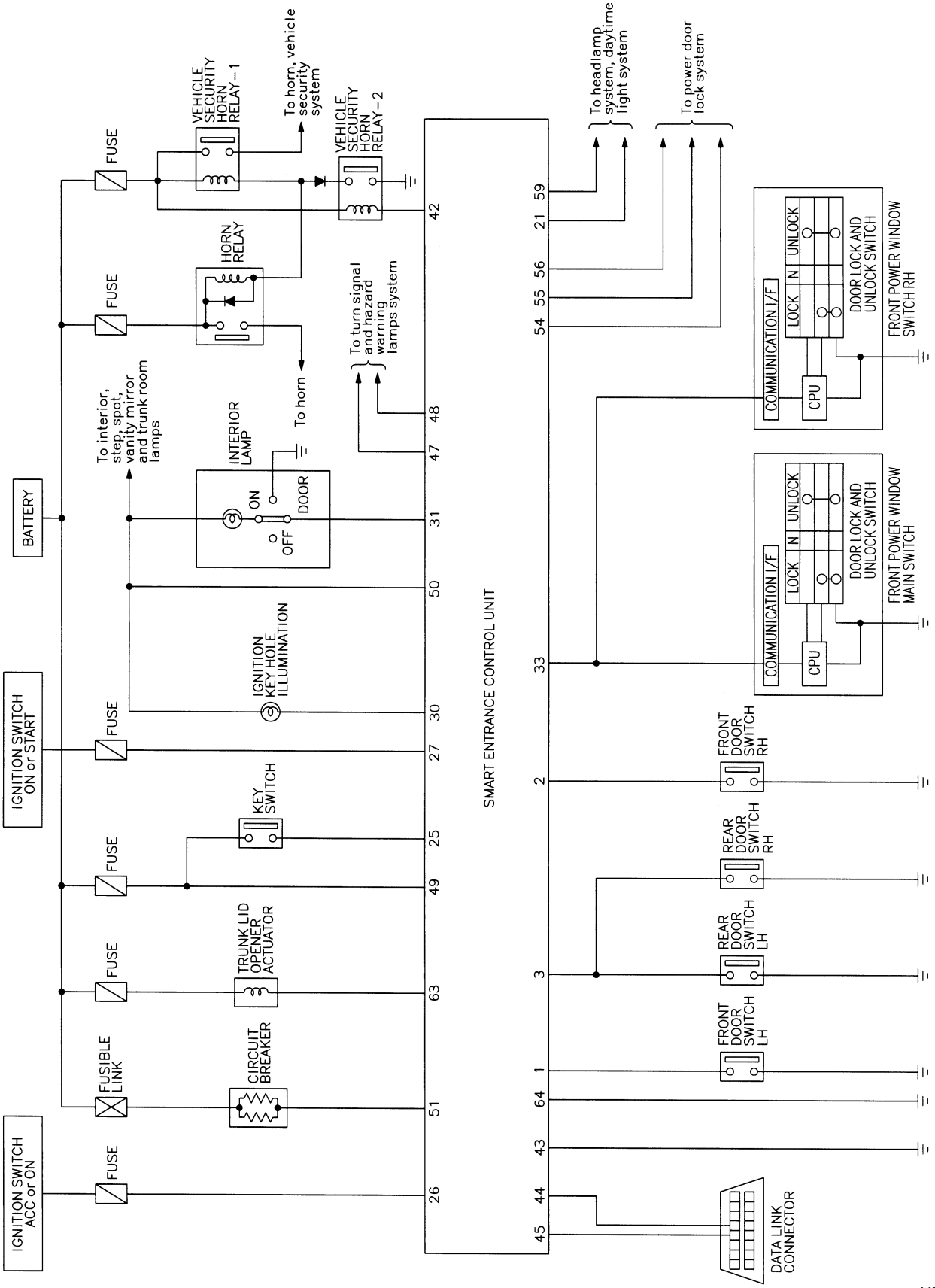
- When the unlock button is kept pressed more than 15 seconds.
- When the ignition switch is turned ON while the power window opening is operated.
- When the unlock button is released.

The unlock button's pressing time can be changed by CONSULT-II (EL-288).
Door Lock/Unlock and front power window down signal is supplied

- through smart entrance control unit terminal 33
- to front power window main switch terminal 8 and
- to front power window switch RH terminal 11.

Schematic

NFEL0171



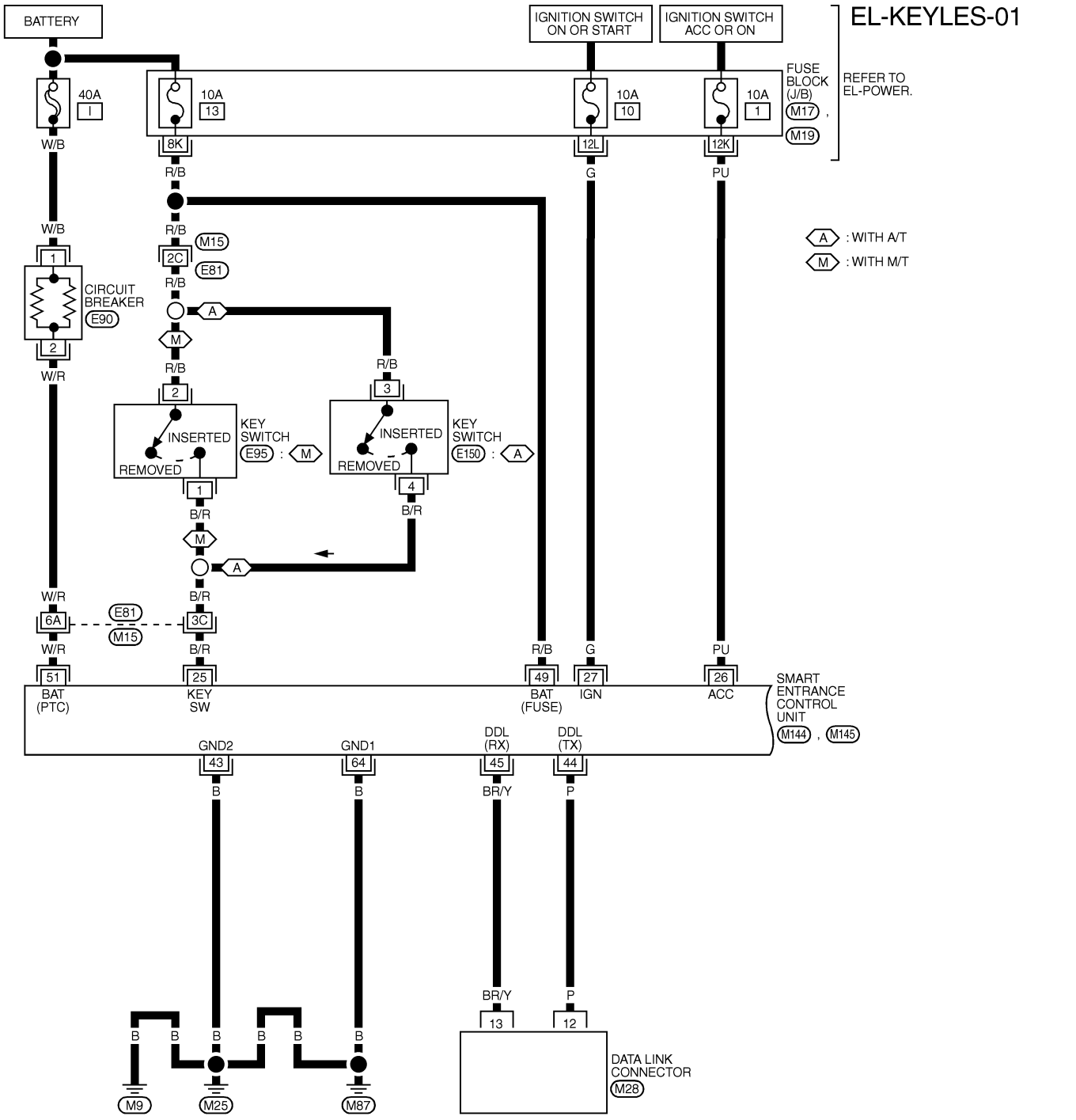
MEL179O

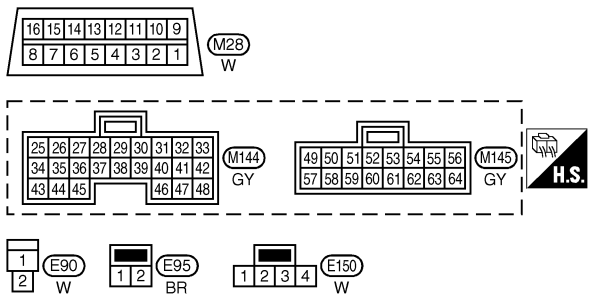
Wiring Diagram — KEYLES —

NFEL0114

FIG. 1

NFEL0114S01



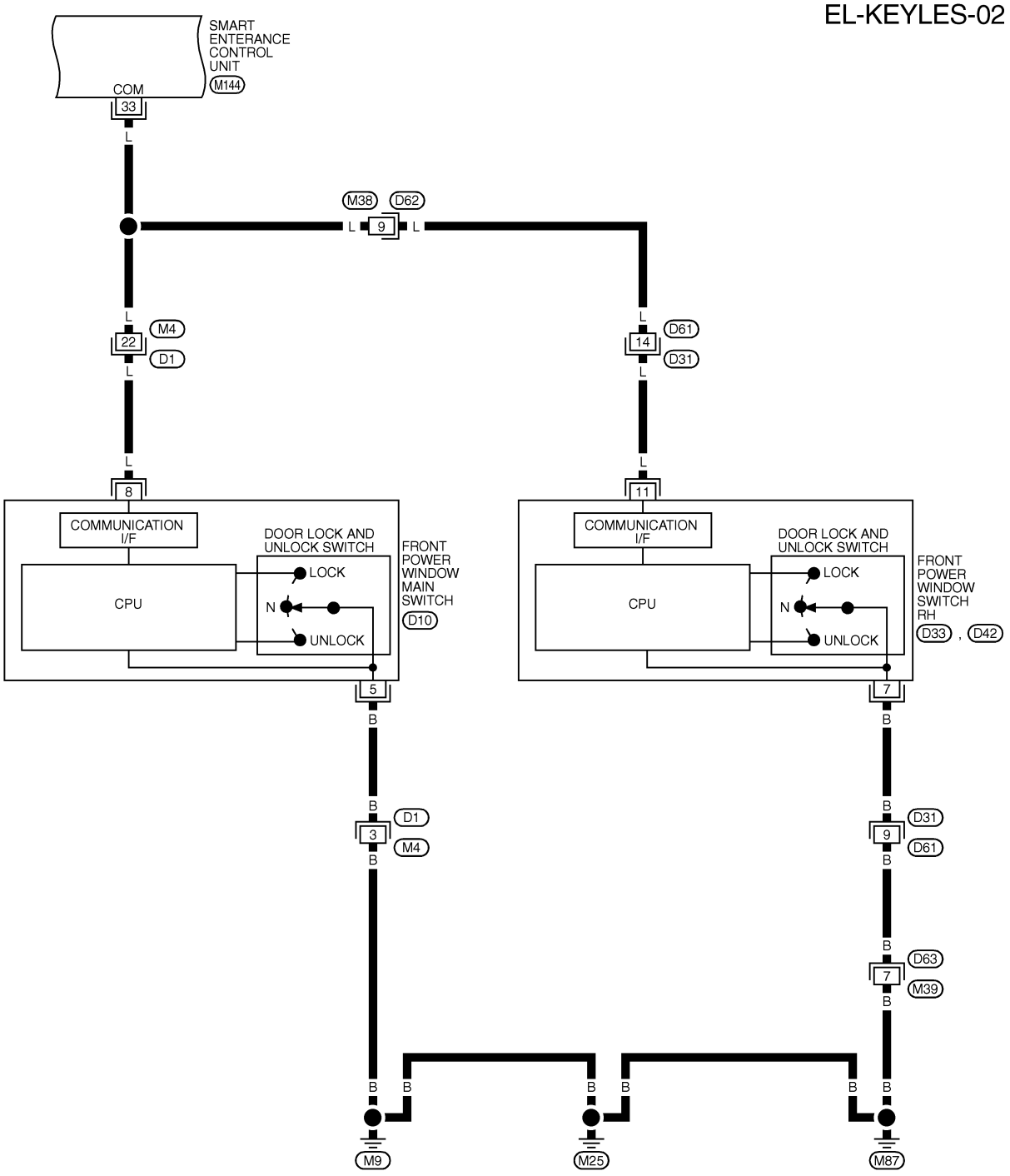


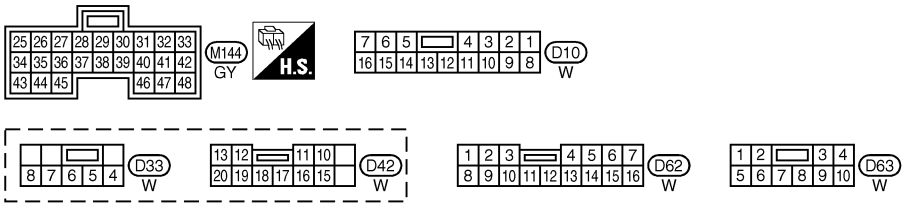
REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)
M17 , M19 -FUSE BLOCK-JUNCTION BOX (J/B)

MEL180O

FIG. 2

NFEL0114S02



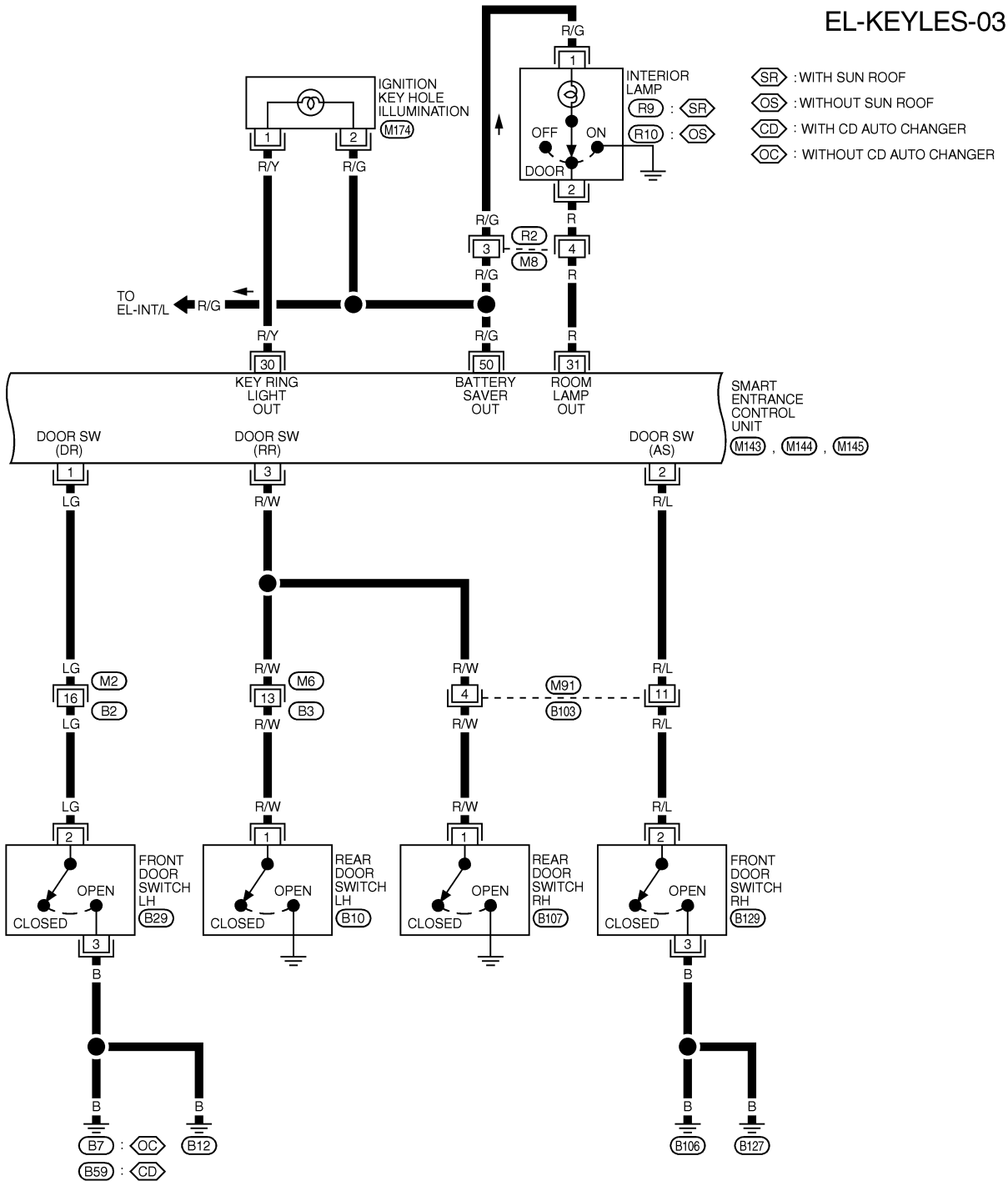


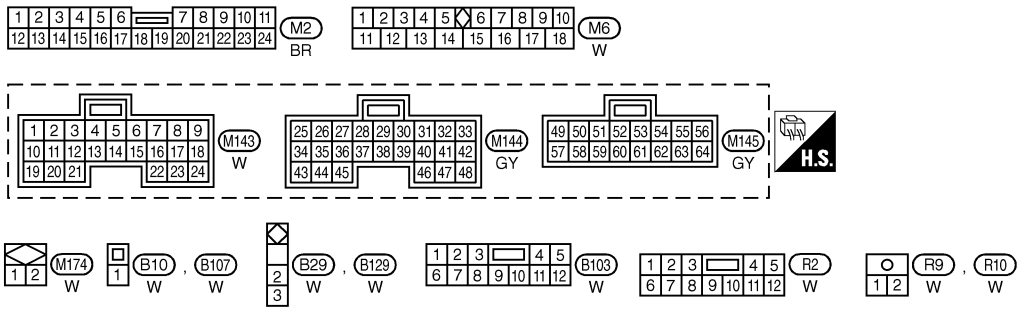
REFER TO THE FOLLOWING.
D1 , D31 -SUPER MULTIPLE JUNCTION (SMJ)

MEL752P

FIG. 3

NFEL0114S05

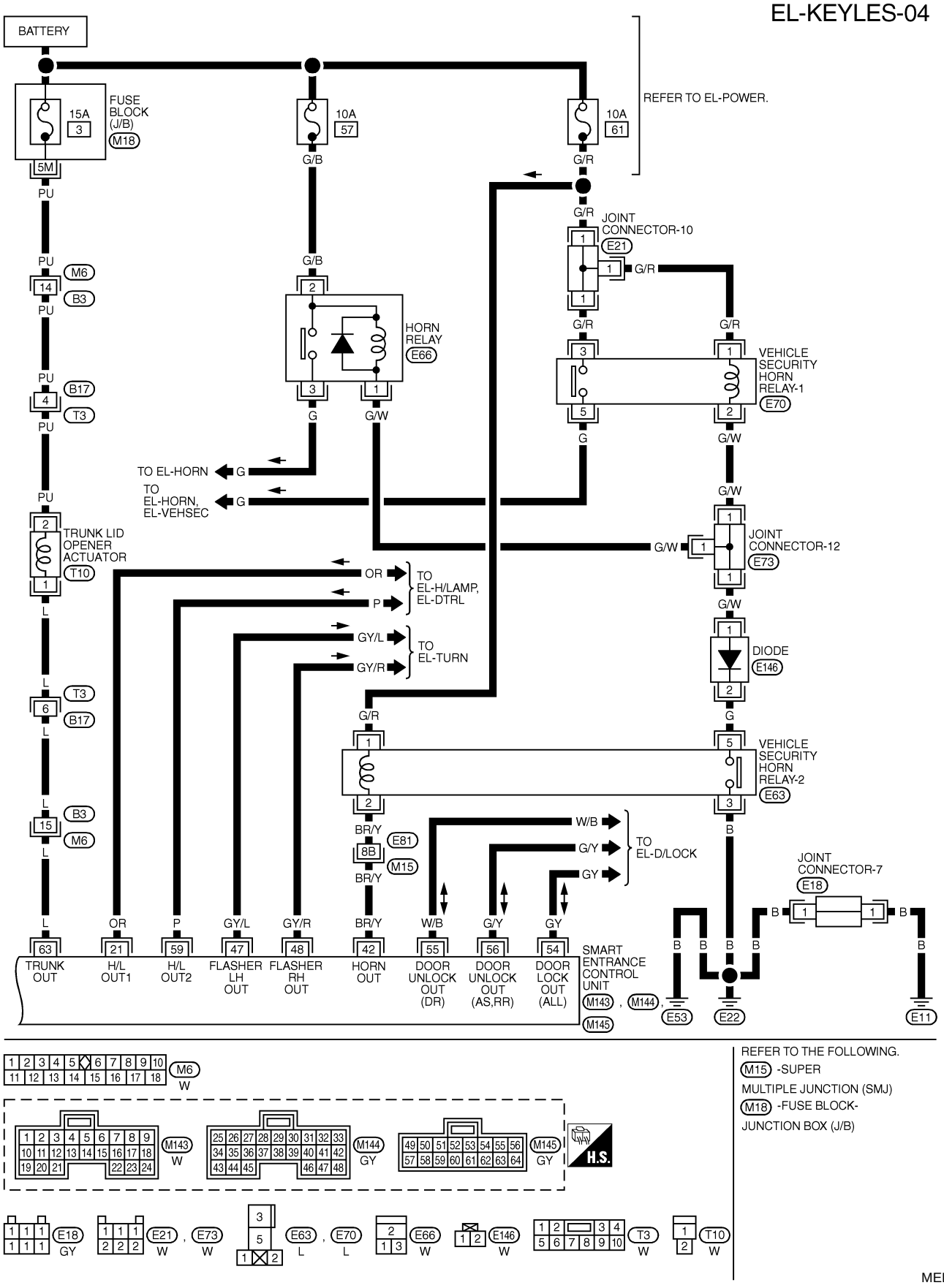




MEL134O

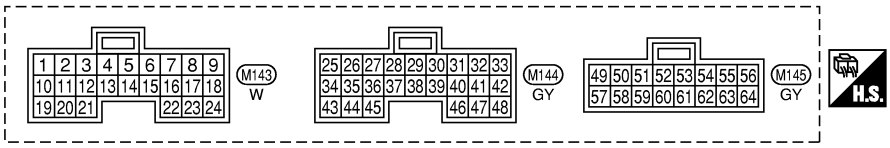
FIG. 4

NFEL0114S06



MEL181O

SMART ENTRANCE CONTROL UNIT CONNECTOR

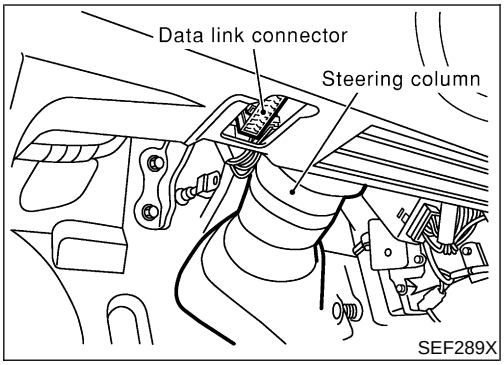


SMART ENTRANCE CONTROL UNIT TERMINALS AND REFERENCE VALUE BETWEEN EACH TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION			DATA (DC)
1	LG	DRIVER DOOR SWITCH	OFF (CLOSED) → ON (OPEN)			12V → 0V
2	R/L	PASSENGER DOOR SWITCH	OFF (CLOSED) → ON (OPEN)			5V → 0V
3	R/W	REAR DOOR SWITCH	OFF (CLOSED) → ON (OPEN)			5V → 0V
21	OR	HEADLAMP LH RELAY	IGNITION SWITCH (WITH LIGHTING SWITCH 2ND)	ON OR START → OFF	MORE THAN 5 MINUTES	12V
					WITHIN 5 MINUTES	0V
				ON OR START		0V
			HEADLAMPS ILLUMINATE BY AUTO LIGHT CONTROL			0V
25	B/R	IGNITION KEY SWITCH (INSERT)	KEY INSERTED → KEY REMOVED FROM IGN KEY CYLINDER			12V → 0V
26	PU	IGNITION SWITCH (ACC)	"ACC" POSITION			12V
27	G	IGNITION SWITCH (ON)	IGNITION SWITCH IS IN "ON" POSITION			12V
30	R/Y	IGNITION KEYHOLE ILLUMINATION	WHEN DOORS ARE UNLOCKED USING KEYFOB (OFF → UNLOCK)			12V → 0V
31	R	INTERIOR LAMP	WHEN DOORS ARE LOCKED USING KEYFOB (UNLOCK → LOCK WITH LAMP SWITCH IN "DOOR" POSITION)			0V → 12V
33	L	COMMUNICATION INTERFACE	DOOR LOCK & UNLOCK SWITCHES (NEUTRAL → LOCK/UNLOCK)			*1
			FRONT DOOR KEY CYLINDER SWITCH LH (NEUTRAL → LOCK/UNLOCK)			
42	BR/Y	VEHICLE SECURITY HORN RELAY	WHEN PANIC ALARM IS OPERATED USING KEYFOB (ON → OFF)			12V → 0V
43	B	GROUND	–			–
47	GY/L	LH TURN SIGNAL LAMP	WHEN DOOR LOCK OR UNLOCK IS OPERATED USING KEYFOB (ON → OFF)			12V → 0V
48	GY/R	RH TURN SIGNAL LAMP	WHEN DOOR LOCK OR UNLOCK IS OPERATED USING KEYFOB (ON → OFF)			12V → 0V
49	R/B	POWER SOURCE (FUSE)	–			12V
50	R/G	BATTERY SAVER (INTERIOR LAMP)	BATTERY SAVER DOSE OPERATE → DOES NOT OPERATE (ON → OFF)			12V → 0V
51	W/R	POWER SOURCE (PTC)	–			12V
54	GY	DOOR LOCK ACTUATORS	DOOR LOCK & UNLOCK SWITCH (FREE → LOCK)			0V → 12V
55	W/B	DRIVER DOOR LOCK ACTUATORS	DOOR LOCK & UNLOCK SWITCH (FREE → UNLOCK)			0V → 12V
56	GY	PASSENGER AND REAR DOORS LOCK ACTUATOR	DOOR LOCK & UNLOCK SWITCH (FREE → UNLOCK)			0V → 12V
59	P	HEADLAMP RH RELAY	IGNITION SWITCH (WITH LIGHTING SWITCH 2ND)	ON OR START → OFF	MORE THAN 5 MINUTES	12V
					WITHIN 5 MINUTES	0V
				ON OR START		0V
			HEADLAMPS ILLUMINATE BY AUTO LIGHT CONTROL (OPERATE → NOT OPERATE)			LESS THAN 1V → 12V
63	L	TRUNK LID OPENER ACTUATOR	WHEN TRUNK LID OPENER ACTUATOR IS OPERATED USING KEYFOB (ON → OFF)			0V → 12V
64	B	GROUND	–			–

*1: REFER TO "SMART ENTRANCE CONTROL UNIT INSPECTION TABLE" IN "SMART ENTRANCE CONTROL UNIT".

SEL591Y



SEF289X

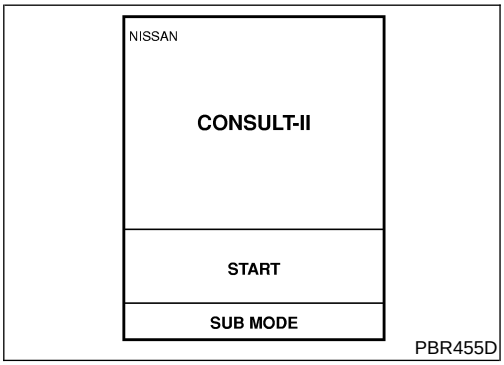
CONSULT-II Inspection Procedure

NFEL0241

"MULTI REMOTE ENT"

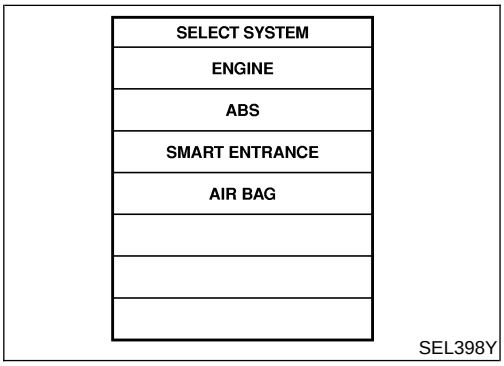
NFEL0241S01

1. Turn ignition switch "OFF".
2. Connect "CONSULT-II" to the data link connector.



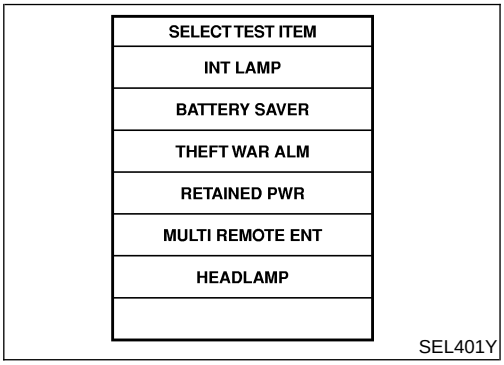
PBR455D

3. Turn ignition switch "ON".
4. Touch "START".



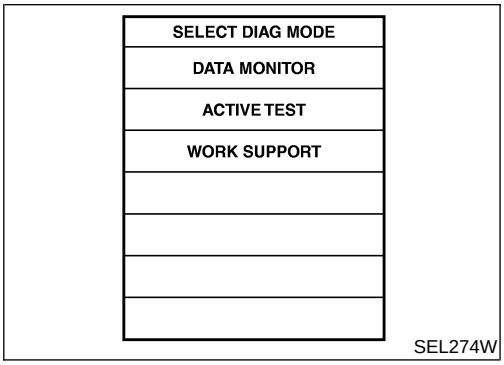
SEL398Y

5. Touch "SMART ENTRANCE".



SEL401Y

6. Touch "MULTI REMOTE ENT".



SEL274W

7. Select diagnosis mode.
   "DATA MONITOR", "ACTIVE TEST" and "WORK SUPPORT" are available.

CONSULT-II Application Items

NFEL0242

"MULTI REMOTE ENT"

NFEL0242S01

Data Monitor

NFEL0242S0101

Monitored Item	Description
IGN ON SW	Indicates [ON/OFF] condition of ignition switch in ON position.
ACC ON SW	Indicates [ON/OFF] condition of ignition switch in ACC position.
DOOR SW-RR	Indicates [ON/OFF] condition of rear door switch.
KEY ON SW	Indicates [ON/OFF] condition of key switch.
DOOR SW-DR	Indicates [ON/OFF] condition of front door switch LH.
DOOR SW-AS	Indicates [ON/OFF] condition of door switch RH.
LOCK SW DR/AS	Indicates [ON/OFF] condition of lock signal from lock/unlock switch LH and RH.
UNLK SW DR/AS	Indicates [ON/OFF] condition of unlock signal from lock/unlock switch LH and RH.
KEY CYL LK-SW	Indicates [ON/OFF] condition of lock signal from key cylinder switch.
LK BUTTON/SIG	Indicates [ON/OFF] condition of lock signal from keyfob.
UN BUTTON/SIG	Indicates [ON/OFF] condition of unlock signal from keyfob.
TRUNK BTN/SIG	Indicates [ON/OFF] condition of trunk open signal from keyfob.
PANIC BTN	Indicates [ON/OFF] condition of panic signal from keyfob.
UN BUTTON ON	Indicates [ON/OFF] condition of unlock switch form keyfob.
LK/UN BTN ON	Indicates [ON/OFF] condition of lock/unlock signal at the same time from keyfob.

Active Test

NFEL0242S0102

Test Item	Description
INT/IGN ILLUM	This test is able to check interior lamp and ignition key hole illumination operation. The interior lamp and ignition key hole illumination are turned on when "ON" on CONSULT-II screen is touched.
HAZARD	This test is able to check hazard reminder operation. The hazard lamp turns on when "ON" on CONSULT-II screen is touched.
TRUNK OUTPUT	This test is able to check trunk lid opener actuator operation. The trunk is unlocked when "ON" on CONSULT-II screen is touched.
HORN	This test is able to check panic alarm and horn reminder operations. The alarm activate for 0.5 seconds after "ON" on CONSULT-II screen is touched.
HEAD LAMP	This test is able to check headlamps panic alarm operation. The headlamp illuminates for 0.5 seconds after "ON" on CONSULT-II screen is touched.
PW REMOTE DOWN SET	This test is able to check power window open operation. The front power windows activate for 10 seconds after "ON" on CONSULT-II screen is touched.

Work Support

NFEL0242S0103

Test Item	Description
REMO CONT ID CONFIR	It can be checked whether keyfob ID code is registered or not in this mode.
REMO CONT ID REGIST	Keyfob ID code can be registered.
REMO CONT ID ERASUR	Keyfob ID code can be erased.
MULTI ANSWER BACK SET	Hazard and horn reminder mode can be changed with this mode. Selects hazard and horn reminder mode among six steps (EL-278).

Test Item	Description
AUTO LOCK SET	Auto door lock mode can be selected among the following periods: ● MODE 1 (5 min.)/MODE 2 (OFF-Mode)/MODE 3 (1 min.)
PANIC ALARM SET	The panic alarm button's pressing time on keyfob can be selected among the following periods: ● MODE 1 (0.5 sec.)/MODE 2 (OFF-Mode)/MODE 3 (1.5 sec.)
TRUNK OPENER	The trunk lid opener button's pressing time on keyfob can be selected among the following periods: ● MODE 1 (0.5 sec.)/MODE 2 (OFF-Mode)/MODE 3 (1.5 sec.)
PW DOWN SET	The unlock button's pressing time on keyfob can be selected among the following periods: ● MODE 1 (3 sec.)/MODE 2 (OFF-Mode)/MODE 3 (5 sec.)

Trouble Diagnoses

NFEL0195

SYMPTOM CHART

NFEL0195S01

NOTE:

- Always check keyfob battery before replacing keyfob.
- The panic alarm operation and trunk lid opener operation of keyfob system do not activate with the ignition key inserted in the ignition key cylinder.

Symptom	Diagnoses/service procedure	Reference page (EL-)
All function of remote keyless entry system do not operate.	1. Keyfob battery and function check	291
	2. Power supply and ground circuit for smart entrance control unit check	292
	3. Replace keyfob. Refer to ID Code Entry Procedure. NOTE: If the result of keyfob function check with CONSULT-II is OK, keyfob is not malfunctioning.	303
The new ID of keyfob cannot be entered.	1. Keyfob battery and function check	291
	2. Key switch (insert) check	295
	3. Door switch check	294
	4. Door lock/unlock switch LH check	296
	5. Power supply and ground circuit for smart entrance control unit check	292
	6. Replace keyfob. Refer to ID Code Entry Procedure. NOTE: If the result of keyfob function check with CONSULT-II is OK, keyfob is not malfunctioning.	303
Door lock or unlock does not function. (If the power door lock system does not operate manually, check power door lock system. Refer to EL-269)	1. Keyfob battery and function check	291
	2. Replace keyfob. Refer to ID Code Entry Procedure. NOTE: If the result of keyfob function check with CONSULT-II is OK, keyfob is not malfunctioning.	303

Trouble Diagnoses (Cont'd)

Symptom	Diagnoses/service procedure	Reference page (EL-)
Hazard and horn reminder does not activate properly when pressing lock or unlock button of keyfob.	1. Keyfob battery and function check	291
	2. Hazard reminder check	298
	3. Horn reminder check* *: Horn chirp can be activated or deactivated. First check the horn chirp setting. Refer to "System Description", EL-277.	299
	4. Door switch check	294
	5. Replace keyfob. Refer to ID Code Entry Procedure. NOTE: If the result of keyfob function check with CONSULT-II is OK, keyfob is not malfunctioning.	303
Interior lamp and key hole illumination operation do not activate properly.	1. Interior lamp operation check	301
	2. Key hole illumination operation check	302
	3. Door switch check	294
Panic alarm (horn and headlamp) does not activate when panic alarm button is continuously pressed.	1. Keyfob battery and function check	291
	2. Theft warning operation check. Refer to "PRELIMINARY CHECK" in "VEHICLE SECURITY SYSTEM".	324
	3. Key switch (insert) check	295
	4. Replace keyfob. Refer to ID Code Entry Procedure. NOTE: If the result of keyfob function check with CONSULT-II is OK, keyfob is not malfunctioning.	303
Trunk lid does not open when trunk opener button is continuously pressed.	1. Keyfob battery and function check	291
	2. Trunk lid opener actuator check	297
	3. Key switch (insert) check	295
	4. Replace keyfob. Refer to ID Code Entry Procedure. NOTE: If the result of keyfob function check with CONSULT-II is OK, keyfob is not malfunctioning.	303

KEYFOB BATTERY AND FUNCTION CHECK

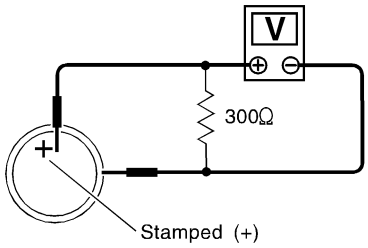
=NFEL0195S02

1	CHECK KEYFOB BATTERY

Remove battery (refer to EL-307) and measure voltage across battery positive and negative terminals, (+) and (−).

Voltage [V]:
2.5 - 3.0

NOTE:
Keyfob does not function if battery is not set correctly.



SEL237W

OK or NG

OK	▶	GO TO 2.
NG	▶	Replace battery.

2	CHECK KEYFOB FUNCTION

With CONSULT-II
Check keyfob function ("LK BUTTON/SIG", "UN BUTTON/SIG", "TRUNK BTN/SIG", "PANIC BTN", "UN BUTTON ON" and "LK/UN BTN ON") in "DATA MONITOR" mode with CONSULT-II.

DATA MONITOR	
MONITOR	
LK BUTTON/SIG	ON
UN BUTTON/SIG	ON
TRUNK BTN/SIG	ON
PANIC BTN	ON
UN BUTTON ON	ON
LK/UN BTN ON	ON

When pushing each button of keyfob, the corresponding monitor item should be turned as follows.

Condition	Monitor item	
Pushing LOCK	LK BUTTON/SIG	ON
Pushing UNLOCK	UN BUTTON/SIG	ON
Pushing TRUNK	TRUNK BTN/SIG	ON
Pushing PANIC	PANIC BTN/SIG	ON
Pushing UNLOCK	UN BUTTON ON	ON
Pushing LOCK and UNLOCK at the same time	LK/UN BTN ON	ON

SEL423Y

OK or NG

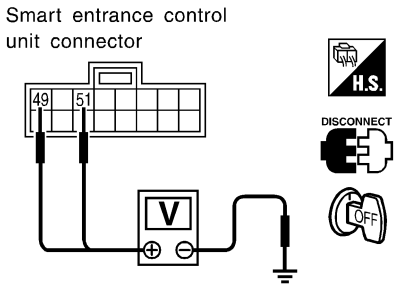
OK	▶	Keyfob is OK. Further inspection is necessary. Refer to "SYMPTOM CHART", EL-289.
NG	▶	Replace keyfob. Refer to ID Code Entry Procedure.

POWER SUPPLY AND GROUND CIRCUIT CHECK

=NFEL0195S03

1	CHECK MAIN POWER SUPPLY CIRCUIT FOR SMART ENTRANCE CONTROL UNIT

1. Disconnect smart entrance control unit harness connector.
2. Check voltage between smart entrance control unit harness connector M145 terminal 49 (R/B) or 51 (W/R) and ground.



Battery voltage should exist.

SEL018Y

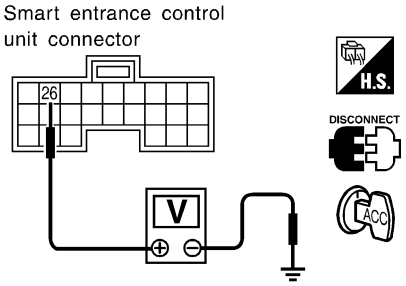
Refer to wiring diagram in EL-282.

OK or NG

OK	▶	GO TO 2.
NG	▶	**Check the following.** ● 40A fusible link (letter **I**, located in fuse and fusible link box) ● 10A fuse [No. 13, located in fuse block (J/B)] ● E90 circuit breaker ● Harness for open or short between smart entrance control unit and fuse

2	CHECK IGNITION SWITCH "ACC" CIRCUIT

1. Disconnect smart entrance control unit harness connector.
2. Check voltage between smart entrance control unit harness connector M144 terminal 26 (PU) and ground while ignition switch is "ACC".



Battery voltage should exist.

SEL019Y

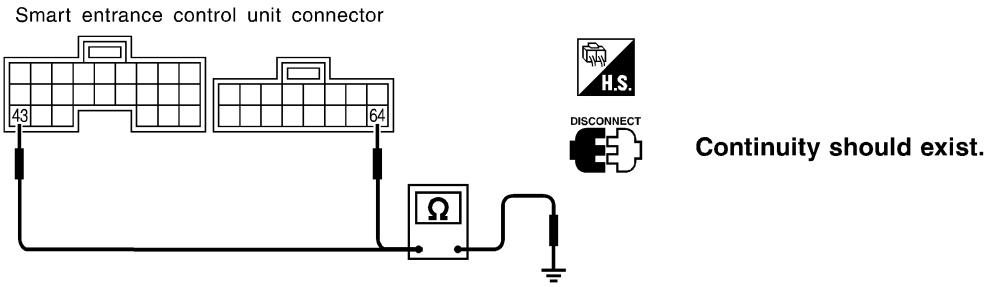
Refer to wiring diagram in EL-282.

OK or NG

OK	▶	GO TO 3.
NG	▶	**Check the following.** ● 10A fuse [No. 1, located in fuse block (J/B)] ● Harness for open or short between smart entrance control unit and fuse

3	CHECK GROUND CIRCUIT FOR SMART ENTRANCE CONTROL UNIT

Check continuity between smart entrance control unit harness connector M144 terminal 43 (B) or M145 terminal 64 (B) and ground.



Continuity should exist.

SEL020Y

Refer to wiring diagram in EL-282.

OK or NG

OK	▶	Power supply and ground circuits are OK.
NG	▶	Check ground harness.

DOOR SWITCH CHECK

=NFEL0195S04

1 CHECK DOOR SWITCH INPUT SIGNAL

With CONSULT-II

Check door switches ("DOOR SW-RR", "DOOR SW-DR" and "DOOR SW-AS") in "DATA MONITOR" mode with CONSULT-II.

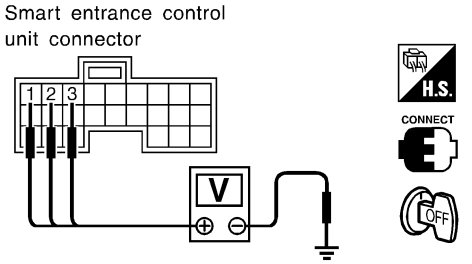
DATA MONITOR	
MONITOR	
DOOR SW-RR	OFF
DOOR SW-DR	OFF
DOOR SW-AS	OFF

	Monitor item	Condition	Condition
DOOR SW-RR	Rear doors switch	Open	ON
		Closed	OFF
DOOR SW-DR	Door switch LH	Open	ON
		Closed	OFF
DOOR SW-AS	Door switch RH	Open	ON
		Closed	OFF

SEL024Y

Without CONSULT-II

Check voltage between smart entrance control unit harness connector M143 terminals 1 (LG), 2 (R/L) or 3 (R/W) and ground.



	Terminals (+)	Terminals (–)	Condition	Voltage [V]
Front door switch LH	1	Ground	Open	0
			Closed	Approx. 12
Front door switch RH	2	Ground	Open	0
			Closed	Approx. 5
Rear door switches	3	Ground	Open	0
			Closed	Approx. 5

SEL021YC

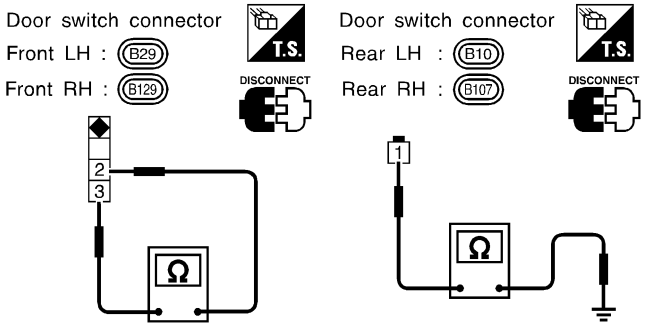
Refer to wiring diagram in EL-284.

OK or NG

OK	▶	Door switch is OK.
NG	▶	GO TO 2.

2 CHECK DOOR SWITCH

1. Disconnect door switch harness connector.
2. Check continuity between door switch terminals.



	Terminals	Condition	Continuity
Front door switches	2 - 3	Closed	No
		Open	Yes
Rear door switches	1 - Ground	Closed	No
		Open	Yes

SEL192W

OK or NG

OK	▶	**Check the following.** ● Door switch ground circuit or door switch ground condition ● Harness for open or short between smart entrance control unit and door switch
NG	▶	Replace door switch.

KEY SWITCH (INSERT) CHECK

=NFEL0195S05

1	CHECK KEY SWITCH INPUT SIGNAL

With CONSULT-II

Check key switch ("KEY ON SW") in "DATA MONITOR" mode with CONSULT-II.

DATA MONITOR	
MONITOR	
KEY ON SW	ON

When key is inserted to ignition key cylinder:

KEY ON SW ON

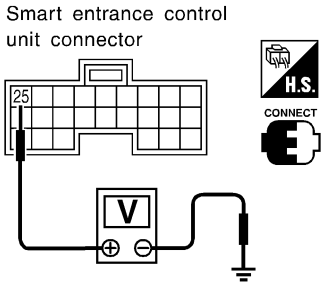
When key is removed from ignition key cylinder:

KEY ON SW OFF

SEL315W

Without CONSULT-II

Check voltage between control unit harness connector M144 terminal 25 (B/R) and ground.
Refer to wiring diagram in EL-282.



Voltage [V]:

Condition of key switch : Key is inserted.
Approx. 12
Condition of key switch : Key is removed.
0

SEL022Y

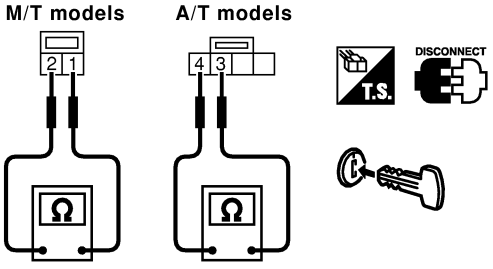
OK or NG

OK	▶	Key switch is OK.
NG	▶	GO TO 2.

2	CHECK KEY SWITCH (INSERT)

Check continuity between key switch harness connector E95 terminals 1 and 2 (M/T models) or E150 terminals 3 and 4 (A/T models).

Key switch connector



Continuity:

Condition of key switch: Key is inserted.
Yes
Condition of key switch: Key is removed.
No

SEL614Y

OK or NG

OK	▶	**Check the following.** • 10A fuse [No. 13, located in fuse block (J/B)] • Harness for open or short between key switch and fuse • Harness for open or short between smart entrance control unit and key switch
NG	▶	Replace key switch.

DOOR LOCK/UNLOCK SWITCH LH CHECK

=NFEL0195S06

1 CHECK DOOR LOCK/UNLOCK SWITCH INPUT SIGNAL

With CONSULT-II

Check door lock/unlock switch ("LOCK SW DR/AS"/"UNLK SW DR/AS") in "DATA MONITOR" mode with CONSULT-II.

DATA MONITOR	
MONITOR	
LOCK SW DR/AS	OFF
UNLK SW DR/AS	OFF

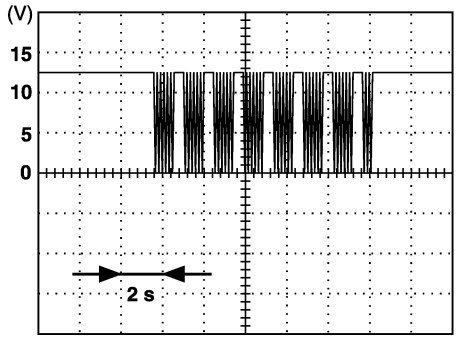
When lock/unlock switch is turned to LOCK:
LOCK SW DR/AS ON

When lock/unlock switch is turned to UNLOCK:
UNLK SW DR/AS ON

SEL341W

Without CONSULT-II

1. Remove key from ignition switch.
2. Check the signal between smart entrance control unit harness connector M144 terminal 33 (L) and ground with oscilloscope when door lock/unlock switch is turned "LOCK" or "UNLOCK".
3. Make sure signals which are shown in the figure below can be detected during 10 sec. just after door lock/unlock switch is turned "LOCK" or "UNLOCK".



Voltage:
12V → 9V (10 sec.) measurement by analog circuit tester.

SEL396Y

Refer to wiring diagram in EL-283.

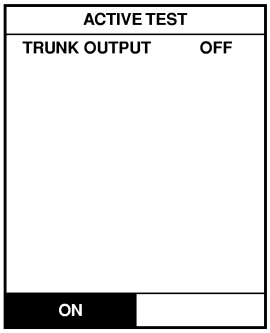
OK or NG

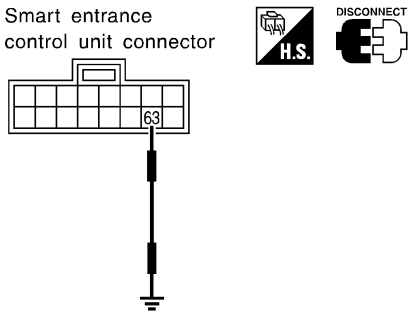
OK	▶	Door lock/unlock switch is OK.
NG	▶	**Check the following.** • Ground circuit for each front power window switch. • Harness for open or short between each front power window switch and smart entrance control unit connector If above systems are normal, replace the front power window switch.

TRUNK LID OPENER ACTUATOR CHECK

=NFEL0195S12

1	CHECK TRUNK LID OPENER	
Check trunk lid opener operation with trunk lid opener switch. NOTE: First check trunk lid opener cancel lever position. **Does trunk lid open?**		
Yes	▶	GO TO 2.
No	▶	Check trunk lid opener actuator and the circuit.

2	CHECK TRUNK LID OPENER ACTUATOR OPERATION	
With CONSULT-II 1. Select "ACTIVE TEST" in "MULTI REMOTE ENT" with CONSULT-II. 2. Select "TRUNK OUTPUT" and touch "ON".  **Trunk lid opener should operate.** SEL345W **NOTE: If CONSULT-II is not available, skip this procedure and go to the next step.** **OK or NG**		
OK	▶	Trunk lid opener actuator circuit is OK.
NG	▶	Check harness for open or short between smart entrance control unit and trunk lid opener actuator.

3	CHECK TRUNK LID OPENER ACTUATOR CIRCUIT	
Without CONSULT-II 1. Disconnect smart entrance control unit harness connector. 2. Apply ground to smart entrance control unit harness connector M145 terminal 63 (L).  SEL026Y Refer to wiring diagram in EL-285. **Does trunk lid open?**		
Yes	▶	Replace smart entrance control unit.
No	▶	Check harness for open or short between smart entrance control unit and trunk lid opener actuator.

HAZARD REMINDER CHECK

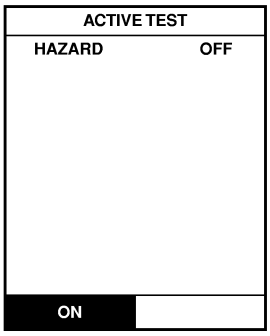
=NFEL0195S08

1	CHECK HAZARD INDICATOR	
Check if hazard indicator flashes with hazard switch.		
Does hazard indicator operate?		
Yes	▶	GO TO 2.
No	▶	Check "hazard indicator" circuit.

2	CHECK HAZARD REMINDER OPERATION WITH CONSULT-II	

With CONSULT-II

1. Select "ACTIVE TEST" in "MULTI REMOTE ENT" with CONSULT-II.
2. Select "HAZARD" and touch "ON".



Hazard indicator should illuminate.

SEL347W

NOTE: If CONSULT-II is not available, skip this procedure and go to the next step.

OK or NG

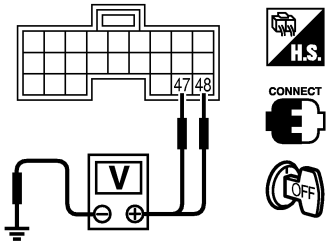
OK	▶	Hazard reminder operation is OK.
NG	▶	Replace smart entrance control unit.

3	CHECK HAZARD REMINDER OPERATION WITHOUT CONSULT-II	

Without CONSULT-II

Check voltage between smart entrance control unit harness connector M144 terminal 47 (GY/L) or 48 (GY/R) and ground.

Smart entrance control unit connector



Condition of lock or unlock button	Voltage (V)
Push.	Approx. 0 - 12
Do not push.	0

SEL592Y

Refer to wiring diagram in EL-285.

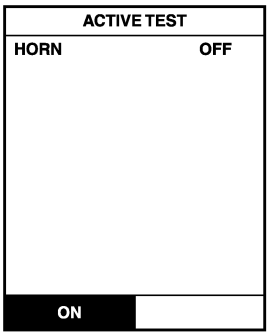
OK or NG

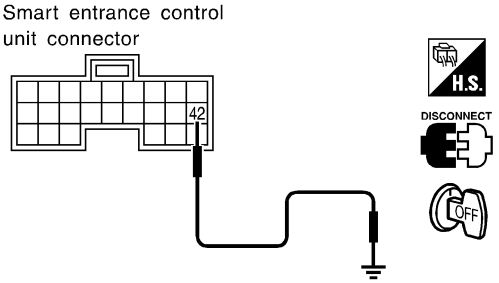
OK	▶	System is OK.
NG	▶	Replace smart entrance control unit.

HORN REMINDER CHECK

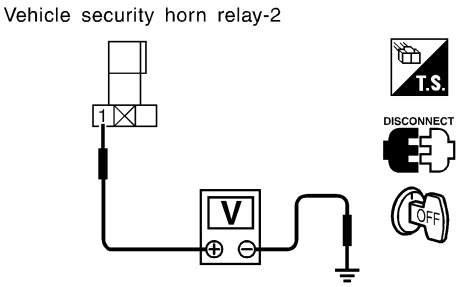
=NFEL0195S09

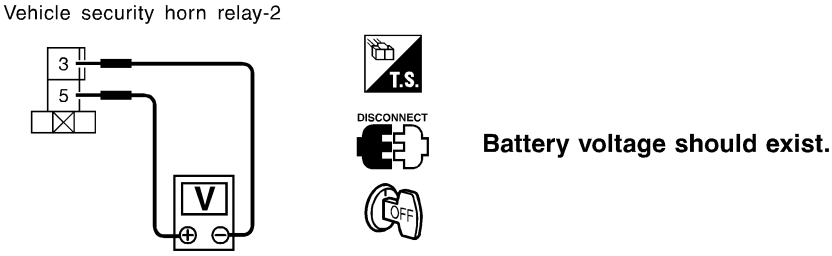
1	CHECK HORN	
Check if horn sounds with horn switch. **Does horn operate?**		
Yes	▶	GO TO 2.
No	▶	Check horn circuit.

2	CHECK HORN REMINDER OPERATION WITH CONSULT-II	
With CONSULT-II 1. Select "ACTIVE TEST" in "MULTI REMOTE ENT" with CONSULT-II. 2. Select "HORN" and touch "ON".  **Horn should sound.** SEL451Y **NOTE: If CONSULT-II is not available, skip this procedure and go to the next step.** **OK or NG**		
OK	▶	Horn reminder operation is OK.
NG	▶	GO TO 4.

3	CHECK HORN REMINDER OPERATION WITHOUT CONSULT-II	
Without CONSULT-II 1. Disconnect smart entrance control unit harness connector. 2. Apply ground to smart entrance control unit harness connector M144 terminal 42 (BR/Y).  SEL028Y Refer to wiring diagram in EL-285. **Does horn sound?**		
Yes	▶	Replace smart entrance control unit.
No	▶	GO TO 4.

4	CHECK VEHICLE SECURITY HORN RELAY-2	
Check vehicle security horn relay-2. **OK or NG**		
OK	▶	GO TO 5.
NG	▶	Replace vehicle security horn relay-2.

5	CHECK POWER SUPPLY FOR VEHICLE SECURITY HORN RELAY-2	
1. Disconnect vehicle security horn relay-2 harness connector. 2. Check voltage between vehicle security horn relay-2 harness connector E63 terminal 1 (G/R) and ground.  SEL031Y **Does battery voltage exist?**		
Yes	▶	GO TO 6.
No	▶	**Check the following.** ● 10A fuse (No. 61, located in the fuse and fusible link box) ● Harness for open or short between vehicle security horn relay-2 and fuse

6	CHECK VEHICLE SECURITY HORN RELAY-2	
1. Disconnect vehicle security horn relay-2 harness connector. 2. Check voltage between vehicle security horn relay-2 harness connector E63 terminals 5 (G) and 3 (B).  **Battery voltage should exist.** SEL032Y **OK or NG**		
OK	▶	Check harness for open or short between smart entrance control unit and vehicle security horn relay-2.
NG	▶	**Check the following.** ● Harness for open or short between vehicle security horn relay-2 and fuse ● Harness for open or short between horn relay and vehicle security horn relay-2 ● Harness for open or short between vehicle security horn relay-2 and body grounds

INTERIOR LAMP OPERATION CHECK

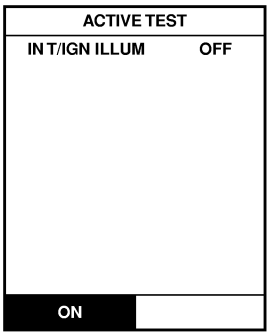
=NFEL0195S10

1	CHECK INTERIOR LAMP	
Check if the interior lamp switch is in the "ON" position and the lamp illuminates. **Does interior lamp illuminate?**		
Yes	▶	GO TO 2.
No	▶	**Check the following.** ● Harness for open or short between smart entrance control unit and interior lamp ● Interior lamp

2	CHECK INTERIOR LAMP OPERATION

With CONSULT-II

1. Select "ACTIVE TEST" in "MULTI REMOTE ENT" with CONSULT-II.
2. Select "INT/IGN ILLUM" and touch "ON".

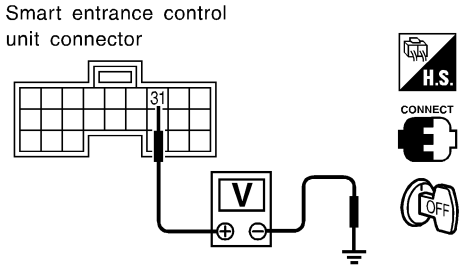


Interior lamp should illuminate.

SEL349W

Without CONSULT-II

Push unlock button of keyfob with all doors closed and driver's door locked, and check voltage between smart entrance control unit harness connector M144 terminal 31 (R) and ground.



Voltage [V]:
Unlock button is pushed.
0 (For approx. 30 seconds.)
Unlock button is not pushed.
Battery voltage

SEL029Y

Refer to wiring diagram in EL-284.

OK or NG

OK	▶	System is OK.
NG	▶	Check harness open or short between smart entrance control unit and interior lamp.

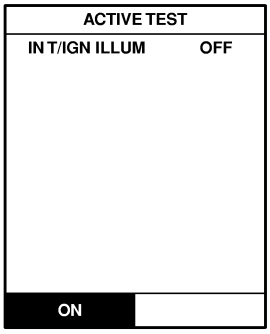
KEY HOLE ILLUMINATION OPERATION CHECK

NFEL0195S13

1 CHECK KEY HOLE ILLUMINATION OPERATION

With CONSULT-II

1. Select "ACTIVE TEST" IN "MULTI REMOTE ENT" with CONSULT-II.
2. Select "INT/IGN ILLUM" and touch "ON".

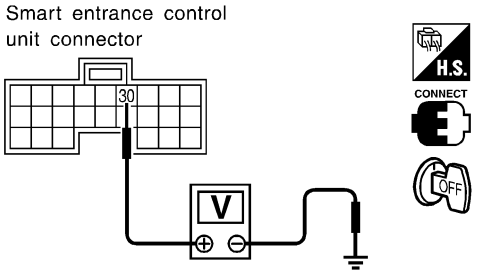


Key hole illuminate should illuminate.

SEL350W

Without CONSULT-II

Push unlock button of keyfob with all doors closed and driver's door locked, and check voltage between smart entrance control unit harness connector M144 terminal 30 (R/Y) and ground.



Voltage [V]:
Unlock button is pushed.
0 (For approx. 30 seconds)
Unlock button is not pushed.
Battery voltage

SEL030Y

Refer to wiring diagram in EL-284.

OK or NG

OK	▶	System is OK.
NG	▶	**Check the following.** ● Harness for open or short between smart entrance control unit and key hole illumination. ● Key hole illumination

ID Code Entry Procedure

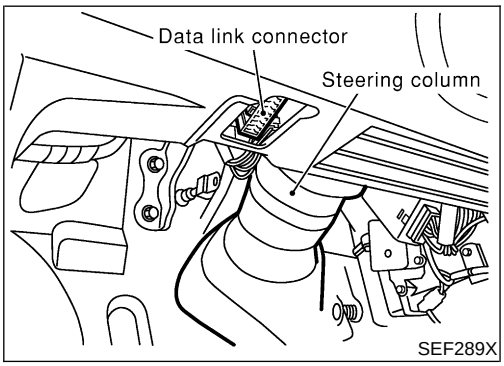
=NFEL0117

KEYFOB ID SET UP WITH CONSULT-II

NFEL0117S01

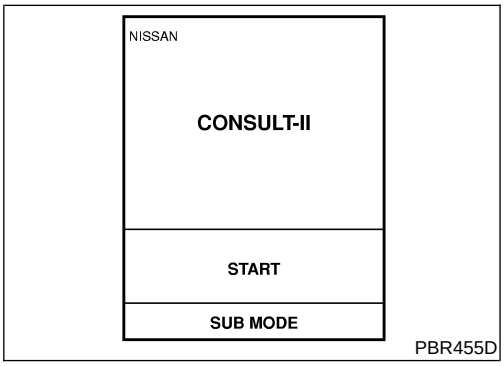
NOTE:

If a keyfob is lost, the ID code of the lost keyfob must be erased to prevent unauthorized use. When the ID code of a lost keyfob is not known, all keyfob ID codes should be erased. After all ID codes are erased, the ID codes of all remaining and/or new keyfob must be re-registered.



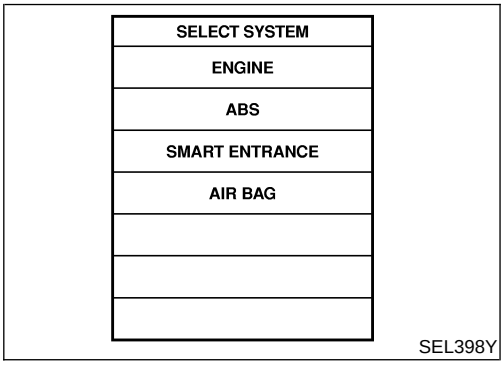
SEF289X

1. Turn ignition switch “OFF”.
2. Connect “CONSULT-II” to the data link connector.



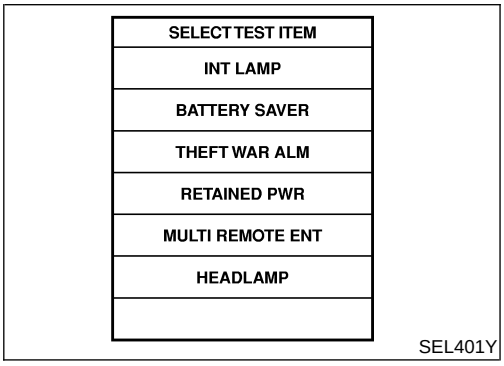
PBR455D

3. Turn ignition switch “ON”.
4. Touch “START”.



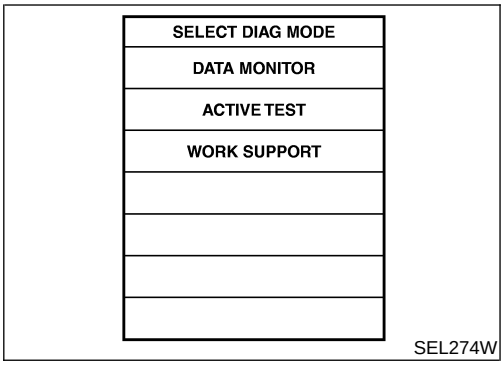
SEL398Y

5. Touch “SMART ENTRANCE”.

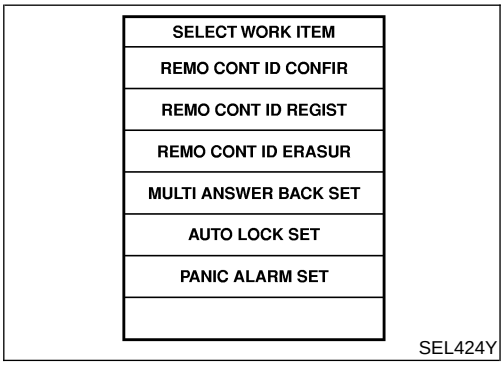


SEL401Y

6. Touch “MULTI REMOTE ENT”.



7. Touch "WORK SUPPORT".



8. The items are shown on the figure at left can be set up.

- "REMO CONT ID CONFIR"
  Use this mode to confirm if a keyfob ID code is registered or not.
- "REMO CONT ID REGIST"
  Use this mode to register a keyfob ID code.

NOTE:
Register the ID code when keyfob or smart entrance control unit is replaced, or when additional keyfob is required.

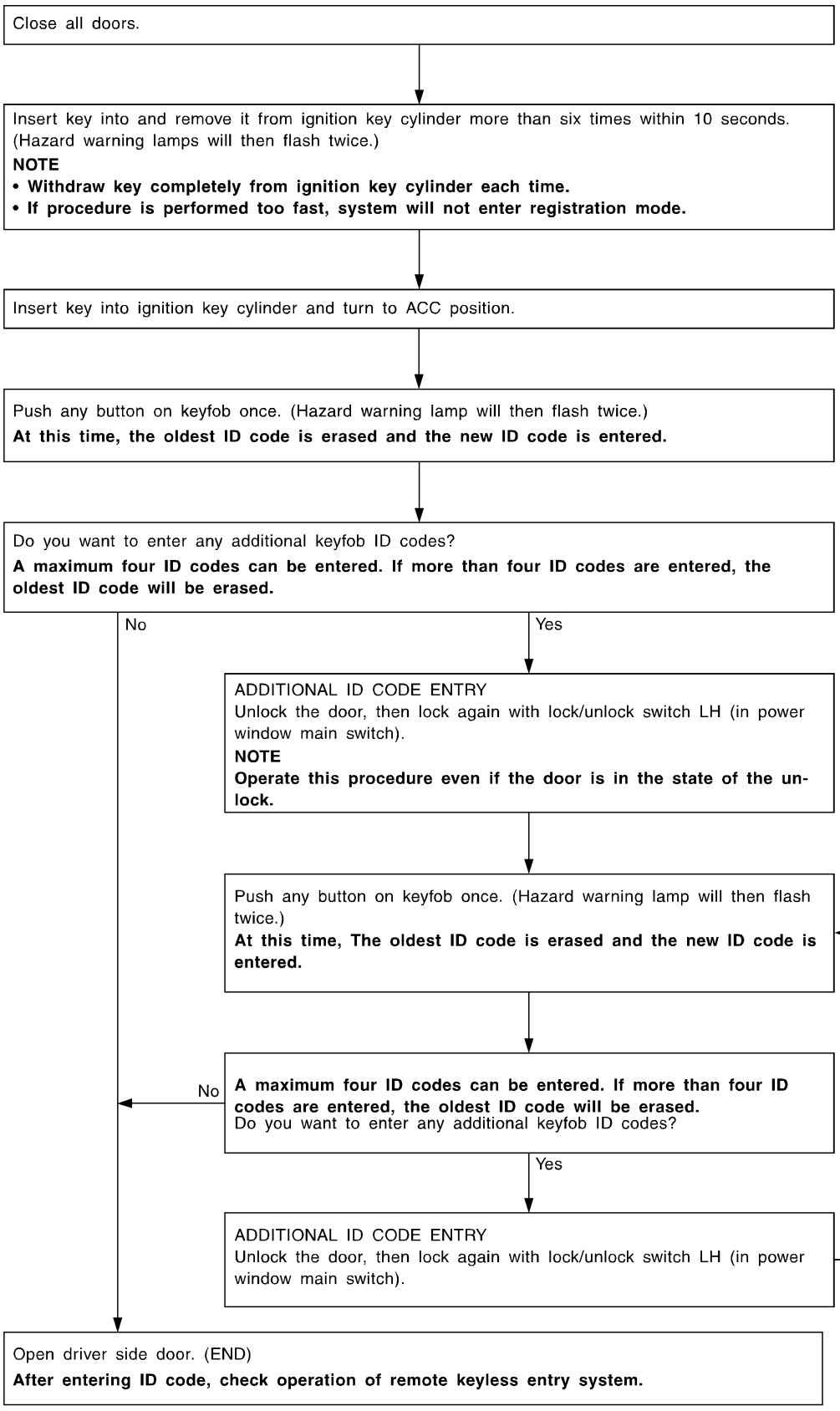
- "REMO CONT ID ERASUR"
  Use this mode to erase a keyfob ID code.

Refer to the EL-288 "Work Support" in "CONSULT-II Application Items" for the following items.

- "MULTI ANSWER BACK SET"
- "AUTO LOCK SET"
- "PANIC ALARM SET"
- "TRUNK OPENER"
- "PW DOWN SET"

KEYFOB ID SET UP WITHOUT CONSULT-II

NFEL0117S02



SEL170YA

NOTE:

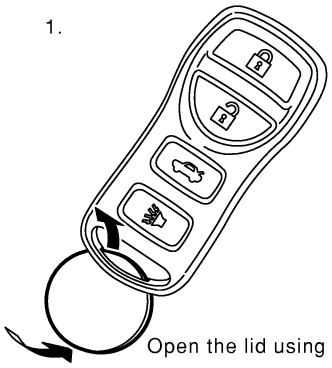
- If a keyfob is lost, the ID code of the lost keyfob must be erased to prevent unauthorized use. A specific ID code can be erased with CONSULT-II. However, when the ID code of a lost keyfob is not known, all keyfob ID codes should be erased. After all ID codes are erased, the ID codes of all remaining and/or new keyfobs must be re-registered.
  To erase all ID codes in memory, register one ID code (keyfob) four times. After all ID codes are erased, the ID codes of all remaining and/or new keyfobs must be re-registered.
- When registering an additional keyfob, the existing ID codes in memory may or may not be erased. If four ID codes are stored in memory, when an additional code is registered, only the oldest code is erased. If less than four ID codes are stored in memory, when an additional ID code is registered, the new ID code is added and no ID codes are erased.
- If you need to activate more than two additional new keyfobs, repeat the procedure "Additional ID code entry" for each new keyfob.
- Entry of maximum four ID codes is allowed. When more than four ID codes are entered, the oldest ID code will be erased.
- Even if same ID code that is already in the memory is input, the same ID code can be entered. The code is counted as an additional code.

Keyfob Battery Replacement

NFEL0118

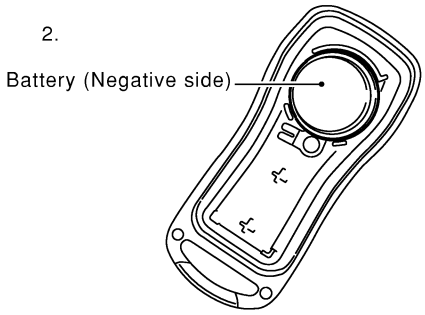
NOTE:
- Be careful not to touch the circuit board or battery terminal.
- The keyfob is water-resistant. However, if it does get wet, immediately wipe it dry.

1.



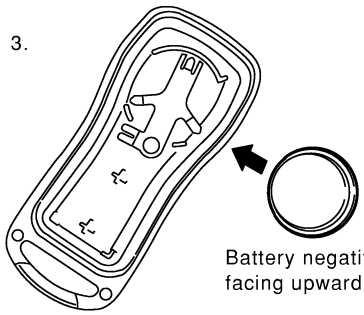
Open the lid using a coin.

2.



Remove the battery.

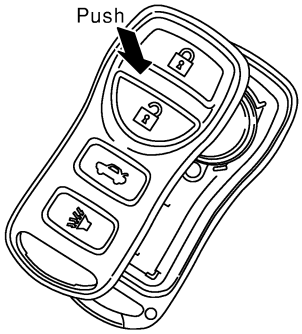
3.



Battery negative side facing upward

Insert the new battery.

4.

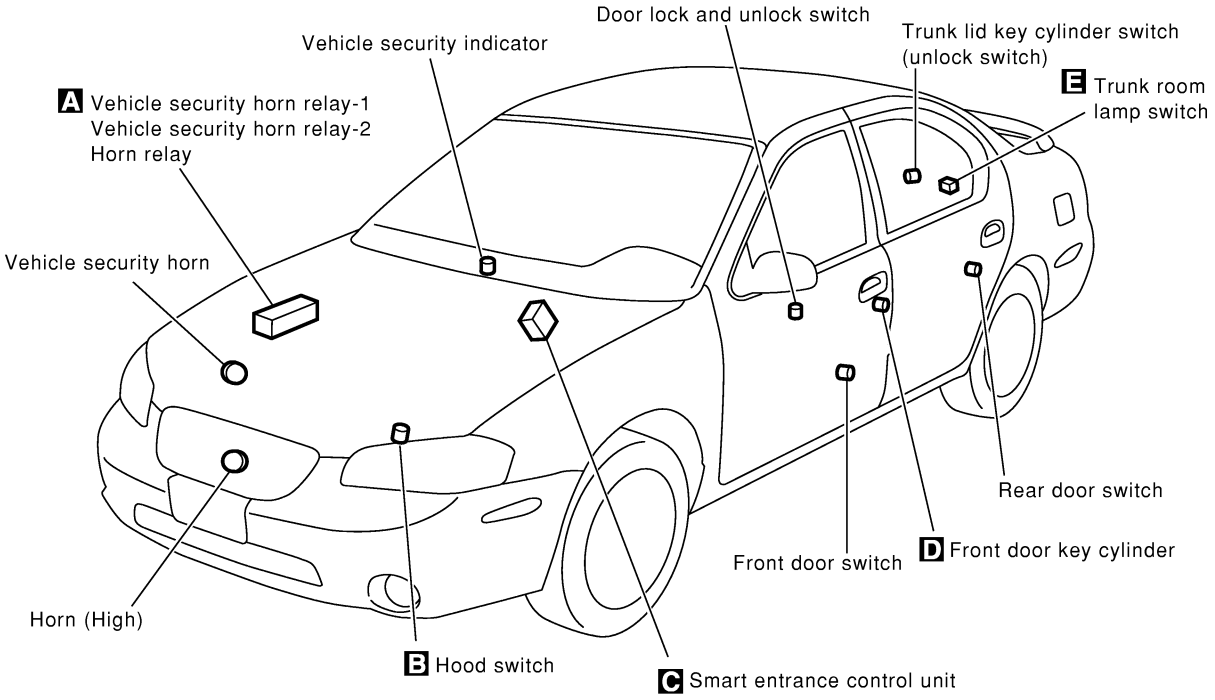


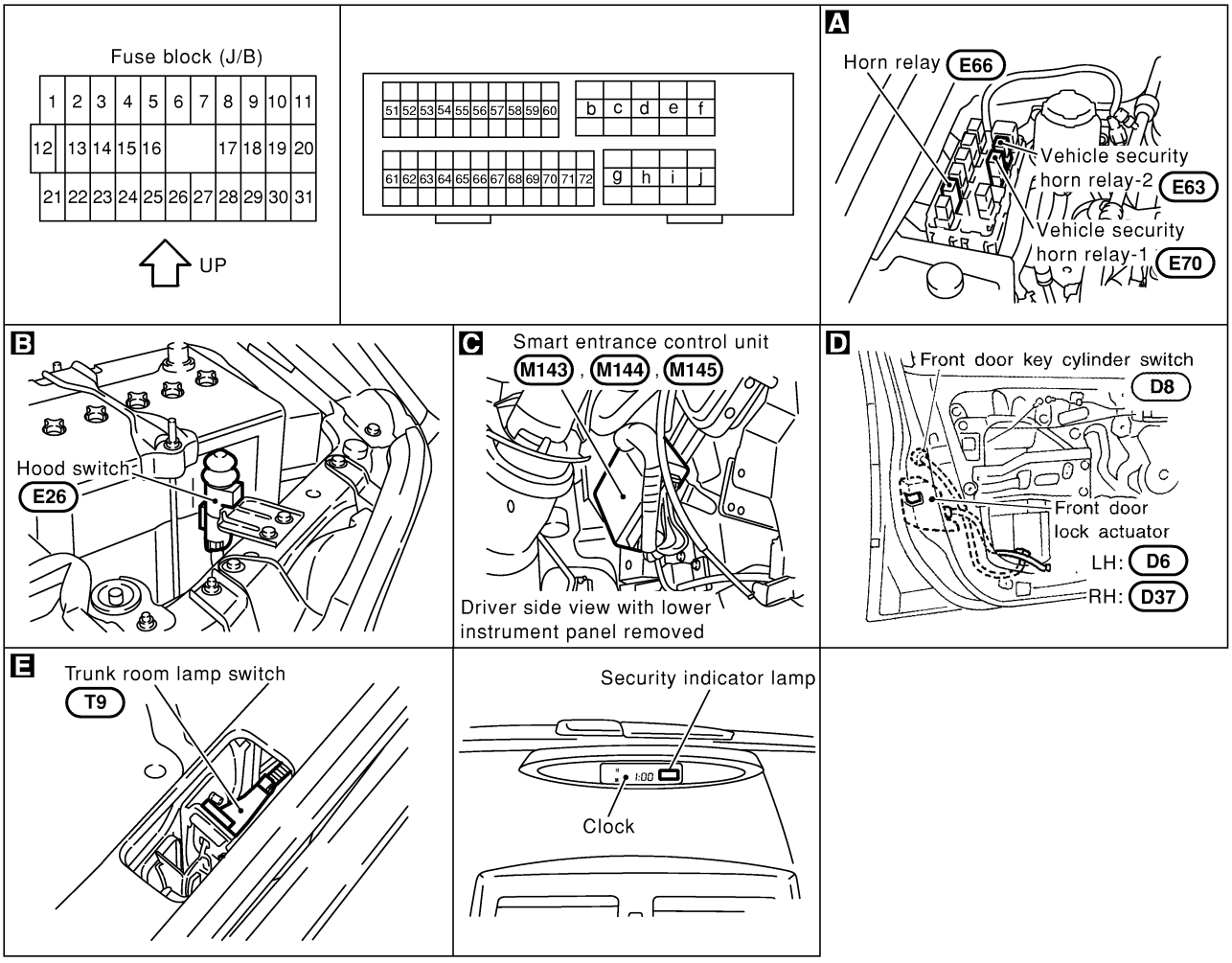
Close the lid securely.
Push the keyfob button two or three times to check its operation.

SEL411Y

Component Parts and Harness Connector Location

NFEL0119





SEL386Y

System Description

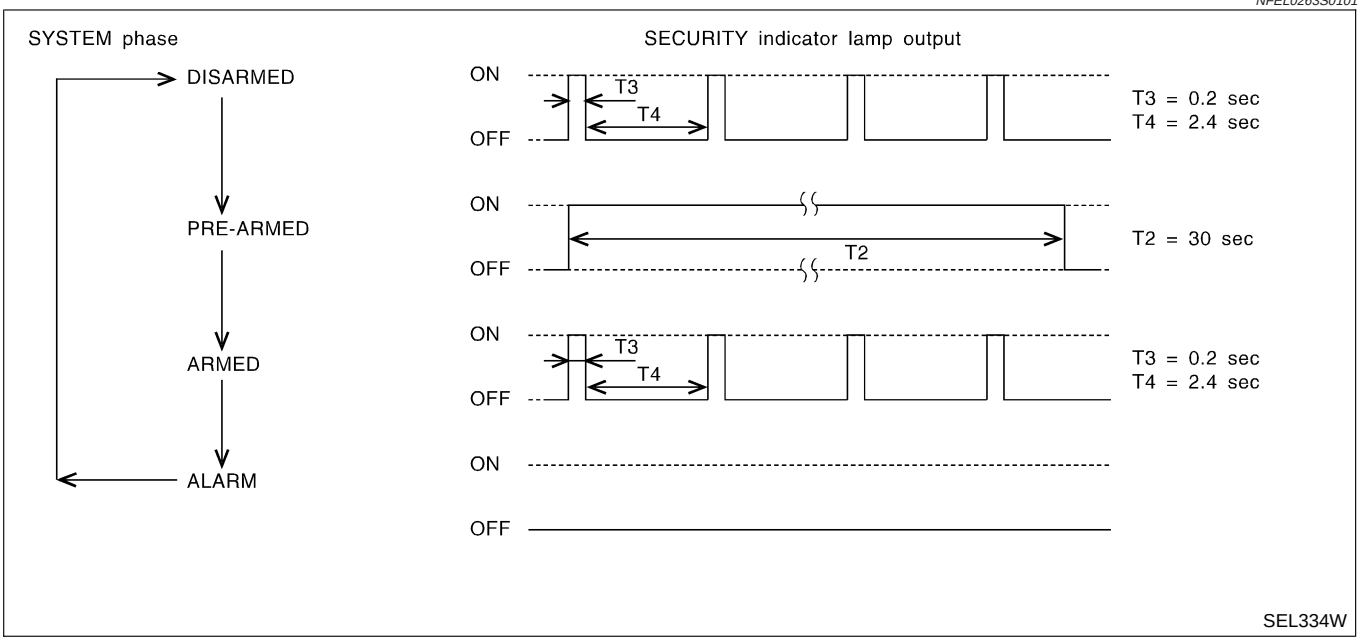
NFEL0263

DESCRIPTION

NFEL0263S01

1. Operation Flow

NFEL0263S0101



2. Setting The Vehicle Security System

NFEL0263S0102

Initial condition

1) Ignition switch is in OFF position.

Disarmed phase

When the vehicle security system is in the disarmed phase, the security indicator lamp blinks every 2.6 seconds.

Pre-armed phase and armed phase

When the following operation 1) or 2) is performed, the vehicle security system turns into the “pre-armed” phase. (The security indicator lamp illuminates.)

1) Smart entrance control unit receives LOCK signal from key cylinder switch or keyfob after hood, trunk lid and all doors are closed.
2) Hood, trunk lid and all doors are closed after front doors are locked by key, lock/unlock switch or keyfob.

After about 30 seconds, the system automatically shifts into the “armed” phase (the system is set). (The security indicator lamp blinks every 2.6 seconds.)

3. Canceling The Set Vehicle Security System

NFEL0263S0103

When the following 1) or 2) operation is performed, the armed phase is canceled.

1) Unlock the doors with the key or keyfob.
2) Open the trunk lid with the key or keyfob.

4. Activating The Alarm Operation of The Vehicle Security System

NFEL0263S0104

Make sure the system is in the armed phase. (The security indicator lamp blinks every 2.6 seconds.)
When the following operation 1) or 2) is performed, the system sounds the horns and flashes the headlamps for about 50 seconds.

1) Engine hood, trunk lid or any door is opened during armed phase.
2) Disconnecting and connecting the battery connector before canceling armed phase.

POWER SUPPLY AND GROUND

NFEL0263S02

Power is supplied at all times

- through 10A fuse [No. 12, located in the fuse block (J/B)]
- to security indicator lamp terminal 4.

Power is supplied at all times

- through 10A fuse [No. 13, located in the fuse block (J/B)]

- to smart entrance control unit terminal 49.

With the ignition switch in the ON or START position, power is supplied

- through 10A fuse [No. 10, located in the fuse block (J/B)]
- to smart entrance control unit terminal 27.

With the ignition switch in the ACC or ON position, power is supplied

- through 10A fuse [No. 1, located in the fuse block (J/B)]
- to smart entrance control unit terminal 26.

Ground is supplied

- to smart entrance control unit terminals 43 and 64
- through body grounds M9, M25 and M87.

INITIAL CONDITION TO ACTIVATE THE SYSTEM

NFEL0263S03

The operation of the vehicle security system is controlled by the doors, hood and trunk lid.

Pattern A

NFEL0263S0301

To activate the vehicle security system, the smart entrance control unit must receive signals indicating the doors, hood and trunk lid are closed.
When a door is open, smart entrance control unit terminal 1, 2 or 3 receives a ground signal from each door switch.
When the hood is open, smart entrance control unit terminal 6 receives a ground signal

- from terminal 1 of the hood switch
- through body grounds E11, E22 and E53.

When the trunk lid is open, smart entrance control unit terminal 13 receives a ground signal

- from terminal 1 of the trunk room lamp switch
- through body grounds T6 and T8.

When smart entrance control unit receives LOCK signal from key cylinder switch or keyfob and none of the described conditions exist, the vehicle security system will automatically shift to armed mode.

Pattern B

NFEL0263S0302

To activate the vehicle security system, the smart entrance control unit must receive signal indicating any door (including hood and trunk lid) is opened.
When the front doors are locked with key, lock/unlock switch or keyfob and then all doors are closed, the vehicle security system will automatically shift to armed mode.

VEHICLE SECURITY SYSTEM ACTIVATION

NFEL0263S04

Pattern A

NFEL0263S0401

With all doors (including hood and trunk lid) closed if the key is used to lock doors, front power window main switch terminal 6 receives a ground signal

- from terminal 3 of the key cylinder switch LH
- through body grounds M9, M25 and M87.

If this signal, or lock signal from keyfob is received by the smart entrance control unit, the vehicle security system will activate automatically.

NOTE:
Vehicle security system can be set even though all doors are not locked.

Pattern B

NFEL0263S0402

With any door (including hood and trunk lid) open if lock/unlock switch is used to lock doors, terminal 33 receives a ground signal

- from terminal 8 of lock/unlock switch LH, or
- from terminal 11 of lock/unlock switch RH
- through body grounds M9, M25 and M87, or

With any door (including hood and trunk lid) open if the key is used to lock doors, front power window main switch terminal 6 receives a ground signal

- from terminal 3 of the key cylinder switch LH
- through body grounds M9, M25 and M87.

If these signals and lock signal from keyfob are received by the smart entrance control unit, ground signals of terminals 1, 2 and 3 are interrupted and all doors are closed, the vehicle security system will activate automatically.

NOTE:
Vehicle security system can be set even though the rear door is not locked.

Once the vehicle security system has been activated, smart entrance control unit terminal 38 supplies ground to terminal 5 of the security indicator lamp.
The security lamp will illuminate for approximately 30 seconds and then blinks every 2.6 seconds.
Now the vehicle security system is in armed phase.

VEHICLE SECURITY SYSTEM ALARM OPERATION

NFEL0263S05

The vehicle security system is triggered by

- opening a door
- opening the hood or the trunk lid
- detection of battery disconnect and connect.

Once the vehicle security system is in armed phase, if the smart entrance control unit receives a ground signal at terminal 1, 2, 3 (door switch), 13 (trunk room lamp switch) or 6 (hood switch), the vehicle security system will be triggered. The headlamps flash and the horn sounds intermittently.
Power is supplied at all times

- through 10A fuse (No, 61 located in fuse and fusible link box)
- to vehicle security horn relay-1 terminals 1 and 3, and
- to vehicle security horn relay-2 terminal 1
- through 10A fuse (No. 57, located in fuse and fusible link box)
- to horn relay terminal 2.

Power is also supplied at all times

- through 15A fuse (No. 68, located in fuse and fusible link box)
- to headlamp relay LH terminal 3,
- through 20A fuse (No. 54, located in fuse and fusible link box)
- to headlamp relay LH terminals 1 and 6,
- through 15A fuse (No. 69, located in fuse and fusible link box)
- to headlamp relay RH terminal 3, and
- through 20A fuse (No. 55, located in fuse and fusible link box)
- to headlamp relay RH terminals 1 and 6.

When the vehicle security system is triggered, ground is supplied intermittently

- to headlamp LH relay terminal 2 from smart entrance control unit terminal 21 and
- to headlamp RH relay terminal 2 from smart entrance control unit terminal 59
- through smart entrance control unit terminals 43 and 64.

When headlamp relays (LH and RH) are energized and then power is supplied to headlamps (LH and RH).
The headlamps flash intermittently.
When the vehicle security system is triggered, ground is supplied intermittently

- from smart entrance control unit terminal 42
- to vehicle security horn relay-2 terminal 2.

When vehicle security horn relay-2 is energized, ground is supplied intermittently

- to vehicle security horn relay-1 terminal 2, and
- to horn relay terminal 1.

When vehicle security horn relay-1 and horn relay are energized, then power is supplied to vehicle security horn and horn.
The horn sounds intermittently.
The alarm automatically turns off after 50 seconds but will reactivate if the vehicle is tampered with again.

VEHICLE SECURITY SYSTEM DEACTIVATION

NFEL0263S06

To deactivate the vehicle security system, a door or trunk lid must be unlocked with the key or keyfob.
When the key is used to unlock the door, front power window main switch terminal 19 receives a ground signal

- from terminal 1 of the LH key cylinder switch.

When the key is used to open the trunk lid, smart entrance control unit terminal 12 receives a ground signal from terminal 1 of the trunk lid key cylinder switch.
When the smart entrance control unit receives either one of these signals or unlock signal from keyfob, the vehicle security system is deactivated. (Disarmed phase)

PANIC ALARM OPERATION

NFEL0263S07

Remote keyless entry system may or may not operate vehicle security system (horn and headlamps) as required.
When the remote keyless entry system (panic alarm) is triggered, ground is supplied intermittently

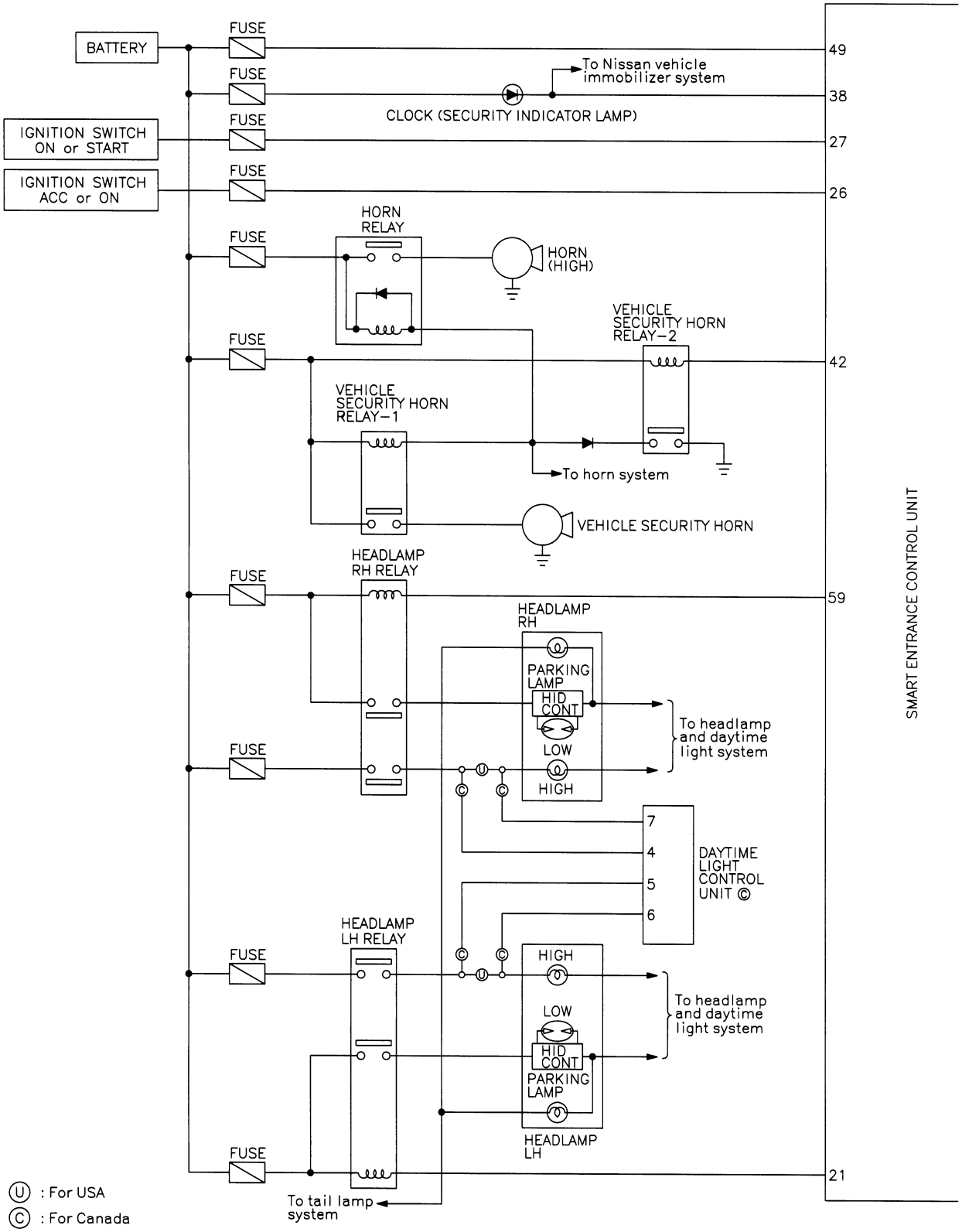
- from smart entrance control unit terminal 42
- to vehicle security horn relay-2 terminal 2,
- from smart entrance control unit terminal 21
- to headlamp LH relay terminal 2 and
- from smart entrance control unit terminal 59
- to headlamp RH relay terminal 2

The headlamp flashes and the horn sounds intermittently.
The alarm automatically turns off after 25 seconds or when smart entrance control unit receives any signal from keyfob.

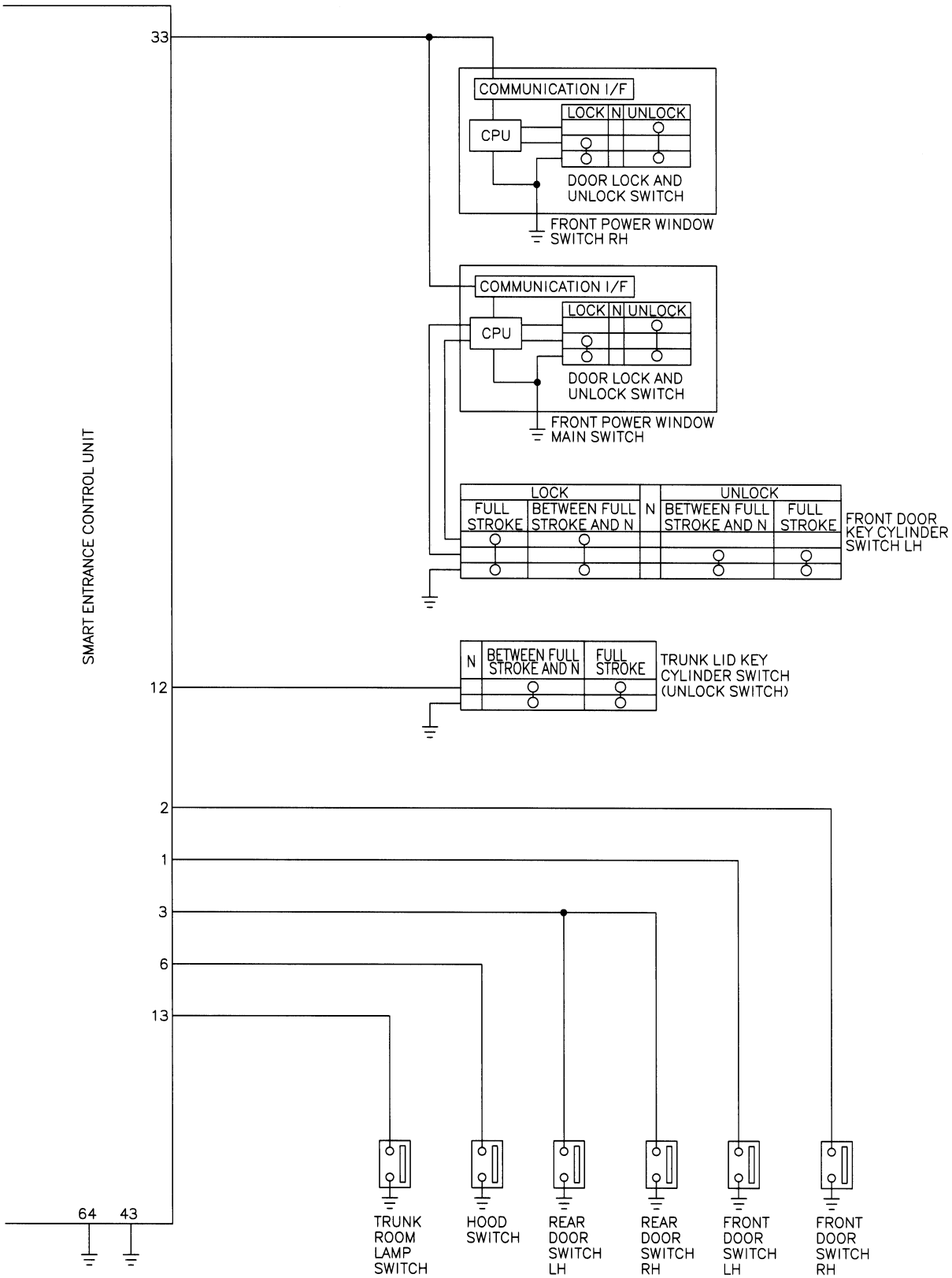
NOTE:

Schematic

NFEL0121



MEL182O


SMART ENTRANCE CONTROL UNIT
33
12
2
1
3
6
13
64
43
COMMUNICATION I/F
CPU
LOCK
N
UNLOCK
DOOR LOCK AND UNLOCK SWITCH
FRONT POWER WINDOW SWITCH RH
COMMUNICATION I/F
CPU
LOCK
N
UNLOCK
DOOR LOCK AND UNLOCK SWITCH
FRONT POWER WINDOW MAIN SWITCH
LOCK
FULL STROKE
BETWEEN FULL STROKE AND N
N
UNLOCK
BETWEEN FULL STROKE AND N
FULL STROKE
FRONT DOOR KEY CYLINDER SWITCH LH
N
BETWEEN FULL STROKE AND N
FULL STROKE
TRUNK LID KEY CYLINDER SWITCH (UNLOCK SWITCH)
TRUNK ROOM LAMP SWITCH
HOOD SWITCH
REAR DOOR SWITCH LH
REAR DOOR SWITCH RH
FRONT DOOR SWITCH LH
FRONT DOOR SWITCH RH

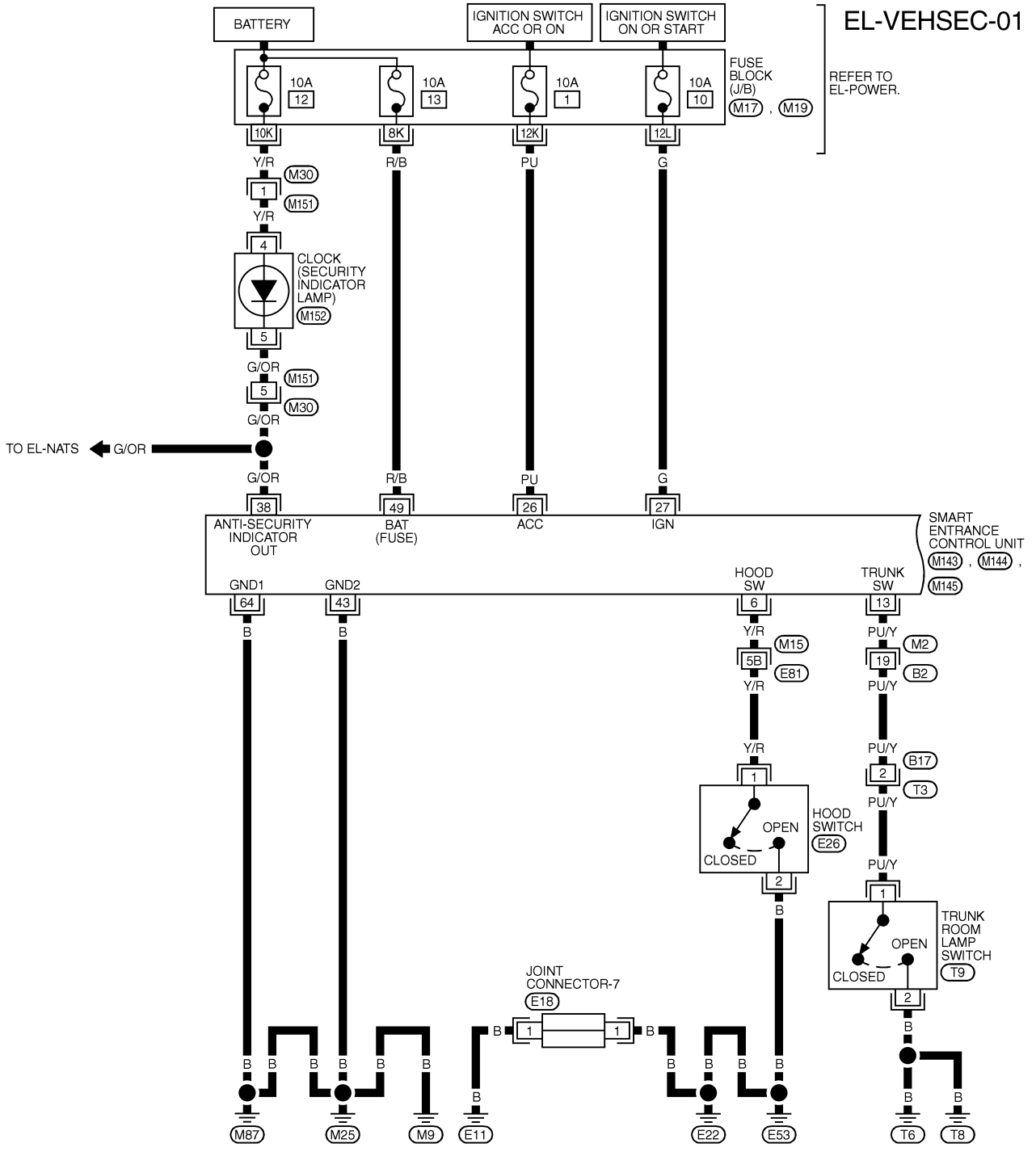
MEL183O

Wiring Diagram — VEHSEC —

NFEL0122

FIG. 1

NFEL0122S01



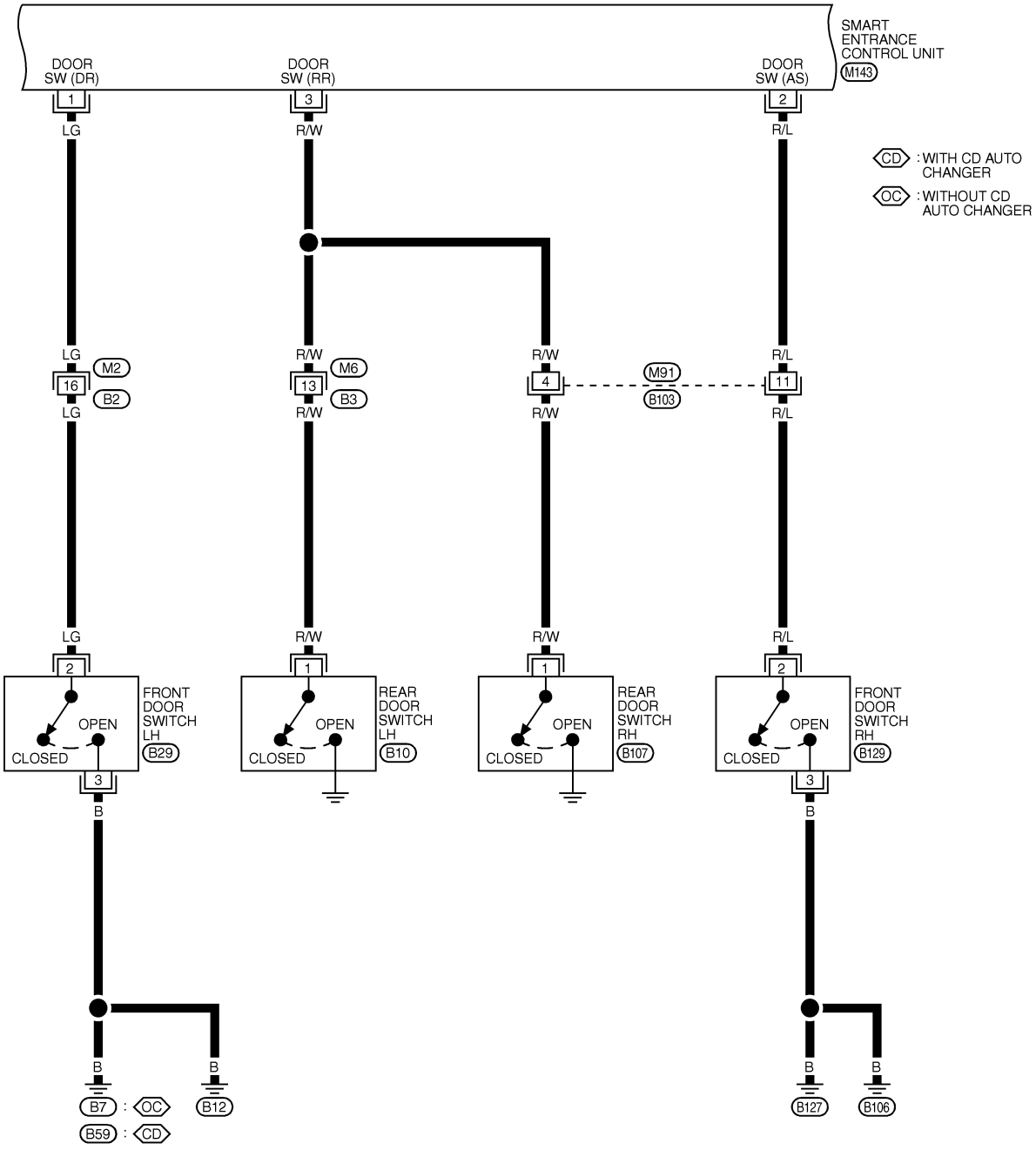
REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)
M17 , M19 -FUSE BLOCK-JUNCTION BOX (J/B)

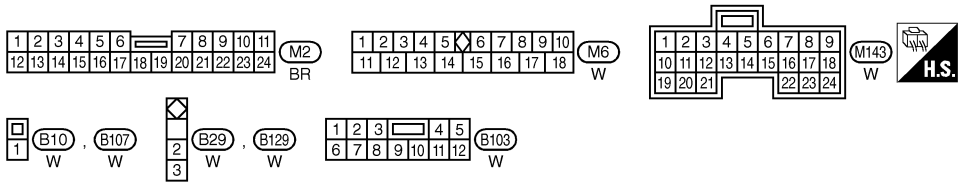
MEL184O

FIG. 2

NFEL0122S02

EL-VEHSEC-02





MEL750O

FIG. 3

NFEL0122S03

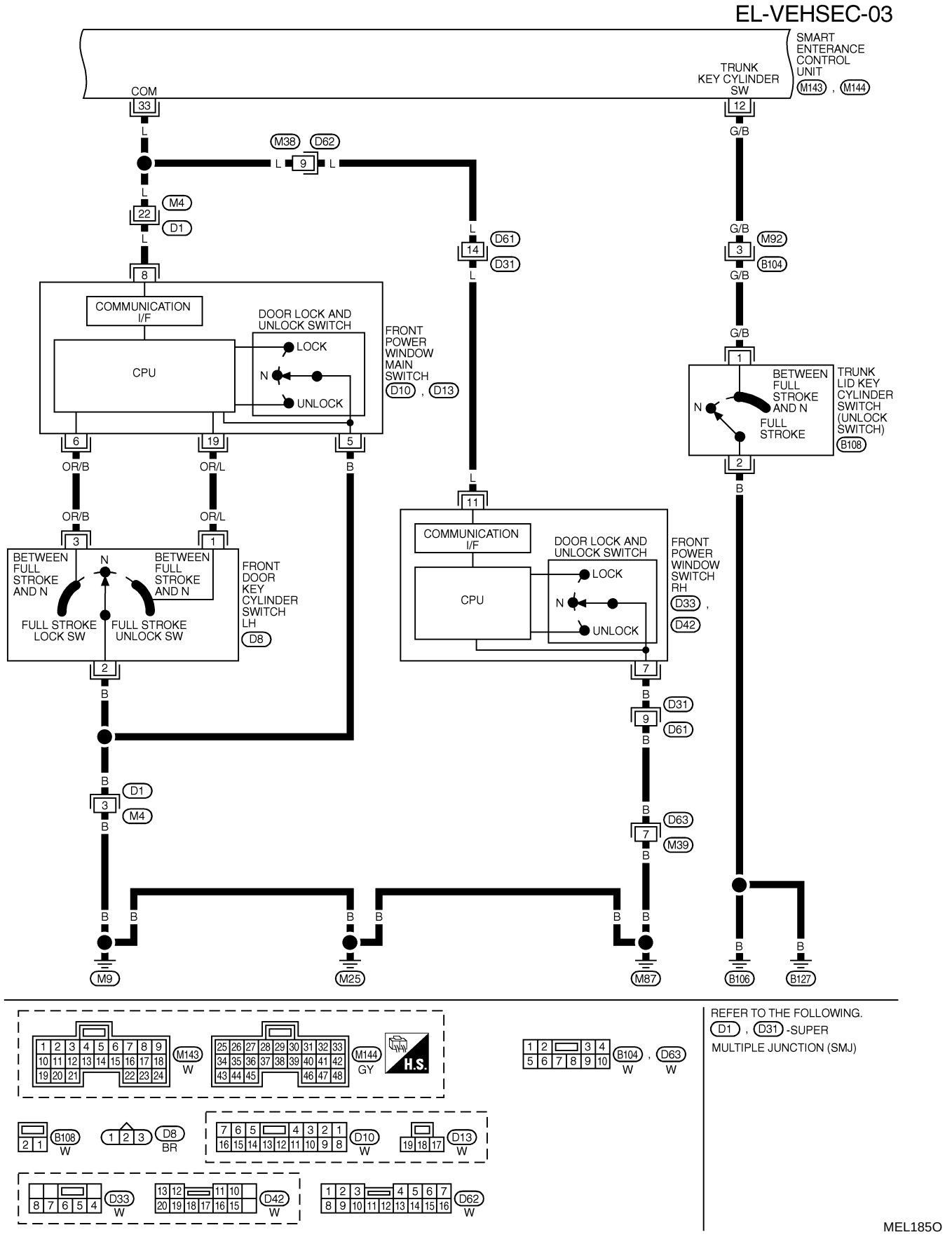
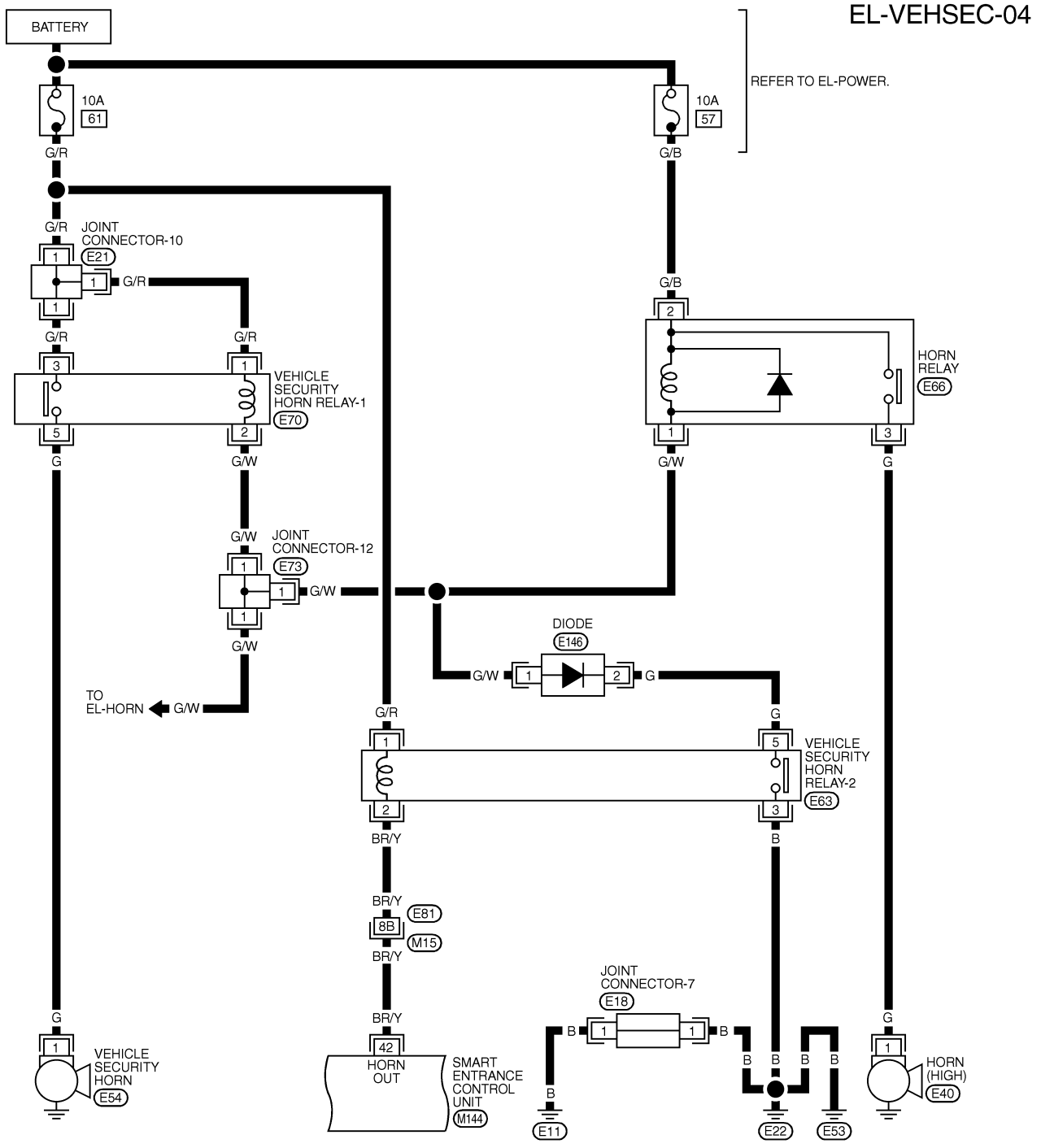
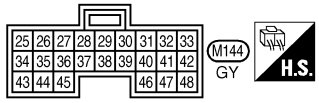
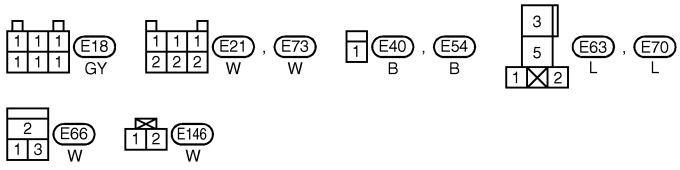


FIG. 4

NFEL0122S04





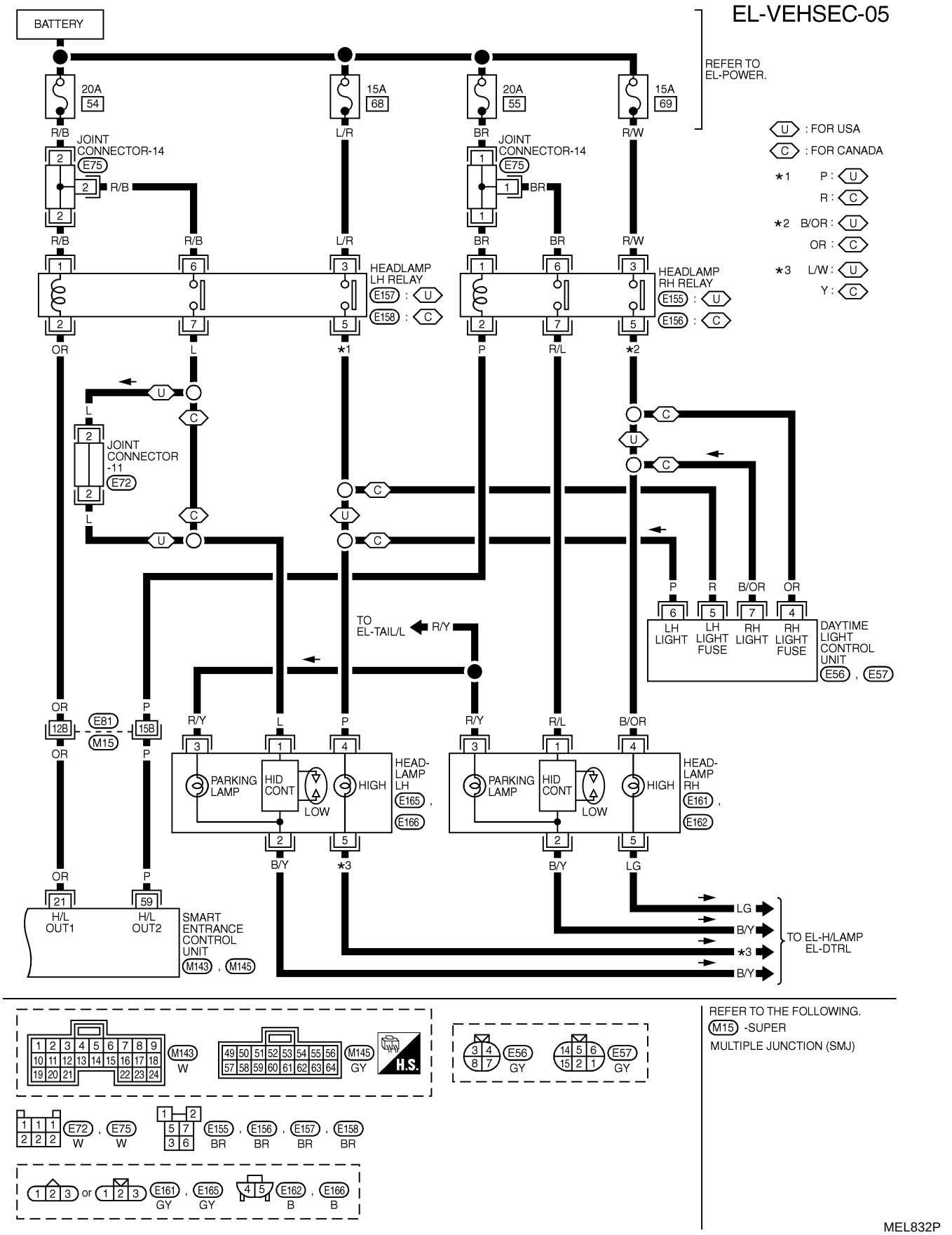


REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)

MEL186O

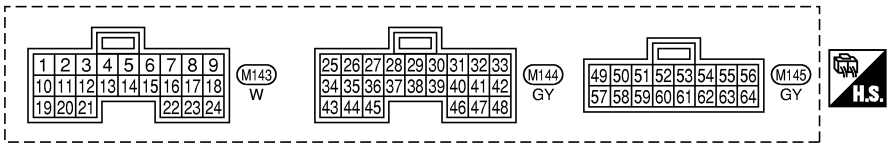
FIG. 5

NFEL0122S07



MEL832P

SMART ENTRANCE CONTROL UNIT CONNECTOR

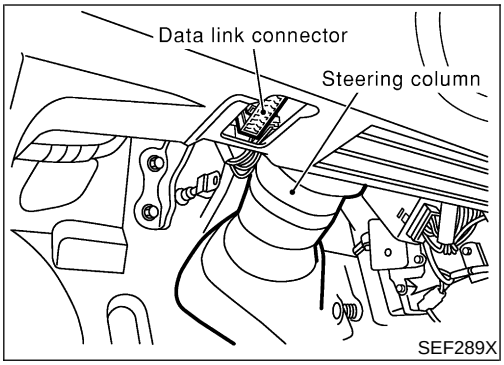


SMART ENTRANCE CONTROL UNIT TERMINALS AND REFERENCE VALUE BETWEEN EACH TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION			DATA (DC)
1	LG	DRIVER DOOR SWITCH	OFF (CLOSED) → ON (OPEN)			12V → 0V
2	R/L	PASSENGER DOOR SWITCH	OFF (CLOSED) → ON (OPEN)			5V → 0V
3	R/W	REAR DOOR SWITCH	OFF (CLOSED) → ON (OPEN)			5V → 0V
6	Y/R	HOOD SWITCH	ON (OPEN) → OFF (CLOSED)			0V → 12V
12	G/B	TRUNK LID KEY CYLINDER SWITCH	OFF (NEUTRAL) → ON (UNLOCK)			5V → 0V
13	PU/Y	TRUNK ROOM LAMP SWITCH	ON (OPEN) → OFF (CLOSED)			0V → 12V
21	OR	HEADLAMP LH RELAY	IGNITION SWITCH (WITH LIGHTING SWITCH 2ND)	ON OR START → OFF	MORE THAN 5 MINUTES	12V
					WITHIN 5 MINUTES	0V
				ON OR START		0V
			HEADLAMPS ILLUMINATE BY AUTO LIGHT CONTROL			0V
26	PU	IGNITION SWITCH (ACC)	"ACC" POSITION			12V
27	G	IGNITION SWITCH (ON)	IGNITION KEY IS IN "ON" POSITION			12V
33	L	COMMUNICATION INTERFACE	DOOR LOCK & UNLOCK SWITCHES (NEUTRAL → LOCK/UNLOCK)			*1
			FRONT DOOR KEY CYLINDER SWITCH LH (NEUTRAL → LOCK/UNLOCK)			
38	G/OR	SECURITY INDICATOR	GOES OFF → ILLUMINATES			12V → 0V
42	BR/Y	VEHICLE SECURITY HORN RELAY	WHEN PANIC ALARM IS OPERATED USING KEYFOB (ON → OFF)			12V → 0V
43	B	GROUND	–			–
49	R/B	POWER SOURCE (FUSE)	–			12V
59	P	HEADLAMP RH RELAY	IGNITION SWITCH (WITH LIGHTING SWITCH 2ND)	ON OR START → OFF	MORE THAN 5 MINUTES	12V
					WITHIN 5 MINUTES	0V
				ON OR START		0V
			HEAD LAMP ILLUMINATE BY AUTO LIGHT CONTROL (OPERATE → NOT OPERATE)			LESS THAN 1.5V → 12V
64	B	GROUND	–			–

*1: REFER TO "SMART ENTRANCE CONTROL UNIT INSPECTION TABLE" IN "SMART ENTRANCE CONTROL UNIT".

SEL593Y



SEF289X

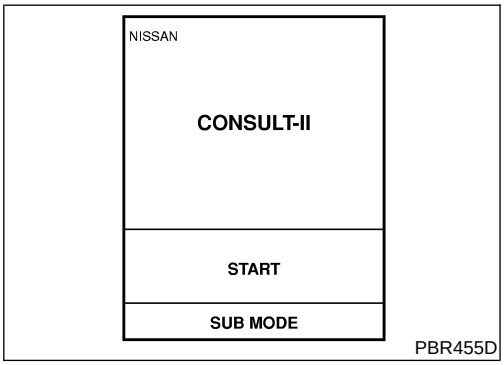
CONSULT-II Inspection Procedure

=NFEL0244

“THEFT WAR ALM”

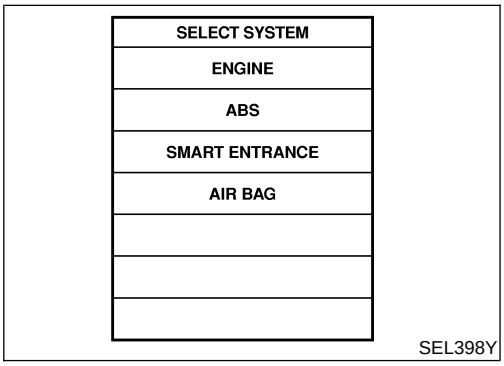
NFEL0244S01

1. Turn ignition switch “OFF”.
2. Connect “CONSULT-II” to the data link connector.



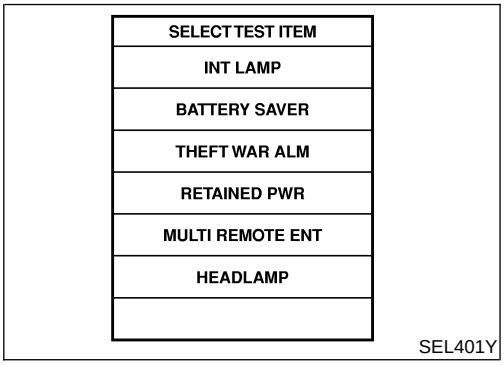
PBR455D

3. Turn ignition switch “ON”.
4. Touch “START”.



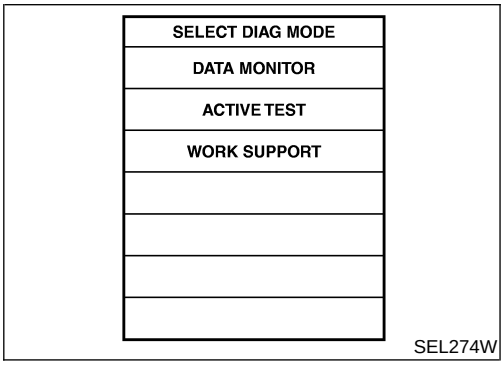
SEL398Y

5. Touch “SMART ENTRANCE”.



SEL401Y

6. Touch “THEFT WAR ALM”.



SEL274W

7. Select diagnosis mode.
   “DATA MONITOR”, “ACTIVE TEST” and “WORK SUPPORT” are available.

CONSULT-II Application Item

NFEL0245

"THEFT WAR ALM"

NFEL0245S01

Data Monitor

NFEL0245S0101

Monitored Item	Description
IGN ON SW	Indicates [ON/OFF] condition of ignition switch.
ACC ON SW	Indicates [ON/OFF] condition of ignition switch in ACC position.
KEY CYL LK SW	Indicates [ON/OFF] condition of lock signal from key cylinder switch.
KEY CYL UN SW	Indicates [ON/OFF] condition of unlock signal from key cylinder switch.
DOOR SW-RR	Indicates [ON/OFF] condition of rear door switch.
DOOR SW-DR	Indicates [ON/OFF] condition of front door switch LH.
DOOR SW-AS	Indicates [ON/OFF] condition of front door switch RH.
TRUNK SW	Indicates [ON/OFF] condition of trunk switch.
TRUNK KEY SW	Indicates [ON/OFF] condition of trunk key cylinder switch.
HOOD SWITCH	Indicates [ON/OFF] condition of hood switch.
LOCK SW DR/AS	Indicates [ON/OFF] condition of lock signal from door lock/unlock switch LH and RH.
UNLK SW DR/AS	Indicates [ON/OFF] condition of unlock signal from door lock/unlock LH and RH.
LK BUTTON/SIG	Indicates [ON/OFF] condition of lock signal from keyfob.
UN BUTTON/SIG	Indicates [ON/OFF] condition of unlock signal from keyfob.
TRUNK BTN/SIG	Indicates [ON/OFF] condition of trunk open signal from keyfob.

Active Test

NFEL0245S0102

Test Item	Description
THEFT IND	This test is able to check security indicator lamp operation. The lamp will be turned on when "ON" on CONSULT-II screen is touched.
HORN	This test is able to check vehicle security alarm operation. The alarm will be activated for 0.5 seconds after "ON" on CONSULT-II screen is touched.
HEADLAMP	This test is able to check vehicle security alarm headlamp operation. The headlamp illuminates for 0.5 seconds after "ON" on CONSULT-II screen is touched.

Work Support

NFEL0245S0103

Test Item	Description
THEFT ALM TRG	The switch which triggered theft warning alarm is recorded. This mode is able to confirm and erase the record of theft waning alarm. The trigger data can be erased by touching "CLEAR" on CONSULT-II screen.
SECURITY ALARM SET	This mode is able to confirm and change security alarm ON-OFF setting.

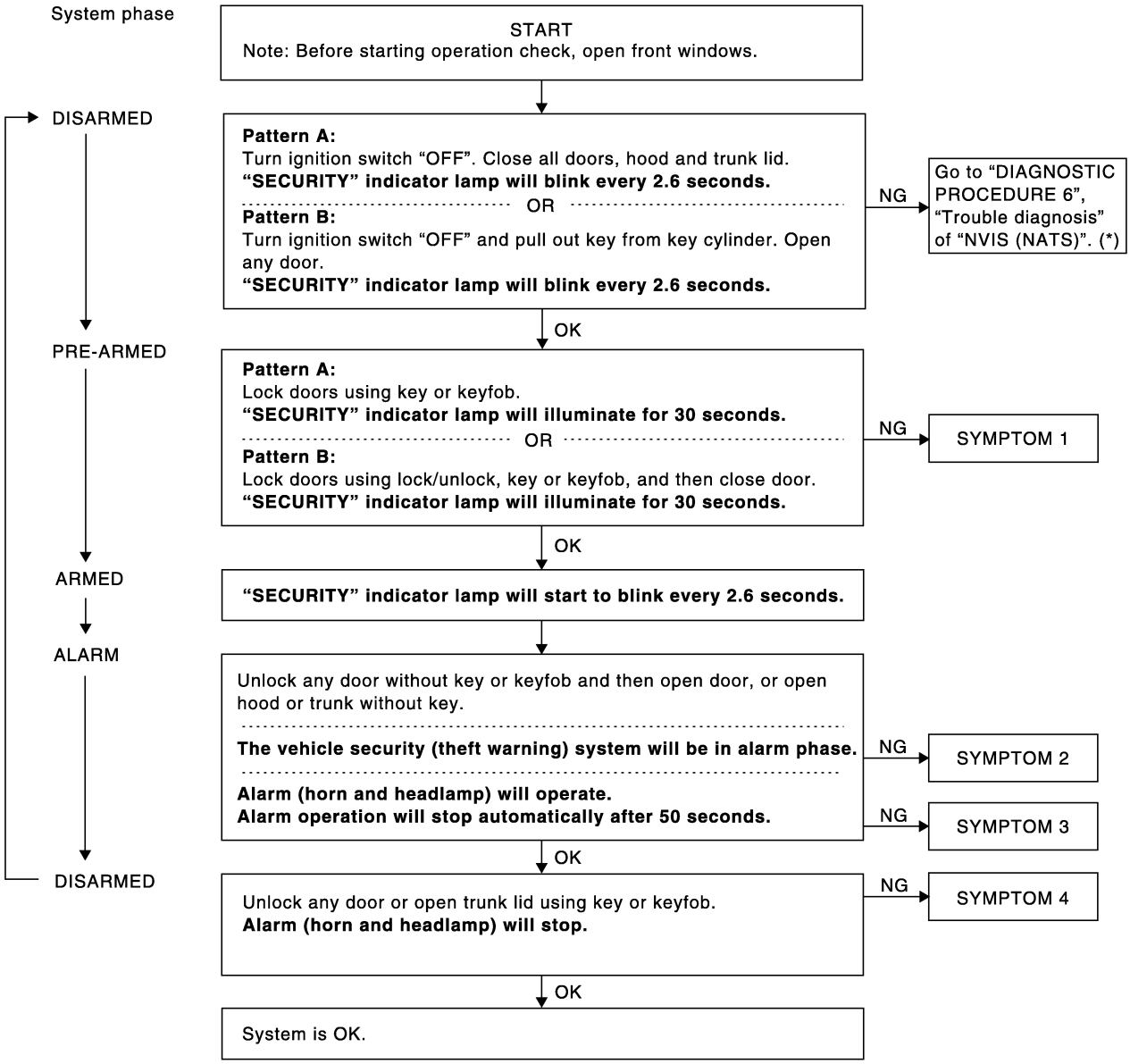
Trouble Diagnoses

=NFEL0123

PRELIMINARY CHECK

NFEL0123S01

The system operation is canceled by turning ignition switch to "ACC" at any step between START and ARMED in the following flow chart.



SEL254WC

For details of "Pattern A" and "Pattern B" about vehicle security (theft warning) system setting, refer to EL-309.
*: Refer to EL-372.
After performing preliminary check, go to symptom chart on next page.

SYMPTOM CHART

NFEL0123S02

REFERENCE PAGE (EL-)			324	326	327	333	335	337	338	339	289
SYMPTOM			PRELIMINARY CHECK	POWER SUPPLY AND GROUND CIRCUIT CHECK	DOOR, HOOD AND TRUNK ROOM LAMP SWITCH CHECK	SECURITY INDICATOR LAMP CHECK	DOOR KEY CYLINDER SWITCH CHECK	TRUNK LID KEY CYLINDER SWITCH CHECK	DOOR LOCK/UNLOCK SWITCH CHECK	VEHICLE SECURITY HORN AND HEADLAMP ALARM CHECK	Check "REMOTE KEYLESS ENTRY SYSTEM".
	Vehicle security indicator does not illuminate for 30 seconds.		X	X		X					
1	Vehicle security system cannot be set by	All items	X	X	X						
		Door outside key	X				X				
		Lock/unlock switch	X						X		
		Keyfob	X								X
2	*1 Vehicle security system does not alarm when ...	One of the door is opened	X		X						
3	Vehicle security alarm does not activate.	Horn or headlamp alarm	X		X					X	
4	Vehicle security system cannot be canceled by	Door outside key	X				X				
		Trunk lid key	X					X			
		Keyfob	X								X

X : Applicable

*1: Make sure the system is in the armed phase.

Before starting trouble diagnoses above, perform preliminary check, EL-324.

Symptom numbers in the symptom chart correspond with those of preliminary check.

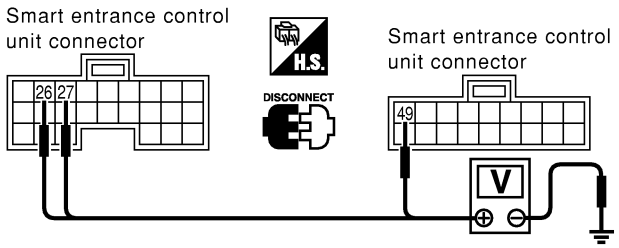
POWER SUPPLY AND GROUND CIRCUIT CHECK

NFEL0123S03

Power Supply Circuit Check

NFEL0123S0301

1. Disconnect smart entrance control unit harness connector.
2. Check voltage between smart entrance control unit harness connector M144 terminals 26 (PU), 27 (G), M145 terminal 49 (R/B) and ground.



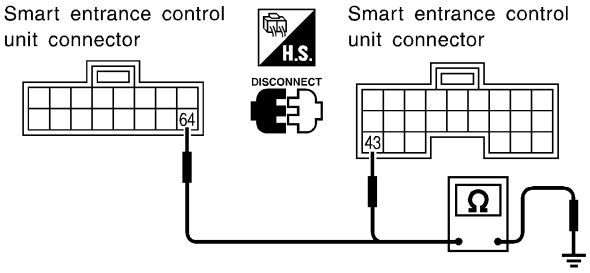
Terminals		Ignition switch position		
(+)	(–)	OFF	ACC	ON
49	Ground	Battery voltage	Battery voltage	Battery voltage
27	Ground	0V	0V	Battery voltage
26	Ground	0V	Battery voltage	Battery voltage

SEL594Y

Ground Circuit Check

NFEL0123S0302

1. Disconnect smart entrance control unit harness connector.
2. Check continuity between smart entrance control unit harness connector M144 terminal 43 (B), M145 terminal 64 (B) and ground.



Terminals	Continuity
43 - Ground	Yes
64 - Ground	Yes

SEL034Y

DOOR, HOOD AND TRUNK ROOM LAMP SWITCH CHECK

=NFEL0123S04

Door Switch Check

NFEL0123S0401

1 PRELIMINARY CHECK

1. Turn ignition switch OFF and remove key from ignition key cylinder.
   "SECURITY" indicator lamp should blink every 2.6 seconds.
2. Close all doors, hood and trunk lid.
3. Lock doors with keyfob from inside the vehicle.
   "SECURITY" indicator lamp should turn on for 30 seconds.
4. Unlock any door with the door lock knob and open the door within 30 seconds after door is locked.
   "SECURITY" indicator lamp should turn off.

OK or NG

OK	▶	Door switch is OK, and go to hood switch check.
NG	▶	GO TO 2.

2 CHECK DOOR SWITCH INPUT SIGNAL

With CONSULT-II

Check door switches ("DOOR SW-RR", "DOOR SW-DR" and "DOOR SW-AS") in "DATA MONITOR" mode with CONSULT-II.

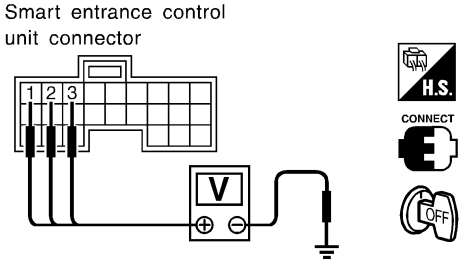
DATA MONITOR	
MONITOR	
DOOR SW-RR	OFF
DOOR SW-DR	OFF
DOOR SW-AS	OFF

	Monitor item	Condition	Condition
DOOR SW-RR	Rear doors switch	Open	ON
		Closed	OFF
DOOR SW-DR	Door switch LH	Open	ON
		Closed	OFF
DOOR SW-AS	Door switch RH	Open	ON
		Closed	OFF

SEL024Y

Without CONSULT-II

Check voltage between smart entrance control unit harness connector M143 terminals 1 (LG), 2 (R/L) or 3 (R/W) and ground.



	Terminals (+)	Terminals (–)	Condition	Voltage [V]
Front door switch LH	1	Ground	Open	0
			Closed	Approx. 12
Front door switch RH	2	Ground	Open	0
			Closed	Approx. 5
Rear door switches	3	Ground	Open	0
			Closed	Approx. 5

SEL021YC

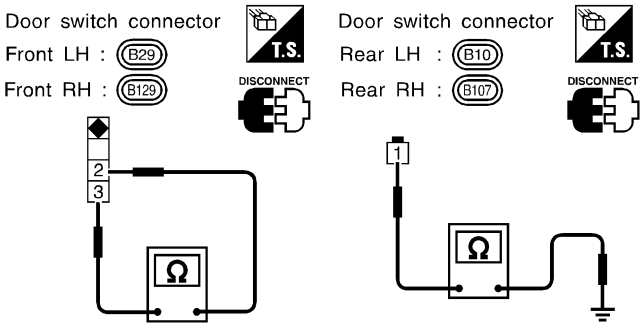
Refer to wiring diagram in EL-317.

OK or NG

OK	▶	Door switch is OK, and go to hood switch check.
NG	▶	GO TO 3.

3 CHECK DOOR SWITCH

1. Disconnect door switch connector.
2. Check continuity between door switch terminals.



	Terminals	Condition	Continuity
Front door switches	2 - 3	Closed	No
		Open	Yes
Rear door switches	1 - Ground	Closed	No
		Open	Yes

SEL192W

OK or NG

OK ▶	**Check the following.** ● Door switch ground circuit or door switch ground condition ● Harness for open or short between smart entrance control unit and door switch
NG ▶	Replace door switch.

Hood Switch Check

=NFEL0123S0402

1	PRELIMINARY CHECK

1. Turn ignition switch OFF and remove key from ignition key cylinder.
   "SECURITY" indicator lamp should blink every 2.6 seconds.
2. Close all doors, hood and trunk lid.
3. Lock doors with keyfob from inside the vehicle.
   "SECURITY" indicator lamp should turn on for 30 seconds.
4. Unlock hood with hood opener within 30 seconds after door is locked.
   "SECURITY" indicator lamp should turn off.

OK or NG

OK	▶	Hood switch is OK, and go to trunk room lamp switch check.
NG	▶	GO TO 2.

2	CHECK HOOD SWITCH FITTING CONDITION

OK or NG

OK	▶	GO TO 3.
NG	▶	Adjust installation of hood switch or hood.

3	CHECK HOOD SWITCH INPUT SIGNAL

With CONSULT-II

Check hood switch ("HOOD SWITCH") in "DATA MONITOR" mode with CONSULT-II.

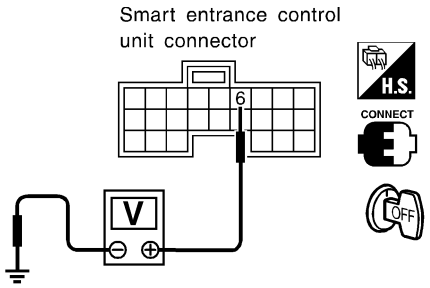
DATA MONITOR	
MONITOR	
HOOD SWITCH	OFF

When hood is open:
HOOD SWITCH ON
When hood is closed:
HOOD SWITCH OFF

SEL354W

Without CONSULT-II

Check voltage between smart entrance control unit harness connector M143 terminal 6 (Y/R) and ground.



Voltage [V]:
Engine hood is open.
0
Engine hood is closed.
Approx. 12

SEL035YA

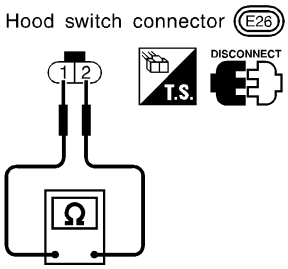
Refer to wiring diagram in EL-316.

OK or NG

OK	▶	Hood switch is OK, and go to trunk room lamp switch check.
NG	▶	GO TO 4.

4	CHECK HOOD SWITCH

1. Disconnect hood switch connector.
2. Check continuity between hood switch terminals 1 and 2.



Continuity:
Condition: Pushed
No
Condition: Released
Yes

SEL240W

OK or NG

OK	▶	**Check the following.** ● Hood switch ground circuit ● Harness for open or short between smart entrance control unit and hood switch
NG	▶	Replace hood switch.

Trunk Room Lamp Switch Check

=NFEL0123S0403

1	PRELIMINARY CHECK

1. Turn ignition switch OFF and remove key from ignition key cylinder.
   "SECURITY" indicator lamp should blink every 2.6 seconds.
2. Close all doors, hood and trunk lid.
3. Lock doors with keyfob from inside the vehicle.
   "SECURITY" indicator lamp should turn on for 30 seconds.
4. Open trunk lid with trunk lid opener switch (on driver side door trim) within 30 seconds after door is locked.
   "SECURITY" indicator lamp should turn off.

OK or NG

OK	▶	Trunk room lamp switch is OK.
NG	▶	GO TO 2.

2	CHECK TRUNK ROOM LAMP SWITCH INPUT SIGNAL

With CONSULT-II

Check trunk room lamp switch ("TRUNK SW"), in "DATA MONITOR" mode with CONSULT-II.

DATA MONITOR	
MONITOR	
TRUNK SW	OFF

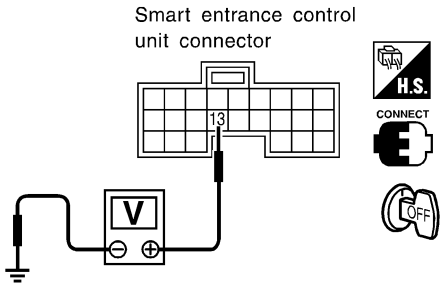
When trunk lid is open:
TRUNK SW ON

When trunk lid is closed:
TRUNK SW OFF

SEL355W

Without CONSULT-II

Check voltage between smart entrance control unit harness connector M143 terminal 13 (PU/Y) and ground.



Voltage [V]:
Trunk lid is open.
Approx. 0
Trunk lid is closed.
Approx. 12

SEL036Y

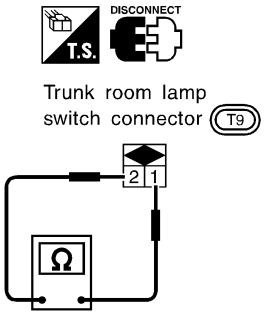
Refer to wiring diagram in EL-316.

OK or NG

OK	▶	Trunk room lamp switch is OK.
NG	▶	GO TO 3.

3	CHECK TRUNK ROOM LAMP SWITCH

1. Disconnect trunk room lamp switch connector.
2. Check continuity between trunk room lamp switch terminals 1 and 2.



Continuity:
Condition: Closed
No
Condition: Open
Yes

SEL242W

OK or NG

OK	▶	**Check the following.** ● Trunk room lamp switch ground circuit ● Harness for open or short between smart entrance control unit and trunk room lamp switch
NG	▶	Replace trunk room lamp switch.

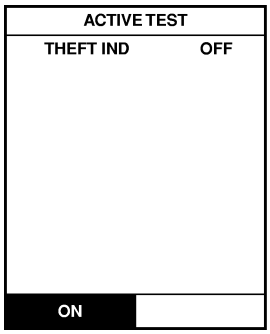
SECURITY INDICATOR LAMP CHECK

=NFEL0123S05

1	CHECK INDICATOR LAMP OPERATION

With CONSULT-II

1. Select "ACTIVE TEST" in "THEFT WAR ALM" with CONSULT-II.
2. Select "THEFT IND" and touch "ON".

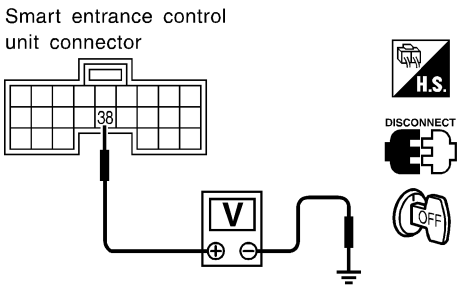


Security indicator lamp should illuminate.

SEL356W

Without CONSULT-II

1. Disconnect smart entrance control unit harness connector.
2. Check voltage between smart entrance control unit harness connector M144 terminal 38 (G/OR) and ground.



Battery voltage should exist.

SEL037Y

Refer to wiring diagram in EL-316.

OK or NG

OK	▶	Security indicator lamp is OK.
NG	▶	GO TO 2.

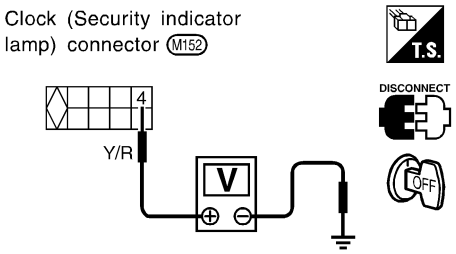
2	CHECK INDICATOR LAMP

OK or NG

OK	▶	GO TO 3.
NG	▶	Replace indicator lamp.

3	CHECK POWER SUPPLY CIRCUIT FOR INDICATOR LAMP

1. Disconnect security lamp connector.
2. Check voltage between indicator lamp terminal 4 and ground.



SEL244W

Does battery voltage exist?

Yes	▶	Check harness for open or short between security indicator lamp and smart entrance control unit.
No	▶	**Check the following.** ● 10A fuse [No. 12, located in fuse block (J/B)] ● Harness for open or short between security indicator lamp and fuse

DOOR KEY CYLINDER SWITCH CHECK

=NFEL0123S07

1	CHECK DOOR KEY CYLINDER SWITCH INPUT SIGNAL (LOCK/UNLOCK SIGNAL)

With CONSULT-II

Check front door key cylinder switch ("KEY CYL LK-SW"/"KEY CYL UN-SW") in "DATA MONITOR" mode with CONSULT-II.

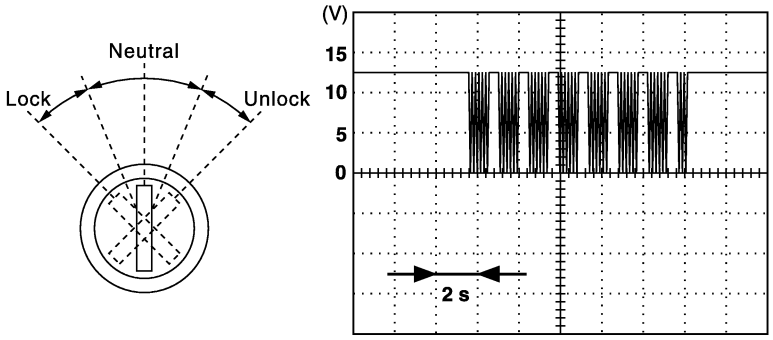
DATA MONITOR	
MONITOR	
KEY CYL LK-SW	OFF
KEY CYL UN-SW	OFF

When key inserted in front key cylinder is turned to LOCK:
KEY CYL LK-SW ON
When key inserted in front key cylinder is turned to UNLOCK:
KEY CYL UN-SW ON

SEL342W

Without CONSULT-II

1. Check the signal between smart entrance control unit harness connector M144 terminal 33 (L) and ground with oscilloscope when key inserted in front key cylinder is turned to "LOCK" or "UNLOCK".
2. Make sure signals which are shown in the figure below can be detected during 10 sec. just after key is turned to "LOCK" or "UNLOCK".



Voltage:
12V → 9V (10 sec.) measurement by analog circuit tester.

SEL397Y

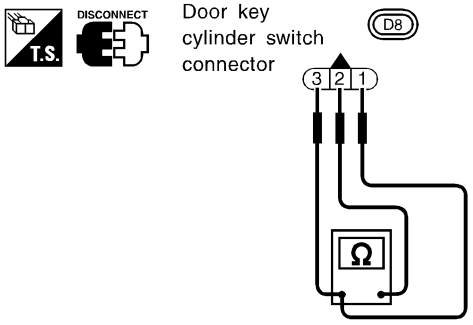
Refer to wiring diagram in EL-318.

OK or NG

OK	▶	Door key cylinder switch is OK.
NG	▶	GO TO 2.

2 CHECK DOOR KEY CYLINDER SWITCH

1. Disconnect door key cylinder switch connector.
2. Check continuity between door key cylinder switch connector terminals.



① : Door unlock switch terminal
② : Ground terminal
③ : Door lock switch terminal

Terminals	Key position	Continuity
③ - ②	Neutral/Unlock	No
	Lock	Yes
① - ②	Neutral/Lock	No
	Unlock	Yes

SEL034X

OK or NG

OK	▶	**Check the following.** ● Door key cylinder switch ground circuit ● Harness for open or short between smart entrance control unit and door key cylinder switch
NG	▶	Replace door key cylinder switch.

TRUNK LID KEY CYLINDER SWITCH CHECK

=NFEL0123S08

1 **CHECK TRUNK LID KEY CYLINDER SWITCH INPUT SIGNAL (UNLOCK SIGNAL)**

With CONSULT-II

Check trunk lid key cylinder switch ("TRUNK KEY SW") in "DATA MONITOR" mode with CONSULT-II.

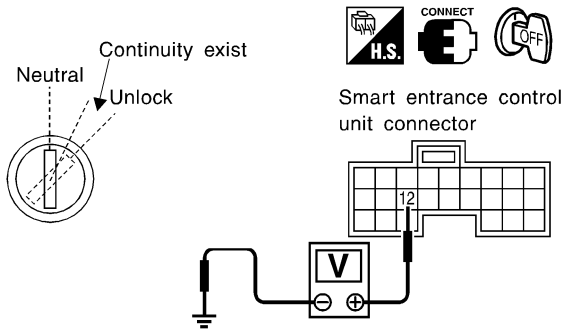
DATA MONITOR	
MONITOR	
TRUNK KEY SW	OFF

When key in key cylinder is at Neutral position:
TRUNK KEY SW OFF
When key in key cylinder is at Unlock position:
TRUNK KEY SW ON

SEL358W

Without CONSULT-II

Check voltage between smart entrance control unit harness connector M143 terminal 12 (G/B) and ground.



Terminal (+)	Terminal (–)	Key position	Voltage [V]
12	Ground	Neutral	Approx. 5
		Unlock	0

SEL039Y

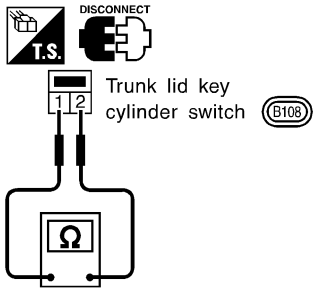
Refer to wiring diagram in EL-318.

OK or NG

OK	▶	Trunk lid key cylinder switch is OK.
NG	▶	GO TO 2.

2 **CHECK TRUNK LID KEY CYLINDER SWITCH**

1. Disconnect trunk lid key cylinder switch connector.
2. Check continuity between trunk lid key cylinder switch terminals.



Key position	Continuity
Neutral	No
Unlock	Yes

SEL248W

OK or NG

OK	▶	**Check the following.** • Trunk lid key cylinder switch ground circuit • Harness for open or short between smart entrance control unit and trunk lid key cylinder switch
NG	▶	Replace trunk lid key cylinder switch.

DOOR LOCK/UNLOCK SWITCH CHECK

NFEL0123S13

1 CHECK DOOR LOCK/UNLOCK SWITCH INPUT SIGNAL

With CONSULT-II

Check door lock/unlock switch ("LOCK SW DR/AS"/"UNLK SW DR/AS") in "DATA MONITOR" mode with CONSULT-II.

DATA MONITOR	
MONITOR	
LOCK SW DR/AS	OFF
UNLK SW DR/AS	OFF

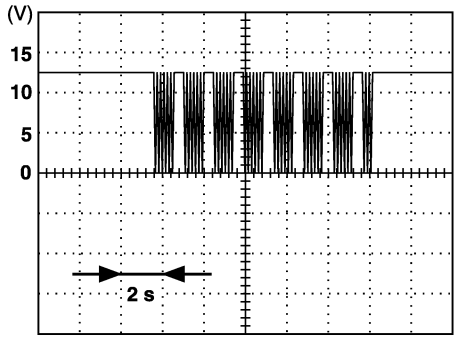
When lock/unlock switch is turned to LOCK:
LOCK SW DR/AS ON

When lock/unlock switch is turned to UNLOCK:
UNLK SW DR/AS ON

SEL341W

Without CONSULT-II

1. Remove key from ignition switch.
2. Check the signal between smart entrance control unit harness connector M144 terminal 33 (L) and ground with oscilloscope when door lock/unlock switch is turned to "LOCK" or "UNLOCK".
3. Make sure signals which are shown in the figure below can be detected during 10 sec. just after door lock/unlock switch is turned to "LOCK" or "UNLOCK".



Voltage:
12V → 9V (10 sec.) measurement by analog circuit tester.

SEL396Y

Refer to wiring diagram in EL-318.

OK or NG

OK	▶	Door lock/unlock switch is OK.
NG	▶	**Check the following.** • Ground circuit for front power window switch. • Harness for open or short between front power window switch and smart entrance control unit. If above systems are normal, replace front power window switch.

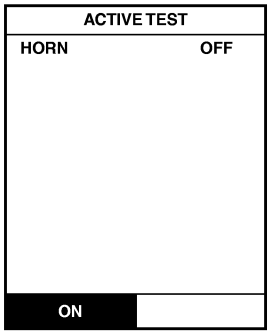
VEHICLE SECURITY HORN AND HEADLAMP ALARM CHECK

=NFEL0123S09

1	CHECK VEHICLE SECURITY HORN AND HEADLAMP ALARM OPERATION WITH CONSULT-II

With CONSULT-II

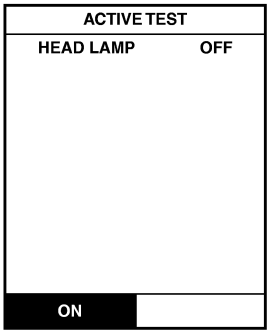
1. Select "ACTIVE TEST" in "THEFT WAR ALM" with CONSULT-II.
2. Select "HORN" and touch "ON".



Vehicle security horn alarm should operate.

SEL041Y

3. Select "HEADLAMP" and touch "ON".



Vehicle security headlamp alarm should operate.

SEL042Y

NOTE:
If CONSULT-II is not available, skip this procedure and go to the nest step.

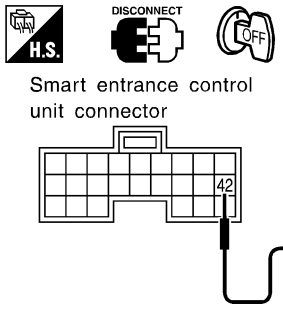
OK or NG

OK	▶	Vehicle security horn and headlamp alarm operation are OK.
NG	▶	GO TO 3.

2	CHECK VEHICLE SECURITY HORN AND HEADLAMP ALARM OPERATION WITHOUT CONSULT-II

Without CONSULT-II

1. Disconnect smart entrance control unit harness connector.
2. Apply ground to smart entrance control unit harness connector M144 terminal 42 (BR/Y).

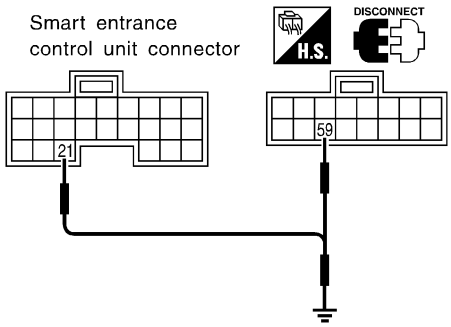


Vehicle security horn should operate.

SEL043YA

Refer to wiring diagram in EL-319.

3. Apply ground to smart entrance control unit harness connector M143 and M145 terminal 21 (OR) and 59 (P).



Vehicle security headlamp alarm should operate.

SEL198Y

Refer to wiring diagram in EL-320.

OK or NG

OK	▶	Horn and headlamp alarm is OK.
NG	▶	GO TO 3.

3	CHECK VEHICLE SECURITY HORN RELAYS

Check vehicle security horn relay-1 and relay-2.

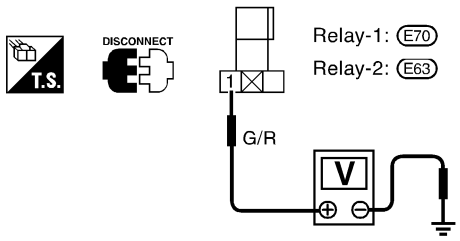
OK or NG

OK	▶	GO TO 4.
NG	▶	Replace.

4	CHECK POWER SUPPLY FOR VEHICLE SECURITY HORN RELAYS

1. Disconnect vehicle security horn relay-1 and relay-2 connectors.
2. Check voltage between terminal 1 and ground.

Vehicle security horn relay connectors



SEL044Y

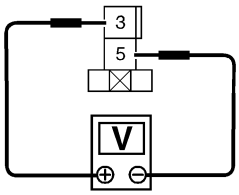
Does battery voltage exist?

Yes	▶	GO TO 5.
No	▶	**Check the following.** ● 10A fuse (No. 61 located in the fuse and fusible link box) ● Harness for open or short between vehicle security horn relays and fuse

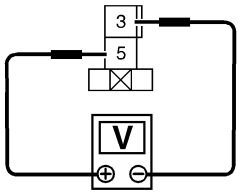
5	CHECK VEHICLE SECURITY HORN RELAYS CIRCUIT

1. Disconnect vehicle security horn relay-1 and relay-2 connectors.
2. Check voltage between terminals of each relay.
   Battery voltage should exist.

Vehicle security horn relay-1 connector E70



Vehicle security horn relay-2 connector E63



SEL045Y

OK or NG

OK	▶	Check harness for open or short between vehicle security horn relay-2 and headlamp relays.
NG	▶	**Check the following.** ● Harness for open or short between vehicle security horn relay-1 and fuse ● Harness for open or short between vehicle security horn relay-1 and relay-2 ● Harness for open or short between vehicle security horn relay-1 and vehicle security horn

Description

NFEL0124

OUTLINE

NFEL0124S01

The smart entrance control unit totally controls the following body electrical system operations.

- Heated steering
- Headlamp system
- Warning chime
- Rear defogger and door mirror defogger
- Power door lock
- Remote keyless entry system
- Vehicle security system
- Interior lamp

In addition, the following timer operations are controlled by the smart entrance control unit.

- Battery saver control
- Retained power control

BATTERY SAVER CONTROL

NFEL0124S02

Headlamps/Parking Lamps/License Lamps/Tail Lamps/Fog Lamps/Illumination Lamps

NFEL0124S0201

While the headlamp is turned ON by “1st” or “2ND” step of light switch, the 5 minute timer is activated when the ignition switch signal changes from ON (or START) to OFF (ACC OFF). The headlamps (including parking, license, tail, fog and illumination lamps) are turned off after 5 minutes.
While the headlamp is turned ON by “AUTO” of light switch, the 5 minute timer is activated when the ignition switch signal changes from ON (or START) to OFF (ACC OFF), and either one of LH or RH front door switch ON signal is input.
The auto light delay off timer is activated as the following:

- When the door switch signal changes from ON to OFF while the timer is activated, the timer in operation is discontinued and the 45 second timer is reset.
- When the door switch signal changes from OFF to ON while the timer is activated, the timer is discontinued and the 45 second timer is reset.
- When the one of four door switch signals changes from OFF to ON while the timer is activated, the timer is discontinued and the 5 minute timer is reset.
- When all the door switch ON signals are input while the timer is activated, the timer is discontinued and the 45 second timer is reset.

Exterior lamp battery saver control mode and auto light delay off timer period can be changed by the function setting of CONSULT-II.

Interior Lamp/Spot Lamp/Vanity Mirror Illumination

NFEL0124S0202

The lamps turn off automatically when the interior lamp, spot lamp or/and vanity mirror illumination are illuminated with the ignition key in the OFF position, if the lamp remains lit by the door switch open signal or if the lamp switch is in the ON position for more than 30 minutes.
After lamps are turned off by the battery saver system, the lamps illuminate again when:

- Driver’s door is locked or unlocked with keyfob, door lock/unlock switch or door key cylinder.
- Ignition switch is turned to ON.
- Door is opened or closed,
- Key is inserted into ignition key cylinder.

Interior lamp battery saver control period can be changed by the function setting of CONSULT-II.

Rear Window Defogger/Door Mirror Defogger

NFEL0124S0203

Rear window defogger and door mirror defogger are turned off in approximately 15 minutes after the rear window defogger switch is turned on.

Heated Steering

NFEL0124S0204

Heated steering is turned off in approximately 30 minutes after the heated steering switch is turned ON.

RETAINED POWER CONTROL

NFEL0124S03

When the ignition switch is turned to OFF (or ACC) position from ON or START position, the following systems can be operated for 45 seconds by the RAP signal from the smart entrance control unit terminal 46.

- Electric sunroof

- Power window

The retained power operation is canceled when the driver or passenger side door is opened.
RAP signal period can be changed by CONSULT-II.

INPUT/OUTPUT

NFEL0124S04

System	Input	Output
Power door lock	Door lock and unlock switch LH and RH Key switch (Insert) Door switches Door key cylinder switches	Door lock actuators
Remote keyless entry	Key switch (Insert) Ignition switch (ACC) Door switches Keyfob signal Door lock/unlock switch LH	Horn relay Vehicle security horn relay-1 Vehicle security horn relay-2 Hazard warning lamp Interior lamp Ignition key hole illumination Door lock actuator Trunk lid opener actuator
Warning chime	Key switch (Insert) Ignition switch (ON) Lighting switch (1st) Seat belt switch (driver's seat) Front door switch LH	Warning chime (located in smart entrance control unit)
Rear window defogger and door mirror defogger	Ignition switch (ON) Rear window defogger switch	Rear window defogger relay
Vehicle security	Ignition switch (ACC, ON) Door switches Hood switch Trunk room lamp switch Door lock/unlock switches Door key cylinder switches (lock/unlock) Trunk lid key cylinder switch (unlock)	Vehicle security horn relay-2 Headlamp relay Security indicator
Interior lamp	Door switches Keyfob signal (lock/unlock) Door lock/unlock switches (lock/unlock) Door key cylinder switch (lock/unlock) Ignition switch (ON) Key switch (Insert)	Interior lamp Key hole illumination Step lamp Door indicator
Battery saver control for headlamps/parking lamps/ licence lamps/tail lamps/fog lamps/illumination lamps	Ignition switch (ON) Front door switches Lighting switches	Headlamps Parking lamps Licence lamps Tail lamps Fog lamps Illumination lamps
Battery saver control for interior lamp/spot lamp/vanity mirror illumination	Ignition switch (ON) Front door switches Lamp switches	Interior lamp Step lamp Spot lamp Vanity mirror illumination
Battery saver control for rear window defogger and door mirror defogger	Ignition switch (ON) Rear window defogger switch	Rear window defogger relay
Retained power control for electric sunroof	Ignition switch (ON) Front door switches	Sunroof motor
Retained power control for power window	Ignition switch (ON) Front door switches	Power window relay

Description (Cont'd)

System	Input	Output
Heated steering	Ingition switch (ON) Heated steering switch (ON)	Heated steering relay

CONSULT-II

NFEL0247

DIAGNOSTIC ITEMS APPLICATION

NFEL0247S01

Item (CONSULT-II screen terms)	Diagnosed system	DATA MONITOR	ACTIVE TEST	WORK SUPPORT
DOOR LOCK	Power door lock	X	X	X
REAR DEFOGGER	Rear window defogger	X	X	
KEY WARN ALM	Warning chime	X	X	
LIGHT WARN ALM	Warning chime	X	X	
SEAT BELT ALM	Warning chime	X	X	
INT LAMP	Interior lamps	X	X	X
BATTERY SAVER	Battery saver control for interior lamp	X	X	X
THEFT WAR ALM	Vehicle security system	X	X	X
RETAINED PWR	Retained power control	X	X	X
MULTI REMOTE ENT	Remote keyless entry system	X	X	X
HEAD LAMP	Headlamp	X	X	X

X: Applicable

For diagnostic item in each control system, refer to the relevant pages for each system.

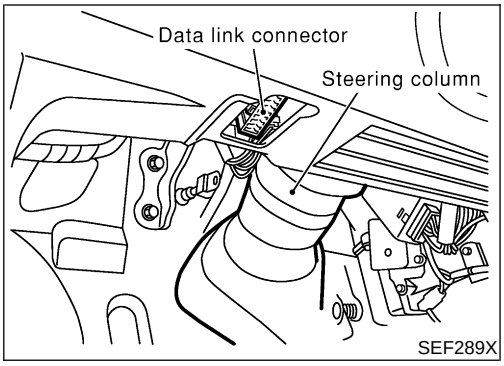
CONSULT-II (Cont'd)

DIAGNOSTIC ITEM DESCRIPTION

=NFEL0247S02

MODE	Description
DATA MONITOR	Input/output data in the smart entrance control unit can be read.
ACTIVE TEST	Diagnostic Test Mode in which CONSULT-II drives some systems apart from the smart entrance control unit.
WORK SUPPORT for DOOR LOCK	• Select unlock mode ON-OFF setting can be changed. • Key reminder door mode ON-OFF setting can be changed.
WORK SUPPORT for INT LAMP	Interior lamp timer mode ON-OFF setting can be changed.
WORK SUPPORT for BATTERY SAVER	Interior lamp battery saver period can be changed.
WORK SUPPORT for THEFT WAR ALM	• The recorded trigger signal when vehicle security system was activated can be checked. • Security alarm ON-OFF setting can be changed.
WORK SUPPORT for RETAINED PWR SET	RAP signal's power supply period can be changed.
WORK SUPPORT for MULTI REMOTE ENT	• ID code of keyfob can be registered and erased. • Keyless answer back mode can be changed. • Pressing time of panic alarm, trunk lid opener and door unlock (for power window down operation) buttons on keyfob can be changed. • Auto lock operation starting time can be changed.
WORK SUPPORT for HEAD LAMP	• Auto light sensitivity can be changed. • Exterior lamp battery saver control ON-OFF setting can be changed. • Auto light delay off time can be changed.

CONSULT-II (Cont'd)

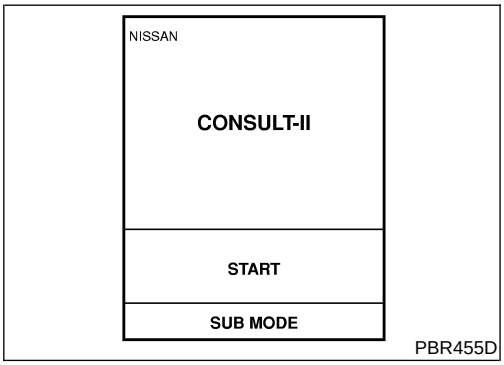


SEF289X

CONSULT-II INSPECTION PROCEDURE

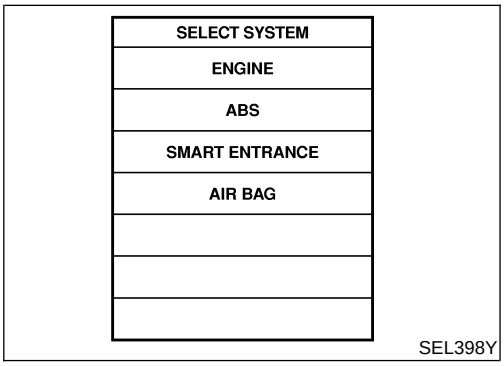
=NFEL0247S03

1. Turn the ignition switch "OFF".
2. Connect "CONSULT-II" to the data link connector.



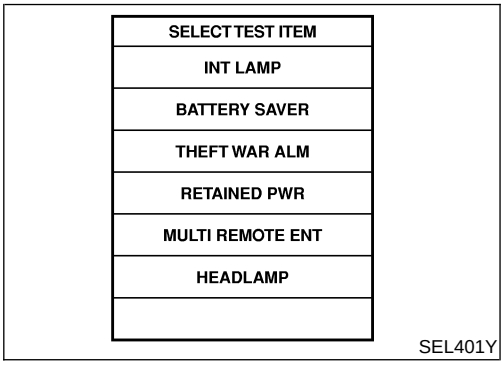
PBR455D

3. Turn ignition switch "ON".
4. Touch "START".



SEL398Y

5. Touch "SMART ENTRANCE".



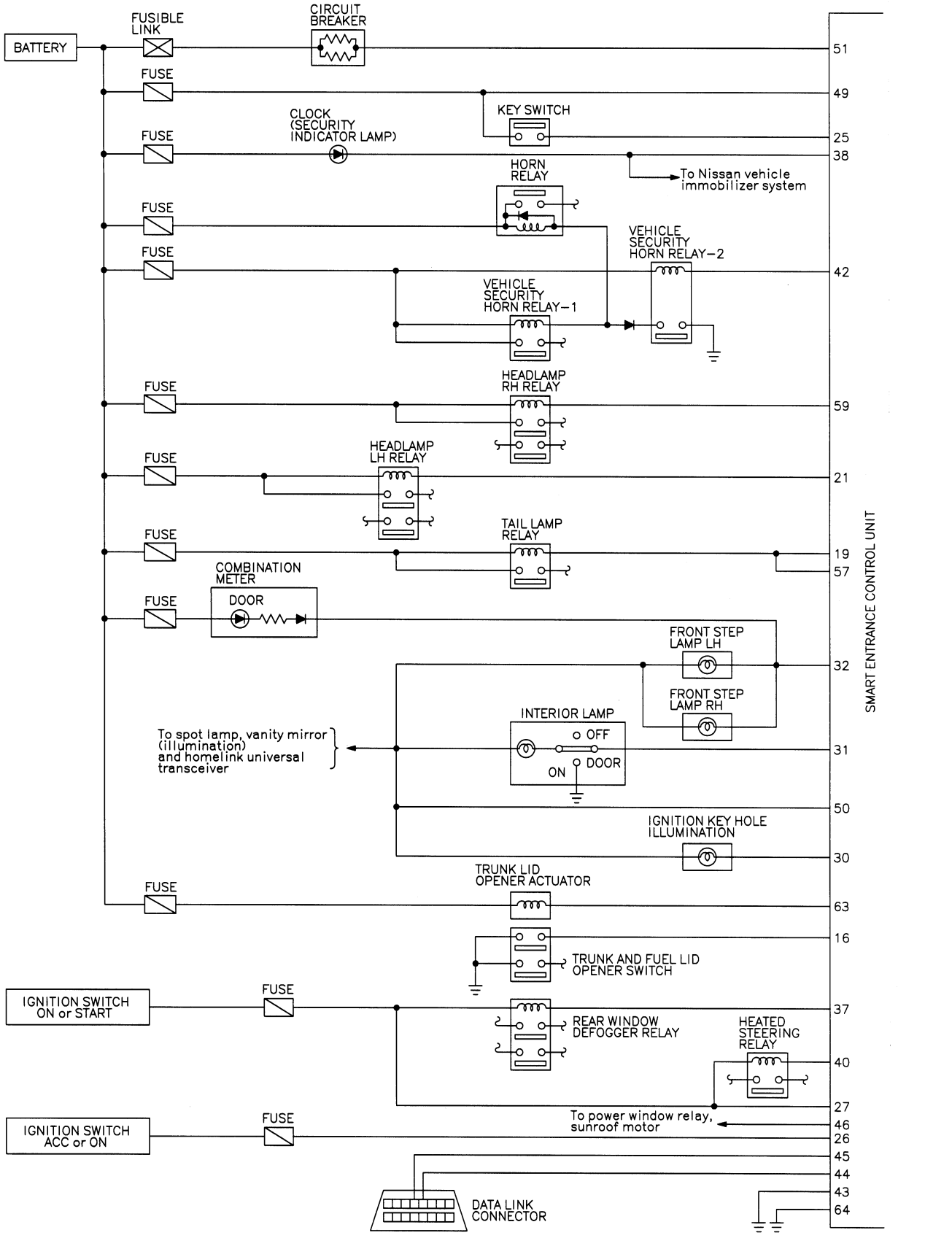
SEL401Y

6. Perform each diagnostic item according to "DIAGNOSTIC ITEMS APPLICATION". Refer to EL-344.

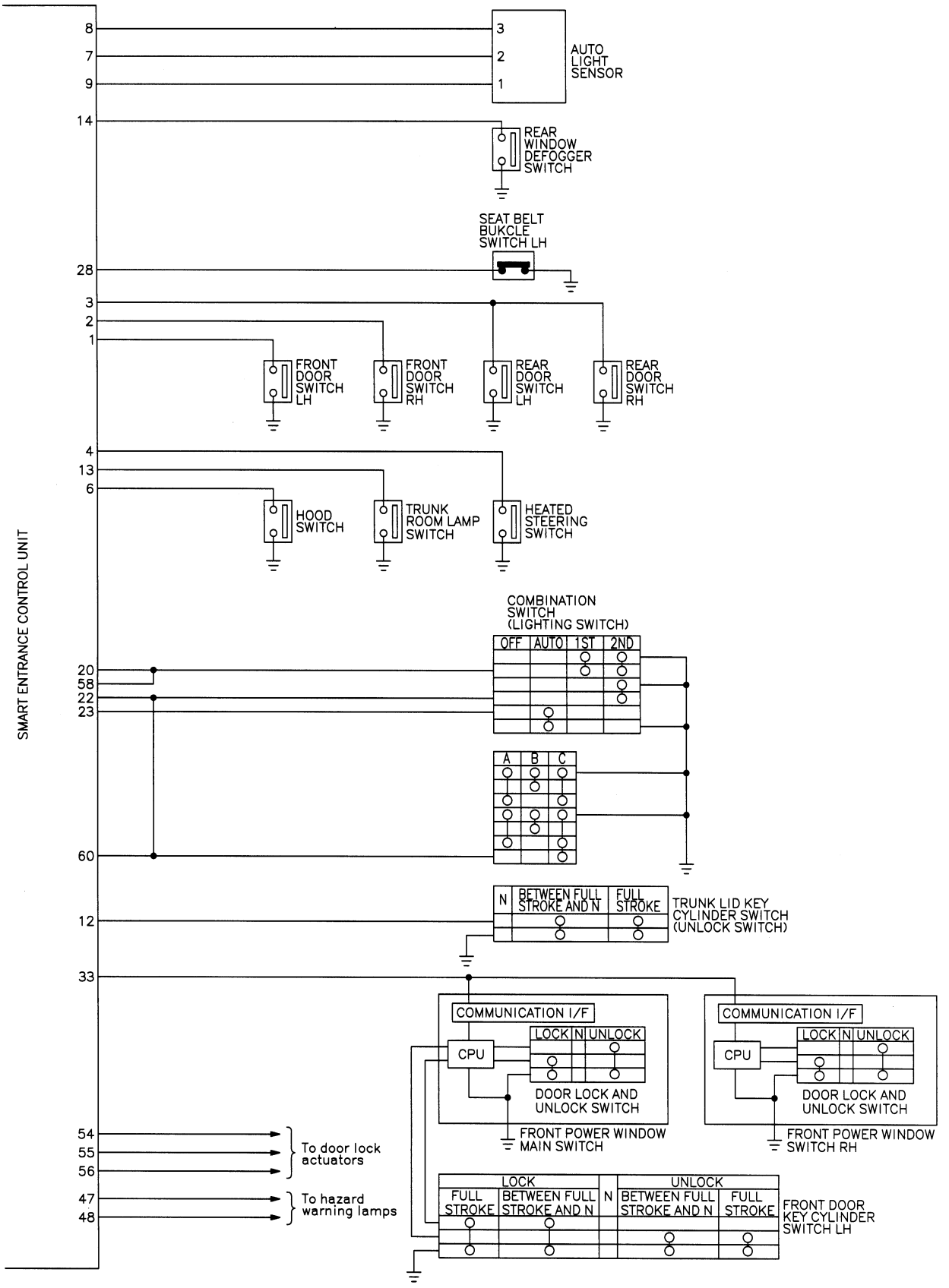
NOTE:

Schematic

NFEL0125



MEL188O


SMART ENTRANCE CONTROL UNIT
8
7
9
3
2
1
AUTO LIGHT SENSOR
14
REAR WINDOW DEFOGGER SWITCH
SEAT BELT BUKCLE SWITCH LH
28
3
2
1
FRONT DOOR SWITCH LH
FRONT DOOR SWITCH RH
REAR DOOR SWITCH LH
REAR DOOR SWITCH RH
4
13
6
HOOD SWITCH
TRUNK ROOM LAMP SWITCH
HEATED STEERING SWITCH
COMBINATION SWITCH (LIGHTING SWITCH)
OFF AUTO 1ST 2ND
20
58
22
23
A B C
60
N BETWEEN FULL STROKE AND N FULL STROKE
TRUNK LID KEY CYLINDER SWITCH (UNLOCK SWITCH)
12
33
COMMUNICATION I/F
CPU
LOCK N UNLOCK
DOOR LOCK AND UNLOCK SWITCH
FRONT POWER WINDOW MAIN SWITCH
FRONT POWER WINDOW SWITCH RH
54
55
56
To door lock actuators
47
48
To hazard warning lamps
LOCK
UNLOCK
FULL STROKE
BETWEEN FULL STROKE AND N
N
FRONT DOOR KEY CYLINDER SWITCH LH

MEL189O

Smart Entrance Control Unit Inspection Table

NFEL0262

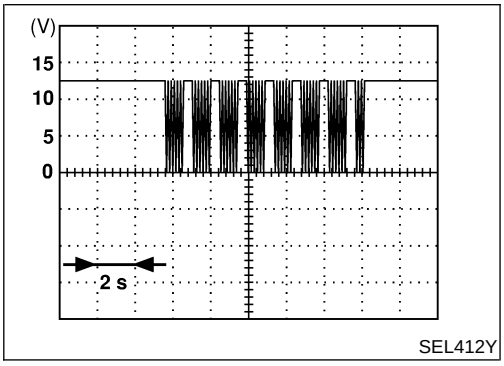
Terminal No.	Wire color	Connections	Operated condition			Voltage (Approximate values)
1	LG	Driver door switch	OFF (Closed) → ON (Open)			12V → 0V
2	R/L	Passenger door switch	OFF (Closed) → ON (Open)			5V → 0V
3	R/W	Rear door switch	OFF (Closed) → ON (Open)			5V → 0V
4	G	Heated steering switch	OFF → ON (Only when pushed)			5V → 0V
6	Y/R	Hood switch	ON (Open) → OFF (Closed)			0V → 12V
7	W/R	Auto light sensor (Signal)	Ignition switch ON position	Light is applied to auto light sensor.		1 to 5V
				Light is not applied to auto light sensor.		Less than 1V
8	P/B	Auto light sensor (GND)	—			—
9	R	Auto light sensor (Power)	Ignition switch (OFF → ON)			0V → 5V
12	G/B	Trunk lid key cylinder switch	OFF (Neutral) → ON (Unlock)			5V → 0V
13	PU/Y	Trunk room lamp switch	ON (Open) → OFF (Closed)			0V → 12V
14	G/W	Rear window defogger switch	OFF → ON (Only when pushed)			5V → 0V
16	L	Trunk and fuel lid opener switch	OFF → ON (Only when pulled)			12V → 0V
19	Y/B	Tail lamp relay (Output)	Ignition switch (with lighting switch 1ST or 2ND)	ON or START → OFF position	More than 5 minutes after ignition switch is turned to OFF position	12V
					Within 5 minutes after ignition switch is turned to OFF position	0V
				ON or START position		0V
			Headlamps illuminate by auto light control. (Operate → Not operate)			Less than 1V → 12V
20	SB	Tail lamp switch	Light switch (OFF or AUTO → 1ST or 2ND position)			12V → 0V
21	OR	Headlamp LH relay	Ignition switch (with lighting switch 2ND)	ON or START → OFF position	More than 5 minutes after ignition switch is turned to OFF position	12V
					Within 5 minutes after ignition switch is turned to OFF position	0V
				ON or START position		0V
			Headlamps illuminate by auto light control.			0V

Smart Entrance Control Unit Inspection Table (Cont'd)

Terminal No.	Wire color	Connections	Operated condition		Voltage (Approximate values)
22	L/OR	Headlamp switch	Lighting switch	Except PASS or 2ND position	12V
				PASS or 2ND position	0V
			Headlamps illuminate by auto light control. (Operate → Not operate)		10V→ 12V
23	L/Y	Headlamp switch	Ignition switch "ON" position	Lighting switch (Except AUTO → AUTO position)	12V → 0V
25	B/R	Ignition key switch (Insert)	Key inserted → Key removed from IGN key cylinder		12V → 0V
26	PU	Ignition switch (ACC)	"ACC" position		12V
27	G	Ignition switch (ON)	Ignition switch is in "ON" position		12V
28	OR	Seat belt buckle switch	Unfastened → Fastened (Ignition key is in "ON" position)		0V → 12V
30	R/Y	Ignition keyhole illumination	When doors are unlocked using keyfob (OFF → Unlock)		12V → 0V
31	R	Interior lamp	When doors are locked using keyfob (Unlock → lock with lamp switch in "DOOR" position)		0V → 12V
32	R/W	Front step lamp	Any door switch	ON (Open) → OFF (Closed)	0V → 12V
33	L	Communication interface	Door lock & unlock switches (Neutral → Lock/Unlock)		EL-352
			Front door key cylinder switch LH (Neutral → Lock/Unlock)		
37	G/R	Rear window defogger relay	OFF → ON (Ignition key is in "ON" position)		12V → 0V
38	G/OR	Security indicator	Goes off → Illuminates		12V → 0V
40	B/R	Heated steering relay	OFF → ON (Ignition key is in "ON" position)		12 → 0V
42	BR/Y	Vehicle Security horn relay	When panic alarm is operated using keyfob (ON → OFF)		12V → 0V
43	B	Ground	—		—
46	PU	Power window relay	Retained power operation is operated (ON → OFF)		12V → 0V
47	GY/L	LH turn signal lamp	When door lock or unlock is operated using keyfob (ON → OFF)		12V → 0V
48	GY/R	RH turn signal lamp	When door lock or unlock is operated using keyfob (ON → OFF)		12V → 0V
49	R/B	Power source (Fuse)	—		12V
50	R/G	Battery saver (Interior lamp)	Battery saver operates → Does not operate (ON →OFF)		12V → 0V
51	W/R	Power source (PTC)	—		12V
54	GY	Door lock actuators	Door lock & unlock switch (Free → Lock)		0V → 12V
55	W/B	Driver door lock actuator	Door lock & unlock switch (Free → Unlock)		0V → 12V
56	GY	Passenger and rear doors lock actuator	Door lock & unlock switch (Free → Unlock)		0V → 12V

Smart Entrance Control Unit Inspection Table (Cont'd)

Terminal No.	Wire color	Connections	Operated condition			Voltage (Approximate values)
57	Y/B	Tail lamp relay	Ignition switch (with lighting switch 1ST or 2ND)	ON or START → OFF position	More than 5 minutes after ignition switch is turned to OFF position	12V
					Within 5 minutes after ignition switch is turned to OFF position	0V
				ON or START position		0V
			Headlamps illuminate by auto light control. (Operate → Not operate)			Less than 1V → 12V
58	SB	Tail lamp switch	Lighting switch (OFF or AUTO → 1ST or 2ND)			12V → 0V
59	P	Headlamp RH relay	Ignition switch (with lighting switch 2ND)	ON or START → OFF position	More than 5 minutes after ignition switch is turned to OFF position	12V
					Within 5 minutes after ignition switch is turned to OFF position	0V
				ON or START position		0V
			Headlamps illuminate by auto light control. (Operate → Not operate)			Less than 1V → 12V
60	LG/R	Headlamp switch	Lighting switch	Except PASS or 2ND position		12V
				PASS or 2ND position		0V
			Headlamps illuminate by auto light control. (Operate → Not operate)			10V → 12V
63	L	Trunk lid opener actuator	When trunk lid opener actuator is operated using keyfob. (ON → OFF)			0V → 12V
64	B	Ground	—			—



COMMUNICATION INTERFACE SIGNAL

NFEL0262S01

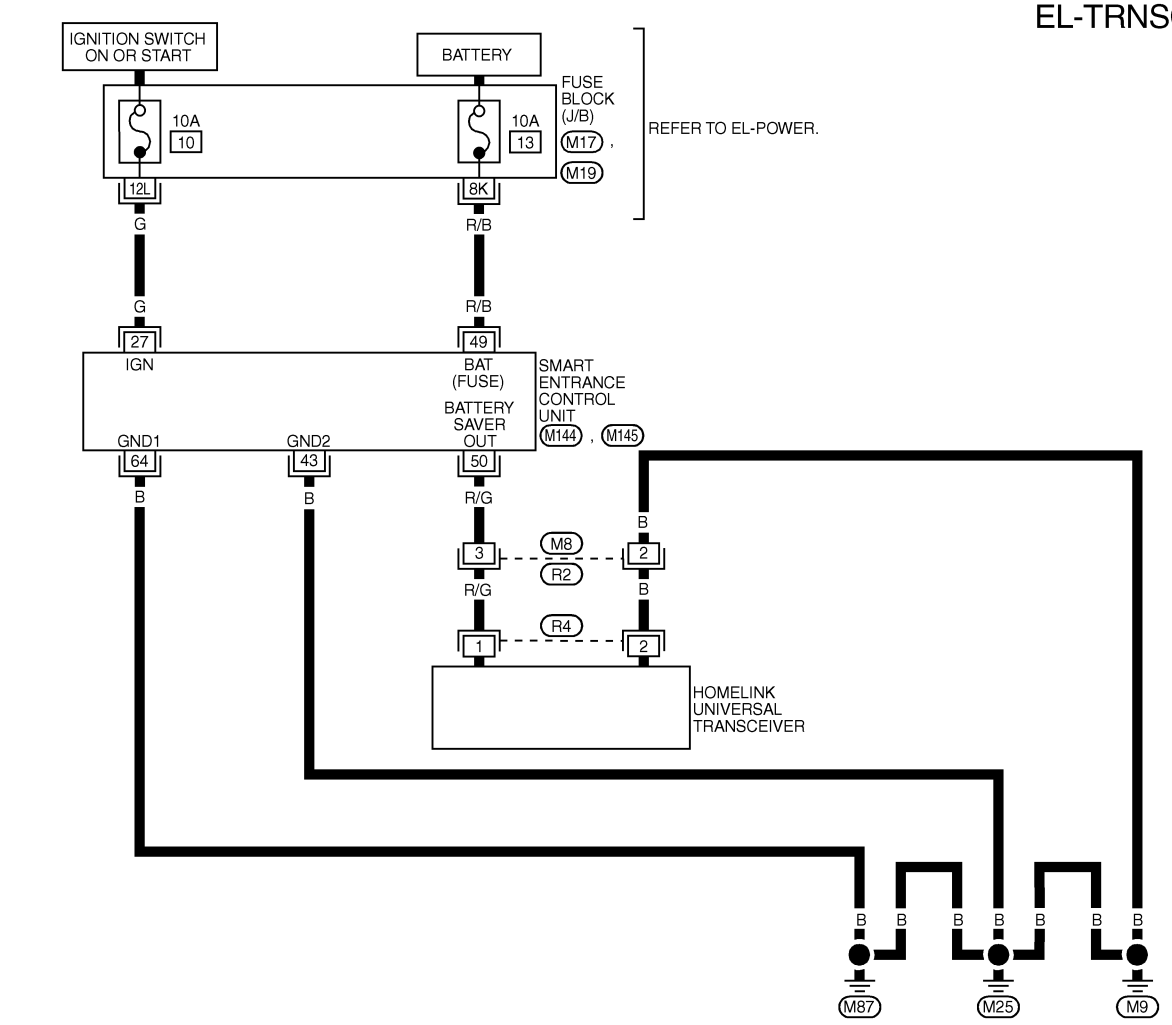
Voltage:

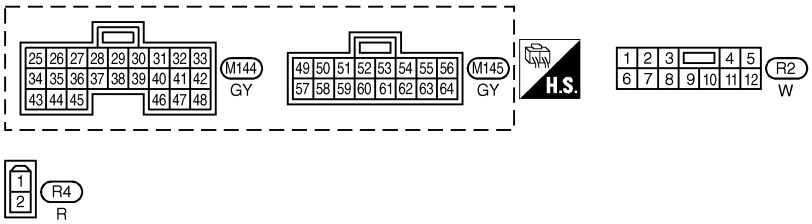
12 V → 9V (10 sec.) measurement by analog circuit tester.

Wiring Diagram — TRNSCV—

NFEL0127

EL-TRNSCV-01





REFER TO THE FOLLOWING.
M17 , M19 – FUSE BLOCK – JUNCTION BOX (J/B)

MEL190O

SMART ENTRANCE CONTROL UNIT TERMINALS AND REFERENCE VALUE BETWEEN EACH TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
27	G	IGNITION SWITCH (ON)	IGNITION KEY IS IN “ON” POSITION	12V
43	B	GROUND	–	–
49	R/B	POWER SOURCE (FUSE)	–	12V
50	R/G	BATTERY SAVER (INTERIOR LAMP)	BATTERY SAVER DOSE OPERATE → DOES NOT OPERATE (ON → OFF)	12V → 0V
64	B	GROUND	–	–

SEL983X

Trouble Diagnoses

NFEL0128

DIAGNOSTIC PROCEDURE

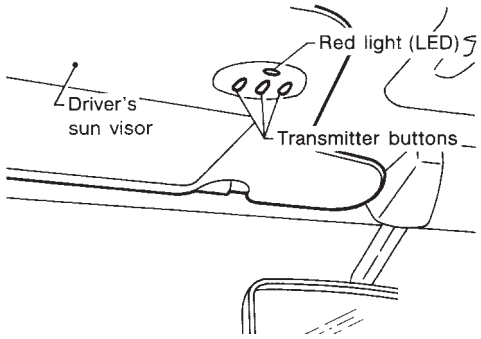
NFEL0128S01

SYMPTOM: Transmitter does not activate receiver.

Before conducting the procedure given below, make sure that system receiver (garage door opener, etc.) operates with original, hand-held transmitter. If NG, receiver or hand-held transmitter is malfunctioning, not vehicle related.

1	PRELIMINARY CHECK

1. Turn ignition switch “OFF”.
2. Does red light (LED) of transmitter illuminate when any button is pressed?



SEL442U

Yes or No

Yes	▶	GO TO 2.
No	▶	GO TO 3.

2	CHECK TRANSMITTER FUNCTION

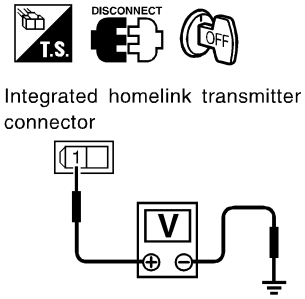
Check transmitter with Tool.
For details, refer to Technical Service Bulletin.

OK or NG

OK	▶	Receiver or handheld transmitter is malfunctioning, not vehicle related.
NG	▶	Replace transmitter with sun visor assembly.

3	CHECK POWER SUPPLY

1. Disconnect transmitter connector.
2. Turn ignition switch “OFF”.
3. Check voltage between terminal 1 and body ground. (Within 10 minutes after turn ignition switch “OFF”.)



Integrated homelink transmitter connector

Battery voltage should exist.

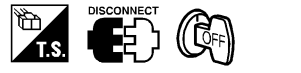
SEL367W

OK or NG

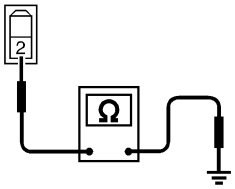
OK	▶	GO TO 4.
NG	▶	Check fuse (10A) and repair harness.

4	CHECK GROUND CIRCUIT

Check continuity between terminal 2 and ground.



Integrated homelink transmitter connector



Continuity should exist.

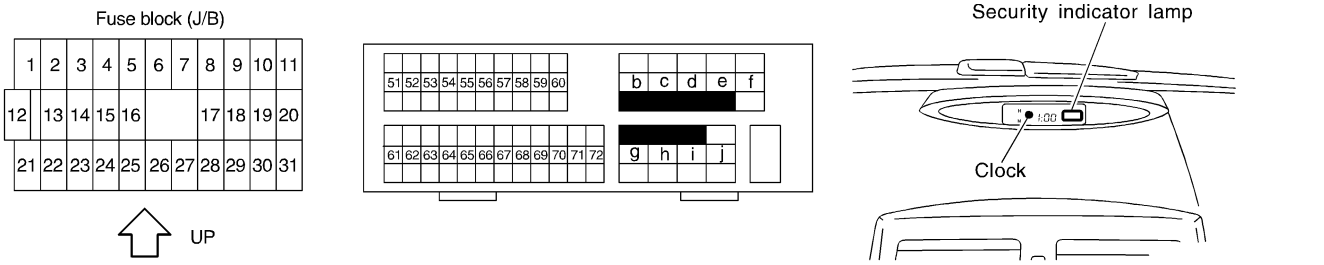
SEL368W

OK or NG

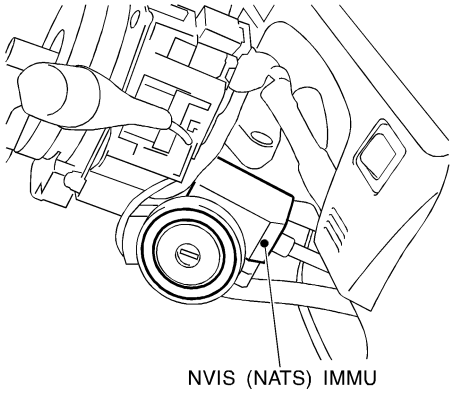
OK	▶	Replace transmitter with sun visor assembly.
NG	▶	Repair harness.

Component Parts and Harness Connetor Location

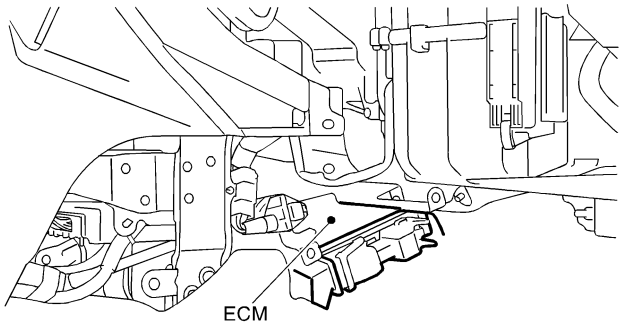
NFEL0172



View with steering wheel and steering column removed



View with glove box removed



SEL301W

NOTE:
If customer reports a “No Start” condition, request ALL KEYS be brought to a NISSAN dealer to check for an NVIS (NATS) malfunction.

System Description

=NFEL0173

NVIS (Nissan Vehicle Immobilizer System-NATS) has the following immobilizer functions:

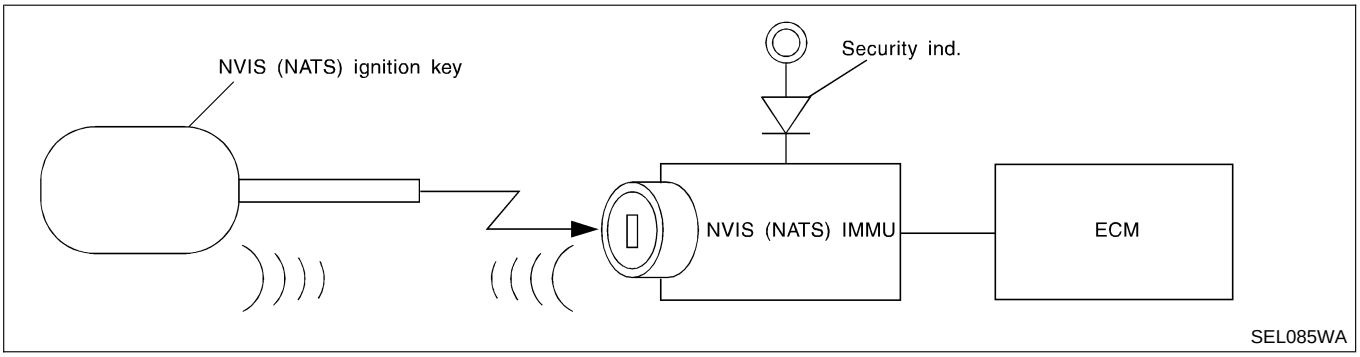
- Since only NVIS (NATS) ignition keys, whose ID nos. have been registered into the ECM and IMMU of NVIS (NATS), allow the engine to run, operation of a stolen vehicle without an NVIS (NATS) registered key is prevented by NVIS (NATS).
  That is to say, NVIS (NATS) will immobilize the engine if someone tries to start it without the registered key of NVIS (NATS).
- All of the originally supplied ignition key IDs have been NVIS (NATS) registered.
  If requested by the vehicle owner, a maximum of five key IDs can be registered into the NVIS (NATS) components.
- The security indicator blinks when the ignition switch is in “OFF” or “ACC” position. Therefore, NVIS (NATS) warns outsiders that the vehicle is equipped with the anti-theft system.
- When NVIS (NATS) detects trouble, the security indicator lamp lights up while ignition key is in the “ON” position.
- NVIS (NATS) trouble diagnoses, system initialization and additional registration of other NVIS (NATS) ignition key IDs must be carried out using CONSULT-II hardware and CONSULT-II NVIS (NATS) software. Regarding the procedures of NVIS (NATS) initialization and NVIS (NATS) ignition key ID registration, refer to CONSULT-II operation manual, IVIS/NVIS.
- **When servicing a malfunction of the NVIS (indicated by lighting up of Security Indicator Lamp) or registering another NVIS ignition key ID no., it is necessary to re-register original key identification. Therefore, be sure to receive ALL KEYS from vehicle owner.**

System Composition

NFEL0174

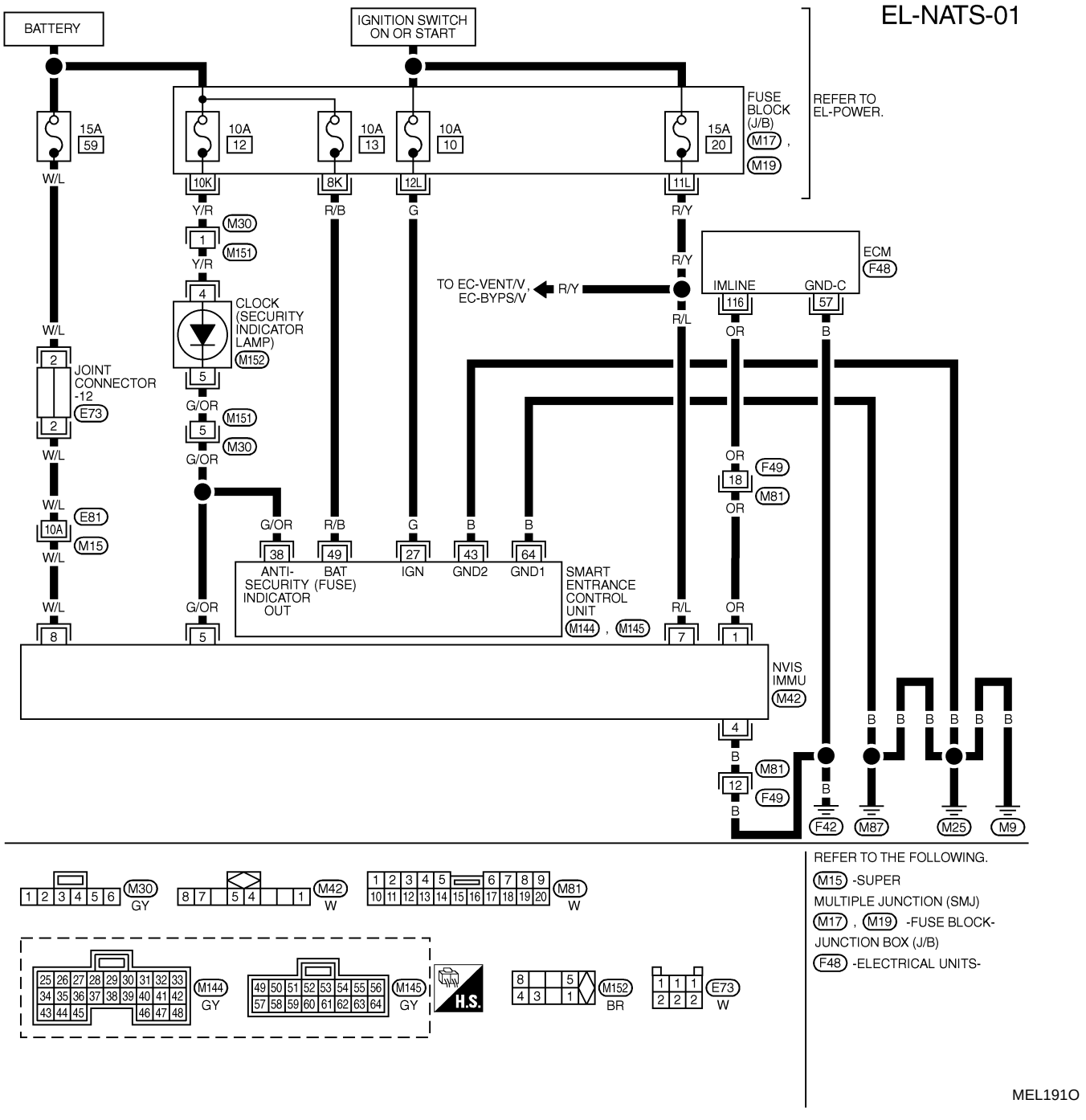
The immobilizer function of the NVIS (NATS) consists of the following:

- NVIS (NATS) ignition key
- NVIS (NATS) immobilizer control unit (IMMU) located in the ignition key cylinder
- Engine control module (ECM)
- Security indicator



Wiring Diagram — NATS —

NFEL0175



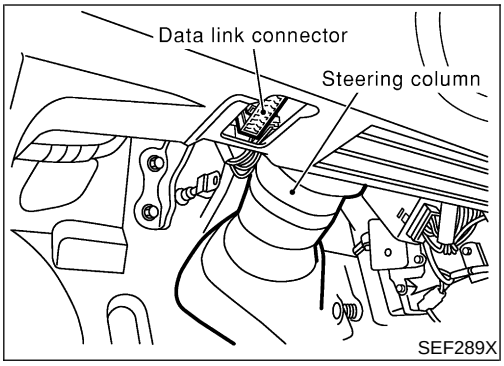
REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)
M17, M19 -FUSE BLOCK- JUNCTION BOX (J/B)
F48 -ELECTRICAL UNITS-

MEL191O

SMART ENTRANCE CONTROL UNIT TERMINALS AND REFERENCE VALUE BETWEEN EACH TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
27	G	IGNITION SWITCH (ON)	IGNITION KEY IS IN “ON” POSITION	12V
38	G/OR	SECURITY INDICATOR	GOES OFF → ILLUMINATES	12V → 0V
43	B	GROUND	–	–
49	R/B	POWER SOURCE (FUSE)	–	12V
64	B	GROUND	–	–

SEL984X



SEF289X

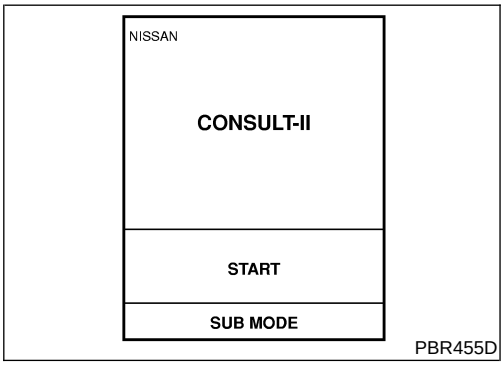
CONSULT-II

NFEL0176

CONSULT-II INSPECTION PROCEDURE

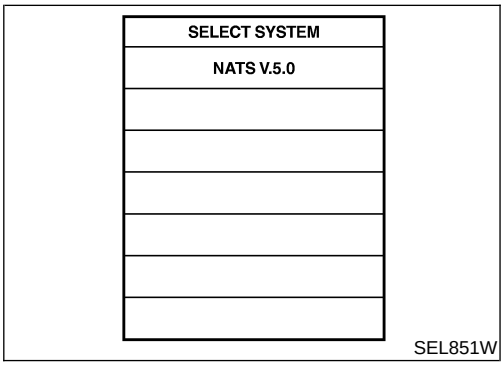
NFEL0176S01

1. Turn ignition switch OFF.
2. Connect “CONSULT-II” to Data link connector.



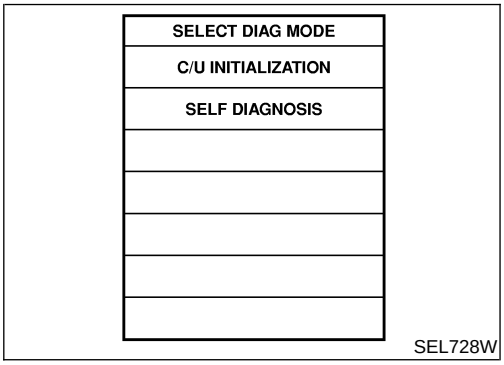
PBR455D

3. Insert NVIS (NATS) program card into CONSULT-II.
   ⬅: Program card
   NATS (AEN00A)
4. Turn ignition switch ON.
5. Touch “START”.



SEL851W

6. Select “NATS” V.5.0”.



SEL728W

7. Perform each diagnostic test mode according to each service procedure.

For further information, see the CONSULT-II Operation Manual, IVIS/NVIS.

CONSULT-II DIAGNOSTIC TEST MODE FUNCTION

NFEL0176S02

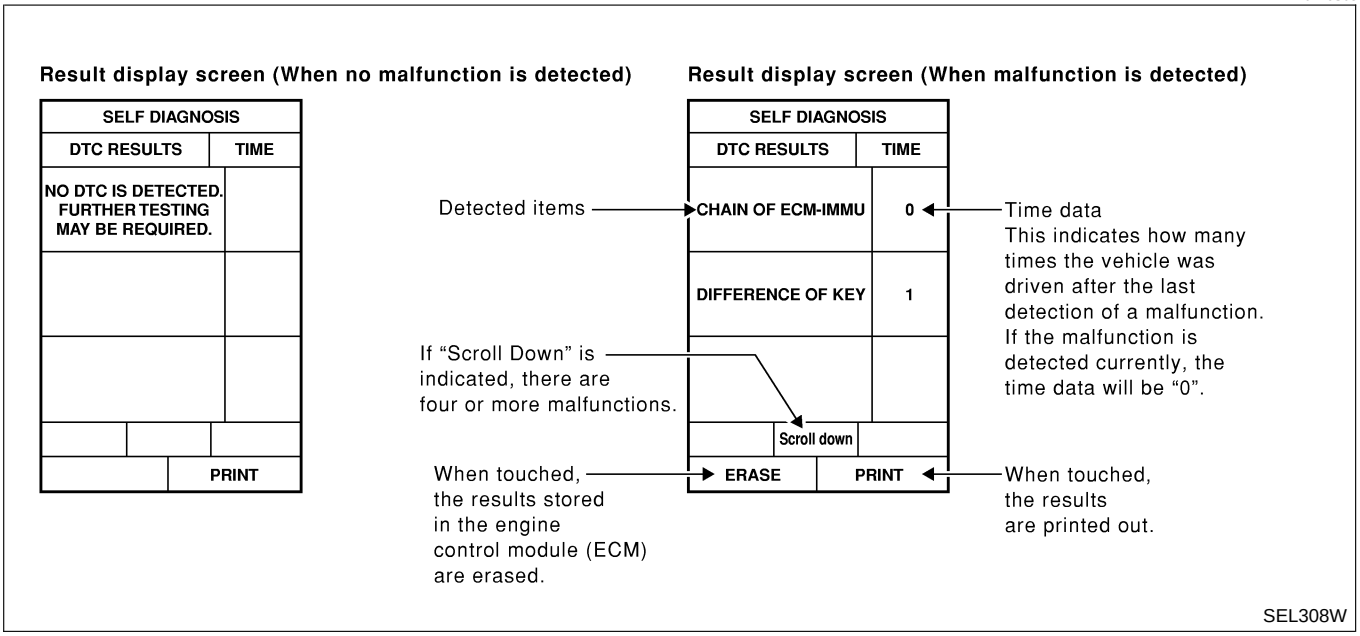
CONSULT-II DIAGNOSTIC TEST MODE	Description
C/U INITIALIZATION	When replacing any of the following three components, C/U initialization is necessary. [NVIS (NATS) ignition key/IMMU/ECM]
SELF DIAGNOSIS	Detected items (screen terms) are as shown in the chart EL-360.

NOTE:

- **When any initialization is performed, all ID previously registered will be erased and all NVIS (NATS) ignition keys must be registered again.**
- The engine cannot be started with an unregistered key. In this case, the system will show "DIFFERENCE OF KEY" or "LOCK MODE" as a self-diagnostic result on the CONSULT-II screen.
- In rare case, "CHAIN OF ECM-IMMU" might be stored as a self-diagnostic result during key registration procedure, even if the system is not malfunctioning.

HOW TO READ SELF-DIAGNOSTIC RESULTS

NFEL0176S03



SEL308W

NVIS (NATS) SELF-DIAGNOSTIC RESULTS ITEM CHART

NFEL0176S04

Detected items (NATS program card screen terms)	P No. Code (Self-diagnostic result of "ENGINE"	Malfunction is detected when	Reference page
ECM INT CIRC-IMMU	NATS MALFUNCTION P1613	The malfunction of ECM internal circuit of IMMU communication line is detected.	EL-364
CHAIN OF ECM-IMMU	NATS MALFUNCTION P1612	Communication impossible between ECM and IMMU (In rare case, "CHAIN OF ECM-IMMU" might be stored during key registration procedure, even if the system is not malfunctioning.)	EL-365
DIFFERENCE OF KEY	NATS MALFUNCTION P1615	IMMU can receive the key ID signal but the result of ID verification between key ID and IMMU is NG.	EL-369
CHAIN OF IMMU-KEY	NATS MALFUNCTION P1614	IMMU cannot receive the key ID signal.	EL-370
ID DISCORD, IMM-ECM	NATS MALFUNCTION P1611	The result of ID verification between IMMU and ECM is NG. System initialization is required.	EL-371

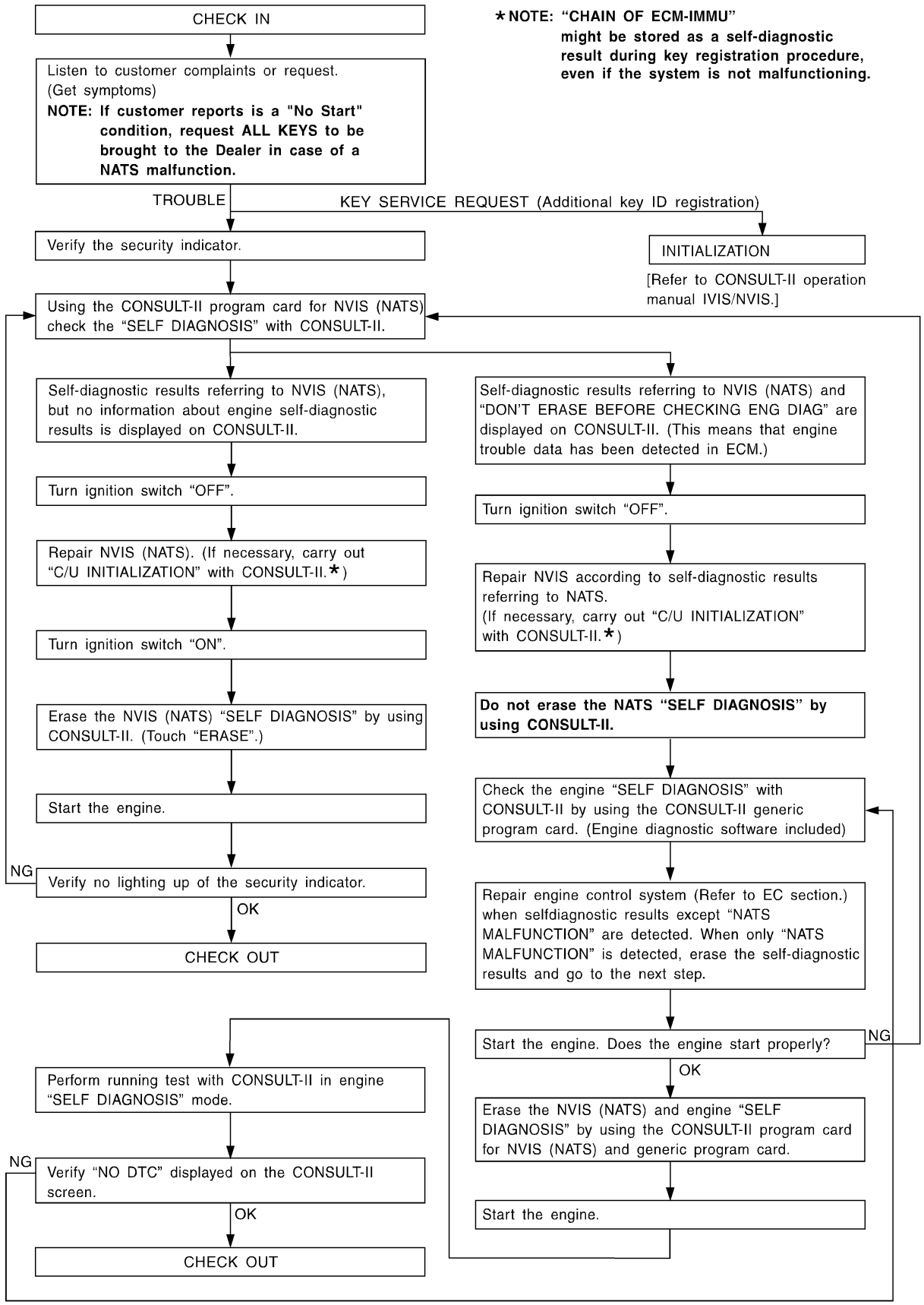
Detected items (NATS program card screen terms)	P No. Code (Self-diagnostic result of "ENGINE"	Malfunction is detected when	Reference page
LOCK MODE	NATS MALFUNCTION P1610	When the starting operation is carried out five or more times consecutively under the following conditions, NVIS (NATS) will shift the mode to one which prevents the engine from being started. ● Unregistered ignition key is used. ● IMMU or ECM's malfunctioning.	EL-374
DON'T ERASE BEFORE CHECKING ENG DIAG	—	All engine trouble codes except NVIS (NATS) trouble code has been detected in ECM.	EL-362

Trouble Diagnoses

NFEL0177

WORK FLOW

NFEL0177S01



SEL004XA

SYMPTOM MATRIX CHART 1
(Self-diagnosis related item)

NFEL0177S02

SYMPTOM	Displayed "SELF-DIAG RESULTS" on CONSULT-II screen.	DIAGNOSTIC PROCEDURE (Reference page)	SYSTEM (Malfunctioning part or mode)	REFERENCE PART NO. OF ILLUSTRATION ON NEXT PAGE
• Security indicator lighting up* • Engine hard to start	ECM INT CIRC-IMMU	PROCEDURE 1 (EL-364)	ECM	B
	CHAIN OF ECM-IMMU	PROCEDURE 2 (EL-365)	In rare cases, "CHAIN OF ECM-IMMU" might be stored during the key registration procedure, even if the system is not malfunctioning.	—
			Open circuit in battery voltage line of IMMU circuit	C1
			Open circuit in ignition line of IMMU circuit	C2
			Open circuit in ground line of IMMU circuit	C3
			Open circuit in communication line between IMMU and ECM	C4
			Short circuit between IMMU and ECM communication line and battery voltage line	C4
			Short circuit between IMMU and ECM communication line and ground line	C4
			ECM	B
			IMMU	A
	DIFFERENCE OF KEY	PROCEDURE 3 (EL-369)	Unregistered key	D
			IMMU	A
	CHAIN OF IMMU-KEY	PROCEDURE 4 (EL-370)	Malfunction of key ID chip	E
			IMMU	A
	ID DISCORD, IMM-ECM	PROCEDURE 5 (EL-371)	System initialisation has not yet been completed.	F
			ECM	F
	LOCK MODE	PROCEDURE 7 (EL-374)	LOCK MODE	D
• MIL staying ON • Security indicator lighting up*	DON'T ERASE BEFORE CHECKING ENG DIAG	WORK FLOW (EL-362)	Engine trouble data and NVIS (NATS) trouble data have been detected in ECM	—

*: When NVIS (NATS) detects trouble, the security indicator lights up while ignition key is in the "ON" position.

SYMPTOM MATRIX CHART 2

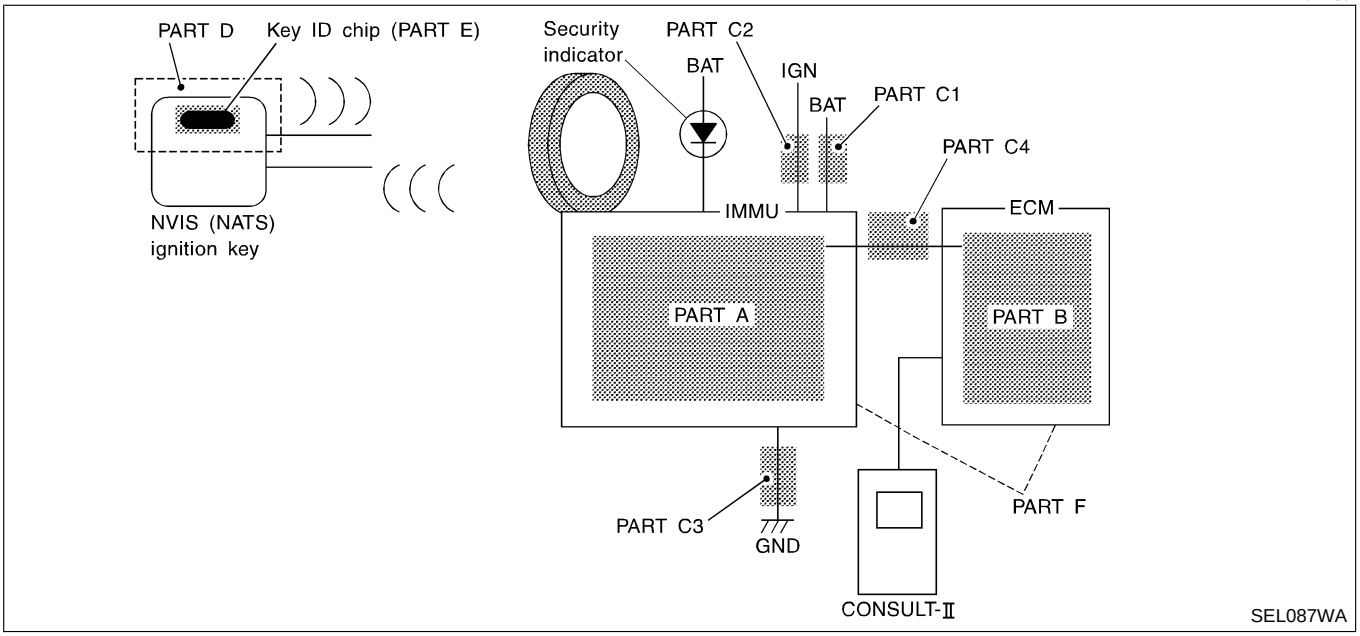
NFEL0177S03

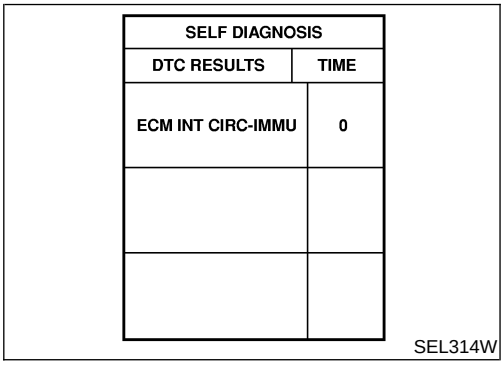
(Non self-diagnosis related item)

SYMPTOM	DIAGNOSTIC PROCEDURE (Reference page)	SYSTEM (Malfunctioning part or mode)
Security ind. does not light up.	PROCEDURE 6 (EL-372)	Security ind.
		Open circuit between Fuse and IMMU
		Continuation of initialization mode
		IMMU

DIAGNOSTIC SYSTEM DIAGRAM

NFEL0177S04





DIAGNOSTIC PROCEDURE 1

NFEL0177S06

Self-diagnostic results:
"ECM INT CIRC-IMMU" displayed on CONSULT-II screen

1. Confirm SELF-DIAGNOSTIC RESULTS "ECM INT CIRC-IMMU" displayed on CONSULT-II screen. Ref. part No. B.
2. Replace ECM.
3. Perform initialization with CONSULT-II.
   For initialization, refer to "CONSULT-II operation manual IVIS/NVIS".

DIAGNOSTIC PROCEDURE 2

=NFEL0177S07

Self-diagnostic results:
"CHAIN OF ECM-IMMU" displayed on CONSULT-II screen

1	CONFIRM SELF-DIAGNOSTIC RESULTS

Confirm SELF-DIAGNOSTIC RESULTS "CHAIN OF ECM-IMMU" displayed on CONSULT-II screen.
NOTE:
In rare cases "CHAIN OF ECM-IMMU" might be stored during the key registration procedure, even if the system is not malfunctioning.

SELF DIAGNOSIS	
DTC RESULTS	TIME
CHAIN OF ECM-IMMU	0

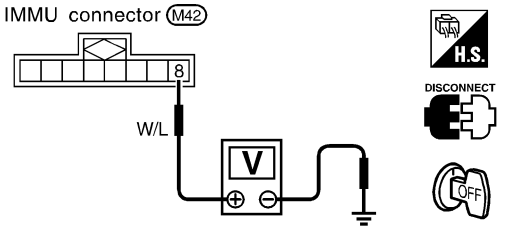
SEL292W

Is CONSULT-II screen displayed as above?

Yes	▶	GO TO 2.
No	▶	GO TO SYMPTOM MATRIX CHART 1.

2	CHECK POWER SUPPLY CIRCUIT FOR IMMU

1. Disconnect IMMU connector.
2. Check voltage between terminal 8 of IMMU and ground with CONSULT-II or tester.



Battery voltage should exist.

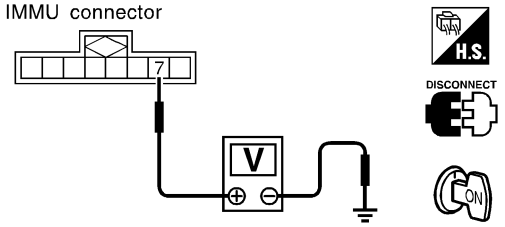
SEL302W

OK or NG

OK	▶	GO TO 3.
NG	▶	**Check the following** ● 15A fuse (No. 59, located in the fuse and fusible link box) ● Harness for open or short between fuse and IMMU connector **Ref. Part No. C1**

3	CHECK IGN SW. ON SIGNAL

1. Turn ignition switch ON.
2. Check voltage between terminal 7 (R/L) of IMMU connector (M42) and ground with CONSULT-II or tester.



Battery voltage should exist.

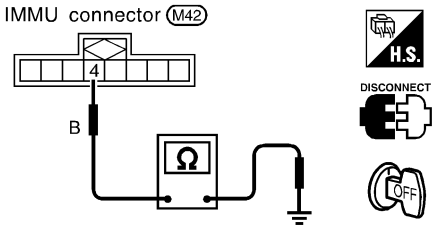
SEL303WK

OK or NG

OK	▶	GO TO 4.
NG	▶	**Check the following** ● 15A fuse [No. 20, located in the fuse block (J/B)] ● Harness for open or short between fuse and IMMU connector **Ref. part No. C2**

4	CHECK GROUND CIRCUIT FOR IMMU

1. Turn ignition OFF.
2. Check harness continuity between IMMU terminal 4 and ground.

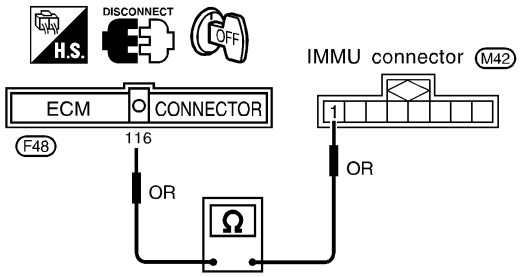


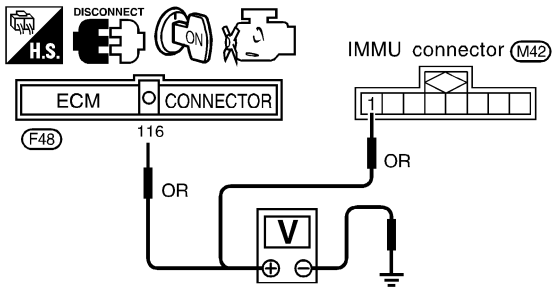
Continuity should exist.

SEL304W

OK or NG

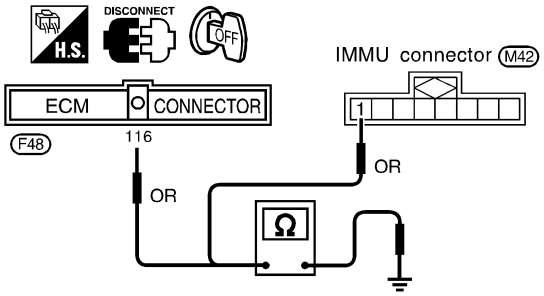
OK	▶	GO TO 5.
NG	▶	Repair harness. **Ref. part No. C3**

5	CHECK COMMUNICATION LINE OPEN CIRCUIT	
1. Disconnect ECM connector. 2. Check harness continuity between ECM terminal 116 and IMMU terminal 1.  SEL305W	**Continuity should exist.**	
OK or NG		
OK	▶	GO TO 6.
NG	▶	Repair harness or connector. **Ref. part No. C4**

6	CHECK COMMUNICATION LINE BATTERY SHORT CIRCUIT	
1. Turn ignition ON. 2. Check voltage between ECM terminal 116 or IMMU terminal 1 and ground.  SEL306W	**Voltage: 0V**	
OK or NG		
OK	▶	GO TO 7.
NG	▶	Communication line is short-circuited with battery voltage line or ignition switch ON line. Repair harness or connectors. **Ref. part No. C4**

7	CHECK COMMUNICATION LINE GROUND SHORT CIRCUIT

1. Turn ignition switch OFF.
2. Check continuity between ECM terminal 116 or IMMU terminal 1 and ground.



Continuity should not exist.

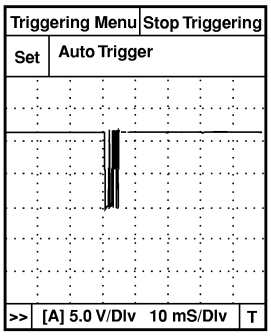
SEL307W

OK or NG

OK	▶	GO TO 8.
NG	▶	Communication line is short-circuited with ground line. Repair harness or connectors. **Ref. part No. C4**

8	SIGNAL FROM ECM TO IMMU CHECK

1. Check the signal between ECM terminal 116 and ground with CONSULT-II or oscilloscope when ignition switch is turned "ON".
2. Make sure signals which are shown in the figure below can be detected during 750 msec. just after ignition switch is turned "ON".



SEL730W

OK or NG

OK	▶	IMMU is malfunctioning. Replace IMMU. **Ref. part No. A** Perform initialization with CONSULT-II. For the operation of initialization, refer to "CONSULT-II Operation Manual IVIS/NVIS".
NG	▶	ECM is malfunctioning. Replace ECM. **Ref. part No. B** Perform initialization with CONSULT-II. For the operation of initialization, refer to "CONSULT-II Operation Manual IVIS/NVIS".

DIAGNOSTIC PROCEDURE 3

=NFEL0177S08

Self-diagnostic results:
"DIFFERENCE OF KEY" displayed on CONSULT-II screen

1	CONFIRM SELF-DIAGNOSTIC RESULTS

Confirm SELF-DIAGNOSTIC RESULTS "DIFFERENCE OF KEY" displayed on CONSULT-II screen.

SELF DIAGNOSIS	
DTC RESULTS	TIME
DIFFERENCE OF KEY	0

SEL293W

Is CONSULT-II screen displayed as above?

Yes	▶	GO TO 2.
No	▶	GO TO SYMPTOM MATRIX CHART 1.

2	PERFORM INITIALIZATION WITH CONSULT-II

Perform initialization with CONSULT-II. Re-register all NVIS (NATS) ignition key IDs.
For initialization, refer to "CONSULT-II operation manual IVIS/NVIS".

IMMU INITIALIZATION
INITIALIZATION FAIL
THEN IGN KEY SW 'OFF' AND 'ON', AFTER CONFIRMING SELF-DIAG AND PASSWORD, PERFORM C/U INITIALIZATION AGAIN.

SEL297W

NOTE:
If the initialization is not completed or fails, CONSULT-II shows above message on the screen.

Can the system be initialized and can the engine be started with re-registered NVIS (NATS) ignition key?

Yes	▶	Ignition key ID was unregistered. **Ref. part No. D**
No	▶	IMMU is malfunctioning. Replace IMMU. **Ref. part No. A** Perform initialization with CONSULT-II. For initialization, refer to "CONSULT-II operation manual IVIS/NVIS".

DIAGNOSTIC PROCEDURE 4

=NFEL0177S09

Self-diagnostic results:
"CHAIN OF IMMU-KEY" displayed on CONSULT-II screen

1	CONFIRM SELF-DIAGNOSTIC RESULTS

Confirm SELF-DIAGNOSTIC RESULTS "CHAIN OF IMMU-KEY" displayed on CONSULT-II screen.

SELF DIAGNOSIS	
DTC RESULTS	TIME
CHAIN OF IMMU-KEY	0

SEL294W

Is CONSULT-II screen displayed as above?

Yes	▶	GO TO 2.
No	▶	GO TO SYMPTOM MATRIX CHART 1.

2	CHECK NVIS (NATS) IGNITION KEY ID CHIP

Start engine with another registered NVIS (NATS) ignition key.

Does the engine start?

Yes	▶	Ignition key ID chip is malfunctioning. Replace the ignition key. **Ref. part No. E** Perform initialization with CONSULT-II. For initialization, refer to "CONSULT-II operation manual IVIS/NVIS".
No	▶	GO TO 3.

3	CHECK IMMU INSTALLATION

Check IMMU installation.
Refer to "How to Replace IMMU" in EL-375.

OK or NG

OK	▶	IMMU is malfunctioning. Replace IMMU. **Ref. part No. A** Perform initialization with CONSULT-II. For initialization, refer to "CONSULT-II operation manual IVIS/NVIS".
NG	▶	Reinstall IMMU correctly.

DIAGNOSTIC PROCEDURE 5

=NFEL0177S10

Self-diagnostic results:
"ID DISCORD, IMM-ECM" displayed on CONSULT-II screen

1	CONFIRM SELF-DIAGNOSTIC RESULTS

Confirm SELF-DIAGNOSTIC RESULTS "ID DISCORD, IMM-ECM" displayed on CONSULT-II screen.

SELF DIAGNOSIS	
DTC RESULTS	TIME
ID DISCORD, IMM-ECM	0

SEL298W

NOTE:
"ID DISCORD IMMU-ECM":
Registered ID of IMMU is in discord with that of ECM.

Is CONSULT-II screen displayed as above?

Yes	▶	GO TO 2.
No	▶	GO TO SYMPTOM MATRIX CHART 1.

2	PERFORM INITIALIZATION WITH CONSULT-II

Perform initialization with CONSULT-II. Re-register all NVIS (NATS) ignition key IDs.
For initialization, refer to "CONSULT-II operation manual IVIS/NVIS".

IMMU INITIALIZATION
INITIALIZATION FAIL
THEN IGN KEY SW 'OFF' AND 'ON', AFTER CONFIRMING SELF-DIAG AND PASSWORD, PERFORM C/U INITIALIZATION AGAIN.

SEL297W

NOTE:
If the initialization is not completed or fails, CONSULT-II shows above message on the screen.

Can the system be initialized?

Yes	▶	Start engine. (END) (System initialization had not been completed. **Ref. part No. F**)
No	▶	ECM is malfunctioning. Replace ECM. **Ref. part No. F** Perform initialization with CONSULT-II. For initialization, refer to "CONSULT-II operation manual IVIS/NVIS".

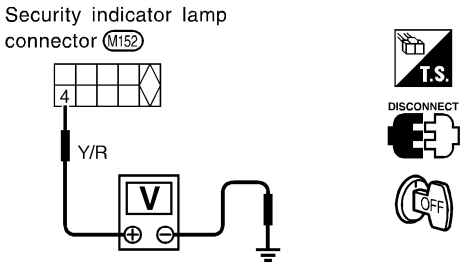
DIAGNOSTIC PROCEDURE 6

=NFEL0177S12

"SECURITY INDICATOR LAMP DOES NOT LIGHT UP"

1	CHECK FUSE	
Check 10A fuse [No. 12, located in the fuse block (J/B)]. **Is 10A fuse OK?**		
Yes	▶	GO TO 2.
No	▶	Replace fuse.

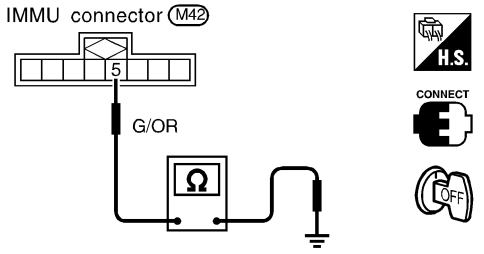
2	CHECK SECURITY INDICATOR LAMP	
1. Install 10A fuse. 2. Perform initialization with CONSULT-II. For initialization, refer to "CONSULT-II operation manual IVIS/NVIS". 3. Turn ignition switch OFF. 4. Start engine and turn ignition switch OFF. 5. Check the security indicator lamp lighting. **Security indicator lamp should be blinking.** **OK or NG**		
OK	▶	INSPECTION END
NG	▶	GO TO 3.

3	CHECK SECURITY INDICATOR LAMP POWER SUPPLY CIRCUIT	
1. Disconnect security indicator lamp connector. 2. Check voltage between security indicator lamp connector terminal 4 and ground.  **Battery voltage should exist.** SEL299W **OK or NG**		
OK	▶	GO TO 4.
NG	▶	Check harness for open or short between fuse and security indicator lamp.

4	CHECK SECURITY INDICATOR LAMP	
Check security Indicator Lamp. **Is security indicator lamp OK?**		
Yes	▶	GO TO 5.
No	▶	Replace security indicator lamp.

5	CHECK IMMU FUNCTION

1. Connect IMMU connector.
2. Disconnect security indicator lamp connector.
3. Check continuity between IMMU terminal 5 and ground.



Cotinuity should exist intermittently.

SEL300W

OK or NG

OK	▶	Check harness for open or short between security indicator lamp and IMMU.
NG	▶	IMMU is malfunctioning. Replace IMMU. Perform initialization with CONSULT-II. For initialization, refer to "CONSULT-II operation manual IVIS/NVIS".

DIAGNOSTIC PROCEDURE 7

=NFEL0177S13

Self-diagnostic results:
"LOCK MODE" displayed on CONSULT-II screen

1	CONFIRM SELF-DIAGNOSTIC RESULTS

Confirm SELF-DIAGNOSTIC RESULTS "LOCK MODE" is displayed on CONSULT-II screen.

SELF DIAGNOSIS	
DTC RESULTS	TIME
LOCK MODE	0

SEL295W

Is CONSULT-II screen displayed as above?

Yes	▶	GO TO 2.
No	▶	GO TO SYMPTOM MATRIX CHART 1.

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.
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	▶	GO TO 3.

3	CHECK IMMU ILLUSTRATION

Check IMMU installation. Refer to "How to Replace IMMU" in EL-375.

OK or NG

OK	▶	GO TO 4.
NG	▶	Reinstall IMMU correctly.

4	PERFORM INITIALIZATION WITH CONSULT-II

Perform initialization with CONSULT-II.
For initialization, refer to "CONSULT-II operation manual IVIS/NVIS".

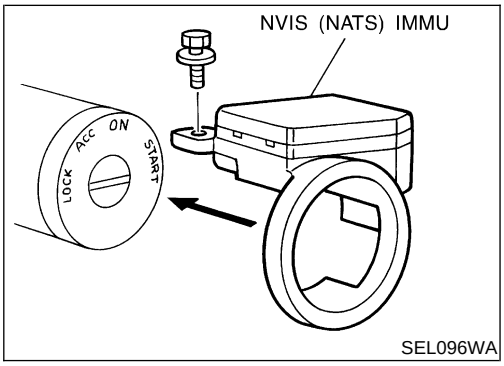
IMMU INITIALIZATION
INITIALIZATION FAIL
THEN IGN KEY SW 'OFF' AND 'ON', AFTER CONFIRMING SELF-DIAG AND PASSWORD, PERFORM C/U INITIALIZATION AGAIN.

SEL297W

NOTE:
If the initialization is not completed or fails, CONSULT-II shows the above message on the screen.

Can the system be initialized?

Yes	▶	System is OK.
No	▶	GO TO DIAGNOSTIC PROCEDURE 5 to check "CHAIN OF IMMU-KEY", refer to EL-370.



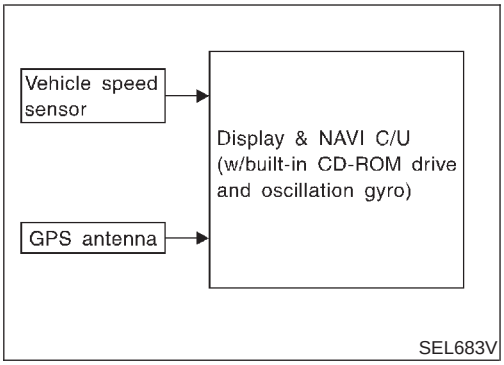
SEL096WA

How to Replace NVIS (NATS) IMMU

NFEL0178

NOTE:

- **If NVIS (NATS) IMMU is not installed correctly, NVIS (NATS) system will not operate properly and SELF-DIAG RESULTS on CONSULT-II screen will show "LOCK MODE" or "CHAIN OF IMMU-KEY".**



System Description

=NFEL0294

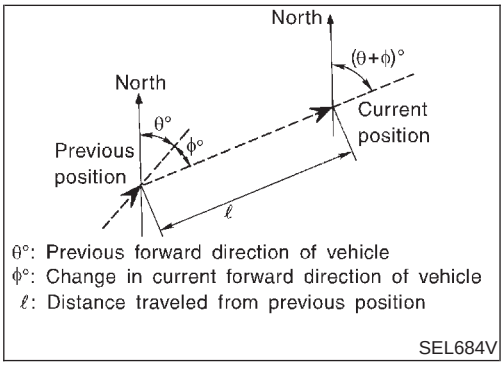
OUTLINE

NFEL0294S01

The Navigation System (Multi-AV System) relies upon three sensing devices in order to determine vehicle location at regular time intervals.

1. Vehicle speed sensor: Determines the distance the vehicle has traveled.
2. Gyro (Angular velocity sensor): Determines vehicle steering angle and directional change.
3. GPS antenna (GPS data): Determines vehicle forward movement and direction.

The data provided by the three sensing functions together with a comparison of the mapping information read from the CD-ROM drive permit accurate determination of the vehicle's current location and subsequent course (map matching). The information appears on a liquid crystal display.
This comparison of GPS data (vehicle position sensing) and map matching permits precise determination of vehicle location.



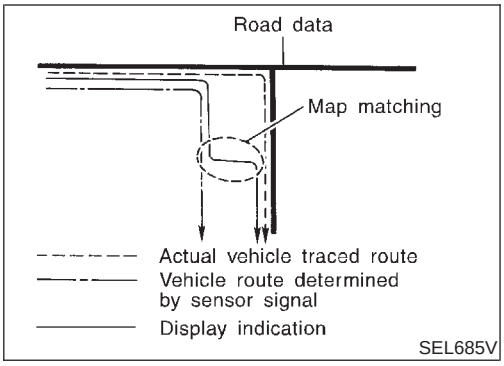
Position Sensor Operating Principles

NFEL0294S0101

The sensor determines current vehicle location by calculating the previously sensed position, the distance traveled from this position, and the directional changes occurring during this travel.

1. Distance traveled
   The distance traveled is calculated using signals received from the vehicle speed sensor. The sensor automatically compensates for the slightly reduced wheel and tire diameter resulting from tire wear.
2. Forward movement (Direction)
   Changes in the direction of forward movement are calculated by the gyro (angular velocity sensor) and the GPS antenna (GPS data). Each of these functions has its advantage and disadvantages. Depending upon conditions, one function takes precedence over the other to accurately determine the direction of forward movement.

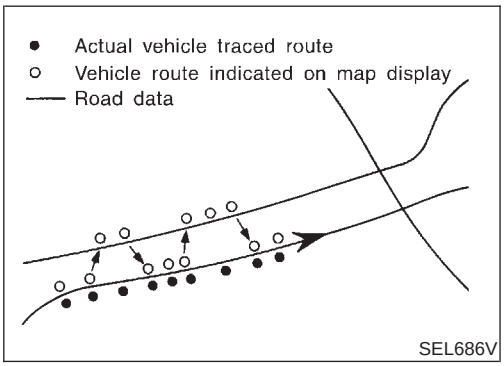
Function type	Advantage	Disadvantage
Gyro (Angular velocity sensor)	• Able to accurately detect minute changes in steering angle and direction.	• Calculation errors may accumulate over a long period of continuous vehicle travel.
GPS antenna (GPS data)	• Able to sense vehicle travel in four general directions (North, South, East, and West)	• Unable to detect direction of vehicle travel at low vehicle speeds.



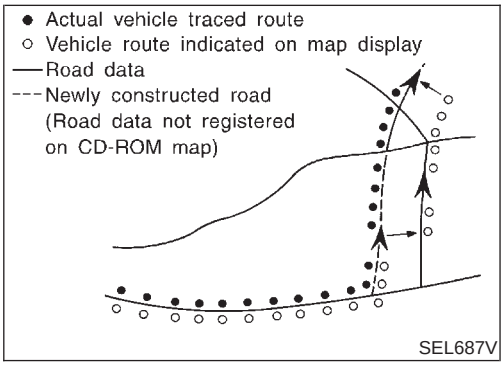
Map Matching

NFEL0294S0102

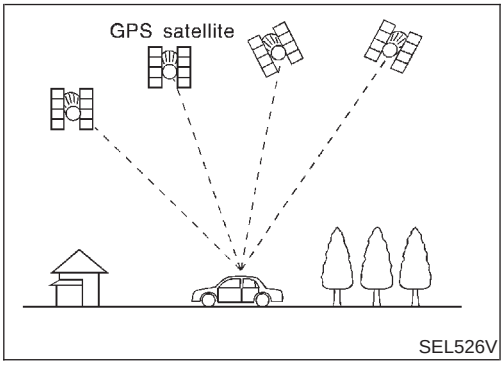
Map matching allows the driver to compare the sensed vehicle location data with the road map contained in the CD-ROM drive. Vehicle position is marked on the CD-ROM map. This permits the driver to accurately determine his/her present position on the highway and to make appropriate course decisions.
When GPS data reception is poor during travel, the vehicle position is not amended. At this time, manual manipulation of the CD-ROM map position marker is required.



Map matching permits the driver to make priority judgments about possible appropriate roads other than the one currently being traveled.
If there is an error in the distance or direction of travel, there will also be an error in the relative position of other routes. When two routes are closely parallel to one another, the indicated position for both routes will be nearly the same priority. This is so that, slight changes in the steering direction may cause the marker to indicate both routes alternately.



Newly constructed roads may not appear on the CD-ROM map. In this case, map matching is not possible. Changes in the course of a road will also prevent accurate map matching.
When driving on a road not shown on the CD-ROM map, the position marker used for map matching may indicate a different route. Even after returning to a route shown on the map, the position marker may jump to the position currently detected.



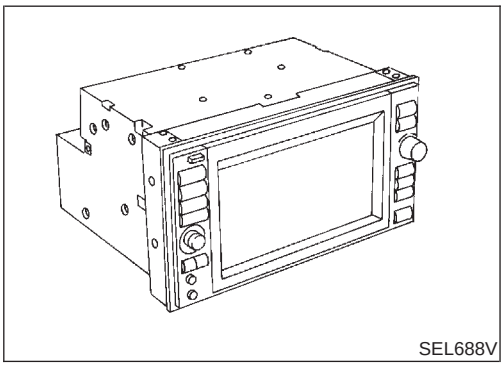
GPS (Global Positioning System)

NFEL0294S0103

GPS is the global positioning system developed and operated by the US Department of Defense. GPS satellites (NAVSTAR) transmit radio waves and orbit around the earth at an altitude of approximately 21,000 km (13,000 miles).
GPS receiver calculates the three-dimensional position of the vehicle (latitude, longitude, and altitude from the sea level) by the time difference of the radio wave arriving from more than four GPS satellites (three-dimensional positioning).
When the radio wave is received from only three GPS satellites, the two-dimensional position (latitude and longitude) is calculated, using the altitude from the sea level data calculated by using four GPS satellites (two-dimensional positioning).
Positioning capability is degraded in the following cases.

- In two-dimensional positioning, when the vehicle's altitude from the sea level changes, the precision becomes lower.
- The location detection performance can have an error of about 100 m (300 ft) even in three-dimensional positioning with high precision. Because the precision is influenced by the location of GPS satellites used for positioning, the location detection performance may drop depending on the location of GPS satellites.
- When the radio wave from GPS satellites cannot be received,

for example, when the vehicle is in a tunnel, in a parking lot inside building, under an elevated superhighway or near strong power lines, the location may not be detected. Turbulent/ electric weather conditions may also affect positioning performance. If something is placed on the antenna, the radio wave from GPS satellites may not be received.


SEL688V

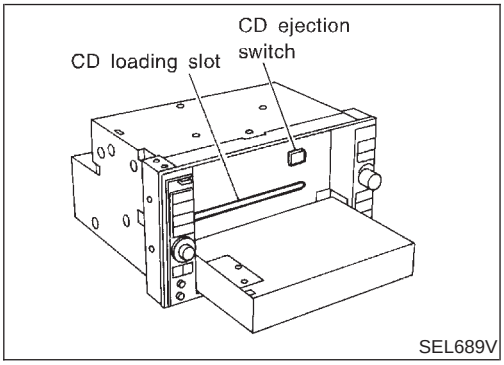
COMPONENT DESCRIPTION

NFEL0294S02

Display & NAVI Control Unit

NFEL0294S0201

- The gyro (angular speed sensor) and the CD-ROM drive are built-in units that control the navigation functions.
- Signals are received from the gyro, the vehicle speed sensor, and the GPS antenna. Vehicle location is determined by combining this data with the data contained in the CD-ROM map. Locational information is shown on liquid crystal display panel.
- Finger-operated touch switches are positioned on the liquid crystal display panel for easy operation.
- The touch switches used to control the equipment are beneath a glass sheet and two resistance membranes at the top of the liquid crystal display panel. The switches are sensitive to resistance value where touched with your finger to detect operating status.



SEL689V

CD-ROM Driver

NFEL0294S0202

Maps, traffic control regulations, and other pertinent information can be easily red from the CD-ROM disc.

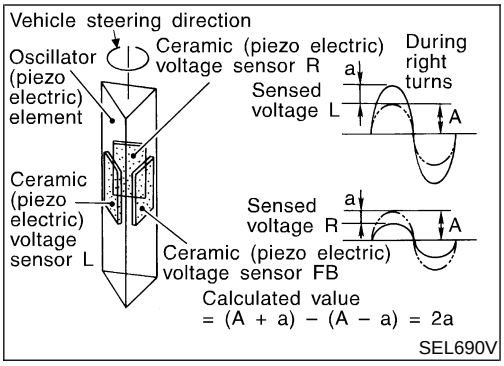
NOTE:

- When removing the CD-ROM, allow it to remain open until the liquid crystal display locks.
- The liquid crystal display must be closed when the vehicle is running.
- Do not place cups, cans or other containers containing liquids on top of the liquid crystal display.

Map CD-ROM

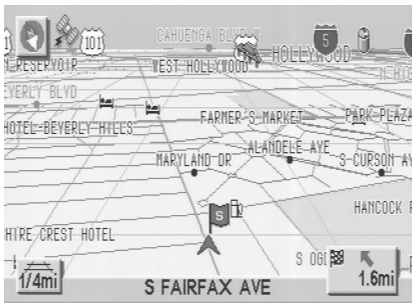
NFEL0294S0203

- The map CD-ROM has maps, traffic control regulations, and other pertinent information.
- To improve CD-ROM map matching and route determination functions, the CD-ROM uses an exclusive Nissan format. Therefore, the use of a CD-ROM provided by other manufacturers cannot be used.



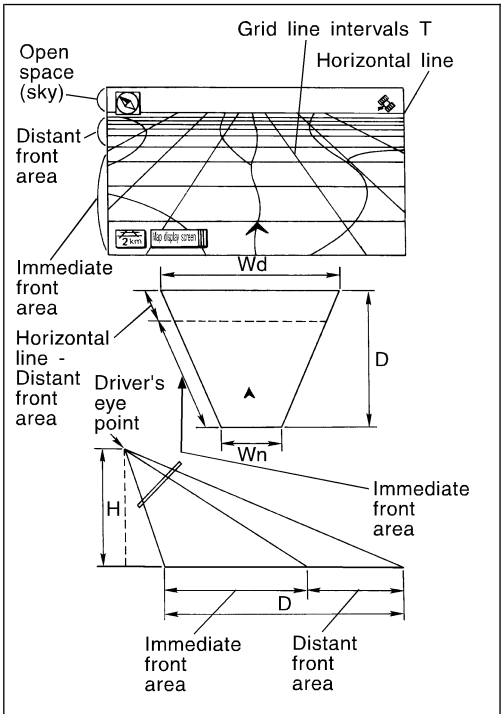
SEL690V

MAP DISPLAY



BIRDVIEW®

SEL636X



SEL691V

Gyro (Angular Speed Sensor)

NFEL0294S0204

- The oscillator gyro sensor is used to detect changes in vehicle steering angle.
- The oscillator gyro periodically senses oscillatory variation at the oscillation terminals. This variation is caused by changes in the vehicle angular velocity. Voltage variations are sensed by ceramic voltage sensors at the left and right sides of the terminals. Vehicle angular velocity corresponds directly with these changes in voltage.
- The gyro is built into the display & navigation (NAVI) control unit.

BIRDVIEW®

NFEL0294S0205

The BIRDVIEW® provides a detailed and easily seen display of road conditions covering the vehicle's immediate to distant area.

Description

NFEL0294S0206

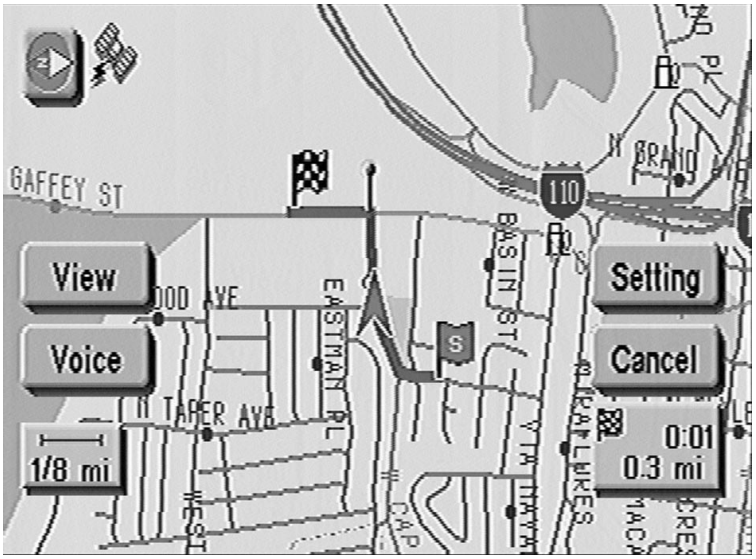
- Display area: Trapezoidal representation showing approximate distances (Wn, D, and Wd).
- Ten horizontal grid lines indicate display width while six vertical grid lines indicate display depth and direction.
- Drawing line area shows open space, depth, and immediate front area. Each area is to a scale of approximately 5:6:25.
- When the "ZM−" button is pushed, the view point height is increased. Pushing the "ZM+" button decreases the height. Pushing the "ZM−" button or the "ZM+" button during operation indicates the scale change and the view point height at the left-hand side of the screen.

FUNCTION OF TOUCH SWITCH (SUMMARY)

=NFEL0294S03

Display with Pushed "MAP" Switch

NFEL0294S0301



SEL475Y

The function of each touch switch is as follows:

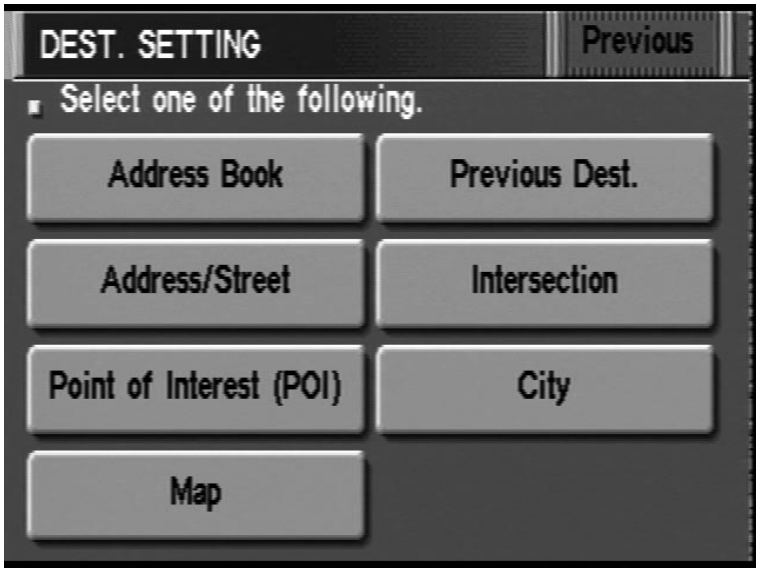
1) Azimuth indication
2) Position marker
   The tip of the arrow shows the current position. The shaft of the arrow indicates the direction in which the vehicle is traveling.
3) GPS reception signal (indicates current reception conditions)
4) Distance display (shows the distance in a reduced scale)
5) Current location voice information
   (this information is available when the route guide is being activated and the designated route is being traveled.)
6) Switch display from map screen to BIRDVIEW® screen (change to map screen on display when the BIRDVIEW® is being used.)
7) The following items can be set.

- Save Current Location
- Edit Address Book
- Guide Volume
- System Setting

8) The route guide operation can be canceled.

Display with Pushed "DEST" Switch

=NFEL0294S0302



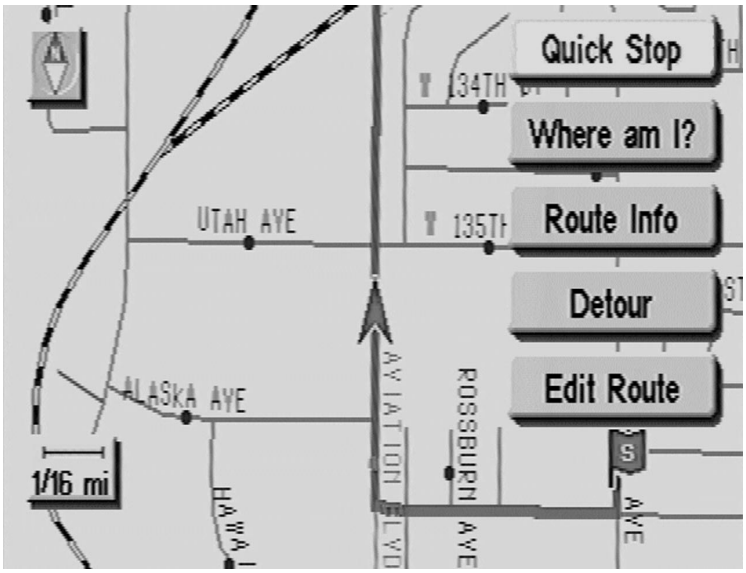
SEL581X

The function of each touch switch is as follows:

Icon	Description
Address Book	Favorite place can be saved to memory. The destination can be selected from the memory.
Address/Street	The destination can be searched from the address.
Point of Interest (POI)	The destination of favorite facility can be searched.
Previous Dest.	The previous ten destinations stored in memory are displayed.
Intersection	The destination from the intersection name can be retrieved.
City	The destination can be searched from city name.
Map	The destination can be searched from the map.

Display with Toutch Screen

NFEL0294S0303



SEL476Y

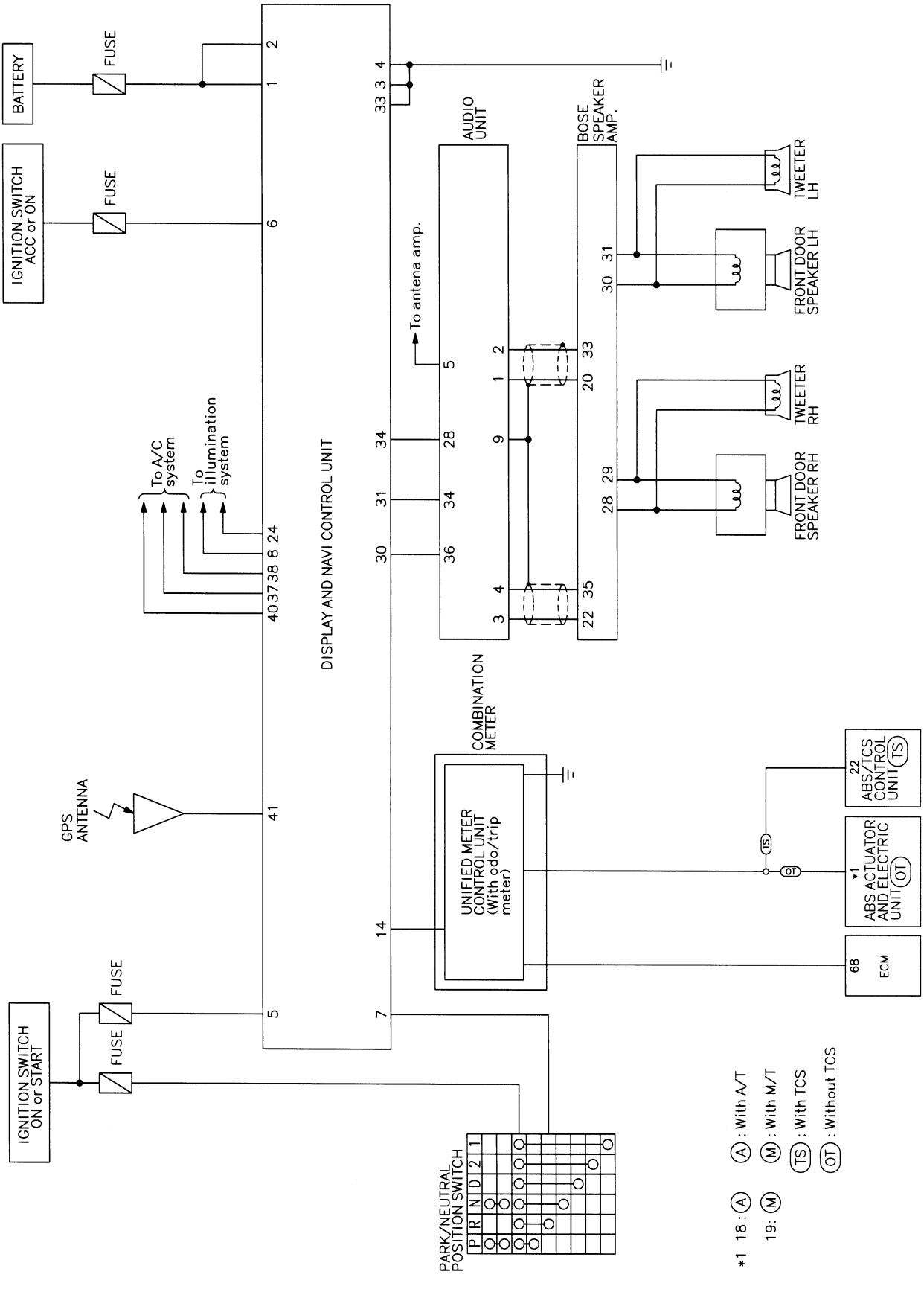
The function of each touch switch is as follows:

Icon	Description
Quick Stop	The selected facility is set as the destination or way-point. (Route guidance has been turned OFF or the destination has been reached.)
Where am I?	Next, current and previous street names can be displayed.
Route Info.*	The following items can be set. ● Complete Route ● Turn List ● Route Simulation (Displayed only when the destination area has been set.)
Detour*	Based on the selected distance, an alternative route is searched. [Displayed only when the recommended route (not its reverse) is followed.]
Edit Route*	Change the destination or add the transit points of the route set in the route guide. (Displayed only when the automatic reroute function has been turned OFF and the recommended route is not followed.)

*: When destinations have been entered, route guidance has been turned OFF or destination has been reached, "Route Info.", "Detour" and "Edit Route" are not displayed.

Schematic

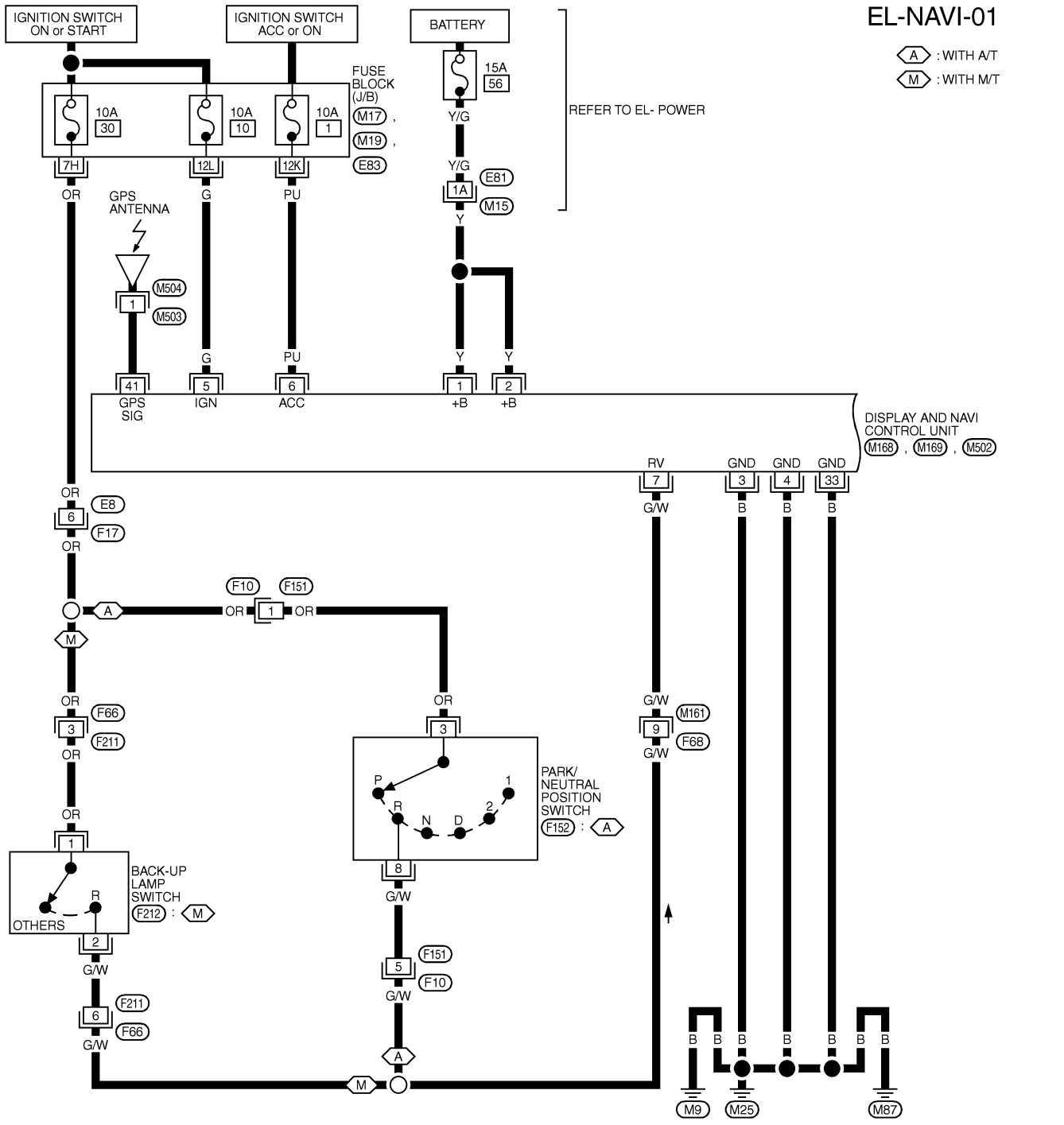
NFEL0295

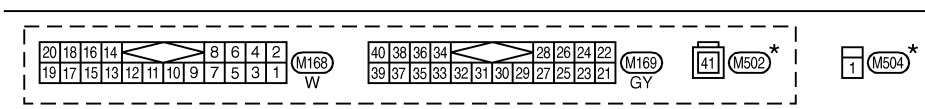


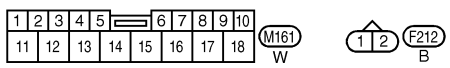
MEL157O

Wiring Diagram — NAVI —

NFEL0296



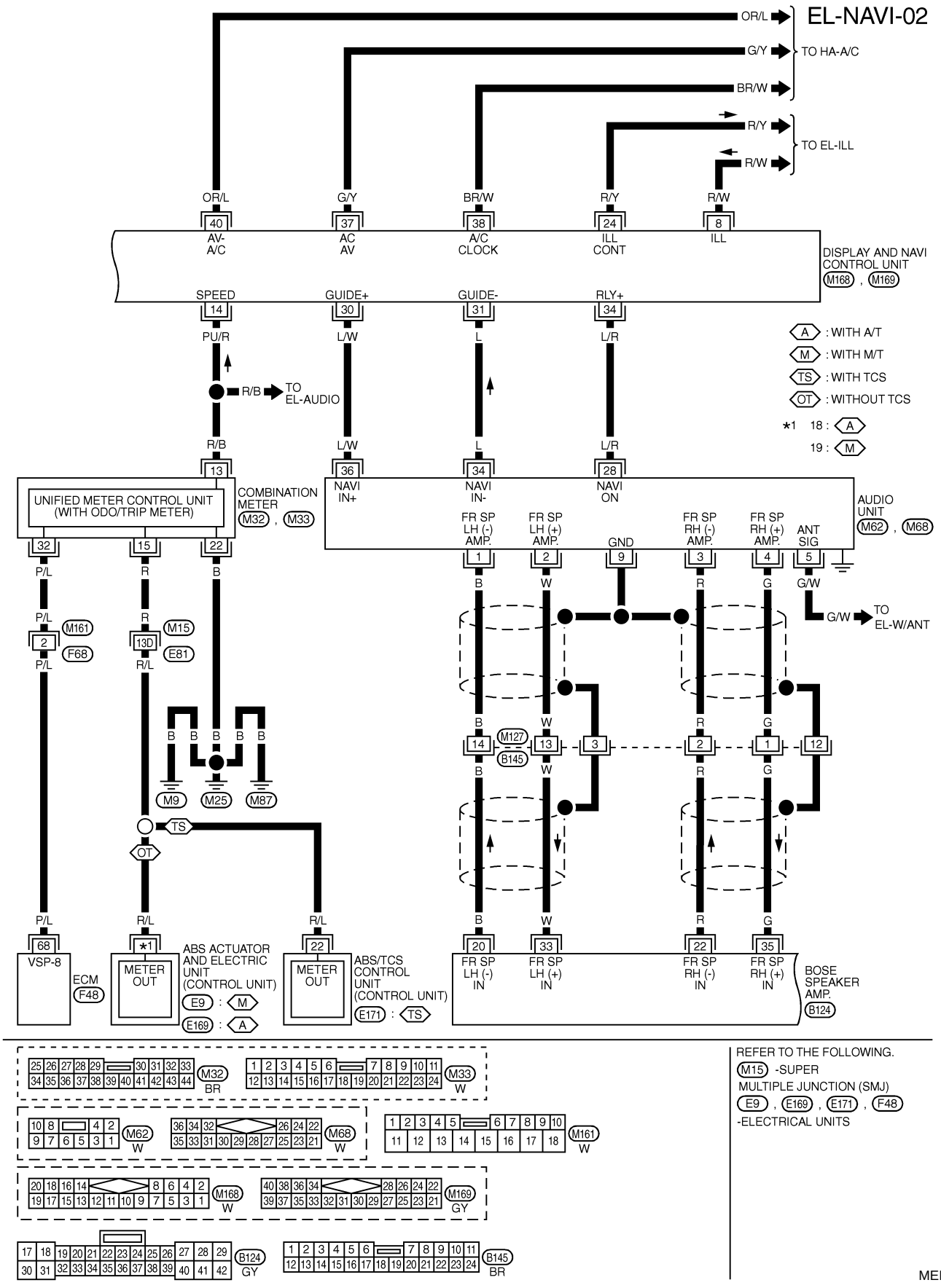




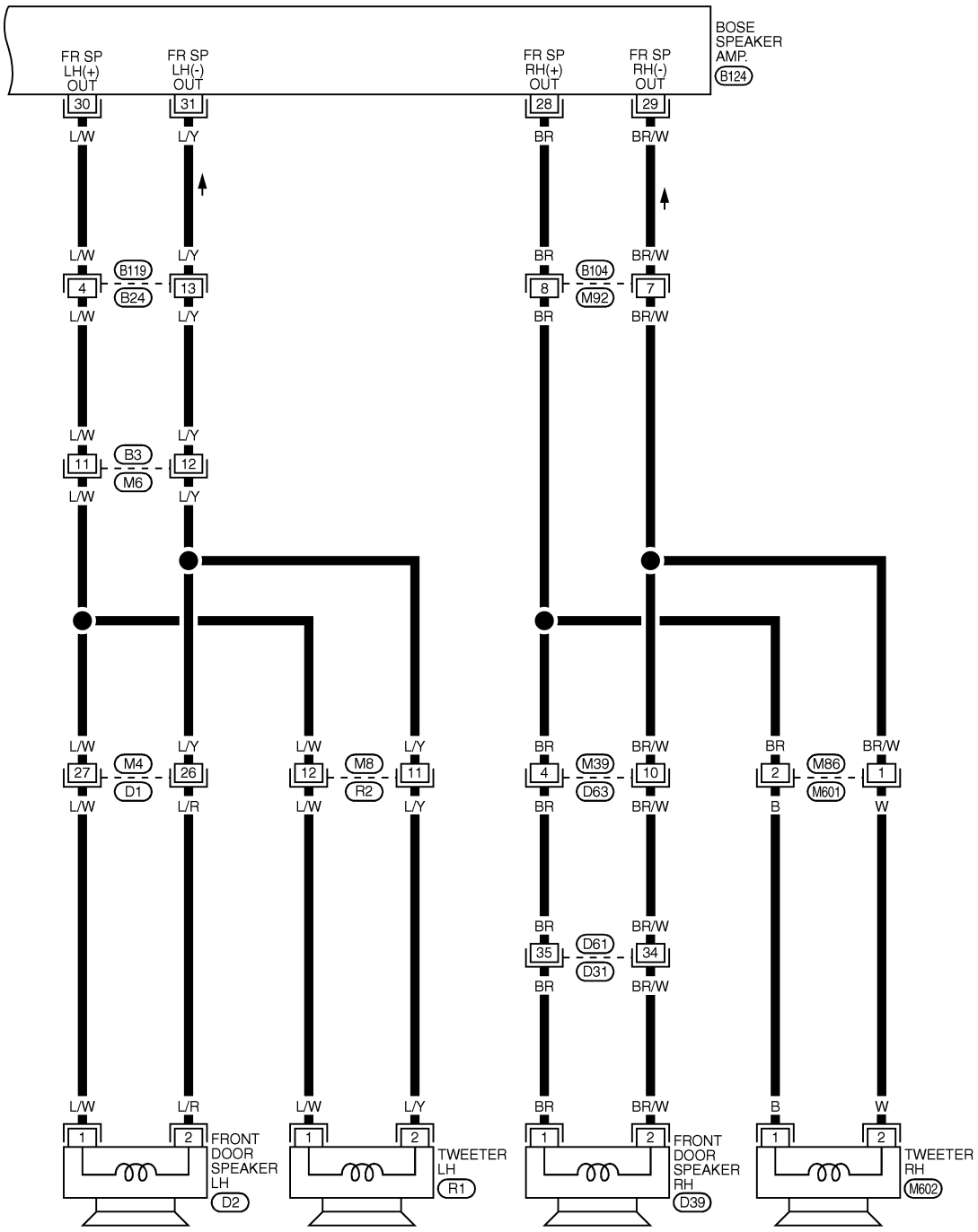
REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)
M17 , M19 , E83
-FUSE BLOCK- JUNCTION BOX (J/B)

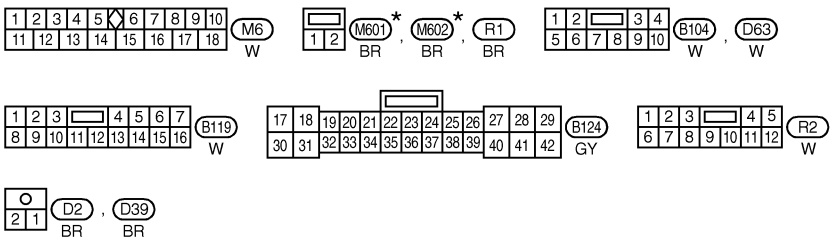
* : THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT" , EL SECTION.

MEL733P


EL-NAVI-02
OR/L
G/Y
BR/W
R/Y
R/W
TO HA-A/C
TO EL-ILL
AV-A/C
AC AV
A/C CLOCK
ILL CONT
ILL
DISPLAY AND NAVI CONTROL UNIT M168 , M169
SPEED
GUIDE+
GUIDE-
RLY+
PU/R
L/W
L
L/R
R/B
TO EL-AUDIO
A : WITH A/T
M : WITH M/T
TS : WITH TCS
OT : WITHOUT TCS
*1 18 : A
19 : M
UNIFIED METER CONTROL UNIT (WITH ODO/TRIP METER)
COMBINATION METER M32 , M33
NAVI IN+
NAVI IN-
NAVI ON
AUDIO UNIT M62 , M68
FR SP LH (-) AMP.
FR SP LH (+) AMP.
GND
FR SP RH (-) AMP.
FR SP RH (+) AMP.
ANT SIG
G/W
TO EL-W/ANT
M161
M15
F68
E81
M9
M25
M87
M127
B145
TS
OT
VSP-8
ECM F48
METER OUT
ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
E9 : M
E169 : A
ABS/TCS CONTROL UNIT (CONTROL UNIT)
E171 : TS
BOSE SPEAKER AMP. B124
M32 BR
M33 W
M62 W
M68 W
M161 W
M168 W
M169 GY
B124 GY
B145 BR
REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)
E9 , E169 , E171 , F48
-ELECTRICAL UNITS
MEL753P

EL-NAVI-03





REFER TO THE FOLLOWING.
D1 , D31 -SUPER MULTIPLE JUNCTION (SMJ)

* : THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", EL SECTION.

MEL160O

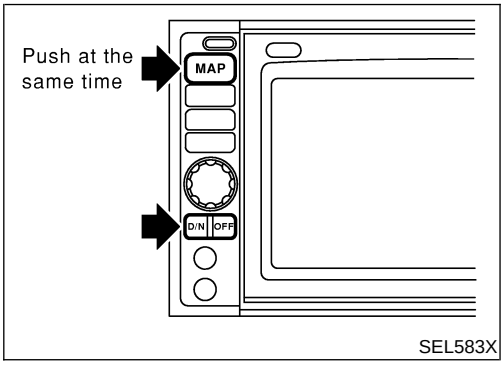
Self-diagnosis Mode

NFEL0297

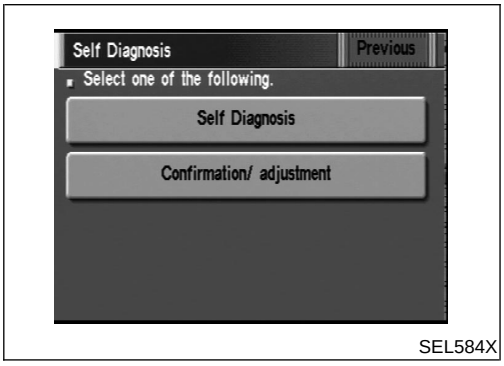
APPLICATION ITEMS

NFEL0297S01

Mode			Description	Reference page
Self Diagnosis			Self-diagnosis for display & NAVI control unit, CD-ROM and GPS antenna connection.	EL-388
Confirmation/ adjustment	Display Diagnosis		Color and gray gradation of display can be checked in this mode.	EL-396
	Diagnostic Signals from the Car		Several input signals to display & NAVI control unit, can be monitored in this mode.	EL-394
	Navigation	Check the Map CD-ROM Version	The version (parts number) of inserted CD-ROM can be checked in this mode.	EL-395
		History of Errors	Diagnosis results previously stored in the memory (before turning ignition switch ON) are displayed in this mode. Time and location when/where the errors occurred are also displayed.	EL-390
		Display Longitude & Latitude	Display the map. Use the joystick to adjust position. Longitude and latitude will be displayed.	EL-397
		Angle Adjustment	Turning angle of the vehicle on the display can be adjusted in this mode.	EL-398
		Speed Calibration	Under ordinary conditions, the navigation system distance measuring function will automatically compensate for minute decreases in wheel and tire diameter caused by tire wear or low pressure. Speed calibration immediately restores system accuracy in cases such as when distance calibration is needed because of the use of tire chains in inclement weather.	EL-399
	Initialize Location		This mode is for initializing the current location. Use when the vehicle is transported a long distance on a trailer, etc.	EL-426



SEL583X



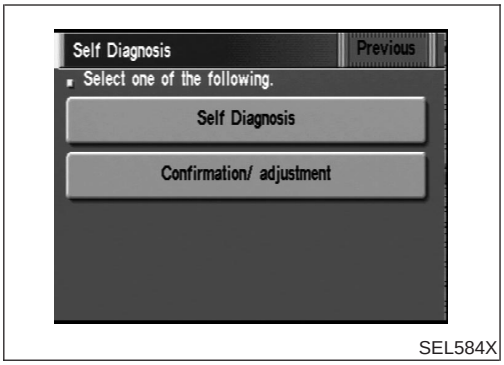
SEL584X

HOW TO PERFORM SELF-DIAGNOSIS MODE

NFEL0297S02

1. Start the engine.
2. Push both of “MAP” and “D/N” switches at the same time for more than 5 seconds.
3. Touch “Self Diagnosis” or “Confirmation/ adjustment”.

- For further procedure, refer to the following pages which describe each application item of the self-diagnosis mode.

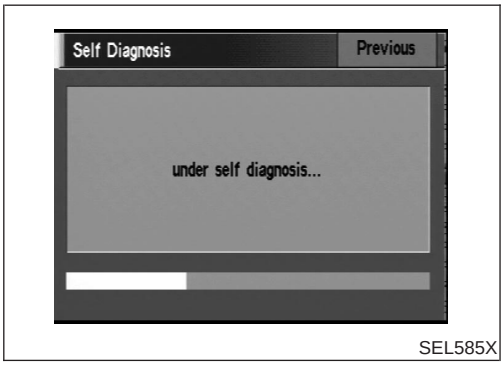


SEL584X

"Self Diagnosis"

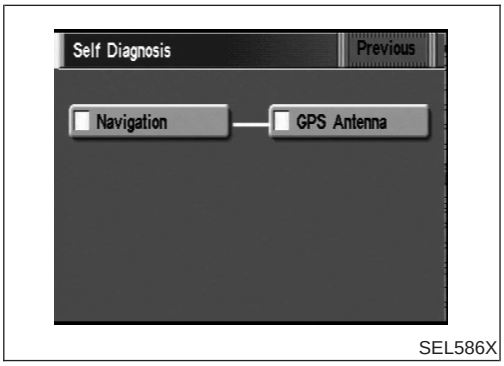
NFEL0297S0201

1. Start the engine.
2. Push both "MAP" and "D/N" switches at the same time for more than 5 seconds.
3. Touch "Self Diagnosis".



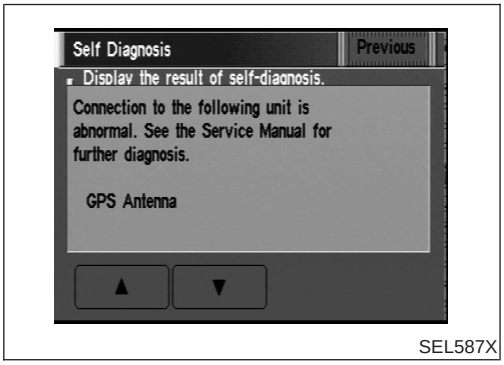
SEL585X

4. Self-diagnosis will be performed.



SEL586X

5. Diagnosis results will be displayed. Diagnosis results are indicated by display color. For details refer to "SELF-DIAGNOSIS RESULTS".



SEL587X

To obtain detailed diagnosis results on the screen, touch "Navigation" or "GPS Antenna".

SELF-DIAGNOSIS RESULTS

=NFEL0297S03

Diagnosed item	Displayed color	Detailed result	Description	Diagnoses/service procedure **Recheck system at each check or replacement (When malfunction is eliminated, further repair work is not required.)**
"GPS Antenna" (GPS antenna connection)	Green	—	GPS antenna is connected to display & NAVI control unit correctly.	—
	Yellow	Connection to the following unit is abnormal. See the Service Manual for further diagnosis.	GPS antenna connection error is detected.	1. Check GPS antenna feeder cable connection at display & NAVI control unit. 2. Visually check GPS antenna feeder cable. If NG, replace GPS antenna assembly. 3. Replace GPS antenna.
"Navigation" (Display & NAVI control unit)	Green	—	No failure is detected.	—
	Red	[*** is abnormal.]	Display & NAVI control unit is malfunctioning.	Replace display & NAVI control unit.
	Gray	Self-diagnosis for CD-ROM DRIVER of NAVI was not conducted because no CD-ROM was available.	Any CD-ROM is not inserted or display & NAVI control unit is malfunctioning.	1. Confirm that map CD-ROM is not inserted into display & NAVI control unit. 2. Replace display & NAVI control unit.
	Yellow	CD-ROM or CD-ROM DRIVER of DISP & NAVI is abnormal. See the Service Manual for further diagnosis.	Display & NAVI control unit judges that inserted CD-ROM is malfunctioning. Map CD-ROM or CD-ROM driver of the unit is malfunctioning.	1. Confirm the disk is installed correctly (not up side down.) 2. Perform "CHECK THE MAP CD-ROM VERSION" in EL-395 to confirm whether correct CD-ROM is inserted or not. 3. Check the disk surface. Are there any scratches, abrasions or pits on the surface? 4. Replace the CD-ROM. 5. Replace display & NAVI control unit.
		CD-ROM is abnormal. Please check the disc.	Inserted map CD-ROM can not be read. Map CD-ROM or CD-ROM driver of the unit is malfunctioning.	
		Connection to the following unit is abnormal. See the Service Manual for further diagnosis.	GPS antenna connection error is detected.	1. Check GPS antenna feeder cable connection at display & NAVI control unit. 2. Visually check GPS antenna feeder cable. If NG, replace GPS antenna assembly. 3. Replace GPS antenna.

Confirmation/Adjustment Mode

=NFEL0298

"HISTORY OF ERRORS" MODE

NFEL0298S01

Description

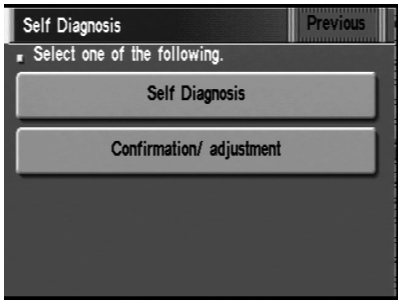
NFEL0298S0101

In this mode, historical errors of the system are displayed with the following data.

- How many times the error was detected
- The last time data when the error was detected
- The last place where the error was detected

NOTE:

- **The number of errors can be counted up to 50 times. More than 51 times will be indicated as 50 times.**
- **Malfunction of the GPS board (inside the display & NAVI control unit) will result in the display of incorrect time data.**
- **When an error occurs, an incorrect position marker appears on the display. The accuracy of the display data (position marker) will be affected.**

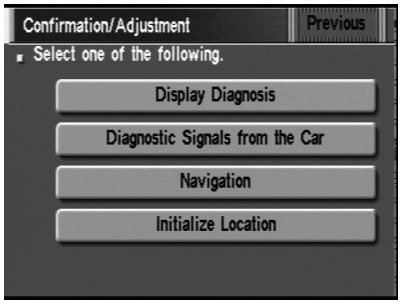


SEL584X

How to Perform

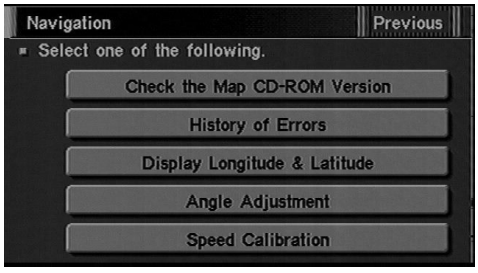
NFEL0298S0102

1. Start the engine.
2. Push both "MAP" and "D/N" switch at the same time for more than 5 seconds.
3. Touch "Confirmation/ adjustment".



SEL588X

4. Touch "Navigation".



SEL453Y

5. Touch "History of Errors".

SEL590X

6. If trouble items are displayed with time count, repair/replace the system according to "HISTORY OF ERRORS" TABLE, EL-392.
7. If necessary, touch error item to display the time when the error was detected and the place where the error was detected.
8. After repairing the system, erase the diagnosis memory.

NOTE:
When the display & NAVI control unit must be replaced, do not erase the diagnosis memory for further inspection of malfunctions.

a. Start the engine.
b. Push both "Map" and "D/N" switches at the same time for more than 5 seconds.
c. Touch "Confirmation/ adjustment".
d. Touch "Navigation".
e. Touch "History of Errors".
f. Touch "Delete".
g. Touch "Yes".

Confirmation/Adjustment Mode (Cont'd)

"HISTORY OF ERRORS" TABLE

=NFEL0298S02

Detected items	Description	Diagnosis/service procedure	Reference page
Gyro sensor disconnected	Communications malfunction between display & NAVI control unit and internal gyro	Perform self-diagnosis to confirm whether the display & NAVI control unit is malfunctioning or not. If no failure is detected, a momentary and/or temporary malfunction may have been caused by strong electromagnetic wave interference.	EL-387
Connection problem of speed sensor	Input malfunction of display & NAVI control unit and speed sensor	Check vehicle speed sensor signal in "DIAGNOSTIC SIGNALS FROM THE CAR" mode. If the input signal is not detected correctly, check harness for open or short between combination meter and display & NAVI control unit.	EL-394
GPS disconnected	Communications malfunction between display & NAVI control unit and GPS board	Perform self-diagnosis to confirm whether the display & NAVI control unit is malfunctioning or not. If no failure is detected, a momentary and/or temporary malfunction may have been caused by strong electromagnetic wave interference.	EL-387
GPS transmission cable malfunction			
GPS input line connection error			
GPS TCXO over	The transmission circuit of the GPS board frequency synchronization oscillator (inside the display & NAVI control unit) is sending an oscillation frequency that is greater or less than the set value.	A location error occurs. Strong electromagnetic wave interference may have occurred. The GPS antenna may be in a very hot or very cold environment. This is usually a temporary malfunction.	—
GPS TCXO under			
GPS ROM malfunction	Internal malfunction of GPS board RAM or ROM inside the display & NAVI control unit.	Perform self-diagnosis to confirm whether the display & NAVI control unit is malfunctioning or not. If no failure is detected, a momentary and/or temporary malfunction may have been caused by strong electromagnetic wave interference.	EL-387
GPS RAM malfunction			
GPS RTC malfunction	Malfunction of GPS board clock IC inside the display & NAVI control unit.		
GPS antenna disconnected	—	Perform self-diagnosis to confirm GPS antenna connection. If no failure is detected, a momentary and/or temporary malfunction may have been caused by a strong impact.	EL-388
Low voltage of GPS	Power supply voltage for GPS board inside the display & NAVI control unit is low.	1. Check power supply circuits for display & NAVI control unit.	EL-411
		2. Perform self-diagnosis to confirm GPS antenna connection.	EL-388
		3. If above diagnosis results are OK, a momentary and/or temporary malfunction may have been caused by a strong impact.	—
CD-ROM communication error	CD-ROM driver malfunction (inside the display & NAVI control unit)	Perform self-diagnosis to confirm whether the display & NAVI control unit is malfunctioning or not. If no failure is detected, a momentary and/or temporary malfunction may have been caused by strong electromagnetic wave interference.	EL-387

Detected items	Description	Diagnosis/service procedure	Reference page
Loading mechanism malfunction	—	Check that whether the disc can be inserted and ejected correctly. If the loading function does not operate correctly, replace display & NAVI control unit.	—
CD-ROM reading error	It is confirmed that the appropriate CD-ROM disc is positioned in the CD-ROM loader. However, no data can be read.	Perform self-diagnosis to confirm whether the inserted disc is malfunctioning or not.	EL-387
Malfunctioning of error correction for CD-ROM	Erroneous data is read from the CD-ROM. The errors cannot be corrected.		
CD-ROM focus error	CD-ROM data reading beam is out of focus.	Rough road driving might create CD skipping like music CD audio unit.	—
CD-ROM malfunction	—	Perform self-diagnosis to confirm whether the inserted disc is malfunctioning or not.	EL-387

"DIAGNOSTIC SIGNALS FROM THE CAR" MODE

=NFEL0298S03

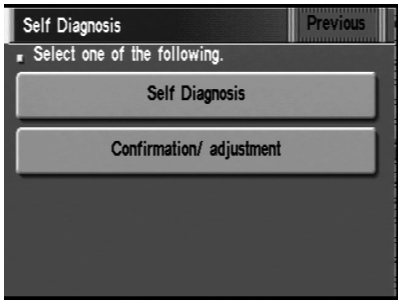
Description

NFEL0298S0301

In "Diagnostic Signals From the Car" mode, following input signals to the display & NAVI control unit can be checked on the display.

Item	Indication	Vehicle condition
Vehicle Speed*	ON	Vehicle speed is greater than 0 km/h (0 MPH).
	OFF	Vehicle speed is 0 km/h (0 MPH).
Light	ON	Lighting switch is in 1st or 2nd position.
	OFF	Lighting switch is in "OFF" position.
IGN	ON	Ignition switch is in "ON" position.
	OFF	Ignition switch is in "ACC" position.
Reverse	ON	Selector/shift lever is in "reverse" position.
	OFF	Selector/shift lever is in other than "reverse" position.

*: When ignition switch is in "ACC" position, indication will be changed to "—".

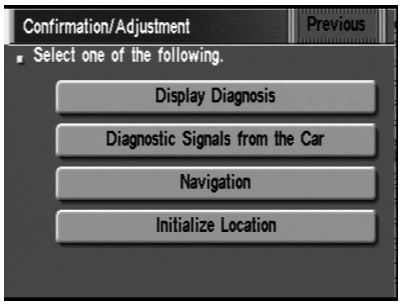


SEL584X

How to Perform

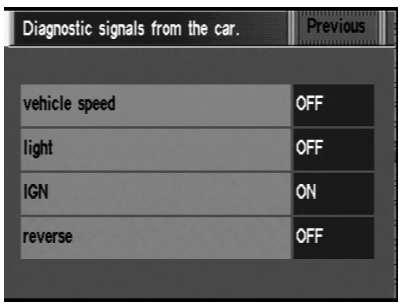
NFEL0298S0302

1. Start the engine.
2. Push both "MAP" and "D/N" switches at the same time for more than 5 seconds.
3. Touch "Confirmation/ adjustment".



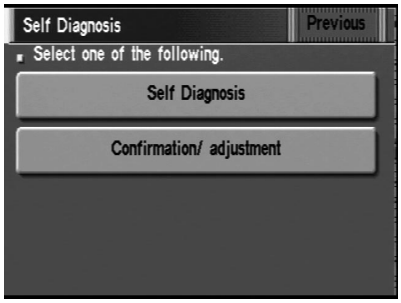
SEL588X

4. Touch "Diagnostic Signals from the Car".



SEL591X

5. Then "Diagnostic Signals from the Car" mode is performed.



SEL584X

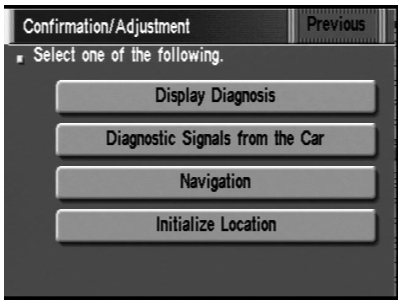
"CHECK THE MAP CD-ROM VERSION" MODE

=NFEL0298S04

How to Perform

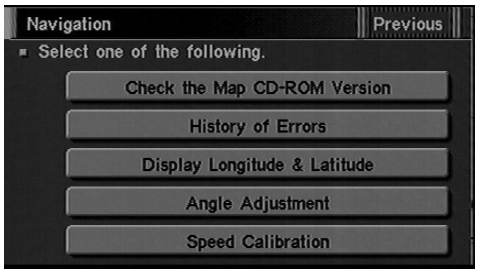
NFEL0298S0401

1. Start the engine.
2. Push both "MAP" and "D/N" switches at the same time for more than 5 seconds.
3. Touch "Confirmation/ adjustment".



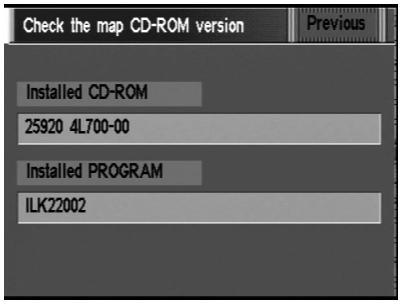
SEL588X

4. Touch "Navigation".



SEL453Y

5. Touch "Check the Map CD-ROM Version".



SEL592X

6. The version (parts number) of CD-ROM loaded to the display and NAVI control unit will be displayed.

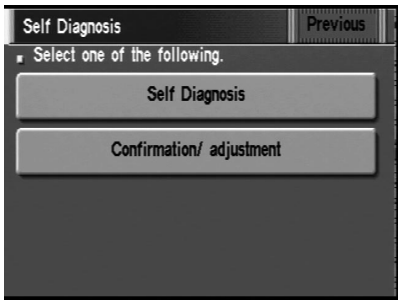
"DISPLAY DIAGNOSIS" MODE

=NFEL0298S05

Description

NFEL0298S0501

Use the "Display Diagnosis" mode to check the display color brightness and shading. The display & NAVI control unit must be replaced if the color brightness and shading are abnormal.

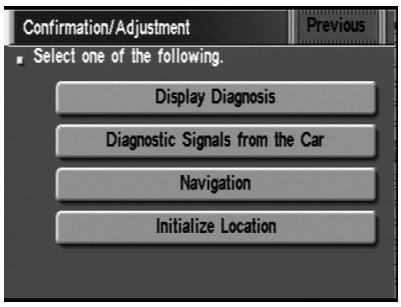


SEL584X

How to Perform

NFEL0298S0502

1. Start the engine.
2. Push both "MAP" and "D/N" switches at the same time for more than 5 seconds.
3. Touch "Confirmation/ adjustment".

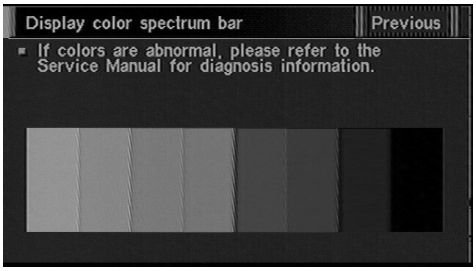


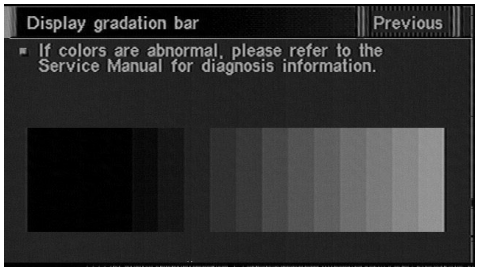
SEL588X

4. Touch "Display Diagnosis".

SEL454Y

5. Touch "Display Color Spectrum Bar" or "Display Gradation Bar".
6. Then color bar/gray scale will be displayed.





SEL455Y

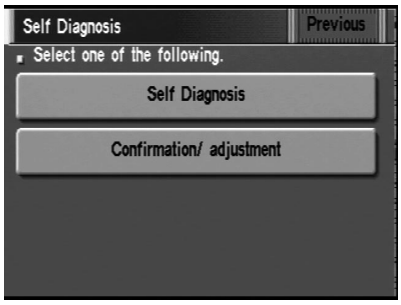
"DISPLAY LONGITUDE & LATITUDE" MODE

NFEL0298S06

Description

NFEL0298S0601

The "Display Longitude & Latitude" is used to confirm the longitude and latitude of some optional area point.

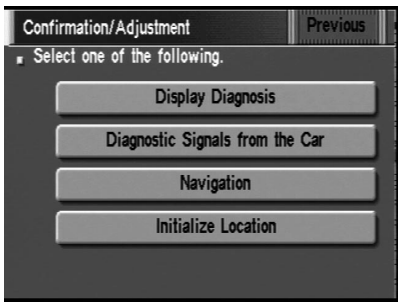


SEL584X

How to Perform

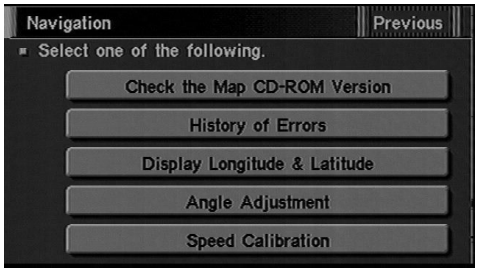
NFEL0298S0602

1. Start the engine.
2. Push both "MAP" and "D/N" switches at the same time for more than 5 seconds.
3. Touch "Confirmation/ adjustment".



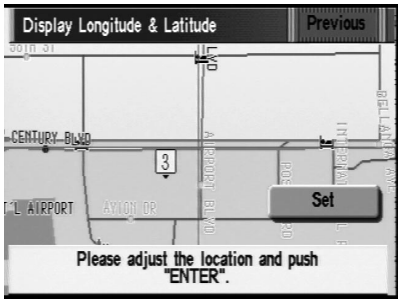
SEL588X

4. Touch "Navigation".



SEL453Y

5. Touch "Display Longitude & Latitude".



SEL595X

6. Adjust the pointer with using the joystick and touch "Set".
7. The display longitude and latitude are displayed.

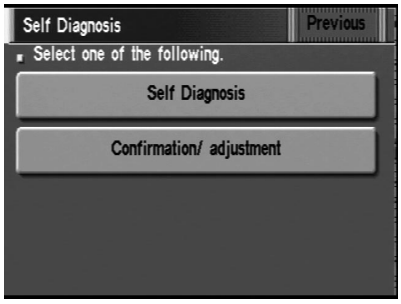
"ANGLE ADJUSTMENT" MODE

=NFEL0298S07

Description

NFEL0298S0701

If the display indicates a larger or smaller turning angle than the actual turning angle, the gyro (angular speed sensor) sensing values must be checked.
In case that the vehicle on the display makes larger angle turn than reality, touch "−". In case that the vehicle on the display makes smaller angle turn than reality, touch "+".

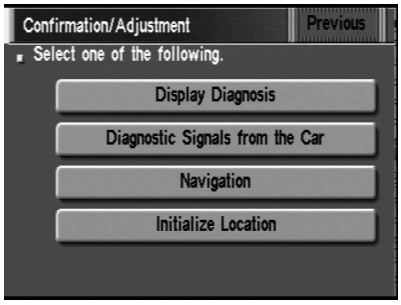


SEL584X

How to Perform

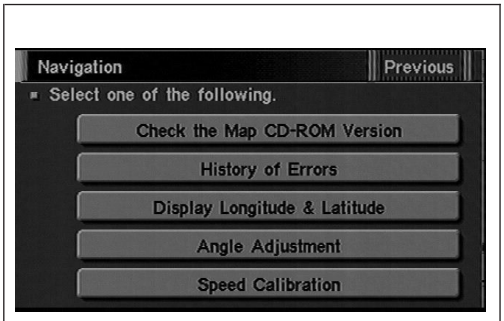
NFEL0298S0702

1. Start the engine.
2. Push both "MAP" and "D/N" switches at the same time for more than 5 seconds.
3. Touch "Confirmation/ adjustment".



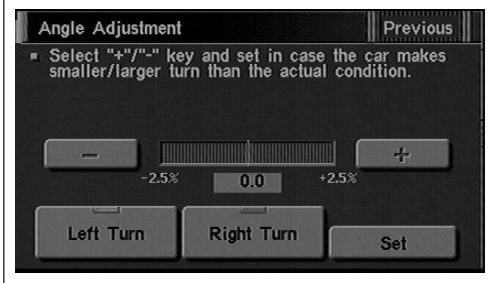
SEL588X

4. Touch "Navigation".



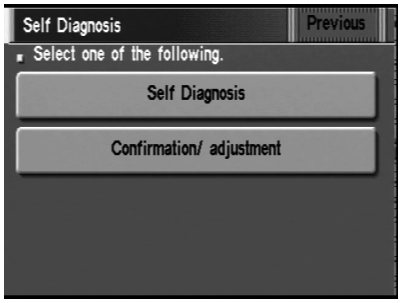
SEL453Y

5. Touch "Angle Adjustment".



SEL456Y

6. Touch "Left Turn" to adjust the angle to the left. Touch "Right Turn" to adjust the angle to the right.
7. Touch "+" to increase the angle change coefficient or "−" to reduce the angle change coefficient.
8. Touch "Set" to save the changed values in memory.
9. Then the vehicle turning angle on the display has adjusted.

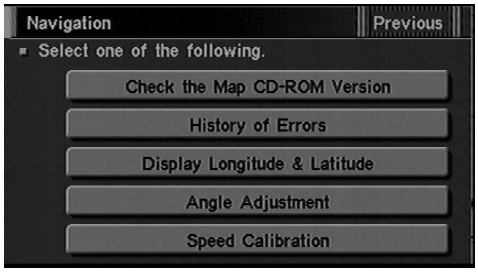


SEL584X

SPEED CALIBRATION

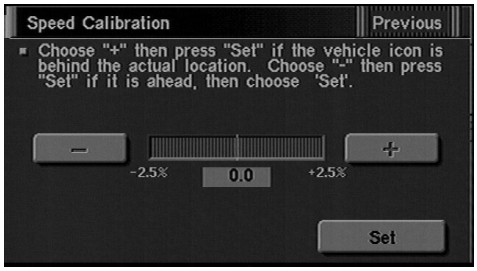
=NFEL0298S08

1. Start the engine.
2. Push both "MAP" and "D/N" switches at the same time for more than 5 seconds.
3. Touch "Confirmation/ adjustment".
4. Touch "Navigation".



SEL453Y

5. Touch "Speed Calibration".



SEL457Y

6. Touch "+" or "−" to adjust the distance change coefficient.
- To make the distance change coefficient smaller, touch "−".
- To make the distance change coefficient larger, touch "+".

7. Touch "Set".

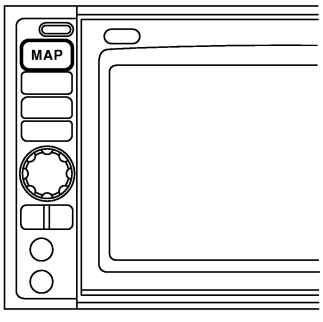
Setting Mode

=NFEL0299

APPLICATION ITEMS

NFEL0299S01

Mode	Description	Reference page
Display Setting	The following display settings can be customized. ● Display color (Day mode or Night mode) ● Brightness of display	EL-402
Heading	Heading of the map display can be customized for either north heading or the actual driving direction of the vehicle.	EL-405
Nearby Display Icons	Icons of facilities can be displayed. Facilities to be displayed can be selected from the variety of selections.	EL-406
Adjust Current Location	Current location of position marker can be adjusted. Direction of position marker also can be calibrated when heading direction of the vehicle on the display is not matched with the actual direction.	EL-401
Avoid Area Setting	Particular area can be avoided when routing.	—
Beep on/off	Beep sounds which correspond to the system operation can be activated/deactivated.	EL-402
Clear Memory	Address book, Previous destination or Avoid area can be deleted.	EL-406
GPS Information	The GPS includes longtitude, latitude and altitude (distance above sea level) of the present vehicle position, and current date and time for the area in which the vehicle is being driven. Also indicated are the GPS reception conditions and the GPS satellite position.	EL-400
Map & A/C	The map and A/C settings can be displayed at the same time.	EL-407
Quick Stop Customer Setting	One facility of your selection can be added to your Quick Stop.	EL-403
Route Priorities	Priorities of search request and automatic re-searching can be set for route search.	EL-404
Tracking	Tracking to the present vehicle position can be displayed.	EL-405



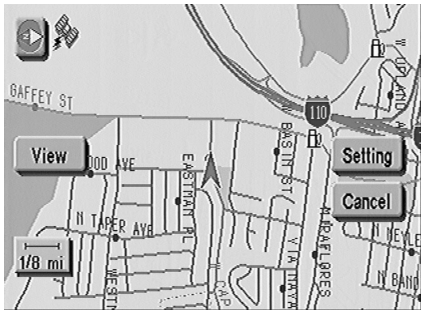
SEL597X

HOW TO PERFORM CONTROL PANEL MODE

NFEL0299S02

1. Start the engine.
2. Push “MAP” switch.

● For further procedures, refer to the following pages which describe each application item of the control panel mode.

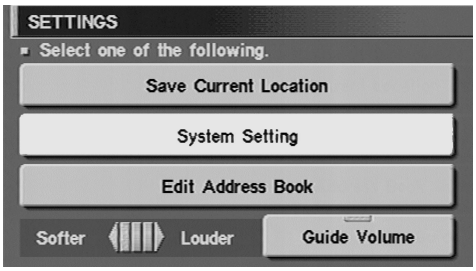


SEL460Y

“GPS INFORMATION” SETTING

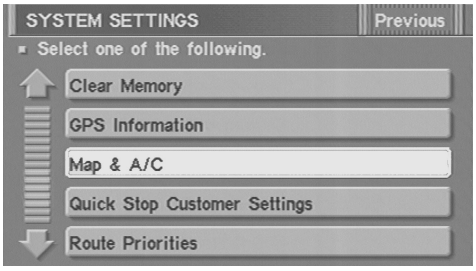
NFEL0299S03

1. Start the engine.
2. Push “MAP” switch.
3. Touch “Setting”.



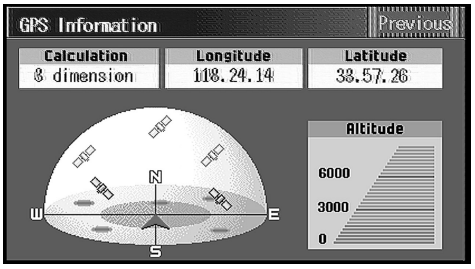
SEL461Y

4. Touch "System Setting".



SEL462Y

5. Touch "GPS Information".



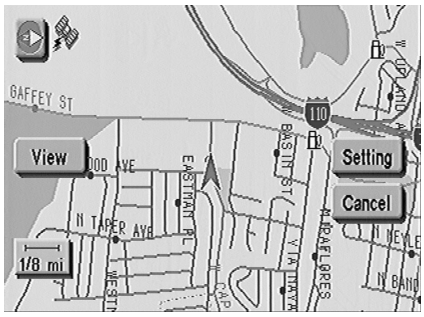
SEL146W

6. Then GPS information will be displayed.

"ADJUST CURRENT LOCATION" SETTING

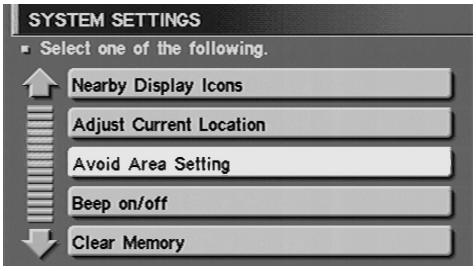
NFEL0299S04

1. Start the engine.
2. Push "MAP" switch.
3. Touch "Setting".
4. Touch "System Setting".

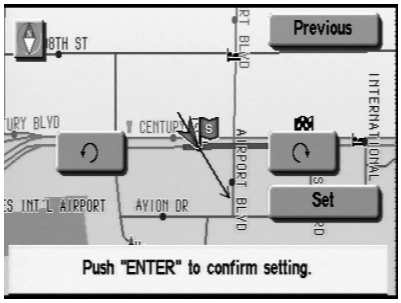


SEL460Y

5. Touch "Adjust Current Location".



SEL463Y



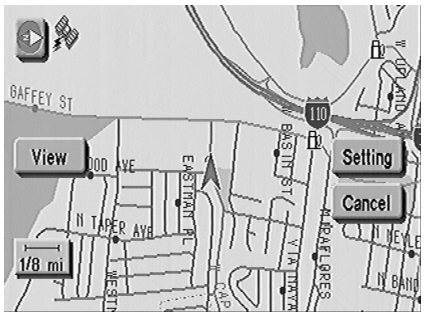
SEL602X

6. Touch "↶" or "↷" to calibrate the heading direction. (Arrow marks will rotate corresponding to the calibration key.)
7. Touch "Set". Then the vehicle mark will be matched to the arrow mark.
8. Display will show "Heading direction has been calibrated" and then go back to the current location map.

BEEP ON/OFF SETTING

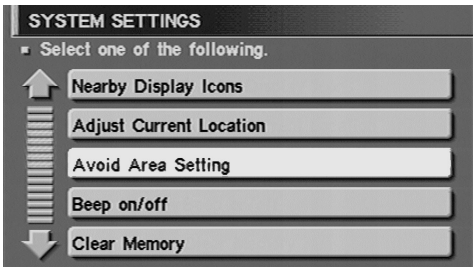
NFEL0299S05

1. Start the engine.
2. Push "MAP" switch.
3. Touch "Setting".
4. Touch "System Setting".

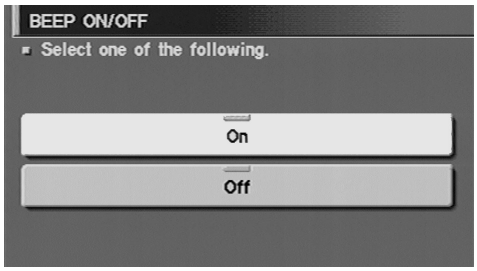


SEL460Y

5. Touch "Beep on/off".



SEL463Y



SEL464Y

6. Touch "On" or "Off" icon.
- If you want the beep sound, select "ON".
- If you do not want the beep sound, select "OFF".

7. Push "MAP" switch, then the display will go back to the current location map.

DISPLAY SETTING

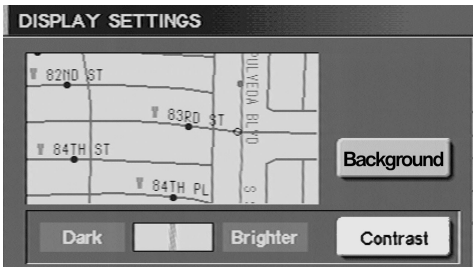
NFEL0299S06

Description

NFEL0299S0601

The following display setting can be changed in this mode.

- Dimmer operation (when lighting switch is turned on.)
- Display color (Day mode or Night mode)
- Brightness of display



SEL465Y

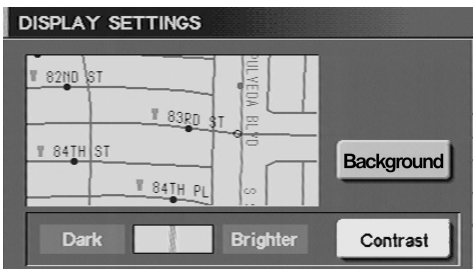
DISPLAY COLOR SETTING

NFEL0299S07

1. Start the engine.
2. Push "MAP" switch.
3. Touch "Setting".
4. Touch "System Setting".
5. Touch "Display Setting".
6. Touch "Background". Display color will change to Day mode/ Night mode.
7. Touch "Previous".

NOTE:

- **Display color can be changed independently when lighting switch is turned on and off.**
- **The D/N button is used to change the display color the same way as the "Background" icon.**
- **Initial setting of the color is as follows:**
  When lighting switch is turned off: Day mode
  When lighting switch is turned on: Night mode
  Day mode: White background
  Night mode: Black background



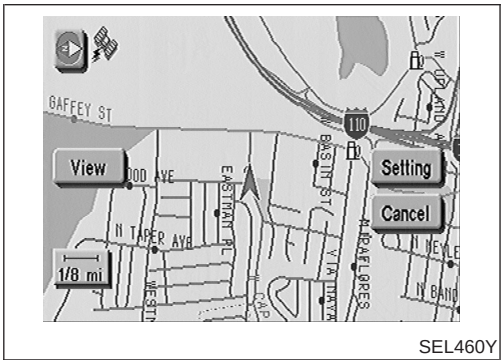
SEL465Y

BRIGHTNESS SETTING

NFEL0299S08

1. Start the engine.
2. Push "MAP" switch.
3. Touch "Setting".
4. Touch "System Setting".
5. Touch "Display Setting".
6. Touch "Brighter" or "Dark" to adjust the brightness of display.
7. Touch "Previous".

NOTE:
Display brightness can be adjusted independently when lighting switch is turned on and off.

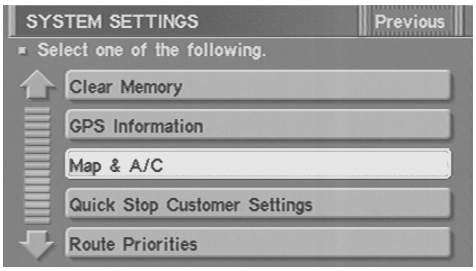


SEL460Y

"QUICK STOP CUSTOMER SETTING" MODE

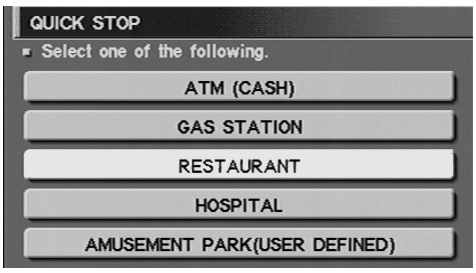
NFEL0299S09

1. Start the engine.
2. Push the "MAP" switch.
3. Touch "Setting".
4. Touch "System Setting".



SEL462Y

5. Touch "Quick Stop Customer Setting".



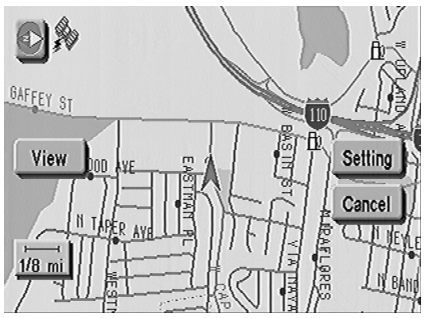
SEL466Y

6. Select from the itemized list.

"ROUTE PRIORITIES" MODE

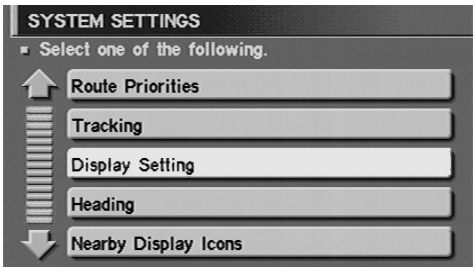
NFEL0299S10

1. Start the engine.
2. Push the "MAP" switch.
3. Touch "Setting".
4. Touch "System Setting".



SEL460Y

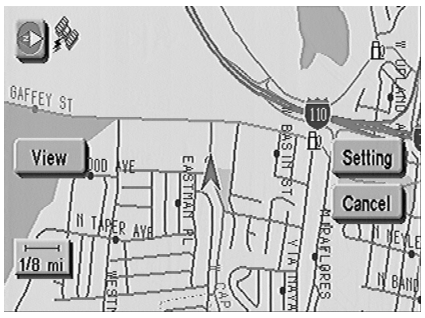
5. Touch "Route Priorities".



SEL467Y

6. Select from the itemized list.

SEL468Y

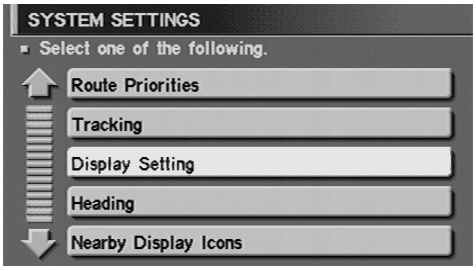


SEL460Y

"TRACKING" MODE

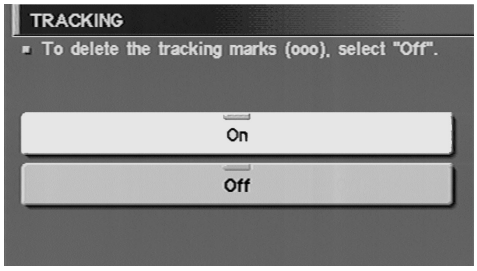
NFEL0299S11

1. Start the engine.
2. Push the "MAP" switch.
3. Touch "Setting".
4. Touch "System Setting".



SEL467Y

5. Touch "Tracking".

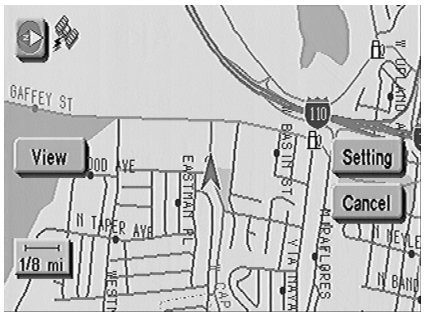


SEL469Y

6. Touch the "On" or "Off" icon.
- If you don't need a trail on the map, select "Off".
- If you need a trail on the map, select "On".

7. Push the "MAP" switch to return the display to the current location map.

NOTE:
When a trail display is turned OFF, trail data is erased from the memory.

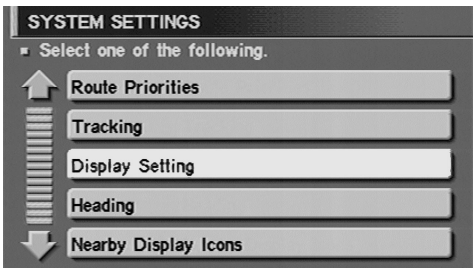


SEL460Y

"HEADING" MODE

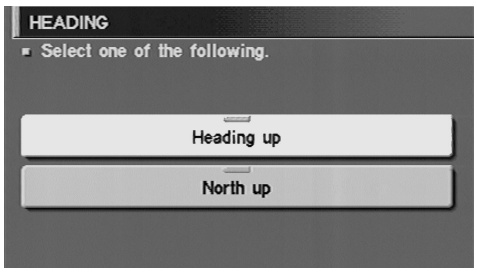
NFEL0299S12

1. Start the engine.
2. Push the "MAP" switch.
3. Touch "Setting".
4. Touch "System Setting".



SEL467Y

5. Touch "Heading".



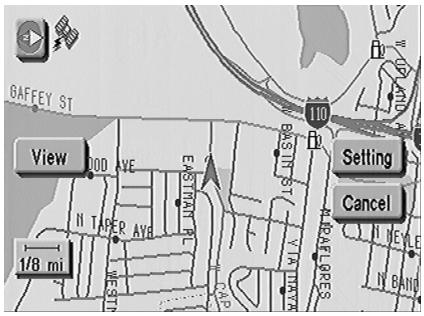
SEL470Y

6. Touch the "Heading up" or "North up" icon.
- To display North up, select "North up".
- To display the car heading up, select "Heading up".

7. Push the "MAP" switch, then the display will go back to the current location map.

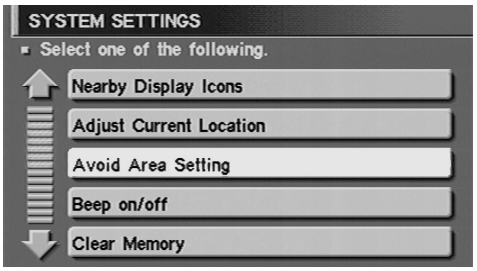
"NEARBY DISPLAY ICONS" MODE

NFEL0299S13



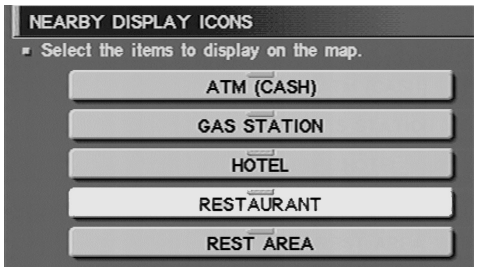
SEL460Y

1. Start the engine.
2. Push the "MAP" switch.
3. Touch "Setting".
4. Touch "System Setting".



SEL463Y

5. Touch "Nearby Display Icons".

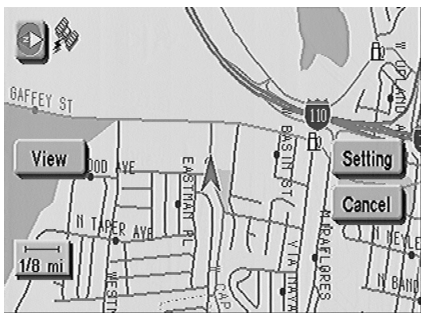


SEL471Y

6. Select and touch the itemized list.
7. Push the "MAP" switch to return the display to the current location map.

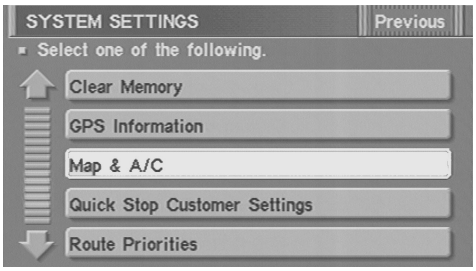
"CLEAR MEMORY" MODE

NFEL0299S14



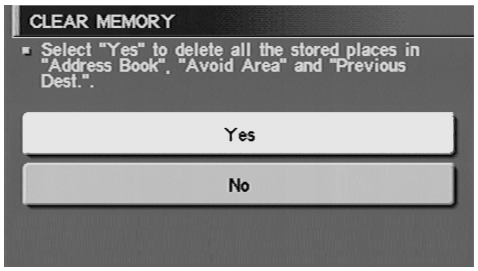
SEL460Y

1. Start the engine.
2. Push the "MAP" switch.
3. Touch "Setting".
4. Touch "System Setting".



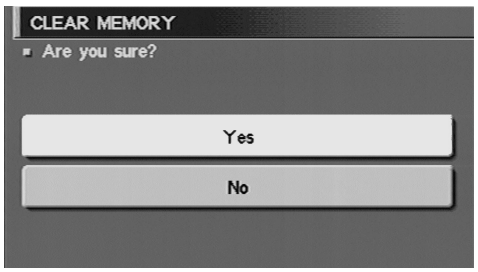
SEL462Y

5. Touch "Clear Memory".



SEL472Y

6. To delete all the stored places in the "Address Book", "Avoid Area" and "Previous Dest.", select "Yes".



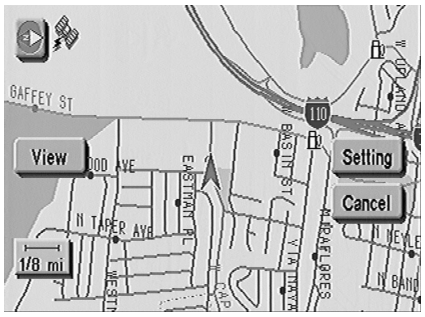
SEL473Y

7. When the "Yes" icon is selected, the stored data will be cleared, and the [SYSTEM SETTINGS] screen will appear.

"MAP & A/C" MODE

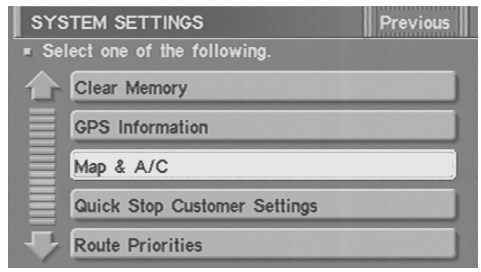
NFEL0299S15

1. Start the engine.
2. Push "MAP" switch.
3. Touch "Setting".
4. Touch "System Setting".



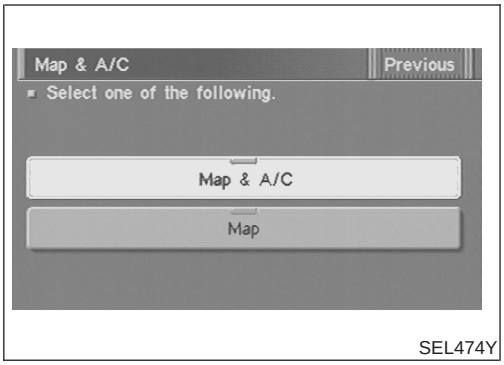
SEL460Y

5. Touch "MAP & A/C".



SEL462Y

Setting Mode (Cont'd)



SEL474Y

6. Touch "Map & A/C" or "Map" icon.
- To set the split display with both the map and the air conditioner information as the initial setting of the NAVI system, select "MAP & A/C".
- To set the map only display as the initial setting of the NAVI system, select "MAP".

7. Push "MAP" switch, then the display will go back to the current location map.

NOTE:
When the enlarged view is displayed, the air conditioner control screen will not be displayed.

Trouble diagnoses

NFEL0300

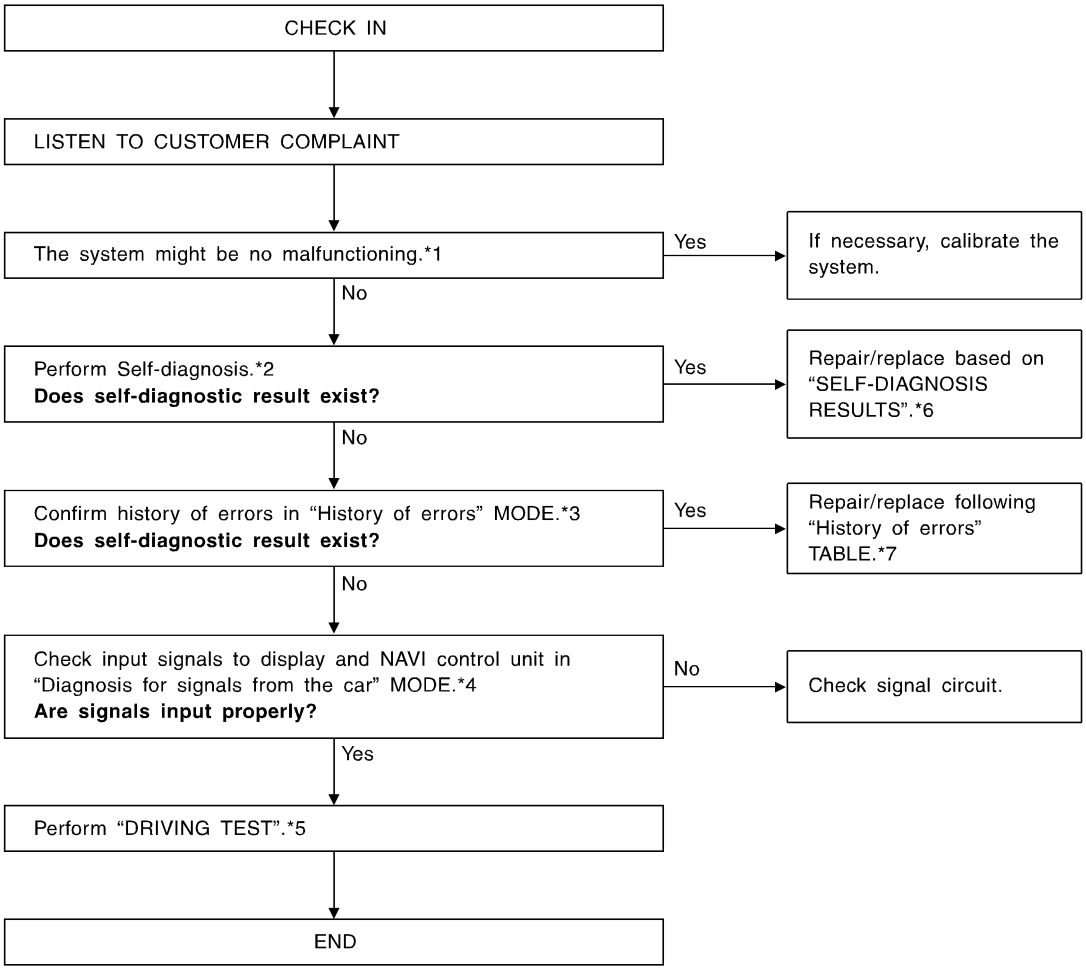
SYMPTOM CHART

NFEL0300S01

Symptom	Diagnoses/service procedure	Reference page
Any function of the system does not operate.	Check power supply and ground circuit for display & NAVI control unit.	EL-411
Strange screen color or unusual screen brightness.	1. Check "DISPLAY SETTING".	EL-402
	2. Check display in "Diagnosis of Display" MODE.	—
The display is not dimmed when turning lighting switch to ON.	1. Check "DISPLAY SETTING".	EL-402
	2. Check lighting switch signal input to display & NAVI control unit correctly in "DIAGNOSTIC SIGNAL FROM THE CAR" MODE.	EL-394
No navigation guide voice are heard from both front speakers.	1. Check "Voice Guidance Setting".	—
	2. Check voice guide operation.	EL-412
Beep does not sound when the system guides route.	Check "BEEP ON/OFF SETTING".	EL-402
Position marker does not trace along the route being traveled.	Go to "WORK FLOW FOR NAVIGATION INSPECTION".	EL-409
Position marker does not indicate forward or backward movement.	Check reverse signal input to display & NAVI control unit correctly by "DIAGNOSTIC SIGNAL FROM THE CAR" MODE.	EL-394
Radio wave of GPS cannot be received. (GPS marker on the display does not become green color.)	1. Is there anything obstructing the GPS antenna on the rear parcel finisher? (GPS antenna located under the rear parcel finisher.)	—
	2. Check GPS radio wave receive condition in "GPS INFORMATION SETTING".	EL-400
	3. Check GPS antenna in "Self Diagnosis".	EL-387
Heading direction of position marker does not match vehicle direction.	1. Perform "ADJUST CURRENT LOCATION" SETTING.	EL-401
	2. Go to "WORK FLOW FOR NAVIGATION INSPECTION".	EL-409
Stored location in the address book and other memory functions are lost when battery is disconnected or becomes discharged.	Stored location in the address book and other memory functions may be lost if the battery is disconnected or becomes discharged. If this should occur, charge or replace the battery as necessary and re-enter the information.	—
Map appears grey and cannot be scrolled.	The current location in the memory is out of the map data area. Perform "Initialize Location".	EL-426

WORK FLOW FOR NAVIGATION INSPECTION

NFEL0300S02



SEL629XA

*1: EL-414
*2: EL-387
*3: EL-390
*4: EL-394
*5: EL-410
*6: EL-389
*7: EL-392

DRIVING TEST

=NFEL0300S03

During the driving test, diagnose the system by checking the difference of symptoms with each sensor ON or OFF.

Test pattern 1

Test method in which current position adjustment is not made according to GPS data.

- Remove the GPS antenna connector from the display & NAVI control unit. Drive the vehicle.
  Before driving the vehicle, perform "ADJUST CURRENT LOCATION" (EL-401).

Test pattern 2

Test procedure in which map matching is not used.

- Before driving the vehicle, perform "ADJUST CURRENT LOCATION" (EL-401). With the ignition switch OFF and the map CD-ROM removed from the display & NAVI control unit, drive the vehicle. After driving the vehicle, reinstall the map CD-ROM. Compare the saved driving tracks for the vehicle's current location with roads on the map.

Example

<The position marker consistently indicates the wrong position when driving in the same area. Determine if this is the result of the map matching function or the GPS function.>

→ Perform test pattern 1.

<To verify the accuracy of the road configuration shown on the display>

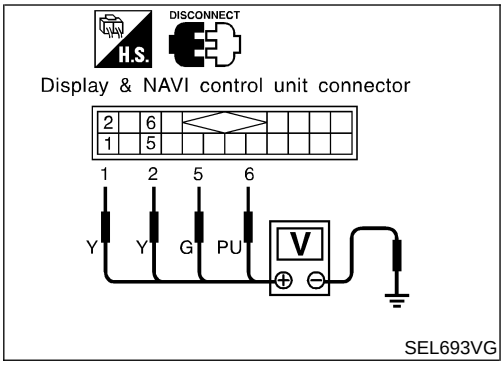
→ Perform test patterns 1 and 2.

- Compare the map and the saved driving tracks. The precision of the saved driving tracks is within several hundred meters.

<To make distance calibration and adjustments>

→ Perform test patterns 1 and 2.

- Make adjustments by driving the vehicle over a known course (highway or other road where distances are clearly marked). Calibrate the distance against the known distance. Use the formula below.
  Calibration value = Screen display distance/Actual distance



POWER SUPPLY AND GROUND CIRCUIT CHECK FOR DISPLAY & NAVI CONTROL UNIT

Power Supply Circuit Check

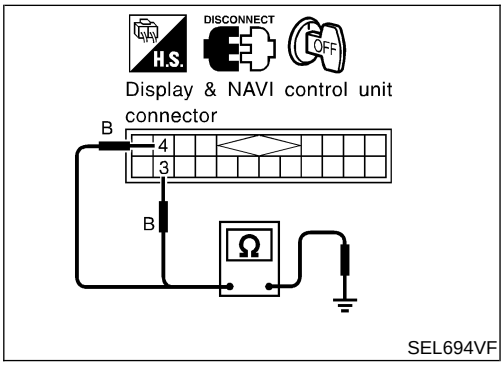
=NFEL0300S04

NFEL0300S0401

Terminals			Ignition switch		
(+)		(−)	OFF	ACC	ON
Connector	Terminal (Wire color)				
M168	1 (Y)	Ground	Battery voltage	Battery voltage	Battery voltage
	2 (Y)	Ground	Battery voltage	Battery voltage	Battery voltage
	5 (G)	Ground	0V	0V	Battery voltage
	6 (PU)	Ground	0V	Battery voltage	Battery voltage

If NG, check the following.

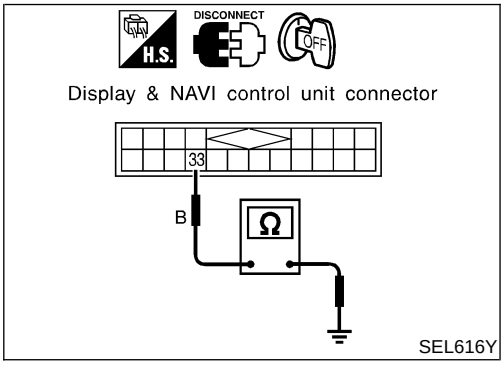
- 10A fuse [No. 1, located in the fuse block (J/B)]
- 10A fuse [No. 10, located in the fuse block (J/B)]
- 15A fuse [No. 56, located in the fuse block (J/B)]
- Harness for open or short between fuse and display & NAVI control unit



Ground Circuit Check

NFEL0300S0402

Connector	Terminals	Continuity
M168	3 (B) - Ground	Yes
	4 (B) - Ground	Yes
M169	33 (B) - Ground	Yes



VOICE GUIDE OPERATION CHECK

=NFEL0300S05

1	PRELIMINARY CHECK

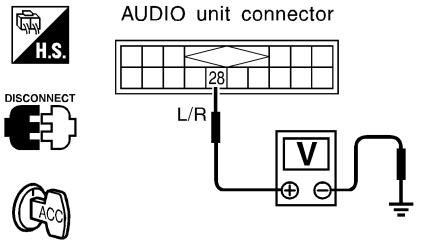
1. Turn ignition switch to ACC position.
2. Insert the music CD into the radio and CD player.
3. Try to play the music CD.
   Is the sound emitted from all speakers?

Yes or No

Yes	▶	GO TO 2.
No	▶	Repair or replace audio system. Refer to "AUDIO", EL-180.

2	CHECK NAVI OPERATION ON SIGNAL

1. Disconnect audio unit connector.
2. Push "VOICE" button.
3. Check voltage between AUDIO unit harness connector M68 terminal 28 (L/R) and ground.



Voltage [V]:
Condition of VOICE button: Push.
Approx. More than 0 - 10
Condition of VOICE button: Do not push.
0

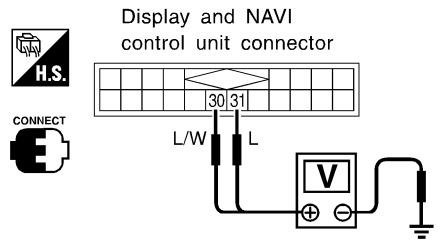
SEL645XB

OK or NG

OK	▶	GO TO 3.
NG	▶	Repair or replace harness or display and NAVI control unit.

3	CHECK VOICE SIGNAL CIRCUIT

1. Push "VOICE" button.
2. Check voltage between display and NAVI control unit harness connector M169 terminal 30 (L/W) or 31 (L) and ground.



Voltage [V]:
Condition of VOICE button: Push.
Approx. 5
Condition of VOICE button: Do not push.
0

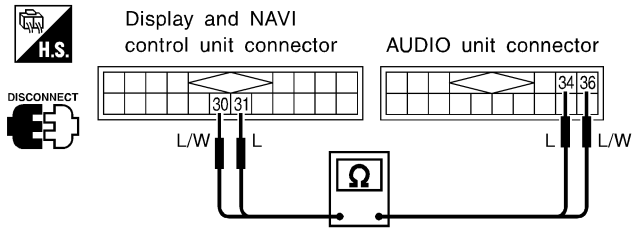
SEL458Y

OK or NG

OK	▶	GO TO 4.
NG	▶	Repair or replace display and NAVI control unit.

4	CHECK VOICE SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect display and NAVI control unit connector and AUDIO unit connector.
3. Check continuity between display and NAVI control unit harness connector M169 terminal 30 (L/W) and AUDIO unit harness connector M68 terminal 36 (L/W).
4. Check continuity between display and NAVI control unit harness connector M169 terminal 31 (L) and AUDIO unit harness connector M68 terminal 34 (L).



Does continuity exist?

SEL459Y

Yes or No

Yes	▶	Repair or replace audio system. Refer to "AUDIO", EL-180.
No	▶	Repair or replace harness or connector.

This Condition is Not Abnormal

=NFEL0301

BASIC OPERATIONS

NFEL0301S01

Symptom	Possible cause	Remedy
No image comes on.	The brightness adjustment is at the lowest setting.	Adjust it brighter.
No map comes on the screen.	No map CD-ROM is inserted, or it is inserted upside down.	Insert the CD-ROM correctly.
	The map display mode is switched off.	Press the MAP button.
No voice guide is available. or The volume is not high enough.	The volume is not set correctly or turned off.	Adjust the volume correctly.
The screen is too dim. The movement is slow.	The temperature in the vehicle is low.	Wait for the temperature to rise.
There are darker or brighter dots in the display.	It is inherent to displays.	This is not abnormal.

- Stored location in the address book and other memory functions may be lost if the car's battery is disconnected or becomes discharged for a long time.
  If this should occur, service the car's battery as necessary and re-enter the address book information.

Area place names are not displayed.
If area place names do not appear on the map display, these names may not be available. Use the BIRDVIEW® flat surface map display function. Display output may differ. Note the items related to BIRDVIEW® below.

- Priority is given to the display of place names in the direction of vehicle travel.
- Extended display of vehicle travel distance for both surfaces and steering angle (flat directional changes). This phenomenon disappears after the display image has been replaced by another one.
- The names of route and area might vary between the immediate front area and distance front area.
- Alphanumeric display characters are limited to maintain display simplicity and clarity. Display details may differ with time and place.
- Identical place and road names may appear on the display at more than one location.

VEHICLE ICONS

NFEL0301S08

Symptom	Possible cause	Remedy
The location names differ, between Planview and Birdview™.	This is because the displayed information is reduced so that the screen does not become too crowded. There is also a chance that names of the roads or locations will be repeatedly displayed. The name appearing on the screen may be different because of the processing procedure.	It should not be regarded as abnormal.
The vehicle icon is not shown correctly.	The vehicle might have moved with the ignition off, for example on a ferry boat or car transporter.	Drive the vehicle with GPS on for some distance.
The screen does not switch to night screen even after turning the headlights on.	The last setting is the daytime screen, when you turned on the lights the last time.	Turn the headlights on again, go to [DISPLAY SETTING] screen and set it to the night screen.
The map does not scroll even when the vehicle is traveling.	The display is not switched to the map screen.	Press the MAP button.
The vehicle icon does not show up.	The display is not switched to the map screen.	Press the MAP button.

This Condition is Not Abnormal (Cont'd)

Symptom	Possible cause	Remedy
GPS indicator on the screen remains gray.	GPS signals are not received because the vehicle is indoors or in the shade of buildings.	Move the vehicle to outdoors with a clear view of the sky.
	GPS signals are not received because some objects are placed on the instrumental panel.	Remove the objects from the instrumental panel.
	GPS satellites are in poor locations.	Please wait for the satellites to move to better locations.
The location of vehicle icon does not match the actual position.	Driving on slippery road surface	If the position marker does not move to the correct position even after the vehicle has been driven approximately 6 miles (10 km), adjust the current location. If necessary, adjust the moving speed of the vehicle.
	Driving on slanted area	
	Rough or violent driving	If the position marker does not move to the correct position even after the vehicle has been driven approximately 6 miles (10 km), adjust the current location.
	GPS indicator remains gray.	Please check the GPS indicator on the screen to see if it remains gray.
	Because the vehicle has tire chains on, or the system was transferred to a different vehicle, errors (gain or loss) result in calculating the speed from the speed pulse.	It will move by driving the vehicle for 30 minutes [in case it is running at 18-3/4 miles/hour (30 km/h)]. If you still notice errors, adjust moving speed.
	The map data has an error or is incomplete (if the location error happens always in the same area).	Please wait for the update of the Map CD-ROM.

MAP CD-ROM

NFEL0301S09

Symptom	Possible cause	Remedy
The message "Error" appears after operation.	Map CD-ROM is soiled or partially damaged.	Check the CD-ROM and wipe it clean with a soft cloth.
		In case you see any damage, replace the CD-ROM.

DESTINATION, WAY POINTS OR MENU CONTENTS

NFEL0301S10

Symptom	Possible cause	Remedy
Turn list is not displayed.	Route search does not occur.	Set designation areas and perform route search.
	Car marker does not appear on recommended route.	Drive on the recommended route.
	Route guide is OFF.	Turn the route guide ON.
In rerouting, the waypoints are not included in the calculation.	The system has judged that the vehicle has already passed the point.	If you want to go to that point again, edit the route again.

This Condition is Not Abnormal (Cont'd)

CANNOT BE CHOSEN OR SET

NFEL0301S11

Symptom	Possible cause	Remedy
Route information is not displayed.	Route calculation has not yet been requested.	Set the destination and request route calculation.
	The vehicle icon is not on the suggested route.	Please drive the vehicle along the suggested route.
	Route guidance is off.	Turn the route guidance on.
Route is not calculated automatically.	The vehicle is not running on a route that can be calculated from.	Enter the route that can be calculated from. Alternatively, you can calculate the route manually. In this case, the entire route will be calculated again.
It is impossible to request a detour.	Your vehicle is not running on the suggested route.	Restart route calculation or join the suggested route.
The detour found is the same as the previous suggestion.	The system took many conditions into consideration, but the same result was obtained.	This is not abnormal.
It is impossible to set the waypoints.	The number of waypoints exceeds 5.	It is impossible to set more than 5 waypoints. Please divide them in groups to find them all.
Some items in the menu cannot be selected.	The vehicle is moving.	Park the vehicle in a safe place and select the marks relevant to the suggested route.

VOICE GUIDANCE

NFEL0301S12

Symptom	Possible cause	Remedy
The voice guidance is not available.	Voice guidance is only available at certain intersections marked with . In some cases, the guidance is not available even when the vehicle should make a turn.	This is not abnormal.
	The vehicle is off the suggested route.	Go back to the suggested route or request route calculation again.
	Voice guidance is set OFF.	Turn the voice guidance ON.
	Route guidance is set OFF.	Turn the route guidance ON.
The guidance content does not correspond to the actual condition.	The content of the voice guidance may vary, depending on the types of junctions to make turns on.	Follow the actual rules and regulations.

ROUTE CALCULATION

NFEL0301S13

Symptom	Possible cause	Remedy
Although the system is set with the moving direction as the preference, it does not find the route by matching the preference.	There is no route found in that direction.	This is not abnormal.
Route is not indicated.	There is no road that can be found by this system close to the destination.	Reset the destination close to the road displayed with orange, or wider ones. Especially with roads which have separate lanes for opposite directions, be careful in setting the destination or way points on it, because results may differ depending on the lane you choose.
	The starting point to the destination is too close.	Set more distant destinations.

This Condition is Not Abnormal (Cont'd)

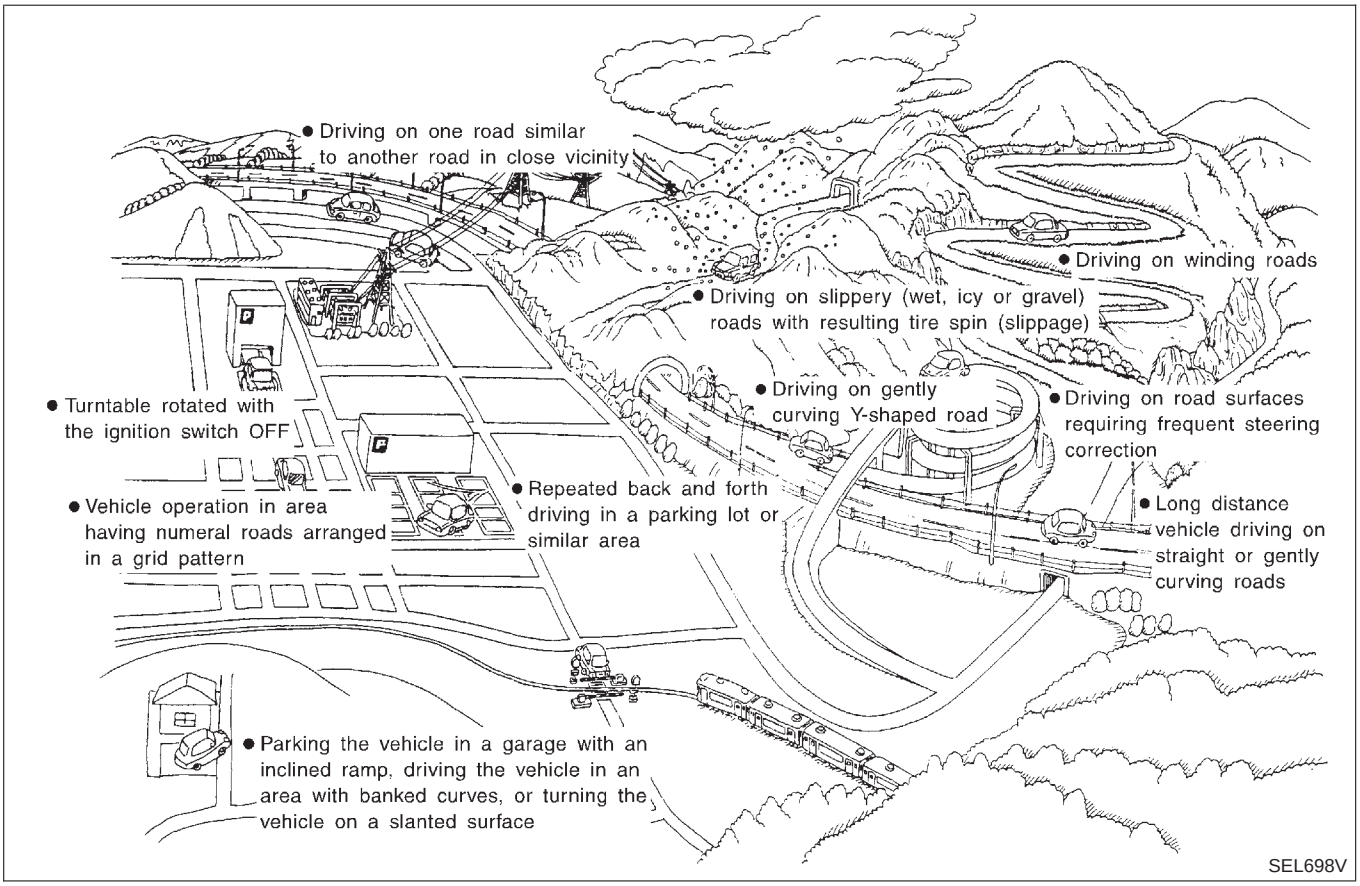
Symptom	Possible cause	Remedy
The route is not displayed continuously at way points, for example, that are not calculated route from the vehicle's current position.	Suggested routes may be displayed discontinuously near way points as route calculation is done at each way point.	This is not abnormal.
The suggested route the vehicle has traveled is erased.	Suggested routes are stored in memory by the blocks; if the vehicle travels past way point 1, the former data will be erased.	This is not abnormal.
A very detoured route is suggested.	If there are restrictions (such as one-way traffic) on roads close to the starting point or destination, the system may suggest a detoured route.	Try slightly moving the starting point or destination.
The landmark description does not correspond to the actual one.	It may be caused by insufficient or incorrect data on the CD-ROM.	Exchange the Map CD-ROM. It will be updated.
The suggested route does not exactly connect to the starting point, way points, or destination.	There is no data for route calculation closer to these points.	Set these points on the main road displayed in thick orange. Please note that in some cases even main roads lack the data for route calculation.

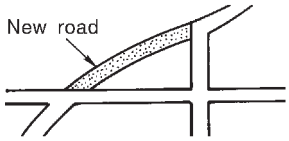
This Condition is Not Abnormal (Cont'd)

EXAMPLE OF CURRENT VEHICLE POSITION MARKER ERROR

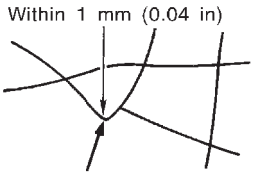
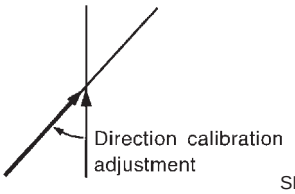
=NFEL0301S02

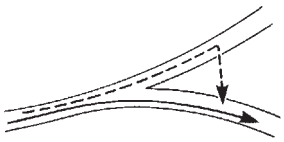
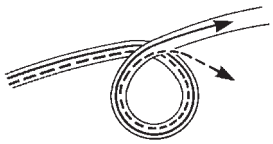
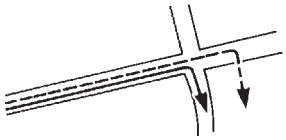
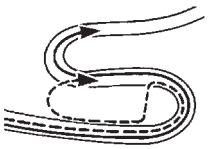
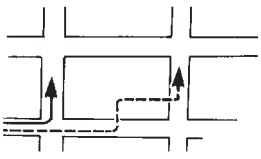
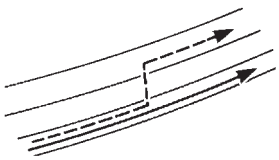
The navigation system reads the vehicle distance and steering angle data. Because the vehicle is moving, there will be an error in the current position indication. After the error appears, drive the vehicle for a short distance. Stop the vehicle. If the position marker does not return to its original position, perform "ADJUST CURRENT LOCATION" (EL-401).



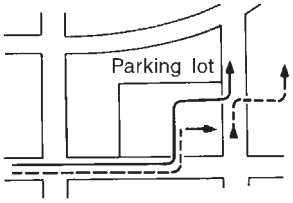
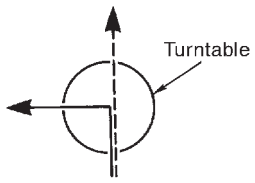
Possible cause		Drive condition	Service procedure
Area	Slippery road surface	On wet, icy, or gravel road where frequent wheel slippage occurs, distance calculations may be erroneous. The position marker may show the vehicle to be in inaccurate position.	If the position marker does not move to the correct position even after the vehicle has been driven approximately 10 km (6 miles), perform "ADJUST CURRENT LOCATION" (EL-401). If necessary, perform "SPEED CALIBRATION" (EL-399).
	Slanted area	Hilly areas where the road has banked curves. When the vehicle enters these banked curves, there may be an error in steering angle measurement. The position marker may show the vehicle to be in inaccurate position.	
Map data	Map display for a given road does not appear.  SEL699V	When the vehicle is driven on a newly constructed road that does not appear on the existing map. Map marking and calibration are not possible. The position marker may indicate inaccurate position in close proximity to the actual position. Subsequently, when the vehicle is driven on a road which is available as map data, the position marker may still indicate an inaccurate position.	
	The vehicle is driven on a road whose course has been altered (usually to improve the road or to eliminate some hazard). SEL700V	When the map data shown on the display and the actual conditions are different. Map matching will not be possible. The position marker may indicate inaccurate position in close proximity to the actual position. If the vehicle is driven on the indicated road, further errors may occur.	
Vehicle	Use of tire chains (Stormy weather)	Tire chains will affect distance sensing. The position marker may indicate inaccurate position.	If the position marker does not move to the correct position even after the vehicle has been driven approximately 10 km (6 miles), perform "SPEED CALIBRATION" (EL-399). After removing the tire chains, sensing accuracy may recover by itself.

This Condition is Not Abnormal (Cont'd)

Possible cause		Drive condition	Service procedure
Operation	Driving immediately after starting engine.	The gyro (angular velocity sensor) needs about 15 seconds after the engine is started to precisely sense the angular velocity. Directional sensing errors will occur if the vehicle is moved immediately after starting the engine. The position marker may indicate inaccurate position.	Wait a few moments between starting the engine and actually driving the vehicle.
	Continuous driving for long distances (non-stop)	When the vehicle is driven continuously without stopping over a long distance, errors in directional sensing may occur. The position marker may indicate inaccurate position.	Stop the vehicle. Perform "SPEED CALIBRATION" (EL-399).
	Rough or violent driving	Wheel spinning (peeling out) or similar rough driving techniques can adversely affect sensing accuracy. The position marker may indicate inaccurate position.	If the position marker does not move to the correct position even after the vehicle has been driven approximately 10 km (6 miles), perform "ADJUST CURRENT LOCATION" (EL-401).
Positional calibration procedures	Positional calibration precision  SEL701V	If current vehicle location is roughly set, the system may be unable to locate the road that the vehicle is traveling on. (This is especially true in an area where there are many roads.)	Perform "ADJUST CURRENT LOCATION" (EL-401) within a precision standard of 1 mm (0.04 in) on the display. Note: During calibration, use the most detailed map possible.
	Position calibration direction  SEL702V	When calibrating the position, check the vehicle direction. If the vehicle direction is not correct, subsequent precision of current location will be affected.	Perform "ADJUST CURRENT LOCATION", refer to EL-401.

Possible cause: —: Vehicle running ---: Indication		Drive condition	Service procedure
Road shapes	Y-intersection  SEL703V	In Y-intersections with a very gradual change in course, a directional sensing may be inaccurate. This may result in the position marker giving the wrong road indication.	If the position marker does not move to the correct position even after the vehicle has been driven approximately 10 km (6 miles), perform "Store place". If required, also perform "ADJUST CURRENT LOCATION" (EL-401).
	Spiral road  SEL704V	On loop bridges and similar structures which result in a large and continuous turn, turning angle may be sensed inaccurately. As a result, the position marker may separate from the route on the map.	
	Straight road  SEL705V	In long distance driving on a straight road or road with very gradual curves, map marking inaccuracies may occur. In such cases, the position marker may stray from the route being traveled during subsequent turns due to inaccurate distance calculation.	
	Winding road  SEL706V	Directional sensing precision errors may occur when traveling on winding roads. During map matching, the position marker may stray to an adjacent road having a similar shape. Subsequent position marker error may occur.	
	Grid-like road shape  SEL707V	Directional sensing and distance sensing, precision errors may occur because of many roads having a similar shape in the immediate area. During map matching, the position marker may stray to an adjacent road having a similar shape. Subsequent position marker error may occur.	
	Parallel roads  SEL708V	When driving on a parallel road, map matching errors may occur. Subsequent position marker error may also occur.	

This Condition is Not Abnormal (Cont'd)

	Possible cause: —: Vehicle running ---: Indication	Drive condition	Service procedure
Location	Parking lot or similar area  SEL709V	When the vehicle is driven in a parking lot or similar area, such as in an area not normally marked as a road on map, during map matching, the system may select nearby roads. This error may continue after the vehicle exits the parking area and begins to run on ordinary roads. Vehicle operation in a parking area may involve frequent turns and up and/or down operation. Directional sensing errors may occur leading to subsequent route and position mistakes.	
	Turntable  SEL710V	When the ignition switch is OFF (the usual situation when the vehicle is on a turntable), the navigation system receives no data from the gyro (angular velocity sensor). When the turntable rotates, no directional change is sensed. During subsequent vehicle operation, directional and route errors may occur.	

Position marker displays a completely different location

In circumstances such as those described below, GPS signal reception conditions may result in an erroneous position of the position marker. Perform "ADJUST CURRENT LOCATION" (EL-401).

NOTE:

- When GPS satellite signal reception conditions are poor, the position of position marker may be erroneous. If correction is not made immediately, the position marker error will be compounded and a completely different location will be indicated. In an area where GPS satellite signal reception conditions are good, the system can be returned to normal operation.
- The vehicle is driven aboard a car ferry or is towed for some distance with the ignition switch OFF. Vehicle movement is not sensed. Current location calculations do not occur and current location data does not appear on the display screen. Use GPS to accurately determine actual vehicle position. The system can be returned to normal operation when the GPS satellite signal reception conditions are good.

Position marker jumps

In circumstances such as those described below, the position marker may jump as a result of automatic current location corrections made by the system.

During map matching

- During map matching, the position marker may jump from one spot to another. In this case, it may be corrected to a wrong road or to an area where no road exist.

GPS location correcting

- Vehicle current location is sensed using the GPS data. Positional calibration is performed. The position marker continues to be in the wrong position. It may jump about from one area of the screen to another. In this case, it may be corrected to a wrong road or to an area where no road exist.

Position marker indicates that the vehicle is in the middle of an ocean or large river

The navigation system does not distinguish between land and water surfaces. In some cases, a position marker error may cause the display to show the vehicle above a water surface.

Position of position marker varies when the vehicle is repeatedly operated on the same road

Driving lane and steering wheel movement results in a variety of different positions of the position mark when traveling on the same road based on sensing results by the GPS antenna and gyro (angular velocity sensor).

Slow locational correction using map matching

- The map matching function requires verification of local data. To make the map matching function, some distance needs to be driven.
- The map matching function may not provide accurate performance in an area where there are numerous parallel roads. Until the system judges the road characteristics, an incorrect position may be shown.

GPS signal reception conditions are good. However, the position mark does not return to its proper position.

- he system senses the vehicle location with an error of approximately 100 m (328 ft). Due to the limitation of precision, the position marker may be inaccurate even if the GPS signal reception condition is good.
- The navigation system uses GPS data to determine vehicle location. GPS data is compared with other locational sensing data during the map matching process. The system decides which data is more precise and uses that data.
- When the vehicle is stationary, GPS data cannot be used to make system corrections.

Area designations on the map display and the BIRDVIEW® display differ.
To prevent the display from becoming congested, alphanumeric information is abridged.
[No problem]
Correct position of your vehicle is not displayed.
Vehicle position changed after ignition key was turned to the OFF position (Vehicle is transported on car ferry, car train, or by some other means).
[Operate vehicle for short time under GPS receiving conditions.]
The display does not change to night-time mode even though the light switch has been turned ON.
Lights have been turned on. In "DISPLAY CHANGE" mode, night-time mode on display has been switched to day-time mode and still is.
[Turn lights on again. Set the display to night-time mode. Refer to EL-402.]
Map does not scroll even though the position of your vehicle is changed.
Present area does not appear on the display.
[Press the "MAP" switch.]
Vehicle position marker does not appear.
Present area does not appear on the display.
[Press the "MAP" switch.]
The map surface precision display (GPS satellite marker) still remains gray.
Vehicle is parked inside a building or in the shadow of a large building. This intercepts the GPS signal.
[Move the vehicle to a more open position.]
GPS signal is not received because objects are placed on the rear parcel shelf.
[Remove objects from the rear parcel shelf.]
GPS satellite position is bad.
[Wait until GPS satellite position improves.]
Vehicle position precision is bad.
The map surface precision display (GPS satellite marker) still remains gray.
[Refer to "The map surface precision display (GPS satellite marker) still remains gray" item (Symptoms)]
Vehicle speed and elapsed distance is calculated from the vehicle speed pulse. This pulse is dependent upon tire size. If tire chains are used on the vehicle, accuracy will be affected (pulse rate will be too fast or too slow). The same is true if the system installed to your vehicle is removed and installed on another vehicle.
[Drive the vehicle at a speed higher than 30 km/h (19 MPH) for approximately 30 minutes. Automatic readjustment should occur. If it does not (remains too fast or too slow), distance calibration is required. Or, drive the vehicle for a short distance. Perform "SPEED CALIBRATION" (EL-399). After removing the tire chains, sensing accuracy may recover by itself.]
Bad map data or system defect (same error consistently occurs in the same area)

ROUTE SEARCH/ROUTE GUIDE

NFEL0301S03

- If the present location or the destination location is displayed in the avoid area, it is not possible to search routes.
- If the avoid area is set to wide range area, it may not be possible to find appropriate routes or search for alternate routes.
- The automatic re-route calculates a return to the original route. Because of this, it may not be possible to search appropriate new routes. If you deviate from the original route and wish to select an appropriate new route, touch "Route Calculation".
- The automatic re-route function may sometimes require considerable time.
- Displayed route number and directional information at a highway junction may differ from the information posted on the actual road signs.
- Displayed street name information at a highway exit may differ from the information posted on the actual road signs.
- Street name information displayed on the enlarged intersection map may differ from the information posted on the actual road signs.

This Condition is Not Abnormal (Cont'd)

- The enlarged intersection map may display an "Unknown Street" message at some street intersections.
- Because of road configuration, etc. the guide may finish early. If this occurs, follow the marker to reach your destination.
- Destination area side information (left side and right side) may differ from actual conditions because of data error.

LOCATION OF CAR MARKER

NFEL0301S04

- If the vehicle has been parked in a multi-level parking facility or underground parking facility, the car marker position may be inaccurate immediately after exiting the parking facility.
- The GPS accuracy is within ±100 m (300 ft). Even when receiving conditions are excellent, further positional correction may not occur.

STREET INDICATION

NFEL0301S05

- Street names displayed on the map may differ from the actual street names.
- An "Unknown Street" message may appear on the map in place of street name information.

RESEARCH

NFEL0301S06

- Position may be searched by house number. However, the displayed position and street may differ from the actual position and street.
- When position is searched using POI, the displayed position may differ from the actual position.
- Some data may not be available for new buildings and other structures in a map.

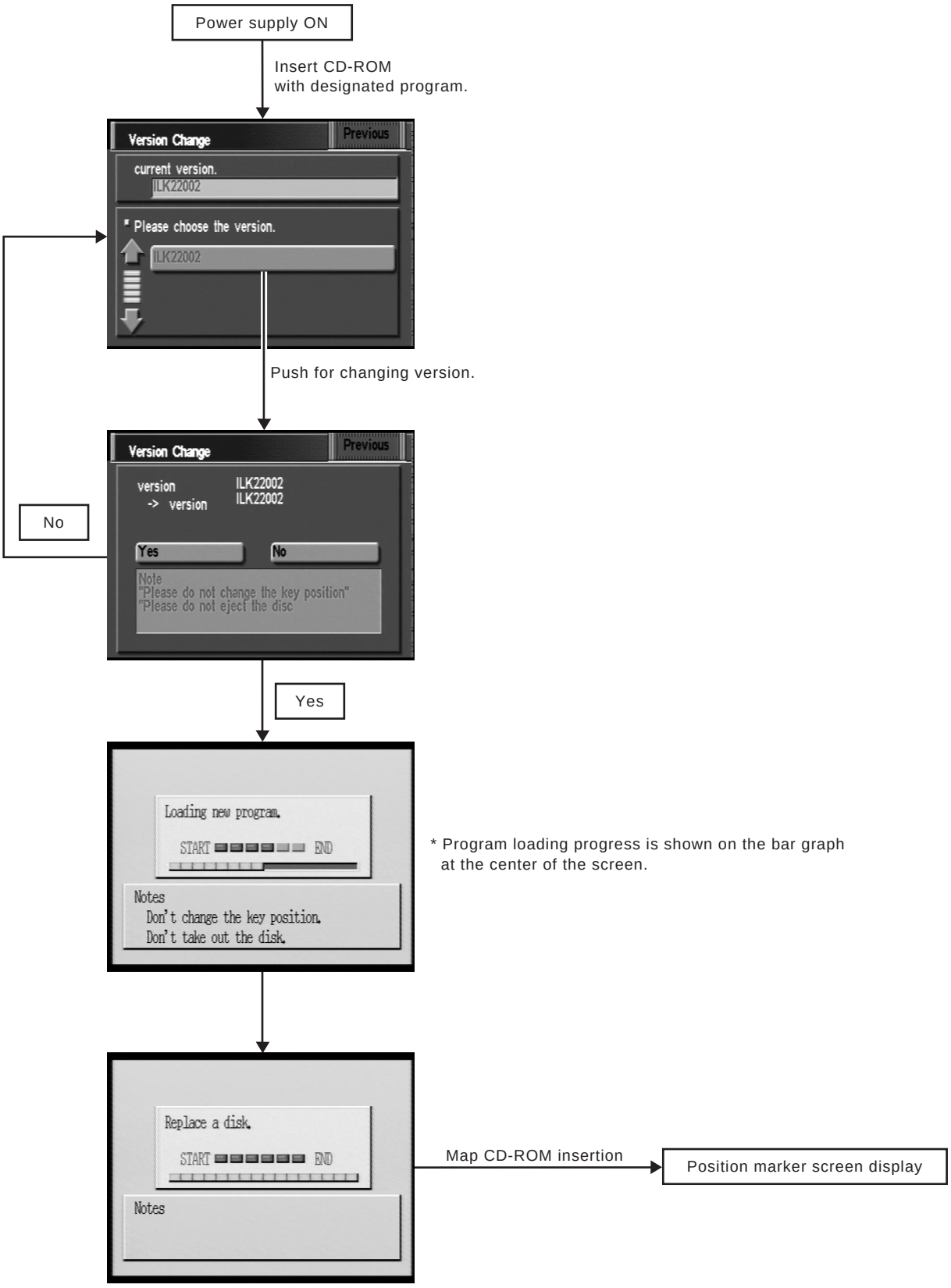
GPS ANTENNA

NFEL0301S07

- Do not place metal objects above the GPS antenna mounted on the rear parcel shelf. This will cause interference with signal reception.
- Do not place mobile telephones or vehicle radio transceivers in close proximity to the GPS antenna mounted on the rear parcel shelf. This may cause interference with signal reception.

Program Loading

NFEL0302



Note: Load the program only after the engine has been started.

SEL612X

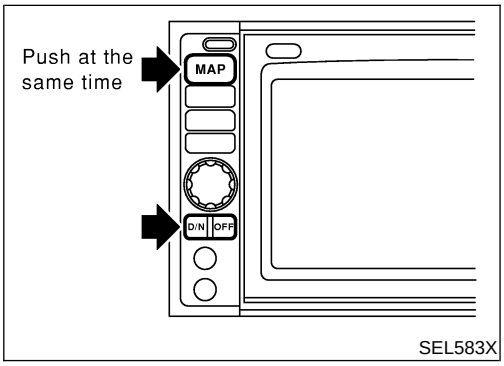
Initialization

NFEL0303

This procedure is for initializing the current location. Perform "Initialize Location" when the vehicle is transported a long distance by trailer, etc.
Map with grey background appears and the vehicle location cannot be adjusted by scrolling the display when the vehicle location in the memory is out of the area of the inserted map data.
Perform "Initialize Location" when this occurs.

NOTE:

- **Only initialize the system when the display & NAVI control unit is replaced. If the system is initialized in other cases, it may cause inaccurate positioning of the position marker for a while.**
- **Initialize the system outside for receiving the radio wave from the GPS satellite.**

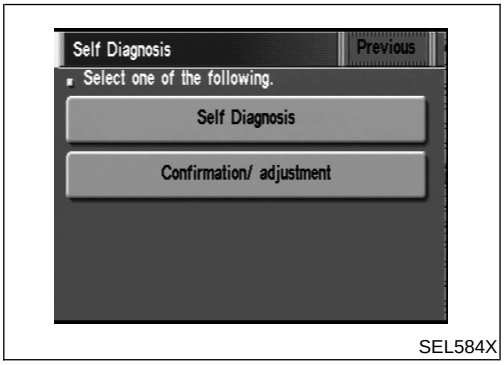


SEL583X

HOW TO PERFORM

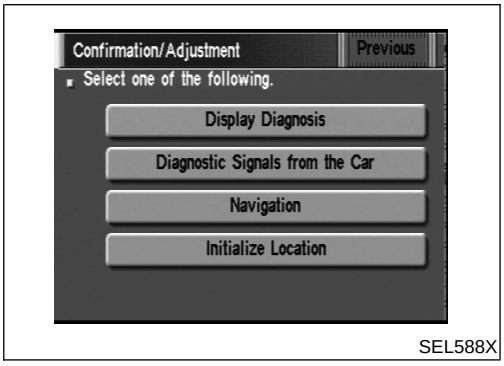
NFEL0303S01

1. Switch the navigation system mode to self-diagnosis by pushing both "MAP" and "D/N" switches at the same time for more than 5 seconds.



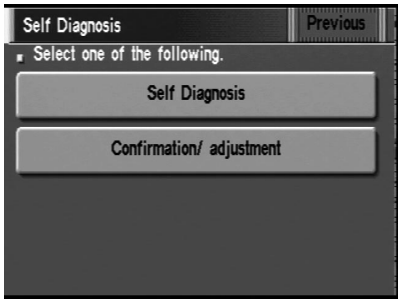
SEL584X

2. Touch "Confirmation/ adjustment".



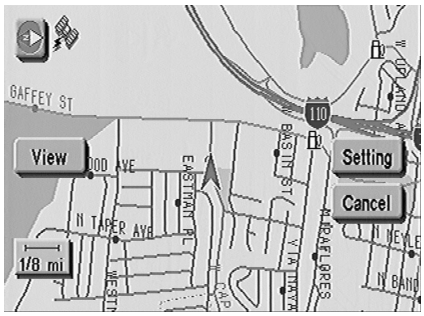
SEL588X

3. Touch "Initialize Location". Then the previous screen is displayed.



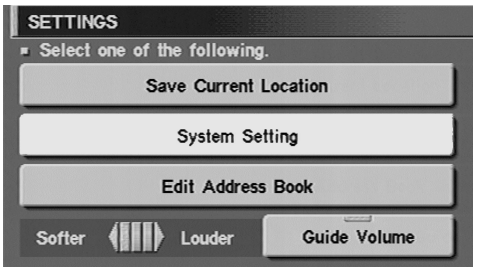
SEL584X

4. Push "Previous" switch.



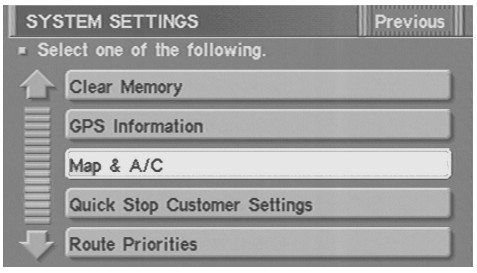
SEL460Y

5. Push the "MAP" switch.
6. Touch "Setting".



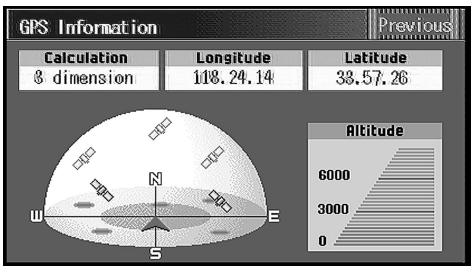
SEL461Y

7. Touch "System Setting".



SEL462Y

8. Touch "GPS Information".

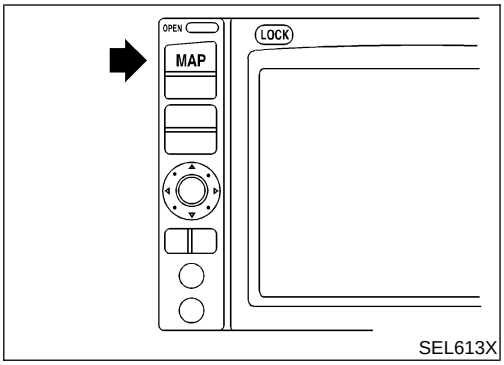


SEL146W

9. More than one GPS satellite icon turns green. (It may take 1 to 15 minutes.)

NOTE:
Drive the vehicle for a while* in order to change the receiving condition of the radio wave from the GPS satellite if the GPS icon does not turn green.
*** The driving distance which is necessary depends on the receiving condition of the radio wave from the GPS satellite.**

Initialization (Cont'd)



10. Push "MAP" switch and check the following.
- Confirm that the GPS icon on the map turns green.
- Then the position marker should show the current location.
- Position marker rotates corresponding to the movement of the vehicle.

11. Initialization is completed.

System Description

NFEL0304

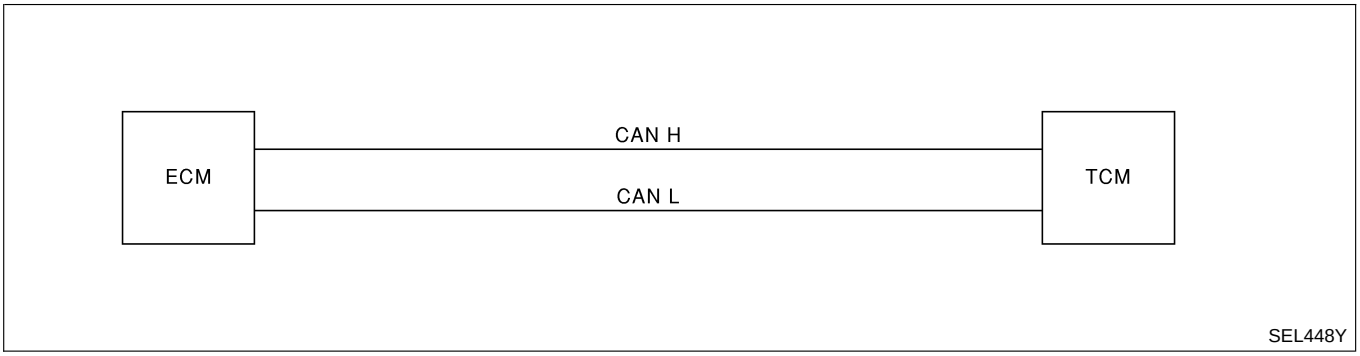
CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information 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 A/T MODELS

NFEL0304S01

System Diagram

NFEL0304S0101



Input/Output Signal Chart

NFEL0304S0102

T: Transmit R: Receive

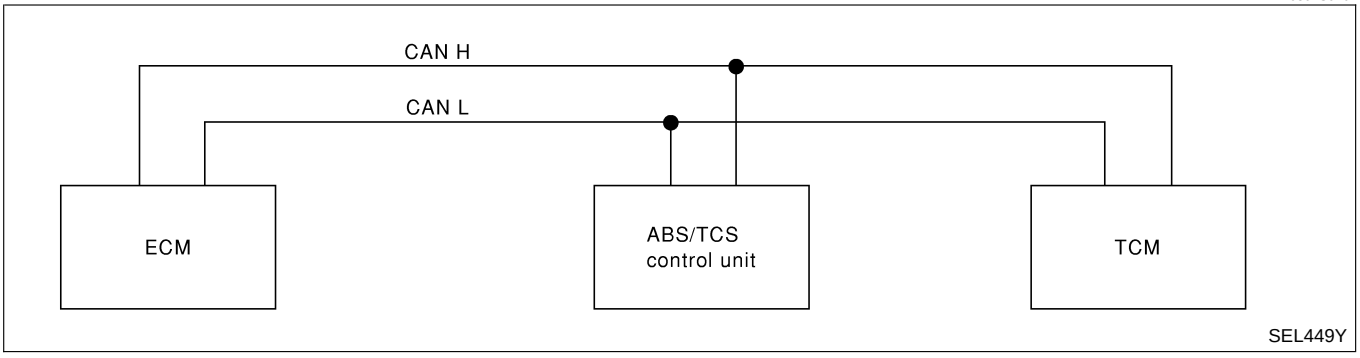
Signals	ECM	TCM
Accelerator pedal position signal	T	R
Output shaft revolution signal	R	T

FOR TCS MODELS

NFEL0304S02

System Diagram

NFEL0304S0201



Input/Output Signal Chart

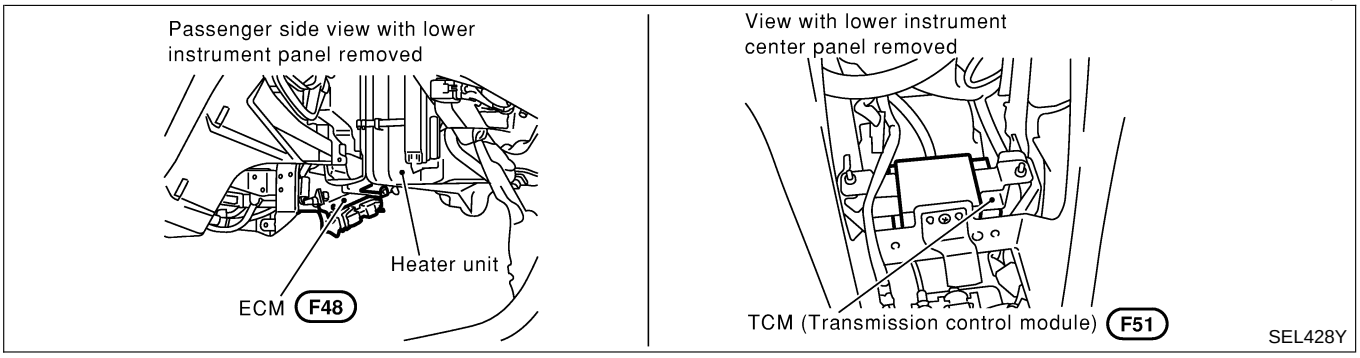
NFEL0304S0202

T: Transmit R: Receive

Signals	ECM	ABS/TCS control unit	TCM
Accelerator pedal position signal	T	R	R
Output shaft revolution signal	R		T
TCS self-diagnostic signal	R	T	
ABS self-diagnostic signal	R	T	

Component Parts and Harness Connector Location

NFEL0271



System Description

NFEL0272

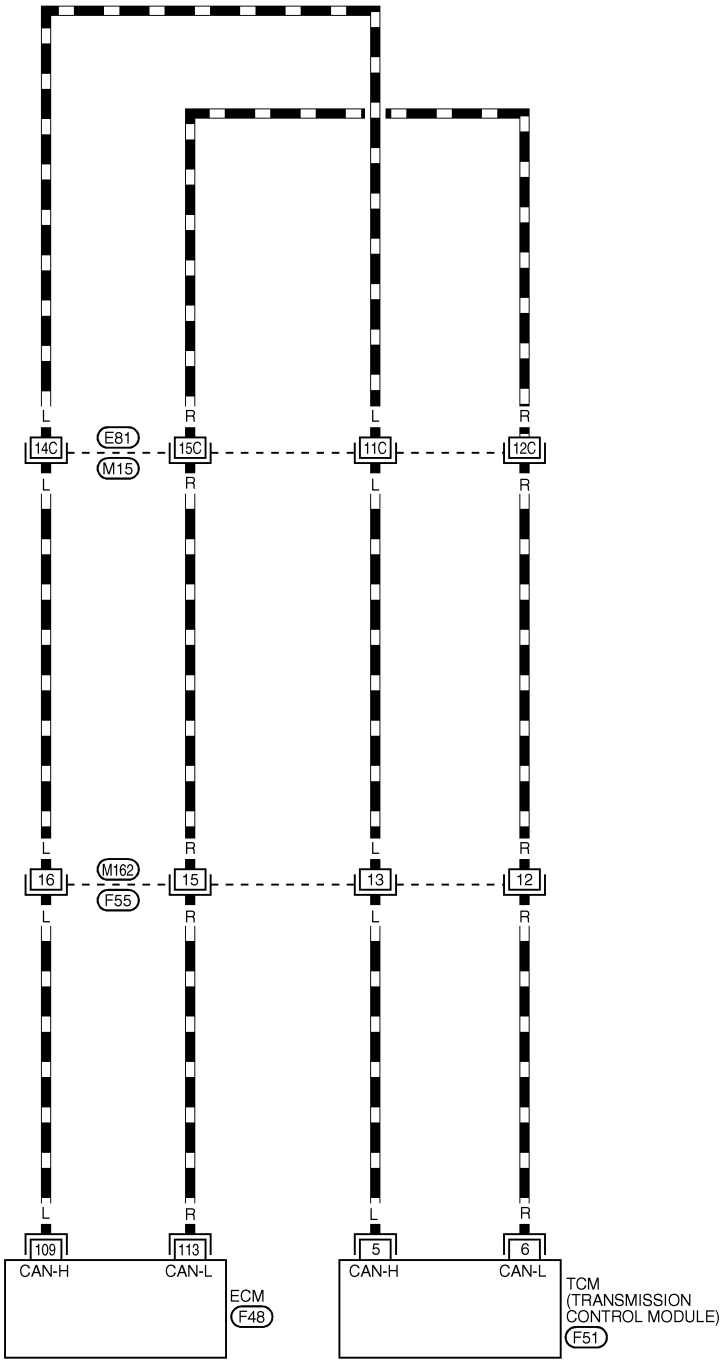
CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information 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.

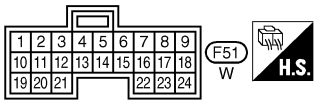
Wiring Diagram — CAN —

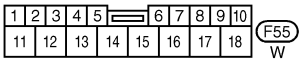
NFEL0273

EL-CAN-01

: DATA LINE







REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)
F48 -ELECTRICAL UNITS

MEL734P

Trouble Diagnoses

NFEL0274

WORK FLOW

NFEL0274S01

1. Print all the data of “SELF-DIAG RESULTS” and “DATA MONITOR” for “ENGINE” and “A/T” displayed on CONSULT-II. Refer to “DTC U1000, U1001 CAN COMMUNICATION LINE” (EC-164) for “ENGINE” and “DTC U1000 CAN COMMUNICATION LINE” (AT-208) for “A/T”.
2. Attach the printed sheet of “SELF-DIAG RESULTS” and “DATA MONITOR” onto the check sheet. Refer to “CHECK SHEET” (EL-433).
3. Based on the data monitor results, put “v” marks onto the items with “UNKWN” or “NG” in the check sheet table. Refer to “CHECK SHEET” (EL-433).

NOTE:
If “NG” is displayed on “CAN COMM” for the diagnosed control unit, replace the control unit.

4. According to the check sheet results (example), start inspection. Refer to “CHECK SHEET RESULTS (EXAMPLE)” (EL-434).

CHECK SHEET

NFEL0274S02

Check sheet table

ENGINE	CAN COMM	CAN CIRC 1	—	CAN CIRC 2
A/T	CAN COMM	CAN CIRC 1	CAN CIRC 2	—

Symptoms :

Attach copy of ENGINE SELF-DIAG RESULTS

Attach copy of A/T SELF-DIAG RESULTS

Attach copy of ENGINE DATA MONITOR

Attach copy of A/T DATA MONITOR

SEL429Y

CHECK SHEET RESULTS (EXAMPLE)

NFEL0274S03

Case 1: Replace ECM

ENGINE	CAN COMM	CAN CIRC 1	—	CAN CIRC 2
A/T	CAN COMM	CAN CIRC 1	CAN CIRC 2	—

Case 2: Replace TCM

ENGINE	CAN COMM	CAN CIRC 1	—	CAN CIRC 2
A/T	CAN COMM	CAN CIRC 1	CAN CIRC 2	—

Case 3

ENGINE	CAN COMM	CAN CIRC 1	—	CAN CIRC 2
A/T	CAN COMM	CAN CIRC 1	CAN CIRC 2	—

SEL430Y

NOTE:
If "NG" is displayed on "CAN COMM" for the diagnosed control unit, replace the control unit.

INSPECTION

NFEL0274S05

Proceed trouble diagnosis according to the check sheet results (example).
Case 1: Replace ECM.
Case 2: Replace TCM.
Case 3: Check CAN communication Circuit. Refer to "CAN COMMUNICATION CIRCUIT CHECK" (EL-434).

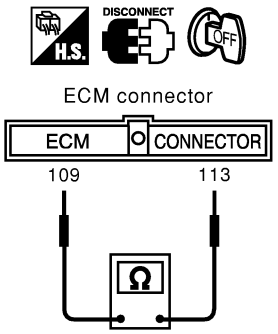
CAN COMMUNICATION CIRCUIT CHECK

NFEL0274S04

1	CHECK CONNECTOR	
1. Turn ignition switch OFF. 2. Check following terminals and connector for damage, bend and loose connection. (control module-side and harness-side) • TCM • ECM • Between ECM and TCM		
OK or NG		
OK	▶	GO TO 2.
NG	▶	Repair terminal or connector.

2	CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect ECM connector and TCM connector.
2. Check continuity between ECM harness connector F48 terminals 109 (L) and 113 (R).



Continuity should not exist.

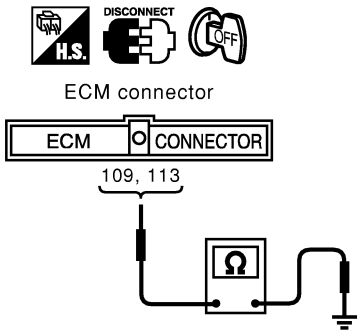
SEL431Y

OK or NG

OK	▶	GO TO 3.
NG	▶	Repair harness between ECM and TCM.

3	CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between ECM harness connector F48 terminals 109 (R), 113 (L) and ground.



Continuity should not exist.

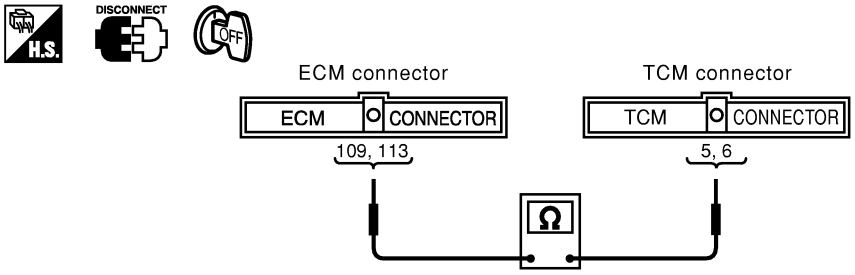
SEL432Y

OK or NG

OK	▶	GO TO 4.
NG	▶	Repair harness between ECM and TCM.

4	CHECK HARNESS FOR OPEN CIRCUIT

Check continuity between ECM harness connector F48 terminals 109 (R), 113 (L) and TCM harness connector F51 terminals 5 (R), 6 (L).



Continuity should exist.

SEL647Y

OK or NG

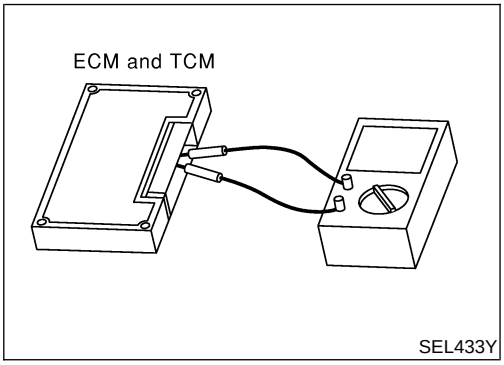
OK	▶	GO TO 5.
NG	▶	Repair harness.

5	ECM/TCM INTERNAL CIRCUIT INSPECTION

Check components inspection. Refer to "ECM/TCM INTERNAL CIRCUIT INSPECTION" (EL-436).

OK or NG

OK	▶	Reconnect all connectors to perform "SELF-DIAG RESULTS" and "DATA MONITOR" for "ENGINE" and "A/T" displayed on CONSULT-II. Refer to "DTC U1000, U1001 CAN COMMUNICATION LINE" (EC-164) for "ENGINE" and refer to "DTC U1000 CAN COMMUNICATION LINE" (AT-208) for "A/T".
NG	▶	Replace ECM and/or TCM.



SEL433Y

Component Inspection

NFEL0275

ECM/TCM INTERNAL CIRCUIT INSPECTION

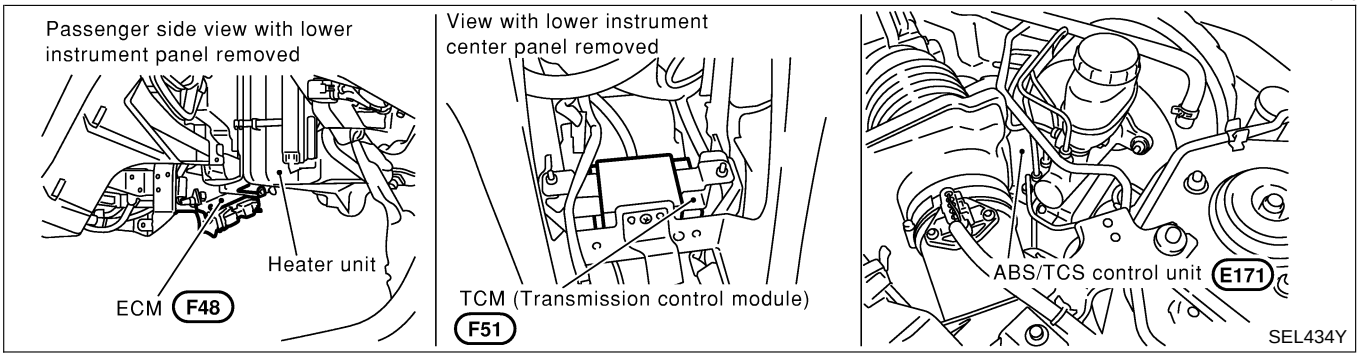
NFEL0275S01

- Remove ECM and TCM from vehicle.
- Check resistance between ECM terminals 109 and 113.
- Check resistance between TCM terminals 5 and 6.

Unit	Terminal	Resistance value (Ω)
ECM	109 - 113	Approx. 108 - 132
TCM	5 - 6	

Component Parts and Harness Connector Location

NFEL0276



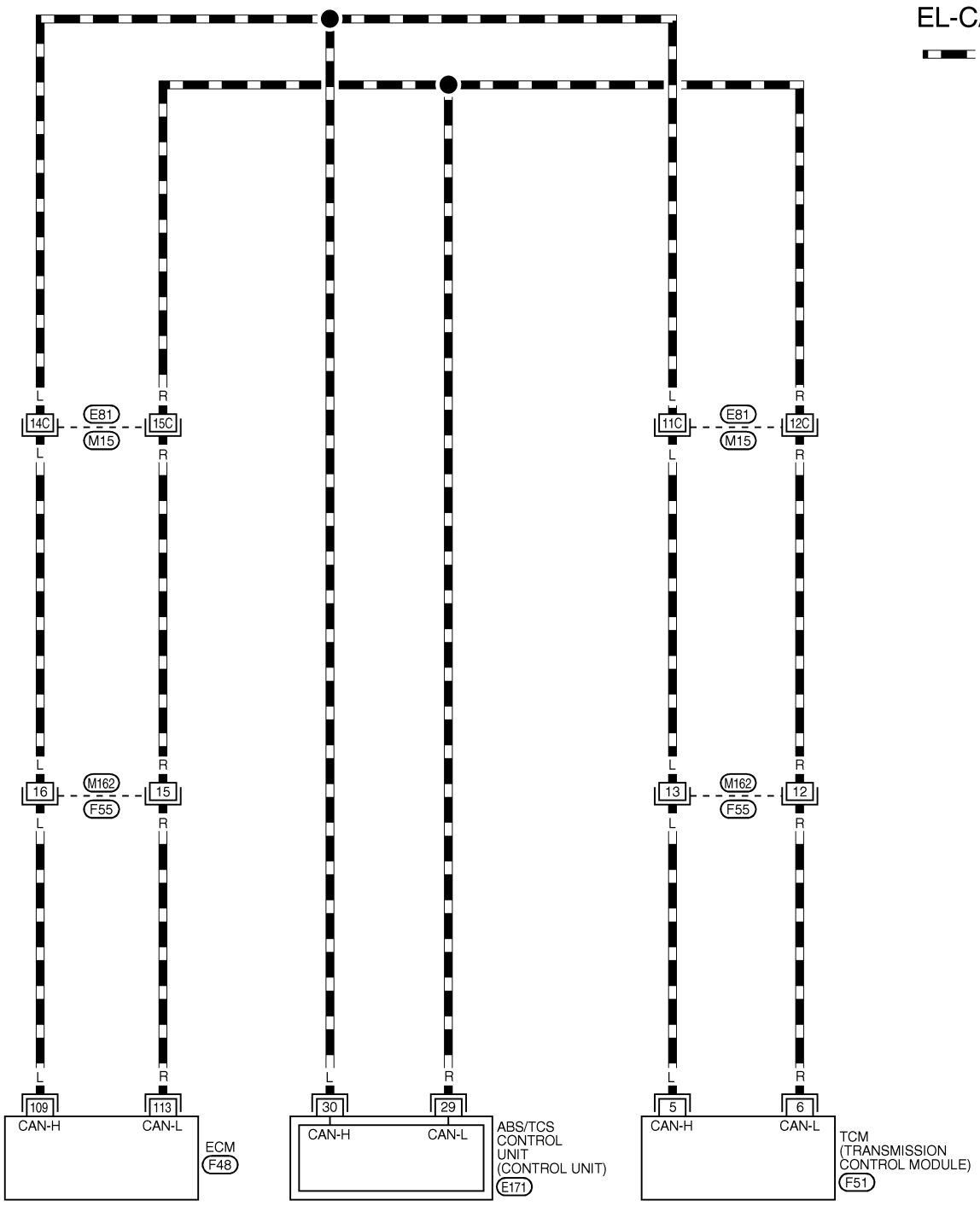
System Description

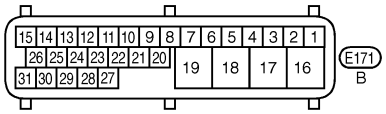
NFEL0277

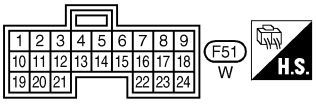
CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information 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.

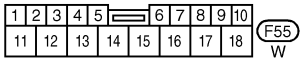
Wiring Diagram — CAN —

NFEL0278









REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)
F48 -ELECTRICAL UNITS

MEL735P

Trouble Diagnoses

NFEL0279

WORK FLOW

NFEL0279S01

1. Print all the data of “SELF-DIAG RESULTS” and “DATA MONITOR” for “ENGINE”, “ABS” and “A/T” displayed on CONSULT-II. Refer to “DTC U1000, U1001 CAN COMMUNICATION LINE” (EC-164) for “ENGINE”, “CAN COMMUNICATION LINE” (BR-122) for “ABS”, and “DTC U1000 CAN COMMUNICATION LINE” (AT-208) for “A/T”.
2. Attach the printed sheet of “SELF-DIAG RESULTS” and “DATA MONITOR” onto the check sheet. Refer to “CHECK SHEET” (EL-440).
3. Based on the data monitor results, put “v” marks onto the items with “UNKWN” or “NG” in the check sheet table. Refer to “CHECK SHEET” (EL-440).

NOTE:
If “NG” is displayed on “CAN COMM” for the diagnosed control unit, replace the control unit.

4. According to the check sheet results (example), start inspection. Refer to “CHECK SHEET RESULTS (EXAMPLE)” (EL-441).

CHECK SHEET

NFEL0279S02

Check sheet table

ENGINE	CAN COMM	CAN CIRC 1	—	CAN CIRC 3	CAN CIRC 2
ABS	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	CAN CIRC 3
A/T	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 3	—

Symptoms :

Attach copy of
ENGINE SELF-DIAG RESULTS

Attach copy of
ABS SELF-DIAG RESULTS

Attach copy of
A/T SELF-DIAG RESULTS

Attach copy of
ENGINE DATA MONITOR

Attach copy of
ABS DATA MONITOR

Attach copy of
A/T DATA MONITOR

SEL435Y

CHECK SHEET RESULTS (EXAMPLE)

NFEL0279S03

Case 1 : Replace ECM

ENGINE	CAN COMM	CAN CIRC 1	—	CAN CIRC 3	CAN CIRC 2
ABS	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	CAN CIRC 3
A/T	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 3	—

ENGINE	CAN COMM	CAN CIRC 1	—	✓	✓
ABS	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	CAN CIRC 3
A/T	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 3	—

Case 2 : Replace ABS/TCS control unit

ENGINE	CAN COMM	CAN CIRC 1	—	✓	CAN CIRC 2
ABS	✓	CAN CIRC 1	CAN CIRC 2	—	CAN CIRC 3
A/T	CAN COMM	CAN CIRC 1	CAN CIRC 2	✓	—

ENGINE	CAN COMM	CAN CIRC 1	—	CAN CIRC 3	CAN CIRC 2
ABS	CAN COMM	CAN CIRC 1	✓	—	✓
A/T	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 3	—

Case 3 : Replace TCM

ENGINE	CAN COMM	CAN CIRC 1	—	CAN CIRC 3	✓
ABS	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	✓
A/T	✓	CAN CIRC 1	CAN CIRC 2	CAN CIRC 3	—

ENGINE	CAN COMM	CAN CIRC 1	—	CAN CIRC 3	CAN CIRC 2
ABS	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	CAN CIRC 3
A/T	CAN COMM	CAN CIRC 1	✓	✓	—

Case 4

ENGINE	CAN COMM	✓	—	✓	✓
ABS	CAN COMM	CAN CIRC 1	✓	—	CAN CIRC 3
A/T	CAN COMM	CAN CIRC 1	✓	CAN CIRC 3	—

Case 5

ENGINE	CAN COMM	CAN CIRC 1	—	✓	CAN CIRC 2
ABS	CAN COMM	✓	CAN CIRC 2	—	CAN CIRC 3
A/T	CAN COMM	CAN CIRC 1	CAN CIRC 2	✓	—

Case 6

ENGINE	CAN COMM	CAN CIRC 1	—	CAN CIRC 3	✓
ABS	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	✓
A/T	CAN COMM	✓	✓	✓	—

Case 7

ENGINE	CAN COMM	✓	—	✓	✓
ABS	CAN COMM	✓	CAN CIRC 2	—	CAN CIRC 3
A/T	CAN COMM	✓	✓	✓	—

SEL574Y

NOTE:
If "NG" is displayed on "CAN COMM" for the diagnosed control unit, replace the control unit.

INSPECTION

NFEL0279S05

Proceed trouble diagnosis according to the check sheet results (example).
Case 1: Replace ECM.
Case 2: Replace ABS/TCS control unit.
Case 3: Replace TCM.
Case 4: Check ECM Circuit. Refer to "ECM CIRCUIT CHECK" (EL-442).
Case 5: Check ABS/TCS control unit Circuit. Refer to "ABS/TCS CONTROL UNIT CIRCUIT CHECK" (EL-442).
Case 6: Check TCM Circuit. Refer to "TCM CIRCUIT CHECK" (EL-443).
Case 7: Check CAN communication Circuit. Refer to "CAN COMMUNICATION CIRCUIT CHECK" (EL-444).

ECM CIRCUIT CHECK

NFEL0279S06

1	CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Check following terminals and connector for damage, bend and loose connection. (control module-side and harness-side)

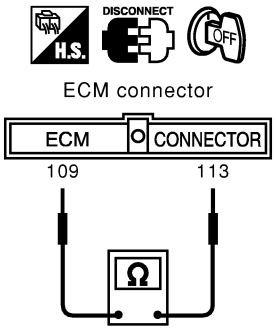
- ECM
- Harness connector F55
- Harness connector M162
- Harness connector M15
- Harness connector E81

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 F48 terminals 109 (L) and 113 (R).



Approx. 108 - 132 Ω

SEL437Y

OK or NG

OK	▶	Replace ECM.
NG	▶	Repair harness between ABS/TCS control unit and ECM.

ABS/TCS CONTROL UNIT CIRCUIT CHECK

NFEL0279S07

1	CHECK CONNECTOR

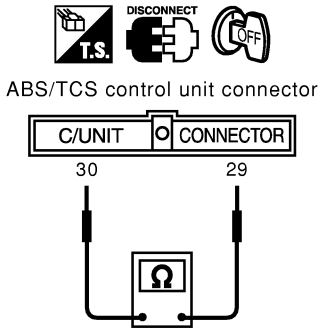
1. Turn ignition switch OFF.
2. Check the terminals and connector of ABS/TCS control unit for damage, bend and loose connection. (control unit-side and harness-side)

OK or NG

OK	▶	GO TO 2.
NG	▶	Repair terminal or connector.

2	CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect ABS/TCS control unit connector.
2. Check resistance between ABS/TCS control unit harness connector E171 terminals 30 (L) and 29 (R).



Approx. 54 - 66 Ω

SEL438Y

OK or NG

OK	▶	Replace ABS/TCS control unit.
NG	▶	Repair harness between ABS/TCS control unit and harness connector E81.

TCM CIRCUIT CHECK

NFEL0279S08

1	CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Check following terminals and connector for damage, bend and loose connection. (control module-side and harness-side)

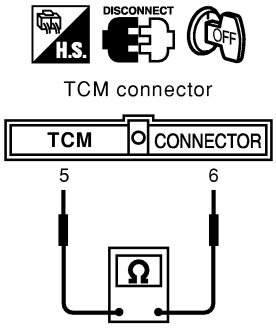
- TCM
- Harness connector F55
- Harness connector M162
- Harness connector M15
- Harness connector E81

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 F51 terminals 5 (L) and 6 (R).



Approx. 108 - 132 Ω

SEL439Y

OK or NG

OK	▶	Replace TCM.
NG	▶	Repair harness ABS/TCS control unit and TCM.

CAN COMMUNICATION CIRCUIT CHECK

NFEL0279S04

1	CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Check following terminals and connector for damage, bend and loose connection. (control module-side, control unit-side and harness-side)

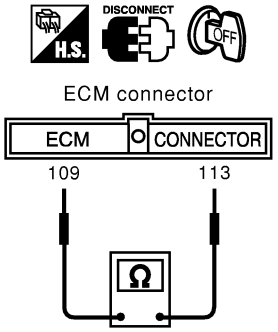
- TCM
- ECM
- ABS/TCS control unit
- Between ECM and TCM

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 F55.
2. Check continuity between ECM harness connector F48 terminals 109 (L) and 113 (R).



Continuity should not exist.

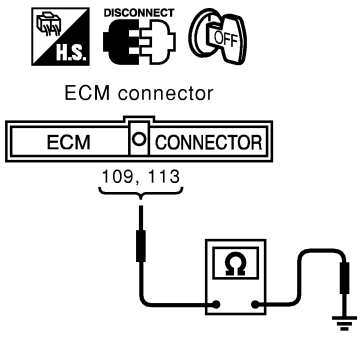
SEL431Y

OK or NG

OK	▶	GO TO 3.
NG	▶	Repair harness between ECM and harness connector F55.

3	CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between ECM harness connector F48 terminals 109 (L), 113 (R) and ground.



Continuity should not exist.

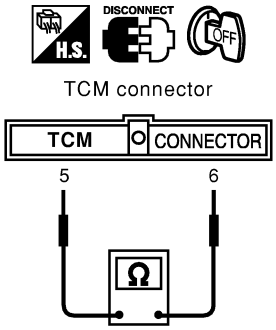
SEL432Y

OK or NG

OK	▶	GO TO 4.
NG	▶	Repair harness between ECM and harness connector F55.

4	CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect TCM connector.
2. Check continuity between TCM harness connector F51 terminals 5 (L) and 6 (R).



Continuity should not exist.

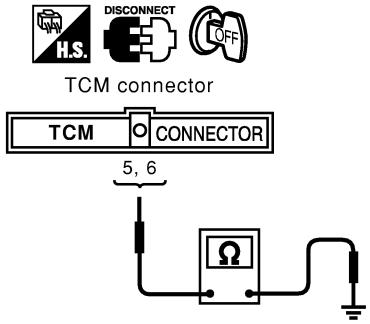
SEL440Y

OK or NG

OK	▶	GO TO 5.
NG	▶	Repair harness between TCM and harness connector F55.

5	CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between TCM harness connector F51 terminals 5 (L), 6 (R) and ground.



Continuity should not exist.

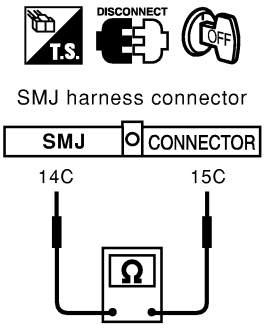
SEL441Y

OK or NG

OK	▶	GO TO 6.
NG	▶	Repair harness between TCM and harness connector F55.

6	CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect harness connector M15.
2. Check continuity between harness connector M15 terminals 14C (L) and 15C (R).



Continuity should not exist.

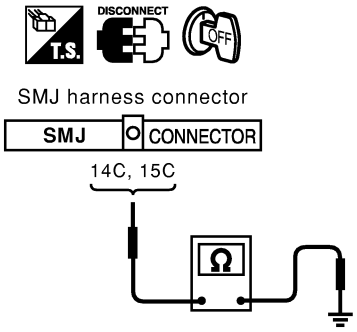
SEL442Y

OK or NG

OK	▶	GO TO 7.
NG	▶	Repair harness between harness connector M162 and harness connector M15.

7	CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between harness connector M15 terminals 14C (L), 15C (R) and ground.



Continuity should not exist.

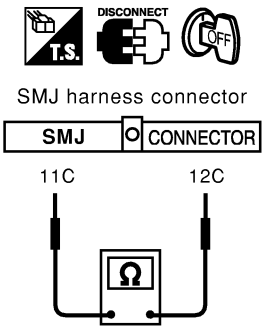
SEL443Y

OK or NG

OK	▶	GO TO 8.
NG	▶	Repair harness between harness connector M162 and harness connector M15.

8	CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between harness connector M15 terminals 11C (L) and 12C (R).



Continuity should not exist.

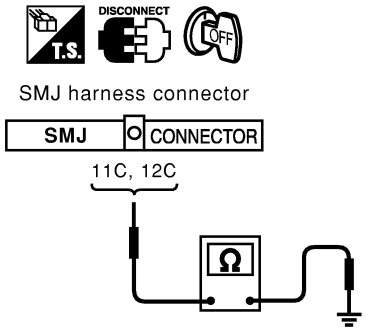
SEL444Y

OK or NG

OK	▶	GO TO 9.
NG	▶	Repair harness between harness connector M162 and harness connector M15.

9	CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between harness connector M15 terminals 11C (L), 12C (R) and ground.



Continuity should not exist.

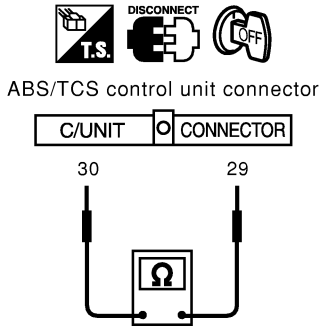
SEL445Y

OK or NG

OK	▶	GO TO 10.
NG	▶	Repair harness between harness connector M162 and harness connector M15.

10	CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect ABS/TCS control unit connector.
2. Check continuity between ABS/TCS control unit harness connector E171 terminals 30 (L) and 29 (R).



Continuity should not exist.

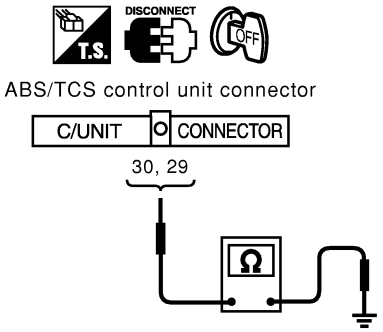
SEL446Y

OK or NG

OK	▶	GO TO 11.
NG	▶	Repair harness between ABS/TCS control unit and harness connector E81.

11	CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between ABS/TCS control unit harness connector E171 terminals 30 (L), 29 (R) and ground.



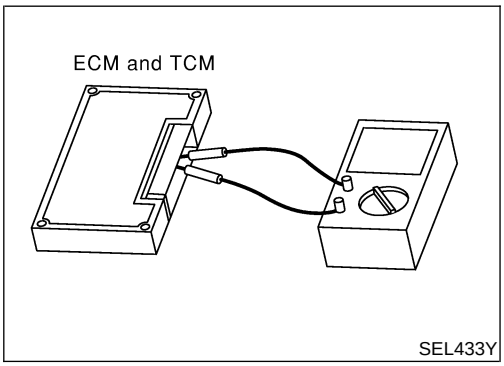
Continuity should not exist.

SEL447Y

OK or NG

OK	▶	GO TO 12.
NG	▶	Repair harness between ABS/TCS control unit and harness connector E81.

12	ECM/TCM INTERNAL CIRCUIT INSPECTION	
Check components inspection. Refer to "ECM/TCM INTERNAL CIRCUIT INSPECTION" (EL-448).		
OK or NG		
OK	▶	Reconnect all connectors to perform "SELF-DIAG RESULTS" and "DATA MONITOR" for "ENGINE", "ABS" and "A/T" displayed on CONSULT-II. Refer to "DTC U1000, U1001 CAN COMMUNICATION LINE" (EC-164) for "ENGINE", "CAN COMMUNICATION LINE" BR-122) for "ABS", and "U1000 CAN COMMUNICATION LINE" (AT-208) for "A/T".
NG	▶	Replace ECM and/or TCM.



Component Inspection

NFEL0280

ECM/TCM INTERNAL CIRCUIT INSPECTION

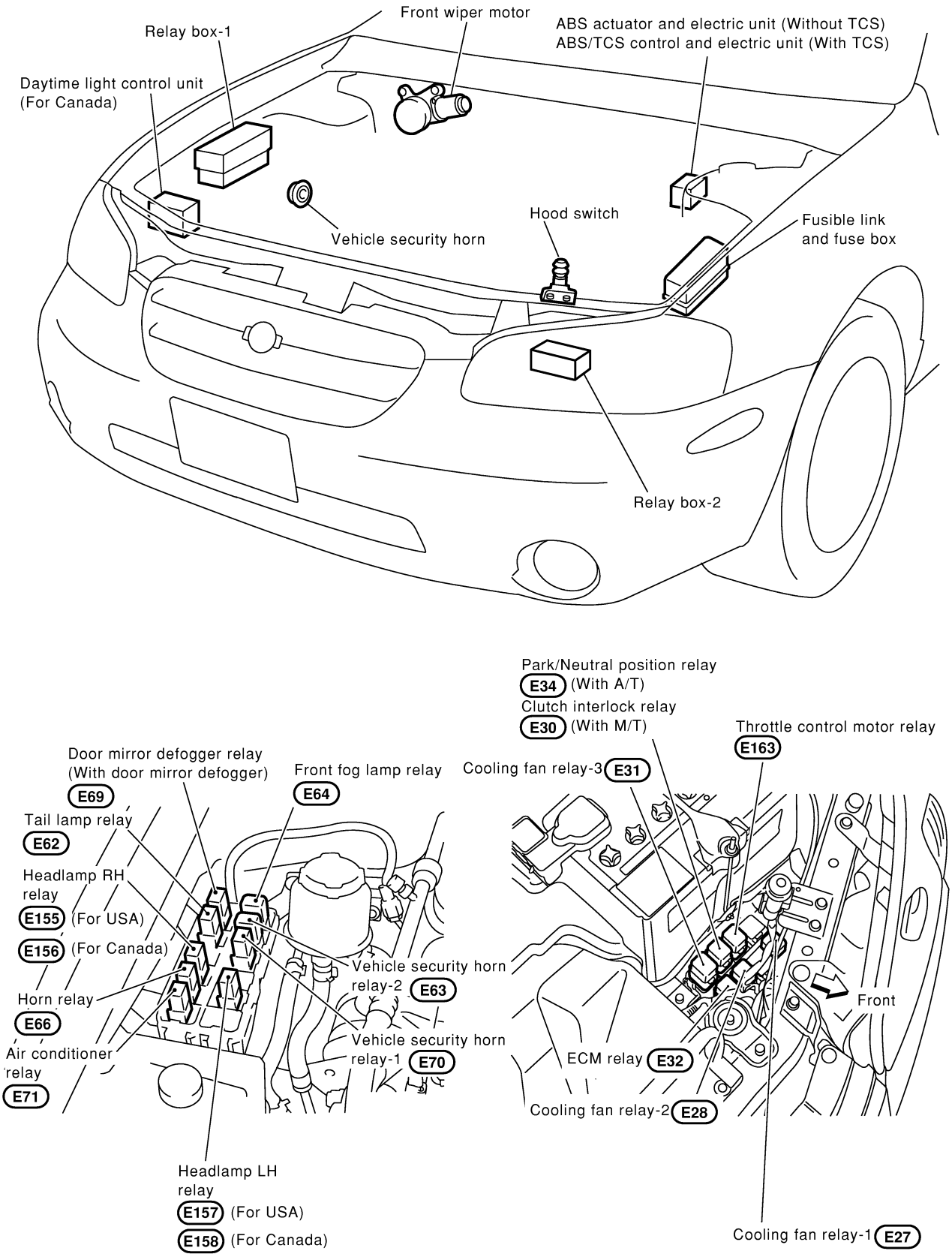
NFEL0280S01

- Remove ECM and TCM from vehicle.
- Check resistance between ECM terminals 109 and 113.
- Check resistance between TCM terminals 5 and 6.

Unit	Terminal	Resistance value (Ω)
ECM	109 - 113	Approx. 108 - 132
TCM	5 - 6	

Engine Compartment

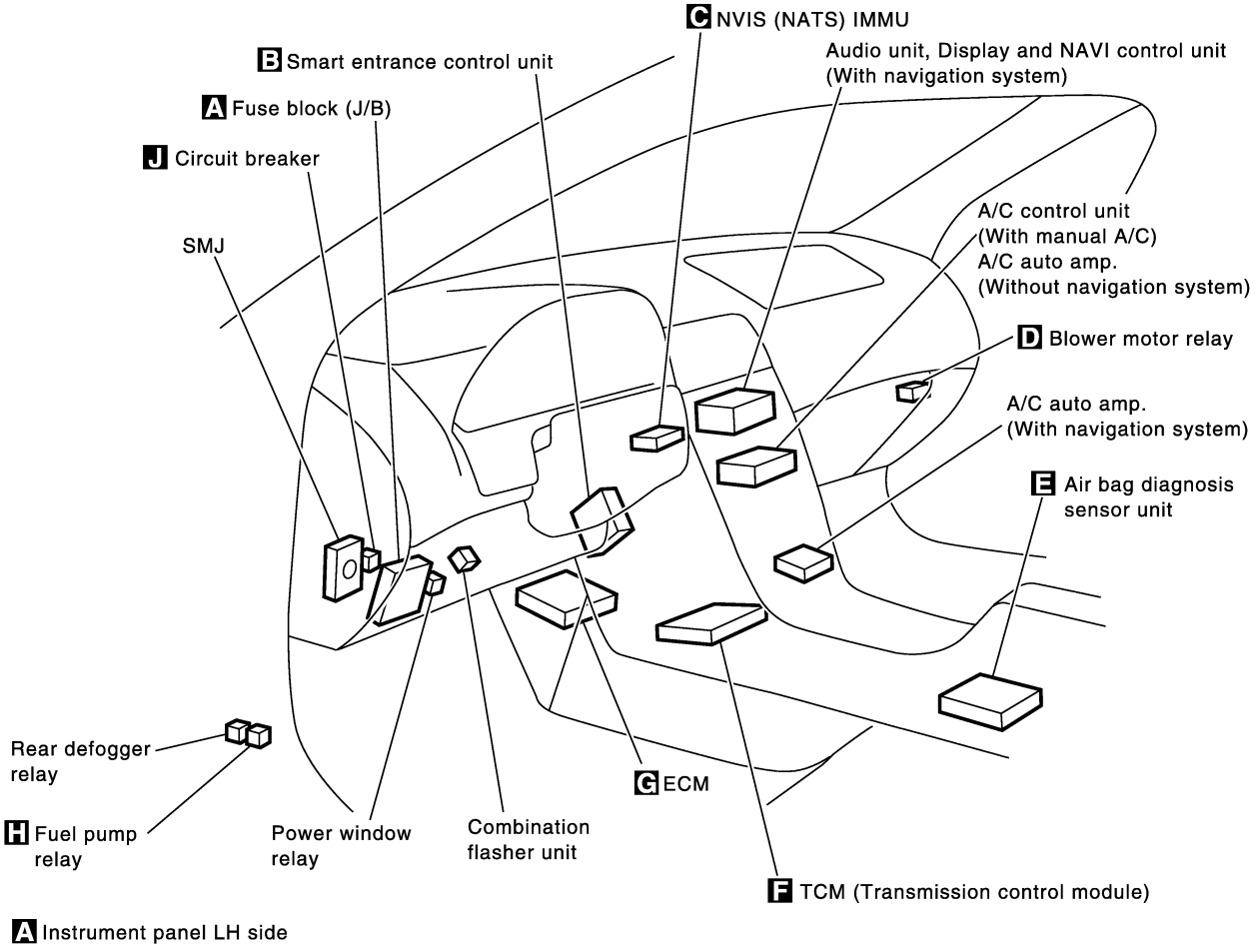
NFEL0129



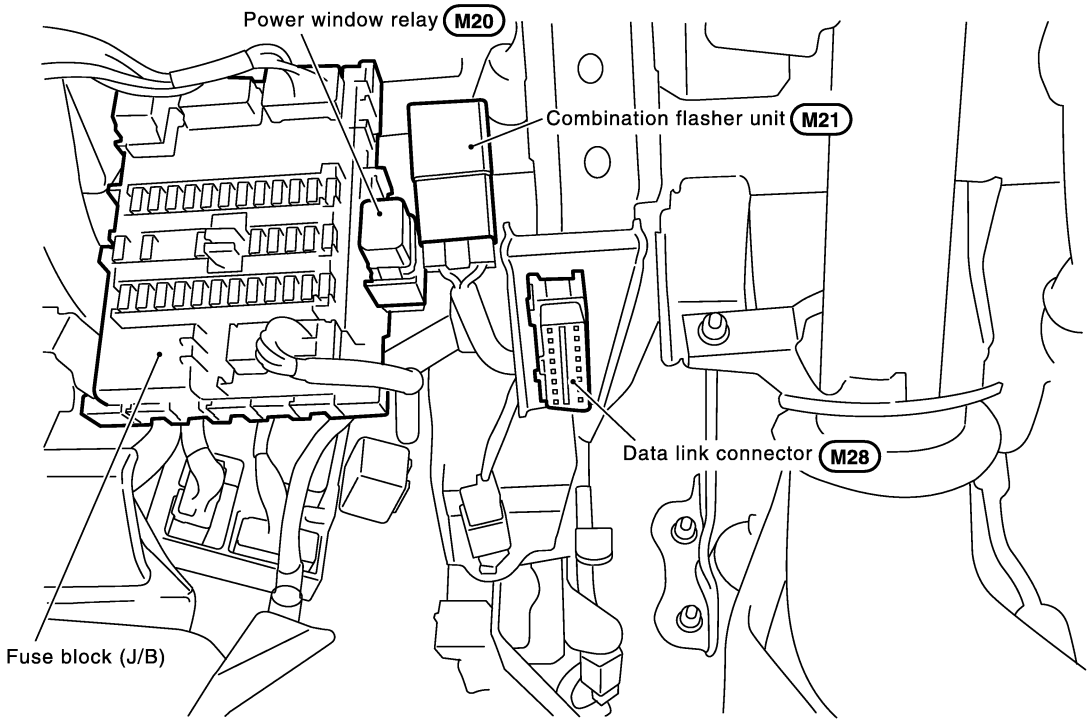
MEL071O

Passenger Compartment

NFEL0130

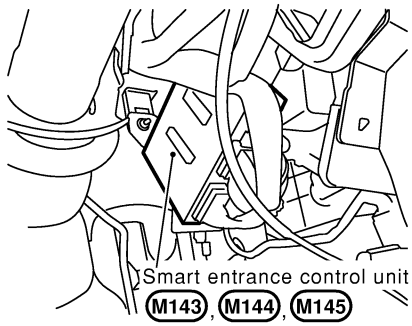


A Instrument panel LH side

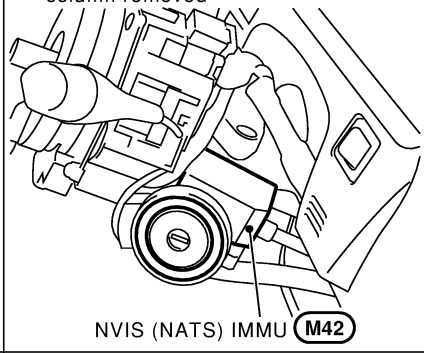


MEL072O

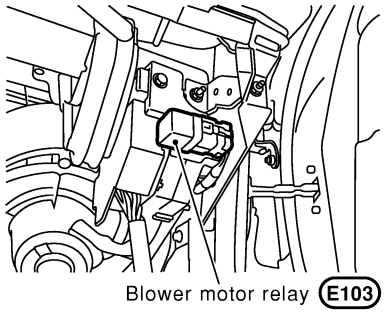
B Driver side view with lower instrument panel removed



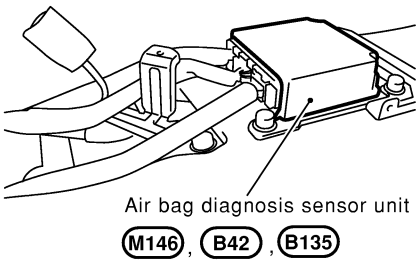
C View with steering wheel and steering column removed



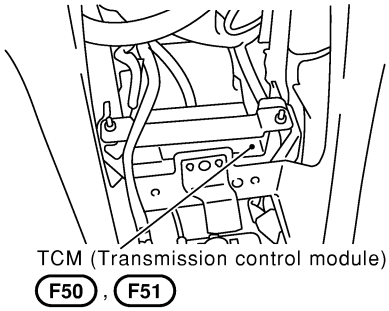
D Passenger side view with dash side lower finisher removed



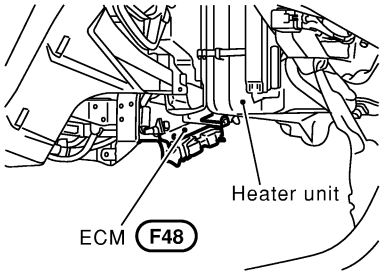
E Rear of parking brake



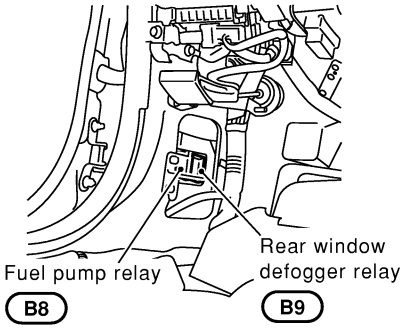
F View with lower instrument center panel removed



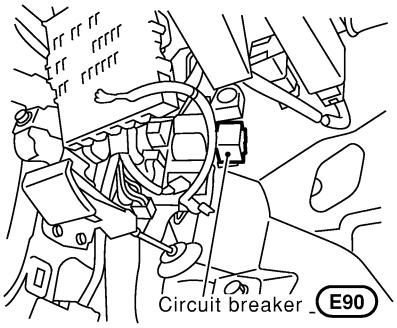
G Passenger side view with lower instrument panel removed



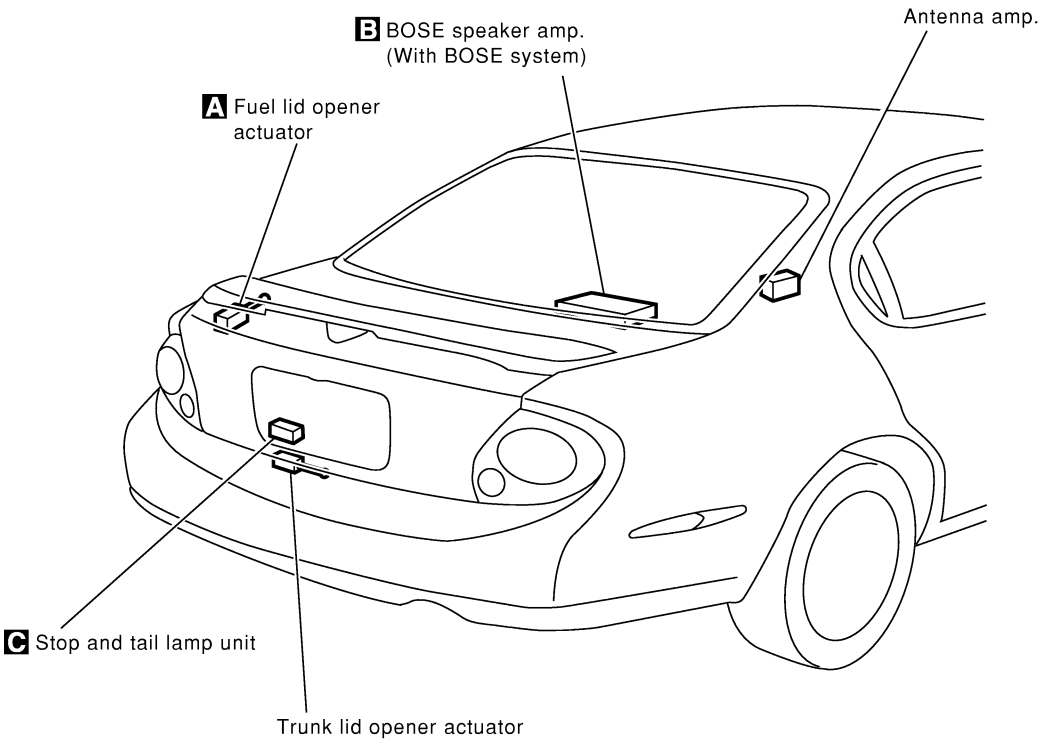
H Driver side view with dash side lower finisher removed

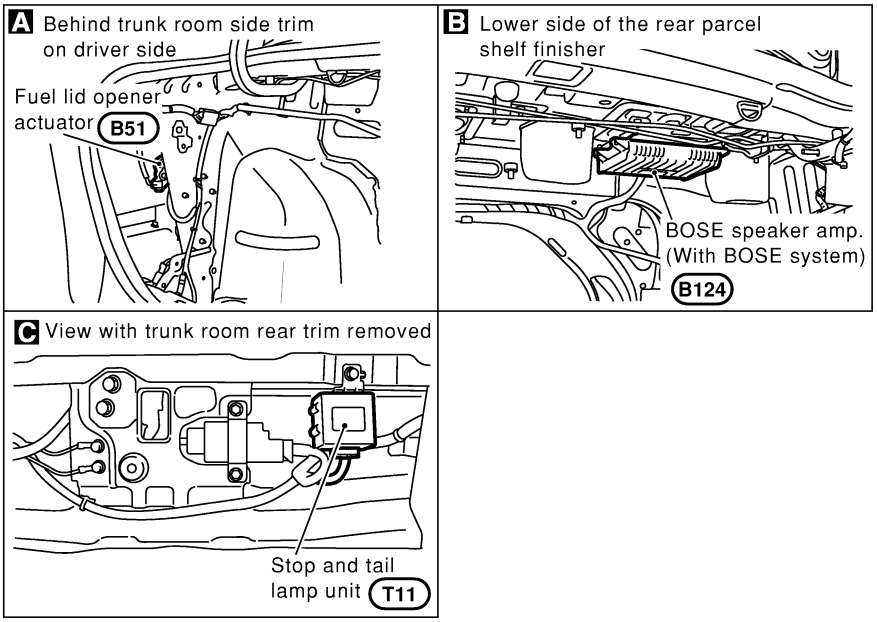


J Driver side view with lower instrument panel removed



MEL073O

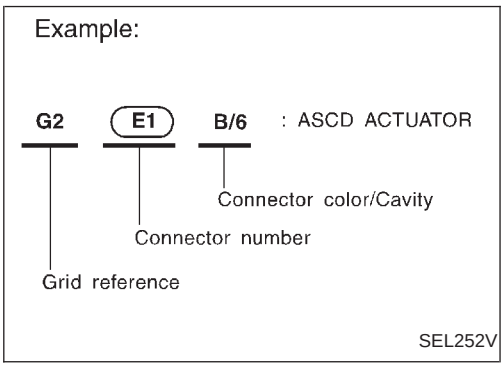

B BOSE speaker amp.
(With BOSE system)
Antenna amp.
A Fuel lid opener
actuator
C Stop and tail lamp unit
Trunk lid opener actuator


A Behind trunk room side trim
on driver side
Fuel lid opener
actuator
B51
B Lower side of the rear parcel
shelf finisher
BOSE speaker amp.
(With BOSE system)
B124
C View with trunk room rear trim removed
Stop and tail
lamp unit
T11

MEL074O

How to Read Harness Layout

NFEL0131



The following Harness Layouts use a map style grid to help locate connectors on the drawings:

- Main Harness
- Engine Room Harness (Engine Compartment)

TO USE THE GRID REFERENCE

NFEL0131S01

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.

CONNECTOR SYMBOL

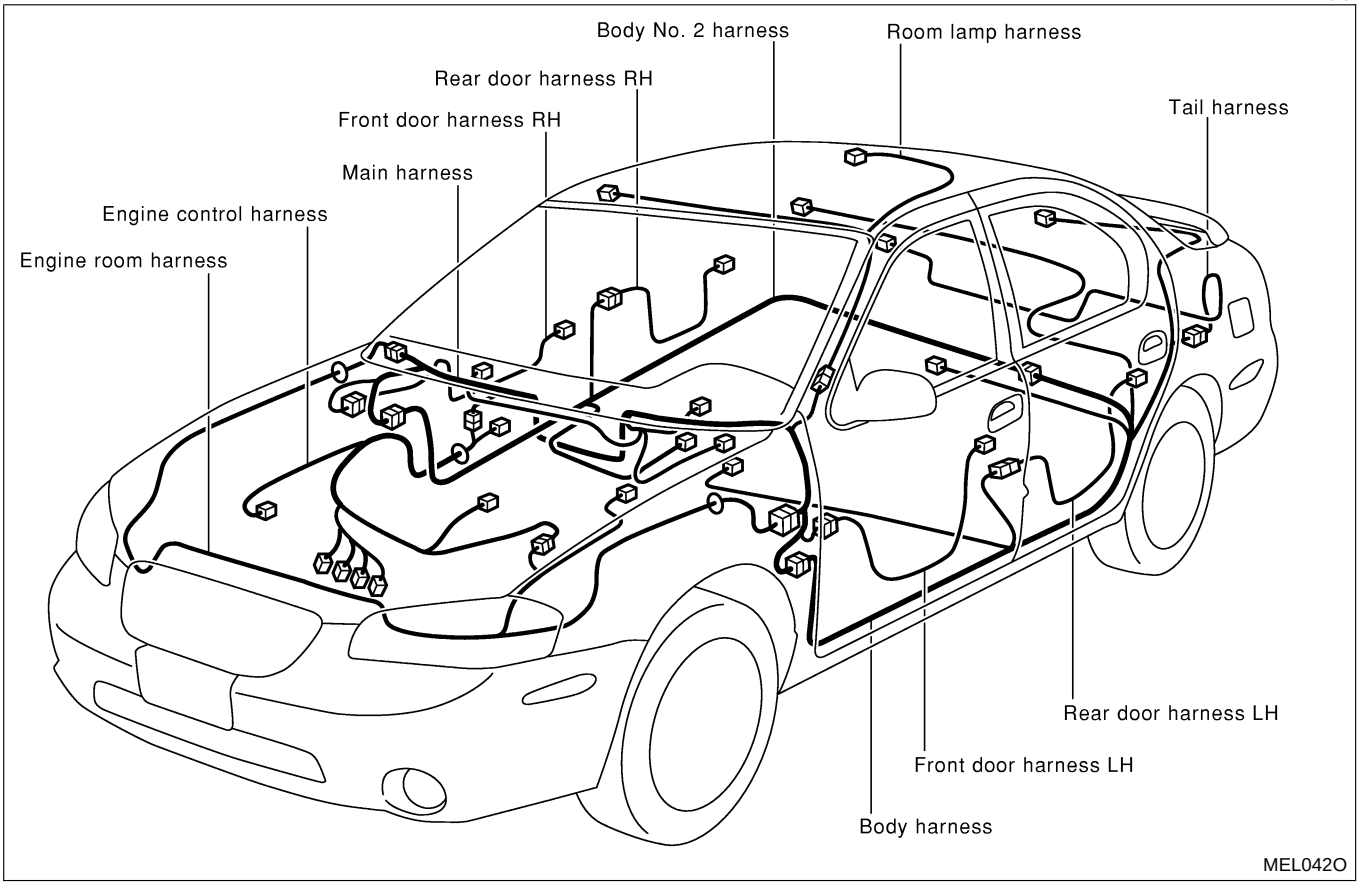
NFEL0131S02

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.	—			

Outline

NFEL0132

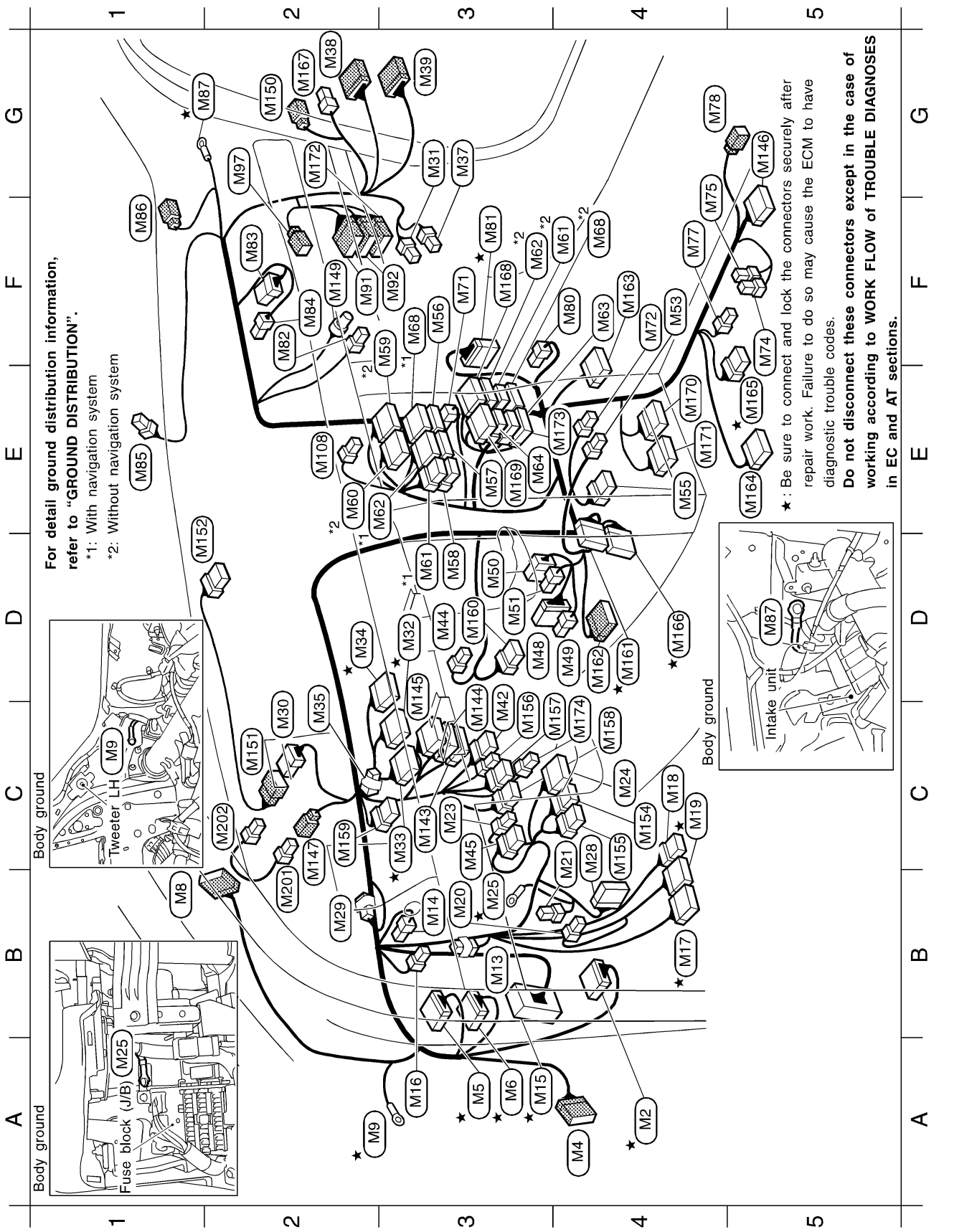


NOTE:
For detailed ground distribution information, refer to “Ground Distribution”, “GROUND”, EL-19.

NOTE:

Main Harness

NFEL0133



MEL043O

Main harness

A4★ (M2) BR/24 : To (B2)
A4 (M4) SMJ : To (D1)
A3★ (M5) W/16 : To (B1)
A3★ (M6) W/18 : To (B3)
B1 (M8) W/12 : To (R2)
A2★ (M9) – : Body ground
B3 (M13) L/4 : Diode (For Canada)
B3 (M14) L/2 : ASCD clutch switch (With M/T)
A3★ (M15) SMJ : To (E81)
A3 (M16) W/4 : Telephone
B4★ (M17) W/12 : Fuse block (J/B)
C4 (M18) W/6 : Fuse block (J/B)
C4★ (M19) W/16 : Fuse block (J/B)
B3 (M20) L/4 : Power window relay
C4 (M21) B/3 : Combination flasher unit
C3 (M23) W/3 : Illumination control switch
C4 (M24) W/10 : Door mirror remote control switch
B3★ (M25) – : Body ground
C4 (M28) W/16 : Data link connector
B2 (M29) GY/3 : Joint connector-3 (Diode) (With A/T)
C2 (M30) GY/6 : To (M151)
G3 (M31) W/4 : Fan control amp. (With auto A/C)
D3★ (M32) BR/20 : Combination meter
C3★ (M33) W/24 : Combination meter
D2★ (M34) BR/24 : Combination meter
C2 (M35) B/2 : Diode
G3 (M37) BR/4 : Fan resistor (With manual A/C)
G2 (M38) W/16 : To (D62)
G3 (M39) W/10 : To (D63)
C3 (M42) W/8 : NVIS (NATS) IMMU
D3 (M44) W/2 : In-vehicle sensor (With auto A/C)
C3 (M45) L/6 : TCS ON/OFF switch (With TCS)
D3 (M48) BR/10 : Mode door motor (With manual A/C)
D4 (M49) W/3 : Mode door motor (With auto A/C)
D3 (M50) B/6 : Air mix door motor (With manual A/C)
D3 (M51) W/3 : Air mix door motor (With auto A/C)
F4 (M53) B/2 : Cigarette lighter
E4 (M55) W/8 : Hazard switch
F3 (M56) GY/16 : A/C control unit (With manual A/C)
E3 (M57) GY/20 : A/C control unit (With manual A/C)
D3 (M58) W/6 : Fan switch (With manual A/C)
F3 (M59) GY/20 : A/C auto amp. (With auto A/C) (Without navigation system)
E2 (M60) GY/16 : A/C auto amp. (With auto A/C) (Without navigation system)

★: 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.**

(M13) : Diode

(M29) : Joint connector-3 (Diode)

(M35) : Diode

MEL044O

Main harness

F4,D3	M61	W/6	:	Audio unit (With BOSE system)
E2,F3	M62	W/10	:	Audio unit (With BOSE system)
F4,	M63	W/6	:	Audio unit (With BASE system)
E3	M64	W/10	:	Audio unit (With BASE system)
F3,F4	M68	W/16	:	Audio unit
F3	M71	W/2	:	Antenna amp. (Via sub-harness)
F4	M72	W/2	:	Ashtray illumination
F5	M74	L/4	:	Heated seat switch LH
F4	M75	W/4	:	Heated seat switch RH
F4	M77	B/1	:	Parking brake switch
G4	M78	B/2	:	Power socket
F4	M80	W/3	:	Intake sensor (With auto A/C)
F3★	M81	W/20	:	To F49
F2	M82	W/2	:	Glove box lamp
F2	M83	W/8	:	Intake door motor (With manual A/C)
F2	M84	W/3	:	Intake door motor (With auto A/C)
E1	M85	B/2	:	Sunload sensor (With auto A/C)
F1	M86	BR/2	:	Tweeter RH (Via sub-harness)
G1★	M87	–	:	Body ground
F2	M91	W/12	:	To B103
F3	M92	W/10	:	To B104
G2	M97	G/2	:	To E105
E2	M108	BR/2	:	Indirect lamp (Without navigation system)
C3	M143	W/24	:	Smart entrance control unit
C3	M144	GY/24	:	Smart entrance control unit
D3	M145	GY/16	:	Smart entrance control unit
G5	M146	Y/28	:	Air bag diagnosis sensor unit
C2	M147	W/3	:	To M201
F2	M149	Y/4	:	Passenger air bag module
G2	M150	Y/4	:	To E147
C4	M154	GY/6	:	Memory seat cancel switch (With memory seat)
C4	M155	W/8	:	Heated steering switch (With heated steering)
C3	M156	W/2	:	Combination switch (With heated steering)
C3	M157	Y/6	:	Combination switch (Air bag module) (Via spiral cable)
C4	M158	GY/8	:	Combination switch (Steering switch and horn switch) (Via spiral cable)
C2	M159	GY/6	:	Accelerator pedal position sensor
C4	M160	W/8	:	Rear window defogger switch (With navigation system)
D4	M161	W/18	:	To F68
D4	M162	W/18	:	To F55
E4	M163	GY/10	:	Shift lock control unit (With A/T)
E5	M164	W/16	:	To B52 (With memory seat)
E5	M165	W/12	:	A/T device (with A/T)
D4	M166	W/20	:	To F69
G2	M167	L/4	:	Heated steering relay (With heated steering)
F3	M168	W/20	:	Display and NAVI control unit
E3	M169	GY/20	:	Display and NAVI control unit
E4	M170	GY/20	:	A/C auto amp. (With auto A/C) (With navigation system)
E4	M171	GY/16	:	A/C auto amp. (With auto A/C) (With navigation system)
E4	M172	BR/24	:	To B145
E3	M173	W/12	:	Audio unit (With CD auto changer)
C3	M174	W/2	:	Ignition keyhole illumination

Main sub-harness-1

C2	M151	GY/6	:	To M30
D1	M152	BR/8	:	Clock

Main sub-harness-2

B2	M201	W/3	:	To M147
C2	M202	W/3	:	Auto light sensor

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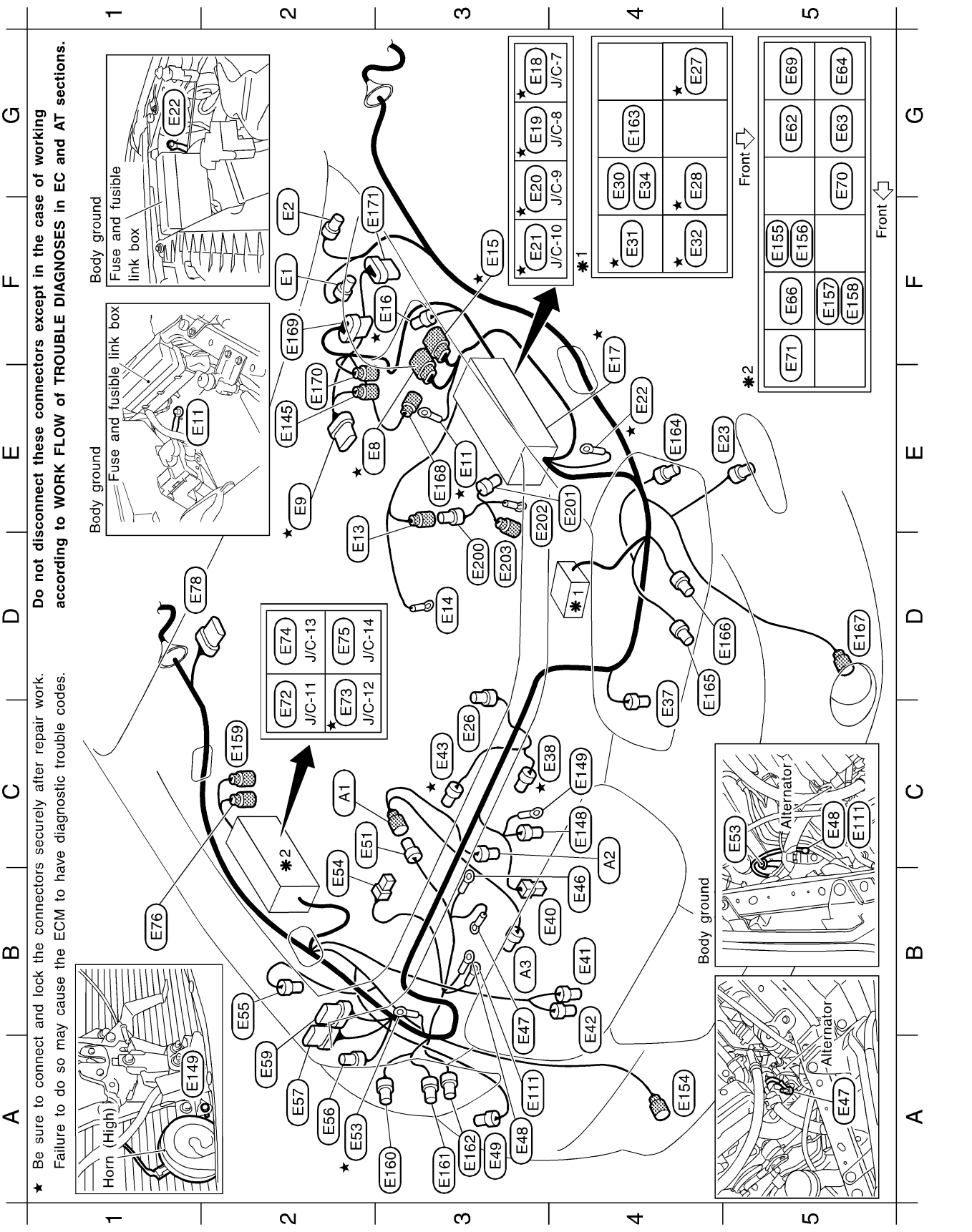
MEL754P

NOTE:

Engine Room Harness

NFEL0134



MEL046O

Engine room harness

F2 (E1) GY/2 : Brake fluid level switch
E2★ (E8) GY/8 : To (F17)
E2★ (E9) SMJ : ABS actuator and electric unit (With M/T)
E3★ (E11) – : Body ground
D2 (E13) GY/1 : To (E200)
D3 (E14) – : Battery (Fusible link 120A)
F3★ (E15) B/8 : To (F18)
F3★ (E16) GY/2 : Dropping resistor (With A/T)
F4★ (E17) – : Fuse and fusible link box
G3★ (E18) GY/6 : Joint connector-7
G3★ (E19) GY/6 : Joint connector-8
G3★ (E20) W/6 : Joint connector-9
F3★ (E21) W/6 : Joint connector-10
E4★ (E22) – : Body ground
E5 (E23) GY/2 : Front side marker lamp LH
C3 (E26) W/2 : Hood switch
G4★ (E27) BR/6 : Cooling fan relay-1
G4★ (E28) BR/6 : Cooling fan relay-2
G4 (E30) L/4 : Clutch interlock relay (With M/T)
F4★ (E31) BR/6 : Cooling fan relay-3
F4★ (E32) BR/6 : ECM relay
G4 (E34) GY/6 : Park/Neutral position relay (With A/T)
C4 (E37) B/3 : Refrigerant pressure sensor
C4★ (E38) GY/4 : Cooling fan motor-1
B4 (E40) B/1 : Horn (High)
B4 (E41) GY/2 : Front washer motor
B4 (E42) BR/2 : Washer level switch (With washer level switch)
C3★ (E43) GY/4 : Cooling fan motor-2
B4 (E46) – : Alternator
B3 (E47) – : Alternator
A3 (E48) – : Body ground
A3 (E49) GY/2 : Front side marker lamp RH
C2 (E51) GY/3 : To (A1)
A2★ (E53) – : Body ground
B2 (E54) B/1 : Vehicle security horn
B2 (E55) B/2 : Ambient sensor
A2 (E56) GY/4 : Daytime light control unit (For Canada)
A2 (E57) GY/6 : Daytime light control unit (For Canada)
A2 (E59) GY/8 : Daytime light control unit (For Canada)
G5 (E62) L/4 : Tail lamp relay
G5 (E63) L/4 : Vehicle security horn relay-2
G5 (E64) L/4 : Front fog lamp relay
F5 (E66) W/3 : Horn relay
G5 (E69) L/4 : Door mirror defogger relay (With door mirror defogger)
G5 (E70) L/4 : Vehicle security horn relay-1
F5 (E71) L/4 : Air conditioner relay
C2 (E72) W/6 : Joint connector-11
C2★ (E73) W/6 : Joint connector-12
D2 (E74) W/6 : Joint connector-13
D2 (E75) W/6 : Joint connector-14
B1 (E76) GY/2 : Front wheel sensor RH (With M/T)
D1 (E78) GY/6 : Front wiper motor
A3 (E111) – : Body ground
E2 (E145) BR/2 : Front wheel sensor LH (With M/T)
C4 (E148) Y/2 : Crash zone sensor
C4 (E149) – : Body ground
A4 (E154) GY/2 : Front fog lamp RH
F5 (E155) BR/6 : Headlamp RH relay (For USA)
F5 (E156) BR/6 : Headlamp RH relay (For Canada)
F5 (E157) BR/6 : Headlamp LH relay (For USA)
F5 (E158) BR/6 : Headlamp LH relay (For Canada)
C2 (E159) GY/2 : Front wheel sensor RH (With A/T)
A3 (E160) BR/2 : Front turn signal lamp RH
A3 (E161) GY/3 : Headlamp RH (Low and parking lamp)
A3 (E162) B/2 : Headlamp RH (High)
G4 (E163) L/4 : Throttle control motor relay
E4 (E164) BR/2 : Front turn signal lamp LH
D5 (E165) GY/3 : Headlamp LH (Low and parking lamp)
D4 (E166) B/2 : Headlamp LH (High)
D5 (E167) GY/2 : Front fog lamp LH
E3 (E168) L/2 : Front wheel sensor LH (With TCS)
F2 (E169) SMJ : ABS actuator and electric unit (Without TCS for A/T models)
E2 (E170) L/2 : Front wheel sensor LH (With A/T, ABS)
G2 (E171) SMJ : ABS/TCS control unit (With TCS)

★: 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.**

Engine room sub-harness

D3 (E200) GY/1 : To (E13)
E4 (E201) GY/1 : Starter motor (With A/T)
E3 (E202) – : Starter motor
D3 (E203) GY/1 : Starter motor (With M/T)

Alternator harness

C2 (A1) GY/3 : To (E51)
C4 (A2) GY/4 : Alternator
B3 (A3) B/1 : Compressor

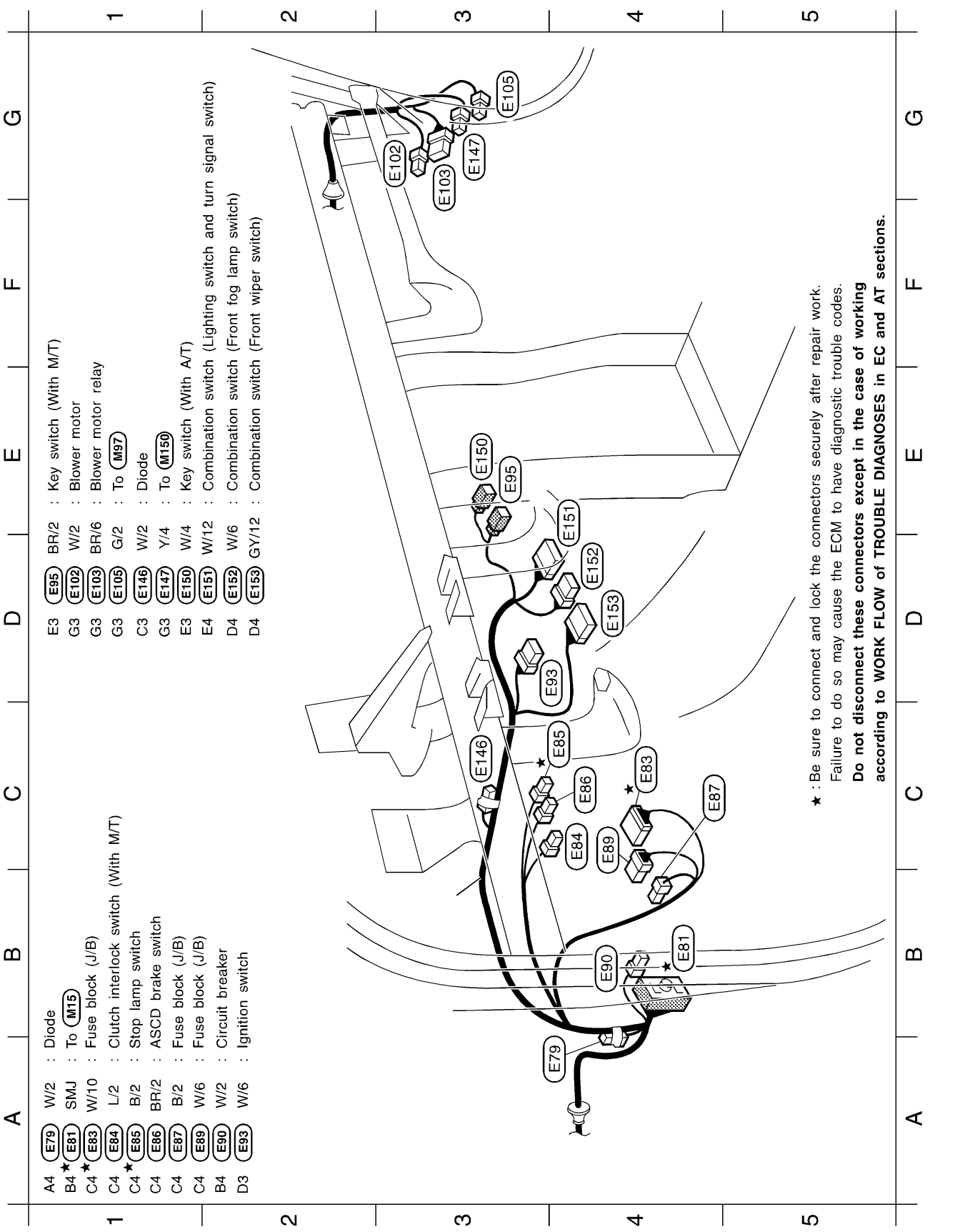
(E79) : Diode

Daytime light control unit (C) — ECM
Headlamp RH relay (U) — (U) : For USA, (C) : For Canada

(E146) : Diode

Vehicle security horn relay-1 — Vehicle security horn relay-2
Horn relay

MEL047O

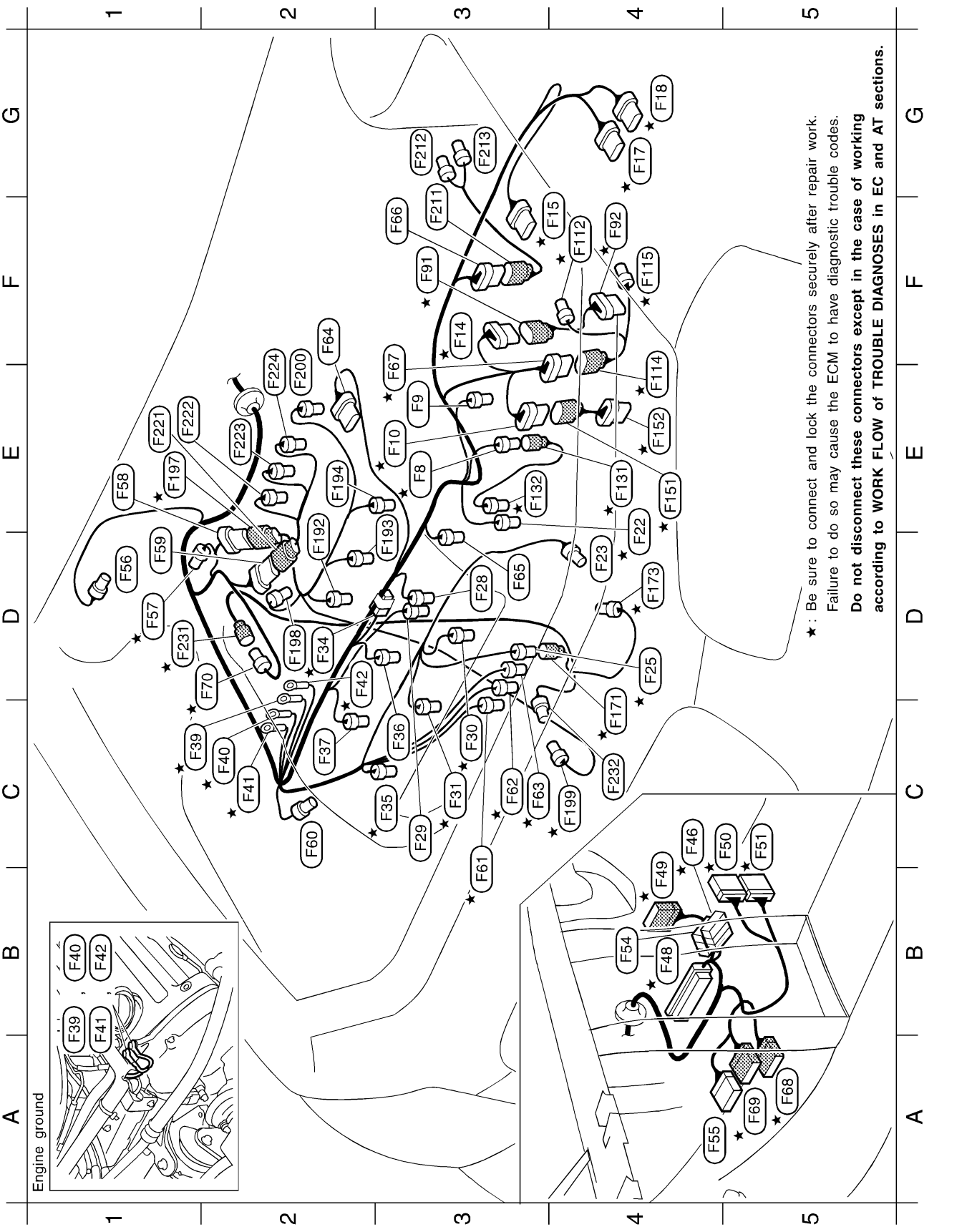

A4 E79 W/2 : Diode
B4 ★ E81 SMJ : To M15
C4 ★ E83 W/10 : Fuse block (J/B)
C4 E84 L/2 : Clutch interlock switch (With M/T)
C4 ★ E85 B/2 : Stop lamp switch
C4 E86 BR/2 : ASCD brake switch
C4 E87 B/2 : Fuse block (J/B)
C4 E89 W/6 : Fuse block (J/B)
B4 E90 W/2 : Circuit breaker
D3 E93 W/6 : Ignition switch
E3 E95 BR/2 : Key switch (With M/T)
G3 E102 W/2 : Blower motor
G3 E103 BR/6 : Blower motor relay
G3 E105 G/2 : To M97
C3 E146 W/2 : Diode
G3 E147 Y/4 : To M150
E3 E150 W/4 : Key switch (With A/T)
E4 E151 W/12 : Combination switch (Lighting switch and turn signal switch)
D4 E152 W/6 : Combination switch (Front fog lamp switch)
D4 E153 GY/12 : Combination switch (Front wiper switch)
★ : 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.
E79
E81
E90
E84
E89
E86
E85
E146
E83
E87
E93
E153
E152
E151
E150
E95
E102
E103
E147
E105

MEL048O

NOTE:

Engine Control Harness

NFEL0135



MEL049O

Engine control harness

E3 ★ (F8) B/2 : To (F131)
E3 (F9) BR/3 : Rear electronic controlled engine mount (With A/T)
E3 ★ (F10) GY/10 : To (F151) (With A/T)
F3 ★ (F14) BR/8 : To (F91) (With A/T)
F4 ★ (F15) GY/5 : Mass air flow sensor
G4 ★ (F17) GY/8 : To (E8)
G4 ★ (F18) B/8 : To (E15)
E4 ★ (F22) GY/2 : Engine coolant temperature sensor
D4 (F23) BR/3 : Front electronic controlled engine mount (With A/T)
D4 ★ (F25) G/4 : To (F171)
D3 (F28) GY/2 : Injector No. 6
C3 (F29) B/2 : VIAS control solenoid valve
C3 ★ (F30) GY/3 : Ignition coil No. 6
C3 ★ (F31) GY/3 : Ignition coil No. 4
D2 ★ (F34) W/2 : Condenser
C3 ★ (F35) GY/3 : Ignition coil No. 2
C3 (F36) GY/2 : Injector No. 4
C2 (F37) GY/2 : Injector No. 2
C1 ★ (F39) – : Engine ground
C2 ★ (F40) – : Engine ground
C2 ★ (F41) – : Engine ground
D2 ★ (F42) – : Engine ground
C4 ★ (F46) L/12 : Joint connector-18
B4 (F48) SMJ : ECM
B4 ★ (F49) W/20 : To (M81)
C5 ★ (F50) GY/24 : TCM (Transmission control module) (With A/T)
C5 ★ (F51) W/24 : TCM (Transmission control module) (With A/T)
B4 (F54) L/12 : Joint connector-19
A4 (F55) W/18 : To (M162)
D1 (F56) B/3 : Power steering oil pressure sensor
D1 (F57) SB/3 : Heated oxygen sensor 1 (Bank 1)
E1 (F58) G/8 : To (F197)
D1 (F59) G/6 : To (F221)
C2 (F60) G/2 : Intake valve timing control solenoid valve (Bank 2)
B3 (F61) SB/3 : Heated oxygen sensor 1 (Bank 2)
C3 (F62) G/4 : Heated oxygen sensor 2 (Bank 2)
C3 (F63) L/4 : Heated oxygen sensor 2 (Bank 1)
E3 (F64) G/6 : Electric throttle control actuator
D3 (F65) B/3 : Camshaft position sensor (PHASE) (Bank 2)
F3 (F66) GY/6 : To (F211) (With M/T)
E3 (F67) GY/8 : To (F114) (With A/T)
A5 (F68) W/18 : To (M161)
A5 (F69) W/20 : To (M166)
D2 (F70) L/4 : To (F231)

Engine control sub-harness-1

F3 ★ (F91) BR/8 : To (F14) (With A/T)
F4 ★ (F92) B/8 : Terminal cord assembly (With A/T)

Engine control sub-harness-2

F4 ★ (F112) B/3 : Revolution sensor (With A/T)
E4 ★ (F114) GY/8 : To (F67) (With A/T)
F4 ★ (F115) B/3 : Power train revolution sensor

Engine control sub-harness-3

E4 ★ (F131) B/2 : To (F8)
E4 ★ (F132) GY/2 : Knock sensor

Engine control sub-harness-4

E4 ★ (F151) GY/10 : To (F10) (With A/T)
E4 ★ (F152) B/10 : Park/Neutral position switch (With A/T)

Engine control sub-harness-5

C4 ★ (F171) G/4 : To (F25)
D4 ★ (F173) B/3 : Crankshaft position sensor (POS)

Engine control sub-harness-6

D1 ★ (F231) L/4 : To (F70)
C4 ★ (F232) G/3 : Camshaft position sensor (PHASE) (Bank 1)

Engine control sub-harness-7

F3 (F211) GY/6 : To (F66) (With M/T)
G3 (F212) B/2 : Back-up lamp switch (With M/T)
G3 (F213) B/2 : Park/Neutral position switch (With M/T)

Engine control sub-harness-8

D2 (F221) G/6 : To (F59)
E1 (F222) GY/3 : Ignition coil No. 1
E2 (F223) GY/3 : Ignition coil No. 3
E2 (F224) GY/3 : Ignition coil No. 5

Engine control sub-harness-9

D2 (F192) GY/2 : Injector No. 1
D3 (F193) GY/2 : Injector No. 3
E2 (F194) GY/2 : Injector No. 5
E1 (F197) G/8 : To (F58)
D2 (F198) G/2 : Intake valve timing control solenoid valve (Bank 1)
C4 (F199) B/1 : Oil pressure switch
E2 (F200) L/2 : EVAP canister purge volume control solenoid valve

★ : 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.

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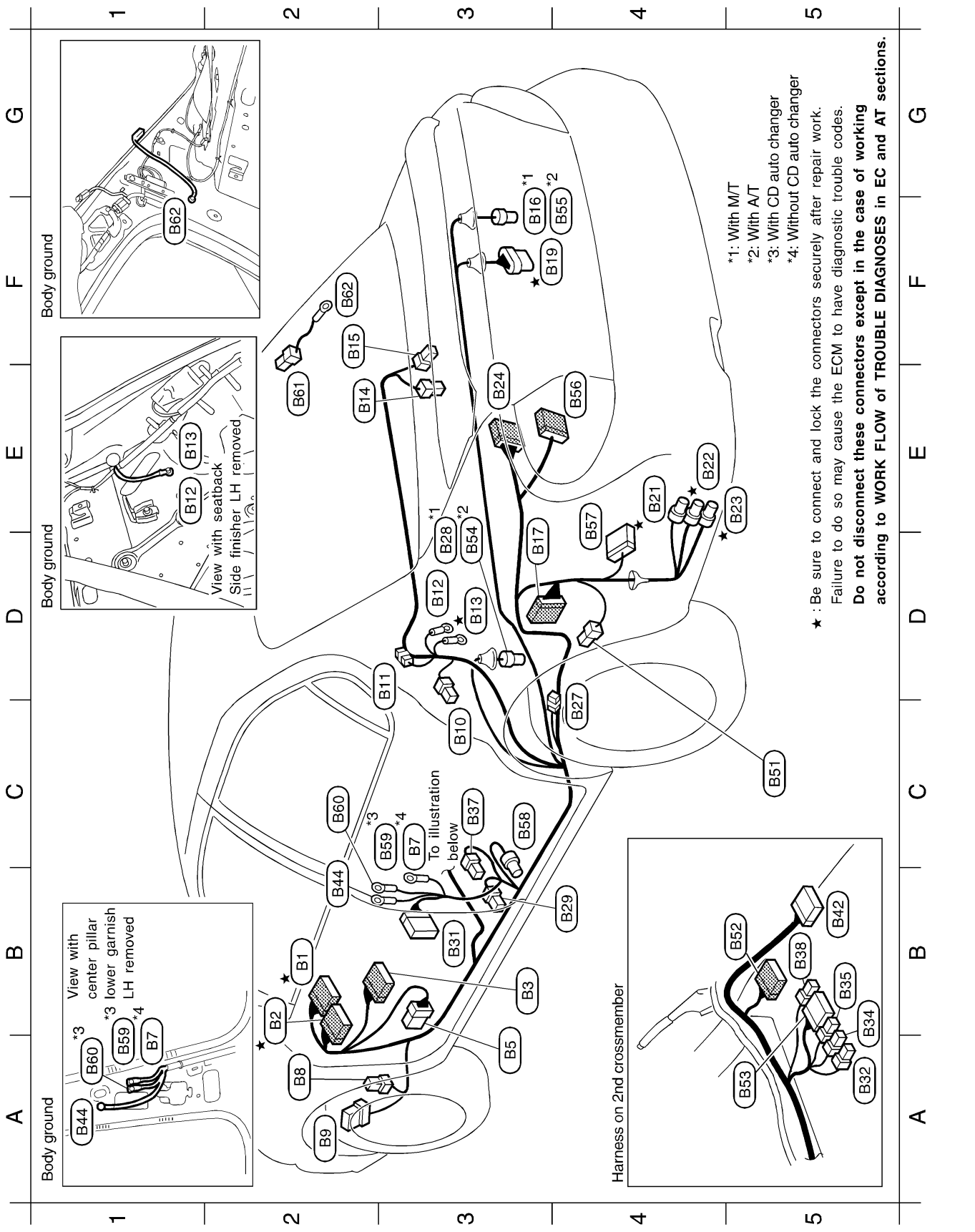
MEL755P

Body Harness

NFEL0136



MEL051O

Body harness

B2★ (B1) W/16 : To (M5)
B2★ (B2) BR/24 : To (M2)
B3★ (B3) W/18 : To (M6)
A3 (B5) W/8 : Fuse block (J/B)
C3 (B7) – : Body ground (Without CD auto changer)
A2 (B8) L/4 : Fuel pump relay
A2 (B9) BR/6 : Rear window defogger relay
C3 (B10) W/1 : Rear door switch LH
D3 (B11) W/1 : Condenser (Rear window defogger)
D3 (B12) – : Body ground
D3★ (B13) – : Body ground
E2 (B14) BR/2 : High-mounted stop lamp (Without rear air spoiler)
F2 (B15) W/2 : Trunk room lamp
F3 (B16) GY/2 : Rear wheel sensor RH (With M/T)
E4 (B17) W/10 : To (T3)
F3★ (B19) GY/5 : Fuel level sensor unit and fuel pump
E4★ (B21) G/2 : Vacuum cut valve bypass valve
E4★ (B22) B/2 : EVAP canister vent control valve
E5★ (B23) GY/3 : EVAP control system pressure sensor
E3 (B24) W/16 : To (B119)
C4 (B27) W/2 : Condenser
D3 (B28) BR/2 : Rear wheel sensor LH (With M/T)
B4 (B29) W/3 : Front door switch LH
B3 (B31) W/10 : To (D81)
A5 (B32) W/3 : Heated seat LH (Via sub-harness)
B5 (B34) W/3 : Seat belt buckle switch LH
B5 (B35) W/2 : Power seat LH (Via sub-harness)
C3 (B37) Y/2 : Seat belt pre-tensioner LH
B5 (B38) Y/2 : Side air bag module LH (With side air bag system) (Via sub-harness)
B5 (B42) Y/12 : Air bag diagnosis sensor unit (With side air bag system)
B2 (B44) – : Body ground (With side air bag system)
C5 (B51) W/4 : Fuel lid opener actuator
B5 (B52) W/16 : To (M164) (With memory seat)
A5 (B53) W/16 : Seat control unit LH (With memory seat) (Via sub-harness)
D3 (B54) L/2 : Rear wheel sensor LH (With A/T)
F4 (B55) GY/2 : Rear wheel sensor RH (With A/T)
E4 (B56) W/20 : To (B147)
E4 (B57) W/16 : CD auto changer
C3 (B58) Y/2 : Satellite sensor LH (With side air bag system)
C3 (B59) – : Body ground (With CD auto changer)
C2 (B60) – : Body ground (With CD auto changer)

Defogger harness

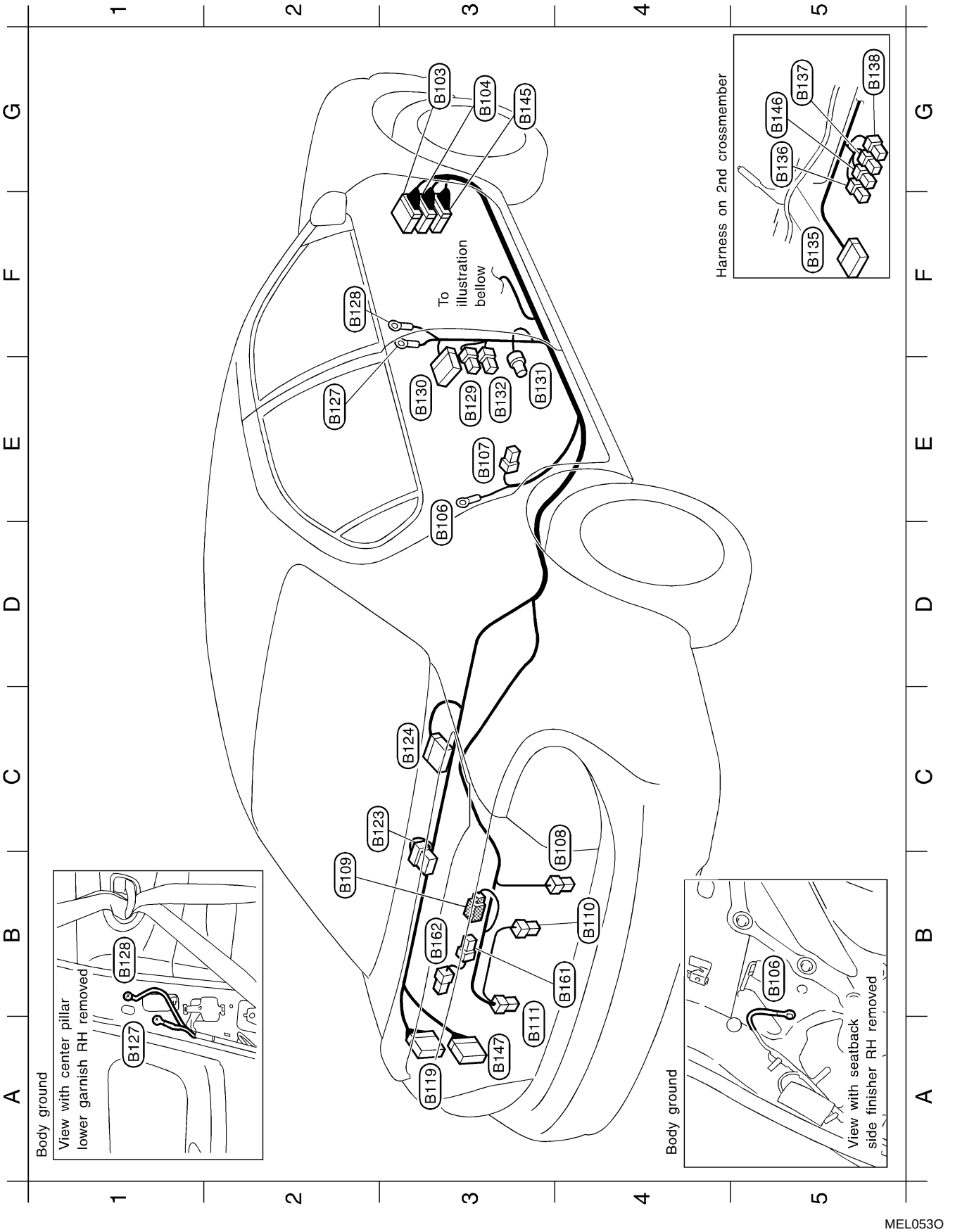
E2 (B61) B/1 : Rear window defogger
F2 (B62) – : Body ground

★ : 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.**

MEL834P

Body No. 2 Harness

NFEL0137



MEL053O

Body No. 2 harness

G3	B103	W/12	: To M91
G3	B104	W/10	: To M92
E3	B106	–	: Body ground
E3	B107	W/1	: Rear door switch RH
C4	B108	W/2	: Trunk lid key cylinder switch
B2	B109	BR/2	: To B161
B4	B110	W/2	: License lamp RH
A3	B111	W/2	: License lamp LH
A3	B119	W/16	: To B24
C2	B123	BR/6	: Woofer (With BOSE system)
C3	B124	GY/26	: BOSE speaker amp. (With BOSE system)
E2	B127	–	: Body ground
F2	B128	–	: Body ground (With side air bag system)
E3	B129	W/3	: Front door switch RH
E3	B130	W/10	: To D101
E3	B131	Y/2	: Satellite sensor RH (With side air bag system)
E3	B132	Y/2	: Seat belt pre-tensioner RH
F5	B135	Y/12	: Air bag diagnosis sensor unit
G5	B136	W/3	: Heated seat RH (Via sub-harness)
G5	B137	W/2	: Power seat RH (Via sub-harness)
G5	B138	Y/2	: Side air bag module RH (With side air bag system) (Via sub-harness)
G3	B145	BR/24	: To M172 (With BOSE system)
G5	B146	W/3	: Seat belt buckle switch RH
A3	B147	W/20	: To B56

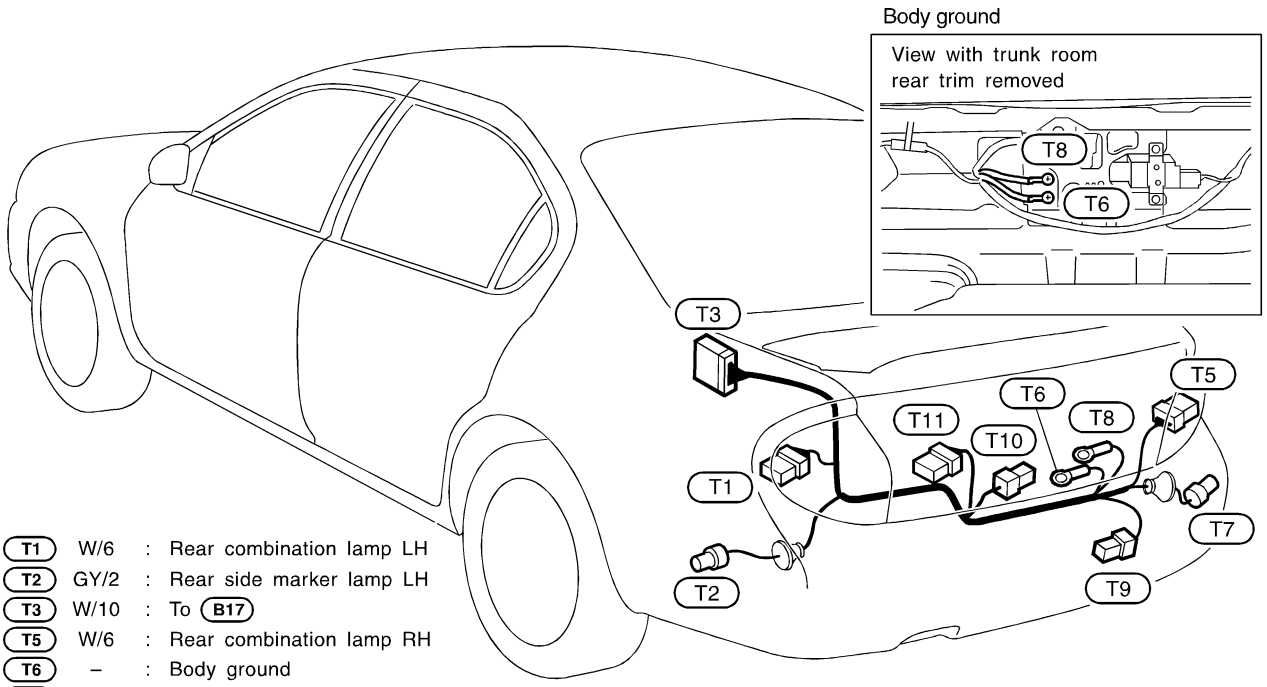
Body No. 2 sub-harness

B4	B161	BR/2	: To B109
B3	B162	B/2	: High-mounted stop lamp (With rear air spoiler)

MEL054O

Tail Harness

NFEL0138



T1	W/6	:	Rear combination lamp LH
T2	GY/2	:	Rear side marker lamp LH
T3	W/10	:	To B17
T5	W/6	:	Rear combination lamp RH
T6	–	:	Body ground
T7	GY/2	:	Rear side marker lamp RH
T8	–	:	Body ground
T9	W/2	:	Trunk room lamp switch
T10	W/2	:	Trunk lid opener actuator
T11	W/8	:	Stop and tail lamp unit

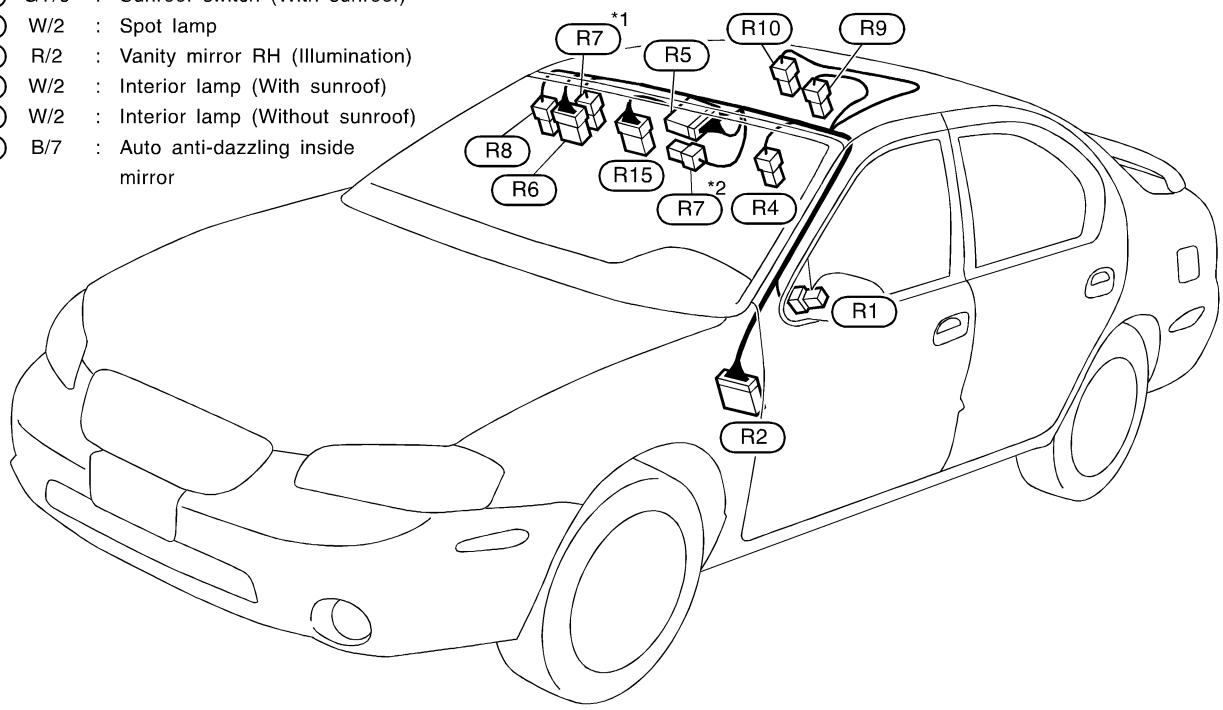
MEL055O

Room Lamp Harness

NFEL0140

(R1) BR/2 : Tweeter LH
(R2) W/12 : To (M8)
(R4) R/2 : Vanity mirror LH (Illumination)
(R5) W/12 : Sunroof motor (With sunroof)
(R6) GY/6 : Sunroof switch (With sunroof)
(R7) W/2 : Spot lamp
(R8) R/2 : Vanity mirror RH (Illumination)
(R9) W/2 : Interior lamp (With sunroof)
(R10) W/2 : Interior lamp (Without sunroof)
(R15) B/7 : Auto anti-dazzling inside mirror

*1: With sunroof
*2: Without sunroof



MEL056O

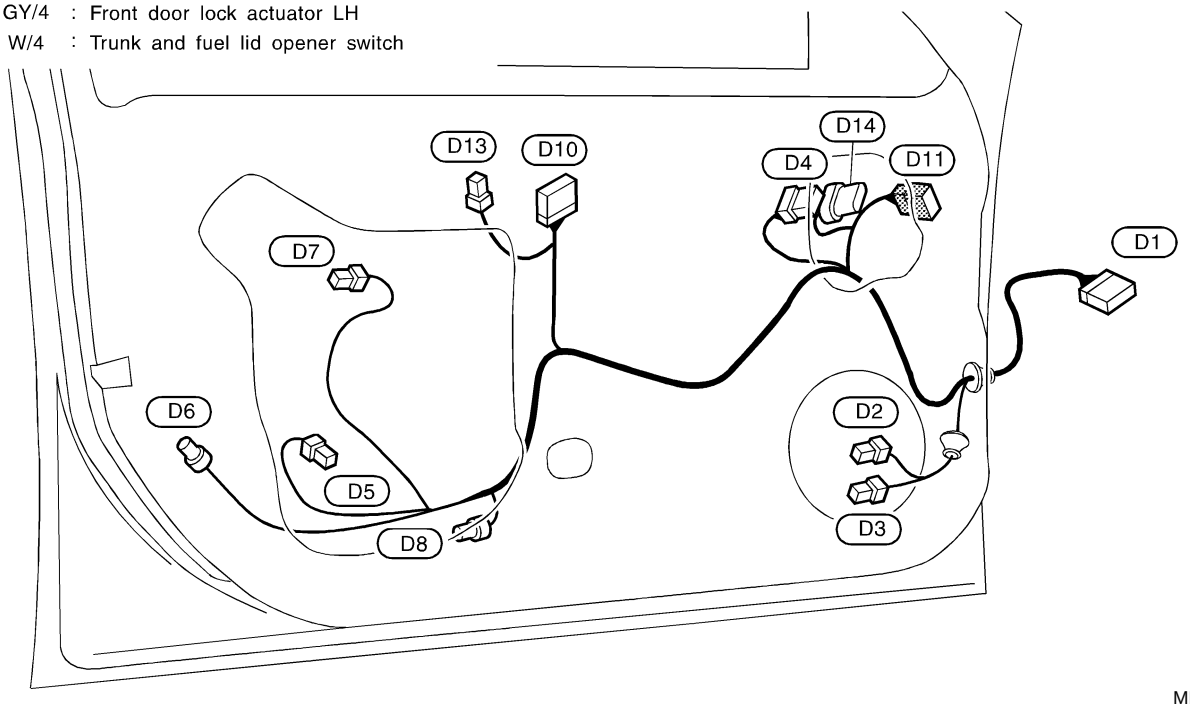
Front Door Harness

NFEL0142

LH SIDE

NFEL0142S03

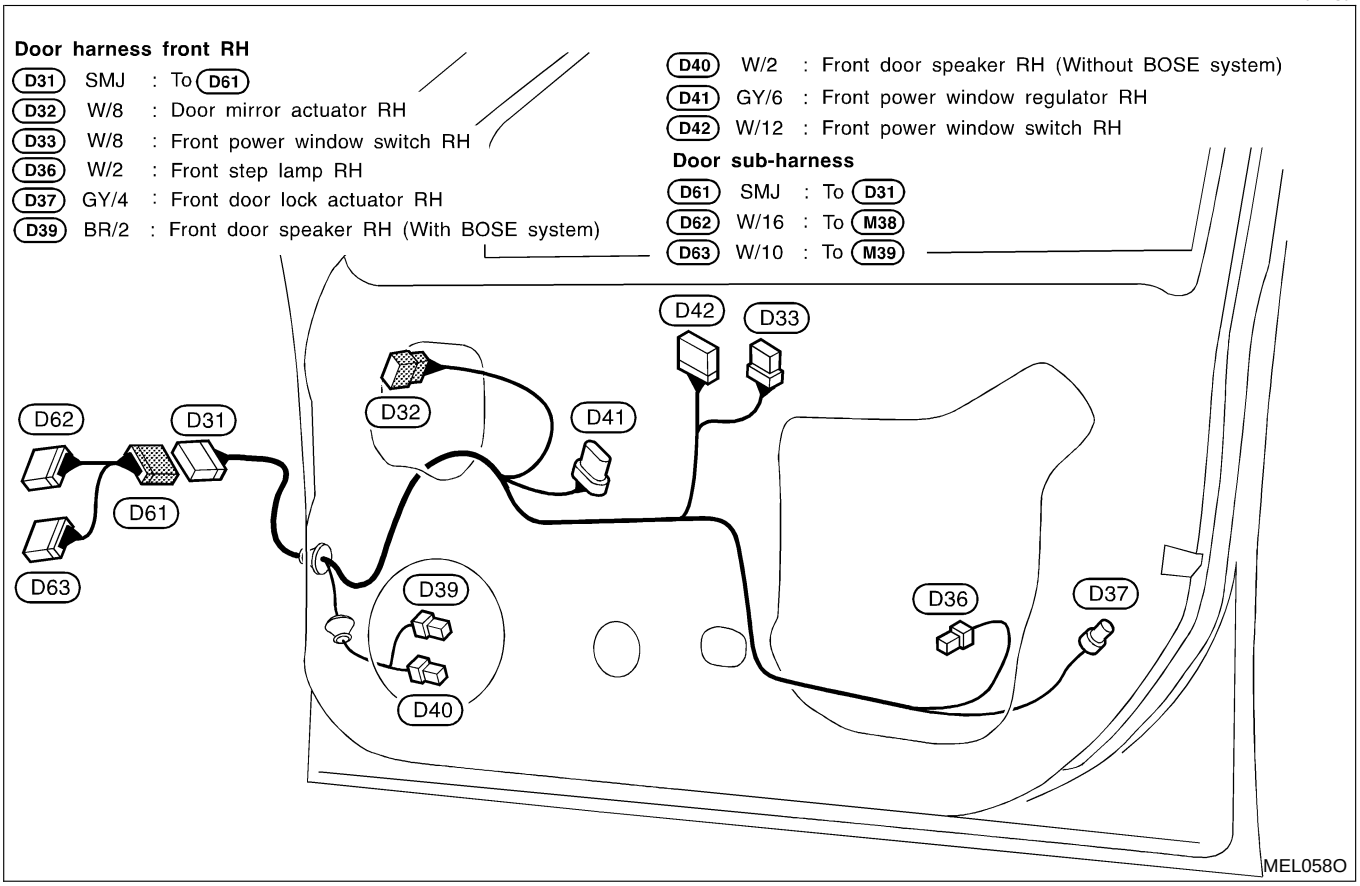
D1	SMJ	: To M4	D8	BR/3	:	Front door key cylinder switch LH
D2	BR/2	: Front door speaker LH (With BOSE system)	D10	W/16	:	Front power window main switch
D3	W/2	: Front door speaker LH (Without BOSE system)	D11	W/8	:	Door mirror actuator LH
D4	GY/6	: Front power window regulator LH	D13	W/3	:	Front power window main switch
D5	W/2	: Front step lamp LH	D14	W/8	:	Memory seat switch
D6	GY/4	: Front door lock actuator LH				
D7	W/4	: Trunk and fuel lid opener switch				



MEL057O

RH SIDE

NFEL0142S04

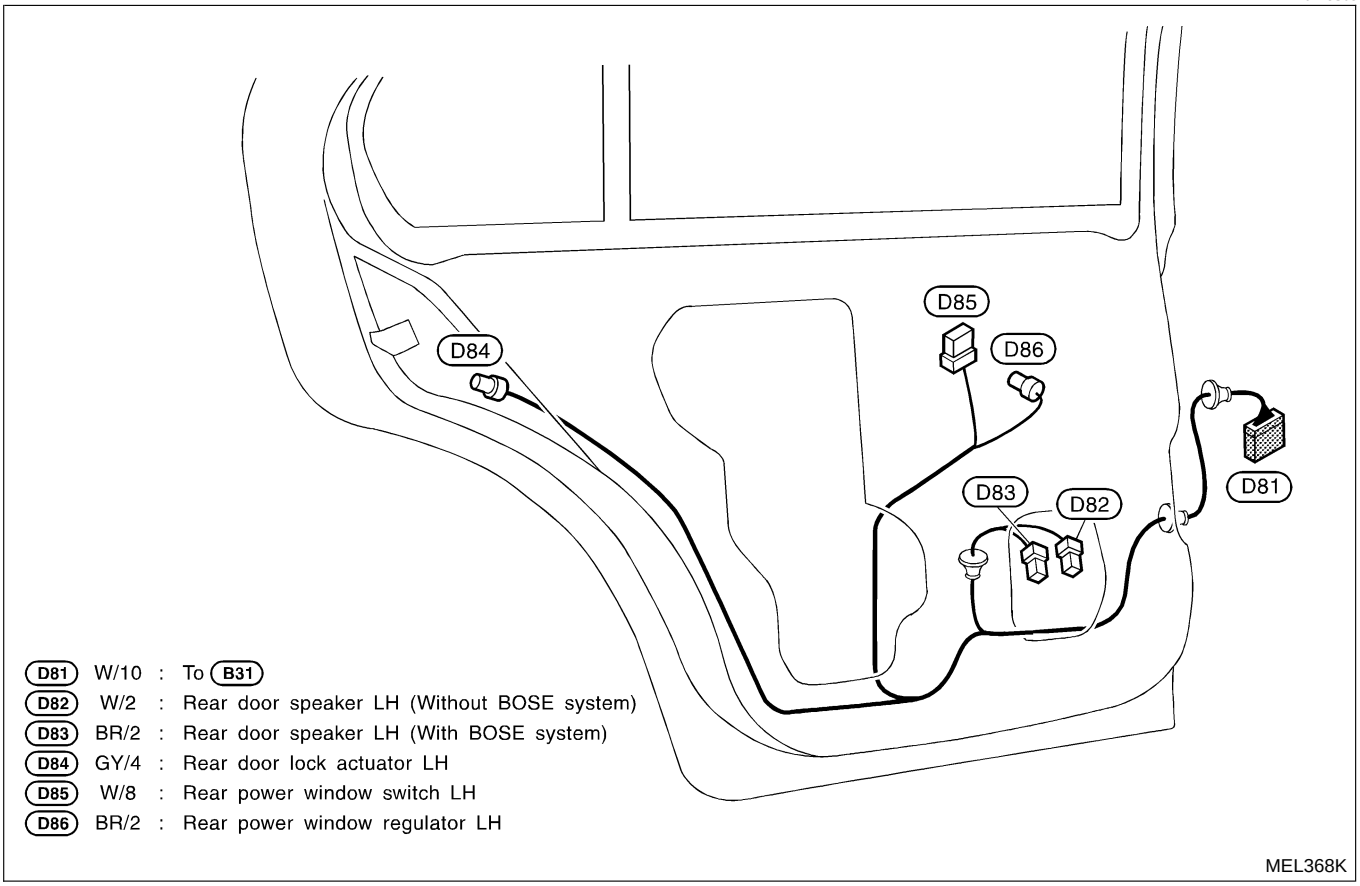


Rear Door Harness

NFEL0143

LH SIDE

NFEL0143S03

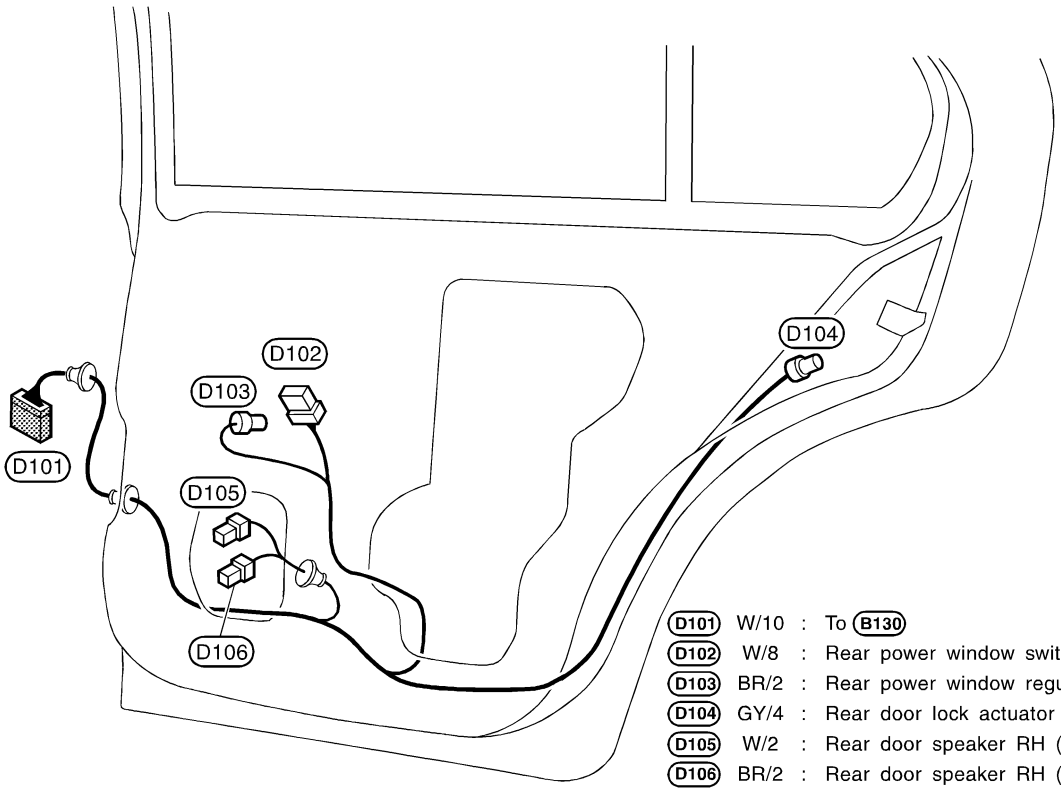


D81	W/10	:	To B31
D82	W/2	:	Rear door speaker LH (Without BOSE system)
D83	BR/2	:	Rear door speaker LH (With BOSE system)
D84	GY/4	:	Rear door lock actuator LH
D85	W/8	:	Rear power window switch LH
D86	BR/2	:	Rear power window regulator LH

MEL368K

RH SIDE

NFEL0143S04



BULB SPECIFICATIONS

Headlamp

Headlamp

NFEL0144S03

Item	Wattage (W)
High/Low	60/35 (HB3)

Exterior Lamp

NFEL0144S01

Item		Wattage (W)
Front fog lamp		55 (H3)
Front turn signal lamp		21
Parking lamp		5
Front side marker lamp		3.8
Rear combination lamp	Turn signal	21
	Stop/Tail	21/5
	Back-up	13
Rear side marker lamp		3.8
License lamp		5
High-mounted stop lamp (without rear spoiler)		21

Interior Lamp

NFEL0144S02

Item	Wattage (W)
Interior room lamp	10
Map lamp	8
Vanity mirror lamp	1.4
Trunk room lamp	3.4
Step lamp	2.7

WIRING DIAGRAM CODES (CELL CODES)

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 Signal
2NDSIG	AT	A/T 2ND Signal
3RDSIG	AT	A/T 3RD Signal
4THSIG	AT	A/T 4TH Signal
ABS	BR	Anti-lock Brake System
A/C, A	HA	Auto Air Conditioner
A/C, M	HA	Manual Air Conditioner
APPS1	EC	Accelerator Pedal Position Sensor (Sensor 1)
APPS2	EC	Accelerator Pedal Position Sensor (Sensor 2)
APPS3	EC	Accelerator Pedal Position Sensor
ASC/BS	EC	Automatic Speed Control Device (ASCD) Brake Switch
ASC/SW	EC	Automatic Speed Control Device (ASCD) Steering Switch
ASC/VS	EC	Automatic Speed Control Device (ASCD) Vehicle Speed Sensor
ASCBOF	EC	Automatic Speed Control Device (ASCD) Brake Switch (Off)
ASCIND	EC	Automatic Speed Control Device (ASCD) Indicator
AT/IND	EL	A/T Indicator Lamp
AUDIO	EL	Audio
AUT/DP	EL	Automatic Drive Positioner
BACK/L	EL	Back-up Lamp
BA/FTS	AT	A/T Fluid Temperature Sensor and TCM Power Supply
B/COMP	EL	Board Computer
BRK/SW	EC	Brake Switch
BYPS/V	EC	Vacuum Cut Valve Bypass Valve
CAN	AT	CAN System
CAN	EC	CAN System
CAN	EL	CAN System
CHARGE	SC	Charging System
CHIME	EL	Warning Chime
CIGAR	EL	Cigarette Lighter
CLOCK	EL	Clock
COOL/F	EC	Cooling Fan Control
DEF	EL	Rear Window Defogger
D/LOCK	EL	Power Door Lock
DLC	EC	Data Link Connector
DTRL	EL	Headlamp - With Daytime Light System
ECM/PW	EC	ECM Power Supply
ECTS	EC	Engine Coolant Temperature Sensor
EMNT	EC	Electronic Controlled Engine Mount
ENGSS	AT	Engine Speed Signal
ETC1	EC	Electrical Throttle Function
ETC2	EC	Electrical Throttle Control Motor Relay
ETC3	EC	Electrical Throttle Control Motor
F/FOG	EL	Front Fog Lamp
FLS1	EC	Fuel Level Sensor
FLS2	EC	Fuel Level Sensor
FLS3	EC	Fuel Level Sensor
F/PUMP	EC	Fuel Pump Control
FTS	AT	A/T Fluid Temperature Sensor
FTTS	EC	Fuel Tank Temperature Sensor
FUELB1	EC	Fuel Injection System Function (Bank 1)
FUELB2	EC	Fuel Injection System Function (Bank 2)
H/LAMP	EL	Headlamp
HORN	EL	Horn
HSEAT	EL	Heated Seat
H/STRG	EL	Heated Steering
I/MIRR	EL	Inside Mirror (Auto Anti-dazzling Mirror)
IATS	EC	Intake Air Temperature Sensor
IGNSYS	EC	Ignition System
ILL	EL	Illumination
INJECT	EC	Injector
INT/L	EL	Interior, Step, Spot, Vanity Mirror and Trunk Room Lamps
IVCB1	EC	Intake Valve Timing Control Solenoid Valve RH

Code	Section	Wiring Diagram Name
IVCB2	EC	Intake Valve Timing Control Solenoid Valve LH
KEYLES	EL	Remote Keyless Entry System
KS	EC	Knock Sensor
LOAD	EC	Electrical Load Signal
LPSV	AT	Line Pressure Solenoid Valve
MAFS	EC	Mass Air Flow Sensor
MAIN	AT	Main Power Supply and Ground Circuit
MAIN	EC	Main Power Supply and Ground Circuit
METER	EL	Speedometer, Tachometer, Temp. and Fuel Gauges
MIL	EC	Malfunction Indicator Lamp
MIRROR	EL	Power Door Mirror
NATS	EL	NVIS (Nissan Vehicle Immobilizer System — NATS)
NAVI	EL	Navigation System
NONDTC	AT	Non-detectable Items
O2H1B1	EC	Heated Oxygen Sensor 1 Heater (Bank 1)
O2H1B2	EC	Heated Oxygen Sensor 1 Heater (Bank 2)
O2H2B1	EC	Heated Oxygen Sensor 2 Heater (Bank 1)
O2H2B2	EC	Heated Oxygen Sensor 2 Heater (Bank 2)
O2S1B1	EC	Heated Oxygen Sensor 1 (Bank 1)
O2S1B2	EC	Heated Oxygen Sensor 1 (Bank 2)
O2S2B1	EC	Heated Oxygen Sensor 2 (Bank 1)
O2S2B2	EC	Heated Oxygen Sensor 2 (Bank 2)
OVRCSV	AT	Overrun Clutch Solenoid Valve
PHASE	EC	Camshaft Position Sensor (PHASE) (Bank 1)
PHASE	EC	Camshaft Position Sensor (PHASE) (Bank 2)
PHONE	EL	Telephone (Pre-wire)
PGC/V	EC	EVAP Canister Purge Volume Control Solenoid Valve
PNP/SW	AT	Park/Neutral Position Switch
PNP/SW	EC	Park/Neutral Position Switch
POS	EC	Crankshaft Position Sensor (CKPS) (POS)
POWER	EL	Power Supply Routing
PRE/SE	EC	EVAP Control System Pressure Sensor
PS/SEN	EC	Power Steering Oil Pressure Sensor
REF	EC	Crankshaft Position Sensor (CKPS) (REF)
REMOTE	EL	Audio (Remote Control Switch)
RP/SEN	EC	Refrigerant Pressure Sensor
SEN/PW	EC	Sensor Power Supply
SEAT	EL	Power Seat
SHIFT	AT	A/T Shift Lock System
SROOF	EL	Sunroof
SRS	RS	Supplemental Restraint System
S/SIG	EC	Start Signal
SSV/A	AT	Shift Solenoid Valve A
SSV/B	AT	Shift Solenoid Valve B
START	SC	Starting System
STOP/L	EL	Stop Lamp
TAIL/L	EL	Parking, License and Tail Lamps
TCCSIG	AT	A/T TCC Signal (Lock Up)
TCS	EC	ABS/TCS Communication Line
TCS	BR	Traction Control System
TCV	AT	Torque Converter Clutch Solenoid Valve
T&FLID	EL	Trunk Lid and Fuel Filler Lid Opener
TPS	AT	Throttle Position Sensor
TPS1	EC	Throttle Position Sensor (Sensor 1)
TPS2	EC	Throttle Position Sensor (Sensor 2)
TPS3	EC	Throttle Position Sensor
TRNSCV	EL	Homelink Universal Transceiver
TURN	EL	Turn Signal and Hazard Warning Lamps
VEHSEC	EL	Vehicle Security (Theft Warning) System

Code	Section	Wiring Diagram Name
VENT/V	EC	EVAP Canister Vent Control Valve
VIAS	EC	Variable Induction Air Control System
VIAS/V	EC	Variable Induction Air Control System
VSS	EC	Vehicle Speed Sensor
VSSA/T	AT	Vehicle Speed Sensor A/T (Revolution Sensor)
VSSMTR	AT	Vehicle Speed Sensor MTR
W/ANT	EL	Audio Antenna
WARN	EL	Warning Lamps
WINDOW	EL	Power Window
WIPER	EL	Front Wiper and Washer

NOTES

ENGINE CONTROL SYSTEM

SECTION EC

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NOTE:
If DTC U1000 or U1001 is displayed with other DTC, first perform the trouble diagnosis for DTC U1000, U1001. Refer to EC-164.

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	CONSULT-II GST*2	ECM*3	
Unable to access ECM	—		EC-129
A/T 1ST GR FNCTN	P0731	0731	AT-132
A/T 2ND GR FNCTN	P0732	0732	AT-138
A/T 3RD GR FNCTN	P0733	0733	AT-144
A/T 4TH GR FNCTN	P0734	0734	AT-158
A/T TCC S/V FNCTN	P0744	0744	AT-158
ABSL PRES SEN/CIRC	P0107	0107	EC-201
ABSL PRES SEN/CIRC	P0108	0108	EC-201
APP SEN 1/CIRC*5	P0227	0227	EC-311
APP SEN 1/CIRC*5	P0228	0228	EC-311
APP SEN 2/CIRC*5	P1227	1227	EC-561
APP SEN 2/CIRC*5	P1228	1228	EC-561
APP SENSOR*5	P0226	0226	EC-304
APP SEN/CIRCUIT*5	P0121	0121	EC-212
ASCD BRAKE SW	P1572	1572	EC-647
ASCD SW	P1564	1564	EC-640
ASCD VHL SPD SEN	P1574	1574	EC-662
ATF TEMP SEN/CIRC	P0710	0710	AT-110
BRAKE SW/CIRCUIT	P1805	1805	EC-678
CAN COMM CIRCUIT	U1000	1000*6	EC-164
CAN COMM CIRCUIT	U1001	1001*6	EC-164
CKP SEN/CIRCUIT	P0335	0335	EC-330
CLOSED LOOP-B1	P1148	1148	EC-526
CLOSED LOOP-B2	P1168	1168	EC-526
CMP SEN/CIRC-B1	P0340	0340	EC-337
CMP SEN/CIRC-B2	P0345	0345	EC-337
CTP LEARNING	P1225	1225	EC-557
CTP LEARNING	P1226	1226	EC-559
CYL 1 MISFIRE	P0301	0301	EC-317
CYL 2 MISFIRE	P0302	0302	EC-317
CYL 3 MISFIRE	P0303	0303	EC-317
CYL 4 MISFIRE	P0304	0304	EC-317
CYL 5 MISFIRE	P0305	0305	EC-317

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Items (CONSULT-II screen terms)	DTC*1		Reference page
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CYL 6 MISFIRE	P0306	0306	EC-317
ECM	P0605	0605	EC-455
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ECT SEN/CIRC*5	P0118	0118	EC-207
ECT SENSOR	P0125	0125	EC-213
ENG OVER TEMP	P1217	1217	EC-532
ENGINE SPEED SIG	P0725	0725	AT-121
ETC MOT	P1128	1128	EC-487
ETC MOT PWR	P1124	1124	EC-481
ETC MOT PWR*5	P1126	1126	EC-481
ETC ACTR*5	P1121	1121	EC-471
ETC FUNCTION/CIRC*5	P1122	1122	EC-473
EVAP GROSS LEAK	P0455	0455	EC-405
EVAP VERY SML LEAK	P0456	0456	EC-417
EVAP VERY SML LEAK	P1456	1456	EC-603
EVAP PURG FLOW/MON	P0441	0441	EC-351
EVAP SMALL LEAK	P0442	0442	EC-361
EVAP SYS PRES SEN	P0452	0452	EC-390
EVAP SYS PRES SEN	P0453	0453	EC-396
FTT SEN/CIRCUIT	P0182	0182	EC-285
FTT SEN/CIRCUIT	P0183	0183	EC-285
FTT SENSOR	P0181	0181	EC-282
FUEL LEV SEN SLOSH	P0460	0460	EC-432
FUEL LEVEL SENSOR	P0461	0461	EC-436
FUEL LEVL SEN/CIRC	P0462	0462	EC-438
FUEL LEVL SEN/CIRC	P0463	0463	EC-438
FUEL LEVL SEN/CIRC	P1464	1464	EC-619
FUEL SYS-LEAN-B1	P0171	0171	EC-267
FUEL SYS-LEAN-B2	P0174	0174	EC-267
FUEL SYS-RICH-B1	P0172	0172	EC-275
FUEL SYS-RICH-B2	P0175	0175	EC-275
HO2S1 (B1)	P0132	0132	EC-220
HO2S1 (B1)	P0133	0133	EC-228
HO2S1 (B1)	P0134	0134	EC-240
HO2S1 (B1)	P1143	1143	EC-492

Items (CONSULT-II screen terms)	DTC*1		Reference page
	CONSULT-II GST*2	ECM*3	
HO2S1 (B1)	P1144	1144	EC-499
HO2S1 (B2)	P0152	0152	EC-220
HO2S1 (B2)	P0153	0153	EC-228
HO2S1 (B2)	P0154	0154	EC-240
HO2S1 (B2)	P1163	1163	EC-492
HO2S1 (B2)	P1164	1164	EC-499
HO2S1 HTR (B1)	P0031	0031	EC-175
HO2S1 HTR (B1)	P0032	0032	EC-175
HO2S1 HTR (B2)	P0051	0051	EC-175
HO2S1 HTR (B2)	P0052	0052	EC-175
HO2S2 (B1)	P0138	0138	EC-249
HO2S2 (B1)	P0139	0139	EC-257
HO2S2 (B1)	P1146	1146	EC-506
HO2S2 (B1)	P1147	1147	EC-516
HO2S2 (B2)	P0158	0158	EC-249
HO2S2 (B2)	P0159	0159	EC-257
HO2S2 (B2)	P1166	1166	EC-506
HO2S2 (B2)	P1167	1167	EC-516
HO2S2 HTR (B1)	P0037	0037	EC-181
HO2S2 HTR (B1)	P0038	0038	EC-181
HO2S2 HTR (B2)	P0057	0057	EC-181
HO2S2 HTR (B2)	P0058	0058	EC-181
IAT SEN/CIRCUIT	P0112	0112	EC-203
IAT SEN/CIRCUIT	P0113	0113	EC-203
IAT SENSOR	P0127	0127	EC-216
INT/V TIM CONT-B1	P0011	0011	EC-167
INT/V TIM CONT-B2	P0021	0021	EC-167
ISC SYSTEM	P0506	0506	EC-446
ISC SYSTEM	P0507	0507	EC-448
KNOCK SEN/CIRC-B1	P0327	0327	EC-325
KNOCK SEN/CIRC-B1	P0328	0328	EC-325
L/PRESS SOL/CIRC	P0745	0745	AT-168
MAF SEN/CIRCUIT	P0101	0101	EC-188
MAF SEN/CIRCUIT*5	P0102	0102	EC-195
MAF SEN/CIRCUIT*5	P0103	0103	EC-195
MAF SENSOR*5	P1102	1102	EC-465

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Items (CONSULT-II screen terms)	DTC*1		Reference page
	CONSULT-II GST*2	ECM*3	
MIL/CIRC	P0650	0650	EC-457
MULTI CYL MISFIRE	P0300	0300	EC-317
NATS MALFUNCTION	P1610-P1615	1610-1615	EL-356
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	No DTC	Flashing*4	EC-93
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	**P0000**	**0000**	**—**
O/R CLTCH SOL/CIRC	P1760	1760	AT-191
P-N POS SW/CIRCUIT	P1706	1706	EC-667
PNP SW/CIRC	P0705	0705	AT-104
PURG VOLUME CONT/V	P0444	0444	EC-376
PURG VOLUME CONT/V	P0445	0445	EC-376
PURG VOLUME CONT/V	P1444	1444	EC-573
PW ST P SEN/CIRC	P0550	0550	EC-450
SENSOR POWER/CIRC*5	P1229	1229	EC-567
SFT SOL A/CIRC*5	P0750	0750	AT-174
SFT SOL B/CIRC*5	P0755	0755	AT-179
TCC SOLENOID/CIRC	P0740	0740	AT-153
TCS/CIRC	P1212	1212	EC-530
TCS C/U FUNCTN	P1211	1211	EC-528
THERMSTAT FNCTN	P0128	0128	EC-218
TP SEN 1/CIRC*5	P0222	0222	EC-297
TP SEN 1/CIRC*5	P0223	0223	EC-297
TP SEN 2/CIRC*5	P1223	1223	EC-550
TP SEN 2/CIRC*5	P1224	1224	EC-550
TP SENSOR*5	P0221	0221	EC-290
TP SEN/CIRC A/T	P1705	1705	AT-184
TP SEN/CIRCUIT*5	P0122	0122	EC-212
TP SEN/CIRCUIT*5	P0123	0123	EC-212
TW CATALYST SYS-B1	P0420	0420	EC-346
TW CATALYST SYS-B2	P0430	0430	EC-346
VC/V BYPASS/V	P1490	1490	EC-622
VC CUT/V BYPASS/V	P1491	1491	EC-628
VEH SPD SEN/CIR AT*7	P0720	0720	AT-116
VEH SPEED SEN/CIRC*7	P0500	0500	EC-442
VENT CONTROL VALVE	P0447	0447	EC-383

Items (CONSULT-II screen terms)	DTC*1		Reference page
	CONSULT-II GST*2	ECM*3	
VENT CONTROL VALVE	P1446	1446	EC-586
VENT CONTROL VALVE	P1448	1448	EC-594
VIAS S/V CIRC	P1800	1800	EC-673

*1: 1st trip DTC No. is the same as DTC No.
*2: These numbers are prescribed by SAE J2012.
*3: In Diagnostic Test Mode II (Self-diagnostic results), these numbers are controlled by NISSAN.
*4: When engine is running.
*5: When the fail-safe operation occurs, the MIL illuminates.
*6: The troubleshooting for this DTC needs CONSULT-II.
*7: When fail-safe operations for both self-diagnoses occur at the same time, the MIL illuminates.
NOTE:
Regarding A33 models, "B1" indicates bank 1, "B2" indicates bank 2.

DTC No. Index

NFEC1408

NOTE:
If DTC U1000 or U1001 is displayed with other DTC, first perform the trouble diagnosis for DTC U1000, U1001. Refer to EC-164.

DTC*1		Items (CONSULT-II screen terms)	Reference page
CONSULT-II GST*2	ECM*3		
—	—	Unable to access ECM	EC-129
No DTC	Flashing*4	NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	EC-93
P0000	**0000**	**NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.**	**—**
U1000	1000*6	CAN COMM CIRCUIT	EC-164
U1001	1001*6	CAN COMM CIRCUIT	EC-164
P0011	0011	INT/V TIM CONT-B1	EC-167
P0021	0021	INT/V TIM CONT-B2	EC-167
P0031	0031	HO2S1 HTR (B1)	EC-175
P0032	0032	HO2S1 HTR (B1)	EC-175
P0037	0037	HO2S2 HTR (B1)	EC-181
P0038	0038	HO2S2 HTR (B1)	EC-181
P0051	0051	HO2S1 HTR (B2)	EC-175
P0052	0052	HO2S1 HTR (B2)	EC-175
P0057	0057	HO2S2 HTR (B2)	EC-181
P0058	0058	HO2S2 HTR (B2)	EC-181
P0101	0101	MAF SEN/CIRCUIT	EC-188
P0102	0102	MAF SEN/CIRCUIT*5	EC-195
P0103	0103	MAF SEN/CIRCUIT*5	EC-195
P0107	0107	ABSL PRES SEN/CIRC	EC-201

DTC*1		Items (CONSULT-II screen terms)	Reference page
CONSULT-II GST*2	ECM*3		
P0108	0108	ABSL PRES SEN/CIRC	EC-201
P0112	0112	IAT SEN/CIRCUIT	EC-203
P0113	0113	IAT SEN/CIRCUIT	EC-203
P0117	0117	ECT SEN/CIRC*5	EC-207
P0118	0118	ECT SEN/CIRC*5	EC-207
P0121	0121	APP SEN/CIRCUIT*5	EC-212
P0122	0122	TP SEN/CIRCUIT*5	EC-212
P0123	0123	TP SEN/CIRCUIT*5	EC-212
P0125	0125	ECT SENSOR	EC-213
P0127	0127	IAT SENSOR	EC-216
P0128	0128	THERMSTAT FNCTN	EC-218
P0132	0132	HO2S1 (B1)	EC-220
P0133	0133	HO2S1 (B1)	EC-228
P0134	0134	HO2S1 (B1)	EC-240
P0138	0138	HO2S2 (B1)	EC-249
P0139	0139	HO2S2 (B1)	EC-257
P0152	0152	HO2S1 (B2)	EC-220
P0153	0153	HO2S1 (B2)	EC-228
P0154	0154	HO2S1 (B2)	EC-240
P0158	0158	HO2S2 (B2)	EC-249
P0159	0159	HO2S2 (B2)	EC-257
P0171	0171	FUEL SYS-LEAN-B1	EC-267
P0172	0172	FUEL SYS-RICH-B1	EC-275
P0174	0174	FUEL SYS-LEAN-B2	EC-267
P0175	0175	FUEL SYS-RICH-B2	EC-275
P0181	0181	FTT SENSOR	EC-282
P0182	0182	FTT SEN/CIRCUIT	EC-285
P0183	0183	FTT SEN/CIRCUIT	EC-285
P0221	0221	TP SENSOR*5	EC-290
P0222	0222	TP SEN 1/CIRC*5	EC-297
P0223	0223	TP SEN 1/CIRC*5	EC-297
P0226	0226	APP SENSOR*5	EC-304
P0227	0227	APP SEN 1/CIRC*5	EC-311
P0228	0228	APP SEN 1/CIRC*5	EC-311
P0300	0300	MULTI CYL MISFIRE	EC-317
P0301	0301	CYL 1 MISFIRE	EC-317

DTC*1		Items (CONSULT-II screen terms)	Reference page
CONSULT-II GST*2	ECM*3		
P0302	0302	CYL 2 MISFIRE	EC-317
P0303	0303	CYL 3 MISFIRE	EC-317
P0304	0304	CYL 4 MISFIRE	EC-317
P0305	0305	CYL 5 MISFIRE	EC-317
P0306	0306	CYL 6 MISFIRE	EC-317
P0327	0327	KNOCK SEN/CIRC-B1	EC-325
P0328	0328	KNOCK SEN/CIRC-B1	EC-325
P0335	0335	CKP SEN/CIRCUIT	EC-330
P0340	0340	CMP SEN/CIRC-B1	EC-337
P0345	0345	CMP SEN/CIRC-B2	EC-337
P0420	0420	TW CATALYST SYS-B1	EC-346
P0430	0430	TW CATALYST SYS-B2	EC-346
P0441	0441	EVAP PURG FLOW/MON	EC-351
P0442	0442	EVAP SMALL LEAK	EC-361
P0444	0444	PURG VOLUME CONT/V	EC-376
P0445	0445	PURG VOLUME CONT/V	EC-376
P0447	0447	VENT CONTROL VALVE	EC-383
P0452	0452	EVAP SYS PRES SEN	EC-390
P0453	0453	EVAP SYS PRES SEN	EC-396
P0455	0455	EVAP GROSS LEAK	EC-405
P0456	0456	EVAP VERY SML LEAK	EC-417
P0460	0460	FUEL LEV SEN SLOSH	EC-432
P0461	0461	FUEL LEVEL SENSOR	EC-436
P0462	0462	FUEL LEVL SEN/CIRC	EC-438
P0463	0463	FUEL LEVL SEN/CIRC	EC-438
P0500	0500	VEH SPEED SEN/CIRC*7	EC-442
P0506	0506	ISC SYSTEM	EC-446
P0507	0507	ISC SYSTEM	EC-448
P0550	0550	PW ST P SEN/CIRC	EC-450
P0605	0605	ECM	EC-455
P0650	0650	MIL/CIRC	EC-457
P0705	0705	PNP SW/CIRC	AT-104
P0710	0710	ATF TEMP SEN/CIRC	AT-110
P0720	0720	VEH SPD SEN/CIR AT*7	AT-116
P0725	0725	ENGINE SPEED SIG	AT-121
P0731	0731	A/T 1ST GR FNCTN	AT-126

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DTC*1		Items (CONSULT-II screen terms)	Reference page
CONSULT-II GST*2	ECM*3		
P0732	0732	A/T 2ND GR FNCTN	AT-132
P0733	0733	A/T 3RD GR FNCTN	AT-138
P0734	0734	A/T 4TH GR FNCTN	AT-144
P0740	0740	TCC SOLENOID/CIRC	AT-153
P0744	0744	A/T TCC S/V FNCTN	AT-158
P0745	0745	L/PRESS SOL/CIRC	AT-168
P0750	0750	SFT SOL A/CIRC*5	AT-174
P0755	0755	SFT SOL B/CIRC*5	AT-179
P1065	1065	ECM BACK UP/CIRCUIT	EC-461
P1102	1102	MAF SENSOR*5	EC-465
P1121	1121	ETC ACTR*5	EC-471
P1122	1122	ETC FUNCTION/CIRC*5	EC-473
P1124	1124	ETC MOT PWR	EC-481
P1126	1126	ETC MOT PWR*5	EC-481
P1128	1128	ETC MOT	EC-487
P1143	1143	HO2S1 (B1)	EC-492
P1144	1144	HO2S1 (B1)	EC-499
P1146	1146	HO2S2 (B1)	EC-506
P1147	1147	HO2S2 (B1)	EC-516
P1148	1148	CLOSED LOOP-B1	EC-526
P1163	1163	HO2S1 (B2)	EC-492
P1164	1164	HO2S1 (B2)	EC-499
P1166	1166	HO2S2 (B2)	EC-506
P1167	1167	HO2S2 (B2)	EC-516
P1168	1168	CLOSED LOOP-B2	EC-526
P1211	1211	TCS C/U FUNCTN	EC-528
P1212	1212	TCS/CIRC	EC-530
P1217	1217	ENG OVER TEMP	EC-532
P1223	1223	TP SEN 2/CIRC*5	EC-550
P1224	1224	TP SEN 2/CIRC*5	EC-550
P1225	1225	CTP LEARNING	EC-557
P1226	1226	CTP LEARNING	EC-559
P1227	1227	APP SEN 2/CIRC*5	EC-561
P1228	1228	APP SEN 2/CIRC*5	EC-561
P1229	1229	SENSOR POWER/CIRC*5	EC-567
P1444	1444	PURG VOLUME CONT/V	EC-573

DTC*1		Items (CONSULT-II screen terms)	Reference page
CONSULT-II GST*2	ECM*3		
P1446	1446	VENT CONTROL VALVE	EC-586
P1448	1448	VENT CONTROL VALVE	EC-594
P1456	1456	EVAP VERY SML LEAK	EC-603
P1464	1464	FUEL LEVL SEN/CIRC	EC-619
P1490	1490	VC/V BYPASS/V	EC-622
P1491	1491	VC CUT/V BYPASS/V	EC-628
P1564	1564	ASCD SW	EC-640
P1572	1572	ASCD BRAKE SW	EC-647
P1574	1574	ASCD VHL SPD SEN	EC-662
P1610-P1615	1610-1615	NATS MALFUNCTION	EL-356
P1705	1705	TP SEN/CIRC A/T	AT-184
P1706	1706	P-N POS SW/CIRCUIT	EC-667
P1760	1760	O/R CLTCH SOL/CIRC	AT-191
P1800	1800	VIAS S/V CIRC	EC-673
P1805	1805	BRAKE SW/CIRCUIT	EC-678

*1: 1st trip DTC No. is the same as DTC No.
*2: These numbers are prescribed by SAE J2012.
*3: In Diagnostic Test Mode II (Self-diagnostic results), these numbers are controlled by NISSAN.
*4: When engine is running.
*5: When the fail-safe operation occurs, the MIL illuminates.
*6: The troubleshooting for this DTC needs CONSULT-II.
*7: When fail-safe operations for both self-diagnoses occur at the same time, the MIL illuminates.
NOTE:
Regarding A33 models, "B1" indicates bank 1, "B2" indicates bank 2.

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

NFEC0002

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER” used along with a seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. The SRS system composition which is available to NISSAN MODEL A33 is as follows:

- For a frontal collision
  The Supplemental Restraint System consists of driver air bag module (located in the center of the steering wheel), front passenger air bag module (located on the instrument panel on passenger side), seat belt pre-tensioners, a diagnosis sensor unit, crash zone sensor, warning lamp, wiring harness and spiral cable.
- For a side collision
  The Supplemental Restraint System consists of front side air bag module (located in the outer side of front seat), satellite sensor, diagnosis sensor unit (one of components of air bags for a frontal collision), wiring harness, warning lamp (one of components of air bags for a frontal collision).

Information necessary to service the system safely is included in the **RS 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 should be performed by an authorized NISSAN 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 RS 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 harness connector.**

Precautions for On Board Diagnostic (OBD) System of Engine and A/T

NFEC0003

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 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 EL-7, “HARNESS CONNECTOR (SLIDE-LOCKING TYPE)”.**
- **Be sure to route and secure the harnesses properly after work. The interference of the harness with a bracket, etc. may cause the MIL 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 MIL to light up due to the malfunction of the EVAP system or fuel injection system, etc.**
- **Be sure to erase the unnecessary malfunction information (repairs completed) from the ECM or TCM (Transmission control module) before returning the vehicle to the customer.**

Engine Fuel & Emission Control System

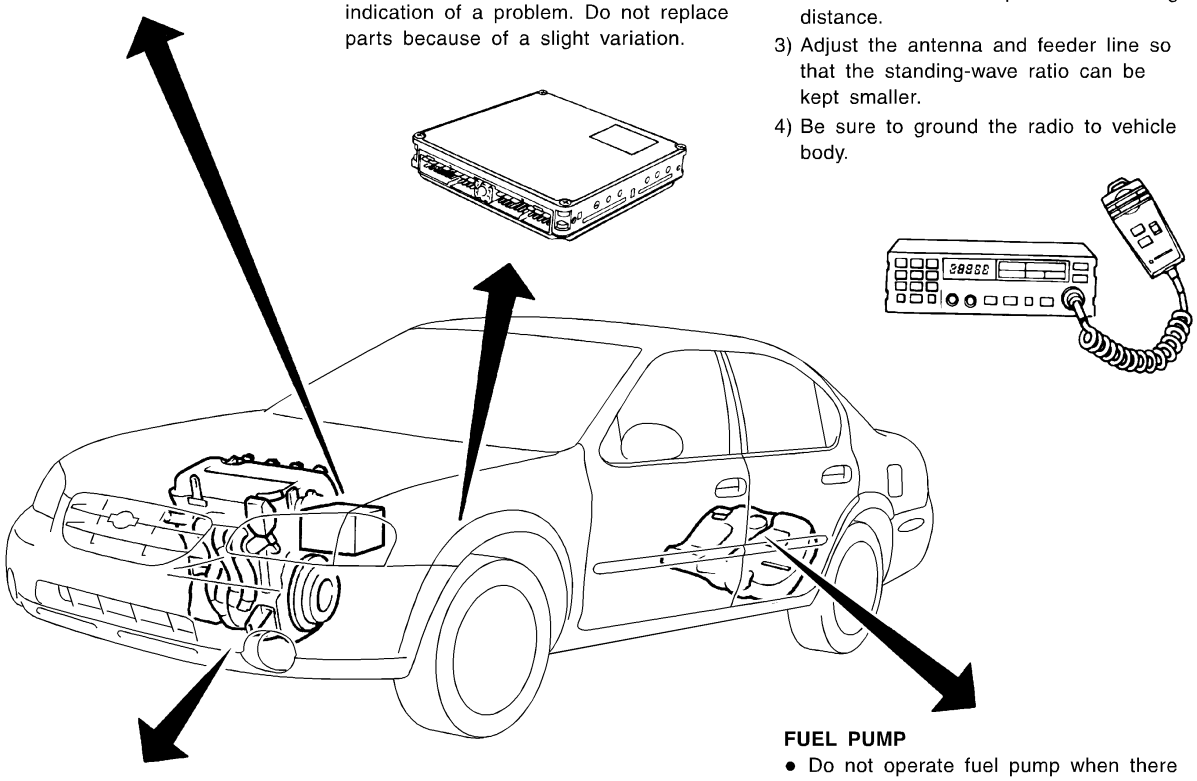
NFEC0004

BATTERY
- Always use a 12 volt battery as power source.
- Do not attempt to disconnect battery cables while engine is running.

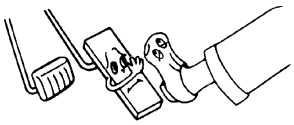
ECM
- Do not disassemble ECM.
- Do not turn dignosis mode selector forcibly.
- If a battery terminal is disconnected, the memory will return to the ECM value.
  The ECM will now start to self-control at its initial value. Engine operation can vary slightly when the terminal is disconnected. However, this is not an indication of a problem. Do not replace parts because of a slight variation.

WIRELESS EQUIPMENT
- 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 its installation location.

1) Keep the antenna as far away as possible from the ECM.
2) Keep the antenna feeder line more than 20 cm (7.9 in) away from the harness of electronic controls.
   Do not let them run parallel for a long distance.
3) Adjust the antenna and feeder line so that the standing-wave ratio can be kept smaller.
4) Be sure to ground the radio to vehicle body.



ENGINE CONTROL PARTS HANDLING
- Handle mass air flow sensor carefully to avoid damage.
- Do not disassemble mass air flow sensor.
- Do not clean mass air flow sensor with any type of detergent.
- Even a slight leak in the air intake system can cause serious problems.
- Do not shock or jar the camshaft position sensor or crankshaft position sensor.



WHEN STARTING
- 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.

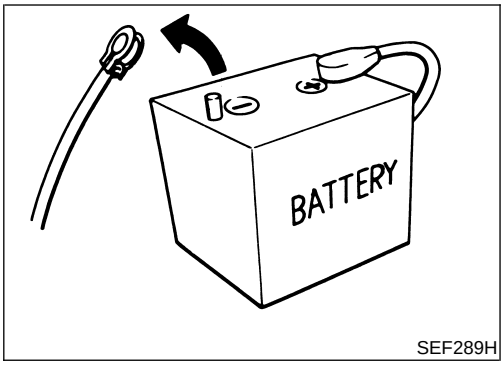
FUEL PUMP
- Do not operate fuel pump when there is no fuel in lines.
- Tighten fuel hose clamps to the specified torque.

ECM HARNESS HANDLING
- 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 (3.9 in) away from adjacent harnesses to prevent an engine control system malfunction due to receiving external noise, degraded operation of ICs, etc.
- Keep engine control system parts and harnesses dry.
- Before removing parts, turn off ignition switch and then disconnect battery ground cable.

SEF242XD

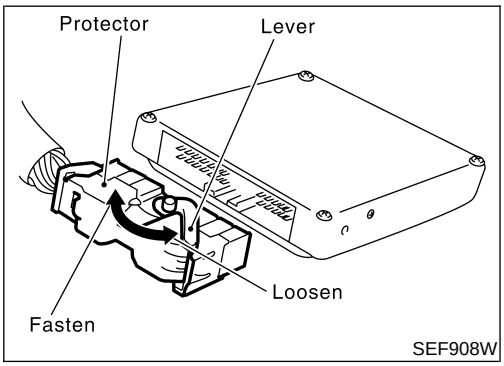
Precautions

NFEC0005



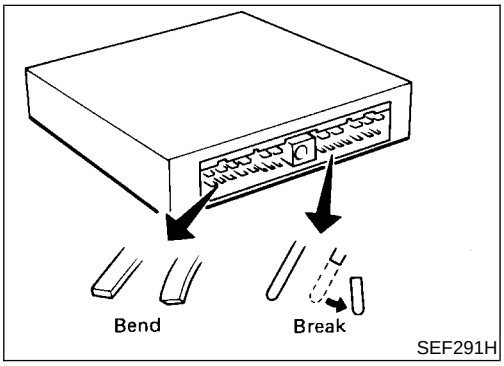
SEF289H

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



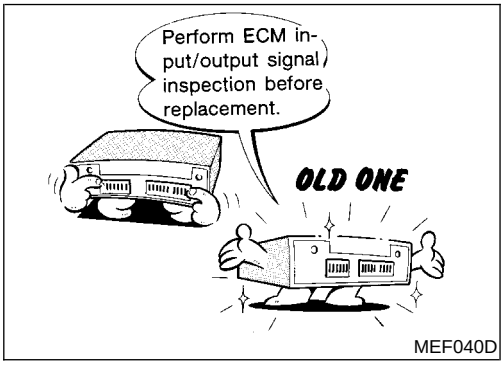
SEF908W

- **When connecting ECM harness connector, fasten it securely with a lever as far as it will go as shown at left.**



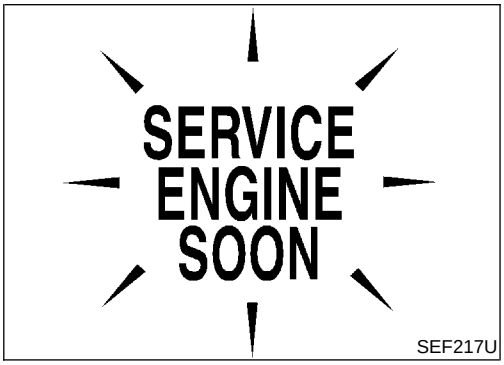
SEF291H

- **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.



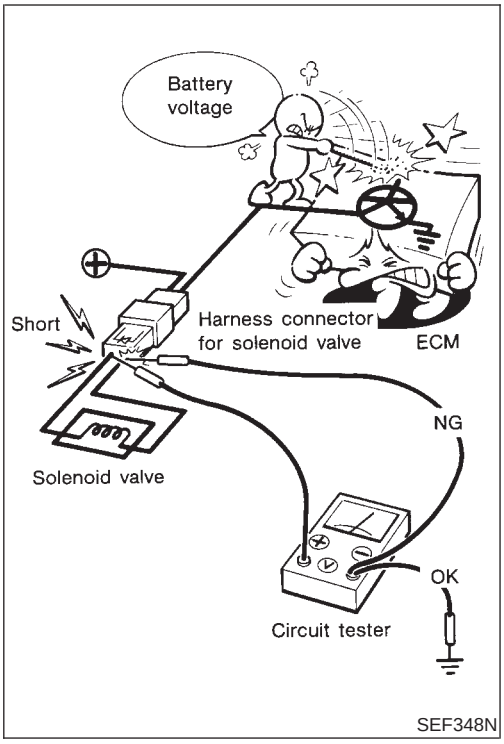
MEF040D

- **Before replacing ECM, perform "ECM Terminals and Reference Value" inspection and make sure ECM functions properly. Refer to EC-141.**

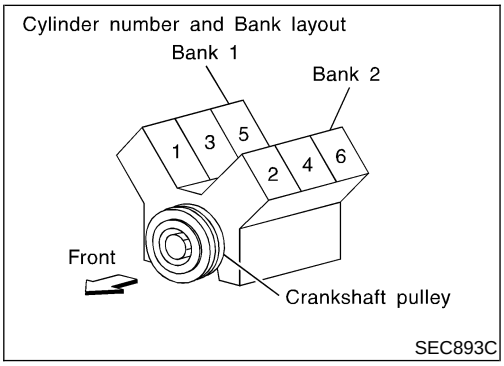


SEF217U

- **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, 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 the ECM terminals, such as the ground.**



- **Regarding model A33, "B1" indicates the bank 1 and "B2" indicates the bank 2 as shown in the figure.**
- **Bank 1 includes No. 1 cylinder.**

Wiring Diagrams and Trouble Diagnosis

NFEC0006

When you read Wiring diagrams, refer to the following:

- GI-11, "HOW TO READ WIRING DIAGRAMS"
- EL-10, "POWER SUPPLY ROUTING" for power distribution circuit

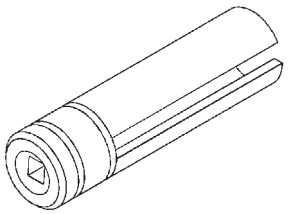
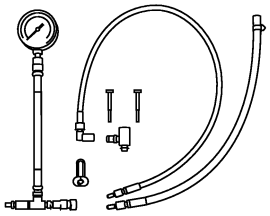
When you perform trouble diagnosis, refer to the following:

- GI-24, "HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES"
- GI-21, "HOW TO PERFORM EFFICIENT DIAGNOSIS FOR AN ELECTRICAL INCIDENT"

Special Service Tools

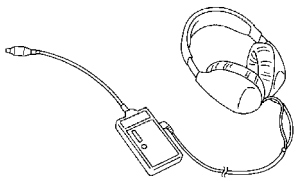
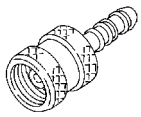
NFEC1417

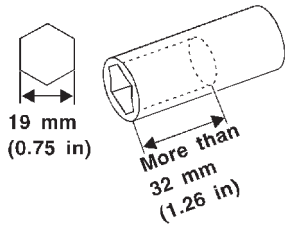
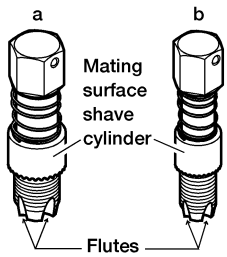
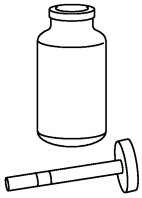
The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
KV10117100 (J36471-A) Heated oxygen sensor wrench	 NT379 — Loosening or tightening heated oxygen sensors with 22 mm (0.87 in) hexagon nut
(J44321) Fuel pressure adapter and gauge kit	 SEF326Z — Checking fuel pressure with pressure gauge

Commercial Service Tools

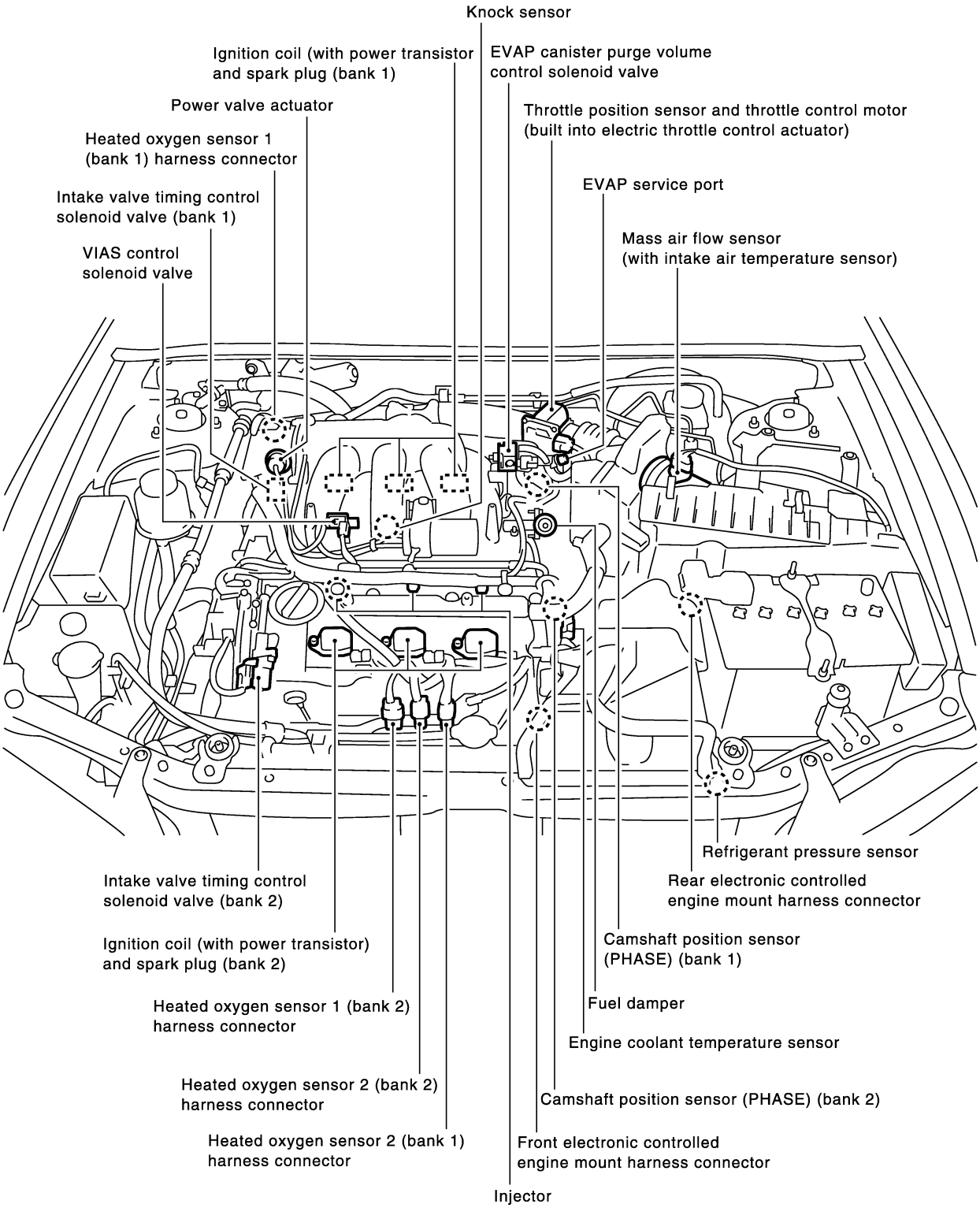
NFEC1418

Tool name (Kent-Moore No.)	Description
Leak detector ie: (J41416)	 NT703 — Locating the EVAP leak
EVAP service port adapter ie: (J41413-OBD)	 NT704 — Applying positive pressure through EVAP service port
Fuel filler cap adapter ie: (MLR-8382)	NT815 — Checking fuel tank vacuum relief valve opening pressure

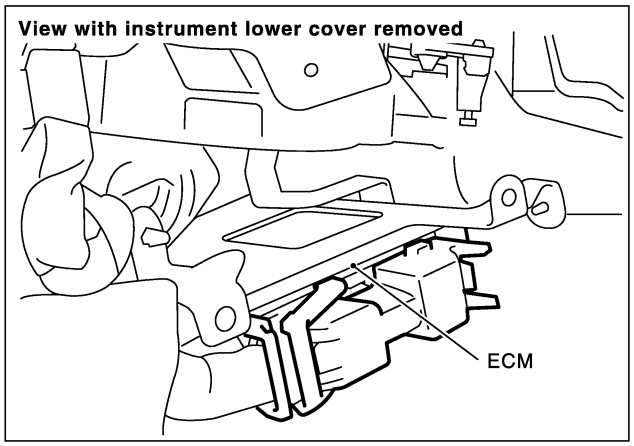
Tool name (Kent-Moore No.)	Description	
Socket wrench	 NT705	Removing and installing engine coolant temperature sensor
Oxygen sensor thread cleaner ie: (J-43897-18) (J-43897-12)	 AEM488	Reconditioning the exhaust system threads before installing a new oxygen sensor. Use with anti-seize lubricant shown below. **a: J-43897-18 18 mm diameter with pitch 1.5 mm, for Zirconia Oxygen Sensor** **b: J-43897-12 12 mm diameter with pitch 1.25 mm, for Titania Oxygen Sensor**
Anti-seize lubricant ie: (Permatex™ 133AR or equivalent meeting MIL specification MIL-A-907)	 NT779	Lubricating oxygen sensor thread cleaning tool when reconditioning exhaust system threads.

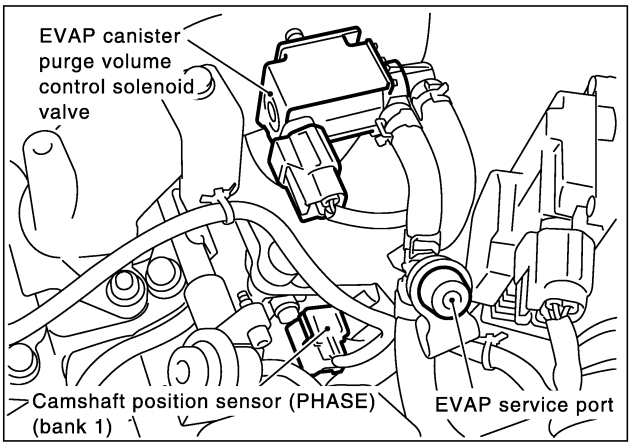
Engine Control Component Parts Location

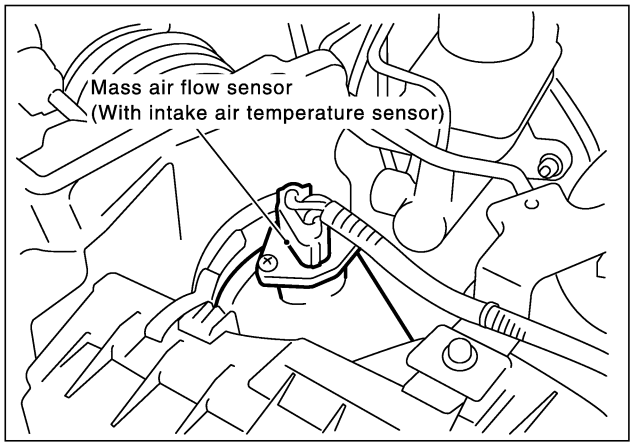
NFEC1419

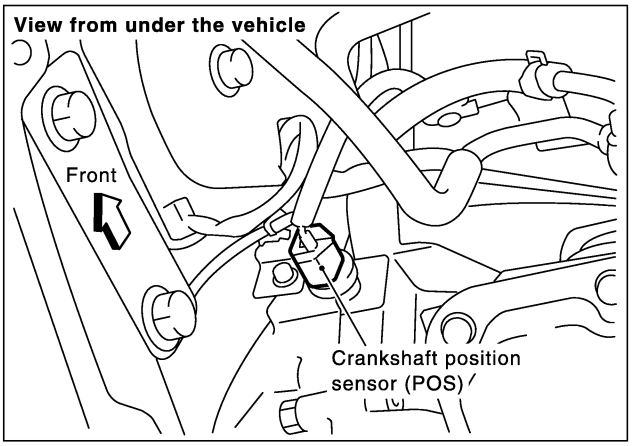


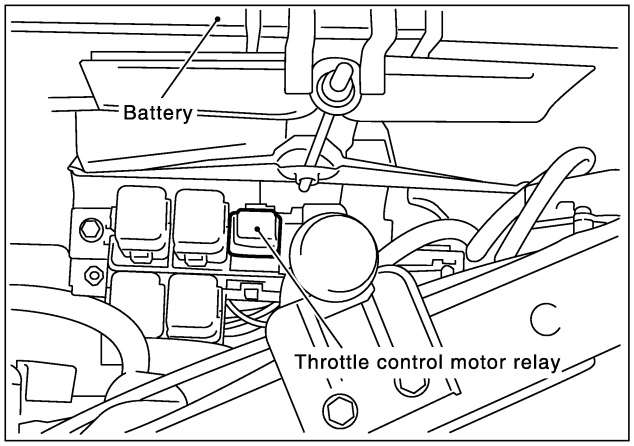
SEC993CA

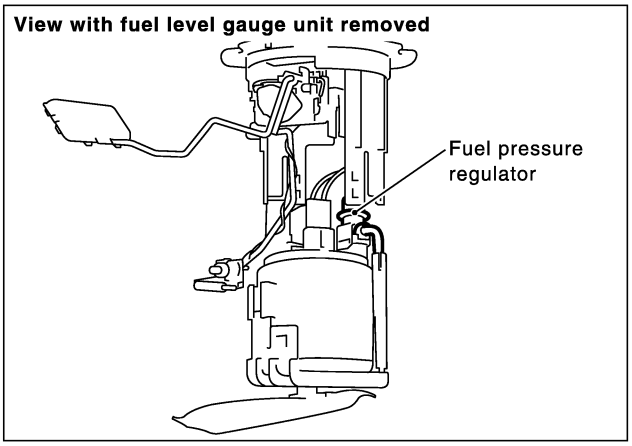

View with instrument lower cover removed
ECM


EVAP canister purge volume control solenoid valve
Camshaft position sensor (PHASE) (bank 1)
EVAP service port

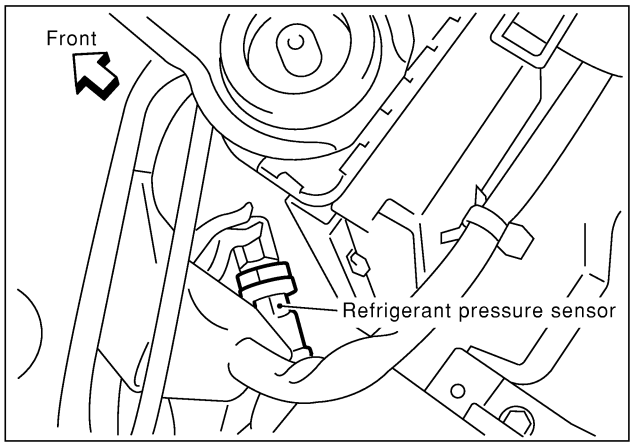

Mass air flow sensor (With intake air temperature sensor)

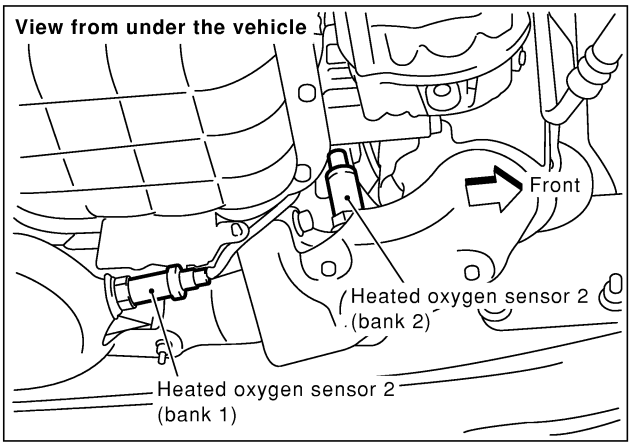

View from under the vehicle
Front
Crankshaft position sensor (POS)

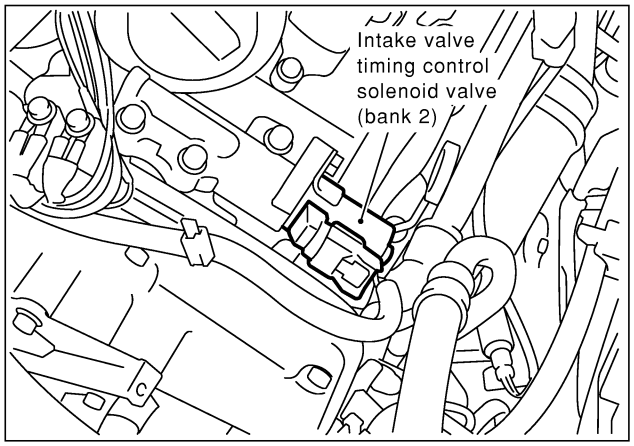

Battery
Throttle control motor relay

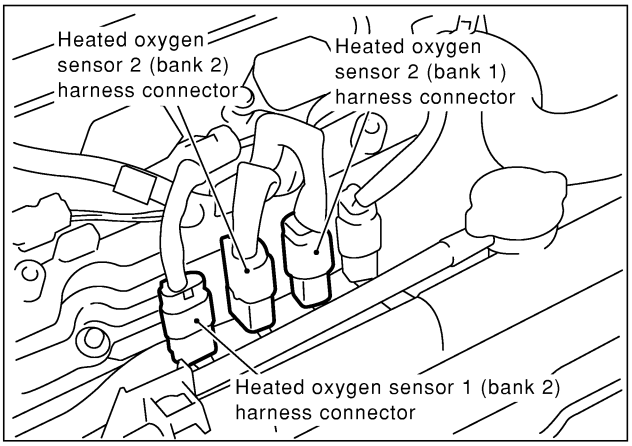

View with fuel level gauge unit removed
Fuel pressure regulator

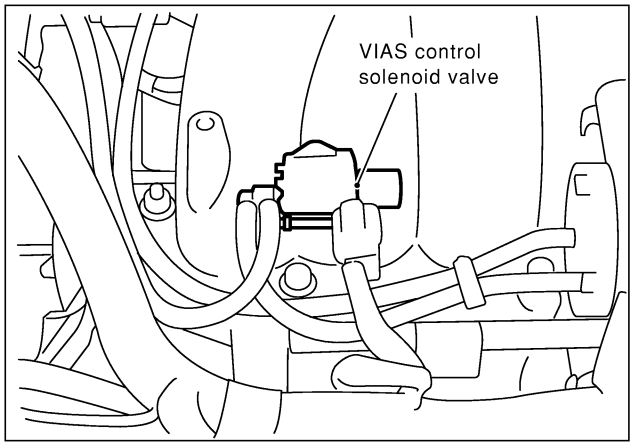
SEC994C

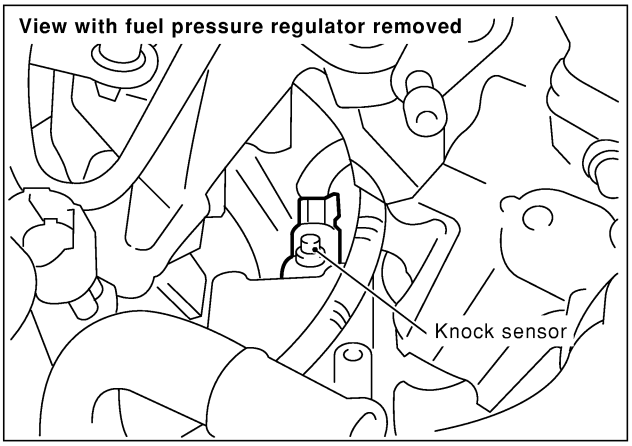

Front
Refrigerant pressure sensor


View from under the vehicle
Front
Heated oxygen sensor 2
(bank 2)
Heated oxygen sensor 2
(bank 1)

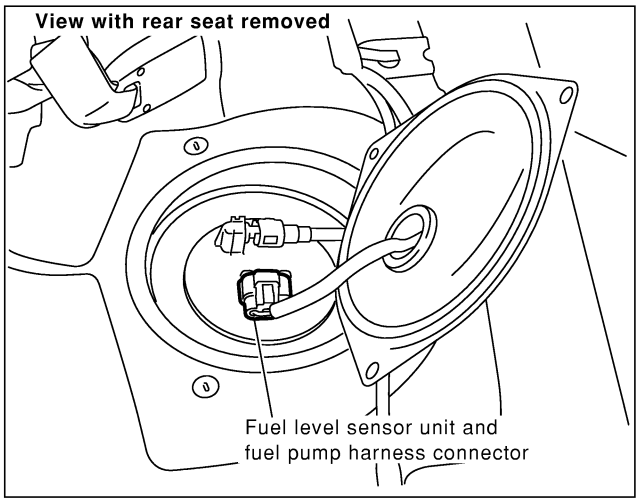

Intake valve
timing control
solenoid valve
(bank 2)

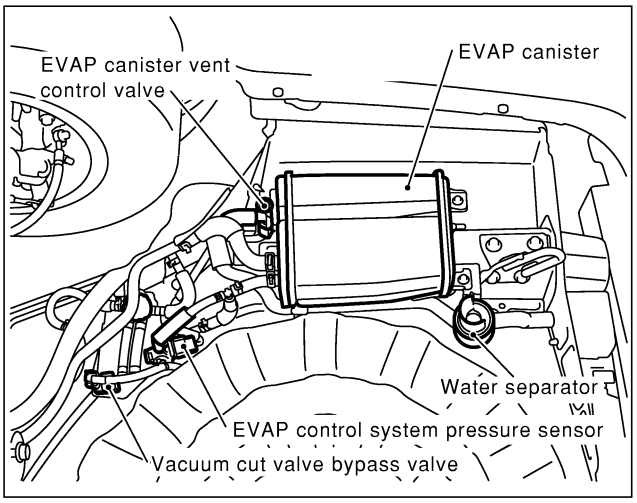

Heated oxygen
sensor 2 (bank 2)
harness connector
Heated oxygen
sensor 2 (bank 1)
harness connector
Heated oxygen sensor 1 (bank 2)
harness connector

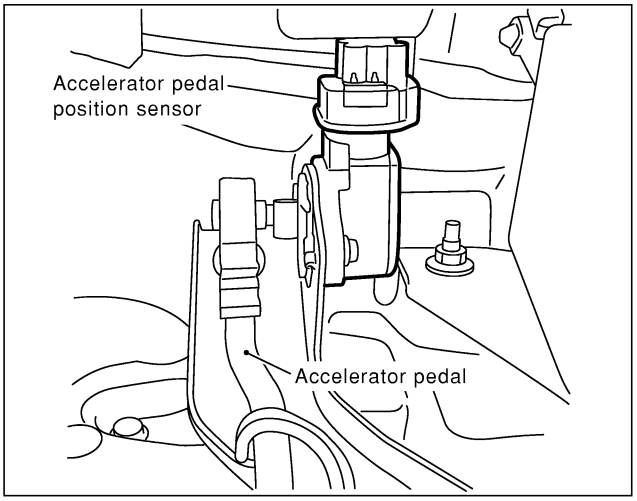

VIAS control
solenoid valve

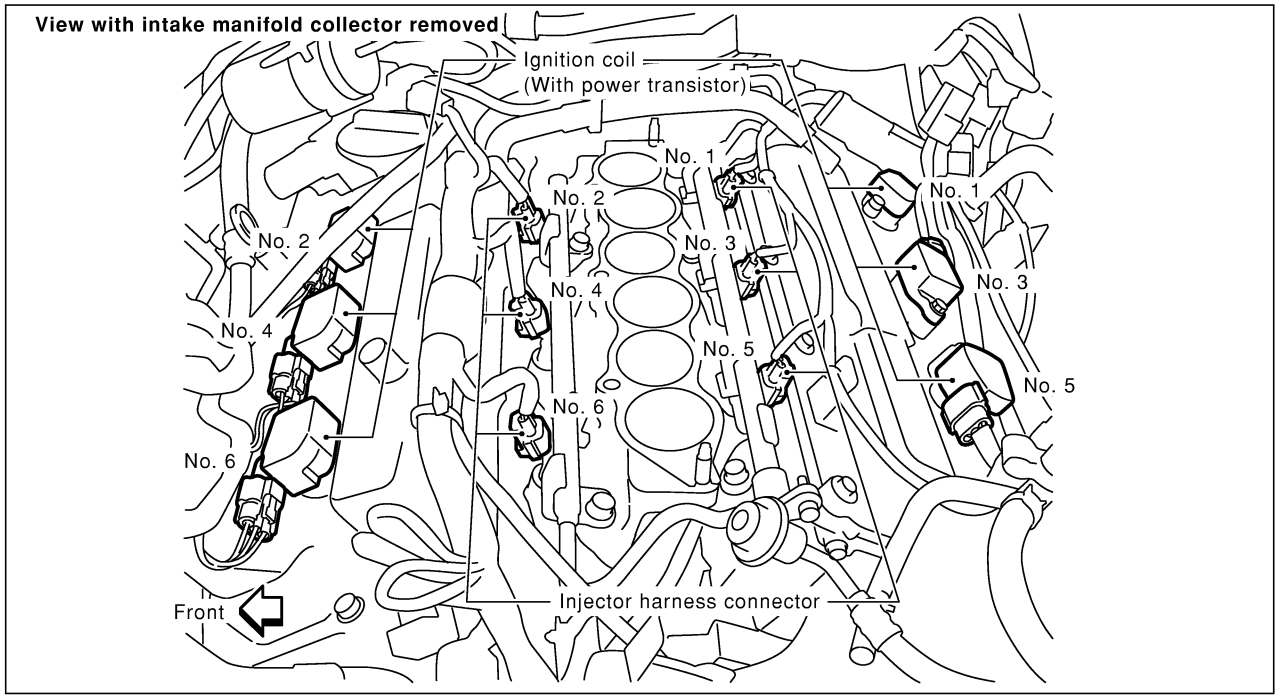

View with fuel pressure regulator removed
Knock sensor

SEC995C


View with rear seat removed
Fuel level sensor unit and
fuel pump harness connector


EVAP canister vent
control valve
EVAP canister
Water separator
EVAP control system pressure sensor
Vacuum cut valve bypass valve

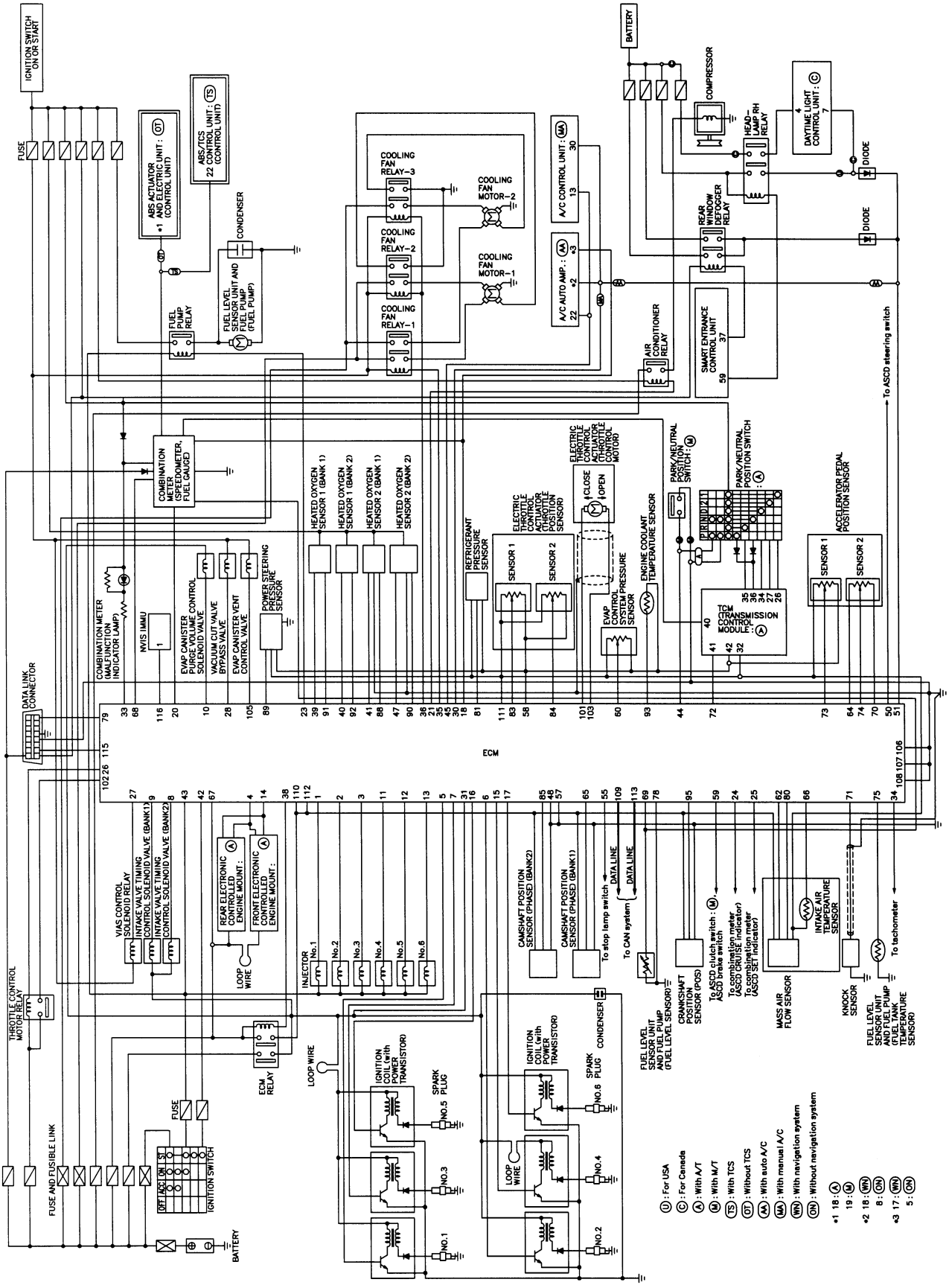

Accelerator pedal
position sensor
Accelerator pedal


View with intake manifold collector removed
Ignition coil
(With power transistor)
No. 1
No. 2
No. 3
No. 4
No. 5
No. 6
Front
Injector harness connector

SEC996C

Circuit Diagram

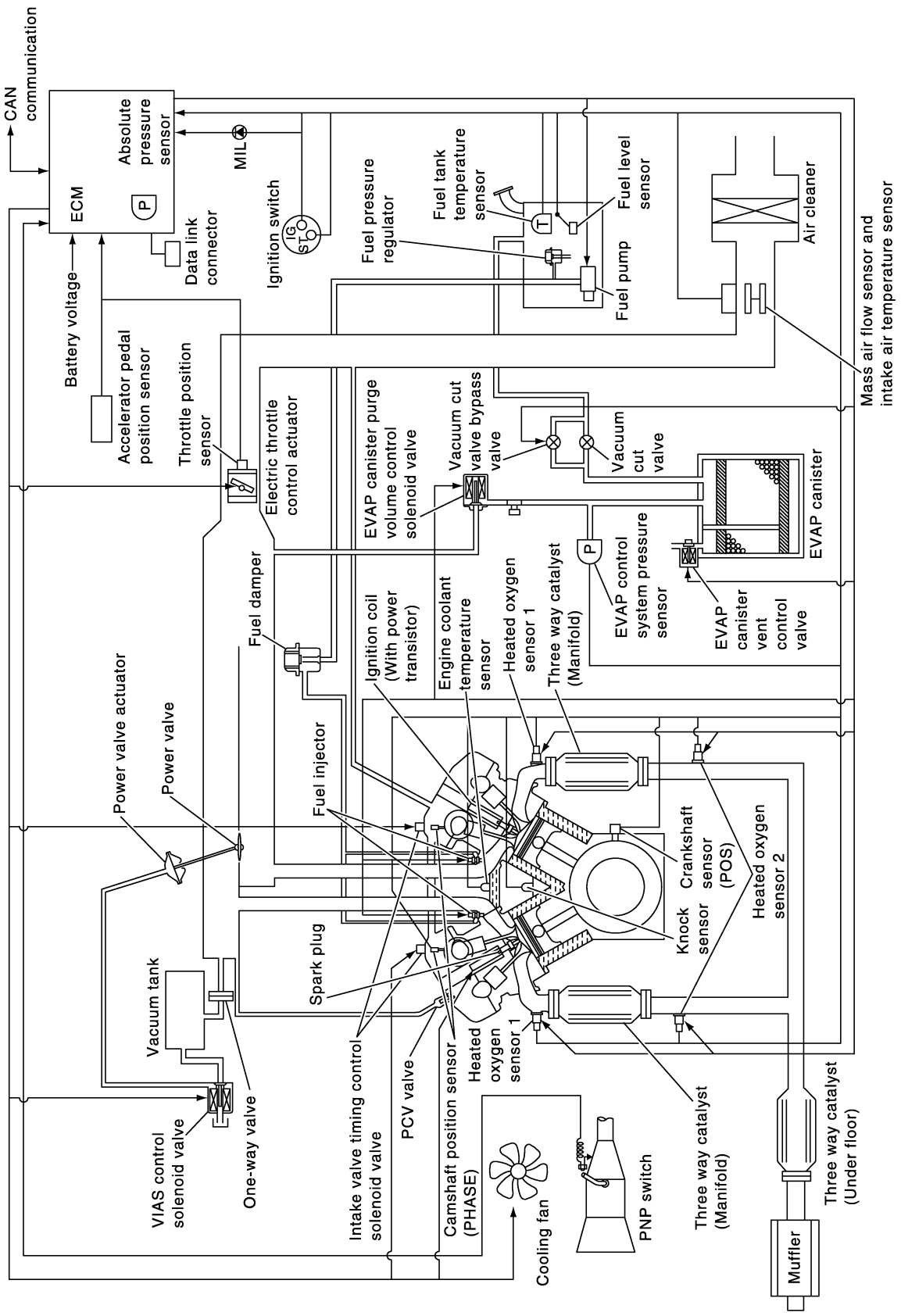
NFEC0010



MEC920D

System Diagram

NFEC0011

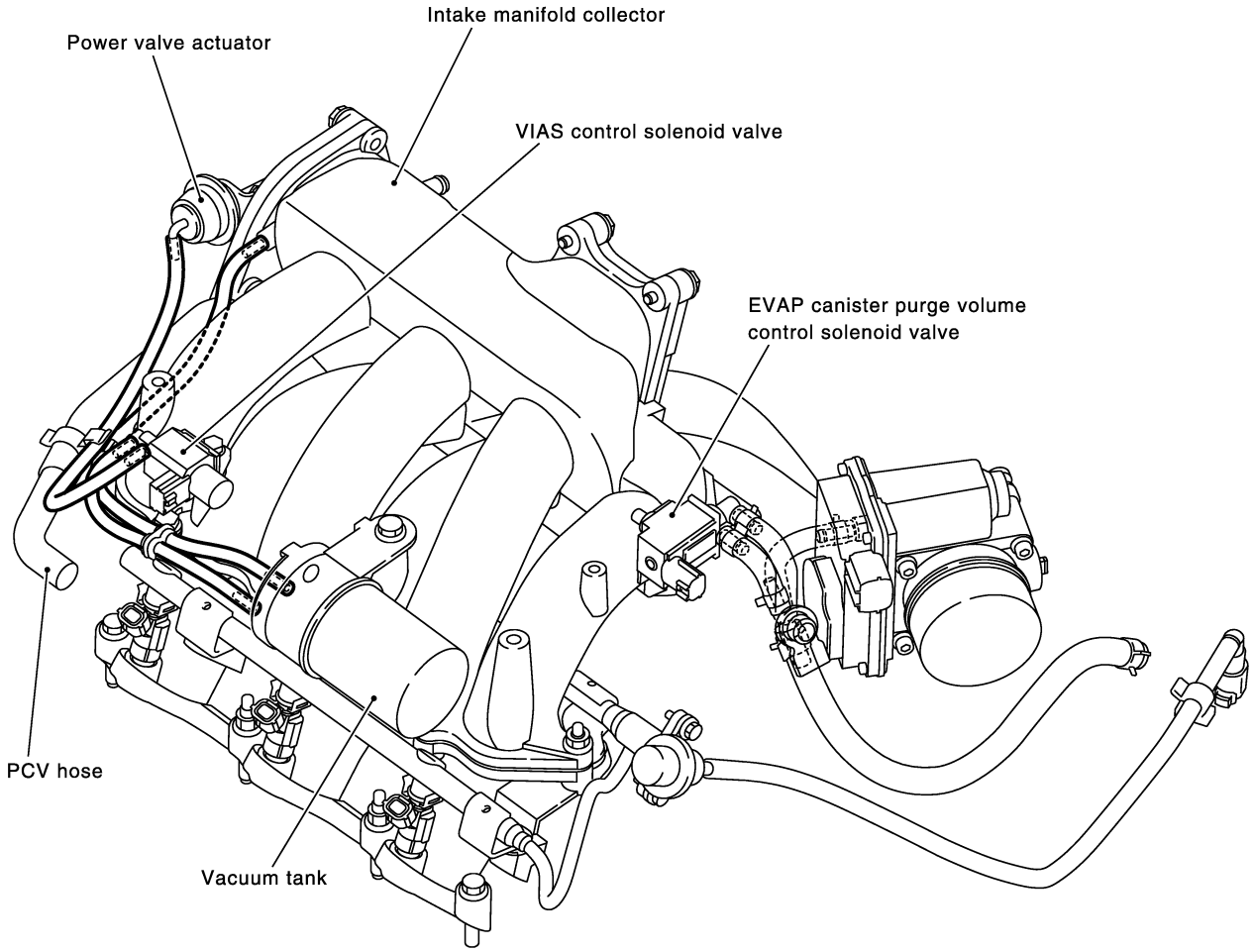


SEC894C

Vacuum Hose Drawing

NFEC1420

Refer to “System Diagram”, EC-29 for Vacuum control system.



NOTE:
Do not use soapy water or any type of solvent while installing vacuum hose or purge hose.

SEC895CA

System Chart

NFEC0013

Input (Sensor)	ECM Function	Output (Actuator)
• Camshaft position sensor (PHASE) • Mass air flow sensor • Engine coolant temperature sensor • Heated oxygen sensor 1 • Ignition switch • Throttle position sensor • Accelerator pedal position sensor • Park/neutral position (PNP) switch • Air conditioner switch • Knock sensor • Intake air temperature sensor • Absolute pressure sensor • EVAP control system pressure sensor*1 • Battery voltage • Power steering pressure sensor • Vehicle speed (From combination meter) • Fuel tank temperature sensor*1 • Crankshaft position sensor (POS) • Heated oxygen sensor 2*2 • TCM (Transmission control module)*3 • Refrigerant pressure sensor • Electrical load • Fuel level sensor*1 • ASCD steering switch • ASCD brake switch • ASCD clutch switch (MT models) • Stop lamp switch	Fuel injection & mixture ratio control	Injectors
	Electronic ignition system	Power transistor
	Fuel pump control	Fuel pump relay
	On board diagnostic system	MIL (On the instrument panel)
	ASCD vehicle speed control	Electric throttle control actuator
	Cooling fan control	Cooling fan relays
	Power valve control	VIAS control solenoid valve
	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
	ON BOARD DIAGNOSIS for EVAP system	• EVAP canister vent control valve • Vacuum cut valve bypass valve

*1: These sensors are not used to control the engine system. They are used only for the on board diagnosis.
*2: This sensor is not used to control the engine system under normal conditions.
*3: The signals are sent to the ECM through CAN communication line.

Multiport Fuel Injection (MFI) System

DESCRIPTION

NFEC0014

Input/Output Signal Chart

NFEC0014S01

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed Piston position	Fuel injection & mixture ratio control	Injectors
Camshaft position sensor (PHASE)			
Mass air flow 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		
Vehicle speed (From combination meter)	Vehicle speed		
Ignition switch	Start signal		
Air conditioner switch	Air conditioner operation		
Knock sensor	Engine knocking condition		
Battery	Battery voltage		
Absolute pressure sensor	Ambient air barometric pressure		
Power steering pressure sensor	Power steering operation		
Heated oxygen sensor 2*	Density of oxygen in exhaust gas		

*: Under normal conditions, this sensor is not for engine control operation.

Basic Multiport Fuel Injection System

NFEC0014S02

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) from both the crankshaft position sensor and the mass air flow sensor.

Various Fuel Injection Increase/Decrease Compensation

NFEC0014S03

In addition, the amount of fuel injected is compensated to improve engine performance under various operating conditions as listed below.

<Fuel increase>

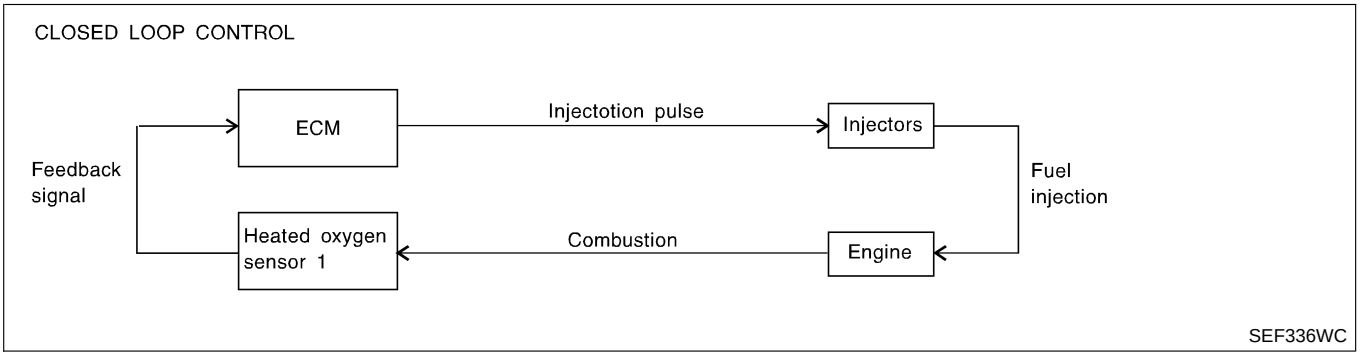
- During warm-up
- When starting the engine
- During acceleration
- Hot-engine operation
- When selector lever is changed from “N” to “D”
- High-load, high-speed operation

<Fuel decrease>

- During deceleration
- During high engine speed operation

Mixture Ratio Feedback Control (Closed loop control)

NFEC0014S04



The mixture ratio feedback system provides the best air-fuel mixture ratio for driveability and emission control. The warm-up three way catalyst can then better reduce CO, HC and NOx emissions. This system uses a heated oxygen sensor 1 in the exhaust manifold to monitor if the engine operation is rich or lean. The ECM adjusts the injection pulse width according to the sensor voltage signal. For more information about the heated oxygen sensor 1, refer to EC-240. 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 warm-up three way catalyst. Even if the switching characteristics of the heated oxygen sensor 1 shift, the air-fuel ratio is controlled to stoichiometric by the signal from the heated oxygen sensor 2.

Open Loop Control

NFEC0014S05

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"
- When starting the engine

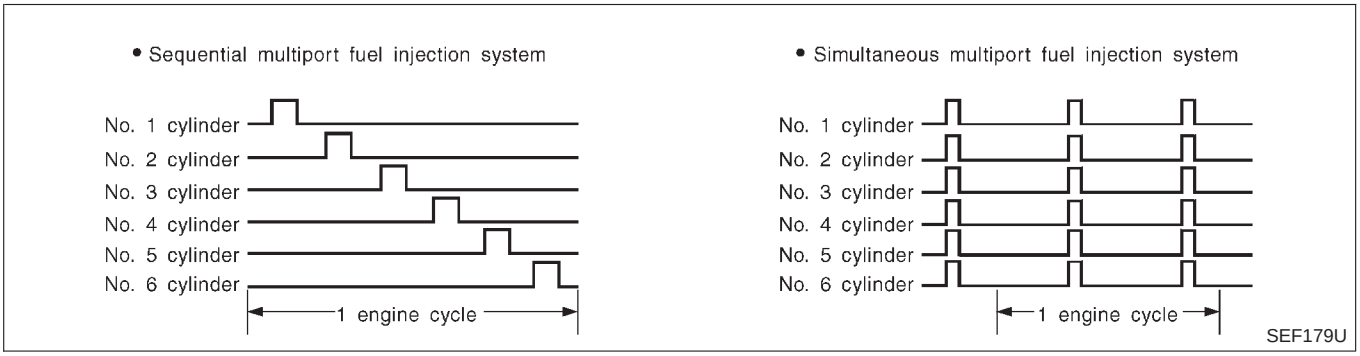
Mixture Ratio Self-learning Control

NFEC0014S06

The mixture ratio feedback control system monitors the mixture ratio signal transmitted from the 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 originally designed. Both manufacturing differences (i.e., mass air flow sensor hot wire) 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 the 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

NFEC0014S07



Two types of systems are used.

Sequential Multiport Fuel Injection System

NFEC0014S0701

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

NFEC0014S0702

Fuel is injected simultaneously into all six cylinders twice each engine cycle. In other words, pulse signals of the same width are simultaneously transmitted from the ECM.
The six 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

NFEC0014S08

Fuel to each cylinder is cut off during deceleration or operation of the engine at excessively high speeds.

Electronic Ignition (EI) System

DESCRIPTION

NFEC0015

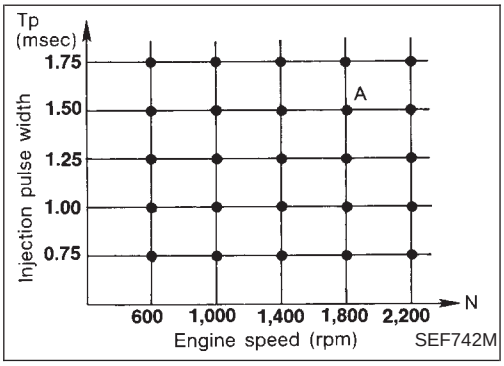
Input/Output Signal Chart

NFEC0015S01

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed	Ignition timing control	Power transistor
Camshaft position sensor (PHASE)	Piston position		
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Vehicle speed (From combination meter)	Vehicle speed		
Ignition switch	Start signal		
Knock sensor	Engine knocking		
Park/neutral position (PNP) switch	Gear position		
Battery	Battery voltage		

System Description

NFEC0015S02



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

DESCRIPTION

NFEC0016

Input/Output Signal Chart

NFEC0016S01

Sensor	Input Signal to ECM	ECM function	Actuator
Air conditioner switch	Air conditioner "ON" signal	Air conditioner cut control	Air conditioner relay
Throttle position sensor	Throttle valve opening angle		
Crankshaft position sensor (POS)	Engine speed		
Engine coolant temperature sensor	Engine coolant temperature		
Ignition switch	Start signal		
Vehicle speed (From combination meter)	Vehicle speed		
Refrigerant pressure sensor	Refrigerant pressure		
Power steering pressure sensor	Power steering operation		

System Description

NFEC0016S02

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 operating power steering during low engine speed or low vehicle speed.

- When engine speed is excessively low.
- When refrigerant pressure is excessively low or high.

Fuel Cut Control (at no load & high engine speed)

DESCRIPTION

Input/Output Signal Chart

NFEC0017

NFEC0017S01

Sensor	Input Signal to ECM	ECM function	Actuator
Vehicle speed (From combination meter)	Vehicle speed	Fuel cut control	Injectors
Park/neutral position (PNP) switch	Neutral position		
Throttle position sensor	Throttle position		
Engine coolant temperature sensor	Engine coolant temperature		
Crankshaft position sensor (POS)	Engine speed		

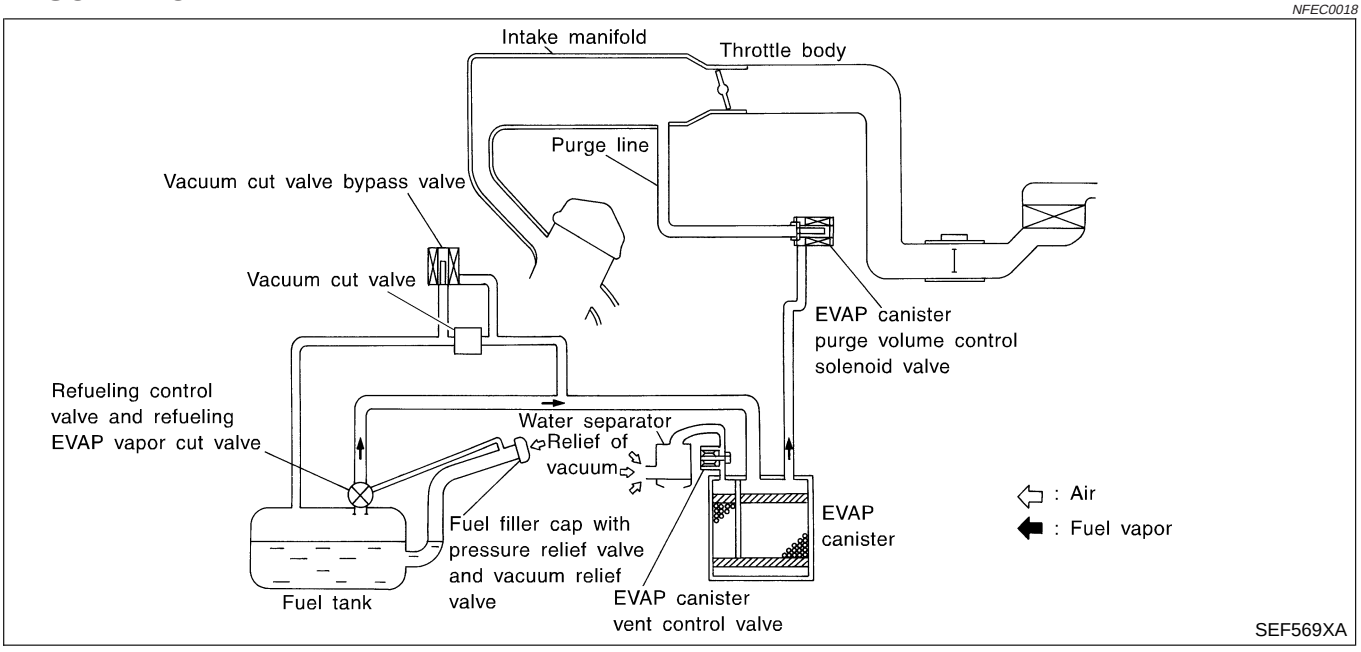
If the engine speed is above 1,800 rpm with no load (for example, in neutral and engine speed over 1,800 rpm) fuel will be cut off after some time. The exact time when the fuel is cut off varies based on engine speed. Fuel cut will operate until the engine speed reaches 1,500 rpm, then fuel cut is cancelled.

NOTE:
This function is different from deceleration control listed under "Multiport Fuel Injection (MFI) System", EC-32.

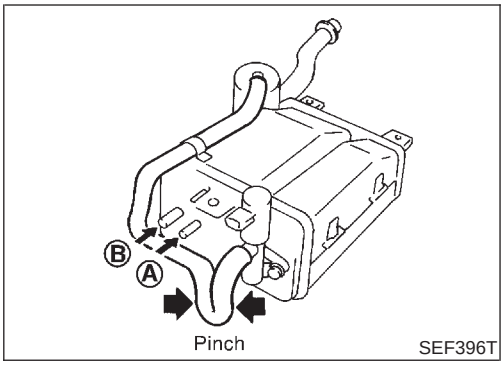
Evaporative Emission System

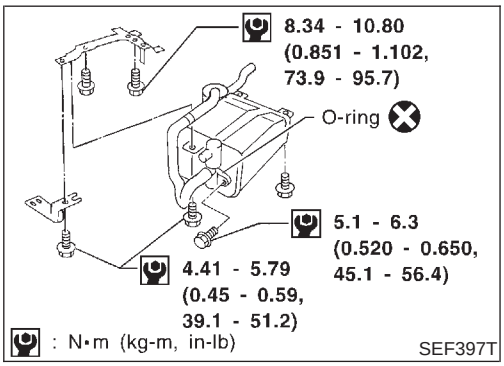
DESCRIPTION

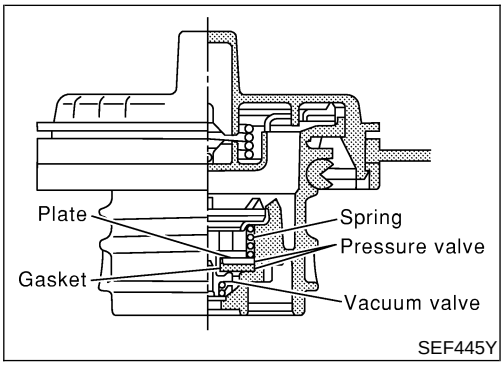
NFEC0018

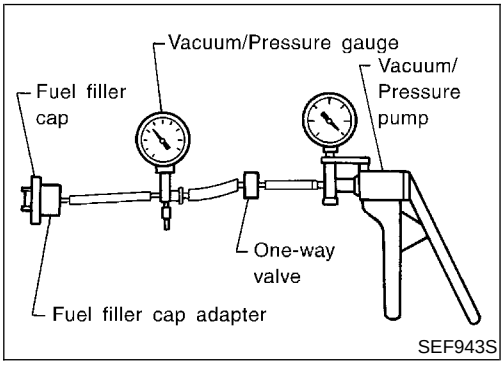


The evaporative emission system is used to reduce hydrocarbons emitted into the atmosphere from the fuel system. This reduction of hydrocarbons is accomplished by activated charcoals in the EVAP canister.
The fuel vapor in the sealed fuel tank is led into the EVAP canister which contains activated carbon 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.









INSPECTION

NFEC0019

EVAP Canister

NFEC0019S01

Check EVAP canister as follows:

1. Pinch the fresh air hose.
2. Blow air into port **A** and check that it flows freely out of port **B**.

Tightening Torque

NFEC0019S02

Tighten EVAP canister as shown in the figure.

Make sure new O-ring is installed properly between EVAP canister and EVAP canister vent control valve.

Fuel Tank Vacuum Relief Valve (Built into fuel filler cap)

NFEC0019S03

1. Wipe clean valve housing.
2. Check valve opening pressure and vacuum.

Pressure:

15.3 - 20.0 kPa (0.156 - 0.204 kg/cm^2, 2.22 - 2.90 psi)

Vacuum:

−6.0 to −3.3 kPa (−0.061 to −0.034 kg/cm^2, −0.87 to −0.48 psi)

3. If out of specification, replace fuel filler cap as an assembly.

CAUTION:

Use only a genuine fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.

Vacuum Cut Valve and Vacuum Cut Valve Bypass Valve

NFEC0019S04

Refer to EC-628.

EVAP Canister Purge Volume Control Solenoid Valve

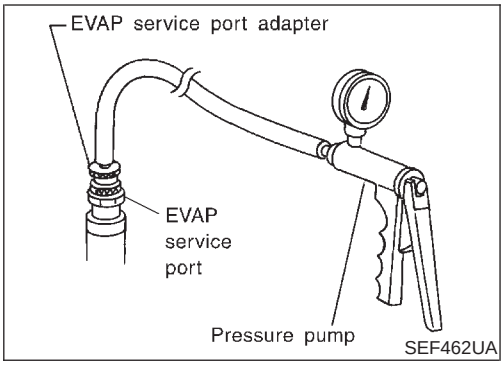
NFEC0019S05

Refer to EC-376.

Fuel Tank Temperature Sensor

NFEC0019S06

Refer to EC-285.

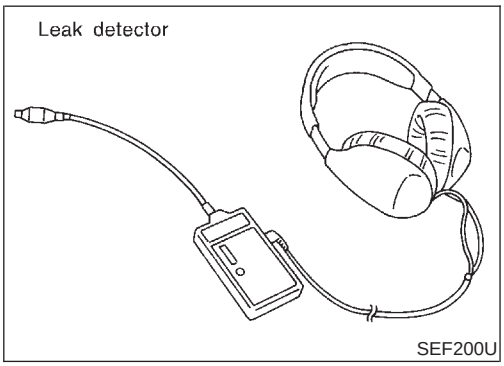


SEF462UA

Evap Service Port

NFEC0019S07

Positive pressure is delivered to the EVAP system through the EVAP service port. If fuel vapor leakage in the EVAP system occurs, use a leak detector to locate the leak.



SEF200U

How to Detect Fuel Vapor Leakage

NFEC0019S08

CAUTION:

- **Never use compressed air or a high pressure pump.**
- **Do not exceed 4.12 kPa (0.042 kg/cm^2, 0.6 psi) of pressure in EVAP system.**

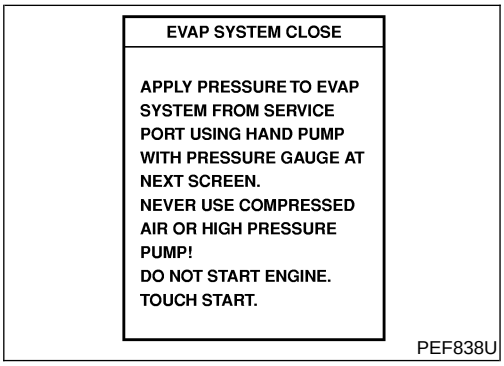
NOTE:

- Do not start engine.
- Improper installation of EVAP service port adapter to the EVAP service port may cause a leak.

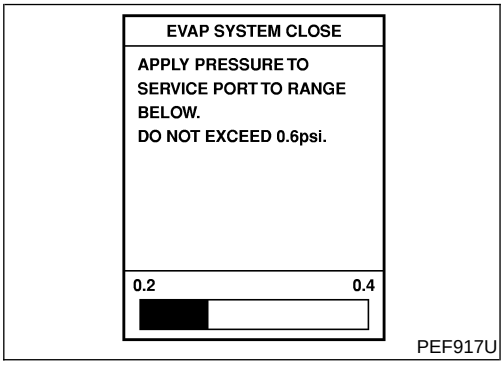
With CONSULT-II

NFEC0019S0801

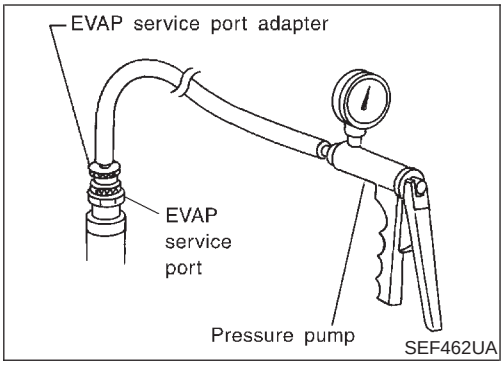
1) Attach the EVAP service port adapter securely to the EVAP service port.
2) Also attach the pressure pump and hose to the EVAP service port adapter.
3) Turn ignition switch "ON".
4) Select the "EVAP SYSTEM CLOSE" of "WORK SUPPORT MODE" with CONSULT-II.
5) Touch "START". A bar graph (Pressure indicating display) will appear on the screen.
6) Apply positive pressure to the EVAP system until the pressure indicator reaches the middle of the bar graph.
7) Remove EVAP service port adapter and hose with pressure pump.
8) Locate the leak using a leak detector. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-40.

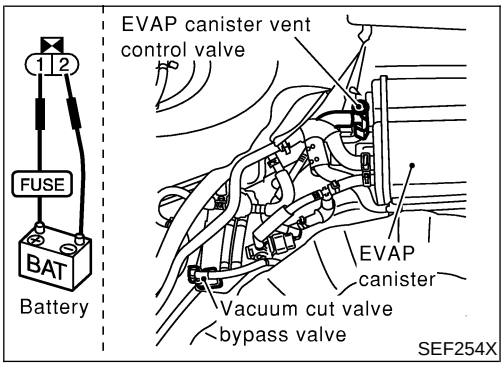


PEF838U



PEF917U





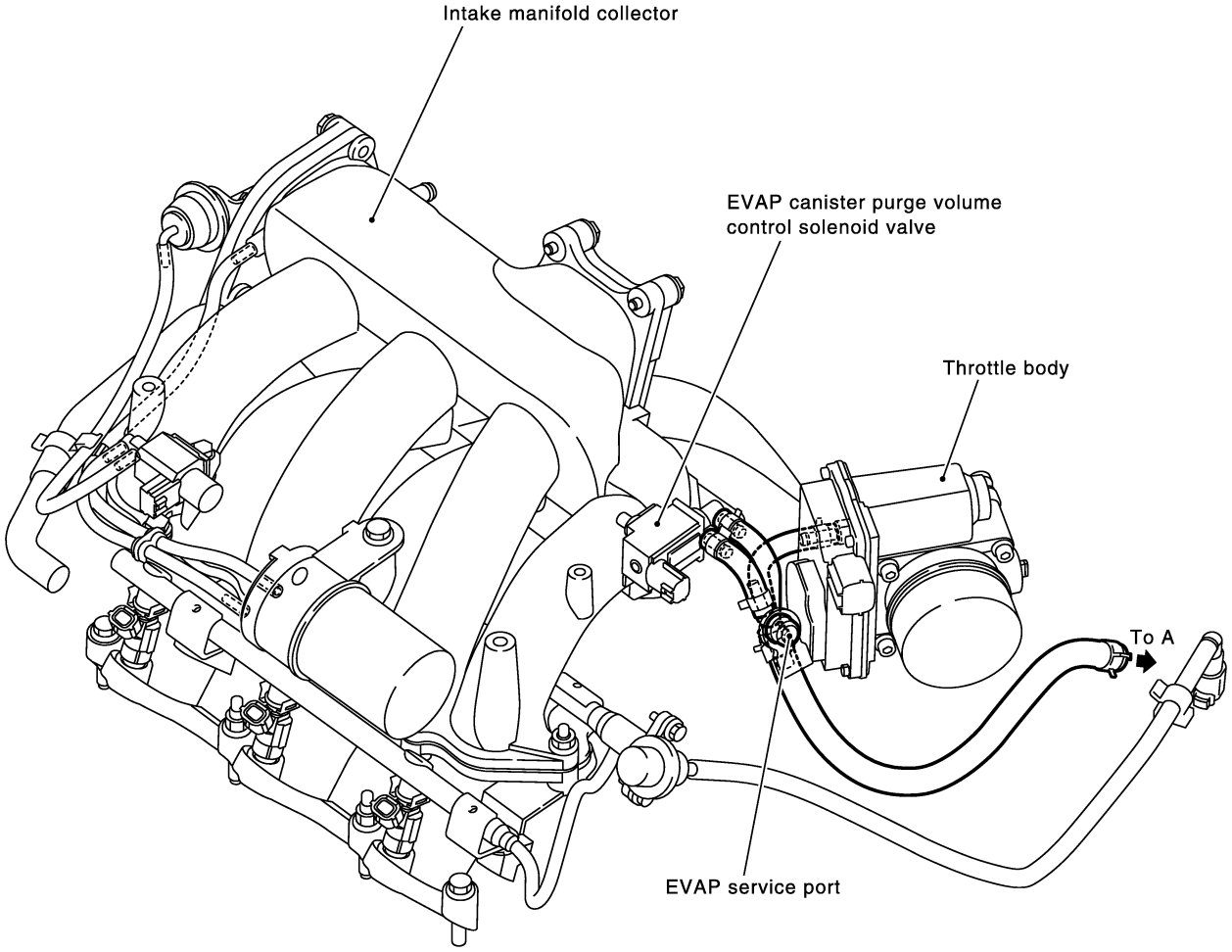
Without CONSULT-II

NFEC0019S0802

1) Attach the EVAP service port adapter securely to the EVAP service port.
2) Also attach the pressure pump with pressure gauge to the EVAP service port adapter.
3) Apply battery voltage to between the terminals of both EVAP canister vent control valve and vacuum cut valve bypass valve to make a closed EVAP system.
4) To locate the leak, deliver positive pressure to the EVAP system until pressure gauge points reach 1.38 to 2.76 kPa (0.014 to 0.028 kg/cm^2, 0.2 to 0.4 psi).
5) Remove EVAP service port adapter and hose with pressure pump.
6) Locate the leak using a leak detector. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-40.

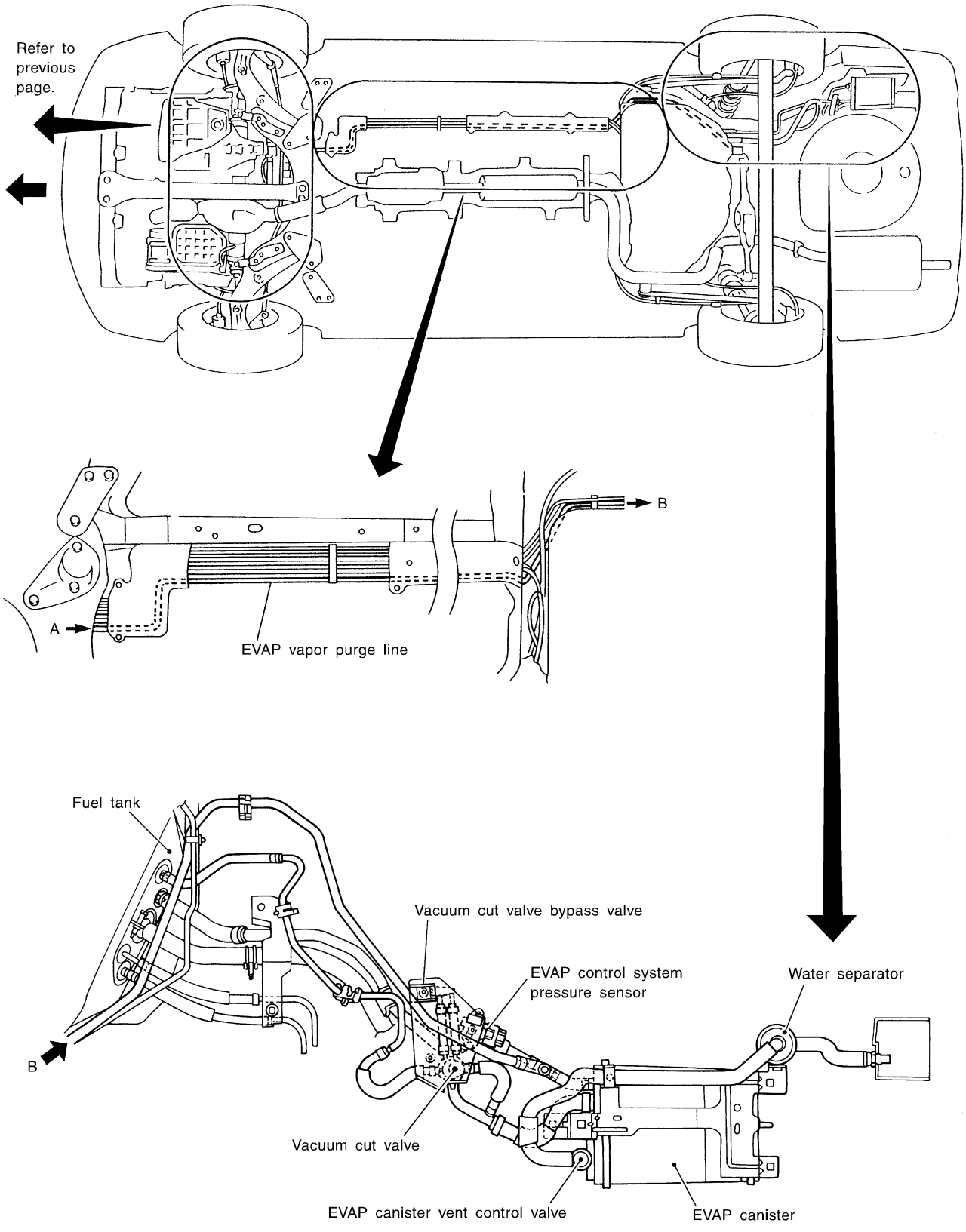
EVAPORATIVE EMISSION LINE DRAWING

NFEC1421



NOTE:
Do not use soapy water or any type of solvent while installing vacuum hose or purge hose.

SEC896CA


Refer to previous page.
A
B
EVAP vapor purge line
Fuel tank
B
Vacuum cut valve bypass valve
EVAP control system pressure sensor
Water separator
Vacuum cut valve
EVAP canister vent control valve
EVAP canister

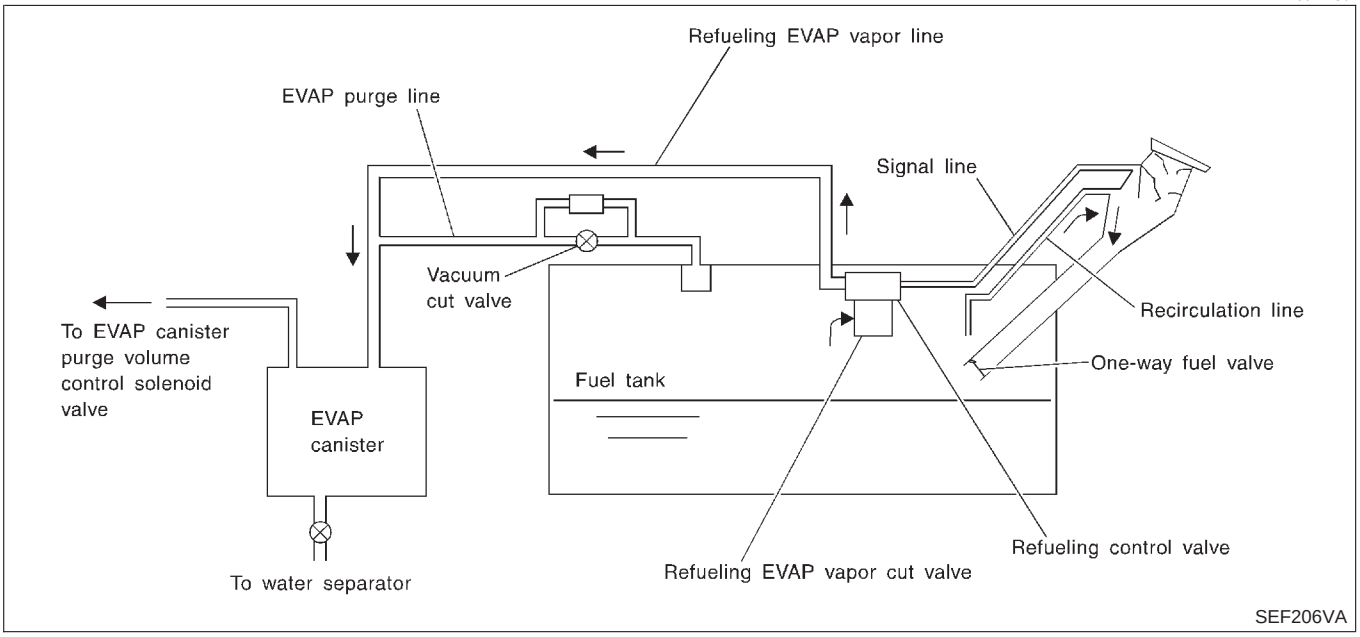
SEF253XA

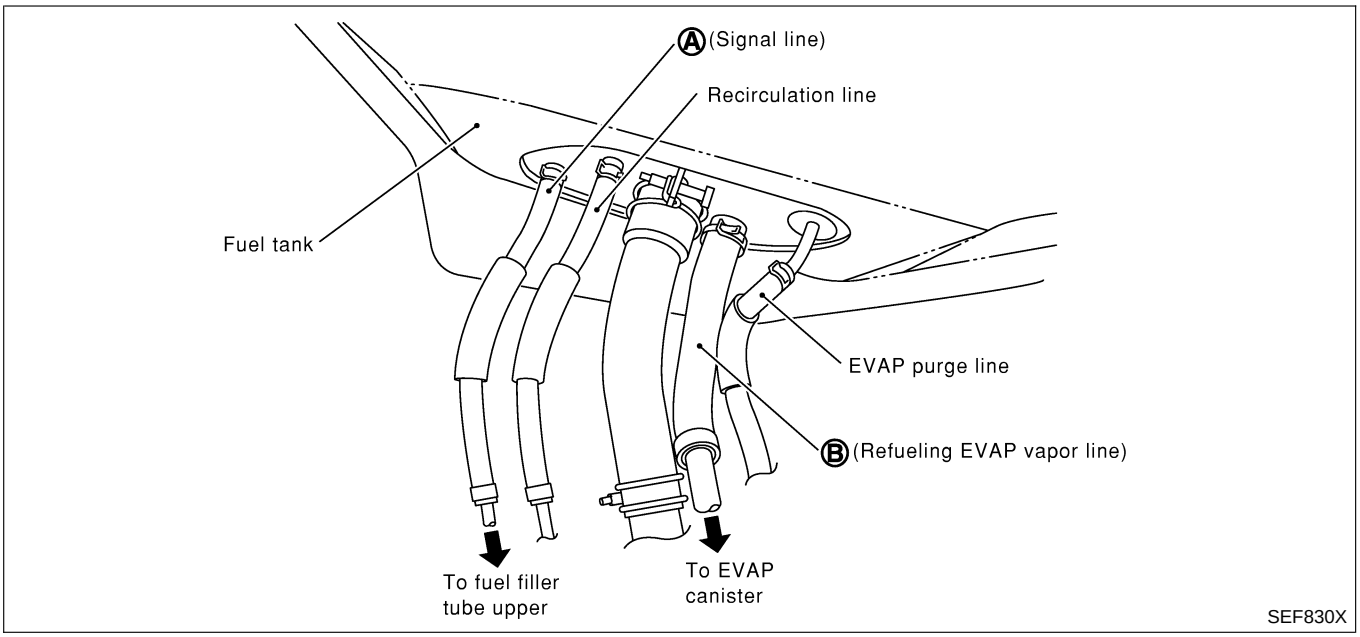
On Board Refueling Vapor Recovery (ORVR)

NFEC0744

SYSTEM DESCRIPTION

NFEC0744S01





From the beginning of refueling, the fuel tank pressure goes up. When the pressure reaches the setting value of the refueling control valve (RCV) opening pressure, the RCV is opened. After RCV opens, the air and vapor inside the fuel tank go through refueling EVAP vapor cut valve, RCV and refueling vapor line to the EVAP canister. The vapor is absorbed by the EVAP canister and the air is released to the atmosphere.
When the refueling has reached the full level of the fuel tank, the refueling EVAP vapor cut valve is closed and refueling is stopped because of auto shut-off. The vapor which was absorbed by the EVAP canister is purged during driving.
The RCV is always closed during driving and the evaporative emission control system is operated the same as conventional system.

WARNING:

When conducting inspections below, be sure to observe the following:

- **Put a “CAUTION: INFLAMMABLE” sign in workshop.**
- **Do not smoke while servicing fuel system. Keep open flames and sparks away from work area.**
- **Be sure to furnish the workshop with a CO_2 fire extinguisher.**

CAUTION:

- **Before removing fuel line parts, carry out the following procedures:**

a) Put drained fuel in an explosion-proof container and put lid on securely.
b) Release fuel pressure from fuel line. Refer to "Fuel Pressure Release", EC-56.
c) Disconnect battery ground cable.

- **Always replace O-ring when the fuel gauge retainer is removed.**
- **Do not kink or twist hose and tube when they are installed.**
- **Do not tighten hose and clamps excessively to avoid damaging hoses.**
- **After installation, run engine and check for fuel leaks at connection.**
- **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.**

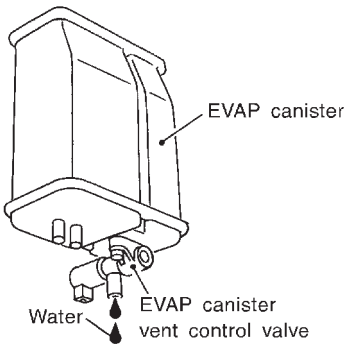
DIAGNOSTIC PROCEDURE

NFEC0744S02

Symptom: Fuel Odor from EVAP Canister Is Strong.

NFEC0744S0201

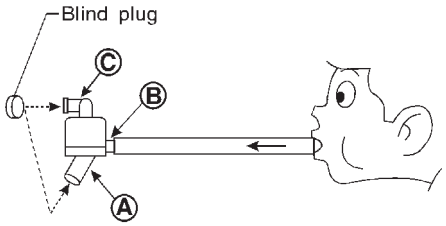
1	CHECK EVAP CANISTER
1. Remove EVAP canister with EVAP canister vent control valve attached. 2. Weigh the EVAP canister with EVAP canister vent control valve attached. The weight should be less than 1.8 kg (4.0 lb).	
OK or NG	
OK ▶	GO TO 2.
NG ▶	GO TO 3.

2	CHECK IF EVAP CANISTER SATURATED WITH WATER
Does water drain from the EVAP canister?	
 SEF596U	
Yes or No	
Yes ▶	GO TO 3.
No (With CONSULT-II) ▶	GO TO 6.
No (Without CONSULT-II) ▶	GO TO 7.

3	REPLACE EVAP CANISTER
Replace EVAP canister with a new one.	
▶	GO TO 4.

4	CHECK WATER SEPARATOR

1. Check visually for insect nests in the water separator air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.
4. Check that **A** and **C** are not clogged by blowing air into **B** with **A**, and then **C** plugged.



* Ⓐ: Bottom hole (To atmosphere)
Ⓑ: Emergency tube (From EVAP canister)
Ⓒ: Inlet port (To member)

SEF829T

5. In case of NG in items 2 - 4, replace the parts.

NOTE:
- Do not disassemble water separator.

OK or NG

OK	▶	GO TO 5.
NG	▶	Replace water separator.

5	DETECT MALFUNCTIONING PART

Check the EVAP hose between EVAP canister and water separator for clogging or poor connection.

	▶	Repair or replace EVAP hose.

6	CHECK REFUELING EVAP VAPOR CUT VALVE

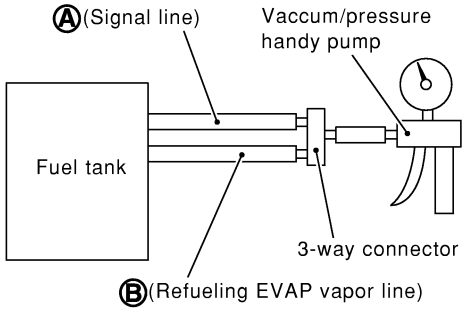
With CONSULT-II

1. Remove fuel tank. Refer to FE-4, "FUEL SYSTEM".
2. Drain fuel from the tank as follows:

a. Remove fuel feed hose located on the fuel gauge retainer.
b. Connect a spare fuel hose, one side to fuel gauge retainer where the hose was removed and the other side to a fuel container.
c. Drain fuel using "FUEL PUMP RELAY" in "ACTIVE TEST" mode with CONSULT-II.

3. Check refueling EVAP vapor cut valve for being stuck to close as follows.
   Blow air into the refueling EVAP vapor cut valve (from hose end B), and check that the air flows freely into the tank.
4. Check EVAP vapor cut valve for being stuck to open as follows.

a. Connect vacuum pump to hose ends A and B using a suitable 3-way connector.
b. Remove fuel gauge retainer with fuel gauge unit.
   Always replace O-ring with new one.
c. Put fuel tank upside down.
d. Apply vacuum pressure to both hose ends A and B [−13.3 kPa (−100 mmHg, −3.94 inHg)] with fuel gauge retainer remaining open and check that the pressure is applicable.



SEF968X

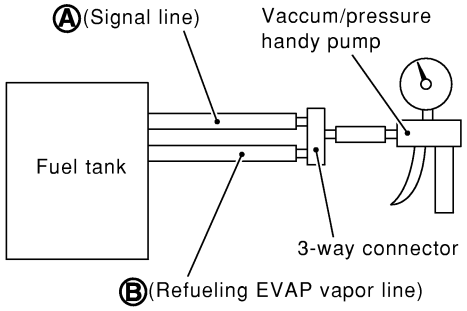
OK or NG

OK	▶	GO TO 8.
NG	▶	Replace refueling EVAP vapor cut valve with fuel tank.

7	CHECK REFUELING EVAP VAPOR CUT VALVE

Without CONSULT-II

1. Remove fuel tank. Refer to FE-4, "FUEL SYSTEM".
2. Drain fuel from the tank as follows:
a. Remove fuel gauge retainer.
b. Drain fuel from the tank using a hand pump into a fuel container.
3. Check refueling EVAP vapor cut valve for being stuck to close as follows.
   Blow air into the refueling EVAP vapor cut valve (from hose end B), and check that the air flows freely into the tank.
4. Check EVAP vapor cut valve for being stuck to open as follows.
a. Connect vacuum pump to hose ends A and B using a suitable 3-way connector.
b. Remove fuel gauge retainer with fuel gauge unit.
   Always replace O-ring with new one.
c. Put fuel tank upside down.
d. Apply vacuum pressure to both hose ends A and B [−13.3 kPa (−100 mmHg, −3.94 inHg)] with fuel gauge retainer remaining open and check that the pressure is applicable.



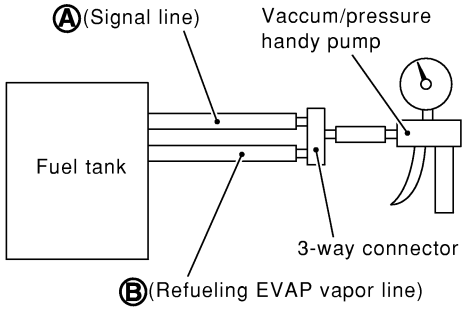
SEF968X

OK or NG

OK	▶	GO TO 8.
NG	▶	Replace refueling EVAP vapor cut valve with fuel tank.

8	CHECK REFUELING CONTROL VALVE

1. Remove fuel filler cap.
2. Check air continuity between hose ends A and B.
   Blow air into the hose end B. Air should flow freely into the fuel tank.
3. Blow air into hose end A and check there is no leakage.
4. Apply pressure to both hose ends A and B [20 kPa (150 mmHg, 5.91 inHg)] using a pressure pump and a suitable 3-way connector. Check that there is no leakage.



SEF968X

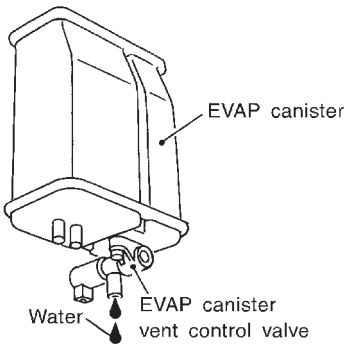
OK or NG

OK	▶	**INSPECTION END**
NG	▶	Replace refueling control valve with fuel tank.

Symptom: Cannot Refuel/Fuel Odor From The Fuel Filler Opening Is Strong While Refueling.

NFEC0744S0202

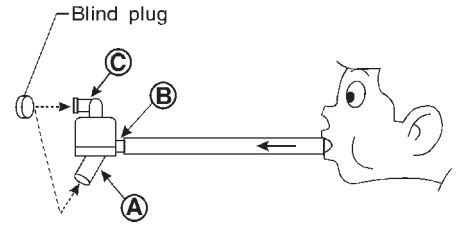
1	CHECK EVAP CANISTER	
1. Remove EVAP canister with EVAP canister vent control valve attached. 2. Weigh the EVAP canister with EVAP canister vent control valve attached. The weight should be less than 1.8 kg (4.0 lb).		
OK or NG		
OK	▶	GO TO 2.
NG	▶	GO TO 3.

2	CHECK IF EVAP CANISTER SATURATED WITH WATER	
Does water drain from the EVAP canister?  SEF596U		
Yes or No		
Yes	▶	GO TO 3.
No	▶	GO TO 6.

3	REPLACE EVAP CANISTER	
Replace EVAP canister with a new one.		
	▶	GO TO 4.

4	CHECK WATER SEPARATOR

1. Check visually for insect nests in the water separator air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.
4. Check that **A** and **C** are not clogged by blowing air into **B** with **A**, and then **C** plugged.



* Ⓐ: Bottom hole (To atmosphere)
Ⓑ: Emergency tube (From EVAP canister)
Ⓒ: Inlet port (To member)

SEF829T

5. In case of NG in items 2 - 4, replace the parts.

NOTE:
- Do not disassemble water separator.

OK or NG

OK	▶	GO TO 5.
NG	▶	Replace water separator.

5	DETECT MALFUNCTIONING PART

Check the EVAP hose between EVAP canister and water separator for clogging or poor connection.

	▶	Repair or replace EVAP hose.

6	CHECK VENT HOSES AND VENT TUBES

Check hoses and tubes between EVAP canister and refueling control valve for clogging, kink, looseness and improper connection.

OK or NG

OK	▶	GO TO 7.
NG	▶	Repair or replace hoses and tubes.

7	CHECK FILLER NECK TUBE

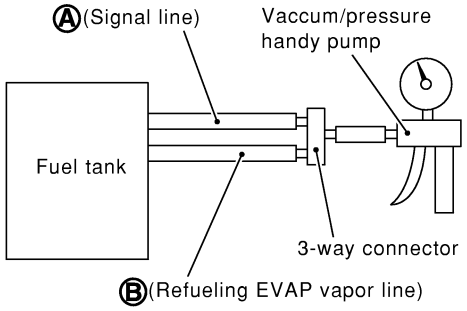
Check signal line and recirculation line for clogging, dents and cracks.

OK or NG

OK	▶	GO TO 8.
NG	▶	Replace filler neck tube.

8	CHECK REFUELING CONTROL VALVE

1. Remove fuel filler cap.
2. Check air continuity between hose ends A and B.
   Blow air into the hose end B. Air should flow freely into the fuel tank.
3. Blow air into hose end A and check there is no leakage.
4. Apply pressure to both hose ends A and B [20 kPa (150 mmHg, 5.91 inHg)] using a pressure pump and a suitable 3-way connector. Check that there is no leakage.



SEF968X

OK or NG

OK (With CONSULT-II)	▶	GO TO 9.
OK (Without CONSULT-II)	▶	GO TO 10.
NG	▶	Replace refueling control valve with fuel tank.

9	CHECK REFUELING EVAP VAPOR CUT VALVE

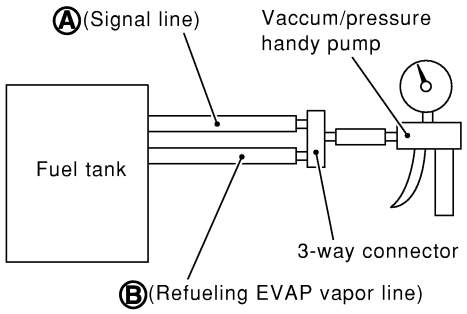
With CONSULT-II

1. Remove fuel tank. Refer to FE-4, "FUEL SYSTEM".
2. Drain fuel from the tank as follows:

a. Remove fuel feed hose located on the fuel gauge retainer.
b. Connect a spare fuel hose, one side to fuel gauge retainer where the hose was removed and the other side to a fuel container.
c. Drain fuel using "FUEL PUMP RELAY" in "ACTIVE TEST" mode with CONSULT-II.

3. Check refueling EVAP vapor cut valve for being stuck to close as follows.
   Blow air into the refueling EVAP vapor cut valve (from hose end B), and check that the air flows freely into the tank.
4. Check EVAP vapor cut valve for being stuck to open as follows.

a. Connect vacuum pump to hose ends A and B using a suitable 3-way connector.
b. Remove fuel gauge retainer with fuel gauge unit.
   Always replace O-ring with new one.
c. Put fuel tank upside down.
d. Apply vacuum pressure to both hose ends A and B [−13.3 kPa (−100 mmHg, −3.94 inHg)] with fuel gauge retainer remaining open and check that the pressure is applicable.



SEF968X

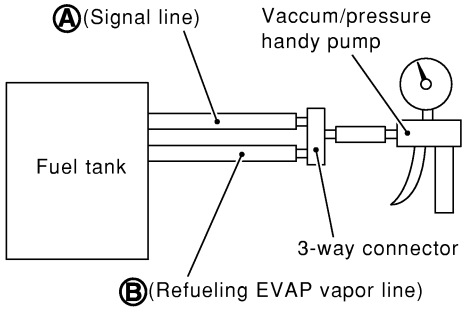
OK or NG

OK	▶	GO TO 11.
NG	▶	Replace refueling EVAP vapor cut valve with fuel tank.

10	CHECK REFUELING EVAP VAPOR CUT VALVE

Without CONSULT-II

1. Remove fuel tank. Refer to FE-4, "FUEL SYSTEM".
2. Drain fuel from the tank as follows:
a. Remove fuel gauge retainer.
b. Drain fuel from the tank using a hand pump into a fuel container.
3. Check refueling EVAP vapor cut valve for being stuck to close as follows.
   Blow air into the refueling EVAP vapor cut valve (from hose end B), and check that the air flows freely into the tank.
4. Check EVAP vapor cut valve for being stuck to open as follows.
a. Connect vacuum pump to hose ends A and B using a suitable 3-way connector.
b. Remove fuel gauge retainer with fuel gauge unit.
   Always replace O-ring with new one.
c. Put fuel tank upside down.
d. Apply vacuum pressure to both hose ends A and B [−13.3 kPa (−100 mmHg, −3.94 inHg)] with fuel gauge retainer remaining open and check that the pressure is applicable.



SEF968X

OK or NG

OK	▶	GO TO 11.
NG	▶	Replace refueling EVAP vapor cut valve with fuel tank.

11	CHECK FUEL FILLER TUBE

Check filler neck tube and hose connected to the fuel tank for clogging, dents and cracks.

OK or NG

OK	▶	GO TO 12.
NG	▶	Replace fuel filler tube.

12	CHECK ONE-WAY FUEL VALVE-I

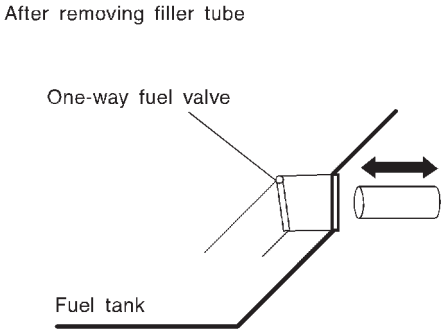
Check one-way valve for clogging.

OK or NG

OK	▶	GO TO 13.
NG	▶	Repair or replace one-way fuel valve with fuel tank.

13	CHECK ONE-WAY FUEL VALVE-II

1. Make sure that fuel is drained from the tank.
2. Remove fuel filler tube and hose.
3. Check one-way fuel valve for operation as follows.
   When a stick is inserted, the valve should open, when removing stick it should close.



SEF665U

Do not drop any material into the tank.

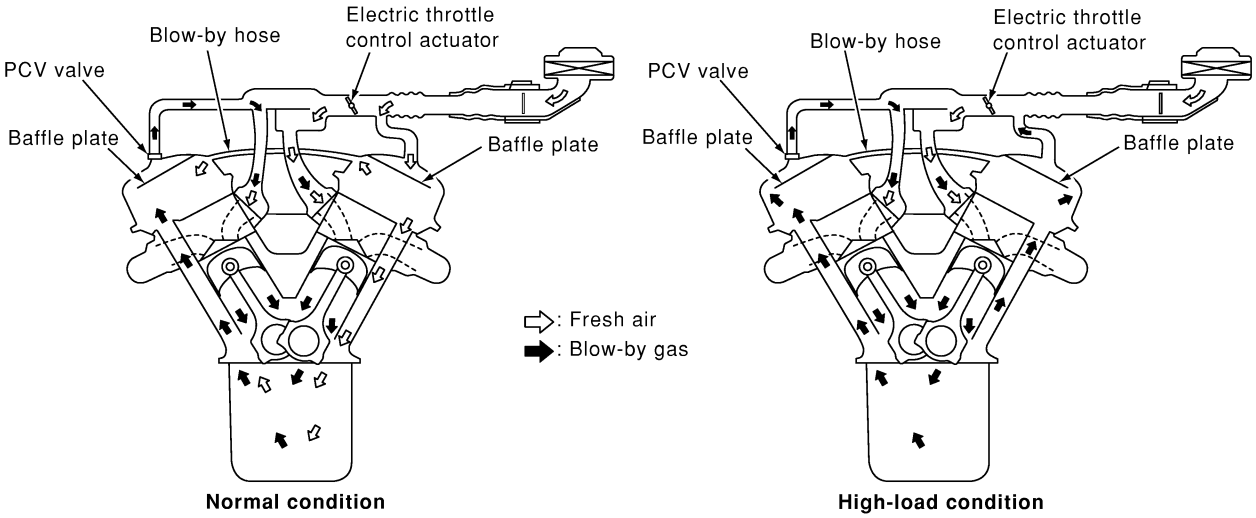
OK or NG

OK	▶	**INSPECTION END**
NG	▶	Replace fuel filler tube or replace one-way fuel valve with fuel tank.

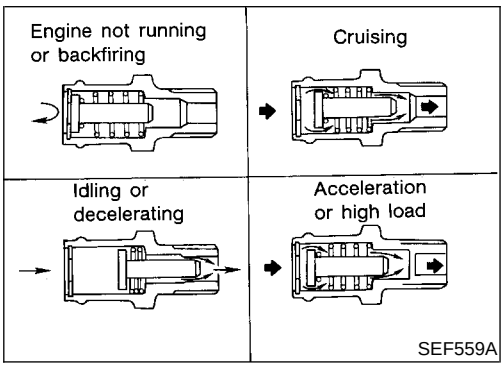
Positive Crankcase Ventilation

DESCRIPTION

NFEC0021



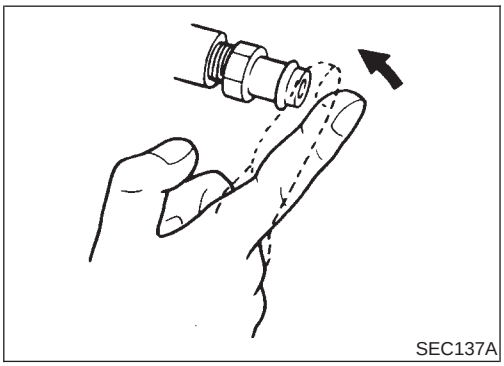
SEC921C



SEF559A

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.


SEC137A

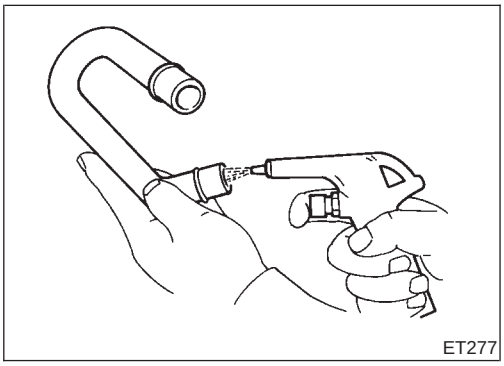
INSPECTION

NFEC0022

PCV (Positive Crankcase Ventilation) Valve

NFEC0022S01

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.


ET277

PCV Valve Ventilation Hose

NFEC0022S02

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.

CAN Communication

NFEC1183

SYSTEM DESCRIPTION

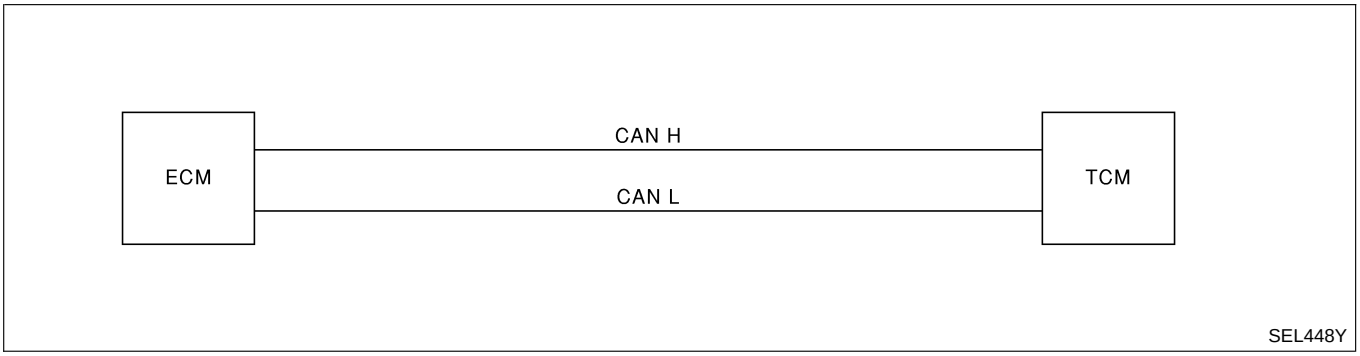
NFEC1183S01

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 A/T Models

NFEC1183S0101

System Diagram



SEL448Y

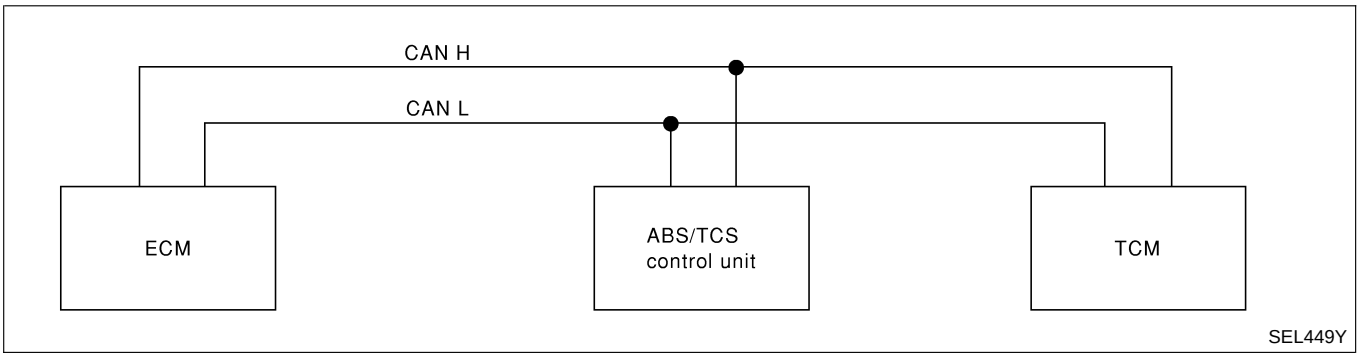
Input/Output Signal Chart
T: Transmit R: Receive

Signals	ECM	TCM
Accelerator pedal position signal	T	R
Output shaft revolution signal	R	T

For TCS Models

NFEC1183S0102

System Diagram



INPUT/OUTPUT SIGNAL CHART

NFEC1183S02

T: Transmit R: Receive

Signals	ECM	ABS/TCS control unit	TCM
Accelerator pedal position signal	T	R	R
Output shaft revolution signal	R		T
TCS self-diagnostic signal	R	T	
ABS self-diagnostic signal	R	T	

Automatic Speed Control Device (ASCD) System

DESCRIPTION

NFEC1184

Input/Output Signal Chart

NFEC1184S01

Sensor	Input signal to ECM	ECM function	Actuator
ASCD brake switch	Brake pedal operation	ASCD vehicle speed control	Electric throttle control actuator
Stop lamp switch	Brake pedal operation		
ASCD clutch switch (MT models)	Clutch pedal operation		
ASCD steering switch	ASCD steering switch operation		
Park/Neutral position (PNP) switch (AT models)	Gear position		
Combination meter	Vehicle speed		
TCM	Power train revolution		

Basic ASCD System

NFEC1184S02

Refer to Owner's Manual for ASCD operating instructions.
Automatic Speed Control Device (ASCD) allows a driver to keep vehicle at predetermined constant speed without depressing accelerator pedal. Driver can set vehicle speed in advance between approximately 40 km/h (25 MPH) and 144 km/h (89 MPH).

ECM controls throttle valve operating angle of electric throttle control actuator to regulate engine speed.
Operation status of ASCD is indicated by CRUISE indicator and SET indicator in combination meter.
If any malfunction occurs in ASCD system, it automatically deactivates control.

Set Operation

NFEC1184S03

Press ASCD CRUISE switch (Main switch). (Then CRUISE indicator in combination meter illuminates.)
When vehicle speed reaches a desired speed between approximately 40 km/h (25 MPH) and 144 km/h (89 MPH), press SET switch. (Then SET indicator in combination meter illuminates.)

Accel Operation

NFEC1184S04

If the RESUME/ACCEL switch is depressed during cruise control driving, increase the vehicle speed until the switch is released or vehicle speed reaches maximum speed controlled by the system.
And then ASCD will keep the new set speed.

Cancel Operation

NFEC1184S05

When any of following conditions exist, cruise operation will be canceled.

- CANCEL switch is depressed.
- Brake pedal is depressed.
- Clutch pedal is depressed (M/T models).
- A/T selector lever is shifted to P or N position (A/T models).

If MAIN switch is turned to OFF while ASCD is activated, all of ASCD operations will be canceled and vehicle speed memory will be erased.

Coast Operation

NFEC1184S06

When the SET/COAST switch is depressed during cruise control driving, decrease vehicle set speed until the switch is released. And then ASCD will keep the new set speed.

Resume Operation

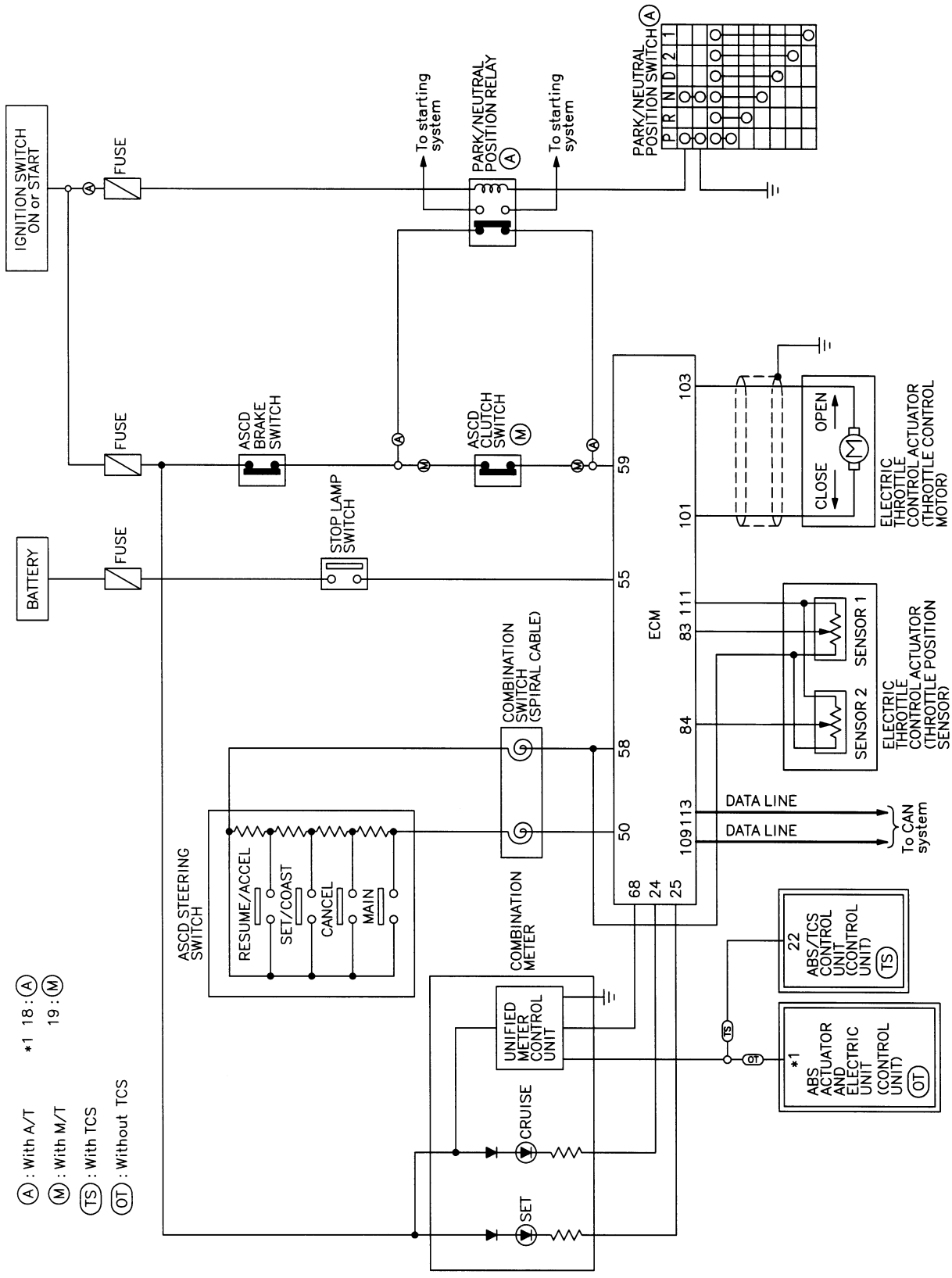
NFEC1184S07

When the RESUME/ACCEL switch is depressed after cancel operation other than depressing MAIN switch is performed, vehicle speed will return to last set speed. To resume vehicle set speed, vehicle condition must meet following conditions.

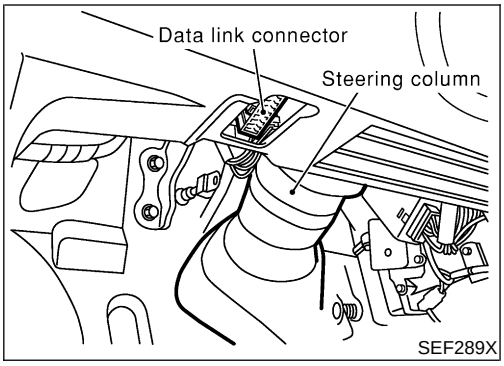
- Brake pedal is released.
- Clutch pedal is released (M/T models).
- A/T selector lever is in other than P and N position (A/T models).
- Vehicle speed is greater than 40 km/h (25 MPH) and 144 km/h (89 MPH).

SYSTEM DIAGRAM

NFEC1185



MEC921D



Fuel Pressure Release

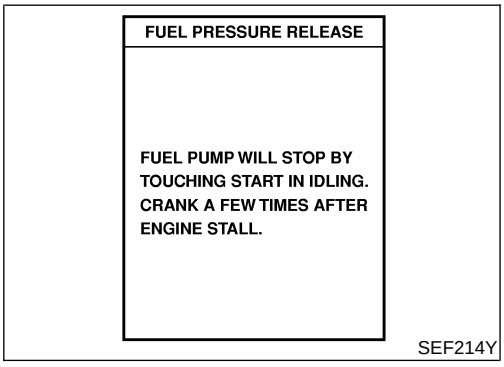
NFEC0023

Before disconnecting fuel line, release fuel pressure from fuel line to eliminate danger.

WITH CONSULT-II

NFEC0023S01

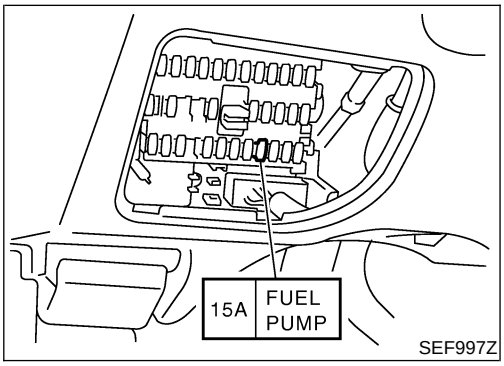
1. Turn ignition switch “ON”.
2. Perform “FUEL PRESSURE RELEASE” in “WORK SUPPORT” mode with CONSULT-II.
3. Start engine.
4. After engine stalls, crank it two or three times to release all fuel pressure.
5. Turn ignition switch “OFF”.



WITHOUT CONSULT-II

NFEC0023S02

1. Remove fuel pump fuse located in fuse box.
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.

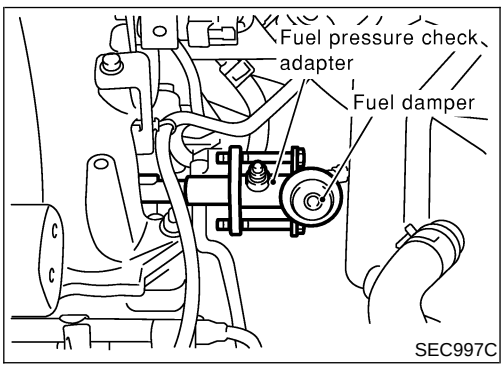


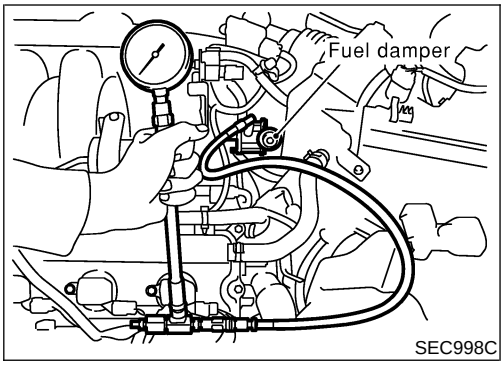
Fuel Pressure Check

NFEC0024

- **When reconnecting fuel line, always use new clamps.**
- **Make sure that clamp screw does not contact adjacent parts.**
- **Use a torque driver to tighten clamps.**
- **Use Pressure Gauge to check fuel pressure.**
- **Do not perform fuel pressure check with system operating. Fuel pressure gauge may indicate false readings.**

1. Release fuel pressure to zero.
2. Disconnect fuel tube joint between fuel damper and injector tube and set fuel pressure check adapter (J44321).





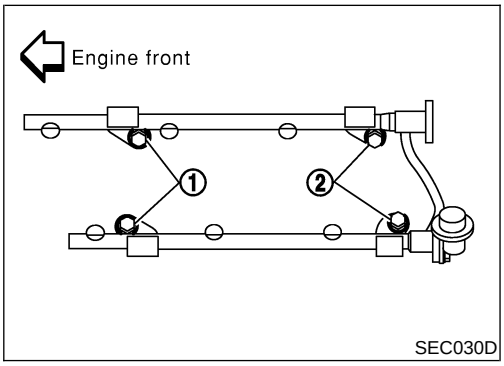
3. Install pressure gauge to the fuel pressure check adapter as shown in the figure.
4. Start engine and check for fuel leakage.
5. Read the indication of fuel pressure gauge.

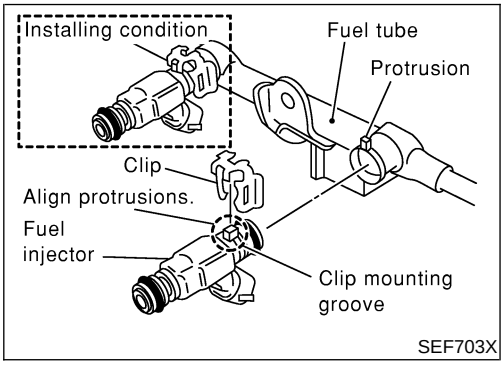
At idling: Approximately 350 kPa (3.57 kg/cm^2, 51 psi)

6. If results are unsatisfactory, go to next step.
7. 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.





Injector

REMOVAL AND INSTALLATION

NFEC0026

1. Release fuel pressure to zero.
2. Remove intake manifold collector. Refer to EM-21, "TIMING CHAIN".
3. Remove fuel tube assemblies in numerical sequence as shown in the figure at left.
4. Expand and remove clips securing fuel injectors.
5. Extract fuel injectors straight from fuel tubes.

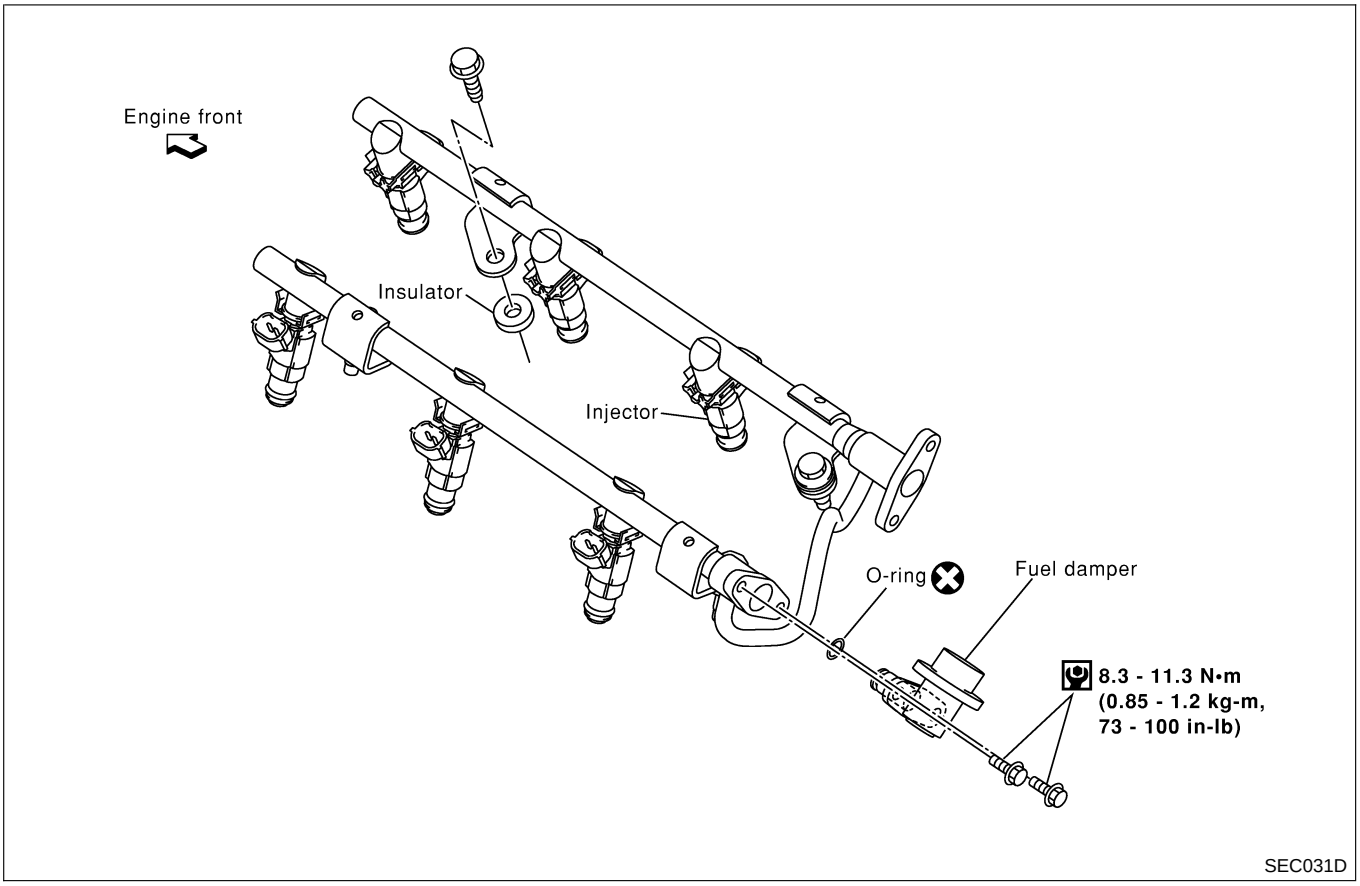
- **Be careful not to damage injector nozzles during removal.**
- **Do not bump or drop fuel injectors.**

6. Carefully install O-rings.

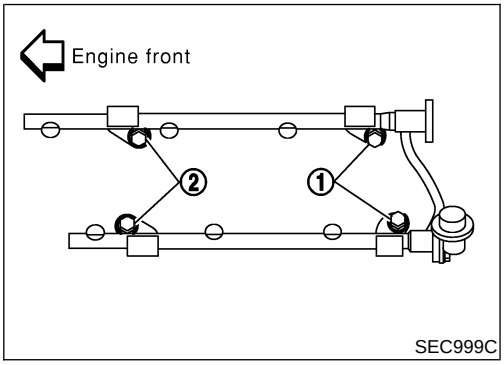
- **Lubricate O-rings with a smear of engine oil.**
- **Be careful not to damage O-rings with service tools, finger nails or clips. Do not expand or twist O-rings.**
- **Discard old clips; replace with new ones.**

7. Position clips in grooves on fuel injectors.

- **Make sure that protrusions of fuel injectors are aligned with cutouts of clips after installation.**



8. Align protrusions of fuel tubes with those of fuel injectors. Insert fuel injectors straight into fuel tubes.
9. After properly inserting fuel injectors, check to make sure that fuel tube protrusions are engaged with those of fuel injectors, and that flanges of fuel tubes are engaged with clips.



10. Tighten fuel tube assembly mounting nuts in numerical sequence (indicated in the figure at left) and in two stages.
    : Tightening torque N·m (kg-m, ft-lb)
    1st stage:
    9.3 - 10.8 (1.0 - 1.1, 6.9 - 7.9)
    2nd stage:
    20.6 - 26.5 (2.1 - 2.7, 16 - 19)
11. Install all parts removed in reverse order of removal.

CAUTION:
After properly connecting fuel tube assembly to injector and fuel hose, check connection for fuel leakage.

How to Check Idle Speed and Ignition Timing

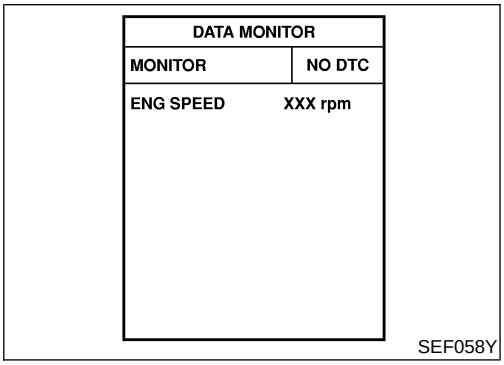
NFEC1422

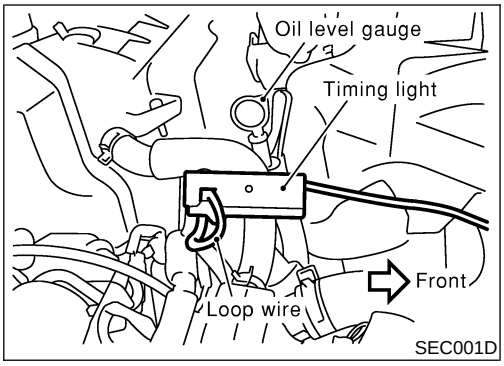
IDLE SPEED

NFEC1422S01

- **Using CONSULT-II**

Check idle speed in "DATA MONITOR" mode with CONSULT-II.





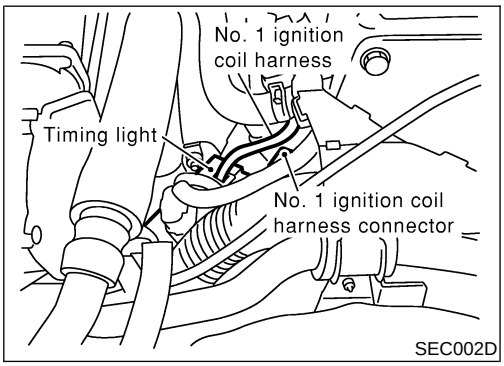
IGNITION TIMING

NFEC1422S02

Any of following two methods may be used.

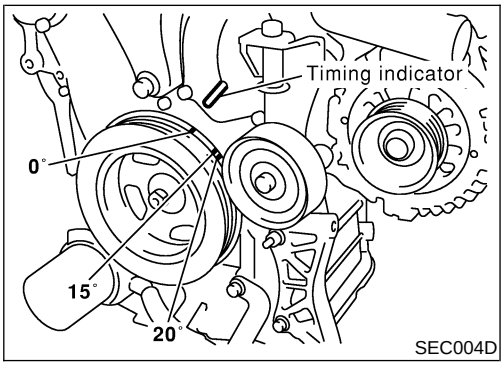
- **Method A**

a) Attach timing light to loop wire as shown.
b) Check ignition timing.



- **Method B**

a) Attach timing light to No. 1 ignition coil harness as shown.



b) Check ignition timing.

Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment

NFEC0028

PREPARATION

NFEC0028S01

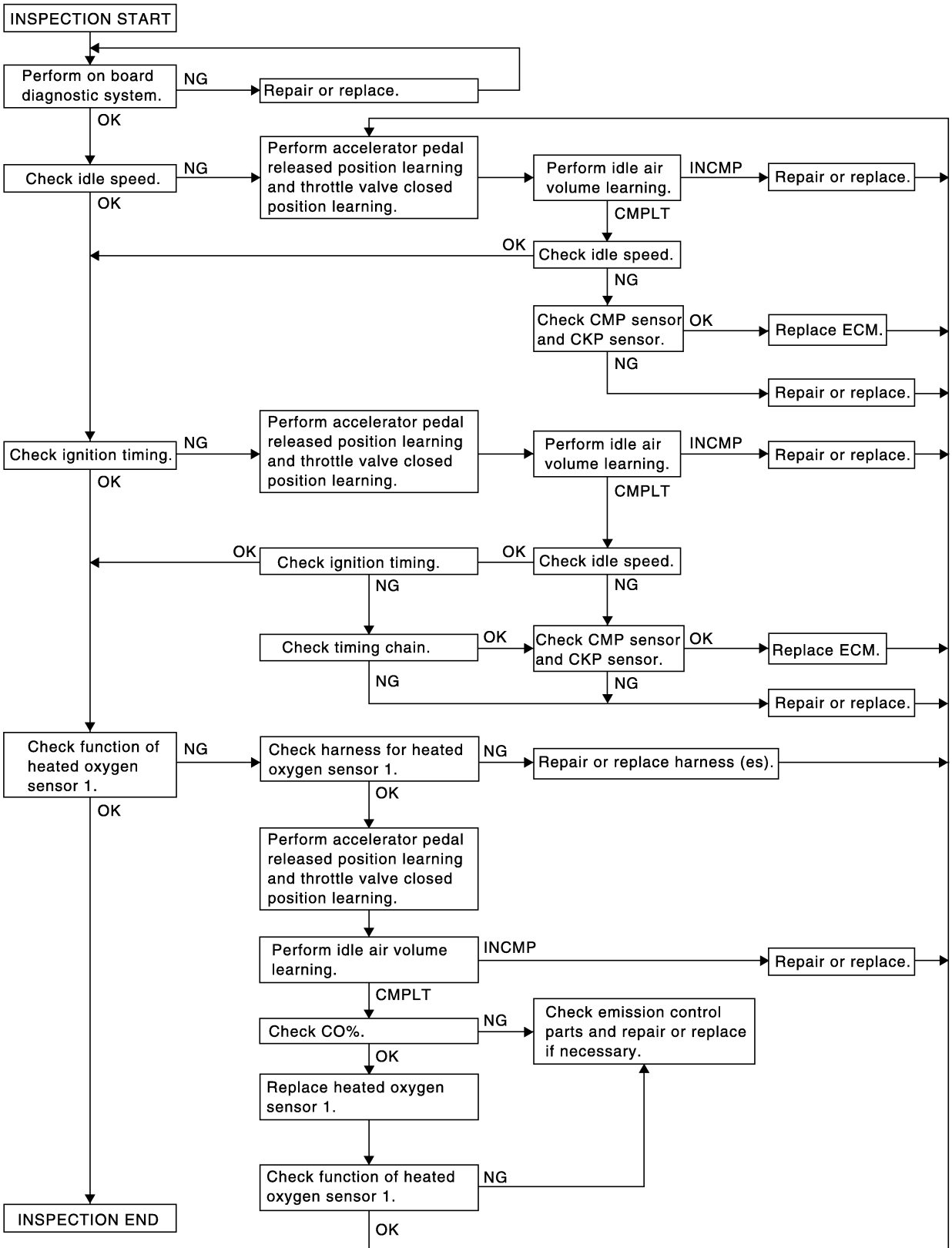
1) Make sure that the following parts are in good order.
- Battery
- Ignition system
- Engine oil and coolant levels
- Fuses
- ECM harness connector
- Vacuum hoses
- Air intake system
  (Oil filler cap, oil level gauge, etc.)
- Fuel pressure
- Engine compression
- Throttle valve
- Evaporative emission system

2) On air conditioner equipped models, checks should be carried out while the air conditioner is "OFF".
3) On automatic transmission equipped models, when checking idle rpm, ignition timing and mixture ratio, checks should be carried out while shift lever is in "N" position.
4) When measuring "CO" percentage, insert probe more than 40 cm (15.7 in) into tail pipe.
5) Turn off headlamps, heater blower, rear defogger.

6) Keep front wheels pointed straight ahead.
7) Make the check after the cooling fan has stopped.

Overall Inspection Sequence

NFEC0028S0101



NOTE:
If a vehicle contains a part which is operating outside of design specifications with no MIL illumination, the part shall not be replaced prior to emission testing unless it is determined that the part has been tampered with or abused in such a way that the diagnostic system cannot reasonably be expected to detect the resulting malfunction.

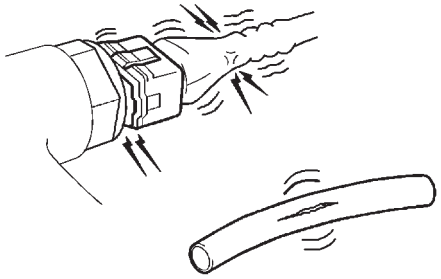
SEC154D

INSPECTION PROCEDURE

=NFEC0028S02

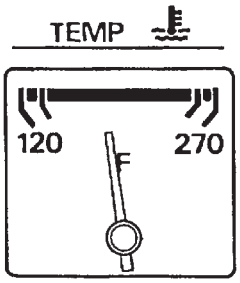
1	INSPECTION START

1. Check service records for any recent repairs that may indicate a related problem, 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



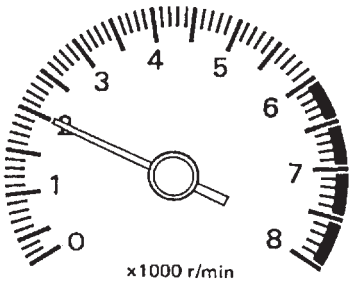
SEF983U

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.



SEF977U

6. Make sure that no DTC is displayed with CONSULT-II or GST.

OK or NG

OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	REPAIR OR REPLACE

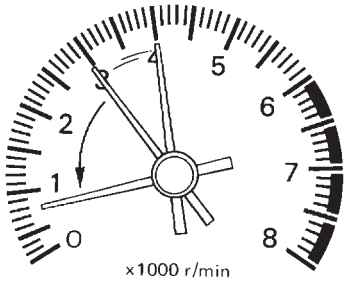
Repair or replace components as necessary according to corresponding "Diagnostic Procedure".

	▶	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.



SEF978U

3. Read idle speed in "DATA MONITOR" mode with CONSULT-II.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

M/T: 625±50 rpm
A/T: 675±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: 625±50 rpm
A/T: 675±50 rpm (in "P" or "N" position)

OK or NG

OK	▶	GO TO 9.
NG	▶	GO TO 4.

4	PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Stop engine.
2. Perform "Accelerator Pedal Released Position Learning", EC-71.

	▶	GO TO 5.

5	PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform "Throttle Valve Closed Position Learning", EC-71.

	▶	GO TO 6.

6	PERFORM IDLE AIR VOLUME LEARNING	
Perform "Idle Air Volume Learning", EC-71. **Which is the result CMPLT or INCMP?**		
	CMPLT or INCMP	
CMPLT	▶	GO TO 7.
INCMP	▶	1. Follow the construction 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: 625±50 rpm** **A/T: 675±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: 625±50 rpm** **A/T: 675±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 "DTC P0340, P0345 CMP SENSOR (PHASE)", EC-337. ● Check crankshaft position sensor (POS) and circuit. Refer to "DTC P0335 CKP SENSOR (POS)", EC-330.		
	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 a problem, but this is the rarely the case.) 2. Perform initialization of NVIS (NATS) system and registration of NVIS (NATS) ignition key IDs. Refer to NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM — NATS)", EC-92.		
	▶	GO TO 4.

10	CHECK IGNITION TIMING	
1. Run engine at idle. 2. Check ignition timing with a timing light. **M/T: 15°±5° BTDC** **A/T: 15°±5° BTDC (in "P" or "N" position)**		
	OK or NG	
OK (With CONSULT-II)	▶	GO TO 19.
OK (Without CONSULT-II)	▶	GO TO 20.
NG	▶	GO TO 11.

11	PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING
1. Stop engine. 2. Perform "Accelerator Pedal Released Position Learning", EC-71.	
▶	GO TO 12.

12	PERFORM THROTTLE VALVE CLOSED POSITION LEARNING
Perform "Throttle Valve Closed Position Learning", EC-71.	
▶	GO TO 13.

13	PERFORM IDLE AIR VOLUME LEARNING
Perform "Idle Air Volume Learning", EC-71. **Which is the result CMPLT or INCMP?**	
CMPLT or INCMP	
CMPLT ▶	GO TO 14.
INCMP ▶	1. Follow the construction 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: 625±50 rpm** **A/T: 675±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: 625±50 rpm** **A/T: 675±50 rpm (in "P" or "N" position)**	
OK or NG	
OK ▶	GO TO 15.
NG ▶	GO TO 17.

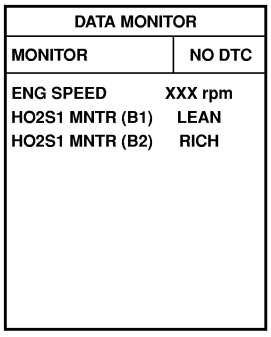
15	CHECK IGNITION TIMING AGAIN
1. Run engine at idle. 2. Check ignition timing with a timing light. **M/T: 15°±5° BTDC** **A/T: 15°±5° BTDC (in "P" or "N" position)**	
OK or NG	
OK (With CONSULT-II) ▶	GO TO 19.
OK (Without CONSULT-II) ▶	GO TO 20.
NG ▶	GO TO 16.

16	CHECK TIMING CHAIN INSTALLATION	
Check timing chain installation. Refer to EM-21, "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 "DTC P0340, P0345 CMP SENSOR (PHASE)", EC-337. ● Check crankshaft position sensor (POS) and circuit. Refer to "DTC P0335 CKP SENSOR (POS)", EC-330.		
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 a problem, but this is the rarely the case.) 2. Perform initialization of NVIS (NATS) system and registration of NVIS (NATS) ignition key IDs. Refer to "NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM — NATS)", EC-92.		
	▶	GO TO 4.

19	CHECK HEATED OXYGEN SENSOR 1 (BANK 1) SIGNAL	
With CONSULT-II 1. Run engine at about 2,000 rpm for about 2 minutes under no-load. 2. See "HO2S1 MNTR (B1)" in "DATA MONITOR" mode. 3. Running engine at 2,000 rpm under no-load (The engine is warmed up to normal operating temperature.), check that the monitor fluctuates between LEAN and RICH more than 5 times during 10 seconds.		
1 time: RICH → LEAN → RICH **2 times: RICH → LEAN → RICH → LEAN → RICH**		
OK or NG		
OK	▶	GO TO 21.
NG (Monitor does not fluctuate.)	▶	GO TO 23.
NG (Monitor fluctuates less than 5 times.)	▶	GO TO 30.



PBIB0120E

20	CHECK HEATED OXYGEN SENSOR 1 (BANK 1) SIGNAL

Without CONSULT-II
1. Stop engine and set ECM to Self-diagnostic mode II (Heated oxygen sensor 1 monitor). Refer to "HOW TO SWITCH DIAGNOSTIC TEST MODE", EC-94.
2. Start engine and run it at about 2,000 rpm for about 2 minutes under no-load.
3. Running engine at 2,000 rpm under no-load (The engine is warmed up to normal operating temperature.), check that the MIL comes on more than 5 times during 10 seconds.

OK or NG

OK	▶	GO TO 22.
NG (MIL does not come on)	▶	GO TO 23.
NG (MIL comes on less than 5 times)	▶	GO TO 30.

21	CHECK HEATED OXYGEN SENSOR 1 (BANK 2) SIGNAL

With CONSULT-II
1. See "HO2S1 MNTR (B2)" in "DATA MONITOR" mode.
2. Running engine at 2,000 rpm under no-load (The engine is warmed up to normal operating temperature.), check that the monitor fluctuates between LEAN and RICH more than 5 times during 10 seconds.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
HO2S1 MNTR (B1)	LEAN
HO2S1 MNTR (B2)	RICH

PBIB0120E

1 time: RICH → LEAN → RICH
2 times: RICH → LEAN → RICH → LEAN → RICH

OK or NG

OK	▶	**INSPECTION END**
NG (Monitor does not fluctuate.)	▶	GO TO 24.
NG (Monitor fluctuates less than 5 times.)	▶	GO TO 31.

22	CHECK HEATED OXYGEN SENSOR 1 (BANK 2) SIGNAL

Without CONSULT-II
1. Switch the monitored sensor from bank 1 to bank 2. Refer to "How to Switch Monitored Sensor from Bank 1 to Bank 2 or Vice Versa", EC-94.
2. Running engine at 2,000 rpm under no-load (The engine is warmed up to normal operating temperature.), check that the MIL comes on more than 5 times during 10 seconds.

OK or NG

OK	▶	**INSPECTION END**
NG (MIL does not come on)	▶	GO TO 24.
NG (MIL comes on less than 5 times)	▶	GO TO 31.

23	CHECK HEATED OXYGEN SENSOR 1 (BANK 1) HARNESS
1. Turn ignition switch "OFF" and disconnect battery ground cable. 2. Disconnect ECM harness connector. 3. Disconnect heated oxygen sensor 1 (bank 1) harness connector. 4. Check harness continuity between ECM terminal 91 and heated oxygen sensor 1 (bank 1) terminal 1. Refer to "Wiring Diagram", EC-243 **Continuity should exist.** 5. Also check harness for short to ground and short to power.	
OK or NG	
OK ▶	GO TO 25.
NG ▶	1. Repair or replace harness between ECM and heated oxygen sensor 1 (bank 1). 2. GO TO 4.

24	CHECK HEATED OXYGEN SENSOR 1 (BANK 2) HARNESS
1. Turn ignition switch "OFF" and disconnect battery ground cable. 2. Disconnect ECM harness connector. 3. Disconnect heated oxygen sensor 1 (bank 2) harness connector. 4. Check harness continuity between ECM terminal 92 and heated oxygen sensor 1 (bank 2) terminal 1. Refer to "Wiring Diagram", EC-244. **Continuity should exist.** 5. Also check harness for short to ground and short to power.	
OK or NG	
OK ▶	GO TO 25.
NG ▶	1. Repair or replace harness between ECM and heated oxygen sensor 1 (bank 2). 2. GO TO 4.

25	PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING
1. Reconnect ECM harness connector. 2. Perform "Accelerator pedal released position learning", EC-71.	
▶	GO TO 26.

26	PERFORM THROTTLE VALVE CLOSED POSITION LEARNING
Perform "Throttle Valve Closed Position Learning", EC-71.	
▶	GO TO 27.

27	PERFORM IDLE AIR VOLUME LEARNING
Perform "Idle Air Volume Learning", EC-71. **Which is the result CMPLT or INCMP?**	
CMPLT or INCMP	
CMPLT (With CONSULT-II) ▶	GO TO 28.
CMPLT (Without CONSULT-II) ▶	GO TO 29.
INCMP ▶	1. Follow the construction of "Idle Air Volume Learning". 2. GO TO 4.

28	CHECK "CO" %

With CONSULT-II

1. Start engine and warm it up until engine coolant temperature indicator points to the middle of gauge.
2. Turn ignition switch "OFF", wait at least 10 seconds and then turn "ON".
3. Select "ENG COOLANT TEMP" in "ACTIVE TEST" mode.
4. Set "ENG COOLANT TEMP" to 5°C (41°F) by touching "DWN" and "Qd".
5. Start engine and rev it (2,000 to 3,000 rpm) two or three times under no-load, then run engine at idle speed.
6. Check "CO" %.

ACTIVE TEST	
ENG COOLANT TEMP	XXX °C
MONITOR	
ENG SPEED	XXX rpm
INJ PULSE-B1	XXX msec
IGN TIMING	XXX BTDC

SEF172Y

Idle CO: 0.7 - 9.9 % and engine runs smoothly.

OK or NG

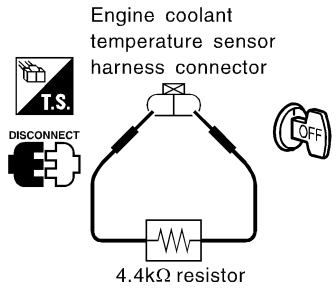
OK	▶	GO TO 31.
NG	▶	GO TO 30.

29	CHECK "CO" %

Without CONSULT-II

1. Start engine and warm it up until engine coolant temperature indicator points to the middle of gauge.
2. Turn ignition switch "OFF".
3. Disconnect engine coolant temperature sensor harness connector.
4. Connect a resistor (4.4 kΩ) between terminals of engine coolant temperature sensor harness connector.
5. Start engine and rev it (2,000 to 3,000 rpm) two or three times under no-load, then run engine at idle speed.
6. Check "CO" %.

   Idle CO: 0.7 - 9.9 % and engine runs smoothly.
7. After checking "CO" %, turn ignition switch "OFF", disconnect the resistor from the terminals of engine coolant temperature sensor harness connector, and then connect engine coolant temperature sensor harness connector to engine coolant temperature sensor.



SEF982UA

OK or NG

OK	▶	GO TO 31.
NG	▶	GO TO 30.

30	RECONNECT HEATED OXYGEN SENSOR 1 HARNESS CONNECTOR

1. Turn ignition switch "OFF".
2. Reconnect heated oxygen sensor 1 harness connector.

	▶	GO TO 34.

31	REPLACE HEATED OXYGEN SENSOR 1	
1. Stop engine. 2. Replace heated oxygen sensor 1 on the malfunctioning bank.		
With CONSULT-II	▶	GO TO 32.
Without CONSULT-II	▶	GO TO 33.

32	CHECK HEATED OXYGEN SENSOR 1 (BANK 1)/(BANK 2) SIGNAL	
With CONSULT-II 1. Start engine and warm it up until engine coolant temperature indicator points to the middle of gauge. 2. See "HO2S1 MNTR (B1)/(B2)" in "DATA MONITOR" mode. 3. Running engine at 2,000 rpm under no-load (The engine is warmed up to normal operating temperature.), check that the monitor fluctuates between LEAN and RICH more than 5 times during 10 seconds. **1 time: RICH → LEAN → RICH** **2 times: RICH → LEAN → RICH → LEAN → RICH**		
OK or NG		
OK	▶	GO TO 4.
NG	▶	GO TO 34.

33	CHECK HEATED OXYGEN SENSOR 1 (BANK 1)/(BANK 2) SIGNAL	
Without CONSULT-II 1. Set ECM to Self-diagnostic mode II (Heated oxygen sensor 1 monitor). Refer to "How to Switch Diagnostic Test Mode", EC-94. 2. Switch the monitored sensor to the malfunctioning bank. Refer to "How to Switch Monitored Sensor from Bank 1 to Bank 2 or Vice Versa", EC-94. 3. Running engine at 2,000 rpm under no-load (The engine is warmed up to normal operating temperature.), check that the MIL comes on more than 5 times during 10 seconds.		
OK or NG		
OK	▶	GO TO 4.
NG	▶	GO TO 34.

34	DETECT MALFUNCTIONING PART	
Check the following. ● Check mass air flow sensor and its circuit, and repair or replace if necessary. Refer to EC-195. ● Check injector and its circuit, and repair or replace if necessary. Refer to EC-703. ● Check engine coolant temperature sensor and its circuit, and repair or replace if necessary. Refer to EC-207. ● Check fuel pressure and repair or replace if necessary. Refer to EC-56.		
OK or NG		
OK	▶	GO TO 36.
NG	▶	1. Repair or replace. 2. GO TO 35.

35	ERASE UNNECESSARY DTC	
After this inspection, unnecessary DTC might be displayed. Erase the stored memory in ECM and TCM. Refer to "How to Erase Emission-related Diagnostic Information", EC-76 and AT-38.		
	▶	GO TO 4.

36	CHECK ECM FUNCTION
1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of a problem, but this is the rarely the case.) 2. Perform initialization of NVIS (NATS) system and registration of NVIS (NATS) ignition key IDs. Refer to "NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM — NATS", EC-92.	
▶	GO TO 4.

Accelerator Pedal Released Position Learning

NFEC1186

DESCRIPTION

NFEC1186S01

"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

NFEC1186S02

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

NFEC1187

DESCRIPTION

NFEC1187S01

"Throttle Valve Closed Position Learning" is an operation to learn the fully closed position of the throttle valve by monitorizing 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

NFEC1187S02

1. Turn ignition switch "ON".
2. Turn ignition switch "OFF" wait at least 10 seconds.
   Make sure that throttle valve moves during above 10 seconds by confirming the operating sound.

Idle Air Volume Learning

NFEC1188

DESCRIPTION

NFEC1188S01

"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

NFEC1188S02

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 - 99°C (158 - 210°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

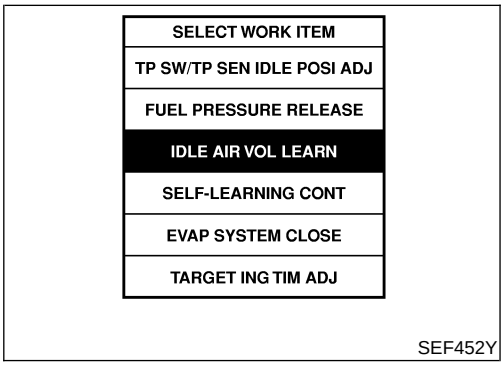
NFEC1188S03

With CONSULT-II

NFEC1188S0301

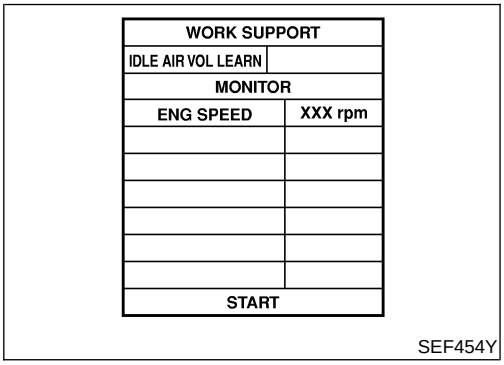
NOTE:
Before perform "Idle Air Volume Learning", make sure that "Accelerator Pedal Released Position Learning" and "Throttle Valve Closed Position Learning" are completed.
If not, perform "Accelerator Pedal Released Position Learning", EC-71 and "Throttle Valve Closed Position Learning", EC-71.

1. Start engine and warm it up to normal operating temperature.
2. Check that all items listed under the topic "PRE-CONDITIONING" (previously mentioned) are in good order.



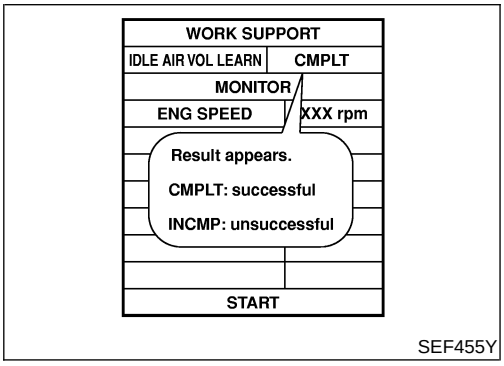
SEF452Y

3. Select "IDLE AIR VOL LEARN" in "WORK SUPPORT" mode.



SEF454Y

4. Touch "START" and wait 20 seconds.



SEF455Y

5. Make sure that "CMPLT" is displayed on CONSULT-II screen. If "INCMP" is displayed, "Idle Air Volume Learning" will not be carried out successfully. In this case, find the cause of the problem by referring to the "Diagnostic Procedure" below.
6. 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	MT: 625±50 rpm AT: 675±50 rpm (in "P" or "N" position)

Ignition timing	MT: 15±5° BTDC AT: 15±5° BTDC (in "P" or "N" position)

Without CONSULT-II

NFEC1188S0302

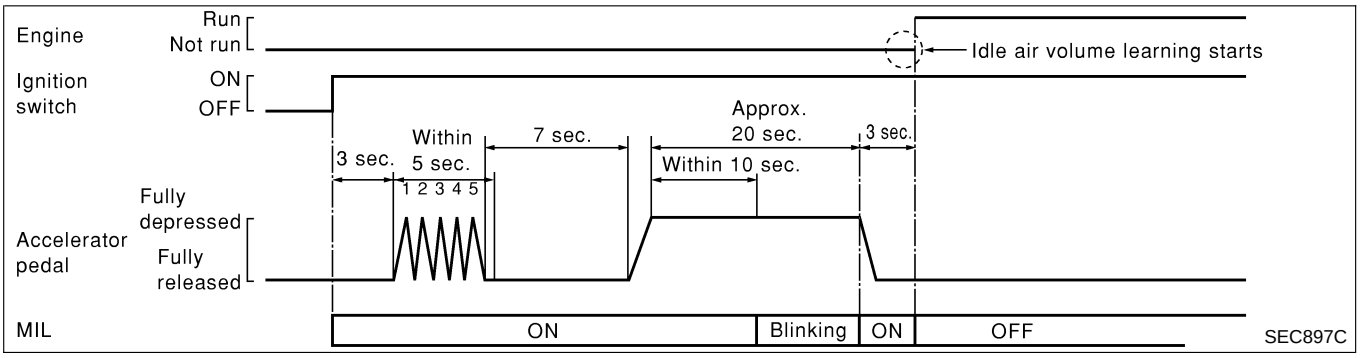
NOTE:

- **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.**

NOTE:

Before perform "Idle Air Volume Learning", make sure that "Accelerator Pedal Released Position Learning" and "Throttle Valve Closed Position Learning" are completed.
If not, perform "Accelerator Pedal Released Position Learning", EC-71 and "Throttle Valve Closed Position Learning", EC-71.

1. Start engine and warm it up to normal operating temperature.
2. Check that all items listed under the topic "PRE-CONDITIONING" (previously mentioned) are in good order.
3. Turn ignition switch "OFF" and wait at least 10 seconds.
4. Confirm that accelerator pedal is fully released, turn ignition switch "ON" and wait 3 seconds.
5. Repeat the following procedure quickly five times within 5 seconds.
1) Fully depress the accelerator pedal.
2) Fully release the accelerator pedal.
6. Wait 7 seconds, fully depress the accelerator pedal and keep it for approx. 20 seconds until the MIL goes off.
7. Fully release the accelerator pedal within 3 seconds after the MIL goes off.
8. Start engine and let it idle.
9. Wait 20 seconds.



10. 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	MT: 625±50 rpm AT: 675±50 rpm (in "P" or "N" position)
Ignition timing	MT: 15±5° BTDC AT: 15±5° BTDC (in "P" or "N" position)

11. If idle speed and ignition timing are not within the specification, the result will be incomplete. In this case, find the cause of the problem by referring to the "Diagnostic Procedure" below.

DIAGNOSTIC PROCEDURE

NFEC1188S04

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 problem.**
   It is useful to perform EC-152, "TROUBLE DIAGNOSIS - SPECIFICATION VALUE".
5. **If any of the following conditions occur after the engine has started, eliminate the cause of the problem and perform "Idle air volume learning" all over again:**

- **Engine stalls.**
- **Erroneous idle.**

Introduction

NFEC1423

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	SAE Mode
Diagnostic Trouble Code (DTC)	Mode 3 of SAE J1979
Freeze Frame data	Mode 2 of SAE J1979
System Readiness Test (SRT) code	Mode 1 of SAE J1979
1st Trip Diagnostic Trouble Code (1st Trip DTC)	Mode 7 of SAE J1979
1st Trip Freeze Frame data	
Test values and Test limits	Mode 6 of SAE J1979
Calibration ID	Mode 9 of SAE J1979

The above information can be checked using procedures listed in the table below.

X: Applicable —: Not applicable

	DTC	1st trip DTC	Freeze Frame data	1st trip Freeze Frame data	SRT code	Test value
CONSULT-II	X	X	X	X	X	—
GST	X	X*1	X	—	X	X
ECM	X	X*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 lamp (MIL) 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-129.)

Two Trip Detection Logic

NFEC1424

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 MIL 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 MIL lights up. The MIL 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 MIL, and store DTC and Freeze Frame data, even in the 1st trip, as shown below.

Two Trip Detection Logic (Cont'd)

X: Applicable —: Not Exit

Items	MIL				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 - P0306 is being detected	X	—	—	—	—	—	X	—
Misfire (Possible three way catalyst damage) — DTC: P0300 - P0306 is being detected	—	—	X	—	—	X	—	—
Throttle control motor — DTC: P1128	—	X	—	—	X	—	—	—
Closed loop control — DTC: P1148, P1168	—	X	—	—	X	—	—	—
Fail-safe items (Refer to EC-129.)	—	X	—	—	X*1	—	X*1	—
Except above	—	—	—	X	—	X	X	—

*1: Except "ECM"

Emission-related Diagnostic Information

NFEC0031

DTC AND 1ST TRIP DTC

NFEC0031S01

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 MIL 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 MIL lights up. In other words, the DTC is stored in the ECM memory and the MIL 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 MIL 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 "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-91.

For malfunctions in which 1st trip DTCs are displayed, refer to EC-86. 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 SAE J1979. 1st trip DTC detection occurs without lighting up the MIL and therefore does not warn the driver of a problem. 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-121. Then perform "DTC Confirmation Procedure" or "Overall Function Check" to try to duplicate the problem. If the malfunction is duplicated, the item requires repair.

How to Read DTC and 1st Trip DTC

NFEC0031S0101

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: P0117, P0340, P1065, etc.

These DTCs are prescribed by SAE J2012.

(CONSULT-II also displays the malfunctioning component or system.)

NO TOOLS

The number of blinks of the MIL in the Diagnostic Test Mode II (Self-Diagnostic Results) indicates the DTC.

Example: 0117, 0340, 1065, etc.

- **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 does 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
MAF SEN/CIRCUIT [P0101]	0

1st trip DTC display

SELF DIAG RESULTS	
DTC RESULTS	TIME
MAF SEN/CIRCUIT [P0101]	1t

SEC745C

FREEZE FRAME DATA AND 1ST TRIP FREEZE FRAME DATA

NFEC0031S02

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 and absolute pressure 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.
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/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	

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 "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-91.

SYSTEM READINESS TEST (SRT) CODE

NFEC0031S03

System Readiness Test (SRT) code is specified in Mode 1 of SAE J1979.
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 MIL 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

=NFEC0031S0310

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, P0430
EVAP SYSTEM	1	EVAP control system	P0442
	2	EVAP control system	P0456, P1456
	2	EVAP control system purge flow monitoring	P0441
HO2S	2	Heated oxygen sensor 1	P0132, P0152
		Heated oxygen sensor 1	P0133, P0153
		Heated oxygen sensor 1	P0134, P0154
		Heated oxygen sensor 1	P1143, P1163
		Heated oxygen sensor 1	P1144, P1164
		Heated oxygen sensor 2	P0138, P0158
		Heated oxygen sensor 2	P0139, P0159
		Heated oxygen sensor 2	P1146, P1166
		Heated oxygen sensor 2	P1147, P1167
HO2S HTR	2	Heated oxygen sensor 1 heater	P0031, P0032, P0051, P0052
		Heated oxygen sensor 2 heater	P0037, P0038, P0057, P0058

*: 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

=NFEC0031S0311

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 (= MIL "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 of 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".

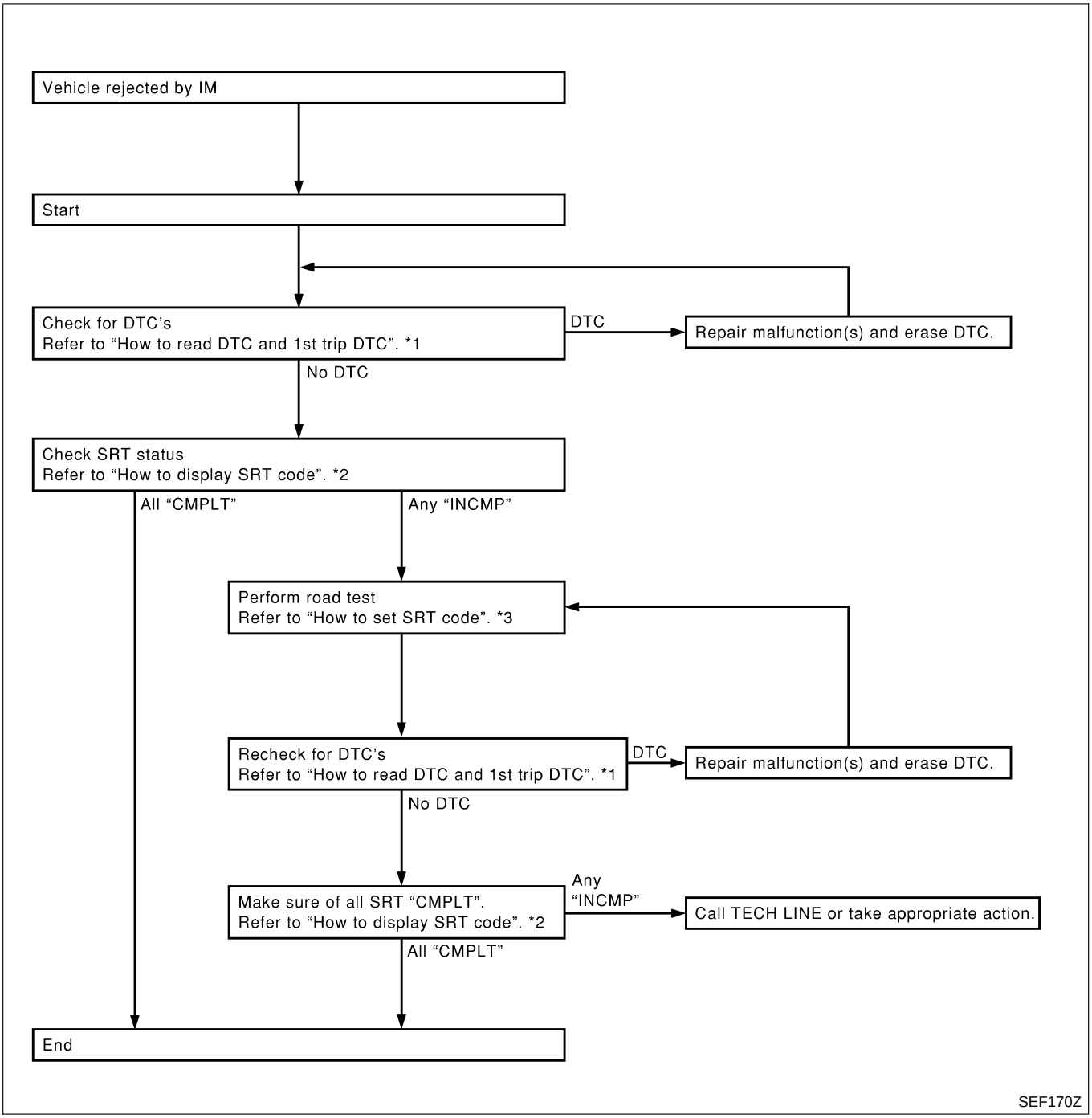
NOTE:

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

NFEC0031S0312

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-76 *2 EC-81 *3 EC-82

How to Display SRT Code

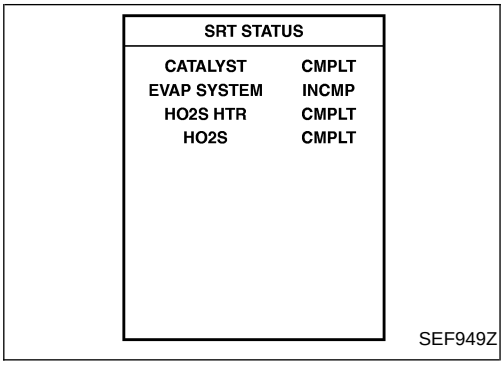
NFEC0031S0301

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.

With GST

Selecting Mode 1 with GST (Generic Scan Tool)
A sample of CONSULT-II display for SRT code is shown below.
"INCMP" means the self-diagnosis is incomplete and SRT is not set. "CMPLT" means the self-diagnosis is complete and SRT is set.



How to Set SRT Code

NFEC0031S0302

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-79.

Without CONSULT-II

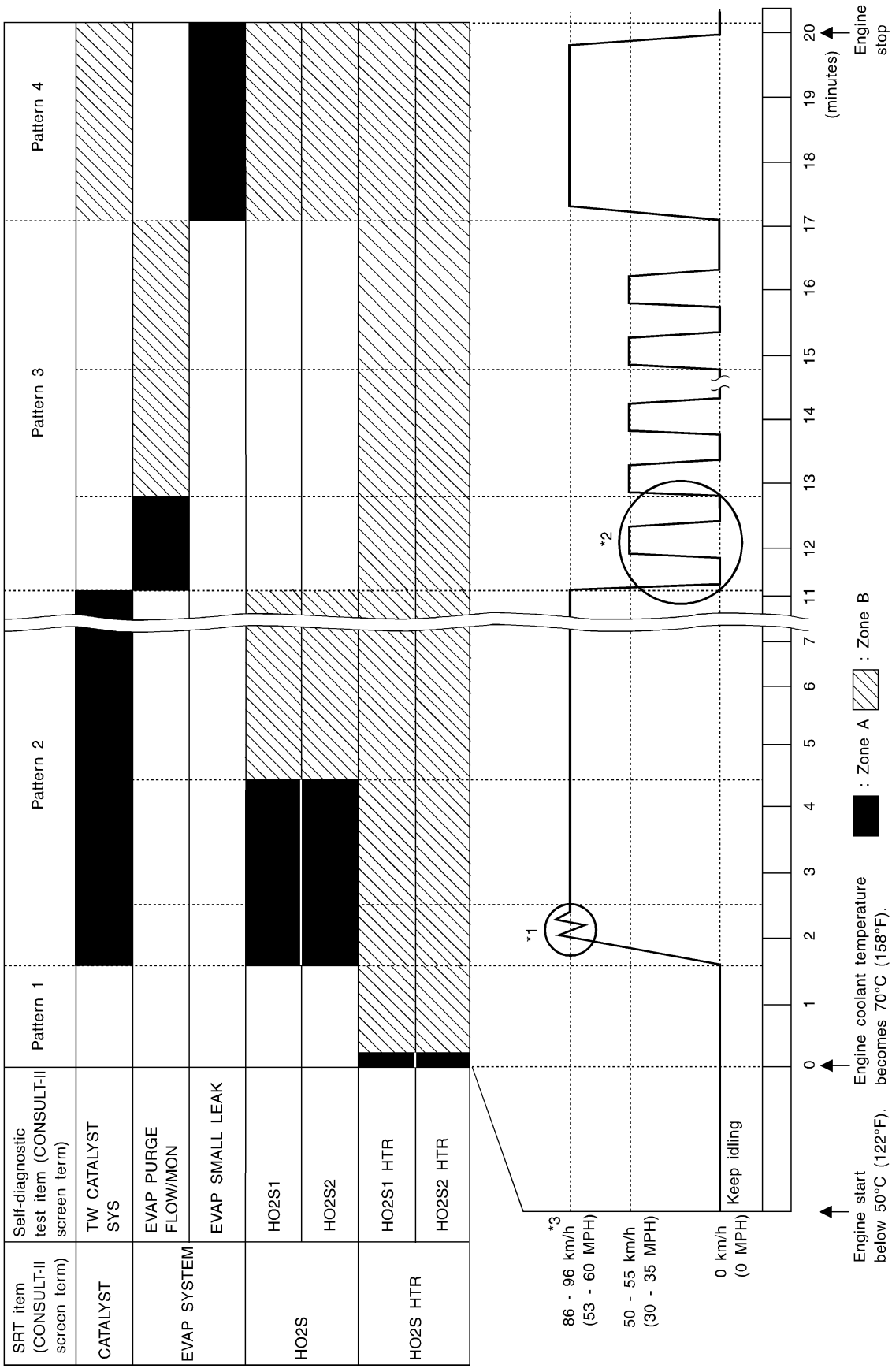
The most efficient driving pattern in which SRT codes can be properly set is explained on the next page. The driving pattern should be performed one or more times to set all SRT codes.

Driving Pattern

NFEC0031S0303

Driving pattern

Note: Always drive vehicle in safe manner according to traffic conditions and obey all traffic laws.
Refer to next page for more information and explanation of chart.



SEF947YC

- 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 93 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 93 and ground is lower than 1.4V).**
- **The engine is started at the fuel tank temperature of warmer than 0°C (32°F) (where the voltage between the ECM terminal 75 and ground is less than 4.1V).**

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.

Pattern 3:

- The driving pattern outlined in *2 must be repeated at least 3 times.

Pattern 4:

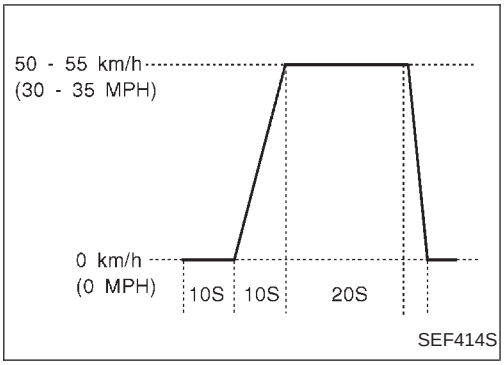
- Tests are performed after the engine has been operated for at least 17 minutes.
- The accelerator pedal must be held very steady during steady-state driving.
- If the accelerator pedal is moved, the test must be conducted all over again.

*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: Operate the vehicle in the following driving pattern.

1) Decelerate vehicle to 0 km/h (0 MPH) and let engine idle.
2) Repeat driving pattern shown below at least 10 times.

- **During acceleration, hold the accelerator pedal as steady as possible.**



*3: Checking the vehicle speed with GST is advised.

Suggested Transmission Gear Position for A/T Models

Set the selector lever in the "D" position with the overdrive switch turned ON.

Suggested upshift speeds for M/T models

Shown below are suggested vehicle speeds for shifting into a higher gear. These suggestions relate to fuel economy and vehicle performance. Actual upshift speeds will vary according to road conditions, the weather and individual driving habits.

	For normal acceleration in low altitude areas [less than 1,219 m (4,000 ft)]:		For quick acceleration in low altitude areas and high altitude areas [over 1,219 m (4,000 ft)]:
Gear change	ACCEL shift point km/h (MPH)	CRUISE shift point km/h (MPH)	km/h (MPH)
1st to 2nd	21 (13)	21 (13)	24 (15)
2nd to 3rd	37 (23)	26 (16)	40 (25)
3rd to 4th	53 (33)	44 (27)	64 (40)
4th to 5th	63 (39)	58 (36)	72 (45)
6th	80 (50)	80 (50)	80 (50)

Suggested Maximum Speed in Each Gear

Downshift to a lower gear if the engine is not running smoothly, or if you need to accelerate.
Do not exceed the maximum suggested speed (shown below) in any gear. For level road driving, use the highest gear suggested for that speed. Always observe posted speed limits and drive according to the road conditions to ensure safe operation. Do not over-rev the engine when shifting to a lower gear as it may cause engine damage or loss of vehicle control.

Gear	km/h (MPH)
1st	65 (40)
2nd	105 (65)
3rd	—
4th	—
5th	—
6th	—

TEST VALUE AND TEST LIMIT (GST ONLY — NOT APPLICABLE TO CONSULT-II)

NFEC0031S04

The following is the information specified in Mode 6 of SAE J1979.
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 (30 test 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.

X: Applicable —: Not applicable

SRT item	Self-diagnostic test item	Test value (GST display)		Test limit	Application
		TID	CID		
CATALYST	Three way catalyst function (Bank 1)	01H	01H	Max.	X
	Three way catalyst function (Bank 2)	03H	02H	Max.	X
EVAP SYSTEM	EVAP control system (Small leak)	05H	03H	Max.	X
	EVAP control system purge flow monitoring	06H	83H	Min.	X

SRT item	Self-diagnostic test item	Test value (GST display)		Test limit	Application
		TID	CID		
HO2S	Heated oxygen sensor 1 (bank 1)	09H	04H	Max.	X
		0AH	84H	Min.	X
		0BH	04H	Max.	X
		0CH	04H	Max.	X
		0DH	04H	Max.	X
	Heated oxygen sensor 1 (bank 2)	11H	05H	Max.	X
		12H	85H	Min.	X
		13H	05H	Max.	X
		14H	05H	Max.	X
		15H	05H	Max.	X
	Heated oxygen sensor 2 (bank 1)	19H	86H	Min.	X
		1AH	86H	Min.	X
		1BH	06H	Max.	X
		1CH	06H	Max.	X
	Heated oxygen sensor 2 (bank 2)	21H	87H	Min.	X
		22H	87H	Min.	X
		23H	07H	Max.	X
		24H	07H	Max.	X
HO2S HTR	Heated oxygen sensor 1 heater (bank 1)	29H	08H	Max.	X
		2AH	88H	Min.	X
	Heated oxygen sensor 1 heater (bank 2)	2BH	09H	Max.	X
		2CH	89H	Min.	X
	Heated oxygen sensor 2 heater (bank 1)	2DH	0AH	Max.	X
		2EH	8AH	Min.	X
	Heated oxygen sensor 2 heater (bank 2)	2FH	0BH	Max.	X
		30H	8BH	Min.	X

EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS

NFEC0031S05

X: Applicable —: Not applicable

Items (CONSULT-II screen terms)	DTC*1		SRT code	Test value/ Test limit (GST only)	1st trip DTC*1	Reference page
	CONSULT-II GST*2	ECM*3				
CAN COMM CIRCUIT	U1000	1000*6	—	—	X	EC-164
CAN COMM CIRCUIT	U1001	1001*6	—	—	X	EC-164
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	**P0000**	**0000**	**—**	**—**	**—**	**—**
INT/V TIM CONT-B1	P0011	0011	—	—	X	EC-167
INT/V TIM CONT-B2	P0021	0021	—	—	X	EC-167

Items (CONSULT-II screen terms)	DTC*1		SRT code	Test value/ Test limit (GST only)	1st trip DTC*1	Reference page
	CONSULT-II GST*2	ECM*3				
HO2S1 HTR (B1)	P0031	0031	X	X	X*5	EC-175
HO2S1 HTR (B1)	P0032	0032	X	X	X*5	EC-175
HO2S2 HTR (B1)	P0037	0037	X	X	X*5	EC-181
HO2S2 HTR (B1)	P0038	0038	X	X	X*5	EC-181
HO2S1 HTR (B2)	P0051	0051	X	X	X*5	EC-175
HO2S1 HTR (B2)	P0052	0052	X	X	X*5	EC-175
HO2S2 HTR (B2)	P0057	0057	X	X	X*5	EC-181
HO2S2 HTR (B2)	P0058	0058	X	X	X*5	EC-181
MAF SEN/CIRCUIT	P0101	0101	—	—	X	EC-188
MAF SEN/CIRCUIT*8	P0102	0102	—	—	—	EC-195
MAF SEN/CIRCUIT*8	P0103	0103	—	—	—	EC-195
ABSL PRES SEN/CIRC	P0107	0107	—	—	X	EC-201
ABSL PRES SEN/CIRC	P0108	0108	—	—	X	EC-201
IAT SEN/CIRCUIT	P0112	0112	—	—	X	EC-203
IAT SEN/CIRCUIT	P0113	0113	—	—	X	EC-203
ECT SEN/CIRC*8	P0117	0117	—	—	—	EC-207
ECT SEN/CIRC*8	P0118	0118	—	—	—	EC-207
APP SEN/CIRCUIT*8	P0121	0121	—	—	—	EC-212
TP SEN/CIRCUIT*8	P0122	0122	—	—	—	EC-212
TP SEN/CIRCUIT*8	P0123	0123	—	—	—	EC-212
ECT SENSOR	P0125	0125	—	—	X	EC-213
IAT SENSOR	P0127	0127	—	—	X	EC-216
THERMSTAT FNCTN	P0128	0128	—	—	X	EC-218
HO2S1 (B1)	P0132	0132	X	X	X*5	EC-220
HO2S1 (B1)	P0133	0133	X	X	X*5	EC-228
HO2S1 (B1)	P0134	0134	X	X	X*5	EC-240
HO2S2 (B1)	P0138	0138	X	X	X*5	EC-249
HO2S2 (B1)	P0139	0139	X	X	X*5	EC-257
HO2S1 (B2)	P0152	0152	X	X	X*5	EC-220
HO2S1 (B2)	P0153	0153	X	X	X*5	EC-228
HO2S1 (B2)	P0154	0154	X	X	X*5	EC-240
HO2S2 (B2)	P0158	0158	X	X	X*5	EC-249
HO2S2 (B2)	P0159	0159	X	X	X*5	EC-257
FUEL SYS-LEAN-B1	P0171	0171	—	—	X	EC-267
FUEL SYS-RICH-B1	P0172	0172	—	—	X	EC-275
FUEL SYS-LEAN-B2	P0174	0174	—	—	X	EC-267

Items (CONSULT-II screen terms)	DTC*1		SRT code	Test value/ Test limit (GST only)	1st trip DTC*1	Reference page
	CONSULT-II GST*2	ECM*3				
FUEL SYS-RICH-B2	P0175	0175	—	—	X	EC-275
FTT SENSOR	P0181	0181	—	—	X	EC-282
FTT SEN/CIRCUIT	P0182	0182	—	—	X	EC-285
FTT SEN/CIRCUIT	P0183	0183	—	—	X	EC-285
TP SENSOR*8	P0221	0221	—	—	—	EC-290
TP SEN 1/CIRC*8	P0222	0222	—	—	—	EC-297
TP SEN 1/CIRC*8	P0223	0223	—	—	—	EC-297
APP SENSOR*8	P0226	0226	—	—	—	EC-304
APP SEN 1/CIRC*8	P0227	0227	—	—	—	EC-311
APP SEN 1/CIRC*8	P0228	0228	—	—	—	EC-311
MULTI CYL MISFIRE	P0300	0300	—	—	X	EC-317
CYL 1 MISFIRE	P0301	0301	—	—	X	EC-317
CYL 2 MISFIRE	P0302	0302	—	—	X	EC-317
CYL 3 MISFIRE	P0303	0303	—	—	X	EC-317
CYL 4 MISFIRE	P0304	0304	—	—	X	EC-317
CYL 5 MISFIRE	P0305	0305	—	—	X	EC-317
CYL 6 MISFIRE	P0306	0306	—	—	X	EC-317
KNOCK SEN/CIRC-B1	P0327	0327	—	—	—	EC-325
KNOCK SEN/CIRC-B1	P0328	0328	—	—	—	EC-325
CKP SEN/CIRCUIT	P0335	0335	—	—	X	EC-330
CMP SEN/CIRCUIT	P0340	0340	—	—	X	EC-337
CMP SEN/CIRC-B2	P0345	0345	—	—	X	EC-337
TW CATALYST SYS-B1	P0420	0420	X	X	X*5	EC-346
TW CATALYST SYS-B2	P0430	0430	X	X	X*5	EC-346
EVAP PURG FLOW/MON	P0441	0441	X	X	X*5	EC-351
EVAP SMALL LEAK	P0442	0442	X	X	X*5	EC-361
PURG VOLUME CONT/V	P0444	0444	—	—	X	EC-376
PURG VOLUME CONT/V	P0445	0445	—	—	X	EC-376
VENT CONTROL VALVE	P0447	0447	—	—	X	EC-383
EVAP SYS PRES SEN	P0452	0452	—	—	X	EC-390
EVAP SYS PRES SEN	P0453	0453	—	—	X	EC-396
EVAP GROSS LEAK	P0455	0455	—	X	X*5	EC-405
EVAP VERY SML LEAK	P0456	0456	X*4	X	X*5	EC-417
FUEL LEV SEN SLOSH	P0460	0460	—	—	X	EC-432
FUEL LEVEL SENSOR	P0461	0461	—	—	X	EC-436
FUEL LEVL SEN/CIRC	P0462	0462	—	—	X	EC-438

Items (CONSULT-II screen terms)	DTC*1		SRT code	Test value/ Test limit (GST only)	1st trip DTC*1	Reference page
	CONSULT-II GST*2	ECM*3				
FUEL LEVL SEN/CIRC	P0463	0463	—	—	X	EC-438
VEH SPEED SEN/CIRC*7	P0500	0500	—	—	X	EC-442
ISC SYSTEM	P0506	0506	—	—	X	EC-446
ISC SYSTEM	P0507	0507	—	—	X	EC-448
PW ST P SEN/CIRC	P0550	0550	—	—	X	EC-450
ECM	P0605	0605	—	—	X	EC-455
MIL/CIRC	P0650	0650	—	—	X	EC-457
PNP SW/CIRC	P0705	0705	—	—	X	AT-104
ATF TEMP SEN/CIRC	P0710	0710	—	—	X	AT-110
VEH SPD SEN/CIR AT*7	P0720	0720	—	—	X	AT-116
ENGINE SPEED SIG	P0725	0725	—	—	X	AT-121
A/T 1ST GR FNCTN	P0731	0731	—	—	X	AT-126
A/T 2ND GR FNCTN	P0732	0732	—	—	X	AT-132
A/T 3RD GR FNCTN	P0733	0733	—	—	X	AT-138
A/T 4TH GR FNCTN	P0734	0734	—	—	X	AT-144
TCC SOLENOID/CIRC	P0740	0740	—	—	X	AT-153
A/T TCC S/V FNCTN	P0744	0744	—	—	X	AT-158
L/PRESS SOL/CIRC	P0745	0745	—	—	X	AT-168
SFT SOL A/CIRC*8	P0750	0750	—	—	—	AT-174
SFT SOL B/CIRC*8	P0755	0755	—	—	—	AT-179
ECM BACK UP/CIRCUIT	P1065	1065	—	—	X	EC-461
MAF SENSOR*8	P1102	1102	—	—	—	EC-465
ETC ACTR*8	P1121	1121	—	—	—	EC-471
ETC FUNCTION/CIRC*8	P1122	1122	—	—	—	EC-473
ETC MOT PWR	P1124	1124	—	—	X	EC-481
ETC MOT PWR*8	P1126	1126	—	—	—	EC-481
ETC MOT	P1128	1128	—	—	—	EC-487
HO2S1 (B1)	P1143	1143	X	X	X*5	EC-492
HO2S1 (B1)	P1144	1144	X	X	X*5	EC-499
HO2S2 (B1)	P1146	1146	X	X	X*5	EC-506
HO2S2 (B1)	P1147	1147	X	X	X*5	EC-516
CLOSED LOOP-B1	P1148	1148	—	—	—	EC-526
HO2S1 (B2)	P1163	1163	X	X	X*5	EC-492
HO2S1 (B2)	P1164	1164	X	X	X*5	EC-499
HO2S2 (B2)	P1166	1166	X	X	X*5	EC-506
HO2S2 (B2)	P1167	1167	X	X	X*5	EC-516

Emission-related Diagnostic Information (Cont'd)

Items (CONSULT-II screen terms)	DTC*1		SRT code	Test value/ Test limit (GST only)	1st trip DTC*1	Reference page
	CONSULT-II GST*2	ECM*3				
CLOSED LOOP-B2	P1168	1168	—	—	—	EC-526
TCS C/U FUNCTN	P1211	1211	—	—	X	EC-528
TCS/CIRC	P1212	1212	—	—	X	EC-530
ENG OVER TEMP	P1217	1217	—	—	X	EC-532
TP SEN 2/CIRC*8	P1223	1223	—	—	—	EC-550
TP SEN 2/CIRC*8	P1224	1224	—	—	—	EC-550
CTP LEARNING	P1225	1225	—	—	X	EC-557
CTP LEARNING	P1226	1226	—	—	X	EC-559
APP SEN 2/CIRC*8	P1227	1227	—	—	—	EC-561
APP SEN 2/CIRC*8	P1228	1228	—	—	—	EC-561
SENSOR POWER/CIRC*8	P1229	1229	—	—	—	EC-567
PURG VOLUME CONT/V	P1444	1444	—	—	X	EC-573
VENT CONTROL VALVE	P1446	1446	—	—	X	EC-586
VENT CONTROL VALVE	P1448	1448	—	—	X	EC-594
EVAP VERY SML LEAK	P1456	1456	X*4	X	X*5	EC-603
FUEL LEVL SEN/CIRC	P1464	1464	—	—	X	EC-619
VC/V BYPASS/V	P1490	1490	—	—	X	EC-622
VC CUT/V BYPASS/V	P1491	1491	—	—	X	EC-628
ASCD SW	P1564	1564	—	—	X	EC-640
ASCD BRAKE SW	P1572	1572	—	—	X	EC-647
ASCD VHL SPD SEN	P1574	1574	—	—	X	EC-662
NATS MALFUNCTION	P1610-P1615	1610-1615	—	—	X	EL-356
TP SEN/CIRC A/T	P1705	1705	—	—	X	AT-184
P-N POS SW/CIRCUIT	P1706	1706	—	—	X	EC-667
O/R CLTCH SOL/CIRC	P1760	1760	—	—	X	AT-191
VIAS S/V CIRC	P1800	1800	—	—	X	EC-673
BRAKE SW/CIRCUIT	P1805	1805	—	—	X	EC-678

*1: 1st trip DTC No. is the same as DTC No.
*2: These numbers are prescribed by SAE J2012.
*3: In Diagnostic Test Mode II (Self-diagnostic results), these numbers are controlled by NISSAN.
*4: SRT code will not be set if the self-diagnostic result is NG.
*5: These are not displayed with GST.
*6: The troubleshooting for this DTC needs CONSULT-II.
*7: When the fail-safe operations for both self-diagnoses occur at the same time, the MIL illuminates.
*8: When the fail-safe operation occurs, the MIL illuminates.

NOTE:
Regarding A33 models, "-B1" indicates bank 1 and "-B2" indicates bank 2.

HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION

NFEC0031S06

How to Erase DTC (With CONSULT-II)

NFEC0031S0601

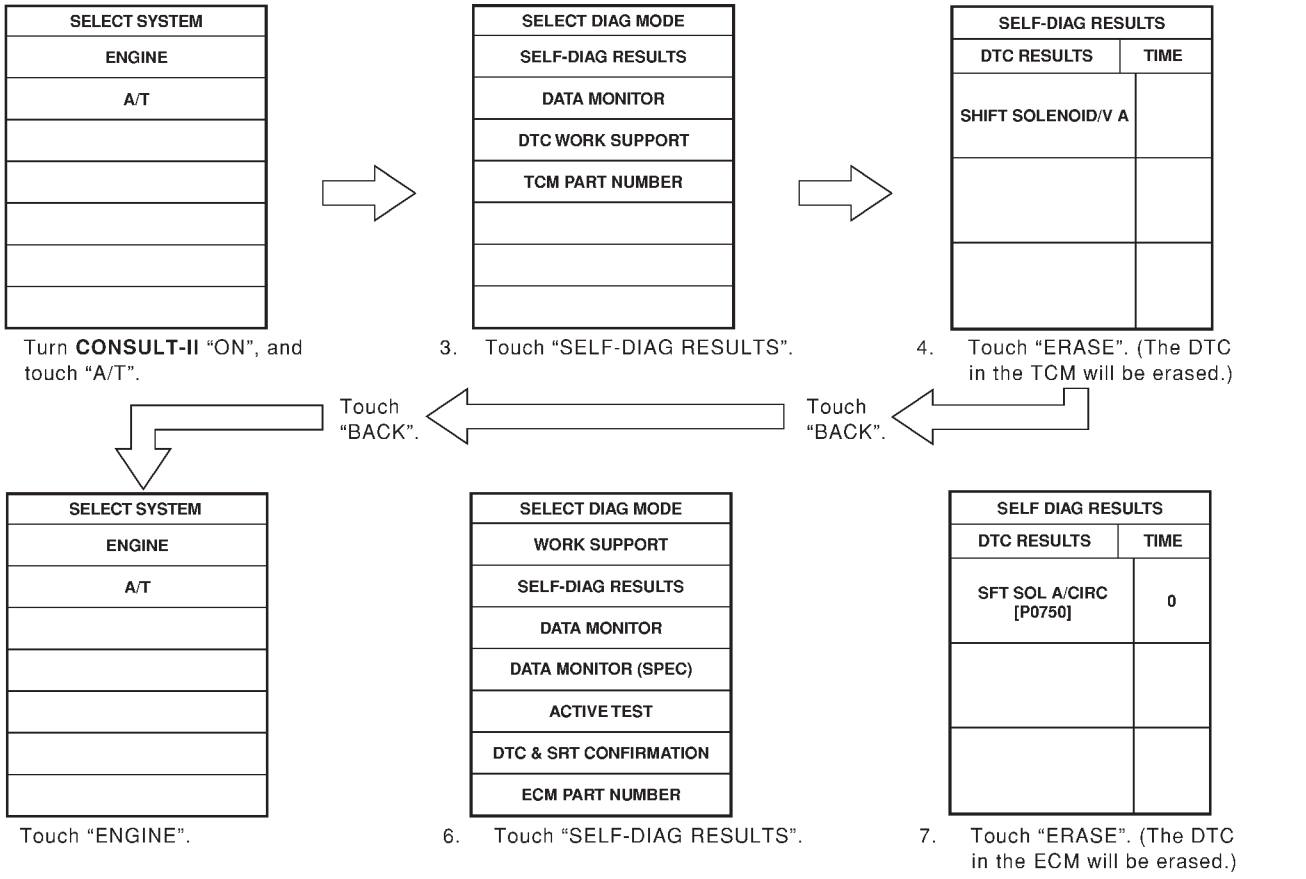
NOTE:
If the DTC is not for A/T related items (see EC-9), skip steps 2 through 4.

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.)

- 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).

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" (engine stopped) again.



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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).

How to Erase DTC (With GST)

NFEC0031S0602

NOTE:
If the DTC is not for A/T related items (see EC-9), 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 AT 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).

The emission related diagnostic information in the ECM can be erased by selecting Mode 4 with GST.

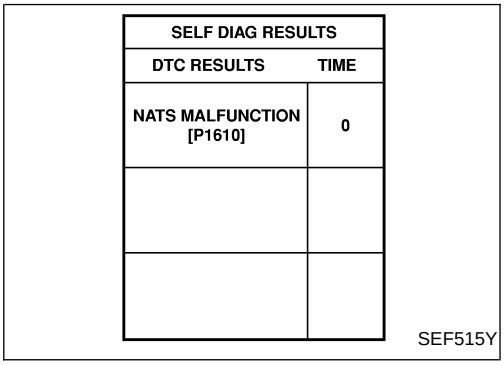
- **If the battery is disconnected, the emission-related diagnostic information will be lost after approx. 24 hours.**
- **The following data are cleared when the ECM memory is erased.**

1) Diagnostic trouble codes
2) 1st trip diagnostic trouble codes
3) Freeze frame data
4) 1st trip freeze frame data
5) System readiness test (SRT) codes
6) Test values
7) 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.

NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM — NATS)

NFEC0031S08



- **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 "NVIS (Nissan Vehicle Immobilizer System — NATS)" EL-356.**
- **Confirm no self-diagnostic results of NVIS (NATS) is displayed before touching "ERASE" in "SELF-DIAG RESULTS" mode with CONSULT-II.**
- **When replacing ECM, initialization of NVIS (NATS) system and registration of all NVIS (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 NVIS (NATS) initialization and NVIS (NATS) ignition key ID registration, refer to CONSULT-II operation manual, IVIS/NVIS.

Malfunction Indicator Lamp (MIL)

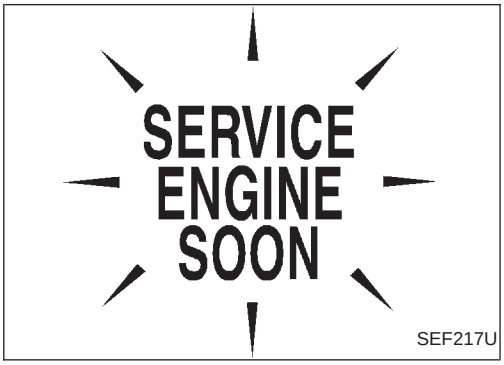
NFEC1189

DESCRIPTION

NFEC1189S01

The MIL is located on the instrument panel.

1. The MIL will light up when the ignition switch is turned ON without the engine running. This is a bulb check.
   - If the MIL does not light up, refer to "WARNING LAMPS", EL-136 or see DTC P0650 MIL (CIRCUIT), EC-457.
2. When the engine is started, the MIL should go off. If the MIL remains on, the on board diagnostic system has detected an engine system malfunction.



SEF217U

ON BOARD DIAGNOSTIC SYSTEM FUNCTION

NFEC1189S02

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 MIL bulb for damage (blown, open circuit, etc.). If the MIL does not come on, check MIL 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 MIL will light up to inform the driver that a malfunction has been detected. The following malfunctions will light up or blink the MIL in the 1st trip. ● "Misfire (Possible three way catalyst damage)" ● "Throttle control motor" ● "Closed loop control" ● Fail-safe mode
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.

MIL Flashing without DTC

NFEC1189S0201

If the ECM is in Diagnostic Test Mode II, MIL may flash when engine is running. In this case, check ECM diagnostic test mode. How to Switch Diagnostic Test Mode.
How to switch the diagnostic test (function) modes, and details of the above functions are described later.How to Switch Diagnostic Test Mode.
The following emission-related diagnostic information is cleared when the ECM memory is erased.

1. Diagnostic trouble codes
2. 1st trip diagnostic trouble codes
3. Freeze frame data
4. 1st trip freeze frame data
5. System readiness test (SRT) codes

6. Test values
7. Others

HOW TO SWITCH DIAGNOSTIC TEST MODE

NFEC1189S03

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".**

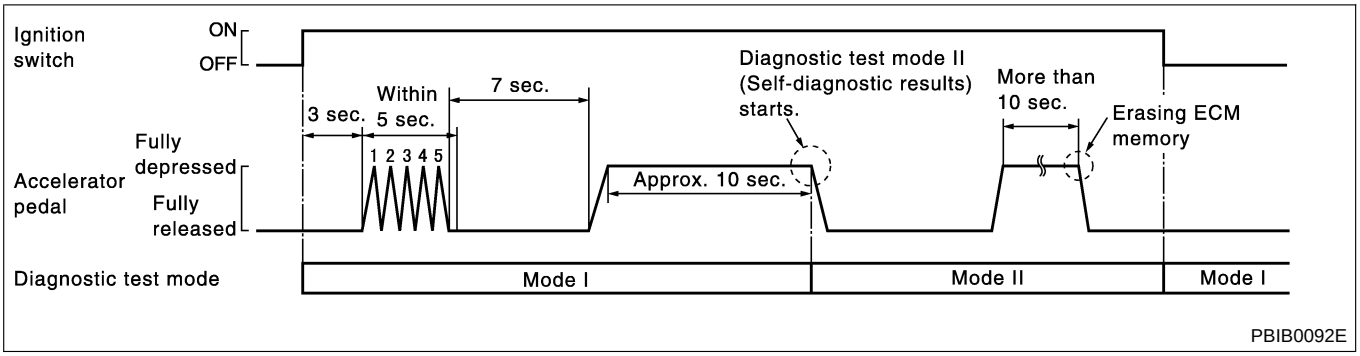
How to Set Diagnostic Test Mode II (Self-diagnostic Results)

NFEC1189S0301

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.

1) Fully depress the accelerator pedal.
2) Fully release the accelerator pedal.

3. Wait 7 seconds, fully depress the accelerator pedal and keep it for approx. 10 seconds until the MIL 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)

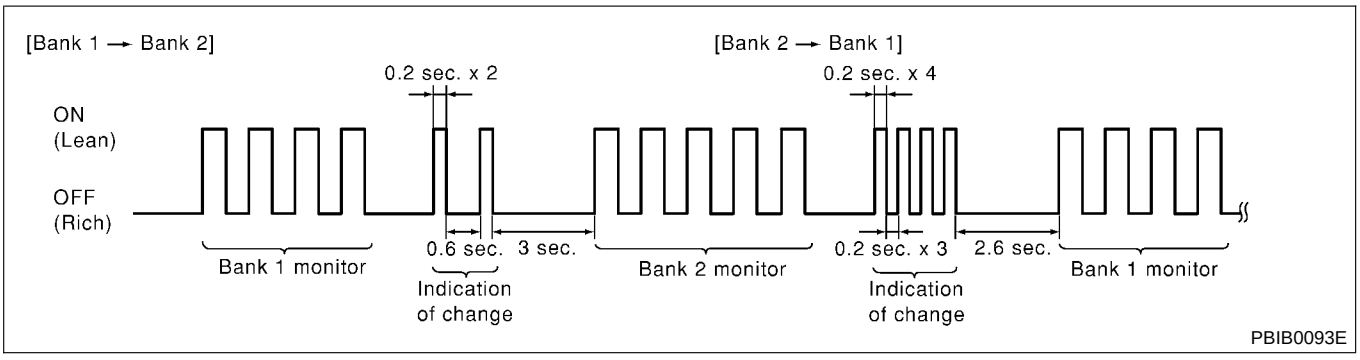
NFEC1189S0302

1. Set the ECM in Diagnostic Test Mode II (Self-diagnostic results). Refer to 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).
   ECM will start heated oxygen sensor 1 monitoring from the bank 1 sensor.

How to Set Diagnostic Switch Monitored Sensor from Bank 1 to Bank 2 or Vice versa

NFEC1189S0303

1. Fully depress the accelerator pedal quickly and then release it immediately.
2. Make sure that monitoring sensor has changed by MIL blinking as follows.



How to Erase Diagnostic Test Mode II (Self-diagnostic Results)

NFEC1189S0304

1. Set ECM in Diagnostic Test Mode II (Self-diagnostic results). Refer to 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

NFEC1189S04

In this mode, the MIL on the instrument panel should stay ON. If it remains OFF, check the bulb. Refer to "WARNING LAMPS", EL-136 or see DTC P0650 MIL (CIRCUIT), EC-457.

DIAGNOSTIC TEST MODE I — MALFUNCTION WARNING

NFEC1189S05

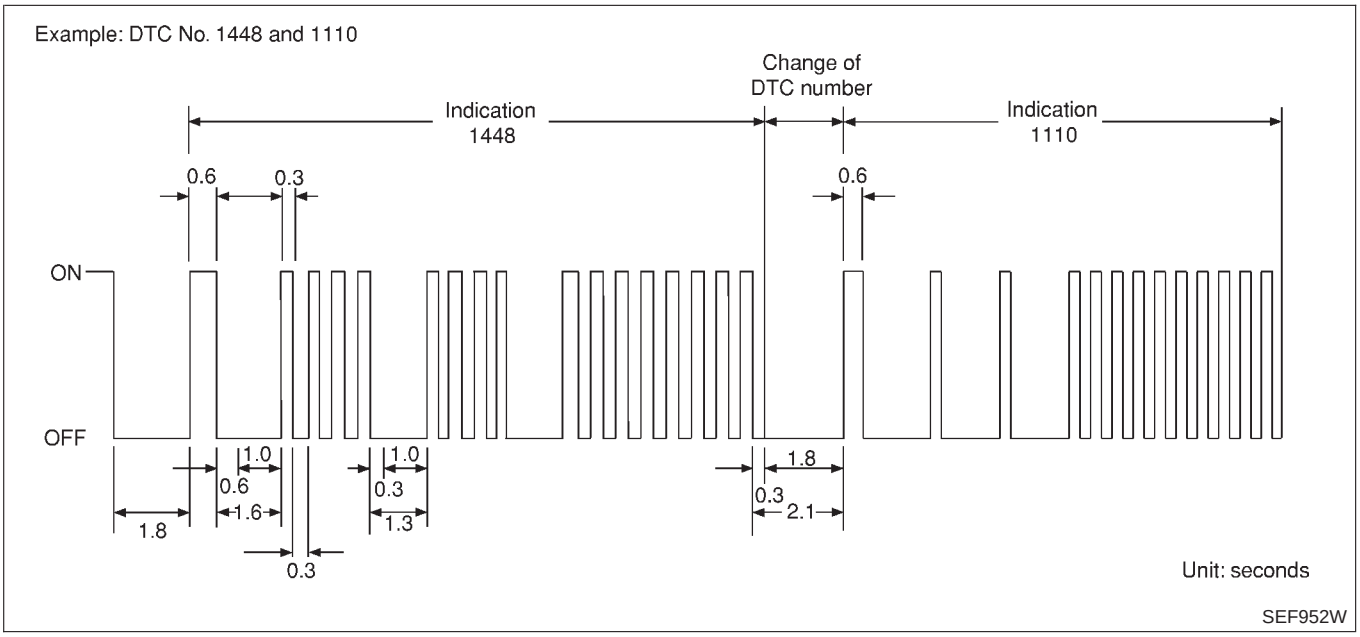
MIL	Condition
ON	When the malfunction is detected or the ECM's CPU is malfunctioning.
OFF	No malfunction.

- These DTC numbers are clarified in Diagnostic Test Mode II (SELF-DIAGNOSTIC RESULTS)

DIAGNOSTIC TEST MODE II — SELF-DIAGNOSTIC RESULTS

NFEC1189S06

In this mode, the DTC and 1st trip DTC are indicated by the number of blinks of the MIL as shown below. The DTC and 1st trip DTC are displayed at the same time. If the MIL 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 MIL 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 "TROUBLE DIAGNOSIS — INDEX", EC-9.)

How to Erase Diagnostic Test Mode II (Self-diagnostic Results)

NFEC1189S0601

The DTC can be erased from the back up memory in the ECM by depressing accelerator pedal. Refer to How to Switch Diagnostic Test Mode.

- **If the battery is disconnected, the DTC will be lost from the backup memory after approx 24 hours.**
- **Be careful not to erase the stored memory before starting trouble diagnoses.**

Malfunction Indicator Lamp (MIL) (Cont'd)

DIAGNOSTIC TEST MODE II — HEATED OXYGEN SENSOR 1 MONITOR

NFEC1189S07

In this mode, the MIL displays the condition of the fuel mixture (lean or rich) which is monitored by the heated oxygen sensor 1.

MIL	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 MIL comes ON more than 5 times within 10 seconds with engine running at 2,000 rpm under no-load.

OBD System Operation Chart

NFEC0033

RELATIONSHIP BETWEEN MIL, 1ST TRIP DTC, DTC, AND DETECTABLE ITEMS

NFEC0033S01

- 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 MIL will come on. For details, refer to "Two Trip Detection Logic" on EC-75.
- The MIL 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

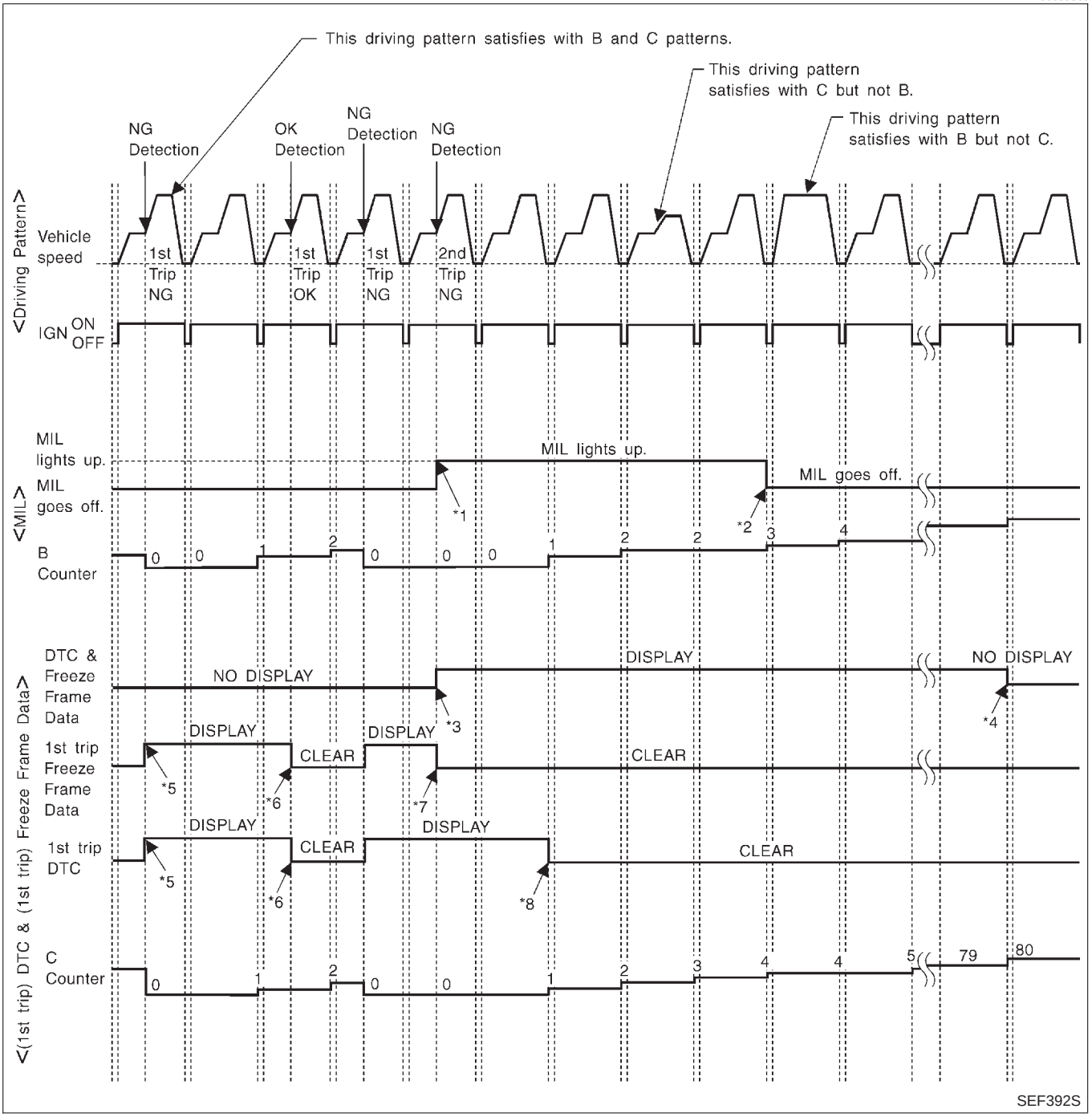
NFEC0033S02

Items	Fuel Injection System	Misfire	Other
MIL (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-98.
For details about patterns "A" and "B" under "Other", see EC-100.
*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 MIL, DTC, 1ST TRIP DTC AND DRIVING PATTERNS FOR "MISFIRE" <EXHAUST QUALITY DETERIORATION>, "FUEL INJECTION SYSTEM"

=NFEC0033S03



*1: When the same malfunction is detected in two consecutive trips, MIL will light up.

*2: MIL 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"

NFEC0033S04

<Driving Pattern B>

NFEC0033S0401

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 MIL will go off when the B counter reaches 3. (*2 in "OBD SYSTEM OPERATION CHART")

<Driving Pattern C>

NFEC0033S0402

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:

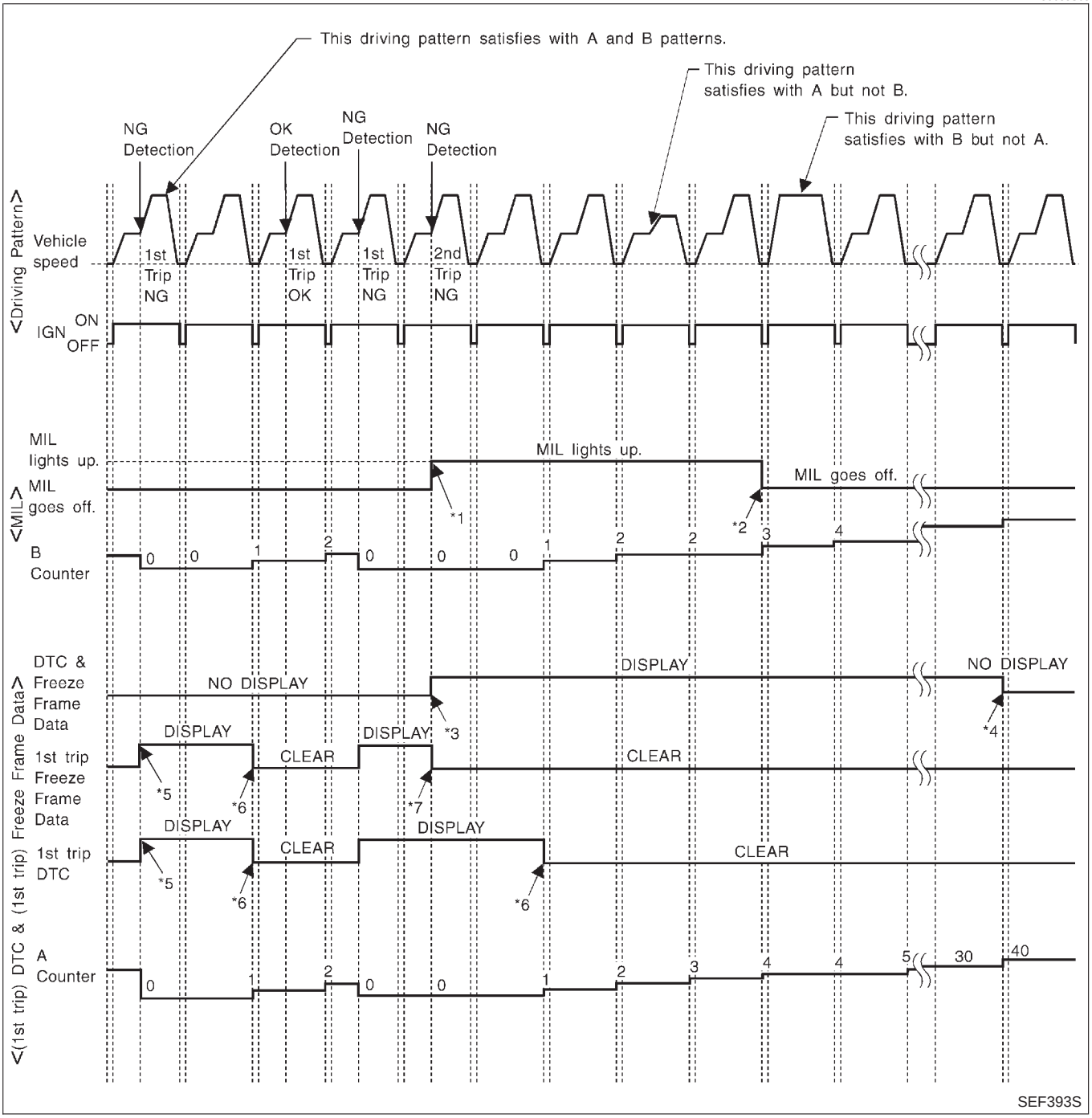
- When the freeze frame data shows lower than 70°C (158°F), "T" should be lower than 70°C (158°F).
- When the freeze frame data shows higher than or equal to 70°C (158°F), "T" should be higher than or equal to 70°C (158°F).

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 (1).
- The C counter will be counted up when (1) 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 MIL, DTC, 1ST TRIP DTC AND DRIVING PATTERNS EXCEPT FOR "MISFIRE <EXHAUST QUALITY DETERIORATION>", "FUEL INJECTION SYSTEM"

NFEC0033S05



*1: When the same malfunction is detected in two consecutive trips, MIL will light up.

*2: MIL 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.

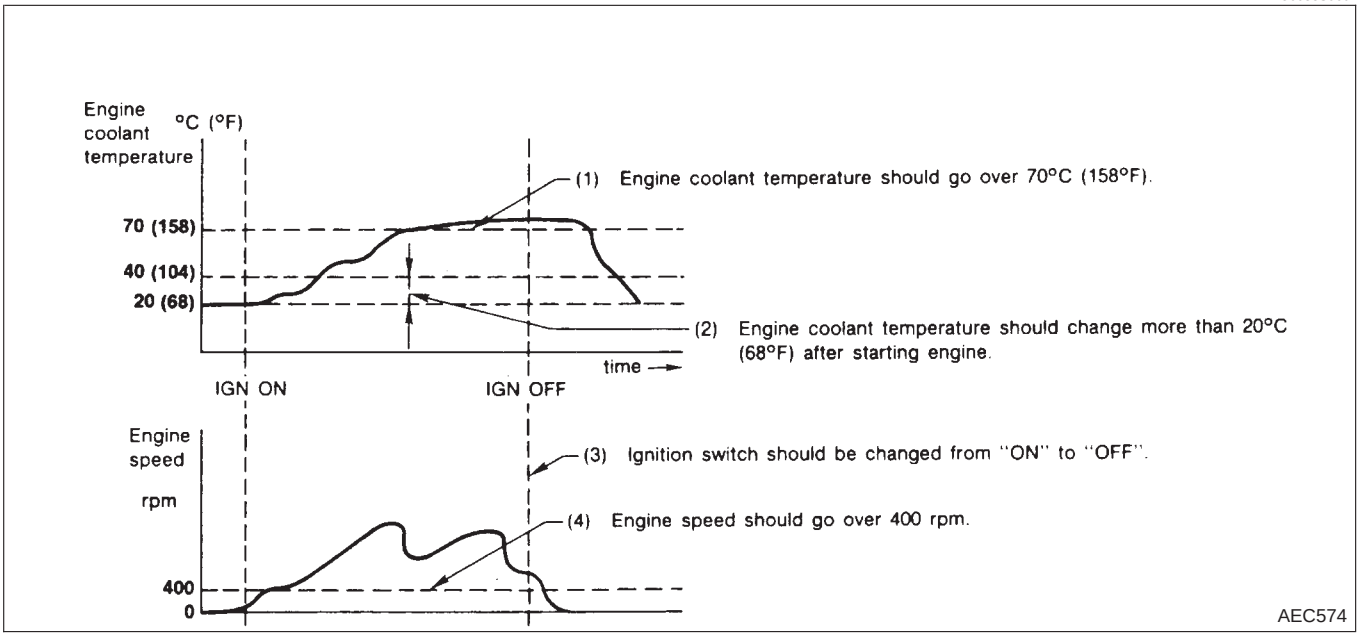
*7: When the same malfunction is detected in the 2nd trip, the 1st trip freeze frame data will be cleared.

EXPLANATION FOR DRIVING PATTERNS EXCEPT FOR "MISFIRE <EXHAUST QUALITY DETERIORATION>", "FUEL INJECTION SYSTEM"

NFEC0033S06

<Driving Pattern A>

NFEC0033S0601



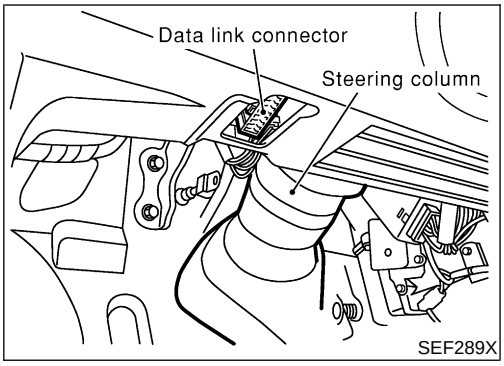
- The A counter will be cleared when the malfunction is detected regardless of (1) - (4).
- The A counter will be counted up when (1) - (4) are satisfied without the same malfunction.
- The DTC will not be displayed after the A counter reaches 40.

<Driving Pattern B>

NFEC0033S0602

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 MIL will go off when the B counter reaches 3 (*2 in "OBD System Operation Chart", EC-96).



SEF289X

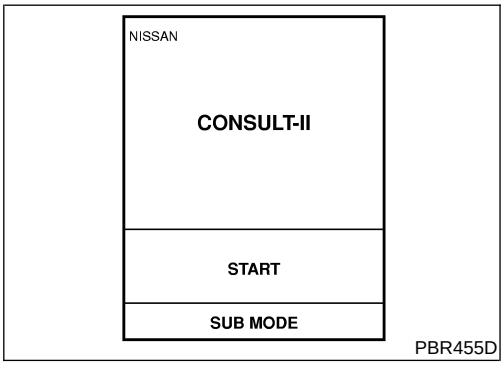
CONSULT-II

=NFEC0034

CONSULT-II INSPECTION PROCEDURE

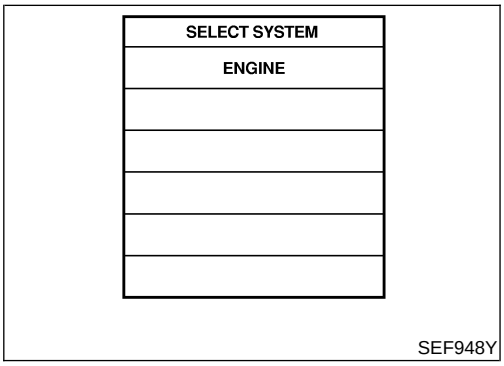
NFEC0034S01

1. Turn ignition switch OFF.
2. Connect CONSULT-II to data link connector, which is located under LH dash panel near the fuse box cover.



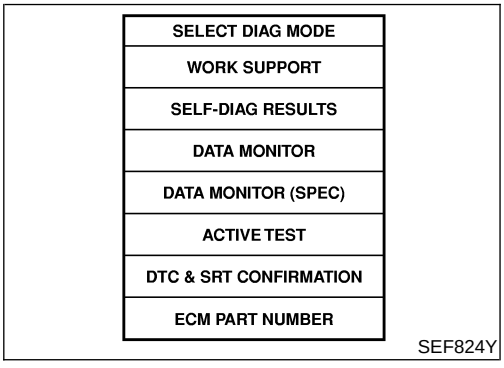
PBR455D

3. Turn ignition switch ON.
4. Touch “START”.



SEF948Y

5. Touch “ENGINE”.



SEF824Y

6. Perform each diagnostic test mode according to each service procedure.

For further information, see the CONSULT-II Operation Manual.

CONSULT-II (Cont'd)

ENGINE CONTROL COMPONENT PARTS/CONTROL SYSTEMS APPLICATION

NFEC0034S02

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)		X	X	X	X			
		Camshaft position sensor (PHASE)		X						
		Mass air flow sensor		X		X	X			
		Engine coolant temperature sensor		X	X	X	X	X		
		Heated oxygen sensor 1		X		X	X		X	X
		Heated oxygen sensor 2		X		X	X		X	X
		Vehicle speed sensor		X	X	X	X			
		Accelerator pedal position sensor		X		X	X			
		Throttle position sensor		X		X	X			
		Fuel tank temperature sensor		X		X	X	X		
		EVAP control system pressure sensor		X		X	X			
		Absolute pressure sensor		X		X	X			
		Intake air temperature sensor		X		X	X			
		Knock sensor		X						
		Refrigerant pressure sensor				X	X			
		Ignition switch (start signal)				X	X			
		Closed throttle position switch (accelerator pedal position sensor signal)				X	X			
		Air conditioner switch				X	X			
		Park/neutral position (PNP) switch		X		X	X			
		Power steering pressure sensor		X		X	X			
		Battery voltage				X	X			
		Load signal				X	X			
		Fuel level sensor		X		X	X			
		ASCD steering switch		X		X	X			
		ASCD brake switch		X		X	X			

CONSULT-II (Cont'd)

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	OUTPUT	Injectors				X	X	X		
		Power transistor (Ignition timing)				X	X	X		
		Throttle control motor relay		X		X	X			
		EVAP canister purge volume control solenoid valve		X		X	X	X		X
		Air conditioner relay				X	X			
		Fuel pump relay	X			X	X	X		
		Heated oxygen sensor 1 heater		X		X	X		X	
		Heated oxygen sensor 2 heater		X		X	X		X	
		EVAP canister vent control valve		X		X	X	X		
		Vacuum cut valve bypass valve		X		X	X	X		X
		VIAS control solenoid valve		X		X	X	X		
		Intake valve timing control sole-noid valve		X		X	X	X		
		Electronic controlled engine mount				X	X	X		
		Calculated load value			X	X	X			

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-77.

CONSULT-II (Cont'd)

FUNCTION

=NFEC0034S03

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-DIAG 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.*1
DATA MONITOR	Input/Output data in the ECM can be read.
DATA MONITOR (SPEC)	Input/Output specification of the basic fuel schedule, AFM, A/F feedback control value and the other data monitor items 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	Conducted by CONSULT-II instead of a technician to determine whether each system is "OK" or "NG".
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.

*1 The following emission-related diagnostic information is cleared when the ECM memory is erased.

1) Diagnostic trouble codes
2) 1st trip diagnostic trouble codes
3) Freeze frame data
4) 1st trip freeze frame data
5) System readiness test (SRT) codes
6) Test values
7) Others

WORK SUPPORT MODE

=NFEC0034S04

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
EVAP SYSTEM CLOSE	OPEN THE VACUUM CUT VALVE BYPASS VALVE AND CLOSE THE EVAP CANISTER VENT CONTROL VALVE IN ORDER TO MAKE EVAP SYSTEM CLOSE UNDER THE FOLLOWING CONDITIONS. • IGN SW "ON" • ENGINE NOT RUNNING • AMBIENT TEMPERATURE IS ABOVE 0°C (32°F). • NO VACUUM AND NO HIGH PRESSURE IN EVAP SYSTEM • TANK FUEL TEMP. IS MORE THAN 0°C (32°F). • WITHIN 10 MINUTES AFTER STARTING "EVAP SYSTEM CLOSE" • WHEN TRYING TO EXECUTE "EVAP SYSTEM CLOSE" UNDER THE CONDITION EXCEPT ABOVE, CONSULT-II WILL DISCONTINUE IT AND DISPLAY APPROPRIATE INSTRUCTION. **NOTE:** **WHEN STARTING ENGINE, CONSULT-II MAY DISPLAY "BATTERY VOLTAGE IS LOW. CHARGE BATTERY", EVEN IN USING CHARGED BATTERY.**	When detecting EVAP vapor leak point of EVAP system
TARGET IGN TIM ADJ*	• IDLE CONDITION	• When adjusting target ignition timing After adjustment, confirm target ignition timing with a timing light. • If once the "TARGET IDLE RPM ADJ" has been done, the Idle Air Volume Learning procedure will not be completed.
TARGET IDLE RPM ADJ*	• IDLE CONDITION	When setting target idle speed

*: This function is not necessary in the usual service procedure.

SELF-DIAGNOSTIC MODE

NFEC0034S05

DTC and 1st Trip DTC

NFEC0034S0501

Regarding items of "DTC and 1st trip DTC", refer to "TROUBLE DIAGNOSIS — INDEX" (See EC-9.)

Freeze Frame Data and 1st Trip Freeze Frame Data

NFEC0034S0502

Freeze frame data item*1	Description
DIAG TROUBLE CODE [PXXXX]	• The engine control component part/control system has a trouble code, it is displayed as "PXXXX". (Refer to "TROUBLE DIAGNOSIS — INDEX", EC-9.)

CONSULT-II (Cont'd)

Freeze frame data item*1	Description
FUEL SYS-B1*2	• "Fuel injection system status" at the moment a malfunction is detected is displayed. • One mode in the following is displayed. "MODE 2": Open loop due to detected system malfunction "MODE 3": Open loop due to driving conditions (power enrichment, deceleration enrichment) "MODE 4": Closed loop - using oxygen sensor(s) as feedback for fuel control "MODE 5": Open loop - has not yet satisfied condition to go to closed loop
FUEL SYS-B2*2	
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.
S-FUEL TRIM-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.
S-FUEL TRIM-B2 [%]	
L-FUEL TRIM-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.
L-FUEL TRIM-B2 [%]	
ENGINE SPEED [rpm]	• The engine speed at the moment a malfunction is detected is displayed.
VHCL 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.

*1: The items are the same as those of 1st trip freeze frame data.
*2: Regarding A33, "B1" indicates bank 1 and "B2" indicates bank 2.

DATA MONITOR MODE

=NFEC0034S06

Monitored item [Unit]	ECM INPUT SIGNALS	MAIN SIGNALS	CAN DIAG SUPPORT MNTR	Description	Remarks
ENG SPEED [rpm]	○	○		• Indicates the engine speed computed from the signal 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.
MAS A/F SE-B1 [V]	○	○		• The signal voltage of the mass air flow sensor is displayed.	• When the engine is stopped, a certain value is 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.	
HO2S1 (B2) [V]	○				
HO2S2 (B1) [V]	○			• The signal voltage of the heated oxygen sensor 2 is displayed.	
HO2S2 (B2) [V]	○				
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.
HO2S1 MNTR (B2) [RICH/LEAN]	○				
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.
HO2S2 MNTR (B2) [RICH/LEAN]	○				
VHCL SPEED SE [km/h] or [mph]	○	○		• The vehicle speed computed from the vehicle speed sensor signal is displayed.	
BATTERY VOLT [V]	○	○		• The power supply voltage of ECM is displayed.	
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]	○				
FUEL T/TMP SE [°C] or [°F]	○			• The fuel temperature judged from the fuel tank temperature sensor signal voltage is displayed.	

CONSULT-II (Cont'd)

Monitored item [Unit]	ECM INPUT SIG-NALS	MAIN SIG-NALS	CAN DIAG SUP-PORT MNTR	Description	Remarks
INT/A TEMP SE [°C] or [°F]	○	○		• The intake air temperature determined by the signal voltage of the intake air temperature sensor is indicated.	
EVAP SYS PRES [V]	○			• The signal voltage of EVAP control system pressure sensor is displayed.	
ABSOL PRES/SE [V]	○			• The signal voltage of the absolute pressure sensor is displayed.	
FUEL LEVEL SE [V]	○			• The signal voltage of the fuel level sensor is displayed.	
START SIGNAL [ON/OFF]	○	○		• Indicates [ON/OFF] condition from the starter signal.	• After starting the engine, [OFF] is displayed regardless of the starter signal.
CLSD THL POS [ON/OFF]	○	○		• Indicates idle position [ON/OFF] computed by 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 system (determined by the power steering pressure sensor signal) is indicated.	
LOAD SIGNAL [ON/OFF]	○	○		• Indicates [ON/OFF] condition from the electrical load signal and/or lighting switch. ON ... rear defogger is operating and/or lighting switch is on. OFF ... rear defogger is not operating and lighting switch is not on.	
IGNITION SW [ON/OFF]	○			• Indicates [ON/OFF] condition from ignition switch.	
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.
INJ PULSE-B2 [msec]					
B/FUEL SCHDL [msec]		○		• "Base fuel schedule" indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction.	

Monitored item [Unit]	ECM INPUT SIG-NALS	MAIN SIG-NALS	CAN DIAG SUP-PORT MNTR	Description	Remarks
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.
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.	
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.
A/F ALPHA-B2 [%]		○			
AIR COND RLY [ON/OFF]		○		• The air conditioner relay control condition (determined by ECM according to the input signal) is indicated.	
FUEL PUMP RLY [ON/OFF]		○		• Indicates the fuel pump relay control condition determined by ECM according to the input signals.	
VENT CONT/V [ON/OFF]				• The control condition of the EVAP canister vent control valve (determined by ECM according to the input signal) is indicated. • ON ... Closed OFF ... Open	
HO2S1 HTR (B1) [ON/OFF]				• Indicates [ON/OFF] condition of heated oxygen sensor 1 heater determined by ECM according to the input signals.	
HO2S1 HTR (B2) [ON/OFF]					
HO2S2 HTR (B1) [ON/OFF]				• Indicates [ON/OFF] condition of heated oxygen sensor 2 heater determined by ECM according to the input signals.	
HO2S2 HTR (B2) [ON/OFF]					
VC/V BYPASS/V [ON/OFF]				• The control condition of the vacuum cut valve bypass valve (determined by ECM according to the input signal) is indicated. • ON ... Open OFF ... Closed	
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 airflow computed by ECM according to the signal voltage of the mass airflow sensor.	

CONSULT-II (Cont'd)

Monitored item [Unit]	ECM INPUT SIG-NALS	MAIN SIG-NALS	CAN DIAG SUP-PORT MNTR	Description	Remarks
INT/V TIM (B1) [°CA]				• Indicate [°CA] of intake camshaft advanced angle.	
INT/V TIM (B2) [°CA]					
INT/V SOL (B1) [%]				• The control condition of the intake valve timing control solenoid valve is indicated.	
INT/V SOL (B2) [%]					
TRVL AFTER MIL [km] or [Mile]				• Distance traveled while MIL is activated	
VIAS S/V [ON/OFF]				• The control condition of the VIAS control solenoid valve (determined by ECM according to the input signal) is indicated. • OFF ... VIAS control solenoid valve is not operating. ON ... VIAS control solenoid valve is operating.	
IDL A/V LEARN				• 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. INCMP ... Idle air volume learning has not been performed successfully.	
ENGINE MOUNT [IDLE/TRVL]				• The control condition of the electronic controlled engine mount (computed by ECM according to the input signals) is indicated. • IDLE ... Idle condition • TRVL ... Driving condition	
COOLING FAN [HI/LOW/OFF]				• Indicates the control condition of the cooling fan (determined by ECM according to the input signal). HIGH ... High speed operation LOW ... Low speed operation OFF ... Stop	
THRTL RELAY [ON/OFF]				• Indicates the throttle control motor relay control condition determined by the ECM according to the input signals.	
AC PRESS SEN [V]				• The signal voltage from the refrigerant pressure sensor is displayed.	
BRAKE SW 1 [ON/OFF]				• Indicates [ON/OFF] condition from ASCD brake switch signal, and ASCD clutch switch signal (M/T models) or park/neutral position relay signal (A/T models).	
BRAKE SW 2 [ON/OFF]				• Indicates [ON/OFF] condition of stop lamp switch signal.	

Monitored item [Unit]	ECM INPUT SIG-NALS	MAIN SIG-NALS	CAN DIAG SUP-PORT MNTR	Description	Remarks
MAIN SW [ON/OFF]				• Indicates [ON/OFF] condition from CRUISE switch signal.	
CANCEL SW [ON/OFF]				• Indicates [ON/OFF] condition from CANCEL switch signal.	
RESUME/ACC SW [ON/OFF]				• Indicates [ON/OFF] condition from ACCEL/RES switch signal.	
SET SW [ON/OFF]				• Indicates [ON/OFF] condition from COAST/SET switch signal.	
VHCL SPEED SE [km/h] or [mph]				• The present vehicle speed computed from the vehicle speed signal sent from combination meter is displayed.	
SET VHCL SPD [km/h] or [mph]				• The preset vehicle speed is displayed.	
VHCL SPD CUT [NON/CUT]				• Indicates the vehicle cruise condition. NON...Vehicle speed is maintained at the ASCD set speed. CUT...Vehicle speed decreased to excessively low compared with the ASCD set speed, and ASCD operation is cut off.	
LO SPEED CUT [NON/CUT]				• Indicates the vehicle cruise condition. NON...Vehicle speed is maintained at the ASCD set speed. CUT...Vehicle speed decreased to excessively low compared with the ASCD set speed, and ASCD operation is cut off.	
AT OD MONITOR [ON/OFF]				• Indicates [ON/OFF] condition of A/T O/D according to the input signal from the TCM.	
AT OD CANCEL] [ON/OFF]				• Indicates [ON/OFF] condition of A/T OD cancel signal sent from the TCM.	
CRUISE LAMP [ON/OFF]				• Indicates [ON/OFF] condition CRUISE lamp determined by the ECM according to the input signals.	
SET LAMP [ON/OFF]				• Indicates [ON/OFF] condition of SET lamp determined by the ECM according to the input signals.	

CONSULT-II (Cont'd)

Monitored item [Unit]	ECM INPUT SIG-NALS	MAIN SIG-NALS	CAN DIAG SUP-PORT MNTR	Description	Remarks
Voltage [V]				• Voltage, frequency, duty cycle or pulse width measured by the probe.	• Pulse width, frequency or duty cycle measured by the pulse 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					
CAN COMM [OK/NG]			○	• Indicates the communication condition of CAN communication line.	
CAN CIRC 1 [OK/UNKWN]			○		
CAN CIRC 2 [OK/UNKWN]			○		
CAN CIRC 3 [OK/UNKWN]			○		

NOTE:

- Any monitored item that does not match the vehicle being diagnosed is deleted from the display automatically.
- Regarding A33 model, "B1" indicates bank 1 and "B2" indicates bank 2.
- Bank 1 (B1) includes No. 1 cylinder.

DATA MONITOR (SPEC) MODE

NFEC0034S11

Monitored item [Unit]	ECM input signals	Main signals	Description	Remarks
MAS A/F SE-B1 [V]	○	○	• The signal voltage of the mass air flow sensor specification is displayed.	• When the engine is running, specification range is indicated.
B/FUEL SCHDL [msec]			• "Base fuel schedule" indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction.	• When the engine is running, specification range is indicated.
A/F ALPHA-B1 [%]		○	• Indicates the mean value of the air-fuel ratio feedback correction factor per cycle.	• When the engine is running, specification range is indicated. • This data also includes the data for the air-fuel ratio learning control.
A/F ALPHA-B2 [%]		○		

NOTE:

- Any monitored item that does not match the vehicle being diagnosed is deleted from the display automatically.
- Regarding A33 model, "B1" indicates bank 1 and "B2" indicates bank 2.

ACTIVE TEST MODE

NFEC0034S07

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 connector • Fuel injectors • Heated oxygen sensor

TEST ITEM	CONDITION	JUDGEMENT	CHECK ITEM (REMEDY)
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.	• Adjust initial ignition timing
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 connector • Compression • Injectors • Power transistor • Spark plugs • Ignition coils
COOLING FAN	• Ignition switch: ON • Turn the cooling fan "ON" and "OFF" using CONSULT-II.	Cooling fan moves and stops.	• Harness and connector • Cooling fan motor • Cooling fan relay
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 connector • 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 connector • Fuel pump relay
VIAS SOL VALVE	• Ignition switch: ON • Turn solenoid valve "ON" and "OFF" with CONSULT-II and listen for operating sound.	Solenoid valve makes an operating sound.	• Harness and connector • Solenoid valve
ENGINE MOUNTING	• Engine: After warming up, run engine at idle speed. • Gear position: "D"' range (Vehicle stopped) • Turn electronic controlled engine mount "IDLE" and "TRVL" with the CONSULT-II.	Body vibration changes according to the electronic controlled engine mount condition.	• Harness and connector • Electronic controlled engine mount
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 connector • Solenoid valve
FUEL/T TEMP SEN	• Change the fuel tank temperature using CONSULT-II.		
VENT CONTROL/V	• Ignition switch: ON (Engine stopped) • Turn solenoid valve "ON" and "OFF" with the CONSULT-II and listen to operating sound.	Solenoid valve makes an operating sound.	• Harness and connector • Solenoid valve
VC/V BYPASS/V	• Ignition switch: ON (Engine stopped) • Turn solenoid valve "ON" and "OFF" with the CONSULT-II and listen to operating sound.	Solenoid valve makes an operating sound.	• Harness and connector • Solenoid valve
V/T ASSIGN ANGLE	• Engine: After warming up, hold engine speed at 2,500 rpm. • Change the intake valve timing using CONSULT-II.	If trouble symptom disappears, see CHECK ITEM.	• Harness and connector • Intake valve timing control solenoid valve

CONSULT-II (Cont'd)

DTC & SRT CONFIRMATION MODE

NFEC0034S08

SRT STATUS Mode

NFEC0034S0801

For details, refer to "SYSTEM READINESS TEST (SRT) CODE", EC-77.

SRT Work Support Mode

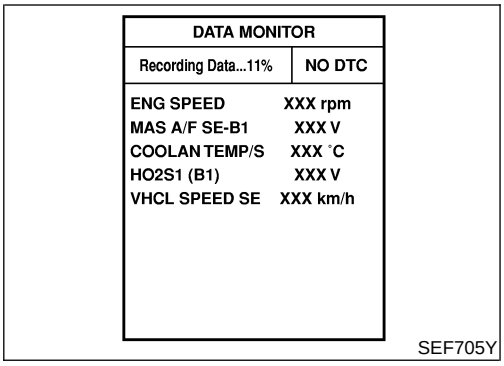
NFEC0034S0803

This mode enables a technician to drive a vehicle to set the SRT while monitoring the SRT status.

DTC Work Support Mode

NFEC0034S0802

Test mode	Test item	Condition	Reference page
EVAPORATIVE SYSTEM	PURGE FLOW P0441	Refer to corresponding trouble diagnosis for DTC.	EC-351
	EVP SML LEAK P0442/P1442		EC-361
	EVP V/S LEAK P0456/P1456		EC-417
	PURG VOL CN/V P1444		EC-573
	VC CUT/V BP/V P1491		EC-628
HO2S1	HO2S1 (B1) P0133		EC-228
	HO2S1 (B1) P0134		EC-240
	HO2S1 (B1) P1143		EC-492
	HO2S1 (B1) P1144		EC-499
	HO2S1 (B2) P0153		EC-228
	HO2S1 (B2) P0154		EC-240
	HO2S1 (B2) P1163		EC-492
	HO2S1 (B2) P1164		EC-499
HO2S2	HO2S2 (B1) P0139		EC-257
	HO2S2 (B1) P1146		EC-506
	HO2S2 (B1) P1147		EC-516
	HO2S2 (B2) P0159		EC-257
	HO2S2 (B2) P1166		EC-506
	HO2S2 (B2) P1167		EC-516



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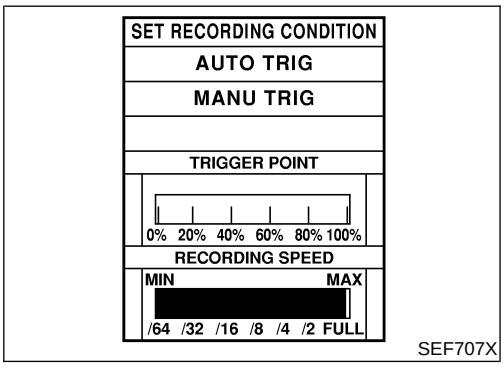


SEF707X

REAL TIME DIAGNOSIS IN DATA MONITOR MODE (RECORDING VEHICLE DATA)

NFEC0034S10

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 at left, 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.

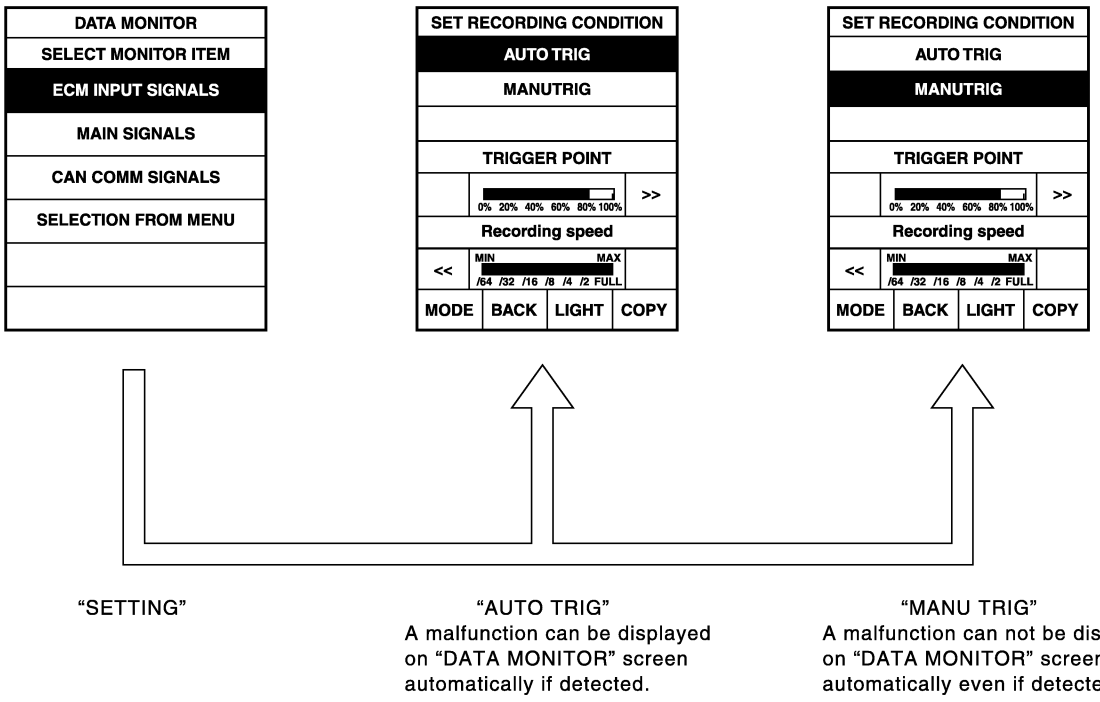
Use these triggers as follows:

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 GI-21, "Incident Simulation Tests".)

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.

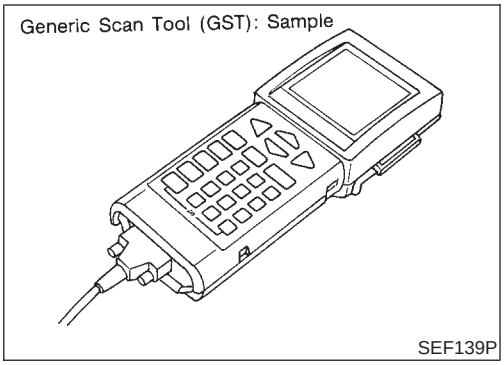


"SETTING"

"AUTO TRIG"
A malfunction can be displayed on "DATA MONITOR" screen automatically if detected.

"MANU TRIG"
A malfunction can not be displayed on "DATA MONITOR" screen automatically even if detected.

SEC221D



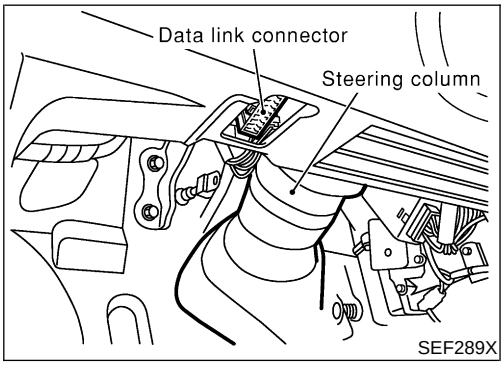
Generic Scan Tool (GST)

=NFEC0035

DESCRIPTION

NFEC0035S01

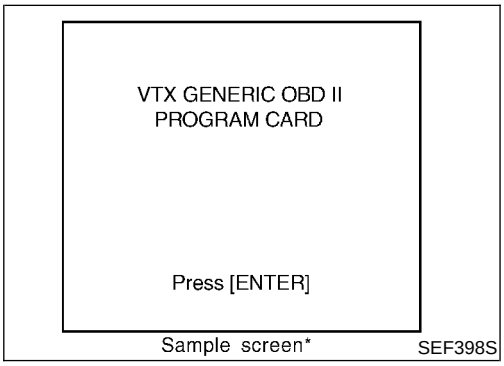
Generic Scan Tool (OBDII scan tool) complying with SAE J1978 has 8 different functions explained on the next page.
ISO9141 is used as the protocol.
The name “GST” or “Generic Scan Tool” is used in this service manual.



GST INSPECTION PROCEDURE

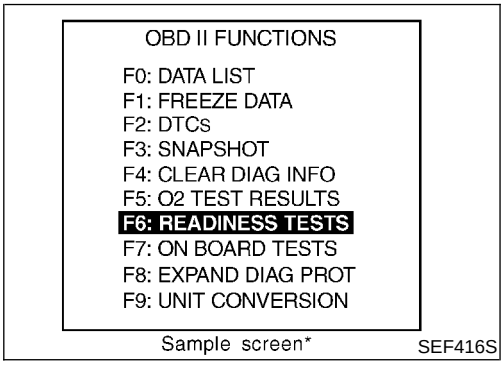
NFEC0035S02

1. Turn ignition switch OFF.
2. Connect GST to data link connector, which is located under LH 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.

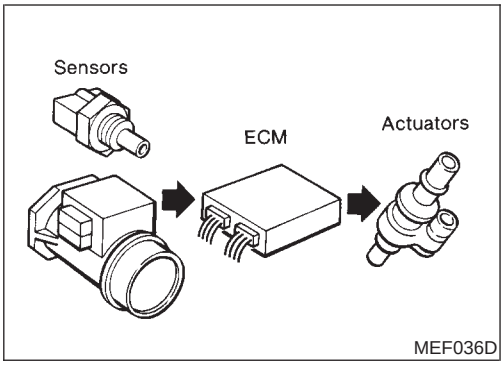
For further information, see the GST Operation Manual of the tool maker.

Generic Scan Tool (GST) (Cont'd)

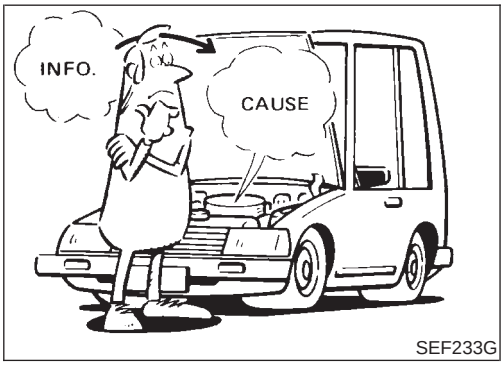
FUNCTION

NFEC0035S03

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 "Freeze Frame Data" (EC-105).]
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 can close EVAP system in ignition switch "ON" position (Engine stopped). When this mode is performed, the following parts can be opened or closed. ● EVAP canister vent control valve open ● Vacuum cut valve bypass valve closed In the following conditions, this mode cannot function. ● Low ambient temperature ● Low battery voltage ● Engine running ● Ignition switch "OFF" ● Low fuel temperature ● Too much pressure is applied to EVAP system
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.



MEF036D



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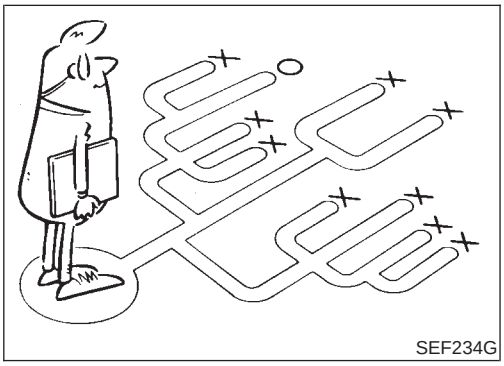

SEF234G

KEY POINTS

WHAT ..... Vehicle & engine model
WHEN ..... Date, Frequencies
WHERE..... Road conditions
HOW ..... Operating conditions, Weather conditions, Symptoms

SEF907L

Introduction

NFEC0036

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 problems such as vacuum leaks, fouled spark plugs, or other problems with the engine.

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” on EC-121.

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 problems, especially intermittent ones. Find out what symptoms are present and under what conditions they occur. A “Diagnostic Worksheet” like the example on next page should be used.

Start your diagnosis by looking for “conventional” problems first. This will help troubleshoot driveability problems on an electronically controlled engine vehicle.

DIAGNOSTIC WORKSHEET

NFEC0036S01

There are many operating conditions that lead to the malfunction of engine components. A good grasp of such conditions can make trouble-shooting 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.

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 MIL 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

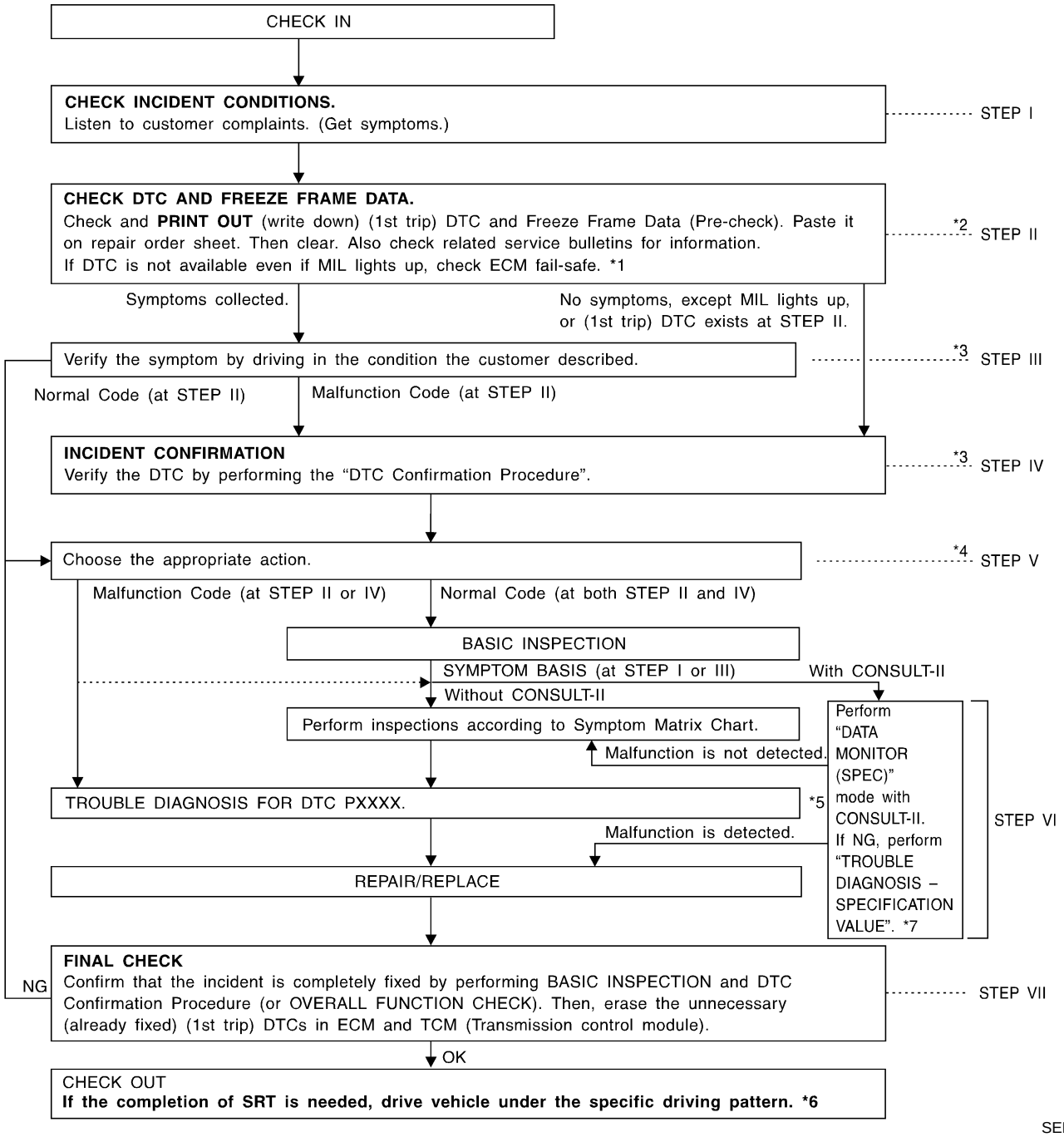
NFEC0036S0101

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 [ ]	
Symptoms — ☐ Idling	☐ No fast idle ☐ Unstable ☐ High idle ☐ Low idle ☐ Others [ ]	
Symptoms — ☐ Driveability	☐ Stumble ☐ Surge ☐ Knock ☐ Lack of power ☐ Intake backfire ☐ Exhaust backfire ☐ Others [ ]	
Symptoms — ☐ 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

Work Flow

NFEC0037



SEF510ZF

*1 EC-129

*2 If time data of "SELF-DIAG RESULTS" is other than "0" or "[1t]", perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.

*3 If the incident cannot be verified, perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.

*4 If the on board diagnostic system cannot be performed, check main power supply and ground circuit. Refer to "TROUBLE DIAGNOSIS FOR POWER SUPPLY", EC-157.

*5 If malfunctioning part cannot be detected, perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.

*6 EC-83

*7 EC-152

Work Flow (Cont'd)

DESCRIPTION FOR WORK FLOW

NFEC0037S01

STEP	DESCRIPTION
STEP I	Get detailed information about the conditions and the environment when the incident/symptom occurred using the "DIAGNOSTIC WORK SHEET", EC-120.
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-91.) 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 "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156. 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-131.) 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 "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156. 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 "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156. 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-123.) If CONSULT-II is available, perform "DATA MONITOR (SPEC)" mode with CONSULT-II and proceed to the "TROUBLE DIAGNOSIS — SPECIFICATION VALUE", EC-152. (If malfunction is detected, proceed to "REPAIR REPLACE".) Then perform inspections according to the Symptom Matrix Chart. (Refer to EC-131.)
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-135, 141. 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 GI-22, "Circuit Inspection". Repair or replace the malfunction parts. If malfunctioning part cannot be detected, perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.
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 different method 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-91.)

Basic Inspection

NFEC0038

Precaution:

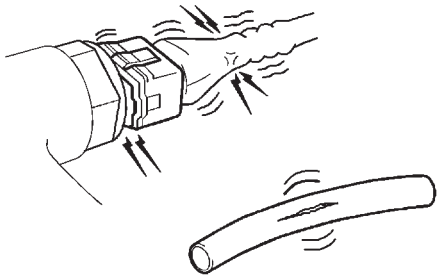
Perform Basic Inspection without electrical or mechanical loads applied;

- Headlamp switch is OFF,
- Air conditioner switch is OFF,
- Rear window defogger switch is OFF,
- Steering wheel is in the straight-ahead position, etc.

1	INSPECTION START

1. Check service records for any recent repairs that may indicate a related problem, or a current need for scheduled maintenance.
2. Open engine hood and check the following:

- Harness connectors for improper connections
- Vacuum hoses for splits, kinks and improper connections
- Wiring for improper connections, pinches and cuts
- Air cleaner clogging
- Hoses and ducts for leaks



SEF983U

▶	GO TO 2.

2	REPAIR OR REPLACE

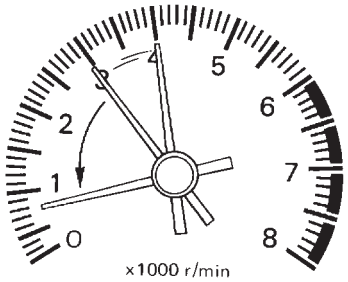
Repair or replace components as necessary according to corresponding “Diagnostic Procedure”.

▶	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.



SEF978U

3. Read idle speed in "DATA MONITOR" mode with CONSULT-II.
   MT: 625±50 rpm
   AT: 675±50 rpm (in "P" or "N" position)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

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.
   MT: 625±50 rpm
   AT: 675±50 rpm (in "P" or "N" position)

OK or NG

OK	▶	GO TO 9.
NG	▶	GO TO 4.

4	PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Stop engine.
2. Perform "Accelerator Pedal Released Position Learning", EC-71.

	▶	GO TO 5.

5	PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform "Throttle Valve Closed Position Learning", EC-71.

	▶	GO TO 6.

6	PERFORM IDLE AIR VOLUME LEARNING	
Refer to "Idle Air Volume Learning", EC-71. **Which is the result CMPLT or INCMP?**		
CMPLT	▶	GO TO 7.
INCMP	▶	1. Follow the construction 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. **MT: 625±50 rpm** **AT: 675±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. **MT: 625±50 rpm** **AT: 675±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-337. • Check crankshaft position sensor (POS) and circuit. Refer to EC-330. **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 a malfunction, but this is the rarely the case.) 2. Perform initialization of NVIS (NATS) system and registration of NVIS (NATS) ignition key IDs. Refer to "NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM — NATS)", EC-92.		
	▶	GO TO 4.

10	CHECK IGNITION TIMING	
1. Run engine at idle. 2. Check ignition timing with a timing light. **MT: 15°±5° BTDC** **AT: 15°±5° 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 "Accelerator Pedal Released Position Learning", EC-71.	
▶	GO TO 12.

12	PERFORM THROTTLE VALVE CLOSED POSITION LEARNING
Perform "Throttle Valve Closed Position Learning", EC-71.	
▶	GO TO 13.

13	PERFORM IDLE AIR VOLUME LEARNING
Refer to "Idle Air Volume Learning", EC-71.	
Which is the result CMPLT or INCMP?	
CMPLT ▶	GO TO 14.
INCMP ▶	1. Follow the construction 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. **MT: 625±50 rpm** **AT: 675±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. **MT: 625±50 rpm** **AT: 675±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. **MT: 15°±5° BTDC** **AT: 15°±5° 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-21, "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-337. ● Check crankshaft position sensor (POS) and circuit. Refer to EC-330. **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 a malfunction, but this is the rarely the case.) 2. Perform initialization of NVIS (NATS) system and registration of NVIS (NATS) ignition key IDs. Refer to "NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM — NATS)", EC-92.		
	▶	GO TO 4.

DTC Inspection Priority Chart

NFEC0039

If some DTCs are displayed at the same time, perform inspections one by one based on the following priority chart.

Priority	Detected items (DTC)
1	• U1000, U1001 CAN communication line • P0101, P0102, P0103, P1102 MAF sensor • P0112, P0113, P0127 IAT sensor • P0117, P0118, P0125 ECT sensor • P0121, P0226, P0227, P0228, P1227, P1228 Accelerator pedal position sensor • P0128 Thermostat function • P0122, P0123, P0221, P0222, P0223, P1223, P1224, P1225, P1226, P1229 Throttle position sensor • P0181, P0182, P0183 FTT sensor • P0327, P0328 KS • P0335 CKP sensor (POS) • P0340, P0345 CMP sensor (PHASE) • P0460, P0461, P0462, P0463, P1464 Fuel level sensor • P0500 VSS • P0605 ECM • P0705 Park/Neutral position switch • P1706 PNP switch
2	• P0031, P0032, P0051, P0052 HO2S1 heater • P0037, P0038, P0057, P0058 HO2S2 heater • P0107, P0108 Absolute pressure sensor • P0132-P0134, P1143, P1144 and P0152-P0154, P1163, P1164 HO2S1 • P0138, P0139, P1146, P1147 and P0158, P0159, P1166, P1167 HO2S2 • P0441 EVAP control system purge flow monitoring • P0444, P0445, P1444 EVAP canister purge volume control solenoid valve • P0447, P1446, P1448 EVAP canister vent control valve • P0452, P0453 EVAP control system pressure sensor • P0550 Power steering pressure sensor • P0650 MIL • P0710, P0720, P0725, P0740, P0745, P0750, P1705, P1760 A/T related sensors, solenoid valves and switches • P1065 ECM power supply • P1122 Electric throttle control function • P1217 Engine overtemperature (OVERHEAT) • P1490, P1491 Vacuum cut valve bypass valve • P1800 VIAS control solenoid valve • P1805 Brake switch
3	• P0011, P0021 Intake valve timing control • P0171, P0172 and P0174, P0175 Fuel injection system function • P0300-P0306 Misfire • P0420, P0430 Three way catalyst function • P0442, P0456/P1456 EVAP control system (SMALL LEAK, VERY SMALL LEAK) • P0455 EVAP control system (GROSS LEAK) • P0506, P0507 ISC system • P0731-P0734, P0744 A/T function • P1121 Electric throttle control actuator • P1124, P1126 Throttle control motor relay • P1128 Throttle control motor • P1148, P1168 Closed loop control • P1211 ABS/TCS control unit • P1212 ABS/TCS communication line • P1564 ASCD steering switch • P1572 ASCD brake switch • P1574 ASCD Vehicle speed sensor

Fail-safe Chart

=NFEC1425

The ECM enters fail-safe mode, if any of the following malfunctions is detected due to the open or short circuit. When the ECM enters the fail-safe mode, the MIL illuminates.

DTC No.	Detected items	Engine operating condition in fail-safe mode
P0102, P0103, P1102	Mass air flow sensor circuit	Engine speed will not rise more than 2,400 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.
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 an opening speed of approx. 5 seconds to an opening of 10 degrees. 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 an opening speed of approx. 5 seconds to an opening of 10 degrees. So, the acceleration will be poor.
P1121	Electric throttle control actuator (ECM detect 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.
P1126	Throttle control relay	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.
P1129	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.

Fail-safe Chart (Cont'd)

<table>
<tr><th>DTC No.</th><th>Detected items</th><th>Engine operating condition in fail-safe mode</th></tr>
<tr><td>Unable to access ECM</td><td>ECM</td><td>
ECM fail-safe activating condition
The computing function of the ECM was judged to be malfunctioning.
When the fail-safe system activates (i.e., if the ECM detects a malfunction condition in the CPU of ECM), the MIL on the instrument panel lights to warn the driver.
However it is not possible to access ECM and DTC cannot be confirmed.
Engine control with fail-safe
When ECM fail-safe is operating, fuel injection, ignition timing, fuel pump operation and cooling fan operation are controlled under certain limitations.
<table>
<tr><td></td><td>ECM fail-safe operation</td></tr>
<tr><td>Engine speed</td><td>Engine speed will not rise more than 3,000 rpm</td></tr>
<tr><td>Fuel injection</td><td>Simultaneous multiport fuel injection system</td></tr>
<tr><td>Ignition timing</td><td>Ignition timing is fixed at the preset valve</td></tr>
<tr><td>Cooling fans</td><td>Cooling fan relay is “ON” (High speed condition) when engine is running, and “OFF” when engine stalls.</td></tr>
<tr><td>Fuel pump</td><td>Fuel pump relay is “ON” when engine is running and “OFF” when engine stalls</td></tr>
</table>
Replace ECM, if ECM fail-safe condition is confirmed.
</td></tr>
</table>

Symptom Matrix Chart

SYSTEM — BASIC ENGINE CONTROL SYSTEM

NFEC0041

NFEC0041S01

		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-713
	Fuel pressure regulator system	3	3	4	4	4	4	4	4	4		4			EC-56
	Injector circuit	1	1	2	3	2		2	2			2			EC-703
	Evaporative emission system	3	3	4	4	4	4	4	4	4		4			EC-36
Air	Positive crankcase ventilation system												1		EC-51
	Incorrect idle speed adjustment						1	1	1	1		1			EC-123
	Electric throttle control actuator	1	1	2	3	3	2	2	2	2		2		2	EC-471, 473, 481, 487
Ignition	Incorrect ignition timing adjustment	3	3	1	1	1		1	1			1			EC-123
	Ignition circuit	1	1	2	2	2		2	2			2			EC-692
Main power supply and ground circuit		2	2	3	3	3		3	3		2	3			EC-157
Air conditioner circuit							3			3				2	HA section
ABS/TCS control unit				4											EC-528, 530

1 - 6: The numbers refer to the order of inspection.

(continued on next page)

Symptom Matrix Chart (Cont'd)

		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	
Engine control	Crankshaft position sensor (POS) circuit	2	2												EC-330
	Camshaft position sensor (PHASE) circuit	3	2												EC-337
	Mass air flow sensor circuit	1			2										EC-188, 195, 465
	Heated oxygen sensor 1 circuit														EC-220, 228, 240, 492, 499
	Engine coolant temperature sensor circuit	1			3		3			3					EC-207, 213
	Throttle position sensor circuit						2			2					EC-290, 297, 550, 557, 559
	Accelerator pedal position sensor circuit			3		1	1	1	1	1					EC-304, 311, 561
	Vehicle speed sensor circuit		2	3		3									EC-442
	Knock sensor circuit			2											EC-325
	ECM	2	2	3	3	3	3	3	3	3	3				EC-455, 129
	Start signal circuit	2													EC-709
	Park/Neutral position switch circuit			3		3									EC-667
	Power steering pressure sensor circuit		2												EC-450
	Electrical load signal circuit														EC-744

1 - 6: The numbers refer to the order of inspection.

(continued on next page)

Symptom Matrix Chart (Cont'd)

SYSTEM — ENGINE MECHANICAL & OTHER

NFEC0041S02

		SYMPTOM													Reference section
		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												FE section
	Fuel piping			5	5	5		5	5			5			—
	Vapor lock														
	Valve deposit	5		5	5	5		5	5			5			
	Poor fuel (Heavy weight gasoline, Low octane)														
Air	Air duct	5	5	5	5	5	5	5	5	5		5			
	Air cleaner														
	Air leakage from air duct (Mass air flow sensor — throttle body)														
	Air leakage from intake manifold/ Collector/Gasket														—
Cranking	Battery	1	1	1		1		1	1			1		1	EL section
	Alternator circuit														
	Starter circuit	3													
	Flywheel/Drive plate	6													EM section
	PNP switch	4													AT section

1 - 6: The numbers refer to the order of inspection.

(continued on next page)

Symptom Matrix Chart (Cont'd)

		SYMPTOM													Reference section
		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	
Engine	Cylinder head	5	5	5	5	5		5	5			5			EM section
	Cylinder head gasket										4		3		
	Cylinder block	6	6	6	6	6		6	6			6	4		
	Piston														
	Piston ring														
	Connecting rod														
	Bearing														
	Crankshaft														
Valve mechanism	Timing chain	5	5	5	5	5		5	5			5			
	Camshaft														
	Intake valve timing control														
	Intake valve												3		
	Exhaust valve														
Exhaust	Exhaust manifold/Tube/Muffler/ Gasket	5	5	5	5	5	5	5		5					FE section
	Three way catalyst														
Lubrication	Oil pan/Oil strainer/Oil pump/Oil filter/Oil gallery	5	5	5	5	5		5	5			5			MA, EM, LC section
	Oil level (Low)/Filthy oil														LC section
Cooling	Radiator/Hose/Radiator filler cap	5	5	5	5	5		5	5		4	5			
	Thermostat									5					
	Water pump														
	Water gallery														
	Coolant level (low)/Contaminated coolant														MA section

1 - 6: The numbers refer to the order of inspection.

	SYMPTOM													Reference section
	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	
NVIS (NISSAN Vehicle Immobilizer System — NATS)	1	1												EC-92 or EL section

1 - 6: The numbers refer to the order of inspection.

CONSULT-II Reference Value in Data Monitor Mode

NFEC1426

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 tachometer indication with the CONSULT-II value.		Almost the same speed as the CONSULT-II value.
MAS A/F SE-B1	• Engine: After warming up • Air conditioner switch: "OFF" • Shift lever: "N" • No-load	Idle	1.1 - 1.5V
		2,500 rpm	1.7 - 2.4V
COOLAN TEMP/S	• Engine: After warming up		More than 70°C (158°F)
HO2S1 (B1) HO2S1 (B2)	• Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ⟷ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1) HO2S1 MNTR (B2)			LEAN ⟷ RICH Changes more than 5 times during 10 seconds.
HO2S2 (B1) HO2S2 (B2)	• Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ⟷ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1) HO2S2 MNTR (B2)			LEAN ⟷ RICH
VHCL SPEED SE	• Turn drive wheels and compare speedometer indication with the CONSULT-II value		Almost the same speed as the CONSULT-II value
BATTERY VOLT	• Ignition switch: ON (Engine stopped)		11 - 14V

CONSULT-II Reference Value in Data Monitor Mode (Cont'd)

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL SEN 1	• Ignition switch: ON (Engine stopped) • Shift lever: "D"	Accelerator pedal: Fully released	0.41 - 0.71V
		Accelerator pedal: Fully depressed	More than 3.7V
ACCEL SEN 2	• Ignition switch: ON (Engine stopped) • Shift lever: "D"	Accelerator pedal: Fully released	0.15 - 0.71V
		Accelerator pedal: Fully depressed	More than 3.5V
THRTL SEN 1 THRTL SEN 2	• Ignition switch: ON (Engine stopped) • Shift lever: "D"	Accelerator pedal: Fully released	More than 0.36V
		Accelerator pedal: Fully depressed	Less than 4.75V
START SIGNAL	• Ignition switch: ON → START → ON		OFF → ON → OFF
CLSD THL POS	• Ignition switch: ON • Shift lever: "D"	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"	ON
		Except above	OFF
PW/ST SIGNAL	• Engine: After warming up, idle the engine	Steering wheel in neutral position (forward direction)	OFF
		The steering wheel is turned	ON
IGNITION SW	• Ignition switch: ON → OFF → ON		ON → OFF → ON
INJ PULSE-B1 INJ PULSE-B2	• Engine: After warming up • Air conditioner switch: "OFF" • Shift lever: "N" • No-load	Idle	2.0 - 3.0 msec
		2,000 rpm	1.9 - 2.9 msec
B/FUEL SCHDL	• Engine: After warming up • Air conditioner switch: "OFF" • Shift lever: "N" • No-load	Idle	2.3 - 2.9 msec
		2,000 rpm	2.3 - 2.9 msec
IGN TIMING	• Engine: After warming up • Air conditioner switch: "OFF" • Shift lever: "N" • No-load	Idle	13 - 18° BTDC
		2,000 rpm	25 - 45° BTDC
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
PURG VOL C/V	• Engine: After warming up • Air conditioner switch: "OFF" • Shift lever: "N" • No-load	Idle	0 %
		2,000 rpm	—
A/F ALPHA-B1 A/F ALPHA-B2	• Engine: After warming up	Maintaining engine speed at 2,000 rpm	54 - 155%
EVAP SYS PRES	• Ignition switch: ON		Approx. 3.4V
AIR COND RLY	• Air conditioner switch: OFF → ON		OFF → ON
FUEL PUMP RLY	• Ignition switch is turned to ON (Operates for 1 seconds) • Engine running or cranking		ON
	Except as shown above		OFF

MONITOR ITEM	CONDITION		SPECIFICATION
VENT CONT/V	• Ignition switch: ON		OFF
HO2S1 HTR (B1) HO2S1 HTR (B2)	• Engine speed: Below 3,600 rpm		ON
	• Engine speed: Above 3,600 rpm		OFF
HO2S2 HTR (B1) HO2S2 HTR (B2)	• Ignition switch: ON (Engine stopped) • Engine speed: Above 3,600 rpm		OFF
	• Engine speed: Below 3,600 rpm [After driving for 2 minutes at a speed of 70 km/h (43 MPH) or more]		ON
VC/V BYPASS/V	Ignition switch: ON		OFF
CAL/LD VALUE	• Engine: After warming up • Air conditioner switch: "OFF" • Shift lever: "N" • No-load	Idle	10 - 35%
		2,500 rpm	10 - 35%
BRAKE SW	• Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON
MASS AIRFLOW	• Engine: After warming up • Air conditioner switch: "OFF" • Shift lever: "N" • No-load	Idle	2.0 - 6.0 g·m/s
		2,500 rpm	7.0 - 20.0 g·m/s
ABSOL PRES/SE	• Ignition switch: ON		Approx. 4.4V
VIAS S/V	• Engine: After warming up	1,800 - 3,600 rpm	ON
		Except above conditions	OFF
TRVL AFTER MIL	Ignition switch: ON	Vehicle has traveled after MIL has turned ON.	0 - 65,535 km (0 - 40,723 mile)
AC PRESS SEN	• Ignition switch: ON (Engine stopped)		Approx. 0V
	• Engine: Idle • Air conditioner switch: OFF		1.0 - 4.0V
INT/V TIM (B1) INT/V TIM (B2)	• Engine: After warming up • Shift lever "N" • Quickly depressed accelerator pedal • No-load	Idle	−5 - 5° CA
		2,000 rpm	Approximately 0 - 30° CA
INT/V SOL (B1) INT/V SOL (B2)	• Engine: After warming up • Shift lever "N" • Quickly depressed accelerator pedal • No-load	Idle	0 - 2%
		2,000 rpm	Approximately 25 - 50%
ENGINE MOUNT	• Engine: Running	Idle	"IDLE"
		2,000 rpm	"TRVL"
COOLING FAN	• After warming up engine, idle the engine. • After conditioner switch: "OFF"	Engine coolant temperature is 94°C (201°F) or less.	OFF
		Engine coolant temperature is between 95°C (203°F) and 99°C (210°F).	LOW
		Engine coolant temperature is 100°C (212°F) or more.	HIGH
VHCL SPEED SE	Turn drive wheels and compare speedometer indication with the CONSULT-II value.		Almost the same speed as the CONSULT-II value

CONSULT-II Reference Value in Data Monitor Mode (Cont'd)

MONITOR ITEM	CONDITION	SPECIFICATION
SET VHCL SPD	• ASCD set condition.	The preset vehicle speed is displayed.
MAIN SW	• CRUISE switch is depressed.	ON
	• CRUISE switch is released.	OFF
CANCEL SW	• CANCEL switch is depressed.	ON
	• CANCEL switch is released.	OFF
RESUME/ACC SW	• ACCEL RES switch is depressed.	ON
	• ACCEL RES switch is released.	OFF
SET SW	• SET switch is depressed.	ON
	• SET switch is released.	OFF
BRAKE SW1	• Brake pedal is depressed.	OFF
	• Brake pedal is released.	ON
BRAKE SW2	• Brake pedal is depressed.	ON
	• Brake pedal is released.	OFF
CRUISE LAMP	• CRUISE lamp is indicated.	ON
	• CRUISE lamp is not indicated.	OFF
SET LAMP	• SET lamp is indicated.	ON
	• SET lamp is not indicated.	OFF
CAN COMM CAN CIRC 1 CAN CIRC 2 CAN CIRC 3	• Ignition switch: ON	OK

Major Sensor Reference Graph in Data Monitor Mode

NFEC1427

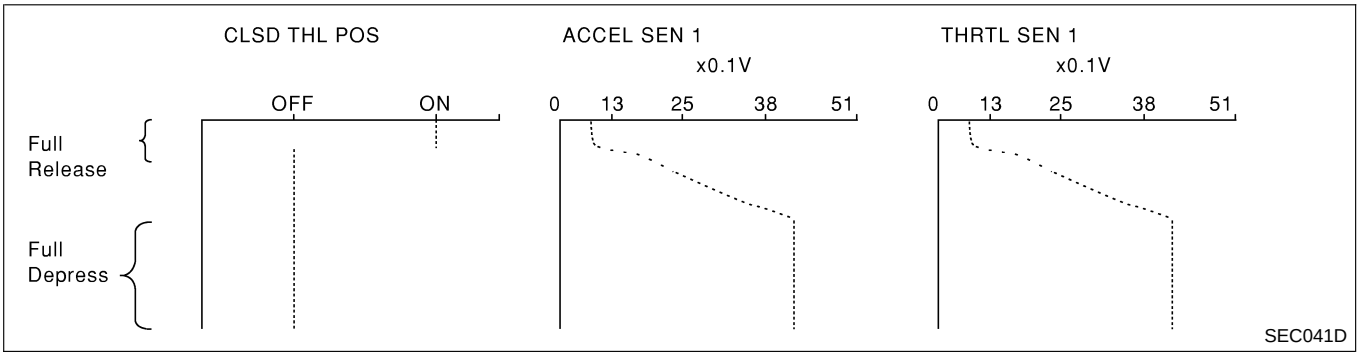
The following are the major sensor reference graphs in "DATA MONITOR" mode.

CLSD THL POS, ACCEL SEN1, THRTL SEN1

NFEC1427S01

Below is the data for "CLSD THL POS", "ACCEL SEN1" and "THRTL SEN1" when depressing the accelerator pedal with the ignition switch "ON" and with selector lever in "D" position (AT models) or with shift lever in "1st" position (MT models).

The signal of "ACCEL SEN1" and "THRTL SEN1" should rise gradually without any intermittent drop or rise after "CLSD THL POS" is changed from "ON" to "OFF".

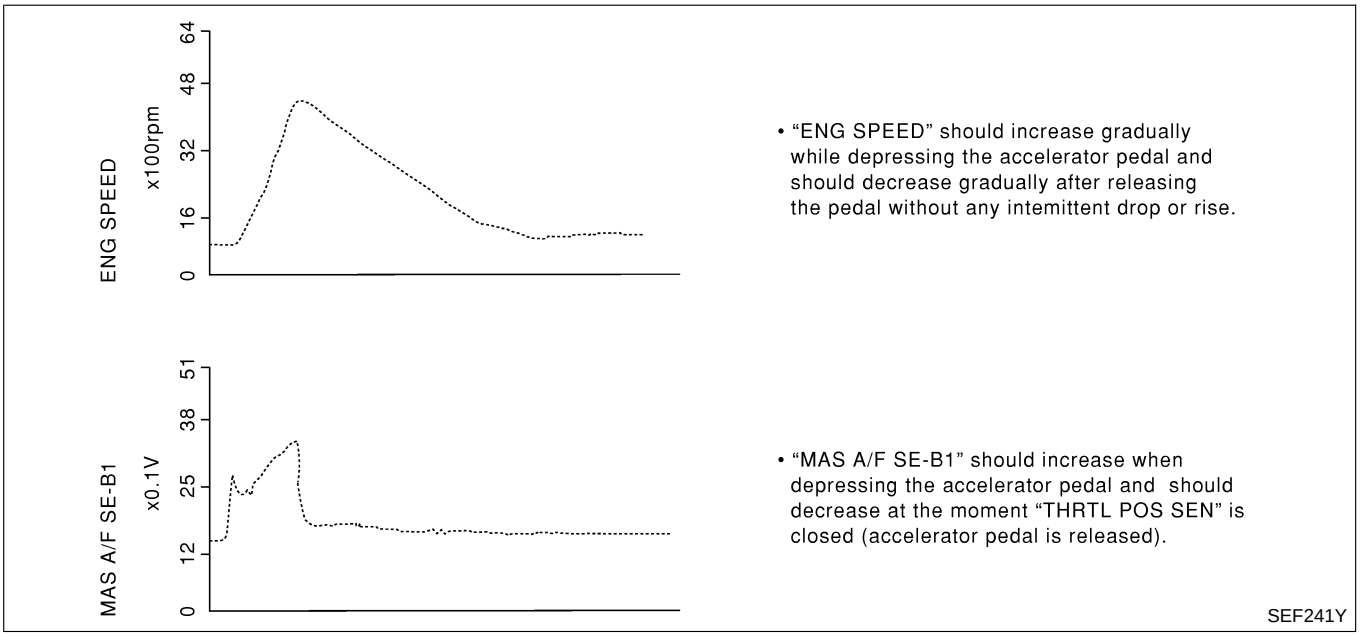


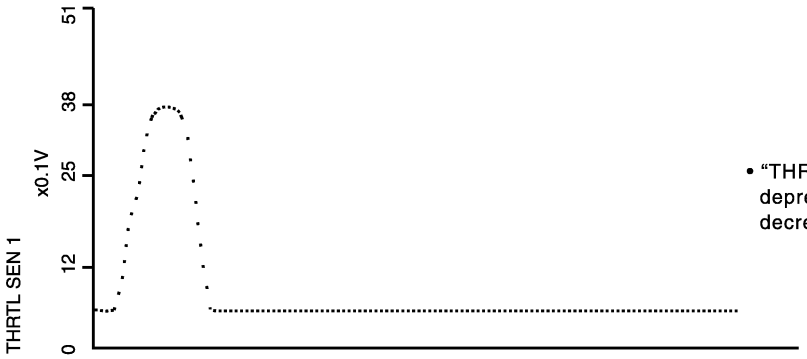
ENG SPEED, MAS A/F SE-B1, THRTL POS SEN, HO2S2 (B1), HO2S1 (B1), INJ PULSE-B1

NFEC1427S02

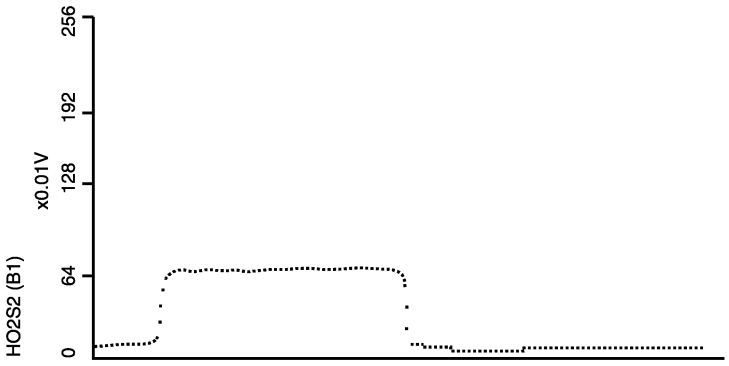
Below is the data for "ENG SPEED", "MAS A/F SE-B1", "THRTL POS SEN", "HO2S2 (B1)", "HO2S1 (B1)" and "INJ PULSE-B1" when revving engine quickly up to 4,800 rpm under no load after warming up engine sufficiently.

Each value is for reference, the exact value may vary.

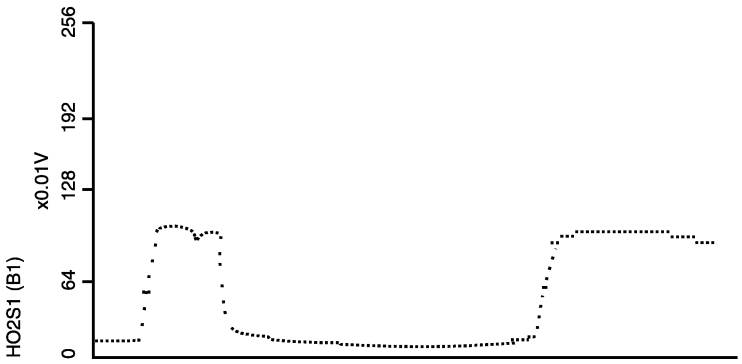




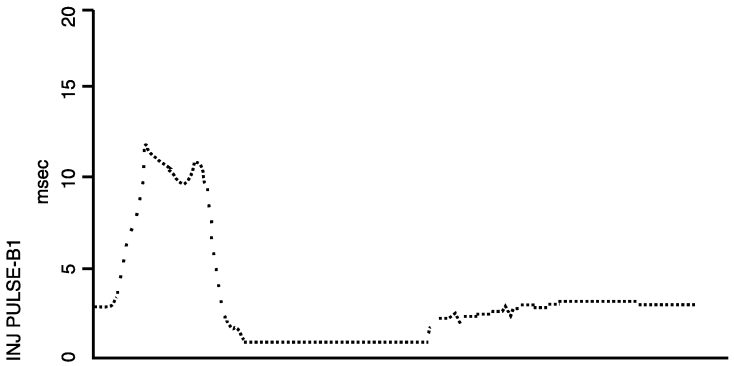
- "THRTL SEN 1" should increase while depressing the accelerator pedal and should decrease while releasing it.



- "HO2S2 (B1)" may increase immediately after depressing the accelerator pedal and may decrease after releasing the pedal.

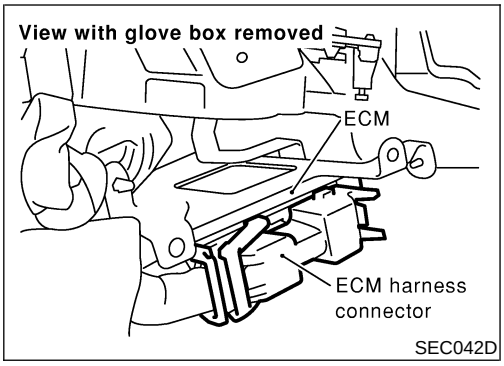


- "HO2S1 (B1)" may increase immediately after depressing the accelerator pedal and may decrease after releasing the pedal.



- "INJ PULSE-B1" should increase when depressing the accelerator pedal and should decrease when the pedal is released.

PBIB0668E



ECM Terminals and Reference Value

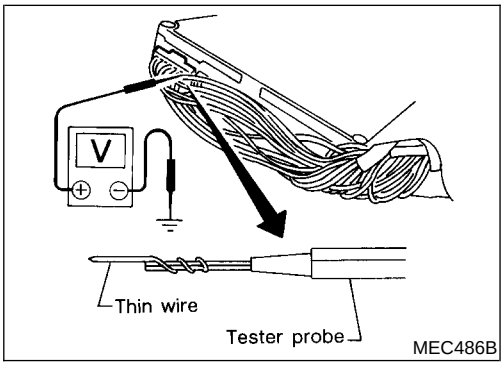
NFEC0044

PREPARATION

NFEC0044S01

1. ECM is located behind the instrument lower cover. For this inspection, remove instrument lower cover.

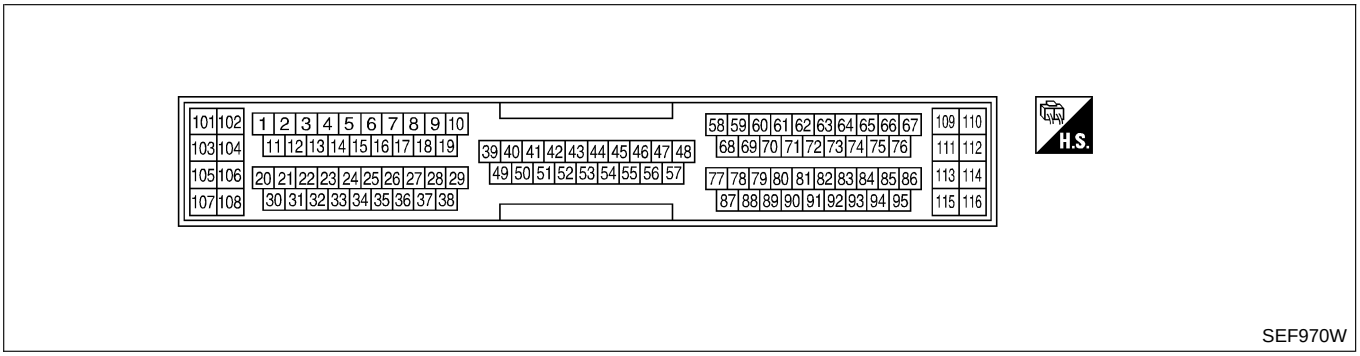
2. Remove ECM harness protector.



3. Perform all voltage measurements with the connector connected. Extend tester probe as shown to perform tests easily.
- Open harness securing clip to make testing easier.
- Use extreme care not to touch 2 pins at one time.
- Data is for comparison and may not be exact.

ECM HARNESS CONNECTOR TERMINAL LAYOUT

NFEC0044S02



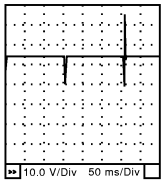
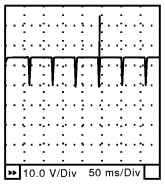
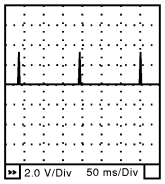
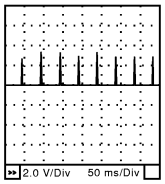
ECM INSPECTION TABLE

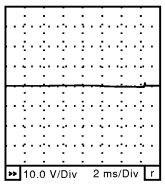
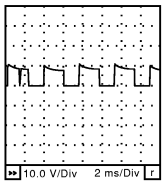
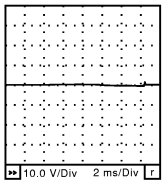
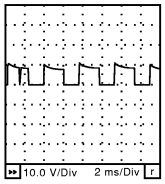
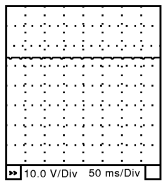
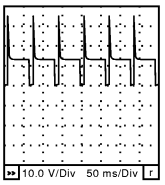
NFEC0044S03

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 the input/ output voltage. Doing so may result in damage to the ECM's transistor. Use ground other than the ECM terminals, such as the ground.

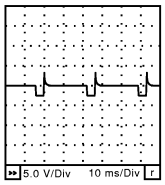
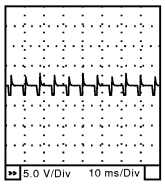
ECM Terminals and Reference Value (Cont'd)

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
1 2 3 11 12 13	R/B R/W R/Y R/L L/W PU/R	Injector No. 1 Injector No. 2 Injector No. 3 Injector No. 4 Injector No. 5 Injector No. 6	**[Engine is running]** ● Warm-up condition ● Idle speed	BATTERY VOLTAGE (11 - 14V)★  SEC984C
			[Engine is running] ● Warm-up condition ● Engine speed is 2,000 rpm.	BATTERY VOLTAGE (11 - 14V)★  SEC985C
4	W	Electronic controlled engine mount-1	**[Engine is running]** ● Idle speed	0 - 1V
			[Engine is running] ● Except the above	BATTERY VOLTAGE (11 - 14V)
5 6 7 15 16 17	Y/R G/R L/R G/Y PU/W GY/R	Ignition signal No. 1 Ignition signal No. 2 Ignition signal No. 3 Ignition signal No. 4 Ignition signal No. 5 Ignition signal No. 6	**[Engine is running]** ● Warm-up condition ● Idle speed	0 - 0.2V★  SEC986C
			[Engine is running] ● Warm-up condition ● Engine speed is 2,500 rpm.	0.1 - 0.3V★  SEC987C

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
8	G	Intake valve timing control solenoid valve (bank 2)	**[Engine is running]** ● Warm-up condition ● Idle speed	BATTERY VOLTAGE (11 - 14V)★  SEC988C
			[Engine is running] ● Warm-up condition ● Engine speed is 2,500 rpm.	7 - 12V★  SEC989C
9	L/W	Intake valve timing control solenoid valve (bank 1)	**[Engine is running]** ● Warm-up condition ● Idle speed	BATTERY VOLTAGE (11 - 14V)★  SEC988C
			[Engine is running] ● Warm-up condition ● Engine speed is 2,500 rpm.	7 - 12V★  SEC989C
10	PU/R	EVAP canister purge volume control solenoid valve	**[Engine is running]** ● Idle speed	BATTERY VOLTAGE (11 - 14V)★  SEC990C
			[Engine is running] ● Engine speed is 2,000 rpm (More than 100 seconds after starting engine).	BATTERY VOLTAGE (11 - 14V)★  SEC991C

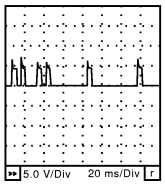
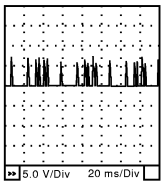
ECM Terminals and Reference Value (Cont'd)

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
14	W/R	Electronic controlled engine mount-2	**[Engine is running]** ● Idle speed	BATTERY VOLTAGE (11 - 14V)
			[Engine is running] ● Except the above	0 - 1V
18	PU/W	Engine coolant temperature sensor signal output	**[Engine is running]** ● Idle speed	0 - 12V Output voltage varies with engine coolant temperature.
21	B/R	Air conditioner relay	**[Engine is running]** ● Both A/C switch and blower switch are "ON" (Compressor is operating).	0 - 1.0V
			[Engine is running] ● A/C switch is "OFF".	BATTERY VOLTAGE (11 - 14V)
23	B/P	Fuel pump relay	**[Ignition switch "ON"]** ● For 1 second after turning ignition switch "ON" **[Engine is running]**	0 - 1.5V
			[Ignition switch "ON"] ● 1 second pressed after turning ignition switch "ON"	BATTERY VOLTAGE (11 - 14V)
24	Y	ASCD CRUISE lamp	**[Ignition switch "ON"]** ● CRUISE switch is "ON".	0V
			[Ignition switch "ON"] ● CRUISE switch is "OFF".	BATTERY VOLTAGE (11 - 14V)
25	R	ASCD SET lamp	**[Engine is running]** ● SET switch is "ON". ● ASCD control is operating.	0V
			[Engine is running] ● SET or CRUISE switch is "OFF". ● ASCD control is not operating.	BATTERY VOLTAGE (11 - 14V)
26	O/R	Throttle control motor relay	**[Ignition switch "OFF"]**	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch "ON"]	0 - 1.0V
27	Y/G	VIAS control solenoid valve	**[Engine is running]** ● Idle speed	BATTERY VOLTAGE (11 - 14V)
			[Engine is running] ● Engine speed is above 5,000 rpm.	0 - 1.0V
28	OR/G	Vacuum cut valve bypass valve	**[Ignition switch "ON"]**	BATTERY VOLTAGE (11 - 14V)
30	PU	A/C cut signal	**[Engine is running]** ● Air conditioner is operating.	0 - 0.5V
31	R	Counter current return	**[Ignition switch "ON"]**	BATTERY VOLTAGE (11 - 14V)
33	LG/B	MIL	**[Ignition switch "ON"]**	0 - 1.0V
			[Engine is running] ● Idle speed	BATTERY VOLTAGE (11 - 14V)

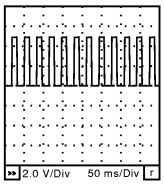
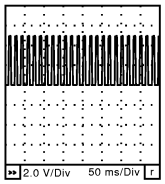
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
34	W/G	Tachometer	**[Engine is running]** ● **Warm-up condition** ● Idle speed	7 - 8V★  SEC992C
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,500 rpm.	7 - 8V★  SEC032D
35	BR/R	Cooling fan relay (LOW)	**[Engine is running]** ● Cooling fan is operating.	0 - 1.0V
			[Engine is running] ● Cooling fan is not operating.	BATTERY VOLTAGE (11 - 14V)
36	LG	Cooling fan relay (HIGH)	**[Engine is running]** ● Cooling fan is operating at high speed.	0 - 1.0V
			[Engine is running] ● Cooling fan is not operating.	BATTERY VOLTAGE (11 - 14V)
38	W/B	ECM relay (Self shut-off)	**[Engine is running]** **[Ignition switch "ON"]** ● For a few seconds after turning ignition switch "OFF"	0 - 1.5V
			[Ignition switch "ON"] ● A few seconds after turning ignition switch "OFF"	BATTERY VOLTAGE (11 - 14V)
39	OR/L	Heated oxygen sensor 1 heater (bank 1)	**[Engine is running]** ● Engine speed is below 3,600 rpm.	0 - 0.5V
			[Engine is running] ● Engine speed is above 3,600 rpm.	BATTERY VOLTAGE (11 - 14V)
40	R/L	Heated oxygen sensor 1 heater (bank 2)	**[Engine is running]** ● Engine speed is below 3,600 rpm.	0 - 0.5V
			[Engine is running] ● Engine speed is above 3,600 rpm.	BATTERY VOLTAGE (11 - 14V)
41	P/B	Heated oxygen sensor 2 heater (bank 1)	**[Engine is running]** ● Engine speed is below 3,600 rpm. ● After driving for 2 minutes at a speed of 70 km/h (43 MPH) or more	0 - 0.5V
			[Ignition switch "ON"] ● Engine stopped **[Engine is running]** ● Engine speed is above 3,600 rpm.	BATTERY VOLTAGE (11 - 14V)
42	BR/W	Start signal	**[Ignition switch "ON"]**	Approximately 0V
			[Ignition switch "START"]	9 - 12V

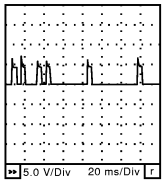
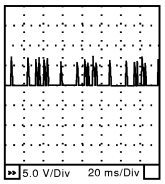
ECM Terminals and Reference Value (Cont'd)

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
43	R	Ignition switch	**[Ignition switch "OFF"]**	0V
			[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
44	G/OR	PNP switch	**[Ignition switch "ON"]** ● General position is "P" or "N".	Approximately 0V
			[Ignition switch "ON"] ● Except the above gear position	BATTERY VOLTAGE (11 - 14V)
45	G/B	Air conditioner switch signal	**[Engine is running]** ● Both A/C switch and blower switch are "ON".	Approximately 0V
			[Engine is running] ● A/C switch is "OFF".	BATTERY VOLTAGE (11 - 14V)
47	R/L	Heated oxygen sensor 2 heater (bank 2)	**[Engine is running]** ● Engine speed is below 3,600 rpm. ● After driving for 2 minutes at a speed of 70 km/h (43 MPH) or more	0 - 0.5V
			[Ignition switch "ON"] ● Engine stopped **[Engine is running]** ● Engine speed is above 3,600 rpm.	BATTERY VOLTAGE (11 - 14V)
48	B	ECM ground	**[Engine is running]** ● Idle speed	Engine ground
50	G/Y	ASCD steering switch	**[Ignition switch "ON"]**	Approximately 4.0V
			[Ignition switch "ON"] ● CRUISE switch is "ON".	Approximately 0V
			[Ignition switch "ON"] ● CANCEL switch is "ON".	Approximately 1.0V
			[Ignition switch "ON"] ● ACCEL RES switch is "ON".	Approximately 3.0V
			[Ignition switch "ON"] ● COAST/SET switch is "ON".	Approximately 2.0V
51	W/G	Electrical load signal	**[Engine is running]** ● Rear window defogger: ON ● Hi-beam headlamp: ON	BATTERY VOLTAGE (11 - 14V)
			[Engine is running] ● Electrical load: OFF	0V
55	R/G	Stop lamp switch	Brake pedal is depressed.	BATTERY VOLTAGE (11 - 14V)
			Brake pedal is released.	0V
57	B	ECM ground	**[Engine is running]** ● Idle speed	Engine ground
58	B	Sensors' ground	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V

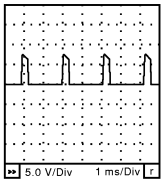
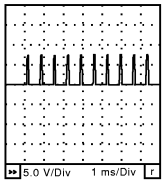
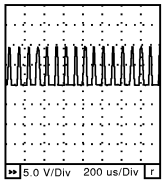
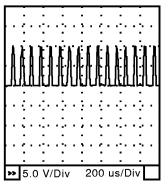
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
59	G/B	ASCD brake switch	**[Ignition switch "ON"]** ● Gear position is "P" or "N" (A/T models). ● Brake pedal is depressed. ● Clutch pedal is depressed (M/T models).	0V
			[Ignition switch "ON"] ● Gear position is except "P" or "N" (A/T models). ● Brake pedal is released. ● Clutch pedal is released (M/T models).	BATTERY VOLTAGE (11 - 14V)
60	W	EVAP control system pressure sensor	**[Ignition switch "ON"]**	Approximately 3.4V
62	W	Mass air flow sensor	**[Engine is running]** ● **Warm-up condition** ● Idle speed	1.1 - 1.5V
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,500 rpm.	1.7 - 2.4V
64	OR	Accelerator pedal position sensor 2 power supply	**[Ignition switch "ON"]**	Approximately 2.5V
65	Y	Camshaft position sensor (PHASE) (bank 1)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	1.0 - 4.0V★  SEC033D
			[Engine is running] ● Engine speed is 2,000 rpm.	1.0 - 4.0V★  SEC034D
66	Y/G	Mass air flow sensor (Intake air temperature sensor)	**[Engine is running]**	Approximately 0 - 4.8V Output voltage varies with intake air temperature.
67	W/L	Power supply for ECM (Back-up)	**[Ignition switch "OFF"]**	BATTERY VOLTAGE (11 - 14V)

ECM Terminals and Reference Value (Cont'd)

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
68	P/L	Vehicle speed sensor	**[Engine is running]** ● Jack-up front wheels ● In 1st gear position ● 10 km/h (6 MPH)	Approximately 2.5V★  SEC039D
			[Engine is running] ● Jack-up front wheels ● In 2nd gear position ● 30 km/h (19 MPH)	Approximately 2.0V★  SEC040D
69	G	Fuel level sensor	**[Ignition switch "ON"]**	Approximately 0 - 4.8V Output voltage varies with fuel level.
70	B/P	Accelerator pedal position sensor 2 ground	**[Ignition switch "ON"]**	Approximately 0V
71	W	Knock sensor	**[Engine is running]** ● Idle speed	Approximately 2.5V
72	W	Accelerator pedal position sensor signal output	**[Engine is running]** ● **Warm-up condition** ● Accelerator pedal fully released	Approximately 0.6V
			[Ignition switch "ON"] ● Accelerator pedal fully depressed	Approximately 4.0V
73	W	Accelerator pedal position sensor 1	**[Ignition switch "ON"]** ● Accelerator pedal fully released	0.41 - 0.71V
			[Ignition switch "ON"] ● Accelerator pedal fully depressed	More than 3.7V
74	W/B	Accelerator pedal position sensor 2	**[Ignition switch "ON"]** ● Accelerator pedal fully released	0.08 - 0.48V
			[Ignition switch "ON"] ● Accelerator pedal fully depressed	More than 1.8V
75	P/L	Fuel tank temperature sensor	**[Engine is running]**	Approximately 0 - 4.8V Output voltage varies with fuel tank temperature.
78	B	Fuel level sensor ground	**[Engine is running]** ● Idle speed	Approximately 0V
80	B	Mass air flow sensor ground	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
81	W	Refrigerant pressure sensor	**[Engine is running]** ● **Warm-up condition** ● Both A/C switch and blower switch are "ON". (Compressor operates.)	1.0 - 4.0V

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
83	W	Throttle position sensor 1	**[Ignition switch "ON"]** ● Gear position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully released	More than 0.36V
			[Ignition switch "ON"] ● Gear position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully depressed	Less than 4.75V
84	L	Throttle position sensor 2	**[Ignition switch "ON"]** ● Gear position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully released	Less than 4.75V
			[Ignition switch "ON"] ● Gear position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully depressed	More than 0.36V
85	R	Camshaft position sensor (PHASE) (bank 2)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	1.0 - 4.0V★  SEC033D
			[Engine is running] ● Engine speed is 2,000 rpm.	1.0 - 4.0V★  SEC034D
88	W	Heated oxygen sensor 2 (bank 1)	**[Engine is running]** ● **Warm-up condition** ● Engine speed is 2,000 rpm.	0 - Approximately 1.0V
89	G	Power steering pressure sensor	**[Engine is running]** ● Steering wheel is being turned.	0 - 1.0V
			[Engine is running] ● Steering wheel is not being turned.	BATTERY VOLTAGE (11 - 14V)
90	W	Heated oxygen sensor 2 (bank 2)	**[Engine is running]** ● **Warm-up condition** ● Engine speed is 2,000 rpm.	0 - Approximately 1.0V
91	W	Heated oxygen sensor 1 (bank 1)	**[Engine is running]** ● **Warm-up condition** ● Engine speed is 2,000 rpm.	0 - Approximately 1.0V (Periodically change)
92	W	Heated oxygen sensor 1 (bank 2)	**[Engine is running]** ● **Warm-up condition** ● Engine speed is 2,000 rpm.	0 - Approximately 1.0V (Periodically change)
93	Y	Engine coolant temperature sensor	**[Engine is running]**	Approximately 0 - 4.8V Output voltage varies with engine coolant temperature.

ECM Terminals and Reference Value (Cont'd)

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
95	W	Crankshaft position sensor (POS)	**[Engine is running]** ● Idle speed	Approximately 2.4V★  SEC035D
			[Engine is running] ● Engine speed is 2,000 rpm.	Approximately 2.3V★  SEC036D
101	Y	Throttle control motor (Open)	**[Ignition switch "ON"]** ● Gear position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully depressed	0 - 5V★  SEC037D
102	R	Throttle control motor relay	**[Ignition switch "ON"]**	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch "OFF"]	0 - 1.0V
103	BR	Throttle control motor (Close)	**[Ignition switch "ON"]** ● Gear position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully released	0 - 3V★  SEC038D
105	OR/L	EVAP canister vent control valve	**[Ignition switch "ON"]**	BATTERY VOLTAGE (11 - 14V)
106 108	B B	ECM ground	**[Engine is running]** ● Idle speed	Engine ground
107	B	Throttle control motor ground	**[Ignition switch "ON"]**	Approximately 0V
109	L	CAN communication line	**[Ignition switch "ON"]**	Approximately 2.6 - 3.2V Output voltage varies with the communication status.
110 112	R/G R/G	Power supply for ECM	**[Ignition switch "ON"]**	BATTERY VOLTAGE (11 - 14V)
111	R	Sensors' power supply	**[Ignition switch "ON"]**	Approximately 5V

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
113	R	CAN communication line	**[Ignition switch "ON"]**	Approximately 1.7 - 2.3V Output voltage varies with the communication status.
115	OR	Data link connector	**[Ignition switch "ON"]** ● CONSULT-II or GST is disconnected.	BATTERY VOLTAGE (11 - 14V)

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Description

NFEC0717

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 MIL.

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/B2 (The mean value of air-fuel ratio feedback correction factor per cycle)
- MAS A/F SE-B1 (The signal voltage of the mass air flow sensor)

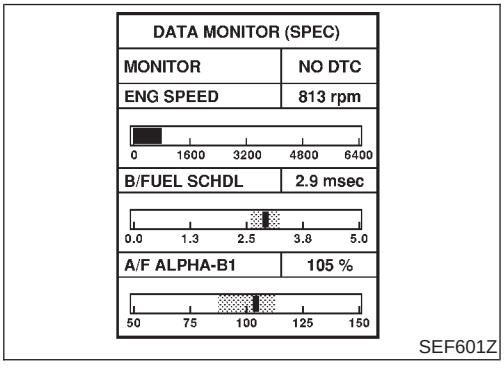
Testing Condition

NFEC0718

- Vehicle driven distance: More than 5,000 km (3,107 miles)
- Barometric pressure: 98.3 - 104.3 kPa (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 less than 0.9V. For M/T models, drive vehicle for 10 minutes after the engine is warmed up to normal operating temperature.

*2: Rear window defogger switch, air conditioner switch, lighting switch are “OFF”. Cooling fans are not operating. Steering wheel is straight ahead.



Inspection Procedure

NFEC0719

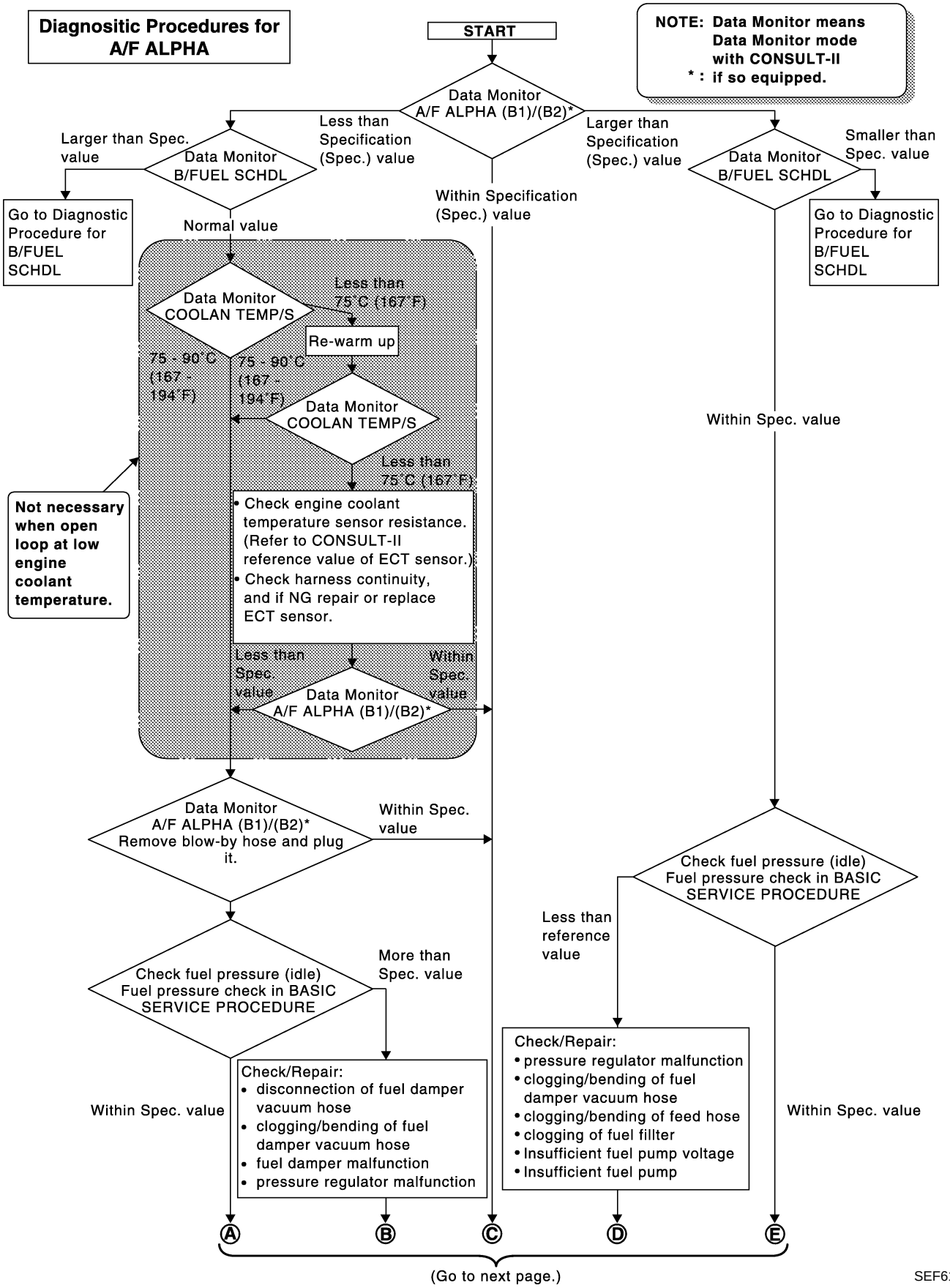
NOTE:

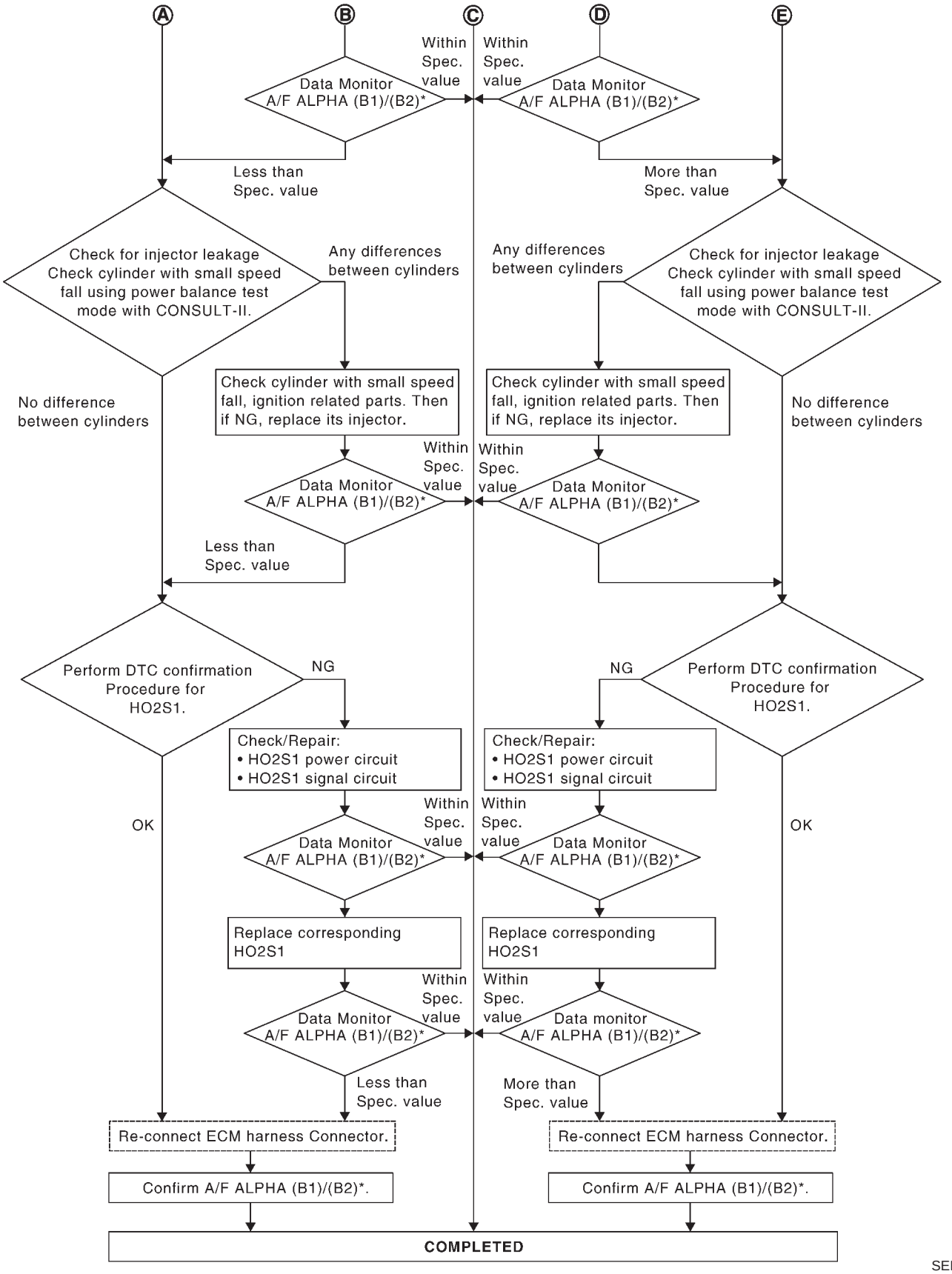
Perform “DATA MONITOR (SPEC)” mode in maximum scale display.

1. Perform “Basic Inspection”, EC-123.
2. Confirm that the testing conditions indicated above are met.
3. Select “B/FUEL SCHDL”, “A/F ALPHA-B1”, “A/F ALPHA-B2” and “MAS A/F SE-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 “Diagnostic Procedure”, EC-153.

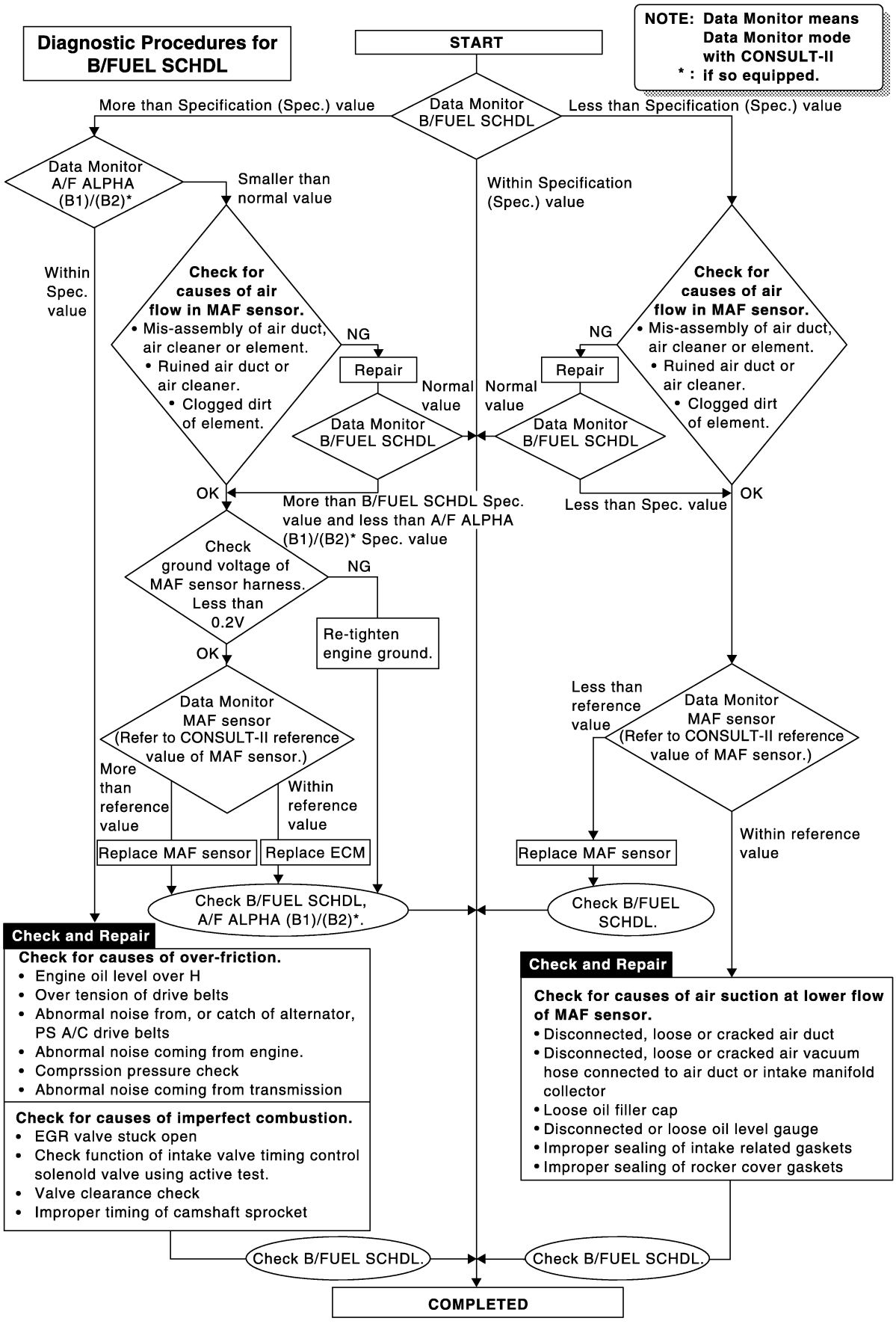
Diagnostic Procedure

NFEC0720




Ⓐ
Ⓑ
Ⓒ
Ⓓ
Ⓔ
Data Monitor A/F ALPHA (B1)/(B2)*
Within Spec. value
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


Diagnostic Procedures for B/FUEL SCHDL
START
NOTE: Data Monitor means Data Monitor mode with CONSULT-II
* : if so equipped.
Data Monitor B/FUEL SCHDL
More than Specification (Spec.) value
Less than Specification (Spec.) value
Within Specification (Spec.) value
Data Monitor A/F ALPHA (B1)/(B2)*
Smaller than normal value
Within Spec. value
Check for causes of air flow in MAF sensor.
• Mis-assembly of air duct, air cleaner or element.
• Ruined air duct or air cleaner.
• Clogged dirt of element.
NG
Repair
Normal value
Data Monitor B/FUEL SCHDL
OK
More than B/FUEL SCHDL Spec. value and less than A/F ALPHA (B1)/(B2)* Spec. value
Less than Spec. value
Check ground voltage of MAF sensor harness. Less than 0.2V
Re-tighten engine ground.
Data Monitor MAF sensor (Refer to CONSULT-II reference value of MAF sensor.)
More than reference value
Within reference value
Less than reference value
Replace MAF sensor
Replace ECM
Check B/FUEL SCHDL, A/F ALPHA (B1)/(B2)*.
Check B/FUEL SCHDL.
Check and Repair
Check for causes of over-friction.
• Engine oil level over H
• Over tension of drive belts
• Abnormal noise from, or catch of alternator, PS A/C drive belts
• Abnormal noise coming from engine.
• Comprssion pressure check
• Abnormal noise coming from transmission
Check for causes of imperfect combustion.
• EGR valve stuck open
• Check function of intake valve timing control solenold valve using active test.
• Valve clearance check
• Improper timing of camshaft sprocket
Check and Repair
Check for causes of air suction at lower flow of MAF sensor.
• Disconnected, loose or cracked air duct
• Disconnected, loose or cracked air vacuum hose connected to air duct or intake manifold collector
• Loose oil filler cap
• Disconnected or loose oil level gauge
• Improper sealing of intake related gaskets
• Improper sealing of rocker cover gaskets
Check B/FUEL SCHDL.
Check B/FUEL SCHDL.
COMPLETED

SEF615ZA

Description

NFEC0045

Intermittent incidents (I/I) may occur. In many cases, the problem 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 problem area.

COMMON I/I REPORT SITUATIONS

NFEC0045S01

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 problem area.

Diagnostic Procedure

NFEC0046

1	**INSPECTION START**
Erase (1st trip) DTCs. Refer to "HOW TO ERASE EMISSION — RELATED INFORMATION", EC-91.	
▶	GO TO 2.

2	**CHECK GROUND TERMINALS**
Check ground terminals for corroding or loose connection. Refer to GI-30, "GROUND INSPECTION".	
OK or NG	
OK ▶	GO TO 3.
NG ▶	Repair or replace.

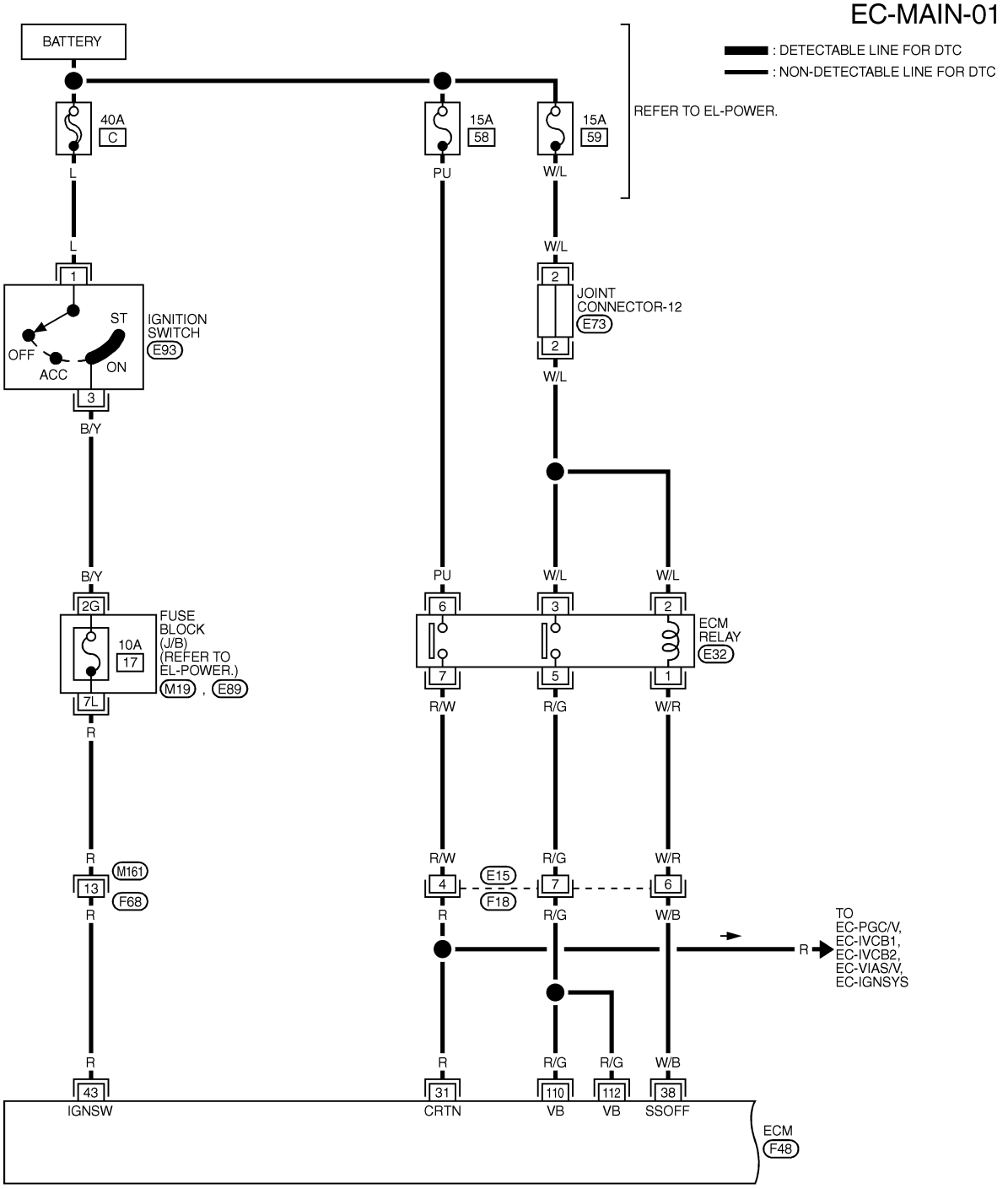
3	**SEARCH FOR ELECTRICAL INCIDENT**
Perform GI-25, "Incident Simulation Tests".	
OK or NG	
OK ▶	GO TO 4.
NG ▶	Repair or replace.

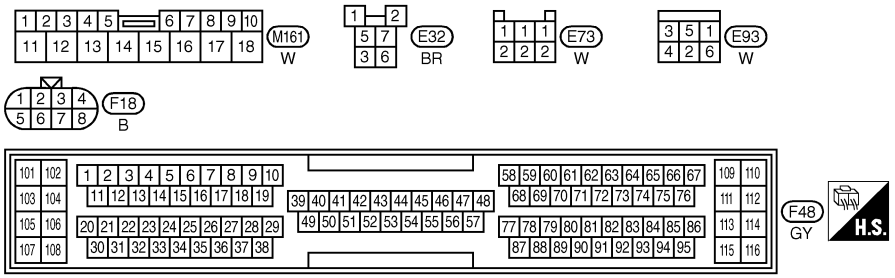
4	**CHECK CONNECTOR TERMINALS**
Refer to GI-22, "How to Check Enlarged Contact Spring of Terminal".	
OK or NG	
OK ▶	**INSPECTION END**
NG ▶	Repair or replace connector.

Main Power Supply and Ground Circuit

WIRING DIAGRAM

NFEC0047

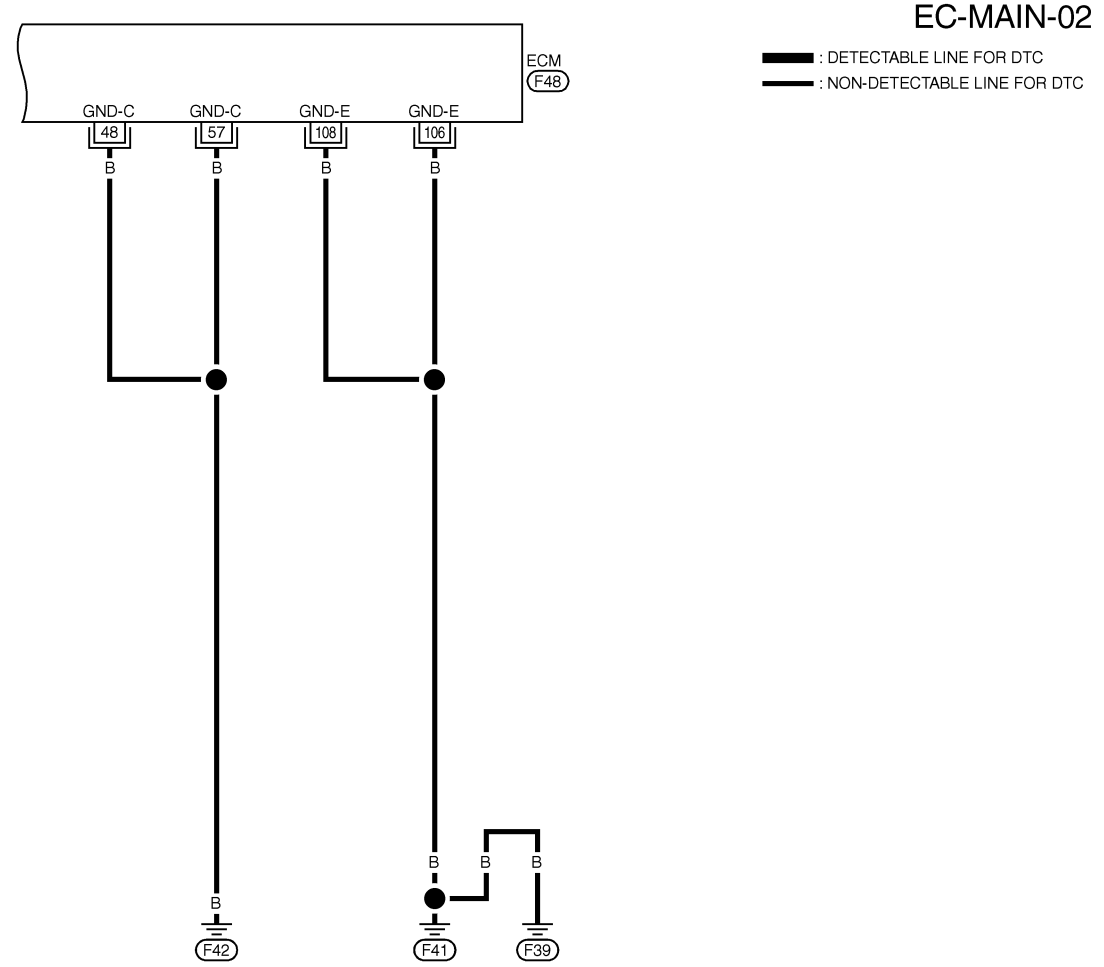




REFER TO THE FOLLOWING.
M19 , E89 -FUSE BLOCK-JUNCTION BOX (J/B)

MEC922D

EC-MAIN-02



MEC472D

ECM TERMINALS AND REFERENCE VALUE 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	WIRE COLOR	ITEM	CONDITION	DATA (DC)
31	R	COUNTER CURRENT RETURN	IGN ON	BATTERY VOLTAGE
38	W/B	ECM RELAY (SELF-SHUTOFF)	ENGINE RUNNING FOR A FEW SECONDS AFTER TURNING IGN OFF	0 - 1.5V
			A FEW SECONDS PASSED AFTER TURNING IGN OFF	BATTERY VOLTAGE
43	R	IGN	IGN OFF	0V
			IGN ON	BATTERY VOLTAGE
48	B	ECM GROUND	ENGINE RUNNING AT IDLE SPEED	ENGINE GROUND
57	B	ECM GROUND	ENGINE RUNNING AT IDLE SPEED	ENGINE GROUND
106	B	ECM GROUND	ENGINE RUNNING AT IDLE SPEED	ENGINE GROUND
108	B			
110	R/G	POWER SUPPLY FOR ECM	IGN ON	BATTERY VOLTAGE
112	R/G			

SEC043D

DIAGNOSTIC PROCEDURE

NFEC0049

1	INSPECTION START

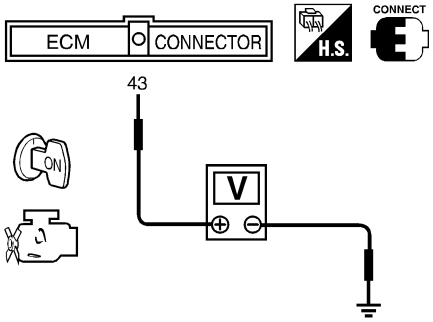
Start engine.
Is engine running?

Yes or No

Yes	▶	GO TO 9.
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 43 and ground with CONSULT-II or tester.



Voltage: Battery voltage

SEF291X

OK or NG

OK	▶	GO TO 4.
NG	▶	GO TO 3.

3	DETECT MALFUNCTIONING PART

Check the following.
- 10A fuse
- Harness connectors M161, F68
- Fuse block (J/B) connectors M19, E89
- Harness for open or short between ECM and ignition switch

	▶	Repair harness or connectors.

4	CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-I

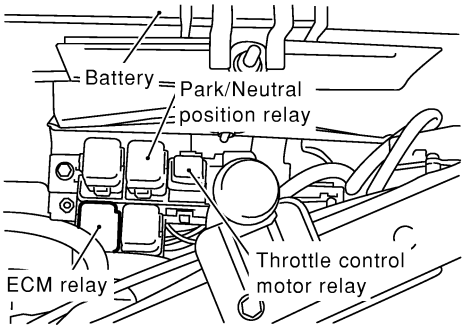
1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminals 48, 57, 106, 108 and engine ground.
   Refer to WIRING DIAGRAM.
   Continuity should exist.
4. Also check harness for short to power.

OK or NG

OK	▶	GO TO 5.
NG	▶	Repair open circuit or short to power in harness or connectors.

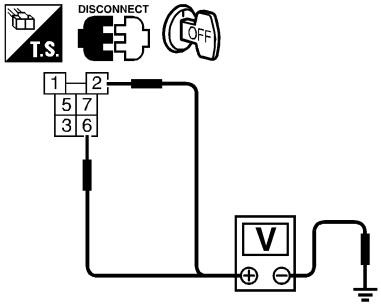
5	CHECK POWER SUPPLY-II

1. Disconnect ECM relay.



SEC044D

2. Check voltage between ECM relay terminals 2, 6 and ground with CONSULT-II or tester.



Voltage: Battery voltage

SEF292X

OK or NG

OK	▶	GO TO 7.
NG	▶	GO TO 6.

6	DETECT MALFUNCTIONING PART

Check the following.
- 15A fuses
- Joint connector-12
- Harness for open or short between ECM relay and battery

	▶	Repair open circuit or short to ground or short to power in harness or connectors.

7	CHECK OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 38 and ECM relay terminal 1. 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 "IGNITION SIGNAL", EC-692.
NG	▶	GO TO 8.

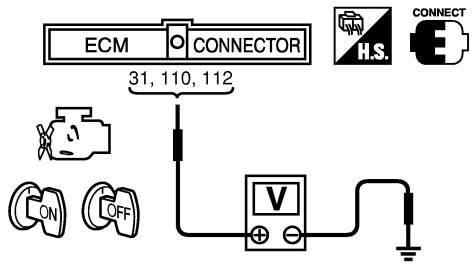
8	DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E15, F18
- Harness for open or short between ECM relay and ECM

	▶	Repair open circuit or short to ground or short to power in harness or connectors.

9 CHECK ECM POWER SUPPLY CIRCUIT-II

1. Turn ignition switch "ON" and then "OFF".
2. Check voltage between ECM terminals 31, 110, 112 and ground with CONSULT-II or tester.



SEC899C

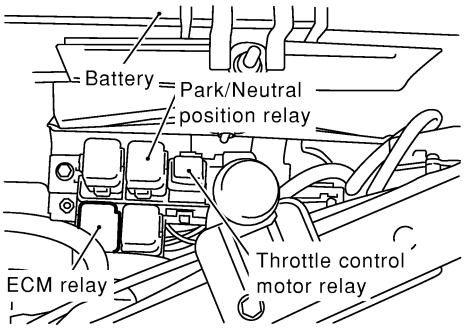
Voltage:
After turning ignition switch "OFF", battery voltage will exist for a few seconds, then drop approximately 0V.

OK or NG

OK	▶	GO TO 15.
NG (Battery voltage does not exist.)	▶	GO TO 10.
NG (Battery voltage exists for more than a few seconds.)	▶	GO TO 12.

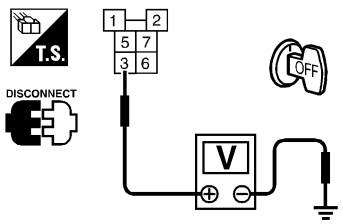
10 CHECK ECM POWER SUPPLY CIRCUIT-III

1. Disconnect ECM relay.



SEC044D

2. Check voltage between ECM relay terminal 3 and ground with CONSULT-II or tester.



Voltage: Battery voltage

SEF295X

OK or NG

OK	▶	GO TO 12.
NG	▶	GO TO 11.

11	DETECT MALFUNCTIONING PART
Check the following. ● Joint connector-12 ● Harness for open or short between ECM relay and 15A fuse	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

12	CHECK HARNESS CONTINUITY BETWEEN ECM RELAY AND ECM FOR OPEN AND SHORT

1. Check harness continuity between ECM terminals and ECM relay terminals as follows.
   Refer to WIRING DIAGRAM.

ECM terminal	ECM relay terminal
31	7
110, 112	5

MTBL1139

Continuity should exist.

2. Also check harness for short to ground and short to power.

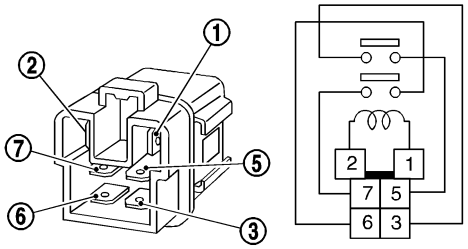
OK or NG

OK	▶	GO TO 14.
NG	▶	GO TO 13.

13	DETECT MALFUNCTIONING PART
Check the following. ● Harness connectors E15, F18 ● Harness for open or short between ECM and ECM relay	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

14	CHECK ECM RELAY

1. Apply 12V direct current between ECM relay terminals 1 and 2.
2. Check continuity between relay terminals 3 and 5, 6 and 7.



Condition	Continuity
12V direct current supply between terminals 1 and 2	Yes
OFF	No

SEF296X

OK or NG

OK	▶	GO TO 15.
NG	▶	Replace ECM relay.

15	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 48, 57, 106, 108 and engine 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 16.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

16	CHECK INTERMITTENT INCIDENT	
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.		
	▶	**INSPECTION END**

Description

NFEC1245

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 electonic 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

NFEC1246

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
U1000 1000 U1001 1001	CAN communication line	● ECM cannot communicate to other control unit. ● ECM cannot communicate for more than the specified time.	● Harness or connectors (CAN communication line is open or shorted.)

DTC Confirmation Procedure

NFEC1247

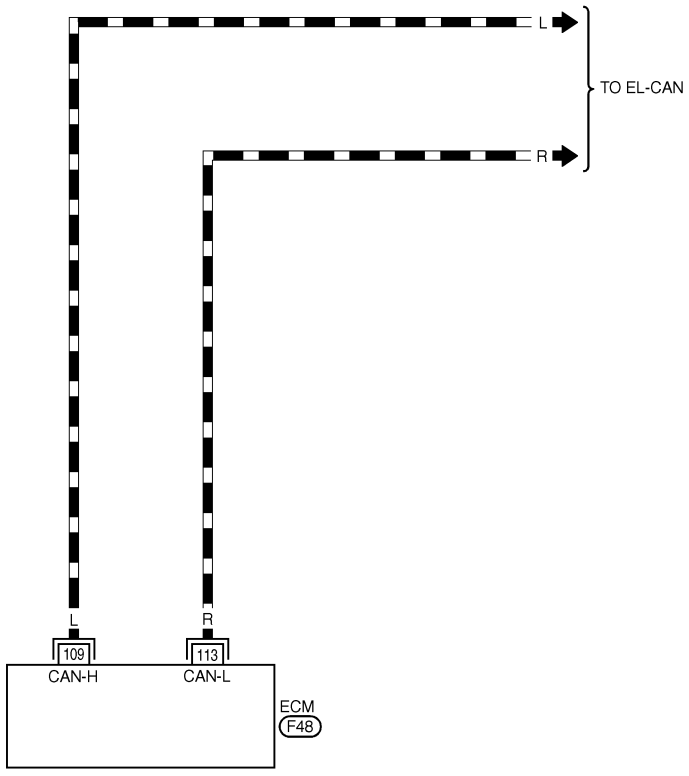
1. Turn ignition switch “ON” and wait at least 3 seconds.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. If 1st trip DTC is detected, go to “Diagnostic Procedure” EC-166.

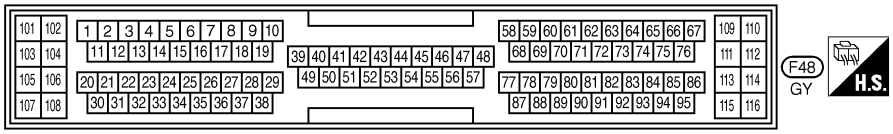
Wiring Diagram

NFEC1248

EC-CAN-01

: DETECTABLE LINE FOR DTC
: NON-DETECTABLE LINE FOR DTC
: DATA LINE





MEC923D

Diagnostic Procedure

NFEC1249

1 **INSPECTION START**

1. Turn ignition switch “ON”.
2. Select “CAN COMM SIGNALS” in “DATA MONITOR” mode with CONSULT-II.
3. Print out the CONSULT-II screen.

With TCS models

OK data

DATA MONITOR	
MONITOR	
CAN COMM	OK
CAN CIRC 1	OK
CAN CIRC 2	OK
CAN CIRC 3	OK

NG data

DATA MONITOR	
MONITOR	
CAN COMM	OK
CAN CIRC 1	UNKWN
CAN CIRC 2	UNKWN
CAN CIRC 3	UNKWN

SEC898C

Without TCS models

OK data

DATA MONITOR	
MONITOR	
CAN COMM	OK
CAN CIRC 1	OK
CAN CIRC 2	OK
CAN CIRC 3	UNKWN

NG data

DATA MONITOR	
MONITOR	
CAN COMM	OK
CAN CIRC 1	UNKWN
CAN CIRC 2	UNKWN
CAN CIRC 3	UNKWN

SEC153D

▶ Go to EL-437 (With TCS models) or EL-430 (Without TCS models), “CAN SYSTEM”.

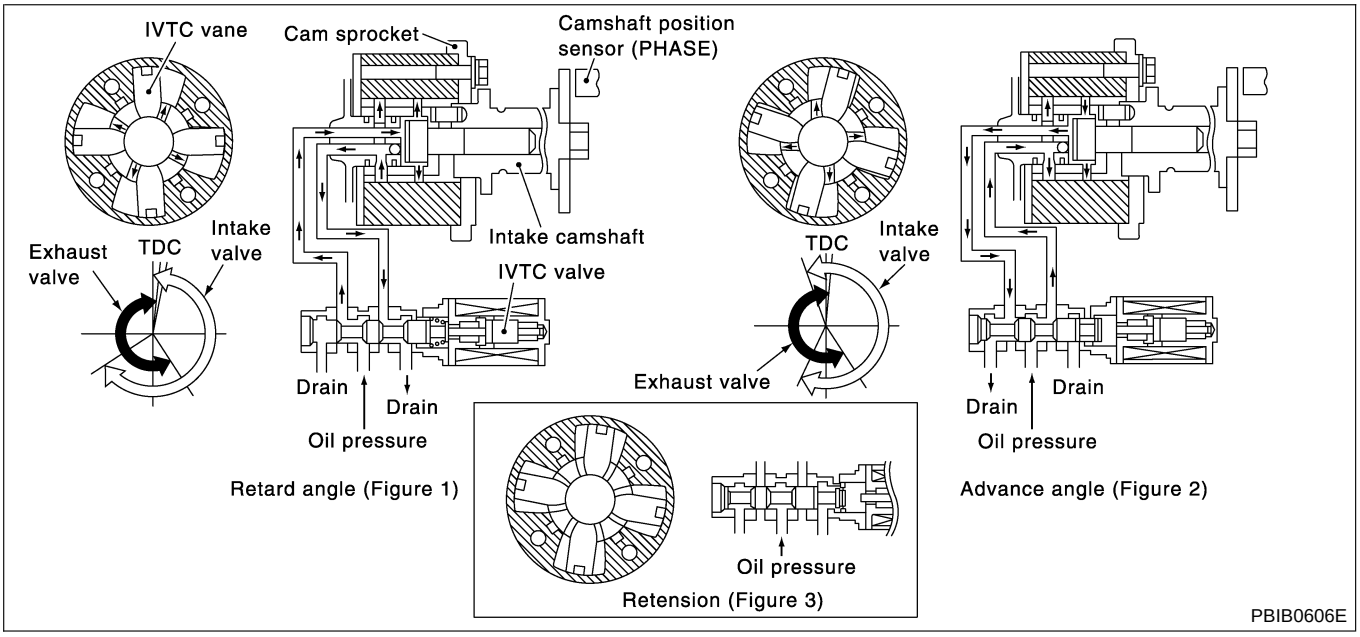
Description

NFEC0821

SYSTEM DESCRIPTION

NFEC0821S01

Sensor	Input signal to ECM function	ECM	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed	Intake valve timing control	Intake valve timing control solenoid valve
Engine coolant temperature sensor	Engine coolant temperature		
Vehicle speed sensor	Vehicle speed		



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 camshaft timing control 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

NFEC0822

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
INT/V TIM (B1) INT/V TIM (B2)	● Engine: After warming up ● Shift lever “N” ● Quickly depressed accelerator pedal ● No-load	Idle	−5 - 5° CA
		2,000 rpm	Approximately 0 - 30° CA
INT/V SOL (B1) INT/V SOL (B2)	● Engine: After warming up ● Shift lever “N” ● Quickly depressed accelerator pedal ● No-load	Idle	0 - 2%
		2,000 rpm	Approximately 25 - 50%

On Board Diagnosis Logic

NFEC0824

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0011 0011 (Bank 1) P0021 0021 (Bank 2)	Intake valve timing control performance	There is a gap between angle of target and phase-control angle degree.	• Harness or connectors (Intake valve timing control solenoid valve circuit is open or shorted.) • Intake valve timing control solenoid valve • Crankshaft position sensor (POS) • Camshaft position sensor (PHASE) • Accumulation of debris to the signal pick-up portion of the camshaft

FAIL-SAFE MODE

NFEC0824S01

When malfunction A or B is detected, the ECM enters fail-safe mode and the MIL lights up.

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

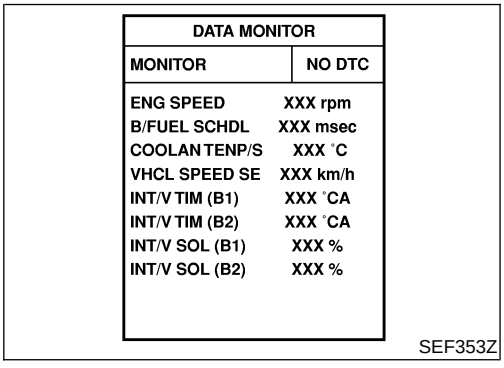
NFEC0825

CAUTION:

Always drive 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

NFEC0825S03

1) Turn ignition switch "ON".
2) Select "DATA MONITOR" mode with CONSULT-II.
3) Maintain the following conditions for at least 20 conecutive seconds.

ENG SPEED	2,000 - 3,000 rpm (A constant rotation is maintained.)
COOLANT TEMPS	70 - 90°C (158 - 194°F)
Selector lever	1st position (A/T or M/T)
Driving location	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 "Diagnostic Procedure", EC-172.

WITH GST

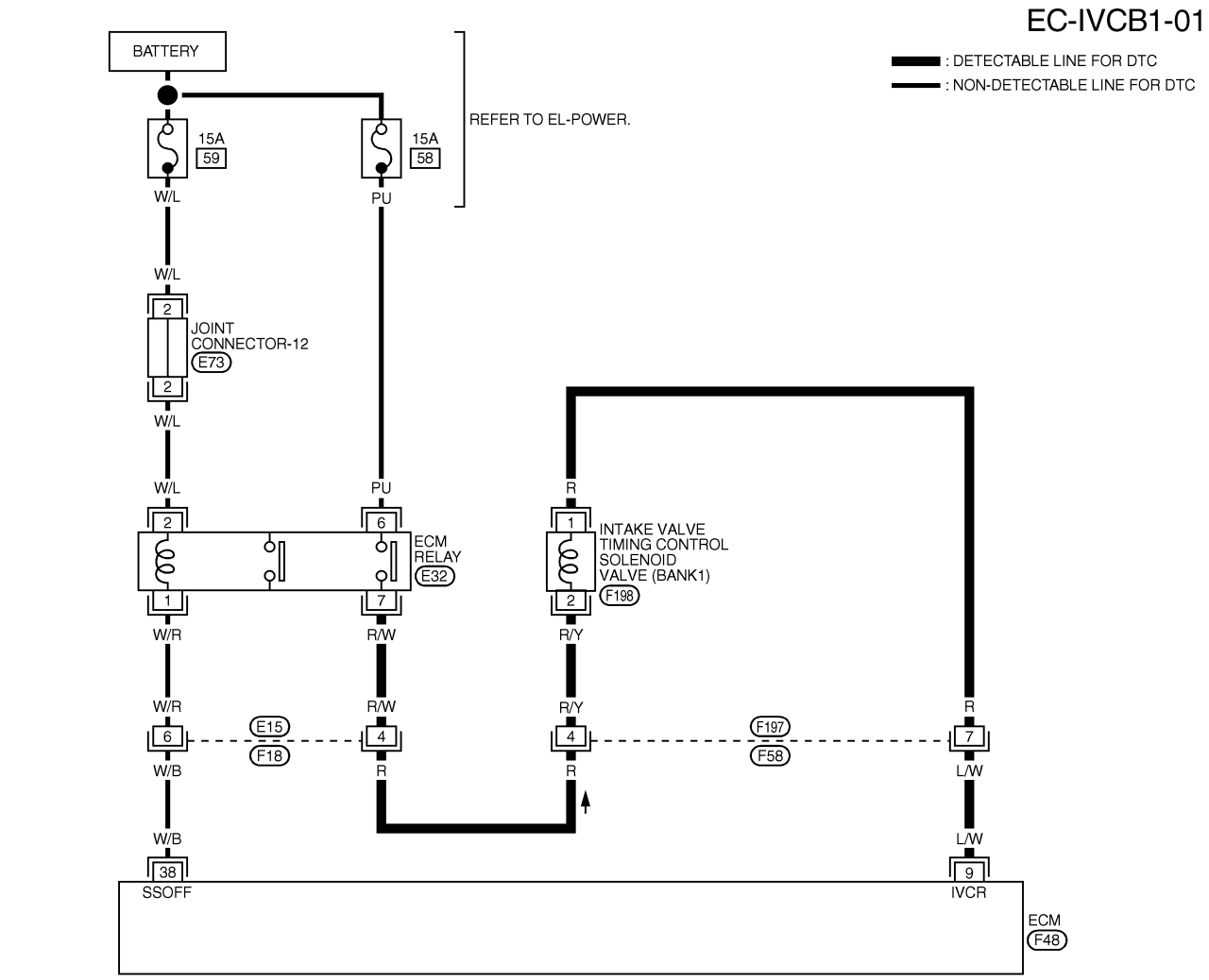
NFEC0825S04

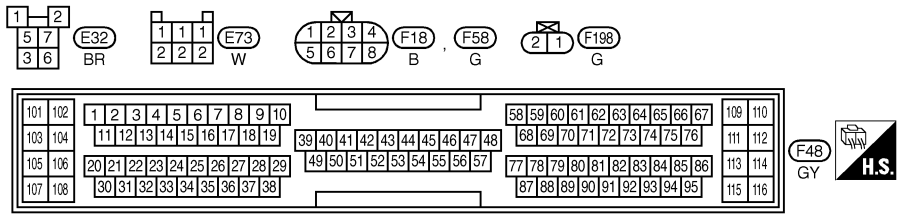
Follow the procedure "WITH CONSULT-II" above.

Wiring Diagram

=NFEC1409

BANK 1

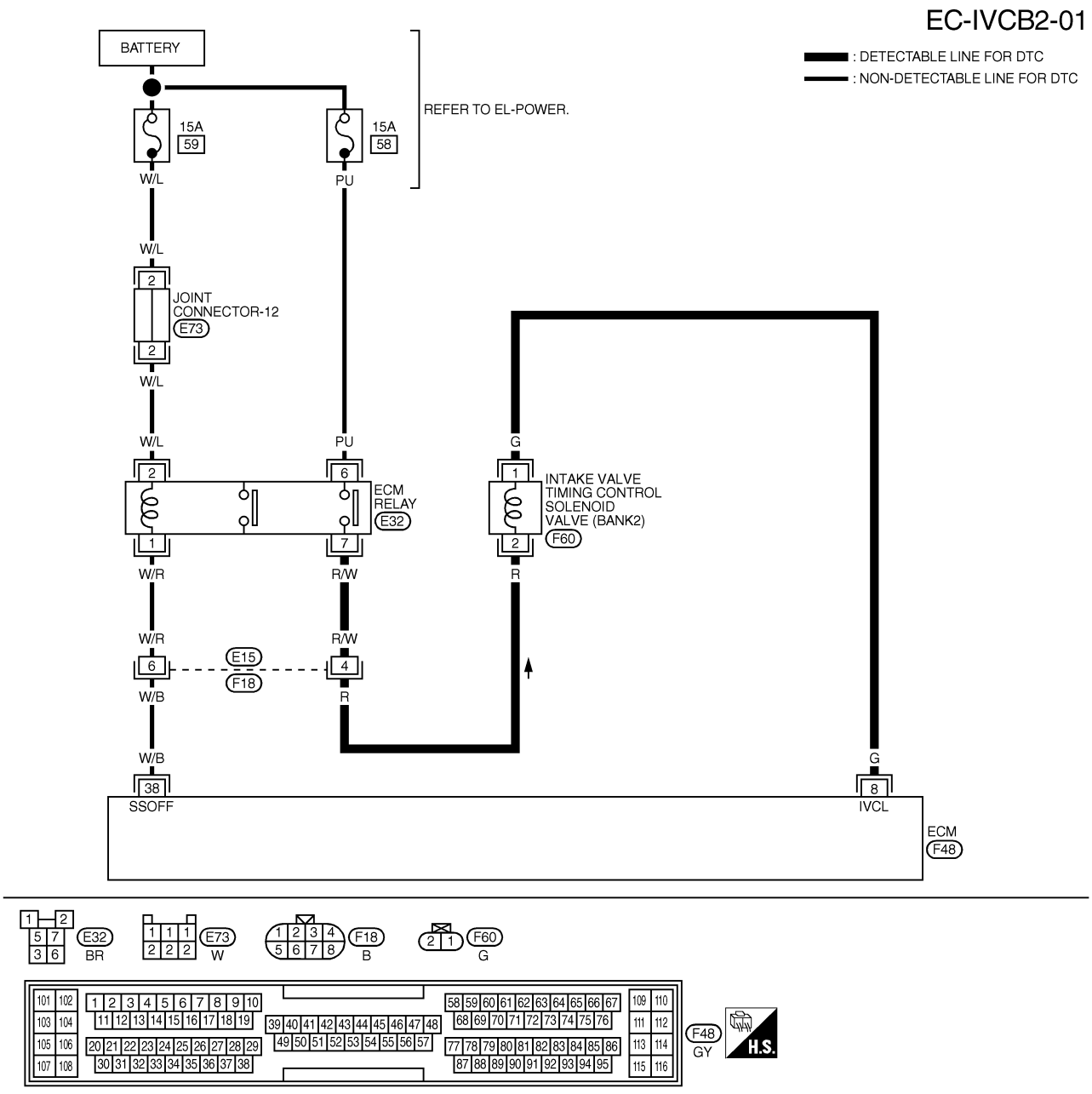




MEC505D

Wiring Diagram (Cont'd)

BANK 2

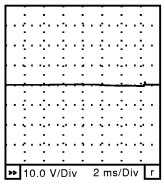
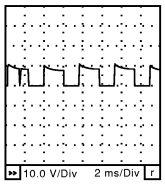
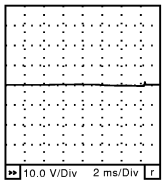
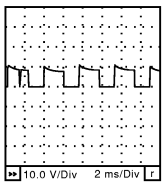


MEC504D

Specification data are reference values, and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than the ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
8	G	Intake valve timing control solenoid valves (Bank 2)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Battery voltage (11 - 14V)★  SEC988C
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,500 rpm.	7 - 12V★  SEC989C
9	L/W	Intake valve timing control solenoid valves (Bank 1)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Battery voltage (11 - 14V)★  SEC988C
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,500 rpm.	7 - 12V★  SEC989C

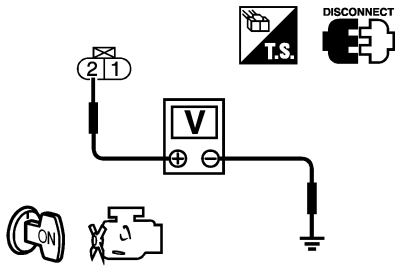
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnostic Procedure

NFEC1410

1	CHECK 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 2 and ground with CONSULT-II or tester.



PBIB0192E

Voltage: Battery voltage

OK or NG

OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	DETECT MALFUNCTION PART

Check the following.
- Harness connectors E15, F18
- Harness connectors F58, F197
- Harness for open or short between intake valve timing control solenoid valve and ECM relay

	▶	Repair 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 9 (bank 1) or 8 (bank 2) and intake valve timing control solenoid valve 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	▶	GO TO 4.

4	DETECT MALFUNCTIONING PART

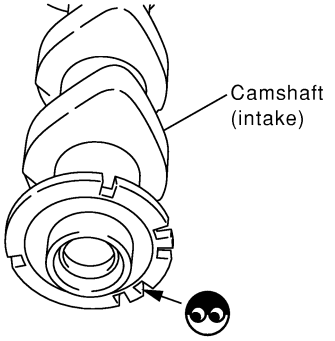
Check the following
- Harness connectors F58, F197
- Harness for open or short between intake valve timing control solenoid valve and ECM

	▶	Repair open circuit or short to ground or short to power in harness or connectors.

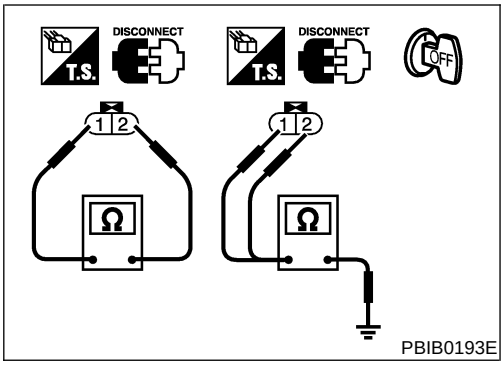
5	CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE	
Refer to "Component Inspection", EC-174.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Replace intake valve timing control solenoid valve.

6	CHECK CRANKSHAFT POSITION SENSOR (POS)	
Refer to "Component Inspection", EC-336.		
OK or NG		
OK	▶	GO TO 7.
NG	▶	Replace crankshaft position sensor (POS).

7	CHECK CAMSHAFT POSITION SENSOR (PHASE)	
Refer to "Component Inspection", EC-345.		
OK or NG		
OK	▶	GO TO 8.
NG	▶	Replace.

8	CHECK CAMSHAFT (INTAKE)	
Visually check for chipped signal plate at camshaft rear.		
 SEC905C		
OK or NG		
OK	▶	GO TO 9.
NG	▶	Replace camshaft.

9	CHECK INTERMITTENT INCIDENT	
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.		
OK or NG		
	▶	**INSPECTION END**



Component Inspection

NFEC1411

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 as follows.

Terminals	Resistance
1 and 2	7.0 - 7.5Ω at 20°C (68°F)
1 or 2 and ground	∞Ω (Continuity should not exist)

Description

NFEC0826

SYSTEM DESCRIPTION

NFEC0826S01

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed	Heated oxygen sensor 1 heater control	Heated oxygen sensor 1 heaters
Camshaft position sensor (PHASE)			

The ECM performs ON/OFF control of the heated oxygen sensor 1 heaters corresponding to the engine speed.

OPERATION

NFEC0826S02

Engine speed rpm	Heated oxygen sensor 1 heaters
Above 3,600	OFF
Below 3,600	ON

CONSULT-II Reference Value in Data Monitor Mode

NFEC0827

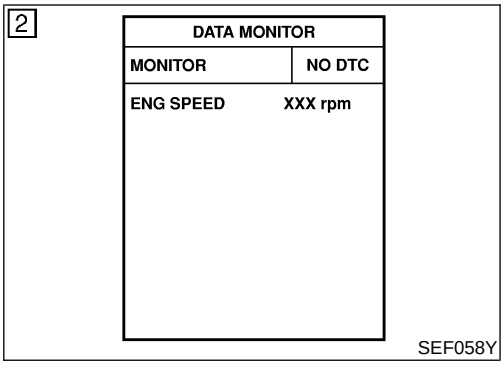
Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
HO2S1 HTR (B1) HO2S1 HTR (B2)	• Engine speed: Below 3,600 rpm	ON
	• Engine speed: Above 3,600 rpm	OFF

On Board Diagnosis Logic

NFEC0829

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0031 0031 (Bank 1) P0051 0051 (Bank 2)	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.) • Heated oxygen sensor 1 heater
P0032 0032 (Bank 1) P0052 0052 (Bank 2)	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.) • Heated oxygen sensor 1 heater



DTC Confirmation Procedure

NFEC0830

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

NFEC0830S01

1) Turn ignition switch “ON” and select “DATA MONITOR” mode with CONSULT-II.
2) Start engine and run it for at least 6 seconds at idle speed.
3) If 1st trip DTC is detected, go to “Diagnostic Procedure”, EC-179.

WITH GST

NFEC0830S02

1) Start engine and run it for at least 6 seconds at idle speed.
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) Select “MODE 3” with GST.
5) If DTC is detected, go to “Diagnostic Procedure”, EC-179.

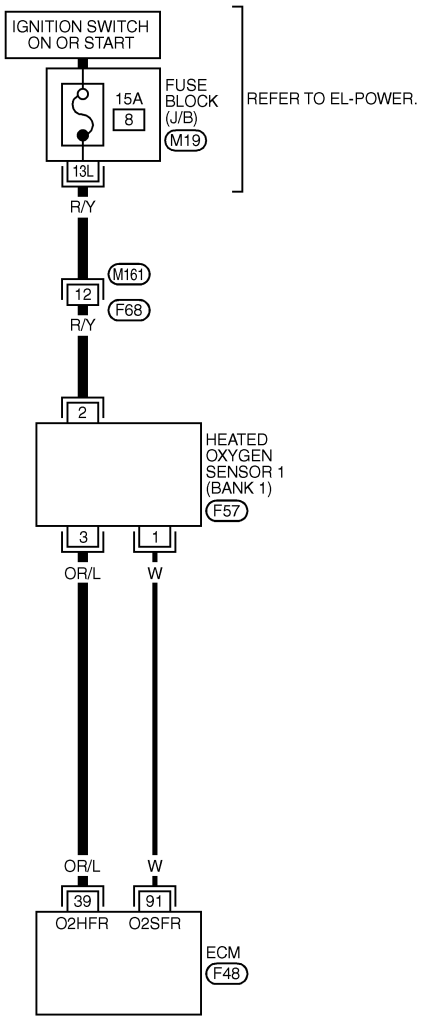
- **When using GST, “DTC Confirmation Procedure” should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.**

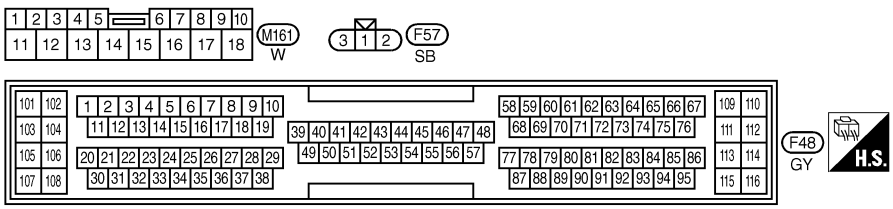
Wiring Diagram

NFEC0831

BANK 1

NFEC0831S01





REFER TO THE FOLLOWING.
M19 -FUSE BLOCK-
JUNCTION BOX (J/B)

MEC481D

ECM TERMINALS AND REFERENCE VALUE 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.

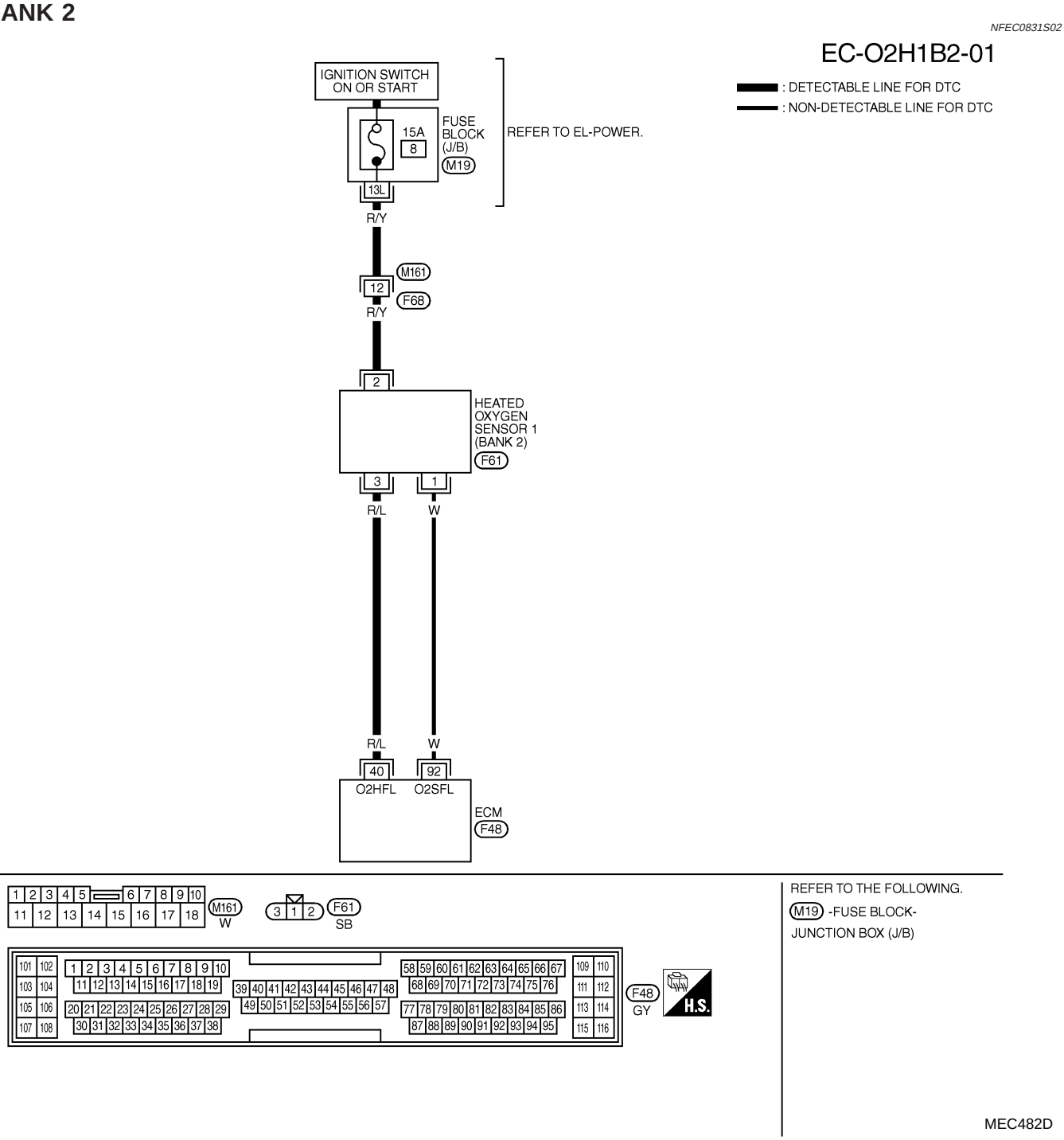
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
39	OR/L	HEATED OXYGEN SENSOR 1 HEATER (BANK 1)	ENGINE RUNNING BELOW 3,600 RPM	0 - 1.0V
			ENGINE RUNNING ABOVE 3,600 RPM	BATTERY VOLTAGE

SEC095D

Wiring Diagram (Cont'd)

BANK 2

NFEC0831S02



ECM TERMINALS AND REFERENCE VALUE 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	WIRE COLOR	ITEM	CONDITION	DATA (DC)
40	R/L	HEATED OXYGEN SENSOR 1 HEATER (BANK 2)	ENGINE RUNNING BELOW 3,600 RPM	0 - 1.0V
			ENGINE RUNNING ABOVE 3,600 RPM	BATTERY VOLTAGE

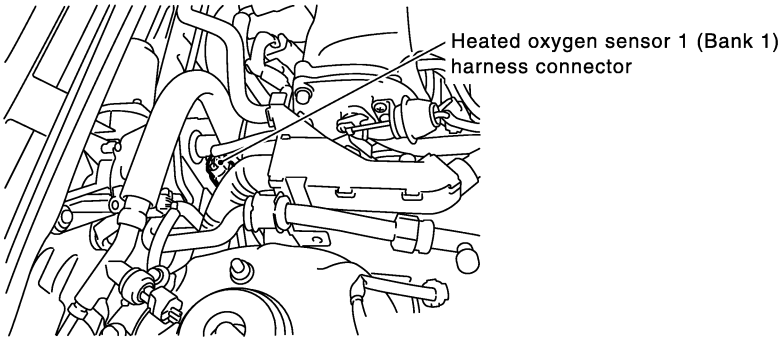
SEC096D

Diagnostic Procedure

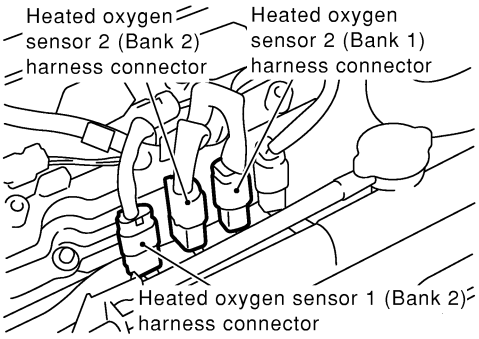
NFEC0832

1	CHECK HO2S1 POWER SUPPLY CIRCUIT

1. Turn ignition switch “OFF”.
2. Disconnect corresponding heated oxygen sensor 1 harness connector.

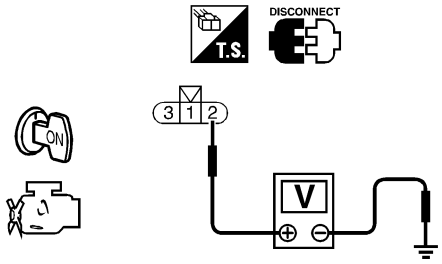


SEC099D



SEC134D

3. Turn ignition switch “ON”.
4. Check voltage between HO2S1 terminal 2 and ground with CONSULT-II or tester.



Voltage: Battery voltage

SEF311X

OK or NG

OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors M161, F68
- Fuse block (J/B) connector M19
- 15A fuse
- Harness for open or short between heated oxygen sensor 1 and fuse

	▶	Repair harness or connectors.

Diagnostic Procedure (Cont'd)

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 and HO2S1 terminal as follows. Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM	Sensor	
P0031, P0032	39	3	Bank 1
P0051, P0052	40	3	Bank 2

MTBL1140

Continuity should exist.

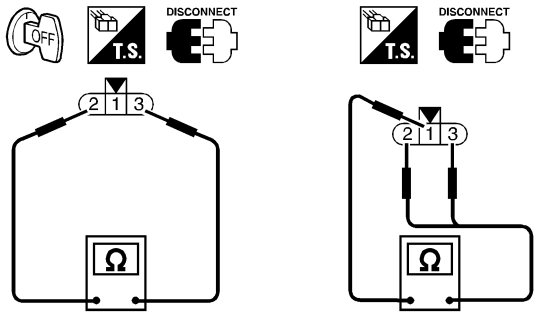
4. Also check harness for short to ground and short to power.

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

Check resistance between HO2S1 terminals as follows.



Terminals	Resistance
2 and 3	2.3 - 4.3Ω at 25°C (77°F)
1 and 2 1 and 3	∞Ω (Continuity should not exist.)

SEF310X

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.**

OK or NG

OK	▶	GO TO 5.
NG	▶	Replace malfunctioning heated oxygen sensor.

5	CHECK INTERMITTENT INCIDENT

Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.

▶ **INSPECTION END**

Description

NFEC0833

SYSTEM DESCRIPTION

NFEC0833S01

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed	Heated oxygen sensor heater 2 control	Heated oxygen sensor 2 heaters
Camshaft position sensor (PHASE)			

The ECM performs ON/OFF control of the heated oxygen sensor 2 heaters corresponding to the engine speed.

OPERATION

NFEC0833S02

Engine speed rpm	Heated oxygen sensor 2 heaters
Above 3,600	OFF
Below 3,600	ON

CONSULT-II Reference Value in Data Monitor Mode

NFEC0834

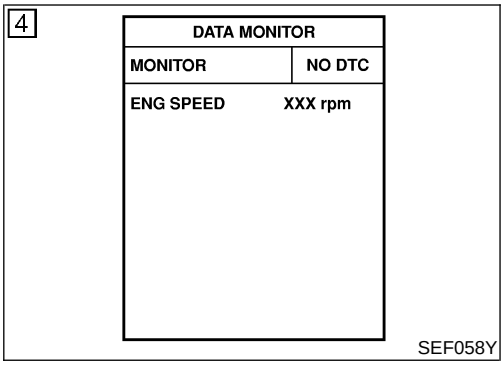
Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
HO2S2 HTR (B1) HO2S2 HTR (B2)	● Engine is running above 3,600 rpm.	OFF
	● Engine is running below 3,600 rpm after driving for 2 minutes at a speed of 70 km/h (43 MPH) or more.	ON

On Board Diagnosis Logic

NFEC0836

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0037 0037 (Bank 1) P0057 0057 (Bank 2)	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.) ● Heated oxygen sensor 2 heater
P0038 0038 (Bank 1) P0058 0058 (Bank 2)	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.) ● Heated oxygen sensor 2 heater



DTC Confirmation Procedure

NFEC0837

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 11.0V and 16V at idle.

WITH CONSULT-II

NFEC0837S01

1) Turn ignition switch “ON” and select “DATA MONITOR” mode with CONSULT-II.
2) Start engine.
3) Drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
4) Stop vehicle and let engine idle for at least 6 seconds.
5) If 1st trip DTC is detected, go to “Diagnostic Procedure”, EC-185.

WITH GST

NFEC0837S02

1) Start engine.
2) Drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
3) Stop vehicle and let engine idle for at least 6 seconds.
4) Turn ignition switch “OFF” and wait at least 10 seconds.
5) Start engine.
6) Drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
7) Stop vehicle and let engine idle for at least 6 seconds.
8) Select “MODE 3” with GST.
9) If DTC is detected, go to “Diagnostic Procedure”, EC-185.

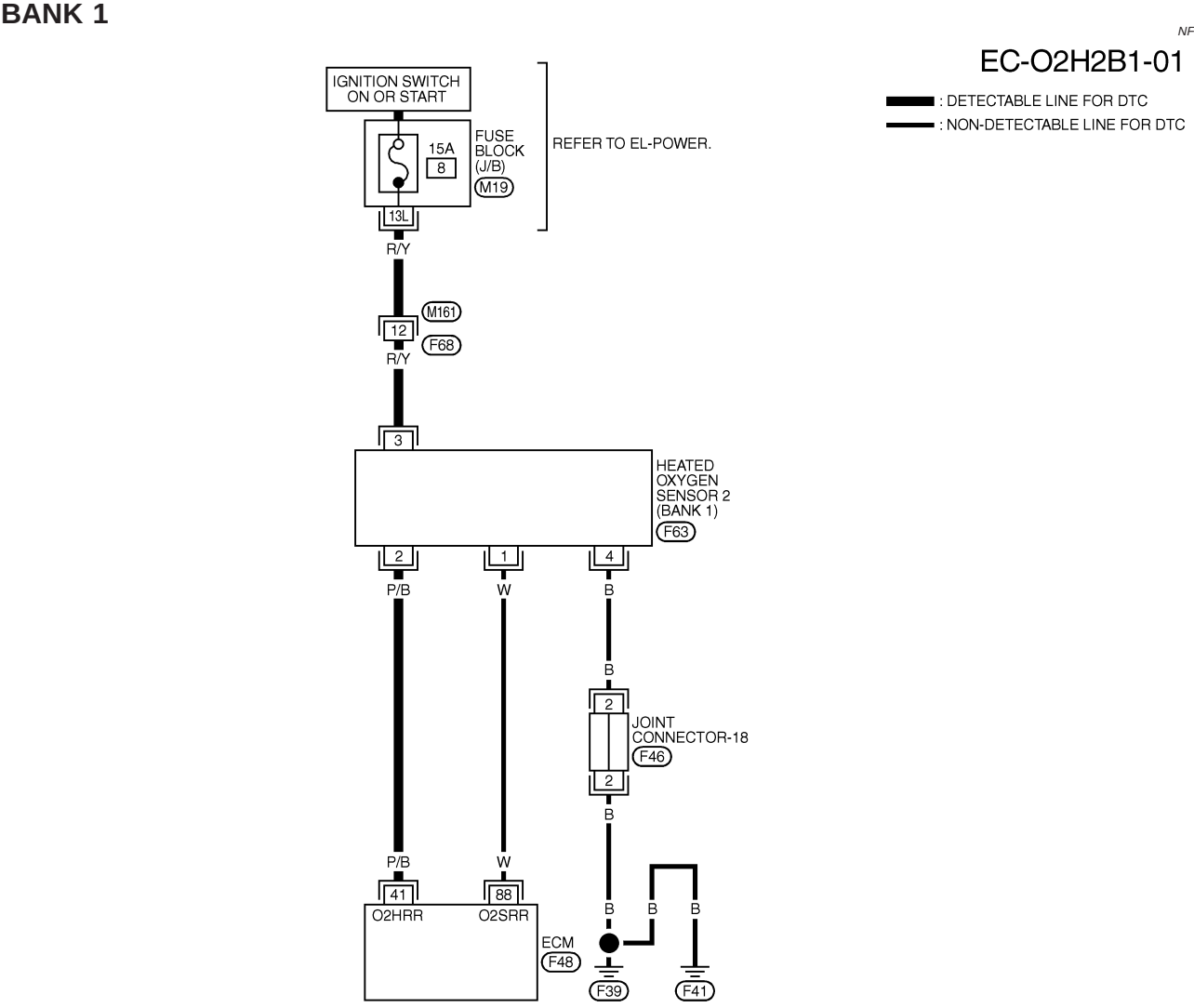
- **When using GST, “DTC Confirmation Procedure” should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.**

Wiring Diagram

=NFEC0838

BANK 1

NFEC0838S01



MEC485D

ECM TERMINALS AND REFERENCE VALUE 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	WIRE COLOR	ITEM	CONDITION	DATA (DC)
41	P/B	HEATED OXYGEN SENSOR 2 HEATER (BANK 1)	IGN ON ENGINE RUNNING ABOVE 3,600 RPM	BATTERY VOLTAGE
			ENGINE RUNNING BELOW 3,600 RPM AFTER DRIVING FOR 2 MINUTES AT A SPEED OF 70 KM/H (43 MPH) OR MORE	0 - 1.0V

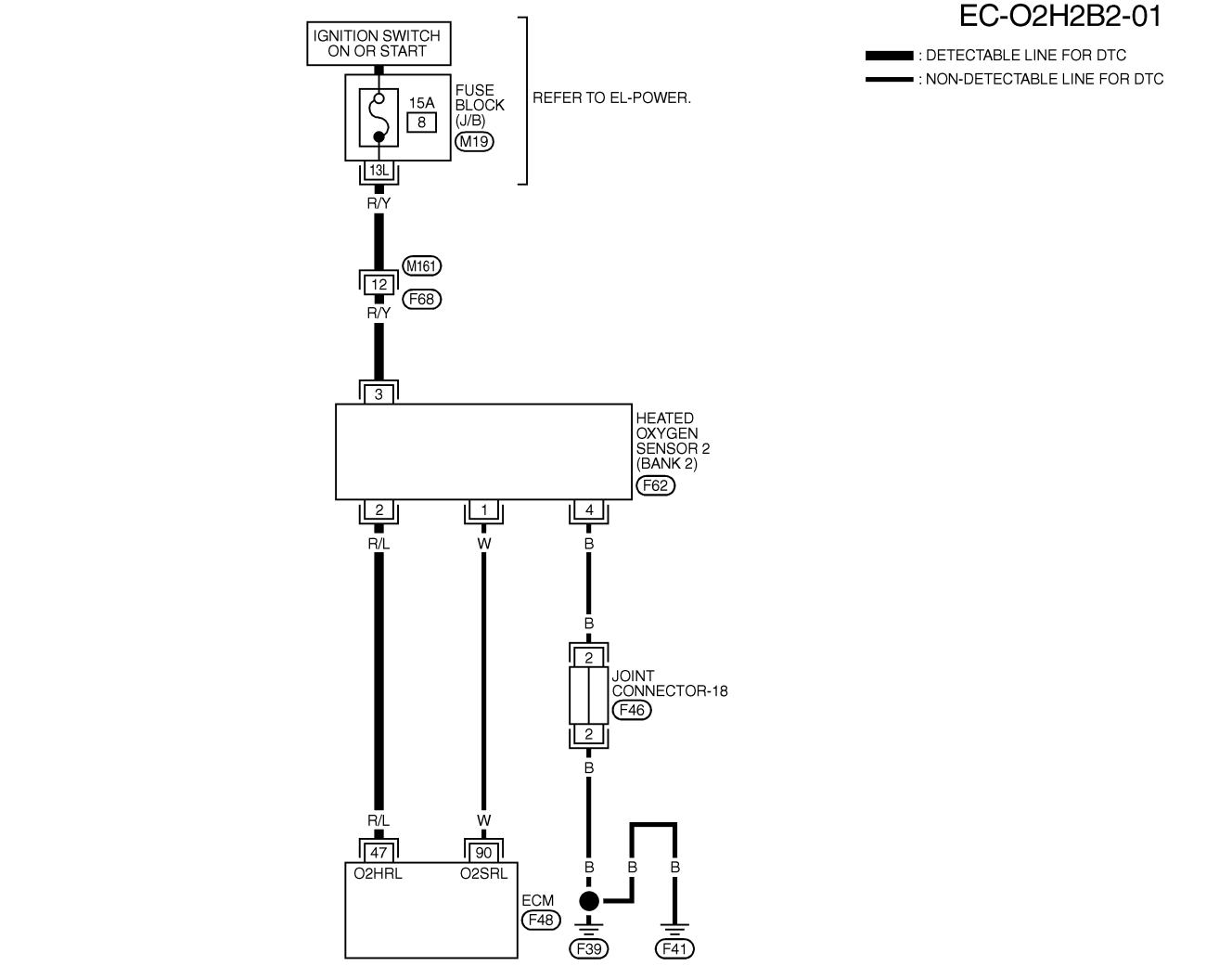
SEC100D

Wiring Diagram (Cont'd)

BANK 2

NFEC0838S02

EC-O2H2B2-01



REFER TO THE FOLLOWING.
M19 -FUSE BLOCK-
JUNCTION BOX (J/B)

MEC486D

ECM TERMINALS AND REFERENCE VALUE 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	WIRE COLOR	ITEM	CONDITION	DATA (DC)
47	R/L	HEATED OXYGEN SENSOR 2 HEATER (BANK 2)	IGN ON	BATTERY VOLTAGE
			ENGINE RUNNING ABOVE 3,600 RPM	
			ENGINE RUNNING BELOW 3,600 RPM AFTER DRIVING FOR 2 MINUTES AT A SPEED OF 70 KM/H (43 MPH) OR MORE	0 - 1.0V

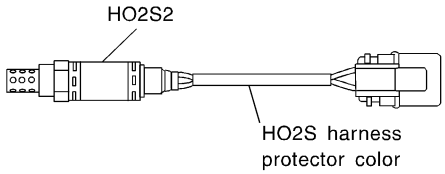
SEC101D

Diagnostic Procedure

NFEC0839

1	CHECK HO2S2 POWER SUPPLY CIRCUIT

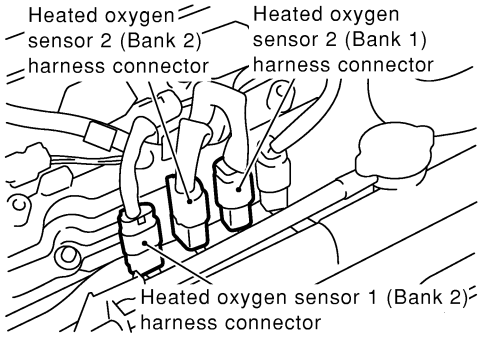
1. Turn ignition switch “OFF”.
2. Check heated oxygen sensor harness 2 protector color.



HO2S2 (bank 1): White or Gray
HO2S2 (bank 2): Red or Red/Brown

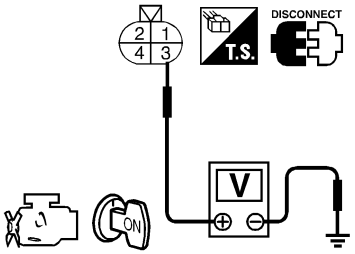
SEF372ZB

3. Disconnect corresponding heated oxygen sensor 2 harness connector.



SEC134D

4. Turn ignition switch “ON”.
5. Check voltage between HO2S2 terminal 3 and ground.



Voltage: Battery voltage

SEF314X

OK or NG

OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors M161, F68
- Fuse block (J/B) connector M19
- 15A fuse
- Harness for open or short between heated oxygen sensor 2 and fuse

	▶	Repair harness or connectors.

Diagnostic Procedure (Cont'd)

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 and HO2S2 terminal as follows. Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM	Sensor	
P0037, P0038	41	2	Bank 1
P0057, P0058	47	2	Bank 2

MTBL1141

Continuity should exist.

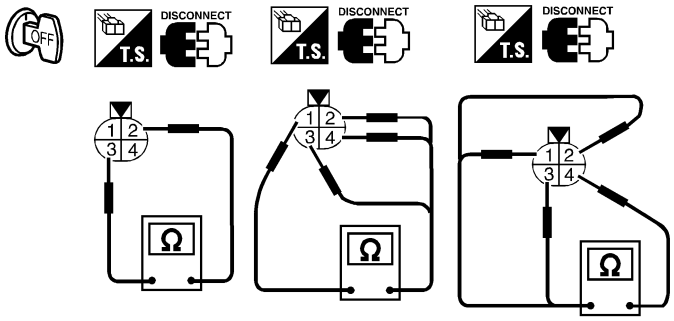
4. Also check harness for short to ground and short to power.

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

Check the resistance between HO2S2 terminals as follows.



Terminal No.	Resistance
2 and 3	2.3 - 4.3Ω at 25°C (77°F)
1 and 2, 3, 4	∞ Ω (Continuity should not exist.)
4 and 1, 2, 3	

SEF315X

CAUTION:

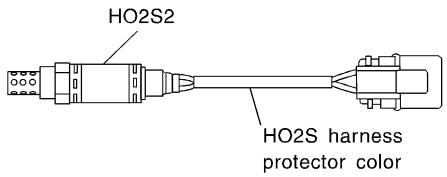
Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.

OK or NG

OK	▶	GO TO 6.
NG	▶	GO TO 5.

5	REPLACE HEATED OXYGEN SENSOR 2

Check rear heated oxygen sensor harness protector color.



HO2S2 (bank 1): White or Gray
HO2S2 (bank 2): Red or Red/Brown

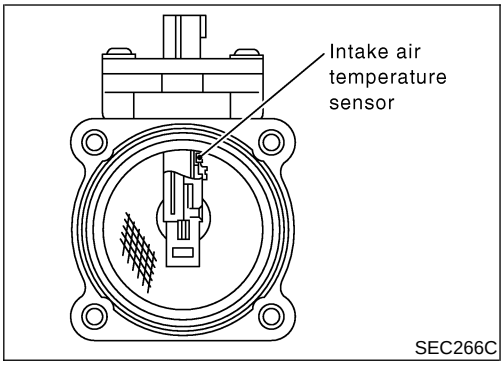
SEF372ZB

CAUTION:

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.

	▶	Replace malfunctioning heated oxygen sensor 2.

6	**CHECK INTERMITTENT INCIDENT**
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.	
▶	**INSPECTION END**



Component Description

NFEC0840

The mass air flow sensor is placed in the stream of intake air. It measures the intake flow rate by measuring a part of the entire intake flow. It consists of a hot film that is supplied with electric current from the ECM. The temperature of the hot film is controlled by the ECM a certain amount. The heat generated by the hot film is reduced as the intake air flows around it. The more air, the greater the heat loss.

Therefore, the ECM must supply more electric current to maintain the temperature of the hot film as air flow increases. The ECM detects the air flow by means of this current change.

CONSULT-II Reference Value in Data Monitor Mode

NFEC0841

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
MAS A/F SE-B1	• Engine: After warming up • Air conditioner switch: “OFF” • Shift lever: “N” • No-load	Idle	1.1 - 1.5V
		2,500 rpm	1.7 - 2.4V
CAL/LD VALUE	ditto	Idle	10 - 35%
		2,500 rpm	10 - 35%
MASS AIRFLOW	ditto	Idle	2.0 - 6.0 g·m/s
		2,500 rpm	7.0 - 20.0 g·m/s

On Board Diagnosis Logic

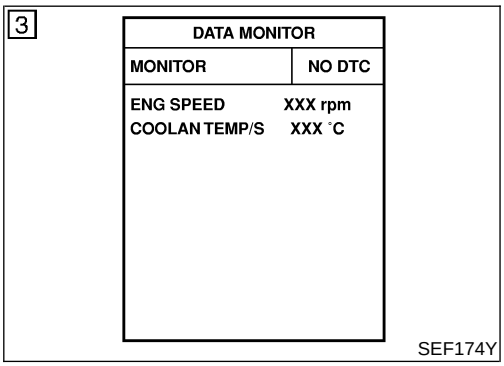
NFEC1428

DTC No.	Trouble diagnosis name	DTC Detecting Condition		Possible Cause
P0101 0101	Mass air flow sensor circuit range/ performance problem	A)	A high voltage from the sensor is sent to ECM under light load driving condition.	• Harness or connectors (The sensor circuit is open or shorted.) • Mass air flow sensor
		B)	A low voltage from the sensor is sent to ECM under heavy load driving condition.	• Harness or connectors (The sensor circuit is open or shorted.) • Intake air leaks • Mass air flow sensor

DTC Confirmation Procedure

NFEC0844

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

NFEC0844S01

NOTE:
If engine will not start or stops soon, wait at least 10 seconds with engine stopped (Ignition switch “ON”) instead of running engine at idle speed.

With CONSULT-II

NFEC0844S0101

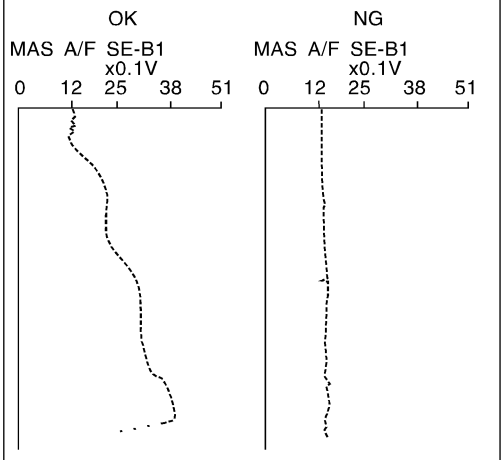
1) Turn ignition switch “ON”.
2) Select “DATA MONITOR” mode with CONSULT-II.
3) Start engine and warm it up to normal operating temperature.
4) Run engine for at least 10 seconds at idle speed.
5) If 1st trip DTC is detected, go to “Diagnostic Procedure”, EC-192.

With GST

NFEC0844S0102

Follow the procedure “With CONSULT-II” above.

6



SEF243Y

7

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
VHCL SPEED SE	XXX km/h
THRTL SEN 1	XXX V
THRTL SEN 2	XXX V

PBIB0199E

CALC LOAD	20%
COOLANT TEMP	95°C
SHORT FT #1	2%
LONG FT #1	0%
SHORT FT #2	4%
LONG FT #2	0%
ENGINE SPD	2637RPM
VEHICLE SPD	0MPH
IGN ADVANCE	41.0°
INTAKE AIR	41°C
MAF	14.1gm/sec
THROTTLE POS	3%

SEF534P

PROCEDURE FOR MALFUNCTION B

NFEC0844S02

CAUTION:

Always drive vehicle at a safe speed.

With CONSULT-II

NFEC0844S0201

1) Turn ignition switch "ON".
2) Start engine and warm it up to normal operating temperature. **If engine cannot be started, go to "Diagnostic Procedure", EC-192.**
3) Select "DATA MONITOR" mode with CONSULT-II.
4) Check the voltage of MAS A/F SE B1 with "DATA MONITOR".
5) Increases engine speed to about 4,000 rpm.
6) Monitor the linear voltage rise in response to engine speed increases.
   If NG, go to "Diagnostic Procedure", EC-192.
   If OK, go to following step.
7) Maintain the following conditions for at least 10 consecutive seconds.

ENG SPEED	More than 2,000 rpm
THRTL SEN 1 THRTL SEN 2	More than 3V
Selector lever	Suitable position
Driving location	Driving vehicle uphill (Increased engine load) will help maintain the driving conditions required for this test.

8) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-192.

Overall Function Check

NFEC0845

PROCEDURE FOR MALFUNCTION B

NFEC0845S01

Use this procedure to check the overall function of the mass air flow sensor circuit. During this check, a 1st trip DTC might not be confirmed.

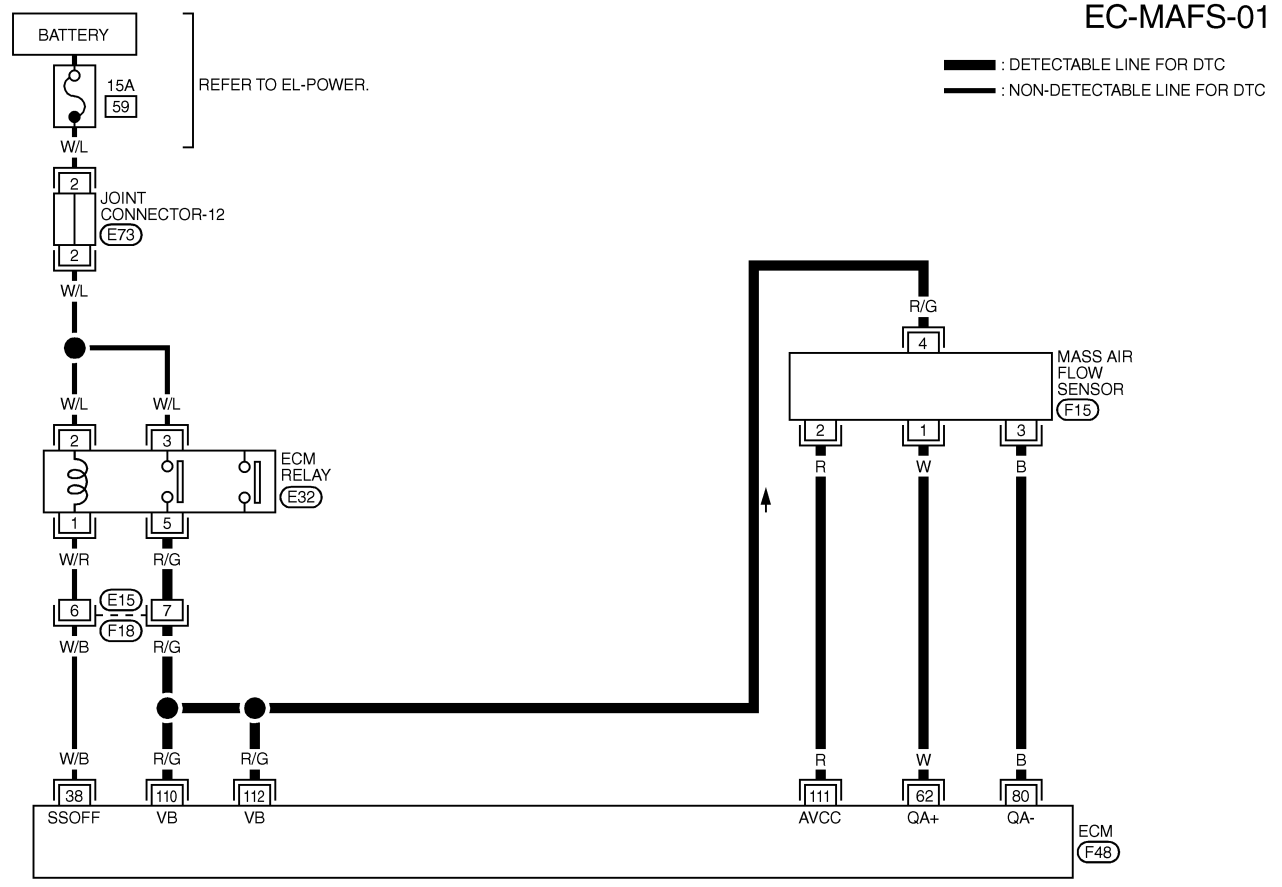
With GST

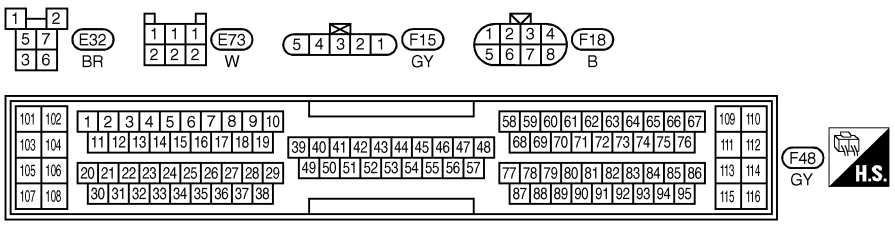
NFEC0845S0101

1) Start engine and warm it up to normal operating temperature.
2) Select "MODE 1" with GST.
3) Check the mass air flow sensor signal with "MODE 1".
4) Check for linear mass air flow sensor signal value rise in response to increases to about 4,000 rpm in engine speed.
5) If NG, go to "Diagnostic Procedure", EC-192.

Wiring Diagram

NFEC0846





MEC473D

ECM TERMINALS AND REFERENCE VALUE 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	WIRE COLOR	ITEM	CONDITION	DATA (DC)
62	W	MASS AIR FLOW SENSOR	ENGINE RUNNING AT IDLE SPEED UNDER WARM-UP CONDITION	1.1 - 1.5V
			ENGINE RUNNING AT 2,500 RPM UNDER WARM-UP CONDITION	1.7 - 2.4V
80	B	MASS AIR FLOW SENSOR GROUND	ENGINE RUNNING AT IDLE SPEED UNDER WARM-UP CONDITION	APPROX. 0V
111	R	SENSORS' POWER SUPPLY	IGN ON	APPROX. 5V

SEF650XC

Diagnostic Procedure

NFEC0847

1	INSPECTION START

Which malfunction (A, B) is duplicated?

MALFUNCTION	Type
A	I
B	II

MTBL1142

Type I or Type II

Type I	▶	GO TO 3.
Type II	▶	GO TO 2.

2	CHECK INTAKE SYSTEM

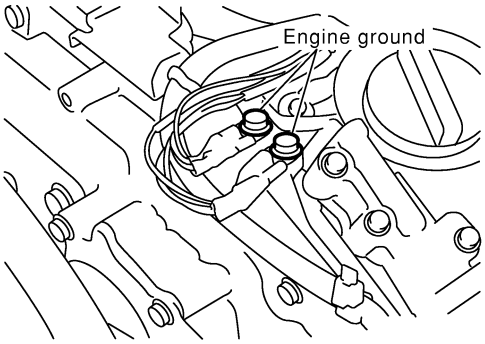
Check the following for connection.
- Air duct
- Vacuum hoses
- Intake air passage between air duct to intake manifold collector

OK or NG

OK	▶	GO TO 3.
NG	▶	Reconnect the parts.

3	RETIGHTEN GROUND SCREWS

1. Turn ignition switch “OFF”.
2. Loosen and retighten engine ground screws.

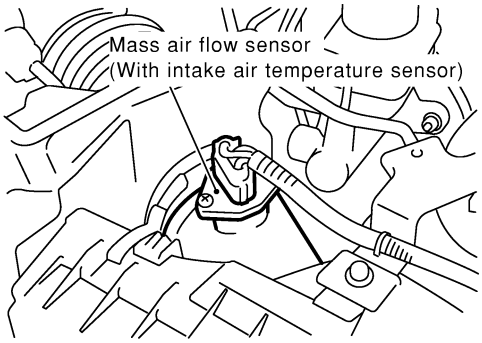


SEC047D

	▶	GO TO 4.

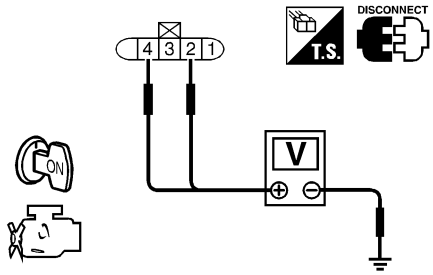
4	CHECK MAF SENSOR POWER SUPPLY CIRCUIT

1. Disconnect mass air flow (MAF) sensor harness connector.



SEC055D

2. Turn ignition switch "ON".
3. Check voltage between MAF sensor terminals 2, 4 and ground with CONSULT-II or tester.



Terminal	Voltage
2	Approximately 5
4	Battery voltage

SEF297X

OK or NG

OK	▶	GO TO 6.
NG	▶	GO TO 5.

5	DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E15, F18
- Harness for open or short between ECM relay and mass air flow sensor
- Harness for open or short between mass air flow sensor and ECM

	▶	Repair harness or connectors.

6	CHECK MAF SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between MAF sensor terminal 3 and ECM terminal 80.
   Refer to Wiring Diagram.
   Continuity should exist.
4. Also check harness for short to power.

OK or NG

OK	▶	GO TO 7.
NG	▶	Repair open circuit or short to power in harness or connectors.

Diagnostic Procedure (Cont'd)

7	CHECK MAF SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

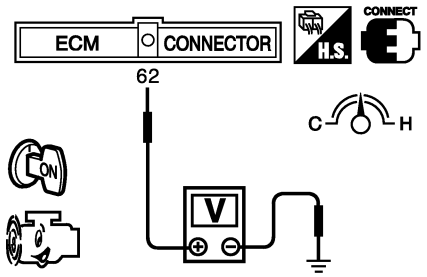
1. Check harness continuity between MAF sensor terminal 1 and ECM terminal 62.
   Refer to Wiring Diagram.
   Continuity should exist.
2. Also check harness for short to ground and short to power.

OK or NG

OK	▶	GO TO 8.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

8	CHECK MASS AIR FLOW SENSOR

1. Reconnect harness connectors disconnected.
2. Start engine and warm it up to normal operating temperature.
3. Check voltage between ECM terminal 62 (Mass air flow sensor signal) and ground.



Condition	Voltage V
Ignition switch "ON" (Engine stopped.)	Approx. 1.0
Idle (Engine is warmed-up to normal operating temperature.)	1.1 - 1.5
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.7 - 2.4
Idle to about 4,000 rpm*	1.1 - 1.5 to Approx. 4.0

*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.

SEC103D

4. If the voltage is out of specification, disconnect MAF sensor harness connector and connect it again.
   Then repeat above check.

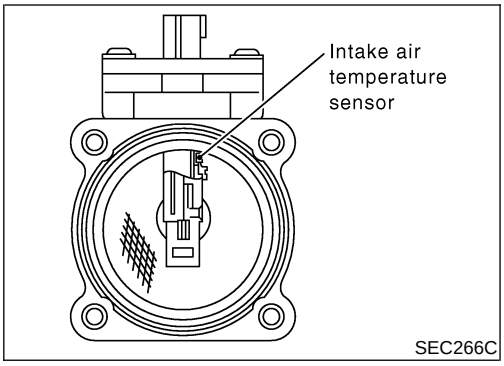
OK or NG

OK	▶	GO TO 9.
NG	▶	Replace mass air flow sensor.

9	CHECK INTERMITTENT INCIDENT

Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.

▶ **INSPECTION END**



Component Description

NFEC0746

The mass air flow sensor is placed in the stream of intake air. It measures the intake flow rate by measuring a part of the entire intake flow. It consists of a hot film that is supplied with electric current from the ECM. The temperature of the hot film is controlled by the ECM a certain amount. The heat generated by the hot film is reduced as the intake air flows around it. The more air, the greater the heat loss.

Therefore, the ECM must supply more electric current to maintain the temperature of the hot film as air flow increases. The ECM detects the air flow by means of this current change.

CONSULT-II Reference Value in Data Monitor Mode

NFEC0747

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
MAS A/F SE-B1	• Engine: After warming up • Air conditioner switch: “OFF” • Shift lever: “N” • No-load	Idle	1.1 - 1.5V
		2,500 rpm	1.7 - 2.4V
CAL/LD VALUE	ditto	Idle	10 - 35%
		2,500 rpm	10 - 35%
MASS AIRFLOW	ditto	Idle	2.0 - 6.0 g·m/s
		2,500 rpm	7.0 - 20.0 g·m/s

On Board Diagnosis Logic

NFEC1429

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0102 0102	Mass air flow sensor circuit low input	An excessively low voltage from the sensor is sent to ECM when engine is running.	• Harness or connectors (The sensor circuit is open or shorted.) • Intake air leaks • Mass air flow sensor
P0103 0103	Mass air flow 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.) • Mass air flow sensor

FAIL-SAFE MODE

NFEC1429S01

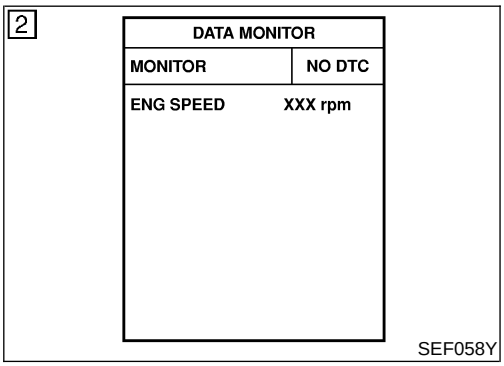
When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Detected items	Engine operating condition in fail-safe mode
Mass air flow sensor circuit	Engine speed will not rise more than 2,400 rpm due to the fuel cut.

DTC Confirmation Procedure

NFEC1430

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 P0103

NFEC1430S01

With CONSULT-II

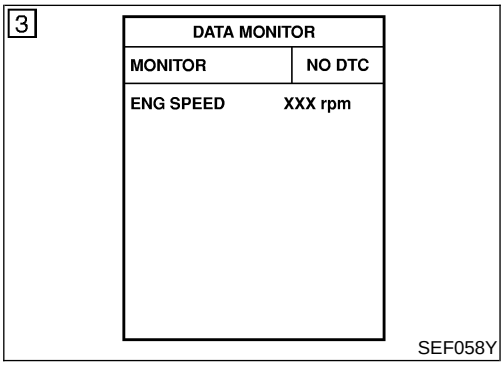
NFEC1430S0101

1) Turn ignition switch “ON”.
2) Select “DATA MONITOR” mode with CONSULT-II.
3) Wait at least 6 seconds.
4) If DTC is detected, go to “Diagnostic Procedure”, EC-198.

With GST

NFEC1430S0102

Follow the procedure “With CONSULT-II” above.



PROCEDURE FOR DTC P0102

NFEC1430S02

With CONSULT-II

NFEC1430S0201

1) Turn ignition switch “ON”.
2) Select “DATA MONITOR” mode with CONSULT-II.
3) Start engine and wait 5 seconds at most.
4) If DTC is detected, go to “Diagnostic Procedure”, EC-198.

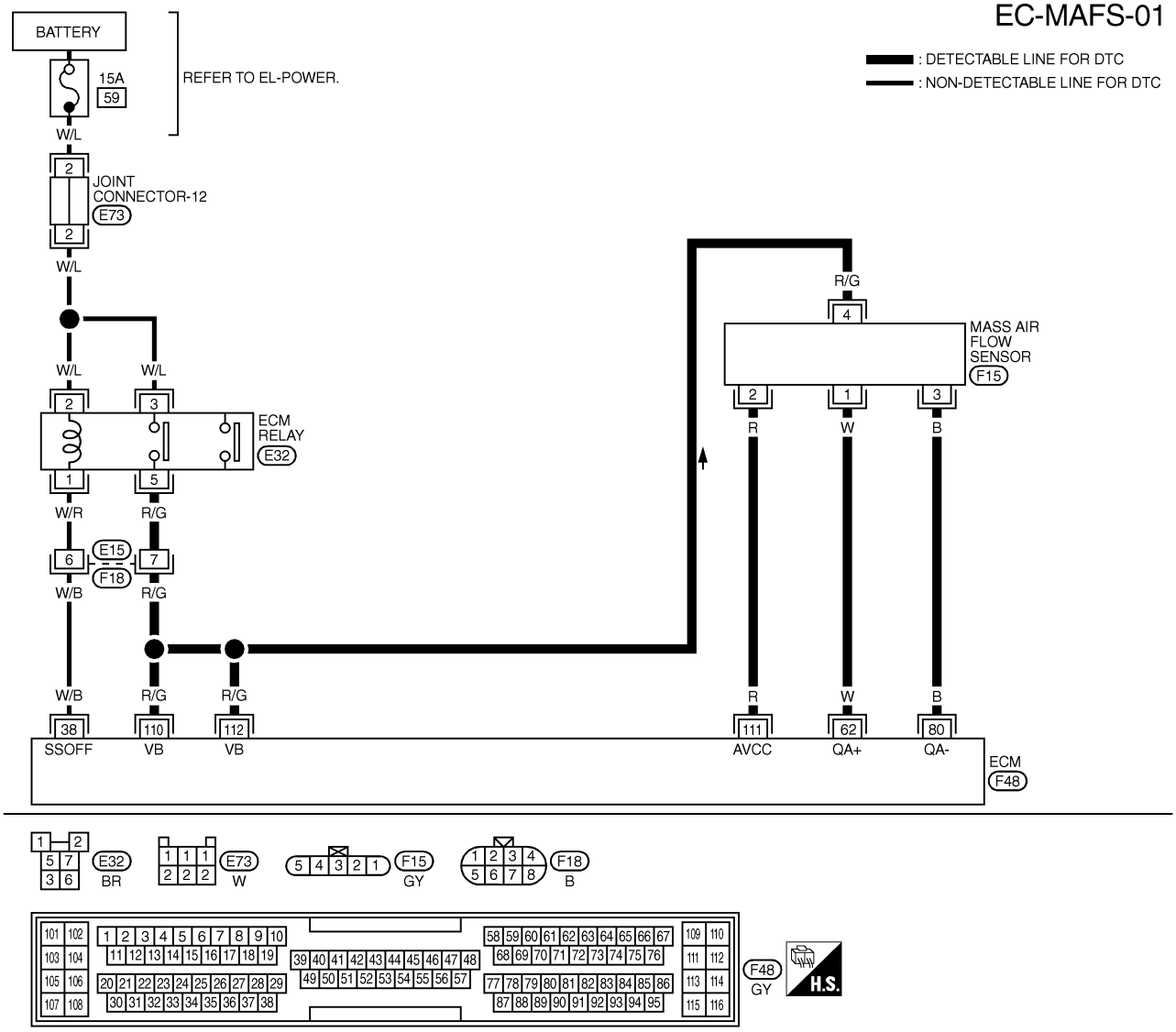
With GST

NFEC1430S0202

Follow the procedure “With CONSULT-II” above.

Wiring Diagram

NFEC0753



MEC473D

ECM TERMINALS AND REFERENCE VALUE 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	WIRE COLOR	ITEM	CONDITION	DATA (DC)
62	W	MASS AIR FLOW SENSOR	ENGINE RUNNING AT IDLE SPEED UNDER WARM-UP CONDITION	1.1 - 1.5V
			ENGINE RUNNING AT 2,500 RPM UNDER WARM-UP CONDITION	1.7 - 2.4V
80	B	MASS AIR FLOW SENSOR GROUND	ENGINE RUNNING AT IDLE SPEED UNDER WARM-UP CONDITION	APPROX. 0V
111	R	SENSORS' POWER SUPPLY	IGN ON	APPROX. 5V

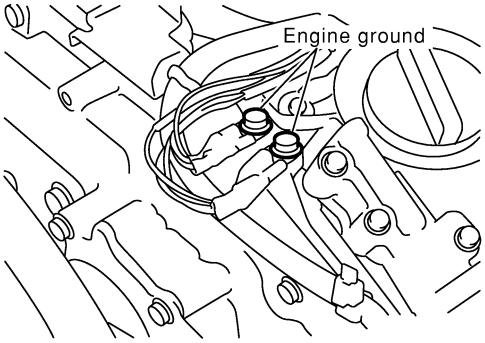
SEF650XC

Diagnostic Procedure

NFEC0754

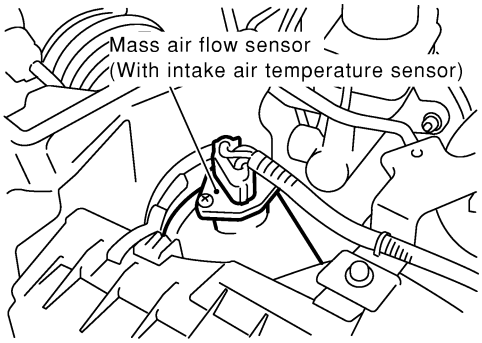
1	INSPECTION START	
Which malfunction (P0102 or P0103) is duplicated?		
P0102 or P0103		
P0103	▶	GO TO 3.
P0102	▶	GO TO 2.

2	CHECK INTAKE SYSTEM	
Check the following for connection. ● Air duct ● Vacuum hoses ● Intake air passage between air duct to intake manifold collector		
OK or NG		
OK	▶	GO TO 3.
NG	▶	Reconnect the parts.

3	RETIGHTEN GROUND SCREWS	
1. Turn ignition switch “OFF”. 2. Loosen and retighten engine ground screws.		
 SEC047D		
	▶	GO TO 4.

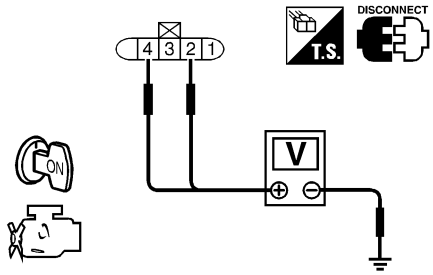
4	CHECK MAF SENSOR POWER SUPPLY CIRCUIT

1. Disconnect mass air flow (MAF) sensor harness connector.



SEC055D

2. Turn ignition switch "ON".
3. Check voltage between MAF sensor terminals 2, 4 and ground with CONSULT-II or tester.



Terminal	Voltage
2	Approximately 5
4	Battery voltage

SEF297X

OK or NG

OK	▶	GO TO 6.
NG	▶	GO TO 5.

5	DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E15, F18
- Harness for open or short between ECM relay and mass air flow sensor
- Harness for open or short between mass air flow sensor and ECM

	▶	Repair harness or connectors.

6	CHECK MAF SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between MAF sensor terminal 3 and ECM terminal 80.
   Refer to Wiring Diagram.
   Continuity should exist.
4. Also check harness for short to power.

OK or NG

OK	▶	GO TO 7.
NG	▶	Repair open circuit or short to power in harness or connectors.

Diagnostic Procedure (Cont'd)

7	CHECK MAF SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

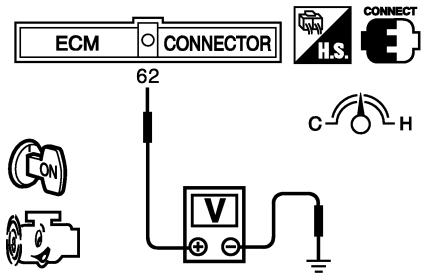
1. Check harness continuity between MAF sensor terminal 1 and ECM terminal 62.
   Refer to Wiring Diagram.
   Continuity should exist.
2. Also check harness for short to ground and short to power.

OK or NG

OK	▶	GO TO 8.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

8	CHECK MASS AIR FLOW SENSOR

1. Reconnect harness connectors disconnected.
2. Start engine and warm it up to normal operating temperature.
3. Check voltage between ECM terminal 62 (Mass air flow sensor signal) and ground.



Condition	Voltage V
Ignition switch "ON" (Engine stopped.)	Approx. 1.0
Idle (Engine is warmed-up to normal operating temperature.)	1.1 - 1.5
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.7 - 2.4
Idle to about 4,000 rpm*	1.1 - 1.5 to Approx. 4.0

*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.

SEC103D

4. If the voltage is out of specification, disconnect MAF sensor harness connector and connect it again.
   Then repeat above check.

OK or NG

OK	▶	GO TO 9.
NG	▶	Replace mass air flow sensor.

9	CHECK INTERMITTENT INCIDENT

Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.

▶ **INSPECTION END**

Component Description

NFEC0848

The absolute pressure sensor is built into ECM. The sensor detects ambient barometric pressure and sends the voltage signal to the microcomputer.

On Board Diagnosis Logic

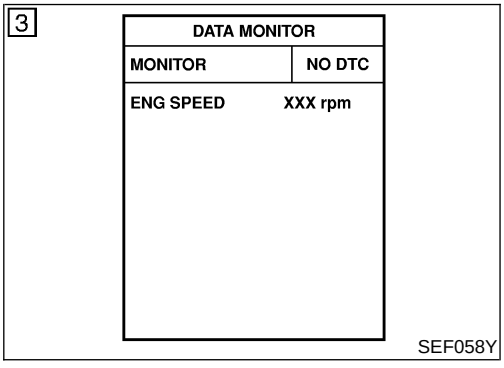
NFEC0849

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0107 0107	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.) • Absolute pressure sensor
P0108 0108	Absolute pressure sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC Confirmation Procedure

NFEC0850

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 6 seconds.
4) If 1st trip DTC is detected, go to “Diagnostic Procedure”, EC-202.

With GST

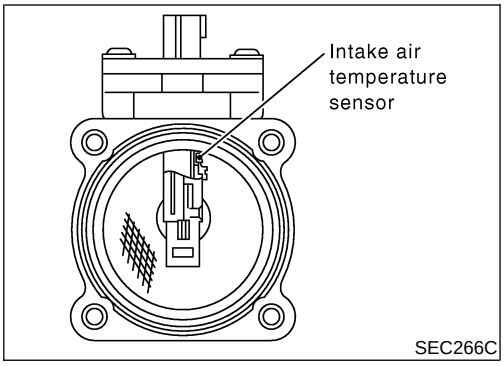
Follow the procedure “With CONSULT-II”.

Diagnostic Procedure

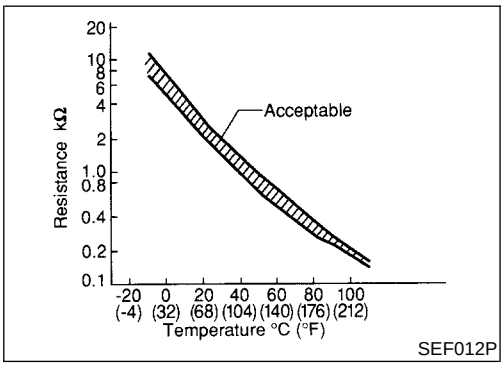
NFEC0851

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-201. 5. Is the 1st trip DTC P0107 or P0108 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-201. 5. Is the 1st trip DTC P0107 or P0108 displayed again?	
Yes or No	
Yes ▶	GO TO 2.
No ▶	**INSPECTION END**

2	REPLACE ECM
1. Replace ECM. 2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to “NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM — NATS)”, EC-92. 3. Perform “Accelerator Pedal Released Position Learning”, EC-71. 4. Perform “Throttle Valve Closed Position Learning”, EC-71. 5. Perform “Idle Air Volume Learning”, EC-71.	
▶	**INSPECTION END**



SEC266C



SEF012P

Component Description

NFEC0852

The intake air temperature sensor is mounted to the air duct housing. 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
25 (77)	3.32	1.9 - 2.1

*: These data are reference values and are measured between ECM terminal 66 (Intake air temperature sensor) and body 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

NFEC0853

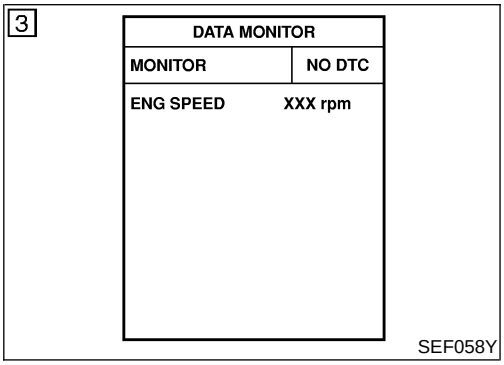
DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0112 0112	Intake air temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	• Harness or connectors (The sensor circuit is open or shorted.) • Intake air temperature sensor
P0113 0113	Intake air temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC Confirmation Procedure

NFEC0854

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.



SEF058Y

WITH CONSULT-II

NFEC0854S01

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 "Diagnostic Procedure", EC-205.

WITH GST

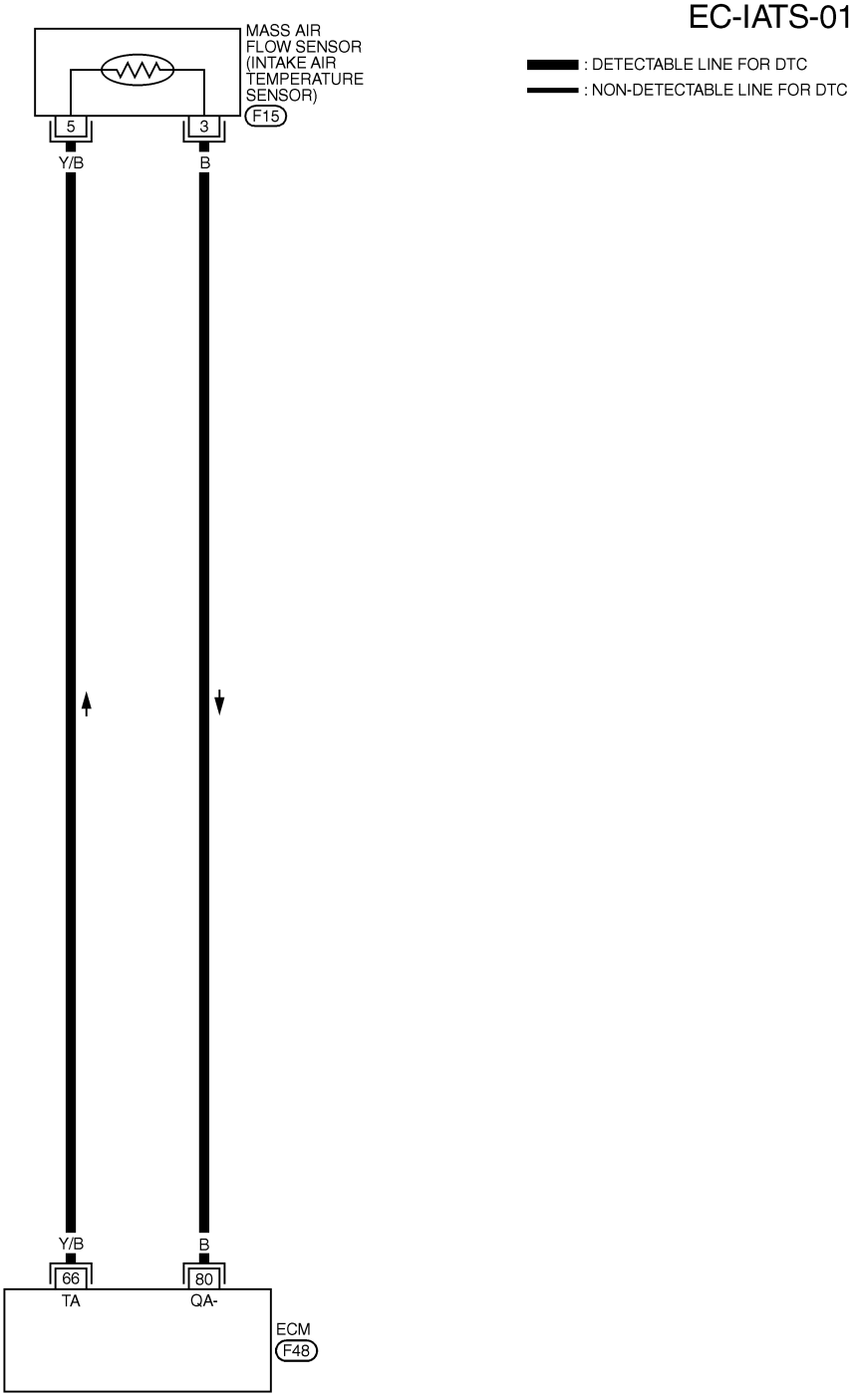
NFEC0854S02

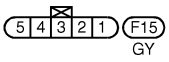
Follow the procedure "With CONSULT-II" above.

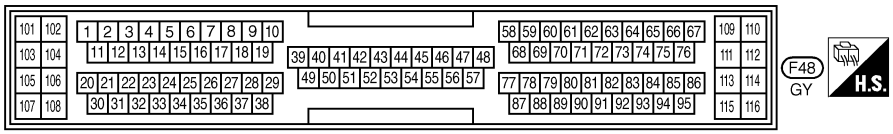
Wiring Diagram

NFEC0855

EC-IATS-01







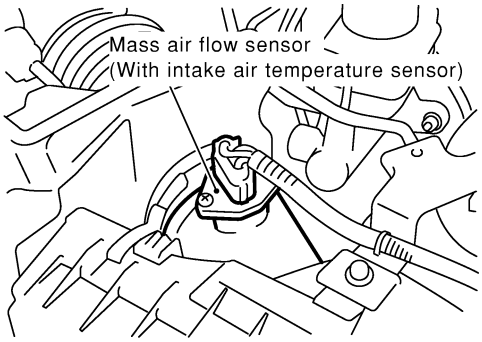
MEC474D

Diagnostic Procedure

NFEC0856

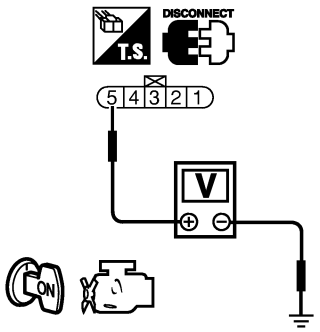
1	CHECK INTAKE AIR TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch “OFF”.
2. Disconnect intake air temperature sensor harness connector.



SEC055D

3. Turn ignition switch “ON”.
4. Check voltage between terminal 1 and ground.



Voltage: Approximately 5V

SEC104D

OK or NG

OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	DETECT MALFUNCTIONING PART

Check harness for open or short between ECM and intake air temperature sensor.

	▶	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 sensor terminal 3 and engine ground.
   Refer to Wiring Diagram.
   Continuity should exist.
3. Also check harness for short to power.

OK or NG

OK	▶	GO TO 5.
NG	▶	GO TO 4.

4	DETECT MALFUNCTIONING PART

Check harness for open between ECM and intake air temperature sensor.

	▶	Repair open circuit or short to power in harness or connectors.

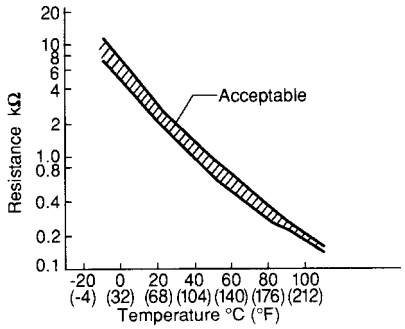
Diagnostic Procedure (Cont'd)

5	CHECK INTAKE AIR TEMPERATURE SENSOR

Check resistance between intake air temperature sensor terminals 3 and 5 as shown in the figure.

Temperature °C (°F)	Resistance kΩ
25 (77)	1.9 - 2.1

MTBL1143

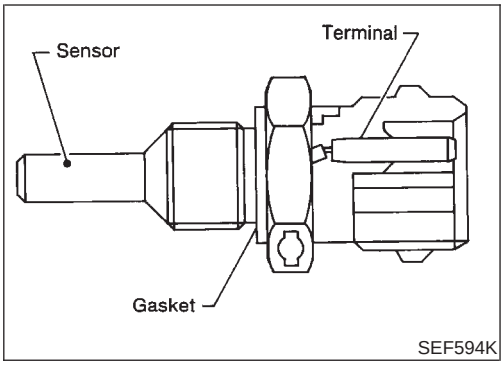


SEF012P

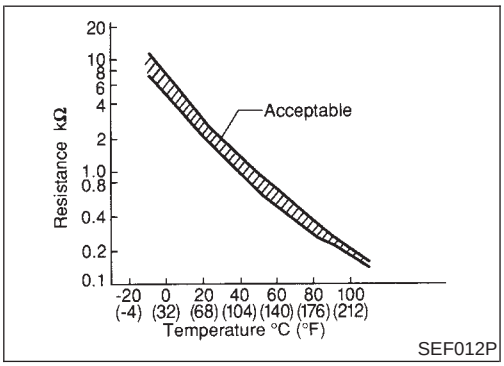
OK or NG

OK	▶	GO TO 6.
NG	▶	Replace intake air temperature sensor.

6	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.	
▶	**INSPECTION END**



SEF594K



SEF012P

Component Description

NFEC0857

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 93 (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

NFEC1431

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.	

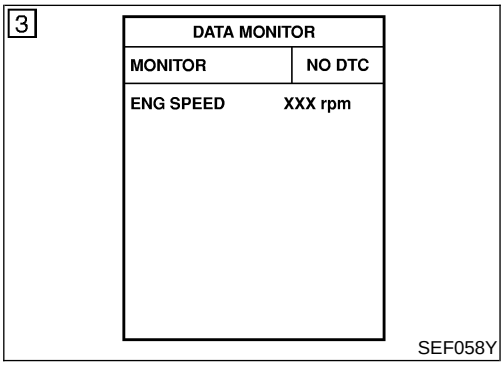
FAIL-SAFE MODE

NFEC1431S01

When this malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

On Board Diagnosis Logic (Cont'd)

<table>
<tr><th>Detected items</th><th colspan="2">Engine operating condition in fail-safe mode</th></tr>
<tr><td rowspan="5">Engine coolant temperature sensor circuit</td><td colspan="2">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.</td></tr>
<tr><td>Condition</td><td>Engine coolant temperature decided (CONSULT-II display)</td></tr>
<tr><td>Just as ignition switch is turned ON or Start</td><td>40°C (104°F)</td></tr>
<tr><td>More than approx. 4 minutes after ignition ON or Start</td><td>80°C (176°F)</td></tr>
<tr><td>Except as shown above</td><td>40 - 80°C (104 - 176°F)
(Depends on the time)</td></tr>
<tr><td colspan="2">When the fail-safe system for engine coolant temperature sensor is activated, the cooling fan operates while engine is running.</td></tr>
</table>



DTC Confirmation Procedure

NFEC1432

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

NFEC1432S01

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 “Diagnostic Procedure”, EC-210.

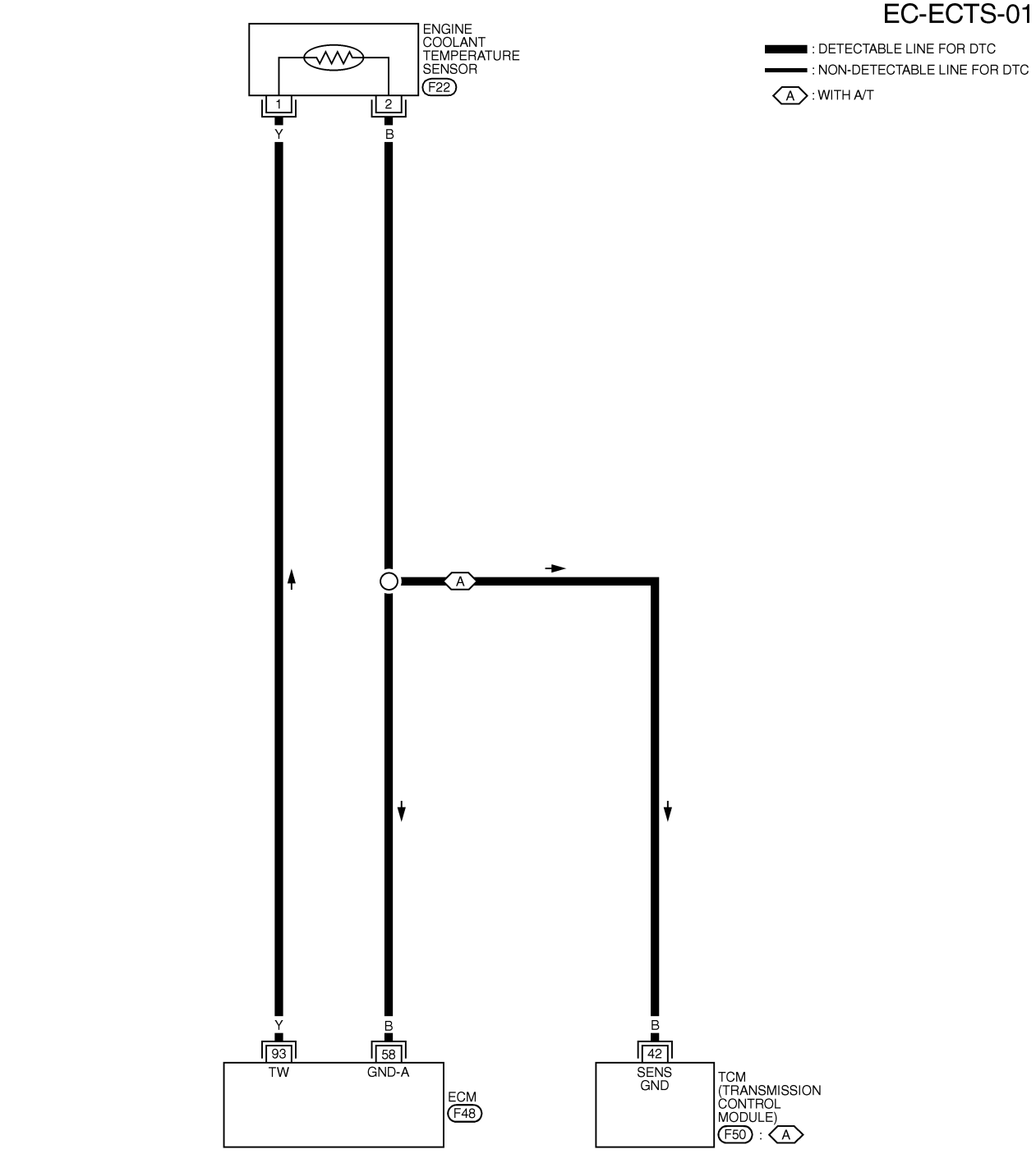
WITH GST

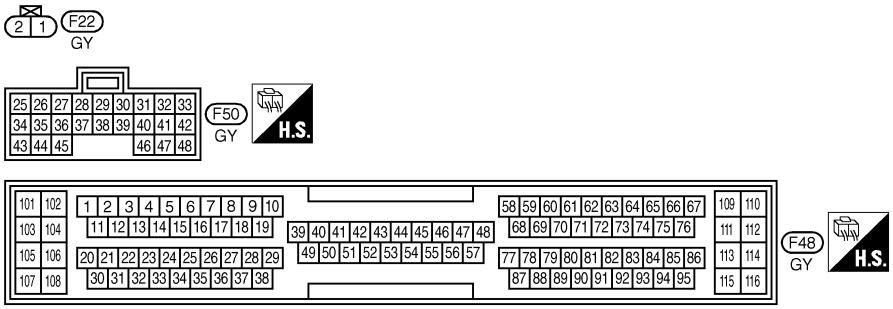
NFEC1432S02

Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

NFEC0860





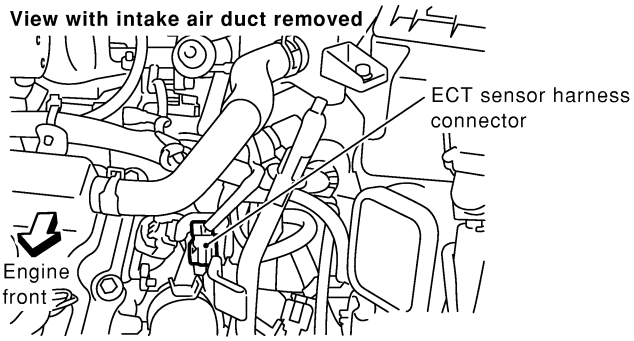
MEC475D

Diagnostic Procedure

NFEC0861

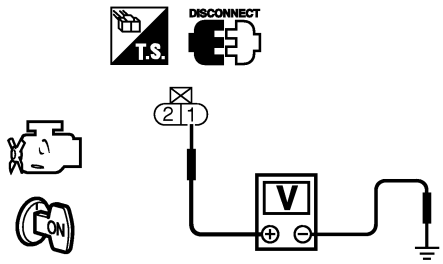
1	CHECK ECT SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch “OFF”.
2. Disconnect engine coolant temperature (ECT) sensor harness connector.



SEC105D

3. Turn ignition switch “ON”.
4. Check voltage between ECT sensor harness connector terminal 1 and ground with CONSULT-II or tester.



Voltage: Approximately 5V

SEC106D

OK or NG

OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	DETECT MALFUNCTIONING PART

Check harness for open or short between ECM and engine coolant temperature sensor.

	▶	Repair harness or connectors.

3	CHECK ECT SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch “OFF”.
2. Check harness continuity between ECT sensor 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 5.
NG	▶	GO TO 4.

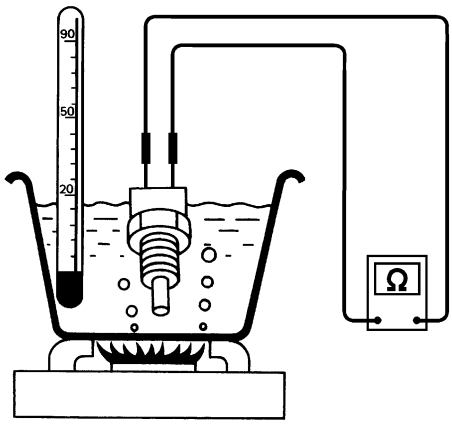
4	DETECT MALFUNCTIONING PART

Check the following.
- Harness for open between ECM and engine coolant temperature sensor
- Harness for open between TCM (Transmission Control Module) and engine coolant temperature sensor

	▶	Repair open circuit or short to power in harness or connectors.

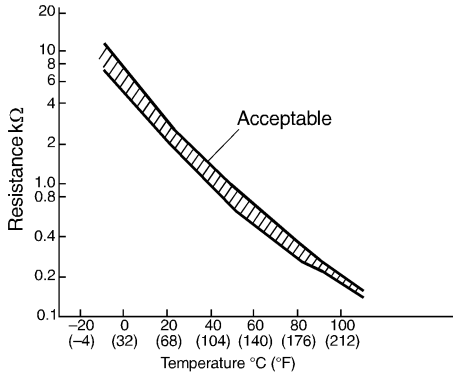
5	CHECK ENGINE COOLANT TEMPERATURE SENSOR

Check resistance between engine coolant temperature sensor terminals 1 and 2 as shown in the figure.



<Reference data>

Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260



SEF304X

OK or NG

OK	▶	GO TO 6.
NG	▶	Replace engine coolant temperature sensor.

6	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.	
▶	**INSPECTION END**

Description

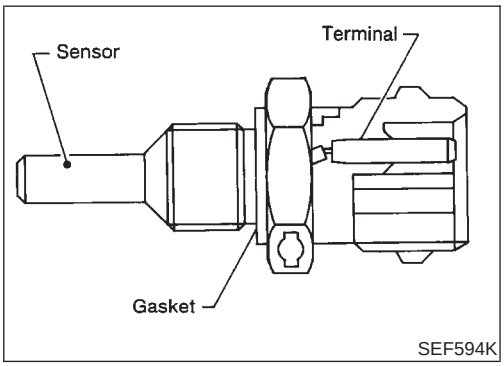
NFEC1412

DTC P0121, P0122 or P0123 is displayed with other DTC.
First perform the trouble diagnosis for displayed other DTC.

Description

NFEC0869

NOTE:
If DTC P0125 is displayed with P0117, P0118, first perform the trouble diagnosis for DTC P0117, P0118. Refer to EC-207.

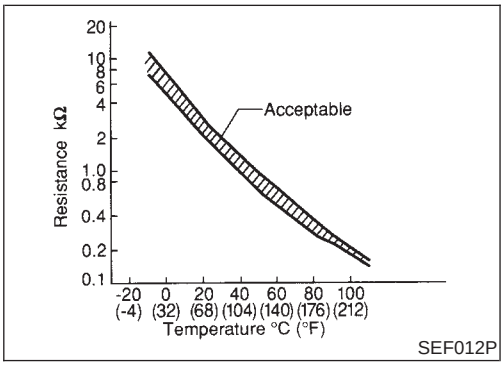


SEF594K

COMPONENT DESCRIPTION

NFEC0869S01

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.



SEF012P

<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

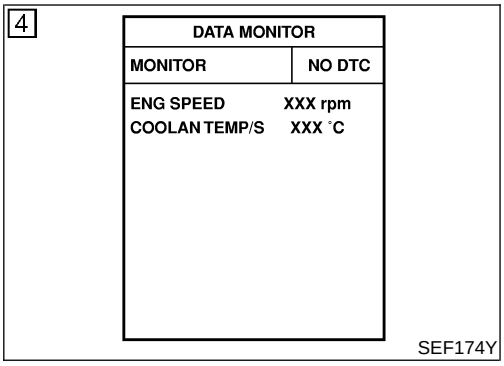
*: These data are reference values and are measured between ECM terminal 93 (Engine coolant temperature sensor) and ground.

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

NFEC0870

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0125 0125	Insufficient engine coolant temperature for closed loop fuel control	• Voltage sent to ECM from the sensor is not practical, even when some time has passed after starting the engine. • Engine coolant temperature is insufficient for closed loop fuel control.	• Harness or connectors (The sensor circuit is open or shorted.) • Engine coolant temperature sensor • Thermostat



DTC Confirmation Procedure

NFEC0871

CAUTION:

Be careful not to overheat engine.

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

NFEC0871S01

1) Turn ignition switch “ON”.
2) Select “DATA MONITOR” mode with CONSULT-II.
3) Check that “COOLAN TEMP/S” is above 10°C (50°F).
   If it is above 10°C (50°F), the test result will be OK.
   If it is below 10°C (50°F), go to following step.
4) Start engine and run it for 65 minutes at idle speed.
   If “COOLAN TEMP/S” increases to more than 10°C (50°F) within 65 minutes, stop engine because the test result will be OK.
5) If 1st trip DTC is detected, go to “Diagnostic Procedure”, EC-214.

WITH GST

NFEC0871S02

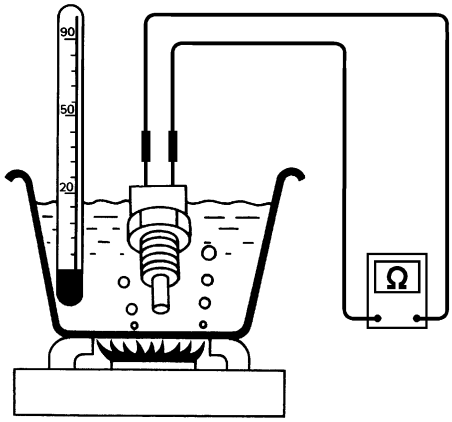
Follow the procedure “WITH CONSULT-II” above.

Diagnostic Procedure

NFEC0872

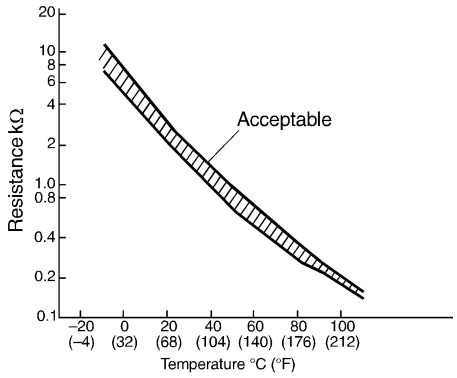
1	CHECK ENGINE COOLANT TEMPERATURE SENSOR

Check resistance between engine coolant temperature sensor terminals 1 and 2 as shown in the figure.



<Reference data>

Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260



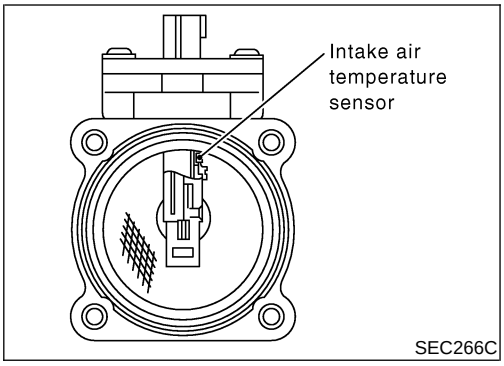
SEF304X

OK or NG

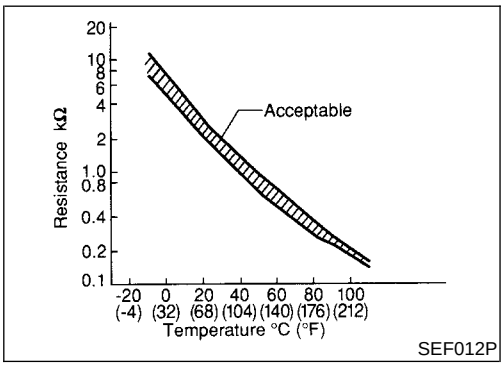
OK	▶	GO TO 2.
NG	▶	Replace engine coolant temperature sensor.

2	CHECK THERMOSTAT OPERATION	
When the engine is cold [lower than 70°C (158°F)] condition, grasp lower radiator hose and confirm the engine coolant does not flow. **OK or NG**		
OK	▶	GO TO 3.
NG	▶	Repair or replace thermostat. Refer to LC-18, "Thermostat".

3	CHECK INTERMITTENT INCIDENT	
• Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156. • Refer to Wiring Diagram, EC-209.		
	▶	**INSPECTION END**



SEC266C



SEF012P

Component Description

NFEC0767

The intake air temperature sensor is mounted to the air duct housing. 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
25 (77)	3.32	1.9 - 2.1

*: These data are reference values and are measured between ECM terminal 66 (Intake air temperature sensor) and body 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

NFEC0768

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0127 0127	Intake air temperature too high	Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage signal from engine coolant temperature sensor.	• Harness or connectors (The sensor circuit is open or shorted.) • Intake air temperature sensor

DTC Confirmation Procedure

NFEC0770

NOTE:

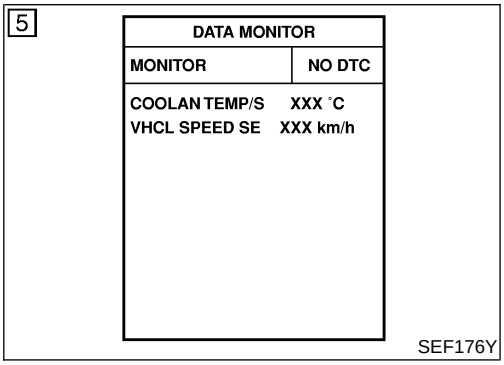
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

CAUTION:

Always drive vehicle at a safe speed.

TESTING CONDITION:

This test 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.



SEF176Y

WITH CONSULT-II

NFEC0770S03

1) Wait until engine coolant temperature is less than 90°C (194°F).
a) Turn ignition switch "ON".
b) Select "DATA MONITOR" mode with CONSULT-II.
c) Check the engine coolant temperature.
d) If the engine coolant temperature is not less than 90°C (194°F), turn ignition switch "OFF" and cool down engine.

- Perform the following steps before engine coolant temperature is above 90°C (194°F).

2) Turn ignition switch "ON".

3) Select "DATA MONITOR" mode with CONSULT-II.
4) Start engine.
5) Hold vehicle speed at more than 70 km/h (43 MPH) for 100 consecutive seconds.
6) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-217.

WITH GST NFEC0770S04

Follow the procedure "With CONSULT-II" above.

Diagnostic Procedure

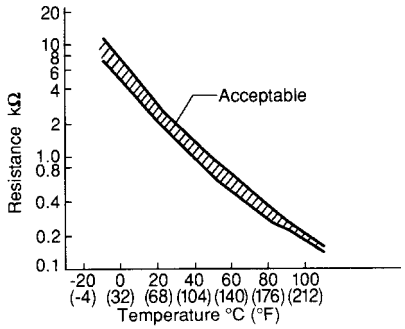
NFEC0772

1	CHECK INTAKE AIR TEMPERATURE SENSOR

Check resistance between intake air temperature sensor terminals 3 and 5 as shown in the figure.

Temperature °C (°F)	Resistance kΩ
25 (77)	1.9 - 2.1

MTBL1143



SEF012P

OK or NG

OK	▶	GO TO 2.
NG	▶	Replace intake air temperature sensor.

2	CHECK INTERMITTENT INCIDENT

- Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.
- Refer to wiring diagram, EC-204.

	▶	**INSPECTION END**

On Board Diagnosis Logic

NFEC1289

Engine coolant temperature has not risen enough to open the thermostat even though the engine has run long enough.
This is due to a leak in the seal or the thermostat open stuck.

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0128 0128	Thermostat function	The engine coolant temperature does not reach to specified temperature even though the engine has run long enough.	• Thermostat malfunction • Leakage from sealing portion of thermostat • Engine coolant temperature sensor

DTC Confirmation Procedure

NFEC1291

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:

- **For best results, perform at ambient temperature of –10°C (14°F) or higher.**
- **For best results, perform at engine coolant temperature of –10°C (14°F) to 60°C (140°F).**

WITH CONSULT-II

NFEC1291S01

1) Replace thermostat with new one. Refer to LC-18, "Thermostat". Use only a genuine NISSAN thermostat as a replacement. If an incorrect thermostat is used, the MIL may come on.
2) Turn ignition switch "ON".
3) Select "COOLAN TEMP/S" in "DATA MONITOR" mode with CONSULT-II.
4) Check that the "COOLAN TEMP/S" is above 60°C (140°F).
   If it is below 60°C (140°F), go to following step.
   If it is above 60°C (140°F), stop engine and cool down the engine to less than 60°C (140°F), then retry from step 1.
5) Drive vehicle for 10 consecutive minutes under the following conditions.

VHCL SPEED SE	80 - 120 km/h (50 - 75 MPH)

   If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-219.

WITH GST

NFEC1291S02

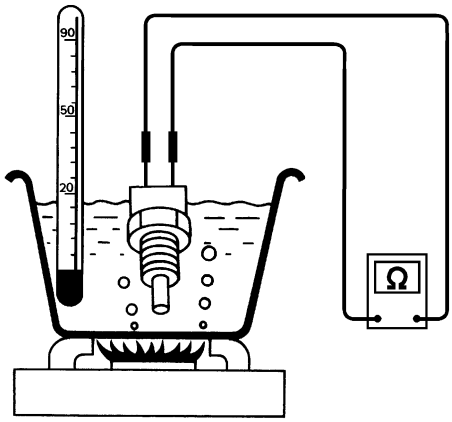
1) Follow the prodedure "WITH CONSULT-II" above.

Diagnostic Procedure

NFEC1292

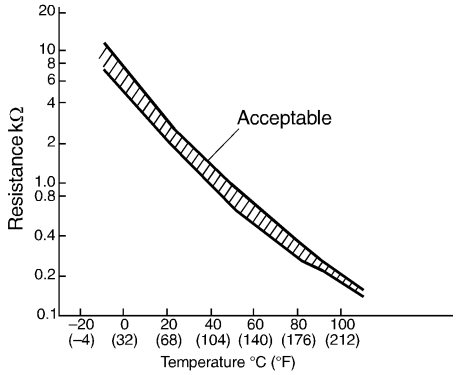
1	CHECK ENGINE COOLANT TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Remove engine coolant temperature sensor.
3. Check resistance between engine coolant temperature sensor terminals under the following conditions.



<Reference data>

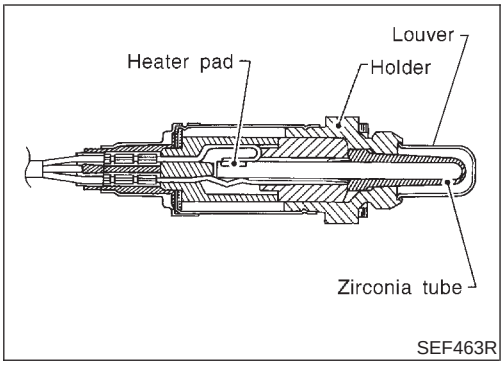
Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260



SEF304X

OK or NG

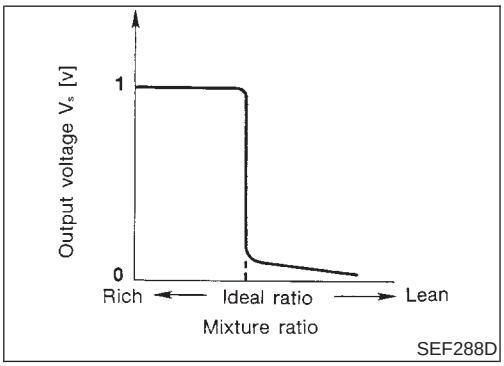
OK	▶	**INSPECTION END**
NG	▶	Replace engine coolant temperature sensor.



Component Description

NFEC0873

The heated oxygen sensor 1 is placed into the front tube. 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.

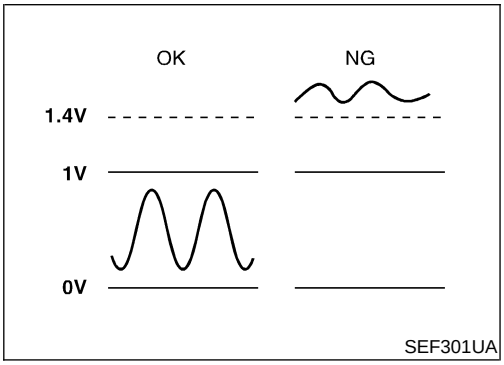


CONSULT-II Reference Value in Data Monitor Mode

NFEC0874

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1) HO2S1 (B2)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ⟷ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1) HO2S1 MNTR (B2)			LEAN ⟷ RICH Changes more than 5 times during 10 seconds.

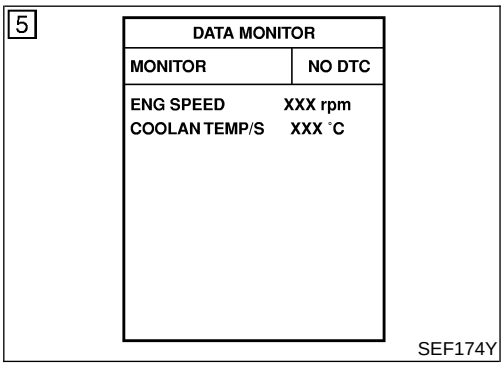


On Board Diagnosis Logic

NFEC0876

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 (Bank 1) P0152 0152 (Bank 2)	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

NFEC0877

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

NFEC0877S01

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 25 seconds.
6) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-224.

WITH GST

NFEC0877S02

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 25 seconds.
4) Turn ignition switch "OFF" and wait at least 10 seconds.
5) Restart engine and let it idle for 25 seconds.
6) Select "MODE 3" with GST.
7) If DTC is detected, go to "Diagnostic Procedure", EC-224.

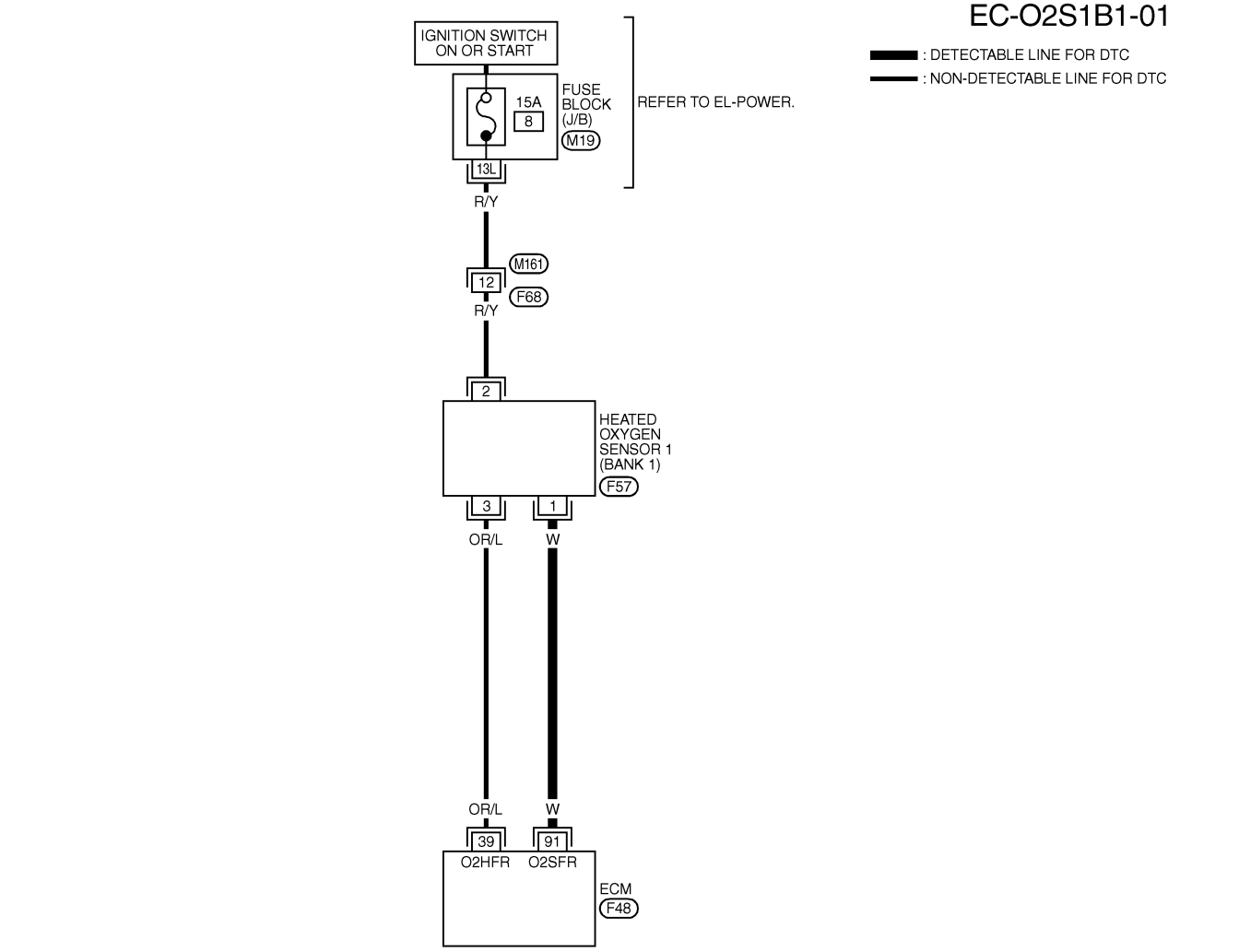
- **When using GST, "DTC Confirmation Procedure" should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.**

Wiring Diagram

NFEC0878

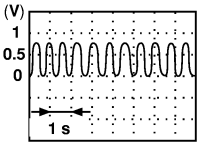
BANK 1

NFEC0878S01



MEC479D

ECM TERMINALS AND REFERENCE VALUE 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	WIRE COLOR	ITEM	CONDITION	DATA (DC)
91	W	HEATED OXYGEN SENSOR 1 (BANK 1)	ENGINE RUNNING AT 2,000 RPM AFTER WARMING UP TO NORMAL OPERATING TEMPERATURE	0 - APPROX. 1.0V 

SEC107D

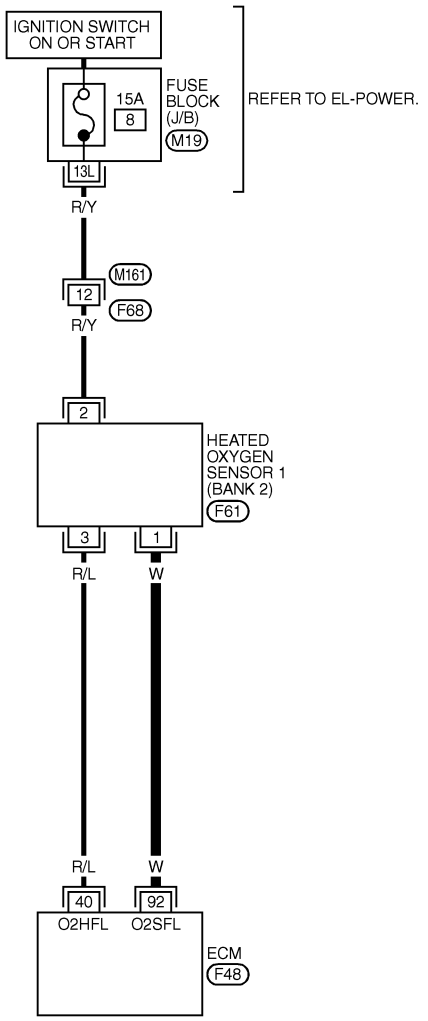
BANK 2

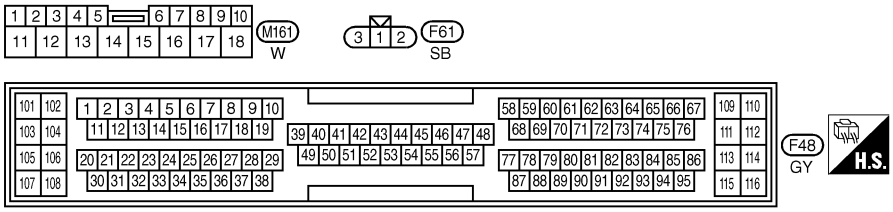
NFEC0878S02

EC-O2S1B2-01

: DETECTABLE LINE FOR DTC

: NON-DETECTABLE LINE FOR DTC

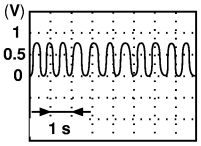




REFER TO THE FOLLOWING.
M19 -FUSE BLOCK-
JUNCTION BOX (J/B)

MEC480D

ECM TERMINALS AND REFERENCE VALUE 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	WIRE COLOR	ITEM	CONDITION	DATA (DC)
92	W	HEATED OXYGEN SENSOR 1 (BANK 2)	ENGINE RUNNING AT 2,000 RPM AFTER WARMING UP TO NORMAL OPERATING TEMPERATURE	0 - APPROX. 1.0V 

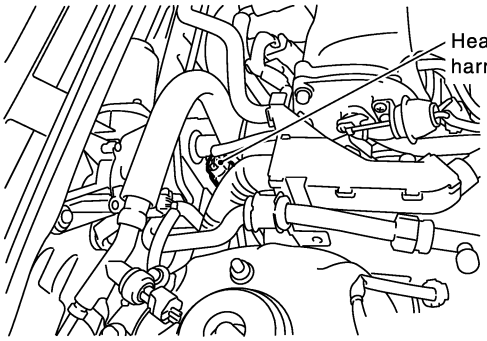
SEC108D

Diagnostic Procedure

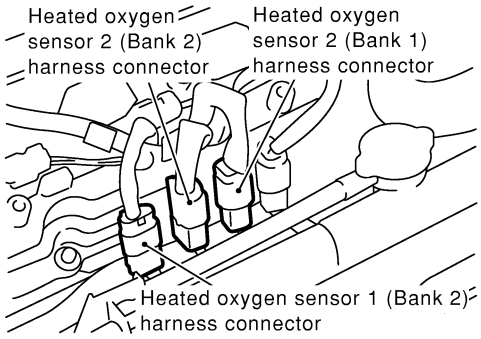
NFEC0879

1	INSPECTION START

1. Turn ignition switch “OFF”.
2. Disconnect corresponding heated oxygen sensor 1 harness connector.



SEC099D



SEC134D

▶	GO TO 2.

2	RETIGHTEN HEATED OXYGEN SENSOR 1

Loosen and retighten corresponding heated oxygen sensor 1.

Tightening torque:

40 - 60 N·m (4.1 - 6.1 kg-m, 30 - 44 ft-lb)

▶	GO TO 3.

3	CHECK HO2S1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal and HO2S1 terminal as follows. Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM	Sensor	
P0132	91	1	Bank 1
P0152	92	1	Bank 2

MTBL1144

Continuity should exist.

3. Check harness continuity between ECM terminal or HO2S1 terminal and ground as follows. Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM or Sensor	Ground	
P0132	91 or 1	Ground	Bank 1
P0152	92 or 1	Ground	Bank 2

MTBL1145

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. Disconnect heated oxygen sensor 1 harness connector.
2. Check connectors for water.

Water should not exist.

OK or NG

OK (With CONSULT-II)	▶	GO TO 5.
OK (Without CONSULT-II)	▶	GO TO 6.
NG	▶	Repair or replace harness or connectors.

5	CHECK 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)/(B2)" and "HO2S1 MNTR (B1)/(B2)".
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
HO2S2 (B2)	XXX V

SEF967Y

6. Check the following.

- "HO2S1 MNTR (B1)/(B2)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" 5 times in 10 seconds. 5 times (cycles) are counted as shown left:

Bank 1

cycle	1	2	3	4	5
HO2S1 MNTR (B1)	R-L-R-L-R-L-R-L-R-L				

Bank 2

cycle	1	2	3	4	5
HO2S1 MNTR (B2)	R-L-R-L-R-L-R-L-R-L				

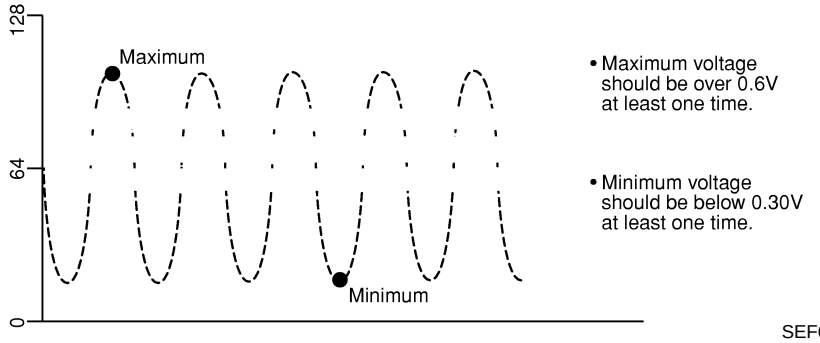
R means HO2S1 MNTR (B1)/(B2) indicates RICH

L means HO2S1 MNTR (B1)/(B2) indicates LEAN

SEF647Y

- "HO2S1 (B1)/(B2)" voltage goes above 0.6V at least once.
- "HO2S1 (B1)/(B2)" voltage goes below 0.3V at least once.
- "HO2S1 (B1)/(B2)" 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



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.**

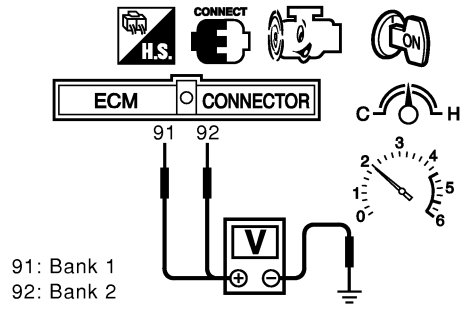
OK or NG

OK	▶	GO TO 7.
NG	▶	Replace malfunctioning heated oxygen sensor 1.

6	CHECK HEATED OXYGEN SENSOR 1

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 91 (HO2S1 bank 1 signal) or 92 (HO2S1 bank 2 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

SEC109D

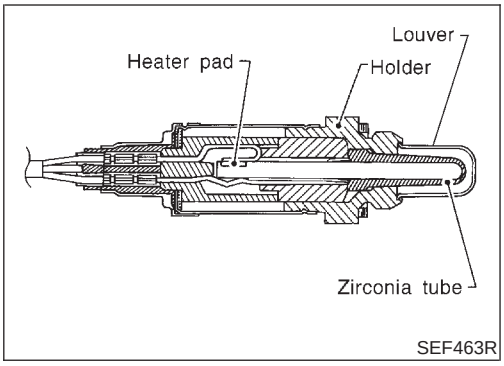
CAUTION:

- **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.**

OK or NG

OK	▶	GO TO 7.
NG	▶	Replace malfunctioning heated oxygen sensor 1.

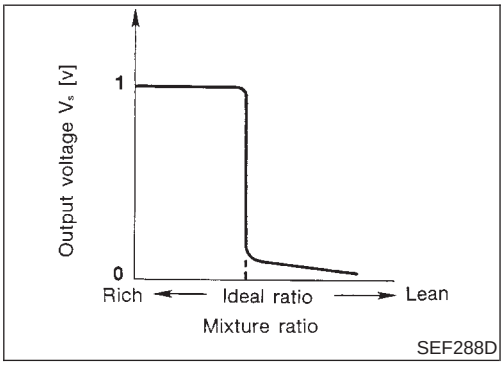
7	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.	
▶	**INSPECTION END**



Component Description

NFEC0880

The heated oxygen sensor 1 is placed into the front tube. 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.

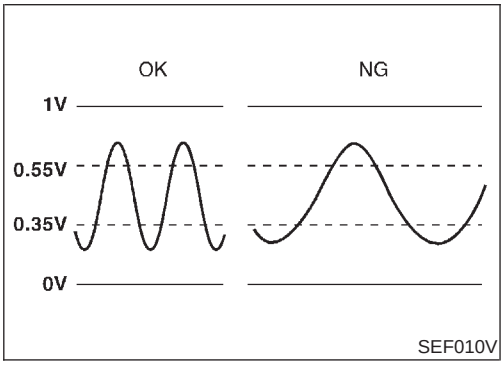


CONSULT-II Reference Value in Data Monitor Mode

NFEC0881

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1) HO2S1 (B2)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ⟷ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1) HO2S1 MNTR (B2)			LEAN ⟷ RICH Changes more than 5 times during 10 seconds.



On Board Diagnosis Logic

NFEC0883

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 (Bank 1) P0153 0153 (Bank 2)	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 • PCV valve • Mass air flow sensor

DTC Confirmation Procedure

NFEC0884

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.**

DTC Confirmation Procedure (Cont'd)

6

HO2S1 (B1) P0133	
OUT OF CONDITION	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SEN	XXX km/h

SEF338Z

6

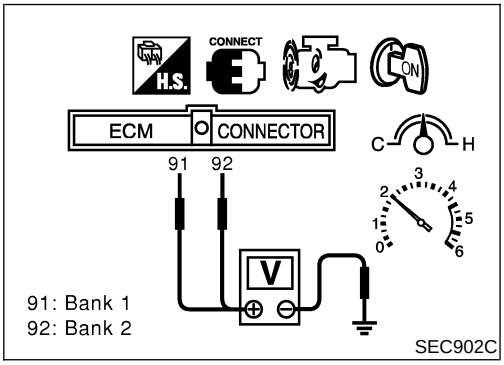
HO2S1 (B1) P0133	
TESTING	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SEN	XXX km/h

SEF339Z

6

HO2S1 (B1) P0133
COMPLETED

SEF658Y



SEC902C

WITH CONSULT-II

NFEC0884S01

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)/(B2) P0133/ P0153" 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 50 seconds.)

ENG SPEED	1,200 - 3,100 rpm
Vehicle speed	More than 80 km/h (50 MPH)
B/FUEL SCHDL	2.5 - 12 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 "Diagnostic Procedure", EC-233.

Overall Function Check

NFEC0885

Use this procedure to check the overall function of the heated oxygen sensor 1 circuit. During this check, a 1st trip DTC might not be confirmed.

WITH GST

NFEC0885S01

1) Start engine and warm it up to normal operating temperature.
2) Set voltmeter probes between ECM terminal 91 (HO2S1 bank 1 signal) or 92 (HO2S1 bank 2 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

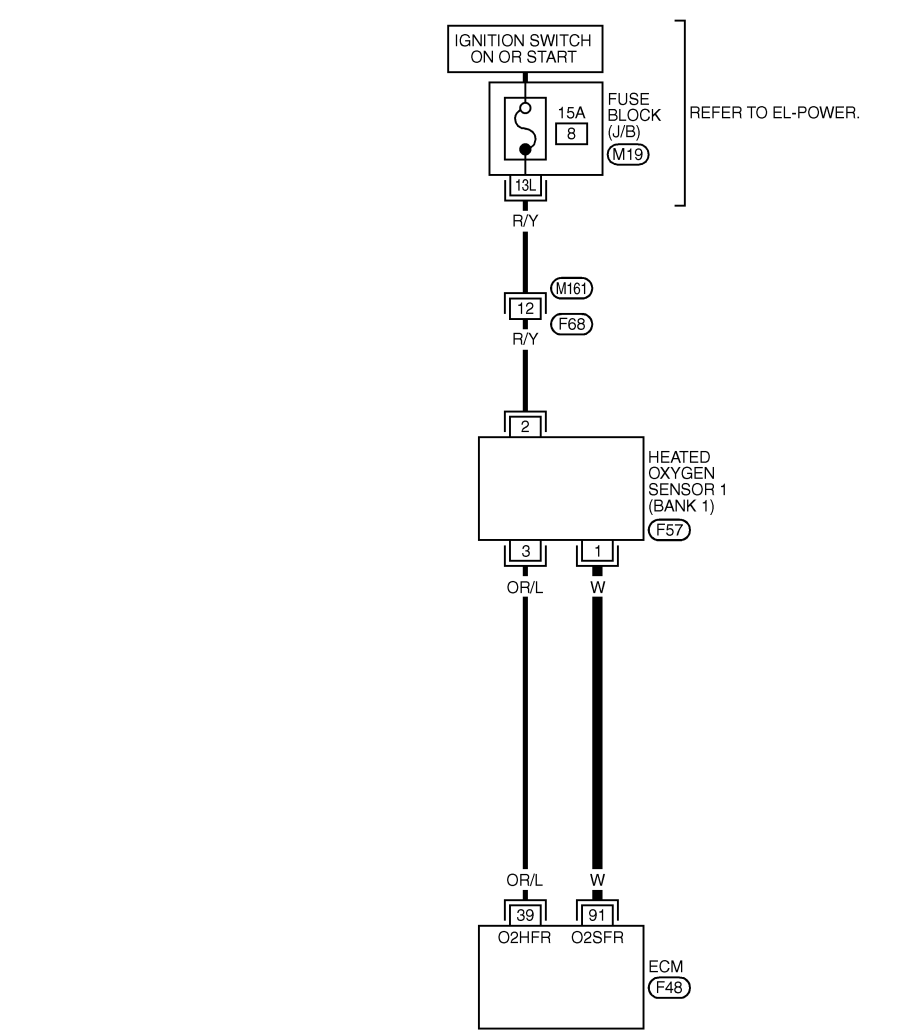
4) If NG, go to "Diagnostic Procedure", EC-233.

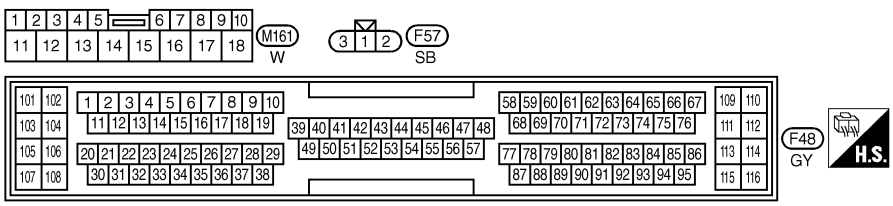
Wiring Diagram

NFEC0886

BANK 1

NFEC0886S01

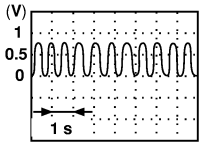




REFER TO THE FOLLOWING.
M19 -FUSE BLOCK-
JUNCTION BOX (J/B)

MEC479D

ECM TERMINALS AND REFERENCE VALUE 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	WIRE COLOR	ITEM	CONDITION	DATA (DC)
91	W	HEATED OXYGEN SENSOR 1 (BANK 1)	ENGINE RUNNING AT 2,000 RPM AFTER WARMING UP TO NORMAL OPERATING TEMPERATURE	0 - APPROX. 1.0V 

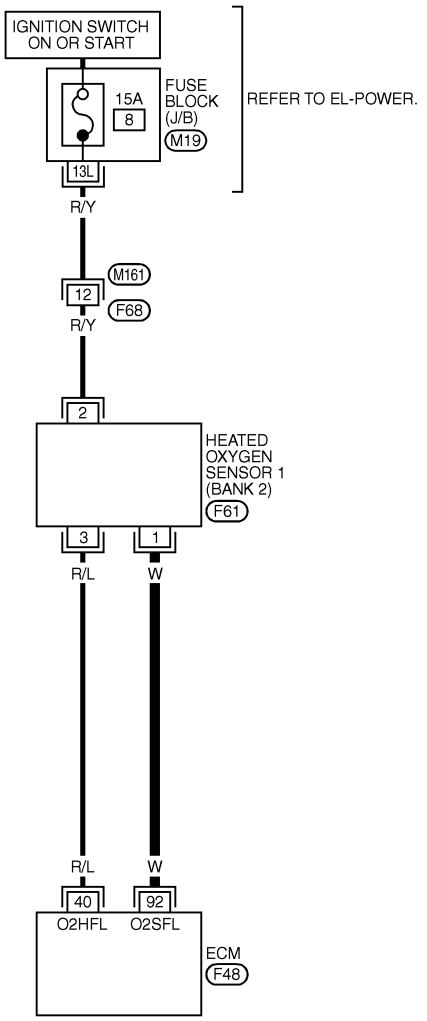
SEC107D

Wiring Diagram (Cont'd)

BANK 2

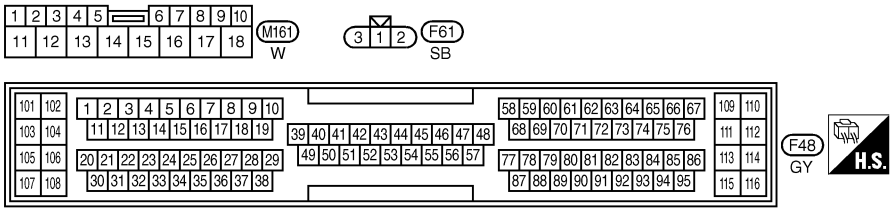
NFEC0886S02

EC-O2S1B2-01



: DETECTABLE LINE FOR DTC

: NON-DETECTABLE LINE FOR DTC

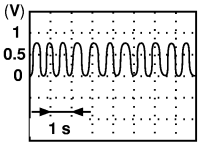


REFER TO THE FOLLOWING.

M19 -FUSE BLOCK-JUNCTION BOX (J/B)

MEC480D

ECM TERMINALS AND REFERENCE VALUE 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	WIRE COLOR	ITEM	CONDITION	DATA (DC)
92	W	HEATED OXYGEN SENSOR 1 (BANK 2)	ENGINE RUNNING AT 2,000 RPM AFTER WARMING UP TO NORMAL OPERATING TEMPERATURE	0 - APPROX. 1.0V 

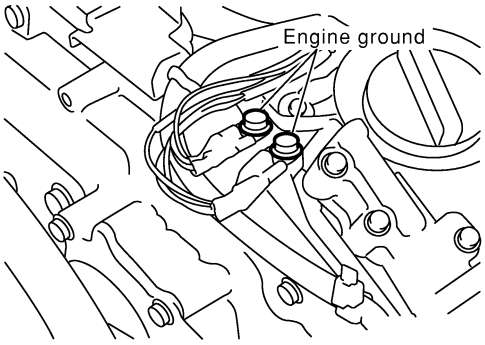
SEC108D

Diagnostic Procedure

NFEC0887

1	RETIGHTEN GROUND SCREWS

1. Turn ignition switch “OFF”.
2. Loosen and retighten engine ground screws.



SEC047D

▶	GO TO 2.

2	RETIGHTEN HEATED OXYGEN SENSOR 1

Loosen and retighten corresponding heated oxygen sensor 1.

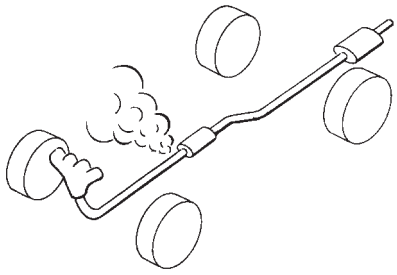
Tightening torque:

40 - 60 N·m (4.1 - 6.1 kg-m, 30 - 44 ft-lb)

▶	GO TO 3.

3	CHECK FOR EXHAUST AIR LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust air leak before three way catalyst.



SEF099P

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 mass air flow sensor.

OK or NG

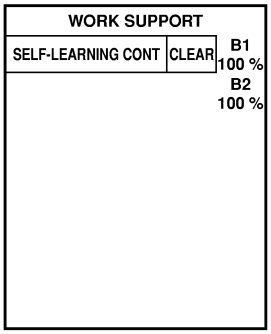
OK	▶	GO TO 5.
NG	▶	Repair or replace.

Diagnostic Procedure (Cont'd)

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".



SEF968Y

4. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0171, P0172, P0174 or P0175 detected?
   Is it difficult to start engine?

Without CONSULT-II

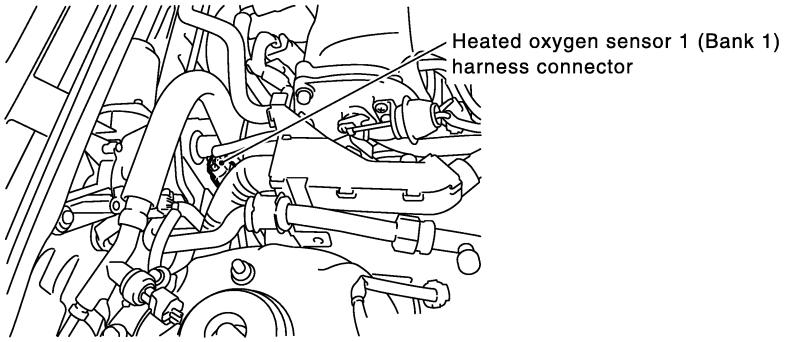
1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure DTC P0102 is displayed.
6. Erase the DTC memory. Refer to "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-91.
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0171, P0172, P0174 or P0175 detected?
   Is it difficult to start engine?

Yes or No

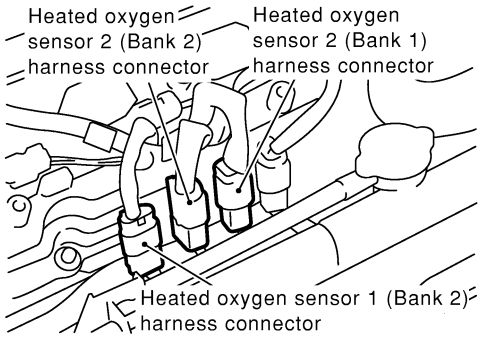
Yes	▶	Perform trouble diagnosis for DTC P0171, P0174 or P0172, P0175. Refer to EC-267, EC-275.
No	▶	GO TO 6.

6 **DISCONNECT HO2S1 HARNESS CONNECTOR**

1. Turn ignition switch "OFF".
2. Disconnect corresponding heated oxygen sensor 1 harness connector.



SEC099D



SEC134D

▶ GO TO 7.

7 **CHECK HO2S1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal and HO2S1 terminal as follows. Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM	Sensor	
P0133	91	1	Bank 1
P0153	92	1	Bank 2

MTBL1146

Continuity should exist.

3. Check harness continuity between ECM terminal or HO2S1 terminal and ground as follows. Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM or Sensor	Ground	
P0133	91 or 1	Ground	Bank 1
P0153	92 or 1	Ground	Bank 2

MTBL1147

Continuity should not exist.

4. Also check harness for short to power.

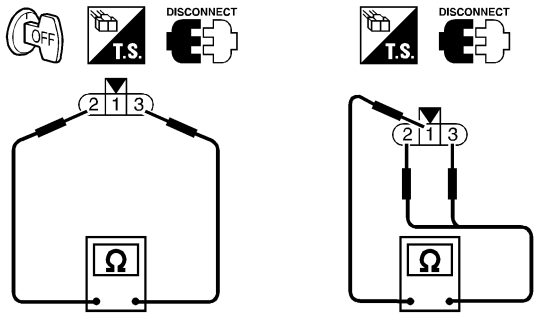
OK or NG

OK	▶	GO TO 8.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

Diagnostic Procedure (Cont'd)

8	CHECK HEATED OXYGEN SENSOR 1 HEATER

Check resistance between HO2S1 terminals as follows.



Terminals	Resistance
2 and 3	2.3 - 4.3Ω at 25°C (77°F)
1 and 2 1 and 3	∞Ω (Continuity should not exist.)

SEF310X

CAUTION:

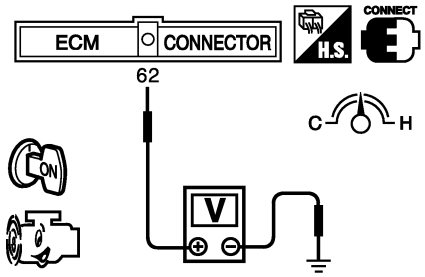
Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.

OK or NG

OK	▶	GO TO 9.
NG	▶	GO TO 13.

9	CHECK MASS AIR FLOW SENSOR

1. Reconnect harness connectors disconnected.
2. Start engine and warm it up to normal operating temperature.
3. Check voltage between ECM terminal 62 (Mass air flow sensor signal) and ground.



Condition	Voltage V
Ignition switch "ON" (Engine stopped.)	Approx. 1.0
Idle (Engine is warmed-up to normal operating temperature.)	1.1 - 1.5
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.7 - 2.4
Idle to about 4,000 rpm*	1.1 - 1.5 to Approx. 4.0

*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.

SEC103D

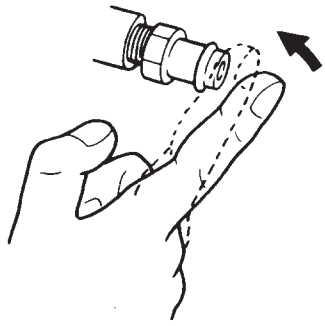
4. If the voltage is out of specification, disconnect mass air flow sensor harness connector and connect it again. Then repeat above check.

OK or NG

OK	▶	GO TO 10.
NG	▶	Replace mass air flow sensor.

10	CHECK PCV VALVE

1. Install all removed parts.
2. Start engine and let it idle.
3. Remove PCV valve from rocker cover.
4. Make sure that a hissing noise will be heard as air passes through it and a strong vacuum should be felt immediately when a finger is placed over valve inlet.



SEC137A

OK or NG

OK (With CONSULT-II)	▶	GO TO 11.
OK (Without CONSULT-II)	▶	GO TO 12.
NG	▶	Replace PCV valve.

11	CHECK 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)/(B2)" and "HO2S1 MNTR (B1)/(B2)".
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
HO2S2 (B2)	XXX V

SEF967Y

6. Check the following.

- "HO2S1 MNTR (B1)/(B2)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" 5 times in 10 seconds. 5 times (cycles) are counted as shown below.

Bank 1

cycle	1	2	3	4	5
HO2S1 MNTR (B1)	R-L	R-L	R-L	R-L	R-L

Bank 2

cycle	1	2	3	4	5
HO2S1 MNTR (B2)	R-L	R-L	R-L	R-L	R-L

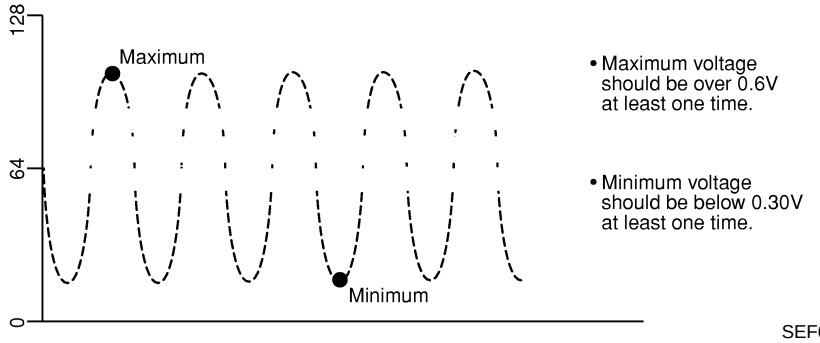
R means HO2S1 MNTR (B1)/(B2) indicates RICH

L means HO2S1 MNTR (B1)/(B2) indicates LEAN

SEF647Y

- "HO2S1 (B1)/(B2)" voltage goes above 0.6V at least once.
- "HO2S1 (B1)/(B2)" voltage goes below 0.3V at least once.
- "HO2S1 (B1)/(B2)" 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



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.**

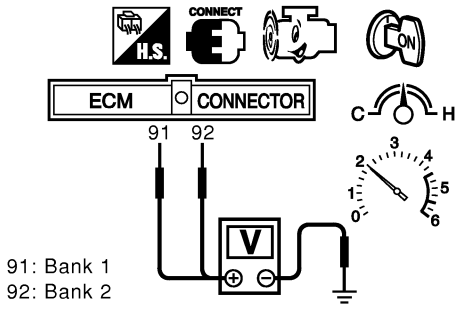
OK or NG

OK	▶	GO TO 13.
NG	▶	Replace malfunctioning heated oxygen sensor 1.

12	CHECK HEATED OXYGEN SENSOR 1

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 91 (HO2S1 bank 1 signal) or 92 (HO2S1 bank 2 signal) and engine ground.
3. Check the following with engine speed held at 2,000 rpm constant under no load.



91: Bank 1
92: Bank 2

- 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

SEC109D

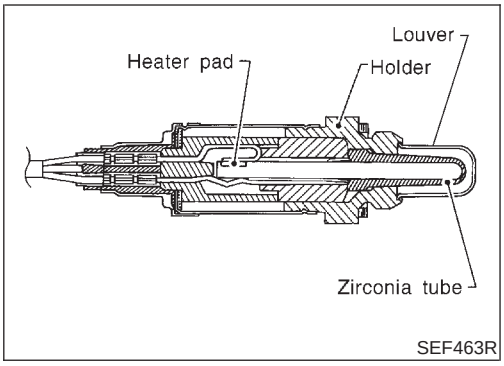
CAUTION:

- **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.**

OK or NG

OK	▶	GO TO 13.
NG	▶	Replace malfunctioning heated oxygen sensor 1.

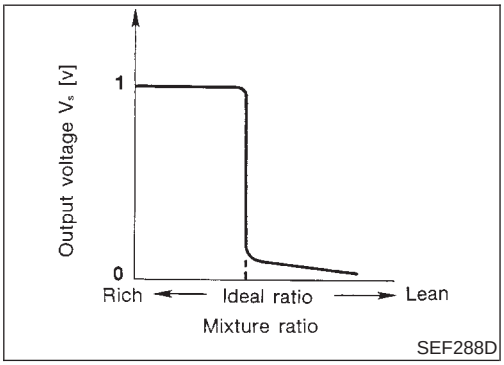
13	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.	
▶	**INSPECTION END**



Component Description

NFEC0888

The heated oxygen sensor 1 is placed into the front tube. 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.

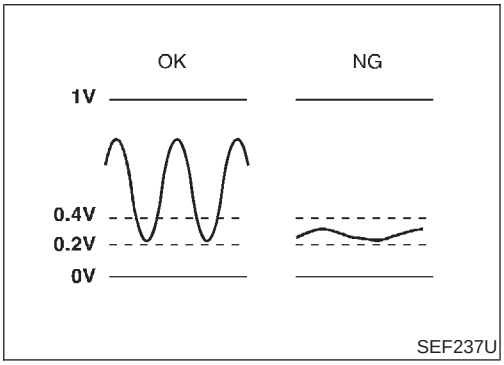


CONSULT-II Reference Value in Data Monitor Mode

NFEC0889

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1) HO2S1 (B2)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ⟷ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1) HO2S1 MNTR (B2)			LEAN ⟷ RICH Changes more than 5 times during 10 seconds.



On Board Diagnosis Logic

NFEC0891

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 (Bank 1) P0154 0154 (Bank 2)	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

5

HO2S1 (B1) P0134	
OUT OF CONDITION	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SEN	XXX km/h

PBIB0544E

5

HO2S1 (B1) P0134	
TESTING	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SEN	XXX km/h

PBIB0545E

5

HO2S1 (B1) P0134
COMPLETED

SEC750C

DTC Confirmation Procedure

NFEC1433

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

NFEC1433S01

1) Start engine and warm it up to normal operating temperature.
2) Select "HO2S1 (B1)/(B2) P0134/P0154" 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.

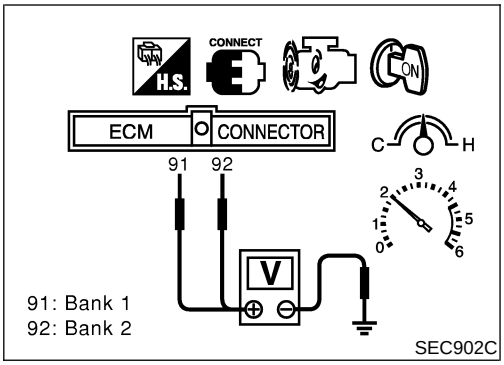
5) When the following conditions are met, "TESTING" will be displayed on the CONSULT-II screen. Maintain the conditions continuously until "TESTING" changes to "COMPLETED". (It will take approximately 10 to 60 seconds.)

ENG SPEED	1,400 - 2,600 rpm
Vehicle speed	More than 70 km/h (43 MPH)
B/FUEL SCHDL	2 - 12 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 "Diagnostic Procedure", EC-245.

During this test, P1148 and P1168 may be stored in ECM.



Overall Function Check

NFEC0893

Use this procedure to check the overall function of the heated oxygen sensor 1 circuit. During this check, a 1st trip DTC might not be confirmed.

WITH GST

NFEC0893S01

1) Start engine and warm it up to normal operating temperature.
2) Set voltmeter probes between ECM terminal 91 (HO2S1 bank 1 signal) or 92 (HO2S1 bank 2 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.

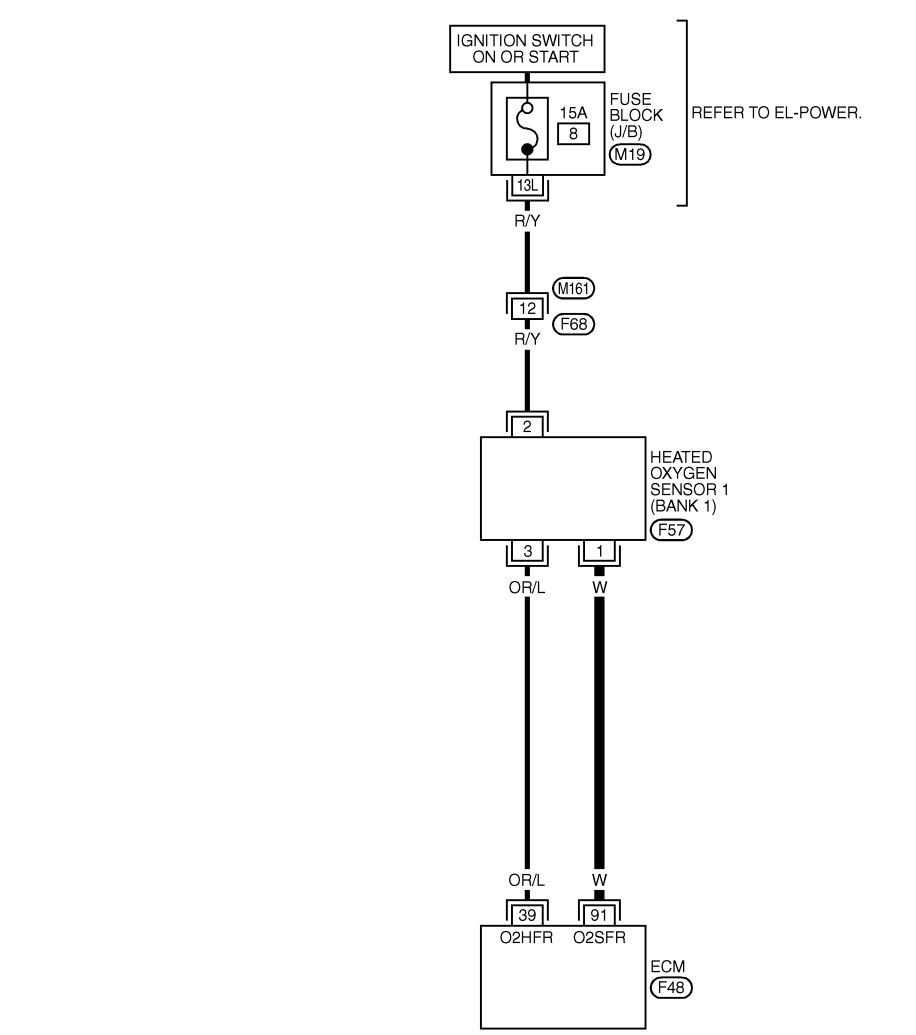
4) If NG, go to “Diagnostic Procedure”, EC-245.

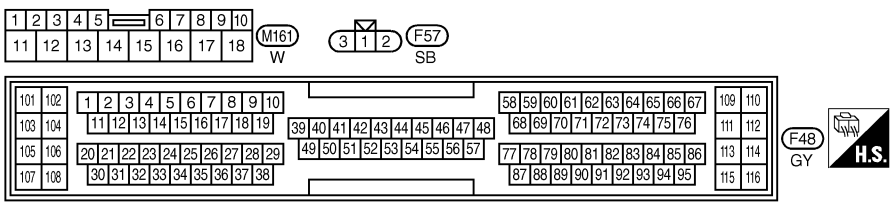
Wiring Diagram

=NFEC0894

BANK 1

NFEC0894S01

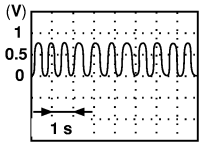




REFER TO THE FOLLOWING.
M19 -FUSE BLOCK-
JUNCTION BOX (J/B)

MEC479D

ECM TERMINALS AND REFERENCE VALUE 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	WIRE COLOR	ITEM	CONDITION	DATA (DC)
91	W	HEATED OXYGEN SENSOR 1 (BANK 1)	ENGINE RUNNING AT 2,000 RPM AFTER WARMING UP TO NORMAL OPERATING TEMPERATURE	0 - APPROX. 1.0V 

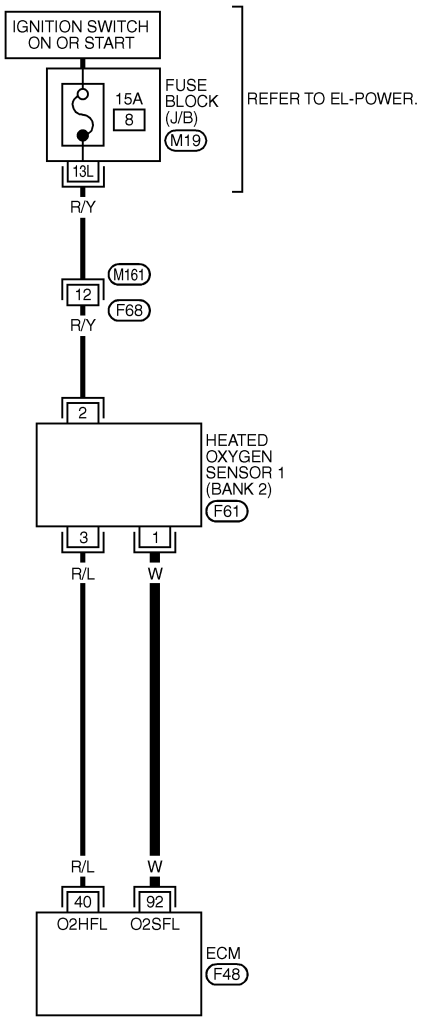
SEC107D

Wiring Diagram (Cont'd)

BANK 2

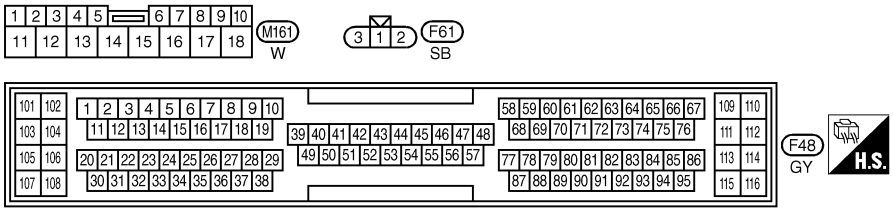
NFEC0894S02

EC-O2S1B2-01



: DETECTABLE LINE FOR DTC

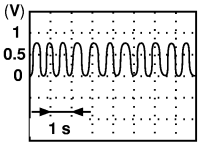
: NON-DETECTABLE LINE FOR DTC



REFER TO THE FOLLOWING.
M19 -FUSE BLOCK-
JUNCTION BOX (J/B)

MEC480D

ECM TERMINALS AND REFERENCE VALUE 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	WIRE COLOR	ITEM	CONDITION	DATA (DC)
92	W	HEATED OXYGEN SENSOR 1 (BANK 2)	ENGINE RUNNING AT 2,000 RPM AFTER WARMING UP TO NORMAL OPERATING TEMPERATURE	0 - APPROX. 1.0V 

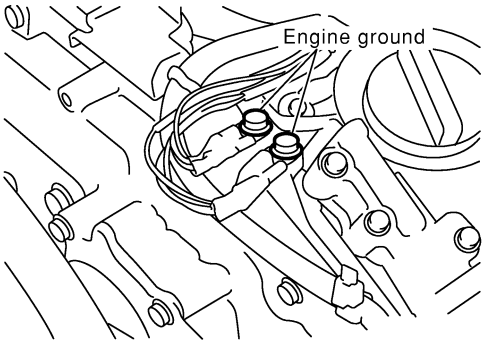
SEC108D

Diagnostic Procedure

NFEC0895

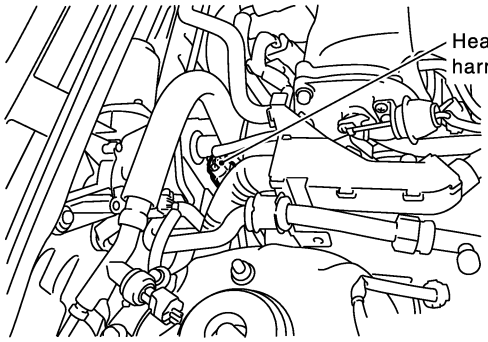
1	INSPECTION START

1. Turn ignition switch “OFF”.
2. Loosen and retighten engine ground screws.

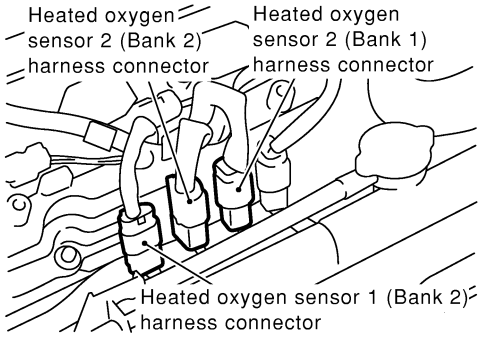


SEC047D

3. Disconnect corresponding heated oxygen sensor 1 harness connector.



SEC099D



SEC134D

▶	GO TO 2.

Diagnostic Procedure (Cont'd)

2	CHECK HO2S1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal and HO2S1 terminal as follows. Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM	Sensor	
P0134	91	1	Bank 1
P0154	92	1	Bank 2

MTBL1148

Continuity should exist.

3. Check harness continuity between ECM terminal or HO2S1 terminal and ground as follows. Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM or Sensor	Ground	
P0134	91 or 1	Ground	Bank 1
P0154	92 or 1	Ground	Bank 2

MTBL1149

Continuity should not exist.

4. Also check harness for short to power.

OK or NG

OK (With CONSULT-II) ▶	GO TO 3.
OK (Without CONSULT-II) ▶	GO TO 4.
NG ▶	Repair open circuit or short to ground or short to power in harness or connectors.

3	CHECK 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)/(B2)" and "HO2S1 MNTR (B1)/(B2)".
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
HO2S2 (B2)	XXX V

SEF967Y

6. Check the following.

- "HO2S1 MNTR (B1)/(B2)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" 5 times in 10 seconds. 5 times (cycles) are counted as shown below.

Bank 1

cycle	1	2	3	4	5
HO2S1 MNTR (B1)	R-L	R-L	R-L	R-L	R-L

Bank 2

cycle	1	2	3	4	5
HO2S1 MNTR (B2)	R-L	R-L	R-L	R-L	R-L

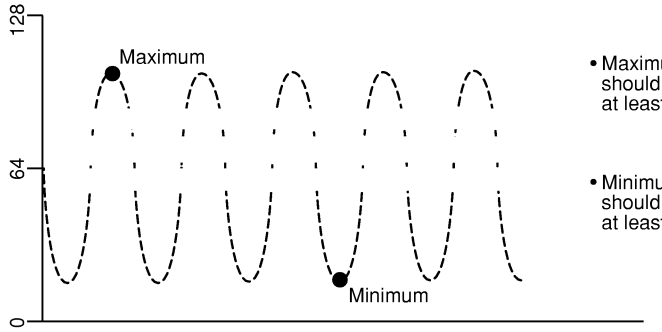
R means HO2S1 MNTR (B1)/(B2) indicates RICH

L means HO2S1 MNTR (B1)/(B2) indicates LEAN

SEF647Y

- "HO2S1 (B1)/(B2)" voltage goes above 0.6V at least once.
- "HO2S1 (B1)/(B2)" voltage goes below 0.3V at least once.
- "HO2S1 (B1)/(B2)" 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
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.**

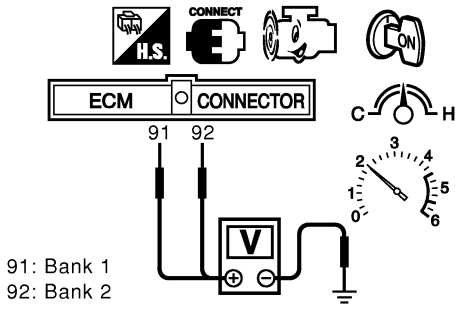
OK or NG

OK	▶	GO TO 5.
NG	▶	Replace malfunctioning heated oxygen sensor 1.

4	CHECK HEATED OXYGEN SENSOR 1

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 91 (HO2S1 bank 1 signal) or 92 (HO2S1 bank 2 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

SEC109D

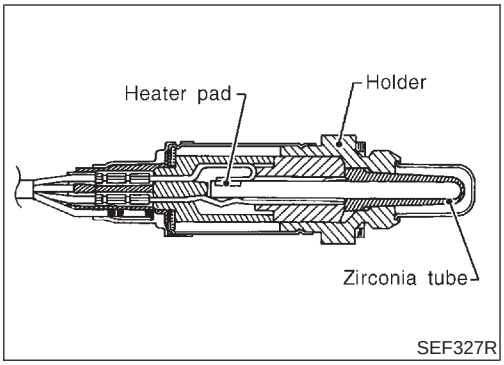
CAUTION:

- **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.**

OK or NG

OK	▶	GO TO 5.
NG	▶	Replace malfunctioning heated oxygen sensor 1.

5	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.	
▶	**INSPECTION END**



Component Description

NFEC0896

The heated oxygen sensor 2, after three way catalyst, 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.

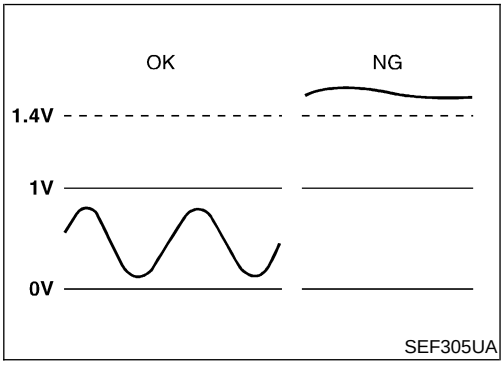
Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.

CONSULT-II Reference Value in Data Monitor Mode

NFEC0897

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1) HO2S2 (B2)	● Engine: After warming up	Revving engine from idle up to 2,000 rpm	0 - 0.3V ⟷ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1) HO2S2 MNTR (B2)			LEAN ⟷ RICH

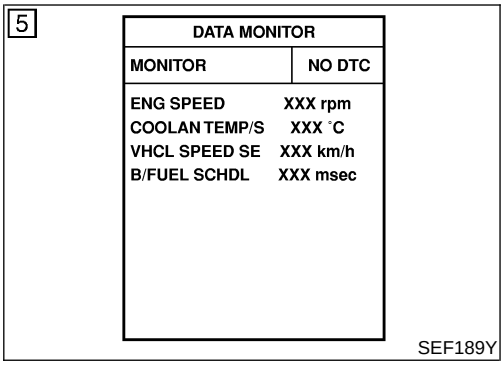


On Board Diagnosis Logic

NFEC0899

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 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 (Bank 1) P0158 0158 (Bank 2)	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

NFEC0900

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.

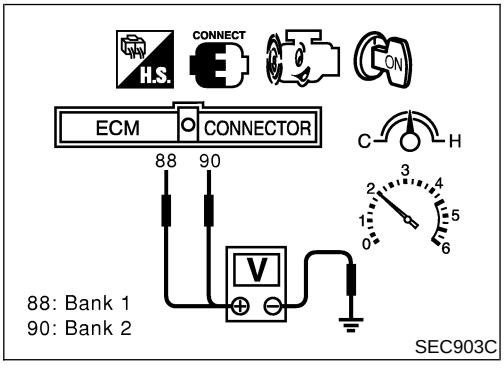
WITH CONSULT-II

NFEC0900S01

1) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
2) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
3) Stop vehicle with engine running.
4) Let engine idle for 1 minute.
5) Maintain the following conditions for at least 5 consecutive seconds.

ENG SPEED	1,300 - 3,100 rpm
VHCL SPEED SE	64 - 130 km/h (40 - 80 MPH)
B/FUEL SCHDL	0.5 - 6.4 msec
COOLAN TEMP/S	More than 70°C (158°F)
Selector lever	Suitable position

6) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-253.



Overall Function Check

NFEC0901

Use this procedure to check the overall function of the heated oxygen sensor 2 circuit. During this check, a 1st trip DTC might not be confirmed.

WITH GST

NFEC0901S01

1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
2) Stop vehicle with engine running.
3) Set voltmeter probes between ECM terminal 88 (HO2S2 bank 1 signal) or 90 (HO2S2 bank 2 signal) and engine ground.
4) Check the voltage when racing 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 1.4V during this procedure.
5) If NG, go to "Diagnostic Procedure", EC-253.

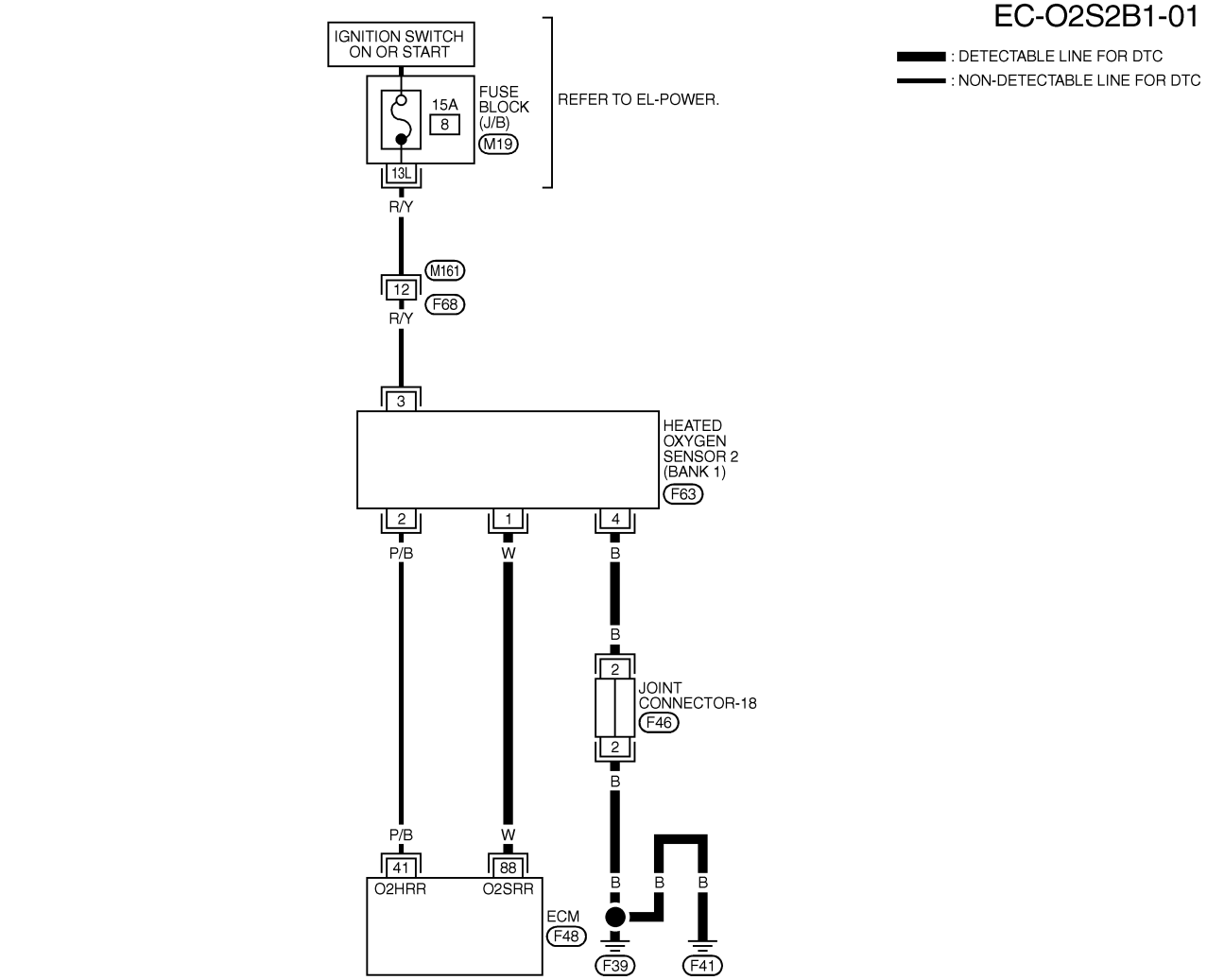
Wiring Diagram

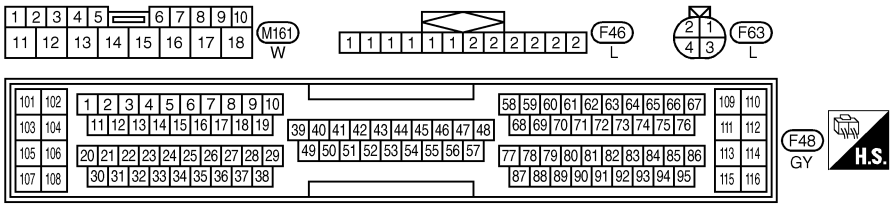
=NFEC0902

BANK 1

NFEC0902S01

EC-O2S2B1-01





REFER TO THE FOLLOWING.
M19 -FUSE BLOCK-
JUNCTION BOX (J/B)

MEC483D

ECM TERMINALS AND REFERENCE VALUE 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	WIRE COLOR	ITEM	CONDITION	DATA (DC)
88	W	HEATED OXYGEN SENSOR 2 (BANK 1)	ENGINE RUNNING FROM IDLE UP TO 2,000 RPM UNDER WARM-UP CONDITION	0 - APPROX. 1.0V

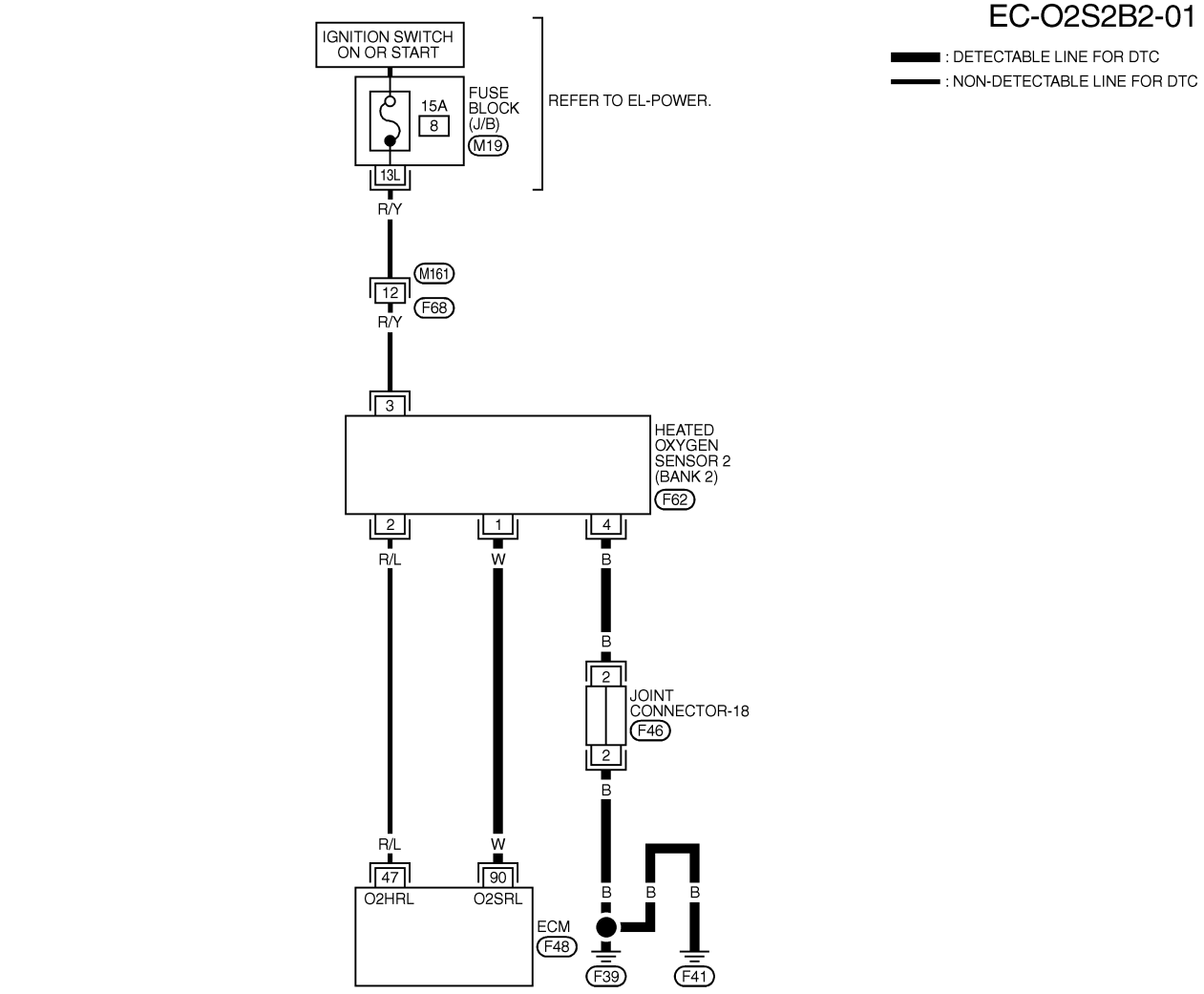
SEC112D

Wiring Diagram (Cont'd)

BANK 2

NFEC0902S02

EC-O2S2B2-01



MEC484D

ECM TERMINALS AND REFERENCE VALUE 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	WIRE COLOR	ITEM	CONDITION	DATA (DC)
90	W	HEATED OXYGEN SENSOR 2 (BANK 2)	ENGINE RUNNING FROM IDLE UP TO 2,000 RPM UNDER WARM-UP CONDITION	0 - APPROX. 1.0V

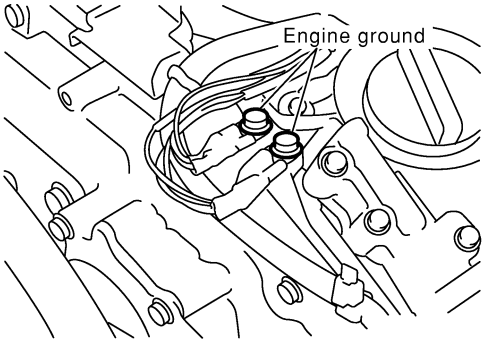
SEC113D

Diagnostic Procedure

NFEC0903

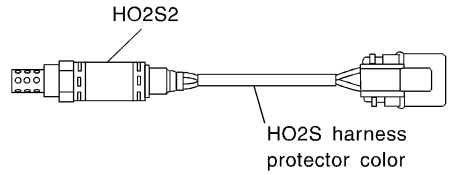
1	INSPECTION START

1. Turn ignition switch “OFF”.
2. Loosen and retighten engine ground screws.



SEC047D

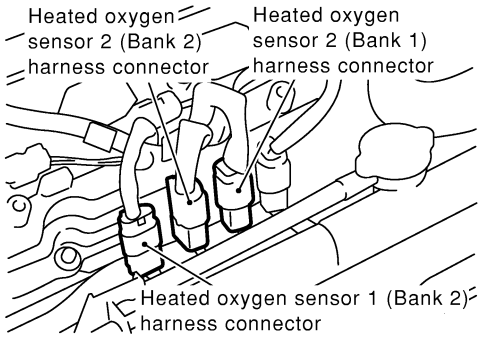
3. Check heated oxygen sensor 2 harness protector color.



HO2S2 (bank 1): White or Gray
HO2S2 (bank 2): Red or Red/Brown

SEF372ZB

4. Disconnect corresponding heated oxygen sensor 2 harness connector.



SEC134D

5. Disconnect ECM harness connector.

▶	GO TO 2.

Diagnostic Procedure (Cont'd)

2	CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal and HO2S2 terminal as follows. Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM	Sensor	
P0138	88	1	Bank 1
P0158	90	1	Bank 2

MTBL1150

Continuity should exist.

2. Check harness continuity between ECM terminal or HO2S2 terminal and ground as follows. Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM or Sensor	Ground	
P0138	88 or 1	Ground	Bank 1
P0158	90 or 1	Ground	Bank 2

MTBL1151

Continuity should not exist.

3. Also check harness for 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 GROUND CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between HO2S2 terminal 4 and engine ground. Refer to Wiring Diagram.
   Continuity should exist.
2. Also check harness for short to power.

OK or NG

OK	▶	GO TO 5.
NG	▶	GO TO 4.

4	DETECT MALFUNCTIONING PART

Check the following.
- Joint connector-18
- Harness for open and short between HO2S2 and engine ground

	▶	Repair open circuit or short to power in harness or connectors.

5	CHECK HO2S2 CONNECTORS FOR WATER

Check heated oxygen sensor connector 2 and harness connector for water.
Water should not exist.

OK or NG

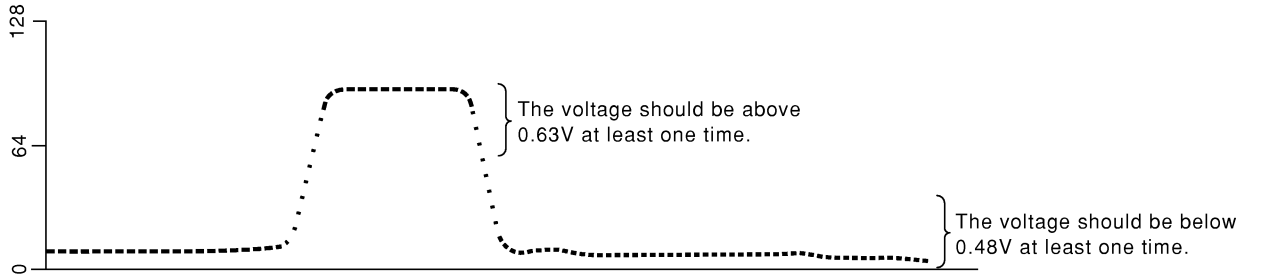
OK (With CONSULT-II)	▶	GO TO 6.
OK (Without CONSULT-II)	▶	GO TO 7.
NG	▶	Repair or replace harness or connectors.

6	CHECK HEATED OXYGEN SENSOR 2

With CONSULT-II

1. Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
2. Stop vehicle with engine running.
3. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)/(B2)" as the monitor item with CONSULT-II.
4. Check "HO2S2 (B1)/(B2)" at idle speed when adjusting "FUEL INJECTION" to ±25%.

(Reference data)



SEF066YA

"HO2S2 (B1)/(B2)" should be above 0.63V at least once when the "FUEL INJECTION" is +25%.
"HO2S2 (B1)/(B2)" should be below 0.48V 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.

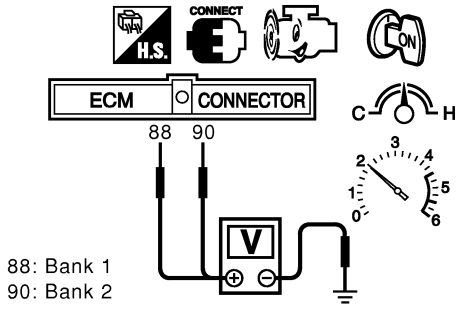
OK or NG

OK	▶	GO TO 10.
NG	▶	GO TO 9.

7	CHECK HEATED OXYGEN SENSOR 2-I

Without CONSULT-II

1. Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
2. Stop vehicle with engine running.
3. Set voltmeter probes between ECM terminal 88 (HO2S2 bank 1 signal) or 90 (HO2S2 bank 2 signal) and engine ground.
4. 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.

SEC114D

OK or NG

OK	▶	GO TO 10.
NG	▶	GO TO 8.

Diagnostic Procedure (Cont'd)

8	CHECK HEATED OXYGEN SENSOR 2-II

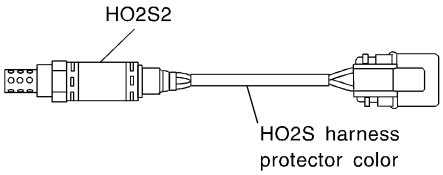
Idle vehicle for 10 minutes, then check voltage between the same terminals as in Test No. 7; or check voltage when coasting from 80 km/h (50 MPH) in 3rd gear position (M/T), "D" position with "OD" OFF (A/T).
The voltage should go below 0.48V at least once during this procedure.
CAUTION:
Discard any heated 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.

OK or NG

OK	▶	GO TO 10.
NG	▶	GO TO 9.

9	REPLACE HEATED OXYGEN SENSOR 2

1. Stop vehicle and turn ignition switch "OFF".
2. Check heated oxygen sensor 2 harness protector color.



HO2S2 (bank 1): White or Gray
HO2S2 (bank 2): Red or Red/Brown

SEF372ZB

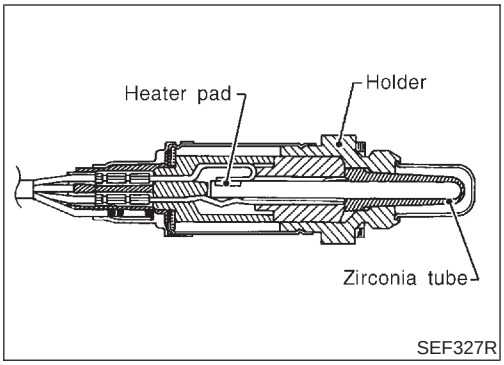
CAUTION:
Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

	▶	Replace malfunctioning heated oxygen sensor 2.

10	CHECK INTERMITTENT INCIDENT

Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.

	▶	**INSPECTION END**



Component Description

NFEC0904

The heated oxygen sensor 2, after three way catalyst, 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.

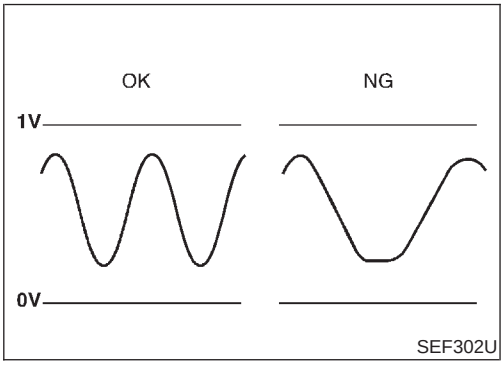
Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.

CONSULT-II Reference Value in Data Monitor Mode

NFEC0905

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1) HO2S2 (B2)	● Engine: After warming up	Revving engine from idle up to 2,000 rpm	0 - 0.3V ⟷ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1) HO2S2 MNTR (B2)			LEAN ⟷ RICH

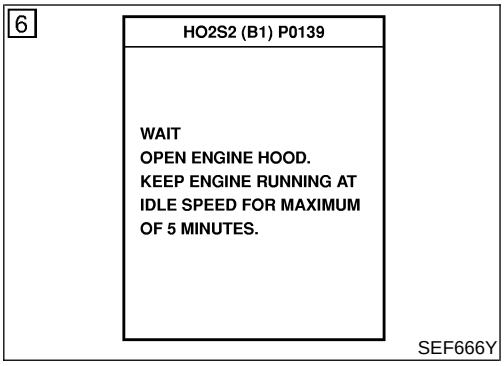


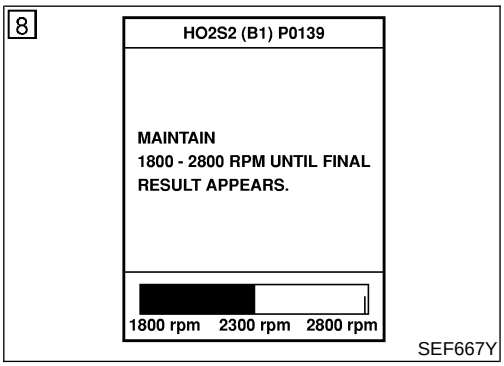
On Board Diagnosis Logic

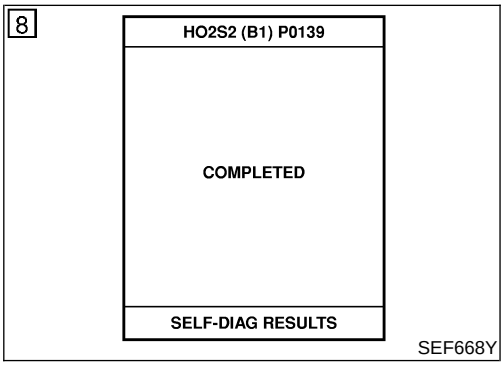
NFEC0907

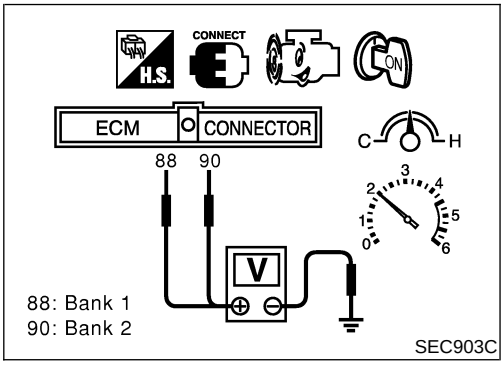
The heated oxygen sensor 2 has a much longer switching time between rich and lean than the heated oxygen sensor 1. The oxygen storage capacity before the three way catalyst causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the switching response 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 (Bank 1) P0159 0159 (Bank 2)	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

NFEC0908

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:
Open engine hood before conducting following procedure.

WITH CONSULT-II

NFEC0908S01

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) Make sure that "COOLAN TEMP/S" indicates more than 70°C (158°F).
6) Select "HO2S2 (B1)/(B2) P0139/P0159" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-II.
7) Start engine and follow the instruction of CONSULT-II.
8) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS".
   If NG is displayed, refer to "Diagnostic Procedure", EC-262.
   If "CANNOT BE DIAGNOSED" is displayed, perform the following.

a) Stop engine and cool down until "COOLAN TEMP/S" indicates less than 70°C (158°F).
b) Turn ignition switch "ON".
c) Select "DATA MONITOR" mode with CONSULT-II.
d) Start engine.
e) Return to step 6 again when the "COOLAN TEMP/S" reaches to 70°C (158°F).

Overall Function Check

NFEC0909

Use this procedure to check the overall function of the heated oxygen sensor 2 circuit. During this check, a 1st trip DTC might not be confirmed.

WITH GST

NFEC0909S01

1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
2) Stop vehicle with engine running.
3) Set voltmeter probes between ECM terminal 88 (HO2S2 bank 1 signal) or 90 (HO2S2 bank 2 signal) and engine ground.
4) Check the voltage when racing up to 4,000 rpm under no load at least 10 times.
   (Depress and release accelerator pedal as soon as possible.)
   The voltage should change at more than 0.06V for 1 second during this procedure.
   If the voltage can be confirmed in step 4, step 5 is not necessary.
5) Keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in 3rd gear position (M/T), "D" position with "OD" OFF (A/T).
   The voltage should change at more than 0.06V for 1 second during this procedure.

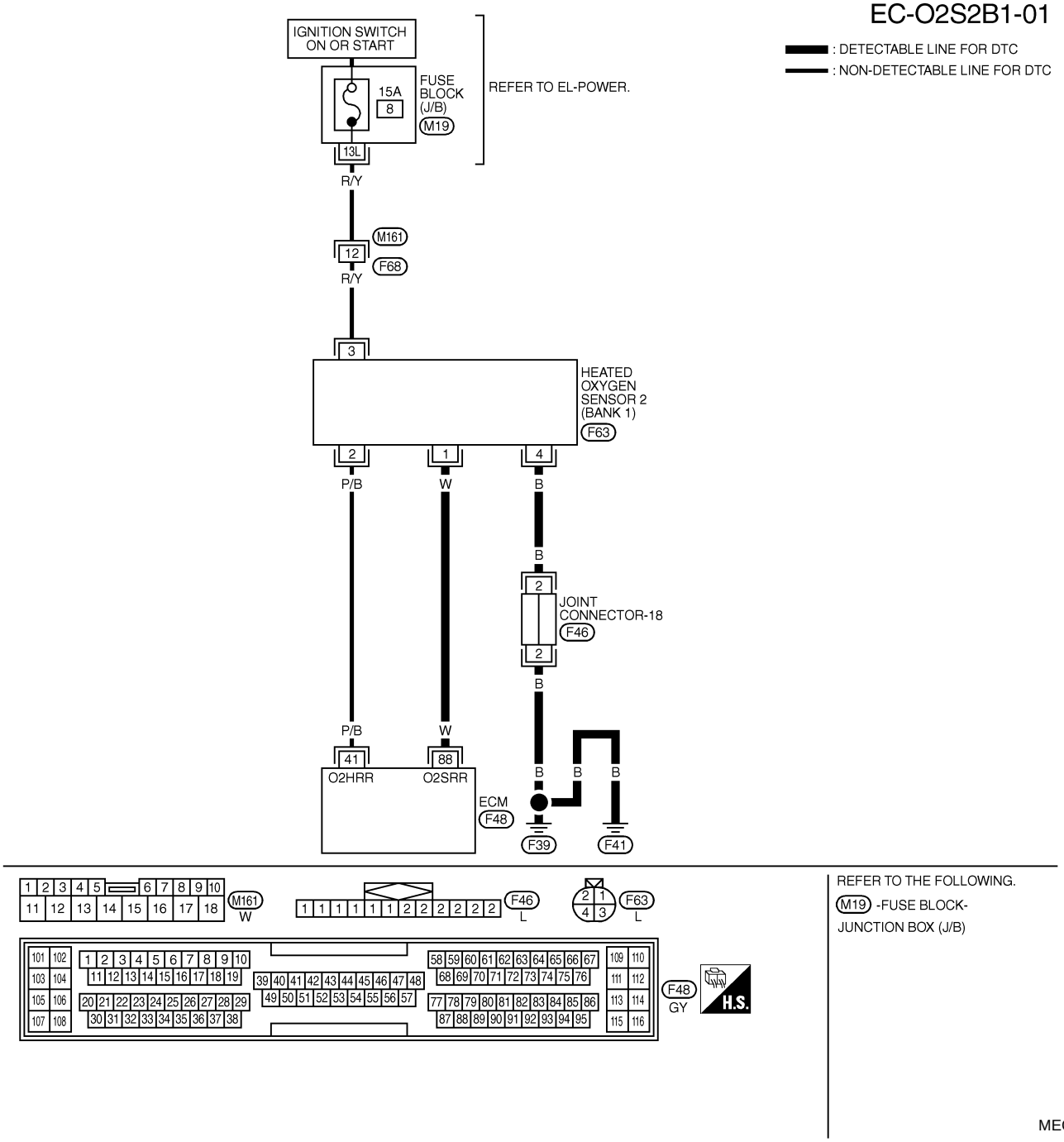
6) If NG, go to "Diagnostic Procedure", EC-262.

Wiring Diagram

=NFEC0910

BANK 1

NFEC0910S01



ECM TERMINALS AND REFERENCE VALUE 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.

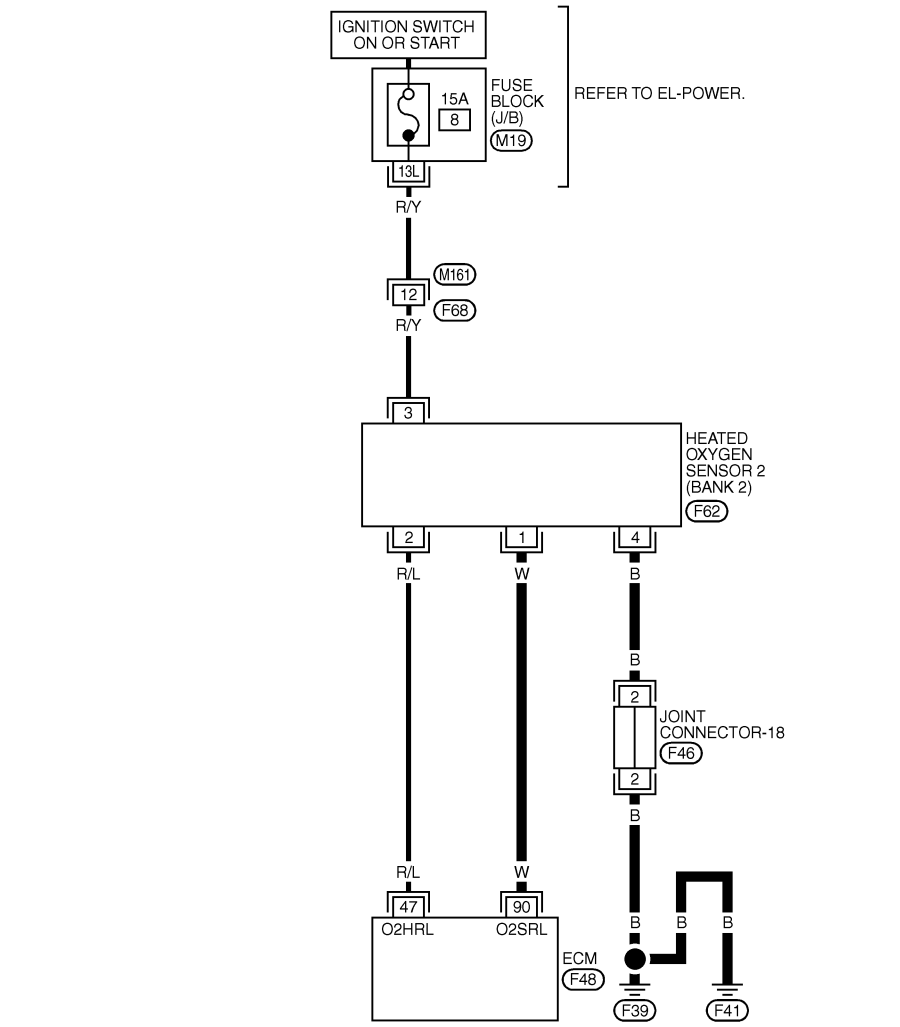
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
88	W	HEATED OXYGEN SENSOR 2 (BANK 1)	ENGINE RUNNING FROM IDLE UP TO 2,000 RPM UNDER WARM-UP CONDITION	0 - APPROX. 1.0V

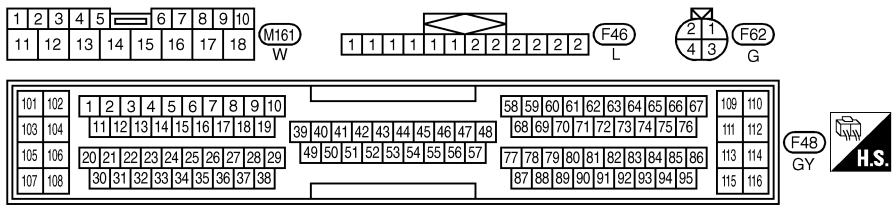
SEC112D

BANK 2

NFEC0910S02

EC-O2S2B2-01





REFER TO THE FOLLOWING.
M19 -FUSE BLOCK-
JUNCTION BOX (J/B)

MEC484D

ECM TERMINALS AND REFERENCE VALUE 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	WIRE COLOR	ITEM	CONDITION	DATA (DC)
90	W	HEATED OXYGEN SENSOR 2 (BANK 2)	ENGINE RUNNING FROM IDLE UP TO 2,000 RPM UNDER WARM-UP CONDITION	0 - APPROX. 1.0V

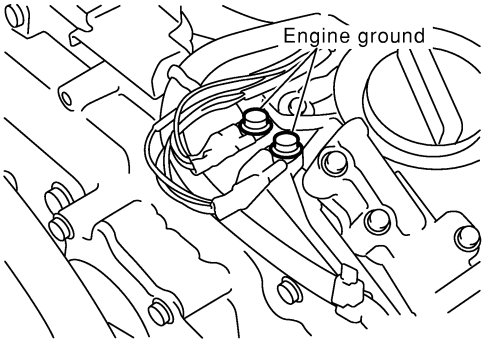
SEC113D

Diagnostic Procedure

NFEC0911

1	RETIGHTEN GROUND SCREWS

1. Turn ignition switch “OFF”.
2. Loosen and retighten engine ground screws.



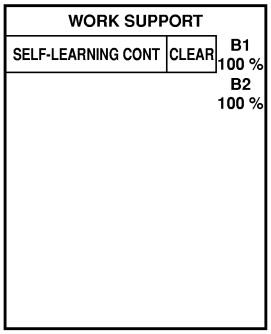
SEC047D

	▶	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”.



SEF968Y

4. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0171, P0172, P0174 or P0175 detected?
   Is it difficult to start engine?

Without CONSULT-II

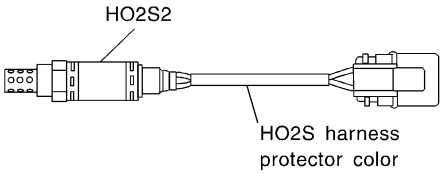
1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch “OFF”.
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure 1st trip DTC No. P0102 is displayed.
6. Erase the 1st trip DTC memory. Refer to “HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION”, EC-91.
7. Make sure DTC No. P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0171, P0172, P0174 or P0175 detected?
   Is it difficult to start engine?

Yes or No

Yes	▶	Perform trouble diagnosis for DTC P0171, P0174 or P0172, P0175. Refer to EC-267, 275.
No	▶	GO TO 3.

3 **CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

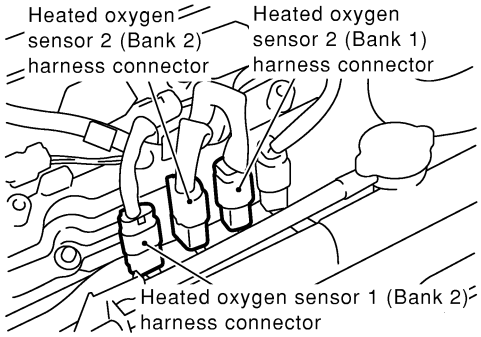
1. Turn ignition switch "OFF".
2. Check heated oxygen sensor 2 harness protector color.



HO2S2 (bank 1): White or Gray
HO2S2 (bank 2): Red or Red/Brown

SEF372ZB

3. Disconnect corresponding heated oxygen sensor 2 harness connector.



SEC134D

4. Disconnect ECM harness connector.
5. Check harness continuity between ECM terminal and HO2S2 terminal as follows. Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM	Sensor	
P0139	88	1	Bank 1
P0159	90	1	Bank 2

MTBL1152

Continuity should exist.

6. Check harness continuity between ECM terminal or HO2S2 terminal and ground as follows. Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM or Sensor	Ground	
P0139	88 or 1	Ground	Bank 1
P0159	90 or 1	Ground	Bank 2

MTBL1153

Continuity should not exist.

7. 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.

Diagnostic Procedure (Cont'd)

4	CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between HO2S2 terminal 4 and engine ground.
   Refer to Wiring Diagram.
   Continuity should exist.
2. Also check harness for short to power.

OK or NG

OK (With CONSULT-II)	▶	GO TO 6.
OK (Without CONSULT-II)	▶	GO TO 7.
NG	▶	GO TO 5.

5	DETECT MALFUNCTIONING PART

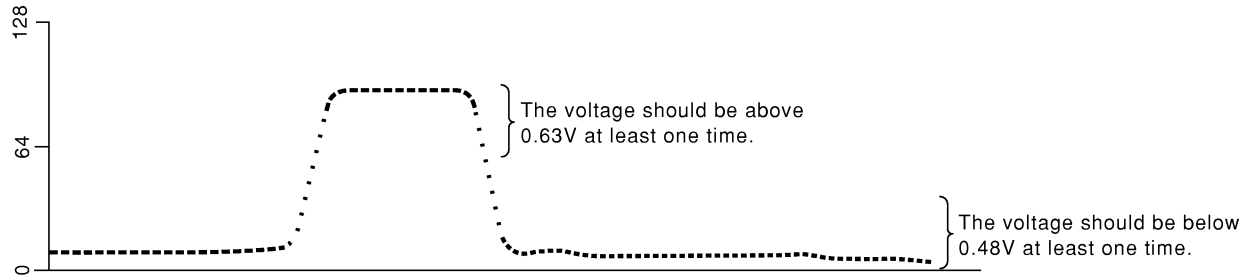
Check the following.
- Joint connector-18
- Harness for open and short between HO2S2 and engine ground

	▶	Repair open circuit or short to power in harness or connectors.

6	CHECK HEATED OXYGEN SENSOR 2

With CONSULT-II
1. Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
2. Stop vehicle with engine running.
3. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)/(B2)" as the monitor item with CONSULT-II.
4. Check "HO2S2 (B1)/(B2)" at idle speed when adjusting "FUEL INJECTION" to ±25%.

(Reference data)



SEF066YA

"HO2S2 (B1)/(B2)" should be above 0.63V at least once when the "FUEL INJECTION" is +25%.
"HO2S2 (B1)/(B2)" should be below 0.48V 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.

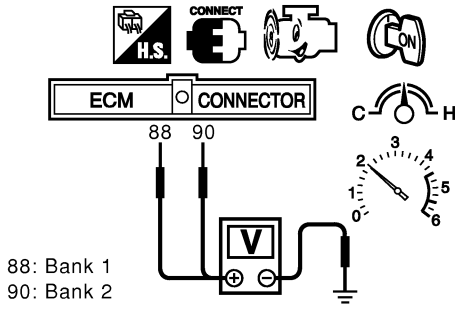
OK or NG

OK	▶	GO TO 10.
NG	▶	GO TO 9.

7	CHECK HEATED OXYGEN SENSOR 2-I

Without CONSULT-II

1. Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
2. Stop vehicle with engine running.
3. Set voltmeter probes between ECM terminal 88 (HO2S2 bank 1 signal) or 90 (HO2S2 bank 2 signal) and engine ground.
4. 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.

SEC114D

OK or NG

OK	▶	GO TO 10.
NG	▶	GO TO 8.

8	CHECK HEATED OXYGEN SENSOR 2-II

Idle vehicle for 10 minutes, then check voltage between the same terminals as in Test No. 7; or check voltage when coasting from 80 km/h (50 MPH) in 3rd gear position (M/T), "D" position with "OD" OFF (A/T).

The voltage should go below 0.48V at least once during this procedure.

CAUTION:

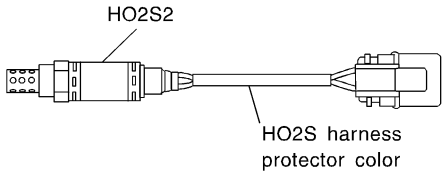
Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.

OK or NG

OK	▶	GO TO 10.
NG	▶	GO TO 9.

9	REPLACE HEATED OXYGEN SENSOR 2

1. Stop vehicle and turn ignition switch "OFF".
2. Check heated oxygen sensor 2 harness protector color.



HO2S2 (bank 1): White or Gray
HO2S2 (bank 2): Red or Red/Brown

SEF372ZB

CAUTION:

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.

	▶	Replace malfunctioning heated oxygen sensor 2.

Diagnostic Procedure (Cont'd)

10	**CHECK INTERMITTENT INCIDENT**
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.	
▶	**INSPECTION END**

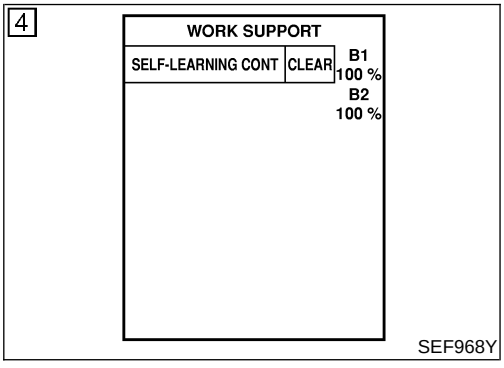
On Board Diagnosis Logic

NFEC0912

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 lean.), the ECM judges the condition as the fuel injection system malfunction and light up the MIL (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	Injectors

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0171 0171 (Bank 1) P0174 0174 (Bank 2)	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 • Mass air flow sensor • Incorrect PCV hose connection



DTC Confirmation Procedure

NFEC0913

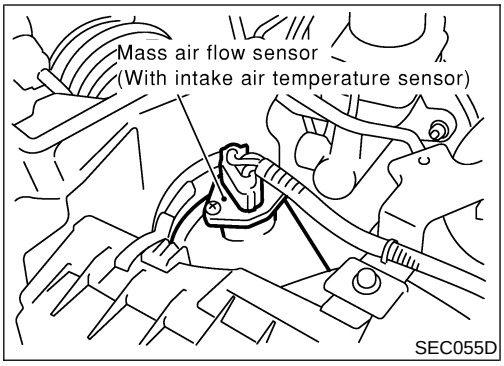
NOTE:
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

NFEC0913S01

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-LEARN CONTROL" 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 or P0174 should be detected at this stage, if a malfunction exists. If so, go to "Diagnostic Procedure", EC-271.
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 "Diagnostic Procedure", EC-271. If engine does not start, check exhaust and intake air leak visually.

DTC Confirmation Procedure (Cont'd)



WITH GST

NFEC0913S02

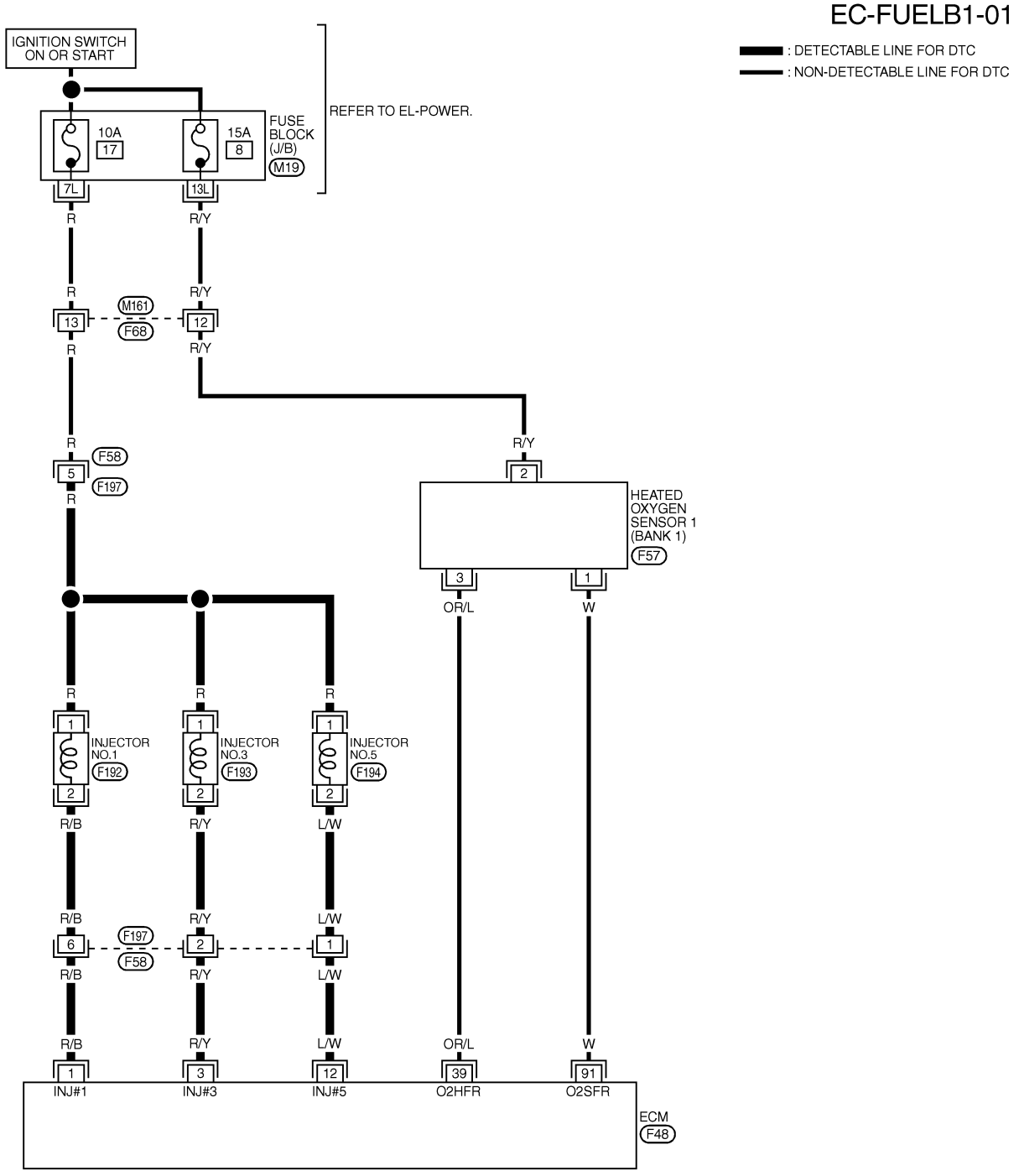
1) Start engine and warm it up to normal operating temperature.
2) Turn ignition switch "OFF" and wait at least 10 seconds.
3) Disconnect mass air flow sensor harness connector. Then restart and run engine for at least 5 seconds at idle speed.
4) Stop engine and reconnect mass air flow sensor harness connector.
5) Select "MODE 7" with GST. Make sure DTC P0102 is detected.
6) Select "MODE 4" with GST and erase the DTC P0102.
7) Start engine again and let it idle for at least 10 minutes.
8) Select "MODE 7" with GST. The 1st trip DTC P0171 or P0174 should be detected at this stage, if a malfunction exists. If so, go to "Diagnostic Procedure", EC-271.
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 "Diagnostic Procedure", EC-271. If engine does not start, check exhaust and intake air leak visually.

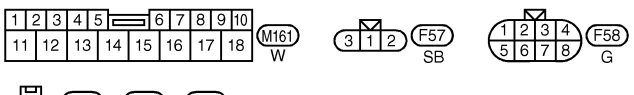
Wiring Diagram

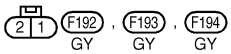
NFEC0914

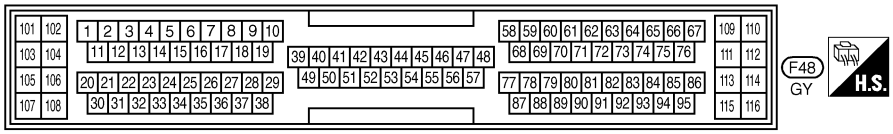
BANK 1

NFEC0914S01









REFER TO THE FOLLOWING.
M19 -FUSE BLOCK-
JUNCTION BOX (J/B)

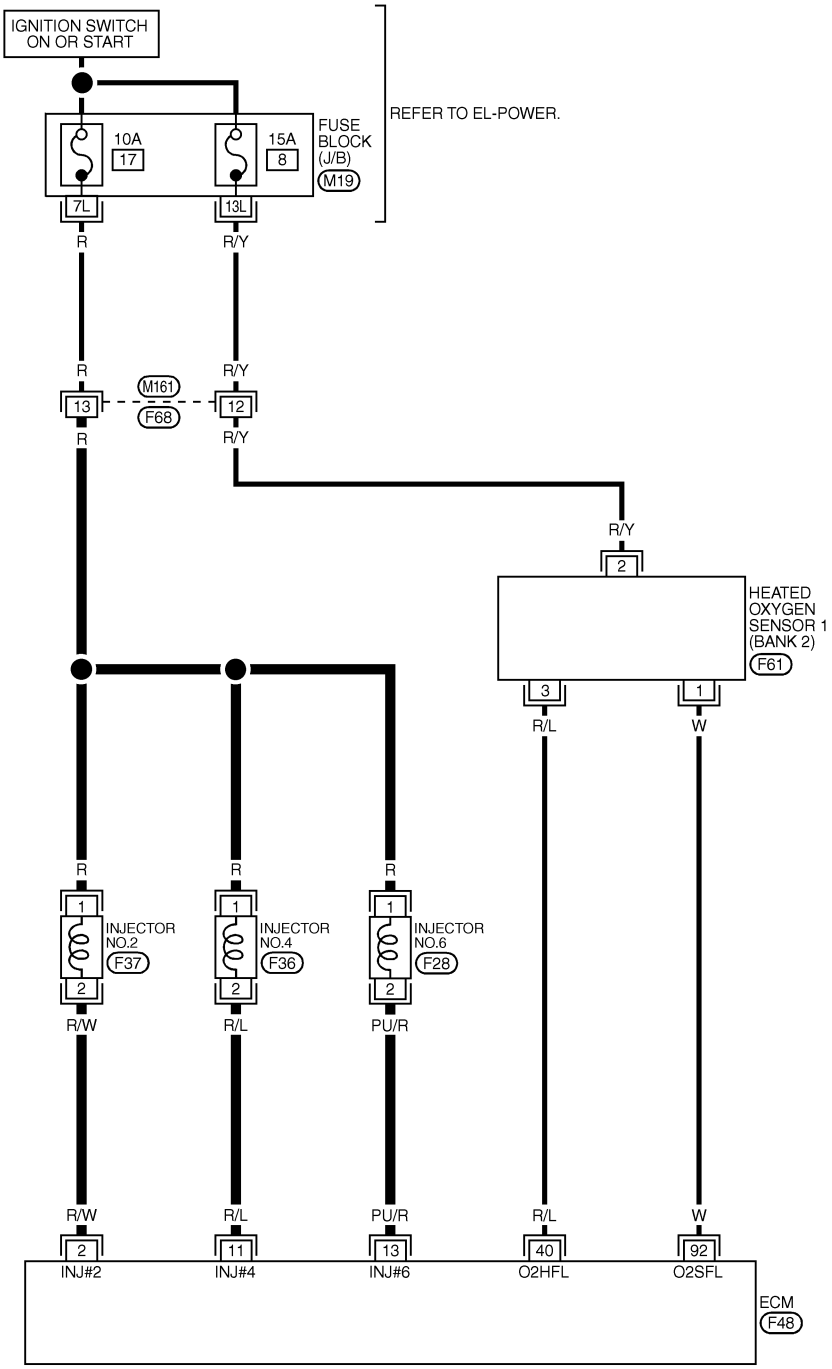
MEC487D

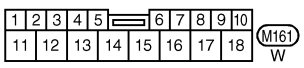
Wiring Diagram (Cont'd)

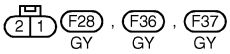
BANK 2

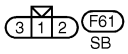
NFEC0914S02

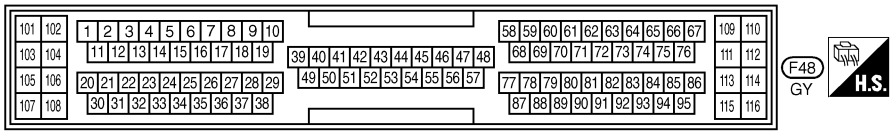
EC-FUELB2-01











REFER TO THE FOLLOWING.
M19 -FUSE BLOCK-
JUNCTION BOX (J/B)

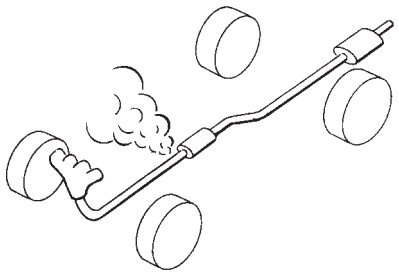
MEC488D

Diagnostic Procedure

NFEC0915

1	CHECK EXHAUST AIR LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust air leak before three way catalyst.



SEF099P

OK or NG

OK	▶	GO TO 2.
NG	▶	Repair or replace.

2	CHECK FOR INTAKE AIR LEAK

1. Listen for an intake air leak after the mass air flow 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 corresponding heated oxygen sensor 1 harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between ECM terminal and HO2S1 terminal as follows. Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM	Sensor	
P0171	91	1	Bank 1
P0174	92	1	Bank 2

MTBL1154

Continuity should exist.

5. Check harness continuity between ECM terminal or HO2S1 terminal and ground as follows. Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM or Sensor	Ground	
P0171	91 or 1	Ground	Bank 1
P0174	92 or 1	Ground	Bank 2

MTBL1155

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.

Diagnostic Procedure (Cont'd)

4	CHECK FUEL PRESSURE	
1. Release fuel pressure to zero. Refer to EC-56. 2. Install fuel pressure gauge and check fuel pressure. Refer to EC-56. **At idling:** **Approximately 350 kPa (3.7 kg/cm^2, 51 psi)** **OK or NG**		
OK	▶	GO TO 5.
NG	▶	Follow the construction of "Fuel Pressure Check", EC-56.

5	CHECK MASS AIR FLOW SENSOR	
With CONSULT-II 1. Install all removed parts. 2. Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT-II. **2.0 - 6.0 g·m/sec: at idling** **7.0 - 20.0 g·m/sec: at 2,500 rpm**		
With GST 1. Install all removed parts. 2. Check mass air flow sensor signal in MODE 1 with GST. **2.0 - 6.0 g·m/sec: at idling** **7.0 - 20.0 g·m/sec: at 2,500 rpm** **OK or NG**		
OK	▶	GO TO 6.
NG	▶	Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or engine grounds. Refer to EC-198.

6	CHECK FUNCTION OF INJECTORS

With CONSULT-II

1. Start engine.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II.

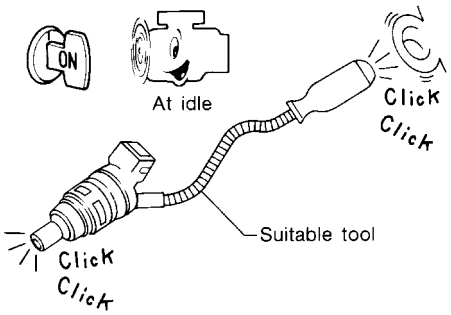
ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS AIF SE-B1	XXX V

SEC136D

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.



MEC703B

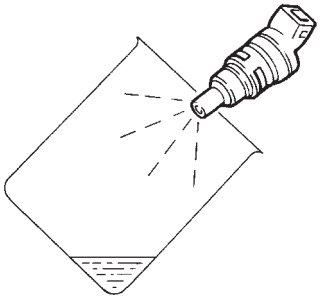
Clicking noise should be heard.

OK or NG

OK	▶	GO TO 7.
NG	▶	Perform trouble diagnosis for "INJECTORS", EC-703.

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. Disconnect injector harness connectors on bank 2 (for DTC P0171), bank 1 (for DTC P0174).
4. Remove injector gallery assembly. Refer to EC-57.
   Keep fuel hose and all injectors connected to injector gallery.
   The injector harness connectors on bank 1 (for DTC P0171), bank 2 (for DTC P0174) should remain connected.
5. Disconnect all ignition coil harness connectors.
6. Prepare pans or saucers under each injector.
7. Crank engine for about 3 seconds. Make sure that fuel sprays out from injectors.



SEF595Q

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 "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.	
▶	**INSPECTION END**

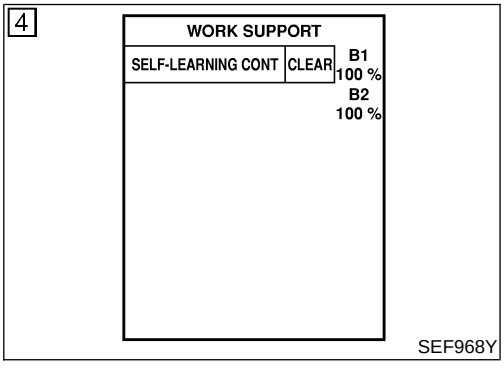
On Board Diagnosis Logic

NFEC0916

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 light up the MIL (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	Injectors

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0172 0172 (Bank 1) P0175 0175 (Bank 2)	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 • Mass air flow sensor



DTC Confirmation Procedure

NFEC0917

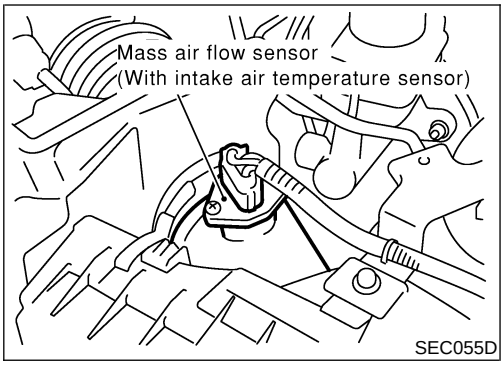
NOTE:
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

NFEC0917S01

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-LEARN CONTROL" 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, P0175 should be detected at this stage, if a malfunction exists. If so, go to "Diagnostic Procedure", EC-279.
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 "Diagnostic Procedure", EC-279. If engine does not start, remove ignition plugs and check for fouling, etc.

DTC Confirmation Procedure (Cont'd)



WITH GST

NFEC0917S02

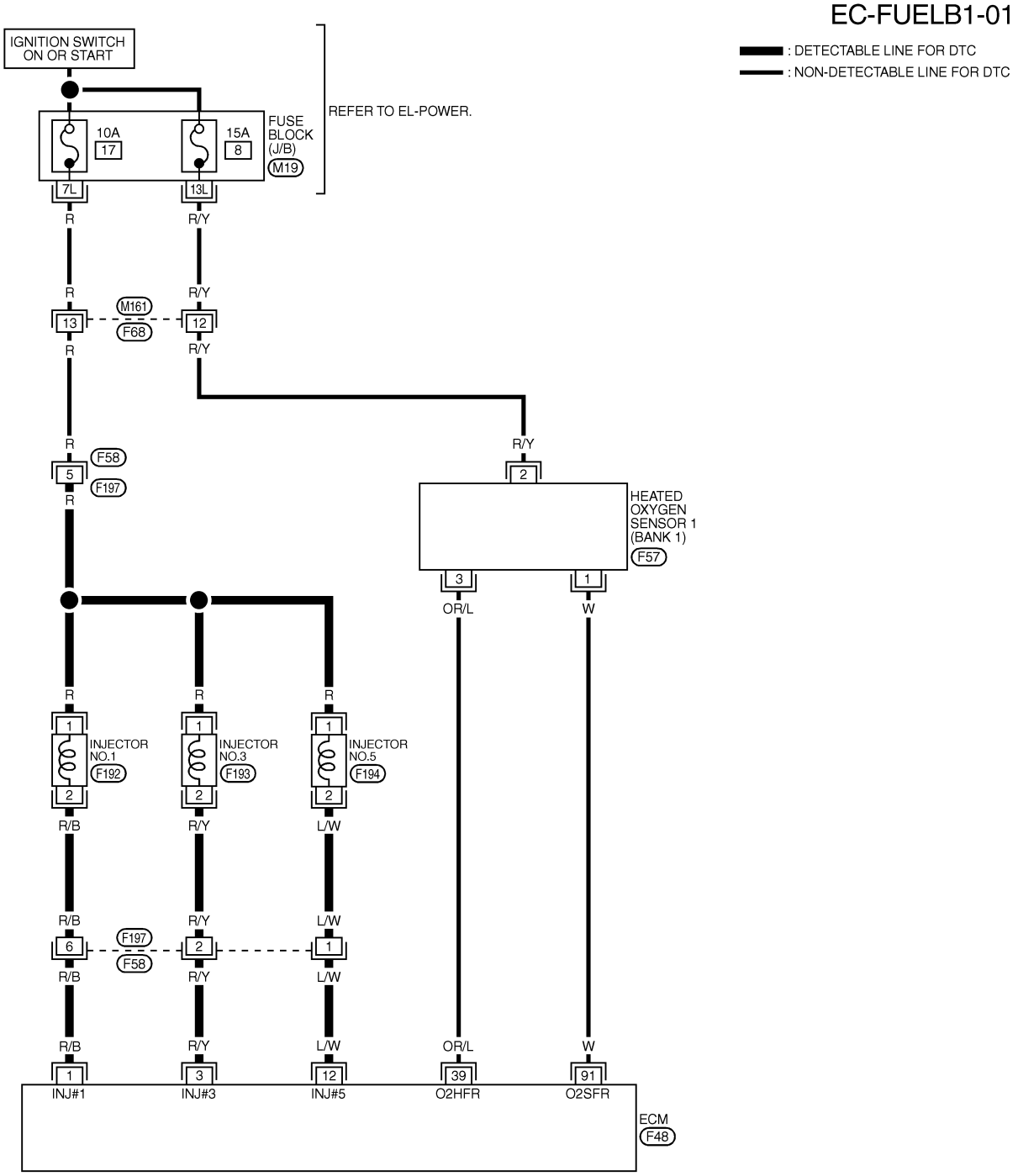
1) Start engine and warm it up to normal operating temperature.
2) Turn ignition switch "OFF" and wait at least 10 seconds.
3) Disconnect mass air flow sensor harness connector. Then restart and run engine for at least 5 seconds at idle speed.
4) Stop engine and reconnect mass air flow sensor harness connector.
5) Select "MODE 7" with GST. Make sure DTC P0102 is detected.
6) Select "MODE 4" with GST and erase the DTC P0102.
7) Start engine again and let it idle for at least 10 minutes.
8) Select "MODE 7" with GST. The 1st trip DTC P0172 or P0175 should be detected at this stage, if a malfunction exists. If so, go to "Diagnostic Procedure", EC-279.
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 "Diagnostic Procedure", EC-279. If engine does not start, check exhaust and intake air leak visually.

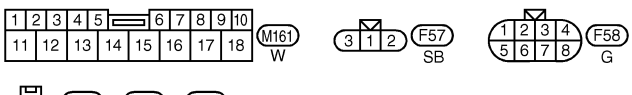
Wiring Diagram

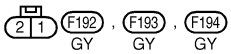
NFEC0918

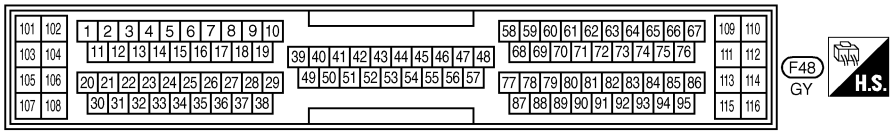
BANK 1

NFEC0918S01









REFER TO THE FOLLOWING.
M19 -FUSE BLOCK-
JUNCTION BOX (J/B)

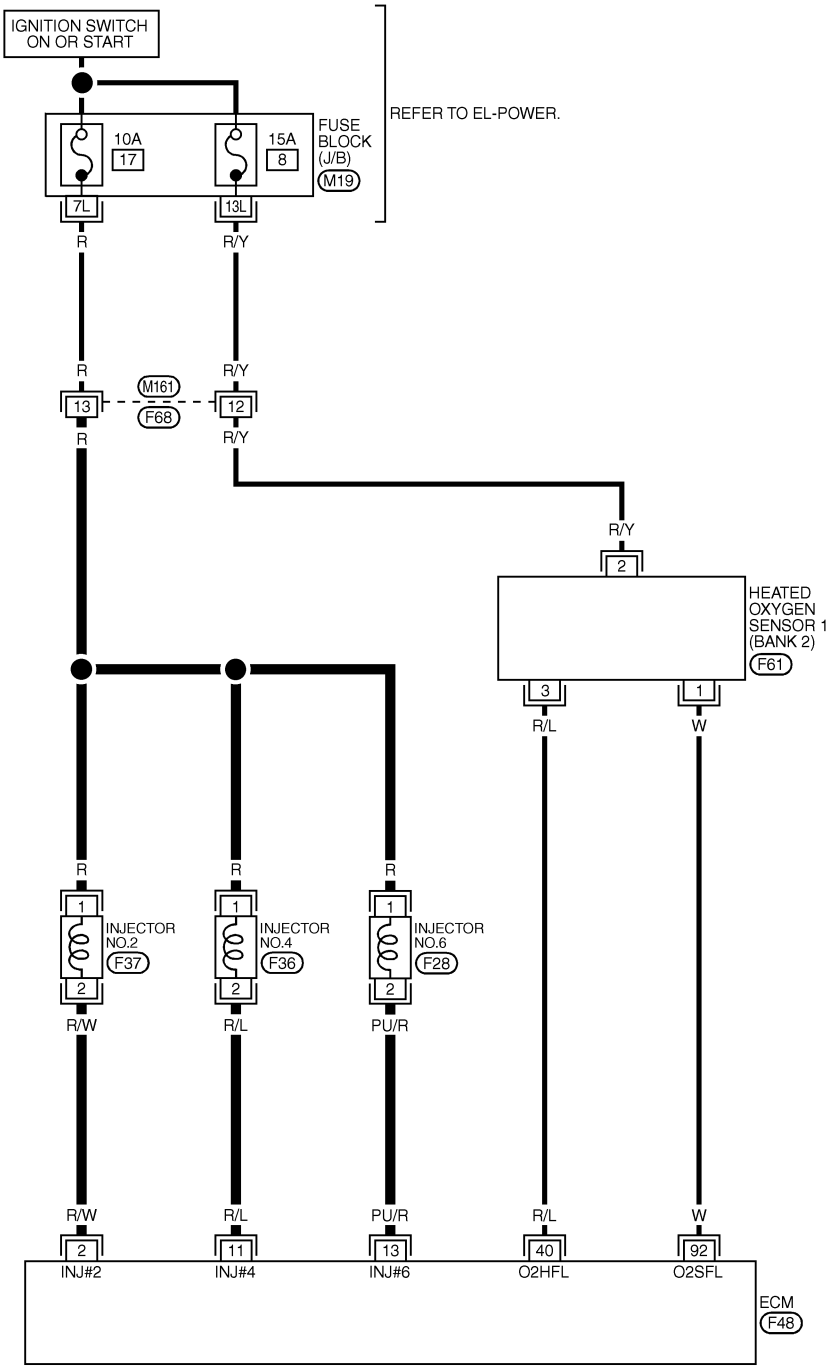
MEC487D

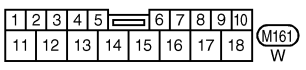
Wiring Diagram (Cont'd)

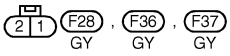
BANK 2

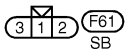
NFEC0918S02

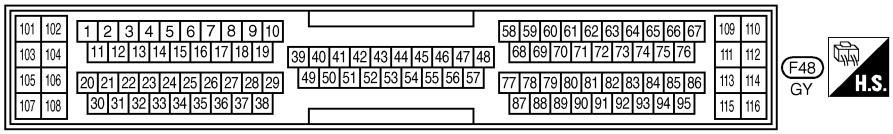
EC-FUELB2-01











REFER TO THE FOLLOWING.
M19 -FUSE BLOCK-JUNCTION BOX (J/B)

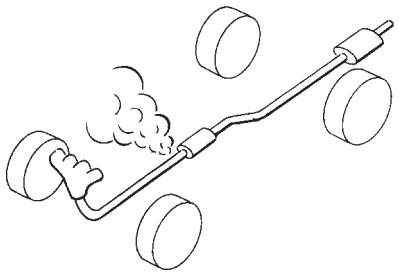
MEC488D

Diagnostic Procedure

NFEC0919

1	CHECK EXHAUST AIR LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust air leak before three way catalyst.



SEF099P

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 mass air flow 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 corresponding heated oxygen sensor 1 harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between ECM terminal and HO2S1 terminal as follows.
   Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM	Sensor	
P0172	91	1	Bank 1
P0175	92	1	Bank 2

MTBL1156

Continuity should exist.

5. Check harness continuity between ECM terminal or HO2S1 terminal and ground as follows.
   Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM or Sensor	Ground	
P0172	91 or 1	Ground	Bank 1
P0175	92 or 1	Ground	Bank 2

MTBL1157

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-56. 2. Install fuel pressure gauge and check fuel pressure. Refer to EC-56. **At idling:** **Approximately 350 kPa (3.7 kg/cm^2, 51 psi)** **OK or NG**		
OK	▶	GO TO 5.
NG	▶	Follow the construction of "Fuel Pressure Check", EC-56.

5	CHECK MASS AIR FLOW SENSOR	
With CONSULT-II 1. Install all removed parts. 2. Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT-II. **2.0 - 6.0 g·m/sec: at idling** **7.0 - 20.0 g·m/sec: at 2,500 rpm**		
With GST 1. Install all removed parts. 2. Check mass air flow sensor signal in MODE 1 with GST. **2.0 - 6.0 g·m/sec: at idling** **7.0 - 20.0 g·m/sec: at 2,500 rpm** **OK or NG**		
OK	▶	GO TO 6.
NG	▶	Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or engine grounds. Refer to EC-198.

6	CHECK FUNCTION OF INJECTORS

With CONSULT-II

1. Start engine.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II.

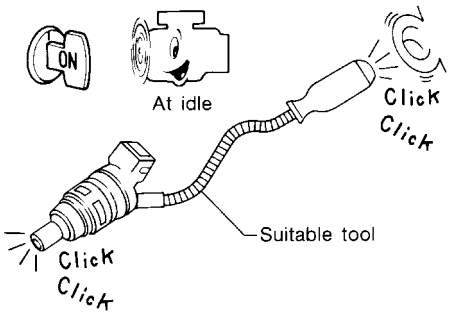
ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS AIF SE-B1	XXX V

SEC136D

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.



MEC703B

Clicking noise should be heard.

OK or NG

OK	▶	GO TO 7.
NG	▶	Perform trouble diagnosis for "INJECTORS", EC-703.

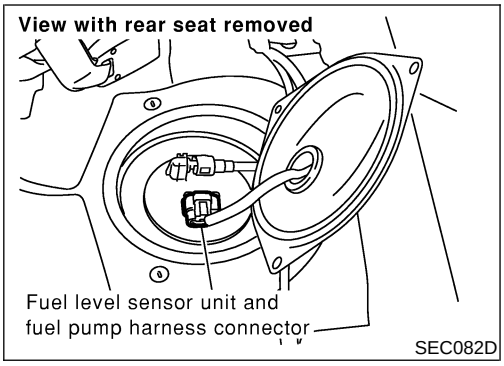
7	CHECK INJECTOR

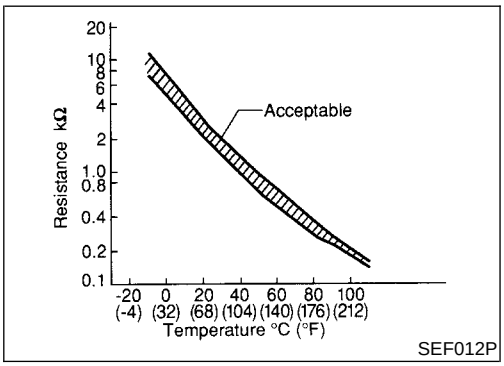
1. Remove injector assembly. Refer to EC-57.
   Keep fuel hose and all injectors connected to injector gallery.
2. Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
3. Disconnect injector harness connectors bank 2 (for DTC P0172), bank 1 (for P0175).
   The injector harness connectors on bank 1 (for P0172), bank 2 (for P0175) should remain connected.
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 "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.	
▶	**INSPECTION END**





Component Description

NFEC0773

The fuel tank temperature sensor is used to detect the fuel temperature inside the fuel tank. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the fuel 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>

Fuel temperature °C (°F)	Voltage* V	Resistance kΩ
20 (68)	3.5	2.3 - 2.7
50 (122)	2.2	0.79 - 0.90

*: These data are reference values and are measured between ECM terminal 75 (Fuel tank temperature sensor) and body 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

NFEC0774

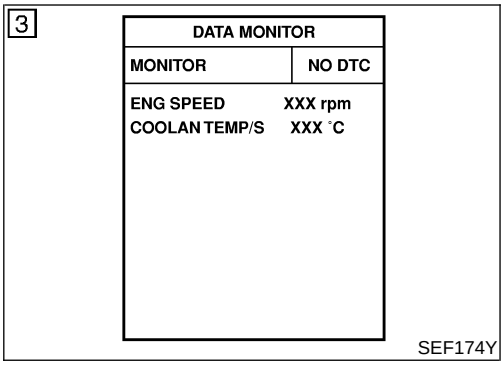
DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0181 0181	Fuel tank temperature sensor circuit range/ performance	Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage signals from engine coolant temperature sensor and intake air temperature sensor.	• Harness or connectors (The sensor circuit is open or shorted.) • Fuel tank temperature sensor

DTC Confirmation Procedure

NFEC0776

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

NFEC0776S01

1) Turn ignition switch "ON".
2) Select "DATA MONITOR" mode with CONSULT-II.
3) Wait at least 10 seconds.
   If the result is NG, go to "Diagnostic Procedure", EC-283.
   If the result is OK, go to following step.
4) Check "COOLAN TEMP/S" value.
   If "COOLAN TEMP/S" is less than 60°C (140°F), the result will be OK.
   If "COOLAN TEMP/S" is above 60°C (140°F), go to the following step.
5) Cool engine down until "COOLAN TEMP/S" is less than 60°C (140°F).
6) Wait at least 10 seconds.
7) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-283.

WITH GST

NFEC0776S02

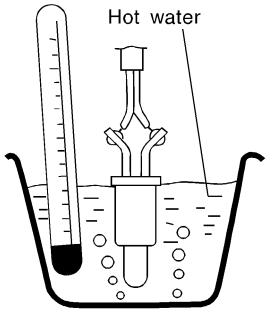
Follow the procedure "With CONSULT-II" above.

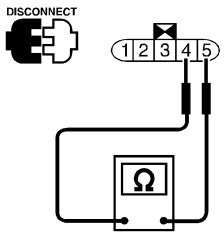
Diagnostic Procedure

NFEC0778

1	CHECK FUEL TANK TEMPERATURE SENSOR

1. Remove fuel level sensor unit.
2. Check resistance between fuel level sensor unit and fuel pump terminals 4 and 5 by heating with hot water or heat gun as shown in the figure.





Temperature °C (°F)	Resistance kΩ
20 (68)	2.3 - 2.7
50 (122)	0.79 - 0.90

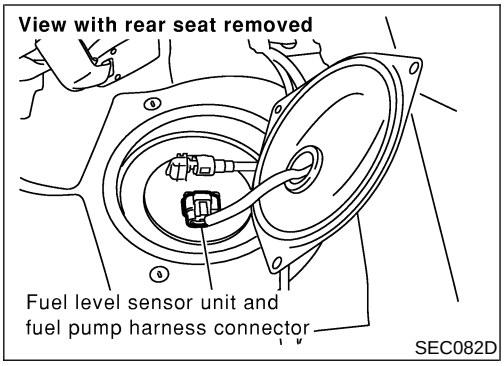
SEF587X

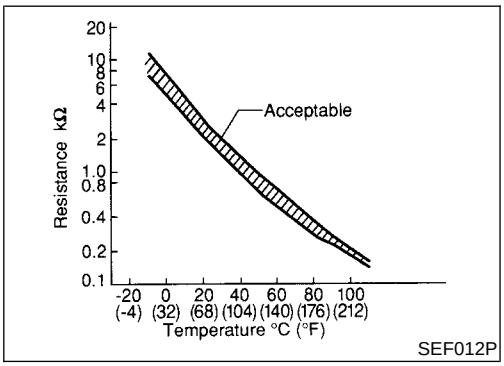
OK or NG

OK	▶	GO TO 2.
NG	▶	Replace fuel level sensor unit.

Diagnostic Procedure (Cont'd)

2	CHECK INTERMITTENT INCIDENT
• Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156. • Refer to Wiring Diagram, EC-287.	
▶	**INSPECTION END**





Component Description

NFEC0920

The fuel tank temperature sensor is used to detect the fuel temperature inside the fuel tank. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the fuel 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>

Fuel temperature °C (°F)	Voltage* V	Resistance kΩ
20 (68)	3.5	2.3 - 2.7
50 (122)	2.2	0.79 - 0.90

*: These data are reference values and are measured between ECM terminal 75 (Fuel tank temperature sensor) and body 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

NFEC0921

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0182 0182	Fuel tank 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.) • Fuel tank temperature sensor
P0183 0183	Fuel tank temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

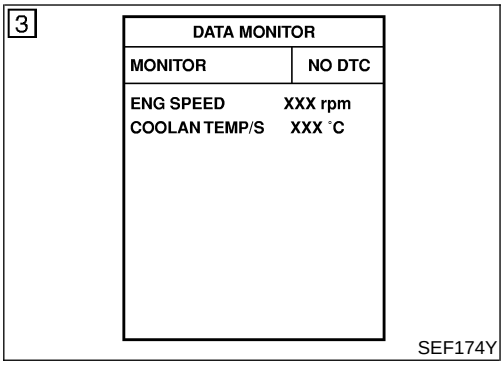
DTC Confirmation Procedure

NFEC0922

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.

DTC Confirmation Procedure (Cont'd)



WITH CONSULT-II

NFEC0922S01

1) Turn ignition switch "ON".
2) Select "DATA MONITOR" mode with CONSULT-II.
3) Wait at least 10 seconds.
   If the result is NG, go to "Diagnostic Procedure", EC-288.
   If the result is OK, go to following step.
4) Check "COOLAN TEMP/S" value.
   If "COOLAN TEMP/S" is less than 60°C (140°F), the result will be OK.
   If "COOLAN TEMP/S" is above 60°C (140°F), go to the following step.
5) Cool engine down until "COOLAN TEMP/S" is less than 60°C (140°F).
6) Wait at least 10 seconds.
7) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-288.

WITH GST

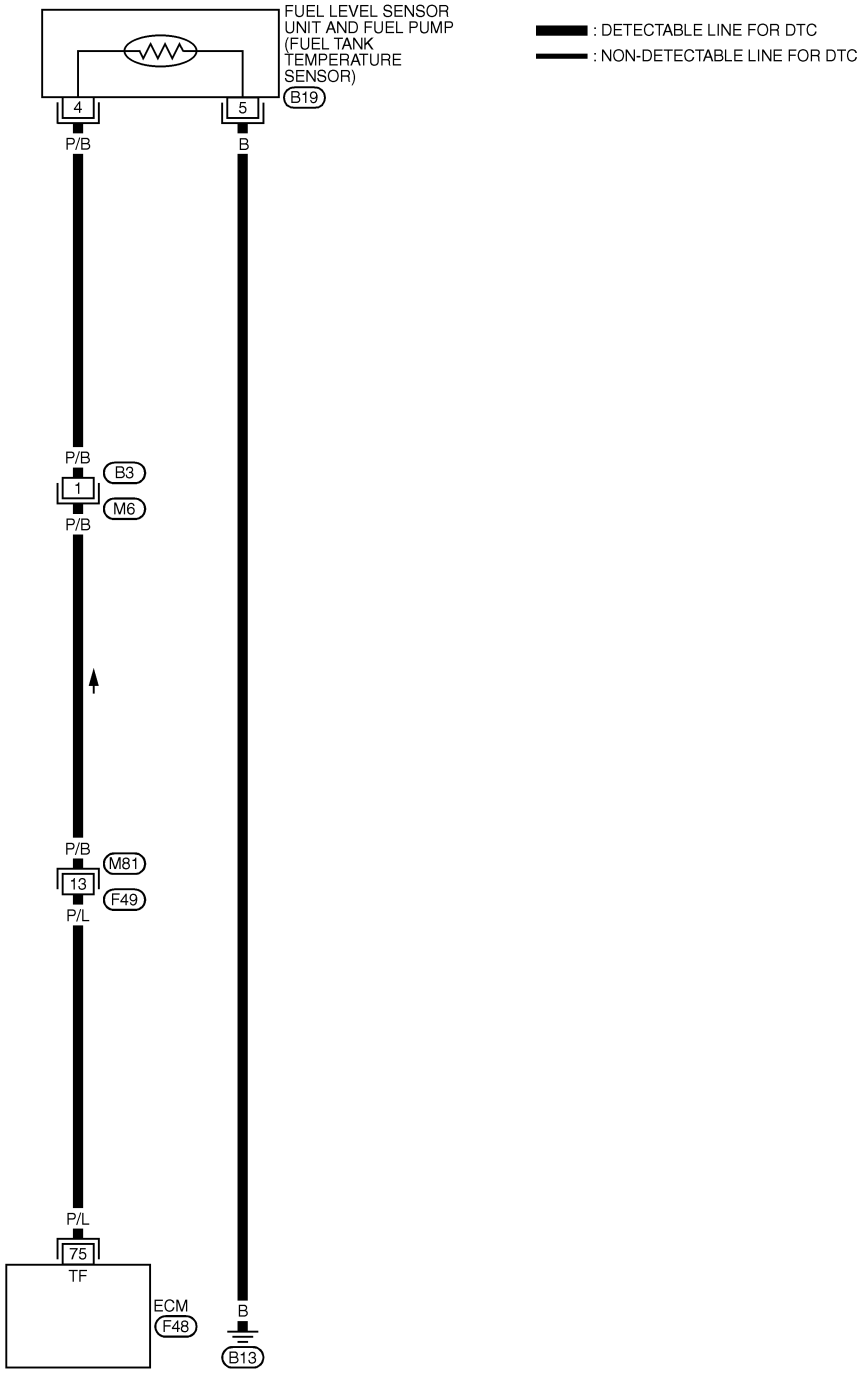
NFEC0922S02

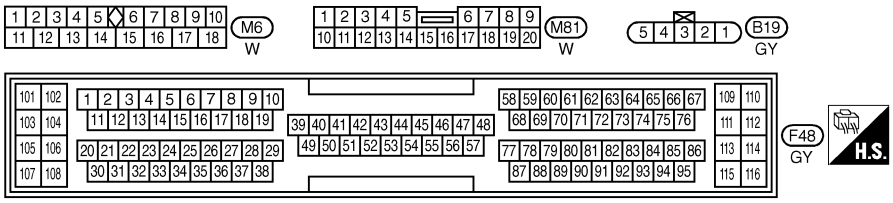
Follow the procedure "With CONSULT-II" above.

Wiring Diagram

NFEC0923

EC-FTTS-01





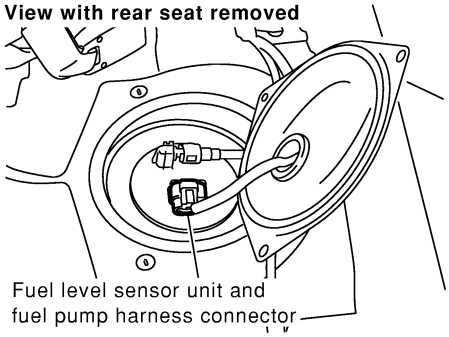
MEC489D

Diagnostic Procedure

NFEC0924

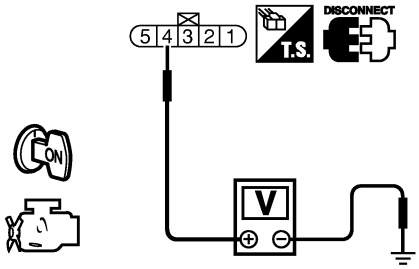
1	CHECK FUEL TANK TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch “OFF”.
2. Disconnect fuel level sensor unit and fuel pump harness connector.



SEC082D

3. Turn ignition switch “ON”.
4. Check voltage between fuel level sensor unit terminal 4 and ground with CONSULT-II or tester.



Voltage: Approximately 5V

SEC116D

OK or NG

OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors B3, M6
- Harness connectors M81, F49
- Harness for open or short between ECM and fuel level sensor unit and fuel pump

	▶	Repair harness or connector.

3	CHECK FUEL TANK TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

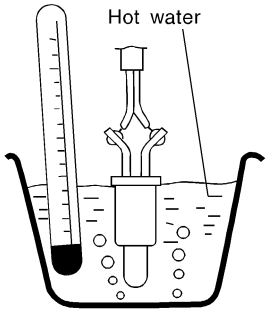
1. Turn ignition switch “OFF”.
2. Check harness continuity between fuel level sensor unit and fuel pump terminal 5 and body ground. Refer to Wiring Diagram.
   Continuity should exist.
3. Also check harness for short to power.

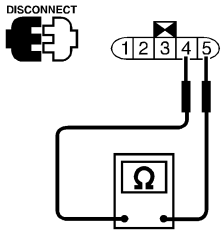
OK or NG

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

4	CHECK FUEL TANK TEMPERATURE SENSOR

1. Remove fuel level sensor unit.
2. Check resistance between fuel level sensor unit and fuel pump terminals 4 and 5 by heating with hot water or heat gun as shown in the figure.





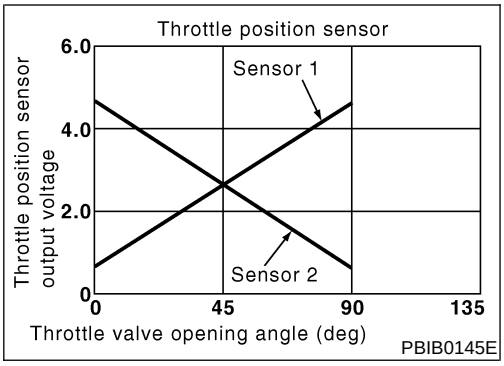
Temperature °C (°F)	Resistance kΩ
20 (68)	2.3 - 2.7
50 (122)	0.79 - 0.90

SEF587X

OK or NG

OK	▶	GO TO 5.
NG	▶	Replace fuel level sensor unit.

5	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.	
▶	**INSPECTION END**



Component Description

NFEC1365

Electric Throttle Control Actuator Consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle vale 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 form these signal 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

NFEC1366

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

On Board Diagnosis Logic

NFEC1434

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

NFEC1434S01

When the malfunction is detected, the ECM enters in fail-safe mode and the MIL lights up.

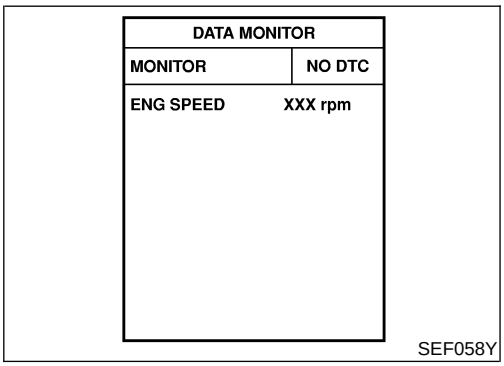
Engine operation condition in fail-safe mode
The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates an opening speed of approx. 5 seconds to an opening of 10 degrees. So, the acceleration will be poor.

DTC Confirmation Procedure

NFEC1435

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 “Diagnostic Procedure”, EC-293.

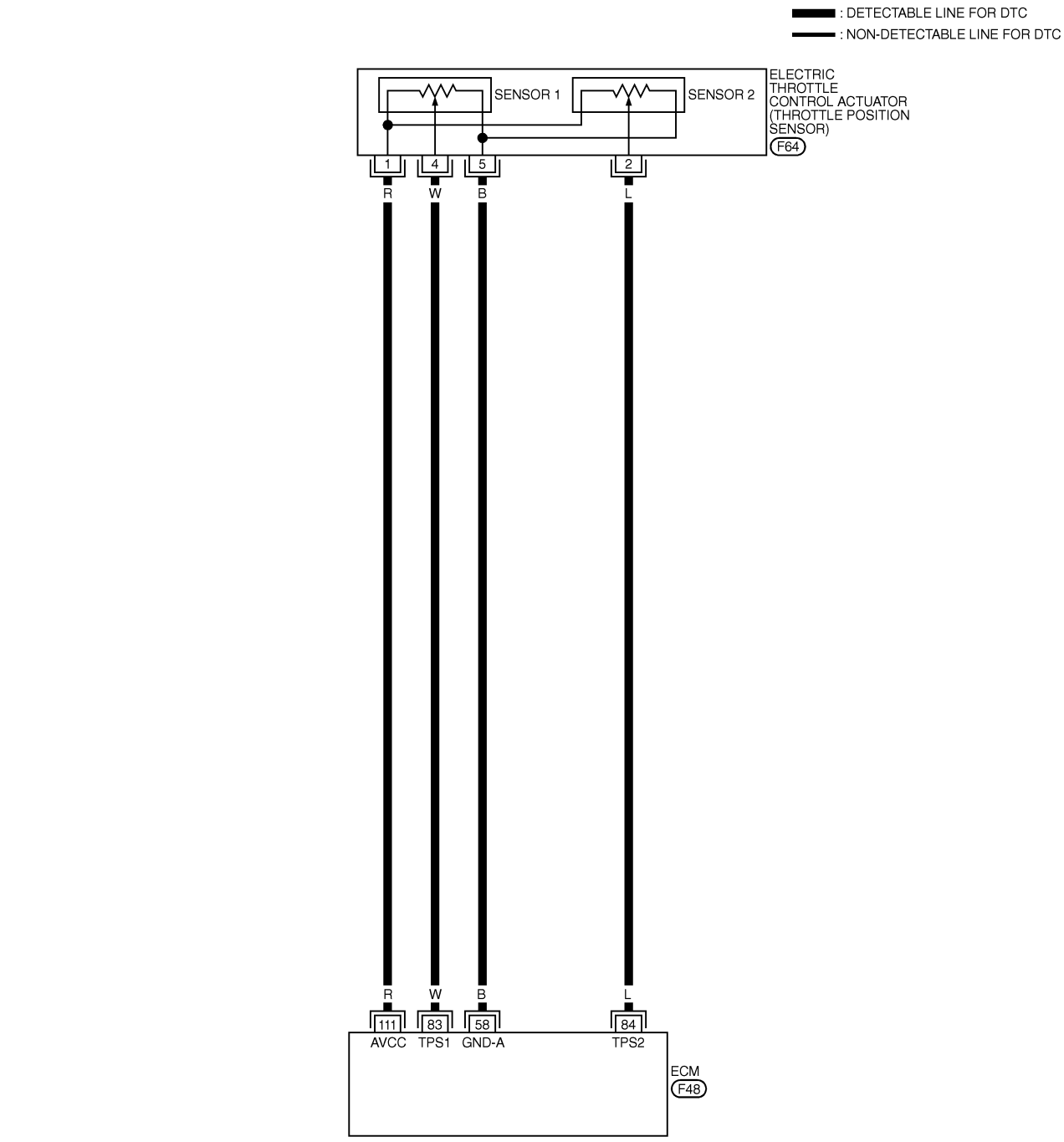
With GST

Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

NFEC1369

EC-TPS3-01



MEC476D

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.

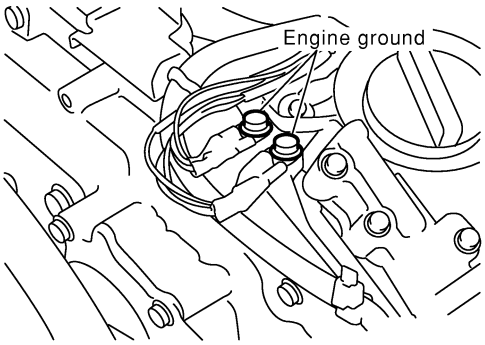
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
58	B	Sensors' ground	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
83	W	Throttle position sensor 1	**[Ignition switch "ON"]** ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully released	More than 0.36V
			[Ignition switch "ON"] ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully depressed	Less than 4.75V
84	L	Throttle position sensor 2	**[Ignition switch "ON"]** ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully released	Less than 4.75V
			[Ignition switch "ON"] ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully depressed	More than 0.36V
111	R	Sensor's power supply	**[Ignition switch "ON"]**	Approximately 5V

Diagnostic Procedure

NFEC1370

1	RETIGHTEN GROUND SCREWS

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.



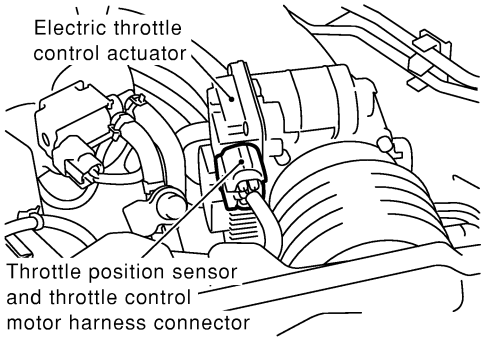
SEC047D

▶ GO TO 2.

Diagnostic Procedure (Cont'd)

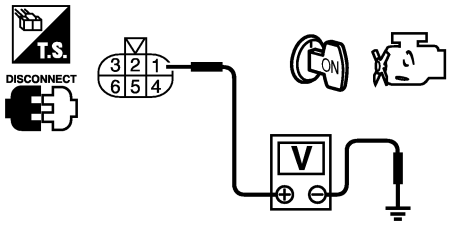
2	CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch "ON".



SEC054D

3. Check voltage between electric throttle control actuator terminal 1 and ground with CONSULT-II or tester.



PBIB0082E

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 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between electric throttle control actuator terminal 5 and engine ground.
   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	▶	GO TO 4.

4	DETECT MALFUNCTIONING PART

Check the following.
- Harness for open or short between electric throttle control actuator and ECM

	▶	Repair open circuit or short to ground or short to power in harness or connectors.

5	CHECK THROTTLE POSITION SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 83 and electric throttle control actuator terminal 4, ECM terminal 84 and electric throttle control actuator terminal 2.
   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 6.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

6	CHECK THROTTLE POSITION SENSOR

Refer to "Component Inspection", EC-295.

OK or NG

OK	▶	GO TO 8.
NG	▶	GO TO 7.

7	REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

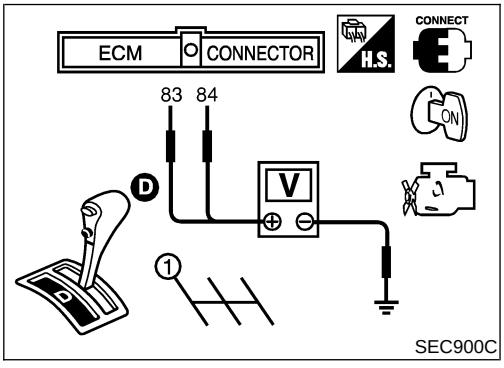
1. Replace the electric throttle control actuator.
2. Perform "Throttle Valve Closed Position Learning", EC-71.
3. Perform "Idle Air Volume Learning", EC-71.

▶ **INSPECTION END**

8	CHECK INTERMITTENT INCIDENT

Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.

▶ **INSPECTION END**



Component Inspection

NFEC1371

THROTTLE POSITION SENSOR

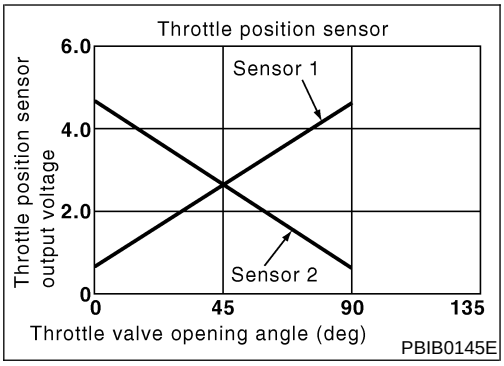
1. Reconnect all harness connectors disconnected.
2. Perform "Throttle Valve Closed Position Learning", EC-71.
3. Turn ignition switch "ON".
4. Set selector lever to "D" position (A/T models) or "1st" position (M/T models).
5. Check voltage between ECM terminals 83 (TP sensor 1), 84 (TP sensor 2) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
83 (Throttle position sensor 1)	Fully released	More than 0.36V
	Fully depressed	Less than 4.75V
84 (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 "Throttle Valve Closed Position Learning", EC-71.

Component Inspection (Cont'd)

8. Perform "Idle Air Volume Learning", EC-71.



Component Description

NFEC1372

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

NFEC1373

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
THRTL SEN1	• 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

On Board Diagnosis Logic

NFEC1436

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

NFEC1436S01

When the malfunction is detected, ECM enters in fail-safe mode and the MIL lights up.

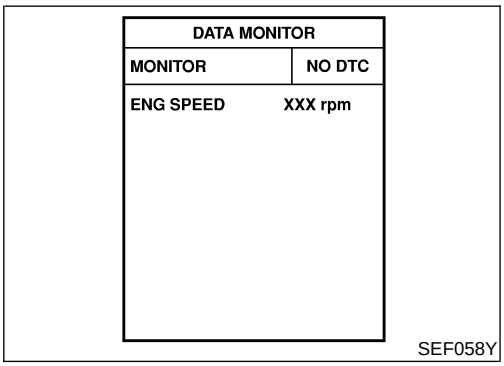
Engine operation condition in fail-safe mode
The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates an opening speed of approx. 5 seconds to an opening of 10 degrees. So, the acceleration will be poor.

DTC Confirmation Procedure

NFEC1437

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 “Diagnostic Procedure”, EC-300.

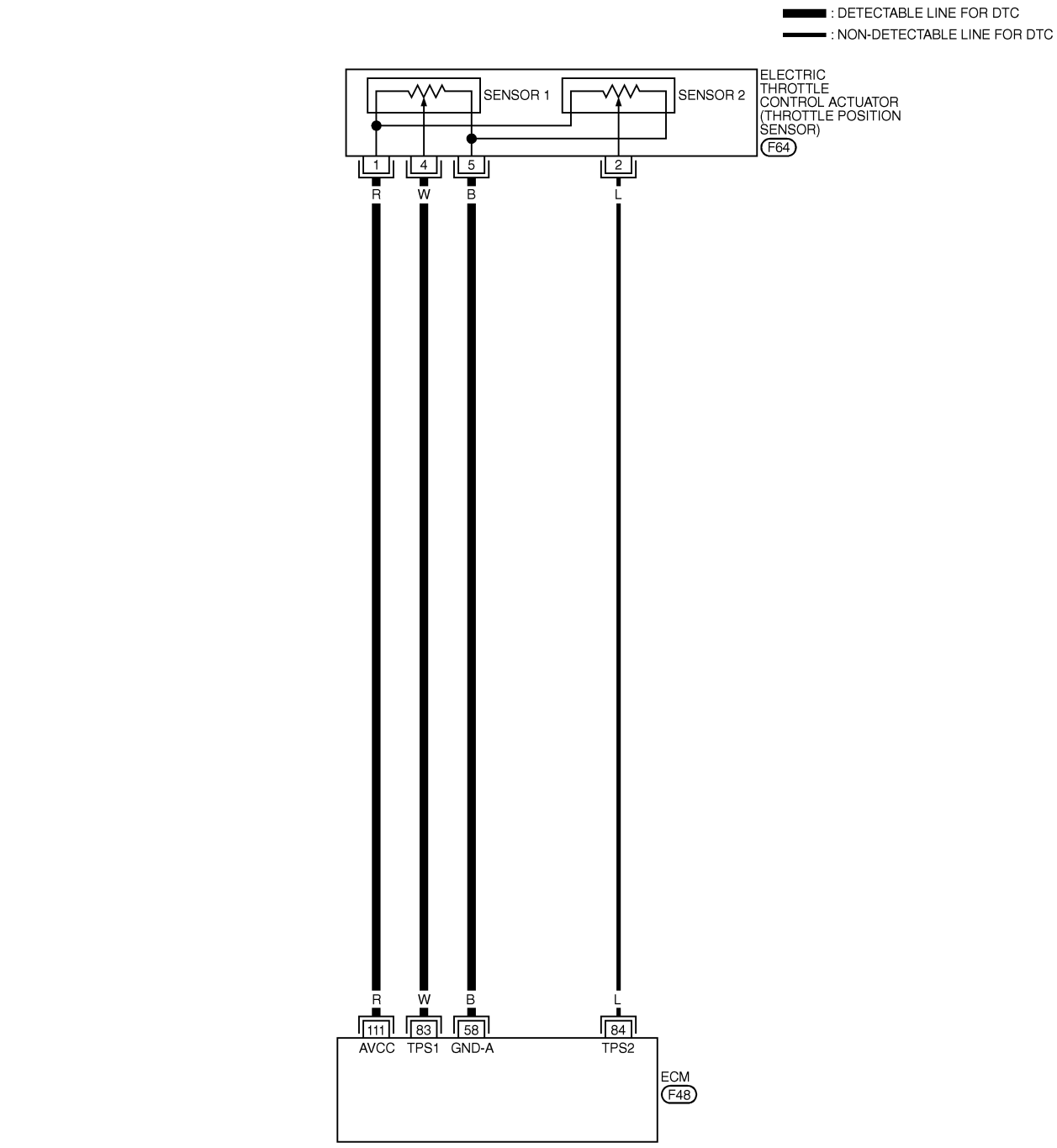
With GST

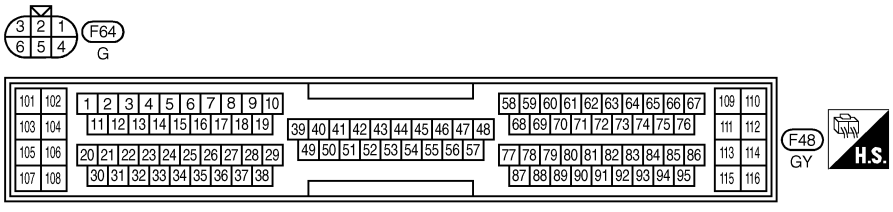
Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

NFEC1376

EC-TPS1-01





MEC700D

Wiring Diagram (Cont'd)

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.

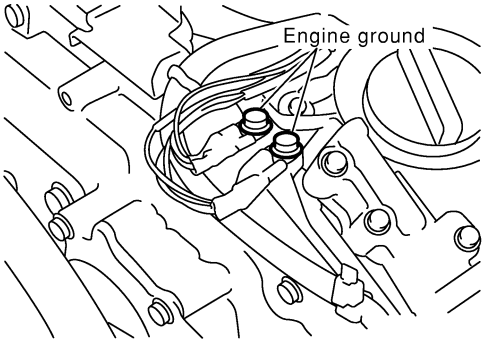
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
58	B	Sensors' ground	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
83	W	Throttle position sensor 1	**[Ignition switch "ON"]** ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully released	More than 0.36V
			[Ignition switch "ON"] ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully depressed	Less than 4.75V
84	L	Throttle position sensor 2	**[Ignition switch "ON"]** ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully released	Less than 4.75V
			[Ignition switch "ON"] ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully depressed	More than 0.36V
111	R	Sensor's power supply	**[Ignition switch "ON"]**	Approximately 5V

Diagnostic Procedure

NFEC1377

1	RETIGHTEN GROUND SCREWS

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

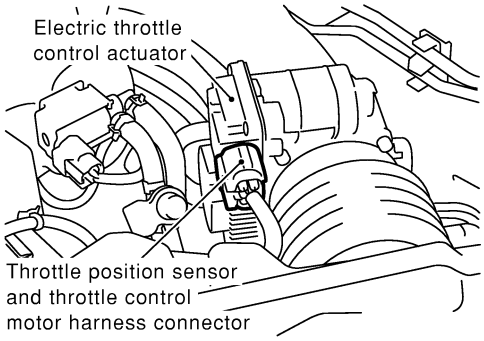


SEC047D

▶ GO TO 2.

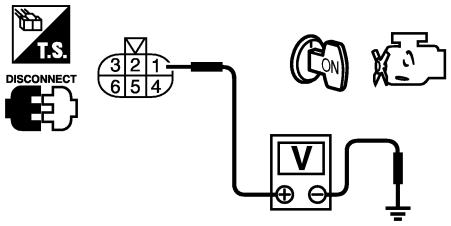
2	CHECK THROTTLE POSITION SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch "ON".



SEC054D

3. Check voltage between electric throttle control actuator terminal 1 and ground with CONSULT-II or tester.



PBIB0082E

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. Check harness continuity between electric throttle control actuator terminal 5 and engine ground.
   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	▶	GO TO 4.

4	DETECT MALFUNCTIONING PART

Check the following.
- Harness for open or short between electric throttle control actuator and ECM

	▶	Repair open circuit or short to ground or short to power in harness or connectors.

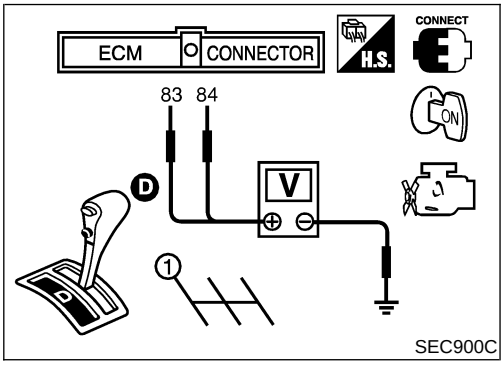
Diagnostic Procedure (Cont'd)

5	CHECK THROTTLE POSITION SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	
1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 83 and electric throttle control actuator terminal 4. 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 6.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

6	CHECK THROTTLE POSITION SENSOR	
Refer to "Component Inspection", EC-302.		
OK or NG		
OK	▶	GO TO 8.
NG	▶	GO TO 7.

7	REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR	
1. Replace the electric throttle control actuator. 2. Perform "Throttle Valve Closed Position Learning", EC-71. 3. Perform "Idle Air Volume Learning", EC-71.		
	▶	**INSPECTION END**

8	CHECK INTERMITTENT INCIDENT	
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.		
	▶	**INSPECTION END**



Component Inspection

NFEC1378

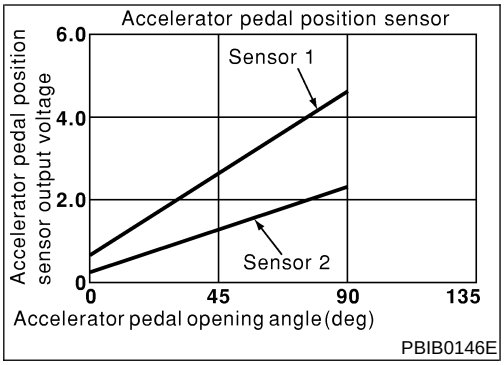
THROTTLE POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Perform "Throttle Valve Closed Position Learning", EC-71.
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 83 (TP sensor 1), 84 (TP sensor 2) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
83 (Throttle position sensor 1)	Fully released	More than 0.36V
	Fully depressed	Less than 4.75V
84 (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 "Throttle Valve Closed Position Learning", EC-71.

8. Perform "Idle Air Volume Learning", EC-71.



Component Description

NFEC1379

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

NFEC1380

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL SEN1	• Ignition switch: ON (engine stopped)	Accelerator pedal: Fully released	0.41 - 0.71V
		Accelerator pedal: Fully depressed	More than 3.7V
ACCEL SEN2	• Ignition switch: ON (engine stopped)	Accelerator pedal: Fully released	0.15 - 0.97V
		Accelerator pedal: Fully depressed	More than 3.5V
CLSD THL POS	• Ignition switch: ON	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF

On Board Diagnosis Logic

NFEC1438

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

NFEC1438S01

When the malfunction is detected, ECM enters in fail-safe mode and the MIL 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 an opening speed of approx. 5 seconds to an opening of 10 degrees. So, the acceleration will be poor.

DTC Confirmation Procedure

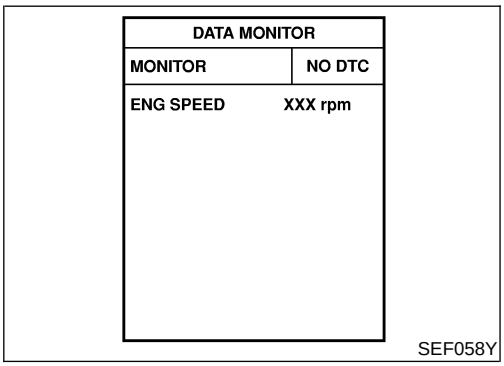
NFEC1439

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 “Diagnostic Procedure”, EC-307.

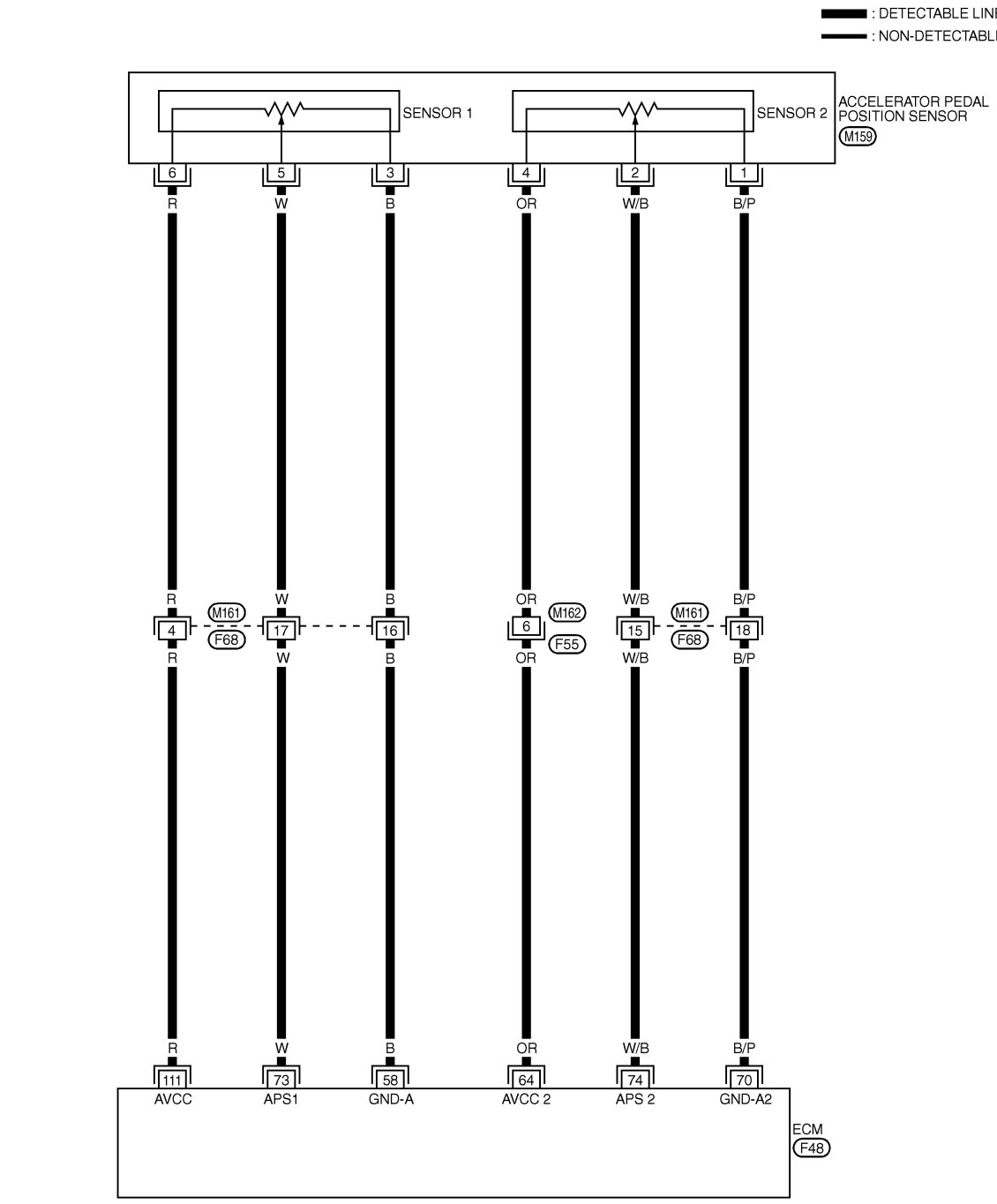
With GST

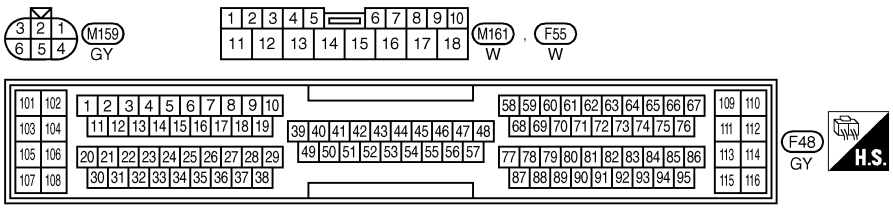
Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

NFEC1383

EC-APPS3-01





MEC925D

Wiring Diagram (Cont'd)

Specification data are reference values and are measured between each terminal and ground.

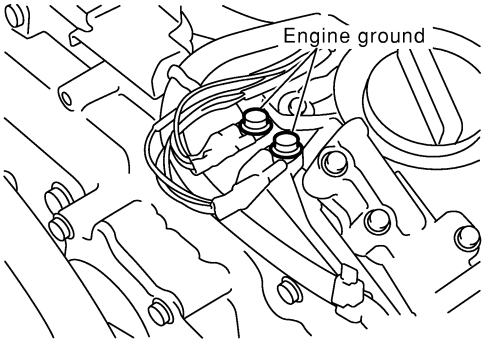
CAUTION:

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)
58	B	Sensors' ground	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
64	OR	Accelerator pedal position sensor 2 power supply	**[Ignition switch "ON"]**	Approximately 2.5V
70	B/P	Accelerator pedal position sensor 2 ground	**[Ignition switch "ON"]**	Approximately 0V
73	W	Accelerator pedal position sensor 1	**[Ignition switch "ON"]** ● Accelerator pedal fully released	0.41 - 0.71V
			[Ignition switch "ON"] ● Accelerator pedal fully depressed	More than 3.7V
74	W/B	Accelerator pedal position sensor 2	**[Ignition switch "ON"]** ● Accelerator pedal fully released	0.08 - 0.48V
			[Ignition switch "ON"] ● Accelerator pedal fully depressed	More than 1.8V
111	R	Sensor's power supply	**[Ignition switch "ON"]**	Approximately 5V

Diagnostic Procedure

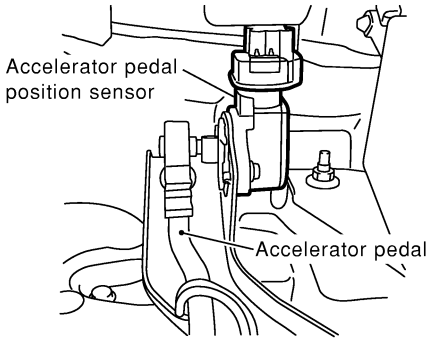
NFEC1384

1	RETIGHTEN GROUND SCREWS
1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.  SEC047D	
▶	GO TO 2.

Diagnostic Procedure (Cont'd)

2	CHECK APP SENSOR POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch "ON".

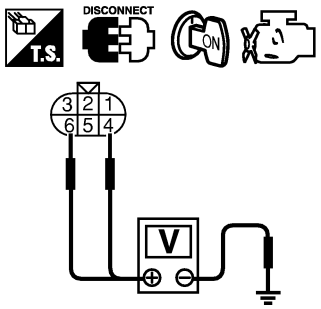


SEC081D

3. Check voltage between APP sensor terminals 4, 6 and ground with CONSULT-II or tester.

APP sensor terminal	Voltage (V)
4	Approximately 2.5
6	Approximately 5

MTBL1167



SEC092D

OK or NG

OK	▶	GO TO 4.
NG	▶	GO TO 3.

3	DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors M161, F68
- Harness connectors M162, F55
- Harness for open or short between ECM and accelerator pedal position sensor

OK	▶	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. Check harness continuity between APP sensor terminals 1, 3 and engine ground.
   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 6.
NG	▶	GO TO 5.

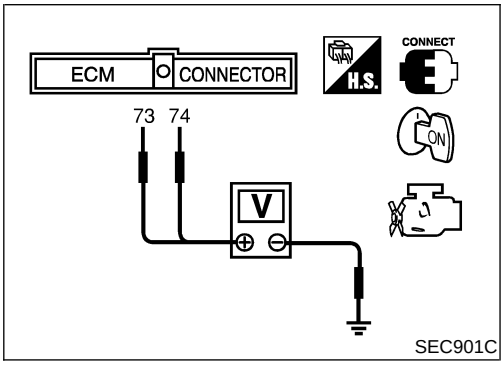
5	DETECT MALFUNCTIONING PART
Check the following. ● Harness connectors M161, F68 ● Harness for open or short between ECM and accelerator pedal position sensor	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

6	CHECK APP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 73 and APP sensor terminal 5, ECM terminal 74 and APP sensor terminal 2. 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 ▶	GO TO 7.

7	DETECT MALFUNCTIONING PART
Check the following. ● Harness connectors M161, F68 ● 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 "Component Inspection", EC-309.	
OK or NG	
OK ▶	GO TO 9.
NG ▶	Replace accelerator pedal assembly.

9	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.	
▶	**INSPECTION END**



Component Inspection

NFEC1385

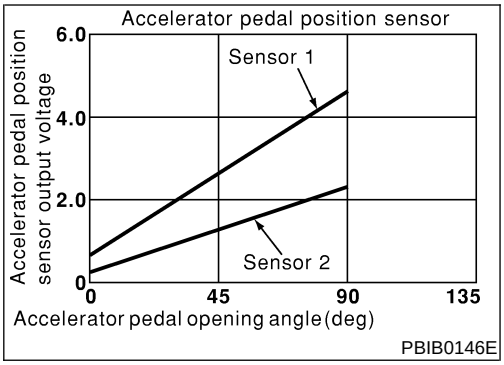
ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch "ON".
3. Check voltage between ECM terminals 73 (APP sensor 1 signal), 74 (APP sensor 2 signal) and engine ground under the following conditions.

Component Inspection (Cont'd)

Terminal	Accelerator pedal	Voltage
73 (Accelerator pedal position sensor 1)	Fully released	0.41 - 0.71V
	Fully depressed	More than 3.7V
74 (Accelerator pedal position sensor 2)	Fully released	0.08 - 0.48V
	Fully depressed	More than 1.8V

4. If NG, replace accelerator pedal assembly.
5. Perform "Accelerator Pedal Released Position Learning", EC-71.
6. Perform "Throttle Valve Closed Position Learning", EC-71.
7. Perform "Idle Air Volume Learning", EC-71.



Component Description

NFEC1386

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

NFEC1387

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL SEN1	• Ignition switch: ON (engine stopped)	Accelerator pedal: Fully released	0.41 - 0.71V
		Accelerator pedal: Fully depressed	More than 3.7V
ACCEL SEN2	• Ignition switch: ON (engine stopped)	Accelerator pedal: Fully released	0.15 - 0.97V
		Accelerator pedal: Fully depressed	More than 3.5V
CLSD THL POS	• Ignition switch: ON	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF

On Board Diagnosis Logic

NFEC1440

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

=NFEC1440S01

When the malfunction is detected, ECM enters in fail-safe mode and the MIL 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 an opening speed of approx. 5 seconds to an opening of 10 degrees. So, the acceleration will be poor.

DTC Confirmation Procedure

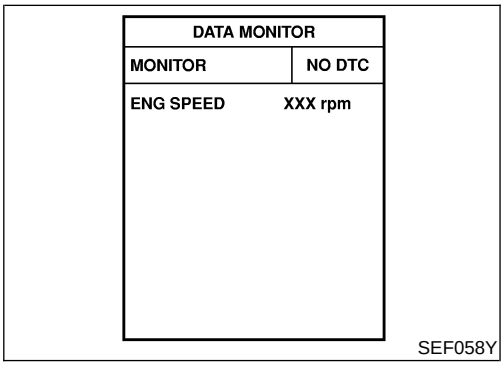
NFEC1441

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 "Diagnostic Procedure", EC-314.

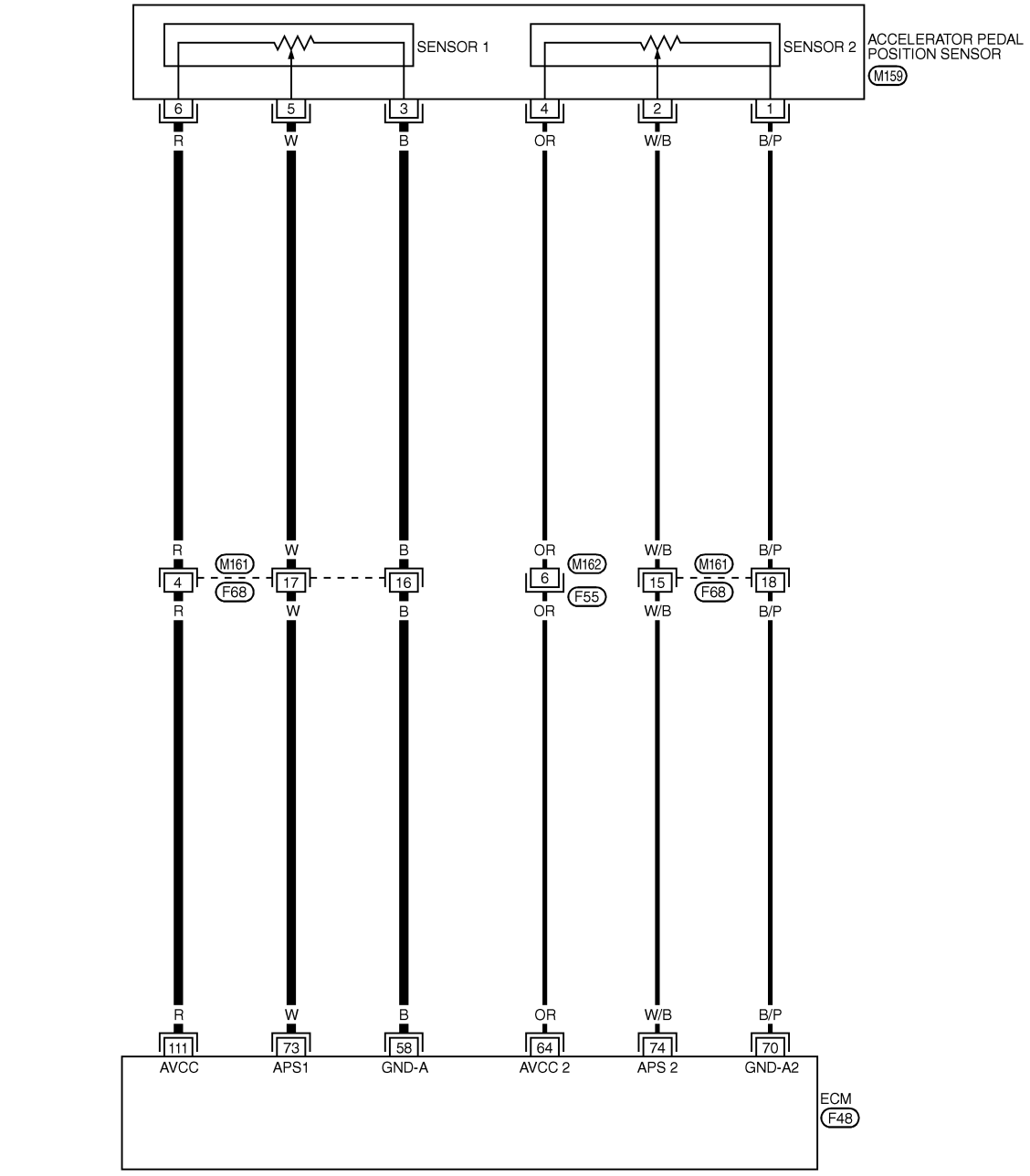
With GST

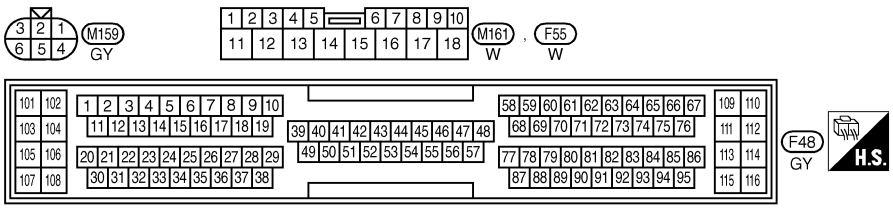
Follow the procedure "WITH CONSULT-II" above.

Wiring Diagram

NFEC1390

EC-APPS1-01





MEC926D

Wiring Diagram (Cont'd)

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.

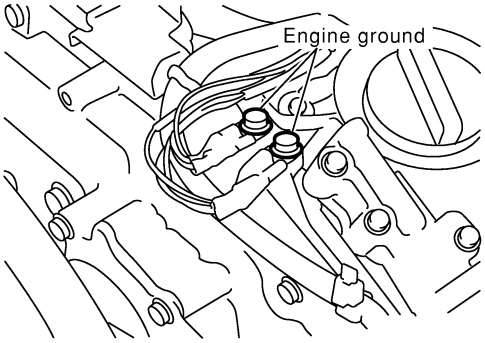
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
58	B	Sensors' ground	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
64	OR	Accelerator pedal position sensor 2 power supply	**[Ignition switch "ON"]**	Approximately 2.5V
70	B/P	Accelerator pedal position sensor 2 ground	**[Ignition switch "ON"]**	Approximately 0V
73	W	Accelerator pedal position sensor 1	**[Ignition switch "ON"]** ● Accelerator pedal fully released	0.41 - 0.71V
			[Ignition switch "ON"] ● Accelerator pedal fully depressed	More than 3.7V
74	W/B	Accelerator pedal position sensor 2	**[Ignition switch "ON"]** ● Accelerator pedal fully released	0.08 - 0.48V
			[Ignition switch "ON"] ● Accelerator pedal fully depressed	More than 1.8V
111	R	Sensor's power supply	**[Ignition switch "ON"]**	Approximately 5V

Diagnostic Procedure

NFEC1391

1	RETIGHTEN GROUND SCREWS

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

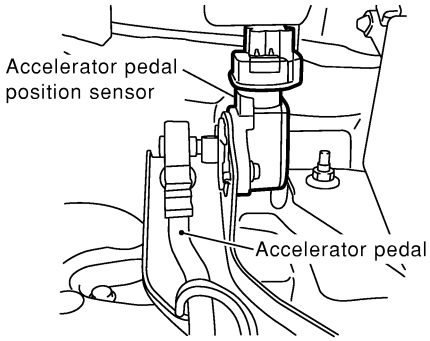


SEC047D

▶ GO TO 2.

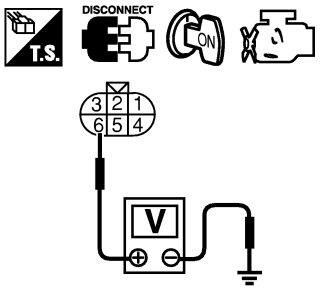
2	CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch "ON".



SEC081D

3. Check voltage between APP sensor terminals 6 and ground with CONSULT-II or tester.



SEC093D

Voltage: Approximately 5V

OK or NG

OK	▶	GO TO 4.
NG	▶	GO TO 3.

3	DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors M161, F68
- 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. Check harness continuity between APP sensor terminal 3 and engine ground.
   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 6.
NG	▶	GO TO 5.

5	DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors M161, F68
- 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.

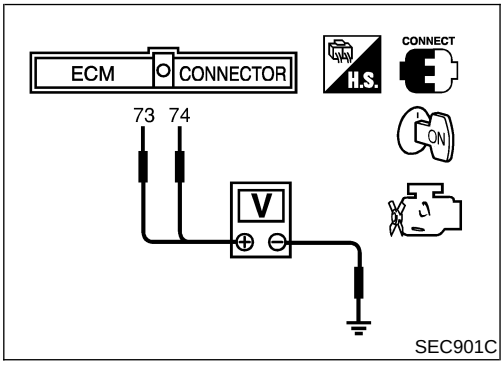
Diagnostic Procedure (Cont'd)

6	CHECK APP SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 73 and APP sensor terminal 5. 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 ▶	GO TO 7.

7	DETECT MALFUNCTIONING PART
Check the following. ● Harness connectors M161, F68 ● 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 "Component Inspection", EC-316. **OK or NG**	
OK ▶	GO TO 9.
NG ▶	Replace accelerator pedal assembly.

9	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.	
▶	**INSPECTION END**



Component Inspection

NFEC1442

ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch "ON".
3. Check voltage between ECM terminals 73 (APP sensor 1 signal), 74 (APP sensor 2 signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
73 (Accelerator pedal position sensor 1)	Fully released	0.41 - 0.71V
	Fully depressed	More than 3.7V
74 (Accelerator pedal position sensor 2)	Fully released	0.08 - 0.48V
	Fully depressed	More than 1.8V

4. If NG, replace accelerator pedal assembly.
5. Perform "Accelerator Pedal Released Position Learning", EC-71.
6. Perform "Throttle Valve Closed Position Learning", EC-71.
7. Perform "Idle Air Volume Learning", EC-71.

On Board Diagnosis Logic

NFEC0929

When a misfire occurs, engine speed will fluctuate. If the engine speed fluctuates enough to cause the CKP sensor 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 MIL will blink.
   When a misfire condition occurs, the ECM monitors the CKP sensor signal every 200 engine revolutions for a change.
   When the misfire condition decreases to a level that will not damage the TWC, the MIL will turn off.
   If another misfire condition occurs that can damage the TWC on a second trip, the MIL will blink.
   When the misfire condition decreases to a level that will not damage the TWC, the MIL will remain on.
   If another misfire condition occurs that can damage the TWC, the MIL 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 MIL 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 cylinders misfire, No. 1 cylinder misfires, No. 2 cylinder misfires, No. 3 cylinder misfires, No. 4 cylinder misfires, No. 5 cylinder misfires and No. 6 cylinder misfires.	• Improper spark plug • Insufficient compression • Incorrect fuel pressure • The injector circuit is open or shorted • Injectors • Intake air leak • The ignition secondary 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		
P0302 0302	No. 2 cylinder misfire detected		
P0303 0303	No. 3 cylinder misfire detected		
P0304 0304	No. 4 cylinder misfire detected		
P0305 0305	No. 5 cylinder misfire detected		
P0306 0306	No. 6 cylinder misfire detected		

4

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h
P/N POSI SW	OFF
B/FUEL SCHDL	XXX msec

SEF213Y

DTC Confirmation Procedure

NFEC0930

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

NFEC0930S01

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) Start engine again and drive at 1,500 to 3,000 rpm for at least 3 minutes.
   Hold the accelerator pedal as steady as possible.

NOTE:

Refer to the freeze frame data for the test driving conditions.

5) If 1st trip DTC is detected, go to “Diagnostic Procedure”, EC-318.

WITH GST

NFEC0930S02

Follow the procedure “With CONSULT-II” above.

Diagnostic Procedure

NFEC0931

1	CHECK FOR INTAKE AIR LEAK	
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	▶	Discover air leak location and repair.

2	CHECK FOR EXHAUST SYSTEM CLOGGING	
1. 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 it.

3	PERFORM POWER BALANCE TEST

With CONSULT-II

1. Perform "POWER BALANCE" in "ACTIVE TEST" mode.

ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS AIF SE-B1	XXX V

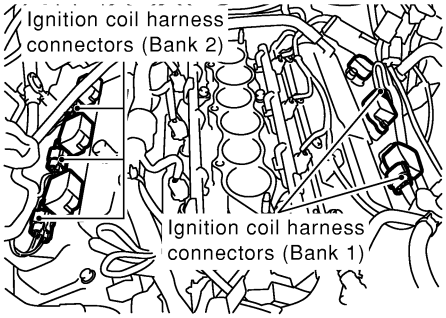
SEC136D

2. Is there any cylinder which does not produce a momentary engine speed drop?

Without CONSULT-II

When disconnecting each ignition coil harness connector one at a time, is there any cylinder which does not produce a momentary engine speed drop?

View with intake manifold collector removed



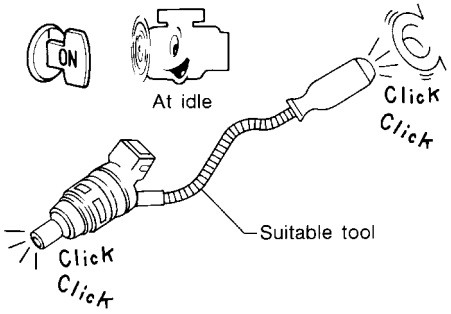
SEC120D

Yes or No

Yes	▶	GO TO 5.
No	▶	GO TO 4.

4	CHECK INJECTOR

Does each injector make an operating sound at idle?



MEC703B

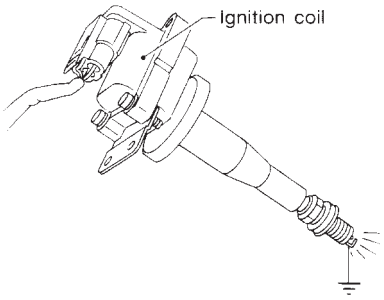
Yes or No

Yes	▶	GO TO 5.
No	▶	Check injector(s) and circuit(s). Refer to EC-703.

Diagnostic Procedure (Cont'd)

5	CHECK IGNITION SPARK

1. Disconnect ignition wire from spark plug.
2. Connect a known good spark plug to the ignition wire.
3. Place end of spark plug against a suitable ground and crank engine.
4. Check for spark.



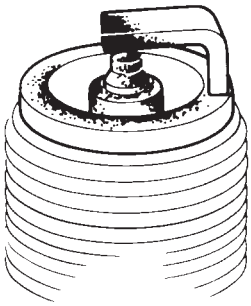
SEF575Q

OK or NG

OK	▶	GO TO 6.
NG	▶	Check ignition coil, power transistor and their circuits. Refer to "IGNITION SIGNAL", EC-692.

6	CHECK SPARK PLUGS

Remove the spark plugs and check for fouling, etc.



SEF156I

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-17, "Changing Spark Plugs".

7	CHECK COMPRESSION PRESSURE

Check compression pressure. Refer to EM-13, "Measurement of Compression Pressure".

Standard:

1,275 kPa (13.0 kg/cm^2, 185 psi)/300 rpm

Minimum:

981 kPa (10.0 kg/cm^2, 142 psi)/300 rpm

Difference between each cylinder:

98 kPa (1.0 kg/cm^2, 14 psi)/300 rpm

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-56. 3. Install fuel pressure gauge and check fuel pressure. Refer to EC-56. **At idle:** **Approx. 350 kPa (3.7 kg/cm^2, 51 psi)**		
OK or NG		
OK	▶	GO TO 9.
NG	▶	Follow the construction of "Fuel Pressure Check", EC-56.

9	CHECK IGNITION TIMING	
Check the following items. Refer to "Basic Inspection", EC-123.		

Items	Specifications
Ignition timing	15° ± 5° BTDC
Target idle speed	M/T: 625 ± 50 rpm A/T: 675 ± 50 rpm (in "P" or "N" position)

MTBL1186

OK or NG		
OK (With CONSULT-II)	▶	GO TO 10.
OK (Without CONSULT-II)	▶	GO TO 11.
NG	▶	Follow the "Basic Inspection".

Diagnostic Procedure (Cont'd)

10	CHECK HEATED OXYGEN SENSOR 1

With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "MANU TRIG" and "HI SPEED" in "DATA MONITOR" mode with CONSULT-II, and select "HO2S1 (B1)/(B2)" and "HO2S1 MNTR (B1)/(B2)".
3. Hold engine speed at 2,000 rpm under no load during the following steps.
4. Touch "RECORD" on CONSULT-II screen.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
HO2S1 (B1)	XXX V
HO2S2 (B2)	XXX V

SEF967Y

5. Check the following.

- "HO2S1 MNTR (B1)/(B2)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" 5 times in 10 seconds. 5 times (cycles) are counted as shown left:

Bank 1

cycle	1	2	3	4	5
HO2S1 MNTR (B1)	R-L	R-L	R-L	R-L	R-L

Bank 2

cycle	1	2	3	4	5
HO2S1 MNTR (B2)	R-L	R-L	R-L	R-L	R-L

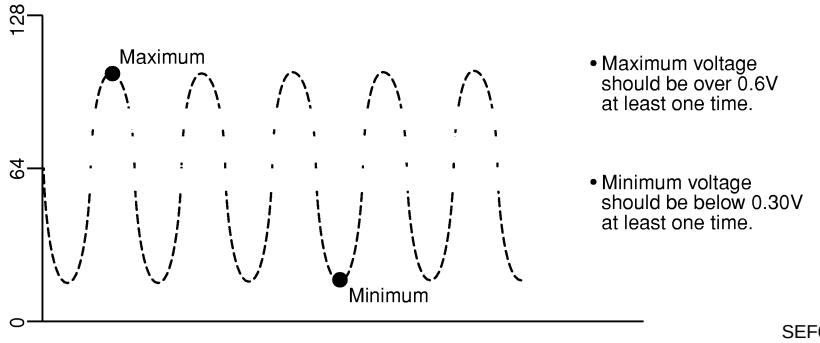
R means HO2S1 MNTR (B1)/(B2) indicates RICH

L means HO2S1 MNTR (B1)/(B2) indicates LEAN

SEF647Y

- "HO2S1 (B1)/(B2)" voltage goes above 0.6V at least once.
- "HO2S1 (B1)/(B2)" voltage goes below 0.3V at least once.
- "HO2S1 (B1)/(B2)" 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



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.**

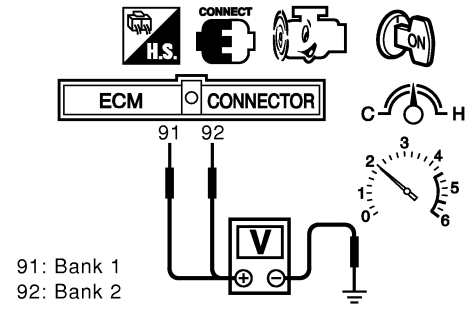
OK or NG

OK	▶	GO TO 12.
NG	▶	Replace malfunctioning heated oxygen sensor 1.

11	CHECK HEATED OXYGEN SENSOR 1

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 91 (HO2S1 bank 1 signal) or 92 (HO2S1 bank 2 signal) and engine ground.
3. Check the following with engine speed held at 2,000 rpm constant under no load.



91: Bank 1
92: Bank 2

- 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

SEC109D

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.**

OK or NG

OK	▶	GO TO 12.
NG	▶	Replace malfunctioning heated oxygen sensor 1.

12	CHECK MASS AIR FLOW SENSOR

With CONSULT-II

Check mass air flow sensor signal in "DATA MONITOR" mode with CONSULT-II.

2.0 - 6.0 g·m/sec: at idling
7.0 - 20.0 g·m/sec: at 2,500 rpm

With GST

Check mass air flow sensor signal in MODE 1 with GST.

2.0 - 6.0 g·m/sec: at idling
7.0 - 20.0 g·m/sec: at 2,500 rpm

OK or NG

OK	▶	GO TO 13.
NG	▶	Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or engine grounds. Refer to EC-195.

13	CHECK SYMPTOM MATRIX CHART

Check items on the rough idle symptom in "Symptom Matrix Chart", EC-131.

OK or NG

OK	▶	GO TO 14.
NG	▶	Repair or replace.

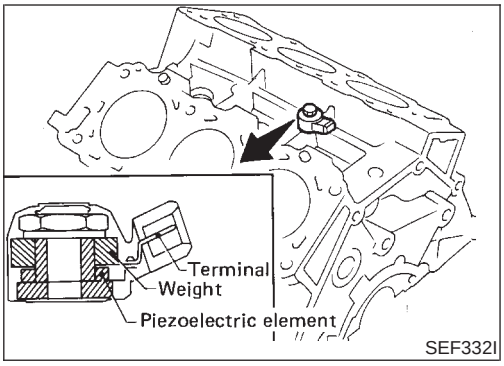
14	ERASE THE 1ST TRIP DTC

Erase the 1st trip DTC from the ECM memory after performing the tests. Refer to EC-91.
Some tests may cause a 1st trip DTC to be set.

	▶	GO TO 15.

Diagnostic Procedure (Cont'd)

15	**CHECK INTERMITTENT INCIDENT**
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.	
▶	**INSPECTION END**



Component Description

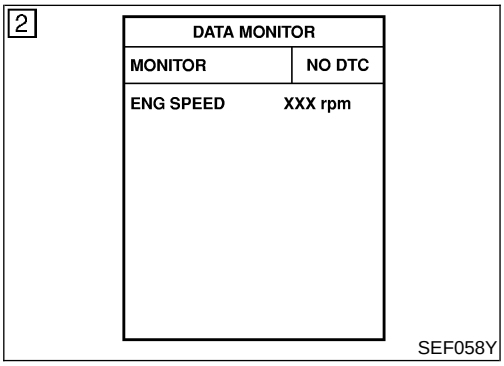
NFEC0932

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.
Freeze frame data will not be stored in the ECM for the knock sensor. The MIL will not light for knock sensor malfunction.

On Board Diagnosis Logic

NFEC0934

DTC No.	Trouble diagnosis name	DTC Detecting 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

NFEC0935

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

NFEC0935S01

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 “Diagnostic Procedure”, EC-327.

WITH GST

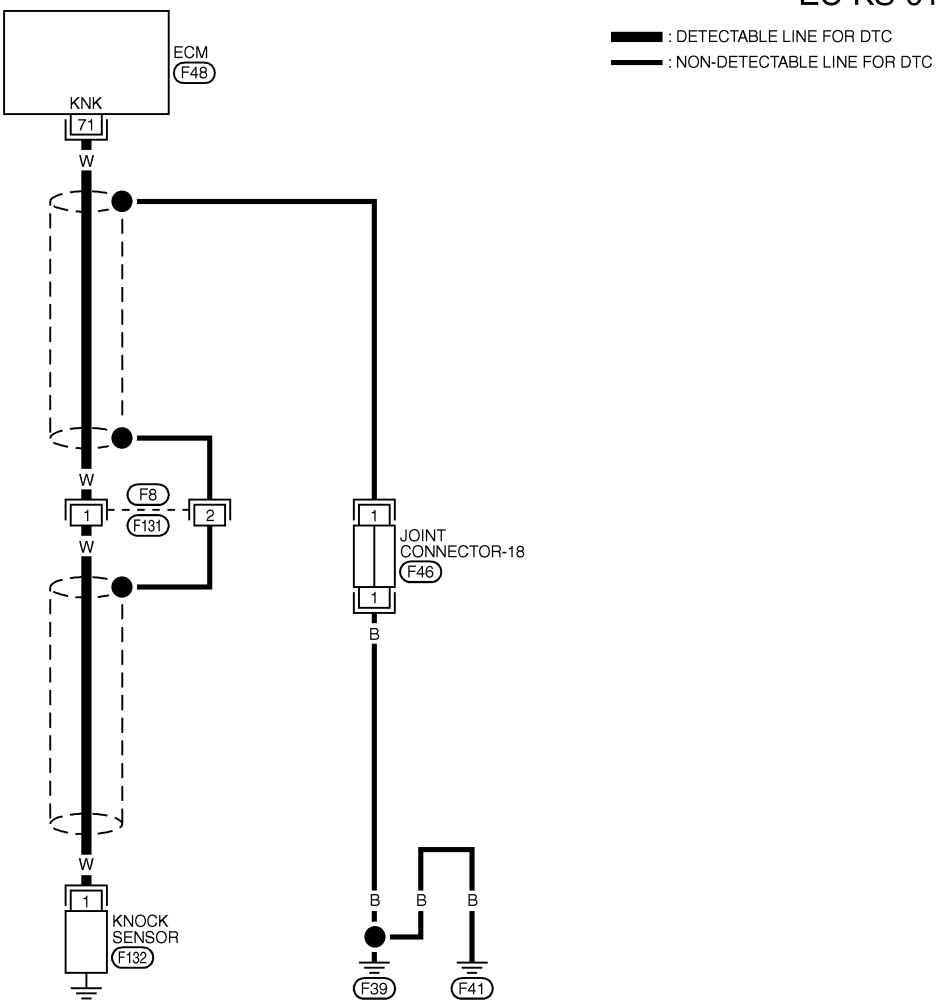
NFEC0935S03

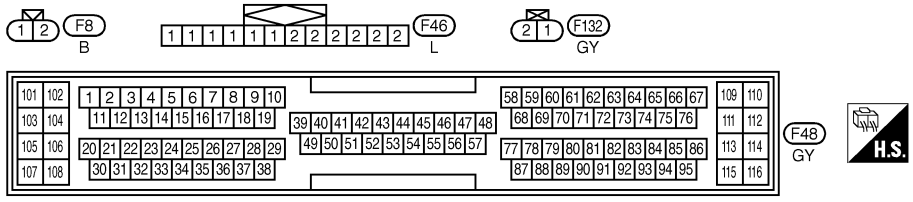
Follow the procedure “With CONSULT-II” above.

Wiring Diagram

NFEC0936

EC-KS-01





MEC492D

ECM TERMINALS AND REFERENCE VALUE 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	WIRE COLOR	ITEM	CONDITION	DATA (DC)
71	W	KNOCK SENSOR	ENGINE RUNNING AT IDLE SPEED	APPROX. 2.5V

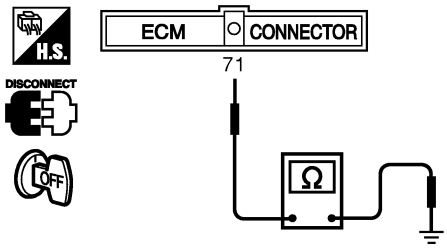
SEC117D

Diagnostic Procedure

NFEC0937

1	CHECK KNOCK SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT-I

1. Turn ignition switch “OFF”.
2. Disconnect ECM harness connector.
3. Check resistance between ECM terminal 71 and engine ground.
   NOTE:
   It is necessary to use an ohmmeter which can measure more than 10 MΩ.



Resistance:
Approximately 500 - 620 kΩ
[at 25°C (77°F)]

SEC118D

4. Also check harness for short to ground and short to power.

OK or NG

OK	▶	GO TO 5.
NG	▶	GO TO 2.

2	CHECK KNOCK SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT-II

1. Disconnect knock sensor harness connector.
2. Check harness continuity between ECM terminal 71 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 4.
NG	▶	GO TO 3.

3	DETECT MALFUNCTIONING PART

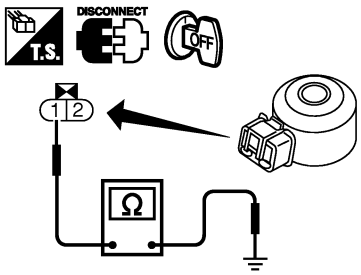
Check the following.
- Harness connectors F8, F131
- Harness for open or short between ECM and knock sensor

	▶	Repair open circuit or short to ground or short to power in harness or connectors.

Diagnostic Procedure (Cont'd)

4	CHECK 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: 500 - 620 kΩ [at 25°C (77°F)]

SEC119D

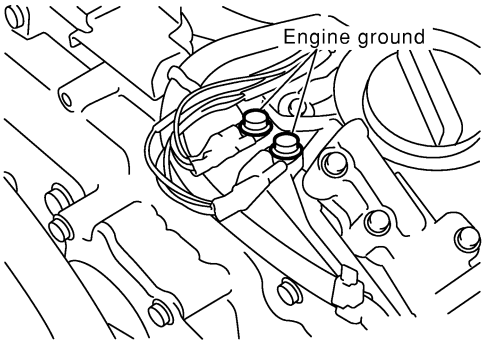
CAUTION:
Do not use any knock sensors that have been dropped or physically damaged. Use only new ones.

OK or NG

OK	▶	GO TO 8.
NG	▶	Replace knock sensor.

5	RETIGHTEN GROUND SCREWS

Loose and retighten engine ground screws.



SEC047D

	▶	GO TO 6.

6	CHECK KNOCK SENSOR SHIELD CIRCUIT FOR OPEN AND SHORT

1. Disconnect harness connectors F8, F131.
2. Check harness continuity between harness connector F8 terminal 2 and engine ground.
   Continuity should exist.
3. Also check harness for short to power.

OK or NG

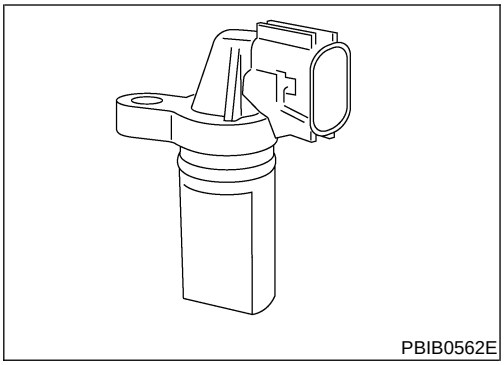
OK	▶	GO TO 8.
NG	▶	GO TO 7.

7	DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F8, F131
- Joint connector-18
- Harness for open or short between harness connector F8 and engine ground

	▶	Repair open circuit or short to power in harness or connectors.

8	**CHECK INTERMITTENT INCIDENT**
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.	
▶	**INSPECTION END**



PBIB0562E

Component Description

NFEC0938

The crankshaft position sensor (POS) is located on the oil pan 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 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.

CONSULT-II Reference Value in Data Monitor Mode

NFEC0939

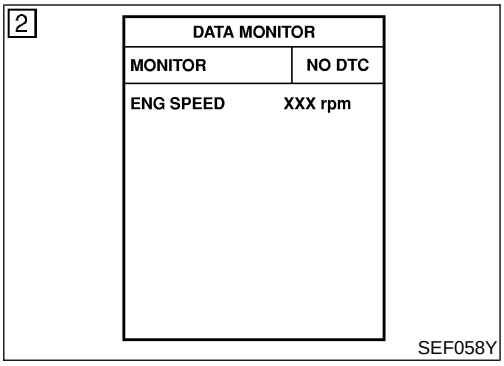
Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
ENG SPEED	• Tachometer: Connect • Run engine and compare tachometer indication with the CONSULT-II value.	Almost the same speed as the CONSULT-II value.

On Board Diagnosis Logic

NFEC0941

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0335 0335	Crankshaft position sensor (POS) circuit	• The crankshaft position sensor 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 signal is not in the normal pattern during engine running.	• Harness or connectors [The crankshaft position sensor (POS) circuit is open or shorted.] • Crankshaft position sensor (POS) • Signal plate



DTC Confirmation Procedure

=NFEC0942

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 "Diagnostic Procedure", EC-333.
   If 1st trip DTC is not detected, go to next step.
4) Maintaining engine speed at more than 1,000 rpm for at least 5 seconds.
5) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-333

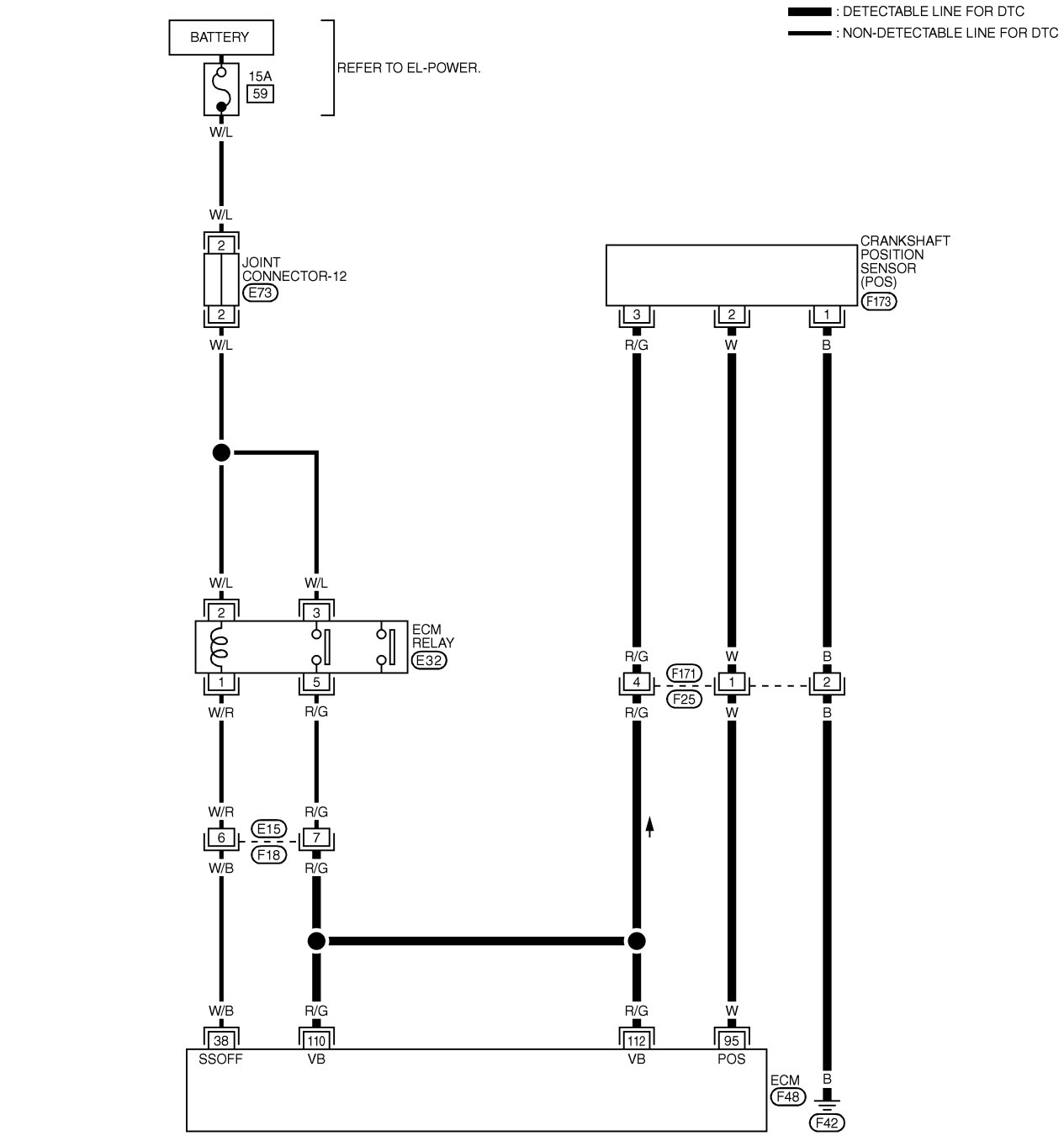
With GST

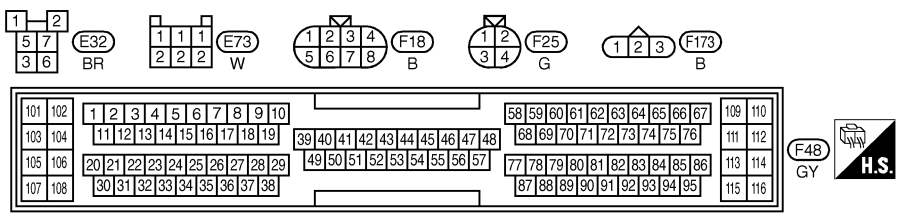
Follow the procedure "With CONSULT-II" above.

Wiring Diagram

NFEC0943

EC-POS-01



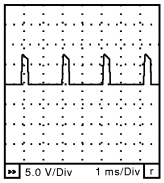
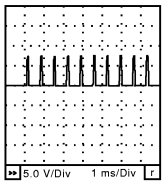


MEC493D

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

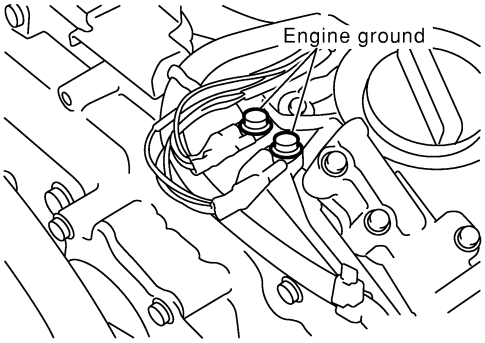
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
95	W	Crankshaft position sensor (POS)	**[Engine is running]** ● Idle speed	Approximately 2.4V★  SEC035D
			[Engine is running] ● Engine speed is 2,000 rpm.	Approximately 2.3V★  SEC036D

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnostic Procedure

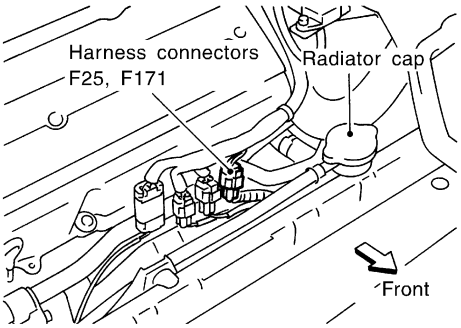
NFEC0944

1	RETIGHTEN GROUND SCREWS
1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.  SEC047D	
▶	GO TO 2.

Diagnostic Procedure (Cont'd)

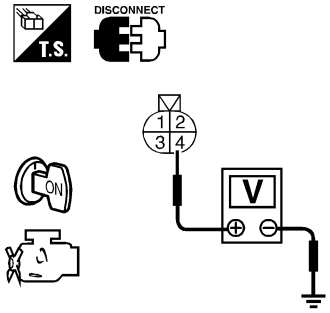
2	CHECK CKP SENSOR (POS) POWER SUPPLY CIRCUIT

1. Disconnect harness connectors F25, F171.



SEF511WB

2. Turn ignition switch "ON".
3. Check voltage between harness connector F25 terminal 4 and ground with CONSULT-II or tester.



Voltage: Battery voltage

SEF323X

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 F25, F171 and E15, F18
- Harness for open or short between ECM and harness connector F25
- Harness for open or short between ECM relay and harness connector F25

	▶	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. Check harness continuity between harness connector F25 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 6.
NG	▶	GO TO 5.

5	DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F25, F171
- Harness for open between harness connector F25 and ground

	▶	Repair open circuit or short to power in harness or connectors.

6	CHECK CKP SENSOR (POS) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 95 and harness connector F25 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 8.
NG	▶	GO TO 7.

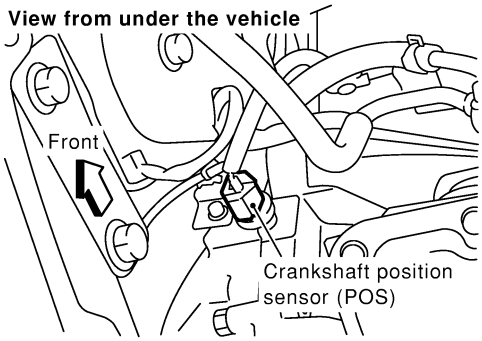
7	DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F25, F171
- Harness for open or short between ECM and harness connector F25

	▶	Repair open circuit or short to ground or short to power in harness or connectors.

8	CHECK CKP SENSOR (POS) SUB-HARNESS CIRCUIT FOR OPEN AND SHORT

1. Disconnect CKP sensor (POS) harness connector.



SEC137D

2. Check harness continuity between CKP sensor (POS) terminals and harness connector F171 terminals as follows.

CKP sensor (POS) terminal	Harness connector F171 terminal
1	2
2	1
3	4

MTBL1191

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

OK	▶	GO TO 9.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

9	CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to "Component Inspection", EC-336.

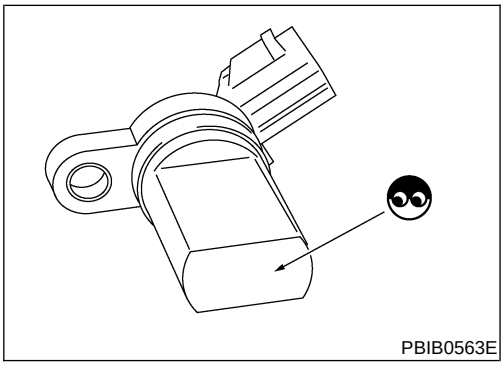
OK or NG

OK	▶	GO TO 10.
NG	▶	Replace crankshaft position sensor (POS).

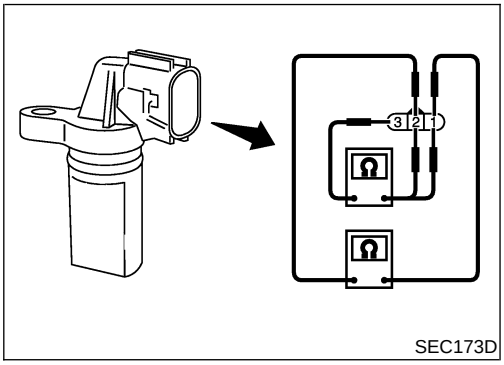
Diagnostic Procedure (Cont'd)

10	CHECK GEAR TOOTH	
Visually check for chipping signal plate gear tooth. **OK or NG**		
OK	▶	GO TO 11.
NG	▶	Replace the signal plate.

11	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.	
▶	**INSPECTION END**



PBIB0563E



SEC173D

Component Inspection

NFEC1415

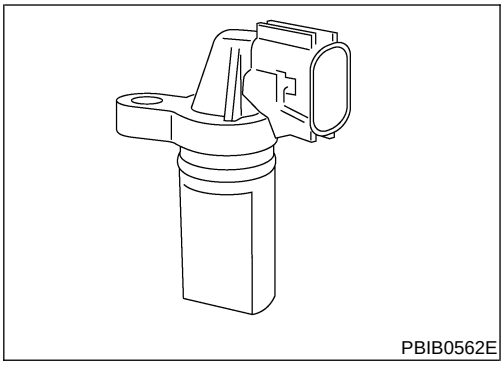
CRANKSHAFT POSITION SENSOR (POS)

NFEC1415S01

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)]
1 (+) - 2 (−)	Except 0 or ∞
1 (+) - 3 (−)	
2 (+) - 3 (−)	


PBIB0562E

Component Description

NFEC0945

The camshaft position sensor (PHASE) senses the retraction with intake valve camshaft to identify a particular cylinder. The crankshaft position sensor (POS) 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.

On Board Diagnosis Logic

NFEC0947

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0340 0340 (Bank 1) P0345 0345 (Bank 2)	Camshaft position sensor circuit	• The cylinder No. signal is not sent to ECM for the first few seconds during engine cranking. • The cylinder No. signal is not sent to ECM during engine running. • The cylinder No. signal is not in the normal pattern during engine running.	• Harness or connectors [The camshaft position sensor (PHASE) circuit is open or shorted.] • Camshaft position sensor (PHASE) • Camshaft (Intake) • Starter motor (Refer to SC section.) • Starting system circuit (Refer to SC section.) • Dead (Weak) battery

DTC Confirmation Procedure

NFEC0948

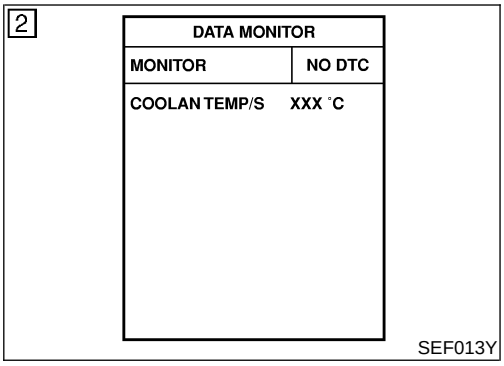
NOTE:

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”.

DTC Confirmation Procedure (Cont'd)



WITH CONSULT-II

NFEC0948S03

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 "Diagnostic Procedure", EC-342. If 1st trip DTC is not detected, go to next step.
5) Maintaining engine speed at more than 1,000 rpm for at least 5 seconds.
6) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-342.

WITH GST

NFEC0948S04

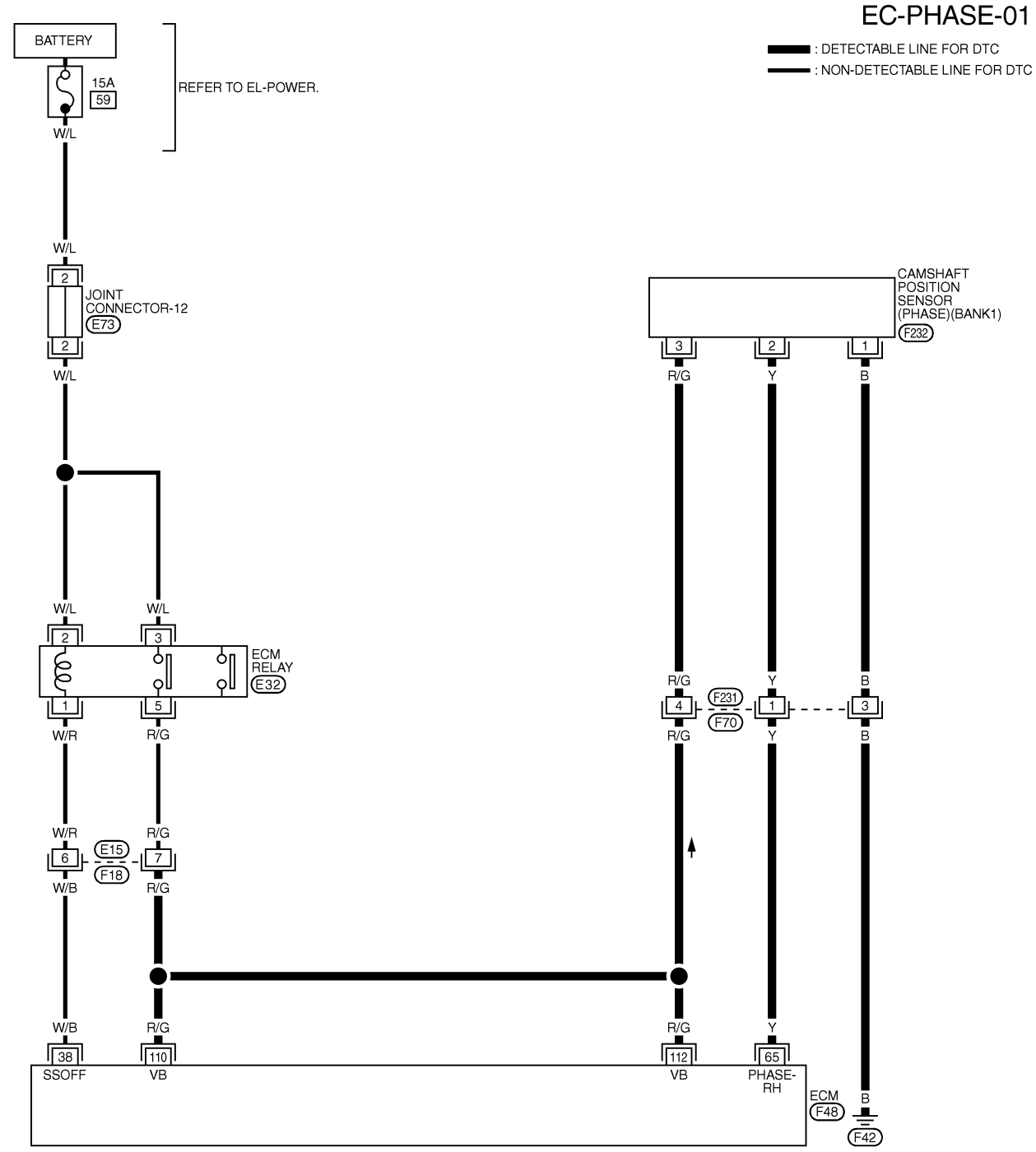
Follow the procedure "With CONSULT-II" above.

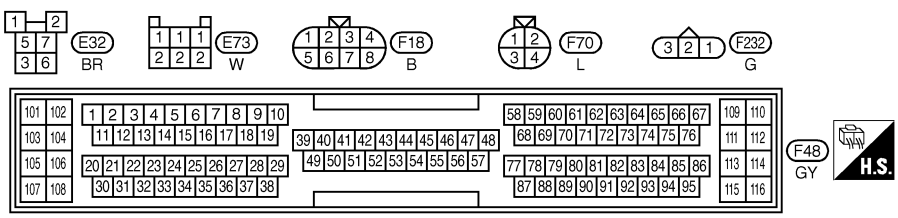
Wiring Diagram

NFEC0949

BANK 1

NFEC0949S01





MEC507D

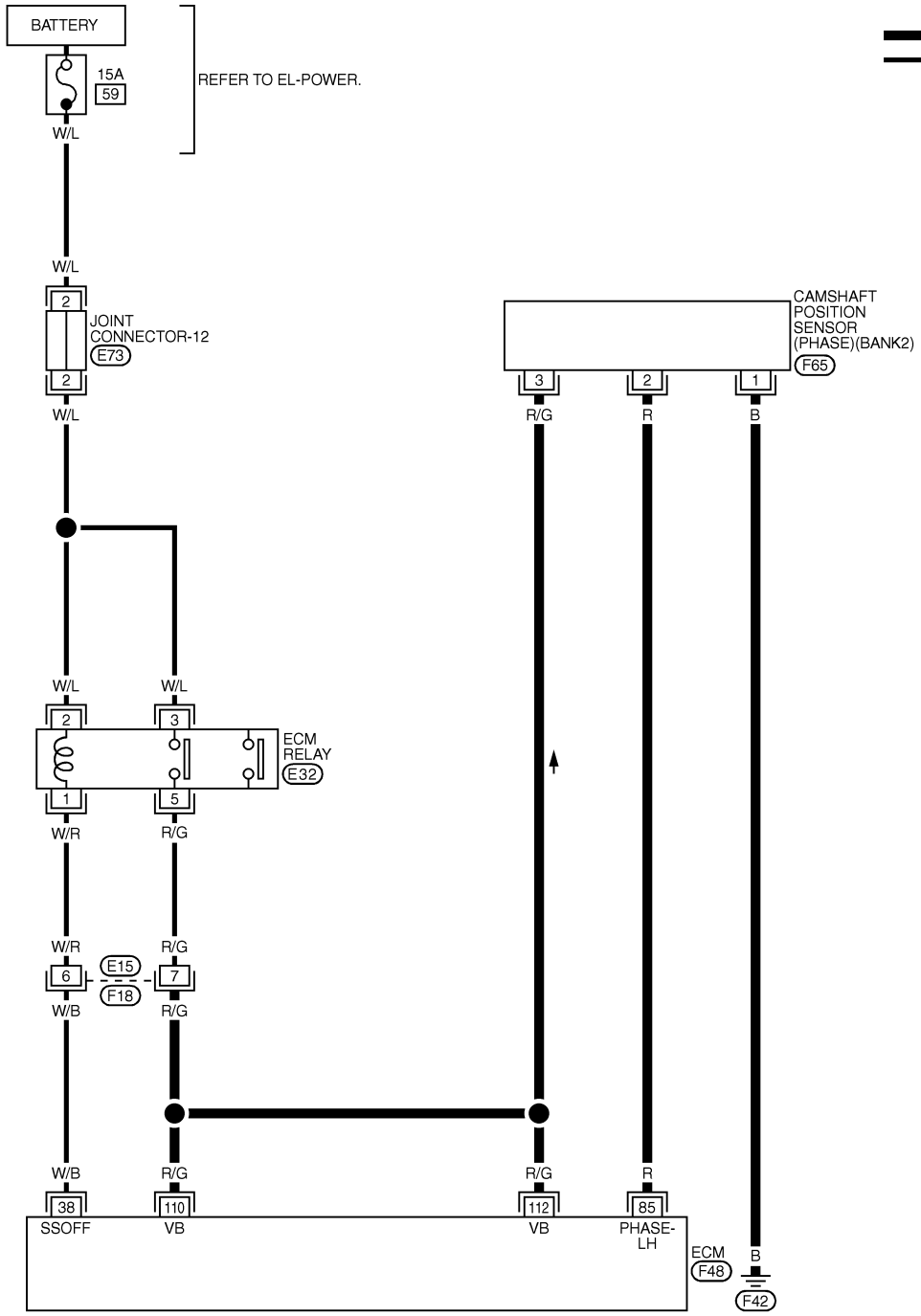
Wiring Diagram (Cont'd)

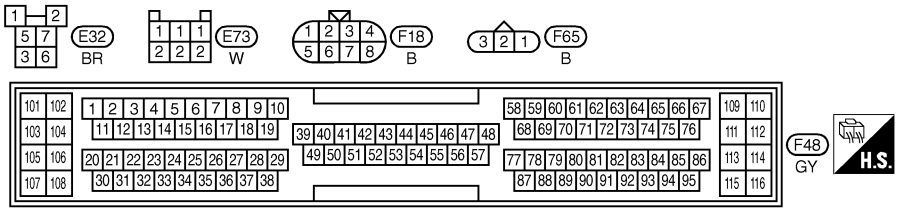
BANK 2

NFEC0949S02

EC-PHASE-02

: DETECTABLE LINE FOR DTC
: NON-DETECTABLE LINE FOR DTC



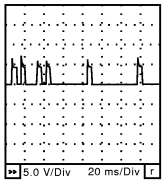
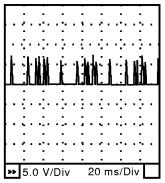
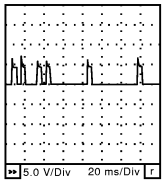
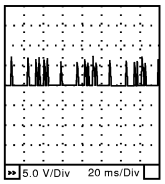


MEC506D

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.

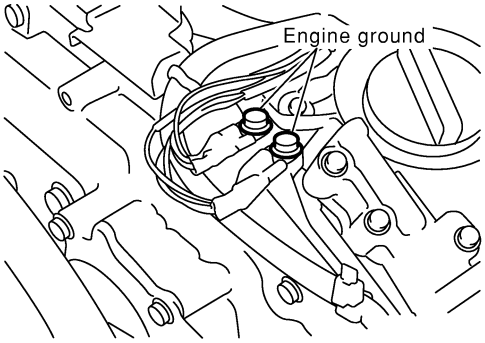
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
65	Y	Camshaft position sensor (PHASE) (Bank 1)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	BATTERY VOLTAGE (11 - 14V)★  SEC033D
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm.	BATTERY VOLTAGE (11 - 14V)★  SEC034D
85	R	Camshaft position sensor (PHASE) (Bank 2)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	BATTERY VOLTAGE (11 - 14V)★  SEC033D
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm.	BATTERY VOLTAGE (11 - 14V)★  SEC034D

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnostic Procedure

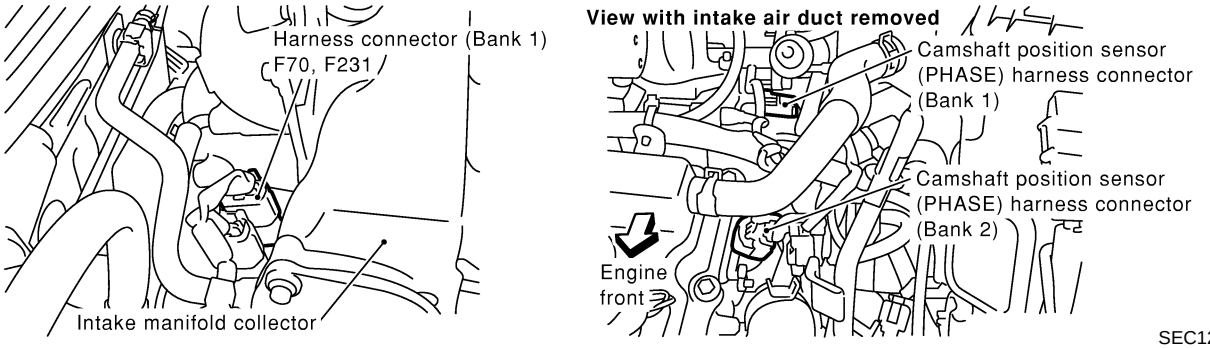
NFEC0950

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-10, “STARTING SYSTEM”.)

2	RETIGHTEN GROUND SCREWS	
1. Turn ignition switch “OFF”. 2. Loosen and retighten engine ground screws.  SEC047D		
	▶	GO TO 3.

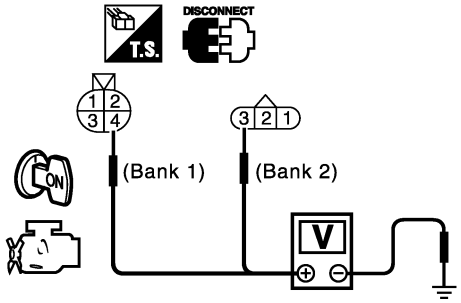
3	CHECK CMP SENSOR (PHASE) POWER SUPPLY CIRCUIT

1. Disconnect CMP sensor (PHASE) harness connector (bank 2) or harness connectors F70, F231 (bank 1).



SEC122D

2. Check voltage between CMP sensor (PHASE) harness connector (bank 2) terminal 3 or harness connector F70 (bank 1) terminal 4 and ground with CONSULT-II or tester.



SEC206D

Voltage: Battery voltage

3. 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 F70, F231 (bank 1)
- Harness connectors E15, F18
- Harness for open or short between ECM and camshaft position sensor (PHASE) or harness connector F70
- Harness for open or short between ECM relay and camshaft position sensor (PHASE) or harness connector F70

	▶	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. Check harness continuity between harness connector F70 terminal 3 and engine ground (bank 1). Refer to Wiring Diagram.
2. Check CMP sensor (PHASE) harness connector terminal 1 and engine ground (bank 2). Refer to Wiring Diagram.
   Continuity should exist.
3. Also check harness for short to power.

OK or NG

OK	▶	GO TO 7.
NG	▶	GO TO 6.

6	DETECT MALFUNCTIONING PART
Check the following. ● Harness connectors F70, F231 (bank 1) ● Harness for open between camshaft position sensor (PHASE) or harness connector F70 and ground	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

7	CHECK CMP SENSOR (PHASE) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 65 and harness connector F70 terminal 1. 3. Check harness continuity between ECM terminal 85 and CMP sensor (PHASE) harness connector 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 (DTC P0340) ▶	GO TO 9.
OK (DTC P0345) ▶	GO TO 10.
NG ▶	GO TO 8.

8	DETECT MALFUNCTIONING PART
Check the following. ● Harness connectors F70, F231 (bank 1) ● Harness for open or short between ECM and camshaft position sensor (PHASE) or harness connector F70	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

9	CHECK CMP SENSOR (PHASE) SUB-HARNESS CIRCUIT FOR OPEN AND SHORT

1. Disconnect CMP sensor (PHASE) harness connector.
2. Check harness continuity between CMP sensor (PHASE) terminals and harness connector F231 terminals as follows.

CMP sensor (PHASE) terminal	Harness connector F231 terminal
1	3
2	1
3	4

MTBL1192

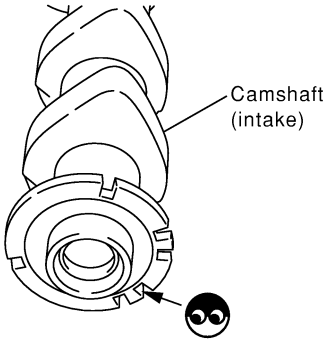
Continuity should exist.

3. 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.

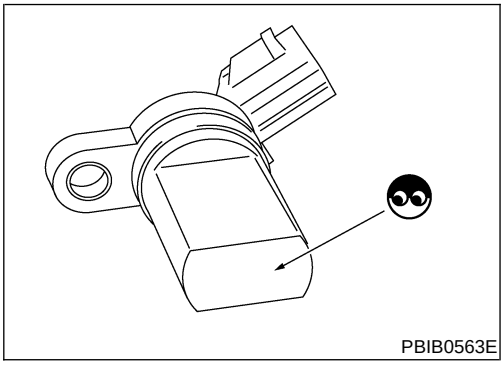
10	CHECK CAMSHAFT POSITION SENSOR (PHASE)
Refer to "Component Inspection", EC-345.	
OK or NG	
OK ▶	GO TO 11.
NG ▶	Replace camshaft position sensor (PHASE).

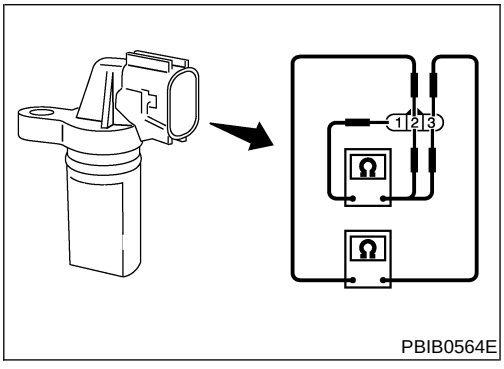
11	CHECK CAMSHAFT (INTAKE)	
Visually check for chipped signal plate at camshaft rear.		
OK or NG		
OK	▶	GO TO 12.
NG	▶	Replace camshaft.



SEC905C

12	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.	
▶	**INSPECTION END**


PBIB0563E



PBIB0564E

Component Inspection

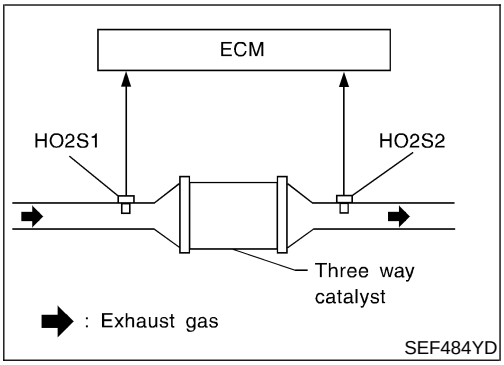
CAMSHAFT POSITION SENSOR (PHASE)

NFEC1416

NFEC1416S01

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 inthe figure.

Terminal No. (Polarity)	Resistance Ω [at 25°C (77°F)]
1 (+) - 2 (−)	Except 0 or ∞
1 (+) - 3 (−)	
2 (+) - 3 (−)	



SEF484YD

On Board Diagnosis Logic

NFEC1443

The ECM monitors the switching frequency ratio of heated oxygen sensors 1 and 2.
A warm-up three way catalyst 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 warm-up three way catalyst malfunction is diagnosed.

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0420 0420 (Bank 1) P0430 0430 (Bank 2)	Catalyst system efficiency below threshold	Warm-up three way catalyst does not operate properly, warm-up three way catalyst does not have enough oxygen storage capacity.	• Warm-up three way catalyst • Exhaust tube • Intake air leaks • Injectors • Injector leaks • Spark plug • Improper ignition timing

SRT WORK SUPPORT	
CATALYST	INCMP
EVAP SYSTEM	INCMP
HO2S HTR	CMPLT
HO2S	INCMP
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec

SEC138D

SRT WORK SUPPORT	
CATALYST	CMPLT
EVAP SYSTEM	INCMP
HO2S HTR	CMPLT
HO2S	INCMP
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec

SEC139D

SELF DIAG RESULTS	
DTC RESULTS	TIME
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	

SEF560X

DTC Confirmation Procedure

NFEC0952

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.

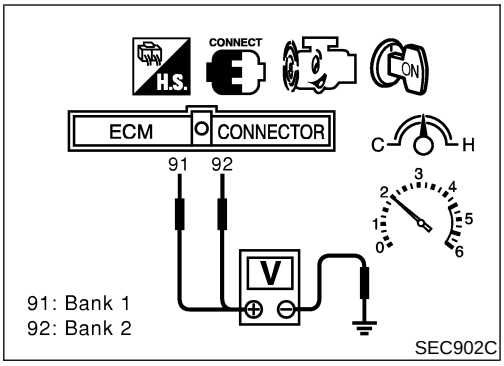
WITH CONSULT-II

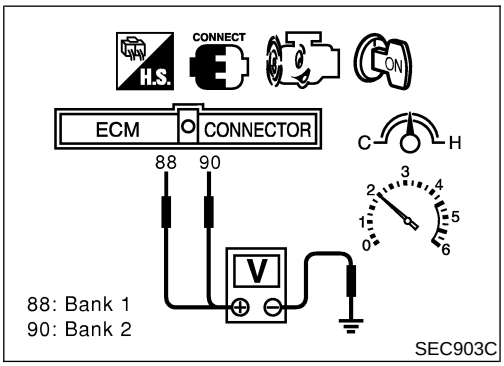
NFEC0952S01

TESTING CONDITION:

- **Open engine hood before conducting the following procedure.**
- **Do not hold engine speed for more than the specified minutes below.**

1) Turn ignition switch "ON".
2) Select "DTC & SRT CONFIRMATION" then "SRT WORK SUPPORT" mode with CONSULT-II.
3) Start engine.
4) Rev engine up to 3,000±500 rpm and hold it for 3 consecutive minutes then release the accelerator pedal completely.
5) Wait 5 seconds at idle.
6) Rev engine up to 2,500±500 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.
7) Select "SELF-DIAG RESULTS" mode with CONSULT-II.
8) Confirm that the 1st trip DTC is not detected.
   If the 1st trip DTC is detected, go to "Diagnostic Procedure", EC-347.





Overall Function Check

NFEC0953

Use this procedure to check the overall function of the warm-up three way catalyst. During this check, a 1st trip DTC might not be confirmed.

CAUTION:
Always drive vehicle at a safe speed.

WITH GST

NFEC0953S01

1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
2) Stop vehicle with engine running.
3) Set voltmeters probes between ECM terminals 91 [heated oxygen sensor 1 bank 1 signal], 92 [heated oxygen sensor 1 bank 2 signal] and engine ground, and ECM terminals 88 [heated oxygen sensor 2 bank 1 signal], 90 [heated oxygen sensor 2 bank 2 signal] and engine ground.
4) Keep engine speed at 2,000 rpm constant under no load.
5) Make sure that the voltage switching frequency (high & low) between ECM terminals 88 and engine ground, or 90 and engine ground is very less than that of ECM terminals 91 and engine ground, or 91 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 warm-up three way catalyst does not operate properly. Go to “Diagnostic Procedure”, EC-347.

NOTE:
If the voltage at terminal 92 or 91 does not switch periodically more than 5 times within 10 seconds at step 5, perform trouble diagnosis for “DTC P0133, P0153” first. (See EC-228.)

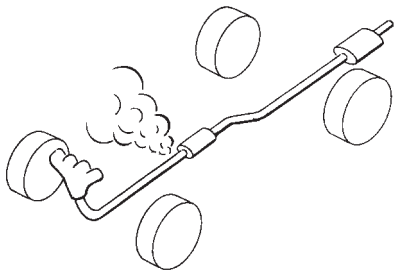
Diagnostic Procedure

NFEC0954

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 AIR LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust air leak before the warm-up three way catalyst.



SEF099P

OK or NG

OK	▶	GO TO 3.
NG	▶	Repair or replace.

3	CHECK INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

OK or NG

OK	▶	GO TO 4.
NG	▶	Repair or replace.

4	CHECK IGNITION TIMING

Check the following items. Refer to "Basic Inspection", EC-123.

Items	Specifications
Ignition timing	15° ± 5° BTDC
Target idle speed	M/T: 625 ± 50 rpm A/T: 675 ± 50 rpm (in "P" or "N" position)

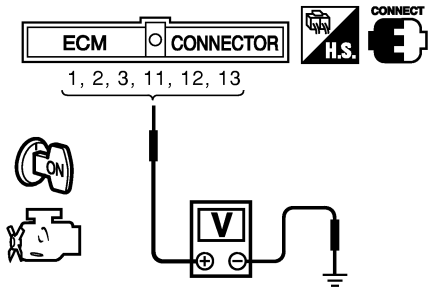
MTBL1186

OK or NG

OK	▶	GO TO 5.
NG	▶	Follow the "Basic Inspection".

5	CHECK INJECTORS

1. Refer to WIRING DIAGRAM for Injectors, EC-704.
2. Stop engine and then turn ignition switch "ON".
3. Check voltage between ECM terminals 1, 2, 3, 11, 12, 13 and ground with CONSULT-II or tester.



Battey: voltage should exist.

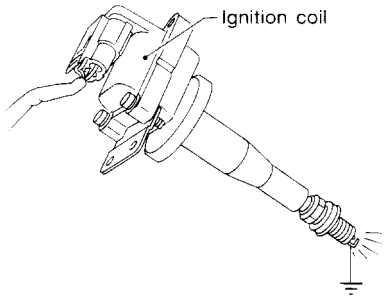
SEC124D

OK or NG

OK	▶	GO TO 6.
NG	▶	Perform "Diagnostic Procedure", "INJECTOR", EC-705.

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. Place end of spark plug against a suitable ground and crank engine.
5. Check for spark.



SEF575Q

OK or NG

OK	▶	GO TO 7.
NG	▶	Check ignition coil with power transistor and their circuit. Refer to EC-692.

7	CHECK INJECTOR

1. Turn ignition switch "OFF".
2. Remove injector assembly.
   Refer to EC-57.
   Keep fuel hose and all injectors connected to injector gallery.
3. Disconnect all ignition coil harness connectors.
4. 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.

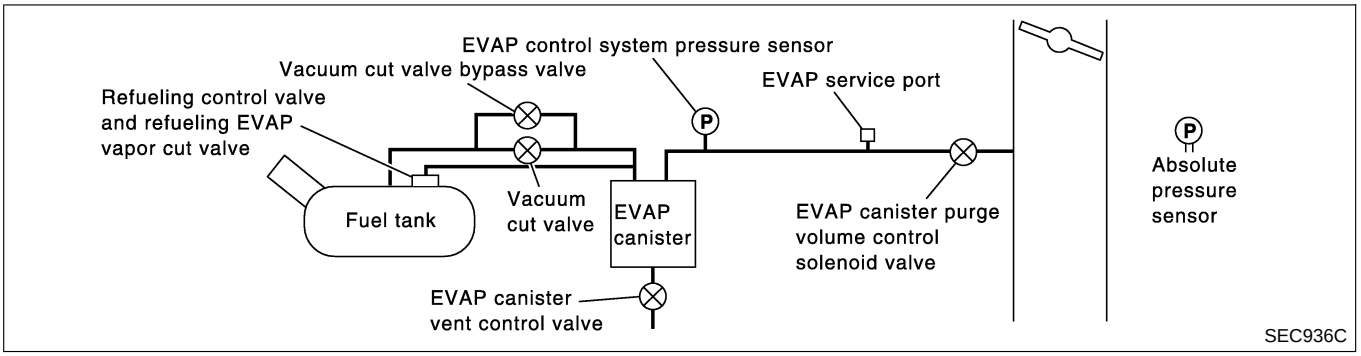
Diagnostic Procedure (Cont'd)

8	**CHECK INTERMITTENT INCIDENT**	
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.		
Trouble is fixed.	▶	**INSPECTION END**
Trouble is not fixed.	▶	Replace warm-up three way catalyst.

System Description

NFEC0955

NOTE:
If DTC P0441 is displayed with P0121, P0122, P0123, P0226, P0227, P0228, P1227 or P1228, perform trouble diagnosis for other DTC.



In this evaporative emission (EVAP) control system, purge flow occurs during non-closed throttle conditions. Purge volume is related to air intake volume. Under normal purge conditions (non-closed throttle), the EVAP canister purge volume control solenoid valve is open to admit purge flow. Purge flow exposes the EVAP control system pressure sensor to intake manifold vacuum.

On Board Diagnosis Logic

NFEC0956

Under normal conditions (non-closed throttle), sensor output voltage indicates if pressure drop and purge flow are adequate. If not, a fault is determined.

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0441 0441	EVAP control system incorrect purge flow	EVAP control system does not operate properly, EVAP control system has a leak between intake manifold and EVAP control system pressure sensor.	• EVAP canister purge volume control solenoid valve stuck closed • EVAP control system pressure sensor and the circuit • Loose, disconnected or improper connection of rubber tube • Blocked rubber tube • Cracked EVAP canister • EVAP canister purge volume control solenoid valve circuit • Blocked purge port • EVAP canister vent control valve

5

PURG FLOW P0441	
OUT OF CONDITION	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h

SEC140D

6

PURG FLOW P0441	
TESTING	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h

SEC141D

6

PURG FLOW P0441
COMPLETED

SEC759C

DTC Confirmation Procedure

NFEC0957

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 test at a temperature of 5°C (41°F) or more.

WITH CONSULT-II

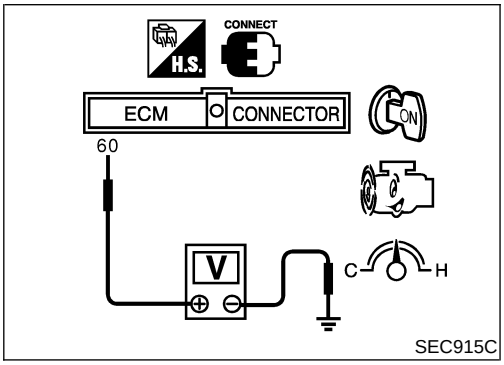
NFEC0957S01

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 let it idle for at least 70 seconds.
4) Select “PURG FLOW P0441” of “EVAPORATIVE SYSTEM” in “DTC CONFIRMATION” mode with CONSULT-II.
5) Touch “START”.
   If “COMPLETED” is displayed, go to step 7.
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 at least 35 seconds.)

Selector lever	Suitable position
Vehicle speed	32 - 120 km/h (20 - 75 MPH)
ENG SPEED	500 - 3,000 rpm
B/FUEL SCHDL	1.3 - 8.1 msec
Engine coolant temperature	70 - 100°C (158 - 212°F)

If “TESTING” is not changed for a long time, retry from step 2.

7) Make sure that “OK” is displayed after touching “SELF-DIAG RESULTS”. If “NG” is displayed, refer to “Diagnostic Procedure”, EC-354.



SEC915C

Overall Function Check

NFEC0958

Use this procedure to check the overall monitoring function of the EVAP control system purge flow monitoring. During this check, a 1st trip DTC might not be confirmed.

WITH GST

NFEC0958S01

1) Lift up drive wheels.
2) Start engine (TCS switch “OFF”) and warm it up to normal operating temperature.
3) Turn ignition switch “OFF”, wait at least 10 seconds.
4) Start engine and wait at least 70 seconds.

5) Set voltmeter probes to ECM terminals 60 (EVAP control system pressure sensor signal) and ground.
6) Check EVAP control system pressure sensor value at idle speed and note it.
7) Establish and maintain the following conditions for at least 1 minute.

Air conditioner switch	ON
Steering wheel	Fully turned
Headlamp switch	ON
Rear window defogger switch	ON
Engine speed	Approx. 3,000 rpm
Gear position	Any position other than "P", "N" or "R"

8) Verify that EVAP control system pressure sensor value stays 0.1V less than the value at idle speed (measured at step 6) for at least 1 second.
9) If NG, go to "Diagnostic Procedure", EC-354.

Diagnostic Procedure

=NFEC0959

1	CHECK EVAP CANISTER

1. Turn ignition switch “OFF”.
2. Check EVAP canister for cracks.

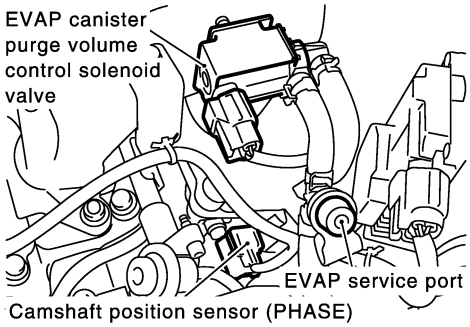
OK or NG

OK (With CONSULT-II)	▶	GO TO 2.
OK (Without CONSULT-II)	▶	GO TO 3.
NG	▶	Replace EVAP canister.

2	CHECK PURGE FLOW

With CONSULT-II

1. Disconnect vacuum hose connected to EVAP canister purge volume control solenoid valve at EVAP service port and install vacuum gauge.



SEC929C

2. Start engine and let it idle.
3. Select “PURG VOL CONT/V” in “ACTIVE TEST” mode with CONSULT-II.
4. Rev engine up to 2,000 rpm.
5. Touch “Qd” and “Qu” on CONSULT-II screen to adjust “PURG VOL CONT/V” opening and check vacuum existence.

ACTIVE TEST	
PURG VOL CONT/V	0.0%
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %
HO2S1 MNTR (B1)	RICH
HO2S1 MNTR (B2)	RICH

SEC142D

PURG VOL CONT/V	VACUUM
100.0%	Should exist
0.0%	Should not exist

MTBL1158

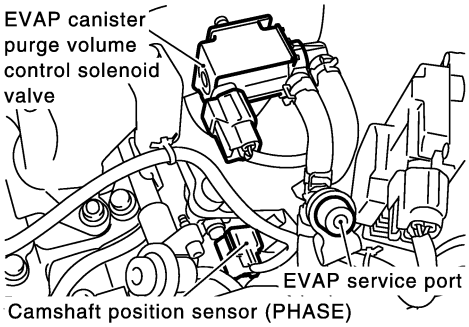
OK or NG

OK	▶	GO TO 7.
NG	▶	GO TO 4.

3	CHECK PURGE FLOW

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Stop engine.
3. Disconnect vacuum hose connected to EVAP canister purge volume control solenoid valve at EVAP service port and install vacuum gauge.



SEC929C

4. Start engine and let it idle for at least 80 seconds.
5. Check vacuum gauge indication when revving engine up to 2,000 rpm.
   Vacuum should exist.
6. Release the accelerator pedal fully and let idle.
   Vacuum should not exist.

OK or NG

OK	▶	GO TO 7.
NG	▶	GO TO 4.

4	CHECK EVAP PURGE LINE

1. Turn ignition switch "OFF".
2. Check EVAP purge line for improper connection or disconnection.
   Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-40.

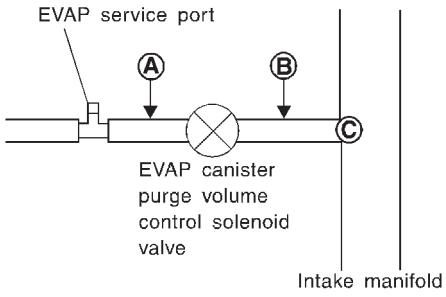
OK or NG

OK	▶	GO TO 5.
NG	▶	Repair it.

Diagnostic Procedure (Cont'd)

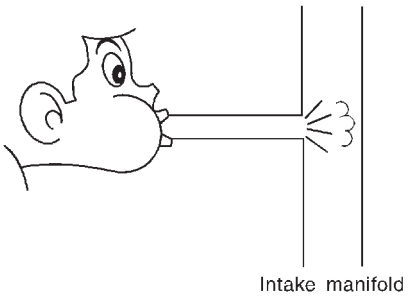
5	CHECK EVAP PURGE HOSE AND PURGE PORT

1. Disconnect purge hoses connected to EVAP service port **A** and EVAP canister purge volume control solenoid valve **B**.



SEF367U

2. Blow air into each hose and EVAP purge port **C**.
3. Check that air flows freely.



SEF368U

OK or NG

OK (With CONSULT-II)	▶	GO TO 6.
OK (Without CONSULT-II)	▶	GO TO 7.
NG	▶	Repair or clean hoses and/or purge port.

6	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-II

1. Start engine.
2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.

ACTIVE TEST	
PURG VOL CONT/V	0.0%
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %
HO2S1 MNTR (B1)	RICH
HO2S1 MNTR (B2)	RICH

SEC142D

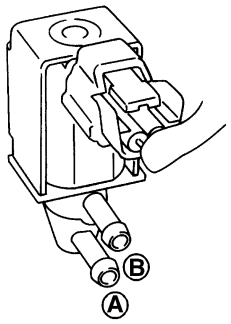
OK or NG

OK	▶	GO TO 8.
NG	▶	GO TO 7.

7	CHECK 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.

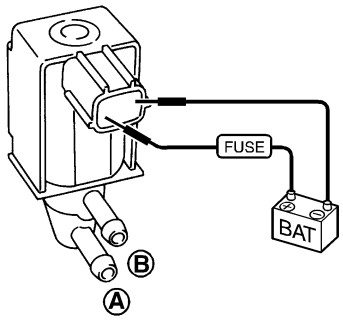


Condition PURG VOL CONT/V value	Air passage continuity between A and B
100.0%	Yes
0.0%	No

SEF334X

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

SEF335X

OK or NG

OK	▶	GO TO 8.
NG	▶	Replace EVAP canister purge volume control solenoid valve.

8	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE

1. Turn ignition switch "OFF".
2. Check disconnection or improper connection of hose connected to EVAP control system pressure sensor.

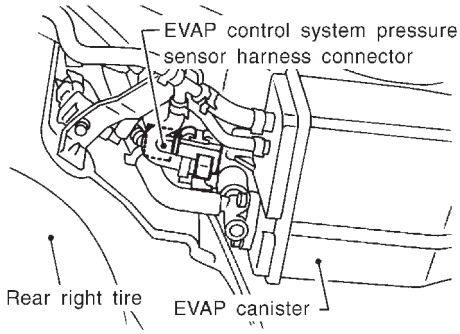
OK or NG

OK	▶	GO TO 9.
NG	▶	Repair it.

Diagnostic Procedure (Cont'd)

9	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.



SEF495R

2. Check connectors for water.
   Water should not exist.

OK or NG

OK	▶	GO TO 10.
NG	▶	Replace EVAP control system pressure sensor.

10	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR FUNCTION

Refer to "DTC Confirmation Procedure" for DTC P0452, EC-390 and P0453, EC-397.

OK or NG

OK	▶	GO TO 11.
NG	▶	Replace EVAP control system pressure sensor.

11	CHECK RUBBER TUBE FOR CLOGGING

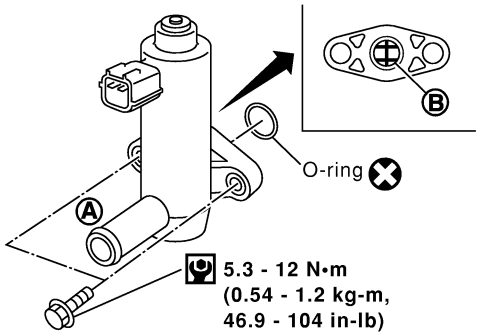
1. Disconnect rubber tube connected to EVAP canister vent control valve.
2. Check the rubber tube for clogging.

OK or NG

OK	▶	GO TO 12.
NG	▶	Clean the rubber tube using an air blower.

12	CHECK EVAP CANISTER VENT CONTROL VALVE-I

1. Remove EVAP canister vent control valve from EVAP canister.
2. Check portion **B** of EVAP canister vent control valve for being rusted.



SEF376Z

OK or NG

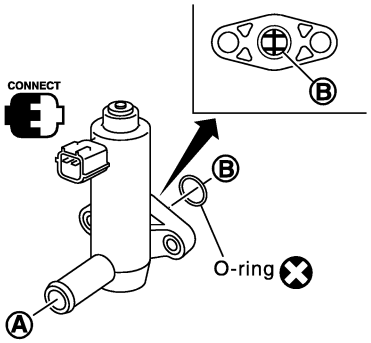
OK	▶	GO TO 13.
NG	▶	Replace EVAP canister vent control valve.

13	CHECK EVAP CANISTER VENT CONTROL VALVE-II

With CONSULT-II

1. Reconnect harness connectors disconnected.
2. Turn ignition switch "ON".
3. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
4. Check air passage continuity and operation delay time.

ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %
HO2S1 MNTR (B1)	LEAN
HO2S1 MNTR (B2)	LEAN



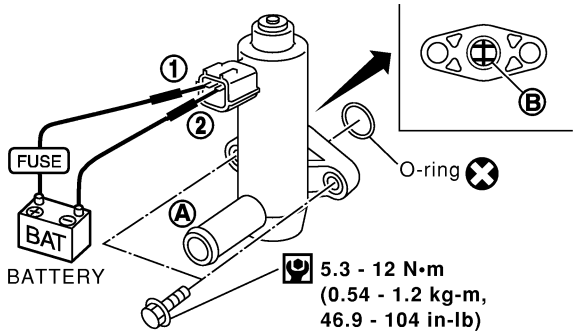
Condition VENT CONTROL/V	Air passage continuity between A and B
ON	No
OFF	Yes

Operation takes less than 1 second.

SEC158D

Without CONSULT-II

Check air passage continuity and operation delay time under the following conditions.



Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	No
OFF	Yes

Operation takes less than 1 second.

SEF378Z

Make sure new O-ring is installed properly.

OK or NG

OK	▶	GO TO 15.
NG	▶	GO TO 14.

14	CHECK EVAP CANISTER VENT CONTROL VALVE-III

1. Clean the air passage (Portion **A** to **B**) of EVAP canister vent control valve using an air blower.
2. Perform Test No. 13 again.

OK or NG

OK	▶	GO TO 15.
NG	▶	Replace EVAP canister vent control valve.

15	CHECK EVAP PURGE LINE

Inspect EVAP purge line (pipe and rubber tube). Check for evidence of leaks.
Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-40.

OK or NG

OK	▶	GO TO 16.
NG	▶	Replace it.

Diagnostic Procedure (Cont'd)

16	**CLEAN EVAP PURGE LINE**
Clean EVAP purge line (pipe and rubber tube) using air blower.	
▶	GO TO 17.

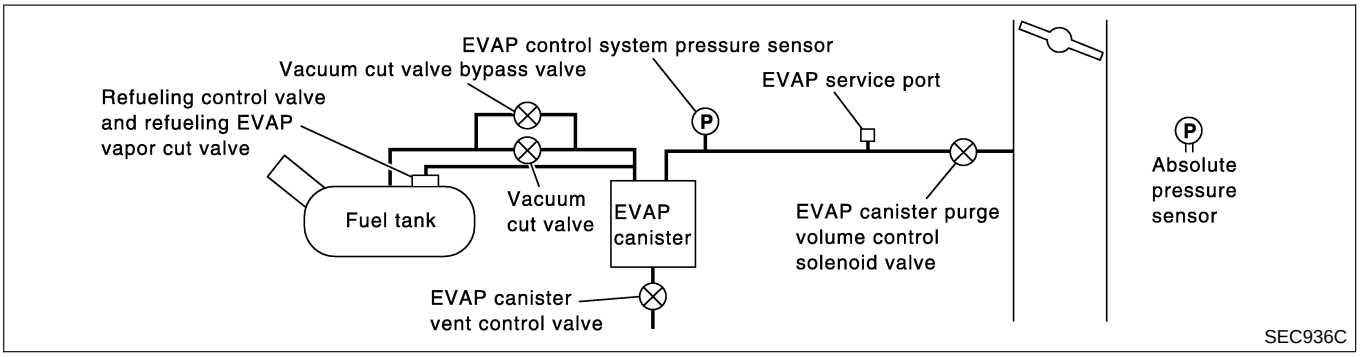
17	**CHECK INTERMITTENT INCIDENT**
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.	
▶	**INSPECTION END**

On Board Diagnosis Logic

NFEC0960

NOTE:
If DTC P0442 is displayed with P1448, perform trouble diagnosis for DTC P1448 first. (See EC-594.)

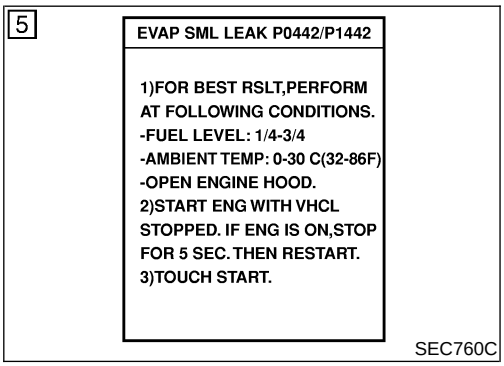
This diagnosis detects leaks in the EVAP purge line using engine intake manifold vacuum.
If pressure does not increase, the ECM will check for leaks in the line between the fuel tank and EVAP canister purge volume control solenoid valve, under the following “Vacuum test” conditions.
The vacuum cut valve bypass valve is opened to clear the line between the fuel tank and the EVAP canister purge volume control solenoid valve. The EVAP canister vent control valve will then be closed to shut the EVAP purge line off. The EVAP canister purge volume control solenoid valve is opened to depressurize the EVAP purge line using intake manifold vacuum. After this occurs, the EVAP canister purge volume control solenoid valve will be closed.

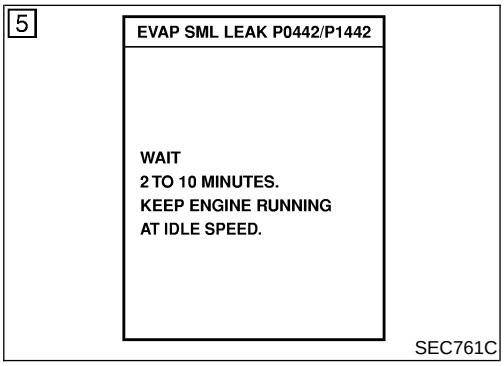


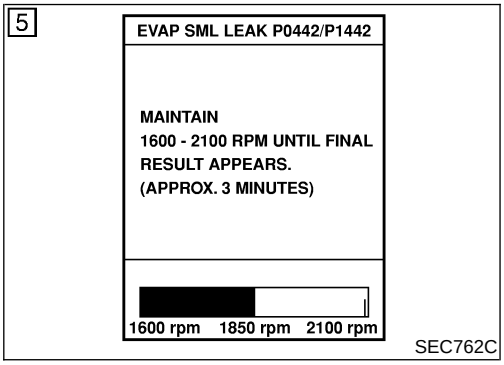
DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0442 0442	EVAP control system small leak detected (negative pressure)	EVAP control system has a leak, EVAP control system does not operate properly.	• Incorrect fuel tank vacuum relief valve • Incorrect fuel filler cap used • Fuel filler cap remains open or fails to close. • Foreign matter caught in fuel filler cap • Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve. • Foreign matter caught in EVAP canister vent control valve • EVAP canister or fuel tank leaks • EVAP purge line (pipe and rubber tube) leaks • EVAP purge line rubber tube bent • Blocked or bent rubber tube to EVAP control system pressure sensor • Loose or disconnected rubber tube • EVAP canister vent control valve and the circuit • EVAP canister purge volume control solenoid valve and the circuit • Absolute pressure sensor • Fuel tank temperature sensor • O-ring of EVAP canister vent control valve is missing or damaged. • Water separator • EVAP canister is saturated with water. • EVAP control system pressure sensor • Fuel level sensor and the circuit • Refueling control valve • ORVR system leaks

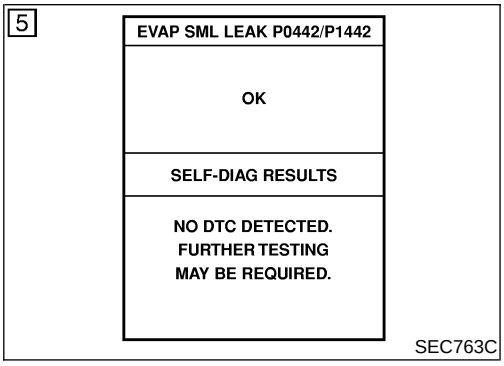
CAUTION:

- **Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.**
- **If the fuel filler cap is not tightened properly, the MIL may come on.**
- **Use only a genuine NISSAN rubber tube as a replacement.**









DTC Confirmation Procedure

NFEC1444

NOTE:

- **If DTC P0442 is displayed with P1448, perform trouble diagnosis for DTC P1448 first (see EC-594).**
- If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.
- **Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.**

TESTING CONDITION:

- **Perform "DTC WORK SUPPORT" when the fuel level is between 1/4 to 3/4 full and vehicle is placed on flat level surface.**
- **Always perform test at a temperature of 0 to 30°C (32 to 86°F).**
- **Open engine hood before conducting the following procedure.**

WITH CONSULT-II

NFEC1444S01

1) Turn ignition switch "ON".
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) Make sure that the following conditions are met.
   COOLAN TEMP/S: 0 - 70°C (32 - 158°F)
   INT/A TEMP SE: 0 - 30°C (32 - 86°F)
5) Select "EVP SML LEAK P0442/P1442" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II.
   Follow the instruction displayed.

NOTE:
If the engine speed cannot be maintained within the range displayed on the CONSULT-II screen, go to "Basic Inspection", EC-123.

6) Make sure that "OK" is displayed.
   If "NG" is displayed, refer to "Diagnostic Procedure", EC-363.

NOTE:
Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.

WITH GST

NFEC1444S02

NOTE:
Be sure to read the explanation of "Driving Pattern" on EC-83 before driving vehicle.

1) Start engine.
2) Drive vehicle according to "Driving Pattern", EC-83.

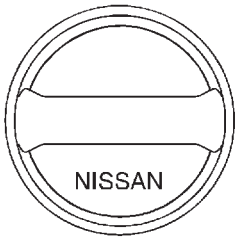
3) Stop vehicle.
4) Select "MODE 1" with GST.
- If SRT of EVAP system is not set yet, go to the following step.
- If SRT of EVAP system is set, the result will be OK.

5) Turn ignition switch "OFF" and wait at least 10 seconds.
6) Start engine.
It is not necessary to cool engine down before driving.
7) Drive vehicle again according to the "Driving Pattern", EC-83.
8) Stop vehicle.
9) Select "MODE 3" with GST.
- If P0442 is displayed on the screen, go to "Diagnostic Procedure", EC-363.
- If P0441 is displayed on the screen, go to "Diagnostic Procedure" for DTC P0441, EC-354.
- If P0441 and P0442 are not displayed on the screen, go to the following step.

10) Select "MODE 1" with GST.
- If SRT of EVAP system is set, the result will be OK.
- If SRT of EVAP system is not set, go to step 6.

Diagnostic Procedure

NFEC0962

1	CHECK FUEL FILLER CAP DESIGN	
1. Turn ignition switch "OFF". 2. Check for genuine NISSAN fuel filler cap design.  SEF915U **OK or NG**		
OK	▶	GO TO 2.
NG	▶	Replace with genuine NISSAN fuel filler cap.

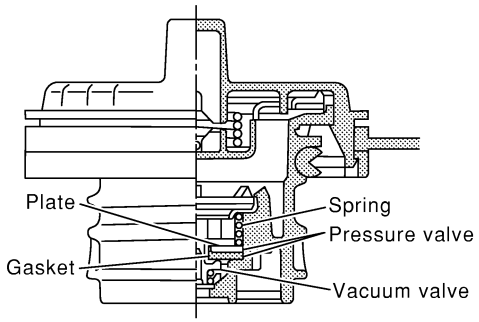
2	CHECK FUEL FILLER CAP INSTALLATION	
Check that the cap is tightened properly by rotating the cap clockwise. **OK or NG**		
OK	▶	GO TO 3.
NG	▶	• Open fuel filler cap, then clean cap and fuel filler neck threads using air blower. • Retighten until ratcheting sound is heard.

Diagnostic Procedure (Cont'd)

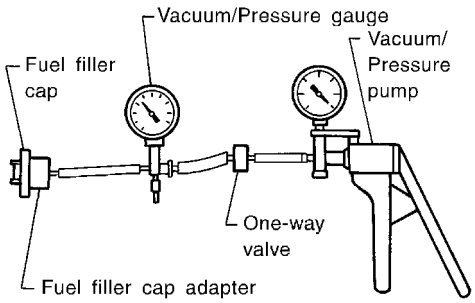
3	CHECK FUEL FILLER CAP FUNCTION	
Check for air releasing sound while opening the fuel filler cap.		
OK or NG		
OK	▶	GO TO 5.
NG	▶	GO TO 4.

4	CHECK FUEL TANK VACUUM RELIEF VALVE	

1. Wipe clean valve housing.
2. Check valve opening pressure and vacuum.



SEF445Y



SEF943S

Pressure:
15.3 - 20.0 kPa (0.156 - 0.204 kg/cm^2, 2.22 - 2.90 psi)
Vacuum:
−6.0 to −3.3 kPa (−0.061 to −0.034 kg/cm^2, −0.87 to −0.48 psi)

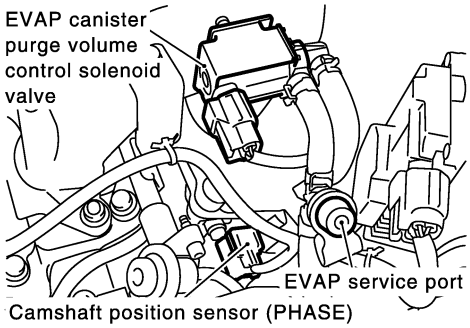
CAUTION:
Use only a genuine fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.

OK or NG

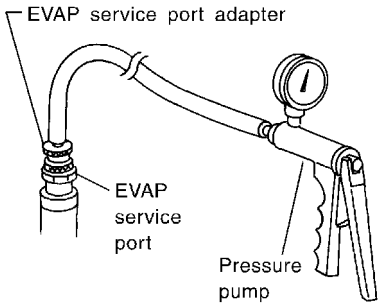
OK	▶	GO TO 5.
NG	▶	Replace fuel filler cap with a genuine one.

5	INSTALL THE PRESSURE PUMP

To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely.



SEC929C



SEF916U

NOTE:
Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.

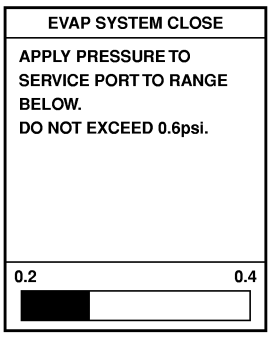
Models with CONSULT-II ▶	GO TO 6.
Models without CONSULT-II ▶	GO TO 7.

Diagnostic Procedure (Cont'd)

6	CHECK FOR EVAP LEAK

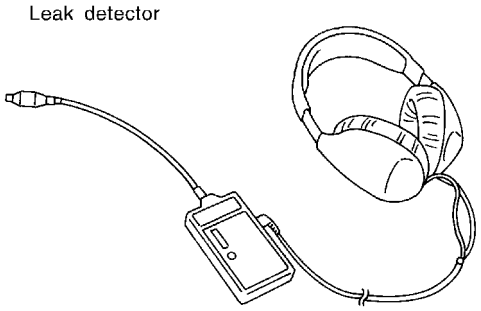
With CONSULT-II

1. Turn ignition switch "ON".
2. Select "EVAP SYSTEM CLOSE" of "WORK SUPPORT" mode with CONSULT-II.
3. Touch "START" and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.
   NOTE:
   - **Never use compressed air or a high pressure pump.**
   - **Do not exceed 4.12 kPa (0.042 kg/cm^2, 0.6 psi) of pressure in the system.**



PEF917U

4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-40.



SEF200U

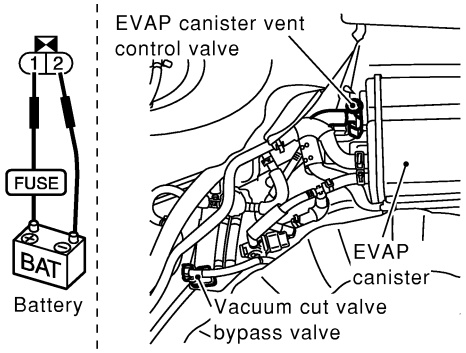
OK or NG

OK	▶	GO TO 8.
NG	▶	Repair or replace.

7	CHECK FOR EVAP LEAK

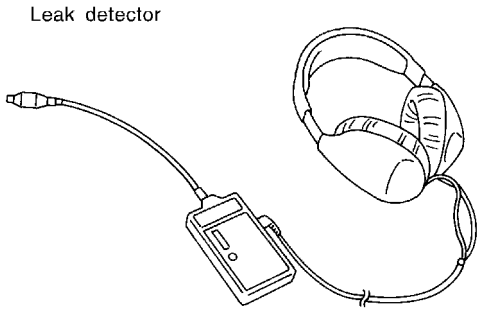
Without CONSULT-II

1. Turn ignition switch "OFF".
2. Apply 12 volts DC to EVAP canister vent control valve. The valve will close. (Continue to apply 12 volts until the end of test.)
3. Apply 12 volts DC to vacuum cut valve bypass valve. The valve will open. (Continue to apply 12V until the end of test.)



SEF254X

4. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.
   NOTE:
   - **Never use compressed air or a high pressure pump.**
   - **Do not exceed 4.12 kPa (0.042 kg/cm^2, 0.6 psi) of pressure in the system.**
5. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-40.



SEF200U

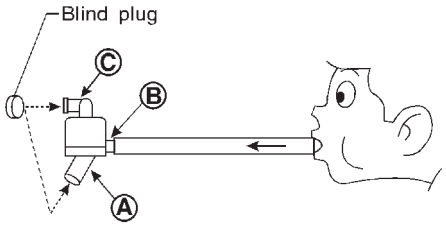
OK or NG

OK	▶	GO TO 8.
NG	▶	Repair or replace.

Diagnostic Procedure (Cont'd)

8	CHECK WATER SEPARATOR

1. Check visually for insect nests in the water separator air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.
4. Check that **A** and **C** are not clogged by blowing air into **B** with **A**, and then **C** plugged.



* A : Bottom hole (To atmosphere)
B : Emergency tube (From EVAP canister)
C : Inlet port (To member)

SEF829T

5. In case of NG in items 2 - 4, replace the parts.

NOTE:

- Do not disassemble water separator.

OK or NG

OK	▶	GO TO 9.
NG	▶	Replace water separator.

9	CHECK EVAP CANISTER VENT CONTROL VALVE, O-RING AND CIRCUIT

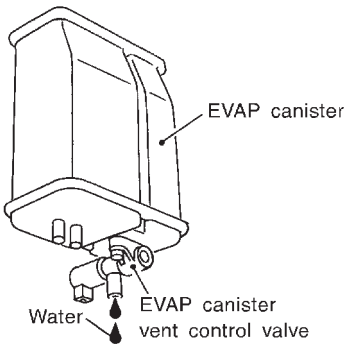
Refer to "DTC Confirmation Procedure", EC-594.

OK or NG

OK	▶	GO TO 10.
NG	▶	Repair or replace EVAP canister vent control valve and O-ring or harness/connector.

10	CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve attached.
2. Does water drain from the EVAP canister?



SEF596U

Yes or No

Yes	▶	GO TO 11.
No (With CONSULT-II)	▶	GO TO 13.
No (Without CONSULT-II)	▶	GO TO 14.

11	CHECK EVAP CANISTER
Weigh the EVAP canister with the EVAP canister vent control valve attached. **The weight should be less than 1.8 kg (4.0 lb).** **OK or NG**	
OK (With CONSULT-II) ▶	GO TO 13.
OK (Without CONSULT-II) ▶	GO TO 14.
NG ▶	GO TO 12.

12	DETECT MALFUNCTIONING PART
Check the following. ● EVAP canister for damage ● EVAP hose between EVAP canister and water separator for clogging or poor connection	
▶	Repair hose or replace EVAP canister.

13	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

With CONSULT-II

1. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
2. Start engine.
3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode.
4. Touch "Qu" on CONSULT-II screen to increase "PURG VOL CONT/V" opening to 100.0%.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

ACTIVE TEST	
PURG VOL CONT/V	0.0%
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %
HO2S1 MNTR (B1)	RICH
HO2S1 MNTR (B2)	RICH

SEC142D

Vacuum should exist.

OK or NG

OK ▶	GO TO 16.
NG ▶	GO TO 15.

14	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Stop engine.
3. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
4. Start engine and let it idle for at least 80 seconds.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

Vacuum should exist.

OK or NG

OK ▶	GO TO 17.
NG ▶	GO TO 15.

15	CHECK VACUUM HOSE	
Check vacuum hoses for clogging or disconnection. Refer to "Vacuum Hose Drawing", EC-30.		
OK or NG		
OK (With CONSULT-II)	▶	GO TO 16.
OK (Without CONSULT-II)	▶	GO TO 17.
NG	▶	Repair or reconnect the hose.

16	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE	
With CONSULT-II 1. Start engine. 2. 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 18.
NG	▶	GO TO 17.

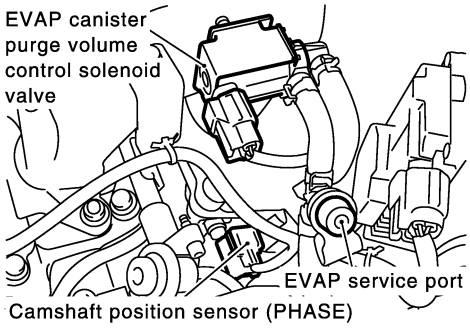
ACTIVE TEST	
PURG VOL CONT/V	0.0%
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %
HO2S1 MNTR (B1)	RICH
HO2S1 MNTR (B2)	RICH

SEC142D

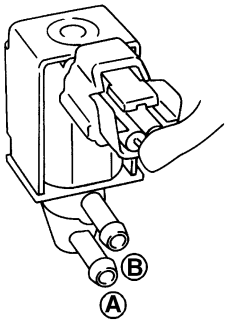
17	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



SEC929C

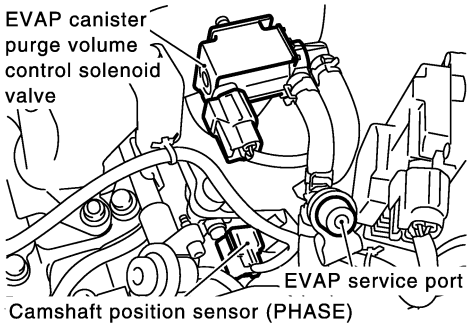


Condition PURG VOL CONT/V value	Air passage continuity between A and B
100.0%	Yes
0.0%	No

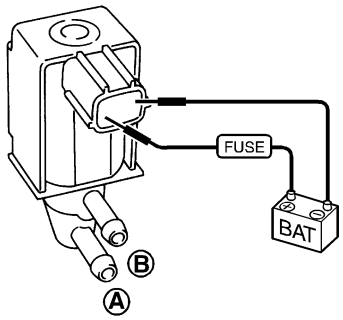
SEF334X

Without CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



SEC929C



Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	Yes
No supply	No

SEF335X

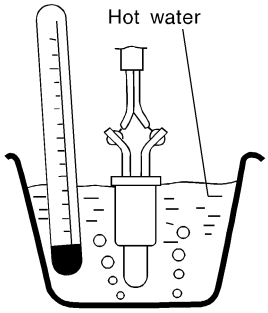
OK or NG

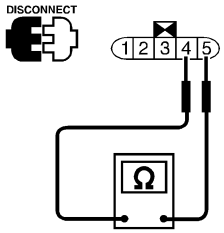
OK	▶	GO TO 18.
NG	▶	Replace EVAP canister purge volume control solenoid valve.

Diagnostic Procedure (Cont'd)

18	CHECK FUEL TANK TEMPERATURE SENSOR

1. Remove fuel level sensor unit.
2. Check resistance between fuel level sensor unit and fuel pump terminals 4 and 5 by heating with hot water or heat gun as shown in the figure.





Temperature °C (°F)	Resistance kΩ
20 (68)	2.3 - 2.7
50 (122)	0.79 - 0.90

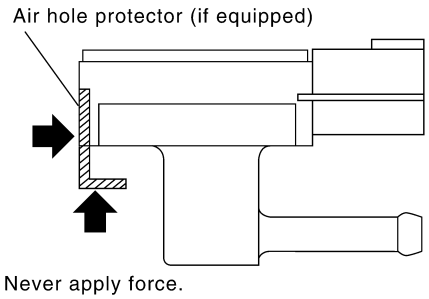
SEF587X

OK or NG

OK	▶	GO TO 19.
NG	▶	Replace fuel level sensor unit.

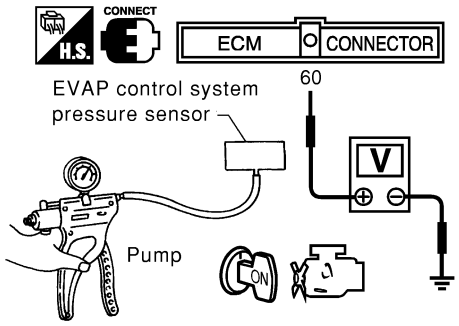
19	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Remove EVAP control system pressure sensor with its harness connector connected.
   CAUTION:
   Never apply force to the air hole protector of the sensor if equipped.



SEF799W

2. Remove hose from EVAP control system pressure sensor.
3. Turn ignition switch "ON".
4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.
   CAUTION:
   - **Always calibrate the vacuum pump gauge when using it.**
   - **Do not apply below −20 kPa (−150 mmHg, −5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure.**
5. Check input voltage between ECM terminal 60 and ground.



SEC908C

Pressure (Relative to atmospheric pressure)	Voltage V
0 kPa (0 mmHg, 0 inHg)	3.0 - 3.6
-9.3 kPa (-70 mmHg, -2.76 inHg)	0.4 - 0.6

MTBL1159

CAUTION:
Discard and EVAP control system pressure 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.

OK or NG

OK	▶	GO TO 20.
NG	▶	Replace EVAP control system pressure sensor.

20	CHECK EVAP PURGE LINE

Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks or improper connection.
Refer to "Evaporative Emission System", EC-36.

OK or NG

OK	▶	GO TO 21.
NG	▶	Repair or reconnect the hose.

Diagnostic Procedure (Cont'd)

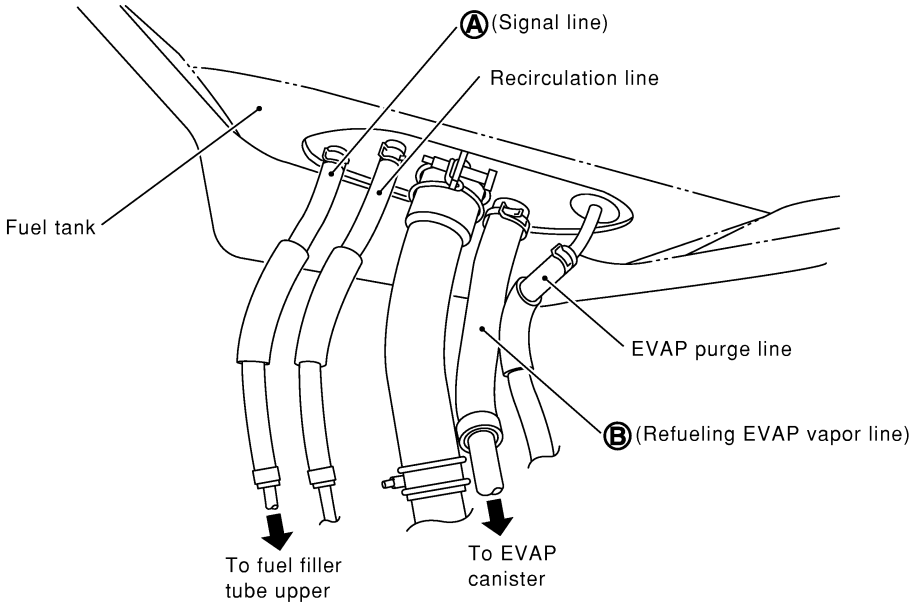
21	CLEAN EVAP PURGE LINE
Clean EVAP purge line (pipe and rubber tube) using air blower.	
▶	GO TO 22.

22	CHECK REFUELING EVAP VAPOR LINE
Check refueling EVAP vapor line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to "ON BOARD REFUELING VAPOR RECOVERY (ORVR)", EC-42.	
OK or NG	
OK ▶	GO TO 23.
NG ▶	Repair or replace hoses and tubes.

23	CHECK SIGNAL LINE AND RECIRCULATION LINE
Check signal line and recirculation line between filler neck tube and fuel tank for clogging, kink, cracks, looseness and improper connection.	
OK or NG	
OK ▶	GO TO 24.
NG ▶	Repair or replace hoses, tubes or filler neck tube.

24 CHECK REFUELING CONTROL VALVE

1. Remove fuel filler cap.
2. Check air continuity between hose ends A and B.
   Blow air into the hose end B. Air should flow freely into the fuel tank.
3. Blow air into hose end A and check there is no leakage.
4. Apply pressure to both hose ends A and B [20 kPa (150 mmHg, 5.91 inHg)] using a pressure pump and a suitable 3-way connector. Check that there is no leakage.



SEF830X

OK or NG

OK ▶	GO TO 25.
NG ▶	Replace refueling control valve with fuel tank.

25	CHECK FUEL LEVEL SENSOR	
Refer to EL-129, "Fuel Level Sensor Unit Check".		
OK or NG		
OK	▶	GO TO 26.
NG	▶	Replace fuel level sensor unit.

26	CHECK INTERMITTENT INCIDENT	
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.		
	▶	**INSPECTION END**

Description

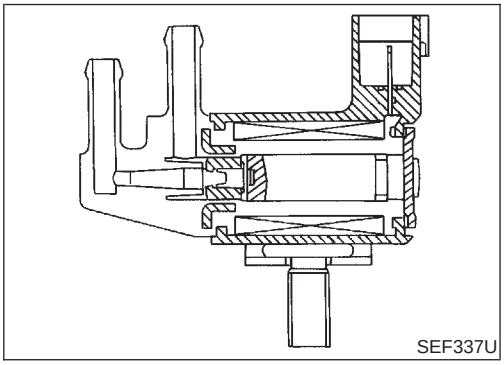
NFEC0963

SYSTEM DESCRIPTION

NFEC0963S01

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed	EVAP canister purge flow control	EVAP canister purge volume control solenoid valve
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Ignition switch	Start signal		
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)		
Fuel tank temperature sensor	Fuel temperature in fuel tank		
Vehicle speed sensor	Vehicle speed		

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.


SEF337U

COMPONENT DESCRIPTION

NFEC0963S02

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

NFEC0964

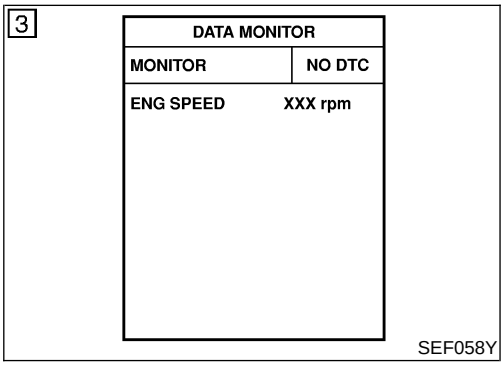
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
PURG VOL C/V	● Engine: After warming up ● Air conditioner switch “OFF” ● Shift lever: “N” ● No-load	Idle (Vehicle stopped)	0%
		2,000 rpm	—

On Board Diagnosis Logic

NFEC0966

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
P0445 0445	EVAP canister purge volume control solenoid valve circuit shorted	An excessively high voltage signal is sent to ECM through the valve.	• Harness or connectors (The solenoid valve circuit is shorted.) • EVAP canister purge volume control solenoid valve



DTC Confirmation Procedure

NFEC0967

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

NFEC0967S01

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 "Diagnostic Procedure", EC-380.

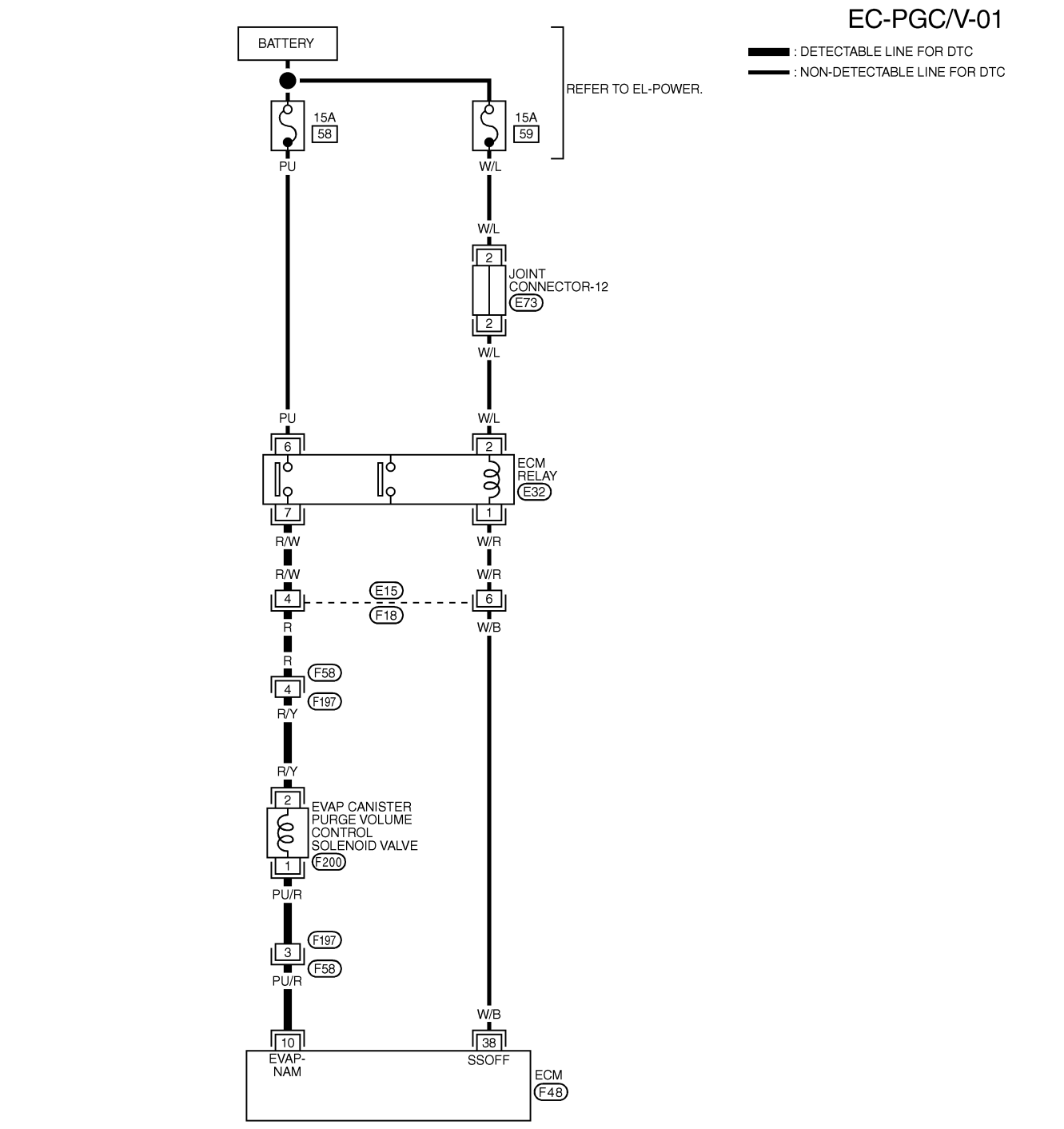
WITH GST

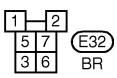
NFEC0967S02

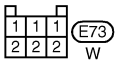
Follow the proocedure "WITH CONSULT-II" above.

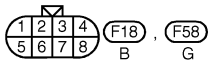
Wiring Diagram

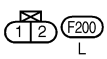
NFEC0968

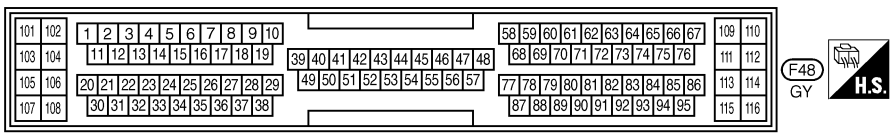






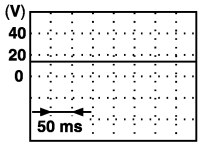
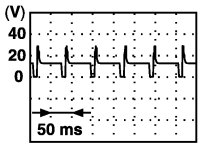






MEC494D

ECM TERMINALS AND REFERENCE VALUE 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	WIRE COLOR	ITEM	CONDITION	DATA (DC)
10	PU/R	EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE	ENGINE RUNNING AT IDLE SPEED	BATTERY VOLTAGE★ (11 - 14) 
			ENGINE RUNNING AT 2,000 RPM (MORE THAN 100 SECONDS AFTER STARTING ENGINE)	BATTERY VOLTAGE★ (11 - 14) 

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

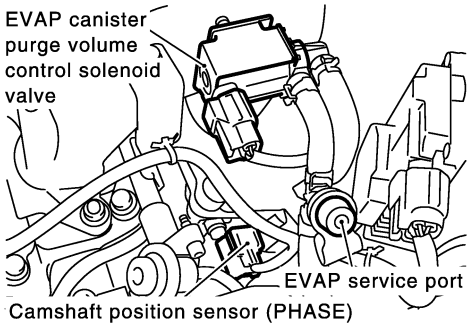
SEC219D

Diagnostic Procedure

NFEC0969

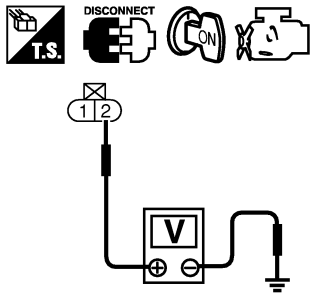
1	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch “OFF”.
2. Disconnect EVAP canister purge volume control solenoid valve harness connector.



SEC929C

3. Turn ignition switch “ON”.
4. Check voltage between EVAP canister purge volume control solenoid valve terminal 2 and ground with CONSULT-II or tester.



SEC062D

Voltage: Battery voltage

OK or NG

OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E15, F18
- Harness connectors F58, F197
- Harness for open or short between EVAP canister purge volume control solenoid valve and ECM relay

	▶	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 10 and EVAP canister purge volume control solenoid valve 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 (With CONSULT-II)	▶	GO TO 5.
OK (Without CONSULT-II)	▶	GO TO 6.
NG	▶	GO TO 4.

4	DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F197, F58
- Harness for open or short between EVAP canister purge volume control solenoid valve and ECM

	▶	Repair harness or connectors.

5	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

With CONSULT-II
1. Start engine.
2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.

ACTIVE TEST	
PURG VOL CONT/V	0.0%
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %
HO2S1 MNTR (B1)	RICH
HO2S1 MNTR (B2)	RICH

SEC142D

OK or NG

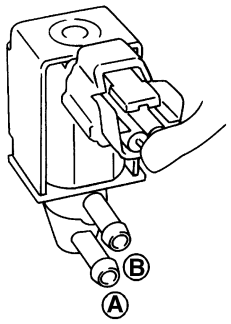
OK	▶	GO TO 7.
NG	▶	GO TO 6.

Diagnostic Procedure (Cont'd)

6	CHECK 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.

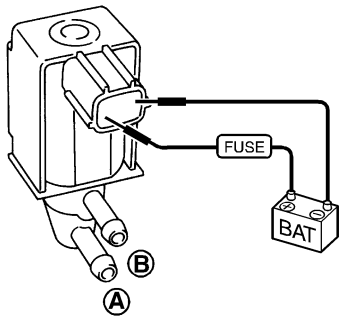


Condition PURG VOL CONT/V value	Air passage continuity between A and B
100.0%	Yes
0.0%	No

SEF334X

Without CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



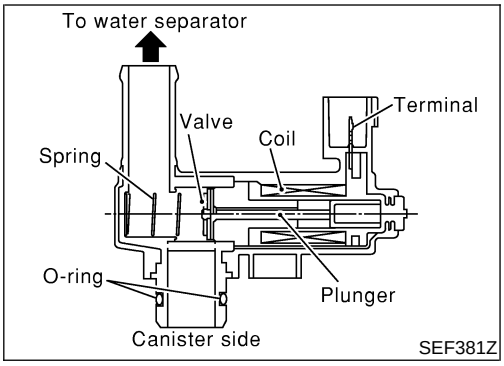
Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	Yes
No supply	No

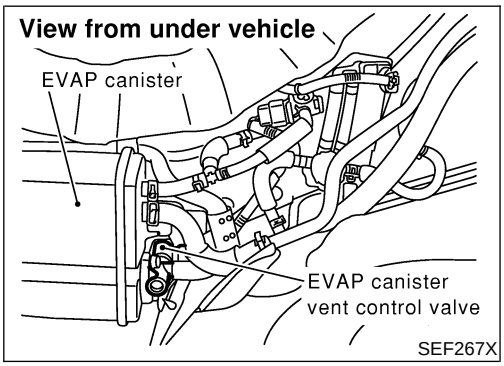
SEF335X

OK or NG

OK	▶	GO TO 7.
NG	▶	Replace EVAP canister purge volume control solenoid valve.

7	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.	
▶	**INSPECTION END**





Component Description

NFEC0970

The EVAP canister vent control valve is located on the EVAP canister and is used to seal the canister vent.

This solenoid valve responds to signals from the ECM. When the ECM sends an ON signal, the coil in the solenoid valve is energized. A plunger will then move to seal the canister vent. The ability to seal the vent is necessary for the on board diagnosis of other evaporative emission control system components.

This solenoid valve is used only for diagnosis, and usually remains opened.

When the vent is closed, under normal purge conditions, the evaporative emission control system is depressurized and allows "EVAP Control System (Small Leak)" diagnosis.

CONSULT-II Reference Value in Data Monitor Mode

NFEC0971

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VENT CONT/V	• Ignition switch: ON	OFF

On Board Diagnosis Logic

NFEC0973

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0447 0447	EVAP canister vent control valve circuit open	An improper voltage signal is sent to ECM through EVAP canister vent control valve.	• Harness or connectors (The valve circuit is open or shorted.) • EVAP canister vent control valve

DTC Confirmation Procedure

NFEC0974

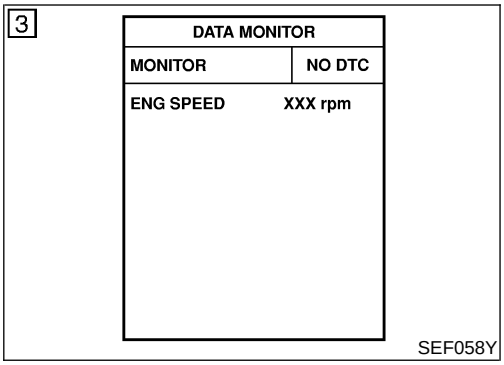
NOTE:

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.

DTC Confirmation Procedure (Cont'd)



WITH CONSULT-II

NFEC0974S01

1) Turn ignition switch "ON".
2) Select "DATA MONITOR" mode with CONSULT-II.
3) Start engine and wait at least 8 seconds.
4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-386.

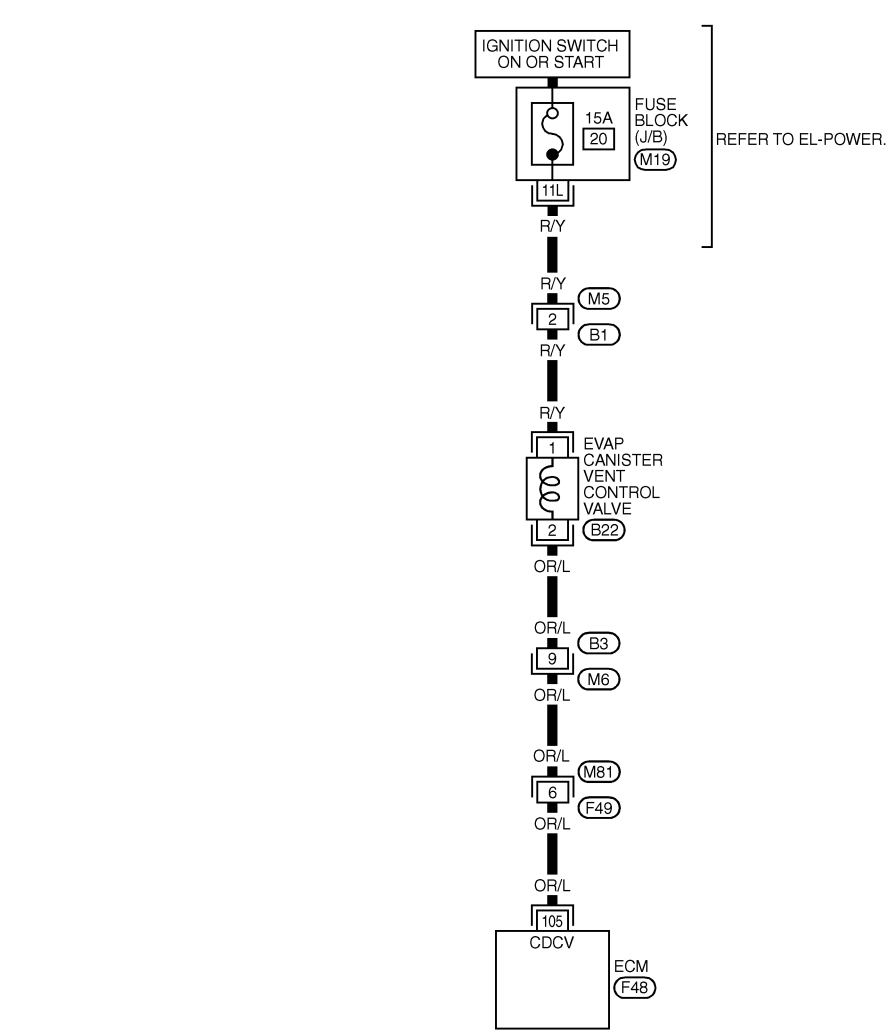
WITH GST

NFEC0974S02

Follow the procedure "WITH CONSULT-II" above.

Wiring Diagram

=NFEC0975



MEC495D

ECM TERMINALS AND REFERENCE VALUE 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	WIRE COLOR	ITEM	CONDITION	DATA (DC)
105	OR/L	EVAP CANISTER VENT CONTROL VALVE	IGN ON	BATTERY VOLTAGE

SEF668XC

Diagnostic Procedure

NFEC0976

1	INSPECTION START

1. Do you have CONSULT-II?

Yes or No

Yes	▶	GO TO 2.
No	▶	GO TO 3.

2	CHECK EVAP CANISTER VENT CONTROL VALVE CIRCUIT

With CONSULT-II

1. Turn ignition switch “OFF” and then turn “ON”.
2. Select “VENT CONTROL/V” in “ACTIVE TEST” mode with CONSULT-II.
3. Touch “ON/OFF” on CONSULT-II screen.

ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %
HO2S1 (B1)	XXX V
HO2S1 (B2)	XXX V

PBIB0151E

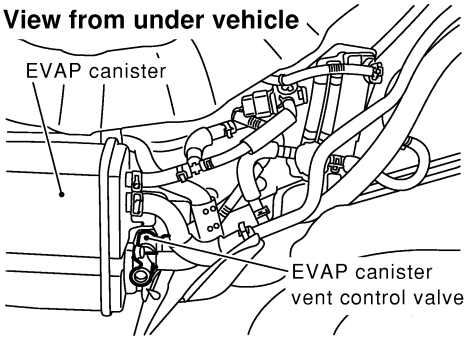
4. Check for operating sound of the valve.
   Clicking noise should be heard.

OK or NG

OK	▶	GO TO 7.
NG	▶	GO TO 3.

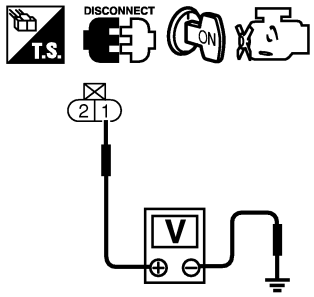
3	CHECK EVAP CANISTER VENT CONTROL VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect EVAP canister vent control valve harness connector.



SEF267X

3. Turn ignition switch "ON".
4. Check voltage between EVAP canister vent control valve terminal 1 and ground with CONSULT-II or tester.



SEC061D

Voltage: Battery voltage

OK or NG

OK	▶	GO TO 5.
NG	▶	GO TO 4.

4	DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors M5, B1
- Fuse block (J/B) connector M19
- 15A fuse
- Harness for open or short between EVAP canister vent control valve and fuse

	▶	Repair harness or connectors.

5	CHECK EVAP CANISTER VENT CONTROL 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 105 and EVAP canister vent control 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

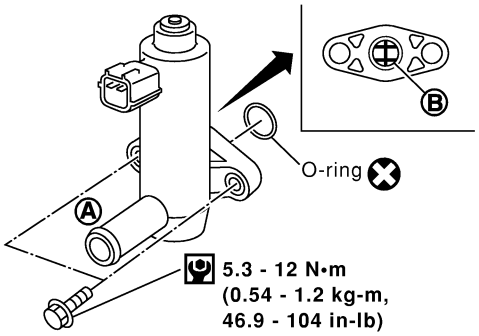
OK	▶	GO TO 7.
NG	▶	GO TO 6.

Diagnostic Procedure (Cont'd)

6	DETECT MALFUNCTIONING PART
Check the following. ● Harness connectors B3, M6 ● Harness connectors M81, F49 ● Harness for open or short between EVAP canister vent control valve and ECM	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

7	CHECK RUBBER TUBE FOR CLOGGING
1. Disconnect rubber tube connected to EVAP canister vent control valve. 2. Check the rubber tube for clogging.	
OK or NG	
OK ▶	GO TO 8.
NG ▶	Clean the rubber tube using an air blower.

8	CHECK EVAP CANISTER VENT CONTROL VALVE-I
1. Remove EVAP canister vent control valve from EVAP canister. 2. Check portion **B** of EVAP canister vent control valve for being rusted.	



SEF376Z

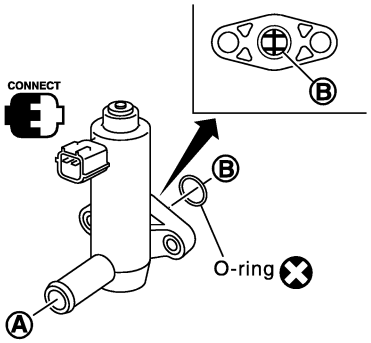
OK or NG	
OK ▶	GO TO 9.
NG ▶	Replace EVAP canister vent control valve.

9	CHECK EVAP CANISTER VENT CONTROL VALVE-II

With CONSULT-II

1. Reconnect harness connectors disconnected.
2. Turn ignition switch "ON".
3. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
4. Check air passage continuity and operation delay time.

ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %
HO2S1 MNTR (B1)	LEAN
HO2S1 MNTR (B2)	LEAN



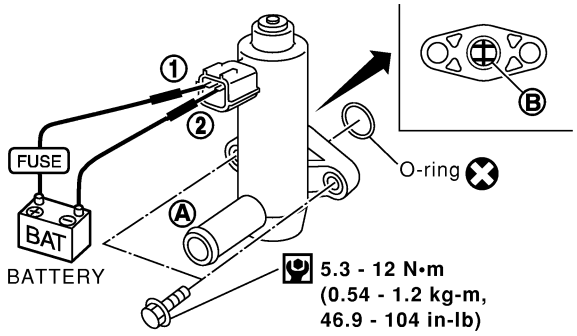
Condition VENT CONTROL/V	Air passage continuity between A and B
ON	No
OFF	Yes

Operation takes less than 1 second.

SEC158D

Without CONSULT-II

Check air passage continuity and operation delay time under the following conditions.



Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	No
OFF	Yes

Operation takes less than 1 second.

SEF378Z

Make sure new O-ring is installed properly.

OK or NG

OK	▶	GO TO 11.
NG	▶	GO TO 10.

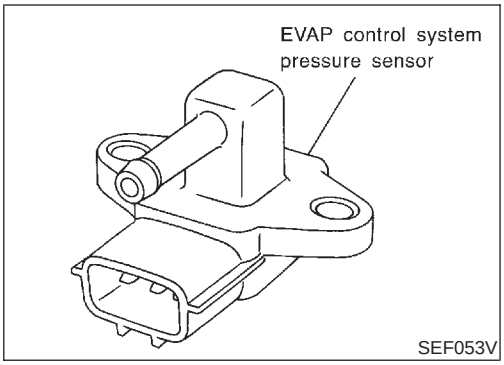
10	CHECK EVAP CANISTER VENT CONTROL VALVE-III

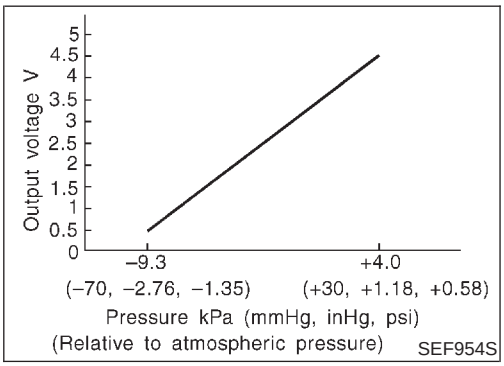
1. Clean the air passage (Portion **A** to **B**) of EVAP canister vent control valve using an air blower.
2. Perform Test No. 9 again.

OK or NG

OK	▶	GO TO 11.
NG	▶	Replace EVAP canister vent control valve.

11	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.	
▶	**INSPECTION END**





Component Description

NFEC0779

The EVAP control system pressure sensor detects pressure in the purge line. The sensor output voltage to the ECM increases as pressure increases. The EVAP control system pressure sensor is not used to control the engine system. It is used only for on board diagnosis.

CONSULT-II Reference Value in Data Monitor Mode

NFEC0780

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
EVAP SYS PRES	• Ignition switch: ON	Approx. 3.4V

On Board Diagnosis Logic

NFEC0782

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0452 0452	EVAP control system pressure sensor low input	An excessively low voltage from the sensor is sent to ECM.	• Harness or connectors (The sensor circuit is open or shorted.) • EVAP control system pressure sensor

DTC Confirmation Procedure

NFEC0784

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.

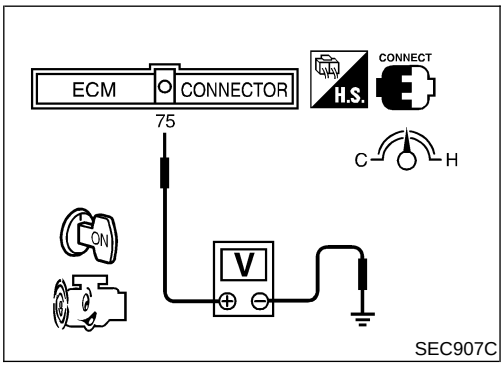
TESTING CONDITION:

Always perform test at a temperature of 5°C (41°F) or more.

6

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
FUEL T/TMP SE	XXX °C

SEF194Y



SEC907C

WITH CONSULT-II

NFEC0784S01

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) Make sure that "FUEL T/TEMP SE" is more than 0°C (32°F).
6) Start engine and wait at least 20 seconds.
7) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-393.
   If 1st trip DTC is not detected, go to next step.
8) Stop engine and install EVAP service port adapter and pressure pump to EVAP service port securely.
9) Pressurize the EVAP line using pressure pump.
10) Confirm the pressure does not go up.
11) If pressure go up, go to "Diagnostic Procedure", EC-393.

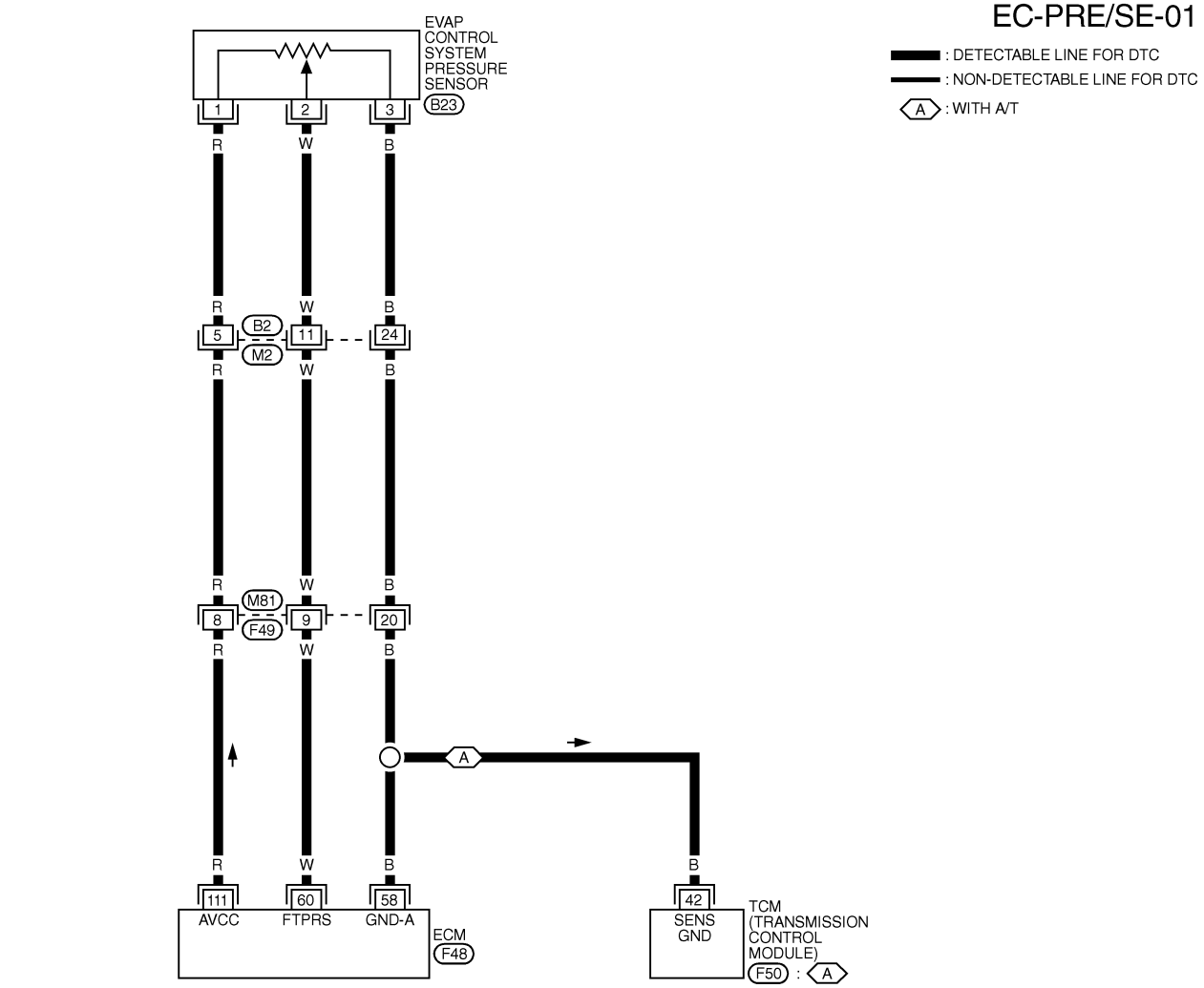
WITH GST

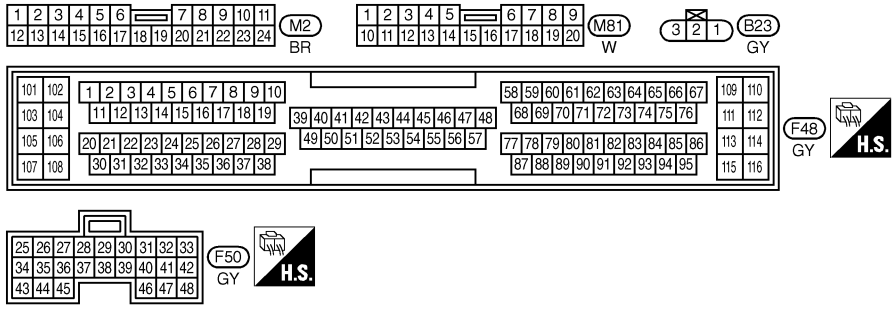
NFEC0784S02

1) Start engine and warm it up to normal operating temperature.
2) Check that voltage between ECM terminal 75 (Fuel tank temperature sensor signal) and ground is less than 4.2V.
3) Turn ignition switch "OFF" and wait at least 10 seconds.
4) Start engine and wait at least 20 seconds.
5) Select "MODE 7" with GST.
6) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-393.

Wiring Diagram

NFEC0785





MEC496D

ECM TERMINALS AND REFERENCE VALUE 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	WIRE COLOR	ITEM	CONDITION	DATA (DC)
58	B	SENSORS' GROUND	ENGINE RUNNING AT IDLE SPEED UNDER WARM-UP CONDITION	APPROX. 0V
60	W	EVAP CONTROL SYSTEM PRESSURE SENSOR	IGN ON	APPROX. 3.4V
111	R	SENSORS' POWER SUPPLY	IGN ON	APPROX. 5V

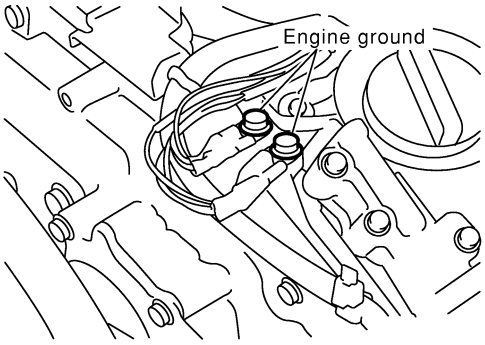
SEF623XC

Diagnostic Procedure

NFEC0786

1	RETIGHTEN GROUND SCREWS

1. Turn ignition switch “OFF”.
2. Loosen and retighten engine ground screws.



SEC047D

	▶	GO TO 2.

2	CHECK CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.
2. Check sensor harness connector for water.

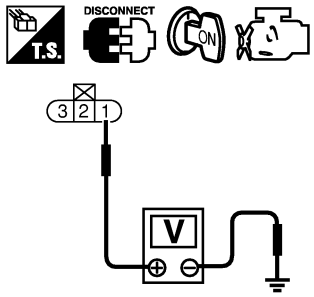
Water should not exist.

OK or NG

OK	▶	GO TO 3.
NG	▶	Repair or replace harness connector.

3	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch “ON”.
2. Check voltage between EVAP control system pressure sensor terminal 1 and ground with CONSULT-II or tester.



SEC063D

Voltage: Approximately 5V

OK or NG

OK	▶	GO TO 5.
NG	▶	GO TO 4.

4	DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors B2, M2
- Harness connectors M81, F49
- Harness for open or short between EVAP control system pressure sensor and ECM

	▶	Repair harness or connectors.

Diagnostic Procedure (Cont'd)

5	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT
1. Turn ignition switch "OFF". 2. Check harness continuity between EVAP control system pressure sensor terminal 3 and engine ground. Refer to Wiring Diagram. **Continuity should exist.** 3. Also check harness for short to power. **OK or NG**	
OK ▶	GO TO 7.
NG ▶	GO TO 6.

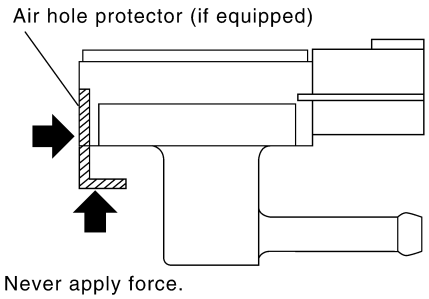
6	DETECT MALFUNCTIONING PART
Check the following. ● Harness connectors B2, M2 ● Harness connectors M81, F49 ● Harness for open between EVAP control system pressure sensor and ECM ● Harness for open between EVAP control system pressure sensor and TCM (Transmission Control Module)	
▶	Repair open circuit or short to power in harness or connectors.

7	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 60 and EVAP control system pressure sensor terminal 2. 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 9.
NG ▶	GO TO 8.

8	DETECT MALFUNCTIONING PART
Check the following. ● Harness connectors B2, M2 ● Harness connectors M81, F49 ● Harness for open or short between ECM and EVAP control system pressure sensor	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

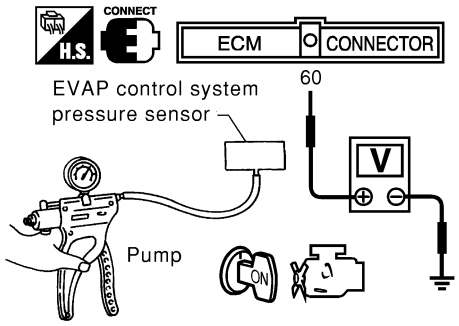
9	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Remove EVAP control system pressure sensor with its harness connector connected.
   CAUTION:
   Never apply force to the air hole protector of the sensor if equipped.



SEF799W

2. Remove hose from EVAP control system pressure sensor.
3. Turn ignition switch "ON".
4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.
   CAUTION:
   - **Always calibrate the vacuum pump gauge when using it.**
   - **Do not apply below −20 kPa (−150 mmHg, −5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure.**
5. Check input voltage between ECM terminal 60 and ground.



SEC908C

Pressure (Relative to atmospheric pressure)	Voltage V
0 kPa (0 mmHg, 0 inHg)	3.0 - 3.6
-9.3 kPa (-70 mmHg, -2.76 inHg)	0.4 - 0.6

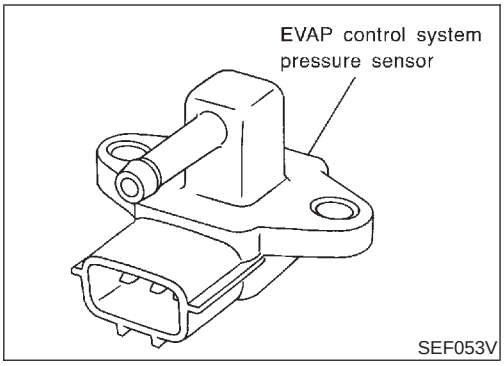
MTBL1159

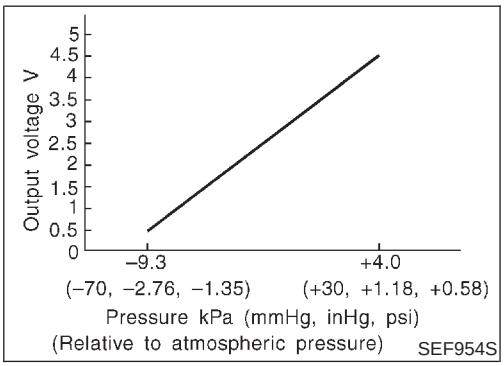
CAUTION:
Discard and EVAP control system pressure sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.

OK or NG

OK	▶	GO TO 10.
NG	▶	Replace EVAP control system pressure sensor.

10	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.	
▶	**INSPECTION END**





Component Description

NFEC0977

The EVAP control system pressure sensor detects pressure in the purge line. The sensor output voltage to the ECM increases as pressure increases. The EVAP control system pressure sensor is not used to control the engine system. It is used only for on board diagnosis.

CONSULT-II Reference Value in Data Monitor Mode

NFEC0978

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
EVAP SYS PRES	• Ignition switch: ON	Approx. 3.4V

On Board Diagnosis Logic

NFEC0980

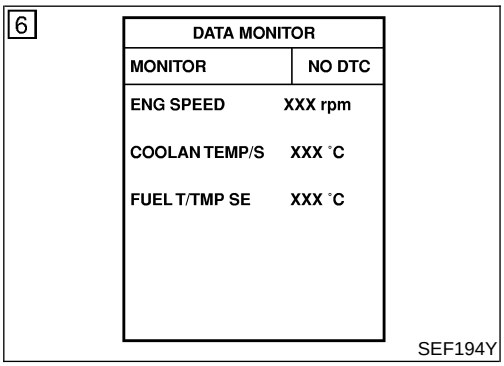
DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0453 0453	EVAP control system pressure sensor high input	An excessively high voltage from the sensor is sent to ECM.	• Harness or connectors (The sensor circuit is open or shorted.) • EVAP control system pressure sensor • EVAP canister vent control valve • EVAP canister • Water separator • Rubber hose from EVAP canister vent control valve to water separator

DTC Confirmation Procedure

NFEC0981

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.

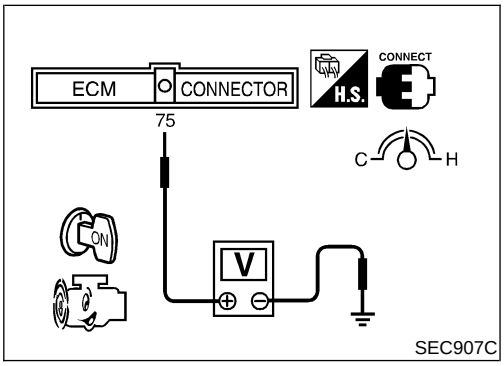
TESTING CONDITION:
Always perform test at a temperature of 5°C (41°F) or more.



WITH CONSULT-II

NFEC0981S01

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) Make sure that “FUEL T/TEMP SE” is more than 0°C (32°F).
6) Start engine and wait at least 20 seconds.
7) If 1st trip DTC is detected, go to “Diagnostic Procedure”, EC-399.



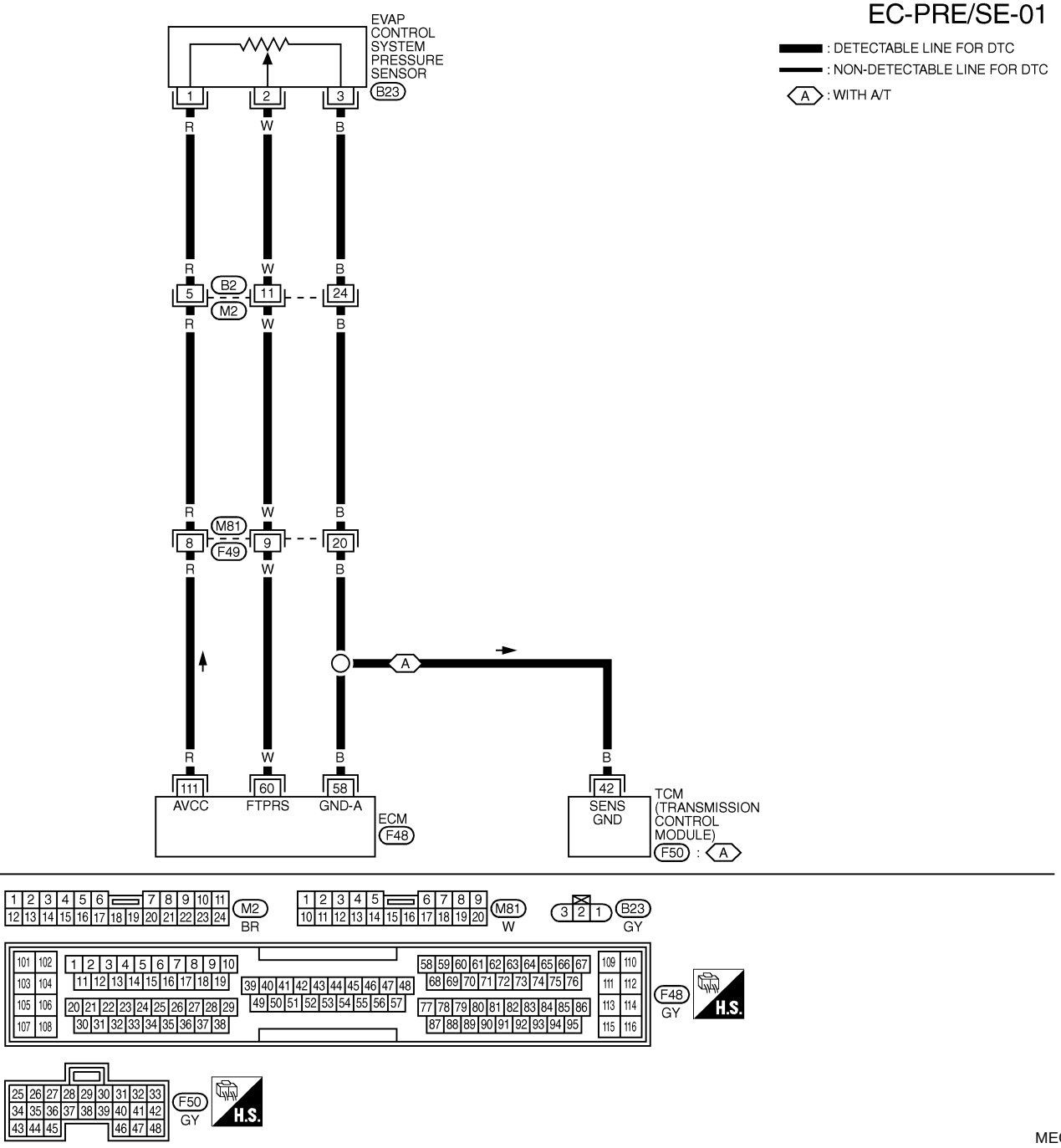
WITH GST

NFEC0981S02

1) Start engine and warm it up to normal operating temperature.
2) Check that voltage between ECM terminal 75 (Fuel tank temperature sensor signal) and ground is less than 4.2V.
3) Turn ignition switch “OFF” and wait at least 10 seconds.
4) Start engine and wait at least 20 seconds.
5) Select “MODE 7” with GST.
6) If 1st trip DTC is detected, go to “Diagnostic Procedure”, EC-399.

Wiring Diagram

NFEC0982



MEC496D

ECM TERMINALS AND REFERENCE VALUE 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	WIRE COLOR	ITEM	CONDITION	DATA (DC)
58	B	SENSORS' GROUND	ENGINE RUNNING AT IDLE SPEED UNDER WARM-UP CONDITION	APPROX. 0V
60	W	EVAP CONTROL SYSTEM PRESSURE SENSOR	IGN ON	APPROX. 3.4V
111	R	SENSORS' POWER SUPPLY	IGN ON	APPROX. 5V

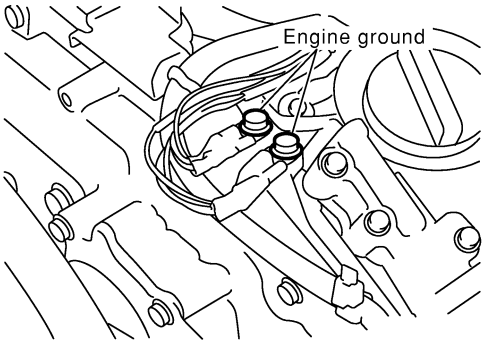
SEF623XC

Diagnostic Procedure

NFEC0983

1	RETIGHTEN GROUND SCREWS

1. Turn ignition switch “OFF”.
2. Loosen and retighten engine ground screws.



SEC047D

	▶	GO TO 2.

2	CHECK CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.
2. Check sensor harness connector for water.

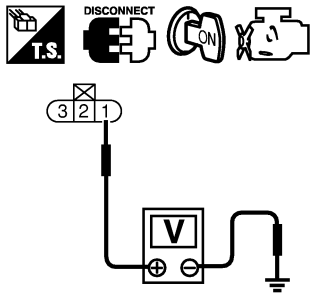
Water should not exist.

OK or NG

OK	▶	GO TO 3.
NG	▶	Repair or replace harness connector.

3	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch “ON”.
2. Check voltage between EVAP control system pressure sensor terminal 1 and ground with CONSULT-II or tester.



SEC063D

Voltage: Approximately 5V

OK or NG

OK	▶	GO TO 5.
NG	▶	GO TO 4.

4	DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors B2, M2
- Harness connectors M81, F49
- Harness for open or short between EVAP control system pressure sensor and ECM

	▶	Repair harness or connectors.

Diagnostic Procedure (Cont'd)

5	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT
1. Turn ignition switch "OFF". 2. Check harness continuity between EVAP control system pressure sensor terminal 3 and engine ground. Refer to Wiring Diagram. **Continuity should exist.** 3. Also check harness for short to power.	
OK or NG	
OK ▶	GO TO 7.
NG ▶	GO TO 6.

6	DETECT MALFUNCTIONING PART
Check the following. ● Harness connectors B2, M2 ● Harness connectors M81, F49 ● Harness for open between EVAP control system pressure sensor and ECM ● Harness for open between EVAP control system pressure sensor and TCM (Transmission Control Module)	
▶	Repair open circuit or short to power in harness or connectors.

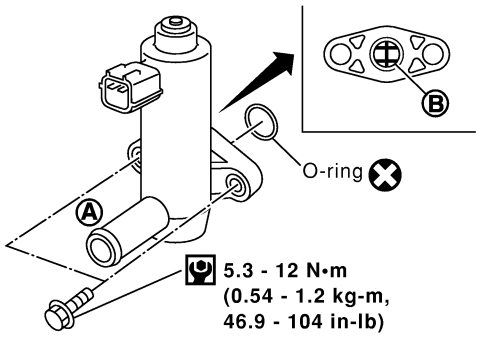
7	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 60 and EVAP control system pressure sensor terminal 2. Refer to Wiring Diagram. **Continuity should exist.** 3. Also check harness for short to ground and short to power.	
OK or NG	
OK ▶	GO TO 9.
NG ▶	GO TO 8.

8	DETECT MALFUNCTIONING PART
Check the following. ● Harness connectors B2, M2 ● Harness connectors M81, F49 ● Harness for open or short between ECM and EVAP control system pressure sensor	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

9	CHECK RUBBER TUBE FOR CLOGGING
1. Disconnect rubber tube connected to EVAP canister vent control valve. 2. Check the rubber tube for clogging.	
OK or NG	
OK ▶	GO TO 10.
NG ▶	Clean the rubber tube using an air blower.

10	CHECK EVAP CANISTER VENT CONTROL VALVE-I

1. Remove EVAP canister vent control valve from EVAP canister.
2. Check portion **B** of EVAP canister vent control valve for being rusted.



SEF376Z

OK or NG

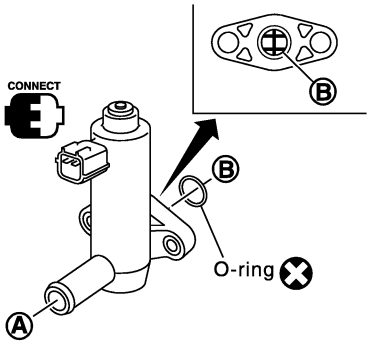
OK	▶	GO TO 11.
NG	▶	Replace EVAP canister vent control valve.

11	CHECK EVAP CANISTER VENT CONTROL VALVE

With CONSULT-II

1. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
2. Check air passage continuity and operation delay time under the following conditions.

ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %
HO2S1 MNTR (B1)	LEAN
HO2S1 MNTR (B2)	LEAN



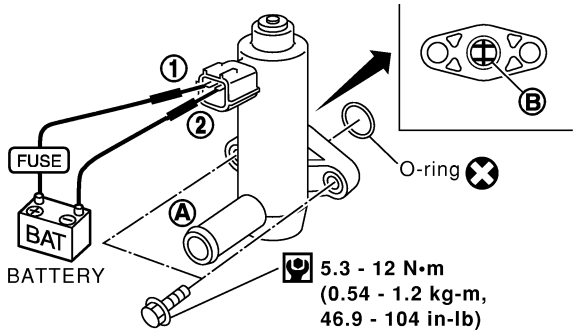
Condition VENT CONTROL/V	Air passage continuity between A and B
ON	No
OFF	Yes

Operation takes less than 1 second.

SEC158D

Without CONSULT-II

Check air passage continuity and operation delay time under the following conditions.



Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	No
OFF	Yes

Operation takes less than 1 second.

SEF378Z

Make sure new O-ring is installed properly.

OK or NG

OK	▶	GO TO 13.
NG	▶	GO TO 12.

Diagnostic Procedure (Cont'd)

12	CHECK EVAP CANISTER VENT CONTROL VALVE-III

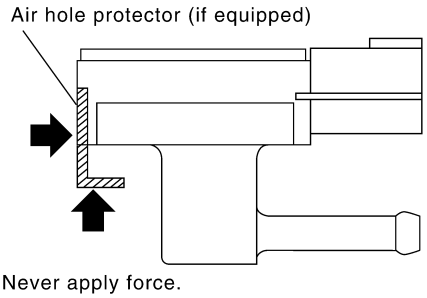
1. Clean the air passage (portion **A** to **B**) of EVAP canister vent control valve using an air blower.
2. Perform Test No. 14 again.

OK or NG

OK	▶	GO TO 13.
NG	▶	Replace EVAP canister vent control valve.

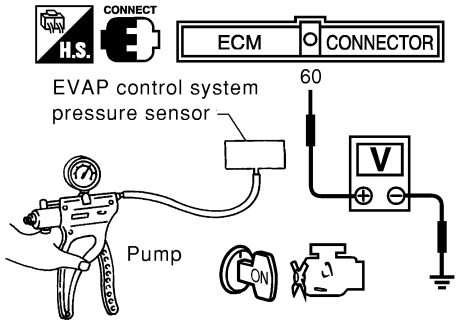
13	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Remove EVAP control system pressure sensor with its harness connector connected.
   CAUTION:
   Never apply force to the air hole protector of the sensor if equipped.



SEF799W

2. Remove hose from EVAP control system pressure sensor.
3. Turn ignition switch "ON".
4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.
   CAUTION:
   - **Always calibrate the vacuum pump gauge when using it.**
   - **Do not apply below −20 kPa (−150 mmHg, −5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure.**
5. Check input voltage between ECM terminal 60 and ground.



SEC908C

Pressure (Relative to atmospheric pressure)	Voltage V
0 kPa (0 mmHg, 0 inHg)	3.0 - 3.6
-9.3 kPa (-70 mmHg, -2.76 inHg)	0.4 - 0.6

MTBL1159

CAUTION:
Discard and EVAP control system pressure 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.

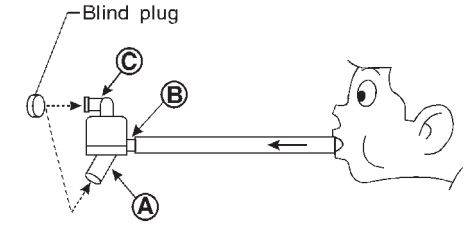
OK or NG

OK	▶	GO TO 14.
NG	▶	Replace EVAP control system pressure sensor.

14	CHECK RUBBER TUBE	
Check obstructed rubber tube connected to EVAP canister vent control valve.		
OK or NG		
OK	▶	GO TO 15.
NG	▶	Clean rubber tube using an air blower, repair or replace rubber tube.

15	CHECK WATER SEPARATOR	

1. Check visually for insect nests in the water separator air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.
4. Check that **A** and **C** are not clogged by blowing air into **B** with **A**, and then **C** plugged.



* Ⓐ: Bottom hole (To atmosphere)
Ⓑ: Emergency tube (From EVAP canister)
Ⓒ: Inlet port (To member)

SEF829T

5. In case of NG in items 2 - 4, replace the parts.

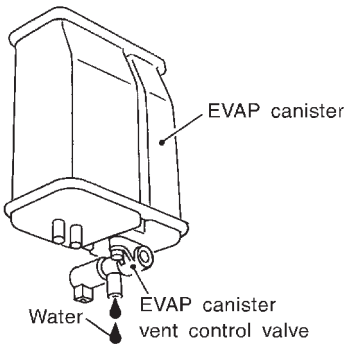
NOTE:
Do not disassemble water separator.

OK or NG

OK	▶	GO TO 16.
NG	▶	Replace water separator.

16	CHECK IF EVAP CANISTER SATURATED WITH WATER	

1. Remove EVAP canister with EVAP canister vent control valve attached.
2. Check if water will drain from the EVAP canister.



SEF596U

Yes or No

Yes	▶	GO TO 17.
No	▶	GO TO 19.

Diagnostic Procedure (Cont'd)

17	CHECK EVAP CANISTER	
Weigh the EVAP canister with the EVAP canister vent control valve attached. **The weight should be less than 1.8 kg (4.0 lb).** **OK or NG**		
OK	▶	GO TO 19.
NG	▶	GO TO 18.

18	DETECT MALFUNCTIONING PART	
Check the following. ● EVAP canister for damage ● EVAP hose between EVAP canister and water separator for clogging or poor connection		
	▶	Repair hose or replace EVAP canister.

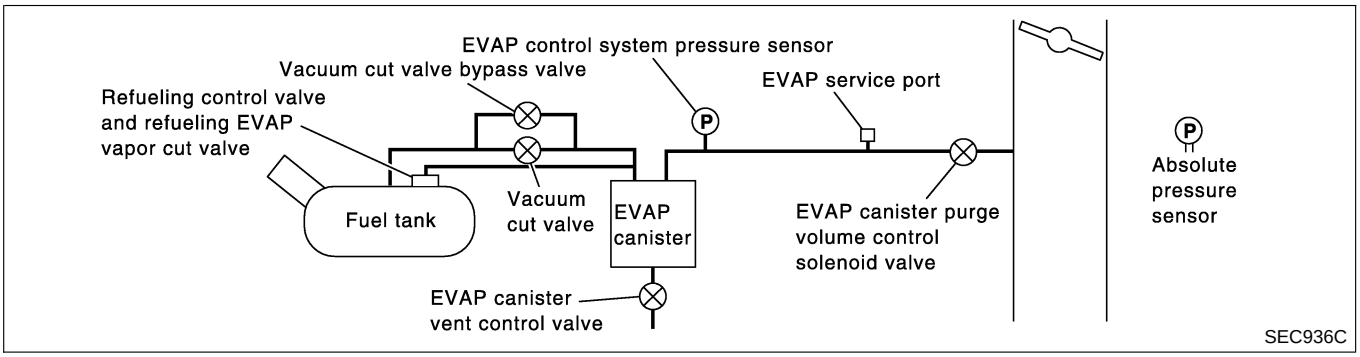
19	CHECK INTERMITTENT INCIDENT	
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.		
	▶	**INSPECTION END**

On Board Diagnosis Logic

NFEC1475

NOTE:
If DTC P0455 is displayed with P1448, perform trouble diagnosis for DTC P1448 first. (See EC-594.)

This diagnosis detects a very large leak (fuel filler cap fell off etc.) in EVAP system between the fuel tank and EVAP canister purge volume control solenoid valve.



Malfunction is detected when EVAP control system has a very large leak such as fuel filler cap fell off, EVAP control system does not operate properly.

CAUTION:

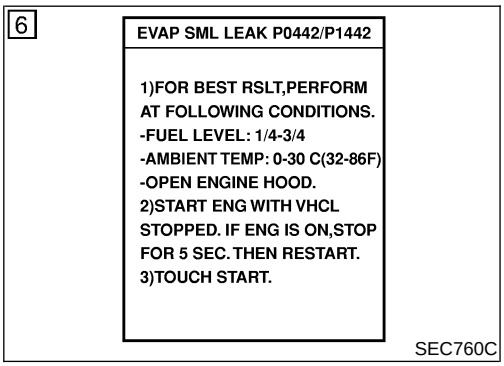
- **Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.**
- **If the fuel filler cap is not tightened properly, the MIL may come on.**
- **Use only a genuine NISSAN rubber tube as a replacement.**

Possible Cause

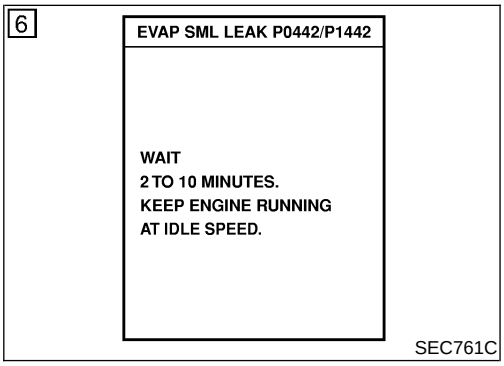
NFEC1476

- Fuel filler cap remains open or fails to close.
- Incorrect fuel tank vacuum relief valve
- Incorrect fuel filler cap used
- Foreign matter caught in fuel filler cap.
- Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve.
- Foreign matter caught in EVAP canister vent control valve.
- EVAP canister or fuel tank leaks
- EVAP purge line (pipe and rubber tube) leaks
- EVAP purge line rubber tube bent.
- Blocked or bent rubber tube to EVAP control system pressure sensor
- Loose or disconnected rubber tube
- EVAP canister vent control valve and the circuit
- EVAP canister purge volume control solenoid valve and the circuit
- Fuel tank temperature sensor
- O-ring of EVAP canister vent control valve is missing or damaged.
- EVAP control system pressure sensor

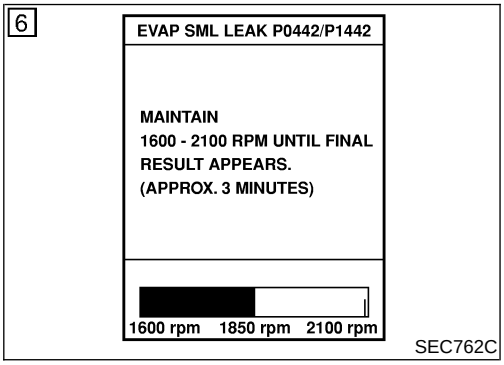
- Refueling control valve
- ORVR system leaks



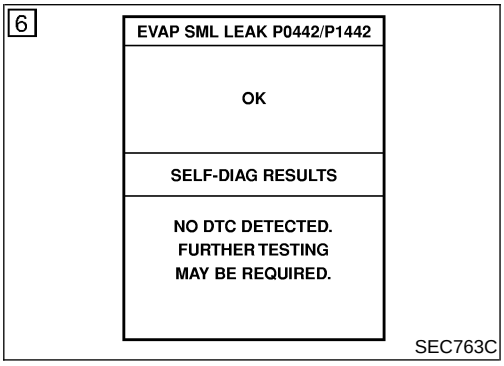
SEC760C



SEC761C



SEC762C



SEC763C

DTC Confirmation Procedure

NFEC1477

CAUTION:

Never remove fuel filler cap during the DTC Confirmation Procedure.

NOTE:

- **If DTC P0455 is displayed with P1448, perform trouble diagnosis for DTC P1448 first. (See EC-594.)**
- **Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.**
- 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:

- **Perform "DTC WORK SUPPORT" when the fuel level is between 1/4 to 3/4 full and vehicle is placed on flat level surface.**
- **Open engine hood before conducting the following procedures.**

WITH CONSULT-II

NFEC1477S01

1) Tighten fuel filler cap securely until ratcheting sound is heard.
2) Turn ignition switch "ON".
3) Turn ignition switch "OFF" and wait at least 10 seconds.
4) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
5) Make sure that the following conditions are met.
   COOLAN TEMP/S: 0 - 70°C (32 - 158°F)
   INT/A TEMP SE: 0 - 60°C (32 - 140°F)
6) Select "EVAP SML LEAK P0442/P1442" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II.
   Follow the instruction displayed.

NOTE:

If the engine speed cannot be maintained within the range displayed on the CONSULT-II screen, go to "Basic Inspection", EC-123.

7) Make sure that "OK" is displayed.
   If "NG" is displayed, select "SELF-DIAG RESULTS" mode and make sure that "EVAP GROSS LEAK [P0455]" is displayed. If it is displayed, refer to "Diagnostic Procedure", EC-407.
   If P0442 is displayed, perform "Diagnostic Procedure" for DTC P0442.

WITH GST

NFEC1477S02

NOTE:
Be sure to read the explanation of "Driving Pattern" on EC-83 before driving vehicle.

1) Start engine.
2) Drive vehicle according to "Driving Pattern", EC-83.
3) Stop vehicle.
4) Select "MODE 1" with GST.
- If SRT of EVAP system is not set yet, go to the following step.
- If SRT of EVAP system is set, the result will be OK.

5) Turn ignition switch "OFF" and wait at least 10 seconds.
6) Start engine.
   It is not necessary to cool engine down before driving.
7) Drive vehicle again according to the "Driving Pattern", EC-83.
8) Stop vehicle.
9) Select "MODE 3" with GST.
- If P0455 is displayed on the screen, go to "Diagnostic Procedure", EC-407.
- If P0442 is displayed on the screen, go to "Diagnostic Procedure", for DTC P0442, EC-363.
- If P0441 is displayed on the screen, go to "Diagnostic Procedure" for DTC P0441, EC-354.
- If P0455, P0442 and P0441 are not displayed on the screen, go to the following step.

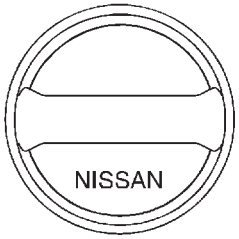
10) Select "MODE 1" with GST.
- If SRT of EVAP system is set, the result will be OK.
- If SRT of EVAP system is not set, go to step 6.

Diagnostic Procedure

NFEC1478

1	CHECK FUEL FILLER CAP DESIGN

1. Turn ignition switch "OFF".
2. Check for genuine NISSAN fuel filler cap design.



SEF915U

OK or NG

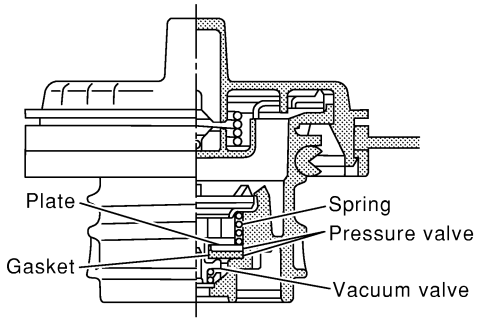
OK	▶	GO TO 2.
NG	▶	Replace with genuine NISSAN fuel filler cap.

2	CHECK FUEL FILLER CAP INSTALLATION
Check that the cap is tightened properly by rotating the cap clockwise. **OK or NG**	
OK ▶	GO TO 3.
NG ▶	• Open fuel filler cap, then clean cap and fuel filler neck threads using air blower. • Retighten until ratcheting sound is heard.

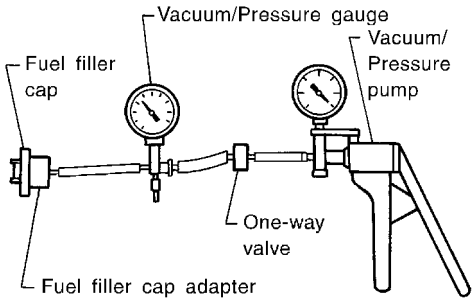
3	CHECK FUEL FILLER CAP FUNCTION
Check for air releasing sound while opening the fuel filler cap. **OK or NG**	
OK ▶	GO TO 5.
NG ▶	GO TO 4.

4 CHECK FUEL TANK VACUUM RELIEF VALVE

1. Wipe clean valve housing.
2. Check valve opening pressure and vacuum.



SEF445Y



SEF943S

Pressure:
15.3 - 20.0 kPa (0.156 - 0.204 kg/cm^2, 2.22 - 2.90 psi)
Vacuum:
−6.0 to −3.3 kPa (−0.061 to −0.034 kg/cm^2, −0.87 to −0.48 psi)

CAUTION:
Use only a genuine fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.

OK or NG

OK ▶	GO TO 5.
NG ▶	Replace fuel filler cap with a genuine one.

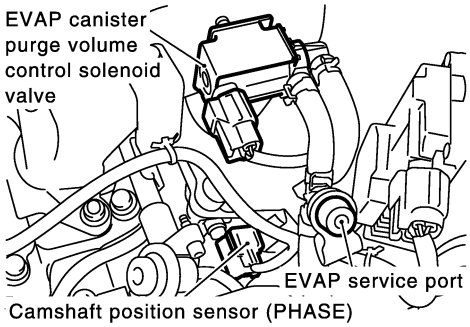
5	CHECK EVAP PURGE LINE	
Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks, improper connection or disconnection. Refer to "Evaporative Emission System", EC-36.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Repair or reconnect the hose.

6	CLEAN EVAP PURGE LINE	
Clean EVAP purge line (pipe and rubber tube) using air blower.		
	▶	GO TO 7.

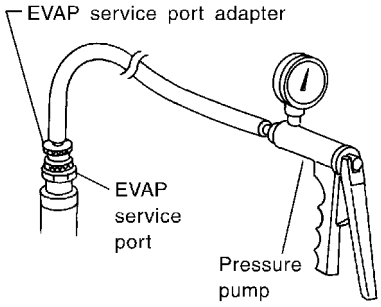
7	CHECK EVAP CANISTER VENT CONTROL VALVE, O-RING AND CIRCUIT	
Refer to "DTC Confirmation Procedure", EC-383.		
OK or NG		
OK	▶	GO TO 8.
NG	▶	Repair or replace EVAP canister vent control valve and O-ring or harness/connector.

8 INSTALL THE PRESSURE PUMP

To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely.



SEC929C



SEF916U

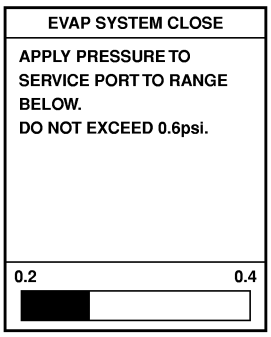
NOTE:
Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.

Models with CONSULT-II	▶	GO TO 9.
Models without CONSULT-II	▶	GO TO 10.

9	CHECK FOR EVAP LEAK

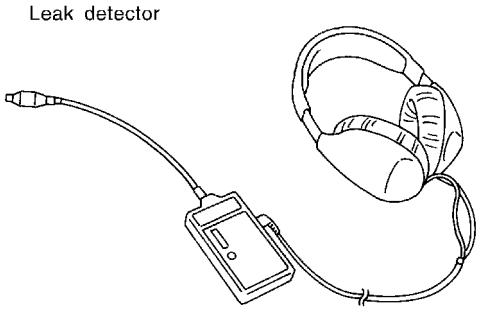
With CONSULT-II

1. Turn ignition switch "ON".
2. Select "EVAP SYSTEM CLOSE" of "WORK SUPPORT" mode with CONSULT-II.
3. Touch "START" and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.
   NOTE:
   - **Never use compressed air or a high pressure pump.**
   - **Do not exceed 4.12 kPa (0.042 kg/cm^2, 0.6 psi) of pressure in the system.**



PEF917U

4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-40.



SEF200U

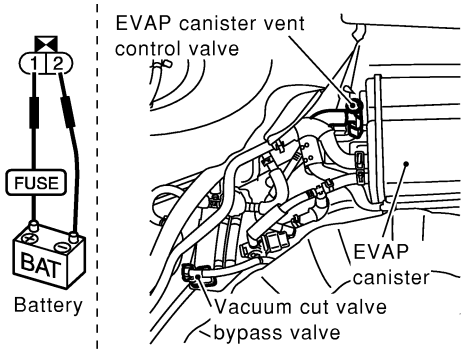
OK or NG

OK	▶	GO TO 11.
NG	▶	Repair or replace.

10	CHECK FOR EVAP LEAK

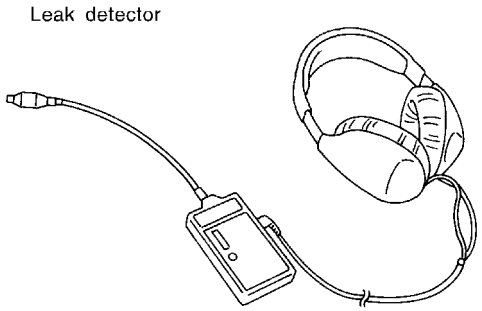
Without CONSULT-II

1. Turn ignition switch "OFF".
2. Apply 12 volts DC to EVAP canister vent control valve. The valve will close. (Continue to apply 12 volts until the end of test.)
3. Apply 12 volts DC to vacuum cut valve bypass valve. The valve will open. (Continue to apply 12V until the end of test.)



SEF254X

4. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.
   NOTE:
   - **Never use compressed air or a high pressure pump.**
   - **Do not exceed 4.12 kPa (0.042 kg/cm^2, 0.6 psi) of pressure in the system.**
5. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-40.



SEF200U

OK or NG

OK	▶	GO TO 12.
NG	▶	Repair or replace.

11	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

With CONSULT-II

1. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
2. Start engine.
3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode.
4. Touch "Qu" on CONSULT-II screen to increase "PURG VOL CONT/V" opening to 100.0%.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

ACTIVE TEST	
PURG VOL CONT/V	0.0%
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %
HO2S1 MNTR (B1)	RICH
HO2S1 MNTR (B2)	RICH

SEC142D

Vacuum should exist.

OK or NG

OK	▶	GO TO 14.
NG	▶	GO TO 13.

12	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Stop engine.
3. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
4. Start engine and let it idle for at least 80 seconds.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

Vacuum should exist.

OK or NG

OK	▶	GO TO 15.
NG	▶	GO TO 13.

13	CHECK VACUUM HOSE

Check vacuum hoses for clogging or disconnection. Refer to "Vacuum Hose Drawing", EC-30.

OK or NG

OK (With CONSULT-II)	▶	GO TO 14.
OK (Without CONSULT-II)	▶	GO TO 15.
NG	▶	Repair or reconnect the hose.

14 **CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE**

With CONSULT-II

1. Start engine.
2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.

ACTIVE TEST	
PURG VOL CONT/V	0.0%
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %
HO2S1 MNTR (B1)	RICH
HO2S1 MNTR (B2)	RICH

SEC142D

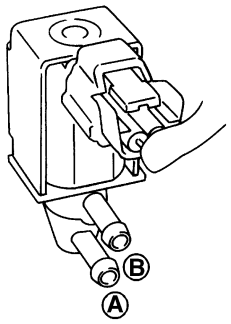
OK or NG

OK	▶	GO TO 16.
NG	▶	GO TO 15.

15 **CHECK 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.

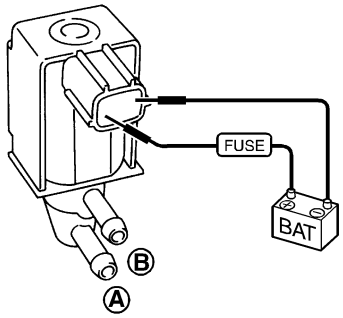


Condition PURG VOL CONT/V value	Air passage continuity between A and B
100.0%	Yes
0.0%	No

SEF334X

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

SEF335X

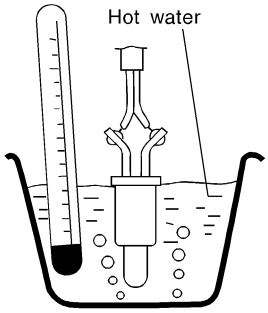
OK or NG

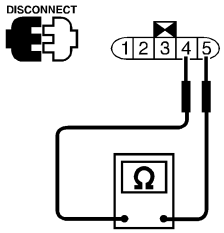
OK	▶	GO TO 16.
NG	▶	Replace EVAP canister purge volume control solenoid valve.

Diagnostic Procedure (Cont'd)

16	CHECK FUEL TANK TEMPERATURE SENSOR

1. Remove fuel level sensor unit.
2. Check resistance between fuel level sensor unit and fuel pump terminals 4 and 5 by heating with hot water or heat gun as shown in the figure.





Temperature °C (°F)	Resistance kΩ
20 (68)	2.3 - 2.7
50 (122)	0.79 - 0.90

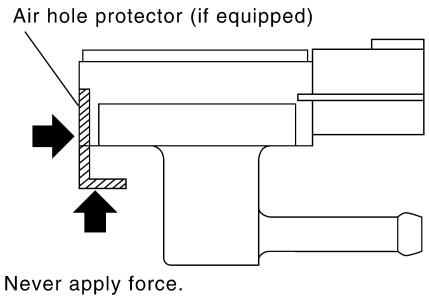
SEF587X

OK or NG

OK	▶	GO TO 17.
NG	▶	Replace fuel level sensor unit.

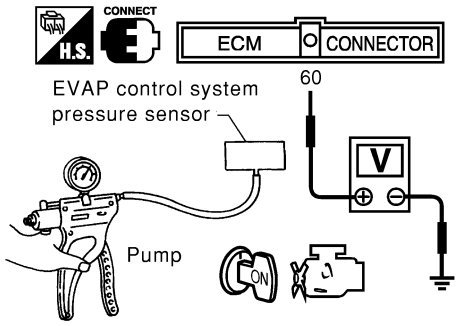
17	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Remove EVAP control system pressure sensor with its harness connector connected.
   CAUTION:
   Never apply force to the air hole protector of the sensor if equipped.



SEF799W

2. Remove hose from EVAP control system pressure sensor.
3. Turn ignition switch "ON".
4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.
   CAUTION:
   - **Always calibrate the vacuum pump gauge when using it.**
   - **Do not apply below −20 kPa (−150 mmHg, −5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure.**
5. Check input voltage between ECM terminal 60 and ground.



SEC908C

Pressure (Relative to atmospheric pressure)	Voltage V
0 kPa (0 mmHg, 0 inHg)	3.0 - 3.6
-9.3 kPa (-70 mmHg, -2.76 inHg)	0.4 - 0.6

MTBL1159

CAUTION:
Discard and EVAP control system pressure 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.

OK or NG

OK	▶	GO TO 18.
NG	▶	Replace EVAP control system pressure sensor.

18	CHECK REFUELING EVAP VAPOR LINE

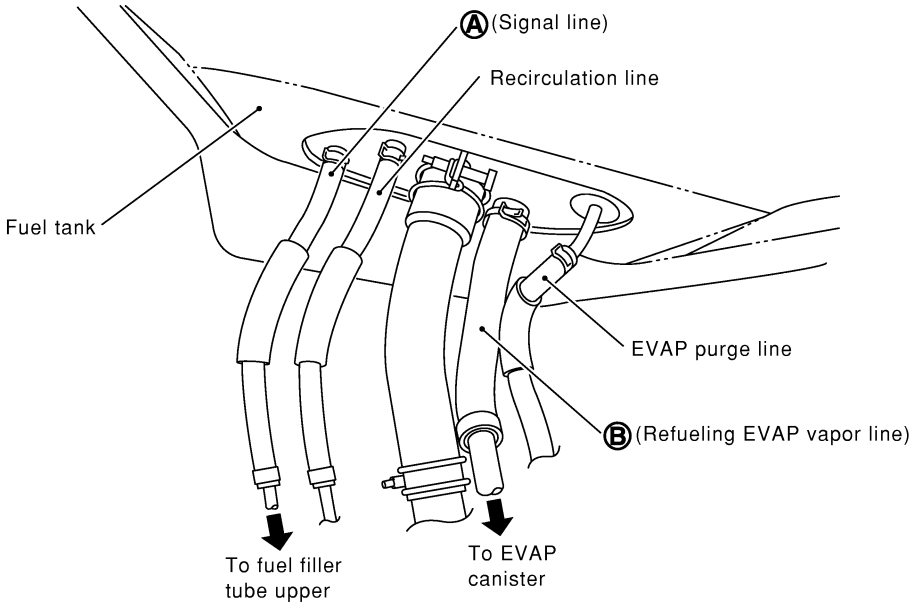
Check refueling EVAP vapor line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to "ON BOARD REFUELING VAPOR RECOVERY (ORVR)", EC-42.

OK or NG

OK	▶	GO TO 19.
NG	▶	Repair or replace hoses and tubes.

19	CHECK SIGNAL LINE AND RECIRCULATION LINE	
Check signal line and recirculation line between filler neck tube and fuel tank for clogging, kink, cracks, looseness and improper connection.		
OK or NG		
OK	▶	GO TO 20.
NG	▶	Repair or replace hoses, tubes or filler neck tube.

20	CHECK REFUELING CONTROL VALVE	
1. Remove fuel filler cap. 2. Check air continuity between hose ends A and B. Blow air into the hose end B. Air should flow freely into the fuel tank. 3. Blow air into hose end A and check there is no leakage. 4. Apply pressure to both hose ends A and B [20 kPa (150 mmHg, 5.91 inHg)] using a pressure pump and a suitable 3-way connector. Check that there is no leakage.		
OK or NG		
OK	▶	GO TO 21.
NG	▶	Replace refueling control valve with fuel tank.

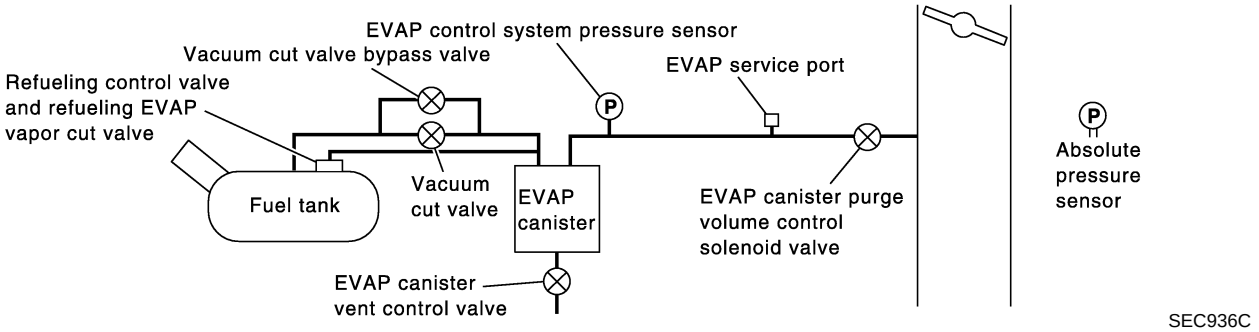


SEF830X

21	CHECK INTERMITTENT INCIDENT	
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.		
	▶	**INSPECTION END**

On Board Diagnosis Logic

NFEC0987

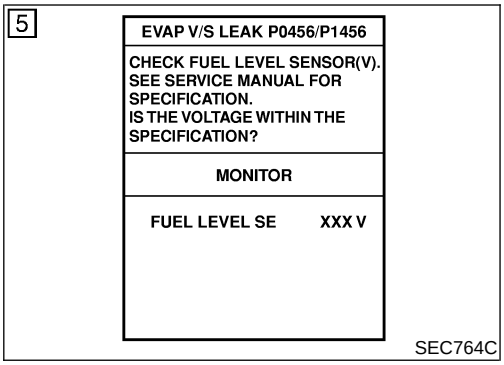


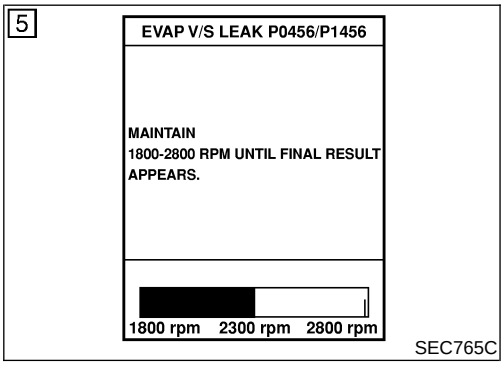
This diagnosis detects very small leaks in the EVAP line between fuel tank and EVAP canister purge volume control solenoid valve, using the intake manifold same as a conventional EVAP small leak diagnosis.
If ECM judges a leak which corresponds to a very small leak, the very small leak P0456 will be detected.
If ECM judges a leak equivalent to a small leak, EVAP small leak P0442 will be detected.
If ECM judges there are no leaks, the diagnosis will be OK.

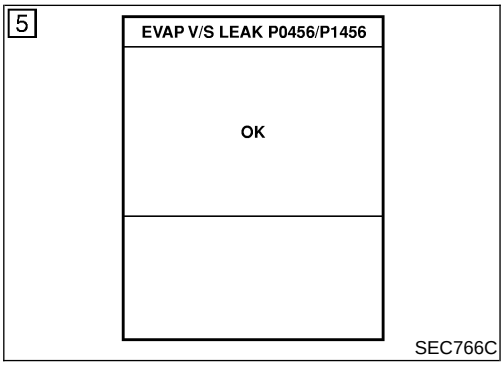
DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0456 0456	Evaporative emission control system very small leak (negative pressure check)	• EVAP system has a very small leak. • EVAP system does not operate properly.	• Incorrect fuel tank vacuum relief valve • Incorrect fuel filler cap used • Fuel filler cap remains open or fails to close. • Foreign matter caught in fuel filler cap • Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve. • Foreign matter caught in EVAP canister vent control valve • EVAP canister or fuel tank leaks • EVAP purge line (Pipe and rubber tube) leaks • EVAP purge line rubber tube bent • Blocked or bent rubber tube to EVAP control system pressure sensor • Loose or disconnected rubber tube • EVAP canister vent control valve and the circuit • EVAP canister purge volume control solenoid valve and the circuit • Absolute pressure sensor • Fuel tank temperature sensor • O-ring of EVAP canister vent control valve is missing or damaged. • Water separator • EVAP canister saturated with water • EVAP control system pressure sensor • Refueling control valve • ORVR system leaks • Fuel level sensor and the circuit • Foreign matter caught in EVAP canister purge volume control solenoid valve

CAUTION:

- **Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.**
- **If the fuel filler cap is not tightened properly, the MIL may come on.**
- **Use only a genuine NISSAN rubber tube as a replacement.**







DTC Confirmation Procedure

NFEC0988

CAUTION:

Never remove fuel filler cap during the DTC confirmation procedure.

NOTE:

- **If DTC P0456 is displayed with P0442, perform TROUBLE DIAGNOSIS FOR DTC P0456 first.**
- If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.
- **After repair, make sure that the hoses and clips are installed properly.**

TESTING CONDITION:

- **Open engine hood before conducting following procedure.**
- **If any of following condition is met just before the DTC confirmation procedure, leave the vehicle for more than 1 hour.**

a) **Fuel filler cap is removed.**
b) **Refilled or drained the fuel.**
c) **EVAP component parts is/are removed.**

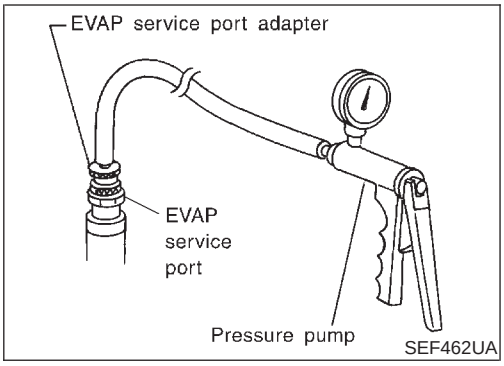
- **Before performing the following procedure, confirm that battery voltage is more than 11V at idle.**

With CONSULT-II

1) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
2) Make sure the following conditions are met.
   FUEL LEVEL SE: 1.08 - 0.2V
   COOLAN TEMP/S: 0 - 32°C (32 - 90°F)
   FUEL T/TMP SE: 0 - 35°C (32 - 95°F)
   INT A/TEMP SE: More than 0°C (32°F)
   If NG, turn ignition switch "OFF" and leave the vehicle in a cool place (soak the vehicle) or refilling/draining fuel until the output voltage condition of the "FUEL LEVEL SE" meets within the range above and leave the vehicle for more than 1 hour. Then start from step 1).
3) Turn ignition switch "OFF" and wait at least 5 seconds.
4) Turn ignition switch "ON".
5) Select "EVP V/S LEAK P0456/P1456" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II.
   Follow the instruction displayed.
6) Make sure that "OK" is displayed.
   If "NG" is displayed, refer to "Diagnostic Procedure", EC-419.

NOTE:

- **If the engine speed cannot be maintained within the range displayed on CONSULT-II screen, go to "Basic Inspection", EC-123.**
- **Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.**



Overall Function Check

NFEC0989

WITH GST

NFEC0989S01

Use this procedure to check the overall function of the EVAP very small leak function. During this check, a DTC might not be confirmed.

CAUTION:

- **Never use compressed air, doing so may damage the EVAP system.**
- **Do not start engine.**
- **Do not exceeded 4.12 kPa (0.042 kg/cm^2, 0.6 psi).**

1) Attach the EVAP service port adapter securely to the EVAP service port.
2) Set the pressure pump and a hose.
3) Also set a vacuum gauge via 3-way connector and a hose.
4) Turn ignition switch “ON”.
5) Connect GST and select mode 8.
6) Using mode 8 control the EVAP canister vent control valve (close) and vacuum cut valve bypass valve (open).
7) Apply pressure and make sure the following conditions are satisfied.
   Pressure to be applied: 2.7 kPa (20 mmHg, 0.79 inHg)
   Time to be waited after the pressure drawn in to the EVAP system and the pressure to be dropped: 60 seconds and the pressure should not be dropped more than 0.4 kPa (3 mmHg, 0.12 inHg)
   If NG, go to diagnostic procedure, EC-419.

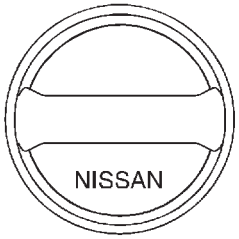
NOTE:
For more information, refer to GST instruction manual.

Diagnostic Procedure

NFEC0990

1	CHECK FUEL FILLER CAP DESIGN

1. Turn ignition switch “OFF”.
2. Check for genuine NISSAN fuel filler cap design.



SEF915U

OK or NG

OK	▶	GO TO 2.
NG	▶	Replace with genuine NISSAN fuel filler cap.

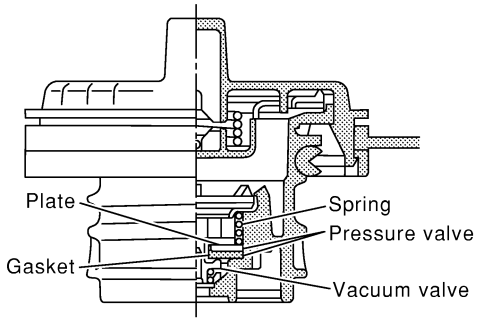
Diagnostic Procedure (Cont'd)

2	CHECK FUEL FILLER CAP INSTALLATION
Check that the cap is tightened properly by rotating the cap clockwise.	
OK or NG	
OK ▶	GO TO 3.
NG ▶	• Open fuel filler cap, then clean cap and fuel filler neck threads using air blower. • Retighten until ratcheting sound is heard.

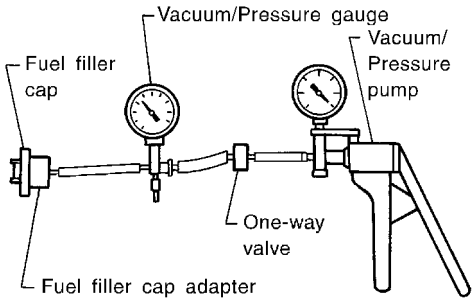
3	CHECK FUEL FILLER CAP FUNCTION
Check for air releasing sound while opening the fuel filler cap.	
OK or NG	
OK ▶	GO TO 5.
NG ▶	GO TO 4.

4 CHECK FUEL TANK VACUUM RELIEF VALVE

1. Wipe clean valve housing.
2. Check valve opening pressure and vacuum.



SEF445Y



SEF943S

Pressure:
15.3 - 20.0 kPa (0.156 - 0.204 kg/cm^2, 2.22 - 2.90 psi)
Vacuum:
−6.0 to −3.3 kPa (−0.061 to −0.034 kg/cm^2, −0.87 to −0.48 psi)

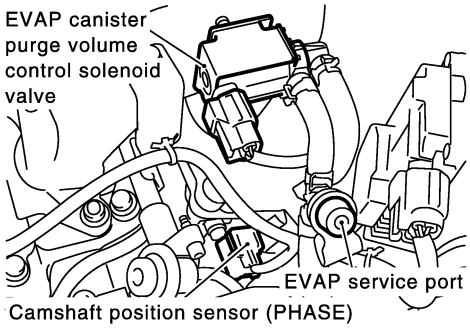
CAUTION:
Use only a genuine fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.

OK or NG

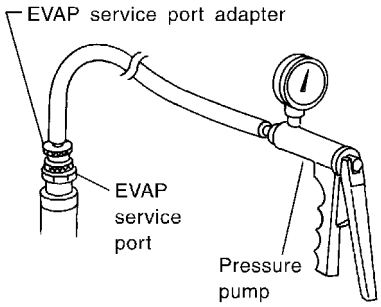
OK ▶	GO TO 5.
NG ▶	Replace fuel filler cap with a genuine one.

5	INSTALL THE PRESSURE PUMP

To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely.



SEC929C



SEF916U

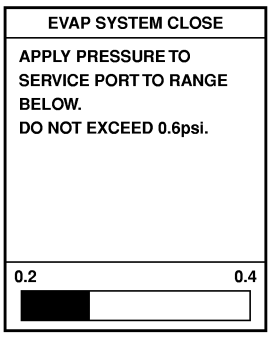
NOTE:
Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.

Models with CONSULT-II ▶	GO TO 6.
Models without CONSULT-II ▶	GO TO 7.

6	CHECK FOR EVAP LEAK

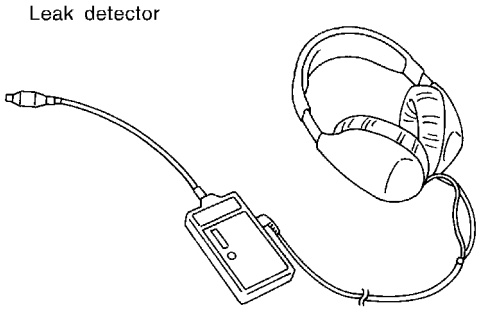
With CONSULT-II

1. Turn ignition switch "ON".
2. Select "EVAP SYSTEM CLOSE" of "WORK SUPPORT" mode with CONSULT-II.
3. Touch "START" and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.
   NOTE:
   - **Never use compressed air or a high pressure pump.**
   - **Do not exceed 4.12 kPa (0.042 kg/cm^2, 0.6 psi) of pressure in the system.**



PEF917U

4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-40.



SEF200U

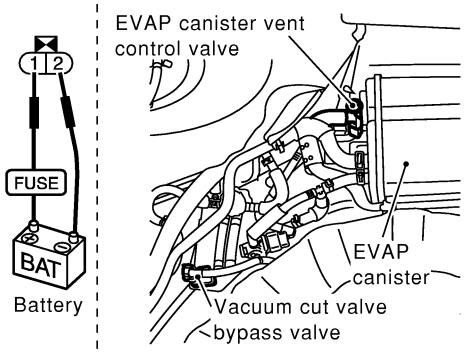
OK or NG

OK	▶	GO TO 8.
NG	▶	Repair or replace.

7	CHECK FOR EVAP LEAK

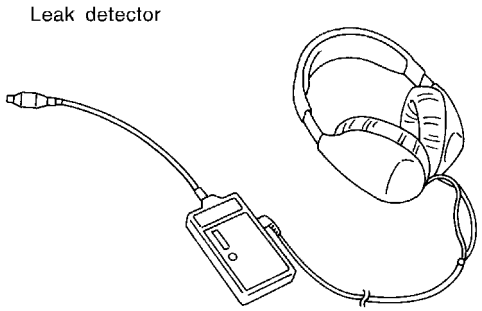
Without CONSULT-II

1. Turn ignition switch "OFF".
2. Apply 12 volts DC to EVAP canister vent control valve. The valve will close. (Continue to apply 12 volts until the end of test.)
3. Apply 12 volts DC to vacuum cut valve bypass valve. The valve will open. (Continue to apply 12V until the end of test.)



SEF254X

4. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.
   NOTE:
   - **Never use compressed air or a high pressure pump.**
   - **Do not exceed 4.12 kPa (0.042 kg/cm^2, 0.6 psi) of pressure in the system.**
5. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-40.



SEF200U

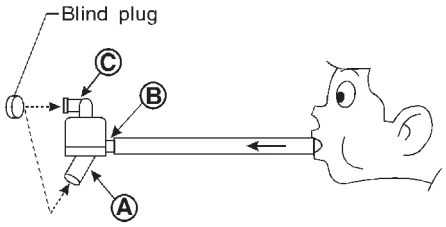
OK or NG

OK	▶	GO TO 8.
NG	▶	Repair or replace.

Diagnostic Procedure (Cont'd)

8	CHECK WATER SEPARATOR

1. Check visually for insect nests in the water separator air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.
4. Check that **A** and **C** are not clogged by blowing air into **B** with **A**, and then **C** plugged.



* Ⓐ: Bottom hole (To atmosphere)
Ⓑ: Emergency tube (From EVAP canister)
Ⓒ: Inlet port (To member)

SEF829T

5. In case of NG in items 2 - 4, replace the parts.

NOTE:
Do not disassemble water separator.

OK or NG

OK	▶	GO TO 9.
NG	▶	Replace water separator.

9	CHECK EVAP CANISTER VENT CONTROL VALVE, O-RING AND CIRCUIT

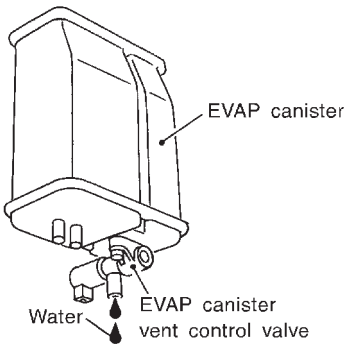
Refer to "DTC Confirmation Procedure", EC-594.

OK or NG

OK	▶	GO TO 10.
NG	▶	Repair or replace EVAP canister vent control valve and O-ring or harness/connector.

10	CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve attached.
2. Does water drain from the EVAP canister?



SEF596U

Yes or No

Yes	▶	GO TO 11.
No (With CONSULT-II)	▶	GO TO 13.
No (Without CONSULT-II)	▶	GO TO 14.

11	CHECK EVAP CANISTER
Weigh the EVAP canister with the EVAP canister vent control valve attached. **The weight should be less than 1.8 kg (4.0 lb).** **OK or NG**	
OK (With CONSULT-II) ▶	GO TO 13.
OK (Without CONSULT-II) ▶	GO TO 14.
NG ▶	GO TO 12.

12	DETECT MALFUNCTIONING PART
Check the following. ● EVAP canister for damage ● EVAP hose between EVAP canister and water separator for clogging or poor connection	
▶	Repair hose or replace EVAP canister.

13	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

With CONSULT-II

1. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
2. Start engine.
3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode.
4. Touch "Qu" on CONSULT-II screen to increase "PURG VOL CONT/V" opening to 100.0%.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

ACTIVE TEST	
PURG VOL CONT/V	0.0%
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %
HO2S1 MNTR (B1)	RICH
HO2S1 MNTR (B2)	RICH

SEC142D

Vacuum should exist.

OK or NG

OK ▶	GO TO 16.
NG ▶	GO TO 15.

14	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Stop engine.
3. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
4. Start engine and let it idle for at least 80 seconds.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

Vacuum should exist.

OK or NG

OK ▶	GO TO 17.
NG ▶	GO TO 15.

Diagnostic Procedure (Cont'd)

15	CHECK VACUUM HOSE	
Check vacuum hoses for clogging or disconnection. Refer to "Vacuum Hose Drawing", EC-30.		
OK or NG		
OK (With CONSULT-II)	▶	GO TO 16.
OK (Without CONSULT-II)	▶	GO TO 17.
NG	▶	Repair or reconnect the hose.

16	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE	
With CONSULT-II 1. Start engine. 2. 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 18.
NG	▶	GO TO 17.

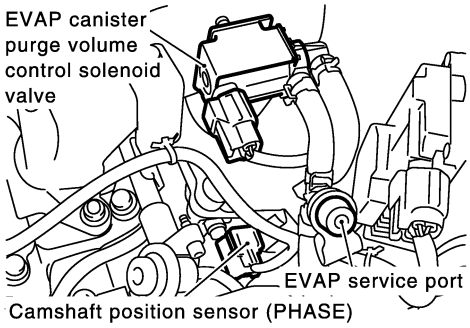
ACTIVE TEST	
PURG VOL CONT/V	0.0%
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %
HO2S1 MNTR (B1)	RICH
HO2S1 MNTR (B2)	RICH

SEC142D

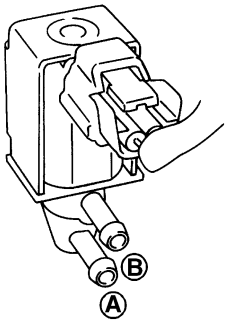
17	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



SEC929C

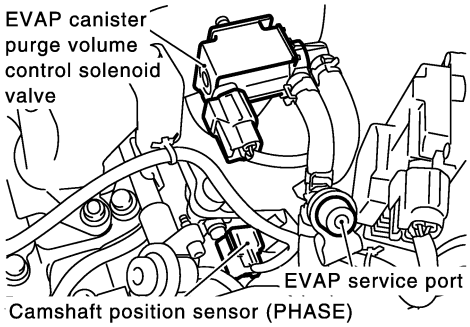


Condition PURG VOL CONT/V value	Air passage continuity between A and B
100.0%	Yes
0.0%	No

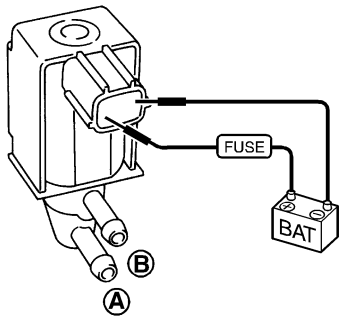
SEF334X

Without CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



SEC929C



Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	Yes
No supply	No

SEF335X

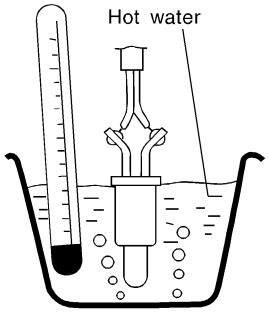
OK or NG

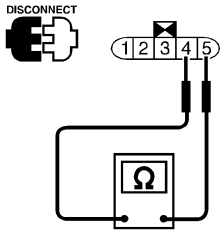
OK	▶	GO TO 18.
NG	▶	Replace EVAP canister purge volume control solenoid valve.

Diagnostic Procedure (Cont'd)

18	CHECK FUEL TANK TEMPERATURE SENSOR

1. Remove fuel level sensor unit.
2. Check resistance between fuel level sensor unit and fuel pump terminals 4 and 5 by heating with hot water or heat gun as shown in the figure.





Temperature °C (°F)	Resistance kΩ
20 (68)	2.3 - 2.7
50 (122)	0.79 - 0.90

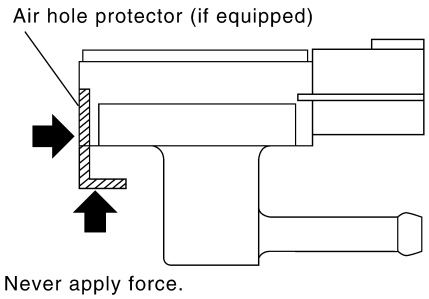
SEF587X

OK or NG

OK	▶	GO TO 19.
NG	▶	Replace fuel level sensor unit.

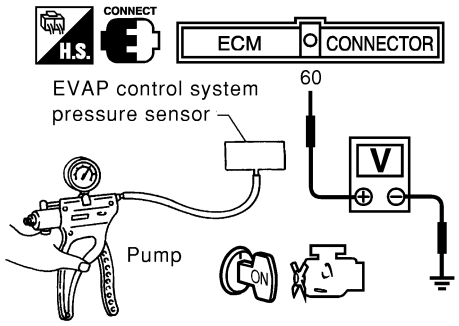
19	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Remove EVAP control system pressure sensor with its harness connector connected.
   CAUTION:
   Never apply force to the air hole protector of the sensor if equipped.



SEF799W

2. Remove hose from EVAP control system pressure sensor.
3. Turn ignition switch "ON".
4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.
   CAUTION:
   - **Always calibrate the vacuum pump gauge when using it.**
   - **Do not apply below −20 kPa (−150 mmHg, −5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure.**
5. Check input voltage between ECM terminal 60 and ground.



SEC908C

Pressure (Relative to atmospheric pressure)	Voltage V
0 kPa (0 mmHg, 0 inHg)	3.0 - 3.6
-9.3 kPa (-70 mmHg, -2.76 inHg)	0.4 - 0.6

MTBL1159

CAUTION:
Discard and EVAP control system pressure 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.

OK or NG

OK	▶	GO TO 20.
NG	▶	Replace EVAP control system pressure sensor.

20	CHECK EVAP PURGE LINE

Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks or improper connection.
Refer to "Evaporative Emission System", EC-36.

OK or NG

OK	▶	GO TO 21.
NG	▶	Repair or reconnect the hose.

Diagnostic Procedure (Cont'd)

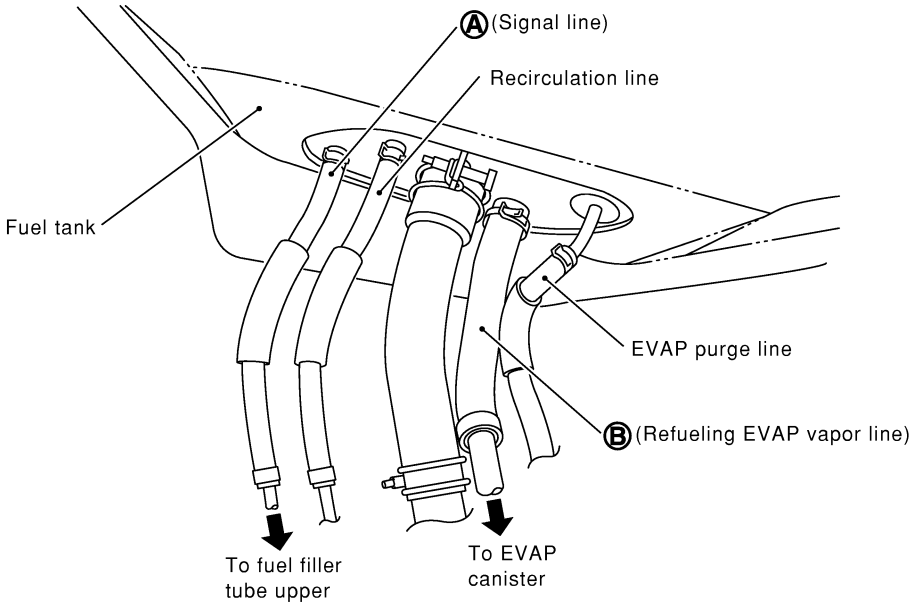
21	CLEAN EVAP PURGE LINE
Clean EVAP purge line (pipe and rubber tube) using air blower.	
▶	GO TO 22.

22	CHECK REFUELING EVAP VAPOR LINE
Check refueling EVAP vapor line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-40.	
OK or NG	
OK ▶	GO TO 23.
NG ▶	Repair or replace hoses and tubes.

23	CHECK SIGNAL LINE AND RECIRCULATION LINE
Check signal line and recirculation line between filler neck tube and fuel tank for clogging, kink, cracks, looseness and improper connection.	
OK or NG	
OK ▶	GO TO 24.
NG ▶	Repair or replace hoses, tubes or filler neck tube.

24 CHECK REFUELING CONTROL VALVE

1. Remove fuel filler cap.
2. Check air continuity between hose ends A and B.
   Blow air into hose end B. Air should flow freely into the fuel tank.
3. Blow air into hose end A and check that there is no leakage.
4. Apply pressure to both hose ends A and B [20 kPa (150 mmHg, 5.91 inHg)] using a pressure pump and a suitable 3-way connector. Check that there is no leakage.



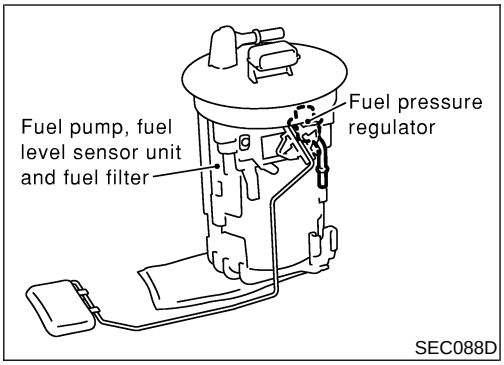
SEF830X

OK or NG

OK ▶	GO TO 25.
NG ▶	Replace or refueling control valve with fuel tank.

25	CHECK FUEL LEVEL SENSOR	
Refer to EL-129, "Fuel Level Sensor Unit Check".		
OK or NG		
OK	▶	GO TO 26.
NG	▶	Replace fuel level sensor unit.

26	CHECK INTERMITTENT INCIDENT	
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.		
	▶	**INSPECTION END**



Component Description

NFEC0991

The fuel level sensor is mounted in the fuel level sensor unit. The sensor detects a fuel level in the fuel tank and transmits a signal to the ECM.

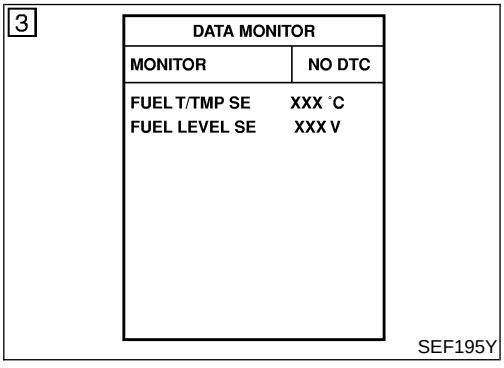
It consists of two parts, one is mechanical float and the other side is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.

On Board Diagnostic Logic

NFEC0992

When the vehicle is parked, naturally the fuel level in the fuel tank is stable. It means that output signal of the fuel level sensor does not change. If ECM senses sloshing signal from the sensor, fuel level sensor malfunction is detected.

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0460 0460	Fuel level sensor circuit noise	Even though the vehicle is parked, a signal being varied is sent from the fuel level sensor to ECM.	• Fuel level sensor circuit (The fuel level sensor circuit is open or shorted.) • Fuel level sensor



DTC Confirmation Procedure

NFEC0993

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

NFEC0993S01

1) Turn ignition switch "ON".
2) Select "DATA MONITOR" mode with CONSULT-II.
3) Start engine and wait maximum of 2 consecutive minutes.
4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-434.

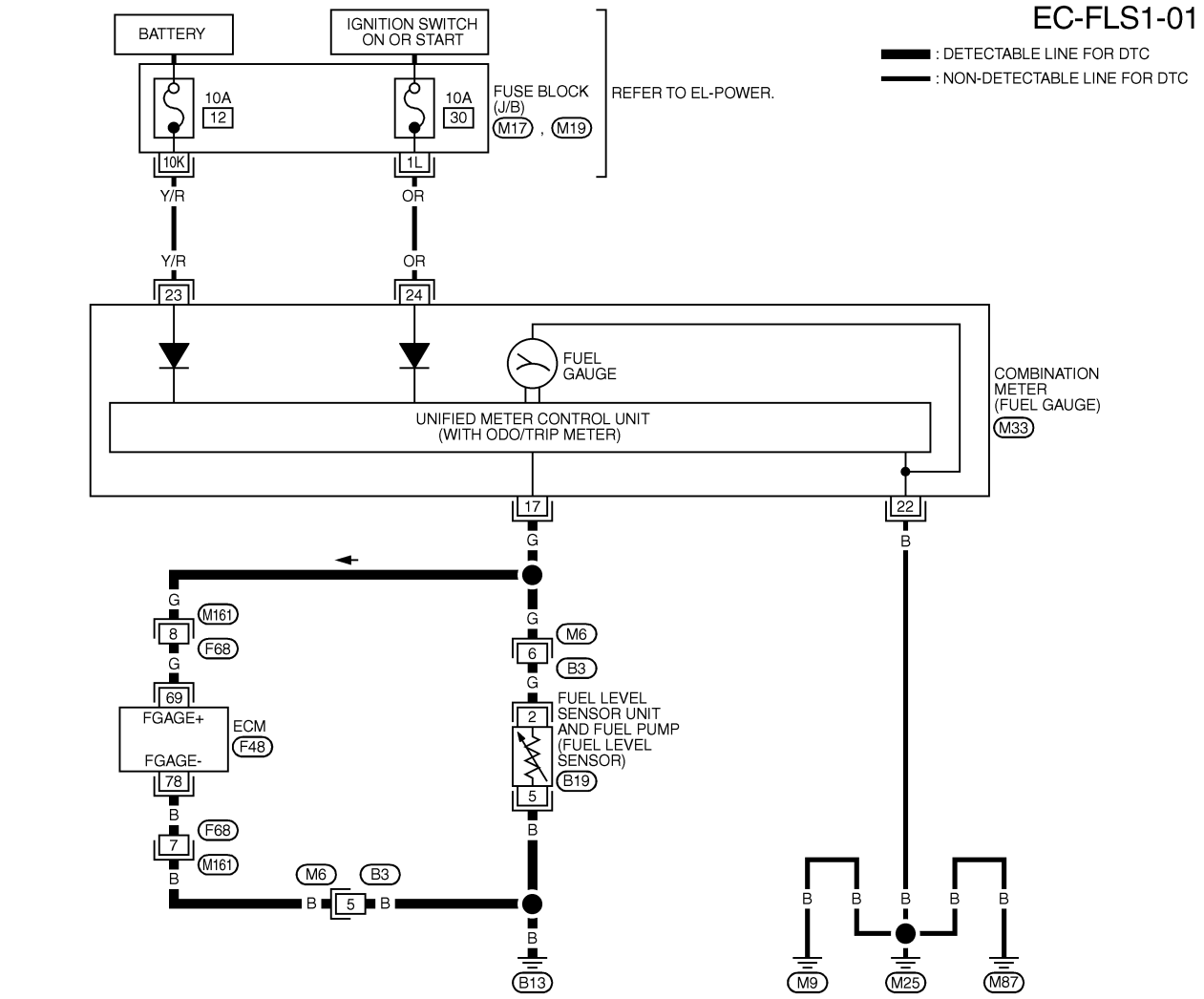
WITH GST

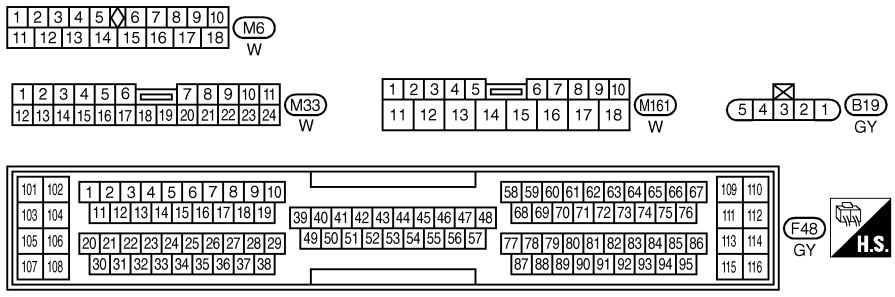
NFEC0993S02

Follow the procedure "WITH CONSULT-II" above.

Wiring Diagram

NFEC0994





REFER TO THE FOLLOWING.
M17 , M19 - FUSE BLOCK - JUNCTION BOX (J/B)

MEC497D

ECM TERMINALS AND REFERENCE VALUE 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	WIRE COLOR	ITEM	CONDITION	DATA (DC)
78	B	FUEL LEVEL SENSOR GROUND	ENGINE RUNNING AT IDLE SPEED	APPROX. 0V
69	G	FUEL LEVEL SENSOR	IGN ON	APPROX. 0 - 4.8V OUTPUT VOLTAGE VARIES WITH FUEL LEVEL.

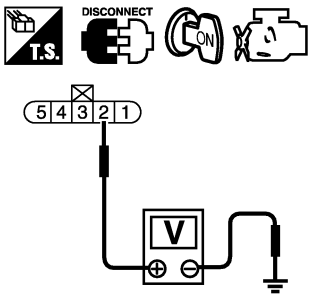
SEF711YB

Diagnostic Procedure

=NFEC0995

1	CHECK FUEL LEVEL SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch “OFF”.
2. Disconnect fuel level sensor unit and fuel pump harness connector.
3. Turn ignition switch “ON”.
4. Check voltage between fuel level sensor unit and fuel pump terminal 2 and ground with CONSULT-II or a tester.



SEC065D

Voltage: Battery voltage

OK or NG

OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors M6, B3
- Harness for open or short between combination meter and fuel level sensor unit and fuel pump

	▶	Repair or replace harness or connectors.

3	CHECK FUEL LEVEL SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch “OFF”.
2. Check harness continuity between fuel level sensor unit and fuel pump terminal 5 and body ground. Refer to Wiring Diagram.
   Continuity should exist.
3. Also check harness for short to power.

OK or NG

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

4	CHECK FUEL LEVEL SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 69 and fuel level sensor unit and fuel pump terminal 2, ECM terminal 78 and fuel level sensor unit and fuel pump terminal 5. Refer to Wiring Diagram.
   Continuity should exist.
3. Also check harness for short to ground and short to power.

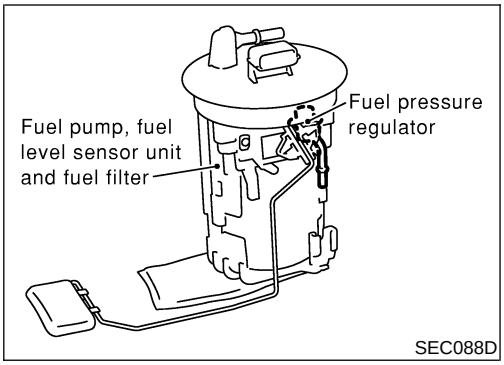
OK or NG

OK	▶	GO TO 6.
NG	▶	GO TO 5.

5	DETECT MALFUNCTIONING PART
Check the following. ● Harness connectors M161, F68 ● Harness connectors M6, B3 ● Harness for open or short between ECM and fuel level sensor unit and fuel pump	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

6	CHECK FUEL LEVEL SENSOR
Refer to EL-129, "Fuel Level Sensor Unit Check".	
OK or NG	
OK ▶	GO TO 7.
NG ▶	Replace fuel level sensor unit and fuel pump.

7	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.	
▶	**INSPECTION END**



Component Description

=NFEC0996

The fuel level sensor is mounted in the fuel level sensor unit. The sensor detects a fuel level in the fuel tank and transmits a signal to the ECM.
It consists of two parts, one is mechanical float and the other side is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.

On Board Diagnostic Logic

NFEC0997

Driving long distances naturally affect fuel gauge level.
This diagnosis detects the fuel gauge malfunction of the gauge not moving even after a long distance has been driven.

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0461 0461	Fuel level sensor circuit range/ performance	The output signal of the fuel level sensor does not change within the specified range even though the vehicle has been driven a long distance.	• Harness or connectors (The level sensor circuit is open or shorted.) • Fuel level sensor

Overall Function Check

NFEC0998

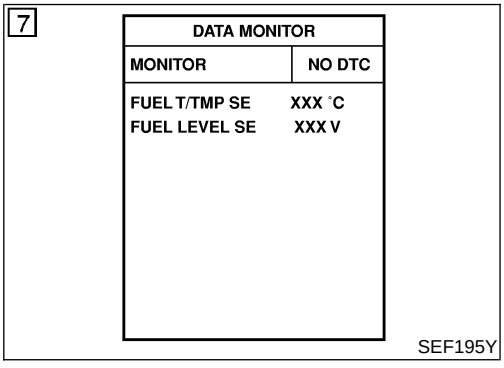
Use this procedure to check the overall function of the fuel level sensor function. During this check, a 1st trip DTC might not be confirmed.

WARNING:

When performing following procedure, be sure to observe the handling of the fuel. Refer to FE-4, “Fuel Tank”.

TESTING CONDITION:

Before starting overall function check, preparation of draining fuel and refilling fuel is required.



WITH CONSULT-II

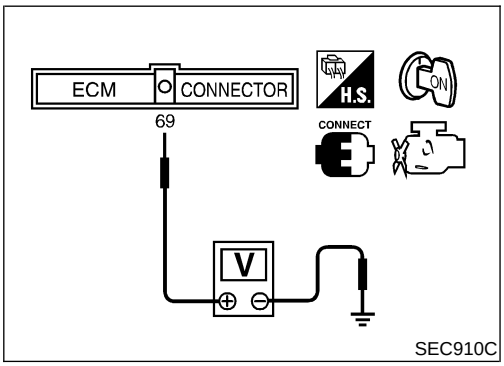
NFEC0998S01

NOTE:

Start from step 11, if it is possible to confirm that the fuel cannot be drained by 30ℓ (7-7/8 US gal, 6-5/8 Imp gal) in advance.

1) Prepare a fuel container and a spare hose.
2) Release fuel pressure from fuel line, refer to “Fuel Pressure Release”, EC-56.
3) Remove the fuel feed hose on the fuel level sensor unit.
4) Connect a spare fuel hose where the fuel feed hose was removed.
5) Turn ignition switch “OFF” and wait at least 10 seconds then turn “ON”.
6) Select “FUEL LEVEL SE” in “DATA MONITOR” mode with CONSULT-II.
7) Check “FUEL LEVEL SE” output voltage and note it.
8) Select “FUEL PUMP” in “ACTIVE TEST” mode with CONSULT-II.
9) Touch “ON” and drain fuel approximately 30ℓ (7-7/8 US gal, 6-5/8 Imp gal) and stop it.
10) Fill fuel into the fuel tank for 30ℓ (7-7/8 US gal, 6-5/8 Imp gal).
11) Check “FUEL LEVEL SE” output voltage and note it.

12) Check "FUEL LEVEL SE" output voltage and confirm whether the voltage changes more than 0.03V during step 7 to 11.
If NG, check the fuel level sensor, refer to EL-129, "FUEL LEVEL SENSOR UNIT CHECK".

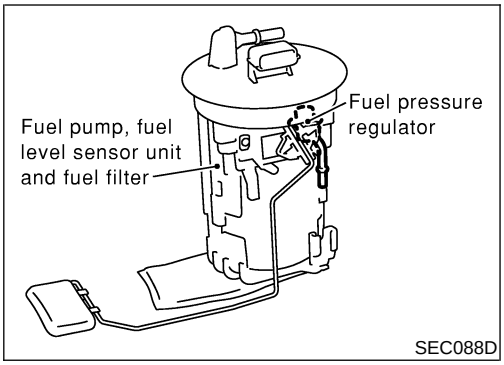


WITH GST

NFEC0998S02

NOTE:
Start from step 11, if it is possible to confirm that the fuel cannot be drained by 30ℓ (7-7/8 US gal, 6-5/8 Imp gal) in advance.

1) Prepare a fuel container and a spare hose.
2) Release fuel pressure from fuel line, refer to "Fuel Pressure Release", EC-56.
3) Remove the fuel feed hose on the fuel level sensor unit.
4) Connect a spare fuel hose where the fuel feed hose was removed.
5) Turn ignition switch "OFF".
6) Set voltmeters probe between ECM terminal 69 (fuel level sensor signal) and ground.
7) Turn ignition switch "ON".
8) Check voltage between ECM terminal 69 and ground and note it.
9) Drain fuel by 30ℓ (7-7/8 US gal, 6-5/8 Imp gal) from the fuel tank using proper equipment.
10) Fill fuel into the fuel tank for 30ℓ (7-7/8 US gal, 6-5/8 Imp gal).
11) Confirm that the voltage between ECM terminal 69 and ground changes more than 0.03V during step 8 - 10.
If NG, check component of fuel level sensor, refer to EL-129, "FUEL LEVEL SENSOR UNIT CHECK".



Component Description

NFEC0999

The fuel level sensor is mounted in the fuel level sensor unit. The sensor detects a fuel level in the fuel tank and transmits a signal to the ECM.

It consists of two parts, one is mechanical float and the other side is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.

On Board Diagnostic Logic

NFEC1000

ECM receives two signals from the fuel level sensor circuit.

One is fuel level sensor power supply circuit, and the other is fuel level sensor ground circuit.

This diagnosis indicates the former, to detect open or short circuit malfunction.

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0462 0462	Fuel level sensor circuit low input	An excessively low voltage is sent from the sensor is sent to ECM.	• Harness or connectors (The sensor circuit is open or shorted.) • Fuel level sensor
P0463 0463	Fuel level sensor circuit high input	An excessively high voltage is sent from the sensor is sent to ECM.	

DTC Confirmation Procedure

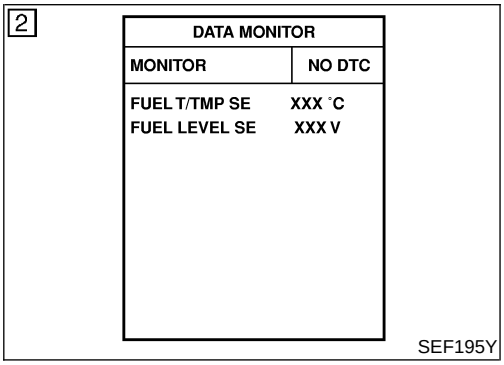
NFEC1001

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 ignition switch “ON”.



WITH CONSULT-II

NFEC1001S01

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 “Diagnostic Procedure”, EC-440.

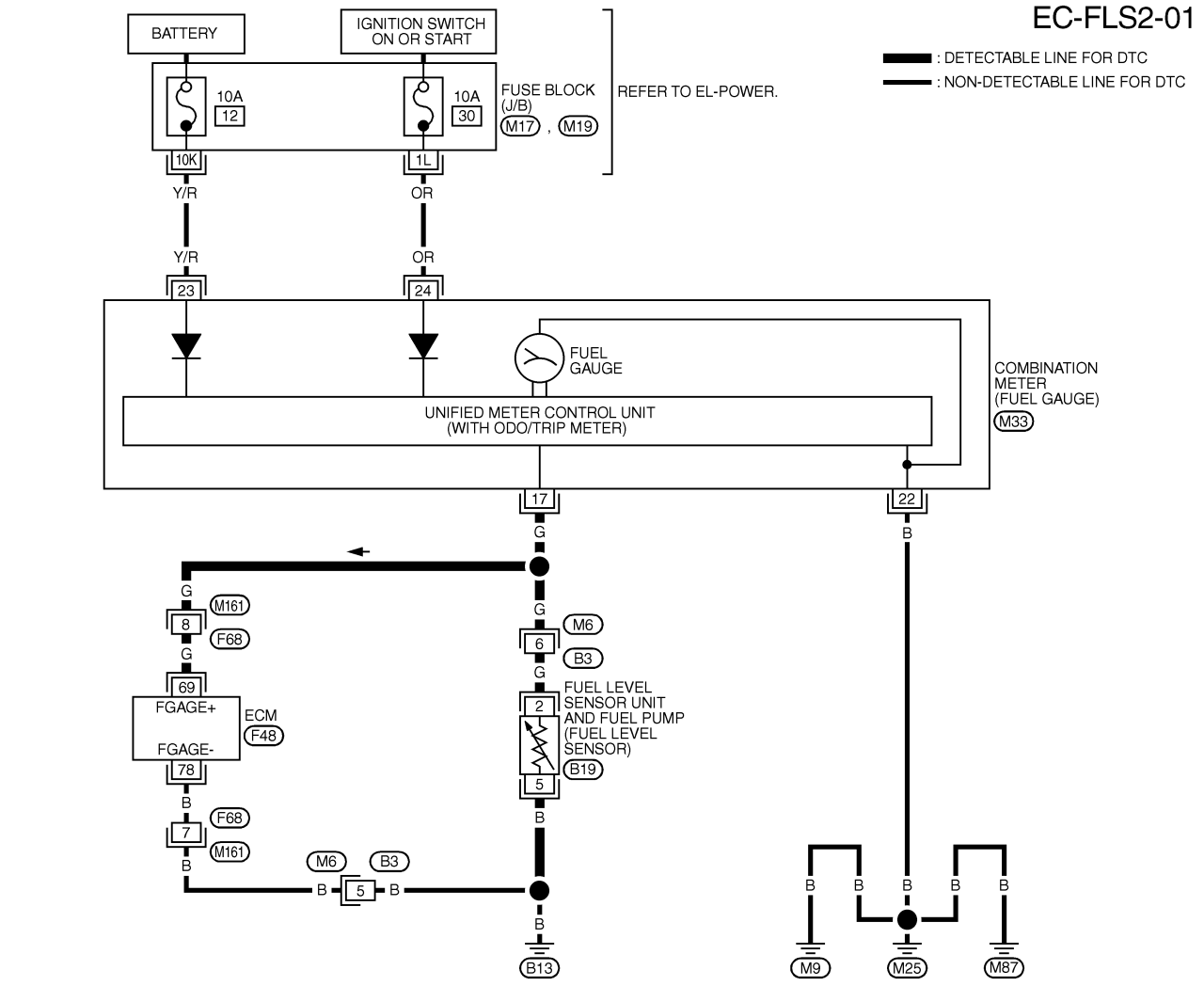
WITH GST

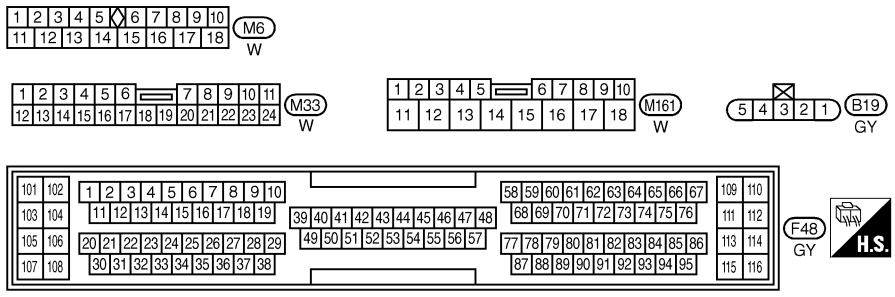
NFEC1001S02

Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

NFEC1002





REFER TO THE FOLLOWING.
M17 , M19 - FUSE BLOCK - JUNCTION BOX(J/B)

MEC498D

ECM TERMINALS AND REFERENCE VALUE 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	WIRE COLOR	ITEM	CONDITION	DATA (DC)
78	B	FUEL LEVEL SENSOR GROUND	ENGINE RUNNING AT IDLE SPEED	APPROX. 0V
69	G	FUEL LEVEL SENSOR	IGN ON	APPROX. 0 - 4.8V OUTPUT VOLTAGE VARIES WITH FUEL LEVEL.

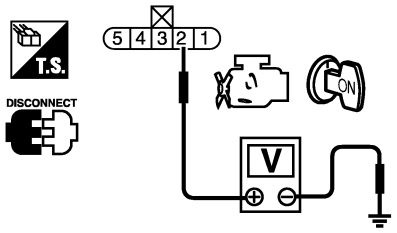
SEF711YB

Diagnostic Procedure

=NFEC1003

1	CHECK FUEL LEVEL SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch “OFF”.
2. Disconnect fuel level sensor unit and fuel pump harness connector.
3. Turn ignition switch “ON”.
4. Check voltage between fuel level sensor unit and fuel pump terminal 2 and ground with CONSULT-II or tester.



SEC220D

Voltage: Battery voltage

OK or NG

OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors M6, B3
- Harness for open or short between combination meter and fuel level sensor unit

	▶	Repair or replace harness or connectors.

3	CHECK FUEL LEVEL SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch “OFF”.
2. Check harness continuity between fuel level sensor unit terminal 5 and body ground. Refer to Wiring Diagram.
   Continuity should exist.
3. Also check harness for short to power.

OK or NG

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

4	CHECK FUEL LEVEL SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 69 and fuel level sensor and fuel pump terminal 2. Refer to Wiring Diagram.
   Continuity should exist.
3. 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 F68, M161 ● Harness connectors M6, B3 ● Harness for open between ECM and fuel level sensor	
▶	Repair open circuit or short to power in harness on connectors.

6	CHECK FUEL LEVEL SENSOR
Refer to EL-129, "Fuel Level Sensor Unit Check".	
OK or NG	
OK ▶	GO TO 7.
NG ▶	Replace fuel level sensor unit.

7	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.	
▶	**INSPECTION END**

Component Description

=NFEC1004

The vehicle speed sensor signal is sent from ABS actuator and electric unit or ABS/TCS control unit to combination meter. The combination meter then sends a signal to the ECM.

On Board Diagnosis Logic

NFEC1006

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 signal is sent to ECM even when vehicle is being driven.	• Harness or connector (The vehicle speed sensor signal circuit is open or shorted.) • ABS actuator and electric unit or ABS/TCS control unit • Combination meter

DTC Confirmation Procedure

NFEC1007

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.

5

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
B/FUEL SCHDL	XXX msec
PW/ST SIGNAL	OFF
VHCL SPEED SE	XXX km/h

SEF196Y

WITH CONSULT-II

NFEC1007S01

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 “Diagnostic Procedure”, EC-445.
   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 10 consecutive seconds.

ENG SPEED	More than 1,800 rpm (A/T) More than 2,000 rpm (M/T)
COOLAN TEMP/S	More than 70°C (158°F)
B/FUEL SCHDL	5.5 - 14.0 msec (A/T) 6.0 - 14.0 msec (M/T)
Selector lever	Suitable position
PW/ST SIGNAL	OFF

6) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-445.

Overall Function Check

NFEC1008

Use this procedure to check the overall function of the vehicle speed sensor signal circuit. During this check, a 1st trip DTC might not be confirmed.

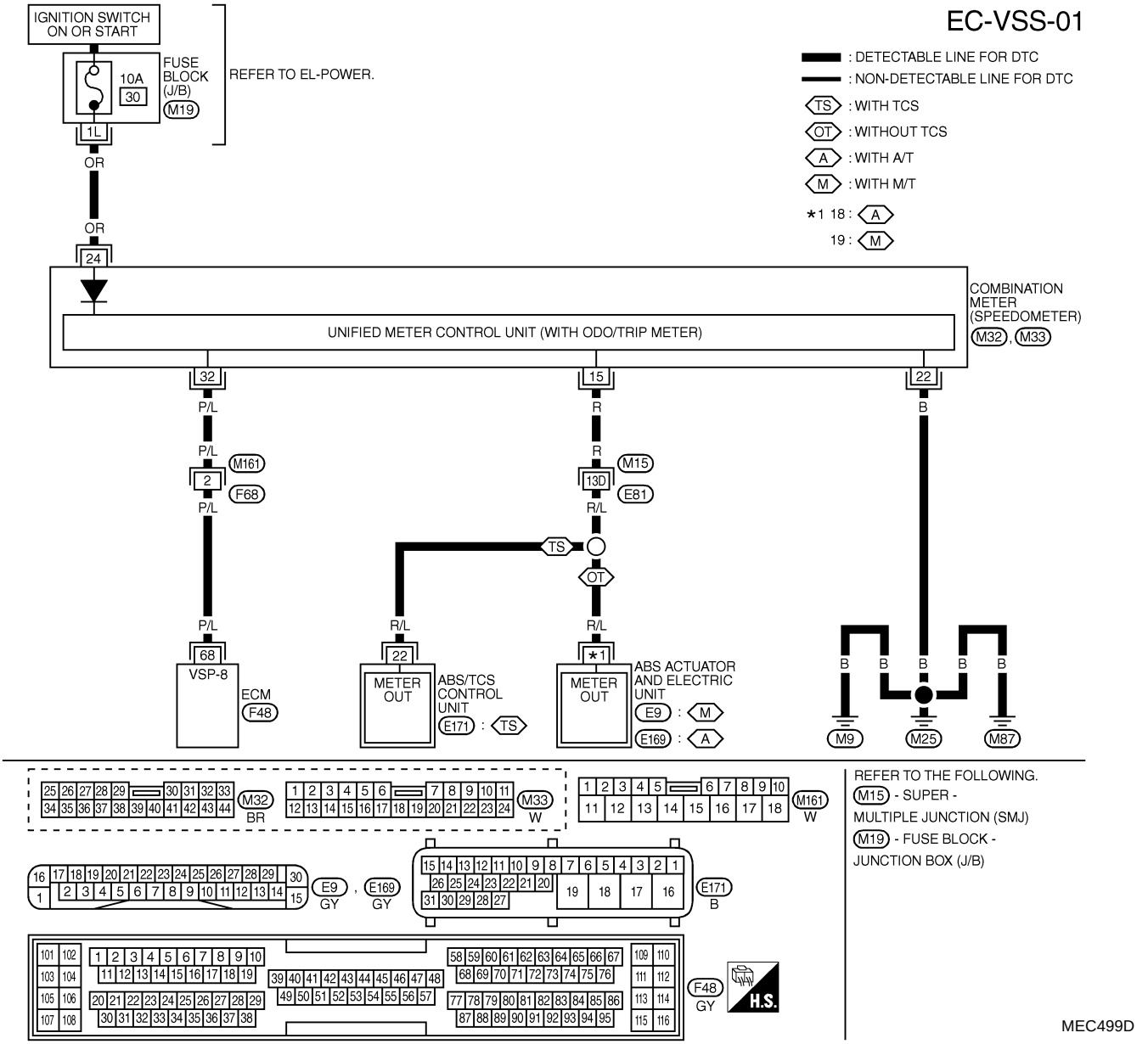
WITH GST

NFEC1008S01

1) Lift up drive wheels.
2) Start engine.
3) Read vehicle speed sensor signal in "MODE 1" with GST.
   The vehicle speed sensor 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 "Diagnostic Procedure", EC-445.

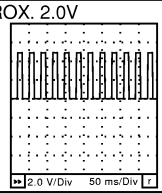
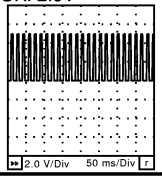
Wiring Diagram

=NFEC1009



MEC499D

ECM TERMINALS AND REFERENCE VALUE 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	WIRE COLOR	ITEM	CONDITION	DATA (DC)
68	P/L	VEHICLE SPEED SENSOR	VEHICLE DRIVING AT 10 KM/H (6 MPH) IN 1ST GEAR POSITION UNDER LIFTED UP CONDITION	APPROX. 2.0V 
			VEHICLE DRIVING AT 30 KM/H (19 MPH) IN 2ND GEAR POSITION UNDER LIFTED UP CONDITION	APPROX. 2.5V 

SEC045D

Diagnostic Procedure

NFEC1010

1	CHECK VEHICLE SPEED SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch “OFF”.
2. Disconnect ECM harness connector and combination meter harness connector M32.
3. Check harness continuity between ECM terminal 68 and combination meter terminal 32.
   Refer to Wiring Diagram.
   Continuity should exist.
4. Also check harness for short to power.

OK or NG

OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors M161, F68
- Harness for open or short between ECM and combination meter

	▶	Repair open circuit or short to ground or short to power in harness or connectors.

3	CHECK COMBINATION METER FUNCTION

Make sure that speedometer functions properly.

OK or NG

OK	▶	GO TO 5.
NG	▶	GO TO 4.

4	CHECK COMBINATION METER CIRCUIT FOR OPEN AND SHORT

Check the following.
- Harness connectors M15, E81
- Harness for open or short between combination meter and ABS actuator and electric unit or ABS/TCS control unit
- Harness for open between combination meter and ground

OK or NG

OK	▶	Check combination meter and ABS actuator and electric unit or ABS/TCS control unit. Refer to EL section.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

5	CHECK INTERMITTENT INCIDENT

Refer to “TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT”, EC-156.

	▶	**INSPECTION END**

Description

NFEC0787

NOTE:
If DTC P0506 is displayed with other DTC, first perform the trouble diagnosis for the other DTC.

The ECM controls the engine idle speed to a specified level through the fine adjustment of the air, which is let into the intake manifold, by operating the electric throttle control actuator. The operating of the throttle valve is varied to allow for optimum control of the engine idling speed. The crankshaft position sensor (POS) detects the actual engine speed and sends a signal to the ECM.
The ECM controls the electric throttle control actuator so that the engine speed coincides with the target value memorized in the ECM. The target engine speed is the lowest speed at which the engine can operate steadly. The optimum value stored in the ECM is determined by taking into consideration various engine conditions, such as during warming up, deceleration, and engine load (air conditioner, power steering and cooling fan operation, etc.).

On Board Diagnosis Logic

NFEC0790

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0506 0506	Idle speed control system RPM lower than expected	The idle speed is not in the specified range.	● Electric throttle control actuator ● Intake air leak

DTC Confirmation Procedure

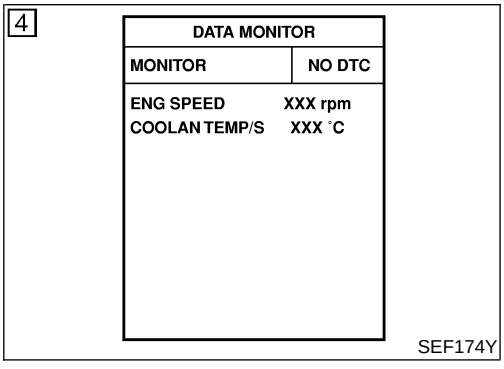
NFEC0792

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.
- **If the target idle speed is out of the specified value, perform “Idle Air Volume Learning”, Idle Air Volume Learning , before conducting “DTC Confirmation Procedure”. For the target idle speed, refer to the “Service Data and Specifications (SDS)”, EC-749.**

TESTING CONDITION:

- **Before performing the following procedure, confirm that battery voltage is more than 11V at idle.**
- **Always perform the test at a temperature above −10°C (14°F).**



WITH CONSULT-II

NFEC0792S03

1) Open engine hood.
2) Start engine and warm it up to normal operating temperature.
3) Turn ignition switch “OFF” and wait at least 10 seconds.
4) Turn ignition switch “ON” again and select “DATA MONITOR” mode with CONSULT-II.
5) Start engine and run it for at least 1 minute at idle speed.
6) If 1st trip DTC is detected, go to “Diagnostic Procedure”, EC-447.

WITH GST

NFEC0792S04

Follow the procedure "With CONSULT-II" above.

Diagnostic Procedure

NFEC0794

1	CHECK INTAKE AIR LEAK	
1. Start engine and let it idle. 2. Listen for an intake air leak after the mass air flow sensor.		
OK or NG		
OK	▶	GO TO 2.
NG	▶	Discover air leak location and repair.

2	REPLACE ECM	
1. Stop engine. 2. Replace ECM. 3. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to "NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM — NATS)", EC-92. 4. Perform "Accelerator Pedal Released Position Learning", EC-71. 5. Perform "Throttle Valve Closed Position Learning", EC-71. 6. Perform "Idle Air Volume Learning", EC-71.		
	▶	**INSPECTION END**

Description

NFEC0795

NOTE:
If DTC P0507 is displayed with other DTC, first perform the trouble diagnosis for the other DTC.

The ECM controls the engine idle speed to a specified level through the fine adjustment of the air, which is let into the intake manifold, by operating the electric throttle control actuator. The operating of the throttle valve is varied to allow for optimum control of the engine idling speed. The crankshaft position sensor (POS) detects the actual engine speed and sends a signal to the ECM.
The ECM controls the electric throttle control actuator so that the engine speed coincides with the target value memorized in the ECM. The target engine speed is the lowest speed at which the engine can operate steadly. The optimum value stored in the ECM is determined by taking into consideration various engine conditions, such as during warming up, deceleration, and engine load (air conditioner, power steering and cooling fan operation, etc.).

On Board Diagnosis Logic

NFEC0798

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P0507 0507	Idle speed control system RPM higher than expected	The idle speed is not in the specified range.	● Electric throttle control actuator ● Intake air leak

DTC Confirmation Procedure

NFEC0800

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.
- **If the target idle speed is out of the specified value, perform “Idle Air Volume Learning”, Idle Air Volume Learning , before conducting “DTC Confirmation Procedure”. For the target idle speed, refer to the “Service Data and Specifications (SDS)”, EC-749.**

TESTING CONDITION:

- **Before performing the following procedure, confirm that battery voltage is more than 11V at idle.**
- **Always perform the test at a temperature above −10°C (14°F).**

4

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEF174Y

WITH CONSULT-II

NFEC0800S03

1) Open engine hood.
2) Start engine and warm it up to normal operating temperature.
3) Turn ignition switch “OFF” and wait at least 10 seconds.
4) Turn ignition switch “ON” again and select “DATA MONITOR” mode with CONSULT-II.
5) Start engine and run it for at least 1 minute at idle speed.
6) If 1st trip DTC is detected, go to “Diagnostic Procedure”, EC-449.

WITH GST

NFEC0800S04

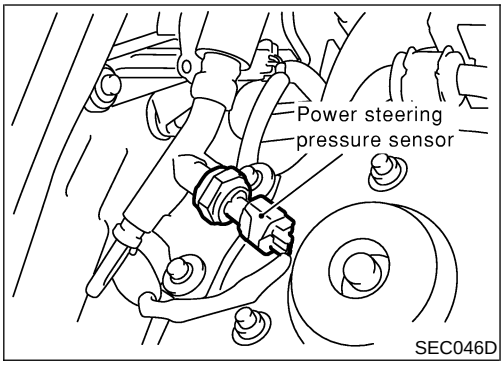
Follow the procedure "With CONSULT-II" above.

Diagnostic Procedure

NFEC0802

1	CHECK INTAKE AIR LEAK	
1. Start engine and let it idle. 2. Listen for an intake air leak after the mass air flow sensor.		
OK or NG		
OK	▶	GO TO 2.
NG	▶	Discover air leak location and repair.

2	REPLACE ECM
1. Stop engine. 2. Replace ECM. 3. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to "NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM — NATS)", EC-92. 4. Perform "Accelerator Pedal Released Position Learning", EC-71. 5. Perform "Throttle Valve Closed Position Learning", EC-71. 6. Perform "Idle Air Volume Learning", EC-71.	
▶	**INSPECTION END**



Component Description

NFEC1250

Power steering pressure (PSP) sensor is installed to the power steering high-pressure tube and detects a power steering load. This sensor is a potentiometer which transforms the power steering load into output voltage, and emits the voltage signal to the ECM. The ECM controls the ETC actuator and adjusts the throttle valve opening angle to increase the engine speed and adjusts the idle speed for the increased load.

CONSULT-II Reference Value in Data Monitor Mode

NFEC1256

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
PW/ST SIGNAL	● Engine: After warming up, idle the engine	Steering wheel is in neutral position. (Forward direction)	OFF
		Steering wheel is turned.	ON

On Board Diagnosis Logic

NFEC1251

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0550 0550	Power steering pressure sensor circuit	An excessively low or high voltage from the sensor is sent to ECM.	● Harness or connectors (The sensor circuit is open or shorted.) ● Power steering pressure sensor

DTC Confirmation Procedure

NFEC1252

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 at least 5 seconds.
4. If 1st trip DTC is detected, go to EC-452, “Diagnostic Procedure”.

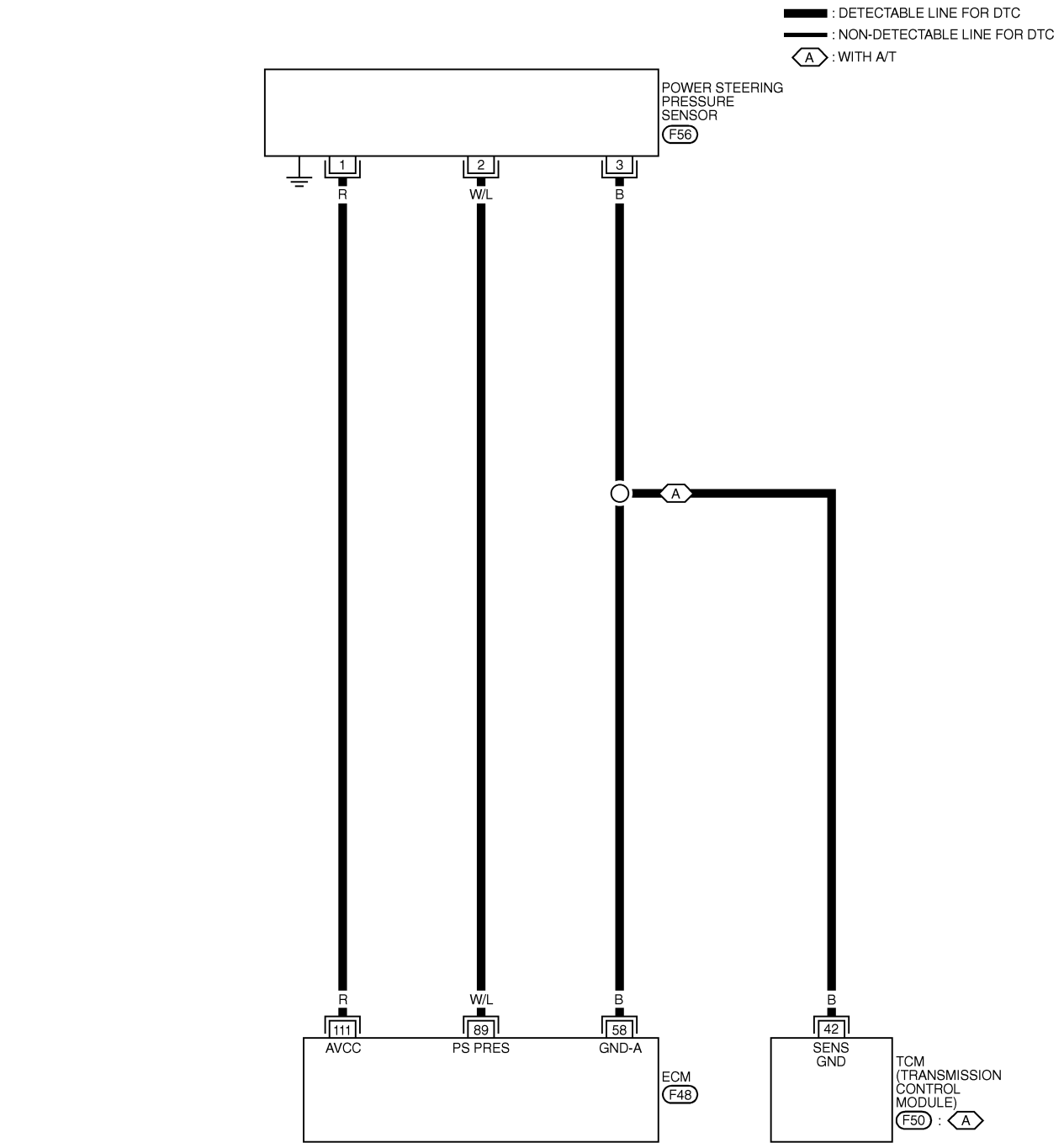
With GST

Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

NFEC1253

EC-PS/SEN-01



MEC516D

Wiring Diagram (Cont'd)

Specification data are reference values and are measured between each terminal and body 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.

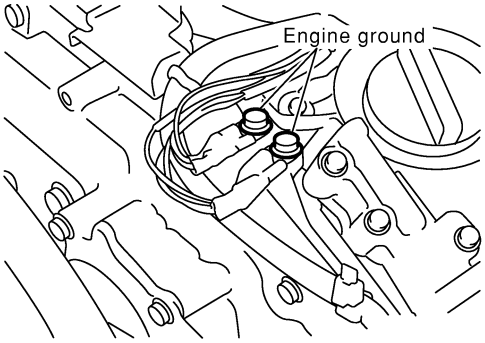
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
58	B	Sensors' ground	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
89	W/L	Power steering pressure sensor	**[Engine is running]** ● Steering wheel is being turned.	0.5 - 4.0V
			[Engine is running] ● Steering wheel is not being turned.	0.4 - 0.8V
111	R	Sensors' power supply	**[Ignition switch "ON"]**	Approximately 5V

Diagnostic Procedure

NFEC1254

1	RETIGHTEN GROUND SCREWS

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

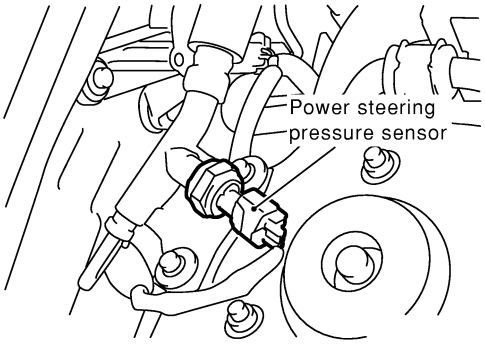


SEC047D

▶	GO TO 2.

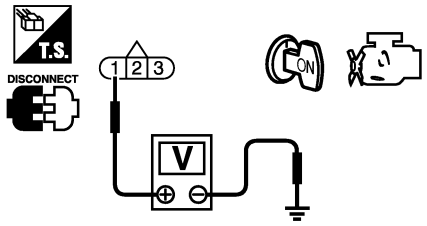
2	CHECK PSP SENSOR POWER SUPPLY CIRCUIT

1. Disconnect PSP sensor harness connector.
2. Turn ignition switch "ON".



SEC046D

3. Check voltage between PSP sensor terminal 1 and ground with CONSULT-II or tester.



SEC048D

Voltage: Approximately 5V

OK or NG

OK	▶	GO TO 3.
NG	▶	Repair harness or connectors.

3	CHECK PSP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between PSP sensor terminal 3 and engine ground.
   Refer to Wiring Diagram.
   Continuity should exist.
3. Also check harness for 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 ECM and PSP sensor
- Harness for open or short between TCM (Transmission Control Module) and PSP sensor.

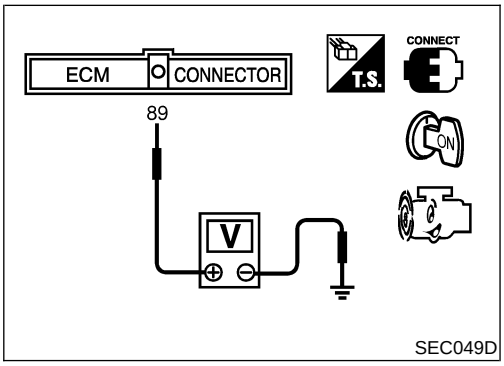
	▶	Repair open circuit or short to ground or short to power in harness or connectors.

Diagnostic Procedure (Cont'd)

5	CHECK PSP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	
1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 89 and PSP sensor terminal 2. **Continuity should exist.** 3. 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 PSP SENSOR	
Refer to "Component Inspection", EC-454.		
OK or NG		
OK	▶	GO TO 7.
NG	▶	Replace PSP sensor.

7	CHECK INTERMITTENT INCIDENT	
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.		
	▶	**INSPECTION END**



SEC049D

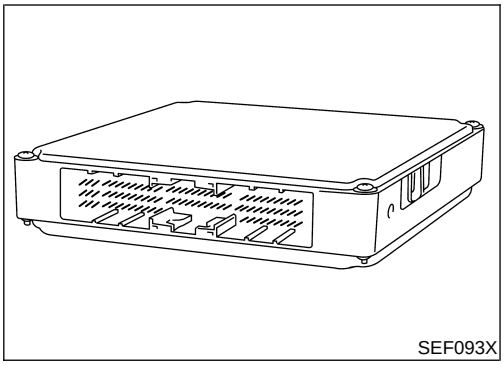
Component Inspection

NFEC1257

POWER STEERING PRESSURE SENSOR

1. Reconnect all harness connectors disconnected.
2. Start engine and let it idle.
3. Check voltage between ECM terminal 89 and ground under the following conditions.

Condition	Voltage
Steering wheel is turned fully.	Approximately 3.6V
Steering wheel is not turned.	Approximately 0.6V



SEF093X

Component Description

NFEC1032

The ECM consists of a microcomputer and connectors for signal input and output and for power supply. The unit controls the engine.

On Board Diagnosis Logic

NFEC1033

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

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. • ECM deactivates ASCD operation.

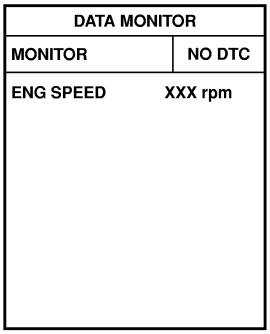
DTC Confirmation Procedure

NFEC1445

Perform "PROCEDURE FOR MALFUNCTION A" first. If the 1st trip DTC cannot be confirmed, perform "PROCEDURE FOR MALFUNCTION B". If there is no problem 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.



SEF058Y

PROCEDURE FOR MALFUNCTION A

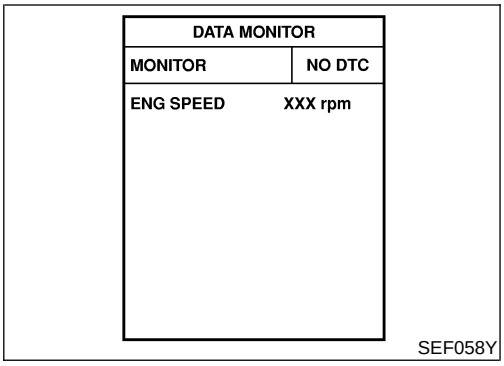
With CONSULT-II

1) Turn ignition switch "ON".
2) Select "DATA MONITOR" mode with CONSULT-II.
3) If 1st trip DTC is detected, go to EC-456, "Diagnostic Procedure".

With GST

Follow the procedure "With CONSULT-II" above.

DTC Confirmation Procedure (Cont'd)



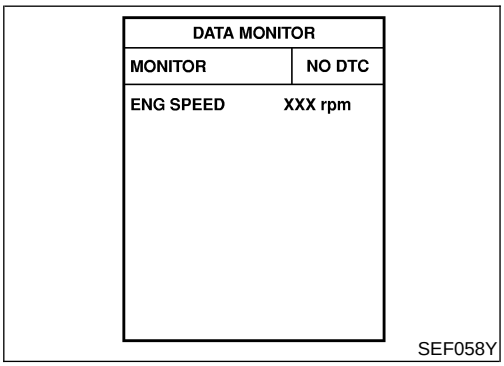
PROCEDURE FOR MALFUNCTION B

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-456, "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 procedure, 32 times.
5) If 1st trip DTC is detected, go to EC-456, "Diagnostic Procedure".

With GST

Follow the procedure "With CONSULT-II" above.

Diagnostic Procedure

NFEC1035

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-455. 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-455. 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 NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to "NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM — NATS)", EC-92. 3. Perform "Accelerator Pedal Released Position Learning", EC-71. 4. Perform "Throttle Valve Closed Position Learning", EC-71. 5. Perform "Idle Air Volume Learning", EC-71.		
	▶	**INSPECTION END**

Component Description

NFEC1258

Malfunction Indicator Lamp (MIL) is located on the instrument panel. When the ignition switch is turned ON without engine running, MIL will light up. This is a bulb check. When the engine is started, MIL should go off. If MIL remains on, the on board diagnostic system has detected an engine system malfunction.

On Board Diagnosis Logic

NFEC1259

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0650 0650	Malfunction indicator (MIL) control circuit	• An excessively high voltage is sent to ECM through the MIL circuit under the condition that calls for MIL light up. • An excessively low voltage is sent to ECM through the MIL circuit under the condition that calls for MIL not to light up.	• Harness or connectors (MIL circuit is open or shorted.) • MIL

FAIL-SAFE MODE

ECM enters in fail-safe mode when both DTC P0650 and another DTC, which calls for MIL to light up, are detected at the same time.

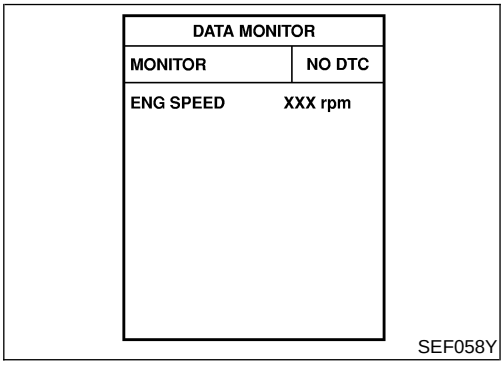
Detected items	Engine operating condition in fail-safe mode
MIL circuit	Engine speed will not rise more than 2,500 rpm due to the fuel cut.

DTC Confirmation Procedure

NFEC1260

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. If 1st trip DTC is detected, go to “Diagnostic Procedure”, EC-459.

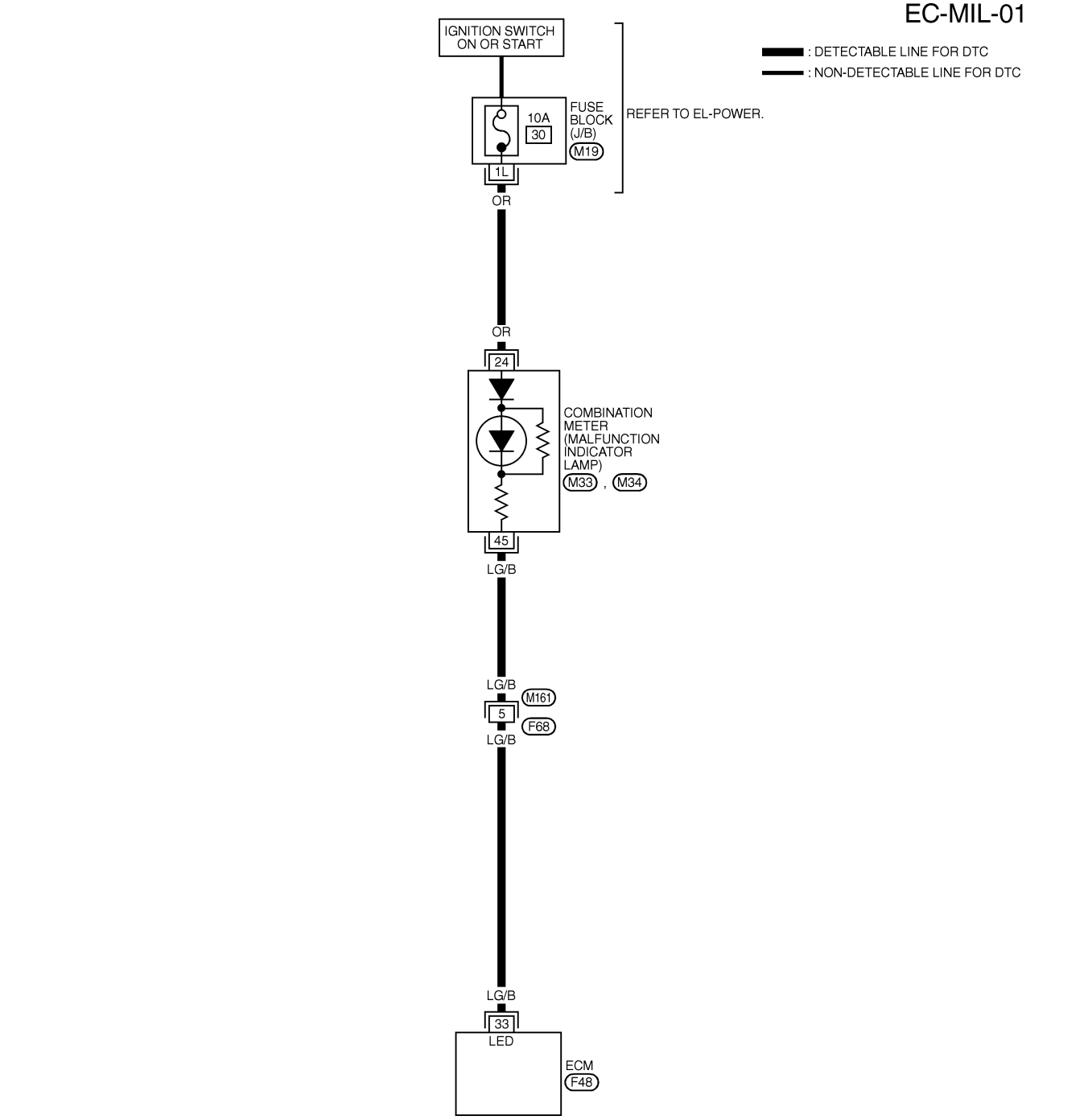
WITH GST

Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

NFEC1261

EC-MIL-01



MEC519D

Specification data are reference values and are measured between each terminal and body 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.

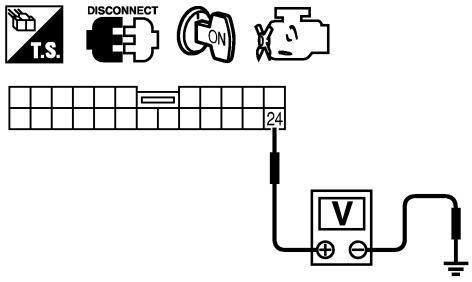
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
33	LG/B	MIL	**[Ignition switch "ON"]**	0 - 1.0V
			[Engine is running] ● Idle speed	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

NFEC1262

1 CHECK MIL POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect combination meter harness connector.
3. Turn ignition switch "ON".
4. Check voltage between combination meter terminal 24 and ground with CONSULT-II or tester.



SEC050D

Voltage: Battery voltage

OK or NG

OK	▶	GO TO 3.
NG	▶	GO TO 2.

2 DETECT MALFUNCTIONING PART

Check the following.
- Fuse block (J/B) connector M19
- 10A fuse
- Harness for open or short between fuse block (J/B) and combination meter

	▶	Repair harness or connectors.

3 CHECK MIL OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 33 and combination meter terminal 45.
   Refer to Wiring Diagram.
   Continuity should exist.
4. Also check harness for short to ground and short to power.

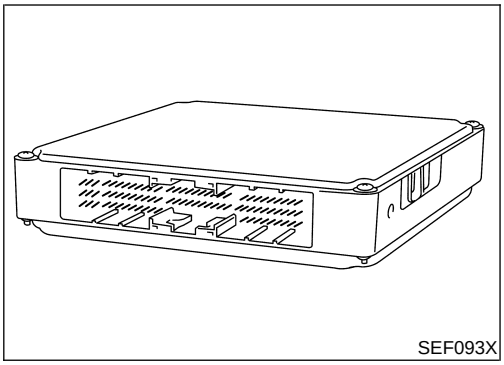
OK or NG

OK	▶	GO TO 5.
NG	▶	GO TO 4.

Diagnostic Procedure (Cont'd)

4	DETECT MALFUNCTIONING PART
Check the following. ● Harness connectors M161, F68 ● Harness for open or short between ECM and combination meter	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

5	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.	
OK or NG	
OK ▶	Replace combination meter. Refer to EL-117, "METERS AND GAUGES".
NG ▶	Repair or replace.


SEF093X

Component Description

NFEC1263

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.

On Board Diagnosis Logic

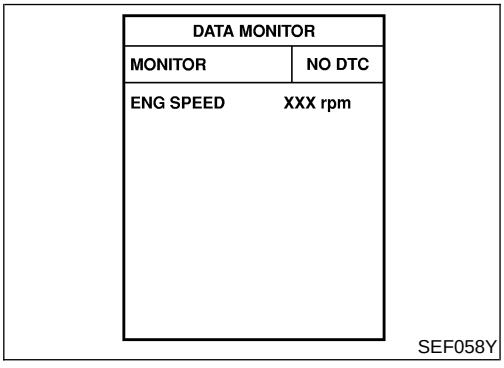
NFEC1264

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

NFEC1265

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.



SEF058Y

With CONSULT-II

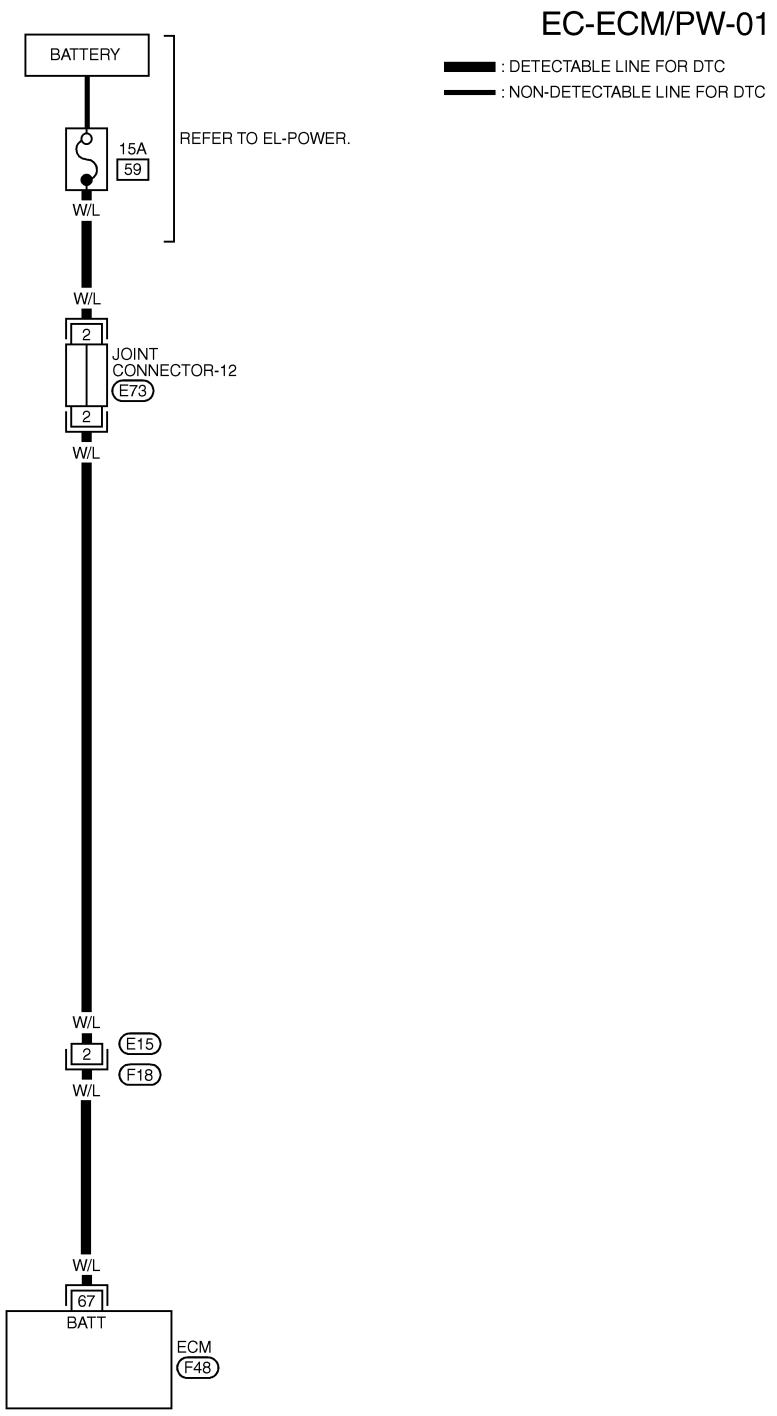
1. Turn ignition switch “ON” and wait at least 1 second.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. Turn ignition switch “OFF”, wait at least 10 seconds, and then turn “ON”.
5. Repeat steps 3 and 4 four times.
6. If 1st trip DTC is detected, go to “Diagnostic Procedure”, EC-463.

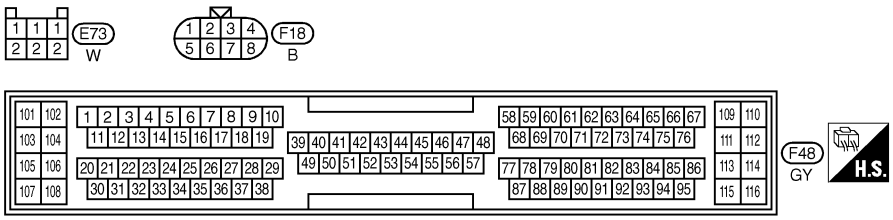
With GST

Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

NFEC1266





MEC805D

Wiring Diagram (Cont'd)

Specification data are reference values and are measured between each terminal and body 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.

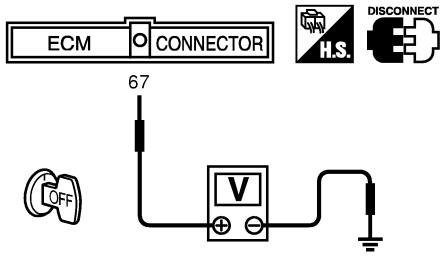
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
67	W/L	Power supply for ECM (Buck-up)	**[Ignition switch "OFF"]**	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

NFEC1267

1	CHECK ECM POWER SUPPLY

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check voltage between ECM terminal 67 and ground with CONSULT-II or tester.



SEC912C

Voltage: Battery voltage

OK or NG

OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E15, F18
- Joint connector-12
- 15A fuse
- Harness for open or short between ECM and fuse

	▶	Repair or replace harness or connectors.

3	CHECK INTERMITTENT INCIDENT

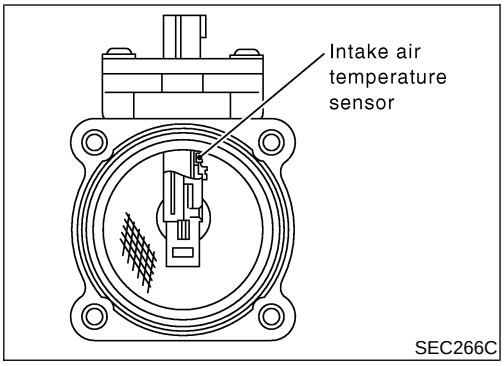
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.

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-461. 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-461. 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 NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to "NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM — NATS)", EC-92. 3. Perform "Accelerator Pedal Released Position Learning", EC-71. 4. Perform "Throttle Valve Closed Position Learning", EC-71. 5. Perform "Idle Air Volume Learning", EC-71.	
▶	**INSPECTION END**



Component Description

NFEC0803

The mass air flow sensor is placed in the stream of intake air. It measures the intake flow rate by measuring a part of the entire intake flow. It consists of a hot film that is supplied with electric current from the ECM. The temperature of the hot film is controlled by the ECM a certain amount. The heat generated by the hot film is reduced as the intake air flows around it. The more air, the greater the heat loss.
Therefore, the ECM must supply more electric current to maintain the temperature of the hot film as air flow increases. The ECM detects the air flow by means of this current change.

CONSULT-II Reference Value in Data Monitor Mode

NFEC0804

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
MAS A/F SE-B1	• Engine: After warming up • Air conditioner switch: “OFF” • Shift lever: “N” • No-load	Idle	1.1 - 1.5V
		2,500 rpm	1.7 - 2.4V
CAL/LD VALUE	ditto	Idle	10 - 35%
		2,500 rpm	10 - 35%
MASS AIRFLOW	ditto	Idle	2.0 - 6.0 g·m/s
		2,500 rpm	7.0 - 20.0 g·m/s

On Board Diagnosis Logic

NFEC1446

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P1102 1102	Mass air flow sensor circuit range/ performance problem	A voltage from the sensor is constantly approx. 1.0V when engine is running.	• Harness or connectors (The sensor circuit is open or shorted.) • Mass air flow sensor

FAIL-SAFE MODE

NFEC1446S01

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

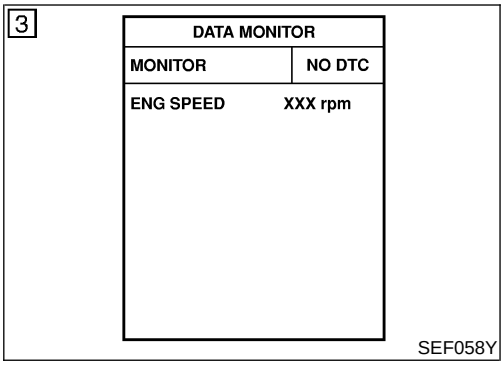
Detected items	Engine operating condition in fail-safe mode
Mass air flow sensor circuit	Engine speed will not rise more than 2,400 rpm due to the fuel cut.

DTC Confirmation Procedure

NFEC1447

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.

DTC Confirmation Procedure (Cont'd)



WITH CONSULT-II

NFEC1447S01

1) Turn ignition switch "ON".
2) Select "DATA MONITOR" mode with CONSULT-II.
3) Start engine and wait 5 seconds at most.
4) If DTC is detected, go to "Diagnostic Procedure", EC-468.

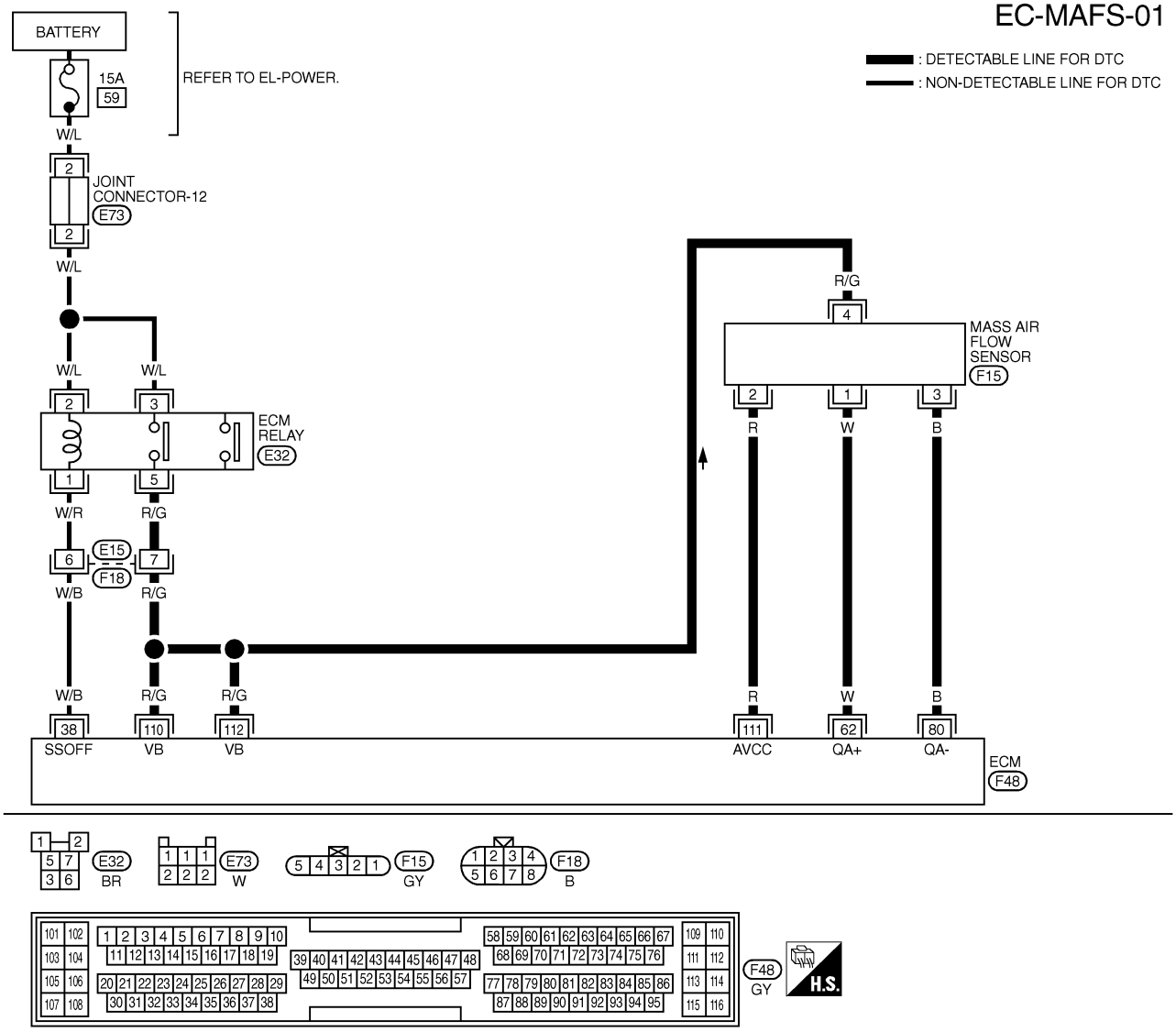
WITH GST

NFEC1447S02

Follow the procedure "With CONSULT-II" above.

Wiring Diagram

=NFEC0810



MEC473D

ECM TERMINALS AND REFERENCE VALUE 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.

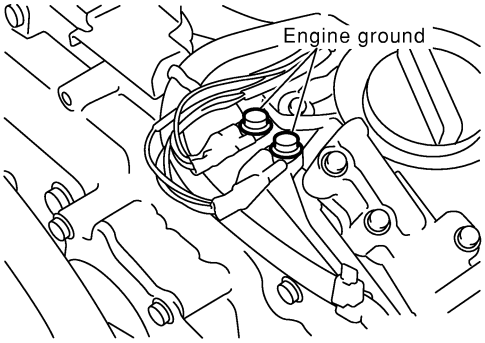
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
62	W	MASS AIR FLOW SENSOR	ENGINE RUNNING AT IDLE SPEED UNDER WARM-UP CONDITION	1.1 - 1.5V
			ENGINE RUNNING AT 2,500 RPM UNDER WARM-UP CONDITION	1.7 - 2.4V
80	B	MASS AIR FLOW SENSOR GROUND	ENGINE RUNNING AT IDLE SPEED UNDER WARM-UP CONDITION	APPROX. 0V
111	R	SENSORS' POWER SUPPLY	IGN ON	APPROX. 5V

SEF650XC

Diagnostic Procedure

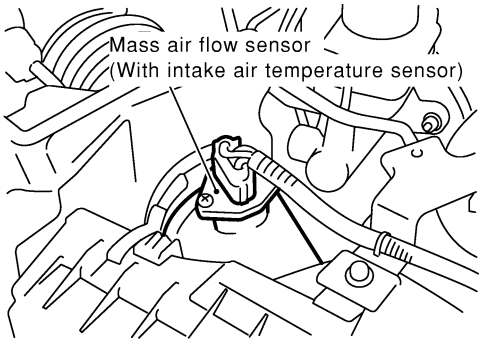
=NFEC0811

1	CHECK INTAKE SYSTEM	
Check the following for connection. ● Air duct ● Vacuum hoses		
OK or NG		
OK	▶	GO TO 2.
NG	▶	Reconnect the parts.

2	RETIGHTEN GROUND SCREWS	
1. Turn ignition switch “OFF”. 2. Loosen and retighten engine ground screws.		
 SEC047D		
	▶	GO TO 3.

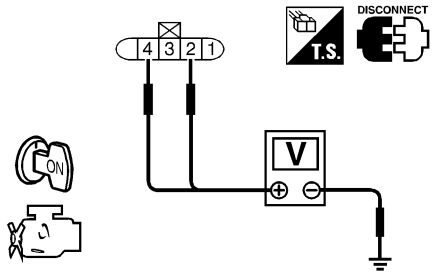
3	CHECK MAF SENSOR POWER SUPPLY CIRCUIT

1. Disconnect mass air flow (MAF) sensor harness connector.



SEC055D

2. Turn ignition switch "ON".
3. Check voltage between MAF sensor terminals 2, 4 and ground with CONSULT-II or tester.



Terminal	Voltage
2	Approximately 5
4	Battery voltage

SEF297X

OK or NG

OK	▶	GO TO 5.
NG	▶	GO TO 4.

4	DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E15, F18
- Harness for open or short between ECM relay and mass air flow sensor
- Harness for open or short between mass air flow sensor and ECM

	▶	Repair harness or connectors.

5	CHECK MAF SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between MAF sensor terminal 3 and ECM terminal 80.
   Refer to Wiring Diagram.
   Continuity should exist.
4. Also check harness for short to power.

OK or NG

OK	▶	GO TO 6.
NG	▶	Repair open circuit or short to power in harness or connectors.

Diagnostic Procedure (Cont'd)

6	CHECK MAF SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

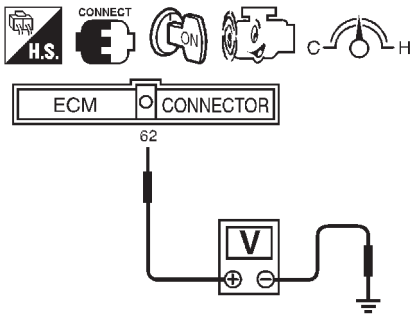
1. Check harness continuity between MAF sensor terminal 1 and ECM terminal 62.
   Refer to Wiring Diagram.
   Continuity should exist.
2. Also check harness for short to ground and short to power.

OK or NG

OK	▶	GO TO 7.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

7	CHECK MASS AIR FLOW SENSOR

1. Reconnect harness connectors disconnected.
2. Start engine and warm it up to normal operating temperature.
3. Check voltage between ECM terminal 62 (Mass air flow sensor signal) and ground.



SEF391R

Condition	Voltage V
Ignition switch "ON" (Engine stopped.)	Approx. 1.0
Idle (Engine is warmed-up to normal operating temperature.)	1.1 - 1.5
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.7 - 2.4
Idle to about 4,000 rpm*	1.1 - 1.5 to Approx. 4.0

*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.

MTBL1160

4. If the voltage is out of specification, disconnect MAF sensor harness connector and connect it again.
   Then repeat above check.

OK or NG

OK	▶	GO TO 8.
NG	▶	Replace mass air flow sensor.

8	CHECK INTERMITTENT INCIDENT

Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.

▶ **INSPECTION END**

Component Description

NFEC1298

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

NFEC1299

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. **This self-diagnosis has the one trip detection logic.**	

FAIL-SAFE MODE
When the malfunction A or B is detected, ECM enters in fail-safe mode.
When the malfunction C is detected, ECM enters in fail-safe mode and the MIL lights up.

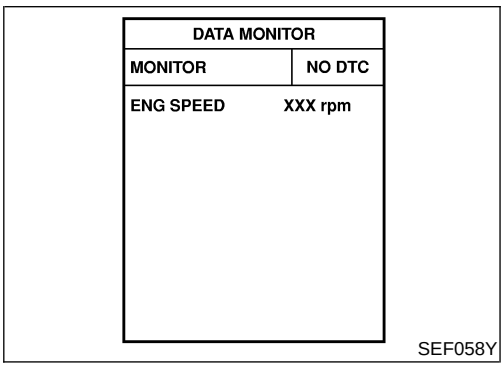
Detected items	Engine operating condition in fail-safe mode
Malfunction A	The ECM controls the electric throttle throttle actuator by regulating the throttle opening around the idle position. The engine speed will not rise more than 2,000 rpm.
Malfunction B	ECM controls the electric throttle control 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

NFEC1300

NOTE:

- **Perform “PROCEDURE FOR MALFUNCTION A AND B” first. If the 1st trip DTC cannot be confirmed, perform “PROCEDURE FOR MALFUNCTION C”.**
  If there is no problem on “PROCEDURE FOR MALFUNCTION A AND B”, 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

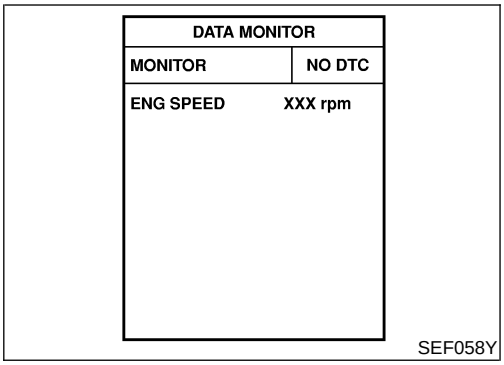
With CONSULT-II

1) Turn ignition switch “ON” and wait at least 1 second.
2) Select “DATA MONITOR” mode with CONSULT-II.
3) Shift selector lever to “D” position and wait at least 2 seconds.
4) Turn ignition switch “OFF”, wait at least 10 seconds, and then turn “ON”.
5) If 1st trip DTC is detected, go to “Diagnostic Procedure”, EC-472.

With GST

Follow the procedure “WITH CONSULT-II” above.

DTC Confirmation Procedure (Cont'd)



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 and wait at least 2 seconds.
4) Shift selector lever to "N" or "P" position.
5) Start engine and let it idle for 3 seconds.
6) If DTC is detected, go to "Diagnostic Procedure", EC-472.

With GST

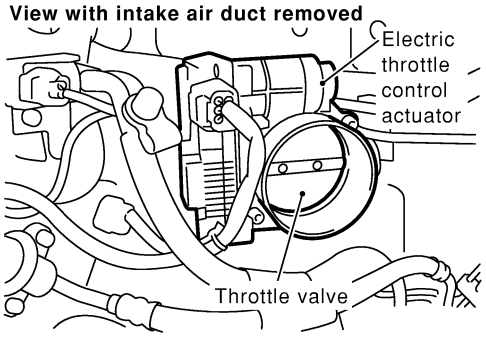
Follow the procedure "WITH CONSULT-II" above.

Diagnostic Procedure

NFEC1413

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 "Throttle Valve Closed Position Learning", EC-71.
3. Perform "Idle Air Volume Learning", EC-71.

	▶	**INSPECTION END**

Description

NFEC1301

NOTE:
If DTC P1122 is displayed with DTC P1121 or P1126, first perform the trouble diagnosis for DTC P1121 or P1126. Refer to EC-471, 481.

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 the 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

NFEC1448

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

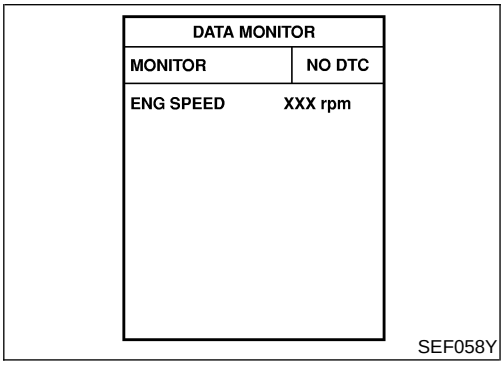
FAIL-SAFE MODE
When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

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

NFEC1449

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 “Diagnostic Procedure”, EC-476.

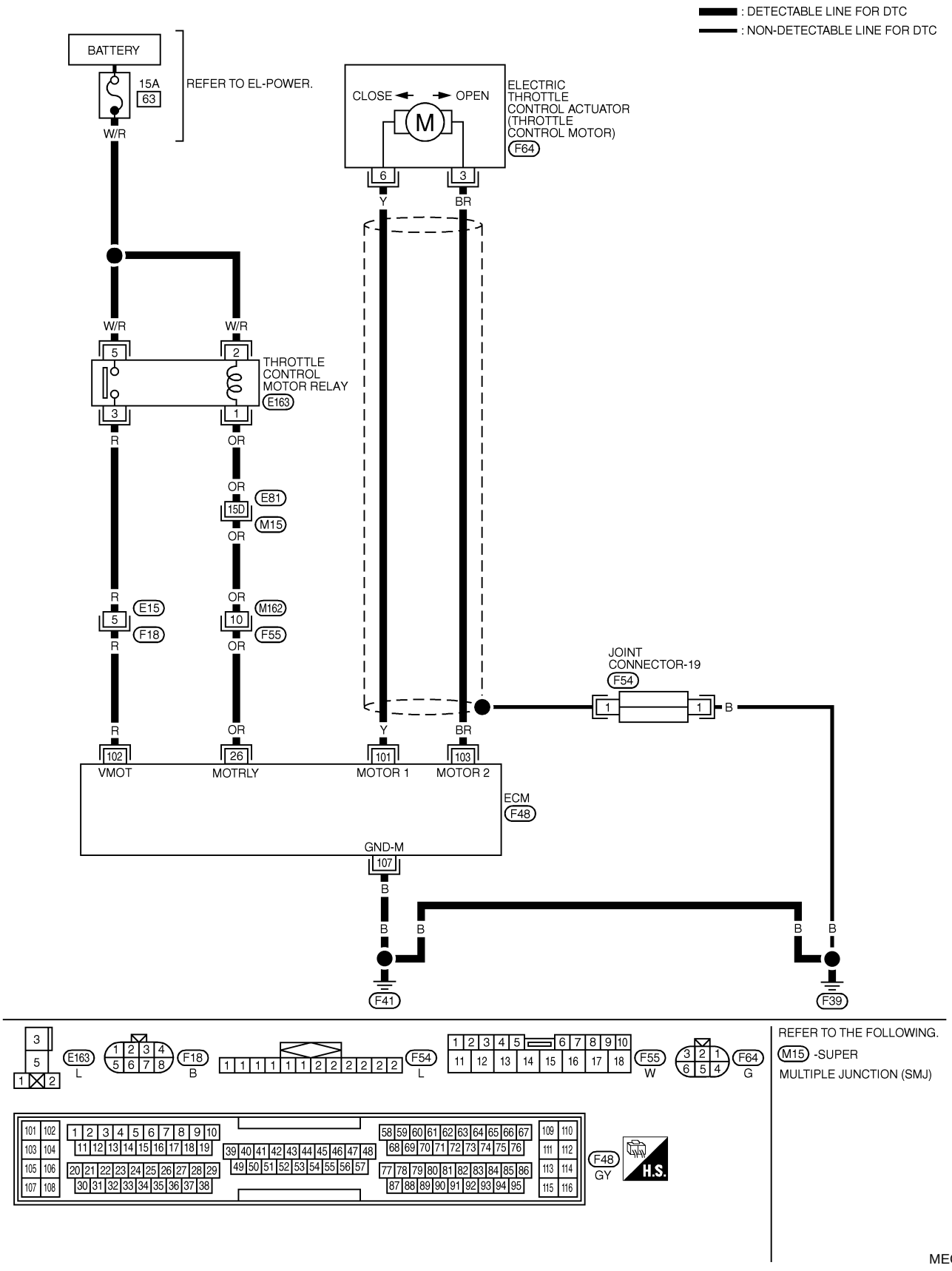
With GST

Follow the procedure "WITH CONSULT-II" above.

Wiring Diagram

NFEC1304

EC-ETC1-01



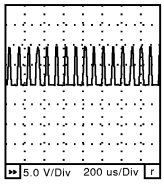
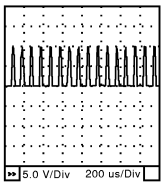
MEC478D

Wiring Diagram (Cont'd)

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)
26	OR	Throttle control motor relay	**[Ignition switch "OFF"]**	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch "ON"]	0 - 1.0V
101	Y	Throttle control motor (Open)	**[Ignition switch "ON"]** ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal is depressing	0 - 14V★  SEC037D
102	R	Throttle control motor relay power supply	**[Ignition switch "ON"]**	BATTERY VOLTAGE (11 - 14V)
103	BR	Throttle control motor (Close)	**[Ignition switch "ON"]** ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal is releasing	0 - 14V★  SEC038D
107	B	Throttle control motor ground	**[Engine is running]** ● Idle speed	Approximately 0V

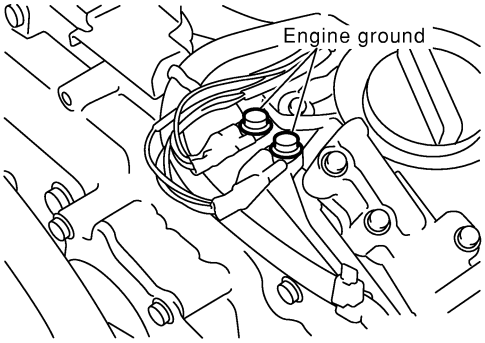
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnostic Procedure

NFEC1305

1	RETIGHTEN GROUND SCREWS

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.



SEC047D

▶ GO TO 2.

2	CHECK THROTTLE CONTROL MOTOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 107 and engine ground.
   Refer to Wiring Diagram.
   Continuity should exist.
3. Also check harness for short to power.

OK or NG

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

3	CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT-I

1. Reconnect harness connector disconnected.
2. Check voltage between ECM terminal 102 and ground under the following conditions with CONSULT-II or tester.

Ignition switch	Voltage
OFF	Approximately 0V
ON	Battery voltage (11- 14V)

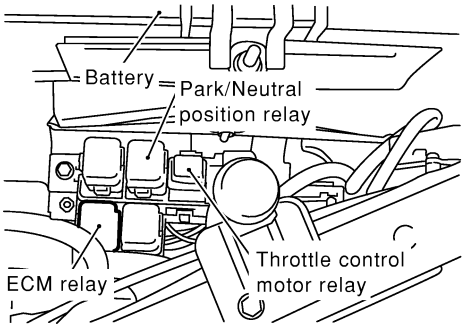
MTBL1168

OK or NG

OK	▶	GO TO 12.
NG	▶	GO TO 4.

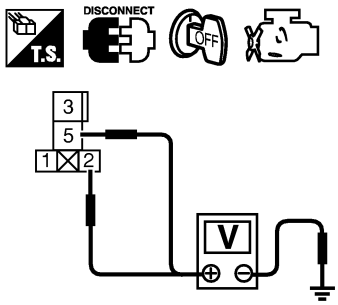
4	CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect throttle control motor relay.



SEC044D

3. Check voltage between throttle control motor relay terminals 2, 5 and ground with CONSULT-II or tester.



SEC091D

Voltage: Battery voltage

OK or NG

OK	▶	GO TO 6.
NG	▶	GO TO 5.

5	DETECT MALFUNCTIONING PART
Check the following. ● 15A fuse ● Harness for open and short between throttle control motor relay and fuse	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

6	CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT-II	
1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 102 and throttle control motor relay 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 8.
NG	▶	GO TO 7.

7	DETECT MALFUNCTIONING PART
Check the following. ● Harness connector E15, F18 ● Harness for open and short between throttle control motor relay and ECM	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

8	CHECK THROTTLE CONTROL MOTOR RELAY OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	
1. Check harness continuity between ECM terminal 26 and throttle control motor relay terminal 1. 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 10.
NG	▶	GO TO 9.

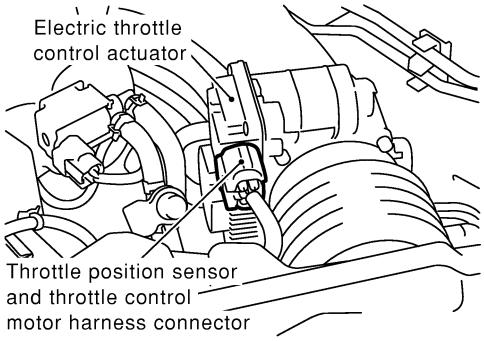
9	DETECT MALFUNCTIONING PART
Check the following. ● Harness connector E81, M15 ● Harness connectors M162, F55 ● Harness for open and short between throttle control motor relay and ECM	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

10	CHECK THROTTLE CONTROL MOTOR RELAY	
Refer to "Component Inspection", EC-480.		
OK or NG		
OK	▶	GO TO 11.
NG	▶	Replace throttle control motor relay.

11	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.	
▶	**INSPECTION END**

12 **CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN OR SHORT**

1. Turn ignition switch "OFF".
2. Disconnect electric throttle control actuator harness connector.



SEC054D

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	101	Should not exist
	103	Should exist
6	101	Should exist
	103	Should not exist

MTBL1169

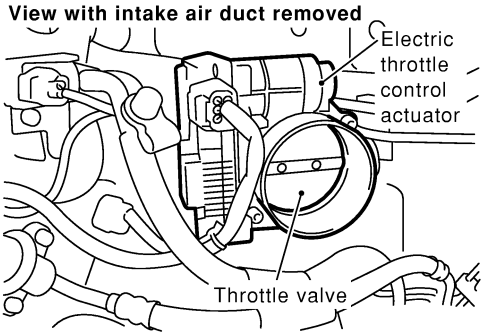
5. Also check harness for short to ground and short to power.

OK or NG

OK	▶	GO TO 13.
NG	▶	Repair or replace.

13 **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.



SEC083D

OK or NG

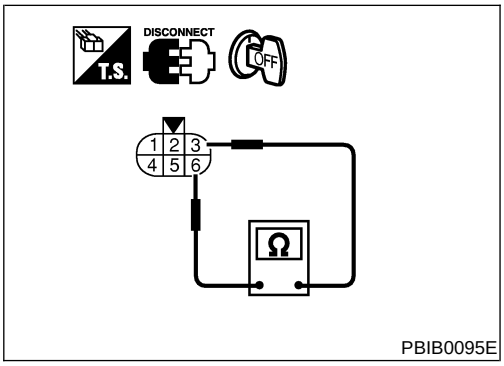
OK	▶	GO TO 14.
NG	▶	Remove the foreign matter and clean the electric throttle control actuator inside.

Diagnostic Procedure (Cont'd)

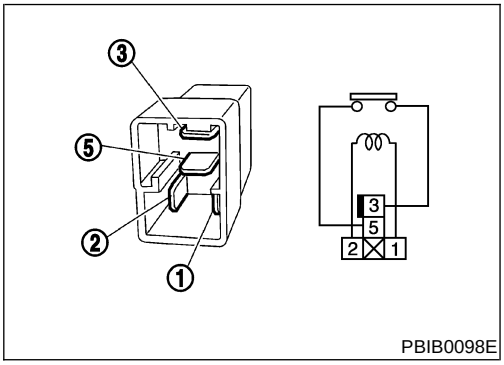
14	CHECK THROTTLE CONTROL MOTOR	
Refer to "Component Inspection", EC-480.		
OK or NG		
OK	▶	GO TO 15.
NG	▶	GO TO 16.

15	CHECK INTERMITTENT INCIDENT	
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.		
OK or NG		
OK	▶	GO TO 16.
NG	▶	Repair or replace harness or connectors.

16	REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR	
1. Replace the electric throttle control actuator. 2. Perform "Throttle Valve Closed Position Learning", EC-71. 3. Perform "Idle Air Volume Learning", EC-71.		
	▶	**INSPECTION END**



PBIB0095E



PBIB0098E

Component Inspection

NFEC1306

THROTTLE CONTROL MOTOR

NFEC1306S01

1. Disconnect electric throttle control actuator harness connector.
2. Check resistance between terminals 3 and 6.

   Resistance: Approximately 1 - 15Ω [at 25°C (77°F)]
3. If NG, replace electric throttle control actuator and go to next step.
4. Perform "Throttle Valve Closed Position Learning", EC-71.
5. Perform "Idle Air Volume Learning", EC-71.

THROTTLE CONTROL MOTOR RELAY

NFEC1306S02

1. Apply 12V direct current between relay terminals 1 and 2.
2. Check continuity between relay terminals 3 and 5.

Conditions	Continuity
12V direct current supply between terminals 1 and 2	Yes
No current supply	No

3. If NG, replace throttle control motor relay.

Component Description

NFEC1307

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

NFEC1319

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
THRTL RELAY	● Ignition switch: ON	ON

On Board Diagnosis Logic

NFEC1450

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P1124 1124	Throttle control motor relay circuit short	ECM detect 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. **This self-diagnosis has the one trip detection logic.**	● Harness or connectors (Throttle control motor relay circuit is open) ● Throttle control motor relay

FAIL-SAFE MODE

NFEC1450S01

When the malfunction is detected, ECM enters in fail-safe mode (for DTC P1124).
When the malfunction is detected, ECM enters in fail-safe mode and the MIL lights up (for DTC P1126).

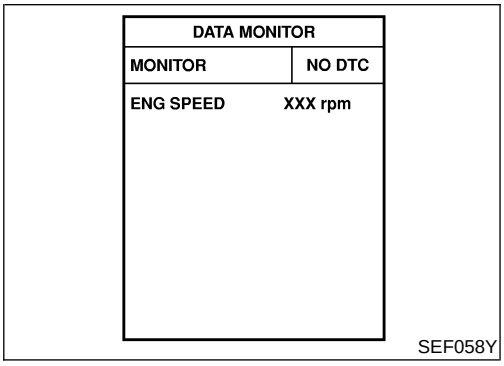
Engine operating condition in fail-safe mode
ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

DTC Confirmation Procedure

NFEC1451

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 10V at idle.



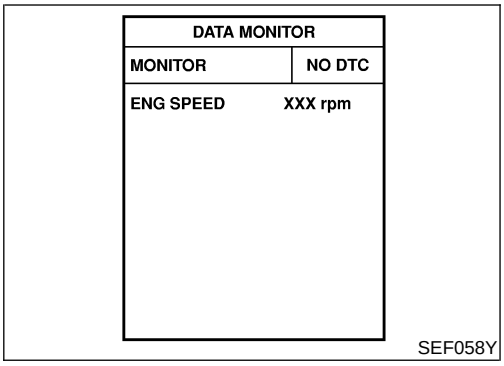
With CONSULT-II

1) Turn ignition switch “ON” and wait at least 1 second.
2) Select “DATA MONITOR” mode with CONSULT-II.
3) If 1st trip DTC is detected, go to “Diagnostic Procedure”, EC-484.

With GST

Follow the procedure “With CONSULT-II” above.

DTC Confirmation Procedure (Cont'd)



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 "Diagnostic Procedure", EC-484.

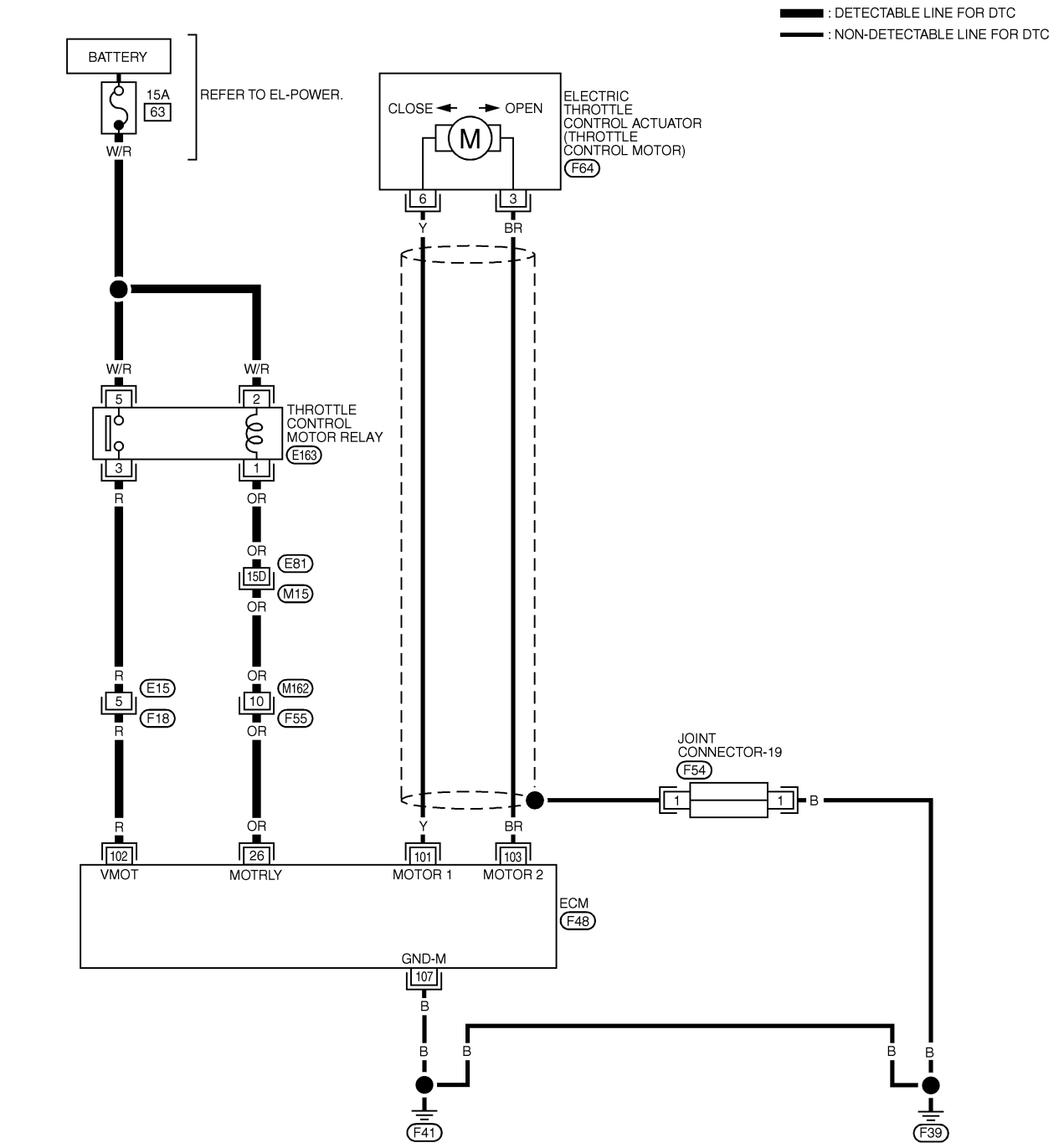
With GST

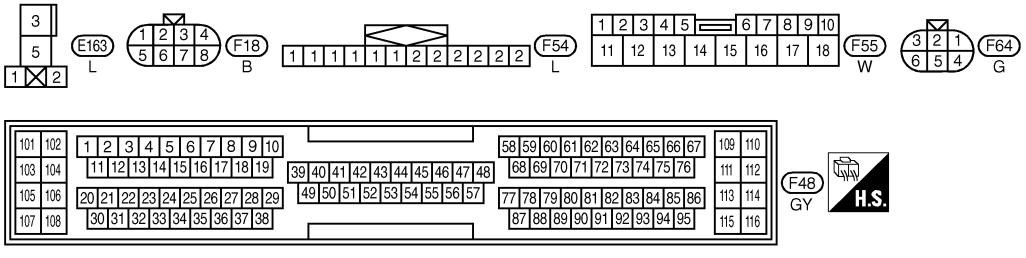
Follow the procedure "With CONSULT-II" above.

Wiring Diagram

NFEC1310

EC-ETC2-01





REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)

MEC654D

Wiring Diagram (Cont'd)

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.

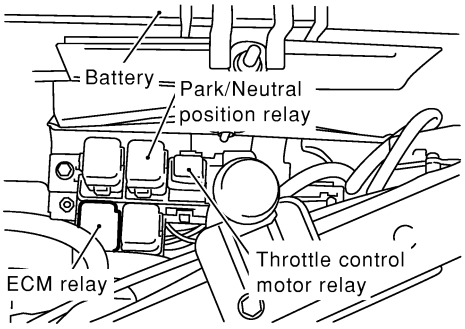
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
26	OR	Throttle control motor relay	**[Ignition switch "OFF"]**	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch "ON"]	0 - 1.0V
102	R	Throttle control motor relay power supply	**[Ignition switch "ON"]**	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

NFEC1311

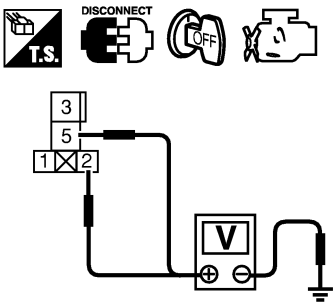
1 CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect throttle control motor relay.



SEC044D

3. Check voltage between throttle control motor relay terminals 2, 5 and ground with CONSULT-II or tester.



SEC091D

Voltage: Battery voltage

OK or NG

OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	DETECT MALFUNCTIONING PART
Check the following. ● 15A fuse ● Harness for open and short between throttle control motor relay and fuse	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

3	CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 102 and throttle control motor relay 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 5.
NG ▶	GO TO 4.

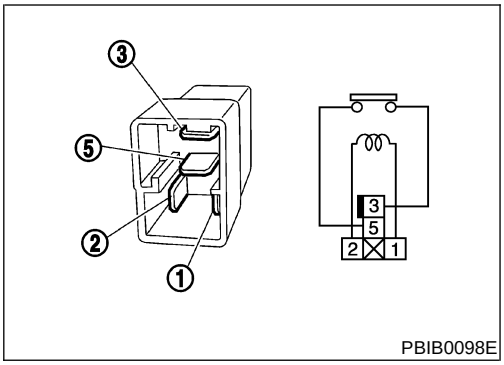
4	DETECT MALFUNCTIONING PART
Check the following. ● Harness connector E15, F18 ● Harness for open and short between throttle control motor relay and ECM	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

5	CHECK THROTTLE CONTROL MOTOR RELAY OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
1. Check harness continuity between ECM terminal 26 and throttle control motor relay terminal 1. 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 7.
NG ▶	GO TO 6.

6	DETECT MALFUNCTIONING PART
Check the following. ● Harness connector E81, M15 ● Harness connectors M162, F55 ● Harness for open and short between throttle control motor relay and ECM	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

7	CHECK THROTTLE CONTROL MOTOR RELAY
Refer to "Component Inspection", EC-486.	
OK or NG	
OK ▶	GO TO 8.
NG ▶	Replace throttle control motor relay.

8	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.	
▶	**INSPECTION END**



PBIB0098E

Component Inspection

NFEC1312

THROTTLE CONTROL MOTOR RELAY

1. Apply 12V direct current between relay terminals 1 and 2.
2. Check continuity between relay terminals 3 and 5.

Conditions	Continuity
12V direct current supply between terminals 1 and 2	Yes
No current supply	No

3. If NG, replace throttle control motor relay.

Component Description

NFEC1313

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

NFEC1452

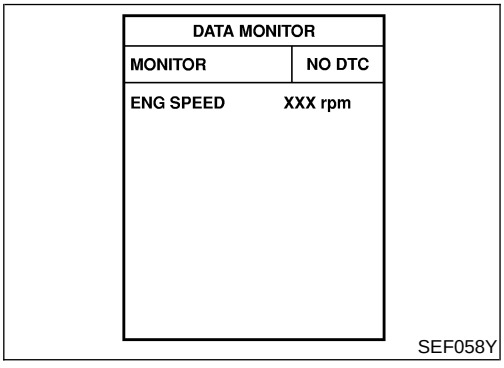
This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P1128 1128	Throttle control motor circuit short	ECM detects short both circuits between ECM and throttle control motor.	• Harness or connectors (Throttle control motor circuit is shorted.) • Electric throttle control actuator (Throttle control motor)

DTC Confirmation Procedure

NFEC1453

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 “Diagnostic Procedure”, EC-489.

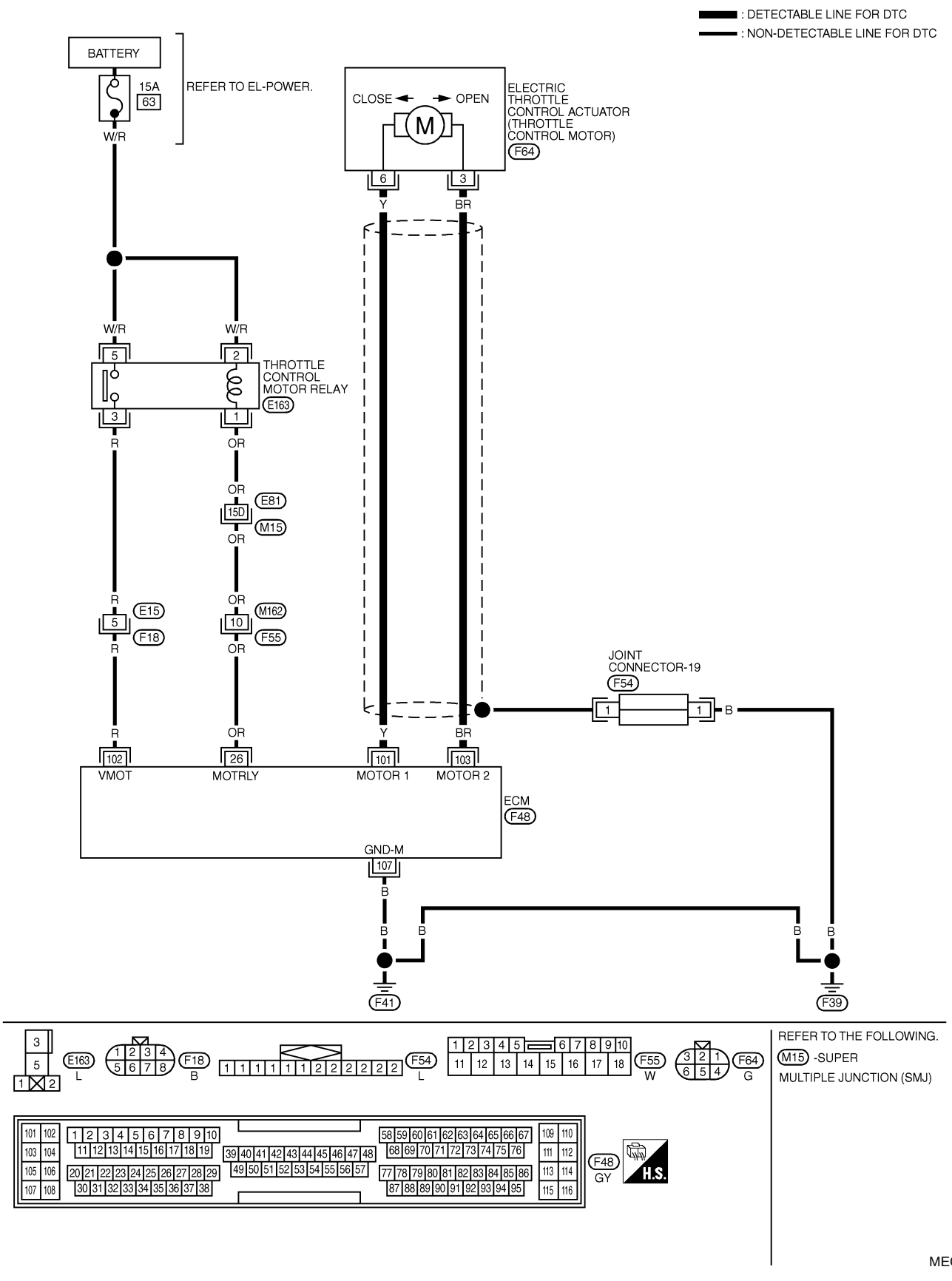
With GST

Follow the procedure “With CONSULT-II” above.

Wiring Diagram

NFEC1316

EC-ETC3-01



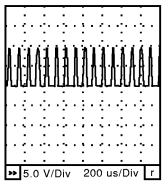
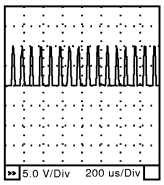
MEC655D

Wiring Diagram (Cont'd)

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

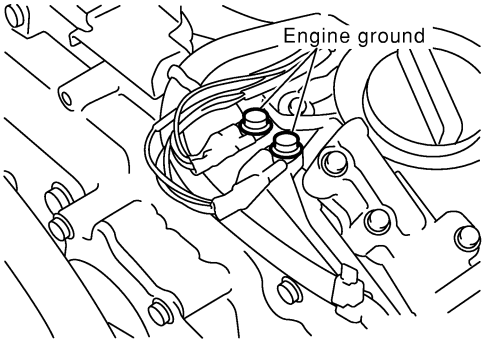
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
101	Y	Throttle control motor (Open)	**[Ignition switch "ON"]** ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal is depressing	0 - 5V★  SEC037D
103	BR	Throttle control motor (Close)	**[Ignition switch "ON"]** ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal is releasing	0 - 3V★  SEC038D

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnostic Procedure

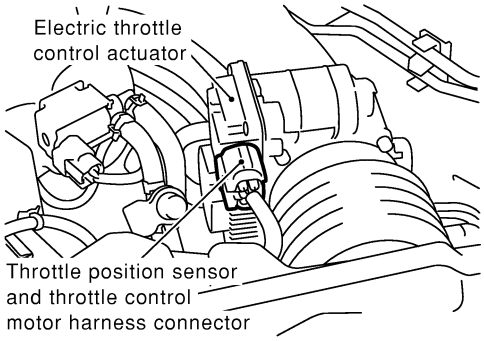
NFEC1317

1	RETIGHTEN GROUND SCREWS
1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.  SEC047D	
▶	GO TO 2.

Diagnostic Procedure (Cont'd)

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.



SEC054D

Electric throttle control actuator terminal	ECM terminal	Continuity
3	101	Should not exist
	103	Should exist
6	101	Should exist
	103	Should not exist

MTBL1169

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 "Component Inspection", EC-491.

OK or NG

OK	▶	GO TO 4.
NG	▶	GO TO 5.

4	CHECK INTERMITTENT INCIDENT

Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.

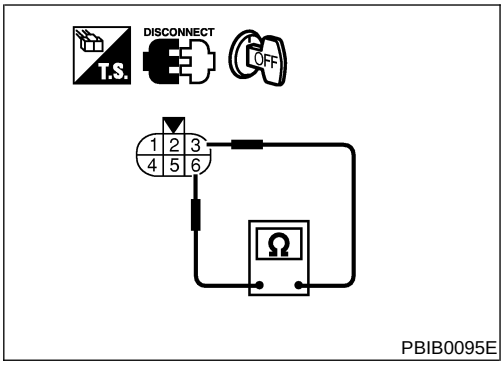
OK or NG

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 "Throttle Valve Closed Position Learning", EC-71.
3. Perform "Idle Air Volume Learning", EC-71.

	▶	**INSPECTION END**



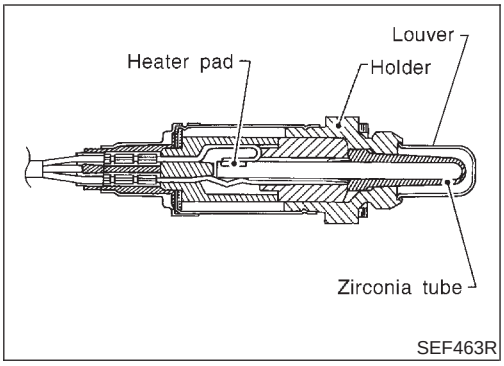
Component Inspection

NFEC1318

THROTTLE CONTROL MOTOR

1. Disconnect electric throttle control actuator harness connector.
2. Check resistance between terminals 3 and 6.

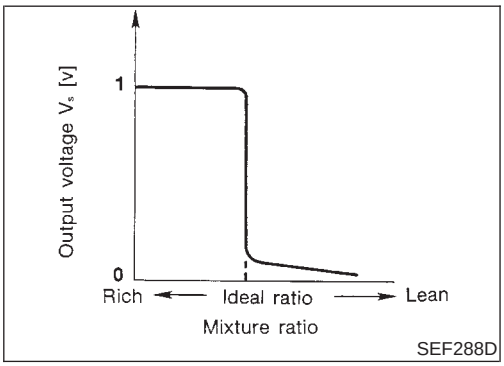
   Resistance: Approximately 1 - 15Ω [at 25°C (77°F)]
3. If NG, replace electric throttle control actuator and go to next step.
4. Perform “Throttle Valve Closed Position Learning”, EC-71.
5. Perform “Idle Air Volume Learning”, EC-71.



Component Description

NFEC1147

The heated oxygen sensor 1 is placed into the front tube. 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.

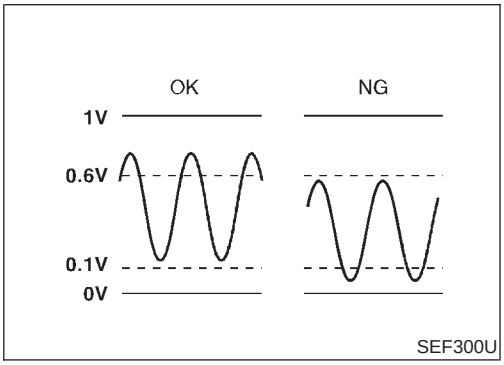


CONSULT-II Reference Value in Data Monitor Mode

NFEC1148

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1) HO2S1 (B2)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ⟷ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1) HO2S1 MNTR (B2)			LEAN ⟷ RICH Changes more than 5 times during 10 seconds.



On Board Diagnosis Logic

NFEC1150

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 (Bank 1) P1163 1163 (Bank 2)	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

NFEC1151

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

NFEC1151S01

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)/(B2) P1143/P1163" 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	1,200 - 2,600 rpm (A/T) 1,800 - 2,600 rpm (M/T)
Vehicle speed	Less than 100 km/h (62 MPH)
B/FUEL SCHDL	3 - 9 msec (A/T) 2.5 - 9 msec (M/T)
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 "Diagnostic Procedure", EC-494.

6

HO2S1 (B1) P1143	
OUT OF CONDITION	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SEN	XXX km/h

PBIB0546E

6

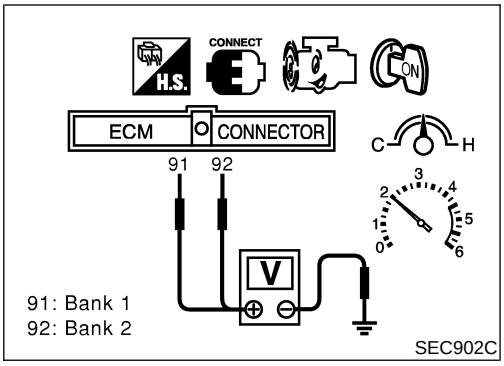
HO2S1 (B1) P1143	
TESTING	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SEN	XXX km/h

PBIB0547E

6

HO2S1 (B1) P1143
COMPLETED

SEC769C



Overall Function Check

NFEC1152

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

NFEC1152S01

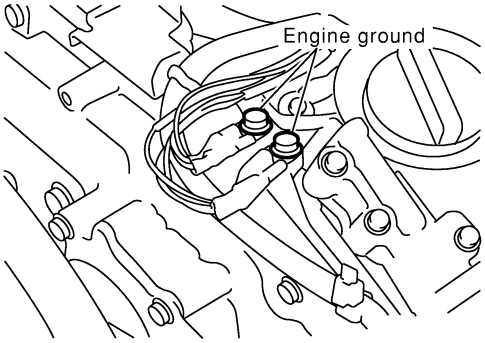
1) Start engine and warm it up to normal operating temperature.
2) Set voltmeter probes between ECM terminal 91 (bank 1 HO2S1 signal) or 92 (bank 2 HO2S1 signal) and engine ground.
3) Check one of the following with engine speed held at 2,000 rpm constant under no load.
   - The maximum voltage is over 0.6V at least one time.
   - The minimum voltage is over 0.1V at least one time.
4) If NG, go to “Diagnostic Procedure”, EC-494.

Diagnostic Procedure

NFEC1153

1	RETIGHTEN GROUND SCREWS

1. Turn ignition switch “OFF”.
2. Loosen and retighten engine ground screws.



▶	GO TO 2.

2	RETIGHTEN HEATED OXYGEN SENSOR 1

Loosen and retighten corresponding heated oxygen sensor 1.

Tightening torque:

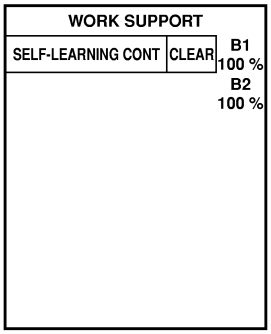
40 - 60 N·m (4.1 - 6.1 kg-m, 30 - 44 ft-lb)

▶	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".



SEF968Y

4. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0171 or P0174 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 mass air flow sensor harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure DTC P0102 is displayed.
6. Erase the DTC memory. Refer to "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-91.
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0171 or P0174 detected?
   Is it difficult to start engine?

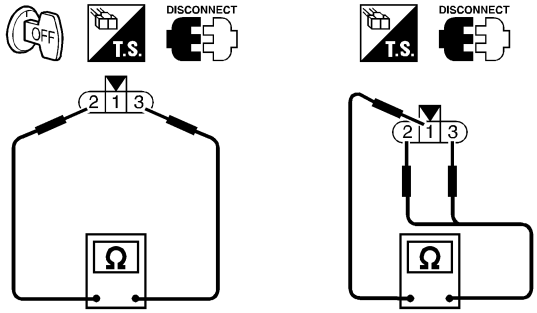
Yes or No

Yes	▶	Perform trouble diagnosis for DTC P0171, P0174. Refer to EC-267.
No	▶	GO TO 4.

Diagnostic Procedure (Cont'd)

4	CHECK HEATED OXYGEN SENSOR 1 HEATER

1. Stop engine.
2. Disconnect HO2S1 harness connector.
3. Check resistance between HO2S1 terminals as follows.



Terminals	Resistance
2 and 3	2.3 - 4.3Ω at 25°C (77°F)
1 and 2 1 and 3	∞Ω (Continuity should not exist.)

SEF310X

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.**

OK or NG

OK (With CONSULT-II) ▶	GO TO 5.
OK (Without CONSULT-II) ▶	GO TO 6.
NG ▶	Replace malfunctioning heated oxygen sensor 1.

5	CHECK 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)/(B2)" and "HO2S1 MNTR (B1)/(B2)".
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
HO2S2 (B2)	XXX V

SEF967Y

6. Check the following.

- "HO2S1 MNTR (B1)/(B2)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" 5 times in 10 seconds. 5 times (cycles) are counted as shown below.

Bank 1

cycle	1	2	3	4	5
HO2S1 MNTR (B1)	R-L	R-L	R-L	R-L	R-L

Bank 2

cycle	1	2	3	4	5
HO2S1 MNTR (B2)	R-L	R-L	R-L	R-L	R-L

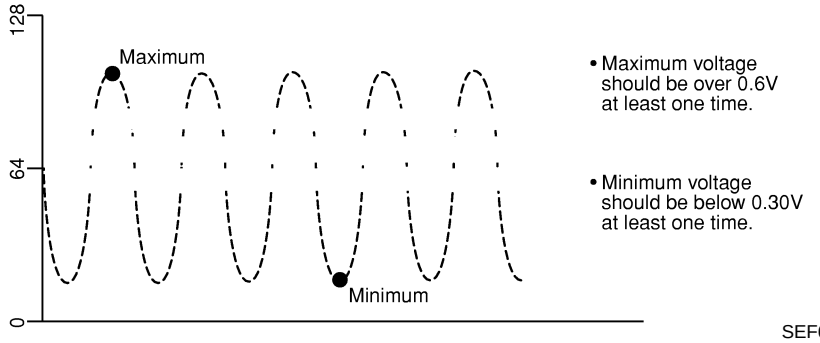
R means HO2S1 MNTR (B1)/(B2) indicates RICH

L means HO2S1 MNTR (B1)/(B2) indicates LEAN

SEF647Y

- "HO2S1 (B1)/(B2)" voltage goes above 0.6V at least once.
- "HO2S1 (B1)/(B2)" voltage goes below 0.3V at least once.
- "HO2S1 (B1)/(B2)" 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
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.**

OK or NG

OK	▶	GO TO 7.
NG	▶	Replace malfunctioning heated oxygen sensor 1.

Diagnostic Procedure (Cont'd)

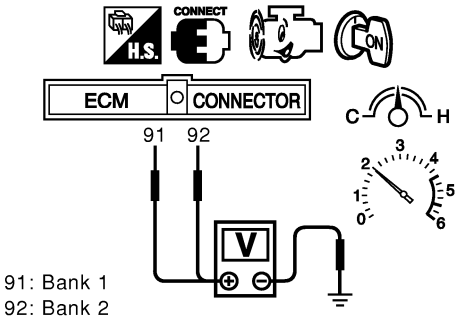
6	CHECK HEATED OXYGEN SENSOR 1

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 91 (HO2S1 bank 1 signal) or 92 (HO2S1 bank 2 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



SEC085D

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.**

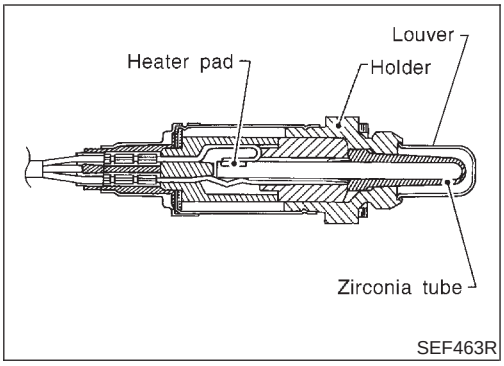
OK or NG

OK	▶	GO TO 7.
NG	▶	Replace malfunctioning heated oxygen sensor 1.

7	CHECK INTERMITTENT INCIDENT

Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.
For circuit, refer to "Wiring Diagram", EC-231.

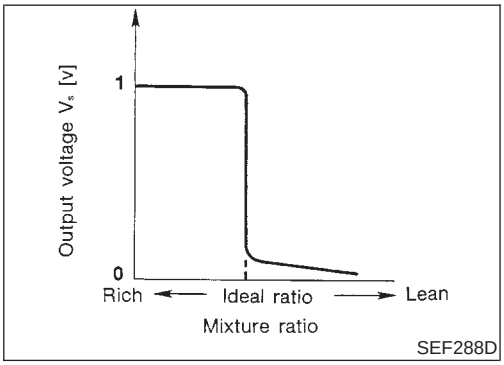
▶ **INSPECTION END**



Component Description

NFEC1154

The heated oxygen sensor 1 is placed into the front tube. 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.

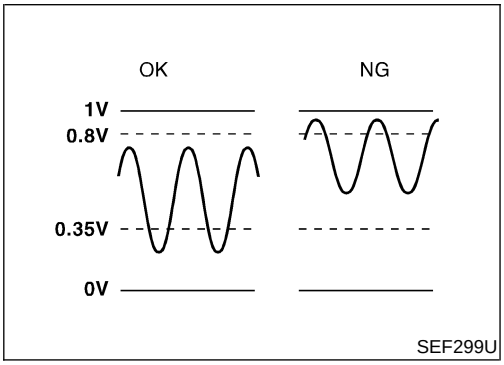


CONSULT-II Reference Value in Data Monitor Mode

NFEC1155

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1) HO2S1 (B2)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ⟷ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1) HO2S1 MNTR (B2)			LEAN ⟷ RICH Changes more than 5 times during 10 seconds.



On Board Diagnosis Logic

NFEC1157

To judge the malfunction, the output from the heated oxygen sensor 1 is monitored to determine whether the “rich” output is sufficiently high. 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 (Bank 1) P1164 1164 (Bank 2)	Heated oxygen sensor 1 rich shift monitoring	The maximum and minimum voltages from the sensor are beyond the specified voltages.	• Heated oxygen sensor 1 • Fuel pressure • Injectors • Heated oxygen sensor 1 heater

DTC Confirmation Procedure

NFEC1158

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

NFEC1158S01

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)/(B2) P1144/P1164" 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	1,200 - 2,600 rpm (A/T) 1,800 - 2,600 rpm (M/T)
Vehicle speed	Less than 100 km/h (62 MPH)
B/FUEL SCHDL	3 - 9 msec (A/T) 2.5 - 9 msec (M/T)
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 "Diagnostic Procedure", EC-501.

6

HO2S1 (B1) P1144	
OUT OF CONDITION	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SEN	XXX km/h

PBIB0548E

6

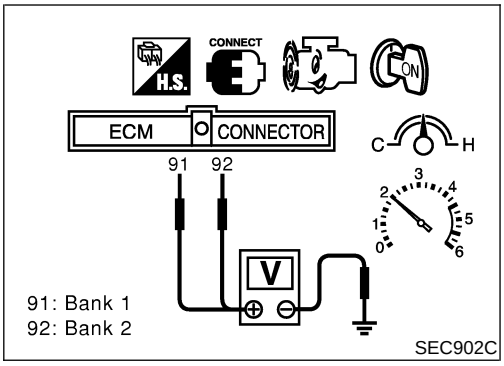
HO2S1 (B1) P1144	
TESTING	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SEN	XXX km/h

PBIB0549E

6

HO2S1 (B1) P1144
COMPLETED

SEC772C



Overall Function Check

NFEC1159

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

NFEC1159S01

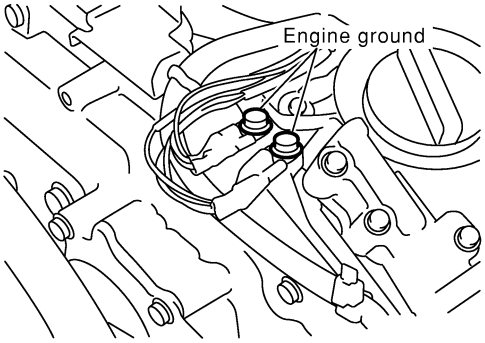
1) Start engine and warm it up to normal operating temperature.
2) Set voltmeter probes between ECM terminal 91 (HO2S1 bank 1 signal) or 92 (HO2S1 bank 2 signal) and engine ground.
3) Check one of the following with engine speed held at 2,000 rpm constant under no load.
   - The maximum voltage is below 0.8V at least one time.
   - The minimum voltage is below 0.35V at least one time.
4) If NG, go to “Diagnostic Procedure”, EC-501.

Diagnostic Procedure

NFEC1160

1	RETIGHTEN GROUND SCREWS

1. Turn ignition switch “OFF”.
2. Loosen and retighten engine ground screws.



SEC047D

▶	GO TO 2.

2	RETIGHTEN HEATED OXYGEN SENSOR 1

Loosen and retighten corresponding heated oxygen sensor 1.

Tightening torque:
40 - 60 N·m (4.1 - 6.1 kg-m, 30 - 44 ft-lb)

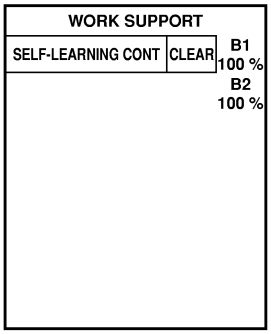
▶	GO TO 3.

Diagnostic Procedure (Cont'd)

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".



SEF968Y

4. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0172 or P0175 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 mass air flow sensor harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure DTC P0102 is displayed.
6. Erase the DTC memory. Refer to "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-91.
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0172 or P0175 detected?
   Is it difficult to start engine?

Yes or No

Yes	▶	Perform trouble diagnosis for DTC P0172, P0175. Refer to EC-275.
No	▶	GO TO 4.

4	CHECK HO2S 1 CONNECTOR FOR WATER

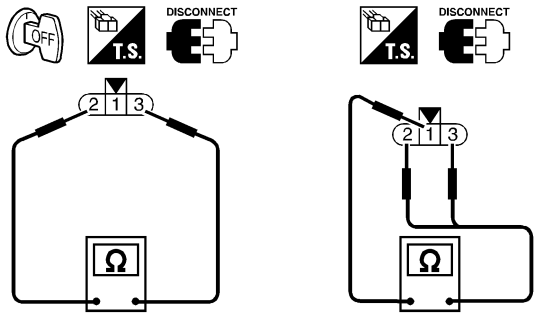
1. Turn ignition switch "OFF".
2. Disconnect heated oxygen sensor 1 harness connector.
3. Check connectors for water.
   Water should not exist.

OK or NG

OK	▶	GO TO 5.
NG	▶	Repair or replace harness or connectors.

5	CHECK HEATED OXYGEN SENSOR 1 HEATER

Check resistance between HO2S1 terminals as follows.



Terminals	Resistance
2 and 3	2.3 - 4.3Ω at 25°C (77°F)
1 and 2 1 and 3	∞Ω (Continuity should not exist.)

SEF310X

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.**

OK or NG

OK (With CONSULT-II)	▶	GO TO 6.
OK (Without CONSULT-II)	▶	GO TO 7.
NG	▶	Replace malfunctioning heated oxygen sensor 1.

6	CHECK 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)/(B2)" and "HO2S1 MNTR (B1)/(B2)".
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
HO2S2 (B2)	XXX V

SEF967Y

6. Check the following.

- "HO2S1 MNTR (B1)/(B2)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" 5 times in 10 seconds. 5 times (cycles) are counted as shown below.

Bank 1

cycle	1	2	3	4	5
HO2S1 MNTR (B1)	R-L-R-L-R-L-R-L-R-L				

Bank 2

cycle	1	2	3	4	5
HO2S1 MNTR (B2)	R-L-R-L-R-L-R-L-R-L				

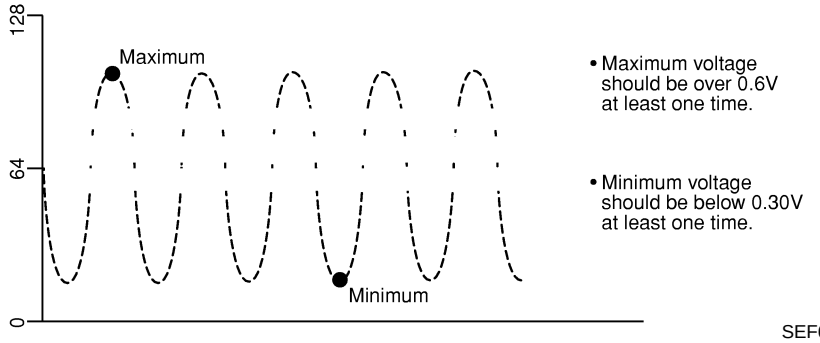
R means HO2S1 MNTR (B1)/(B2) indicates RICH

L means HO2S1 MNTR (B1)/(B2) indicates LEAN

SEF647Y

- "HO2S1 (B1)/(B2)" voltage goes above 0.6V at least once.
- "HO2S1 (B1)/(B2)" voltage goes below 0.3V at least once.
- "HO2S1 (B1)/(B2)" 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



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.**

OK or NG

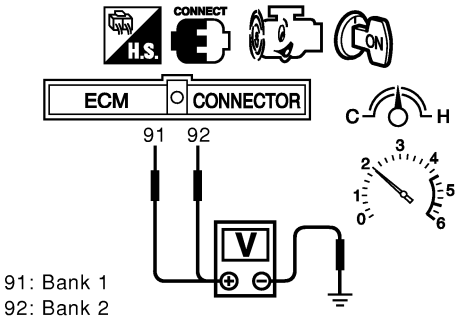
OK	▶	GO TO 8.
NG	▶	Replace malfunctioning heated oxygen sensor 1.

7	CHECK HEATED OXYGEN SENSOR 1

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 91 (HO2S1 bank 1 signal) or 92 (HO2S1 bank 2 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



SEC085D

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.**

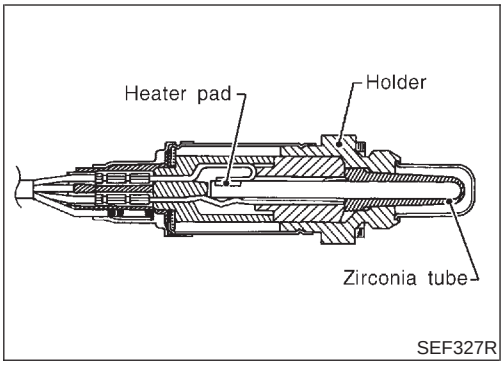
OK or NG

OK	▶	GO TO 8.
NG	▶	Replace malfunctioning heated oxygen sensor 1.

8	CHECK INTERMITTENT INCIDENT

Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.
For circuit, refer to "Wiring Diagram", EC-231.

▶ **INSPECTION END**



Component Description

NFEC1161

The heated oxygen sensor 2, after three way catalyst, 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.

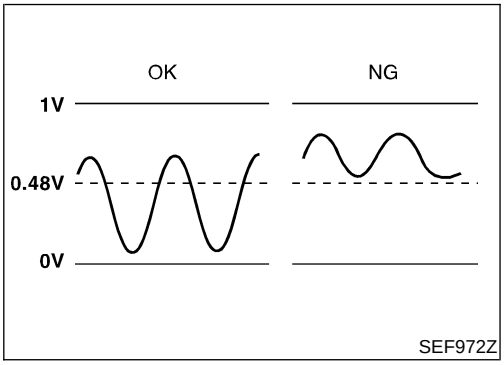
Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.

CONSULT-II Reference Value in Data Monitor Mode

NFEC1162

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1) HO2S2 (B2)	● Engine: After warming up	Revving engine from idle up to 2,000 rpm	0 - 0.3V ⟷ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1) HO2S2 MNTR (B2)			LEAN ⟷ RICH

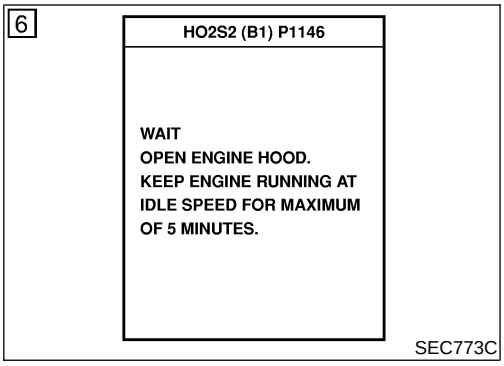


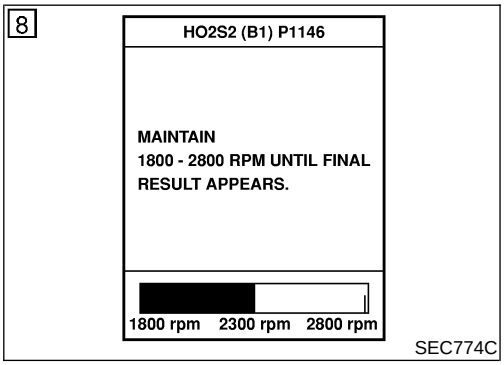
On Board Diagnosis Logic

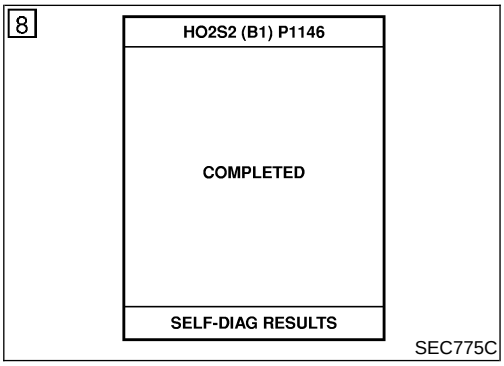
NFEC1164

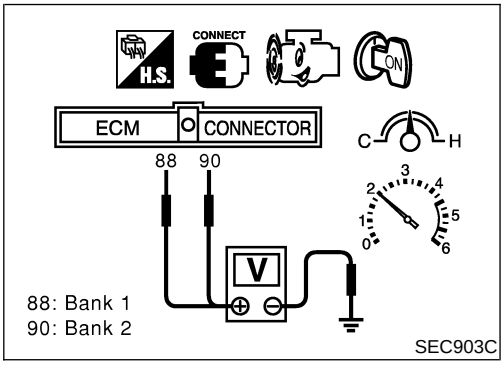
The heated oxygen sensor 2 has a much longer switching time between rich and lean than the heated oxygen sensor 1. The oxygen storage capacity before the three way catalyst causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the minimum voltage of sensor is sufficiently low during the various driving condition such as fuel-cut.

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P1146 1146 (Bank 1) P1166 1166 (Bank 2)	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

NFEC1165

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:
Open engine hood before conducting following procedure.

WITH CONSULT-II

NFEC1165S01

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) Make sure that "COOLAN TEMP/S" indicates more than 70°C (158°F).
6) Select "HO2S2 (B1)/(B2) P1146/P1166" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-II.
7) Start engine and follow the instruction of CONSULT-II.
8) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS".
   If NG is displayed, refer to "Diagnostic Procedure", EC-511.
   If "CANNOT BE DIAGNOSED" is displayed, perform the following.

a) Stop engine and cool down until "COOLAN TEMP/S" indicates less than 70°C (158°F).
b) Turn ignition switch "ON".
c) Select "DATA MONITOR" mode with CONSULT-II.
d) Start engine.
e) Return to step 6 again when the "COOLAN TEMP/S" reaches to 70°C (158°F).

Overall Function Check

NFEC1166

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

NFEC1166S01

1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
2) Stop vehicle with engine running.
3) Set voltmeter probes between ECM terminal 88 (HO2S2 bank 1 signal) or 90 (HO2S2 bank 2 signal) and engine ground.
4) Check the voltage when racing 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 0.48V at least once during this procedure.
   If the voltage can be confirmed in step 4, step 5 is not necessary.
5) Keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in 3rd gear position (M/T), "D" position with "OD" OFF (A/T).
   The voltage should be below 0.48V at least once during this procedure.

6) If NG, go to "Diagnostic Procedure", EC-511.

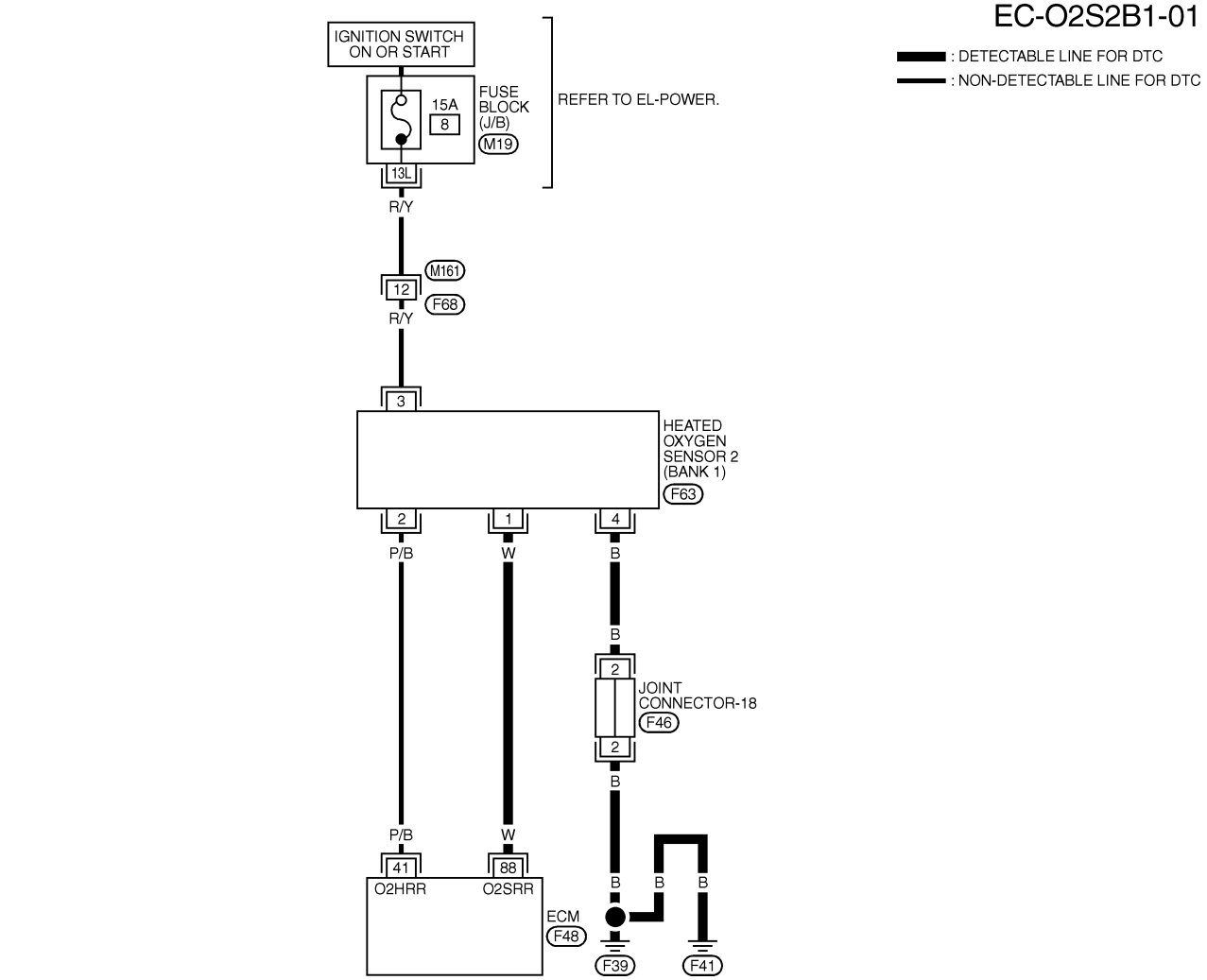
Wiring Diagram

=NFEC1167

BANK 1

NFEC1167S01

EC-O2S2B1-01



REFER TO THE FOLLOWING.
M19 -FUSE BLOCK-
JUNCTION BOX (J/B)

MEC483D

ECM TERMINALS AND REFERENCE VALUE 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.

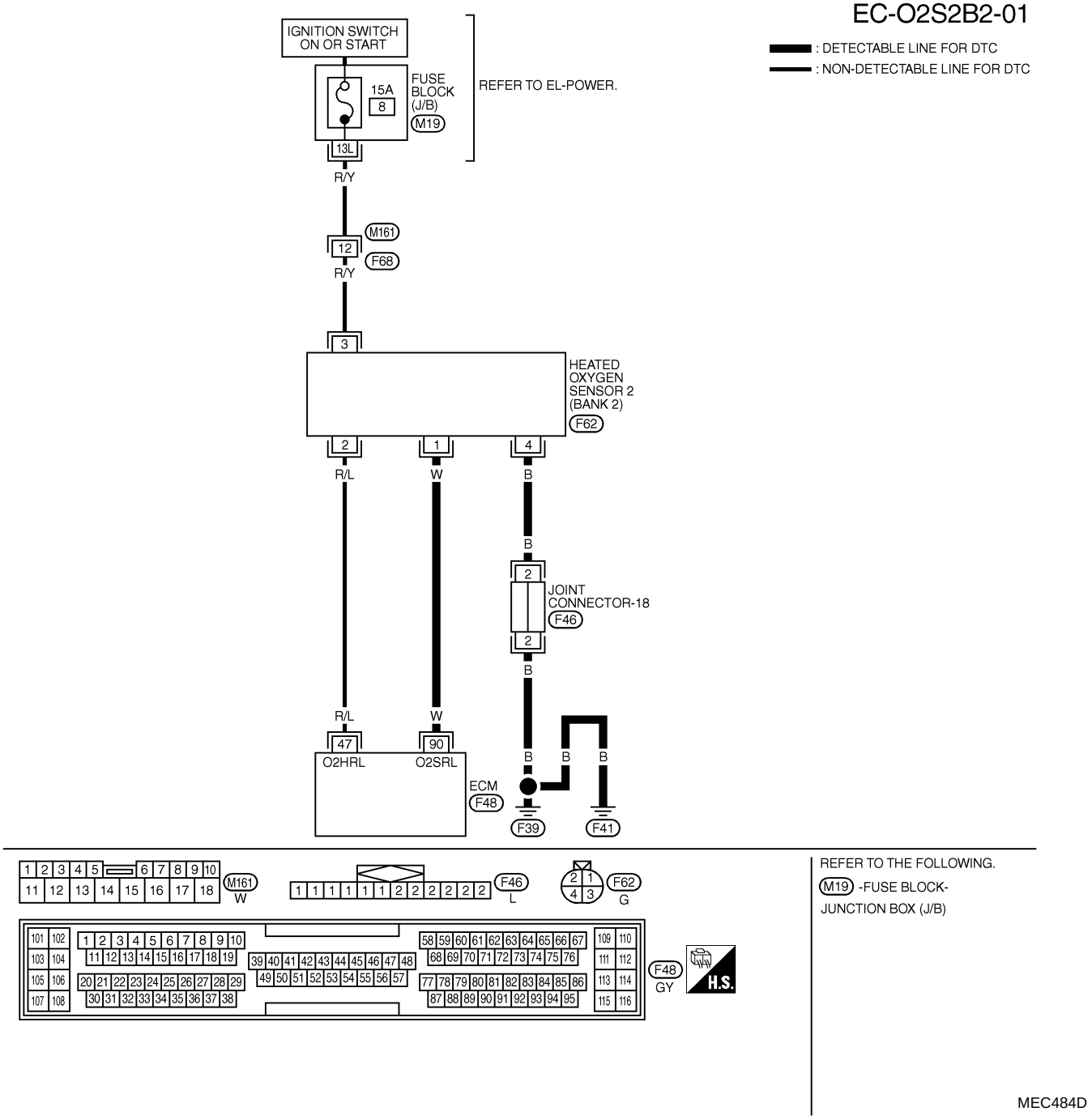
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
88	W	HEATED OXYGEN SENSOR 2 (REAR) (BANK 1)	ENGINE RUNNING FROM IDLE UP TO 2,000 RPM UNDER WARM-UP CONDITION	0 - APPROX. 1.0V

SEF657XF

Wiring Diagram (Cont'd)

BANK 2

NFEC1167S02



ECM TERMINALS AND REFERENCE VALUE 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	WIRE COLOR	ITEM	CONDITION	DATA (DC)
90	W	HEATED OXYGEN SENSOR 2 (REAR) (BANK 2)	ENGINE RUNNING FROM IDLE UP TO 2,000 RPM UNDER WARM-UP CONDITION	0 - APPROX. 1.0V

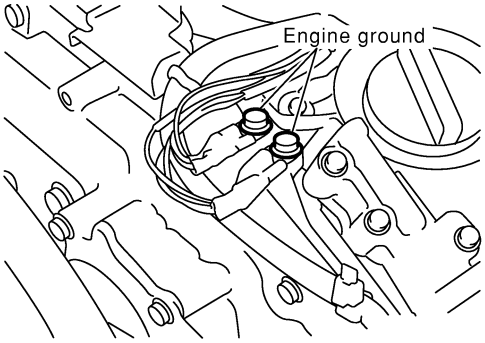
SEF658XF

Diagnostic Procedure

NFEC1168

1	RETIGHTEN GROUND SCREWS

1. Turn ignition switch “OFF”.
2. Loosen and retighten engine ground screws.



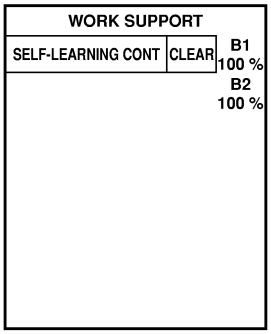
SEC047D

▶ 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”.



SEF968Y

4. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0172 or P0175 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 mass air flow sensor harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure DTC P0102 is displayed.
6. Erase the DTC memory. Refer to “HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION”, EC-91.
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0172 or P0175 detected?
   Is it difficult to start engine?

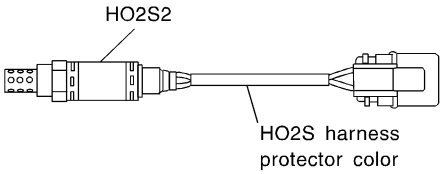
Yes or No

Yes	▶	Perform trouble diagnosis for DTC P0172, P0175. Refer to EC-275.
No	▶	GO TO 3.

Diagnostic Procedure (Cont'd)

3	CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

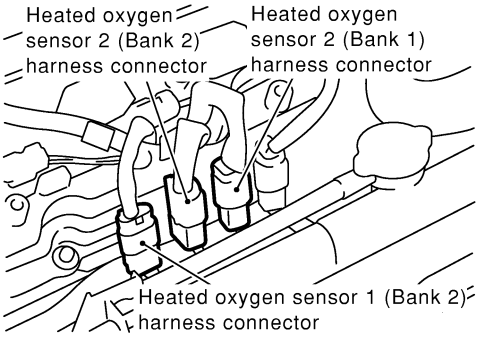
1. Turn ignition switch "OFF".
2. Check heated oxygen sensor 2 harness protector color.



HO2S2 (bank 1): White or Gray
HO2S2 (bank 2): Red or Red/Brown

SEF372ZB

3. Disconnect corresponding heated oxygen sensor 2 harness connector.



SEC134D

4. Disconnect ECM harness connector.
5. Check harness continuity between ECM terminal and HO2S2 terminal as follows. Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM	Sensor	
P1146	88	1	Bank 1
P1166	90	1	Bank 2

MTBL1161

Continuity should exist.

6. Check harness continuity between ECM terminal or HO2S2 terminal and ground as follows. Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM or Sensor	Ground	
P1146	88 or 1	Ground	Bank 1
P1166	90 or 1	Ground	Bank 2

MTBL1162

Continuity should not exist.

7. 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 HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between HO2S2 terminal 4 and engine ground.
   Refer to Wiring Diagram.
   Continuity should exist.
2. Also check harness for short to power.

OK or NG

OK (With CONSULT-II)	▶	GO TO 6.
OK (Without CONSULT-II)	▶	GO TO 7.
NG	▶	GO TO 5.

5	DETECT MALFUNCTIONING PART

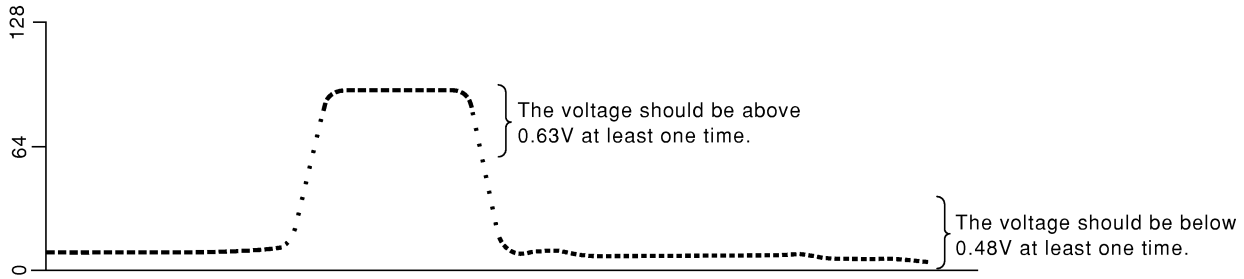
Check the following.
- Joint connectors-18
- Harness for open or short between heated oxygen sensor 2 and ground

	▶	Repair open circuit or short to power in harness or connectors.

6	CHECK HEATED OXYGEN SENSOR 2

With CONSULT-II
1. Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
2. Stop vehicle with engine running.
3. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)/(B2)" as the monitor item with CONSULT-II.
4. Check "HO2S2 (B1)/(B2)" at idle speed when adjusting "FUEL INJECTION" to ±25%.

(Reference data)



SEF066YA

"HO2S2 (B1)/(B2)" should be above 0.63V at least once when the "FUEL INJECTION" is +25%.
"HO2S2 (B1)/(B2)" should be below 0.48V 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.

OK or NG

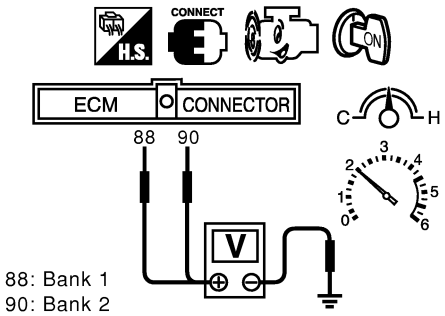
OK	▶	GO TO 10.
NG	▶	GO TO 9.

Diagnostic Procedure (Cont'd)

7	CHECK HEATED OXYGEN SENSOR 2-I

Without CONSULT-II

1. Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
2. Stop vehicle with engine running.
3. Set voltmeter probes between ECM terminal 88 (HO2S2 bank 1 signal) or 90 (HO2S2 bank 2 signal) and engine ground.
4. Check the voltage when rewing up to 4,000 rpm under no load at least 10 times.
   (Depress and release accelerator pedal as soon as possible.)



SEC903C

The voltage should be above 0.63V at least once during this procedure.

OK or NG

OK	▶	GO TO 10.
NG	▶	GO TO 8.

8	CHECK HEATED OXYGEN SENSOR 2-II

Without CONSULT-II

Idle vehicle for 10 minutes, then check voltage between the same terminals as in Test No. 7; or check voltage when coasting from 80 km/h (50 MPH) in 3rd gear position (M/T), "D" position with "OD" OFF (A/T).

The voltage should go below 0.48V at least once during this procedure.

CAUTION:

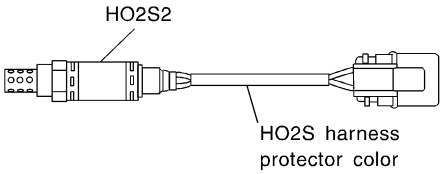
Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.

OK or NG

OK	▶	GO TO 10.
NG	▶	GO TO 9.

9	REPLACE HEATED OXYGEN SENSOR 2

1. Stop vehicle and turn ignition switch OFF.
2. Check heated oxygen sensor 2 harness protector color.



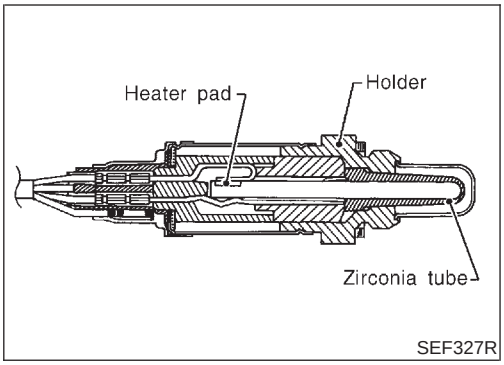
HO2S2 (bank 1): White or Gray
HO2S2 (bank 2): Red or Red/Brown

SEF372ZB

CAUTION:
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.

▶	Replace malfunctioning heated oxygen sensor 2.

10	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.	
▶	**INSPECTION END**



Component Description

NFEC1169

The heated oxygen sensor 2, after three way catalyst, 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.

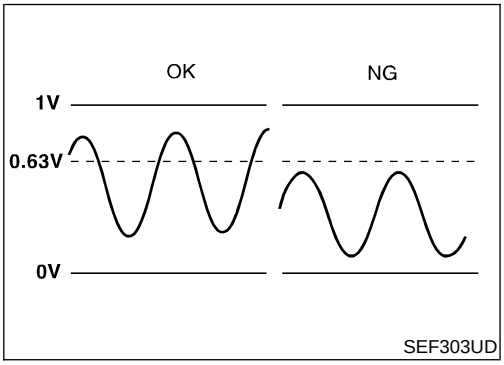
Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.

CONSULT-II Reference Value in Data Monitor Mode

NFEC1170

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1) HO2S2 (B2)	● Engine: After warming up	Revving engine from idle up to 2,000 rpm	0 - 0.3V ⟷ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1) HO2S2 MNTR (B2)			LEAN ⟷ RICH

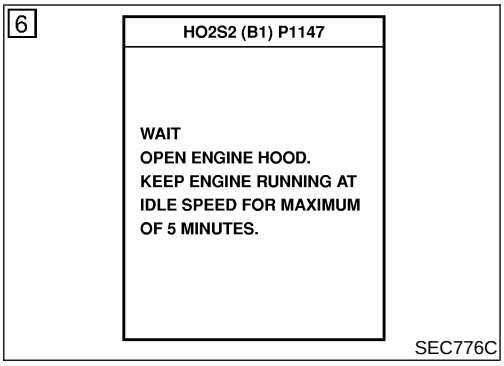


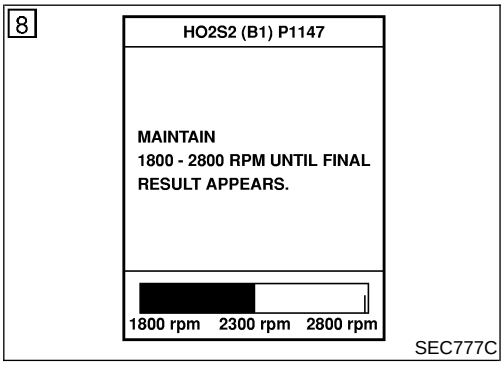
On Board Diagnosis Logic

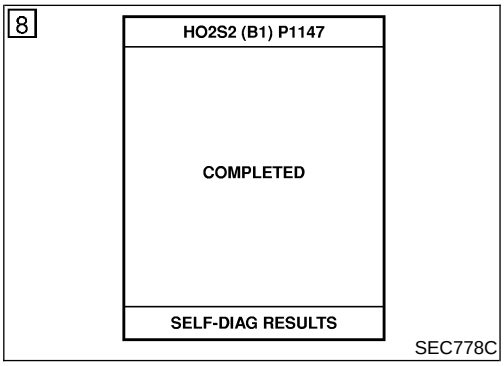
NFEC1172

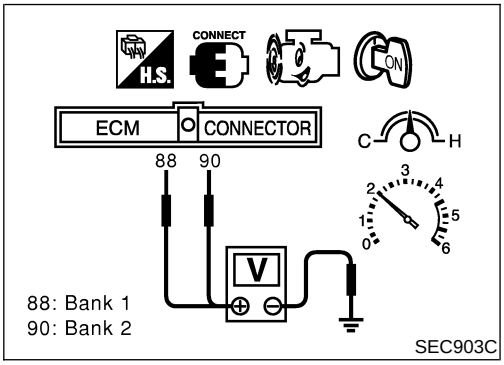
The heated oxygen sensor 2 has a much longer switching time between rich and lean than the heated oxygen sensor 1. The oxygen storage capacity before the three way catalyst causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the maximum voltage 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 (Bank 1) P1167 1167 (Bank 2)	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 is open or shorted.) ● Heated oxygen sensor 2 ● Fuel pressure ● Injectors ● Intake air leaks









DTC Confirmation Procedure

NFEC1173

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:
Open engine hood before conducting following procedure.

WITH CONSULT-II

NFEC1173S01

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) Make sure that "COOLAN TEMP/S" indicates more than 70°C (158°F).
6) Select "HO2S2 (B1)/(B2) P1147/P1167" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-II.
7) Start engine and follow the instruction of CONSULT-II.
8) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS".
   If NG is displayed, refer to "Diagnostic Procedure", EC-521.
   If "CANNOT BE DIAGNOSED" is displayed, perform the following.

a) Stop engine and cool down until "COOLAN TEMP/S" indicates less than 70°C (158°F).
b) Turn ignition switch "ON".
c) Select "DATA MONITOR" mode with CONSULT-II.
d) Start engine.
e) Return to step 6 again when the "COOLAN TEMP/S" reaches to 70°C (158°F).

Overall Function Check

NFEC1174

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

NFEC1174S01

1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
2) Stop vehicle with engine running.
3) Set voltmeter probes between ECM terminal 88 (HO2S2 bank 1 signal) or 90 (HO2S2 bank 2 signal) and engine ground.
4) Check the voltage when racing 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 4, step 5 is not necessary.
5) Keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in 3rd gear position (M/T), "D" position with "OD" OFF (A/T).
   The voltage should be above 0.63V at least once during this procedure.

Overall Function Check (Cont'd)

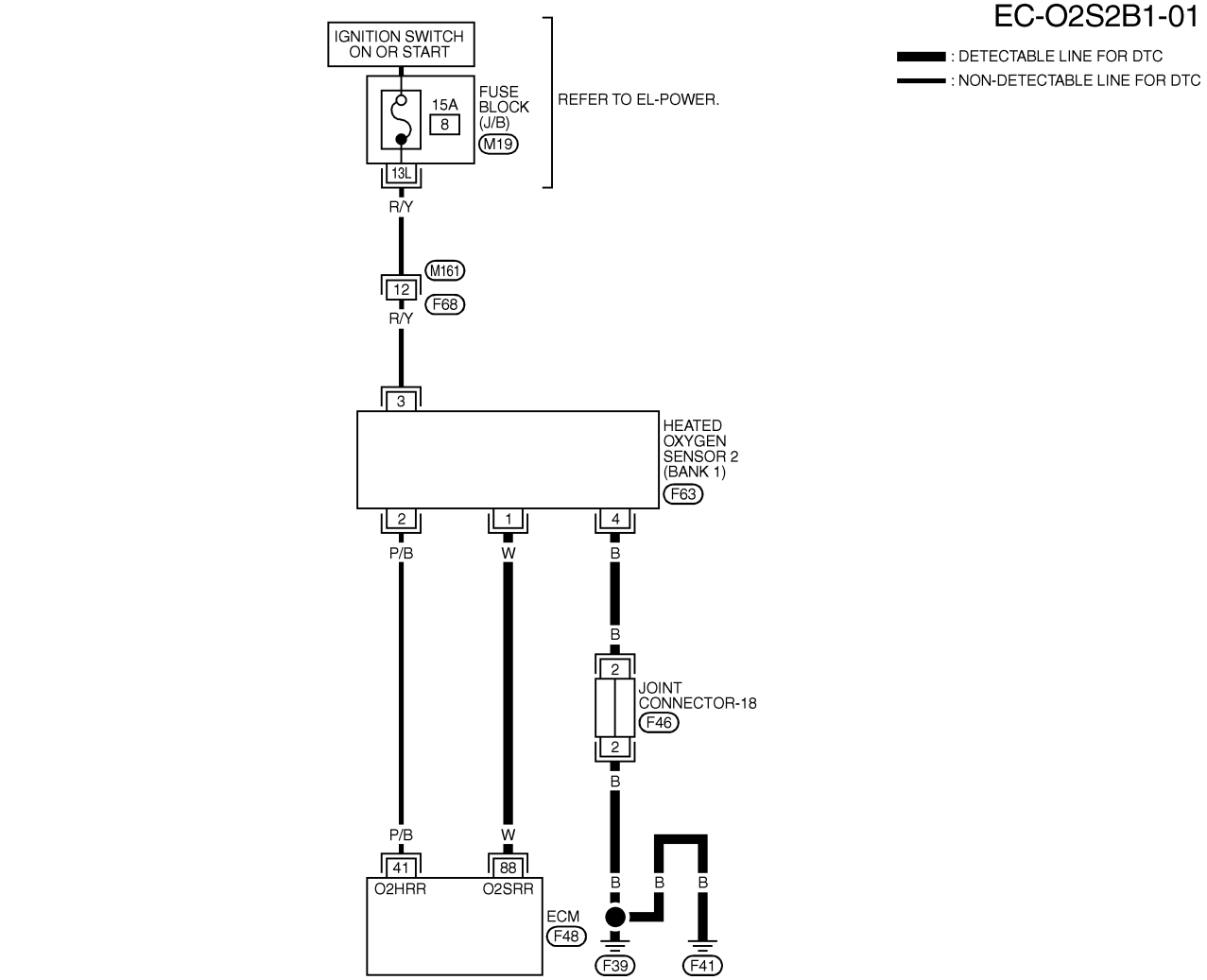
6) If NG, go to "Diagnostic Procedure", EC-521.

Wiring Diagram

=NFEC1175

BANK 1

NFEC1175S01



MEC483D

ECM TERMINALS AND REFERENCE VALUE 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.

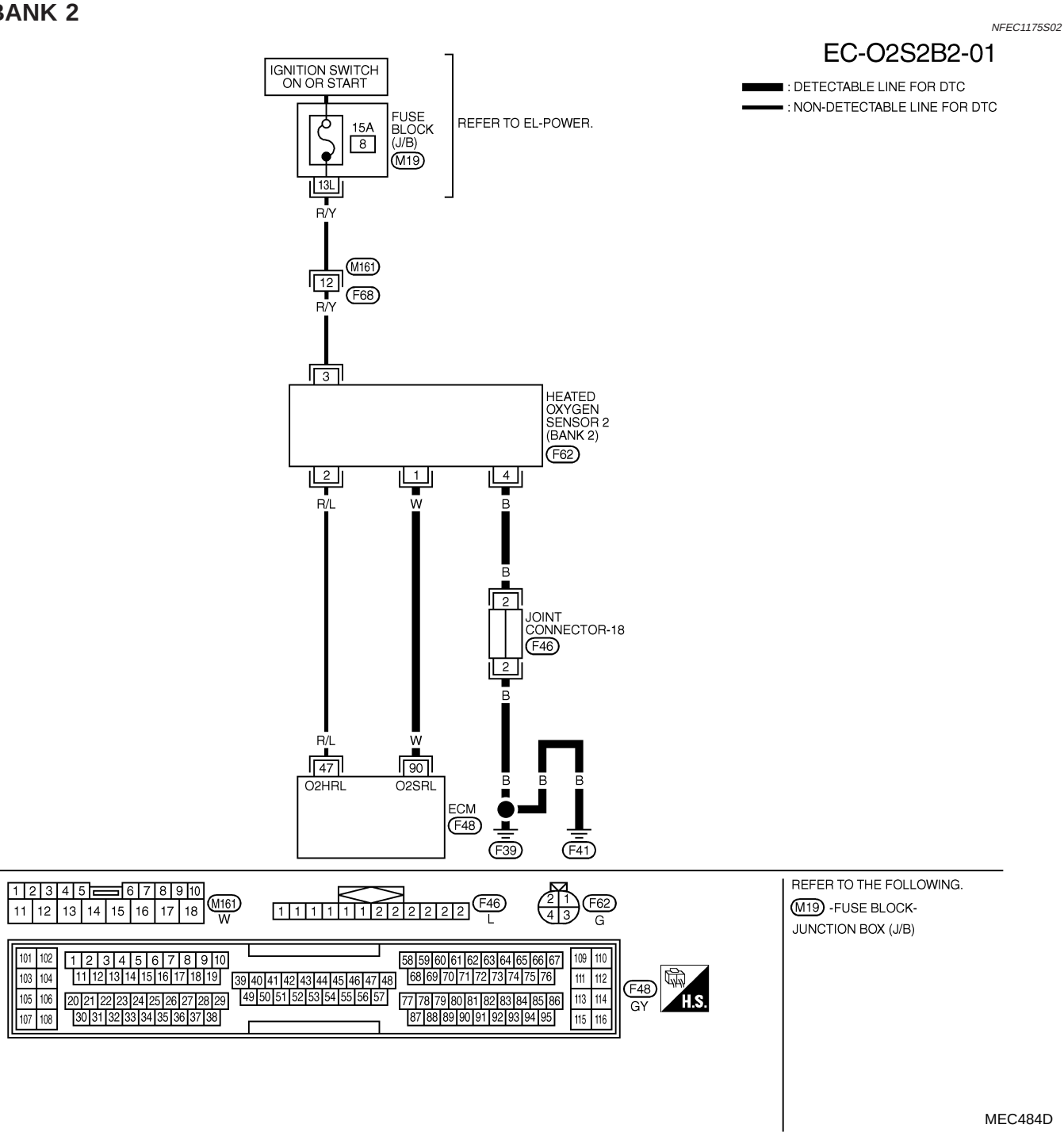
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
88	W	HEATED OXYGEN SENSOR 2 (REAR) (BANK 1)	ENGINE RUNNING FROM IDLE UP TO 2,000 RPM UNDER WARM-UP CONDITION	0 - APPROX. 1.0V

SEF657XF

Wiring Diagram (Cont'd)

BANK 2

NFEC1175S02



ECM TERMINALS AND REFERENCE VALUE 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	WIRE COLOR	ITEM	CONDITION	DATA (DC)
90	W	HEATED OXYGEN SENSOR 2 (REAR) (BANK 2)	ENGINE RUNNING FROM IDLE UP TO 2,000 RPM UNDER WARM-UP CONDITION	0 - APPROX. 1.0V

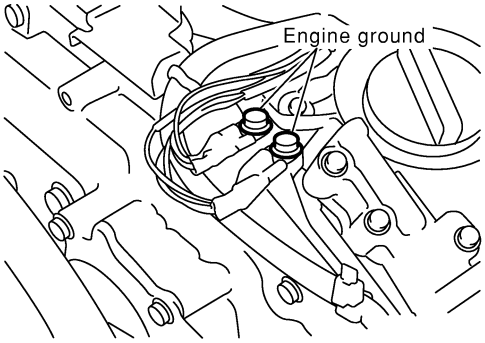
SEF658XF

Diagnostic Procedure

NFEC1176

1	RETIGHTEN GROUND SCREWS

1. Turn ignition switch “OFF”.
2. Loosen and retighten engine ground screws.



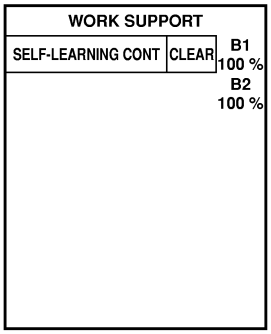
SEC047D

	▶	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”.



SEF968Y

4. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0171 or P0174 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 mass air flow sensor harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure DTC P0102 is displayed.
6. Erase the DTC memory. Refer to “HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION”, EC-91.
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0171 or P0174 detected?
   Is it difficult to start engine?

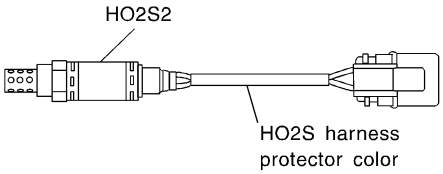
Yes or No

Yes	▶	Perform trouble diagnosis for DTC P0171, P0174. Refer to EC-267.
No	▶	GO TO 3.

Diagnostic Procedure (Cont'd)

3	CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

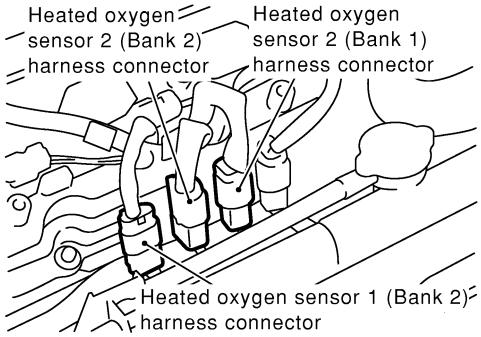
1. Turn ignition switch "OFF".
2. Check heated oxygen sensor 2 harness protector color.



HO2S2 (bank 1): White or Gray
HO2S2 (bank 2): Red or Red/Brown

SEF372ZB

3. Disconnect corresponding heated oxygen sensor 2 harness connector.



SEC134D

4. Disconnect ECM harness connector.
5. Check harness continuity between ECM terminal and HO2S2 terminal as follows. Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM	Sensor	
P1147	88	1	Bank 1
P1167	90	1	Bank 2

MTBL1163

Continuity should exist.

6. Check harness continuity between ECM terminal or HO2S2 terminal and ground as follows. Refer to Wiring Diagram.

DTC	Terminals		Bank
	ECM or Sensor	Ground	
P1147	88 or 1	Ground	Bank 1
P1167	90 or 1	Ground	Bank 2

MTBL1164

Continuity should not exist.

7. 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 HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between HO2S2 terminal 4 and engine ground.
   Refer to Wiring Diagram.
   Continuity should exist.
2. Also check harness for short to power.

OK or NG

OK (With CONSULT-II)	▶	GO TO 6.
OK (Without CONSULT-II)	▶	GO TO 7.
NG	▶	GO TO 5.

5	DETECT MALFUNCTIONING PART

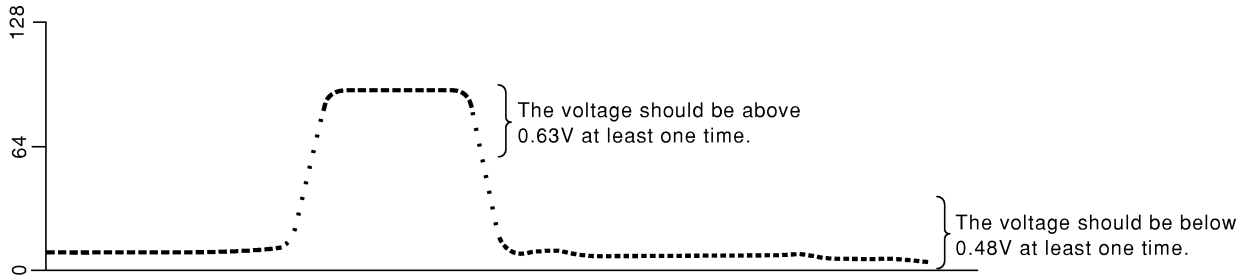
Check the following.
- Joint connectors-18
- Harness for open or short between heated oxygen sensor 2 and ground

	▶	Repair open circuit or short to power in harness or connectors.

6	CHECK HEATED OXYGEN SENSOR 2

With CONSULT-II
1. Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
2. Stop vehicle with engine running.
3. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)/(B2)" as the monitor item with CONSULT-II.
4. Check "HO2S2 (B1)/(B2)" at idle speed when adjusting "FUEL INJECTION" to ±25%.

(Reference data)



SEF066YA

"HO2S2 (B1)/(B2)" should be above 0.63V at least once when the "FUEL INJECTION" is +25%.
"HO2S2 (B1)/(B2)" should be below 0.48V 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.

OK or NG

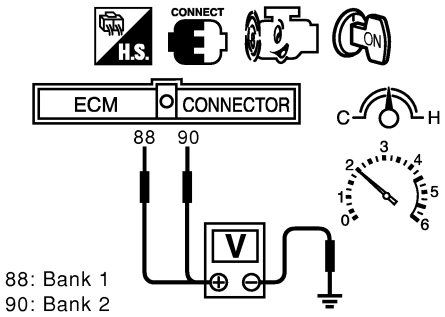
OK	▶	GO TO 10.
NG	▶	GO TO 9.

Diagnostic Procedure (Cont'd)

7	CHECK HEATED OXYGEN SENSOR 2-I

Without CONSULT-II

1. Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
2. Stop vehicle with engine running.
3. Set voltmeter probes between ECM terminal 88 (HO2S2 bank 1 signal) or 90 (HO2S bank 2 signal) and engine ground.
4. 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.)



SEC903C

The voltage should be above 0.63V at least once during this procedure.

OK or NG

OK	▶	GO TO 10.
NG	▶	GO TO 8.

8	CHECK HEATED OXYGEN SENSOR 2-II

Without CONSULT-II

Idle vehicle for 10 minutes, then check voltage between the same terminals as in Test No. 7; or check voltage when coasting from 80 km/h (50 MPH) in 3rd gear position (M/T), "D" position with "OD" OFF (A/T).

The voltage should go below 0.48V at least once during this procedure.

CAUTION:

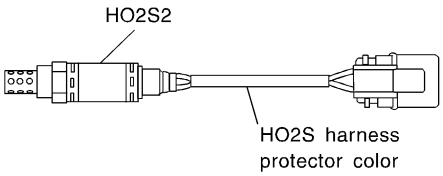
Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.

OK or NG

OK	▶	GO TO 10.
NG	▶	GO TO 9.

9	REPLACE HEATED OXYGEN SENSOR 2

1. Stop vehicle and turn ignition switch "OFF".
2. Check heated oxygen sensor 2 harness protector color.



HO2S2 (bank 1): White or Gray
HO2S2 (bank 2): Red or Red/Brown

SEF372ZB

CAUTION:

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.

	▶	Replace malfunctioning heated oxygen sensor 2.

10	**CHECK INTERMITTENT INCIDENT**
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.	
▶	**INSPECTION END**

On Board Diagnosis Logic

NFEC1064

★ The closed loop control has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P1148 1148 (Bank 1) P1168 1168 (Bank 2)	Closed loop control	The closed loop control function for bank 1 does not operate even when vehicle is driving in the specified condition, the closed loop control function for bank 2 does not operate even when vehicle is driving in the specified condition.	• The heated oxygen sensor 1 circuit is open or shorted. • Heated oxygen sensor 1 • Heated oxygen sensor 1 heater

DTC Confirmation Procedure

NFEC1065

CAUTION:

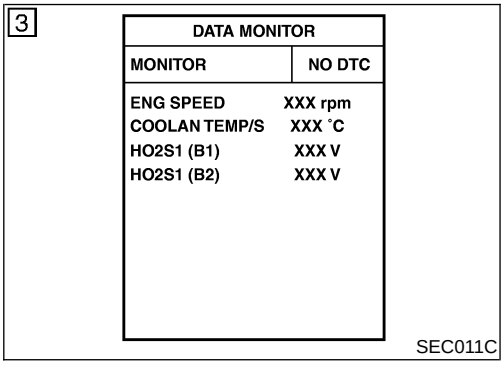
Always drive vehicle at a safe speed.

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:

- **Never raise engine speed above 3,600 rpm during the “DTC Confirmation Procedure”. If the engine speed limit is exceeded, retry the procedure from step 2.**
- **Before performing the following procedure, confirm that battery voltage is more than 11V at idle.**



WITH CONSULT-II

NFEC1065S01

1) Start engine and warm it up to normal operating temperature.
2) Select “DATA MONITOR” mode with CONSULT-II.
3) Hold engine speed at 2,000 rpm and check one of the following.

- “HO2S1 (B1)/(B2)” voltage should go above 0.70V at least once.
- “HO2S1 (B1)/(B2)” voltage should go below 0.21V at least once.

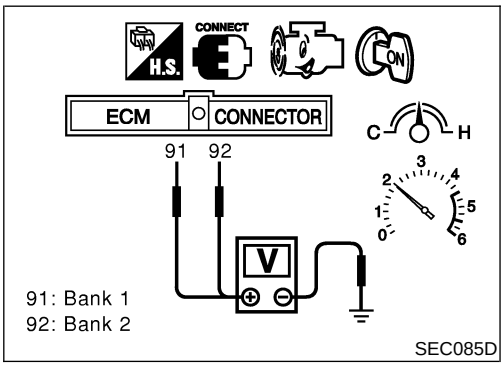
If the check result is NG, perform “Diagnosis Procedure”, EC-527.
If the check result is OK, perform the following step.

4) Let engine idle at least 5 minutes.
5) Maintain the following condition at least 50 consecutive seconds.

B/FUEL SCHDL	3.0 msec or more
ENG SPEED	1,800 - 3,000 rpm
Selector lever	Suitable position
VHCL SPEED SE	More than 70 km/h (43 MPH)

During this test, P0134 and/or P0154 may be displayed on CONSULT-II screen.

6) If DTC is detected, go to "Diagnostic Procedure", EC-527.



Overall Function Check

NFEC1066

Use this procedure to check the overall function of the closed loop control. During this check, a DTC might not be confirmed.

WITH GST

NFEC1066S01

1) Start engine and warm it up to normal operating temperature.
2) Set voltmeter probes between ECM terminal 91 [Heated oxygen sensor 1 bank 1 signal] or 92 [Heated oxygen sensor 1 bank 2 signal] and engine ground.
3) Check the following with engine speed held at 2,000 rpm constant under no-load.

- The voltage should go above 0.70V at least once.
- The voltage should go below 0.21V at least once.

4) If NG, go to "Diagnostic Procedure", EC-527.

Diagnostic Procedure

NFEC1067

Perform trouble diagnosis for "DTC P0133, P0153", EC-228.

Description

NFEC1268

The malfunction information related to ABS or ABS/TCS is transferred through the CAN communication line from ABS actuator and electric unit or ABS/TCS control unit to ECM.

Be sure to erase the malfunction information such as DTC not only for ABS actuator and electric unit or ABS/TCS control unit but also for ECM after the ABS or ABS/TCS related repair.

On Board Diagnosis Logic

NFEC1269

Freeze frame data is not stored in the ECM for this self-diagnosis. The MIL will not light up for this self-diagnosis.

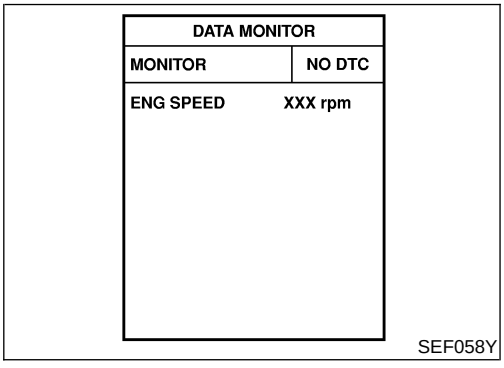
DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1211 1211	ABS/TCS control unit performance	ECM receives a malfunction information from ABS actuator and electric unit or ABS/TCS control unit.	• ABS actuator and electric unit • ABS/TCS control unit • TCS related parts

DTC Confirmation Procedure

NFEC1270

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 “Diagnostic Procedure”, EC-529.

WITH GST

Follow the procedure “WITH CONSULT-II” above.

Diagnostic Procedure

NFEC1272

Go to BR-56 (With ABS models) or BR-102 (With ABS/TCS models), “TROUBLE DIAGNOSIS — INTRODUCTION”.

Description

NFEC1273

NOTE:
If DTC P1212 is displayed with DTC U1000, U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to "DTC U1000, U1001 CAN COMMUNICATION LINE", EC-164.

This CAN communication line is used to control the smooth engine operation during the ABS or TCS operation. Pulse signals are exchanged between ECM and ABS actuator and electric unit or ABS/TCS control unit. **Be sure to erase the malfunction information such as DTC not only in ABS actuator and electric unit or ABS/TCS control unit but also ECM after the ABS or ABS/TCS related repair.**

On Board Diagnosis Logic

NFEC1274

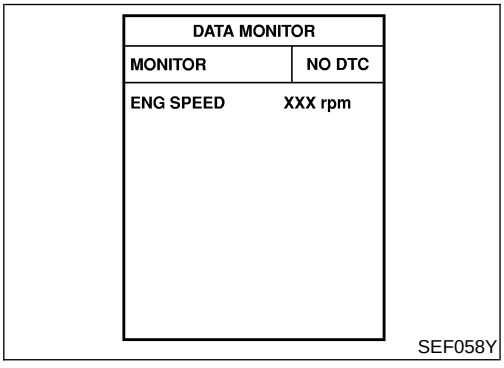
Freeze frame data is not stored in the ECM for this self-diagnosis. The MIL will not light up for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1212 1212	ABS/TCS communication line	ECM cannot receive the information from ABS actuator and electric unit or ABS/TCS control unit continuously.	• Harness or connectors (The CAN communication line is open or shorted.) • ABS actuator and electric unit • ABS/TCS control unit • Dead (Weak) battery

DTC Confirmation Procedure

NFEC1275

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 1st trip DTC is detected, go to "Diagnostic Procedure", EC-531.

WITH GST

Follow the procedure "WITH CONSULT-II" above.

Diagnostic Procedure

NFEC1277

1	**CHECK ABS/TCS CONTROL UNIT FUNCTION**
Refer to “TROUBLE DIAGNOSIS — INTRODUCTION”, BR-56 (With ABS models) or BR-102 (With ABS/TCS models).	
▶	**INSPECTION END**

System Description

NFEC1320

COOLING FAN CONTROL

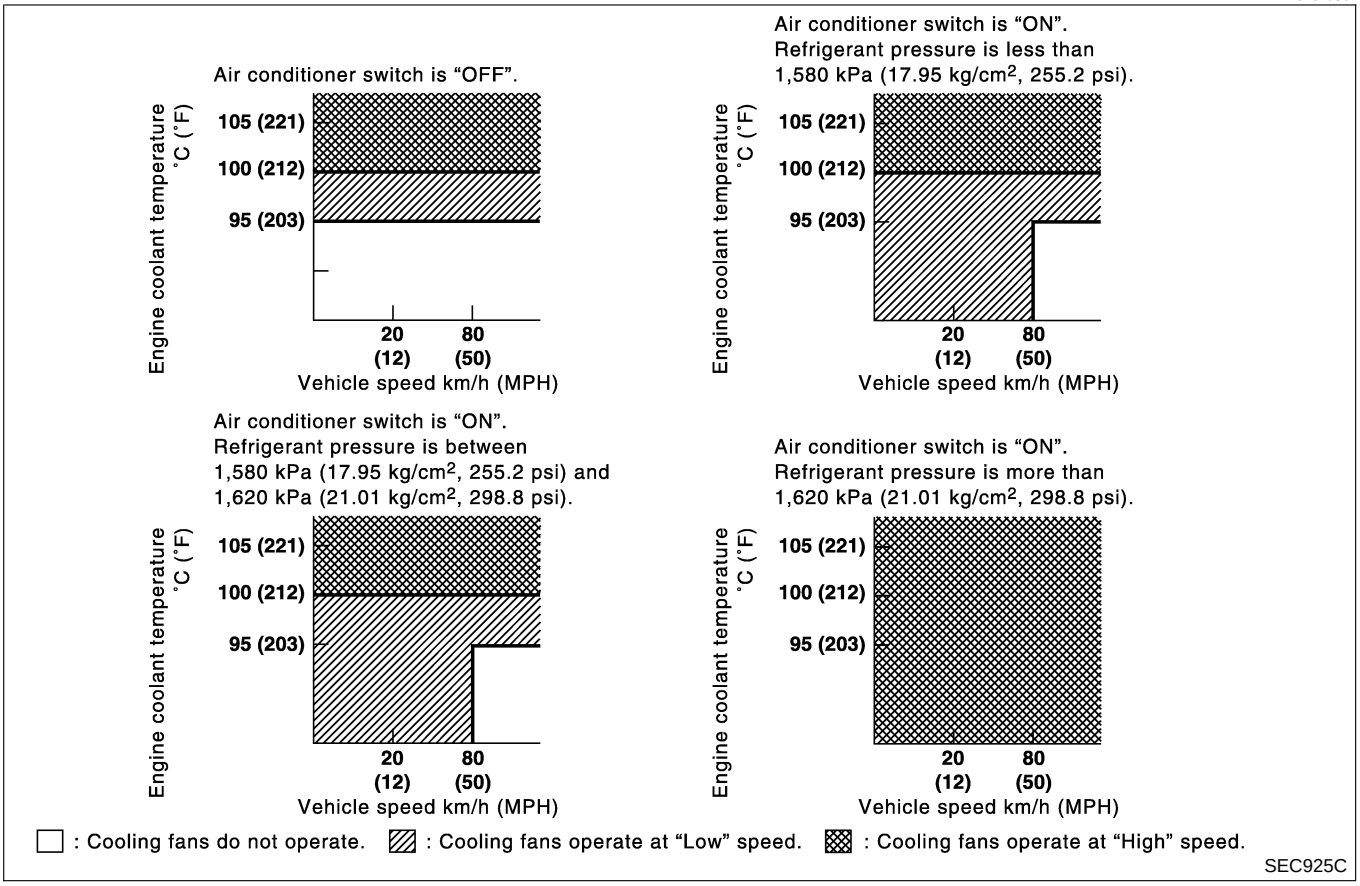
NFEC1320S01

Sensor	Input Signal to ECM	ECM function	Actuator
Wheel sensor	Vehicle speed	Cooling fan control	Cooling fan relay(s)
Engine coolant temperature sensor	Engine coolant temperature		
Air conditioner switch	Air conditioner “ON” signal		
Ignition switch	Start signal		
Refrigerant pressure sensor	Refrigerant pressure		

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].

OPERATION

NFEC1320S02



SEC925C

CONSULT-II Reference Value in Data Monitor Mode

NFEC1321

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

CONSULT-II Reference Value in Data Monitor Mode (Cont'd)

MONITOR ITEM	CONDITION		SPECIFICATION
COOLING FAN	● After warming up engine, 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 99°C (210°F)	LOW
		Engine coolant temperature is 100°C (212°F) or more	HIGH

On Board Diagnosis Logic

NFEC1454

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.

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P1217 1217	Engine over temperature	● 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.	● 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 "MAIN 12 CAUSES OF OVERHEATING", EC-549.

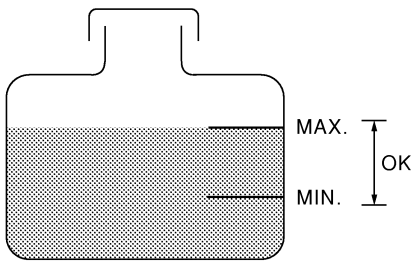
CAUTION:

When a malfunction is indicated, be sure to replace the coolant following the procedure in the MA-14, "Changing Engine Coolant". Also, replace the 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-12, "Anti-freeze Coolant Mixture Ratio".

2) After refilling coolant, run engine to ensure that no water-flow noise is emitted.

1



SEF621W

4

ACTIVE TEST	
COOLING FAN	OFF
MONITOR	
COOLAN TEMP/S	XXX °C

SEF111X

Overall Function Check

NFEC1324

Use this procedure to check the overall function of the cooling fan. During this check, a DTC might not be confirmed.

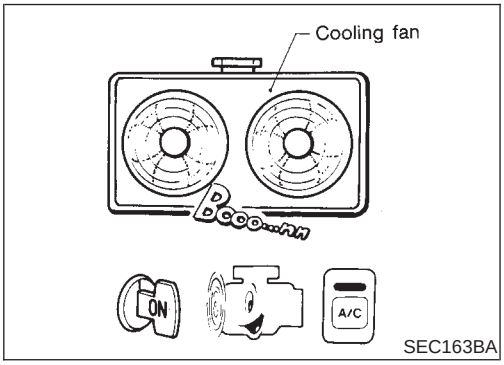
WARNING:

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.

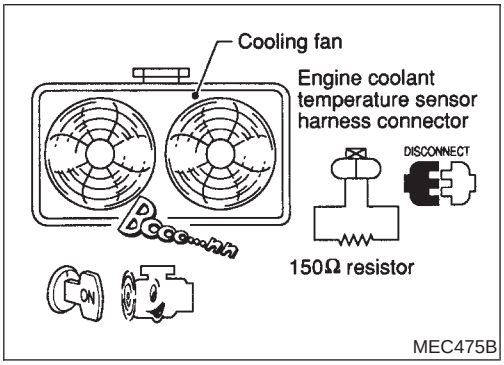
WITH CONSULT-II

NFEC1324S01

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 “Diagnostic Procedure”, EC-538.
2) Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to “Diagnostic Procedure”, EC-538.
3) Turn ignition switch “ON”.
4) Perform “COOLING FAN” in “ACTIVE TEST” mode with CONSULT-II.
5) If the results are NG, go to “Diagnostic Procedure”, EC-538.



SEC163BA



MEC475B

WITH GST

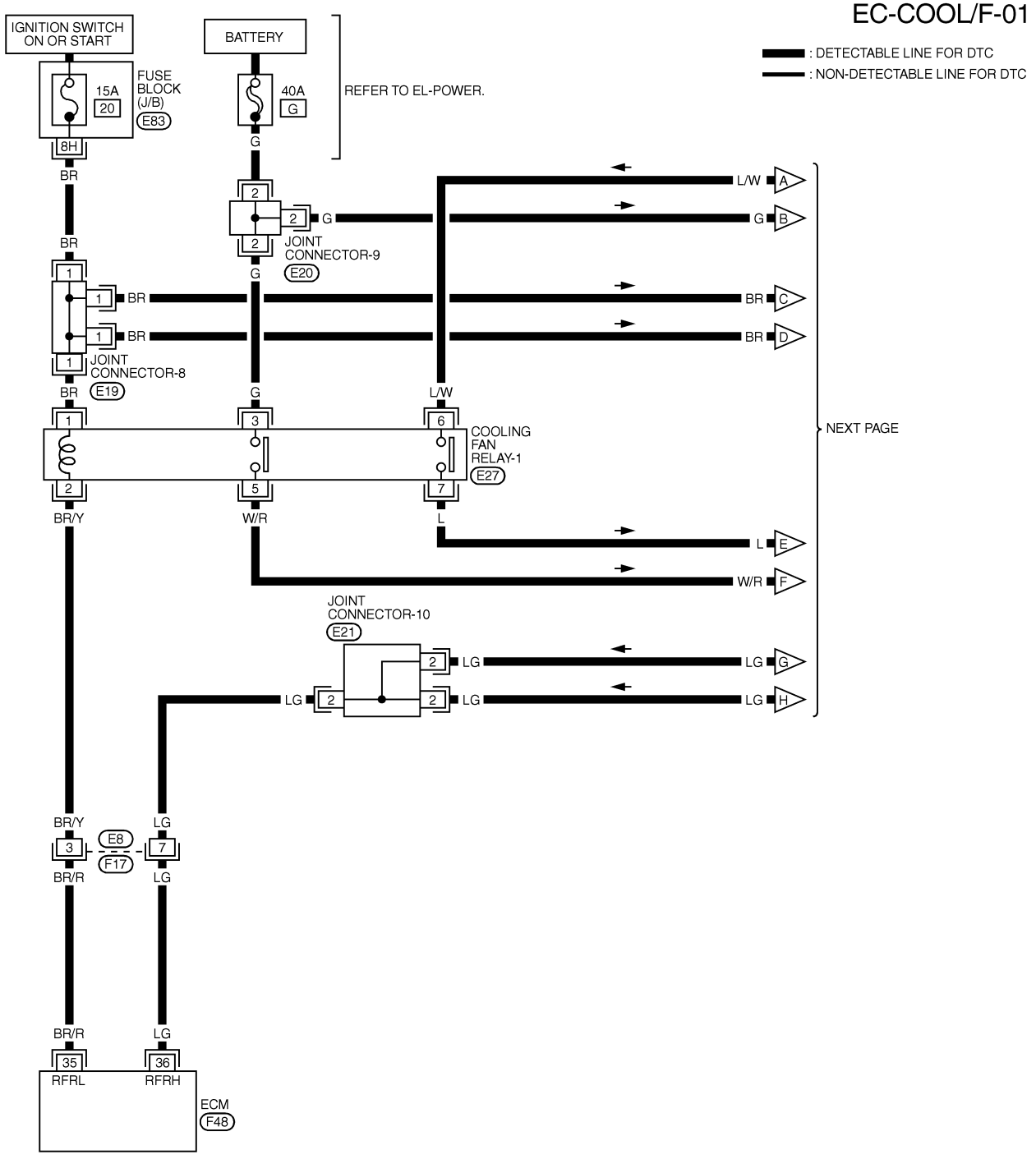
NFEC1324S03

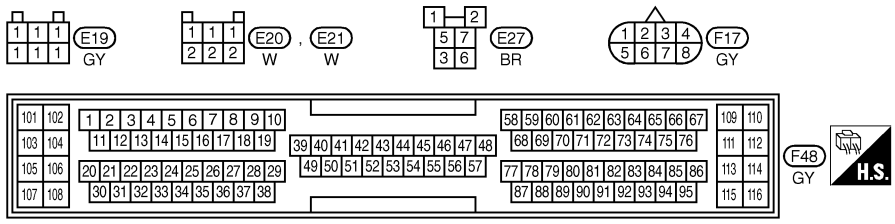
1) Check the coolant level in the reservoir tank and radiator.
Allow engine to cool before checking coolant level.
If the coolant level in the reservoir tank and/or radiator is below the proper range, skip the following steps and go to “Diagnostic Procedure”, EC-538.
2) Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to “Diagnostic Procedure”, EC-538.
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 fan operates at low speed.
If NG, go to “Diagnostic Procedure”, EC-538.
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 "Diagnostic Procedure", EC-538.

Wiring Diagram

NFEC1325

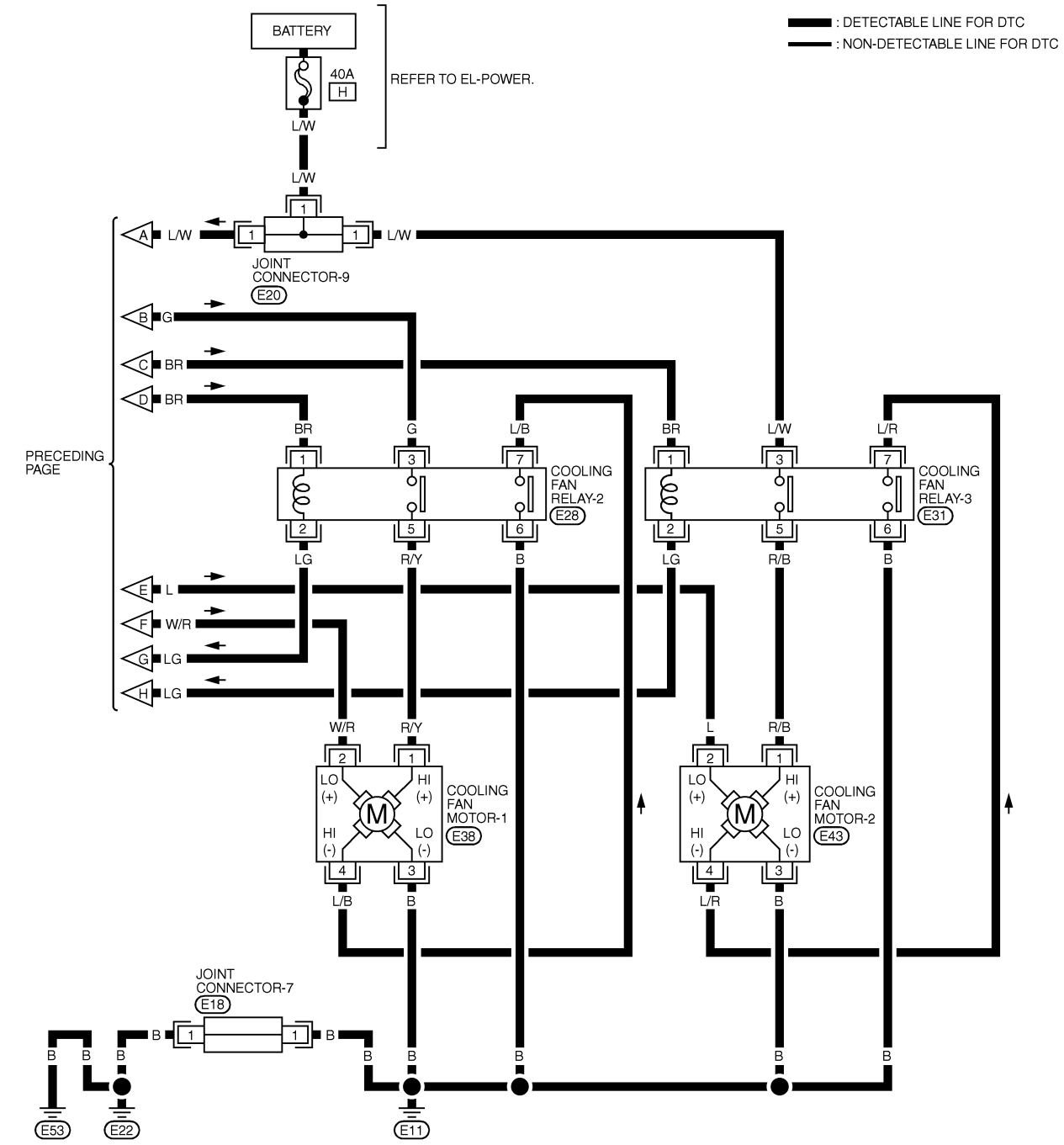


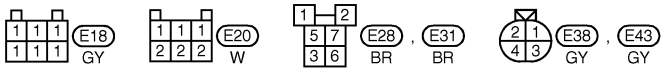


REFER TO THE FOLLOWING.
E83 -FUSE BLOCK-
JUNCTION BOX (J/B)

MEC490D

EC-COOL/F-02





MEC491D

Wiring Diagram (Cont'd)

ECM TERMINALS AND REFERENCE VALUE 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	WIRE COLOR	ITEM	CONDITION	DATA (DC)
36	LG	COOLING FAN RELAY (HIGH)	ENGINE RUNNING WITH COOLING FAN NOT OPERATING	BATTERY VOLTAGE
			ENGINE RUNNING WITH COOLING FAN OPERATING AT HIGH SPEED	0 - 1.0V
35	BR/R	COOLING FAN RELAY (LOW)	ENGINE RUNNING WITH COOLING FAN NOT OPERATING	BATTERY VOLTAGE
			ENGINE RUNNING WITH COOLING FAN OPERATING AT LOW SPEED	0 - 1.0V

SEF630XC

Diagnostic Procedure

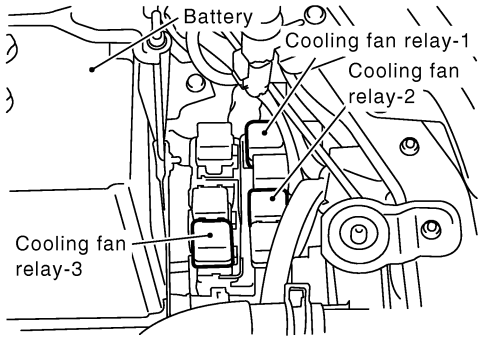
NFEC1326

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. Disconnect cooling fan relays-2 and -3.



SEC006C

2. Turn ignition switch "ON".
3. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II.

ACTIVE TEST	
COOLING FAN	OFF
MONITOR	
COOLAN TEMP/S	XXX °C

SEF646X

4. Make sure that cooling fans-1 and -2 operate at low speed.

OK or NG

OK ▶	GO TO 3.
NG ▶	Check cooling fan low speed control circuit. (Go to PROCEDURE A, EC-544.)

3	CHECK COOLING FAN HIGH SPEED OPERATION	
With CONSULT-II 1. Turn ignition switch "OFF". 2. Reconnect cooling fan relays-2 and -3. 3. Turn ignition switch "ON". 4. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II.		

ACTIVE TEST	
COOLING FAN	OFF
MONITOR	
COOLAN TEMP/S	XXX °C

SEF111X

5. Make sure that cooling fans-1 and -2 operate at high speed.

OK or NG

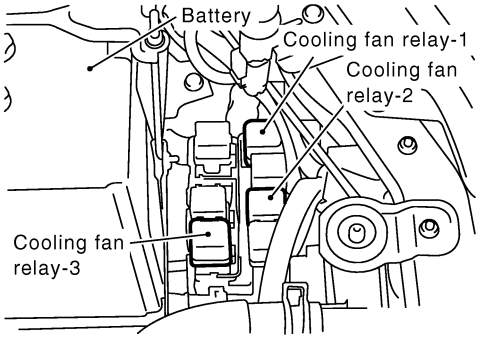
OK	▶	GO TO 6.
NG	▶	Check cooling fan high speed control circuit. (Go to PROCEDURE B, EC-547.)

Diagnostic Procedure (Cont'd)

4	CHECK COOLING FAN LOW SPEED OPERATION

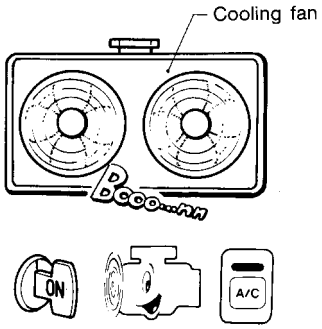
Without CONSULT-II

1. Disconnect cooling fan relays-2 and -3.



SEC006C

2. Start engine and let it idle.
3. Set temperature lever at full cold position.
4. Turn air conditioner switch "ON".
5. Turn blower fan switch "ON".
6. Make sure that cooling fans-1 and -2 operate at low speed.



SEC163BA

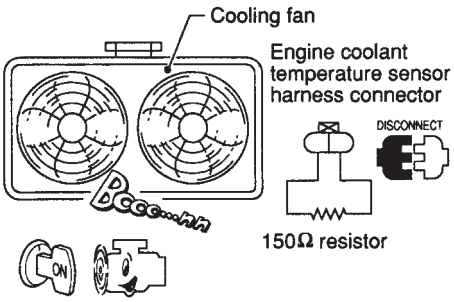
OK or NG

OK	▶	GO TO 5.
NG	▶	Check cooling fan low speed control circuit. (Go to PROCEDURE A, EC-544.)

5	CHECK COOLING FAN HIGH SPEED OPERATION

Without CONSULT-II

1. Turn ignition switch "OFF".
2. Reconnect cooling fan relays-2 and -3.
3. Turn air conditioner switch and blower fan switch "OFF".
4. Disconnect engine coolant temperature sensor harness connector.
5. Connect 150Ω resistor to engine coolant temperature sensor harness connector.
6. Restart engine and make sure that cooling fans-1 and -2 operate at high speed.



MEC475B

OK or NG

OK	▶	GO TO 6.
NG	▶	Check cooling fan high speed control circuit. (Go to PROCEDURE B, EC-547.)

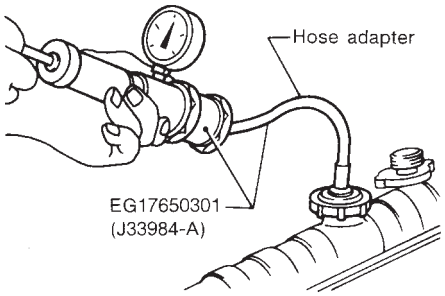
6	CHECK COOLING SYSTEM FOR LEAK

Apply pressure to the cooling system with a tester, and check if the pressure drops.

Testing pressure: 157 kPa (1.6 kg/cm^2, 23 psi)

CAUTION:

Higher than the specified pressure may cause radiator damage.



SLC754A

Pressure should not drop.

OK or NG

OK	▶	GO TO 8.
NG	▶	GO TO 7.

7	DETECT MALFUNCTIONING PART

Check the following for leak.

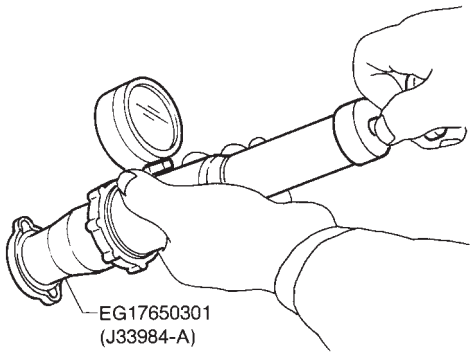
- Hose
- Radiator
- Water pump (Refer to LC-14, "Water Pump".)

	▶	Repair or replace.

Diagnostic Procedure (Cont'd)

8	CHECK RADIATOR CAP

Apply pressure to cap with a tester and check radiator cap relief pressure.



SLC755A

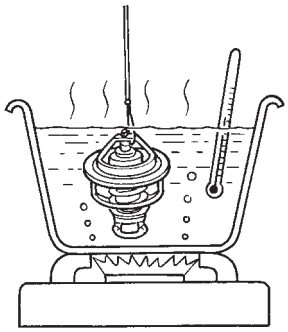
Radiator cap relief pressure:
59 - 98 kPa (0.6 - 1.0 kg/cm^2, 9 - 14 psi)

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.



SLC343

Valve opening temperature:
82°C (180°F) [standard]
Valve lift:
More than 8.6 mm/95°C (0.339 in/203°F)

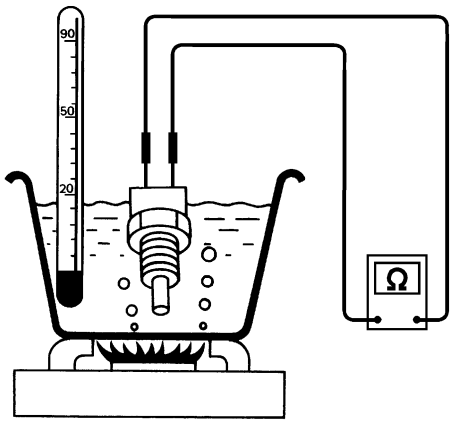
4. Check if valve is closed at 5°C (9°F) below valve opening temperature. For details, refer to LC-18, "Thermostat".

OK or NG

OK	▶	GO TO 10.
NG	▶	Replace thermostat.

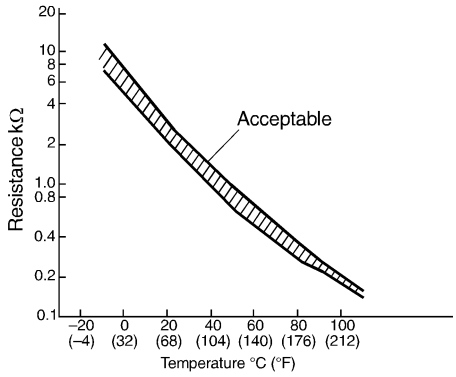
10	CHECK ENGINE COOLANT TEMPERATURE SENSOR

1. Remove engine coolant temperature sensor.
2. Check resistance between engine coolant temperature sensor terminals 1 and 2 as shown in the figure.



<Reference data>

Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260



SEF304X

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 "MAIN 12 CAUSES OF OVERHEATING", EC-549.	
▶	**INSPECTION END**

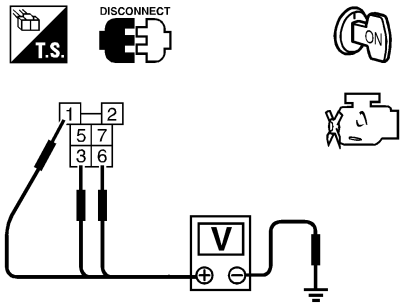
Diagnostic Procedure (Cont'd)

PROCEDURE A

=NFEC1326S01

1	CHECK COOLING FAN POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect cooling fan relay-1.
3. Turn ignition switch "ON".
4. Check voltage between cooling fan relay-1 terminals 1, 3, 6 and ground with CONSULT-II or tester.



Voltage: Battery voltage

SEF590X

OK or NG

OK	▶	GO TO 3.
NG	▶	GO TO 2.

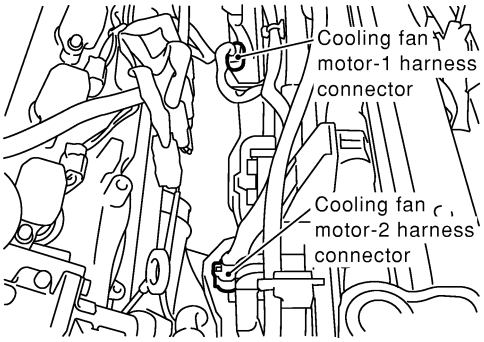
2	DETECT MALFUNCTIONING PART

Check the following.
- Joint connector-8
- Joint connector-9
- 15A fuse
- 40A fusible links
- Harness for open or short between cooling fan relay-1 and fuse
- Harness for open or short between cooling fan relay-1 and battery

	▶	Repair open circuit or short to ground or short to power in harness or connectors.

3	CHECK COOLING FAN MOTORS CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector.



SEC057D

3. Check harness continuity between cooling fan relay-1 terminal 5 and cooling fan motor-1 terminal 2, cooling fan motor-1 terminal 3 and body ground. Refer to Wiring Diagram.
   Continuity should exist.
4. Also check harness for short to ground and short to power.
5. Check harness continuity between cooling fan relay-1 terminal 7 and cooling fan motor-2 terminal 2, cooling fan motor-2 terminal 3 and body ground. Refer to Wiring Diagram.
   Continuity should exist.
6. 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 COOLING FAN OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 35 and cooling fan relay-1 terminal 2. 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 6.
NG	▶	GO TO 5.

5	DETECT MALFUNCTIONING PART

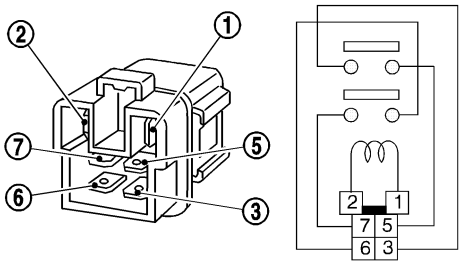
Check the following.
- Harness connectors E8, F17
- Harness for open or short between cooling fan relay-1 and ECM

	▶	Repair open circuit or short to ground or short to power in harness or connectors.

Diagnostic Procedure (Cont'd)

6	CHECK COOLING FAN RELAY-1

Check continuity between cooling fan relay-1 terminals 3 and 5, 6 and 7 under the following conditions.



Conditions	Continuity
12V direct current supply between terminals 1 and 2	Yes
No current supply	No

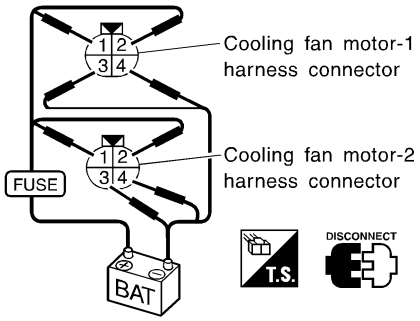
SEF591X

OK or NG

OK	▶	GO TO 7.
NG	▶	Replace cooling fan relay.

7	CHECK COOLING FAN MOTORS-1 AND -2

Supply battery voltage between the following terminals and check operation.



	Speed	Terminals	
		(+)	(–)
Cooling fan motor-1	Low	2	3
	High	1 , 2	3 , 4
Cooling fan motor-2	Low	2	3
	High	1 , 2	3 , 4

SEF592X

OK or NG

OK	▶	GO TO 8.
NG	▶	Replace cooling fan motors.

8	CHECK INTERMITTENT INCIDENT

Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.

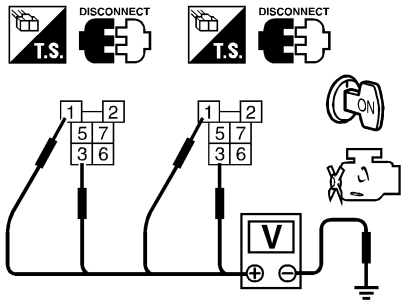
▶ **INSPECTION END**

PROCEDURE B

NFEC1326S02

1	CHECK COOLING FAN POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect cooling fan relays-2 and -3.
3. Turn ignition switch "ON".
4. Check voltage between cooling fan relays-2 and -3 terminals 1, 3 and ground with CONSULT-II or tester.



Voltage: Battery voltage

SEF593X

OK or NG

OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	DETECT MALFUNCTIONING PART

Check the following.
- Joint connector-8
- Joint connector-9
- Harness for open or short between cooling fan relays-2 and -3 and joint connectors-8, -9

	▶	Repair harness or connectors.

3	CHECK COOLING FAN CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector.
3. Check harness continuity between cooling fan relay-2 terminal 5 and cooling fan motor-1 terminal 1, cooling fan relay-2 terminal 7 and cooling fan motor-1 terminal 4, cooling fan relay-2 terminal 6 and body ground. Refer to Wiring Diagram.
   Continuity should exist.
4. Also check harness for short to ground and short to power.
5. Check harness continuity between cooling fan relay-3 terminal 5 and cooling fan motor-2 terminal 1, cooling fan relay-3 terminal 7 and cooling fan motor-2 terminal 4, cooling fan relay-3 terminal 6 and body ground. Refer to Wiring Diagram.
   Continuity should exist.
6. 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 COOLING FAN OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 36 and cooling fan relay-2 terminal 2, cooling fan relay-3 terminal 2. Refer to Wiring Diagram.
   Continuity should exist.
3. Also check harness for short to ground and short to power.

OK or NG

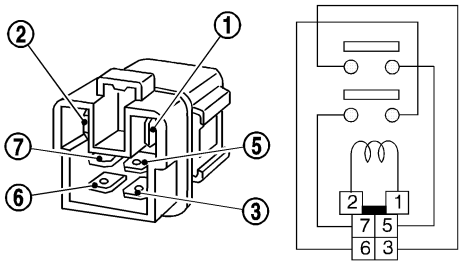
OK	▶	GO TO 6.
NG	▶	GO TO 5.

Diagnostic Procedure (Cont'd)

5	DETECT MALFUNCTIONING PART
Check the following. ● Harness connectors E8, E17 ● Joint connector-10 ● Harness for open or short between cooling fan relays-2 and -3 and ECM	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

6	CHECK COOLING FAN RELAYS-2 AND -3

Check continuity between cooling fan relay-2, -3 terminals 3 and 5, 6 and 7 under the following conditions.



Conditions	Continuity
12V direct current supply between terminals 1 and 2	Yes
No current supply	No

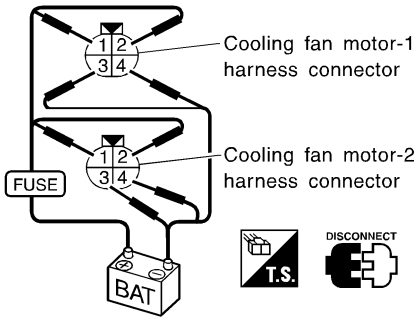
SEF591X

OK or NG

OK	▶	GO TO 7.
NG	▶	Replace cooling fan relays.

7	CHECK COOLING FAN MOTORS

Supply battery voltage between the following terminals and check operation.



	Speed	Terminals (+)	Terminals (–)
Cooling fan motor-1	Low	2	3
	High	1 , 2	3 , 4
Cooling fan motor-2	Low	2	3
	High	1 , 2	3 , 4

SEF592X

OK or NG

OK	▶	GO TO 8.
NG	▶	Replace cooling fan motors.

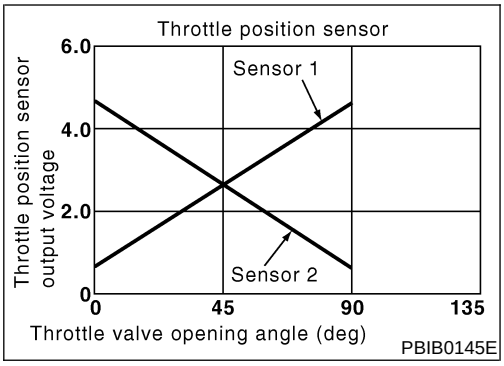
8	CHECK INTERMITTENT INCIDENT
1. Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.	
▶	**INSPECTION END**

Main 12 Causes of Overheating

NFEC1327

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-11, “RECOMMENDED FLUIDS AND LUBRICANTS”.
	3	• Coolant level	• Visual	Coolant up to MAX level in reservoir tank and radiator filler neck	See MA-14, “Changing Engine Coolant”.
	4	• Radiator cap	• Pressure tester	59 - 98 kPa (0.6 - 1.0 kg/cm^2, 9 - 14 psi) (Limit)	See LC-12, “System Check”.
ON*2	5	• Coolant leaks	• Visual	No leaks	See LC-12, “System Check”.
ON*2	6	• Thermostat	• Touch the upper and lower radiator hoses	Both hoses should be hot	See LC-18, “Thermostat” and LC-20, “Radiator”.
ON*1	7	• Cooling fan	• CONSULT-II	Operating	See trouble diagnosis for DTC P1217 (EC-532).
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 MA-14, “Changing Engine Coolant”.
OFF*4	10	• Coolant return from reservoir tank to radiator	• Visual	Should be initial level in reservoir tank	See MA-13, “ENGINE MAINTENANCE”.
OFF	11	• Cylinder head	• Straight gauge feeler gauge	0.1 mm (0.004 in) Maximum distortion (warping)	See EM-42, “Inspection”.
	12	• Cylinder block and pistons	• Visual	No scuffing on cylinder walls or piston	See EM-64, “Inspection”.

*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 LC-25, “OVERHEATING CAUSE ANALYSIS”.



Component Description

NFEC1333

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

NFEC1334

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
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

On Board Diagnosis Logic

NFEC1455

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

NFEC1455S01

When the malfunction is detected, ECM enters in fail-safe mode and the MIL lights up.

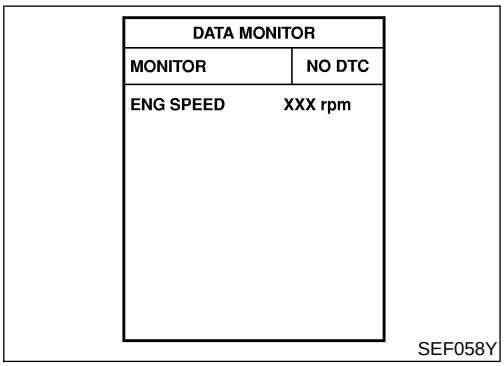
Engine operation condition in fail-safe mode
The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates an opening speed of approx. 5 seconds to an opening of 10 degrees. So, the acceleration will be poor.

DTC Confirmation Procedure

NFEC1456

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 “Diagnostic Procedure”, EC-553.

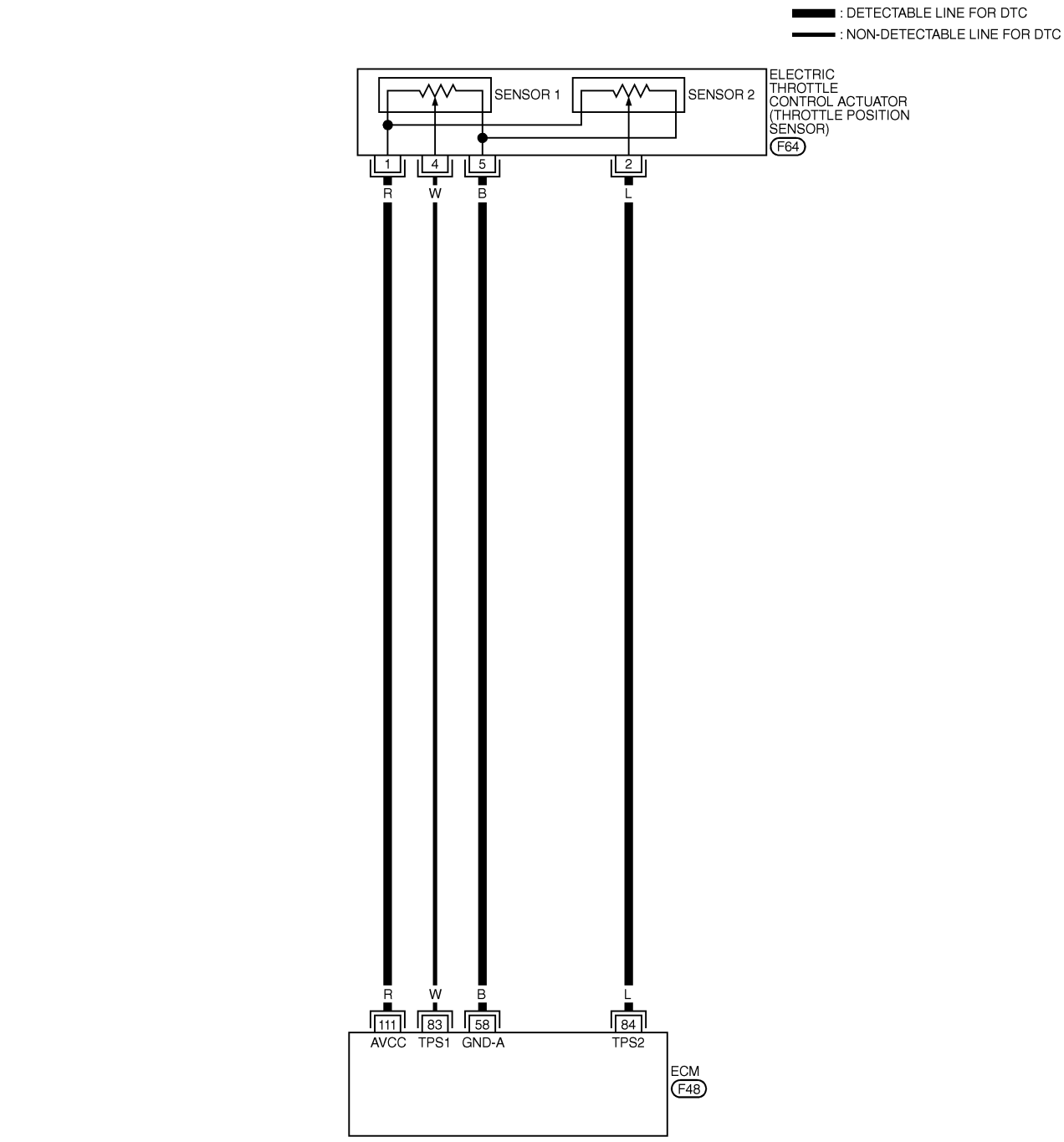
With GST

Follow the procedure “With CONSULT-II” above.

Wiring Diagram

NFEC1337

EC-TPS2-01



MEC701D

Specification data are reference values and are measured between each terminal and ground.

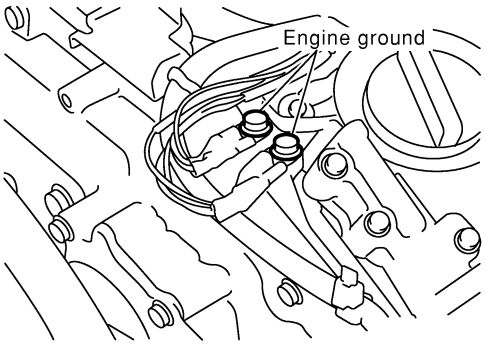
CAUTION:

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)
58	B	Sensors' ground	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
83	W	Throttle position sensor 1	**[Ignition switch "ON"]** ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully released	More than 0.36V
			[Ignition switch "ON"] ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully depressed	Less than 4.75V
84	L	Throttle position sensor 2	**[Ignition switch "ON"]** ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully released	Less than 4.75V
			[Ignition switch "ON"] ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully depressed	More than 0.36V
111	R	Sensor's power supply	**[Ignition switch "ON"]**	Approximately 5V

Diagnostic Procedure

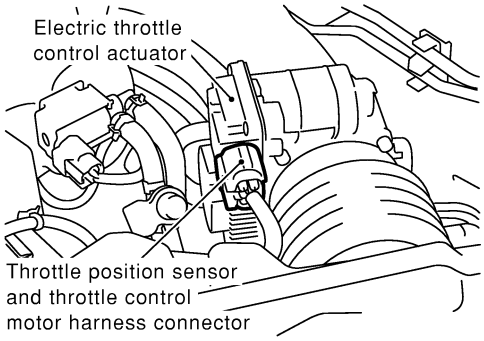
NFEC1338

1	**RETIGHTEN GROUND SCREWS**
1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.  SEC047D	
▶	GO TO 2.

Diagnostic Procedure (Cont'd)

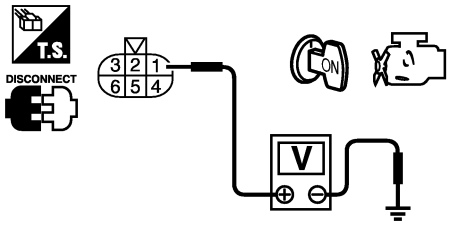
2	CHECK THROTTLE POSITION SENSOR 2 POWER SUPPLY CIRCUIT

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch "ON".



SEC054D

3. Check voltage between electric throttle control actuator terminal 1 and ground with CONSULT-II or tester.



PBIB0082E

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. Check harness continuity between electric throttle control actuator terminal 5 and engine ground.
   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	▶	GO TO 4.

4	DETECT MALFUNCTIONING PART

Check the following.
- Harness for open or short between electric throttle control actuator and ECM

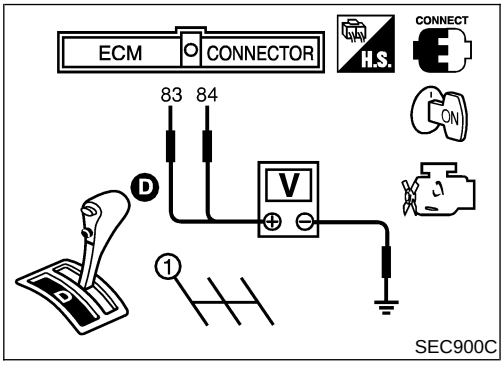
	▶	Repair open circuit or short to ground or short to power in harness or connectors.

5	CHECK THROTTLE POSITION SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 84 and electric throttle control actuator terminal 2. 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 6.
NG ▶	Repair open circuit or short to ground or short to power in harness or connectors.

6	CHECK THROTTLE POSITION SENSOR
Refer to "Component Inspection", EC-555.	
OK or NG	
OK ▶	GO TO 8.
NG ▶	GO TO 7.

7	REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR
1. Replace the electric throttle control actuator. 2. Perform "Throttle Valve Closed Position Learning", EC-71. 3. Perform "Idle Air Volume Learning", EC-71.	
▶	**INSPECTION END**

8	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.	
▶	**INSPECTION END**



Component Inspection

NFEC1339

THROTTLE POSITION SENSOR

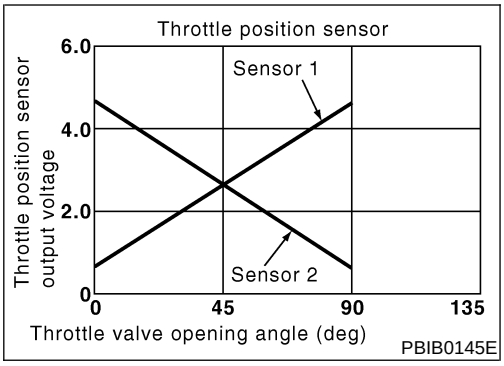
1. Reconnect all harness connectors disconnected.
2. Perform "Throttle Valve Closed Position Learning", EC-71.
3. Turn ignition switch "ON".
4. Set selector lever to "D" position (A/T models) or "1st" position (M/T models).
5. Check voltage between ECM terminals 83 (TP sensor 1), 84 (TP sensor 2) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
83 (Throttle position sensor 1)	Fully released	More than 0.36V
	Fully depressed	Less than 4.75V
84 (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 "Throttle Valve Closed Position Learning", EC-71.

Component Inspection (Cont'd)

8. Perform "Idle Air Volume Learning", EC-71.



Component Description

NFEC1340

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

NFEC1342

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

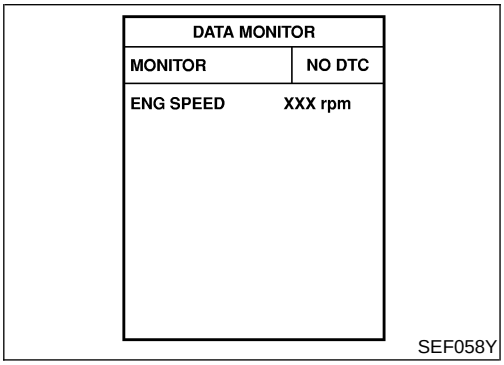
NFEC1343

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 “Diagnostic Procedure”, EC-558.

With GST

Follow the procedure "With CONSULT-II" above.m

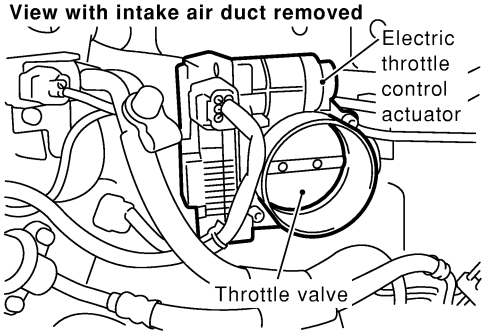
Diagnostic Procedure

NFEC1345

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.

View with intake air duct removed



SEC083D

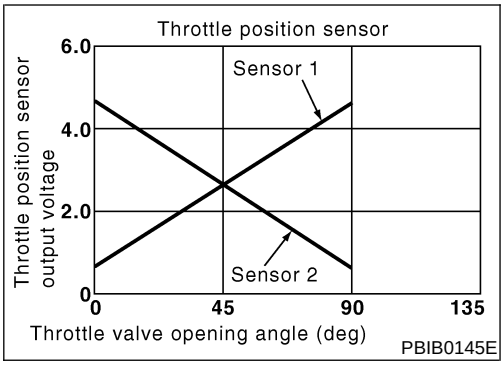
OK or NG

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 "Throttle Valve Closed Position Learning", EC-71.
3. Perform "Idle Air Volume Learning", EC-71.

	▶	**INSPECTION END**



Component Description

NFEC1361

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

NFEC1362

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

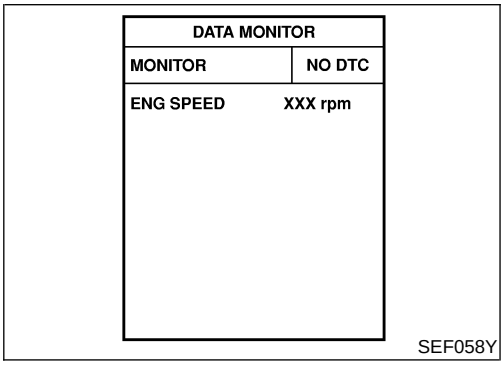
NFEC1363

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, 32 times.
6) If 1st trip DTC is detected, go to “Diagnostic Procedure”, EC-560.

With GST
Follow the procedure "With CONSULT-II" above.

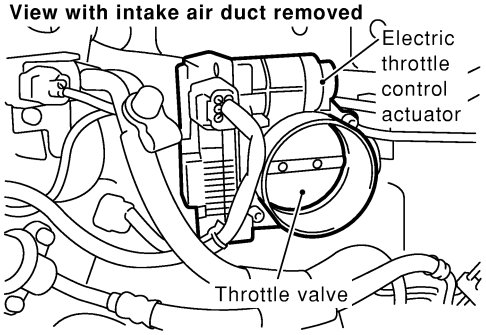
Diagnostic Procedure

NFEC1364

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.

View with intake air duct removed



SEC083D

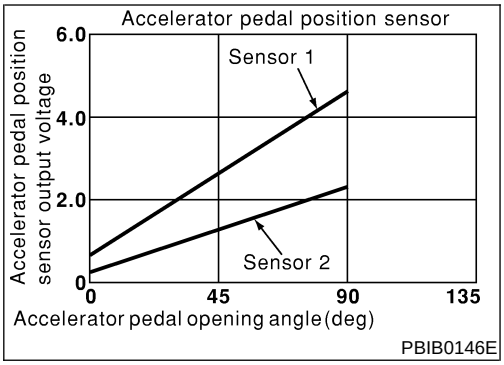
OK or NG

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 "Throttle Valve Closed Position Learning", EC-71.
3. Perform "Idle Air Volume Learning", EC-71.

	▶	**INSPECTION END**



Component Description

NFEC1347

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

NFEC1348

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL SEN1	• Ignition switch: ON (engine stopped)	Accelerator pedal: Fully released	0.41 - 0.71V
		Accelerator pedal: Fully depressed	More than 3.7V
ACCEL SEN2	• Ignition switch: ON (engine stopped)	Accelerator pedal: Fully released	0.15 - 0.97V
		Accelerator pedal: Fully depressed	More than 3.5V
CLSD THL POS	• Ignition switch: ON	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF

On Board Diagnosis Logic

NFEC1457

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.	

On Board Diagnosis Logic (Cont'd)

FAIL-SAFE MODE

=NFEC1457S01

When the malfunction is detected, ECM enters in fail-safe mode and the MIL 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 an opening speed of approx. 5 seconds to an opening of 10 degrees. So, the acceleration will be poor.

DTC Confirmation Procedure

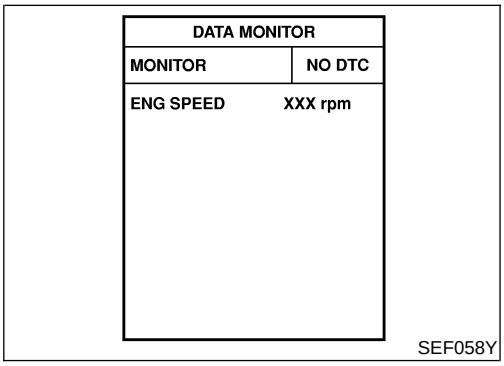
NFEC1458

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 "Diagnostic Procedure", EC-564.

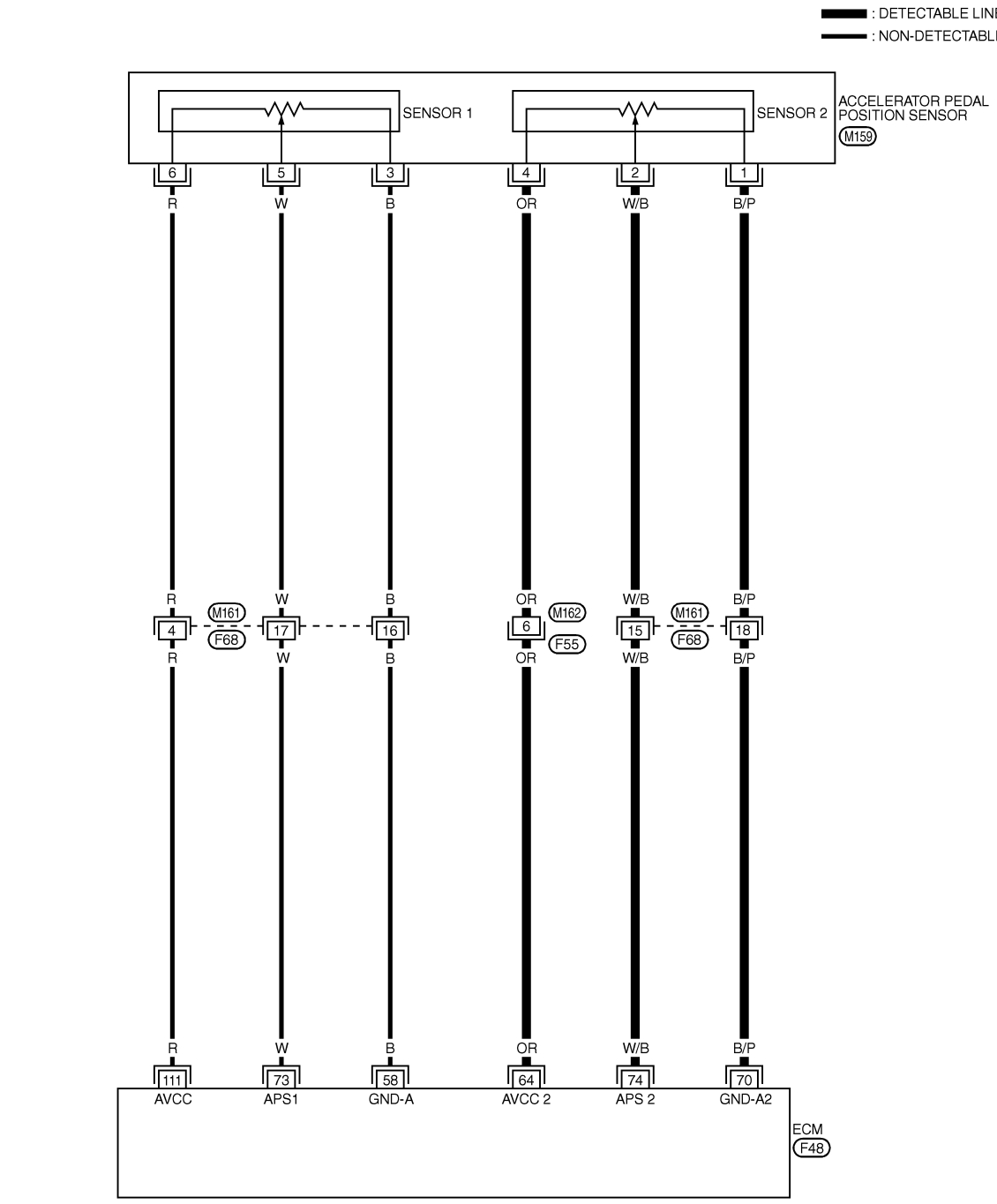
With GST

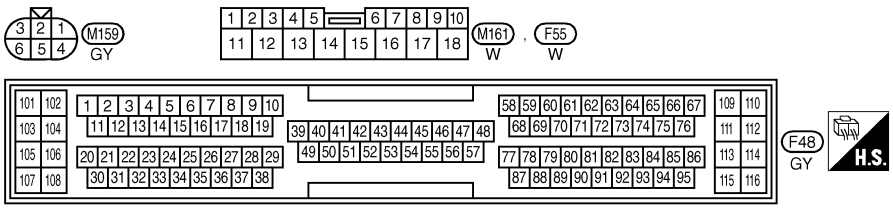
Follow the procedure "With CONSULT-II" above.

Wiring Diagram

NFEC1351

EC-APPS2-01





MEC927D

Wiring Diagram (Cont'd)

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.

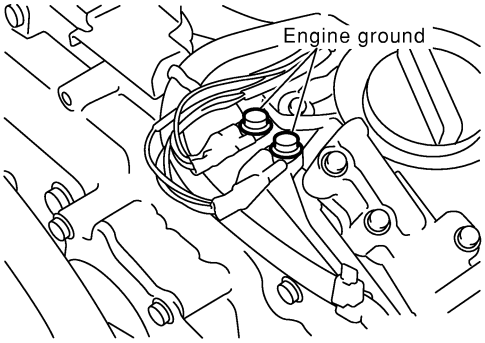
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
58	B	Sensors' ground	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
64	OR	Accelerator pedal position sensor 2 power supply	**[Ignition switch "ON"]**	Approximately 2.5V
70	B/P	Accelerator pedal position sensor 2 ground	**[Ignition switch "ON"]**	Approximately 0V
73	W	Accelerator pedal position sensor 1	**[Ignition switch "ON"]** ● Accelerator pedal fully released	0.41 - 0.71V
			[Ignition switch "ON"] ● Accelerator pedal fully depressed	More than 3.7V
74	W/B	Accelerator pedal position sensor 2	**[Ignition switch "ON"]** ● Accelerator pedal fully released	0.08 - 0.48V
			[Ignition switch "ON"] ● Accelerator pedal fully depressed	More than 1.8V
111	R	Sensor's power supply	**[Ignition switch "ON"]**	Approximately 5V

Diagnostic Procedure

NFEC1352

1	RETIGHTEN GROUND SCREWS

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

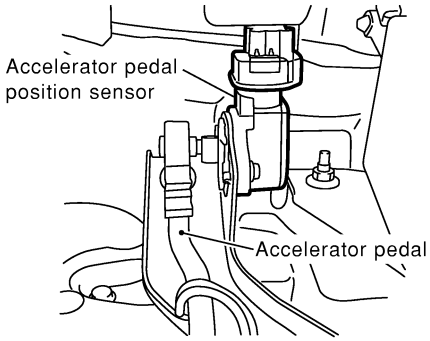


SEC047D

▶ GO TO 2.

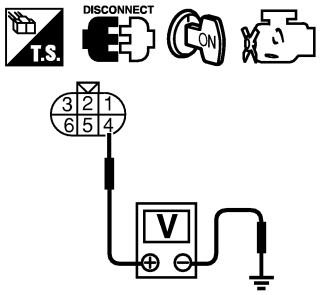
2	CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch "ON".



SEC081D

3. Check voltage between APP sensor terminal 4 and ground with CONSULT-II or tester.



SEC094D

Voltage: Approximately 2.5V

OK or NG

OK	▶	GO TO 4.
NG	▶	GO TO 3.

3	DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors M162, F55
- 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. Check harness continuity between APP sensor terminal 1 and engine ground.
   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 6.
NG	▶	GO TO 5.

5	DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors M161, F68
- 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.

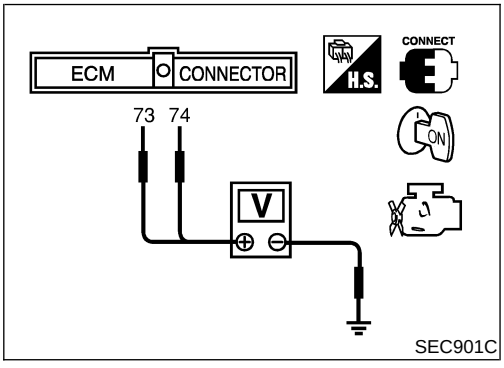
Diagnostic Procedure (Cont'd)

6	CHECK APP SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 74 and APP sensor terminal 2. 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 ▶	GO TO 7.

7	DETECT MALFUNCTIONING PART
Check the following. ● Harness connectors M161, F68 ● 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 "Component Inspection", EC-566.	
OK or NG	
OK ▶	GO TO 9.
NG ▶	Replace accelerator pedal assembly.

9	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.	
▶	**INSPECTION END**



Component Inspection

NFEC1459

ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch "ON".
3. Check voltage between ECM terminals 73 (APP sensor 1 signal), 74 (APP sensor 2 signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
73 (Accelerator pedal position sensor 1)	Fully released	0.41 - 0.71V
	Fully depressed	More than 3.7V
74 (Accelerator pedal position sensor 2)	Fully released	0.08 - 0.48V
	Fully depressed	More than 1.8V

4. If NG, replace accelerator pedal assembly.
5. Perform "Accelerator Pedal Released Position Learning", EC-71.
6. Perform "Throttle Valve Closed Position Learning", EC-71.
7. Perform "Idle Air Volume Learning", EC-71.

On Board Diagnosis Logic

NFEC1460

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.) (APP sensor circuit is shorted.) (MAF sensor circuit is shorted.) (EVAP control system pressure sensor circuit is shorted.) (Power steering pressure sensor circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) • Electric throttle control actuator (TP sensor 1 and 2) • Accelerator pedal position sensor (APP sensor 1) • MAF sensor • EVAP control system pressure sensor • Power steering pressure sensor • Refrigerant pressure sensor • ECM pin terminal

FAIL-SAFE MODE

NFEC1460S01

When the malfunction is detected, ECM enters in fail-safe mode and the MIL 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

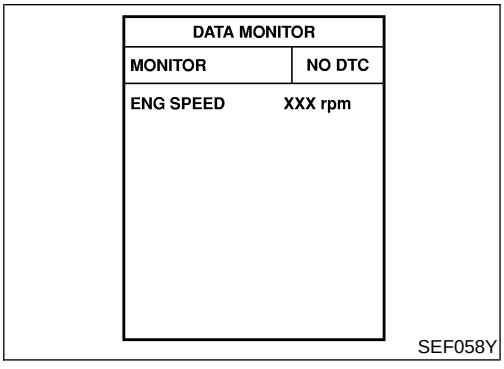
NFEC1461

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 “Diagnostic Procedure”, EC-570.

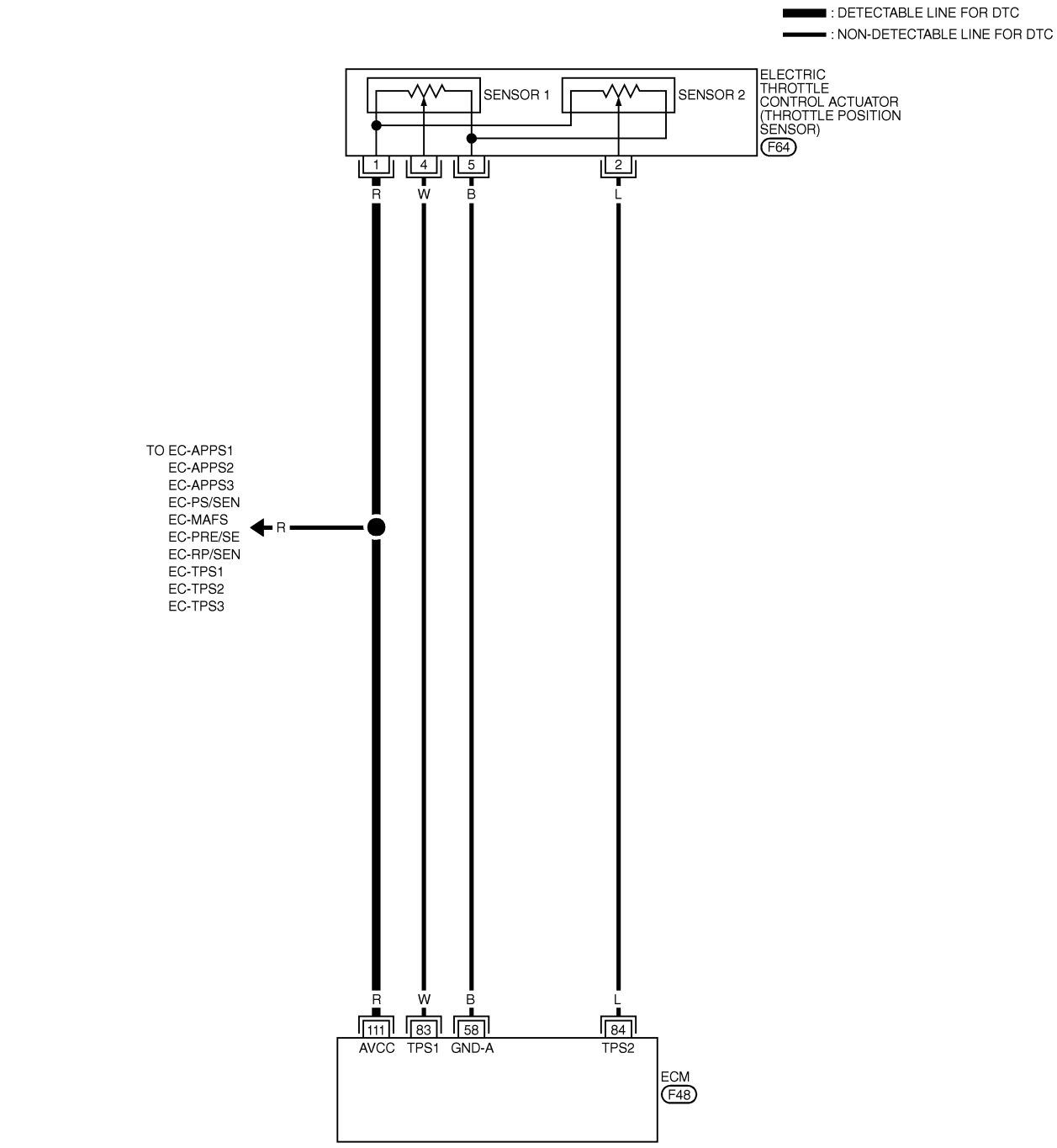
With GST

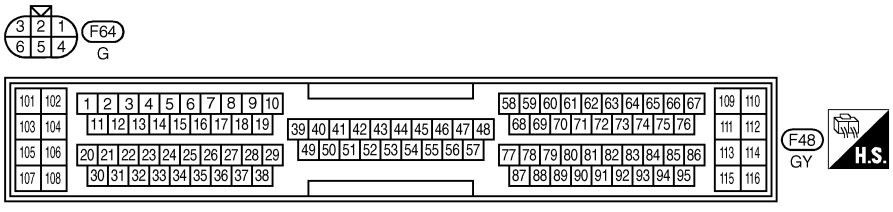
Follow the procedure "With CONSULT-II" above.

Wiring Diagram

NFEC1358

EC-SEN/PW-01





MEC657D

Wiring Diagram (Cont'd)

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.

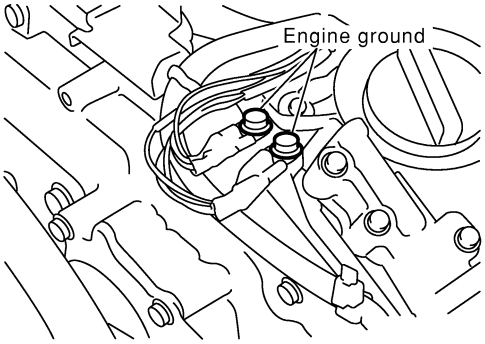
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
111	R	Sensor's power supply	**[Ignition switch "ON"]**	Approximately 5V

Diagnostic Procedure

NFEC1359

1	RETIGHTEN GROUND SCREWS

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

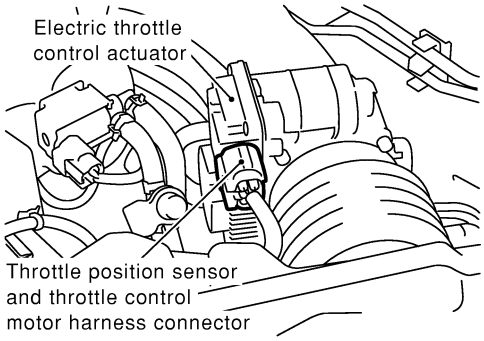


SEC047D

▶ GO TO 2.

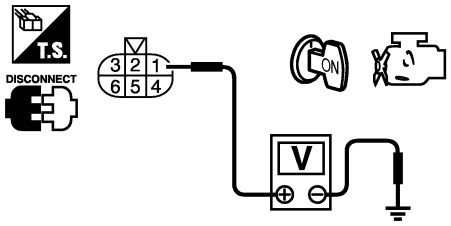
2	CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch "ON".



SEC054D

3. Check voltage between electric throttle control actuator terminal 1 and ground with CONSULT-II or tester.



PBIB0082E

Voltage: Approximately 5V

OK or NG

OK	▶	GO TO 5.
NG	▶	GO TO 3.

3	CHECK SENSOR POWER SUPPLY CIRCUITS

Check the following.

- Harness for short to power and short to ground, between the following terminals.
  ECM terminal 111 and electric throttle control actuator terminal 1. Refer to "Wiring Diagram", EC-569.
  ECM terminal 111 and APP sensor terminal 2. Refer to "Wiring Diagram", EC-313.
  ECM terminal 111 and MAF sensor terminal 2. Refer to "Wiring Diagram", EC-197.
  ECM terminal 111 and EVAP control system pressure sensor terminal 1. Refer to "Wiring Diagram", EC-392.
  ECM terminal 111 and power steering pressure sensor terminal 1. Refer to "Wiring Diagram", EC-451.
  ECM terminal 111 and refrigerant pressure sensor terminal 1. Refer to "Wiring Diagram", EC-725.
- ECM pin terminal

OK or NG

OK	▶	GO TO 4.
NG	▶	Repair short to ground or short to power in harness or connectors.

Diagnostic Procedure (Cont'd)

4	CHECK COMPONENTS	
Check the following. ● Accelerator pedal position sensor (Refer to "Component Inspection", EC-309.) ● Mass air flow sensor (Refer to "Diagnostic Procedure", EC-192.) ● EVAP control system pressure sensor (Refer to "Diagnostic Procedure", EC-393.) ● Power steering pressure sensor (Refer to "Component Inspection", EC-454.) ● Refrigerant pressure sensor (Refer to "Diagnostic Procedure", EC-726.)		
OK or NG		
OK	▶	GO TO 7.
NG	▶	Replace malfunctioning component.

5	CHECK THROTTLE POSITION SENSOR	
Refer to "Component Inspection", EC-295.		
OK or NG		
OK	▶	GO TO 7.
NG	▶	GO TO 6.

6	REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR	
1. Replace electric throttle control actuator. 2. Perform "Throttle valve closed position learning", EC-71. 3. Perform "Idle air volume learning", EC-71.		
	▶	**INSPECTION END**

7	CHECK INTERMITTENT INCIDENT	
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.		
	▶	**INSPECTION END**

Description

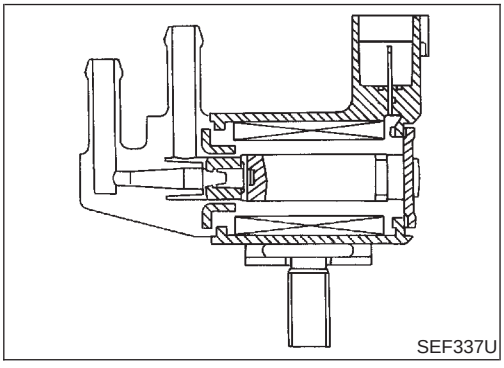
NFEC1089

SYSTEM DESCRIPTION

NFEC1089S01

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed	EVAP canister purge flow control	EVAP canister purge volume control solenoid valve
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Ignition switch	Start signal		
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)		
Fuel tank temperature sensor	Fuel temperature in fuel tank		
Vehicle speed sensor	Vehicle speed		

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.


SEF337U

COMPONENT DESCRIPTION

NFEC1089S02

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

NFEC1090

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
PURG VOL C/V	● Engine: After warming up ● Air conditioner switch “OFF” ● Shift lever: “N” ● No-load	Idle (Vehicle stopped)	0%
		2,000 rpm	—

On Board Diagnosis Logic

NFEC1092

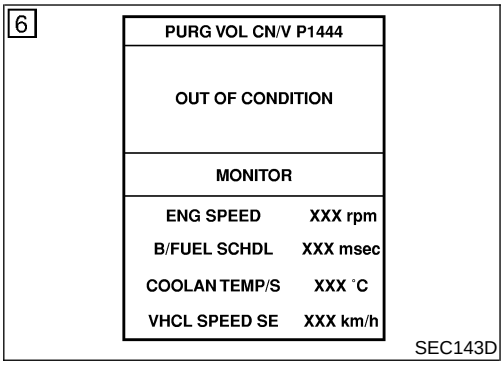
DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P1444 1444	EVAP canister purge volume control solenoid valve	The canister purge flow is detected during the specified driving conditions, even when EVAP canister purge volume control solenoid valve is completely closed.	● EVAP control system pressure sensor ● EVAP canister purge volume control solenoid valve (The valve is stuck open.) ● EVAP canister vent control valve ● EVAP canister ● Hoses (Hoses are connected incorrectly or clogged.)

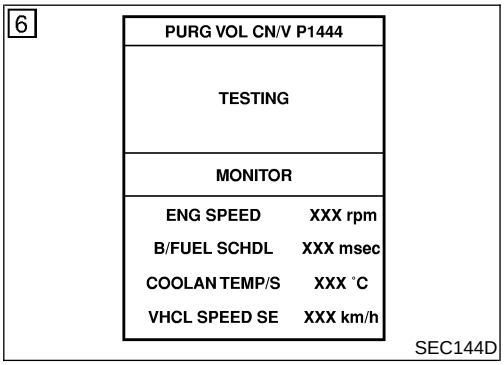
DTC Confirmation Procedure

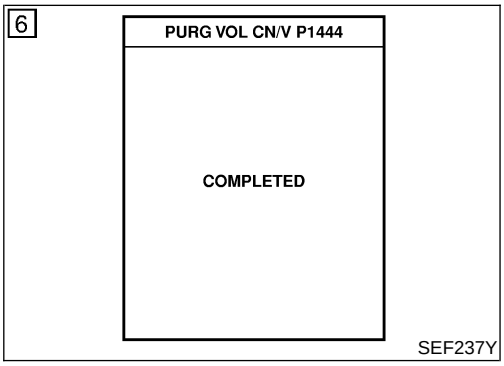
NFEC1093

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 test at a temperature of 5°C (41°F) or more.







WITH CONSULT-II

NFEC1093S01

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 "PURG VOL CN/V P1444" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II.
5) Touch "START".
6) Start engine and let it idle until "TESTING" on CONSULT-II changes to "COMPLETED". (It will take for approximately 10 seconds.)
   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 "Diagnostic Procedure", EC-578.

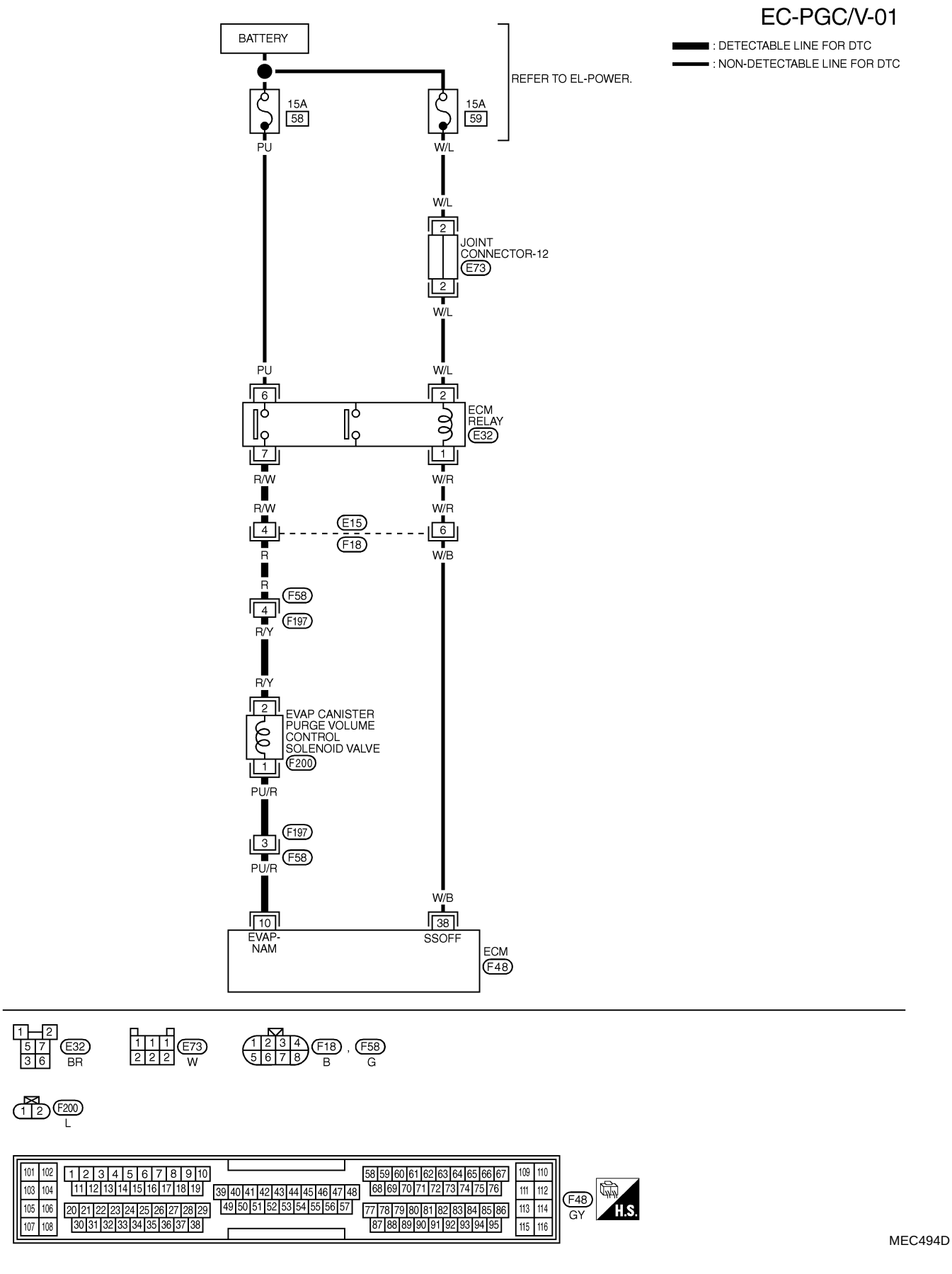
WITH GST

NFEC1093S02

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 let it idle for at least 20 seconds.
4) Select "MODE 7" with GST.
5) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-578.

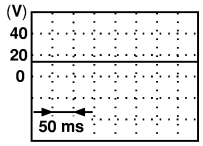
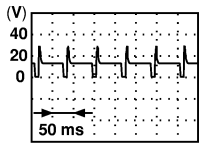
Wiring Diagram

NFEC1094



MEC494D

ECM TERMINALS AND REFERENCE VALUE 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	WIRE COLOR	ITEM	CONDITION	DATA (DC)
10	PU/R	EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE	ENGINE RUNNING AT IDLE SPEED	BATTERY VOLTAGE 
			ENGINE RUNNING AT 2,000 RPM (MORE THAN 100 SECONDS AFTER STARTING ENGINE)	BATTERY VOLTAGE 

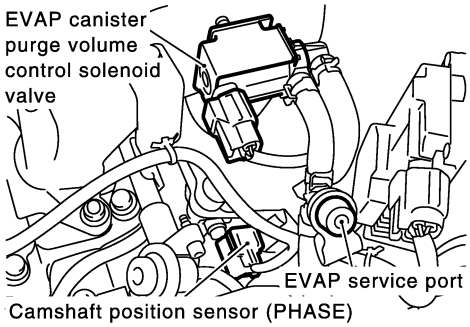
SEF800YB

Diagnostic Procedure

NFEC1095

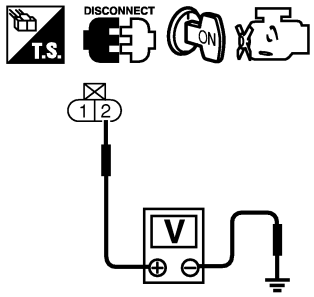
1	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch “OFF”.
2. Disconnect EVAP canister purge volume control solenoid valve harness connector.



SEC929C

3. Turn ignition switch “ON”.
4. Check voltage between EVAP canister purge volume control solenoid valve terminal 2 and engine ground with CONSULT-II or tester.



SEC062D

Voltage: Battery voltage

OK or NG

OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E15, F18
- Harness connectors F58, F197
- Harness for open or short between EVAP canister purge volume control solenoid valve and ECM relay

	▶	Repair harness or connectors.

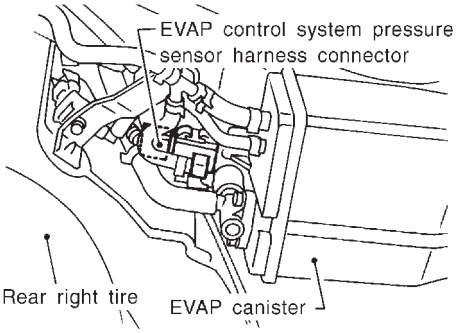
3	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch “OFF”.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 10 and EVAP canister purge volume control solenoid valve 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	▶	GO TO 4.

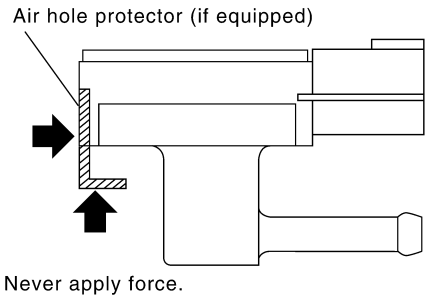
4	DETECT MALFUNCTIONING PART
Check the following. ● Harness connectors F197, F58 ● Harness for open or short between ECM and EVAP canister purge volume control solenoid valve	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

5	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE
Check disconnection or improper connection of hose connected to EVAP control system pressure sensor.  SEF495R	
OK or NG	
OK ▶	GO TO 6.
NG ▶	Repair it.

6	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR
1. Disconnect EVAP control system pressure sensor harness connector. 2. Check connectors for water. **Water should not exist.**	
OK or NG	
OK ▶	GO TO 7.
NG ▶	Replace EVAP control system pressure sensor.

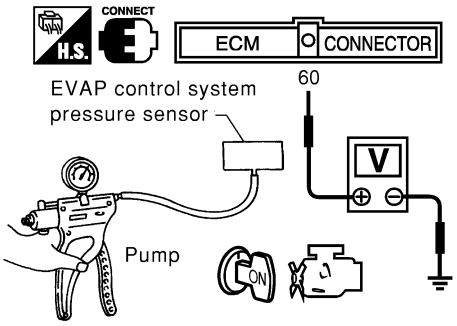
7	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Remove EVAP control system pressure sensor with its harness connector connected.
   CAUTION:
   Never apply force to the air hole protector of the sensor if equipped.



SEF799W

2. Remove hose from EVAP control system pressure sensor.
3. Turn ignition switch "ON".
4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.
   CAUTION:
   - **Always calibrate the vacuum pump gauge when using it.**
   - **Do not apply below −20 kPa (−150 mmHg, −5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure.**
5. Check input voltage between ECM terminal 60 and ground.



SEC908C

Pressure (Relative to atmospheric pressure)	Voltage V
0 kPa (0 mmHg, 0 inHg)	3.0 - 3.6
-9.3 kPa (-70 mmHg, -2.76 inHg)	0.4 - 0.6

MTBL1159

CAUTION:
Discard and EVAP control system pressure 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.

OK or NG

OK (With CONSULT-II)	▶	GO TO 8.
OK (Without CONSULT-II)	▶	GO TO 9.
NG	▶	Replace EVAP control system pressure sensor.

8	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-II

1. Turn ignition switch "OFF".
2. Reconnect harness connectors disconnected.
3. Start engine.
4. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.

ACTIVE TEST	
PURG VOL CONT/V	0.0%
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %
HO2S1 MNTR (B1)	RICH
HO2S1 MNTR (B2)	RICH

SEC142D

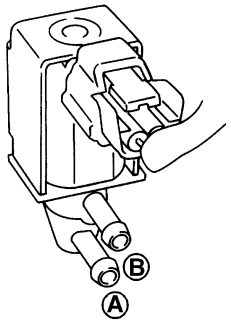
OK or NG

OK	▶	GO TO 10.
NG	▶	GO TO 9.

9	CHECK 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.

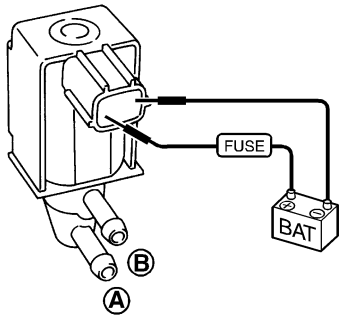


Condition PURG VOL CONT/V value	Air passage continuity between A and B
100.0%	Yes
0.0%	No

SEF334X

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

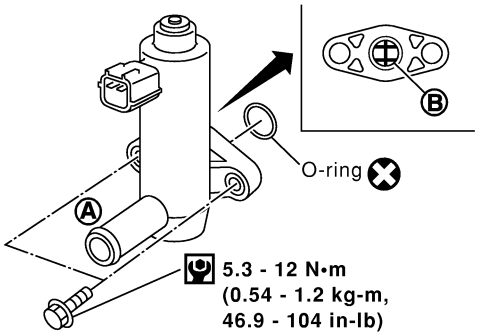
SEF335X

OK or NG

OK	▶	GO TO 10.
NG	▶	Replace EVAP canister purge volume control solenoid valve.

Diagnostic Procedure (Cont'd)

10	CHECK RUBBER TUBE FOR CLOGGING	
1. Disconnect rubber tube connected to EVAP canister vent control valve. 2. Check the rubber tube for clogging. **OK or NG**		
OK	▶	GO TO 11.
NG	▶	Clean the rubber tube using an air blower.

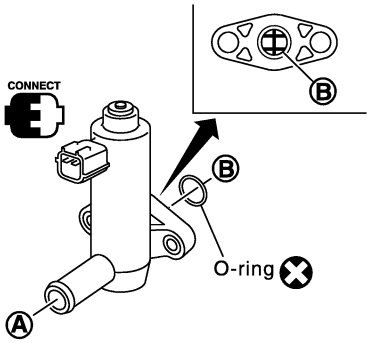
11	CHECK EVAP CANISTER VENT CONTROL VALVE-I	
1. Remove EVAP canister vent control valve from EVAP canister. 2. Check portion **B** of EVAP canister vent control valve for being rusted.  SEF376Z **OK or NG**		
OK	▶	GO TO 12.
NG	▶	Replace EVAP canister vent control valve.

12	CHECK EVAP CANISTER VENT CONTROL VALVE-II

With CONSULT-II

1. Reconnect harness connectors disconnected.
2. Turn ignition switch "ON".
3. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
4. Check air passage continuity and operation delay time.

ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %
HO2S1 MNTR (B1)	LEAN
HO2S1 MNTR (B2)	LEAN



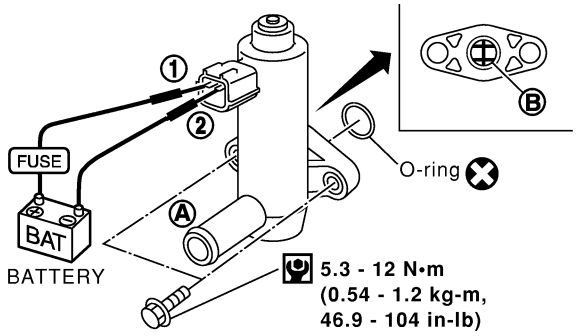
Condition VENT CONTROL/V	Air passage continuity between A and B
ON	No
OFF	Yes

Operation takes less than 1 second.

SEC158D

Without CONSULT-II

Check air passage continuity and operation delay time under the following conditions.



Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	No
OFF	Yes

Operation takes less than 1 second.

SEF378Z

Make sure new O-ring is installed properly.

OK or NG

OK	▶	GO TO 14.
NG	▶	GO TO 13.

13	CHECK EVAP CANISTER VENT CONTROL VALVE-III

1. Clean the air passage (Portion **A** to **B**) of EVAP canister vent control valve using an air blower.
2. Perform procedure 9 again.

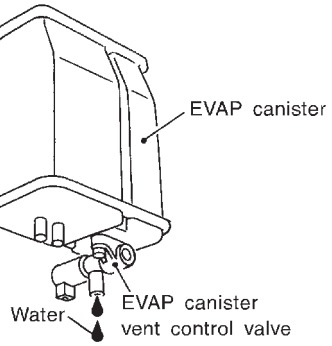
OK or NG

OK	▶	GO TO 14.
NG	▶	Replace EVAP canister vent control valve.

Diagnostic Procedure (Cont'd)

14	CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve attached.
2. Check if water will drain from the EVAP canister.



SEF596U

Yes or No

Yes	▶	GO TO 15.
No	▶	GO TO 18.

15	CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve attached.
The weight should be less than 1.8 kg (4.0 lb).

OK or NG

OK	▶	GO TO 17.
NG	▶	GO TO 16.

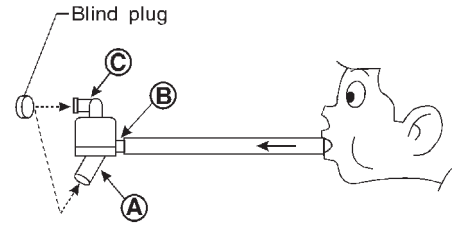
16	DETECT MALFUNCTIONING PART

Check the following.
- EVAP canister for damage
- EVAP hose between EVAP canister and water separater for clogging or poor connection

	▶	Repair hose or replace EVAP canister.

17	CHECK WATER SEPARATOR

1. Check visually for insect nests in the water separator air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.
4. Check that **A** and **C** are not clogged by blowing air into **B** with **A**, and then **C** plugged.



* Ⓐ: Bottom hole (To atmosphere)
Ⓑ: Emergency tube (From EVAP canister)
Ⓒ: Inlet port (To member)

SEF829T

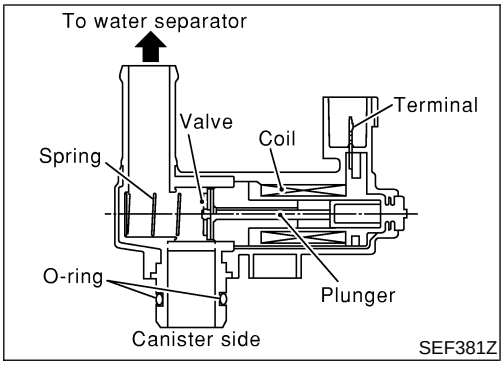
5. In case of NG in items 2 - 4, replace the parts.

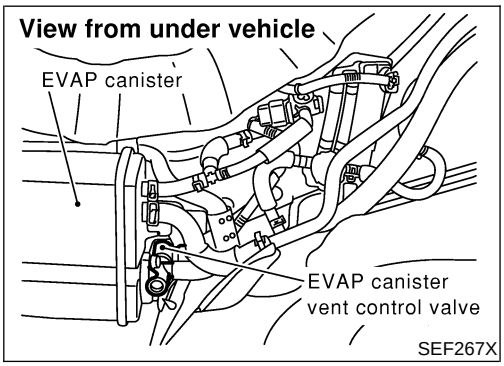
NOTE:
Do not disassemble water separator.

OK or NG

OK	▶	GO TO 18.
NG	▶	Clean or replace water separator.

18	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.	
▶	**INSPECTION END**





Component Description

NFEC1096

The EVAP canister vent control valve is located on the EVAP canister and is used to seal the canister vent.
This solenoid valve responds to signals from the ECM. When the ECM sends an ON signal, the coil in the solenoid valve is energized. A plunger will then move to seal the canister vent. The ability to seal the vent is necessary for the on board diagnosis of other evaporative emission control system components.
This solenoid valve is used only for diagnosis, and usually remains opened.
When the vent is closed, under normal purge conditions, the evaporative emission control system is depressurized and allows "EVAP Control System (Small Leak)" diagnosis.

CONSULT-II Reference Value in Data Monitor Mode

NFEC1097

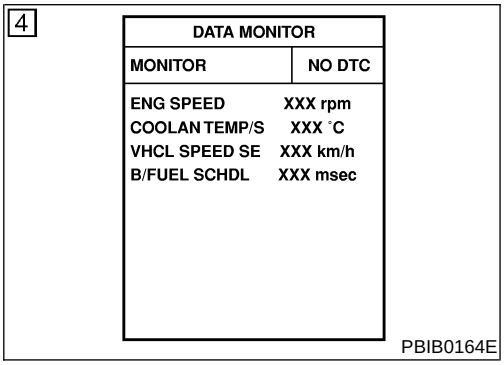
Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VENT CONT/V	• Ignition switch: ON	OFF

On Board Diagnosis Logic

NFEC1099

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P1446 1446	EVAP canister vent control valve closed	EVAP canister vent control valve remains closed under specified driving conditions.	• EVAP canister vent control valve • EVAP control system pressure sensor and the circuit • Blocked rubber tube to EVAP canister vent control valve • Water separator • EVAP canister is saturated with water.



DTC Confirmation Procedure

NFEC1100

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

NFEC1100S01

1) Turn ignition switch "ON".
2) Select "DATA MONITOR" mode with CONSULT-II.

3) Start engine.
4) Drive vehicle at a speed of approximately 80 km/h (50 MPH) for a maximum of 15 minutes.

NOTE:
If a malfunction exists, NG result may be displayed quicker.

5) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-589.

WITH GST

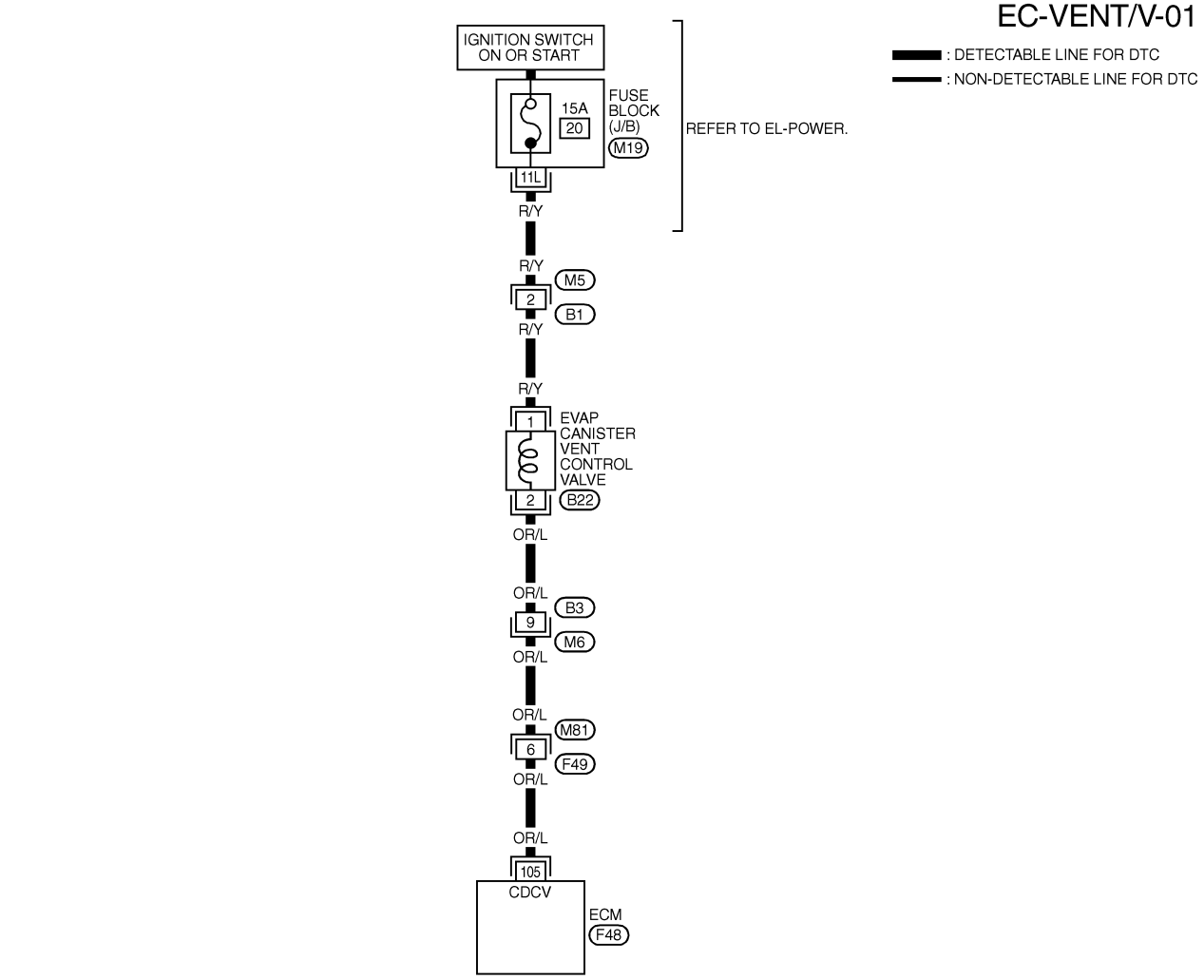
NFEC1100S02

Follow the procedure "WITH CONSULT-II" above.

Wiring Diagram

=NFEC1101

EC-VENT/V-01



MEC495D

ECM TERMINALS AND REFERENCE VALUE 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	WIRE COLOR	ITEM	CONDITION	DATA (DC)
105	OR/L	EVAP CANISTER VENT CONTROL VALVE	IGN ON	BATTERY VOLTAGE

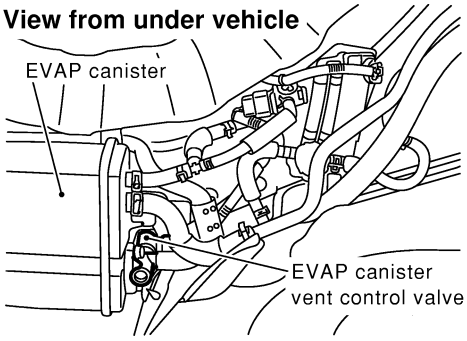
SEF668XC

Diagnostic Procedure

NFEC1102

1	CHECK RUBBER TUBE

1. Turn ignition switch “OFF”.
2. Disconnect rubber tube connected to EVAP canister vent control valve.
3. Check the rubber tube for clogging.



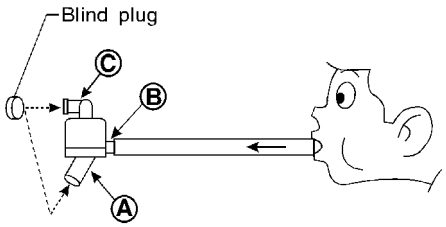
SEF267X

OK or NG

OK	▶	GO TO 2.
NG	▶	Clean rubber tube using an air blower.

2	CHECK WATER SEPARATOR

1. Check visually for insect nests in the water separator air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.
4. Check that **A** and **C** are not clogged by blowing air into **B** with **A**, and then **C** plugged.



* Ⓐ: Bottom hole (To atmosphere)
Ⓑ: Emergency tube (From EVAP canister)
Ⓒ: Inlet port (To member)

SEF829T

5. In case of NG in items 2 - 4, replace the parts.

NOTE:
Do not disassemble water separator.

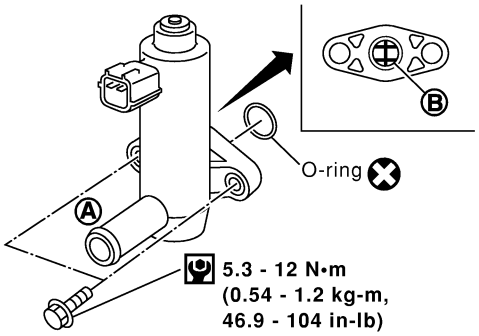
OK or NG

OK	▶	GO TO 3.
NG	▶	Clean or replace water separator.

Diagnostic Procedure (Cont'd)

3	CHECK EVAP CANISTER VENT CONTROL VALVE-I

1. Remove EVAP canister vent control valve from EVAP canister.
2. Check portion **B** of EVAP canister vent control valve for being rusted.



SEF376Z

OK or NG

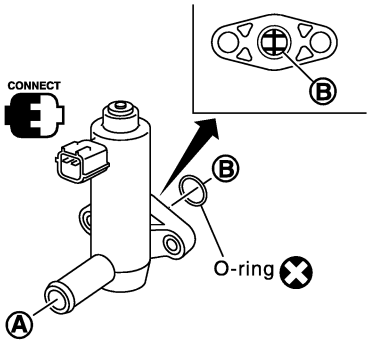
OK	▶	GO TO 4.
NG	▶	Replace EVAP canister vent control valve.

4	CHECK EVAP CANISTER VENT CONTROL VALVE-II

With CONSULT-II

1. Turn ignition switch ON.
2. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
3. Check air passage continuity and operation delay time.

ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %
HO2S1 MNTR (B1)	LEAN
HO2S1 MNTR (B2)	LEAN



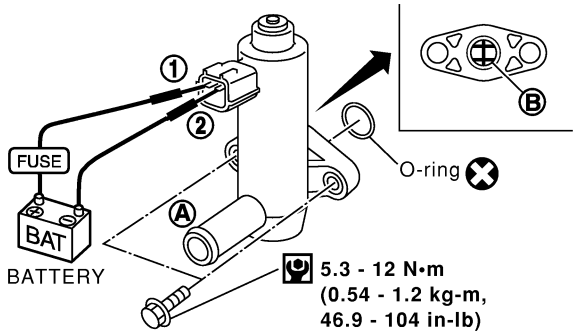
Condition VENT CONTROL/V	Air passage continuity between A and B
ON	No
OFF	Yes

Operation takes less than 1 second.

SEC158D

Without CONSULT-II

Check air passage continuity and operation delay time under the following conditions.



Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	No
OFF	Yes

Operation takes less than 1 second.

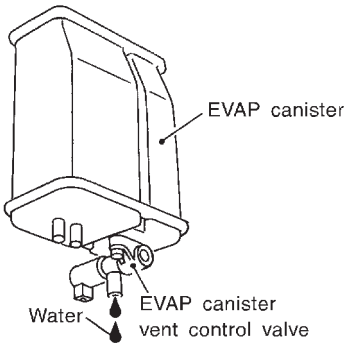
SEF378Z

Make sure new O-ring is installed properly.

OK or NG

OK	▶	GO TO 6.
NG	▶	GO TO 5.

5	CHECK EVAP CANISTER VENT CONTROL VALVE-III	
1. Clean the air passage (Portion **A** to **B**) of EVAP canister vent control valve using an air blower. 2. Perform the procedure 4 again. **OK or NG**		
OK	▶	GO TO 6.
NG	▶	Replace EVAP canister vent control valve.

6	CHECK IF EVAP CANISTER SATURATED WITH WATER	
1. Remove EVAP canister with EVAP canister vent control valve attached. 2. Check if water will drain from the EVAP canister.  SEF596U **Yes or No**		
Yes	▶	GO TO 7.
No	▶	GO TO 9.

7	CHECK EVAP CANISTER	
Weigh the EVAP canister with the EVAP canister vent control valve attached. **The weight should be less than 1.8 kg (4.0 lb).** **OK or NG**		
OK	▶	GO TO 9.
NG	▶	GO TO 8.

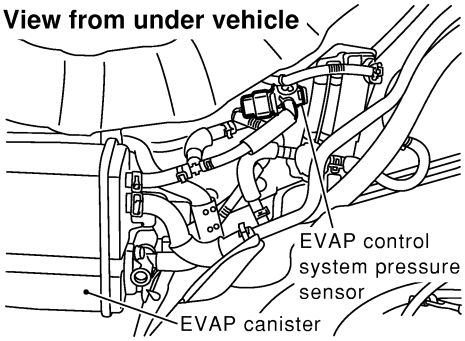
8	DETECT MALFUNCTIONING PART	
Check the following. ● EVAP canister for damage ● EVAP hose between EVAP canister and water separator for clogging or poor connection		
	▶	Repair hose or replace EVAP canister.

9	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE	
Check disconnection or improper connection of hose connected to EVAP control system pressure sensor. **OK or NG**		
OK	▶	GO TO 10.
NG	▶	Repair it.

Diagnostic Procedure (Cont'd)

10	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.



SEF268X

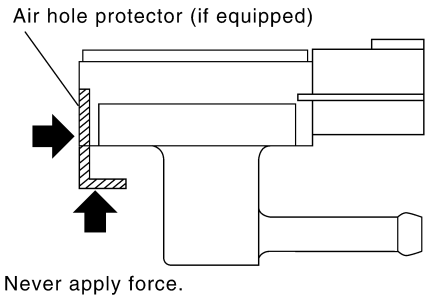
2. Check connectors for water.
   Water should not exist.

OK or NG

OK	▶	GO TO 11.
NG	▶	Replace EVAP control system pressure sensor.

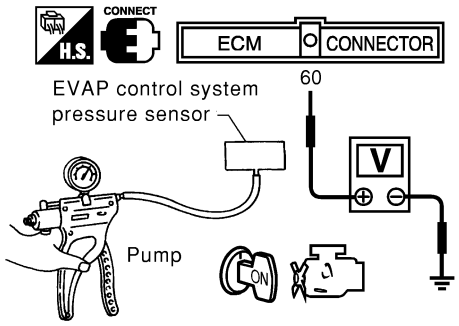
11	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Remove EVAP control system pressure sensor with its harness connector connected.
   CAUTION:
   Never apply force to the air hole protector of the sensor if equipped.



SEF799W

2. Remove hose from EVAP control system pressure sensor.
3. Turn ignition switch "ON".
4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.
   CAUTION:
   - **Always calibrate the vacuum pump gauge when using it.**
   - **Do not apply below −20 kPa (−150 mmHg, −5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure.**
5. Check input voltage between ECM terminal 60 and ground.



SEC908C

Pressure (Relative to atmospheric pressure)	Voltage V
0 kPa (0 mmHg, 0 inHg)	3.0 - 3.6
-9.3 kPa (-70 mmHg, -2.76 inHg)	0.4 - 0.6

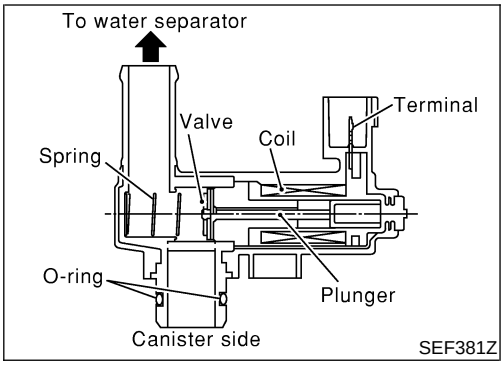
MTBL1159

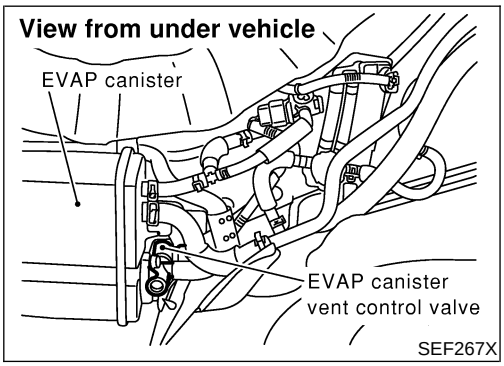
CAUTION:
Discard and EVAP control system pressure sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.

OK or NG

OK	▶	GO TO 12.
NG	▶	Replace EVAP control system pressure sensor.

12	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.	
▶	**INSPECTION END**





Component Description

NFEC1103

NOTE:
If DTC P1448 is displayed with P0442, perform trouble diagnosis for DTC P1448 first.

The EVAP canister vent control valve is located on the EVAP canister and is used to seal the canister vent.
This solenoid valve responds to signals from the ECM. When the ECM sends an ON signal, the coil in the solenoid valve is energized. A plunger will then move to seal the canister vent. The ability to seal the vent is necessary for the on board diagnosis of other evaporative emission control system components.
This solenoid valve is used only for diagnosis, and usually remains opened.
When the vent is closed, under normal purge conditions, the evaporative emission control system is depressurized and allows "EVAP Control System (Small Leak)" diagnosis.

CONSULT-II Reference Value in Data Monitor Mode

NFEC1104

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VENT CONT/V	• Ignition switch: ON	OFF

On Board Diagnosis Logic

NFEC1106

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P1448 1448	EVAP canister vent control valve open	EVAP canister vent control valve remains opened under specified driving conditions.	• EVAP canister vent control valve • EVAP control system pressure sensor and circuit • Blocked rubber tube to EVAP canister vent control valve • Water separator • EVAP canister is saturated with water. • Vacuum cut valve

DTC Confirmation Procedure

NFEC1107

NOTE:
- **If DTC P1448 is displayed with P0442, perform trouble diagnosis for DTC P1448 first.**
- If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

5

EVAP SML LEAK P0442/P1442
1)FOR BEST RSLT,PERFORM AT FOLLOWING CONDITIONS. -FUEL LEVEL: 1/4-3/4 -AMBIENT TEMP: 0-30 C(32-86F) -OPEN ENGINE HOOD. 2)START ENG WITH VHCL STOPPED. IF ENG IS ON,STOP FOR 5 SEC. THEN RESTART. 3)TOUCH START.

SEC760C

5

EVAP SML LEAK P0442/P1442
WAIT 2 TO 10 MINUTES. KEEP ENGINE RUNNING AT IDLE SPEED.

SEC761C

5

EVAP SML LEAK P0442/P1442
MAINTAIN 1600 - 2100 RPM UNTIL FINAL RESULT APPEARS. (APPROX. 3 MINUTES)
1600 rpm 1850 rpm 2100 rpm

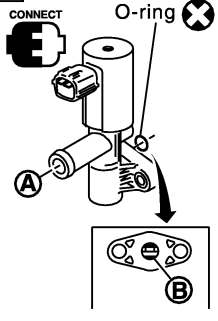
SEC762C

6

EVAP SML LEAK P0442/P1442
OK
SELF-DIAG RESULTS
NO DTC DETECTED. FURTHER TESTING MAY BE REQUIRED.

SEC763C

11



ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %
HO2S1 (B1)	XXX V
HO2S1 (B2)	XXX V

PBIB0153E

WITH CONSULT-II

NFEC1107S01

TESTING CONDITION:

- **Perform "DTC WORK SUPPORT" when the fuel level is between 1/4 to 3/4 full and vehicle is placed on flat level surface.**
- **Always perform test at a temperature of 0 to 30°C (32 to 86°F).**
- **Open engine hood before conducting the following procedure.**

1) Turn ignition switch "ON".
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) Make sure that the following conditions are met.

COOLAN TEMP/S	0 - 70°C (32 - 158°F)
INT/A TEMP SE	0 - 30°C (32 - 86°F)

5) Select "EVP SML LEAK P0442/P1442" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II.
   Follow the instruction displayed.

NOTE:
If the engine speed cannot be maintained within the range displayed on the CONSULT-II screen, go to "Basic Inspection", EC-123.

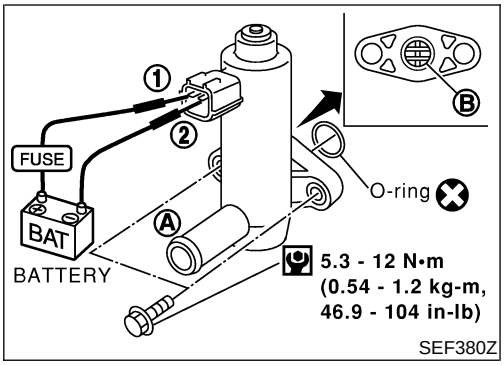
6) Make sure that "OK" is displayed.
   If "NG" is displayed, go to the following step.

NOTE:
Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.

7) Stop engine and wait at least 10 seconds, then turn "ON".
8) Disconnect hose from water separator.
9) Select "VENT CONTROL/V" of "ACTIVE TEST" mode with CONSULT-II.
10) Touch "ON" and "OFF" alternately.
11) Make sure the following.

Condition VENT CONTROL/V	Air passage continuity between **A** and **B**
ON	No
OFF	Yes

If the result is NG, go to "Diagnostic Procedure", EC-598.
If the result is OK, go to "Diagnostic Procedure" for DTC P0442, EC-361.



Overall Function Check

NFEC1108

Use this procedure to check the overall function of the EVAP canister vent control valve circuit. During this check, a DTC might not be confirmed.

WITH GST

NFEC1108S01

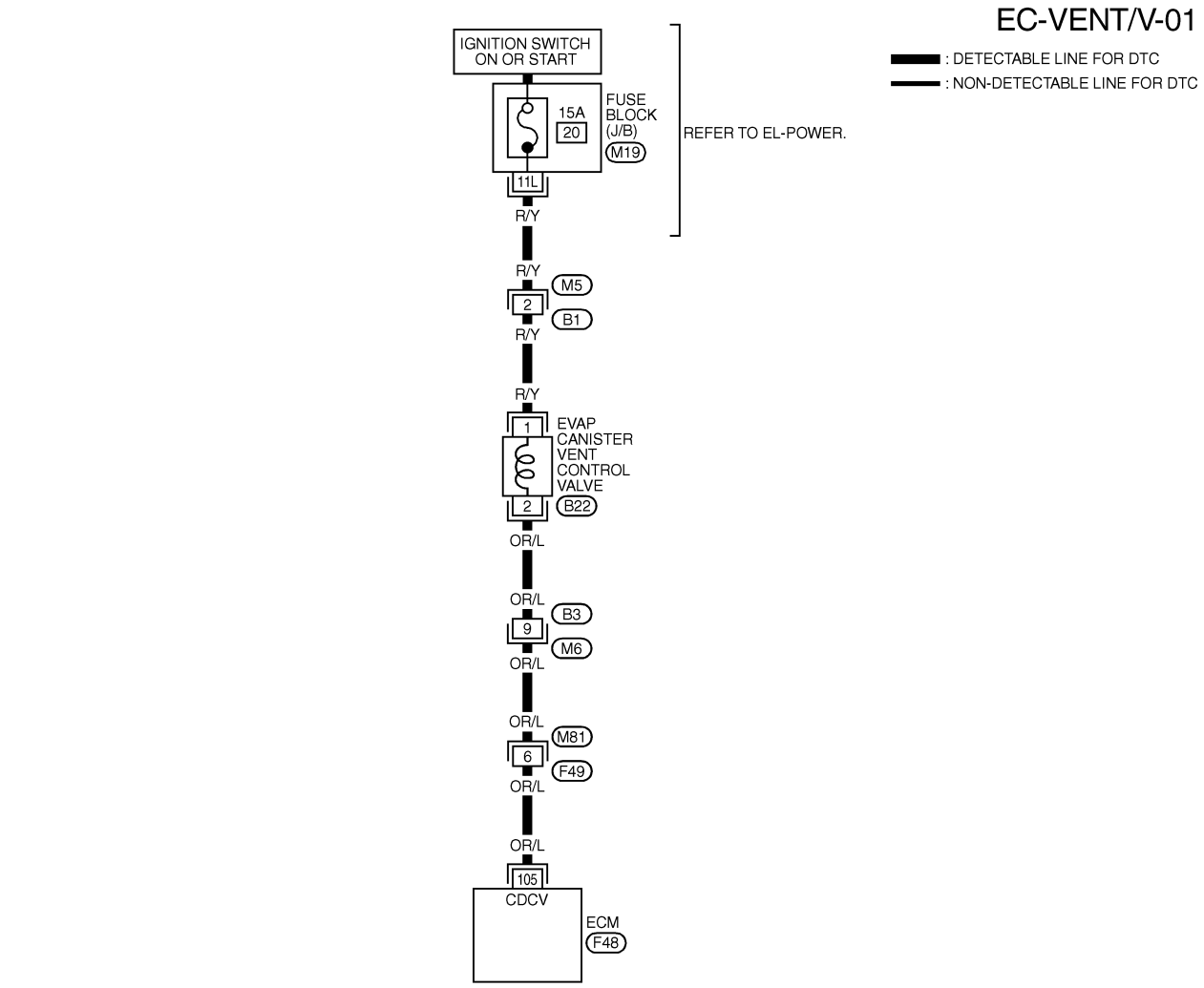
1) Disconnect hose from water separator.
2) Disconnect EVAP canister vent control valve harness connector.
3) Verify the following.

Condition	Air passage continuity
12V direct current supply between terminals 1 and 2	No
No supply	Yes

If the result is NG, go to “Diagnostic Procedure”, EC-598.
If the result is OK, go to “Diagnostic Procedure” for DTC P0442, EC-361.

Wiring Diagram

NFEC1109



MEC495D

ECM TERMINALS AND REFERENCE VALUE 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	WIRE COLOR	ITEM	CONDITION	DATA (DC)
105	OR/L	EVAP CANISTER VENT CONTROL VALVE	IGN ON	BATTERY VOLTAGE

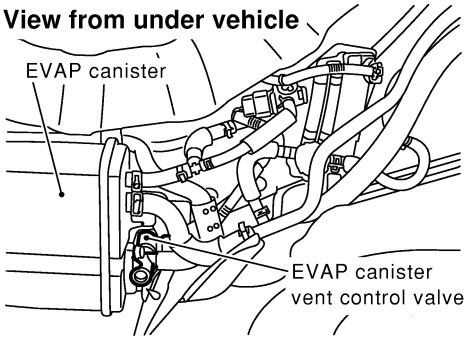
SEF668XC

Diagnostic Procedure

NFEC1110

1	CHECK RUBBER TUBE

1. Turn ignition switch “OFF”.
2. Disconnect rubber tube connected to EVAP canister vent control valve.
3. Check the rubber tube for clogging.



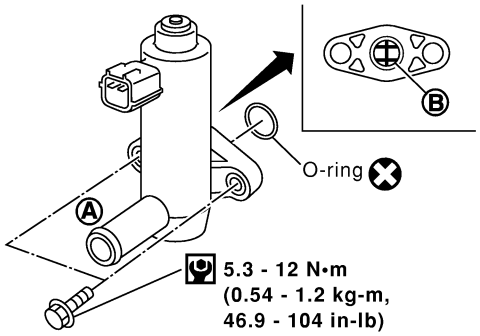
SEF267X

OK or NG

OK	▶	GO TO 2.
NG	▶	Clean rubber tube using an air blower.

2	CHECK EVAP CANISTER VENT CONTROL VALVE-I

1. Remove EVAP canister vent control valve from EVAP canister.
2. Check portion **B** of EVAP canister vent control valve for being rusted.



SEF376Z

OK or NG

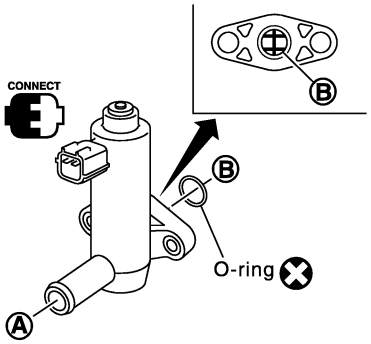
OK	▶	GO TO 3.
NG	▶	Replace EVAP canister vent control valve.

3	CHECK EVAP CANISTER VENT CONTROL VALVE-II

With CONSULT-II

1. Turn ignition switch ON.
2. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
3. Check air passage continuity and operation delay time.

ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %
HO2S1 MNTR (B1)	LEAN
HO2S1 MNTR (B2)	LEAN



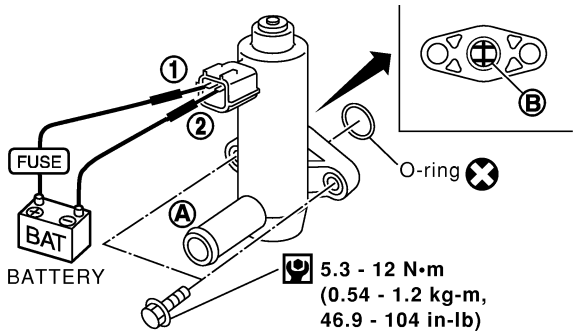
Condition VENT CONTROL/V	Air passage continuity between A and B
ON	No
OFF	Yes

Operation takes less than 1 second.

SEC158D

Without CONSULT-II

Check air passage continuity and operation delay time under the following conditions.



Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	No
OFF	Yes

Operation takes less than 1 second.

SEF378Z

Make sure new O-ring is installed properly.

OK or NG

OK	▶	GO TO 5.
NG	▶	GO TO 4.

4	CHECK EVAP CANISTER VENT CONTROL VALVE-III

1. Clean the air passage (Portion **A** to **B**) of EVAP canister vent control valve using an air blower.
2. Perform Test No. 3 again.

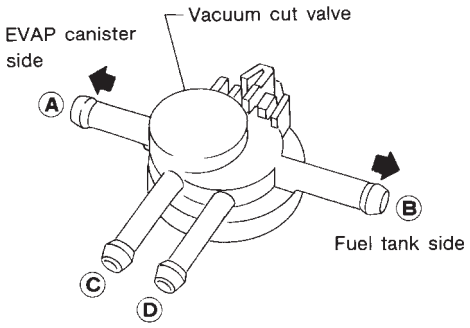
OK or NG

OK	▶	GO TO 5.
NG	▶	Replace EVAP canister vent control valve.

Diagnostic Procedure (Cont'd)

5	CHECK VACUUM CUT VALVE

1. Turn ignition switch OFF.
2. Remove vacuum cut valve.
3. Check vacuum cut valve as follows:



SEF379Q

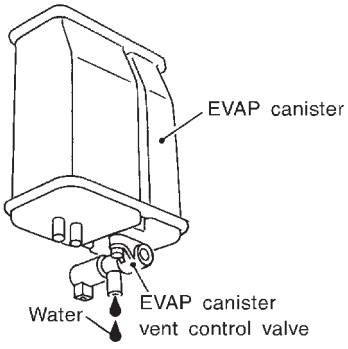
a. Plug port **C** and **D** with fingers.
b. Apply vacuum to port **A** and check that there is no suction from port **B**.
c. Apply vacuum to port **B** and check that there is suction from port **A**.
d. Blow air in port **B** and check that there is a resistance to flow out of port **A**.
e. Open port **C** and **D**.
f. Blow air in port **A** check that air flows freely out of port **C**.
g. Blow air in port **B** check that air flows freely out of port **D**.

OK or NG

OK	▶	GO TO 6.
NG	▶	Replace vacuum cut valve.

6	CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve attached.
2. Check if water will drain from the EVAP canister.



SEF596U

Yes or No

Yes	▶	GO TO 7.
No	▶	GO TO 9.

7	CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve attached.
The weight should be less than 1.8 kg (4.0 lb).

OK or NG

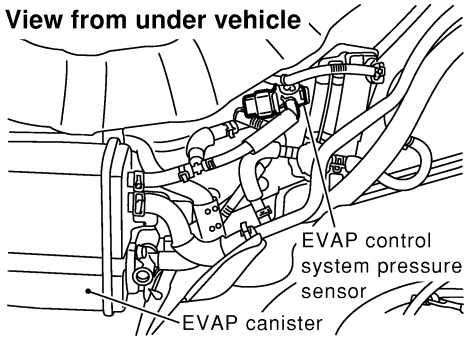
OK	▶	GO TO 9.
NG	▶	GO TO 8.

8	DETECT MALFUNCTIONING PART
Check the following. ● EVAP canister for damage ● EVAP hose between EVAP canister and water separator for clogging or poor connection	
▶	Repair hose or replace EVAP canister.

9	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE
Check disconnection or improper connection of hose connected to EVAP control system pressure sensor.	
OK or NG	
OK ▶	GO TO 10.
NG ▶	Repair it.

10	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.



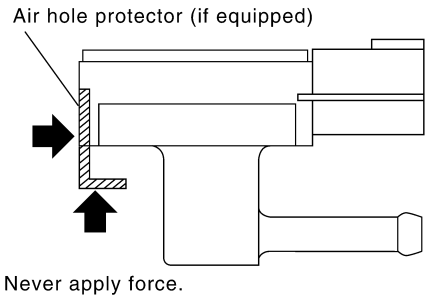
SEF268X

2. Check connectors for water.
Water should not exist.

OK or NG	
OK ▶	GO TO 11.
NG ▶	Replace EVAP control system pressure sensor.

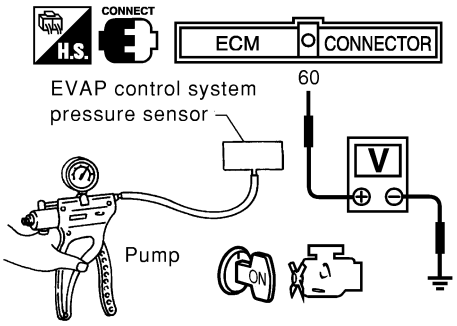
11	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Remove EVAP control system pressure sensor with its harness connector connected.
   CAUTION:
   Never apply force to the air hole protector of the sensor if equipped.



SEF799W

2. Remove hose from EVAP control system pressure sensor.
3. Turn ignition switch "ON".
4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.
   CAUTION:
   - **Always calibrate the vacuum pump gauge when using it.**
   - **Do not apply below −20 kPa (−150 mmHg, −5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure.**
5. Check input voltage between ECM terminal 60 and ground.



SEC908C

Pressure (Relative to atmospheric pressure)	Voltage V
0 kPa (0 mmHg, 0 inHg)	3.0 - 3.6
-9.3 kPa (-70 mmHg, -2.76 inHg)	0.4 - 0.6

MTBL1159

CAUTION:
Discard and EVAP control system pressure 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.

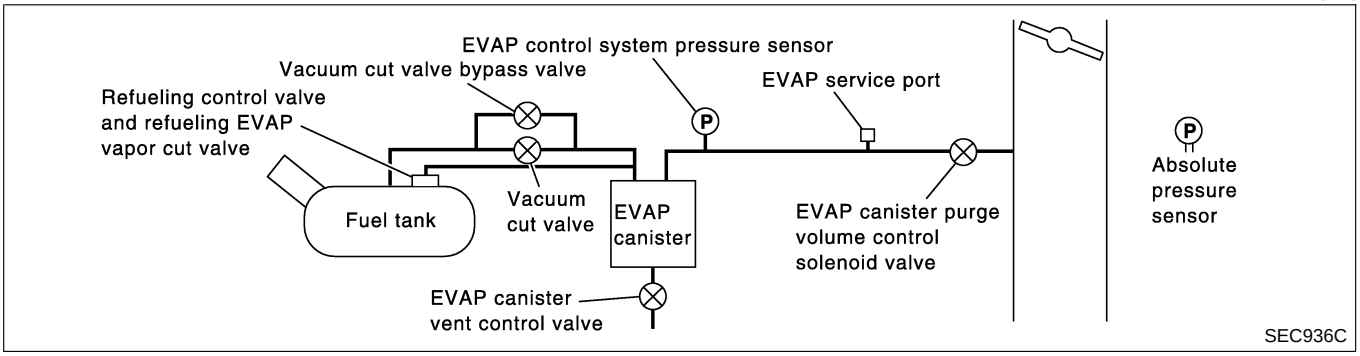
OK or NG

OK	▶	GO TO 12.
NG	▶	Replace EVAP control system pressure sensor.

12	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.	
▶	**INSPECTION END**

On Board Diagnosis Logic

NFEC1479

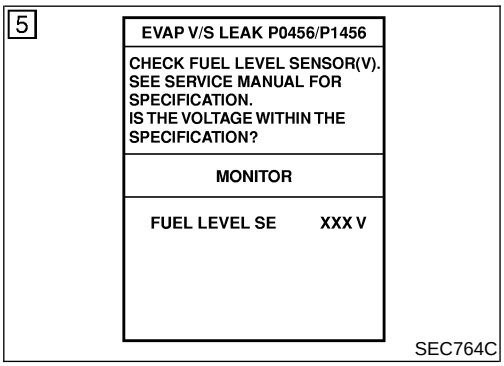


This diagnosis detects very small leaks in the EVAP line between fuel tank and EVAP canister purge volume control solenoid valve, using of vapor pressure in the fuel tank.
The EVAP canister vent control valve is closed to shut the EVAP purge line. The vacuum cut valve bypass valve will then be opened to clear the line between the fuel tank and the EVAP canister purge volume control solenoid valve. The EVAP control system pressure sensor can now monitor the pressure inside the fuel tank. If pressure increases, the ECM will check for leaks in the line between the vacuum cut valve and EVAP canister purge volume control solenoid valve.
If ECM judges a leak which corresponds to a very small leak, the very small leak P1456 will be detected.
If ECM judges a leak equivalent to a small leak, EVAP small leak P1442 will be detected.
If ECM judges there are no leaks, the diagnosis will be OK.

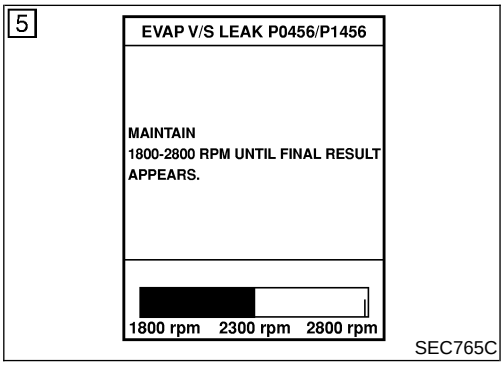
DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P1456 1456	Evaporative emission control system very small leak (positive pressure check)	• EVAP system has a very small leak. • EVAP system does not operate properly.	• Incorrect fuel tank vacuum relief valve • Incorrect fuel filler cap used • Fuel filler cap remains open or fails to close. • Foreign matter caught in fuel filler cap • Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve. • Foreign matter caught in EVAP canister vent control valve • EVAP canister or fuel tank leaks • EVAP purge line (Pipe and rubber tube) leaks • EVAP purge line rubber tube bent • Blocked or bent rubber tube to EVAP control system pressure sensor • Loose or disconnected rubber tube • EVAP canister vent control valve and the circuit • EVAP canister purge volume control solenoid valve and the circuit • Fuel tank temperature sensor • O-ring of EVAP canister vent control valve is missing or damaged. • Water separator • EVAP canister saturated with water • EVAP control system pressure sensor • Refueling control valve • ORVR system leaks • Fuel level sensor and the circuit • Foreign matter caught in EVAP canister purge volume control solenoid valve

CAUTION:
- **Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.**

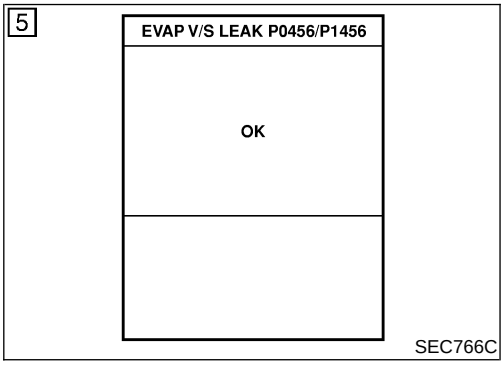
- **If the fuel filler cap is not tightened properly, the MIL may come on.**
- **Use only a genuine NISSAN rubber tube as a replacement.**



SEC764C



SEC765C



SEC766C

DTC Confirmation Procedure

NFEC1480

CAUTION:

Never remove fuel filler cap during the DTC confirmation procedure.

NOTE:

- **If DTC P1456 is displayed with P0442, perform TROUBLE DIAGNOSIS FOR DTC P1456 first.**
- If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.
- **After repair, make sure that the hoses and clips are installed properly.**

TESTING CONDITION:

- **Open engine hood before conducting following procedure.**
- **If any of following conditions are met just before the DTC confirmation procedure, leave the vehicle for more than 1 hour.**

a) **Fuel filler cap is removed.**
b) **Refilled or drained the fuel.**
c) **EVAP component parts is/are removed.**

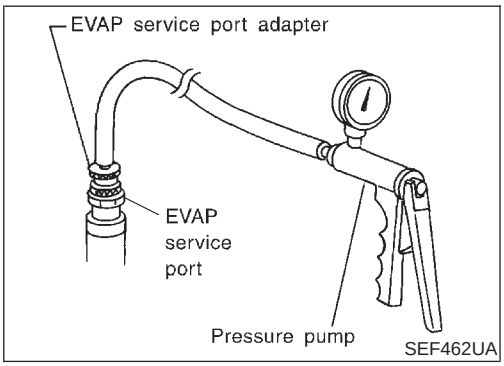
- **Before performing the following procedure, confirm that battery voltage is more than 11V at idle.**

With CONSULT-II

1) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
2) Make sure the following conditions are met.
   FUEL LEVEL SE: 1.08 - 0.2V
   COOLAN TEMP/S: 0 - 32°C (32 - 90°F)
   FUEL T/TMP SE: 0 - 35°C (32 - 95°F)
   INT A/TEMP SE: More than 0°C (32°F)
   If NG, turn ignition switch "OFF" and leave the vehicle in a cool place (soak the vehicle) or refilling/draining fuel until the output voltage condition of the "FUEL LEVEL SE" meets within the range above and leave the vehicle for more than 1 hour. Then start from step 1).
3) Turn ignition switch "OFF" and wait at least 10 seconds.
4) Turn ignition switch "ON".
5) Select "EVP V/S LEAK P0456/P1456" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II.
   Follow the instruction displayed.
6) Make sure that "OK" is displayed.
   If "NG" is displayed, refer to "Diagnostic Procedure", EC-606.

NOTE:

- **If the engine speed cannot be maintained within the range displayed on CONSULT-II screen, go to "Basic Inspection", EC-123.**
- **Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.**



Overall Function Check

NFEC1481

WITH GST

NFEC1481S01

Use this procedure to check the overall function of the EVAP very small leak function. During this check, a DTC might not be confirmed.

CAUTION:

- **Never use compressed air, doing so may damage the EVAP system.**
- **Do not start engine.**
- **Do not exceeded 4.12 kPa (0.042 kg/cm^2, 0.6 psi).**

1) Attach the EVAP service port adapter securely to the EVAP service port.
2) Set the pressure pump and a hose.
3) Also set a vacuum gauge via 3-way connector and a hose.
4) Turn ignition switch "ON".
5) Connect GST and select mode 8.
6) Using mode 8 control the EVAP canister vent control valve (close) and vacuum cut valve bypass valve (open).
7) Apply pressure and make sure the following conditions are satisfied.
   Pressure to be applied: 2.7 kPa (20 mmHg, 0.79 inHg)
   Time to be waited after the pressure drawn in to the EVAP system and the pressure to be dropped: 60 seconds and the pressure should not be dropped more than 0.4 kPa (3 mmHg, 0.12 inHg)
   If NG, go to diagnostic procedure, EC-606.

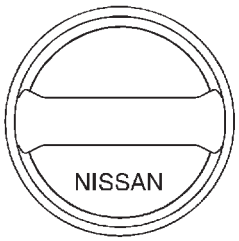
NOTE:
For more information, refer to GST instruction manual.

Diagnostic Procedure

NFEC1482

1	CHECK FUEL FILLER CAP DESIGN

1. Turn ignition switch “OFF”.
2. Check for genuine NISSAN fuel filler cap design.



SEF915U

OK or NG

OK	▶	GO TO 2.
NG	▶	Replace with genuine NISSAN fuel filler cap.

2	CHECK FUEL FILLER CAP INSTALLATION

Check that the cap is tightened properly by rotating the cap clockwise.

OK or NG

OK	▶	GO TO 3.
NG	▶	1. Open fuel filler cap, then clean cap and fuel filler neck threads using air blower. 2. Retighten until ratcheting sound is heard.

3	CHECK FUEL FILLER CAP FUNCTION

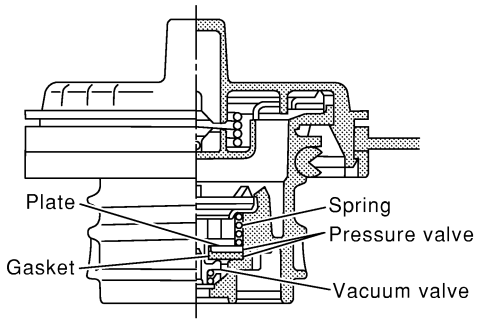
Check for air releasing sound while opening the fuel filler cap.

OK or NG

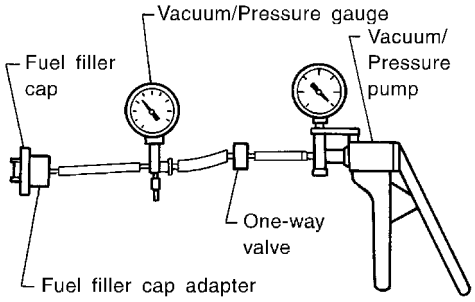
OK	▶	GO TO 5.
NG	▶	GO TO 4.

4	CHECK FUEL TANK VACUUM RELIEF VALVE

1. Wipe clean valve housing.
2. Check valve opening pressure and vacuum.



SEF445Y



SEF943S

Pressure:
15.3 - 20.0 kPa (0.156 - 0.204 kg/cm^2, 2.22 - 2.90 psi)
Vacuum:
−6.0 to −3.3 kPa (−0.061 to −0.034 kg/cm^2, −0.87 to −0.48 psi)

CAUTION:
Use only a genuine fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.

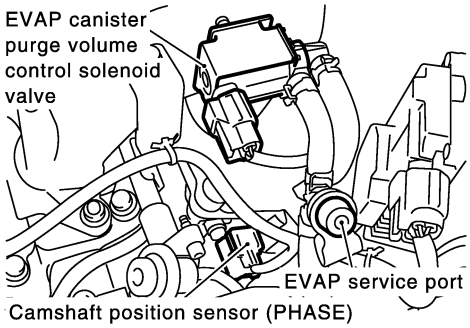
OK or NG

OK	▶	GO TO 5.
NG	▶	Replace fuel filler cap with a genuine one.

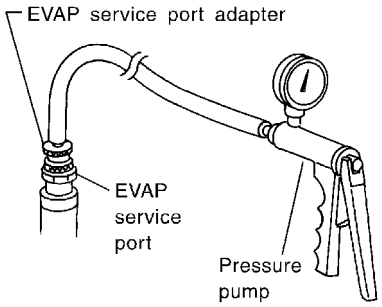
Diagnostic Procedure (Cont'd)

5	INSTALL THE PRESSURE PUMP

To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely.



SEC929C



SEF916U

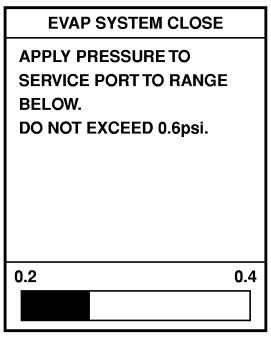
NOTE:
Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.

Models with CONSULT-II ▶	GO TO 6.
Models without CONSULT-II ▶	GO TO 7.

6	CHECK FOR EVAP LEAK

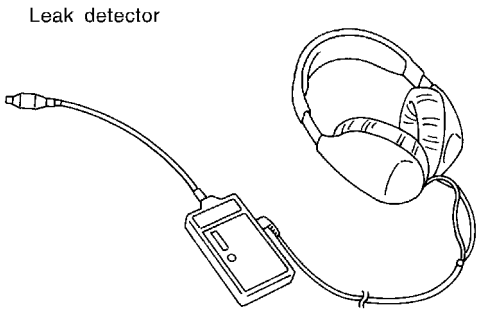
With CONSULT-II

1. Turn ignition switch "ON".
2. Select "EVAP SYSTEM CLOSE" of "WORK SUPPORT" mode with CONSULT-II.
3. Touch "START" and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.
   NOTE:
   - **Never use compressed air or a high pressure pump.**
   - **Do not exceed 4.12 kPa (0.042 kg/cm^2, 0.6 psi) of pressure in the system.**



PEF917U

4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-40.



SEF200U

OK or NG

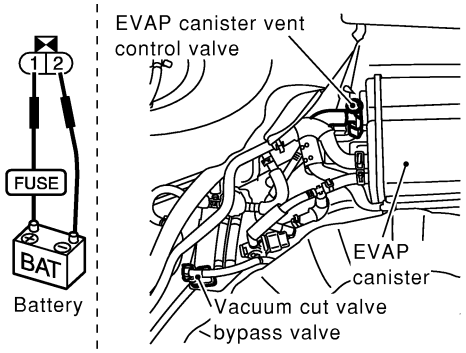
OK	▶	GO TO 8.
NG	▶	Repair or replace.

Diagnostic Procedure (Cont'd)

7	CHECK FOR EVAP LEAK

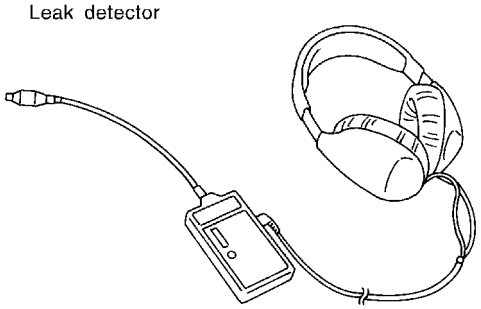
Without CONSULT-II

1. Turn ignition switch "OFF".
2. Apply 12 volts DC to EVAP canister vent control valve. The valve will close. (Continue to apply 12 volts until the end of test.)
3. Apply 12 volts DC to vacuum cut valve bypass valve. The valve will open. (Continue to apply 12V until the end of test.)



SEF254X

4. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.
   NOTE:
   - **Never use compressed air or a high pressure pump.**
   - **Do not exceed 4.12 kPa (0.042 kg/cm^2, 0.6 psi) of pressure in the system.**
5. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-40.



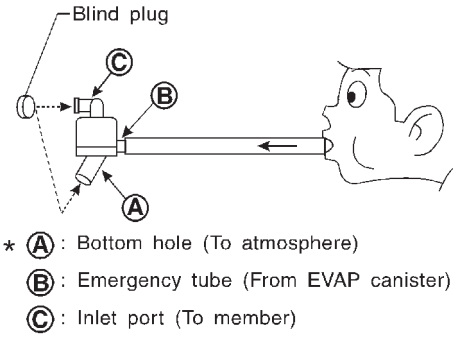
SEF200U

OK or NG

OK	▶	GO TO 8.
NG	▶	Repair or replace.

8	CHECK WATER SEPARATOR

1. Check visually for insect nests in the water separator air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.
4. Check that **A** and **C** are not clogged by blowing air into **B** with **A**, and then **C** plugged.



* Ⓐ: Bottom hole (To atmosphere)
Ⓑ: Emergency tube (From EVAP canister)
Ⓒ: Inlet port (To member)

SEF829T

5. In case of NG in items 2 - 4, replace the parts.

NOTE:
Do not disassemble water separator.

OK or NG

OK	▶	GO TO 9.
NG	▶	Replace water separator.

9	CHECK EVAP CANISTER VENT CONTROL VALVE, O-RING AND CIRCUIT

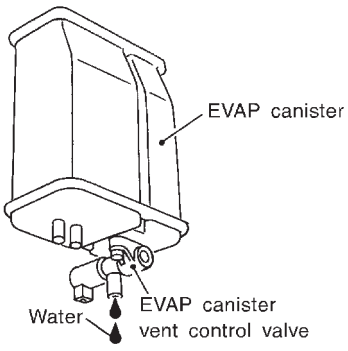
Refer to "DTC Confirmation Procedure", EC-594.

OK or NG

OK	▶	GO TO 10.
NG	▶	Repair or replace EVAP canister vent control valve and O-ring or harness/connector.

10	CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve attached.
2. Does water drain from the EVAP canister?



SEF596U

Yes or No

Yes	▶	GO TO 11.
No (With CONSULT-II)	▶	GO TO 13.
No (Without CONSULT-II)	▶	GO TO 14.

11	CHECK EVAP CANISTER
Weigh the EVAP canister with the EVAP canister vent control valve attached. **The weight should be less than 1.8 kg (4.0 lb).** **OK or NG**	
OK (With CONSULT-II) ▶	GO TO 13.
OK (Without CONSULT-II) ▶	GO TO 14.
NG ▶	GO TO 12.

12	DETECT MALFUNCTIONING PART
Check the following. ● EVAP canister for damage ● EVAP hose between EVAP canister and water separator for clogging or poor connection	
▶	Repair hose or replace EVAP canister.

13	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

With CONSULT-II

1. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
2. Start engine.
3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode.
4. Touch "Qu" on CONSULT-II screen to increase "PURG VOL CONT/V" opening to 100.0%.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

ACTIVE TEST	
PURG VOL CONT/V	0.0%
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %
HO2S1 MNTR (B1)	RICH
HO2S1 MNTR (B2)	RICH

SEC142D

Vacuum should exist.

OK or NG

OK ▶	GO TO 16.
NG ▶	GO TO 15.

14	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Stop engine.
3. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
4. Start engine and let it idle for at least 80 seconds.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

Vacuum should exist.

OK or NG

OK ▶	GO TO 17.
NG ▶	GO TO 15.

15	CHECK VACUUM HOSE	
Check vacuum hoses for clogging or disconnection. Refer to "Vacuum Hose Drawing", EC-30.		
OK or NG		
OK (With CONSULT-II)	▶	GO TO 16.
OK (Without CONSULT-II)	▶	GO TO 17.
NG	▶	Repair or reconnect the hose.

16	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE	
With CONSULT-II 1. Start engine. 2. 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 18.
NG	▶	GO TO 17.

ACTIVE TEST	
PURG VOL CONT/V	0.0%
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %
HO2S1 MNTR (B1)	RICH
HO2S1 MNTR (B2)	RICH

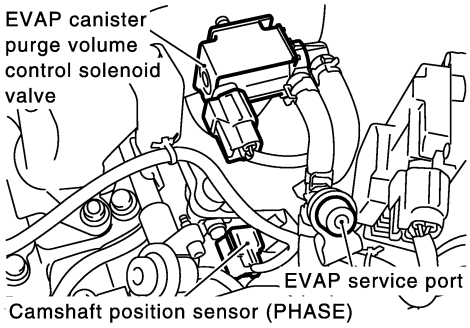
SEC142D

Diagnostic Procedure (Cont'd)

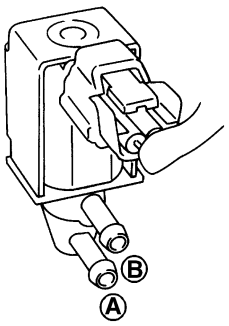
17	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



SEC929C

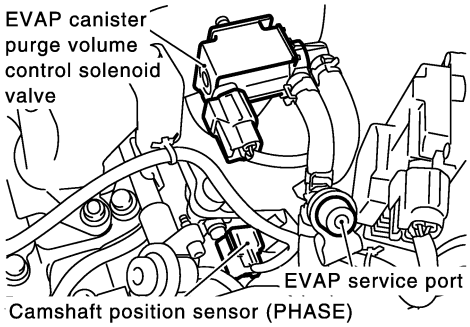


Condition PURG VOL CONT/V value	Air passage continuity between A and B
100.0%	Yes
0.0%	No

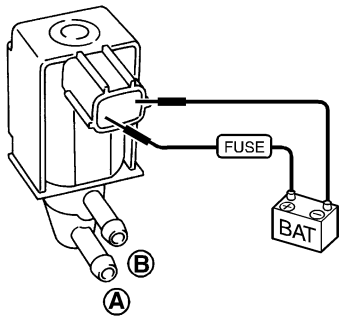
SEF334X

Without CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



SEC929C



Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	Yes
No supply	No

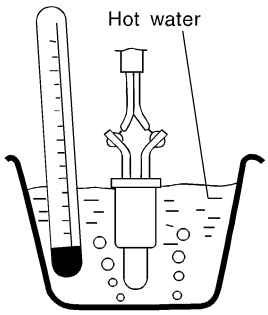
SEF335X

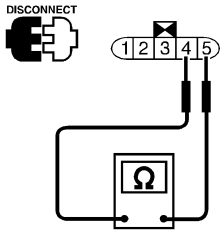
OK or NG

OK	▶	GO TO 18.
NG	▶	Replace EVAP canister purge volume control solenoid valve.

18	CHECK FUEL TANK TEMPERATURE SENSOR

1. Remove fuel level sensor unit.
2. Check resistance between fuel level sensor unit and fuel pump terminals 4 and 5 by heating with hot water or heat gun as shown in the figure.





Temperature °C (°F)	Resistance kΩ
20 (68)	2.3 - 2.7
50 (122)	0.79 - 0.90

SEF587X

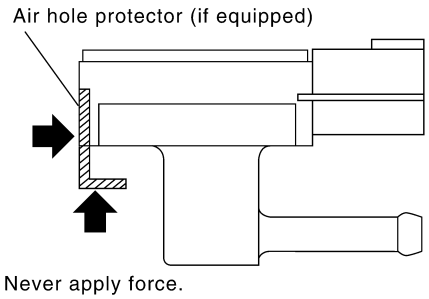
OK or NG

OK	▶	GO TO 19.
NG	▶	Replace fuel level sensor unit.

Diagnostic Procedure (Cont'd)

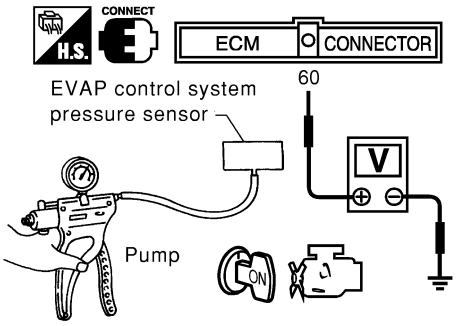
19	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Remove EVAP control system pressure sensor with its harness connector connected.
   CAUTION:
   Never apply force to the air hole protector of the sensor if equipped.



SEF799W

2. Remove hose from EVAP control system pressure sensor.
3. Turn ignition switch "ON".
4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.
   CAUTION:
   - **Always calibrate the vacuum pump gauge when using it.**
   - **Do not apply below −20 kPa (−150 mmHg, −5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure.**
5. Check input voltage between ECM terminal 60 and ground.



SEC908C

Pressure (Relative to atmospheric pressure)	Voltage V
0 kPa (0 mmHg, 0 inHg)	3.0 - 3.6
-9.3 kPa (-70 mmHg, -2.76 inHg)	0.4 - 0.6

MTBL1159

CAUTION:
Discard and EVAP control system pressure 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.

OK or NG

OK	▶	GO TO 20.
NG	▶	Replace EVAP control system pressure sensor.

20	CHECK EVAP PURGE LINE

Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks or improper connection.
Refer to "Evaporative Emission System", EC-36.

OK or NG

OK	▶	GO TO 21.
NG	▶	Repair or reconnect the hose.

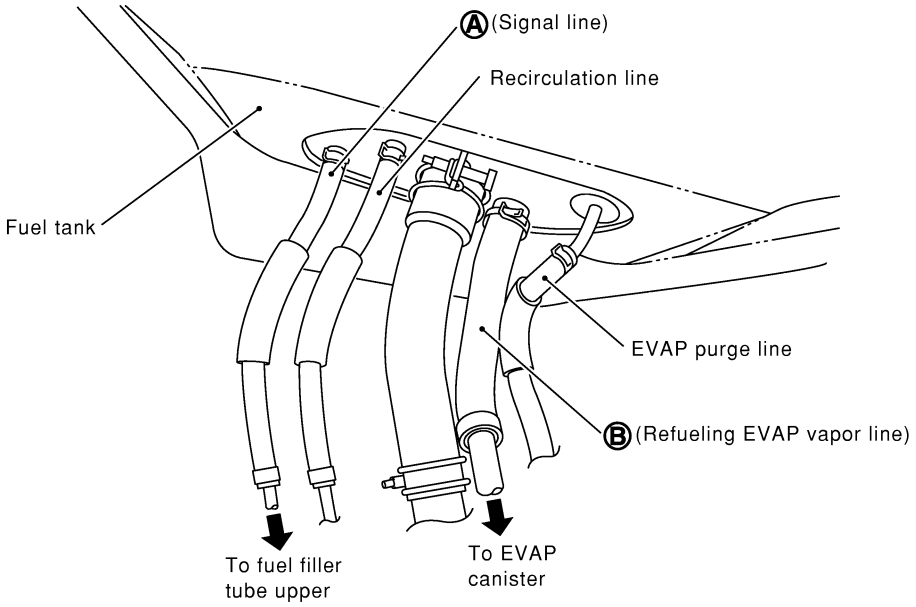
21	CLEAN EVAP PURGE LINE
Clean EVAP purge line (pipe and rubber tube) using air blower.	
▶	GO TO 22.

22	CHECK REFUELING EVAP VAPOR LINE
Check refueling EVAP vapor line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-40.	
OK or NG	
OK ▶	GO TO 23.
NG ▶	Repair or replace hoses and tubes.

23	CHECK SIGNAL LINE AND RECIRCULATION LINE
Check signal line and recirculation line between filler neck tube and fuel tank for clogging, kink, cracks, looseness and improper connection.	
OK or NG	
OK ▶	GO TO 24.
NG ▶	Repair or replace hoses, tubes or filler neck tube.

24 CHECK REFUELING CONTROL VALVE

1. Remove fuel filler cap.
2. Check air continuity between hose ends A and B.
   Blow air into hose end B. Air should flow freely into the fuel tank.
3. Blow air into hose end A and check that there is no leakage.
4. Apply pressure to both hose ends A and B [20 kPa (150 mmHg, 5.91 inHg)] using a pressure pump and a suitable 3-way connector. Check that there is no leakage.



SEF830X

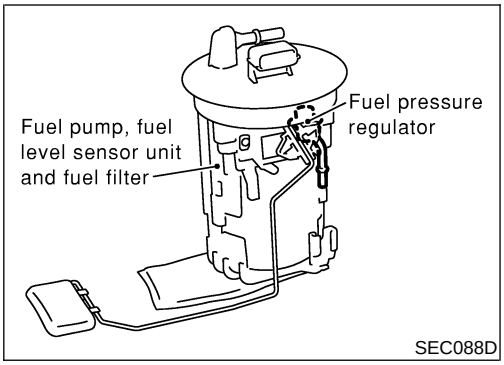
OK or NG

OK ▶	GO TO 25.
NG ▶	Replace or refueling control valve with fuel tank.

Diagnostic Procedure (Cont'd)

25	CHECK FUEL LEVEL SENSOR	
Refer to EL-129, "Fuel Level Sensor Unit Check".		
	OK or NG	
OK	▶	GO TO 26.
NG	▶	Replace fuel level sensor unit.

26	CHECK INTERMITTENT INCIDENT	
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.		
	▶	**INSPECTION END**



Component Description

NFEC1111

The fuel level sensor is mounted in the fuel level sensor unit. The sensor detects a fuel level in the fuel tank and transmits a signal to the ECM.
It consists of two parts, one is mechanical float and the other side is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.

On Board Diagnostic Logic

NFEC1112

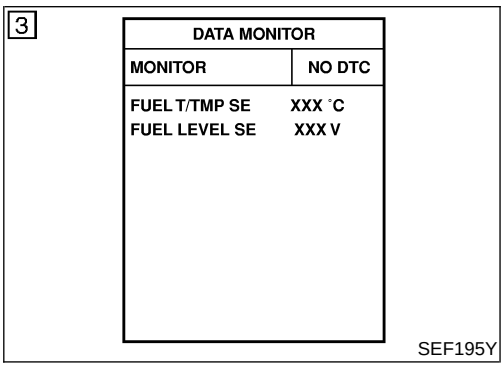
ECM receives two signals from the fuel level sensor.
One is fuel level sensor power supply circuit, and the other is fuel level sensor ground circuit.
This diagnosis indicates the latter to detect open circuit malfunction.

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P1464 1464	Fuel level sensor circuit ground signal	A high voltage from the sensor is sent to ECM.	• Fuel level sensor circuit (The fuel level sensor circuit is open or shorted.)

DTC Confirmation Procedure

NFEC1113

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

NFEC1113S01

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 “Diagnostic Procedure”, EC-621.

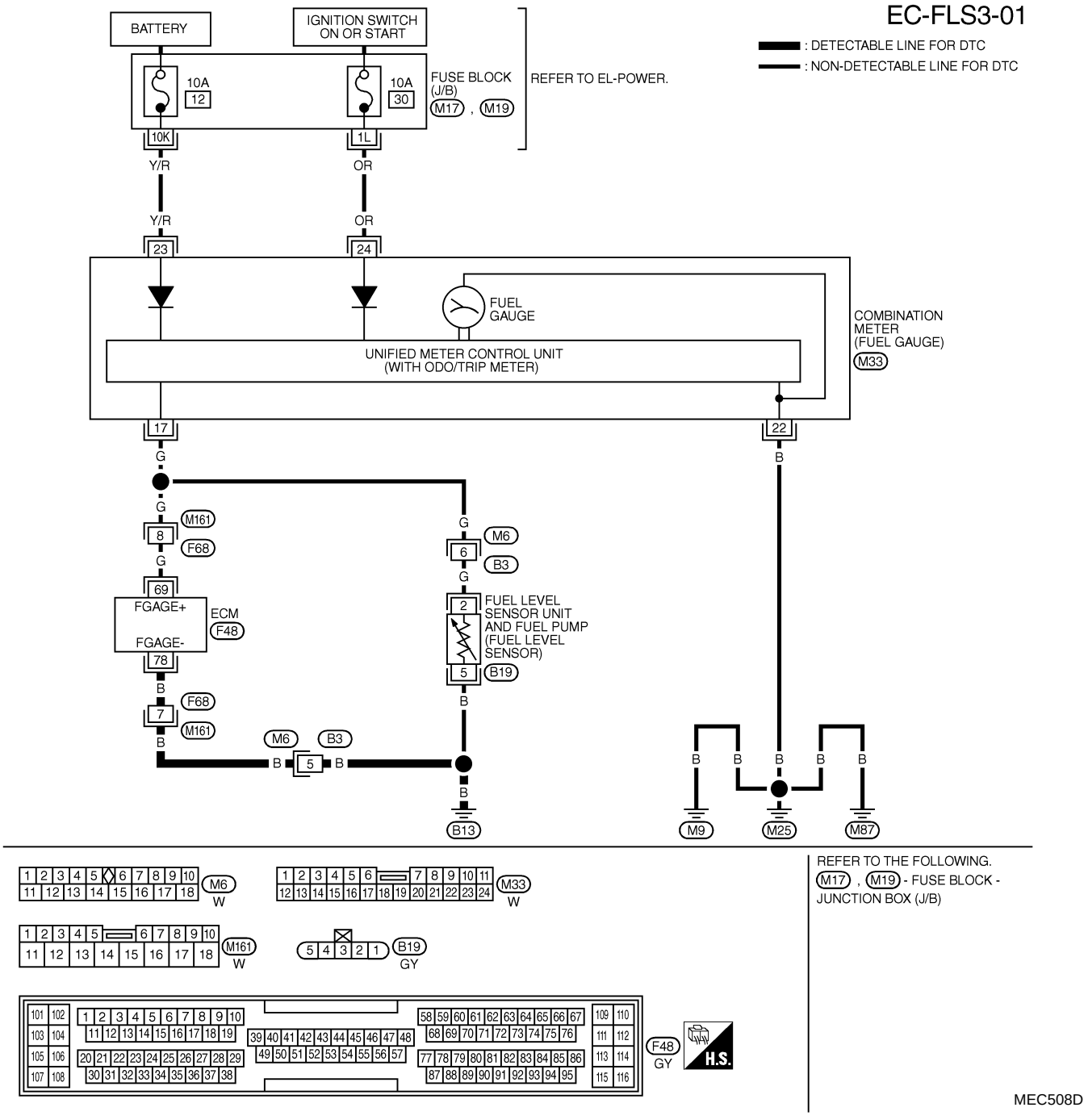
WITH GST

NFEC1113S02

Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

NFEC1114



ECM TERMINALS AND REFERENCE VALUE 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	WIRE COLOR	ITEM	CONDITION	DATA (DC)
78	B	FUEL LEVEL SENSOR GROUND	ENGINE RUNNING AT IDLE SPEED	APPROX. 0V
69	G	FUEL LEVEL SENSOR	IGN ON	APPROX. 0 - 4.8V OUTPUT VOLTAGE VARIES WITH FUEL LEVEL.

SEF711YB

Diagnostic Procedure

=NFEC1115

1	CHECK FUEL LEVEL SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch “OFF”.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 78 and body ground. Refer to Wiring Diagram.
   Continuity should exist.
4. Also check harness for short to power.

OK or NG

OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	DETECT MALFUNCTIONING PART

1. Check the following.
- Harness connectors F68, M161
- Harness connectors M6, B3
- Harness for open between ECM and body ground

	▶	Replace open circuit or short to power in harness or connectors.

3	CHECK FUEL LEVEL SENSOR

Refer to EL-129, “Fuel Level Sensor Unit Check”.

OK or NG

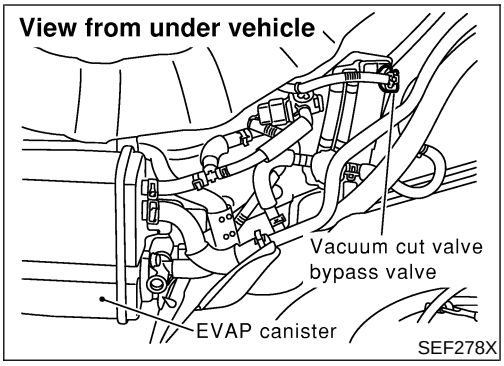
OK	▶	GO TO 4.
NG	▶	Replace fuel level sensor unit.

4	CHECK INTERMITTENT INCIDENT

Refer to “TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT”, EC-156.

OK or NG

	▶	**INSPECTION END**



Description

=NFEC1116

COMPONENT DESCRIPTION

NFEC1116S01

The vacuum cut valve and vacuum cut valve bypass valve are installed in parallel on the EVAP purge line between the fuel tank and the EVAP canister.

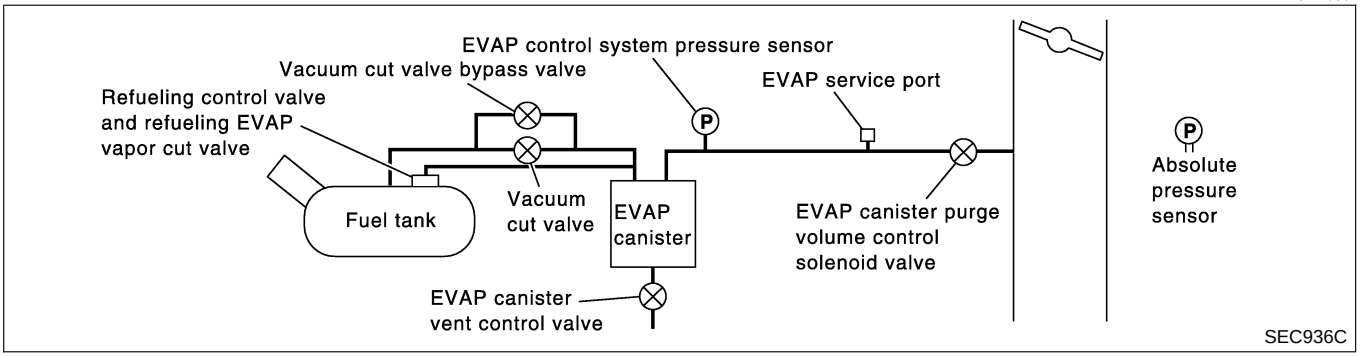
The vacuum cut valve prevents the intake manifold vacuum from being applied to the fuel tank.

The vacuum cut valve bypass valve is a solenoid type valve and generally remains closed. It opens only for on board diagnosis.

The vacuum cut valve bypass valve responds to signals from the ECM. When the ECM sends an ON (ground) signal, the valve is opened. The vacuum cut valve is then bypassed to apply intake manifold vacuum to the fuel tank.

EVAPORATIVE EMISSION SYSTEM DIAGRAM

NFEC1116S02



CONSULT-II Reference Value in Data Monitor Mode

NFEC1117

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VC/V BYPASS/V	● Ignition switch: ON	OFF

On Board Diagnosis Logic

NFEC1119

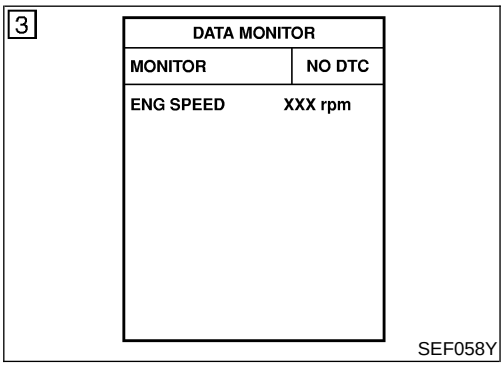
DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P1490 1490	Vacuum cut valve bypass valve circuit	An improper voltage signal is sent to ECM through vacuum cut valve bypass valve.	● Harness or connectors (The vacuum cut valve bypass valve circuit is open or shorted.) ● Vacuum cut valve bypass valve

DTC Confirmation Procedure

NFEC1120

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 speed.



WITH CONSULT-II

NFEC1120S01

1) Turn ignition switch “ON”.
2) Select “DATA MONITOR” mode with CONSULT-II.
3) Start engine and wait at least 5 seconds.
4) If 1st trip DTC is detected, go to “Diagnostic Procedure”, EC-625.

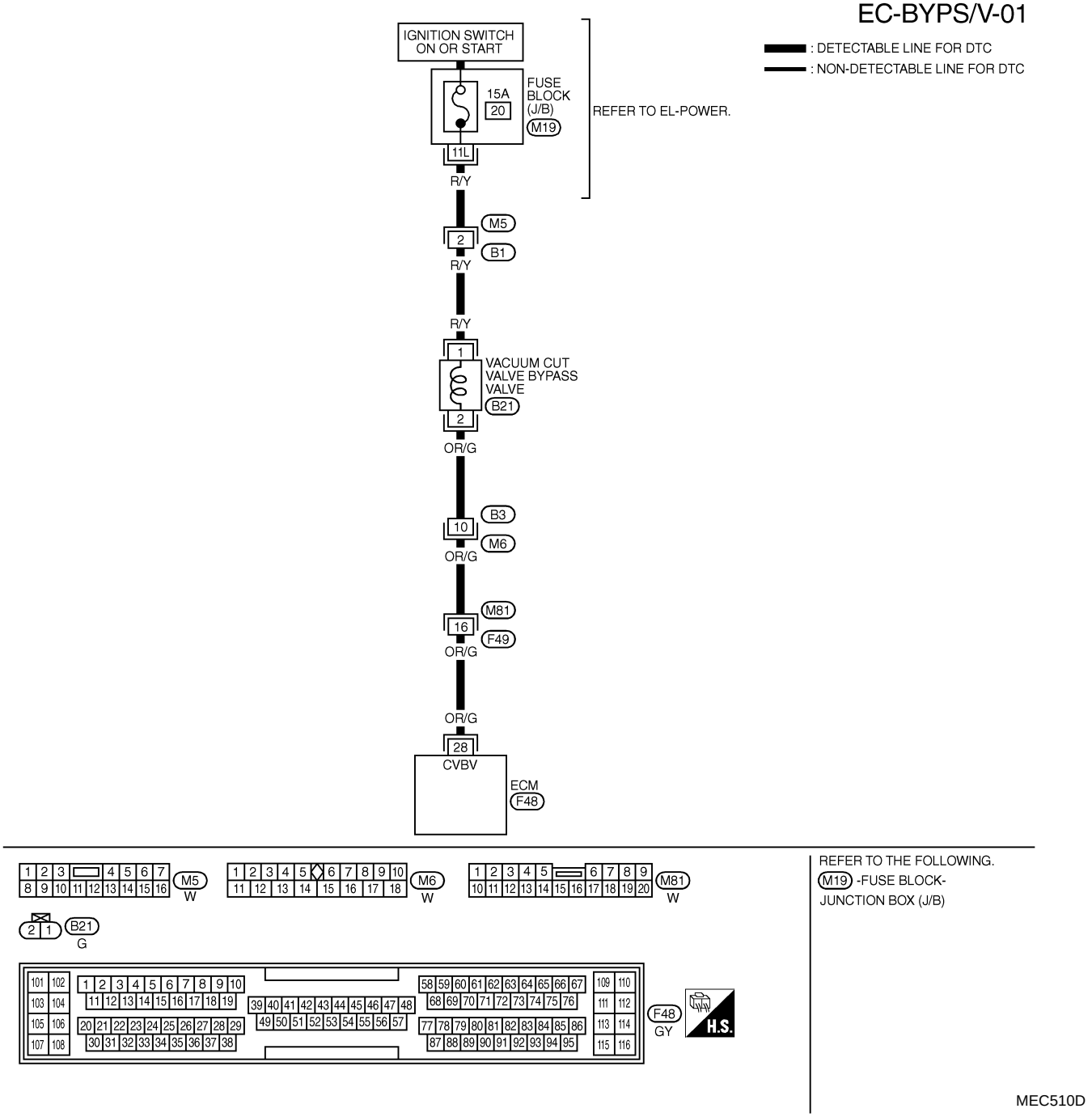
WITH GST

NFEC1120S02

Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

NFEC1121



ECM TERMINALS AND REFERENCE VALUE 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	WIRE COLOR	ITEM	CONDITION	DATA (DC)
28	OR/G	VACUUM CUT VALVE BYPASS VALVE	IGN ON	BATTERY VOLTAGE

SEF634XD

Diagnostic Procedure

NFEC1122

1	INSPECTION START	
Do you have CONSULT-II?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	GO TO 3.

2	CHECK VACUUM CUT VALVE BYPASS VALVE CIRCUIT	

With CONSULT-II

1. Turn ignition switch “OFF” and then “ON”.
2. Select “VC/V BYPASS/V” in “ACTIVE TEST” mode with CONSULT-II.
3. Touch “ON/OFF” on CONSULT-II screen.

ACTIVE TEST	
VC/V BYPASS/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %
HO2S1 MNTR (B1)	LEAN
HO2S1 MNTR (B2)	LEAN

PBIB0157E

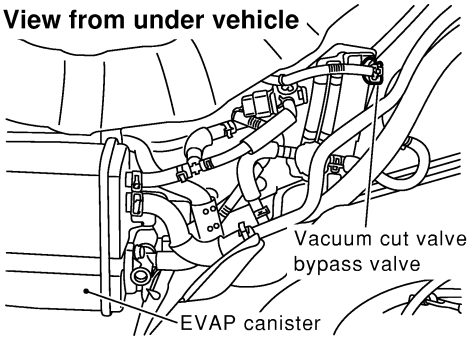
4. Make sure that clicking sound is heard from the vacuum cut valve bypass valve.

OK or NG		
OK	▶	GO TO 7.
NG	▶	GO TO 3.

Diagnostic Procedure (Cont'd)

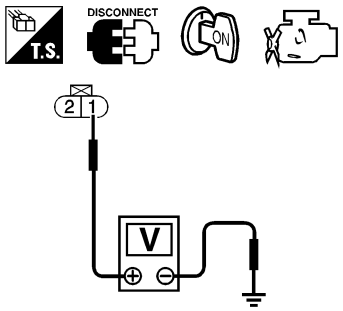
3	CHECK VACUUM CUT VALVE BYPASS VALUE POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect vacuum cut valve bypass valve harness connector.



SEF278X

3. Turn ignition switch "ON".
4. Check voltage between vacuum cut valve bypass valve terminal 1 and ground with CONSULT-II or tester.



Voltage: Battery voltage

SEF356X

OK or NG

OK	▶	GO TO 5.
NG	▶	GO TO 4.

4	DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors M5, B1
- Fuse block (J/B) connector M19
- 15A fuse
- Harness for open or short between vacuum cut valve bypass valve and fuse

	▶	Repair harness or connectors.

5	CHECK VACUUM CUT VALVE BYPASS 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 28 and vacuum cut valve bypass 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

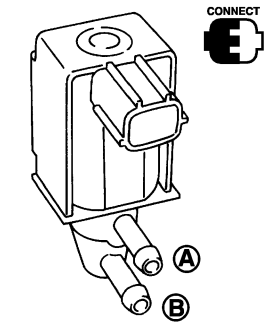
OK	▶	GO TO 7.
NG	▶	GO TO 6.

6	DETECT MALFUNCTIONING PART
Check the following. ● Harness connectors B3, M6 ● Harness connectors M81, F49 ● Harness for open or short between vacuum cut valve bypass valve and ECM	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

7	CHECK VACUUM CUT VALVE BYPASS VALVE

With CONSULT-II

1. Reconnect harness disconnected connectors.
2. Turn ignition switch ON.
3. Perform "VC/V BYPASS/V" in "ACTIVE TEST" mode.
4. Check air passage continuity and operation delay time under the following conditions.



ACTIVE TEST	
VC/V BYPASS/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %
HO2S1 MNTR (B1)	LEAN
HO2S1 MNTR (B2)	LEAN

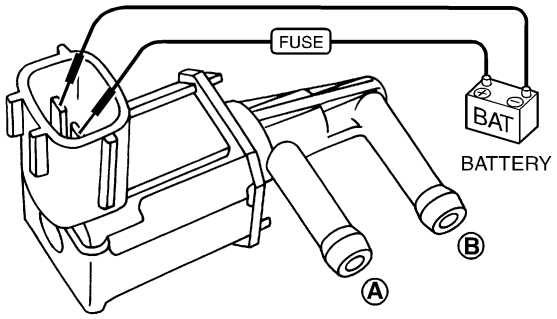
Condition VC/V BYPASS/V	Air passage continuity between A and B
ON	Yes
OFF	No

Operation takes less than 1 second.

SEC156D

Without CONSULT-II

Check air passage continuity and operation delay time 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

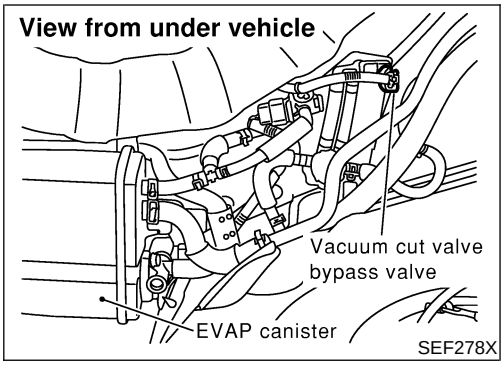
Operation takes less than 1 second.

SEF358X

OK or NG

OK	▶	GO TO 8.
NG	▶	Replace vacuum cut valve bypass valve.

8	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.	
▶	**INSPECTION END**



Description

NFEC1123

COMPONENT DESCRIPTION

NFEC1123S01

The vacuum cut valve and vacuum cut valve bypass valve are installed in parallel on the EVAP purge line between the fuel tank and the EVAP canister.

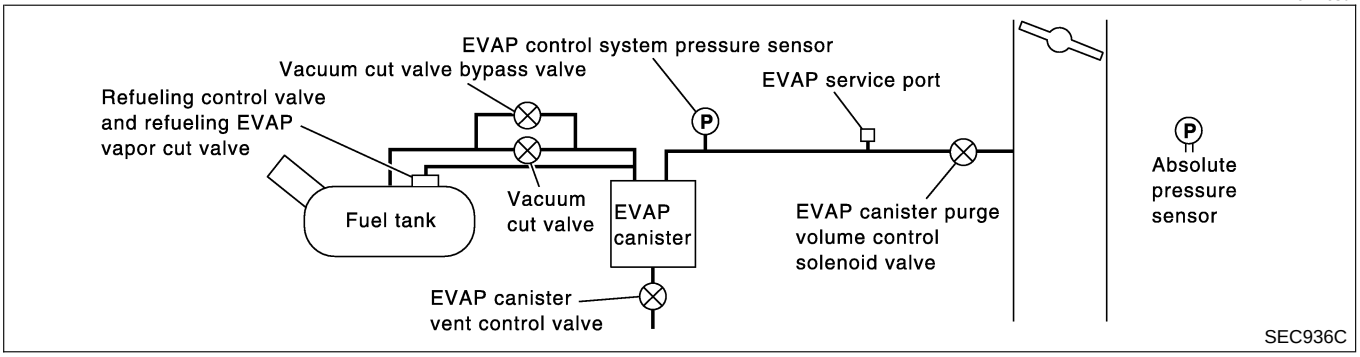
The vacuum cut valve prevents the intake manifold vacuum from being applied to the fuel tank.

The vacuum cut valve bypass valve is a solenoid type valve and generally remains closed. It opens only for on board diagnosis.

The vacuum cut valve bypass valve responds to signals from the ECM. When the ECM sends an ON (ground) signal, the valve is opened. The vacuum cut valve is then bypassed to apply intake manifold vacuum to the fuel tank.

EVAPORATIVE EMISSION SYSTEM DIAGRAM

NFEC1123S02



CONSULT-II Reference Value in Data Monitor Mode

NFEC1124

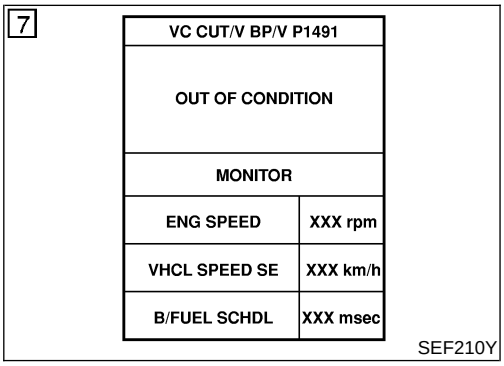
Specification data are reference values.

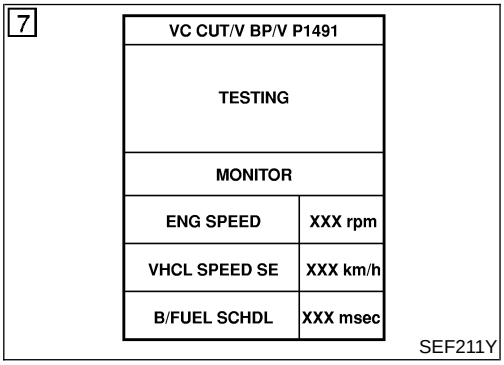
MONITOR ITEM	CONDITION	SPECIFICATION
VC/V BYPASS/V	• Ignition switch: ON	OFF

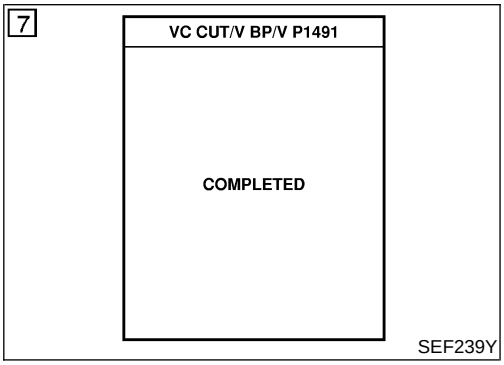
On Board Diagnosis Logic

NFEC1126

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P1491 1491	Vacuum cut valve bypass valve	Vacuum cut valve bypass valve does not operate properly.	• Vacuum cut valve bypass valve • Vacuum cut valve • Bypass hoses for clogging • EVAP control system pressure sensor and circuit • EVAP canister vent control valve • Hose between fuel tank and vacuum cut valve clogged • Hose between vacuum cut valve and EVAP canister clogged • EVAP canister • EVAP purge port of fuel tank for clogging







DTC Confirmation Procedure

NFEC1127

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:
For best results, perform test at a temperature of 5 to 30°C (41 to 86°F).

WITH CONSULT-II

NFEC1127S01

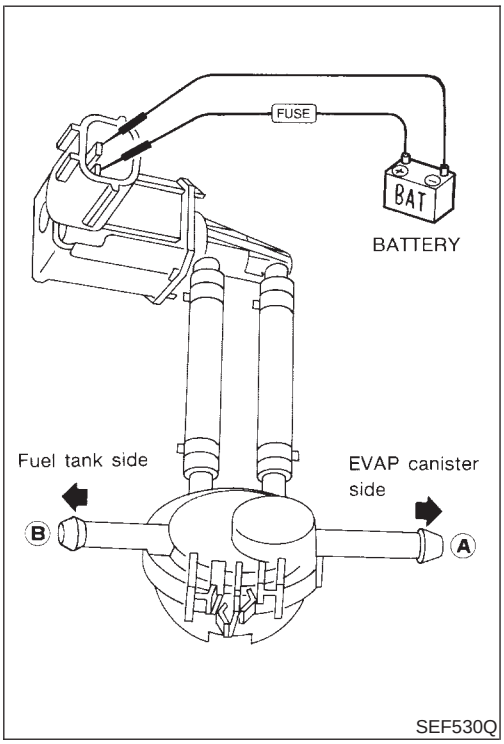
1) Turn ignition switch "ON".
2) Start engine and warm it up to normal operating temperature.
3) Turn ignition switch "OFF" and wait at least 10 seconds.
4) Start engine and let it idle for at least 70 seconds.
5) Select "VC CUT/V BP/V P1491" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II.
6) Touch "START".
7) 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 at least 30 seconds.)

ENG SPEED	Idle speed or more
Selector lever	Suitable position
Vehicle speed	35 - 120 km/h (22 - 75 MPH) or more
B/FUEL SCHDL	1.3 - 8.1 msec

If "TESTING" is not displayed after 5 minutes, retry from step 3.

8) Make sure that "OK" is displayed after touching "SELF-DIAG

RESULTS". If "NG" is displayed, refer to "Diagnostic Procedure", EC-632.



Overall Function Check

NFEC1128

Use this procedure to check the overall function of vacuum cut valve bypass valve. During this check, the 1st trip DTC might not be confirmed.

WITH GST

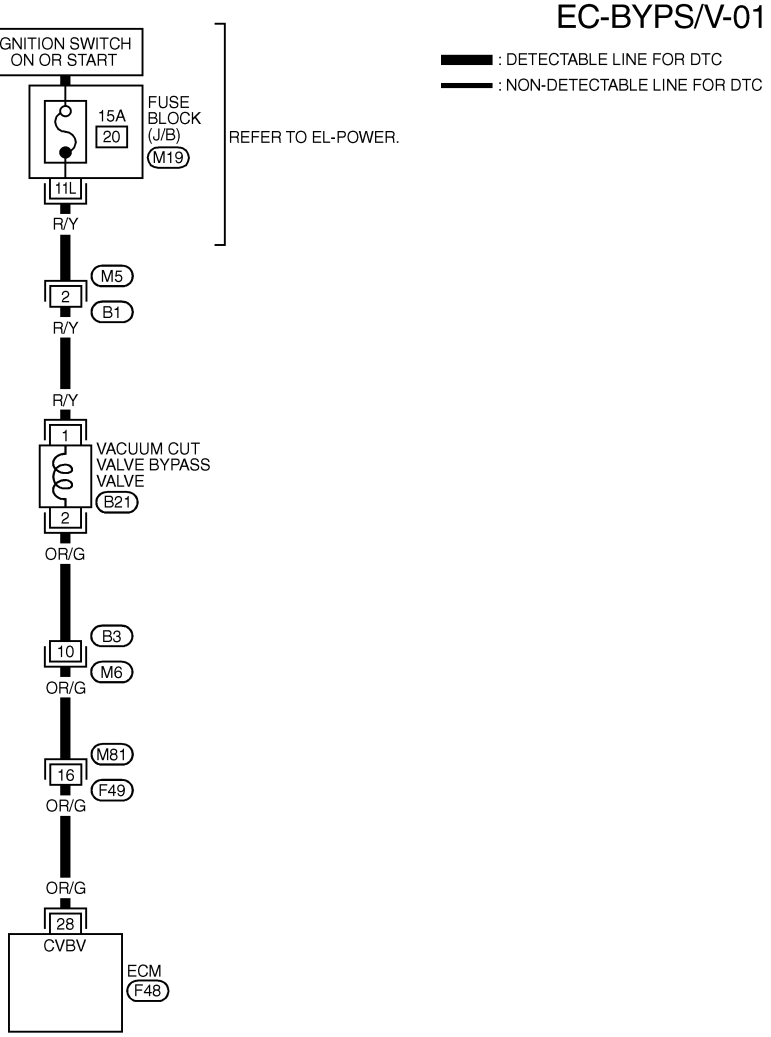
NFEC1128S01

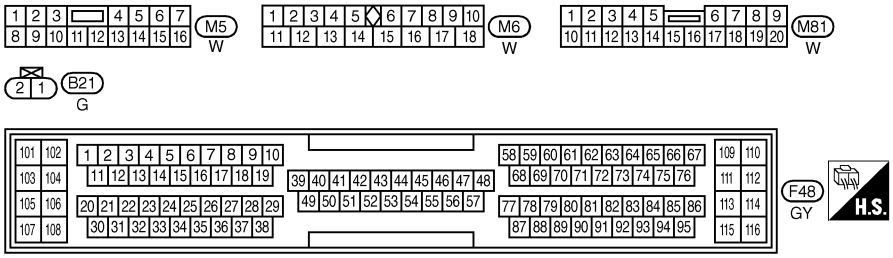
1) Remove vacuum cut valve and vacuum cut valve bypass valve as an assembly.
2) Apply vacuum to port **A** and check that there is no suction from port **B**.
3) Apply vacuum to port **B** and check that there is suction from port **A**.
4) Blow air in port **B** and check that there is a resistance to flow out of port **A**.
5) Supply battery voltage to the terminal.
6) Blow air in port **A** and check that air flows freely out of port **B**.
7) Blow air in port **B** and check that air flows freely out of port **A**.
8) If NG, go to "Diagnostic Procedure", EC-632.

Wiring Diagram

NFEC1129

EC-BYPS/V-01





REFER TO THE FOLLOWING.
M19 -FUSE BLOCK-
JUNCTION BOX (J/B)

MEC510D

ECM TERMINALS AND REFERENCE VALUE 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	WIRE COLOR	ITEM	CONDITION	DATA (DC)
28	OR/G	VACUUM CUT VALVE BYPASS VALVE	IGN ON	BATTERY VOLTAGE

SEF634XD

Diagnostic Procedure

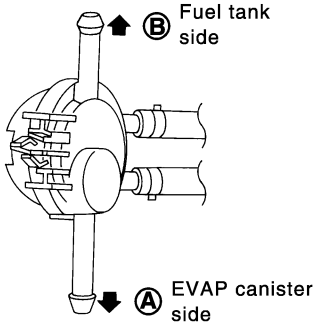
NFEC1130

1	INSPECTION START
Do you have CONSULT-II?	
Yes or No	
Yes ▶	GO TO 2.
No ▶	GO TO 3.

2	CHECK VACUUM CUT VALVE BYPASS VALVE OPERATION

With CONSULT-II

1. Turn ignition switch “OFF”.
2. Remove vacuum cut valve and vacuum cut valve bypass valve as an assembly.
3. Apply vacuum to port A and check that there is no suction from port B.
4. Apply vacuum to port B and check that there is suction from port A.
5. Blow air in port B and check that there is a resistance to flow out of port A.
6. Turn ignition switch “ON”.
7. Select “VC/V BYPASS/V” in “ACTIVE TEST” mode with CONSULT-II and touch “ON”.
8. Blow air in port A and check that air flows freely out of port B.
9. Blow air in port B and check that air flows freely out of port A.



ACTIVE TEST	
VC/V BYPASS/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %
HO2S1 MNTR (B1)	LEAN
HO2S1 MNTR (B2)	LEAN

SEC157D

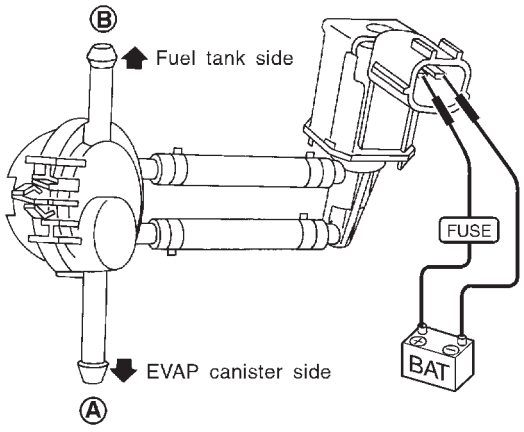
OK or NG

OK ▶	GO TO 4.
NG ▶	GO TO 5.

3	CHECK VACUUM CUT VALVE BYPASS VALVE OPERATION

Without CONSULT-II

1. Turn ignition switch "OFF".
2. Remove vacuum cut valve and vacuum cut valve bypass valve as an assembly.
3. Apply vacuum to port A and check that there is no suction from port B.
4. Apply vacuum to port B and check that there is suction from port A.
5. Blow air in port B and check that there is a resistance to flow out of port A.
6. Disconnect vacuum cut valve bypass valve harness connector.
7. Supply battery voltage to the terminal.
8. Blow air in port A and check that air flows freely out of port B.
9. Blow air in port B and check that air flows freely out of port A.



SEF914U

OK or NG

OK	▶	GO TO 4.
NG	▶	GO TO 7.

4	CHECK EVAP PURGE LINE

Check EVAP purge line between EVAP canister and fuel tank for clogging or disconnection.

OK or NG

OK	▶	GO TO 5.
NG	▶	Repair it.

5	CHECK EVAP PURGE PORT

Check EVAP purge port of fuel tank for clogging.

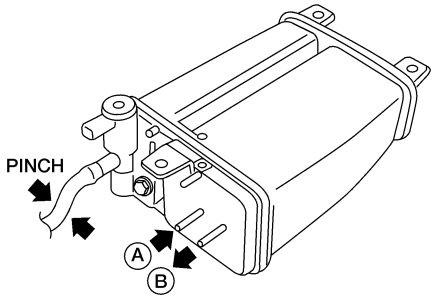
OK or NG

OK	▶	GO TO 6.
NG	▶	Clean EVAP purge port.

Diagnostic Procedure (Cont'd)

6	CHECK EVAP CANISTER

1. Pinch the fresh air hose.
2. Blow air into port **A** and check that it flows freely out of port **B**.



AEC630A

OK or NG

OK	▶	GO TO 12.
NG	▶	Replace EVAP canister.

7	CHECK BYPASS HOSE

Check bypass hoses for clogging.

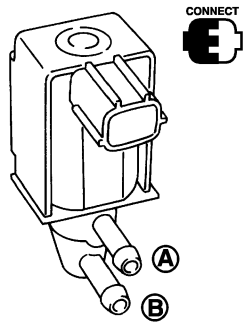
OK or NG

OK	▶	GO TO 8.
NG	▶	Repair or replace hoses.

8	CHECK VACUUM CUT VALVE BYPASS VALVE

With CONSULT-II

1. Perform "VC/V BYPASS/V" in "ACTIVE TEST" mode.
2. Check air passage continuity and operation delay time under the following conditions.



ACTIVE TEST	
VC/V BYPASS/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %
HO2S1 MNTR (B1)	LEAN
HO2S1 MNTR (B2)	LEAN

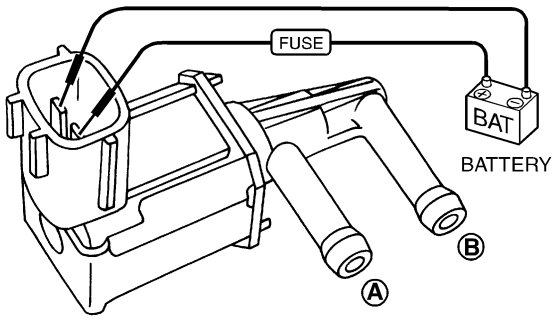
Condition VC/V BYPASS/V	Air passage continuity between A and B
ON	Yes
OFF	No

Operation takes less than 1 second.

SEC156D

Without CONSULT-II

Check air passage continuity and operation delay time 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

Operation takes less than 1 second.

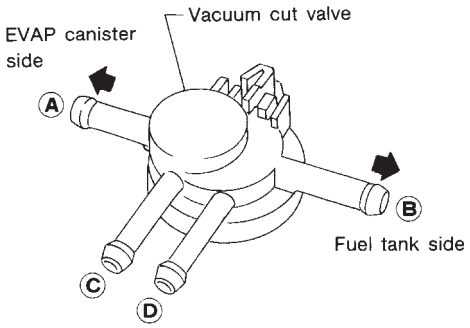
SEF358X

OK or NG

OK	▶	GO TO 9.
NG	▶	Replace vacuum cut valve bypass valve.

9	CHECK VACUUM CUT VALVE

Check vacuum cut valve as follows:



SEF379Q

a. Plug port **C** and **D** with fingers.
b. Apply vacuum to port **A** and check that there is no suction from port **B**.
c. Apply vacuum to port **B** and check that there is suction from port **A**.
d. Blow air in port **B** and check that there is a resistance to flow out of port **A**.
e. Open port **C** and **D**.
f. Blow air in port **A** check that air flows freely out of port **C**.
g. Blow air in port **B** check that air flows freely out of port **D**.

OK or NG

OK	▶	GO TO 10.
NG	▶	Replace vacuum cut valve.

10	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE

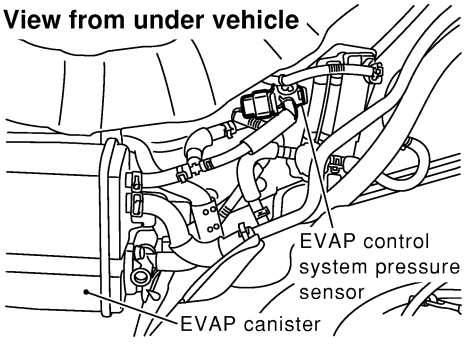
1. Turn ignition switch "OFF".
2. Check disconnection or improper connection of hose connected to EVAP control system pressure sensor.

OK or NG

OK	▶	GO TO 11.
NG	▶	Repair or replace.

11	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.



SEF268X

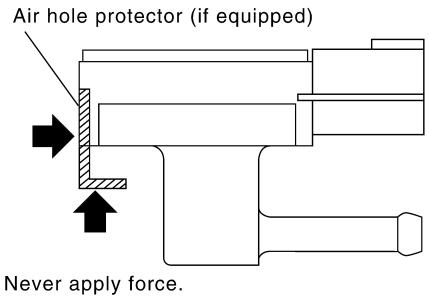
2. Check connectors for water.
   Water should not exist.

OK or NG

OK	▶	GO TO 12.
NG	▶	Replace EVAP control system pressure sensor.

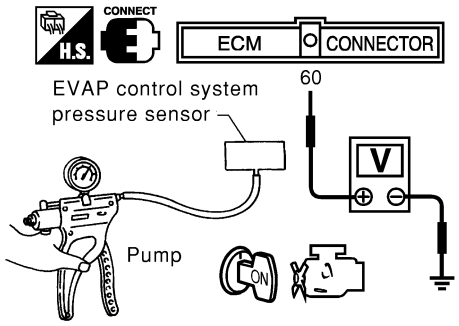
12	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Remove EVAP control system pressure sensor with its harness connector connected.
   CAUTION:
   Never apply force to the air hole protector of the sensor if equipped.



SEF799W

2. Remove hose from EVAP control system pressure sensor.
3. Turn ignition switch "ON".
4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.
   CAUTION:
   - **Always calibrate the vacuum pump gauge when using it.**
   - **Do not apply below −20 kPa (−150 mmHg, −5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure.**
5. Check input voltage between ECM terminal 84 and ground.



SEC908C

Pressure (Relative to atmospheric pressure)	Voltage V
0 kPa (0 mmHg, 0 inHg)	3.0 - 3.6
-9.3 kPa (-70 mmHg, -2.76 inHg)	0.4 - 0.6

MTBL1159

CAUTION:
Discard and EVAP control system pressure 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.

OK or NG

OK	▶	GO TO 13.
NG	▶	Replace EVAP control system pressure sensor.

13	CHECK RUBBER TUBE FOR CLOGGING

1. Disconnect rubber tube connected to EVAP canister vent control valve.
2. Check the rubber tube for clogging.

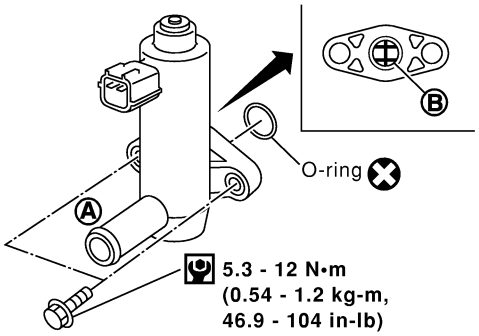
OK or NG

OK	▶	GO TO 14.
NG	▶	Clean the rubber tube using an air blower.

Diagnostic Procedure (Cont'd)

14	CHECK EVAP CANISTER VENT CONTROL VALVE-I

1. Remove EVAP canister vent control valve from EVAP canister.
2. Check portion **B** of EVAP canister vent control valve for being rusted.



SEF376Z

OK or NG

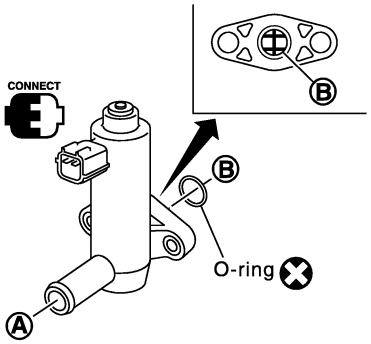
OK	▶	GO TO 15.
NG	▶	Replace EVAP canister vent control valve.

15	CHECK EVAP CANISTER VENT CONTROL VALVE-II

With CONSULT-II

1. Reconnect harness disconnected connectors.
2. Turn ignition switch ON.
3. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
4. Check air passage continuity and operation delay time.

ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %
HO2S1 MNTR (B1)	LEAN
HO2S1 MNTR (B2)	LEAN



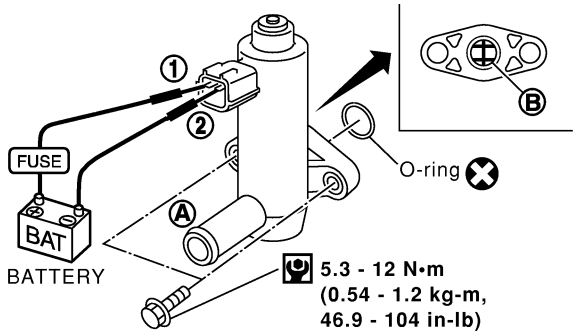
Condition VENT CONTROL/V	Air passage continuity between A and B
ON	No
OFF	Yes

Operation takes less than 1 second.

SEC158D

Without CONSULT-II

Check air passage continuity and operation delay time under the following conditions.



Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	No
OFF	Yes

Operation takes less than 1 second.

SEF378Z

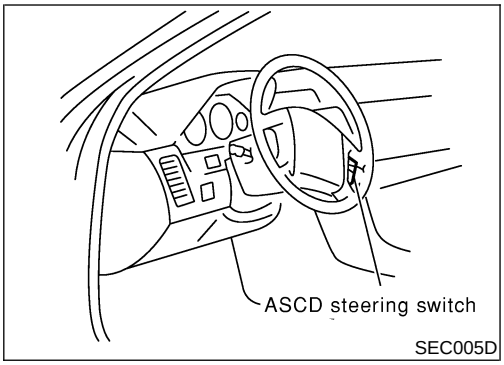
Make sure new O-ring is installed properly.

OK or NG

OK	▶	GO TO 17.
NG	▶	GO TO 16.

16	CHECK EVAP CANISTER VENT CONTROL VALVE-III	
1. Clean the air passage (Portion **A** to **B**) of EVAP canister vent control valve using an air blower. 2. Perform the Test No. 15 again.		
OK or NG		
OK	▶	GO TO 17.
NG	▶	Replace EVAP canister vent control valve.

17	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.	
▶	**INSPECTION END**



Component Description

NFEC1208

ASCD steering switch has variant values of electrical resistance for each button. ECM reads voltage variation of switch, and determines which button is operated.
Refer to EC-53 for the ASCD function.

CONSULT-II Reference Value in Data Monitor Mode

NFEC1209

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
MAIN SW	• Ignition switch: ON	• CRUISE switch pressed	ON
		• CRUISE switch released	OFF
CANCEL SW	• Ignition switch: ON	• CANCEL switch pressed	ON
		• CANCEL switch released	OFF
RESUME/ACC SW	• Ignition switch: ON	• ACCEL RES switch pressed	ON
		• ACCEL RES switch released	OFF
SET SW	• Ignition switch: ON	• COAST/SET switch pressed	ON
		• COAST/SET switch released	OFF

On Board Diagnosis Procedure

NFEC1462

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible cause
P1564 1564	ASCD steering switch	• An excessively high voltage signal from the ASCD steering switch is sent to ECM. • ECM detects that input signal from the ASCD steering switch is out of the specified range. • ECM detects that the ASCD steering switch is stuck ON.	• Harness or connectors (The ASCD steering switch circuit is open or shorted.) • ASCD steering switch • ECM

DTC Confirmation Procedure

NFEC1463

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 10 seconds.
4. Press “CRUISE” switch for at least 10 seconds, then release

it and wait at least 10 seconds.

5. Press "ACCEL/RES" switch for at least 10 seconds, then release it and wait at least 10 seconds.
6. Press "COAST/SET" switch for at least 10 seconds, then release it and wait at least 10 seconds.
7. Press "CANCEL" switch for at least 10 seconds, then release it and wait at least 10 seconds.
8. If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-644.

With GST

Follow the procedure "With CONSULT-II" above.

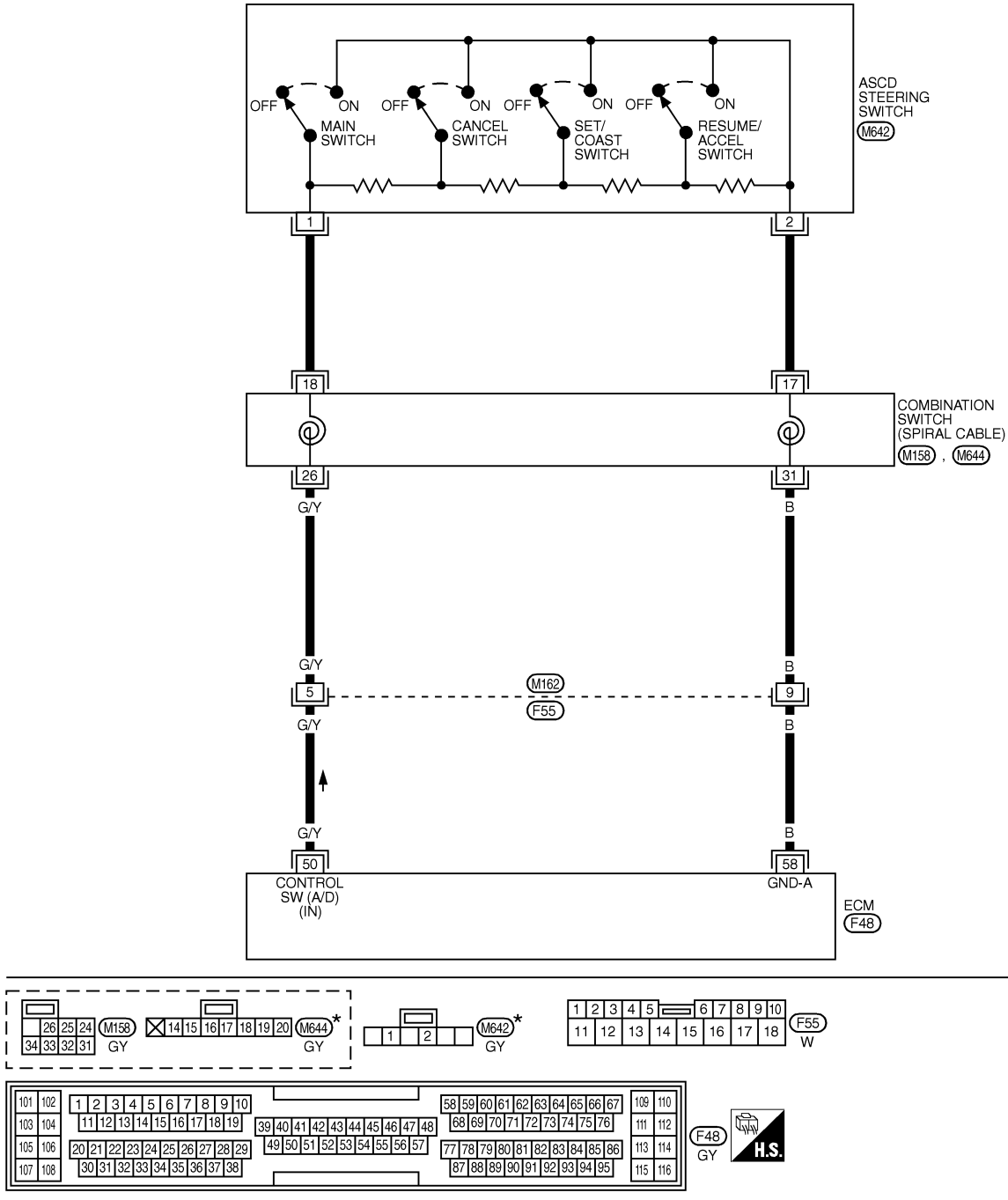
Wiring Diagram

NFEC1464

EC-ASC/SW-01

: DETECTABLE LINE FOR DTC

: NON-DETECTABLE LINE FOR DTC



★: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", EL SECTION.

MEC924D

Wiring Diagram (Cont'd)

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)
50	G/Y	ASCD steering switch	**[Ignition switch "ON"]** ● ASCD steering switch is "OFF".	Approximately 4.0V
			[Ignition switch "ON"] ● CRUISE switch is "ON".	Approximately 0V
			[Ignition switch "ON"] ● CANCEL switch is "ON".	Approximately 1V
			[Ignition switch "ON"] ● COAST/SET switch is "ON".	Approximately 2V
			[Ignition switch "ON"] ● ACCEL/RES switch is "ON".	Approximately 3V
58	B	Sensors' ground	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V

Diagnostic Procedure

NFEC1465

1 **CHECK ASCD STEERING SWITCH CIRCUIT**

With CONSULT-II

1. Turn ignition switch “ON”.
2. Select “MAIN SW”, “RESUME/ACC SW”, “SET SW” and “CANCEL SW” in “DATA MONITOR” mode with CONSULT-II.

DATA MONITOR	
MONITOR	NO DTC
MAIN SW	OFF
CANCEL SW	OFF
RESUME/ACC SW	OFF
SET SW	OFF

SEC006D

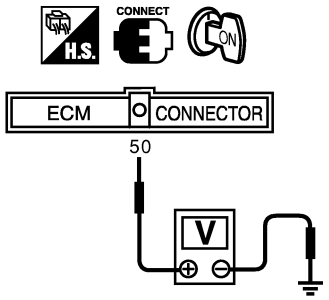
3. Check each item indication under the following conditions.

Switch	Monitor item	Condition	Indication
CRUISE	MAIN SW	Pressed	ON
		Released	OFF
COAST/SET	SET SW	Pressed	ON
		Released	OFF
ACCEL/RES	RESUME/ACC SW	Pressed	ON
		Released	OFF
CANCEL	CANCEL SW	Pressed	ON
		Released	OFF

MTBL1193

Without CONSULT-II

1. Turn ignition switch “ON”.
2. Check voltage between ECM terminal 50 and ground with pressing each button.



SEC007D

Switch	Condition	Voltage [V]
CRUISE SW	Pressed	Approx. 0.5
	Released	Approx. 4.0
COAST/SET SW	Pressed	Approx. 2.0
	Released	Approx. 4.0
ACCEL/RES SW	Pressed	Approx. 3.0
	Released	Approx. 4.0
CANCEL SW	Pressed	Approx. 1.0
	Released	Approx. 4.0

MTBL1133

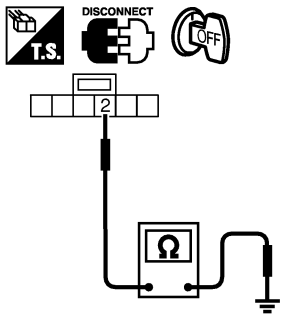
Refer to Wiring Diagram.

OK or NG

OK	▶	GO TO 4.
NG	▶	GO TO 2.

2	CHECK ASCD STEERING SWITCH GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect ASCD steering harness connector.
3. Check harness continuity between switch terminal 2 and ground. Refer to Wiring Diagram.



SEC198D

Continuity should exist.

4. Also check harness for short to power.

OK or NG

OK	▶	GO TO 4.
NG	▶	GO TO 3.

3	DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors M162, F55
- Combination switch (spiral cable)
- Harness for open and short between ECM and ASCD steering switch

	▶	Repair open circuit or short to power in harness or connectors.

4	CHECK ASCD STEERING SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 50 and ASCD steering switch 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 6.
NG	▶	GO TO 5.

5	DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors M162, F55
- Combination switch (spiral cable)
- Harness for open and short between ECM and ASCD steering switch

	▶	Repair open circuit or short to ground or short to power in harness or connectors.

6	CHECK ASCD STEERING SWITCH

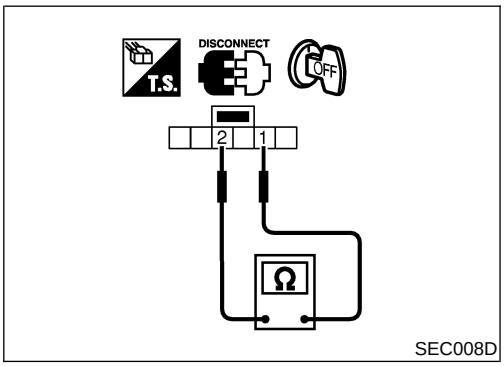
Refer to "Component Inspection", EC-646.

OK or NG

OK	▶	GO TO 7.
NG	▶	Replace ASCD steering switch.

Diagnostic Procedure (Cont'd)

7	**CHECK INTERMITTENT INCIDENT**
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.	
▶	**INSPECTION END**



SEC008D

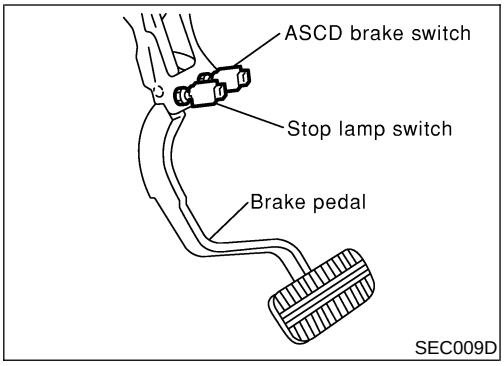
Component Inspection

NFEC1215

ASCD STEERING SWITCH

1. Disconnect ASCD steering switch.
2. Check continuity between terminals 1 and 2 by pushing each switch.

Switch	Condition	Resistance [Ω]
CRUISE SW	Pressed	Approx. 0
	Released	Approx. 4,000
COAST/SET SW	Pressed	Approx. 660
	Released	Approx. 4,000
ACCEL/RES SW	Pressed	Approx. 1,480
	Released	Approx. 4,000
CANCEL SW	Pressed	Approx. 250
	Released	Approx. 4,000



Component Description

NFEC1466

NOTE:

- **If DTC P1572 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to EC-455.**
- **If DTC P1572 is displayed with DTC P1706, first perform the trouble diagnosis for DTC P1706. Refer to EC-667.**
- **If DTC P1572 is displayed with DTC P1805, first perform the trouble diagnosis for DTC P1805. Refer to EC-678.**

When the brake pedal is depressed, ASCD brake switch is turned OFF and stop lamp switch is turned ON.
ECM detects the state of the brake pedal by this input of two kinds (ON/OFF signal).
Refer to EC-53 for the ASCD function.

CONSULT-II Reference Value in Data Monitor Mode

NFEC1217

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
BRAKE SW 1 (ASCD brake switch)	• Ignition switch: ON • Shift lever: Except “N” and “P” position (AT models)	• Brake pedal fully released	ON
		• Brake pedal depressed	OFF
BRAKE SW 2 (Stop lamp switch)	• Ignition switch: ON	• Brake pedal fully released	OFF
		• Brake pedal depressed	ON

On Board Diagnosis Procedure

NFEC1467

DTC	Trouble diagnosis name	DTC Detecting Condition	Possible cause
P1572 1572	ASCD brake switch	When the vehicle speed is above 30 km/h (19 MPH), ON signal from the stop lamp switch and ASCD brake switch are sent to the ECM at the same time.	• Harness or connectors (The stop lamp switch circuit is open or shorted.) • Harness or connectors (The ASCD brake switch circuit is open or shorted.) • ASCD brake switch • Stop lamp switch • Harness or connectors (The ASCD brake switch or stop lamp switch circuit is open or shorted.) • Incorrect stop lamp switch installation • Incorrect ASCD brake switch installation • ECM

DTC Confirmation Procedure

NFEC1468

CAUTION:

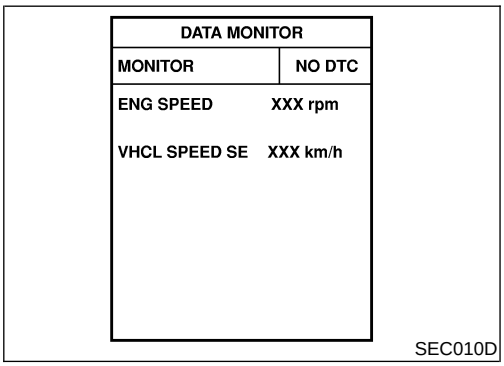
Always drive vehicle at a safe speed.

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 3 and 4 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 (TCS switch “OFF”).
2) Select “DATA MONITOR” mode with CONSULT-II.
3) Drive the vehicle for at least 5 consecutive seconds under the following condition.

VHCL SPEED SE	More than 30 km/h (19 MPH)
Selector lever	Suitable position

If 1st trip DTC is detected, go to “Diagnostic Procedure”, EC-651.
If 1st rip DTC is not detected, go to the following step.

4) Drive the vehicle for at least 5 consecutive seconds under the following condition.

VHCL SPEED SE	More than 30 km/h (19 MPH)
Selector lever	Suitable position
Driving location	Depress the brake pedal for more than five seconds so as not to come off from the above-mentioned condition.

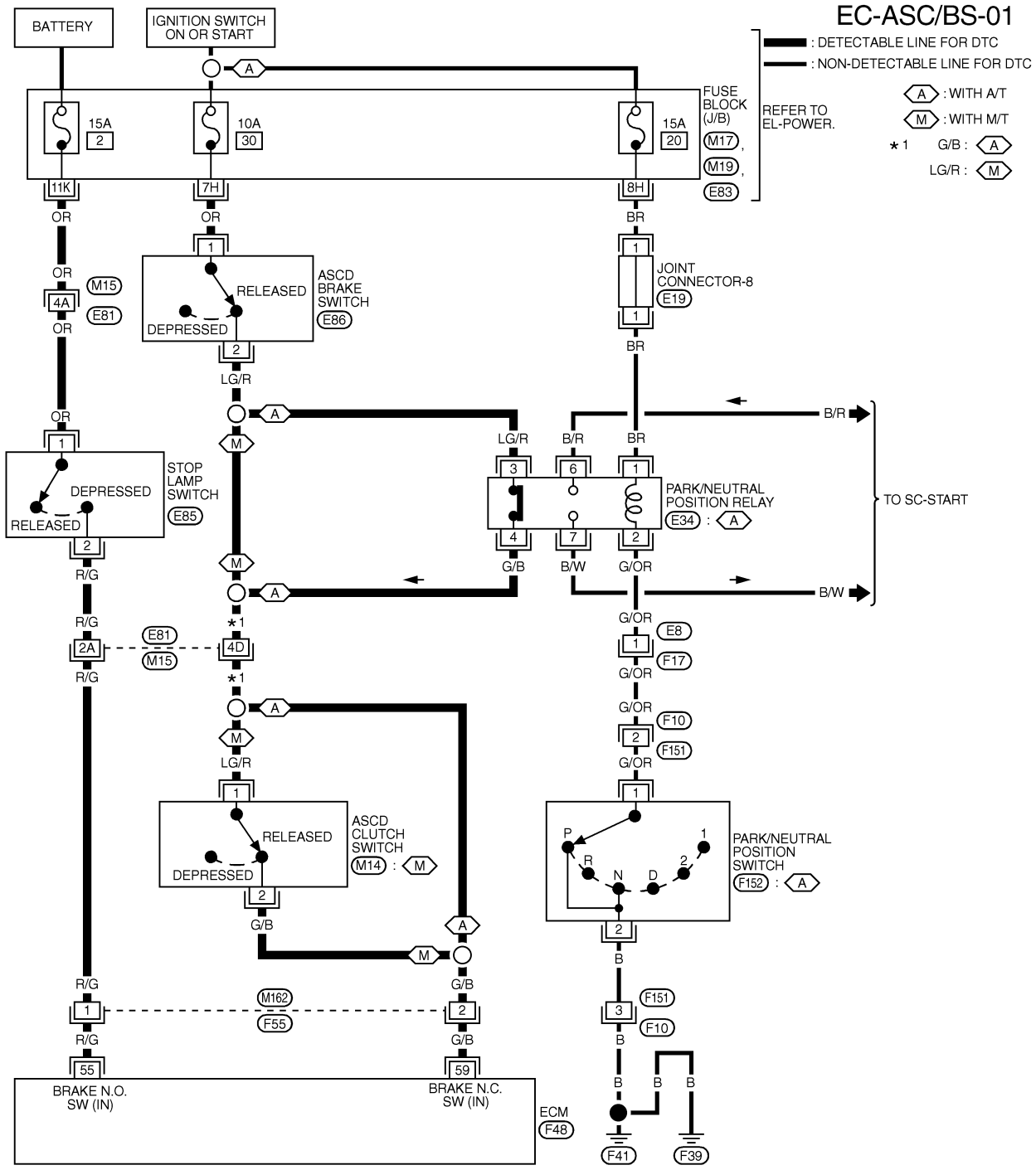
5) If 1st trip DTC is detected, go to “Diagnostic Procedure”, EC-651.

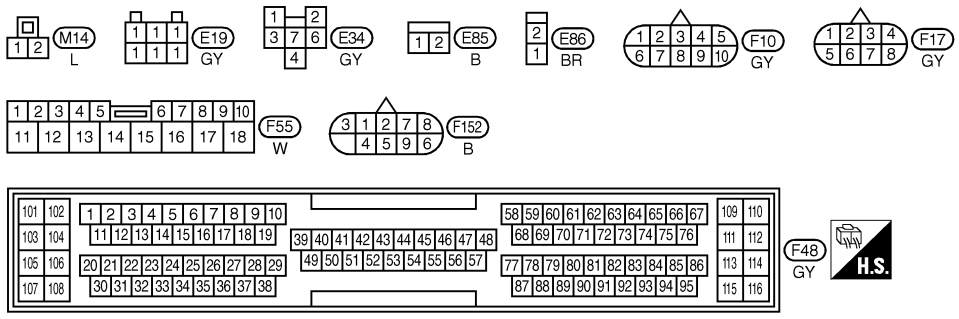
With GST

Follow the procedure “With CONSULT-II” above.

Wiring Diagram

NFEC1221





REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)
M17 , M19 , E83
-FUSE BLOCK- JUNCTION BOX (J/B)

MEC693D

Wiring Diagram (Cont'd)

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)
55	R/G	Stop lamp switch	**[Ignition switch "ON"]** ● Brake pedal is fully released	Approximately 0V
			[Ignition switch "ON"] ● Brake pedal is depressed	BATTERY VOLTAGE (11 - 14V)
59	G/B	ASCD brake switch	**[Ignition switch "ON"]** ● Brake pedal is fully released ● Clutch pedal is fully released (M/T models)	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch "ON"] ● Brake pedal is depressed ● Clutch pedal is fully depressed (M/T models)	Approximately 0V

Diagnostic Procedure

NFEC1222

1	CHECK OVERALL FUNCTION-I

With CONSULT-II

1. Turn ignition switch “ON”.
2. Select “BRAKE SW1” in “DATA MONITOR” mode with CONSULT-II.
3. Check the indication of “BRAKE SW1” under the following conditions.

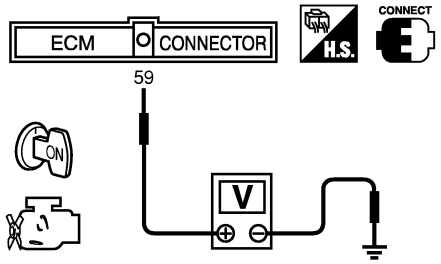
DATA MONITOR	
MONITOR	NO DTC
BRAKE SW1	OFF

SEC011D

A/T models
When brake pedal is depressed or A/T selector lever is in “N” or “P” range:
BRAKE SW1 OFF
When brake pedal is released and A/T selector lever is not “N” or “P” range:
BRAKE SW1 ON
M/T models
When clutch pedal or brake pedal is depressed:
BRAKE SW1 OFF
When clutch pedal and brake pedal are released:
BRAKE SW1 ON

Without CONSULT-II

1. Turn ignition switch “ON”.
2. Check voltage between ECM terminal 59 and ground under the following conditions.



SEC012D

When brake or clutch pedal is depressed (M/T), or when brake pedal is depressed or A/T selector lever is in “N” or “P” range (A/T):
Approx. 0V
When brake and clutch pedal are released (M/T), or when both brake pedal is released and A/T selector lever is not in “N” or “P” range (A/T):
Battery voltage should exist.

Refer to Wiring Diagram.

OK or NG

OK	▶	GO TO 2.
NG	▶	A/T MODELS: GO TO 3.
NG	▶	M/T MODELS: GO TO 19.

Diagnostic Procedure (Cont'd)

2	CHECK OVERALL FUNCTION-II

With CONSULT-II

See "BRAKE SW2" indication in "DATA MONITOR" mode.

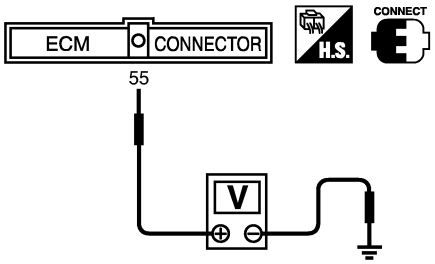
DATA MONITOR	
MONITOR	NO DTC
BRAKE SW2	OFF

SEC013D

When brake pedal is released:
BRAKE SW2 OFF
When brake pedal is depressed:
BRAKE SW2 ON

Without CONSULT-II

Check voltage between ECM terminal 55 and ground under the following conditions.



SEC014D

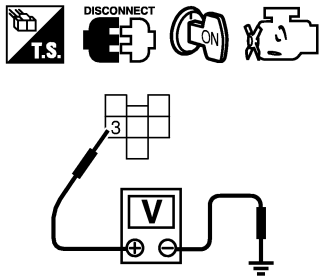
When brake pedal is released:
Approx. 0V
When brake pedal is depressed:
Battery voltage should exist.
Refer to Wiring Diagram.

OK or NG

OK	▶	GO TO 33.
NG	▶	GO TO 28.

3	CHECK ASCD BRAKE SWITCH CIRCUIT-I

1. Turn ignition switch "OFF".
2. Disconnect park/neutral position relay harness connector.
3. Turn ignition switch "ON".
4. Check voltage between park/neutral position relay terminal 3 and ground under the following conditions.



SEC209D

CONDITION	VOLTAGE
When brake pedal is released	Battery voltage
When brake pedal is depressed	Approx. 0V

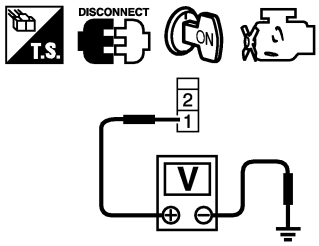
MTBL1259

OK or NG

OK	▶	GO TO 8.
NG	▶	GO TO 4.

4	CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect ASCD brake switch harness connector.
3. Turn ignition switch "ON".
4. Check voltage between ASCD brake switch terminal 1 and ground with CONSULT-II or tester.



PBIB0857E

Voltage: Battery voltage

OK or NG

OK	▶	GO TO 6.
NG	▶	GO TO 5.

5	DETECT MALFUNCTIONING PART

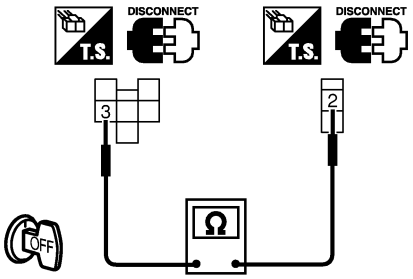
Check the following.
- Fuse block (J/B) connector E83
- 10A fuse
- Harness for open or short between ASCD brake switch and fuse

	▶	Repair open circuit or short to ground or short to power in harness or connectors.

Diagnostic Procedure (Cont'd)

6	CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check continuity between ASCD brake switch terminal 2 and park/neutral position relay terminal 3.



SEC213D

Continuity should exist.

3. 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 ASCD BRAKE SWITCH

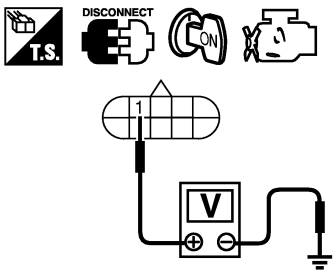
Refer to "Component Inspection", EC-661.

OK or NG

OK	▶	GO TO 8.
NG	▶	Replace ASCD brake switch.

8	CHECK PARK/NEUTRAL POSITION (PNP) RELAY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect park/neutral position switch harness connector.
3. Turn ignition switch "ON".
4. Check voltage between park/neutral position (PNP) switch terminal 1 and ground with CONSULT-II or tester.



SEC214D

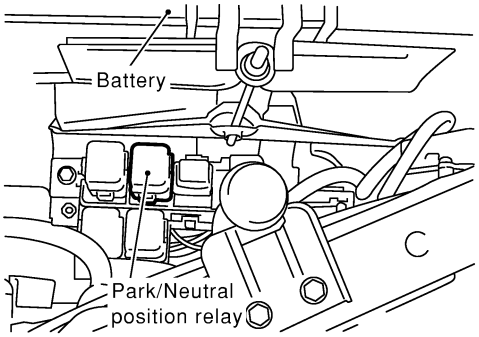
Voltage: Battery voltage

OK or NG

OK	▶	GO TO 13.
NG	▶	GO TO 9.

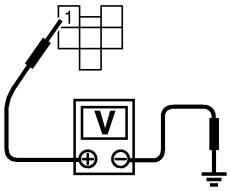
9	CHECK PARK/NEUTRAL POSITION (PNP) RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect park/neutral position (PNP) relay.



SEC018D

3. Turn ignition switch "ON".
4. Check voltage between park/neutral position (PNP) relay terminal 1 and ground with CONSULT-II or tester.



SEC019D

Voltage: Battery voltage

OK or NG

OK	▶	GO TO 11.
NG	▶	GO TO 10.

10	DETECT MALFUNCTIONING PART

Check the following.
- Fuse block (J/B) connector E83
- 15A fuse
- Joint connector-8
- Harness for open or short between park/neutral position (PNP) relay and fuse

	▶	Repair open circuit or short to ground in harness or connectors.

11	CHECK PARK/NEUTRAL POSITION RELAY CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check continuity between park/neutral position (PNP) relay terminal 2 and park/neutral position switch 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 13.
NG	▶	GO TO 12.

Diagnostic Procedure (Cont'd)

12	DETECT MALFUNCTIONING PART
Check the following. ● Harness connectors E8, F17 ● Harness connectors F10, F151 ● Harness for open or short between park/neutral position relay and park/neutral position switch	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

13	CHECK PARK/NEUTRAL POSITION RELAY
Refer to "Component Inspection", EC-661.	
OK or NG	
OK ▶	GO TO 28.
NG ▶	Replace park/neutral position relay.

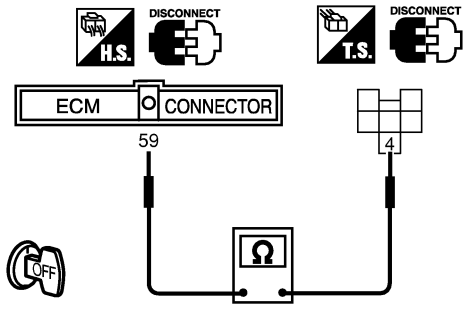
14	CHECK PARK/NEUTRAL POSITION (PNP) SWITCH GROUND CIRCUIT
1. Turn ignition switch "OFF". 2. Disconnect park/neutral position switch harness connector. 3. Check continuity between park/neutral position (PNP) switch terminal 2 and ground. **Continuity should exist.** 4. Also check harness for short to ground and short to power.	
OK or NG	
OK ▶	GO TO 16.
NG ▶	GO TO 15.

15	DETECT MALFUNCTIONING PART
Check the following. ● Harness connectors F10, F151 ● Harness for open or short between park/neutral position (PNP) switch and ground	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

16	CHECK PARK/NEUTRAL POSITION SWITCH
Refer to "Component Inspection", EC-661.	
OK or NG	
OK ▶	GO TO 17.
NG ▶	Replace park/neutral position switch.

17	CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector and park/neutral position (PNP) relay harness connector.
3. Check harness continuity between park/neutral position (PNP) relay terminal 4 and ECM terminal 59.



SEC215D

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK	▶	GO TO 28.
NG	▶	GO TO 18.

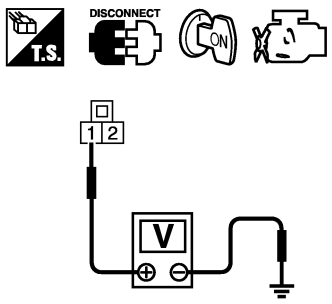
18	DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E81, M15
- Harness connectors M162, F55
- Harness for open or short between park/neutral position (PNP) relay and ECM

	▶	Repair open circuit or short to ground or short to power in harness or connectors.

19	CHECK ASCD BRAKE SWITCH CIRCUIT-II

1. Turn ignition switch "OFF".
2. Disconnect ASCD clutch switch harness connector.
3. Turn ignition switch "ON".
4. Check voltage between ASCD clutch switch terminal 1 and ground under the following conditions.



PBIB0799E

CONDITION	VOLTAGE
When brake pedal is released	Battery voltage
When brake pedal is depressed	Approx. 0V

MTBL1303

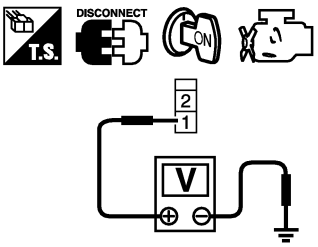
OK or NG

OK	▶	GO TO 25.
NG	▶	GO TO 20.

Diagnostic Procedure (Cont'd)

20	CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect ASCD brake switch harness connector.
3. Turn ignition switch "ON".
4. Check voltage between ASCD brake switch terminal 1 and ground with CONSULT-II or tester.



PBIB0857E

Voltage: Battery voltage

OK or NG

OK	▶	GO TO 22.
NG	▶	GO TO 21.

21	DETECT MALFUNCTIONING PART

Check the following.
- Fuse block (J/B) connector E83
- 10A fuse
- Harness for open or short between ASCD brake switch and fuse

	▶	Repair open circuit or short to ground or short to power in harness or connectors.

22	CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect ASCD clutch switch harness connector.
3. Check continuity between ASCD brake switch terminal 2 and ASCD clutch switch 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 24.
NG	▶	GO TO 23.

23	DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E81, M15
- Harness for open or short between ASCD brake switch and ASCD clutch switch

	▶	Repair open circuit or short to ground or short to power in harness or connectors.

24	CHECK ASCD BRAKE SWITCH

Refer to "Component Inspection", EC-661.

OK or NG

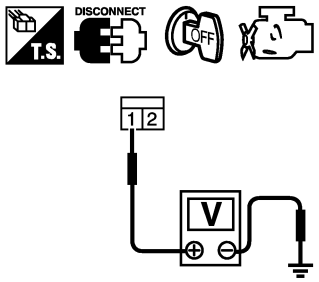
OK	▶	GO TO 25.
NG	▶	Replace ASCD brake switch.

25	CHECK ASCD CLUTCH SWITCH CIRCUIT FOR OPEN AND SHORT
1. Turn ignition switch "OFF". 2. Check continuity between ASCD clutch switch terminal 2 and ECM terminal 59. **Continuity should exist.** 3. Also check harness for short to ground and short to power.	
OK or NG	
OK ▶	GO TO 27.
NG ▶	GO TO 26.

26	DETECT MALFUNCTIONING PART
Check the following. ● Harness connectors M162, F55 ● Harness for open or short between ASCD clutch switch and ECM	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

27	CHECK ASCD CLUTCH SWITCH
Refer to "Component Inspection", EC-661.	
OK or NG	
OK ▶	GO TO 28.
NG ▶	Replace ASCD clutch switch.

28	CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT
1. Turn ignition switch "OFF". 2. Disconnect stop lamp switch harness connector. 3. Check voltage between stop lamp switch terminal 1 and ground with CONSULT-II or tester.	



PBIB0117E

Voltage: Battery voltage

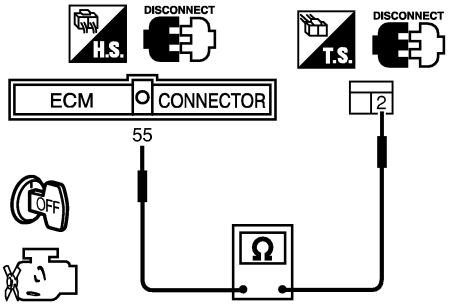
OK or NG	
OK ▶	GO TO 30.
NG ▶	GO TO 29.

29	DETECT MALFUNCTIONING PART
Check the following. ● Fuse block (J/B) connector M17 ● 15A fuse ● Harness connectors M15, E81 ● Harness for open or short between stop lamp switch and fuse	
▶	Repair open circuit or short to ground in harness or connectors.

Diagnostic Procedure (Cont'd)

30	CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between stop lamp switch terminal 2 and ECM terminal 55.



SEC216D

Continuity should exist

3. Also check harness for short to ground and short to power.

OK or NG

OK	▶	GO TO 32.
NG	▶	GO TO 31.

31	DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors M15, E81
- Harness connectors M162, F55
- Harness for open or short between stop lamp switch and ECM

	▶	Repair open circuit or short to ground or short to power in harness or connectors.

32	CHECK STOP LAMP SWITCH

Refer to "Component Inspection", EC-661.

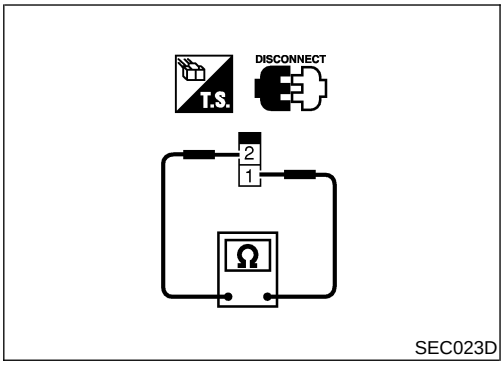
OK or NG

OK	▶	GO TO 33.
NG	▶	Replace stop lamp switch.

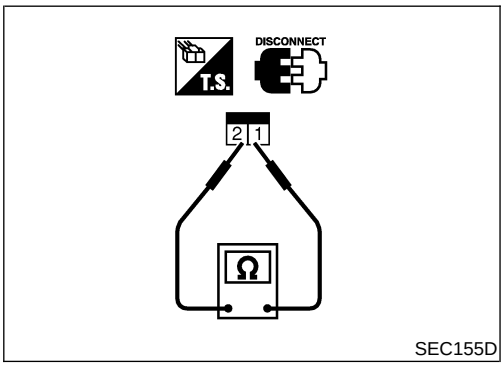
33	CHECK INTERMITTENT INCIDENT

Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.

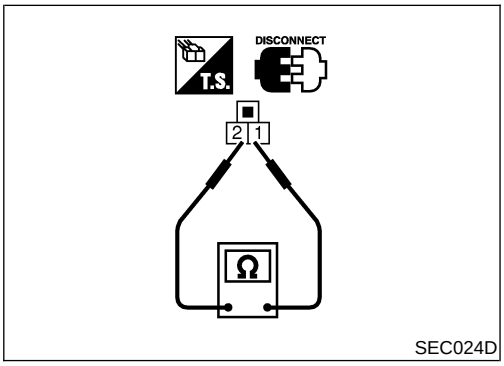
	▶	**INSPECTION END**



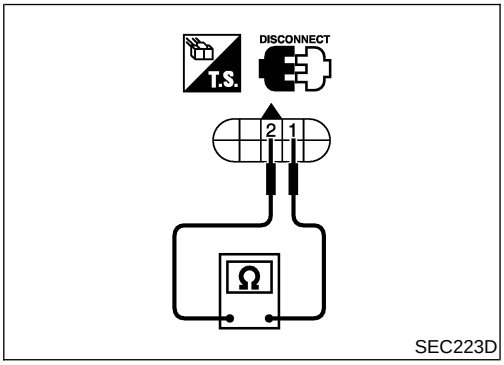
SEC023D



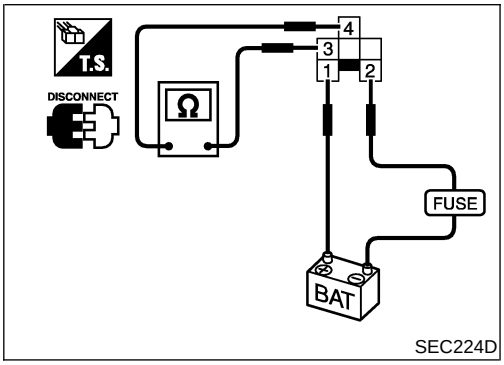
SEC155D



SEC024D



SEC223D



SEC224D

Component Inspection

NFEC1223

ASCD BRAKE SWITCH AND STOP LAMP SWITCH

Condition	Continuity	
	ASCD brake switch	Stop lamp switch
When brake pedal is depressed	No	Yes
When brake pedal is released	Yes	No

Check each switch after adjusting brake pedal — refer to BR section.

ASCD CLUTCH SWITCH (FOR M/T MODELS)

Condition	Continuity
When clutch pedal is depressed	No
When clutch pedal is released	Yes

PARK/NEUTRAL POSITION (PNP) SWITCH (FOR A/T MODELS)

A/T selector lever position	Continuity
	Between terminals 1 and 2
“P”	Yes
“N”	Yes
Except “P” and “N”	No

PARK/NEUTRAL POSITION (PNP) RELAY (FOR A/T MODELS)

1. Apply 12V direct current between park/neutral position (PNP) relay terminals 1 and 2.
2. Check continuity between park/neutral position (PNP) relay Terminals 3 and 4.

Condition	Continuity
12V direct current supply between terminals 1 and 2	No
OFF	Yes

Component Description

NFEC1469

NOTE:

- **If DTC P1574 is displayed with DTC U1000, U1001, first perform the trouble diagnosis for DTC U1000, U1001, refer to EC-164.**
- **If DTC P1574 is displayed with DTC P0500, first perform the trouble diagnosis for DTC P0500. Refer to EC-442.**
- **If DTC P1574 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to EC-455.**

ECM receives vehicle speed signals via two different lines, and detects vehicle speed for ASCD control.
Vehicle speed signals are input from combination meter and TCM separately.
Signal from TCM is sent via CAN communication line.
Refer to EC-53 for ASCD functions.

On Board Diagnosis Procedure

NFEC1470

DTC	Trouble diagnosis name	DTC Detecting Condition	Possible cause
P1574 1574	ASCD vehicle speed sensor	ECM detects a difference values between two vehicle speed signals if they are out of the specified range.	• Harness or connectors (The CAN communication line is open or shorted.) • Harness or connectors (The combination meter circuit is open or shorted.) • Combination meter • Vehicle speed sensor • TCM • ECM

DTC Confirmation Procedure

NFEC1471

CAUTION:

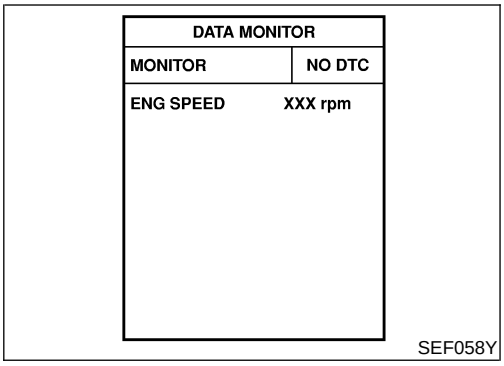
Always drive vehicle at a safe speed.

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:

Step 3 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

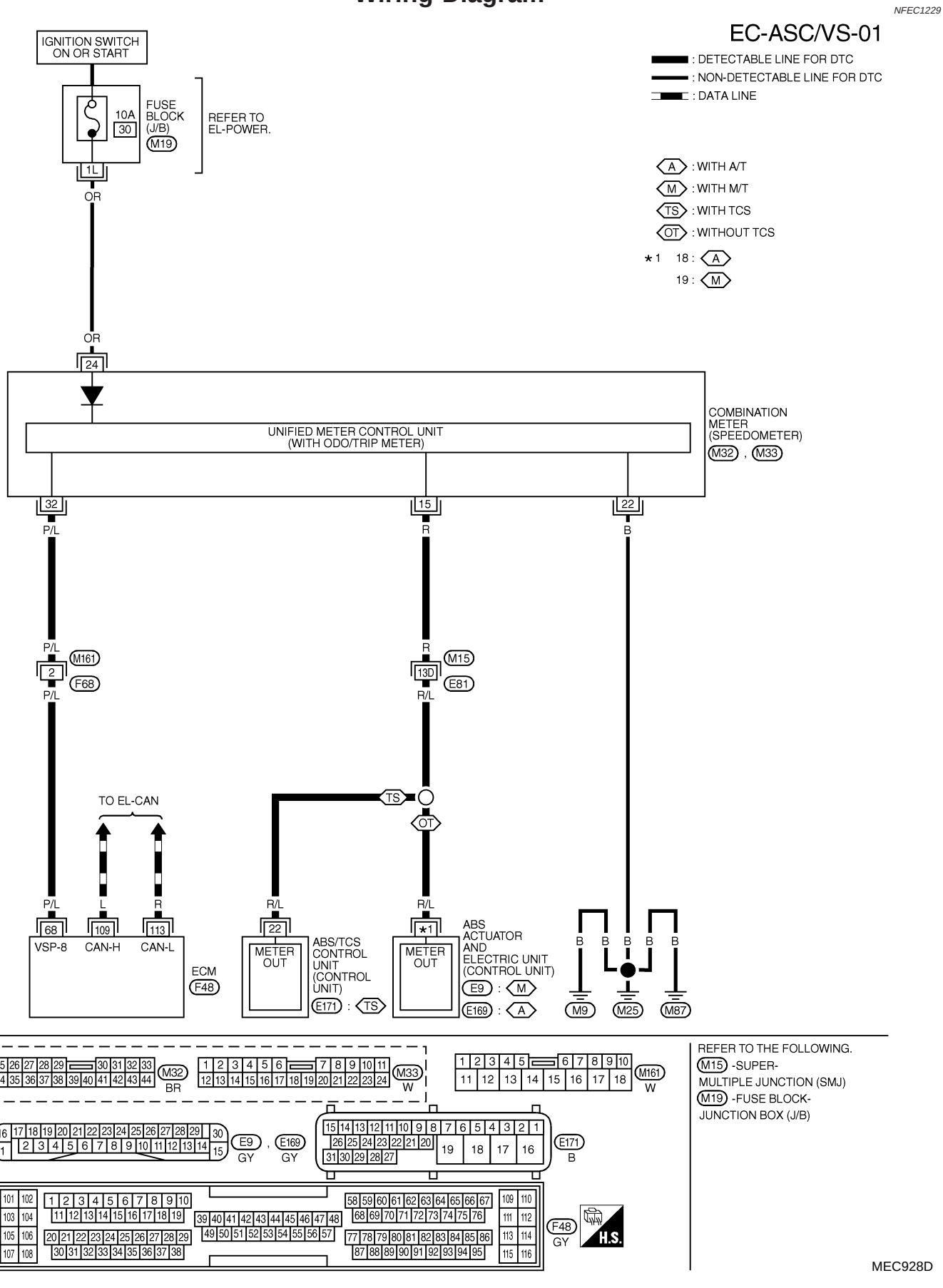
1) Start engine (TCS switch "OFF").
2) Select "DATA MONITOR" mode with CONSULT-II.
3) Drive the vehicle at more than 40 km/h (25 MPH).
4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-665.

With GST

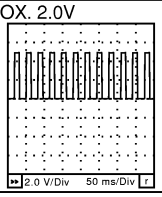
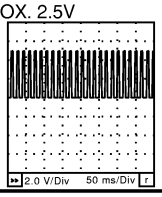
Follow the procedure "With CONSULT-II" above.

Wiring Diagram

NFEC1229



ECM TERMINALS AND REFERENCE VALUE 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	WIRE COLOR	ITEM	CONDITION	DATA (DC)
68	P/L	VEHICLE SPEED SENSOR	VEHICLE DRIVING AT 10 KM/H (6 MPH) IN 1ST GEAR POSITION UNDER LIFTED UP CONDITION	APPROX. 2.0V 
			VEHICLE DRIVING AT 30 KM/H (19 MPH) IN 2ND GEAR POSITION UNDER LIFTED UP CONDITION	APPROX. 2.5V 

SEC045D

Diagnostic Procedure

NFEC1230

1	CHECK TCM FUNCTION	
Check malfunction of the AT system with CONSULT-II or "O/D OFF" indicator. Refer to AT-5.		
OK or NG		
OK	▶	GO TO 2.
NG	▶	Check AT system. Refer to AT-5.

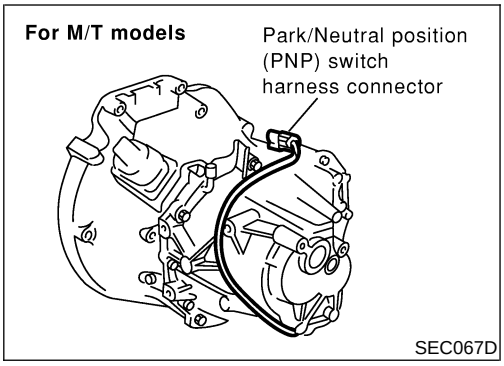
2	CHECK SPEEDOMETER OPERATION	
Check if speedometer operates normally.		
OK or NG		
OK	▶	GO TO 3.
NG	▶	Check speedometer and vehicle speed sensor circuit. Refer to EL-117.

3	CHECK VEHICLE SPEED SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	
1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector and combination meter harness connector. 3. Check harness continuity between ECM terminal 68 and combination meter terminal 32 with CONSULT-II or tester. 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	▶	GO TO 4.

Diagnostic Procedure (Cont'd)

4	DETECT MALFUNCTIONING PART
Check the following. ● Harness connectors F68, M161 ● Harness for open or short between combination meter and ECM	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

5	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.	
▶	**INSPECTION END**



Component Description

NFEC1134

When the gear position is “P” (A/T models only) or “N”, park/neutral position (PNP) switch is “ON”.
ECM detects the position because the continuity of the line (the “ON” signal) exists.
For A/T models, the park/neutral position (PNP) switch assembly also includes a transmission range switch to detect selector lever position.

CONSULT-II Reference Value in Data Monitor Mode

NFEC1135

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
P/N POSI SW	• Ignition switch: ON	Shift lever: “P” or “N”	ON
		Except above	OFF

On Board Diagnosis Logic

NFEC1137

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

NFEC1138

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.

DTC Confirmation Procedure (Cont'd)

2

DATA MONITOR	
MONITOR	NO DTC
P/N POSI SW	ON

SEF212Y

5

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h
P/N POSI SW	OFF
B/FUEL SCHDL	XXX msec

SEF213Y

WITH CONSULT-II

=NFEC1138S01

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.

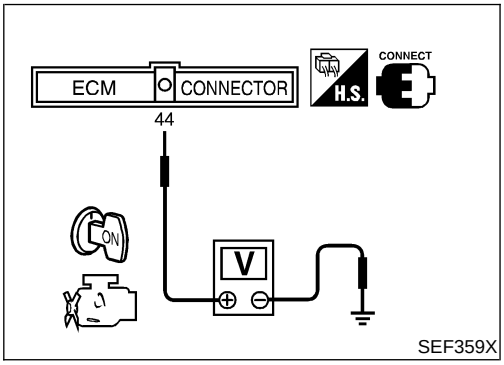
Position (Selector lever)	Known-good signal
"N" and "P" position	ON
Except the above position	OFF

If NG, go to "Diagnostic Procedure", EC-670.
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	More than 1,400 rpm
COOLAN TEMP/S	More than 70°C (158°F)
B/FUEL SCHDL	More than 2 msec
VHCL SPEED SE	More than 65 km/h (40 MPH)
Selector lever	Suitable position (A/T models) 6th position (M/T models)

6) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-670.



SEF359X

Overall Function Check

NFEC1139

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

NFEC1139S01

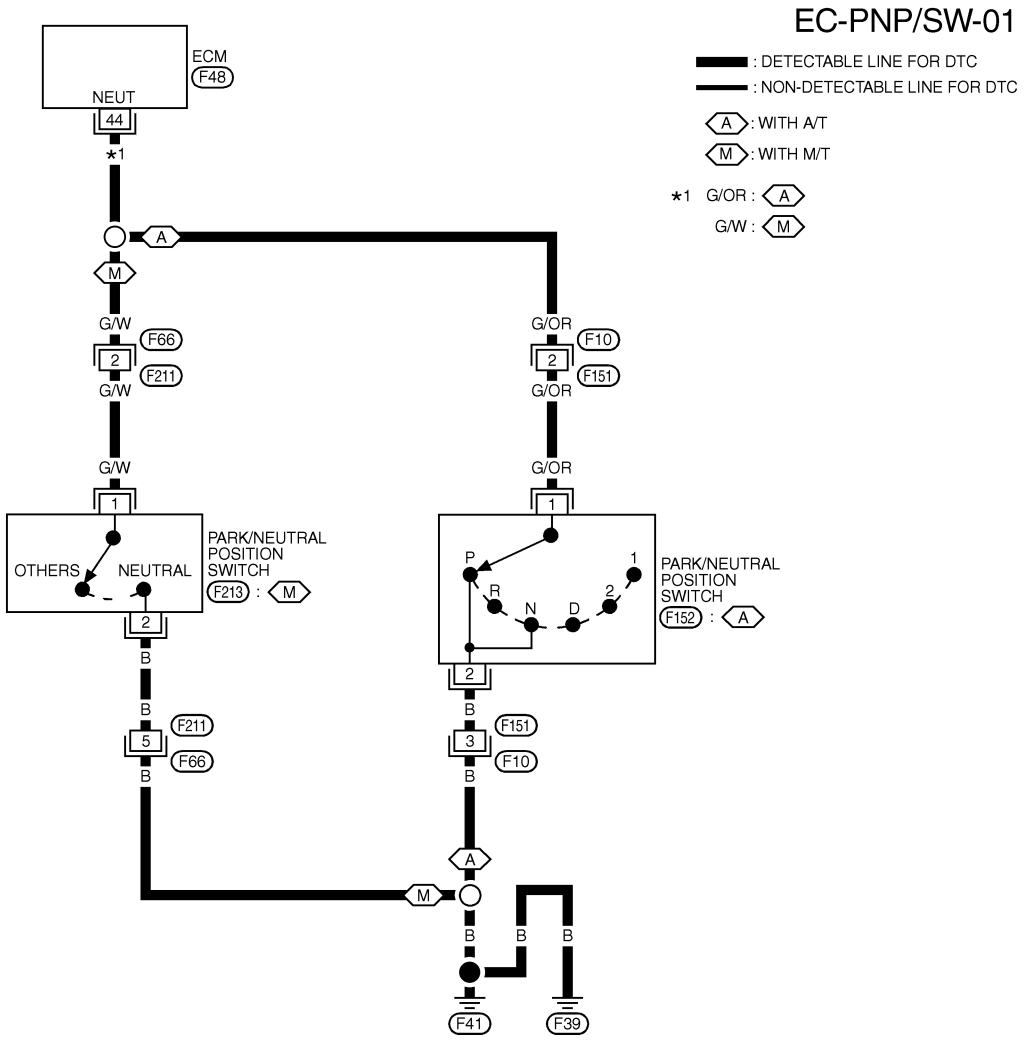
1) Turn ignition switch "ON".
2) Check voltage between ECM terminal 44 and body ground under the following conditions.

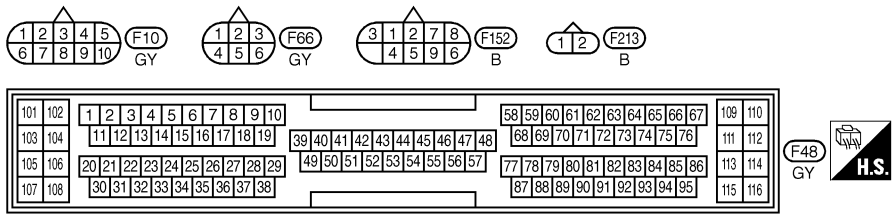
Condition (Gear position)	Voltage V (Known-good data)
"P" and "N" position	Approx. 0
Except the above position	Battery voltage

3) If NG, go to "Diagnostic Procedure", EC-670.

Wiring Diagram

NFEC1140





MEC509D

ECM TERMINALS AND REFERENCE VALUE 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	WIRE COLOR	ITEM	CONDITION	DATA (DC)
44	G/OR (A/T) G/W (M/T)	PARK/NEUTRAL POSITION (PNP) SWITCH	IGN ON WITH GEAR POSITION "N" OR "P"(A/T), GEAR POSITION NEUTRAL (M/T)	APPROX. 0V
			IGN ON WITHOUT THE ABOVE GEAR POSITION	BATTERY VOLTAGE

SEF635XB

Diagnostic Procedure

NFEC1141

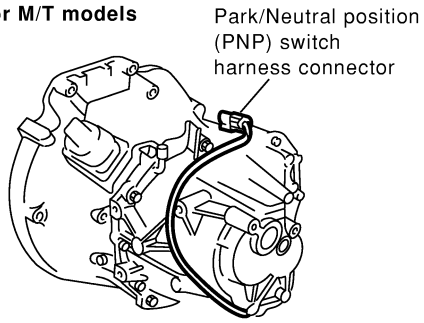
FOR M/T MODELS

NFEC1141S01

1	CHECK PNP SWITCH GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch “OFF”.
2. Disconnect park/neutral position (PNP) switch harness connector.

For M/T models



SEC067D

3. Check harness continuity between PNP switch terminal 2 and engine ground. Refer to Wiring Diagram.
   Continuity should exist.
4. Also check harness for short to power.

OK or NG

OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F211, F66
- Harness for open or short between park/neutral position (PNP) switch and ground

	▶	Repair open circuit or short to power in harness or connectors.

3	CHECK PNP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 44 and PNP switch 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 5.
NG	▶	GO TO 4.

4	DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F66, F211
- Harness for open or short between park/neutral position (PNP) switch and ECM

	▶	Repair open circuit or short to ground or short to power in harness or connectors.

5	CHECK PARK/NEUTRAL POSITION (PNP) SWITCH

Refer to MT section, “Position Switch Check”.

OK or NG

OK	▶	GO TO 6.
NG	▶	Replace park/neutral position (PNP) switch.

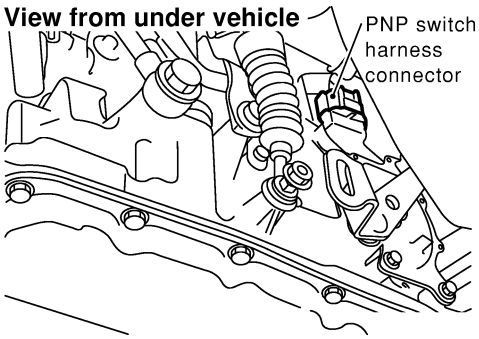
6	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.	
▶	INSPECTION END

FOR A/T MODELS

NFEC1141S02

1	CHECK PNP SWITCH GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect park/neutral position (PNP) switch harness connector.



SEF279X

3. Check harness continuity between PNP switch terminal 2 and engine ground. Refer to Wiring Diagram.
   Continuity should exist.
4. Also check harness for short to power.

OK or NG

OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	DETECT MALFUNCTIONING PART
Check the following. ● Harness connectors F151, F10 ● Check harness for open between park/neutral position (PNP) switch and engine ground.	
▶	Repair open circuit or short to power in harness or connectors.

3	CHECK PNP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 44 and PNP switch terminal 1. Refer to Wiring Diagram.
   Continuity should exist.
3. Also check harness for short to ground and short to power.

OK or NG

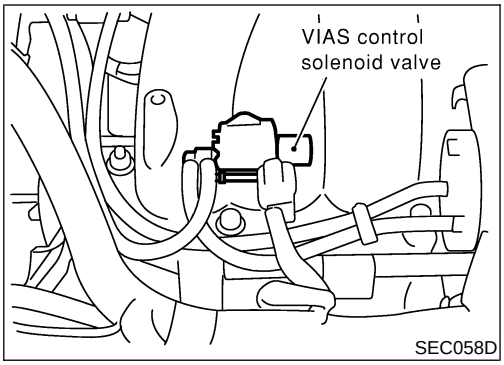
OK	▶	GO TO 5.
NG	▶	GO TO 4.

4	DETECT MALFUNCTIONING PART
Check the following. ● Harness connectors F10, F151 ● Harness for open or short between ECM and park/neutral position (PNP) switch	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

Diagnostic Procedure (Cont'd)

5	CHECK PARK/NEUTRAL POSITION (PNP) SWITCH	
Refer to AT-107, "Diagnostic Procedure".		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Replace park/neutral position (PNP) switch.

6	CHECK INTERMITTENT INCIDENT	
Refer to "TROUBLE DIGNOSIS FOR INTERMITTENT INCIDENT", EC-156.		
	▶	**INSPECTION END**



Component Description

NFEC1400

The VIAS control solenoid valve cuts the intake manifold vacuum signal for power valve control. It responds to ON/OFF signals from the ECM. When the solenoid is off, the vacuum signal from the intake manifold is cut. When the ECM sends an ON signal the coil pulls the plunger downward and feeds the vacuum signal to the power valve actuator.

CONSULT-II Reference Value in Data Monitor Mode

NFEC1404

MONITOR ITEM	CONDITION		SPECIFICATION
VIAS S/V	• Engine: After warning up	1,800 - 3,600 rpm	ON
		Except above condition	OFF

On Board Diagnosis Logic

NFEC1472

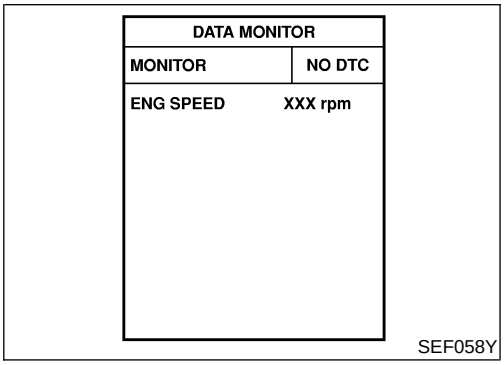
DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P1800 1800	VIAS control solenoid valve circuit open	An improper voltage signal is sent to ECM through VIAS control solenoid valve.	• Harness connectors (The solenoid valve circuit is open or shorted.) • VIAS control solenoid valve

DTC Confirmation Procedure

NFEC1473

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

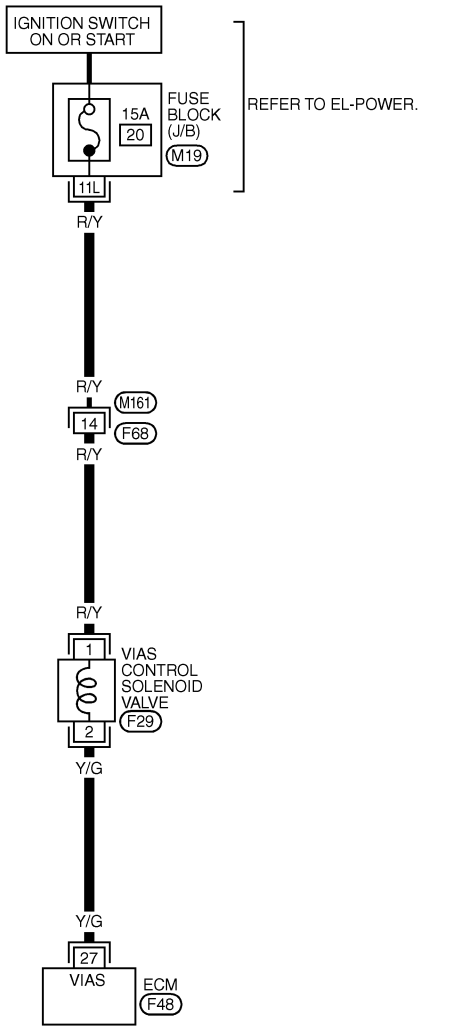
1. Turn ignition switch “ON”.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it for 10 seconds.
4. If 1st trip DTC is detected, go to “Diagnostic Procedure”, EC-676.

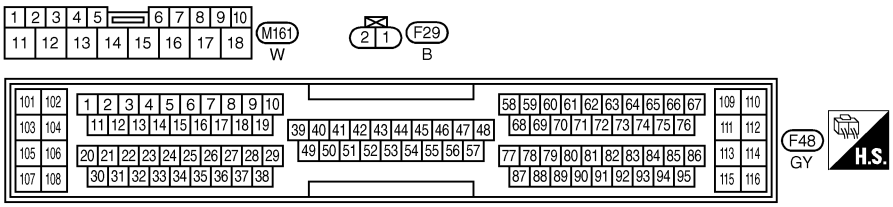
WITH GST

Follow the procedure "WITH CONSULT-II" above.

Wiring Diagram

=NFEC1402





REFER TO THE FOLLOWING.
M19 -FUSE BLOCK-
JUNCTION BOX (J/B)

MEC511D

ECM TERMINALS AND REFERENCE VALUE 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	WIRE COLOR	ITEM	CONDITION	DATA (DC)
27	Y/G	VIAS CONTROL SOLENOID VALVE	ENGINE RUNNING BETWEEN 1,800 AND 3,600 RPM	0 - 1.0V
			EXCEPT ABOVE CONDITION	BATTERY VOLTAGE

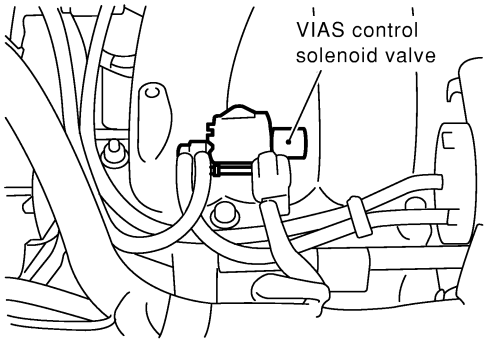
SEF636XC

Diagnostic Procedure

NFEC1403

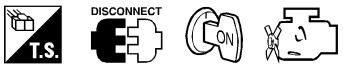
1	CHECK VIAS CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

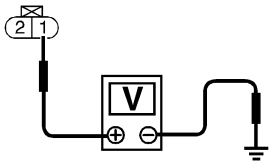
1. Turn ignition switch “OFF”.
2. Disconnect VIAS control solenoid valve harness connector.



SEC058D

3. Turn ignition switch “ON”.
4. Check voltage between terminal 1 and ground with CONSULT-II or tester.





Voltage: Battery voltage

SEF603X

OK or NG

OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors M161, F68
- Fuse block (J/B) connector M19
- 15A fuse
- Harness continuity between fuse and VIAS control solenoid valve

	▶	Repair harness or connectors.

3	CHECK VIAS 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 27 and terminal 2. Refer to Wiring Diagram.
   Continuity should exist.
4. Also check harness for short to ground and short to power.

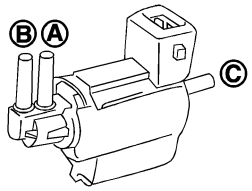
OK or NG

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

4	CHECK VIAS CONTROL SOLENOID VALVE

With CONSULT-II

1. Reconnect harness connector disconnected.
2. Turn ignition switch ON.
3. Perform "VIAS SOL VALVE" in "ACTIVE TEST" mode.
4. Check air passage continuity and operation delay time under the following conditions.



ACTIVE TEST	
VIAS SOL VALVE	ON
MONITOR	
ENG SPEED	XXX rpm

PBIB0177E

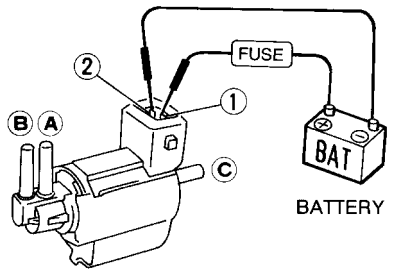
Condition VIAS SOL VALVE	Air passage continuity between A and B	Air passage continuity between A and C
ON	Yes	No
OFF	No	Yes

Operation takes less than 1 second.

MTBL1301

Without CONSULT-II

Check air passage continuity and operation delay time under the following conditions.



MEC488B

Condition VIAS SOL VALVE	Air passage continuity between A and B	Air passage continuity between A and C
12V direct current supply between terminals 1 and 2	Yes	No
No supply	No	Yes

Operation takes less than 1 second.

MTBL1302

OK or NG

OK	▶	GO TO 5.
NG	▶	Replace VIAS control solenoid valve.

5	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.	
▶	**INSPECTION END**

Description

NFEC1278

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

NFEC1279

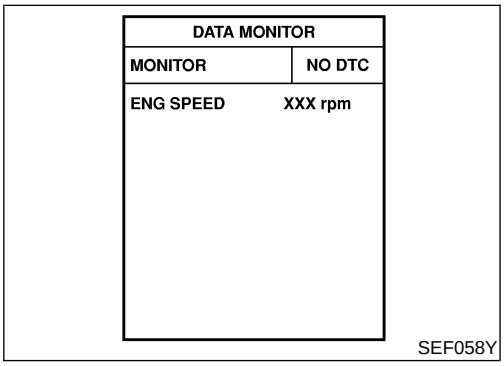
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
BRAKE SW	• Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON

On Board Diagnosis Logic

NFEC1280

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



DTC Confirmation Procedure

NFEC1281

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 “Diagnostic Procedure”, EC-680.

WITH GST

Follow the procedure “WITH CONSULT-II” above.

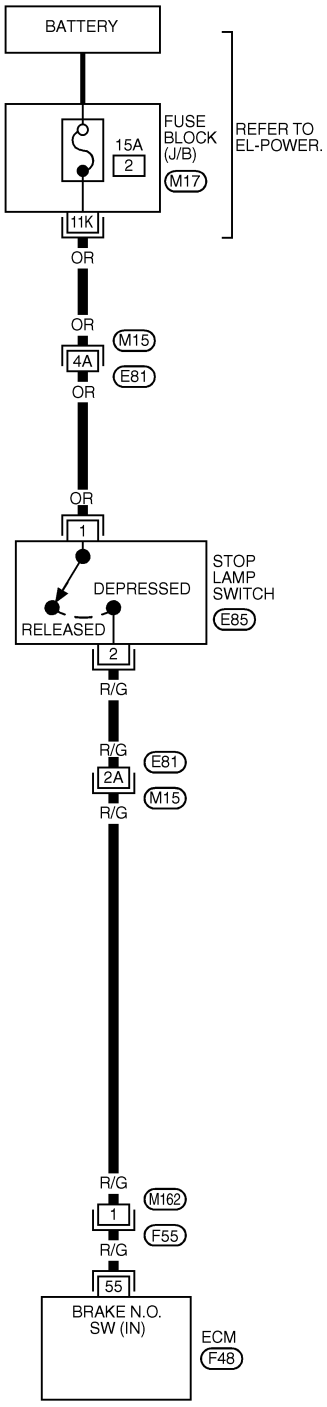
Wiring Diagram

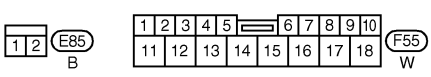
NFEC1282

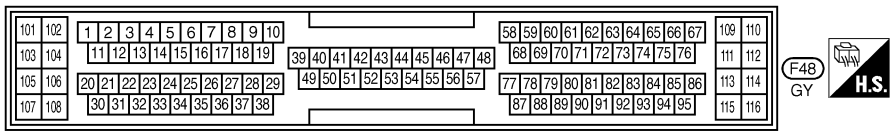
EC-BRK/SW-01

: DETECTABLE LINE FOR DTC

: NON-DETECTABLE LINE FOR DTC







REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)
M17 -FUSE BLOCK-JUNCTION BOX (J/B)

MEC822D

Wiring Diagram (Cont'd)

Specification data are reference values and are measured between each terminal and body 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)
55	R/G	Stop lamp switch	**[Engine is running]** ● Brake pedal fully released	Approximately 0V
			[Engine is running] ● Brake pedal fully depressed	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

NFEC1283

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

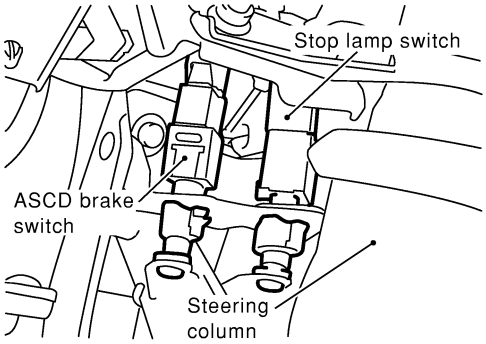
MTBL1138

OK or NG

OK	▶	GO TO 4.
NG	▶	GO TO 2.

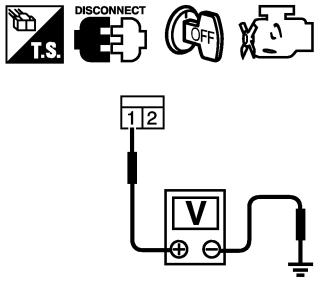
2	CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Disconnect stop lamp switch harness connector.



SEC053D

2. Check voltage between stop lamp switch terminal 1 and ground with CONSULT-II or tester.



SEC051D

Voltage: Battery voltage

OK or NG

OK	▶	GO TO 4.
NG	▶	GO TO 3.

3	DETECT MALFUNCTIONING PART

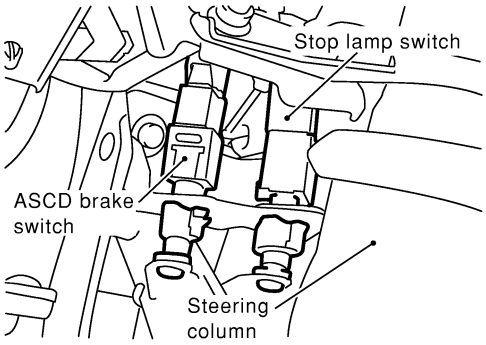
Check the following.
- Harness connectors M15, E81
- 15A fuse
- Fuse block (J/B) connector M17
- Harness for open and short between stop lamp switch and battery

	▶	Repair open circuit or short to ground or short to power in harness or connectors.

Diagnostic Procedure (Cont'd)

4	CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Disconnect stop lamp switch harness connector.



SEC053D

4. Check harness continuity between ECM terminal 55 and stop lamp switch terminal 2. 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 6.
NG	▶	GO TO 5.

5	DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E81, M15
- Harness connectors M162, F55
- 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 "Component Inspection", EC-683.

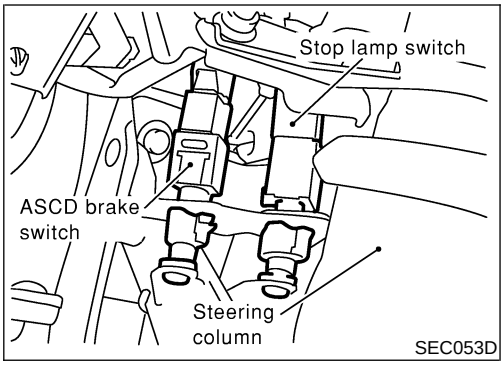
OK or NG

OK	▶	GO TO 7.
NG	▶	Replace stop lamp switch.

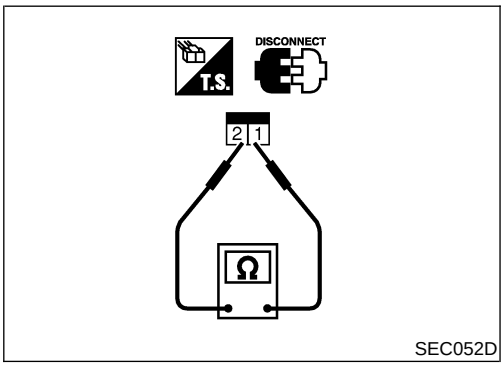
7	CHECK INTERMITTENT INCIDENT

Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.

	▶	**INSPECTION END**



SEC053D



SEC052D

Component Inspection

=NFEC1284

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.

3. If NG, replace stop lamp switch.

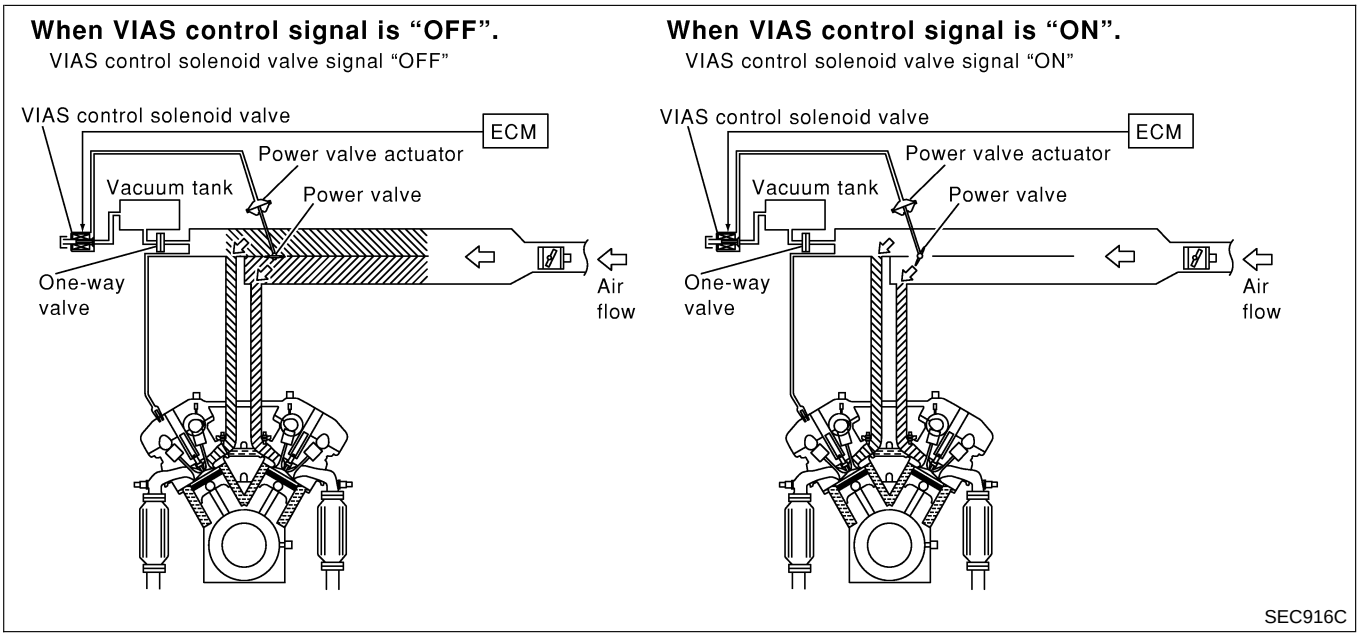
Description

NFEC0596

SYSTEM DESCRIPTION

NFEC0596S01

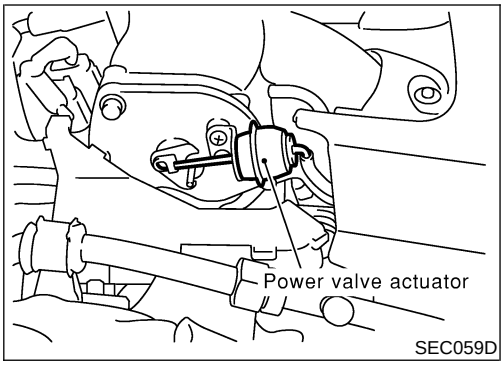
Sensor	Input Signal to ECM	ECM function	Actuator
Mass air flow sensor	Amount of intake air	VIAS control	VIAS control solenoid valve
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Ignition switch	Start signal		
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed		
Engine coolant temperature sensor	Engine coolant temperature		

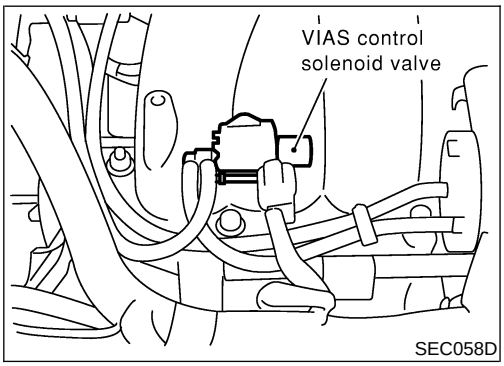


When the engine is running at low or medium speed, the power valve is fully closed. Under this condition, the effective suction port length is equivalent to the total length of the intake manifold collector’s suction port including the intake valve. This long suction port provides increased air intake which results in improved suction efficiency and higher torque generation.

The surge tank and one-way valve are provided. When engine is running at high speed, the ECM sends the signal to the VIAS control solenoid valve. This signal introduces the intake manifold vacuum into the power valve actuator and therefore opens the power valve to two suction passages together in the collector.

Under this condition, the effective port length is equivalent to the length of the suction port provided independently for each cylinder. This shortened port length results in enhanced engine output with reduced suction resistance under high speeds.





COMPONENT DESCRIPTION

NFEC0596S02

Power Valve

NFEC0596S0201

The power valve is installed in intake manifold collector and used to control the suction passage of the variable induction air control system. It is set in the fully closed or fully opened position by the power valve actuator operated by the vacuum stored in the surge tank. The vacuum in the surge tank is controlled by the VIAS control solenoid valve.

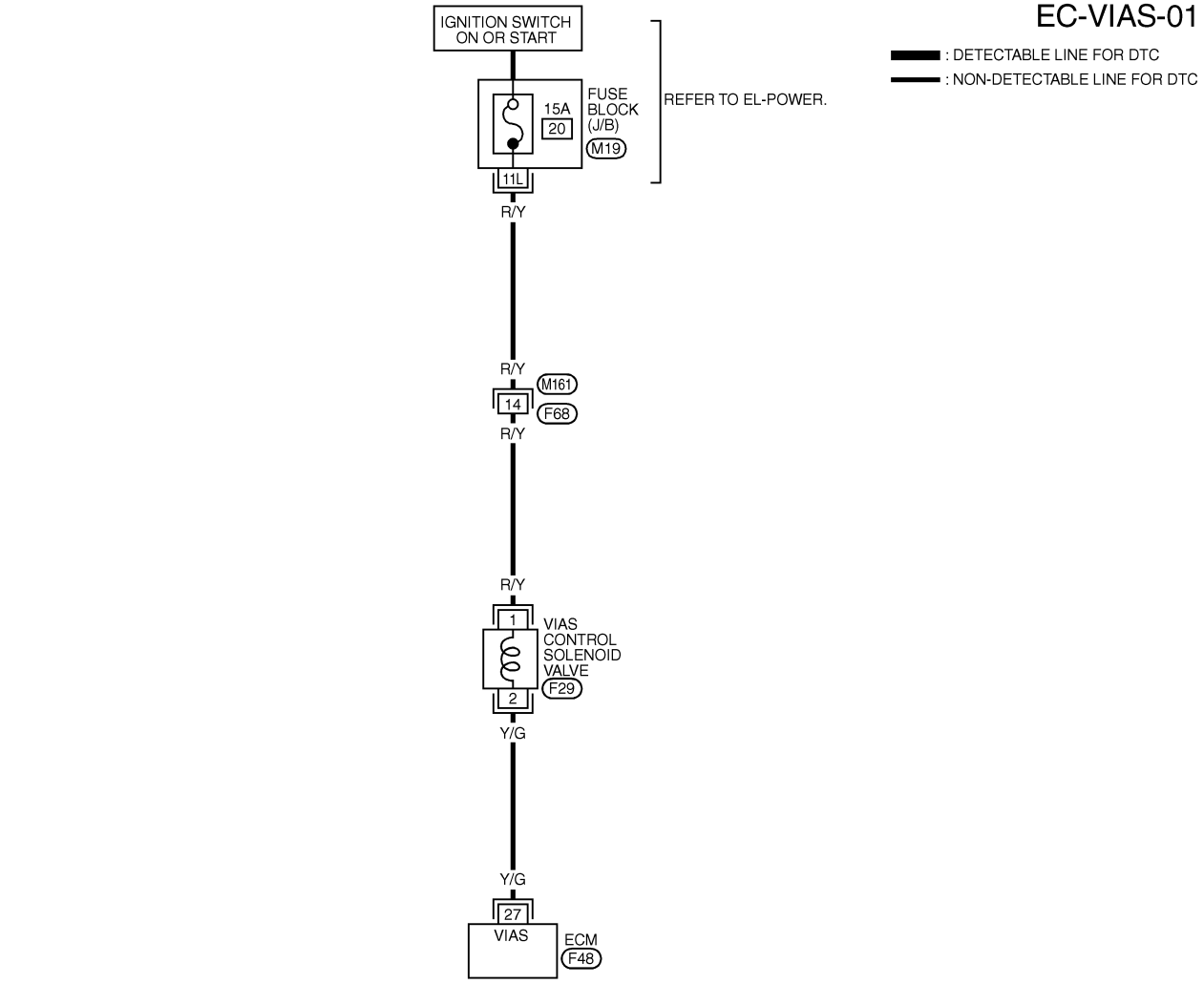
VIAS Control Solenoid Valve

NFEC0596S0202

The VIAS control solenoid valve cuts the intake manifold vacuum signal for power valve control. It responds to ON/OFF signals from the ECM. When the solenoid is off, the vacuum signal from the intake manifold is cut. When the ECM sends an ON signal the coil pulls the plunger downward and feeds the vacuum signal to the power valve actuator.

Wiring Diagram

NFEC0597



ECM TERMINALS AND REFERENCE VALUE 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	WIRE COLOR	ITEM	CONDITION	DATA (DC)
27	Y/G	VIAS CONTROL SOLENOID VALVE	ENGINE RUNNING BETWEEN 1,800 AND 3,600 RPM	0 - 1.0V
			EXCEPT ABOVE CONDITION	BATTERY VOLTAGE

SEF636XC

Diagnostic Procedure

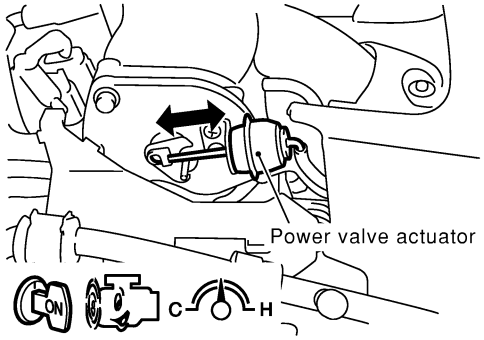
NFEC0598

1	CHECK OVERALL FUNCTION

With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Perform “VIAS SOL VALVE” in “ACTIVE TEST” mode with CONSULT-II.
3. Turn VIAS control solenoid valve “ON” and “OFF”, and make sure that power valve actuator rod moves.

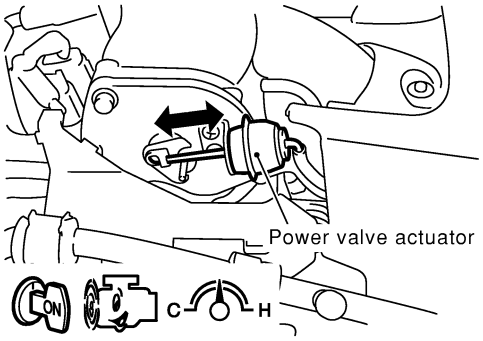
ACTIVE TEST	
VIAS SOL VALVE	OFF
MONITOR	
ENG SPEED	XXX rpm



SEC128D

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Rev engine quickly up to above 5,000 rpm and make sure that power valve actuator rod moves.



SEC060D

OK or NG

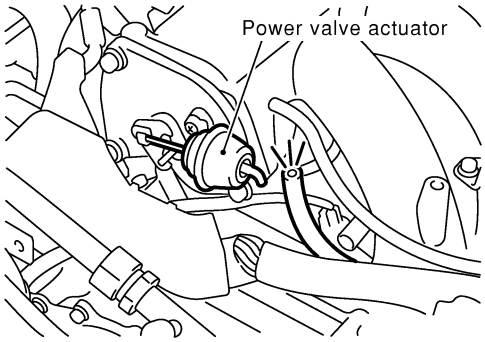
OK	▶	**INSPECTION END**
NG	▶	GO TO 2.

2 **CHECK VACUUM EXISTENCE**

With CONSULT-II

1. Stop engine and disconnect vacuum hose connected to power valve actuator.
2. Start engine and let it idle.
3. Perform "VIAS SOL VALVE" in "ACTIVE TEST" mode with CONSULT-II.
4. Turn VIAS control solenoid valve "ON" and "OFF", and check for the existence of vacuum under the following conditions.

ACTIVE TEST	
VIAS SOL VALVE	OFF
MONITOR	
ENG SPEED	XXX rpm



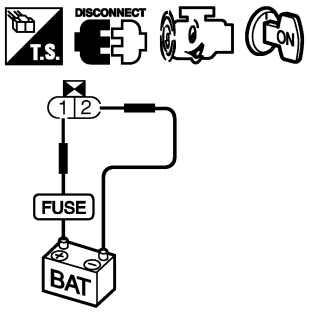
SEC129D

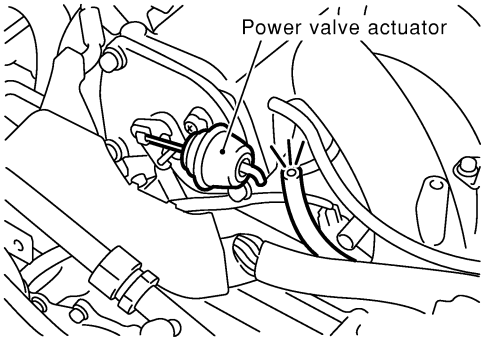
VIAS SOL VALVE	Vacuum
ON	Should exist.
OFF	Should not exist.

MTBL1174

Without CONSULT-II

1. Stop engine and disconnect vacuum hose connected to power valve actuator.
2. Disconnect VIAS control solenoid valve harness connector.
3. Start engine and let it idle.
4. Apply 12V of direct current between VIAS control solenoid valve terminals 1 and 2.
5. Check for the existence of vacuum under the following conditions.





SEC130D

Condition	Vacuum
12V direct current supply	Should exist.
No supply	Should not exist.

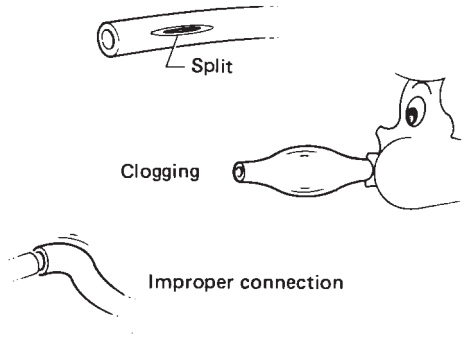
MTBL1175

OK or NG

OK	▶	Repair or replace power valve actuator.
NG	▶	GO TO 3.

3	CHECK VACUUM HOSE

1. Stop engine.
2. Check hoses and tubes between intake manifold and power valve actuator for crack, clogging, disconnection or improper connection.



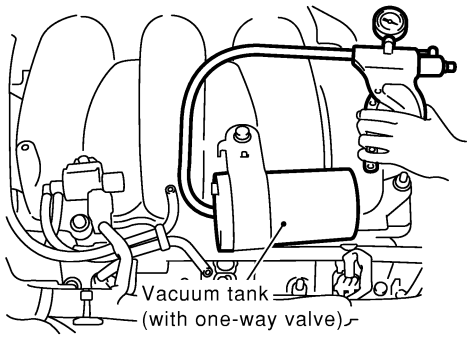
SEF109L

OK or NG

OK	▶	GO TO 4.
NG	▶	Replace vacuum hose.

4	CHECK VACUUM TANK

1. Disconnect vacuum hose connected to vacuum tank.
2. Connect a vacuum pump to port (at the center) of vacuum tank.
3. Apply vacuum and make sure that vacuum exists at another port.



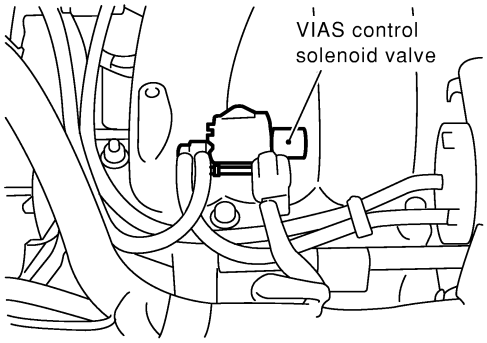
SEC131D

OK or NG

OK	▶	GO TO 5.
NG	▶	Replace vacuum tank.

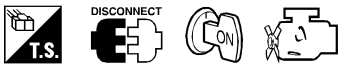
5	CHECK VIAS CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

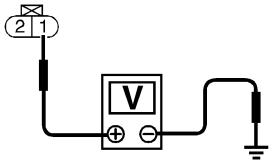
1. Stop engine.
2. Disconnect VIAS control solenoid valve harness connector.



SEC058D

3. Turn ignition switch "ON".
4. Check voltage between terminal 1 and ground with CONSULT-II or tester.





Voltage: Battery voltage

SEF603X

OK or NG

OK	▶	GO TO 7.
NG	▶	GO TO 6.

6	DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors M161, F68
- Fuse block (J/B) connector M19
- 15A fuse
- Harness continuity between fuse and VIAS control solenoid valve

	▶	Repair harness or connectors.

7	CHECK VIAS 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 27 and terminal 2. Refer to Wiring Diagram.
   Continuity should exist.
4. Also check harness for short to ground and short to power.

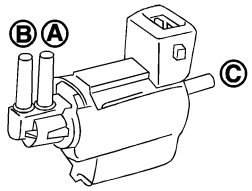
OK or NG

OK	▶	GO TO 8.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

8	CHECK VIAS CONTROL SOLENOID VALVE

With CONSULT-II

1. Reconnect disconnected harness connector.
2. Turn ignition switch ON.
3. Perform "VIAS SOL VALVE" in "ACTIVE TEST" mode.
4. Check air passage continuity and operation delay time under the following conditions.



ACTIVE TEST	
VIAS SOL VALVE	ON
MONITOR	
ENG SPEED	XXX rpm

PBIB0177E

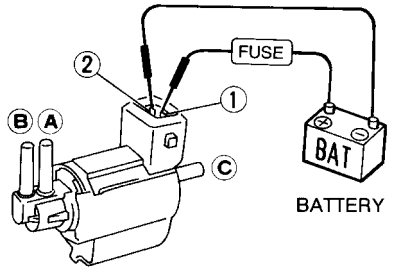
Condition VIAS SOL VALVE	Air passage continuity between A and B	Air passage continuity between A and C
ON	Yes	No
OFF	No	Yes

Operation takes less than 1 second.

MTBL1301

Without CONSULT-II

Check air passage continuity and operation delay time under the following conditions.



MEC488B

Condition VIAS SOL VALVE	Air passage continuity between A and B	Air passage continuity between A and C
12V direct current supply between terminals 1 and 2	Yes	No
No supply	No	Yes

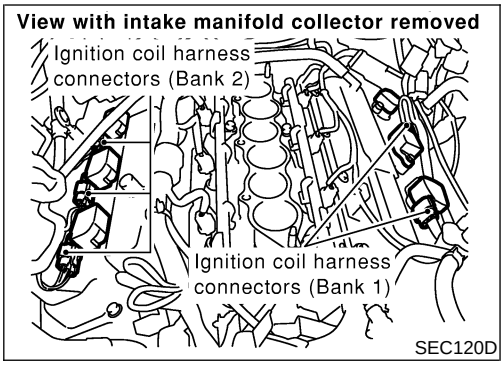
Operation takes less than 1 second.

MTBL1302

OK or NG

OK	▶	GO TO 9.
NG	▶	Replace VIAS control solenoid valve.

9	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.	
▶	**INSPECTION END**



Component Description

NFEC0817

IGNITION COIL & POWER TRANSISTOR

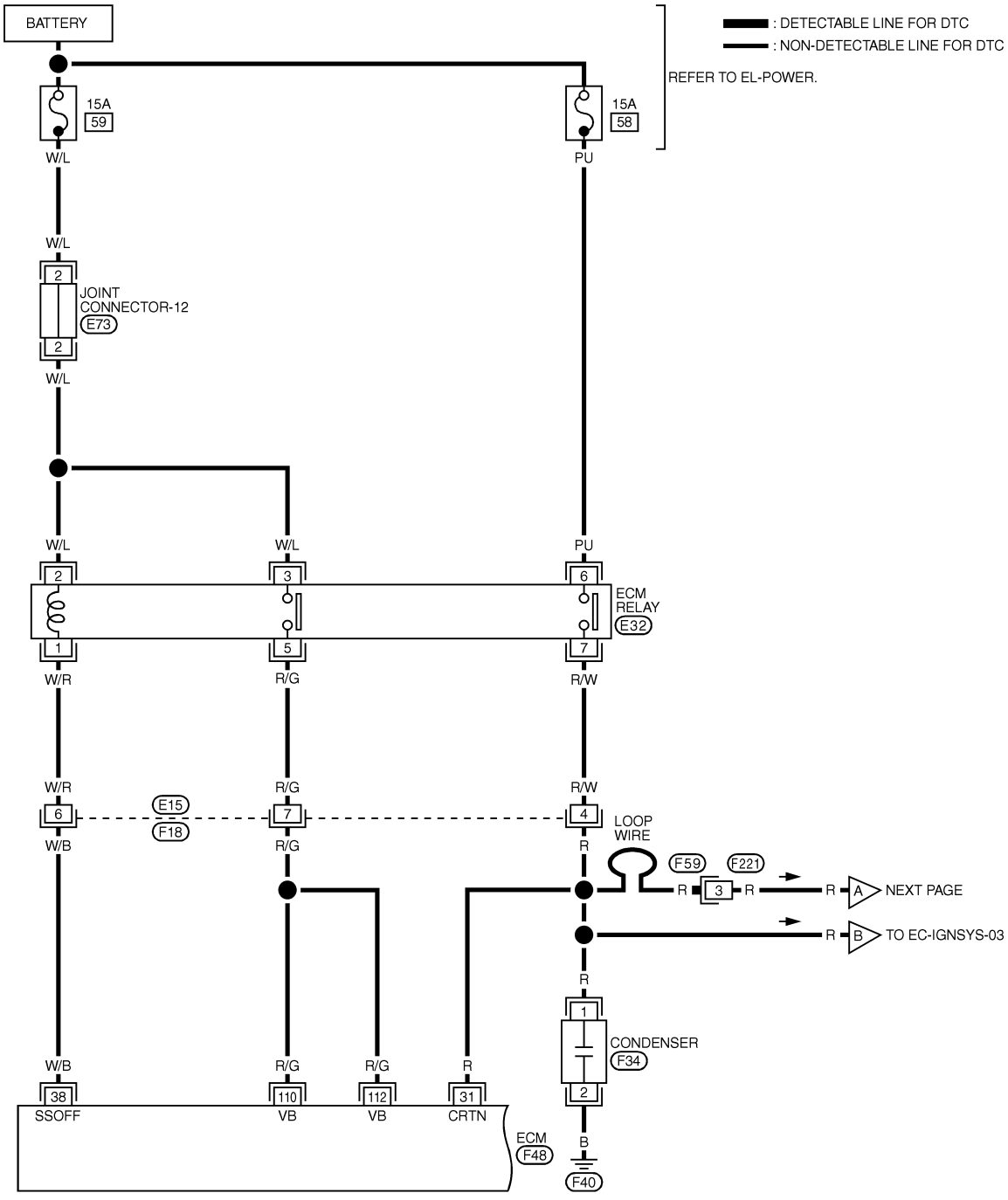
NFEC0817S01

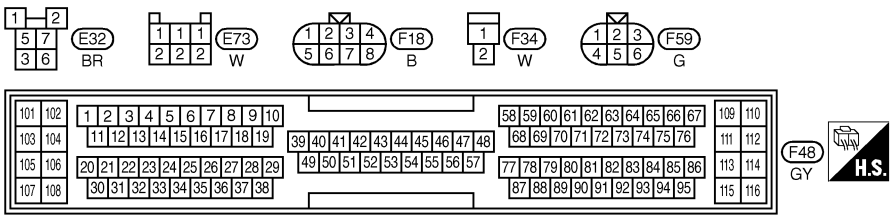
The ignition signal from the ECM is sent to and amplified by the power transistor. The power transistor turns on and off the ignition coil primary circuit. This on-off operation induces the proper high voltage in the coil secondary circuit.

Wiring Diagram

NFEC0819

EC-IGNSYS-01

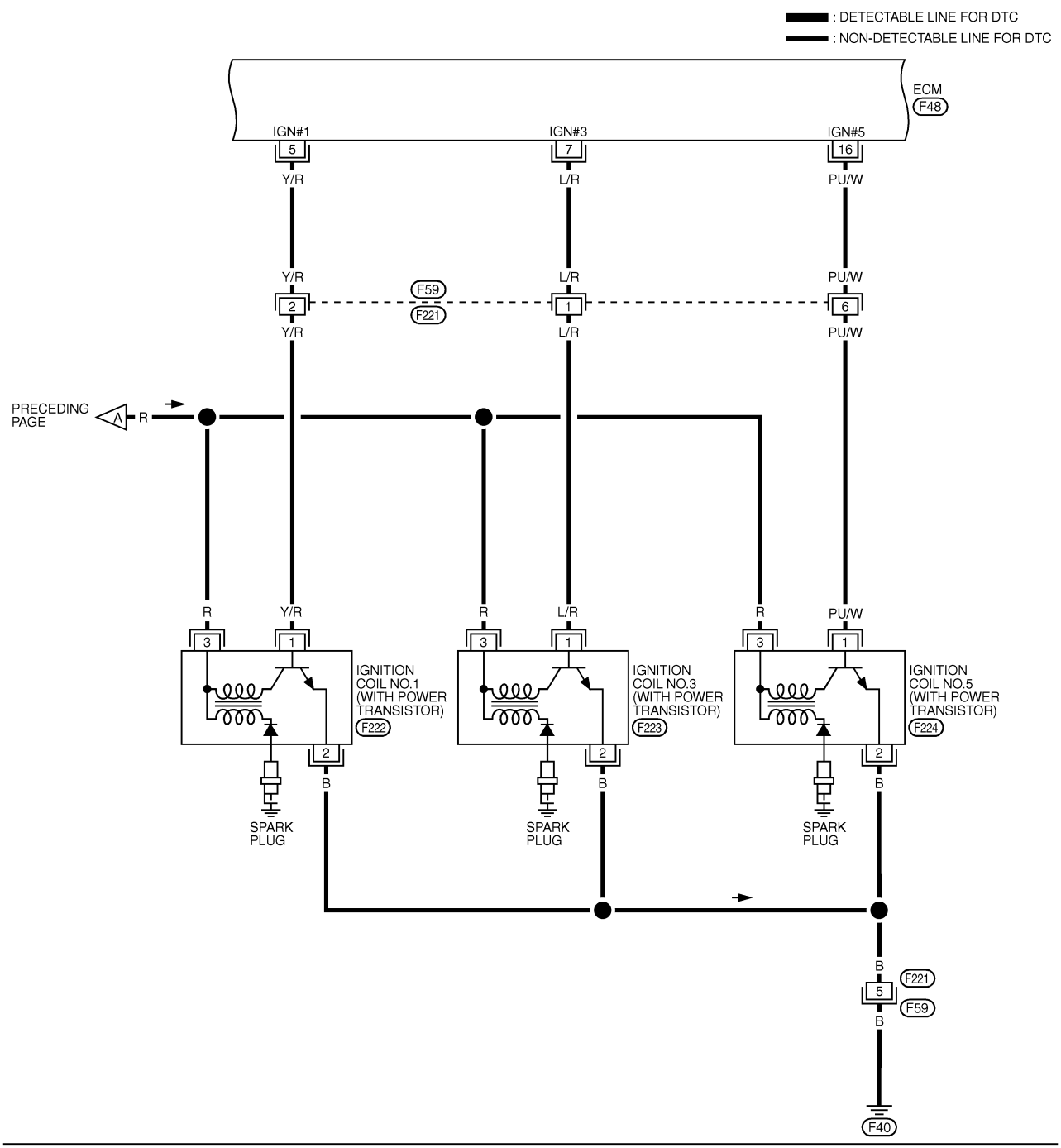




MEC501D

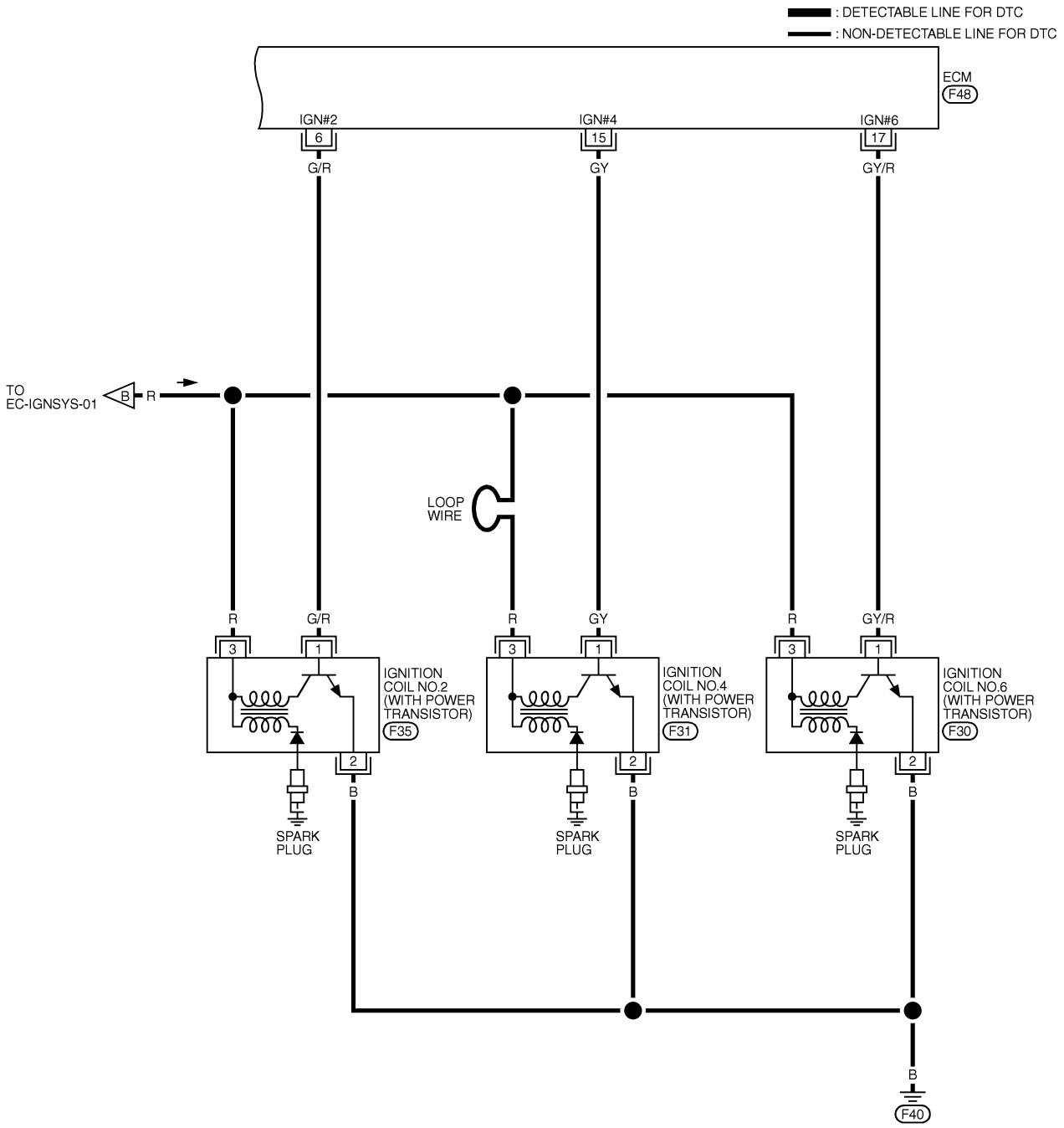
Wiring Diagram (Cont'd)

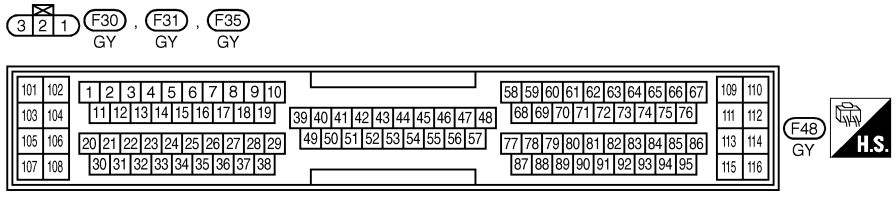
EC-IGNSYS-02



MEC502D

EC-IGNSYS-03





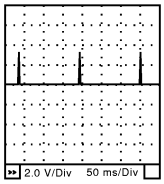
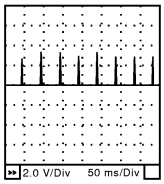
MEC503D

Wiring Diagram (Cont'd)

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)
5 6 7 15 16 17	Y/R G/R L/R GY PU/W GY/R	Ignition signal No. 1 Ignition signal No. 2 Ignition signal No. 3 Ignition signal No. 4 Ignition signal No. 5 Ignition signal No. 6	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0 - 0.2V★  SEC986C
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,500 rpm.	0.1 - 0.3V★  SEC987C

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnostic Procedure

NFEC0820

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 all circuits do not produce a momentary engine speed drop.

ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V

PBIB0133E

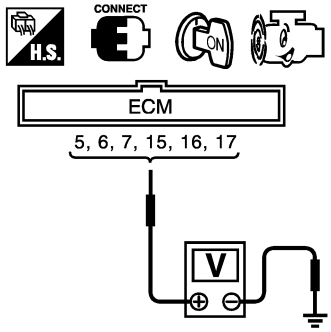
OK or NG

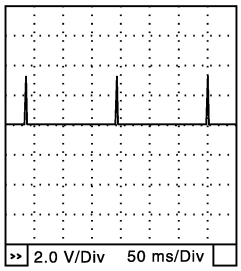
OK	▶	**INSPECTION END**
NG	▶	GO TO 14.

3	CHECK OVERALL FUNCTION

Without CONSULT-II

1. Let engine idle.
2. Read the voltage signal between ECM terminals 5, 6, 7, 15, 16, 17 and ground with oscilloscope.
3. Verify that the oscilloscope screen shows the signal wave as shown below.





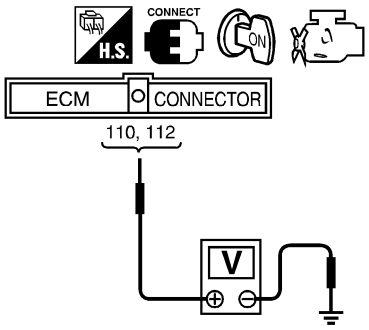
SEC159D

OK or NG

OK	▶	**INSPECTION END**
NG	▶	GO TO 14.

4	CHECK IGNITION COIL POWER SUPPLY CIRCUIT-I

1. Turn ignition switch ON.
2. Check voltage between ECM terminals 110, 112 and ground with CONSULT-II or tester.



Voltage: Battery voltage

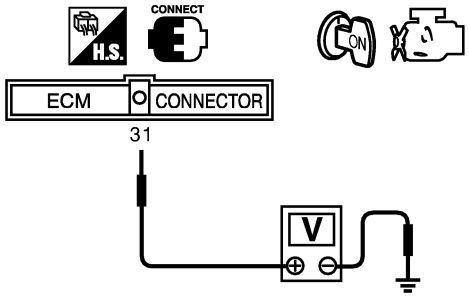
SEF366X

OK or NG

OK	▶	GO TO 5.
NG	▶	Go to TROUBLE DIAGNOSIS FOR POWER SUPPLY, EC-157.

5	CHECK IGNITION COIL POWER SUPPLY CIRCUIT-II

1. Check voltage between ECM terminal 31 and ground with CONSULT-II or tester.



SEC914C

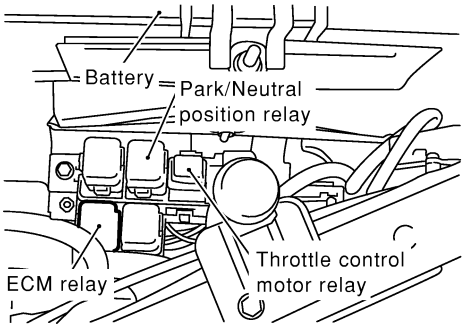
Voltage: Battery voltage

OK or NG

OK	▶	GO TO 11.
NG	▶	GO TO 6.

6	CHECK IGNITION COIL POWER SUPPLY CIRCUIT-III

1. Turn ignition switch OFF.
2. Disconnect ECM relay.



SEC044D

3. Check harness continuity between ECM relay terminal 31 and ECM relay terminal 7. 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.

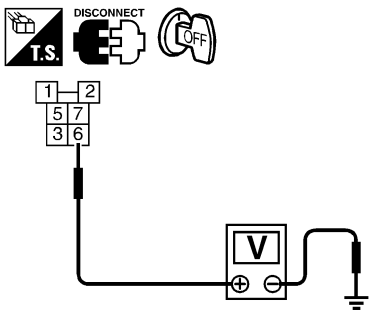
7	DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E15, F18
- Harness for open or short between ECM and ECM relay

	▶	Repair open circuit or short to ground or short to power in harness or connectors.

8	CHECK IGNITION COIL POWER SUPPLY CIRCUIT-IV

Check voltage between ECM relay terminal 6 and ground with CONSULT-II or tester.



Voltage: Battery voltage

SEF368X

OK or NG

OK	▶	GO TO 10.
NG	▶	GO TO 9.

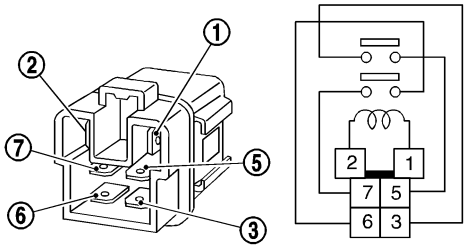
9	DETECT MALFUNCTIONING PART

Check the following.
- 15A fuse
- Harness for open and short between ECM relay and fuse

	▶	Repair or replace harness or connectors.

10	CHECK ECM RELAY

1. Apply 12V direct current between ECM relay terminals 1 and 2.
2. Check continuity between ECM relay terminals 3 and 5, 6 and 7.



Condition	Continuity
12V direct current supply between terminals 1 and 2	Yes
OFF	No

SEF296X

OK or NG

OK	▶	GO TO 19.
NG	▶	Replace ECM relay.

11	CHECK CONDENSER CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect condenser harness connector.
3. Check harness continuity between ECM terminal 31 and condenser terminal 1.
   Refer to Wiring Diagram.
   Continuity should exist.
4. Also check 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 CONDENSER GROUND CIRCUIT FOR OPEN AND SHORT

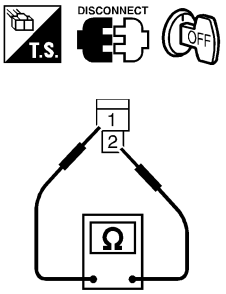
1. Check harness continuity between condenser terminal 2 and engine ground. Refer to Wiring Diagram.
   Continuity should exist.
2. Also check harness for short to power.

OK or NG

OK	▶	GO TO 13.
NG	▶	Repair open circuit or short to power in harness or connectors.

13	CHECK CONDENSER

Check resistance between condenser terminals 1 and 2.



Resistance: Above 1MΩ at 25°C (77°F)

SEF369X

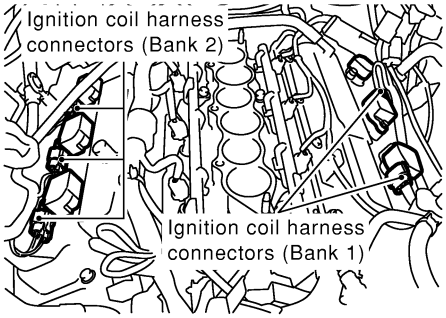
OK or NG

OK	▶	GO TO 14.
NG	▶	Replace condenser.

14	CHECK IGNITION COIL POWER SUPPLY CIRCUIT-V

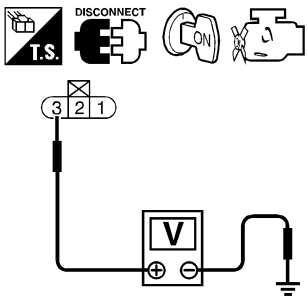
1. Turn ignition switch OFF.
2. Reconnect harness connectors disconnected.
3. Disconnect ignition coil harness connector.

View with intake manifold collector removed



SEC120D

4. Turn ignition switch ON.
5. Check voltage between ignition coil terminal 3 and ground with CONSULT-II or tester.



Voltage: Battery voltage

SEF370X

OK or NG

OK	▶	GO TO 16.
NG	▶	GO TO 15.

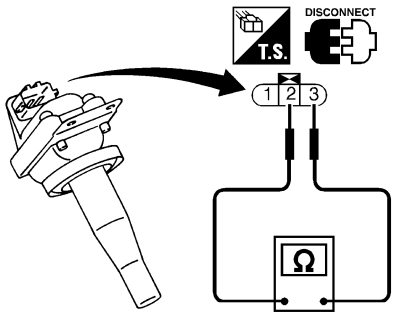
Diagnostic Procedure (Cont'd)

15	DETECT MALFUNCTIONING PART
Check the following. ● Harness connectors F59, F221 ● Harness for open and short between ignition coil and harness connector F18	
▶	Repair or replace harness or connectors.

16	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 17.
NG ▶	Repair open circuit or short to power in harness or connectors.

17	CHECK IGNITION COIL OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminals 5, 6, 7, 15, 16, 17 and ignition coil 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 18.
NG ▶	Repair open circuit or short to ground or short to power in harness or connectors.

18	CHECK IGNITION COIL WITH POWER TRANSISTOR
Check resistance between ignition coil terminals 2 and 3.	

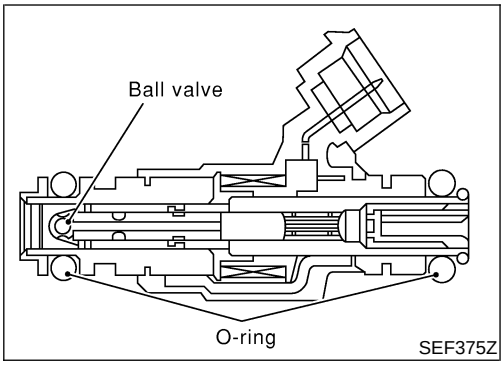


Terminals	Resistance	Result
2 and 3	Not 0Ω	OK
	0Ω	NG

SEF371X

OK or NG	
OK ▶	GO TO 19.
NG ▶	Replace ignition coil with power transistor.

19	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.	
▶	**INSPECTION END**



Component Description

NFEC0383

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 ball 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

NFEC0384

Specification data are reference values.

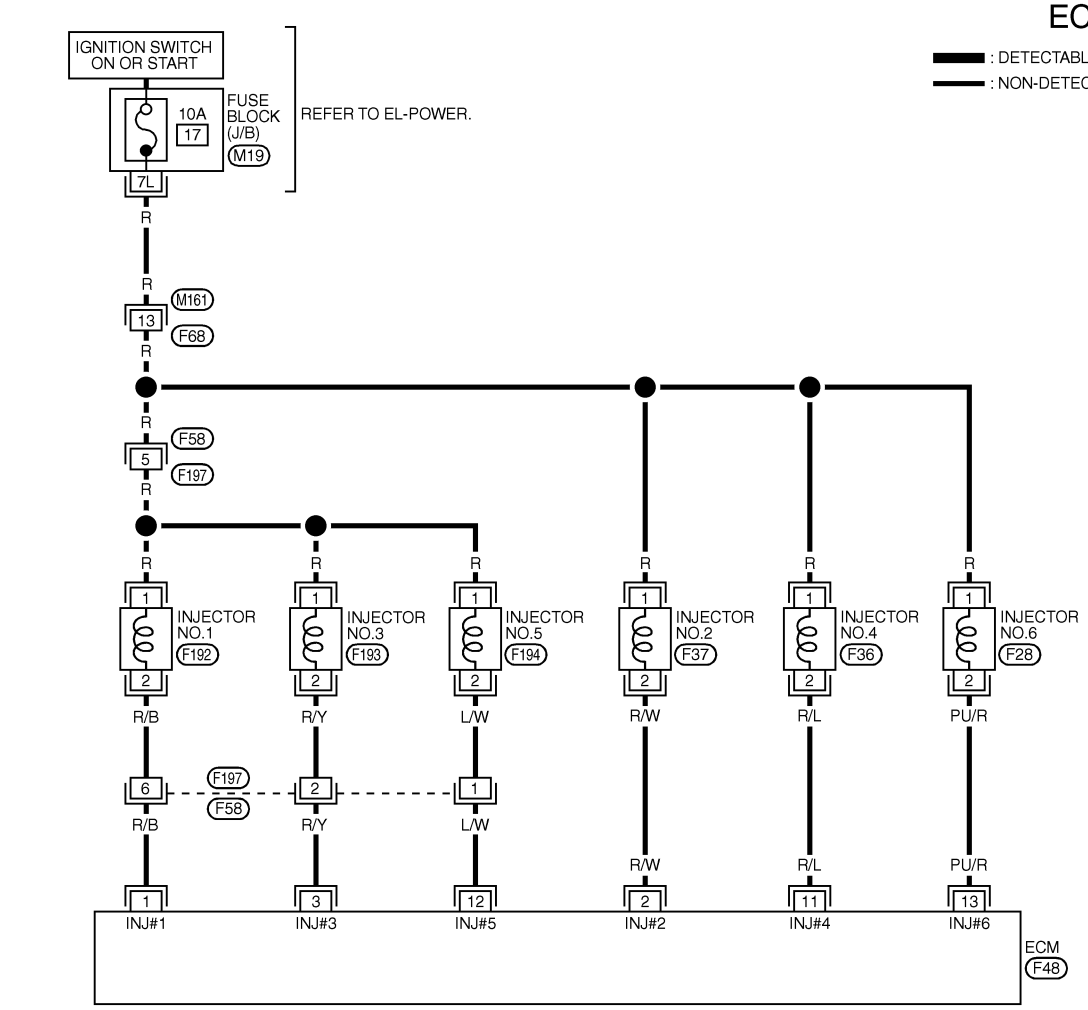
MONITOR ITEM	CONDITION		SPECIFICATION
INJ PULSE-B2 INJ PULSE-B1	● Engine: After warming up ● Air conditioner switch: “OFF” ● Shift lever: “N” ● No-load	Idle	2.0 - 3.0 msec
		2,000 rpm	1.9 - 2.9 msec
B/FUEL SCHDL	ditto	Idle	2.3 - 2.9 msec
		2,000 rpm	2.3 - 2.9 msec

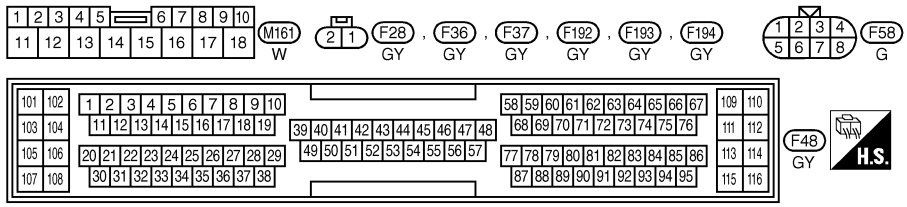
Wiring Diagram

NFEC0386

EC-INJECT-01

: DETECTABLE LINE FOR DTC
: NON-DETECTABLE LINE FOR DTC



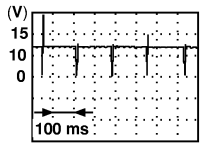


REFER TO THE FOLLOWING.
M19 -FUSE BLOCK-
JUNCTION BOX (J/B)

MEC512D

ECM TERMINALS AND REFERENCE VALUE 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	WIRE COLOR	ITEM	CONDITION	DATA (DC)
1	R/B	INJECTOR NO. 1	ENGINE RUNNING AT IDLE SPEED UNDER WARM-UP CONDITION	BATTERY VOLTAGE
2	R/W	INJECTOR NO. 2		
3	R/Y	INJECTOR NO. 3		
11	R/L	INJECTOR NO. 4		
12	L/W	INJECTOR NO. 5		
13	PU/R	INJECTOR NO. 6		



SEF796YB

Diagnostic Procedure

NFEC0387

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

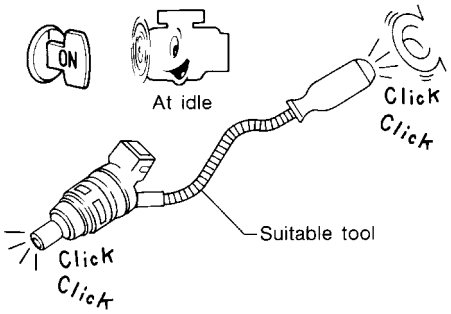
With CONSULT-II
1. Start engine.
2. Perform “POWER BALANCE” in “ACTIVE TEST” mode with CONSULT-II.

ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V

PBIB0133E

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.



MEC703B

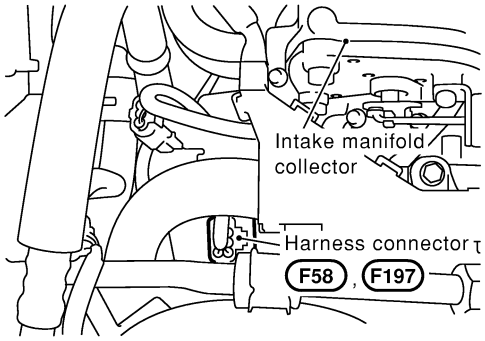
Clicking noise should be heard.

OK or NG

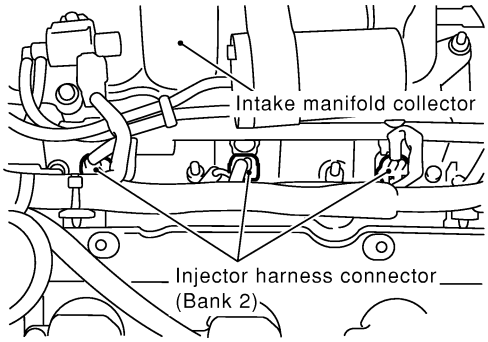
OK	▶	**INSPECTION END**
NG	▶	GO TO 3.

3	CHECK INJECTOR POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect injector harness connectors (bank 2) and harness connectors F58, F197 (bank 1).

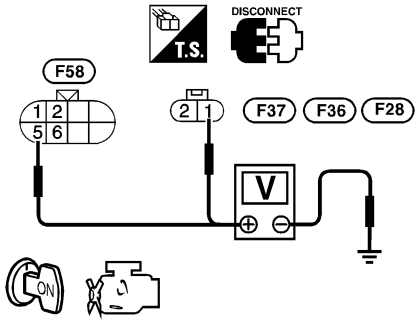


SEC086D



SEC087D

3. Turn ignition switch "ON".
4. Check voltage between injector terminal 1 and ground, harness connector F58 terminal 5 and ground with CONSULT-II or tester.



Voltage: Battery voltage

SEF897XA

OK or NG

OK	▶	GO TO 5.
NG	▶	GO TO 4.

4	DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors M161, F68
- Harness connectors F58, F197
- Fuse block (J/B) connector M19
- 10A fuse
- Harness for open or short between injector and fuse
- Harness for open or short between harness connector F58 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 2, 11, 13, harness connector F58 terminals 6, 2, 1 and ECM terminals 1, 3, 12. 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 F58, F191
- Harness for open or short between harness connector F58 and ECM
- Harness for open or short between ECM and injector

	▶	Repair open circuit or short to ground or short to power in harness or connectors.

7	CHECK SUB-HARNESS CIRCUIT FOR OPEN AND SHORT (BANK 1)

1. Remove intake manifold collector.
2. Disconnect injector harness connectors (Bank 1).
3. Check harness continuity between the following terminals. Refer to Wiring Diagram.

Harness connector F197	Injector F192, F193, F194
5	1
6, 2, 1	2

MTBL1173

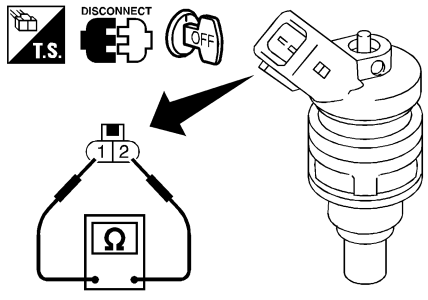
Continuity should exist.

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 INJECTOR

1. Disconnect injector harness connector.
2. Check resistance between terminals as shown in the figure.



Resistance: 13.5 - 17.5 Ω [at 20°C (68°F)]

SEF964XA

OK or NG

OK	▶	GO TO 9.
NG	▶	Replace injector.

Diagnostic Procedure (Cont'd)

9	**CHECK INTERMITTENT INCIDENT**
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.	
▶	**INSPECTION END**

CONSULT-II Reference Value in Data Monitor Mode

NFEC0388

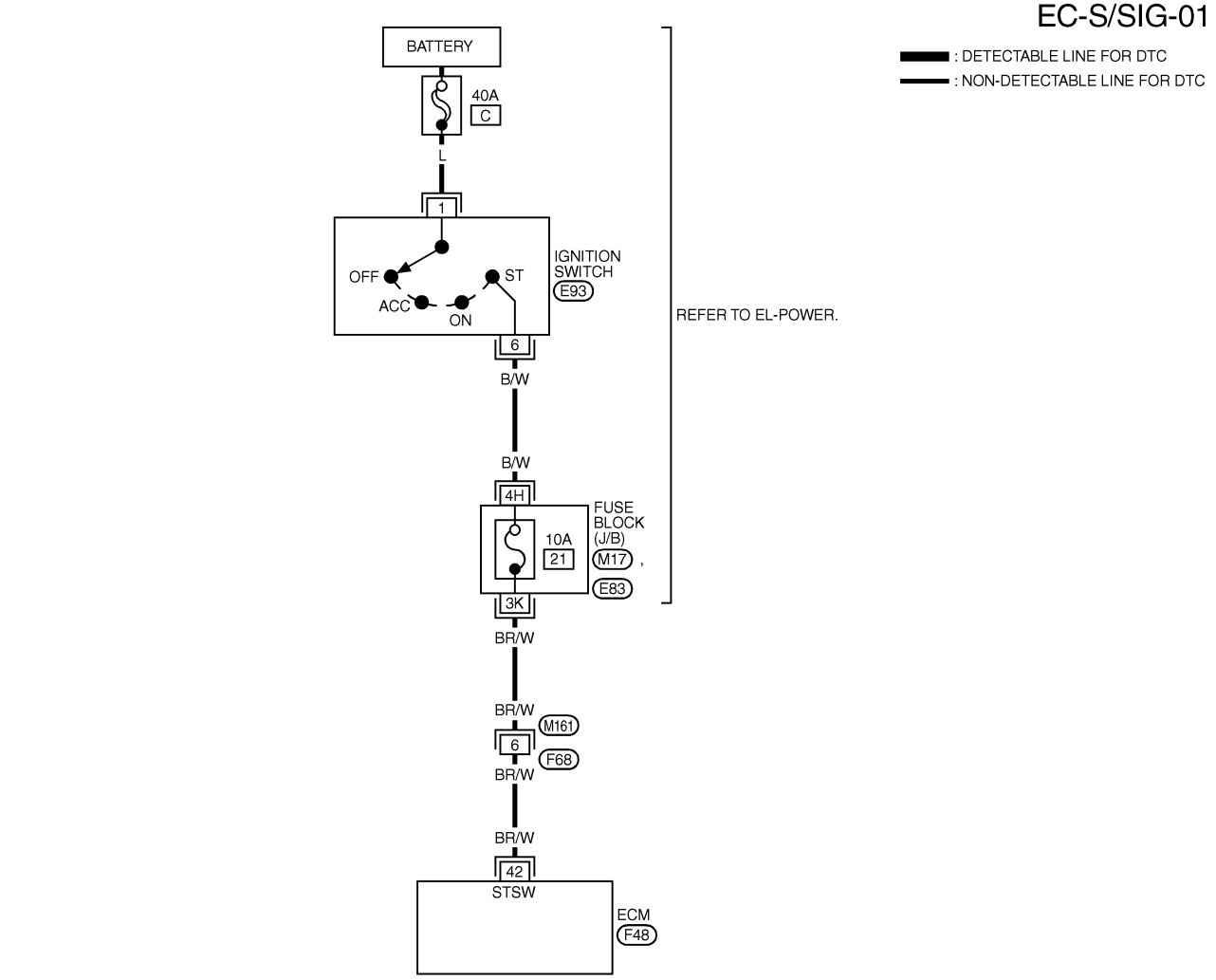
Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
START SIGNAL	● Ignition switch: ON → START → ON	OFF → ON → OFF

Wiring Diagram

=NFEC0390

EC-S/SIG-01



MEC513D

ECM TERMINALS AND REFERENCE VALUE 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	WIRE COLOR	ITEM	CONDITION	DATA (DC)
42	BR/W	START SIGNAL	IGN ON	APPROX 0V
			IGN START	9 - 12V

SEF638XB

Diagnostic Procedure

NFEC0391

1	INSPECTION START

Do you have CONSULT-II?

Yes or No

Yes	▶	GO TO 2.
No	▶	GO TO 3.

2	CHECK OVERALL FUNCTION

With CONSULT-II

1. Turn ignition switch “ON”.
2. Check “START SIGNAL” in “DATA MONITOR” mode with CONSULT-II under the following conditions.

DATA MONITOR	
MONITOR	NO DTC
START SIGNAL	OFF
CLSD THL POS	ON
AIR COND SIG	OFF
P/N POSI SW	ON

Condition	“START SIGNAL”
Ignition switch “ON”	OFF
Ignition switch “START”	ON

SEF072Y

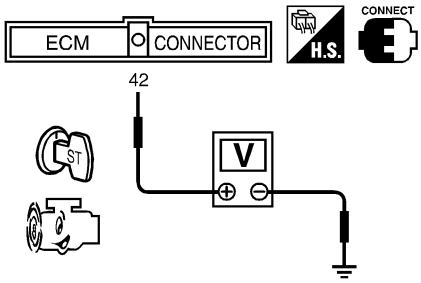
OK or NG

OK	▶	**INSPECTION END**
NG	▶	GO TO 4.

3	CHECK OVERALL FUNCTION

Without CONSULT-II

Check voltage between ECM terminal 42 and ground under the following conditions.



Condition	Voltage
Ignition switch “START”	Battery voltage
Other positions	Approximately 0V

SEF362X

OK or NG

OK	▶	**INSPECTION END**
NG	▶	GO TO 4.

4	CHECK STARTING SYSTEM

Turn ignition switch “OFF”, then turn it to “START”.

Does starter motor operate?

Yes or No

Yes	▶	GO TO 5.
No	▶	Refer to SC-10, “STARTING SYSTEM”.

Diagnostic Procedure (Cont'd)

5	CHECK FUSE
1. Turn ignition switch "OFF". 2. Disconnect 10A fuse. 3. Check if 10A fuse is OK.	
OK or NG	
OK ▶	GO TO 6.
NG ▶	Replace 10A fuse.

6	CHECK START SIGNAL INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
1. Disconnect ECM harness connector. 2. Disconnect ignition switch harness connector. 3. Check harness continuity between ECM terminal 42 and ignition switch terminal 6. 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. ● Harness connectors F68, M161 ● Fuse block (J/B) connectors M17, E83 ● Harness for open or short between ignition switch and ECM	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

8	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.	
▶	**INSPECTION END**

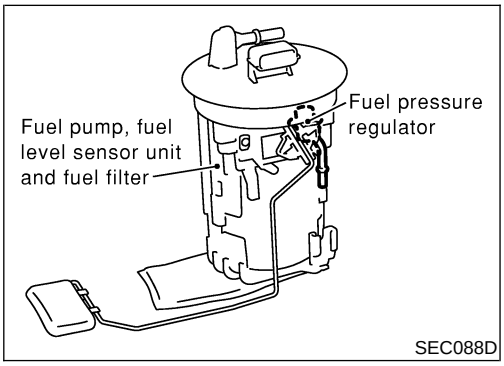
System Description

NFEC0392

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed	Fuel pump control	Fuel pump relay
Ignition switch	Start signal		

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 120° signal from the camshaft position sensor (PHASE), it knows that the engine is rotating, and causes the pump to operate. If the 120° 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

NFEC0393

The fuel pump with a fuel damper is an in-tank type (the pump and damper are located in the fuel tank).

CONSULT-II Reference Value in Data Monitor Mode

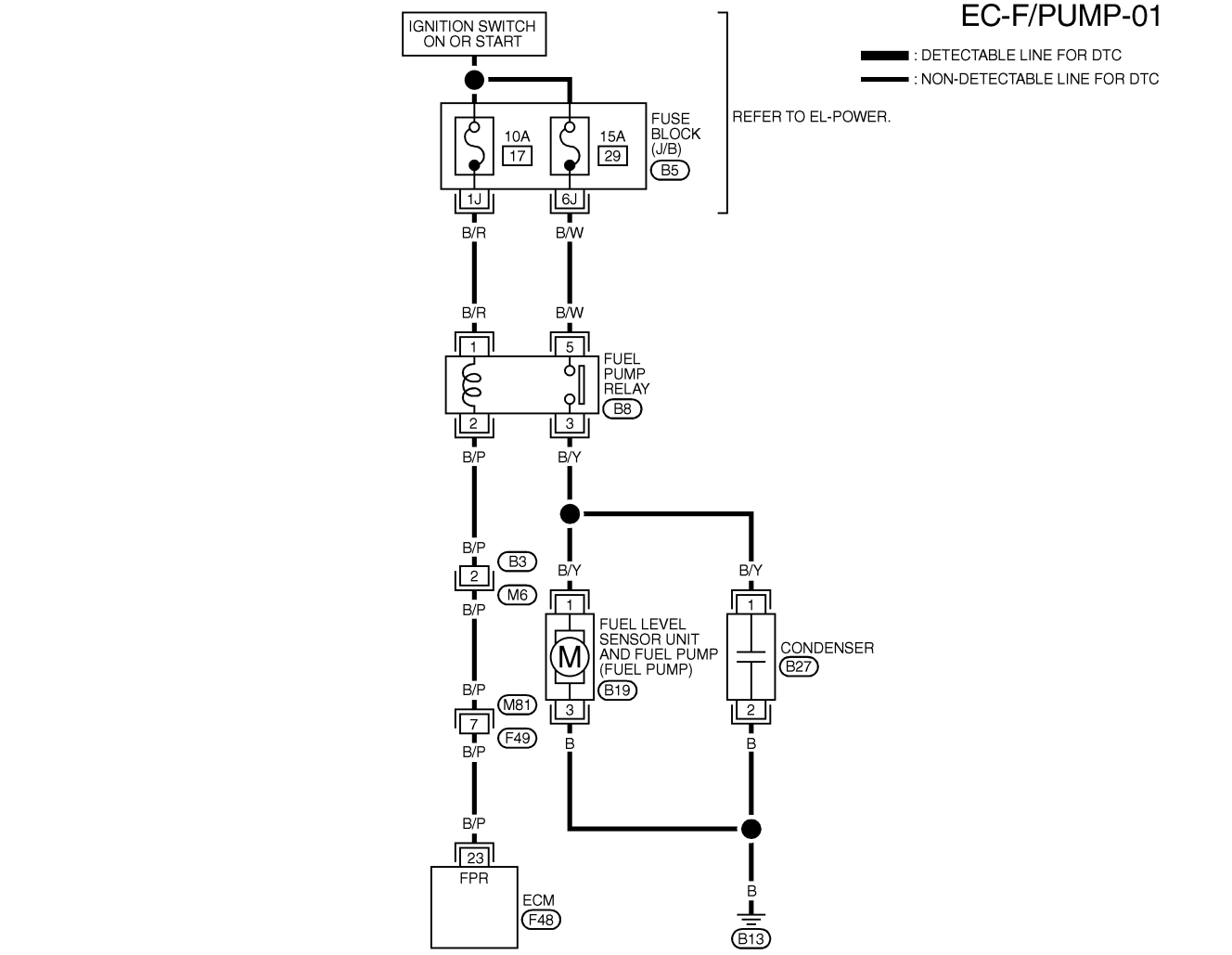
NFEC0394

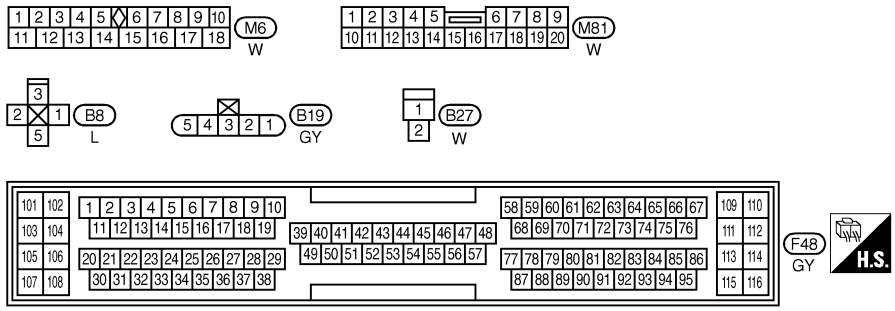
Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
FUEL PUMP RLY	● Ignition switch is turned to ON. (Operates for 1 second.) ● Engine running and cranking	ON
	Except as shown above	OFF

Wiring Diagram

NFEC0396





REFER TO THE FOLLOWING.
B5 -FUSE BLOCK-
JUNCTION BOX (J/B)

MEC514D

ECM TERMINALS AND REFERENCE VALUE 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	WIRE COLOR	ITEM	CONDITION	DATA (DC)
23	B/P	FUEL PUMP RELAY	FOR 1 SECOND AFTER IGN ON	0 - 1.5V
			ENGINE RUNNING	
			MORE THAN 1 SECOND AFTER IGN ON	BATTERY VOLTAGE (11 - 14V)

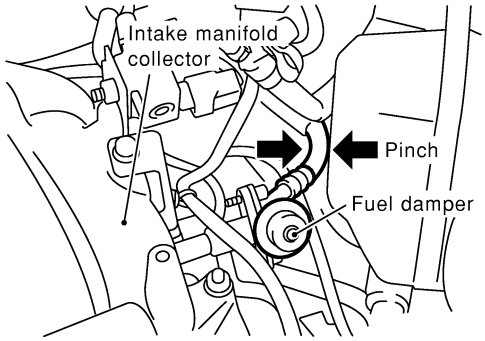
SEF639XC

Diagnostic Procedure

NFEC0397

1	CHECK OVERALL FUNCTION

1. Turn ignition switch “ON”.
2. Pinch fuel feed hose with two fingers.



SEC089D

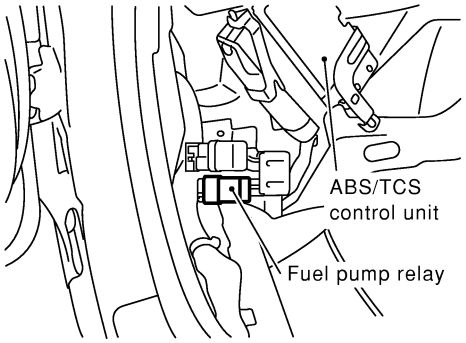
Fuel pressure pulsation should be felt on the fuel feed hose for 1 second after ignition switch is turned “ON”.

OK or NG

OK	▶	**INSPECTION END**
NG	▶	GO TO 2.

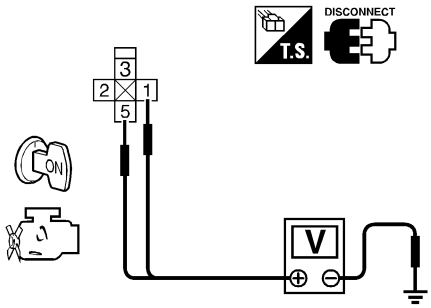
2	CHECK FUEL PUMP RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch “OFF”.
2. Disconnect fuel pump relay.



SEF284X

3. Turn ignition switch “ON”.
4. Check voltage between terminals 1, 5 and ground with CONSULT-II or tester.



Voltage: Battery voltage

SEF898X

OK or NG

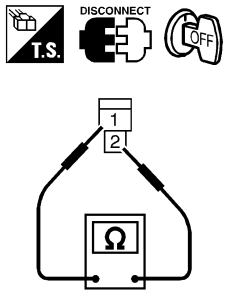
OK	▶	GO TO 4.
NG	▶	GO TO 3.

3	DETECT MALFUNCTIONING PART
Check the following. ● Fuse block (J/B) connector B5 ● 10A fuse ● 15A fuse ● Harness for open or short between fuse and fuel pump relay	
▶	Repair harness or connectors.

4	CHECK CONDENSER CIRCUIT FOR OPEN AND SHORT
1. Turn ignition switch "OFF". 2. Disconnect condenser harness connector. 3. Check harness continuity between fuel pump relay terminal 3 and condenser terminal 1, condenser terminal 2 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 6.
NG ▶	GO TO 5.

5	DETECT MALFUNCTIONING PART
Check the following. ● Harness for open or short between fuel pump relay and condenser ● Harness for open or short between condenser and body ground	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

6	CHECK CONDENSER
1. Turn ignition switch "OFF". 2. Disconnect condenser harness connector. 3. Check resistance between condenser terminals 1 and 2.	



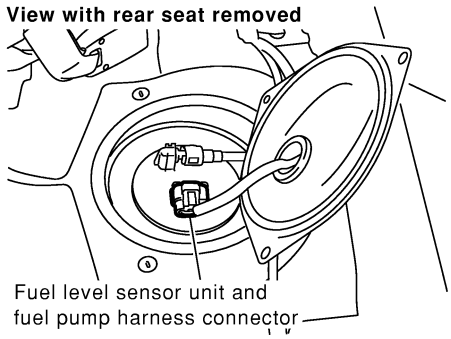
SEF124Y

Resistance: Above 1 MΩ at 25°C (77°F)

OK or NG	
OK ▶	GO TO 7.
NG ▶	Replace condenser.

7	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.



SEC082D

3. Check harness continuity between fuel pump terminal 3 and body ground, fuel pump terminal 1 and fuel pump relay 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 9.
NG	▶	GO TO 8.

8	DETECT MALFUNCTIONING PART

Check the following.
- Harness for open or short between fuel pump relay and fuel pump
- Harness for open or short between fuel pump and body ground

	▶	Repair open circuit or short to ground or short to power in harness or connectors.

9	CHECK FUEL PUMP RELAY OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 23 and fuel pump relay terminal 2. 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 11.
NG	▶	GO TO 10.

10	DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors B3, M6
- Harness connectors M81, F49
- Harness for open or short between ECM and fuel pump relay

	▶	Repair open circuit or short to ground or short to power in harness or connectors.

11	CHECK FUEL PUMP RELAY

With CONSULT-II

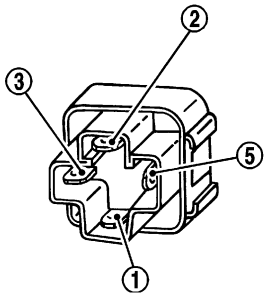
1. Reconnect fuel pump relay, fuel level sensor unit and fuel pump harness connector and ECM harness connector.
2. Turn ignition switch "ON".
3. Turn fuel pump relay "ON" and "OFF" in "ACTIVE TEST" mode with CONSULT-II and check operating sound.

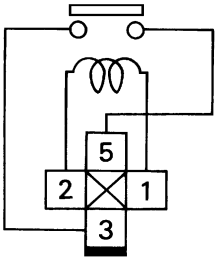
ACTIVE TEST	
FUEL PUMP RELAY	ON
MONITOR	
ENG SPEED	XXX rpm

SEF073Y

Without CONSULT-II

Check continuity between terminals 3 and 5 under the following conditions.





Conditions	Continuity
12V direct current supply between terminals 1 and 2	Yes
No current supply	No

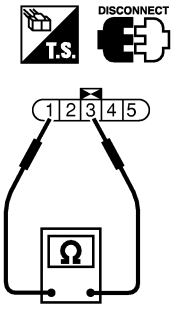
SEF608X

OK or NG

OK	▶	GO TO 12.
NG	▶	Replace fuel pump relay.

12	CHECK 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.



SEC918C

Resistance: 0.2 - 5.0Ω [at 25°C (77°F)]

OK or NG

OK	▶	GO TO 13.
NG	▶	Replace fuel pump.

13	**CHECK INTERMITTENT INCIDENT**
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.	
▶	**INSPECTION END**

System Description

NFEC1328

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed	Engine mount control	Electronic controlled engine mount
Wheel sensor	Vehicle speed		

The ECM controls the engine mount operation corresponding to the engine speed and the vehicle speed. The control system has 2-step control [soft/hard].

Vehicle condition	Engine mount control
Idle (with vehicle stopped)	Soft
Driving	Hard

CONSULT-II Reference Value in Data Monitor Mode

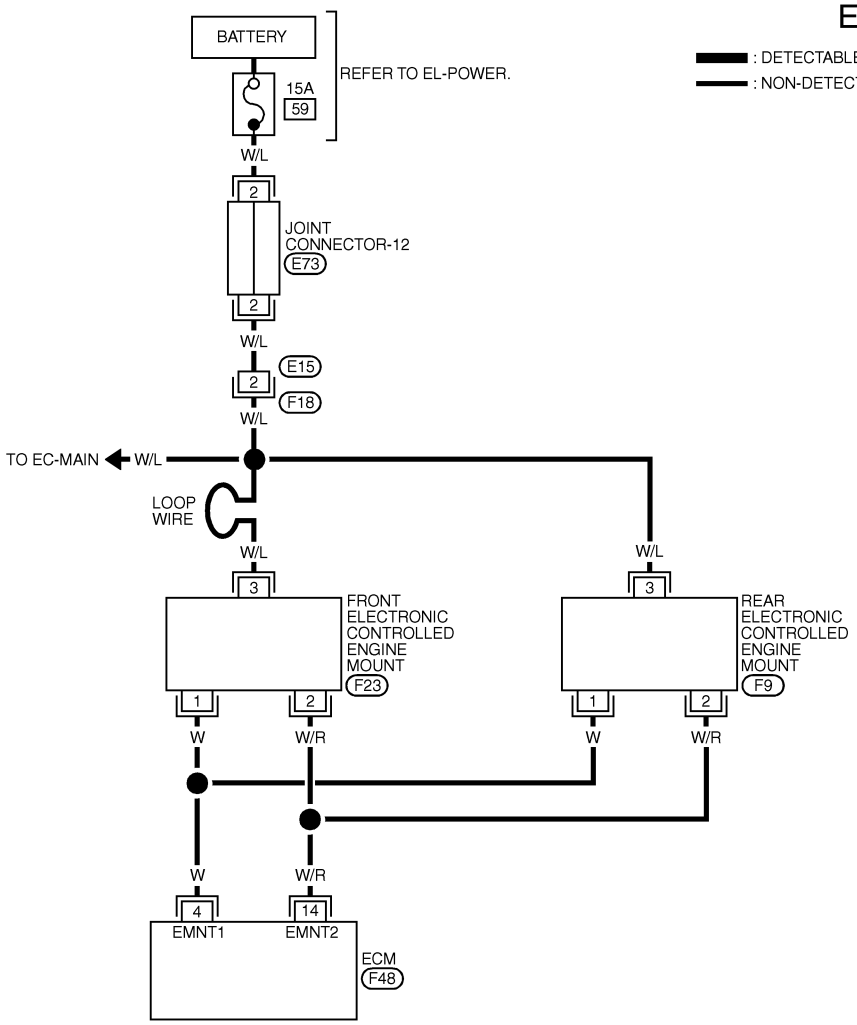
NFEC1329

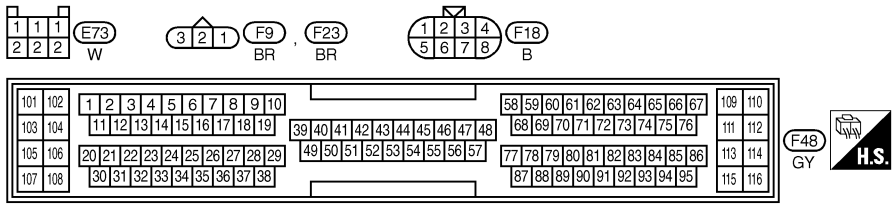
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ENGINE MOUNT	• Engine: Running	Idle	“IDLE”
		Except above	“TRVL”

Wiring Diagram

NFEC1330





MEC515D

ECM TERMINALS AND REFERENCE VALUE 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	WIRE COLOR	ITEM	CONDITION	DATA (DC)
4	W	ELECTRONIC CONTROLLED ENGINE MOUNT-1	ENGINE RUNNING AT IDLE SPEED	0 - 1.0V
			EXCEPT ABOVE	BATTERY VOLTAGE
14	W/R	ELECTRONIC CONTROLLED ENGINE MOUNT-2	ENGINE RUNNING AT IDLE SPEED	BATTERY VOLTAGE
			EXCEPT ABOVE	0 - 1.0V

SEF640XC

Diagnostic Procedure

NFEC1331

1	CHECK THE OVERALL FUNCTION

With CONSULT-II

1. After warming up engine, run it at idle speed.
2. Shift selector lever to “D” range while depressing the brake pedal and pulling the parking brake control lever.
3. Perform “ENGINE MOUNTING” in “ACTIVE TEST” mode with CONSULT-II and check that the body vibration changes according to switching the condition (With vehicle stopped).

ACTIVE TEST	
ENGINE MOUNTING	IDLE
MONITOR	
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEC237C

Without CONSULT-II

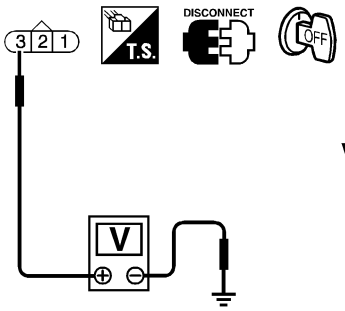
1. After warming up engine, run it at idle speed.
2. Shift selector lever to “D” range while depressing the brake pedal and pulling the parking brake control lever.
3. Disconnect front or rear electronic controlled engine mount harness connector when engine speed is more than 1,000 rpm.
4. When returning engine speed to idle speed, check that the body vibration increases, compared with the condition of the above step 2 (With vehicle stopped).

OK or NG

OK	▶	**INSPECTION END**
NG	▶	GO TO 2.

2	CHECK ELECTRONIC CONTROLLED ENGINE MOUNT POWER SUPPLY CIRCUIT

1. Turn ignition switch “OFF”.
2. Disconnect front or rear electronic controlled engine mount harness connector.
3. Check voltage between electronic controlled engine mount terminal 3 and ground with CONSULT-II or tester.



Voltage: Battery voltage

SEF899X

OK or NG

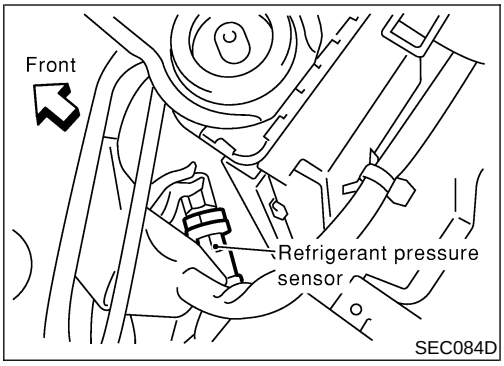
OK	▶	GO TO 4.
NG	▶	GO TO 3.

3	DETECT MALFUNCTIONING PART
Check the following. ● Harness connectors E15, F18 ● 15A fuse ● Joint connector-12 ● Harness for open or short between electronic controlled engine mount and battery	
▶	Repair harness or connectors.

4	CHECK ELECTRONIC CONTROLLED ENGINE MOUNT OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	
1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 4 and electronic controlled engine mount terminal 1, ECM terminal 14 and electronic controlled engine mount terminal 2. 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, short to ground or short to power in harness connectors.

5	CHECK ELECTRONIC CONTROLLED ENGINE MOUNT	
Visually check front and rear electronic controlled engine mount.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Replace front or rear engine mount assembly.

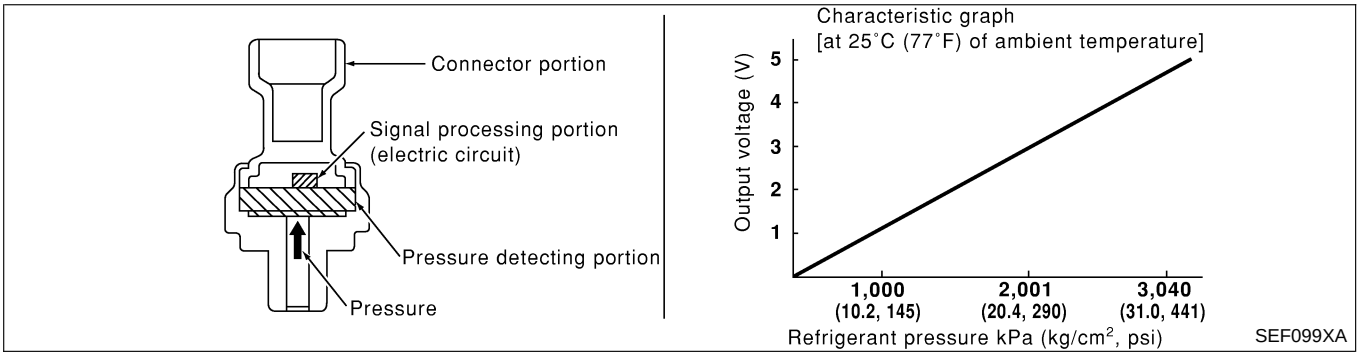
6	CHECK INTERMITTENT INCIDENT	
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.		
▶	**INSPECTION END**	



Description

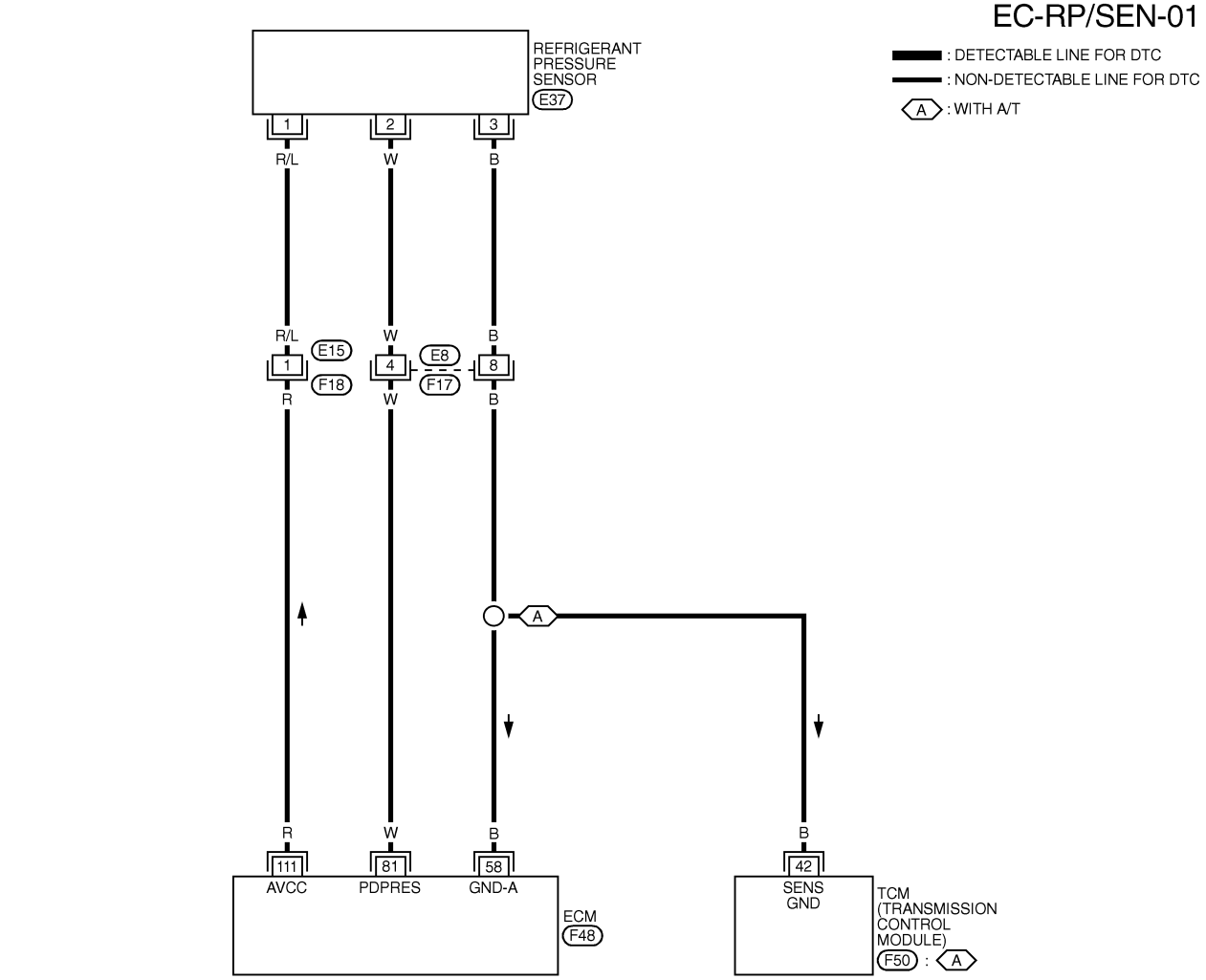
NFEC0636

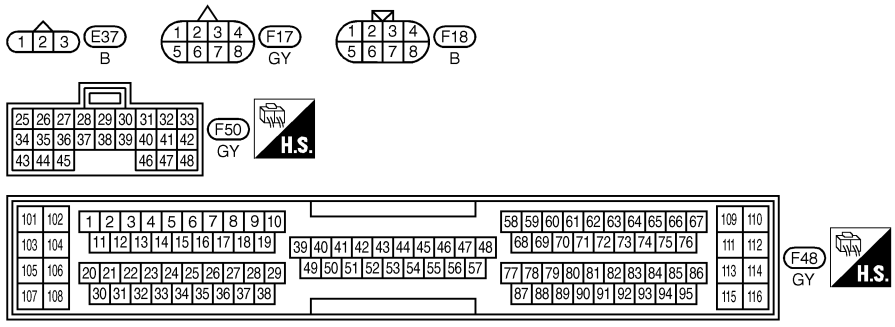
The refrigerant pressure sensor is installed at the liquid tank of the air conditioner system. The sensor uses an electrostatic volume pressure transducer to convert refrigerant pressure to voltage. The voltage signal is sent to ECM, and ECM controls cooling fan system.



Wiring Diagram

NFEC0637





MEC517D

ECM TERMINALS AND REFERENCE VALUE 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	WIRE COLOR	ITEM	CONDITION	DATA (DC)
58	B	SENSOR'S GROUND	ENGINE RUNNING AT IDLE SPEED UNDER WARM-UP CONDITION	0V
81	W	REFRIGERANT PRESSURE SENSOR	ENGINE RUNNING UNDER WARM-UP CONDITION WITH A/C SWITCH AND BLOWER SWITH ON	1.0 - 4.0V
111	R	SENSOR'S POWER SUPPLY	IGN ON	APPROX. 5V

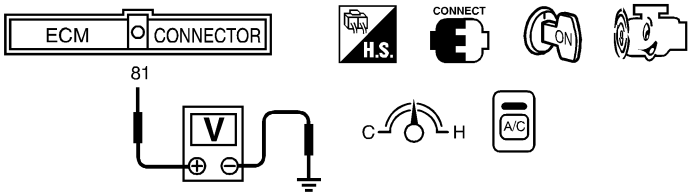
SEF643XC

Diagnostic Procedure

NFEC0638

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 81 and ground with CONSULT-II or tester.



Voltage: 1 - 4V

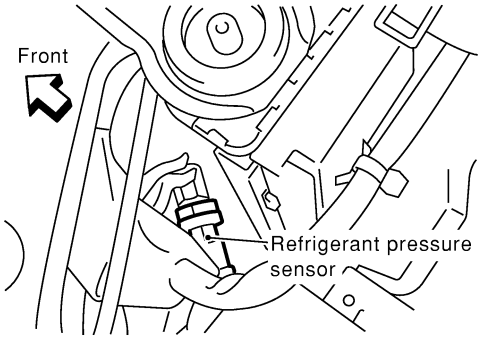
SEF617XA

OK or NG

OK	▶	**INSPECTION END**
NG	▶	GO TO 2.

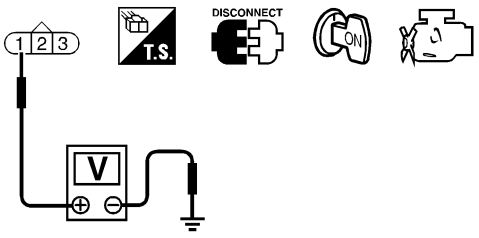
2	CHECK REFRIGERANT PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Turn A/C switch and blower switch “OFF”.
2. Stop engine.
3. Disconnect refrigerant pressure sensor harness connector.



SEC084D

4. Turn ignition switch “ON”.
5. Check voltage between refrigerant pressure sensor terminal 1 and ground with CONSULT-II or tester.



Voltage: Approximately 5V

SEF618X

OK or NG

OK	▶	GO TO 4.
NG	▶	GO TO 3.

3	DETECT MALFUNCTIONING PART
Check the following. ● Harness connectors E15, F18 ● 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. Check harness continuity between refrigerant pressure sensor terminal 3 and engine ground. Refer to Wiring Diagram. **Continuity should exist.** 3. Also check harness for short to power.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	GO TO 5.

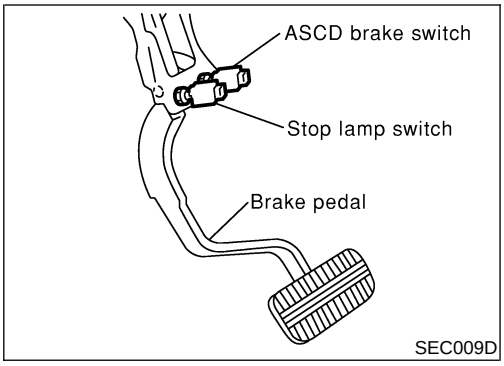
5	DETECT MALFUNCTIONING PART
Check the following. ● Harness connectors E8, F17 ● Harness for open between ECM and refrigerant pressure sensor ● Harness for open between TCM (Transmission control module) and refrigerant pressure sensor	
▶	Repair open circuit or short to power in harness or connectors.

6	CHECK REFRIGERANT PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	
1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 81 and refrigerant pressure sensor terminal 2. 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	▶	GO TO 7.

7	DETECT MALFUNCTIONING PART
Check the following. ● Harness connectors E8, F17 ● 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 REFRIGERANT PRESSURE SENSOR	
Refer to HA-15, "Refrigerant pressure sensor".		
OK or NG		
OK	▶	GO TO 9.
NG	▶	Replace refrigerant pressure sensor.

9	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.	
▶	**INSPECTION END**



Component Description

NFEC1232

When depressing the brake pedal, ASCD brake switch is turned OFF and stop lamp switch is turned ON.
ECM detects the state of the brake pedal by this two kinds of input (ON/OFF signal).
Refer to EC-53 for the ASCD function.

CONSULT-II Reference Value in Data Monitor Mode

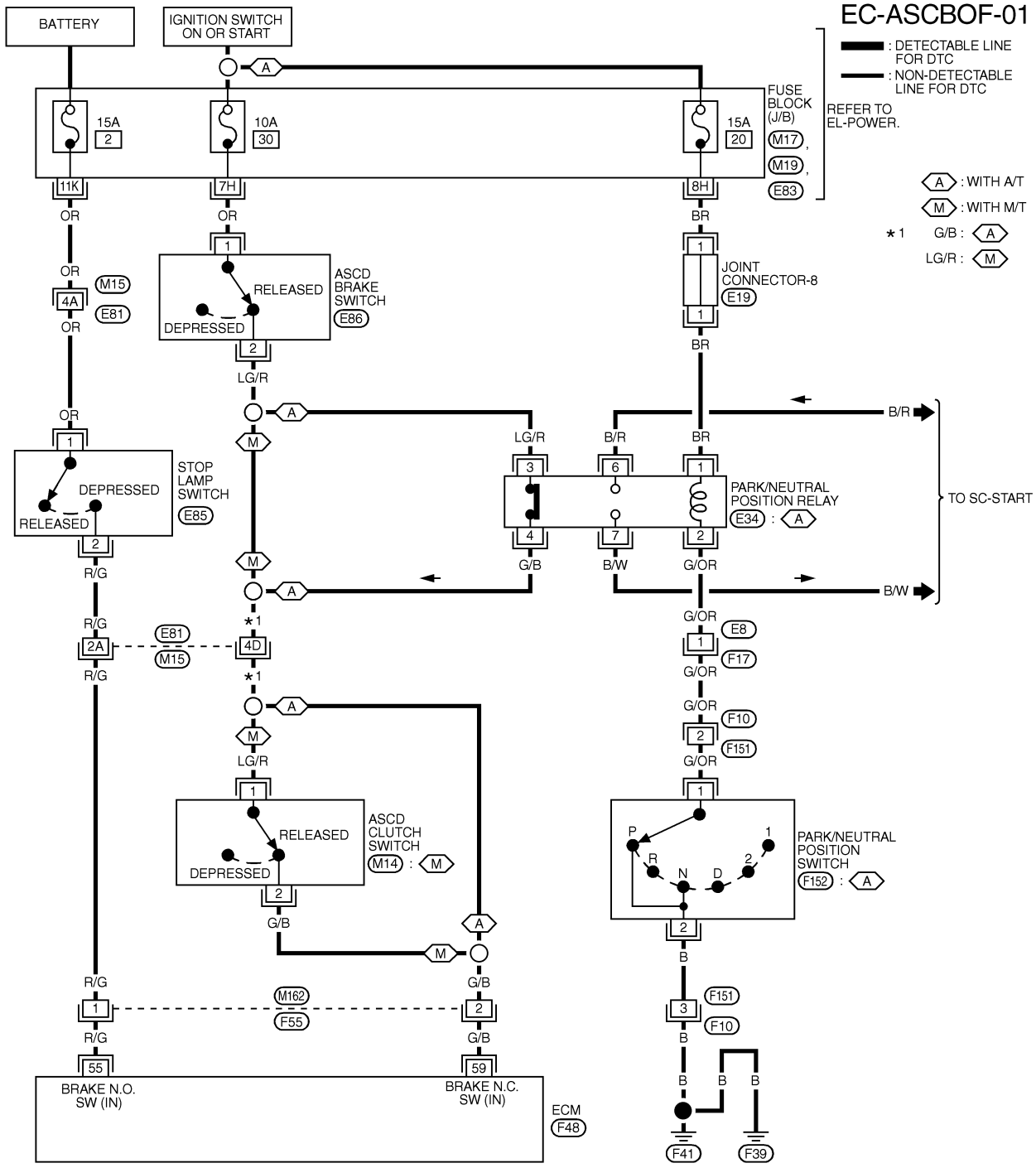
NFEC1233

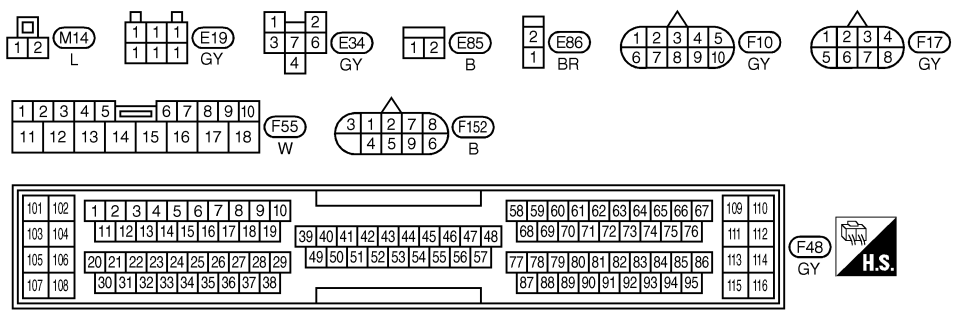
CONSULT-II Reference Value in Data Monitor Mode Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
BRAKE SW 1 (ASCD brake switch)	• Ignition switch: ON • Shift lever: Except “N” and “P” position	• Brake pedal fully released	ON
		• Brake pedal depressed	OFF
BRAKE SW 2 (Stop lamp switch)	• Ignition switch: ON	• Brake pedal fully released	OFF
		• Brake pedal depressed	ON

Wiring Diagram

NFEC1237





REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)
M17 , M19 , E83
-FUSE BLOCK- JUNCTION BOX (J/B)

MEC694D

Wiring Diagram (Cont'd)

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)
55	R/G	Stop lamp switch	**[Ignition switch "ON"]** ● Brake pedal is fully released	Approximately 0V
			[Ignition switch "ON"] ● Brake pedal is depressed	BATTERY VOLTAGE (11 - 14V)
59	G/B	ASCD brake switch	**[Ignition switch "ON"]** ● Brake pedal is fully released ● Clutch pedal is fully released (M/T models)	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch "ON"] ● Brake pedal is depressed ● Clutch pedal is fully depressed (M/T models)	Approximately 0V

Diagnostic Procedure

NFEC1238

1	CHECK OVERALL FUNCTION-I

With CONSULT-II

1. Turn ignition switch “ON”.
2. Select “BRAKE SW1” in “DATA MONITOR” mode with CONSULT-II.
3. Check the indication of “BRAKE SW1” under the following conditions.

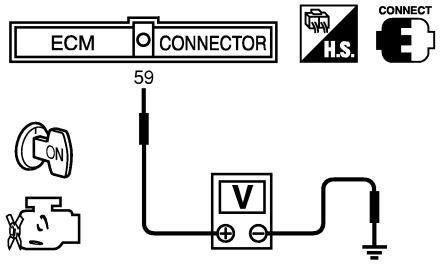
DATA MONITOR	
MONITOR	NO DTC
BRAKE SW1	OFF

SEC011D

A/T models
When brake pedal is depressed or A/T selector lever is in “N” or “P” range:
BRAKE SW1 OFF
When brake pedal is released and A/T selector lever is not “N” or “P” range:
BRAKE SW1 ON
M/T models
When clutch pedal or brake pedal is depressed:
BRAKE SW1 OFF
When clutch pedal and brake pedal are released:
BRAKE SW1 ON

Without CONSULT-II

1. Turn ignition switch “ON”.
2. Check voltage between ECM terminal 59 and ground under the following conditions.



SEC012D

When brake or clutch pedal is depressed (M/T), or when brake pedal is depressed or A/T selector lever is in “N” or “P” range (A/T):
Approx. 0V
When brake and clutch pedal are released (M/T), or when both brake pedal is released and A/T selector lever is not in “N” or “P” range (A/T):
Battery voltage should exist.

Refer to Wiring Diagram.

OK or NG

OK	▶	GO TO 2.
NG	▶	A/T MODELS: GO TO 3.
NG	▶	M/T MODELS: GO TO 19.

Diagnostic Procedure (Cont'd)

2	CHECK OVERALL FUNCTION-II

With CONSULT-II

See "BRAKE SW2" indication in "DATA MONITOR" mode.

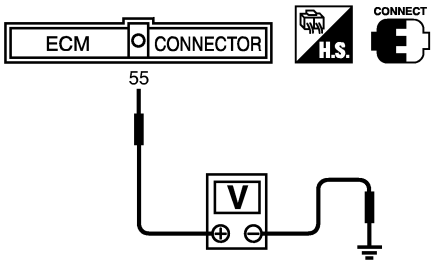
DATA MONITOR	
MONITOR	NO DTC
BRAKE SW2	OFF

SEC013D

When brake pedal is released:
BRAKE SW2 OFF
When brake pedal is depressed:
BRAKE SW2 ON

Without CONSULT-II

Check voltage between ECM terminal 55 and ground under the following conditions.



SEC014D

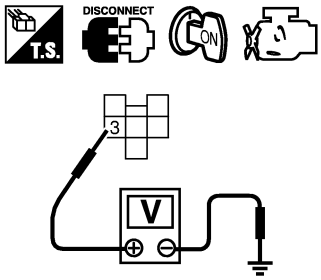
When brake pedal is released:
Approx. 0V
When brake pedal is depressed:
Battery voltage should exist.
Refer to Wiring Diagram.

OK or NG

OK	▶	GO TO 33.
NG	▶	GO TO 28.

3	CHECK ASCD BRAKE SWITCH CIRCUIT-I

1. Turn ignition switch "OFF".
2. Disconnect park/neutral position relay harness connector.
3. Turn ignition switch "ON".
4. Check voltage between park/neutral position relay terminal 3 and ground under the following conditions.



SEC209D

CONDITION	VOLTAGE
When brake pedal is released	Battery voltage
When brake pedal is depressed	Approx. 0V

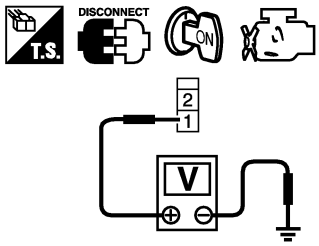
MTBL1259

OK or NG

OK	▶	GO TO 8.
NG	▶	GO TO 4.

4	CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect ASCD brake switch harness connector.
3. Turn ignition switch "ON".
4. Check voltage between ASCD brake switch terminal 1 and ground with CONSULT-II or tester.



PBIB0857E

Voltage: Battery voltage

OK or NG

OK	▶	GO TO 6.
NG	▶	GO TO 5.

5	DETECT MALFUNCTIONING PART

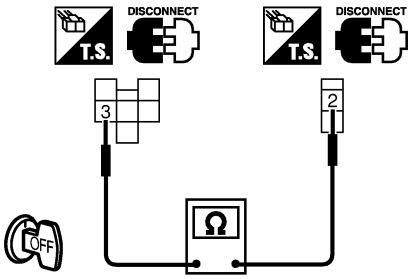
Check the following.
- Fuse block (J/B) connector E83
- 10A fuse
- Harness for open or short between ASCD brake switch and fuse

	▶	Repair open circuit or short to ground or short to power in harness or connectors.

Diagnostic Procedure (Cont'd)

6	CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check continuity between ASCD brake switch terminal 2 and park/neutral position relay terminal 3.



SEC213D

Continuity should exist.

3. 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 ASCD BRAKE SWITCH

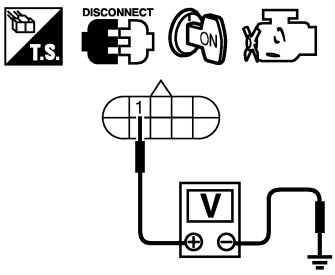
Refer to "Component Inspection", EC-661.

OK or NG

OK	▶	GO TO 8.
NG	▶	Replace ASCD brake switch.

8	CHECK PARK/NEUTRAL POSITION (PNP) RELAY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect park/neutral position switch harness connector.
3. Turn ignition switch "ON".
4. Check voltage between park/neutral position (PNP) switch terminal 1 and ground with CONSULT-II or tester.



SEC214D

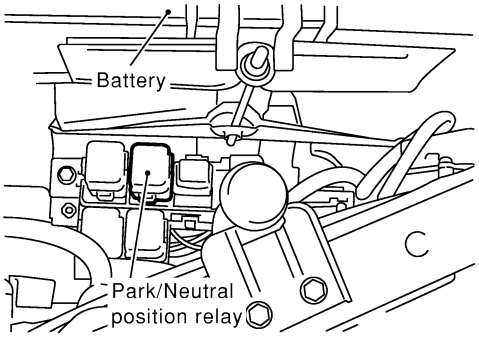
Voltage: Battery voltage

OK or NG

OK	▶	GO TO 13.
NG	▶	GO TO 9.

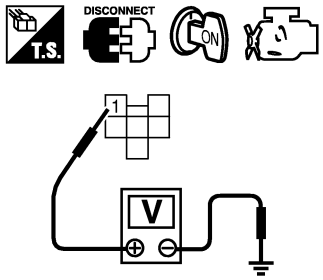
9	CHECK PARK/NEUTRAL POSITION (PNP) RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect park/neutral position (PNP) relay.



SEC018D

3. Turn ignition switch "ON".
4. Check voltage between park/neutral position (PNP) relay terminal 1 and ground with CONSULT-II or tester.



SEC019D

Voltage: Battery voltage

OK or NG

OK	▶	GO TO 11.
NG	▶	GO TO 10.

10	DETECT MALFUNCTIONING PART

Check the following.
- Fuse block (J/B) connector E83
- 15A fuse
- Joint connector-8
- Harness for open or short between park/neutral position (PNP) relay and fuse

	▶	Repair open circuit or short to ground in harness or connectors.

11	CHECK PARK/NEUTRAL POSITION RELAY CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check continuity between park/neutral position (PNP) relay terminal 2 and park/neutral position switch 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 13.
NG	▶	GO TO 12.

Diagnostic Procedure (Cont'd)

12	DETECT MALFUNCTIONING PART
Check the following. ● Harness connectors E8, F17 ● Harness connectors F10, F151 ● Harness for open or short between park/neutral position relay and park/neutral position switch	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

13	CHECK PARK/NEUTRAL POSITION RELAY
Refer to "Component Inspection", EC-661.	
OK or NG	
OK ▶	GO TO 28.
NG ▶	Replace park/neutral position relay.

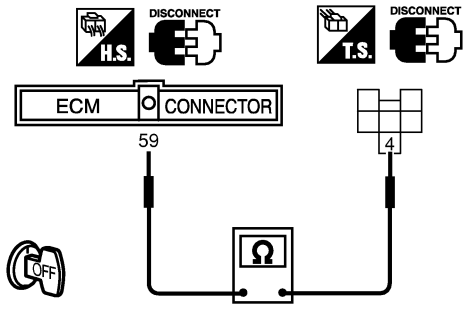
14	CHECK PARK/NEUTRAL POSITION (PNP) SWITCH GROUND CIRCUIT
1. Turn ignition switch "OFF". 2. Disconnect park/neutral position switch harness connector. 3. Check continuity between park/neutral position (PNP) switch terminal 2 and ground. **Continuity should exist.** 4. Also check harness for short to ground and short to power.	
OK or NG	
OK ▶	GO TO 16.
NG ▶	GO TO 15.

15	DETECT MALFUNCTIONING PART
Check the following. ● Harness connectors F10, F151 ● Harness for open or short between park/neutral position (PNP) switch and ground	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

16	CHECK PARK/NEUTRAL POSITION SWITCH
Refer to "Component Inspection", EC-661.	
OK or NG	
OK ▶	GO TO 17.
NG ▶	Replace park/neutral position switch.

17	CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector and park/neutral position (PNP) relay harness connector.
3. Check harness continuity between park/neutral position (PNP) relay terminal 4 and ECM terminal 59.



SEC215D

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK	▶	GO TO 28.
NG	▶	GO TO 18.

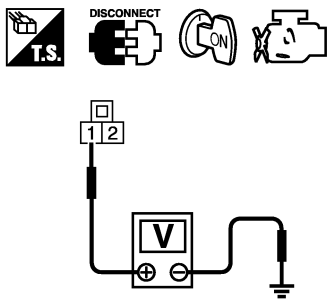
18	DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E81, M15
- Harness connectors M162, F55
- Harness for open or short between park/neutral position (PNP) relay and ECM

	▶	Repair open circuit or short to ground or short to power in harness or connectors.

19	CHECK ASCD BRAKE SWITCH CIRCUIT-II

1. Turn ignition switch "OFF".
2. Disconnect ASCD clutch switch harness connector.
3. Turn ignition switch "ON".
4. Check voltage between ASCD clutch switch terminal 1 and ground under the following conditions.



PBIB0799E

CONDITION	VOLTAGE
When brake pedal is released	Battery voltage
When brake pedal is depressed	Approx. 0V

MTBL1303

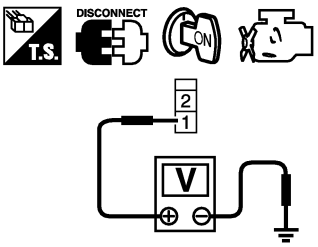
OK or NG

OK	▶	GO TO 25.
NG	▶	GO TO 20.

Diagnostic Procedure (Cont'd)

20	CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect ASCD brake switch harness connector.
3. Turn ignition switch "ON".
4. Check voltage between ASCD brake switch terminal 1 and ground with CONSULT-II or tester.



PBIB0857E

Voltage: Battery voltage

OK or NG

OK	▶	GO TO 22.
NG	▶	GO TO 21.

21	DETECT MALFUNCTIONING PART

Check the following.
- Fuse block (J/B) connector E83
- 10A fuse
- Harness for open or short between ASCD brake switch and fuse

	▶	Repair open circuit or short to ground or short to power in harness or connectors.

22	CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect ASCD clutch switch harness connector.
3. Check continuity between ASCD brake switch terminal 2 and ASCD clutch switch 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 24.
NG	▶	GO TO 23.

23	DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E81, M15
- Harness for open or short between ASCD brake switch and ASCD clutch switch

	▶	Repair open circuit or short to ground or short to power in harness or connectors.

24	CHECK ASCD BRAKE SWITCH

Refer to "Component Inspection", EC-661.

OK or NG

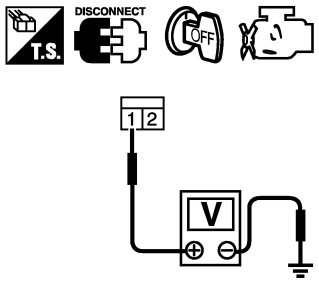
OK	▶	GO TO 25.
NG	▶	Replace ASCD brake switch.

25	CHECK ASCD CLUTCH SWITCH CIRCUIT FOR OPEN AND SHORT
1. Turn ignition switch "OFF". 2. Check continuity between ASCD clutch switch terminal 2 and ECM terminal 59. **Continuity should exist.** 3. Also check harness for short to ground and short to power.	
OK or NG	
OK ▶	GO TO 27.
NG ▶	GO TO 26.

26	DETECT MALFUNCTIONING PART
Check the following. ● Harness connectors M162, F55 ● Harness for open or short between ASCD clutch switch and ECM	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

27	CHECK ASCD CLUTCH SWITCH
Refer to "Component Inspection", EC-661.	
OK or NG	
OK ▶	GO TO 28.
NG ▶	Replace ASCD clutch switch.

28	CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT
1. Turn ignition switch "OFF". 2. Disconnect stop lamp switch harness connector. 3. Check voltage between stop lamp switch terminal 1 and ground with CONSULT-II or tester.	



PBIB0117E

Voltage: Battery voltage

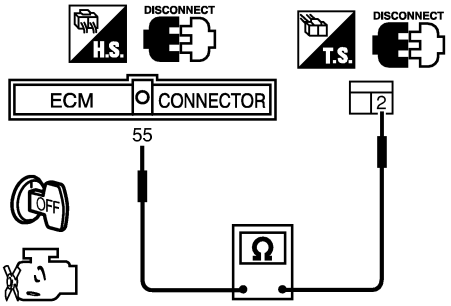
OK or NG	
OK ▶	GO TO 30.
NG ▶	GO TO 29.

29	DETECT MALFUNCTIONING PART
Check the following. ● Fuse block (J/B) connector M17 ● 15A fuse ● Harness connectors M15, E81 ● Harness for open or short between stop lamp switch and fuse	
▶	Repair open circuit or short to ground in harness or connectors.

Diagnostic Procedure (Cont'd)

30	CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between stop lamp switch terminal 2 and ECM terminal 55.



SEC216D

Continuity should exist

3. Also check harness for short to ground and short to power.

OK or NG

OK	▶	GO TO 32.
NG	▶	GO TO 31.

31	DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors M15, E81
- Harness connectors M162, F55
- Harness for open or short between stop lamp switch and ECM

	▶	Repair open circuit or short to ground or short to power in harness or connectors.

32	CHECK STOP LAMP SWITCH

Refer to "Component Inspection", EC-661.

OK or NG

OK	▶	GO TO 33.
NG	▶	Replace stop lamp switch.

33	CHECK INTERMITTENT INCIDENT

Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.

	▶	**INSPECTION END**

Component Description

NFEC1240

ASCD indicator lamp illuminates to indicate ASCD operation status. Lamp has two indicators, CRUISE and SET, and is integrated in combination meter.

CRUISE indicator illuminates when CRUISE switch on steering switch is turned ON to indicate that ASCD system is ready for operation.

SET indicator illuminates when following conditions are met. CRUISE indicator illuminates, and SET switch on steering switch is turned ON while vehicle speed is within range of ASCD setting. SET indicator remains lit during ASCD control. Refer to EC-53 for ASCD functions.

CONSULT-II Reference Value in Data Monitor Mode

NFEC1474

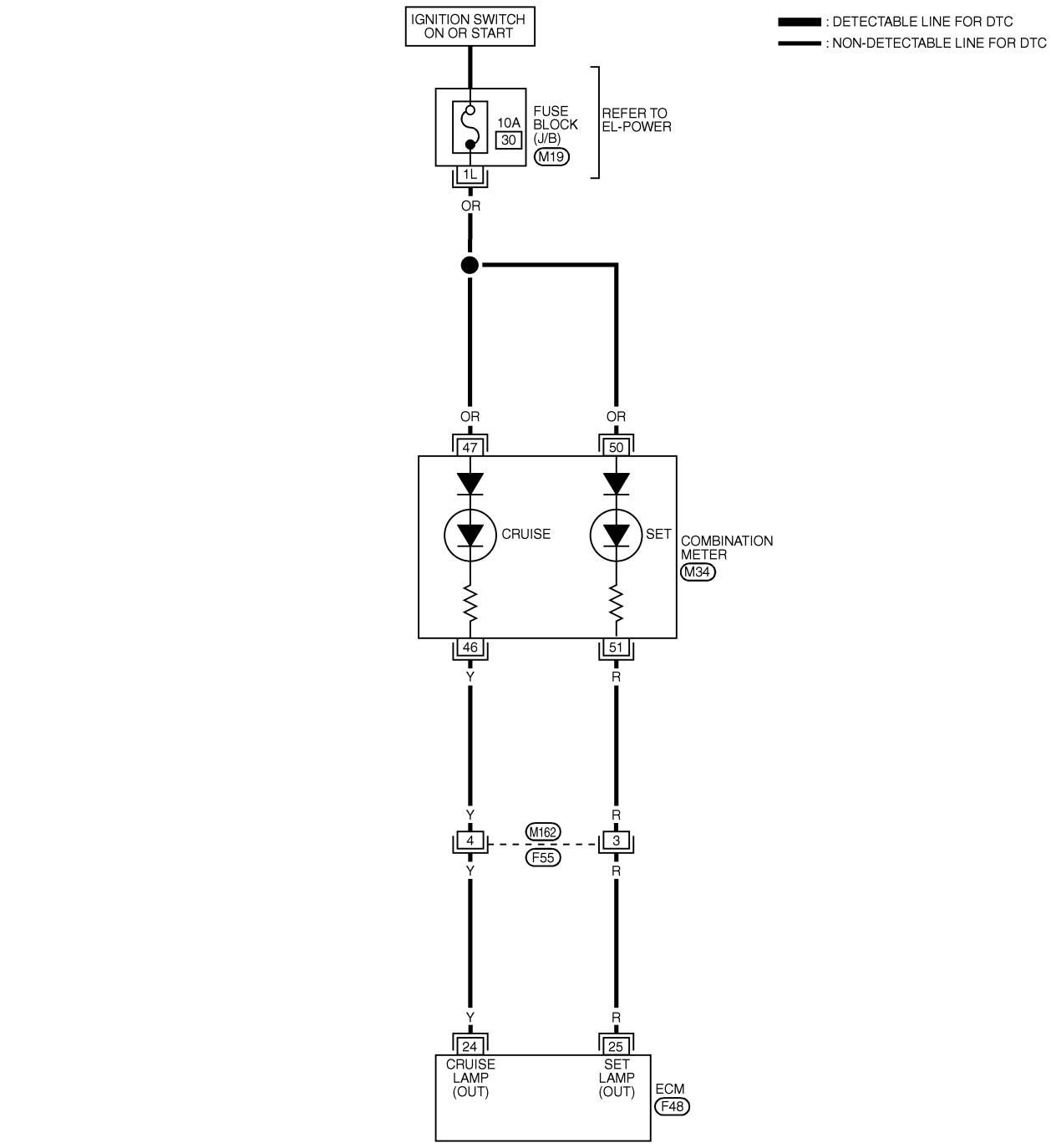
Specification data are reference values.

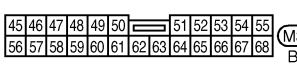
MONITOR ITEM	CONDITION		SPECIFICATION
CRUISE LAMP	• Ignition switch: ON	• CRUISE switch is depressed at first time → second time.	ON → OFF
SET LAMP	• When vehicle speed is between 40 km/h (25 MPH) to 144 km/h (89 MPH), and CRUISE switch is ON.	• COAST/SET switch pressed	ON
		• ASCD control is canceled.	OFF

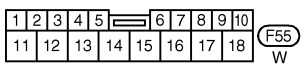
Wiring Diagram

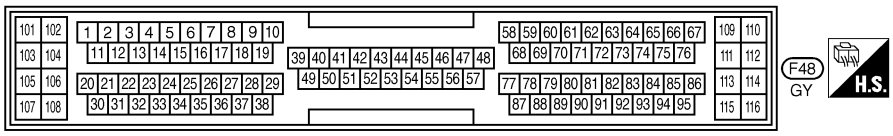
NFEC1242

EC-ASCIND-01









REFER TO THE FOLLOWING.
M19 -FUSE BLOCK-JUNCTION BOX (J/B)

MEC692D

Diagnostic Procedure

NFEC1243

1	CHECK OVERALL FUNCTION

Check ASCD indicator under the following conditions.

MONITOR ITEM	CONDITION		SPECIFICATION
CRUISE LAMP	Ignition switch : ON	CRUISE switch pressed	ON
		CRUISE switch released	OFF
SET LAMP	When vehicle speed is between 40 km/h (25 MPH) to 144 km/h (89 MPH), and CRUISE switch is ON.	COAST/SET switch pressed	ON
		COAST/SET switch released	OFF

MTBL1260

OK or NG

OK	▶	**INSPECTION END**
NG	▶	GO TO 2.

2	CHECK COMBINATION METER OPERATION

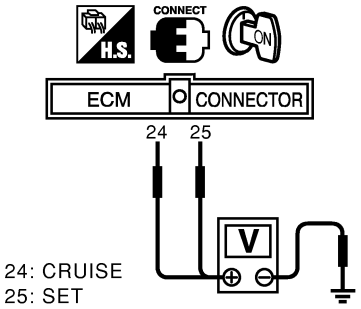
Check that combination meter operates normally.

OK or NG

OK	▶	GO TO 3.
NG	▶	Check combination meter circuit. Refer to EL-121.

3	CHECK INDICATOR CIRCUIT

1. Turn ignition switch “ON”.
2. Check voltage between ECM terminals 24, 25 and ground with CONSULT-II or tester.



SEC028D

Battery voltage should exist.

OK or NG

OK	▶	GO TO 5.
NG	▶	GO TO 4.

4	DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors F55, M162
- Harness for open or short between combination meter and ECM

	▶	Repair open circuit or short to ground or short to power in harness or connectors.

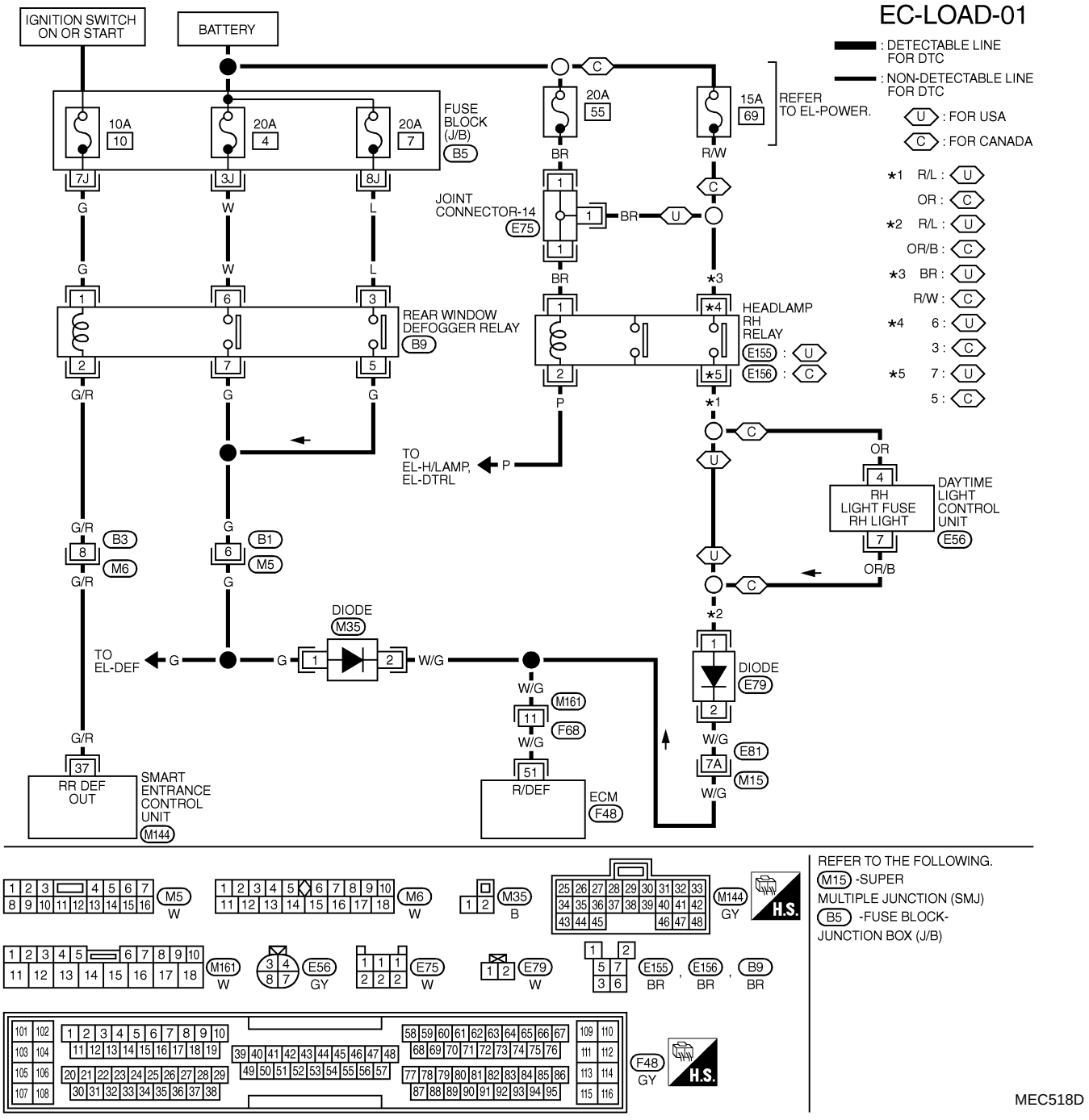
5	CHECK INTERMITTENT INCIDENT

Refer to “TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT”, EC-156.

	▶	**INSPECTION END**

Wiring Diagram

NFEC0604



ECM TERMINALS AND REFERENCE VALUE 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	WIRE COLOR	ITEM	CONDITION	DATA (DC)
51	W/G	ELECTRICAL LOAD SIGNAL	IGN ON WITH REAR WINDOW DEFOGGER SWITCH ON OR LIGHTING SWITCH ON AT 1ST POSITION	BATTERY VOLTAGE
			IGN ON UNDER EXCEPT ABOVE CONDITION	0V

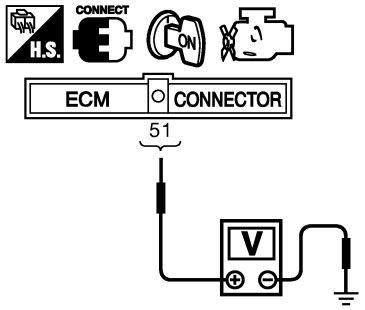
SEF642XC

Diagnostic Procedure

NFEC0605

1	CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-I

1. Turn ignition switch “ON”.
2. Check voltage between ECM terminal 51 and ground under the following conditions.



SEC090D

Condition	Voltage
Rear window defogger switch “ON”	BATTERY VOLTAGE
Rear window defogger switch “OFF”	0V

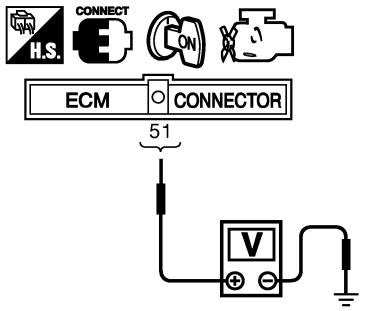
MTBL1165

OK or NG

OK	▶	GO TO 2.
NG	▶	GO TO 3.

2	CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-II

Check voltage between ECM terminal 51 and ground under the following conditions.



SEC090D

Condition	Voltage
Lighting switch “ON” at 1st position	BATTERY VOLTAGE
Lighting switch “OFF”	0V

MTBL1166

OK or NG

OK	▶	**INSPECTION END**
NG	▶	GO TO 7.

Diagnostic Procedure (Cont'd)

3	CHECK REAR WINDOW DEFOGGER FUNCTION

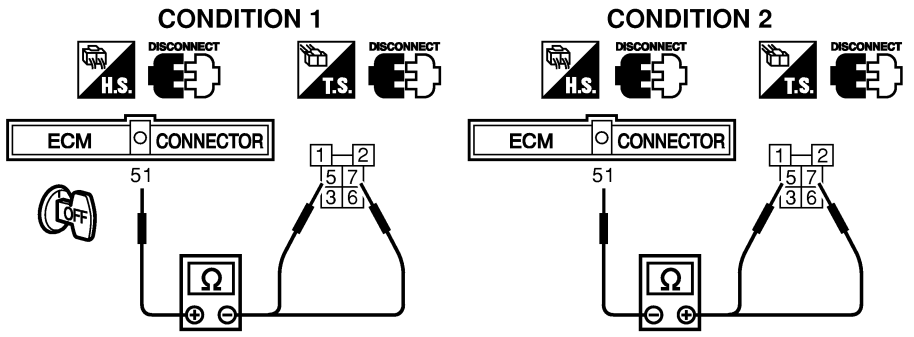
1. Start engine.
2. Turn "ON" the rear window defogger switch.
3. Check the rear windshield. Is the rear windshield heated up?

Yes or No

Yes	▶	GO TO 4.
No	▶	Refer to EL-167, "Rear Window Defogger".

4	CHECK REAR WINDOW DEFOGGER INPUT SIGNAL CIRCUIT FOR OPEN OR SHORT

1. Stop engine.
2. Disconnect ECM harness connector.
3. Disconnect rear window defogger relay.
4. Check harness continuity between ECM terminal 51 and rear window defogger relay terminal 5 and 7.



CONDITION	CONTINUITY
1	Should exist.
2	Should not exist.

SEC125D

5. 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 B1, M5
- Harness connectors M161, F68
- Diode M35
- Harness for open and short between ECM and rear window defogger relay

	▶	Repair open circuit or short to ground or short to power in harness or connectors.

6	CHECK INTERMITTENT INCIDENT

Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.

	▶	**INSPECTION END**

7	CHECK HEADLAMP FUNCTION

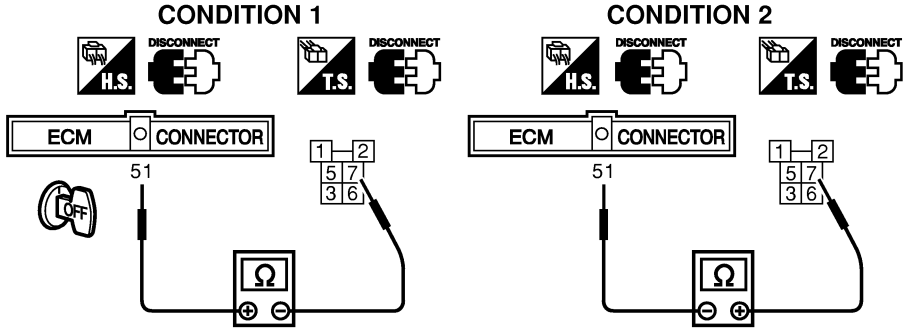
1. Start engine.
2. Turn the lighting switch "ON" at 1st position with high beam.
3. Check that headlamps are illuminated.

OK or NG

OK	▶	GO TO 8.
NG	▶	Refer to EL-37, "HEADLAMP (FOR USA)" or "EL-51, "HEADLAMP (FOR CANADA) — DAYTIME LIGHT SYSTEM".

8	CHECK HEADLAMP INPUT SIGNAL CIRCUIT FOR OPEN OR SHORT

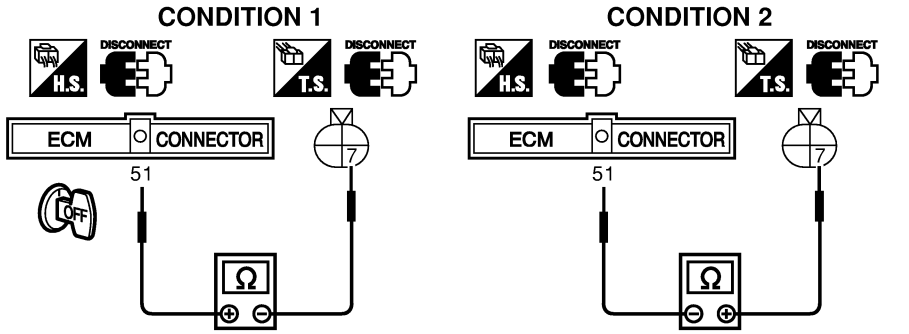
1. Stop engine.
2. Disconnect ECM harness connector.
3. Disconnect headlamp RH relay (Models for USA), daytime light control unit harness connector (Models for Canada).
4. Check harness continuity between ECM terminal 51 and headlamp LH relay terminal 7 under the following conditions. (Models for USA)



CONDITION	CONTINUITY
1	Should exist.
2	Should not exist.

SEC126D

5. Check harness continuity between ECM terminal 51 and daytime light control unit terminal 7 under the following conditions.(Model for Canada)



CONDITION	CONTINUITY
1	Should exist.
2	Should not exist.

SEC127D

6. Also check harness for short to ground and short to power.

OK or NG

OK	▶	GO TO 10.
NG	▶	GO TO 9.

9	DETECT MALFUNCTIONING PART

Check the following.
- Harness connectors E81, M15
- Harness connectors M161, F68
- Diode E79
- Harness for open and short between ECM and headlamp RH relay or daytime light control unit

	▶	Repair open circuit or short to ground or short to power in harness or connectors.

10	CHECK INTERMITTENT INCIDENT

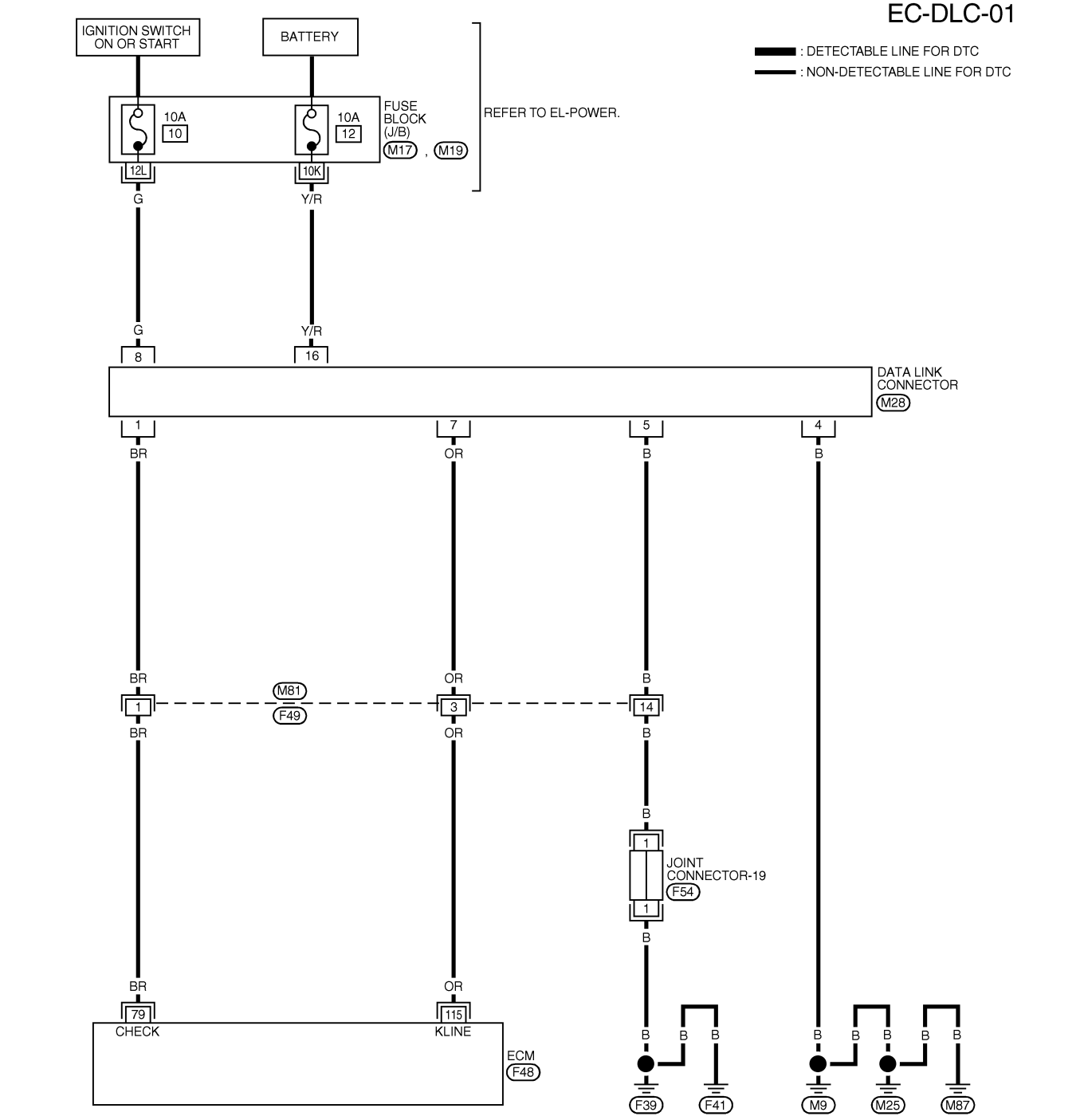
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-156.

	▶	**INSPECTION END**

Wiring Diagram

NFEC0407

EC-DLC-01



MEC697D

Fuel Pressure Regulator

NFEC0408

Fuel pressure at idling kPa (kg/cm^2, psi)	Approximately 350 (3.7, 51)

Idle Speed and Ignition Timing

NFEC0409

Target idle speed*1	No-load*2 (in “P” or N” position)	M/T: 625±50 rpm A/T: 675±50 rpm
Air conditioner: ON	In “P” or N” position	825 rpm or more
Ignition timing*1	In “P” or N” position	15°±5° BTDC

*1: Throttle position sensor harness connector connected
*2: Under the following conditions:

- Air conditioner switch: OFF
- Electric load: OFF (Lights, heater fan & rear window defogger)
- Steering wheel: Kept in straight-ahead position

Mass Air Flow Sensor

NFEC0411

Supply voltage	Battery voltage (11 - 14)V
Output voltage at idle	1.1 - 1.5*V
Mass air flow (Using CONSULT-II or GST)	2.0 - 6.0 g·m/sec at idle* 7.0 - 20.0 g·m/sec at 2,500 rpm*

*: Engine is warmed up to normal operating temperature and running under no-load.

Engine Coolant Temperature Sensor

NFEC0412

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

NFEC0414

Resistance [at 25°C (77°F)]	2.3 - 4.3Ω

Fuel Pump

NFEC0415

Resistance [at 25°C (77°F)]	0.2 - 5.0Ω

Injector

NFEC0417

Resistance [at 20°C (68°F)]	13.5 - 17.5Ω

Calculated Load Value

NFEC0420

	Calculated load value % (Using CONSULT-II or GST)
At idle	10 - 35
At 2,500 rpm	10 - 35

Intake Air Temperature Sensor

NFEC0421

Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
80 (176)	0.27 - 0.38

Heated Oxygen Sensor 2 Heater

NFEC0422

Resistance [at 25°C (77°F)]	2.3 - 4.3Ω

Fuel Tank Temperature Sensor

NFEC0424

Temperature °C (°F)	Resistance kΩ
20 (68)	2.3 - 2.7
50 (122)	0.79 - 0.90

Throttle Control Motor

NFEC1332

Resistance [at 25°C (77°F)]	Approximately 1 - 15Ω

Crankshaft Position Sensor (POS)

NFEC1414

Refer to “Component Inspection”, EC-336.

Camshaft Position Sensor (PHASE)

NFEC0639

Refer to “Component Inspection”, EC-345.

ENGINE LUBRICATION & COOLING SYSTEMS

SECTION LC

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Precautions

SUPPLEMENTAL RESTRAINT SYSTEM (SRS) “AIR BAG” AND “SEAT BELT PRE-TENSIONER”

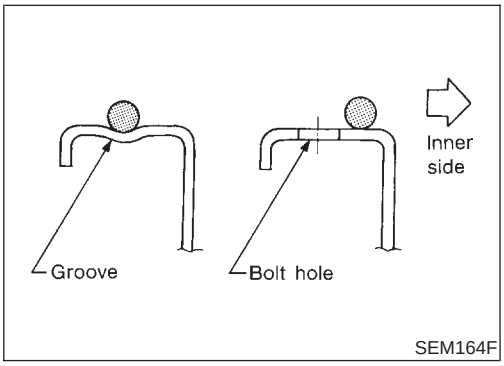
NFLC0036

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER” used along with a seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. The SRS composition which is available to NISSAN MODEL A33 is as follows:

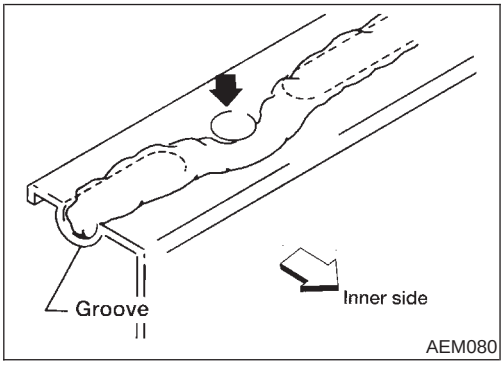
- For a frontal collision
  The Supplemental Restraint System consists of driver air bag module (located in the center of the steering wheel), front passenger air bag module (located on the instrument panel on passenger side), seat belt pre-tensioners, a diagnosis sensor unit, crash zone sensor, warning lamp, wiring harness and spiral cable.
- For a side collision
  The Supplemental Restraint System consists of front side air bag module (located in the outer side of front seat), satellite sensor, diagnosis sensor unit (one of components of air bags for a frontal collision), wiring harness, warning lamp (one of components of air bags for a frontal collision).

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 should be performed by an authorized NISSAN dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system.**
- **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 harness connector.**



SEM164F



AEM080

LIQUID GASKET APPLICATION PROCEDURE

NFLC0001

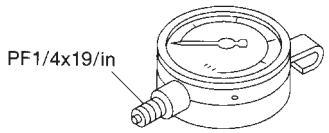
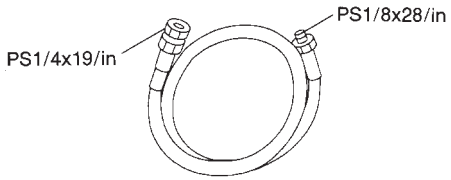
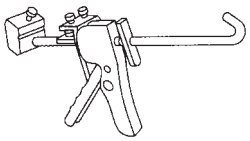
1. Use a scraper to remove all traces of old liquid gasket from mating surfaces and grooves. Also, completely clean any oil from these areas.
2. Apply a continuous bead of liquid gasket to mating surfaces. **(Use Genuine RTV silicone sealant or equivalent. Refer to GI-50.)**
   - For oil pan, be sure liquid gasket diameter is 3.5 to 4.5 mm (0.138 to 0.177 in) or 4.5 to 5.5 mm (0.177 to 0.217 in) as specified in this manual.
3. Apply liquid gasket around the inner side of bolt holes (unless otherwise specified).
4. Assembly should be done within 5 minutes after coating.
5. Wait at least 30 minutes before refilling engine oil and engine coolant.

Preparation

SPECIAL SERVICE TOOLS

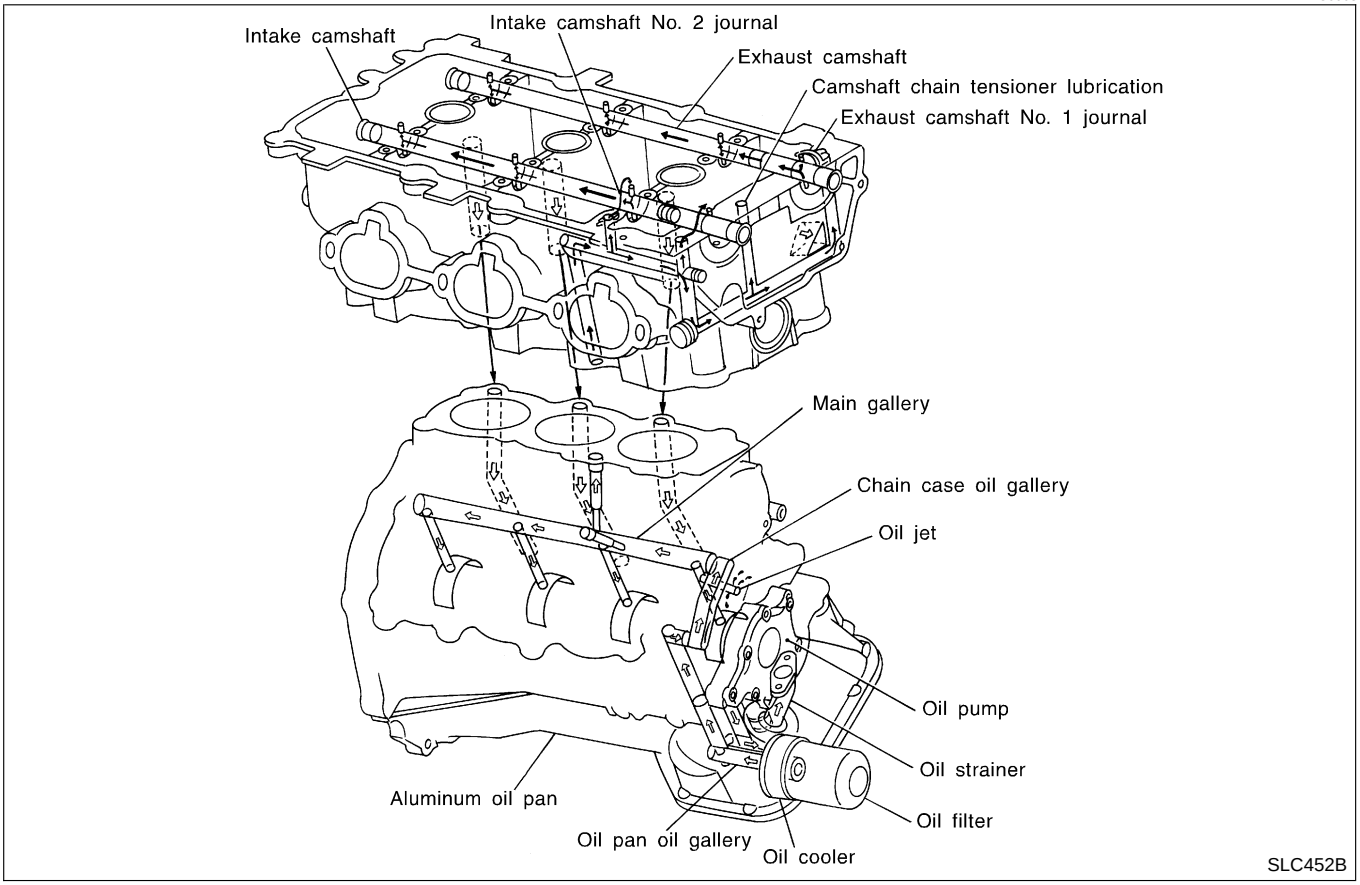
=NFLC0002

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

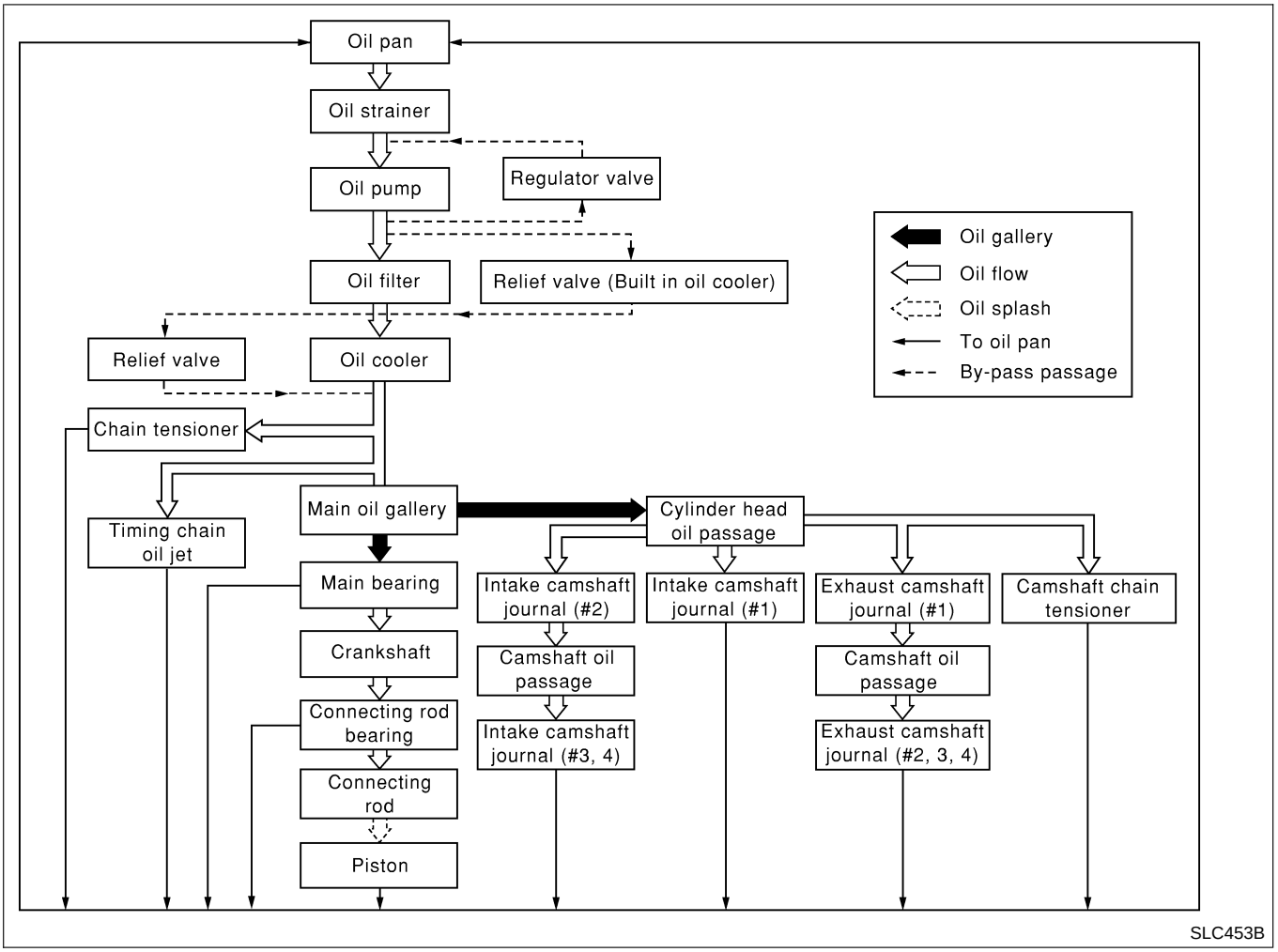
Tool number (Kent-Moore No.) Tool name	Description	
ST25051001 (J25695-1) Oil pressure gauge	 NT558	Measuring oil pressure **Maximum measuring range:** **2,452 kPa (25 kg/cm^2, 356 psi)**
ST25052000 (J25695-2) Hose	 NT559	Adapting oil pressure gauge to upper oil pan
WS39930000 (—) Tube pressure	 NT052	Pressing the tube of liquid gasket

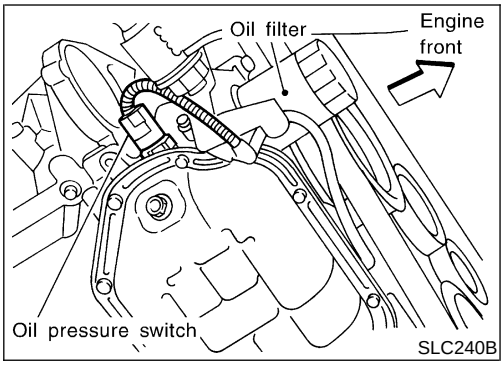
Lubrication Circuit

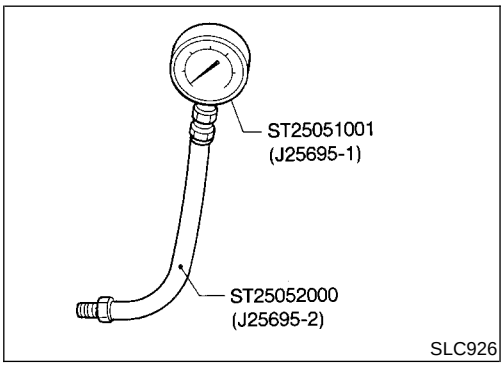
NFLC0003



Lubrication Circuit (Cont'd)







Oil Pressure Check

=NFLC0004

WARNING:

- **Be careful not to burn yourself, as the engine and oil may be hot.**
- **Oil pressure check should be done in "Neutral position" (M/T) or "Parking position" (A/T).**

1. Check oil level.
2. Remove oil pressure switch.
3. Install pressure gauge.
4. Start engine and warm it up to normal operating temperature.
5. Check oil pressure with engine running under no-load.

Engine speed rpm	Approximate discharge pressure kPa (kg/cm^2, psi)
Idle speed 2,000	More than 98 (1.0, 14) 294 (3.0, 43)

If difference is extreme, check oil passage and oil pump for oil leaks.

6. Install oil pressure switch with sealant.

Oil Pump

REMOVAL AND INSTALLATION

NFLC0005

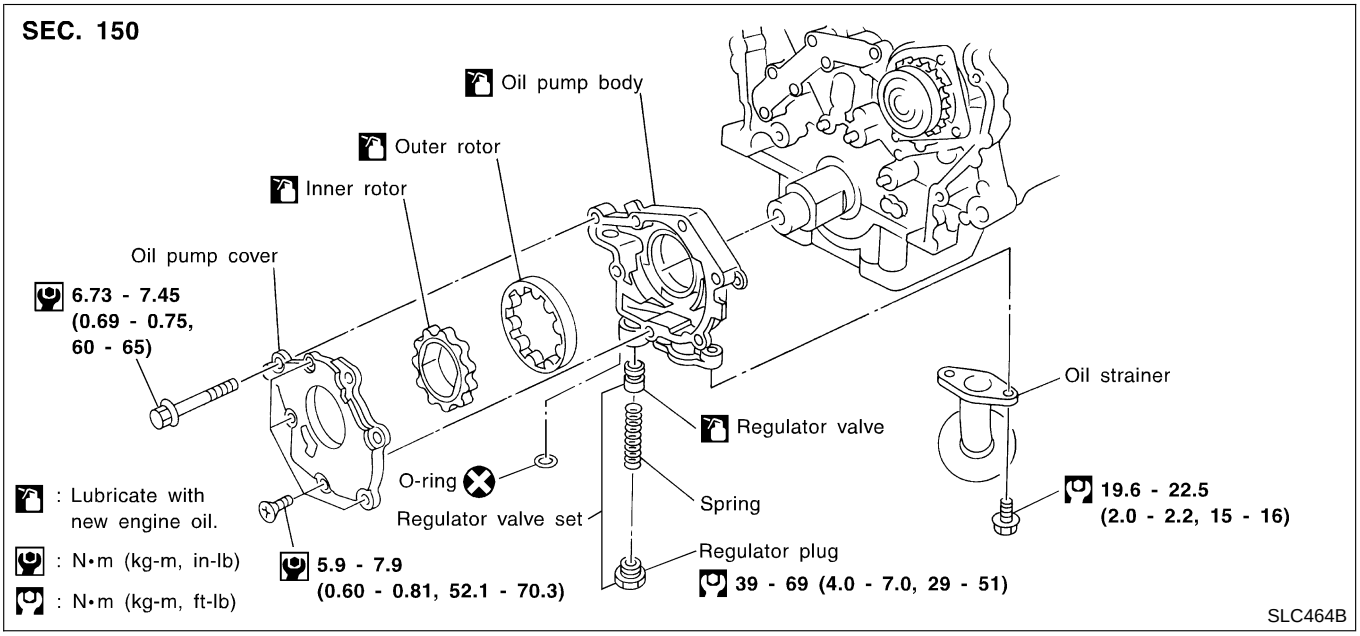
CAUTION:

When removing the oil pans, oil pump assembly and timing chain from engine, first remove the crankshaft position sensor (POS) from the assembly.
Be careful not to damage sensor edge.

1. Drain engine oil.
2. Remove drive belts.
3. Remove crankshaft position sensor (POS).
4. Remove engine under covers.
5. Remove crankshaft pulley.
6. Remove front exhaust tube and its support.
7. Support engine at right and left side engine slingers with a suitable hoist.
8. Remove engine right side mounting insulator and bracket bolts and nuts.
9. Remove center member assembly.
10. Remove air compressor assembly and bracket.
11. Remove oil pans. Refer to EM-14, "Removal".
12. Remove water pump cover.
13. Remove front cover assembly.
14. Remove timing chain. Refer to EM-24, "Removal".
15. Remove oil pump assembly.
16. Reinstall any parts removed in reverse order of removal.

DISASSEMBLY AND ASSEMBLY

NFLC0006



- **When installing oil pump, apply engine oil to rotors.**

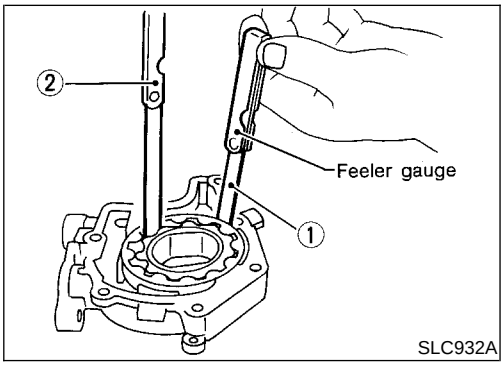
OIL PUMP INSPECTION

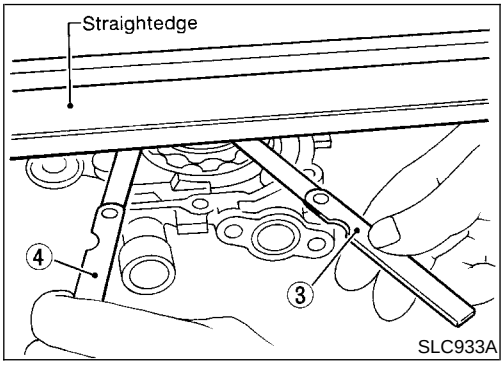
NFLC0007

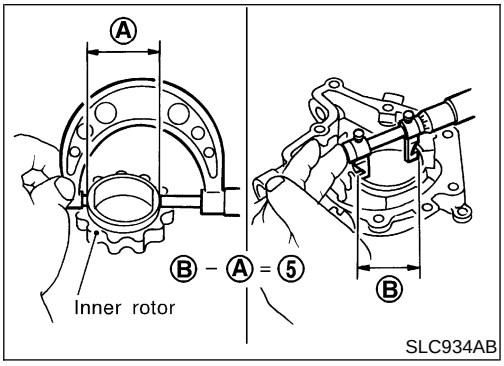
Using a feeler gauge, straightedge and micrometers, check the following clearances:

Unit: mm (in)

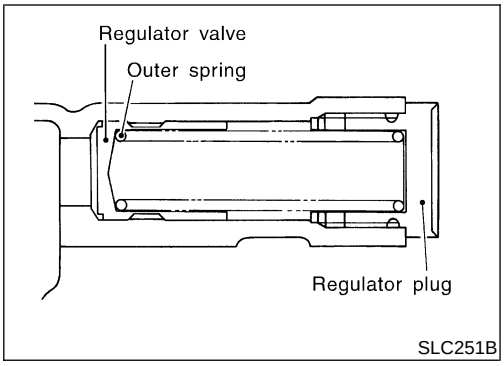
Body to outer rotor radial clearance 1	0.114 - 0.260 (0.0045 - 0.0102)
Inner rotor to outer rotor tip clearance 2	Below 0.18 (0.0071)
Body to inner rotor axial clearance 3	0.030 - 0.070 (0.0012 - 0.0028)
Body to outer rotor axial clearance 4	0.050 - 0.110 (0.0020 - 0.0043)
Inner rotor to brazed portion of housing clearance 5	0.045 - 0.091 (0.0018 - 0.0036)







- **If the tip clearance (2) exceeds the limit, replace rotor set.**
- **If body to rotor clearances (1, 3, 4, 5) exceed the limit, replace oil pump body assembly.**

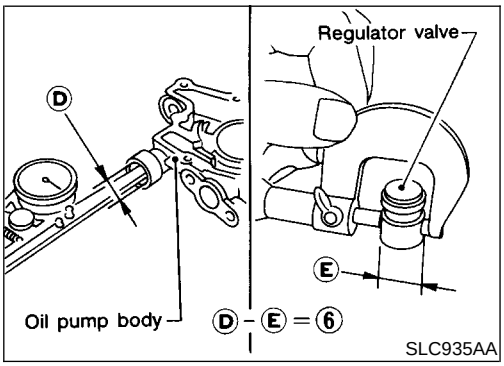


REGULATOR VALVE INSPECTION

NFLC0008

1. Visually inspect components for wear and damage.
2. Check oil pressure regulator valve sliding surface and valve spring.
3. Coat regulator valve with engine oil. Check that it falls smoothly into the valve hole by its own weight.

If damaged, replace regulator valve set or oil pump body.

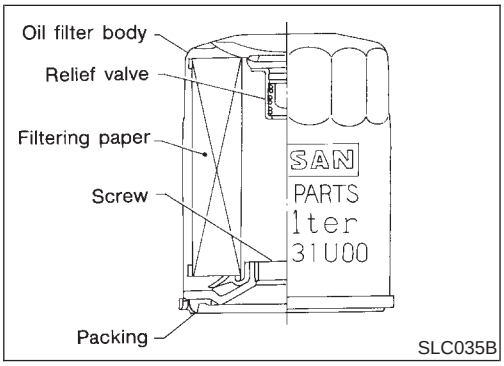


4. Check regulator valve to oil pump body clearance.

Clearance:

6 : 0.040 - 0.097 mm (0.0016 - 0.0038 in)

If it exceeds the limit, replace oil pump body.



Oil Filter

NFLC0009

The oil filter is a small, full-flow cartridge type and is provided with a relief valve.

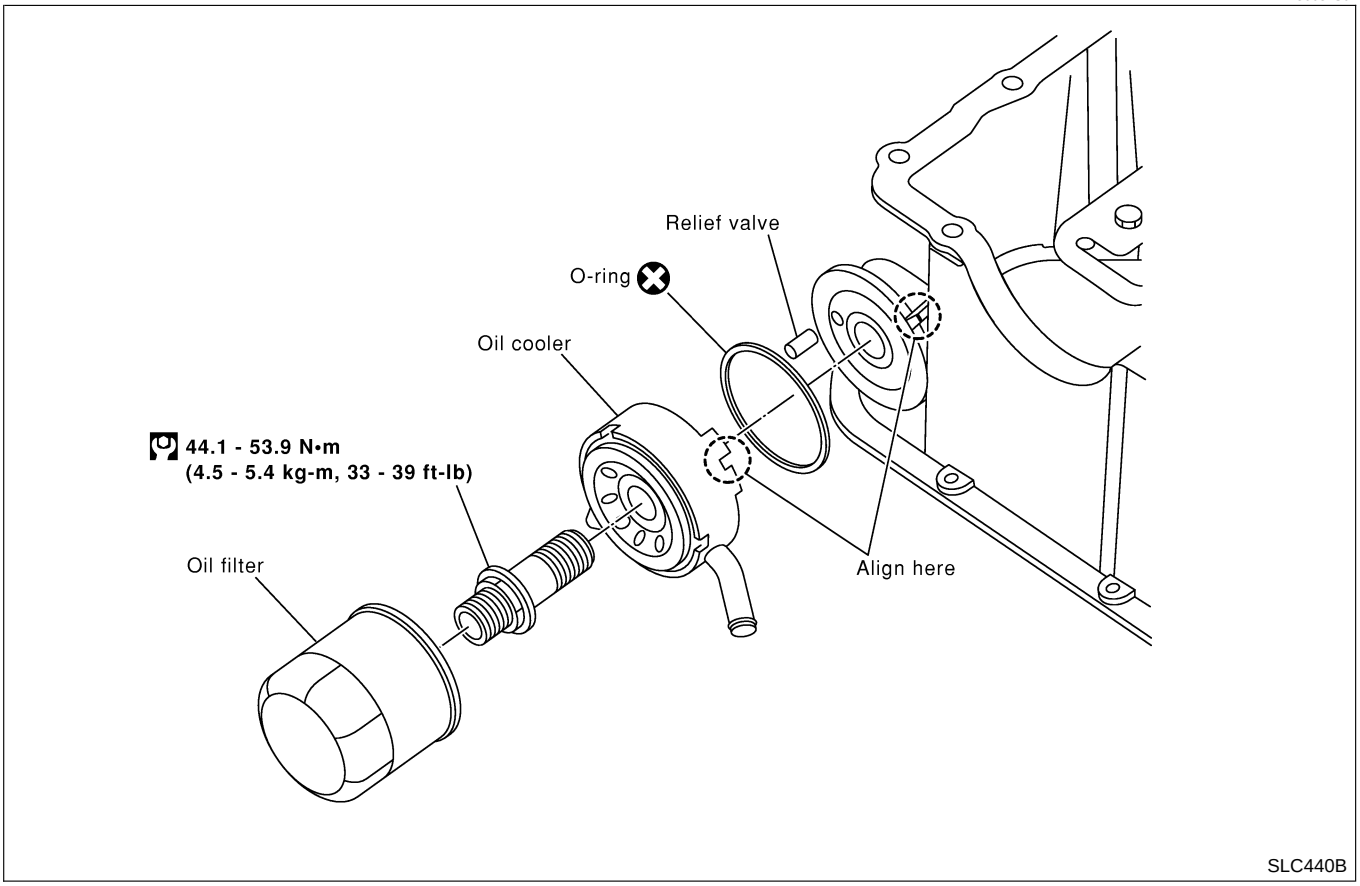
- **Use Tool specified in MA-17 for changing oil filter.**

Oil Cooler

NFLC0037

REMOVAL AND INSTALLATION

NFLC0037S01



1. Drain engine oil and coolant.
2. Remove oil cooler.
3. Installation is in reverse order of removal.

- **Do not spill coolant on the drive belt.**
- **Install oil cooler to oil pan aligning the protrusion of flange as shown.**

INSPECTION

NFLC0037S02

Oil Cooler

NFLC0037S0201

1. Check oil cooler for cracks.
2. Check oil cooler for clogging by blowing through coolant inlet. If necessary, replace oil cooler assembly.

Relief Valve

NFLC0037S0202

Inspect relief valve for movement, cracks and breaks by pushing the ball. If replacement is necessary, remove valve by prying it out with a suitable tool. Install a new valve in place by tapping it.

Service Data and Specifications (SDS)

OIL PRESSURE

=NFLC0010

Engine speed rpm	Approximate discharge pressure kPa (kg/cm^2, psi)
Idle speed 2,000	More than 98 (1.0, 14) 294 (3.0, 43)

REGULATOR VALVE

NFLC0011

Unit: mm (in)

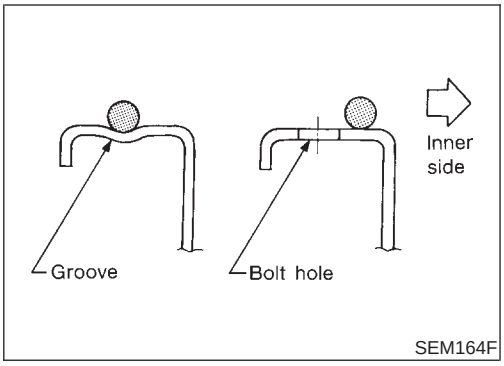
Regulator valve to oil pump cover clearance	0.040 - 0.097 (0.0016 - 0.0038)

OIL PUMP

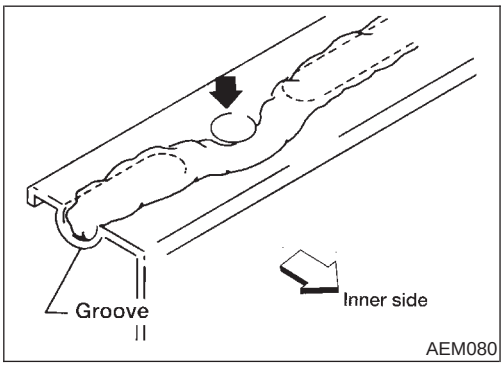
NFLC0012

Unit: mm (in)

Body to outer rotor radial clearance	0.114 - 0.260 (0.0045 - 0.0102)
Inner rotor to outer rotor tip clearance	Below 0.18 (0.0071)
Body to inner rotor axial clearance	0.030 - 0.070 (0.0012 - 0.0028)
Body to outer rotor axial clearance	0.050 - 0.110 (0.0020 - 0.0043)
Inner rotor to brazed portion of housing clearance	0.045 - 0.091 (0.0018 - 0.0036)



SEM164F



AEM080

Precautions

LIQUID GASKET APPLICATION PROCEDURE

NFLC0013

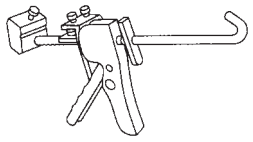
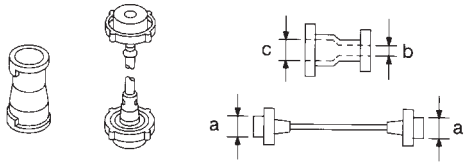
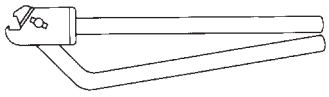
1. Use a scraper to remove all traces of old liquid gasket from mating surfaces and grooves. Also, completely clean any oil from these areas.
2. Apply a continuous bead of liquid gasket to mating surfaces. **(Use Genuine RTV silicone sealant or equivalent. Refer to GI-50.)**
   - Be sure liquid gasket diameter is 2.3 to 3.3 mm (0.091 to 0.130 in).
3. Apply liquid gasket around the inner side of bolt holes (unless otherwise specified).
4. Assembly should be done within 5 minutes after coating.
5. Wait at least 30 minutes before refilling engine oil and engine coolant.

Preparation

SPECIAL SERVICE TOOLS

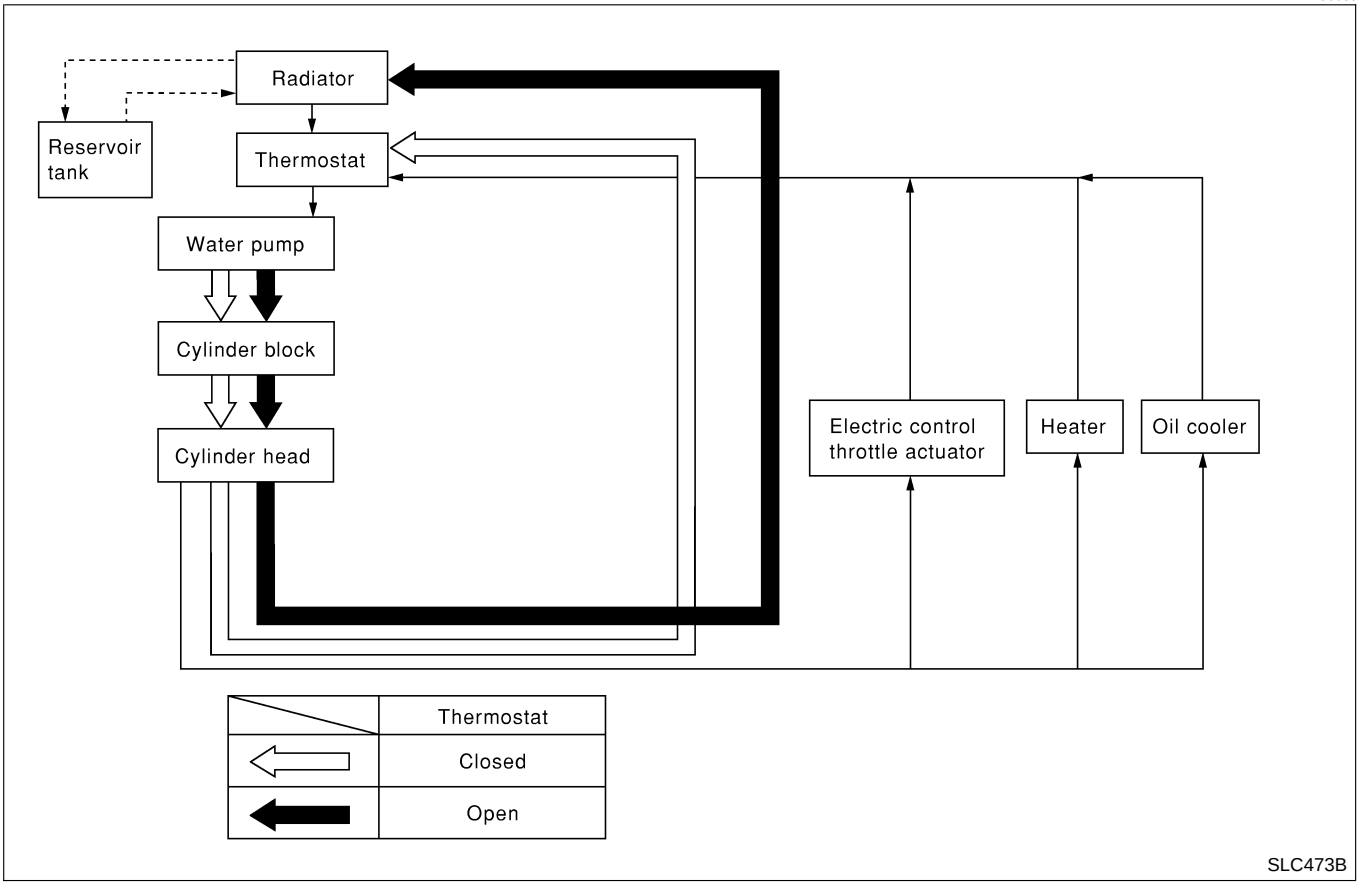
NFLC0014

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description	
WS39930000 (—) Tube pressure	 NT052	Pressing the tube of liquid gasket
EG17650301 (J33984-A) Radiator cap tester adapter	 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	 NT224	Installing radiator upper and lower tanks
KV99103520 (—) Radiator plate pliers B	NT225	Removing radiator upper and lower tanks

Cooling Circuit

NFLC0038



System Check

NFLC0016

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

NFLC0016S01

Check hoses for improper attachment, leaks, cracks, damage, loose connections, chafing and deterioration.

CHECKING RADIATOR

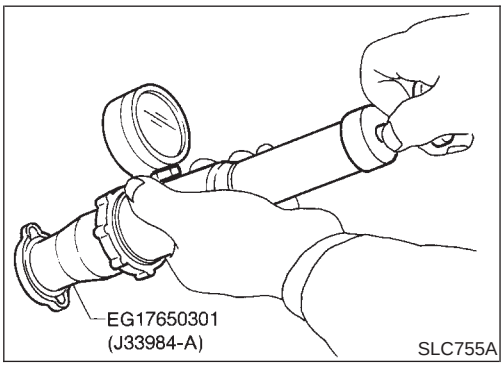
NFLC0016S02

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 (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.

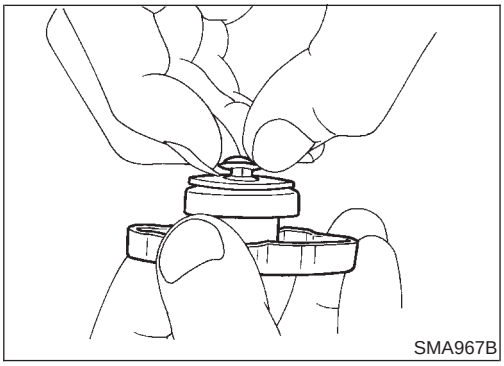


CHECKING RADIATOR CAP

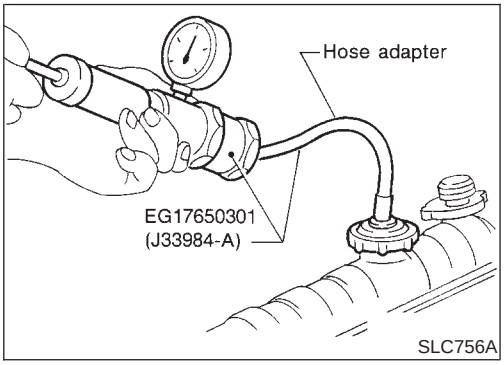
NFLC0016S03

To check radiator cap, apply pressure to cap with a tester.

Radiator cap relief pressure:
Standard
78 - 98 kPa
(0.8 - 1.0 kg/cm^2, 11 - 14 psi)
Limit
59 kPa
(0.6 kg/cm^2, 9 psi)



Pull the negative pressure valve to open it.
Check that it closes completely when released.



CHECKING COOLING SYSTEM FOR LEAKS

NFLC0016S04

To check for leakage, apply pressure to the cooling system with a tester.

Testing pressure:
157 kPa (1.6 kg/cm^2, 23 psi)

CAUTION:
Higher than the specified pressure may cause radiator damage.

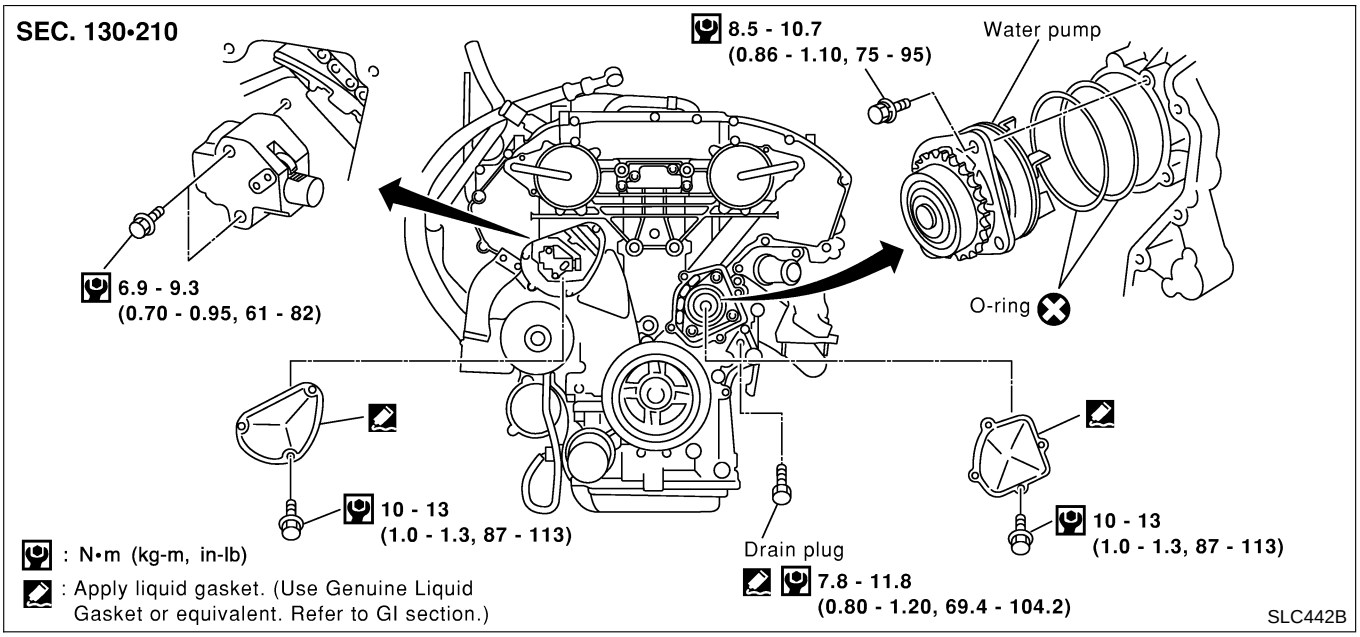
Water Pump

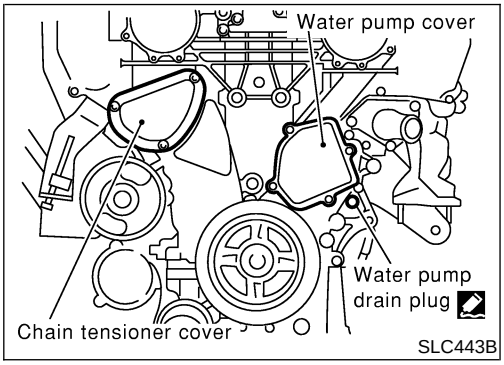
REMOVAL AND INSTALLATION

=NFLC0017

CAUTION:

- **When removing water pump assembly, be careful not to get coolant on drive belt.**
- **Water pump cannot be disassembled and should be replaced as a unit.**
- **After installing water pump, connect hose and clamp securely, then check for leaks using radiator cap tester.**

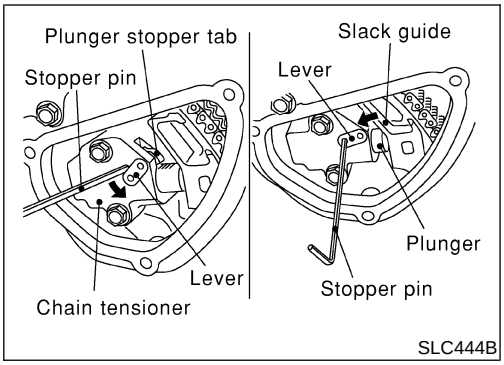




REMOVAL

NFLC0018

1. Drain coolant from drain plugs on radiator and right side of cylinder block. Refer to MA-14, “Changing Engine Coolant”.
2. Remove right side engine mounting, mounting bracket and nuts.
3. Remove drive belts and idler pulley bracket.
4. Remove water pump drain plug.
5. Remove chain tensioner cover and water pump cover.

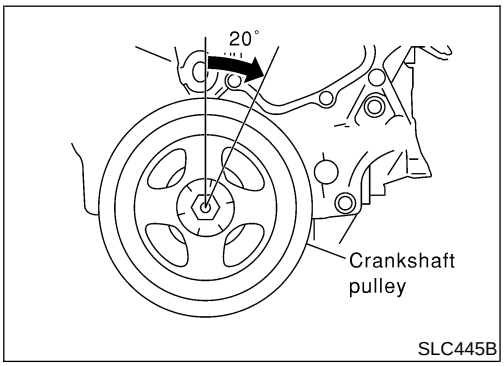


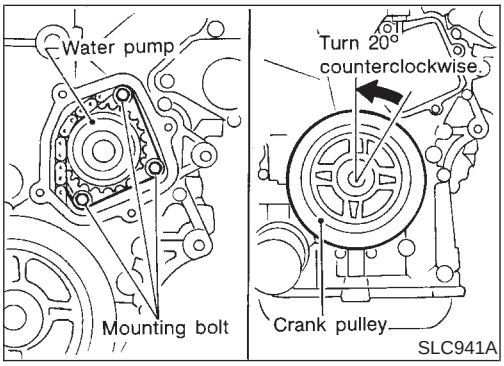
6. Pull lever down, and release plunger stopper tab.
- Plunger stopper tab can be pushed up to release (coaxial structure with lever).

7. Insert stopper pin into tensioner body hole to fix lever, and keep the tab released.
8. Insert plunger into tensioner body by pressing slack guide.
9. Keep slack guide pressed, and fix it by pushing stopper pin through lever hole and body hole.
10. Turn crankshaft pulley approx. 20° clockwise so that the timing chain on the chain tensioner side is loose.
11. Remove chain tensioner.

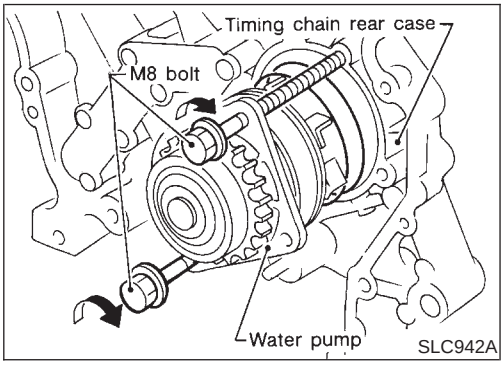
CAUTION:

Be careful not to drop mounting bolts inside chain case.

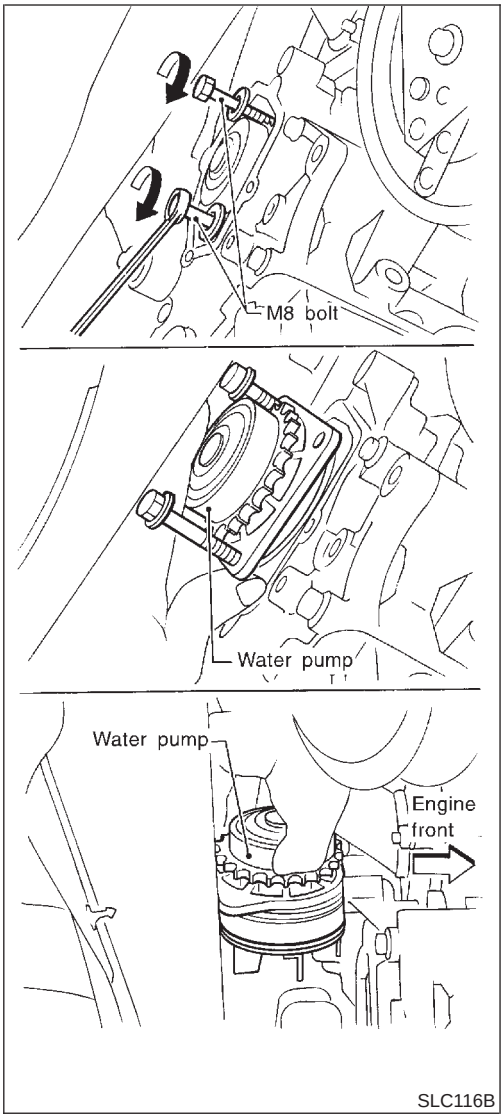




12. Remove the 3 water pump fixing bolts. Secure a gap between water pump gear and timing chain, by turning crankshaft pulley 20° backwards.

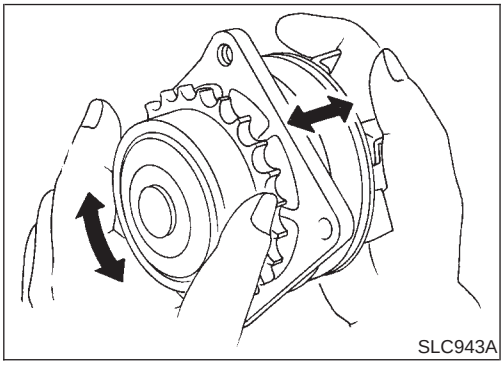


13. Put M8 bolts to two M8-threaded holes out of 3 water pump fixing bolt holes.



14. Tighten M8 bolts by turning half turn alternately until they reach timing chain rear case.
- In order to prevent damages to water pump or timing chain rear case, do not tighten one bolt continuously. Always turn each bolt half turn each time.

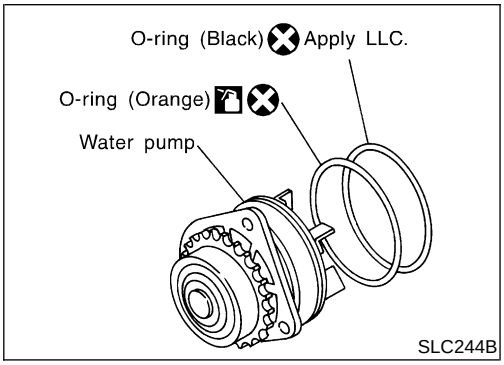
15. Lift up water pump and remove it.
- When lifting up water pump, do not allow water pump gear to hit timing chain.



INSPECTION

NFLC0019

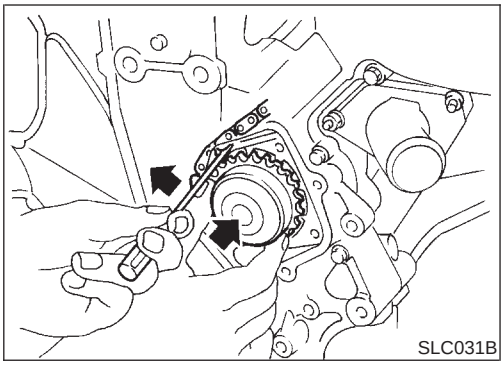
1. Check for badly rusted or corroded body assembly.
2. Check for rough operation due to excessive end play.



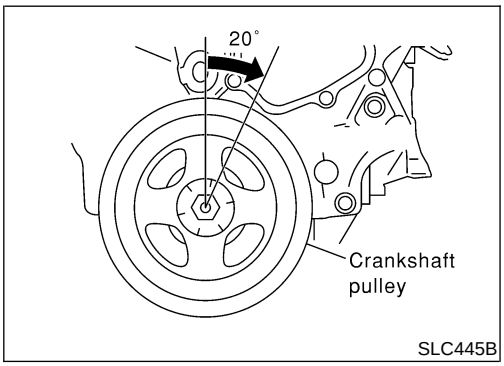
INSTALLATION

NFLC0020

1. Apply engine oil and coolant to O-rings as shown in the figure.

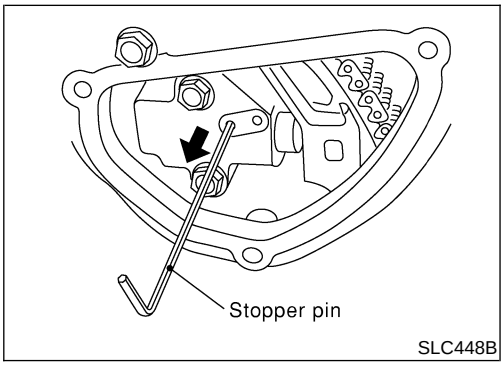

SLC031B

2. Install water pump.
- **Do not allow cylinder block to nip O-rings when installing water pump.**



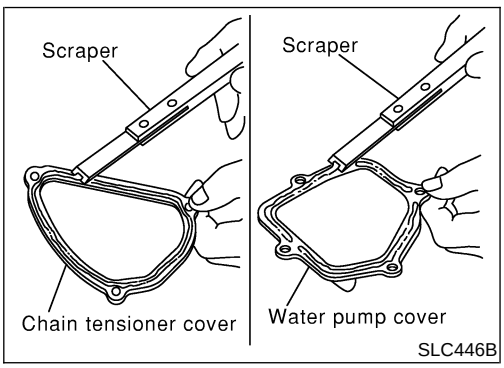
SLC445B

3. Return the crankshaft pulley to its original position by turning it 20° forward.



SLC448B

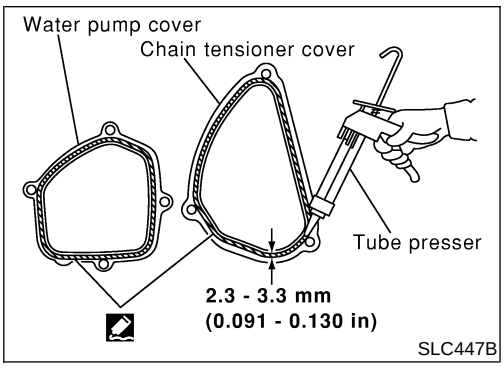
4. Install timing chain tensioner, then remove the stopper pin.
- **When installing the timing chain tensioner, engine oil should be applied to the oil hole and tensioner.**



SLC446B

5. Install chain tensioner cover and water pump cover.

a. Before installing, remove all traces of liquid gasket from mating surface of water pump cover and chain tensioner cover using a scraper.
Also remove traces of liquid gasket from mating surface of front cover.



SLC447B

b. Apply a continuous bead of liquid gasket to mating surface of chain tensioner cover and water pump cover.

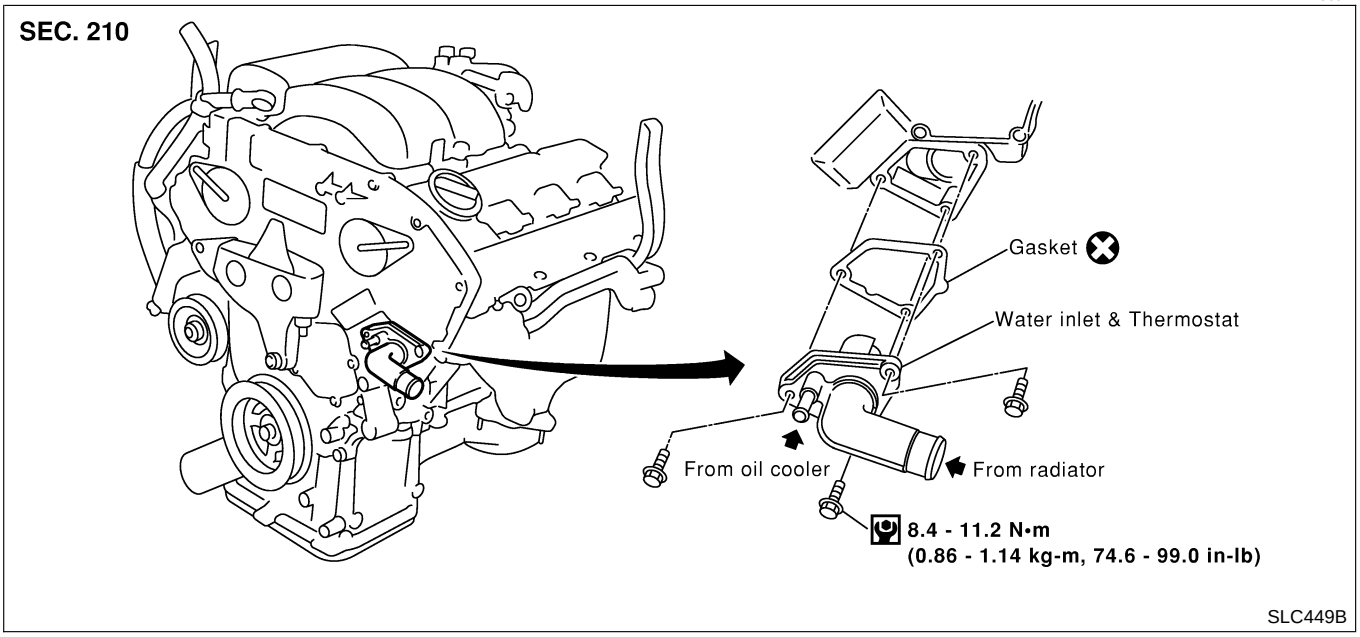
6. Install drain plug on cylinder block.

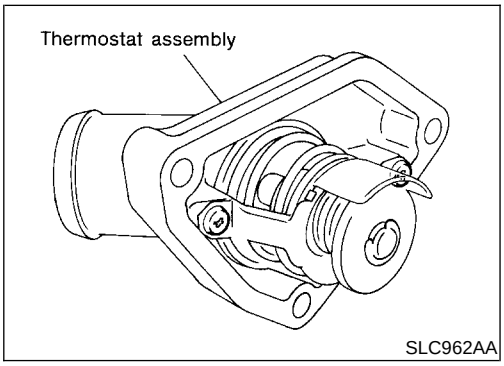
7. Reinstall any parts removed in reverse order of removal.
- **After starting engine, let idle for three minutes, then rev engine up to 3,000 rpm under no load to purge air from the high-pressure chamber of the chain tensioners. The engine may produce a rattling noise. This indicates that air still remains in the chamber and is not a matter of concern.**

Thermostat

REMOVAL AND INSTALLATION

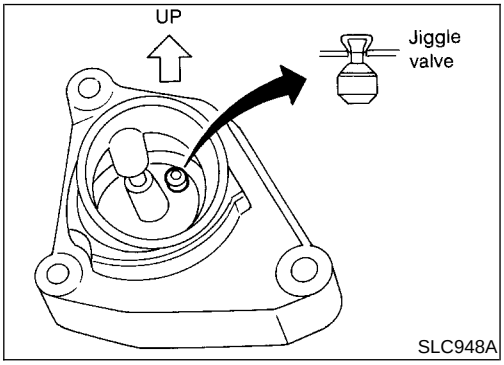
NFLC0021





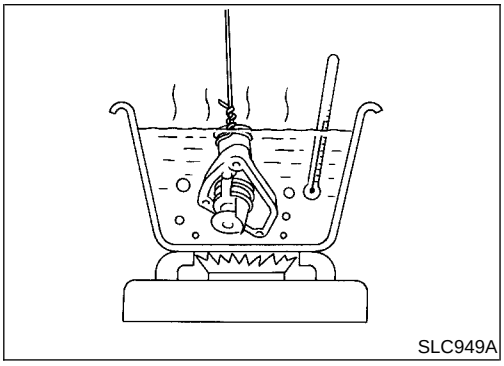
1. Drain coolant from drain plugs on radiator and both sides of cylinder block.
2. Remove drive belts and idler pulley bracket.
3. Remove water pump drain plug on pump side of cylinder block.
4. Remove lower radiator hose.
5. Remove water inlet and thermostat assembly.

- **Do not disassemble water inlet and thermostat. Replace them as a unit, if necessary.**



6. Install thermostat with jiggle valve facing upward.

- **After installation, run engine for a few minutes, and check for leaks.**
- **Be careful not to spill coolant over engine compartment. Use a rag to absorb coolant.**



INSPECTION

NFLC0022

1. Check valve seating condition at ordinary room temperatures. It should seat tightly.
2. Check valve opening temperature and maximum valve lift.

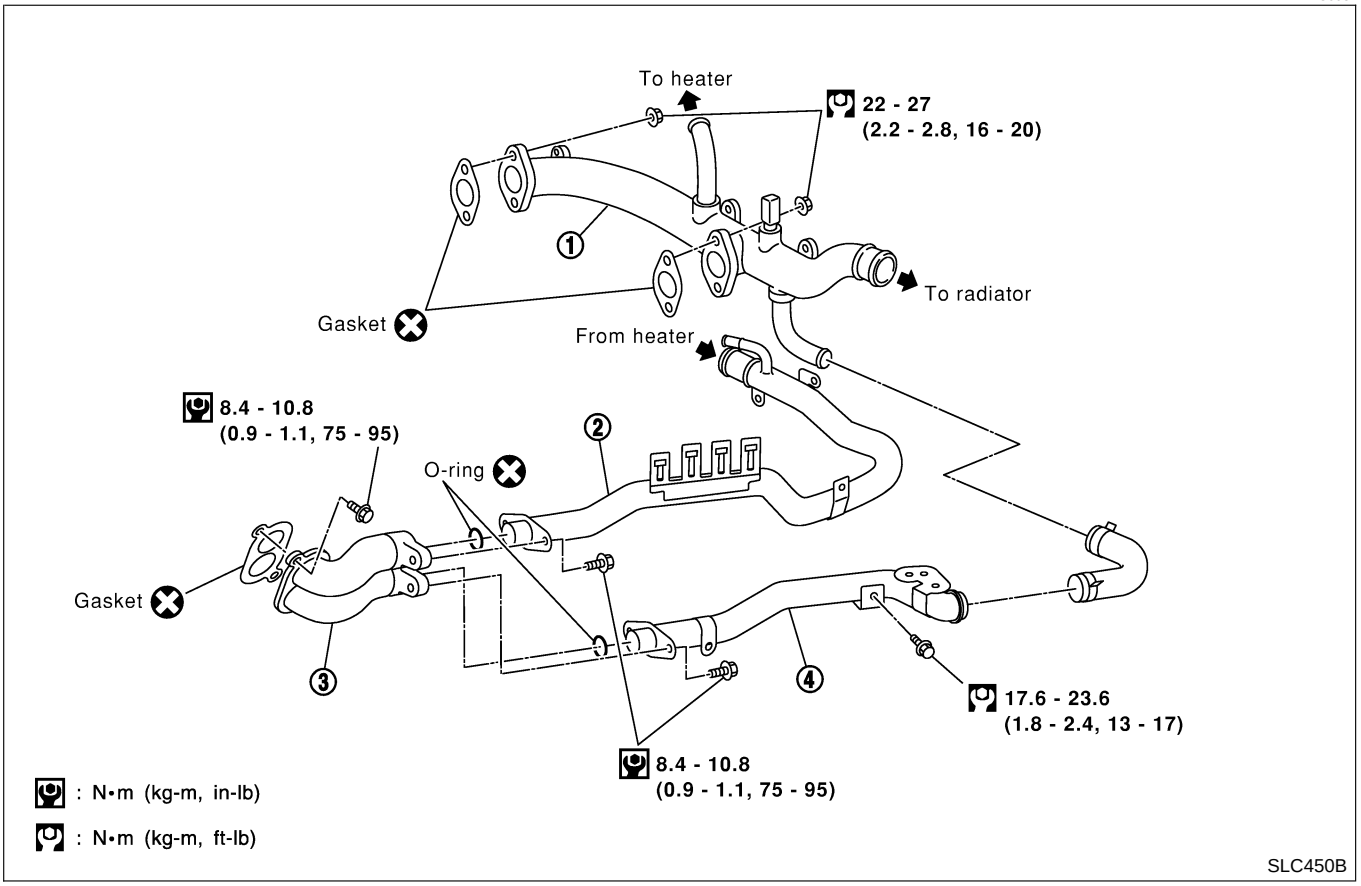
	Standard
Valve opening temperature	82°C (180°F)
Valve lift	More than 8.6 mm/95°C (0.339 in/203°F)

3. Then check if valve closes at 5°C (9°F) below valve opening temperature.

Water Outlet and Water Piping

REMOVAL AND INSTALLATION

NFLC0032



1. Water outlet
2. Heater pipe
3. Water connector
4. Water bypass pipe

1. Drain coolant from drain plugs on radiator and both sides of cylinder block.
2. Remove water connector, heater pipe and water bypass pipe.
3. Install in the reverse order of removal.

- **After installation, run engine for a few minutes, and check for leaks.**
- **Be careful not to spill coolant over engine compartment. Use a rag to absorb coolant.**

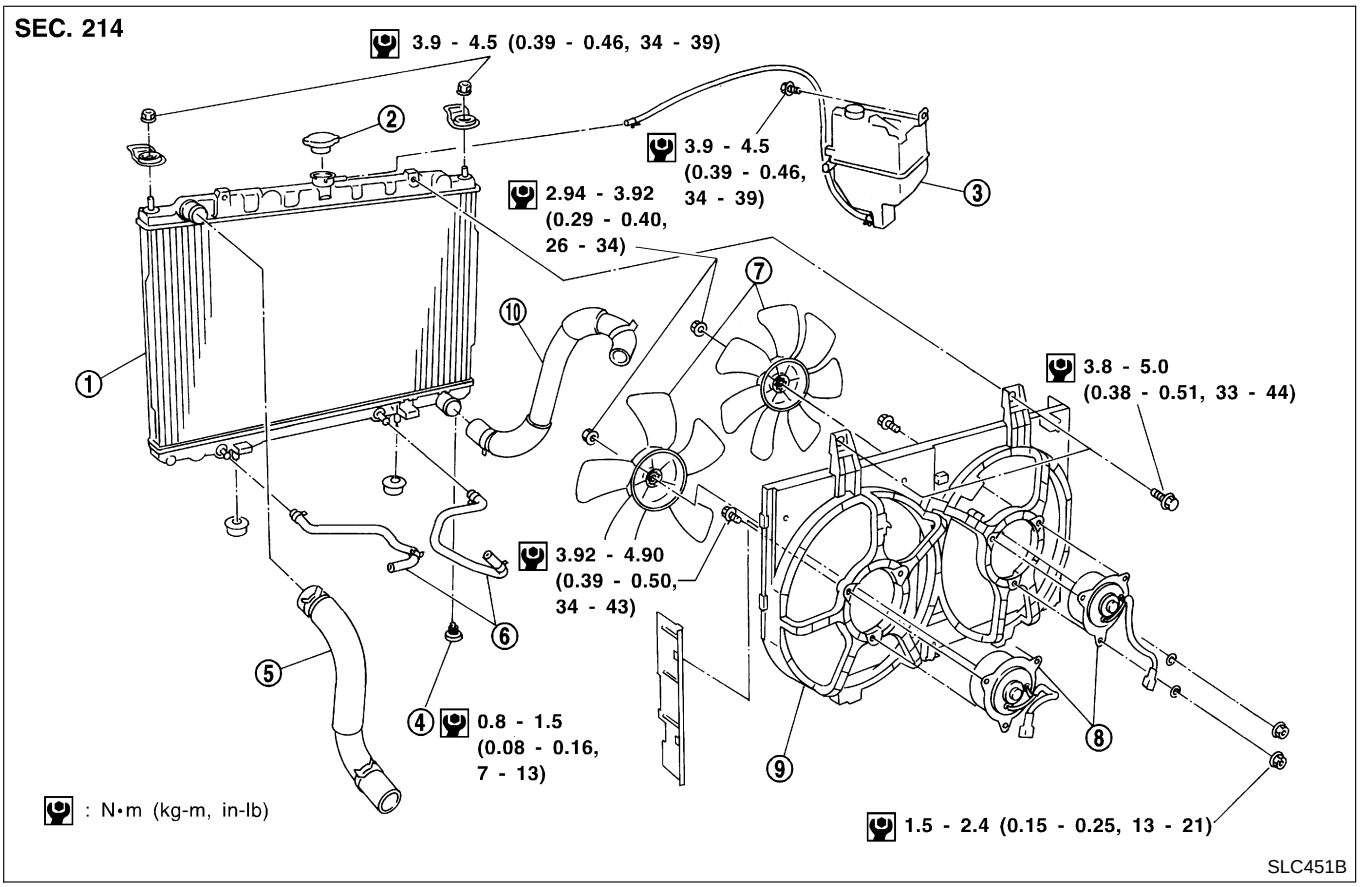
Radiator

REMOVAL AND INSTALLATION

=NFLC0023

1. Remove under cover.
2. Drain coolant from radiator.
3. Disconnect radiator upper and lower hoses.
4. Remove radiator shroud.
5. Remove A/T oil cooler hoses. (A/T models only)
6. Disconnect reservoir tank hose.
7. Remove radiator mounting bracket.
8. Remove radiator.
9. After repairing or replacing radiator, install any part removed in reverse order of removal.

When filling radiator with coolant, refer to MA-14, “Changing Engine Coolant”.



1. Radiator
2. Radiator filler cap
3. Reservoir tank
4. Radiator drain cock
5. Upper radiator hose
6. Oil cooler hoses (A/T models)
7. Cooling fans
8. Cooling fan motors
9. Radiator shroud
10. Lower radiator hose

Cooling Fan Control System

NFLC0024

Cooling fans are controlled by ECM. For details, refer to EC-532, “COOLING FAN CONTROL”.

Refilling Engine Coolant

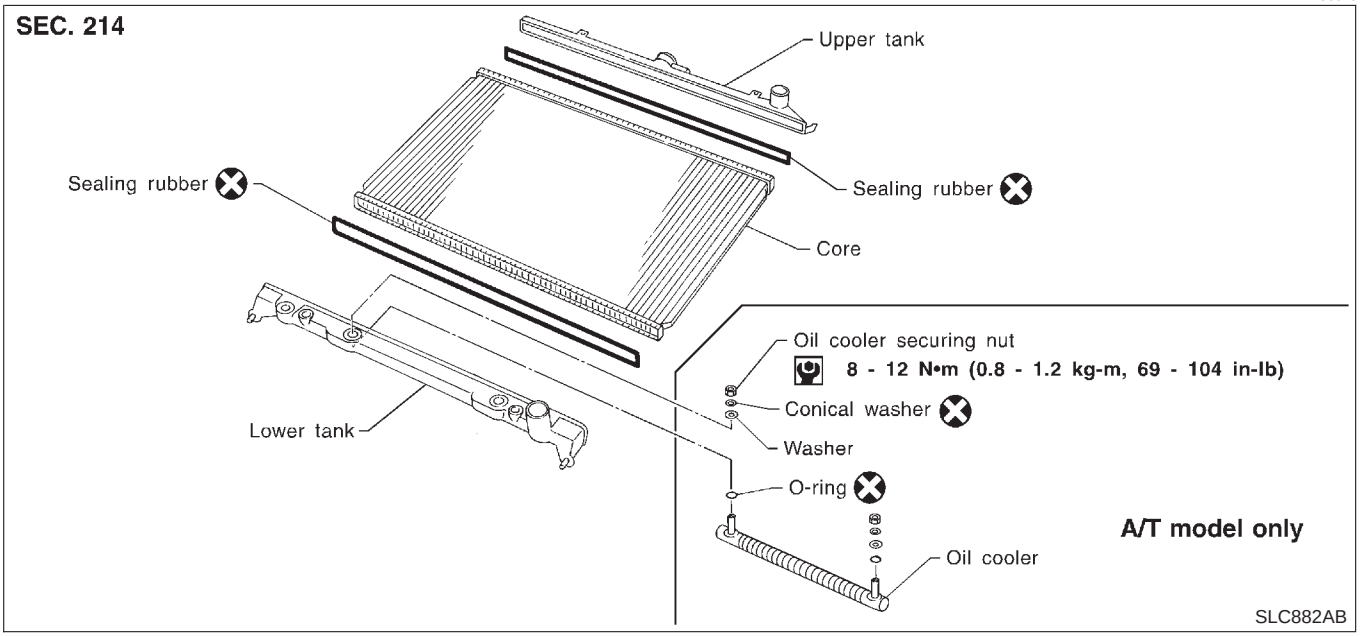
NFLC0034

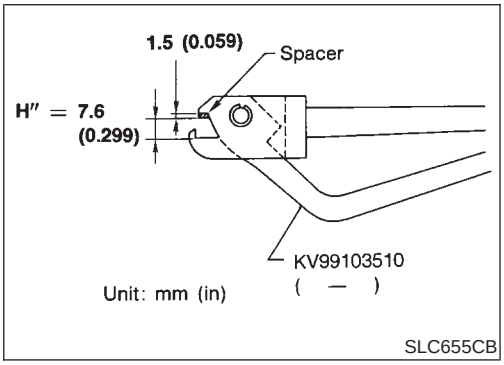
For details on refilling engine coolant, refer to MA-14, “REFILLING ENGINE COOLANT”.

Radiator (Aluminum type)

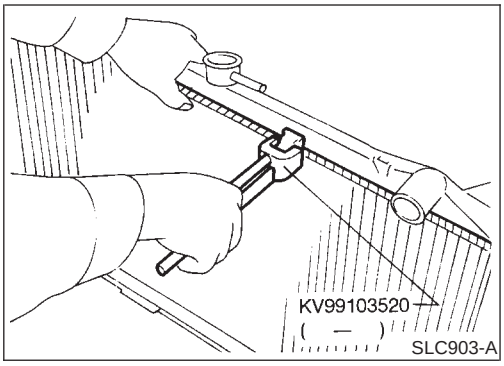
PREPARATION

NFLC0025





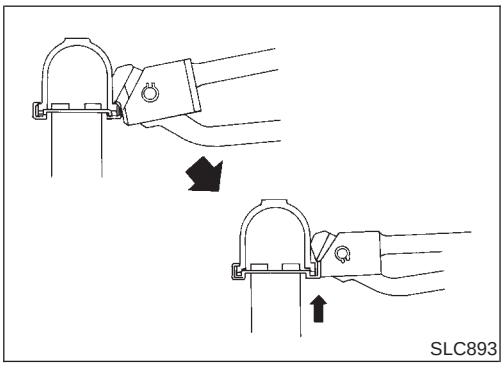
1. Attach the spacer to the tip of the radiator plate pliers A. Spacer specification: 1.5 mm (0.059 in) thick x 18 mm (0.71 in) wide x 8.5 mm (0.335 in) long.
2. Make sure that when radiator plate pliers A are closed dimension H″ is approx. 7.6 mm (0.299 in).
3. Adjust dimension H″ with the spacer, if necessary.



DISASSEMBLY

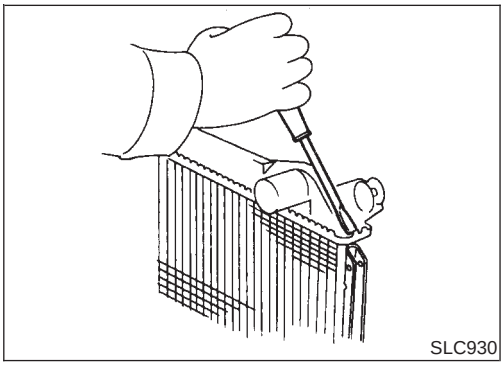
NFLC0026

1. Remove tank with Tool.



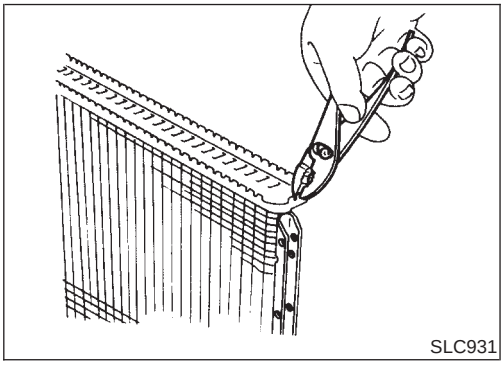
- Grip the crimped edge and bend it upwards so that Tool slips off.

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.



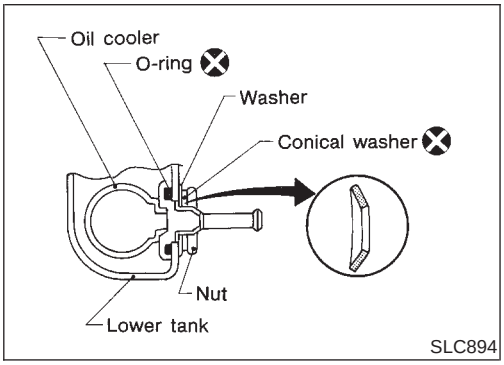
2. Make sure the edge stands straight up.
3. Remove oil cooler from tank. (A/T models only)

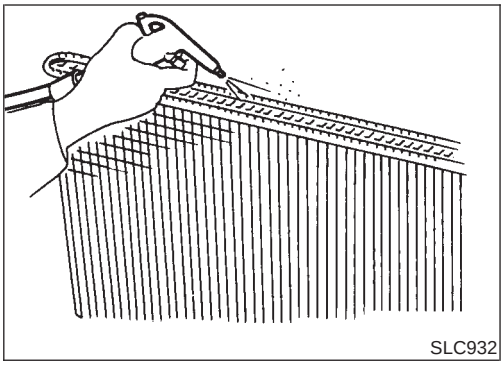
ASSEMBLY

NFLC0027

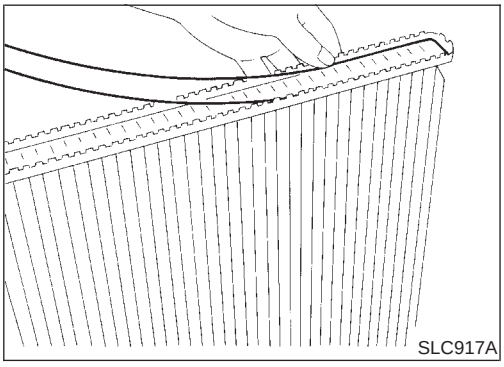
1. Install oil cooler. (A/T models only)

Pay attention to direction of conical washer.



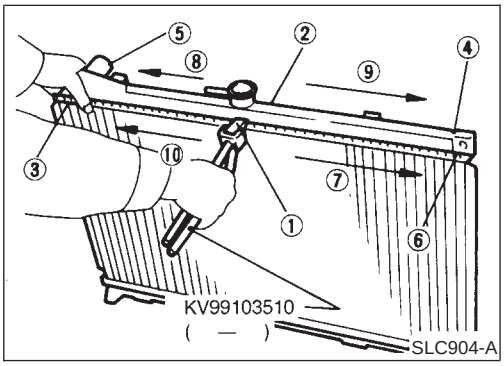

SLC932

2. Clean contact portion of tank.


SLC917A

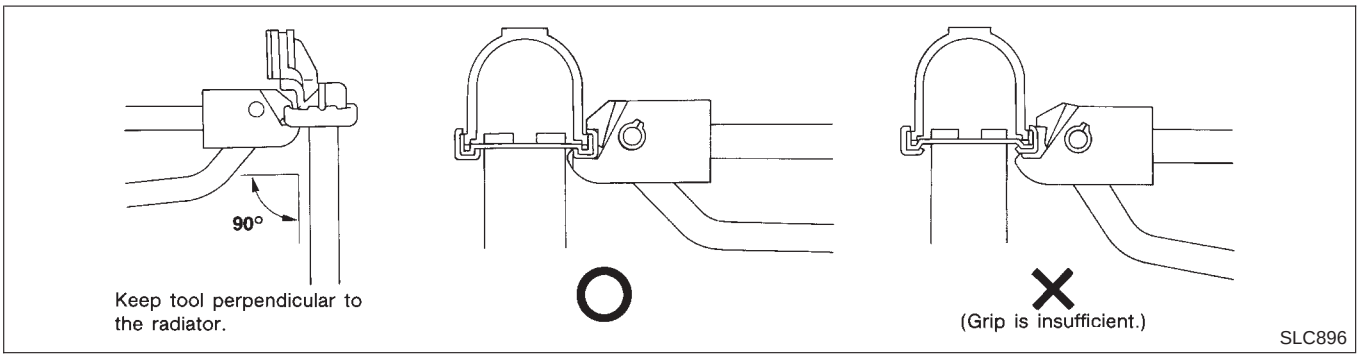
3. Install sealing rubber.

Push it in with fingers.
Be careful not to twist sealing rubber.

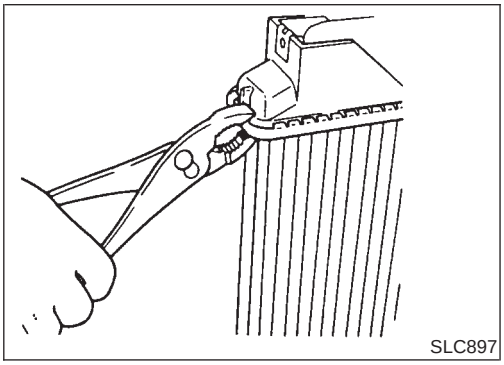


SLC904-A

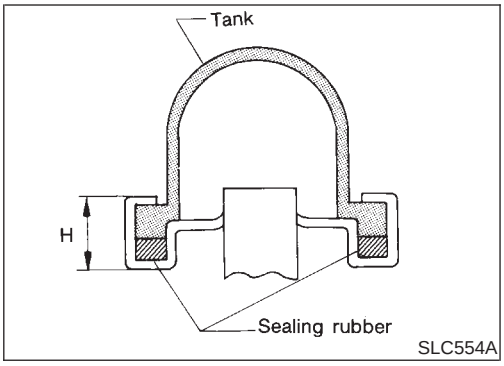
4. Caulk tank in specified sequence with Tool.



SLC896

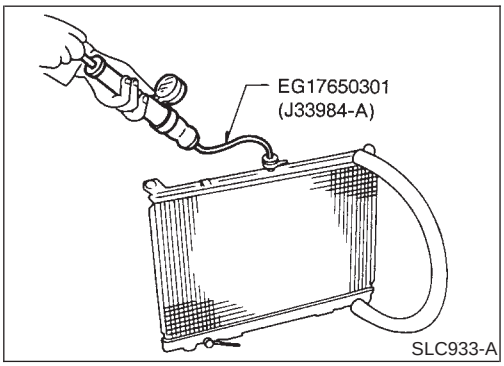

SLC897

- 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 Inspection.



INSPECTION

NFLC0028

Apply pressure with Tool.

Specified pressure value:
157 kPa (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 as well. (A/T models only)

Overheating Cause Analysis

NFLC0029

	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	Refer to DTC P1217 in EC section.	—
		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
			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

Overheating Cause Analysis (Cont'd)

	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		

Service Data and Specifications (SDS)

THERMOSTAT

NFLC0030

Valve opening temperature	82°C (180°F)
Valve lift	More than 8.6 mm/95°C (0.339 in/203°F)

RADIATOR

NFLC0031

Unit: kPa (kg/cm^2, psi)

Cap relief pressure	Standard	78 - 98 (0.8 - 1.0, 11 - 14)
	Limit	59 (0.6, 9)
Leakage test pressure		157 (1.6, 23)

ENGINE MECHANICAL

SECTION EM

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Parts Requiring Angular Tightening

NFEM0001

- Use an angle wrench for the final tightening of the following engine parts:

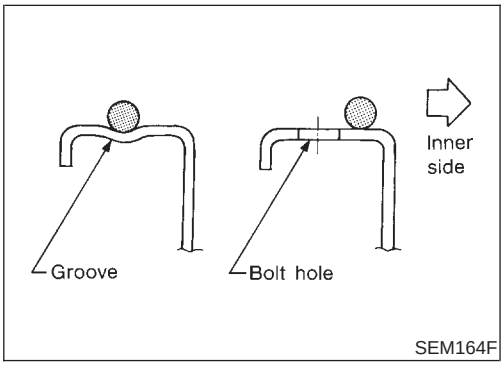
a) Cylinder head bolts
b) Main bearing cap bolts
c) Connecting rod cap nuts
d) Crankshaft pulley bolt

- 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.

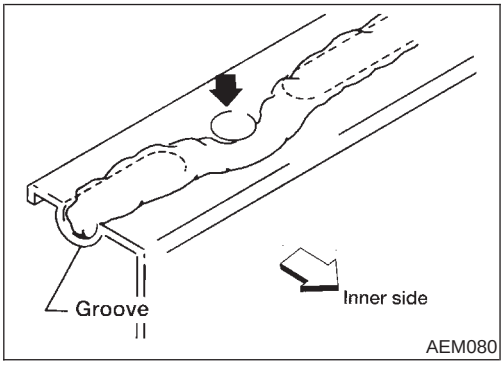
Liquid Gasket Application Procedure

NFEM0002

1. Use a scraper to remove all traces of old liquid gasket from mating surfaces and grooves. Also, completely clean any oil from these areas.
2. Apply a continuous bead of liquid gasket to mating surfaces. (Use Genuine RTV silicone sealant or equivalent. Refer to GI-50.)
   - Be sure liquid gasket diameter is as specified in this manual.



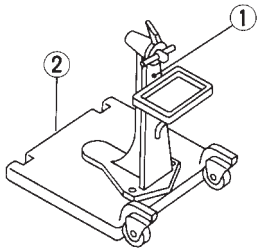
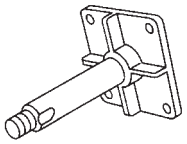
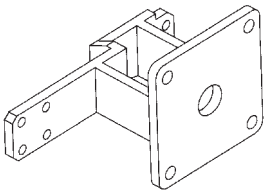
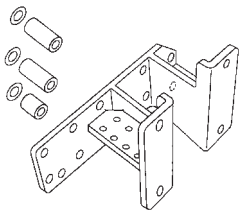
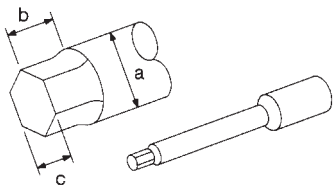
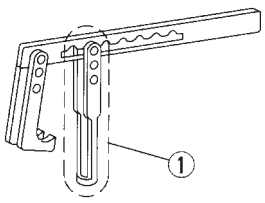
3. Apply liquid gasket around the inner side of bolt holes (unless otherwise specified).
4. Assembly should be done within 5 minutes after coating.
5. Wait at least 30 minutes before refilling engine oil and engine coolant.

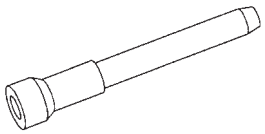
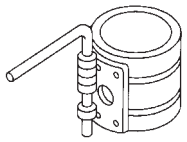
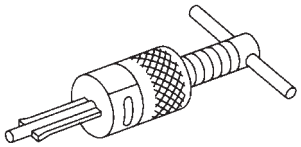
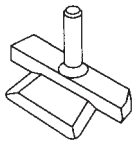
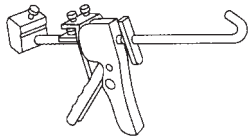
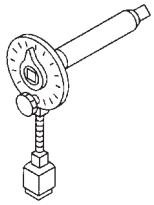


Special Service Tools

NFEM0003

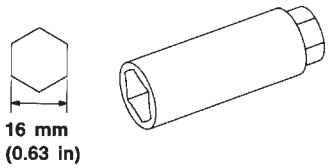
The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description	
ST0501S000 (—) Engine stand assembly 1 ST05011000 (—) Engine stand 2 ST05012000 (—) Base	 NT042	Disassembling and assembling
KV10106500 (—) Engine stand shaft	 NT028	
KV10117000 (J41262) Engine sub-attachment	 NT373	KV10117000 has been replaced with KV10117001 (KV10117000 is no longer in production, but it is usable).
KV10117001 (—) Engine sub-attachment	 NT372	Installing on the cylinder block
ST10120000 (J24239-01) Cylinder head bolt wrench	 NT583	Loosening and tightening cylinder head bolt **a: 13 (0.51) dia.** **b: 12 (0.47)** **c: 10 (0.39)** Unit: mm (in)
KV10116200 (J26336-A) Valve spring compressor 1 KV10115900 (J26336-20) Attachment	 NT022	Disassembling valve mechanism

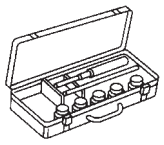
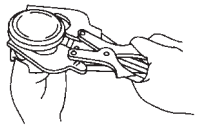
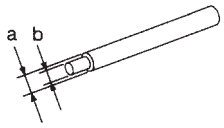
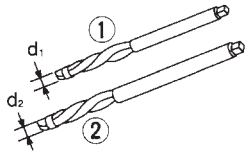
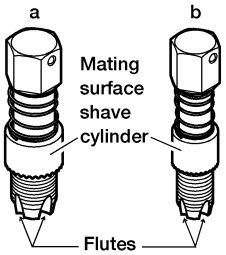
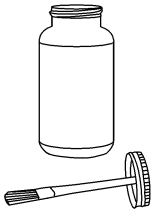
Tool number (Kent-Moore No.) Tool name	Description	
(J39386) Valve oil seal drift	 NT024	Installing valve oil seal
EM03470000 (J8037) Piston ring compressor	 NT044	Installing piston assembly into cylinder bore
ST16610001 (J23907) Pilot bushing puller	 NT045	Removing crankshaft pilot bushing
KV10111100 (J37228) Seal cutter	 NT046	Removing steel oil pan and rear timing chain case
WS39930000 (—) Tube presser	 NT052	Pressing the tube of liquid gasket
KV10112100 (BT8653-A) Angle wrench	 NT014	Tightening bolts for bearing cap, cylinder head, etc.

Commercial Service Tools

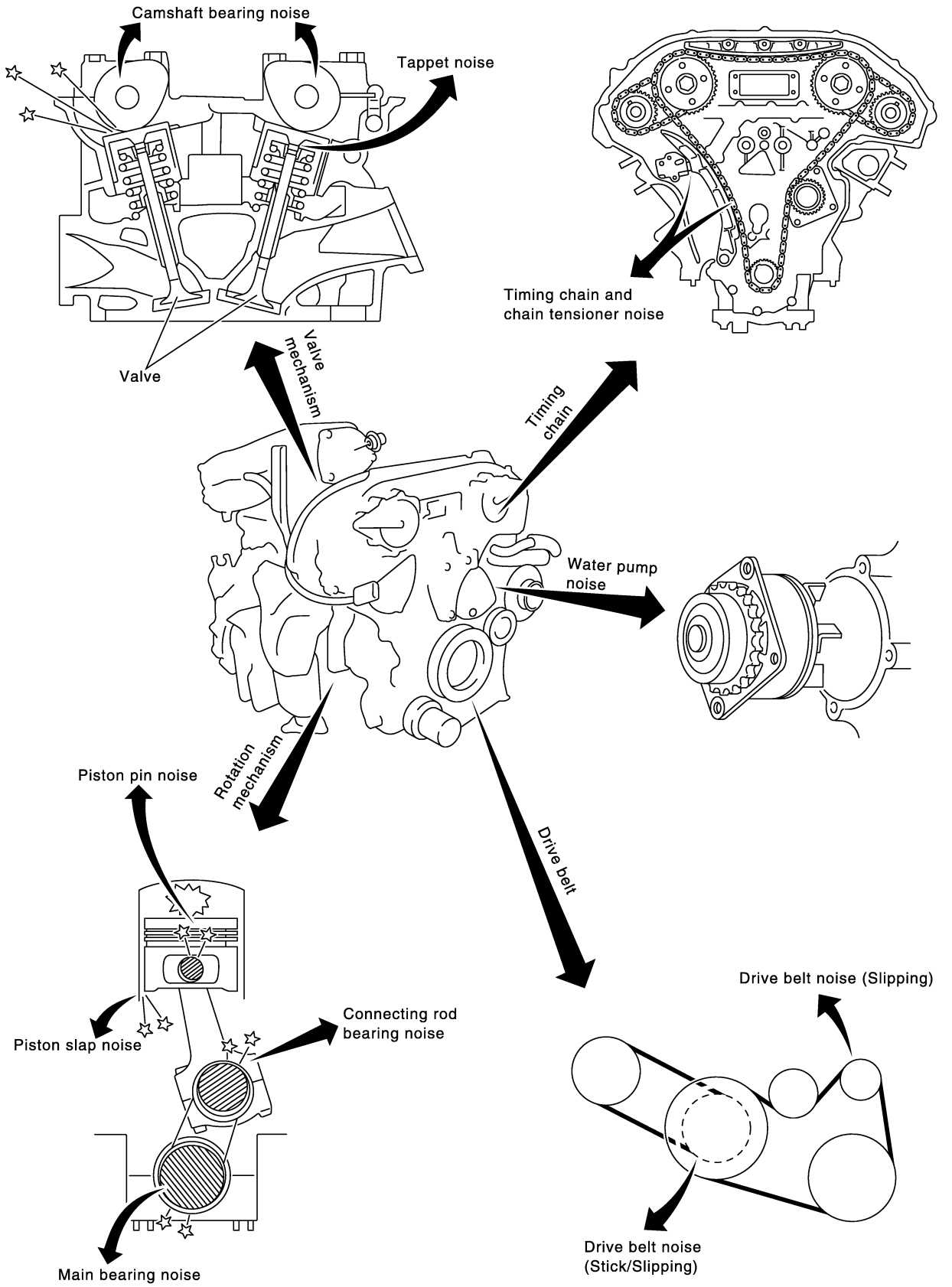
NFEM0004

Tool number (Kent-Moore No.) Tool name	Description	
Spark plug wrench	 NT047	Removing and installing spark plug

Commercial Service Tools (Cont'd)

Tool number (Kent-Moore No.) Tool name	Description	
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 = 6.0 mm (0.236 in) dia.** **d_2 = 10.2 mm (0.402 in) dia.**
(J-43897-18) (J-43897-12) Oxygen sensor thread cleaner	 AEM488	Reconditioning the exhaust system threads before installing a new oxygen sensor (Use with anti-seize lubricant shown below.) **a = J-43897-18 (18 mm dia.) for zirconia oxygen sensor** **b = J-43897-12 (12 mm dia.) for titania oxygen sensor**
Anti-seize lubricant (Permatex 133AR or equivalent meeting MIL specification MIL-A-907)	 AEM489	Lubricating oxygen sensor thread cleaning tool when reconditioning exhaust system threads

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING



SEM706G

NVH Troubleshooting — Engine Noise

NFEM0005S01

Use the chart below to help you find the cause of the symptom.

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.

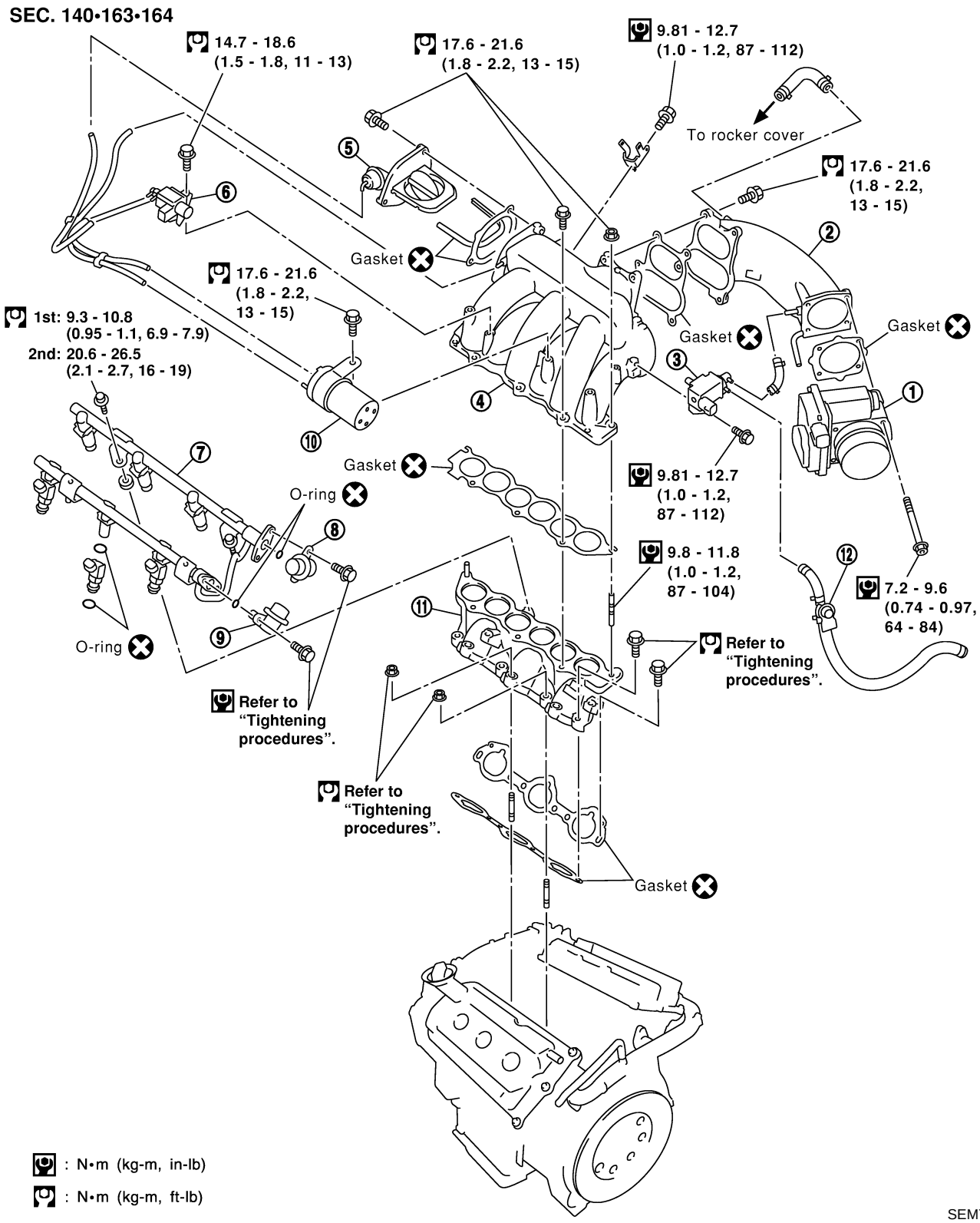
If necessary, repair or replace these parts.

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-56
	Rattle	C	A	—	A	B	C	Camshaft bearing noise	Camshaft journal clearance Camshaft runout	EM-46, EM-46
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-66, EM-72
	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-68, EM-66, EM-66, EM-67
	Knock	A	B	C	B	B	B	Connecting rod bearing noise	Connecting rod bushing clearance (Small end) Connecting rod bearing clearance (Big end)	EM-72, EM-71
	Knock	A	B	—	A	B	C	Main bearing noise	Main bearing oil clearance Crankshaft runout	EM-69, EM-69
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-31, EM-21
Front of engine	Squeaking or fizzing	A	B	—	B	—	C	Drive belts (Sticking or slipping)	Drive belts deflection	MA section (“Checking Drive Belts”, “ENGINE MAINTENANCE”)
	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	LC section (“Water Pump Inspection”, “ENGINE COOLING SYSTEM”)

A: Closely related B: Related C: Sometimes related —: Not related

Removal and Installation

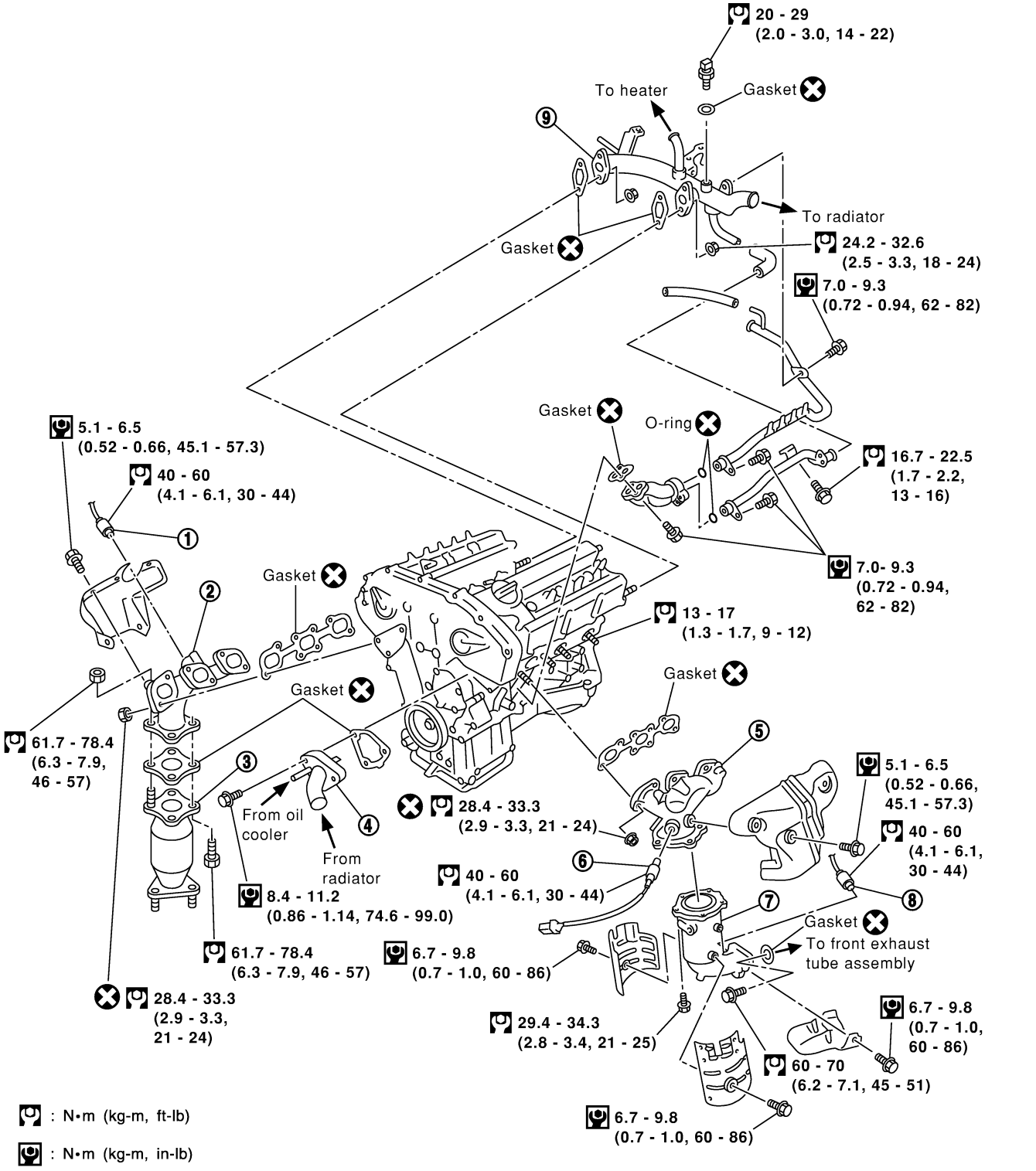
NFEM0006



SEM707GA

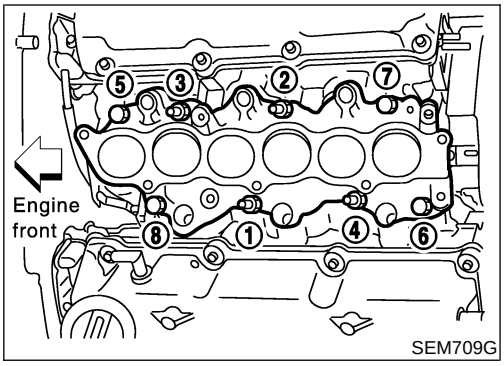
1. Electronic control throttle actuator
2. Intake manifold upper collector
3. EVAP canister purge volume control solenoid valve
4. Intake manifold lower collector
5. Power valve
6. VIAS control solenoid valve
7. Fuel tube
8. Fuel damper
9. Fuel damper
10. Vacuum tank
11. Intake manifold
12. Service port

SEC. 140•208•211



SEM708GA

1. Heated oxygen sensor 1 (front) (bank 1)
2. Exhaust manifold
3. TWC (manifold)
4. Thermostat with water inlet
5. Exhaust manifold
6. Heated oxygen sensor 1 (front) (bank 2)
7. TWC (manifold)
8. Heated oxygen sensor 2 (rear) (bank 2)
9. Water outlet



TIGHTENING PROCEDURES

NFEM0006S01

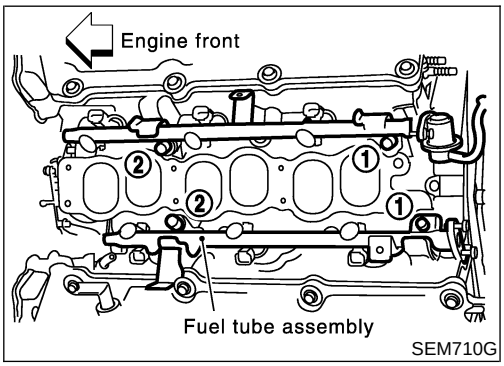
Intake Manifold

NFEM0006S0101

- **Tighten in numerical order shown in the figure.**

1. Tighten all bolts and nuts to 4.9 to 9.8 N·m (0.50 to 0.99 kg-m, 4 to 7 ft-lb).
2. Finally tighten all bolts and nuts to 26.5 to 31.4 N·m (2.7 to 3.2 kg-m, 20 to 23 ft-lb).

- Tighten all bolts and nuts to the final torque, evenly dividing the tightening into at least three steps.

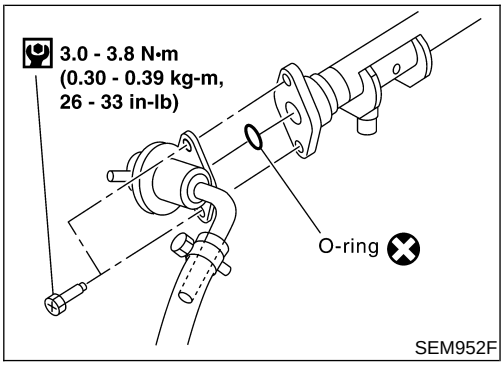


Fuel Tube

NFEM0006S0102

- **Tighten in numerical order shown in the figure.**

1. Tighten all bolts to 9.3 to 10.8 N·m (0.95 to 1.1 kg-m, 6.9 to 7.9 ft-lb).
2. Then tighten all bolts to 20.6 to 26.5 N·m (2.1 to 2.7 kg-m, 16 to 19 ft-lb).

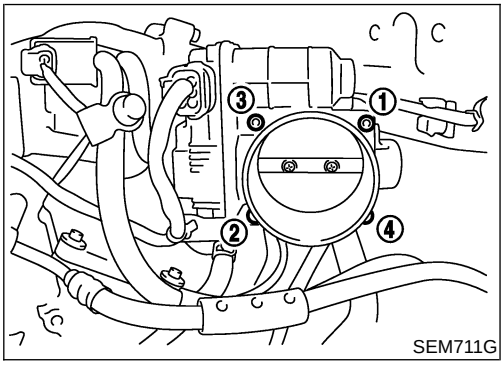


Fuel Damper

NFEM0006S0103

Tighten fuel damper to 2.9 to 3.8 N·m (0.3 to 0.39 kg-m, 26.0 to 33.9 in-lb).

- **Tighten screws evenly several times to have the fuel damper tightened at the specified torque.**
- **Always replace O-ring with new ones.**
- **Lubricate O-ring with new engine oil.**



Electronic Control Throttle Actuator

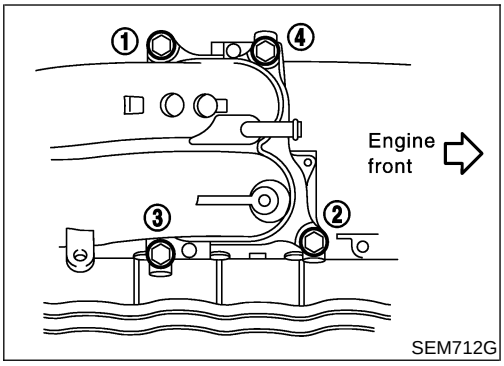
NFEM0006S0105

- **Tighten in numerical order shown in the figure.**

Tighten all bolts to 7.2 to 9.6 N·m (0.74 to 0.97 kg-m, 64 to 84 in-lb).

CAUTION:

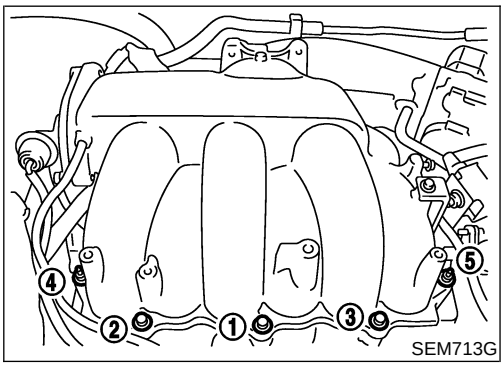
- **Perform "Throttle Valve Closed Position Learning" when harness connector of electronic throttle control actuator is disconnected.**
  Refer to "BASIC SERVICE PROCEDURE" in EC section.
- **Perform "Idle Air Volume Learning" when electronic throttle control actuator is replaced.**
  Refer to "BASIC SERVICE PROCEDURE" in EC section.



Intake Manifold Upper Collector

NFEM0006S0108

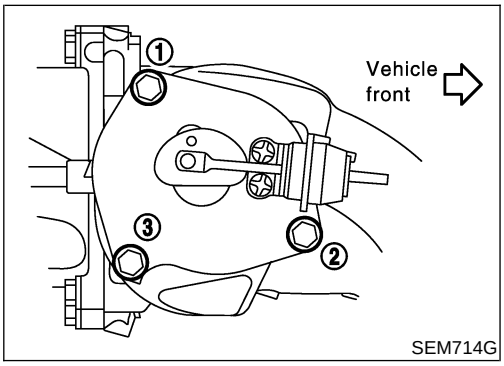
- **Tighten in numerical order shown in the figure.**
  Tighten all bolts to 17.6 to 21.6 N·m (1.8 to 2.2 kg-m, 13 to 15 ft-lb).



Intake Manifold Lower Collector

NFEM0006S0107

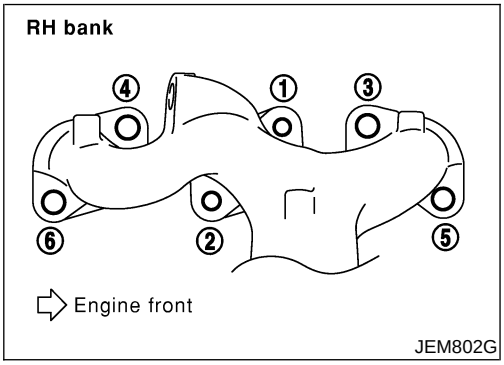
Tighten bolts and nuts to 17.6 to 21.6 N·m (1.8 to 2.2 kg-m, 13 to 15 ft-lb) in numerical order shown in the figure.



Power Valve

NFEM0006S0109

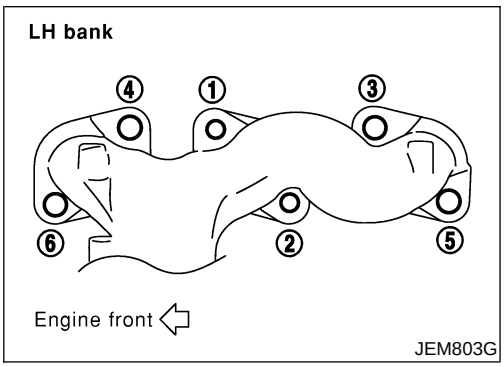
- **Tighten in numerical order shown in the figure.**
  Tighten all bolts to 17.6 to 21.6 N·m (1.8 to 2.2 kg-m, 13 to 15 ft-lb).



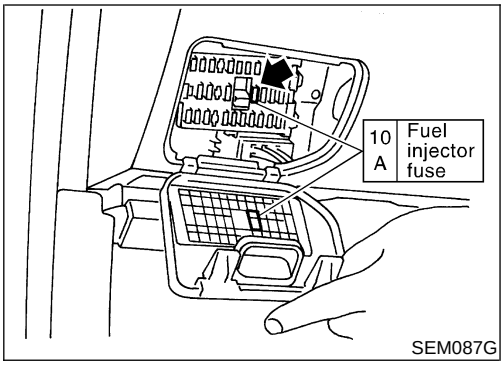
Exhaust Manifold

NFEM0006S0110

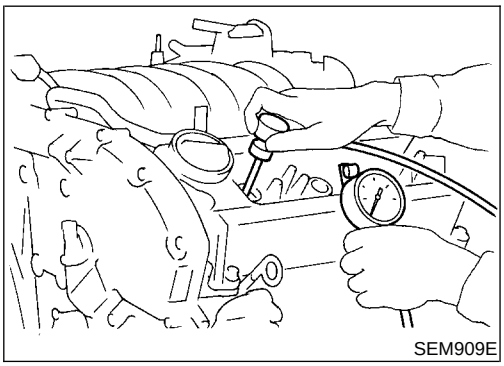
Tighten nuts to 28.4 to 33.3 N·m (2.9 to 3.3 kg-m, 21 to 24 ft-lb) in numerical order shown in the figure.



MEASUREMENT OF COMPRESSION PRESSURE



SEM087G


SEM909E

20 mm (0.79 in) dia.

Use compressor tester whose end (rubber portion) is less than 20 mm (0.79 in) dia. Otherwise, it may be caught by cylinder head during removal.

SEM387C

1. Warm up engine.
2. Turn ignition switch OFF.
3. Release fuel pressure.
   Refer to EC-56, “Fuel Pressure Release”.
4. Disconnect ignition coil with power transistor harness connectors, then remove ignition coils.
5. Remove all spark plugs.
6. Remove fuse for fuel injector.
7. Attach a compression tester to No. 1 cylinder.
8. Depress accelerator pedal fully to keep throttle valve wide open.
9. Crank engine and record highest gauge indication.
10. Repeat the measurement on each cylinder as shown above.

- **Always use a fully-charged battery to obtain specified engine speed.**

Unit: kPa (kg/cm^2, psi)/rpm

Standard	Minimum	Difference limit between cylinders
1,275 (13.0, 185)/300	981 (10.0, 142)/300	98 (1.0, 14)/300

11. If compression in one or more cylinders is low:

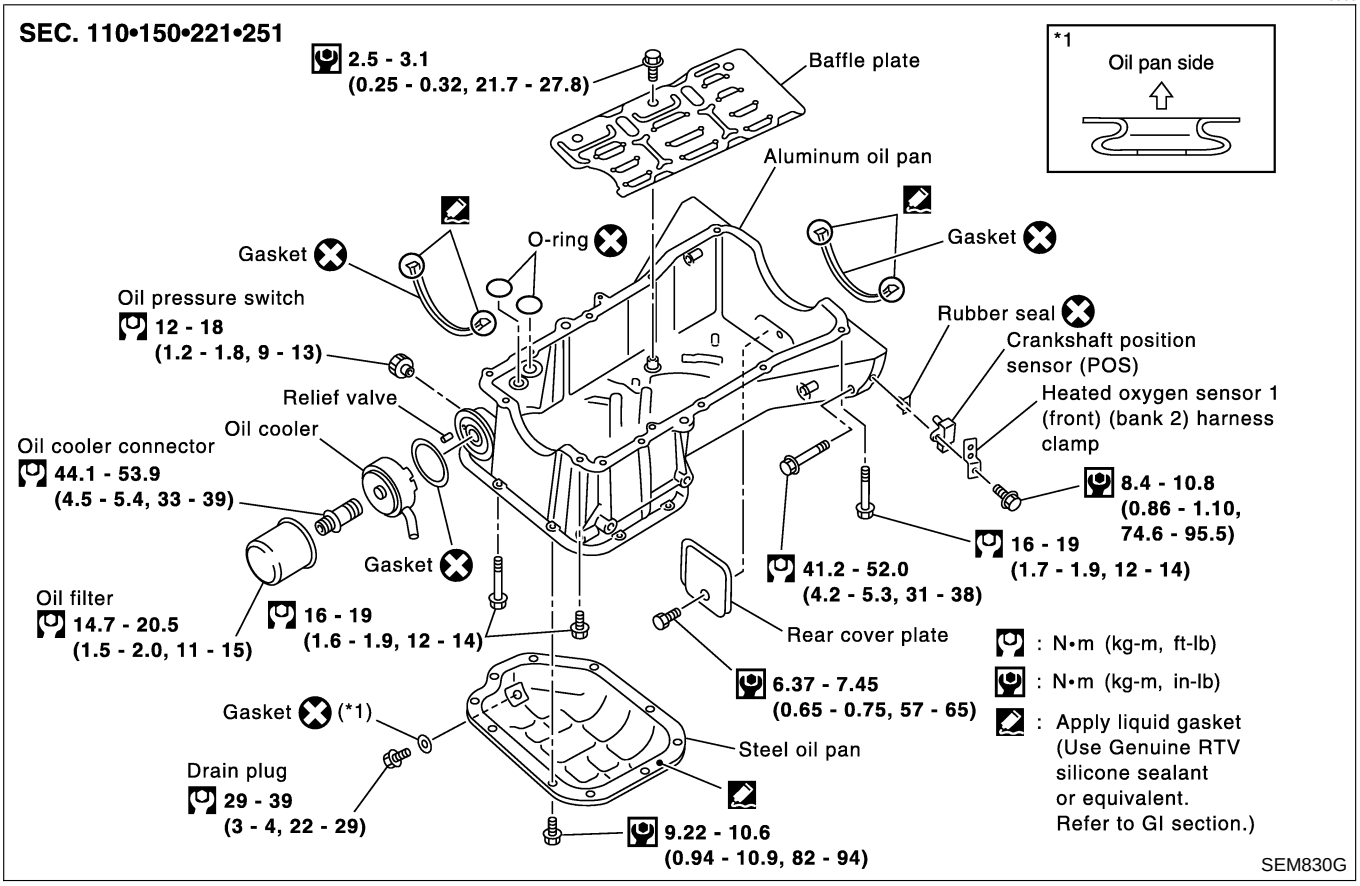
a. Pour a small amount of engine oil into cylinders through spark plug holes.
b. Retest compression.

- **If adding oil helps compression, piston rings may be worn or damaged. If so, replace piston rings after checking piston.**
- **If pressure stays low, a valve may be sticking or seating improperly. Inspect and repair valve and valve seat. (Refer to SDS, EM-80 and EM-83.) If valve or valve seat is damaged excessively, replace them.**
- **If compression stays low in two cylinders that are next to each other:**

a) The cylinder head gasket may be leaking, or
b) Both cylinders may have valve component damage. Inspect and repair as necessary.

Components

NFEM0008



Removal

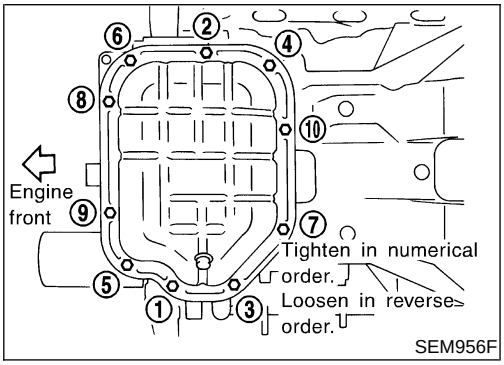
NFEM0009

CAUTION:

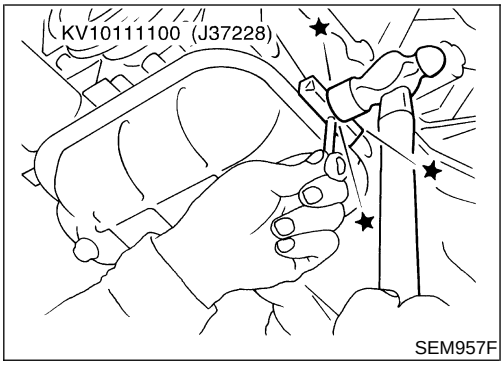
When removing the aluminum oil pan from engine, first remove the crankshaft position sensor (POS) from the assembly.

Be careful not to damage sensor edges and signal plate teeth.

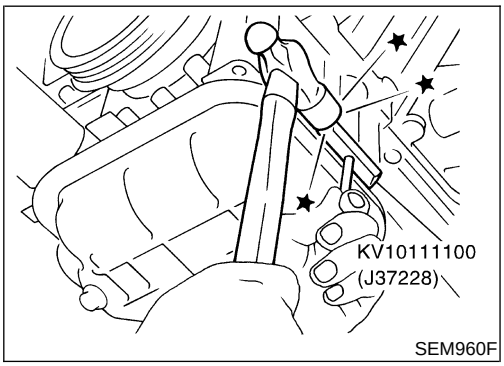
1. Remove engine undercover.
2. Drain engine oil.



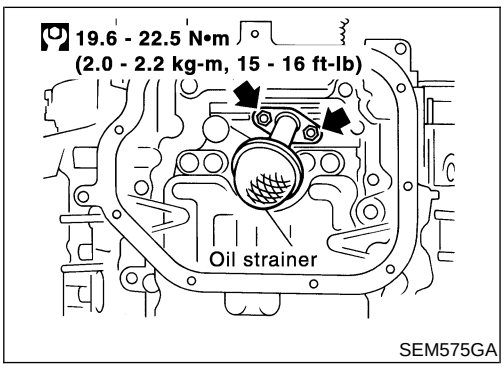
3. Remove steel oil pan bolts.



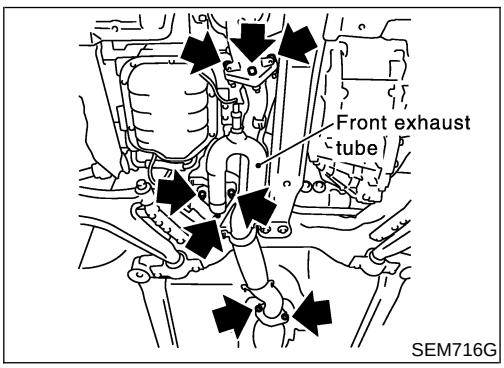
4. Remove steel oil pan.
a. Insert Tool between aluminum oil pan and steel oil pan.
- **Be careful not to damage aluminum mating surface.**
- **Do not insert screwdriver, or oil pan flange will be deformed.**



b. Slide Tool by tapping on the side of the Tool with a hammer.
c. Remove steel oil pan.

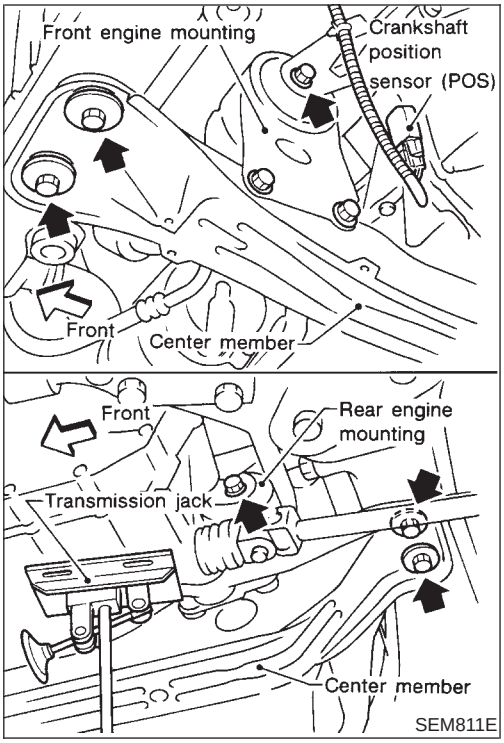


5. Remove oil strainer.



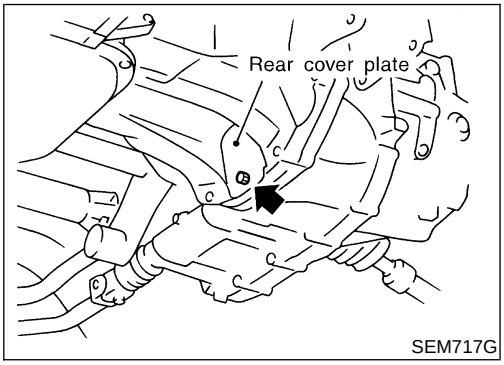
6. Remove front exhaust tube and its support.
Refer to FE-9, "Removal and Installation".

Removal (Cont'd)

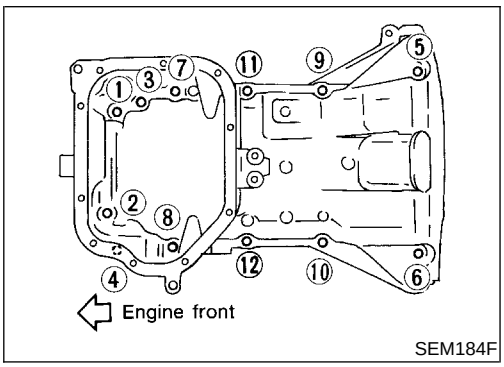


7. Set a suitable transmission jack under transaxle and hoist engine with engine slinger.
8. Remove crankshaft position sensor (POS) from oil pan.
9. Remove front and rear engine mounting nuts and bolts.
10. Remove center member.

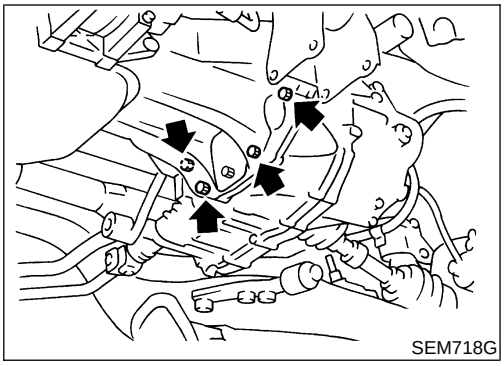
11. Remove drive belts.
12. Remove air conditioner compressor and bracket.
    Refer to HA-143 or HA-230, "REMOVAL AND INSTALLATION".



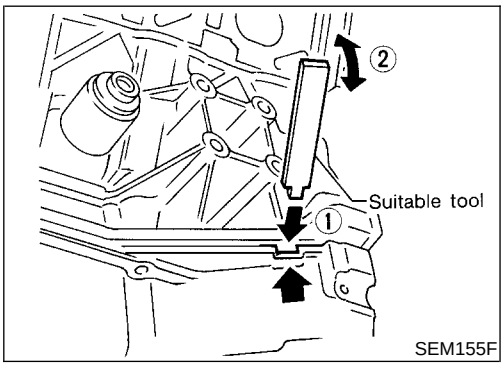
13. Remove rear cover plate.



14. Remove aluminum oil pan bolts in numerical order.


SEM718G

15. Remove four engine-to-transaxle bolts.



SEM155F

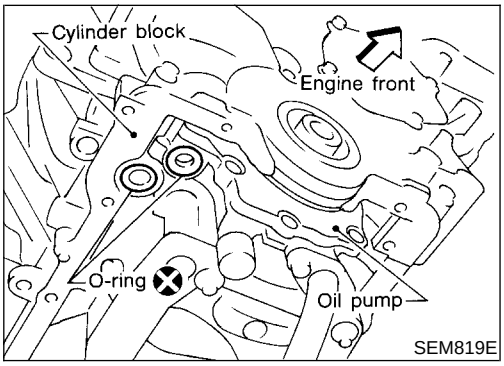
16. Remove aluminum oil pan.

a. Insert an appropriate size tool into the notch of aluminum oil pan as shown in the figure.

- **Be careful not to damage aluminum mating surface.**
- **Do not insert screwdriver, or oil pan flange will be deformed.**

b. Pry off aluminum oil pan by moving the tool up and down.

c. Remove aluminum oil pan.

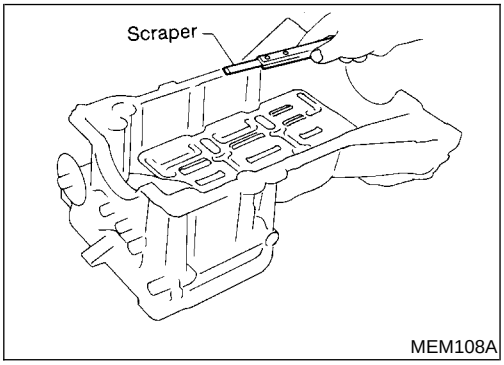


SEM819E

17. Remove O-rings from cylinder block and oil pump body.

Installation

NFEM0010

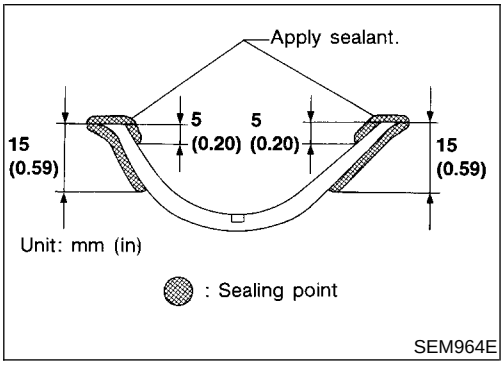


MEM108A

1. Install aluminum oil pan.

a. Use a scraper to remove old liquid gasket from mating surfaces.

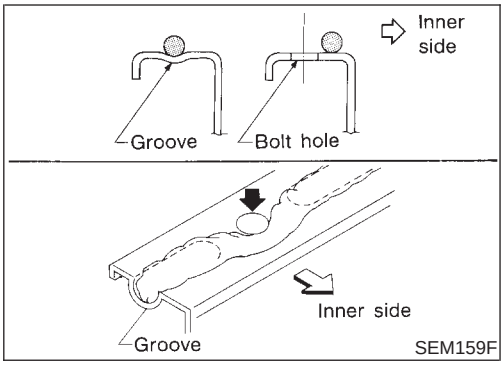
- **Also remove old liquid gasket from mating surface of cylinder block, front cover and steel oil pan.**
- **Remove old liquid gasket from the bolt hole and thread.**



SEM964E

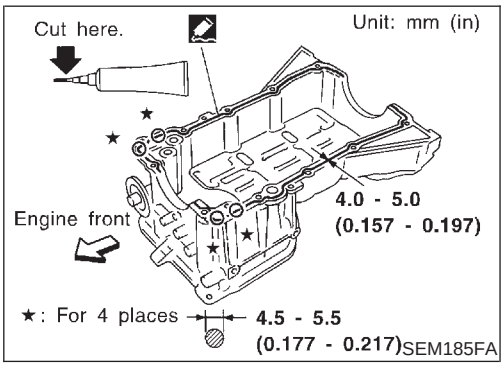
b. Apply sealant to front cover gasket and rear oil seal retainer gasket.

Installation (Cont'd)



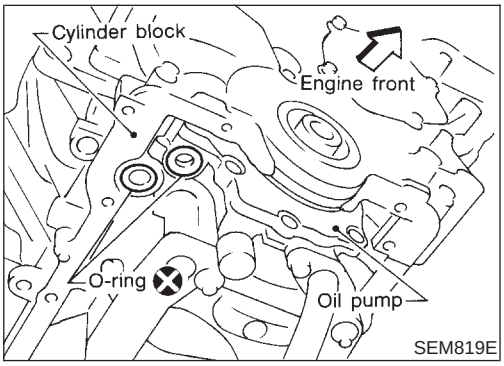
c. Apply a continuous bead of liquid gasket to mating surface of aluminum oil pan.

- **Use Genuine RTV silicone sealant or equivalent. Refer to GI-50.**

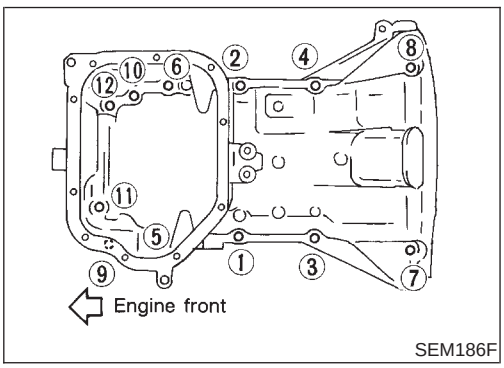


d. Apply liquid gasket to inner sealing surface as shown in figure.

- **Be sure liquid gasket is 4.0 to 5.0 mm (0.157 to 0.197 in) or 4.5 to 5.5 mm (0.177 to 0.217 in) wide as shown in the figure.**
- **Assembly should be done within 5 minutes after coating.**

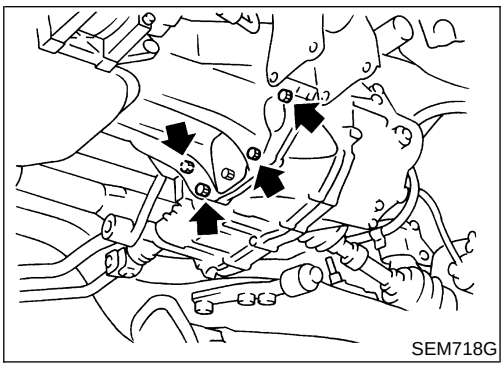


e. Install O-rings, cylinder block and oil pump body.



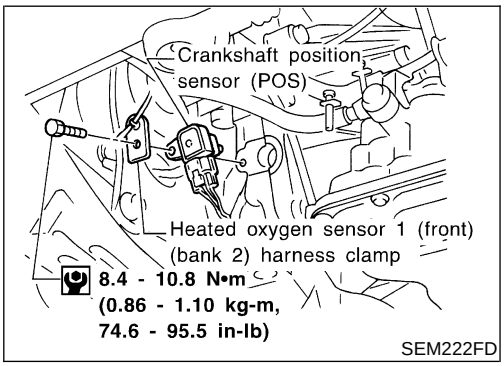
f. Install aluminum oil pan.

- Tighten bolts in numerical order.
- **Wait at least 30 minutes before refilling engine oil.**



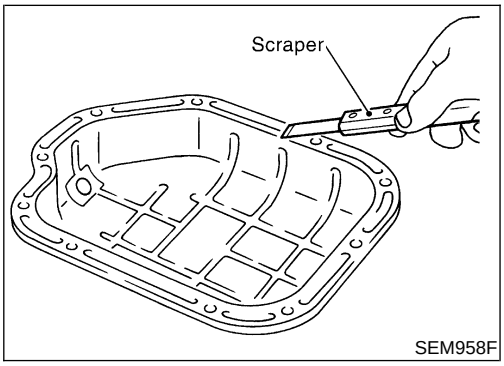
2. Install the four engine-to-transaxle bolts. For tightening torque, refer to AT-281 or MT-14, "Installation".
3. Install rear cover plate.

4. Install air conditioner compressor and bracket.
   Refer to HA-143, "REMOVAL AND INSTALLATION".
5. Install drive belts.
6. Install center member.
7. Install front and rear engine mounting insulator nuts and bolts.



8. Install crankshaft position sensor (POS) with new rubber seal, and heated oxygen sensor 1 (front) (bank 2) harness clamp.
- **Make sure that crankshaft position sensor (POS) and heated oxygen sensor 1 (front) (bank 2) harness clamp are installed correctly as shown in figure.**

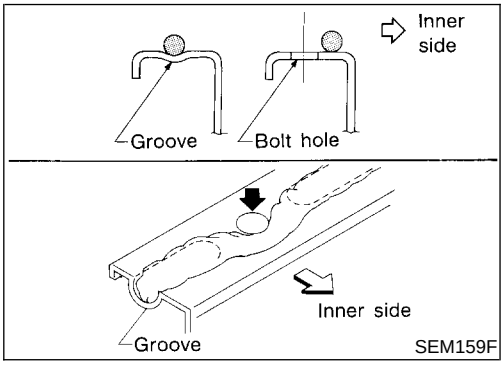
9. Install front exhaust tube and its support.
10. Install oil strainer.



11. Install steel oil pan.

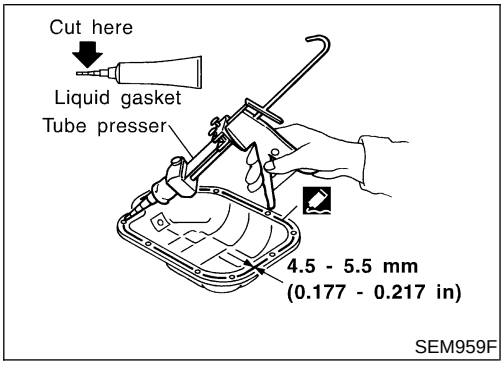
a. Use a scraper to remove old liquid gasket from mating surfaces.

- **Also remove old liquid gasket from mating surface of aluminum oil pan.**



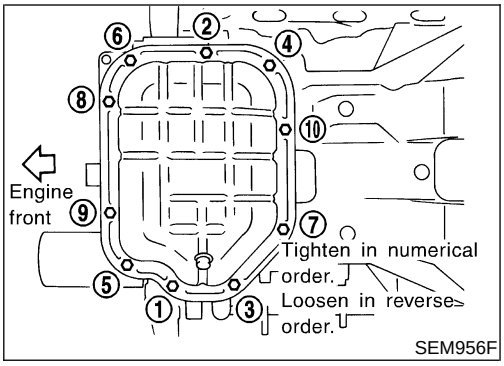
b. Apply a continuous bead of liquid gasket to mating surface of steel oil pan.

- **Use Genuine RTV silicone sealant or equivalent. Refer to GI-50.**



- **Be sure liquid gasket is 4.5 to 5.5 mm (0.177 to 0.217 in) wide.**
- **Assembly should be done within 5 minutes after coating.**

Installation (Cont'd)



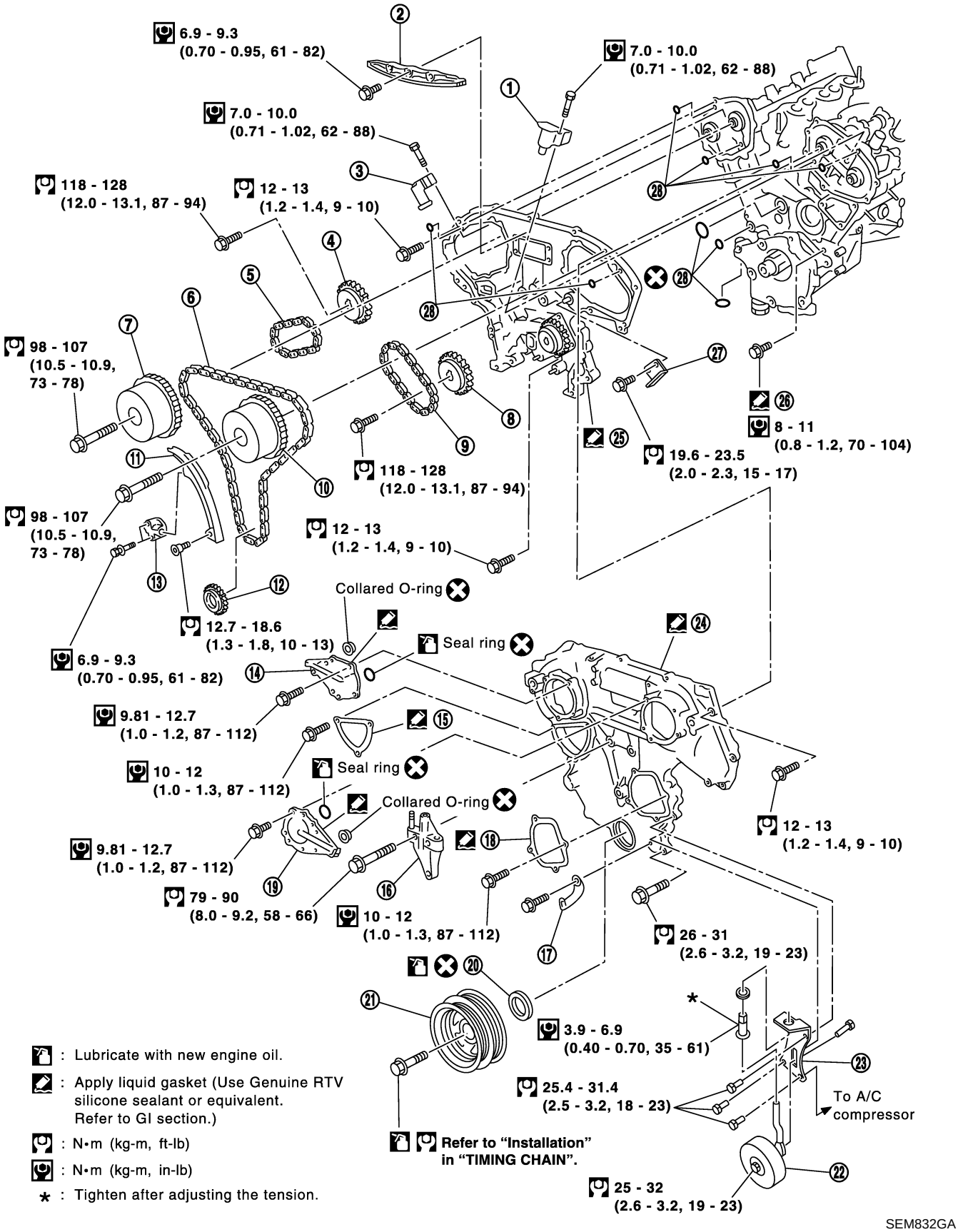
c. Install steel oil pan.

- **Tighten in numerical order shown in the figure.**
- **Wait at least 30 minutes before refilling engine oil.**

Components

NFEM0011

SEC. 120•130•150•210•275



SEM832GA

Components (Cont'd)

1. Timing chain tensioner
2. Internal chain guide
3. Timing chain tensioner
4. Camshaft sprocket (EXH)
5. Timing chain (Secondary)
6. Timing chain (Primary)
7. Camshaft sprocket (INT)
8. Camshaft sprocket (EXH)
9. Timing chain (Secondary)
10. Camshaft sprocket (INT)
11. Slack guide
12. Crankshaft sprocket
13. Timing chain tensioner
14. Intake valve timing control valve cover
15. Chain tensioner cover
16. Mounting bracket
17. Water hose clamp
18. Water pump cover
19. Intake valve timing control valve cover
20. Front oil seal
21. Crankshaft pulley
22. Idler pulley
23. Idler pulley bracket
24. Front timing chain case
25. Rear timing chain case
26. Water drain plug
27. Tension guide
28. O-ring

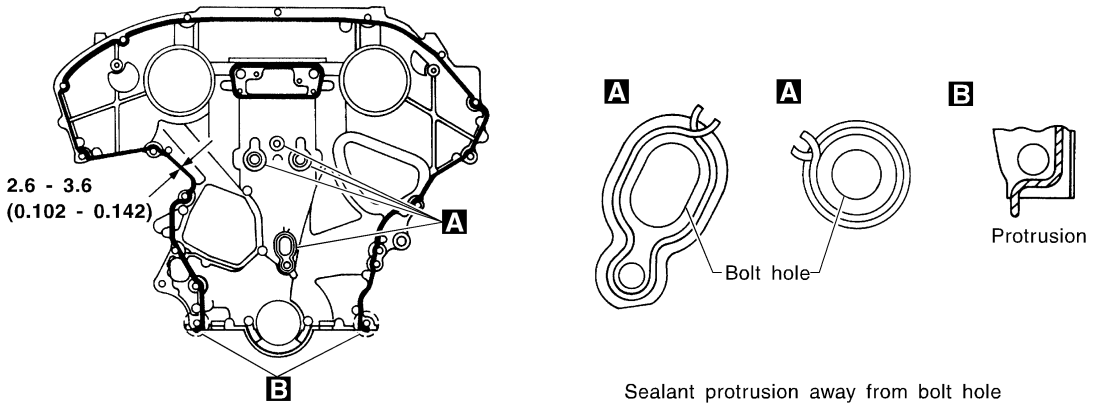
POSITION FOR APPLYING LIQUID GASKET

=NFEM0011S01

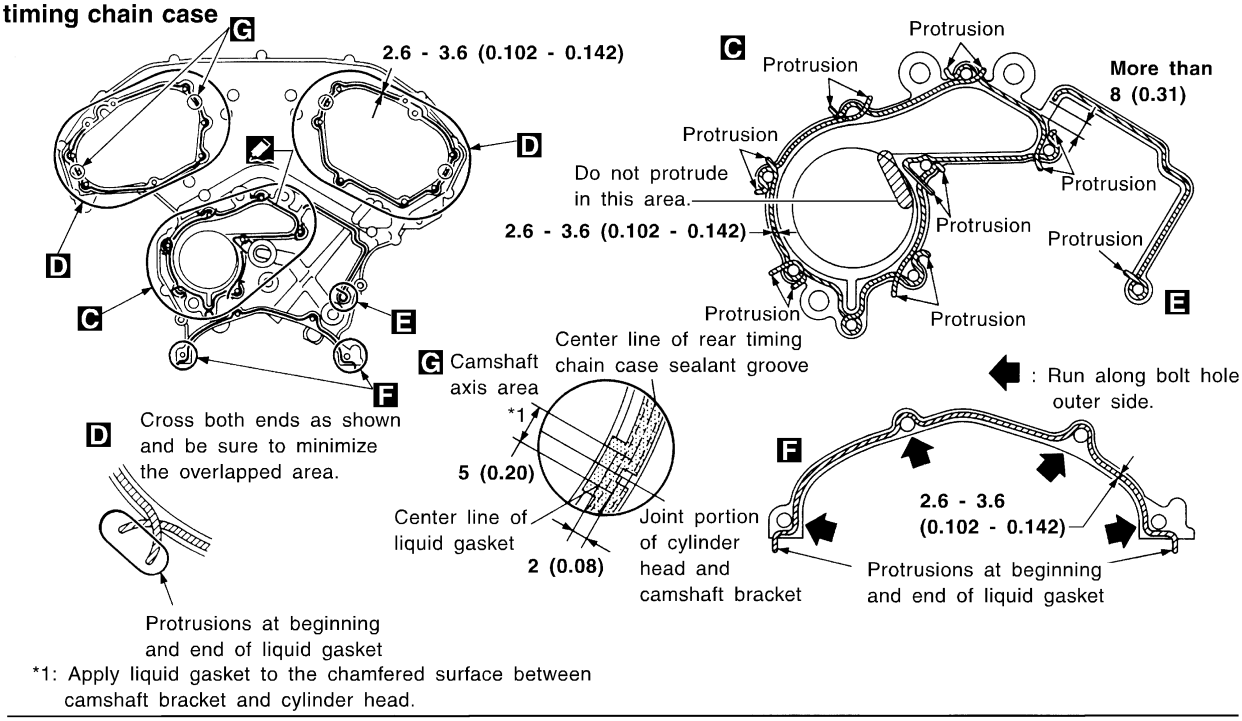
Refer to "Liquid Gasket Application Procedure" in "PRECAUTIONS", EM-3.

- **Before installation, wipe off the protruding sealant.**

Front timing chain case

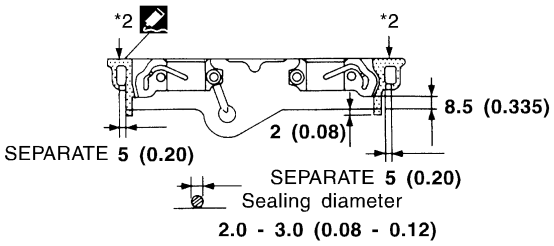


Rear timing chain case



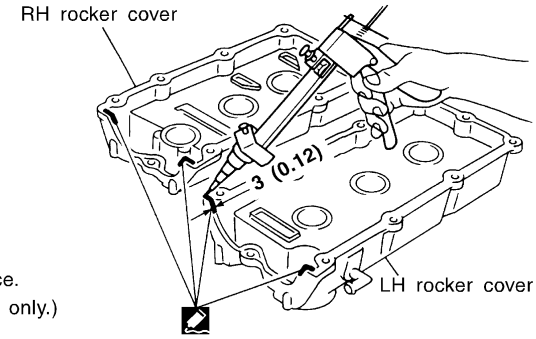
*1: Apply liquid gasket to the chamfered surface between camshaft bracket and cylinder head.

Camshaft bracket



*2: Remove the protruding sealant from front face. (Remove the hardened sealant from surface only.)

Rocker cover



Unit: mm (in)

SEM720GA

CAUTION:

- **After removing timing chain, do not turn crankshaft and**

camshaft separately, or valves will strike piston heads.

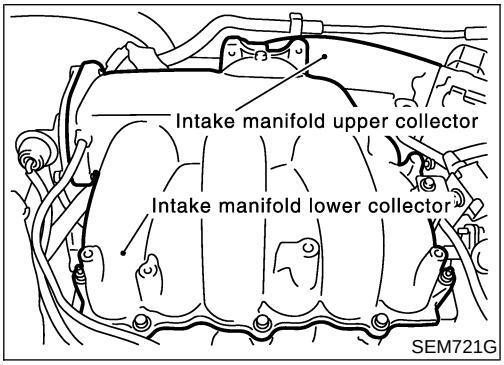
- **When installing camshafts, chain tensioners, oil seals, or other sliding parts, lubricate contacting surfaces with new engine oil.**
- **Apply new engine oil to bolt threads and seat surfaces when installing cylinder head, camshaft sprockets, crankshaft pulley and camshaft brackets.**
- **Before disconnecting fuel hose, release fuel pressure. Refer to EC-56, "Fuel Pressure Release".**
- **When removing the oil pans, oil pump assembly and timing chain from engine, first remove the crankshaft position sensor (POS) from the assembly.**
  Be careful not to damage sensor edges.
- **Do not spill engine coolant on drive belts.**

Removal

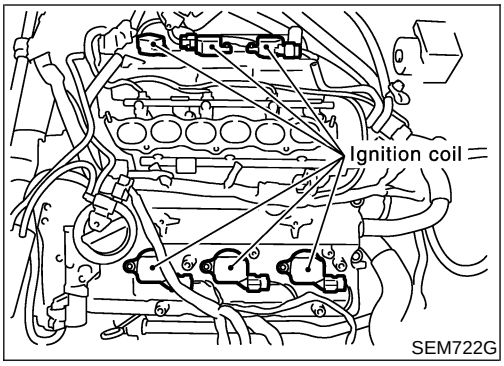
NFEM0012

1. Drain engine oil.
2. Release fuel pressure.
   Refer to EC-56, "Fuel Pressure Release".
3. Drain coolant by removing cylinder block drain plugs. Refer to MA-14, "Changing Engine Coolant".
4. Remove ornament cover.
5. Remove air duct to intake manifold, collector, PCV hose, vacuum hoses, fuel hoses, wires, harness, connectors and so on.
6. Remove the following.

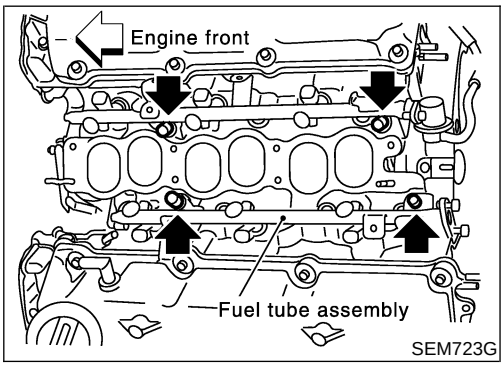
- Water hoses
- EVAP canister purge hose
- PCV hose
- PCV valve
- Water outlet



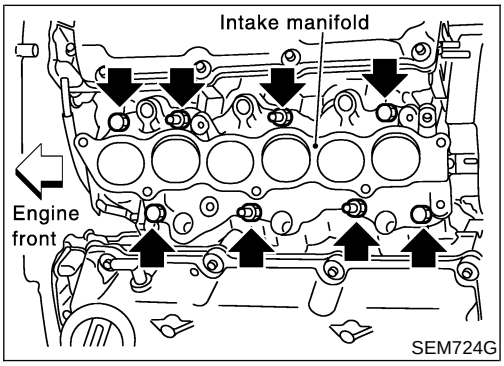
7. Remove intake manifold upper and lower collectors loosening bolts and nuts in reverse order of tightening. Refer to "TIGHTENING PROCEDURES", EM-11.



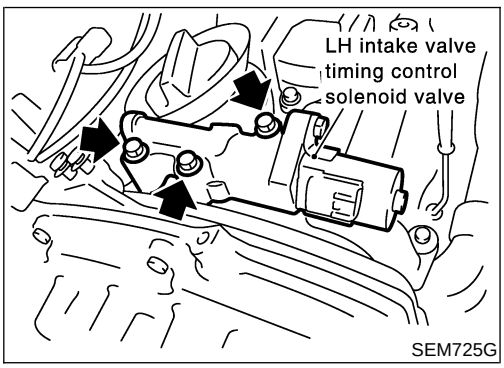
8. Remove RH and LH ignition coils.



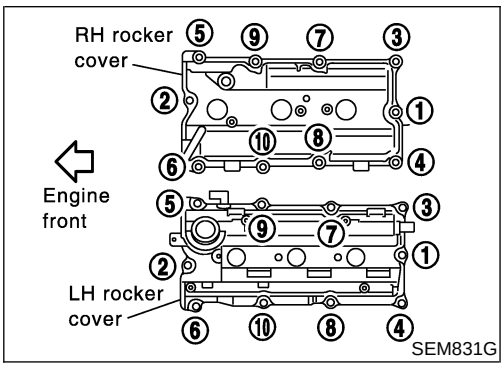
9. Remove fuel tube assembly. Refer to EC-57, "Removal and Installation".



10. Remove intake manifold loosening bolts and nuts in reverse order of tightening. Refer to "TIGHTENING PROCEDURES", EM-11.

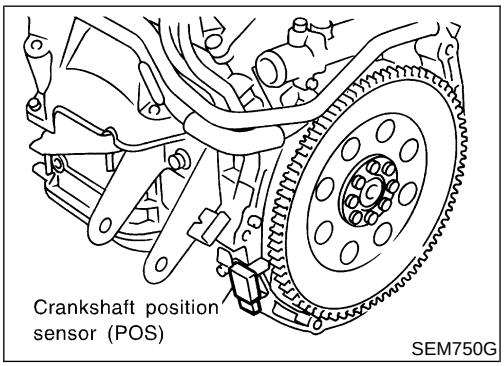


11. Remove RH and LH intake valve timing control solenoid valves.

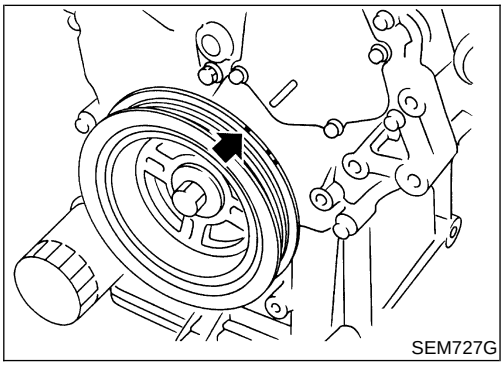


12. Remove RH and LH rocker covers from cylinder head.
- Loosen bolts in numerical order shown in the figure.

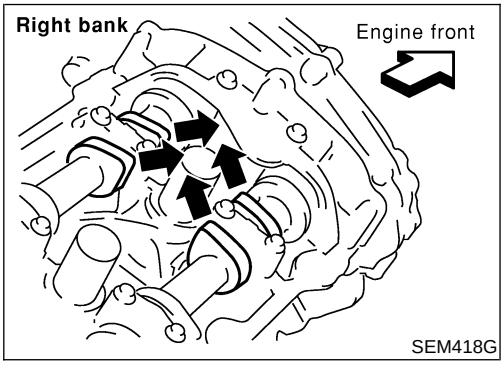
13. Remove engine undercover.
14. Remove front RH wheel and engine side cover.
15. Remove drive belts and idler pulley bracket.
16. Remove power steering oil pump belt and power steering oil pump assembly.
    Refer to ST-24, "Components".



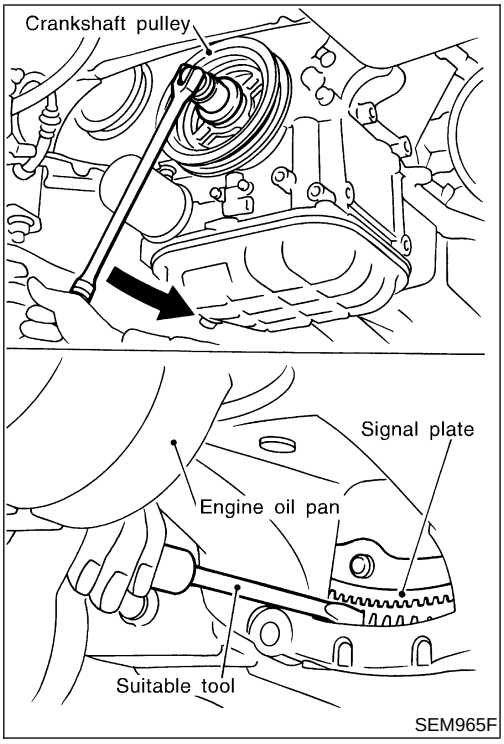
17. Remove crankshaft position sensor (POS).



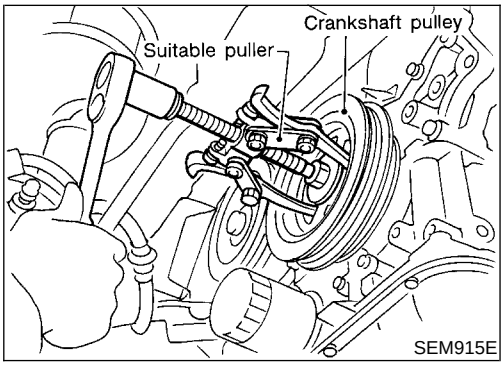
18. Set No. 1 piston at TDC on the compression stroke by rotating crankshaft.



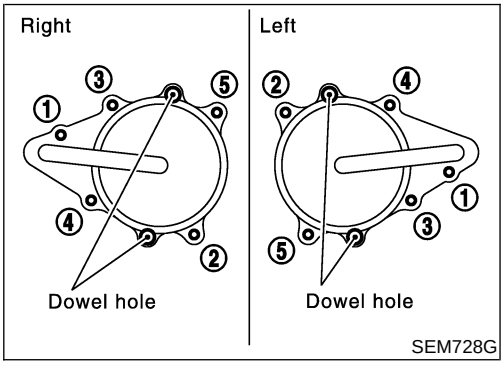
- Check that intake and exhaust cam nose on No. 1 cylinder are installed as shown.
  If not, turn the crankshaft one revolution (360°) and align as above.



19. Loosen crankshaft pulley bolt. (At this time remove oil pan rear cover plate and set a suitable tool to ring gear so that crankshaft cannot rotate.)
- **Be careful not to damage the signal plate teeth.**



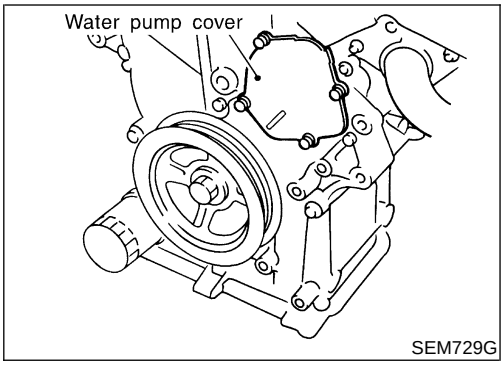
20. Remove crankshaft pulley with a suitable puller.



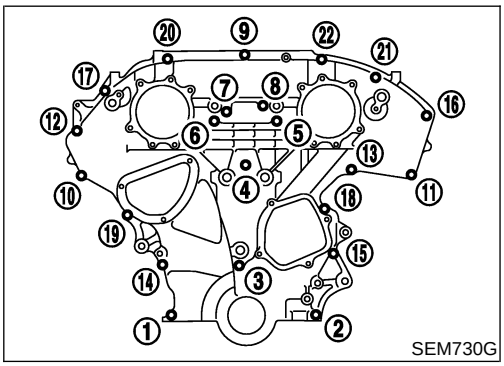
21. Remove intake valve timing control valve covers.
- **Loosen bolts in reverse order shown in the figure.**
- In the cover, the shaft is engaged with the center hole of the intake camshaft sprocket. Remove it straight out until the engagement comes off.

22. Remove air conditioner compressor and bracket. Refer to HA-143 or HA-230, "REMOVAL AND INSTALLATION".
23. Remove front exhaust tube and its support.
24. Hang engine at right and left side engine slingers with a suitable hoist. Refer to EM-60, "Removal and Installation".
25. Remove right side engine mounting, mounting bracket and nuts. Refer to EM-60, "Removal and Installation".
26. Remove center member assembly.
27. Remove upper and lower oil pans. Refer to EM-14, "Removal".

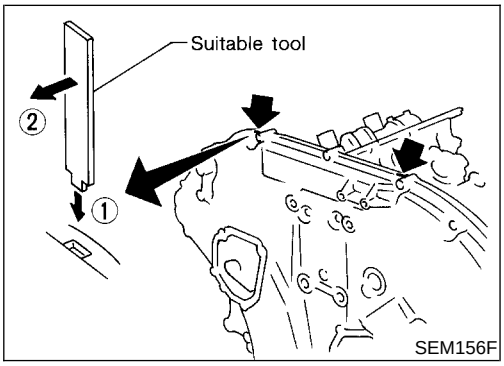
Removal (Cont'd)



28. Remove water pump cover.

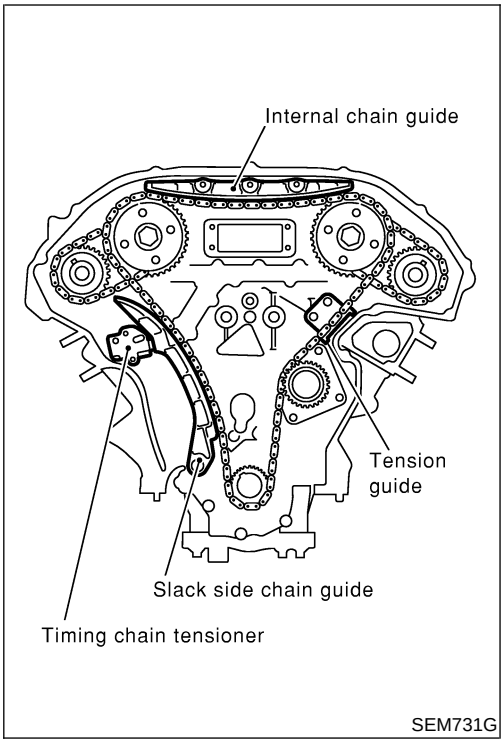


29. Remove front timing chain case bolts.
- **Loosen bolts in reverse order shown in the figure.**

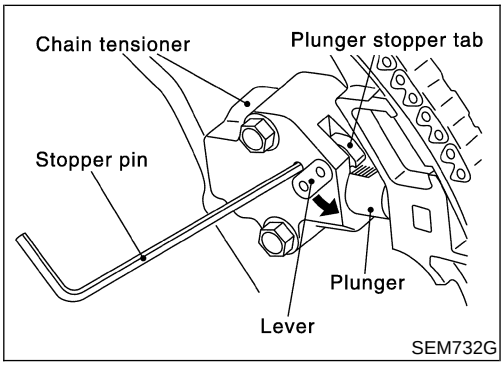


30. Remove front timing chain case.
- **Do not scratch sealing surfaces.**

31. Remove timing chain tensioner cover from front timing chain case.
32. Remove front oil seal from front timing chain case.
Refer to EM-40, "FRONT OIL SEAL".



33. Remove internal chain guide.
34. Remove timing chain tensioner and slack side chain guide.



- Remove chain tensioner as follows.

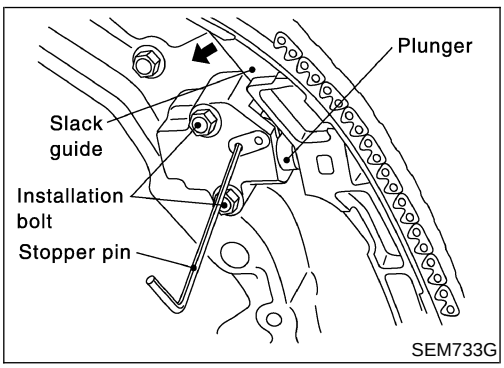
a) Pull lever down, and release plunger stopper tab.

- Plunger stopper tab can be pushed up to release (coaxial structure with lever).

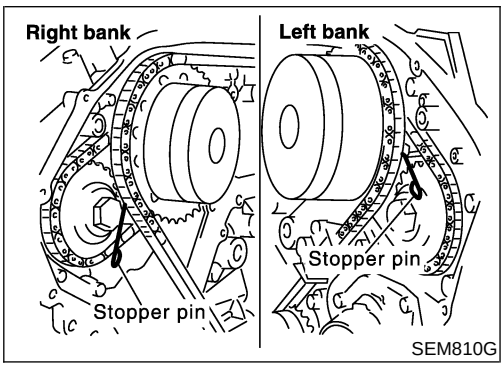
b) Insert stopper pin into tensioner body hole to fix lever, and keep the tab released.

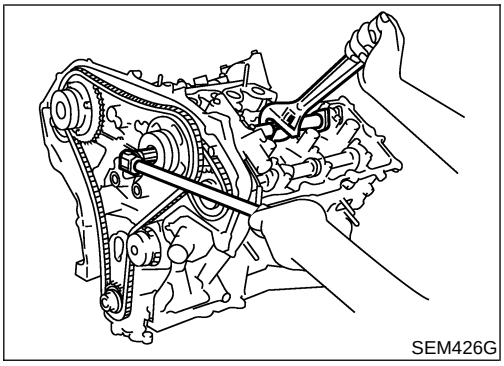
- In figure, Allen wrench [2.5 mm (0.098 in)] is used for stopper pin as an example.

c) Insert plunger into tensioner body by pressing slack guide.
d) Keep slack guide pressed, and fix it by pushing stopper pin through lever hole and body hole.
e) Remove mounting bolts, and remove chain tensioner.

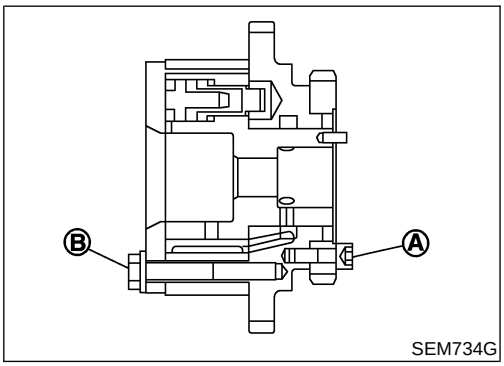


35. Attach a suitable stopper pin to RH and LH camshaft chain tensioners. (For secondary timing chains)




SEM426G

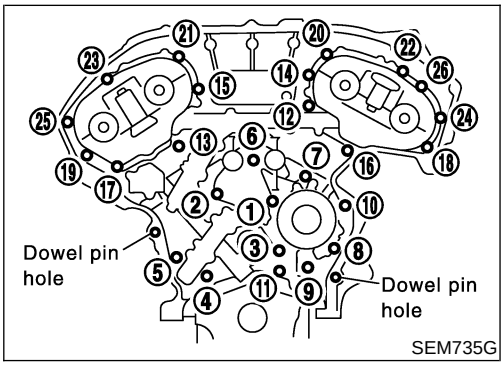
36. Remove intake and exhaust camshaft sprocket bolts.
- **Apply paint to timing chain and camshaft sprockets for alignment during installation.**
- **Secure the hexagonal portion of the camshaft using a spanner to loosen mounting bolts.**



SEM734G

37. Remove primary and secondary timing chains with camshaft sprockets.
- Intake camshaft sprocket is two-for-one structure of primary and secondary sprockets.
- Handle intake camshaft sprocket, taking care of the following.

CAUTION:
- **Avoid impact.**
- **Do not disassemble (Never loosen bolts A and B).**



SEM735G

38. Remove chain tension guide and crankshaft sprocket.
39. Remove rear timing chain case as follows.

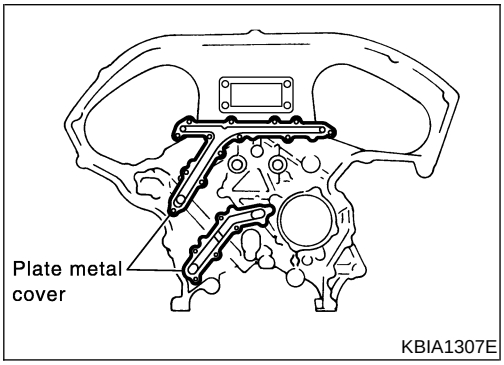
a. Loosen mounting bolts in reverse order shown in figure, and remove them.

b. Disconnect liquid gasket applied portion using seal cutter (special service tool: KV10111100) or an equivalent tool. Then remove rear timing chain case.

40. Remove RH and LH camshaft chain tensioners from cylinder head as follows.

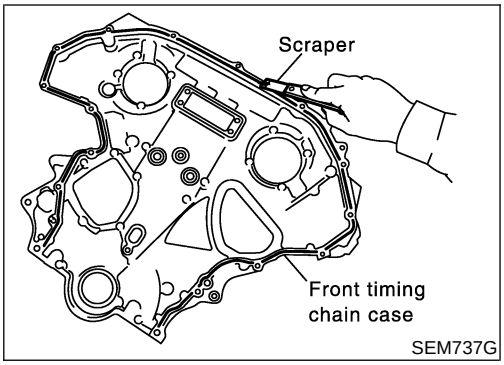
a. Remove No. 1 camshaft brackets.
Refer to EM-43, "Removal".

b. Remove chain tensioners with stopper pin attached.



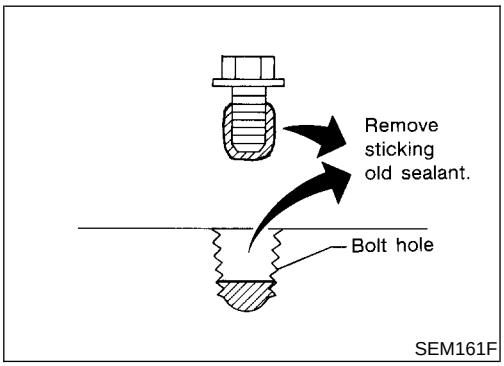
KBIA1307E

CAUTION:
- **Do not remove plate metal cover of oil passage.**
- **After removing chain case, do not apply any load which affects flatness.**



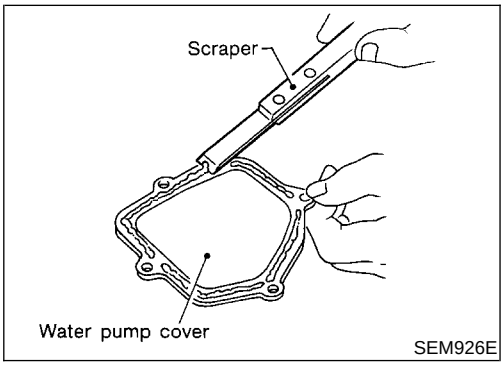
SEM737G

41. Use a scraper to remove all traces of liquid gasket from front timing chain case.



SEM161F

- **Remove old liquid gasket from the bolt hole and thread.**



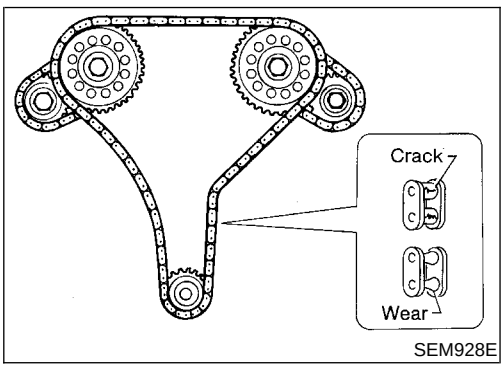
SEM926E

42. Use a scraper to remove all traces of liquid gasket from water pump cover and intake valve timing control solenoid valve covers.

Inspection

NFEM0013

Check for cracks and excessive wear at roller links. Replace chain if necessary.



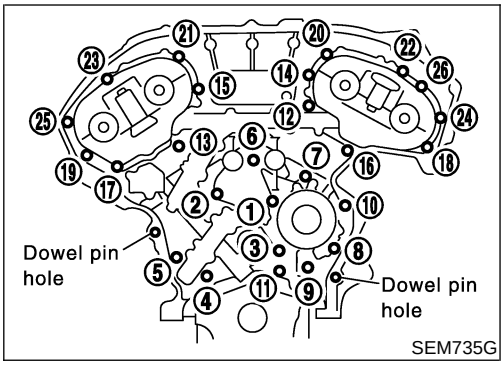
SEM928E

Installation

NFEM0014

1. Install RH and LH camshaft chain tensioners to cylinder head as follows.
   Refer to EM-51.
   a. Install chain tensioners with stopper pin attached and new O-ring.
   b. Install No. 1 camshaft brackets.
2. Apply liquid gasket to rear timing chain case. Refer to EM-23, "POSITION FOR APPLYING LIQUID GASKET".

Installation (Cont'd)



3. Align rear timing chain case and water pump assembly with dowel pins (RH and LH) on cylinder block. Then install it.

- Do not allow O-ring to drop.

a. Tighten mounting bolts in order as shown in the figure.

- Install two types of mounting bolts, referring to the following instructions and figure.

Bolt length:

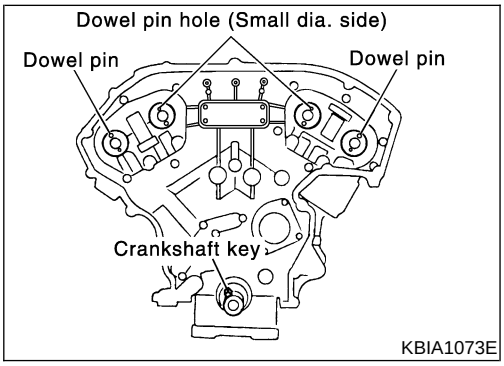
20 mm (0.79 in) (1, 2, 3, 6, 7, 8, 9, and 10 in the figure)

16 mm (0.63 in) (other than the above)

: 12 - 13 N·m (1.2 - 1.4 kg-m, 9 - 10 ft-lb)

b. After all bolts are temporarily tightened, retighten them to specified torque in order shown in the figure.

4. Install chain tension guide.

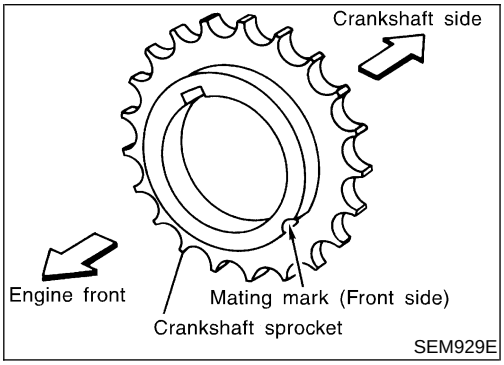


5. Make sure that camshaft and crankshaft are at TDC position of No.1 cylinder.

- Make sure that dowel pin hole, dowel pin and crankshaft key are located as shown in the figure.
  Camshaft dowel pin hole (intake-side): At cylinder head upper face side in each bank
  Camshaft dowel pin (exhaust-side): At cylinder head upper face side in each bank
  Crankshaft key: At cylinder head side of RH bank

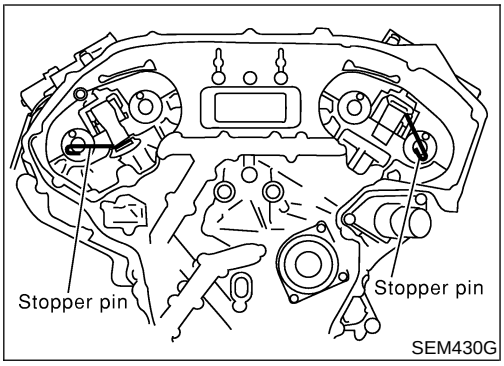
CAUTION:

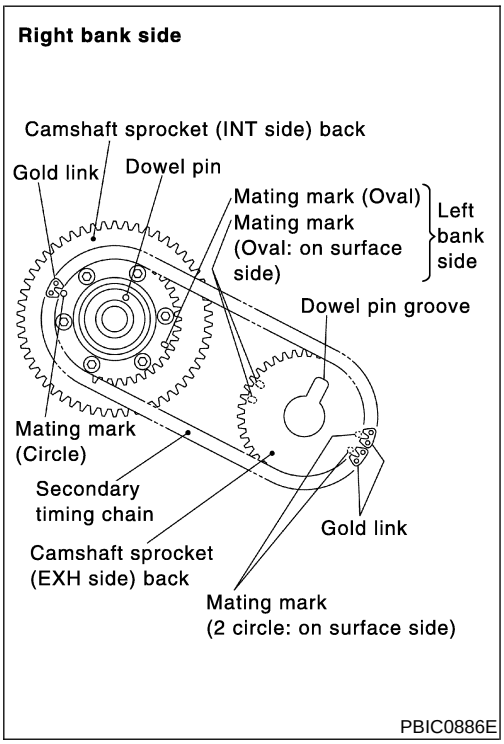
Hole on small diameter side must be used for intake dowel pin. Do not misidentify (Ignore big diameter side).

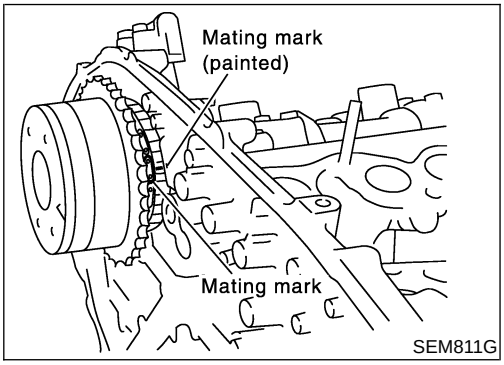


6. Install crankshaft sprocket.

- Install it, with matching mark to timing chain facing front of engine.







7. Install secondary timing chain and camshaft sprocket.

CAUTION:

Matching marks between timing chain and sprockets slip easily. Confirm all matching mark positions repeatedly during the installation process.

- Push sleeve of secondary chain tensioner, and keep it pressed with stopper pin.

a. Align matching marks on secondary timing chain (gold link) with the ones on intake and exhaust sprockets (stamped). Then install them.

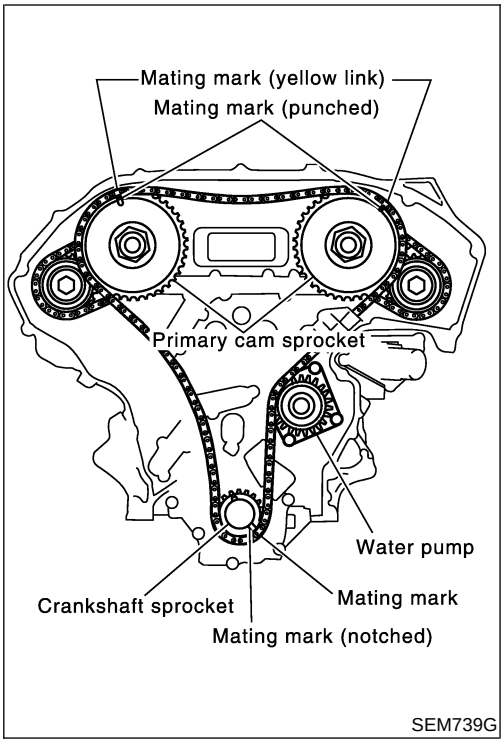
- Matching marks of intake sprocket are on back side of secondary sprocket.
- There are two types of matching marks: round and oval types. They should be used for RH/LH banks respectively.
  RH bank: Use round type.
  LH bank: Use oval type.

b. Align dowel pin and pin hole on camshaft with groove and dowel pin on sprocket. Then install them.

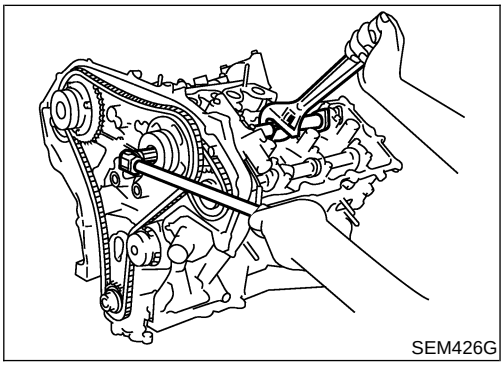
- On intake side, align pin hole on small diameter side of camshaft front end with dowel pin on back side of camshaft sprocket. Then install them.
- On exhaust side, align dowel pin on camshaft front end with pin groove on camshaft sprocket. Then install them.
- Mounting bolts for camshaft sprockets must be tightened in step 7. Tightening them by hand is enough to prevent dislocation of dowel pins.

- It may be difficult to visually check the dislocation of mating marks during and after installation. To make the matching easier, make a mating mark on the sprocket teeth in advance using paint.

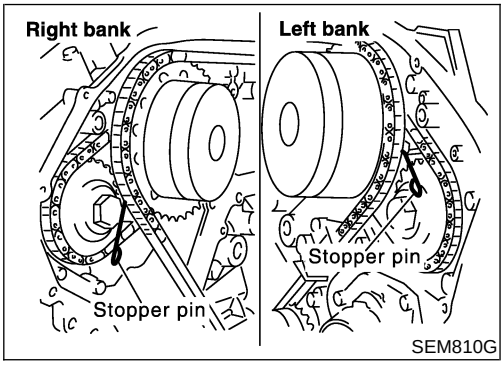
Installation (Cont'd)



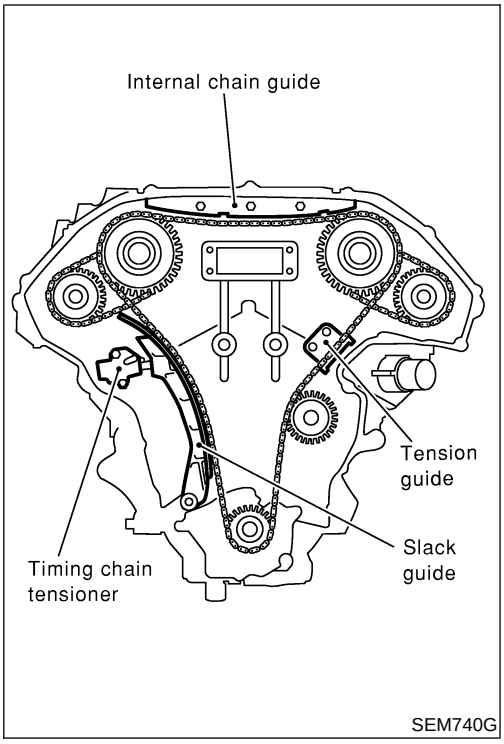
8. Install secondary timing chain and sprocket to the other bank. Install primary timing chain at the same time.
- Installation of the secondary timing chain follows the procedure described in step 6.
- Install primary timing chain so that mating mark (punched) on camshaft sprocket is aligned with that (yellow link) on the timing chain, and mating mark (notched) on crankshaft sprocket is aligned with that on the timing chain, respectively.
- When it is difficult to align mating marks of the primary timing chain with each sprocket, gradually turn the camshaft hexagonal portion using a spanner so it is aligned with the mating mark.
- During alignment, be careful to prevent dislocation of mating marks on the secondary timing chain.



9. After confirming the mating marks are aligned, tighten the camshaft sprocket mounting bolts.
- Secure the camshaft hexagonal portion using a spanner to tighten mounting bolts.

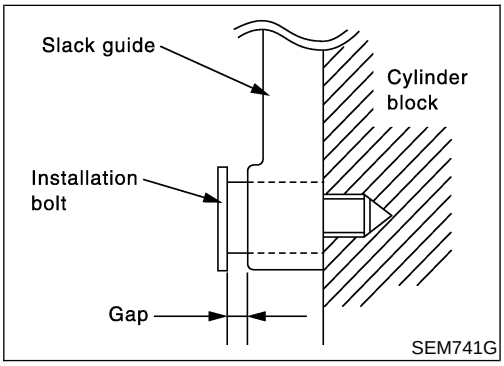


10. Pull out the stopper pin from the secondary timing chain tensioner.



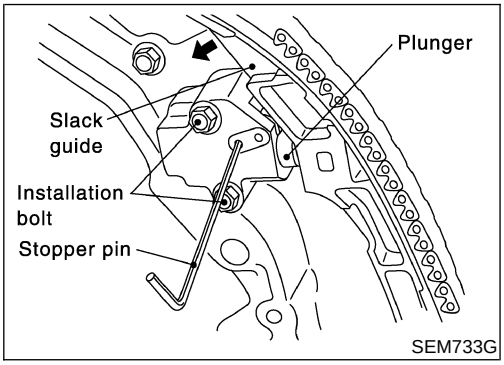
SEM740G

11. Install internal chain guide.
12. Install slack guide.



SEM741G

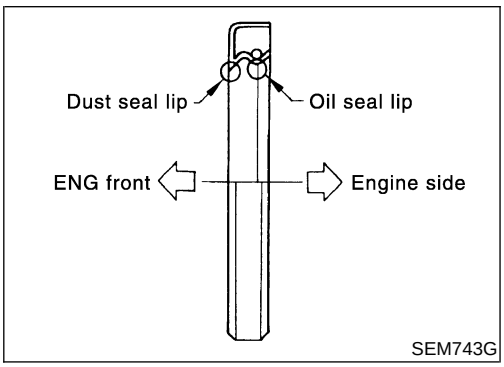
- Take care not to overtighten mounting bolts for slack guide. It is normal for a gap to exist under bolt seats when mounting bolts are tightened to specified torque.



SEM733G

13. Install chain tensioner for slack guide.
- When installing chain tensioner, push in sleeve and keep it pressed with stopper pin.
- Remove dirt and foreign materials completely from back and mounting surfaces of chain tensioner.
- After installing, pull out stopper pin by pressing slack guide.

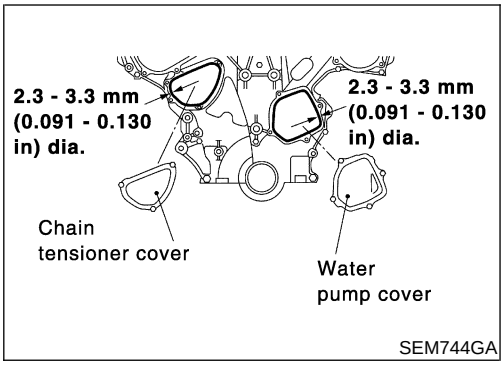
14. Confirm again that matching marks on sprockets and timing chain have not slipped.



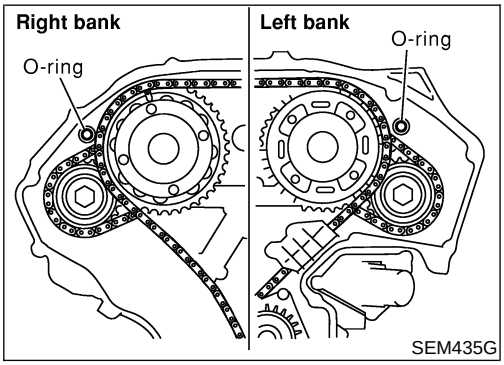
SEM743G

15. Install front oil seal to front timing chain case. Refer to EM-40, "FRONT OIL SEAL".

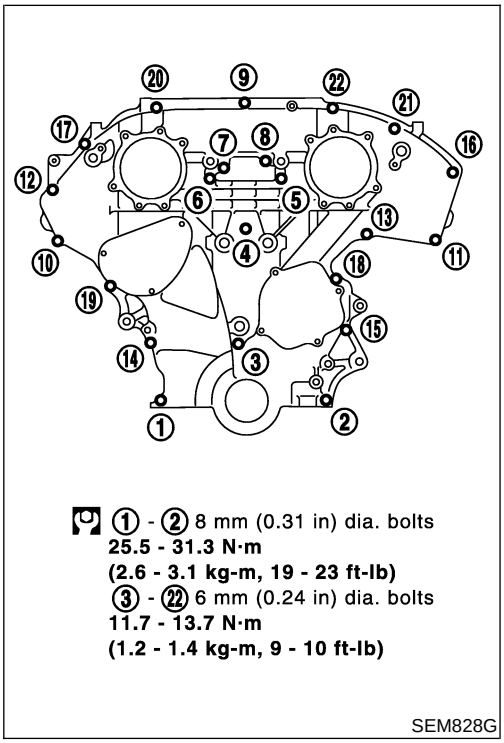
Installation (Cont'd)



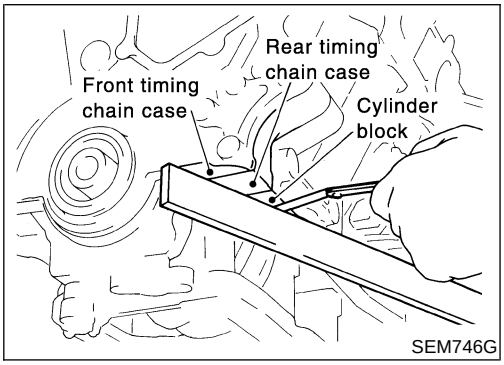
16. Apply liquid gasket to water pump cover and chain tensioner cover.
- **Before installation, wipe off the protruding sealant.**
17. Install water pump cover and chain tensioner cover.



18. Install O-rings on rear timing chain case.
19. Apply liquid gasket to front timing chain case.
- Refer to "POSITION FOR APPLYING LIQUID GASKET", EM-23.
- **Before installation, wipe off the protruding sealant.**



20. Install front timing chain case.
- Align dowel pin on rear timing chain case with hole on front timing chain case.
21. Tighten bolts to the specified torque in order shown in the figure.



22. After installing front timing chain case, check surface height difference between following parts on oil pan mounting surface.

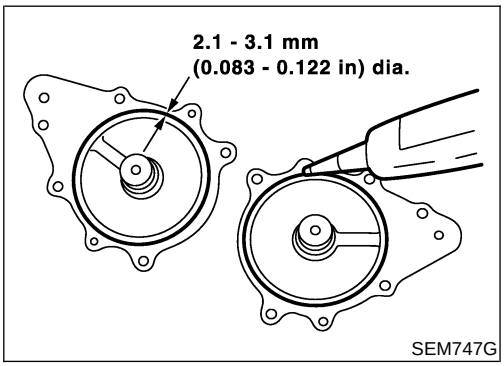
Standard

Front timing chain case to rear timing chain case:
−0.14 to 0.14 mm (−0.0055 to 0.0055 in)

Oil pump to cylinder block:
−0.36 to −0.10 mm (−0.0142 to −0.0039 in)

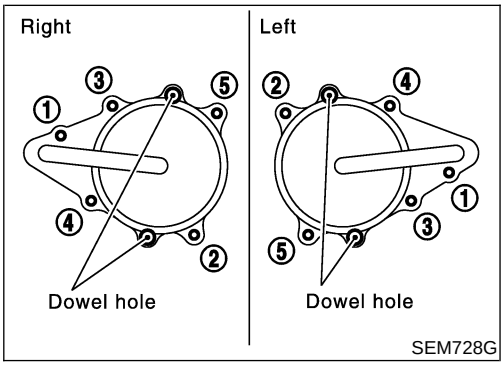
Rear timing chain case to cylinder block:
−0.24 to 0.14 mm (−0.0094 to 0.0055 in)

- If not within standard, repeat above installation procedure.



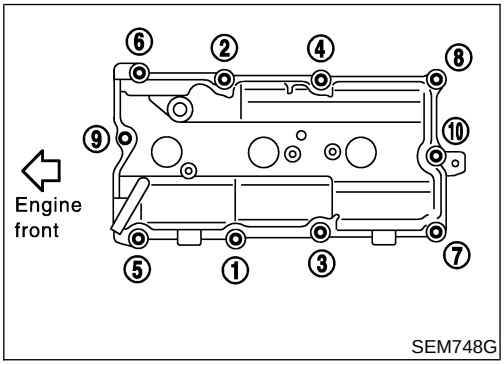
SEM747G

23. Install intake valve timing control valve cover.
a. Install new O-rings at front timing chain case.
b. Install new seal ring at intake valve timing control valve cover with new engine oil applied on it.
c. Apply liquid gasket to intake valve timing control valve covers. Use genuine RTV silicone sealant or equivalent. Refer to GI-50.
- Being careful not to move the seal ring from the installation groove, align the dowel pins on the chain case with the holes to install the intake valve timing control valve cover.



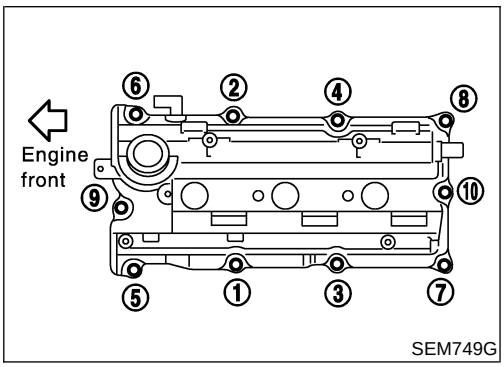
SEM728G

- Tighten in numerical order as shown in the figure.



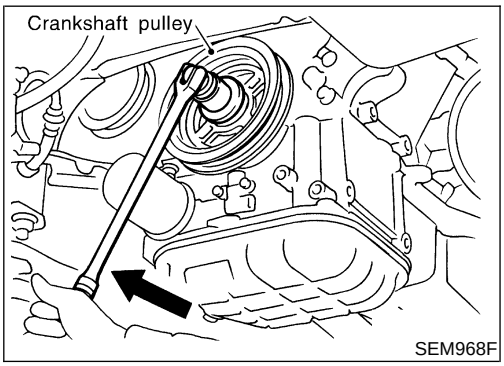
SEM748G

24. Install RH and LH rocker covers.
Rocker cover tightening procedure:
- **Tighten in numerical order as shown in the figure.**
a. Tighten bolts 1 to 10 in that order to 0.96 to 2.96 N·m (0.10 to 0.30 kg-m, 9 to 26 in-lb).
b. Then tighten bolts 1 to 10 as indicated in figure to 7.33 to 9.33 N·m (0.75 to 0.95 kg-m, 65 to 82 in-lb).

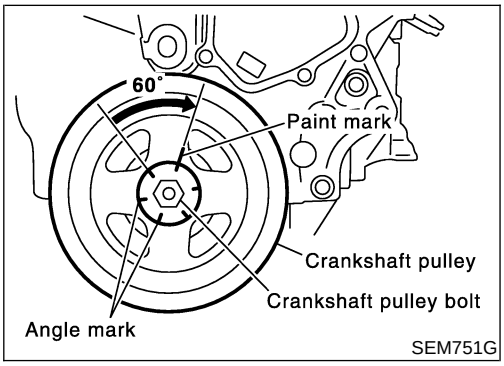


SEM749G

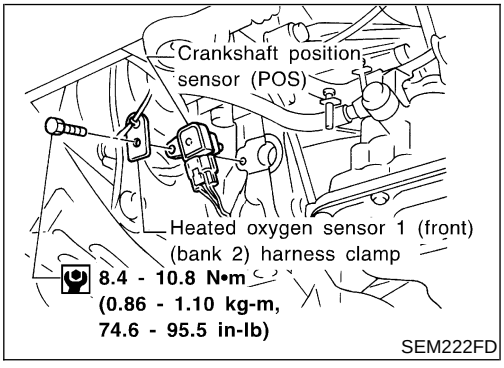
25. Install intake manifold. Tighten intake manifold nuts and bolts. **Refer to "TIGHTENING PROCEDURES", EM-11.**
26. Install fuel tube assembly. **Refer to "TIGHTENING PROCEDURES", EM-11.**
27. Install intake manifold collector gasket.
28. Install intake manifold upper and lower collectors. **Refer to "TIGHTENING PROCEDURES", EM-11.**
29. Install RH and LH ignition coils.



30. Install crankshaft pulley to crankshaft.
a. Tighten to 39 to 49 N·m (4.0 to 5.0 kg-m, 29 to 36 ft-lb).
b. Put a paint mark on the crankshaft pulley.

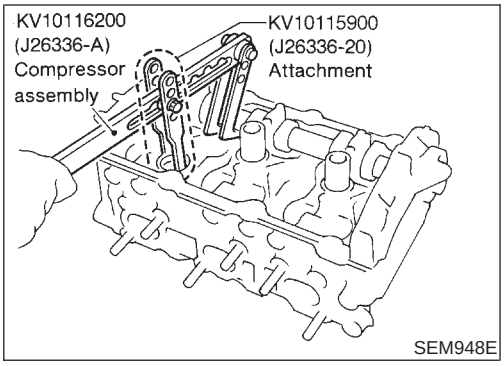


c. Again tighten by turning 60° to 66°, about the angle from one hexagon bolt head corner to another.



31. Reinstall removed parts in reverse order of removal.

- **Make sure that crankshaft position sensor (POS) and heated oxygen sensor 1 (front) (bank 2) harness clamp are installed correctly as shown in figure.**
- When installing fuel tube assembly. Refer to EC-57, "Removal and Installation".
- **After starting engine, keep idling for three minutes. Then rev engine up to 3,000 rpm under no load to purge air from the high-pressure chamber of the chain tensioners. The engine may produce a rattling noise. This indicates that air still remains in the chamber and is not a matter of concern.**



Replacement

NFEM0015

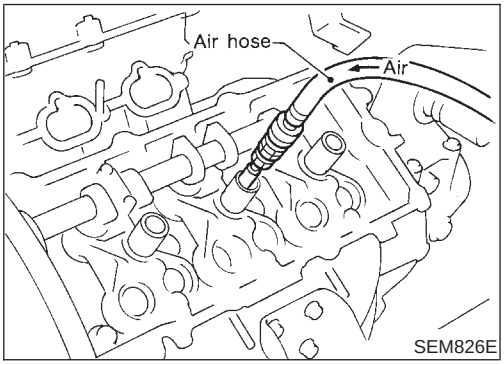
CAUTION:

When removing the oil pans, oil pump assembly and timing chain from engine, first remove the crankshaft position sensor (POS) from the assembly.
Be careful not to damage sensor edges.

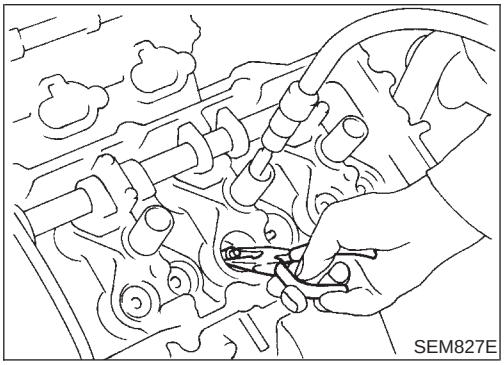
VALVE OIL SEAL

NFEM0015S01

1. Remove ornament cover.
2. Remove intake manifold upper collector and intake manifold lower collector.
3. Remove RH and LH ignition coils.
4. Remove RH and LH rocker covers from cylinder head.
5. Remove crankshaft position sensor (POS).
6. Remove oil pan. Refer to “Removal”, EM-14.
7. Remove timing chain. Refer to “Removal, EM-24.
8. Remove camshaft brackets and camshaft. Refer to “Disassembly”, EM-45.
9. Remove valve lifters.
10. Remove valve spring with Tool.
    Before removing valve spring, fix valve as follows.
    Piston concerned should be set at TDC to prevent valve from falling.

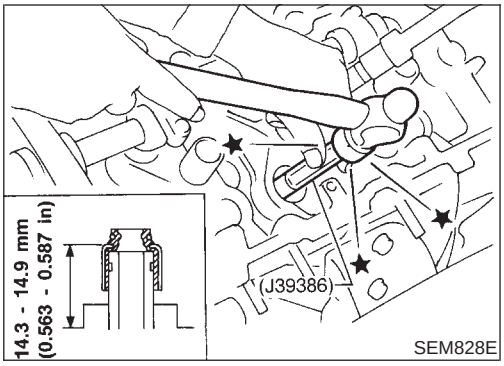


Remove spark plug, then install air hose adapter into spark plug hole and apply air pressure to hold valves in place. Apply a pressure of 490 kPa (5 kg/cm^2, 71 psi).



11. Remove valve oil seal.

Replacement (Cont'd)



12. Apply engine oil to new valve oil seal and install it with Tool.
13. Reinstall any parts removed in reverse order of removal.

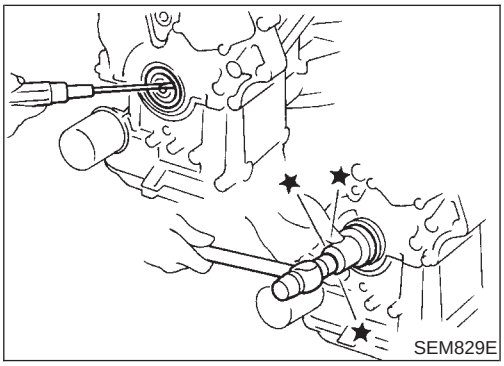
FRONT OIL SEAL

NFEM0015S03

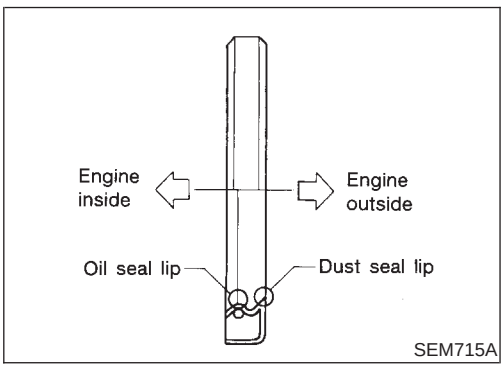
1. Remove the following parts:

- Engine undercover
- Front RH wheel and engine side cover
- Drive belts
- Crankshaft pulley

Be careful not to damage sensor edge.



2. Remove front oil seal using a suitable tool.
Be careful not to scratch front cover.
3. Apply engine oil to new oil seal and install it using a suitable tool.

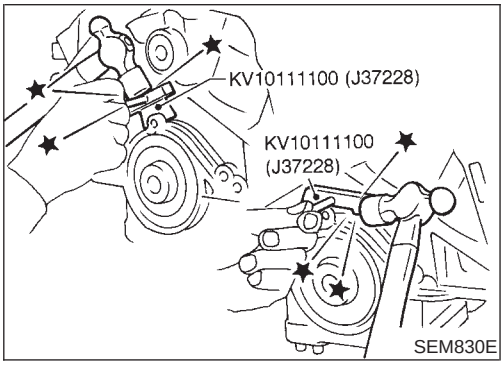


- Install new oil seal in the direction shown in the figure.

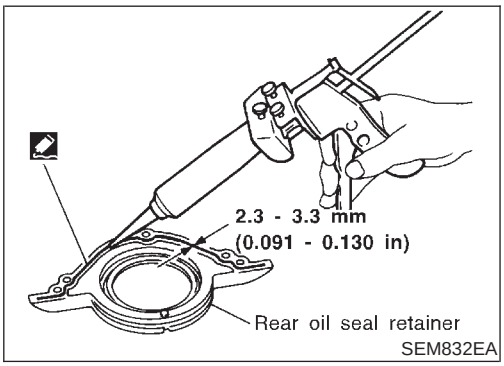
REAR OIL SEAL

NFEM0015S04

1. Remove transaxle. Refer to AT-281 or MT-13.
2. Remove flywheel or drive plate.
3. Remove oil pan. Refer to EM-14.
4. Remove rear oil seal retainer.



5. Remove old liquid gasket on mating surface of cylinder block and oil pan using scraper.
- **Remove old liquid gasket from the bolt hole and thread.**

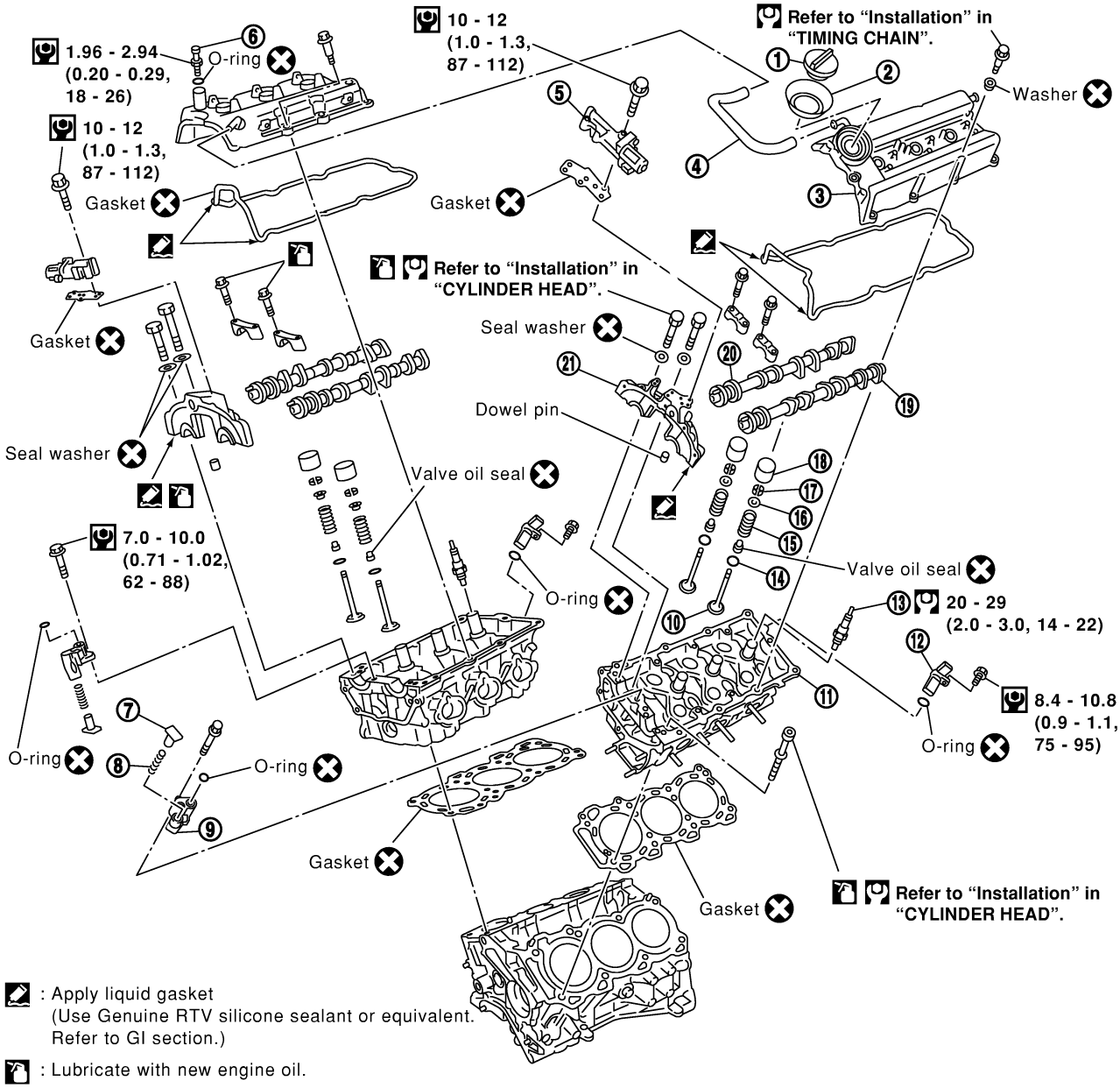


6. Apply liquid gasket to rear oil seal retainer.
- Use Genuine RTV Silicone Sealant or equivalent. Refer to GI-50.
- Assembly should be done within 5 minutes after coating.
- Wait at least 30 minutes before refilling engine oil and engine coolant.

Components

NFEM0043

SEC. 111•118•130•140•220



SEM644G

1. Oil filler cap
2. Oil catcher
3. Rocker cover
4. PCV hose
5. Intake valve timing control solenoid valve
6. PCV valve
7. Chain tensioner
8. Spring
9. Tensioner sleeve
10. Valve
11. Cylinder head
12. Camshaft position sensor (PHASE)
13. Spark plug
14. Valve spring seat
15. Valve spring
16. Valve spring retainer
17. Valve collet
18. Valve lifter
19. Camshaft (Exhaust)
20. Camshaft (Intake)
21. Camshaft bracket

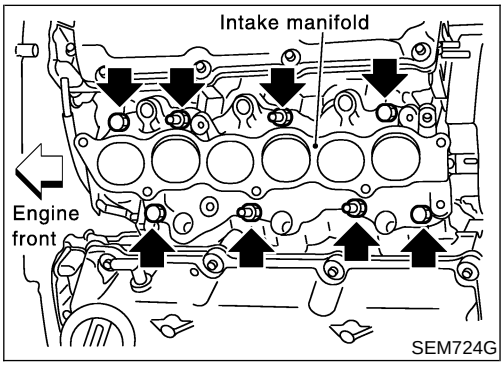
CAUTION:

- **When installing camshafts, chain tensioners, oil seals, or other sliding parts, lubricate contacting surfaces with new engine oil.**
- **Apply new engine oil to threads and seat surfaces when installing cylinder head, camshaft sprocket, crankshaft pulley, and camshaft bracket.**
- **Attach tags to valve lifters so as not to mix them up.**

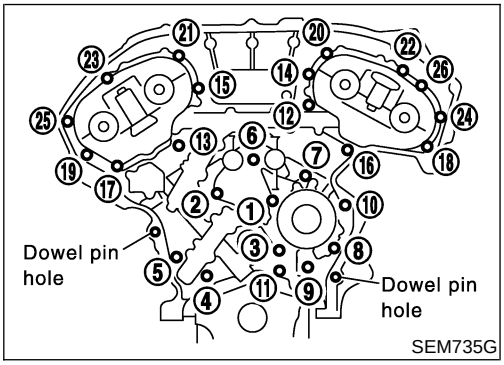
Removal

NFEM0044

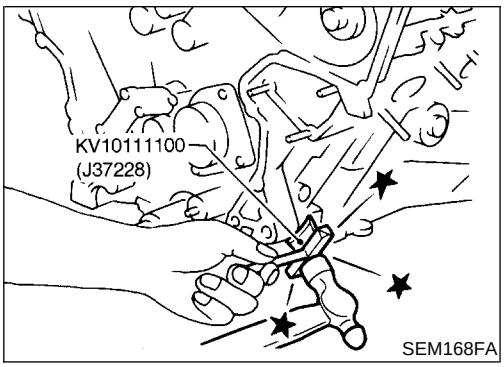
1. Remove engine from vehicle. Refer to EM-60, "Removal and Installation".
2. Remove exhaust manifolds.
3. Place engine on a work stand.
4. Remove aluminum oil pan. Refer to EM-14, "Removal".
5. Remove timing chain. Refer to EM-24, "Removal".



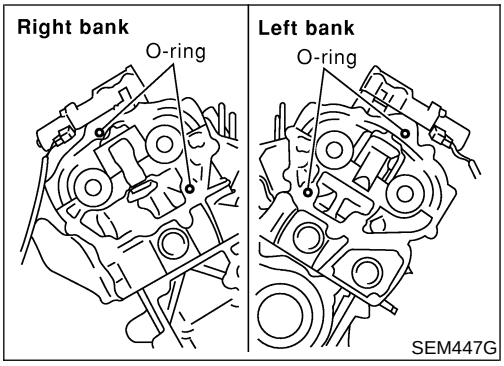
6. Remove intake manifold in reverse order of installation. Refer to "TIGHTENING PROCEDURES", EM-11.
7. Remove water outlet.



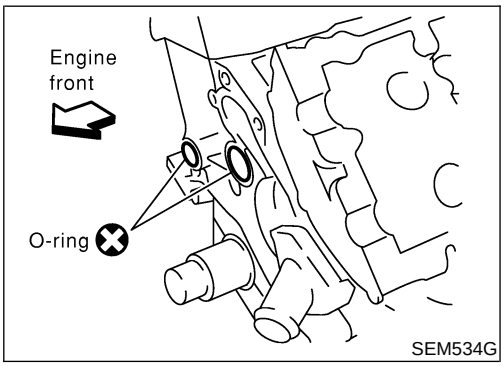
8. Remove rear timing chain case bolts.
- Loosen in reverse order as shown in the figure.



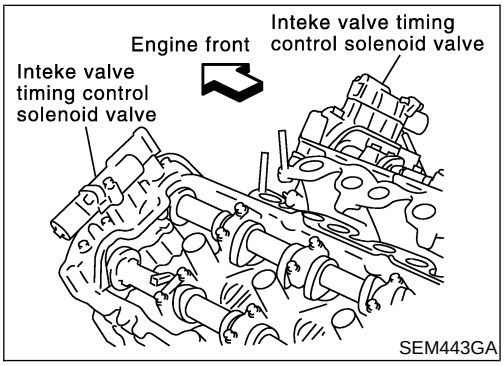
9. Remove rear timing chain case.



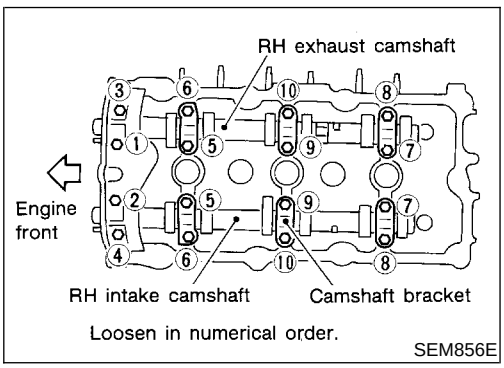
10. Remove O-rings from cylinder head.



11. Remove O-rings from cylinder block.



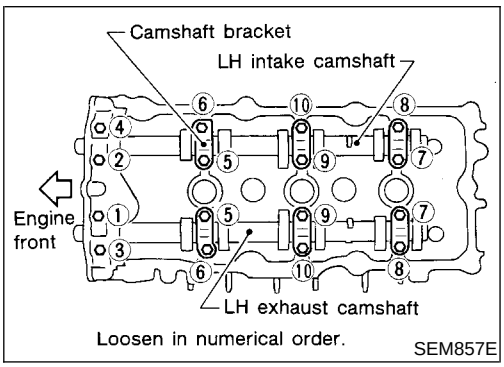
12. Remove intake valve timing control solenoid valves.

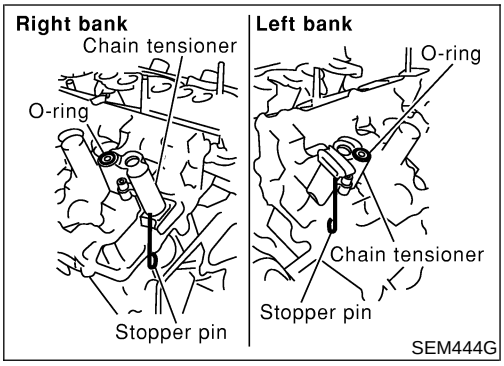


13. Remove intake and exhaust camshafts and camshaft brackets.

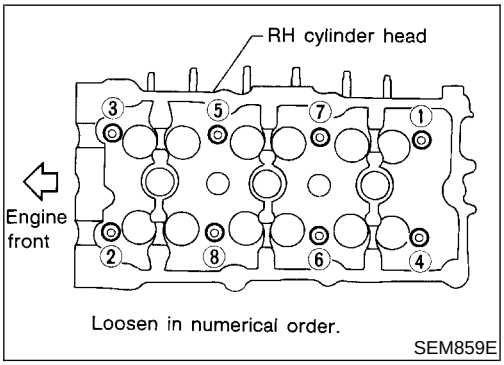
- Equally loosen camshaft bracket bolts in several steps in the numerical order shown in the figure.

  For reinstallation, be sure to put marks on camshaft bracket before removal.

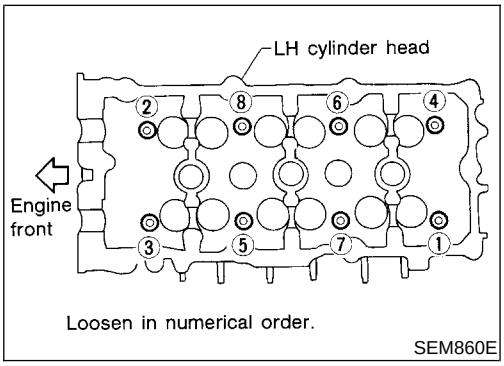


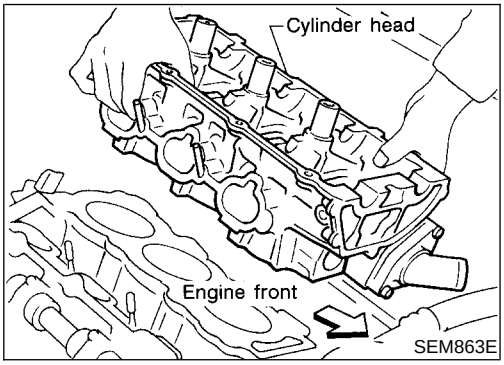


14. Remove RH and LH camshaft chain tensioners from cylinder head.



15. Remove cylinder head bolts.
- **Cylinder head bolts should be loosened in two or three steps.**
- **A warped or cracked cylinder head could result from removing in incorrect order.**



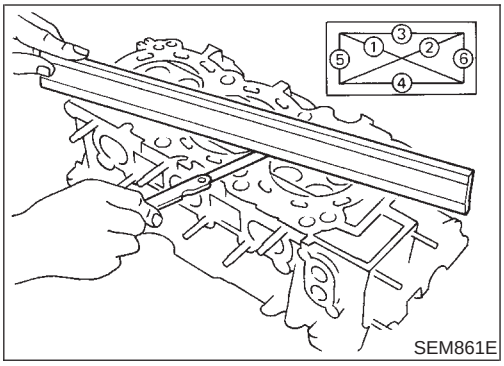


16. Remove cylinder head.

Disassembly

NFEM0045

Remove valve component parts.
Refer to EM-39, "VALVE OIL SEAL".
- Check the clearance before removing the valve guide. Refer to EM-47, "VALVE GUIDE CLEARANCE".



SEM861E

Inspection

NFEM0046

CYLINDER HEAD DISTORTION

NFEM0046S01

Clean surface of cylinder head.

Use a reliable straightedge and feeler gauge to check the flatness of cylinder head surface.

Check along six positions shown in the figure.

Head surface flatness: Limit 0.1 mm (0.004 in)

If beyond the specified limit, resurface or replace it.

The limit for cylinder head resurfacing is determined by the cylinder block resurfacing.

Resurfacing limit:

Amount of cylinder head resurfacing is “A”.

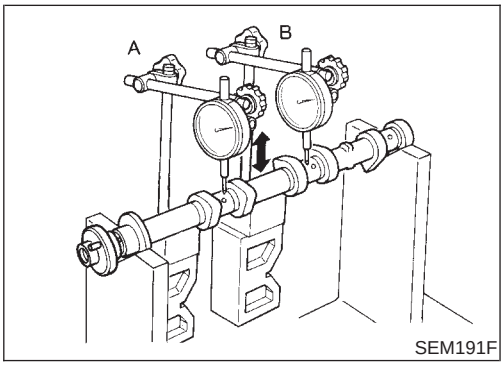
Amount of cylinder block resurfacing is “B”.

The maximum limit : A + B = 0.2 mm (0.008 in)

After resurfacing cylinder head, check that camshaft rotates freely by hand. If resistance is felt, cylinder head must be replaced.

Nominal cylinder head height:

126.3 - 126.5 mm (4.972 - 4.980 in)



SEM191F

CAMSHAFT VISUAL CHECK

NFEM0046S02

Check camshaft for scratches, seizure and wear.

CAMSHAFT RUNOUT

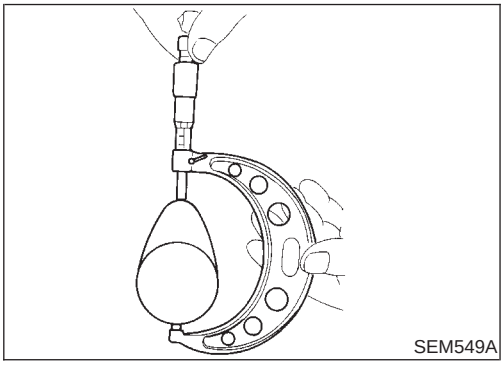
NFEM0046S03

1. Measure camshaft runout at A and B as shown in the figure.

Runout (Total indicator reading):

Limit 0.05 mm (0.0020 in)

2. If it exceeds the limit, replace camshaft.


SEM549A

CAMSHAFT CAM HEIGHT

NFEM0046S04

1. Measure camshaft cam height.

Standard cam height:

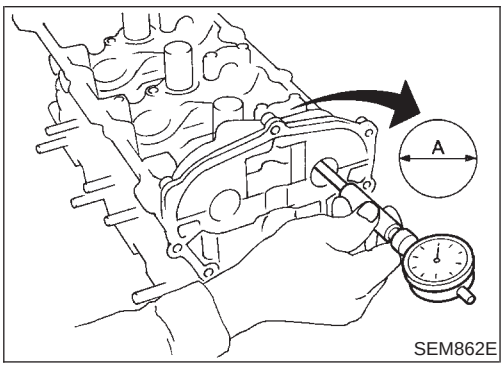
Intake and exhaust

44.865 - 45.055 mm (1.7763 - 1.7738 in)

Cam wear limit:

0.2 mm (0.008 in)

2. If wear is beyond the limit, replace camshaft.



SEM862E

CAMSHAFT JOURNAL CLEARANCE

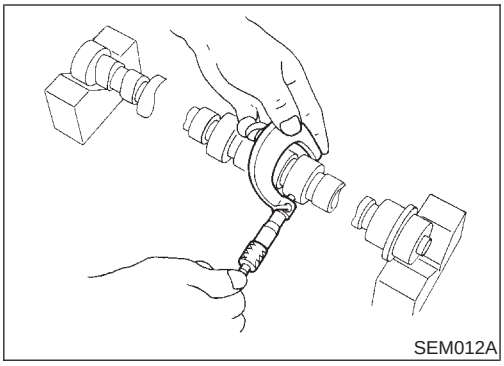
NFEM0046S05

1. Install camshaft bracket and tighten bolts to the specified torque.
2. Measure inner diameter “A” of camshaft bearing.

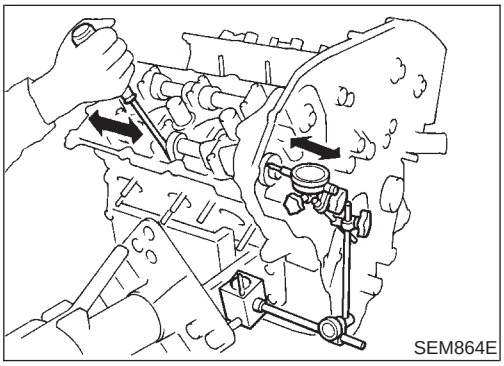
Standard inner diameter:

No. 1: 26.000 - 26.021 mm (1.0236 - 1.0244 in)

No. 2, 3, 4: 23.500 - 23.521 mm (0.9252 - 0.9260 in)


SEM012A

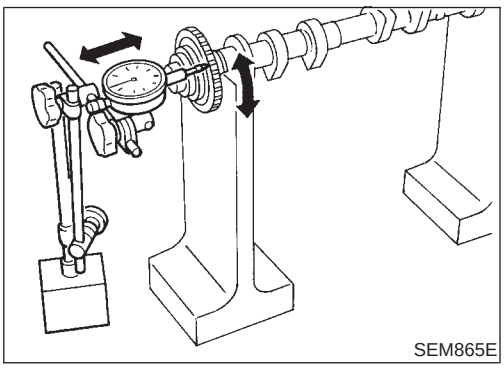
3. Measure outer diameter of camshaft journal.
   Standard outer diameter:
   No. 1: 25.935 - 25.955 mm (1.0211 - 1.0218 in)
   No. 2, 3, 4: 23.445 - 23.465 mm (0.9230 - 0.9238 in)
4. If clearance exceeds the limit, replace camshaft and/or cylinder head.
   Camshaft journal clearance:
   Standard
   No. 1: 0.045 - 0.086 mm (0.0018 - 0.0034 in)
   No. 2, 3, 4: 0.035 - 0.076 mm (0.0014 - 0.0030 in)
   Limit
   0.15 mm (0.0059 in)


SEM864E

CAMSHAFT END PLAY

NFEM0046S06

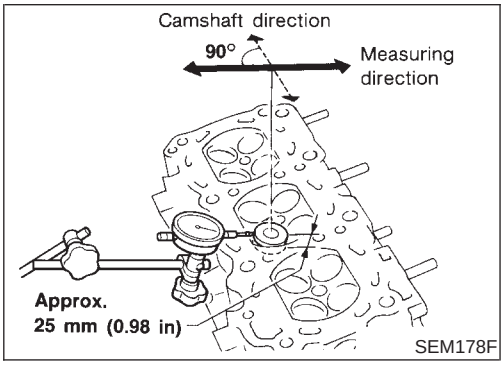
1. Install camshaft in cylinder head.
2. Measure camshaft end play.
   Camshaft end play:
   Standard
   0.115 - 0.188 mm (0.0045 - 0.0074 in)
   Limit
   0.24 mm (0.0094 in)


SEM865E

CAMSHAFT SPROCKET RUNOUT

NFEM0046S07

1. Install sprocket on camshaft.
2. Measure camshaft sprocket runout.
   Runout (Total indicator reading):
   Less than 0.15 mm (0.0059 in)
3. If it exceeds the limit, replace camshaft sprocket.

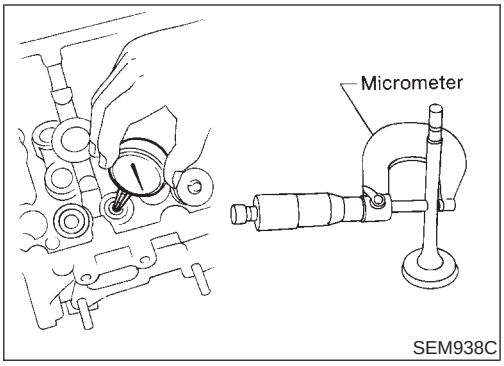


SEM178F

VALVE GUIDE CLEARANCE

NFEM0046S08

1. Measure valve deflection as shown in the figure. (Valve and valve guide mostly wear in this direction.)
   Valve deflection limit (Dial gauge reading):
   Intake 0.24 mm (0.0094 in)
   Exhaust 0.28 mm (0.0110 in)



2. If it exceeds the limit, check valve to valve guide clearance.
a. Measure valve stem diameter and valve guide inner diameter.
b. Check that clearance is within specification.

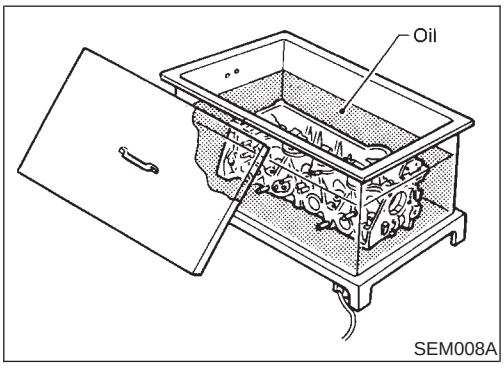
Valve to valve guide clearance limit:
Intake 0.08 mm (0.0031 in)
Exhaust 0.1 mm (0.004 in)

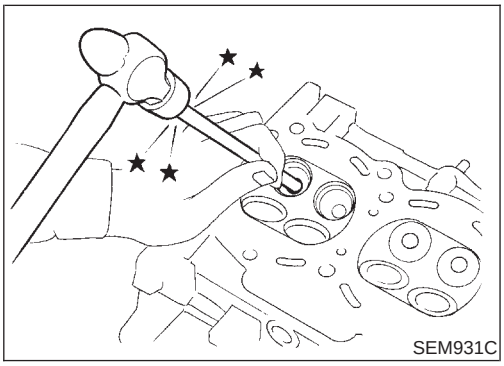
c. If it exceeds the limit, replace valve or valve guide.

VALVE GUIDE REPLACEMENT

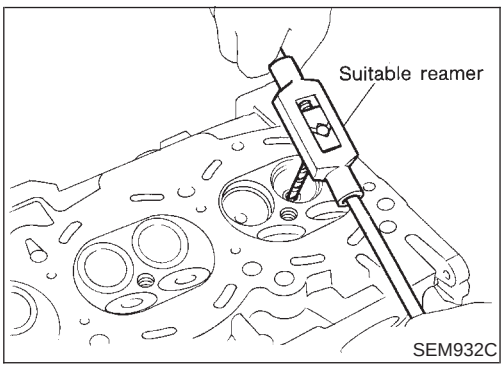
NFEM0046S09

1. To remove valve guide, heat cylinder head to 110 to 130°C (230 to 266°F) by soaking in heated oil.



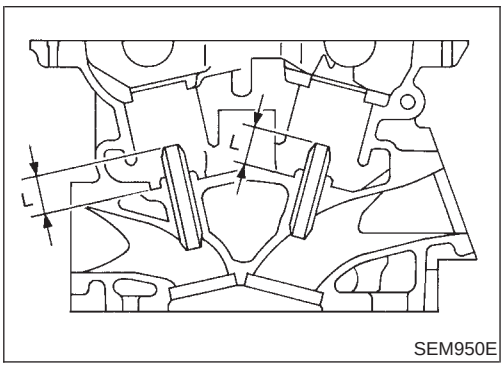


2. Drive out valve guide with a press [under a 20 kN (2 ton, 2.2 US ton, 2.0 Imp ton) pressure] or hammer and suitable tool.



3. Ream cylinder head valve guide hole.

Valve guide hole diameter (for service parts):
10.175 - 10.196 mm (0.4006 - 0.4014 in)

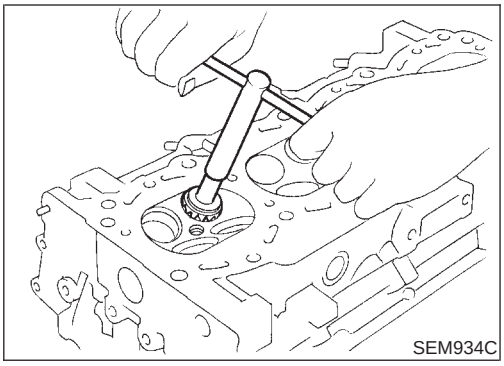


4. Heat cylinder head to 110 to 130°C (230 to 266°F) and press service valve guide onto cylinder head.

Projection "L":
12.6 - 12.8 mm (0.496 - 0.504 in)

5. Ream valve guide.

Finished size:
6.000 - 6.018 mm (0.2362 - 0.2369 in)

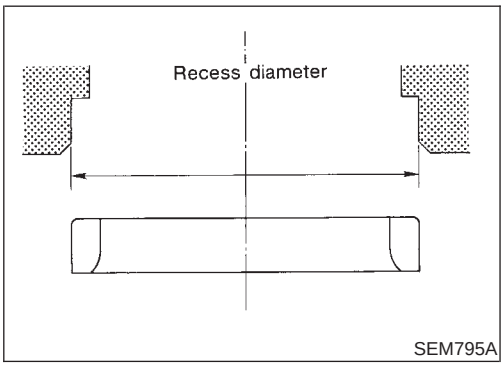

SEM934C

VALVE SEATS

NFEM0046S10

Check valve seats for any evidence of pitting at valve contact surface, and reseat or replace if it has worn out excessively.

- **Before repairing valve seats, check valve and valve guide for wear. If they have worn, replace them. Then correct valve seat.**
- **Use both hands to cut uniformly.**



SEM795A

REPLACING VALVE SEAT FOR SERVICE PARTS

NFEM0046S11

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 for service valve seat.

   Oversize [0.5 mm (0.020 in)]:

   Intake 38.500 - 38.516 mm (1.5157 - 1.5164 in)

   Exhaust 32.700 - 32.716 mm (1.2874 - 1.2880 in)

   Be sure to ream in circles concentric to the valve guide center.

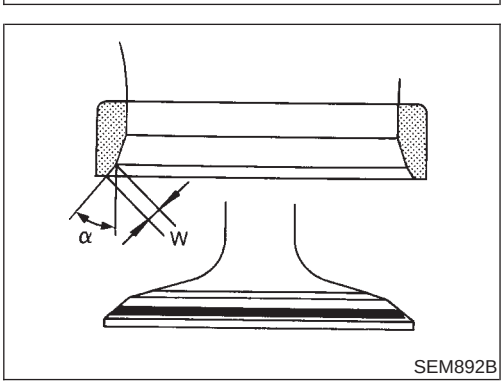
   This will enable valve seat to fit correctly.
3. Heat cylinder head to 110 to 130°C (230 to 266°F) by soaking in heated oil.
4. Press fit valve seat until it seats on the bottom.
5. Cut or grind valve seat using suitable tool to the specified dimensions as shown in SDS (EM-83).
6. After cutting, lap valve seat with abrasive compound.
7. Check valve seating condition.

   Seat face angle "α": 45°15′ - 45°45′

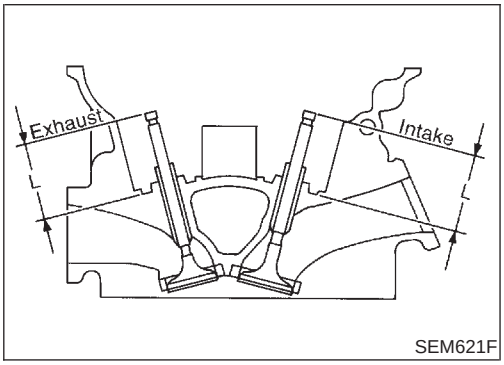
   Contacting width "W":

   Intake 1.09 - 1.31 mm (0.0429 - 0.0516 in)

   Exhaust 1.29 - 1.51 mm (0.0508 - 0.0594 in)



SEM892B



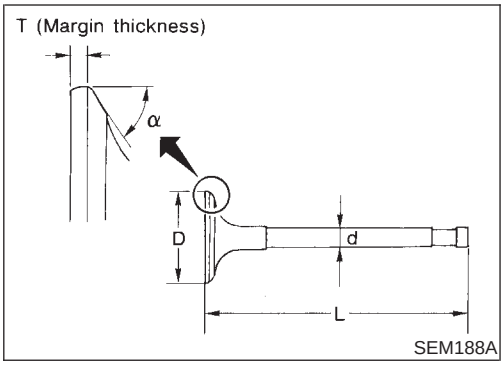
SEM621F

8. Use a depth gauge to measure the distance between the mounting surface of the cylinder head spring seat and the valve stem end. If the distance is shorter than specified, repeat step 5 above to adjust it. If it is longer, replace the valve seat with a new one.

   Valve seat resurface limit "L":

   Intake 41.07 - 41.67 mm (1.6169 - 1.6405 in)

   Exhaust 41.00 - 41.60 mm (1.6142 - 1.6378 in)



SEM188A

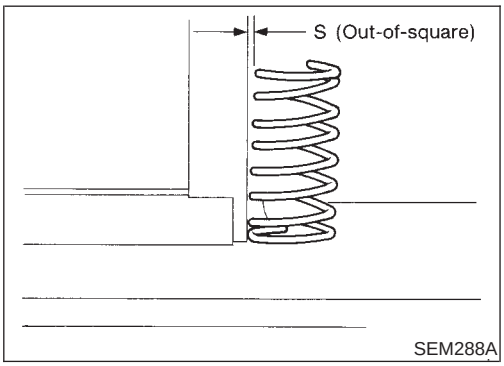
VALVE DIMENSIONS

NFEM0046S12

Check dimensions of each valve. For dimensions, refer to SDS (EM-80).

When valve head has been worn down to 0.5 mm (0.020 in) in margin thickness, replace valve.

Grinding allowance for valve stem tip is 0.2 mm (0.008 in) or less.



SEM288A

VALVE SPRING

NFEM0046S13

Squareness

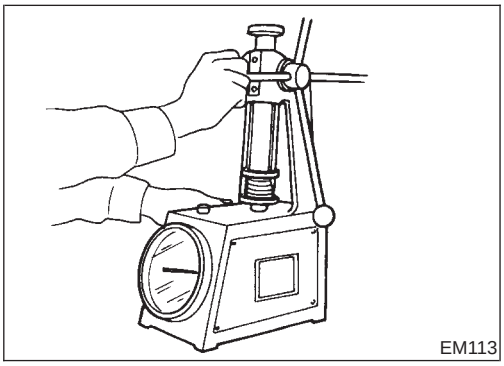
NFEM0046S1301

1. Measure dimension "S".

   Out-of-square "S":

   Less than 2.0 mm (0.079 in)

2. If it exceeds the limit, replace spring.


EM113

Pressure

NFEM0046S1302

Check valve spring pressure at specified spring height.

Pressure:

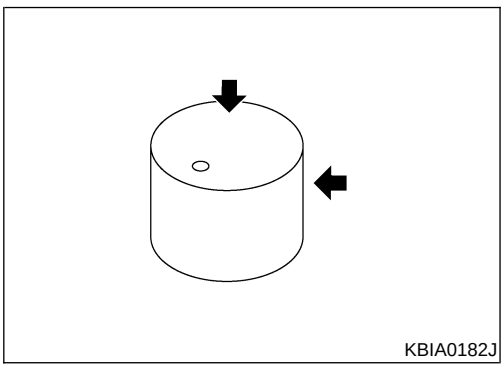
Standard

196 N (20.0 kg, 44.1 lb) at height 37.0 mm (1.457 in)

Limit

More than 433 N (44.2 kg, 97.3 lb) at height 27.8 mm (1.094 in)

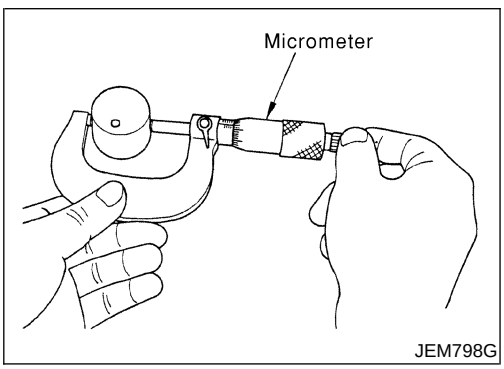
If it exceeds the limit, replace spring.


KBIA0182J

VALVE LIFTER

NFEM0046S14

1. Check contact and sliding surfaces for wear or scratches.

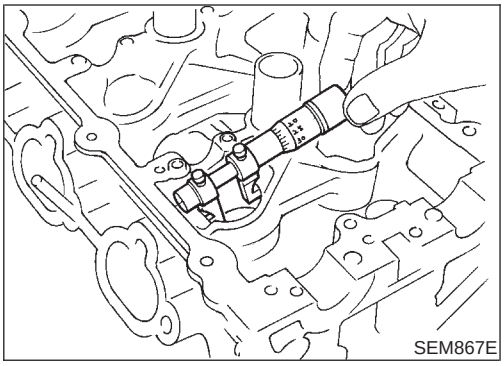


JEM798G

2. Check diameter of valve lifter and valve lifter guide bore.

   Valve lifter outer diameter:

   33.977 - 33.987 mm (1.3377 - 1.3381 in)


SEM867E

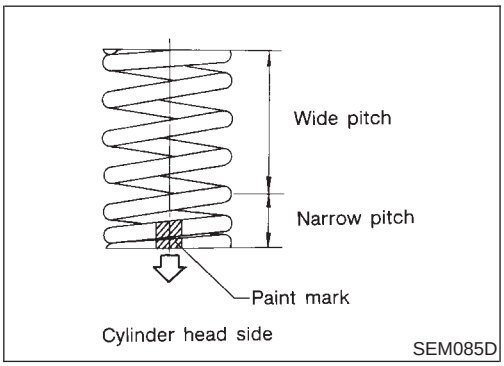
Lifter guide bore diameter:
34.000 - 34.016 mm (1.3386 - 1.3392 in)

Assembly

NFEM0047

1. Install valve component parts.

- **Always use new valve oil seal. Refer to "VALVE OIL SEAL", EM-39.**
- **Before installing valve oil seal, install valve spring seat.**
- **Install valve spring (uneven pitch type) with its narrow pitch side toward cylinder head side (paint mark).**
- After installing valve component parts, tap valve stem tip with plastic hammer to assure a proper fit.



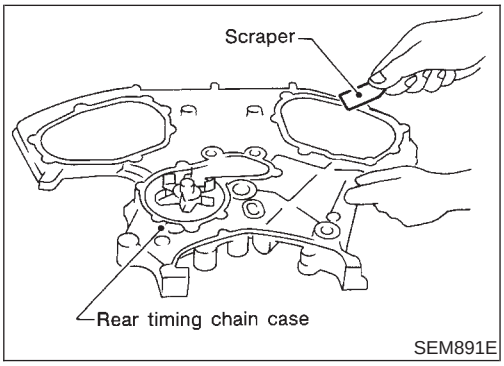
SEM085D

Installation

NFEM0048

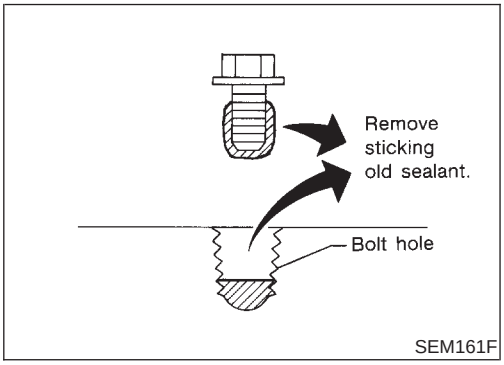
1. Before installing rear timing chain case, remove old liquid gasket from mating surface using a scraper.

- Also remove old liquid gasket from mating surface of cylinder block.



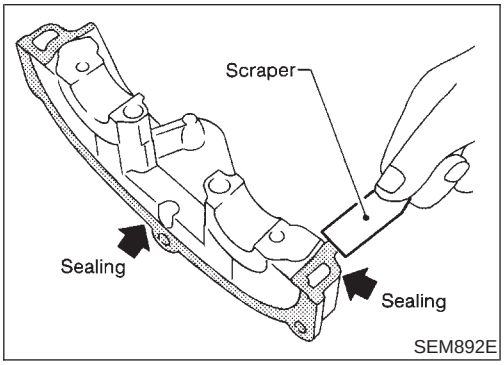
SEM891E

- **Remove old liquid gasket from the bolt hole and thread.**

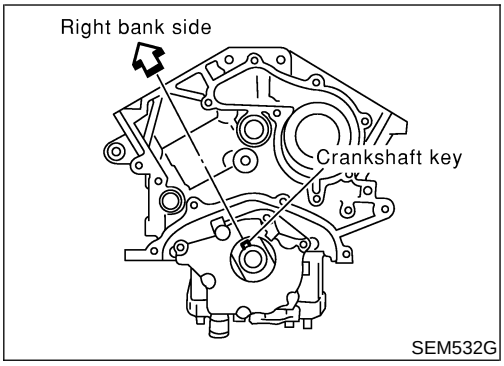


SEM161F

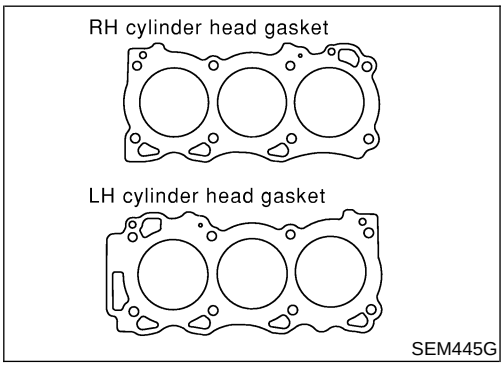
2. Before installing cam bracket, remove old liquid gasket from mating surface using a scraper.



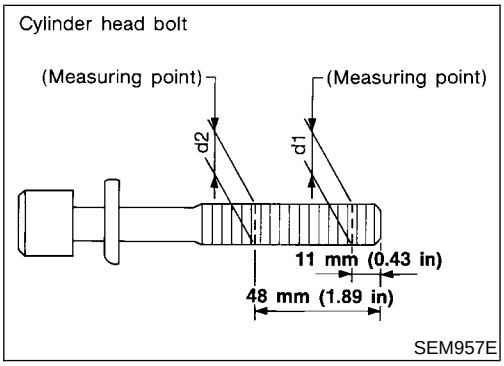
SEM892E



3. Before installing the cylinder head gasket, be sure that No. 1 cylinder is at TDC.
- At this time, the crankshaft key should face toward the right bank.



4. Install cylinder heads with new gaskets.
- **Do not rotate crankshaft and camshaft separately, or valves will strike piston heads.**



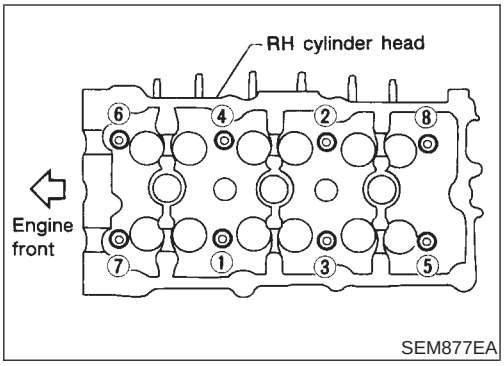
CAUTION:

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 ones.

Limit (d1 - d2):

0.11 mm (0.0043 in)

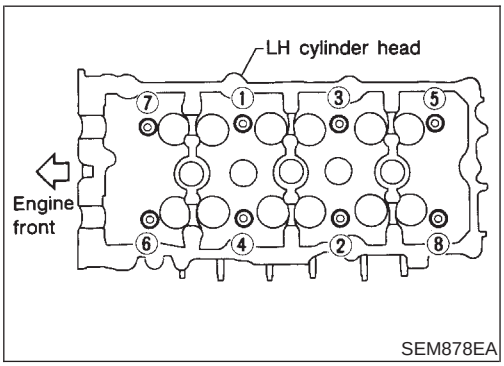
- **Lubricate threads and seat surfaces of the bolts with new engine oil.**

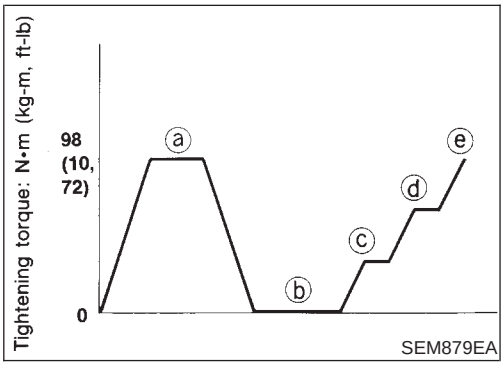


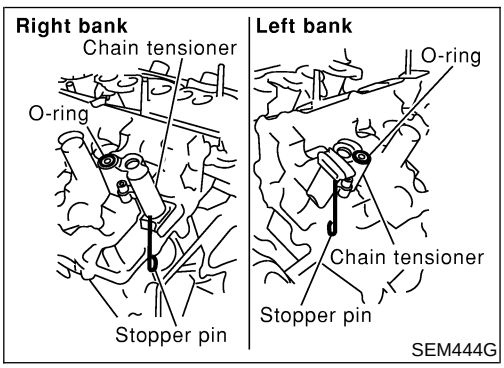
5. Install cylinder head outside bolts.
- **Tightening procedure:**

a. **Tighten all bolts to 98 N·m (10 kg-m, 72 ft-lb).**
b. **Completely loosen all bolts.**
c. **Tighten all bolts to 34.3 to 44.1 N·m (3.5 to 4.4 kg-m, 26 to 32 ft-lb).**
d. **Turn all bolts 90 to 95 degrees clockwise.**
e. **Turn all bolts 90 to 95 degrees clockwise.**

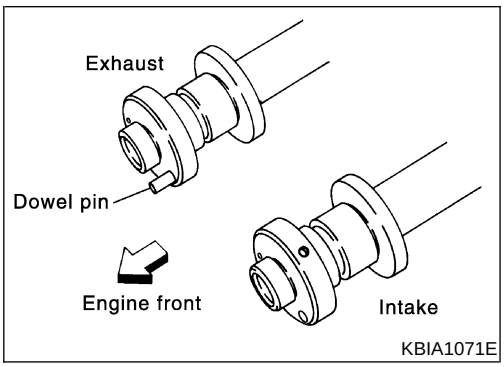
- **Tighten in numerical order shown in the figure.**



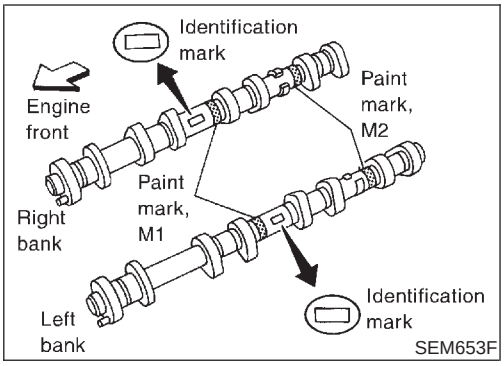




6. Install camshaft chain tensioners on both sides of cylinder head.

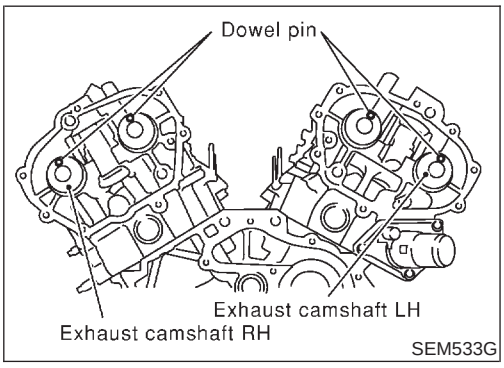


7. Install exhaust and intake camshafts and camshaft brackets.
- **Exhaust camshaft has a dowel pin on camshaft sprocket mounting flange. Install it on the exhaust side.**

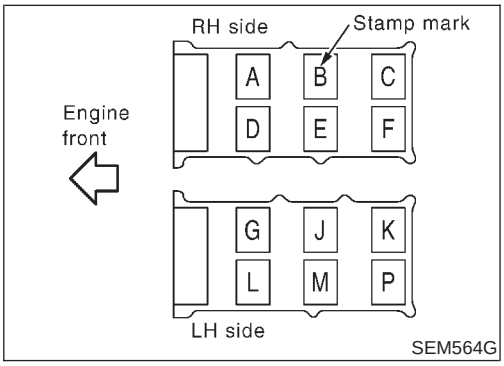


- **Identification marks are present on camshafts.**

Bank	INT/EXH	ID mark	Drill mark	Paint mark	
				M1	M2
RH	INT	RE	Yes	Yes	No
	EXH	RE	No	No	Yes
LH	INT	LH	Yes	Yes	No
	EXH	LH	No	No	Yes



- **Position camshaft**
  RH exhaust camshaft dowel pin at about 10 o'clock
  LH exhaust camshaft dowel pin at about 2 o'clock



8. Before installing camshaft brackets, apply sealant to mating surface of No. 1 camshaft bracket.

- **Refer to "POSITION FOR APPLYING LIQUID GASKET", EM-23.**
- **Use Genuine RTV silicone sealant or equivalent. Refer to GI-50.**
- **Install camshaft brackets in their original positions.**
  Align stamp mark as shown in the figure.
- **If any part of valve assembly or camshaft is replaced, check valve clearance according to reference data.**
  After completing assembly check valve clearance. Refer to "Checking" and "Adjusting", EM-56 and EM-58.

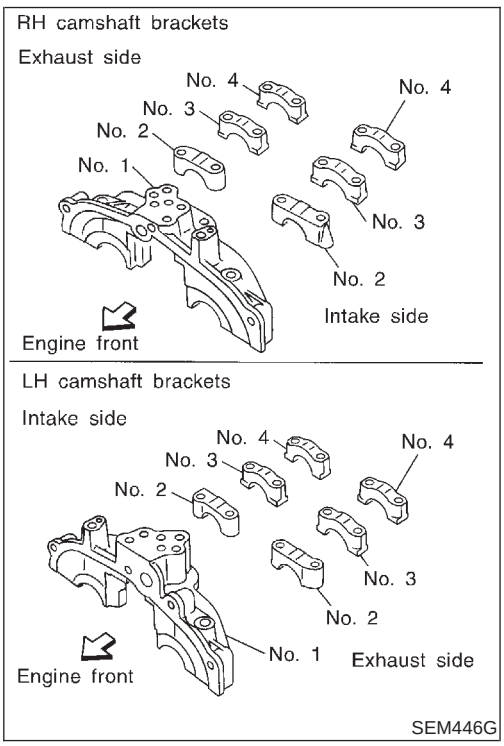
  Reference data valve clearance (Cold):

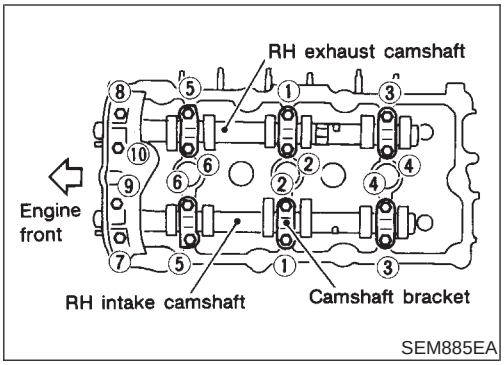
  Intake

  0.26 - 0.34 mm (0.010 - 0.013 in)

  Exhaust

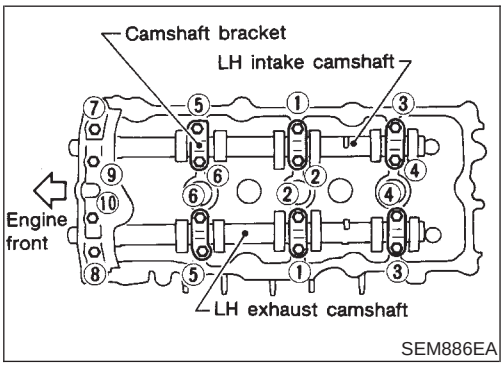
  0.29 - 0.37 mm (0.011 - 0.015 in)
- **Lubricate threads and seat surfaces of camshaft bracket bolts with new engine oil before installing them.**



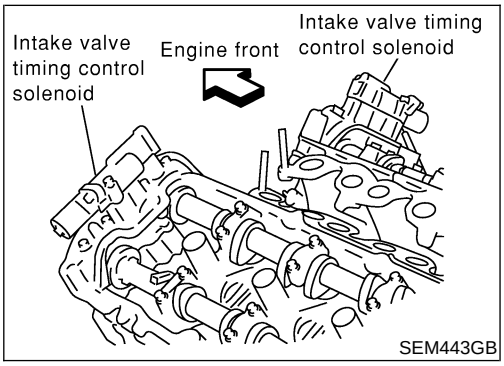


- Tighten the camshaft brackets in the following steps.

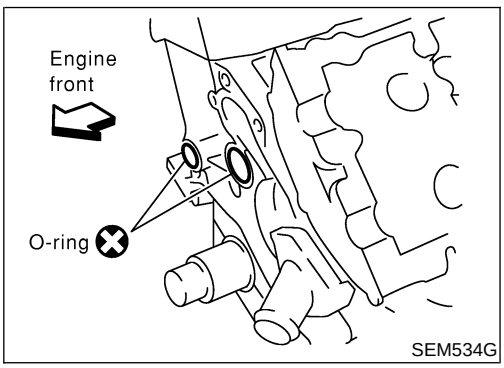
Step	Tightening torque	Tightening order
1	1.96 N·m (0.2 kg-m, 17 in-lb)	Tighten in the order of 7 to 10, then tighten 1 to 6.
2	5.88 N·m (0.6 kg-m, 52 in-lb)	Tighten in the numerical order.
3	9.02 - 11.8 N·m (0.92 - 1.20 kg-m, 79.9 - 104.2 in-lb)	Tighten in the order of 1 to 6.
	8.3 - 10.3 N·m (0.9 - 1.0 kg-m, 74 - 91 in-lb)	Tighten in the order of 7 to 10.



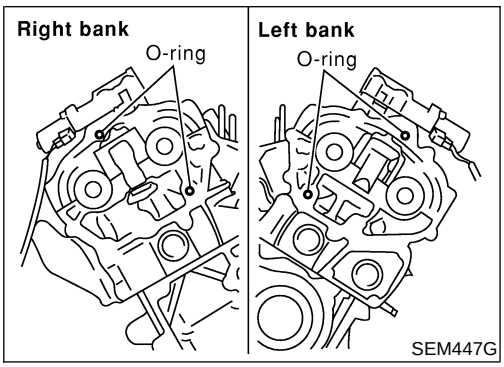
9. Install intake valve timing control solenoid valves.



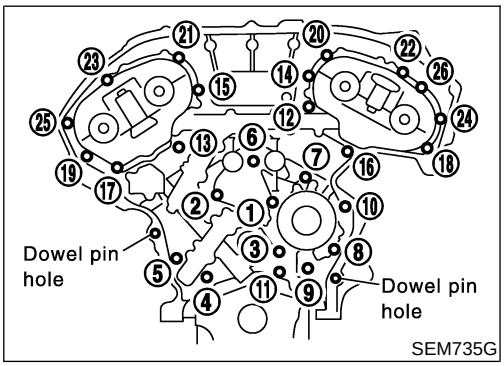
10. Install O-rings to cylinder block.



11. Install O-rings to cylinder head.



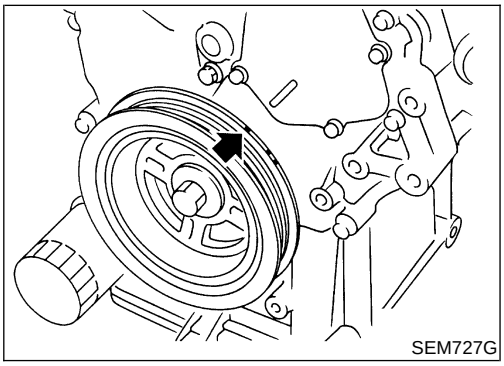
12. Apply sealant to the hatched portion of rear timing chain case. Refer to "POSITION FOR APPLYING LIQUID GASKET", EM-23.
- Apply continuous bead of liquid gasket to mating surface of rear timing chain case.
- **Before installation, wipe off the protruding sealant.**



13. Align rear timing chain case with dowel pins, then install on cylinder head and block.
14. Tighten rear chain case bolts.

a. Tighten bolts in numerical order shown in the figure with smaller torque than specified.
b. Tighten bolts to the specified torque repeating above step a.

15. Reinstall all removed parts in reverse order of removal.



Valve Clearance

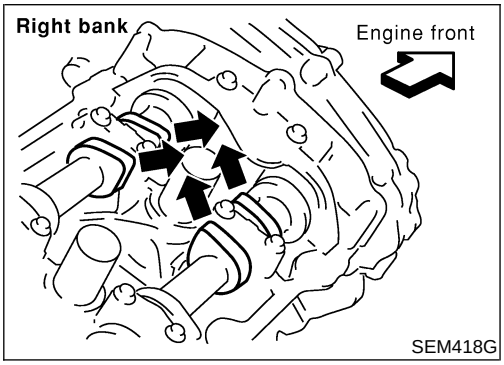
NFEM0049

CHECKING

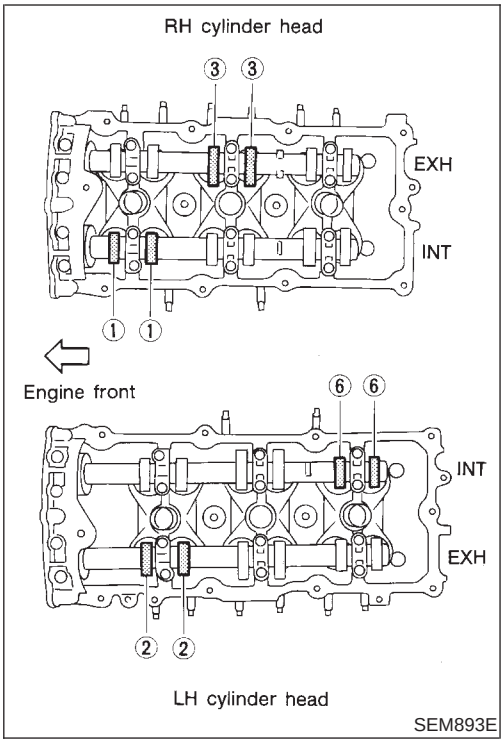
NFEM0049S01

Check valve clearance while engine is cold and not running.

1. Remove ornament cover.
2. Remove air duct with air cleaner case, collectors, hoses, wires, harnesses, connectors and so on.
3. Remove intake manifold collectors.
4. Remove ignition coils and spark plugs.
5. Remove RH and LH rocker covers.
6. Set No. 1 cylinder at TDC on its compression stroke.
- Align pointer with TDC mark on crankshaft pulley.

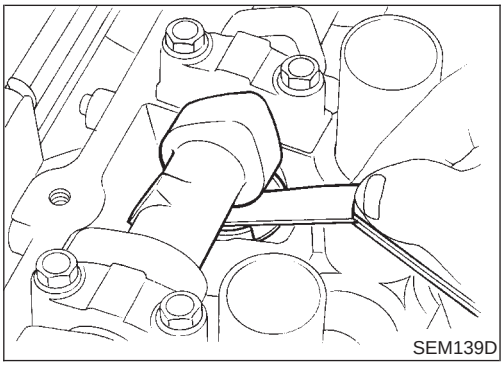


- Check that valve lifters on No. 1 cylinder are loose and valve lifters on No. 4 are tight.
  If not, turn crankshaft one revolution (360°) and align as above.



7. Check only those valves shown in the figure.

Crank position	Valve											
	No. 1		No. 2		No. 3		No. 4		No. 5		No. 6	
	INT	EXH	INT	EXH	INT	EXH	INT	EXH	INT	EXH	INT	EXH
No. 1 TDC	○			○		○					○	



- Using a feeler gauge, measure clearance between valve lifter and camshaft.
- Record any valve clearance measurements which are out of specification. They will be used later to determine the required replacement valve lifter.

Valve clearance for checking (Cold):

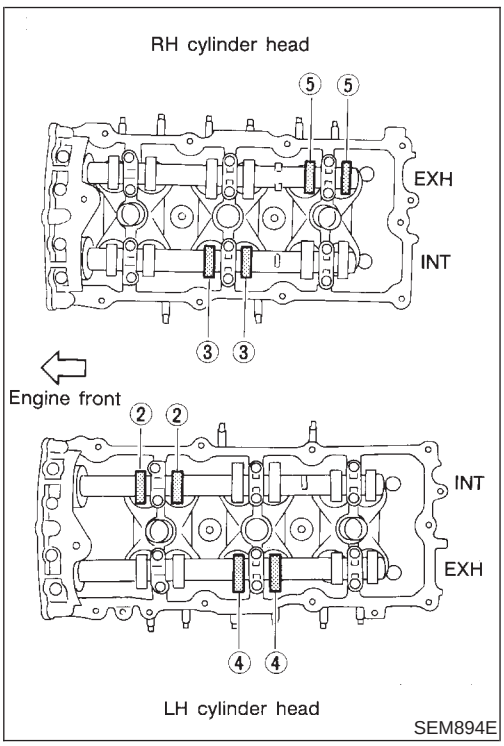
Intake

0.26 - 0.34 mm (0.010 - 0.013 in)

Exhaust

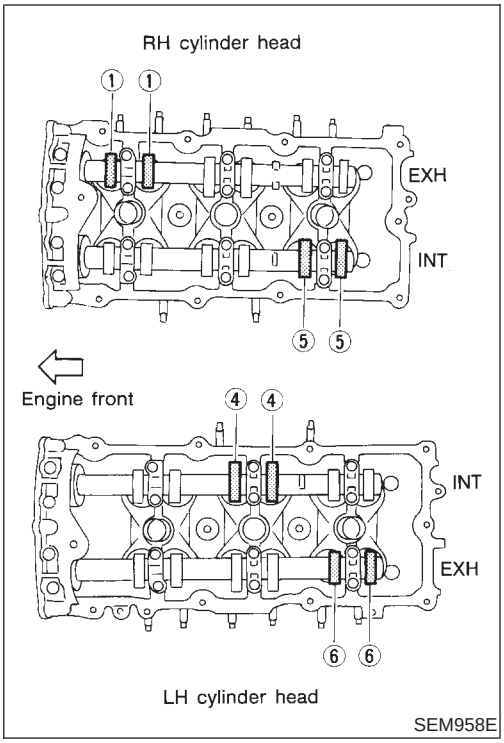
0.29 - 0.37 mm (0.011 - 0.015 in)

8. Turn crankshaft 240° and align as above.
9. Set No. 3 cylinder at TDC on its compression stroke.
10. Check only those valves shown in the figure.



Crank position	Valve											
	No. 1		No. 2		No. 3		No. 4		No. 5		No. 6	
	INT	EXH	INT	EXH	INT	EXH	INT	EXH	INT	EXH	INT	EXH
No. 3 TDC			○		○			○		○		

Valve Clearance (Cont'd)



11. Turn crankshaft 240° and align as above.
12. Set No. 5 cylinder at TDC on its compression stroke.
13. Check only those valves shown in the figure.

Crank position	Valve											
	No. 1		No. 2		No. 3		No. 4		No. 5		No. 6	
	INT	EXH	INT	EXH	INT	EXH	INT	EXH	INT	EXH	INT	EXH
No. 5 TDC		○					○		○			○

14. If all valve clearances are within specification, install the following parts. If they are out of specification, adjust the valve clearances.

- Intake manifold collectors
- RH and LH rocker covers
- All spark plugs
- All ignition coils

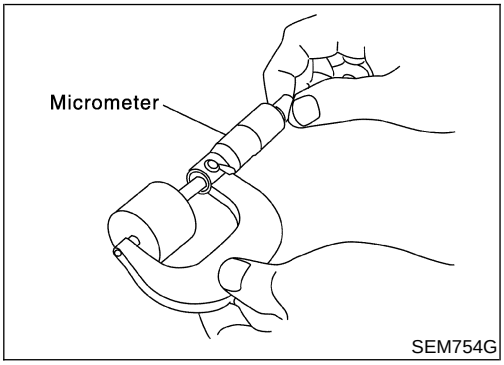
ADJUSTING

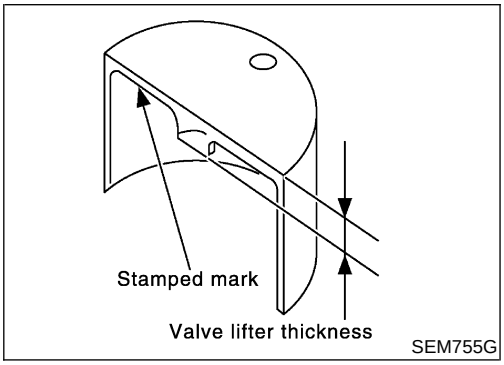
NFEM0049S02

Adjust valve clearance while engine is cold.

Perform adjustment by selecting head thickness of valve lifter (Adjusting shims are not used).

1. Remove camshaft.
2. Remove valve lifter at location where measured value is outside standard.





3. Measure center thickness of removed valve lifter with micrometer.
4. Use equation below to calculate valve lifter thickness for replacement.
   Valve lifter thickness calculation: t = t1 + (C1 − C2)
   t = Thickness of replacement valve lifter
   t1 = Thickness of removed valve lifter
   C1 = Measured valve clearance
   C2 = Standard valve clearance:
   Intake: 0.30 mm (0.012 in)
   Exhaust: 0.33 mm (0.013 in)

- Thickness of new valve lifter can be identified by stamp mark on reverse side (inside cylinder).

Unit: mm (in)

Stamp mark	Thickness of valve lifter
Starting: 788C	7.88 (0.3102)
Ending: 836C	8.36 (0.3291)

- Available thickness of valve lifter (Factory setting):
  7.88 - 8.36 mm (0.3102 - 0.3291 in) [in 0.02 mm (0.0008 in) step] in 25 sizes (Intake/Exhaust)

5. Install selected valve lifter.

6. Install camshaft.
7. Rotate crankshaft a few turns by hand.
8. Confirm that valve clearance is within standard.
9. After repair, confirm that valve clearance is within standard with engine warmed-up.

Valve clearance:

Unit: mm (in)

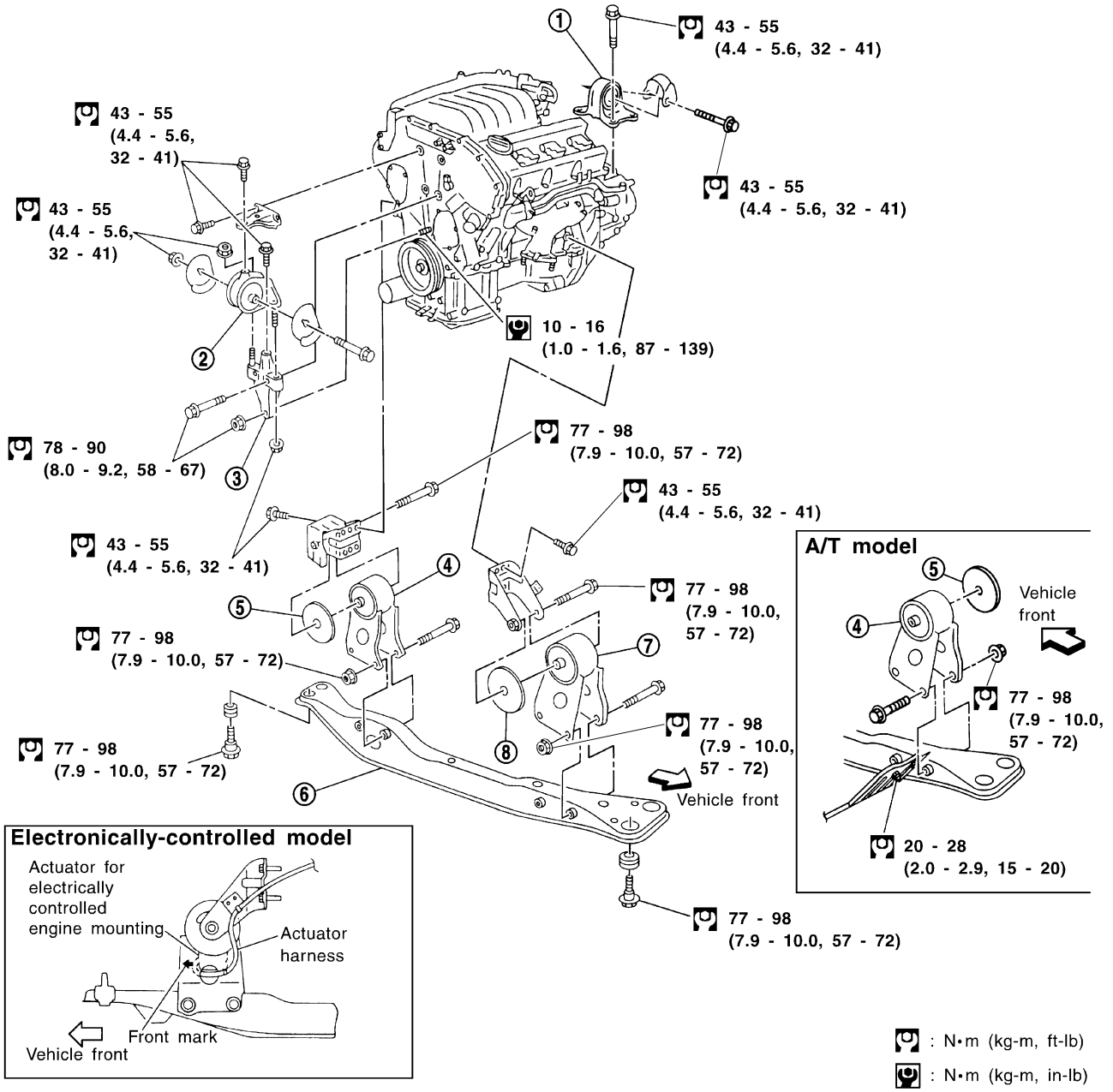
	Cold	Hot* (reference data)
Intake	0.26 - 0.34 (0.010 - 0.013)	0.304 - 0.416 (0.012 - 0.016)
Exhaust	0.29 - 0.37 (0.011 - 0.015)	0.308 - 0.432 (0.012 - 0.017)

*: Approximately 80°C (176°F)

Removal and Installation

NFEM0050

SEC. 112



SEM844G

1. LH engine mounting
2. RH engine mounting
3. Mounting bracket
4. Rear engine mounting (Fluid type)
5. Insulator
6. Center member
7. Front engine mounting (Fluid type)
8. Insulator

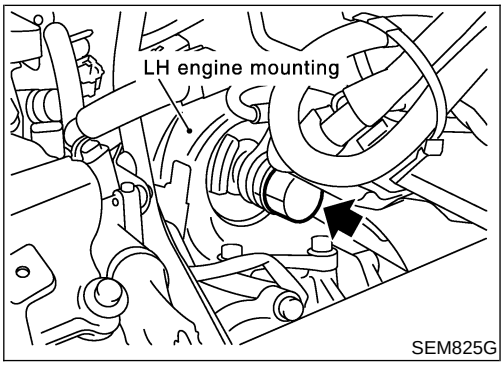
WARNING:

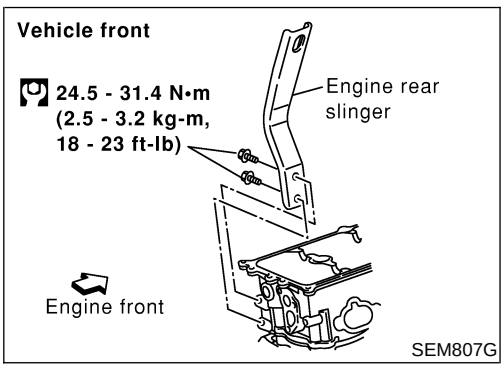
- **Situate vehicle on a flat and solid surface.**
- **Place chocks at front and back of rear wheels.**
- **Do not remove engine until exhaust system has completely cooled off. Otherwise, you may burn yourself and/or fire may break out in fuel line.**
- **For safety during subsequent steps, the tension of wires should be slackened against the engine.**

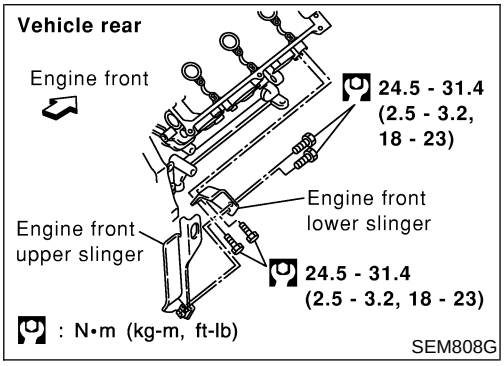
- **Before disconnecting fuel hose, release fuel pressure from fuel line.**
  Refer to EC-56, "Fuel Pressure Release".
- **Before removing front axle from transaxle, place safety stands under designated front supporting points. Refer to GI-46, "Garage Jack and Safety Stand".**
- **Be sure to hoist engine and transaxle in a safe manner.**
- **For engines not equipped with engine slingers, attach proper slingers and bolts described in PARTS CATALOG.**

CAUTION:

- **When lifting engine, be careful not to strike adjacent parts, especially the following: Accelerator wire casing, brake lines, and brake master cylinder.**
- **In hoisting the engine, always use engine slingers in a safe manner.**
- **In removing drive shaft, be careful not to damage grease seal of transaxle.**
- **Before separating engine and transaxle, remove the crankshaft position sensor (POS) from the assembly.**
- **Always pay extra attention not to damage edge of crankshaft position sensor (POS) or ring gear teeth.**



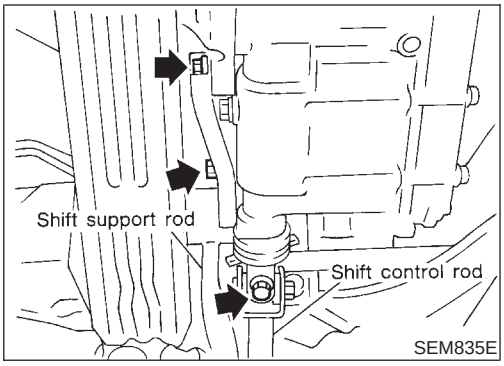




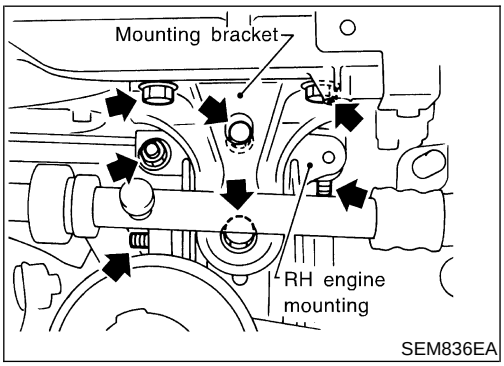
REMOVAL

NFEM0050S01

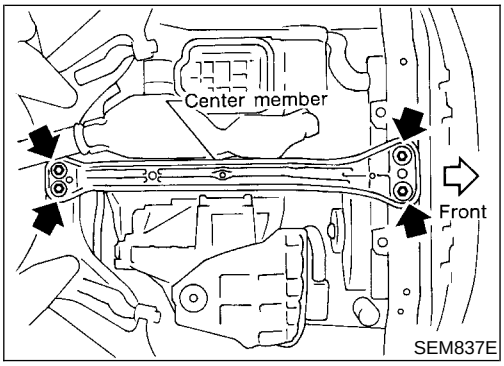
1. Remove engine undercover and hood.
2. Drain coolant from both cylinder block and radiator. Refer to MA-14, "Changing Engine Coolant".
3. Remove vacuum hoses, fuel hoses, wires, harnesses, connectors and so on.
4. Remove front exhaust tubes, ball joints and drive shafts.
5. Remove radiator and fans.
6. Remove drive belts.
7. Remove alternator, compressor and power steering oil pump from engine.
8. Set a suitable transmission jack under transaxle. Hoist engine with engine slinger.
9. Remove LH engine mounting.



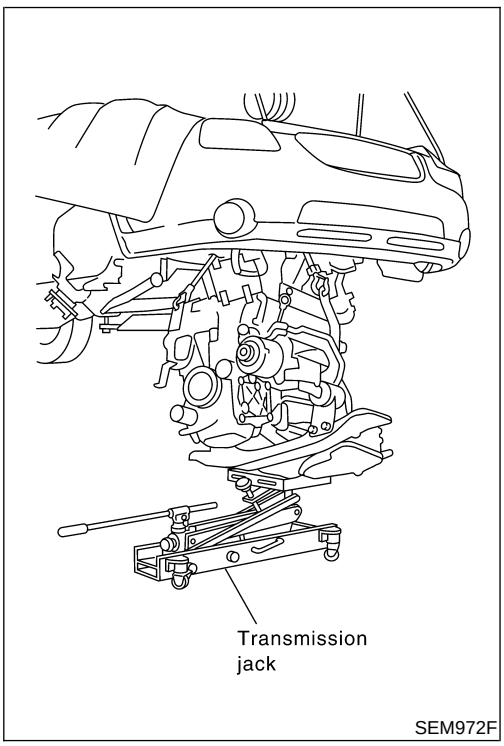
10. Disconnect control rod and support rod from transaxle (M/T model).
11. Disconnect control cable from transaxle (A/T model).



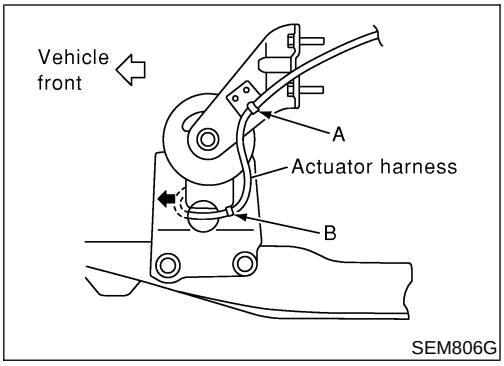
12. Remove RH engine mounting.



13. Remove center member and then slowly lower transmission jack.



14. Remove engine with transaxle as shown.



INSTALLATION

NFEM0050S02

Installation is in the reverse order of removal.

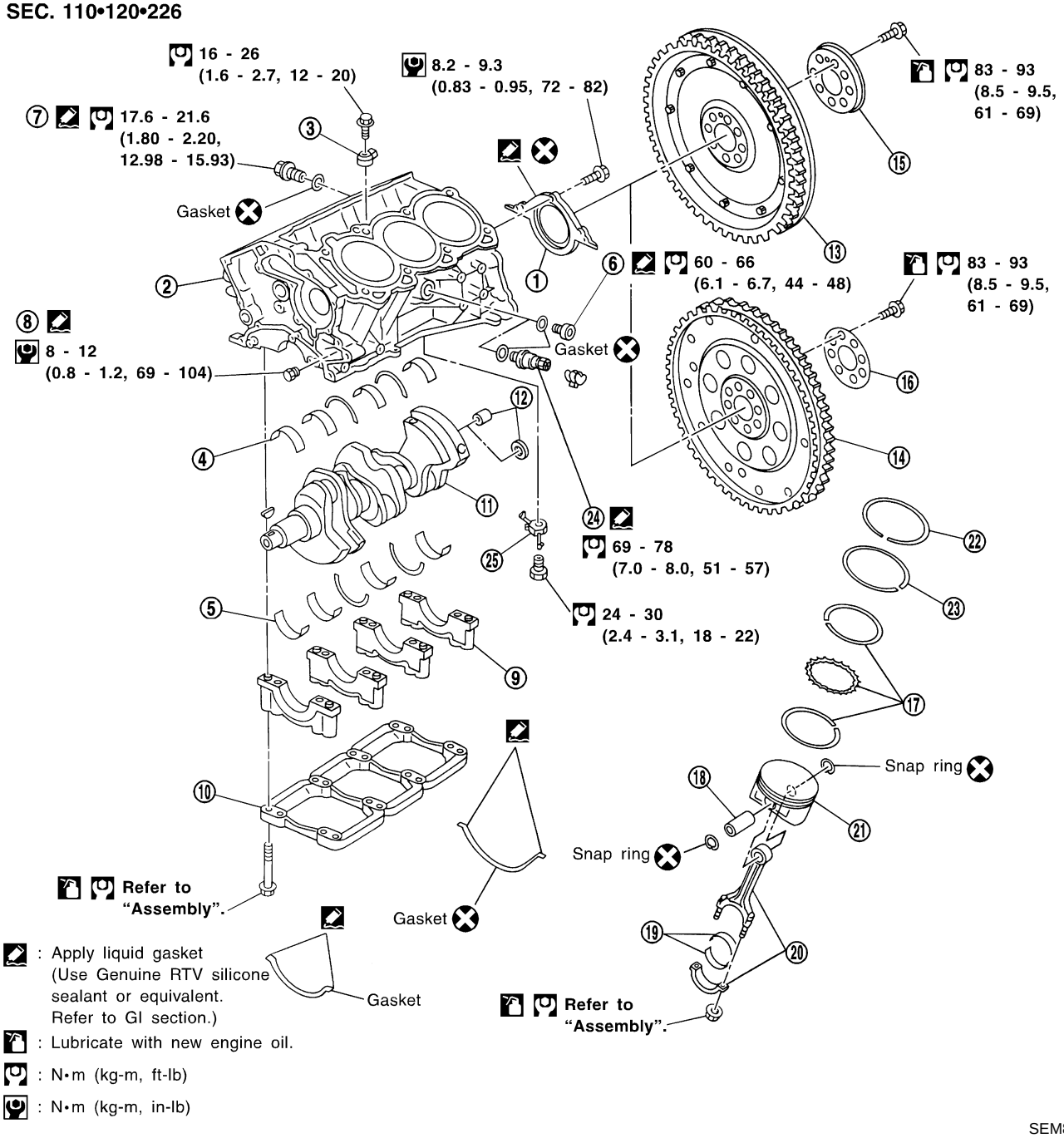
Install the electronically-controlled engine mount harness to match the following values. (Models with electronically-controlled engine mounts)

Length between A and B:
170 mm (6.69 in)

Components

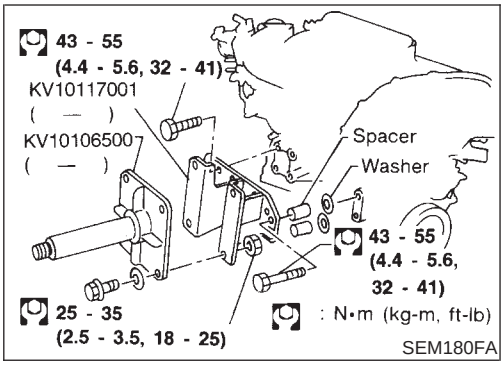
NFEM0051

SEC. 110•120•226



SEM809GA

1. Rear oil seal retainer
2. Cylinder block
3. Knock sensor
4. Upper main bearing
5. Lower main bearing
6. Water drain plug (LH side)
7. Water drain plug (RH side)
8. Water drain plug (Water pump side)
9. Main bearing cap
10. Main bearing beam
11. Crankshaft
12. Pilot bushing or pilot converter
13. Flywheel with signal plate (M/T models)
14. Drive plate with signal plate (A/T model)
15. Flywheel reinforcement
16. Drive plate reinforcement
17. Oil ring
18. Piston pin
19. Connecting rod bearing
20. Connecting rod
21. Piston
22. Top ring
23. 2nd ring
24. Cylinder block heater (For Canada)
25. Oil jet



Removal and Installation

NFEM0052

CAUTION:

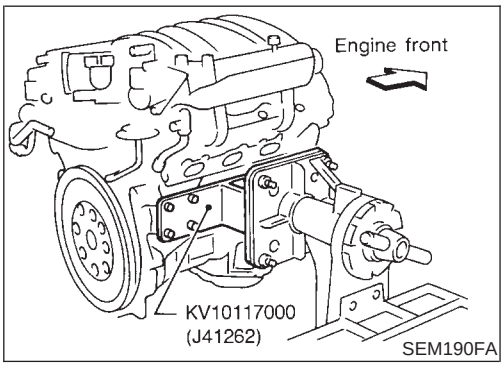
- **When installing bearings, pistons, or other sliding parts, lubricate contacting surfaces with new engine oil.**
- **Place removed parts such as bearings and bearing caps in their proper order and direction.**
- **When installing connecting rod nuts, and main bearing cap bolts, apply new engine oil to threads and seating surfaces.**
- **Do not allow any magnetic materials to contact the signal plate teeth of flywheel or drive plate.**

Disassembly

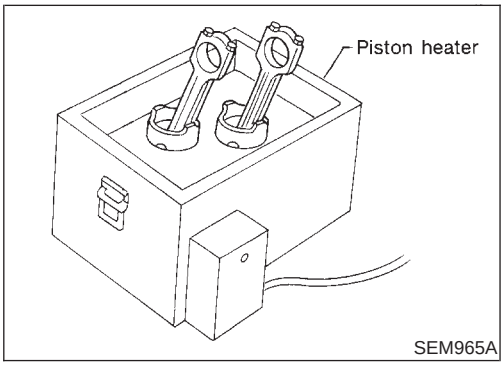
NFEM0053

PISTON, CRANKSHAFT AND OIL JET

NFEM0053S01



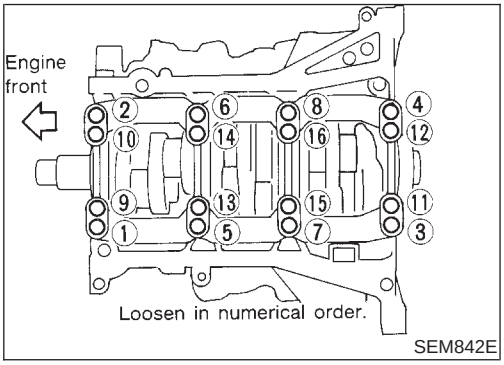
1. Remove engine. Refer to “Removal and Installation”, EM-60.
2. Place engine on a work stand.
3. Drain coolant and oil.
4. Remove oil pan. Refer to “Removal”, EM-14.
5. Remove timing chain. Refer to “Removal”, EM-24.
6. Remove cylinder head. Refer to “Removal”, EM-43.



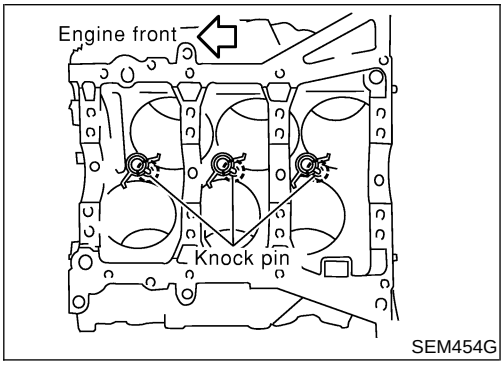
7. Remove pistons with connecting rods.
   - When disassembling piston and connecting rod, remove snap ring first, then heat piston to 60 to 70°C (140 to 158°F).
8. Remove rear oil seal retainer.

CAUTION:

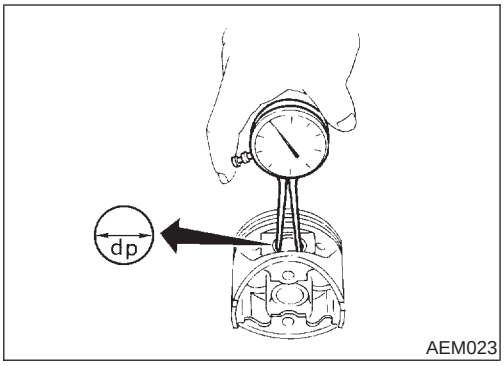
- **When piston rings are not replaced, make sure that piston rings are mounted in their original positions.**
- **When replacing piston rings, if there is no punchmark, install with either side up.**



9. Loosen bolts in numerical order as shown and remove main bearing beam, bearing cap and crankshaft.
   - **Before removing bearing beam and bearing cap, measure crankshaft end play. Refer to EM-75.**
   - **Bolts should be loosened in two or three steps.**



10. Remove oil jets.



Inspection

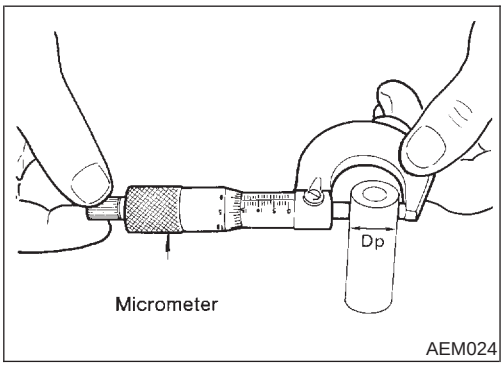
NFEM0054

PISTON AND PISTON PIN CLEARANCE

NFEM0054S01

1. Measure inner diameter of piston pin hole “dp”.

Standard diameter “dp”:
Grade No. 0
21.993 - 21.999 mm (0.8659 - 0.8661 in)
Grade No. 1
21.999 - 22.005 mm (0.8661 - 0.8663 in)



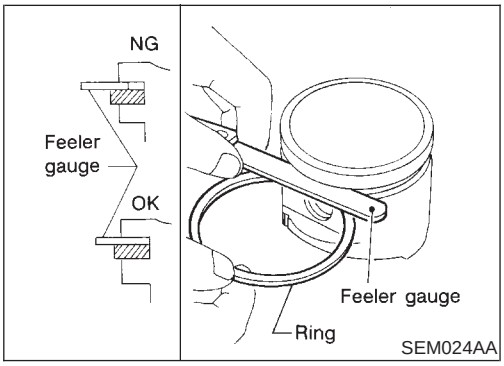
2. Measure outer diameter of piston pin “Dp”.

Standard diameter “Dp”:
Grade No. 0
21.989 - 21.995 mm (0.8657 - 0.8659 in)
Grade No. 1
21.995 - 22.001 mm (0.8659 - 0.8662 in)

3. Calculate interference fit of piston pin to piston.

Dp − dp = 0.002 - 0.006 mm (0.0001 - 0.0002 in)

If it exceeds the above value, replace piston assembly with pin.

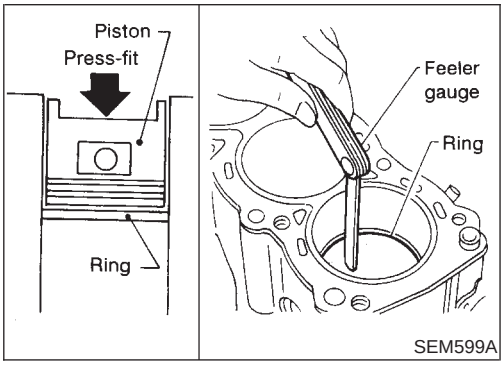


PISTON RING SIDE CLEARANCE

NFEM0054S02

Side clearance:
Top ring
0.045 - 0.080 mm (0.0018 - 0.0031 in)
2nd ring
0.030 - 0.070 mm (0.0012 - 0.0028 in)
Oil ring
0.065 - 0.135 mm (0.0026 - 0.0053 in)
Max. limit of side clearance:
Top ring 0.11 mm (0.0043 in)
2nd ring 0.1 mm (0.004 in)

If out of specification, replace piston ring. If clearance exceeds maximum limit with new ring, replace piston.



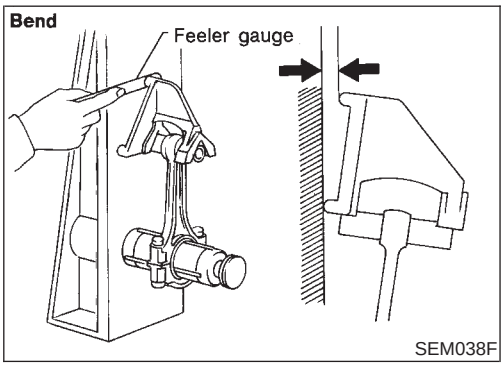
PISTON RING END GAP

NFEM0054S03

End gap:
Top ring 0.23 - 0.33 mm (0.0091 - 0.0130 in)
2nd ring 0.33 - 0.48 mm (0.0130- 0.0189 in)
Oil ring 0.20 - 0.80 mm (0.0079 - 0.0315 in)
Max. limit of ring gap:
Top ring 0.54 mm (0.0213 in)
2nd ring 0.80 mm (0.0315 in)
Oil ring 0.95 mm (0.0374 in)

If out of specification, replace piston ring. If gap still exceeds the limit even with a new ring, do the following. Rebore cylinder and use oversized piston and piston rings.
Refer to SDS (EM-86).

- When replacing the piston, check the cylinder block surface for scratches or seizure. If scratches or seizure is found, hone or replace the cylinder block.

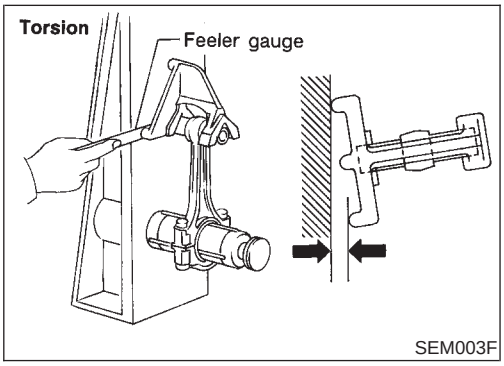


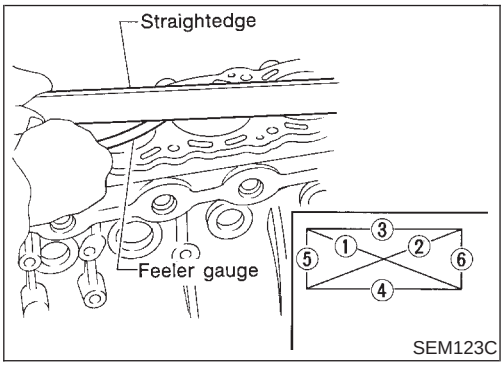
CONNECTING ROD BEND AND TORSION

NFEM0054S04

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.

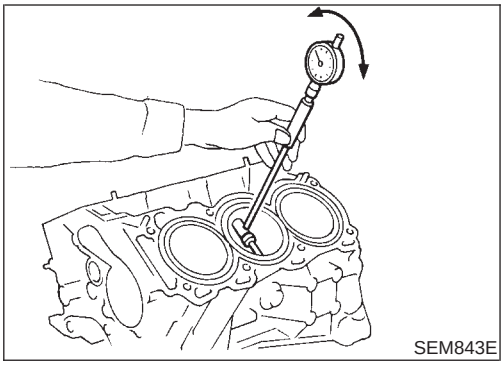


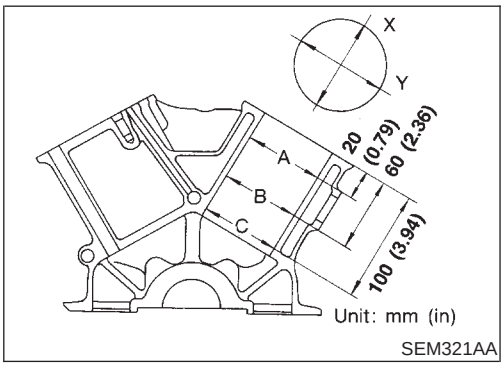


CYLINDER BLOCK DISTORTION AND WEAR

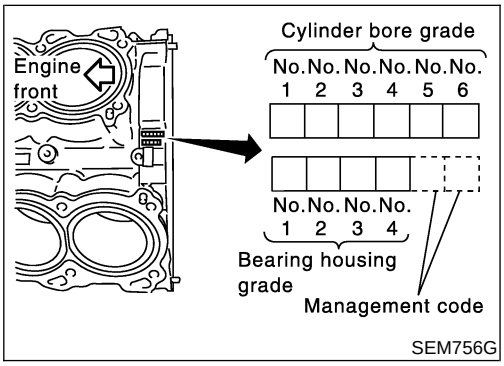
NFEM0054S05

- Clean upper surface of cylinder block.
  Use a reliable straightedge and feeler gauge to check the flatness of cylinder block surface.
  Check along six positions shown in the figure.
  Distortion limit: 0.10 mm (0.0039 in)
- If out of specification, resurface it. The limit for cylinder block resurfacing is determined by cylinder head resurfacing in engine.
  Resurfacing limit:
  Amount of cylinder head resurfacing is "A".
  Amount of cylinder block resurfacing is "B".
  The maximum limit is as follows:
  A + B = 0.2 mm (0.008 in)
  Nominal cylinder block height from crankshaft center:
  214.95 - 215.05 mm (8.4626 - 8.4665 in)
  Refer to SDS (EM-85).
- If necessary, replace cylinder block.

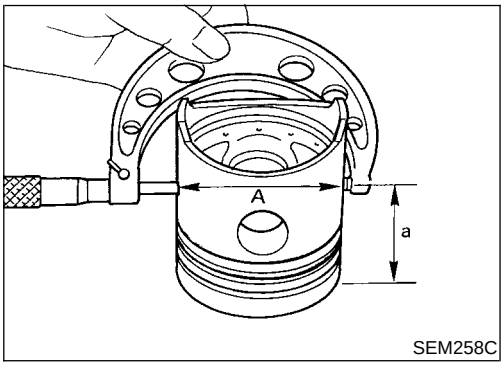

SEM843E



SEM321AA



SEM756G



SEM258C

PISTON-TO-BORE CLEARANCE

NFEM0054S06

1. Using a bore gauge, measure cylinder bore for wear, out-of-round and taper.

Cylinder bore inner diameter

Grade No.	Standard inner diameter	Wear limit
No. 1	95.500 - 95.510 mm (3.7598 - 3.7602 in)	0.20 mm (0.0079 in)
No. 2	95.510 - 95.520 mm (3.7602 - 3.7606 in)	
No. 3	95.520 - 95.530 mm (3.7606 - 3.7610 in)	

If it exceeds the limit, rebore all cylinders. Replace cylinder block if necessary.

Out-of-round (X − Y):
Limit 0.015 mm (0.0006 in)
Taper (A − B − C):
Limit 0.015 mm (0.0006 in)

2. Check for scratches and seizure. If seizure is found, hone it.

- **If both cylinder block and piston are replaced with new ones, select piston of the same grade number punched on cylinder block rear position. These numbers are punched in either Arabic or Roman numerals.**

3. Measure piston skirt diameter.
Piston diameter "A": Refer to SDS (EM-86).
Measuring point "a" (Distance from the top):
41.0 mm (1.61 in)
4. Check that piston-to-bore clearance is within specification.
Piston-to-bore clearance "B":
0.010 - 0.030 mm (0.0004 - 0.0012 in)
5. Determine piston oversize according to amount of cylinder wear.
Oversize pistons are available for service.
Refer to SDS (EM-86).

- **If oversize piston is used, use oversize piston ring also.**

6. Cylinder bore size is determined by adding piston-to-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-bore clearance
C: Honing allowance 0.02 mm (0.0008 in)
7. Install main bearing caps, and tighten to the specified torque.

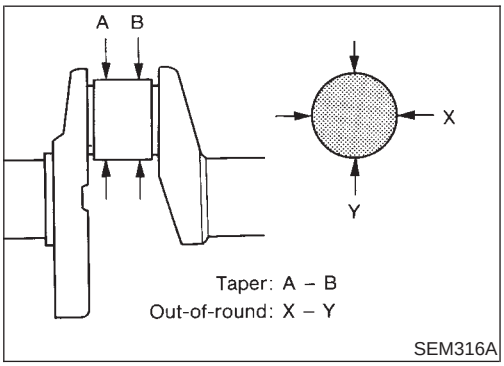
Otherwise, cylinder bores may be distorted in final assembly.

8. 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.**

9. Hone cylinders to obtain specified piston-to-bore clearance.
10. Measure finished cylinder bore for out-of-round and taper.

- **Measurement should be done after cylinder bore cools down.**

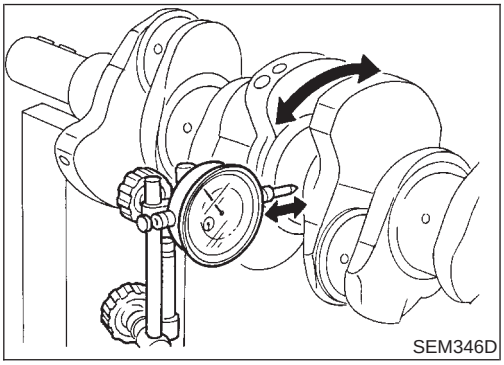


CRANKSHAFT

NFEM0054S07

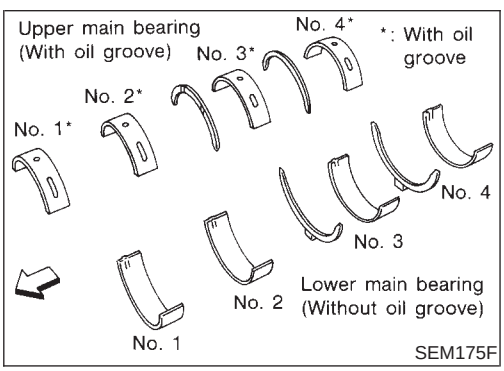
1. Check crankshaft main and pin journals for score, wear or cracks.
2. With a micrometer, measure journals for taper and out-of-round.

Out-of-round (X − Y):
Standard
0.002 mm (0.0001 in)
Taper (A − B):
Standard
0.002 mm (0.0001 in)



3. Measure crankshaft runout.

Runout (Total indicator reading):
Limit 0.10 mm (0.0039 in)



BEARING CLEARANCE

NFEM0054S08

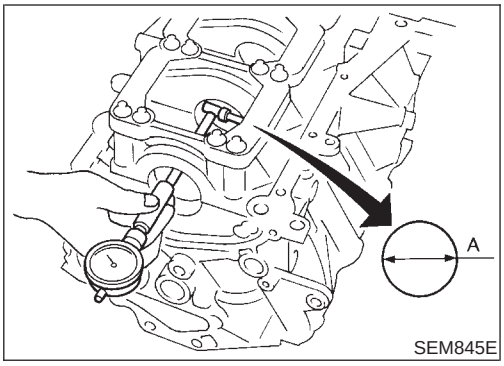
- Use either of the following two methods, however, method "A" gives more reliable results and is preferable.

Method A (Using bore gauge & micrometer)

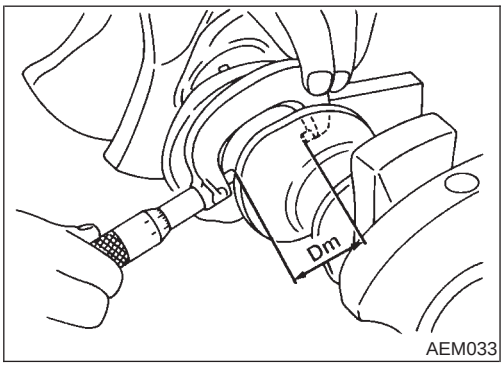
Main bearing

NFEM0054S0801

1. Set main bearings in their proper positions on cylinder block and main bearing cap.

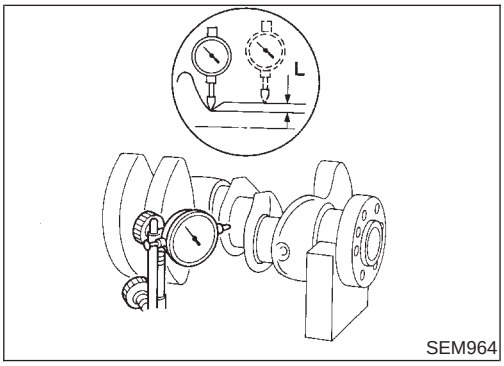


2. Install main bearing cap and bearing beam to cylinder block.
   Tighten all bolts in correct order.
3. Measure inner diameters "A" of each main bearing.

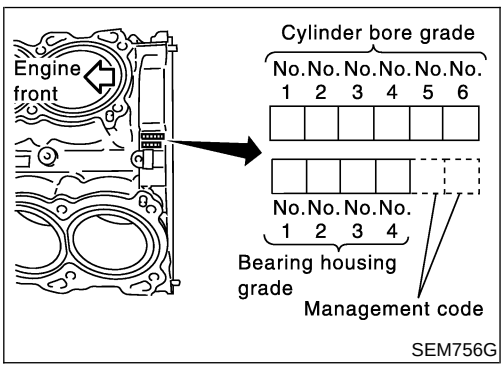


4. Measure outer diameters "Dm" of each crankshaft main journal.
5. Calculate main bearing clearance.
   Main bearing clearance = A − Dm
   Standard: 0.035 - 0.045 mm (0.0014 - 0.0018 in)
   Limit: 0.065 mm (0.0026 in)

- If it exceeds the limit, replace bearing.
- If clearance cannot be adjusted using any standard bearing grade, grind crankshaft journal and use undersized bearing.

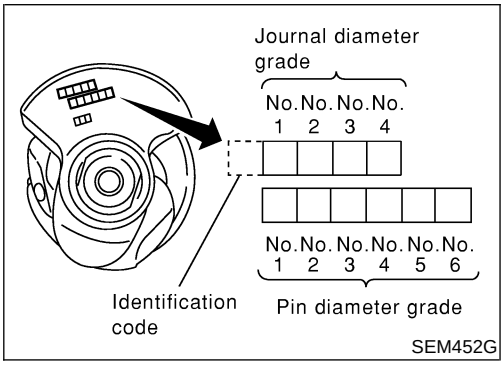


a. When grinding crankshaft journal, confirm that "L" dimension in fillet roll is more than the specified limit.
   "L": 0.1 mm (0.004 in)
b. Refer to SDS for grinding crankshaft and available service parts.



6. If crankshaft or cylinder block is replaced with a new one, select thickness of main bearings as follows:

a. Grade number of each cylinder block main journal is punched on the respective cylinder block. These numbers are punched in either Arabic or Alphabet. Refer to SDS, EM-85.
   If measured diameter is out of grade punched, decide suitable grade using table in SDS.



b. Grade number of each crankshaft main journal is punched on the respective crankshaft. These numbers are punched in either Arabic or Alphabet. Refer to SDS, EM-88.
   If measured diameter is out of grade punched, decide suitable grade using table in SDS.
c. Select main bearing with suitable thickness according to the following table.
   Refer to "SDS", EM-89, for available main bearings.

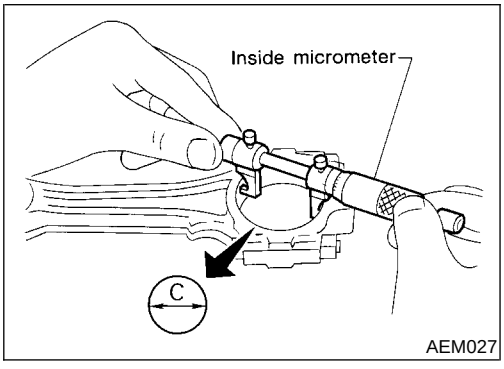
Main bearing selection table

Mark	Axle diameter	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	V	W	X	Y	4	7
	Hole diameter	63.993 - 63.994 (2.5194 - 2.5194)	63.994 - 63.995 (2.5194 - 2.5195)	63.995 - 63.996 (2.5195 - 2.5195)	63.996 - 63.997 (2.5195 - 2.5196)	63.997 - 63.998 (2.5196 - 2.5196)	63.998 - 63.999 (2.5196 - 2.5196)	63.999 - 64.000 (2.5196 - 2.5197)	64.000 - 64.001 (2.5197 - 2.5197)	64.001 - 64.002 (2.5197 - 2.5198)	64.002 - 64.003 (2.5198 - 2.5198)	64.003 - 64.004 (2.5198 - 2.5198)	64.004 - 64.005 (2.5198 - 2.5199)	64.005 - 64.006 (2.5199 - 2.5199)	64.006 - 64.007 (2.5199 - 2.5200)	64.007 - 64.008 (2.5200 - 2.5200)	64.008 - 64.009 (2.5200 - 2.5200)	64.009 - 64.010 (2.5200 - 2.5201)	64.010 - 64.011 (2.5201 - 2.5201)	64.011 - 64.012 (2.5201 - 2.5202)	64.012 - 64.013 (2.5202 - 2.5202)	64.013 - 64.014 (2.5202 - 2.5202)	64.014 - 64.015 (2.5202 - 2.5203)	64.015 - 64.016 (2.5203 - 2.5203)	64.016 - 64.017 (2.5203 - 2.5203)
A	59.975 - 59.974 (2.3612 - 2.3612)	0	0	0	01	01	01	1	1	1	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34
B	59.974 - 59.973 (2.3612 - 2.3611)	0	0	01	01	01	1	1	1	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4
C	59.973 - 59.972 (2.3611 - 2.3611)	0	01	01	01	1	1	1	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4
D	59.972 - 59.971 (2.3611 - 2.3611)	01	01	01	1	1	1	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4
E	59.971 - 59.970 (2.3611 - 2.3610)	01	01	1	1	1	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45
F	59.970 - 59.969 (2.3610 - 2.3610)	01	1	1	1	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45
G	59.969 - 59.968 (2.3610 - 2.3609)	1	1	1	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45
H	59.968 - 59.967 (2.3609 - 2.3609)	1	1	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5
J	59.967 - 59.966 (2.3609 - 2.3609)	1	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5
K	59.966 - 59.965 (2.3909 - 2.3608)	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5
L	59.965 - 59.964 (2.3608 - 2.3608)	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5	56
M	59.964 - 59.963 (2.3608 - 2.3607)	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5	56	56
N	59.963 - 59.962 (2.3607 - 2.3607)	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5	56	56	56
P	59.962 - 59.961 (2.3607 - 2.3607)	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5	56	56	56	6
R	59.961 - 59.960 (2.3607 - 2.3606)	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5	56	56	56	6	6
S	59.960 - 59.959 (2.3606 - 2.3606)	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5	56	56	56	6	6	6
T	59.959 - 59.958 (2.3606 - 2.3605)	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5	56	56	56	6	6	6	67
U	59.958 - 59.957 (2.3605 - 2.3605)	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5	56	56	56	6	6	6	67	67
V	59.957 - 59.956 (2.3605 - 2.3605)	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5	56	56	56	6	6	6	67	67	67
W	59.956 - 59.955 (2.3605 - 2.3604)	3	3	34	34	34	4	4	4	45	45	45	5	5	5	56	56	56	6	6	6	67	67	67	7
X	59.955 - 59.954 (2.3604 - 2.3604)	3	34	34	34	4	4	4	45	45	45	5	5	5	56	56	56	6	6	6	67	67	67	7	7
Y	59.954 - 59.953 (2.3604 - 2.3603)	34	34	34	4	4	4	45	45	45	5	5	5	56	56	56	6	6	6	67	67	67	7	7	7
4	59.953 - 59.952 (2.3603 - 2.3603)	34	34	4	4	4	45	45	45	5	5	5	56	56	56	6	6	6	67	67	67	7	7	7	
7	59.952 - 59.951 (2.3603 - 2.3603)	34	4	4	4	45	45	45	5	5	5	56	56	56	6	6	6	67	67	67	7	7	7		

Cylinder block main journal
Unit: mm (in)

Crankshaft main journal
Unit: mm (in)

SEM845GA

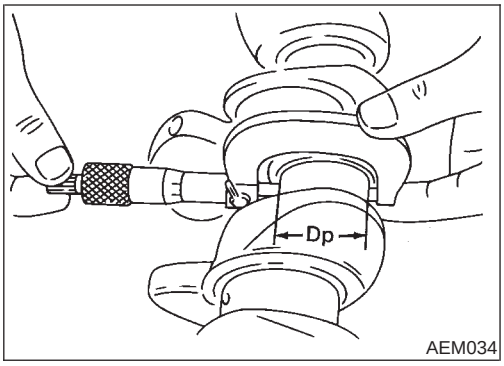


AEM027

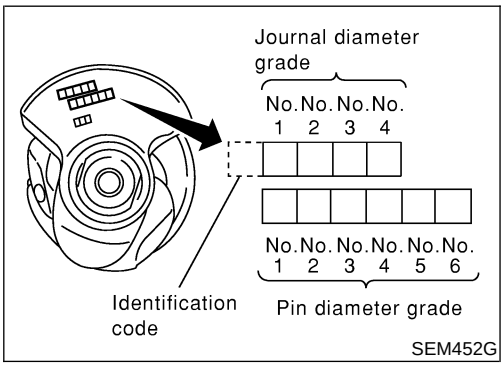
Connecting Rod Bearing (Big end)

NFEM0054S0802

1. Install connecting rod bearing to connecting rod and cap.
2. Install connecting rod cap to connecting rod.
   Tighten bolts to the specified torque.
3. Measure inner diameter "C" of connecting rod.

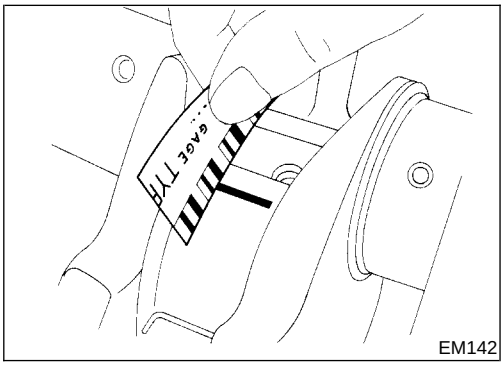


4. Measure outer diameter "Dp" of each crankshaft pin journal.
5. Calculate connecting rod bearing clearance.
   Connecting rod bearing clearance = C − Dp
   Standard: 0.034 - 0.059 mm (0.0013 - 0.0023 in)
   Limit: 0.070 mm (0.0028 in)
6. If it exceeds the limit, replace bearing.
7. If clearance cannot be adjusted within the standard of any bearing, grind crankshaft journal and use undersized bearing. Refer to "BEARING CLEARANCE — Main bearing", EM-69.



8. If crankshaft is replaced with a new one, select connecting rod bearing according to the following table.
   Connecting rod bearing grade number (Identification color):
   These numbers are punched in either Arabic or Roman numerals.

Crankshaft pin journal grade number	Connecting rod bearing grade number
0	0 (Black)
1	1 (Brown)
2	2 (Green)



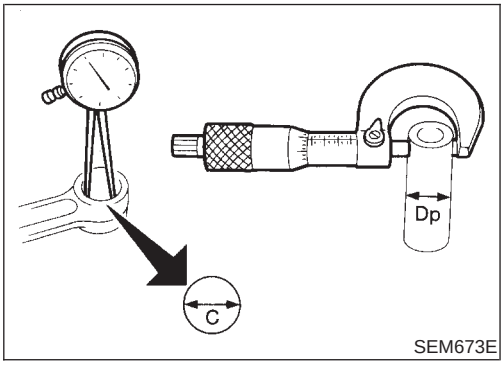
Method B (Using plastigage)

CAUTION:

- **Do not turn crankshaft or connecting rod while plastigage is being inserted.**
- **When bearing clearance exceeds the specified limit, ensure that the proper bearing has been installed. If incorrect bearing clearance exists, use a thicker or undersized main bearing to ensure specified clearance.**

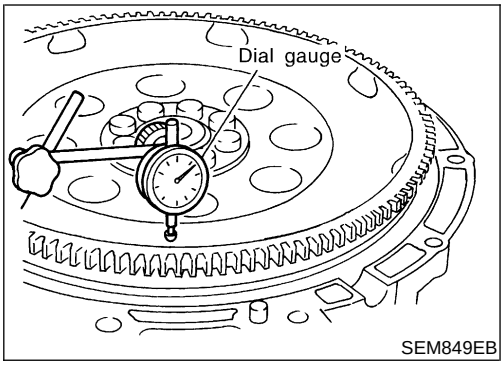
CONNECTING ROD BUSHING CLEARANCE (SMALL END)

NFEM0054S09

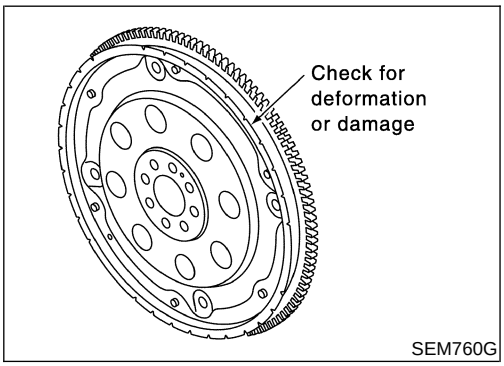


1. Measure inner diameter "C" of bushing.
2. Measure outer diameter "Dp" of piston pin.
3. Calculate connecting rod bushing clearance.
   Connecting rod bushing clearance = C − Dp
   Standard: 0.005 - 0.017 mm (0.0002 - 0.0007 in)
   Limit: 0.030 mm (0.0012 in)

   If it exceeds the limit, replace connecting rod assembly or connecting rod bushing and/or piston set with pin.



SEM849EB



SEM760G

FLYWHEEL/DRIVE PLATE RUNOUT

NFEM0054S10

Runout (Total indicator reading):

Flywheel (M/T model)

Refer to EM-73, "Flywheel Deflection".

Drive plate (A/T model)

Less than 0.15 mm (0.0059 in)

CAUTION:

- **Do not disassemble the flywheel.**
- **Be careful not to damage the signal plate, especially the teeth.**
- **Check the drive plate and signal plate for deformation or cracks.**
- **Never place the flywheel assembly with the signal plate facing down.**
- **Keep any magnetized objects away from the signal plate.**
- **Do not allow any magnetic materials to contact the signal plate teeth.**
- **Do not resurface flywheel. Replace as necessary.**

MOVEMENT AMOUNT OF FLYWHEEL (M/T MODELS)

NFEM0054S12

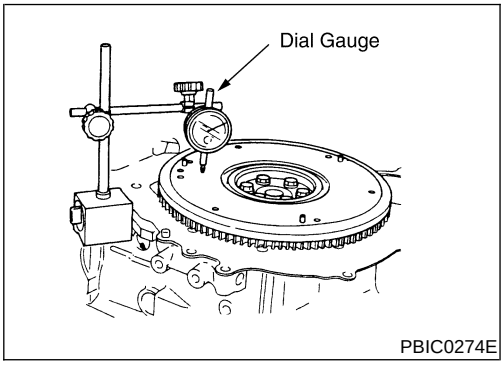
NOTE:

- Inspection for double mass flywheel only.
- Do not disassemble double mass flywheel.

Flywheel Deflection

NFEM0054S1201

- Measure deflection of flywheel contact surface to the clutch with a dial gauge.



PBIC0274E

- Measure deflection at 210 mm (8.27 in) dia.

Standard:

0.45 mm (0.0177 in) or less

Limit:

1.3 mm (0.051 in) or less

- When measured value exceeds the limit, replace it with a new one.

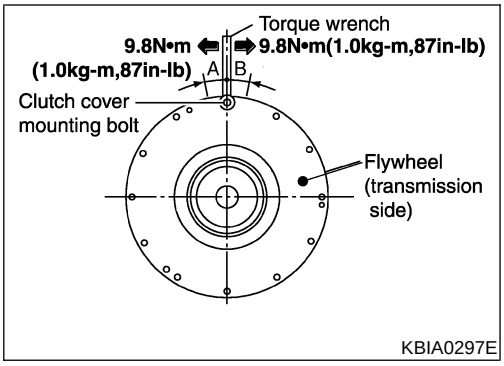
Movement Amount in Radial (rotation) Direction

NFEM0054S1202

- Check the movement amount in the following procedure.

1. Install a bolt to clutch cover mounting hole, and place a torque wrench on the extended line of the flywheel center line.

- Tighten bolt at a force of 9.8 N·m (1 kg-m, 87 in-lb) to keep it from loosening.



2. Put a mating mark on circumference of the two flywheel masses without applying any load (Measurement standard points).
3. Apply a force of 9.8 N·m (1 kg-m, 87 in-lb) in each direction, and mark the movement amount on the mass on the transmission side.
4. Measure dimensions of movement amounts A and B on circumference of the flywheel on the transmission side.

Standard: 24 mm (0.94 in) or less

- When measured value is outside the standard, replace flywheel.

Assembly

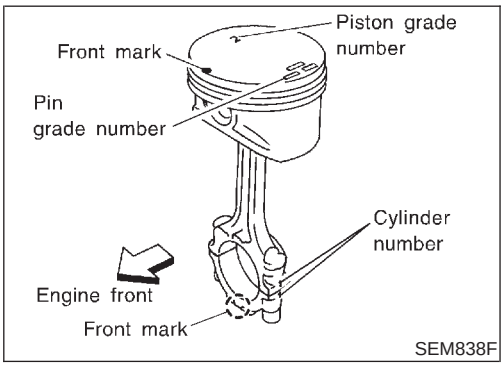
NFEM0055

PISTON

NFEM0055S01

1. Install new snap ring on one side of piston pin hole.
2. Heat piston to 60 to 70°C (140 to 158°F) and assemble piston, piston pin, connecting rod and new snap ring.

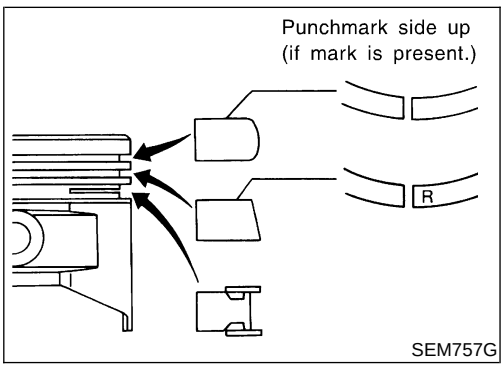
- **Align the direction of piston and connecting rod.**
- **Numbers stamped on connecting rod and cap correspond to each cylinder.**
- **After assembly, make sure connecting rod swings smoothly.**

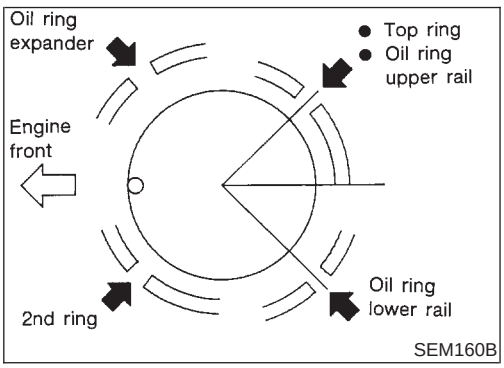


3. Set piston rings as shown.

CAUTION:

- **When piston rings are not replaced, make sure that piston rings are mounted in their original positions.**
- **When replacing piston rings, those without punchmarks present can be mounted with either side up.**





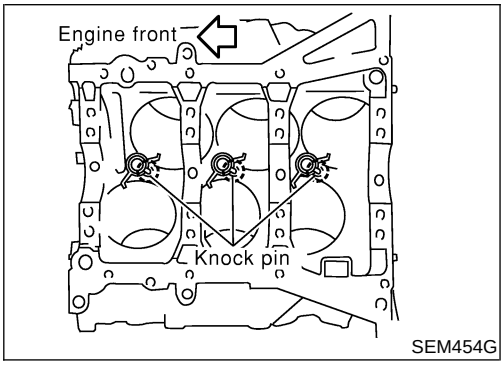
- **Align piston rings so that end gaps are positioned as shown in the figure.**

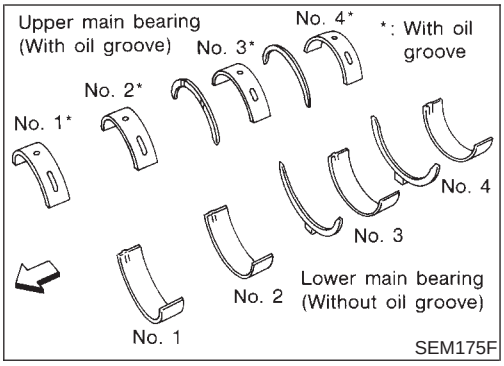
OIL JET

NFEM0055S02

1. Install oil jets.

- Insert oil jet knock pin into the cylinder block knock pin hole, and tighten the mounting bolts.



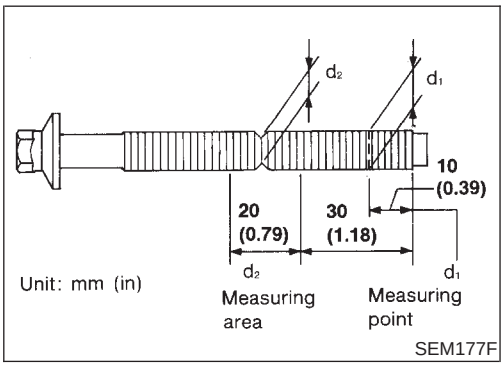


CRANKSHAFT

NFEM0055S03

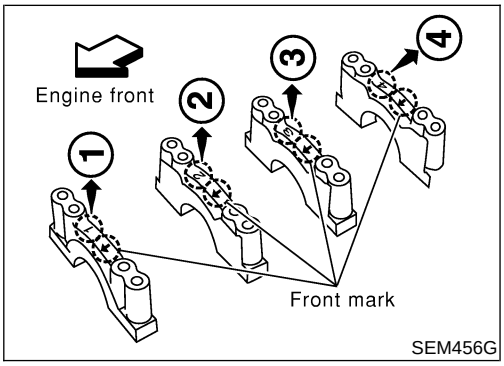
1. Set main bearings in their proper positions on cylinder block and main bearing beam.

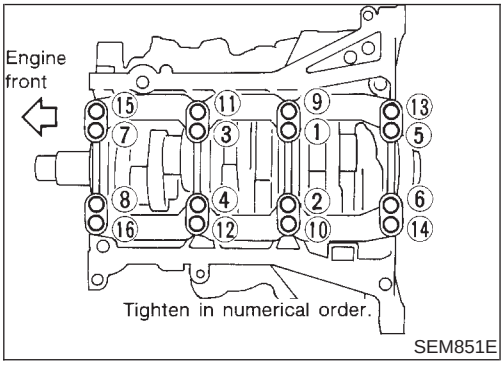
- **Confirm that correct main bearings are used. Refer to "Inspection" of this section.**



2. Instructions for re-use of main bearing cap bolts.

- **A plastic zone tightening method is used for tightening main bearing cap bolts. Measure d1 and d2 as shown in the figure.**
  d2: Select minimum diameter in the measuring area.
  If the difference between d1 and d2 exceeds the limit, replace the bolts with new ones.
  Limit (d1 - d2): 0.11 mm (0.0043 in)





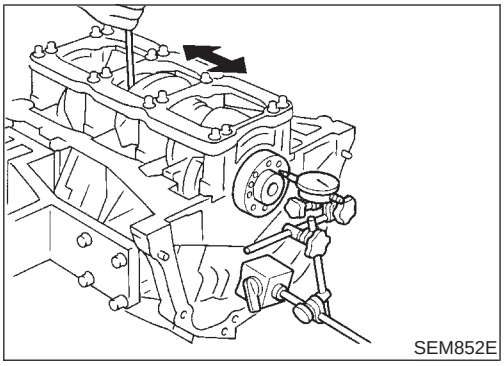
3. After installing crankshaft, main bearing cap, main bearing beam and bearing cap bolts, tighten bearing cap bolts in numerical order as shown.

- **Make sure that the front mark on the main bearing beam faces the front of the engine.**
- **Tightening procedure**

a) **Tighten all bolts to 32 to 38 N·m (3.3 to 3.9 kg-m, 24 to 28 ft-lb).**

b) **Turn all bolts 90 to 95 degrees clockwise with angle wrench.**

- **Prior to tightening bearing cap bolts, place bearing beam in its proper position by shifting crankshaft in the axial direction.**
- **After securing bearing cap bolts, make sure crankshaft turns smoothly by hand.**
- **Lubricate threads and seat surfaces of the bolts with new engine oil.**


SEM852E

4. Measure crankshaft end play.

Crankshaft end play:

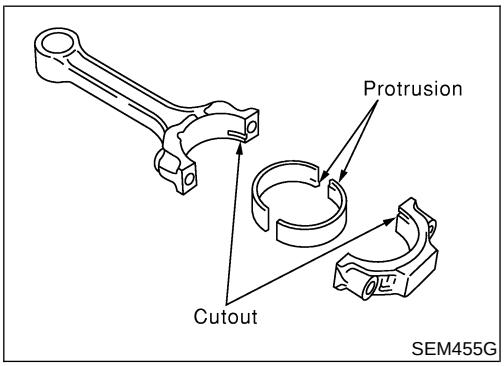
Standard

0.10 - 0.25 mm (0.0039 - 0.0098 in)

Limit

0.30 mm (0.0118 in)

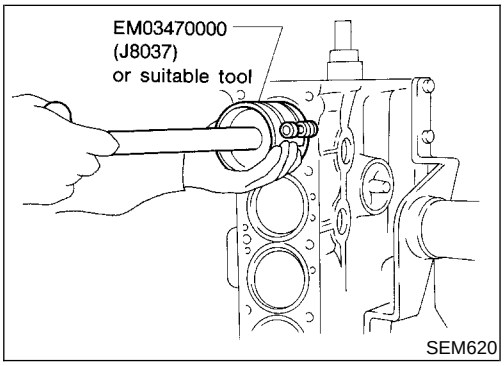
If beyond the limit, replace bearing with a new one.



SEM455G

5. Install connecting rod bearings in connecting rods and connecting rod caps.

- **Confirm that correct bearings are used.**

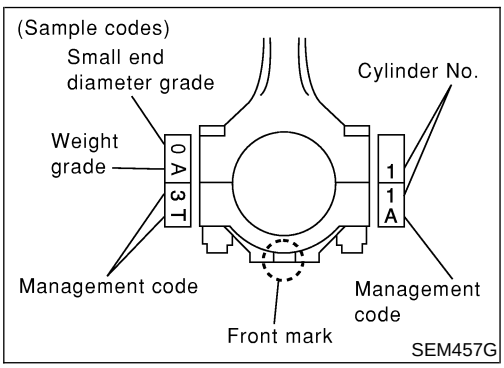


SEM620

6. Install pistons with connecting rods.

a. Install them into corresponding cylinders with Tool.

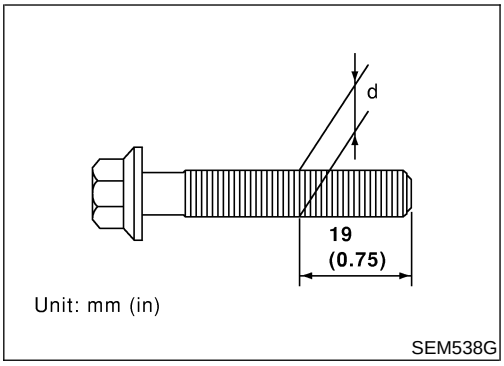
- **Be careful not to scratch cylinder wall with the connecting rod.**
- **Arrange so that front mark on piston head faces toward engine front.**



SEM457G

b. Install connecting rod caps.

- **Lubricate threads and seat surfaces with new engine oil.**
- Install so that the cylinder number stamped on the connecting rod agrees with that stamped on cap side.
- Make sure that front mark on the connecting rod cap faces the front of the engine.



c. Re-use connecting rod cap bolts as follows.

- Make sure that the bolts can be smoothly screwed-in to the end manually.
- If not, measure the outer diameter "d" shown in the figure.

Outer diameter "d" of connecting rod cap bolt:

Standard

7.90 - 8.00 mm (0.3110 - 0.3150 in)

Limit

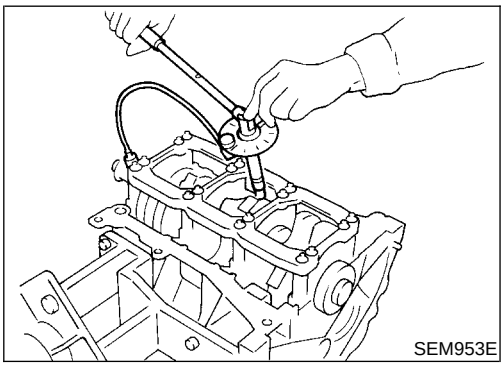
7.75 mm (0.3051 in)

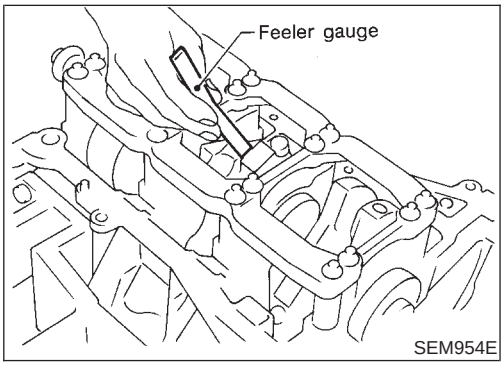
d. Tighten connecting rod cap bolts to the specified torque.

Connecting rod cap bolt:

(1) Tighten nuts to 19 to 21 N·m (1.9 to 2.1 kg-m, 14 to 15 ft-lb).

(2) Turn nuts 90 to 95 degrees clockwise with angle wrench.





7. Measure connecting rod side clearance.

Connecting rod side clearance:

Standard

0.20 - 0.35 mm (0.0079 - 0.0138 in)

Limit

0.40 mm (0.0157 in)

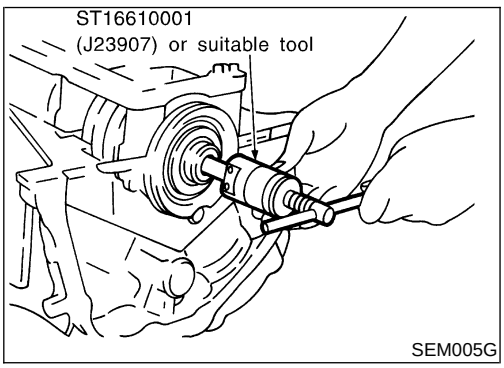
If beyond the limit, replace connecting rod and/or crankshaft.

8. Install rear oil seal retainer.

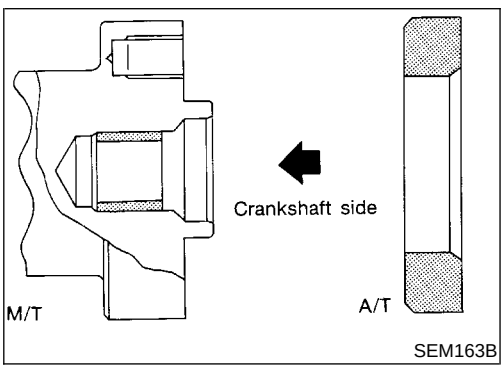
REPLACEMENT OF PILOT BUSHING (M/T) OR PILOT CONVERTER (A/T)

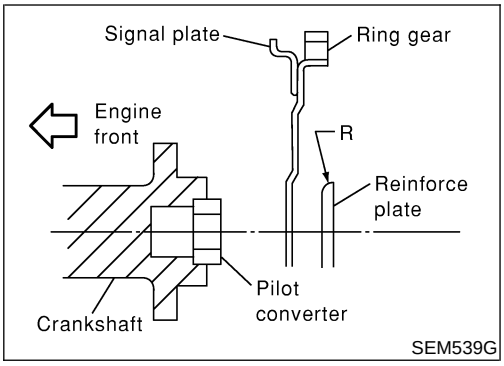
NFEM0055S04

1. Remove pilot converter using tool or suitable tool.



2. Install pilot bushing or pilot converter as shown.





DRIVE PLATE

NFEM0055S07

Install drive plate.

- Install the drive plate and reinforce plate in the direction shown in the figure.
- Secure the crankshaft using a ring gear stopper.
- Tighten the installation bolts crosswise over several times.

General Specifications

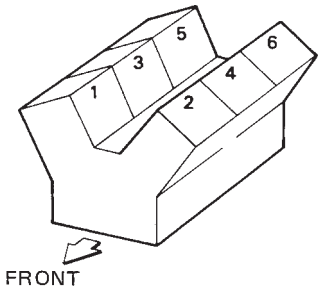
NFEM0056

Cylinder arrangement		V-6
Displacement cm^3 (cu in)		3,498 (213.45)
Bore and stroke mm (in)		95.5 x 81.4 (3.760 x 3.205)
Valve arrangement		DOHC
Firing order		1-2-3-4-5-6
Number of piston rings	Compression	2
	Oil	1
Number of main bearings		4
Compression ratio		10.3

Compression Pressure

NFEM0057

Unit: kPa (kg/cm^2, psi)/300 rpm

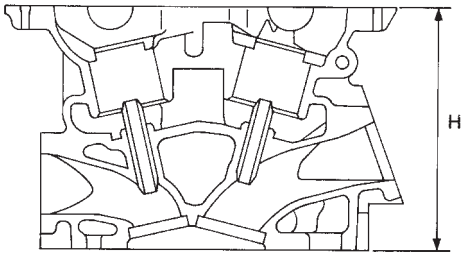
Compression pressure	Standard	1,275 (13.0, 185)
	Minimum	981 (10.0, 142)
	Differential limit between cylinders	98 (1.0, 14)
Cylinder number	 SEM713A	

Cylinder Head

NFEM0058

Unit: mm (in)

	Standard	Limit
Head surface distortion	Less than 0.03 (0.0012)	0.1 (0.004)



Nominal cylinder head height:
H = 126.3 - 126.5 mm (4.972 - 4.980 in)

SEM949E

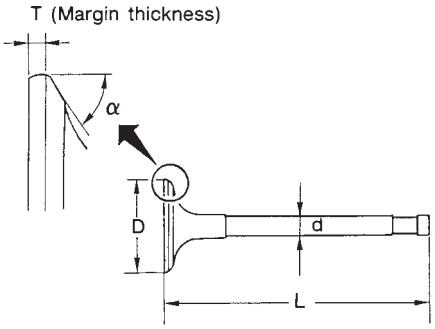
Valve

VALVE

NFEM0059

NFEM0059S01

Unit: mm (in)



SEM188

Valve head diameter “D”	Intake	37.0 - 37.3 (1.4567 - 1.4685)
	Exhaust	31.2 - 31.5 (1.228 - 1.240)
Valve length “L”	Intake	96.12 - 96.62 (3.7842 - 3.8039)
	Exhaust	93.65 - 94.15 (3.6870 - 3.7067)
Valve stem diameter “d”	Intake	5.965 - 5.980 (0.2348 - 0.2354)
	Exhaust	5.955 - 5.970 (0.2344 - 0.2350)
Valve seat angle “α”	Intake	45°15′ - 45°45′
	Exhaust	
Valve margin “T”	Intake	1.15 - 1.45 (0.0453 - 0.0571)
	Exhaust	1.45 - 1.75 (0.0571 - 0.0689)
Valve margin “T” limit		More than 0.5 (0.020)
Valve stem end surface grinding limit		Less than 0.2 (0.008)

VALVE CLEARANCE

NFEM0059S02

Unit: mm (in)

	Cold	Hot* (reference data)
Intake	0.26 - 0.34 (0.010 - 0.013)	0.304 - 0.416 (0.012 - 0.016)
Exhaust	0.29 - 0.37 (0.011 - 0.015)	0.308 - 0.432 (0.012 - 0.017)

*: Approximately 80°C (176°F)

VALVE SPRING

NFEM0059S04

Free height mm (in)		45.62 (1.7961)
Pressure N (kg, lb) at height mm (in)	Standard	196 (20.0, 44.1) at 37.0 (1.457)
	Limit	433 (44.2, 97.3) at 27.8 (1.094)
Out-of-square mm (in)		Less than 2.0 (0.079)

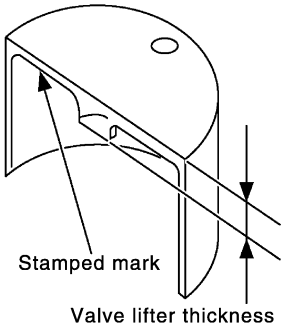
VALVE LIFTER

NFEM0059S05

Unit: mm (in)

Valve lifter outer diameter	33.977 - 33.987 (1.3377 - 1.3381)
Lifter guide inner diameter	34.000 - 34.016 (1.3386 - 1.3392)
Clearance between lifter and lifter guide	0.013 - 0.039 (0.0005 - 0.0015)

Identification mark	Thickness mm (in)
788C	7.88 (0.3102)
790C	7.90 (0.3110)
792C	7.92 (0.3118)
794C	7.94 (0.3126)
796C	7.96 (0.3134)
798C	7.98 (0.3142)
800C	8.00 (0.3150)
802C	8.02 (0.3157)
804C	8.04 (0.3165)
806C	8.06 (0.3173)
808C	8.08 (0.3181)
810C	8.10 (0.3189)
812C	8.12 (0.3197)
814C	8.14 (0.3205)
816C	8.16 (0.3213)
818C	8.18 (0.3220)
820C	8.20 (0.3228)
822C	8.22 (0.3236)
824C	8.24 (0.3244)
826C	8.26 (0.3252)
828C	8.28 (0.3260)
830C	8.30 (0.3268)
832C	8.32 (0.3276)
834C	8.34 (0.3283)
836C	8.36 (0.3291)

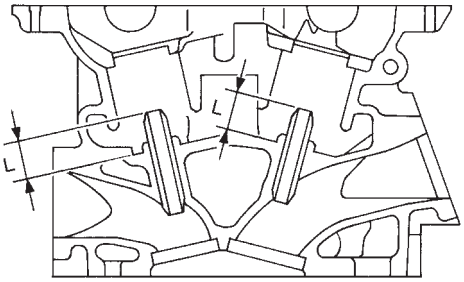


SEM758G

VALVE GUIDE

NFEM0059S06

Unit: mm (in)



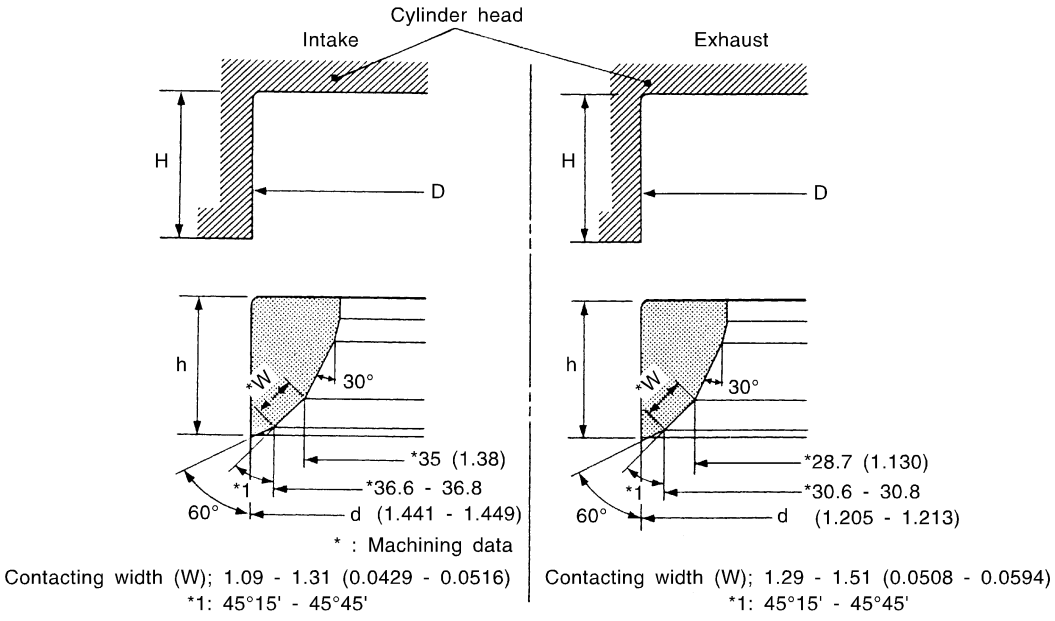
SEM950E

		Standard	Service
Valve guide	Outer diameter	10.023 - 10.034 (0.3946 - 0.3950)	10.223 - 10.234 (0.4025 - 0.4029)
Valve guide	Inner diameter (Finished size)	6.000 - 6.018 (0.2362 - 0.2369)	
Cylinder head valve guide hole diameter		9.975 - 9.996 (0.3927 - 0.3935)	10.175 - 10.196 (0.4006 - 0.4014)
Interference fit of valve guide		0.027 - 0.059 (0.0011 - 0.0023)	
		Standard	Max. tolerance
Stem to guide clearance	Intake	0.020 - 0.053 (0.0008 - 0.0021)	0.08 (0.0031)
	Exhaust	0.030 - 0.063 (0.0012 - 0.0025)	0.09 (0.0035)
Valve deflection limit	Intake	—	0.24 (0.0094)
	Exhaust	—	0.28 (0.0110)
Projection length "L"		12.6 - 12.8 (0.496 - 0.504)	

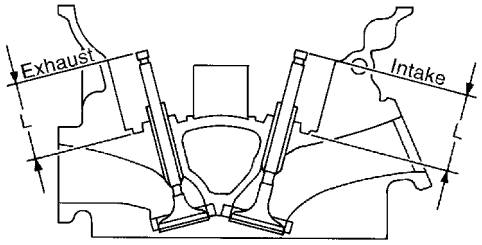
Valve Seat

NFEM0060

Unit: mm (in)



SEM021EC



SEM621F

		Standard	Service
Cylinder head seat recess diameter (D)	Intake	38.000 - 38.016 (1.4961 - 1.4967)	38.500 - 38.516 (1.5157 - 1.5164)
	Exhaust	32.200 - 32.216 (1.2677 - 1.2683)	32.700 - 32.716 (1.2874 - 1.2880)
Valve seat interference fit	Intake	0.081 - 0.113 (0.0032 - 0.0044)	
	Exhaust	0.064 - 0.096 (0.0025 - 0.0038)	
Valve seat outer diameter (d)	Intake	38.097 - 38.113 (1.4999 - 1.5005)	38.597 - 38.613 (1.5196 - 1.5202)
	Exhaust	32.280 - 32.296 (1.2709 - 1.2715)	32.780 - 32.796 (1.2905 - 1.2912)
Height (h)	Intake	5.9 - 6.0 (0.232 - 0.236)	5.05 - 5.15 (0.1988 - 0.2028)
	Exhaust	5.9 - 6.0 (0.232 - 0.236)	4.95 - 5.05 (0.1949 - 0.1988)
Depth (H)		5.9 - 6.1 (0.232 - 0.240)	
Depth (L)	Intake	41.07 - 41.67 (1.6169 - 1.6405)	
	Exhaust	41.00 - 41.60 (1.6142 - 1.6378)	

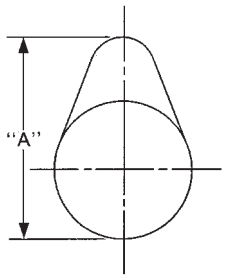
Camshaft and Camshaft Bearing

=NFEM0061

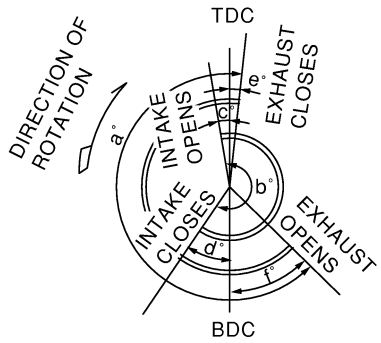
Unit: mm (in)

	Standard	Limit
Camshaft journal to bearing clearance	No. 1 0.045 - 0.086 (0.0018 - 0.0034) No. 2, 3, 4 0.035 - 0.076 (0.0014 - 0.0030)	0.15 (0.0059)
Inner diameter of camshaft bearing	No. 1 26.000 - 26.021 (1.0236 - 1.0244) No. 2, 3, 4 23.500 - 23.521 (0.9252 - 0.9260)	—
Outer diameter of camshaft journal	No. 1 25.935 - 25.955 (1.0211 - 1.0218) No. 2, 3, 4 23.445 - 23.465 (0.9230 - 0.9238)	—
Camshaft runout [TIR*]	Less than 0.02 (0.0008)	0.05 (0.0020)
Camshaft sprocket runout [TIR*]	Less than 0.15 (0.0059)	—
Camshaft end play	0.115 - 0.188 (0.0045 - 0.0074)	0.24 (0.0094)

*: Total indicator reading



EM671

Cam height "A"	Intake and exhaust	44.865 - 45.055 (1.7663 - 1.7738)
Wear limit of cam height		0.2 (0.008)
Valve timing		

PBIC0187E

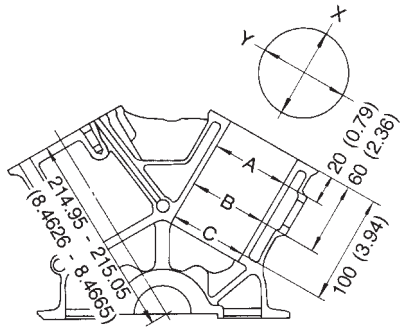
Unit: degree

		a	b	c	d	e	f
Intake valve timing control	OFF	240	238	−6	64	8	52

Cylinder Block

NFEM0062

Unit: mm (in)



SEM022EA

Surface flatness	Standard			Less than 0.03 (0.0012)
	Limit			0.10 (0.0039)
Cylinder bore	Inner diameter	Standard	Grade No. 1	95.500 - 95.510 (3.7598 - 3.7602)
			Grade No. 2	95.510 - 95.520 (3.7602 - 3.7606)
			Grade No. 3	95.520 - 95.530 (3.7606 - 3.7610)
		Wear limit		0.20 (0.0079)
Out-of-round (X − Y)				Less than 0.015 (0.0006)
Taper (A − B − C)				Less than 0.015 (0.0006)
Main journal inner diameter grade (Without bearing)	Grade No. A			63.993 - 63.994 (2.5194 - 2.5194)
	Grade No. B			63.994 - 63.995 (2.5194 - 2.5195)
	Grade No. C			63.995 - 63.996 (2.5195 - 2.5195)
	Grade No. D			63.996 - 63.997 (2.5195 - 2.5196)
	Grade No. E			63.997 - 63.998 (2.5196 - 2.5196)
	Grade No. F			63.998 - 63.999 (2.5196 - 2.5196)
	Grade No. G			63.999 - 64.000 (2.5196 - 2.5197)
	Grade No. H			64.000 - 64.001 (2.5197 - 2.5197)
	Grade No. J			64.001 - 64.002 (2.5197 - 2.5198)
	Grade No. K			64.002 - 64.003 (2.5198 - 2.5198)
	Grade No. L			64.003 - 64.004 (2.5198 - 2.5198)
	Grade No. M			64.004 - 64.005 (2.5198 - 2.5199)
	Grade No. N			64.005 - 64.006 (2.5199 - 2.5199)
	Grade No. P			64.006 - 64.007 (2.5199 - 2.5200)
	Grade No. R			64.007 - 64.008 (2.5200 - 2.5200)
	Grade No. S			64.008 - 64.009 (2.5200 - 2.5200)
	Grade No. T			64.009 - 64.010 (2.5200 - 2.5201)
	Grade No. U			64.010 - 64.011 (2.5201 - 2.5201)
	Grade No. V			64.011 - 64.012 (2.5201 - 2.5202)
	Grade No. W			64.012 - 64.013 (2.5202 - 2.5202)
	Grade No. X			64.013 - 64.014 (2.5202 - 2.5202)
	Grade No. Y			64.014 - 64.015 (2.5202 - 2.5203)
	Grade No. 4			64.015 - 64.016 (2.5203 - 2.5203)
	Grade No. 7			64.016 - 64.017 (2.5203 - 2.5203)
Difference in inner diameter between cylinders	Standard			Less than 0.03 (0.0012)

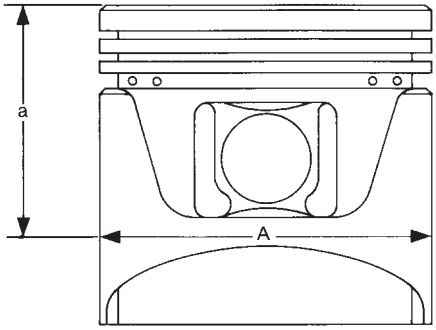
Piston, Piston Ring and Piston Pin

NFEM0063

AVAILABLE PISTON

NFEM0063S01

Unit: mm (in)



SEM882E

Piston skirt diameter “A”	Standard	Grade No. 1	95.480 - 95.490 (3.7590 - 3.7594)
		Grade No. 2	95.490 - 95.500 (3.7594 - 3.7598)
		Grade No. 3	95.500 - 95.510 (3.7598 - 3.7602)
		0.20 (0.0079) oversize (Service)	95.680 - 95.710 (3.7669 - 3.7681)
“a” dimension			41.0 (1.614)
Piston pin hole diameter		Grade No. 0	21.993 - 21.999 (0.8659 - 0.8661)
		Grade No. 1	21.999 - 22.005 (0.8661 - 0.8663)
Piston clearance to cylinder block			0.010 - 0.030 (0.0004 - 0.0012)

PISTON RING

=NFEM0063S02
Unit: mm (in)

		Standard	Limit
Side clearance	Top	0.045 - 0.080 (0.0018 - 0.0031)	0.11 (0.0043)
	2nd	0.030 - 0.070 (0.0012 - 0.0028)	0.1 (0.004)
	Oil ring	0.065 - 0.135 (0.0026 - 0.0053)	—
End gap	Top	0.23 - 0.33 (0.0091 - 0.0130)	0.54 (0.0213)
	2nd	0.33 - 0.48 (0.0130 - 0.0189)	0.80 (0.0315)
	Oil (rail ring)	0.20 - 0.50 (0.0079 - 0.0197)	0.95 (0.0374)

PISTON PIN

NFEM0063S03
Unit: mm (in)

Piston pin outer diameter	Grade No. 0	21.989 - 21.995 (0.8657 - 0.8659)
	Grade No. 1	21.995 - 22.001 (0.8659 - 0.8662)
Interference fit of piston pin to piston		0.002 - 0.006 (0.0001 - 0.0002)
Piston pin to connecting rod bushing clearance	Standard	0.005 - 0.017 (0.0002 - 0.0007)
	Limit	0.030 (0.0012)

*: Values measured at ambient temperature of 20°C (68°F)

Connecting Rod

NFEM0064
Unit: mm (in)

Center distance		144.15 - 144.25 (5.6752 - 5.6791)
Bend [per 100 (3.94)]	Limit	0.15 (0.0059)
Torsion [per 100 (3.94)]	Limit	0.30 (0.0118)
Connecting rod small end inner diameter		23.980 - 24.000 (0.9441 - 0.9449)
Piston pin bushing inner diameter*	Grade No. 0	22.000 - 22.006 (0.8661 - 0.8664)
	Grade No. 1	22.006 - 22.012 (0.8664 - 0.8666)
Connecting rod big end inner diameter		55.000 - 55.013 (2.1654 - 2.1659)
Side clearance	Standard	0.20 - 0.35 (0.0079 - 0.0138)
	Limit	0.40 (0.0157)

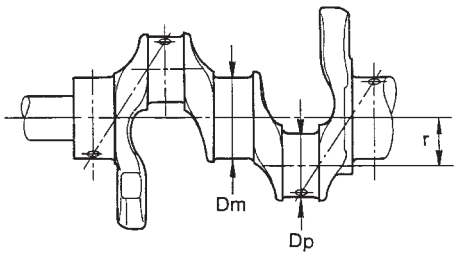
*: After installing in connecting rod

Crankshaft

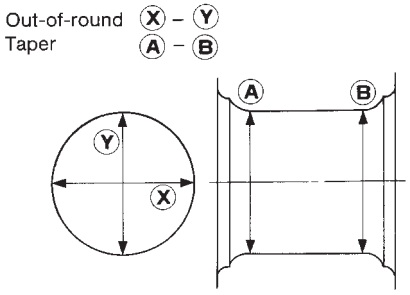
NFEM0065

Unit: mm (in)

Main journal dia. “Dm” grade	Grade No. A	59.975 - 59.974 (2.3612 - 2.3612)
	Grade No. B	59.974 - 59.973 (2.3612 - 2.3611)
	Grade No. C	59.973 - 59.972 (2.3611 - 2.3611)
	Grade No. D	59.972 - 59.971 (2.3611 - 2.3611)
	Grade No. E	59.971 - 59.970 (2.3611 - 2.3610)
	Grade No. F	59.970 - 59.969 (2.3610 - 2.3610)
	Grade No. G	59.969 - 59.968 (2.3610 - 2.3609)
	Grade No. H	59.968 - 59.967 (2.3609 - 2.3609)
	Grade No. J	59.967 - 59.966 (2.3609 - 2.3609)
	Grade No. K	59.966 - 59.965 (2.3609 - 2.3608)
	Grade No. L	59.965 - 59.964 (2.3608 - 2.3608)
	Grade No. M	59.964 - 59.963 (2.3608 - 2.3607)
	Grade No. N	59.963 - 59.962 (2.3607 - 2.3607)
	Grade No. P	59.962 - 59.961 (2.3607 - 2.3607)
	Grade No. R	59.961 - 59.960 (2.3607 - 2.3606)
	Grade No. S	59.960 - 59.959 (2.3606 - 2.3606)
	Grade No. T	59.959 - 59.958 (2.3606 - 2.3605)
	Grade No. U	59.958 - 59.957 (2.3605 - 2.3605)
	Grade No. V	59.957 - 59.956 (2.3605 - 2.3605)
	Grade No. W	59.956 - 59.955 (2.3605 - 2.3604)
	Grade No. X	59.955 - 59.954 (2.3604 - 2.3604)
	Grade No. Y	59.954 - 59.953 (2.3604 - 2.3603)
	Grade No. 4	59.953 - 59.952 (2.3603 - 2.3603)
	Grade No. 7	59.952 - 59.951 (2.3603 - 2.3603)
Pin journal dia. “Dp”	Grade No. 0	51.968 - 51.974 (2.0460 - 2.0462)
	Grade No. 1	51.962 - 51.968 (2.0457 - 2.0460)
	Grade No. 2	51.956 - 51.962 (2.0445 - 2.0457)
Center distance “r”		40.36 - 40.44 (1.5890 - 1.5921)
Out-of-round (X − Y)	Standard	Less than 0.002 (0.0001)
Taper (A − B)	Standard	Less than 0.002 (0.0001)
Runout [TIR*]	Limit	Less than 0.10 (0.0039)
Free end play	Standard	0.10 - 0.25 (0.0039 - 0.0098)
	Limit	0.30 (0.0118)



SEM645

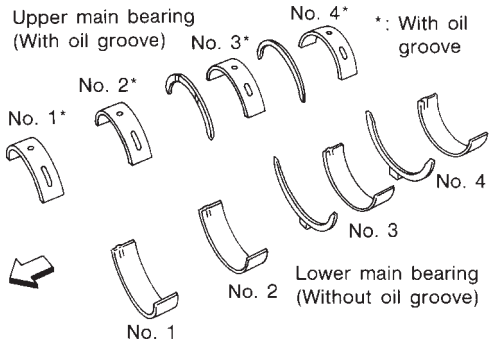


EM715

*: Total indicator reading

Available Main Bearing

NFEM0066



SEM175F

Grade number		Thickness "T" mm (in)	Width "W" mm (in)	Identification color (UPR/LWR)	Remarks
0		2.000 - 2.003 (0.0787 - 0.0789)	19.9 - 20.1 (0.783 - 0.791)	Black	Grade is the same for upper and lower bearings.
1		2.003 - 2.006 (0.0789 - 0.0790)		Brown	
2		2.006 - 2.009 (0.0790 - 0.0791)		Green	
3		2.009 - 2.012 (0.0791 - 0.0792)		Yellow	
4		2.012 - 2.015 (0.0792 - 0.0793)		Blue	
5		2.015 - 2.018 (0.0793 - 0.0794)		Pink	
6		2.018 - 2.021 (0.0794 - 0.0796)		Purple	
7		2.021 - 2.024 (0.0796 - 0.0797)		White	
01	UPP	2.003 - 2.006 (0.0789 - 0.0790)		Brown/Black	Grade is different for upper and lower bearings.
	LWR	2.000 - 2.003 (0.0787 - 0.0789)			
12	UPR	2.006 - 2.009 (0.0790 - 0.0791)		Green/Brown	
	LWR	2.003 - 2.006 (0.0789 - 0.0790)			
23	UPR	2.009 - 2.012 (0.0791 - 0.0792)		Yellow/Green	
	LWR	2.006 - 2.009 (0.0790 - 0.0791)			
34	UPR	2.012 - 2.015 (0.0792 - 0.0793)		Blue/Yellow	
	LWR	2.009 - 2.012 (0.0791 - 0.0792)			
45	UPR	2.015 - 2.018 (0.0793 - 0.0794)		Pink/Blue	
	LWR	2.012 - 2.015 (0.0792 - 0.0793)			
56	UPR	2.018 - 2.021 (0.0794 - 0.0796)		Purple/Pink	
	LWR	2.015 - 2.018 (0.0793 - 0.0794)			
67	UPR	2.021 - 2.024 (0.0796 - 0.0797)		White/Purple	
	LWR	2.018 - 2.021 (0.0794 - 0.0796)			

UNDERSIZE

NFEM0066S01

Unit: mm (in)

	Thickness	Main journal diameter "Dm"
0.25 (0.0098)	2.132 - 2.140 (0.0839 - 0.0843)	Grind so that bearing clearance is the specified value.

Available Connecting Rod Bearing

NFEM0067

CONNECTING ROD BEARING

NFEM0067S01

Grade number	Thickness "T" mm (in)	Identification color (mark)
0	1.500 - 1.503 (0.0591 - 0.0592)	Black
1	1.503 - 1.506 (0.0592 - 0.0593)	Brown
2	1.506 - 1.509 (0.0593 - 0.0594)	Green

UNDERSIZE

NFEM0067S02

Unit: mm (in)

	Thickness	Crank pin journal diameter "Dp"
0.25 (0.0098)	1.626 - 1.634 (0.0640 - 0.0643)	Grind so that bearing clearance is the specified value.

Miscellaneous Components

NFEM0068

Unit: mm (in)

Flywheel deflection [TIR]*	Standard	Less than 0.45 (0.0177)
	Limit	1.3 (0.051)
Drive plate runout [TIR]*		Less than 0.15 (0.0059)
Flywheel movement in radial (rotation) direction		Less than 24 (0.94)

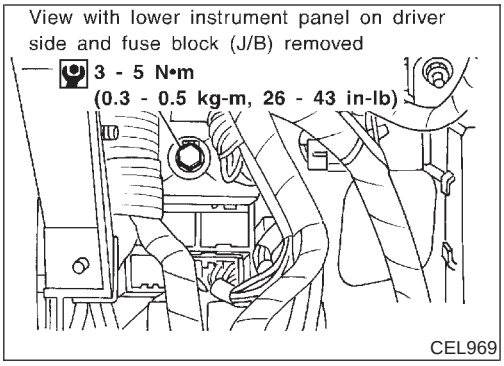
*: Total indicator reading

BEARING CLEARANCE

NFEM0068S01

Unit: mm (in)

Main bearing clearance	Standard	0.035 - 0.045 (0.0014 - 0.0018)
	Limit	0.065 (0.0026)
Connecting rod bearing clearance	Standard	0.034 - 0.059 (0.0013 - 0.0023)
	Limit	0.070 (0.0028)



Installation

NFEL0146

To install SMJ, tighten bolts until orange “fulltight” mark appears and then retighten to specified torque as required.

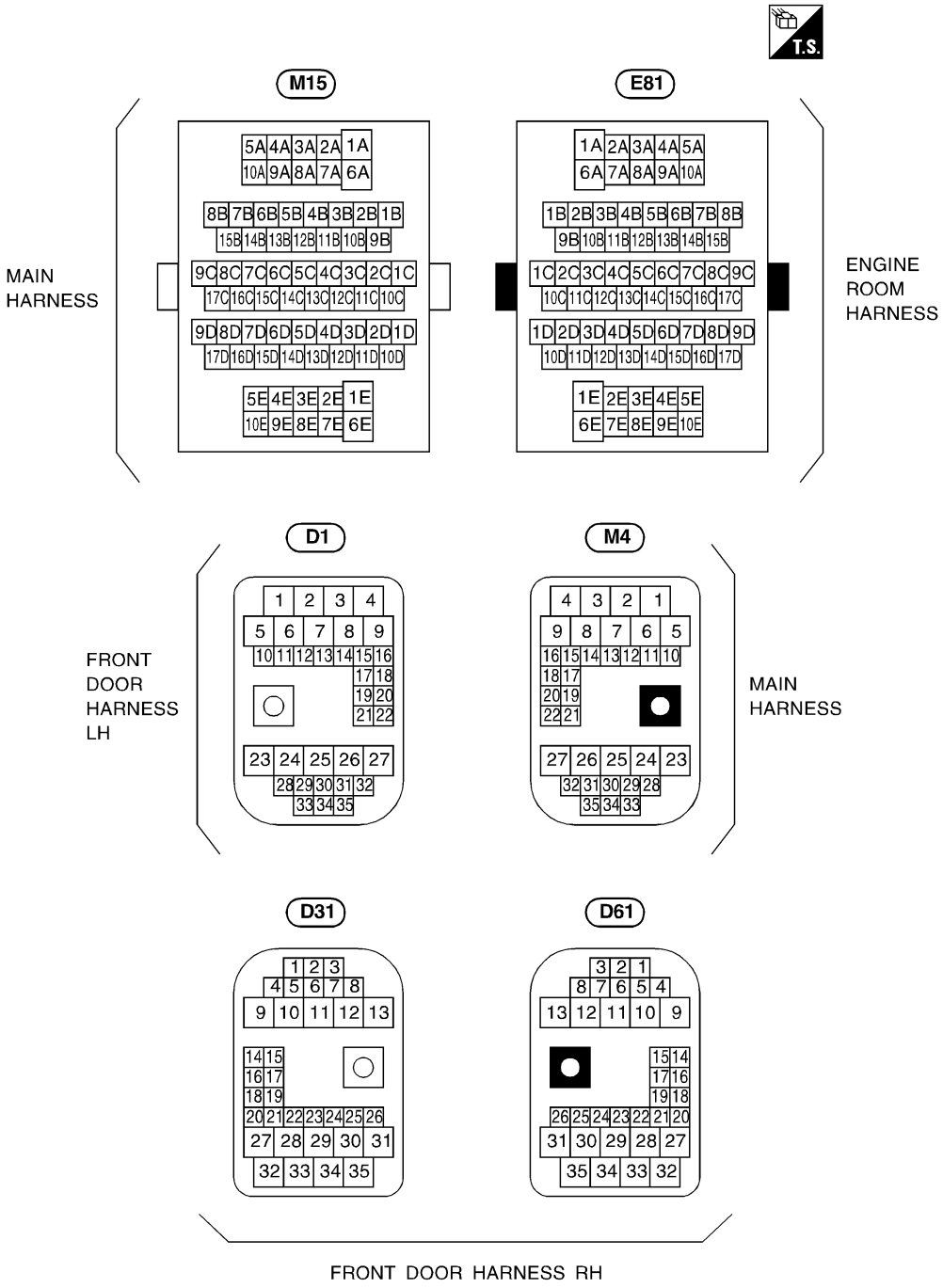
: 3 - 5 N·m (0.3 - 0.5 kg-m, 26 - 43 in-lb)

CAUTION:

Do not overtighten bolts, otherwise, they may be damaged.

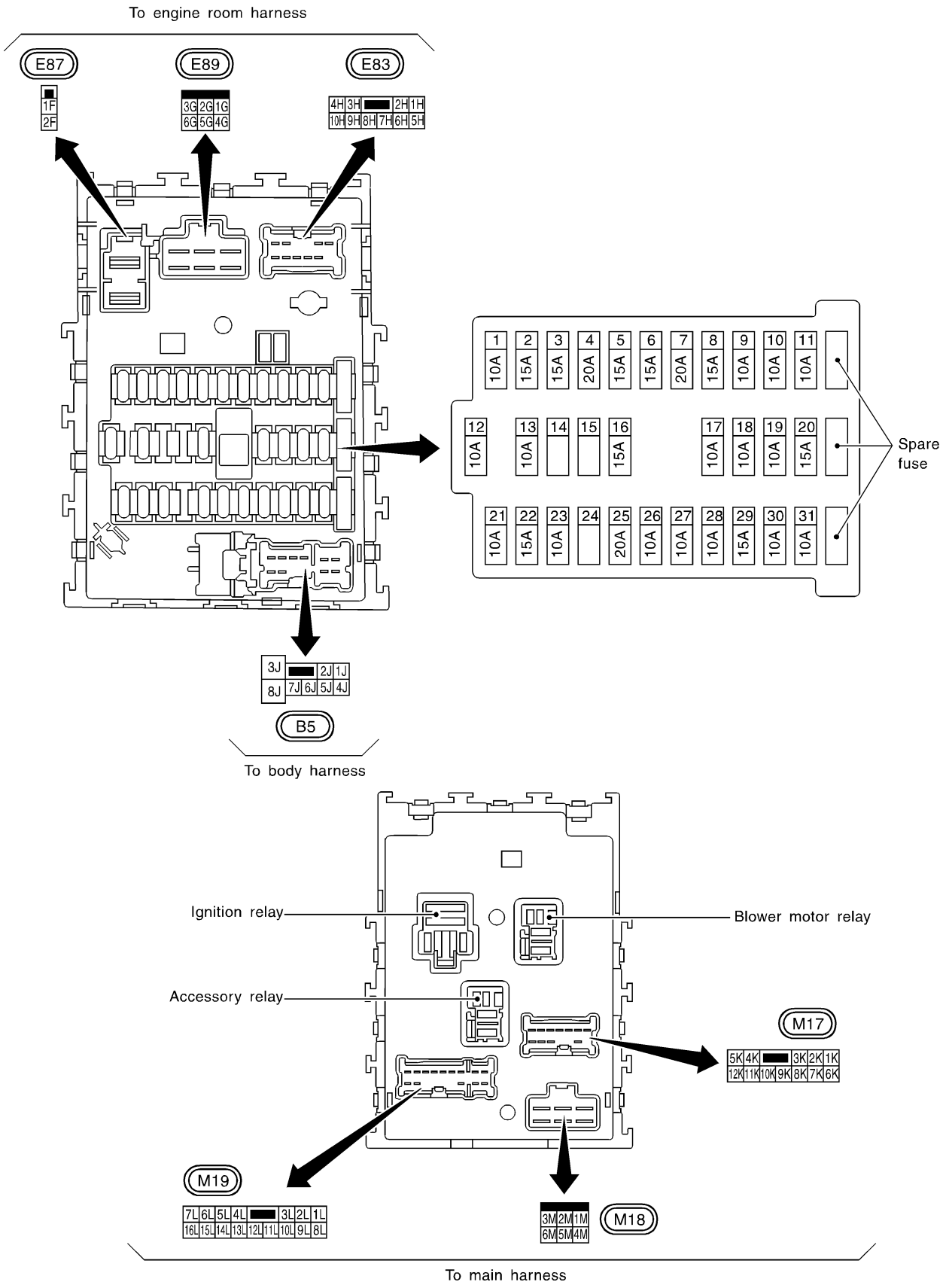
Terminal Arrangement

NFEL0147



Terminal Arrangement

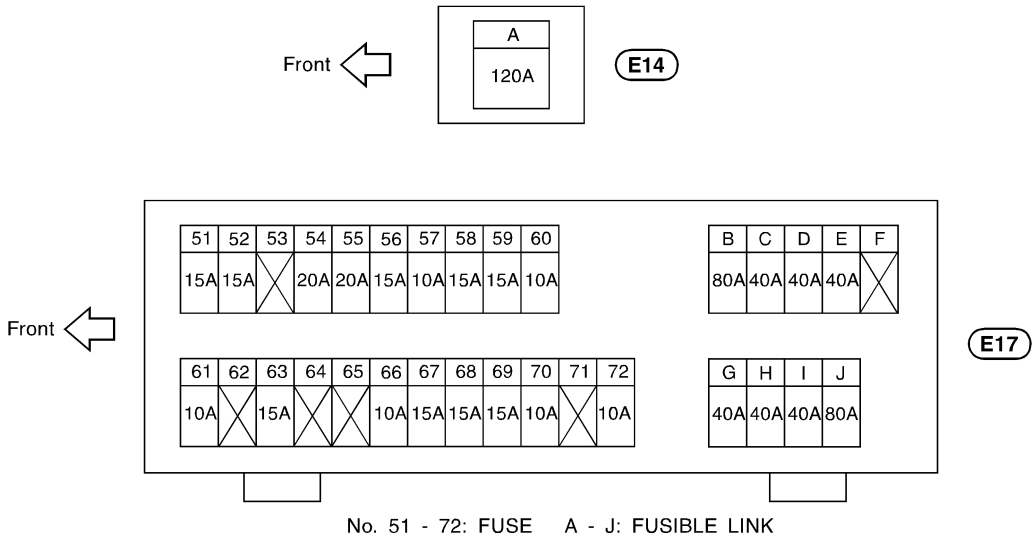
NFEL0148



MEL356L

Terminal Arrangement

NFEL0149



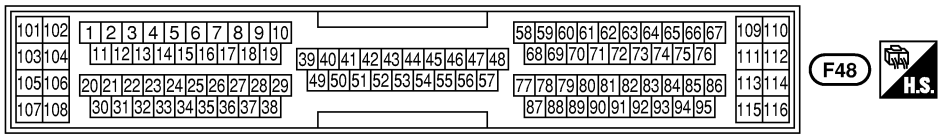
No. 51 - 72: FUSE A - J: FUSIBLE LINK

MEL075O

Terminal Arrangement

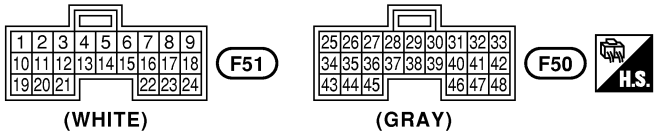
NFEL0150

ECM



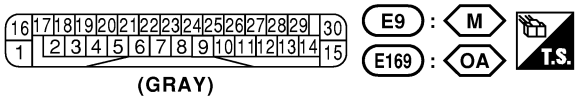
(GRAY)

TCM (TRANSMISSION CONTROL MODULE)



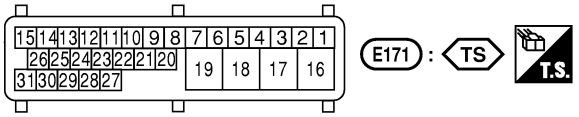
(WHITE) (GRAY)

ABS ACTUATOR AND ELECTRIC UNIT



(GRAY)

ABS/TCS CONTROL UNIT



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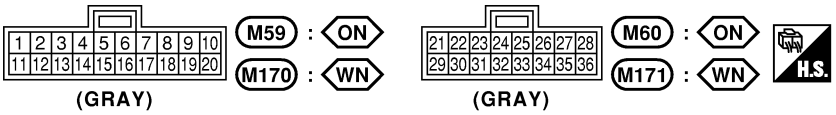
A/C AUTO AMP.



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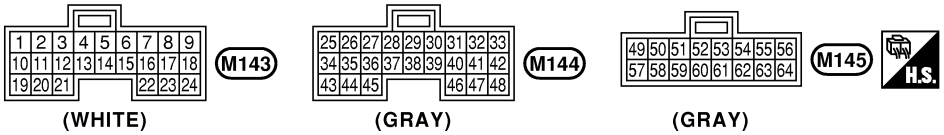
SMART ENTRANCE CONTROL UNIT



(WHITE) (GRAY) (GRAY)

TS : With TCS

M : With M/T

OA : Without TCS for A/T models

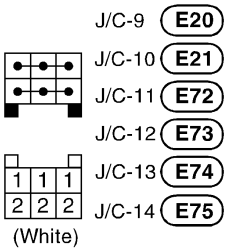
WN : With navigation system

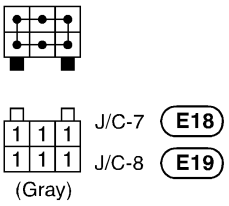
ON : Without navigation system

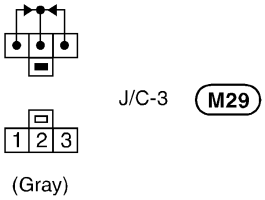
MEL737P

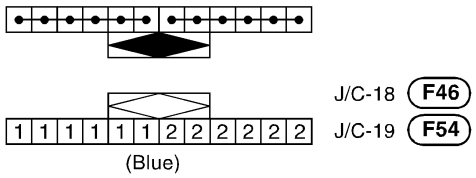
Terminal Arrangement

NFEL0160









QUICK REFERENCE CHART: MAXIMA 2002

ENGINE TUNE-UP DATA

Engine model			VQ35DE		
Firing order			1-2-3-4-5-6		
Idle speed rpm	M/T		625±50		
	A/T (in "N" position)		675±50		
Ignition timing (degree BTDC at idle speed)			M/T: 15°±5° A/T:		
CO% at idle			Idle mixture screw is preset and sealed at factory.		
Belt deflection (Cold) mm (in)			Used belt		New belt
	Alternator and air conditioner compressor		Limit	After adjustment	
			7 (0.28)	4.2 - 4.6 (0.165 - 0.181)	3.7 - 4.1 (0.146 - 0.161)
	Power steering oil pump		11 (0.43)	7.3 - 8 (0.287 - 0.315)	6.5 - 7.2 (0.256 - 0.283)
	Applied pressed force N (kg, lb)		98 (10, 22)		
Belt tension adjustment (Cold) N (kg, lb)			Used belt		New belt
	Alternator and air conditioner compressor		Limit	After adjustment	
			294 (30, 66)	730 - 819 (74.5 - 83.5, 164 - 184)	838 - 926 (85.45 - 94.43, 188.4 - 208.2)
	Power steering oil pump		196 (20, 44)	495 - 583 (50.5 - 59.5, 111 - 131)	603 - 691 (61.5 - 70.5, 136 - 155)
	Applied pushing force		—		
Radiator cap relief pressure kPa (kg/cm^2, psi)			78 - 98 (0.8 - 1.0, 11 - 14)		
Cooling system leakage testing pressure kPa (kg/cm^2, psi)			157 (1.6, 23)		
Compression pressure kPa (kg/cm^2, psi)/rpm		Standard	1,275 (13.0, 185)/300		
		Minimum	981 (10.0, 142)/300		
Spark plug	Type	Standard	PLFR5A-11		
		Hot	PLFR4A-11		
		Cold	PLFR6A-11		
	Gap (Nominal) mm (in)		1.1 (0.043)		

FRONT WHEEL ALIGNMENT (Unladen*)

Tire size		P225/50R17	P215/55R17	P215/55R16
Camber	Minimum	−1°00′ (−1.00°)		
	Nominal	−0°15′ (−0.25°)		
	Maximum	0°30′ (0.50°)		
Degree minute (Decimal degree)	Left and right difference	45′ (0.75°) or less		
Caster	Minimum	2°00′ (2.00°)		
	Nominal	2°45′ (2.75°)		
	Maximum	3°30′ (3.50°)		
Degree minute (Decimal degree)	Left and right difference	45′ (0.75°) or less		
Kingpin inclination	Minimum	13°30′ (13.50°)		
Degree minute	Nominal	14°15′ (14.25°)		
(Decimal degree)	Maximum	15°00′ (15.00°)		
Total toe-in	Minimum	0 (0)		
Distance (A − B) mm (in)	Nominal	1 (0.04)		
	Maximum	2 (0.08)		
Angle (left plus right)	Minimum	18′ (0.30°)		
	Nominal	24′ (0.40°)		
Degree minute (Decimal degree)	Maximum	30′ (0.50°)		
Wheel turning angle (Full turn)	Minimum	29°30′ (29.50°)		36°00′ (36.00°)
Inside	Nominal	33°00′ (33.00°)		39°30′ (39.50°)
Degree minute (Decimal degree)	Maximum	34°00′ (34.00°)		40°30′ (40.50°)
Outside				
Degree minute (Decimal degree)	Nominal	28°30′ (28.50°)		32°00′ (32.00°)

* Fuel, radiator coolant and engine oil full.
Spare tire, jack, hand tools and mats in designated positions.

REAR WHEEL ALIGNMENT (Unladen*)

Camber		Minimum	−1°45′ (−1.75°)
	Degree minute (Decimal degree)	Nominal	−1°00′ (−1.00°)
		Maximum	−0°15′ (−0.25°)
Total toe-in		Minimum	−3 (−0.12)
Distance (A − B)	mm (in)	Nominal	1 (0.04)
		Maximum	5 (0.20)
Angle (left plus right)		Minimum	0′ (0°)
	Degree minute (Decimal degree)	Nominal	24′ (0.40°)
		Maximum	48′ (0.80°)

* Fuel, radiator coolant and engine oil full.
Spare tire, jack, hand tools and mats in designated positions.

CLUTCH PEDAL

Unit: mm (in)

Pedal height	179.5 - 189.5 (7.07 - 7.46)
Pedal free play	9 - 16 (0.35 - 0.63)

BRAKE

Unit: mm (in)

Front brake	
Pad wear limit	2.0 (0.079)
Rotor repair limit	22.0 (0.866)
Rear brake	
Pad wear limit	1.5 (0.059)
Rotor repair limit	8.0 (0.315)
Pedal free height	M/T: 158 - 165 (6.22 - 6.50) A/T: 167 - 174 (6.57 - 6.85)
Pedal depressed height*1	M/T: 75.3 (2.965) A/T: 82.5 (3.248)
Parking brake	
Number of notches*2	Center lever type: 10 - 11 Foot lever type: 4 - 5

*1 Under force of 490 N (50 kg, 110 lb) with engine running
*2 At pulling force: 196 N (20 kg, 44 lb)

REFILL CAPACITIES

Unit			Liter	US measure
Coolant with reservoir			7.7	8-1/8 qt
Engine*	Drain and refill			
	With oil filter		4.0	4-1/4 qt
	Without oil filter		3.7	3-7/8 qt
	Dry engine (engine overhaul)		5.0	5-1/4 qt
Transaxle	M/T	RS5F50V	4.3 - 4.5	9-1/8 - 9-1/2 pt
		RS5F50A	4.5 - 4.8	9-1/2 - 10-1/8 pt
	A/T	RE4F04B	8.5	9 qt
Power steering system			1.1	1-1/8 qt
Air conditioning system		Refrigerant	0.5 kg	1.1 lb
		Compressor oil	0.2	6.8 fl oz

* For further details, see "Changing Engine Oil" in MA section.

NOTES

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Revision: January 2002
Publication No. SM2E-1A33U2

NISSAN MAXIMA

MODEL A33 SERIES

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FOREWORD

This manual contains maintenance and repair procedures for the 2002 Nissan MAXIMA.

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 MOTOR CO., LTD.
Overseas Service Department
Tokyo, Japan

PLEASE HELP MAKE THIS SERVICE MANUAL BETTER!

Your comments are important to NISSAN and will help us to improve our Service Manuals.
Use this form to report any issues or comments you may have regarding our Service Manuals.
Please print this form and type or write your comments below. Mail or fax to:

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Technical Service Information
39001 Sunrise Drive, P.O. Box 9200
Farmington Hills, MI USA 48331
FAX: (248) 488-3910

SERVICE MANUAL: Model: _____ **Year:** _____

PUBLICATION NO. (Please photocopy back cover): _____

VEHICLE INFORMATION VIN: _____ **Production Date:** _____

Please describe any issues or problems in detail:

Page number(s) _____ *Note: Please include a copy of each page, marked with your comments.*

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Are the trouble diagnosis procedures logical and easy to use? (circle your answer) YES NO

If no, what page number(s)?_____*Note: Please include a copy of each page, marked with your comments.*

Please describe the issue or problem in detail: _____

_____

_____

_____

Is the organization of the manual clear and easy to follow? (circle your answer) YES NO

Please comment: _____

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What information should be included in NISSAN Service Manuals to better support you in servicing or repairing customer vehicles?

_____

_____

_____

_____

DATE: _____ YOUR NAME: _____ POSITION: _____

DEALER: _____ DEALER NO.: _____ ADDRESS: _____

CITY:_____ STATE/PROV./COUNTRY: _____ ZIP/POSTAL CODE: _____

NOTES

FRONT & REAR AXLE

SECTION AX

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  - REAR AXLE PARTS 17
  - REAR WHEEL BEARING 17
- Wheel Hub 18
  - COMPONENTS 18
  - REMOVAL 18
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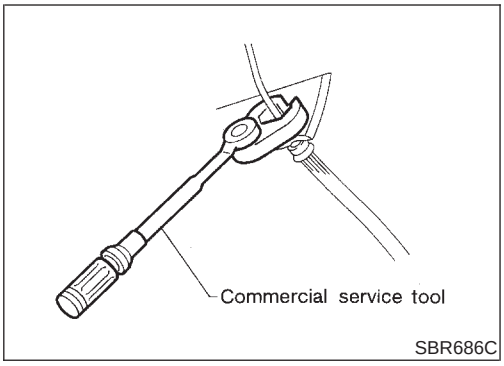
- Service Data and Specifications (SDS) 21
  - WHEEL BEARING (REAR) 21



SBR686C

Precautions

PRECAUTIONS

NFAX0001

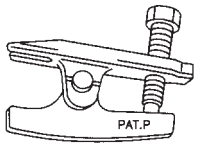
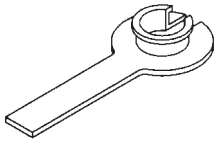
- **When installing rubber parts, final tightening must be carried out under unladen condition* with tires on ground.**
  ***: Fuel, radiator coolant and engine oil full. Spare tire, jack, hand tools and mats in designated positions.**
- **After installing removed suspension parts, check wheel alignment and adjust if necessary.**
- **Use flare nut wrench when removing or installing brake tubes.**
- **Always torque brake lines when installing.**

Preparation

SPECIAL SERVICE TOOLS

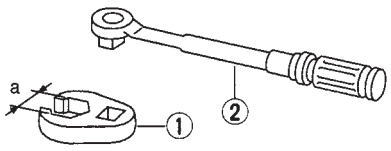
NFAX0002

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description	
HT72520000 (J25730-B) Ball joint remover	 NT146	Removing tie-rod outer end and lower ball joint
KV38106700 (J34296) KV38106800 (J34297) Differential side oil seal protector	 NT147	Installing drive shaft LH: KV38106700 (J34296) RH: KV38106800 (J34297)

COMMERCIAL SERVICE TOOLS

NFAX0003

Tool name	Description	
1 Flare nut crowfoot 2 Torque wrench	 NT360	Removing and installing each brake piping **a: 10 mm (0.39 in)**

Noise, Vibration and Harshness (NVH) Troubleshooting

=NFAX0004

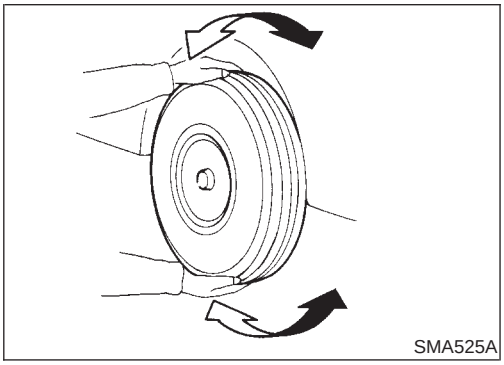
NVH TROUBLESHOOTING CHART

NFAX0004S01

Use the chart below to help you find the cause of the symptom. If necessary, repair or replace these parts.

Reference page			—	AX-13	—	AX-5, 18	—	AX-4, 17	Refer to DRIVE SHAFT in this chart.	Refer to AXLE in this chart.	SU-4	SU-4	SU-4	BR-7	ST-5
Possible cause and SUSPECTED PARTS			Excessive joint angle	Joint sliding resistance	Imbalance	Improper installation, looseness	Parts interference	Wheel bearing damage	DRIVE SHAFT	AXLE	SUSPENSION	TIRES	ROAD WHEEL	BRAKES	STEERING
Symptom	DRIVE SHAFT	Noise, Vibration	×	×						×	×	×	×	×	×
		Shake	×		×					×	×	×	×	×	×
	AXLE	Noise				×	×		×		×	×	×	×	×
		Shake				×	×		×		×	×	×	×	×
		Vibration				×	×		×		×	×			×
		Shimmy				×	×				×	×	×	×	×
		Judder				×					×	×	×	×	×
		Poor quality ride or handling				×	×	×			×	×	×		

×: Applicable


SMA525A

On-vehicle Service

FRONT AXLE PARTS

NFAX0005

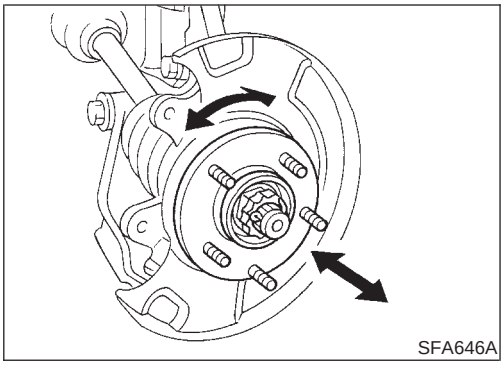
Check front axle and front suspension parts for excessive play, cracks, wear or other damage.

- Shake each front wheel to check for excessive play.
- Make sure that cotter pin is inserted.
- Retighten all axle and suspension nuts and bolts to the specified torque.

Tightening torque:

Refer to SU-9, “FRONT SUSPENSION”.

On-vehicle Service (Cont'd)


SFA646A

FRONT WHEEL BEARING

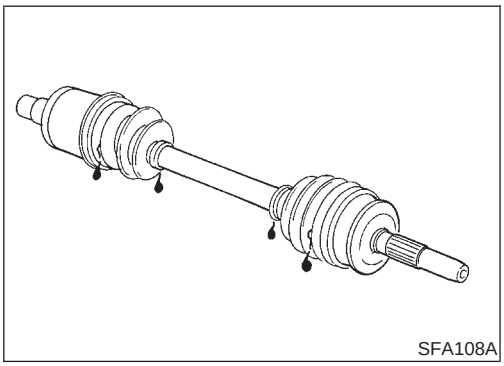
NFAX0006

- Check that wheel bearings operate smoothly.
- Check axial end play.

Axial end play:

Less than 0.05 mm (0.0020 in)

If out of specification or wheel bearing does not turn smoothly, replace wheel bearing assembly.
Refer to "Wheel Hub and Knuckle", "FRONT AXLE", AX-5.


SFA108A

DRIVE SHAFT

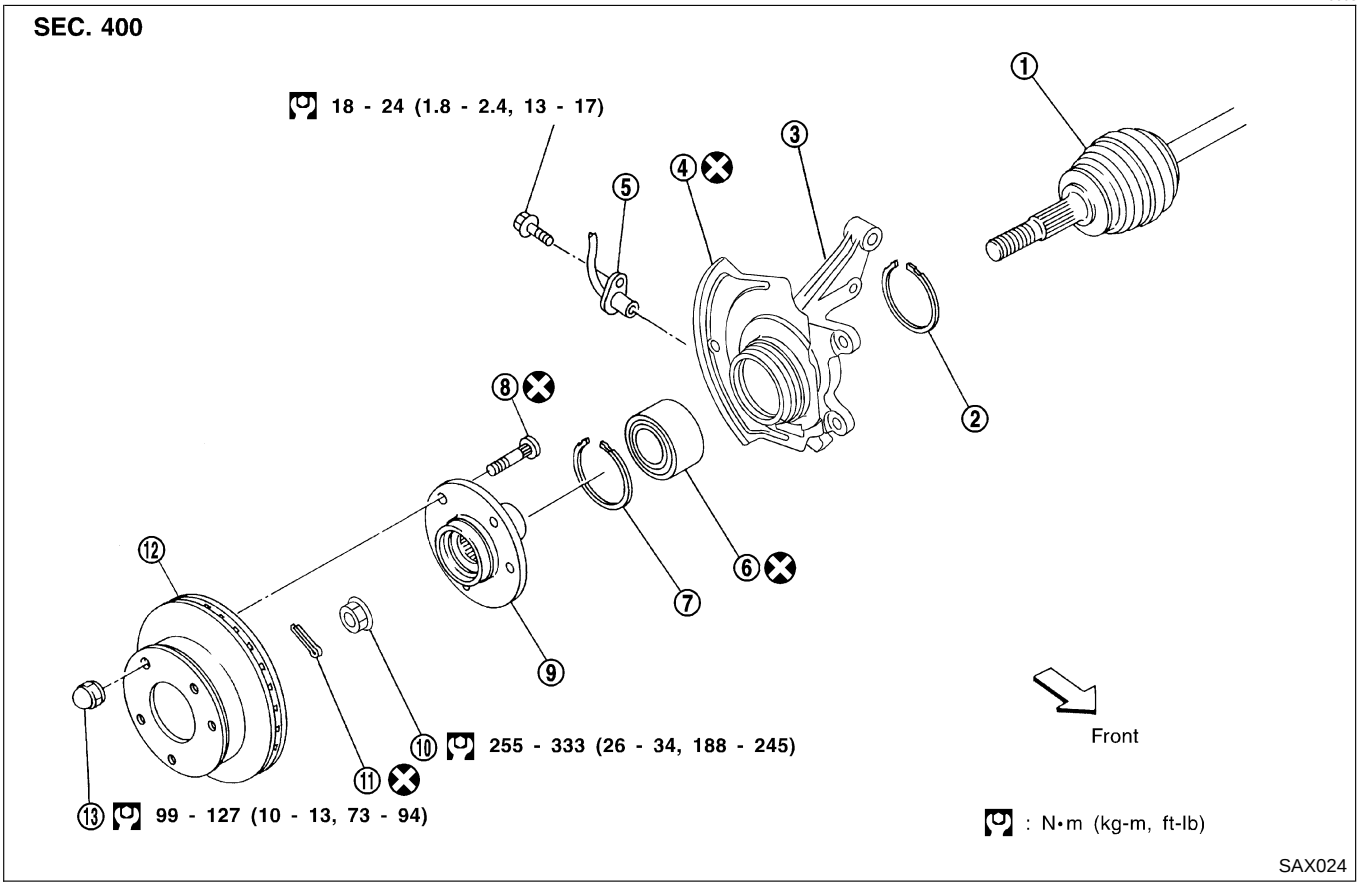
NFAX0007

Check for grease leakage or other damage.

Wheel Hub and Knuckle

COMPONENTS

=NFAX0008



1. Drive shaft
2. Snap ring
3. Knuckle
4. Baffle plate
5. ABS sensor
6. Wheel bearing assembly
7. Snap ring
8. Hub bolt
9. Wheel hub
10. Wheel bearing lock nut
11. Cotter pin
12. Brake disc
13. Wheel nut

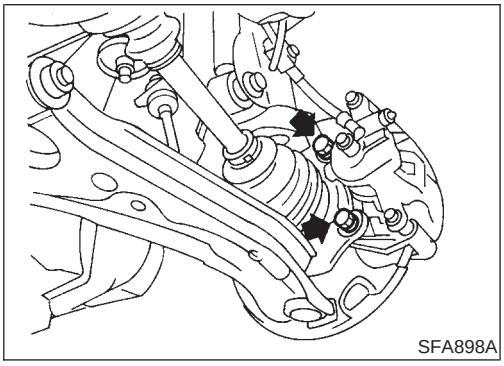
REMOVAL

NFAX0009

CAUTION:

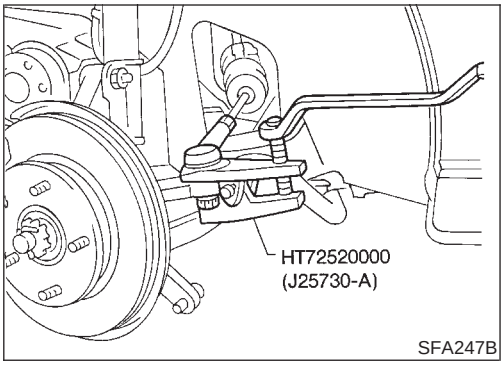
Before removing the front axle assembly, disconnect the ABS wheel sensor from the assembly. Then move it away from the front axle assembly area.
Failure to do so may result in damage to the sensor wires and the sensor becoming inoperative.

1. Remove wheel bearing lock nut.



2. Remove brake caliper assembly and rotor.

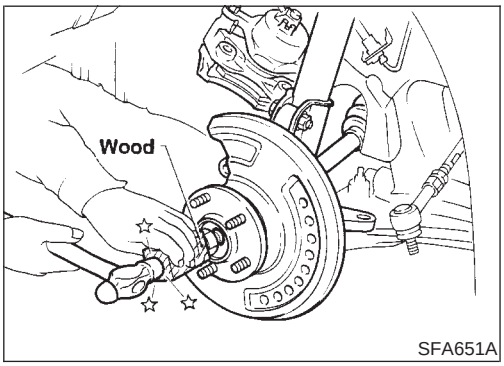
Brake hose need not be disconnected from brake caliper. In this case, suspend caliper assembly with wire so as not to stretch brake hose. Be careful not to depress brake pedal, or piston will pop out.
Make sure brake hose is not twisted.



SFA247B

3. Separate tie-rod from knuckle with Tool.

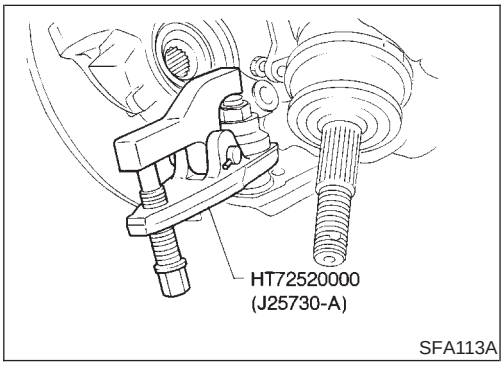
Install stud nut on stud bolt to prevent damage to stud bolt.



SFA651A

4. Separate drive shaft from knuckle by lightly tapping it. If it is hard to remove, use a puller.

- **Cover boots with shop towel so as not to damage them when removing drive shaft.**



SFA113A

5. Loosen lower ball joint tightening nut.
6. Separate knuckle from lower ball joint stud with Tool.
7. Remove knuckle from transverse link.

INSTALLATION

NFAX0010

1. Install knuckle with wheel hub.

When installing knuckle to strut, be sure to hold bolts and tighten nuts.

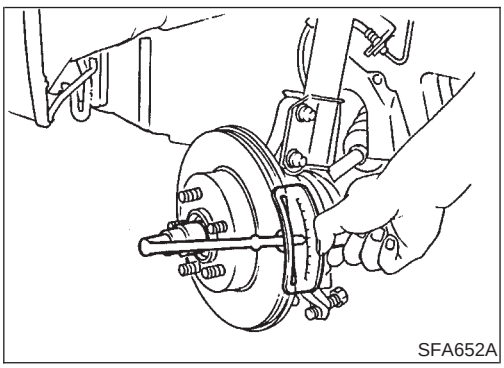
: 125 - 155 N·m (13 - 15 kg-m, 93 - 114 ft-lb)

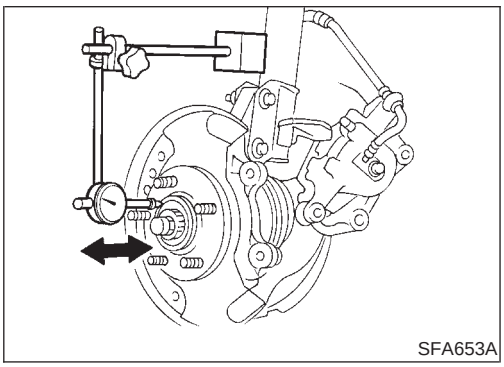
- **Before tightening, apply oil to threaded portion of drive shaft.**

2. Tighten wheel bearing lock nut.

: 255 - 333 N·m (26 - 34 kg-m, 188 - 245 ft-lb)

3. Check that wheel bearings operate smoothly.

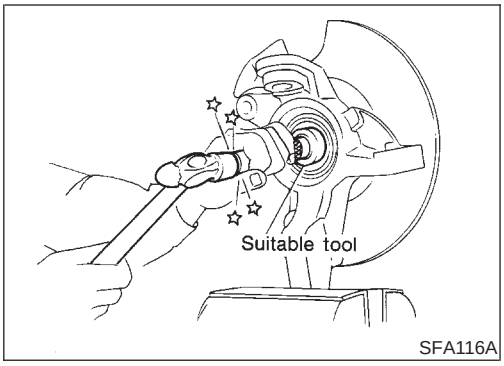

SFA652A


SFA653A

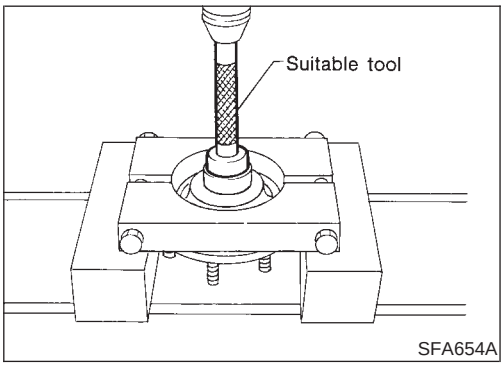
4. Check wheel bearing axial end play.

Axial end play:

Less than 0.05 mm (0.0020 in)



SFA116A



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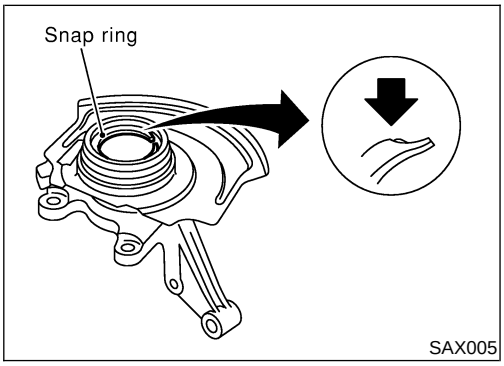
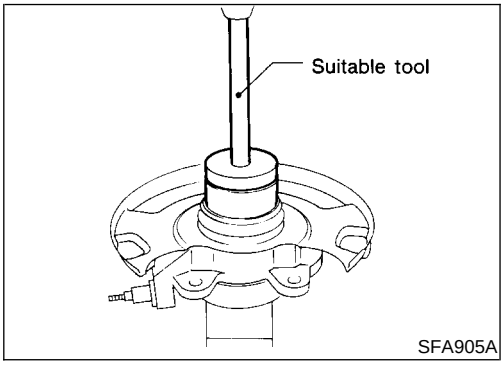


SAX005



SFA905A

DISASSEMBLY

NFAX0011

CAUTION:

When removing wheel hub or wheel bearing from knuckle, replace wheel bearing assembly (outer race, inner races and grease seals) with a new one.

Wheel Hub

NFAX0011S01

Drive out hub with inner race (outside) from knuckle with a suitable tool.

Wheel Bearing

NFAX0011S02

When replacing wheel bearing, replace complete wheel bearing assembly (Inner races and outer race).

1. Remove bearing inner race (outside).
2. Remove snap rings.
3. Press out bearing outer race.

INSPECTION

NFAX0012

Wheel Hub and Knuckle

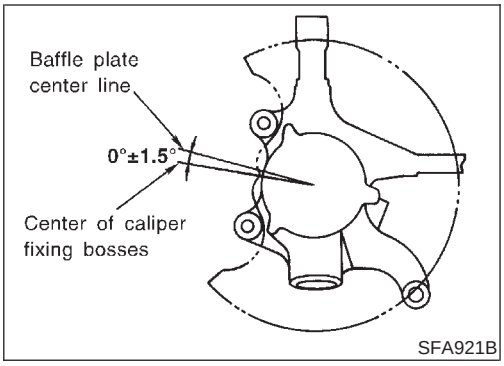
NFAX0012S01

Check wheel hub and knuckle for cracks by using a magnetic exploration or dyeing test.

Snap Ring

NFAX0012S02

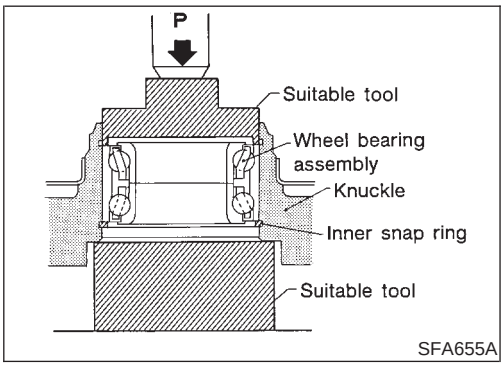
Check snap ring for wear or cracks. Replace if necessary.



ASSEMBLY

NFAX0013

- When removing baffle plate, replace it with a new one.
- When installing the baffle plate, press new plate so that it is in contact with knuckle wall. Refer to figure at left.



1. Install inner snap ring into groove of knuckle.
2. Press new wheel bearing assembly into knuckle until it contacts snap ring.

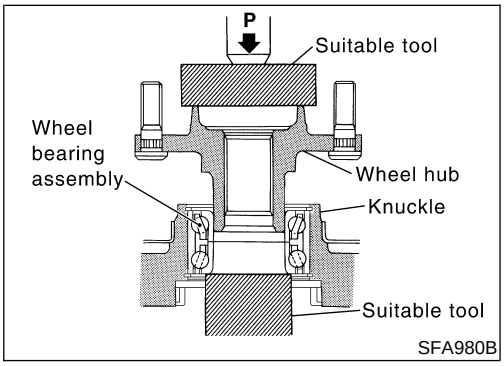
Maximum load P:

29 kN (3 ton, 3.3 US ton, 3.0 Imp ton)

CAUTION:

- **Do not press inner race of wheel bearing assembly.**
- **Do not apply oil or grease to mating surfaces of wheel bearing outer race and knuckle.**

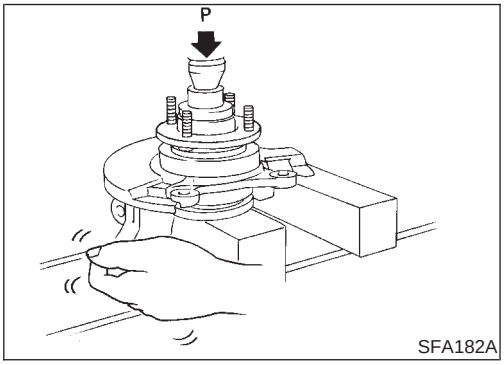
3. Install outer snap ring into groove of knuckle.



4. Press wheel hub into knuckle until it stops when the end of the wheel bearing is hit.

Maximum load P:

49 kN (5 ton, 5.5 US ton, 4.9 Imp ton)



5. Check bearing operation.

a. Add load P with press.

Load P:

49.0 kN
(5.0 ton, 5.5 US ton, 4.92 Imp ton)

b. Spin knuckle several turns in both directions.

c. Make sure that wheel bearings operate smoothly.

Drive Shaft

COMPONENTS

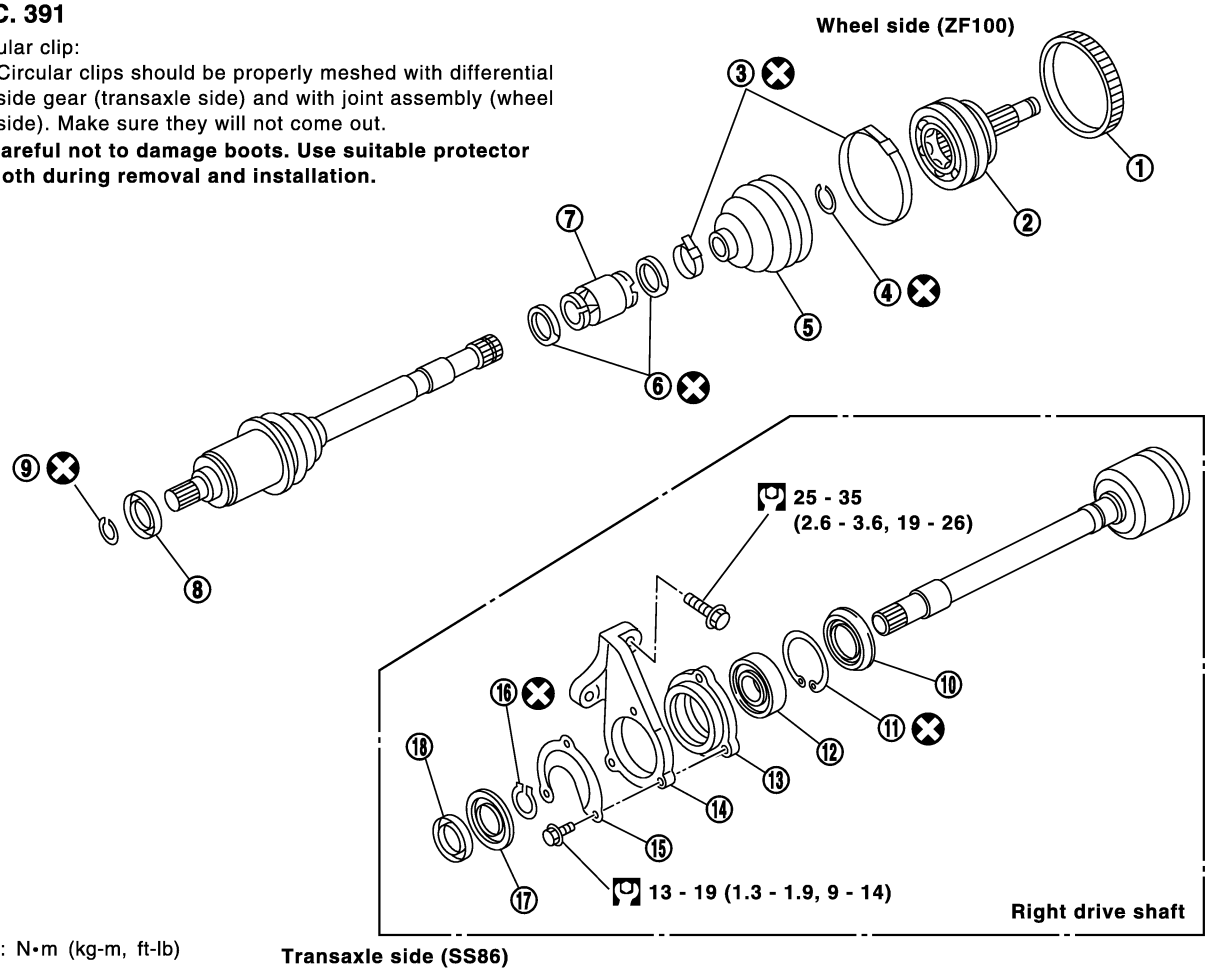
NFAX0016

SEC. 391

Circular clip:

Circular clips should be properly meshed with differential side gear (transaxle side) and with joint assembly (wheel side). Make sure they will not come out.

Be careful not to damage boots. Use suitable protector or cloth during removal and installation.



: N•m (kg-m, ft-lb)

SAX027

1. ABS sensor rotor
2. Joint assembly
3. Boot band
4. Circular clip
5. Boot
6. Dynamic damper band
7. Dynamic damper
8. Dust shield
9. Circular clip
10. Support bearing dust shield
11. Snap ring
12. Support bearing
13. Support bearing retainer
14. Support bearing bracket
15. Shield heat plate
16. Snap ring
17. Support bearing dust shield
18. Dust shield

REMOVAL

=NFAX0014

1. Remove wheel bearing lock nut.

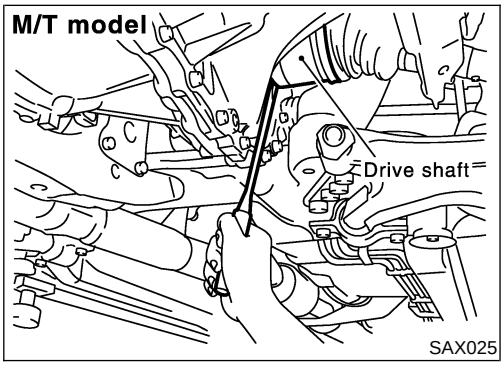
Brake caliper need not be disconnected. Do not twist or stretch brake hose when moving components.

2. Remove strut lower mount bolts.
3. Remove brake hose clip.
4. Separate drive shaft from knuckle by lightly tapping it. If it is hard to remove, use a puller.

- **Cover boots with shop towel so as not to damage them when removing drive shaft.**

  Refer to "Wheel Hub and Knuckle", "FRONT AXLE", AX-5.

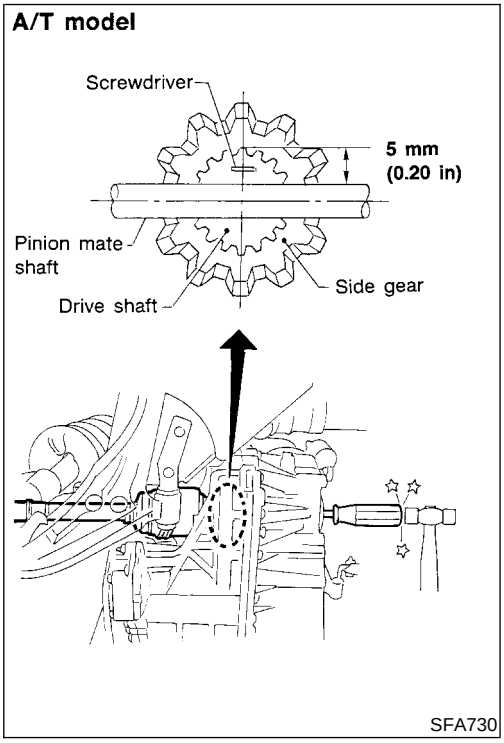
5. Remove right drive shaft from transaxle.



6. Remove left drive shaft from transaxle.

— For M/T models —

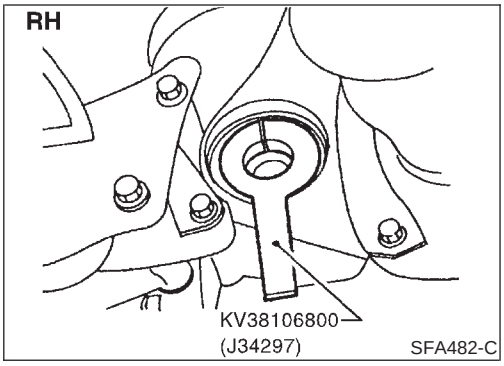
- Pry off drive shaft from transaxle as shown at left.

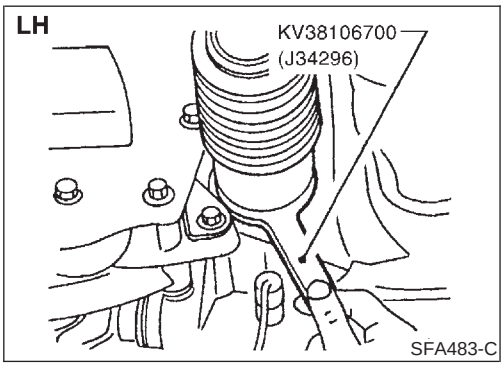


— For A/T models —

- Insert screwdriver into transaxle opening for right drive shaft and strike with a hammer.

Be careful not to damage pinion mate shaft and side gear.





INSTALLATION

NFAX0015

Transaxle Side

NFAX0015S01

1. Drive a new oil seal to transaxle. Refer to MA-21, "Replacing Oil Seal" or "Differential Side Oil Seal Replacement", "ON-VEHICLE SERVICE".
2. Set Tool along the inner circumference of oil seal.
3. Insert drive shaft into transaxle. Be sure to properly align the serrations and then withdraw Tool.
4. Push drive shaft, then press-fit circular clip on the drive shaft into circular clip groove of side gear.
5. After its insertion, try to pull the flange out of the slide joint by hand. If it pulls out, the circular clip is not properly meshed with the side gear.

Wheel Side

NFAX0015S02

- Install drive shaft into knuckle.
- Tighten upper knuckle nut and wheel bearing lock nut. Refer to section Installation in "Wheel Hub and Knuckle", "FRONT AXLE", AX-5.

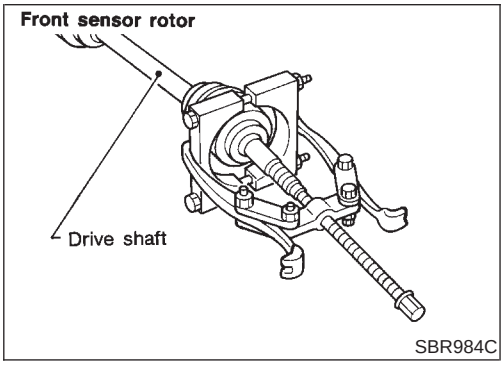
DISASSEMBLY

NFAX0017

Transaxle Side

NFAX0017S01

The joint on the transaxle side cannot be disassembled.



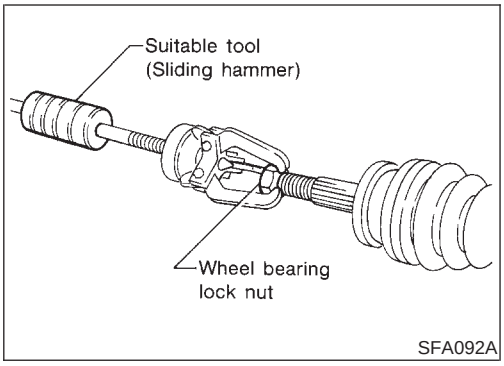
Wheel Side

NFAX0017S02

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. Remove ABS sensor rotor.



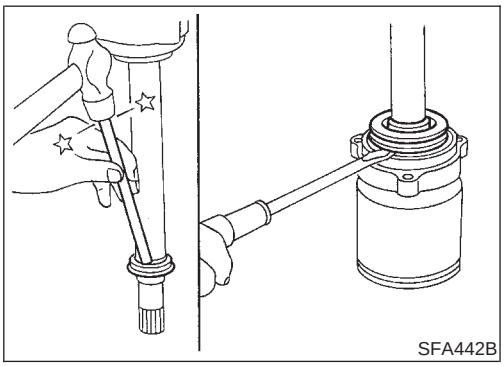
3. Separate joint assembly with a suitable tool.

Be careful not to damage threads on drive shaft.

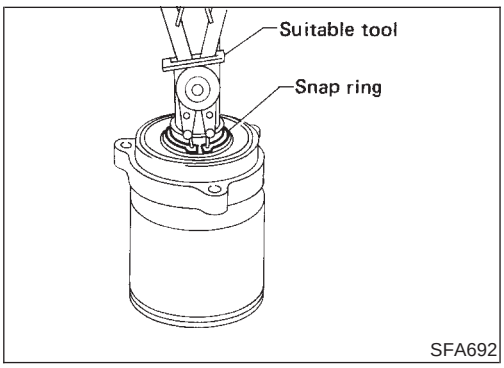
4. Remove boot bands.
5. Draw out boot.

Support Bearing

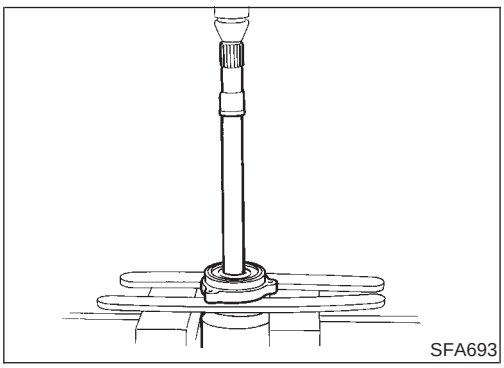
NFAX0017S03



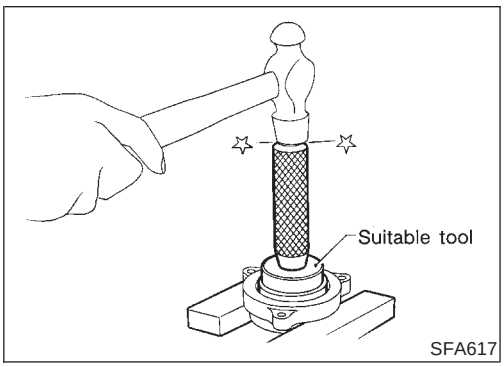
1. Remove dust shield.
2. Remove support bearing dust shield.



3. Remove snap ring.



4. Press support bearing assembly off of drive shaft.
5. Remove support bearing dust shield.
6. Remove snap ring.



7. Separate support bearing from support bearing retainer.

INSPECTION

NFAX0018

Thoroughly clean all parts in cleaning solvent, and dry with compressed air. Check parts for evidence of deformation or other damage.

Drive Shaft

NFAX0018S01

Replace drive shaft if it is twisted or cracked.

Boot

NFAX0018S02

Check boot for fatigue, cracks or wear. Replace boot with new boot bands.

Joint Assembly (Transaxle side)

NFAX0018S03

- Check serration for deformation. Replace if necessary.
- Check slide joint housing for any damage. Replace if necessary.

Joint Assembly (Wheel side)

NFAX0018S04

Replace joint assembly if it is deformed or damaged.

Support Bearing

NFAX0018S05

Make sure wheel bearing rolls freely and is free from noise, cracks, pitting or wear.

Support Bearing Bracket

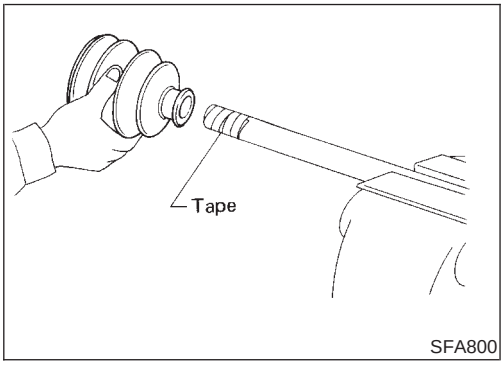
NFAX0018S06

Check support bearing bracket for cracks with a magnetic exploration or dyeing test.

ASSEMBLY

NFAX0019

- **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.**



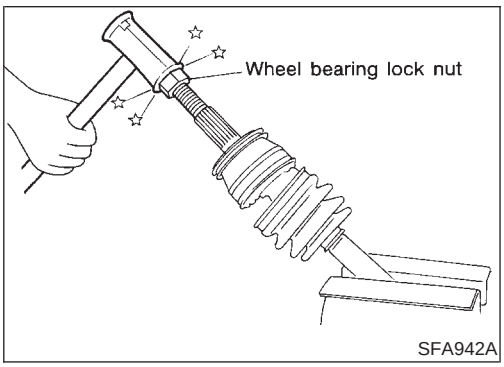
SFA800

Wheel Side

NFAX0019S01

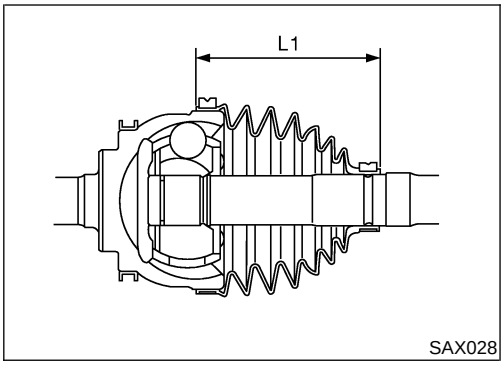
1. Install boot and new small boot band on drive shaft.

Cover drive shaft serration with tape so as not to damage boot during installation.

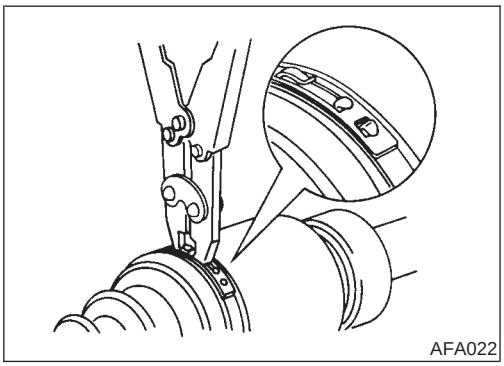


SFA942A

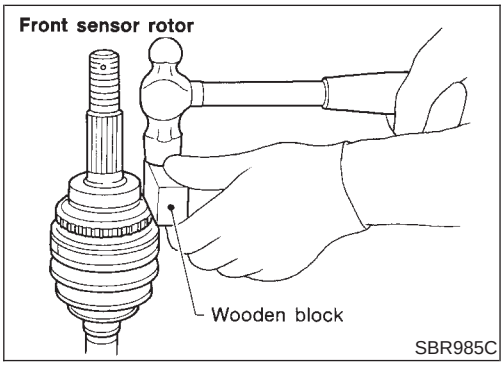
2. Set joint assembly onto drive shaft by lightly tapping it. Install joint assembly securely, ensuring marks which were made during disassembly are properly aligned.



3. Pack drive shaft with specified amount of grease.
   Specified amount of grease:
   115 - 125 g (4.06 - 4.41 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":
   103 mm (4.06 in)



5. Lock new larger and smaller boot bands securely with a suitable tool.

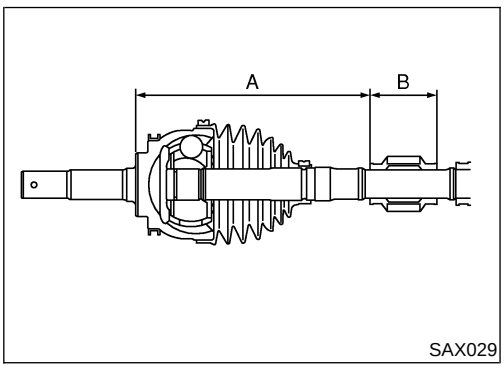


6. Install the sensor rotor. For front sensor rotor, use hammer and wooden block. For rear sensor rotor, use suitable drift and press.
- Always replace sensor rotor with new one.

Dynamic Damper

NFAX0019S02

1. Use new damper bands when installing.
2. Install dynamic damper from stationary-joint side while holding it securely.
   Length:
   "A": 205 - 215 mm (8.07 - 8.46 in)
   "B": 50 mm (1.97 in) (Except M/T model with LSD)
   70 mm (2.76 in) (M/T model with LSD)



Transaxle Side

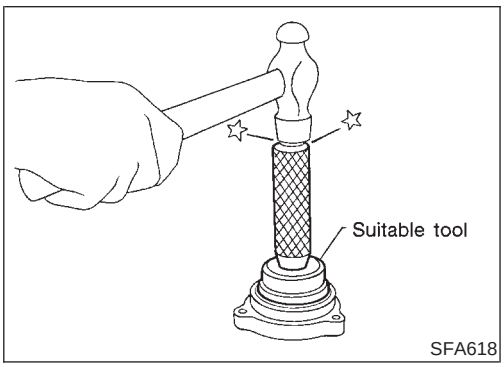
NFAX0019S03

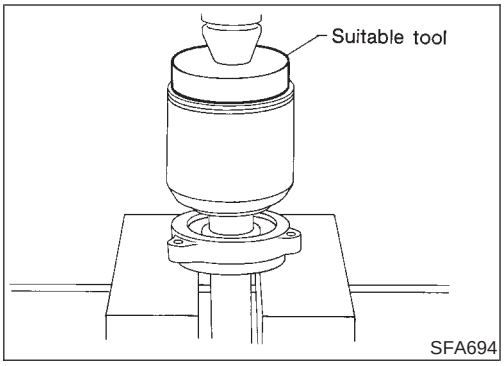
The joint on the transaxle side cannot be disassembled.

Support Bearing

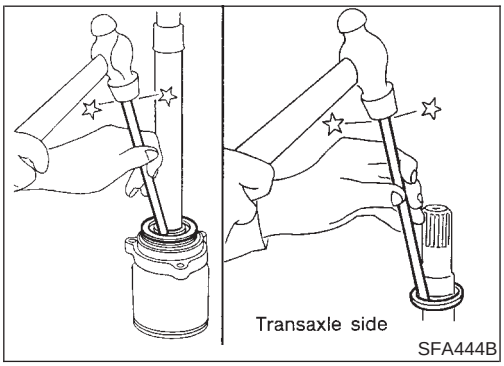
NFAX0019S04

- Press bearing into retainer.
- Install snap ring.
- Install support bearing dust shield.





- Press drive shaft into bearing.



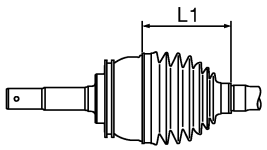
- Install snap ring.
- Install support bearing dust shield.
- Install dust shield.

Service Data and Specifications (SDS)

DRIVE SHAFT

NFAX0020

Applied model			All
Joint type	Transaxle side		SS86
	Wheel side		ZF100
Grease	Quality		Nissan genuine grease or equivalent
	Capacity g (oz)	Wheel side	115 - 125 (4.06 - 4.41)
Boot length mm (in)	Wheel side "L_1"		103 (4.06)

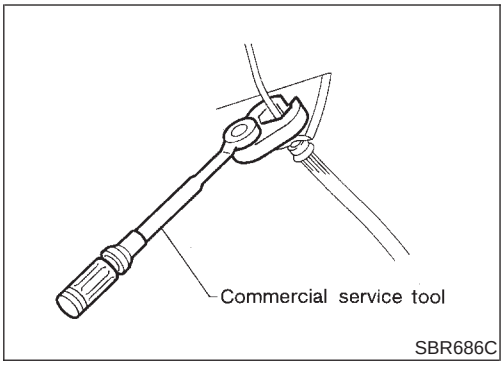


SAX030

WHEEL BEARING (FRONT)

NFAX0021

Wheel bearing axial end play limit mm (in)	Less than 0.05 (0.0020)
Wheel bearing lock nut tightening torque N·m (kg-m, ft-lb)	255 - 333 (26 - 34, 188 - 245)



SBR686C

Precautions

PRECAUTIONS

NFAX0022

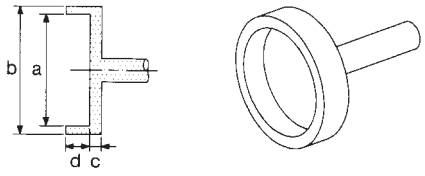
- **When installing each rubber part, final tightening must be carried out under unladen condition* with tires on ground. *: Fuel, radiator coolant and engine oil full. Spare tire, jack, hand tools and mats in designated positions.**
- **Use flare nut wrench when removing or installing brake tubes.**
- **After installing removed suspension parts, check wheel alignment.**
- **Do not jack up at the trailing arm and lateral link.**
- **Always torque brake lines when installing.**

Preparation

SPECIAL SERVICE TOOLS

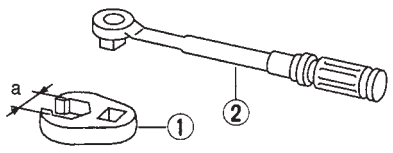
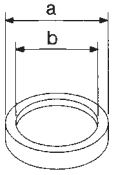
NFAX0032

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
ST15310000 (—) Drift	 NT607 Install ABS sensor rotor **a: 84 mm (3.31 in) dia.** **b: 96 mm (3.78 in) dia.** **c: 8 mm (0.31 in)** **d: 20 mm (0.79 in)**

COMMERCIAL SERVICE TOOLS

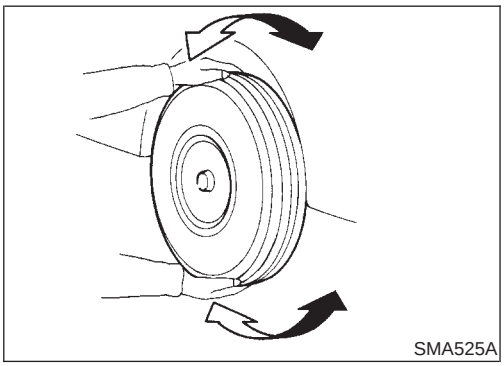
NFAX0024

Tool name	Description
GG94310000 1 Flare nut crowfoot 2 Torque wrench	 NT360 Removing and installing brake piping **a: 10 mm (0.39 in)**
Drift	 NT371 Install ABS sensor rotor **a: 75 mm (2.95 in) dia.** **b: 62 mm (2.44 in) dia.**

Noise, Vibration and Harshness (NVH) Troubleshooting

NFAX0025

Refer to “Noise, Vibration and Harshness (NVH) Troubleshooting”, “FRONT AXLE”, AX-3.


SMA525A

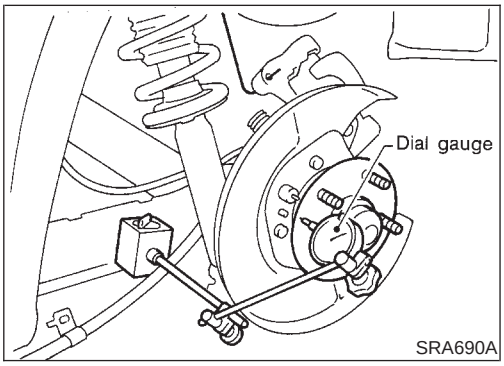
On-vehicle Service

REAR AXLE PARTS

NFAX0026

Check axle and suspension parts for excessive play, wear or damage.

- Shake each rear wheel to check for excessive play.



SRA690A

REAR WHEEL BEARING

NFAX0027

- Check axial end play.

  Axial end play:

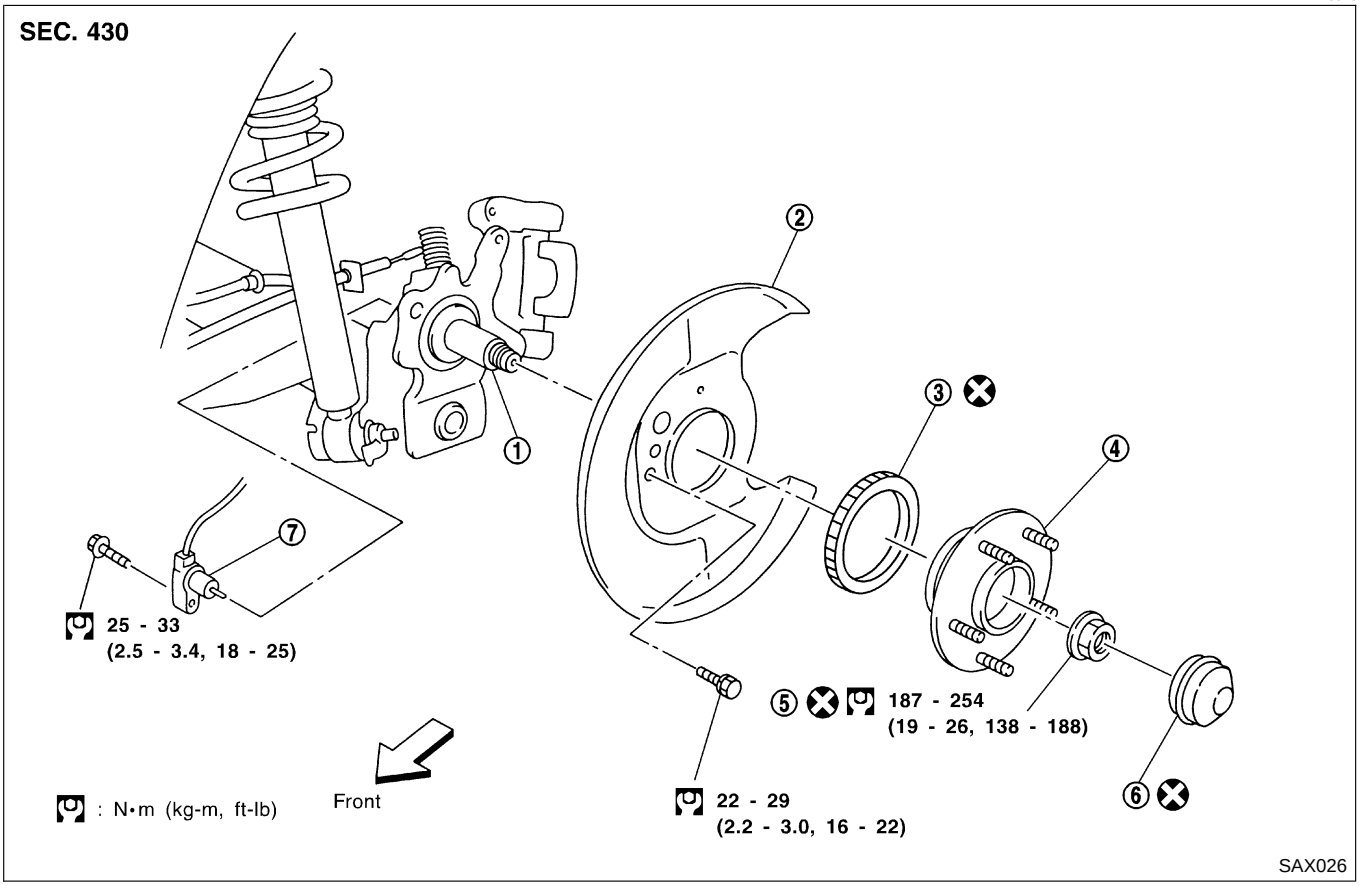
  Less than 0.05 mm (0.0020 in)
- Check that wheel hub bearings operate smoothly.
- Check tightening torque of wheel bearing lock nut.

  : 187 - 254 N·m (19 - 26 kg-m, 138 - 188 ft-lb)
- Replace wheel bearing assembly if there is axial end play or wheel bearing does not turn smoothly. Refer to “Wheel Hub”, “REAR AXLE”, AX-18.

Wheel Hub

COMPONENTS

NFAX0028



1. Spindle
2. Baffle plate
3. ABS sensor rotor
4. Wheel hub bearing
5. Wheel bearing lock nut
6. Hub cap
7. ABS sensor

REMOVAL

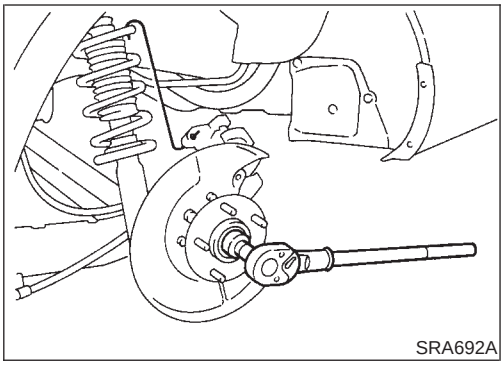
NFAX0029

CAUTION:

- **Before removing the rear wheel hub assembly, disconnect the ABS wheel sensor from the assembly. Then move it away from the hub assembly. Failure to do so may result in damage to the sensor wires and the sensor becoming inoperative.**
- **Wheel hub bearing does not require maintenance. If any of the following symptoms are noted, replace wheel hub bearing assembly.**

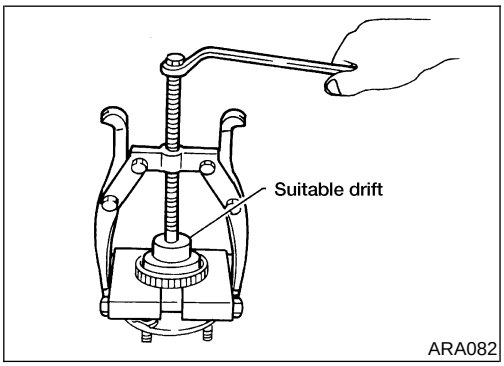
1) Growling noise is emitted from wheel hub bearing during operation.

2) Wheel hub bearing drags or turns roughly. This occurs when turning hub by hand after bearing lock nut is tightened to specified torque.


SRA692A

1. Remove brake caliper assembly.
2. Remove wheel bearing lock nut.
3. Remove brake rotor.
4. Remove wheel hub bearing from spindle.

Brake hose does not need to be disconnected from brake caliper.
Suspend caliper assembly with wire so as not to stretch brake hose.
Be careful not to depress brake pedal, or piston will pop out.
Make sure brake hose is not twisted.



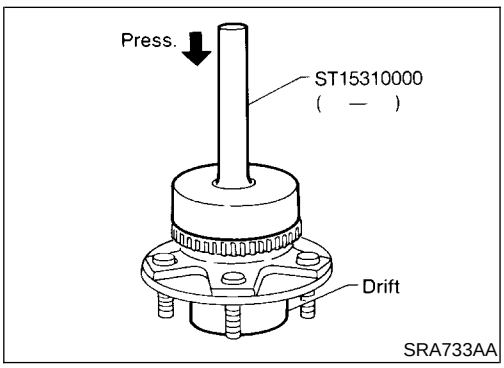
ARA082

5. Remove the sensor rotor using suitable puller, drift and bea ring replacer.

INSTALLATION

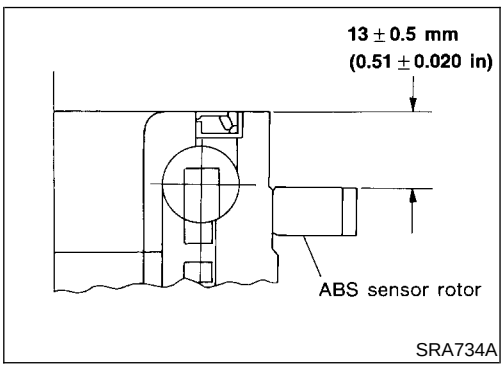
NFAX0030

- With vehicles equipped with ABS, press-fit ABS sensor rotor into wheel hub bearing using a drift.
  Do not reuse ABS sensor rotor. When installing, replace it with a new one.



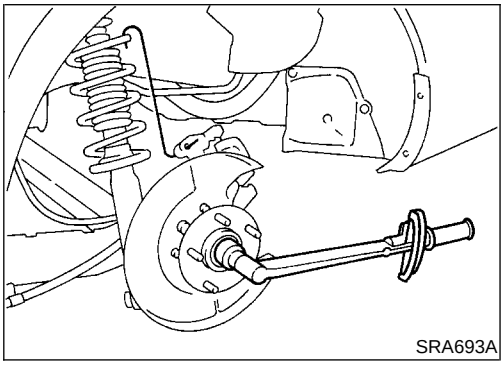
SRA733AA

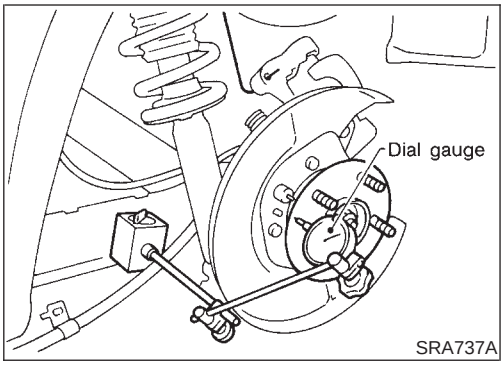
- Press-fit ABS sensor rotor as far as the location shown in figure at left.



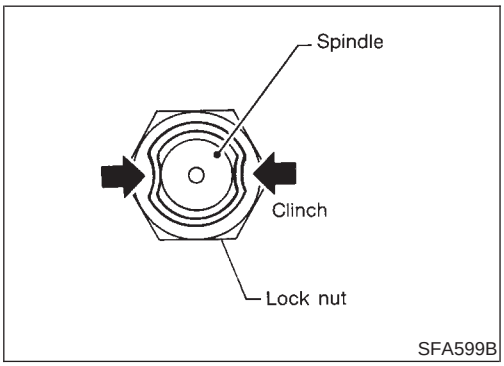
SRA734A

- Install wheel hub bearing.
- Tighten wheel bearing lock nut.
  Before tightening, apply oil to threaded portion of rear spindle.
  Do not reuse wheel bearing lock nut.
  : 187 - 254 N·m (19 - 26 kg-m, 138 - 188 ft-lb)
- Check that wheel bearings operate smoothly.

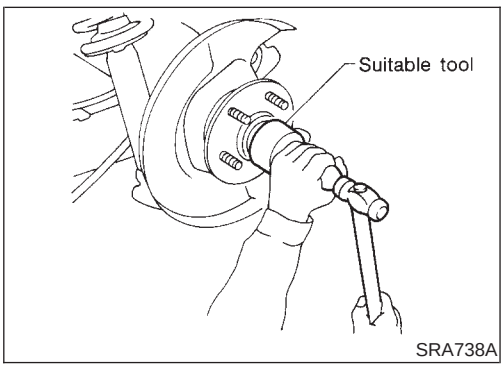

SRA693A



- Check wheel hub bearing axial end play.
  Axial end play:
  Less than 0.05 mm (0.0020 in)



- Clinch two places of lock nut.



- Install hub cap using a suitable tool.
  Do not reuse hub cap. When installing, replace it with a new one.

Service Data and Specifications (SDS)

WHEEL BEARING (REAR)

=NFAX0031

Wheel bearing axial end play limit mm (in)	Less than 0.05 (0.0020)
Wheel bearing lock nut tightening torque N·m (kg-m, ft-lb)	187 - 254 (19 - 26, 138 - 188)

NOTES

FRONT & REAR SUSPENSION

SECTION SU

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  - PRECAUTIONS 2
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  - SPECIAL SERVICE TOOLS 2
  - COMMERCIAL SERVICE TOOLS 2
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- Coil Spring and Shock Absorber 9
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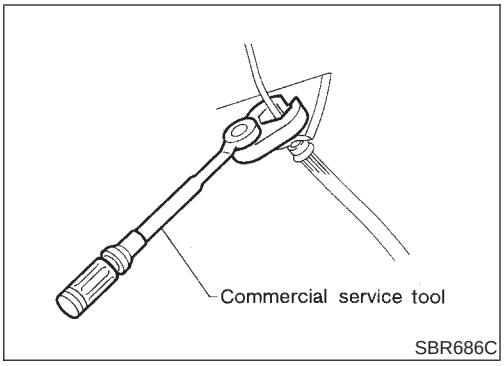


SBR686C

Precautions

PRECAUTIONS

NFSU0001

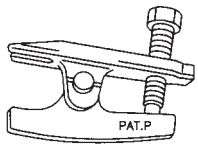
- **When installing rubber parts, final tightening must be carried out under unladen condition* with tires on ground. Oil will shorten the life of rubber bushes. Be sure to wipe off any spilled oil.**
  ***: Fuel, radiator coolant and engine oil full. Spare tire, jack, hand tools and mats in designated positions.**
- **After installing removed suspension parts, check wheel alignment and adjust if necessary.**
- **Use flare nut wrench when removing or installing brake tubes.**
- **Always torque brake lines when installing.**
- **Lock nuts are unreusable parts; always use new ones. When replacing, do not wipe the oil off the new lock nut before tightening.**

Preparation

SPECIAL SERVICE TOOLS

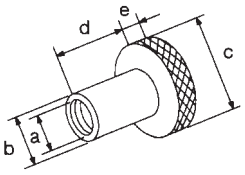
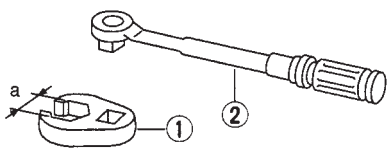
NFSU0002

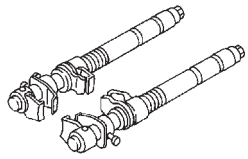
The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description	
HT72520000 (J25730-A) Ball joint remover	 NT146	Removing tie-rod outer end and lower ball joint

COMMERCIAL SERVICE TOOLS

NFSU0003

Tool name	Description	
Attachment Wheel alignment	 NT148	Measure wheel alignment **a: Screw M24 x 1.5 pitch** **b: 35 mm (1.38 in) dia.** **c: 65 mm (2.56 in) dia.** **d: 56 mm (2.20 in)** **e: 12 mm (0.47 in)**
1 Flare nut crowfoot 2 Torque wrench	 NT360	Removing and installing each brake piping **a: 10 mm (0.39 in)**

Tool name	Description
Spring compressor	Removing and installing coil spring  NT717

Noise, Vibration and Harshness (NVH) Troubleshooting

=NFSU0004

NVH TROUBLESHOOTING CHART

NFSU0004S01

Use the chart below to help you find the cause of the symptom. If necessary, repair or replace these parts.

		Reference page	SU-5, 17	SU-10, 22	—	—	—	SU-9, 20	SU-6, 18	SU-11	SU-6	—	—	—	—	—	—	AX-9	AX-5	Refer to SUSPENSION in this chart.	Refer to TIRES in this chart.	Refer to ROAD WHEEL in this chart.	BR-7	ST-5
		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	Out-of-round	Imbalance	Incorrect air pressure	Uneven tire wear	Deformation or damage	Non-uniformity	Incorrect tire size	DRIVE SHAFT	AXLE	SUSPENSION	TIRES	ROAD WHEEL	BRAKES	STEERING
Symptom	SUSPENSION	Noise	×	×	×	×	×	×										×	×		×	×	×	×
		Shake	×	×	×	×		×										×	×		×	×	×	×
		Vibration	×	×	×	×	×											×	×		×			×
		Shimmy	×	×	×	×			×										×		×	×	×	×
		Judder	×	×	×														×		×	×	×	×
		Poor quality ride or handling	×	×	×	×	×		×	×									×		×	×		
	TIRES	Noise	×								×	×	×	×	×	×		×	×	×		×	×	×
		Shake	×								×	×	×	×	×		×	×	×	×		×	×	×
		Vibration											×				×	×	×	×				×
		Shimmy	×								×	×	×	×	×	×	×		×	×		×	×	×
		Judder	×								×	×	×	×	×		×		×	×		×	×	×
		Poor quality ride or handling	×								×	×	×	×	×		×		×	×		×		
	ROAD WHEEL	Noise	×								×	×			×			×	×	×	×		×	×
		Shake	×								×	×			×			×	×	×	×		×	×
		Shimmy, Judder	×								×	×			×				×	×	×		×	×
		Poor quality ride or handling	×								×	×			×				×	×	×			

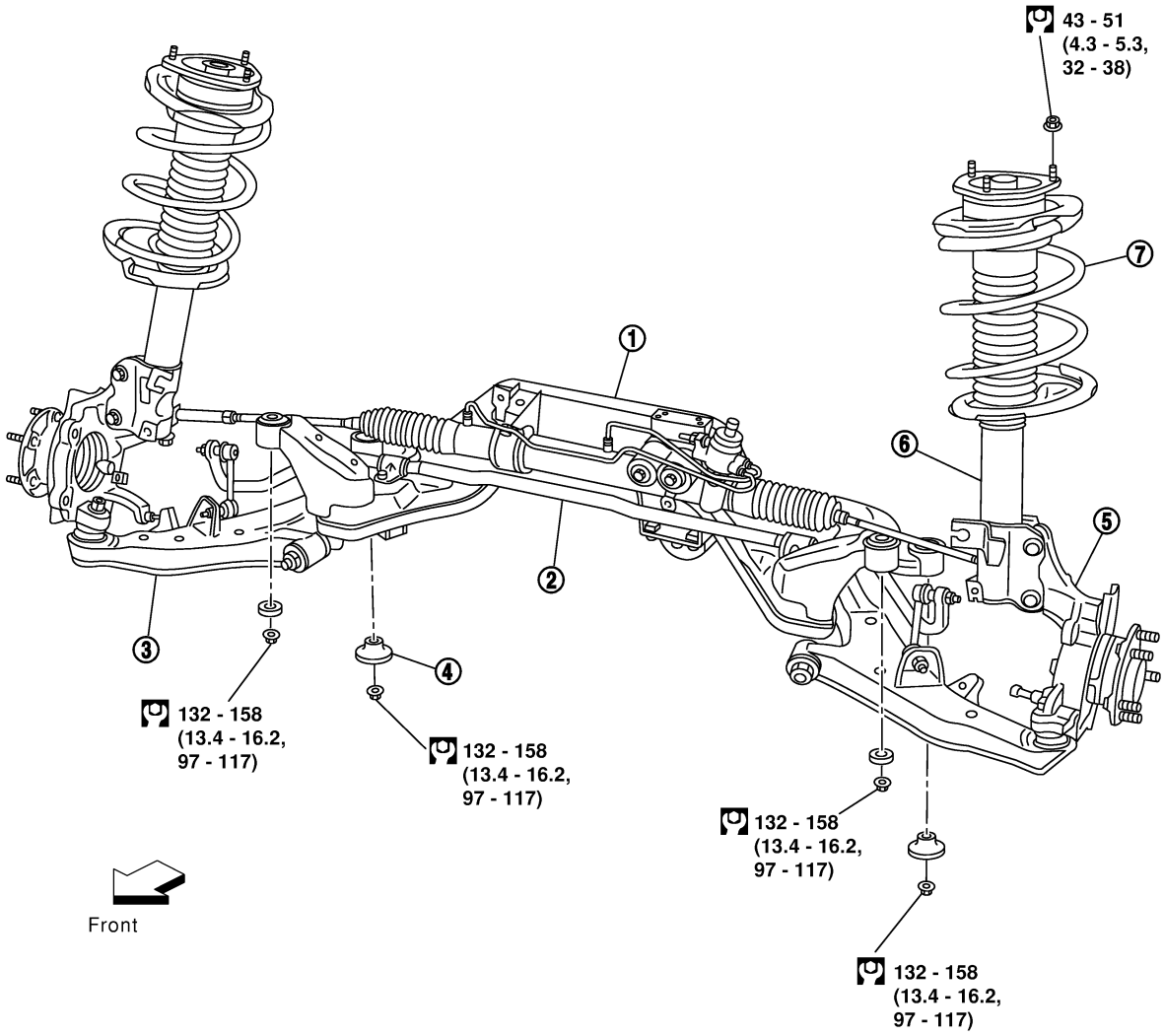
×: Applicable

Components

NFSU0005

SEC. 391•400•401

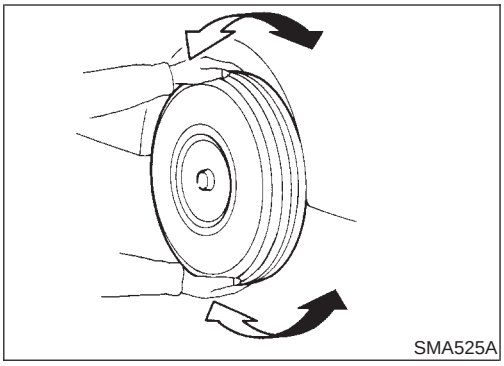
When installing rubber parts, final tightening must be carried out under unladen condition* with tires on ground.
*** Fuel, radiator coolant and engine oil full. Spare tire, jack, hand tools and mats in designated positions.**



: N•m (kg-m, ft-lb)

SSU042

1. Front suspension member
2. Stabilizer bar
3. Transverse link
4. Rebound stopper
5. Knuckle
6. Strut assembly
7. Coil spring


SMA525A

On-vehicle Service

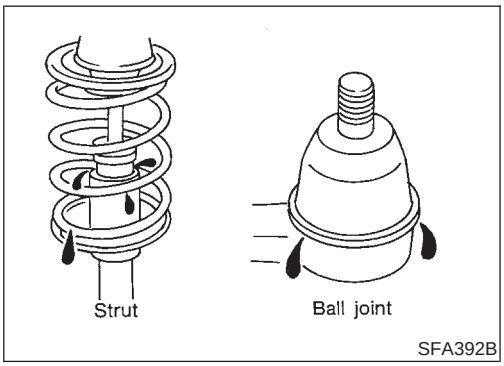
FRONT SUSPENSION PARTS

NFSU0006

Check front axle and front suspension parts for excessive play, cracks, wear or other damage.

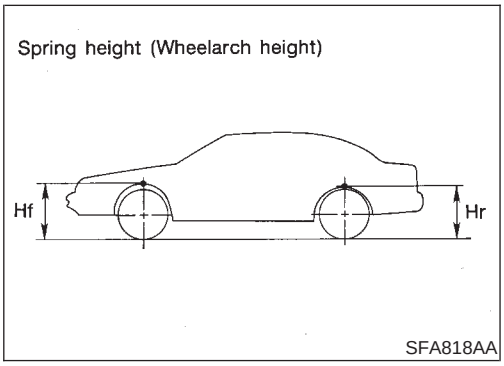
- Shake each front wheel to check for excessive play.
- Make sure that cotter pin is inserted.
- Retighten all axle and suspension nuts and bolts to the specified torque.

Tightening torque:
Refer to “FRONT SUSPENSION”, SU-9.



SFA392B

- 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.
  If ball joint dust cover is cracked or damaged, replace transverse link.



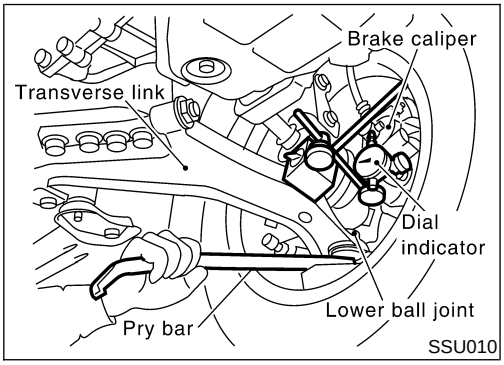
SFA818AA

- Check spring height from top of wheelarch to the ground.

a) Vehicle must be unladen*, parked on a level surface, and tires checked for proper inflation and wear (tread wear indicator must not be showing).
   *: Fuel, radiator coolant and engine oil full. Spare tire, jack, hand tools and mats in designated positions.

b) Bounce vehicle up and down several times before measuring.
   Standard height: Refer to SDS (SU-15).

c) Spring height is not adjustable. If out of specification, check for worn springs or suspension parts.



SSU010

- Check suspension ball joint end play.

a) Jack up front of vehicle and set the stands.

b) Clamp dial indicator onto transverse link and place indicator tip on lower edge of brake caliper.

c) Make sure front wheels are straight and brake pedal is depressed.

d) Place a pry bar between transverse link and inner rim of road wheel.

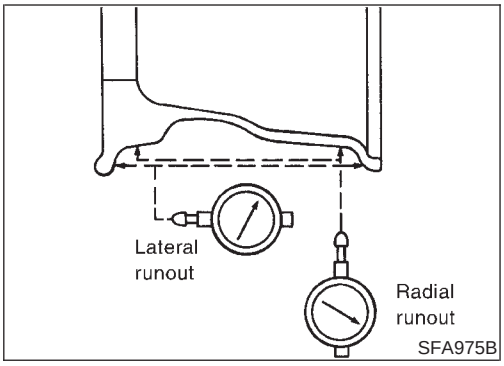
e) While raising and releasing pry bar, observe maximum dial indicator value.
   Vertical end play: 0 mm (0 in)

f) If ball joint movement is beyond specifications, remove and replace it.

FRONT WHEEL ALIGNMENT

NFSU0007

Before checking front wheel alignment, be sure to make a preliminary inspection (Unladen*).
*: Fuel, radiator coolant and engine oil full. Spare tire, jack, hand tools and mats in designated positions.



Preliminary Inspection

NFSU0007S01

1. Check tires for wear and improper inflation.
2. Check wheels for deformation, cracks and other damage. If deformed, remove wheel and check wheel runout.

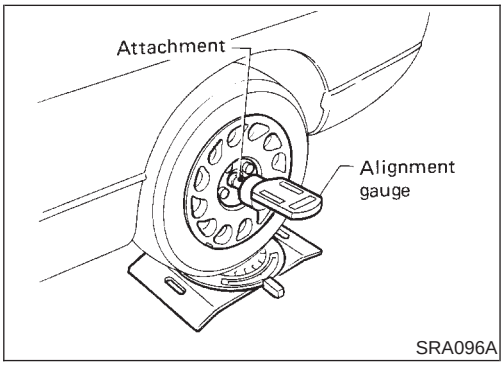
a. Remove tire from wheel and mount wheel on a tire balance machine.

b. Set dial indicator as shown in the illustration.

Wheel runout (Dial indicator value):

Refer to SDS, SU-15.

3. Check front wheel bearings for looseness.
4. Check front suspension for looseness.
5. Check steering linkage for looseness.
6. Check that front shock absorbers work properly.
7. Check vehicle posture (Unladen).



Camber, Caster and Kingpin Inclination

NFSU0007S02

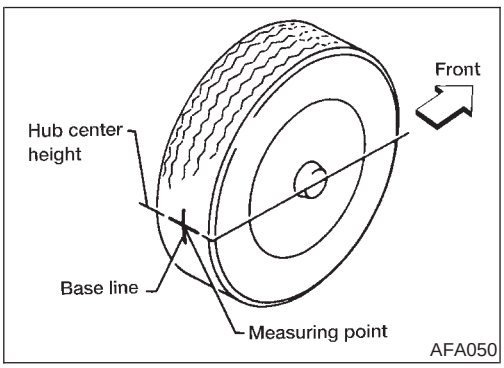
Camber, caster and kingpin inclination are preset at factory and cannot be adjusted.

1. Measure camber, caster and kingpin inclination of both right and left wheels with a suitable alignment gauge.

Camber, caster and kingpin inclination:

Refer to SDS, SU-14.

2. If camber, caster or kingpin inclination is not within specification, inspect front suspension parts. Replace damaged or worn out parts.



Toe-in

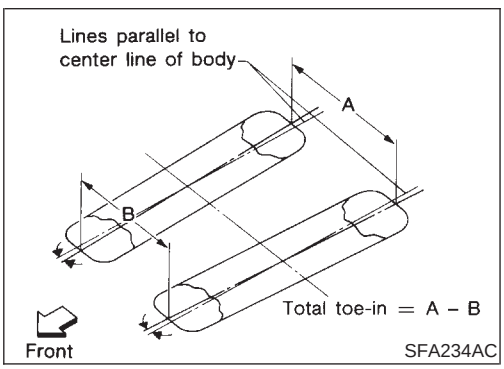
NFSU0007S03

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.



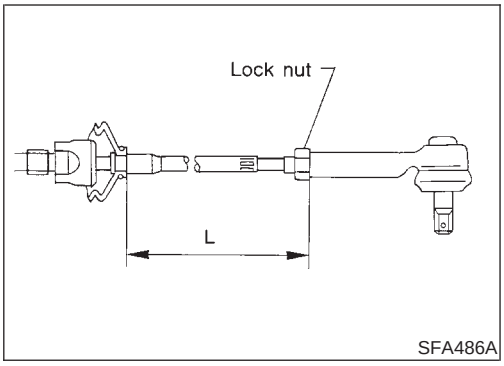
4. Measure distance "A" (rear side).
5. Push the vehicle slowly ahead to rotate the wheels 180 degrees (1/2 turn).

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 side).

Total toe-in:

Refer to SDS, SU-14.



7. Adjust toe-in by varying the length of steering tie-rods.
a. Loosen lock nuts.
b. Adjust toe-in by screwing tie-rods in and out.

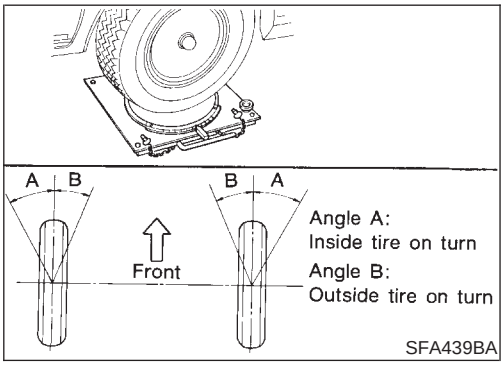
Standard length "L":

Refer to ST-29, "SDS".

c. Tighten lock nuts to specified torque.

Lock nut tightening torque:

Refer to ST-19, "POWER STEERING GEAR AND LINKAGE".



Front Wheel Turning Angle

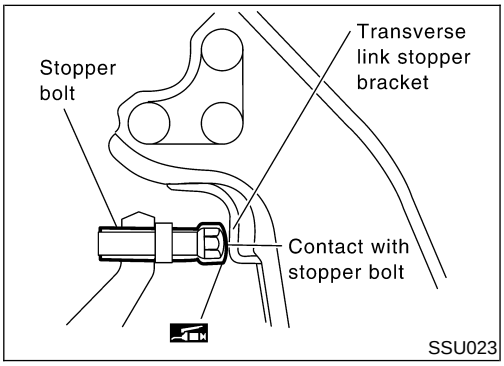
NFSU0007S04

1. Set wheels in straight-ahead position. Then move vehicle forward until front wheels rest on turning radius gauge properly.
2. Rotate steering wheel all the way right and left; measure turning angle.

Do not hold the steering wheel on full lock for more than 15 seconds.

Wheel turning angle (Full turn):

Refer to SDS, SU-14.



3. Check stopper bolt head to see whether it contacts stopper bracket at specified outside wheel angle. If not, adjust stopper bolt to contact stopper bracket at the correct angle.
Adjust protrusion of stopper bolt before placing stopper bolt cap.
Apply grease to face of stopper bracket that bolt touches.

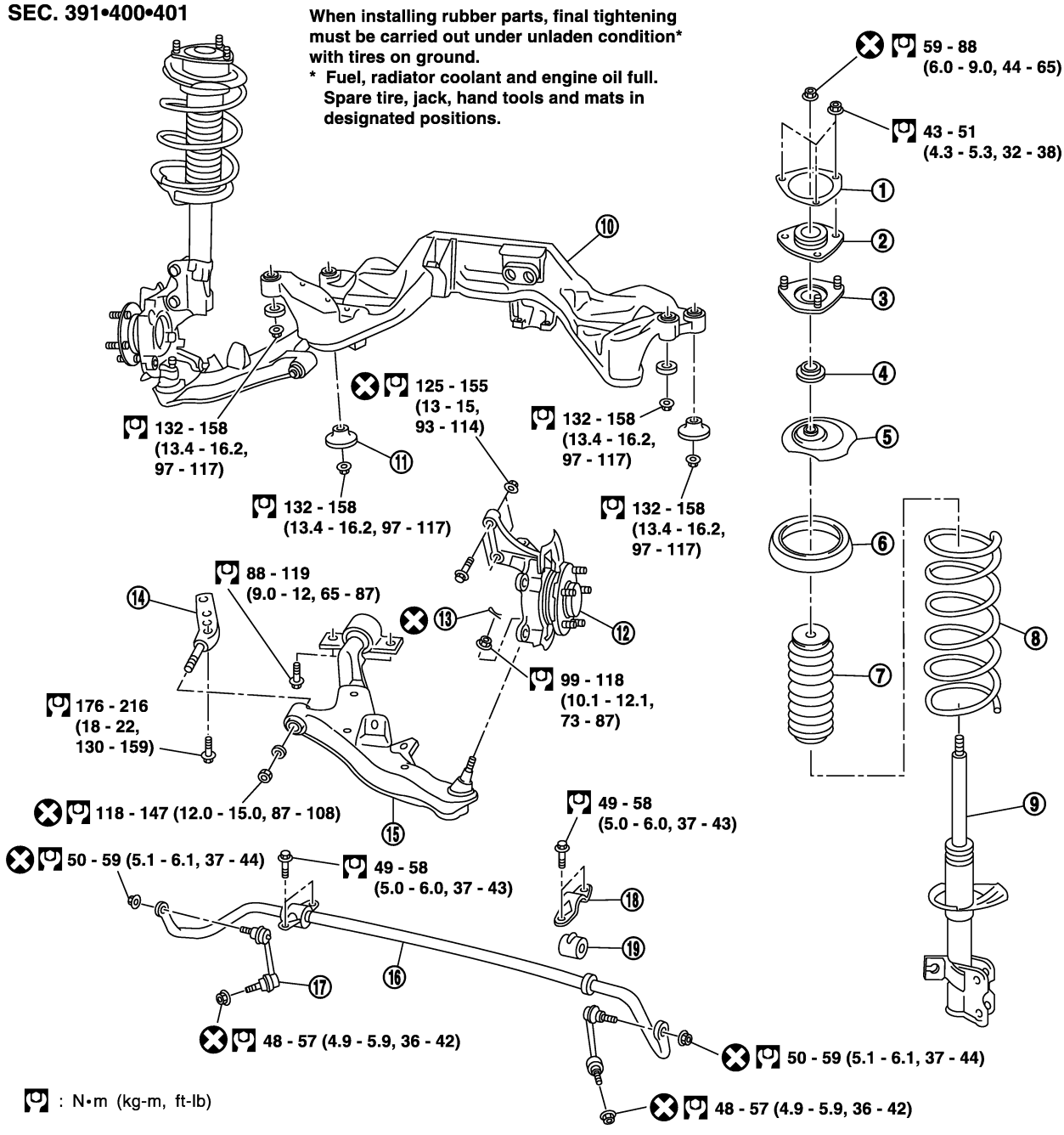
Tighten stopper bolt lock nut.

: 54 - 71 N·m (5.5 - 7.2 kg-m, 40 - 52 ft-lb)

Coil Spring and Shock Absorber

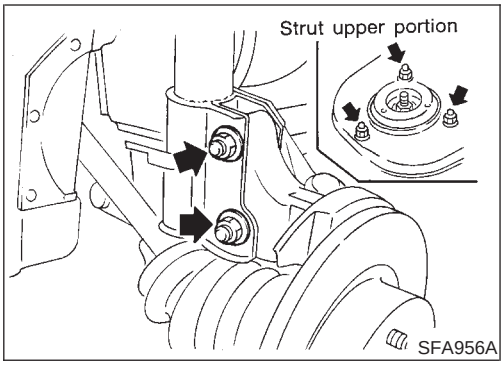
COMPONENTS

=NFSU0008



SSU049

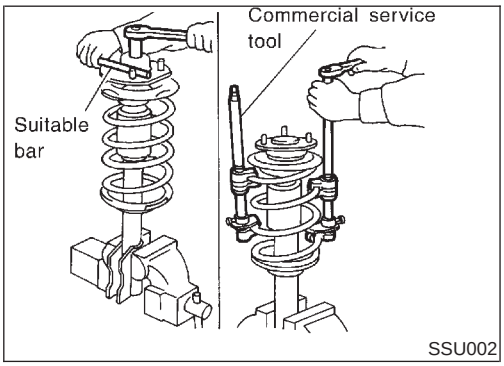
1. Strut spacer
2. Strut mount insulator
3. Strut mount bracket
4. Strut mount bearing
5. Spring upper seat
6. Spring rubber seat
7. Bound bumper rubber
8. Coil spring
9. Shock absorber
10. Suspension member
11. Rebound stopper
12. Wheel hub and steering knuckle
13. Cotter pin
14. Bush link pin
15. Transverse link
16. Stabilizer
17. Connecting rod
18. Stabilizer clamp
19. Bushing



REMOVAL AND INSTALLATION

=NFSU0009

- Remove shock absorber fixing bolt and nut (to hoodledge).
- **Do not remove piston rod lock nut on vehicle.**



DISASSEMBLY

NFSU0010

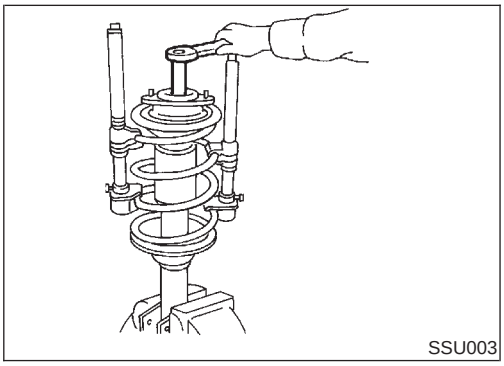
1. Set shock absorber on vise, then **loosen** piston rod lock nut.

- **Do not remove piston rod lock nut at this time.**

2. Compress spring with Tool so that shock absorber mounting insulator can be turned by hand.

WARNING:

Make sure that the pawls of the two spring compressors are firmly hooked on the spring. The spring compressors must be tightened alternately so as not to tilt the spring.



3. Remove piston rod lock nut.

INSPECTION

NFSU0011

Shock Absorber Assembly

NFSU0011S01

- Check for smooth operation through a full stroke, both compression and extension.
- Check for oil leakage on welded or gland packing portions.
- Check piston rod for cracks, deformation or other damage. Replace if necessary.

Mounting Insulator and Rubber Parts

NFSU0011S02

- Check cemented rubber-to-metal portion for separation or cracks. Check rubber parts for deterioration. Replace if necessary.

Thrust Bearing

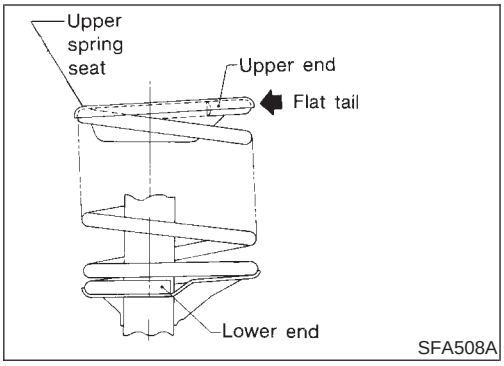
NFSU0011S06

- Check thrust bearing parts for abnormal noise or excessive rattle in axial direction.
- Replace if necessary.

Coil Spring

NFSU0011S03

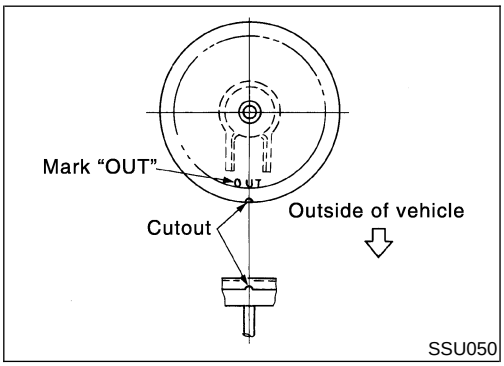
- Check for cracks, deformation or other damage. Replace if necessary.



ASSEMBLY

NFSU0012

- When installing coil spring on strut, it must be positioned as shown in the figure at left.



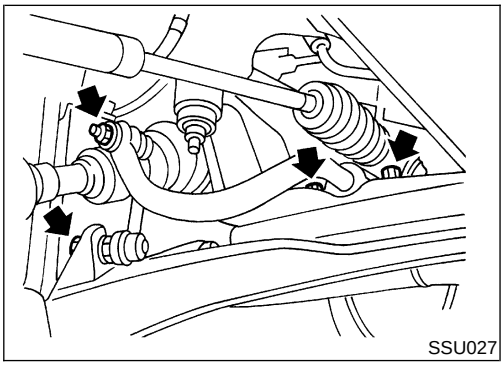
- Install in the direction of the spring upper seat with "OUT" mark facing the outer side the wheel.

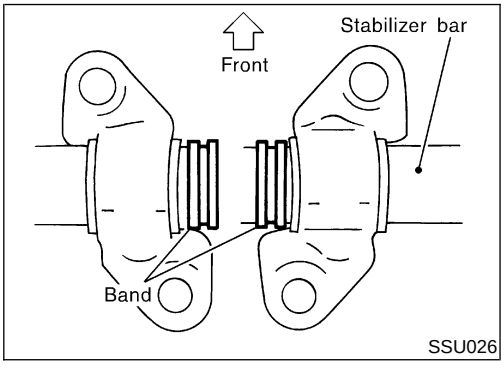
Stabilizer Bar

REMOVAL AND INSTALLATION

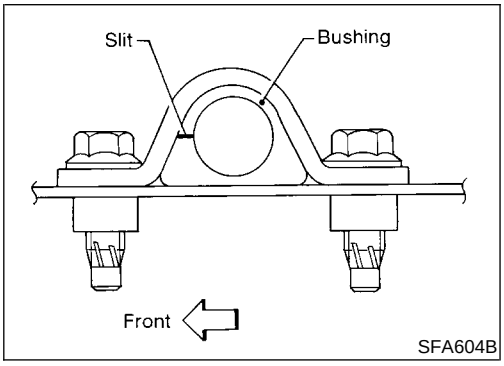
NFSU0017

- Remove power steering gear. Refer to ST-15, "POWER STEERING GEAR AND LINKAGE".
- Remove stabilizer bar.

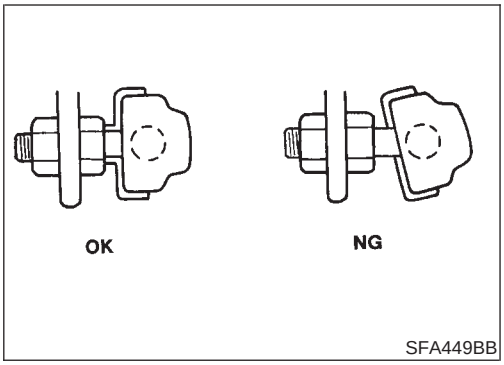




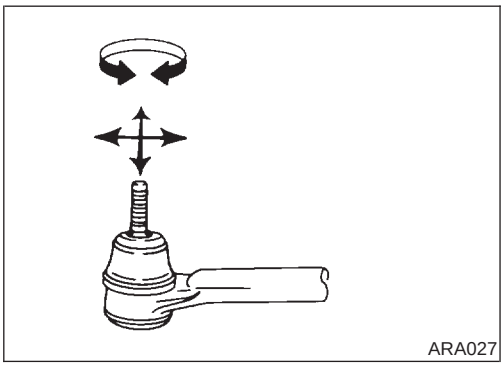
- When installing stabilizer, make sure that band and clamp face in their correct directions.



- Make sure that slit in bushing is in the position shown in the figure.



- Install stabilizer bar with ball joint socket properly placed.



INSPECTION

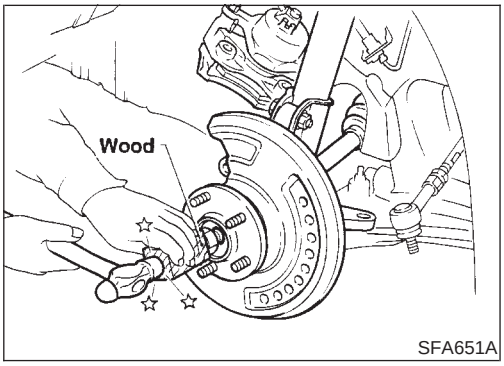
NFSU0042

- Check stabilizer for deformation or cracks. Replace if necessary.
- Check rubber bushings for deterioration or cracks. Replace if necessary.
- Check ball joint can rotate in all directions. If movement is not smooth and free, replace stabilizer bar connecting rod.

Transverse Link and Lower Ball Joint

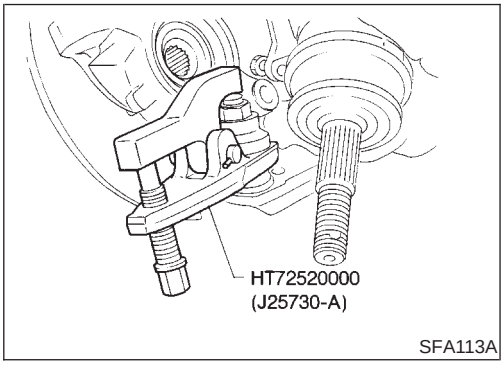
REMOVAL AND INSTALLATION

NFSU0018

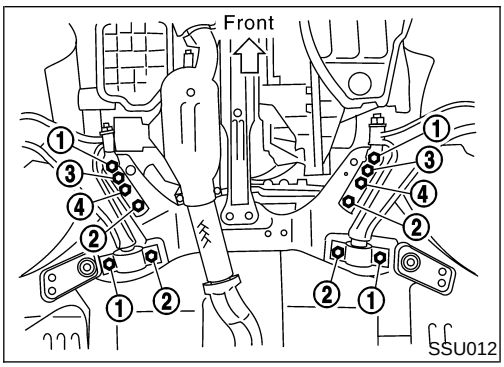


1. Remove wheel bearing lock nut.
2. Remove tie-rod ball joint.
3. Remove strut lower bracket fixing bolts and nuts.
4. Separate drive shaft from knuckle by slightly tapping drive shaft end.

Cover boots with shop towel so as not to damage them when removing drive shaft.



5. Separate lower ball joint stud from knuckle with suitable tool. Refer to AX-5, "FRONT AXLE — Wheel Hub and Knuckle".



6. Remove fixing bolts.
7. Remove transverse link and lower ball joint.
8. Install fixing bolts in order of number.

   Tightening torque:

   Refer to "FRONT SUSPENSION", SU-9.
9. During installation, final tightening must be carried out at curb weight with tires on the ground.
10. After installation, check wheel alignment. Refer to "ON-VEHICLE SERVICE — Front Wheel Alignment", SU-6.

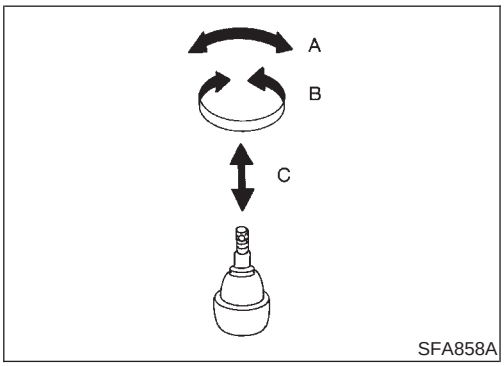
INSPECTION

NFSU0019

Transverse Link

NFSU0019S01

- Check transverse link for damage, cracks or deformation. Replace it if necessary.
- Check rubber bushing for damage, cracks and deformation. Replace transverse link if necessary.



Lower Ball Joint

NFSU0019S02

- Check ball joint for play. Replace transverse link assembly if any of the following cases occur. Ball stud is worn, play in axial direction is excessive or joint is hard to swing.
  Before checking, turn ball joint at least 10 revolutions so that ball joint is properly broken in.

  Swinging force "A":
  (measuring point: cotter pin hole of ball stud):
  8.0 - 54.4 N (0.82 - 5.55 kg, 1.80 - 12.23 lb)
  Turning torque "B":
  0.5 - 3.4 N·m (5 - 35 kg-cm, 4.3 - 30.4 in-lb)
  Vertical end play "C":
  0 mm (0 in)
- Check dust cover for damage. Replace it and cover clamp if necessary.

Service Data and Specifications (SDS)

GENERAL SPECIFICATIONS (FRONT)

=NFSU0020

Suspension type	Independent MacPherson strut
Shock absorber type	Double-acting hydraulic
Stabilizer bar	Standard equipment

FRONT WHEEL ALIGNMENT (UNLADEN*1)

NFSU0021

Tire size			17-inch tire	16-inch tire
Camber Degree minute (Decimal degree)		Minimum	−1°00′ (−1.00°)	
		Nominal	−0°15′ (−0.25°)	
		Maximum	0°30′ (0.50°)	
		Left and right difference	45′ (0.75°) or less	
Caster Degree minute (Decimal degree)		Minimum	2°00′ (2.00°)	
		Nominal	2°45′ (2.75°)	
		Maximum	3°30′ (3.50°)	
		Left and right difference	45′ (0.75°) or less	
Kingpin inclination Degree minute (Decimal degree)		Minimum	13°30′ (13.50°)	
		Nominal	14°15′ (14.25°)	
		Maximum	15°00′ (15.00°)	
Total toe-in	Distance (A − B) mm (in)	Minimum	0 (0)	
		Nominal	1 (0.04)	
		Maximum	2 (0.08)	
	Angle (left plus right) Degree minute (Decimal degree)	Minimum	18′ (0.30°)	
		Nominal	24′ (0.40°)	
		Maximum	30′ (0.50°)	
Wheel turning angle Full turn*2	Inside Degree minute (Decimal degree)	Minimum	29°30′ (29.50°)	36°00′ (36.0°)
		Nominal	33°00′ (33.0°)	39°30′ (39.50°)
		Maximum	34°00′ (34.0°)	40°30′ (40.50°)
	Outside Degree minute (Decimal degree)	Nominal	28°30′ (28.50°)	32°00′ (32.00°)

*1: Fuel, radiator coolant and engine oil full. Spare tire, jack, hand tools and mats in designated positions.

*2: On power steering models, wheel turning force (at circumference of steering wheel) of 98 to 147 N (10 to 15 kg, 22 to 33 lb) with engine idle.

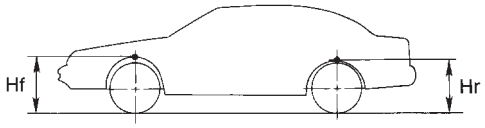
LOWER BALL JOINT

NFSU0022

Swinging force “A” (Measuring point: cotter pin hole of ball stud) N (kg, lb)	8.0 - 54.4 (0.82 - 5.55, 1.80 - 12.23)
Turning torque “B” N·m (kg-cm, in-lb)	0.50 - 3.40 (5 - 35, 4.3 - 30.4)
Vertical end play “C” mm (in)	0 (0)

WHEELARCH HEIGHT (UNLADEN*)

=NFSU0041



SFA818A

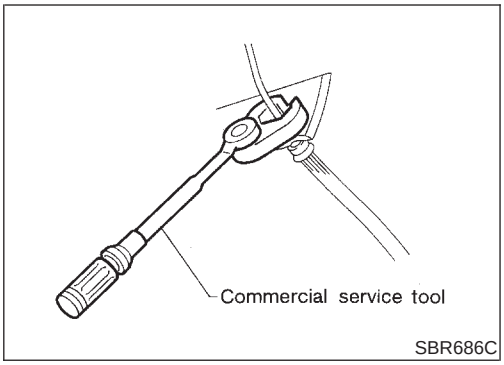
Applied model	Models with P225/50R17 tire	Models with P215/55R17 tire	Models with P215/55R16 tire
Front (Hf) mm (in)	711 (27.99)	717 (28.23)	702 (27.64)
Rear (Hr) mm (in)	694 (27.32)	704 (27.72)	688 (27.09)

*: Fuel, radiator coolant and engine oil full. Spare tire, jack, hand tools and mats in designated positions.

WHEEL RUNOUT

NFSU0023

Radial runout limit mm (in)	0.3 (0.012)
Lateral runout limit mm (in)	0.3 (0.012)



SBR686C

Precautions

PRECAUTIONS

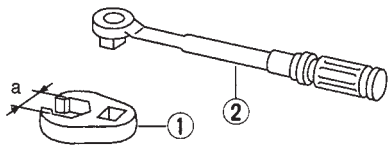
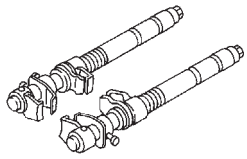
NFSU0024

- **When installing each rubber part, final tightening must be carried out under unladen condition* with tires on ground. Oil will shorten the life of rubber bushes. Be sure to wipe off any spilled oil.**
  ***: 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.**
- **Do not jack up at the trailing arm and lateral link.**
- **Always torque brake lines when installing.**
- **Lock nuts are unreusable parts; always use new ones. When replacing, do not wipe the oil off of the new lock nut before tightening.**

Preparation

COMMERCIAL SERVICE TOOLS

NFSU0026

Tool name	Description	
Equivalent to GG94310000 1 Flare nut crowfoot 2 Torque wrench	 NT360	Removing and installing brake piping **a: 10 mm (0.39 in)**
Spring compressor	 NT717	Removing and installing coil spring

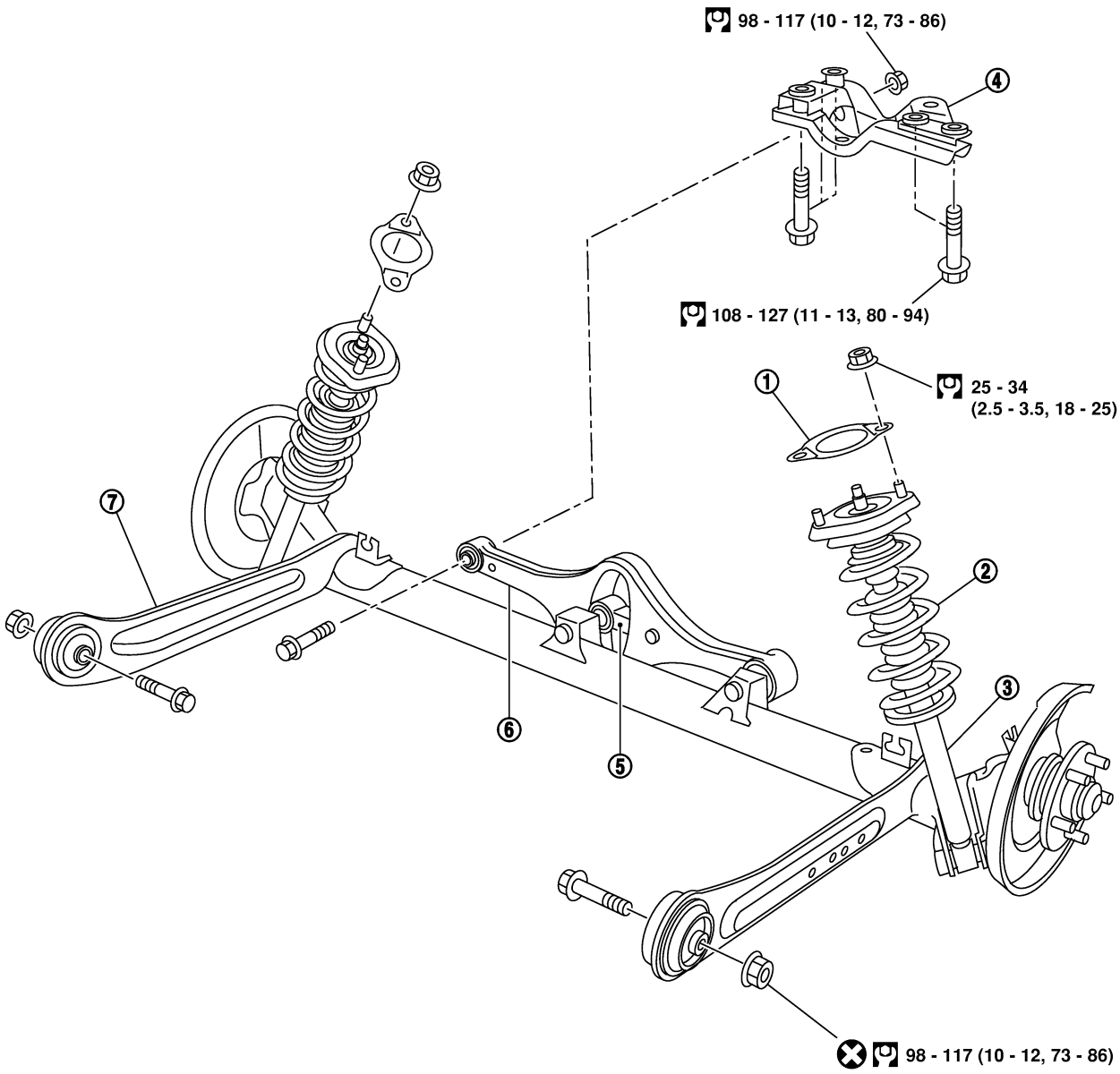
Noise, Vibration and Harshness (NVH) Troubleshooting

NFSU0027

Refer to “Noise, Vibration and Harshness (NVH) Troubleshooting”, “FRONT SUSPENSION”, SU-4.

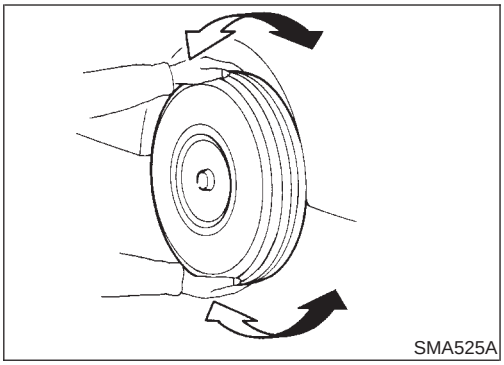
Components

NFSU0028



SSU013

1. Shock absorber mounting seal
2. Coil spring
3. Shock absorber
4. Suspension member
5. Control rod
6. Lateral link
7. Torsion beam


SMA525A

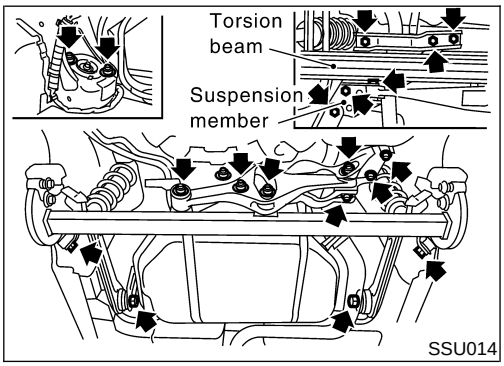
On-vehicle Service

REAR SUSPENSION PARTS

NFSU0029

Check axle and suspension parts for excessive play, wear or damage.

- Shake each rear wheel to check for excessive play.

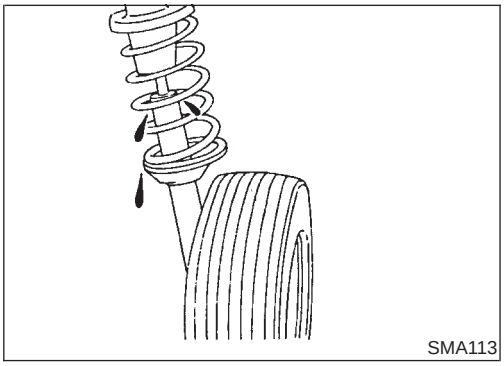


SSU014

- Retighten all nuts and bolts to the specified torque.

  Tightening torque:

  Refer to “REAR SUSPENSION”, SU-20.


SMA113

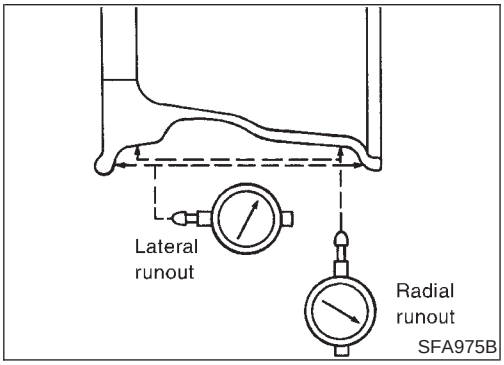
- Check shock absorber for oil leakage or other damage.
- Check wheelarch height. Refer to “On-vehicle Service”, “FRONT SUSPENSION PARTS”, SU-6.

REAR WHEEL ALIGNMENT

NFSU0030

Before checking rear wheel alignment, be sure to make a preliminary inspection (Unladen*).

*: Fuel, radiator coolant and engine oil full. Spare tire, jack, hand tools and mats in designated positions.



SFA975B

Preliminary Inspection

NFSU0030S01

1. Check tires for wear and improper inflation.
2. Check wheels for deformation, cracks and other damage. If deformed, remove wheel and check wheel runout.

a. Remove tire from wheel and mount wheel on a tire balance machine.

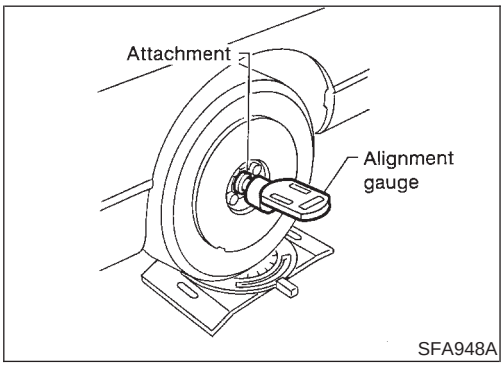
b. Set dial indicator as shown in the illustration.

   Wheel runout (Dial indicator value):

   Refer to SDS, SU-15.

3. Check front wheel bearings for looseness.

4. Check front suspension for looseness.
5. Check steering linkage for looseness.
6. Check that front shock absorbers work properly.
7. Check vehicle posture (Unladen).



Camber

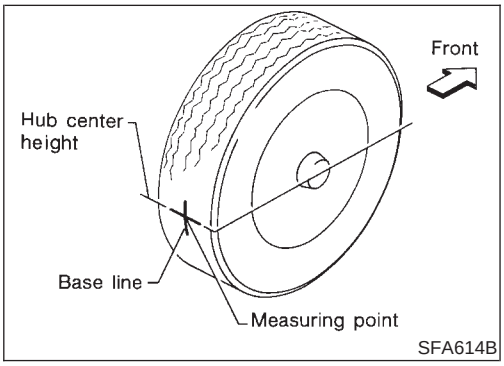
NFSU0030S02

Camber is preset at factory and cannot be adjusted.

Camber:

Refer to SDS, SU-25.

- If the camber is not within specification, inspect and replace any damaged or worn rear suspension parts.



Toe-in

NFSU0030S03

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:

- **Perform following procedure always on a flat surface.**
- **Make sure that no person is in front of the vehicle before pushing it.**

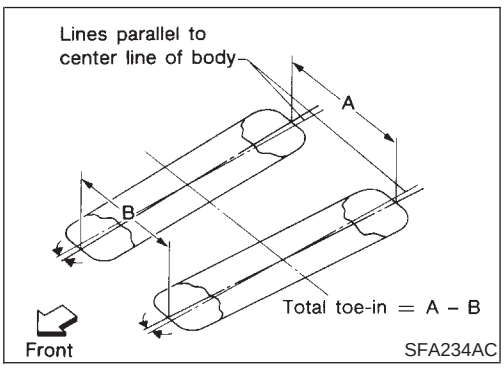
1. Bounce rear of vehicle up and down to stabilize the posture.
2. Push the vehicle straight ahead about 5 m (16 ft).
3. Put a mark on base line of the tread (rear side) of both tires at the same height of hub center. This mark is a measuring point.
4. Measure distance "A" (rear side).
5. Push the vehicle 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 side).

Total toe-in: A – B

Refer to SDS, SU-25.

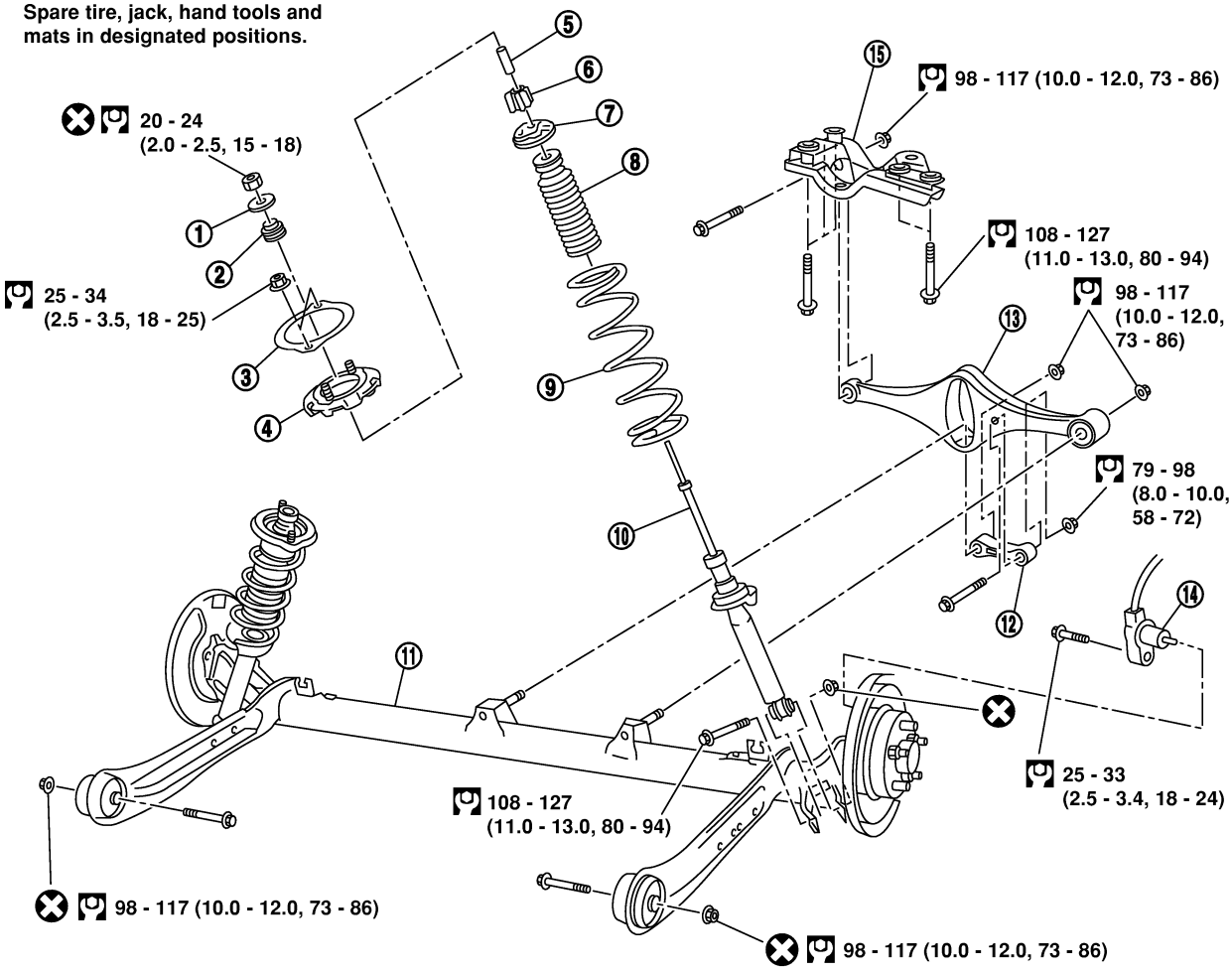


Removal and Installation

NFSU0031

SEC. 431

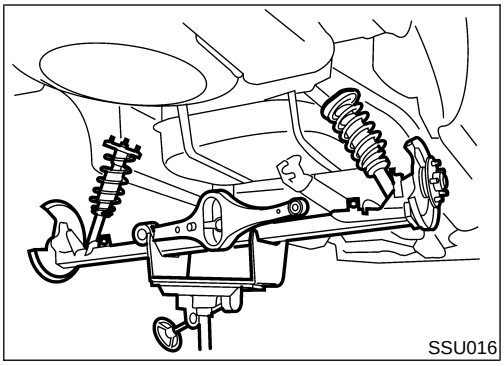
When installing each rubber part, final tightening must be carried out under unladen condition* with tires on ground.
*** Fuel, radiator coolant and engine oil full.**
Spare tire, jack, hand tools and mats in designated positions.

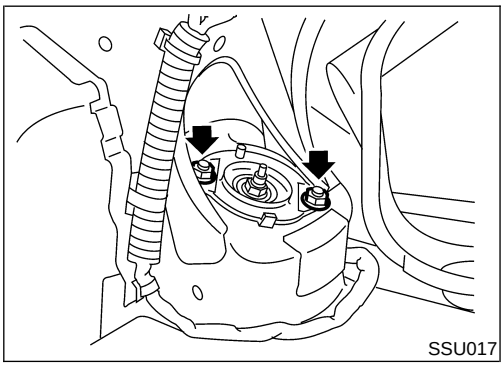


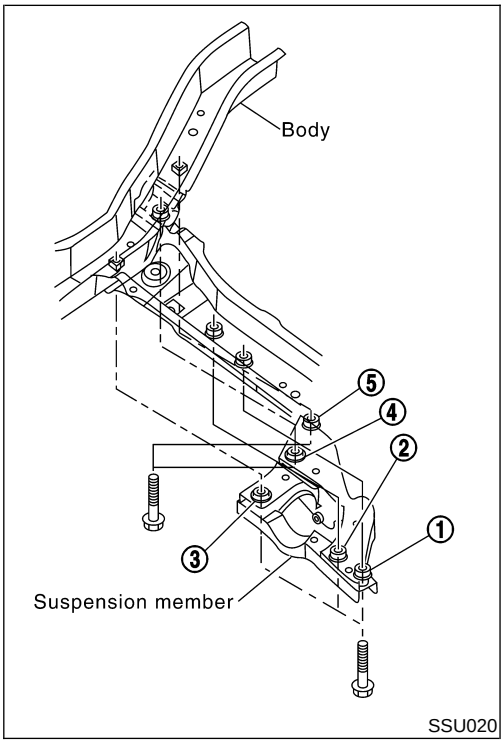
: N•m (kg-m, ft-lb)

SSU015

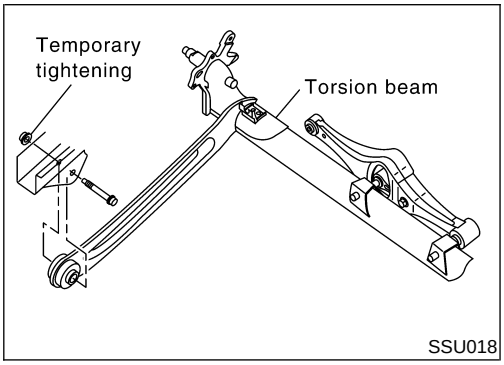
1. Washer
2. Bushing
3. Shock absorber mounting seal
4. Shock absorber mounting bracket
5. Distance tube
6. Bushing
7. Bound bumper cover
8. Bound bumper
9. Coil spring
10. Shock absorber
11. Torsion beam
12. Control rod
13. Lateral link
14. ABS sensor
15. Suspension member


SSU016


SSU017



SSU020



SSU018

REMOVAL

NFSU0031S01

CAUTION:

- **Before removing the rear suspension assembly, disconnect the ABS wheel sensor from the assembly. Failure to do so may result in damage to the sensor wires and the sensor becoming inoperative.**
- Remove suspension assembly.

1. Remove tires, then remove brake hose lock plate.
2. Disconnect parking brake cable from caliper and remove brake caliper and rotor.

Suspend caliper assembly with wire so as not to stretch brake hose.
Be careful not to depress brake pedal, or piston will pop out. Make sure brake hose is not twisted.

3. Using a transmission jack, raise torsion beam a little, and remove nuts and bolts from the trailing arm, shock absorber assembly (lower side) and lateral link.
4. Lower transmission jack, and remove suspension.
5. Remove trunk room trim. Refer to BT-41, "Trunk Room", "INTERIOR TRIM".
6. Remove strut securing nuts (upper side). Then pull out strut assembly.

INSTALLATION

NFSU0031S02

- Install suspension assembly.

CAUTION:

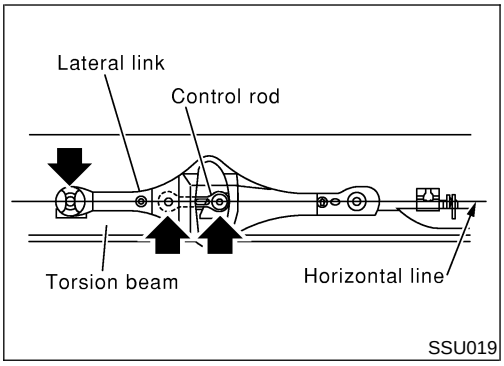
Refill with new brake fluid "DOT 3".
Never reuse drained brake fluid.

1. Install suspension member.

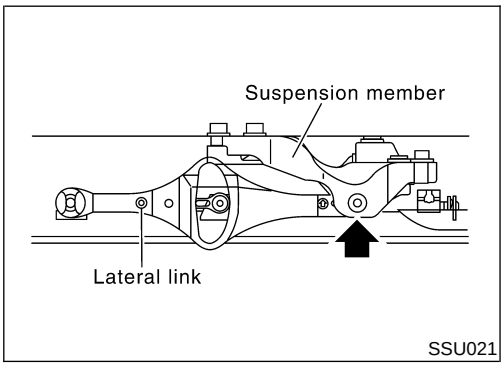
a. Temporarily tighten bolt 5.
b. Tighten all bolts in numerical order shown in the figure.

Tightening torque:
Refer to SU-20.

2. Attach control rod to lateral link. Do not tighten bolts at this time.
3. Attach lateral link, control rod and torsion beam to vehicle. Do not tighten bolts at this time.



4. Using a transmission jack to lift the torsion beam, place lateral link and control rod horizontally against torsion beam. Tighten bolts and nuts to specified torque.



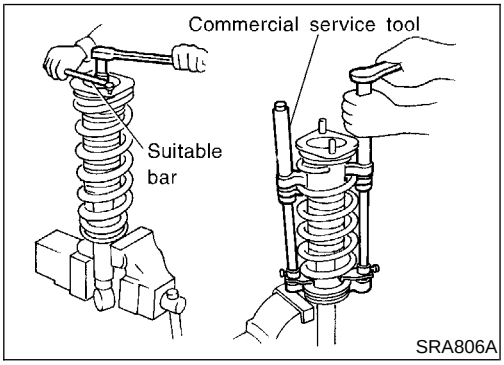
5. Tighten lateral link at suspension member.
6. Attach shock absorber assembly to vehicle. Then tighten the upper side of shock absorber assembly.
7. Remove transmission jack and lower torsion beam so that the shock absorber assembly reaches full extension. Tighten torsion beam and lower side of shock absorber assembly to specified torque.

Coil Spring and Shock Absorber

REMOVAL AND INSTALLATION

NFSU0032

Remove shock absorber upper and lower fixing nuts.
Do not remove piston rod lock nut on vehicle.



DISASSEMBLY

NFSU0033

1. Set shock absorber in vise, then **loosen** piston rod lock nut. **Do not remove piston rod lock nut at this time.**
2. Compress spring with Tool so that the shock absorber upper spring seat can be turned by hand.

WARNING:
Make sure that the pawls of the two spring compressors are firmly hooked on the spring. The spring compressors must be tightened alternately so as not to tilt the spring.

3. Remove piston rod lock nut.

INSPECTION

NFSU0034

Shock Absorber Assembly

NFSU0034S01

- Check for smooth operation through a full stroke, both compression and extension.
- Check for oil leakage on welded or gland packing portions.
- Check piston rod for cracks, deformation or other damage. Replace if necessary.

Upper Rubber Seat and Bushing

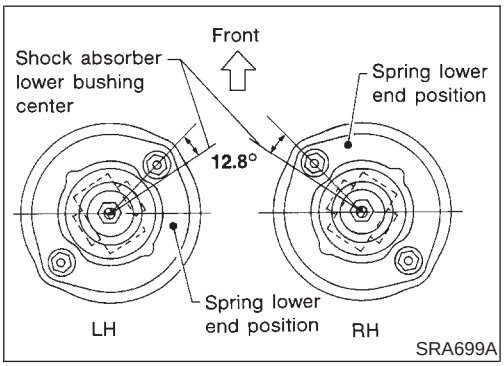
NFSU0034S02

Check rubber parts for deterioration or cracks.
Replace if necessary.

Coil Spring

NFSU0034S03

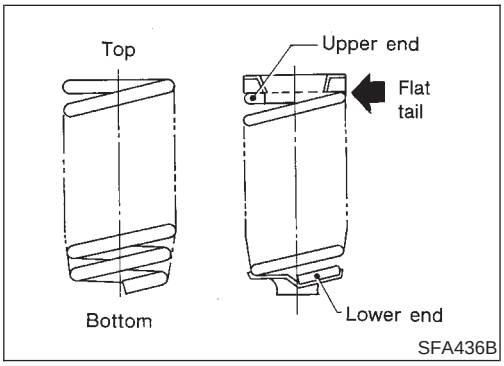
Check for cracks, deformation or other damage. Replace if necessary.



ASSEMBLY

NFSU0035

- Locate upper spring seat as shown.



- When installing coil spring, be careful not to reverse top and bottom direction. (Top end is flat.)
- When installing coil spring on shock absorber, it must be positioned as shown in figure at left.

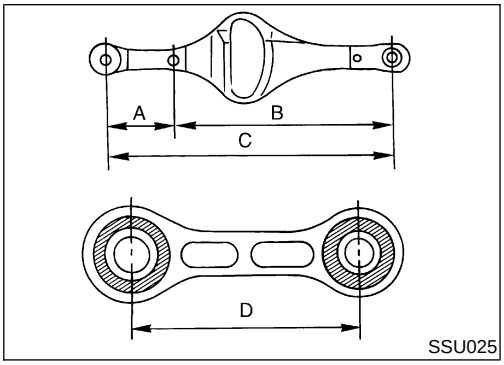
CAUTION:
Do not reuse piston rod lock nut.

Torsion Beam, Lateral Link and Control Rod

DISASSEMBLY

NFSU0036

- Remove torsion beam assembly. Refer to "Removal and Installation", "REAR SUSPENSION", SU-21.
- Remove lateral link and control rod from torsion beam.



INSPECTION

NFSU0037

- Check for cracks, distortion or other damage. Replace if necessary.

  Standard length:

  A 206.5 - 208.5 mm (8.13 - 8.21 in)
  B 393.5 - 395.5 mm (15.49 - 15.57 in)
  C 600 - 604 mm (23.62 - 23.78 in)
  D 106 - 108 mm (4.17 - 4.25 in)

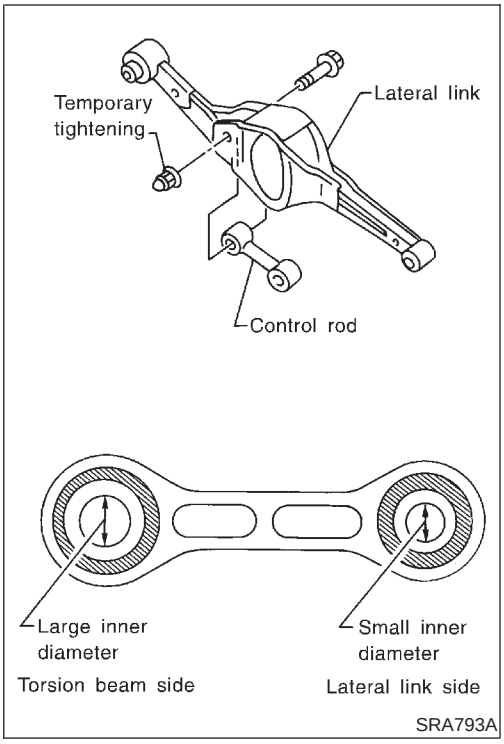
- Check all rubber parts for wear, cracks or deformation. Replace if necessary.

ASSEMBLY

NFSU0038

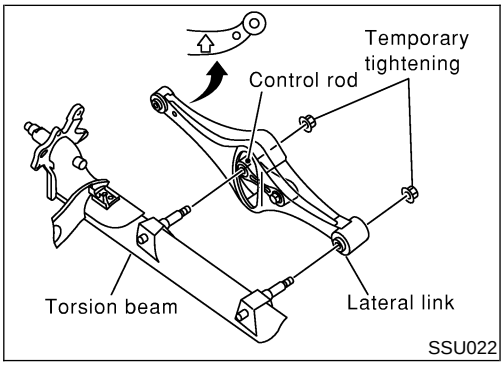
1. Temporarily assemble lateral link and control rod.

- When installing the control rod, connect the bush with the smaller inner diameter to the lateral link.

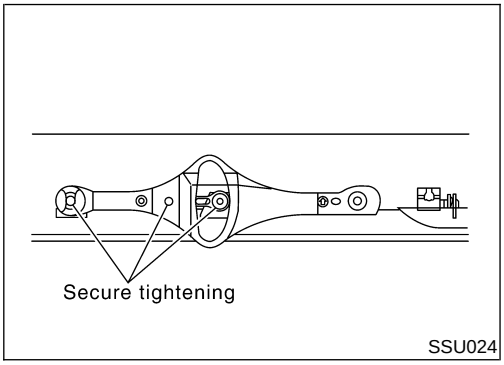


2. Temporarily install lateral link and control rod on torsion beam.

- When installing, place lateral link with the arrow topside.



3. Place lateral link and control rod horizontally against torsion beam, and tighten to the specified torque.
4. Install torsion beam assembly. Refer to "Removal and Installation", "REAR SUSPENSION", SU-21.



Service Data and Specifications (SDS)

GENERAL SPECIFICATIONS (REAR)

=NFSU0039

Suspension type	Multi-link beam suspension
Shock absorber type	Double-acting hydraulic

REAR WHEEL ALIGNMENT (UNLADEN*)

NFSU0040

Camber Degree minute (Decimal degree)		Minimum	−1°45′ (−1.75°)
		Nominal	−1°00′ (−1.00°)
		Maximum	−0°15′ (−0.25°)
Total toe-in	Distance (A − B) mm (in)	Minimum	−3 (−0.12)
		Nominal	1 (0.04)
		Maximum	5 (0.20)
	Angle (left plus right) Degree minute (Decimal degree)	Minimum	0′ (0°)
		Nominal	24′ (0.40°)
		Maximum	48′ (0.80°)

*: Fuel, radiator coolant and engine oil full. Spare tire, jack, hand tools and mats in designated positions.

NOTES

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Precautions

NFGI0001

Observe the following precautions to ensure safe and proper servicing. These precautions are not described in each individual section.

SGI646

PRECAUTIONS FOR SUPPLEMENTAL RESTRAINT SYSTEM (SRS) "AIR BAG" AND "SEAT BELT PRE-TENSIONER"

NFGI0001S01

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER" used along with a seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. The SRS system composition which is available to NISSAN MODEL A33 is as follows:

- For a frontal collision
  The Supplemental Restraint System consists of driver air bag module (located in the center of the steering wheel), front passenger air bag module (located on the instrument panel on passenger side), seat belt pre-tensioners, a diagnosis sensor unit, crash zone sensor, warning lamp, wiring harness and spiral cable.
- For a side collision
  The Supplemental Restraint System consists of front side air bag module (located in the outer side of front seat), satellite sensor, diagnosis sensor unit (one of components of air bags for a frontal collision), wiring harness, warning lamp (one of components of air bags for a frontal collision).

Information necessary to service the system safely is included in the **RS 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 should be performed by an authorized NISSAN 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 RS 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 harness connector.**

PRECAUTIONS FOR NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM — NATS)

NFGI0001S02

NVIS (NATS) will immobilize the engine if someone tries to start it without the registered key of NVIS (NATS).
Both of the originally supplied ignition key IDs have been NVIS (NATS) registered.

The security indicator is located on the instrument panel. The indicator blinks when the ignition switch is in "OFF" or "ACC" position. Therefore, NVIS (NATS) warns outsiders that the vehicle is equipped with the anti-theft system.

- When NVIS (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 NVIS (NATS) (trouble diagnoses, system initialization and additional registration of other NVIS (NATS) ignition key IDs), CONSULT-II hardware and CONSULT-II NVIS (NATS) software is necessary.
  Regarding the procedures of NVIS (NATS) initialization and NVIS (NATS) ignition key ID registration, refer to CONSULT-II operation manual, NVIS (NATS).

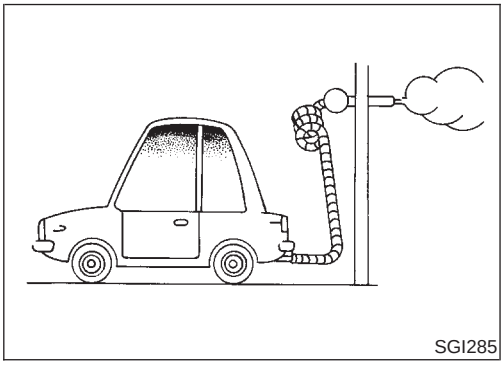
Therefore, CONSULT-II NVIS (NATS) software (program card and operation manual) must be kept strictly confidential to maintain the integrity of the anti-theft function.

- When servicing NVIS (NATS) (trouble diagnoses, system initialization and additional registration of other NVIS (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 five key IDs can be registered into NVIS (NATS).
- When failing to start the engine first time using the key of NVIS (NATS), start as follows.

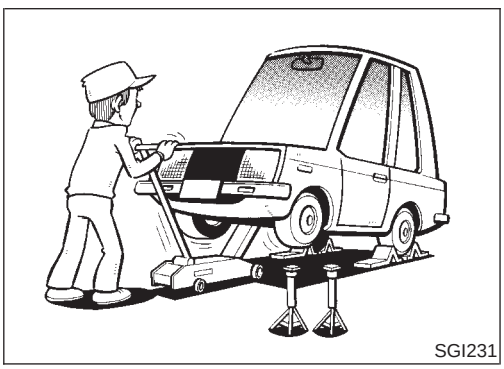
a) Leave the ignition key in "ON" position for approximately 5 seconds.
b) Turn ignition key to "OFF" or "LOCK" position and wait approximately 5 seconds.
c) Repeat step 1 and 2 again.
d) Restart the engine while keeping the key separate from any others on key-chain.

GENERAL PRECAUTIONS

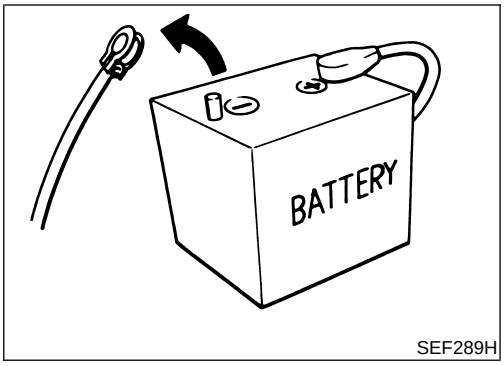
NFGI0001S03


SGI285

- 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.

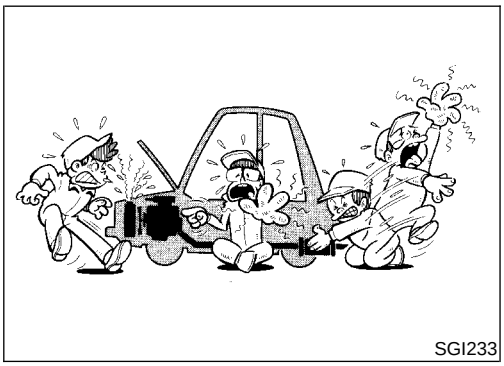

SGI231

- 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, 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.

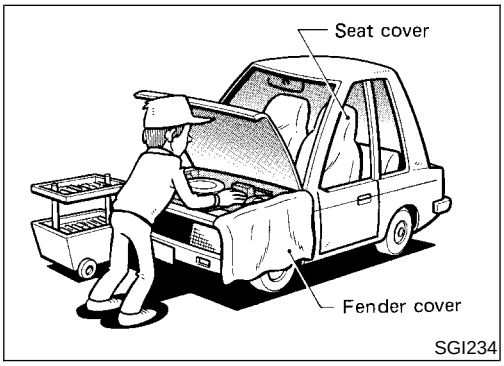


SEF289H

- Before starting repairs which do not require battery power:
  Turn off ignition switch.
  Disconnect the negative battery terminal.


SGI233

- To prevent serious burns:
  Avoid contact with hot metal parts.
  Do not remove the radiator cap when the engine is hot.



SGI234

- Before servicing the vehicle:
  Protect fenders, upholstery and carpeting with appropriate covers.
  Take caution that keys, buckles or buttons do not scratch paint.

- Clean all disassembled parts in the designated liquid or solvent prior to inspection or assembly.
- 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 ECMs).
  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.
- 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.

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.

SGI787

PRECAUTIONS FOR MULTIPORT FUEL INJECTION SYSTEM OR ENGINE CONTROL SYSTEM

NFGI0001S04

- 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.

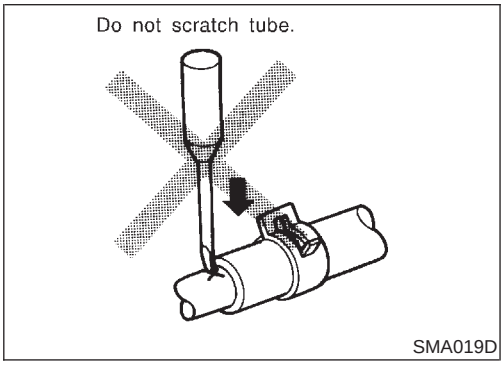
PRECAUTIONS FOR THREE WAY CATALYST

NFGI0001S05

If a large amount of unburned fuel flows into the catalyst, the catalyst temperature will be excessively high. To prevent this, follow the instructions below:

- 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.



SMA019D

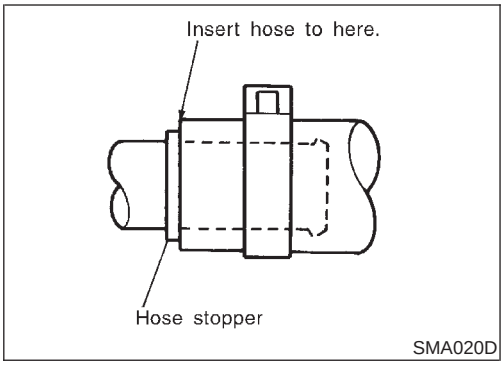
PRECAUTIONS FOR HOSES

NFGI0001S06

Hose Removal and Installation

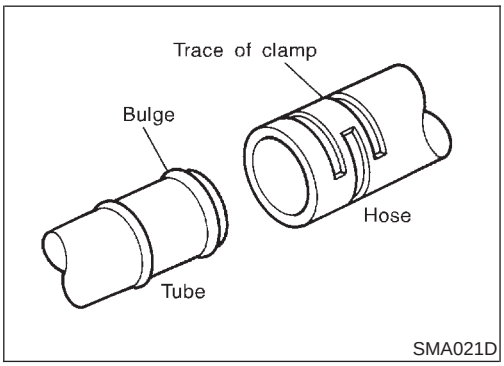
NFGI0001S0601

- To prevent damage to rubber hose, do not pry off rubber hose with tapered tool or screwdriver.



SMA020D

- To reinstall the rubber hose securely, make sure of hose insertion length and clamp orientation. (If tube is equipped with hose stopper, insert rubber hose into tube until it butts up against hose stopper.)

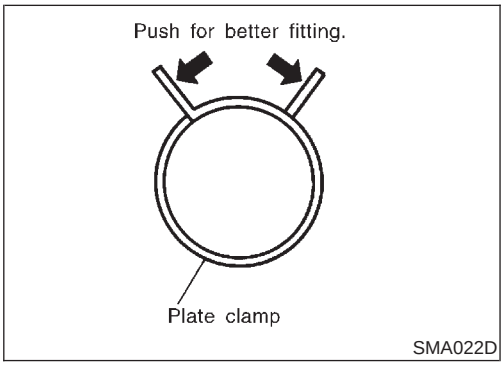


SMA021D

Hose Clamping

NFGI0001S0602

- 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.



SMA022D

- After installing leaf spring clamps, apply force to them in the direction of the arrow, tightening rubber hose equally all around.

PRECAUTIONS FOR ENGINE OILS

NFGI0001S07

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

NFGI0001S0701

- 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 underclothing, 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, kerosine, diesel fuel, gas oil, thinners or solvents for cleaning skin.
- If skin disorders develop, obtain medical advice without delay.
- Where practicable, 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

NFGI0001S0702

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 courses.

The regulations concerning the pollution vary between regions.

PRECAUTIONS FOR FUEL

NFGI0001S08

Use premium unleaded gasoline with an octane rating of at least 91 AKI (Anti-Knock Index) number (research octane number 96). If premium unleaded gasoline is not available, regular unleaded gasoline with an octane rating of at least 87 AKI (research octane number 91) 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.

PRECAUTIONS FOR AIR CONDITIONING

NFGI0001S09

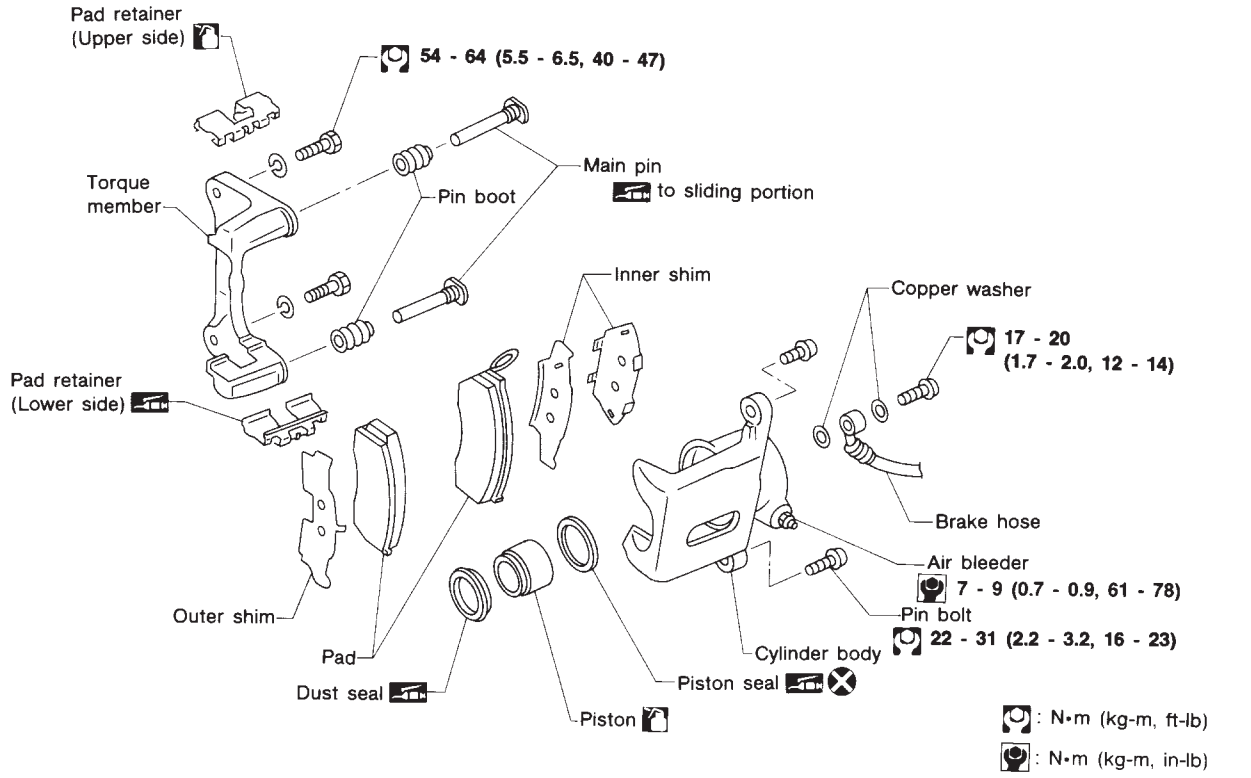
Use an approved refrigerant recovery unit any time the air conditioning system must be discharged. Refer to HA section ("HFC-134a (R-134a) Service Procedure", "SERVICE PROCEDURES") for specific instructions.

HOW TO USE THIS MANUAL

- 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.
- **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 letters which designate the particular section and a number (e.g. "BR-5").
- **THE LARGE ILLUSTRATIONS** are exploded views (See below.) 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**.

"Example"

SEC. 440



- **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.
- 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"
  Tightening torque:
  59 - 78 N·m (6.0 - 8.0 kg-m, 43 - 58 ft-lb)
- **TROUBLE DIAGNOSES** are included in sections dealing with complicated components.

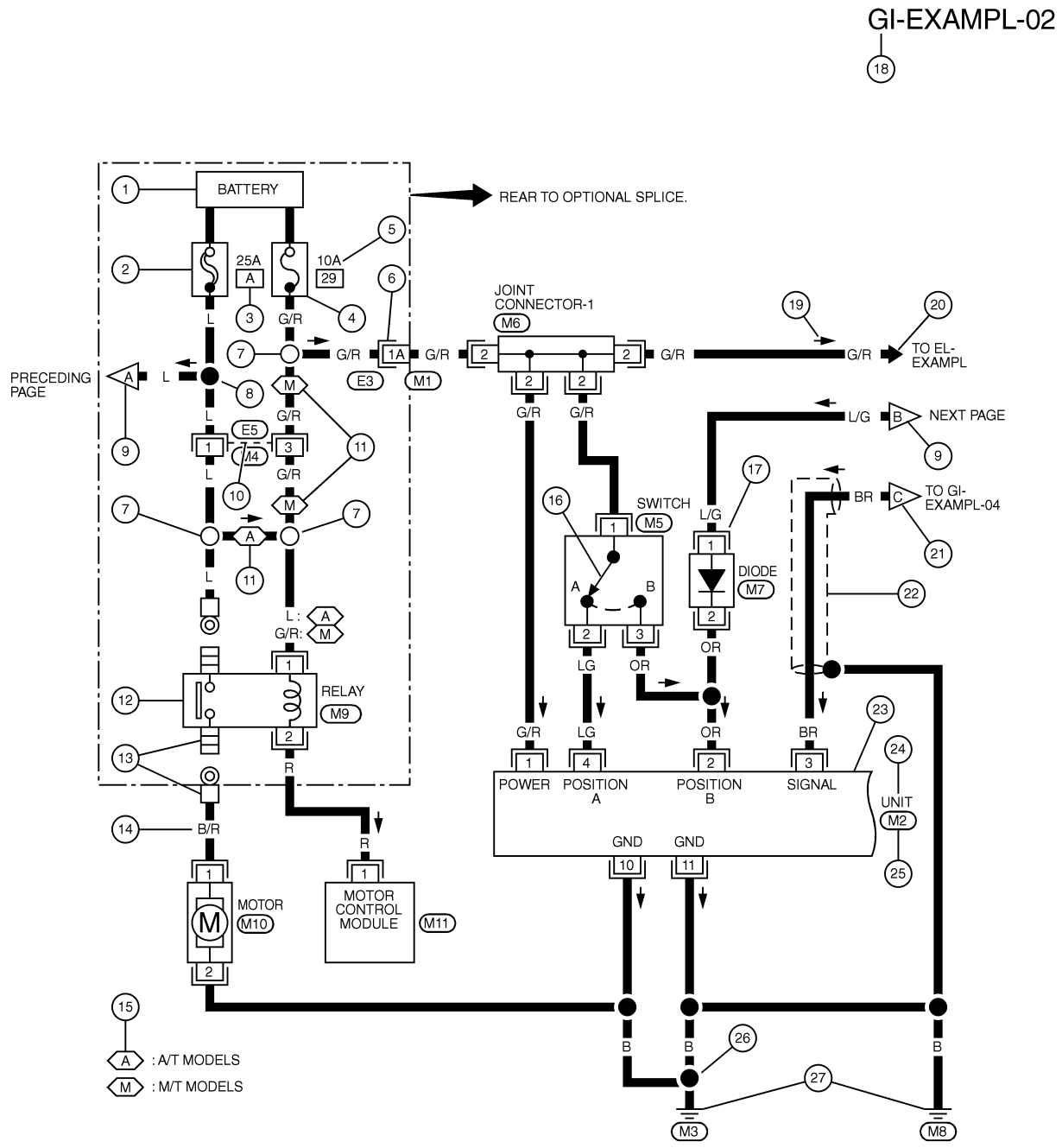
- **SERVICE DATA AND SPECIFICATIONS** are contained at the end of each section for quick reference of data.
- The following **SYMBOLS AND ABBREVIATIONS** are used:

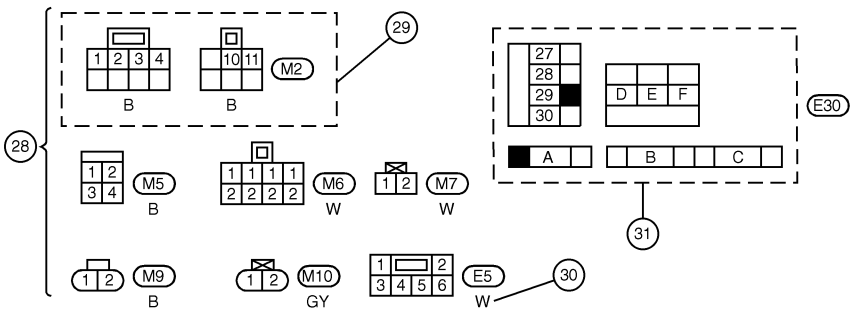
SYMBOL	ABBREVIATION	SYMBOL	ABBREVIATION
	Tightening torque	2WD	2-Wheel Drive
	Should be lubricated with grease. Unless otherwise indicated, use recommended multi-purpose grease.	A/C	Air Conditioner
	Should be lubricated with oil.	P/S	Power Steering
	Sealing point	SST	Special Service Tools
	Checking point	SAE	Society of Automotive Engineers, Inc.
	Always replace after every disassembly.	ATF	Automatic Transmission Fluid
	Apply petroleum jelly.	D_1	Drive range 1st gear
	Apply ATF.	D_2	Drive range 2nd gear
★	Select with proper thickness.	D_3	Drive range 3rd gear
☆	Adjustment is required.	D_4	Drive range 4th gear
SDS	Service Data and Specifications	OD	Overdrive
LH, RH	Left-Hand, Right-Hand	2_2	2nd range 2nd gear
FR, RR	Front, Rear	2_1	2nd range 1st gear
M/T	Manual Transaxle/Transmission	1_2	1st range 2nd gear
A/T	Automatic Transaxle/Transmission	1_1	1st range 1st gear

Sample/Wiring Diagram — EXAMPL —

NFGI0003S01

- For Description, refer to GI-14.





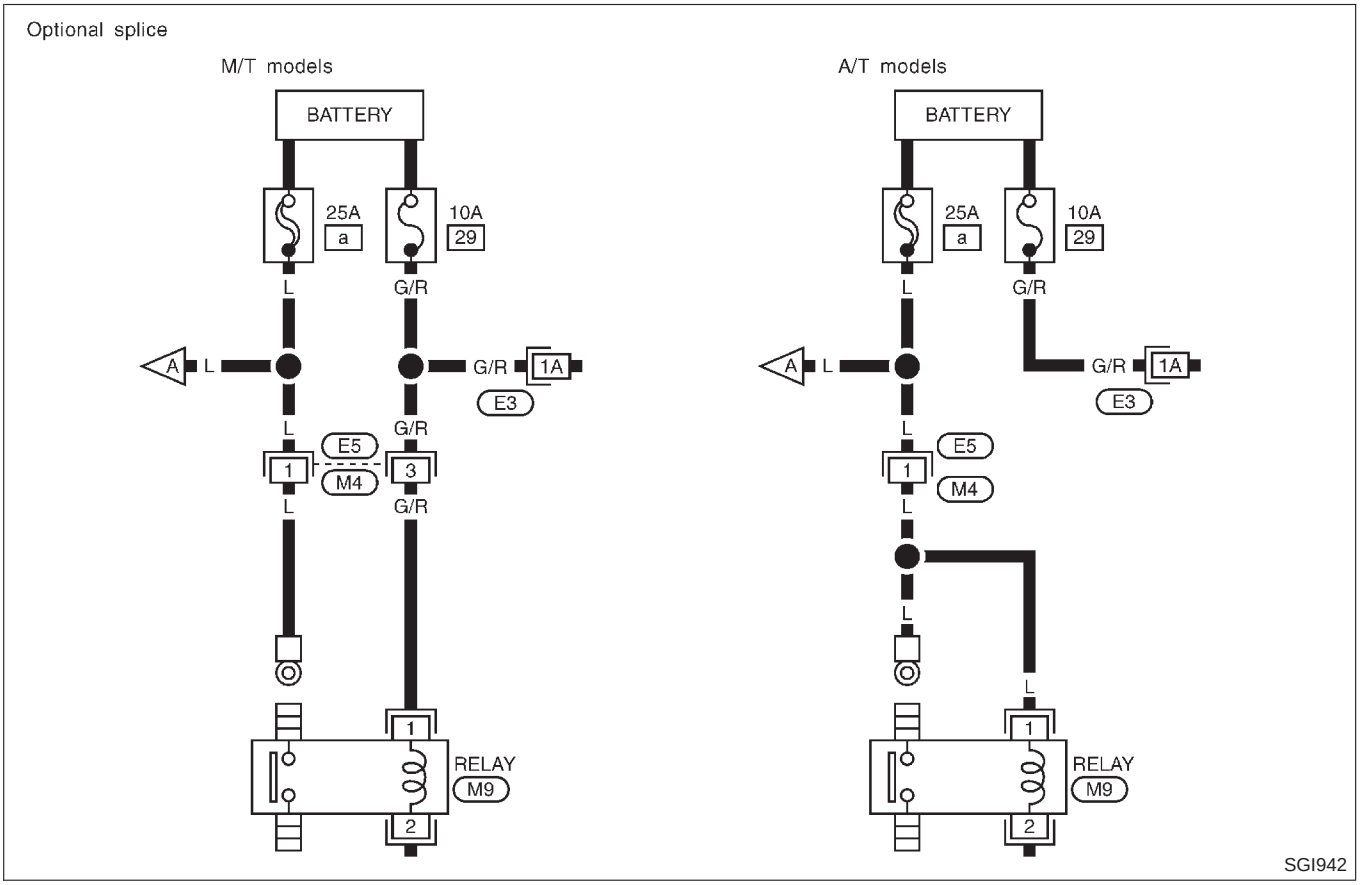
REFER TO THE FOLLOWING.
E3 -SUPER MULTIPLE JUNCTION (SMJ)
M11 -ELECTRICAL UNITS

SGI091A

OPTIONAL SPLICE

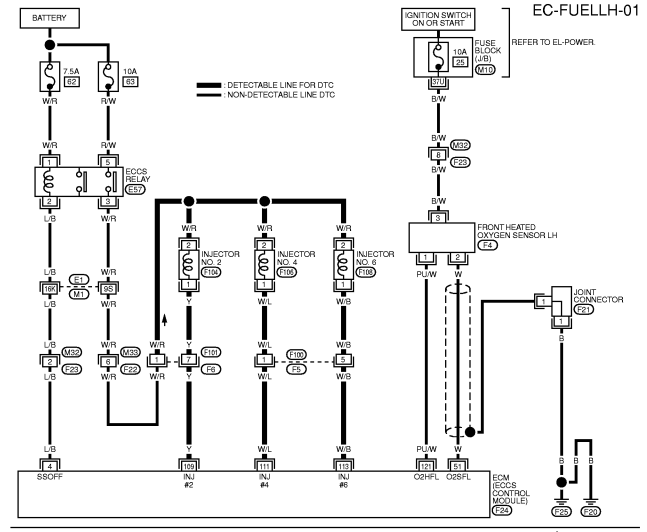
NFGI0003S0101

Optional splice



CONTROL UNIT TERMINALS AND REFERENCE VALUE CHART

NFGI0003S0102



Some wiring diagrams may have the control unit terminals and reference value chart. The chart describes the specification data of control unit terminals as reference value.

CONTROL UNIT TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND XX)

Pin	Item	Condition	Spec.
10	Driver and passenger door lock mortors	Ignition key is in "ON" position	12V
10	Driver and passenger door lock mortors	Ignition key is in "ON" position	12V
10	Driver and passenger door lock mortors	Ignition key is in "ON" position	12V
10	Driver and passenger door lock mortors	Ignition key is in "ON" position	12V
10	Driver and passenger door lock mortors	Ignition key is in "ON" position	12V
10	Driver and passenger door lock mortors	Ignition key is in "ON" position	12V
10	Driver and passenger door lock mortors	Ignition key is in "ON" position	12V
10	Driver and passenger door lock mortors	Ignition key is in "ON" position	12V
10	Driver and passenger door lock mortors	Ignition key is in "ON" position	12V

Control unit terminals and reference value chart

SGI095A

Description

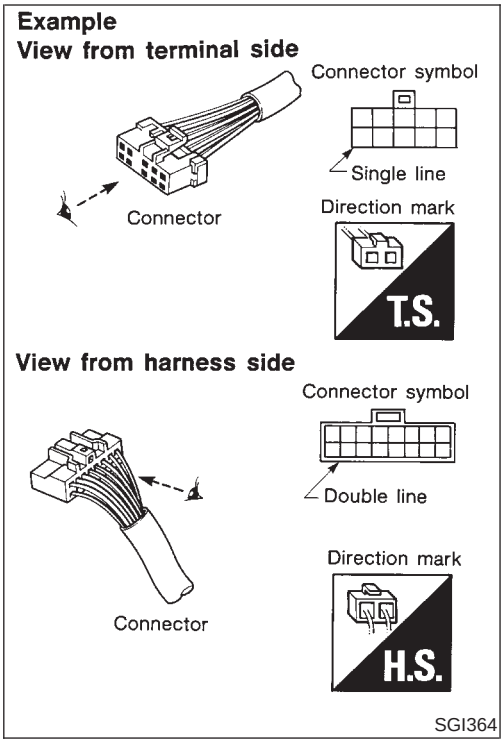
=NFGI0003S02

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 EL-18, “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 GI-19.
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 EL-8, “STANDARDIZED RELAY”.
13	Connectors	● This shows that the connector is connected to the body or a terminal with bolt or nut.
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 = Orange P = Pink PU = Purple GY = 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.

Description (Cont'd)

Number	Item	Description
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 EL 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 EL-19, "GROUND DISTRIBUTION".
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. Refer to EL-11, "POWER SUPPLY ROUTING". 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), Electrical Units, exists at the end of the manual. Refer to GI-19 for details.

Description (Cont'd)

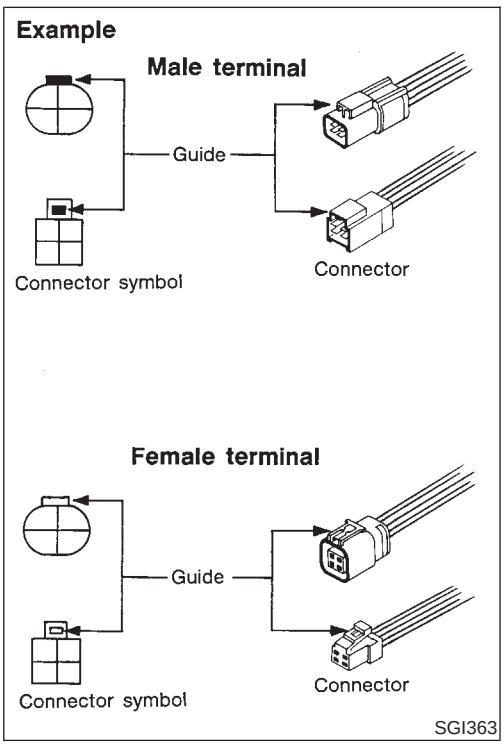


CONNECTOR SYMBOLS

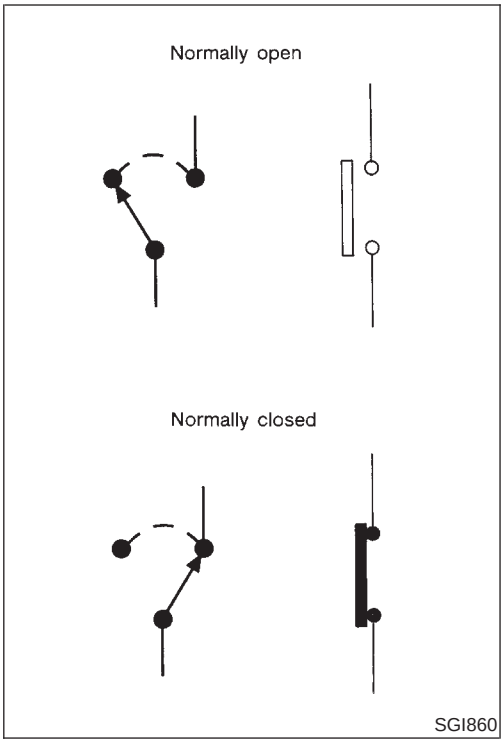
=NFGI0003S0201

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 EL-6, "Description", "HARNESS CONNECTOR".



- Male and female terminals
  Connector guides for male terminals are shown in black and female terminals in white in wiring diagrams.



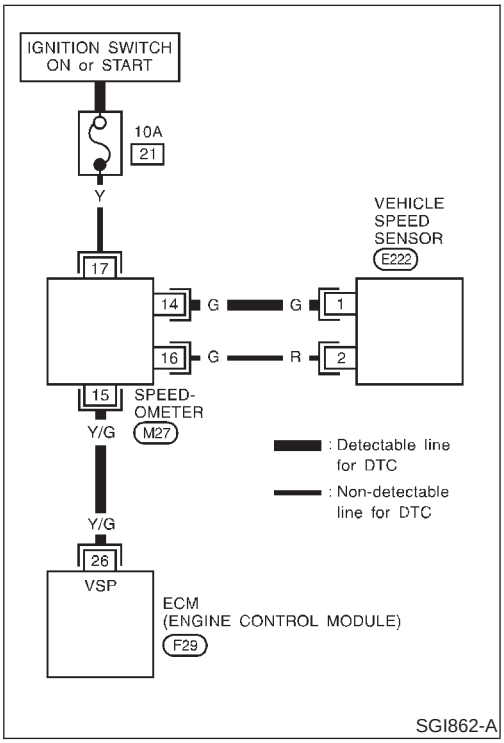
SWITCH POSITIONS

NFGI0003S0204

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

NFGI0003S0205

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

=NFGI0003S0206

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.

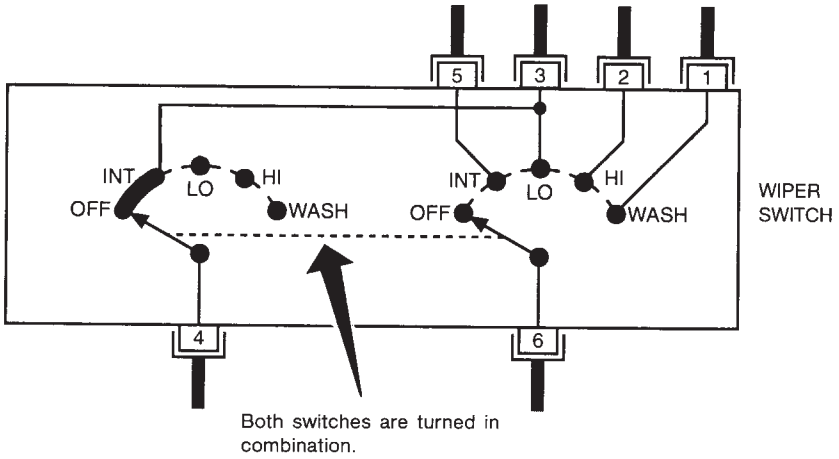
Example

(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

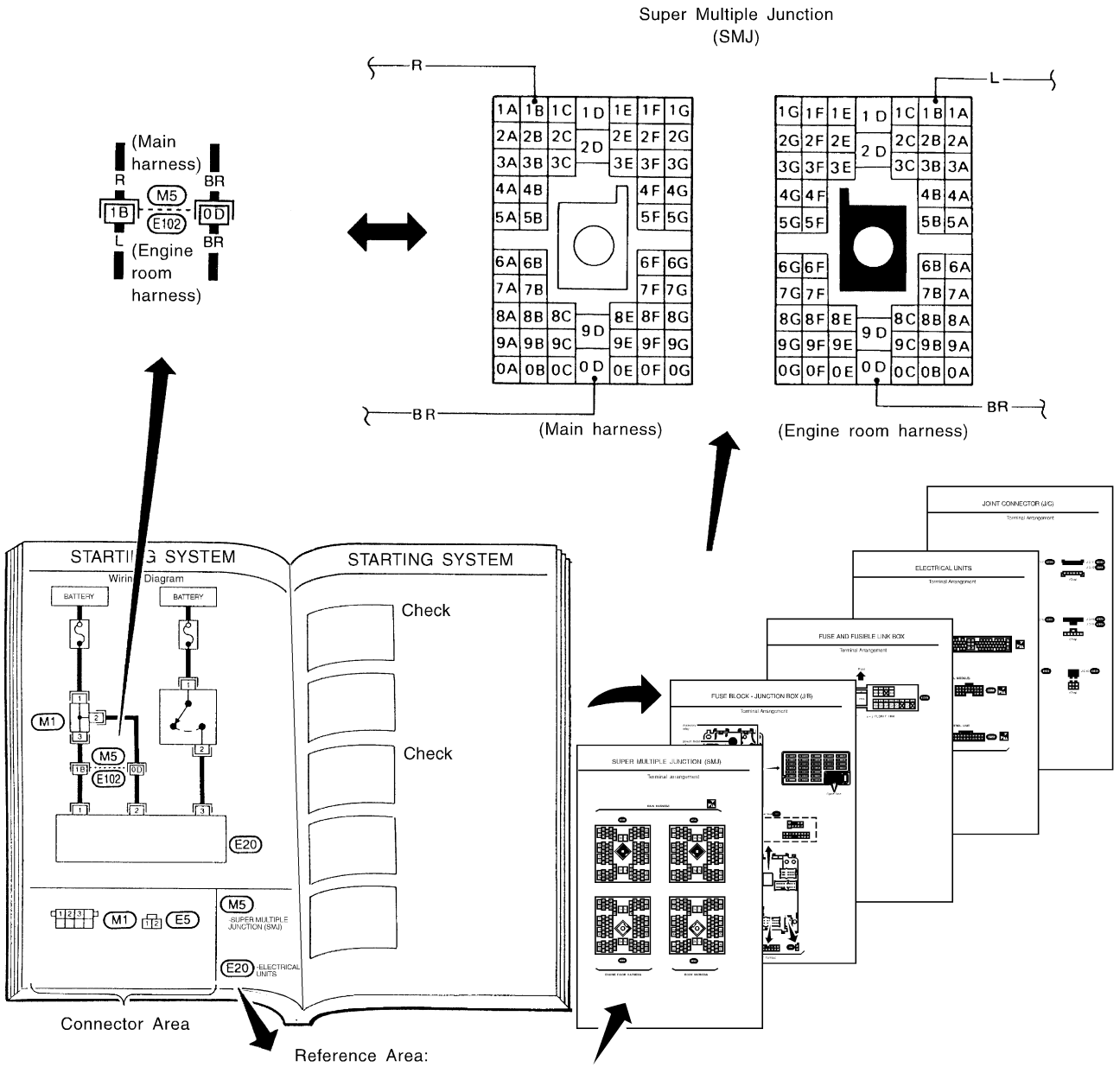
SGI875

REFERENCE AREA

=NFGI0003S0207

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



Super multiple junction (SMJ)

In a wiring diagram, the SMJ connectors include a letter of the alphabet in the terminal number.

SMJ connector numbers are shown in the Reference Area of the wiring diagram. SMJ terminal arrangement can be found on the electrical reference pages at the end of the manual. For terminal arrangement of these connectors, refer to the "SUPER MULTIPLE JUNCTION (SMJ)" electrical reference page at the end of the

manual.

Fuse block — Junction box (J/B)

Fuse block — Junction box (J/B) connector number is shown in the Reference Area of the wiring diagram. For connector terminal and fuse arrangement, refer to the "FUSE BLOCK — Junction Box (J/B)" electrical reference page at the end of the manual.

Fuse and fusible link box

For fuse arrangement in the fuse and fusible link box, refer to the "FUSE AND FUSIBLE LINK BOX" electrical reference page at the end of the manual.

Electrical units

Electrical unit connector symbols are shown in the Connector Area of the wiring diagram.

However, when there is not enough space to show the connector terminal arrangement in the Connector Area of the wiring diagram, the electrical unit connector number is shown in the Reference Area of the wiring diagram. For electrical unit connector terminal arrangement, refer to the "ELECTRICAL UNITS" electrical reference page at the end of the manual. Most of the electrical unit connectors on this page are shown from the harness side of the connector.

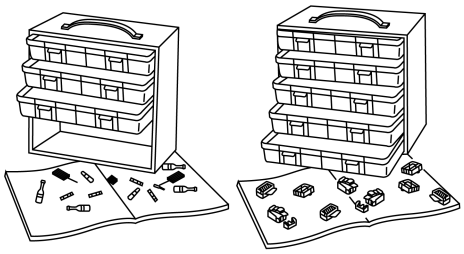
Joint connector

Joint connector symbols are shown in the connector area of the wiring diagram. For connector internal wiring layout and joint connector terminal arrangement, refer to the "JOINT CONNECTOR (J/C)" electrical reference page at the end of the manual.

Connector and Terminal Pin Kit

NFGI0004S01

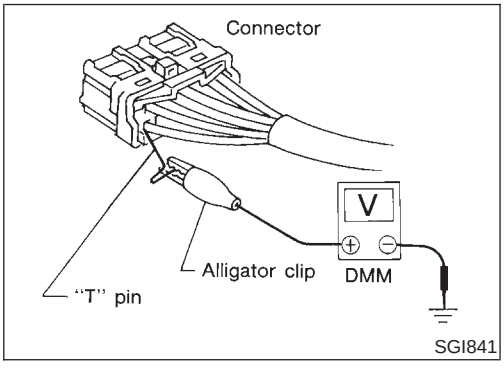
Use the connector and terminal pin kit listed below when replacing connectors or terminals.
The connector and terminal pin kit contains some of the most commonly used NISSAN connectors and terminals.

Tool number (Kent-Moore No.) Tool name	Description
— (J38751-95NI) Connector and terminal pin kit — (J42992-98KIT) OBD Terminal Repair Kit	J42992-98KIT J38751-95NI  AGI121

How to Probe Connectors

NFGI0004S02

Connector damage and an intermittent connection can result from improperly probing of the connector during circuit checks.
The probe of a digital multimeter (DMM) may not correctly fit the connector cavity. To correctly probe the connector, follow the procedures below using a “T” pin. For the best contact grasp the “T” pin using an alligator clip.



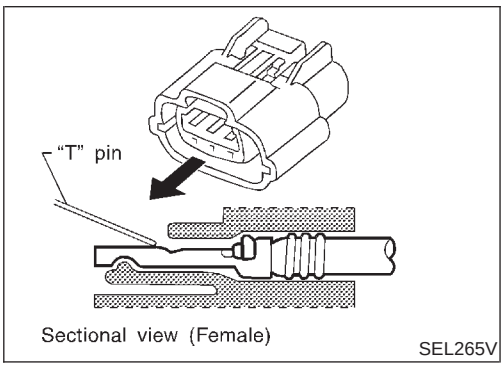
SGI841

PROBING FROM HARNESS SIDE

NFGI0004S0201

Standard type (not waterproof type) connector should be probed from harness side with “T” pin.

- **If the connector has a rear cover such as a ECM connector, remove the rear cover before probing the terminal.**
- **Do not probe waterproof connector from harness side. Damage to the seal between wire and connector may result.**



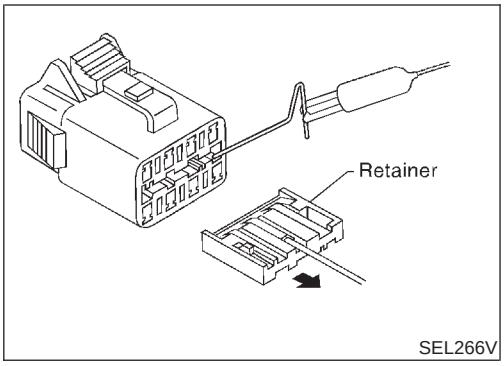
SEL265V

PROBING FROM TERMINAL SIDE

NFGI0004S0202

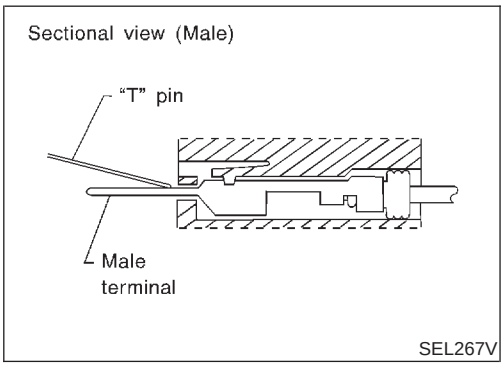
Female terminal

- There is a small notch above each female terminal. Probe each terminal with the “T” pin through the notch.
  Do not insert any object other than the same type male terminal into female terminal.



SEL266V

- Some connectors do not have a notch above each terminal. To probe each terminal, remove the connector retainer to make contact space for probing.



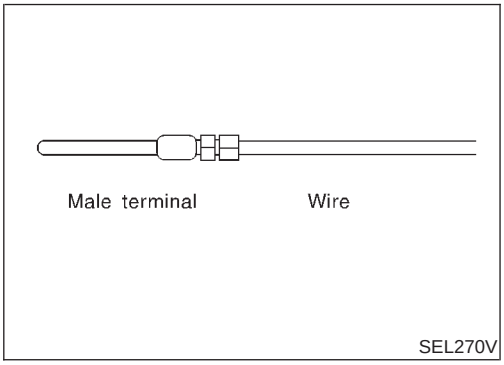
SEL267V

Male terminal
Carefully probe the contact surface of each terminal using a "T" pin.
Do not bend terminal.

How to Check Enlarged Contact Spring of Terminal

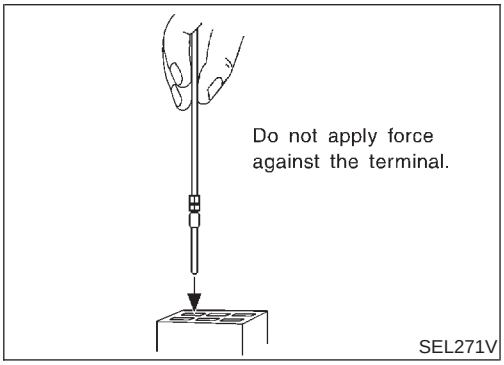
NFGI0004S03

An enlarged contact spring of a terminal may create intermittent signals in the circuit.
If the intermittent open circuit occurs, follow the procedure below to inspect for open wires and enlarged contact spring of female terminal.



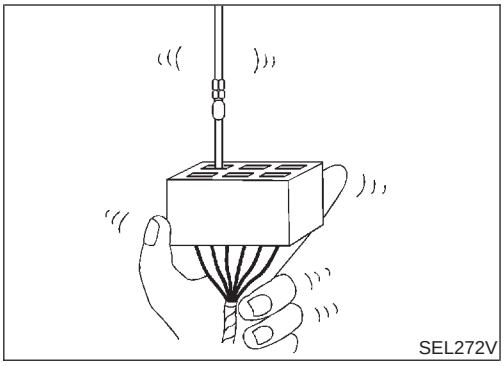
SEL270V

1. Assemble a male terminal and approx. 10 cm (3.9 in) of wire.
   Use a male terminal which matches the female terminal.
2. Disconnect the suspected faulty connector and hold it terminal side up.

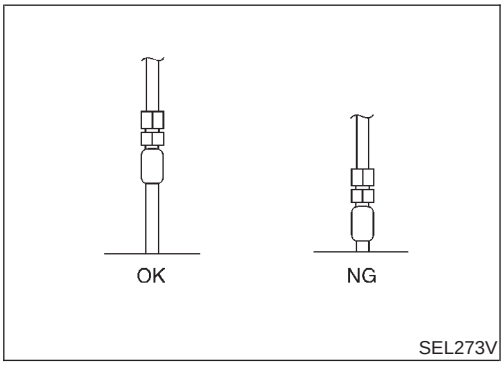


SEL271V

3. While holding the wire of the male terminal, try to insert the male terminal into the female terminal.
   Do not force the male terminal into the female terminal with your hands.

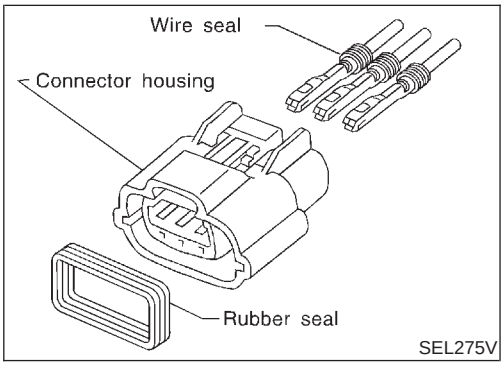

SEL272V

4. While moving the connector, check whether the male terminal can be easily inserted or not.



SEL273V

- If the male terminal can be easily inserted into the female terminal, replace the female terminal.



SEL275V

Waterproof Connector Inspection

NFGI0004S04

If water enters the connector, it can short interior circuits. This may lead to intermittent problems.
Check the following items to maintain the original waterproof characteristics.

RUBBER SEAL INSPECTION

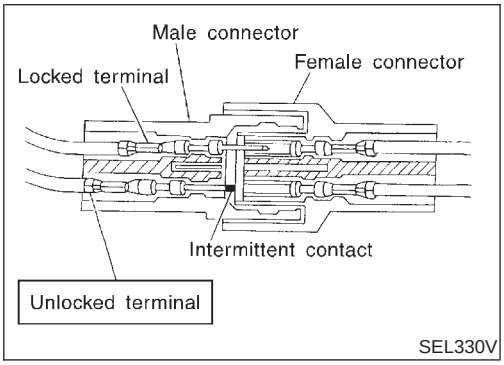
NFGI0004S0401

- Most waterproof connectors are provided with a rubber seal between the male and female connectors. If the seal is missing, the waterproof performance may not meet specifications.
- The rubber seal may come off when connectors are disconnected. Whenever connectors are reconnected, make sure the rubber seal is properly installed on either side of male or female connector.

WIRE SEAL INSPECTION

NFGI0004S0402

The wire seal must be installed on the wire insertion area of a waterproof connector. Be sure that the seal is installed properly.



SEL330V

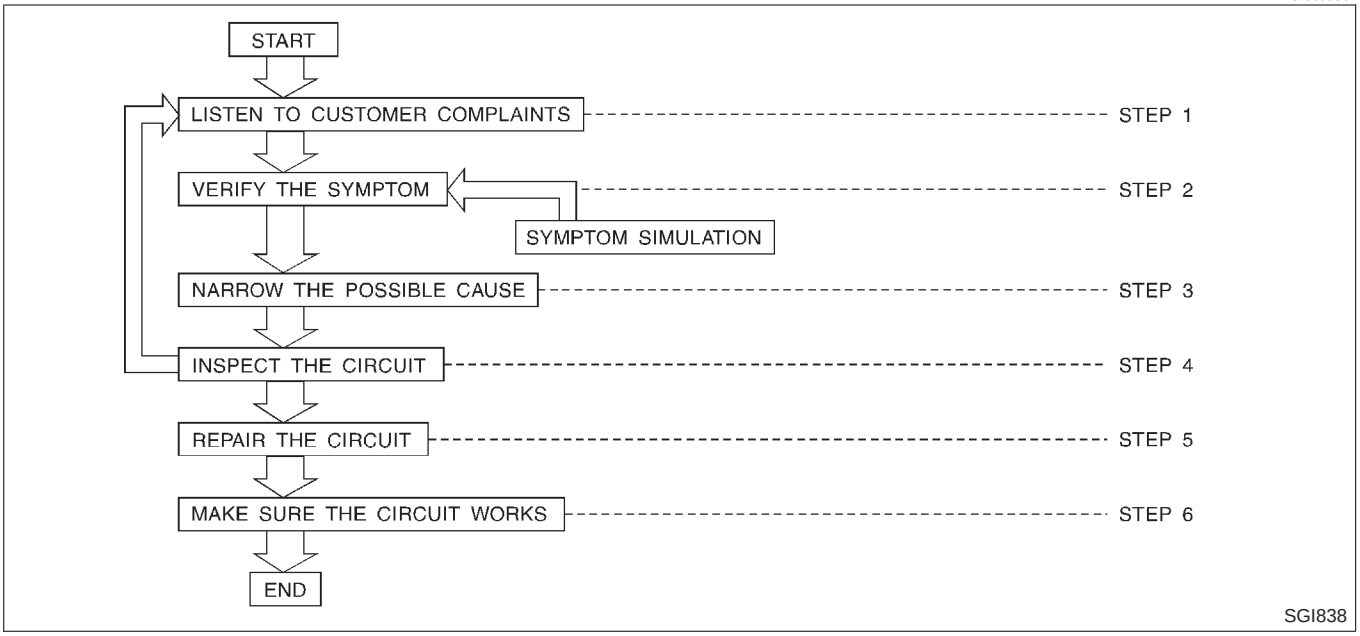
Terminal Lock Inspection

NFGI0004S05

Check for unlocked terminals by pulling wire at the end of connector. An unlocked terminal may create intermittent signals in the circuit.

Work Flow

NFGI0005S01



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 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 can not be duplicated, refer to “Incident Simulation Tests” next page.	
STEP 3	Get the proper diagnosis materials together including: POWER SUPPLY ROUTING System Operation Descriptions Applicable Service Manual Sections Check for any Service Bulletin. 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

NFGI0005S02

INTRODUCTION

NFGI0005S0201

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

NFGI0005S0202

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 illustration below.

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.

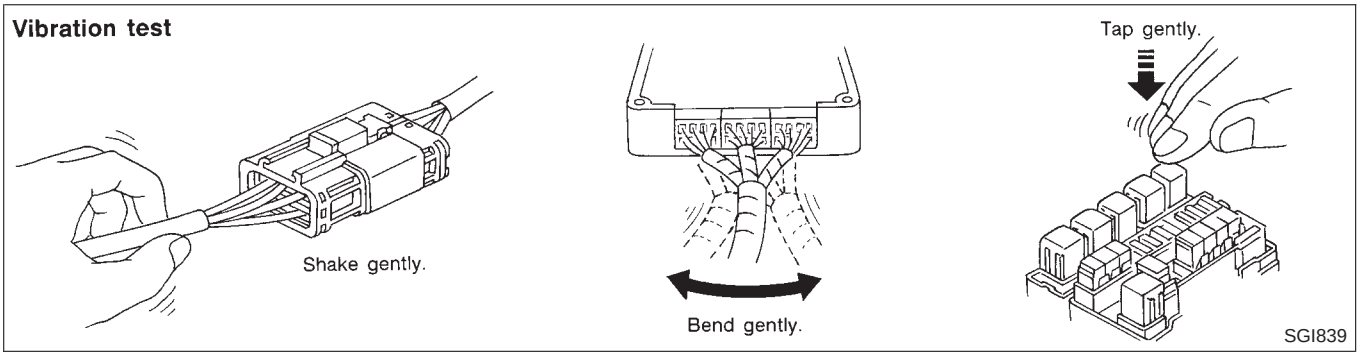
Hint

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.

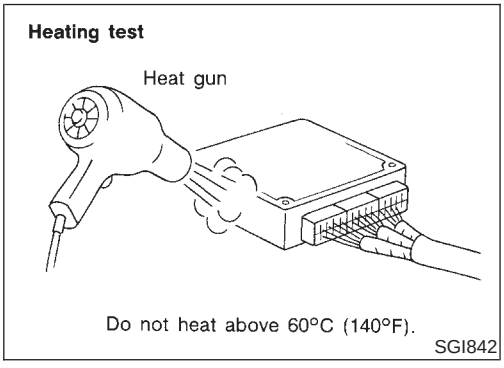
To inspect components under the hood, start by verifying the integrity of ground connections. (Refer to GROUND INSPECTION described later.) First check that the system is properly grounded. Then check for loose connection by **gently shaking** the wiring or components as previously explained. Using the 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.



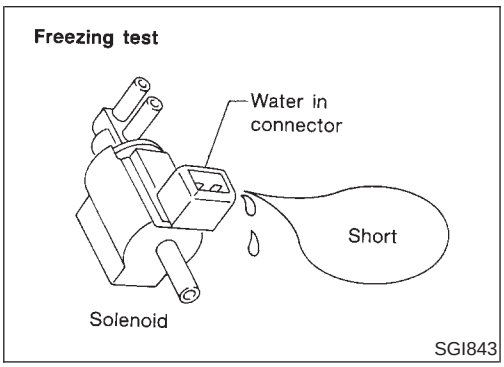
HEAT SENSITIVE

NFGI0005S0203

The owner's problem 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.



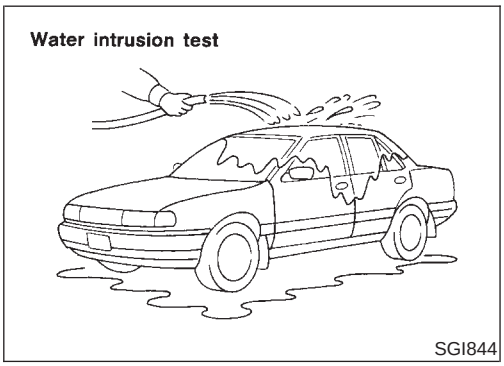
FREEZING

NFGI0005S0204

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.

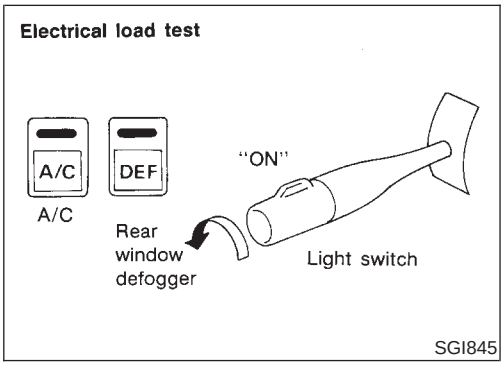
The second method is to put the suspect component into a freezer long enough for any water to freeze. Reinstall the part into the car and check for the reoccurrence of the incident. If it occurs, repair or replace the component.



WATER INTRUSION

NFGI0005S0205

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

NFGI0005S0206

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

NFGI0005S0207

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

NFGI0005S03

INTRODUCTION

NFGI0005S0301

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.

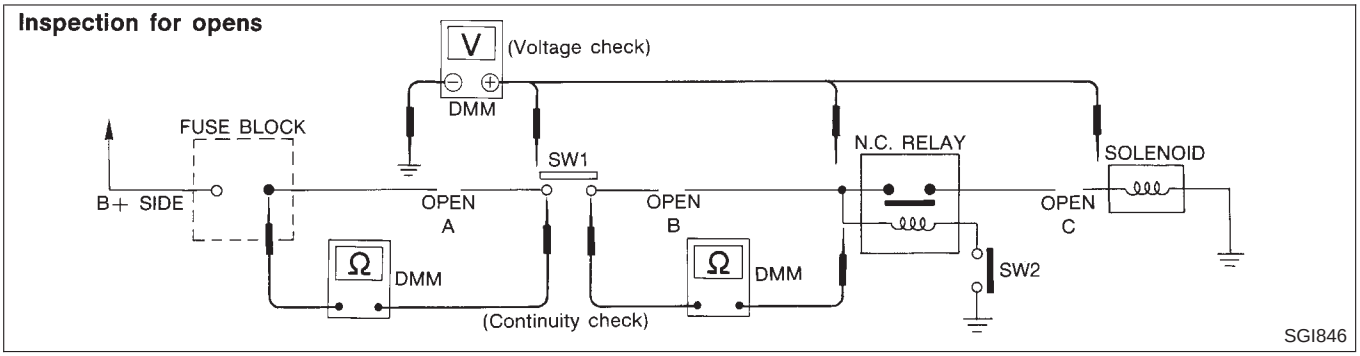
OPEN	A circuit is open when there is no continuity through a section of the circuit.	
SHORT	There are two types of shorts.	
	• SHORT CIRCUIT	When a circuit contacts another circuit and causes the normal resistance to change.
	• SHORT TO GROUND	When a circuit contacts a ground source and grounds the circuit.

NOTE:
Refer to "HOW TO CHECK TERMINAL" in GI-21 to probe or check terminal.

TESTING FOR "OPENS" IN THE CIRCUIT

NFGI0005S0302

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.



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 schematic above.

1) Disconnect the battery negative cable.
2) Start at one end of the circuit and work your way to the other end. (At the fuse block in this example)
3) Connect one probe of the DMM to the fuse block terminal on the load side.
4) 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)
5) 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)
6) 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 above 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.

1) Connect one probe of the DMM to a known good ground.
2) Begin probing at one end of the circuit and work your way to the other end.
3) 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).

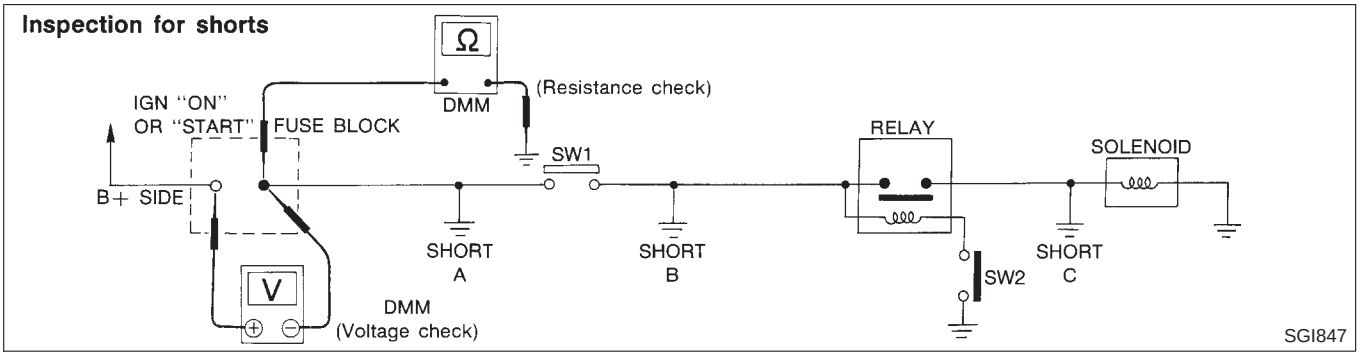
4) Close SW1 and probe at relay.
voltage; open is further down the circuit than the relay.
no voltage; open is between SW1 and relay (point B).
5) Close the relay and probe at the solenoid.
voltage; open is further down the circuit than the solenoid.
no voltage; open is between relay and solenoid (point C).

Any powered circuit can be diagnosed using the approach in the above example.

TESTING FOR "SHORTS" IN THE CIRCUIT

NFGI0005S0303

To simplify the discussion of shorts in the system please refer to the schematic below.



Resistance Check Method

1) Disconnect the battery negative cable and remove the blown fuse.
2) Disconnect all loads (SW1 open, relay disconnected and solenoid disconnected) powered through the fuse.
3) Connect one probe of the ohmmeter to the load side of the fuse terminal. Connect the other probe to a known good ground.
4) 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.
5) 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.
6) 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

1) Remove the blown fuse and disconnect all loads (i.e. SW1 open, relay disconnected and solenoid disconnected) powered through the fuse.
2) Turn the ignition key to the ON or START position. Verify battery voltage at the B + side of the fuse terminal (one lead on the B + terminal side of the fuse block and one lead on a known good ground).
3) 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.

4) 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.
5) 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.

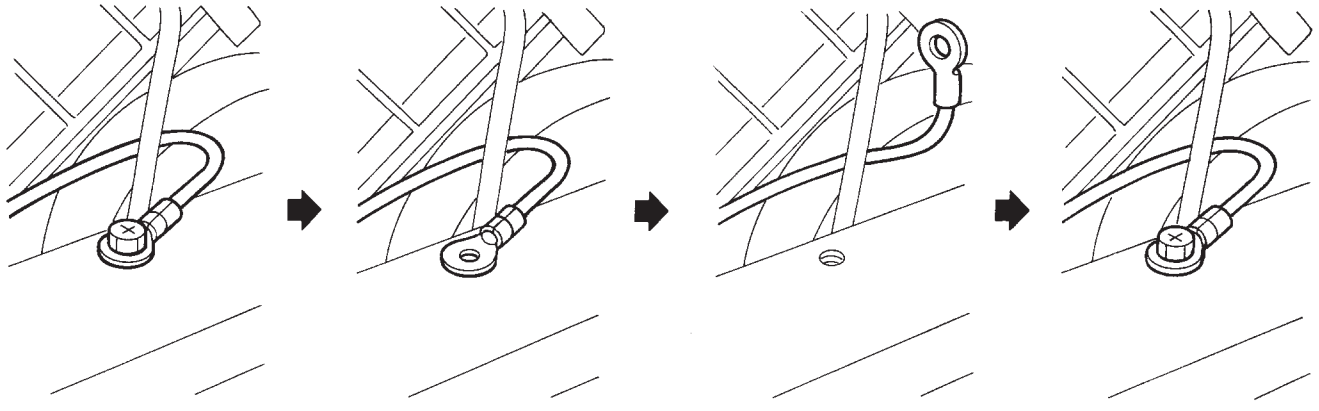
GROUND INSPECTION

NFGI0005S0304

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:

1) Remove the ground bolt or screw.
2) Inspect all mating surfaces for tarnish, dirt, rust, etc.
3) Clean as required to assure good contact.
4) Reinstall bolt or screw securely.
5) Inspect for "add-on" accessories which may be interfering with the ground circuit.
6) 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.

Ground Inspection



SGI853

VOLTAGE DROP TESTS

NFGI0005S0305

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

ohmmeter, 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:

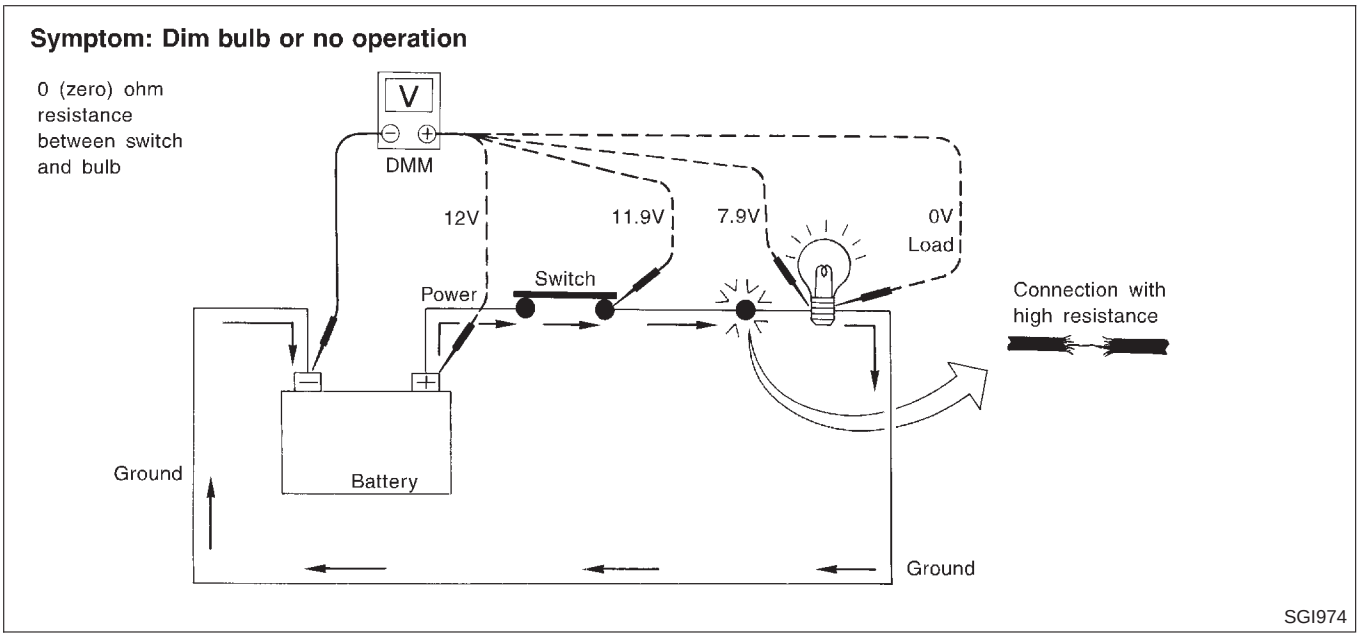
- Undersized wiring (single strand example)
- Corrosion on switch contacts
- Loose wire connections or splices.

If repairs are needed always use wire that is of the same or larger gauge.

Measuring Voltage Drop — Accumulated Method

1) Connect the voltmeter across the connector or part of the circuit you want to check. The positive lead of the voltmeter should be closer to power and the negative lead closer to ground.
2) Operate the circuit.
3) The voltmeter 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.



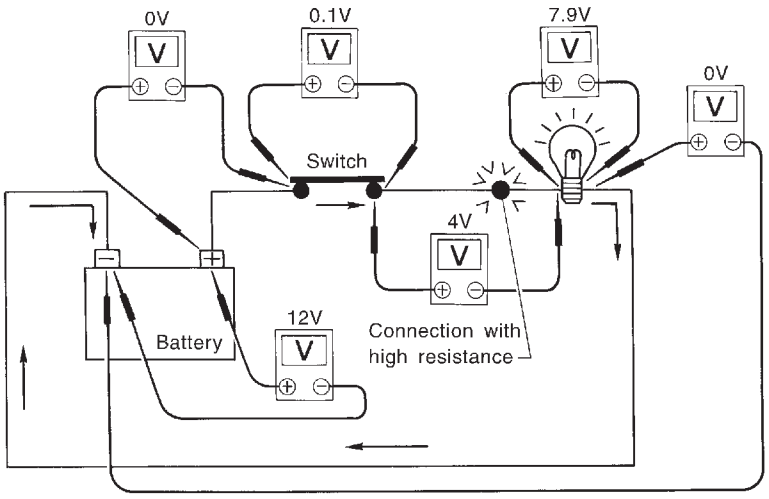
Measuring Voltage Drop — Step by Step

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 voltmeter 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

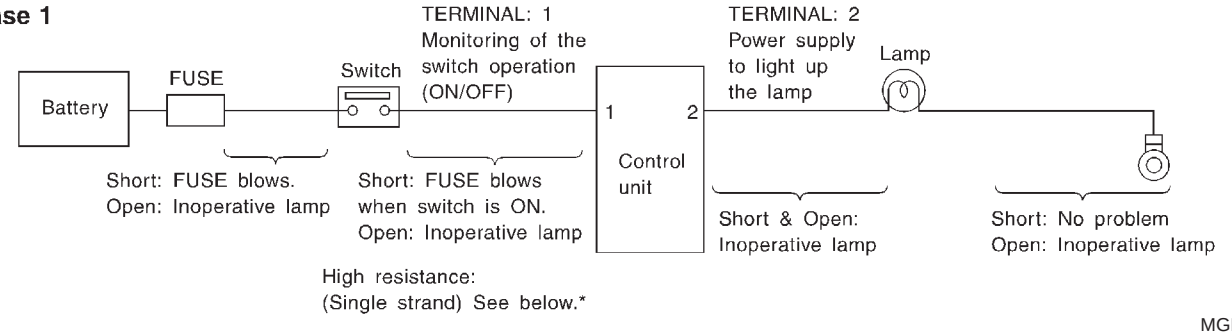
SGI854

CONTROL UNIT CIRCUIT TEST

NFGI0005S0306

System Description: When the switch is ON, the control unit lights up the lamp.

Case 1



MGI034A

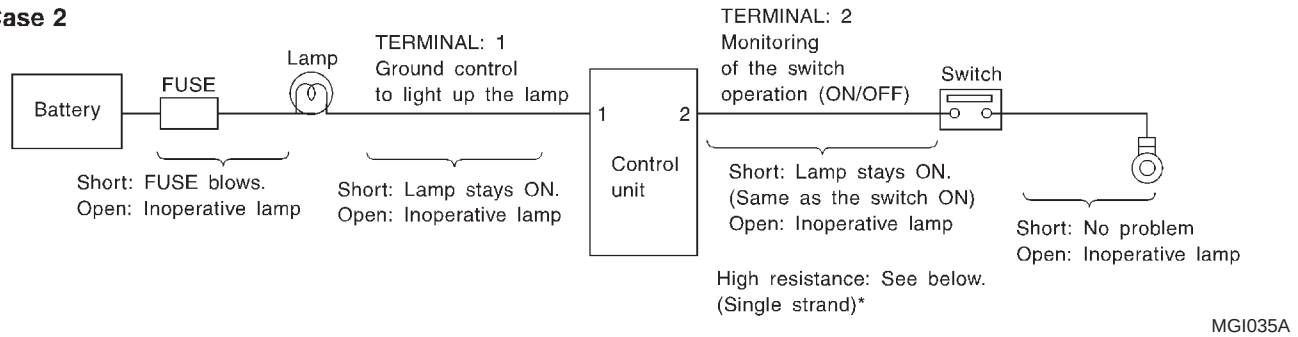
Input-output voltage chart

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.

Case 2



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.

HOW TO FOLLOW TROUBLE DIAGNOSES

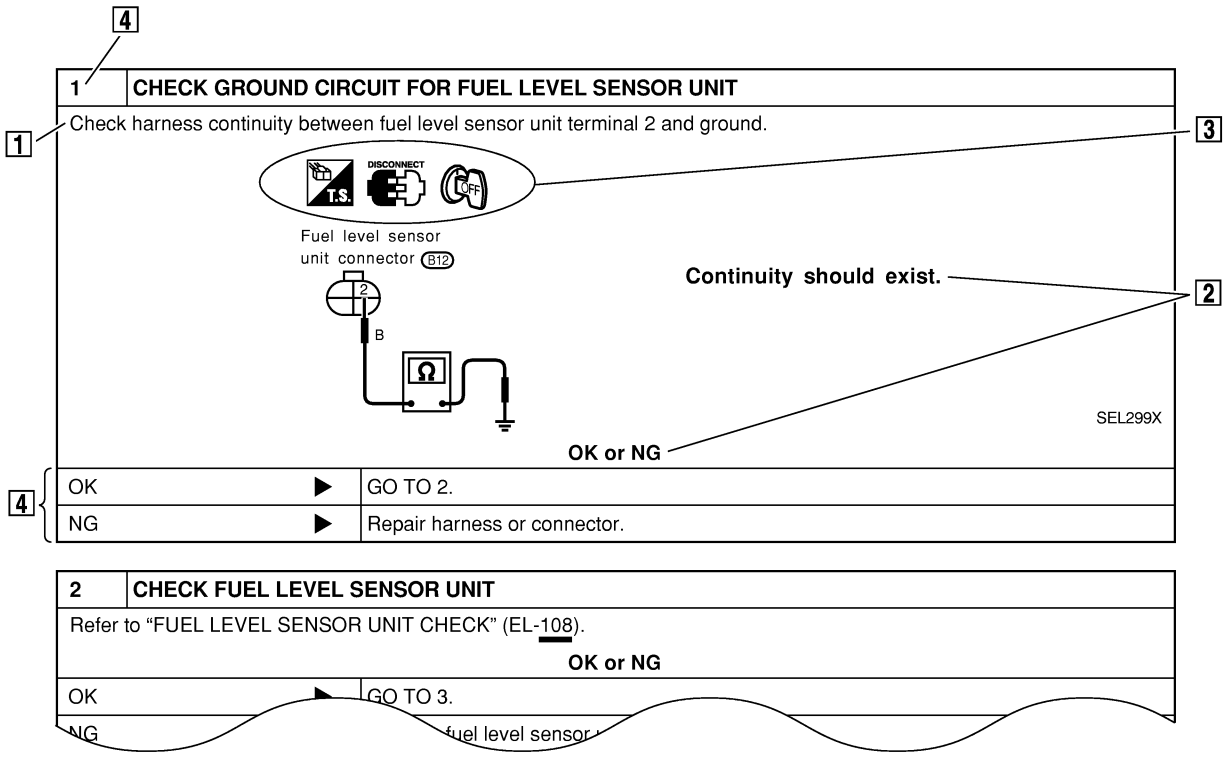
NOTICE:
Trouble diagnoses indicates work procedures required to diagnose problems effectively. Observe the following instructions before diagnosing.

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 EL 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

NFGI0006S01

Example



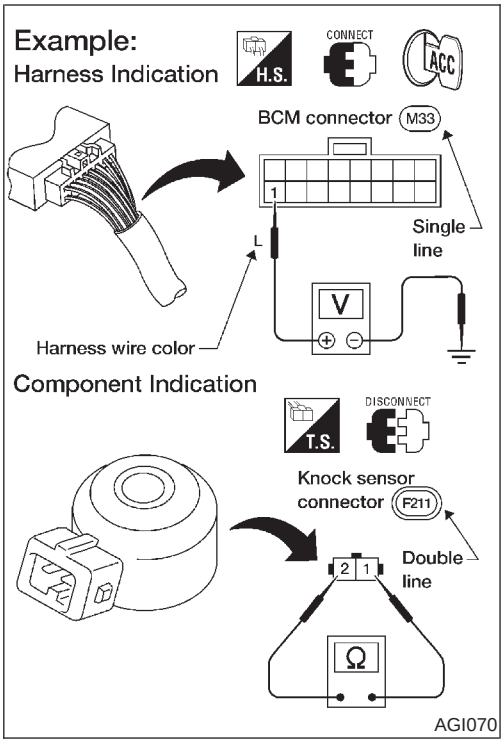
SGI138A

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" (GI-16) and "Key to Symbols Signifying Measurements or Procedures" (GI-37).

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

NFGI0006S03

There are two types of harness wire color and connector number indication.

TYPE 1: HARNESS WIRE COLOR AND CONNECTOR NUMBER ARE SHOWN IN ILLUSTRATION

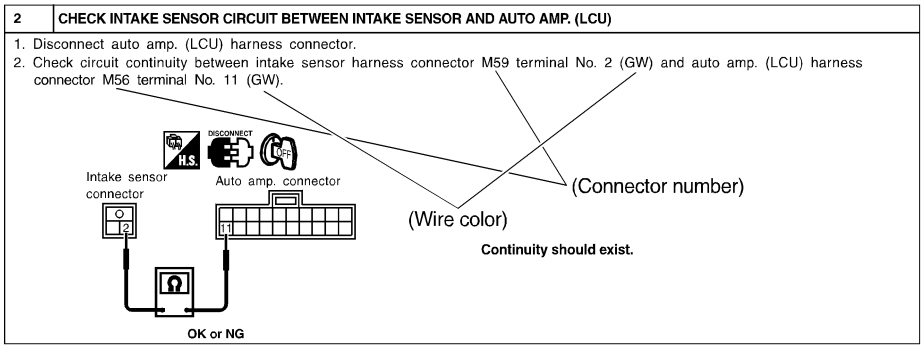
NFGI0006S0301

- 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.

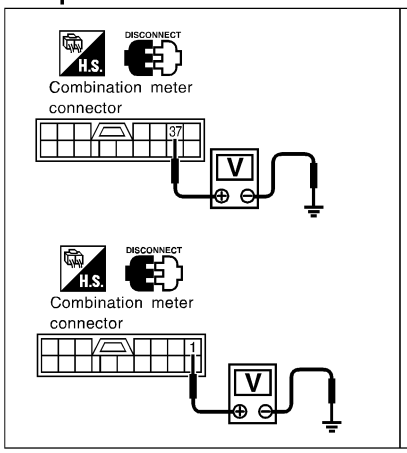
TYPE 2: HARNESS WIRE COLOR AND CONNECTOR NUMBER ARE SHOWN IN TEXT

NFGI0006S0302

Example 1:



Example 2:



POWER SUPPLY AND GROUND CIRCUIT CHECK

Power Supply Circuit Check

≈NCEL00-16S07
NCEL00-16S0701

Terminals			Ignition switch position		
(+)		(–)	OFF	ACC	ON
Connector	Terminal (Wire color)				
M40	37 (Y)	Ground	Battery voltage	Battery voltage	Battery voltage
M41	1 (Y)	Ground	0V	0V	Battery voltage

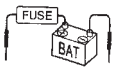
If NG, check the follwing.
- 7.5A fuse [No. 5, located in fuse block (J/B)]
- 10A fuse [No. 11, located in fuse block (J/B)]
- Harness for open or short between fuse and combination meter

Connector number Wire color

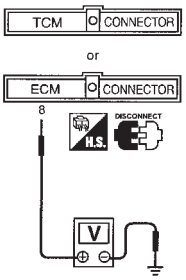
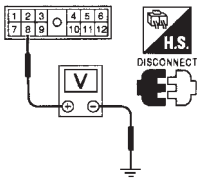
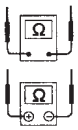
SGI144A

Key to Symbols Signifying Measurements or Procedures

NFGI0006S02

Symbol	Symbol explanation	Symbol	Symbol explanation
	Check after disconnecting the connector to be measured.		Procedure with Generic Scan Tool (GST, OBD-II scan tool)
	Check after connecting the connector to be measured.		Procedure without CONSULT-II or GST
	Insert key into ignition switch.		A/C switch is “OFF”.
	Remove key from ignition switch.		A/C switch is “ON”.
	Turn ignition switch to “OFF” position.		REC switch is “ON”.
	Turn ignition switch to “ON” position.		REC switch is “OFF”.
	Turn ignition switch to “START” position.		Fan switch is “ON”. (At any position except for “OFF” position)
	Turn ignition switch from “OFF” to “ACC” position.		Fan switch is “OFF”.
	Turn ignition switch from “ACC” to “OFF” position.		Apply positive voltage from battery with fuse directly to components.
	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.

Key to Symbols Signifying Measurements or Procedures (Cont'd)

Symbol	Symbol explanation	Symbol	Symbol explanation
	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 foldout page.** 
	Voltage should be measured with a voltmeter.		
	Circuit resistance should be measured with an ohmmeter.		
	Current should be measured with an ammeter.		
	Procedure with CONSULT-II		
	Procedure without CONSULT-II		

Function and System Application

NFGI0007S01

Diagnostic test mode	Function	ENGINE	A/T	ABS	AIR BAG	ASCD	SMART ENTRANCE	NVIS (NATS)*
Work support	This mode enables a technician to adjust some devices faster and more accurate by following the indications on CONSULT-II.	x	x	—	—	—	x	—
Self-diagnostic results	Self-diagnostic results can be read and erased quickly.	x	x	x	x	x	—	x
Trouble diagnostic record	Current self-diagnostic results and all trouble diagnostic records previously stored can be read.	—	—	—	x	—	—	—
ECU discriminated No.	Classification number of a replacement ECU can be read to prevent an incorrect ECU from being installed.	—	—	—	x	—	—	—
Data monitor	Input/Output data in the ECU (ECM) can be read.	x	x	x	—	x	x	—
Data monitor (Spec.)	The specified values will be displayed when an OK/NG jugement is difficult for the DATA MONITOR items by Barchart and Line Graph.	x	—	—	—	—	—	—
DTC work support	This mode enables a technician to set operating conditions to confirm self-diagnosis status/results.	—	x	—	—	—	—	—
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.	x	—	x	—	—	x	—
ECU (ECM) part number	ECU (ECM) part number can be read.	x	x	x	—	—	—	—
Control unit initialization	All registered ignition key IDs in NATS components can be initialized and new IDs can be registered.	—	—	—	—	—	—	x
SRT & DTC confirmation	The results of SRT (System Readiness Test) and the self-diagnosis status/results can be confirmed.	x	—	—	—	—	—	—

x: Applicable

*: NVIS (NATS) [Nissan Vehicle Immobilizer System (Nissan Anti-Theft System)]

Nickel Metal Hydride Battery Replacement

NFGI0007S04

CONSULT-II contains a nickel metal hydride battery. When replacing the battery obey the following:

WARNING:

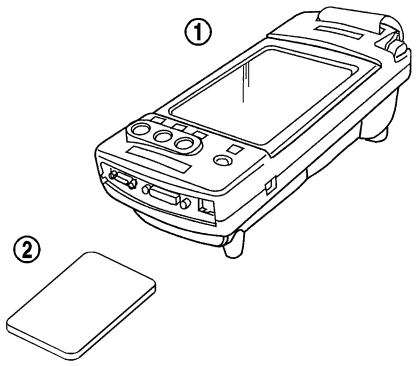
Replace the nickel metal hydride battery with Genuine CONSULT-II battery only. Use of another battery may present a risk of fire or explosion. The battery may present a fire or chemical burn hazard if mistreated. Do not recharge, disassemble of dispose of in fire.

Keep the battery out of reach of children and discard used battery conforming to the local regulations.

Checking Equipment

=NFGI0007S02

When ordering the below equipment, contact your NISSAN/INFINITI distributor.

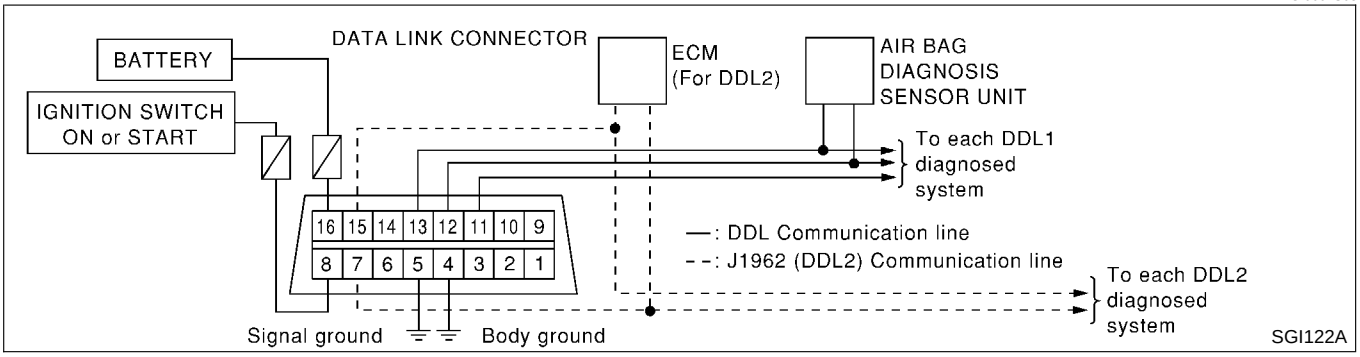
Tool name	Description
NISSAN CONSULT-II ① CONSULT-II unit (Tester internal soft: Resident version 3.2.0) and accessories ② Program card AED01B-1 and AEN00A (For NVIS) For details, refer to CONSULT-II Operation Manual.	 SGI083A

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.**

CONSULT-II Data Link Connector (DLC) Circuit

NFGI0007S03



INSPECTION PROCEDURE

NFGI0007S0301

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 DDL cable
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” above.) • Power supply and ground circuit for the control unite 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.)

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.

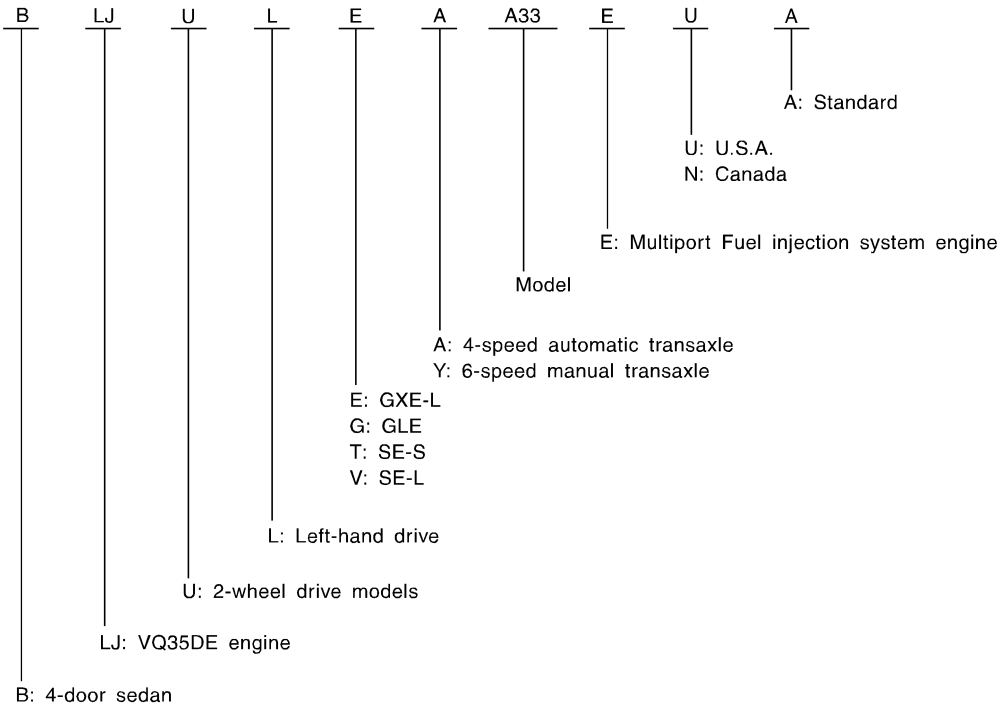
Model Variation

NFGI0008S01

Body	Engine	Grade	Transaxle	Destination	
				U.S.A.	Canada
Sedan	VQ35DE	GXE-L	RE4F04B (A/T)	BLJULEA-EUA	BLJULEA-ENA
		GLE		BLJULGA-EUA	BLJULGA-ENA
		SE-S		BLJULTA-EUA	BLJULTA-ENA
		SE-L		BLJULVA-EUA	BLJULVA-ENA
		SE-S	RS6F51A (M/T)	BLJULTY-EUA	BLJULTY-ENA
		SE-L		BLJULVY-EUA	BLJULVY-ENA

PREFIX AND SUFFIX DESIGNATIONS

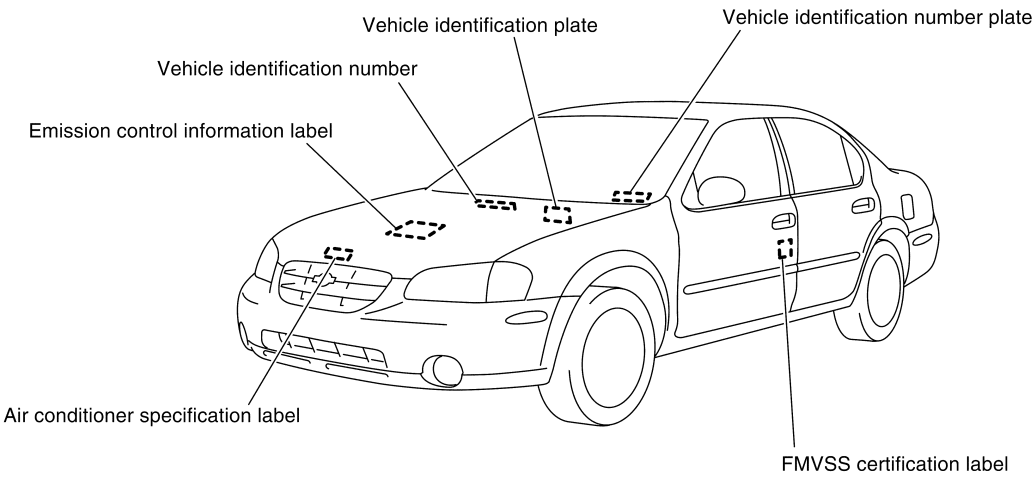
NFGI0008S0101



SGI089AC

Identification Number

NFGI0008S02



SGI079A

VEHICLE IDENTIFICATION NUMBER ARRANGEMENT

NFGI0008S0201

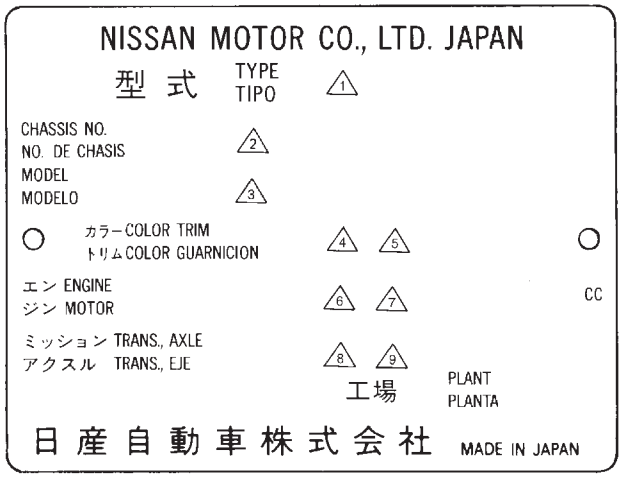
JN1 D A 3 1 A * 2 T 000001~ (No. 1 line) / 300001~ (No. 3 line) (With SRS side air bags); 200001~ (No. 1 line) / 400001~ (No. 3 line) (Without SRS side air bags)

- Vehicle serial number
- Manufacturing plant
  T: Oppama
- Model year
  2: 2002 model year
- Check digit (0 to 9 or X)
  The code for the check digit is determined by mathematical computation.
- Reatraint system
  A: Driver and front passenger SRS air bags, SRS side air bags & 3-point manual seat belts
  D: Driver and front passenger SRS air bags & 3-point manual seat belts
- Body type
  1: Sedan
- Model change
- Vehicle line
  A: Nissan Maxima
- Engine type
  D: VQ35DE
- Manufacturer
  JN1: Nissan, Passenger vehicle

SGI090AD

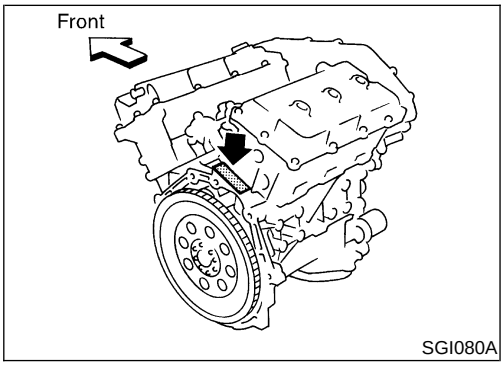
IDENTIFICATION PLATE

NFGI0008S0202



1 Type
2 Vehicle identification number (Chassis number)
3 Model
4 Body color code
5 Trim color code
6 Engine model
7 Engine displacement
8 Transmission model
9 Axle model

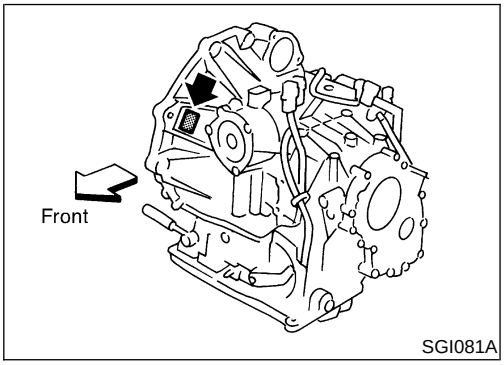
MGI039A



SGI080A

ENGINE SERIAL NUMBER

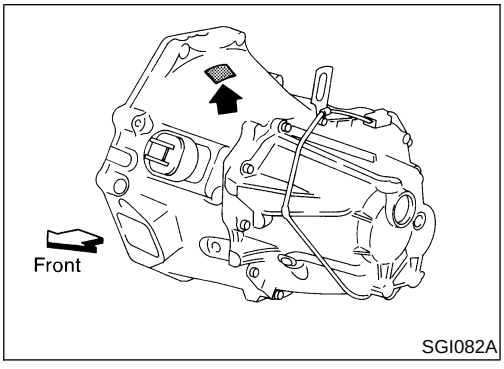
NFGI0008S0203



SGI081A

AUTOMATIC TRANSAXLE NUMBER

NFGI0008S0204



SGI082A

MANUAL TRANSAXLE NUMBER

NFGI0008S0205

Dimensions

NFGI0008S03

Unit: mm (in)

Item		Sedan
Overall length		4,863 (191.5)
Overall width		1,785 (70.3)
Overall height		1,430 (56.3)*3 1,440 (56.7)*4 1,450 (57.1)*5
Front tread		1,530 (60.2)*1 1,520 (59.8)*2
Rear tread		1,510 (59.4)*1 1,500 (59.1)*2
Wheelbase		2,750 (108.3)
Gross vehicle weight rating kg (lb)		See the “FMVSS certification label” on the driver’s side lock pillar.
Gross axle weight rating	Front kg (lb)	
	Rear kg (lb)	

*1: For models with road wheel size - 16 x 6.5JJ, 17 x 7JJ [offset 40 mm (1.57 in)]
*2: For models with aluminum wheel size - 17 x 7JJ [offset 45 mm (1.75 in)]
*3: For models with the tire size P215/55R16 91H
*4: For models with the tire size P225/50R17 93V
*5: For models with the tire size P215/55R17 93H

Wheels and Tires

NFGI0008S04

Unit: mm (in)

Item		Size	Offset
Road wheel	Aluminum	16 x 6.5JJ 17 x 7JJ 17 x 7JJ	40 (1.57) 40 (1.57)*2 45 (1.77)*3
Tire size	Conventional	P215/55R16 91H P215/55R17 93H P225/50R17 93V	
	Spare	Conventional*1 T125/70D16 T125/90D16 T135/70D16 T135/90D16	

*1: For option
*2: For P215/55R17 91H
*3: For P225/50R17 93V

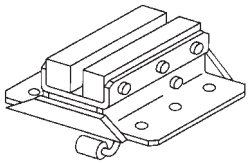
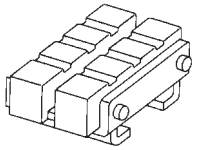
Preparation

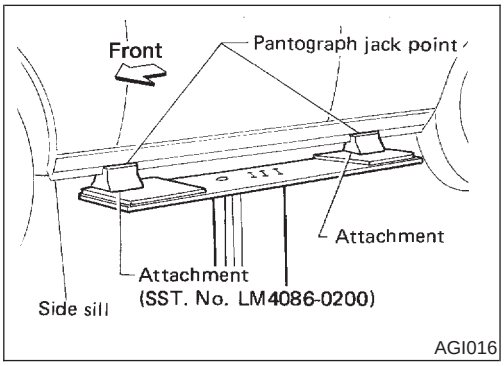
SPECIAL SERVICE TOOLS

NFGI0009S01

NFGI0009S0101

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore number) Tool name	Description
LM4086-0200 (—) Board on attachment	 NT001
LM4519-0000 (—) Safety stand attachment	 NT002



AGI016

Boad-on Lift

NFGI0009S02

CAUTION:

Make sure vehicle is empty when lifting.

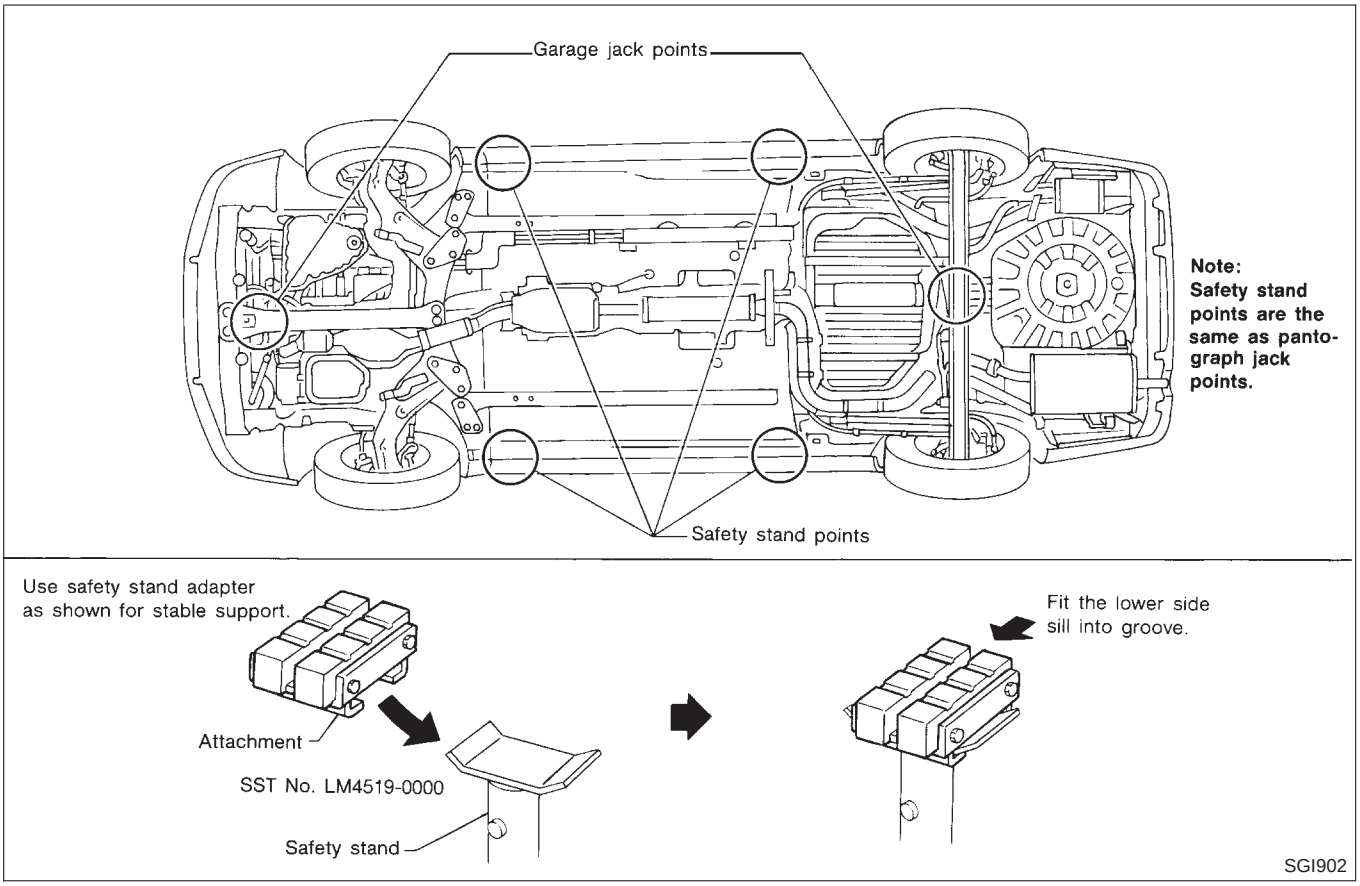
- **The board-on lift attachment (LM4086-0200) set at front end of vehicle should be set on the front of the sill under the front door opening.**
- **Position attachments at front and rear ends of board-on lift.**

Garage Jack and Safety Stand

=NFGI0009S03

WARNING:

- **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.**



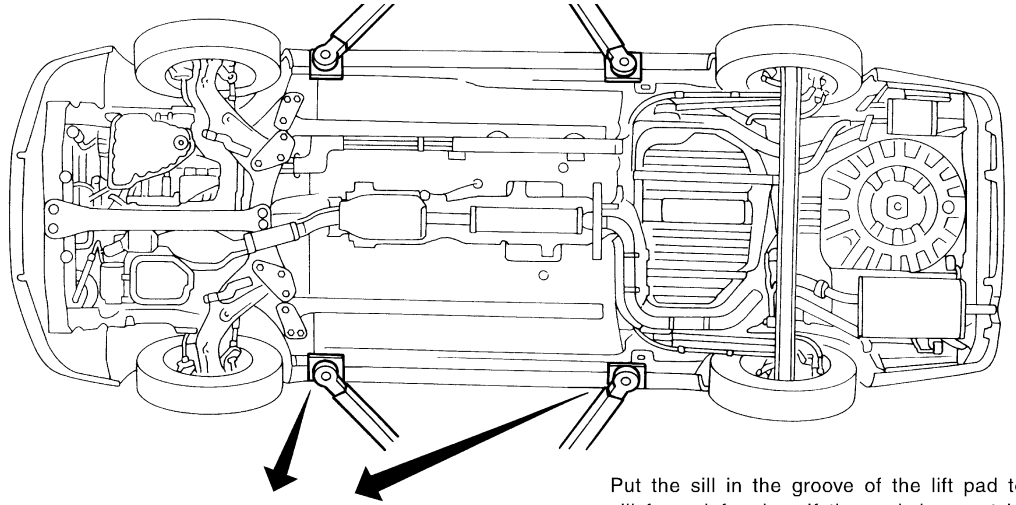
2-pole Lift

=NFGI0009S04

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.

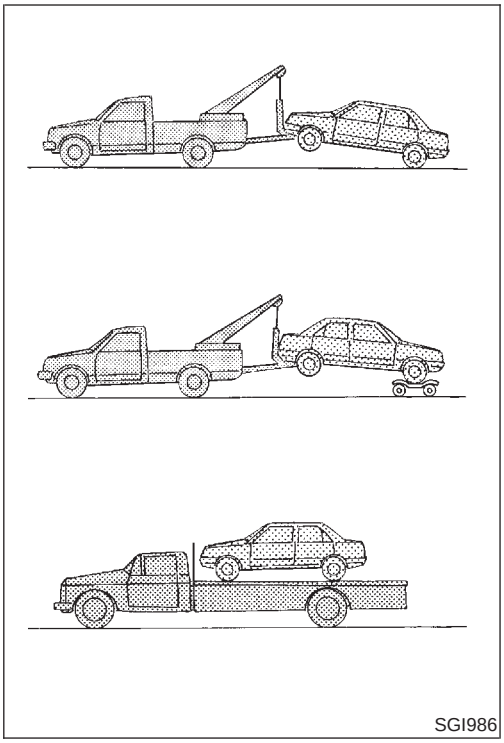
When setting the lift arm, do not allow the arm to contact the brake tubes, brake cable, fuel lines and sill spoiler.

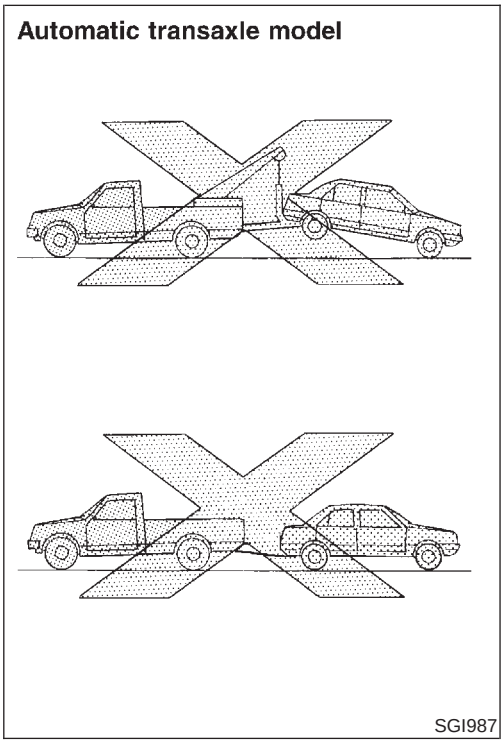


Note:
Lift-up points are the same as pantograph jack points.

Put the sill in the groove of the lift pad to prevent the sill from deforming. If the pad does not have a proove, prepare a suitable attachment with one.

SGI903


SGI986



SGI987

Tow Truck Towing

NFGI0009S05

CAUTION:

- **All applicable state or Provincial (in Canada) laws and 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.**

NISSAN recommends that the vehicle be towed with the driving (front) wheels off the ground as illustrated.

CAUTION:

- **Always release the parking brake when towing the vehicle with the front wheels raised with the rear wheels on the ground.**
- **When towing manual transaxle models with the front wheels on the ground (If a towing dollies does not be used), turn the ignition key to the OFF position, and secure the steering wheel in the straight-ahead position with a rope or similar device. Never place the ignition key in the LOCK position. This will result in damage to the steering lock mechanism.**
  Move the shift lever to the N (Neutral) position.
- **Never tow an automatic transaxle model with the rear wheels raised and the front wheels on the ground. This may cause serious and expensive damage to the transaxle. If it is necessary to tow the vehicle with the rear wheels raised, always use towing dollies under the front wheels.**
- **Never tow an automatic transaxle model from the rear (that is backward) with four wheels on the ground. This may cause serious and expensive damage to the transaxle.**

VEHICLE RECOVERY (FREEING A STUCK VEHICLE)

NFGI0009S0501

- **Tow chains or cables must be attached only to the main structural members of the vehicle.**
- **Pulling devices should be routed so they do not touch any part of the suspension, steering, brake or cooling systems.**
- **Always pull the cable straight out from the front or rear of the vehicle. Never pull on the vehicle at an angle.**
- **Pulling devices such as ropes or canvas straps are not recommended for use in vehicle towing or recovery.**

TIGHTENING TORQUE OF STANDARD BOLTS

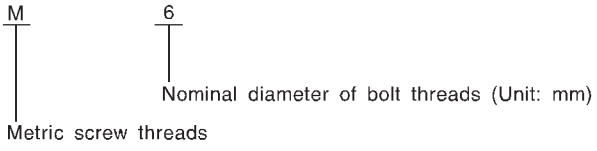
Grade	Bolt size	Bolt diameter * mm	Pitch mm	Tightening torque (Without lubricant)							
				Hexagon head bolt				Hexagon flange bolt			
				N·m	kg-m	ft-lb	in-lb	N·m	kg-m	ft-lb	in-lb
4T	M6	6.0	1.0	5.1	0.52	3.8	45.1	6.1	0.62	4.5	53.8
	M8	8.0	1.25	13	1.3	9	—	15	1.5	11	—
			1.0	13	1.3	9	—	16	1.6	12	—
	M10	10.0	1.5	25	2.5	18	—	29	3.0	22	—
			1.25	25	2.6	19	—	30	3.1	22	—
	M12	12.0	1.75	42	4.3	31	—	51	5.2	38	—
			1.25	46	4.7	34	—	56	5.7	41	—
	M14	14.0	1.5	74	7.5	54	—	88	9.0	65	—
7T	M6	6.0	1.0	8.4	0.86	6.2	74.6	10	1.0	7	87
	M8	8.0	1.25	21	2.1	15	—	25	2.5	18	—
			1.0	22	2.2	16	—	26	2.7	20	—
	M10	10.0	1.5	41	4.2	30	—	48	4.9	35	—
			1.25	43	4.4	32	—	51	5.2	38	—
	M12	12.0	1.75	71	7.2	52	—	84	8.6	62	—
			1.25	77	7.9	57	—	92	9.4	68	—
	M14	14.0	1.5	127	13.0	94	—	147	15.0	108	—
9T	M6	6.0	1.0	12	1.2	9	—	15	1.5	11	—
	M8	8.0	1.25	29	3.0	22	—	35	3.6	26	—
			1.0	31	3.2	23	—	37	3.8	27	—
	M10	10.0	1.5	59	6.0	43	—	70	7.1	51	—
			1.25	62	6.3	46	—	74	7.5	54	—
	M12	12.0	1.75	98	10.0	72	—	118	12.0	87	—
			1.25	108	11.0	80	—	137	14.0	101	—
	M14	14.0	1.5	177	18.0	130	—	206	21.0	152	—

*: Nominal diameter

1) **Special parts are excluded.**

2) **This standard is applicable to bolts having the following marks embossed on the bolt head.**

Grade	Mark
4T	4
7T	7
9T	9



MGI044A

RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS

Refer to the following chart for help in selecting the appropriate chemical product or sealant.

Recommended Chemical Products and Sealants

	Product Description	Purpose	Nissan North America Part No. (USA)	Nissan Canada Part No. (Canada)	Aftermarket Cross Reference Part Nos.
1	Rear View Mirror Adhesive	Used to permanently remount rear view mirrors to windows.	999MP-AM000P	99998-50505	Locktite 11067-2; Permatex 81844
2	Anaerobic Liquid Gasket	For metal-to-metal flange sealing. Can fill a 0.38 mm (0.015 in) gap and provide instant sealing for most powertrain applications.	999MO-AM001P	99998-50503	Locktite 518 (13); Three Bond 1215; Permatex 51813 and 51817
3	High Performance Thread Sealant	Provides instant sealing or parallel threaded fitting. (Thread sealant only, no locking ability.) ● Do not use on plastic.	999MP-AM002P	N/A	Locktite 565; Permatex 56521
4	Silicone RTV	Gasket Maker	999MP-AM003P (Ultra Grey)	99998-50506	Locktite 599, 5699; Permatex Ultra Grey 82194; Three Bond 1207 and 1216; Nissan RTV Part No. 999MP-A7007
5	High Temperature, High Strength Thread Locking Sealant (Red)	Threadlocker	999MP-AM004P	N/A	Locktite 272; Permatex 27200; Three Bond 1360, 1360N, 1305 N&P, 1307N, 1335, 1335B, 1363B, 1377C, 1386B, D&E and 1388
6	Medium Strength Thread Locking Sealant (Blue)	Threadlocker (service tool removable)	999MP-AM005P	N/A	Locktite 242; Permatex 24200, 81788, -89, 90; Three Bond 1322, 1322N, 1324 D&N, 1333D, 1361C, 1364D, 1370C and 1374

SAE J1930 Terminology List

NFGI0011S01

All emission related terms used in this publication in accordance with SAE J1930 are listed. Accordingly, new terms, new acronyms/abbreviations and old terms are listed in the following chart.

***: Not applicable

NEW TERM	NEW ACRONYM / ABBREVIATION	OLD TERM
Air cleaner	ACL	Air cleaner
Barometric pressure sensor	BARO sensor	***
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	***
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

SAE J1930 Terminology List (Cont'd)

NEW TERM	NEW ACRONYM / ABBREVIATION	OLD TERM
Erasable programmable read only memory	EPROM	***
Evaporative emission canister	EVAP canister	Canister
Evaporative emission system	EVAP system	Evaporative emission control system
Exhaust gas recirculation valve	EGR valve	EGR valve
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 level sensor	***	***
Fuel pressure regulator	***	Pressure regulator
Fuel pressure regulator control solenoid valve	***	PRVR control solenoid valve
Fuel tank temperature sensor	FTT sensor	Tank fuel temperature sensor
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

NEW TERM	NEW ACRONYM / ABBREVIATION	OLD TERM
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
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	***

SAE J1930 Terminology List (Cont'd)

NEW TERM	NEW ACRONYM / ABBREVIATION	OLD TERM
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
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

HEATER & AIR CONDITIONER

SECTION HA

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

NFHA0153

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER” used along with a seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. The SRS system composition which is available to NISSAN MODEL A33 is as follows:

- For a frontal collision
  The Supplemental Restraint System consists of driver air bag module (located in the center of the steering wheel), front passenger air bag module (located on the instrument panel on passenger side), seat belt pre-tensioners, a diagnosis sensor unit, warning lamp, wiring harness and spiral cable.
- For a side collision
  The Supplemental Restraint System consists of front side air bag module (located in the outer side of front seat), satellite sensor, diagnosis sensor unit (one of components of air bags for a frontal collision), wiring harness, warning lamp (one of components of air bags for a frontal collision).

Information necessary to service the system safely is included in the **RS 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 should be performed by an authorized NISSAN 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 RS 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 harness connector.**

Precautions for Working with HFC-134a (R-134a)

NFHA0154

WARNING:

- **CFC-12 (R-12) refrigerant and HFC-134a (R-134a) refrigerant are not compatible. If the refrigerants are mixed and compressor failure is likely to occur, refer to “CONTAMINATED REFRIGERANT” below. To determine the purity of HFC-134a (R-134a) in the vehicle and recovery tank, use Refrigerant Recovery/Recycling Recharging equipment (ACR4) (J-39500-NI) and Refrigerant Identifier.**
- **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:**

a) When removing refrigerant components from a vehicle, immediately cap (seal) the component to minimize the entry of moisture from the atmosphere.

b) 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.

c) 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.

d) Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Remove R-134a from the A/C system, using certified service equipment meeting requirements of SAE J2210 (R-134a recycling equipment), or J2209 (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.

e) Do not allow lubricant (Nissan A/C System Oil Type S) to come in contact with styrofoam parts. Damage may result.

CONTAMINATED REFRIGERANT

NFHA0154S01

If a refrigerant other than pure R-134a is identified in a vehicle, your options are:

- Explain to the customer that environmental regulations prohibit the release of contaminated refrigerant into the atmosphere.
- Explain that recovery of the contaminated refrigerant could damage your service equipment and refrigerant supply.

- Suggest the customer return the vehicle to the location of previous service where the contamination may have occurred.
- If you choose to perform the repair, recover the refrigerant using only **dedicated equipment and containers. Do not recover contaminated refrigerant into your existing service equipment.** If your facility does not have dedicated recovery equipment, you may contact a local refrigerant product retailer for available service. This refrigerant must be disposed of in accordance with all federal and local regulations. In addition, replacement of all refrigerant system components on the vehicle is recommended.
- If the vehicle is within the warranty period, the air conditioner warranty is void. Please contact Nissan Customer Affairs for further assistance.

General Refrigerant Precautions

NFHA0155

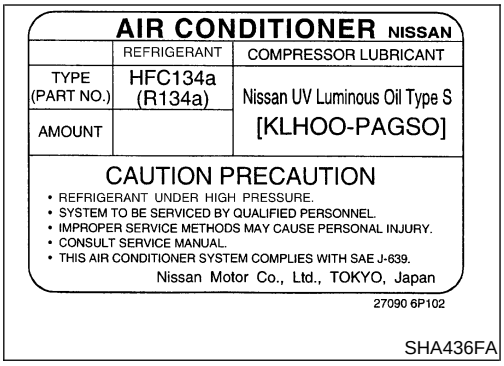
WARNING:

- **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 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.**

Precautions for Leak Detection Dye

NFHA0265

- 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 glasses to protect your eyes and enhance the visibility of the fluorescent dye.
- 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 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 R-134a and R12 A/C systems are different. Do not use R-134a leak detection dye in R-12 A/C system or R-12 leak detection dye in 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 failure occurs.



Precaution for Identification Label on Vehicle

NFHA0266

- Vehicles with factory installed fluorescent dye have this identification label on the under side of hood.
- Vehicles with factory installed fluorescent dye have a green label.
- Vehicles without factory installed fluorescent dye have a blue label.

Precautions for Refrigerant Connection

NFHA0156

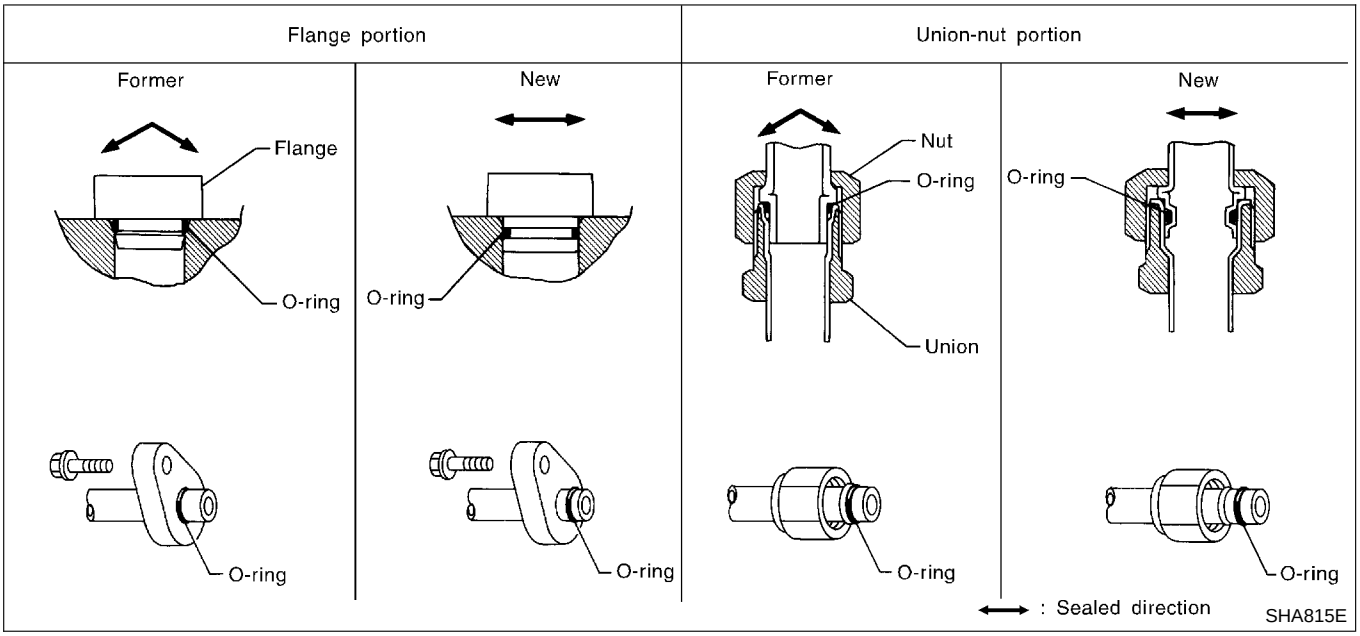
A new type refrigerant connection has been introduced to all refrigerant lines except the following location.

- Expansion valve to cooling unit

FEATURES OF NEW TYPE REFRIGERANT CONNECTION

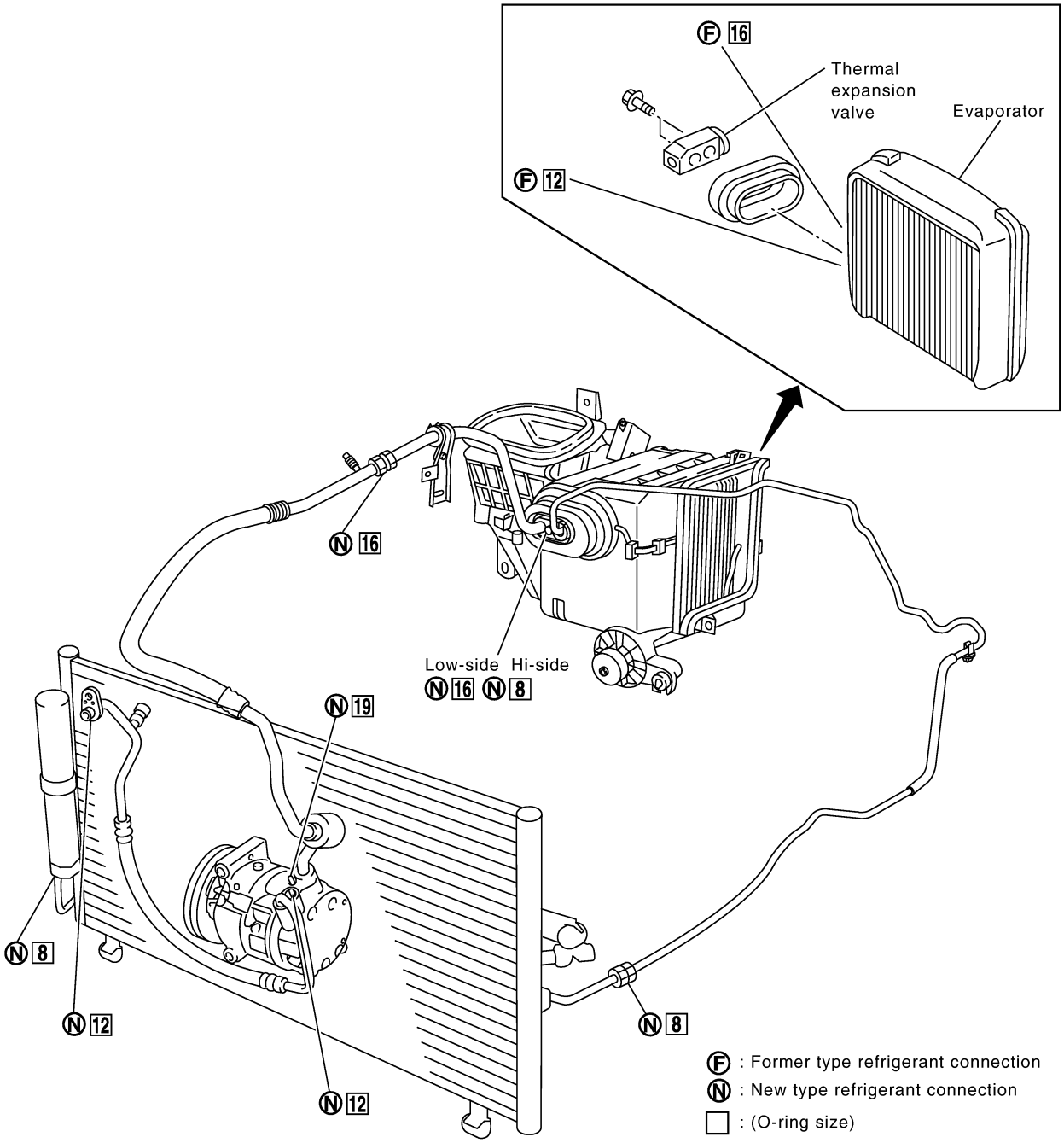
NFHA0156S01

- 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

NFHA0156S02



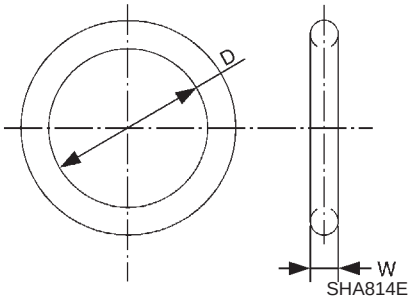
RHA030I

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

NFHA0156S0201



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)
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)

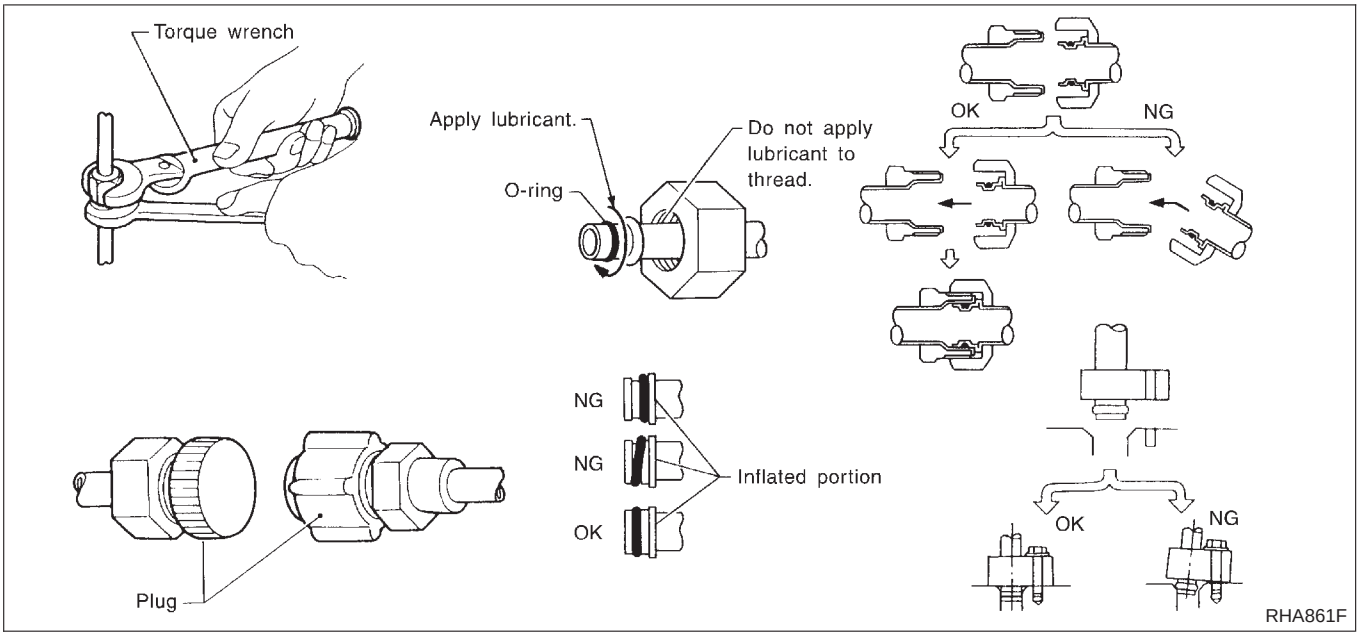
WARNING:

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. Failure 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.**
  Lubricant name: Nissan A/C System Oil Type S
  Part number: KLH00-PAGS0
- **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

NFHA0157

- **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 HA-140.**
- **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

NFHA0158

RECOVERY/RECYCLING EQUIPMENT

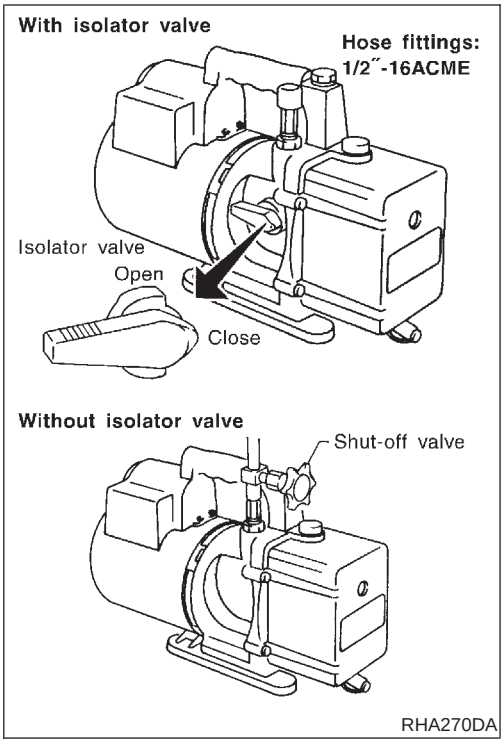
NFHA0158S01

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

NFHA0158S02

Be certain to follow the manufacturer's instructions for tester operation and tester maintenance.



VACUUM PUMP

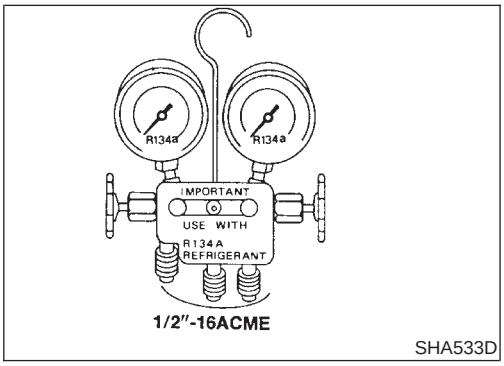
NFHA0158S03

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.

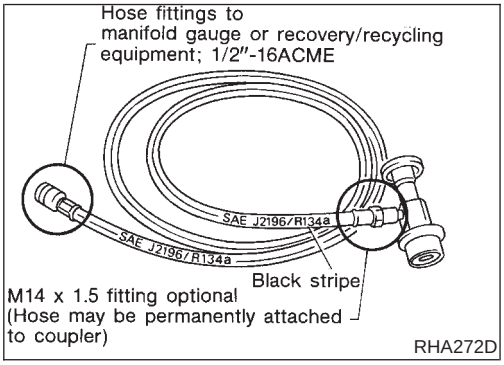
Some one-way valves open when vacuum is applied and close under a no vacuum condition. Such valves may restrict the pump's ability to pull a deep vacuum and are not recommended.



MANIFOLD GAUGE SET

NFHA0158S04

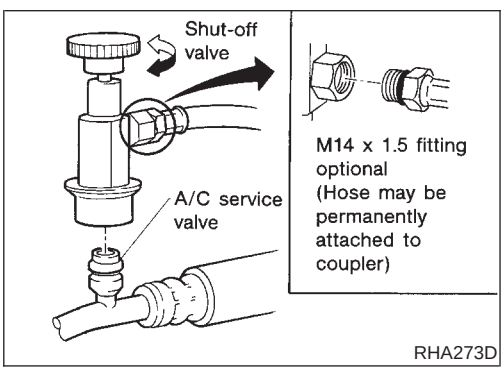
Be certain that the gauge face indicates R-134a or 134a. Be sure the gauge set has 1/2″-16 ACME threaded connections for service hoses. Confirm the set has been used only with refrigerant HFC-134a (R-134a) and specified lubricants.



SERVICE HOSES

NFHA0158S05

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.

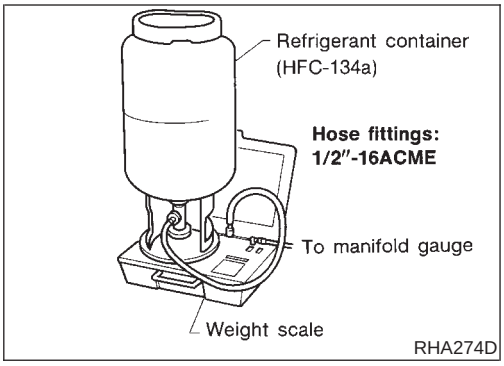


SERVICE COUPLERS

NFHA0158S06

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

NFHA0158S07

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

NFHA0158S08

Calibrate the scale every three months.
To calibrate the weight scale on the ACR4 (J-39500-NI):

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

NFHA0158S09

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.

Wiring Diagrams and Trouble Diagnosis

NFHA0159

When you read wiring diagrams, refer to the following:

- GI-11, "HOW TO READ WIRING DIAGRAMS" in GI section
- EL-11, "Wiring Diagram — POWER —" for power distribution circuit in EL section

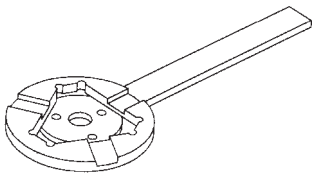
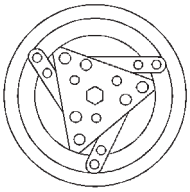
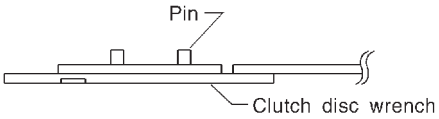
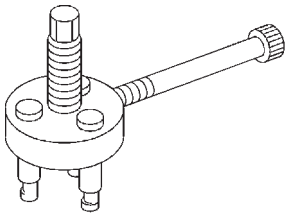
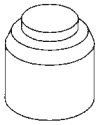
When you perform trouble diagnosis, refer to the following:

- GI-35, "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

Special Service Tools

NFHA0160

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description	
KV99106100 (J-41260) Clutch disc wrench	 NT232  When replacing the magnet clutch in the above compressor, use a clutch disc wrench with the pin side on the clutch disc to remove it.  NT378	Removing center bolt
KV99232340 (J-38874) or KV992T0001 (—) Clutch disc puller	 NT376	Removing clutch disc
KV99106200 (J-41261) Pulley installer	 NT235	Installing pulley

HFC-134a (R-134a) Service Tools and Equipment

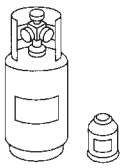
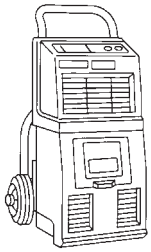
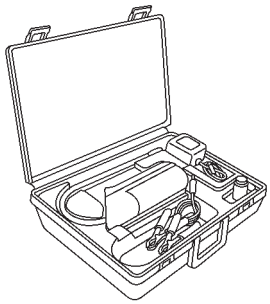
=NFHA0161

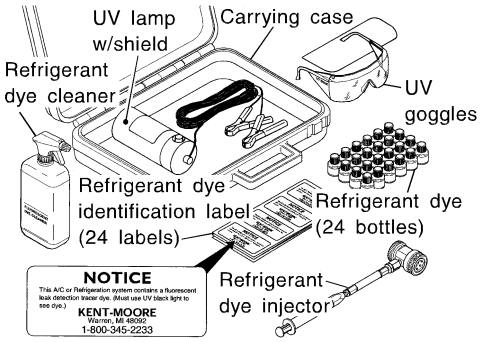
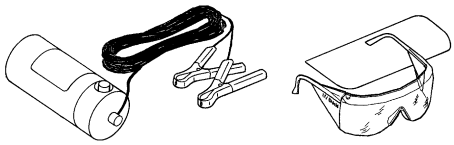
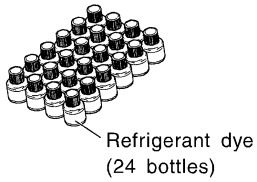
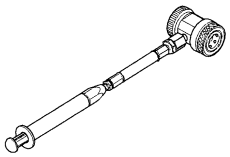
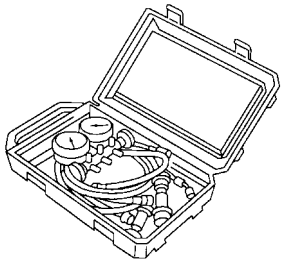
Never mix HFC-134a refrigerant and/or its specified lubricant with CFC-12 (R-12) refrigerant and/or its lubricant.

Separate and non-interchangeable service equipment must be used for handling each type of refrigerant/lubricant.

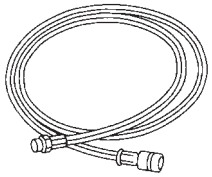
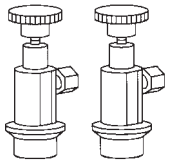
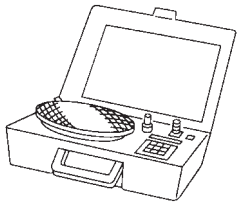
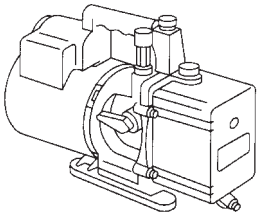
Refrigerant container fittings, service hose fittings and service equipment fittings (equipment which handles refrigerant and/or lubricant) are different between CFC-12 (R-12) and HFC-134a (R-134a). This is to avoid mixed use of the refrigerants/lubricant.

Adapters that convert one size fitting to another must never be used: refrigerant/lubricant contamination will occur and compressor failure will result.

Tool number (Kent-Moore No.) Tool name	Description	
HFC-134a (R-134a) refrigerant	 NT196	Container color: Light blue Container marking: HFC-134a (R-134a) Fitting size: Thread size ● Large container 1/2″-16 ACME
KLH00-PAGS0 (—) Nissan A/C System Oil Type S	 NT197	Type: Poly alkylene glycol oil (PAG), type S Application: HFC-134a (R-134a) swash plate (piston) compressors (Nissan only) Lubricity: 40 mℓ (1.4 US fl oz, 1.4 Imp fl oz)
(J-39500-NI) Recovery/Recycling Recharging equipment (ACR4)	 NT195	Function: Refrigerant Recovery and Recycling and Recharging
(J-41995) Electrical leak detector	 AHA281A	Power supply: ● DC 12V (Cigarette lighter)

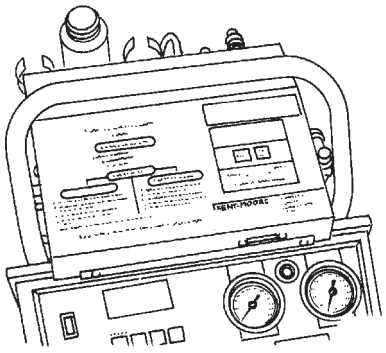
Tool number (Kent-Moore No.) Tool name	Description	
(J-43926) Refrigerant dye leak detection kit Kit includes: (J-42220) UV lamp and UV safety glasses (J-41459) Refrigerant dye injector (J-41447) qty. 24 R-134a refrigerant dye (J-43872) Refrigerant dye cleaner	 ZHA200H	Power supply: DC 12V (Battery terminal)
(J-42220) Fluorescent dye leak detector	UV lamp UV safety glasses  SHA438F	Power supply: DC12V (Battery terminal) For checking refrigerant leak when fluorescent dye is installed in A/C system. Includes: UV lamp and UV safety glasses
(J-41447) R134a Fluorescent Leak Detection Dye (Box of 24, 1/4 ounce bottles)	Dye  SHA439F	Application: For R-134a PAG oil Container: 1/4 ounce (7.4 cc) bottle (Includes self-adhesive dye identification labels for affixing to vehicle after charging system with dye.)
(J-41459) R134a Dye Injector Use with J-41447, 1/4 ounce bottle	Dye injector  SHA440F	For injecting 1/4 ounce of Fluorescent Leak Detection Dye into A/C system.
(J-43872) Dye cleaner	 SHA441F	For cleaning dye spills.
(J-39183) Manifold gauge set (with hoses and couplers)	 NT199	Identification: ● The gauge face indicates R-134a. Fitting size: Thread size ● 1/2″-16 ACME

HFC-134a (R-134a) Service Tools and Equipment (Cont'd)

Tool number (Kent-Moore No.) Tool name	Description	
Service hoses ● High side hose (J-39501-72) ● Low side hose (J-39502-72) ● Utility hose (J-39476-72)	 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 (J-39500-20) ● Low side coupler (J-39500-24)	 NT202	Hose fitting to service hose: ● M14 x 1.5 fitting is optional or permanently attached.
(J-39650) Refrigerant weight scale	 NT200	For measuring of refrigerant Fitting size: Thread size ● 1/2″-16 ACME
(J-39649) Vacuum pump (Including the isolator valve)	 NT203	Capacity: ● Air displacement: 4 CFM ● Micron rating: 20 microns ● Oil capacity: 482 g (17 oz) Fitting size: Thread size ● 1/2″-16 ACME

COMMERCIAL SERVICE TOOL

NFHA0161S01

Tool name	Description	
Refrigerant identifier equipment	 NT765	For checking refrigerant purity and for system contamination

Refrigeration System

REFRIGERATION CYCLE

NFHA0162

Refrigerant Flow

NFHA0162S01

The refrigerant flows in the standard pattern, that is, through the compressor, the condenser, the liquid tank, through the evaporator, and back to the compressor. The refrigerant evaporation through the evaporator coil is controlled by an externally equalized expansion valve, located inside the evaporator case.

Freeze Protection

NFHA0162S02

Under normal operating conditions, when the A/C is switched on, the compressor runs continuously, and the evaporator pressure, and therefore, temperature is controlled by the V-6 variable displacement compressor to prevent freeze up.

Refrigerant System Protection

NFHA0162S03

Refrigerant Pressure Sensor

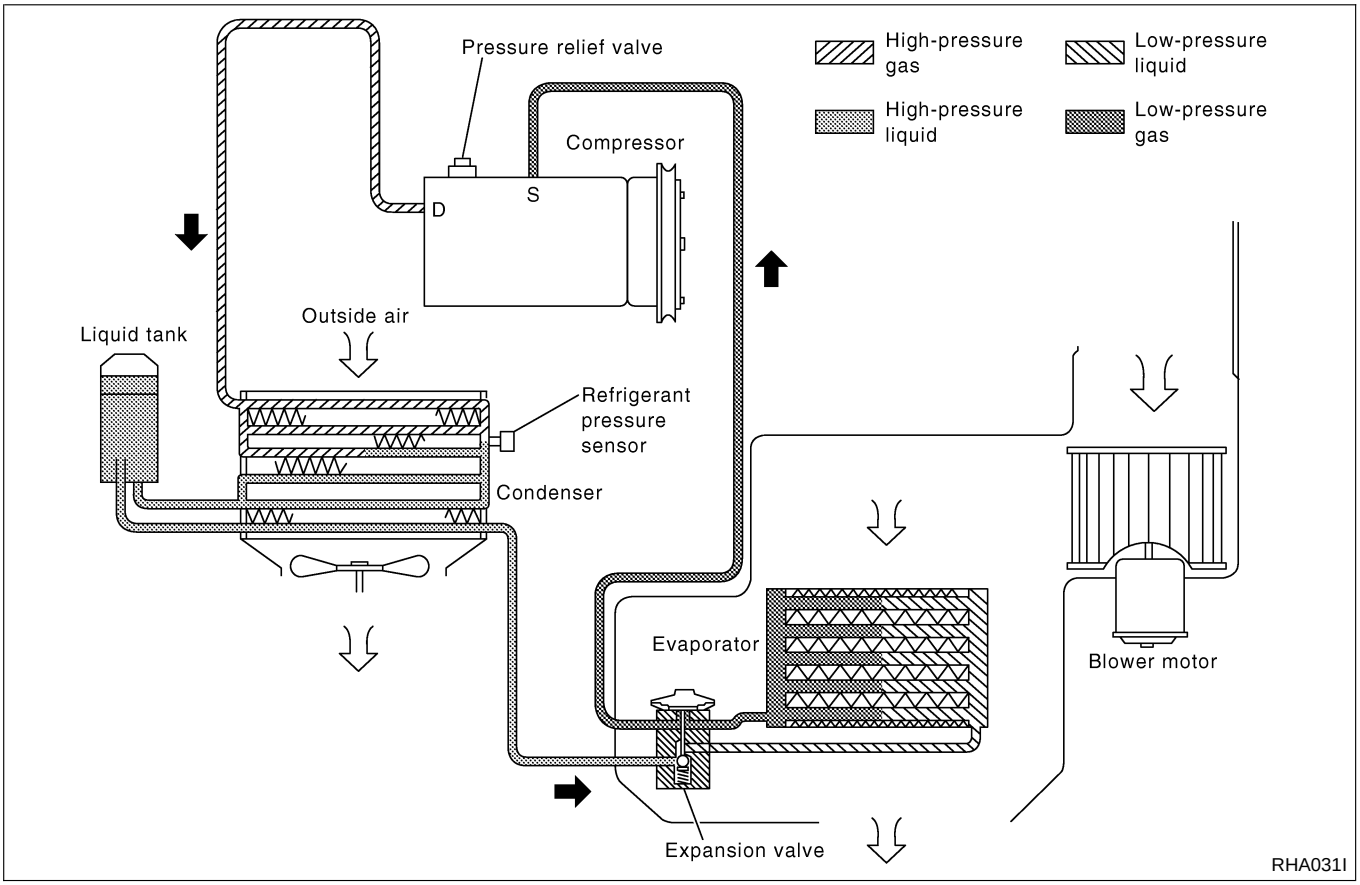
NFHA0162S0301

The refrigerant system is protected against excessively high or low pressures by the refrigerant pressure sensor, located on the condenser. If the system pressure rises above, or falls below the specifications, the refrigerant pressure sensor detects the pressure inside the refrigerant line and sends the voltage signal to the ECM. ECM makes the A/C relay go OFF and stops the compressor when pressure on the high pressure side detected by refrigerant pressure sensor is over about 2,746 kPa (28 kg/cm^2, 398 psi), psi or below about 177 kPa (1.8 kg/cm^2, 26 psi).

Pressure Relief Valve

NFHA0162S0302

The refrigerant system is also protected by a pressure relief valve, located in the rear head of the compressor. When the pressure of refrigerant in the system increases to an abnormal level [more than 3,727 kPa (38 kg/cm^2, 540 psi)], the release port on the pressure relief valve automatically opens and releases refrigerant into the atmosphere.



V-6 Variable Displacement Compressor

GENERAL INFORMATION

=NFHA0163

1. The V-6 variable compressor differs from previous units. The vent temperatures of the V-6 variable compress do not drop too far below 5°C (41°F) when:

- evaporator intake air temperature is less than 20°C (68°F)
- engine is running at speeds less than 1,500 rpm.

   This is because the V-6 compressor provides a means of “capacity” control.

2. The V-6 variable compressor provides refrigerant control under varying conditions. During cold winters, it may not produce high refrigerant pressure discharge (compared to previous units) when used with air conditioning systems.
3. A “clanking” sound may occasionally be heard during refrigerant charge. The sound indicates that the tilt angle of the swash plate has changed and is not a problem.
4. For air conditioning systems with the V-6 compressor, the clutch remains engaged unless: the system main switch, fan switch or ignition switch is turned OFF. When ambient (outside) temperatures are low or when the amount of refrigerant is insufficient, the clutch is disengaged to protect the compressor.
5. A constant range of suction pressure is maintained when engine speed is greater than a certain value. It normally ranges from 147 to 177 kPa (1.5 to 1.8 kg/cm^2, 21 to 26 psi) under varying conditions.
   In previous compressors, however, suction pressure was reduced with increases in engine speed.

DESCRIPTION

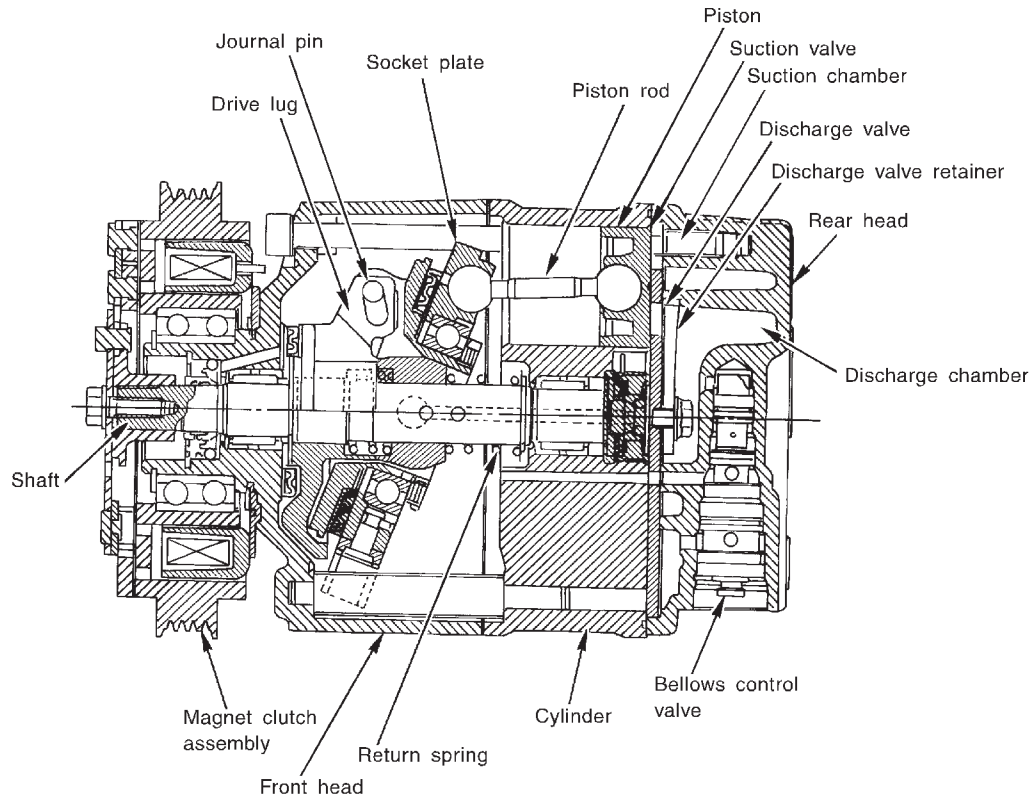
=NFHA0164

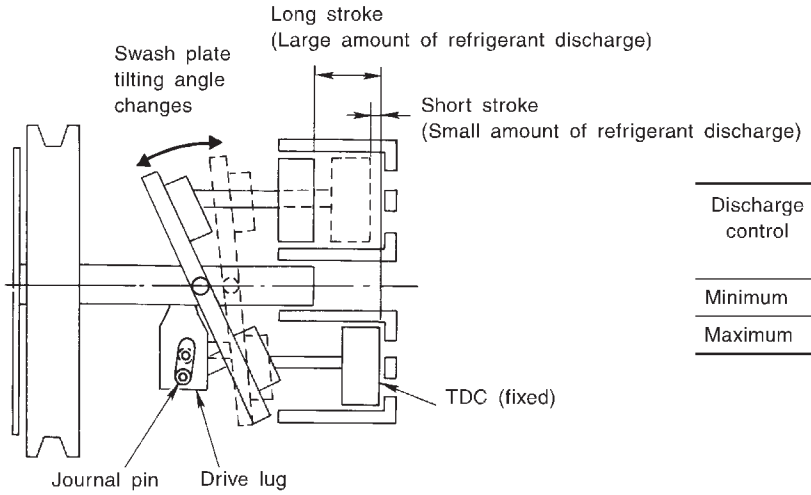
General

NFHA0164S01

The variable compressor is basically a swash plate type that changes piston stroke in response to the required cooling capacity.

The tilt of the swash plate allows the piston's stroke to change so that refrigerant discharge can be continuously changed from 14.5 to 184 cm^3 (0.885 to 11.228 cu in).





Discharge control	Discharge capacity cm^3 (cu in)/rev.	Piston stroke length mm (in)
Minimum	14.5 (0.885)	2.3 (0.091)
Maximum	184 (11.228)	28.6 (1.126)

RHA037DD

Operation

=NFHA0164S02

1. Operation Control Valve

NFHA0164S0201

Operation control valve is located in the suction port (low-pressure) side, and opens or closes in response to changes in refrigerant suction pressure.
Operation of the valve controls the internal pressure of the crankcase.
The angle of the swash plate is controlled between the crankcase's internal pressure and the piston cylinder pressure.

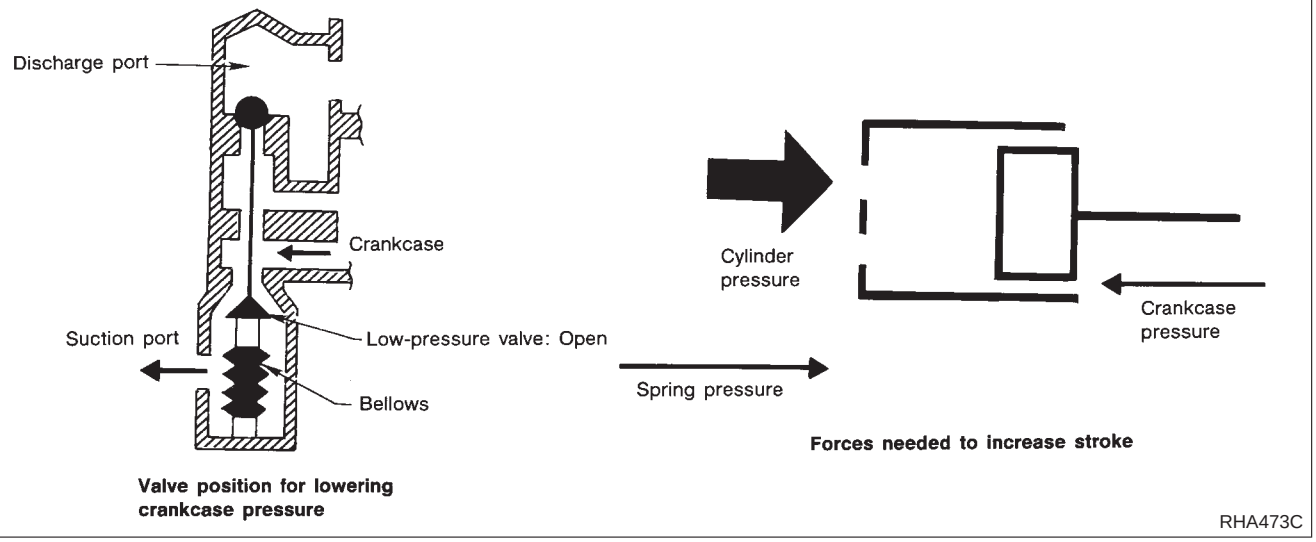
2. Maximum Cooling

NFHA0164S0202

Refrigerant pressure on the low-pressure side increases with an increase in heat loads.
When this occurs, the control valve's bellows compress to open the low-pressure side valve and close the high-pressure side valve.
This causes the following pressure changes:

- the crankcase's internal pressure to equal the pressure on the low-pressure side;
- the cylinder's internal pressure to be greater than the crankcase's internal pressure.

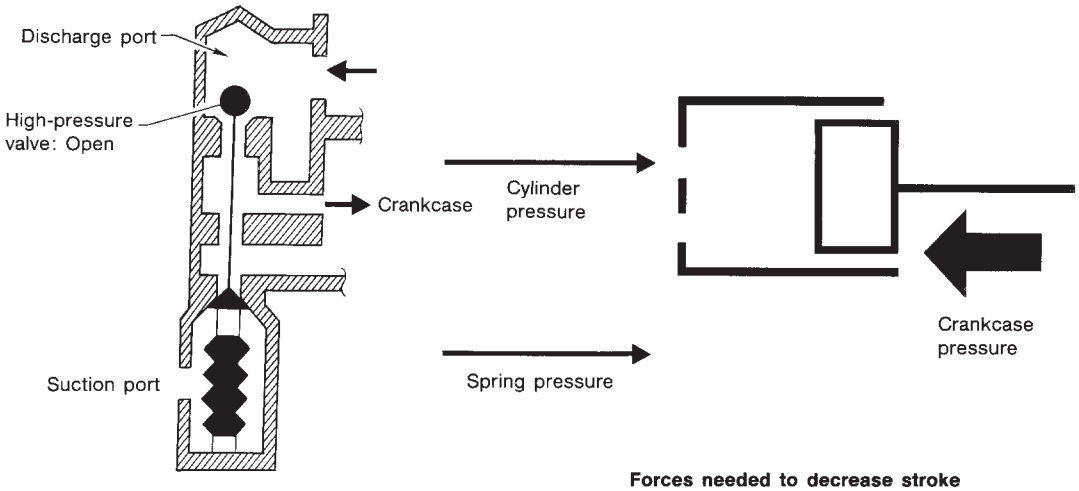
Under this condition, the swash plate is set to the maximum stroke position.



3. Capacity Control

=NFHA0164S0203

- Refrigerant pressure on suction side is low during high speed driving or when ambient or interior temperature is low.
- The bellows expands when refrigerant pressure on the suction pressure side drops below approximately 177 kPa (1.8 kg/cm^2, 26 psi).
  Since suction pressure is low, it makes the suction port close and the discharge port open. Thus, crankcase pressure becomes high as high pressure enters the crankcase.
- The force acts around the journal pin near the swash plate, and is generated by the pressure difference before and behind the piston.
  The drive lug and journal pin are located where the piston generates the highest pressure. Piston pressure is between suction pressure Ps and discharge pressure Pd, which is near suction pressure Ps. If crankcase pressure Pc rises due to capacity control, the force around the journal pin makes the swash plate angle decrease and also the piston stroke decrease. In other words, crankcase pressure increase triggers pressure difference between the piston and the crankcase. The pressure difference changes the angle of the swash plate.



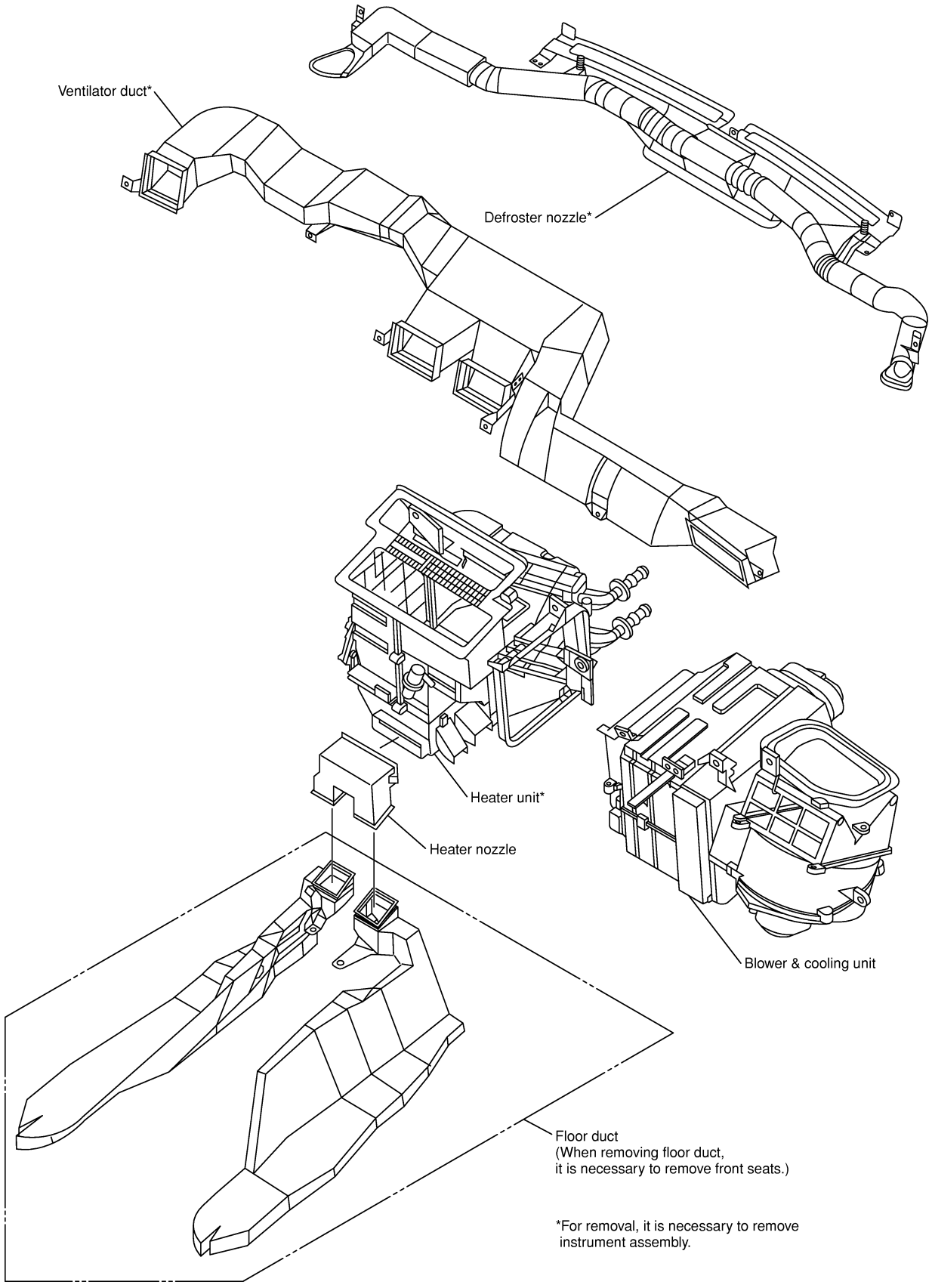
Valve position for raising crankcase pressure

Forces needed to decrease stroke

RHA474C

Component Layout

NFHA0166



RHA349H

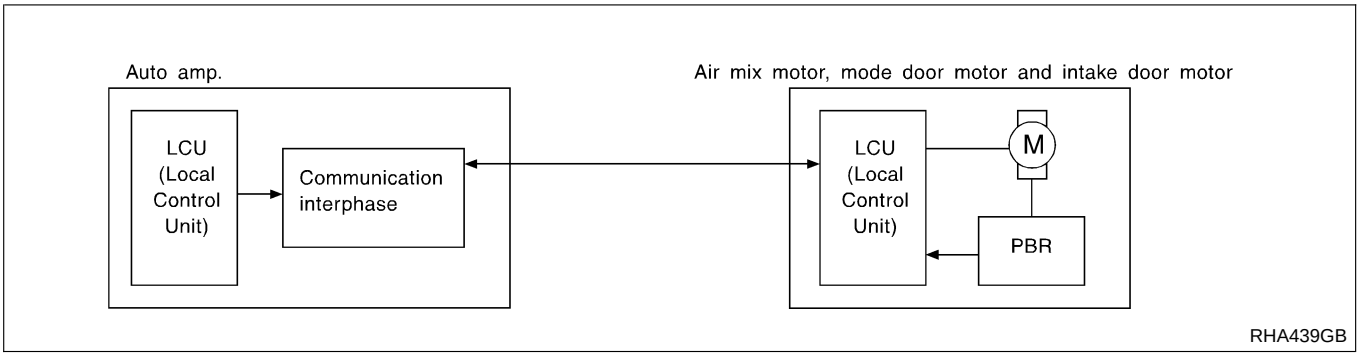
Introduction

NFHA0167

AIR CONDITIONER LAN SYSTEM OVERVIEW CONTROL SYSTEM

NFHA0167S01

The LAN system consists of auto amp., air mix door motor, intake door motor and mode door motor. A configuration of these components is shown in the diagram below.



Features

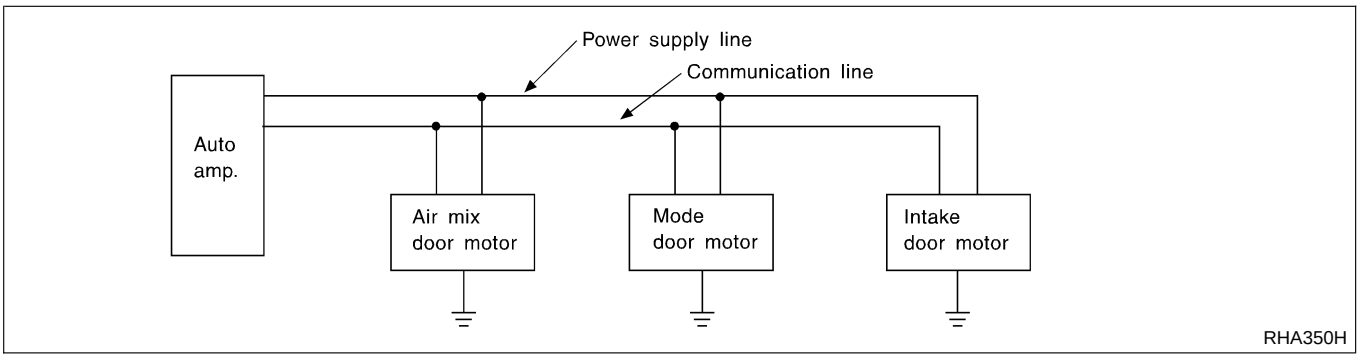
NFHA0168

SYSTEM CONSTRUCTION (LAN)

NFHA0168S01

A small network is constructed between the auto amplifier, air mix door motor, mode door motor and intake door motor. The auto amplifier and motors are connected by data transmission lines and motor power supply lines. The LAN network is built through the ground circuits of the three motors.
Addresses, motor opening angle signals, motor stop signals and error checking messages are all transmitted through the data transmission lines connecting the auto amplifier and three motors.
The following functions are contained in LCUs built into the air mix door motor, intake door motor and the mode door motor.

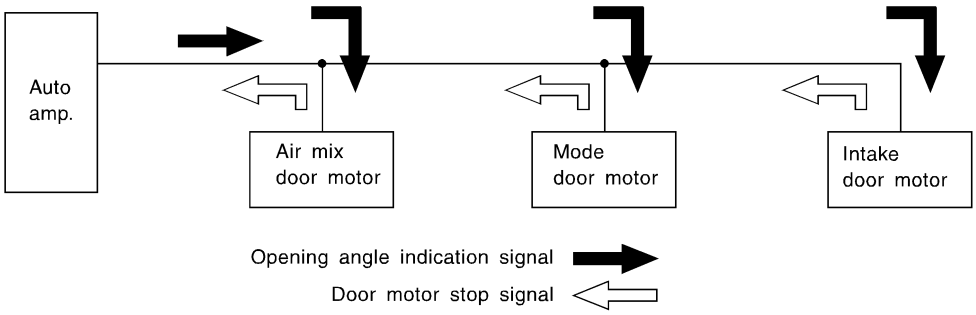
- Address
- Motor opening angle signals
- Data transmission
- Motor stop and drive decision
- Opening angle sensor (PBR function)
- Comparison
- Decision (Auto amplifier indicated value and motor opening angle comparison)



Operation

NFHA0168S0101

The auto amplifier receives data from each of the sensors. The amplifier sends air mix door, intake door and mode door opening angle data to the air mix door motor LCU, mode door LCU and intake door motor LCU.
The air mix door motor, intake door motor and mode door motor read their respective signals according to the address signal. Opening angle indication signals received from the auto amplifier and each of the motor position sensors are compared by the LCUs in each motor with the existing decision and opening angles. Subsequently, HOT/COLD, FRESH/RECIRCULATION or DEFROST/VENT operation is selected. The new selection data is returned to the auto amplifier.



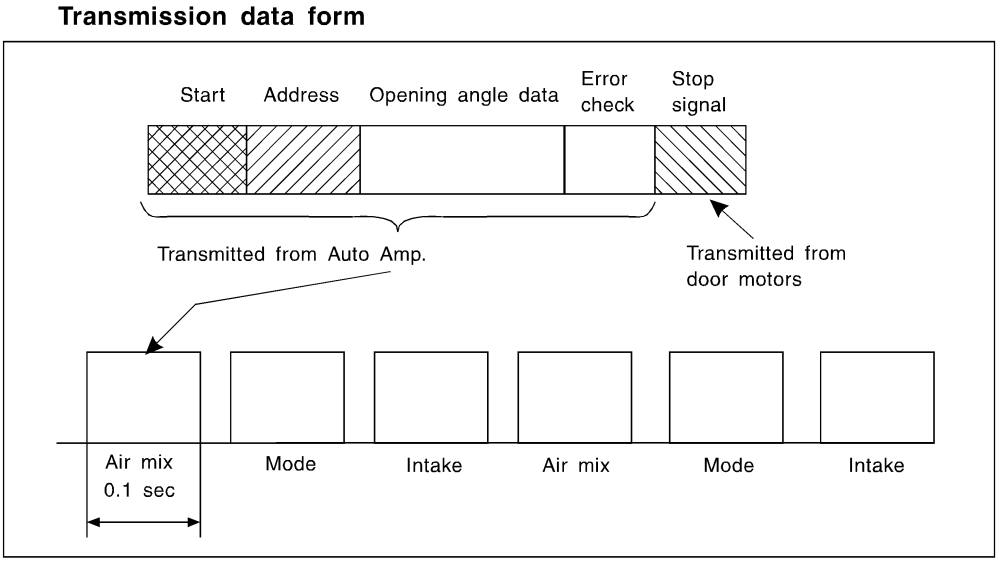
Transmission Data and Transmission Order

NFHA0168S0102

Amplifier data is transmitted consecutively to each of the door motors following the form shown in figure below.
Start: Initial compulsory signal sent to each of the door motors.
Address: Data sent from the auto amplifier is selected according to data-based decisions made by the air mix door motor, intake door motor and mode door motor.
If the addresses are identical, the opening angle data and error check signals are received by the door motor LCUs. The LCUs then make the appropriate error decision. If the opening angle data is normal, door control begins.
If an error exists, the received data is rejected and corrected data received. Finally, door control is based upon the corrected opening angle data.
Opening angle: Data that shows the indicated door opening angle of each door motor.
Error check: Procedure by which sent and received data is checked for errors. Error data is then compiled. The error check prevents corrupted data from being used by the air mix door motor, intake door motor and mode door motor. Error data can be related to the following problems.

- Abnormal electrical frequency
- Poor electrical connections
- Signal leakage from transmission lines
- Signal level fluctuation

Stop signal: At the end of each transmission, a stop operation, in-operation, or internal problem message is delivered to the auto amplifier. This completes one data transmission and control cycle.



Air Mix Door Control (Automatic Temperature Control)

NFHA0168S0103

The air mix door is automatically controlled so that in-vehicle temperature is maintained at a predetermined value by: The temperature setting, ambient temperature, in-vehicle temperature and amount of sunload.

Fan Speed Control

NFHA0168S0104

Blower speed is automatically controlled based on temperature setting, ambient temperature, in-vehicle temperature, intake temperature, amount of sunload and air mix door position.
With FAN switch set to "AUTO", the blower motor starts to gradually increase air flow volume.
When engine coolant temperature is low, the blower motor operation is delayed to prevent cool air from flowing.

Intake Door Control

NFHA0168S0105

The intake doors are automatically controlled based on temperature setting, ambient temperature, in-vehicle temperature, intake temperature, amount of sunload, air mix door position and ON-OFF operation of the compressor.

Outlet Door Control

NFHA0168S0106

The outlet door is automatically controlled by: The temperature setting, ambient temperature, in-vehicle temperature, intake temperature and amount of sunload.

Magnet Clutch Control

NFHA0168S0107

The ECM controls compressor operation using input signals from the throttle position sensor, refrigerant pressure sensor and auto amplifier.

Self-diagnostic System

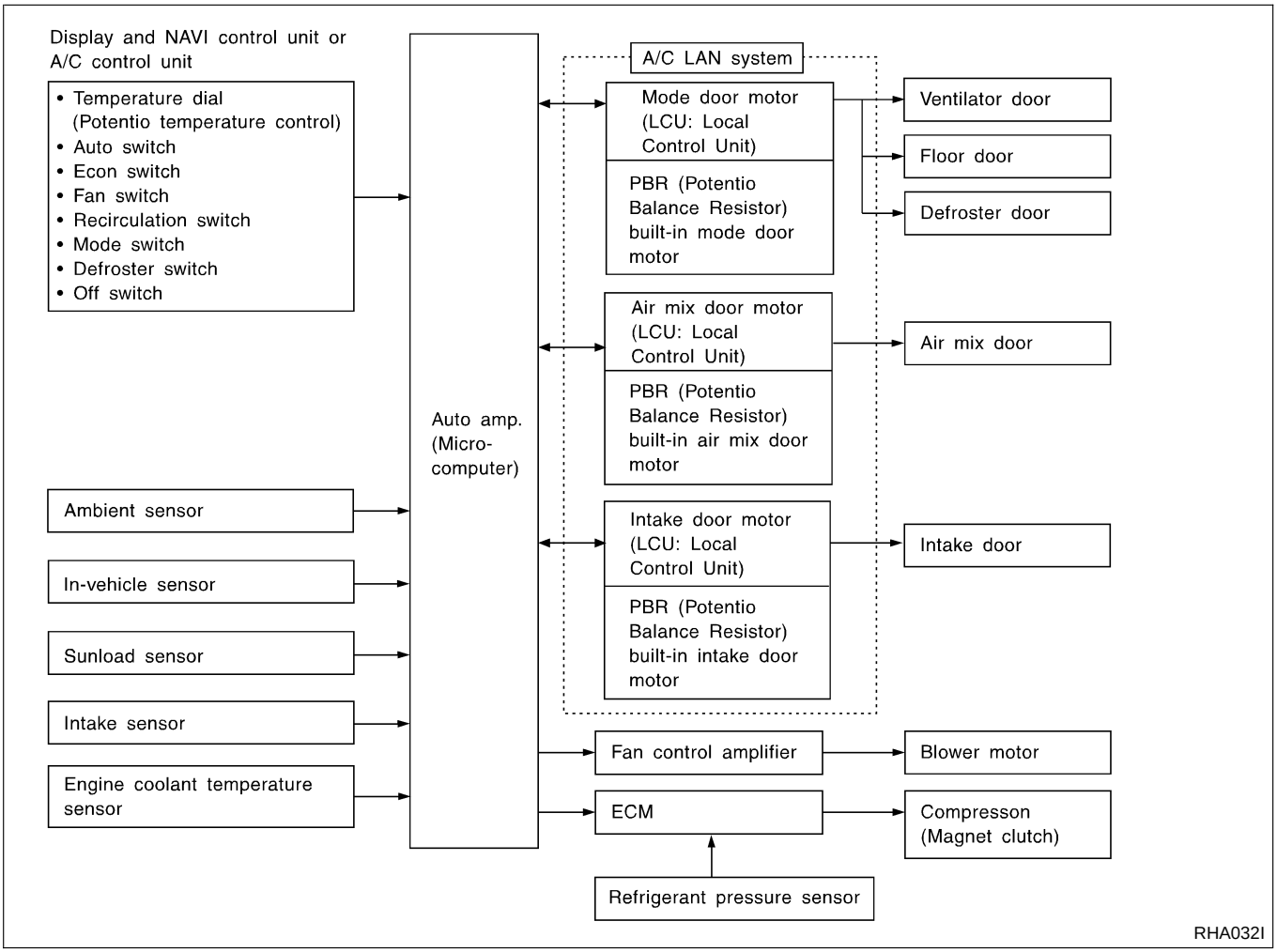
NFHA0168S0108

The self-diagnostic system is built into the auto amplifier (LCU) to quickly locate the cause of problems.

Overview of Control System

=NFHA0169

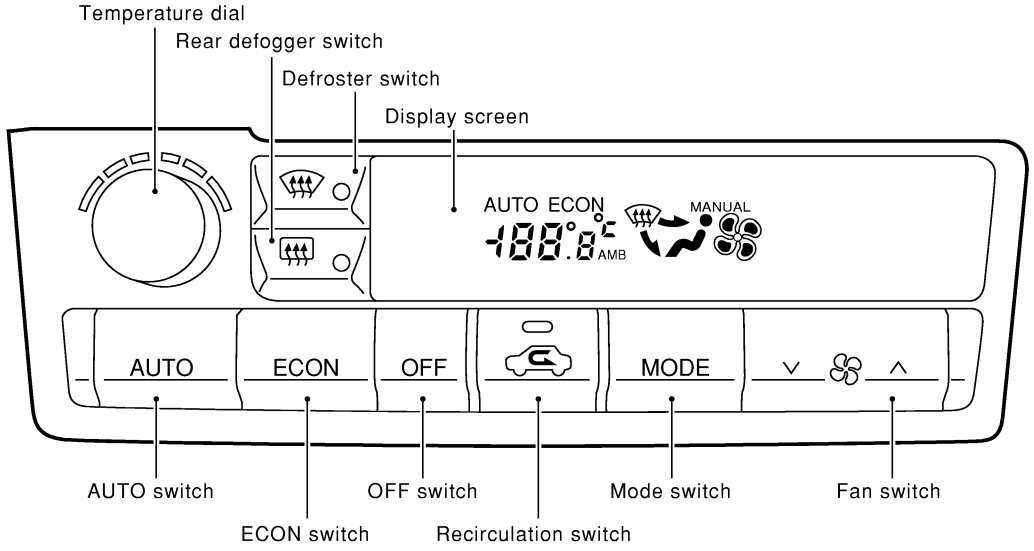
The control system consists of input sensors, switches, the automatic amplifier (microcomputer) and outputs. The relationship of these components is shown in the diagram below:



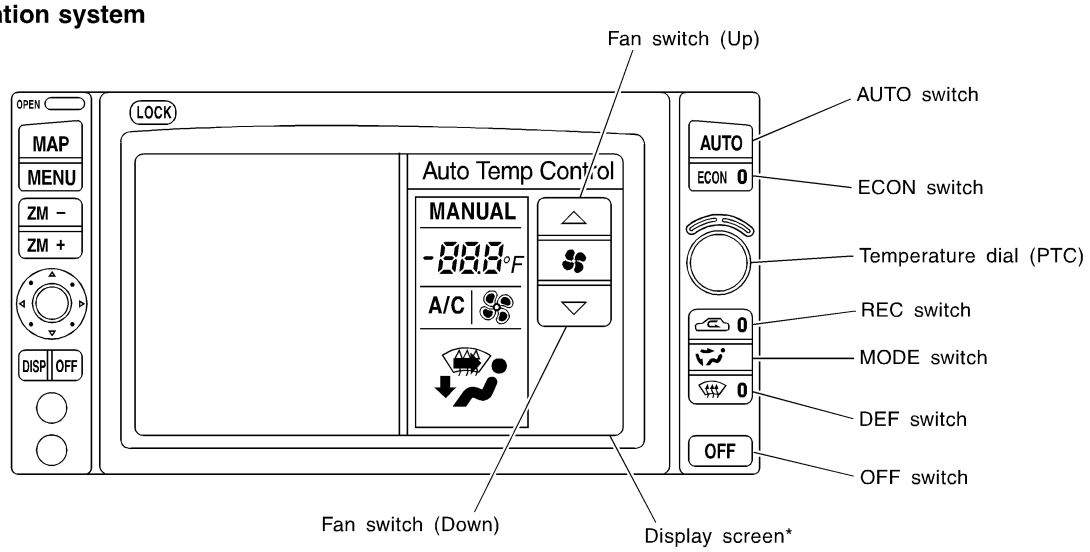
Control Operation

NFHA0170

Without navigation system



With navigation system



*: Displays the operation of the system.

RHA085I

DISPLAY SCREEN

NFHA0170S01

Displays the operational status of the system.

AUTO SWITCH

NFHA0170S02

The compressor, intake doors, air mix door, outlet doors, and blower speed are automatically controlled so that the in-vehicle temperature will reach, and be maintained at the set temperature selected by the operator.

ECON SWITCH

NFHA0170S03

By pressing the ECON switch, the display should indicate ECON and the compressor always turns OFF. With the compressor OFF, the system will not remove heat (cool) or de-humidify. The system will maintain the in-vehicle temperature at the set temperature when the set temperature is above the ambient (outside) temperature. The system will set the intake doors to the outside air position.

TEMPERATURE DIAL (POTENTIO TEMPERATURE CONTROL)

NFHA0170S04

Increases or decreases the set temperature.

OFF SWITCH

NFHA0170S05

The compressor and blower are OFF, the intake doors are set to the outside air position, and the air outlet doors are set to the foot (80% foot and 20% defrost) position.

FAN SWITCH

NFHA0170S06

Manual control of the blower speed. Four speeds are available for manual control (as shown on the display screen):
low , medium low , medium high , high

RECIRCULATION (REC) SWITCH

NFHA0170S07

OFF position: Outside air is drawn into the passenger compartment.
ON position: Interior air is recirculated inside the vehicle.

DEFROSTER (DEF) SWITCH

NFHA0170S08

Positions the air outlet doors to the defrost position. Also positions the intake doors to the outside air position.

MODE SWITCH

NFHA0170S09

Control the air discharge outlets.

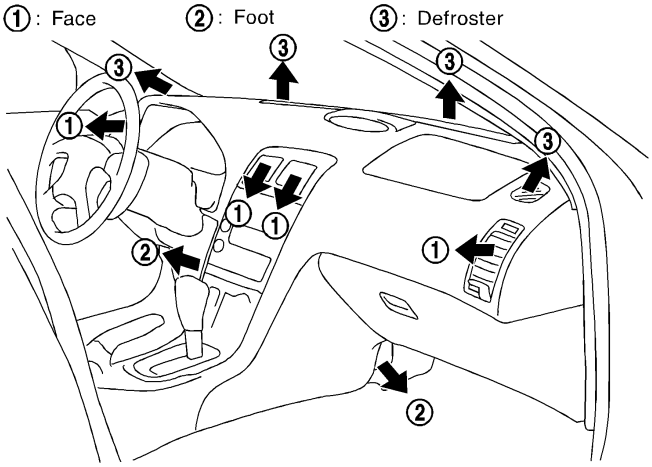
REAR WINDOW DEFOGGER SWITCH (WITHOUT NAVIGATION SYSTEM)

NFHA0170S10

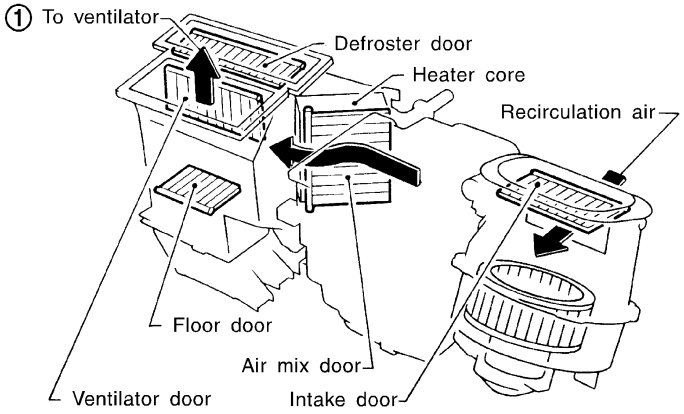
When illumination is ON, rear window is defogged.

Discharge Air Flow

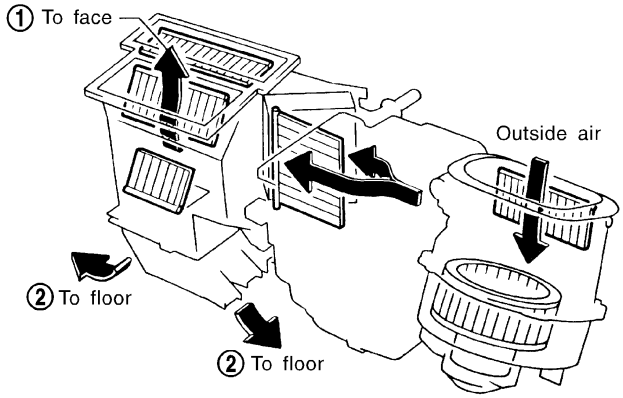
NFHA0171



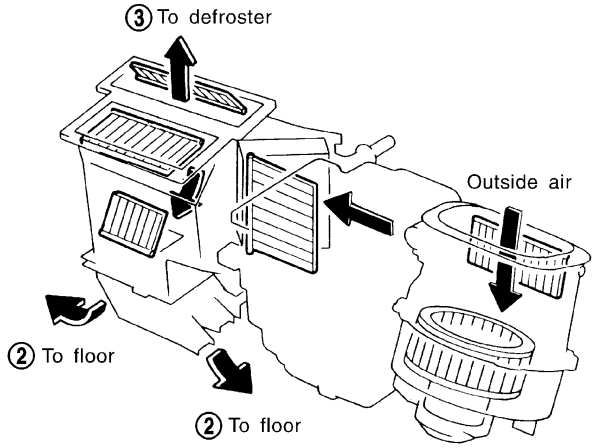
Face
(switch "ON")



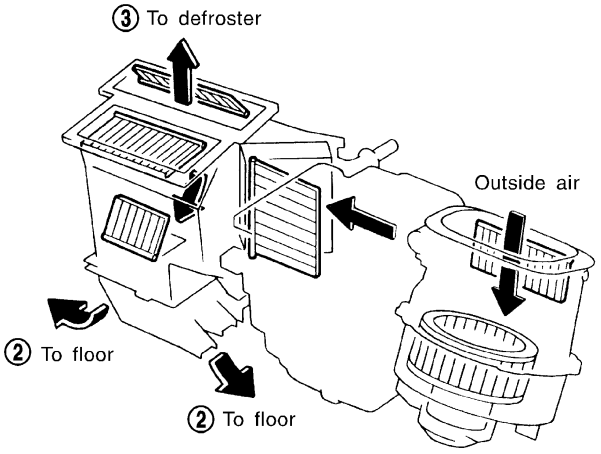
Bi-level
(switch "OFF")



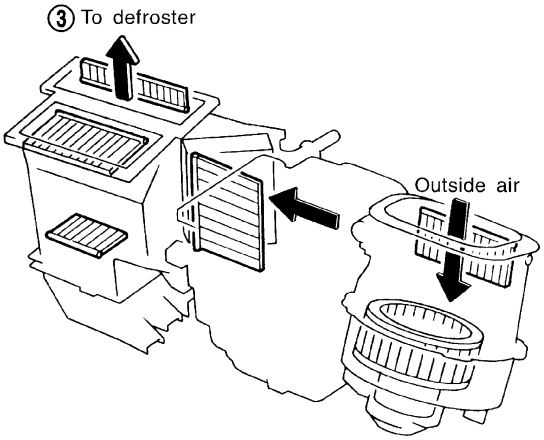
Floor



Floor and defroster



Defroster



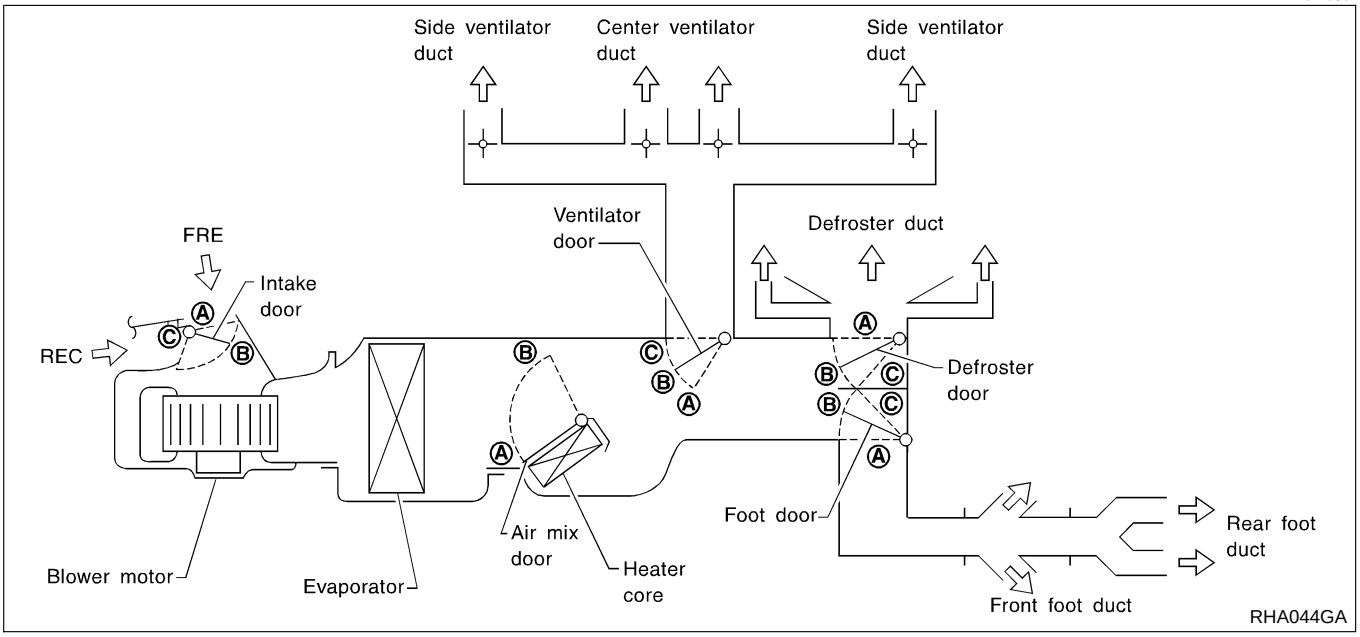
RHA355H

System Description

NFHA0246

SWITCHES AND THEIR CONTROL FUNCTIONS

NFHA0246S01



Position or switch	MODE SW				Front DEF SW		AUTO SW	ECON SW	REC SW		Temperature DIAL		
	VENT	B/L	FOOT	D/F	ON	OFF			ON	OFF			
Door							AUTO	ECON			18.0°C (60°F)	—	32.0°C (90°F)
Ventilator door	A	B	C	C	C		AUTO	AUTO	—		—		
Foot door	A	B	C	C	A				—		—		
Defroster door	A	A	B	C	C	—			—		—		
Air mix door	—				—				—		A	AUTO	B
Intake door	—				C				A	AUTO*1	—		

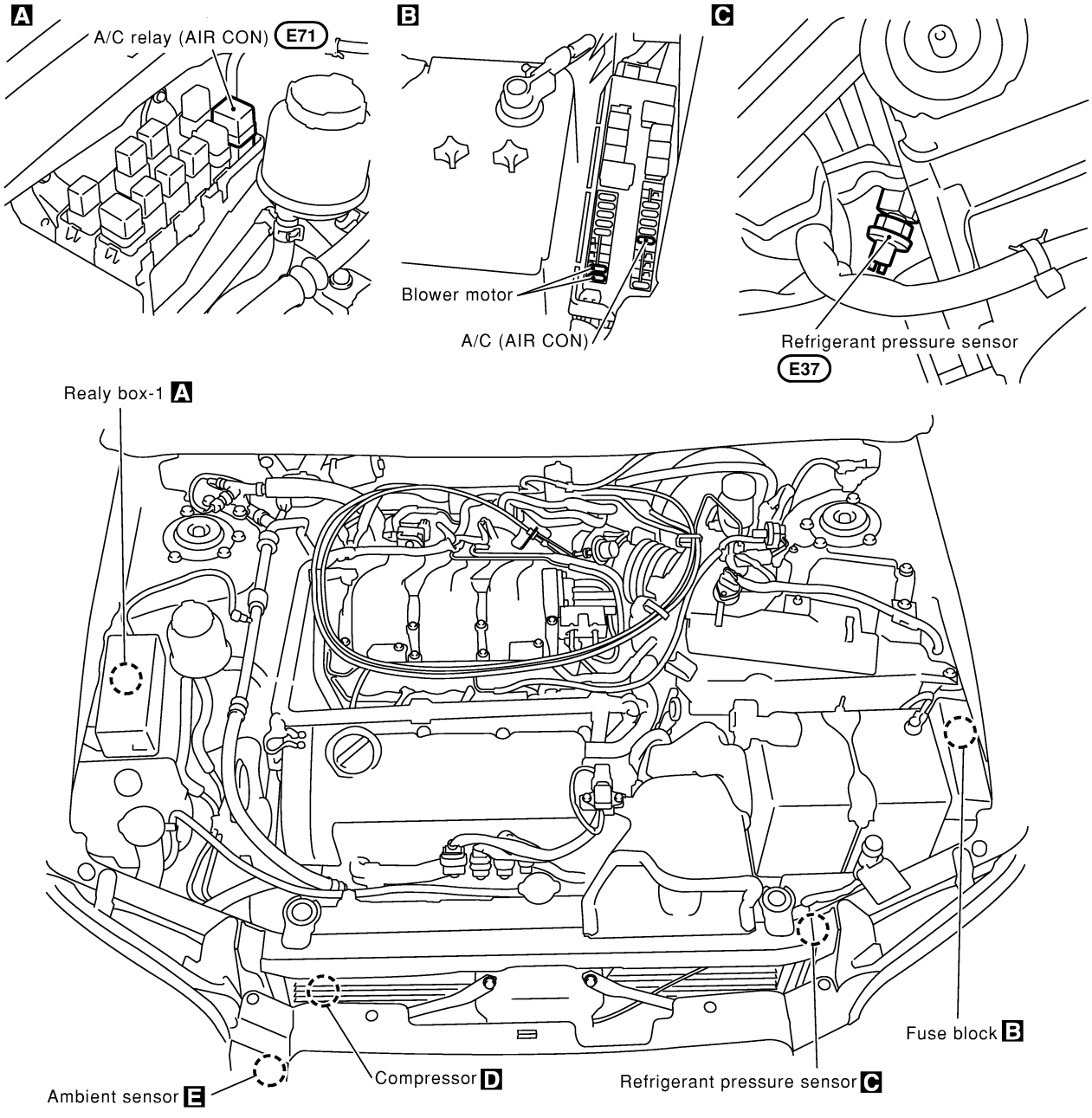
*1: Automatically controlled when REC switch is OFF.

Component Location

NFHA0172

ENGINE COMPARTMENT

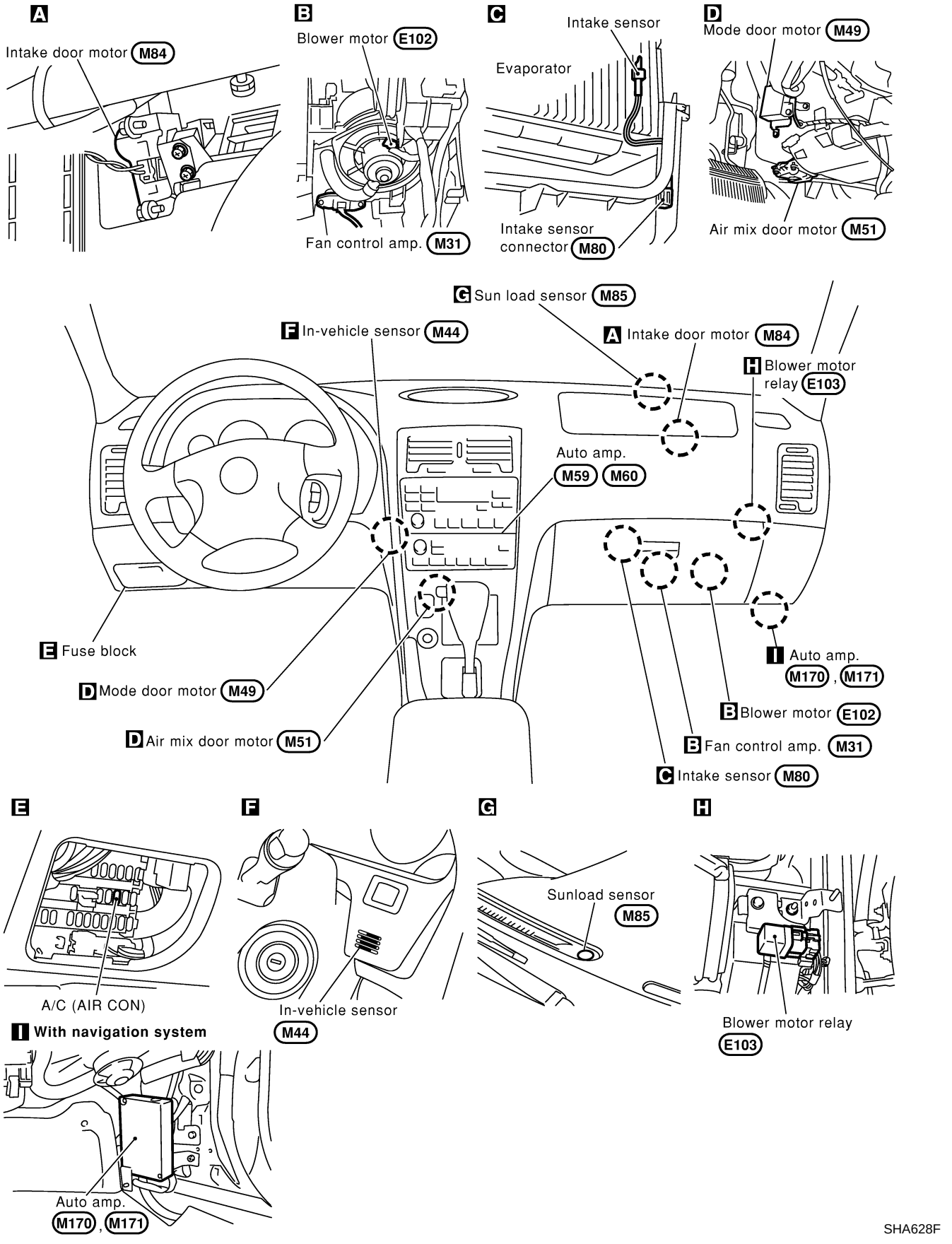
NFHA0172S01



RHA034I

PASSENGER COMPARTMENT

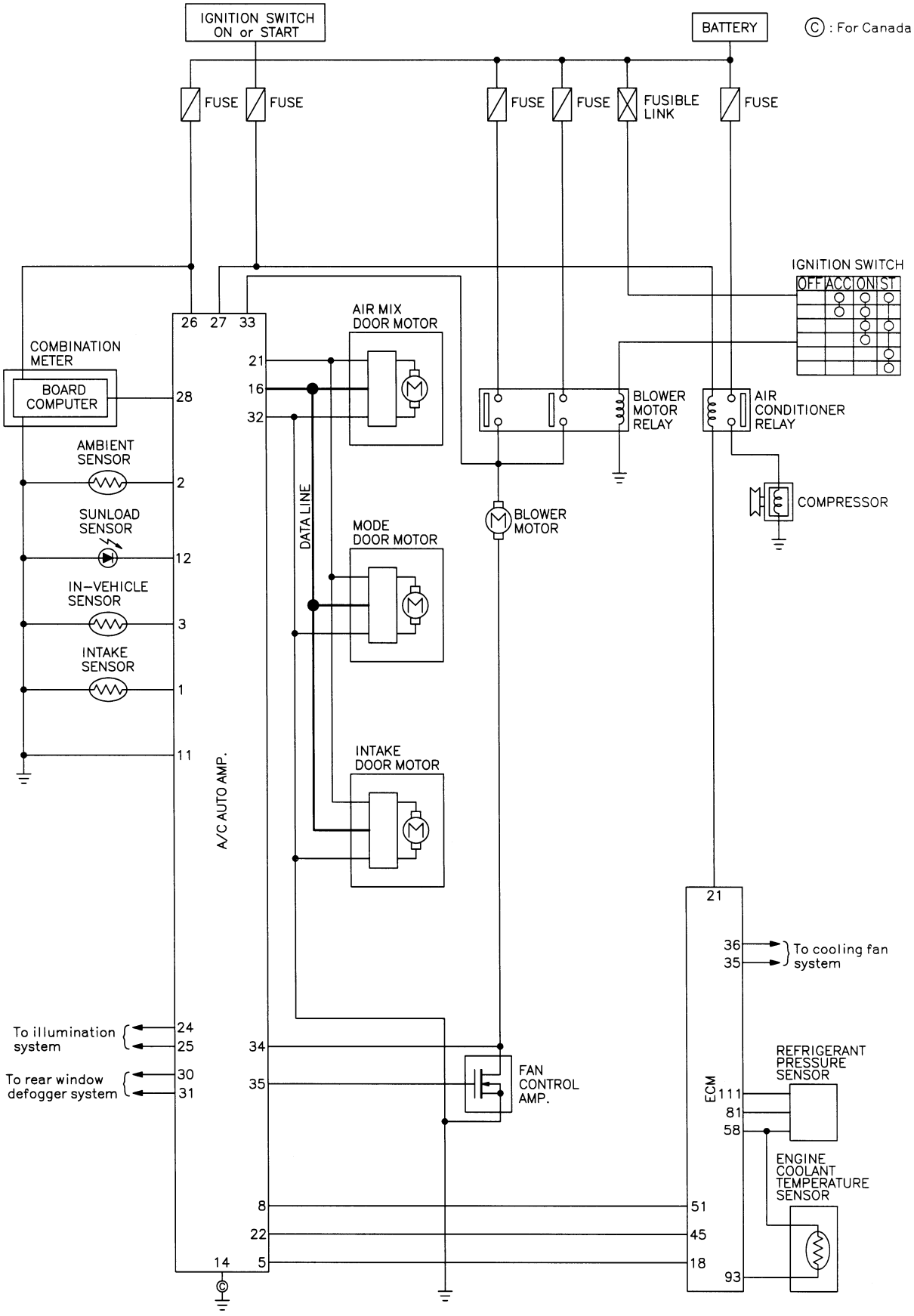
NFHA0172S02



SHA628F

Circuit Diagram (Without Navigation System)

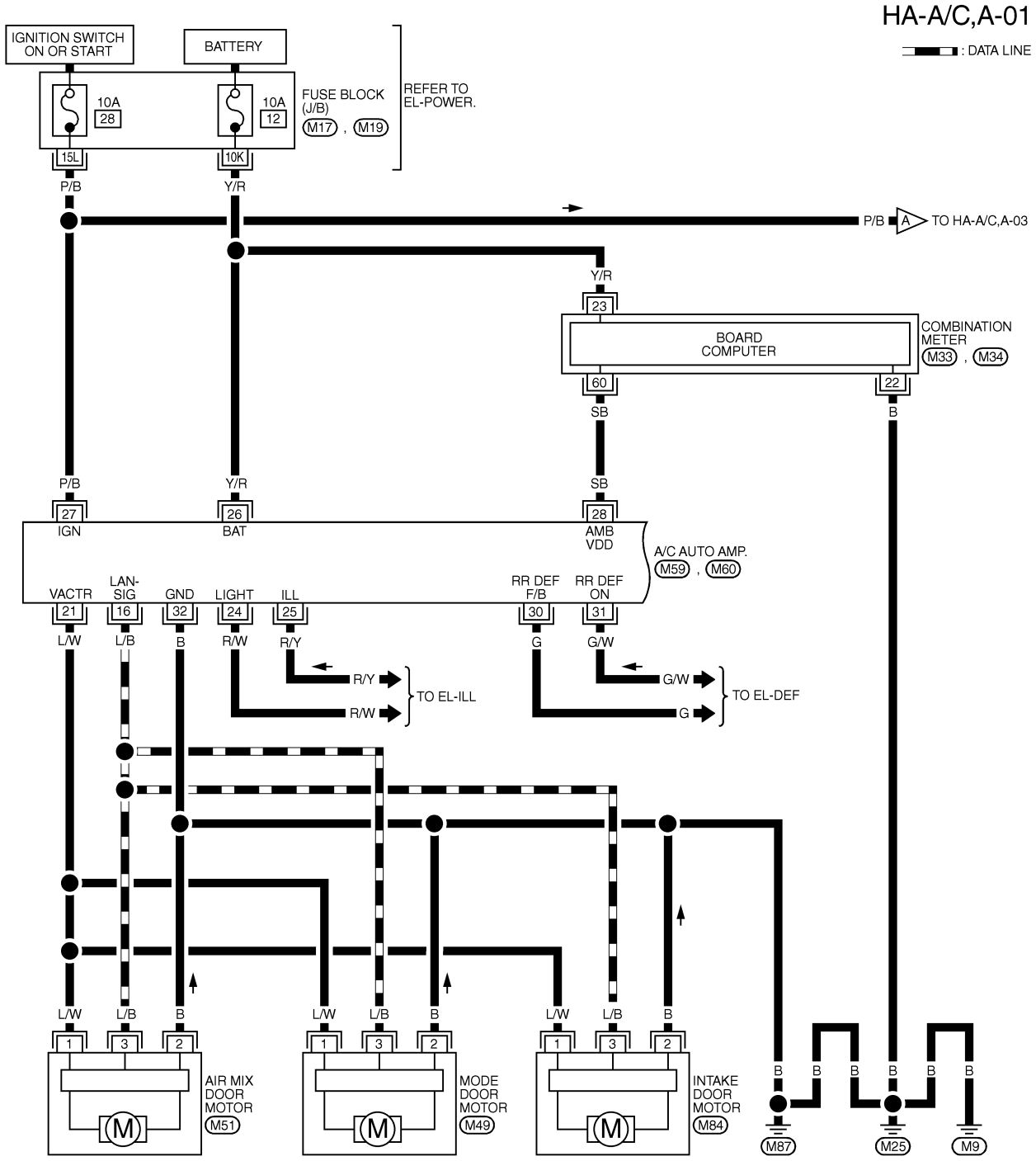
NFHA0173

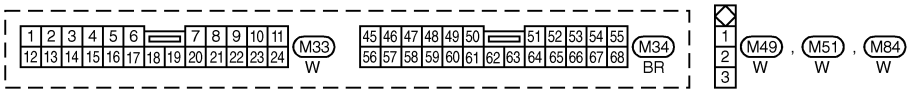


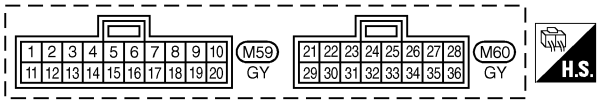
MHA170B

Wiring Diagram — A/C, A —/Without Navigation System

NFHA0174



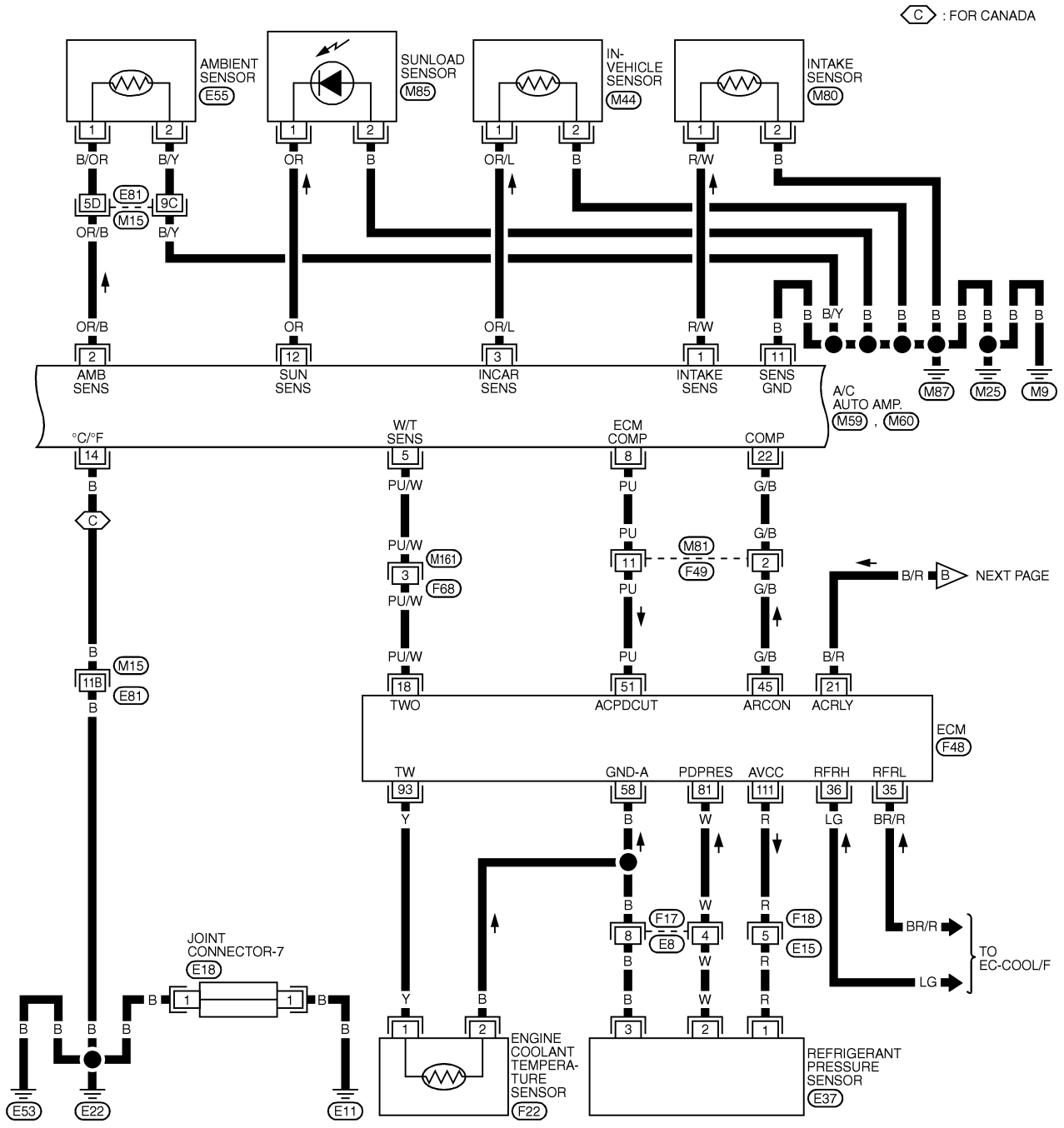


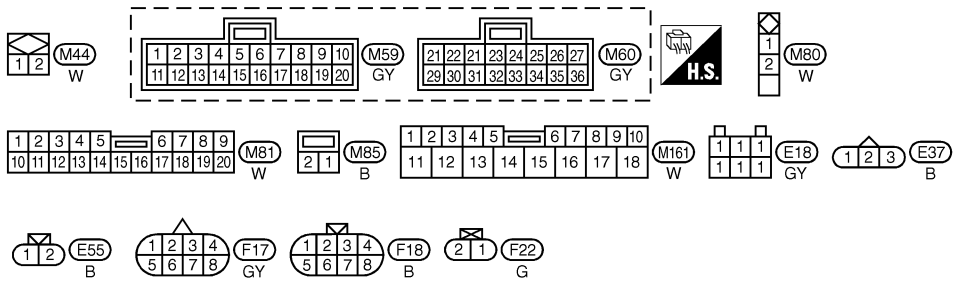


REFER TO THE FOLLOWING.
M17 , M19 - FUSE BLOCK - JUNCTION BOX (J/B)

MHA171B

HA-A/C,A-02

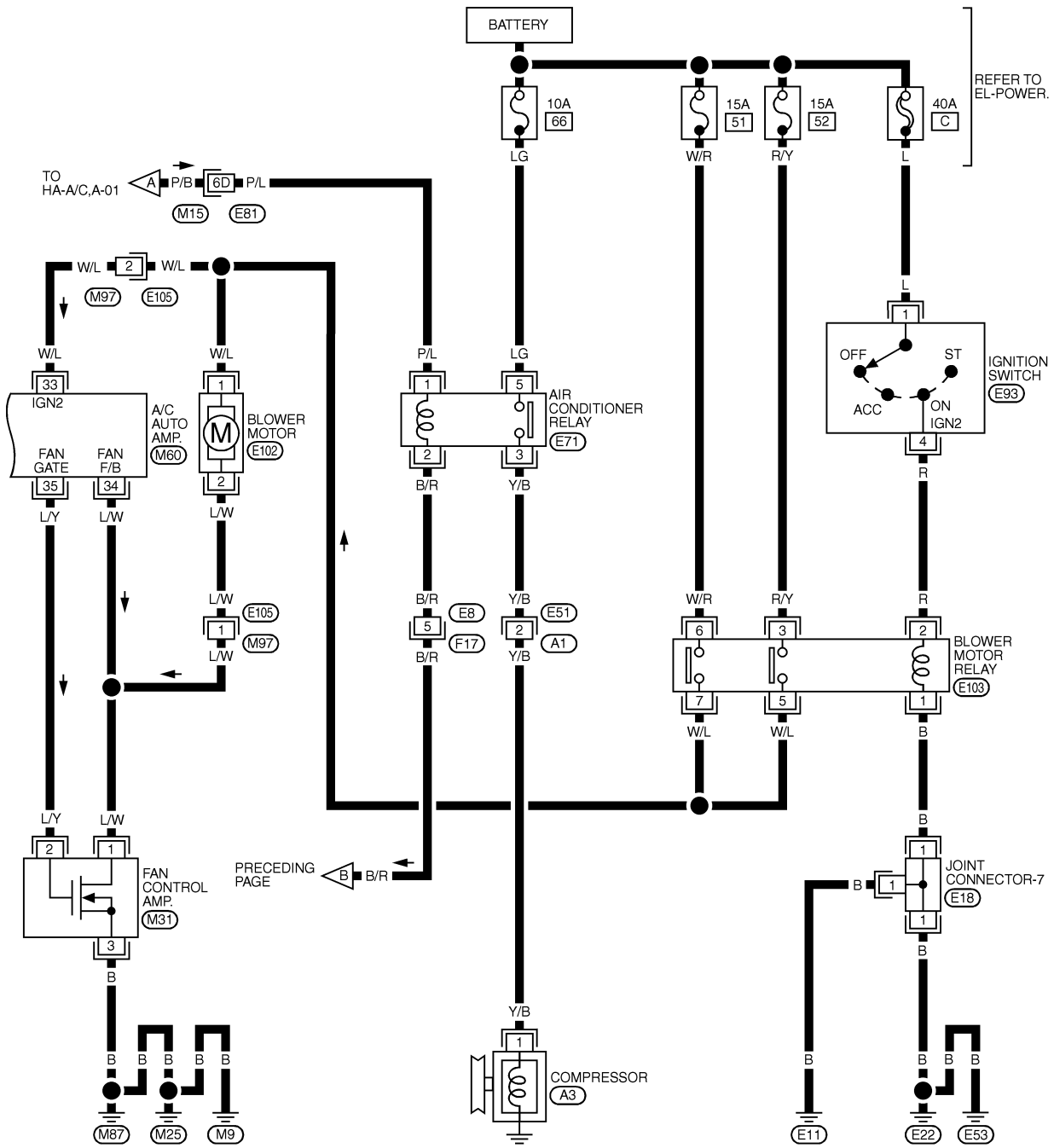


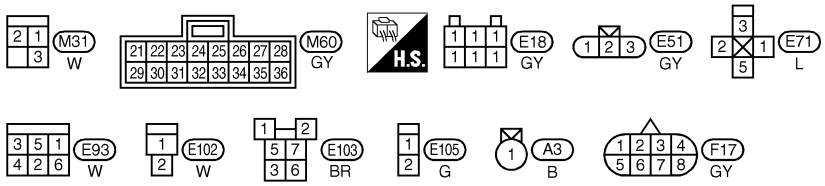


REFER TO THE FOLLOWING.
M15 - SUPER MULTIPLE JUNCTION (SMJ)
F48 - ELECTRICAL UNITS

MHA061B

HA-A/C,A-03



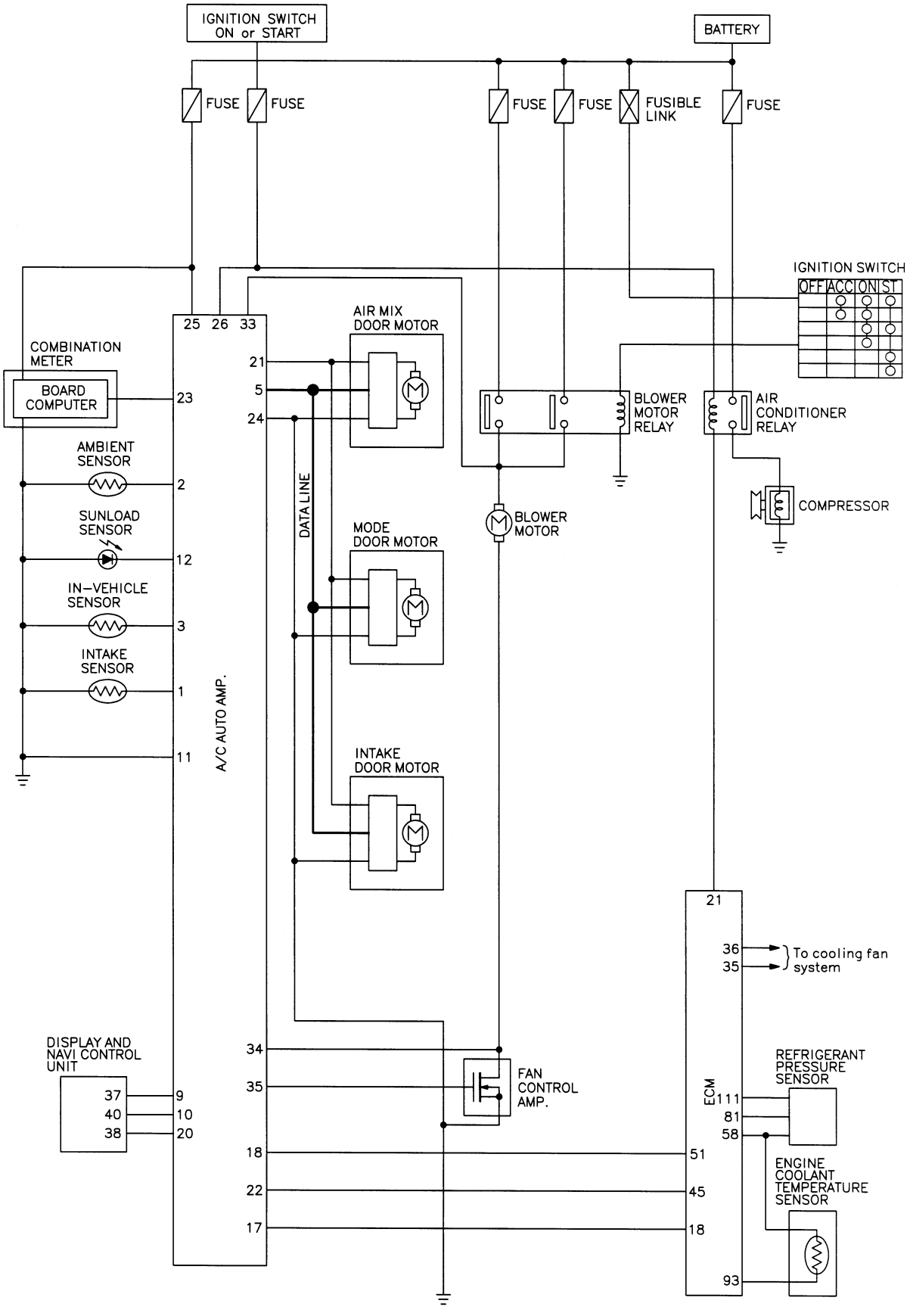


REFER TO THE FOLLOWING.
M15 - SUPER MULTIPLE JUNCTION (SMJ)

MHA062B

Circuit Diagram (With Navigation System)

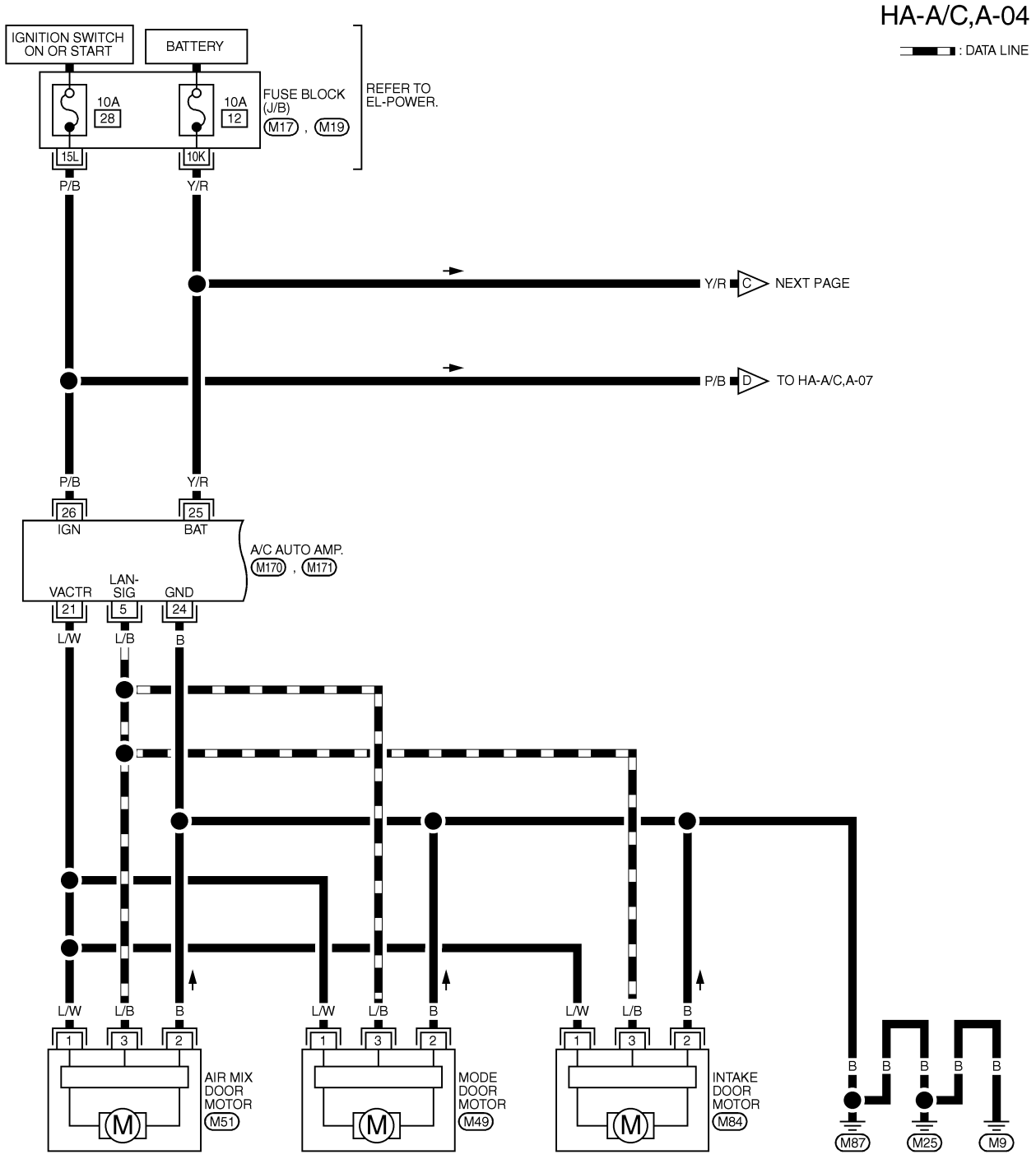
NFHA0282

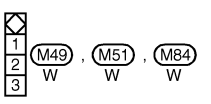


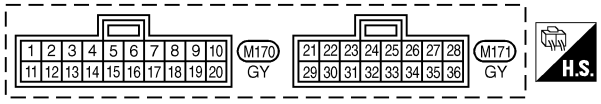
MHA172B

Wiring Diagram — A/C, A —/With Navigation System

NFHA0283



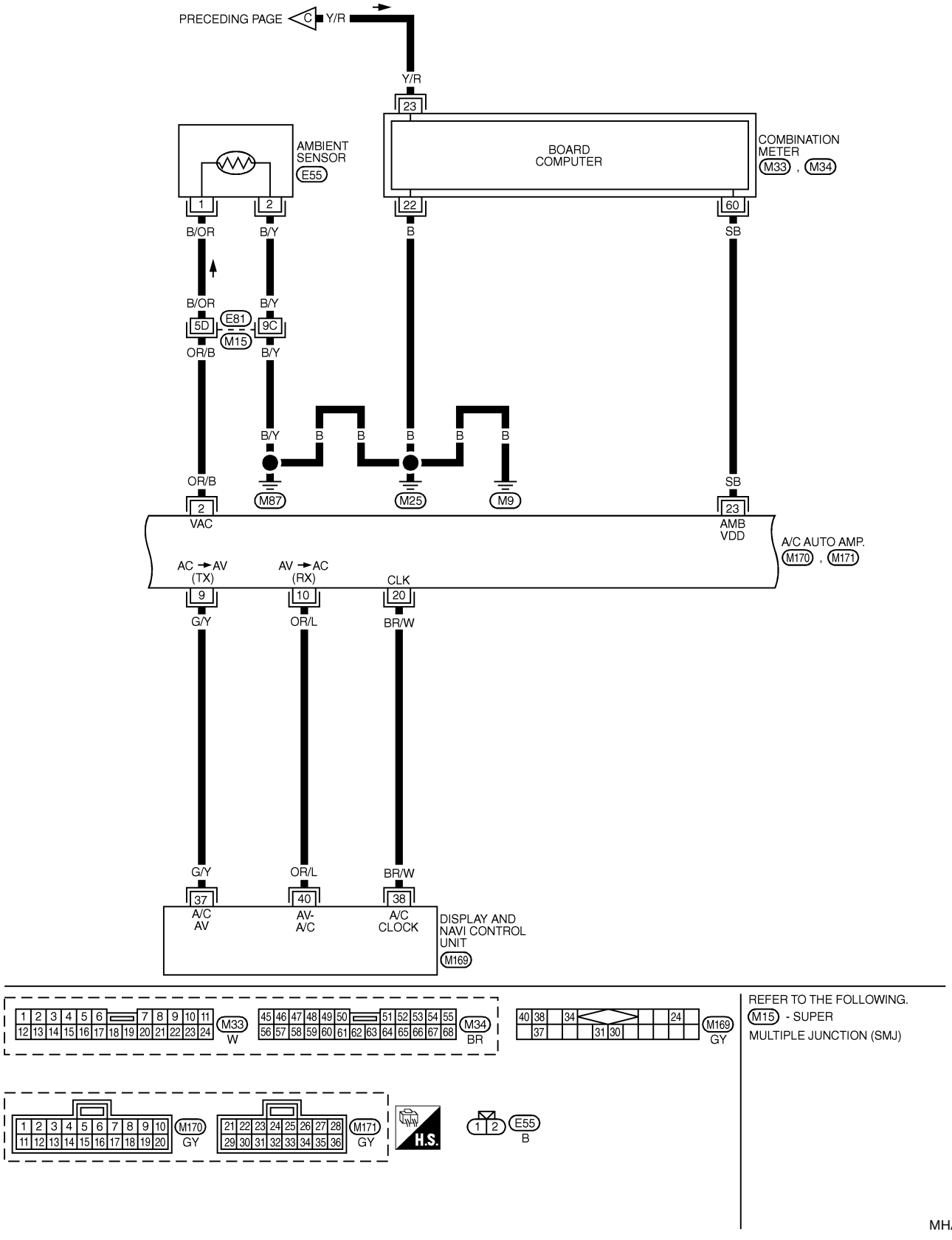




REFER TO THE FOLLOWING.
M17 , M19 - FUSE BLOCK - JUNCTION BOX (J/B)

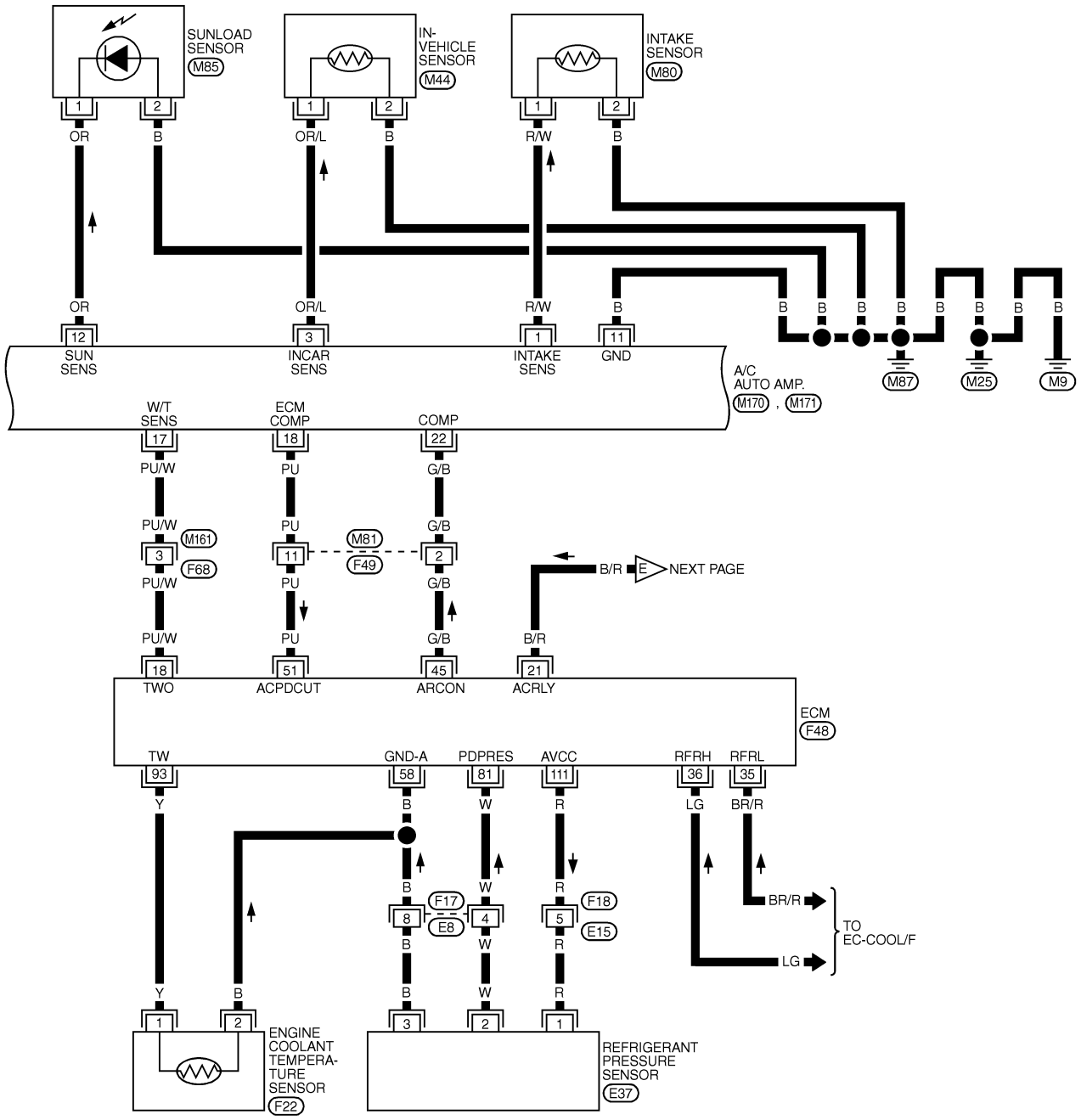
MHA173B

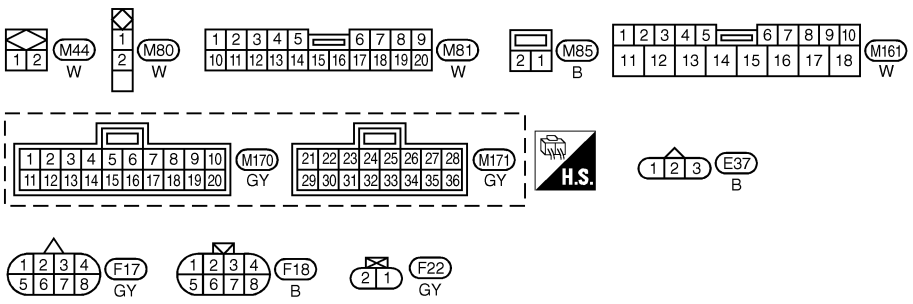
HA-A/C,A-05



MHA175B

HA-A/C,A-06

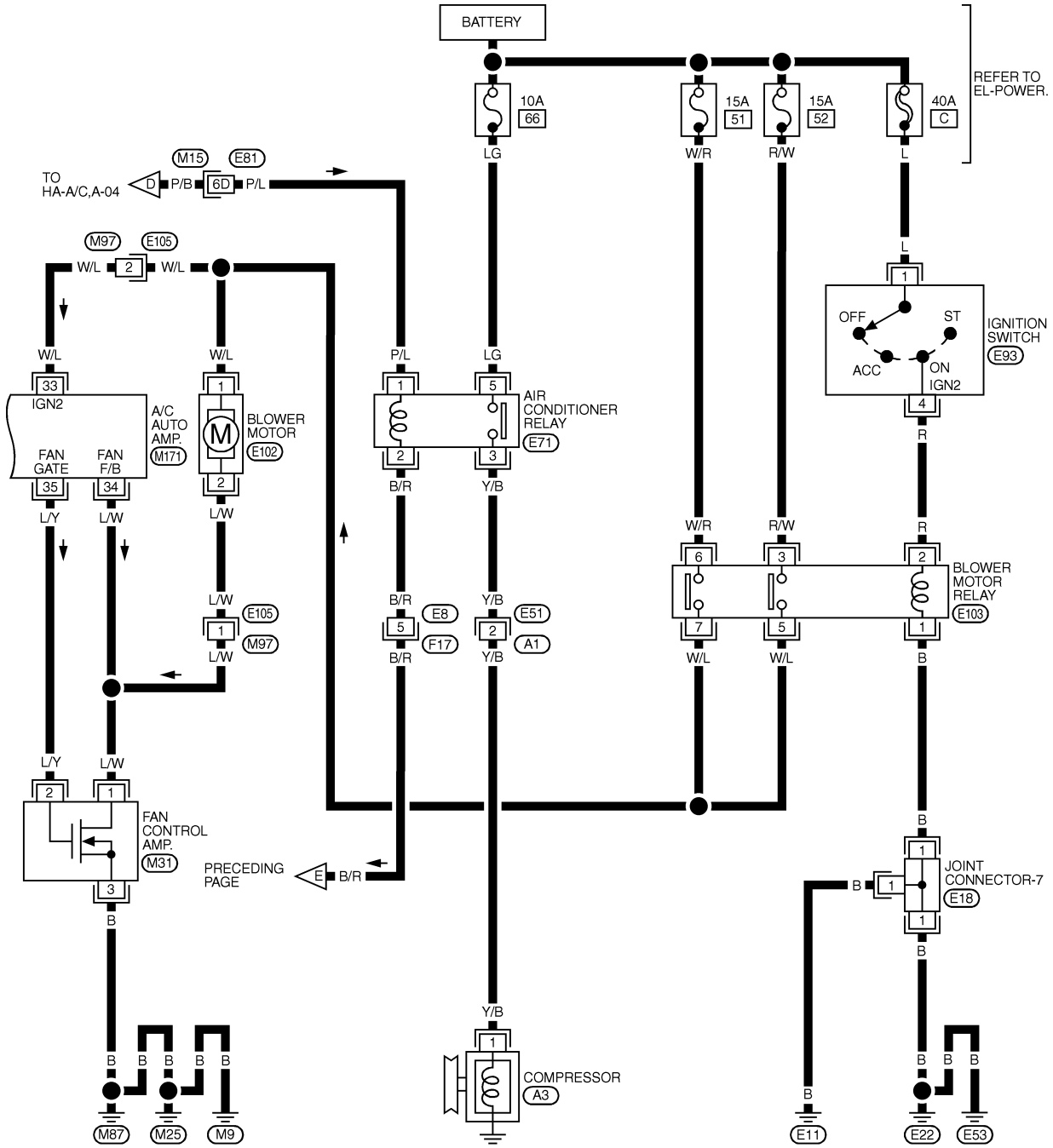


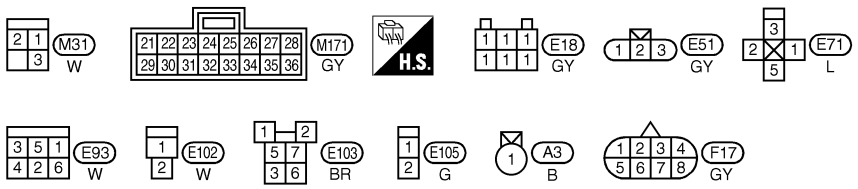


REFER TO THE FOLLOWING.
F48 - ELECTRICAL UNITS

MHA174B

HA-A/C,A-07

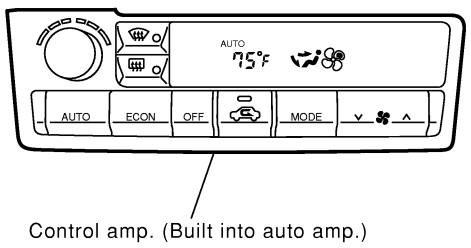




REFER TO THE FOLLOWING.
M15 - SUPER MULTIPLE JUNCTION (SMJ)

MHA067B

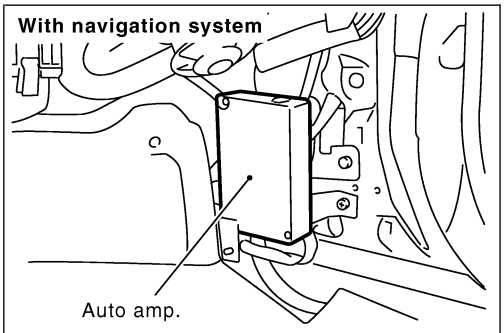
Without navigation system



Control amp. (Built into auto amp.)

RHA036I

With navigation system



RHA037I

Auto Amp. Terminals and Reference Value

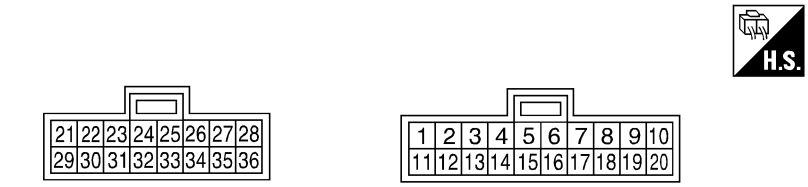
NFHA0175

INSPECTION OF AUTO AMP.

NFHA0175S01

- Measure voltage between each terminal and body ground by following “AUTO AMP. INSPECTION TABLE”.

- Pin connector terminal layout



Without navigation system: M60
With navigation system: M171

Without navigation system: M59
With navigation system: M170

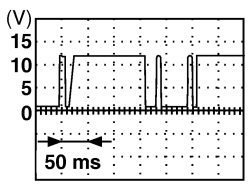
RHA501GE

AUTO AMP. INSPECTION TABLE

NFHA0175S02

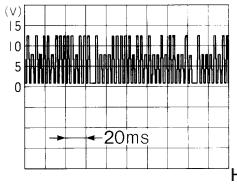
Without Navigation System

NFHA0175S0201

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	Voltage V
1	R/W	Intake sensor	—	—
2	OR/B	Ambient sensor	—	—
3	OR/L	In-vehicle sensor	—	—
5	PU/W	Water temperature sensor	—	

SHA606F

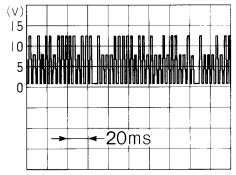
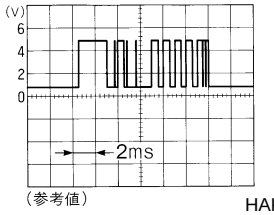
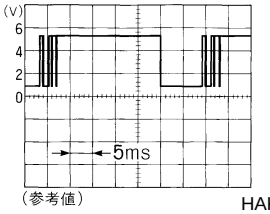
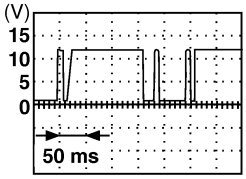
Auto Amp. Terminals and Reference Value (Cont'd)

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION			Voltage V
8	PU	Compressor feed back signal		AUTO SW: ON	—	Approximately 0
					When refrigerant pressure sensor connector is disconnected	Approximately 4.6
11	B	Sensor ground		—		Approximately 0
12	OR	Sunload sensor	—			—
14	B	Ground (for Canada)		—		Approximately 0
16	L/B	A/C LAN signal		—		Approximately 5.5  HAK0652D
21	L/W	Power supply for mode door motor, intake door motor and air mix door motor		—		Approximately 12
22	G/B	Compressor ON signal		Compressor	ON	Approximately 0
					OFF	Approximately 4.6
26	Y/R	Power supply for BAT		—		BATTERY VOLTAGE
27	P/B	Power supply for IGN		—		Approximately 12
28	SB	Ambient temperature output signal	—			—
30	G	Rear window defogger feed back		Rear window defogger switch	ON	Approximately 12
					OFF	Approximately 0
31	G/W	Rear window defogger ON signal		Rear window defogger switch	ON	Approximately 0
					OFF	Approximately 12
32	B	Ground		—		Approximately 0
33	W/L	Power source for ACC		Ignition voltage feed back		Approximately 12
34	L/W	Blower motor feed back		Fan speed: Low		Approximately 7 - 10
35	L/Y	Fan control amp. control signal		Fan speed	Low, Middle low or Middle high	Approximately 2.5 - 3.0
					High	Approximately 9 - 10

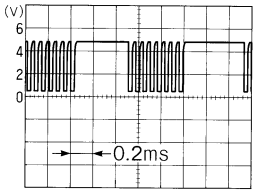
With Navigation System

NFHA0175S0202

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	Voltage V
1	R/W	Intake sensor	—	—

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION		Voltage V
2	OR/B	Ambient sensor	—		—
3	OR/L	In-vehicle sensor	—		—
5	L/B	A/C LAN signal		—	Approximately 5.5  HAK0652D
9	G/Y	Multiplex communication signal (Tx)		—	 HAK0360D
10	OR/L	Multiplex communication signal (Rx)		—	 HAK0361D
11	B	Sensor ground		—	Approximately 0
12	OR	Sunload sensor	—		—
17	PU/W	Water temperature sensor	—		 SHA606F

Auto Amp. Terminals and Reference Value (Cont'd)

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION			Voltage V
18	PU	Compressor feed back signal		AUTO SW: ON	—	Approximately 0
					When refrigerant pressure sensor connector is disconnected	Approximately 4.6
20	BR/W	Multiplex communication signal (CLK)		—		 HAK0363D
21	L/W	Power supply for each door motor		—		Approximately 12
22	G/B	Compressor ON signal		Compressor: ON		Approximately 0
				Compressor: OFF		Approximately 4.6
23	SB	Ambient temperature output signal		—		—
24	B	Ground		—		Approximately 0
25	Y/R	Power supply for BAT		—		Approximately 12
26	P/B	Power supply for IGN		—		Approximately 12
33	W/L	Power supply for ACC		—		Approximately 12
34	L/W	Blower motor feed back signal		—		Approximately 12
35	L/Y	Fan control amp. control signal		Fan speed	Low, Middle low or Middle high	Approximately 2.5 - 3.0
					High	Approximately 9 - 10

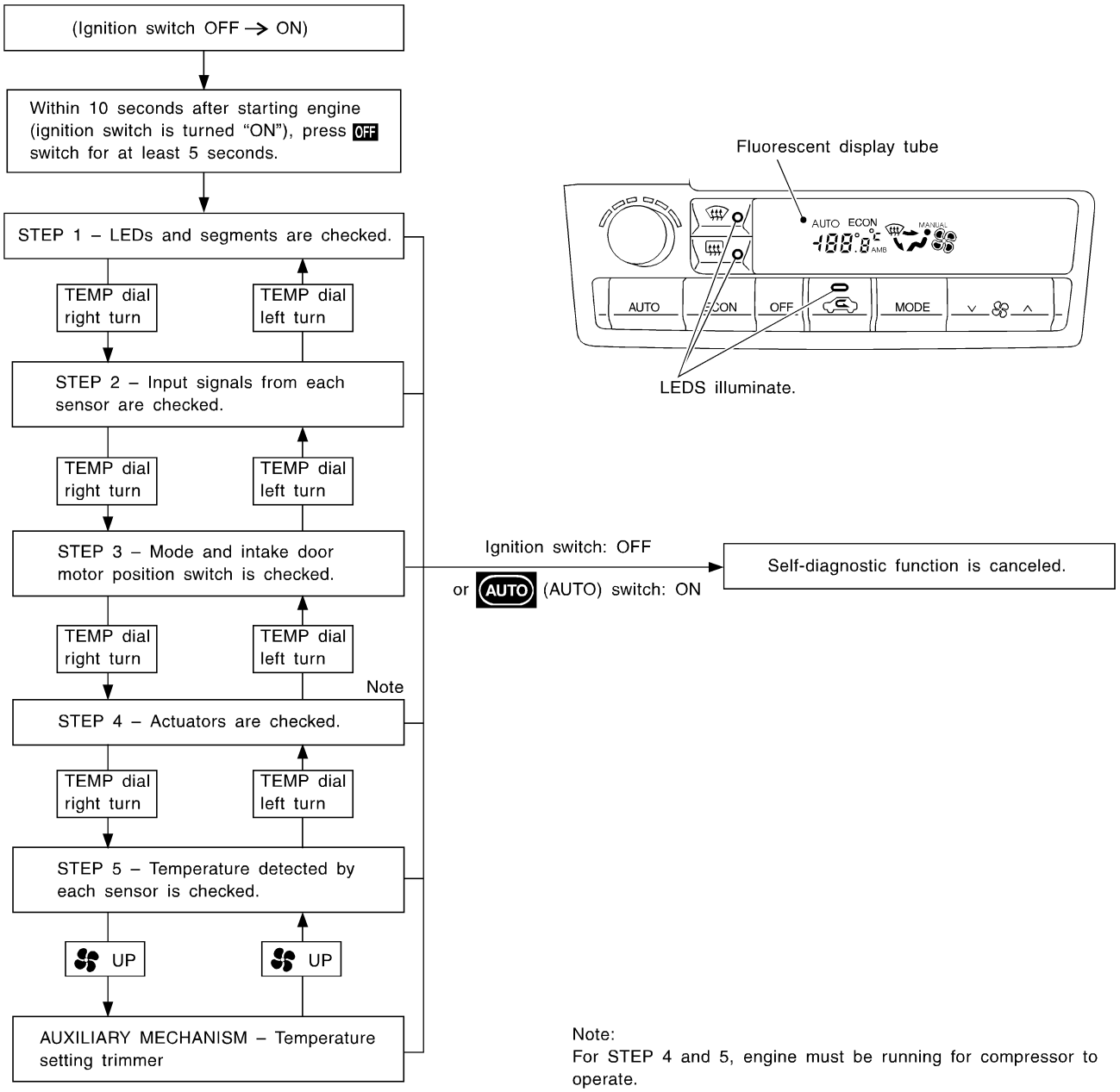
Self-diagnosis

=NFHA0176

INTRODUCTION AND GENERAL DESCRIPTION (WITHOUT NAVIGATION SYSTEM)

NFHA0176S01

The self-diagnostic system diagnoses sensors, door motors, blower motor, etc. by system line. Refer to applicable sections (items) for details. Shifting from normal control to the self-diagnostic system is accomplished by starting the engine (turning the ignition switch from “OFF” to “ON”) and pressing “ OFF ” switch for at least 5 seconds. The “ OFF ” switch must be pressed within 5 seconds after starting the engine (ignition switch is turned “ON”). This system will be canceled by either pressing AUTO (AUTO) switch or turning the ignition switch “OFF”. Shifting from one step to another is accomplished by means of pushing TEMP dial right turn or TEMP dial left turn switch, as required.
Additionally shifting from STEP 5 to AUXILIARY MECHANISM is accomplished by means of pushing (fan) UP switch.



RHA092I

Perform all of the following tests to narrow the problem to a specific assembly, actuator, or function.
Link to the Diagnostic Procedure which corresponds to malfunctions noted in these tests.
If the A/C display screen has no display, check all power supply circuits to the A/C Auto Amp.

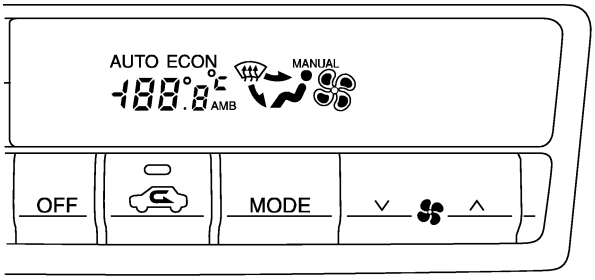
FUNCTION CONFIRMATION PROCEDURE (WITHOUT NAVIGATION SYSTEM)

NFHA0176S02

1	ENTER SELF-DIAGNOSTIC MODE
Perform steps 1 - 3 1. Turn the ignition OFF. 2. Start the engine. 3. Immediately after starting the engine press and hold the OFF switch (for the auto A/C system) for at least 5 seconds. The A/C Auto Amp. should now be in Self Diagnosis mode. Self Diagnosis steps 1 - 5 can now be performed. Self Diagnosis step 1 will be displayed first. Shifting from one step to another is accomplished by pressing the temperature increase or decrease switch.	
▶	GO TO 2.

2	STEP 1 LED/DISPLAY CHECK
Verify all segments illuminate. If all segments do not illuminate the fluorescent display tube is malfunctioning or the system has not entered self diagnosis which would indicate a malfunctioning OFF switch. Do all LEDs and segments illuminate?	

Display malfunction



RHA093I

Yes or No

Yes ▶	GO TO 3.
No ▶	Malfunctioning OFF switch, LED or fluorescent display tube. Replace A/C auto amp.

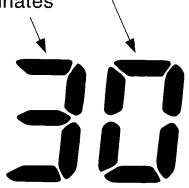
3	CHECK TO ADVANCE SELF-DIAGNOSIS STEP 2
1. Turn the TEMP dial clockwise. 2. Advance to self-diagnosis STEP 2. If the system does not shift between step 1 and 2, a malfunctioning TEMP dial is indicated.	

Yes or No

Yes ▶	GO TO 4.
No ▶	Malfunctioning TEMP dial. Replace A/C auto amp.

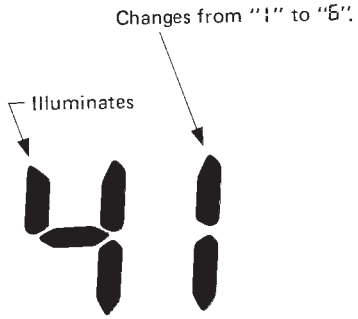
4	CHECK TO RETURN SELF-DIAGNOSIS STEP 1	
1. Turn the TEMP dial counterclockwise. 2. Return to self-diagnosis STEP 1. If the system does not shift between step 1 and 2, a malfunctioning TEMP dial is indicated.		
Yes or No		
Yes	▶	GO TO 5.
No	▶	Malfunctioning TEMP dial. Replace A/C auto amp.

5	STEP 2 - SENSOR CIRCUITS ARE CHECKED FOR OPEN OR SHORT CIRCUIT	
Turn the TEMP dial clockwise, advance to STEP 2: Wait (about 25 seconds) for two digit Code to appear. This is the Electronic Sensor Input Check which includes circuits. Does code No. 20 appear on the display?		
Display (when all sensors are in good order) Illuminates 25 seconds after " 2 " is illuminated. Illuminates RHA970DB		
Yes or No		
Yes	▶	GO TO 6.
No	▶	GO TO 13.

6	STEP 3 - MODE DOOR AND INTAKE DOOR POSITIONS ARE CHECKED	
Turn the TEMP dial clockwise, advance to STEP 3. Wait (about 50 seconds) for two digit Code to appear. This is the Mode Door and Intake Door Position Switch input checks including circuits. Does code No. 30 appear on the display?		
Display (when all doors are in good order) Illuminates 50 seconds after " 3 " is shown on display. Illuminates  RHA869DD		
Yes or No		
Yes	▶	GO TO 7.
No	▶	GO TO 14.

7	STEP 4 - OPERATION OF EACH ACTUATOR IS CHECKED

Turn the TEMP dial clockwise, advance to STEP 4.
Engine running.
This is Heater and A/C system check. Code 41 will be displayed. Use the DEF switch to advance the code number from 41 to 46. After 46, the display will return to code 41 and can be advanced to 46 again.



RHA495A

▶	GO TO 8.

8 CHECK ACTUATORS

Confirm operation of system components according to the following charts.
Checks must be made visually, by listening to any noise, or by touching air outlets with your hand, etc. for improper operation.

Code No. / Actuator	41	42	43	44	45	46
Mode door	VENT	B/L	B/L	FOOT	D/F	DEF
Intake door	REC	REC	20% FRE	FRE	FRE	FRE
Air mix door	Full Cold	Full Cold	Full Hot	Full Hot	Full Hot	Full Hot
Blower motor	4 - 5 V	9 - 11 V	7 - 9 V	7 - 9 V	7 - 9 V	10 - 12 V
Compressor	ON	ON	OFF	OFF	ON	ON

MTBL0314

Operating condition of each actuator cannot be checked by indicators.

Discharge air flow

Mode switch	Air outlet/distribution		
	Face	Foot	Defroster
	100%	—	—
	60%	40%	—
	—	80%	20%
	—	60%	40%
	—	—	100%

MTBL0128

OK or NG

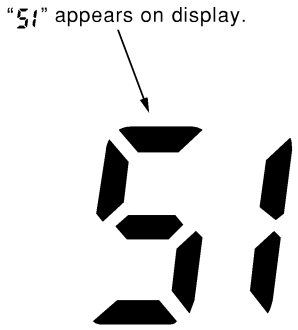
OK	▶	GO TO 9.
NG	▶	• Air outlet does not change. Go to "Mode Door Motor" (HA-75). • Intake door does not change. Go to "Intake Door Motor" (HA-87). • Blower motor operation is malfunctioning. Go to "Blower Motor" (HA-91). • Magnet clutch does not engage. Go to "Magnet Clutch" (HA-101). • Discharge air temperature does not change. Go to "Air Mix Door Motor" (HA-83).

9	STEP 5 - TEMPERATURE OF EACH SENSOR IS CHECKED

Turn the TEMP dial clockwise, advance to STEP 5. This is Intake sensor, In Vehicle sensor and Ambient Sensor function check. Code 51 will be displayed.

NOTE:

Each sensor reading should be approximately the actual temperature.

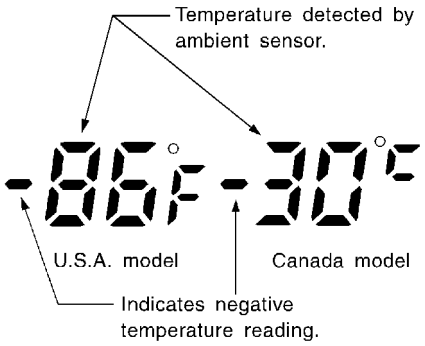


RHA359H

	▶	GO TO 10.

10	CHECK AMBIENT SENSOR

Press DEF once, temperature detected by the Ambient Sensor is displayed.



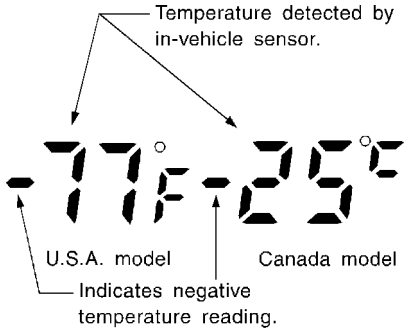
RHA499G

OK or NG

OK	▶	GO TO 11.
NG	▶	Go to Ambient Sensor Circuit (HA-123).

11	CHECK IN-VEHICLE SENSOR

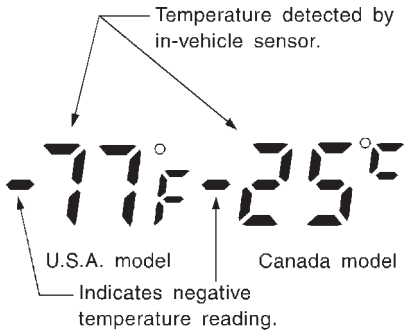
Press DEF second time, temperature detected by the In Vehicle Sensor is displayed.



RHA500G

OK or NG

OK	▶	GO TO 12.
NG	▶	Go to In-vehicle Sensor Circuit (HA-126).

12	CHECK INTAKE SENSOR
Press DEF third time, temperature detected by the Intake Sensor is displayed.  RHA500G **OK or NG**	
OK ▶	1. Press (DEF) switch the fourth time. Display returns to original presentation 51. 2. Turn ignition switch OFF or AUTO (AUTO) switch ON. 3. END
NG ▶	Go to Intake Sensor Circuit (HA-133).

13 **CHECK MALFUNCTIONING SENSOR**

NOTE:

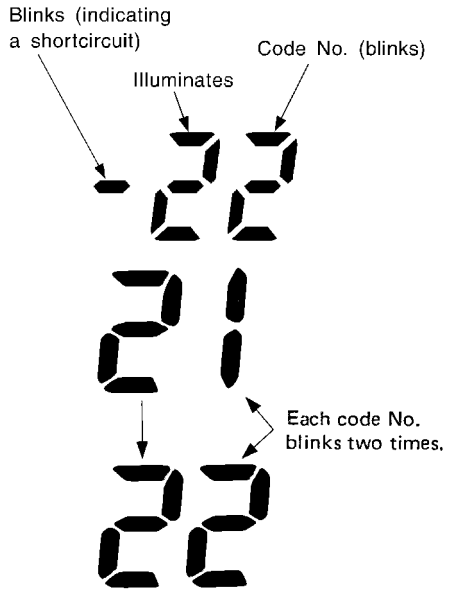
- A blinking mark (-) preceding the Code No. indicates a short circuit.
- If 2 or more items are malfunctioning the corresponding codes will alternately blink twice.
- A circuit will be detected as open or shorted and its code No. will be displayed when input signals correspond with conditions in the following chart.

Code No.	Sensor	Open circuit	Short circuit	Reference page
21 -21	Ambient sensor	Less than –43.8°C (–47°F)	Greater than 100°C (212°F)	*3
22 -22	In-vehicle sensor	Less than –43.8°C (–47°F)	Greater than 100°C (212°F)	*4
24 -24	Intake sensor	Less than –43.8°C (–47°F)	Greater than 100°C (212°F)	*5
25 -25	Sunload sensor*2	Less than 0.228 mA	Greater than 0.98 mA	*6
26 -26	PBR*1	Greater than 95%	Less than 5%	*7

MTBL1185

*1: "95%" and "5%" refer to percentage with respect to stroke of air mix door. (Full cold: 0%, Full hot: 100%)
*2: **Conduct self-diagnosis STEP 2 under sunshine.**
When conducting indoors, direct light (more than 60W) at sunload sensor.
*3: HA-123, *4: HA-126, *5: HA-133, *6: HA-129, *7: HA-135

Display (when sensor malfunctions)



RHA455G

RHA501A

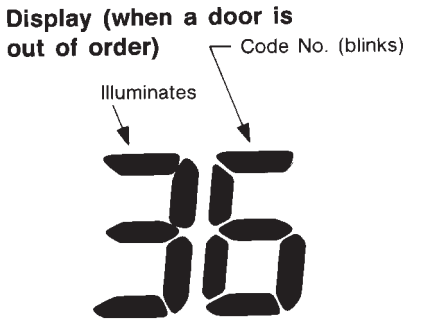
▶ INSPECTION END

14	CHECK MALFUNCTIONING DOOR MOTOR POSITION SWITCH

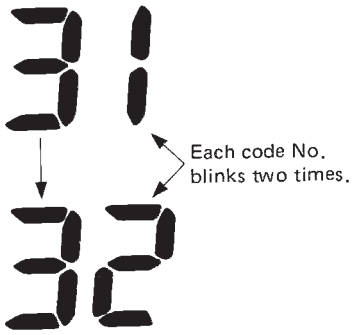
30- Mode door and intake door position switches are in working order.
Continue ot next step.
31- Mode door circuit / switch in vent position switch is malfunctioning.
32- Mode door circuit / switch in B/L position switch is malfunctioning.
34- Mode door circuit / switch in Foot position switch is malfunctioning.
35- Mode door circuit / switch in Foot Def. position switch is malfunctioning.
36- Mode door circuit / switch in Def. position switch is malfunctioning.
37- Intake door mode circuit / switch in Fresh Air position is malfunctioning.
38- Intake door mode circuit / switch in 20% Fresh Air position is malfunctioning.
39- Intake door mode circuit / switch in Recirculation Air position is malfunctioning.

NOTE:

- If 2 or more items are malfunctioning the corresponding codes will alternately blink twice.
- If the Mode Door Motor harness is disconnected repeated display pattern of 31 → 32 → 34 → 35 → 36 will occur.
- If Intake Door Motor harness is disconnected repeated display pattern of 37 → 38 → 39 will occur.
- If any Mode Door Motor Position Switch is malfunctioning the Mode Door Motor will also malfunction.



RHA168DA



RHA498A

▶	INSPECTION END

AUXILIARY MECHANISM: TEMPERATURE SETTING TRIMMER (WITHOUT NAVIGATION SYSTEM)

=NFHA0176S03

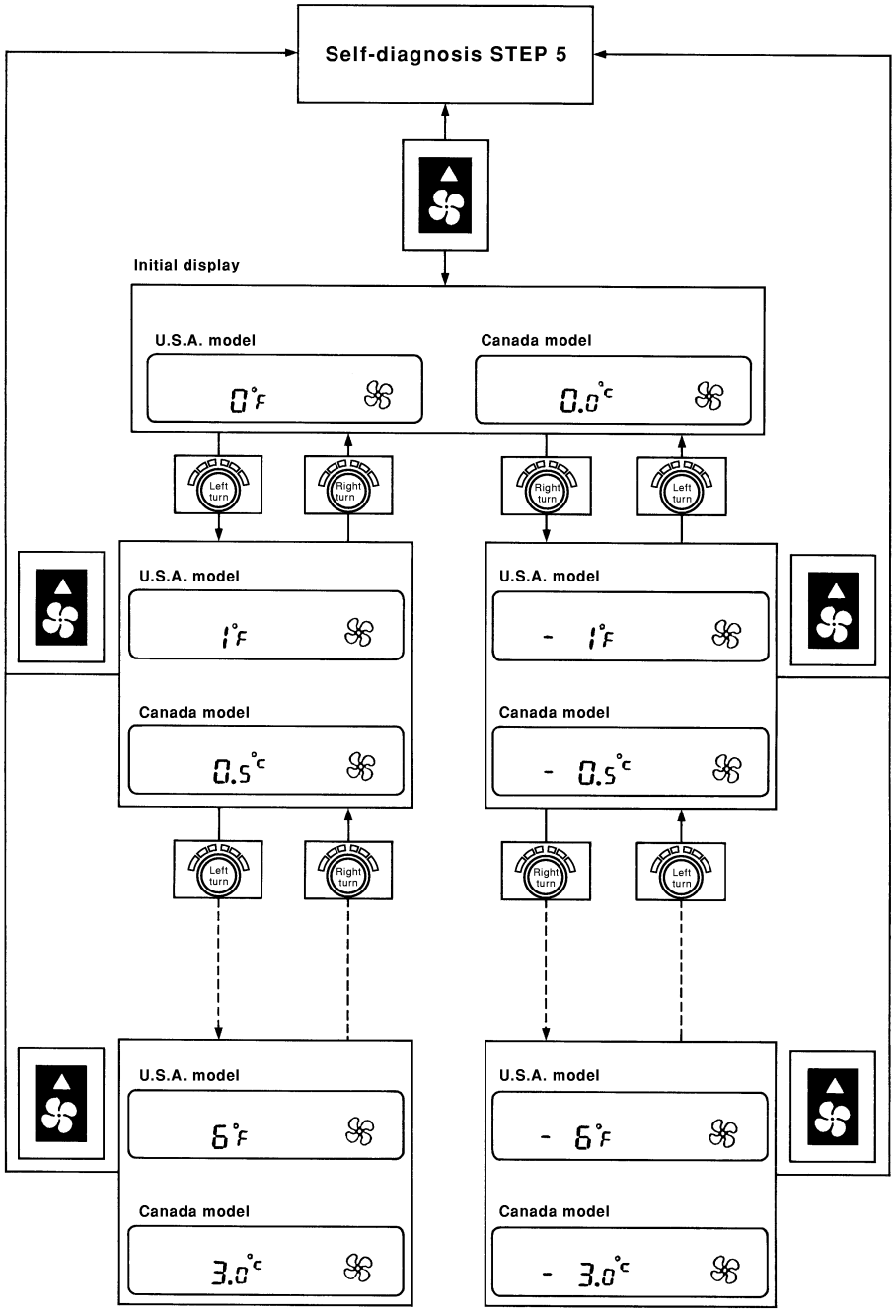
Unconfirmed Incidents

NFHA0176S0301

The customer may feel that the cabin temperature is not being controlled or regulated to the temperature indicated by the auto A/C display screen. To satisfy individual driver preference the Temperature Setting Trimmer may be used to compensate in a range of ±3°C (±6°F).

1. Enter Self Diagnosis mode and select STEP 5.
2. Press the Fan Up ֍ switch: This will set the A/C system in auxiliary mode and the display will show 61.
3. Turn the temperature dial clockwise or counterclockwise: The temperature will change at a rate of 0.5°C (1°F).

If power is lost to the A/C Auto Amp. trimmer setting is canceled and setting becomes that of initial condition, 0°C (0°F).



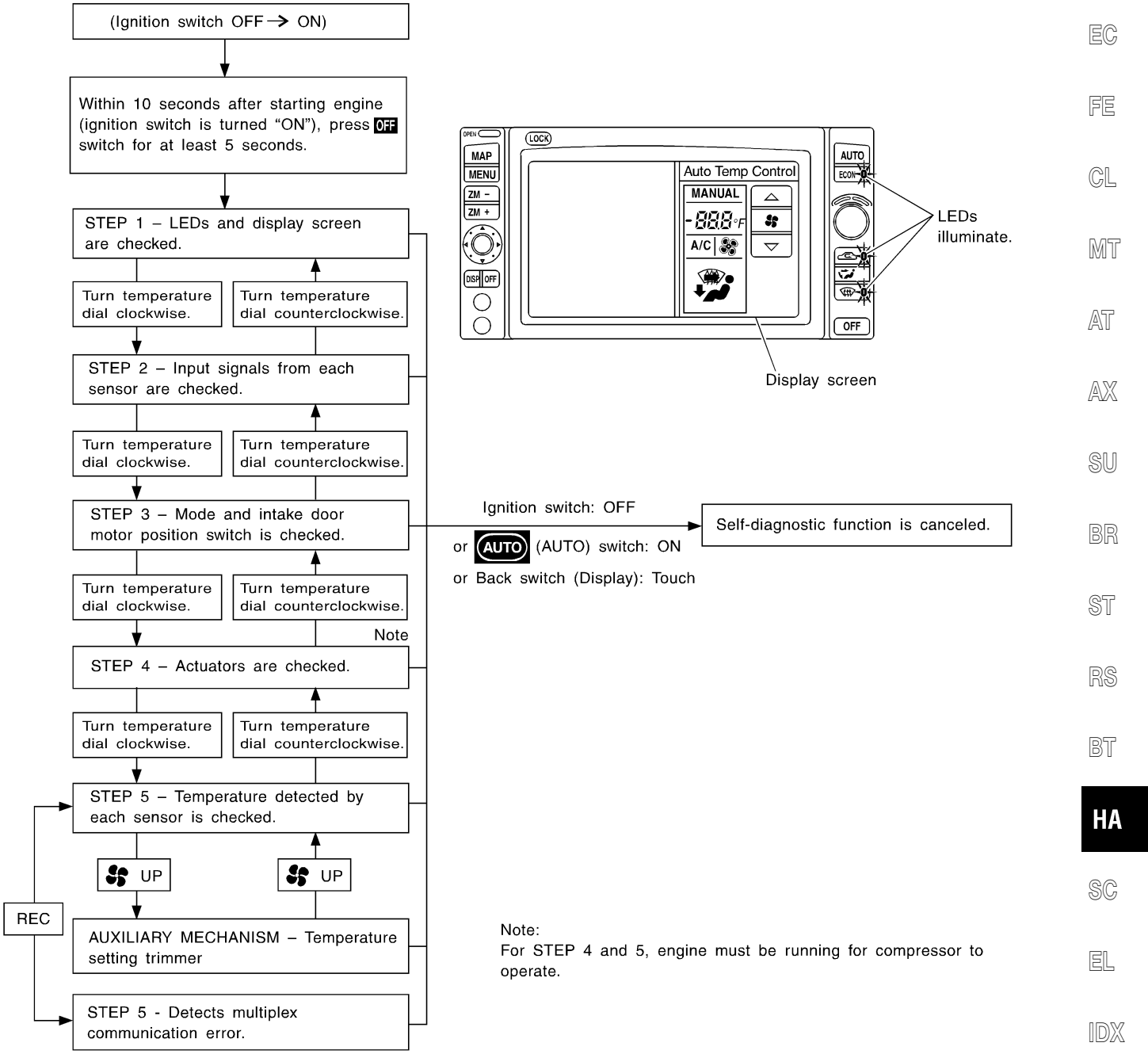
SHA458F

When battery cable is disconnected, trimmer operation is canceled. Temperature set becomes that of initial condition, i.e. 0°C (0°F).

INTRODUCTION AND GENERAL DESCRIPTION (WITH NAVIGATION SYSTEM)

NFHA0176S07

The self-diagnostic system diagnoses sensors, door motors, blower motor, etc. by system line. Refer to applicable sections (items) for details. Shifting from normal control to the self-diagnostic system is accomplished by starting the engine (turning the ignition switch from "OFF" to "ON") and pressing " OFF " switch for at least 5 seconds. The " OFF " switch must be pressed within 10 seconds after starting the engine (ignition switch is turned "ON"). This system will be canceled by either pressing AUTO (AUTO) switch or turning the ignition switch "OFF". Shifting from one step to another is accomplished by means of turning temperature dial, as required. Additionally shifting from STEP 5 to AUXILIARY MECHANISM is accomplished by means of pushing ✲ (fan) UP switch.

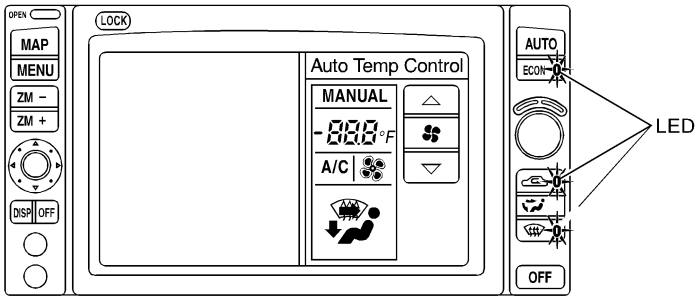


FUNCTION CONFIRMATION PROCEDURE (WITH NAVIGATION SYSTEM)

NFHA0176S08

1	SET IN SELF-DIAGNOSTIC MODE
1. Turn ignition switch ON. 2. Set in self-diagnostic mode as follows. Within 10 seconds after starting engine (ignition switch is turned "ON".), press OFF switch for at least 5 seconds.	
▶	GO TO 2.

2	STEP 1 - ALL LEDs AND DISPLAY SCREEN ARE CHECKED
When switch's LED and display are functioning properly in STEP-1, LED and display will come on.	



RHA095I

OK or NG

OK	▶	GO TO 3.
NG	▶	Malfunctioning OFF switch, LED or fluorescent display tube. Go to "Main Power Supply and Ground Circuit Check", HA-72.

3	VERIFY ADVANCE TO SELF-DIAGNOSIS STEP 2
1. Turn temperature dial clockwise. 2. Does advance to self-diagnosis STEP 2?	
Yes or No	

Yes	▶	GO TO 4.
No	▶	Malfunctioning temperature dial. Check Display & NAVI control unit.

4	VERIFY RETURN TO SELF-DIAGNOSIS STEP 1
1. Turn temperature dial counterclockwise. 2. Does return to self-diagnosis STEP 1?	
Yes or No	

Yes	▶	GO TO 5.
No	▶	Malfunctioning temperature dial. Check Display & NAVI control unit.

5	STEP 2 - SENSOR CIRCUITS ARE CHECKED FOR OPEN OR SHORT CIRCUIT

Turn temperature dial clockwise.
Does code No. 20 appear on the display?

Display (when all sensors are in good order)

Illuminates 25 seconds after " 2 " is illuminated.
Illuminates

RHA970DB

Yes or No

Yes	▶	GO TO 6.
No	▶	GO TO 14.

6	STEP 3 - MODE DOOR AND INTAKE DOOR POSITIONS ARE CHECKED

Turn temperature dial clockwise.
Does code No. 30 appear on the display?

Display (when all doors are in good order)

Illuminates 50 seconds after " 3 " is shown on display.
Illuminates

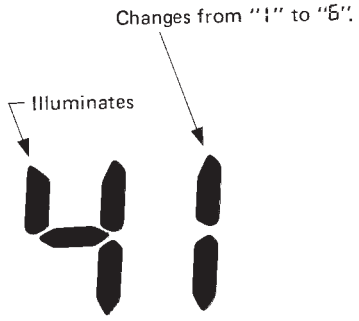
RHA869DD

Yes or No

Yes	▶	GO TO 7.
No	▶	GO TO 15.

7	STEP 4 - OPERATION OF EACH ACTUATOR IS CHECKED

Turn temperature dial clockwise.
Engine running.
Press DEF switch, code No. of each actuator test is indicated on the display.



RHA495A

▶	GO TO 8.

8 CHECK ACTUATORS

Confirm operation of system components according to the following charts.
Checks must be made visually, by listening to any noise, or by touching air outlets with your hand, etc. for improper operation.

Code No. / Actuator	41	42	43	44	45	46
Mode door	VENT	B/L	B/L	FOOT	D/F	DEF
Intake door	REC	REC	20% FRE	FRE	FRE	FRE
Air mix door	Full Cold	Full Cold	Full Hot	Full Hot	Full Hot	Full Hot
Blower motor	4 - 5 V	9 - 11 V	7 - 9 V	7 - 9 V	7 - 9 V	10 - 12 V
Compressor	ON	ON	OFF	OFF	ON	ON

MTBL0314

Operating condition of each actuator cannot be checked by indicators.

Discharge air flow

Mode switch	Air outlet/distribution		
	Face	Foot	Defroster
	100%	—	—
	60%	40%	—
	—	80%	20%
	—	60%	40%
	—	—	100%

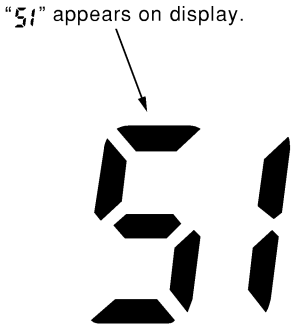
MTBL0128

OK or NG

OK	▶	GO TO 9.
NG	▶	• Air outlet does not change. Go to "Mode Door Motor" (HA-75). • Intake door does not change. Go to "Intake Door Motor" (HA-87). • Blower motor operation is malfunctioning. Go to "Blower Motor" (HA-91). • Magnet clutch does not engage. Go to "Magnet Clutch" (HA-101). • Discharge air temperature does not change. Go to "Air Mix Door Motor" (HA-83).

9	STEP 5 - TEMPERATURE OF EACH SENSOR IS CHECKED

Turn temperature dial clcokwise.
Code No. 51 appears on the display.

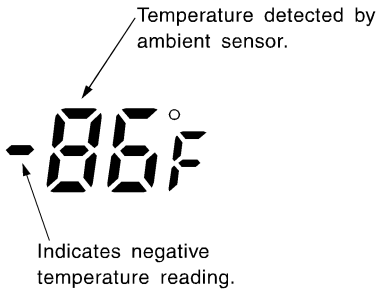


RHA359H

	▶	GO TO 10.

10	CHECK AMBIENT SENSOR

Press (DEF) switch one time, temperature detected by ambient sensor is indicated on the display.
ECON shown in display indicates negative temperature reading.
NOTE:
If temperature shown on display greatly differs from actual temperature, check sensor circuit first, then inspect sensor.



RHA861H

OK or NG

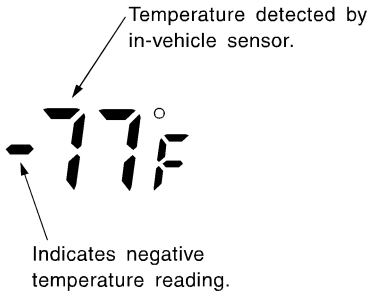
OK	▶	GO TO 11.
NG	▶	Go to Ambient Sensor Circuit (HA-123).

11	CHECK IN-VEHICLE SENSOR

Press (DEF) switch the second time, temperature detected by in-vehicle sensor is indicated on the display screen. ECON shown in display indicates negative temperature reading.

NOTE:

If temperature shown on display greatly differs from actual temperature, check sensor circuit first, then inspect sensor.



RHA862H

OK or NG

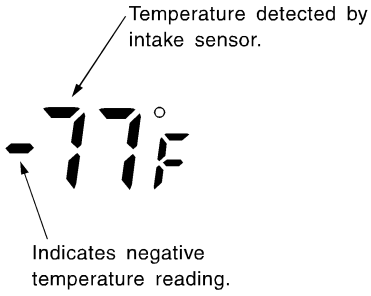
OK	▶	GO TO 12.
NG	▶	Go to In-vehicle Sensor Circuit (HA-133).

12	CHECK INTAKE SENSOR

Press (DEF) switch the third time, temperature detected by intake sensor is indicated on the display.

NOTE:

If temperature shown on display greatly differs from actual temperature, check sensor circuit first, then inspect sensor.



RHA862HA

OK or NG

OK	▶	GO TO 13.
NG	▶	Go to Intake Sensor Circuit (HA-133).

13	DETECTS MULTIPLEX COMMUNICATION ERROR

Press REC switch.
Does code No. 52 appears on the display

Display	Signal direction
52	In good order
52	Display & NAVI control unit → Auto amp.
52	Auto amp. → Display & NAVI control unit

MTBL0509

Yes or No

Yes ▶	INSPECTION END
No ▶	1. Go to "Multiplex Communication Circuit", HA-136. 2. Go to "OPERATIONAL CHECK", HA-67. Confirm that A/C system is in good order.

14 **CHECK MALFUNCTIONING SENSOR**

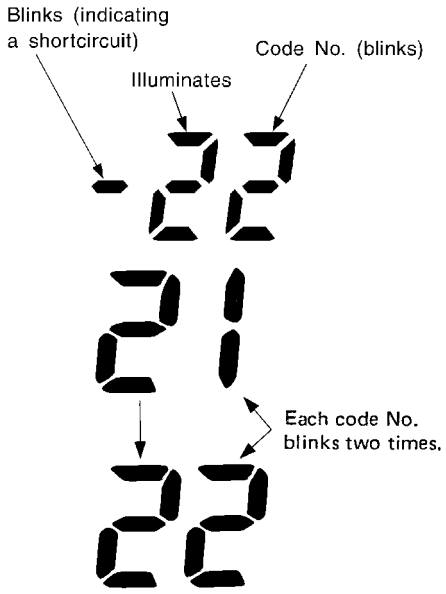
NOTE:
- A blinking mark (-) preceding the Code No. indicates a short circuit.
- If 2 or more items are malfunctioning the corresponding codes will alternately blink twice.
- A circuit will be detected as open or shorted and its code No. will be displayed when input signals correspond with conditions in the following chart.

Code No.	Sensor	Open circuit	Short circuit	Reference page
21 -21	Ambient sensor	Less than –43.8°C (–47°F)	Greater than 100°C (212°F)	*3
22 -22	In-vehicle sensor	Less than –43.8°C (–47°F)	Greater than 100°C (212°F)	*4
24 -24	Intake sensor	Less than –43.8°C (–47°F)	Greater than 100°C (212°F)	*5
25 -25	Sunload sensor*2	Less than 0.228 mA	Greater than 0.98 mA	*6
26 -26	PBR*1	Greater than 95%	Less than 5%	*7

MTBL1185

*1: "95%" and "5%" refer to percentage with respect to stroke of air mix door. (Full cold: 0%, Full hot: 100%)
*2: **Conduct self-diagnosis STEP 2 under sunshine.**
When conducting indoors, direct light (more than 60W) at sunload sensor.
*3: HA-123, *4: HA-126, *5: HA-133, *6: HA-129, *7: HA-135

Display (when sensor malfunctions)



RHA455G

RHA501A

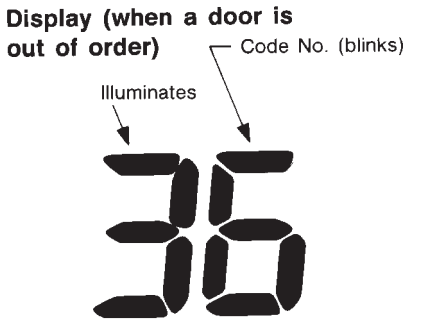
▶ INSPECTION END

15	CHECK MALFUNCTIONING DOOR MOTOR POSITION SWITCH

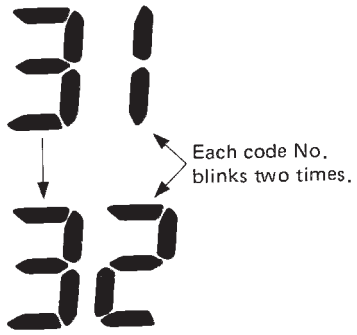
30- Mode door and intake door position switches are in working order.
Continue ot next step.
31- Mode door circuit / switch in vent position switch is malfunctioning.
32- Mode door circuit / switch in B/L position switch is malfunctioning.
34- Mode door circuit / switch in Foot position switch is malfunctioning.
35- Mode door circuit / switch in Foot Def. position switch is malfunctioning.
36- Mode door circuit / switch in Def. position switch is malfunctioning.
37- Intake door mode circuit / switch in Fresh Air position is malfunctioning.
38- Intake door mode circuit / switch in 20% Fresh Air position is malfunctioning.
39- Intake door mode circuit / switch in Recirculation Air position is malfunctioning.

NOTE:

- If 2 or more items are malfunctioning the corresponding codes will alternately blink twice.
- If the Mode Door Motor harness is disconnected repeated display pattern of 31 → 32 → 34 → 35 → 36 will occur.
- If Intake Door Motor harness is disconnected repeated display pattern of 37 → 38 → 39 will occur.
- If any Mode Door Motor Position Switch is malfunctioning the Mode Door Motor will also malfunction.



RHA168DA



RHA498A

▶	INSPECTION END

AUXILIARY MECHANISM: TEMPERATURE SETTING TRIMMER (WITH NAVIGATION SYSTEM)

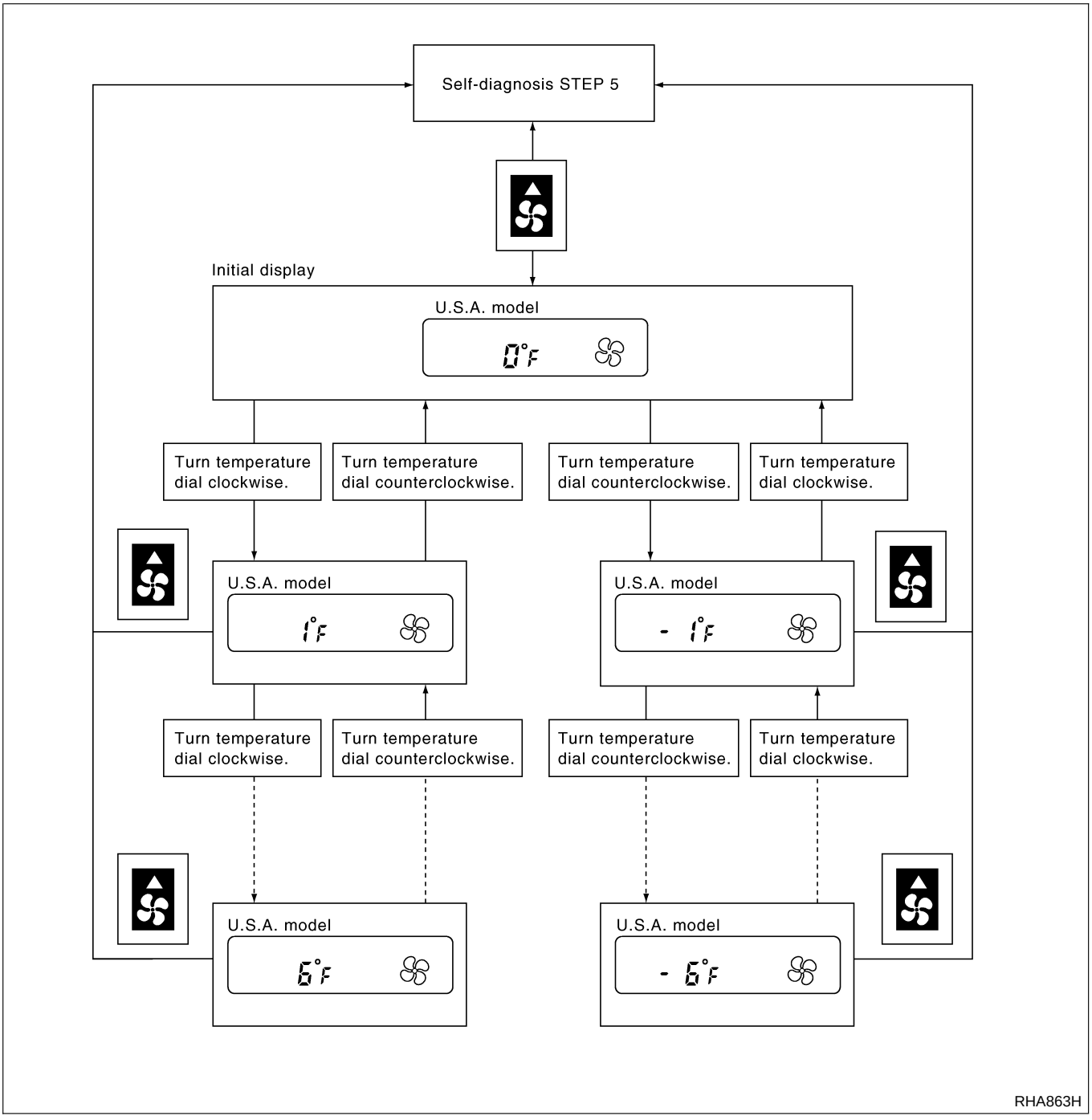
=NFHA0176S09

Unconfirmed Incidents

NFHA0176S0901

The trimmer compensates for differences in range of ±3°C (±6°F) between temperature setting (displayed digitally) and temperature felt by driver.
Operating procedures for this trimmer are as follows:

- Begin Self-diagnosis STEP 5 mode.
- Press ✲ (fan) UP switch to set system in auxiliary mode.
- Display shows "61" in auxiliary mechanism.
  It takes approximately 3 seconds.
- Turn the temperature dial clockwise or counterclockwise: Temperature will change at a rate of 0.5°C (1°F).



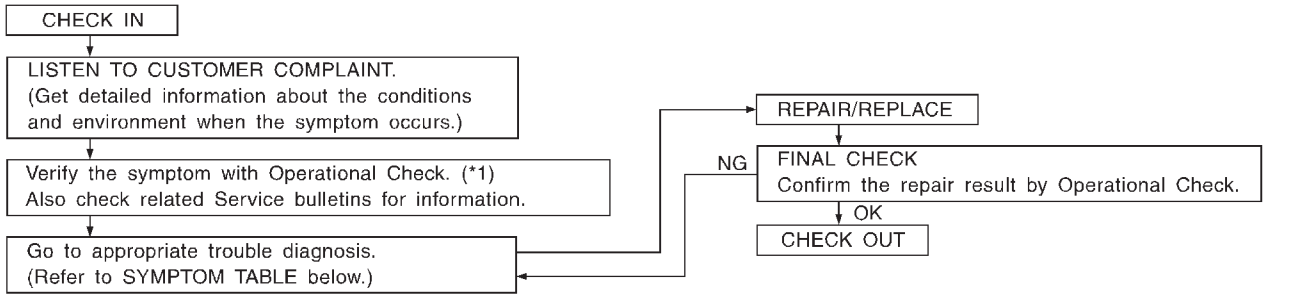
When battery cable is disconnected, trimmer operation is canceled. Temperature set becomes that of initial condition, i.e. 0°C (0°F).

How to Perform Trouble Diagnoses for Quick and Accurate Repair

=NFHA0177

WORK FLOW

NFHA0177S01



SHA900E

*1: Operational Check (HA-65)

SYMPTOM TABLE

NFHA0177S02

Symptom	Reference Page	
• A/C system does not come on.	• Go to Trouble Diagnosis Procedure for A/C system.	HA-70
• Air outlet does not change. • Mode door motor does not operate normally.	• Go to Trouble Diagnosis Procedure for Mode Door Motor. (LAN)	HA-75
• Discharge air temperature does not change. • Air mix door motor does not operate normally.	• Go to Trouble Diagnosis Procedure for Air Mix Door Motor. (LAN)	HA-83
• Intake door does not change. • Intake door motor does not operate normally.	• Go to Trouble Diagnosis Procedure for Intake Door Motor. (LAN)	HA-87
• Blower motor operation is malfunctioning. • Blower motor operation is malfunctioning under out of starting fan speed control.	• Go to Trouble Diagnosis Procedure for Blower Motor.	HA-91
• Magnet clutch does not engage.	• Go to Trouble Diagnosis Procedure for Magnet Clutch.	HA-101
• Insufficient cooling.	• Go to Trouble Diagnosis Procedure for Insufficient Cooling.	HA-108
• Insufficient heating.	• Go to Trouble Diagnosis Procedure for Insufficient Heating.	HA-117
• Noise.	• Go to Trouble Diagnosis Procedure for Noise.	HA-119
• Self-diagnosis can not be performed.	• Go to Trouble Diagnosis Procedure for Self-diagnosis.	HA-120
• Memory function does not operate.	• Go to Trouble Diagnosis Procedure for Memory Function.	HA-121
• ECON mode does not operate.	• Go to Trouble Diagnosis Procedure for ECON (ECONOMY) — mode.	HA-122
• A/C system cannot be controlled (With navigation system).	• Go to Trouble Diagnosis Procedure for Multiplex Communication Circuit.	HA-136

Operational Check

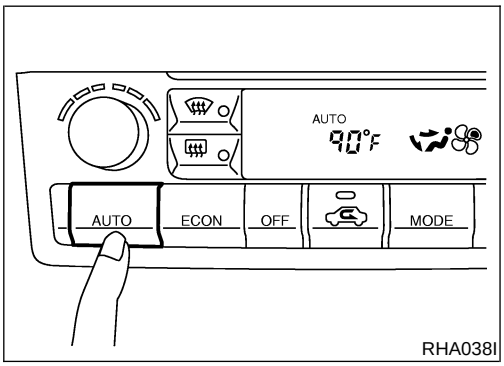
NFHA0178

The purpose of the operational check is to confirm that the system operates properly.

CONDITIONS:

NFHA0178S01

- **Engine running and at normal operating temperature.**



RHA038I

PROCEDURE: (WITHOUT NAVIGATION SYSTEM)

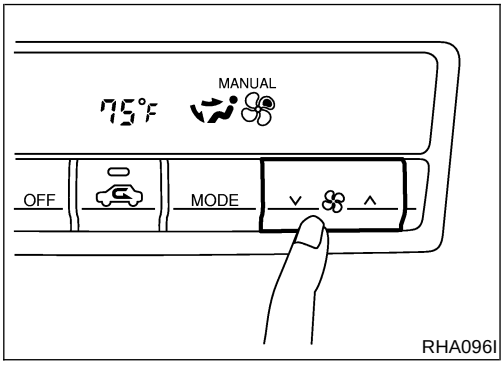
NFHA0178S02

1. Check Memory Function

NFHA0178S0201

1. Set the temperature 90°F or 32°C.
2. Press OFF switch.
3. Turn the ignition off.
4. Turn the ignition on.
5. Press the AUTO switch.
6. Confirm that the set temperature remains at previous temperature.
7. Press OFF switch.

If NG, go to trouble diagnosis procedure for memory function (HA-121).
If OK, continue with next check.



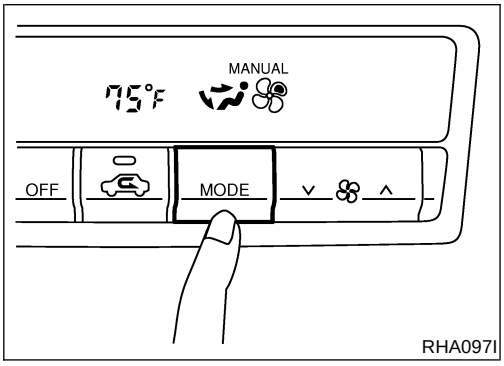
RHA096I

2. Check Blower

NFHA0178S0202

1. Press fan switch (up side) one time.
   Blower should operate on low speed.
   The fan symbol should have one blade lit .
2. Press fan switch (up side) one more time, and continue checking blower speed and fan symbol until all speeds are checked.
3. Leave blower on MAX speed .

If NG, go to trouble diagnosis procedure for blower motor (HA-91).
If OK, continue with next check.



RHA097I

3. Check Discharge Air

NFHA0178S0203

1. Press mode switch four times and DEF button.
2. Each position indicator should change shape.

Discharge air flow

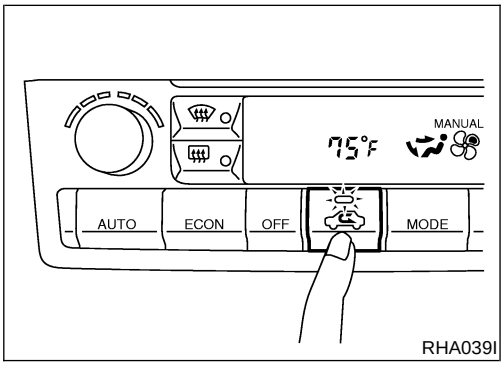
Mode control knob	Air outlet/distribution		
	Face	Foot	Defroster
	100%	–	–
	60%	40%	–
	–	80%	20%
	–	60%	40%
	–	–	100%

RHA654F

3. Confirm that discharge air comes out according to the air distribution table at left.
   Refer to "Discharge Air Flow" (HA-26).

NOTE:
Confirm that the compressor clutch is engaged (visual inspection) and intake door position is at FRESH when the DEF is selected.

Intake door position is checked in the next step.
If NG, go to trouble diagnosis procedure for mode door motor (HA-75).
If OK, continue with next check.



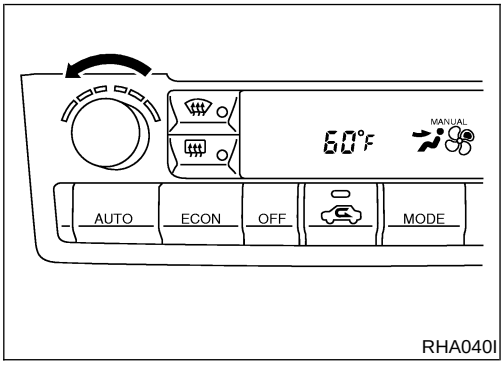
RHA039I

4. Check Recirculation

NFHA0178S0204

1. Press REC switch.
   Recirculation indicator should illuminate.
2. Listen for intake door position change (you should hear blower sound change slightly).

If NG, go to trouble diagnosis procedure for intake door (HA-87).
If OK, continue with next check.



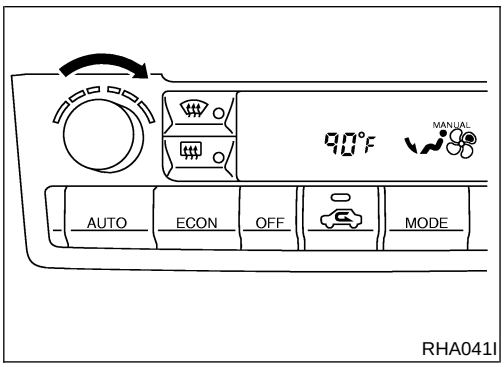
RHA040I

5. Check Temperature Decrease

NFHA0178S0205

1. Turn the temperature dial counterclockwise until 18°C (60°F) is displayed.
2. Check for cold air at discharge air outlets.

If NG, go to trouble diagnosis procedure for insufficient cooling (HA-108).
If OK, continue with next check.



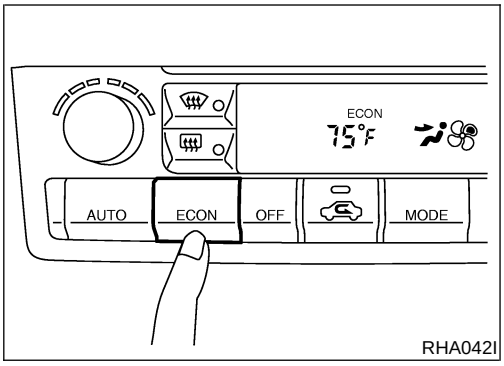
RHA041I

6. Check Temperature Increase

NFHA0178S0206

1. Turn the temperature dial clockwise until 32°C (90°F) is displayed.
2. Check for hot air at discharge air outlets.

If NG, go to trouble diagnosis procedure for insufficient heating (HA-117).
If OK, continue with next check.



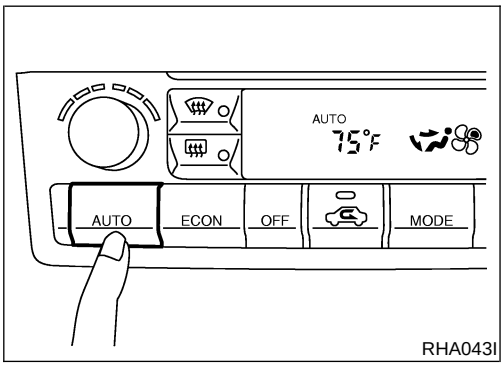
RHA042I

7. Check ECON (Economy) Mode

NFHA0178S0207

1. Set the temperature 75°F or 25°C.
2. Press ECON switch.
3. Display should indicate ECON (no AUTO).
   Confirm that the compressor clutch is not engaged (visual inspection).
   (Discharge air and blower speed will depend on ambient, in-vehicle and set temperatures.)

If NG, go to trouble diagnosis procedure for ECON (Economy) mode (HA-122).
If OK, continue with next check.



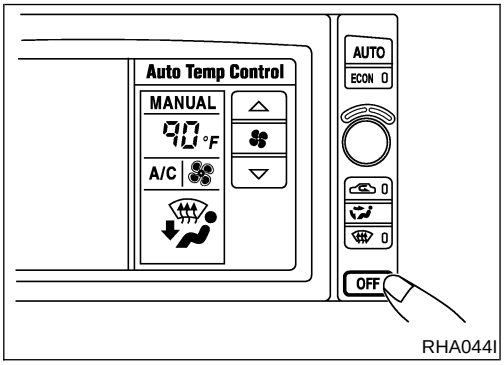
RHA043I

8. Check AUTO Mode

NFHA0178S0208

1. Press AUTO switch.
2. Display should indicate AUTO (no ECON).
   Confirm that the compressor clutch engages (audio or visual inspection).
   (Discharge air and blower speed will depend on ambient, in-vehicle and set temperatures.)

If NG, go to trouble diagnosis procedure for A/C system (HA-70), then if necessary, trouble diagnosis procedure for magnet clutch (HA-101).
If all operational check are OK (symptom can not be duplicated), go to "Incident Simulation Tests" (GI-25) and perform tests as outlined to simulate driving conditions environment. If symptom appears, refer to "Symptom Table" (HA-64) and perform applicable trouble diagnosis procedures.



RHA044I

PROCEDURE: (WITH NAVIGATION SYSTEM)

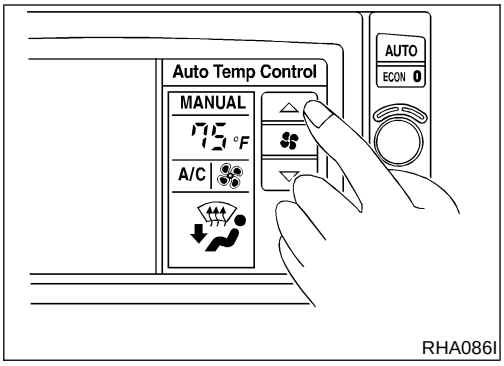
NFHA0178S03

1. Check Memory Function

NFHA0178S0301

1. Set the temperature 90°F or 32°C.
2. Press OFF switch.
3. Turn the ignition off.
4. Turn the ignition on.
5. Press the AUTO switch.
6. Confirm that the set temperature remains at previous temperature.
7. Press OFF switch.

If NG, go to trouble diagnosis procedure for memory function (HA-121).
If OK, continue with next check.



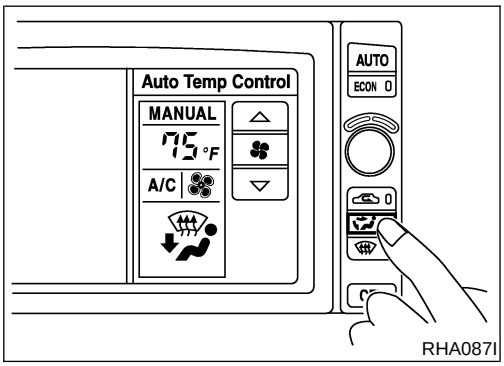
RHA086I

2. Check Blower

NFHA0178S0302

1. Press fan switch (up side) one time.
   Blower should operate on low speed.
   The fan symbol should have one blade lit .
2. Press fan switch (up side) one more time, and continue checking blower speed and fan symbol until all speeds are checked.
3. Leave blower on MAX speed .

If NG, go to trouble diagnosis procedure for blower motor (HA-91).
If OK, continue with next check.



RHA087I

3. Check Discharge Air

NFHA0178S0303

1. Press mode switch four times and DEF button.
2. Each position indicator should change shape.

Discharge air flow

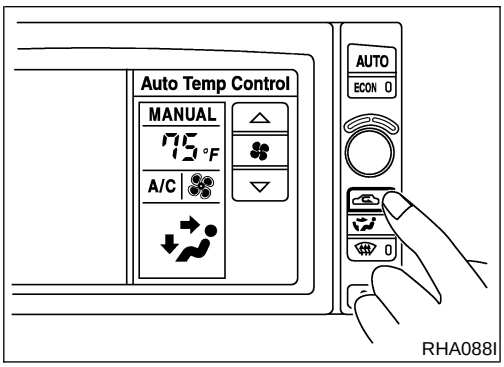
Mode control knob	Air outlet/distribution		
	Face	Foot	Defroster
	100%	–	–
	60%	40%	–
	–	80%	20%
	–	60%	40%
	–	–	100%

RHA654F

3. Confirm that discharge air comes out according to the air distribution table at left.
   Refer to "Discharge Air Flow" (HA-26).

NOTE:
Confirm that the compressor clutch is engaged (visual inspection) and intake door position is at FRESH when the DEF is selected.

Intake door position is checked in the next step.
If NG, go to trouble diagnosis procedure for mode door motor (HA-75).
If OK, continue with next check.



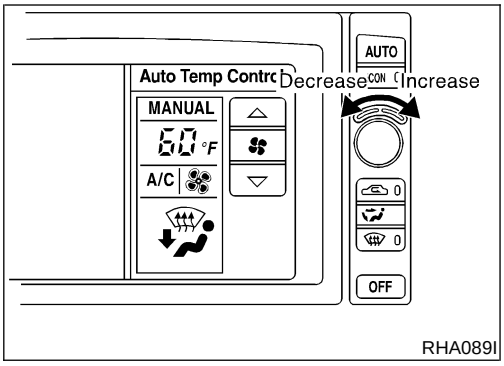
RHA088I

4. Check Recirculation

NFHA0178S0304

1. Press REC switch.
   Recirculation indicator should illuminate.
2. Listen for intake door position change (you should hear blower sound change slightly).

If NG, go to trouble diagnosis procedure for intake door (HA-87).
If OK, continue with next check.



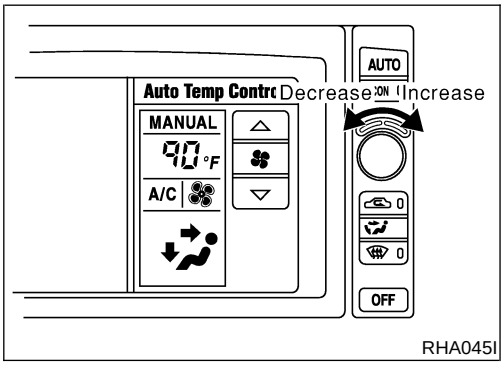
RHA089I

5. Check Temperature Decrease

NFHA0178S0305

1. Turn the temperature dial counterclockwise until 18°C (60°F) is displayed.
2. Check for cold air at discharge air outlets.

If NG, go to trouble diagnosis procedure for insufficient cooling (HA-108).
If OK, continue with next check.



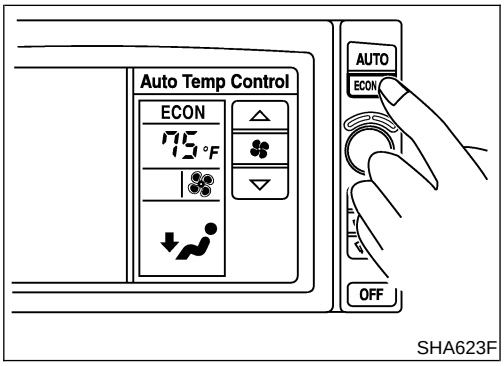
RHA045I

6. Check Temperature Increase

NFHA0178S0306

1. Turn the temperature dial clockwise until 32°C (90°F) is displayed.
2. Check for hot air at discharge air outlets.

If NG, go to trouble diagnosis procedure for insufficient heating (HA-117).
If OK, continue with next check.



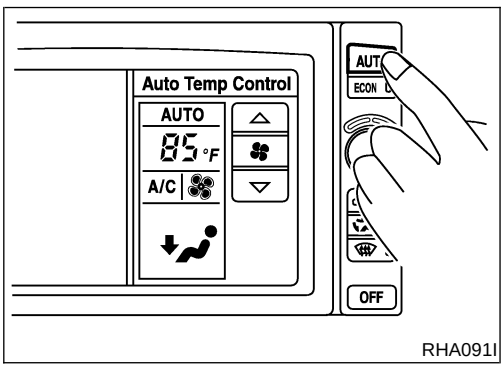
SHA623F

7. Check ECON (Economy) Mode

NFHA0178S0307

1. Set the temperature 75°F or 25°C.
2. Press ECON switch.
3. Display should indicate ECON (no AUTO).
   Confirm that the compressor clutch is not engaged (visual inspection).
   (Discharge air and blower speed will depend on ambient, in-vehicle and set temperatures.)

If NG, go to trouble diagnosis procedure for ECON (Economy) mode (HA-122).
If OK, continue with next check.



RHA091I

8. Check AUTO Mode

NFHA0178S0308

1. Press AUTO switch.
2. Display should indicate AUTO (no ECON).
   Confirm that the compressor clutch engages (audio or visual inspection).
   (Discharge air and blower speed will depend on ambient, in-vehicle and set temperatures.)

If NG, go to trouble diagnosis procedure for A/C system (HA-70), then if necessary, trouble diagnosis procedure for magnet clutch (HA-101).
If all operational check are OK (symptom can not be duplicated), go to "Incident Simulation Tests" (GI-25) and perform tests as outlined to simulate driving conditions environment. If symptom appears, refer to "Symptom Table" (HA-64) and perform applicable trouble diagnosis procedures.

A/C System

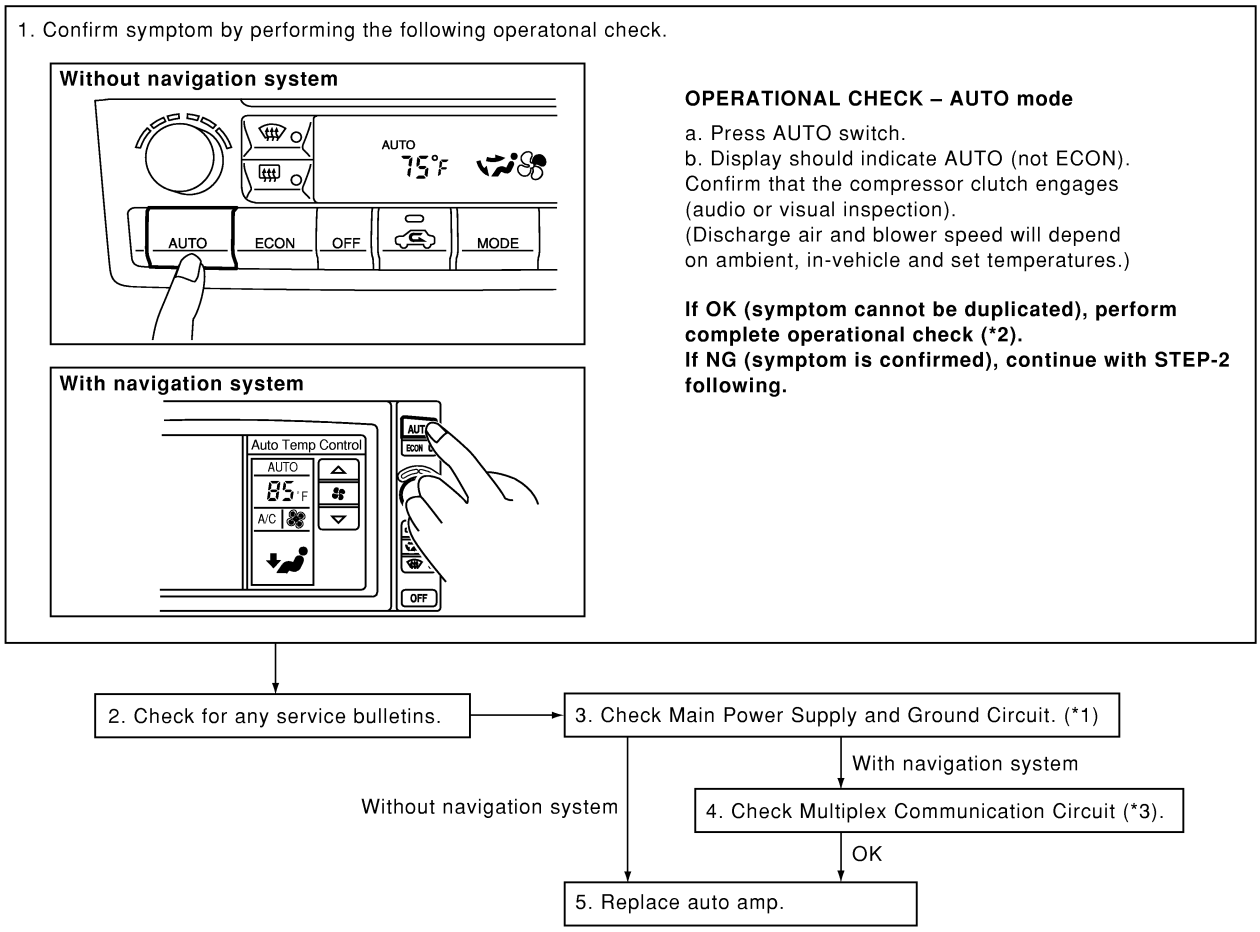
TROUBLE DIAGNOSIS PROCEDURE FOR A/C SYSTEM

=NFHA0179

SYMPTOM:

- **A/C system does not come on.**

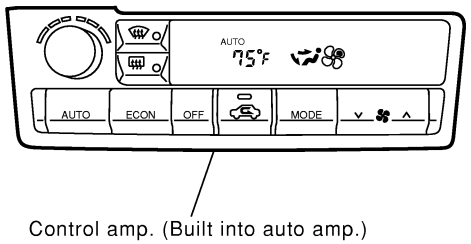
INSPECTION FLOW



RHA046I

*1: HA-72 *2: HA-65 *3: HA-136

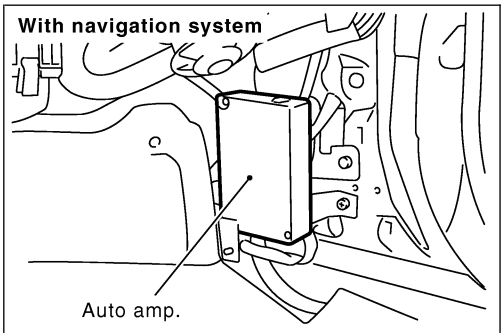
Without navigation system



Control amp. (Built into auto amp.)

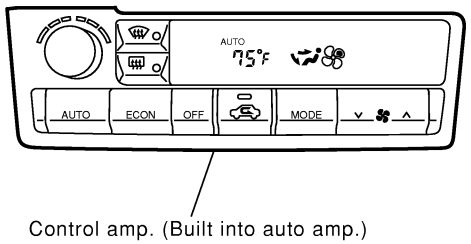
RHA036I

With navigation system



RHA037I

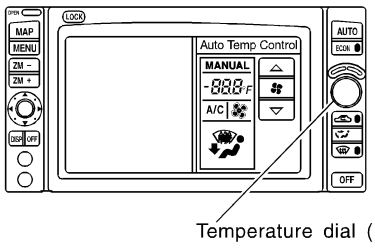
Without navigation system



Control amp. (Built into auto amp.)

RHA036I

With navigation system



Temperature dial (PTC)

RHA098I

COMPONENT DESCRIPTION

NFHA0247

Automatic Amplifier (Auto Amp.)

NFHA0247S01

The auto amplifier has a built-in microcomputer which processes information sent from various sensors needed for air conditioner operation. The air mix door motor, mode door motor, intake door motor, blower motor and compressor are then controlled.

The auto amplifier is unitized with control mechanisms. Signals from various switches and Potentio Temperature Control (PTC) are directly entered into auto amplifier.

Self-diagnostic functions are also built into auto amplifier to provide quick check of malfunctions in the auto air conditioner system.

Potentio Temperature Control (PTC)

NFHA0247S02

The PTC is built into the A/C auto amp. or Display and NAVI control unit. It can be set at an interval of 0.5°C (1.0°F) in the 18°C (60°F) to 32°C (90°F) temperature range by pushing the temperature button. The set temperature is digitally displayed.

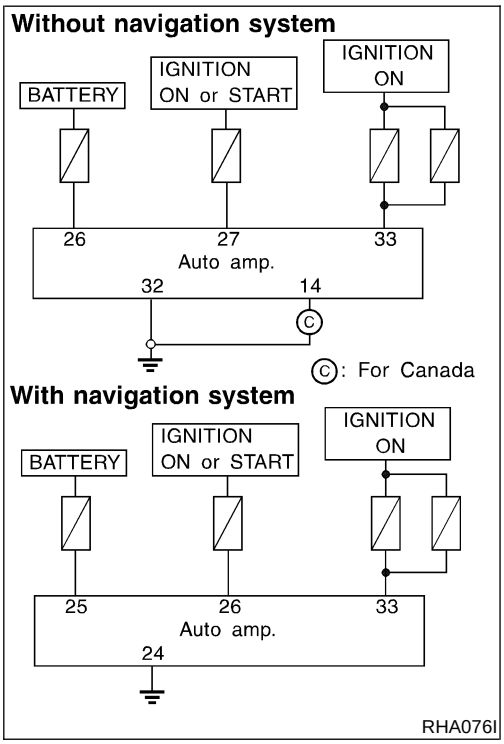
MAIN POWER SUPPLY AND GROUND CIRCUIT CHECK

=NFHA0180

Power Supply Circuit Check

NFHA0180S03

Check power supply circuit for air conditioner system.
Refer to EL-11, "Wiring Diagram — POWER —".



DIAGNOSTIC PROCEDURE

NFHA0181

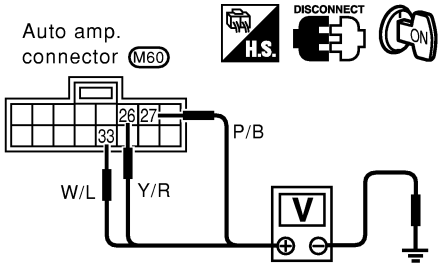
SYMPTOM:

- **A/C system does not come on.**

1	CHECK POWER SUPPLY CIRCUIT FOR AUTO AMP.

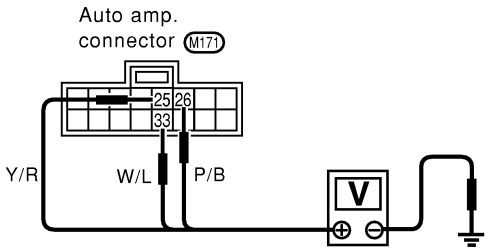
Measure voltage across terminal Nos. 26 (25), 27 (26), 33 (33) and body ground.

Without navigation system



Voltmeter terminal		Voltage
(+)	(–)	
26	Body ground	Approx. 12V
27		
33		

With navigation system



Voltmeter terminal		Voltage
(+)	(–)	
25	Body ground	Approx. 12V
26		
33		

SHA627F

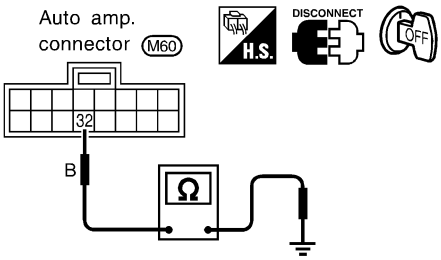
OK or NG

OK	▶	GO TO 2.
NG	▶	**Check auto amp. power circuit.** ● Check 10A fuses (Nos. 12 and 28, located in the fuse block) and 15A fuses (Nos. 51 and 52, located in the fuse block). ● If fuses are OK, check for open circuit in wiring harness. Repair or replace as necessary. ● If fuses are NG, replace fuse and check wiring harness for short circuit. Repair or replace as necessary.

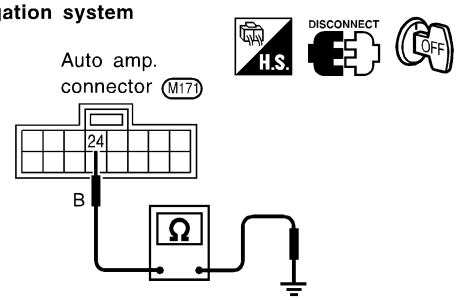
2	CHECK BODY GROUND CIRCUIT FOR AUTO AMP.

Does continuity exist between auto amp. Harness terminal Nos. 32, 24 and body ground?

Without navigation system



With navigation system



Voltmeter terminal		Continuity
(+)	(–)	
32	Body ground	Yes
24		

RHA048I

Yes or No

Yes	▶	Replace auto amp. INSPECTION END
No	▶	Repair or replace harness.

Mode Door Motor

TROUBLE DIAGNOSIS PROCEDURE FOR MODE DOOR MOTOR (LAN)

=NFHA0182

SYMPTOM:

- **Air outlet does not change.**
- **Mode door motor does not operate normally.**

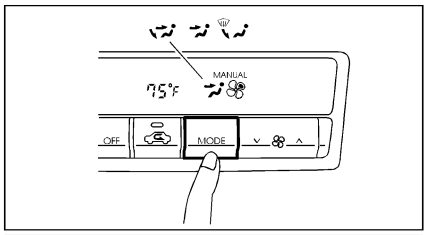
Inspection Flow

Without Navigation System

NFHA0182S01

NFHA0182S0101

1. Confirm symptom by performing the following operational check.



OPERATIONAL CHECK – Discharge air

a. Press mode switch four times and DEF button.
b. Each position indicator should change shape.

Discharge air flow

Mode control knob	Air outlet/distribution		
	Face	Foot	Defroster
	100%	–	–
	60%	40%	–
	–	80%	20%
	–	60%	40%
	–	–	100%

c. Confirm that discharge air comes out according to the air distribution table at left.
Refer to “Discharge Air Flow” (*1).

NOTE:

- **If OK (symptom cannot be duplicated), perform complete operational check (*2).**
  If NG (symptom is confirmed), continue with STEP-2 following.
- **Confirm that the compressor clutch is engaged (visual inspection) and intake door position is at FRESH when DEF is selected.**
  Intake door position is checked in the next step.

2. Check for any service bulletins.
3. Perform self-diagnosis STEP-1. (*3) — OK
4. Perform self-diagnosis STEP-2. (*4) — NG → Go to appropriate malfunctioning sensor circuit. (*9)
5. Perform self-diagnosis STEP-3. (*4) — NG → Go to DIAGNOSTIC PROCEDURE FOR AIR MIX DOOR MOTOR, MODE DOOR MOTOR AND INTAKE DOOR MOTOR CIRCUIT. (*10)
6. Perform self-diagnosis STEP-4. (*4) — NG → Check mode door control linkage. (*11) — NG → Repair or adjust control linkage.
   OK **[Cause cannot be confirmed by self-diagnosis.]**
7. Check ambient sensor circuit. (*5)
8. Check in-vehicle sensor circuit. (*6)
9. Check sunload sensor circuit. (*7)
10. Check intake sensor circuit. (*14)
11. Check air mix door motor PBR circuit. (*8) — OK → If the symptom still exists, perform a complete operational check (*12) and check for other symptoms.
    [Refer to symptom table, (*13).]
    Does another symptom exist?
    - Yes → Go to Trouble Diagnosis for related symptoms. **[Another symptom exists.]**
    - No → Replace auto amp. → INSPECTION END

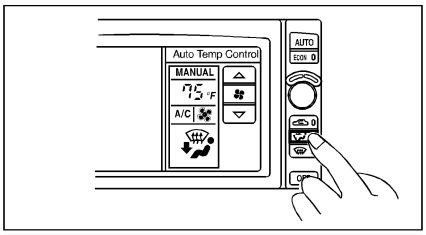
RHA099I

*1: HA-26
*2: HA-65
*3: HA-43
*4: HA-44
*5: HA-123
*6: HA-126
*7: HA-129
*8: HA-135
*9: FUNCTION CONFIRMATION PROCEDURE (HA-44), see No. 13.
*10: HA-78
*11: HA-81
*12: HA-65
*13: HA-64
*14: HA-133

With Navigation System

NFHA0182S0102

1. Confirm symptom by performing the following operational check.



OPERATIONAL CHECK – Discharge air

a. Press mode switch four times and DEF button.
b. Each position indicator should change shape.

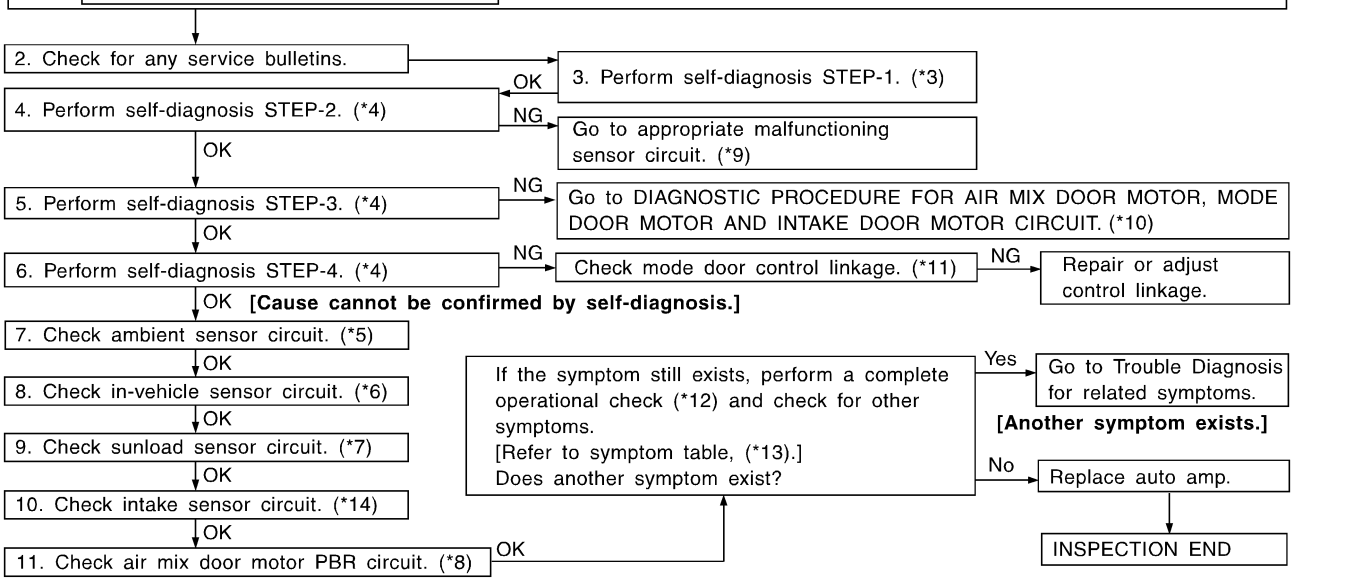
Discharge air flow

Mode control knob	Air outlet/distribution		
	Face	Foot	Defroster
	100%	–	–
	60%	40%	–
	–	80%	20%
	–	60%	40%
	–	–	100%

c. Confirm that discharge air comes out according to the air distribution table at left.
Refer to "Discharge Air Flow" (*1).

NOTE:

- **If OK (symptom cannot be duplicated), perform complete operational check (*2).**
  If NG (symptom is confirmed), continue with STEP-2 following.
- **Confirm that the compressor clutch is engaged (visual inspection) and intake door position is at FRESH when DEF is selected.**
  Intake door position is checked in the next step.



RHA049I

*1: HA-26
*2: HA-67
*3: HA-53
*4: HA-54
*5: HA-123
*6: HA-126
*7: HA-129
*8: HA-135
*9: FUNCTION CONFIRMATION PROCEDURE (HA-54), see No. 14.
*10: HA-78
*11: HA-81
*12: HA-67
*13: HA-64
*14: HA-133

SYSTEM DESCRIPTION

=NFHA0183

Component Parts

NFHA0183S01

Mode door control system components are:

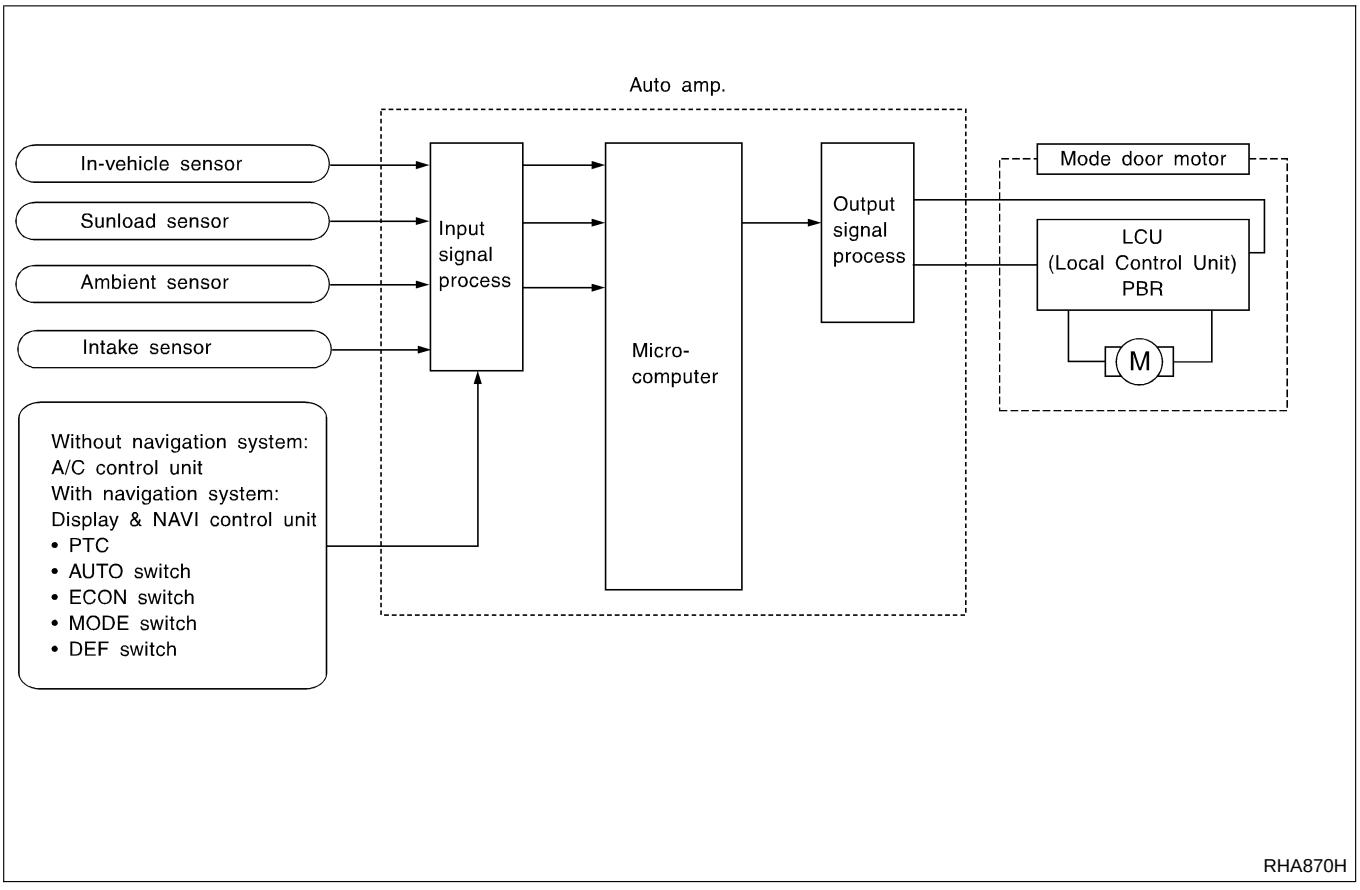
1) Auto amp.
2) Mode door motor (LCU)
3) In-vehicle sensor
4) Ambient sensor
5) Sunload sensor
6) Intake sensor

System Operation

NFHA0183S02

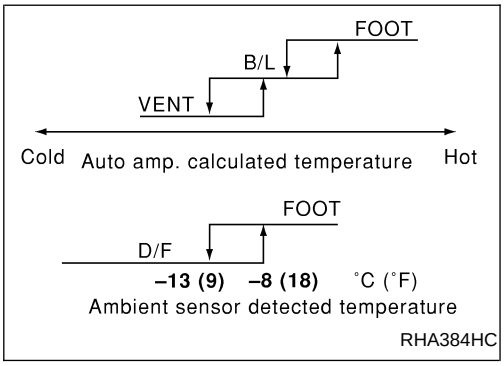
The auto amplifier receives data from each of the sensors. The amplifier sends air mix door, mode door and intake door opening angle data to the air mix door motor LCU, mode door motor LCU and intake door motor LCU.

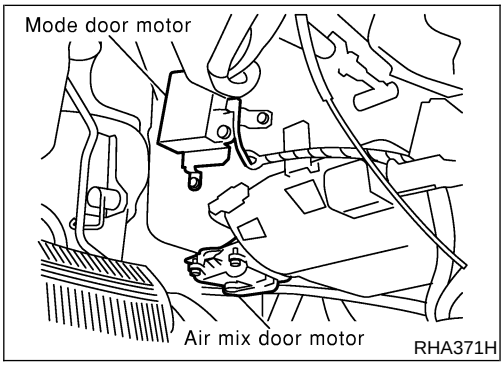
The air mix door motor, mode door motor and intake door motor read their respective signals according to the address signal. Opening angle indication signals received from the auto amplifier and each of the motor position sensors are compared by the LCUs in each motor with the existing decision and opening angles. Subsequently, HOT/COLD or OPEN/CLOSE or DEFROST/VENT operation is selected. The new selection data is returned to the auto amplifier.



Mode Door Control Specification

NFHA0183S03

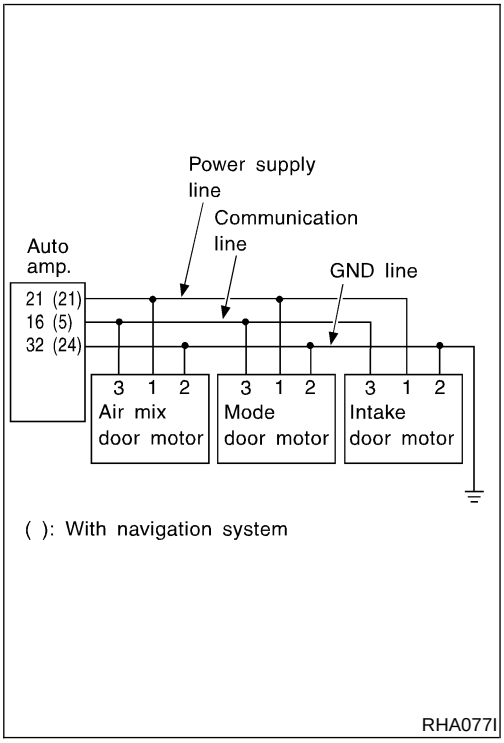




COMPONENT DESCRIPTION

NFHA0184

The mode door motor is attached to the heater unit. It rotates so that air is discharged from the outlet set by the auto amplifier. Motor rotation is conveyed to a link which activates the mode door.



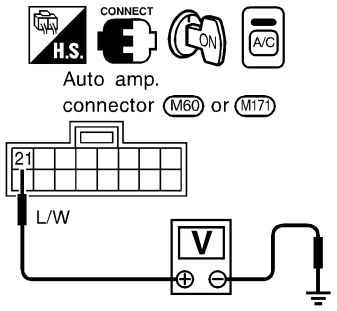
DIAGNOSTIC PROCEDURE FOR AIR MIX DOOR MOTOR, MODE DOOR MOTOR AND INTAKE DOOR MOTOR CIRCUIT

NFHA0185

SYMPTOM: Air mix door motor, mode door motor and/or intake door motor does not operate normally.

1	CHECK POWER SUPPLY FOR AUTO AMP. (LCU) SIDE

Do approx. 12 volts exist between auto amp. (LCU) harness terminal No. 21 and body ground?



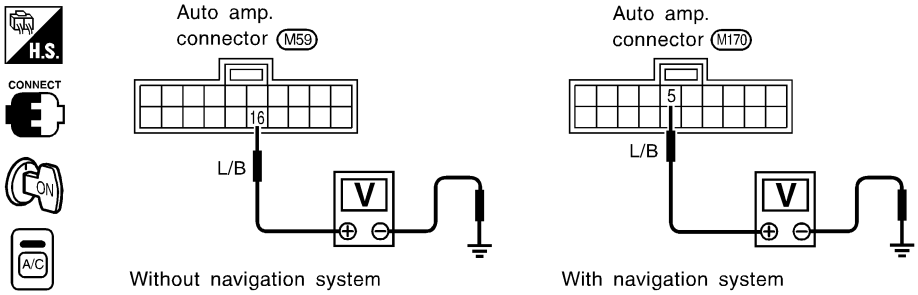
RHA373HA

Yes or No

Yes	▶	GO TO 2.
No	▶	Replace auto amp. (LCU).

2	CHECK SIGNAL FOR AUTO AMP. (LCU) SIDE

Do approx. 5.5 volts exist between auto amp. (LCU) terminal No. 16 or 5 and body ground?



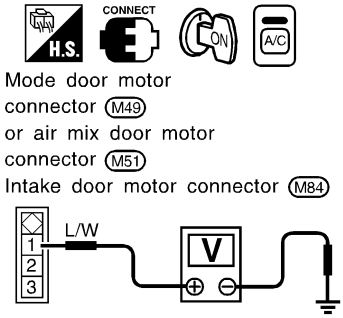
RHA050I

Yes or No

Yes	▶	GO TO 3.
No	▶	Replace auto amp. (LCU).

3	CHECK POWER SUPPLY FOR MOTOR SIDE

Do approx. 12 volts exist between door motor (LCU) harness terminal No. 1 and body ground?



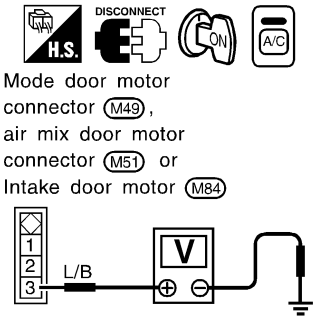
RHA375H

Yes or No

Yes	▶	GO TO 4.
No	▶	Repair harness or connector.

4	CHECK SIGNAL FOR MOTOR SIDE

Do approx. 5.5 volts exist between door motor (LCU) terminal No. 3 and body ground?



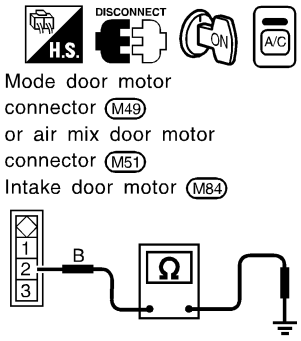
RHA376HD

Yes or No

Yes	▶	GO TO 5.
No	▶	Repair harness or connector.

5	CHECK MOTOR GROUND CIRCUIT

Does continuity exist between door motor (LCU) harness terminal No. 2 and body ground?



RHA377H

Yes or No

Yes	▶	GO TO 6.
No	▶	Repair harness or connector.

6	CHECK MOTOR OPERATION

Disconnect and reconnect the motor connector and confirm the motor operation.

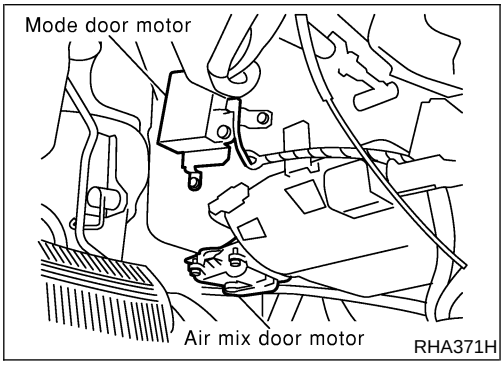
OK or NG

OK (Return to operate normally.)	▶	Poor contacting the motor connector
NG (Does not operate normally.)	▶	GO TO 7.

7	CHECK MODE DOOR MOTOR AND AIR MIX DOOR MOTOR OPERATION
1. Disconnect the intake door motor connector. 2. Reconnect the mode door motor and air mix door motor connector and confirm the mode door motor and air mix door motor operation. **OK or NG**	
OK (Mode door motor and air mix door motor operate normally.) ▶	Replace the intake door motor.
NG (Mode door motor and air mix door motor do not operate normally.) ▶	GO TO 8.

8	CHECK AIR MIX DOOR MOTOR AND INTAKE DOOR MOTOR OPERATION
1. Disconnect the mode door motor connector. 2. Reconnect the intake door motor and confirm the air mix door motor and intake door motor operation. **OK or NG**	
OK (Air mix door motor and intake door motor operate normally.) ▶	Replace mode door motor.
NG (Air mix door motor and intake door motor do not operate normally.) ▶	GO TO 9.

9	CHECK INTAKE DOOR MOTOR AND MODE DOOR MOTOR OPERATION
1. Disconnect the air mix door motor connector. 2. Reconnect the mode door motor and confirm the intake door motor and mode door motor operation. **OK or NG**	
OK (Intake door motor and mode door motor operate normally.) ▶	Replace air mix door motor.
NG (Intake door motor and mode door motor do not operate normally.) ▶	Replace auto amp.



CONTROL LINKAGE ADJUSTMENT

NFHA0186

Mode Door

NFHA0186S01

1. Install mode door motor on heater unit and connect it to main harness.
2. Set up code No. in Self-diagnosis STEP 4. Refer to HA-44.
3. Move side link by hand and hold mode door in DEF mode.
4. Attach mode door motor rod to side link rod holder.
5. Make sure mode door operates properly when changing from code No. 41 to 46 by pushing DEF switch.

41	42	43	44	45	46
VENT	B/L	B/L	FOOT	D/F	DEF

Air Mix Door Motor

TROUBLE DIAGNOSIS PROCEDURE FOR AIR MIX DOOR (LAN)

=NFHA0187

SYMPTOM:

- **Discharge air temperature does not change.**
- **Air mix door motor does not operate.**

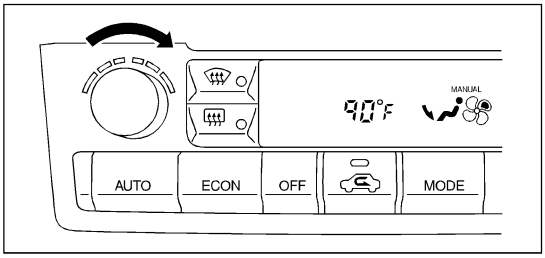
Inspection Flow

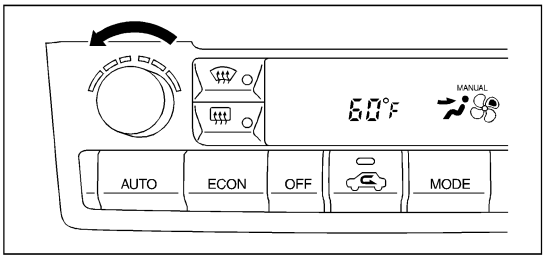
Without Navigation System

NFHA0187S01

NFHA0187S0101

1. Confirm symptom by performing the following operational check.





OPERATIONAL CHECK

Temperature increase

a. Turn the temperature dial clockwise until 32°C (90°F) is displayed.
b. Check for hot air at discharge air outlets.

Temperature decrease

a. Turn the temperature dial counterclockwise until 18°C (60°F) is displayed.
b. Check for cold air at discharge air outlets.

If OK (symptom cannot be duplicated), perform complete operational check (*10).
If NG (symptom is confirmed), continue with STEP-2 following.

2. Check for any service bulletins.
3. Perform self-diagnosis STEP-1. (*1)
OK
4. Perform self-diagnosis STEP-2. (*15)
NG → Go to appropriate malfunctioning sensor circuit. (*6)
OK
5. Perform self-diagnosis STEP-4. (*15)
OK **[Cause cannot be confirmed by self-diagnosis.]**
NG → Go to DIAGNOSTIC PROCEDURE FOR AIR MIX DOOR MOTOR, MODE DOOR MOTOR and INTAKE DOOR MOTOR CIRCUIT. (*7)
OK
6. Check ambient sensor circuit. (*2)
OK
7. Check in-vehicle sensor circuit. (*3)
OK
8. Check sunload sensor circuit. (*4)
OK
9. Check intake sensor circuit. (*14)
OK
10. Check air mix door motor PBR circuit. (*5)
OK
Check air mix door control linkage. (*8)
NG
Repair or adjust control linkage. (*9)
If the symptom still exists, perform a complete operational check (*12) and check for other symptoms. [Refer to symptom table, (*13).] Does another symptom exist?
Yes → Go to Trouble Diagnosis for related symptom.
Another symptom exists.
No
Replace auto amp. → INSPECTION END

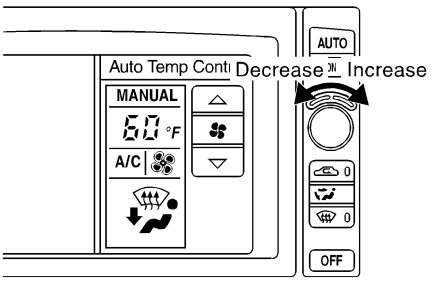
RHA103I

*1: HA-43
*2: HA-123
*3: HA-126
*4: HA-129
*5: HA-135
*6: FUNCTION CONFIRMATION PROCEDURE (HA-44), see No. 13.
*7: HA-78
*8: HA-86
*9: HA-86
*10: HA-65
*12: HA-65
*13: HA-64
*14: HA-133
*15: HA-44

With Navigation System

NFHA0187S0102

1. Confirm symptom by performing the following operational check.



OPERATIONAL CHECK

Temperature increase

a. Turn the temperature dial clockwise until 32°C (90°F) is displayed.
b. Check for hot air at discharge air outlets.

Temperature decrease

a. Turn the temperature dial counterclockwise until 18°C (60°F) is displayed.
b. Check for cold air at discharge air outlets.

If OK (symptom cannot be duplicated), perform complete operational check (*10).
If NG (symptom is confirmed), continue with STEP-2 following.

2. Check for any service bulletins.
3. Perform self-diagnosis STEP-1. (*1)
OK
4. Perform self-diagnosis STEP-2. (*15)
NG → Go to appropriate malfunctioning sensor circuit. (*6)
OK
5. Perform self-diagnosis STEP-4. (*15)
NG → Go to DIAGNOSTIC PROCEDURE FOR AIR MIX DOOR MOTOR, MODE DOOR MOTOR and INTAKE DOOR MOTOR CIRCUIT. (*7)
OK **[Cause cannot be confirmed by self-diagnosis.]**
6. Check ambient sensor circuit. (*2)
OK
7. Check in-vehicle sensor circuit. (*3)
OK
8. Check sunload sensor circuit. (*4)
OK
9. Check intake sensor circuit. (*14)
OK
10. Check air mix door motor PBR circuit. (*5)
OK
If the symptom still exists, perform a complete operational check (*12) and check for other symptoms. [Refer to symptom table, (*13).] Does another symptom exist?
Yes → Go to Trouble Diagnosis for related symptom.
Another symptom exists.
No
Replace auto amp. → INSPECTION END

OK → Check air mix door control linkage. (*8)
NG → Repair or adjust control linkage. (*9)

RHA051I

*1: HA-53
*2: HA-123
*3: HA-126
*4: HA-129
*5: HA-135
*6: FUNCTION CONFIRMATION PROCEDURE (HA-54), see No. 14.
*7: HA-78
*8: HA-86
*9: HA-86
*10: HA-67
*12: HA-67
*13: HA-64
*14: HA-133
*15: HA-54

SYSTEM DESCRIPTION

=NFHA0188

Component Parts

NFHA0188S01

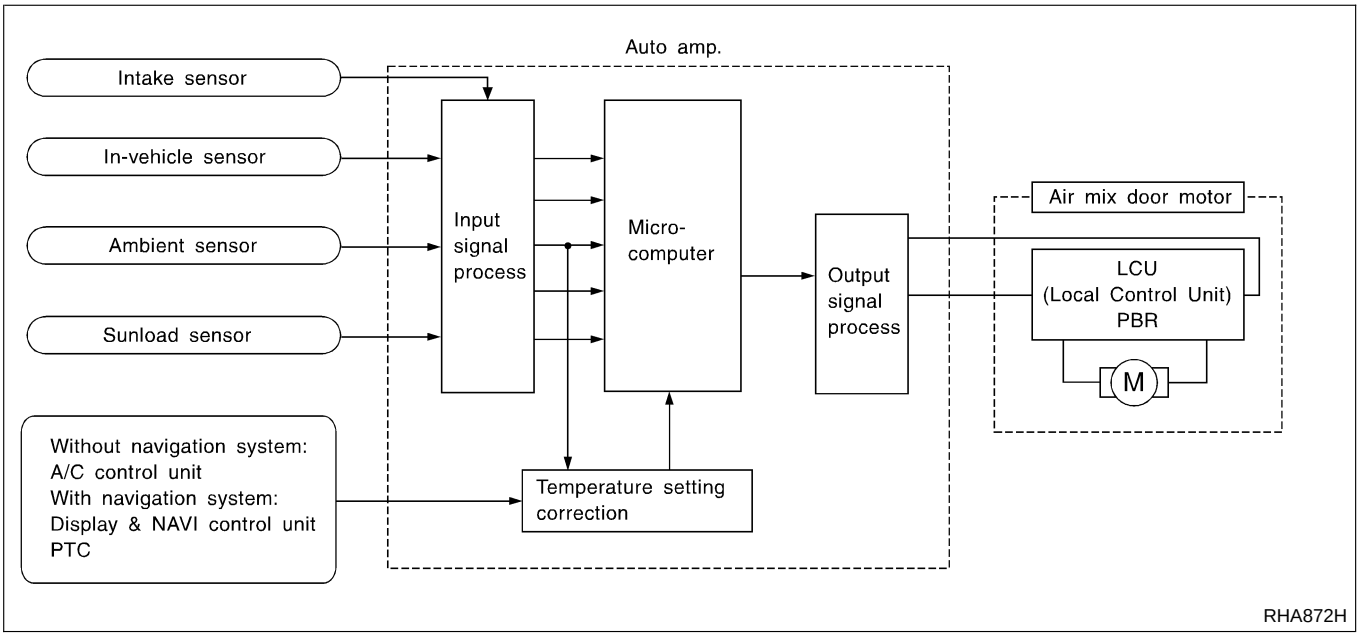
Air mix door control system components are:

1) Auto amp.
2) Air mix door motor (LCU)
3) In-vehicle sensor
4) Ambient sensor
5) Sunload sensor
6) Intake sensor

System Operation

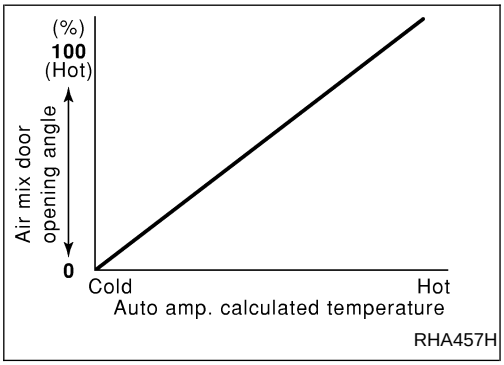
NFHA0188S02

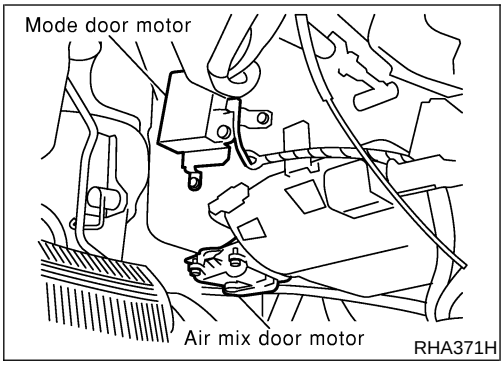
The auto amplifier receives data from each of the sensors. The amplifier sends air mix door, mode door, intake door opening angle data to the air mix door motor LCU, mode door motor LCU and intake door motor LCU. The air mix door motor, mode door motor and intake door motor read their respective signals according to the address signal. Opening angle indication signals received from the auto amplifier and each of the motor position sensors are compared by the LCUs in each motor with the existing decision and opening angles. Subsequently, HOT/COLD or DEFROST/VENT operation is selected. The new selection data is returned to the auto amplifier.



Air Mix Door Control Specification

NFHA0188S03





COMPONENT DESCRIPTION

NFHA0189

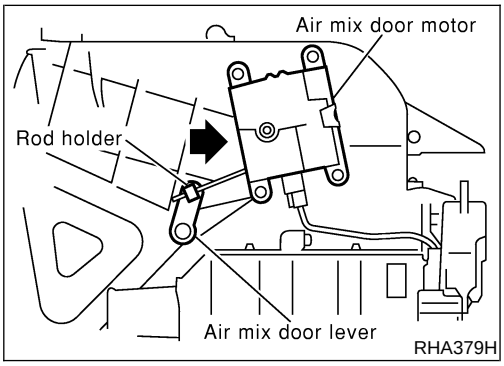
The air mix door motor is attached to the heater unit. It rotates so that the air mix door is opened or closed to a position set by the auto amplifier. Motor rotation is then conveyed through a shaft and the air mix door position is then fed back to the auto amplifier by PBR built-in air mix door motor.

DIAGNOSTIC PROCEDURE

NFHA0248

SYMPTOM: Discharge air temperature does not change.

- **Refer to HA-78.**



CONTROL LINKAGE ADJUSTMENT

NFHA0190

Air Mix Door

NFHA0190S01

1. Install air mix door motor on heater unit and connect it to main harness.
2. Set up code No. 41 in Self-diagnosis STEP 4. Refer to HA-43.
3. Move air mix door lever by hand and hold it in full cold position.
4. Attach air mix door lever to rod holder.
5. Make sure air mix door operates properly when changing from code No. 41 to 46 by pushing DEF switch.

41	42	43	44	45	46
Full cold		Full hot			

Intake Door Motor

TROUBLE DIAGNOSIS PROCEDURE FOR INTAKE DOOR (LAN)

=NFHA0191

SYMPTOM:

- **Intake door does not change.**
- **Intake door motor does not operate normally.**

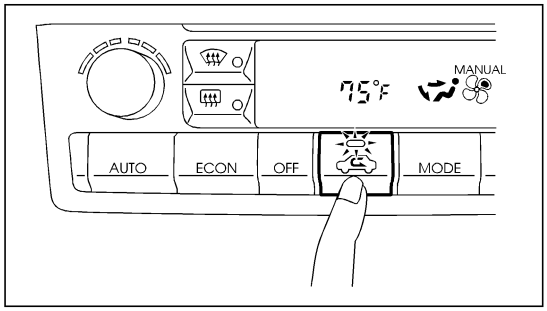
Inspection Flow

Without Navigation System

NFHA0191S01

NFHA0191S0101

1. Confirm symptom by performing the following operational check.



a. Press REC switch.
Recirculation indicator should illuminate.
b. Listen for intake door position change (you should hear blower sound change slightly).

If OK (symptom cannot be duplicated), perform complete operational check (*9).
If NG (symptom is confirmed), continue with STEP-2 following.

2. Check for any service bulletins.

3. Perform self-diagnosis STEP-1. (*1)

OK

4. Perform self-diagnosis STEP-2. (*10)

NG → Go to appropriate malfunctioning sensor circuit. (*6)

OK

5. Perform self-diagnosis STEP-4. (*10)

NG → Check intake door control linkage. (*8)

NG → Repair or adjust control linkage.

OK → Go to DIAGNOSTIC PROCEDURE FOR AIR MIX DOOR MOTOR, MODE DOOR MOTOR AND INTAKE DOOR MOTOR CIRCUIT. (*7)

OK

[Cause cannot be confirmed by self-diagnosis.]

6. Check ambient sensor circuit. (*2)

OK

7. Check in-vehicle sensor circuit. (*3)

OK

8. Check sunload sensor circuit. (*4)

OK

9. Check intake sensor circuit. (*13)

OK

10. Check air mix door motor PBR circuit. (*5)

OK

If the symptom still exists, perform a complete operational check (*11) and check for other symptoms. [Refer to symptom table, (*12).] Does another symptom exist?

Yes → Go To Trouble Diagnosis for related symptoms.

Another symptom exists.

No → Replace auto amp.

INSPECTION END

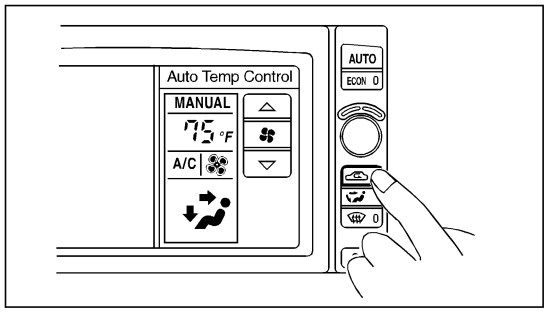
RHA100I

*1: HA-43
*2: HA-123
*3: HA-126
*4: HA-129
*5: HA-135
*6: FUNCTION CONFIRMATION PROCEDURE (HA-44), see No. 13.
*7: HA-78
*8: HA-90
*9: HA-65
*10: HA-44
*11: HA-65
*12: HA-64
*13: HA-133

With Navigation System

NFHA0191S0102

1. Confirm symptom by performing the following operational check.



a. Press REC switch.
Recirculation indicator should illuminate.
b. Listen for intake door position change (you should hear blower sound change slightly).

If OK (symptom cannot be duplicated), perform complete operational check (*9).
If NG (symptom is confirmed), continue with STEP-2 following.

2. Check for any service bulletins.

3. Perform self-diagnosis STEP-1. (*1)

OK

4. Perform self-diagnosis STEP-2. (*10)

NG → Go to appropriate malfunctioning sensor circuit. (*6)

OK

5. Perform self-diagnosis STEP-4. (*10)

OK

[Cause cannot be confirmed by self-diagnosis.]

NG → Check intake door control linkage. (*8)

OK → Go to DIAGNOSTIC PROCEDURE FOR AIR MIX DOOR MOTOR, MODE DOOR MOTOR AND INTAKE DOOR MOTOR CIRCUIT. (*7)

NG → Repair or adjust control linkage.

6. Check ambient sensor circuit. (*2)

OK

7. Check in-vehicle sensor circuit. (*3)

OK

8. Check sunload sensor circuit. (*4)

OK

9. Check intake sensor circuit. (*13)

OK

10. Check air mix door motor PBR circuit. (*5)

OK

If the symptom still exists, perform a complete operational check (*11) and check for other symptoms. [Refer to symptom table, (*12).] Does another symptom exist?

No → Replace auto amp. → INSPECTION END

Yes → Go To Trouble Diagnosis for related symptoms.

Another symptom exists.

RHA052I

*1: HA-53
*2: HA-123
*3: HA-126
*4: HA-129
*5: HA-135
*6: FUNCTION CONFIRMATION PROCEDURE (HA-54), see No. 14.
*7: HA-78
*8: HA-90
*9: HA-67
*10: HA-54
*11: HA-67
*12: HA-64
*13: HA-133

SYSTEM DESCRIPTION

=NFHA0192

Component Parts

NFHA0192S01

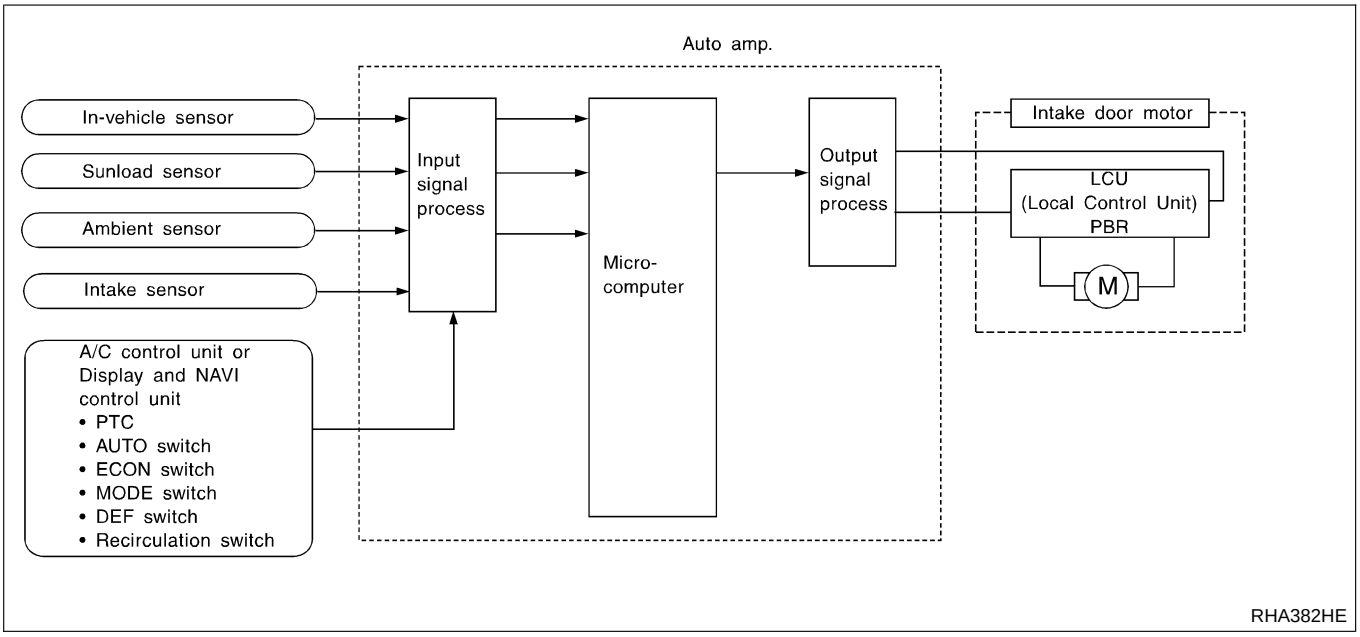
Intake door control system components are:

1) Auto amp.
2) Intake door motor
3) In-vehicle sensor
4) Ambient sensor
5) Sunload sensor
6) Intake sensor

System Operation

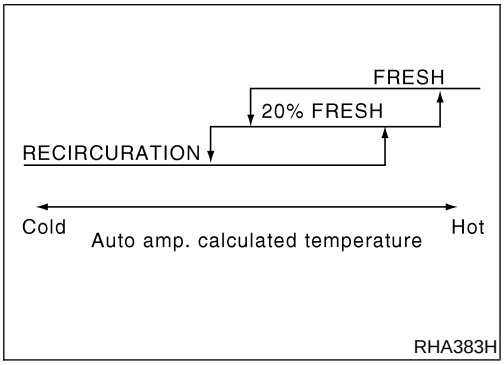
NFHA0192S02

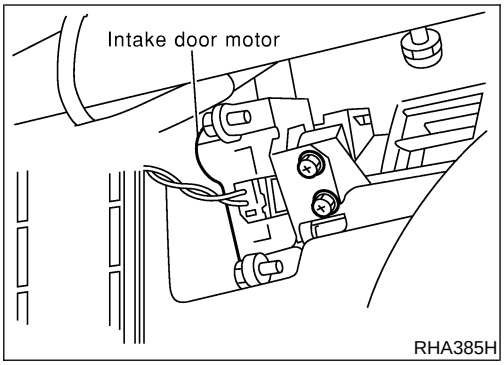
The intake door control determines intake door position based on the ambient temperature, the intake air temperature and the in-vehicle temperature. When the ECON, DEFROST, or OFF switches are pushed, the auto amplifier sets the intake door at the "Fresh" position.



Intake Door Control Specification

NFHA0192S03





COMPONENT DESCRIPTION

NFHA0193

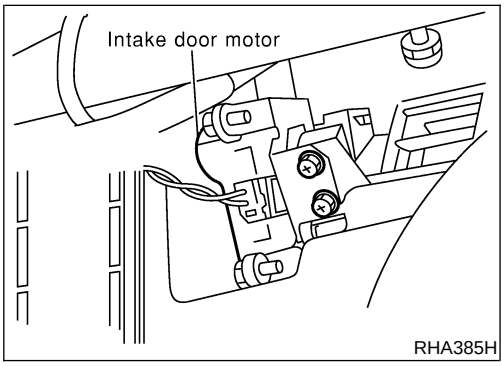
The intake door motor is attached to the intake unit. It rotates so that air is drawn from inlets set by the auto amplifier. Motor rotation is conveyed to a lever which activates the intake door.

DIAGNOSTIC PROCEDURE

NFHA0194

SYMPTOM: Intake door motor does not operate normally.

- **Refer to HA-78.**



CONTROL LINKAGE ADJUSTMENT

NFHA0195

Intake Door

NFHA0195S01

1. Install intake door motor on intake unit and connect it to main harness.
2. Set up code No. 41 in Self-diagnosis STEP 4. Refer to HA-44.
3. Make sure intake door operates properly when changing from code No. 41 to 46 by pushing DEF switch.

41	42	43	44	45	46
REC		20% FRE	FRE		

Blower Motor

TROUBLE DIAGNOSIS PROCEDURE FOR BLOWER MOTOR

=NFHA0196

SYMPTOM:

- **Blower motor operation is malfunctioning.**
- **Blower motor operation is malfunctioning under out of starting fan speed control.**

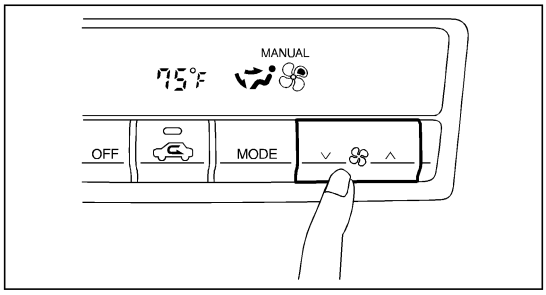
Inspection Flow

Without Navigation System

NFHA0196S01

NFHA0196S0101

1. Confirm symptom by performing the following operational check.



OPERATIONAL CHECK – Blower

a. Press fan switch (up side) one time.
Blower should operate on low speed.
The fan symbol should have one blade lit.
b. Press fan switch (up side) one more time, and continue checking blower speed and fan symbol until all speeds are checked.
c. Leave blower on MAX speed.

If OK (symptom cannot be duplicated), perform complete operational check (*12).
If NG (symptom is confirmed), continue with STEP-2 following.

2. Check for any service bulletins.

3. Perform self-diagnosis STEP-1. (*1)

OK

4. Perform self-diagnosis STEP-2. (*9)
Code No. 20 should be displayed after approx. 4 second.

NG → Go to appropriate malfunctioning sensor circuit. (*6)

OK

5. Perform self-diagnosis STEP-4. (*9)
Does blower motor speed change according to each code No.?

No → Go to Blower Motor Circuit. (*7)

Code No.	41	42	43	44	45	46
Blower motor speed	Low	Middle high	Middle low			High

Yes

6. Is engine coolant temperature below 50°C (122°F) and ambient temperature below 15°C (59°F)?

No → Blower motor operation is normal.

Yes

7. Is blower motor operating under starting blower speed control?

No → Go to Blower Motor Circuit. (*8)

OK → Check thermal transmitter control circuit. Refer to EL-(*14), "Electrical Component Inspection".

Yes **[Cause cannot be confirmed by self-diagnosis.]**

8. Check ambient sensor circuit. (*2)

OK

9. Check in-vehicle sensor circuit. (*3)

OK

10. Check sunload sensor circuit. (*4)

OK

11. Check intake sensor circuit. (*13)

OK

12. Check air mix door motor PBR circuit. (*5)

OK

If the symptom still exists, perform a complete operational check (*10) and check for other symptoms. [Refer to symptom table, (*11).] Does another symptom exist?

Yes → Go to Trouble Diagnosis for related symptom.

Another symptom exists.

No

Replace auto amp. → INSPECTION END

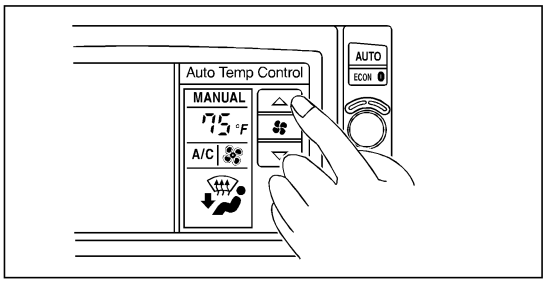
RHA102I

*1: HA-43
*2: HA-123
*3: HA-126
*4: HA-129
*5: HA-135
*6: FUNCTION CONFIRMATION PROCEDURE (HA-44), see No. 13.
*7: HA-94
*8: HA-94
*9: HA-44
*10: HA-65
*11: HA-64
*12: HA-65
*13: HA-133
*14: EL-129

With Navigation System

NFHA0196S0102

1. Confirm symptom by performing the following operational check.



OPERATIONAL CHECK – Blower

a. Press fan switch (up side) one time.
Blower should operate on low speed.
The fan symbol should have one blade lit.

b. Press fan switch (up side) one more time, and continue checking blower speed and fan symbol until all speeds are checked.

c. Leave blower on MAX speed.

If OK (symptom cannot be duplicated), perform complete operational check (*12).
If NG (symptom is confirmed), continue with STEP-2 following.

2. Check for any service bulletins.

3. Perform self-diagnosis STEP-1. (*1)

OK

4. Perform self-diagnosis STEP-2. (*9)
Code No. 20 should be displayed after approx. 4 second.

NG → Go to appropriate malfunctioning sensor circuit. (*6)

OK

5. Perform self-diagnosis STEP-4. (*9)
Does blower motor speed change according to each code No.?

Code No.	41	42	43	44	45	46
Blower motor speed	Low	Middle high	Middle low			High

No → Go to Blower Motor Circuit. (*7)

Yes

6. Is engine coolant temperature below 50°C (122°F) and ambient temperature below 15°C (59°F)?

No → Blower motor operation is normal.

Yes

7. Is blower motor operating under starting blower speed control?

No → Go to Blower Motor Circuit. (*8)

OK → Check engine coolant temperature sensor circuit. Refer to EL-(*14), "Electrical Component Inspection".

Yes **[Cause cannot be confirmed by self-diagnosis.]**

8. Check ambient sensor circuit. (*2)

OK

9. Check in-vehicle sensor circuit. (*3)

OK

10. Check sunload sensor circuit. (*4)

OK

11. Check intake sensor circuit. (*13)

OK

12. Check air mix door motor PBR circuit. (*5)

OK

If the symptom still exists, perform a complete operational check (*10) and check for other symptoms. [Refer to symptom table, (*11).] Does another symptom exist?

Yes → Go to Trouble Diagnosis for related symptom.
Another symptom exists.

No

Replace auto amp. → INSPECTION END

RHA053I

*1: HA-53
*2: HA-123
*3: HA-126
*4: HA-129
*5: HA-135
*6: FUNCTION CONFIRMATION PROCEDURE (HA-54), see No. 14.
*7: HA-94
*8: HA-94
*9: HA-54
*10: HA-67
*11: HA-64
*12: HA-67
*13: HA-133
*14: EL-129

SYSTEM DESCRIPTION

=NFHA0197

Component parts

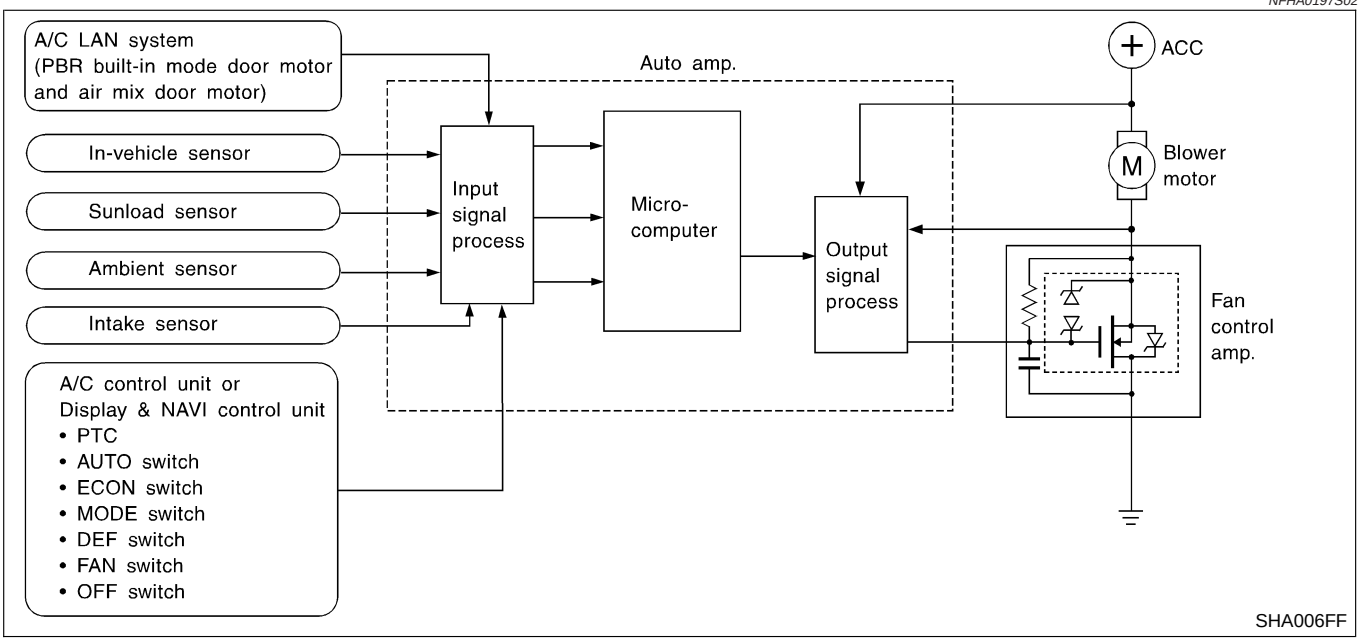
NFHA0197S01

Fan speed control system components are:

1) Auto amp.
2) Fan control amp.
3) A/C LAN system (PBR built-in air mix door motor and mode door motor)
4) In-vehicle sensor
5) Ambient sensor
6) Sunload sensor
7) Intake sensor

System Operation

NFHA0197S02



Automatic Mode

NFHA0197S03

In the automatic mode, the blower motor speed is calculated by the automatic amplifier based on inputs from the PBR, in-vehicle sensor, sunload sensor, intake sensor and ambient sensor. The blower motor applied voltage ranges from approximately 5 volts (lowest speed) to 12 volts (highest speed).

The control blower speed (in the range of 5 to 12V), the automatic amplifier supplies a gate voltage to the fan control amplifier. Based on this voltage, the fan control amplifier controls the voltage supplied to the blower motor.

Starting Fan Speed Control

NFHA0197S04

Start Up From "COLD SOAK" Condition (Automatic mode)

NFHA0197S0401

In a cold start up condition where the engine coolant temperature is below 50°C (122°F), the blower will not operate for a short period of time (up to 150 seconds). The exact start delay time varies depending on the ambient and engine coolant temperature.

In the most extreme case (very low ambient) the blower starting delay will be 126 seconds as described above. After this delay, the blower will operate at low speed until the engine coolant temperature rises above 55°C (131°F), at which time the blower speed will increase to the objective speed.

Start Up From Normal or "HOT SOAK" Condition (Automatic mode)

NFHA0197S0402

The blower will begin operation momentarily after the AUTO button is pushed. The blower speed will gradually rise to the objective speed over a time period of 3 seconds or less (actual time depends on the objective blower speed).

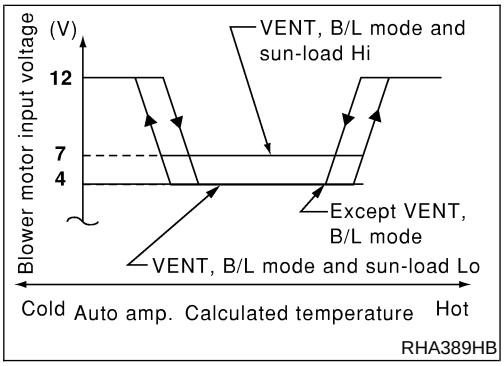
Blower Speed Compensation

NFHA0197S05

Sunload

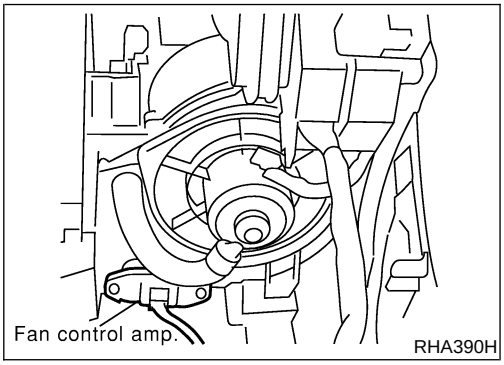
NFHA0197S0501

When the in-vehicle temperature and the set temperature are very close, the blower will be operating at low speed. The low speed will vary depending on the sunload. During conditions of high sunload, the blower low speed is "normal" low speed (approx. 6V). During low or no sunload conditions, the low speed will drop to "low" low speed (approx. 5V).



Fan Speed Control Specification

NFHA0197S06



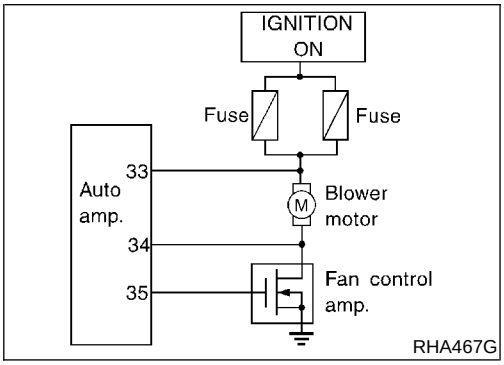
COMPONENT DESCRIPTION

NFHA0198

Fan Control Amplifier

NFHA0198S01

The fan control amplifier is located on the cooling unit. The fan control amp. receives a gate voltage from the auto amp. to steplessly maintain the blower fan motor voltage in the 5 to 12 volt range (approx.).



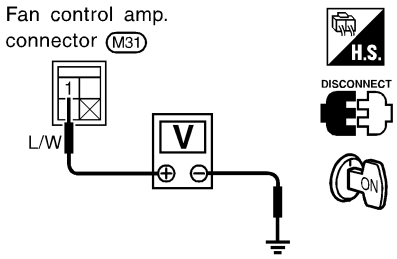
DIAGNOSTIC PROCEDURE

NFHA0199

SYMPTOM: Blower motor operation is malfunctioning under Starting Fan Speed Control.

1	CHECK POWER SUPPLY FOR FAN CONTROL AMP.

Disconnect fan control amp. harness connector.
Do approx. 12 volts exist between fan control amp. harness terminal No. 1 and body ground?



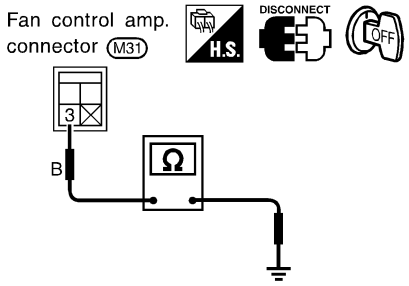
RHA392H

Yes or No

Yes	▶	GO TO 2.
No	▶	GO TO 8.

2	CHECK BODY GROUND CIRCUIT FOR FAN CONTROL AMP.

Does continuity exist between fan control amp. harness terminal No. 3 and body ground?



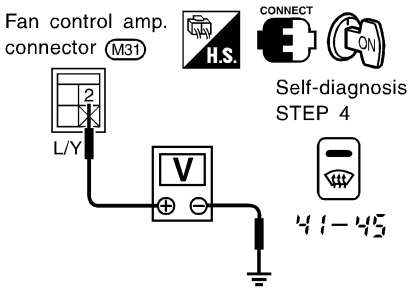
RHA393H

Yes or No

Yes	▶	Reconnect fan control amp. harness connector. And GO TO 3.
No	▶	Repair harness or connector.

3	CHECK VOLTAGE FOR FAN CONTROL AMP.

Set up Self-diagnosis STEP 4.
Measure voltage across fan control amp. harness terminal No. 2 and body ground.



Code No.	Terminal No. (+)	Terminal No. (–)	Voltage
41–45	(2)	Body ground	Approx. 2.5 - 3V

RHA786H

OK or NG

OK	▶	GO TO 4.
NG	▶	1. If the voltage is less than 2.5V, replace fan control amp. 2. If the voltage is more than 3.0V, GO TO 4. 3. Go to "FUNCTION CONFIRMATION PROCEDURE", "Self-diagnosis", HA-44; Without Navigation System or HA-54; With Navigation System and perform self-diagnosis STEP 4. Confirm that blower motor operation is normal.

4	CHECK FAN CONTROL AMP.

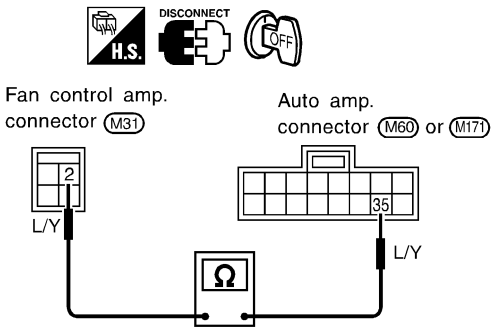
Refer to HA-100.

OK or NG

OK	▶	GO TO 5.
NG	▶	1. Replace fan control amp. 2. Go to "FUNCTION CONFIRMATION PROCEDURE", "Self-diagnosis", HA-44; Without Navigation System or HA-54; With Navigation System and perform self-diagnosis STEP 4. Confirm that blower motor operation is normal.

5	CHECK FAN CONTROL AMP. CIRCUIT BETWEEN FAN CONTROL AMP. AND AUTO AMP. (LCU)

1. Disconnect auto amp. (LCU) and fan control amp. harness connector.
2. Check circuit continuity between auto amp. (LCU) harness terminal No. 35 and fan control amp. harness terminal No. 2.



SHA375FA

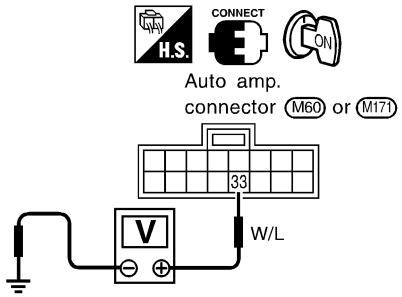
Continuity should exist.
If OK, check harness for short.

OK or NG

OK	▶	GO TO 6.
NG	▶	Repair harness or connector.

6	CHECK FAN FEED BACK CIRCUIT

Reconnect auto amp. (LCU) harness connector.
Do approx. 12 volts exist between auto amp. (LCU) harness terminal No. 33 and body ground?



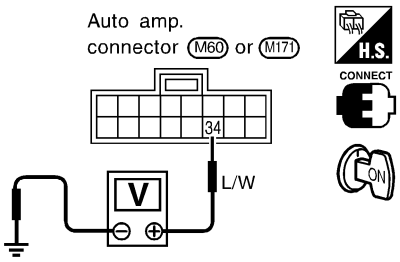
SHA371FA

Yes or No

Yes	▶	GO TO 7.
No	▶	Check power supply circuit and 15A fuses (Nos. 51 and 52, located in the fuse block). Refer to EL-11, "Wiring Diagram — POWER —". ● 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.

7	CHECK POWER SUPPLY FOR AUTO AMP.

Do approx. 12 volts exist between auto amp. harness terminal No. 34 and body ground?



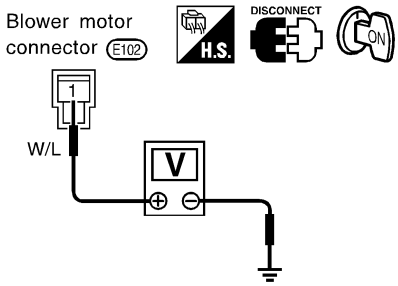
SHA370FA

Yes or No

Yes	▶	1. Replace auto amp. 2. Go to "FUNCTION CONFIRMATION PROCEDURE", "Self-diagnosis", HA-44; Without Navigation System or HA-54; With Navigation System and perform self-diagnosis STEP-4. Confirm that blower motor operation is normal.
No	▶	GO TO 10.

8	CHECK POWER SUPPLY FOR BLOWER MOTOR

Disconnect blower motor harness connector.
Do approx. 12 volts exist between blower motor harness terminal No. 1 and body ground?



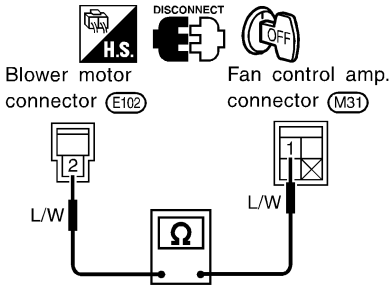
RHA091GE

Yes or No

Yes	▶	GO TO 9.
No	▶	**Check power supply circuit and 15A fuses (No. 51 and 52, located in the fuse block).** ● Check blower motor relay. ● 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.

9	CHECK CIRCUIT CONTINUITY BETWEEN BLOWER MOTOR AND FAN CONTROL AMP.

Disconnect blower motor connector and auto amp. (LCU) connector.
Check circuit continuity between blower motor harness terminal No. 2 and fan control amp. harness terminal No. 1.



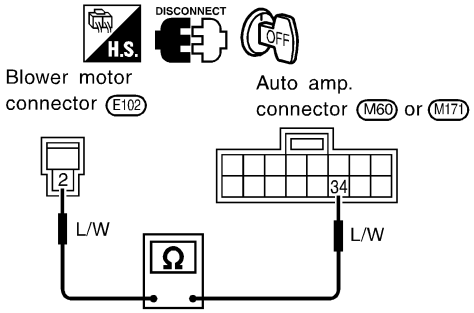
RHA397H

OK or NG

OK	▶	**Check blower motor. (Refer to HA-99.)** 1. If NG, replace blower motor. 2. Go to "FUNCTION CONFIRMATION PROCEDURE", "Self-diagnosis", HA-44; Without Navigation System or HA-54; With Navigation System and perform self-diagnosis STEP-4. Confirm that blower motor operation is normal.
NG	▶	Repair harness or connector.

10	CHECK BLOWER MOTOR CIRCUIT BETWEEN BLOWER MOTOR AND AUTO AMP. (LCU)

Check circuit continuity between blower motor harness terminal No. 2 and auto amp. (LCU) harness terminal No. 34.

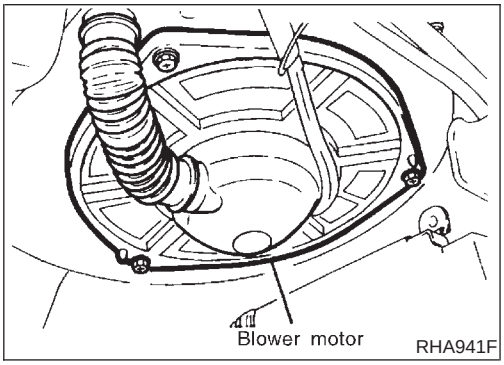


SHA372FA

Continuity should exist.
If OK, check harness for short.

OK or NG

OK	▶	INSPECTION END
NG	▶	Repair harness or connector.



RHA941F

COMPONENT INSPECTION

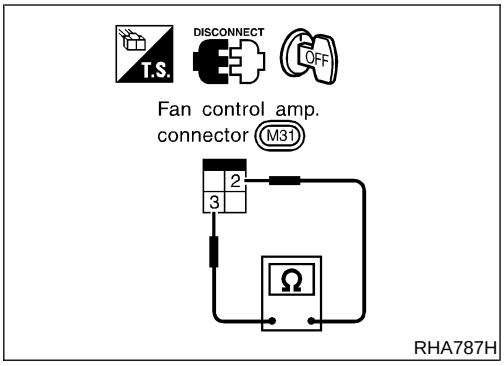
NFHA0200

Blower Motor

NFHA0200S01

Confirm smooth rotation of the blower motor.

- Ensure that there are no foreign particles inside the intake unit.



Fan Control Amp.

NFHA0200S02

Check continuity between terminals.

Terminal Nos.	Continuity
2 - 3	Yes

Magnet Clutch

TROUBLE DIAGNOSIS PROCEDURE FOR MAGNET CLUTCH

=NFHA0201

SYMPTOM:

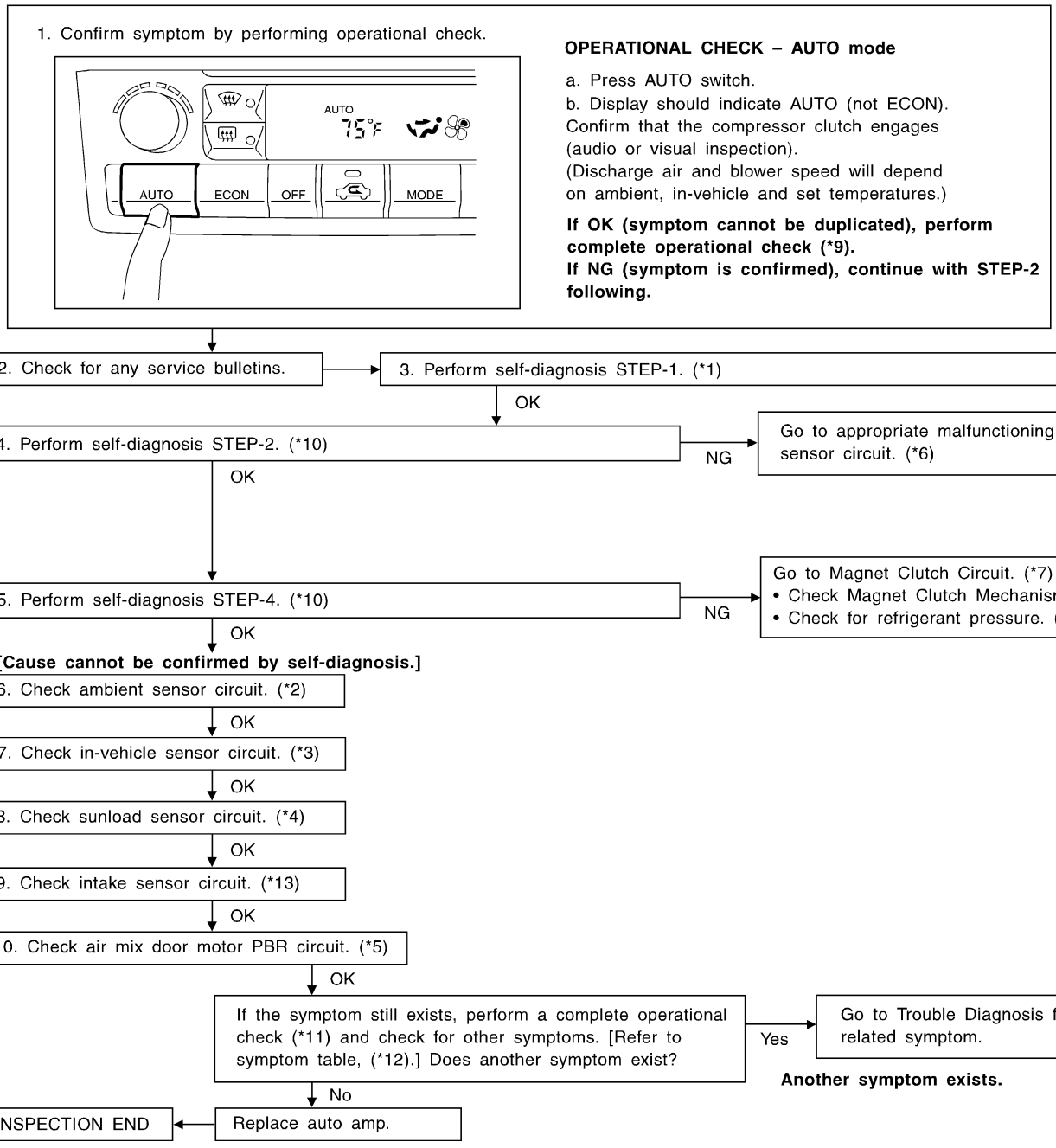
- **Magnet clutch does not engage.**

Inspection Flow

Without Navigation System

NFHA0201S01

NFHA0201S0101



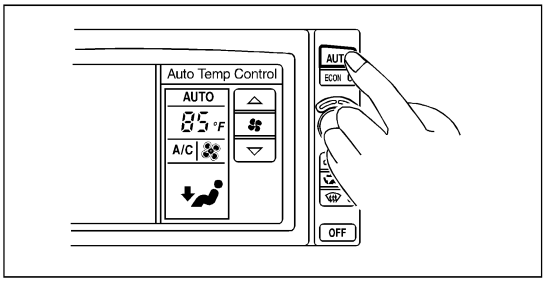
RHA080I

*1: FUNCTION CONFIRMATION PROCEDURE (HA-44)
*2: HA-123
*3: HA-126
*4: HA-129
*5: HA-135
*6: FUNCTION CONFIRMATION PROCEDURE (HA-44), see No. 13.
*7: HA-103
*8: HA-112
*9: HA-65
*10: HA-44
*11: HA-65
*12: HA-64
*13: HA-133

With Navigation System

NFHA0201S0102

1. Confirm symptom by performing operational check.



OPERATIONAL CHECK – AUTO mode

a. Press AUTO switch.
b. Display should indicate AUTO (not ECON).
Confirm that the compressor clutch engages (audio or visual inspection).
(Discharge air and blower speed will depend on ambient, in-vehicle and set temperatures.)

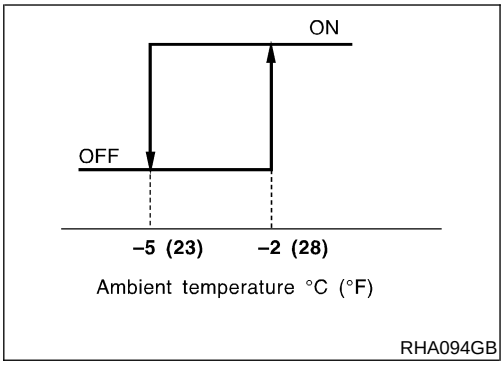
If OK (symptom cannot be duplicated), perform complete operational check (*9).
If NG (symptom is confirmed), continue with STEP-2 following.

2. Check for any service bulletins.
→ 3. Perform self-diagnosis STEP-1. (*1)
OK
4. Perform self-diagnosis STEP-2. (*10)
NG → Go to appropriate malfunctioning sensor circuit. (*6)
OK
5. Perform self-diagnosis STEP-4. (*10)
NG → Go to Magnet Clutch Circuit. (*7)
- Check Magnet Clutch Mechanism.
- Check for refrigerant pressure. (*8)

OK
[Cause cannot be confirmed by self-diagnosis.]
6. Check ambient sensor circuit. (*2)
OK
7. Check in-vehicle sensor circuit. (*3)
OK
8. Check sunload sensor circuit. (*4)
OK
9. Check intake sensor circuit. (*13)
OK
10. Check air mix door motor PBR circuit. (*5)
OK
If the symptom still exists, perform a complete operational check (*11) and check for other symptoms. [Refer to symptom table, (*12).] Does another symptom exist?
Yes → Go to Trouble Diagnosis for related symptom.
Another symptom exists.
No
Replace auto amp. → INSPECTION END

RHA054I

*1: FUNCTION CONFIRMATION PROCEDURE (HA-54)
*2: HA-123
*3: HA-126
*4: HA-129
*5: HA-135
*6: FUNCTION CONFIRMATION PROCEDURE (HA-54), see No. 14.
*7: HA-103
*8: HA-112
*9: HA-67
*10: HA-54
*11: HA-67
*12: HA-64
*13: HA-133



SYSTEM DESCRIPTION

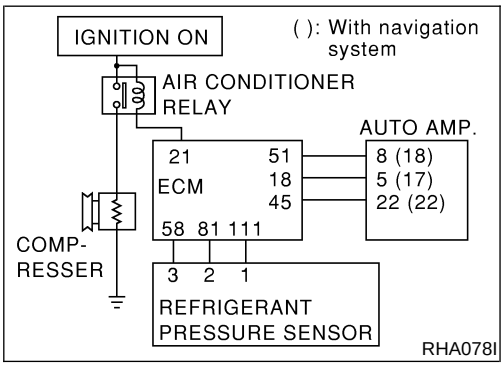
=NFHA0202

Auto amplifier controls compressor operation by ambient temperature and signal from ECM.

Low Temperature Protection Control

NFHA0202S01

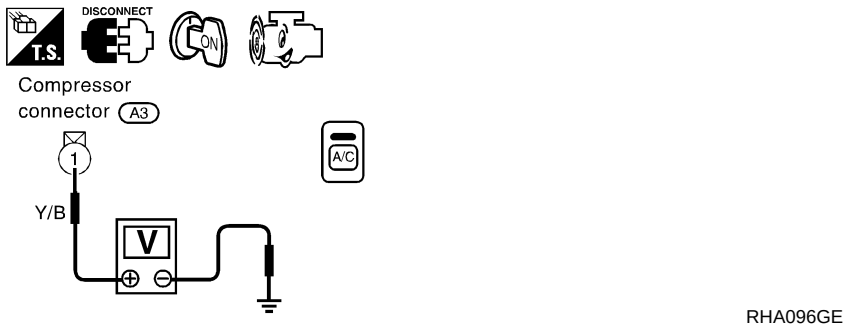
Auto amplifier will turn the compressor "ON" or "OFF" as determined by a signal detected by ambient sensor.
When ambient temperatures are greater than −2°C (28°F), the compressor turns "ON". The compressor turns "OFF" when ambient temperatures are less than −5°C (23°F).



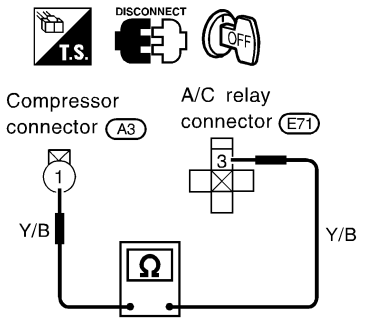
DIAGNOSTIC PROCEDURE

NFHA0203

SYMPTOM: Magnet clutch does not engage when AUTO switch is ON.

1	CHECK POWER SUPPLY FOR COMPRESSOR
Disconnect compressor harness connector. Do approx. 12 volts exist between compressor harness terminal No. 1 and body ground?  RHA096GE	
Yes or No	
Yes ▶	**Check magnet clutch coil.** 1. If NG, replace magnet clutch. Refer to HA-143. 2. Go to "FUNCTION CONFIRMATION PROCEDURE", "Self-diagnosis", HA-44; Without Navigation System or HA-54; With Navigation System and perform self-diagnosis STEP-4. Confirm that magnet clutch operation is normal.
No ▶	Disconnect A/C relay. And GO TO 2.

2	CHECK CIRCUIT CONTINUITY BETWEEN A/C RELAY HARNESS TERMINAL NO. 3 AND COMPRESSOR HARNESS TERMINAL NO. 1



RHA400HA

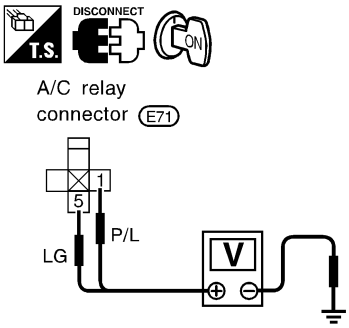
Continuity should exist.
If OK, check harness for short.

OK or NG

OK	▶	GO TO 3.
NG	▶	Repair harness or connector.

3	CHECK POWER SUPPLY FOR A/C RELAY

Disconnect A/C relay.
Do approx. 12 volts exist between A/C relay harness terminal Nos. 1, 5 and body ground?



RHA401H

Yes or No

Yes	▶	GO TO 4.
No	▶	Check power supply circuit and 10A (Nos. 28, 66) fuse at fuse block. Refer to EL-11, "Wiring Diagram — POWER —". ● 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.

4	CHECK A/C RELAY AFTER DISCONNECTING IT

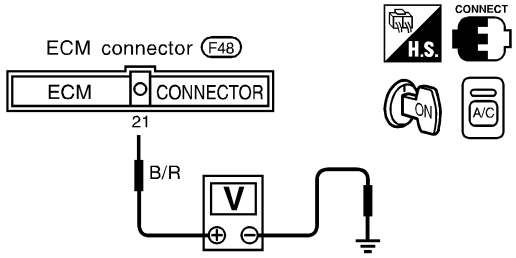
Refer to HA-107.

OK or NG

OK	▶	Reconnect A/C relay. And GO TO 5.
NG	▶	1. Replace A/C relay. 2. Go to "FUNCTION CONFIRMATION PROCEDURE", "Self-diagnosis", HA-44; Without Navigation System or HA-54; With Navigation System and perform self-diagnosis STEP-4. Confirm that magnet clutch operation is normal.

5	CHECK COIL SIDE CIRCUIT OF A/C RELAY

Do approx. 12 volts exist between ECM harness terminal No. 21 and body ground?



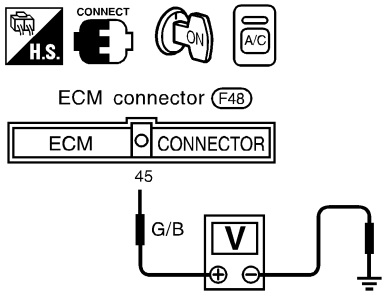
RHA081I

Yes or No

Yes	▶	GO TO 6.
No	▶	Disconnect A/C relay. Disconnect ECM harness connector. GO TO 9.

6	CHECK VOLTAGE FOR ECM

Do approx. 4.6 volts exist between ECM harness terminal No. 45 and body ground?



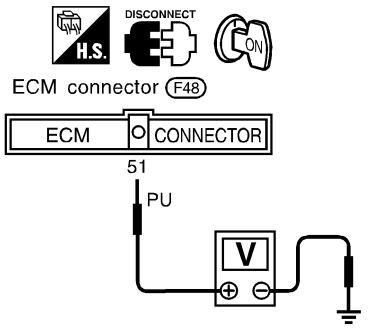
RHA701FM

Yes or No

Yes	▶	GO TO 7.
No	▶	Check ECM. Refer to EC-141, "ECM Terminals and Reference Value".

7	CHECK REFRIGERANT PRESSURE SENSOR INPUT SIGNAL

Do approx. 4.6 volts exist between ECM harness terminal No. 51 and ground?



SHA434F

Yes or No

Yes	▶	GO TO 8.
No	▶	1. Repair harness or connector. 2. Go to "FUNCTION CONFIRMATION PROCEDURE", "Self-diagnosis", HA-44; Without Navigation System or HA-54; With Navigation System and perform self-diagnosis STEP-4. Confirm that magnet clutch operation is normal.

8	CHECK REFRIGERANT PRESSURE SENSOR

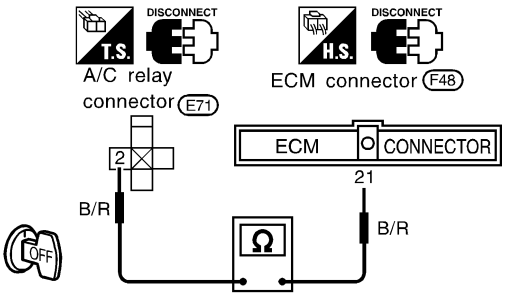
Refer to HA-107.

OK or NG

OK	▶	GO TO 9.
NG	▶	Replace refrigerant pressure sensor.

9	CHECK CIRCUIT CONTINUITY BETWEEN A/C RELAY AND ECM

Check circuit continuity between A/C relay harness terminal No. 2 and ECM harness terminal No. 21.

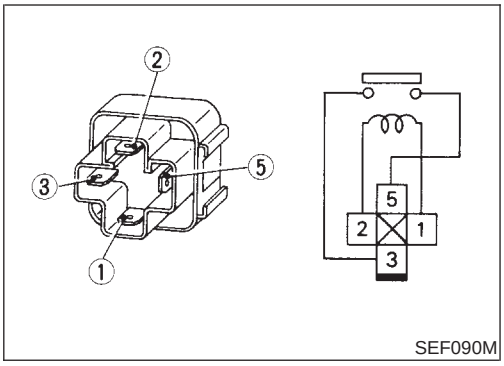


RHA082I

Continuity should exist.
If OK, check harness for short.

OK or NG

OK	▶	Check ECM. Refer to EC-141, "ECM Terminals and Reference Value".
NG	▶	Repair harness or connector. Replace auto amp.



SEF090M

COMPONENT INSPECTION

NFHA0204

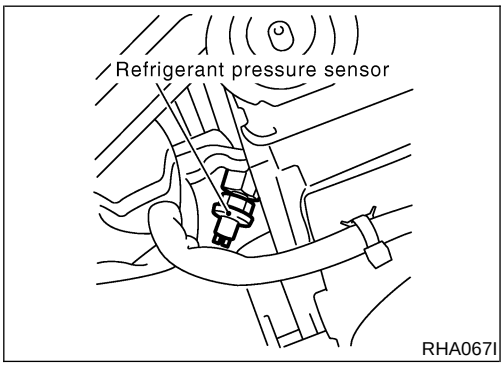
A/C Relay

NFHA0204S01

Check continuity between terminal Nos. 3 and 5.

Conditions	Continuity
12V direct current supply between terminal Nos. 1 and 2	Yes
No current supply	No

If NG, replace relay.

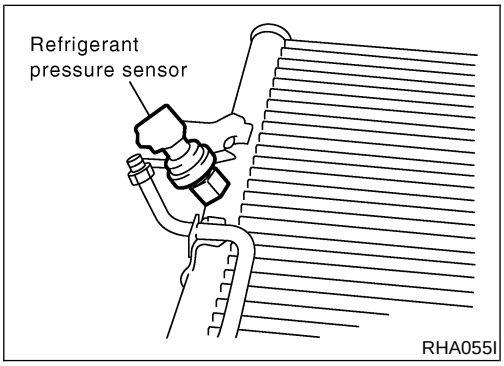


RHA067I

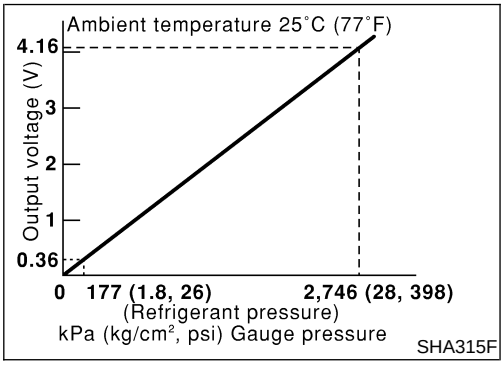
Refrigerant Pressure Sensor

NFHA0204S02

Make sure that higher A/C refrigerant pressure results in higher refrigerant-pressure sensor output voltage.
Refer to EC-726, "Diagnostic Procedure".



RHA055I



SHA315F

Insufficient Cooling

TROUBLE DIAGNOSIS PROCEDURE FOR INSUFFICIENT COOLING

=NFHA0205

SYMPTOM:

- **Insufficient cooling**

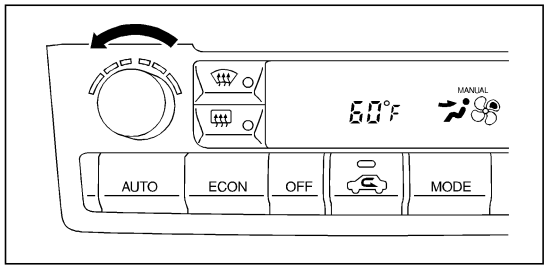
Inspection Flow

NFHA0205S01

Without Navigation System

NFHA0205S0101

1. Confirm symptom by performing the following operational check.



OPERATIONAL CHECK – Temperature decrease

a. Turn the temperature dial counterclockwise until 18°C (60°F) is displayed.

b. Check for cold air at discharge air outlets.

If OK (symptom cannot be duplicated), perform complete operational check (*10).
If NG (symptom is confirmed), continue with STEP-2 following.

2. Check for any service bulletins.

3. Perform self-diagnosis STEP-1. (*1)

OK

4. Perform self-diagnosis STEP-2. (*11)

NG → Go to appropriate malfunctioning sensor circuit. (*5)

OK

5. Perform self-diagnosis STEP-4. (*11)

NG → **Go to appropriate malfunctioning items.**
- Check air mix door motor, mode door motor and, intake door motor circuit. (*6)
- Check blower motor circuit. (*7)
- Check magnet clutch circuit. (*8)

OK

6. Check compressor belt tension. Refer to MA-(*13), “Checking Drive Belts”.

NG → Adjust or replace compressor belt.

OK

7. Check air mix door operation. (*2)

NG → Adjust or replace air mix door control linkage.

OK

8. Check cooling fan motor operation.

NG → Refer to EC (*14), “System Description”.

OK

9. Before connecting ACR4 to vehicle, check ACR4 gauges. No refrigerant pressure should be displayed. If NG, recover refrigerant from equipment lines.

10. Confirm refrigerant purity in supply tank using ACR4 and refrigerant identifier.

NG → Refer to Contaminated refrigerant. (*12)

OK

11. Connect ACR4 to vehicle.
Confirm refrigerant purity in vehicle A/C system using ACR4 and refrigerant identifier.

NG → Refer to Contaminated refrigerant. (*12)

OK

12. Check refrigeration cycle pressure with manifold gauge connected. Refer to (*3).

NG → Perform performance test diagnoses. Refer to (*9).

OK

13. Check for evaporator coil freeze up.

NG (Freeze up.) → Replace compressor.

(Does not freeze up.)

OK

14. Check ducts for air leaks.

NG → Repair air leaks.

OK

15. Perform temperature setting trimmer. (*4)
(1) Set up AUXILIARY MECHANISM mode in self-diagnosis.
(2) Turn temperature dial counterclockwise as desired.

OK

INSPECTION END

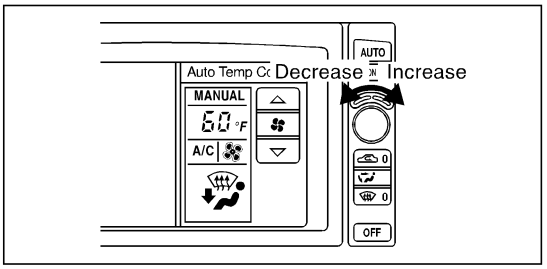
RHA101I

*1: HA-43
*2: HA-86
*3: HA-112
*4: HA-52
*5: FUNCTION CONFIRMATION PROCEDURE (HA-44), see No. 13.
*6: HA-77
*7: HA-93
*8: HA-103
*9: HA-110
*10: HA-65
*11: HA-44
*12: HA-3
*13: MA-13

With Navigation System

NFHA0205S0102

1. Confirm symptom by performing the following operational check.



OPERATIONAL CHECK – Temperature decrease

a. Turn the temperature dial counterclockwise until 18°C (60°F) is displayed.

b. Check for cold air at discharge air outlets.

If OK (symptom cannot be duplicated), perform complete operational check (*10).
If NG (symptom is confirmed), continue with STEP-2 following.

2. Check for any service bulletins.
→ 3. Perform self-diagnosis STEP-1. (*1)
OK ↓
4. Perform self-diagnosis STEP-2. (*11)
NG → Go to appropriate malfunctioning sensor circuit. (*5)
OK ↓
5. Perform self-diagnosis STEP-4. (*11)
NG → **Go to appropriate malfunctioning items.**
- Check air mix door motor, mode door motor and, intake door motor circuit. (*6)
- Check blower motor circuit. (*7)
- Check magnet clutch circuit. (*8)

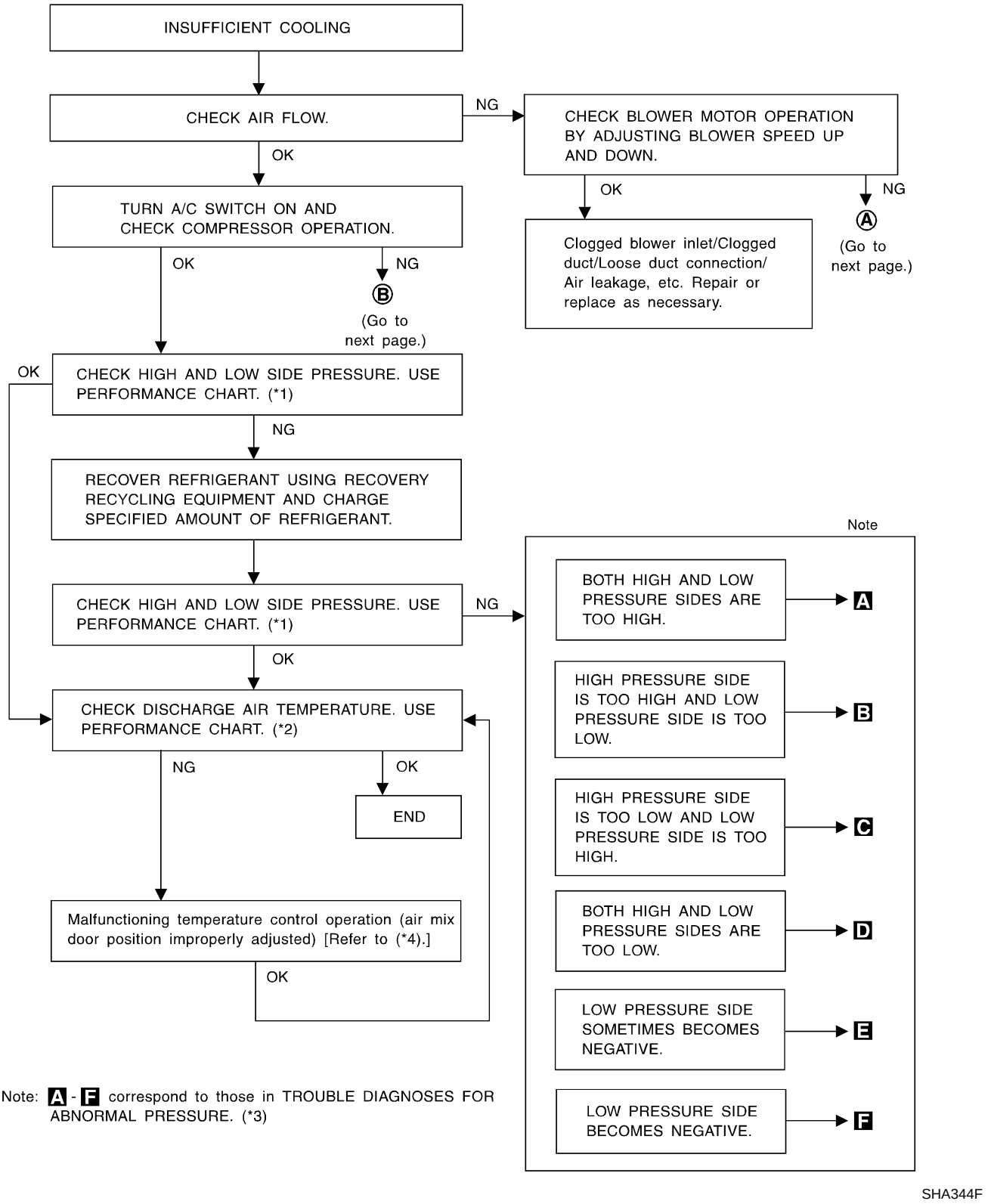
OK ↓
6. Check compressor belt tension. Refer to MA-(*13), "Checking Drive Belts".
NG → Adjust or replace compressor belt.
OK ↓
7. Check air mix door operation. (*2)
NG → Adjust or replace air mix door control linkage.
OK ↓
8. Check cooling fan motor operation.
NG → Refer to EC (*14), "System Description".
OK ↓
9. Before connecting ACR4 to vehicle, check ACR4 gauges. No refrigerant pressure should be displayed. If NG, recover refrigerant from equipment lines.
↓
10. Confirm refrigerant purity in supply tank using ACR4 and refrigerant identifier.
NG → Refer to Contaminated refrigerant. (*12)
OK ↓
11. Connect ACR4 to vehicle.
Confirm refrigerant purity in vehicle A/C system using ACR4 and refrigerant identifier.
NG → Refer to Contaminated refrigerant. (*12)
OK ↓
12. Check refrigeration cycle pressure with manifold gauge connected. Refer to (*3).
NG → Perform performance test diagnoses. Refer to (*9).
OK ↓
13. Check for evaporator coil freeze up.
NG (Freeze up.) → Replace compressor.
(Does not freeze up.)
OK ↓
14. Check ducts for air leaks.
NG → Repair air leaks.
OK ↓
15. Perform temperature setting trimmer. (*4)
(1) Set up AUXILIARY MECHANISM mode in self-diagnosis.
(2) Turn temperature dial counterclockwise as desired.
OK ↓
INSPECTION END

RHA056I

*1: HA-53
*2: HA-86
*3: HA-112
*4: HA-63
*5: FUNCTION CONFIRMATION PROCEDURE (HA-54), see No. 14.
*6: HA-77
*7: HA-93
*8: HA-103
*9: HA-110
*10: HA-67
*11: HA-54
*12: HA-3
*13: MA-13

PERFORMANCE TEST DIAGNOSES

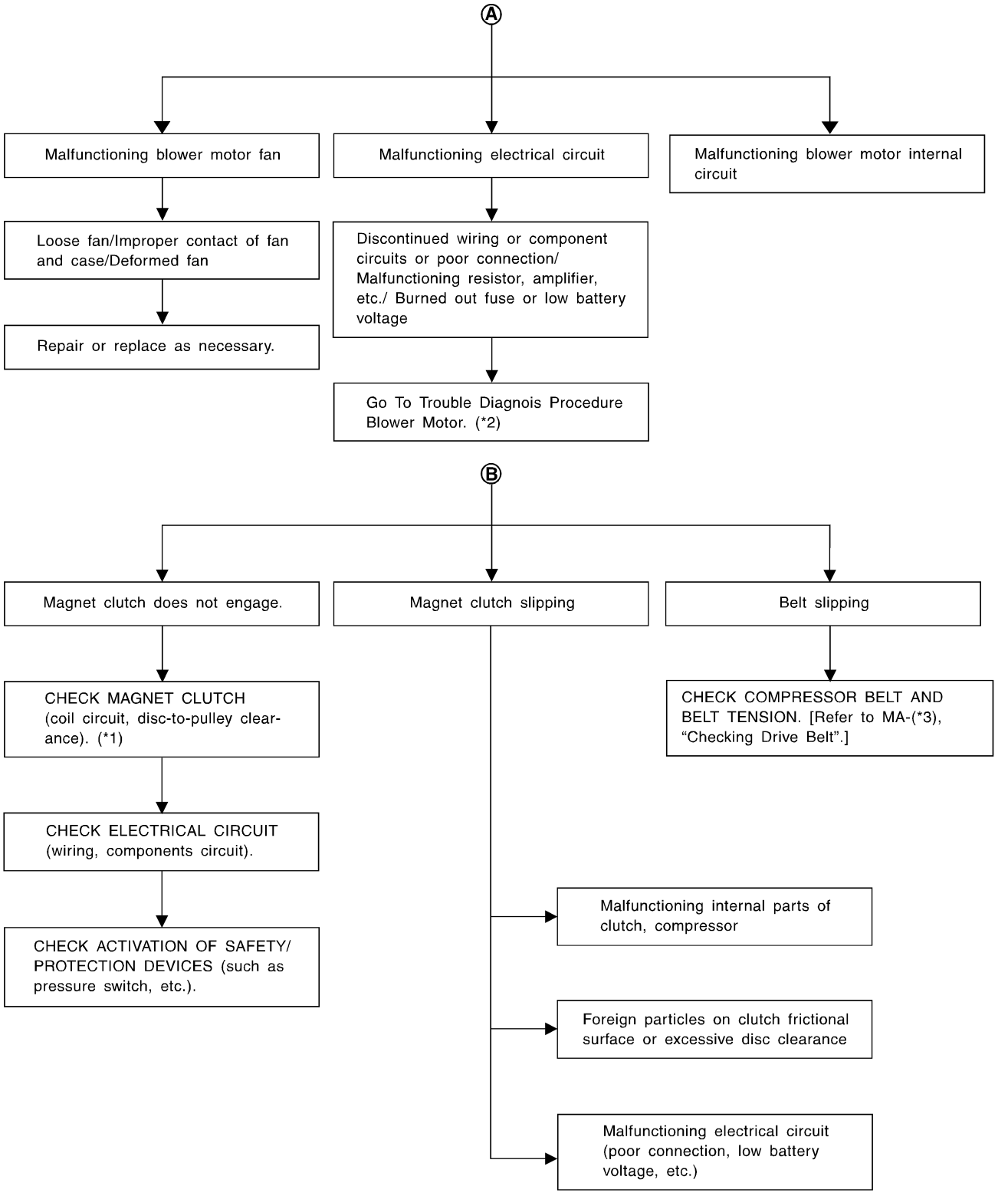
NFHA0206



Note: A - F correspond to those in TROUBLE DIAGNOSES FOR ABNORMAL PRESSURE. (*3)

SHA344F

*1: HA-112
*2: HA-112
*3: HA-113
*4: HA-85



SHA329F

*1: HA-143 *2: HA-91 *3: MA-13

PERFORMANCE TEST

NFHA0207

Test Condition

NFHA0207S01

Testing must be performed as follows:

Vehicle location	Indoors or in the shade (in a well-ventilated place)
Doors	Closed
Door windows	Open
Hood	Open
TEMP.	Max. COLD
Mode switch	(Ventilation) set
REC switch	(Recirculation) set
(blower) speed	Max. speed set
Engine speed	Idle speed
Operate the air conditioning system for 10 minutes before taking measurements.	

Test Reading

NFHA0207S02

Recirculating-to-discharge Air Temperature Table

NFHA0207S0201

Inside air (Recirculating air) at blower assembly inlet		Discharge air temperature at center ventilator °C (°F)
Relative humidity %	Air temperature °C (°F)	
50 - 60	15 (59)	3.5 - 5.4 (38 - 42)
	20 (68)	6.6 - 8.9 (44 - 48)
	25 (77)	9.5 - 12.6 (49 - 55)
	30 (86)	13.4 - 16.5 (56 - 62)
	35 (95)	17.6 - 21.3 (64 - 70)
60 - 70	15 (59)	5.4 - 7.1 (42 - 45)
	20 (68)	8.9 - 11.0 (48 - 52)
	25 (77)	12.6 - 15.4 (55 - 60)
	30 (86)	16.5 - 20.0 (62 - 68)
	35 (95)	21.3 - 24.8 (70 - 77)

Ambient Air Temperature-to-operating Pressure Table

NFHA0207S0202

Ambient air		High-pressure (Discharge side) kPa (kg/cm^2, psi)	Low-pressure (Suction side) kPa (kg/cm^2, psi)
Relative humidity %	Air temperature °C (°F)		
50 - 70	15 (59)	539 - 657 (5.5 - 6.7, 78 - 95)	177 - 216 (1.8 - 2.2, 26 - 31)
	20 (68)	677 - 824 (6.9 - 8.4, 98 - 119)	167 - 206 (1.7 - 2.1, 24 - 30)
	25 (77)	843 - 1,030 (8.6 - 10.5, 122 - 149)	177 - 226 (1.8 - 2.3, 26 - 33)
	30 (86)	1,030 - 1,275 (10.5 - 13.0, 149 - 185)	216 - 255 (2.2 - 2.6, 31 - 37)
	35 (95)	1,245 - 1,520 (12.7 - 15.5, 181 - 220)	265 - 324 (2.7 - 3.3, 38 - 47)

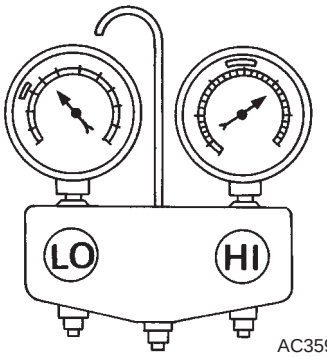
TROUBLE DIAGNOSES FOR ABNORMAL PRESSURE

NFHA0208

Whenever system's high and/or low side pressure is abnormal, diagnose using a manifold gauge. The marker above the gauge scale in the following tables indicates the standard (normal) pressure range. Since the standard (normal) pressure, however, differs from vehicle to vehicle, refer to HA-112 ("Ambient air temperature-to-operating pressure table").

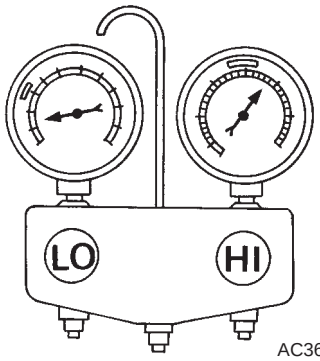
Both High and Low-pressure Sides are Too High.

NFHA0208S01

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Both high and low-pressure sides are too high. A  AC359A	• Pressure is reduced soon after water is splashed on condenser.	Excessive refrigerant charge in refrigeration cycle	Reduce refrigerant until specified pressure is obtained.
	Air suction by cooling fan is insufficient.	Insufficient condenser cooling performance ↓ 1. Condenser fins are clogged. 2. Improper fan rotation of cooling fan	• Clean condenser. • Check and repair cooling fan as necessary.
	• Low-pressure pipe is not cold. • When compressor is stopped high-pressure value quickly drops by approximately 196 kPa (2 kg/cm^2, 28 psi). It then decreases gradually thereafter.	Poor heat exchange in condenser (After compressor operation stops, high pressure decreases too slowly.) ↓ Air in refrigeration cycle	Evacuate repeatedly and recharge system.
	Engine tends to overheat.	Engine cooling systems malfunction.	Check and repair each engine cooling system.
	• An area of the low-pressure pipe is colder than areas near the evaporator outlet. • Plates are sometimes covered with frost.	• Excessive liquid refrigerant on low-pressure side • Excessive refrigerant discharge flow • Expansion valve is open a little compared with the specification. ↓ 1. Improper thermal valve installation 2. Improper expansion valve adjustment	Replace expansion valve.

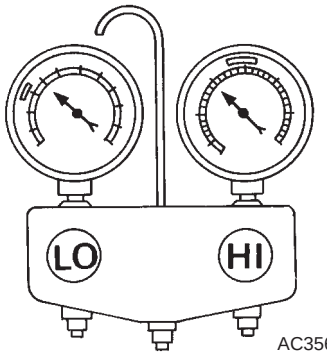
High-pressure Side is Too High and Low-pressure Side is Too Low.

NFHA0208S02

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
High-pressure side is too high and low-pressure side is too low. B  AC360A	Upper side of condenser and high-pressure side are hot, however, liquid tank is not so hot.	High-pressure tube or parts located between compressor and condenser are clogged or crushed.	• Check and repair or replace malfunctioning parts. • Check lubricant for contamination.

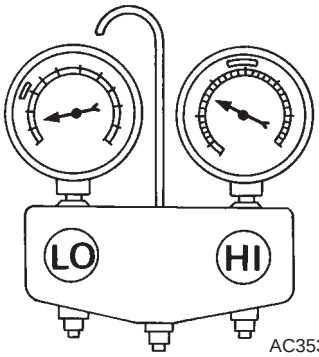
High-pressure Side is Too Low and Low-pressure Side is Too High.

NFHA0208S03

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
High-pressure side is too low and low-pressure side is too high. C  AC356A	High and low-pressure sides become equal soon after compressor operation stops.	Compressor pressure operation is improper. ↓ Damaged inside compressor packings.	Replace compressor.
	No temperature difference between high and low-pressure sides	Compressor pressure operation is improper. ↓ Damaged inside compressor packings.	Replace compressor.

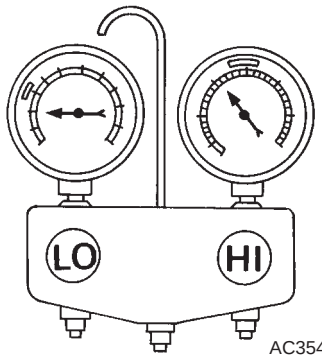
Both High- and Low-pressure Sides are Too Low.

NFHA0208S04

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Both high- and low-pressure sides are too low. D  AC353A	• There is a big temperature difference between receiver drier outlet and inlet. Outlet temperature is extremely low. • Liquid tank inlet and expansion valve are frosted.	Compressor discharge capacity does not change. (Compressor stroke is set at maximum.)	• Replace liquid tank. • Check lubricant for contamination.
	• Temperature of expansion valve inlet is extremely low as compared with areas near liquid tank. • Expansion valve inlet may be frosted. • Temperature difference occurs somewhere in high-pressure side	High-pressure pipe located between receiver drier and expansion valve is clogged.	• Check and repair malfunctioning parts. • Check lubricant for contamination.
	• Expansion valve and liquid tank are warm or only cool when touched.	Low refrigerant charge ↓ Leaking fittings or components	Check refrigerant for leaks. Refer to "Checking Refrigerant Leaks", HA-150.
	There is a big temperature difference between expansion valve inlet and outlet while the valve itself is frosted.	Expansion valve closes a little compared with the specification. ↓ 1. Improper expansion valve adjustment 2. Malfunctioning thermal valve 3. Outlet and inlet may be clogged.	• Remove foreign particles by using compressed air. • Check lubricant for contamination.
	An area of the low-pressure pipe is colder than areas near the evaporator outlet.	Low-pressure pipe is clogged or crushed.	• Check and repair malfunctioning parts. • Check lubricant for contamination.
	Air flow volume is not enough or is too low.	Evaporator is frozen. ↓ Compressor discharge capacity does not change. (Compressor stroke is set at maximum length.)	Replace compressor.

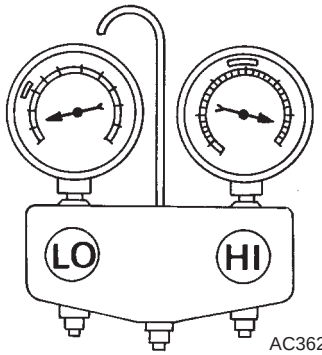
Low-pressure Side Sometimes Becomes Negative.

NFHA0208S05

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Low-pressure side sometimes becomes negative. E  AC354A	• Air conditioning system does not function and does not cyclically cool the compartment air. • The system constantly functions for a certain period of time after compressor is stopped and restarted.	Refrigerant does not discharge cyclically. ↓ Moisture is frozen at expansion valve outlet and inlet. ↓ Water is mixed with refrigerant.	• Drain water from refrigerant or replace refrigerant. • Replace liquid tank.

Low-pressure Side Becomes Negative.

NFHA0208S06

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Low-pressure side becomes negative. F  AC362A	Liquid tank or front/rear side of expansion valve's pipe is frosted or dewed.	High-pressure side is closed and refrigerant does not flow. ↓ Expansion valve or liquid tank is frosted.	Leave the system at rest until no frost is present. Start it again to check whether or not the problem is caused by water or foreign particles. • If water is the cause, initially cooling is okay. Then the water freezes causing a blockage. Drain water from refrigerant or replace refrigerant. • If due to foreign particles, remove expansion valve and remove the particles with dry and compressed air (not shop air). • If either of the above methods cannot correct the problem, replace expansion valve. • Replace liquid tank. • Check lubricant for contamination.

Insufficient Heating

TROUBLE DIAGNOSIS PROCEDURE FOR INSUFFICIENT HEATING

=NFHA0209

SYMPTOM:

- **Insufficient heating**

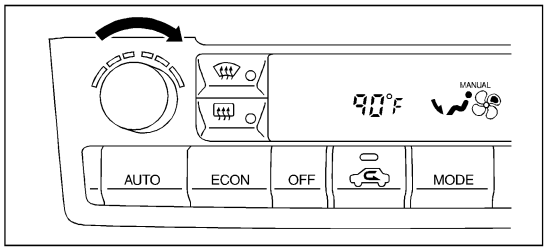
Inspection Flow

Without Navigation System

NFHA0209S01

NFHA0209S0101

1. Confirm symptom by performing the following operational check.



OPERATIONAL CHECK – Temperature increase

a. Turn the temperature dial clockwise until 32°C (90°F) is displayed.

b. Check for hot air at discharge air outlets.

If OK (symptom cannot be duplicated), perform complete operational check (*1).
If NG (symptom is confirmed), continue with STEP-2 following.

2. Check for any service bulletins.

3. Perform self-diagnosis STEP-1. (*2)

OK

4. Perform self-diagnosis STEP-2. (*3)

NG → Go to appropriate malfunctioning sensor circuit. (*6)

OK

5. Perform self-diagnosis STEP-4. (*4)

NG → **Go to appropriate malfunctioning items.**
- Check air mix door motor, mode door motor and intake door motor circuit. (*7)
- Check blower motor circuit. (*8)

OK

6. Check the following:
   - Engine coolant level [Refer to MA-(*12), “Changing Engine Coolant”.]
   - Hoses for leaks or kinks.
   - Radiator cap. Refer to LC-(*13), “System Check”.
   - Air in cooling system.

NG → Repair/replace as necessary.

OK

7. Check air mix door operation. Refer to (*5).

NG → Go to TROUBLE DIAGNOSIS PROCEDURE FOR AIR MIX DOOR (LAN). (*9)

OK

8. Check ducts for air leaks.

NG → Repair leaks.

OK

9. Check the heater inlet and outlet hose temperatures by touching.

Hot inlet
Warm outlet

Check engine coolant tempeerature sensor circuit (*10)

NG → Repair or replace as necessary. Retest.

OK

Both hoses warm

Check heater hoses for proper installation.

NG → Repair or replace as necessary. Retest.

OK

Note

Back flush heater core, drain and refill coolant. [Refer to MA-(*11), “Changing Engine Coolant”.] Retest.

Hot inlet
Warm outlet

System OK

Hot inlet
Warm outlet

Both hoses warm

Replace heater core. Refill engine coolant. [Refer to MA-(*11), “Changing Engine Coolant”.] Retest.

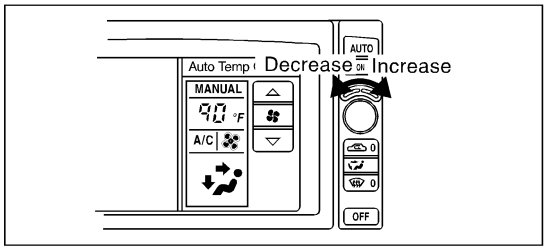
RHA057I

*1: HA-65
*2: HA-43
*3: HA-44
*4: HA-44
*5: HA-86
*6: FUNCTION CONFIRMATION PROCEDURE (HA-44), see No. 13.
*7: HA-78
*8: HA-94
*9: HA-83
*10: LC-18
*11: MA-14
*12: MA-14
*13: LC-12

With Navigation System

NFHA0209S0102

1. Confirm symptom by performing the following operational check.



OPERATIONAL CHECK – Temperature increase

a. Turn the temperature dial clockwise until 32°C (90°F) is displayed.

b. Check for hot air at discharge air outlets.

If OK (symptom cannot be duplicated), perform complete operational check (*1).
If NG (symptom is confirmed), continue with STEP-2 following.

2. Check for any service bulletins.

3. Perform self-diagnosis STEP-1. (*2)

OK

4. Perform self-diagnosis STEP-2. (*3)

NG → Go to appropriate malfunctioning sensor circuit. (*6)

OK

5. Perform self-diagnosis STEP-4. (*4)

NG → **Go to appropriate malfunctioning items.**
- Check air mix door motor, mode door motor and intake door motor circuit. (*7)
- Check blower motor circuit. (*8)

OK

6. Check the following:
   - Engine coolant level [Refer to MA-(*12), "Changing Engine Coolant".]
   - Hoses for leaks or kinks.
   - Radiator cap. Refer to LC-(*13), "System Check".
   - Air in cooling system.

NG → Repair/replace as necessary.

OK

7. Check air mix door operation. Refer to (*5).

NG → Go to TROUBLE DIAGNOSIS PROCEDURE FOR AIR MIX DOOR (LAN). (*9)

OK

8. Check ducts for air leaks.

NG → Repair leaks.

OK

9. Check the heater inlet and outlet hose temperatures by touching.

Hot inlet
Warm outlet

Check engine coolant temperature sensor circuit (*10)

NG → Check heater hoses for proper installation.

NG → Repair or replace as necessary. Retest.

OK

OK

Note

Back flush heater core, drain and refill coolant. [Refer to MA-(*11), "Changing Engine Coolant".] Retest.

Hot inlet
Warm outlet

System OK

Hot inlet
Warm outlet

Both hoses warm

Replace heater core. Refill engine coolant. [Refer to MA-(*11), "Changing Engine Coolant".] Retest.

Both hoses warm

RHA058I

*1: HA-67
*2: HA-53
*3: HA-54
*4: HA-54
*5: HA-86
*6: FUNCTION CONFIRMATION PROCEDURE (HA-54), see No. 14.
*7: HA-78
*8: HA-94
*9: HA-83
*10: LC-18
*11: MA-14
*12: MA-14
*13: LC-12

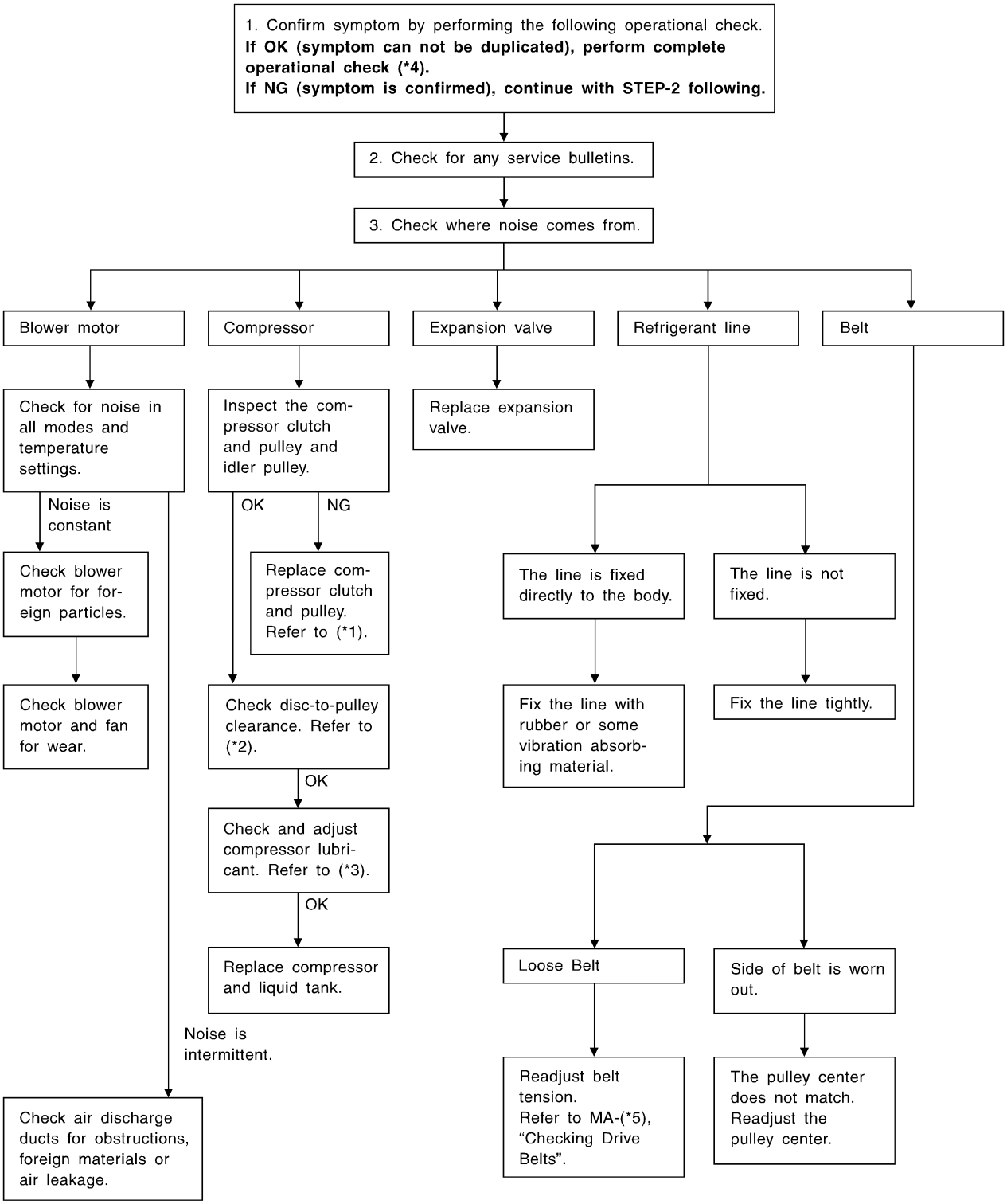
Noise

TROUBLE DIAGNOSIS PROCEDURE FOR NOISE

=NFHA0210

SYMPTOM:

- **Noise**



SHA331F

*1: HA-143
*2: HA-145
*3: HA-140
*4: HA-65
*5: MA-13

Self-diagnosis

TROUBLE DIAGNOSIS PROCEDURE FOR SELF-DIAGNOSIS

=NFHA0211

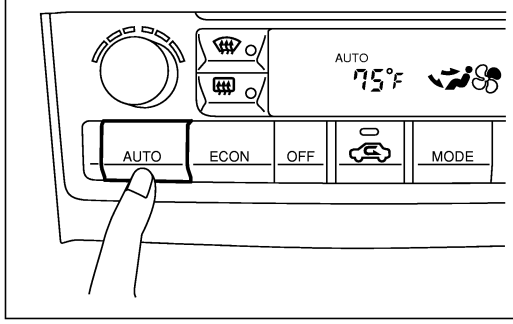
SYMPTOM:

- **Self-diagnosis cannot be performed.**

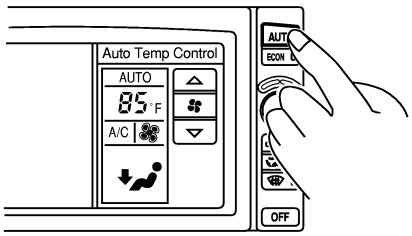
INSPECTION FLOW

1. Confirm sysptom by performing operational check.

Without navigation system



With navigation system



OPERATIONAL CHECK – AUTO mode

a. Press AUTO switch.
b. Display should indicate AUTO (not ECON).
Confirm that the compressor clutch engages (audio or visual inspection).
(Discharge air and blower speed will depend on ambient, in-vehicle and set temperatures.)

If OK (symptom cannot be duplicated), perform complete operational check (*9).
If NG (symptom is confirmed), continue with STEP-2 following.

2. Check for any service bulletins.
3. Check Main Power Supply and Ground Circuit. (*1)

OK **Cause cannot be confirmed by self-diagnosis.**

4. Check ambient sensor circuit. (*2)

OK

5. Check in-vehicle sensor circuit. (*3)

OK

6. Check sunload sensor circuit. (*4)

OK

7. Check intake sensor circuit. (*5)

OK

8. Check air mix door motor PBR circuit. (*6)

OK → If the symptom still exists, perform a complete operational check (*7) and check for other symptoms. [Refer to symptom table, (*8).] Does another symptom exist?

No → Replace auto amp. → INSPECTION END

Yes → Go to Trouble Diagnosis for related symptom.

Another symptom exists.

RHA059I

*1: HA-72
*2: HA-123
*3: HA-126
*4: HA-129
*5: HA-133
*6: HA-135
*7: HA-65
*8: HA-64
*9: HA-65

Memory Function

TROUBLE DIAGNOSIS PROCEDURE FOR MEMORY FUNCTION

=NFHA0212

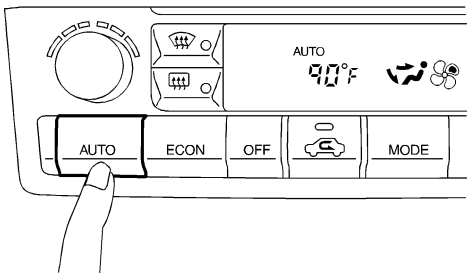
SYMPTOM:

- **Memory function does not operate.**

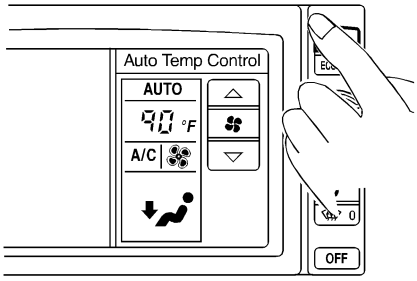
INSPECTION FLOW

1. Confirm symptom by performing the following operational check.

Without navigation system



With navigation system



OPERATIONAL CHECK – Memory function

a. Set the temperature 90°F or 32°C.
b. Press OFF switch.
c. Turn the ignition off.
d. Turn the ignition on.
e. Press the AUTO switch.
f. Confirm that the set temperature remains at previous temperature.
g. Press OFF switch.

If OK (symptom cannot be duplicated), perform complete operational check (*2).
If NG (symptom is confirmed), continue with STEP-2 following.

2. Check for any service bulletins.
3. Check Main Power Supply and Ground Circuit. (*1)

OK

Go to A/C system circuit. (*4)

OK

4. Replace auto amp.
5. FINAL CHECK
   Go to self-diagnosis function confirmation procedure (*3) and perform self-diagnosis STEP-2.
   Confirm that code No. 20 is displayed.

RHA060IA

*1: HA-72
*2: HA-65
*3: HA-44 (Without Navigation System)
HA-54 (With Navigation System)
*4: HA-72

ECON (ECONOMY) Mode

TROUBLE DIAGNOSIS PROCEDURE FOR ECON (ECONOMY) MODE

=NFHA0213

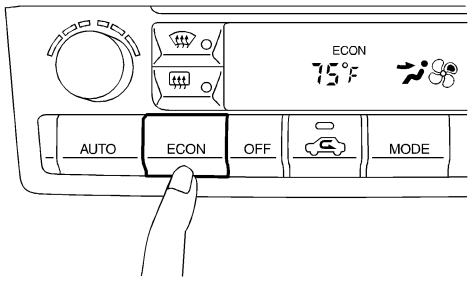
SYMPTOM:

- **ECON mode does not operate.**

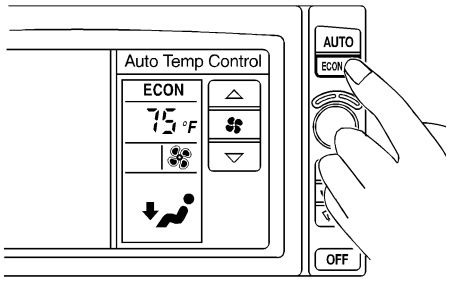
INSPECTION FLOW

1. Confirm symptom by performing the following operational check.

Without navigation system



With navigation system



OPERATIONAL CHECK – ECON (ECONOMY) mode

a. Set the temperature 75°F or 25°C.
b. Press ECON switch.
c. Display should indicate ECON (not AUTO).
Confirm that the compressor clutch is not engaged (visual inspection).
(Discharge air and blower speed will depend on ambient, in-vehicle, and set temperatures.)

If OK (symptom cannot be duplicated), perform complete operational check (*2).
If NG (symptom is confirmed), continue with STEP-2 following.

2. Check for any service bulletins.

3. Check Main Power Supply and Ground Circuit. (*1)

OK

Go to A/C system circuit. (*4)

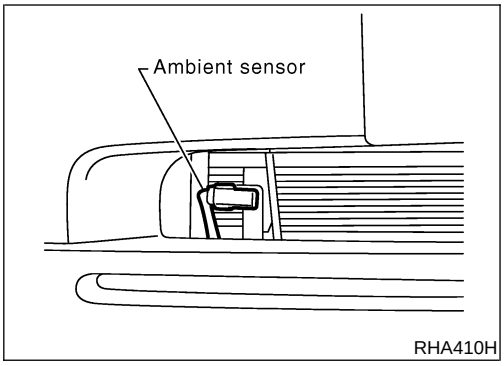
OK

4. Replace auto amp.

5. FINAL CHECK
Go to self-diagnosis step-by-step procedure (*3) and perform self-diagnosis STEP-2.
Confirm that code No. 20 is displayed.

SHA624F

*1: HA-72
*2: HA-65
*3: HA-44 (Without Navigation System)
HA-54 (With Navigation System)
*4: HA-72



Ambient Sensor Circuit

COMPONENT DESCRIPTION

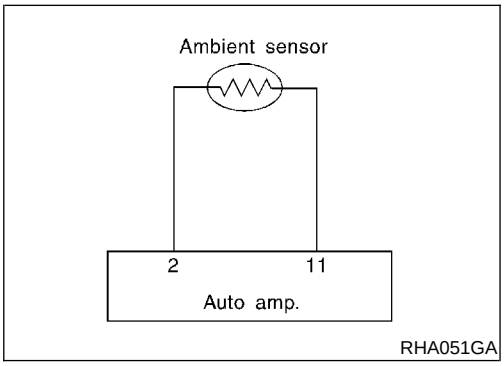
NFHA0214

The ambient sensor is attached in front of the right side condenser. It detects ambient temperature and converts it into a resistance value which is then input into the auto amplifier.

AMBIENT TEMPERATURE INPUT PROCESS

NFHA0215

The automatic amplifier includes a “processing circuit” for the ambient sensor input. However, when the temperature detected by the ambient sensor increases quickly, the processing circuit retards the auto amp. function. It only allows the auto amp. to recognize an ambient temperature increase of 0.33°C (0.6°F) per 100 seconds. As an example, consider stopping for a cup of coffee after high speed driving. Although the actual ambient temperature has not changed, the temperature detected by the ambient sensor will increase. This is because the heat from the engine compartment can radiate to the front grille area, location of the ambient sensor.



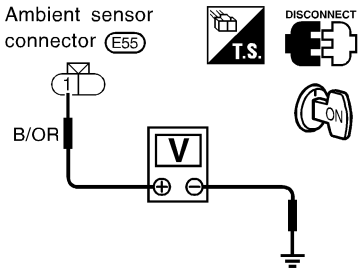
DIAGNOSTIC PROCEDURE

NFHA0216

SYMPTOM: Ambient sensor circuit is open or shorted. (21 or −21 is indicated on the display as a result of conducting Self-diagnosis STEP 2.)

1	CHECK VOLTAGE BETWEEN AMBIENT SENSOR HARNESS CONNECTOR AND BODY GROUND

Disconnect ambient sensor harness connector.
Do approx. 5 volts exist between ambient sensor harness terminal No. 1 and body ground?

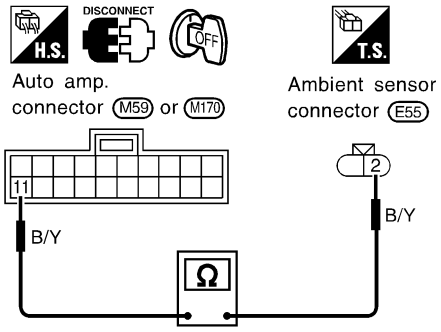


Yes or No

Yes	▶	GO TO 2.
No	▶	GO TO 4.

2	CHECK AMBIENT SENSOR CIRCUIT BETWEEN AMBIENT SENSOR AND AUTO AMP. (LCU)

1. Disconnect auto amp. (LCU) harness connector.
2. Check circuit continuity between ambient sensor harness terminal No. 2 and auto amp. (LCU) harness terminal No. 11.



RHA475GE

Continuity should exist.
If OK, check harness for short.

OK or NG

OK	▶	GO TO 3.
NG	▶	Repair harness or connector.

3	CHECK AMBIENT SENSOR

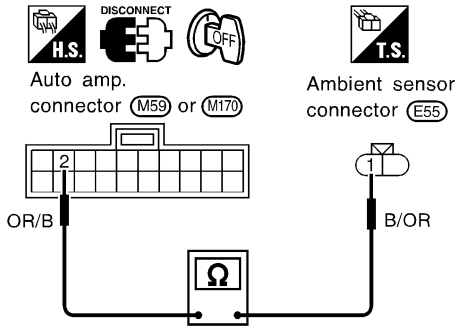
Refer to HA-125.

OK or NG

OK	▶	1. Replace auto amp. (LCU). 2. Go to "FUNCTION CONFIRMATION PROCEDURE", "Self-diagnosis", HA-44; Without Navigation System or HA-54; With Navigation System and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed.
NG	▶	Replace ambient sensor.

4	CHECK AMBIENT SENSOR CIRCUIT BETWEEN AMBIENT SENSOR AND AUTO AMP. (LCU)

1. Disconnect auto amp. (LCU) harness connector.
2. Check circuit continuity between ambient sensor harness terminal No. 1 and auto amp. (LCU) harness terminal No. 2.

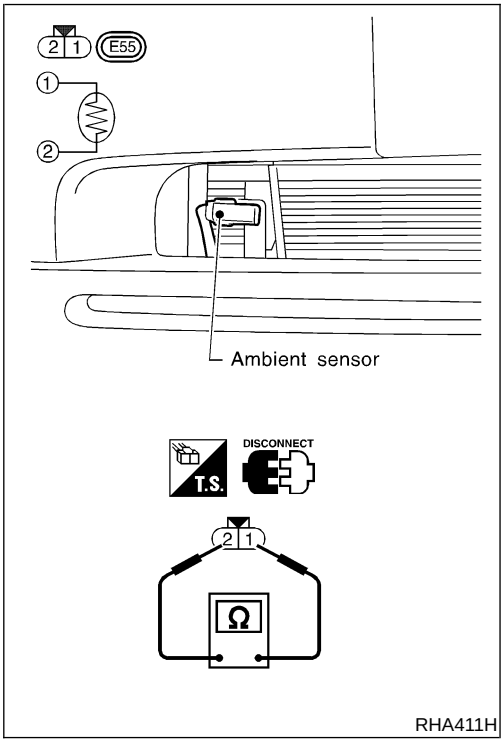


SHA374FA

Continuity should exist.
If OK, check harness for short.

OK or NG

OK	▶	1. Replace auto amp. (LCU). 2. Go to "FUNCTION CONFIRMATION PROCEDURE", "Self-diagnosis", HA-44; Without Navigation System or HA-54; With Navigation System and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed.
NG	▶	Repair harness or connector.



RHA411H

COMPONENT INSPECTION

NFHA0217

Ambient Sensor

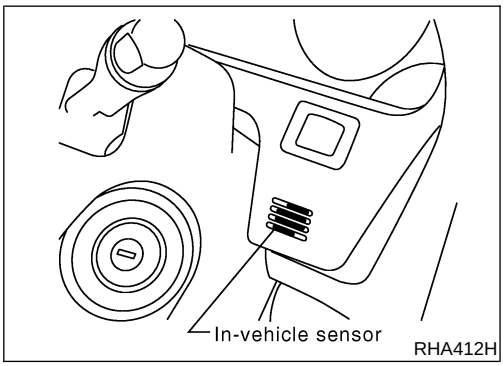
NFHA0217S01

After disconnecting ambient sensor harness connector, measure resistance between terminals 2 and 1 at sensor harness side, using the table below.

Temperature °C (°F)	Resistance kΩ
−15 (5)	12.73
−10 (14)	9.92
−5 (23)	7.80
0 (32)	6.19
5 (41)	4.95
10 (50)	3.99
15 (59)	3.24
20 (68)	2.65
25 (77)	2.19
30 (86)	1.81

Temperature °C (°F)	Resistance kΩ
35 (95)	1.51
40 (104)	1.27
45 (113)	1.07

If NG, replace ambient sensor.



In-vehicle Sensor Circuit

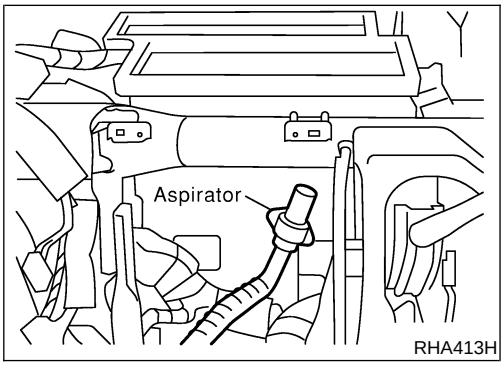
COMPONENT DESCRIPTION

NFHA0218

In-vehicle sensor

NFHA0218S01

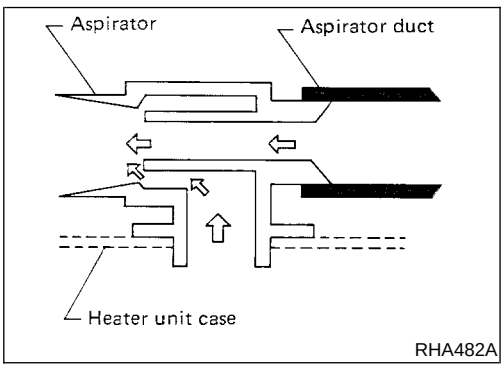
The in-vehicle sensor is located on instrument lower panel. It converts variations in temperature of compartment air drawn from the aspirator into a resistance value. It is then input into the auto amplifier.



Aspirator

NFHA0218S02

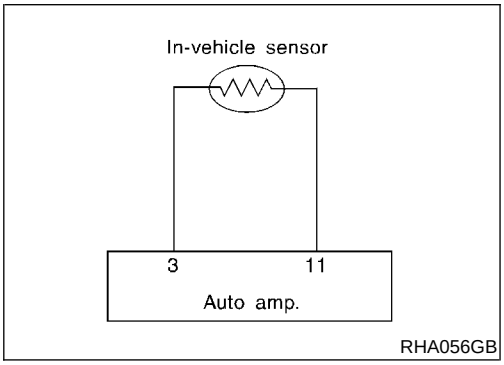
The aspirator is located in front of heater unit. It produces vacuum pressure due to air discharged from the heater unit, continuously taking compartment air in the aspirator.



DIAGNOSTIC PROCEDURE

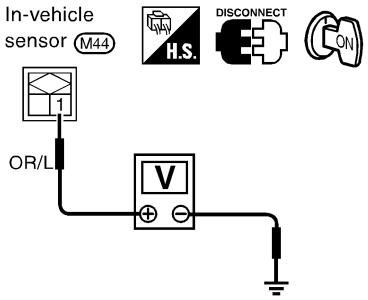
NFHA0219

SYMPTOM: In-vehicle sensor circuit is open or shorted. (22 or −22 is indicated on the display as a result of conducting Self-diagnosis STEP 2.)



1	CHECK IN-VEHICLE SENSOR CIRCUIT BETWEEN IN-VEHICLE SENSOR AND BODY GROUND

Disconnect in-vehicle sensor harness connector.
Do approx. 5 volts exist between in-vehicle sensor harness terminal No. 1 and body ground?



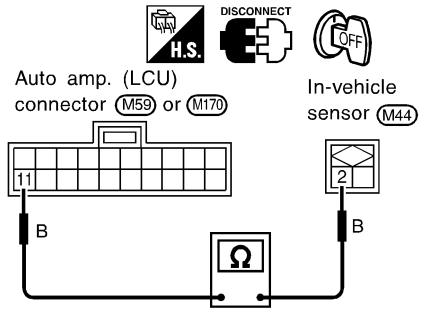
SHA318F

Yes or No

Yes	▶	GO TO 2.
No	▶	GO TO 4.

2	CHECK IN-VEHICLE SENSOR CIRCUIT BETWEEN IN-VEHICLE SENSOR AND AUTO AMP. (LCU)

1. Disconnect auto amp. (LCU) harness connector.
2. Check circuit continuity between in-vehicle sensor harness terminal No. 2 and auto amp. (LCU) harness terminal No. 11.



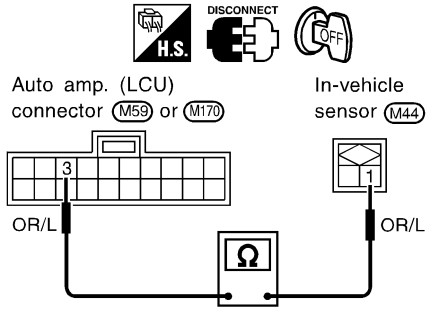
RHA478GE

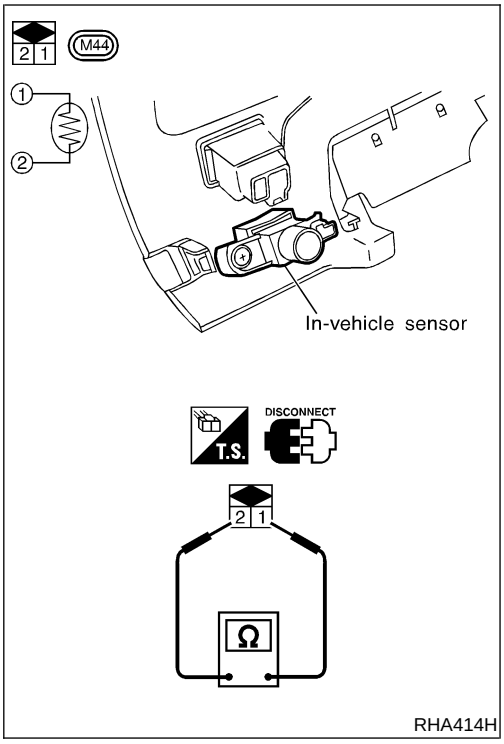
Continuity should exist.
If OK, check harness for short.

OK or NG

OK	▶	GO TO 3.
NG	▶	Repair harness or connector.

3	CHECK IN-VEHICLE SENSOR
Refer to HA-129.	
OK or NG	
OK ▶	1. Replace auto amp. 2. Go to "FUNCTION CONFIRMATION PROCEDURE", "Self-diagnosis", HA-44; Without Navigation System or HA-54; With Navigation System and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed.
NG ▶	1. Replace in-vehicle sensor. 2. Go to "FUNCTION CONFIRMATION PROCEDURE", "Self-diagnosis", HA-44; Without Navigation System or HA-54; With Navigation System and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed.

4	CHECK IN-VEHICLE SENSOR CIRCUIT BETWEEN AMBIENT SENSOR AND AUTO AMP. (LCU)
1. Disconnect auto amp. (LCU) harness connector. 2. Check circuit continuity between in-vehicle sensor harness terminal No. 1 and auto amp. (LCU) harness terminal No. 3.	
 RHA479GD	
Continuity should exist. If OK, check harness for short.	
OK or NG	
OK ▶	1. Replace auto amp. (LCU). 2. Go to "FUNCTION CONFIRMATION PROCEDURE", "Self-diagnosis", HA-44; Without Navigation System or HA-54; With Navigation System and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed.
NG ▶	Repair harness or connector.



COMPONENT INSPECTION

NFHA0220

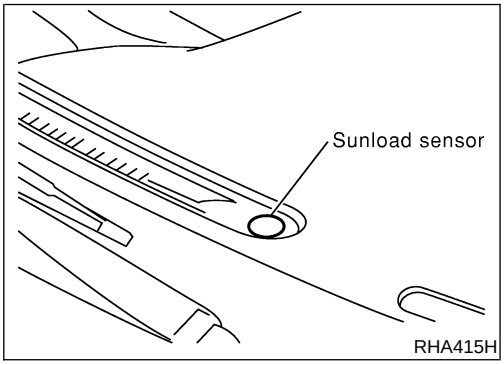
In-vehicle Sensor

NFHA0220S01

After disconnecting in-vehicle sensor harness connector, measure resistance between terminals 1 and 2 at sensor harness side, using the table below.

Temperature °C (°F)	Resistance kΩ
−15 (5)	12.73
−10 (14)	9.92
−5 (23)	7.80
0 (32)	6.19
5 (41)	4.95
10 (50)	3.99
15 (59)	3.24
20 (68)	2.65
25 (77)	2.19
30 (86)	1.81
35 (95)	1.51
40 (104)	1.27
45 (113)	1.07

If NG, replace in-vehicle sensor.



Sunload Sensor Circuit

COMPONENT DESCRIPTION

NFHA0221

The sunload sensor is located on the right defroster grille. It detects sunload entering through windshield by means of a photo diode. The sensor converts the sunload into a current value which is then input into the auto amplifier.

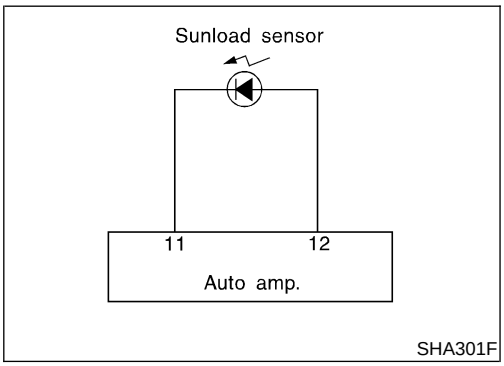
SUNLOAD INPUT PROCESS

NFHA0222

The auto amp. also includes a processing circuit which "average" the variations in detected sunload over a period of time. This prevents drastic swings in the ATC system operation due to small or quick variations in detected sunload.

For example, consider driving along a road bordered by an occasional group of large trees. The sunload detected by the sunload sensor will vary whenever the trees obstruct the sunlight. The processing circuit averages the detected sunload over a period of time, so that the (insignificant) effect of the trees momentarily

obstructing the sunlight does not cause any change in the ATC system operation. On the other hand, shortly after entering a long tunnel, the system will recognize the change in sunload, and the system will react accordingly.



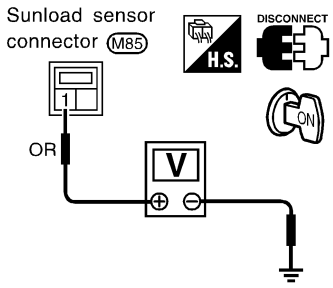
DIAGNOSTIC PROCEDURE

NEHA0223

SYMPTOM: Sunload sensor circuit is open or shorted. (25 or −25 is indicated on the display as a result of conducting Self-diagnosis STEP 2.)

1	CHECK SUNLOAD SENSOR CIRCUIT BETWEEN SUNLOAD SENSOR AND BODY GROUND

Disconnect sunload sensor harness connector.
Do approx. 5 volts exist between sunload sensor harness terminal No. 1 and body ground?

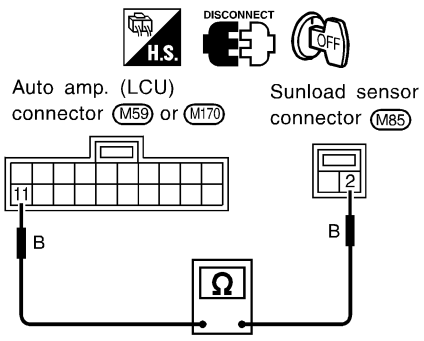


Yes or No

Yes	▶	GO TO 2.
No	▶	GO TO 4.

2	CHECK SUNLOAD SENSOR CIRCUIT BETWEEN SUNLOAD SENSOR AND AUTO AMP. (LCU)

1. Disconnect auto amp. (LCU) harness connector.
2. Check circuit continuity between sunload sensor harness terminal No. 2 and auto amp. (LCU) harness terminal No. 11.



RHA483GE

Continuity should exist.
If OK, check harness for short.

OK or NG

OK	▶	GO TO 3.
NG	▶	Repair harness or connector.

3	CHECK SUNLOAD SENSOR

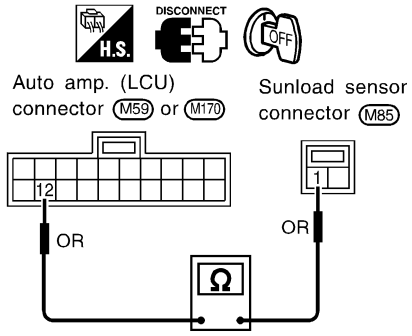
Refer to HA-132.

OK or NG

OK	▶	1. Replace auto amp. (LCU). 2. Go to "FUNCTION CONFIRMATION PROCEDURE", "Self-diagnosis", HA-44; Without Navigation System or HA-54; With Navigation System and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed.
NG	▶	1. Replace sunload sensor. 2. Go to "FUNCTION CONFIRMATION PROCEDURE", "Self-diagnosis", HA-44; Without Navigation System or HA-54; With Navigation System and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed.

4	CHECK SUNLOAD SENSOR CIRCUIT BETWEEN SUNLOAD SENSOR AND AUTO AMP. (LCU)

1. Disconnect auto amp. (LCU) harness connector.
2. Check circuit continuity between sunload sensor harness terminal No. 1 and auto amp. (LCU) harness terminal No. 12.

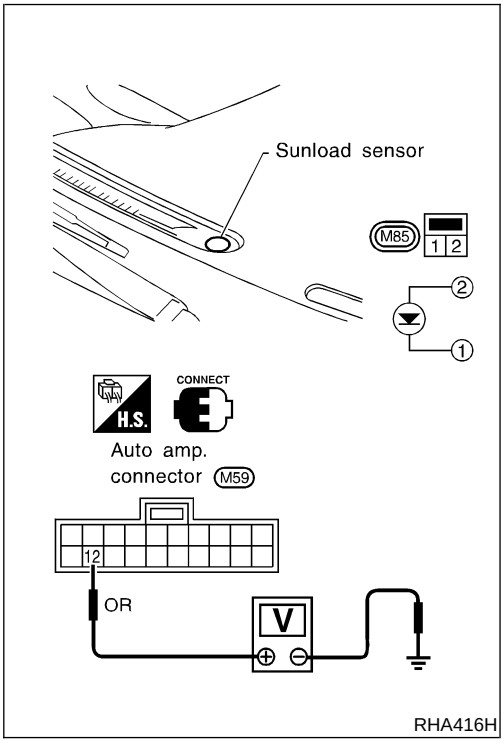


RHA484GD

Continuity should exist.
If OK, check harness for short.

OK or NG

OK	▶	1. Replace auto amp. 2. Go to "FUNCTION CONFIRMATION PROCEDURE", "Self-diagnosis", HA-44; Without Navigation System or HA-54; With Navigation System and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed.
NG	▶	Repair harness or connector.



RHA416H

COMPONENT INSPECTION

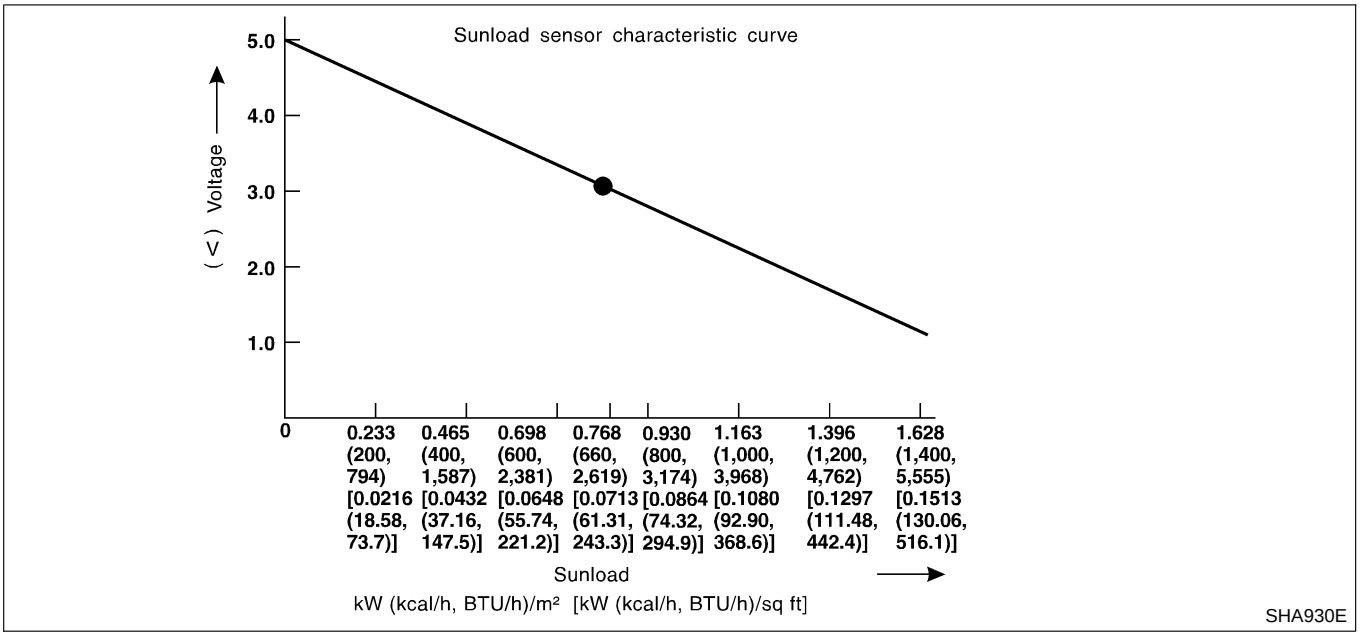
NFHA0224

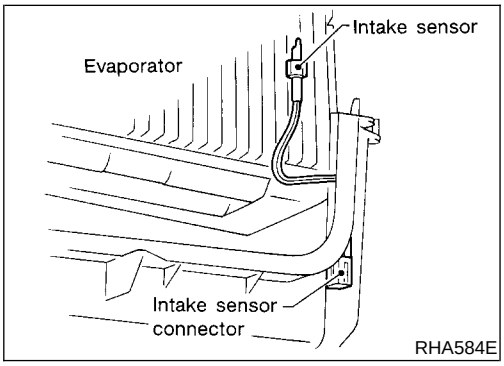
Sunload Sensor

NFHA0224S01

Measure voltage between auto amp. terminal 12 and body ground.
If NG, replace sunload sensor.

- **When checking sunload sensor, select a place where sun shines directly on it.**





Intake Sensor Circuit

COMPONENT DESCRIPTION

NFHA0225

Intake Sensor

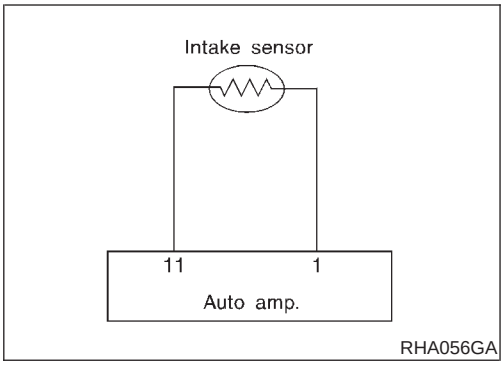
NFHA0225S01

The intake sensor is located on the cooling unit. It converts temperature of air after it passes through the evaporator into a resistance value which is then input to the auto amp.

After disconnecting intake sensor harness connector, measure resistance between terminals 1 and 2 at sensor harness side, using the table below.

Temperature °C (°F)	Resistance kΩ
−15 (5)	12.73
−10 (14)	9.92
−5 (23)	7.80
0 (32)	6.19
5 (41)	4.95
10 (50)	3.99
15 (59)	3.24
20 (68)	2.65
25 (77)	2.19
30 (86)	1.81
35 (95)	1.51
40 (104)	1.27
45 (113)	1.07

If NG, replace intake sensor.



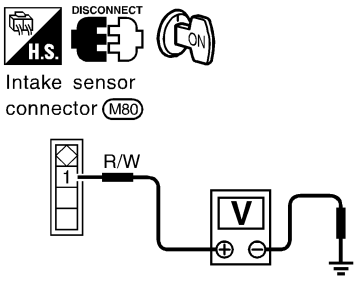
DIAGNOSTIC PROCEDURE

NFHA0226

SYMPTOM: Intake sensor circuit is open or shorted. (24 or −24 is indicated on the display as a result of conducting Self-diagnosis STEP 2.)

1	CHECK INTAKE SENSOR CIRCUIT BETWEEN INTAKE SENSOR AND BODY GROUND

Disconnect intake sensor harness connector.
Do approx. 5 volts exist between intake sensor harness terminal No. 1 and body ground?

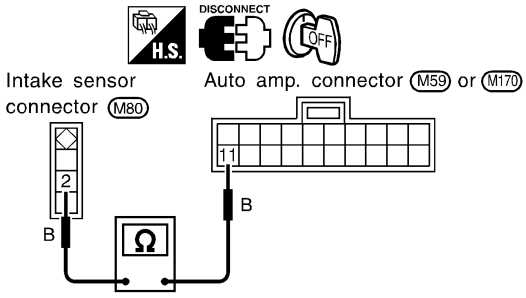


Yes or No

Yes	▶	GO TO 2.
No	▶	GO TO 4.

2	CHECK INTAKE SENSOR CIRCUIT BETWEEN INTAKE SENSOR AND AUTO AMP. (LCU)

1. Disconnect auto amp. (LCU) harness connector.
2. Check circuit continuity between intake sensor harness terminal No. 2 and auto amp. (LCU) harness terminal No. 11.



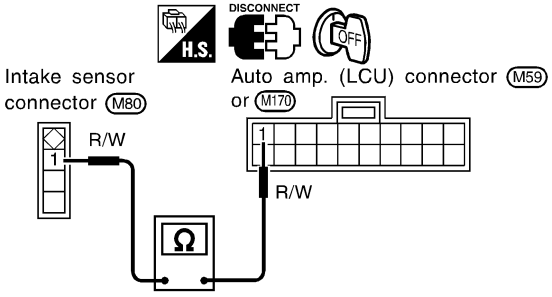
Continuity should exist.
If OK, check harness for short.

OK or NG

OK	▶	GO TO 3.
NG	▶	Repair harness or connector.

3	CHECK INTAKE SENSOR	
Refer to HA-133.		
OK or NG		
OK	▶	1. Replace auto amp. 2. Go to "FUNCTION CONFIRMATION PROCEDURE", "Self-diagnosis", HA-44; Without Navigation System or HA-54; With Navigation System and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed.
NG	▶	1. Replace intake sensor. 2. Go to "FUNCTION CONFIRMATION PROCEDURE", "Self-diagnosis", HA-44; Without Navigation System or HA-54; With Navigation System and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed.

4	CHECK INTAKE SENSOR CIRCUIT BETWEEN INTAKE SENSOR AND AUTO AMP. (LCU)	
1. Disconnect auto amp. (LCU) harness connector. 2. Check circuit continuity between intake sensor harness terminal No. 1 and auto amp. (LCU) harness terminal No. 1.		
OK or NG		
OK	▶	1. Replace auto amp. 2. Go to "FUNCTION CONFIRMATION PROCEDURE", "Self-diagnosis", HA-44; Without Navigation System or HA-54; With Navigation System and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed.
NG	▶	Repair harness or connector.



RHA419HA

Continuity should exist.
If OK, check harness for short.

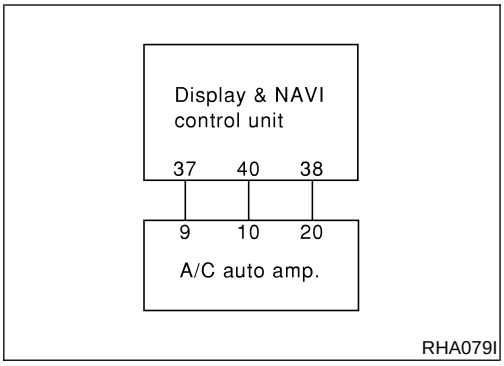
Air Mix Door Motor PBR Circuit

DIAGNOSTIC PROCEDURE

NFHA0227

For description of air mix door motor circuit, refer to HA-85.

SYMPTOM: If PBR circuit is open or shorted. (–26 or 26 is indicated on the display as a result of conducting Self-diagnosis STEP 2.)
Perform diagnostic procedure for air mix door motor, mode door motor and intake. Refer to HA-78.



Multiplex Communication Circuit

DIAGNOSTIC PROCEDURE

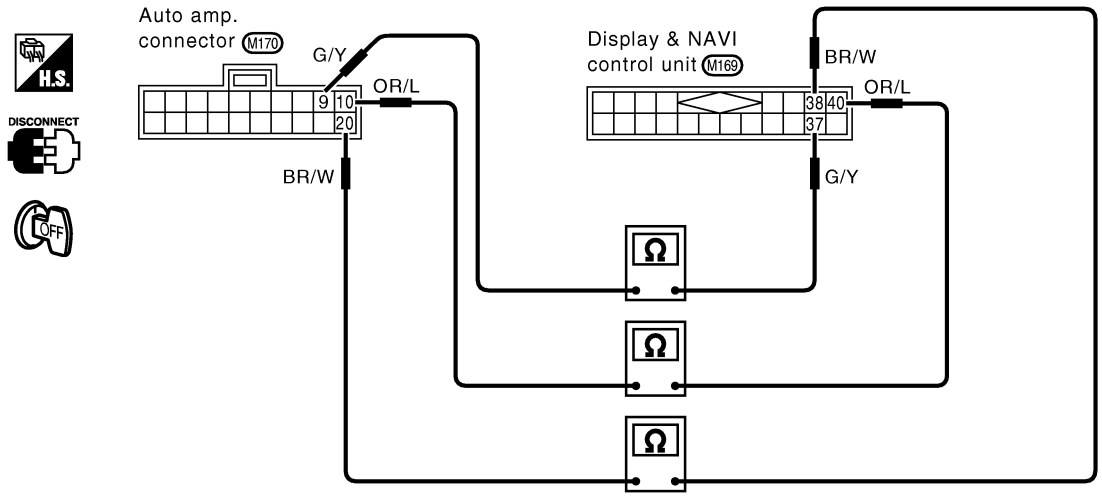
NFHA0285

SYMPTOM:

- **A/C system does not come on.**
- **A/C system can not controlled.**

1	**CHECK CIRCUIT CONTINUITY BETWEEN DISPLAY & NAVI CONTROL UNIT AND AUTO AMP.**

Check circuit continuity between each terminal on Display & Navigation control unit and on auto amp.



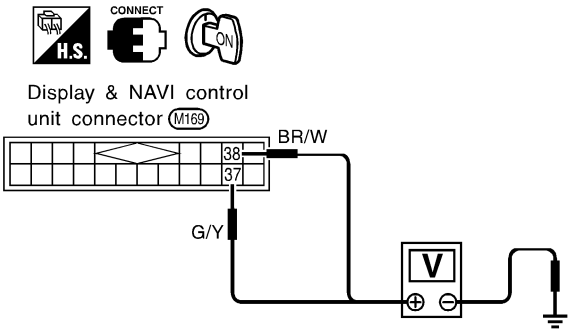
Continuity should exist.
If OK, check harness for short.

OK or NG

OK	▶	GO TO 2.
NG	▶	1. Repair harness or connector. 2. Go to “OPERATIONAL CHECK”, HA-67. Confirm that A/C system is in good order.

2	CHECK MULTI-PLEX COMMUNICATION SIGNAL

Do approx. 3.5 volts exist between Display & NAVI control unit harness terminal Nos. 37, 38 and body ground?



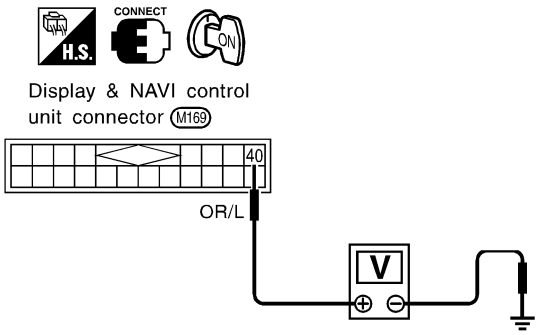
RHA890HB

Yes or No

Yes	▶	GO TO 3.
No	▶	1. Replace auto amp. 2. Go to "OPERATIONAL CHECK", HA-67. Confirm that A/C system is in good order.

3	CHECK MULTIPLEX COMMUNICATION SIGNAL

Do approx. 3.5 volts exist between auto amp. harness terminal No. 40 and body ground?



RHA891HB

Yes or No

Yes	▶	INSPECTION END.
No	▶	1. Replace Display & NAVI control unit. 2. Go to "OPERATIONAL CHECK", HA-67. Confirm that A/C system is in good order.

HFC-134a (R-134a) Service Procedure

NFHA0228

SETTING OF SERVICE TOOLS AND EQUIPMENT

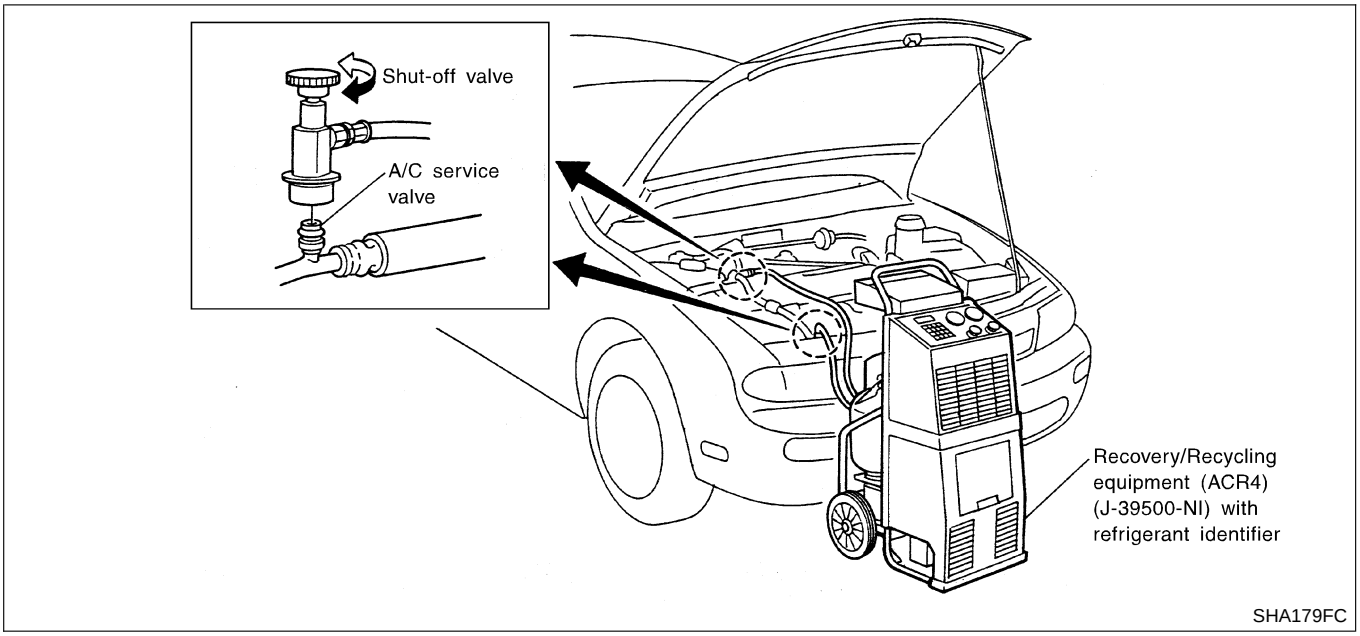
NFHA0228S01

Discharging Refrigerant

NFHA0228S0101

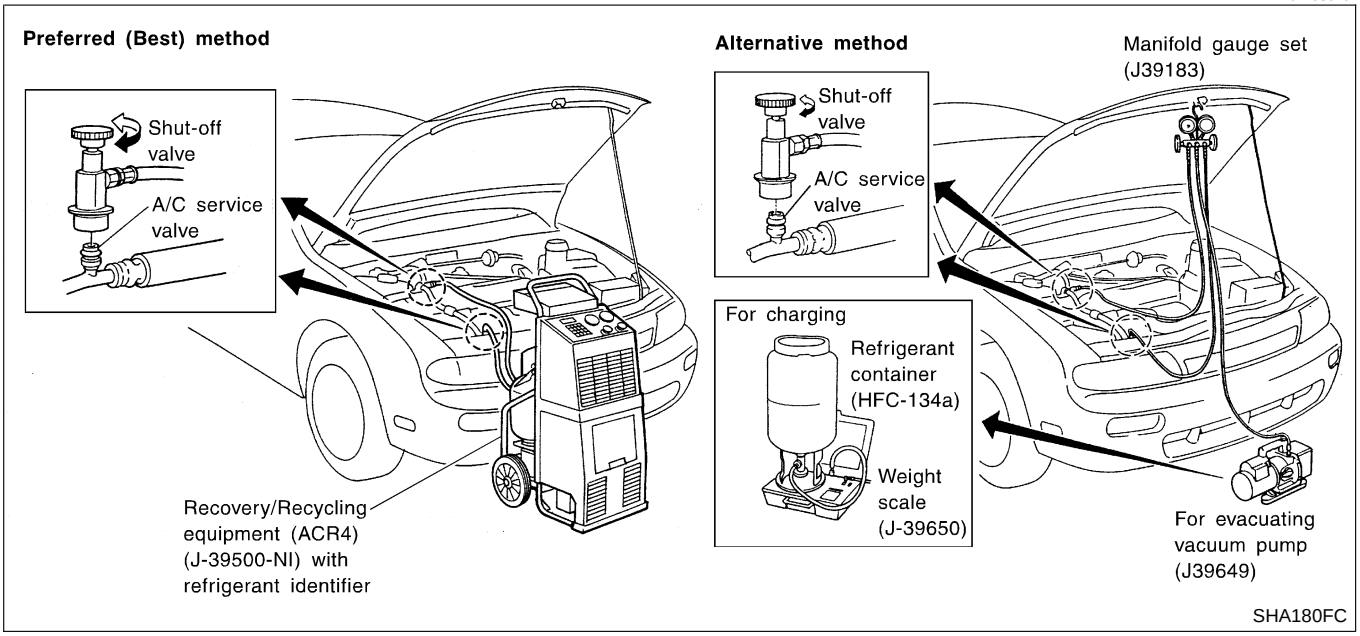
WARNING:

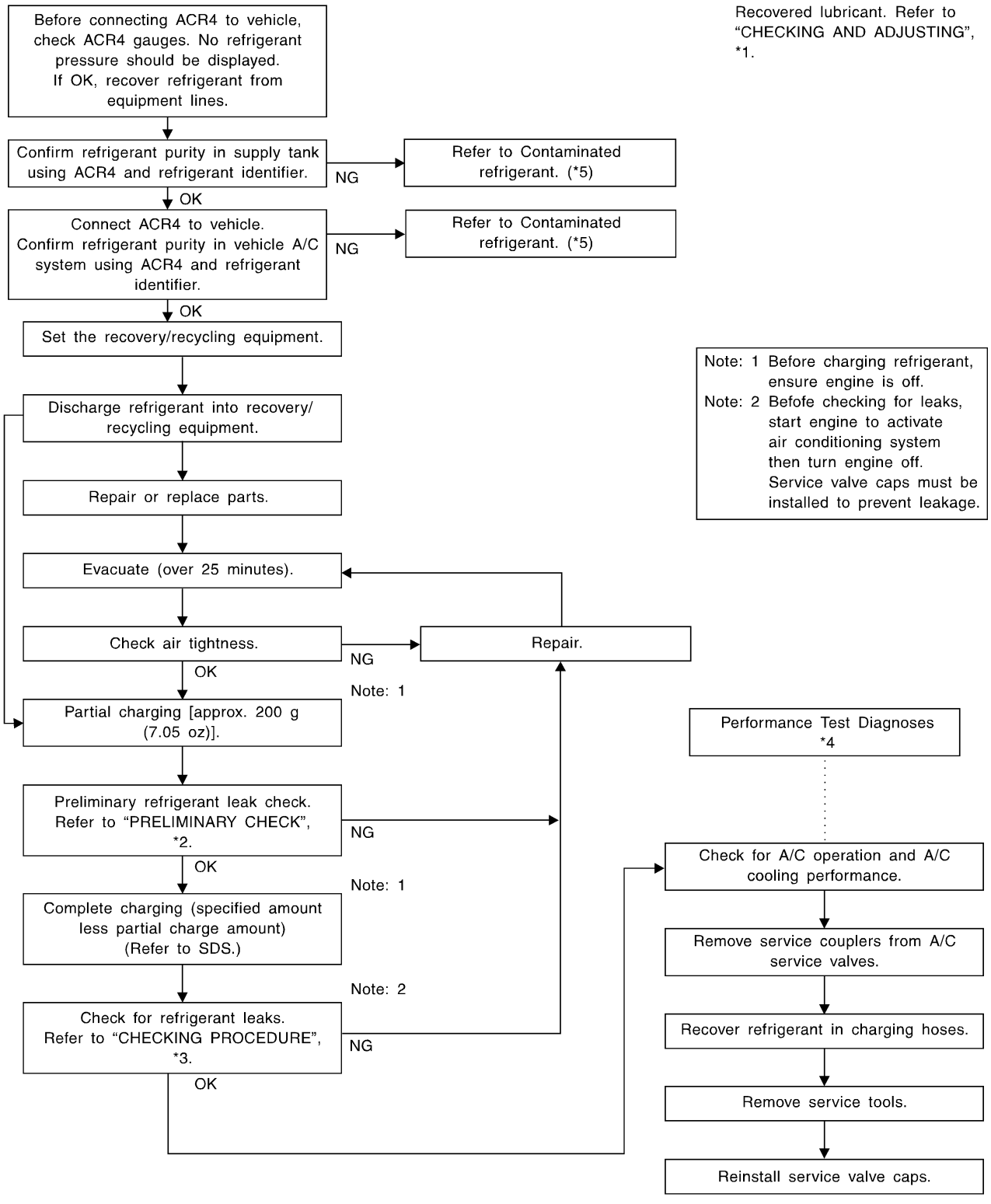
Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Remove HFC-134a (R-134a) from A/C system using certified service equipment meeting requirements of SAE J2210 (R-134a recycling equipment) or J2209 (R-134a recovery equipment). If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.



Evacuating System and Charging Refrigerant

NFHA0228S0102





SHA251F

*1: HA-140
*2: HA-150
*3: HA-151
*4: HA-110
*5: HA-3

Maintenance of Lubricant Quantity in Compressor

NFHA0229

The lubricant in the compressor circulates through the system with the refrigerant. Add lubricant to compressor when replacing any component or after a large gas leakage occurred. It is important to maintain the specified amount. If lubricant quantity is not maintained properly, the following malfunctions may result:

- Lack of lubricant: May lead to a seized compressor
- Excessive lubricant: Inadequate cooling (thermal exchange interference)

LUBRICANT

NFHA0229S01

Name: Nissan A/C System Oil Type S
Part number: KLH00-PAGS0

CHECKING AND ADJUSTING

NFHA0229S02

Adjust the lubricant quantity according to the test group shown below.

1	CHECK LUBRICANT RETURN OPERATION	
Can lubricant return operation be performed? ● A/C system works properly. ● There is no evidence of a large amount of lubricant leakage.		
	Yes or No	
Yes	▶	GO TO 2.
No	▶	GO TO 3.

2	PERFORM LUBRICANT RETURN OPERATION, PROCEEDING AS FOLLOWS:	
1. Start engine, and set the following conditions: **Test condition** **Engine speed: Idling to 1,200 rpm** **A/C or AUTO switch: ON** **Blower speed: Max. position** **Temp. control: Optional [Set so that intake air temperature is 25 to 30°C (77 to 86°F).]** 2. **Next item is for V-6 compressor. Connect the manifold gauge, and check that the high pressure side pressure is 588 kPa (6 kg/cm^2, 85 psi) or higher.** **If less than the reference level, attach a cover to the front face of the condenser to raise the pressure.** 3. Perform lubricant return operation for about 10 minutes. 4. Stop engine. **CAUTION:** **If excessive lubricant leakage is noted, do not perform the lubricant return operation.**		
OK	▶	GO TO 3.

3	CHECK COMPRESSOR	
Should the compressor be replaced?		
	Yes or No	
Yes	▶	Go to “Lubricant Adjustment Procedure for Compressor Replacement”, (HA-141).
No	▶	GO TO 4.

4	CHECK ANY PART	
Is there any part to be replaced? (Evaporator, condenser, liquid tank or in case there is evidence of a large amount of lubricant leakage.)		
	Yes or No	
Yes	▶	Go to "Lubricant Adjusting Procedure for Components Replacement Except Compressor", (HA-141).
No	▶	Carry out the A/C performance test.

Lubricant Adjusting Procedure for Components Replacement Except Compressor

NFHA0229S0201

After replacing any of the following major components, add the correct amount of lubricant to the system.
Amount of lubricant to be added

Part replaced	Lubricant to be added to system	Remarks
	Amount of lubricant mℓ (US fl oz, Imp fl oz)	
Evaporator	75 (2.5, 2.6)	—
Condenser	75 (2.5, 2.6)	—
Liquid tank	5 (0.2, 0.2)	Add if compressor is not replaced. *1
In case of refrigerant leak	30 (1.0, 1.1)	Large leak
	—	Small leak *2

*1: If compressor is replaced, addition of lubricant is included in the table.
*2: If refrigerant leak is small, no addition of lubricant is needed.

Lubricant Adjusting Procedure for Compressor Replacement

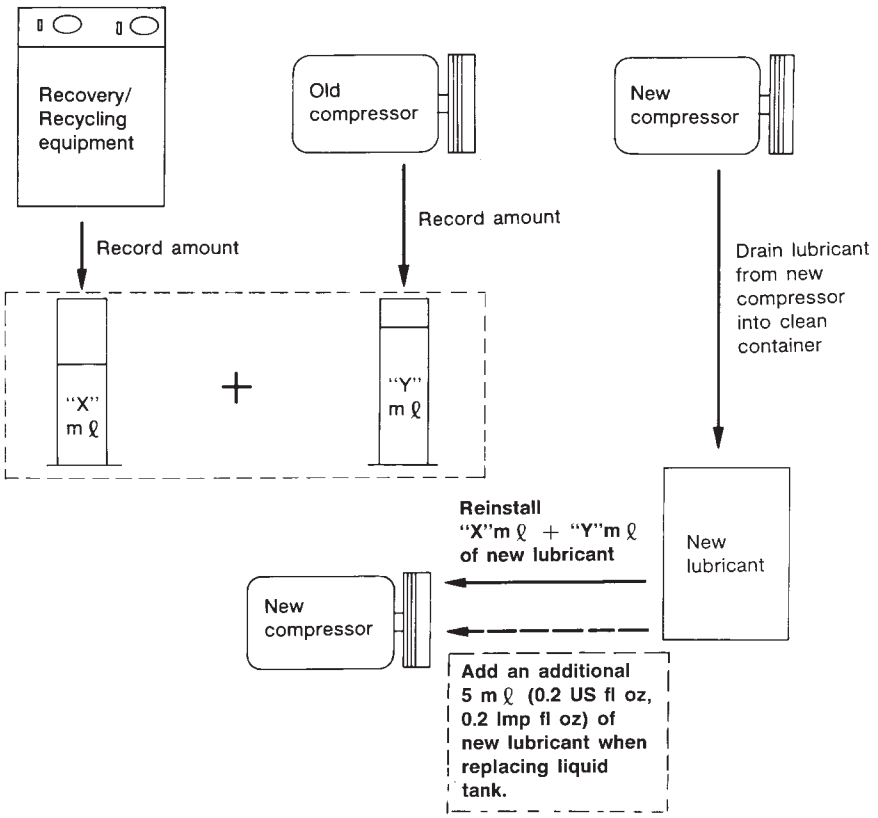
NFHA0229S0202

1. Before connecting ACR4 to vehicle, check ACR4 gauges. No refrigerant pressure should be displayed. If NG, recover refrigerant from equipment lines.
2. Connect ACR4 to vehicle. Confirm refrigerant purity in supply tank using ACR4 and refrigerant identifier. If NG, refer to "CONTAMINATED REFRIGERANT", HA-3.
3. Confirm refrigerant purity in vehicle A/C system using ACR4 and refrigerant identifier. If NG, refer to "CONTAMINATED REFRIGERANT", HA-3.
4. Discharge refrigerant into the refrigerant recovery/recycling equipment. Measure lubricant discharged into the recovery/recycling equipment.
5. Remove the drain plug of the "old" (removed) compressor. Drain the lubricant into a graduated container and record the amount of drained lubricant.
6. Remove the drain plug and drain the lubricant from the "new" compressor into a separate, clean container.
7. Measure an amount of new lubricant installed equal to amount drained from "old" compressor. Add this lubricant to "new" compressor through the suction port opening.
8. Measure an amount of new lubricant equal to the amount recovered during discharging. Add this lubricant to "new" compressor through the suction port opening.
9. Torque the drain plug.

18 - 19 N·m (1.8 - 1.9 kg-m, 13 - 14 ft-lb)

10. If the liquid tank also needs to be replaced, add an additional 5 mℓ (0.2 US fl oz, 0.2 Imp fl oz) of lubricant at this time.
    Do not add this 5 mℓ (0.2 US fl oz, 0.2 Imp fl oz) of lubricant if only replacing the compressor.

Lubricant adjusting procedure for compressor replacement



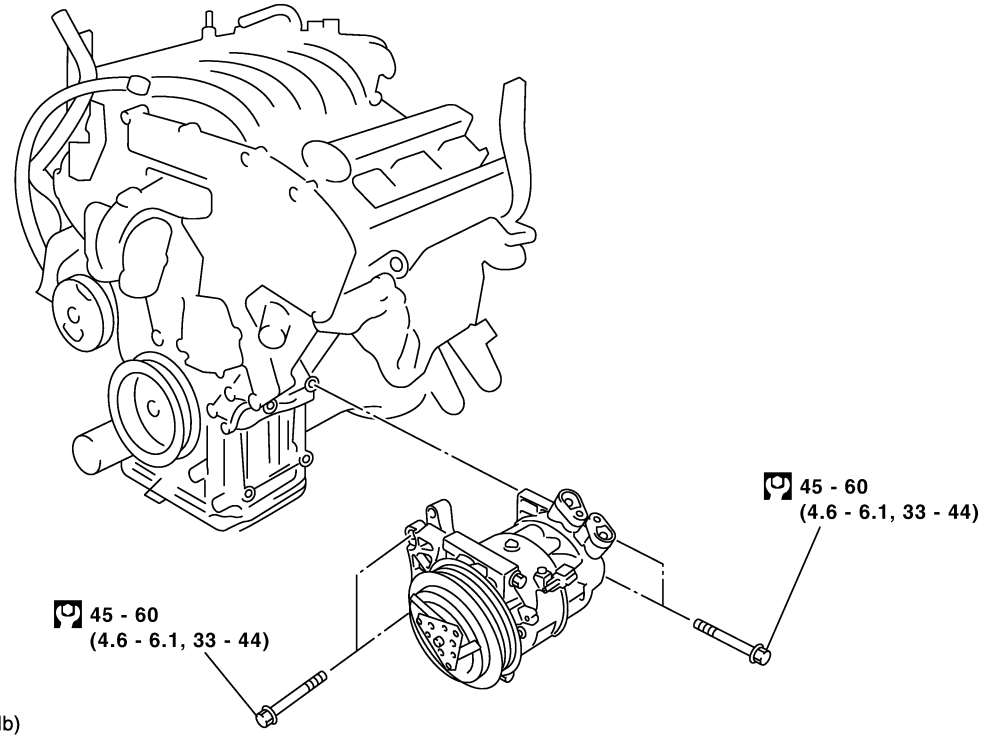
RHA065DD

Compressor

REMOVAL AND INSTALLATION

NFHA0230

SEC. 274•275



: N•m (kg-m, ft-lb)

CAUTION:
Do not remove the compressor bracket from the compressor.

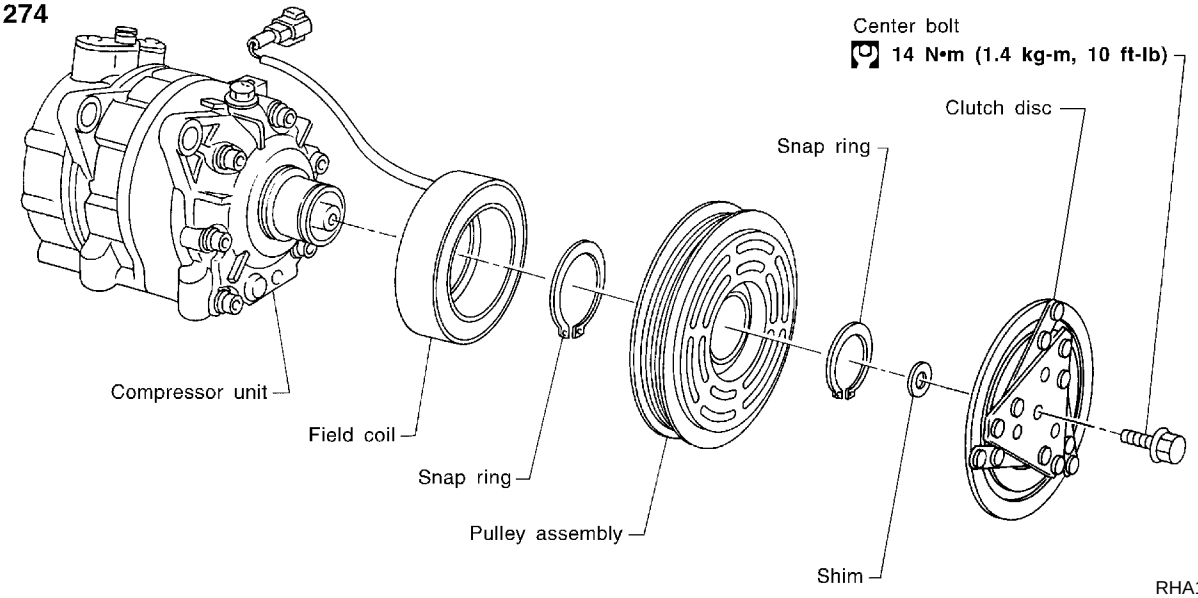
RHA062I

Compressor Clutch

OVERHAUL

NFHA0231

SEC. 274

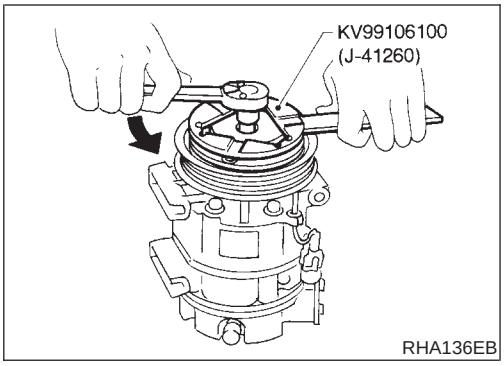


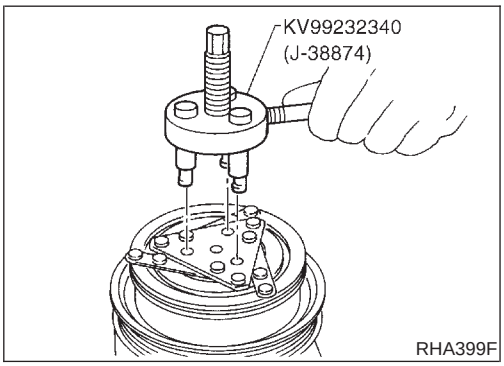
RHA122F

REMOVAL

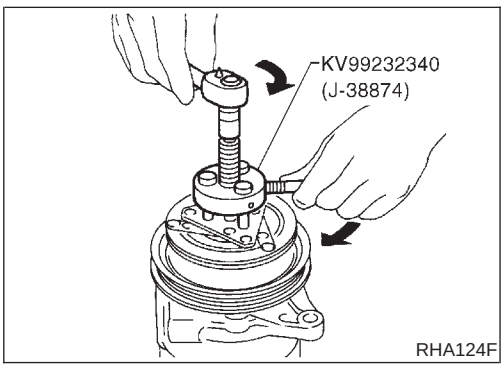
NFHA0232

- When removing center bolt, hold clutch disc with clutch disc wrench.

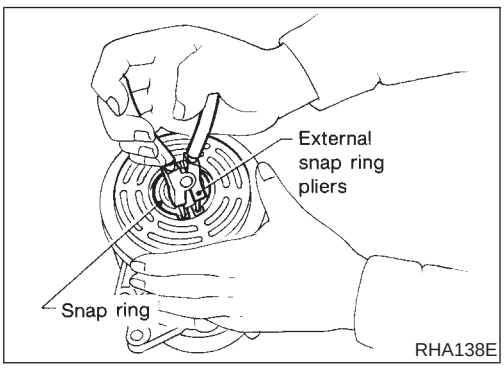




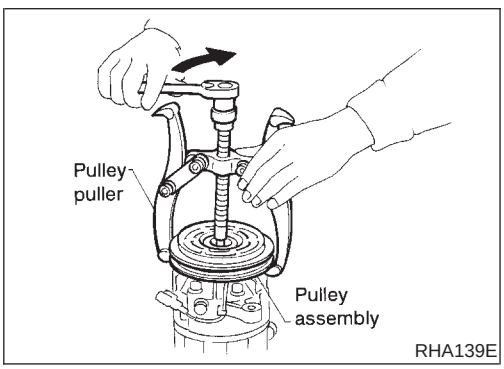
- Remove the clutch disc using the clutch disc puller.
  Insert the holder's three pins into the holes in the clutch disc. Rotate the holder clockwise to hook it onto the plate. Then, tighten the center bolt to remove the clutch disc.
  After removing the clutch disc, remove the shims from either the drive shaft or the clutch disc.

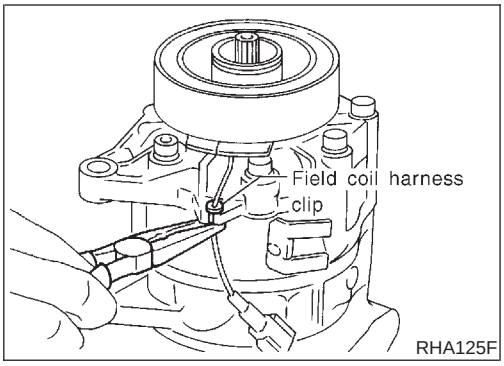


- Remove the snap ring using external snap ring pliers.

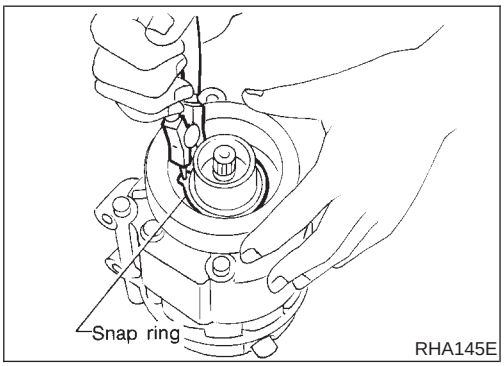


- Pulley removal
  Position the center pulley puller on the end of the drive shaft, and remove the pulley assembly using any commercially available pulley puller.
  To prevent the pulley groove from being deformed, the puller claws should be positioned onto the edge of the pulley assembly.

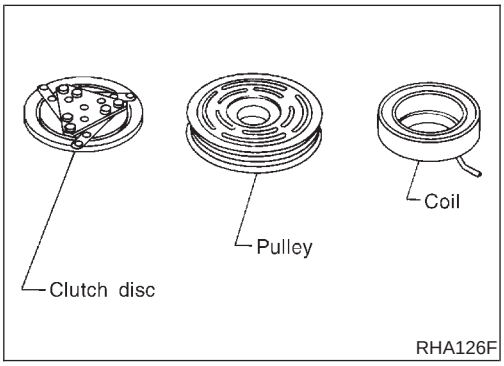




- Remove the field coil harness clip using a pair of pliers.



- Remove the snap ring using external snap ring pliers.



INSPECTION

NFHA0233

Clutch Disc

NFHA0233S01

If the contact surface shows signs of damage due to excessive heat, replace clutch disc and pulley.

Pulley

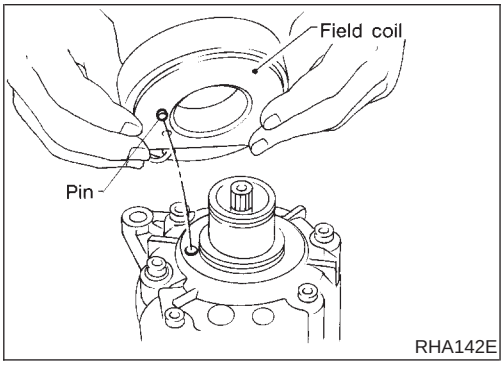
NFHA0233S02

Check the appearance of the pulley assembly. If the contact surface of pulley shows 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

NFHA0233S03

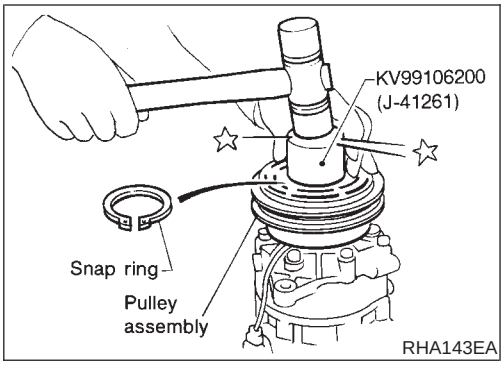
Check coil for loose connection or cracked insulation.



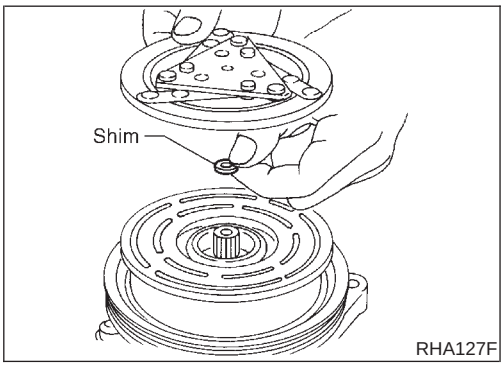
INSTALLATION

NFHA0234

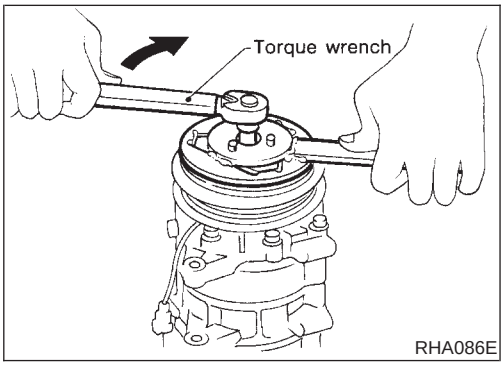
- Install the field coil.
  Be sure to align the coil's pin with the hole in the compressor's front head.
- Install the field coil harness clip using a screwdriver.



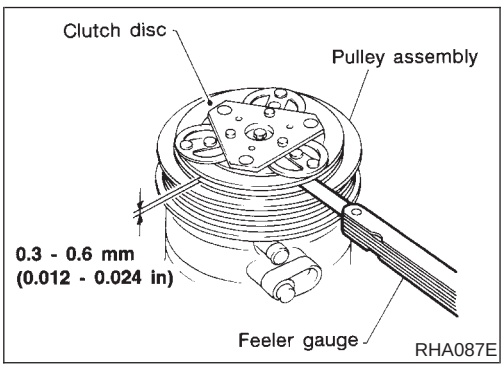
- Install the pulley assembly using the installer and a hand press, and then install the snap ring using snap ring pliers.



- Install the clutch disc on the drive shaft, together with the original shim(s). Press the clutch disc down by hand.



- Using the holder to prevent clutch disc rotation, tighten the bolt to 14 N·m (1.4 kg-m, 10 ft-lb) torque.
  After tightening the bolt, check that the pulley rotates smoothly.



- Check clearance around the entire periphery of clutch disc.
  Disc-to-pulley clearance:
  0.3 - 0.6 mm (0.012 - 0.024 in)
  If the specified clearance is not obtained, replace adjusting spacer and readjust.

Break-in Operation

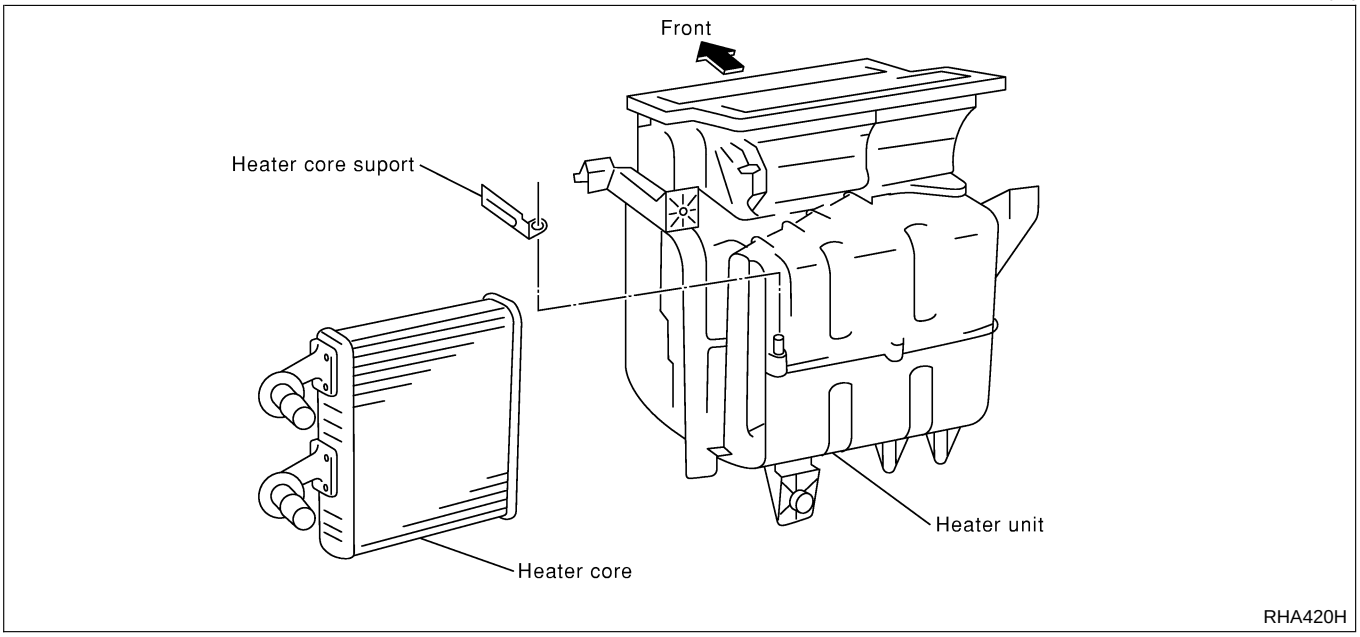
NFHA0234S01

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.

Heater Unit (Heater Core)

REMOVAL

NFHA0249



1. Drain the cooling system. Refer to MA-14, “Changing Engine Coolant”.
2. Disconnect the two heater hoses from inside the engine compartment.
3. Remove the Blower and cooling unit. Refer to HA-148.
4. Remove the steering member assembly. Refer to BT-29, “Removal and Installation”.
5. Remove the heater unit.
6. Remove the heater core.

INSTALLATION

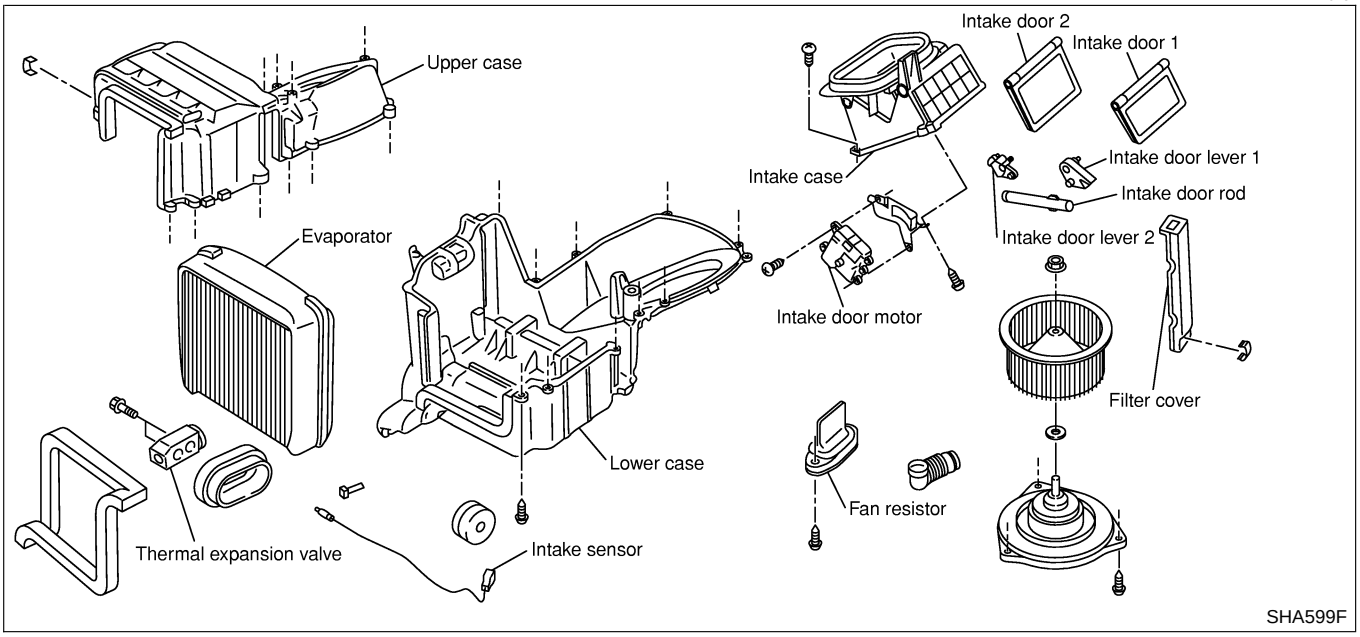
NFHA0250

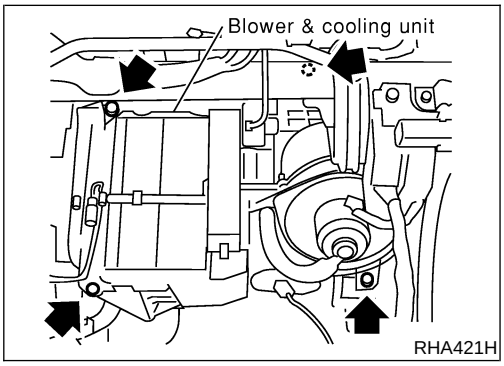
Installation is basically the reverse order of removal.
When filling radiator with coolant, refer to MA-14, “Changing Engine Coolant”.

Blower and Cooling Unit (A/C Evaporator)

REMOVAL

NFHA0251





1. Discharge the A/C system. Refer to HA-138.
2. Disconnect the two refrigerant lines from the engine compartment.
   Cap the A/C lines to prevent moisture from entering the system.
3. Remove the glove box and mating trim. Refer to BT-29, “Removal and Installation”.
4. Disconnect the thermal amp. connector.
5. Disconnect the intake sensor connector.
6. Disconnect the fan control amp. and blower motor connector.
7. Remove the blower and cooling unit.
8. Separate the blower and cooling unit case, and remove the evaporator.
9. Remove the three bolts and then remove the motor from the blower case.

INSTALLATION

NFHA0252

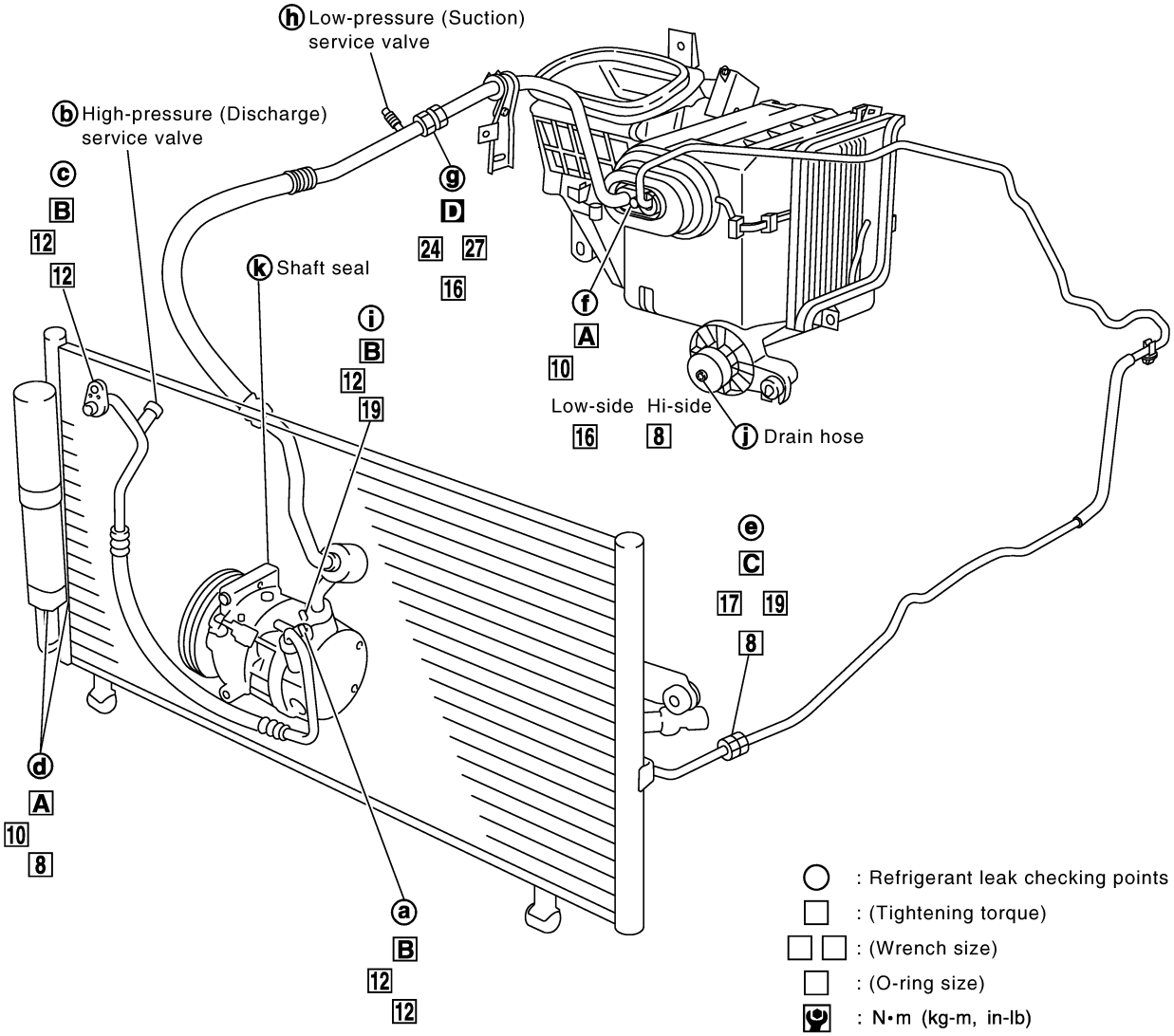
Installation is basically the reverse order of removal.
Recharge the A/C system. Refer to HA-138.

Refrigerant Lines

REMOVAL AND INSTALLATION

=NFHA0235

- Refer to page HA-5 regarding “Precautions for Refrigerant Connection”.



SHA625F

CHECKING REFRIGERANT LEAKS

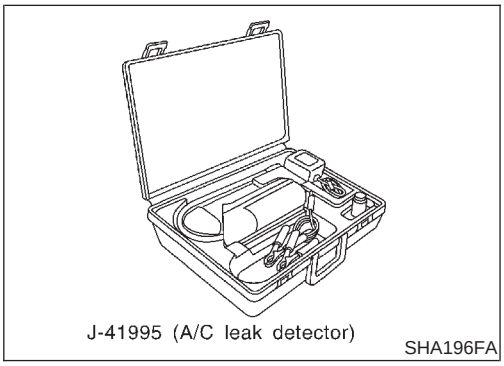
=NFHA0236

Preliminary Check

NFHA0236S01

- Perform a visual inspection of all refrigeration parts, fittings, hoses, and components for signs of A/C lubricant leakage, damage and corrosion. Take note of the areas with A/C lubricant leakage to allow extra time in these areas with electronic 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.

NOTE:
Moving the electronic leak detector probe slower and closer to the suspected leak area will improve the chances of finding a leak.


J-41995 (A/C leak detector)
SHA196FA

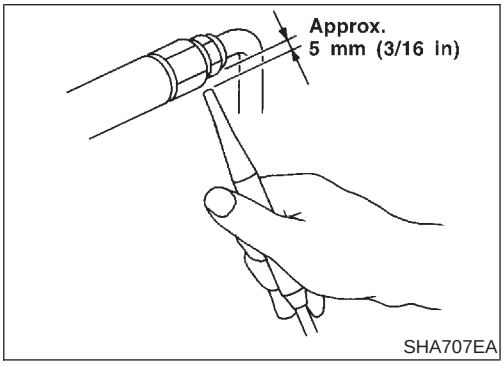
ELECTRONIC REFRIGERANT LEAK DETECTOR

NFHA0269

Precautions for Handling Leak Detector

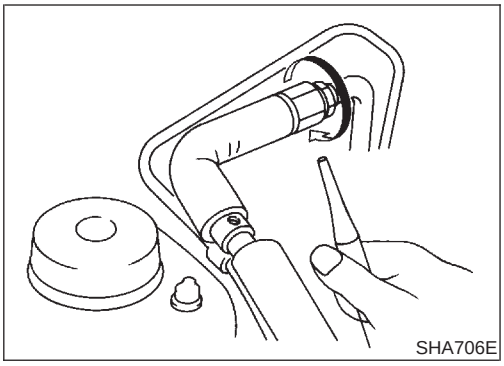
NFHA0269S01

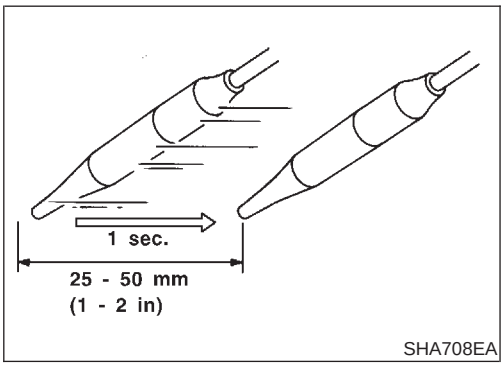
When performing a refrigerant leak check, use a J-41995 A/C leak detector or equivalent. Ensure that the instrument is calibrated and set properly per the operating instructions.
The leak detector is a delicate device. In order to use the leak detector properly, read the operating instructions and perform any specified maintenance.
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.



SHA707EA

1. Position probe approximately 5 mm (3/16 in) away from point to be checked.


SHA706E



SHA708EA

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

NFHA0269S02

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 (3.52 kg/cm^2, 50 psi).

4. Conduct the leak test from the high side (compressor discharge **a** to evaporator inlet **f**) to the low side (evaporator discharge **f** to shaft seal **k**). Refer to HA-149. Perform a leak check for the following areas carefully. Clean the component to be checked and move the leak detector 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 tube fitting.
- **Service valves**
  Check all around the service valves. Ensure service valve caps are secured on the service valves (to prevent leaks).

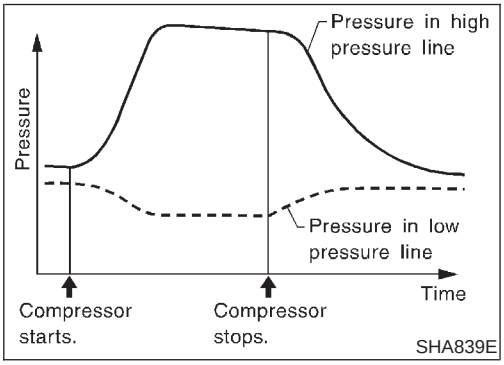
NOTE:
After removing A/C manifold gauge set from service valves, wipe any residue from valves to prevent any false readings by leak detector.

- **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 ten seconds. Use caution not to contaminate the ptobe 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:

1) A/C switch ON.
2) Face mode
3) Recirculation switch ON
4) Max cold temperature
5) 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. Confirm refrigerant purity in supply tank using ACR4 and refrigerant identifier.
13. Confirm refrigerant purity in vehicle A/C system using ACR4 and refrigerant identifier.
14. Discharge A/C system using approved refrigerant recovery equipment. Repair the leaking fitting or component as necessary.

15. Evacuate and recharge A/C system and perform the leak test to confirm no refrigerant leaks.
16. Conduct A/C performance test to ensure system works properly.

Fluorescent Dye Leak Detector

PRECAUTIONS FOR FLUORESCENT DYE LEAK DETECTION

NFHA0270

- 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 (J-41995) to pinpoint refrigerant leaks.
- For your safety and your customer's satisfaction, read and follow all manufacturer's operating instructions and precautions prior to performing the work.
- Refer to "Precautions for Leak Detection Dye", HA-4.

CHECKING SYSTEM FOR LEAKS USING THE FLUORESCENT LEAK DETECTOR

NFHA0271

1. Check A/C system for leaks using the UV lamp and safety glasses (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 TXV) 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, then check the cloth with the UV lamp for dye residue.
3. Confirm any suspected leaks with an approved electronic refrigerant leak detector.
4. After the leak is repaired, remove any residual dye using dye cleaner (J-43872) to prevent future misdiagnosis.
5. Perform a system performance check and verify the leak repair with an approved electronic refrigerant leak detector.

DYE INJECTION

NFHA0272

(This procedure is only necessary when re-charging the system or when the compressor has seized and was replaced.)
Refer to "Precautions for Leak Detection Dye", HA-4.

1. Check A/C system static (at rest) pressure. Pressure must be at least 345 kPa (3.52 kg/cm^2, 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. With 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 manufacturer's operating instructions).

6. With the engine still running, disconnect the injector tool from the service fitting.

CAUTION:
Be careful not to allow dye to spray or drip when disconnecting the injector from the system.

NOTE:
If repairing the A/C system or replacing a component, pour the dye directly into the open system connection and proceed with the service procedures.

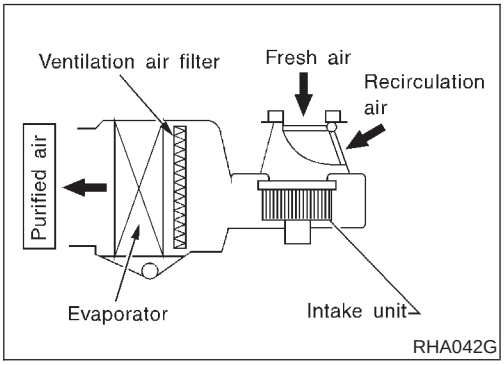
7. Operate the A/C system for a minimum of 20 minutes to mix the dye with the system oil. Depending on the leak size, operating conditions and location of the leak, it may take from minutes to days for the dye to penetrate a leak and become visible.

Belt

TENSION ADJUSTMENT

NFHA0237

- **Refer to MA-13, "Checking Drive Belt".**



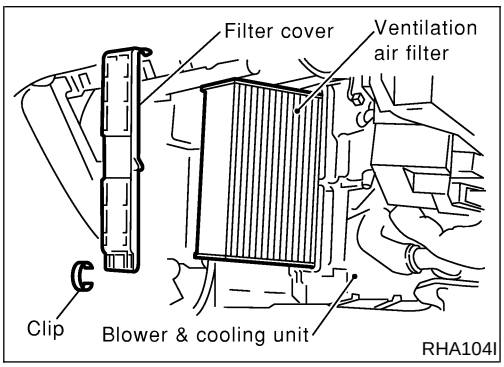
Ventilation Air Filter

FUNCTION

NFHA0286

Air inside passenger compartment is kept clean at either recirculation or fresh mode by installing ventilation air filter into cooling unit.

NOTE:
For replacement interval of ventilation air filter, refer to "PERIODIC MAINTENANCE", MA-6.
Caution label is fixed inside the glove box.



REPLACEMENT PROCEDURE

NFHA0287

1. Remove glove box.
2. Remove instrument lower panel from instrument panel.
3. Remove filter cover fixed clip.
4. Slide the filter cover to the upper side and then remove it.
5. Take out the ventilation air filter from cooling unit.
6. Replace with new one and reinstall on cooling unit.

Auto

COMPRESSOR

NFHA0241

Model		CALSONIC KANSEI make V-6
Type		V-6 variable displacement
Displacement cm^3 (cu in)/rev.	Max.	184 (11.228)
	Min.	14.5 (0.885)
Cylinder bore x stroke mm (in)		37 (1.46) x [2.3 - 28.6 (0.091 - 1.126)]
Direction of rotation		Clockwise (viewed from drive end)
Drive belt		Poly V

LUBRICANT

NFHA0242

Model		CALSONIC KANSEI make V-6
Name		Nissan A/C System Oil Type S
Part number		KLH00-PAGS0
Capacity mℓ (US fl oz, Imp fl oz)	Total in system	180 (6.1, 6.3)
	Compressor (Service part) charging amount	180 (6.1, 6.3)

REFRIGERANT

NFHA0243

Type	HFC-134a (R-134a)
Capacity kg (lb)	0.5 (1.10)

ENGINE IDLING SPEED (WHEN A/C IS ON)

NFHA0244

- **Refer to EC-749, “Idle Speed and Ignition Timing”.**

BELT TENSION

NFHA0245

- **Refer to MA-13, “Checking Drive Belts”.**

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

NFHA0060

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER" used along with a seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. The SRS system composition which is available to NISSAN MODEL A33 is as follows:

- For a frontal collision
  The Supplemental Restraint System consists of driver air bag module (located in the center of the steering wheel), front passenger air bag module (located on the instrument panel on passenger side), seat belt pre-tensioners, a diagnosis sensor unit, warning lamp, wiring harness and spiral cable.
- For a side collision
  The Supplemental Restraint System consists of front side air bag module (located in the outer side of front seat), satellite sensor, diagnosis sensor unit (one of components of air bags for a frontal collision), wiring harness, warning lamp (one of components of air bags for a frontal collision).

Information necessary to service the system safely is included in the **RS 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 should be performed by an authorized NISSAN 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 RS 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 with yellow harness connector.**

Precautions for Working with HFC-134a (R-134a)

NFHA0061

WARNING:

- **CFC-12 (R-12) refrigerant and HFC-134a (R-134a) refrigerant are not compatible. If the refrigerants are mixed and compressor failure is likely to occur, refer to "CONTAMINATED REFRIGERANT" below. To determine the purity of HFC-134a (R-134a) in the vehicle and recovery tank, use Refrigerant Recovery/Recycling Recharging equipment (ACR4) (J-39500-NI) and Refrigerant Identifier.**
- **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:**

a) When removing refrigerant components from a vehicle, immediately cap (seal) the component to minimize the entry of moisture from the atmosphere.

b) 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.

c) 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.

d) Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Remove R-134a from the A/C system, using certified service equipment meeting requirements of SAE J2210 (R-134a recycling equipment), or J2209 (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.

e) Do not allow lubricant (Nissan A/C System Oil Type S) to come in contact with styrofoam parts. Damage may result.

CONTAMINATED REFRIGERANT

NFHA0061S01

If a refrigerant other than pure R-134a is identified in a vehicle, your options are:

- Explain to the customer that environmental regulations prohibit the release of contaminated refrigerant into the atmosphere.
- Explain that recovery of the contaminated refrigerant could damage your service equipment and refrigerant supply.

- Suggest the customer return the vehicle to the location of previous service where the contamination may have occurred.
- If you choose to perform the repair, recover the refrigerant using only **dedicated equipment and containers. Do not recover contaminated refrigerant into your existing service equipment.** If your facility does not have dedicated recovery equipment, you may contact a local refrigerant product retailer for available service. This refrigerant must be disposed of in accordance with all federal and local regulations. In addition, replacement of all refrigerant system components on the vehicle is recommended.
- If the vehicle is within the warranty period, the air conditioner warranty is void. Please contact Nissan Customer Affairs for further assistance.

General Refrigerant Precautions

NFHA0062

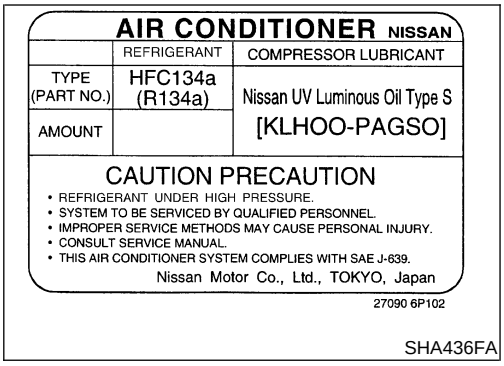
WARNING:

- **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 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.**

Precautions for Leak Detection Dye

NFHA0273

- 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 glasses to protect your eyes and enhance the visibility of the fluorescent dye.
- 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 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 R-134a and R12 A/C systems are different. Do not use R-134a leak detection dye in R-12 A/C system or R-12 leak detection dye in 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 failure occurs.



Precaution for Identification Label on Vehicle

NFHA0274

- Vehicles with factory installed fluorescent dye have this identification label on the under side of hood.
- Vehicles with factory installed fluorescent dye have a green label.
- Vehicles without factory installed fluorescent dye have a blue label.

Precautions for Refrigerant Connection

NFHA0063

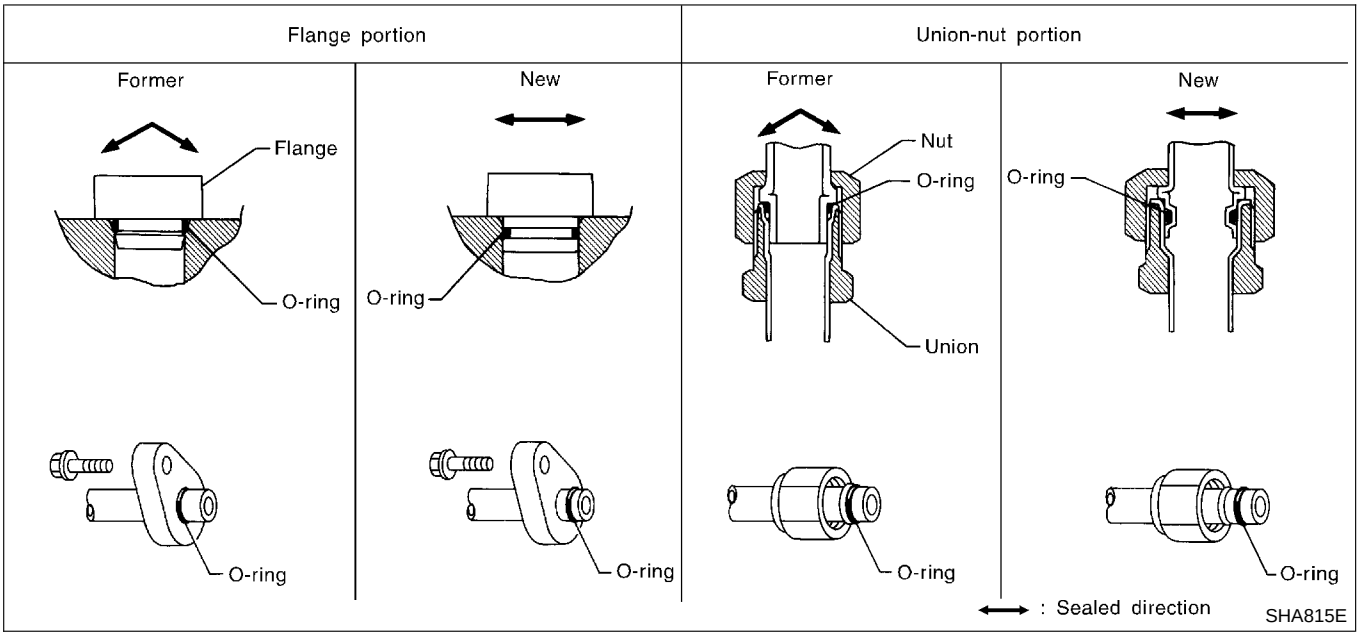
A new type refrigerant connection has been introduced to all refrigerant lines except the following portion.

- Expansion valve to cooling unit

FEATURES OF NEW TYPE REFRIGERANT CONNECTION

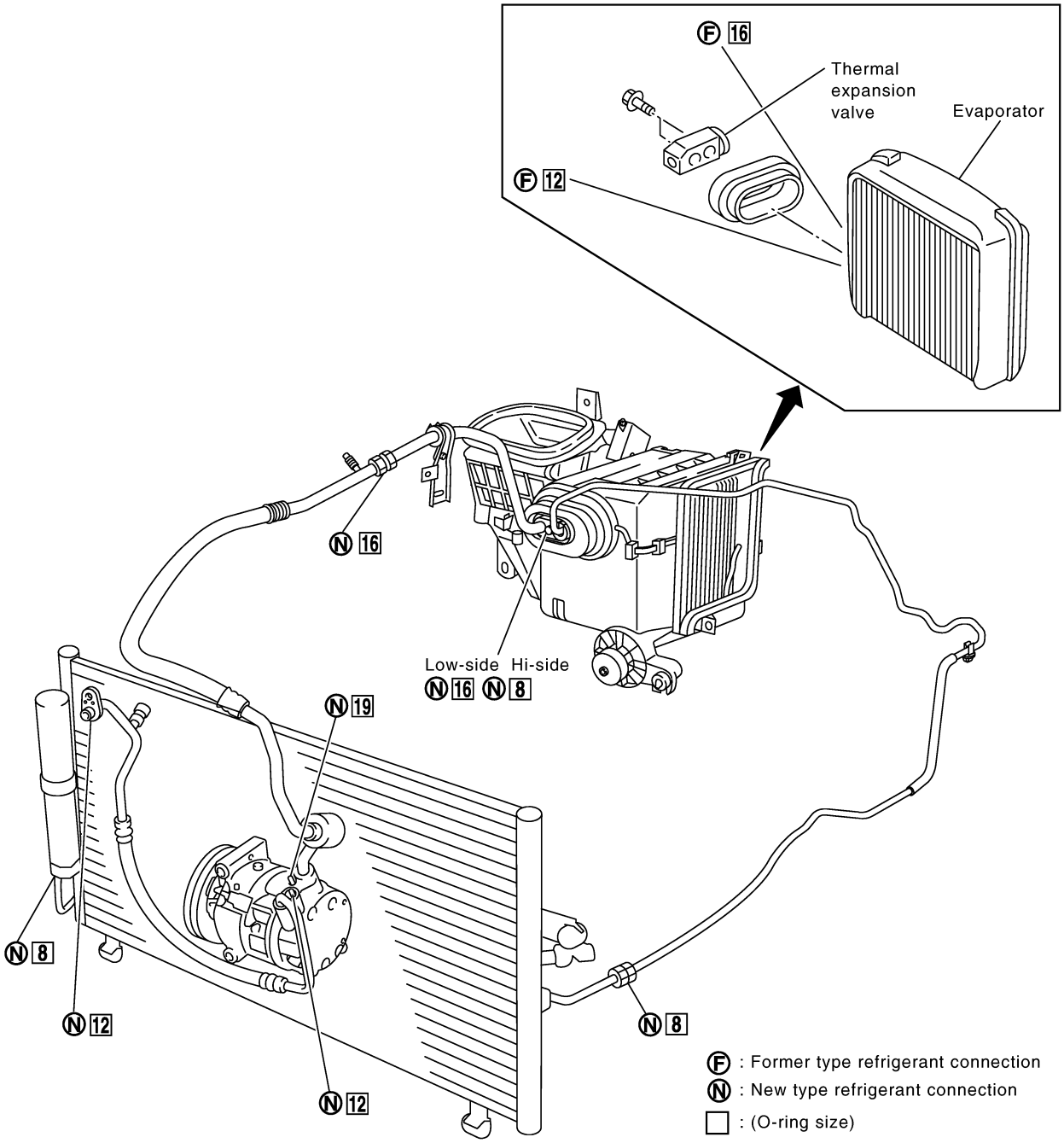
NFHA0063S01

- 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

NFHA0063S02



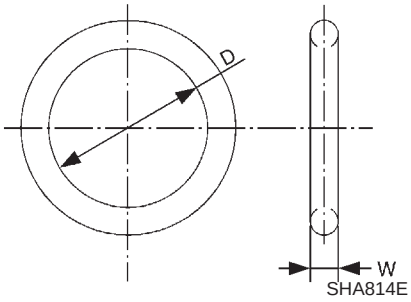
RHA030I

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

NFHA0063S0201



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)
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)

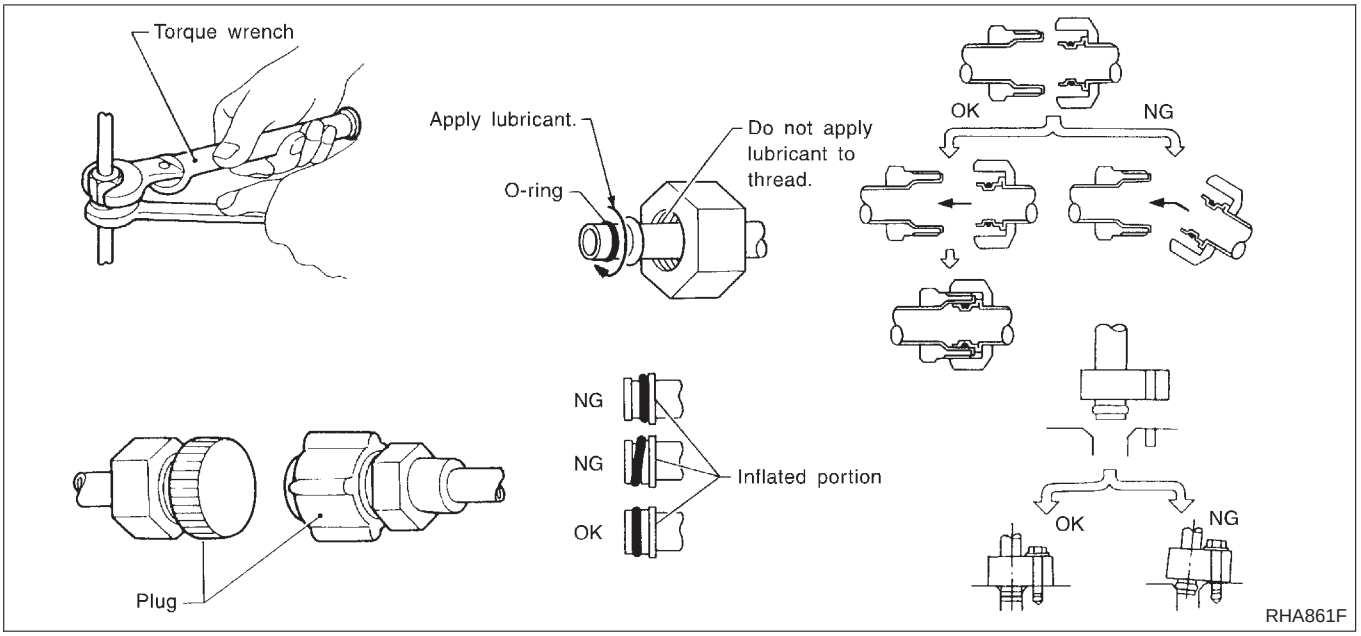
WARNING:

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. Failure 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.**
  Lubricant name: Nissan A/C System Oil Type S
  Part number: KLH00-PAGS0
- **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

NFHA0064

- **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 HA-226.**
- **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

NFHA0065

RECOVERY/RECYCLING EQUIPMENT

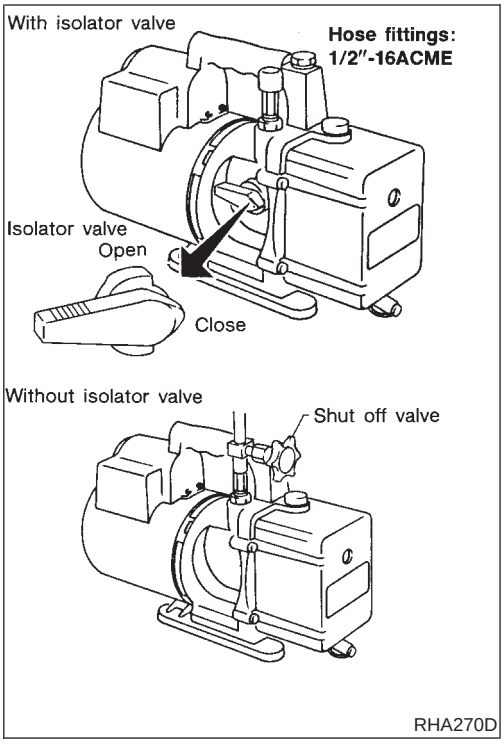
NFHA0065S01

Follow the manufacturer's instructions for machine operation and machine maintenance. Never introduce any refrigerant other than that specified into the machine.

ELECTRONIC LEAK DETECTOR

NFHA0065S02

Follow the manufacture's instructions for tester operation and tester maintenance.



VACUUM PUMP

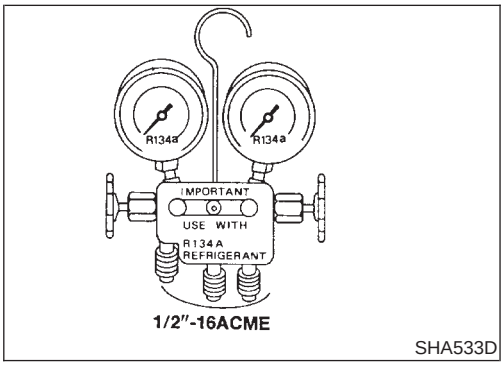
NFHA0065S03

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 situated 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.

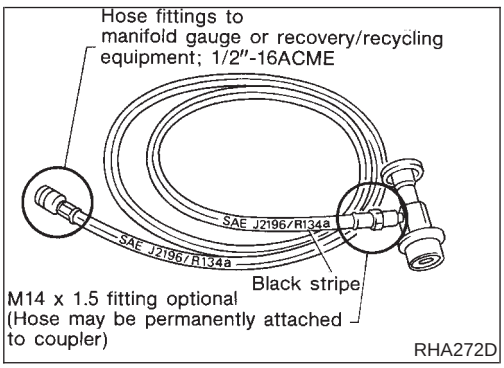
Some one-way valves open when vacuum is applied and close under a no vacuum condition. Such valves may restrict the pump's ability to pull a deep vacuum and are not recommended.



MANIFOLD GAUGE SET

NFHA0065S04

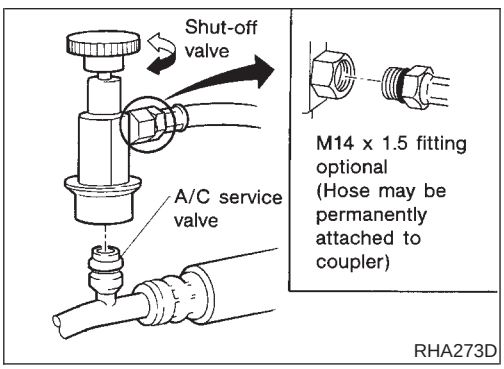
Be certain that the gauge face indicates R-134a or 134a. Make sure the gauge set has 1/2″-16 ACME threaded connections for service hoses. Confirm the set has been used only with refrigerant HFC-134a (R-134a) along with specified lubricant.



SERVICE HOSES

NFHA0065S05

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.

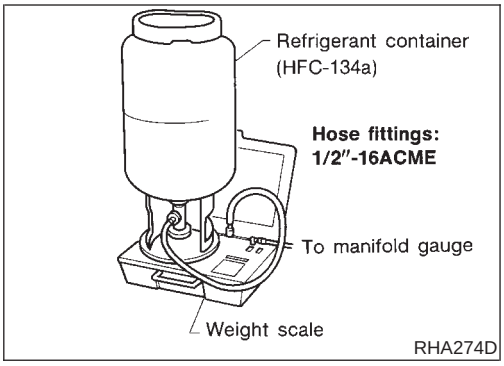


SERVICE COUPLERS

NFHA0065S06

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

NFHA0065S07

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

NFHA0065S09

Calibrate the scale every three months.
To calibrate the weight scale on the ACR4 (J-39500-NI):

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

NFHA0065S08

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.

Wiring Diagrams and Trouble Diagnosis

NFHA0066

When you read wiring diagrams, refer to the following:

- GI-11, "HOW TO READ WIRING DIAGRAMS" in GI section
- EL-11, "Wiring Diagram — POWER —" for power distribution circuit in EL section

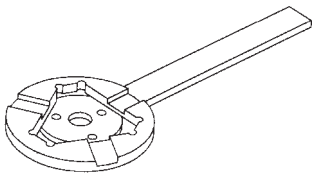
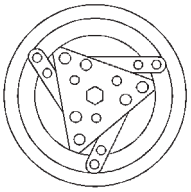
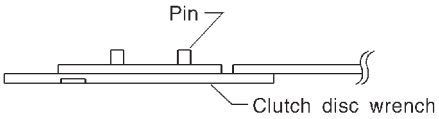
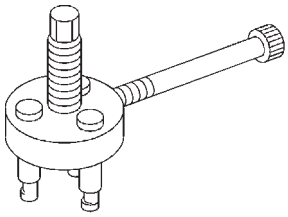
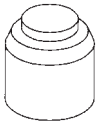
When you perform trouble diagnosis, refer to the following:

- GI-35, "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

Special Service Tools

NFHA0067

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description	
KV99106100 (J-41260) Clutch disc wrench	 NT232  When replacing the magnet clutch in the above compressor, use a clutch disc wrench with the pin side on the clutch disc to remove it.  NT378	Removing center bolt
KV99232340 (J-38874) or KV992T0001 (—) Clutch disc puller	 NT376	Removing clutch disc
KV99106200 (J-41261) Pulley installer	 NT235	Installing pulley

HFC-134a (R-134a) Service Tools and Equipment

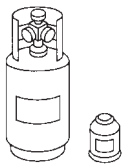
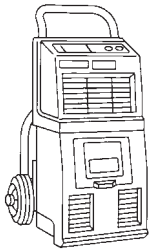
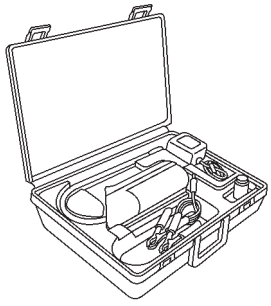
=NFHA0068

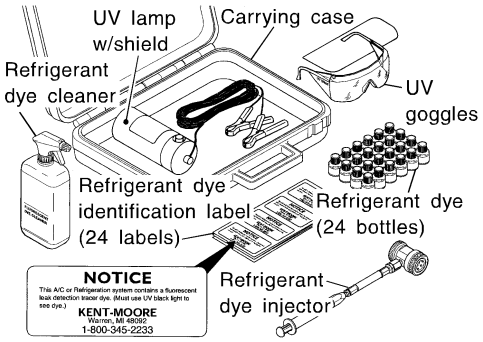
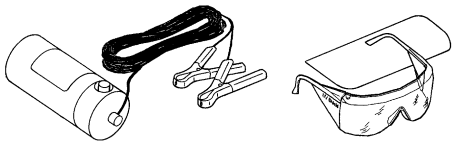
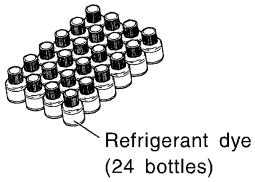
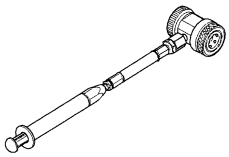
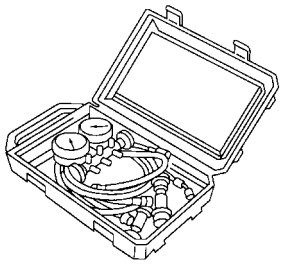
Never mix HFC-134a refrigerant and/or its specified lubricant with CFC-12 (R-12) refrigerant and/or its lubricant.

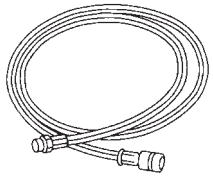
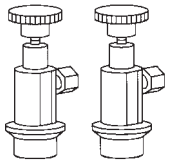
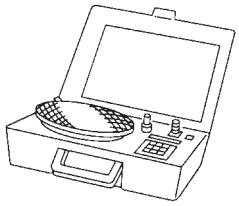
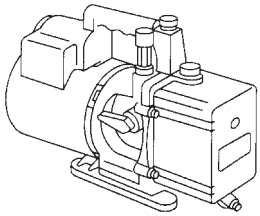
Separate and non-interchangeable service equipment must be used for handling each type of refrigerant/lubricant.

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 failure will result.

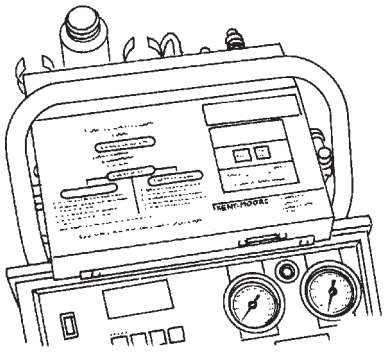
Tool number (Kent-Moore No.) Tool name	Description	
HFC-134a (R-134a) refrigerant	 NT196	Container color: Light blue Container marking: HFC-134a (R-134a) Fitting size: Thread size ● large container 1/2″-16 ACME
KLH00-PAGS0 (—) Nissan A/C System Oil Type S	NT197	Type: Poly alkylene glycol oil (PAG), type S Application: HFC-134a (R-134a) swash plate (piston) compressors (Nissan only) Lubricity: 40 mℓ (1.4 US fl oz, 1.4 Imp fl oz)
(J-39500-NI) Recovery/Recycling Recharging equipment (ACR4)	 NT195	Function: Refrigerant Recovery and Recycling and Recharging
(J-41995) Electrical leak detector	 AHA281A	Power supply: ● DC 12V (Cigarette lighter)

Tool number (Kent-Moore No.) Tool name	Description	
(J-43926) Refrigerant dye leak detection kit Kit includes: (J-42220) UV lamp and UV safety glasses (J-41459) Refrigerant dye injector (J-41447) qty. 24 R-134a refrigerant dye (J-43872) Refrigerant dye cleaner	 ZHA200H	Power supply: DC 12V (Battery terminal)
(J-42220) Fluorescent dye leak detector	UV lamp UV safety glasses  SHA438F	Power supply: DC12V (Battery terminal) For checking refrigerant leak when fluorescent dye is installed in A/C system. Includes: UV lamp and UV safety glasses
(J-41447) R134a Fluorescent Leak Detection Dye (Box of 24, 1/4 ounce bottles)	Dye  SHA439F	Application: For R-134a PAG oil Container: 1/4 ounce (7.4 cc) bottle (Includes self-adhesive dye identification labels for affixing to vehicle after charging system with dye.)
(J-41459) R134a Dye Injector Use with J-41447, 1/4 ounce bottle	Dye injector  SHA440F	For injecting 1/4 ounce of Fluorescent Leak Detection Dye into A/C system.
(J-43872) Dye cleaner	 SHA441F	For cleaning dye spills.
(J-39183) Manifold gauge set (with hoses and couplers)	 NT199	Identification: ● The gauge face indicates R-134a. Fitting size: Thread size ● 1/2″-16 ACME

Tool number (Kent-Moore No.) Tool name	Description	
Service hoses ● High side hose (J-39501-72) ● Low side hose (J-39502-72) ● Utility hose (J-39476-72)	 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 (J-39500-20) ● Low side coupler (J-39500-24)	 NT202	Hose fitting to service hose: ● M14 x 1.5 fitting is optional or permanently attached.
(J-39650) Refrigerant weight scale	 NT200	For measuring of refrigerant Fitting size: Thread size ● 1/2″-16 ACME
(J-39649) Vacuum pump (Including the isolator valve)	 NT203	Capacity: ● Air displacement: 4 CFM ● Micron rating: 20 microns ● Oil capacity: 482 g (17 oz) Fitting size: Thread size ● 1/2″-16 ACME

COMMERCIAL SERVICE TOOL

NFHA0068S01

Tool name	Description	
Refrigerant identifier equipment	 NT765	For checking refrigerant purity and for system contamination

Refrigeration System

REFRIGERATION CYCLE

NFHA0069

Refrigerant Flow

NFHA0069S01

The refrigerant flows in the standard pattern, that is, through the compressor, the condenser, the liquid tank, through the evaporator, and back to the compressor. The refrigerant evaporation through the evaporator coil is controlled by an externally equalized expansion valve, located inside the evaporator case.

Freeze Protection

NFHA0069S02

Under normal operating conditions, when the A/C is switched on, the compressor runs continuously, and the evaporator pressure, and therefore, temperature is controlled by the V-6 variable displacement compressor to prevent freeze up.

Refrigerant System Protection

NFHA0069S03

Refrigerant Pressure Sensor

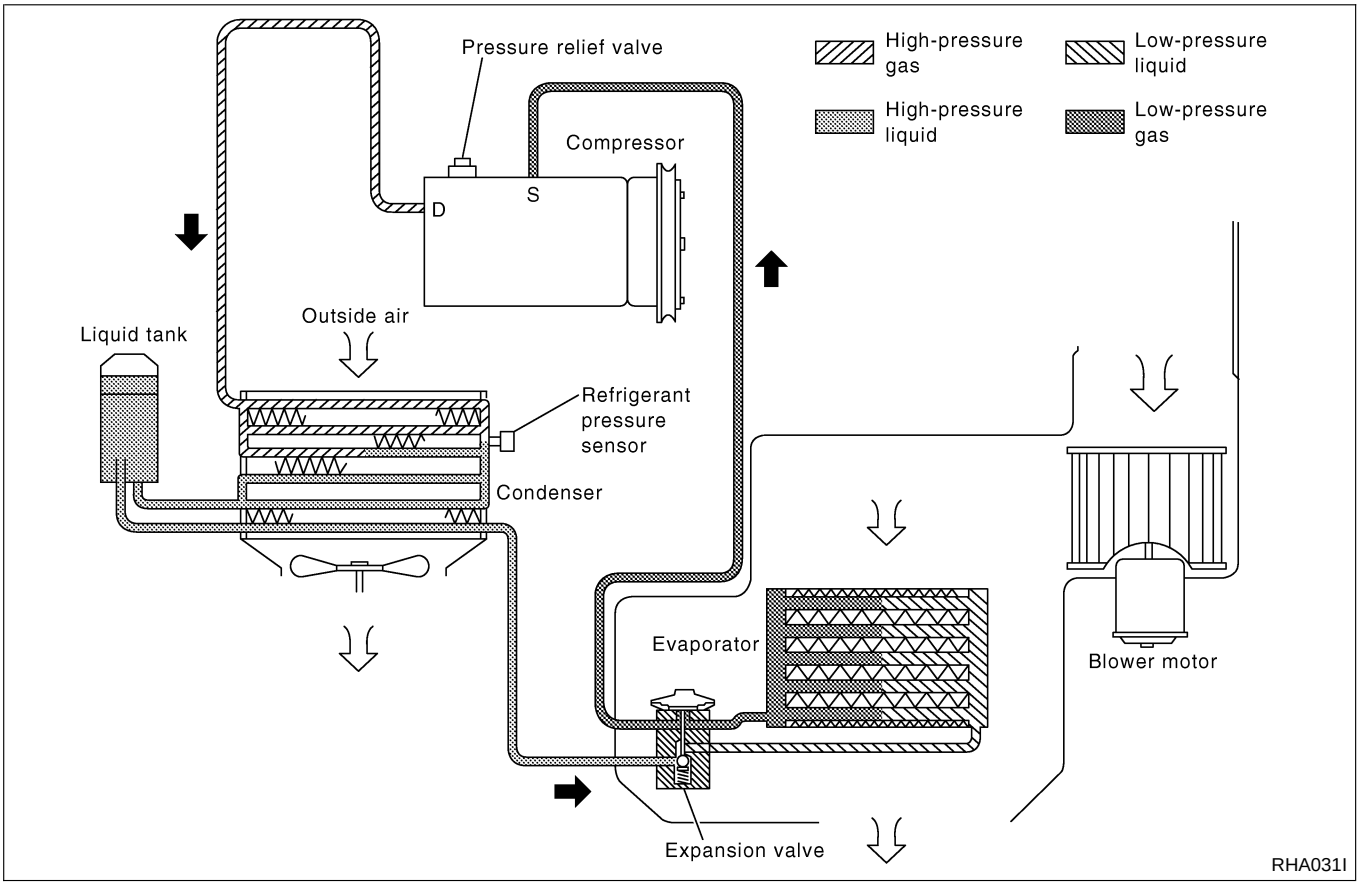
NFHA0069S0301

The refrigerant system is protected against excessively high or low pressures by the refrigerant pressure sensor, located on the condenser. If the system pressure rises above, or falls below the specifications, the refrigerant pressure sensor detects the pressure inside the refrigerant line and sends the voltage signal to the ECM. ECM makes the A/C relay go OFF and stops the compressor when pressure on the high pressure side detected by refrigerant pressure sensor is over about 2,746 kPa (28 kg/cm^2, 398 psi) or below about 177 kPa (1.8 kg/cm^2, 26 psi).

Pressure Relief Valve

NFHA0069S0302

The refrigerant system is also protected by a pressure relief valve, located in the rear head of the compressor. When the pressure of refrigerant in the system increases to an abnormal level [more than 3,727 kPa (38 kg/cm^2, 540 psi)], the release port on the pressure relief valve automatically opens and releases refrigerant into the atmosphere.



V-6 Variable Displacement Compressor

GENERAL INFORMATION

=NFHA0070

1. The V-6 variable compressor differs from previous units. The vent temperatures of the V-6 variable compress do not drop too far below 5°C (41°F) when:
- evaporator intake air temperature is less than 20°C (68°F)
- engine is running at speeds less than 1,500 rpm.

   This is because the V-6 compressor provides a means of “capacity” control.
2. The V-6 variable compressor provides refrigerant control under varying conditions. During cold winters, it may not produce high refrigerant pressure discharge (compared to previous units) when used with air conditioning systems.
3. A “clanking” sound may occasionally be heard during refrigerant charge. The sound indicates that the tilt angle of the swash plate has changed and is not a problem.
4. For air conditioning systems with the V-6 compressor, the clutch remains engaged unless: the system main switch, fan switch or ignition switch is turned OFF. When ambient (outside) temperatures are low or when the amount of refrigerant is insufficient, the clutch is disengaged to protect the compressor.
5. A constant range of suction pressure is maintained when engine speed is greater than a certain value. It normally ranges from 147 to 177 kPa (1.5 to 1.8 kg/cm^2, 21 to 26 psi) under varying conditions.
   In previous compressors, however, suction pressure was reduced with increases in engine speed.

DESCRIPTION

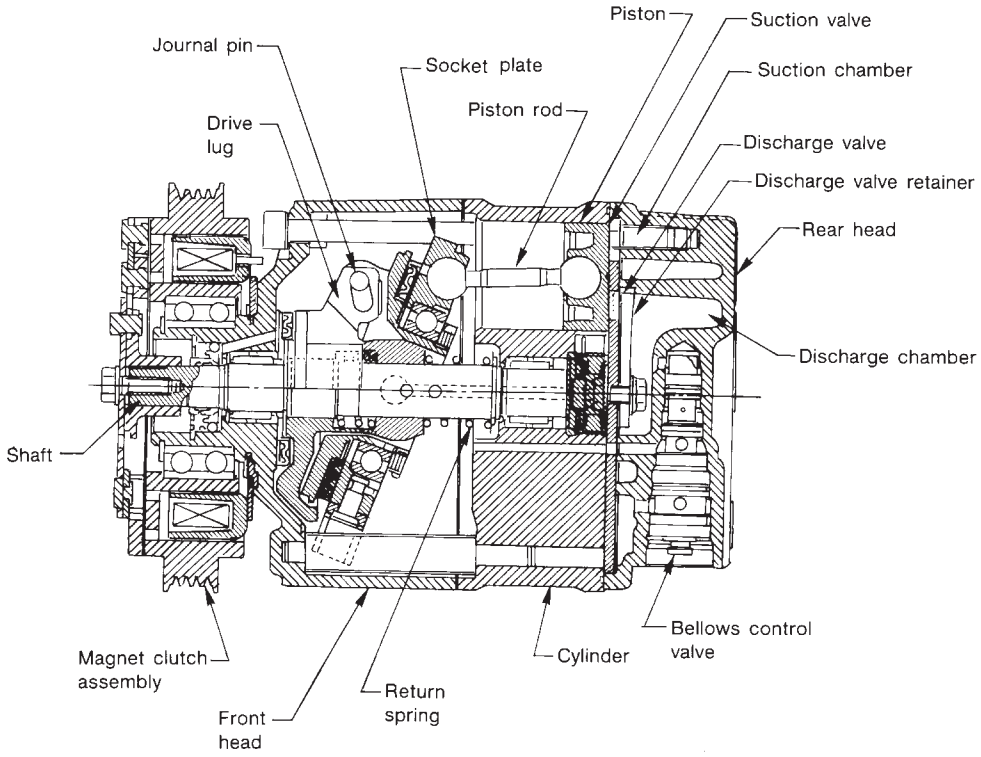
=NFHA0132

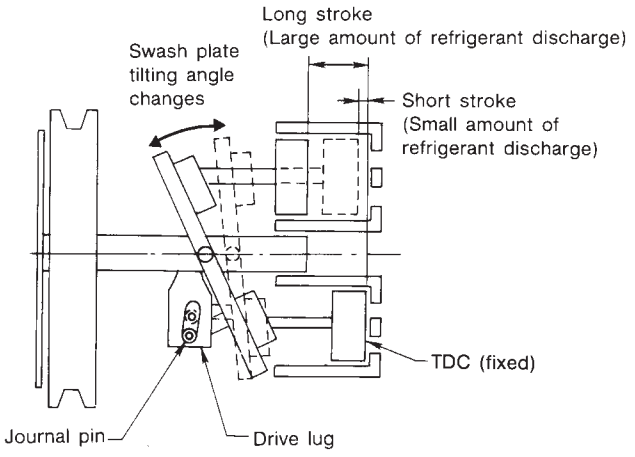
General

NFHA0132S01

The variable compressor is basically a swash plate type that changes piston stroke in response to the required cooling capacity.

The tilt of the swash plate allows the piston's stroke to change so that refrigerant discharge can be continuously changed from 14.5 to 184 cm^3 (0.885 to 11.228 cu in).





Discharge control	Discharge capacity cm^3 (cu in)/rev.	Piston stroke length mm (in)
Minimum	14.5 (0.885)	2.3 (0.091)
Maximum	184 (11.228)	28.6 (1.126)

RHA037DB

Operation

=NFHA0132S02

1. Operation Control Valve

NFHA0132S0201

Operation control valve is located in the suction port (low-pressure) side, and opens or closes in response to changes in refrigerant suction pressure.
Operation of the valve controls the internal pressure of the crankcase.
The angle of the swash plate is controlled between the crankcase's internal pressure and the piston cylinder pressure.

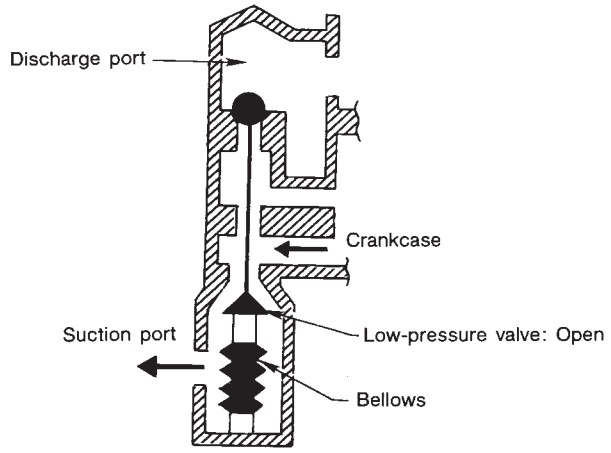
2. Maximum Cooling

NFHA0132S0202

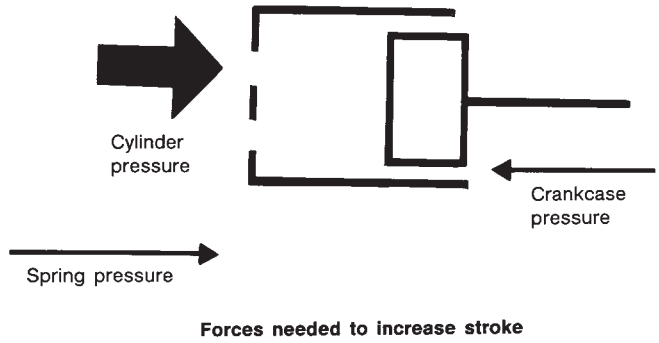
Refrigerant pressure on the low-pressure side increases with an increase in heat loads.
When this occurs, the control valve's bellows compress to open the low-pressure side valve and close the high-pressure side valve.
This causes the following pressure changes:

- the crankcase's internal pressure to equal the pressure on the low-pressure side;
- the cylinder's internal pressure to be greater than the crankcase's internal pressure.

Under this condition, the swash plate is set to the maximum stroke position.



Valve position for lowering crankcase pressure



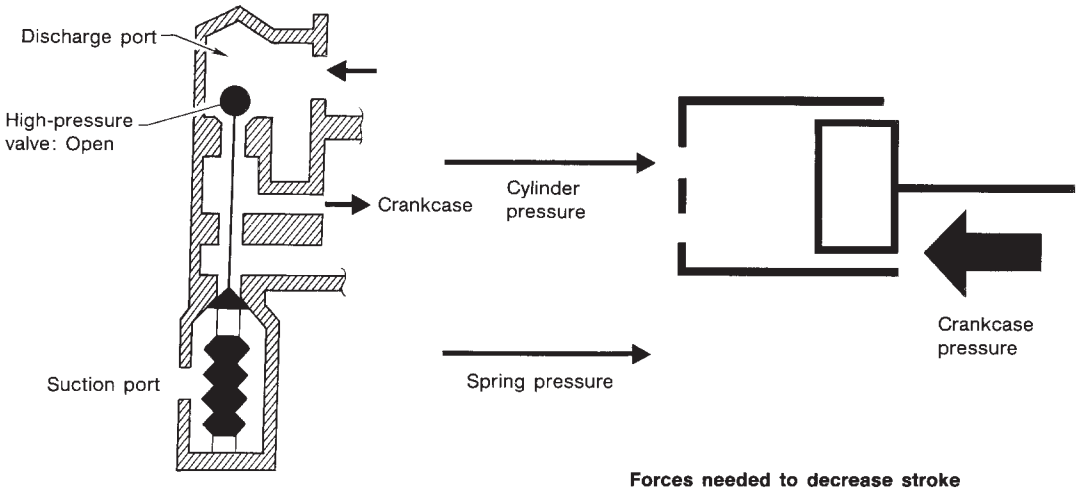
Forces needed to increase stroke

RHA473C

3. Capacity Control

=NFHA0132S0203

- Refrigerant pressure on suction side is low during high speed driving or when ambient or interior temperature is low.
- The bellows expands when refrigerant pressure on the suction pressure side drops below approximately 177 kPa (1.8 kg/cm^2, 26 psi).
  Since suction pressure is low, it makes the suction port close and the discharge port open. Thus, crankcase pressure becomes high as high pressure enters the crankcase.
- The force acts around the journal pin near the swash plate, and is generated by the pressure difference before and behind the piston.
  The drive lug and journal pin are located where the piston generates the highest pressure. Piston pressure is between suction pressure Ps and discharge pressure Pd, which is near suction pressure Ps. If crankcase pressure Pc rises due to capacity control, the force around the journal pin makes the swash plate angle decrease and also the piston stroke decrease. In other words, crankcase pressure increase triggers pressure difference between the piston and the crankcase. The pressure difference changes the angle of the swash plate.



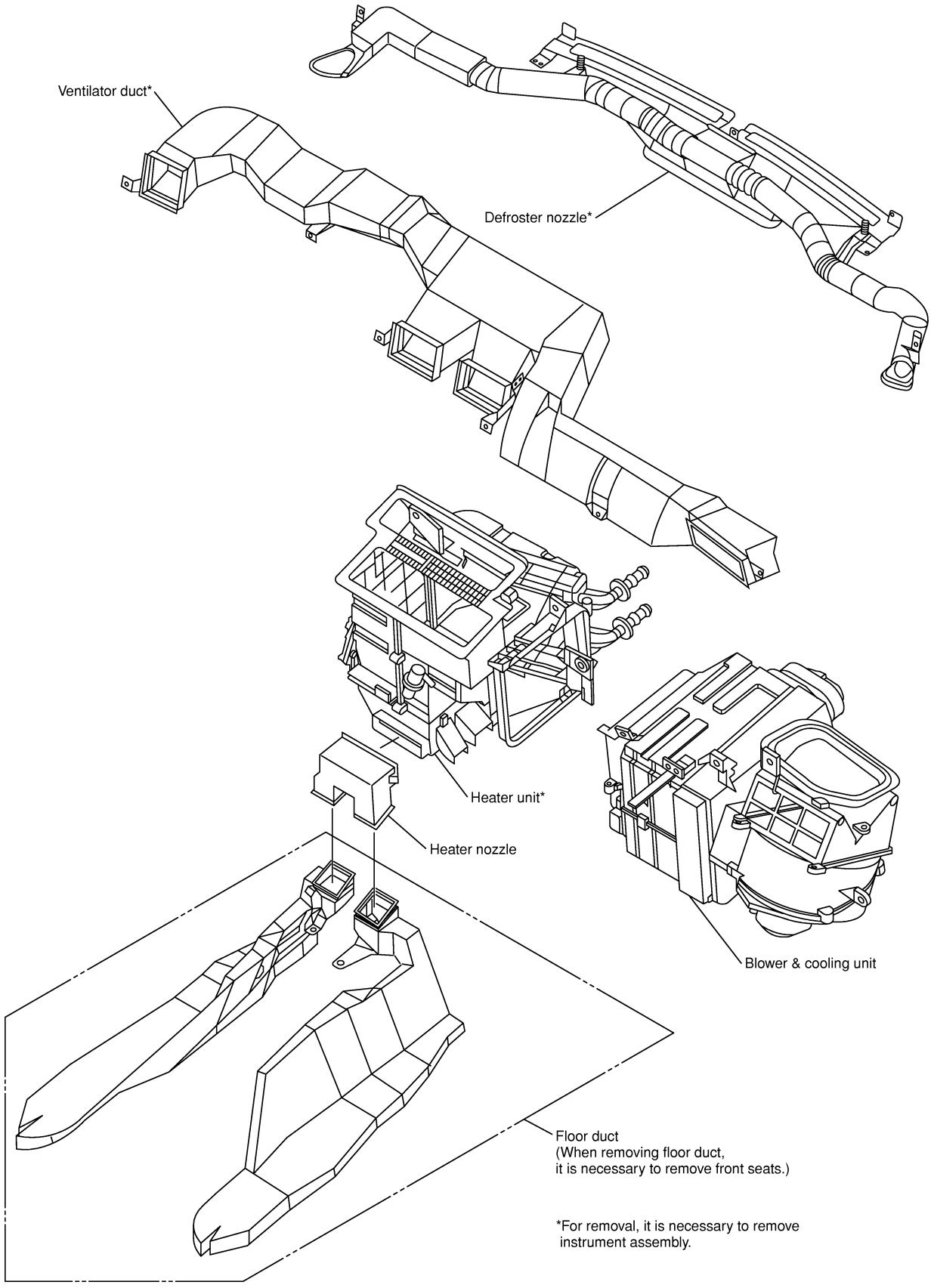
Valve position for raising crankcase pressure

Forces needed to decrease stroke

RHA474C

Component Layout

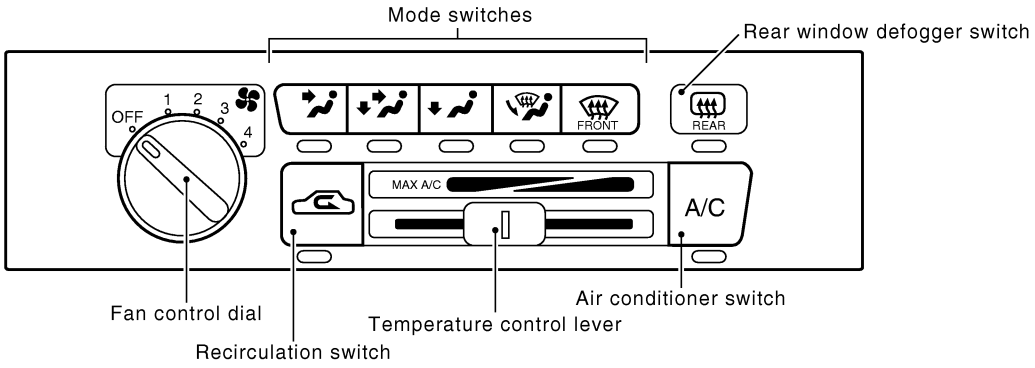
NFHA0071



RHA349H

Control Operation

NFHA0072



RHA985H

FAN CONTROL DIAL

NFHA0072S01

This dial turns the fan ON and OFF, and controls fan speed.

MODE SWITCHES

NFHA0072S02

This switch allows control of the outlet air flow.
In “DEF” or “D/F” mode, the intake door is set to “FRESH”.
The compressor turns on when the Mode switch is moved to “DEF”.

TEMPERATURE CONTROL LEVER

NFHA0072S03

This lever allows adjustment of the temperature of the outlet air.
When the temperature control lever is in full cold position with the fan ON, the compressor will turn ON. A/C and REC indicator lamps will also light.

RECIRCULATION (REC) SWITCH

NFHA0072S04

OFF position: Outside air is drawn into the passenger compartment.
ON position: Interior air is recirculated inside the vehicle. The indicator lamp will also light.
Recirculation is canceled when DEF or D/F is selected, and resumes when another mode is chosen.
If the refrigerant pressure sensor input signal is high, recirculation is canceled, when VENT, B/L and FOOT mode is selected.

AIR CONDITIONER SWITCH

NFHA0072S05

The air conditioner switch controls the A/C system. When the switch is depressed with the fan ON, the compressor will turn ON. The indicator lamp will also light.
The air conditioner cooling function operates only when the engine is running.

REAR WINDOW DEFOGGER SWITCH

NFHA0072S06

When illumination is ON, rear window is defogging.

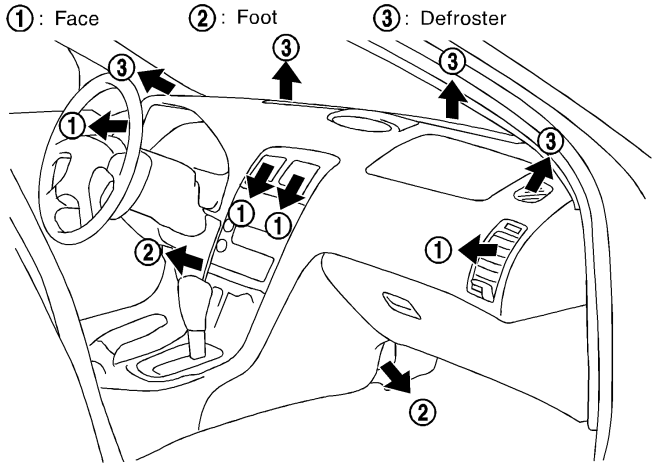
MAX. AIR CONDITIONER SWITCH

NFHA0072S07

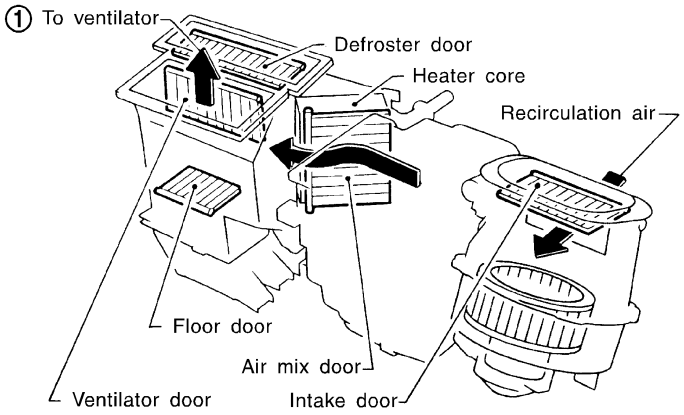
Intake door turns to recirculation position and the compressor operates automatically, when the temperature control level is in full cold position with the fan ON. The indicator lamps will also light.

Discharge Air Flow

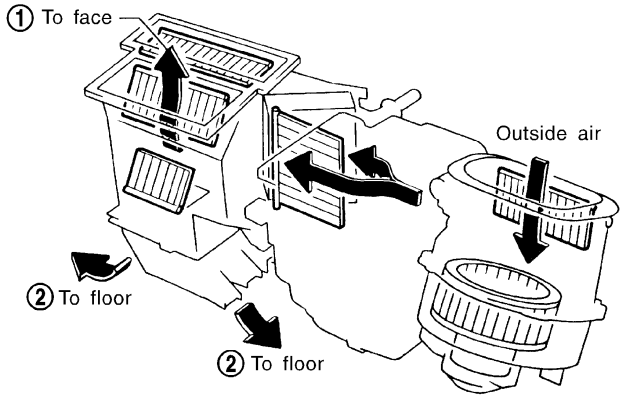
NFHA0073



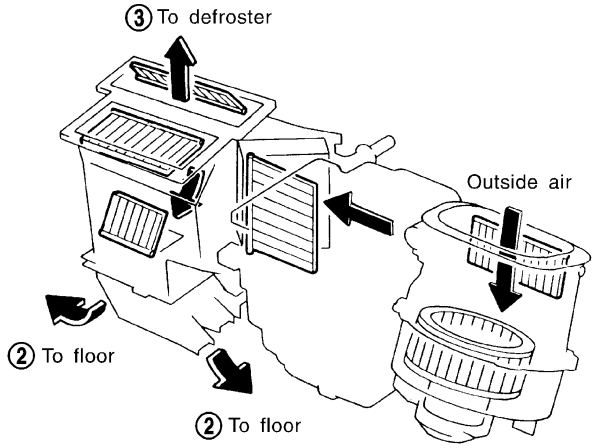
Face
(switch "ON")



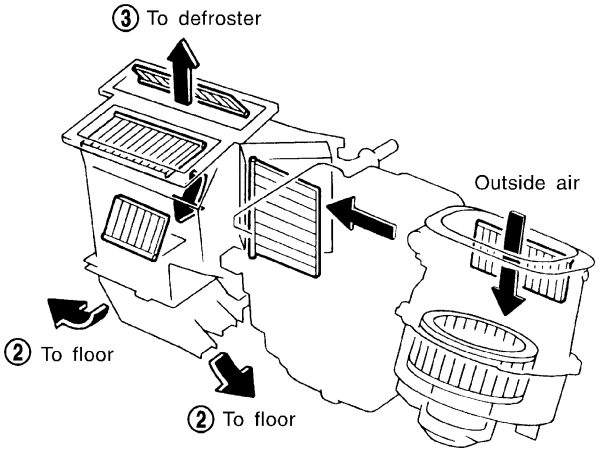
Bi-level
(switch "OFF")



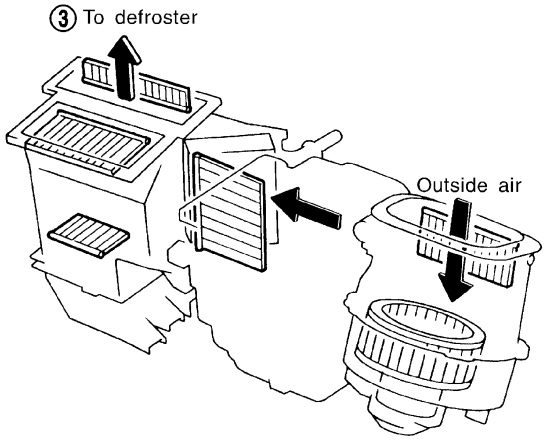
Floor



Floor and defroster



Defroster



RHA355H

System Description

SWITCHES AND THEIR CONTROL FUNCTIONS

NFHA0074

NFHA0074S01

Knob/Switch		Knob/Switch position							Air outlet	Intake air	Compressor
		A/C									
A/C		○							—	—	ON*1
Mode			○						VENT	—	—
				○					B/L	—	—
					○				FOOT	—	—
						○			D/F	FRE	—
							○		DEF	FRE	—
								○	—	REC*2	—

*1: Compressor is operated by ECM.

*2: In DEF and D/F modes, REC switch is canceled.

MAX. A/C SWITCH CONTROL FUNCTION

NFHA0074S02

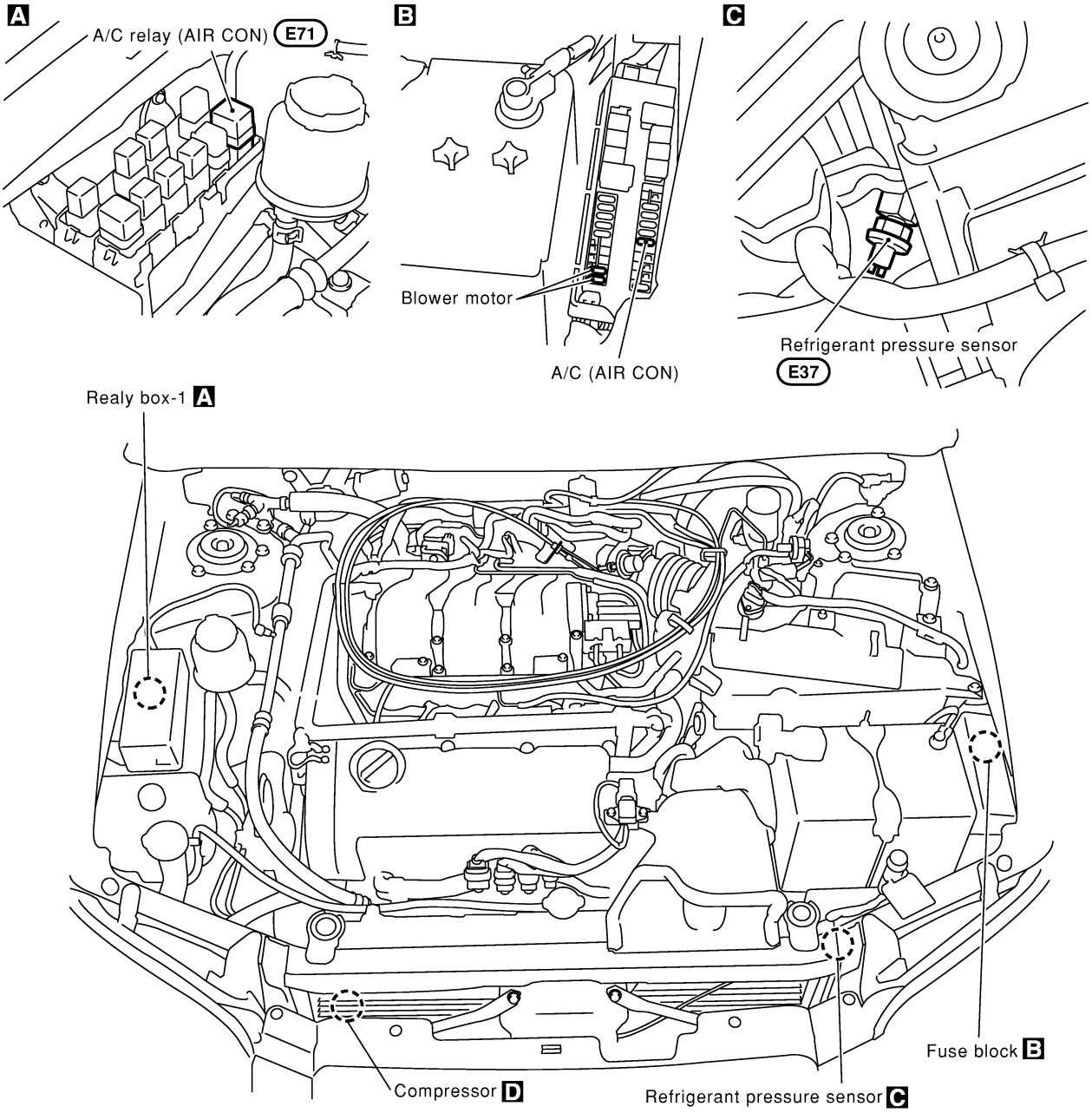
Lever/Switch	Condition: Fan ON				
MAX A/C (Full cold)	OFF	→	ON	→	OFF
REC	OFF		ON		OFF
A/C	OFF		ON		ON

Component Location

NFHA0085

ENGINE COMPARTMENT

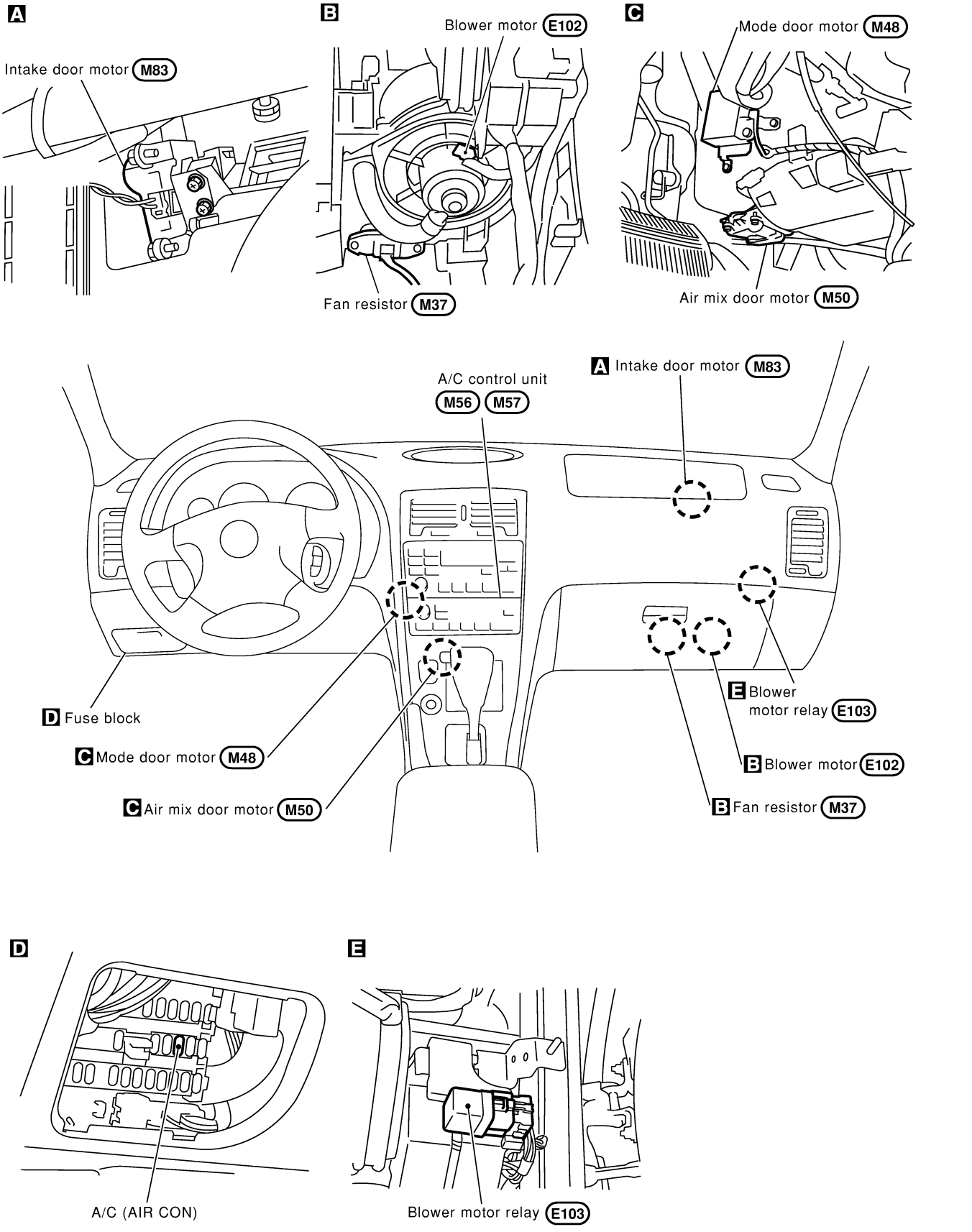
NFHA0085S01



RHA065I

PASSENGER COMPARTMENT

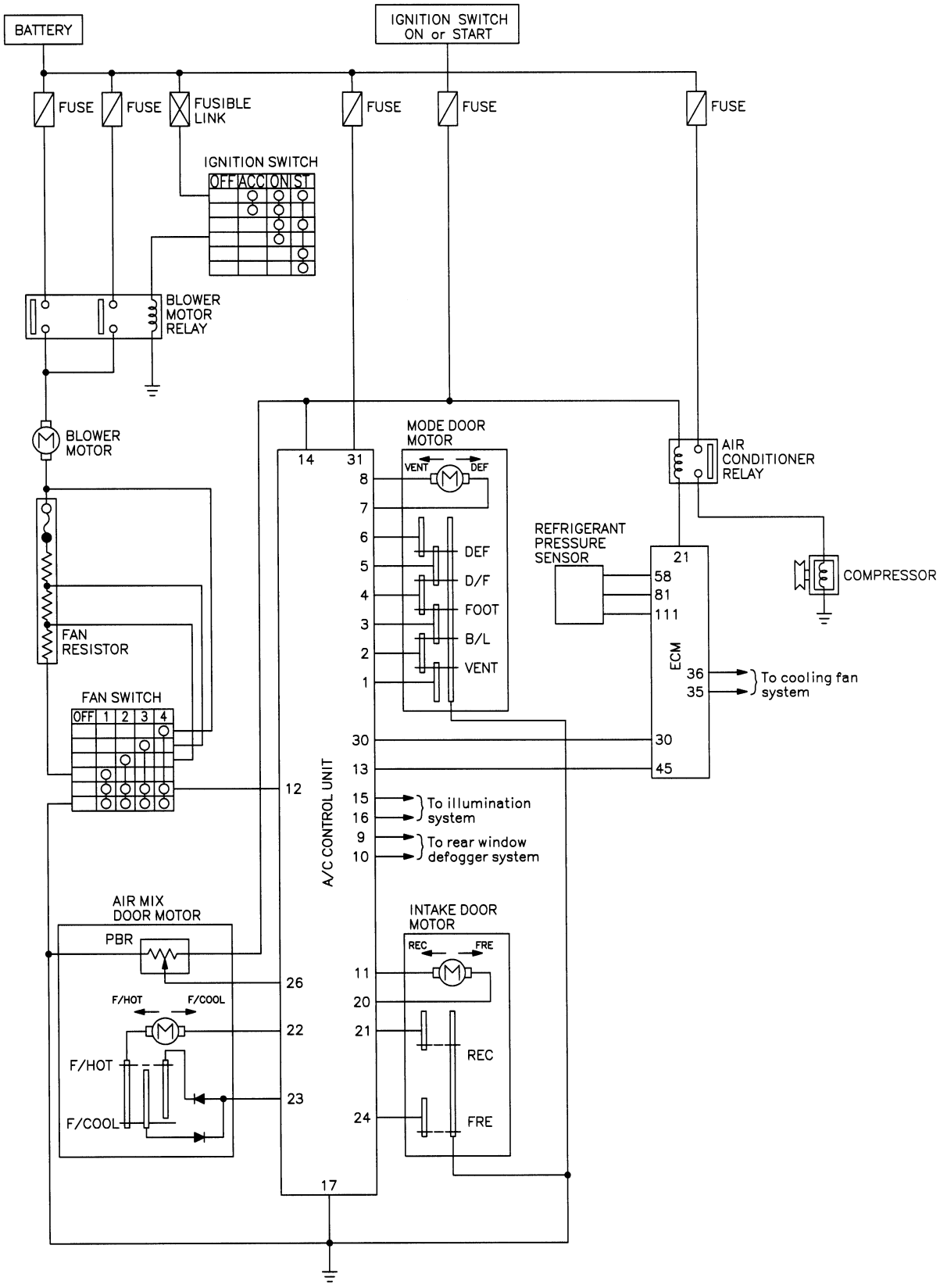
NFHA0085S02



RHA456H

Circuit Diagram — Air Conditioner

NFHA0087

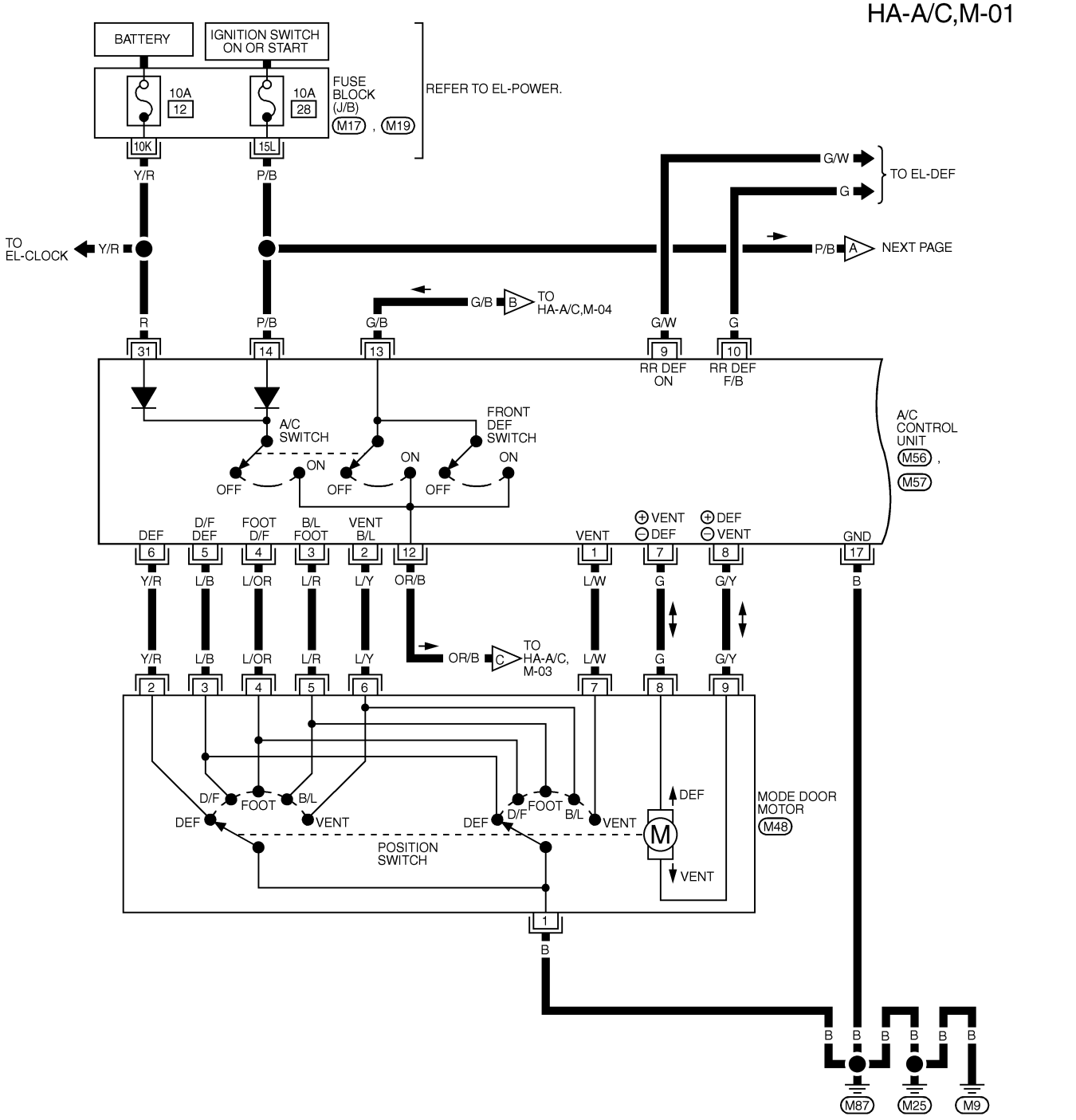


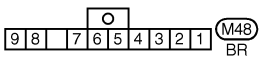
MHA054B

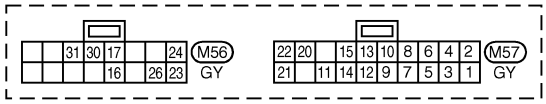
Wiring Diagram — A/C, M —

NFHA0088

HA-A/C,M-01



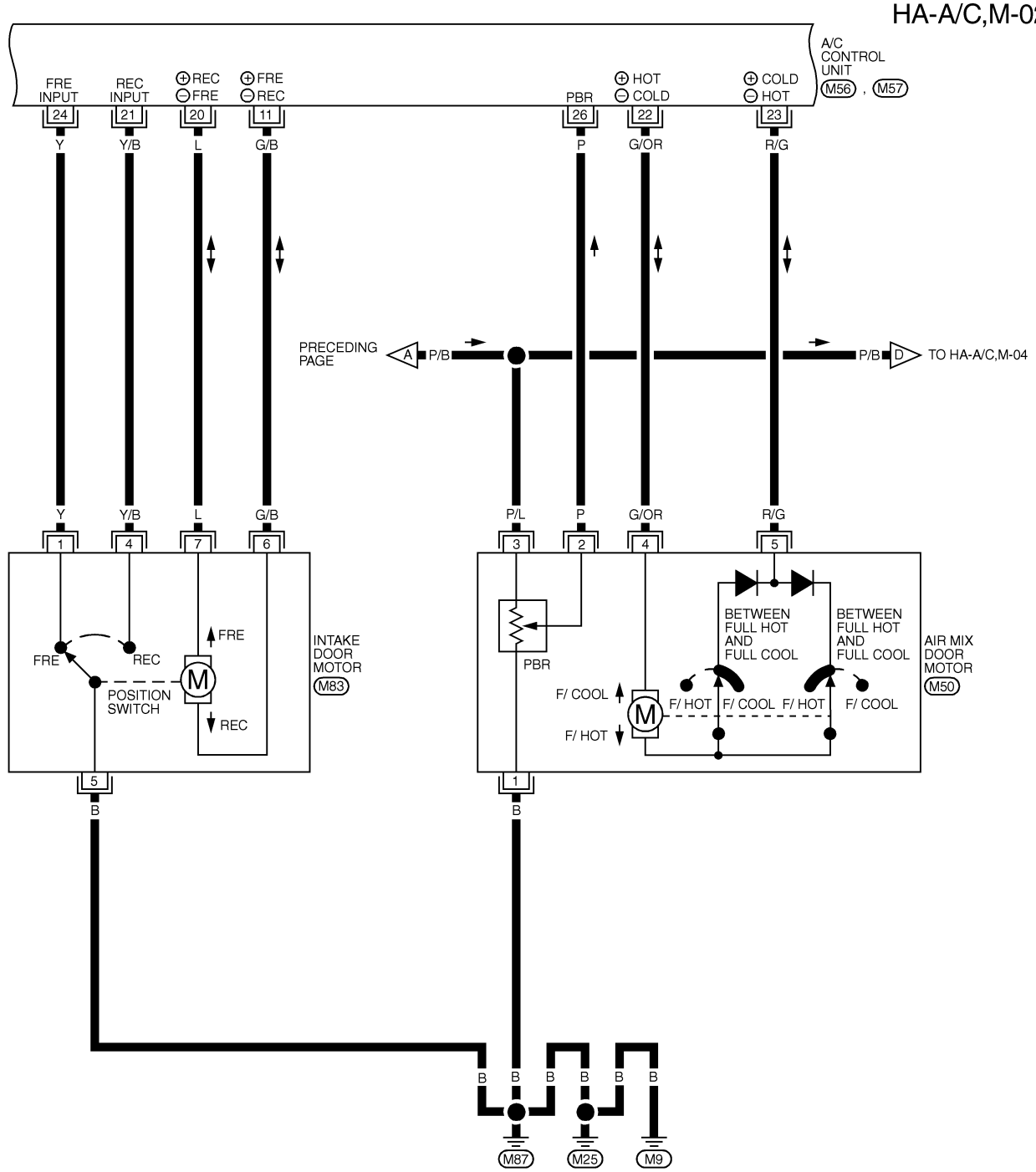


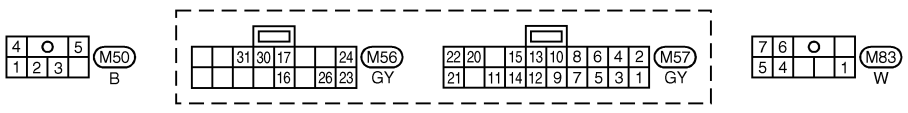


REFER TO THE FOLLOWING.
M17 , M19 - FUSE BLOCK - JUNCTION BOX (J/B)

MHA055B

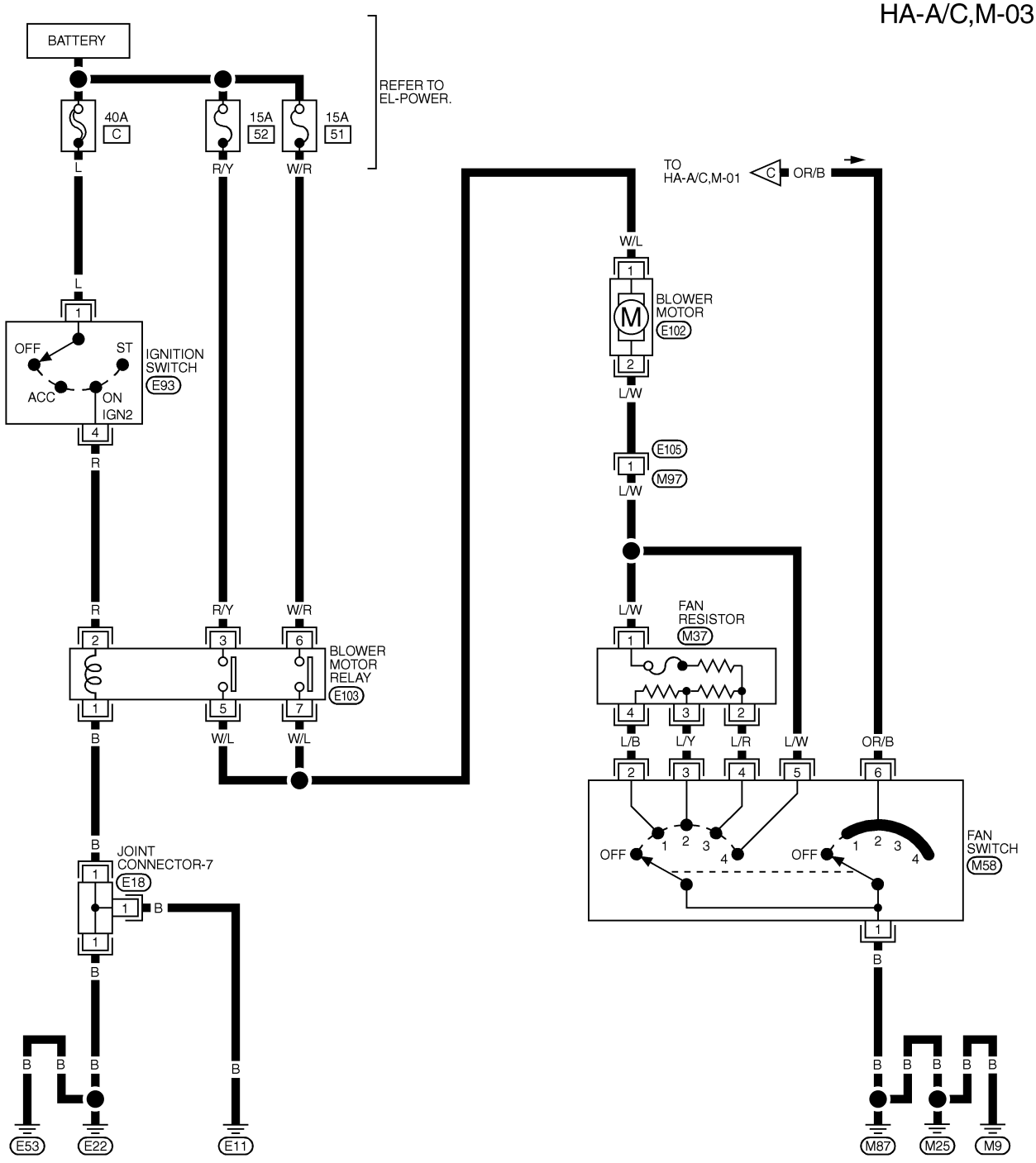
HA-A/C,M-02

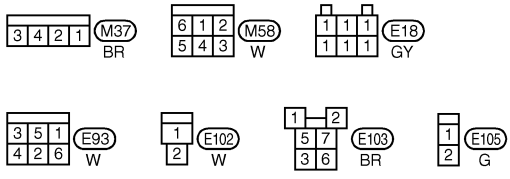




MHA056B

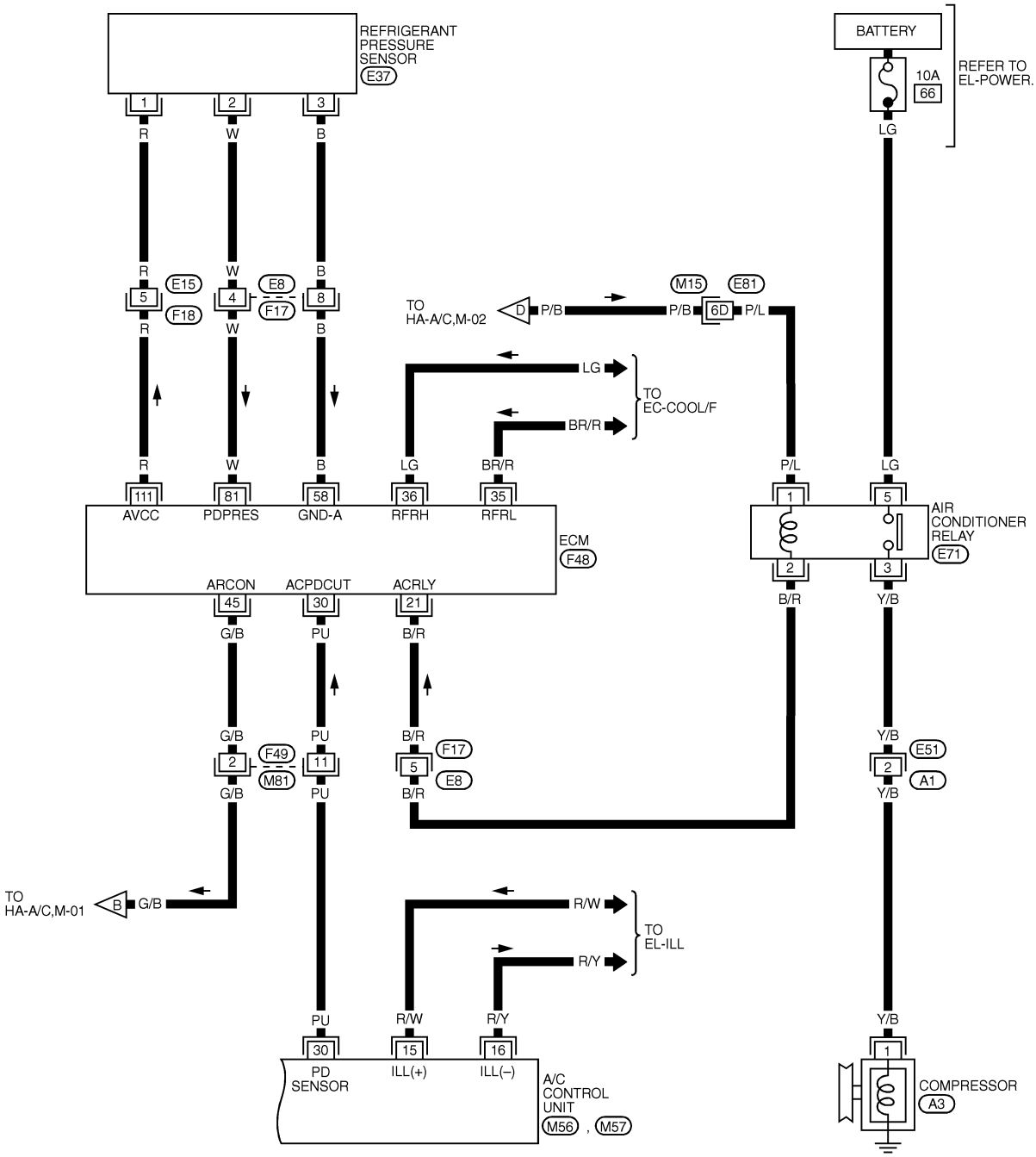
HA-A/C,M-03

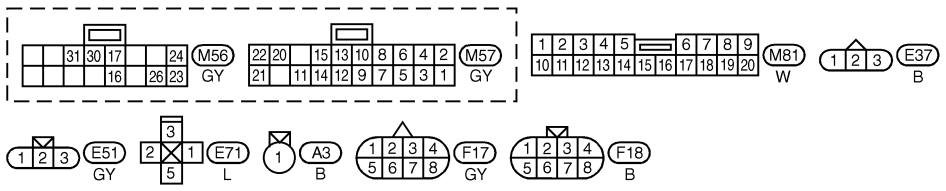




MHA068B

HA-A/C,M-04





REFER TO THE FOLLOWING.
M15 - SUPER MULTIPLE JUNCTION (SMJ)
F48 - ELECTRICAL UNITS

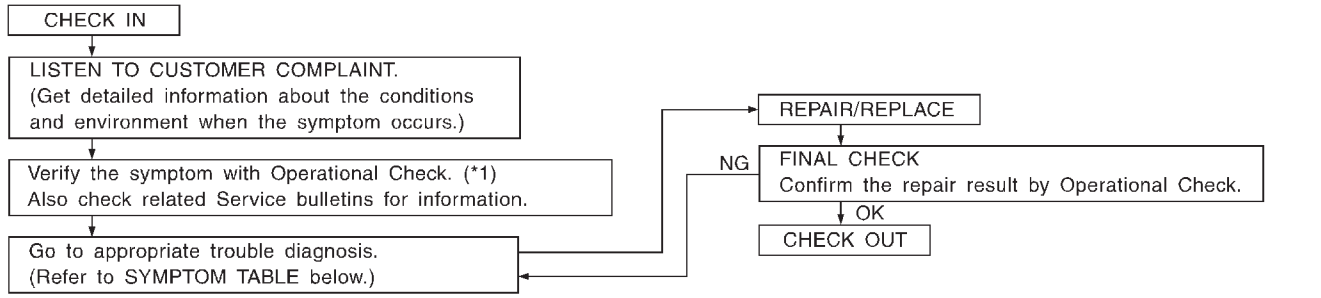
MHA058B

How to Perform Trouble Diagnoses for Quick and Accurate Repair

NFHA0075

WORK FLOW

NFHA0075S01



SHA900E

*1: HA-185

SYMPTOM TABLE

NFHA0075S02

Symptom	Reference page	
• A/C system does not come on.	• Go to Trouble Diagnosis Procedure for A/C system.	HA-187
• Intake door does not change in VENT, B/L or FOOT mode.	• Go to Trouble Diagnosis Procedure for Intake Door.	HA-190
• Blower motor does not rotate at all.	• Go to Trouble Diagnosis Procedure for Blower Motor.	HA-194
• Insufficient cooling.	• Go to Trouble Diagnosis Procedure for Insufficient cooling.	HA-200
• Insufficient heating.	• Go to Trouble Diagnosis Procedure for Insufficient heating.	HA-208
• Air mix door motor does not operate normally.	• Go to Trouble Diagnosis Procedure for Air mix door motor.	HA-209
• Mode door does not change.	• Go to Trouble Diagnosis Procedure for Mode door.	HA-213
• Magnet clutch does not engage when A/C switch and fan switch are ON.	• Go to Trouble Diagnosis Procedure for Magnet Clutch.	HA-216
• Noise	• Go to Trouble Diagnosis Procedure for Noise.	HA-223

Operational Check

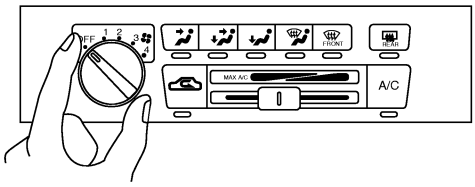
=NFHA0076

The purpose of the operational check is to confirm that the system operates as it should. The systems which are checked are the blower, mode (discharge air), intake air, temperature decrease, temperature increase.

CONDITIONS:

NFHA0076S01

Engine running at normal operating temperature.



RHA986H

PROCEDURE:

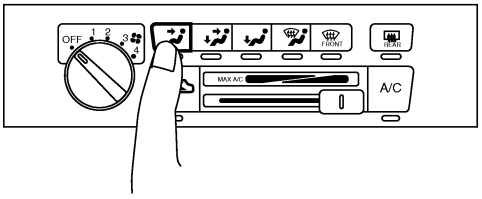
NFHA0076S02

1. Check Blower

NFHA0076S0201

1. Turn fan control dial to 1-speed.
   Blower should operate on 1-speed.
2. Then turn fan control dial to 2-speed.
3. Continue checking blower speed until all four speeds are checked.
4. Leave blower on 4-speed.

If NG, go to trouble diagnosis procedure for blower motor (HA-194).
If OK, continue with next check.



RHA987H

2. Check Discharge Air

NFHA0076S0202

1. Press each mode switch.

Discharge air flow

Mode switch	Air outlet/distribution		
	Face	Foot	Defroster
	100%	–	–
	60%	40%	–
	–	80%	20%
	–	60%	40%
	–	–	100%

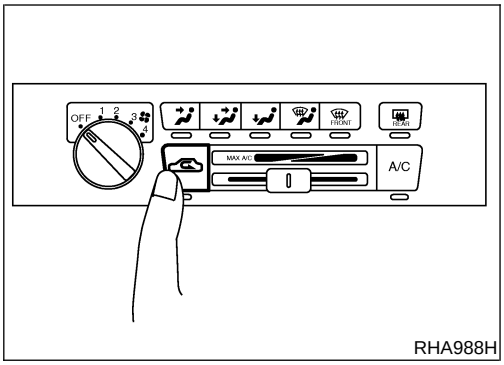
SHA345F

2. Confirm that discharge air comes out according to the air distribution table at left.
   Refer to “Discharge Air Flow” in “DESCRIPTION” (HA-175).

NOTE:

Confirm that the compressor clutch is engaged (visual inspection) and intake door position is at FRESH when the DEF ( ) is pressed.
Confirm that the intake door position is at FRESH when the D/F ( ) is pressed.
Intake door position is checked in the next step.

If NG, go to trouble diagnosis procedure for mode door motor (HA-213).
If OK, continue with next check.



RHA988H

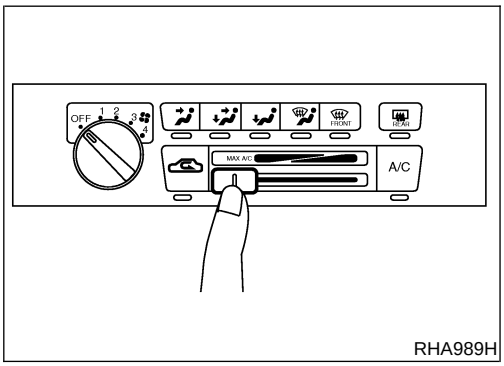
3. Check Recirculation

NFHA0076S0203

1. Press recirculation switch.
   Recirculation indicator should light.
2. Listen for intake door position change (you should hear blower sound change slightly).

NOTE:
Confirm that the RECIRCULATION (REC) switch is canceled in the DEF ( ) and D/F ( ) mode.

If NG, go to trouble diagnosis procedure for intake door motor (HA-190).
If OK, continue with next check.



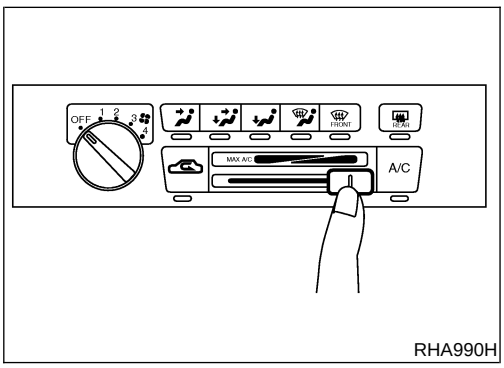
RHA989H

4. Check Temperature Decrease

NFHA0076S0204

1. Turn fan control dial to 1–speed.
2. Slide temperature control lever to full cold.
3. Check for cold air at discharge air outlets.

If NG, go to trouble diagnosis procedure for insufficient cooling (HA-200).
If OK, continue with next check.



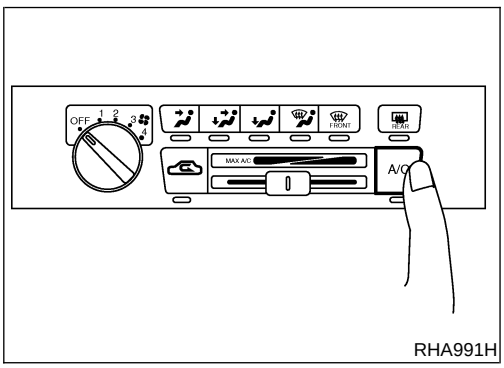
RHA990H

5. Check Temperature Increase

NFHA0076S0205

1. Slide temperature control lever to full hot.
2. Check for hot air at discharge air outlets.

If NG, go to trouble diagnosis procedure for insufficient heating (HA-208).
If OK, continue with next check.



RHA991H

6. Check Air Conditioner Switch

NFHA0076S0206

Turn fan control switch to the desired (1 to 4-speed) position and push the air conditioner switch to turn ON the air conditioner.
The indicator light should come on when air conditioner is ON.
If NG, go to trouble diagnosis procedure for A/C system (HA-187).
If OK, continue with next check.
If all operational check are OK (symptom can not be duplicated), go to "Incident Simulation Tests" (GI-25) and perform tests as outlined to simulate driving conditions environment. If symptom appears, refer to "Symptom Table" (HA-184) and perform applicable trouble diagnosis procedures.

A/C System

TROUBLE DIAGNOSIS PROCEDURE FOR A/C SYSTEM

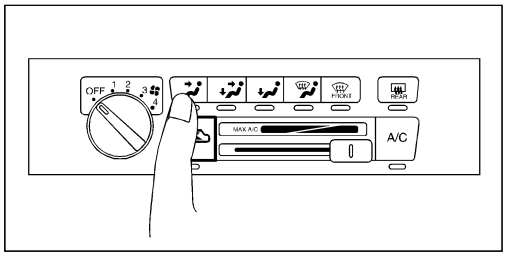
=NFHA0253

Symptom:

- **A/C system does not come on.**

INSPECTION FLOW

1. Confirm symptom by performing the following operational check.



OPERATIONAL CHECK

Confirm that the system operate normally.

If OK (symptom cannot be duplicated), perform complete operational check (*2).
If NG (symptom is confirmed), continue with STEP-2 following.

2. Check for any service bulletins.
OK
3. Check main power supply and ground circuit. (*1)
OK
4. Go to A/C system circuit. (*3)
OK
5. Replace push control unit.
OK
INSPECTION END

RHA992H

*1: HA-188 *2: HA-185 *3: HA-179

MAIN POWER SUPPLY AND GROUND CIRCUIT CHECK

=NFHA0254

Power Supply Circuit Check

NFHA0254S01

Check power supply circuit for air conditioner system.
Refer to EL-11, "Wiring Diagram — POWER —".

DIAGNOSTIC PROCEDURE

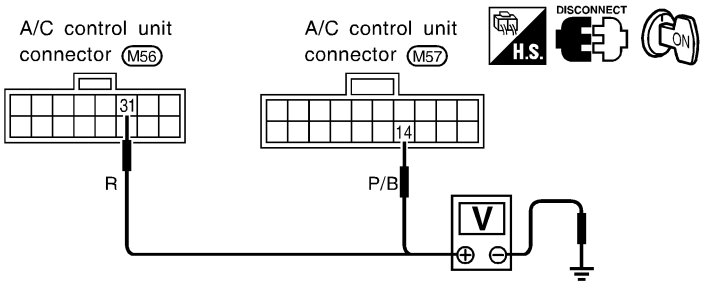
NFHA0255

SYMPTOM:

- **A/C system does not come on.**

1	CHECK POWER SUPPLY CIRCUIT FOR A/C CONTROL UNIT

Measure voltage across terminal Nos. 14, 31 and body ground.



RHA993HA

Votmeter terminal		Voltage
(+)	(–)	
14	Body ground	Approx. 12V
31		

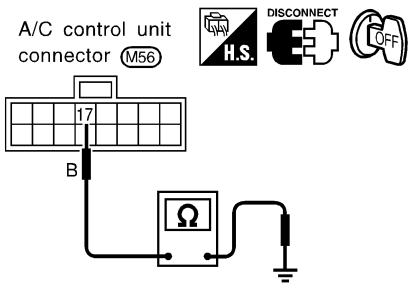
MTBL0619

OK or NG

OK	▶	GO TO 2.
NG	▶	Check 10A fuses (Nos. 12, 28) at fuse block.

2	CHECK BODY GROUND CIRCUIT FOR A/C CONTROL UNIT

Check for continuity between terminal No. 17 and body ground.



RHA391H

Ohmmeter terminal		Continuity
(+)	(–)	
17	Body ground	Yes

MTBL0324

OK or NG

OK	▶	**INSPECTION END**
NG	▶	If NG, repair harness or connector.

Intake Door

TROUBLE DIAGNOSIS PROCEDURE FOR INTAKE DOOR

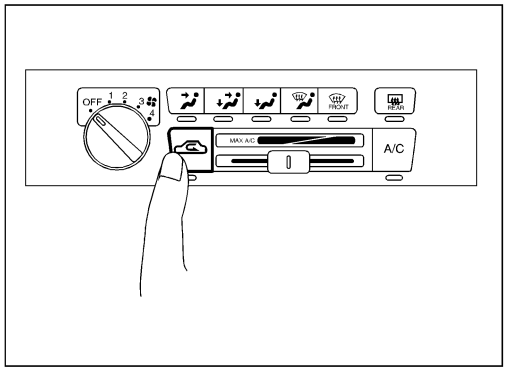
=NFHA0135

Symptom:

- **Intake door does not change in VENT, B/L or FOOT mode.**

Inspection Flow

1. Confirm symptom by performing the following operational check.



OPERATIONAL CHECK – Recirculation

1) Press recirculation switch.
   Recirculation indicator should light.
2) Listen for intake door position change (you should hear blower sound change slightly).

NOTE:
Confirm that the RECIRCULATION (REC) switch is canceled in the DEF ( ) and D/F ( ) mode.

2. Check for any service bulletins.

3. Check intake door motor circuit. (*1)

OK

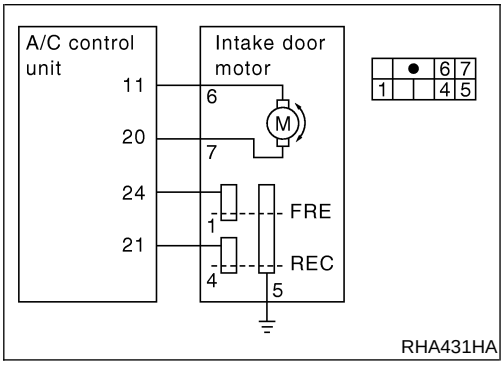
If the symptom still exist, perform a complete operational check (*2) and check for other symptoms.
[Refer to symptom table, (*3).]
Does another symptom exist?

Yes → Go to Trouble Diagnosis for related symptom.
[Another symptom exists.]

INSPECTION END

RHA994H

*1: HA-191 *2: HA-185 *3: HA-184



RHA431HA

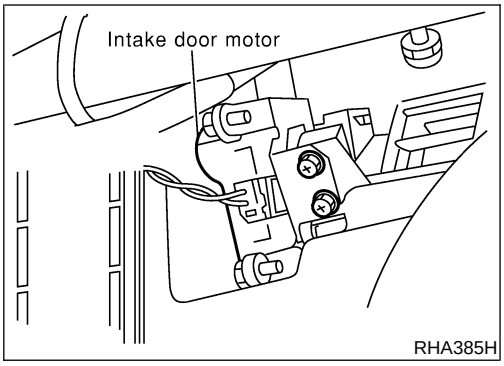
SYSTEM DESCRIPTION

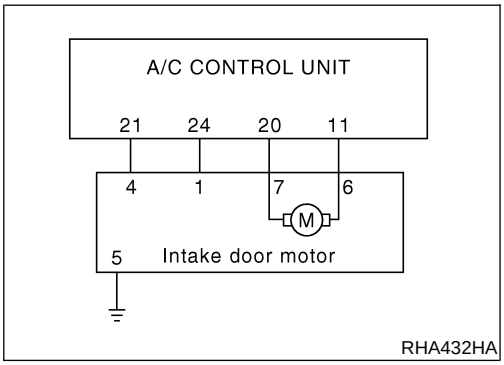
NFHA0136

Intake Door Motor

NFHA0136S01

The intake door motor is installed on the blower and intake unit. Using a link it opens and closes the intake door.
When RECIRCULATION switch is at REC (except DEF and D/F modes), the A/C control unit sets the intake door at the “RECIRCULATION” position.
RECIRCULATION switch is canceled by MODE switch in DEF and D/F modes.





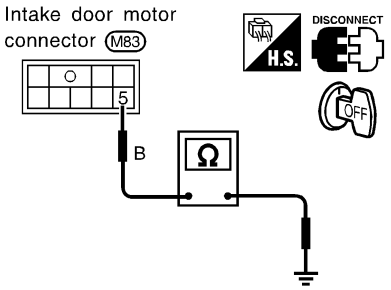
DIAGNOSTIC PROCEDURE

NFHA0090

SYMPTOM: Intake door motor does not operate normally.

1	CHECK BODY GROUND CIRCUIT FOR INTAKE DOOR MOTOR

Check circuit continuity between intake door harness terminal No. 5 and body ground.



Continuity should exist.

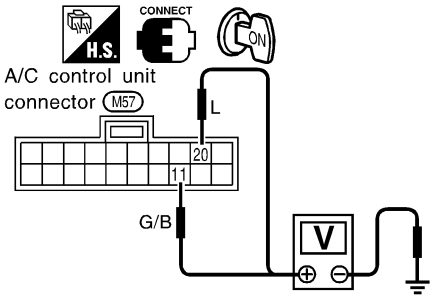
If OK, check harness for short.

OK or NG

OK	▶	GO TO 2.
NG	▶	Repair harness or connector.

2 **CHECK FOR AUTO AMP. OUTPUT**

Measure voltage across auto amp. harness terminals and body ground.



Recirculation switch condition	Terminals No. (+)	Terminals No. (–)	Condition	Voltage V
REC	20	Body ground	REC	12
	11			0
FRE	11		FRE	12
	20			0

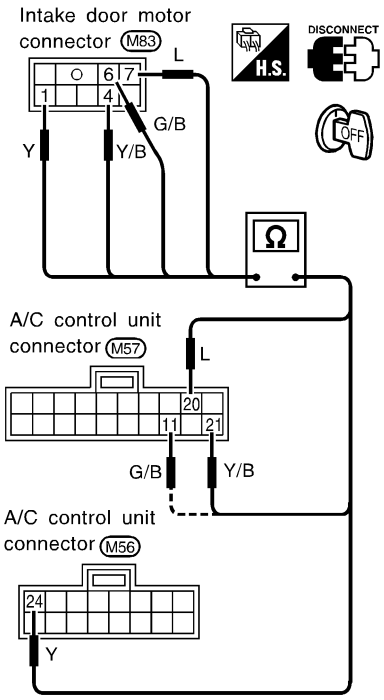
0V : Approx. 0V
12V: Approx. 12V

SHA324FB

OK or NG

OK	▶	INSPECTION END
NG	▶	GO TO 3.

3 **CHECK CIRCUIT CONTINUITY BETWEEN EACH TERMINAL ON A/C CONTROL UNIT AND ON INTAKE DOOR MOTOR**



Terminal No. A/C CONTROL UNIT	Terminal No. Intake door motor	Continuity
11	6	Yes
20	7	
21	4	
24	1	

RHA435HB

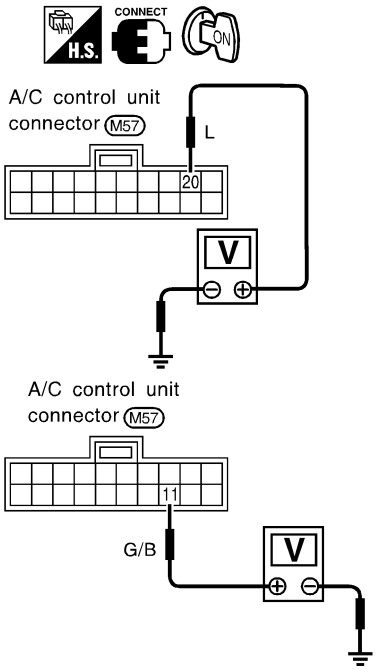
Continuity should exist.
If OK, check harness for short.

OK or NG

OK	▶	GO TO 4.
NG	▶	Repair harness or connector.

4	CHECK FOR A/C CONTROL UNIT OUTPUT

Measure voltage across A/C control unit harness terminals and body ground.



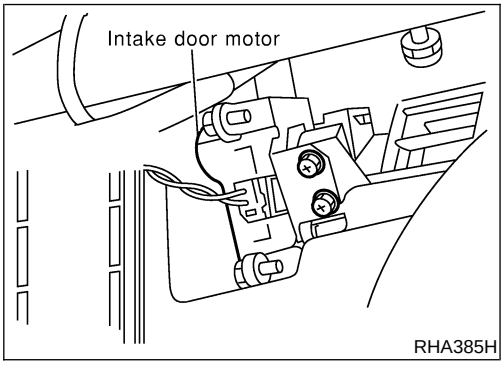
RECIRCULATION SWITCH	Terminals No. (+)	Terminals No. (−)	Condition	Voltage V
REC (ON)	20	Body ground	REC	12
	11			0
FRE (OFF)	20		FRE	0
	11			12

0V: Approx. 0V
12V: Approx. 12V

RHA436HA

OK or NG

OK	▶	Replace intake door motor.
NG	▶	Replace A/C control unit.



CONTROL LINKAGE ADJUSTMENT

NFHA0093

Intake Door Motor

NFHA0093S04

1. Install intake door motor on blower and intake unit. Ensure that the intake door motor lever is fitted into the slit portion of intake door link.
2. Connect the intake door motor harness connector.
3. Turn ignition switch to ON.
4. Check that intake door operates properly when RECIRCULATION switch is turned ON and OFF.

Blower Motor

TROUBLE DIAGNOSIS PROCEDURE FOR BLOWER MOTOR

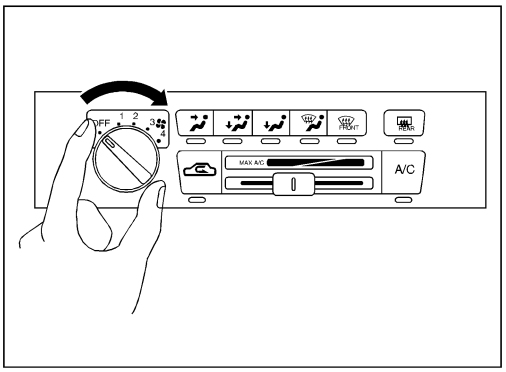
=NFHA0138

Symptom:

- **Blower motor does not rotate at all.**

Inspection Flow

1. Confirm symptom by performing the following operational check.



OPERATIONAL CHECK – Blower motor

1) Turn fan control dial to 1-speed.
   Blower should operate on 1-speed.
2) Then turn fan control dial to 2-speed.
3) Continue checking blower speed until all four speeds are checked.
4) Leave blower on 4-speed.

2. Check for any service bulletins.

3. Check blower motor circuit. (*1)

OK

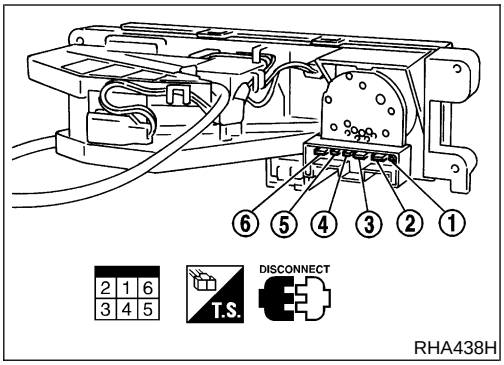
If the symptom still exist, perform a complete operational check (*2) and check for other symptoms.
[Refer to symptom table, (*3).]
Does another symptom exist?

Yes → Go to Trouble Diagnosis for related symptom.
[Another symptom exists.]

INSPECTION END

RHA995H

*1: HA-196 *2: HA-185 *3: HA-184



RHA438H

ELECTRICAL COMPONENTS INSPECTION

=NFHA0139

Fan Switch

NFHA0139S01

Check continuity between terminals at each switch position.

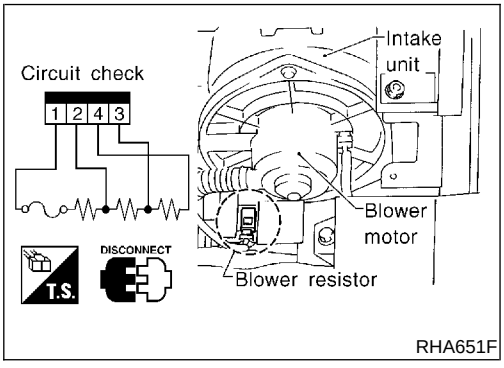
SWITCH POSITION	Continuity between terminals
OFF	
1	2 — 1 — 6
2	3 — 1 — 6
3	4 — 1 — 6
4	5 — 1 — 6

Blower Motor

NFHA0139S02

Confirm smooth rotation of the blower motor.

- Ensure that there are no foreign particles inside the intake unit.



RHA651F

Blower Resistor

NFHA0139S03

Check resistance between terminals.

Terminal No.		Resistance
(+)	(−)	
3	1	Approx. 0.9 - 1.1Ω
4		Approx. 2.75 - 2.95Ω
2		Approx. 0.3 - 0.5Ω

DIAGNOSTIC PROCEDURE

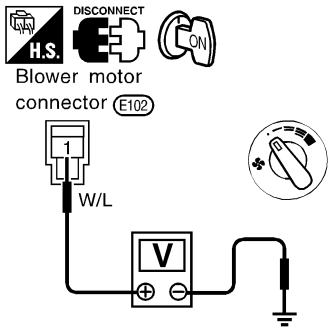
=NFHA0089

SYMPTOM:

- **Blower motor does not rotate.**

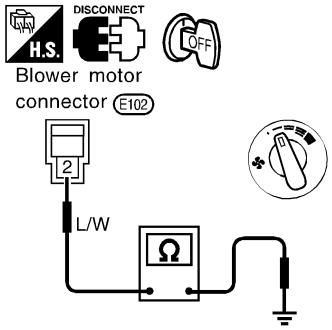
Test group No.	INCIDENT
1	Fan fails to rotate.
2	Fan does not rotate at 1-speed.
3	Fan does not rotate at 2-speed.
4	Fan does not rotate at 3-speed.
5	Fan does not rotate at 4-speed.

1	**DIAGNOSTIC PROCEDURE**	
Check if blower motor rotates properly at each fan speed. Conduct checks as per table at above.		
1	▶	GO TO 2.
2, 3, 4	▶	GO TO 8.
5	▶	GO TO 10.

2	**CHECK POWER SUPPLY FOR BLOWER MOTOR**	
1. Disconnect blower motor harness connector. 2. Do approx. 12 volts exist between blower motor harness terminal No. 1 and body ground?		
 RHA343FC		
Yes or No		
Yes	▶	GO TO 3.
No	▶	Check 15A (Nos. 51 and No. 52) fuses at fuse block. Refer to EL-11, "Wiring Diagram — POWER —". Check blower relay.

3	CHECK CIRCUIT CONTINUITY FOR BLOWER MOTOR

1. Turn fan control switch to any position except OFF.
2. Check circuit continuity between blower motor harness terminal No. 2 and body ground.



RHA344FC

Continuity should exist.

OK or NG

OK	▶	GO TO 4.
NG	▶	Reconnect blower motor harness connector. GO TO 5.

4	CHECK BLOWER MOTOR

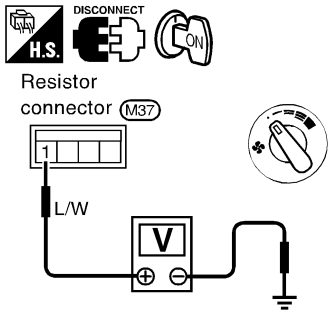
(Refer to Electrical Components Inspection.)
(HA-195)

OK or NG

OK	▶	INSPECTION END
NG	▶	Replace blower motor.

5	CHECK BLOWER MOTOR CIRCUIT BETWEEN BLOWER MOTOR AND RESISTOR

Do approx. 12 volts exist between resistor harness terminal No. 1 and body ground?



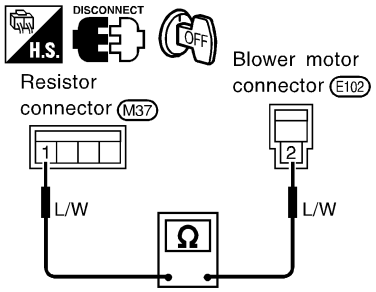
RHA575FB

Yes or No

Yes	▶	Disconnect fan switch harness connector. GO TO 7.
No	▶	Disconnect blower motor and resistor harness connectors. GO TO 6.

6	CHECK CIRCUIT CONTINUITY BETWEEN BLOWER MOTOR AND RESISTOR

Check circuit continuity between blower motor harness terminal No. 2 and resistor harness terminal No. 1.



RHA576FB

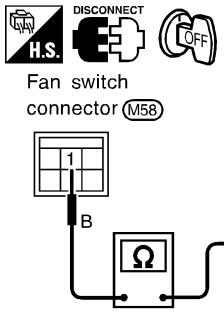
Continuity should exist.
If OK, check harness for short.

OK or NG

OK	▶	INSPECTION END
NG	▶	Repair harness or connector.

7	CHECK GROUND CIRCUIT FOR FAN SWITCH

Check circuit continuity between fan switch harness terminal No. 1 and body ground.



RHA440H

OK or NG

OK	▶	GO TO 8.
NG	▶	Repair harness or connector.

8	CHECK RESISTOR AFTER DISCONNECTING IT

(Refer to Electrical Components Inspection.)
(HA-195)

OK or NG

OK	▶	GO TO 9.
NG	▶	Replace resistor.

9	CHECK RESISTOR HARNESS CONNECTOR

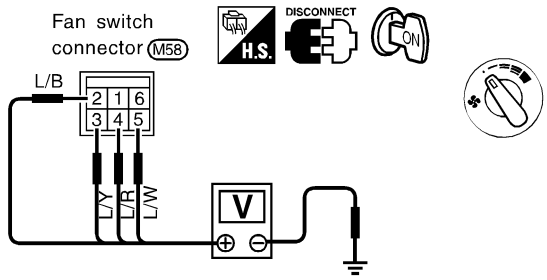
Reconnect resistor harness connector.

OK or NG

1	▶	GO TO 12.
2, 3, 4	▶	GO TO 10.

10	CHECK FAN SWITCH CIRCUIT

Do approx. 12 volts exist between each fan switch harness terminal and body ground?



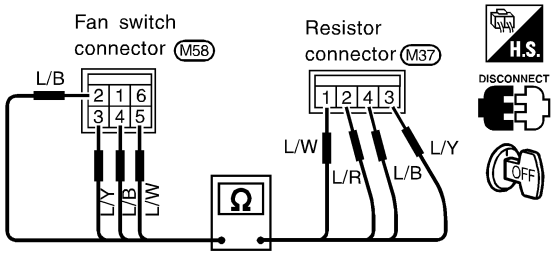
Test group No.	Terminals No. (+)	Terminals No. (−)	Voltage
2	5	Body ground	Approx. 12V
3	4		
4	3		
5	2		

SHA325F

Yes or No

Yes	▶	GO TO 12.
No	▶	GO TO 11.

11	CHECK CIRCUIT CONTINUITY BETWEEN FAN SWITCH HARNESS TERMINAL AND RESISTOR HARNESS TERMINAL



Terminal No. Fan switch	Terminal No. Resistor	Continuity
2	4	Yes
3	3	
4	2	
5	1	

SHA326F

OK or NG

OK	▶	Check harness for short.
NG	▶	Repair harness or connector.

12	CHECK FAN SWITCH AFTER DISCONNECTING IT

(Refer to Electrical Components Inspection.)
(HA-195)

OK or NG

OK	▶	INSPECTION END
NG	▶	Replace fan switch.

Insufficient Cooling

TROUBLE DIAGNOSIS PROCEDURE FOR INSUFFICIENT COOLING

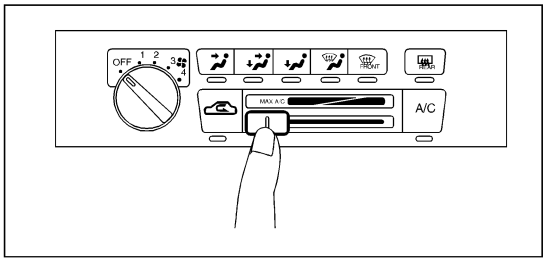
=NFHA0150

Symptom:

- **Insufficient Cooling.**

Inspection Flow

1. Confirm symptom by performing the following operational check.



OPERATIONAL CHECK – Temperature decrease

1) Turn fan control dial to 1-speed.
2) Slide temperature control lever to full cold.
3) Check for cold air at discharge air outlets.

2. Check for any service bulletins.

3. Check compressor belt tension. Refer to MA-(*9), "Checking Drive Belts". — NG → Adjust or replace compressor belt.

OK

4. Check air mix door. (*1) — NG → Go to DIAGNOSTIC PROCEDURE for air mix door motor. (*8)

OK

5. Check cooling fan motor operation. — NG → Refer to EC-(*10), "DTC P1217 ENGINE OVER TEMPARATURE (OVERHEAT)".

OK

Before connecting ACR4 to vehicle, check ACR4 gauges. No refrigerant pressure should be displayed. If NG, recover refrigerant from equipment lines.

Confirm refrigerant purity in supply tank using ACR4 and refrigerant identifier. — NG → Refer to Contaminated refrigerant. (*7)

OK

Connect ACR4 to vehicle.
Confirm refrigerant purity in vehicle A/C system using ACR4 and refrigerant identifier. — NG → Refer to Contaminated refrigerant. (*7)

OK

6. Check refrigeration cycle pressure with manifold gauge connected. Refer to (*2). — NG → Perform Performance Test Diagnoses. Refer to (*3).

OK

7. Check for evaporator coil freeze up. — NG (Freeze up) → Replace compressor. (*6)

(Does not freeze up.)

OK

8. Check ducts for air leaks. — NG → Repair air leaks.

OK

If the symptom still exist, perform a complete operational check (*4) and check for other symptoms.
[Refer to symptom table, (*5).]
Does another symptom exist? — Yes → Go to Trouble Diagnosis for related symptom.

[Another symptom exists.]

No

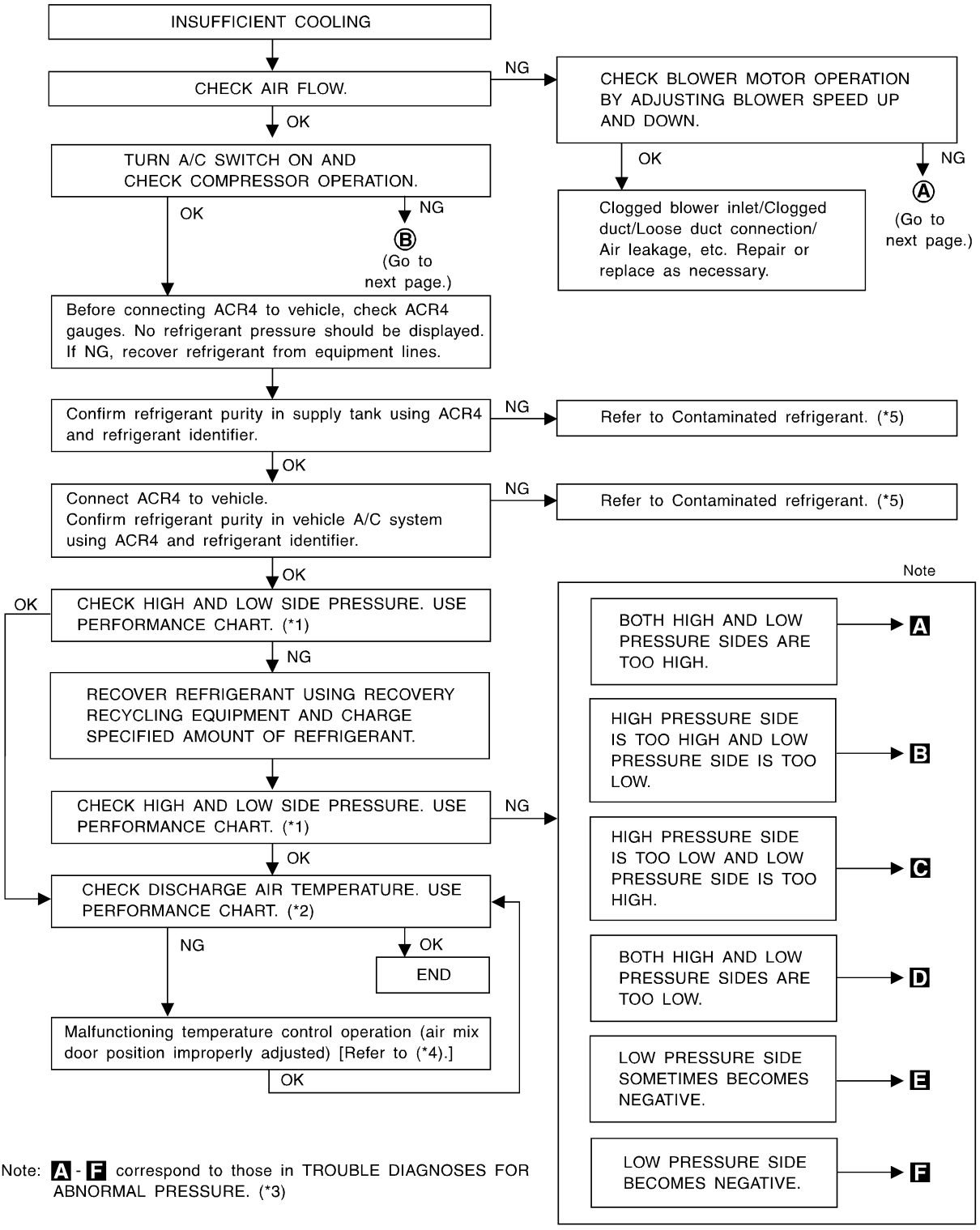
INSPECTION END

RHA996H

*1: HA-209
*2: HA-203
*3: HA-201
*4: HA-185
*5: HA-184
*6: HA-230
*7: HA-156
*8: HA-209
*9: MA-13
*10: EC-532

PERFORMANCE TEST DIAGNOSES

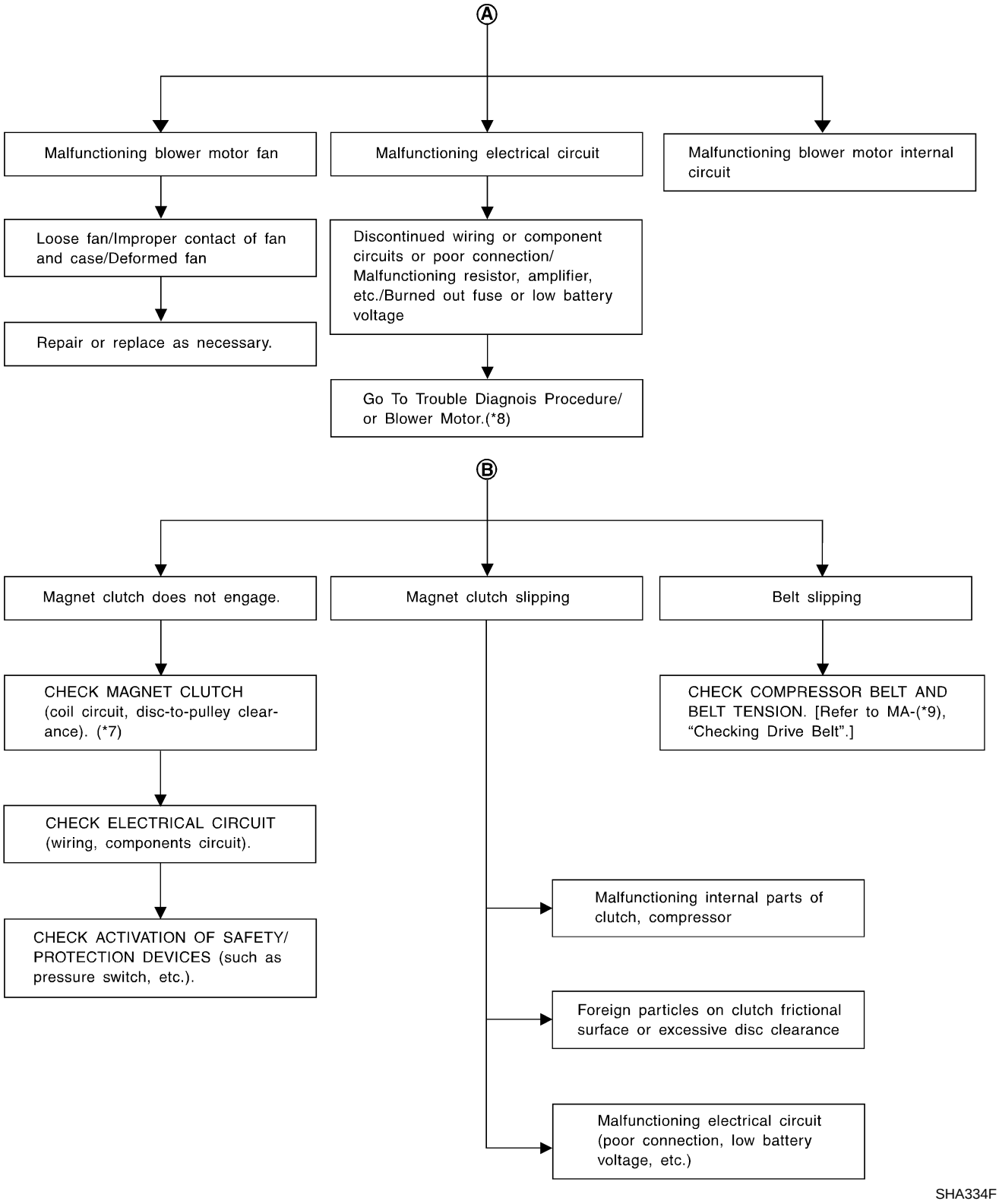
NFHA0082



Note: A - F correspond to those in TROUBLE DIAGNOSES FOR ABNORMAL PRESSURE. (*3)

SHA333F

*1: HA-203
*2: HA-203
*3: HA-204
*4: HA-209
*5: HA-156



SHA334F

*7: HA-232 *8: HA-194 *9: MA-13

PERFORMANCE TEST

=NFHA0083

Test Condition

NFHA0083S01

Testing must be performed as follows:

Vehicle location	Indoors or in the shade (in a well-ventilated place)
Doors	Closed
Door windows	Open
Hood	Open
TEMP.	Max. COLD
Discharge Air	Face Vent
REC switch	(Recirculation) set
FAN speed	High speed
Engine speed	Idle speed
Operate the air conditioning system for 10 minutes before taking measurements.	

Test Reading

NFHA0083S02

Recirculating-to-discharge Air Temperature Table

NFHA0083S0201

Inside air (Recirculating air) at blower assembly inlet		Discharge air temperature at center ventilator °C (°F)
Relative humidity %	Air temperature °C (°F)	
50 - 60	15 (59)	3.5 - 5.4 (38 - 42)
	20 (68)	6.6 - 8.9 (44 - 48)
	25 (77)	9.5 - 12.6 (49 - 55)
	30 (86)	13.4 - 16.5 (56 - 62)
	35 (95)	17.6 - 21.3 (64 - 70)
60 - 70	15 (59)	5.4 - 7.1 (42 - 45)
	20 (68)	8.9 - 11.0 (48 - 52)
	25 (77)	12.6 - 15.4 (55 - 60)
	30 (86)	16.5 - 20.0 (62 - 68)
	35 (95)	21.3 - 24.8 (70 - 77)

Ambient Air Temperature-to-operating Pressure Table

NFHA0083S0202

Ambient air		High-pressure (Discharge side) kPa (kg/cm^2, psi)	Low-pressure (Suction side) kPa (kg/cm^2, psi)
Relative humidity %	Air temperature °C (°F)		
50 - 70	15 (59)	539 - 657 (5.5 - 6.7, 78 - 95)	177 - 216 (1.8 - 2.2, 26 - 31)
	20 (68)	677 - 824 (6.9 - 8.4, 98 - 119)	167 - 206 (1.7 - 2.1, 24 - 30)
	25 (77)	843 - 1,030 (8.6 - 10.5, 122 - 149)	177 - 226 (1.8 - 2.3, 26 - 33)
	30 (86)	1,030 - 1,275 (10.5 - 13.0, 149 - 185)	216 - 255 (2.2 - 2.6, 31 - 37)
	35 (95)	1,245 - 1,520 (12.7 - 15.5, 181 - 220)	265 - 324 (2.7 - 3.3, 38 - 47)

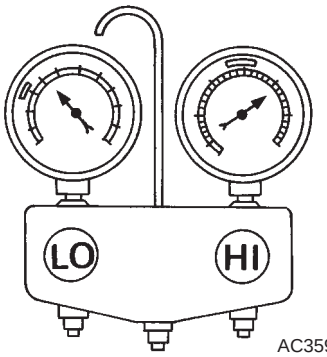
TROUBLE DIAGNOSES FOR ABNORMAL PRESSURE

NFHA0084

Whenever system's high and/or low side pressure is abnormal, diagnose using a manifold gauge. The marker above the gauge scale in the following tables indicates the standard (normal) pressure range. Since the standard (normal) pressure, however, differs from vehicle to vehicle, refer to HA-203 ("Ambient air temperature-to-operating pressure table").

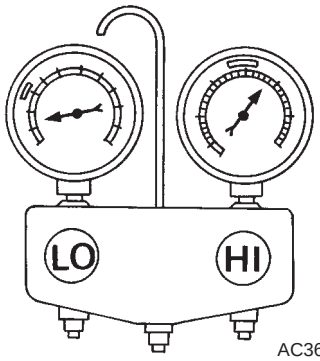
Both High and Low-pressure Sides are Too High.

NFHA0084S01

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Both high and low-pressure sides are too high. A  AC359A	• Pressure is reduced soon after water is splashed on condenser.	Excessive refrigerant charge in refrigeration cycle	Reduce refrigerant until specified pressure is obtained.
	Air suction by cooling fan is insufficient.	Insufficient condenser cooling performance ↓ 1. Condenser fins are clogged. 2. Improper fan rotation of cooling fan	• Clean condenser. • Check and repair cooling fan as necessary.
	• Low-pressure pipe is not cold. • When compressor is stopped high-pressure value quickly drops by approximately 196 kPa (2 kg/cm^2, 28 psi). It then decreases gradually thereafter.	Poor heat exchange in condenser (After compressor operation stops, high pressure decreases too slowly.) ↓ Air in refrigeration cycle	Evacuate repeatedly and recharge system.
	Engine tends to overheat.	Engine cooling systems malfunction.	Check and repair each engine cooling system.
	• An area of the low-pressure pipe is colder than areas near the evaporator outlet. • Plates are sometimes covered with frost.	• Excessive liquid refrigerant on low-pressure side • Excessive refrigerant discharge flow • Expansion valve is open a little compared with the specification. ↓ 1. Improper thermal valve installation 2. Improper expansion valve adjustment	Replace expansion valve.

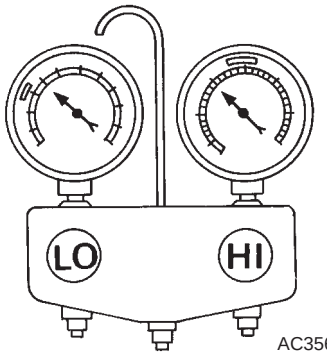
High-pressure Side is Too High and Low-pressure Side is Too Low.

NFHA0084S02

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
High-pressure side is too high and low-pressure side is too low. B  AC360A	Upper side of condenser and high-pressure side are hot, however, liquid tank is not so hot.	High-pressure tube or parts located between compressor and condenser are clogged or crushed.	• Check and repair or replace malfunctioning parts. • Check lubricant for contamination.

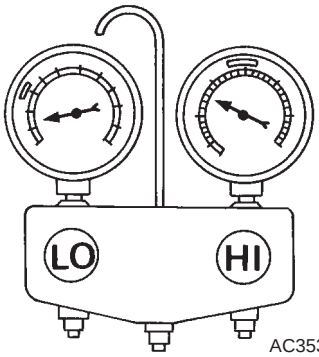
High-pressure Side is Too Low and Low-pressure Side is Too High.

NFHA0084S03

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
High-pressure side is too low and low-pressure side is too high. C  AC356A	High and low-pressure sides become equal soon after compressor operation stops.	Compressor pressure operation is improper. ↓ Damaged inside compressor packings.	Replace compressor.
	No temperature difference between high and low-pressure sides	Compressor pressure operation is improper. ↓ Damaged inside compressor packings.	Replace compressor.

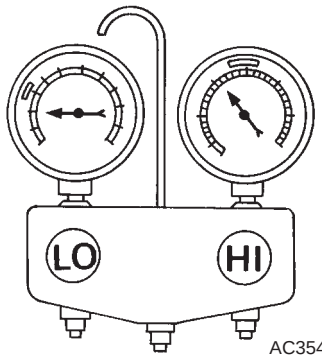
Both High- and Low-pressure Sides are Too Low.

NFHA0084S04

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Both high- and low-pressure sides are too low. D  AC353A	• There is a big temperature difference between receiver drier outlet and inlet. Outlet temperature is extremely low. • Liquid tank inlet and expansion valve are frosted.	Compressor discharge capacity does not change. (Compressor stroke is set at maximum.)	• Replace liquid tank. • Check lubricant for contamination.
	• Temperature of expansion valve inlet is extremely low as compared with areas near liquid tank. • Expansion valve inlet may be frosted. • Temperature difference occurs somewhere in high-pressure side	High-pressure pipe located between receiver drier and expansion valve is clogged.	• Check and repair malfunctioning parts. • Check lubricant for contamination.
	• Expansion valve and liquid tank are warm or only cool when touched.	Low refrigerant charge ↓ Leaking fittings or components	Check refrigerant for leaks. Refer to "Checking Refrigerant Leaks", HA-237.
	There is a big temperature difference between expansion valve inlet and outlet while the valve itself is frosted.	Expansion valve closes a little compared with the specification. ↓ 1. Improper expansion valve adjustment 2. Malfunctioning thermal valve 3. Outlet and inlet may be clogged.	• Remove foreign particles by using compressed air. • Check lubricant for contamination.
	An area of the low-pressure pipe is colder than areas near the evaporator outlet.	Low-pressure pipe is clogged or crushed.	• Check and repair malfunctioning parts. • Check lubricant for contamination.
	Air flow volume is not enough or is too low.	Evaporator is frozen. ↓ Compressor discharge capacity does not change. (Compressor stroke is set at maximum length.)	Replace compressor.

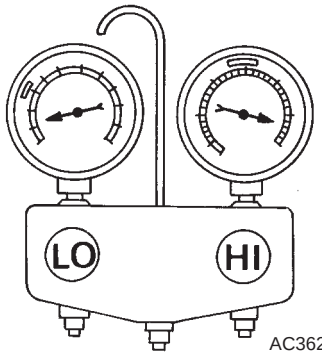
Low-pressure Side Sometimes Becomes Negative.

NFHA0084S05

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Low-pressure side sometimes becomes negative. E  AC354A	• Air conditioning system does not function and does not cyclically cool the compartment air. • The system constantly functions for a certain period of time after compressor is stopped and restarted.	Refrigerant does not discharge cyclically. ↓ Moisture is frozen at expansion valve outlet and inlet. ↓ Water is mixed with refrigerant.	• Drain water from refrigerant or replace refrigerant. • Replace liquid tank.

Low-pressure Side Becomes Negative.

NFHA0084S06

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Low-pressure side becomes negative. F  AC362A	Liquid tank or front/rear side of expansion valve's pipe is frosted or dewed.	High-pressure side is closed and refrigerant does not flow. ↓ Expansion valve or liquid tank is frosted.	Leave the system at rest until no frost is present. Start it again to check whether or not the problem is caused by water or foreign particles. • If water is the cause, initially cooling is okay. Then the water freezes causing a blockage. Drain water from refrigerant or replace refrigerant. • If due to foreign particles, remove expansion valve and remove particles with dry and compressed air (not shop air). • If either of the above methods cannot correct the problem, replace expansion valve. • Replace liquid tank. • Check lubricant for contamination.

Insufficient Heating

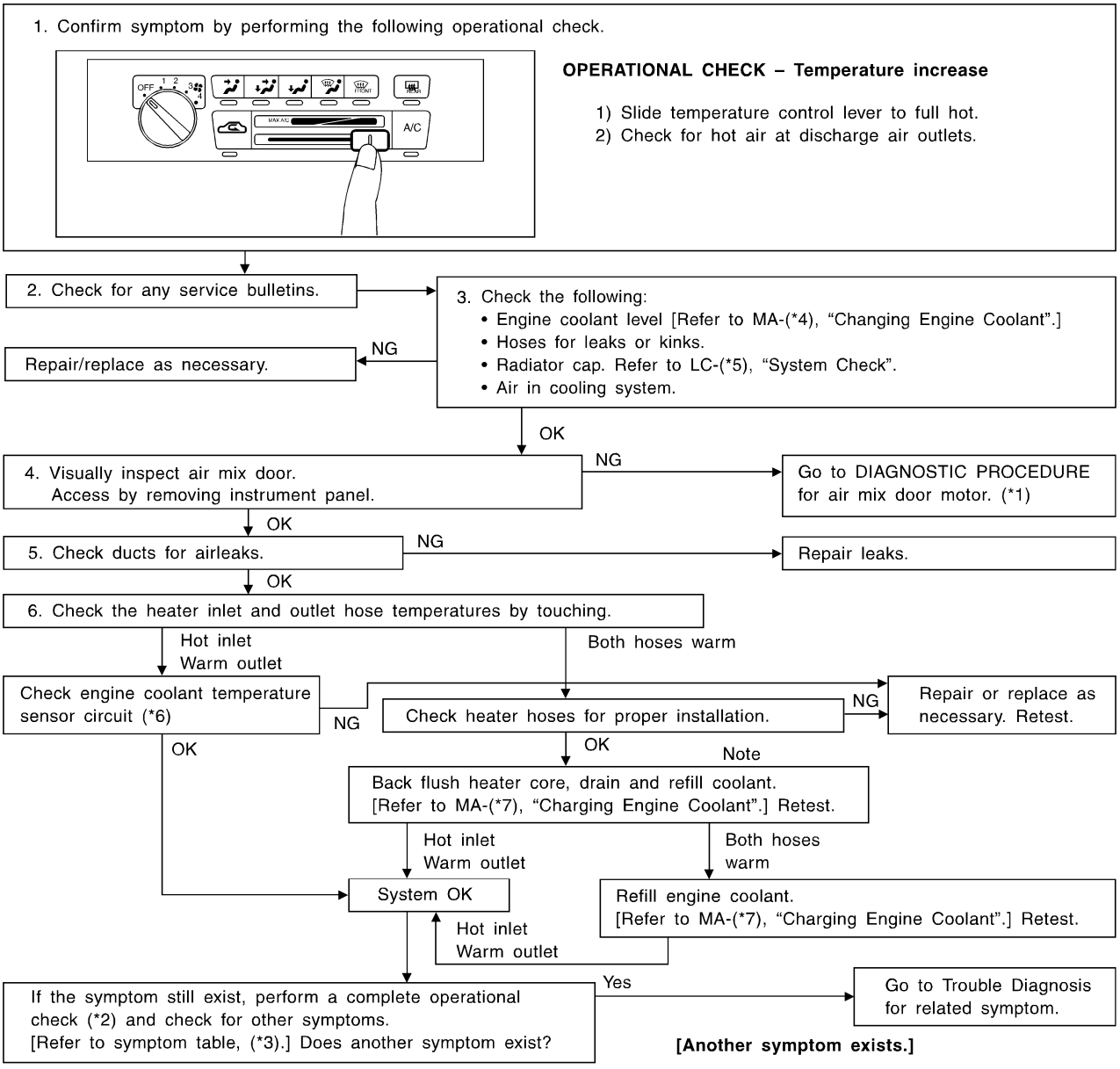
TROUBLE DIAGNOSIS PROCEDURE FOR INSUFFICIENT HEATING

=NFHA0140

Symptom:

- **Insufficient Heating.**

Inspection Flow



RHA066I

*1: HA-209
*2: HA-185
*3: HA-184
*4: MA-14
*5: LC-13
*6: LC-18
*7: MA-14

Air Mix Door

TROUBLE DIAGNOSIS PROCEDURE FOR AIR MIX DOOR MOTOR

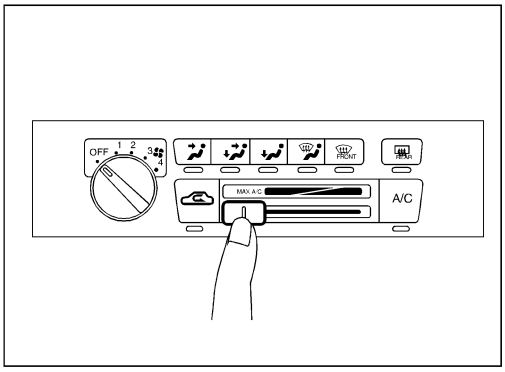
=NFHA0256

SYMPTOM:

- **Air mix door motor does not operate normally.**

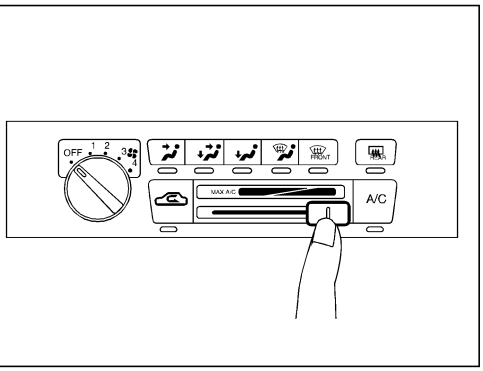
INSPECTION FLOW

1. Confirm symptom by performing the following operational check.



OPERATIONAL CHECK – Temperature decrease and increase

1. Check Temperature Decrease
a) Slide temperature control lever to full cold.
b) Check for cold air at discharge air outlets.



2. Check Temperature Increase
a) Slide temperature control lever to full hot.
b) Check for hot air at discharge air outlets.

If OK (symptom cannot be duplicated). Perform complete operational check. (*3)
If NG (symptom is confirmed), continue with STEP-2 following.

2. Check for any service bulletins.

3. Check air mix door. (*1)

OK

4. Check air mix door motor circuit. (*2)

OK

If the symptom still exist, perform a complete operational check and check for other symptoms.
[Refer to symptom table.]
Does another symptom exist?

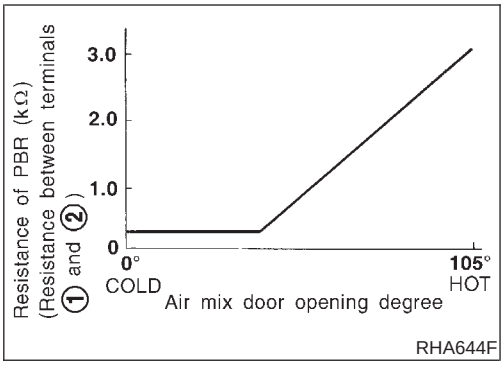
Yes → Go to Trouble Diagnosis for related symptom.

[Another symptom exists.]

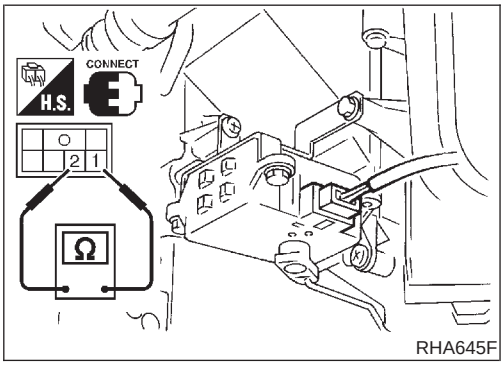
No → INSPECTION END

RHA998H

*1: HA-212 *2: HA-211 *3: HA-185



RHA644F



RHA645F

CONTROL SYSTEM INPUT COMPONENT

NFHA0258

PBR

NFHA0258S01

Measure resistance between terminals 1 and 2 at vehicle harness side.

DIAGNOSTIC PROCEDURE

=NFHA0259

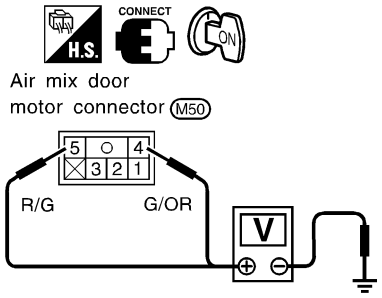
SYMPTOM:

- **Air mix door motor does not operate normally.**

1	CHECK POWER SUPPLY FOR A/C CONTROL UNIT.	
Refer to "MAIN POWER SUPPLY AND GROUND CIRCUIT CHECK", HA-188.		
OK or NG		
OK	▶	GO TO 2.
NG	▶	Repair or replace.

2	CHECK PBR	
Refer to HA-210.		
OK or NG		
OK	▶	GO TO 3.
NG	▶	Replace air mix door motor.

3	CHECK FOR OUTPUT OF AUTO AMP.	
Do approx. 10.5 volts exist between air mix door motor harness terminal Nos. 4, 5 and body ground?		



Air mix door operation	Terminal No. (+)	Terminal No. (−)	Voltage
Cold → Hot	4	Body ground	Approx. 10.5V
Hot → Cold	5		

SHA327F

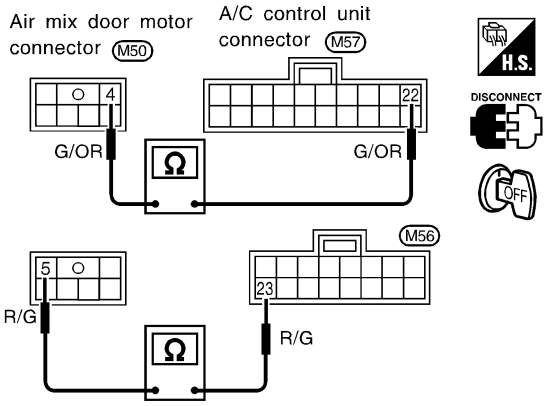
Yes or No

Yes	▶	GO TO 4.
No	▶	Replace A/C control unit.

4	CHECK CIRCUIT CONTINUITY BETWEEN AIR MIX DOOR MOTOR HARNESS TERMINAL NOS. (4), 5 AND A/C CONTROL UNIT HARNESS TERMINAL NOS. (22), 23

Continuity should exist.

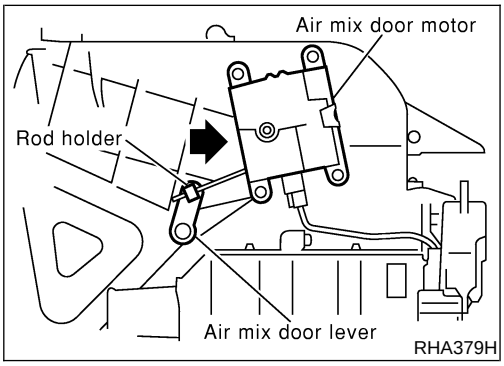
If OK, check harness for short.



RHA380H

OK or NG

OK	▶	Replace air mix door motor.
NG	▶	Repair harness or connector.



RHA379H

CONTROL LINKAGE ADJUSTMENT

NFHA0257

Air Mix Door

NFHA0257S01

1. Install air mix door motor on heater unit and connect it to main harness.
   Make sure lever of air mix door is fitted into the slit of the air mix door link.
2. Turn ignition switch to ON.
3. Slide temperature control lever to full cold.
4. Check that air mix door operates properly when temperature control lever is slid to full hot and full cold.

Mode Door

TROUBLE DIAGNOSIS PROCEDURE FOR MODE DOOR

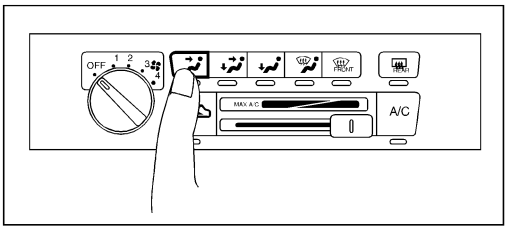
=NFHA0142

Symptom:

- **Air outlet does not change.**

Inspection Flow

1. Confirm symptom by performing the following operational check.



OPERATIONAL CHECK – Discharge air.

1) Push mode switch.

2) Confirm that discharge air comes out according to the air distribution table at left.
Refer to “Discharge Air Flow” in “DESCRIPTION” (*4).

Discharge air flow

Mode switch	Mode door/distribution		
	Face	Foot	Defroster
	100%	–	–
	60%	40%	–
	–	80%	20%
	–	60%	40%
	–	–	100%

2. Check for any service bulletins.

3. Check mode door operation. (*1)

NG → Go to Trouble Diagnosis Procedure for mode door motor. (*5)

OK

If the symptom still exist, perform a complete operational check (*2) and check for other symptoms.
[Refer to symptom table, (*3).]
Does another symptom exist?

Yes → Go to Trouble Diagnosis for related symptom.
[Another symptom exists.]

No → INSPECTION END

RHA999H

*1: HA-215
*2: HA-185
*3: HA-184
*4: HA-175
*5: HA-214

DIAGNOSTIC PROCEDURE

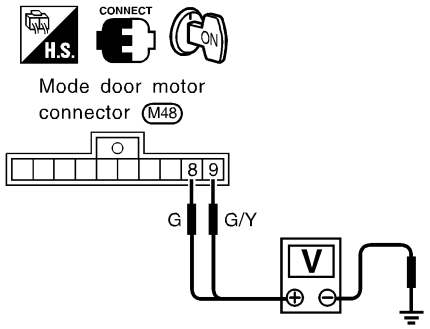
=NFHA0260

SYMPTOM:

- **Mode door motor does not operate normally.**

1	CHECK POWER SUPPLY FOR A/C CONTROL UNIT	
Refer to "MAIN POWER SUPPLY AND GROUND CIRCUIT CHECK", HA-188.		
OK or NG		
OK	▶	GO TO 2.
NG	▶	Repair or replace.

2	CHECK FOR OUTPUT OF A/C CONTROL UNIT	
Do approx. 10.5 volts exist between mode door motor harness terminal Nos. 8, 9 and body ground?		
Yes or No		
Yes	▶	GO TO 3.
No	▶	Replace auto amp.

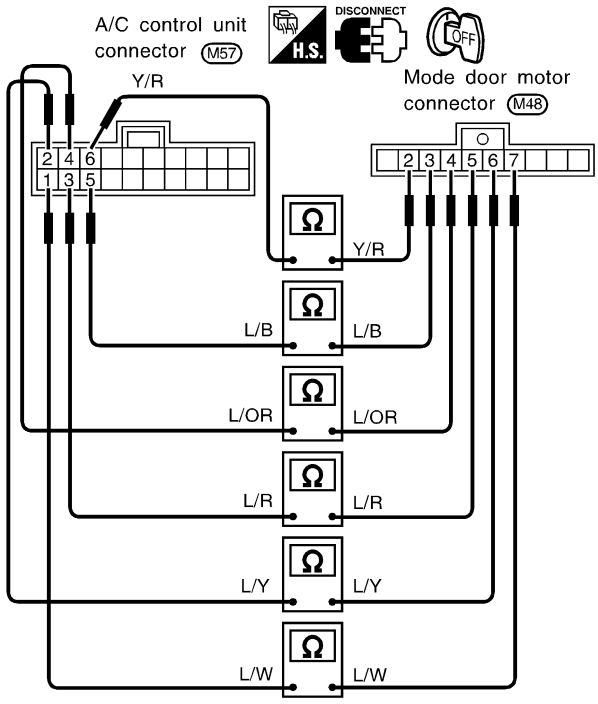


Mode door operation	Terminal No. (+)	Terminal No. (–)	Voltage
VENT → DEF	9	Body ground	Approx. 10.5V
DEF → VENT	8		

SHA328F

3	CHECK CIRCUIT CONTINUITY BETWEEN MODE DOOR MOTOR HARNESS TERMINAL AND A/C CONTROL UNIT HARNESS TERMINAL

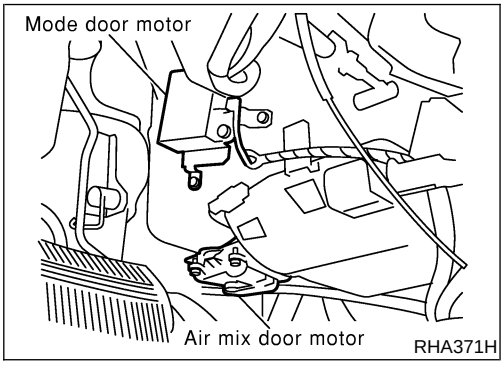
Continuity should exist.
If OK, check harness for short.



RHA395H

OK or NG

OK	▶	Replace air mix door motor.
NG	▶	Repair harness or connector.



RHA371H

CONTROL LINKAGE ADJUSTMENT

NFHA0151

Mode Door

NFHA0151S01

1. Install mode door motor on heater unit and connect it to main harness.
   Make sure lever of mode door motor is fitted into the slit of mode door link.
2. Turn ignition switch to ON.
3. Turn VENT switch ON.
4. Turn DEF switch ON. Check that slide link operates at the full-open position.
   Also turn DEF switch ON to check that slide link operates at the fully-open position.

Magnet Clutch

TROUBLE DIAGNOSIS PROCEDURE FOR MAGNET CLUTCH

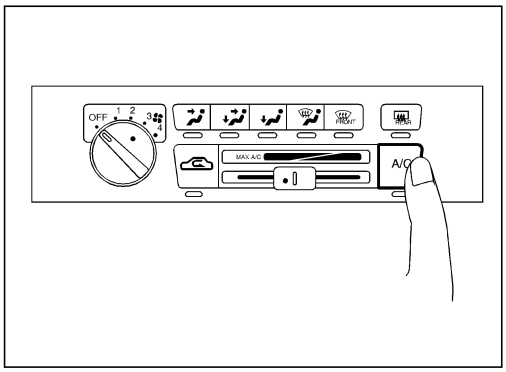
=NFHA0119

Symptom:

- **Magnet clutch does not operate when A/C switch and fan switch are ON.**

Inspection Flow

1. Confirm symptom by performing the following operational check.



OPERATIONAL CHECK – A/C switch

Slide fan control lever to the desired (1 to 4-speed) position and push the air conditioner switch to turn ON the air conditioner. The indicator light should come on when air conditioner is ON.

2. Check for any service bulletins.

3. Check compressor belt tension.
   Refer to MA-(*5), “Checking Drive Belts”.
   - NG → Adjust or replace compressor belt.
   - OK ↓

4. Check refrigerant.
   Connect manifold gauge then check system pressure.
   - NG → Check for refrigerant leaks. Refer to (*1).
   - OK ↓

5. Check magnet clutch circuit. (*2)
   - OK ↓

If the symptom still exist, perform a complete operational check (*3) and check for other symptoms.
[Refer to symptom table, (*4).]
Does another symptom exist?

- Yes → Go to Trouble Diagnosis for related symptom. **[Another symptom exists.]**
- INSPECTION END

RHA001I

*1: HA-237
*2: HA-217
*3: HA-185
*4: HA-184
*5: MA-13

DIAGNOSTIC PROCEDURE

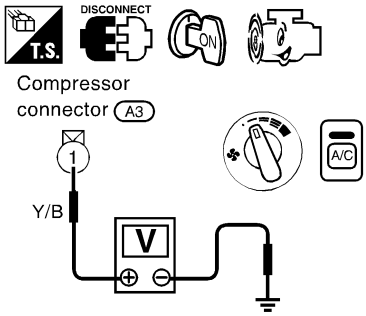
=NFHA0091

SYMPTOM:

- **Magnet clutch does not engage when A/C switch and fan switch are ON.**

1	CHECK POWER SUPPLY FOR COMPRESSOR

Disconnect compressor harness connector.
Do approx. 12 volts exist between compressor harness terminal No. 1 and body ground?



RHA747FI

Yes or No

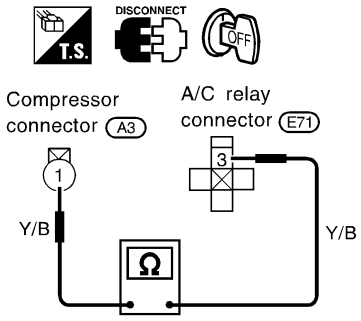
Yes	▶	GO TO 2.
No	▶	Disconnect A/C relay. GO TO 3.

2	CHECK MAGNET CLUTCH COIL

OK or NG

NG	▶	Replace magnet clutch. Refer to HA-230.

3	CHECK CIRCUIT CONTINUITY BETWEEN A/C RELAY HARNESS TERMINAL NO. 3 AND COMPRESSOR HARNESS TERMINAL NO. 1



RHA400HA

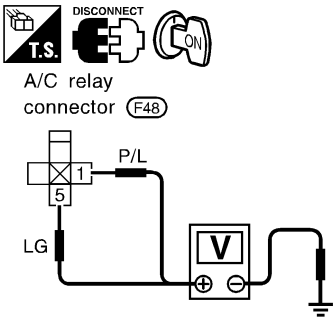
Continuity should exist.
If OK, check harness for short.

OK or NG

OK	▶	GO TO 4.
NG	▶	Repair harness or connector.

4	CHECK POWER SUPPLY FOR A/C RELAY

Disconnect A/C relay.
Do approx. 12 volts exist between A/C relay harness terminal Nos. 1, 5 and body ground?



RHA439H

Yes or No

Yes	▶	GO TO 5.
No	▶	Check power supply circuit and 10A (Nos. 28, 66) fuse at fuse block. Refer to EL-11, "Wiring Diagram — POWER —".

5	CHECK A/C RELAY AFTER DISCONNECTING IT

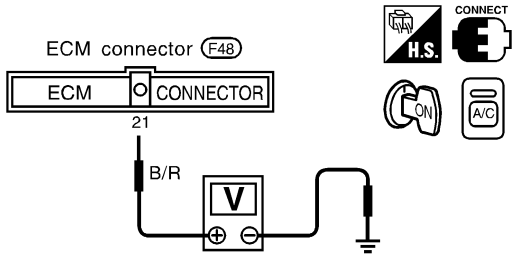
Refer to HA-222.

OK or NG

OK	▶	Reconnect A/C relay. GO TO 6.
NG	▶	Replace A/C relay.

6	CHECK COIL SIDE CIRCUIT OF A/C RELAY

Do approx. 0 volts exist between ECM harness terminal No. 21 and body ground?

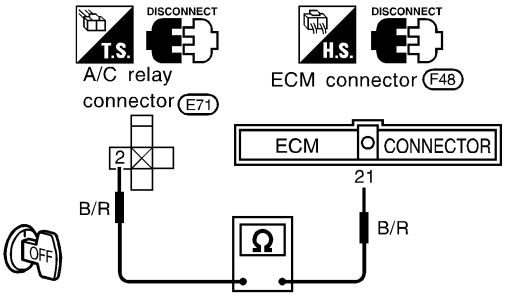


RHA081I

Yes or No

Yes	▶	GO TO 8.
No	▶	Disconnect A/C relay. Disconnect ECM harness connector. GO TO 7.

7	CHECK CIRCUIT CONTINUITY BETWEEN A/C RELAY HARNESS TERMINAL NO. 2 AND ECM HARNESS TERMINAL NO. 21



RHA082I

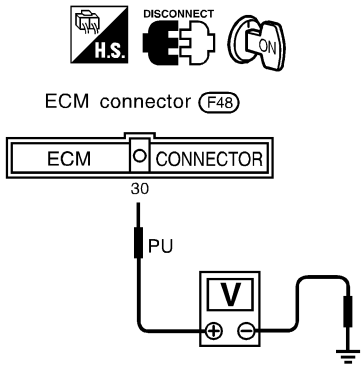
Continuity should exist.

OK or NG

OK	▶	Check harness for short.
NG	▶	Repair harness or connector.

8	CHECK REFRIGERANT PRESSURE SENSOR INPUT SIGNAL

Do approx. 4.6 volts between ECM harness terminal No. 30 and body ground?



RHA083I

Yes or No

Yes	▶	GO TO 9.
No	▶	Check ECM. Refer to EC-141, "ECM Terminals and Reference Value". Repair harness or connector.

9	CHECK REFRIGERANT PRESSURE SENSOR

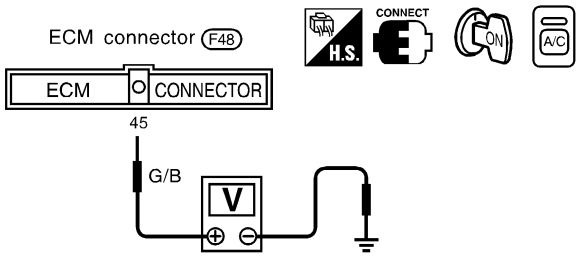
Refer to HA-222.

OK or NG

OK	▶	Disconnect A/C switch harness connector. GO TO 10.
NG	▶	Replace refrigerant pressure sensor.

10	CHECK VOLTAGE FOR ECM

Do approx. 0 volts exist between ECM harness terminal No. 45 and body ground?

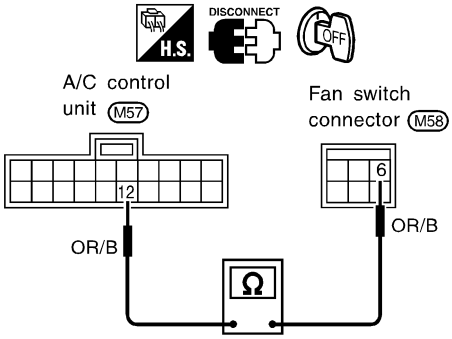


SHA312F

Yes or No

Yes	▶	GO TO 11.
No	▶	Check ECM. Refer to EC-141, "ECM Terminals and Reference Value". Repair harness or connector.

11	CHECK CIRCUIT CONTINUITY BETWEEN A/C CONTROL UNIT HARNESS TERMINAL NO. 12 AND FAN SWITCH HARNESS TERMINAL NO. 6



RHA450H

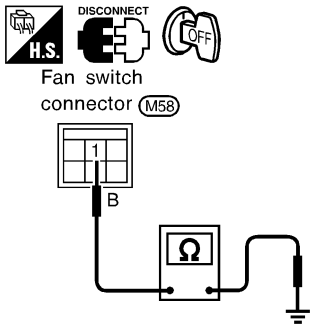
Continuity should exist.
If OK, check harness for short.

OK or NG

OK	▶	GO TO 12.
NG	▶	Repair harness or connector.

12	CHECK BODY GROUND CIRCUIT FOR FAN SWITCH

Does continuity exist between fan switch harness terminal No. 1 and body ground?



RHA451H

Yes or No

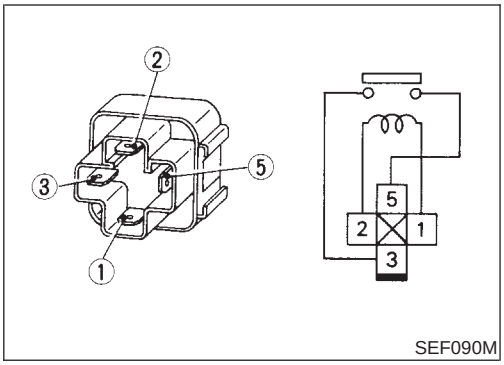
Yes	▶	GO TO 13.
No	▶	Repair harness or connector.

13	CHECK FAN SWITCH

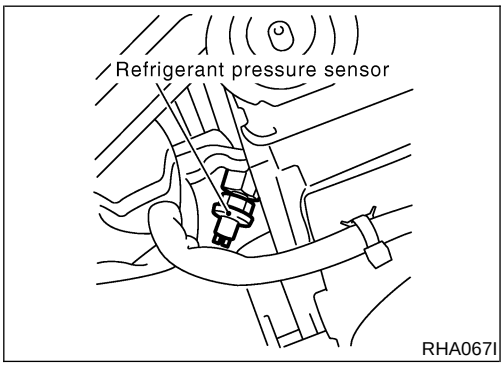
Refer to HA-195.

OK or NG

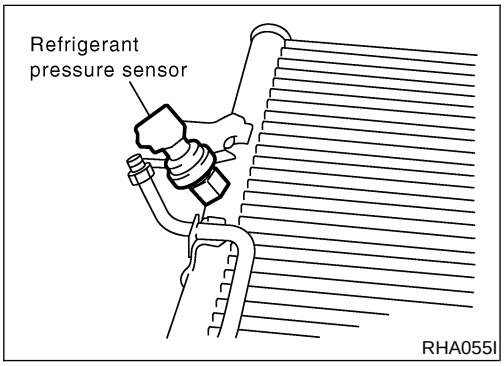
OK	▶	Replace A/C control unit.
NG	▶	Replace fan switch.



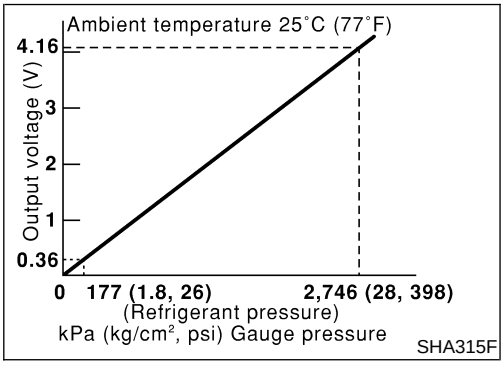
SEF090M



RHA067I



RHA055I



SHA315F

ELECTRICAL COMPONENTS INSPECTION

=NFHA0092

A/C Relay

NFHA0092S07

Check continuity between terminal Nos. 3 and 5.

Conditions	Continuity
12V direct current supply between terminal Nos. 1 and 2	Yes
No current supply	No

If NG, replace relay.

Refrigerant Pressure Sensor

NFHA0092S08

Make sure that higher A/C refrigerant pressure results in higher refrigerant-pressure sensor output voltage.

	OFF kPa (kg/cm^2, psi)
Low-pressure side	Decreasing to 0.18 (0.00184, 0.03)
High-pressure side	Increasing to 2.74 (0.0279, 0.40)

Refer to EC-726, "Diagnostic Procedure".

Noise

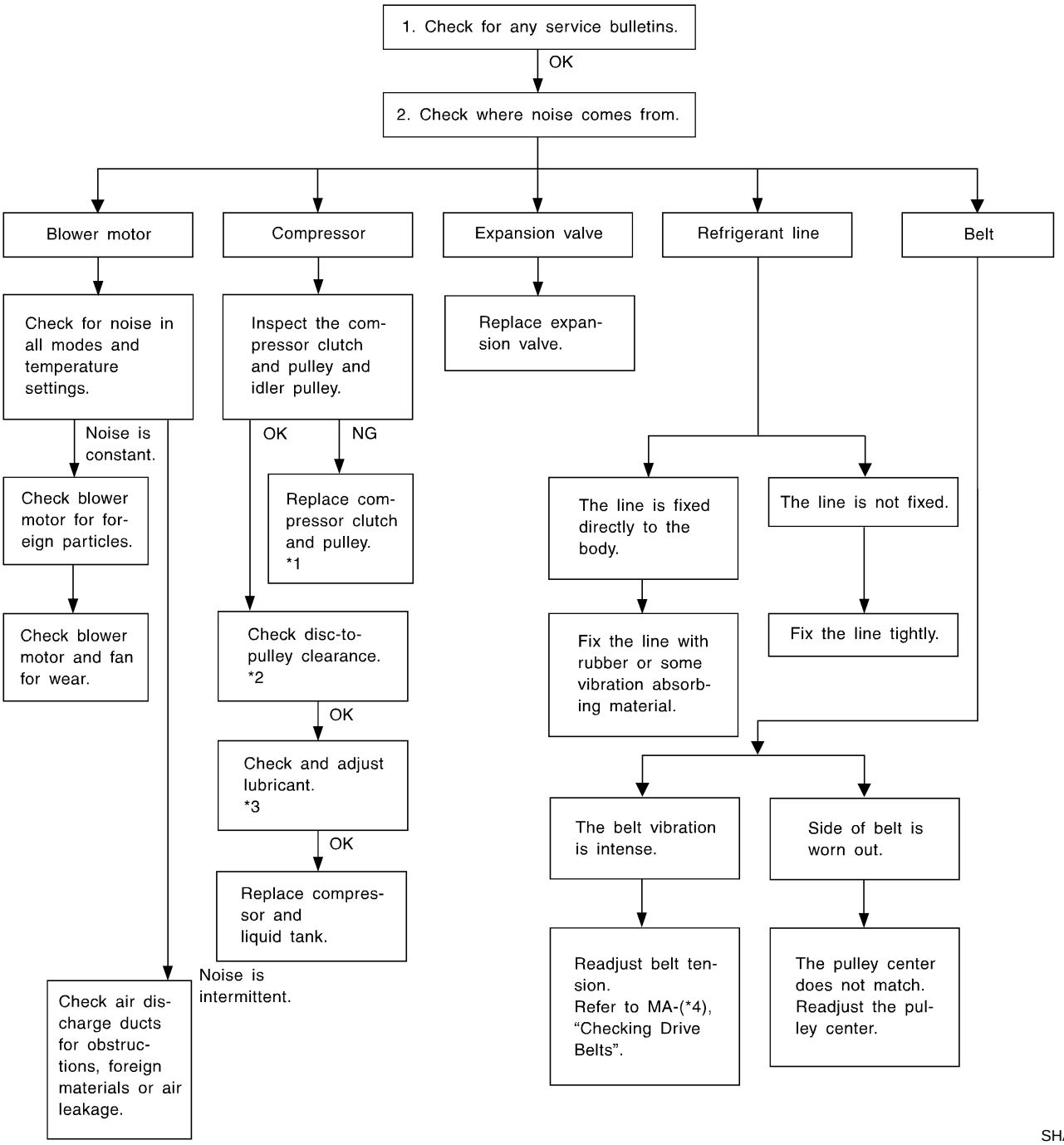
TROUBLE DIAGNOSIS PROCEDURE FOR NOISE

=NFHA0080

Symptom:

- **Noise**

Inspection Flow



SHA336F

*1: HA-232
*2: HA-232
*3: HA-226
*4: MA-13

HFC-134a (R-134a) Service Procedure

NFHA0094

SETTING OF SERVICE TOOLS AND EQUIPMENT

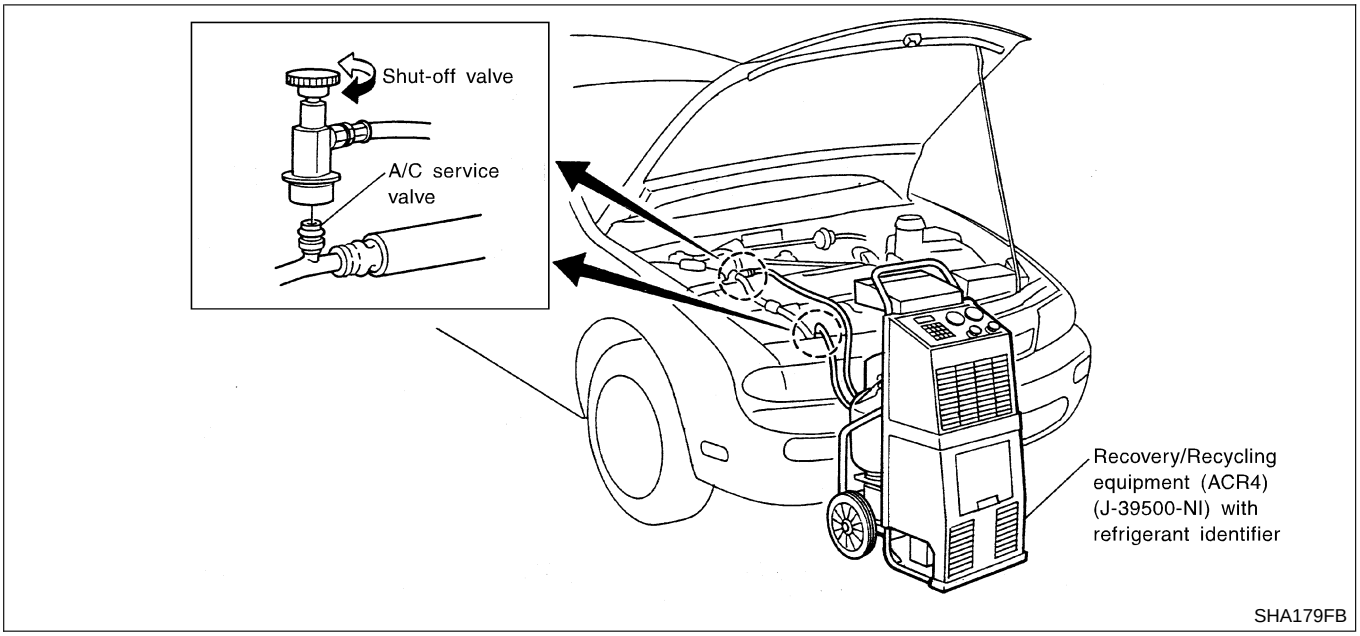
NFHA0094S01

Discharging Refrigerant

NFHA0094S0101

WARNING:

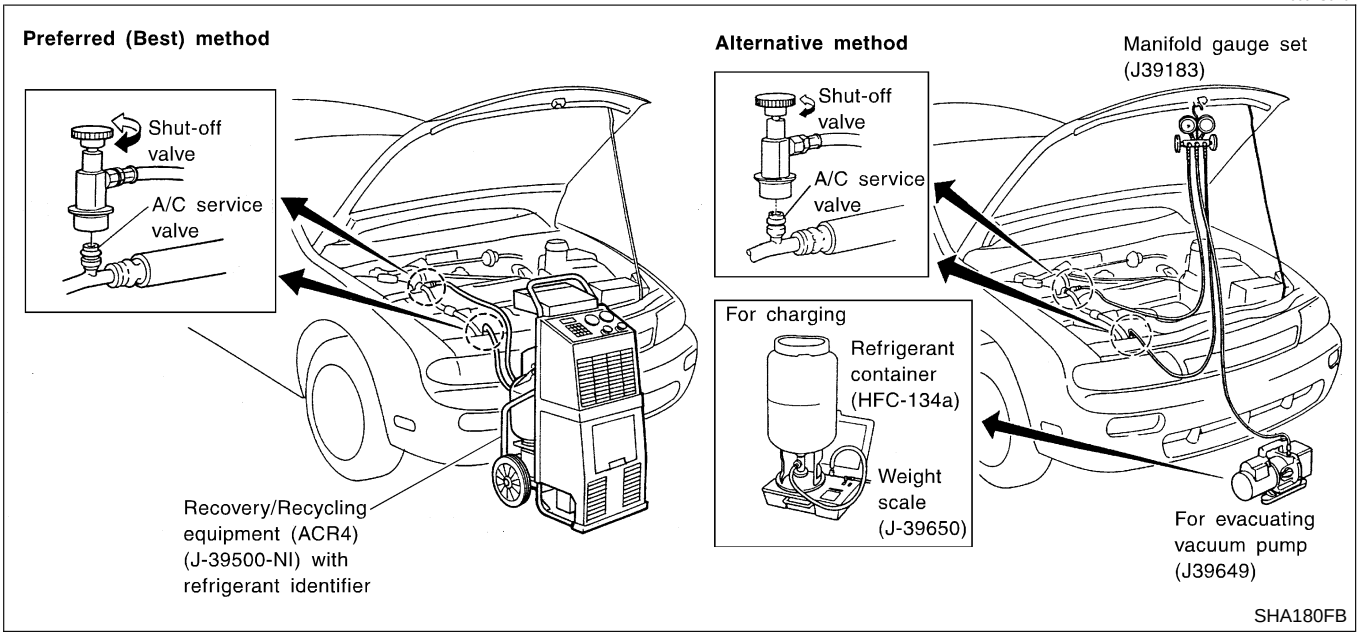
Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Remove HFC-134a (R-134a) from A/C system using certified service equipment meeting requirements of SAE J2210 (R-134a recycling equipment) or J2209 (R-134a recovery equipment). If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.



SHA179FB

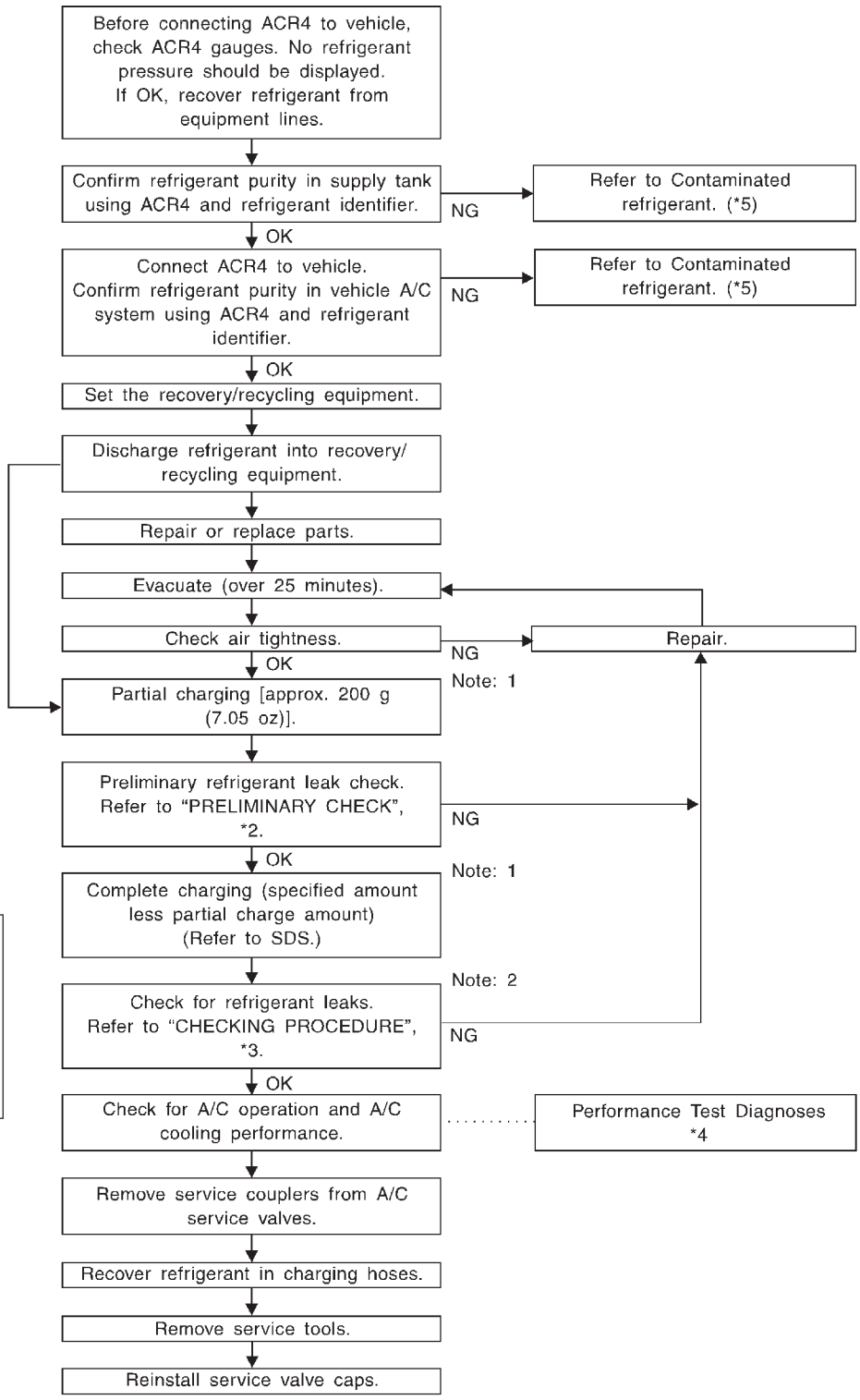
Evacuating System and Charging Refrigerant

NFHA0094S0102



SHA180FB

Recovered lubricant. Refer to "CHECKING AND ADJUSTING", *1.



Note: 1 Before charging refrigerant, ensure engine is off.
Note: 2 Befofe checking for leaks, start engine to activate air conditioning system then turn engine off. Service valve caps must be installed to prevent leakage.

SHA193F

*1: HA-226
*2: HA-237
*3: HA-238
*4: HA-201
*5: HA-156

Maintenance of Lubricant Quantity in Compressor

NFHA0095

The lubricant in the compressor circulates through the system with the refrigerant. Add lubricant to compressor when replacing any component or after a large gas leakage occurred. It is important to maintain the specified amount. If lubricant quantity is not maintained properly, the following malfunctions may result:

- Lack of lubricant: May lead to a seized compressor
- Excessive lubricant: Inadequate cooling (thermal exchange interference)

LUBRICANT

NFHA0095S01

Name: Nissan A/C System Oil Type S
Part number: KLH00-PAGS0

CHECKING AND ADJUSTING

NFHA0095S02

Adjust the lubricant quantity according to the test group shown below.

1	LUBRICANT RETURN OPERATION	
Can lubricant return operation be performed? ● A/C system works properly. ● There is no evidence of a large amount of lubricant leakage.		
	Yes or No	
Yes	▶	GO TO 2.
No	▶	GO TO 3.

2	PERFORM LUBRICANT RETURN OPERATION, PROCEEDING AS FOLLOWS	
1. Start engine, and set the following conditions: **Test condition** **Engine speed: Idling to 1,200 rpm** **A/C or AUTO switch: ON** **Blower speed: Max. position** **Temp. control: Optional [Set so that intake air temperature is 25 to 30°C (77 to 86°F).]** 2. **Next item is for V-6 compressor. Connect the manifold gauge, and check that the high pressure side pressure is 588 kPa (6 kg/cm^2, 85 psi) or higher.** **If less than the reference level, attach a cover to the front face of the condenser to raise the pressure.** 3. Perform lubricant return operation for about 10 minutes. 4. Stop engine. **CAUTION:** **If excessive lubricant leakage is noted, do not perform the lubricant return operation.**		
	▶	GO TO 3.

3	CHECK COMPRESSOR	
Should the compressor be replaced?		
	Yes or No	
Yes	▶	GO TO HA-228.
No	▶	GO TO 4.

4	CHECK ANY PART	
Is there any part to be replaced? (Evaporator, condenser, liquid tank or in case there is evidence of a large amount of lubricant leakage.)		
Yes or No		
Yes	▶	GO TO HA-228.
No	▶	Carry out the A/C performance test.

Lubricant Adjusting Procedure for Components Replacement Except Compressor

=NFHA0095S0201

After replacing any of the following major components, add the correct amount of lubricant to the system.

Amount of lubricant to be added

Part replaced	Lubricant to be added to system	Remarks
	Amount of lubricant mℓ (US fl oz, Imp fl oz)	
Evaporator	75 (2.5, 2.6)	—
Condenser	75 (2.5, 2.6)	—
Liquid tank	5 (0.2, 0.2)	Add if compressor is not replaced. *1
In case of refrigerant leak	30 (1.0, 1.1)	Large leak
	—	Small leak *2

*1: If compressor is replaced, addition of lubricant is included in the table.

*2: If refrigerant leak is small, no addition of lubricant is needed.

Lubricant Adjustment Procedure for Compressor Replacement

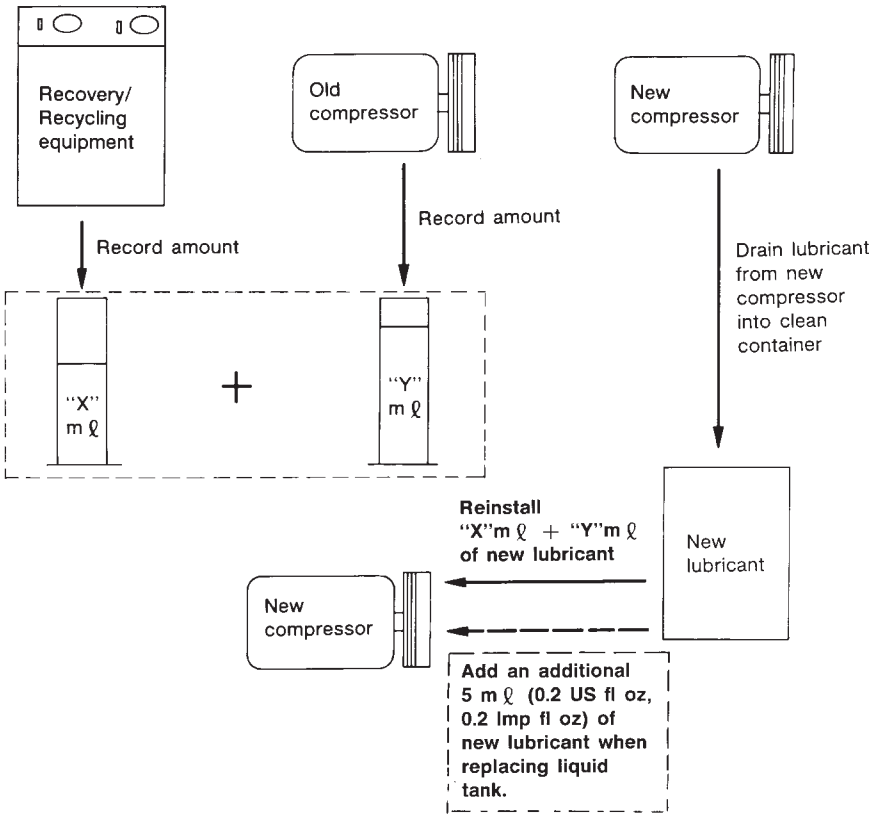
NFHA0095S0202

1. Before connecting ACR4 to vehicle, check ACR4 gauges. No refrigerant pressure should be displayed. If OK, recover refrigerant from equipment lines.
2. Confirm refrigerant purity in supply tank using ACR4 and refrigerant identifier. If NG, refer to "CONTAMINATED REFRIGERANT", HA-156.
3. Connect ACR4 to vehicle. Confirm refrigerant purity in vehicle A/C system using ACR4 and refrigerant identifier. If NG, refer to "CONTAMINATED REFRIGERANT", HA-156.
4. Discharge refrigerant into the refrigerant recovery/recycling equipment. Measure lubricant discharged into the recovery/recycling equipment.
5. Remove the drain plug of the "old" (removed) compressor. Drain the lubricant into a graduated container and record the amount of drained lubricant.
6. Remove the drain plug and drain the lubricant from the "new" compressor into a separate, clean container.
7. Measure an amount of new lubricant installed equal to amount drained from "old" compressor. Add this lubricant to "new" compressor through the suction port opening.
8. Measure an amount of new lubricant equal to the amount recovered during discharging. Add this lubricant to "new" compressor through the suction port opening.
9. Torque the drain plug.

   V-6 compressor:

   18 - 19 N·m (1.8 - 1.9 kg-m, 13 - 14 ft-lb)
10. If the liquid tank also needs to be replaced, add an additional 5 mℓ (0.2 US fl oz, 0.2 Imp fl oz) of lubricant at this time.
    Do not add this 5 mℓ (0.2 US fl oz, 0.2 Imp fl oz) of lubricant if only replacing the compressor.

Lubricant adjusting procedure for compressor replacement



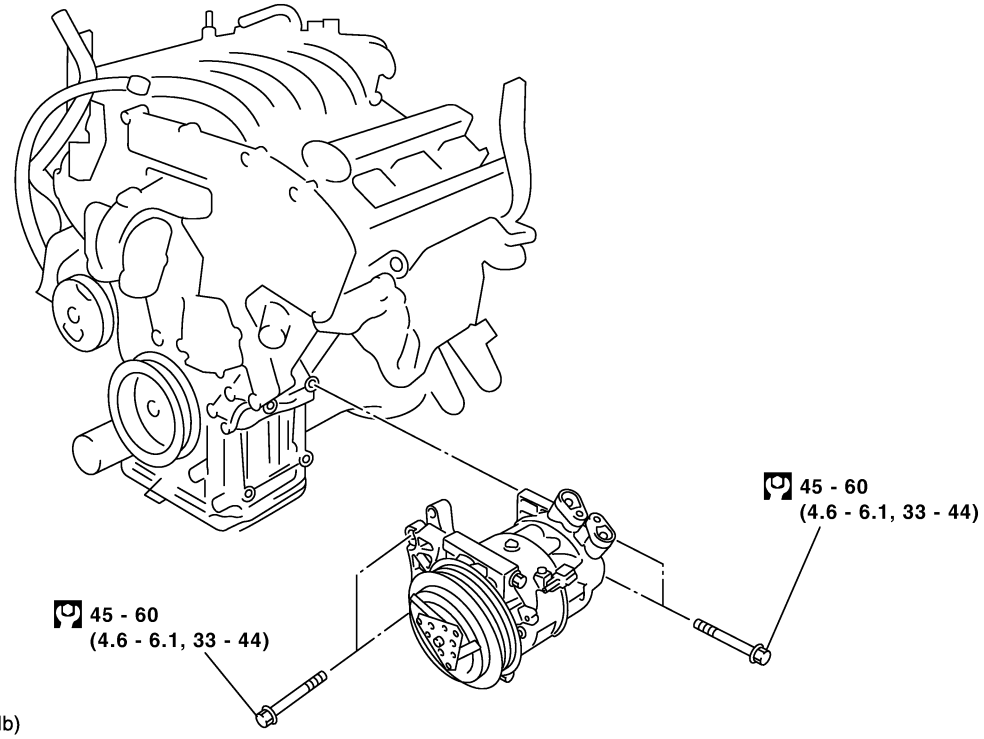
RHA065DD

Compressor

REMOVAL AND INSTALLATION

NFHA0096

SEC. 274•275



: N•m (kg-m, ft-lb)

CAUTION:
Do not remove the compressor bracket from the compressor.

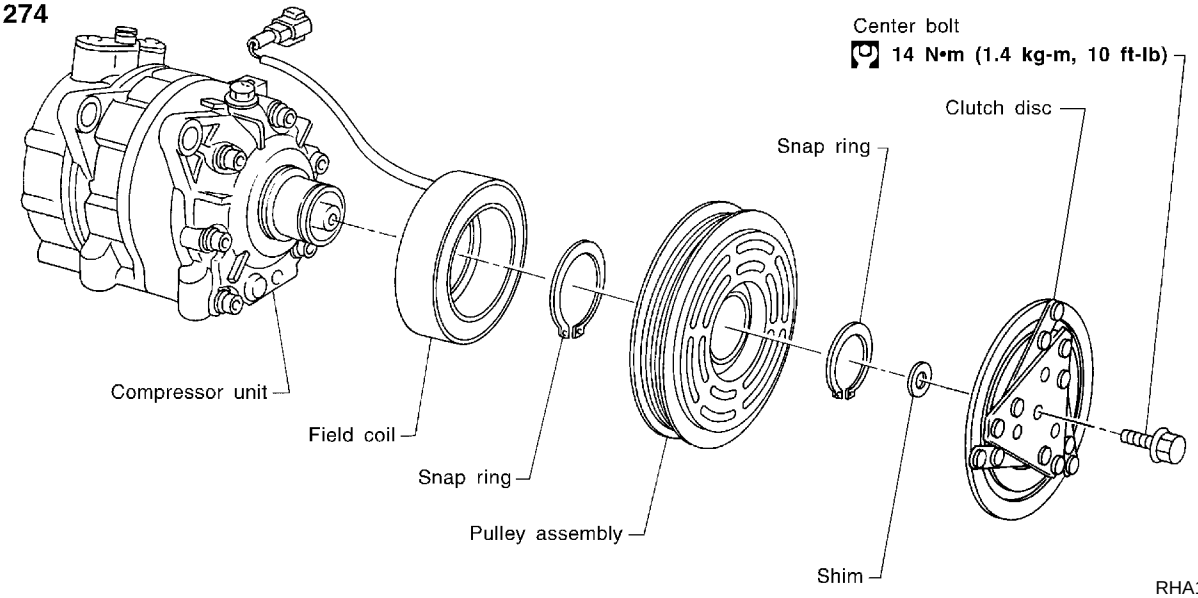
RHA062I

Compressor Clutch

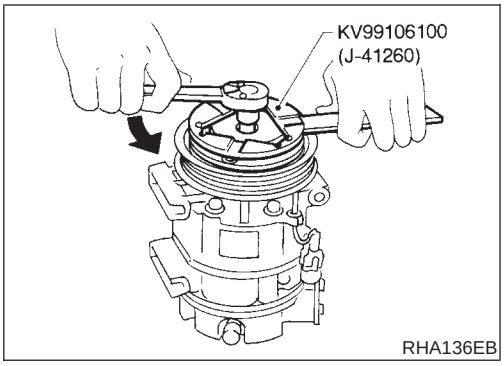
OVERHAUL

NFHA0097

SEC. 274



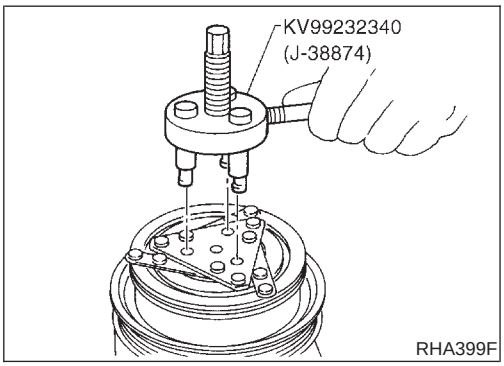
RHA122F

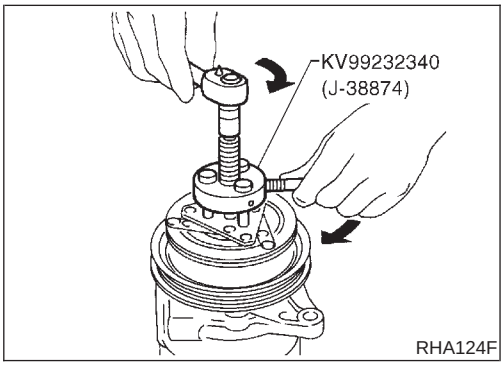


REMOVAL

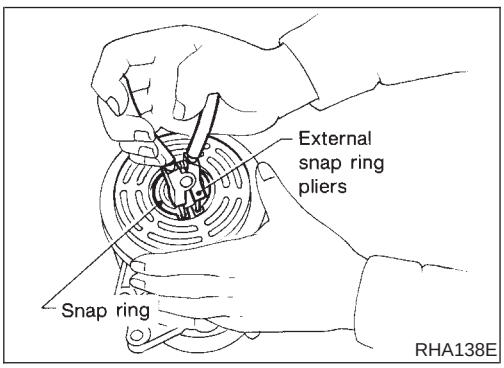
NFHA0098

- When removing center bolt, hold clutch disc with clutch disc wrench.

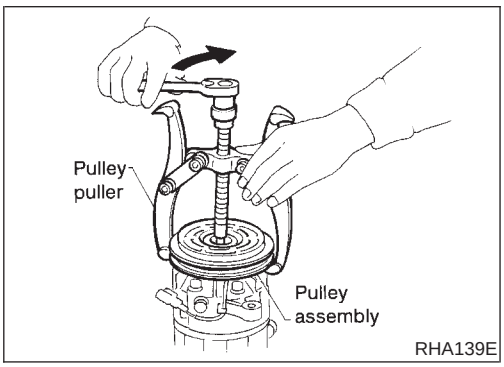




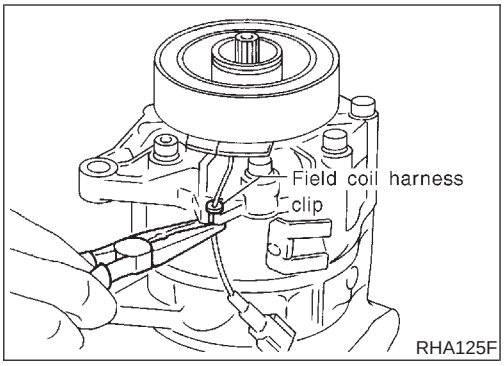
- Remove the clutch disc using the clutch disc puller.
  Insert the holder's three pins into the holes in the clutch disc. Rotate the holder clockwise to hook it onto the plate. Then, tighten the center bolt to remove the clutch disc.
  After removing the clutch disc, remove the shims from either the drive shaft or the clutch disc.



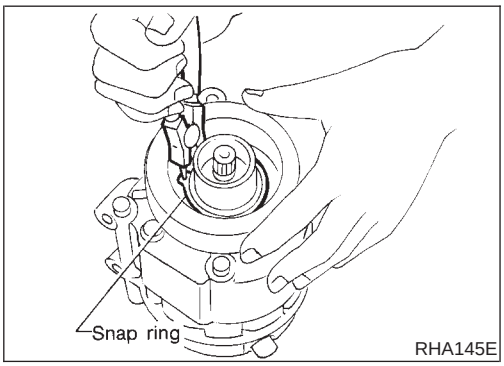
- Remove the snap ring using external snap ring pliers.



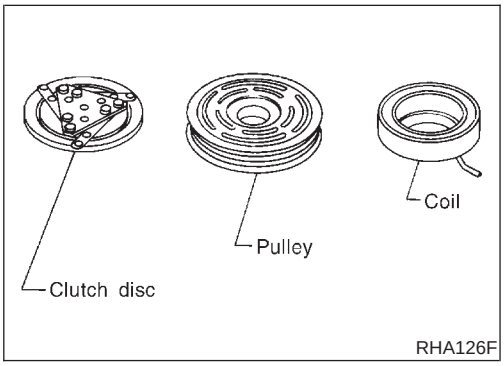
- Pulley removal
  Position the center pulley puller on the end of the drive shaft, and remove the pulley assembly using any commercially available pulley puller.
  To prevent the pulley groove from being deformed, the puller claws should be positioned onto the edge of the pulley assembly.



- Remove the field coil harness clip using a pair of pliers.



- Remove the snap ring using external snap ring pliers.



INSPECTION

NFHA0099

Clutch Disc

NFHA0099S01

If the contact surface shows signs of damage due to excessive heat, replace clutch disc and pulley.

Pulley

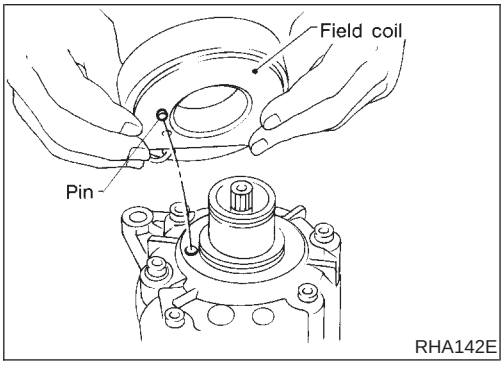
NFHA0099S02

Check the appearance of the pulley assembly. If the contact surface of pulley shows 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

NFHA0099S03

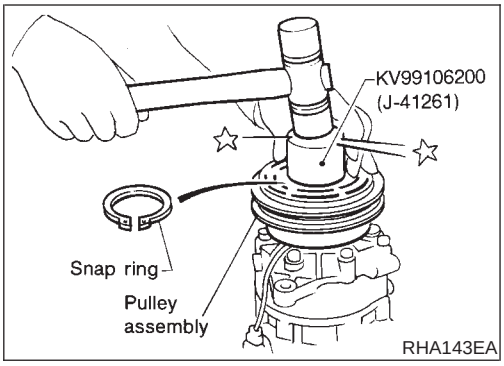
Check coil for loose connection or cracked insulation.



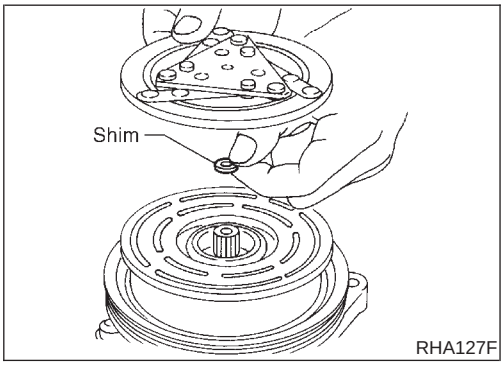
INSTALLATION

NFHA0100

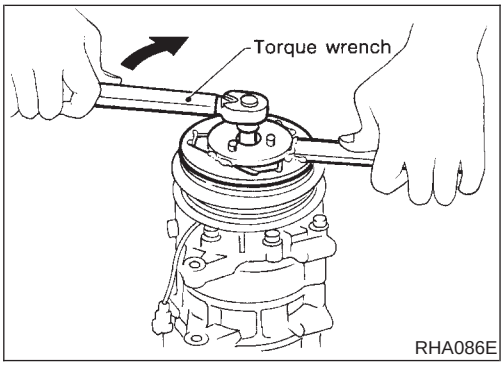
- Install the field coil.
  Be sure to align the coil's pin with the hole in the compressor's front head.
- Install the field coil harness clip using a screwdriver.



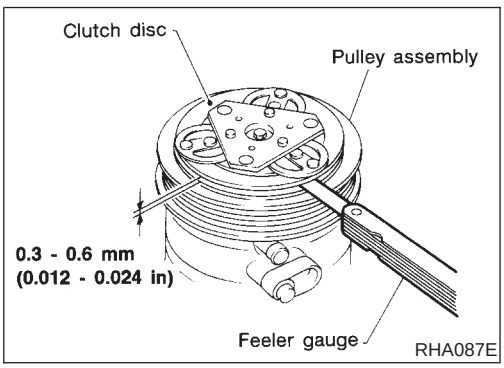
- Install the pulley assembly using the installer and a hand press, and then install the snap ring using snap ring pliers.



- Install the clutch disc on the drive shaft, together with the original shim(s). Press the clutch disc down by hand.



- Using the holder to prevent clutch disc rotation, tighten the bolt to 14 N·m (1.4 kg-m, 10 ft-lb) torque.
  After tightening the bolt, check that the pulley rotates smoothly.



- Check clearance around the entire periphery of clutch disc.
  Disc-to-pulley clearance:
  0.3 - 0.6 mm (0.012 - 0.024 in)
  If the specified clearance is not obtained, replace adjusting spacer and readjust.

Break-in Operation

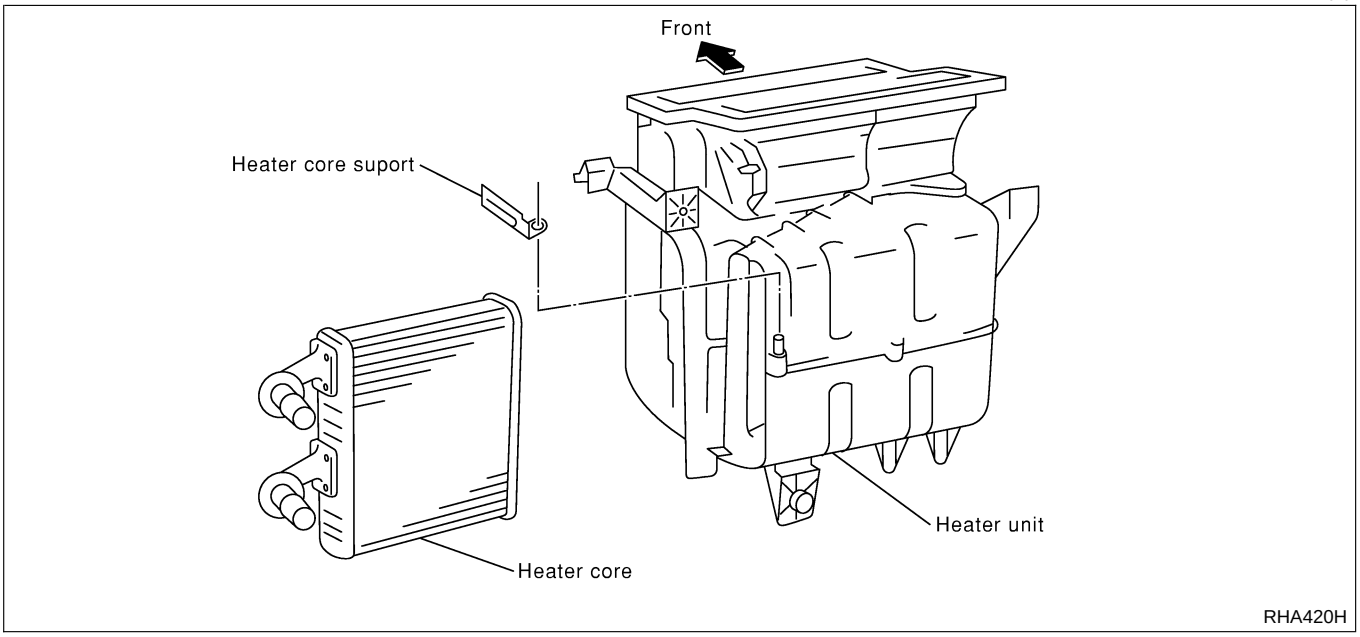
NFHA0100S01

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.

Heater Unit (Heater Core)

REMOVAL

NFHA0261



1. Drain the cooling system. Refer to MA-14, “Changing Engine Coolant”.
2. Disconnect the two heater hoses from inside the engine compartment.
3. Remove the blower and cooling unit. Refer to HA-235.
4. Remove the steering member assembly. Refer to BT-29, “Removal and Installation”.
5. Remove the heater unit.
6. Remove the heater core.

INSTALLATION

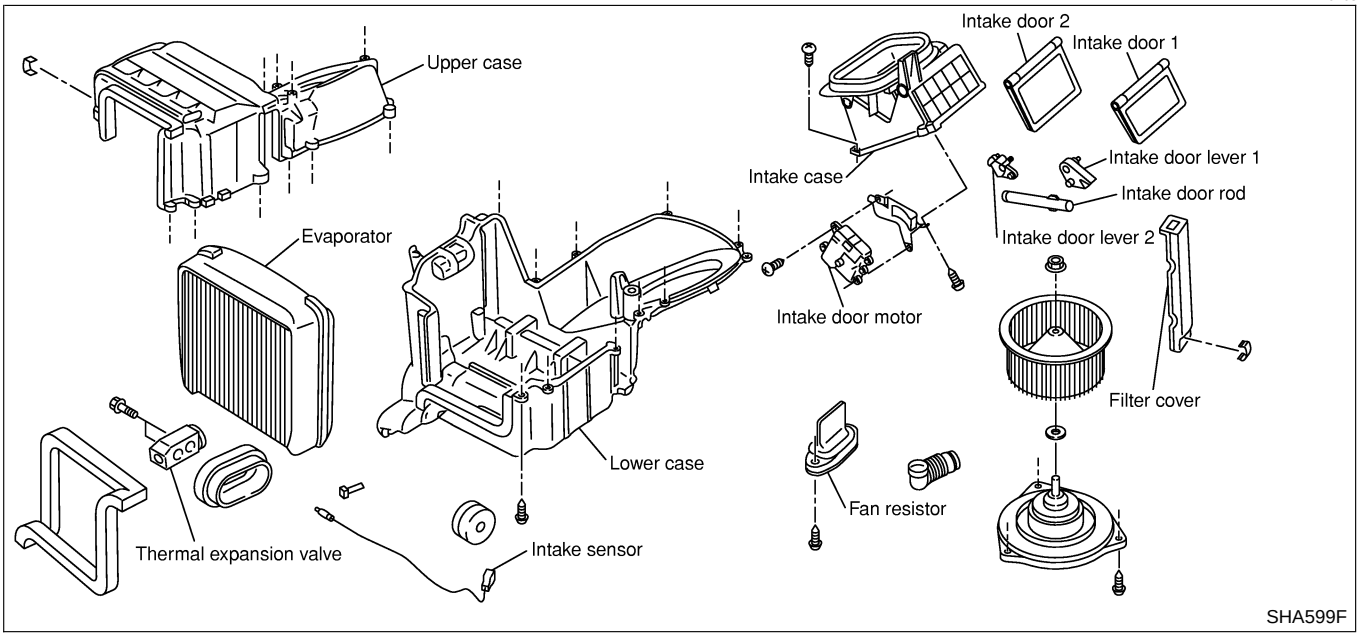
NFHA0262

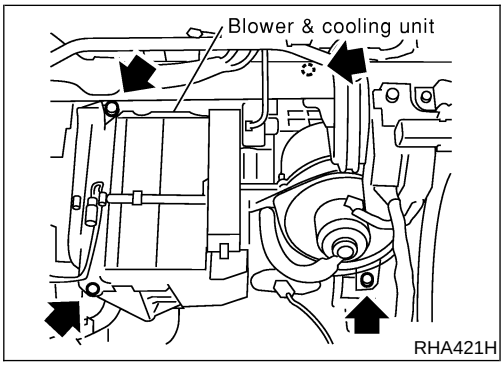
Installation is basically the reverse order of removal.
When filling radiator with coolant, refer to MA-14, “Changing Engine Coolant”.

Blower and Cooling Unit (A/C Evaporator)

REMOVAL

NFHA0263





1. Discharge the A/C system. Refer to HA-224.
2. Disconnect the two refrigerant lines from the engine compartment.
   Cap the A/C lines to prevent moisture from entering the system.
3. Remove the glove box and mating trim. Refer to BT-29, “Removal and Installation”.
4. Disconnect the thermal amp. connector.
5. Disconnect the fan resistor and blower motor connector.
6. Remove the blower and cooling unit.
7. Separate the blower and cooling unit case, and remove the evaporator.

INSTALLATION

NFHA0264

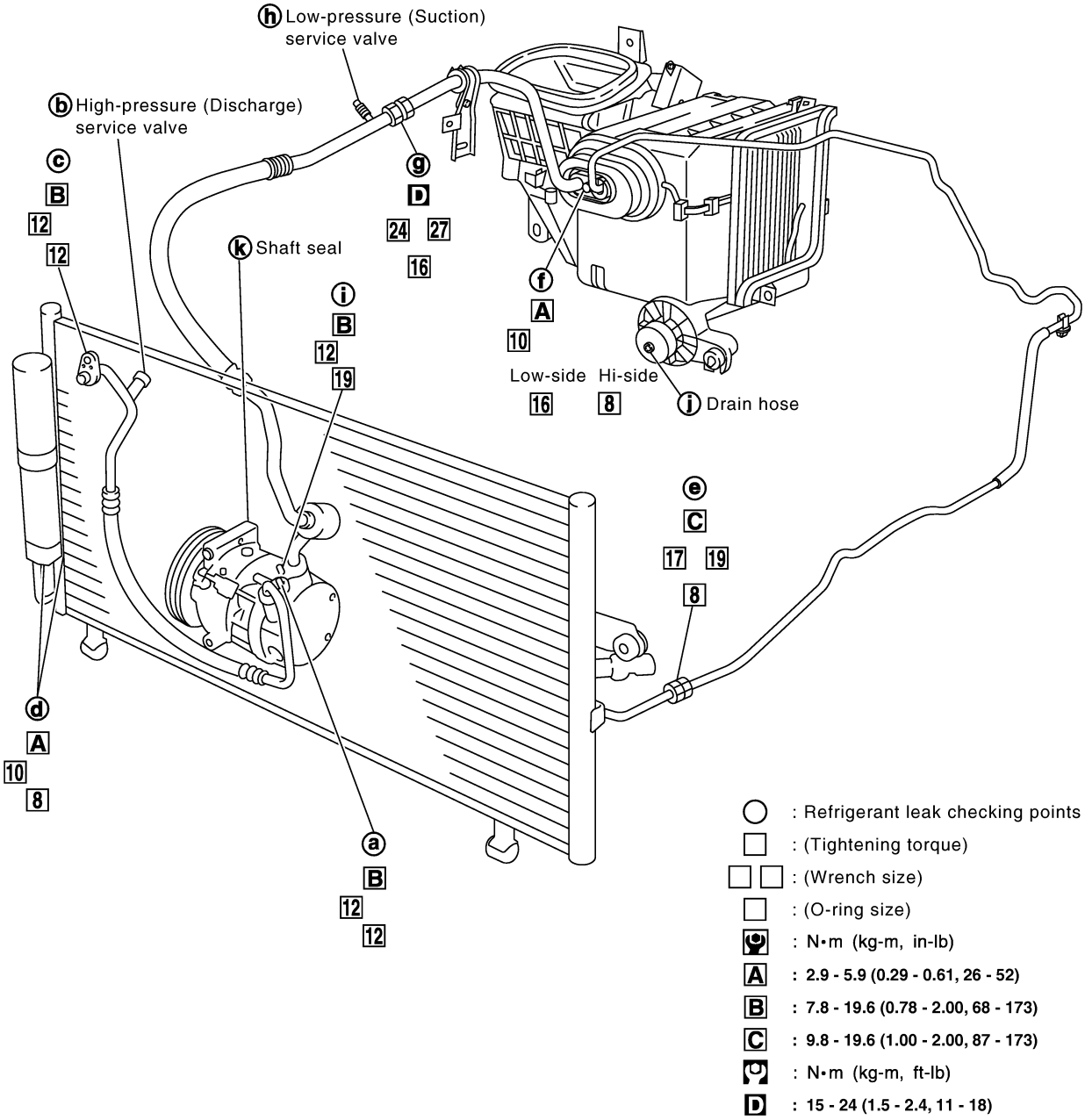
Installation is basically the reverse order of removal.
Recharge the A/C system. Refer to HA-224.

Refrigerant Lines

REMOVAL AND INSTALLATION

=NFHA0101

- Refer to page HA-158 regarding “Precautions for Refrigerant Connection”.



SHA625F

CHECKING REFRIGERANT LEAKS

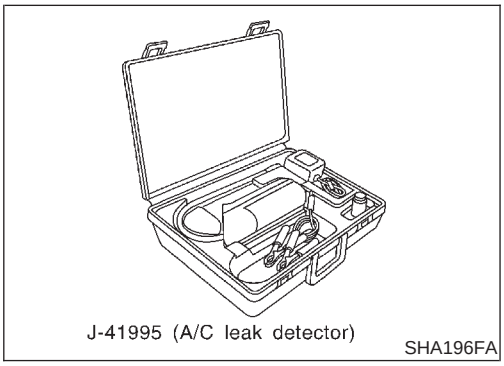
=NFHA0102

Preliminary Check

NFHA0102S01

- Perform a visual inspection of all refrigeration parts, fittings, hoses, and components for signs of A/C lubricant leakage, damage and corrosion. Take note of the areas with A/C lubricant leakage to allow extra time in these areas with electronic 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.

NOTE:
Moving the electronic leak detector probe slower and closer to the suspected leak area will improve the chances of finding a leak.


J-41995 (A/C leak detector)
SHA196FA

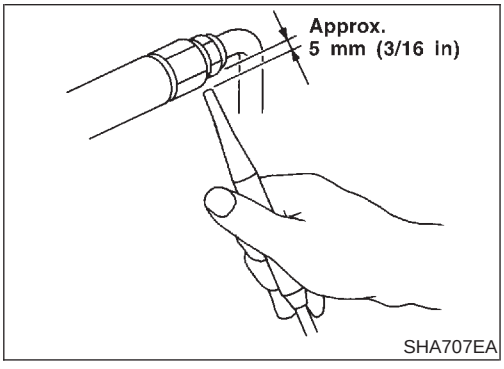
ELECTRONIC REFRIGERANT LEAK DETECTOR

NFHA0278

Precautions for Handling Leak Detector

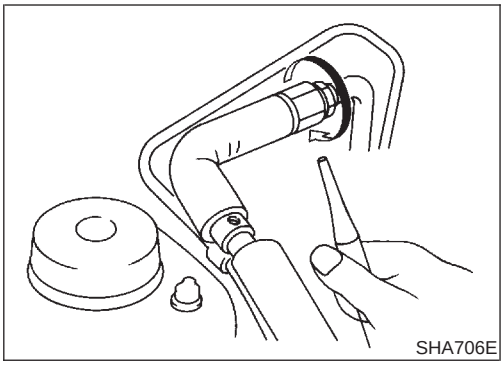
NFHA0278S01

When performing a refrigerant leak check, use a J-41995 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.
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.

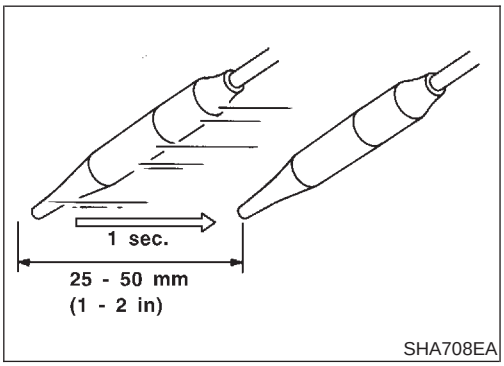


SHA707EA

1. Position probe approximately 5 mm (3/16 in) away from point to be checked.


SHA706E

2. When testing, circle each fitting completely with probe.



SHA708EA

3. Move probe along component approximately 25 to 50 mm (1 to 2 in)/sec.

Checking Procedure

NFHA0278S02

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 (3.52 kg/cm^2, 50 psi).

4. Conduct the leak test from the high side (compressor discharge **a** to evaporator inlet **f**) to the low side (evaporator discharge **f** to shaft seal **k**). Refer to HA-236. Perform a leak check for the following areas carefully. Clean the component to be checked and move the leak detector 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 tube fitting.
- **Service valves**
  Check all around the service valves. Ensure service valve caps are secured on the service valves (to prevent leaks).

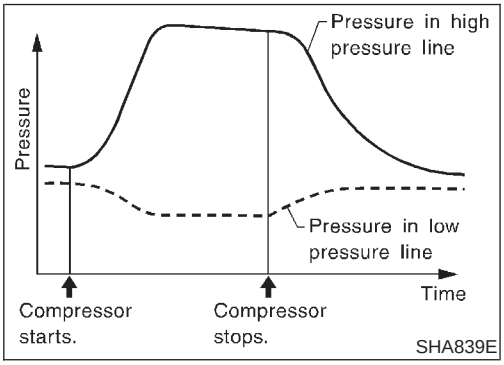
NOTE:
After removing A/C manifold gauge set from service valves, wipe any residue from valves to prevent any false readings by leak detector.

- **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 ten seconds. Use caution not to contaminate the ptobe 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:

1) A/C switch ON.
2) Face mode
3) Recirculation switch ON
4) Max cold temperature
5) 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. Confirm refrigerant purity in supply tank using ACR4 and refrigerant identifier.
13. Confirm refrigerant purity in vehicle A/C system using ACR4 and refrigerant identifier.
14. Discharge A/C system using approved refrigerant recovery equipment. Repair the leaking fitting or component as necessary.

15. Evacuate and recharge A/C system and perform the leak test to confirm no refrigerant leaks.
16. Conduct A/C performance test to ensure system works properly.

Fluorescent Dye Leak Detector

PRECAUTIONS FOR FLUORESCENT DYE LEAK DETECTION

NFHA0279

- 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 (J-41995) to pinpoint refrigerant leaks.
- For your safety and your customer's satisfaction, read and follow all manufacturer's operating instructions and precautions prior to performing the work.
- Refer to "Precautions for Leak Detection Dye", HA-157.

CHECKING SYSTEM FOR LEAKS USING THE FLUORESCENT LEAK DETECTOR

NFHA0280

1. Check A/C system for leaks using the UV lamp and safety glasses (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 TXV) 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, then check the cloth with the UV lamp for dye residue.
3. Confirm any suspected leaks with an approved electronic refrigerant leak detector.
4. After the leak is repaired, remove any residual dye using dye cleaner (J-43872) to prevent future misdiagnosis.
5. Perform a system performance check and verify the leak repair with an approved electronic refrigerant leak detector.

DYE INJECTION

NFHA0281

(This procedure is only necessary when re-charging the system or when the compressor has seized and was replaced.)
Refer to "Precautions for Leak Detection Dye", HA-157.

1. Check A/C system static (at rest) pressure. Pressure must be at least 345 kPa (3.52 kg/cm^2, 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. With 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 manufacturer's operating instructions).

6. With the engine still running, disconnect the injector tool from the service fitting.

CAUTION:
Be careful not to allow dye to spray or drip when disconnecting the injector from the system.

NOTE:
If repairing 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.

Belt

TENSION ADJUSTMENT

NFHA0103

- **Refer to MA-13, "Checking Drive Belt".**

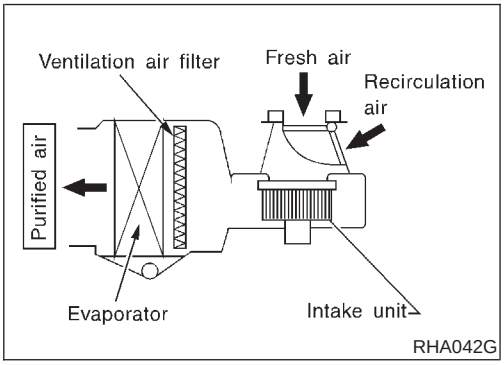
Ventilation Air Filter

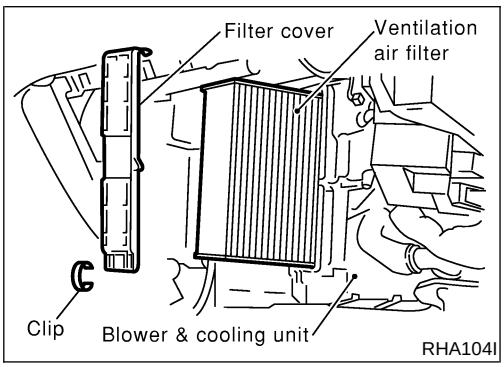
FUNCTION

NFHA0288

Air inside passenger compartment is kept clean at either recirculation or fresh mode by installing ventilation air filter into cooling unit.

NOTE:
For replacement interval of ventilation air filter, refer to "PERIODIC MAINTENANCE", MA-6.
Caution label is fixed inside the glove box.





REPLACEMENT PROCEDURE

NFHA0289

1. Remove glove box.
2. Remove instrument lower panel from instrument panel.
3. Remove filter cover fixed clip.
4. Slide the filter cover to the upper side and then remove it.
5. Take out the ventilation air filter from cooling unit.
6. Replace with new one and reinstall on cooling unit.

Manual

COMPRESSOR

NFHA0105

Model		CALSONIC KANSEI make V-6
Type		V-6 variable displacement
Displacement cm^3 (cu in)/rev.	Max.	184 (11.228)
	Min.	14.5 (0.885)
Cylinder bore x stroke mm (in)		37 (1.46) x [2.3 - 28.6 (0.091 - 1.126)]
Direction of rotation		Clockwise (viewed from drive end)
Drive belt		Poly V

LUBRICANT

NFHA0106

Model		CALSONIC KANSEI make V-6
Name		Nissan A/C System Oil Type S
Part number		KLH00-PAGS0
Capacity mℓ (US fl oz, Imp fl oz)	Total in system	180 (6.1, 6.3)
	Compressor (Service part) charging amount	180 (6.1, 6.3)

REFRIGERANT

NFHA0107

Type	HFC-134a (R-134a)
Capacity kg (lb)	0.5 (1.10)

ENGINE IDLING SPEED (WHEN A/C IS ON)

NFHA0108

- Refer to EC-749, “Idle Speed and Ignition Timing”.

BELT TENSION

NFHA0109

- Refer to MA-13, “Checking Drive Belt”.

MAINTENANCE

SECTION MA

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

NFMA0034

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER” used along with a seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. The SRS system composition which is available to NISSAN MODEL A33 is as follows:

- For a frontal collision
  The Supplemental Restraint System consists of driver air bag module (located in the center of the steering wheel), front passenger air bag module (located on the instrument panel on passenger side), seat belt pre-tensioners, a diagnosis sensor unit, crash zone sensor, warning lamp, wiring harness and spiral cable.
- For a side collision
  The Supplemental Restraint System consists of front side air bag module (located in the outer side of front seat), satellite sensor, diagnosis sensor unit (one of components of air bags for a frontal collision), wiring harness, warning lamp (one of components of air bags for a frontal collision).

Information necessary to service the system safely is included in the **RS section** of this Service Manual.

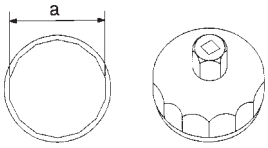
WARNING:

- **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 should be performed by an authorized NISSAN 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 RS 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 harness connector.**

Special Service Tool

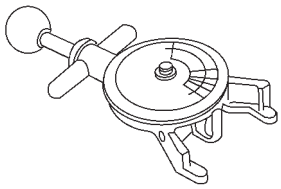
NFMA0002

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
KV10115801 (J38956) Oil filter cap wrench	 NT375 Removing oil filter **a: 64.3 mm (2.531 in)**

Commercial Service Tool

NFMA0003

Tool name (Kent-Moore No.)	Description
Belt tension gauge (BT3373-F)	 AMA126 Checking drive belt tension

GENERAL MAINTENANCE

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 checks and inspections themselves or have their NISSAN dealers do them.

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, including the spare, at least once a month and always prior to a long distance trips. Adjust to the specified pressure if necessary. Check carefully for damage, cuts or excessive wear.	—
Wheel nuts	When checking the tires, make sure no nuts are missing, and check for any loose nuts. Tighten if necessary.	—
Tire rotation	Tires should be rotated every 12,000 km (7,500 miles).	MA-23
Wheel alignment and balance	If the vehicle pulls to either side while driving on a straight and level road, or if you detect uneven or abnormal tire wear, there may be a need for wheel alignment. If the steering wheel or seat vibrates at normal highway speeds, wheel balancing may be needed.	MA-22, SU-7, “Preliminary Inspection” SU-18, “Preliminary Inspection”
Windshield wiper blades	Check for cracks or wear if they do not wipe properly.	—
Doors and engine hood	Check that all doors and the engine hood operate smoothly as well as the trunk lid and back hatch. Also make sure 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 lubrication frequently.	MA-26
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.	—

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
Warning lamps and chimes	Make sure that all warning lamps and chimes are operating properly.	—
Windshield wiper and washer	Check that the wipers and washer operate properly and that the wipers do not streak.	—
Windshield defroster	Check that the air comes out of the defroster outlets properly and in sufficient quantity when operating the heater or air conditioner.	—
Steering wheel	Check that it has the specified play. Be sure to check for changes in the steering condition, such as excessive play, hard steering or strange noises. **Free play: Less than 35 mm (1.38 in)**	—
Seats	Check seat position controls such as seat adjusters, seatback recliner, etc. to make sure they operate smoothly and that all latches lock securely in every position. Check that the head restrains move up and down smoothly and that the locks (if equipped) hold securely in all latched positions. Check that the latches lock securely for folding-down rear seatbacks.	—
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.	MA-27, RS-8, “Seat Belt Inspection”
Accelerator pedal	Check the pedal for smooth operation and make sure the pedal does not catch or require uneven effort. Keep the floor mats away from the pedal.	—

Item		Reference page
Clutch pedal	Make sure the pedal operates smoothly and check that it has the proper free play.	CL-6, “Adjusting Clutch Pedal”
Brakes	Check that the brake does not pull the vehicle to one side when applied.	—
Brake pedal and booster	Check the pedal for smooth operation and make sure it has the proper distance under it when depressed fully. Check the brake booster function. Be sure to keep floor mats away from the pedal.	BR-12, “Brake Pedal and Bracket” and BR-20, “Brake Booster”
Parking brake	Check that the lever has the proper travel and make sure that the vehicle is held securely on a fairly steep hill when only the parking brake is applied.	BR-35, “Parking Brake Control”
Automatic transaxle “Park” mechanism	Check that the lock release button on the selector lever operates properly and smoothly. On a fairly steep hill check that the vehicle is held securely with the selector lever in the “P” position without applying any brakes.	—

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.	MA-14
Radiator and hoses	Check the front of the radiator and clean off any dirt, insects, leaves, etc., that may have accumulated. Make sure the hoses have no cracks, deformation, deterioration or loose connections.	—
Brake and clutch fluid levels	Make sure that the brake and clutch fluid levels are between the “MAX” and “MIN” lines on the reservoirs.	MA-24, MA-20
Battery	Check the fluid level in each cell. It should be between the “MAX” and “MIN” lines. Vehicles operated in high temperatures or under severe conditions require frequent checks of the battery fluid level.	—
Engine drive belts	Make sure that no belt is frayed, worn, cracked or oily.	MA-13
Engine oil level	Check the level on the dipstick after parking the vehicle on a level spot and turning off the engine.	MA-16
Power steering fluid level and lines	Check the level on the dipstick with the engine off. Check the lines for improper attachment, leaks, cracks, etc.	MA-25
Automatic transaxle fluid level	Check the level on the dipstick after putting the selector lever in “P” with the engine idling.	MA-21
Exhaust system	Make sure there are no loose supports, cracks or holes. If the sound of the exhaust seems unusual or there is a smell of exhaust fumes, immediately locate the trouble and correct it.	MA-20
Underbody	The underbody is frequently exposed to corrosive substances such as those used on icy roads or to control dust. It is very important to remove these substances, otherwise rust will form on the floor pan, frame, fuel lines and around the exhaust system. At the end of winter, the underbody should be thoroughly flushed with plain water, being careful to clean those areas where mud and dirt can easily accumulate.	—
Fluid leaks	Check under the vehicle for fuel, oil, water or other fluid leaks after the vehicle has been parked for a while. Water dripping from the air conditioner after use is normal. If you should notice any leaks or gasoline fumes are evident, check for the cause and correct it immediately.	—

PERIODIC MAINTENANCE

Two different maintenance schedules are provided, and should be used, depending upon the conditions in which the vehicle is mainly operated. **After 60,000 miles (96,000 km) or 48 months, continue the periodic maintenance at the same mileage/time intervals.**

Schedule 1	Follow Periodic Maintenance Schedule 1 if the driving habits frequently include one or more of the following driving conditions: ● Repeated short trips of less than 5 miles (8 km). ● Repeated short trips of less than 10 miles (16 km) with outside temperatures remaining below freezing. ● Operating in hot weather in stop-and-go “rush hour” traffic. ● Extensive idling and/or low speed driving for long distances, such as police, taxi or door-to-door delivery use. ● Driving in dusty conditions. ● Driving on rough, muddy, or salt spread roads. ● Towing a trailer, using a camper or a car-top carrier.	Emission Control System Maintenance	MA-7
		Chassis and Body Maintenance	MA-8
Schedule 2	Follow Periodic Maintenance Schedule 2 if none of driving conditions shown in Schedule 1 apply to the driving habits.	Emission Control System Maintenance	MA-9
		Chassis and Body Maintenance	MA-10

NFMA0005S01
NFMA0005S0101

EMISSION CONTROL SYSTEM MAINTENANCE

Schedule 1

Abbreviations: R = Replace. I = Inspect. Correct or replace if necessary. [ ]: At the mileage intervals only

MAINTENANCE OPERATION		MAINTENANCE INTERVAL																Reference Section - Page or - Content Title
Perform at number of miles, kilometers or months, whichever comes first.	Miles x 1,000 (km x 1,000) Months	3.8 (6) 3	7.5 (12) 6	11.3 (18) 9	15 (24) 12	18.8 (30) 15	22.5 (36) 18	26.3 (42) 21	30 (48) 24	33.8 (54) 27	37.5 (60) 30	41.3 (66) 33	45 (72) 36	48.8 (78) 39	52.5 (84) 42	56.3 (90) 45	60 (96) 48	
Drive belts	NOTE (1)																I*	MA-13
Air cleaner filter	NOTE (2)								[R]								[R]	MA-16
EVAP vapor lines									I*								I*	MA-19
Fuel lines									I*								I*	MA-15
Fuel filter	NOTE (3)																	
Engine coolant	NOTE (4)																R*	MA-14
Engine oil		R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	MA-16
Engine oil filter (Use part No. 15208-31U00 or 15208 65F00 or equivalent.)		R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	MA-17
Spark plugs (PLATINUM-TIPPED type)		Replace every 105,000 miles (169,000 km).																MA-17
Intake & exhaust valve clearance*	NOTE (5)																	EM-56, “Valve Clearance”

NOTE:

(1) After 60,000 miles (96,000 km) or 48 months, inspect every 15,000 miles (24,000 km) or 12 months.

(2) If operating mainly in dusty conditions, more frequent maintenance may be required.

(3) Maintenance-free item. For service procedures, refer to FE section.

(4) After 60,000 miles (96,000 km) or 48 months, replace every 30,000 miles (48,000 km) or 24 months.

(5) If valve noise increases, inspect valve clearance.

★ Maintenance items and intervals with “*” are recommended by NISSAN for reliable vehicle operation. The owner need not perform such maintenance in order to maintain the emission warranty or manufacturer recall liability. Other maintenance items and intervals are required.

Abbreviations: R = Replace. I = Inspect. Correct or replace if necessary. L = Lubricate.

MAINTENANCE OPERATION		MAINTENANCE INTERVAL																Reference Section - Page or - Content Title
Perform at number of miles, kilometers or months, whichever comes first.	Miles x 1,000 (km x 1,000) Months	3.8 (6) 3	7.5 (12) 6	11.3 (18) 9	15 (24) 12	18.8 (30) 15	22.5 (36) 18	26.3 (42) 21	30 (48) 24	33.8 (54) 27	37.5 (60) 30	41.3 (66) 33	45 (72) 36	48.8 (78) 39	52.5 (84) 42	56.3 (90) 45	60 (96) 48	
Brake lines & cables					I				I				I				I	MA-24
Brake pads & rotors			I		I		I		I		I		I		I		I	MA-24
Automatic transaxle fluid or manual transaxle oil	NOTE (1)				I				I				I				I	MA-21, MA-20
Steering gear & linkage, axle & suspension parts			I		I		I		I		I		I		I		I	MA-25 MA-26
Tire rotation	NOTE (2)																	MA-4 MA-23
Front drive shaft boots			I		I		I		I		I		I		I		I	MA-26
Exhaust system			I		I		I		I		I		I		I		I	MA-20
Ventilation air filter			I		R		I		R		I		R		I		R	HA-154, "Ventilation Air Filter"

NOTE:
(1) If towing a trailer, using a camper or a car-top carrier, or driving on rough or muddy roads, change (not just inspect) oil at every 30,000 miles (48,000 km) or 24 months.
(2) Refer to "Tire rotation" under the "General maintenance" heading earlier in this section.

NFMA0005S0102

EMISSION CONTROL SYSTEM MAINTENANCE

Schedule 2

NFMA0005S02
NFMA0005S0201

Abbreviations: R = Replace. I = Inspect. Correct or replace if necessary. [ ]: At the mileage intervals only

MAINTENANCE OPERATION		MAINTENANCE INTERVAL								Reference Section - Page or - Content Title
Perform at number of miles, kilometers or months, whichever comes first.	Miles x 1,000 (km x 1,000) Months	7.5 (12) 6	15 (24) 12	22.5 (36) 18	30 (48) 24	37.5 (60) 30	45 (72) 36	52.5 (84) 42	60 (96) 48	
Drive belts	NOTE (1)								I*	MA-13
Air cleaner filter					[R]				[R]	MA-16
EVAP vapor lines					I*				I*	MA-19
Fuel lines					I*				I*	MA-15
Fuel filter	NOTE (2)									
Engine coolant	NOTE (3)								R*	MA-14
Engine oil		R	R	R	R	R	R	R	R	MA-16
Engine oil filter (Use part No. 15208-31U00 or 15208 65F00 or equivalent.)		R	R	R	R	R	R	R	R	MA-17
Spark plugs (PLATINUM-TIPPED type)		Replace every 105,000 miles (169,000 km).								MA-17
Intake & exhaust valve clearance*	NOTE (4)									EM-56, “Valve Clearance”

NOTE:

(1) After 60,000 miles (96,000 km) or 48 months, inspect every 15,000 miles (24,000 km) or 12 months.

(2) Maintenance-free item. For service procedures, refer to FE section.

(3) After 60,000 miles (96,000 km) or 48 months, replace every 30,000 miles (48,000 km) or 24 months.

(4) If valve noise increases, inspect valve clearance.

★ Maintenance items and intervals with “*” are recommended by NISSAN for reliable vehicle operation. The owner need not perform such maintenance in order to maintain the emission warranty or manufacturer recall liability. Other maintenance items and intervals are required.

Abbreviations: R = Replace. I = Inspect. Correct or replace if necessary. L = Lubricate.

MAINTENANCE OPERATION		MAINTENANCE INTERVAL								Reference Section - Page or - Content Title
Perform at number of miles, kilometers or months, whichever comes first.	Miles x 1,000 (km x 1,000) Months	7.5 (12) 6	15 (24) 12	22.5 (36) 18	30 (48) 24	37.5 (60) 30	45 (72) 36	52.5 (84) 42	60 (96) 48	
Brake lines & cables			I		I		I		I	MA-24
Brake pads & rotors			I		I		I		I	MA-24
Automatic transaxle fluid or manual transaxle oil			I		I		I		I	MA-21
Steering gear & linkage, axle & suspension parts					I				I	MA-25 MA-26
Tire rotation	NOTE (1)									MA-4 MA-23
Front drive shaft boots			I		I		I		I	MA-26
Exhaust system					I				I	MA-20
Ventilation air filter			R		R		R		R	HA-154, "Ventilation Air Filter"

NOTE:
(1) Refer to "Tire rotation" under the "General maintenance" heading earlier in this section.

NFMA0005S0202

Fluids and Lubricants

NFMA0006S01

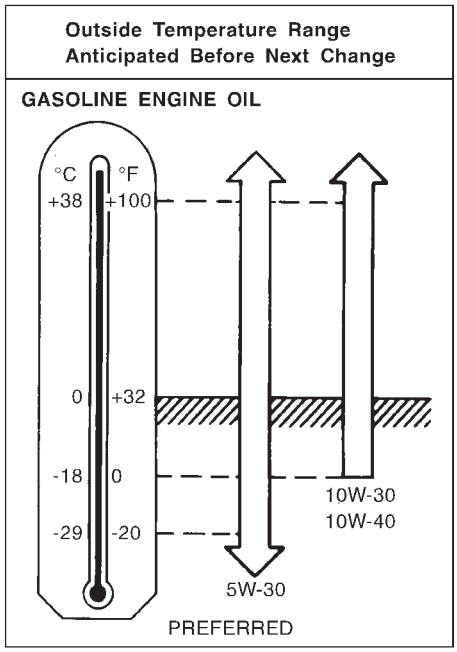
		Capacity (Approximate)			Recommended Fluids/Lubricants
		US measure	Imp measure	Liter	
Engine oil Drain and refill	With oil filter change	4-1/4 qt	3-1/2 qt	4.0	• API Certification Mark*1 • API grade SG/SH, Energy Conserving I & II or API grade SJ, Energy Conserving*1 • ILSAC grade GF-I & GF-II*1
	Without oil filter change	3-7/8 qt	3-1/4 qt	3.7	
Dry engine (engine overhaul)		5-1/4 qt	4-3/8 qt	5.0	
Cooling system	With reservoir	8-1/8 qt	6-3/4 qt	7.7	Genuine Nissan Anti-freeze coolant or equivalent
	Reservoir	7/8 qt	3/4 qt	0.8	
Manual transaxle gear oil	RS6F51A	4-7/8 pt	4 pt	2.3	API GL-4, Viscosity SAE75W-90 or 75W-85
Automatic transaxle fluid	RE4F04B	9 qt	7-1/2 qt	8.5	Nissan Matic “D” (Continental U.S. and Alaska) or Canada NISSAN Automatic Transmission Fluid*2
Power steering fluid		—	—	—	Power Steering Fluid: Genuine NISSAN PSF II or equivalent*4
Brake fluid		—	—	—	Genuine Nissan Brake Fluid*3 or equivalent DOT 3 (US FMVSS No. 116)
Multi-purpose grease		—	—	—	NLGI No. 2 (Lithium soap base)

*1: For further details, see “SAE Viscosity Number”.

*2: Dexron™ III/Mercon™ or equivalent may also be used. Outside the continental United States and Alaska contact a NISSAN dealership for more information regarding suitable fluids, including recommended brand(s) of Dexron™ III/Mercon™ Automatic Transmission Fluid.

*3: Available in mainland U.S.A. through your NISSAN dealer.

*4: Genuine Nissan PSF, Canada NISSAN Automatic Transmission Fluid, Dexron™ III/Mercon™, or equivalent ATF may also be used.



MMA117AA

SAE Viscosity Number

NFMA0006S02

GASOLINE ENGINE OIL

NFMA0006S0203

SAE 5W-30 viscosity oil is preferred for all temperatures. SAE 10W-30 and 10W-40 viscosity oil may be used if the ambient temperature is above −18°C (0°F).

Outside temperature down to		Anti-freeze	Demineralized water or distilled water
°C	°F		
–35	–30	50%	50%

SMA947CA

Anti-freeze Coolant Mixture Ratio

NFMA0006S03

The engine cooling system is filled at the factory with a high-quality, year-round, anti-freeze coolant solution. The anti-freeze solution contains rust and corrosion inhibitors. Therefore, additional cooling system additives are not necessary.

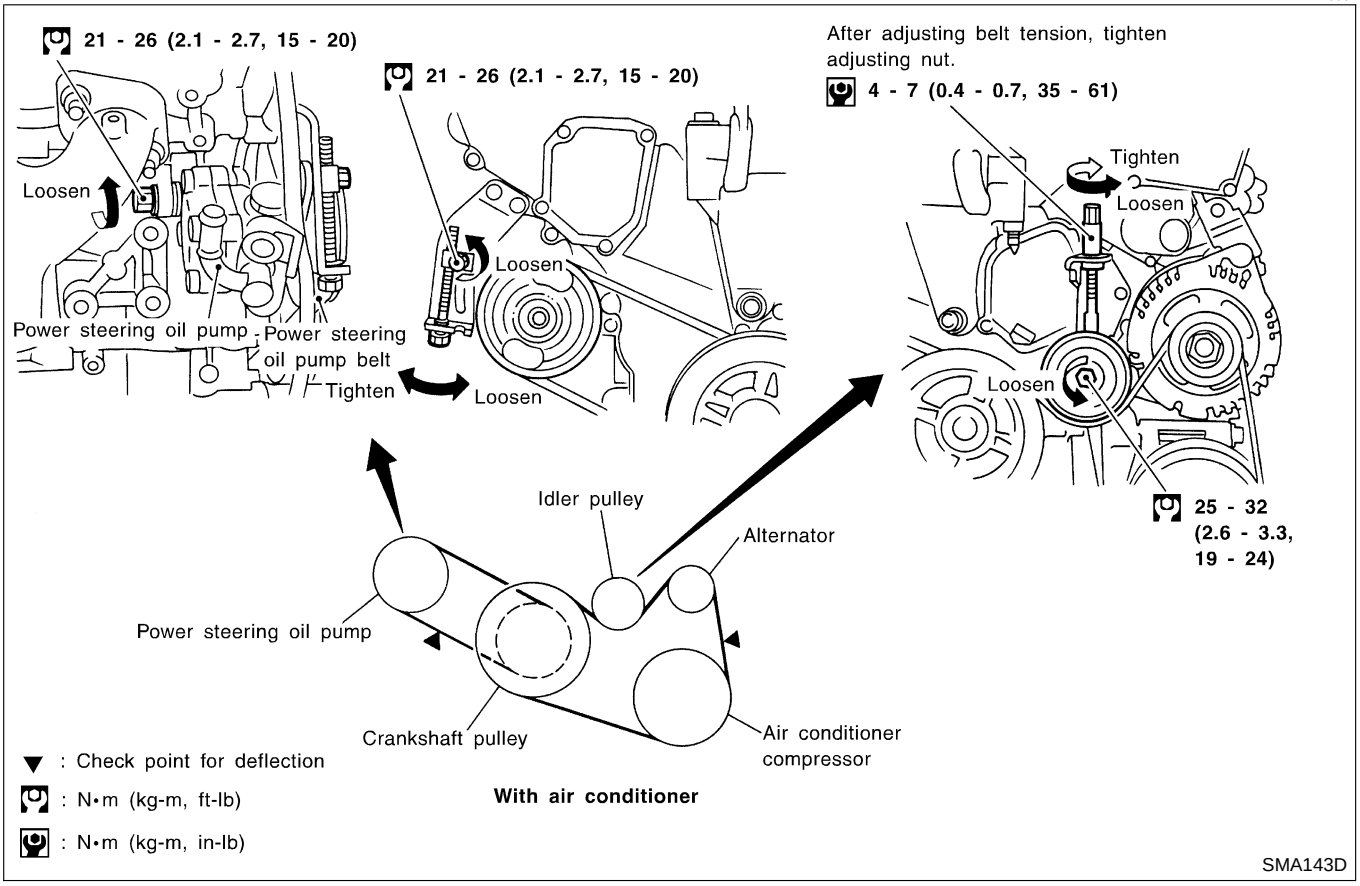
CAUTION:

When adding or replacing coolant, be sure to use only Genuine Nissan anti-freeze coolant or equivalent with the proper mixture ratio of 50% anti-freeze and 50% demineralized water/ distilled water.

Other types of coolant solutions may damage your cooling system.

Checking Drive Belts

NFMA0007



1. Inspect belts for cracks, fraying, wear and oil. If necessary, replace.
2. Inspect drive belt deflection or tension at a point on the belt midway between pulleys.

- **Check belt tension using belt tension gauge (BT 3373-F or equivalent).**
- **Inspect drive belt deflection or tension when engine is cold.**

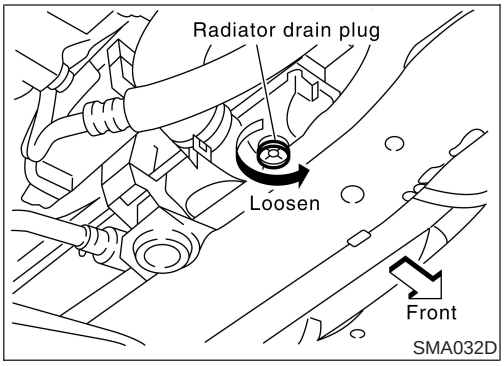
Adjust if belt deflection exceeds the limit or if belt tension is not within specifications.

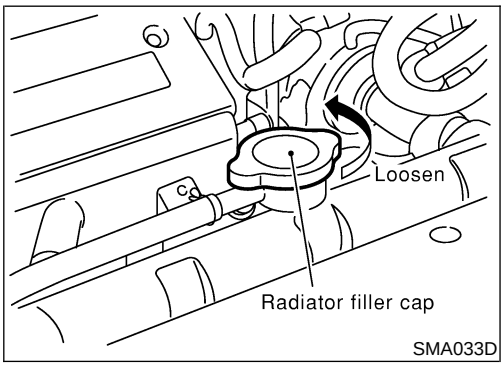
- **Drive belt tension can also be checked at other points on the belts.**

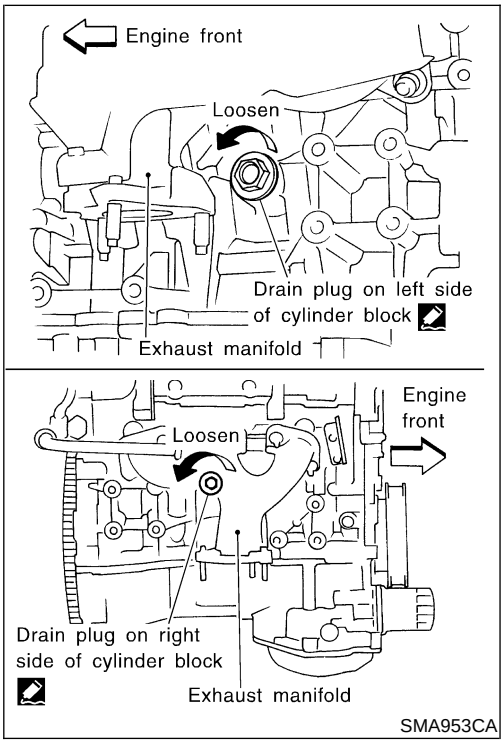
Belt deflection and tension:

	Deflection adjustment Unit: mm (in)			Tension adjustment*1 Unit: N (kg, lb)		
	Used belt		New belt	Used belt		New belt
	Limit	After adjustment		Limit	After adjustment	
Alternator and air conditioner compressor	7 (0.28)	4.2 - 4.6 (0.165 - 0.181)	3.7 - 4.1 (0.146 - 0.161)	294 (30, 66)	730 - 818 (74.5 - 83.5, 164 - 184)	838 - 926 (85.45 - 94.43, 188.4 - 208.2)
Power steering oil pump	11 (0.43)	7.3 - 8 (0.287 - 0.315)	6.5 - 7.2 (0.256 - 0.283)	196 (20, 44)	495 - 583 (50.5 - 59.5, 111 - 131)	603 - 691 (61.5 - 70.5, 136 - 155)
Applied pushing force	98 N (10 kg, 22 lb)			—		

*1: If the belt tension gauge cannot be installed at check points shown, check drive belt tension at a different location on the belt.







Changing Engine Coolant

NFMA0008

WARNING:

To avoid the danger of being scalded, never change the coolant when the engine is hot.

— DRAINING ENGINE COOLANT —

NFMA0008S01

1. Set air conditioning system as follows to prevent coolant from remaining in the system.

a. Turn ignition switch ON and set temperature controller to maximum hot position.

b. Wait 10 seconds before turning ignition switch OFF.

2. Open radiator drain plug at the bottom of radiator, and remove radiator cap.

- **Be careful not to allow coolant to contact drive belts.**

When draining all the coolant in the system, also perform the two following steps.

1) Remove drain plugs on both sides of cylinder block.
2) Check drained coolant for contaminants such as rust, corrosion or discoloration. If contaminated flush engine cooling system, refer to “FLUSHING COOLING SYSTEM”, MA-15.

— REFILLING ENGINE COOLANT —

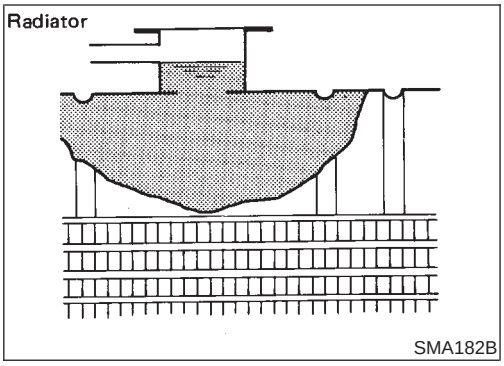
NFMA0008S02

1. Install reservoir tank if removed, and radiator drain plug.
2. Close and tighten cylinder block drain plugs securely if removed.

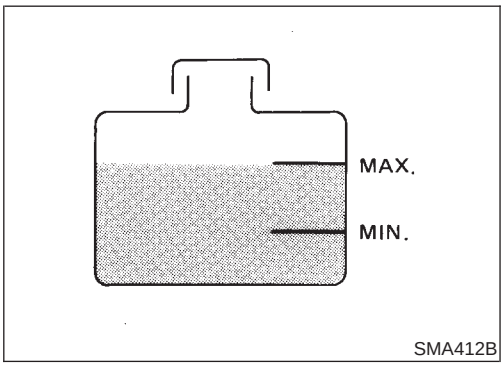
- **Apply sealant to the thread of cylinder block drain plugs. Use Genuine Thread Sealant or equivalent. Refer to GI-50.**

: 60 - 66 N·m (6.1 - 6.7 kg-m, 44 - 48 ft-lb) Left side

: 18 - 22 N·m (1.8 - 2.2 kg-m, 13 - 16 ft-lb) Right side



SMA182B



SMA412B

3. Fill radiator and reservoir tank to specified level.

- **Use genuine Nissan anti-freeze coolant or equivalent mixed with water (distilled or demineralized).**

Refer to "RECOMMENDED FLUIDS AND LUBRICANTS", MA-11.

Engine coolant capacity (With reservoir tank):
7.7ℓ (8-1/8 US qt, 6-3/4 Imp qt)
Reservoir tank capacity:
0.8ℓ (7/8 US qt, 3/4 Imp qt)

- **Pour coolant through coolant filler neck slowly to allow air in system to escape.**

4. Warm up engine to normal operating temperature with radiator cap installed.
5. Run engine at 2,500 rpm for 10 seconds and return to idle speed.
- Repeat two or three times.

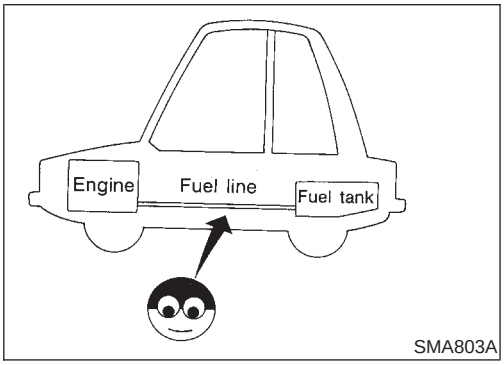
Watch coolant temperature gauge so as not to overheat the engine.

6. Stop engine and cool it down.
- 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 4 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 positions between COOL and WARM.
- Sound may be noticeable at heater water cock.
11. If sound is heard, bleed air from cooling system by repeating steps 4 through 7 until coolant level no longer drops.
- **Clean excess coolant from engine.**

— FLUSHING COOLING SYSTEM —

NFMA0008S03

1. 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.

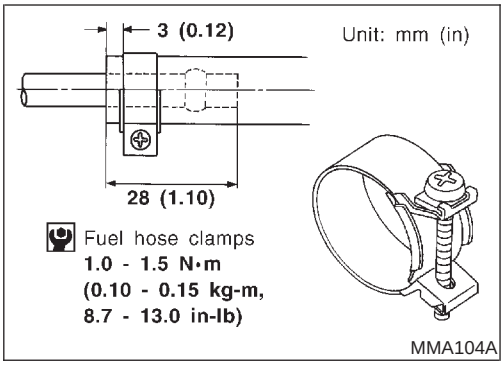


SMA803A

Checking Fuel Lines

NFMA0009

Inspect fuel lines and tank for improper attachment, leaks, cracks, damage, loose connections, chafing or deterioration. If necessary, repair or replace faulty parts.

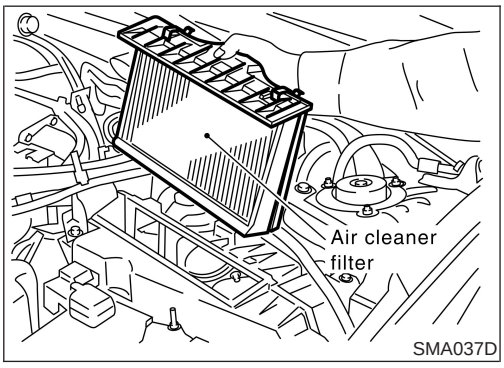


CAUTION:

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.



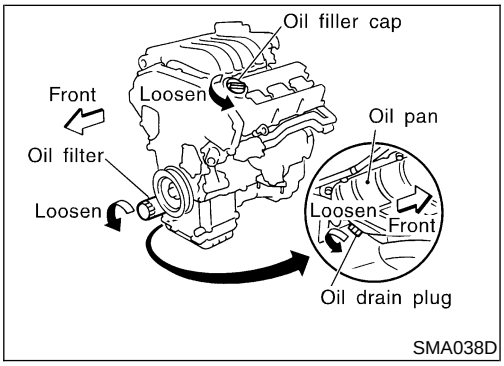
Changing Air Cleaner Filter

NFMA0011

VISCOUS PAPER TYPE

NFMA0011S01

The viscous paper type filter does not need cleaning.



Changing Engine Oil

NFMA0012

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 more than 10 minutes.
3. Remove drain plug and oil filler cap.
4. Drain oil and refill with new engine oil.

Oil specification and viscosity:

- **API Certification Mark**
- **API grade SG/SH, Energy Conserving I & II or API grade SJ, Energy Conserving**
- **ILSAC grade GF-I & GF-II**
- **Refer to "RECOMMENDED FLUIDS AND LUBRICANTS", MA-11.**

Oil capacity (Approximate):

Unit: liter (US qt, Imp qt)

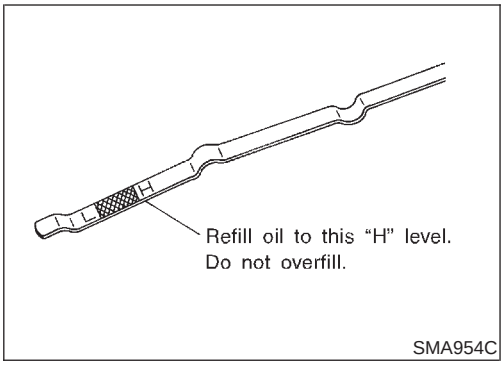
Drain and refill	With oil filter change	4.0 (4-1/4, 3-1/2)
	Without oil filter change	3.7 (3-7/8, 3-1/4)
Dry engine (engine overhaul)		5.0 (5-1/4, 4-3/8)

CAUTION:

- **Be sure to clean drain plug and install with new washer.**

Oil pan drain plug:

: 29 - 39 N·m (3.0 - 4.0 kg-m, 22 - 29 ft-lb)



SMA954C

- **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.**
- **Never pull out level gauge while filling engine oil.**

5. Warm up engine and check area around drain plug and oil filter for oil leakage.
6. Stop engine and wait more than 10 minutes.
7. Check oil level.

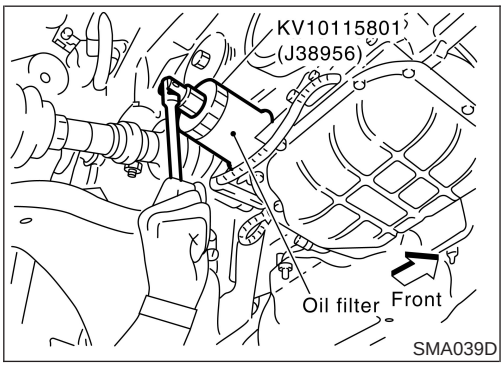
Changing Oil Filter

NFMA0013

1. The oil filter is a small full-flow cartridge type and is provided with a relief valve.

Refer to LC-8, "Oil Filter".

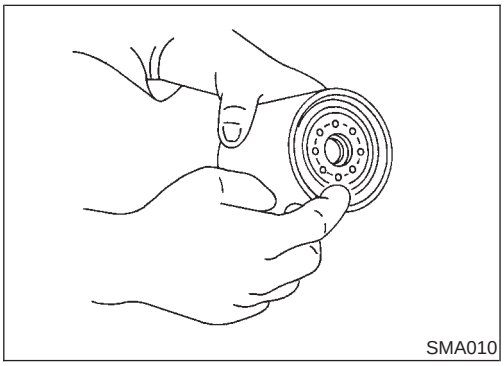
2. Remove oil filter with Tool or suitable tool.



SMA039D

WARNING:
Be careful not to burn yourself, as the engine and the engine oil are hot.

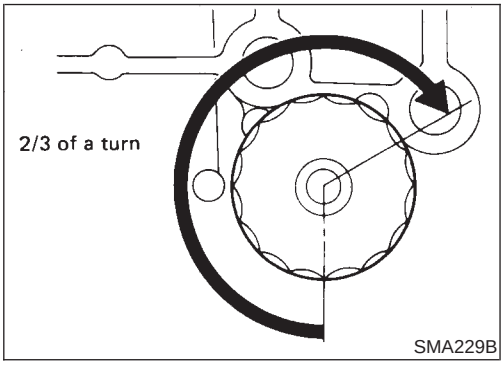
3. Clean oil filter mounting surface on oil cooler. Coat rubber seal of new oil filter with engine oil.


SMA010

4. Screw in the oil filter until a slight resistance is felt, then tighten additionally 2/3 turn.
5. Add engine oil.

Oil filter:
: 14.7 - 20.5 N·m (1.5 - 2.1 kg-m, 11 - 15 ft-lb)

Refer to "Changing Engine Oil", MA-16.

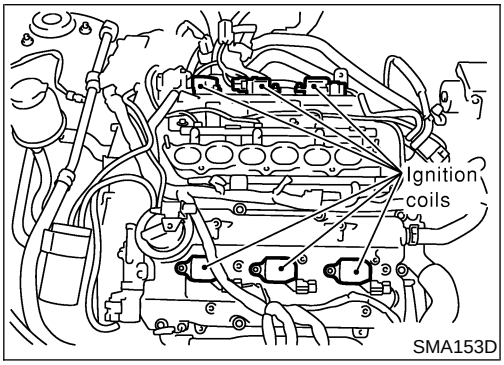


SMA229B

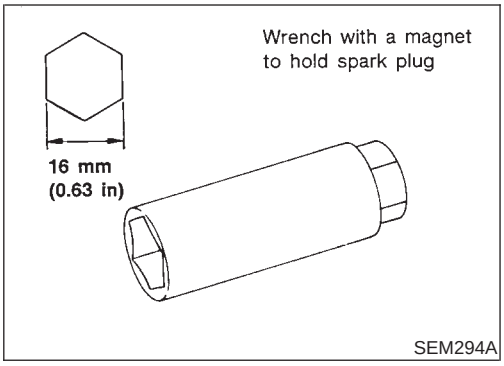
Changing Spark Plugs

NFMA0014

1. Remove intake manifold upper and lower, collectors.
2. Disconnect ignition coil harness connectors.
3. Loosen ignition coil fixing bolts and pull out coil from rocker cover.



SMA153D



4. Remove spark plugs with suitable spark plug wrench.

Spark plug (Platinum-tipped type):

Make	NGK
Standard type	PLFR5A-11
Hot type	PLFR4A-11
Cold type	PLFR6A-11

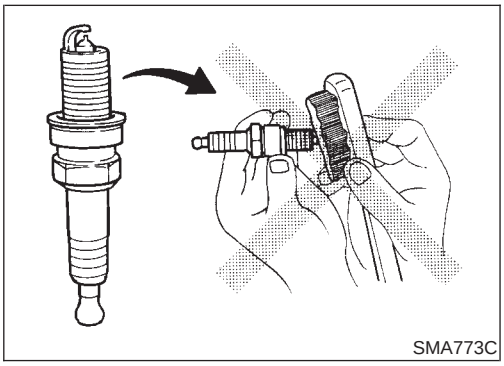
Use standard type spark plug for normal condition.
The hot type spark plug is suitable when fouling may occur with the standard type spark plug such as:

- frequent engine starts
- low ambient temperatures

The cold type spark plug is suitable when spark knock may occur with the standard type spark plug such as:

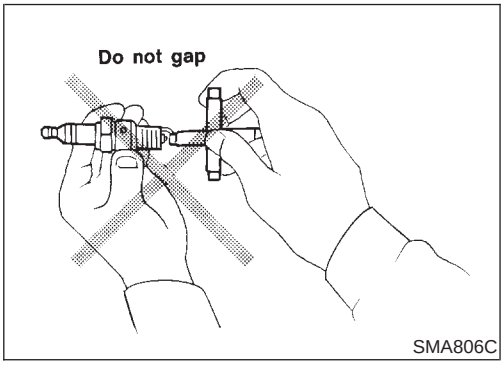
- extended highway driving
- frequent high engine revolution

Gap (Nominal): 1.1 mm (0.043 in)
: 20 - 29 N·m (2.0 - 3.0 kg-m, 14 - 22 ft-lb)

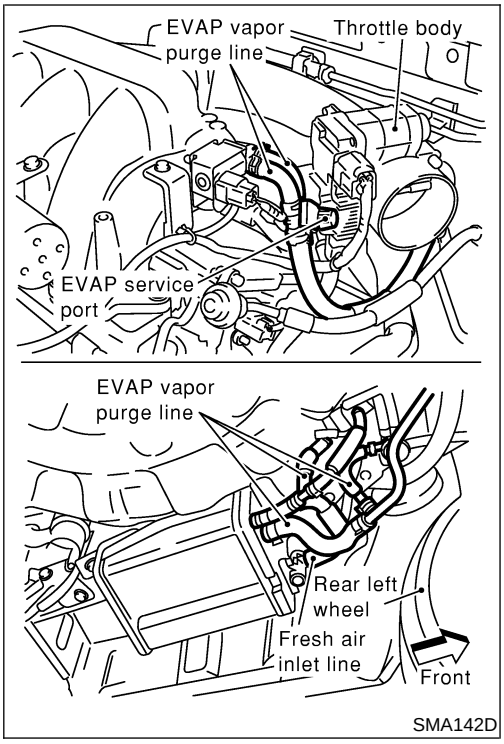


- **Do not use a wire brush for cleaning.**
- **If plug tip is covered with carbon, spark plug cleaner may be used.**

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.**

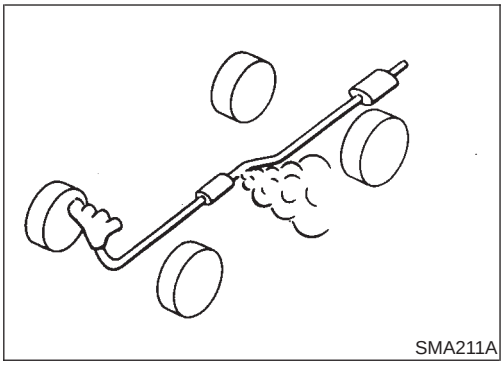


Checking EVAP Vapor Lines

NFMA0015

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.

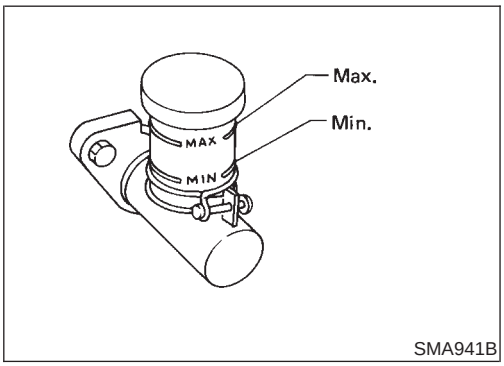
Refer to EC-36, “Evaporative Emission System”.


SMA211A

Checking Exhaust System

NFMA0016

Check exhaust pipes, muffler and mounting for improper attachment, leaks, cracks, damage, chafing or deterioration.

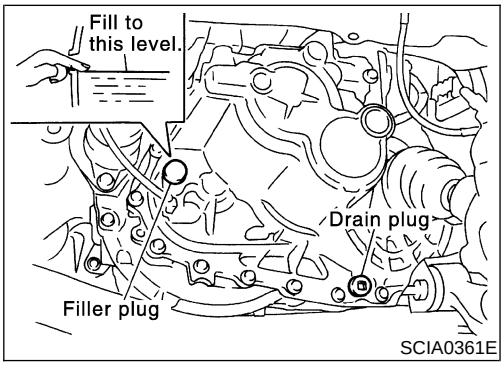


SMA941B

Checking Clutch Fluid Level and Leaks

NFMA0038

If fluid level is extremely low, check clutch system for leaks.



SCIA0361E

Checking M/T Oil

NFMA0039

Check for oil leakage and oil level.

Never start engine while checking oil level.

Filler plug:

: 30 - 39 N·m (3.1 - 3.9 kg-m, 23 - 28 ft-lb)

Changing M/T Oil

NFMA0040

1. Drain oil from drain plug and refill with new gear oil.
2. Check oil level.

Oil grade:

API GL-4

Viscosity:

See “RECOMMENDED FLUIDS AND LUBRICANTS”, MA-11.

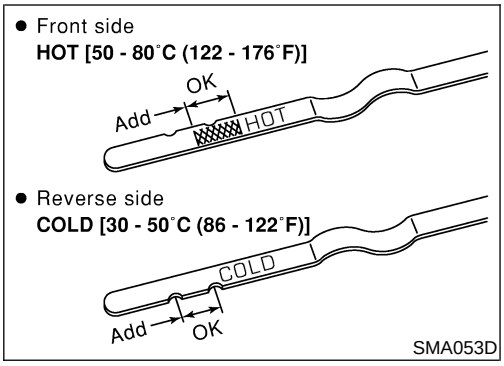
Capacity:

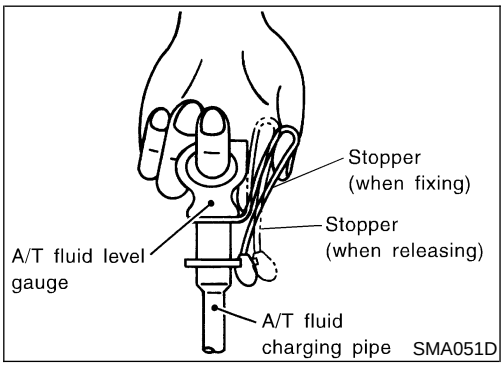
RS6F51A

2.3ℓ (4-7/8 US pt, 4 Imp pt)

Drain plug:

: 30 - 39 N·m (3,1 - 3.9 kg-m, 23 - 28 ft-lb)





Checking A/T Fluid

NFMA0020

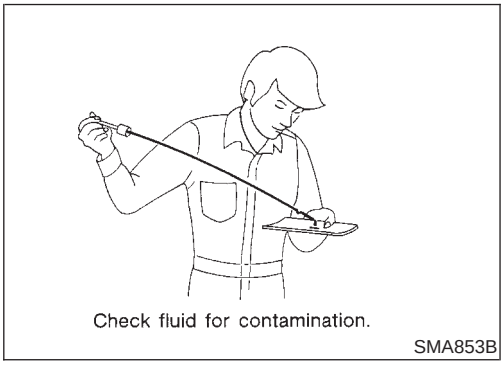
1. Warm up engine.
2. Check for fluid leakage.
3. Before driving, fluid level can be checked at fluid temperatures of 30 to 50°C (86 to 122°F) using “COLD” range on A/T fluid level gauge.

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 A/T fluid level gauge and wipe clean with lint-free paper.
e. Re-insert A/T fluid level gauge into charging pipe as far as it will go.
f. Remove A/T fluid level gauge and note reading. If reading is at low side of range, add fluid to the charging pipe.

Do not overfill.

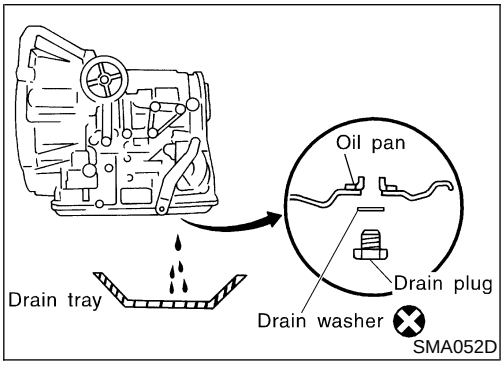
4. Drive vehicle for approximately 5 minutes in urban areas.
5. Re-check fluid level at fluid temperatures of 50 to 80°C (122 to 176°F) using “HOT” range on A/T fluid level gauge.

CAUTION:
Firmly fix the A/T fluid level gauge to the A/T fluid charging pipe using a stopper attached.



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 LC-20, “Radiator”.



Changing A/T Fluid

NFMA0021

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:

Nissan Matic “D” (Continental U.S. and Alaska) or Canada NISSAN Automatic Transmission Fluid

Refer to “RECOMMENDED FLUIDS AND LUBRICANTS”, MA-11.

Fluid capacity (With torque converter):
RE4F04B
8.5ℓ (9 US qt, 7-1/2 Imp qt)
Drain plug:
: 29 - 39 N·m (3.0 - 4.0 kg-m, 22 - 29 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 step 2. through 5.

Balancing Wheels (Bonding Weight Type)

NFMA0022

REMOVAL

NFMA0022S01

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.**

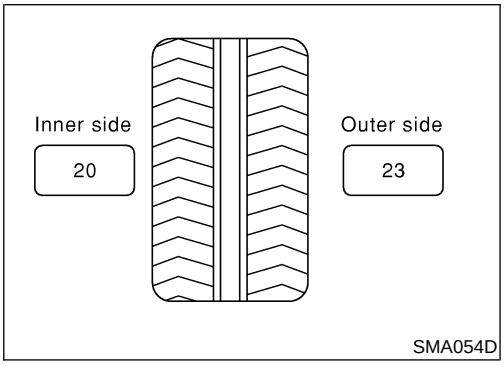
WHEEL BALANCE ADJUSTMENT

NFMA0022S02

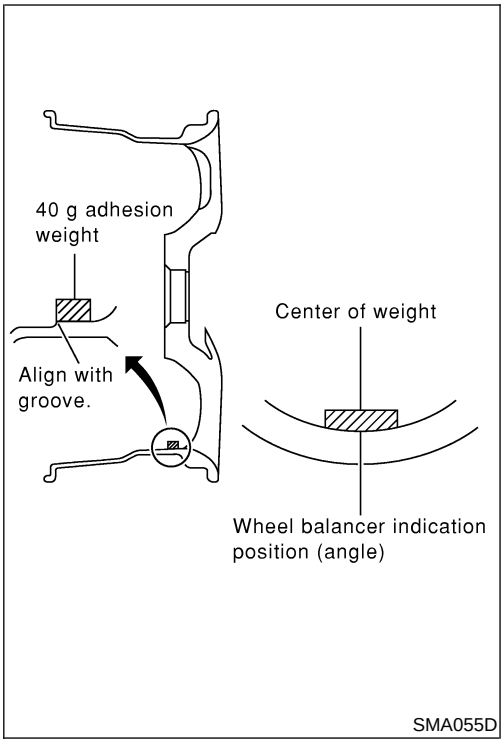
- If a tire balance machine has adhesion balance weight mode settings and drive-in weight mode setting, select and adjust a drive-in weight mode suitable for road wheels.

1. Set road wheel on wheel balancer using the center hole as a guide. Start the tire balance machine.
2. When inner and outer unbalance values are shown on the wheel balancer indicator, multiply outer unbalance value by 1.6 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.**

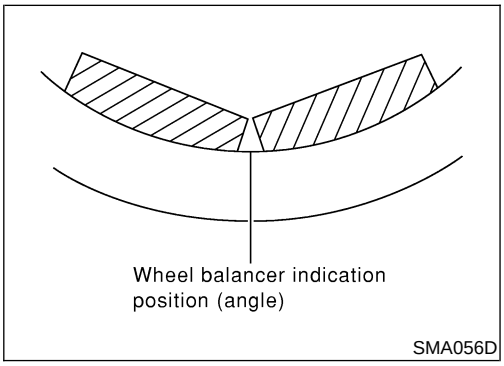


Indicated unbalance value × 1.6 = balance weight to be installed
Calculation example:
23 g (0.81 oz) × 1.6 = 38.33 g (1.35 oz) = 40 g (1.41 oz) balance weight (closer to calculated balance weight value)
Note that balance weight value must be closer to the calculated balance weight value.
Example:
37.4 = 35 g (1.23 oz)
37.5 = 40 g (1.41 oz)



a. Install balance weight in the position shown in the figure at left.
b. When installing balance weight to road wheels, set it into the grooved area on the inner wall of the road wheel as shown in the figure at left so that the balance weight center is aligned with the wheel balancer indication position (angle).

CAUTION:
- **Always use genuine Nissan adhesion balance weights.**
- **Balance weights are unreusable; always replace with new ones.**
- **Do not install more than three sheets of balance weight.**



c. If calculated balance weight value exceeds 50 g (1.76 oz), install two balance weight sheets in line with each other (as shown in the figure at left).

CAUTION:
Do not install one balance weight sheet on top of another.

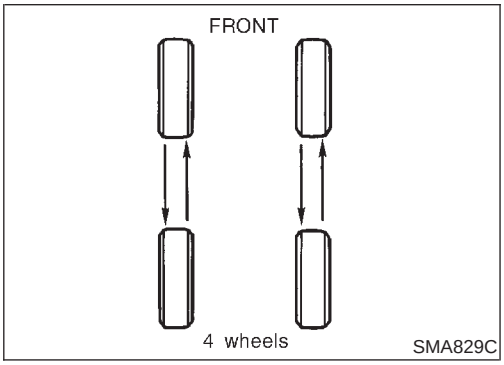
3. Start wheel balancer again.
4. Install drive-in balance weight on inner side of road wheel in the wheel balancer indication position (angle).

CAUTION:
Do not install more than two balance weights.

5. Start wheel balancer. Make sure that inner and outer residual unbalance values are 10 g (0.35 oz) each or below.
- If either residual unbalance value exceeds 10 g (0.35 oz), repeat installation procedures.

Wheel balance (Maximum allowable unbalance):

Maximum allowable unbalance	Dynamic (At rim flange)	10 g (0.35 oz) (one side)
	Static	20 g (0.71 oz)



Tire Rotation

NFMA0023

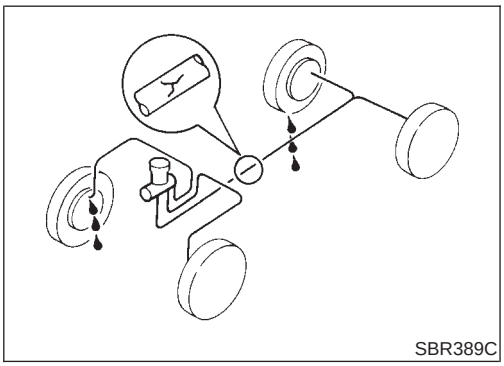
Do not include the T-type spare tire when rotating the tires.

Wheel nuts:
: 98 - 118 N·m (10.0 - 12.0 kg-m, 72 - 87 ft-lb)

Checking Brake Fluid Level and Leaks

NFMA0024

If fluid level is extremely low, check brake system for leaks.


SBR389C

Checking Brake Lines and Cables

NFMA0025

Check brake fluid lines and parking brake cables for improper attachment, leaks, chafing, abrasions, deterioration, etc.

Checking Disc Brake

NFMA0026

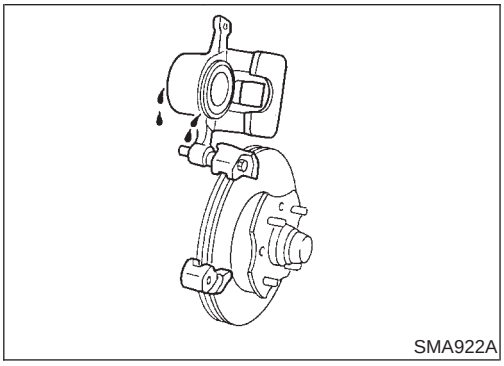
ROTOR

NFMA0026S01

Check condition, wear, and damage.

Unit: mm (in)

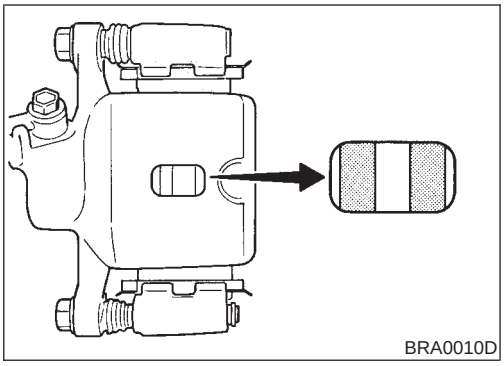
	Front	Rear
Brake model	CLZ25VD	CL9HE
Standard thickness	24.0 (0.94)	9 (0.35)
Maximum runout	0.07 (0.0028)	0.07 (0.0028)
Minimum thickness (Wear limit)	22.0 (0.87)	8.0 (0.315)


SMA922A

CALIPER

NFMA0026S02

Check for leakage.


BRA0010D

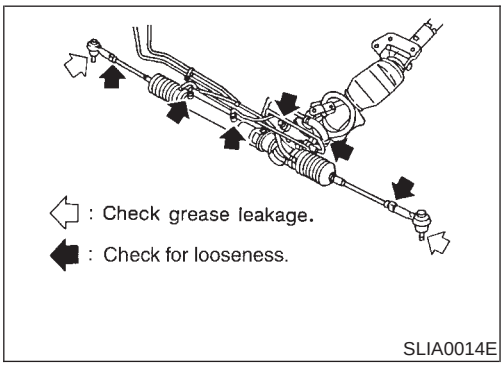
PAD

NFMA0026S03

Check for wear or damage.

Unit: mm (in)

Brake model	CLZ25VD	CL9HE
Standard thickness	9.5 (0.374)	10 (0.39)
Minimum thickness (Wear limit)	2.0 (0.079)	1.5 (0.059)



SLIA0014E

Checking Steering Gear and Linkage

NFMA0027

STEERING GEAR

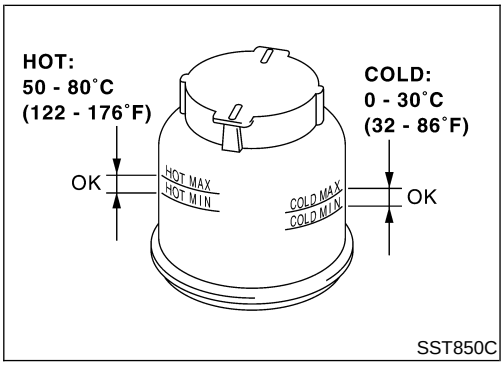
NFMA0027S01

- Check gear housing and boots for looseness, damage and grease leakage.
- Check connection with steering column for looseness.

STEERING LINKAGE

NFMA0027S02

Check ball joint, dust cover and other component parts for looseness, wear, damage and grease leakage.



SST850C

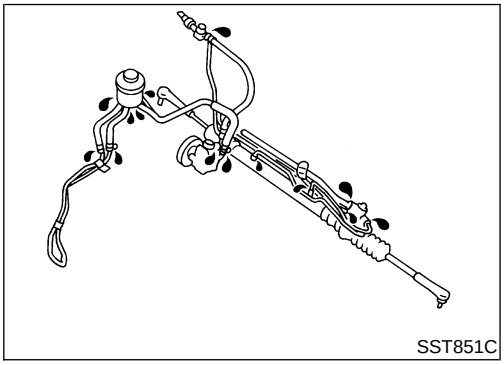
Checking Power Steering Fluid and Lines

NFMA0028

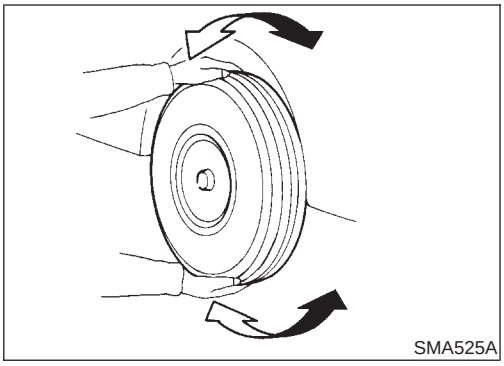
Check fluid level in reservoir tank with engine off.
Use "HOT" range at fluid temperatures of 50 to 80°C (122 to 176°F) or "COLD" range at fluid temperatures of 0 to 30°C (32 to 86°F).

CAUTION:

- **Do not overfill.**
- **Recommended fluid is Genuine NISSAN PSF II or equivalent.**
  Refer to "RECOMMENDED FLUIDS AND LUBRICANTS", MA-11.


SST851C

- Check lines for improper attachment, leaks, cracks, damage, loose connections, chafing and deterioration.
- Check rack boots for accumulation of power steering fluid.

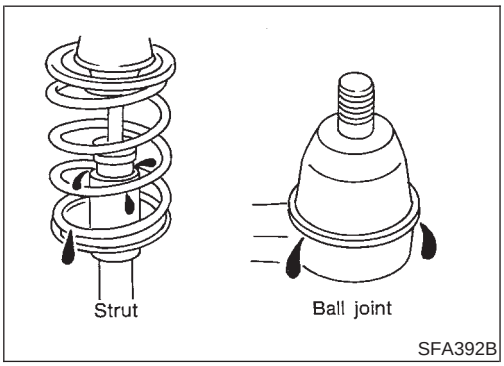

SMA525A

Axle and Suspension Parts

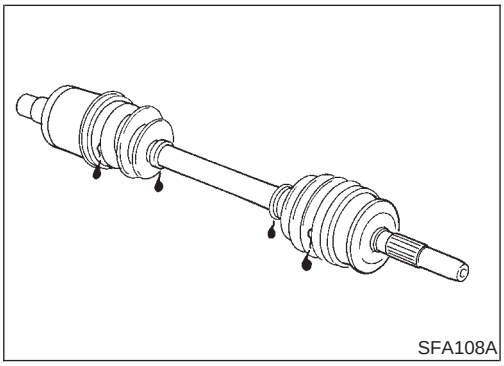
NFMA0035

Check front and rear axle and suspension parts for excessive play, cracks, wear, or other damage.

- Shake each wheel to check for excessive play.
- Rotate each wheel to check for abnormal noise.
- 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.



SFA392B


SFA108A

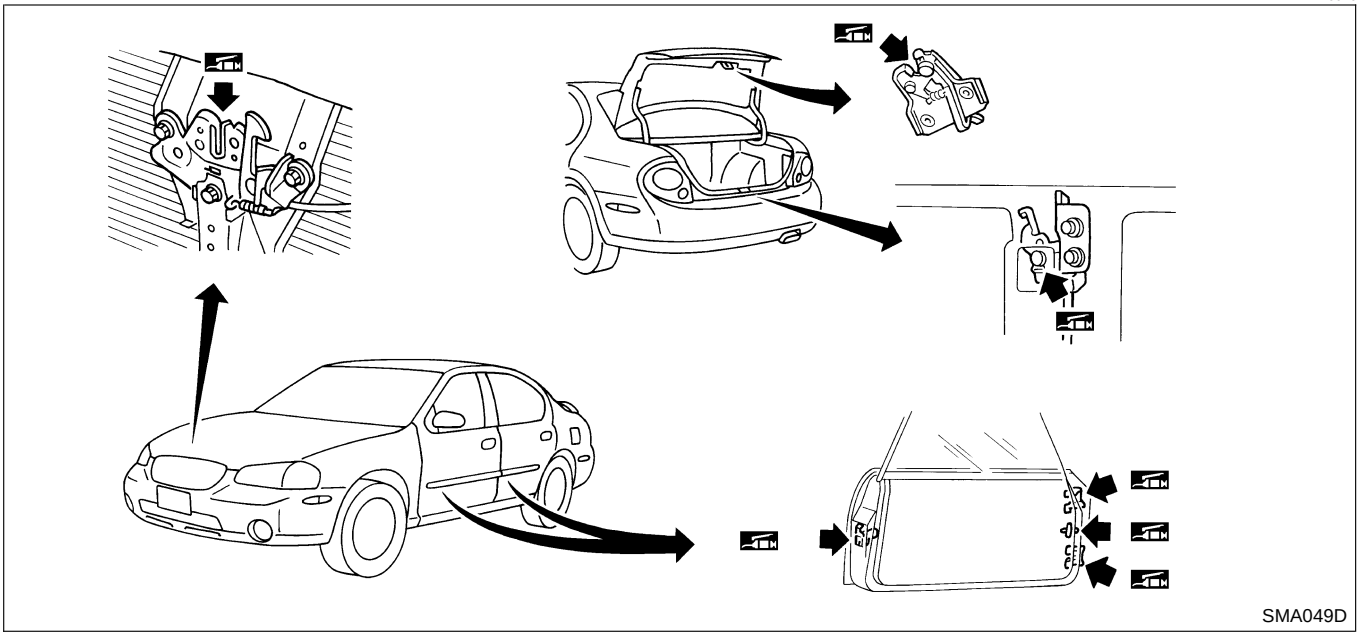
Drive Shaft

NFMA0036

Check boot and drive shaft for cracks, wear, damage and grease leakage.

Lubricating Locks, Hinges and Hood Latches

NFMA0029


SMA049D

Checking Seat Belts, Buckles, Retractors, Anchors and Adjusters

NFMA0030

CAUTION:

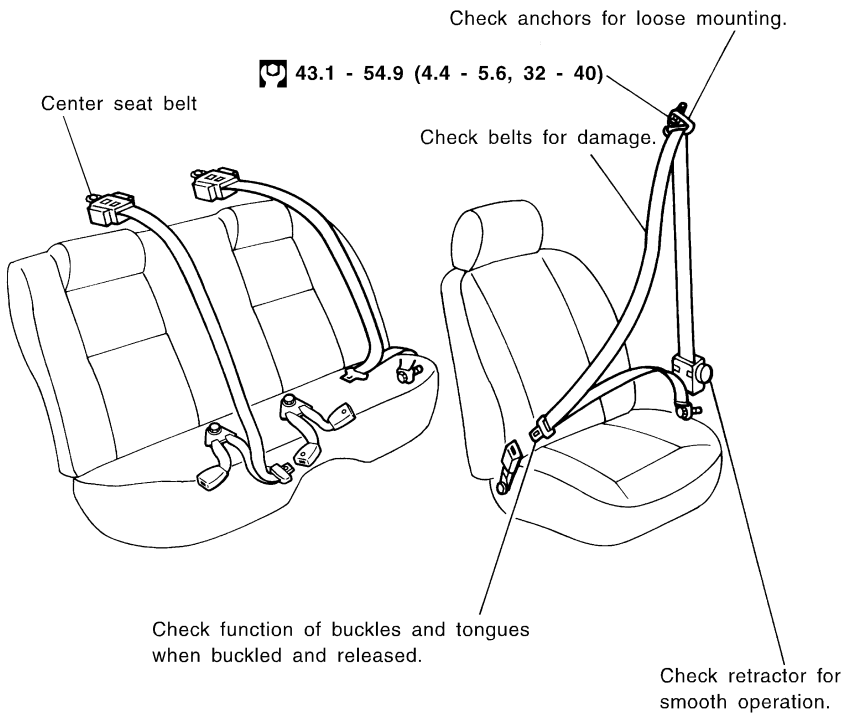
- **After any collision, inspect all seat belt assemblies, including retractors and other attached hardwares (i.e. anchor bolt, guide rail set). Nissan recommends to replace all seat belt assemblies in use during a collision, unless not damaged and properly operating after minor collision.**
  Also inspect seat belt assemblies not in use during a collision, and replace if damaged or improperly operating.
  Seat belt pre-tensioner should be replaced even if the seat belts are not in use during a frontal collision where the driver and passenger air bags are deployed.
- **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.**

For details, refer to "SEAT BELTS" in RS section.

Anchor bolt

43.1 - 54.9 (4.4 - 5.6, 32 - 40)

: N•m (kg-m, ft-lb)



SMA042DA

Engine Maintenance

BELT DEFLECTION AND TENSION

NFMA0031

	Deflection adjustment Unit: mm (in)			Tension adjustment*1 Unit: N (kg, lb)		
	Used belt		New belt	Used belt		New belt
	Limit	After adjustment		Limit	After adjustment	
Alternator and air conditioner compressor	7 (0.28)	4.2 - 4.6 (0.165 - 0.181)	3.7 - 4.1 (0.146 - 0.161)	294 (30, 66)	730 - 818 (74.5 - 83.5, 164 - 184)	838 - 926 (85.45 - 94.43, 188.4 - 208.2)
Power steering oil pump	11 (0.43)	7.3 - 8 (0.287 - 0.315)	6.5 - 7.2 (0.256 - 0.283)	196 (20, 44)	495 - 583 (50.5 - 59.5, 111 - 131)	603 - 691 (61.5 - 70.5, 136 - 155)
Applied pushing force	98 N (10 kg, 22 lb)			—		

*1: If the belt tension gauge cannot be installed at check points shown, check drive belt tension at a different location on the belt.

SPARK PLUG

NFMA0032

		Platinum-tipped type
Make		NGK
Type	Standard	PLFR5A-11
	Hot	PLFR4A-11
	Cold	PLFR6A-11
	Plug gap (Nominal)	1.1 mm (0.043 in)

Chassis and Body Maintenance

WHEEL BALANCE

NFMA0033

Maximum allowable unbalance	Dynamic (At rim flange)	10 g (0.35 oz) (one side)
	Static	20 g (0.71 oz)

MANUAL TRANSAXLE

SECTION MT

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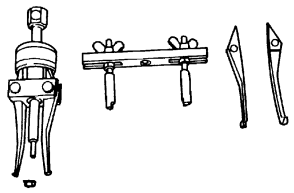
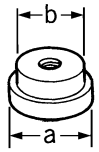
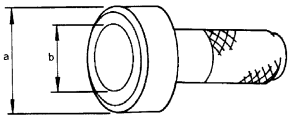
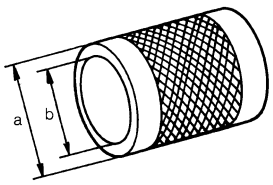
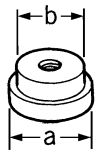
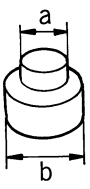
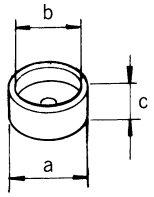
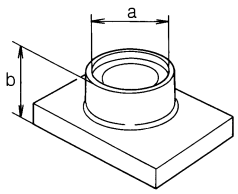
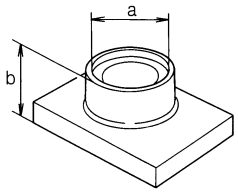
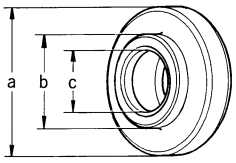
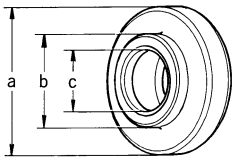
Special Service Tools

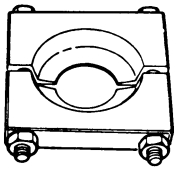
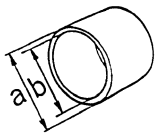
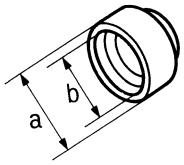
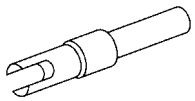
NFMT0001

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description	
KV381054S0 (J34286) Puller	 ZZA0601D	Side bearing outer race removal Mainshaft front bearing removal
ST35321000 (—) Drift	 ZZA1000D	Input shaft oil seal installation Reverse main gear installation 1st bushing installation 1st-2nd synchronizer hub installation 2nd bushing installation 3rd main gear installation **a: 49 mm (1.93 in) dia.** **b: 41 mm (1.61 in) dia.**
ST30720000 (J25405) Drift	 ZZA0811D	Differential oil seal installation Differential side bearing outer race installation Mainshaft rear bearing installation Differential side bearing installation **a: 77 mm (3.03 in) dia.** **b: 55.5 mm (2.185 in) dia.**
ST33200000 (J26082) Drift	 ZZA1002D	Mainshaft front bearing installation 6th bushing installation 4th main gear installation 5th main gear installation 6th main gear installation **a: 60 mm (2.36 in) dia.** **b: 44.5 mm (1.752 in) dia.**
ST33061000 (J8107-2) Drift	 ZZA1000D	Bore plug installation Differential side bearing removal **a: 38 mm (1.50 in) dia.** **b: 28.5 mm (1.122 in) dia.**

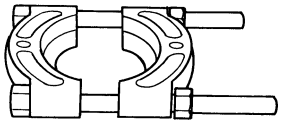
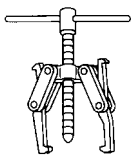
Special Service Tools (Cont'd)

Tool number (Kent-Moore No.) Tool name	Description	
ST33052000 (—) Drift	 ZZA1023D	Welch plug installation Input shaft rear bearing removal 5th bushing, thrust washer, 4th input gear, 4th gear bushing, 3rd-4th synchronizer hub and 3rd input gear removal Input shaft front bearing installation 6th input gear and 6th bushing removal Mainshaft rear bearing removal 4th main gear and 5th main gear removal 6th main gear removal **a: 22 mm (0.87 in) dia.** **b: 28 mm (1.10 in) dia.**
KV40105020 (—) Drift	 ZZA1133D	5th input gear and synchronizer hub removal 3rd main gear, 2nd main gear, 2nd bushing, 1st-2nd synchronizer hub, 1st main gear, reverse main gear and 1st bushing removal **a: 39.7 mm (1.563 in) dia.** **b: 35 mm (1.38 in) dia.** **c: 15 mm (0.59 in)**
KV40105710 (—) Press stand	 ZZA1058D	3rd-4th synchronizer hub installation 4th bushing installation 5th bushing installation 5th-6th synchronizer hub installation 2nd bushing installation 3rd main gear installation **a: 46 mm (1.81 in) dia.** **b: 41 mm (1.61 in)**
ST38220000 (—) Press stand	 ZZA1058D	Reverse main gear installation 1st bushing installation 1st-2nd synchronizer hub installation **a: 63 mm (2.48 in) dia.** **b: 65 mm (2.56 in)**
ST30032000 (J26010-01) Drift	 ZZA0978D	Input shaft front bearing installation **a: 80 mm (3.15 in) dia.** **b: 38 mm (1.50 in) dia.** **c: 31 mm (1.22 in) dia.**
ST30901000 (J26010-01) Drift	 ZZA0978D	Input shaft rear bearing installation 4th main gear installation 5th main gear installation 6th main gear installation Mainshaft rear bearing installation **a: 79 mm (3.11 in) dia.** **b: 45 mm (1.77 in) dia.** **c: 35.2 mm (1.386 in) dia.**

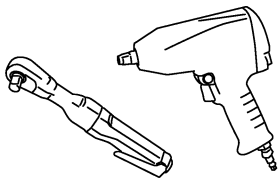
Tool number (Kent-Moore No.) Tool name	Description	
ST30031000 (J22912-01) Puller	 ZZA0537D	Measuring wear of 1st and 2nd baulk ring
KV40101630 (J35870) Drift	 ZZA1003D	Reverse main gear installation **a: 68 mm (2.68 in) dia.** **b: 60 mm (2.36 in) dia.**
KV38102510 (—) Drift	 ZZA0838D	1st bushing installation 1st-2nd synchronizer hub installation Differential side bearing installation **a: 71 mm (2.80 in) dia.** **b: 65 mm (2.56 in) dia.**
(J39713) Preload adapter	 NT087	Checking differential side gear end play

Commercial Service Tools

NFMT0002

Tool name	Description	
Puller	 ZZB0823D	Each bearing gear and bushing removal
Puller	 NT077	Each bearing gear and bushing removal

Commercial Service Tools (Cont'd)

Tool name	Description
Pin punch	Each retaining pin removal and installation **Tip diameter: 4.5 mm (0.177 in) dia.** ZZA0815D
Power tool	Loosening bolts and nuts  PBIC0190E

NVH Troubleshooting Chart

NFMT0003S01

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.

MANUAL TRANSAXLE

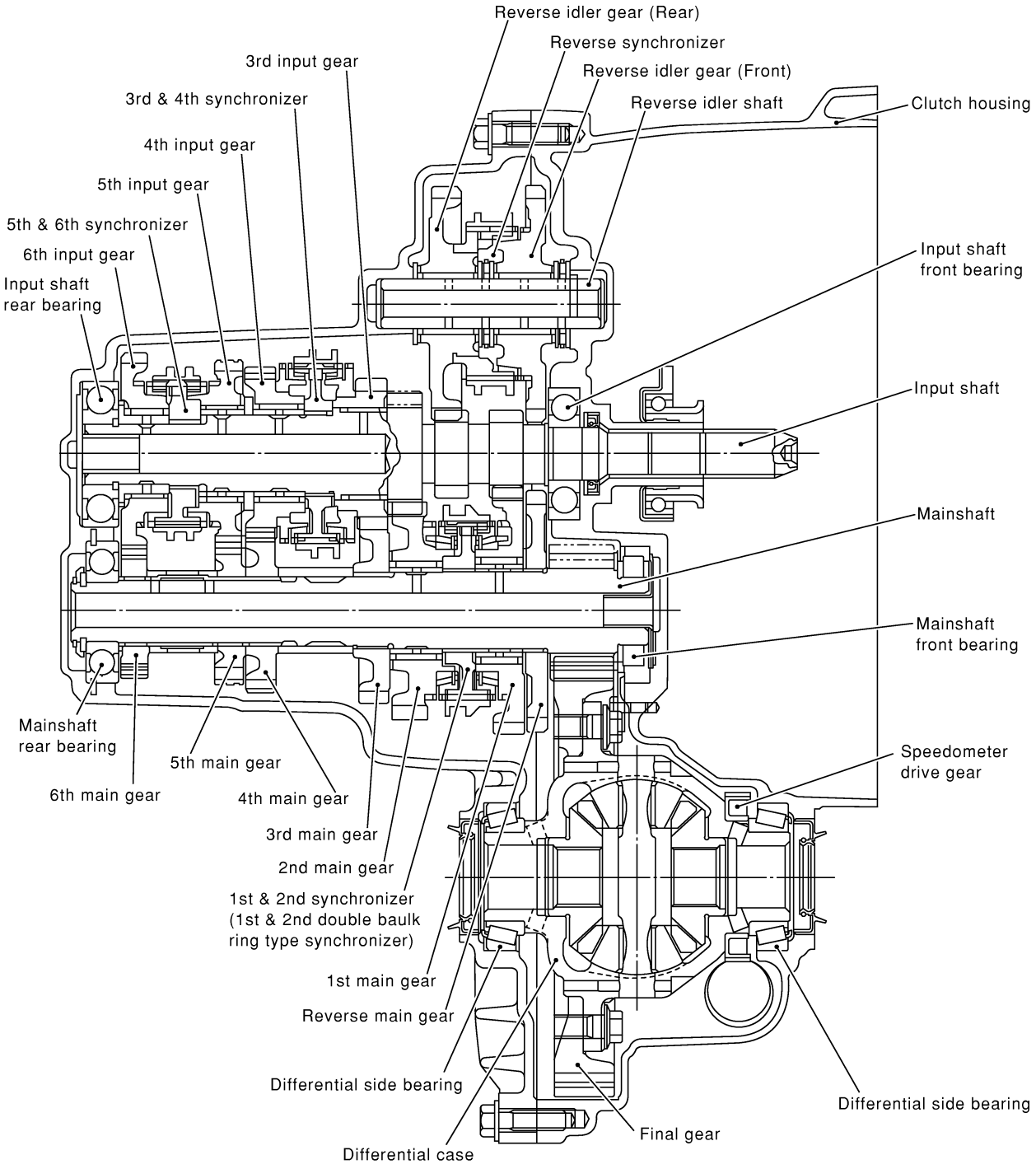
NFMT0003S0101

Reference page			Refer to MA-20, "Checking M/T Oil".		MT-15	MT-15	MT-15	MT-11	MT-18	MT-18	MT-16	MT-16	MT-16	MT-16
SUSPECTED PARTS (Possible cause)		(Oil level is low.)	(Wrong oil.)	(Oil level is high.)	GASKET (Damaged)	OIL SEAL (Worn or damaged)	O-RING (Worn or damaged)	SHIFT CONTROL LINKAGE (Worn)	CHECK PLUG RETURN SPRING AND CHECK BALL (Worn or damaged)	SHIFT FORK (Worn)	GEAR (Worn or damaged)	BEARING (Worn or damaged)	BAULK RING (Worn or damaged)	INSERT SPRING (Damaged)
Symptoms	Noise	1	2								3	3		
	Oil leakage		3	1	2	2	2							
	Hard to shift or will not shift		1	1				2					3	3
	Jumps out of gear							1	2	3	3			

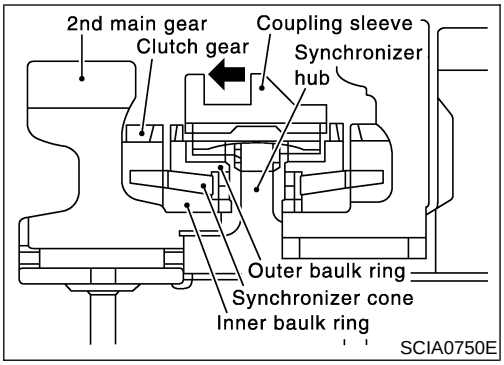
Cross-sectional View

NFMT0004S01

RS6F51A



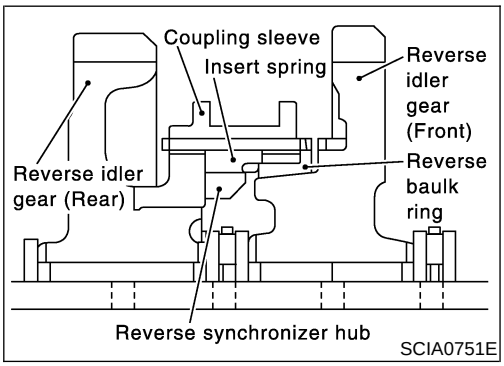
SMT115E



DOUBLE-CONE SYNCHRONIZER

NFMT0004S0101

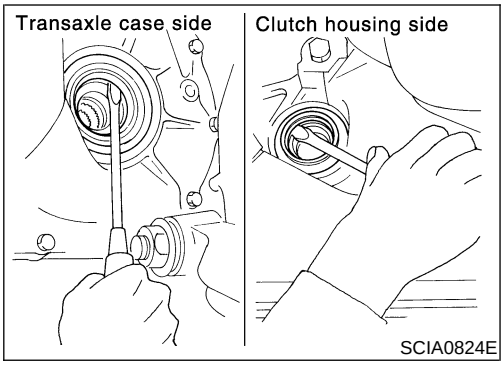
Double-cone synchronizer is adopted for 1st and 2nd gears to reduce operating force of the shift lever.

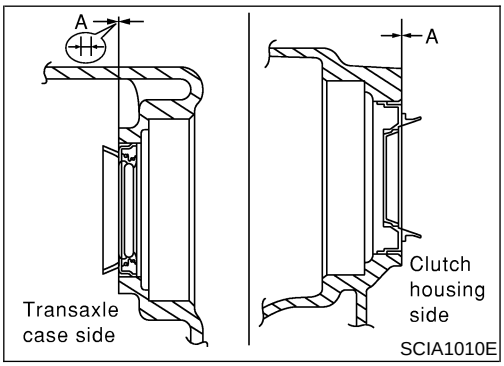


REVERSE GEAR NOISE PREVENTION FUNCTION (SYNCHRONIZING METHOD)

NFMT0004S0102

The gear can be matched smoothly in a structure by setting synchronizer hub, coupling sleeve, baulk ring and insert spring to reverse gear, and letting gear be synchronized.





Replacing Oil Seal

NFMT0005

DIFFERENTIAL OIL SEAL

NFMT0005S01

1. Drain gear oil from transaxle.
2. Remove driveshaft. Refer to AX-10, “Drive Shaft”.
3. Remove differential oil seals.

CAUTION:

Be careful not to damage the case surface when removing the oil seal.

4. Using a drift (special service tool), drive the oil seal straight until it protrudes from the case end equal to dimension A shown in the figure.

Dimension “A”:

Within 0.5 mm (0.020 in) of flush with the case.

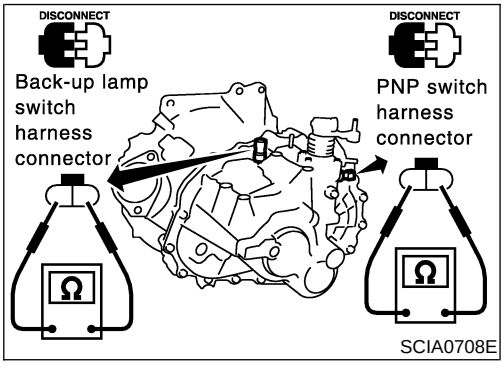
Drift to be used:

ST30720000 (J25405)

CAUTION:

- **When installing oil seals, apply multi-purpose grease to oil seal lips.**
- **Oil seals are not reusable. Never reuse them.**

5. Install all parts in reverse order of removal and check oil level after installation.



Position Switch Check

NFMT0006

BACK-UP LAMP SWITCH

NFMT0006S01

- Check continuity.

Gear position	Continuity
Reverse	Yes
Except reverse	No

PARK/NEUTRAL POSITION SWITCH

NFMT0006S02

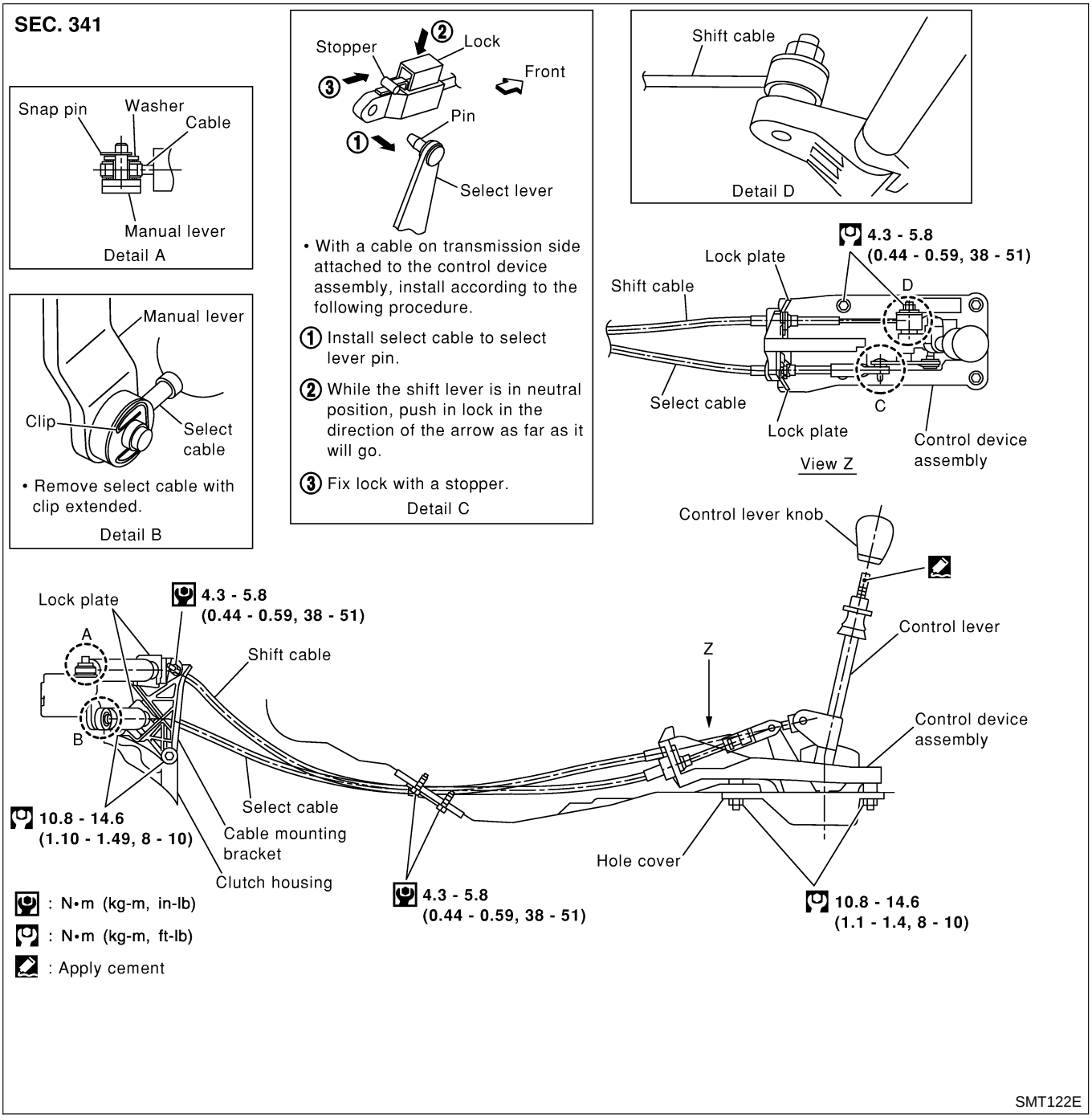
- Check continuity.

Gear position	Continuity
Neutral	Yes
Except neutral	No

Control Device and Cable

NFMT0007

Refer to the figure for removal and installation procedure.



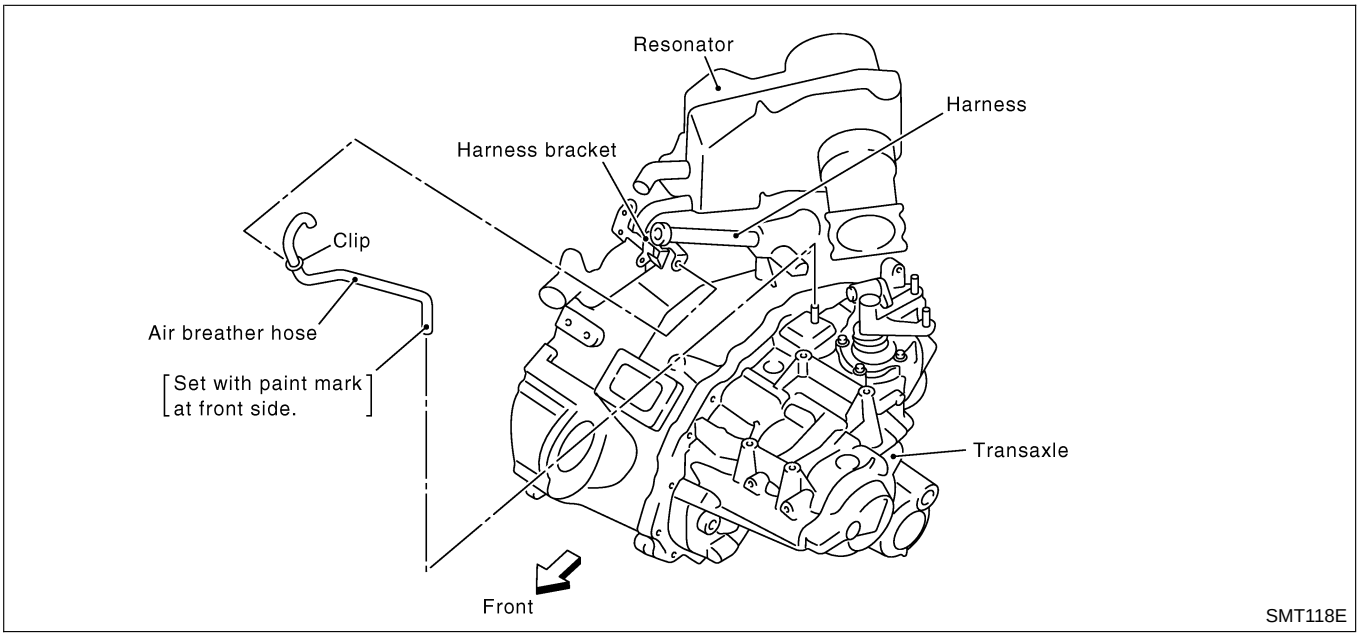
CAUTION:

- **Keep in mind that the select side lock plate for securing the control cable is different from the one on the shift side.**
- **After assembly, make sure selector lever automatically returns to Neutral when it is moved to 1st, 2nd, or Reverse.**

Air Breather Hose

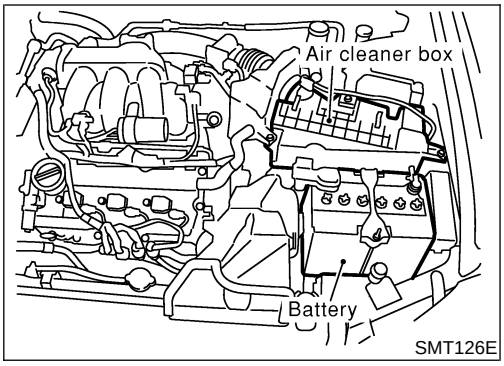
NFMT0030

Refer to the figure for air breather hose removal and installation information.



CAUTION:

- **Make sure there are no pinched or restricted areas on the air breather hose caused by bending or winding when installing it.**
- **Be sure to insert hose into the transaxle tube until overlap area reaches the spool.**



SMT126E

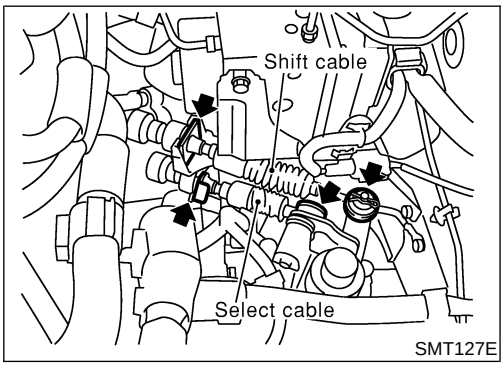
Removal

NFMT0008S01

CAUTION:

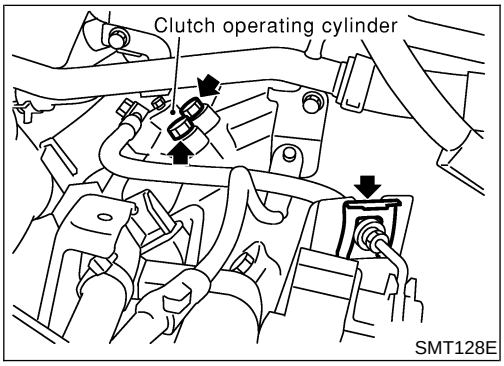
Remove the crankshaft position sensor (POS) from transaxle assembly before separating transaxle from engine.
Be careful not to damage sensor edge.

1. Remove battery and its bracket.
2. Remove air duct and air cleaner box with mass air flow sensor.
3. Remove air breather hose.



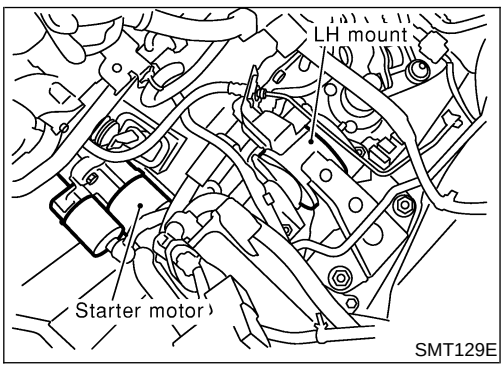
SMT127E

4. Disconnect control cable from transaxle.
5. Remove control cable mounting bracket.



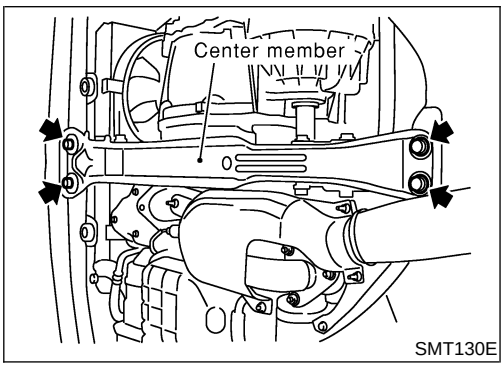
SMT128E

6. Remove clutch operating cylinder from transaxle.
7. Disconnect PNP switch, back-up lamp switch and ground harness connectors.



SMT129E

8. Remove starter motor from transaxle.
9. Remove crankshaft position sensor (POS) from transaxle front side.



SMT130E

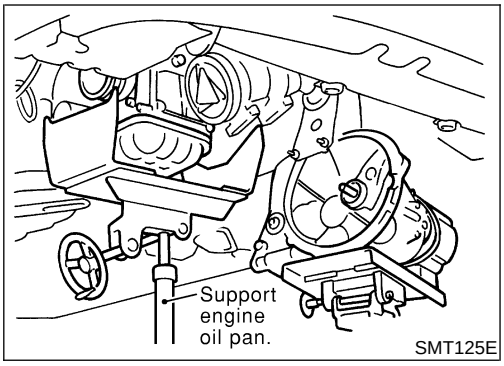
10. Drain gear oil from transaxle.
11. Draw out drive shafts from transaxle. Refer to AX-10, “Drive Shaft”.
12. Support engine of transaxle by placing a jack under oil pan.

CAUTION:

Do not place jack under oil pan drain plug.

13. Remove center member.

Removal (Cont'd)

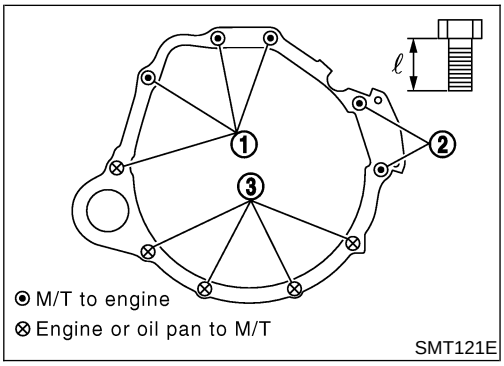


14. Remove LH mount.
15. Remove bolts securing transaxle.
16. Lower transaxle while supporting it with a jack.

Installation

NFMT0008S02

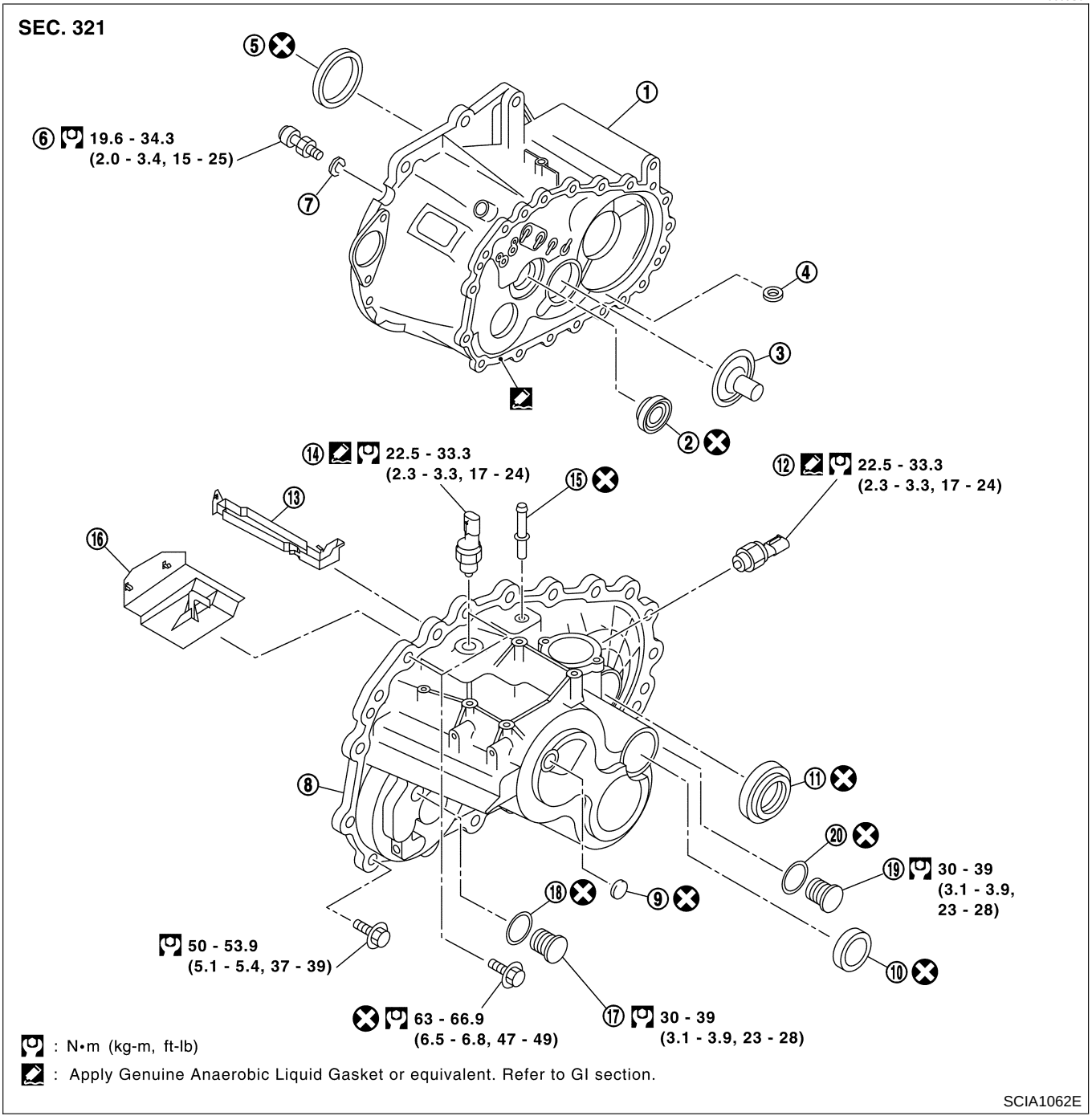
- Tighten LH mount and center member bolts. Refer to EM-60, "ENGINE ASSEMBLY".
- Tighten clutch operating cylinder bolts. Refer to CL-10, "OPERATING CYLINDER".
- Install drive shafts. Refer to AX-11, "Drive Shaft".
- Tighten all transaxle bolts and any part removed.



Bolt No.	Tightening torque N·m (kg-m, ft-lb)	"ℓ" mm (in)
1	69.6 - 79.4 (7.1 - 8.0, 52 - 58)	52 (2.05)
2	69.6 - 79.4 (7.1 - 8.0, 52 - 58)	113 (4.45)
3	36 - 47 (3.7 - 4.7, 27 - 34)	40 (1.57)

Case and Housing Components

NFMT0009S02

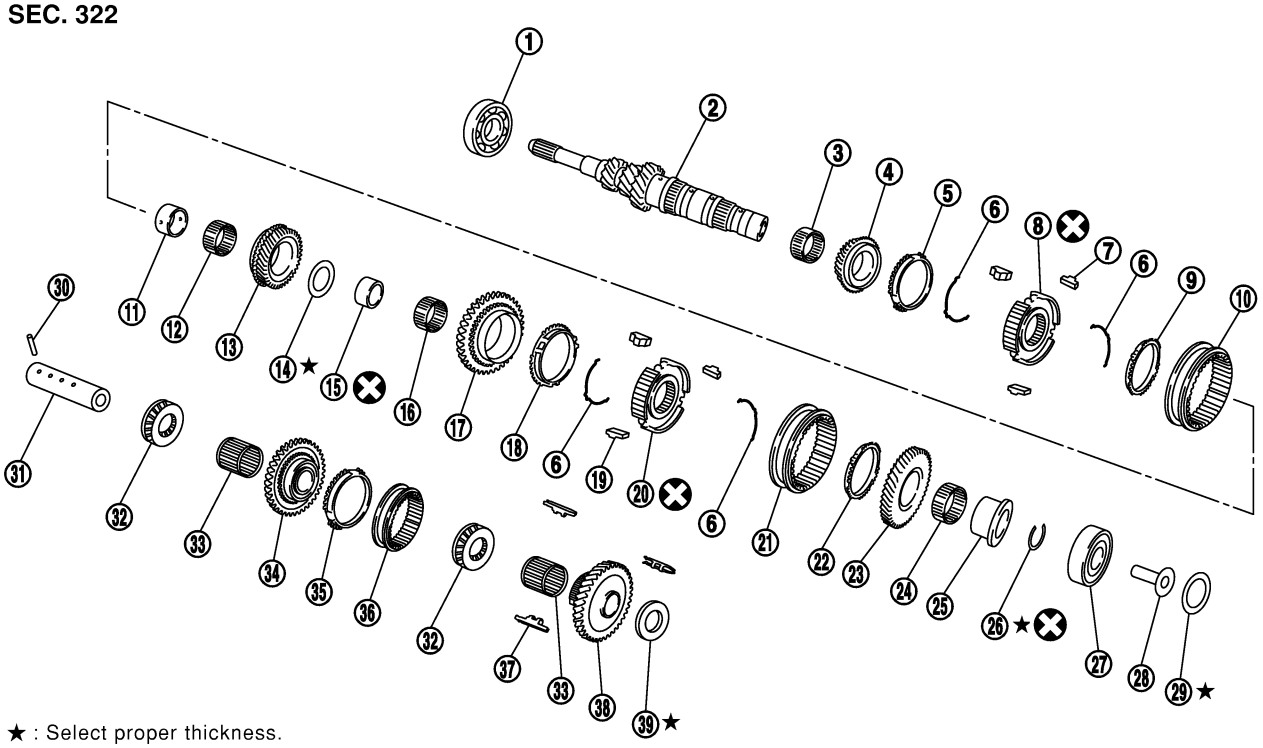


1. Clutch housing
2. Input shaft oil seal
3. Oil channel
4. Magnet
5. Differential oil seal
6. Ball pin
7. Washer
8. Transaxle case
9. Welch plug
10. Bore plug
11. Differential oil seal
12. Park/Neutral position switch
13. Oil gutter
14. Back-up lamp switch
15. Air breather tube
16. Baffle plate
17. Filler plug
18. Gasket
19. Drain plug
20. Gasket

Gear Components

NFMT0009S03

SEC. 322



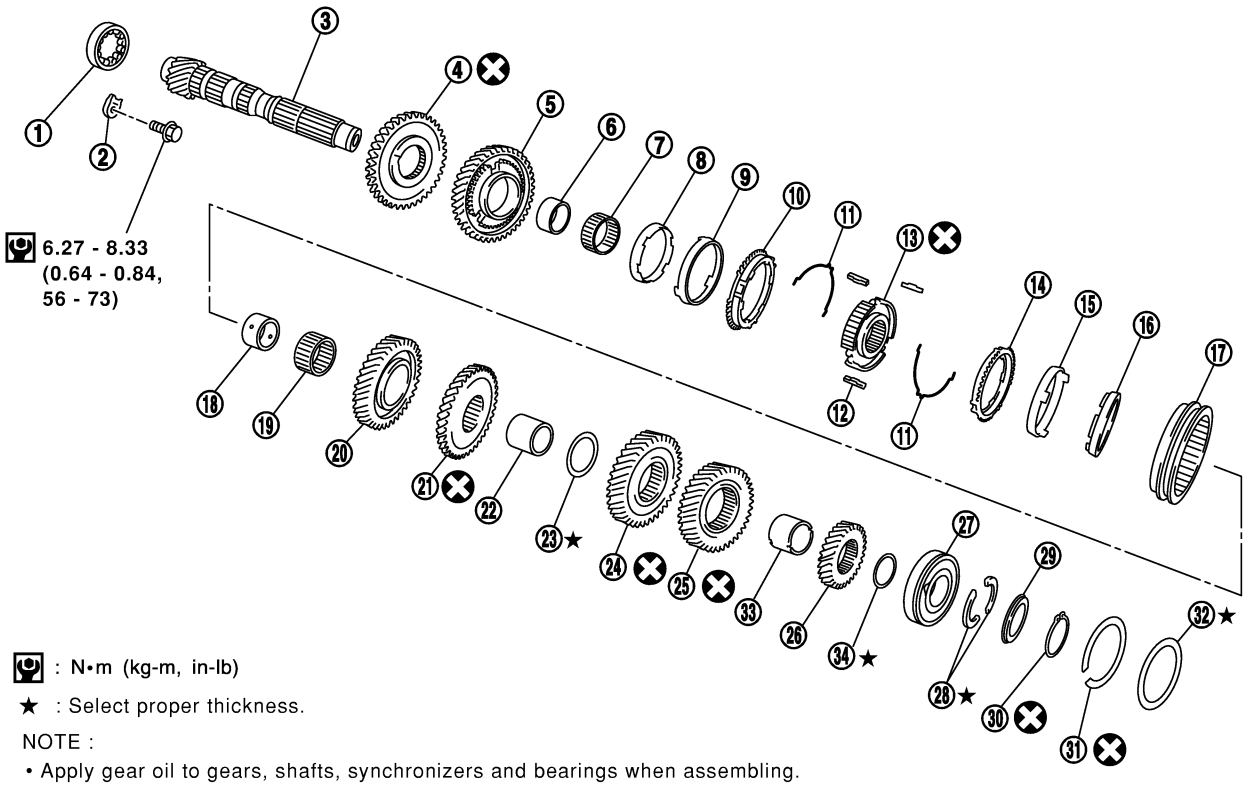
★ : Select proper thickness.

NOTE :

- Apply gear oil to gears, shafts, synchronizers and bearings when assembling.
- Replace ⑧ and ⑩, ⑳ and ㉑ as a set.

SCIA0956E

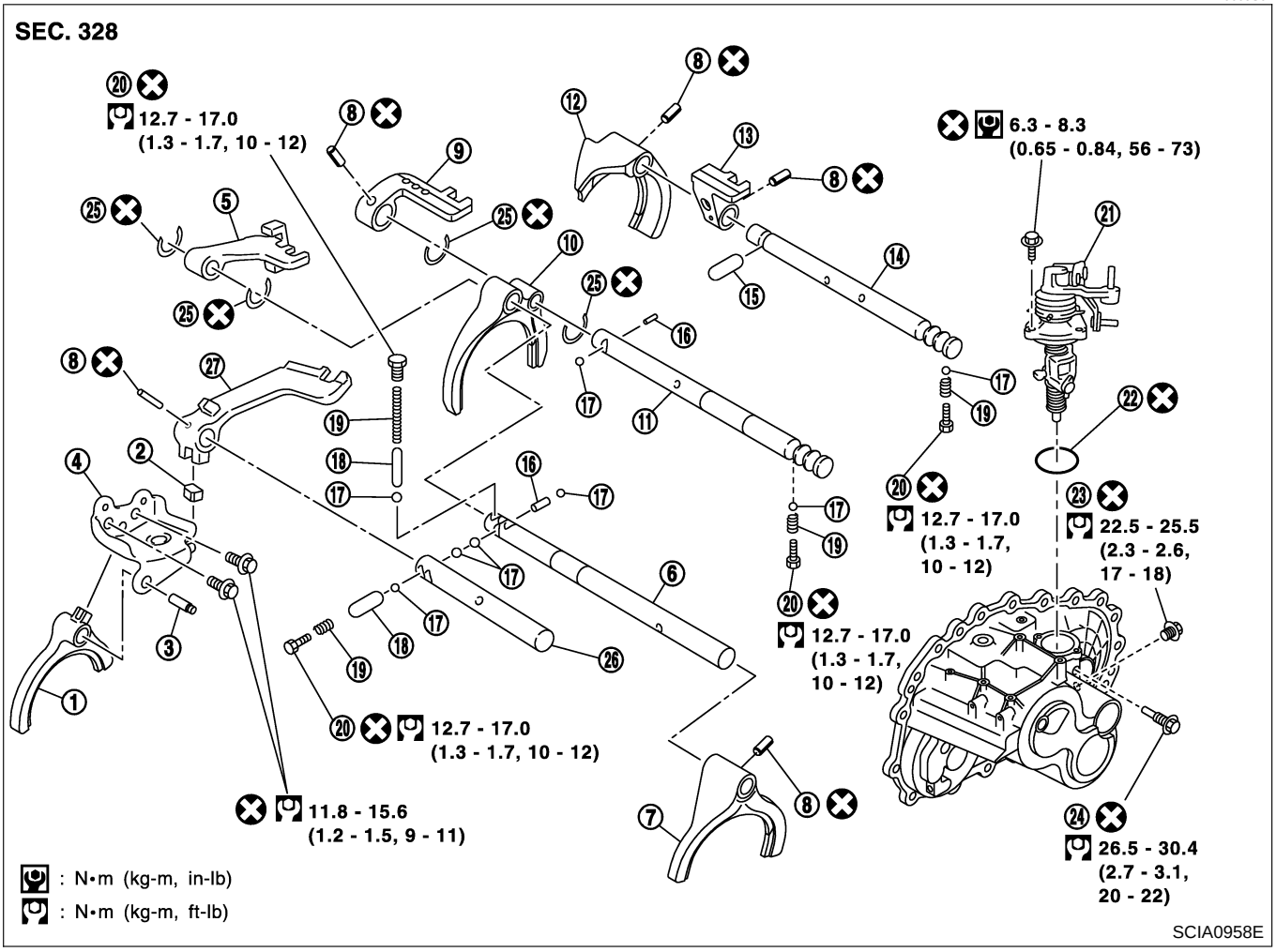
1. Input shaft front bearing
2. Input shaft
3. Needle bearing
4. 3rd input gear
5. 3rd baulk ring
6. Spread spring
7. 3rd & 4th shifting insert
8. 3rd & 4th synchronizer hub
9. 4th baulk ring
10. 3rd & 4th coupling sleeve
11. Bushing
12. Needle bearing
13. 4th input gear
14. Thrust washer
15. Bushing
16. Needle bearing
17. 5th input gear
18. 5th baulk ring
19. 5th & 6th shifting insert
20. 5th & 6th synchronizer hub
21. 5th & 6th coupling sleeve
22. 6th baulk ring
23. 6th input gear
24. Needle bearing
25. Bushing
26. Snap ring
27. Input shaft rear bearing
28. Oil channel
29. Input shaft rear bearing adjusting shim
30. Retaining pin
31. Reverse idler shaft
32. Thrust bearing
33. Needle bearing
34. Reverse idler gear (Front)
35. Reverse baulk ring
36. Reverse coupling sleeve
37. Insert spring
38. Reverse idler gear (Rear)
39. Reverse idler gear adjusting shim



1. Mainshaft front bearing
2. Mainshaft bearing retainer
3. Mainshaft
4. Reverse main gear
5. 1st main gear
6. Bushing
7. Needle bearing
8. 1st inner baulk ring
9. 1st gear synchronizer cone
10. 1st outer baulk ring
11. Spread spring
12. 1st & 2nd shifting insert
13. 1st & 2nd synchronizer hub
14. 2nd outer baulk ring
15. 2nd gear synchronizer cone
16. 2nd inner baulk ring
17. 1st & 2nd coupling sleeve
18. Bushing
19. Needle bearing
20. 2nd main gear
21. 3rd main gear
22. 3rd & 4th mainshaft spacer
23. 4th main adjusting shim
24. 4th main gear
25. 5th main gear
26. 6th main gear
27. Mainshaft rear bearing
28. Mainshaft C ring
29. C ring holder
30. Snap ring
31. Snap ring
32. Mainshaft rear bearing adjusting shim
33. 5th & 6th mainshaft spacer
34. 6th main adjusting shim

Shift Control Components

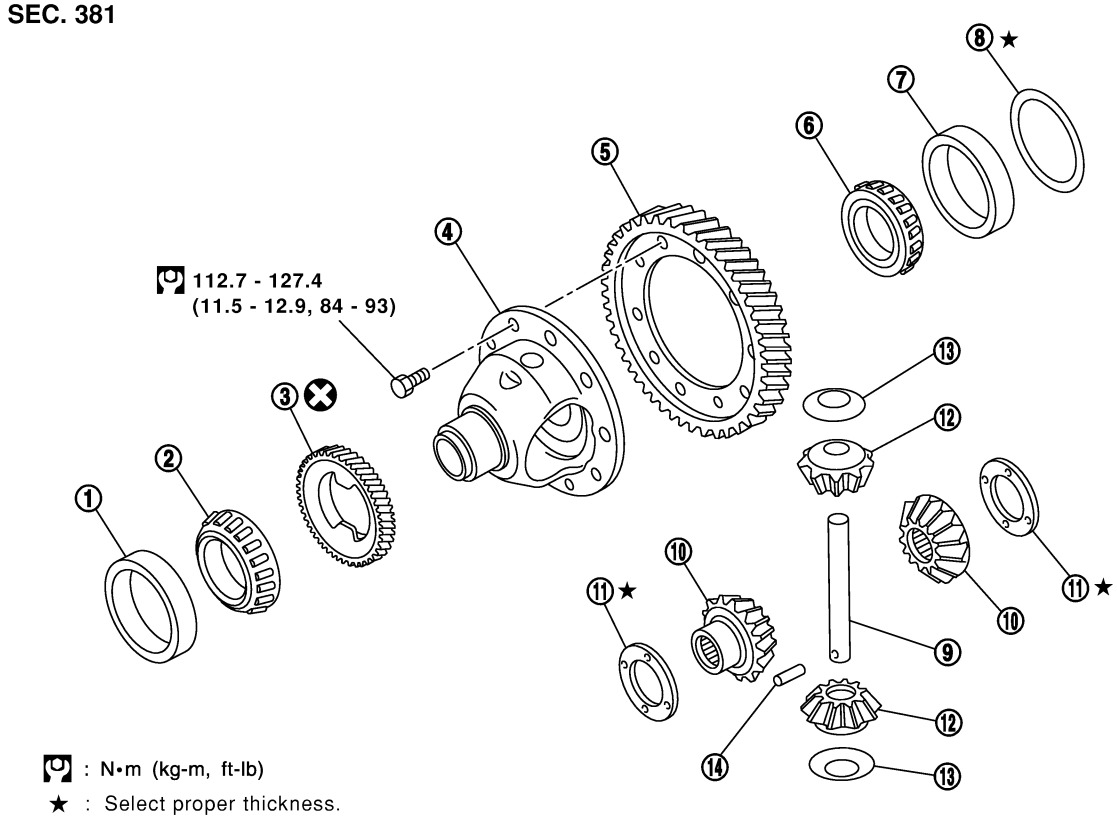
NFMT0009S04



1. Reverse shift fork
2. Shifter cap
3. Reverse fork rod
4. Reverse lever assembly
5. 5th & 6th bracket
6. 5th & 6th fork rod
7. 5th & 6th shift fork
8. Retaining pin
9. 3rd & 4th bracket
10. 3rd & 4th shift fork
11. 3rd & 4th fork rod
12. 1st & 2nd shift fork
13. 1st & 2nd bracket
14. 1st & 2nd fork rod
15. Shift check sleeve
16. Inter lock pin
17. Check ball
18. Shift check sleeve
19. Check spring
20. Check plug
21. Control assembly
22. O ring
23. Shift check
24. Stopper bolt
25. Stopper ring
26. Reverse bracket fork rod
27. Reverse bracket

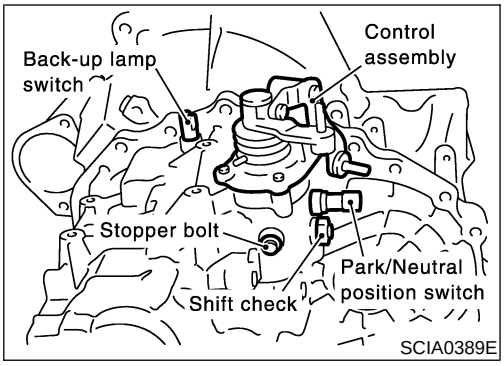
Final Drive Components

NFMT0009S05

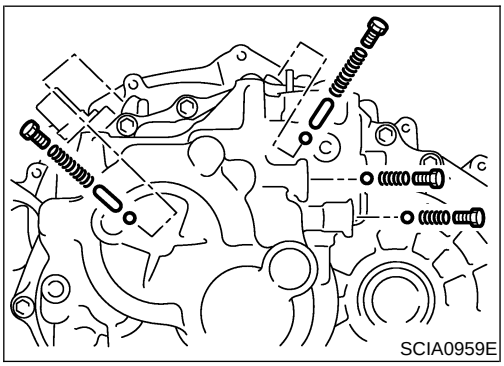


1. Differential side bearing outer race
2. Differential side bearing
3. Speedometer drive gear
4. Differential case
5. Final gear
6. Differential side bearing
7. Differential side bearing outer race
8. Differential side bearing adjusting shim
9. Pinion mate shaft
10. Side gear
11. Side gear thrust washer
12. Pinion mate gear
13. Pinion mate gear washer
14. Retaining pin

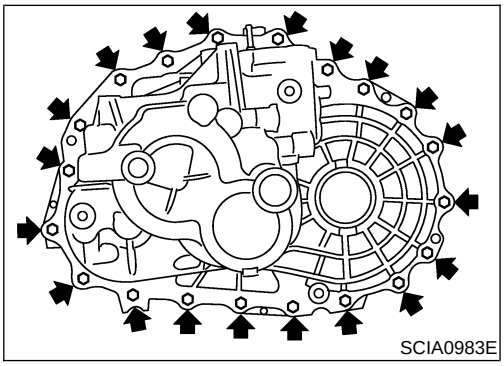
DISASSEMBLY



1. Remove drain plug and filler plug.
2. Remove park/neutral position switch and back-up lamp switch.
3. After removing shift check and stopper bolt, remove control assembly.



4. Remove check plugs (4 pieces), check springs (4 pieces), check balls (4 pieces) and shift check sleeve (2 pieces).

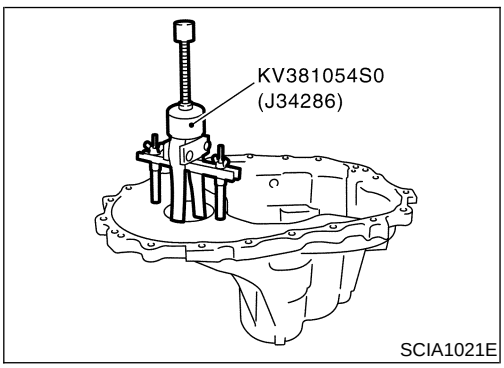


5. Remove transaxle case fixing bolts.
6. Remove bore plug.

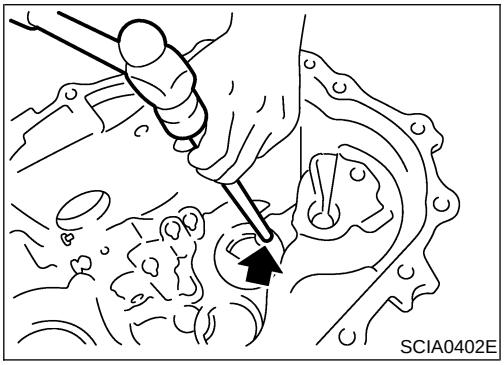
CAUTION:

Be careful not to damage transaxle case.

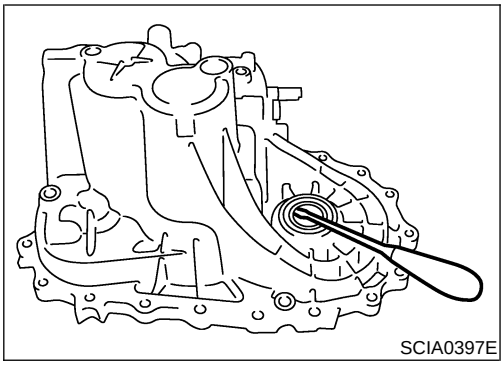
7. While spreading the snap ring of mainshaft rear bearing located at bore plug hole, remove transaxle case.
8. Remove oil gutter, baffle plate.
9. Remove snap ring, mainshaft rear bearing adjusting shim and input shaft rear bearing adjusting shim from transaxle case.



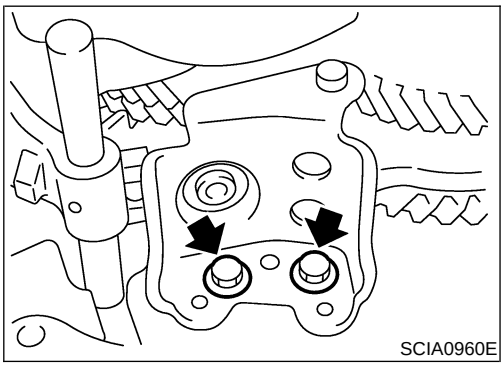
10. Remove differential side bearing outer race (transaxle case side) and then adjusting shim.



11. Remove welch plug.


SCIA0397E

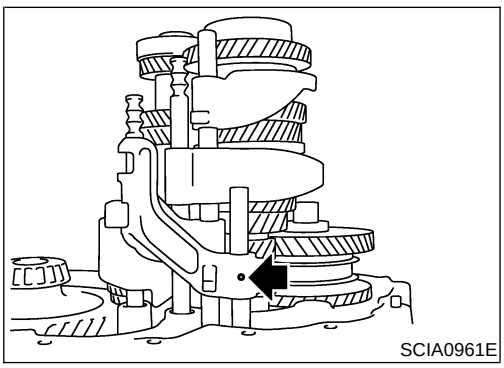
12. Remove differential oil seal (transaxle case side).
13. Remove magnet from clutch housing.


SCIA0960E

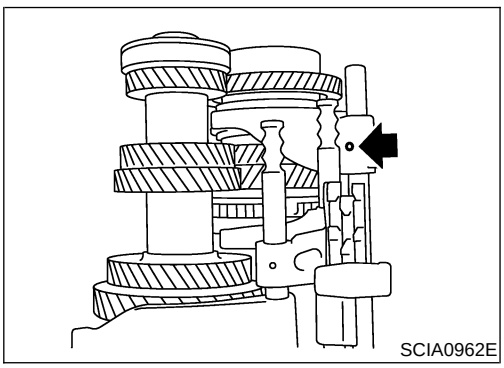
14. With shift lever in 5th position, remove bracket bolts from reverse lever assembly. Lift reverse lever assembly to remove.

CAUTION:
Be careful not to lose shifter cap.

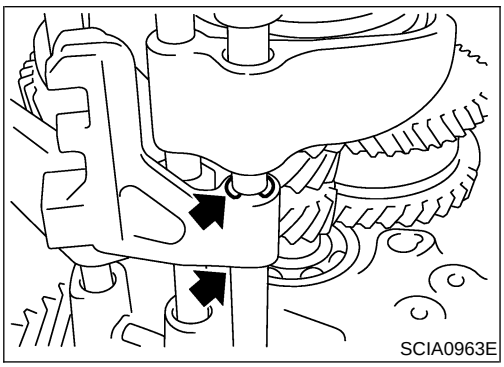
15. Pull out reverse fork rod then remove reverse shift fork.


SCIA0961E

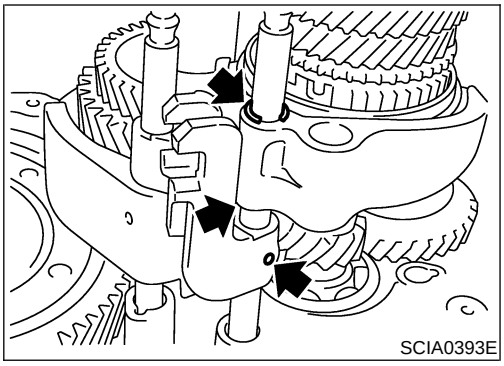
16. Remove retaining pin of reverse bracket.
17. Pull out reverse bracket and reverse bracket fork rod.
18. Remove check ball (2 pieces) and inter lock pin.


SCIA0962E

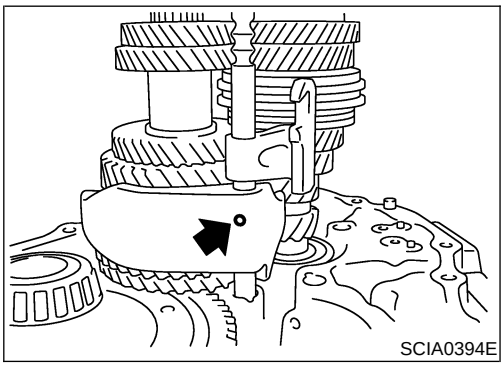
19. Shift 3rd & 4th fork rod to 3rd position. Remove retaining pin of 5th & 6th shift fork using pin punch.


SCIA0963E

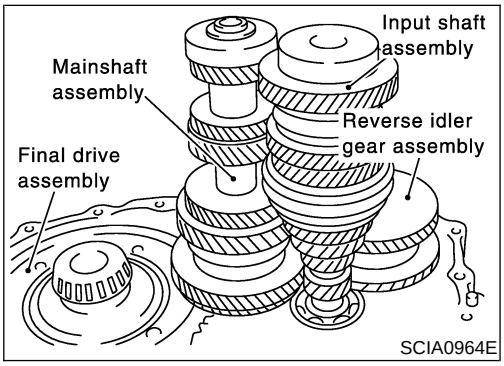
20. Remove stopper rings for 5th & 6th bracket.
21. Pull out 5th & 6th fork rod and remove 5th & 6th shift fork and 5th & 6th bracket.
22. Remove check balls (2 pieces) and inter lock pin.


SCIA0393E

23. Remove retaining pin of 3rd & 4th bracket using pin punch.
24. Remove stopper rings for 3rd & 4th shift fork.
25. Pull out 3rd & 4th fork rod and remove 3rd & 4th shift fork and bracket.
26. Remove shift check sleeve from clutch housing.


SCIA0394E

27. Remove retaining pin of 1st & 2nd shift fork using pin punch.
28. Pull out 1st & 2nd fork rod with bracket.
29. Remove 1st & 2nd shift fork.
30. Remove retaining pin of 1st & 2nd bracket using pin punch and separate fork rod and bracket.



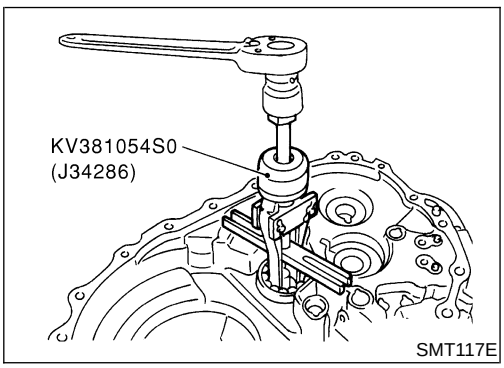
SCIA0964E

31. Remove gear components from clutch housing in the following procedure.

a. While tapping input shaft with plastic hammer, remove input shaft assembly, mainshaft assembly and reverse idler gear assembly as a set.

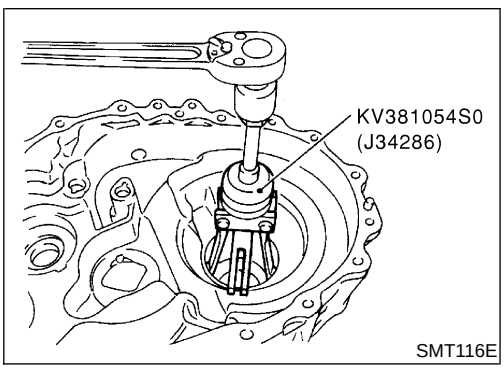
CAUTION:
Always withdraw mainshaft straight out. Failure to do so can damage resin oil channel on clutch housing side.

b. Remove final drive assembly.



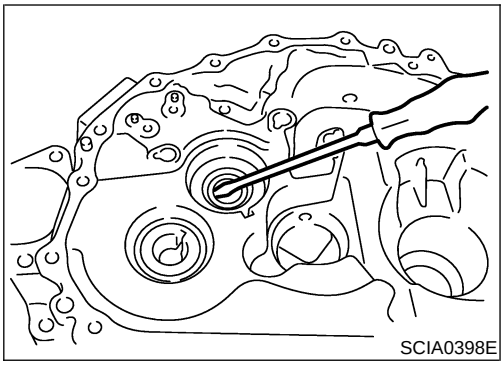
SMT117E

32. Remove mainshaft bearing retainer and then mainshaft front bearing.
33. Remove oil channel on mainshaft side.
34. Remove differential oil seal (clutch housing side).



SMT116E

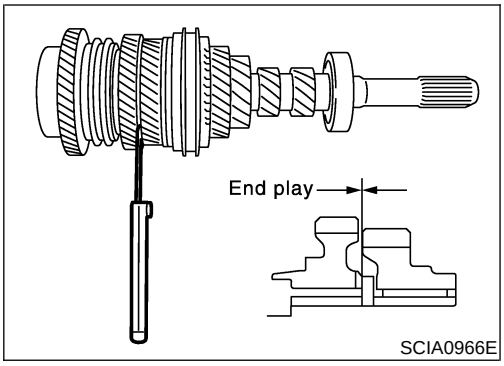
35. Remove differential side bearing outer race (clutch housing side).


SCIA0398E

36. Remove input shaft oil seal.

CAUTION:

Be careful not to damage clutch housing.



Input Shaft and Gears

DISASSEMBLY

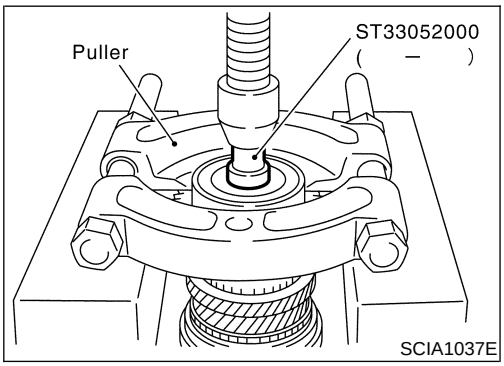
NFMT0011

1. Before disassembling, measure end play for 3rd, 4th, 5th and 6th input gears.

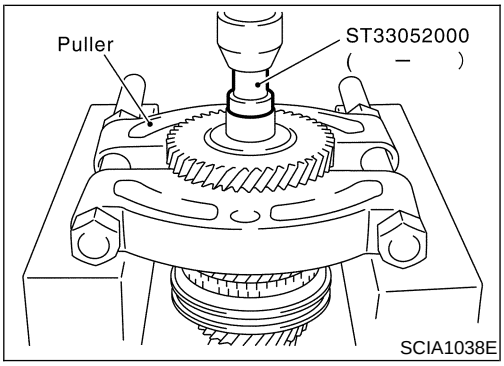
   End play standard value

   3rd gear: 0.18 - 0.31 mm (0.0071 - 0.0122 in)
   4th gear: 0.20 - 0.30 mm (0.0079 - 0.0118 in)
   5th gear: 0.06 - 0.16 mm (0.0024 - 0.0063 in)
   6th gear: 0.06 - 0.16 mm (0.0024 - 0.0063 in)

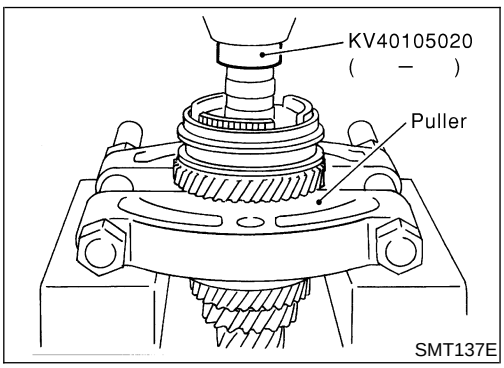
2. Remove oil channel.



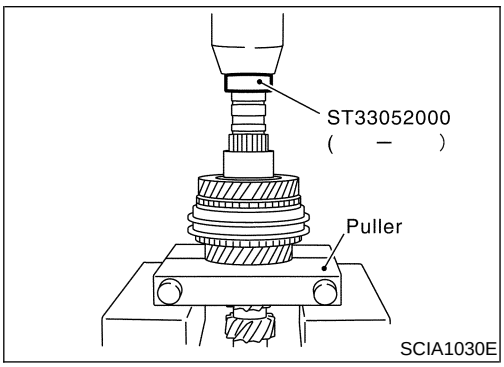
3. Remove input shaft rear bearing.
4. Remove the snap ring.



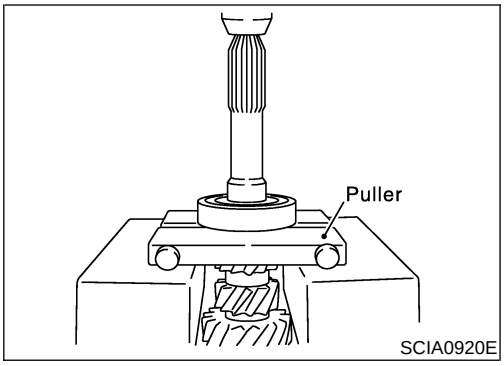
5. Remove 6th input gear, 6th bushing and 6th needle bearing.
6. Remove 6th baulk ring, 5th-6th coupling sleeve and shifting insert.



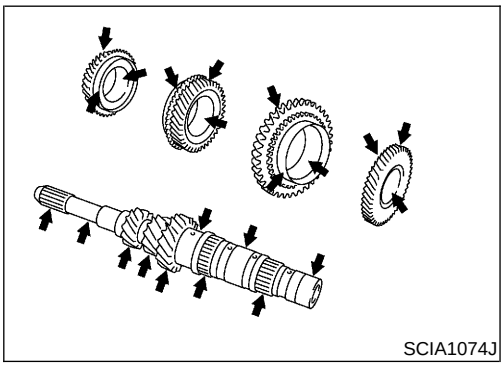
7. Remove 5th input gear and 5th synchronizer hub assembly simultaneously.
8. Remove 5th needle bearing.



9. Remove 5th bushing, thrust washer, 4th input gear, 4th needle bearing, 4th bushing, 4th baulk ring, 3rd-4th synchronizer hub assembly, 3rd baulk ring and 3rd input gear simultaneously.
10. Remove 3rd needle bearing.



11. Remove input shaft front bearing.



INSPECTION

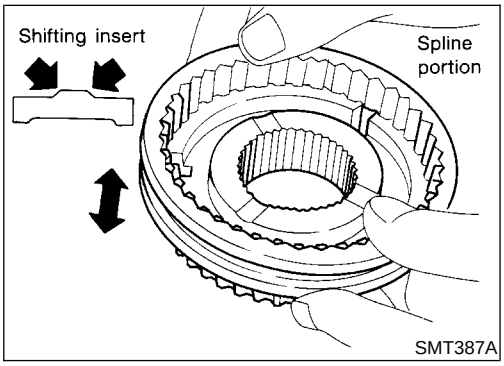
NFMT0012

Input Shaft and Gears

NFMT0012S01

Check items below. If necessary, replace them with new ones.

- Damage, peeling, dent, uneven wear, bending, etc. of shaft
- Excessive wear, damage, peeling, etc. of gears

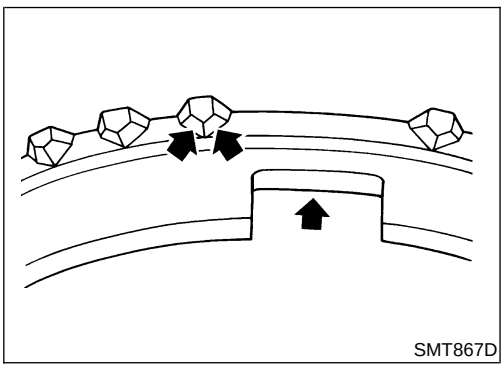


Synchronizer

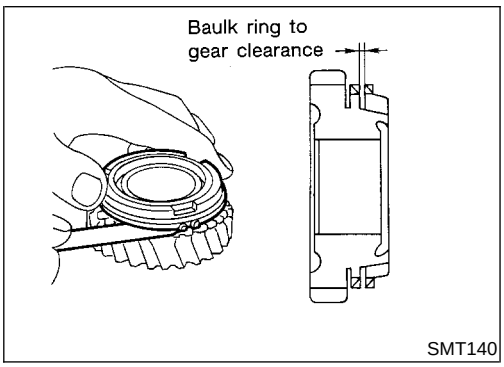
NFMT0012S02

Check items below. If necessary, replace them with new ones.

- Damage and excessive wear of contact surfaces of coupling sleeve, synchronizer hub, and shifting insert
- Coupling sleeve and synchronizer hub must move smoothly.



- If any crack, damage, or excessive wear is found on cam face of baulk ring or working face of insert, replace it.



Baulk Ring Clearance

NFMT0012S0201

- Press baulk ring against cone, and measure clearance between baulk ring and cone. If measurement is below limit, replace it with a new one.

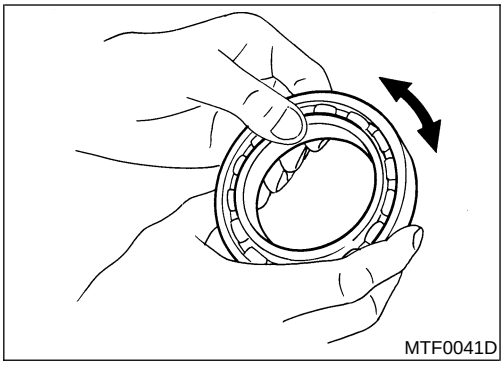
Clearance

Standard

3rd and 4th: 0.9 - 1.45 mm (0.0354 - 0.0571 in)

5th and 6th: 0.95 - 1.4 mm (0.0374 - 0.0551 in)

Limit value: 0.7 mm (0.0276 in)


MTF0041D

Bearing

NFMT0012S03

Check items below. If necessary, replace them with new ones.

- Damage and rough rotation of bearing

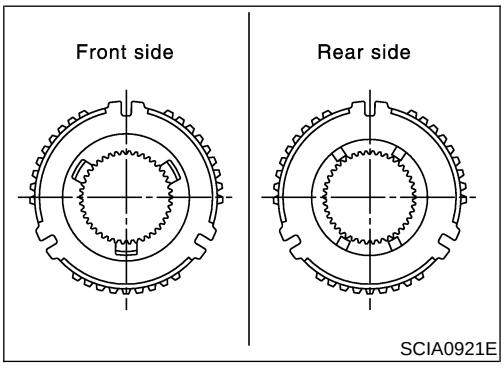
ASSEMBLY

NFMT0013

1. Install 3rd needle bearing.
2. Install 3rd input gear and 3rd baulk ring.
3. Install spread spring, shifting insert and 3rd-4th synchronizer hub onto 3rd-4th coupling sleeve.

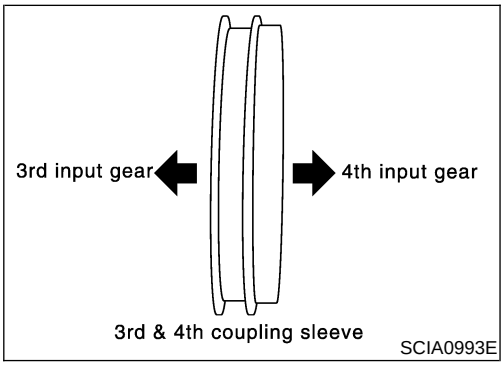
CAUTION:

- **Be careful with orientation of synchronizer hub.**
- **Do not reuse 3rd-4th synchronizer hub.**



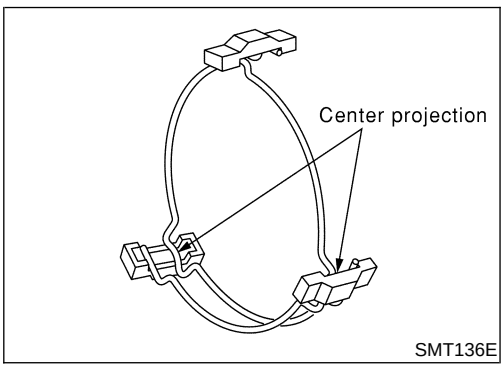
SCIA0921E

- **Be careful with orientation of coupling sleeve.**



SCIA0993E

- **Be sure not to hook center projection of 2 spread springs on same shifting insert.**

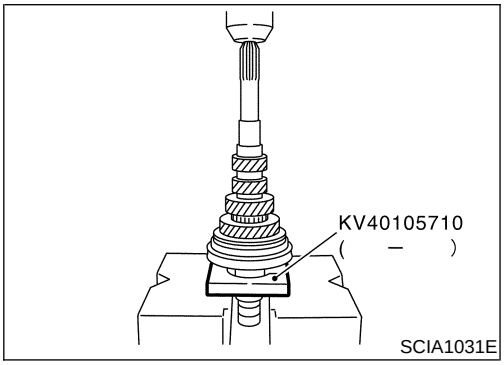


SMT136E

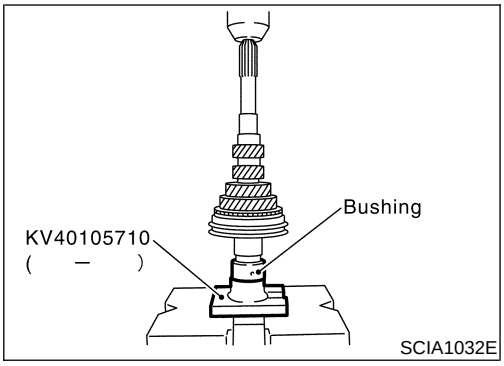
4. Install 3rd-4th synchronizer hub assembly.

CAUTION:

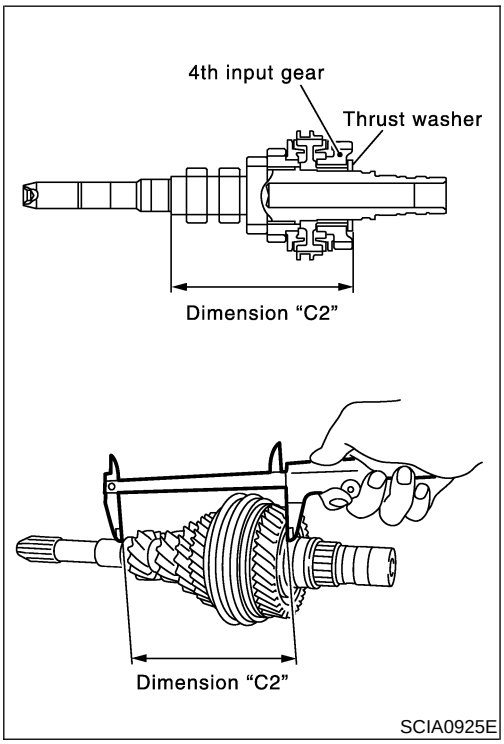
Align grooves of shifting insert and 3rd baulk ring.



SCIA1031E



5. Install 4th bushing.
6. Install 4th baulk ring.
7. Install 4th input gear and 4th needle bearing.



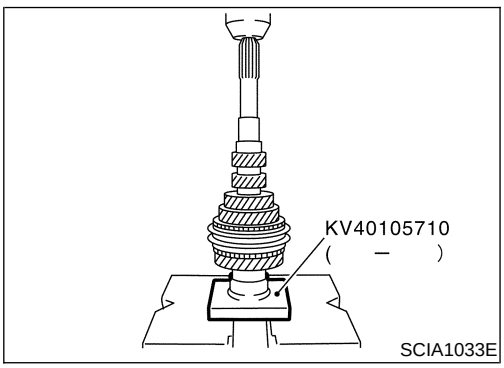
8. Select thrust washer so that dimension "C2" satisfies standard below. Then install it onto input shaft.

Standard for dimension C2:
154.7 - 154.8 mm (6.091 - 6.094 in)

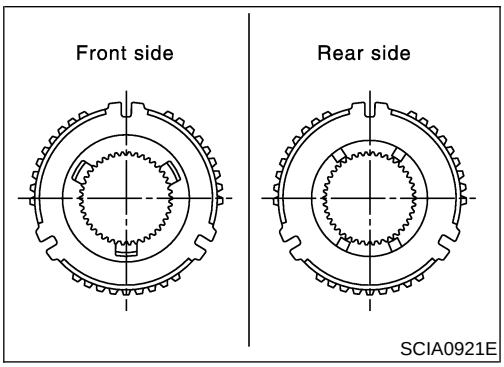
Thrust Washer

Thickness	Part number	Thickness	Part number
3.84 mm (0.1512 in)	32347 8H500	4.02 mm (0.1583 in)	32347 8H503
3.90 mm (0.1535 in)	32347 8H501	4.08 mm (0.1606 in)	32347 8H504
3.96 mm (0.1559 in)	32347 8H502	4.14 mm (0.1630 in)	32347 8H505

CAUTION:
Only one thrust washer can be selected.

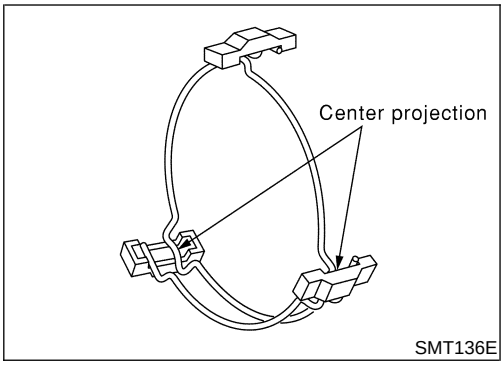


9. Install 5th bushing.
10. Install 5th needle bearing and 5th input gear.
11. Install 5th baulk ring.

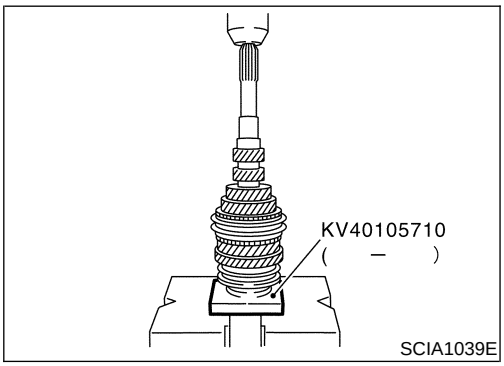


12. Install 5th-6th synchronizer hub, spread spring and shifting insert onto 5th-6th coupling sleeve.

CAUTION:
- **Be careful with orientation of synchronizer hub.**
- **Do not reuse 5th-6th synchronizer hub.**



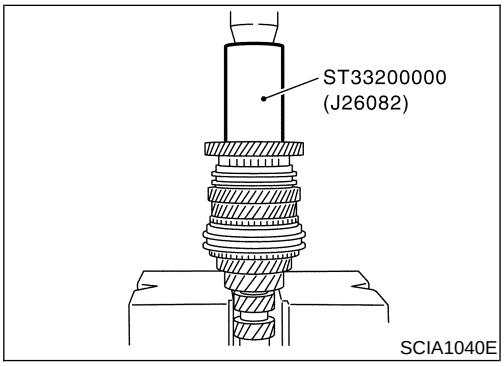
- **Be sure not to hook center projection of 2 spread springs on same shifting insert.**



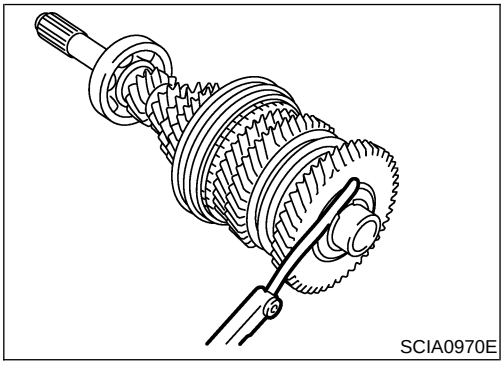
13. Install 5th-6th synchronizer hub assembly.

CAUTION:

Align grooves of 5th-6th shifting insert and 5th-6th baulk ring.



14. Install 6th needle bearing, 6th input gear onto 6th bushing, and then install them onto input shaft.



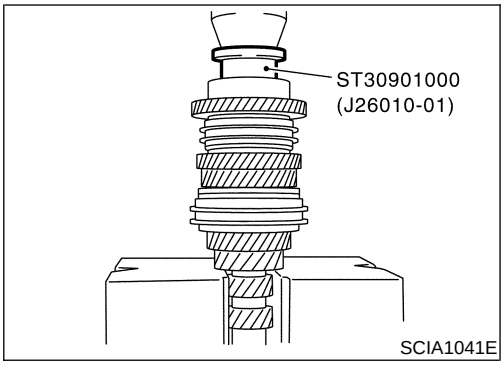
15. Install snap ring onto input shaft, and check that end play (gap between snap ring and groove) of 6th bushing satisfies standard.

End play standard value: 0 - 0.1 mm (0 - 0.004 in)

- If measurement is outside the standard range, select snap ring.

Snap Rings

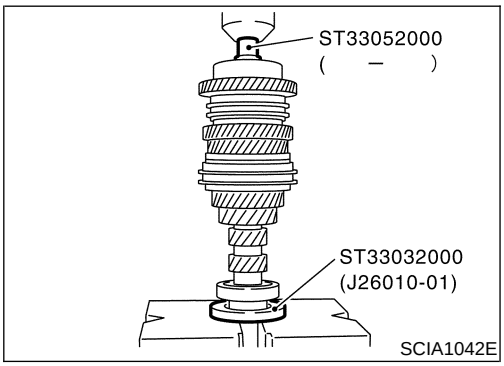
Thickness	Part number	Thickness	Part number
1.76 mm (0.0693 in)	32204 8H511	2.01 mm (0.0791 in)	32204 8H516
1.81 mm (0.0713 in)	32204 8H512	2.06 mm (0.0811 in)	32204 8H517
1.86 mm (0.0732 in)	32204 8H513	2.11 mm (0.0831 in)	32204 8H518
1.91 mm (0.0752 in)	32204 8H514	2.16 mm (0.0850 in)	32204 8H519
1.96 mm (0.0772 in)	32204 8H515	2.21 mm (0.0870 in)	32204 8H520



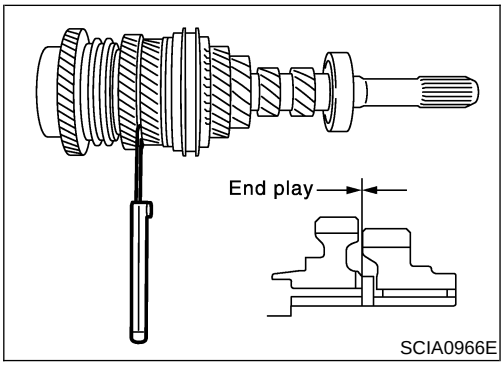
16. Install input shaft rear bearing.

CAUTION:

Install input shaft rear bearing with its brown surface facing the 6th input gear side.



17. Install input shaft front bearing.
18. Install oil channel onto input shaft.



19. Check end play of 3rd, 4th, 5th and 6th input gears.

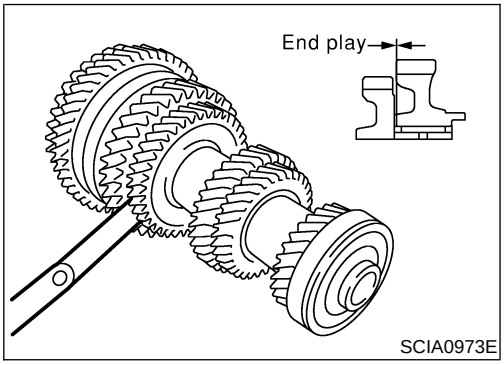
End play standard value

3rd gear: 0.18 - 0.31 mm (0.0071 - 0.0122 in)
4th gear: 0.20 - 0.30 mm (0.0079 - 0.0118 in)
5th gear: 0.06 - 0.16 mm (0.0024 - 0.0063 in)
6th gear: 0.06 - 0.16 mm (0.0024 - 0.0063 in)

Mainshaft and Gears

DISASSEMBLY

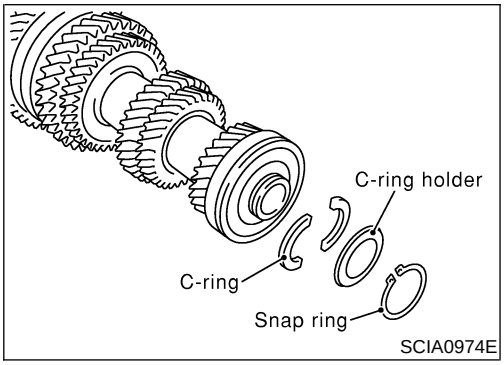
NFMT0014



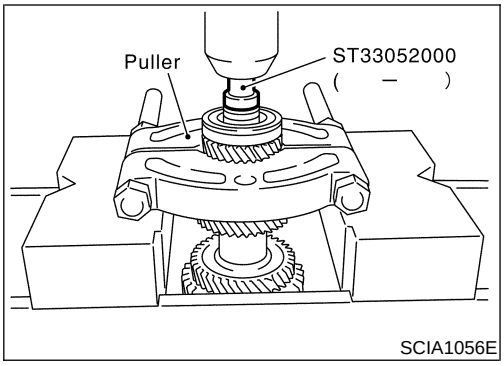
1. Before disassembling, measure end play of 1st and 2nd main gears.

End play standard value

1st gear: 0.20 - 0.30 mm (0.0079 - 0.0118 in)
2nd gear: 0.06 - 0.16 mm (0.0024 - 0.0063 in)

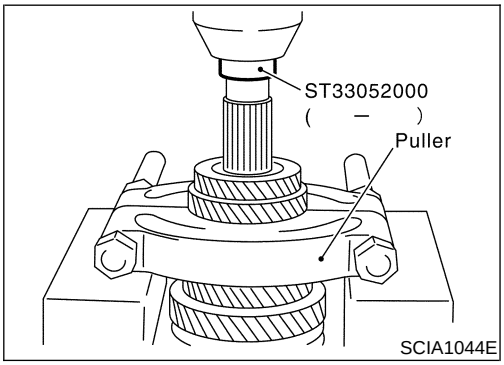


2. Remove the snap ring.
3. Remove C-ring holder, and then mainshaft C-ring.



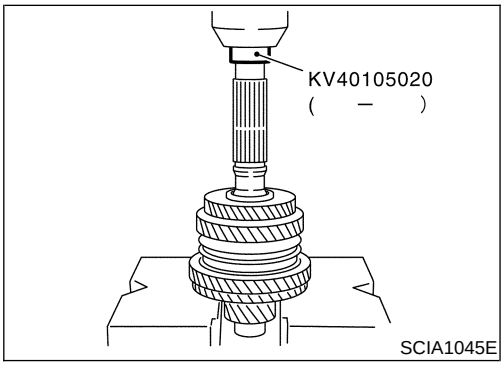
SCIA1056E

4. Remove mainshaft rear bearing, adjust shim and 6th main gear.
5. Remove 5th-6th mainshaft spacer.



SCIA1044E

6. Remove 4th main gear and 5th main gear simultaneously.
7. Remove adjusting shim.
8. Remove 3rd & 4th mainshaft spacer.



SCIA1045E

9. Remove 3rd main gear, 2nd main gear, 2nd gear needle bearing, 2nd bushing, 1st-2nd synchronizer assembly, 1st main gear, reverse main gear, 1st gear needle bearing, and 1st bushing simultaneously.

INSPECTION

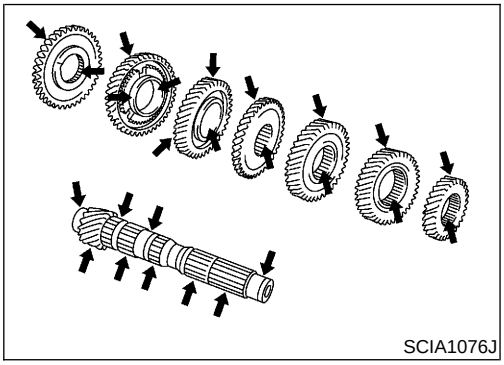
NFMT0015

Mainshaft and Gears

NFMT0015S01

Check items below. If necessary, replace them with new ones.

- Damage, peeling, dent, uneven wear, bending, and other non-standard conditions of the shaft.
- Excessive wear, damage, peeling, and other non-standard conditions of the gears.

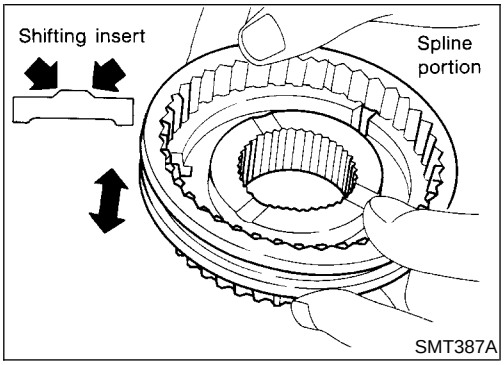

SCIA1076J

Synchronizer

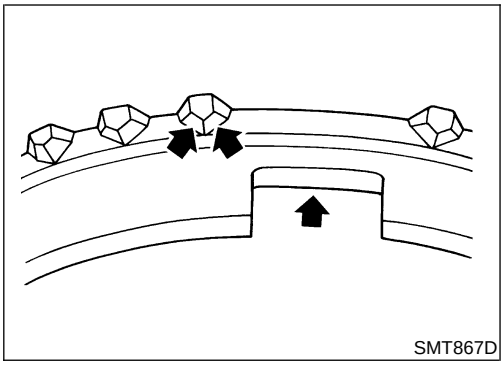
NFMT0015S02

Check items below. If necessary, replace them with new ones.

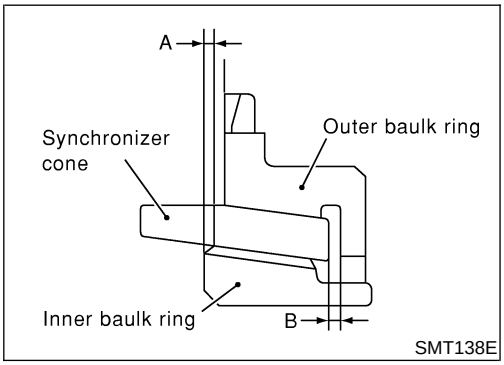
- Damage and unusual wear on contact surfaces of coupling sleeve, synchronizer hub, and shifting insert.
- Coupling sleeve and synchronizer hub must move smoothly.



SMT387A


SMT867D

- If any crack, damage, or excessive wear is found on cam face of baulk ring or working face of insert, replace it.



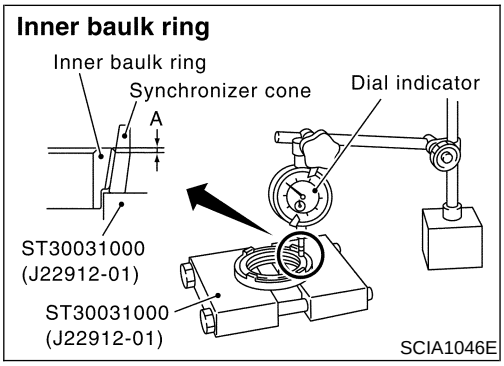
SMT138E

Baulk Ring Clearance

NFMT0015S0201

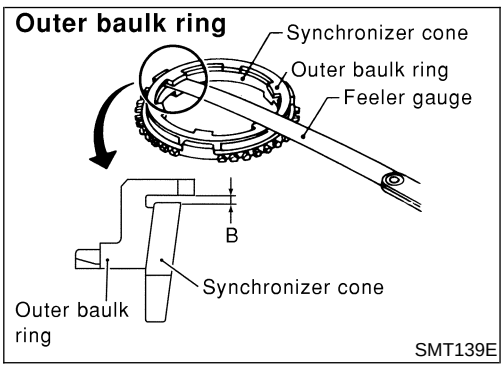
- Double cone synchronizer (1st and 2nd)
  Check clearance of outer baulk ring, synchronizer cone, and inner baulk ring of 1st and 2nd double cone synchronizers, following procedure below.

CAUTION:
Outer baulk ring, synchronizer cone, and inner baulk ring as a set control clearance A and B. If measurement exceeds service limit value, replace all of them as a set.



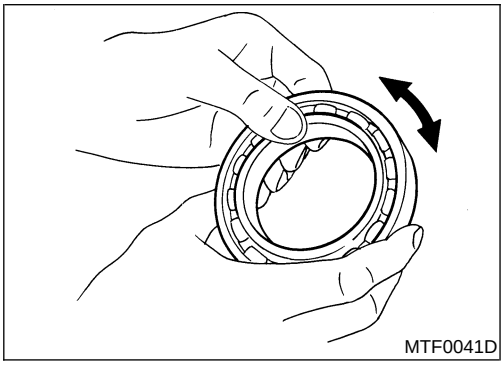
SCIA1046E

1. Using a dial gauge, measure clearance A at 2 or more points diagonally opposite, and calculate mean value.
   Clearance A
   Standard: 0.6 - 0.8 mm (0.024 - 0.031 in)
   Limit value: 0.2 mm (0.008 in) or less



SMT139E

2. Using a feeler gauge, measure clearance B at 2 or more points diagonally opposite, and calculate mean value.
   Clearance B
   Standard: 0.6 - 1.1 mm (0.024 - 0.043 in)
   Limit value: 0.2 mm (0.008 in) or less

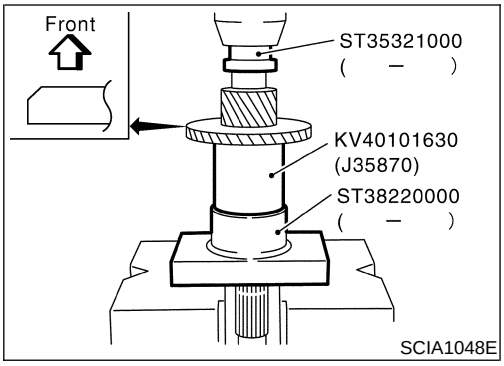

MTF0041D

Bearing

NFMT0015S03

Check items below. If necessary, replace them with new ones.

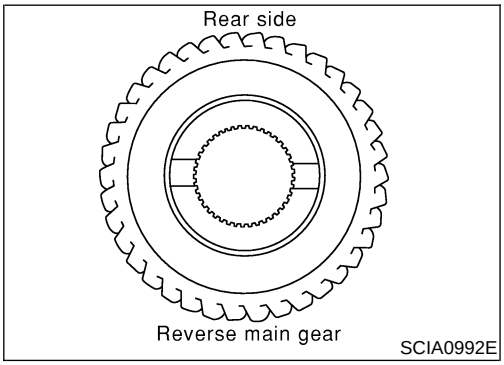
- Damage and rough rotation of bearing



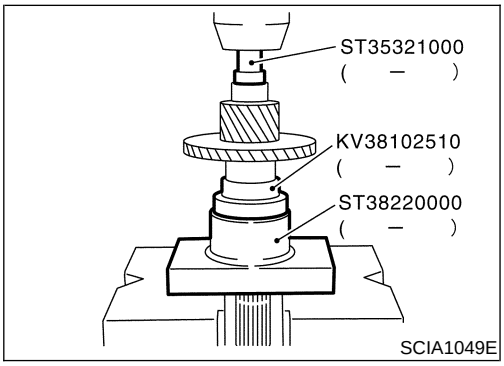
ASSEMBLY

NFMT0016

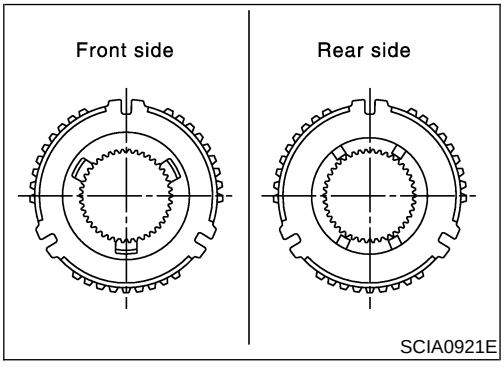
1. Install reverse main gear.



CAUTION:
Be careful with orientation of reverse main gear.

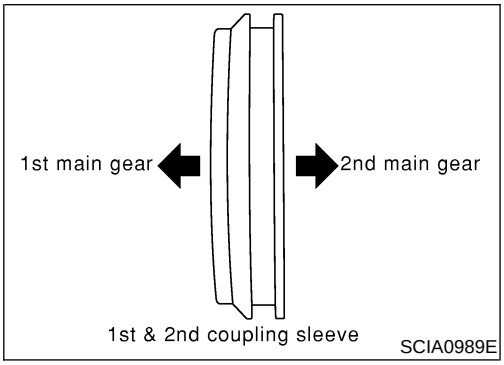


2. Install 1st bushing.
3. Install needle bearing, and then 1st main gear.

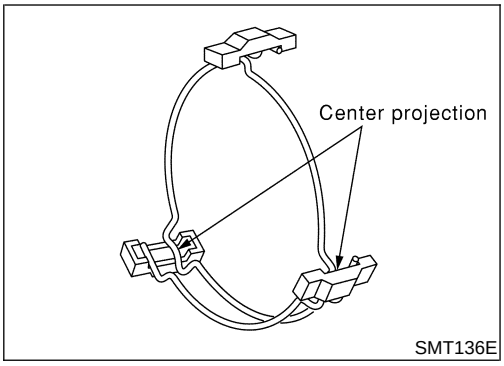


4. Install spread spring, shifting insert and 1st-2nd synchronizer hub onto 1st-2nd coupling sleeve.

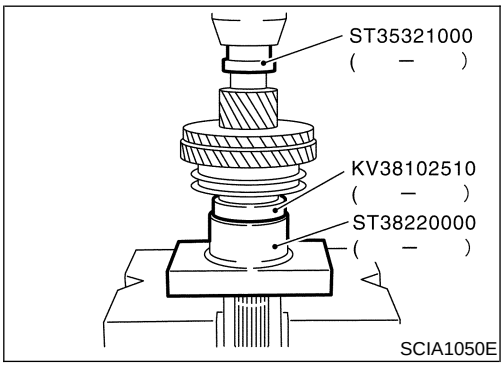
CAUTION:
- **Be careful with orientation of synchronizer hub.**
- **Do not reuse 1st-2nd synchronizer hub.**



- **Be careful with orientation of coupling sleeve.**



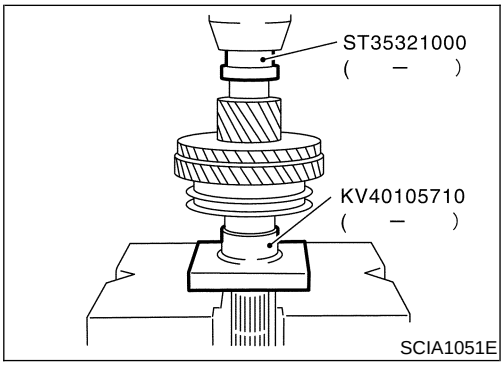
- **Be sure not to hook center projection of 2 spread springs on same shifting insert.**



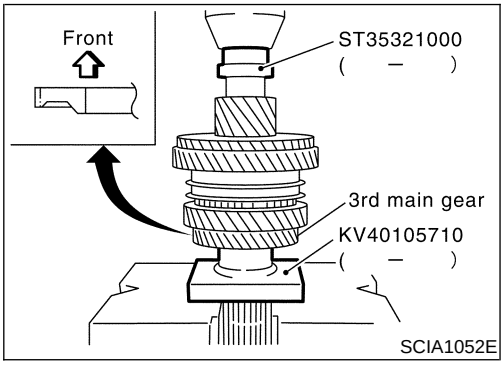
5. Install 1st gear synchronizer assembly onto mainshaft, and synchronizer hub assembly onto mainshaft.

CAUTION:

- **Outer baulk ring, synchronizer cone, and inner baulk ring on 2nd gear-side must have been removed.**
- **Be careful with orientation of coupling sleeve.**



6. Install 2nd bushing.
7. Install outer baulk ring, synchronizer cone, and inner baulk ring on 2nd gear-side.
8. Install 2nd needle bearing and 2nd gear.

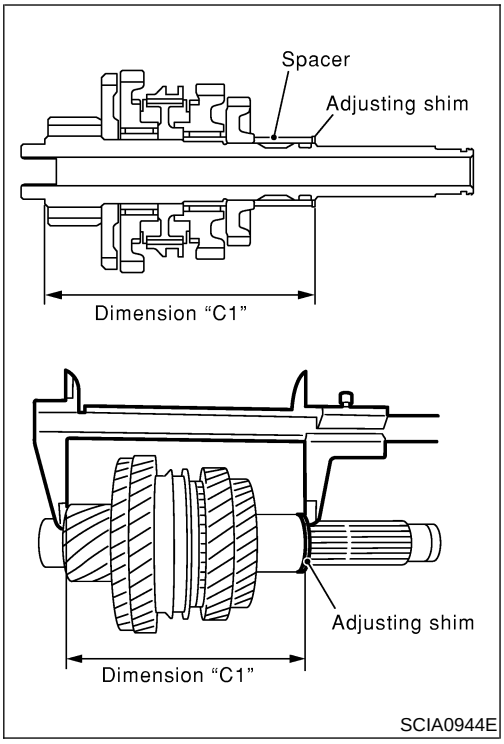


9. Install 3rd main gear.

CAUTION:

Be careful with orientation of 3rd main gear.

10. Install 3rd-4th mainshaft spacer.



11. Select suitable adjusting shim so that dimension "C1" satisfies standard value below, and install it onto mainshaft.

Standard for dimension C1:

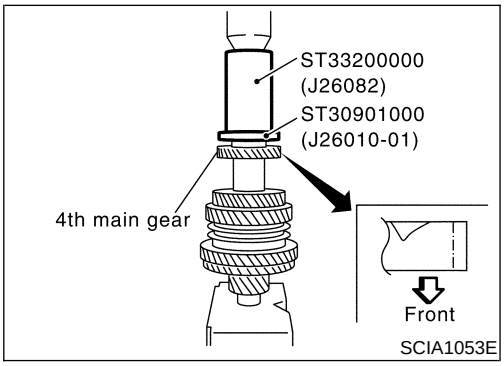
173.85 - 173.95 mm (6.844 - 6.848 in)

Adjusting Shim

Thickness	Part number	Thickness	Part number
0.52 mm (0.0205 in)	32238 8H500	0.84 mm (0.0331 in)	32238 8H504
0.60 mm (0.0236 in)	32238 8H501	0.92 mm (0.0362 in)	32238 8H505
0.68 mm (0.0268 in)	32238 8H502	1.00 mm (0.0394 in)	32238 8H506
0.76 mm (0.0299 in)	32238 8H503	1.08 mm (0.0425 in)	32238 8H507

CAUTION:

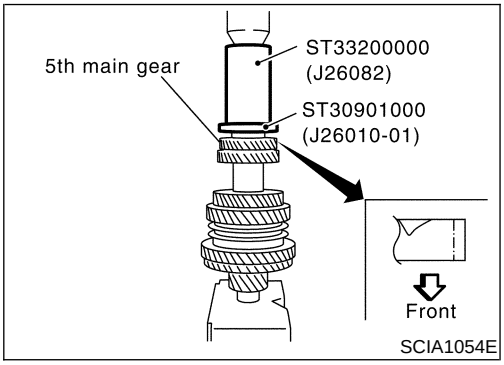
Only one adjusting shim can be selected.



12. Install 4th main gear.

CAUTION:

Be careful with orientation of 4th main gear.

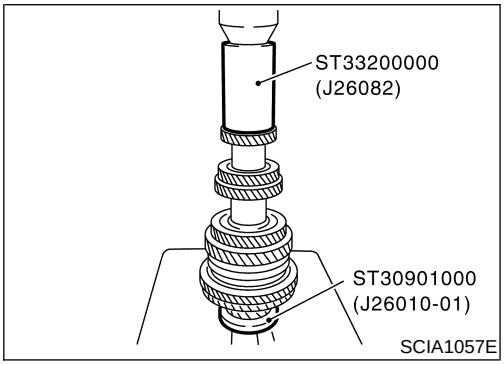


13. Install 5th main gear.

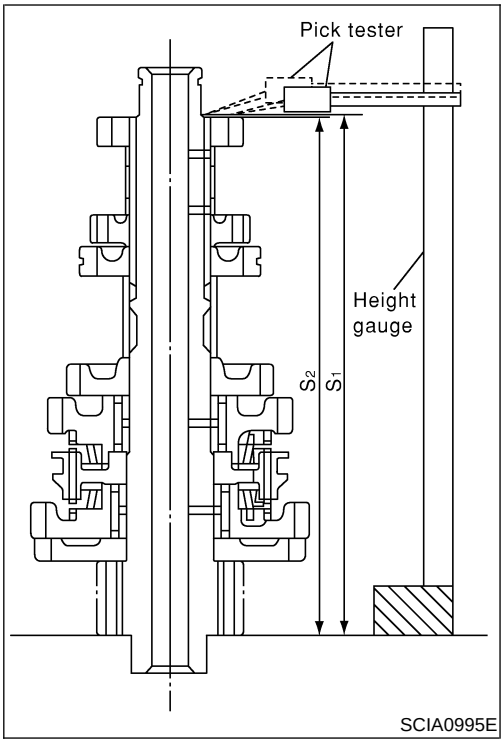
CAUTION:

Be careful with orientation of 5th main gear.

14. Install 5th-6th mainshaft spacer.



15. Install 6th main gear.



16. Select 6th main adjusting shim and then install it onto mainshaft.

- Calculate thickness "S" of 6th main adjusting shim by procedure below so that end play dimension between 6th main gear and mainshaft rear bearing becomes the dimension shown below.

End play: 0 - 0.1 mm (0 - 0.004 in)

Dimension "S" = (S_1 − S_2) + End play

S: Thickness of adjusting shim

S_1: Dimension from mainshaft standard face to mainshaft rear bearing press-fit end face

S_2: Dimension from mainshaft standard face to 6th main gear end face

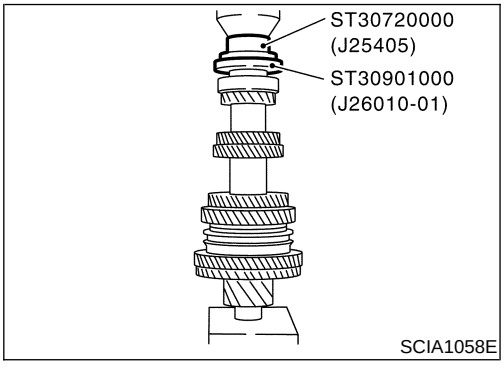
Adjusting Shim

Thickness	Part number	Thickness	Part number
0.88 mm (0.0346 in)	32237 8H560	1.20 mm (0.0472 in)	32237 8H564
0.96 mm (0.0378 in)	32237 8H561	1.28 mm (0.0504 in)	32237 8H565
1.04 mm (0.0409 in)	32237 8H562	1.36 mm (0.0535 in)	32237 8H566
1.12 mm (0.0441 in)	32237 8H563		

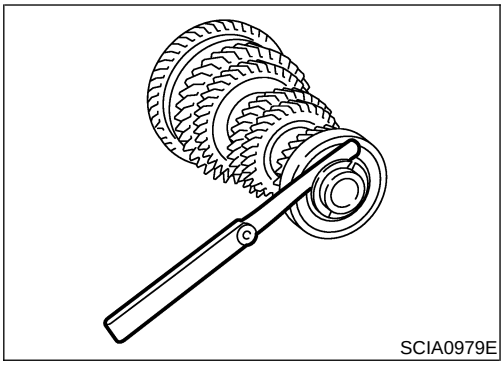
CAUTION:

Only one adjusting shim can be selected.

1) Using height gauge, measure dimension "S_1" and "S_2".
2) Install selected 6th main adjusting shim to mainshaft.



17. Install mainshaft rear bearing.


SCIA0979E

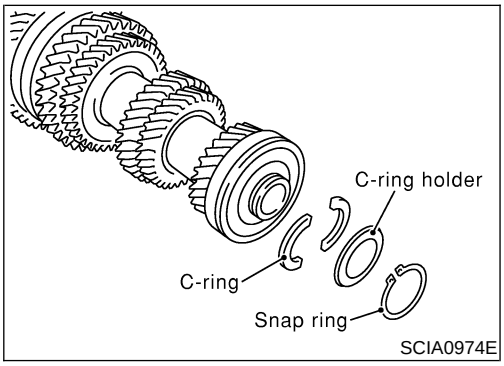
18. Install C-ring onto mainshaft, and check that end play of mainshaft rear bearing satisfies standard value.

End play standard value: 0 - 0.06 mm (0 - 0.0024 in)

- If measurement is outside the standard range, reselect C-ring.

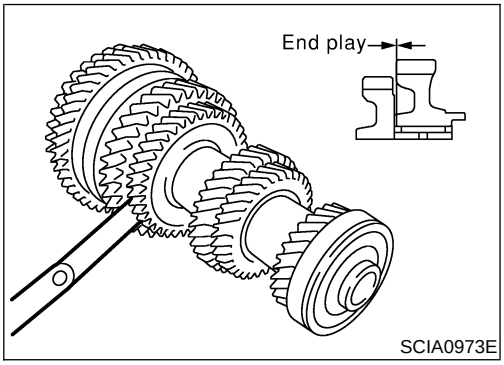
C-ring

Thickness	Part number	Thickness	Part number
2.535 mm (0.0998 in)	32348 8H800	2.835 mm (0.1116 in)	32348 8H810
2.565 mm (0.1010 in)	32348 8H801	2.865 mm (0.1128 in)	32348 8H811
2.595 mm (0.1022 in)	32348 8H802	2.895 mm (0.1140 in)	32348 8H812
2.625 mm (0.1033 in)	32348 8H803	2.925 mm (0.1152 in)	32348 8H813
2.655 mm (0.1045 in)	32348 8H804	2.955 mm (0.1163 in)	32348 8H814
2.685 mm (0.1057 in)	32348 8H805	2.985 mm (0.1175 in)	32348 8H815
2.715 mm (0.1069 in)	32348 8H806	3.015 mm (0.1187 in)	32348 8H816
2.745 mm (0.1081 in)	32348 8H807	3.045 mm (0.1199 in)	32348 8H817
2.775 mm (0.1093 in)	32348 8H808	3.075 mm (0.1211 in)	32348 8H818
2.805 mm (0.1104 in)	32348 8H809		



SCIA0974E

19. Fit C-ring holder, and install snap ring.



SCIA0973E

20. Check end play of 1st and 2nd main gears.

End play standard value

1st gear: 0.20 - 0.30 mm (0.0079 - 0.0118 in)

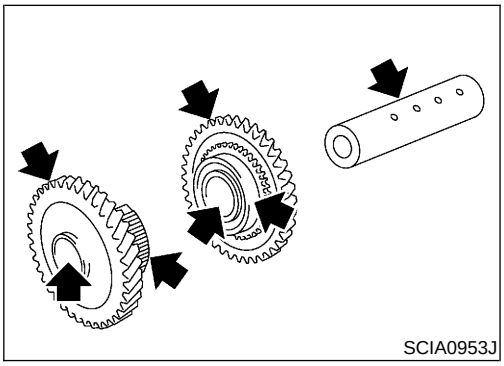
2nd gear: 0.06 - 0.16 mm (0.0024 - 0.0063 in)

Reverse Idler Shaft and Gears

DISASSEMBLY

=NFMT0032

1. Remove reverse idler gear adjusting shim.
2. Remove reverse idler gear (rear), reverse coupling sleeve and insert spring simultaneously.
3. Remove reverse idler gear needle bearing.
4. Remove thrust needle bearing.
5. Remove reverse baulk ring.
6. Remove reverse idler gear (front).
7. Remove reverse idler gear needle bearing.
8. Remove thrust needle bearing.
9. Pull off locking pin from reverse idler shaft.


SCIA0953J

INSPECTION

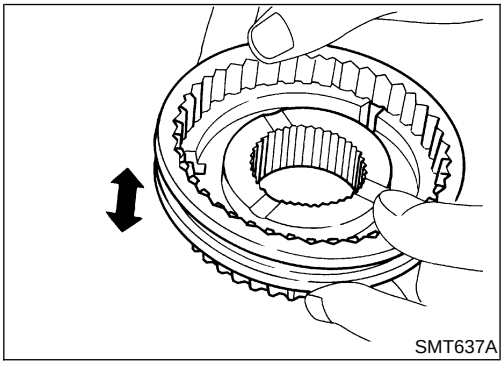
NFMT0033

Reverse Idler Shaft and Gears

NFMT0033S01

Check items below. If necessary, replace them with new ones.

- Damage, peeling, dent, uneven wear, bending, and other non-standard conditions of the shaft.
- Excessive wear, damage, peeling, and other non-standard conditions of the gears.

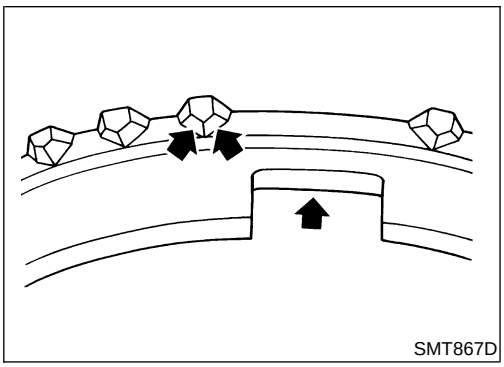

SMT637A

Synchronizer

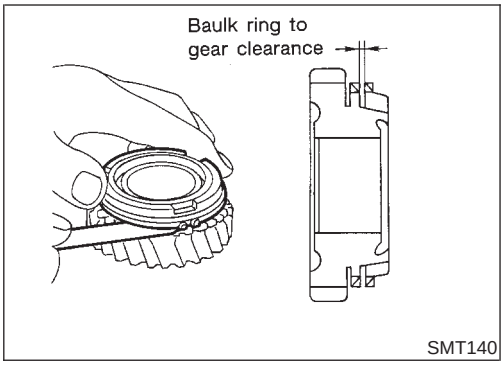
NFMT0033S02

Check items below. If necessary, replace them with new ones.

- Damage and unusual wear on contact surfaces of coupling sleeve, synchronizer hub, and insert spring.
- Coupling sleeve and synchronizer hub must move smoothly.


SMT867D

- If any crack, damage, or excessive wear is found on cam face of baulk ring or working face of insert, replace it.



Baulk Ring Clearance

NFMT0033S0201

- Press baulk ring against cone, and measure clearance between baulk ring and cone. If measurement is below limit, replace it with a new one.

Clearance

Standard: 0.95 - 1.4 mm (0.0374 - 0.0551 in)

Limit value: 0.7 mm (0.0276 in)

Bearing

NFMT0033S03

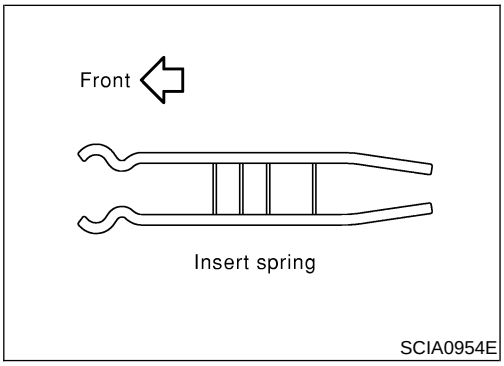
Check items below. If necessary, replace them with new ones.

- Damage and rough rotation of bearing.

ASSEMBLY

NFMT0034

Paying attention to following work, assemble in reverse order of disassembly.



CAUTION:

- **Be careful with orientation of insert spring.**

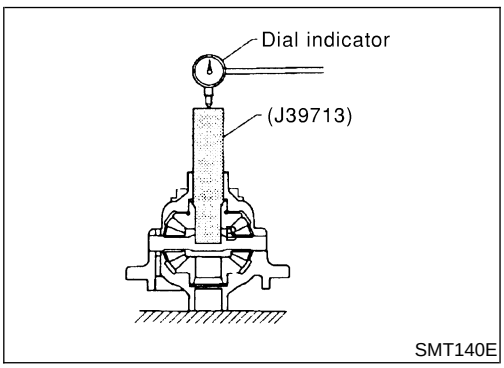
Final Drive

PRE-INSPECTION

NFMT0035

- Check the clearance between side gear and differential case as follows.

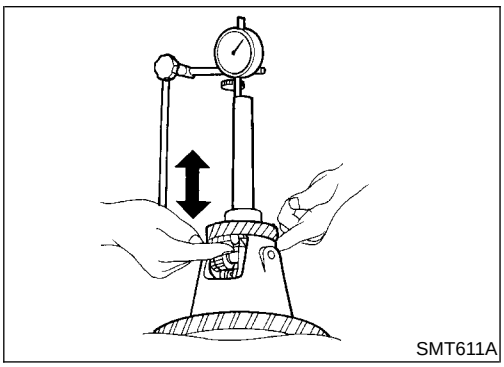
1. Clean final drive assembly sufficiently to prevent side gear thrust washer, differential case, side gear, and other parts from sticking by gear oil.
2. Upright the differential case so that the side gear to be measured faces upward.



3. Place final drive adapter and dial indicator onto side gear. Move side gear up and down, and measure the clearance.

Clearance between side gear and differential case:

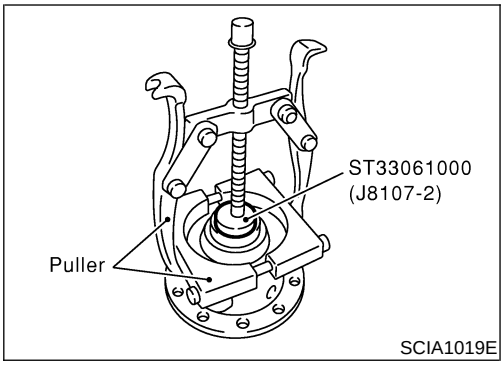
0.1 - 0.2 mm (0.004 - 0.008 in)



CAUTION:

There should be no resistance and gears should rotate freely.

4. If not within specification, adjust the clearance by changing thrust washer thickness.
5. Turn differential case upside down, and measure the clearance between side gear and differential case on the other side in the same way.

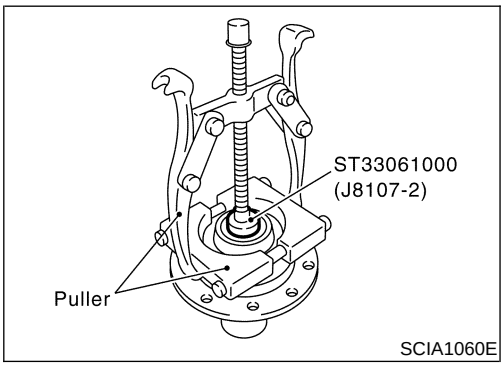


SCIA1019E

DISASSEMBLY

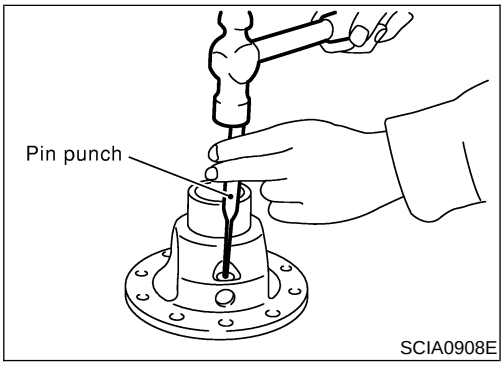
NFMT0017

1. Remove mounting bolts.Then, separate the final gear from differential case.
2. Remove speedometer drive gear.
3. Using a drift and puller, remove differential side bearing (clutch housing side).



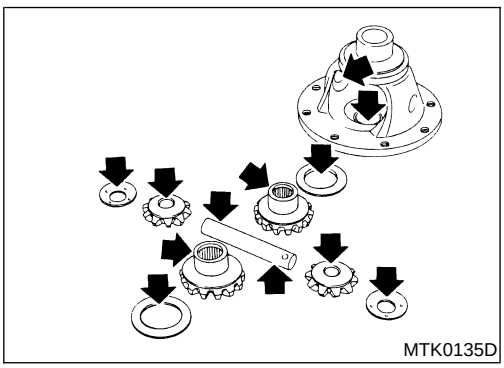
SCIA1060E

4. Using a drift and puller, remove differential side bearing (transaxle case side).



SCIA0908E

5. Using a pin punch, pull out lock pin and pinion mate shaft.
6. Rotate pinion mate gears, and remove pinion mate gears, pinion mate thrust washers, side gears, and side gear thrust washers from differential case.


MTK0135D

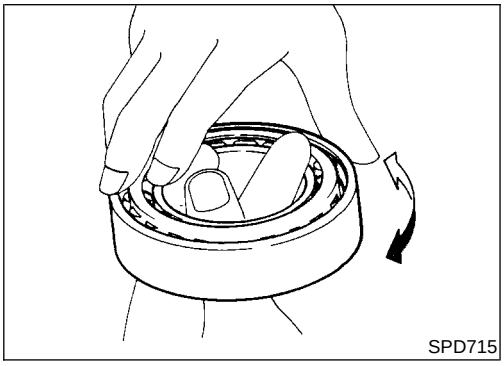
INSPECTION

NFMT0018

Gear, Washer, Shaft and Case

NFMT0018S01

- Check side gears, side gear thrust washers, pinion mate shaft, pinion mate gears, pinion mate thrust washers and differential case. If necessary, replace with a new one.


SPD715

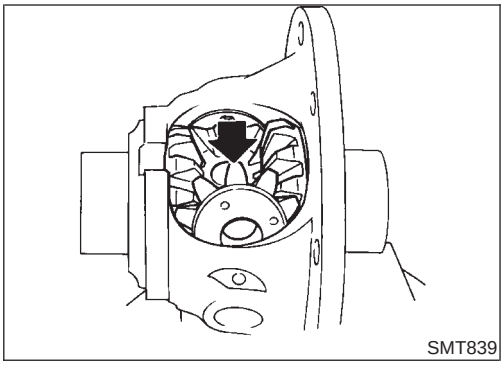
Bearings

NFMT0018S03

- Check for bearing damage and rough rotation. If necessary, replace with a new one.

CAUTION:

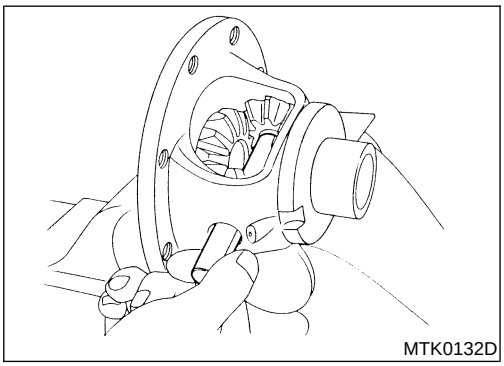
When replacing tapered roller bearing, replace outer and inner races as a set.


SMT839

ASSEMBLY

NFMT0019

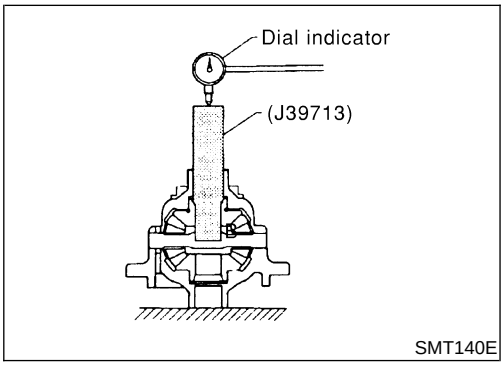
1. Apply gear oil to sliding area of differential case, each gear, and thrust washer.
2. Install side gear thrust washers and side gears into differential case.
3. While rotating pinion mate thrust washers and pinion mate gears, aligning them diagonally, install them into differential case.


MTK0132D

4. Insert pinion mate shaft into differential case.

CAUTION:

Be sure not to damage pinion mate thrust washers.

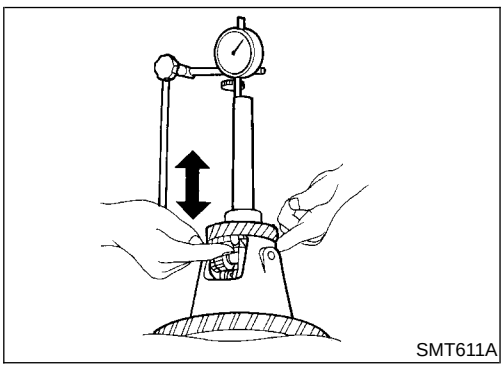


SMT140E

5. Measure end play of side gears following procedure below. Then select side gear thrust washer.

a. Upright the differential case so that its side gear to be measured face upward.

b. Place final drive adapter and dial indicator onto side gears.


SMT611A

c. Move side gears up and down to measure end play, and select thrust washer so that it satisfies standard.

End play standard value:

0.1 - 0.2 mm (0.004 - 0.008 in)

CAUTION:

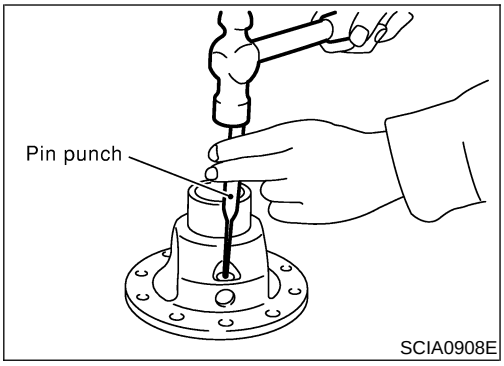
- **There should be no resistance and gears should rotate freely.**
- **Place differential case upside down. Be sure to measure end play for opposite side-gears likewise.**

Thrust washer

Thickness	Part number
0.75 mm (0.0295 in)	38424 81X00
0.80 mm (0.0315 in)	38424 81X01
0.85 mm (0.0335 in)	38424 81X02
0.90 mm (0.0354 in)	38424 81X03
0.95 mm (0.0374 in)	38424 81X04

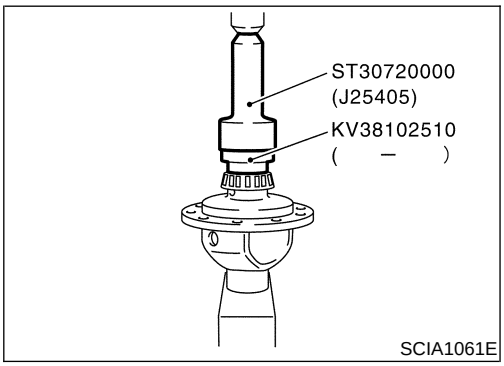
CAUTION:

Only one thrust washer can be selected.

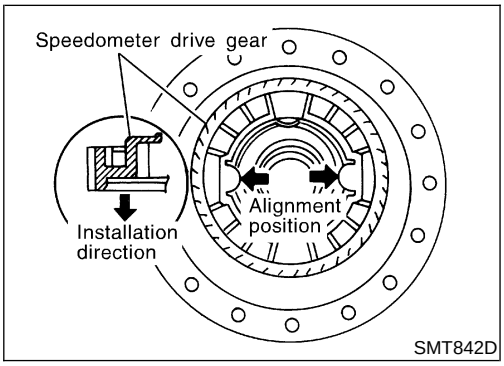


6. Using a pin punch (special service tool), drive a lock pin into the pinion mate shaft.

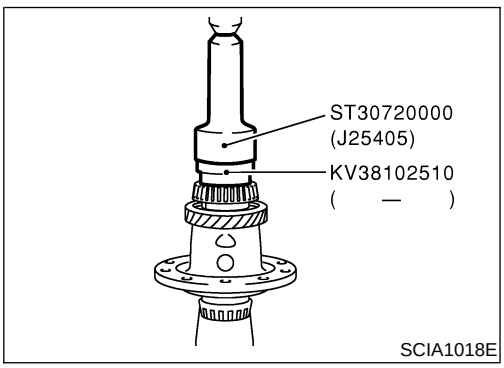
CAUTION:
Do not reuse the lock pin.



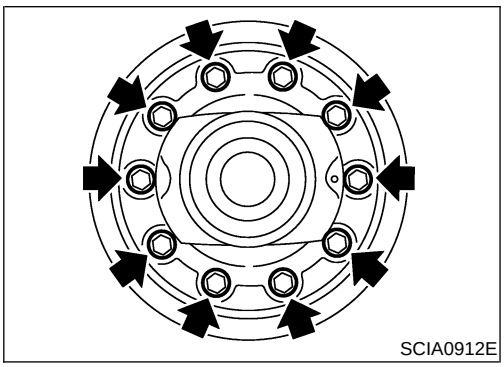
7. Using a drift (special service tool), install differential side bearing (transaxle case side).



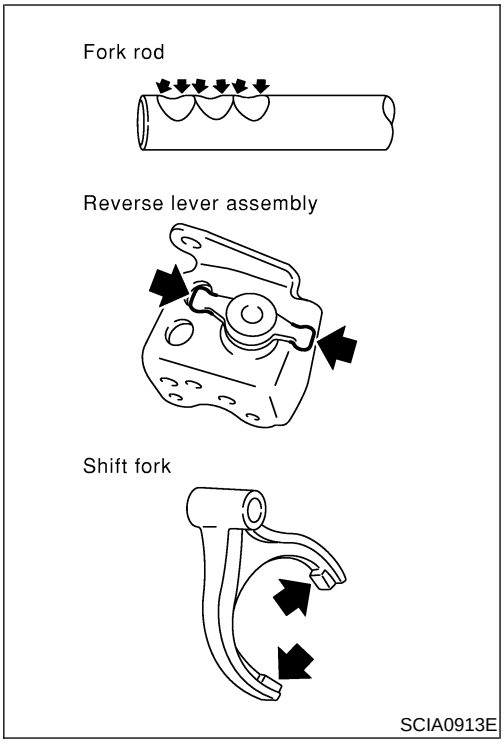
8. Align and install speedometer drive gear onto differential case.

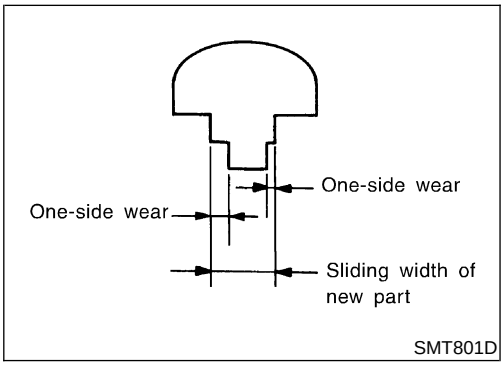


9. Using a drift (special service tool), install differential side bearing (clutch housing side).



10. Install final gear into differential case, and tighten final gear mounting bolts.





Shift Control Components

INSPECTION

NFMT0020

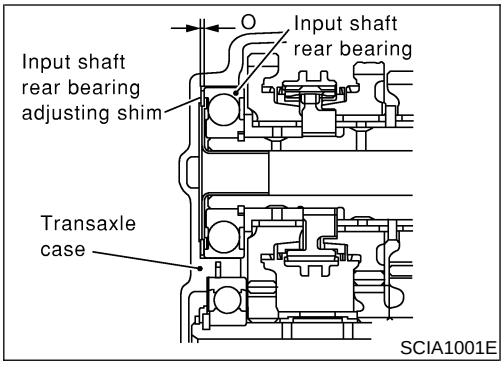
- Check contact surfaces and sliding area for wear, damage, bending, etc. If necessary, replace parts.

Shift Fork

NFMT0020S01

- Check if the width of shift fork hook (sliding area with coupling sleeve) is within allowable specification below.

Item	One-side wear specification	Sliding width of new part
1st & 2nd	0.2 mm (0.008 in)	7.80 - 7.93 mm (0.3071 - 0.3122 in)
3rd & 4th	0.2 mm (0.008 in)	7.80 - 7.93 mm (0.3071 - 0.3122 in)
5th & 6th	0.2 mm (0.008 in)	6.10 - 6.23 mm (0.2402 - 0.2453 in)
Reverse	0.2 mm (0.008 in)	12.80 - 12.93 mm (0.5039 - 0.5091 in)



Input Shaft End Play

NFMT0022S01

- When adjusting input shaft end play, select adjusting shim for input shaft bearing. To select adjusting shim, measure clearance between transaxle case and input shaft rear bearing.
- Calculate dimension “O” (thickness of adjusting shim) using the following procedure to satisfy specification of end play for input shaft rear bearing.

End play: 0 - 0.06 mm (0 - 0.0024 in)

Dimension “O” = (O_1 − O_2) + End play

O: Thickness of adjusting shim

O_1: Distance between transaxle case end face and mounting face of adjusting shim

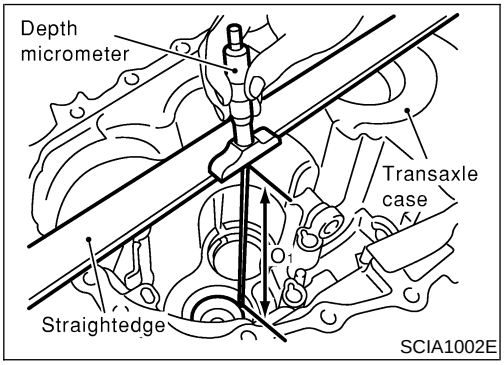
O_2: Distance between clutch housing case end face and end face of input shaft rear bearing

Adjusting Shim

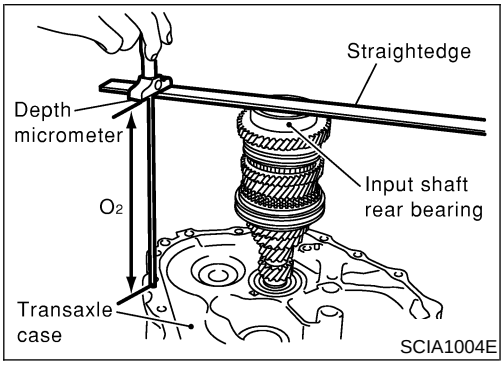
Shim thickness	Part number	Shim thickness	Part number	Shim thickness	Part number
0.40 mm (0.0157 in)	32225 8H500	0.88 mm (0.0346 in)	32225 8H512	1.36 mm (0.0535 in)	32225 8H524
0.44 mm (0.0173 in)	32225 8H501	0.92 mm (0.0362 in)	32225 8H513	1.40 mm (0.0551 in)	32225 8H560
0.48 mm (0.0189 in)	32225 8H502	0.96 mm (0.0378 in)	32225 8H514	1.44 mm (0.0567 in)	32225 8H561
0.52 mm (0.0205 in)	32225 8H503	1.00 mm (0.0394 in)	32225 8H515	1.48 mm (0.0583 in)	32225 8H562
0.56 mm (0.0220 in)	32225 8H504	1.04 mm (0.0409 in)	32225 8H516	1.52 mm (0.0598 in)	32225 8H563
0.60 mm (0.0236 in)	32225 8H505	1.08 mm (0.0425 in)	32225 8H517	1.56 mm (0.0614 in)	32225 8H564
0.64 mm (0.0252 in)	32225 8H506	1.12 mm (0.0441 in)	32225 8H518	1.60 mm (0.0630 in)	32225 8H565
0.68 mm (0.0268 in)	32225 8H507	1.16 mm (0.0457 in)	32225 8H519	1.64 mm (0.0646 in)	32225 8H566
0.72 mm (0.0283 in)	32225 8H508	1.20 mm (0.0472 in)	32225 8H520		
0.76 mm (0.0299 in)	32225 8H509	1.24 mm (0.0488 in)	32225 8H521		
0.80 mm (0.0315 in)	32225 8H510	1.28 mm (0.0504 in)	32225 8H522		
0.84 mm (0.0331 in)	32225 8H511	1.32 mm (0.0520 in)	32225 8H523		

CAUTION:

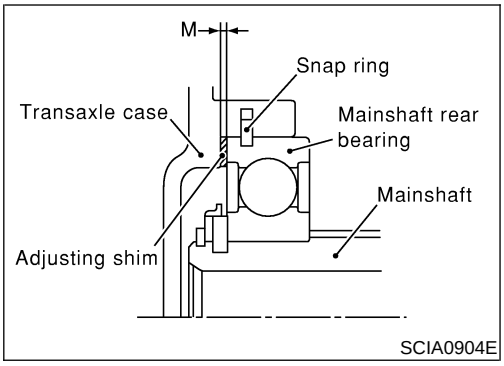
Only 1 adjusting shim can be selected.



1. Using depth micrometer and straight edge, measure dimension “O_1” between transaxle case end face and mounting face of adjusting shim.



2. Using depth micrometer and straight edge as shown in the figure, measure dimension “O_2” between clutch housing case end face and end face of input shaft rear bearing.
3. Install selected input shaft rear bearing adjusting shim onto input shaft.



Mainshaft End Play

NFMT0022S02

- When adjusting mainshaft end play, select adjusting shim for mainshaft rear bearing. To select adjusting shim, measure clearance “M” between transaxle case and mainshaft rear bearing.
- Calculate dimension “P” (thickness of adjusting shim) using the following procedure to satisfy specification of end play for mainshaft rear bearing.

End play: 0 - 0.06 mm (0 - 0.0024 in)

Dimension “P” = “M” + End play

P: Thickness of adjusting shim

M: Distance between mainshaft rear bearing and transaxle case

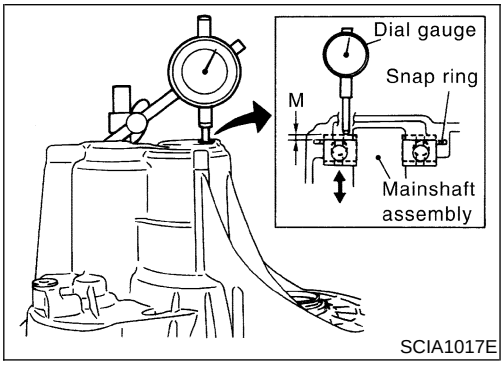
Adjusting Shim

Shim thickness	Part number
0.44 mm (0.0173 in)	32238 8H510
0.48 mm (0.0189 in)	32238 8H511
0.52 mm (0.0205 in)	32238 8H512
0.56 mm (0.0220 in)	32238 8H513
0.60 mm (0.0236 in)	32238 8H514
0.64 mm (0.0252 in)	32238 8H515
0.68 mm (0.0268 in)	32238 8H516
0.72 mm (0.0283 in)	32238 8H517
0.76 mm (0.0299 in)	32238 8H518
0.80 mm (0.0315 in)	32238 8H519
0.84 mm (0.0331 in)	32238 8H520
0.88 mm (0.0346 in)	32238 8H521
0.92 mm (0.0362 in)	32238 8H522
0.96 mm (0.0378 in)	32238 8H523
1.00 mm (0.0394 in)	32238 8H524
1.04 mm (0.0409 in)	32238 8H560
1.08 mm (0.0425 in)	32238 8H561

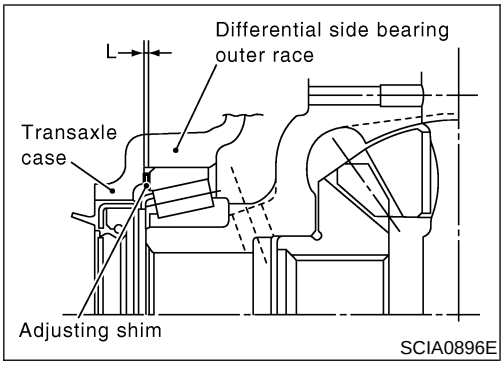
CAUTION:

Only 1 adjusting shim can be selected.

1. Install mainshaft assembly to clutch housing.
2. Install snap ring to transaxle case.
3. Install transaxle case to clutch housing, and temporarily assemble them with fixing bolts. Install temporarily snap ring to mainshaft rear bearing.



4. Install dial gauge to snap ring access hole, and expand snap ring. Lift mainshaft assembly through control assembly installation hole, and push it against transaxle case. This state shall be defined as base. Moving distance of mainshaft assembly, with snap ring fit on main bearing, becomes “M”.



Differential Side Bearing Preload

NFMT0022S03

- When adjusting differential side bearing preload, select adjusting shim for differential side bearing. To select adjusting shim, measure clearance “L” between transaxle case and differential side bearing outer race.
- Calculate dimension “L” (thickness of adjusting shim) using the following procedure to satisfy specification of preload for differential side bearing.

Preload: 0.15 - 0.21 mm (0.0059 - 0.0083 in)

Dimension “L” = (L_1 − L_2) + Preload

L: Thickness of adjusting shim

L_1: Distance between clutch housing case end face and mounting face of adjusting shim

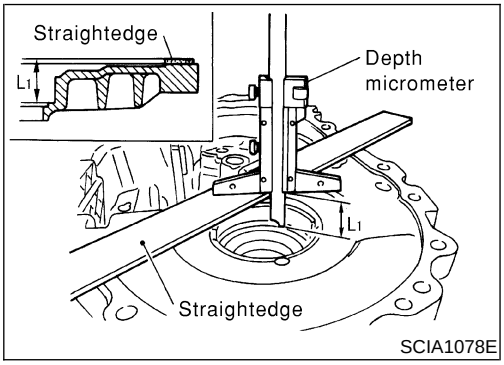
L_2: Distance between differential side bearing and transaxle case

Adjusting Shim

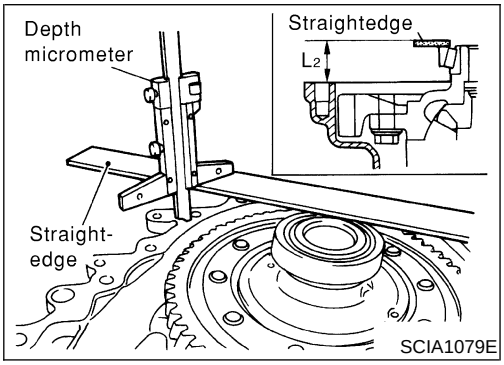
Shim thickness	Part number
0.48 mm (0.0189 in)	31438 80X00
0.52 mm (0.0205 in)	31438 80X01
0.56 mm (0.0220 in)	31438 80X02
0.60 mm (0.0236 in)	31438 80X03
0.64 mm (0.0252 in)	31438 80X04
0.68 mm (0.0268 in)	31438 80X05
0.72 mm (0.0283 in)	31438 80X06
0.76 mm (0.0299 in)	31438 80X07
0.80 mm (0.0315 in)	31438 80X08
0.84 mm (0.0331 in)	31438 80X09
0.88 mm (0.0346 in)	31438 80X10
0.92 mm (0.0362 in)	31438 80X11

CAUTION:

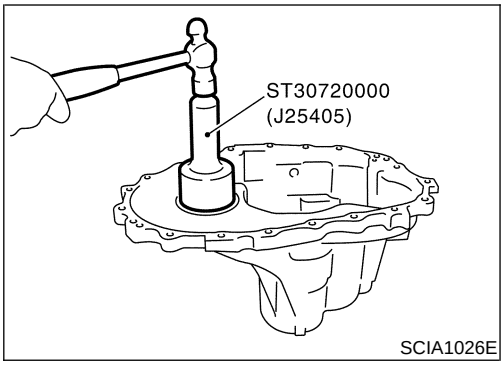
Up to 2 adjusting shims can be selected.



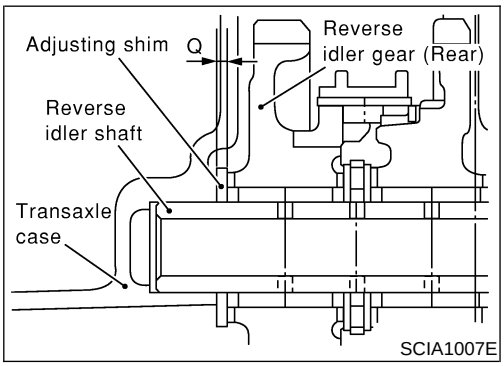
1. Using depth micrometer and straightedge, measure dimension “L_1” between clutch housing case end face and mounting face of adjusting shim.
2. Install outer race onto differential side bearing on final gear side. Holding lightly the outer race horizontally by hand, rotate final gear five times or more (for smooth movement of bearing roller).



3. Using depth micrometer and straightedge as shown in the figure, measure dimension “L_2” between differential side bearing outer race and transaxle case end face.



4. Install selected adjusting shim and then differential side bearing outer race.



Reverse Idler Gear End Play

NFMT0022S04

- When adjusting reverse idler gear end play, select adjusting shim for reverse idler gear. To select adjusting shim, measure clearance between transaxle case and reverse idler gear.
- Calculate dimension "Q" (thickness of adjusting shim) using the following procedure to satisfy specification of end play for reverse idler gear.

End play: 0.04 - 0.14 mm (0.0016 - 0.0055 in)

Dimension "Q" = (Q_1 − Q_2) + End play

Q: Thickness of adjusting shim

Q_1: Distance between transaxle case end face and mounting face of adjusting shim

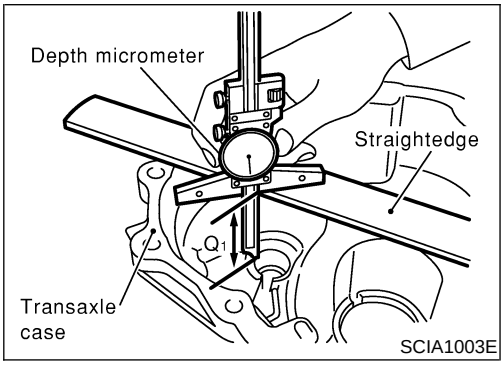
Q_2: Distance between clutch housing case end face and end face of reverse idler gear

Adjusting Shim

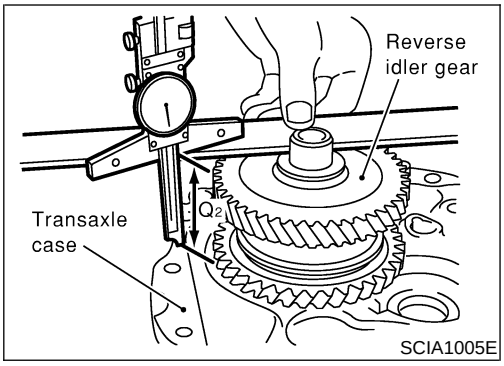
Shim thickness	Part number
1.76 mm (0.0693 in)	32237 8H500
1.84 mm (0.0724 in)	32237 8H501
1.92 mm (0.0756 in)	32237 8H502
2.00 mm (0.0787 in)	32237 8H503
2.08 mm (0.0819 in)	32237 8H504
2.16 mm (0.0850 in)	32237 8H505
2.24 mm (0.0882 in)	32237 8H506
2.32 mm (0.0913 in)	32237 8H507
2.40 mm (0.0945 in)	32237 8H508
2.48 mm (0.0976 in)	32237 8H509
2.56 mm (0.1008 in)	32237 8H510
2.64 mm (0.1039 in)	32237 8H511

CAUTION:

Only 1 adjusting shim can be selected.

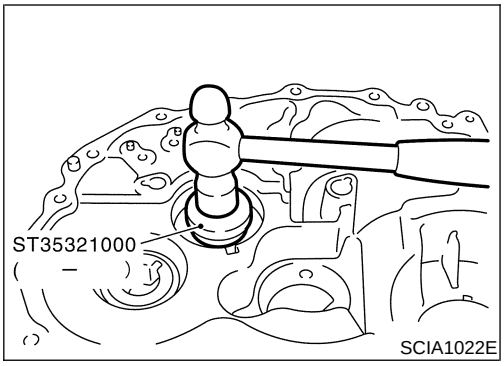


1. Using depth micrometer and straightedge, measure dimension "Q_1" between transaxle case end face and mounting face of adjusting shim.



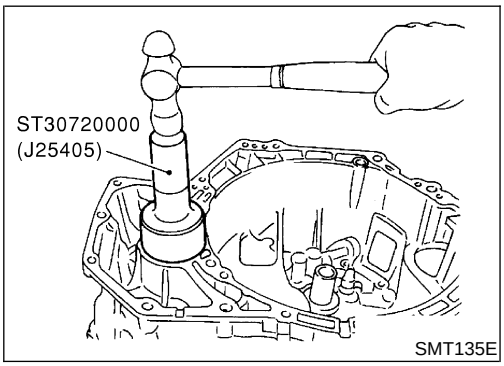
2. Using depth micrometer and straightedge as shown in the figure, measure dimension "Q_2" between clutch housing case end face and end face of reverse idler gear.
3. Install selected reverse idler gear adjusting shim onto reverse idler gear assembly.

ASSEMBLY



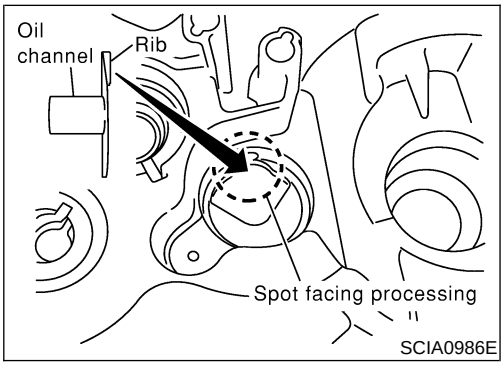
1. Using a drift, install input shaft oil seal from clutch housing end of side to the depth of 1.8 to 2.8 mm (0.071 to 0.110 in).

CAUTION:
Do not reuse oil seal.



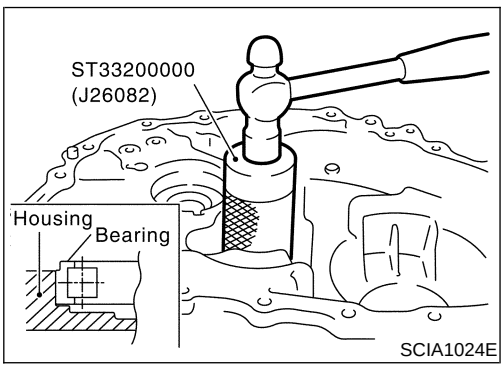
2. Using a drift, install differential oil seal until the face is flush with clutch housing.

CAUTION:
Do not reuse oil seal.



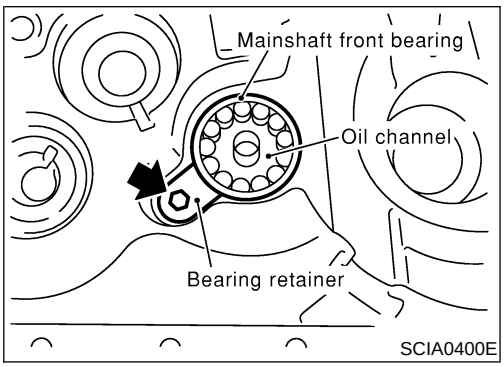
3. Install oil channel on mainshaft side.

CAUTION:
Be careful with orientation of installation.



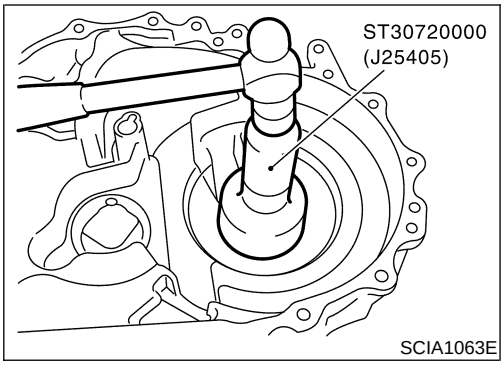
4. Using a drift, install mainshaft front bearing.

CAUTION:
Be careful with orientation of installation.

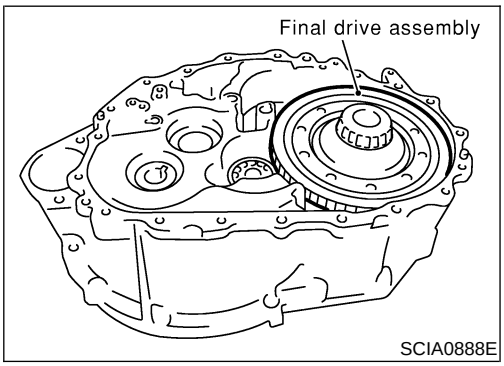


5. Install bearing retainer.

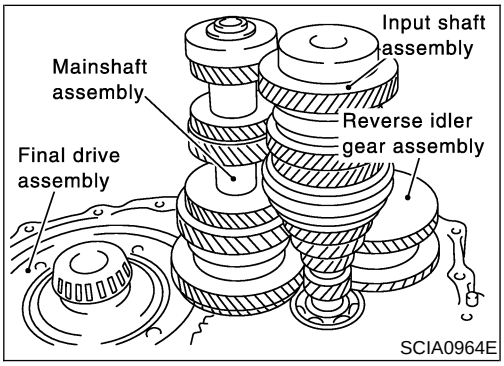
CAUTION:
Install with punched surface facing up.



6. Install differential side bearing outer race.

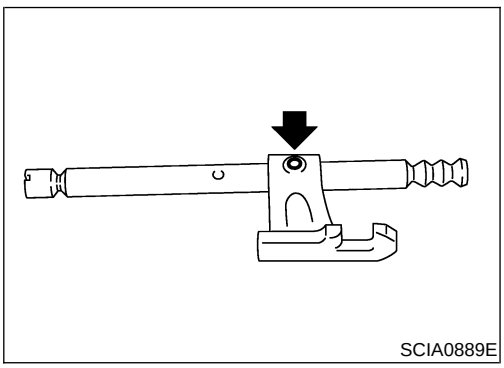


7. Install final drive assembly into clutch housing.



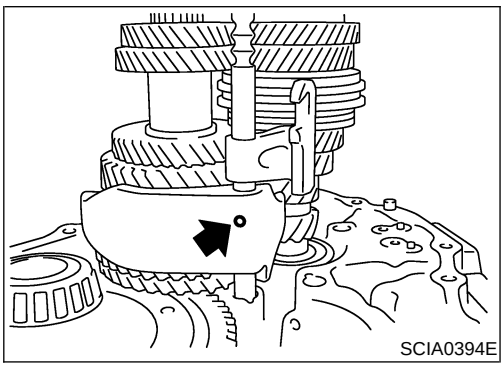
8. Install input shaft assembly, mainshaft assembly, and reverse idler gear assembly into clutch housing.

CAUTION:
Be sure not to damage input shaft oil seal.



9. Install 1st-2nd fork rod bracket onto 1st-2nd fork rod, and then install retaining pin.

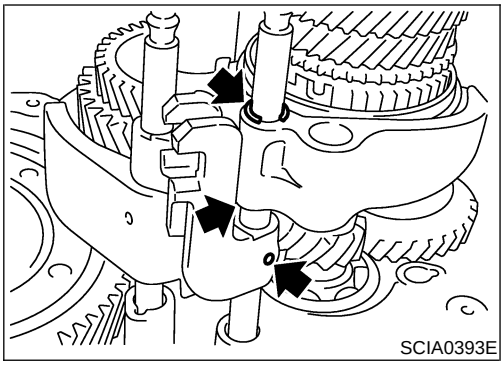
CAUTION:
Do not reuse retaining pin.



10. Install 1st-2nd fork rod and 1st-2nd shift fork, and then install retaining pin.

CAUTION:
Do not reuse retaining pin.

11. Install shift check sleeve.


SCIA0393E

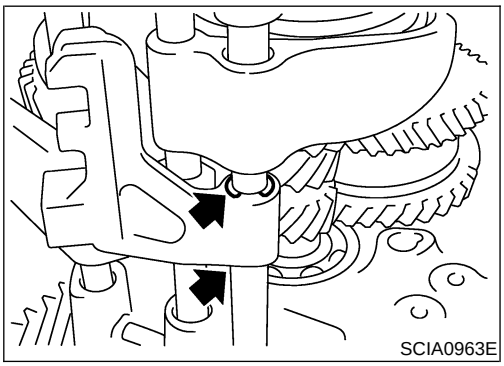
12. Install 3rd-4th bracket, 3rd-4th shift fork, and 3rd-4th fork rod with inter lock pin.
13. Install stopper ring onto 3rd-4th shift fork.

CAUTION:
Do not reuse stopper ring.

14. Install retaining pin onto 3rd-4th bracket.

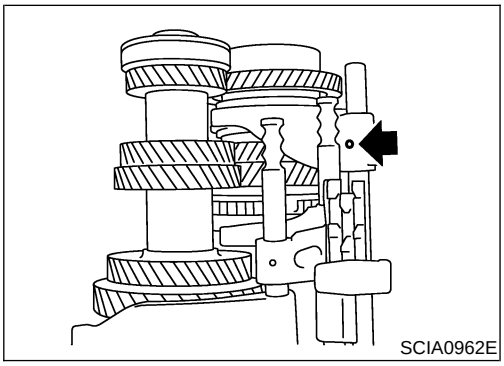
CAUTION:
Do not reuse retaining pin.

15. Install 2 check balls.


SCIA0963E

16. Install 5th-6th bracket, 5th-6th shift fork, and 5th-6th fork rod with inter lock pin.
17. Install stopper ring onto 5th-6th bracket.

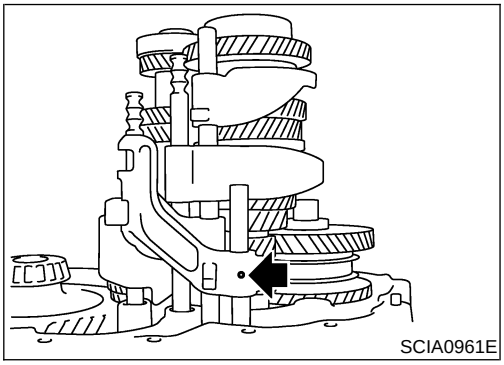
CAUTION:
Do not reuse stopper ring.


SCIA0962E

18. Install retaining pin onto 5th-6th shift fork.

CAUTION:
Do not reuse retaining pin.

19. Install 2 check balls.
20. Install reverse bracket fork rod and reverse lever bracket.


SCIA0961E

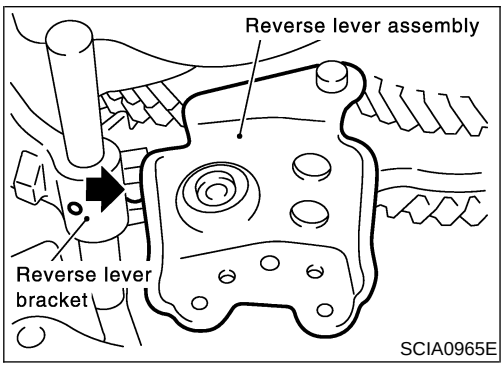
21. Install retaining pin onto reverse bracket.

CAUTION:
Do not reuse retaining pin.

22. Install reverse shift fork and reverse fork rod.
23. Install reverse lever assembly following procedures below.

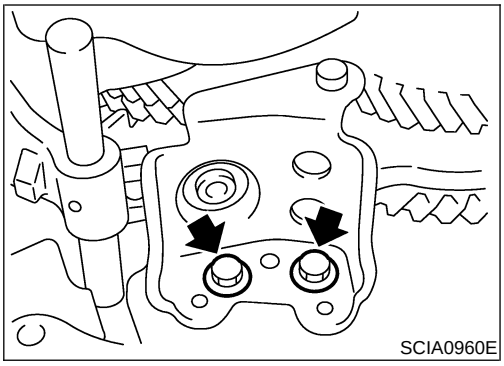
a. Install shifter cap onto reverse lever assembly cam, and then install them onto reverse shift fork.

CAUTION:
Do not drop shifter cap.



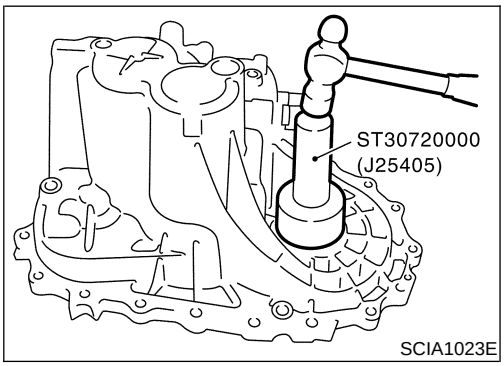
SCIA0965E

b. While lifting reverse shift fork, align cam with reverse bracket.


SCIA0960E

c. Tighten mounting bolts to specified torque, and then install reverse lever assembly.

24. Install the magnet onto clutch housing.



SCIA1023E

25. Using a drift, install differential oil seal until it is flush with end face of transaxle case.

CAUTION:
Do not reuse oil seal.

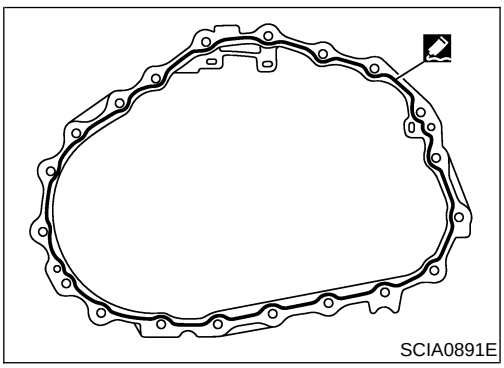
26. Install selected input shaft adjusting shim onto input shaft.
- For selection of adjusting shims. Refer to MT-43, “Input Shaft End Play”.

27. Install baffle plate and oil gutter.
28. Install transaxle case following procedures below.

a. Install selected mainshaft rear bearing adjusting shim into transaxle case.
- For selection of adjusting shims. Refer to MT-44, “Mainshaft End Play”.

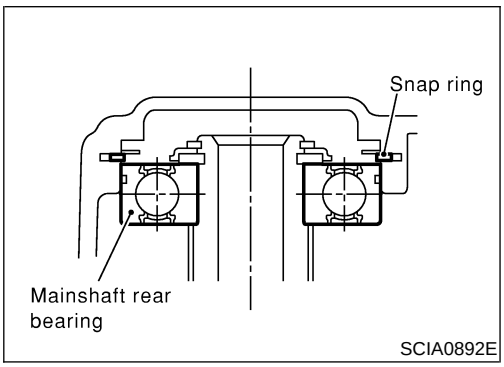
b. Temporarily install snap ring of mainshaft rear bearing into transaxle case.

CAUTION:
Do not reuse the snap ring.


SCIA0891E

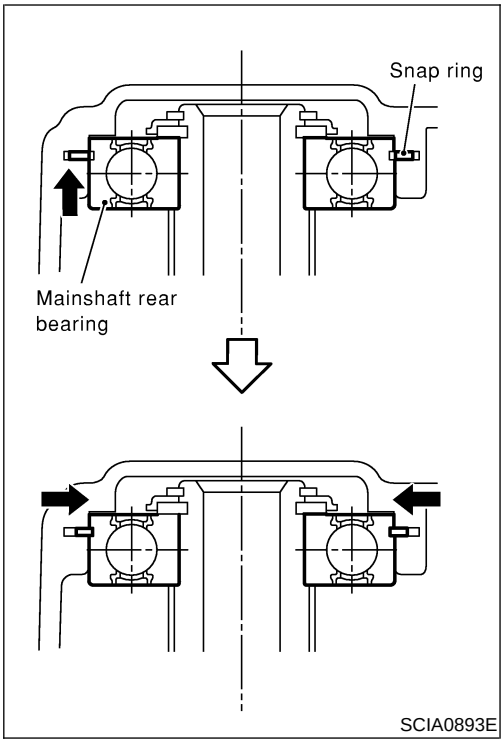
c. Apply Anaerobic Liquid Gasket (Refer to GI-50, “Recommended Chemical Products and Sealants”.) or equivalent to mating surfaces of transaxle case and clutch housing.

CAUTION:
Remove old sealant adhering to mounting surfaces. Also remove any moisture, oil, or foreign material adhering to application and mounting surfaces.



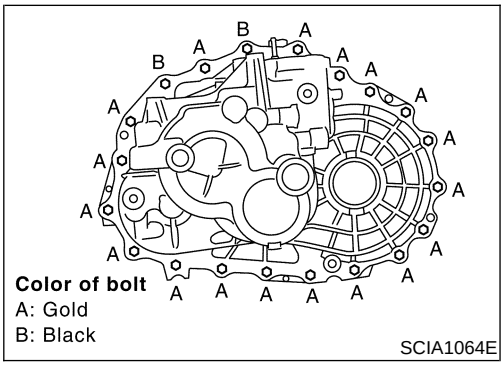
SCIA0892E

d. With snap ring of mainshaft rear bearing temporarily installed, place transaxle case over clutch housing.



e. Through bore plug mounting hole, with snap ring stretched, and lift up mainshaft assembly from the control assembly mounting hole.

f. Securely install snap ring onto mainshaft rear bearing.



g. Tighten mounting bolts.

Bolt A:

: 50.0 - 53.9 N·m (5.1 - 5.4 kg-m, 37 - 39 ft-lb)

Bolt B:

: 63.0 - 66.9 N·m (6.5 - 6.8 kg-m, 47 - 49 ft-lb)

CAUTION:

Always replace bolts B as they are self-sealing bolts.

h. Install control assembly.

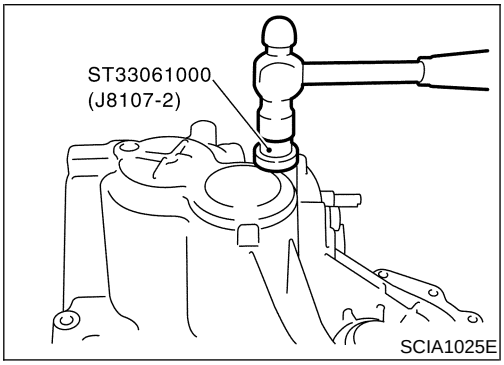
CAUTION:

Do not reuse the O-ring.

i. Install shift check and stopper bolt.

CAUTION:

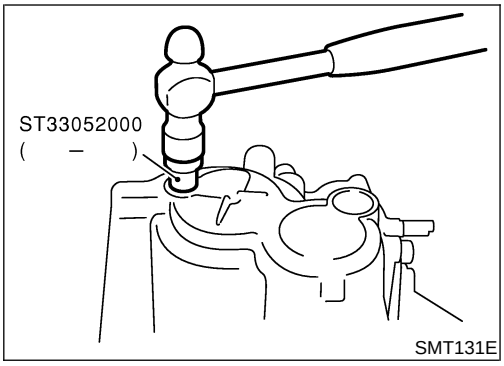
Do not reuse shift check and stopper bolt.



29. Using a drift, install bore plug.

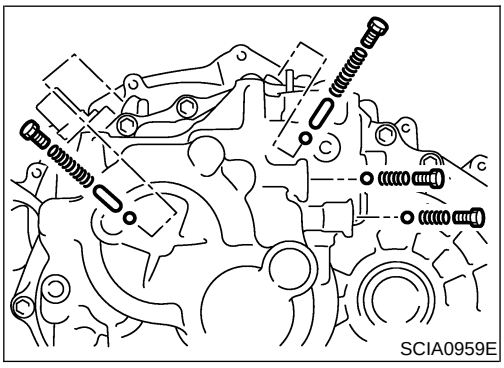
CAUTION:

Do not reuse bore plug.



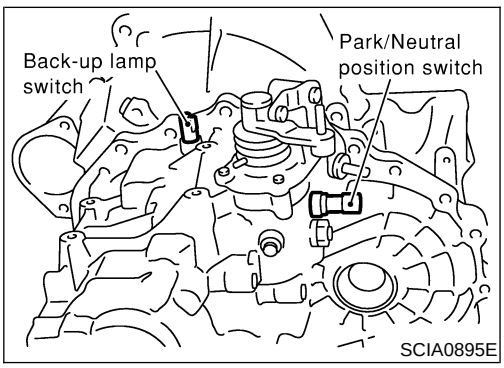
30. Using a drift, install welch plug.

CAUTION:
Do not reuse welch plug.



31. Install 2 shift check sleeves, 4 check balls, 4 check springs, and 4 check ball plugs.

CAUTION:
Do not reuse check ball plug.



32. Apply Anaerobic Liquid Gasket (Refer to GI-50, “Recommended Chemical Products and Sealants”.) or equivalent to threads of neutral switch and reverse lamp switch. Then install them into transaxle case.
33. Install gaskets onto drain plug and filler plug, and then install them into transaxle case.

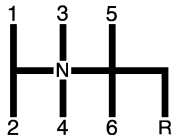
CAUTION:
- **Do not reuse gasket.**
- **After oil is filled, tighten filler plug to specified torque.**

General Specifications

NFMT0024

TRANSAXLE

NFMT0024S01

Engine			VQ35DE
Transaxle model			RS6F51A
Model code number			5Y764
Number of speed			6
Synchromesh type			Warner
Shift pattern			 SCIA0955E
Gear ratio	1st		3.153
	2nd		1.944
	3rd		1.392
	4th		1.055
	5th		0.809
	6th		0.630
	Reverse		3.002
Number of teeth	Input gear	1st	13
		2nd	18
		3rd	28
		4th	36
		5th	42
		6th	46
		Reverse	13
	Main gear	1st	41
		2nd	35
		3rd	39
		4th	38
		5th	34
		6th	29
		Reverse	38
	Reverse idler gear	Front	37
		Rear	38
Oil capacity liter (US pt, Imp pt)			2.3 (4-7/8, 4)
Remarks	Reverse synchronizer		Installed
	Double baulk ring type synchronizer		1st & 2nd synchronizer

FINAL GEAR

=NFMT0024S02

Engine		VQ35DE
Transaxle model		RS6F51A
Model code number		5Y764
Final gear ratio		3.812
Number of teeth	Final gear/Pinion	61/16
	Side gear/Pinion mate gear	14/10

Gear End Play

NFMT0025

Unit: mm (in)

Gear	End play
1st main gear	0.20 - 0.30 (0.0079 - 0.0118)
2nd main gear	0.06 - 0.16 (0.0024 - 0.0063)
3rd input gear	0.18 - 0.31 (0.0071 - 0.0122)
4th input gear	0.20 - 0.30 (0.0079 - 0.0118)
5th input gear	0.06 - 0.16 (0.0024 - 0.0063)
6th input gear	0.06 - 0.16 (0.0024 - 0.0063)

Clearance Between Baulk Ring and Gear

NFMT0026

3RD, 4TH, 5TH, 6TH & REVERSE BAULK RING

NFMT0026S01

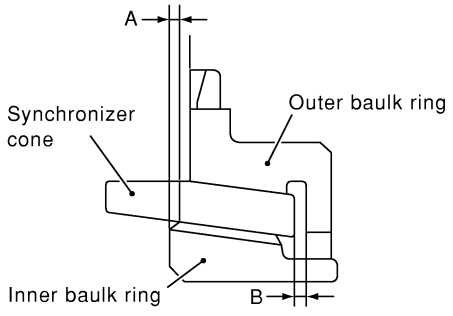
Unit: mm (in)

Standard		Wear limit
3rd	0.9 - 1.45 (0.0354 - 0.0571)	0.7 (0.0276)
4th	0.9 - 1.45 (0.0354 - 0.0571)	0.7 (0.0276)
5th	0.95 - 1.4 (0.0374 - 0.0551)	0.7 (0.0276)
6th	0.95 - 1.4 (0.0374 - 0.0551)	0.7 (0.0276)
Reverse	0.95 - 1.4 (0.0374 - 0.0551)	0.7 (0.0276)

1ST AND 2ND DOUBLE BAULK RING

NFMT0026S02

Unit: mm (in)



SMT138E

Dimension	Standard	Wear limit
A	0.6 - 0.8 (0.024 - 0.031)	0.2 (0.008)
B	0.6 - 1.1 (0.024 - 0.043)	0.2 (0.008)

Available Snap Rings

NFMT0027

6TH BUSHING

NFMT0027S01

End play		0 - 0.1 mm (0 - 0.004 in)	
Thickness mm (in)	Part number*	Thickness mm (in)	Part number*
1.76 (0.0693)	32204 8H511	2.01 (0.0791)	32204 8H516
1.81 (0.0713)	32204 8H512	2.06 (0.0811)	32204 8H517
1.86 (0.0732)	32204 8H513	2.11 (0.0831)	32204 8H518
1.91 (0.0752)	32204 8H514	2.16 (0.0850)	32204 8H519
1.96 (0.0772)	32204 8H515	2.21 (0.0870)	32204 8H520

*: Always check with the Parts Department for the latest parts information.

Available C-rings

NFMT0036

MAINSHAFT C-RING

NFMT0036S01

End play		0 - 0.06 mm (0 - 0.0024 in)	
Thickness mm (in)	Part number*	Thickness mm (in)	Part number*
2.535 (0.0998)	32348 8H800	2.835 (0.1116)	32348 8H810
2.565 (0.1010)	32348 8H801	2.865 (0.1128)	32348 8H811
2.595 (0.1022)	32348 8H802	2.895 (0.1140)	32348 8H812
2.625 (0.1033)	32348 8H803	2.925 (0.1152)	32348 8H813
2.655 (0.1045)	32348 8H804	2.955 (0.1163)	32348 8H814
2.685 (0.1057)	32348 8H805	2.985 (0.1175)	32348 8H815
2.715 (0.1069)	32348 8H806	3.015 (0.1187)	32348 8H816
2.745 (0.1081)	32348 8H807	3.045 (0.1199)	32348 8H817
2.775 (0.1093)	32348 8H808	3.075 (0.1211)	32348 8H818
2.805 (0.1104)	32348 8H809		

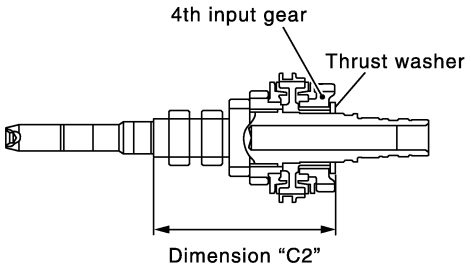
*: Always check with the Parts Department for the latest parts information.

Available Thrust Washer

NFMT0037

INPUT SHAFT THRUST WASHER

NFMT0037S01



SCIA1008E

Standard length “C2”		154.7 - 154.8 mm (6.091 - 6.094 in)	
Thickness mm (in)	Part number*	Thickness mm (in)	Part number*
3.84 (0.1512)	32347 8H500	4.02 (0.1583)	32347 8H503
3.90 (0.1535)	32347 8H501	4.08 (0.1606)	32347 8H504
3.96 (0.1559)	32347 8H502	4.14 (0.1630)	32347 8H505

*: Always check with the Parts Department for the latest parts information.

DIFFERENTIAL SIDE GEAR THRUST WASHER

NFMT0037S02

Allowable clearance between side gear and differential case with washer	0.1 - 0.2 mm (0.004 - 0.008 in)
Thickness mm (in)	Part number*
0.75 (0.0295)	38424 81X00
0.80 (0.0315)	38424 81X01
0.85 (0.0335)	38424 81X02
0.90 (0.0354)	38424 81X03
0.95 (0.0374)	38424 81X04

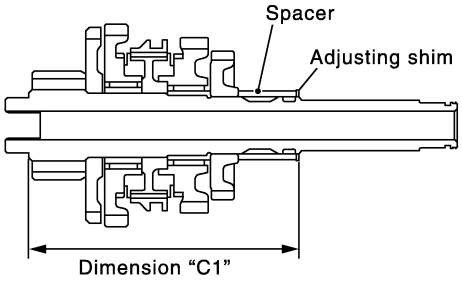
*: Always check with the Parts Department for the latest parts information.

Available Adjusting Shims

NFMT0038

MAINSHAFT ADJUSTING SHIM

NFMT0038S01



SCIA1009E

Standard length "C1"		173.85 - 173.95 mm (6.844 - 6.848 in)	
Thickness mm (in)	Part number*	Thickness mm (in)	Part number*
0.52 (0.0205)	32238 8H500	0.84 (0.0331)	32238 8H504
0.60 (0.0236)	32238 8H501	0.92 (0.0362)	32238 8H505
0.68 (0.0268)	32238 8H502	1.00 (0.0394)	32238 8H506
0.76 (0.0299)	32238 8H503	1.08 (0.0425)	32238 8H507

*: Always check with the Parts Department for the latest parts information.

INPUT SHAFT REAR BEARING ADJUSTING SHIM

NFMT0038S02

End play			0 - 0.06 mm (0 - 0.0024 in)		
Thickness mm (in)	Part number*	Thickness mm (in)	Part number*	Thickness mm (in)	Part number*
0.40 (0.0157)	32225 8H500	0.88 (0.0346)	32225 8H512	1.36 (0.0535)	32225 8H524
0.44 (0.0173)	32225 8H501	0.92 (0.0362)	32225 8H513	1.40 (0.0551)	32225 8H560
0.48 (0.0189)	32225 8H502	0.96 (0.0378)	32225 8H514	1.44 (0.0567)	32225 8H561
0.52 (0.0205)	32225 8H503	1.00 (0.0394)	32225 8H515	1.48 (0.0583)	32225 8H562
0.56 (0.0220)	32225 8H504	1.04 (0.0409)	32225 8H516	1.52 (0.0598)	32225 8H563
0.60 (0.0236)	32225 8H505	1.08 (0.0425)	32225 8H517	1.56 (0.0614)	32225 8H564
0.64 (0.0252)	32225 8H506	1.12 (0.0441)	32225 8H518	1.60 (0.0630)	32225 8H565
0.68 (0.0268)	32225 8H507	1.16 (0.0457)	32225 8H519	1.64 (0.0646)	32225 8H566
0.72 (0.0283)	32225 8H508	1.20 (0.0472)	32225 8H520		
0.76 (0.0299)	32225 8H509	1.24 (0.0488)	32225 8H521		
0.80 (0.0315)	32225 8H510	1.28 (0.0504)	32225 8H522		
0.84 (0.0331)	32225 8H511	1.32 (0.0520)	32225 8H523		

*: Always check with the Parts Department for the latest parts information.

Available Adjusting Shims (Cont'd)

MAINSHAFT REAR BEARING ADJUSTING SHIM

NFMT0038S03

End play		0 - 0.06 mm (0 - 0.0024 in)	
Thickness mm (in)	Part number*	Thickness mm (in)	Part number*
0.44 (0.0173)	32238 8H510	0.80 (0.0315)	32238 8H519
0.48 (0.0189)	32238 8H511	0.84 (0.0331)	32238 8H520
0.52 (0.0205)	32238 8H512	0.88 (0.0346)	32238 8H521
0.56 (0.0220)	32238 8H513	0.92 (0.0362)	32238 8H522
0.60 (0.0236)	32238 8H514	0.96 (0.0378)	32238 8H523
0.64 (0.0252)	32238 8H515	1.00 (0.0394)	32238 8H524
0.68 (0.0268)	32238 8H516	1.04 (0.0409)	32238 8H560
0.72 (0.0283)	32238 8H517	1.08 (0.0425)	32238 8H561
0.76 (0.0299)	32238 8H518		

*: Always check with the Parts Department for the latest parts information.

REVERSE IDLER GEAR ADJUSTING SHIM

NFMT0038S04

End play		0.04 - 0.14 mm (0.0016 - 0.0055 in)	
Thickness mm (in)	Part number*	Thickness mm (in)	Part number*
1.76 (0.0693)	32237 8H500	2.24 (0.0882)	32237 8H506
1.84 (0.0724)	32237 8H501	2.32 (0.0913)	32237 8H507
1.92 (0.0756)	32237 8H502	2.40 (0.0945)	32237 8H508
2.00 (0.0787)	32237 8H503	2.48 (0.0976)	32237 8H509
2.08 (0.0819)	32237 8H504	2.56 (0.1008)	32237 8H510
2.16 (0.0850)	32237 8H505	2.64 (0.1039)	32237 8H511

*: Always check with the Parts Department for the latest parts information.

6TH MAIN GEAR ADJUSTING SHIM

NFMT0038S05

End play		0 - 0.1 mm (0 - 0.004 in)	
Thickness mm (in)	Part number*	Thickness mm (in)	Part number*
0.88 (0.0346)	32237 8H560	1.20 (0.0472)	32237 8H564
0.96 (0.0378)	32237 8H561	1.28 (0.0504)	32237 8H565
1.04 (0.0409)	32237 8H562	1.36 (0.0535)	32237 8H566
1.12 (0.0441)	32237 8H563		

*: Always check with the Parts Department for the latest parts information.

Available Shims — Differential Side Bearing Preload and Adjusting Shim

NFMT0039

BEARING PRELOAD

NFMT0039S01

Differential side bearing preload: L*	0.15 - 0.21 mm (0.0059 - 0.0083 in)

*: Install shims which are "deflection of differential case" + "L" in thickness.

DIFFERENTIAL SIDE BEARING ADJUSTING SHIM(S)

NFMT0039S02

Thickness mm (in)	Part number*	Thickness mm (in)	Part number*
0.48 (0.0189)	31438 80X00	0.72 (0.0283)	31438 80X06
0.52 (0.0205)	31438 80X01	0.76 (0.0299)	31438 80X07
0.56 (0.0220)	31438 80X02	0.80 (0.0315)	31438 80X08
0.60 (0.0236)	31438 80X03	0.84 (0.0331)	31438 80X09
0.64 (0.0252)	31438 80X04	0.88 (0.0346)	31438 80X10
0.68 (0.0268)	31438 80X05	0.92 (0.0362)	31438 80X11

*: Always check with the Parts Department for the latest parts information.

QUICK REFERENCE SPECIFICATIONS

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VQ35DE

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Notes

Engine Oil	SAE 5W-30 API SG/SH I & II or SJ, Energy Conserving Oil		
With Oil Filter	4 1/4 qt		
Without Oil Filter	3 7/8 qt		
Tune up			
Spark Plugs	(Platinum)		
Standard Type	PLFR5A-11		
Hot Type	PLFR4A-11		
Cold Type	PLFR6A-11		
Plug Gap	0.043 in. (1.1mm)		
Ignition Timing	15° ± 5° btdc		☐
Curb Idle	MT 625 ± 50 rpm	AT 675 ± 50 rpm	☐
Idle Mixture Ratio	0.7 – 9.9 % CO		☐
Valve Clearance	**Intake**	**Exhaust**	
cold	0.010 - 0.013 in (0.26 - 0.34 mm)	0.011 - 0.015 in (0.29 - 0.37 mm)	☐ ☐ ☐
hot	0.013 - 0.016 in (0.304 - 0.416 mm)	0.013 - 0.016 in (0.308 - 0.432 mm)	☐ ☐ ☐
T/Position Sensor			
T/V Closed	More than 0.36 V		☐
T/V Open	Less than 4.5 V		☐
Idle Voltage	Approx. 0.5 V		☐
Radiator Fill			
Coolant Type	Ethylene Glycol		
Coolant Capacity	8 1/8 qt		☐
Compression			
Standard	185 psi		☐ ☐ ☐
Minimum	142 psi		☐ ☐ ☐
Diff Between Cyl.	14 psi		
Fuel System			
Fuel Pressure @ Idle	51 psi		☐
Recommended Fuel	91 Octane		
Fuel Pump Ω			
At 77°F (25°C)	0.2 - 5.0 Ω		☐
Fuel Injector Ω			
At 77°F (25°C)	13.5 – 17.5 Ω		☐
Sensors			
Mass Air Flow Sen			
Supply Volt.	11 - 14 V		☐
Output Volt. Idle	1.1 - 1.5 V		☐
Mass Air Flow			
At Idle	2.0 - 6.0 gm/sec		☐
2500 rpm	7.0 -20.0 gm/sec		☐
Coolant Temp Sensor Ω			
68°F (20°C)	2.1 - 2.9 kΩ		☐

122°F (50°C)	0.68 - 1.00 kΩ	☐
194°F (90°C)	0.236 - 0.260 kΩ	☐
FT O_2 Sen Heater Ω		
At 77°F (25°C)	2.3 - 4.3 Ω	☐
Rr O_2 Sen Heater Ω		
At 77°F (25°C)	2.3 - 4.3 Ω	☐
Intake Air Temp Sensor		
68°F (20°C)	2.1 - 2.9 kΩ	☐
176°F (80°C)	0.27 - 0.38 kΩ	☐
Cam P/Sen Phase		
At 77°F (25°C)	Except 0 Ω or Ω	☐
Fuel Tank Temp Sensor		
68°F (20°C)	2.3 - 2.7 kΩ	☐
122°F (50°C)	0.79 - 0.90 kΩ	☐
Throttle Control Motor Ω		
At 77°F (25°C)	Approx. 1 - 15 Ω	☐

Electrical

Ignition System		
Firing Order	1-2-3-4-5-6	
Battery Specs.		
Type USA	**80D26L**	
Capacity (V/AH)	12 V/ 55 AH	
Cold Crank Current	582 A	☐
Charging System		
Alternator Type	**LR1110-720**	
Nom. Rated Out	12 V/ 110 A	
Reg. Volt	14.1 - 14.7 V	
Hot Out Amp	More than 24 A /1300 rpm	☐
	More than 87 A /2500 rpm	☐
	More than 105 A /5000 rpm	☐
EPA Mileage Estimate		
(city/highway)	21/28 (MT) 19/26 (AT)	

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PREPARATION

Make sure that the following parts are in order.

1. Battery
2. Ignition system
3. Engine oil and coolant levels
4. Fuse
5. ECM harness connector
6. Vacuum hoses
7. Air intake system (Oil filler cap, oil level, etc.)
8. Fuel pressure
9. Engine compression
10. Throttle valve
11. Evaporative emission canister purge control valve.

Note:

- On A/C equipped vehicles, turn A/C "Off" for testing.
- Transmission should be in "Park" or "Neutral".
- "CO" probe should be inserted into exhaust approximately 16 inches.
- Turn off headlamps, heater blower, rear defogger, etc.
- Front wheels pointed straight.
- Perform inspection with cooling fans "Off".

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Maxima 2002 | Quick Reference | A/T

RE4F04B

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Notes

A/T Fluid Type Nissan Matic 'D'
Oil Capacity 9 qt
A/T Cooler Type Fin Type Structure

Up-Shift Schedule Range (at normal operating temp.)

Comfort	**Half Throttle**	**Full Throttle**
D1 → D2	28 - 33 mph	37 - 42 mph
D2 → D3	48 - 53 mph	68 - 73 mph
D3 → D4	83 - 88 mph	108 - 112 mph
Auto power		
D1 → D2	28 - 33 mph	36 - 41 mph
D2 → D3	48 - 53 mph	68 - 73 mph
D3 → D4	83 - 88 mph	108 - 112 mph
Lock-Up Clutch ON	62 - 66 mph (Approx. 2/8 Throttle)	

Stall Rpm

R, D, 2, 1 position	2550 - 3050 rpm

Line Pressure	**At Curb idle**	**At Stall rpm**
R - Position	113 psi (7.9 kg/cm2)	278 psi (19.5 kg/cm2)
D, 2, 1 - Position	73 psi (5.1 kg/cm2)	179 psi (12.5 kg/cm2)

Shift Solenoids

Gear	**Solenoid A**	**Solenoid B**
1st	ON (Closed)	ON (Closed)
2nd	OFF (Open)	ON (Closed)
3rd	OFF (Open)	OFF (Open)
4th	ON (Closed)	OFF (Open)

Solenoid Valves	**Resistance**	**Pin Number**
Shift Solenoid A	20 - 30 Ω	2
Shift Solenoid B	5 - 20 Ω	1
Ovr. Clutch Sol.	20 - 30 Ω	3
Line Pres. Sol.	2.5 - 5 Ω	4
T/Conv. Clutch Sol.	5 - 20 Ω	5

ATF Temp Sensor

68°F (20°C)	1.5 V
176°F (80°C)	0.5 V

Rev Sensor

At 12 MPH (20 km/h)	450 Hz
Drop Resistor	10 - 15 Ω

Brake Band

Anchor end pin torque	36 - 51 in-lbs.
Number of return turns	2.5
Lock nut torque	23 - 27 ft-lbs.

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PRECAUTIONS

- Before performing any diagnostic test, vehicle should be driven for approximately 10 minutes to raise transmission to the proper operating temperature of 122° to 176°.
- During stall testing, never hold throttle wide open for more than 5 seconds at a time. Extended stall testing can overheat transmission and cause serious damage.
- Nissan Matic 'D' ATF is the only fluid accepted for warranty, service contracts and goodwill repairs.
- Before performing any internal repairs, thoroughly clean the outside of the transmission case to prevent contamination.
- Use lint free cloth or towels for wiping parts. Common shop towels can leave contaminating fibers on the transmission parts and cause improper transmission operation.
- When servicing the valve body, valves, sleeves, plugs, etc. should slide along the bores in the valve body under their own weight.
- Before assembly, apply a coat of ATF to all internal transmission parts. Use petroleum jelly to protect o-rings and seals, or to hold bearings and washers in place during assembly.

Important Note: Nissan Matic 'D' must be used in performing repairs paid by Nissan/Infiniti, such as warranty, service contract, or good-will repairs. There will not be reimbursement for repairs when non-genuine Nissan Matic 'D' is used.

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RS6F51A

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Notes

Clutch

Pedal height "H"	7.07 - 7.46 in (179.5 - 189.5 mm)	
Pedal free play "A"	0.35 - 0.63 in (9.0 - 16.0 mm)	
Flywheel Deflection	Standard: 0.0177 in (0.45 mm)	Limit: 0.051 in (1.3 mm)
Clutch Disc Run-out	0.039 in (1.00 mm)	
Clutch Cover Torque	8 - 14 ft/lbs. (1 - 2 kg/m)	
(Two Stages)	26 - 32 ft/lbs. (3.5 - 4.5 kg/m)	
Diaphragm Spring Toe Height (Uneven Limit)	0.020 in (0.5 mm)	

Refill Capacity (75W-90 or 75W-85 API GL-4)

RS6F51A	4 7/8 pt

Gear End Play

1st main gear	0.0079 - 0.0118 in (0.20 - 0.30 mm)
2nd main gear	0.0024 - 0.0063 in (0.06 - 0.16 mm)
3rd input gear	0.0071 - 0.0122 in (0.18 - 0.31 mm)
4th input gear	0.0079 - 0.0118 in (0.20 - 0.30 mm)
5th input gear	0.0024 - 0.0063 in (0.06 - 0.16 mm)
6th input gear	0.0024 - 0.0063 in (0.06 - 0.16 mm)

Clearance Between Baulk Ring And Gear

	Standard	Wear Limit
3rd, & 4th Gear	0.0354 - 0.0571 in (0.9 - 1.45 mm)	0.0276 in (0.7 mm)
5th & 6th Gear	0.0374 - 0.0551 in (0.95 - 1.4 mm)	0.0276 in (0.7 mm)
1st & 2nd Gear Inner (A)	0.024 - 0.031 in (0.6 - 0.8 mm)	0.008 in (0.2 mm)
1st & 2nd Gear Outer (B)	0.024 - 0.043 in (0.6 - 1.1 mm)	0.008 in (0.2 mm)

6th Bushing Snap Ring

Allowable End Play	0 - 0.004 in (0 - 0.1 mm)

Mainshaft C-Ring

Allowable End Play	0 - 0.0024 in (0 - 0.06 mm)

Input Shaft 4th Input Gear Thrust Washer

Allowable clearance Thickness	0 - 0.0024 in (0 - 0.06 mm)

Diff. Side Gear Thrust Washer

Side gear & differential case clearance

0.004 - 0.008 in (0.1 - 0.2 mm)

Diff. Side Bearing Preload

Preload dimension	0.0059 - 0.0083 in (0.15 - 0.21 mm)
Input Shaft End Play	0 - 0.0020 in (0 - 0.05 mm)

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PRECAUTIONS

- Nissan does not recommend flywheel resurfacing. If flywheel is not within specification, replacement is recommended.
- Refill transmission with the proper viscosity and amount of gear lube for the anticipated temperatures.
- To help prevent clutch judder, avoid excessive grease to clutch disc splines, input shaft and throwout bearing. Be sure to clean off any excessive grease.
- To avoid transmission contamination, inspect the shift lever dust boot for cracks or damage, and replace if needed. Install plastic wire ties to insure a tight fit of the boot to the shifter and housing.
- Before reinstallation of a removed transmission, inspect the engine to transmission alignment dowels for damage. Damaged dowels can cause misalignment of the engine to transmission, and this can cause the transmission to jump out of gear.

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AIR CONDITIONER (MANUAL AND AUTO)

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Notes

Compressor

Make	Calsonic
Type	V-6 Var. Displacement

Compressor Clutch

Disc-to-Pulley Clearance	0.12 - 0.024 in (0.3 - 0.6 mm) ☐

Refrigerant

Type	HFC-134a (R134a)
Capacity	1.10 +/- 0.11 lb.

Refrigerant Oil

Type	Nissan Type “S” Lub	
Capacity	6.3 fl oz (180 ml)	
Oil to Add Per	Evaporator	2.5 oz (75 ml)
	Condenser	2.5 oz (75 ml)
	*Liquid Tank	0.2 oz (30ml)
	Large Rerig. Leak	1.0 oz (30 ml)
	Compressor	6.3 oz (180 ml)
	(*Add only if comp. Is not replaced.)	
Engine Idle w/A/C On	825 rpm or more in Neutral	☐

Performance Test

Recirculating-to-Discharge Air Temp

Relative Humidity	**Recirc. Air Temp. at Blower Assy. Inlet F°(C°)**	**Discharge Air Temp. at Center Ventilator F°(C°)**		
50 - 60 %	59° (15°)	38 - 42° (3.5 – 5.4°)	☐	☐
	68° (20°)	44 - 48° (6.6 - 8.9°)	☐	☐
	77° (25°)	49 - 55° (9.5 - 12.6°)	☐	☐
	86° (30°)	56 - 62° (13.4 - 16.5°)	☐	☐
	95° (35°)	64 - 70° (17.6 – 21.3°)	☐	☐
60 - 70 %	59° (15°)	42 - 45° (5.4 – 7.1°)	☐	☐
	68° (20°)	48 - 52° (8.9 - 11.0°)	☐	☐
	77° (25°)	55 - 60° (12.6 - 15.4°)	☐	☐
	86° (30°)	62 - 68° (16.5 - 20.0°)	☐	☐
	95° (35°)	70 - 77° (21.3 – 24.8°)	☐	☐

Ambient Air Temp-to-Operating Pressure

Air temperature F°(C°)	**Relative Humidity 50-70% High-pres. PSI**	**Low-pres. PSI**		
77° (25°)	122 - 149	26 - 33	☐	☐
86° (30°)	149 - 185	31 - 37	☐	☐
95° (35°)	181 - 220	38 - 47	☐	☐

Refrigerant Pressure Sensor

	Low pressure (at 26 psi)	High pressure (at 398 psi)		
At 77°F (25°C)	0.36 V	4.16V		

A/C Drive Belt Deflection

Engine Cold	Used Belt	New Belt	
Deflection Limit	0.28 in (7 mm)	0.146 - 0.161 in. (3.7 - 4.1 mm)	
Deflection After Adj.	0.165 - 0.181 in (4.2 - 4.6 mm)	0.146 - 0.161 in. (3.7 - 4.1 mm)	

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PERFORMANCE TEST CONDITIONS

- Vehicle indoors or in the shade (well ventilated location)
- Doors closed
- Windows open
- Hood open
- Temperature on "Max" cold setting
- Discharge air on "Face Vent"
- Recirculation switch on "Recirc"
- Fan speed on "High"
- A/C switch "On" and verify A/C Clutch engagement
- Engine speed at idle RPM
- Verify heater cock is closed
- Operate the A/C system for 10 minutes before taking measurements

Precautions:

1. When removing the compressor, store it in the same position as it is mounted in the vehicle. Failure to do so may cause lubricant to enter the low pressure chamber and cause compressor damage.
2. Allow components stored in cool areas to warm to area temperatures before removing seals. This prevents condensation from forming inside A/C components.

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WHEEL ALIGNMENT (UNLADEN)

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Notes

Toe-in	**Range**	**Nominal**	
Total toe-in (A - B)	0 - 0.08 in (0 - 2 mm)	0.04 in (1 mm)	
Total toe-in angle (left plus right)	0 - 0.20° (0' - 12')	0.10 (6')	

Front Wheel Turning Angle (full turn)

	Equipped with 215/55 R16 or 205/65 R15 tires	**Equipped with 225/50 R17 tires**	
In/Wheel Range	36.00° - 40.50° (36° 00' - 40° 30')	29.50° - 34.0° (29° 30' - 34° 00')	
In/Wheel Nominal	39.50° (39° 30')	33.0° (33° 00')	
Out/Wheel Nominal	32.00° (32° 00')	28.50° (28° 30')	

Camber	**Equipped with 225/50 R17 or 215/55 R16 tires**	**Equipped with 205/65 R15 tires**		
Range	-1.00° - 0.50° (-1° 00' - 0° 30')	-1.08° - 0.42° (-1° 05' - 0° 25')		
Nominal	-0.25° (-0° 15')	-0.33° (-0° 20')		
Left/Right Difference	0.75° (45') or less	0.75° (45') or less		

Caster			
Range	2.00° - 3.50° (2° 00' - 3° 30')		
Nominal	2.75° (2° 45')		
Left/Right Difference	0.75° (45')		

Kingpin Inclination	**Equipped with 225/50 R17 or 215/55 R16 tires**	**Equipped with 205/65 R15 tires**		
Range	13.50° - 15.00° (13° 30' - 15° 00')	13.58° - 15.08° (13° 35' - 15° 05')		
Nominal	14.25° (14° 15')	14.33° (14° 20')		

Set Back	0.0 in +/- (0.0 mm +/-)		
Wheel base	108.3 in (2,750 mm)		

Rear Wheel Alignment

Toe-in	**Range**	**Nominal**	
Total toe-in (A - B)	-0.12 in to 0.20 in (-3 to 5 mm)	0.04 in (1 mm)	
Total toe-in angle (left plus right)	-0.27° to 0.43° (-0° 16' to 0° 26')	0.09° (5' 30")	

Camber			
Range	-1.75° to -0.25° (-1° 45' to -0° 15')		
Nominal	-1.00° (-1° 00')		

Thrust Angle 0.0° +/- (0° 00' +/-)

Ball Joint Vertical End Play
0 in (0 mm)

Front Wheel Bearing

Axial End Play	0.0020 in (0.05 mm) or less
Lock nut torque	188 - 245 ft-lb (26 - 34 kg-m)

Rear Wheel Bearing

Axial End Play	0.0020 in (0.05 mm) or less
Lock nut torque	188 – 245 ft-lb (26 - 34 kg-m)

Wheel Runout	**Aluminum Wheel**	**Steel Wheel inside**
Max. Lateral Runout:	0.012 in (0.3 mm)	0.039 in (0.8 mm)
Max. Radial Runout:	0.012 in (0.3 mm)	0.031 in (0.5 mm)
		Steel Wheel outside
Max. Lateral Runout:		0.035 in (0.9 mm)
Max. Radial Runout:		0.016 in (0.4 mm)

Wheel arch Height (Unladen)

Equipped with:	**Front Height (Hf)**	**Rear Height (Hf)**
205/65 R15 Tires	27.56 in (700 mm)	27.17 in (690 mm)
215/55 R16 Tires	27.48 in (698 mm)	26.89 in (683 mm)
225/50 R17 Tires	27.80 in (706 mm)	27.32 in (694 mm)

W/Lug Nut Torque 72 - 87 ft-lb (10 - 12 kg-m)

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PRELIMINARY INSPECTION

- Check tires for wear and proper inflation
- Check wheel runout
- Check front wheel bearings for excessive play
- Check front suspension for excessive play
- Check steering linkage for excessive play
- Check struts for leakage and condition
- Check vehicle for proper ride height

Precautions

1. When installing rubber parts, final tightening must be carried out under unladen conditions with the tires on the ground.
2. Recheck alignment after installing removed suspension components.

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BRAKE SYSTEM

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Notes

Brake Model Code	**Front Disc Brake CLZ25VC**	**Rear Disc Brake CL9HB**
Brake Fluid	DOT 3 (Recommended)	
Master Cyl. Bore Dia.	15/16 in (23.81 mm)	
Cylinder Bore Dia.	2.252 in (57.2 mm)	1.3370 in (33.96 mm)
Brake Pad Dimensions		
Length	4.94 in (125.6 mm)	3.508 in (89.1 mm)
Width	1.81 in (46 mm)	1.555 in (39.5 mm)
Thickness	0.43 in (11.0 mm)	0.39 in (10.0 mm)
Brake Pad Wear Limit		
Min. Thickness	0.079 in (2.0 mm)	0.059 in (1.5 mm)
Brake Rotor Dimensions		
Outer Diameter	11.02 in (280.0 mm)	10.94 in (278.0 mm)
Standard Thickness	1.02 in (26.0 mm)	0.35 in (9.0 mm)
Brake Rotor Repair/Wear Limits		
Max. Runout	0.0028 in (0.07 mm)	0.0028 in (0.07 mm)
Min. Thickness	0.945 in (24.0 mm)	0.31 in (8.0 mm)
Max. Thickness Variation (at least 8 positions)		
	0.0004 in (0.01 mm)	0.0008 in (0.02 mm)
Brake Pedal Dimensions		
	Manual Trans.	**Auto Trans.**
Free Height 'H'	6.22 - 6.50 in (158 - 165 mm)	6.57 - 6.85 in (167 - 174 mm)
Depressed Height 'D'	2.965 in (75.3 mm)	3.248 in (82.5 mm)
Pedal Free Play 'A'	0.04 - 0.12 in (1.0 - 3.0 mm)	
Switch Clearance 'C'	0.0291 - 0.0772 in (0.74 - 1.96 mm)	
Brake Booster	**Model M215T**	
Output Rod Length	0.4045 - 0.4144 in (10.275 - 10.525 mm)	
Clevis Length	Approx. 5.12 in (130 mm)	
Dual Proportioning Valve		
Applied Pressure (Front)	1067 psi (75 kg/cm^2)	
Output Pressure (Rear)	739 - 796 psi (52 - 56 kg/cm^2)	
Parking Brake Control	**Lever type** No. of Notches 10 - 11 [Under force of 44 lb (20 kg)]	
ABS Wheel Sensor Clearance		
Front	0.0107 - 0.0364 in (0.273 - 0.925 mm)	
Rear	0.0252 - 0.0383 in (0.385 - 0.973 mm)	
Resistance	0.8 - 1.85 Ω	
Sensor Rotor	0.492 - 0.531 in (12.5 - 13.5 mm)	
Wheel Lug Nut	72 - 87 ft lb (10 - 12 kg-m)	

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PRECAUTIONS

1. Never reuse drained brake fluid.
2. Be careful not to splash brake fluid on painted surfaces.
3. Use clean brake fluid to clean or wash master cylinder wheel cylinders, and disc brake calipers parts.
4. Mineral oils such as gasoline and kerosene should not be used. They can cause damage to rubber parts of the hydraulic system.
5. Use flare nut wrench when removing or installing brake line fittings.
6. Always torque brake lines.
7. Always replace brake pad shims when replacing brake pads.

Warning:

Clean brake pads and shoes with a dust collector to minimize the hazard of airborne particles or other materials.

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Mark Actual to Confirm

Notes

ELECTRICAL

Wire Color Code

B = Black	BR = Brown
W = White	OR = Orange
R = Red	P = Pink
G = Green	PU = Purple
L = Blue	GY = Gray
Y = Yellow	SB = Sky Blue
LG = Light Green	CH = Dark Brown
DG = Dark Green	

When a wire color is striped, the base color is given first, followed by the stripe color. Example L/W = Blue with white stripe

Battery specification:

Type	80D26L
Capacity	12 V / 55 AH
Cold cranking current	582 A

Load test at 3 × AH for 15 seconds.

Battery charging rates:

Amps	Time
50	1 hour
25	2 hours
10	5 hours
5	10 hours

Do not charge battery over 50 ampere rate.
Do not "quick charge" a fully discharged battery.
If battery electrolyte temperature rises above 140°F, stop charging.

Starter:	M/T	A/T
Type	M0T87281 Mitsubishi Gear reduction type	M0T87181 Mitsubishi
No-load current	Less than 90 A	Less than 90 A
No-load RPM	More than 2,800 RPM	More than 2,800 RPM

Alternator:

Type	LR1100-720 Hitachi
Nominal Rating	12 V / 110 A
Regulated Output Voltage	14.1 - 14.7 V
Output current A/RPM (with 13.5 V applied)	More than 24 / 1,300 More than 67 / 1,800 More than 87 / 2,500 More than 105 / 5,000

Oil Pressure Switch:

Oil pressure PSI	Continuity
More than 10 - 20	NO
Less than 10 - 20	YES

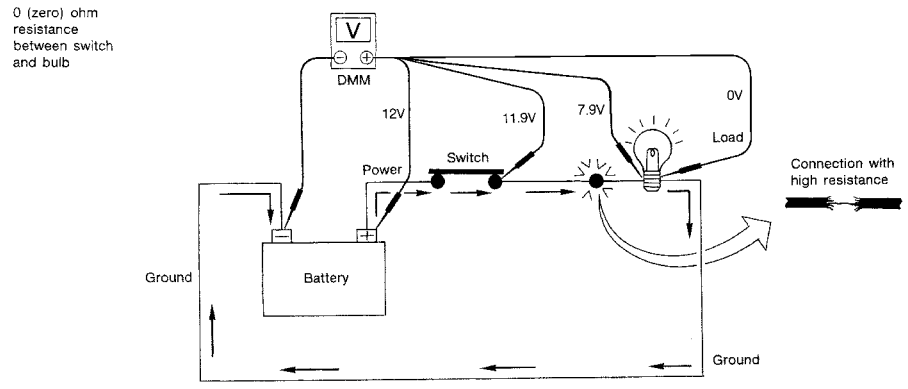
Bulb Specifications:

Item	Wattage (12V)

Headlamp High/Low	60/35 (HB3)
Fog Lamp	55 (H3)
Front Turn Signal	21
Front Parking Lamp	5
Front Side Marker Lamp	3.8
Rear Turn Signal	21
Stop/Tail Lamp	21/5
Back-up Lamp	13
Rear Side Marker Lamp	3.8
License Plate Lamp	5
Center Stop Lamp	(21 Bulb) (3.6 LED)
Interior Room Lamp	10
Map Lamp	8
Vanity Mirror Lamp	1.4
Trunk Room Lamp	3.4
Step Lamp	2.7

How to perform voltage drop test: See Illustrations

Symptom: Dim bulb or no operation



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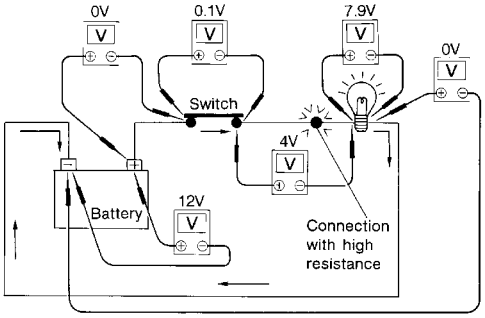

1. Connect the voltmeter as shown, starting at the battery and working your way around the circuit.
2. An unusually large voltage drop will indicate a component or wire that needs to be repaired. In the illustration, the poor connection causes a 4 volt drop.

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

AGI055

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BATTERY CONDITION

Battery Sulphation:
A battery will be completely discharged if it is left unattended for a long time and the specific gravity becomes less than 1.100. This may result in sulphation on the cell plates. To determine if a battery has been sulfated, note its voltage and current when charging. If low current and higher voltage are observed in the initial stages of charging a sulfated battery is likely. A sulfated battery may sometimes be brought back into service by means of a long slow charge, 12 hours or more.

Checking Battery Specific Gravity With Hydrometer
Hydrometer temperature correction

Battery electrolyte temp. °C (°F)	Add to specific gravity reading
71 (160)	0.032
66 (150)	0.028
60 (140)	0.024
54 (129)	0.020
49 (120)	0.016
43 (110)	0.012
38 (100)	0.008
32 (90)	0.004
27 (80)	0
21 (70)	–0.004
16 (60)	–0.008
10 (50)	–0.012
4 (39)	–0.016
–1 (30)	–0.020
–7 (20)	–0.024
–12 (10)	–0.028
–18 (0)	–0.032

Corrected specific gravity	Approximate charge condition
1.260 - 1.280	Fully charged
1.230 - 1.250	3/4 charged
1.200 - 1.220	1/2 charged
1.170 - 1.190	1/4 charged
1.140 - 1.160	Almost discharged

- Do not quick charge a fully discharged battery.
- After charging, if the specific gravity of any two cells varies more then .050, the battery should be replaced.

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BATTERY CONDITION

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10 (50)	–0.012
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RESTRAINT SYSTEM

SECTION RS

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Precautions

SUPPLEMENTAL RESTRAINT SYSTEM (SRS) “AIR BAG” AND “SEAT BELT PRE-TENSIONER”

NFRS0001

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER” used along with a seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. The SRS composition which is available to NISSAN MODEL A33 is as follows:

- For a frontal collision
  The Supplemental Restraint System consists of driver air bag module (located in the center of the steering wheel), front passenger air bag module (located on the instrument panel on passenger side), seat belt pre-tensioners, a diagnosis sensor unit, crash zone sensor, warning lamp, wiring harness and spiral cable.
- For a side collision
  The Supplemental Restraint System consists of front side air bag module (located in the outer side of front seat), satellite sensor, diagnosis sensor unit (one of components of air bags for a frontal collision), wiring harness, warning lamp (one of components of air bags for a frontal collision).

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 should be performed by an authorized NISSAN dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system.**
- **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 harness connector.**

PRECAUTION FOR SEAT BELT SERVICE

NFRS0002

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 Operation Check” for details. (RS-41)
- **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

NFRS0002S01

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.

Front Seat Belt

REMOVAL AND INSTALLATION

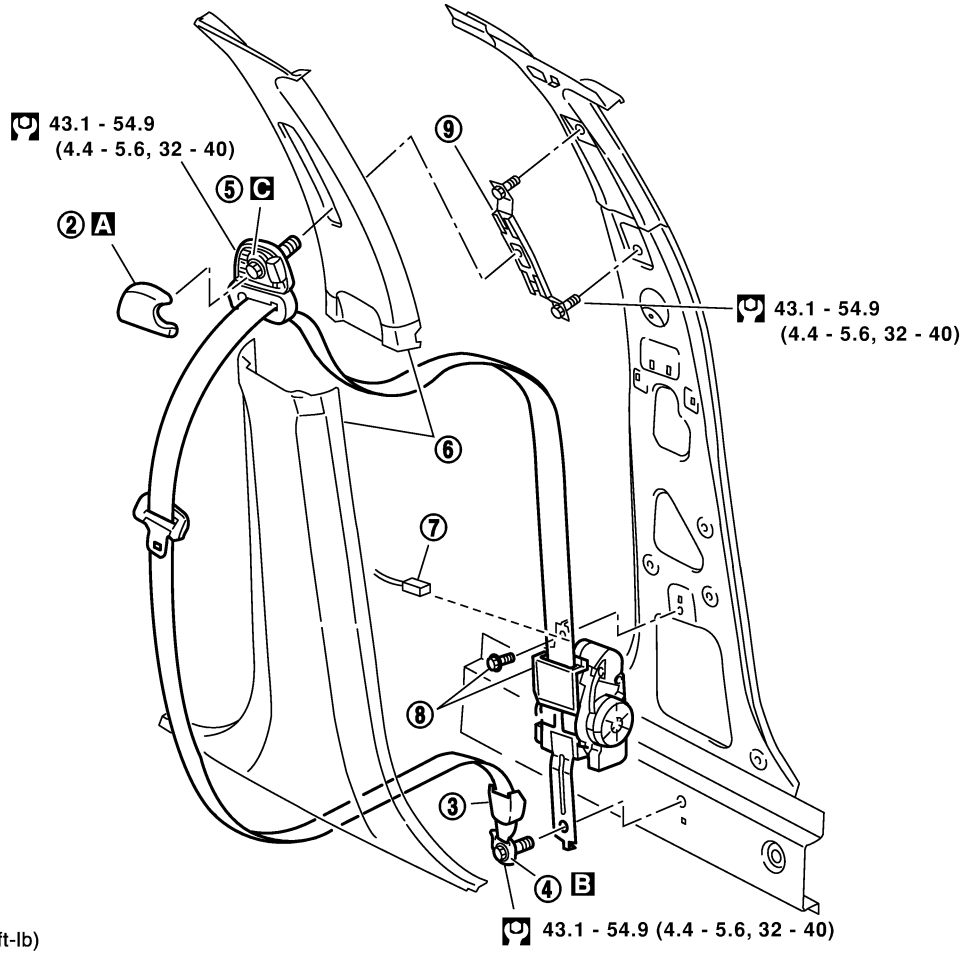
=NFRS0003

CAUTION:

- **Before servicing the SRS, turn ignition switch “OFF”, disconnect the battery ground cable and wait at least 3 minutes.**

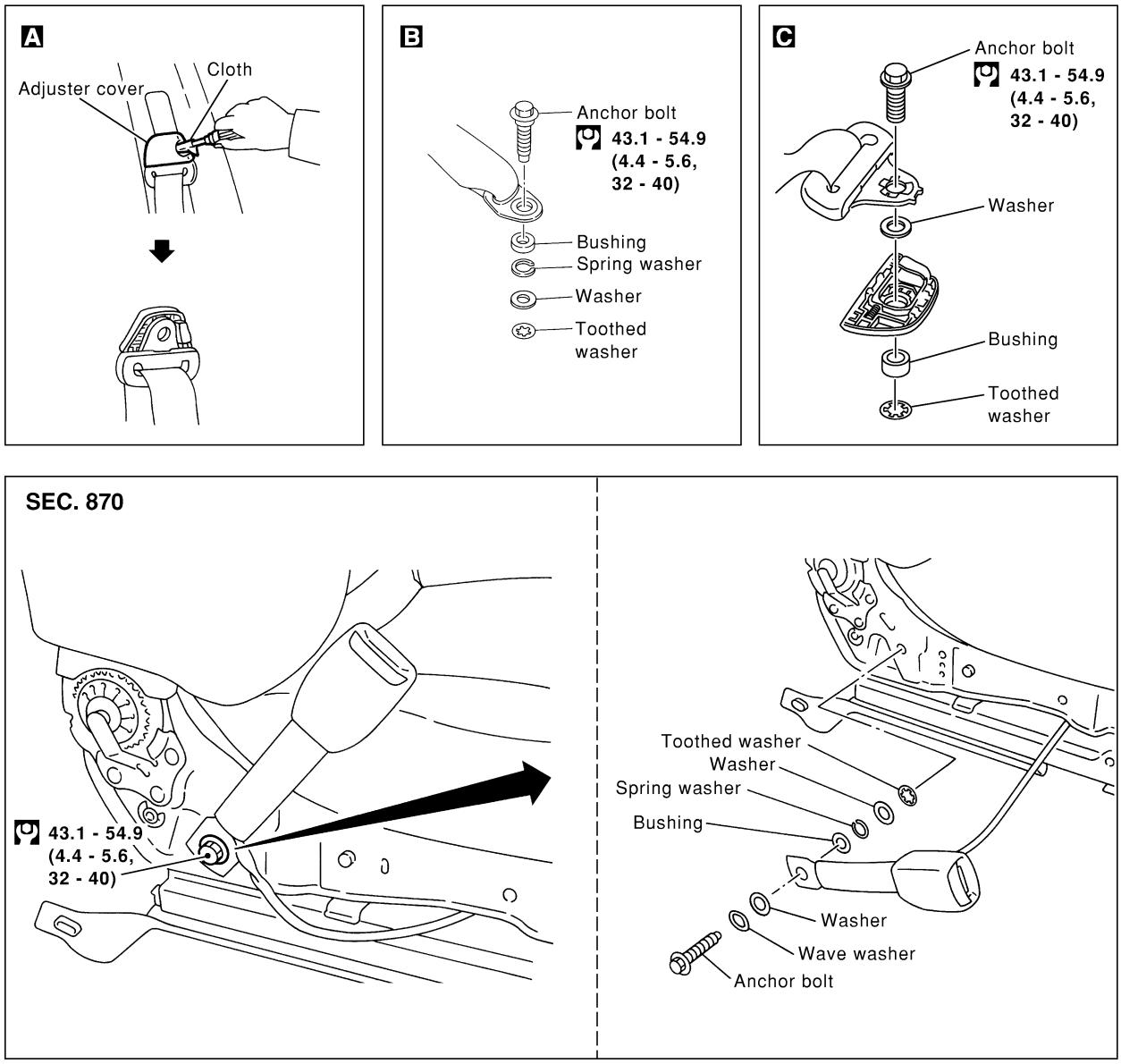
1. Slide the seat all the way forward and tilt the seatback toward the front.
2. Remove adjuster cover. A
3. Slide floor anchor cover.
4. Remove floor anchor bolt. B
5. Remove shoulder anchor bolt. C
6. Remove front and rear kicking plate, then remove center pillar upper and lower garnish. Refer to BT-34, “SIDE AND FLOOR TRIM” for details.
7. Disconnect seat belt pre-tensioner connector.
8. Remove the screw securing seat belt pre-tensioner retractor, then remove seat belt and seat belt pre-tensioner retractor.
9. Remove bolts securing seat belt adjuster, then remove seat belt adjuster.

SEC. 796• 868



: N•m (kg-m, ft-lb)

SRS977



: N•m (kg-m, ft-lb)

SRS789-A

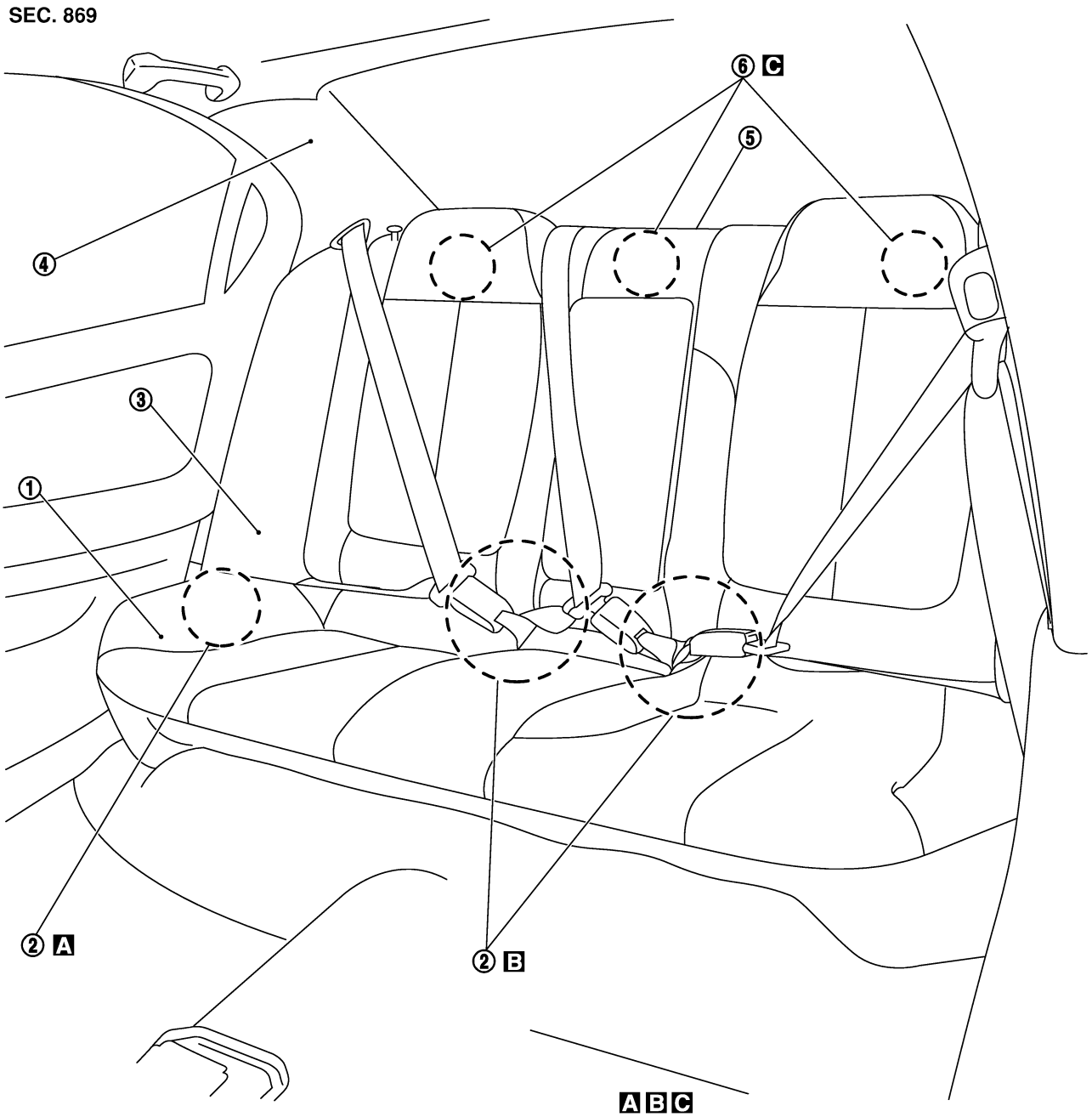
Rear Seat Belt

REMOVAL AND INSTALLATION

=NFRS0004

1. Remove rear seat cushion. Refer to BT-52, “REAR SEAT” for details.
2. Remove outer and floor anchor bolt. A B
3. Remove rear seatback. Refer to BT-52, “REAR SEAT” for details.
4. Remove rear side garnish. Refer to BT-34, “SIDE AND FLOOR TRIM” for details.
5. Remove rear parcel shelf finisher. Refer to BT-34, “SIDE AND FLOOR TRIM” for details.
6. Remove bolts securing rear seat belt retractor, then remove seat belt and seat belt retractor. C

SEC. 869



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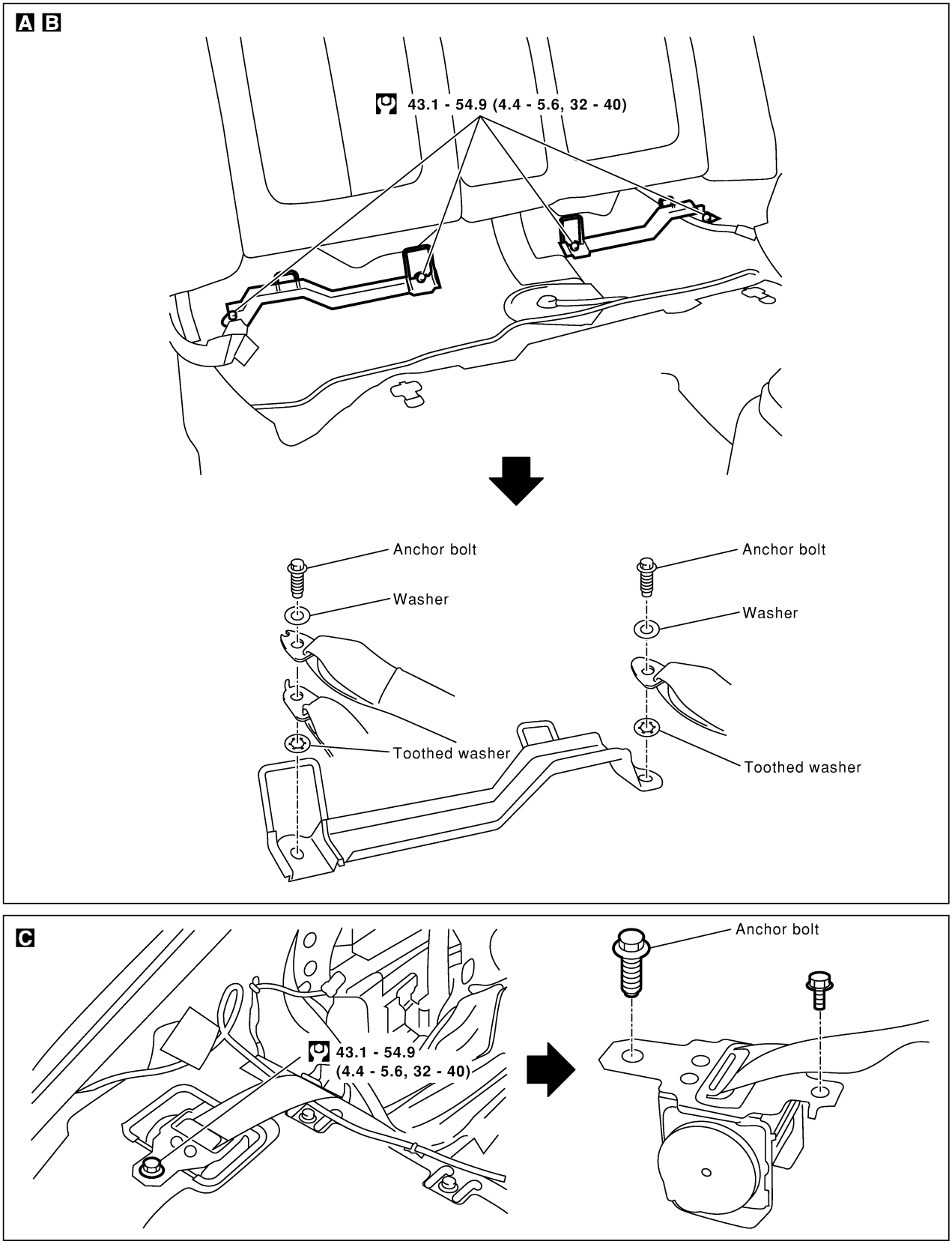

A B
43.1 - 54.9 (4.4 - 5.6, 32 - 40)
Anchor bolt
Washer
Toothed washer
Anchor bolt
Washer
Toothed washer
C
43.1 - 54.9
(4.4 - 5.6, 32 - 40)
Anchor bolt
: N•m (kg-m, ft-lb)

SRS879

Seat Belt Inspection

=NFRS0052

AFTER A COLLISION

NFRS0052S01

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.

PRELIMINARY CHECKS

NFRS0052S02

1. Check the seat belt warning lamp/chime for proper operation as follows:

a. Switch ignition ON. The seat belt warning lamp should illuminate. Also, the seat belt warning chime should sound for about seven seconds.

b. Fasten driver's seat belt. The seat belt warning lamp should go out and the chime (if sounding) should stop.

2. If the air bag warning lamp is blinking, conduct self-diagnosis using CONSULT-II, and air bag warning lamp. Refer to "SRS Operation Check", RS-41.
3. Check that the seat belt retractor, seat belt anchor and buckle bolts are securely attached.
4. Check the shoulder seat belt guide and shoulder belt height adjuster for front seats. Ensure guide swivels freely and that belt lays flat and does not bind in guide. Ensure height adjuster operates properly and holds securely.
5. Check retractor operation:

a. Fully extend the seat belt webbing and check for twists, tears or other damage.

b. Allow the seat belt to retract. Ensure that belt returns smoothly and completely into the retractor. If the seat belt does not returns smoothly, wipe the inside of the loops with a clean paper cloth etc. because dirt built up in the loops of the upper anchors can cause the seat belts to retractor slowly.

c. Fasten the seat belt. Check the seat belt returns smoothly and completely to the retractor. If the belt does not return smoothly, the cause may be an accumulation of dust or dirt. Use the "SEAT BELT TAPE SET" and perform the following steps.
Inspect the front seat belt though-anchor

i. Pull the seat belt out to a length of 500 mm (19.69 in) over more.

ii. Use a clip or other device to the fix the seat belt at the center pillar belt opening.

iii. Pass a thin wire though the though-anchor belt opening. Hold both ends of the wire and pull taut while moving it up and down several times along the belt opening surface to move matter stuck there.

iv. Any dirt that can not be removed with the wire can be removed by cleaning the opening with a clean cloth.

v. Apply tape at the point where the belt contacts the though-anchor belt opening.

NOTE:

Apply the tape so that there is no looseness or wrinkling.

vi. Remove the clip fixing the seat belt and check that the belt returns smoothly.

6. Repeat steps above as necessary to check the other seat belts.

SEAT BELT RETRACTOR ON-VEHICLE CHECK

NFRS0052S03

Emergency Locking Retractors (ELR) and Automatic Locking Retractors (ALR)

NFRS0052S0301

NOTE:

All seat belt retractors are of the Emergency Locking Retractors (ELR) type. In an emergency (sudden stop) the retractor will lock and prevent the belt from extending any further. All 3-point type seat belt retractors except the driver's seat belt also have an Automatic Locking Retractors (ALR) mode. The ALR mode (also called child restraint mode) is used when installing child seats. The ALR mode is activated when the seat belt is fully extended. When the belt is then retracted partially, the ALR mode automatically locks the seat belt in a specific position so the belt cannot be extended any further. To cancel the ALR mode, allow the seat belt to fully wind back into the retractor.

Check the seat belt retractors using the following test(s) to determine if a retractor assembly is operating properly.

ELR Function Stationary Check

NFRS0052S0302

Grasp the shoulder belt and pull forward quickly. The retractor should lock and prevent the belt from extending further.

ALR Function Stationary Check

NFRS0052S0303

1. Pull out entire length of seat belt from retractor until a click is heard.
2. Retract the belt partially. A clicking noise should be heard as the belt retracts indicating that the retractor is in the Automatic Locking Retractors (ALR) mode.
3. Grasp the seat belt and try to pull out the retractor. The belt must lock and not extend any further. If NG, replace the retractor assembly.
4. Allow the entire length of the belt to retract to cancel the automatic locking mode.

ELR Function Moving Check

NFRS0052S0304

WARNING:

Perform the following test in a safe, open area clear of other vehicles and obstructions (for example, a large, empty parking lot). Road surface must be paved and dry. DO NOT perform the following test on wet or gravel roads or on public streets and highways. This could result in an accident and serious personal injury. The driver and passenger must be prepared to brace themselves in the event the retractor does not lock.

1. Fasten driver's seat belt. Buckle a passenger into the seat for the belt that is to be tested.
2. Proceed to the designated safe area.
3. Drive the vehicle at approximately 16 km/h (10 MPH). Notify any passengers of a pending sudden stop and the driver and passenger must be prepared to brace themselves in the event the retractor does not lock, apply brakes firmly and make a very hard stop.

During stop, seat belts should lock and not be extended. If the seat belt retractor assembly does not lock, perform the retractor off-vehicle check.

SEAT BELT RETRACTOR OFF-VEHICLE CHECK

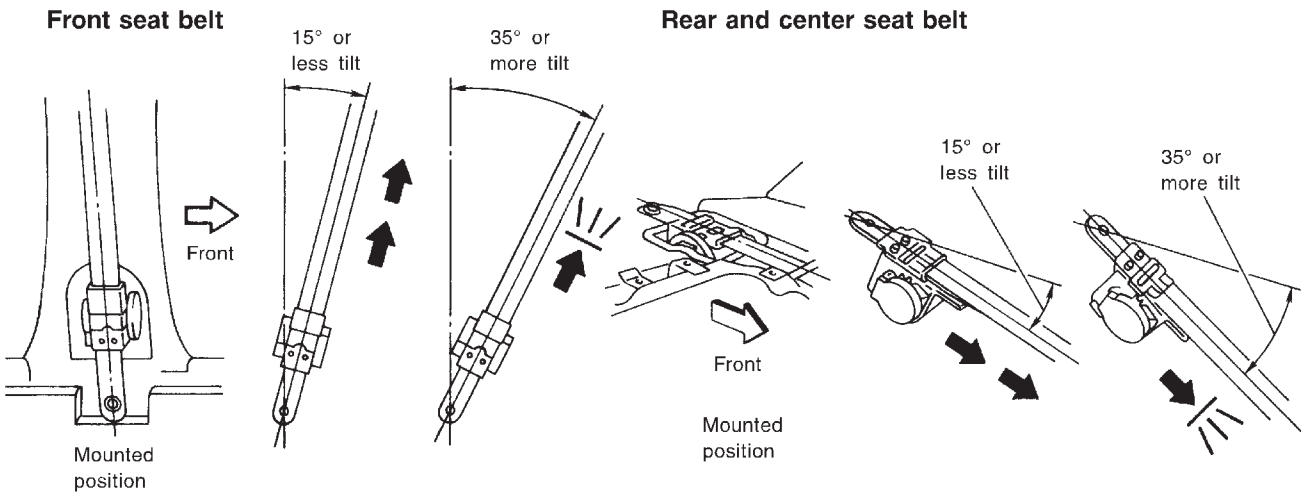
NFRS0052S04

1. Remove the seat belt retractor assembly.
2. Slowly pull out belt while tilting the retractor assembly forward from the mounted position without twisting the retractor assembly as shown in the illustration.

15 degrees or less tilt: Belt can be pulled out.

35 degrees or more tilt: Belt locks and cannot be pulled out.

Seat Belt Inspection (Cont'd)



Tilt the seat belt retractor forward from the mounted position without twisting the retractor.

SRS404-A

If NG, replace the retractor assembly.

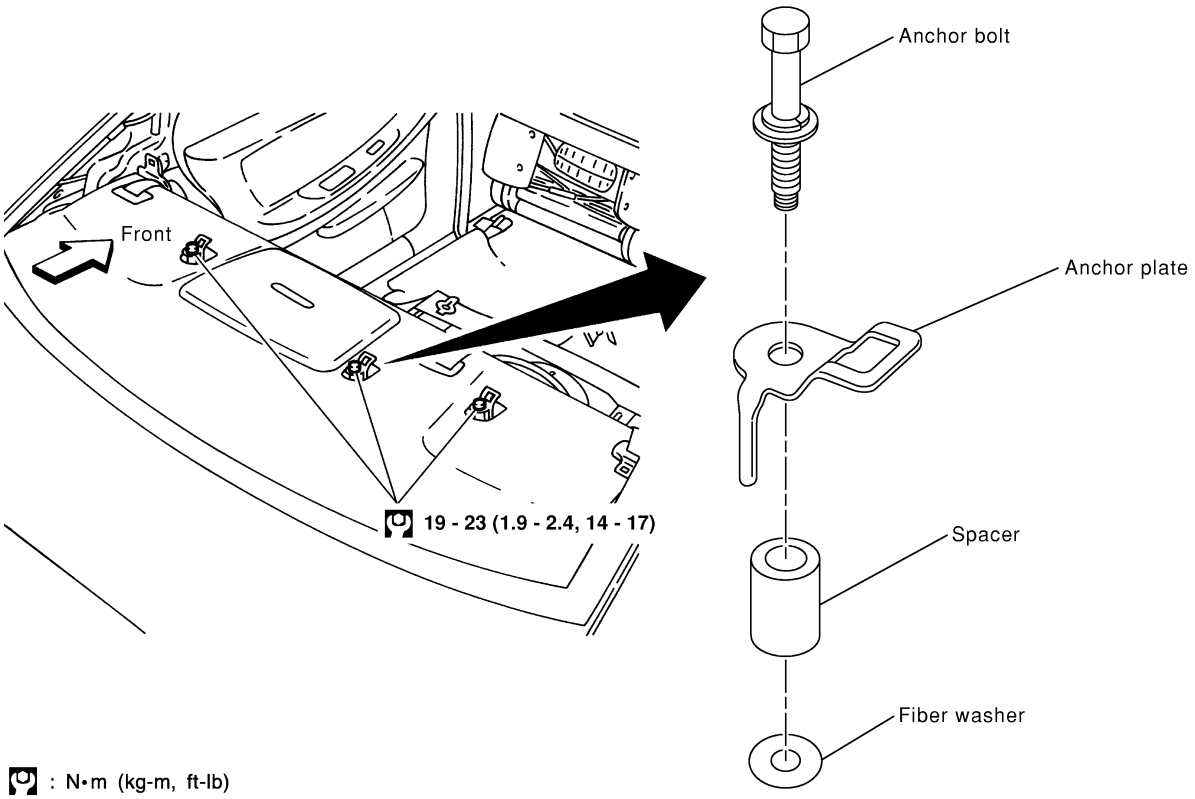
Tether Anchor Plate

REMOVAL AND INSTALLATION

=NFRS0039

CAUTION:

Replace anchor bolts if they are deformed or worn out.



1. Remove tether anchor plate cover. Refer to BT-34, “SIDE AND FLOOR TRIM” for details.
2. Remove tether anchor plate.

NOTE:

- **To install, reverse the removal procedure sequence.**

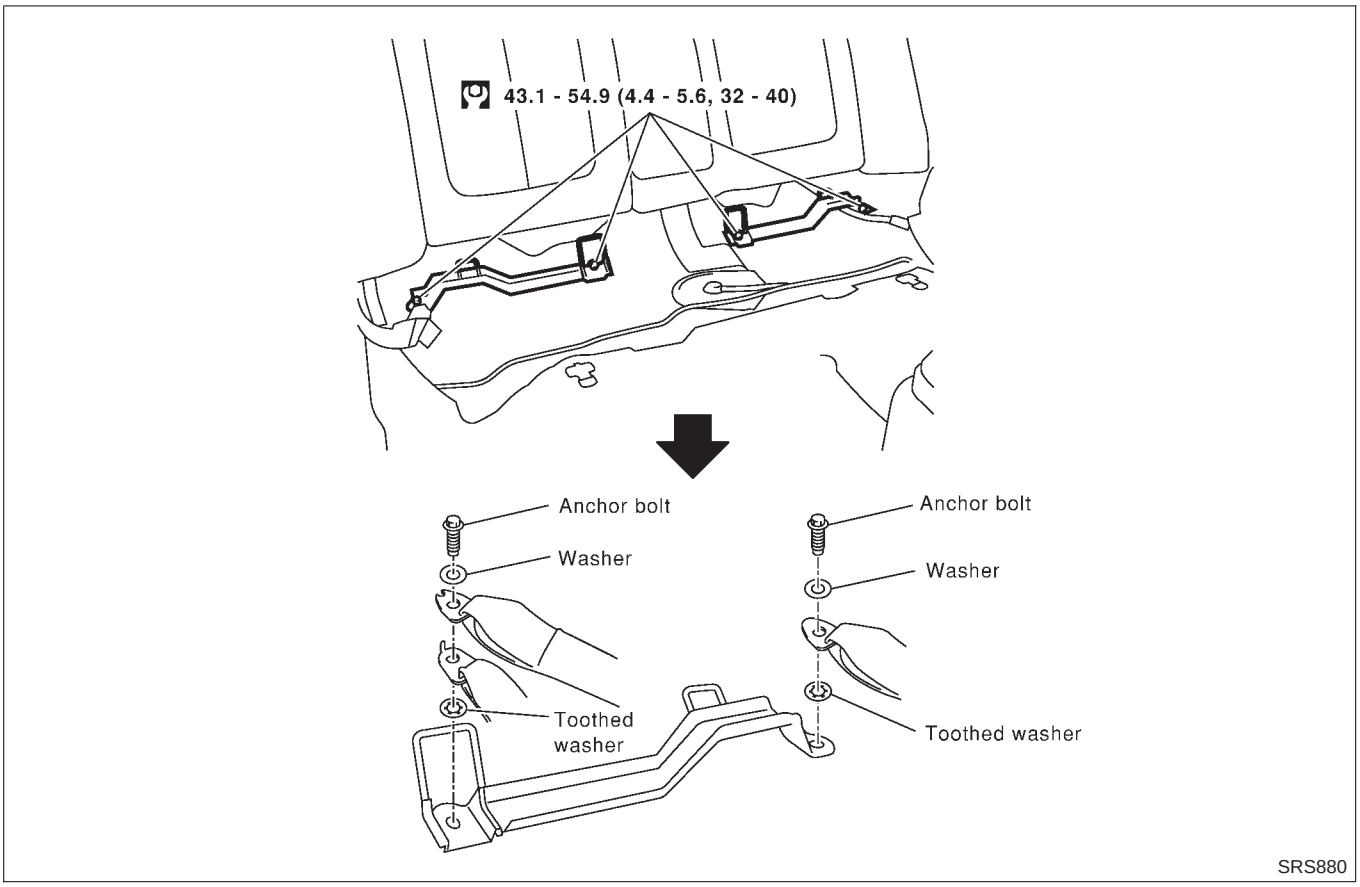
Isofix Child Restraint Anchorage

REMOVAL AND INSTALLATION

=NFRS0053

CAUTION:

Replace anchor bolt if they are deformed or worn out.



1. Remove rear seat cushion. Refer to BT-52, “REAR SEAT” for details.
2. Remove anchor bolts.

NOTE:

- **To install, reverse the removal procedure sequence.**

Precautions

SUPPLEMENTAL RESTRAINT SYSTEM (SRS) “AIR BAG” AND “SEAT BELT PRE-TENSIONER”

NFRS0006

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER” used along with a seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. The SRS composition which is available to NISSAN MODEL A33 is as follows:

- For a frontal collision
  The Supplemental Restraint System consists of driver air bag module (located in the center of the steering wheel), front passenger air bag module (located on the instrument panel on passenger side), seat belt pre-tensioners, a diagnosis sensor unit, crush zone sensor, warning lamp, wiring harness and spiral cable.
- For a side collision
  The Supplemental Restraint System consists of front side air bag module (located in the outer side of front seat), satellite sensor, diagnosis sensor unit (one of components of air bags for a frontal collision), wiring harness, warning lamp (one of components of air bags for a frontal collision).

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 should be performed by an authorized NISSAN dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system.**
- **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 harness connector.**

PRECAUTIONS FOR SRS “AIR BAG” AND “SEAT BELT PRE-TENSIONER” SERVICE

NFRS0007

- 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 the battery ground cable and wait at least 3 minutes.
  For approximately 3 minutes after the cables are 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 passenger air bag modules with the pad side facing upward and place 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 DIAGRAMS AND TROUBLE DIAGNOSIS

NFRS0008

When you read wiring diagrams, refer to the following:

- GI-11, “HOW TO READ WIRING DIAGRAMS”
- EL-10, “POWER SUPPLY ROUTING” for power distribution circuit

When you perform trouble diagnosis, refer to the following:

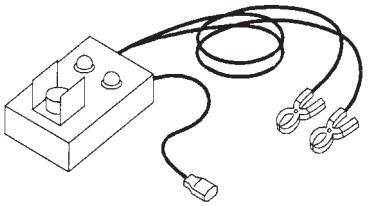
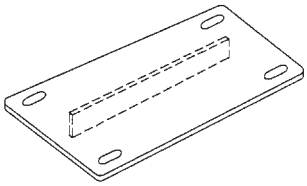
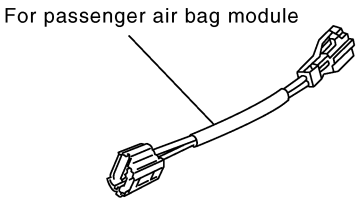
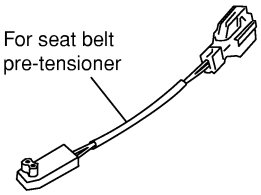
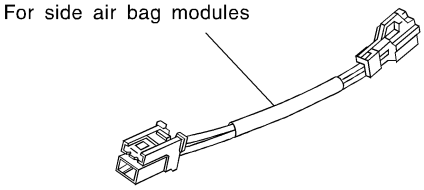
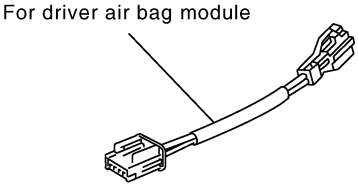
- GI-35, “HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES”
- GI-24, “HOW TO PERFORM EFFICIENT DIAGNOSIS FOR AN ELECTRICAL INCIDENT”

Preparation

SPECIAL SERVICE TOOLS

=NFRS0009

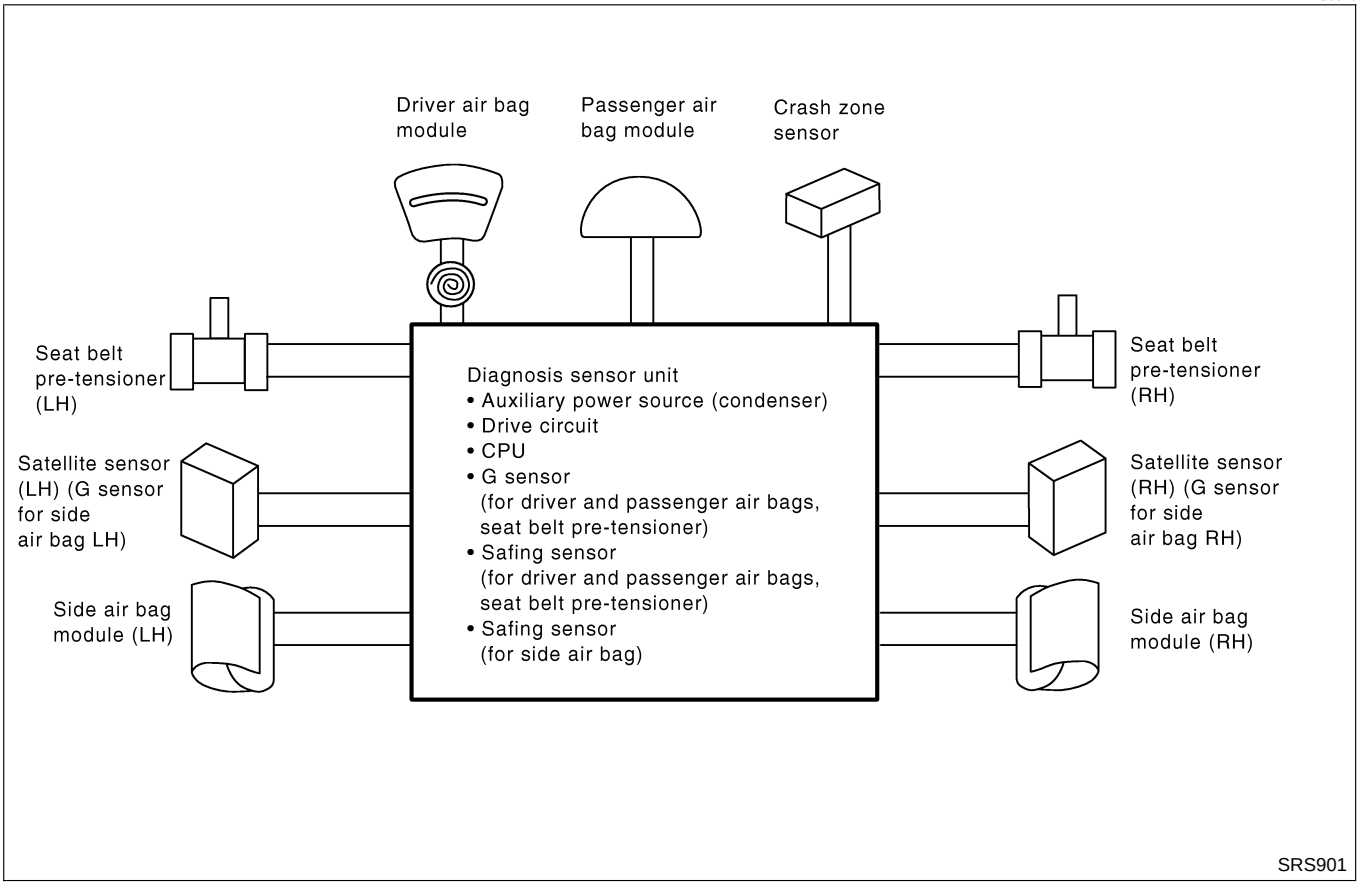
The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
KV99106400 (J38381) Deployment tool	Disposing of air bag module  NT357
KV99105300 (J41246) Air bag module bracket	Anchoring air bag module  NT354
(J38381-65) Deployment tool adapter for passenger air bag	 NT833
KV99109800 (J38381-75) Deployment tool adapters for seat belt pre-tensioner	 SRS987
KV99109000 (J44230) Deployment tool adapters for side air bag	 NT831
(J38381-70) Deployment tool adapter for driver air bag module	 NT834

*: Special tool or commercial equivalent

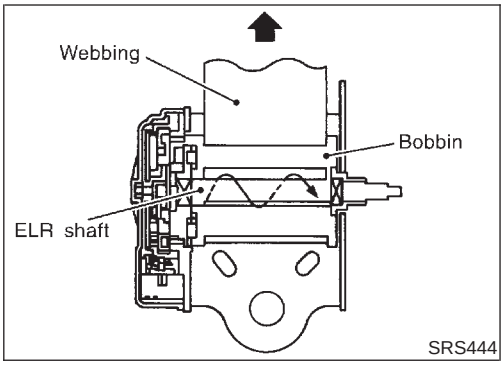
SRS Configuration

=NFRS0010



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 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	○	—	—
Passenger air bag module	○	—	—
Seat belt pre-tensioner (LH)	○	—	—
Seat belt pre-tensioner (RH)	○	—	—
Side air bag module (LH)	—	○	—
Side air bag module (RH)	—	—	○



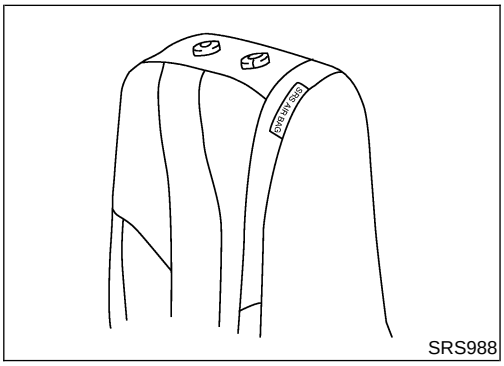
Seat Belt Pre-tensioner with Load Limiter

=NFRS0034

The seat belt pre-tensioner system with load limiter is installed to 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.



Side Air Bag

NFRS0035

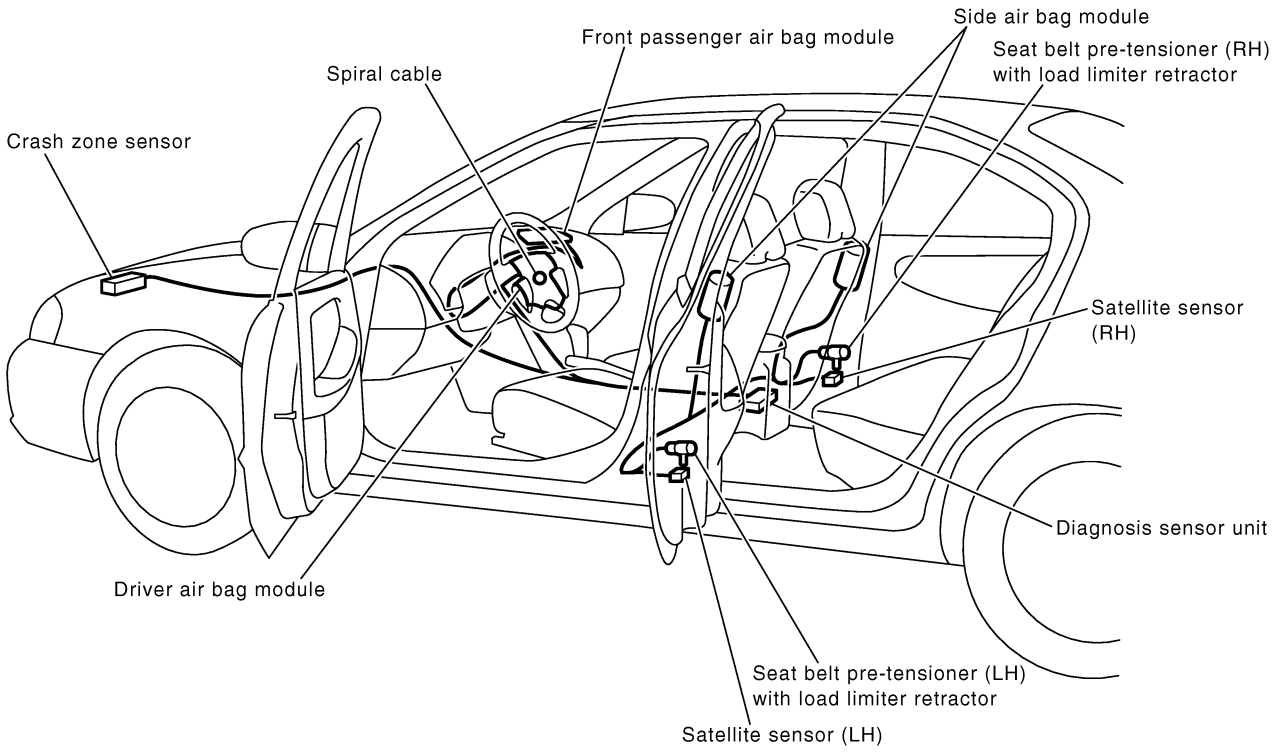
Front side air bag is built-in type.

The front seat backs with built-in type side air bag have the labels shown in figure at left.

SRS Component Parts Location

NFRS0011

SEC. 240•251•253•489•680•868•870



SRS902-B

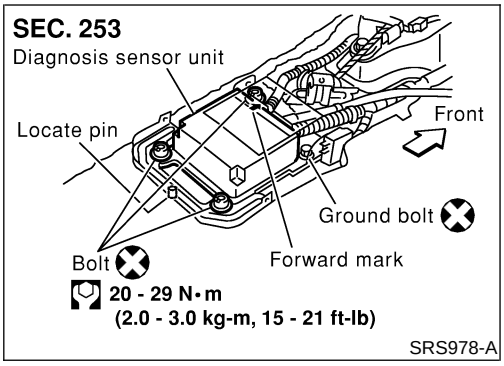
Diagnosis Sensor Unit

REMOVAL AND INSTALLATION

NFRS0013

CAUTION:

- **Before servicing SRS, turn the ignition switch off, disconnect the battery ground cable and wait at least 3 minutes.**
- **Do not use old bolts after removal; replace with new ones.**
- **Check diagnosis sensor unit for proper installation.**
- **Check diagnosis sensor unit to ensure it is free of deformities, dents, cracks or rust. If they show any visible signs of damage, replace them with new ones.**
- **Check diagnosis sensor unit brackets to ensure they are free of deformities or rust.**
- **Replace diagnosis sensor unit if it has been dropped or sustained an impact.**
- **After replacement of diagnosis sensor unit, perform self-diagnosis for SRS. Refer to “SRS Operation Check” for details. (RS-41)**



1. Disconnect driver, passenger and side air bag module connectors. Also, disconnect seat belt pre-tensioner connector.
2. Remove console box. Refer to BT-29, " INSTRUMENT PANEL ASSEMBLY".
3. Disconnect diagnosis sensor unit connector.
4. Remove ground bolt and also remove bolts from diagnosis sensor unit.
   Then remove the diagnosis sensor unit.

NOTE:
- To install, reverse the removal procedure sequence.

Seat Belt Pre-tensioner

REMOVAL AND INSTALLATION

NFRS0036

CAUTION:
- **Before servicing SRS, turn the ignition switch off, disconnect the battery ground cable and wait at least 3 minutes.**
- **Check seat belt pre-tensioner with load limiter for proper installation.**
- **After replacement of seat belt pre-tensioner, check SRS function and perform self-diagnosis for SRS.**
  Refer to "SRS Operation Check" for details. (RS-41)
- **Do not attempt to disassemble seat belt pre-tensioner with load limiter.**
- **Replace seat belt pre-tensioner if it has been dropped or sustained an impact.**
- **Do not expose seat belt pre-tensioner to temperatures exceeding 80°C (176°F).**

For removal of seat belt pre-tensioner, refer to "Front Seat Belt" for details. (RS-4)

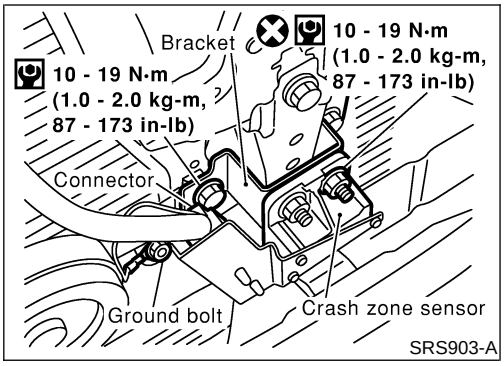
NOTE:
- **To install, reverse the removal procedure sequence.**

Crash Zone Sensor

REMOVAL AND INSTALLATION

NFRS0054

CAUTION:
- **Before servicing SRS, turn the ignition switch off, disconnect the battery ground cable and wait at least 3 minutes.**
- **Do not use old bolts coated with bonding agent after removal; replace with new ones.**
- **Check crash zone sensor for proper installation.**
- **Check crash zone sensor to ensure they are free of deformities, dents, cracks or rust. If it shows any visible signs of damage, replace it with new one.**
- **After replacement of crash zone sensor, check SRS function and perform self-diagnosis for SRS. Refer to "SRS Operation Check" for details. (RS-41)**
- **Do not attempt to disassemble crash zone sensor.**
- **Replace crash zone sensor if it has been dropped or sustained an impact.**



1. Disconnect crash zone connector.
2. Remove ground bolt and remove nuts from crash zone sensor. Then remove the crash zone sensor from bracket.

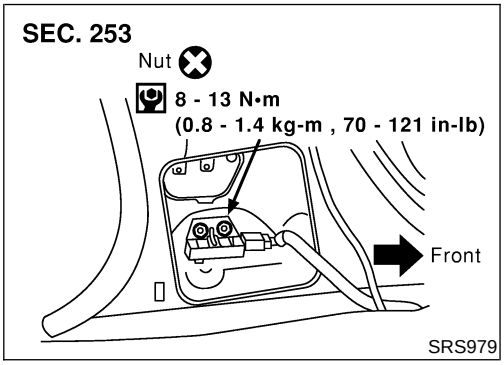
NOTE:
- To install, reverse the removal procedure sequence.

Satellite Sensor

REMOVAL AND INSTALLATION

NFRS0014

CAUTION:
- **Before servicing SRS, turn the ignition switch off, disconnect the battery ground cable and wait at least 3 minutes.**
- **Do not use old bolts coated with bonding agent after removal; replace with new ones.**
- **Check satellite sensor for proper installation.**
- **Check satellite sensor to ensure they are free of deformities, dents, cracks or rust. If it shows any visible signs of damage, replace it with new one.**
- **After replacement of satellite sensor, check SRS function and perform self-diagnosis for SRS. Refer to "SRS Operation Check" for details. (RS-41)**
- **Do not attempt to disassemble satellite sensor.**
- **Replace satellite sensor if it has been dropped or sustained an impact.**



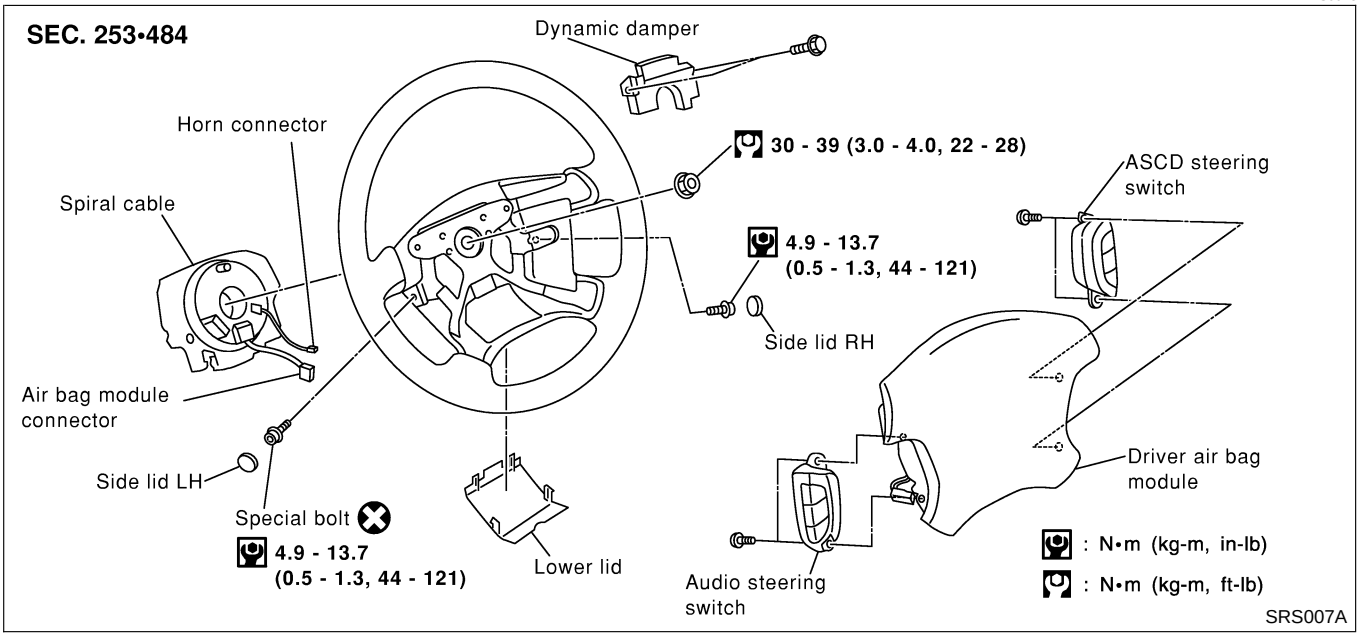
1. Remove seat belt pre-tensioner. Refer to "Front Seat Belt" for details. (RS-4)
2. Disconnect satellite sensor connector.
3. Remove bolt and nuts from satellite sensor unit. Then remove the satellite sensor.

NOTE:
- To install, reverse the removal procedure sequence.

Driver Air Bag Module and Spiral Cable

REMOVAL AND INSTALLATION

NFRS0015

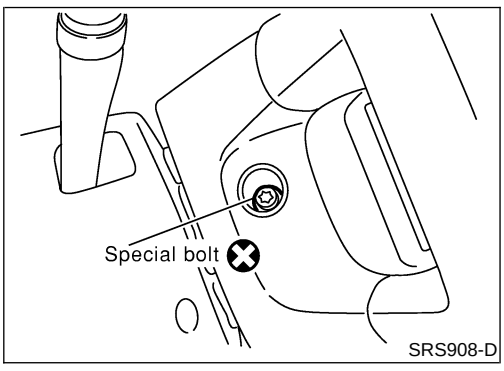


REMOVAL

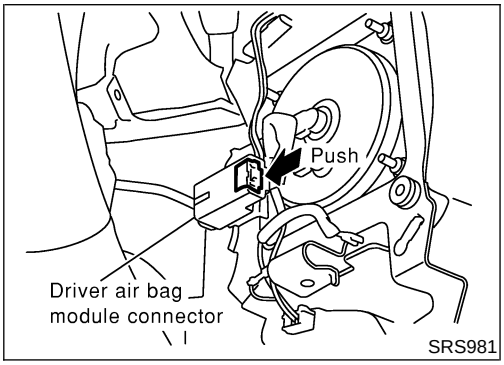
NFRS0016

CAUTION:

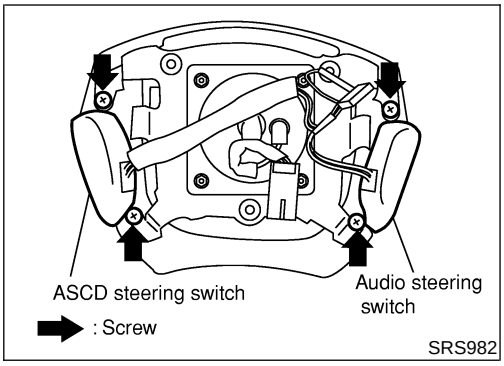
- **Before servicing SRS, turn the ignition switch off, disconnect the battery ground cable and wait at least 3 minutes.**
- **Always work from the side of air bag module.**



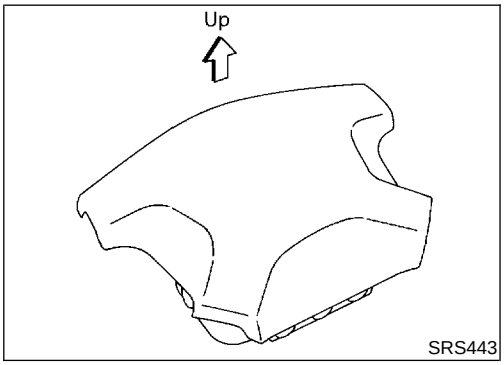
1. Remove side lids. Using the TAMPER RESISTANT TORX (Size T30), remove left and right special bolts.



2. Disconnect air bag module connector. Air bag module can then be removed.

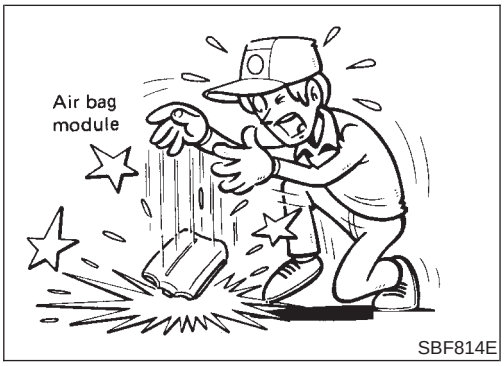


3. Remove steering switches from driver air bag module.

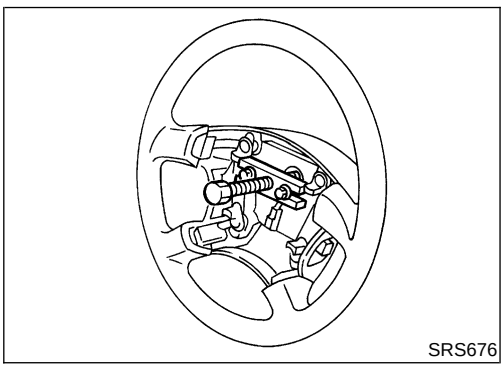


CAUTION:

- **Always place air bag module with pad side facing upward.**
- **Do not attempt to disassemble air bag module.**
- **Do not use old bolts after removal; replace with new ones.**
- **Do not insert any foreign objects (screwdriver, etc.) into air bag module connector.**



- **Replace 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 air bag module.**

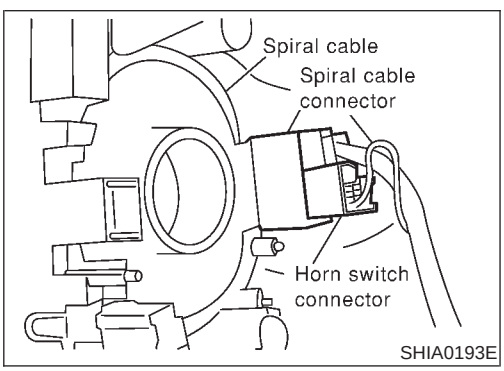


4. Set steering wheel in the neutral position.
5. Disconnect horn connector and remove nuts.
6. Remove dynamic damper. Then using steering wheel puller, remove steering wheel. Be careful not to over-tighten puller bolt on steering wheel.

CAUTION:

- **Do not tap or bump the steering wheel.**

7. Remove steering column cover.

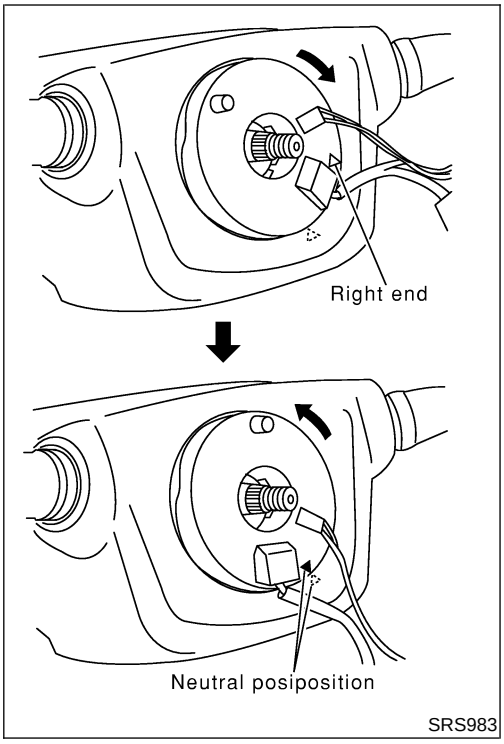


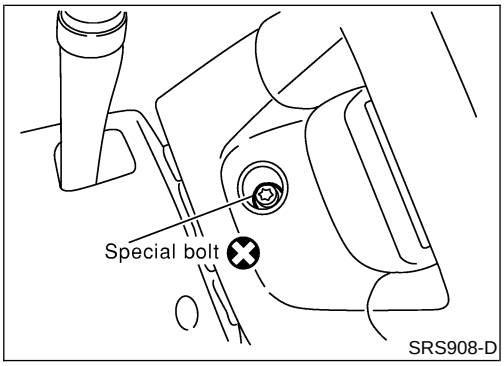
8. Remove the spiral cable fixing screws, and while pushing the upper plastic tab, remove the spiral cable.

CAUTION:

- **Do not attempt to disassemble spiral cable.**
- **Do not apply lubricant to the spiral cable.**

9. Remove the wiper washer switch and lighting switch from the spiral cable.





INSTALLATION

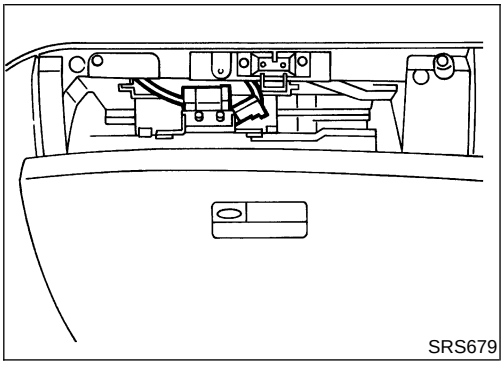
NFRS0017

1. Set the front wheels in the straight-ahead position.
2. Make sure that the spiral cable is in the neutral position.
   The neutral position is detected by turning left about 2.5 revolutions from the right end position. Align the two marks (⧗).

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 to the left about 2.5 turns from the right end position.**

3. Connect spiral cable connector and tighten with screws. Install steering column cover.
4. Install steering wheel, aligning with spiral cable pin guides, and pull spiral cable through.
5. Connect horn connector and engage spiral cable with pawls in steering wheel. Move air bag module connector away from steering wheel lower lid opening.
6. Tighten nut.
   : 30 - 39 N·m (3.0 - 4.0 kg-m, 22 - 28 ft-lb)
7. Install dynamic damper.
8. Position air bag module and tighten with new special bolts.
9. Connect air bag module connector.
10. Install steering switches and lids.
11. Conduct self-diagnosis to ensure entire SRS operates properly. (Use CONSULT-II or warning lamp check.)
    Before performing self-diagnosis, connect both battery cables.
12. Turn steering wheel to the left end and then to the right end fully to make sure that spiral cable is set in the neutral position.
    If "AIR BAG" warning lamp blinks or stays ON (at the user mode), it shows the spiral cable may be snapped due to its improper position. Perform self-diagnosis again (use CONSULT-II or warning lamp). If a malfunction is detected, replace the spiral cable with a new one.
13. Perform self-diagnosis again to check that no malfunction is detected.



Front Passenger Air Bag Module

REMOVAL

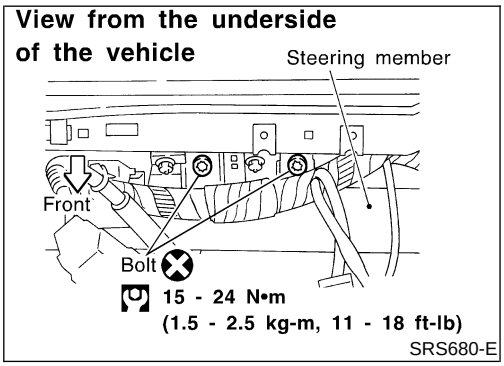
NFRS0018

CAUTION:

- **Before servicing SRS, turn the ignition switch off, disconnect the battery ground cable and wait for at least 3 minutes.**
- **Always work from the side of or under air bag module.**

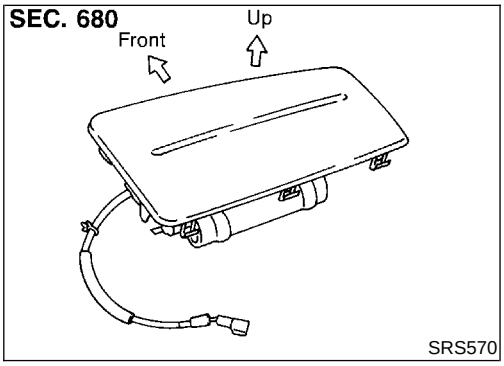
1. Open the glove box lid.
2. Open the connector cover.

3. Disconnect front passenger air bag module connector from air bag harness connector.



4. Remove glove box assembly. Refer to BT-29, "INSTRUMENT PANEL ASSEMBLY" for details.
5. Remove the bolts from front passenger air bag module. Take out the air bag module from the instrument panel.

- The air bag module is heavy and should be supported using both hands during removal.



CAUTION:

- **Always place air bag module with pad side facing upward.**
- **Do not attempt to disassemble air bag module.**
- **Do not use old bolts after removal; replace with new ones.**
- **Do not insert any foreign objects (screwdriver, etc.) into air bag module connector.**

- **Replace 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 air bag module.**
- **After air bag inflates, the front instrument panel assembly should be replaced if damaged.**

INSTALLATION

NFRS0019

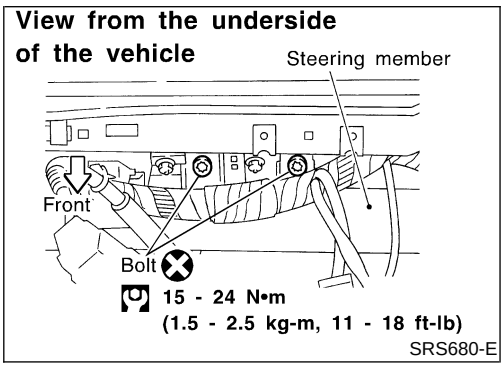
CAUTION:

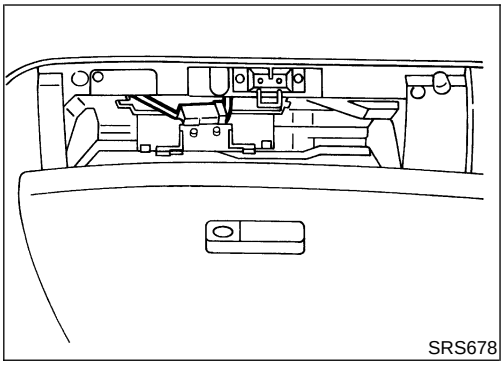
- **Always work from the side of or under air bag module.**

1. Install front passenger air bag module on steering member.

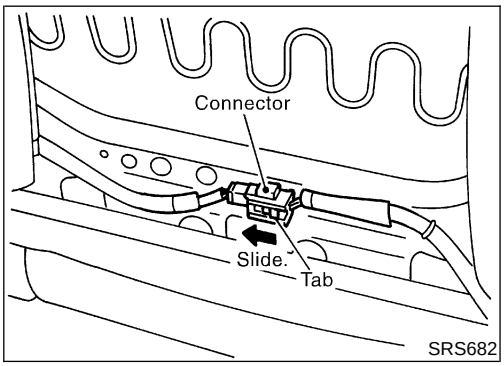
- Ensure harness is not caught between rear of air bag module and steering member.

2. Install glove box assembly. (Glove box lid is open.)




SRS678

3. Connect air bag module connector to air bag harness connector.
4. Close the connector cover.
5. Close the glove box lid.
6. Connect the battery ground cable.
7. Conduct self-diagnosis to ensure entire SRS operates properly. (Use CONSULT-II or warning lamp check.)



SRS682

Side Air Bag Module

REMOVAL

NFRS0020

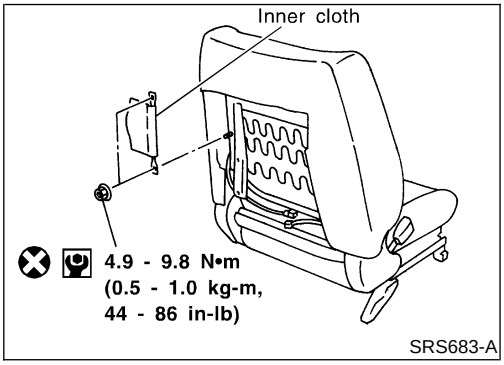
CAUTION:

- **Before servicing SRS, turn the ignition switch OFF, disconnect the battery ground cable and wait at least 3 minutes.**
- **Always work from the rear of the air bag module.**

1. Remove seat back board.

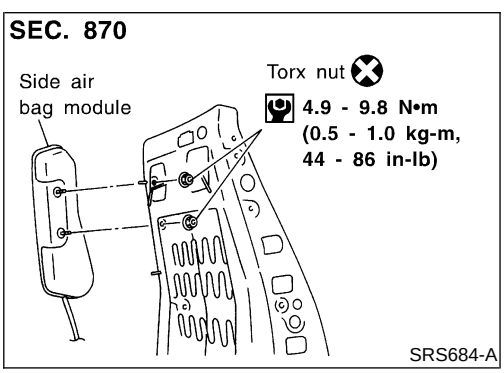
- **When using a clip removal tool to remove the seat back board, take care not to damage the harness for air bag.**

2. Disconnect side air bag module connector by sliding tab.



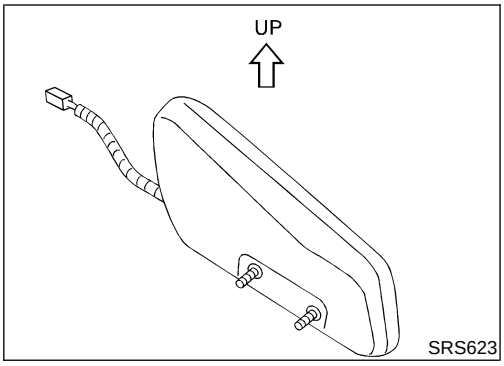
SRS683-A

3. Pull up the seat back trim.
4. Remove the nuts securing the inner cloth with seat back frame. Then pull up the inner cloth.
5. Remove the seat back trim. Refer to BT-48, "Front Seat" for detail.



SRS684-A

6. Remove the torx nuts coated with bonding agent from the side air bag module.
7. Remove side air bag connector. Side air bag module can then be removed.



CAUTION:

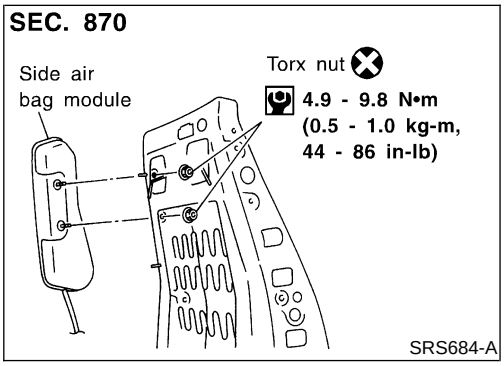
- **Always place the air bag module standing with the stud bolt side setting bottom.**
- **Do not attempt to disassemble air bag module.**
- **The torx nuts are coated with bonding agent. Do not use old nuts after removal; replace with new coated nuts.**
- **Do not insert any foreign objects (screwdriver, etc.) into air bag module connector.**

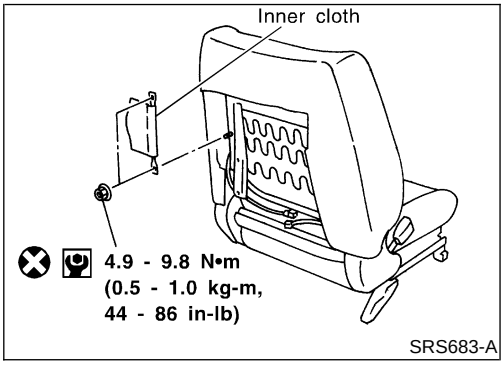
- **Replace air bag module if it has been dropped or sustained an impact.**
- **Do not expose the air bag module to temperatures exceeding 90°C (194°F).**
- **Do not allow oil, grease or water to come in contact with the air bag module.**
- **After air bag inflates, all parts of front seat back (including front seat back frame) should be replaced.**

INSTALLATION

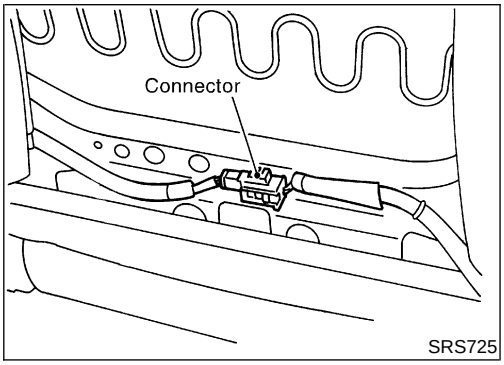
NFRS0021

1. Install side air bag module on seat back frame with new torx nuts coated with bonding agent.
2. Install side air bag connector.





3. Install the seat back trim. Refer to BT-48, "Front Seat".
4. Secure the inner cloth which covers the side air bag module with nuts.

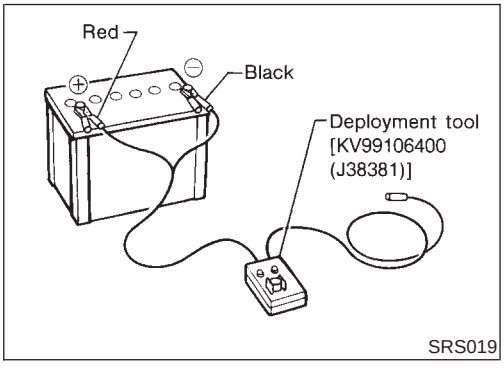


5. Connect side air bag module connector.
6. Install seat back board with new clips.
7. Connect both battery cables.
8. Go to "SRS Operation Check", RS-41 and perform self-diagnosis to ensure entire SRS operates properly. (Use CONSULT-II or air bag warning lamp.)

Disposal of Air Bag Module and Seat Belt Pre-tensioner

NFRS0022

- 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 in “DISPOSING OF AIR BAG MODULE AND SEAT BELT PRE-TENSIONER” (RS-31).
- When deploying the air bag module and seat belt pre-tensioner, always use the Special Service Tool; Deployment tool KV99106400 (J38381).
- 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 move 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

NFRS0022S01

Connecting to Battery

NFRS0022S0101

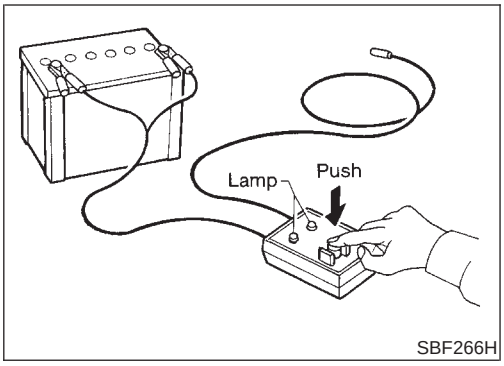
CAUTION:

The battery must show voltage of 9.6V 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.



SBF266H

Deployment Tool Check

NFRS0022S0102

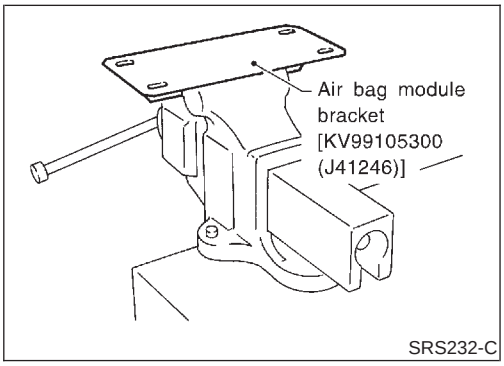
Press the deployment tool switch to the "ON" position. The left side lamp in the tool, marked "air bag connector voltage" should illuminate. If it does not illuminate, replace the tool.

Air Bag Deployment Tool Lamp Illumination Chart (Battery connected)

NFRS0022S0103

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.



SRS232-C

DEPLOYMENT PROCEDURES FOR AIR BAG MODULE (OUTSIDE OF VEHICLE)

NFRS0022S02

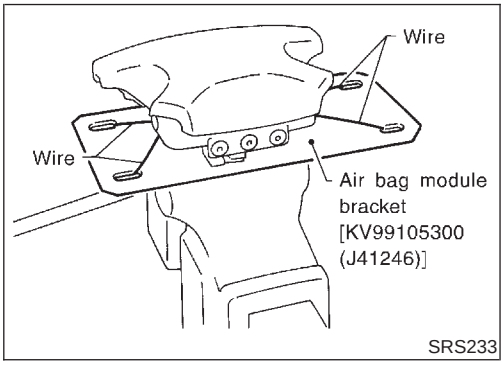
Unless the vehicle is being scrapped, deploying the air bag in the vehicle is not recommended. This may cause damage to the vehicle interior.

Anchor air bag module bracket [KV99105300 (J41246)] in a vise secured to a firm foundation during deployment.

Deployment of Driver Air Bag Module (Outside of vehicle)

NFRS0022S0201

1. Using wire, secure air bag module to air bag module bracket [SST: KV99105300 (J41246)] at two places.

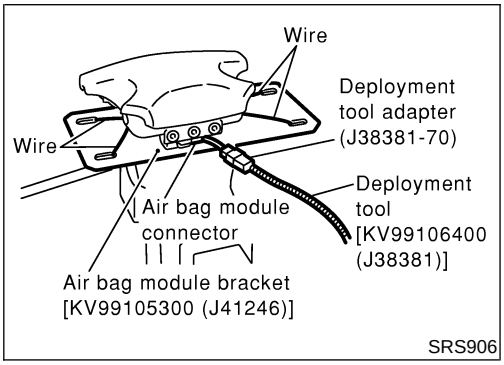


SRS233

CAUTION:

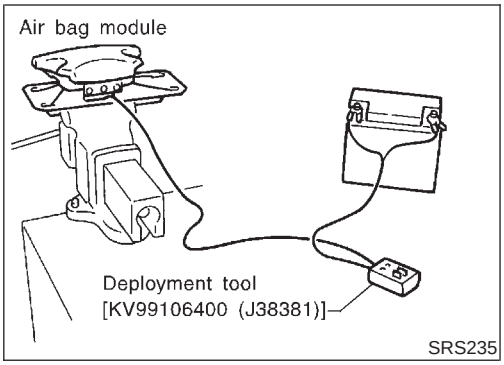
Use wire of at least 1 mm (0.04 in) diameter.

2. Firmly secure air bag module bracket [SST: KV99105300 (J41246)] with air bag module attached, in a vise.



SRS906

3. Connect deployment tool adapter (SST: J38381-70) to deployment tool [SST: KV99106400 (J38381)] and air bag module connector.



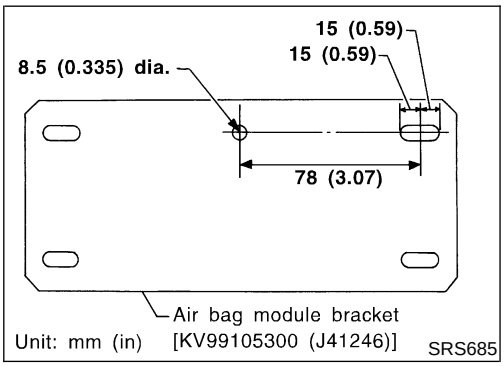
4. Connect red clip of deployment tool to battery positive terminal and black clip to negative terminal.
5. The lamp on the right side of the tool, marked "deployment tool power", should glow green, not red.
6. Press the button on the deployment tool. The left side lamp on the tool, marked "air bag connector voltage", will illuminate and the air bag module will deploy.

CAUTION:
When deploying the air bag module, stand at least 5 m (16 ft) away from the air bag module.

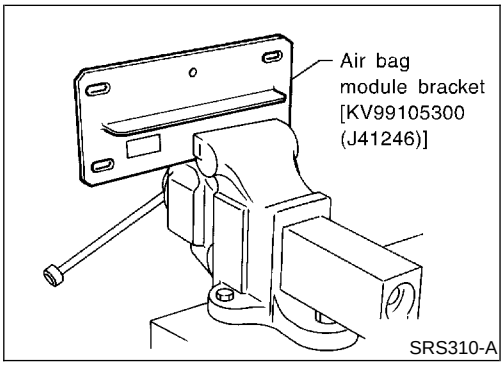
Deployment of Passenger Air Bag Module (Outside of vehicle)

NFRS0022S0202

1. Make an 8.5 mm (0.335 in) diameter hole in air bag module bracket [SST: KV99105300 (J41246)] at the position shown in figure at left.

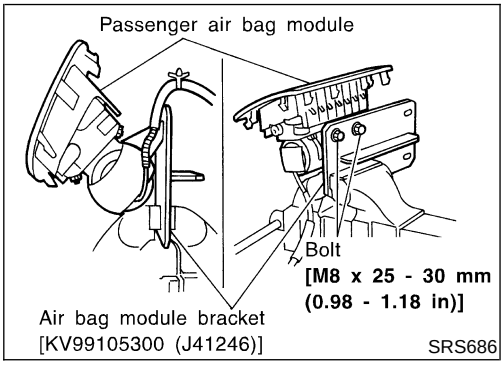


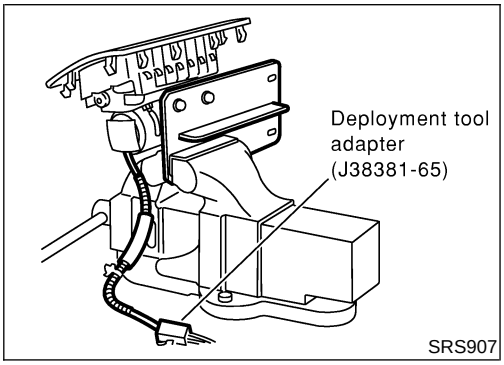
2. Firmly secure air bag module bracket [SST: KV99105300 (J41246)] in a vise.



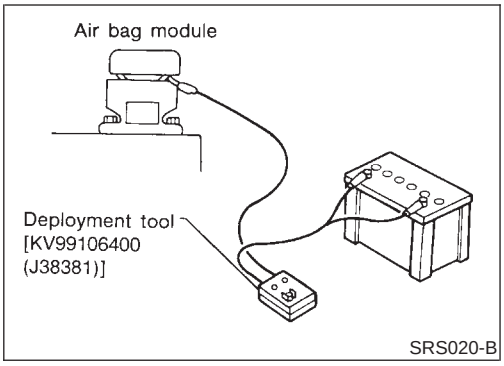
3. Match the two holes in air bag module bracket (held in vise) and passenger air bag module and fix them with two bolts [M8 × 25 - 30 mm (0.98 - 1.18 in)].

CAUTION:
If a gap exists between passenger air bag module and air bag module bracket, use a piece of wood inserted in the gap to stabilize the air bag module.



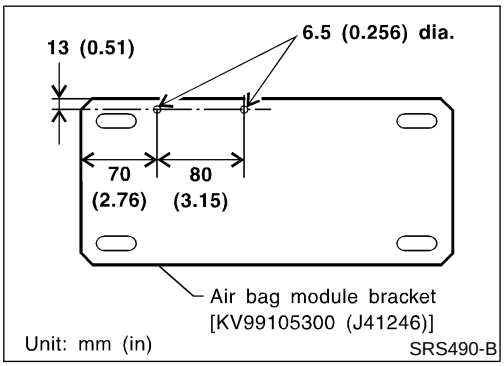


4. Connect deployment tool adapter (SST: J38381-65) to deployment tool [SST: KV99106400 (J38381)] connector and air bag module connector.
5. Connect red clip of deployment tool to battery positive terminal and black clip to negative terminal.
6. The lamp on the right side of the tool, marked "deployment 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:

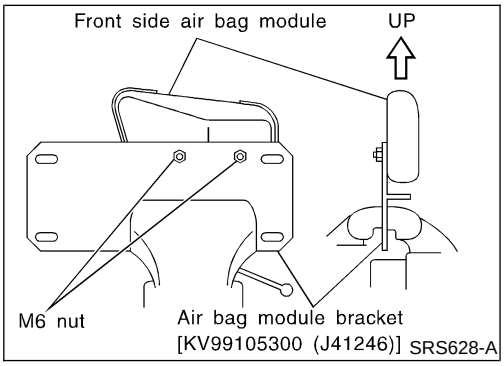
- **When deploying the air bag module, do not stand on the deploying side.**
- **Stand at least 5 m (16 ft) away from the air bag module.**



Deployment of Side Air Bag Module (Outside of vehicle)

NFRS0022S0203

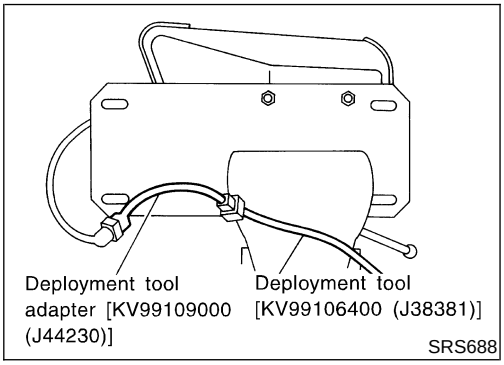
1. Make 6.5 mm (0.256 in) diameter holes in air bag module bracket [SST: KV99105300 (J41246)] at the position shown in figure at left.



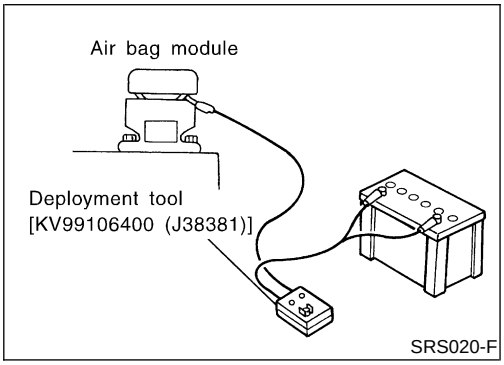
2. Firmly secure air bag module bracket [SST: KV99105300 (J41246)] in a vise.
3. Insert the stud bolts of side air bag module into the two holes in air bag module bracket (held in vise) and fix them with two M6 nuts.

CAUTION:

Side air bag module should be secured to air bag module bracket [SST: KV99105300 (J41246)] in a vise with stud bolt side setting bottom.



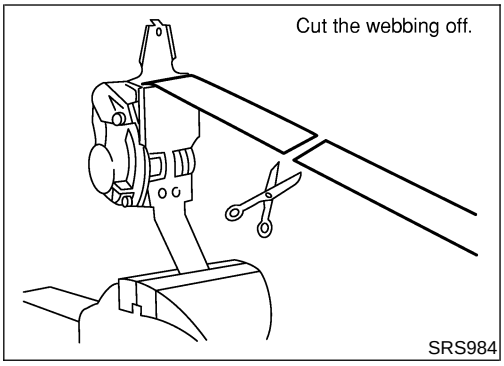
4. Connect deployment tool adapter [SST: KV9910900 (J44230)] to deployment tool [SST: KV99106400 (J38381)] connector and connector on air bag module.



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:

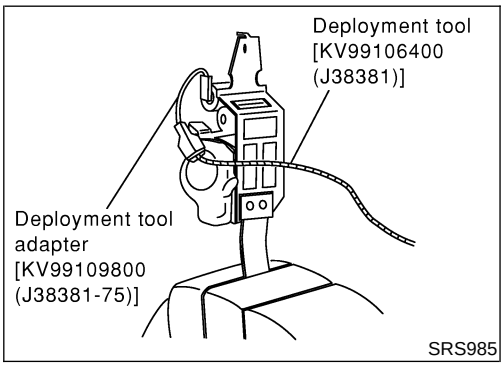
When deploying the air bag module, stand at least 5 m (16 ft) away from the air bag module.



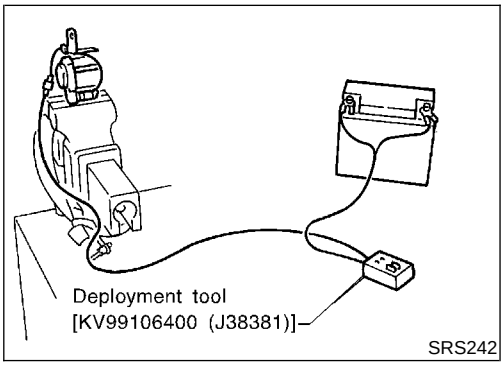
DEPLOYMENT PROCEDURES FOR SEAT BELT PRE-TENSIONER (OUTSIDE OF VEHICLE)

NFRS0022S05

1. Firmly grip pre-tensioner in a vise and cut the webbing off.



2. Connect deployment tool adapter [SST: KV99109800 (J38381-75)] to deployment tool [SST: KV99106400 (J38381)] connector and seat belt pre-tensioner.



3. Connect red clip of deployment tool to battery positive terminal and black clip to negative terminal.
4. The lamp on the right side of the tool, marked "deployment tool power", should glow green, not red.
5. 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 seat belt pre-tensioner, stand at least 5 m (16 ft) away from the seat belt pre-tensioner.

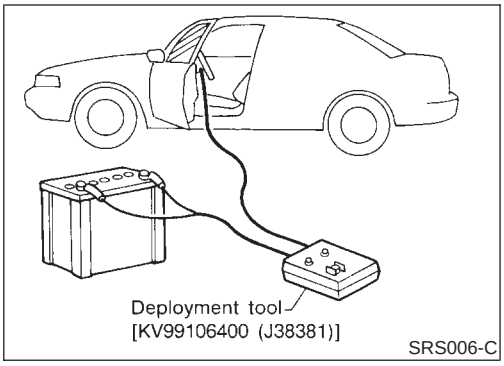
DEPLOYMENT OF AIR BAG MODULE AND SEAT BELT PRE-TENSIONER WHILE MOUNTED IN VEHICLE

NFRS0022S03

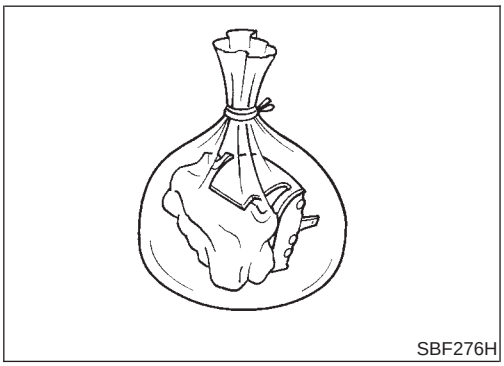
When disposing of a vehicle, deploy air bag module and seat belt pre-tensioners while they are mounted in vehicle.

CAUTION:
When deploying air bag module or seat belt pre-tensioner, ensure vehicle is empty.

1. Disconnect battery ground cable and wait 3 minutes.
2. Disconnect air bag module and seat belt pre-tensioner connector.
3. Connect deployment tool [SST: KV99106400 (J38381)] to air bag module or seat belt pre-tensioner.
   For driver air bag module, attach deployment tool adapter (SST: J38381-70) to the tool connector.
   For front passenger air bag module, attach deployment tool adapter (SST: J38381-65) to the tool connector. For side air bag module, attach deployment tool adapter [SST: KV9910900 (J44230)]. For seat belt pre-tensioner, attach deployment tool adapter [SST: KV99109800 (J38381-75)] to the tool connector.



SRS006-C


SBF276H

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

NFRS0022S04

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.**

Trouble Diagnoses Introduction

=NFRS0043

CAUTION:

- **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 with yellow harness connector.**
- **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

NFRS0043S01

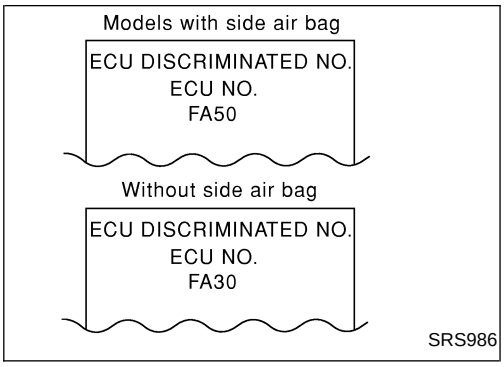
The SRS self-diagnosis results can be read by using “AIR BAG” warning lamp and/or CONSULT-II. The reading of these results is accomplished using one of two modes — “User mode” and “Diagnosis mode”.
The User mode is exclusively prepared for the customer (driver). This mode warns the driver of a system 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

DIAGNOSIS MODE FOR CONSULT-II

NFRS0043S02

- “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 below. 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.



For NISSAN MODEL A33, the diagnosis sensor unit classification numbers assigned are FA50 (With side air bag) and FA30 (Without side air bag).

HOW TO CHANGE SELF-DIAGNOSIS MODE WITH CONSULT-II

=NFRS0043S03

From User Mode to Diagnosis Mode

NFRS0043S0301

After selecting "AIR BAG" on the "SELECT SYSTEM" screen, User mode automatically changes to Diagnosis mode.

From Diagnosis Mode to User Mode

NFRS0043S0302

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 CHANGE SELF-DIAGNOSIS MODE WITHOUT CONSULT-II

NFRS0043S04

From User Mode to Diagnosis Mode

NFRS0043S0401

Diagnosis mode activates only when a malfunction is detected, perform following procedures:

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 steps 1 to 3 two times. (Perform 3 times in total.)
5) Turn ignition switch "ON".

SRS will not enter Diagnosis mode, if no malfunction is detected.

From Diagnosis Mode to User Mode

NFRS0043S0402

After a malfunction is repaired, switch the ignition "OFF" for at least one second, then back "ON". Diagnosis mode is returned to User mode.
If switching Diagnosis mode to User mode is required while malfunction is being detected, perform following procedures:

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 steps 1 to 3 two times. (Perform 3 times in total.)
5) Turn ignition switch "ON".

HOW TO ERASE SELF-DIAGNOSIS RESULTS

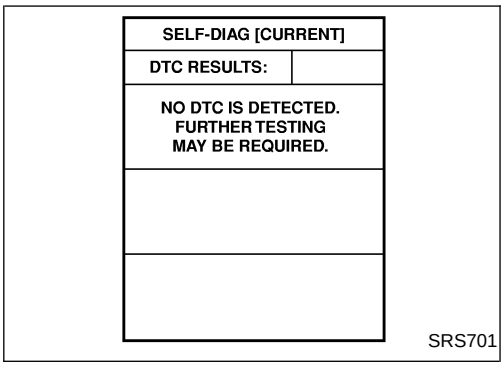
=NFRS0043S05

With CONSULT-II

NFRS0043S0501

- "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 pushing "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.

Without CONSULT-II

NFRS0043S0502

After a malfunction is repaired, switch the ignition "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.

How to Perform Trouble Diagnoses for Quick and Accurate Repair

=NFRS0044

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

NFRS0044S01

WHAT ..... Vehicle model
WHEN ..... Date, Frequencies
WHERE ..... Road conditions
HOW ..... Operating conditions, Symptoms

PRELIMINARY CHECK

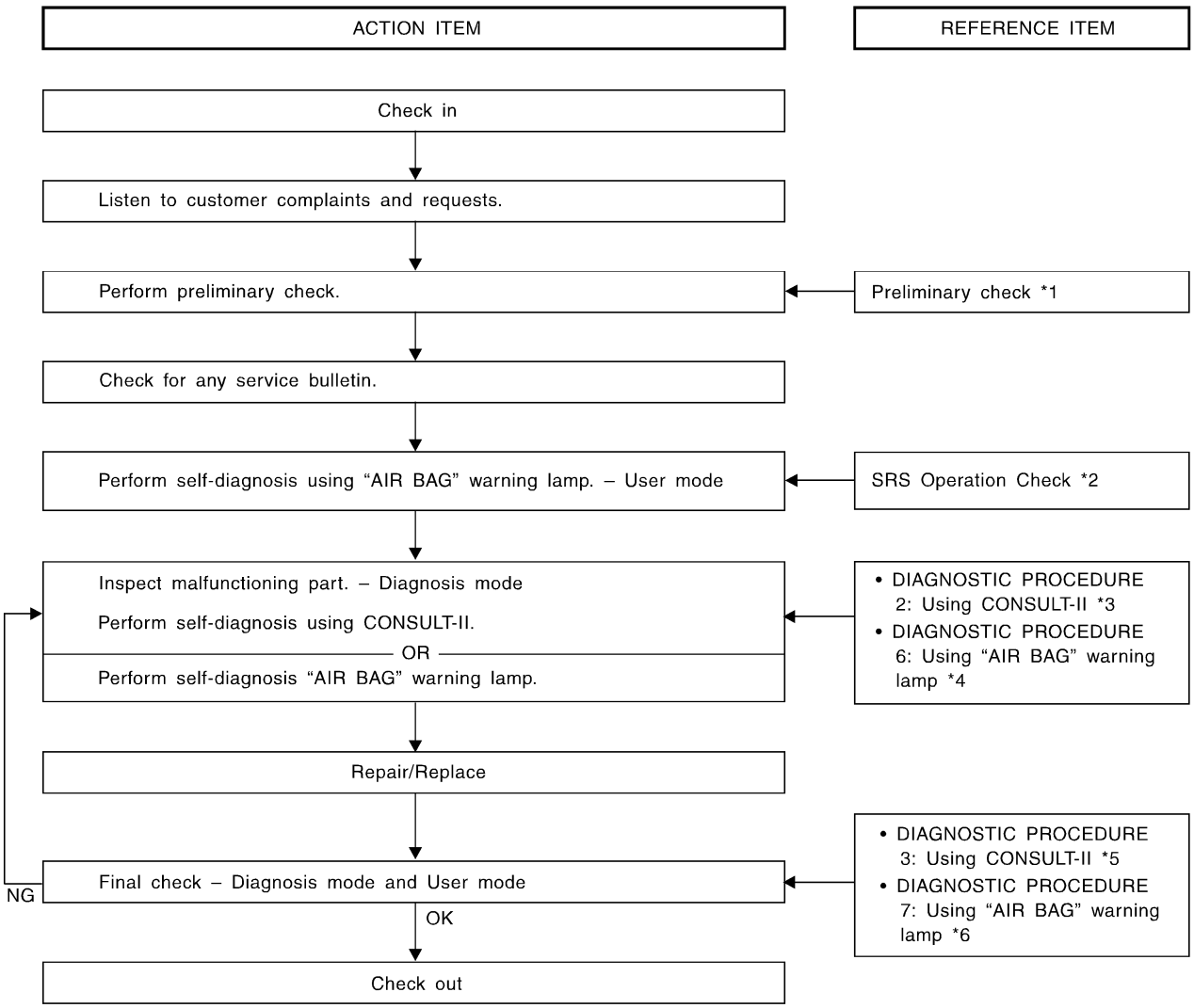
NFRS0044S02

Check that the following parts are in good order.

- Battery [Refer to SC-4, “BATTERY”.]
- Fuse [Refer to EL-18, “Fuse”, “POWER SUPPLY ROUTING”.]
- System component-to-harness connections

WORK FLOW

=NFRS0044S03

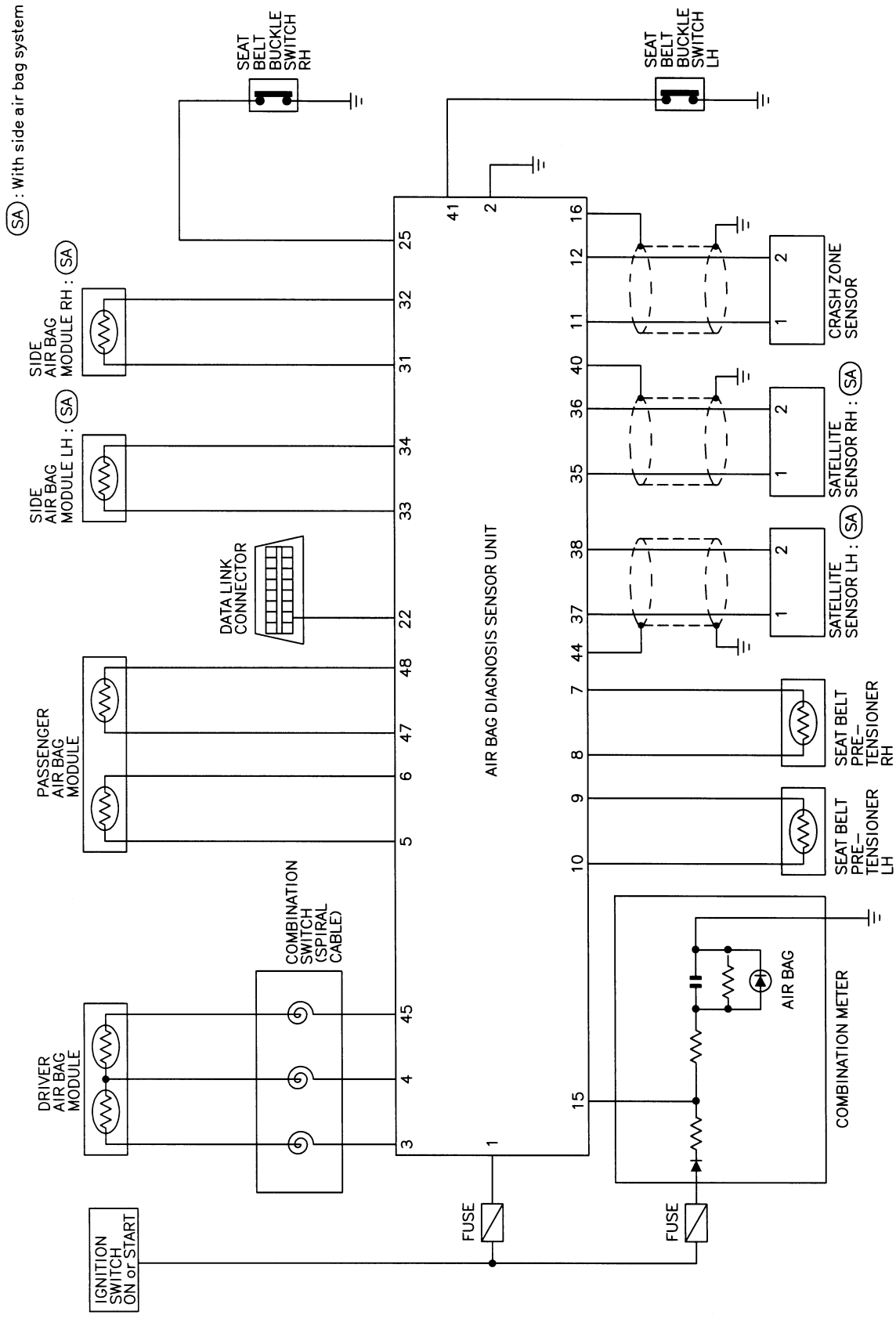


SRS799

*1: RS-35
*2: RS-41
*3: RS-42
*4: RS-51
*5: RS-45
*6: RS-56

Schematic

NFRS0045

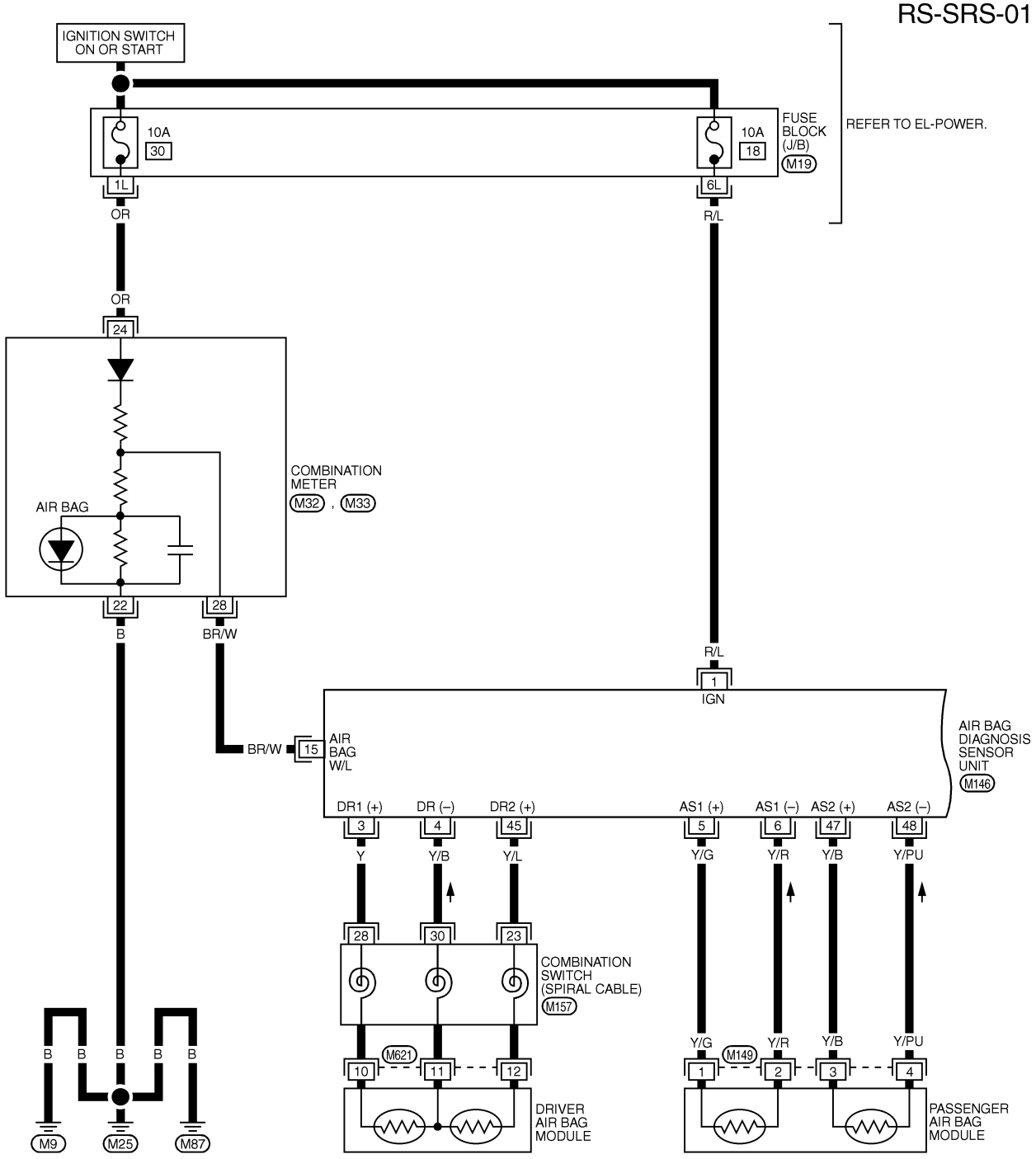


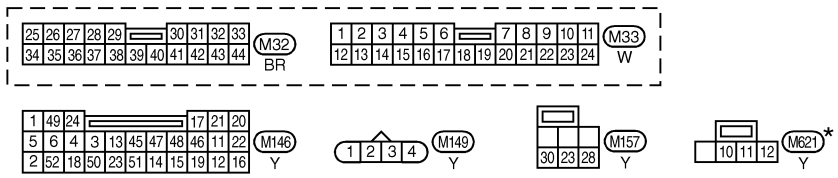
MRS440A

Wiring Diagram — SRS —

NFRS0046

RS-SRS-01



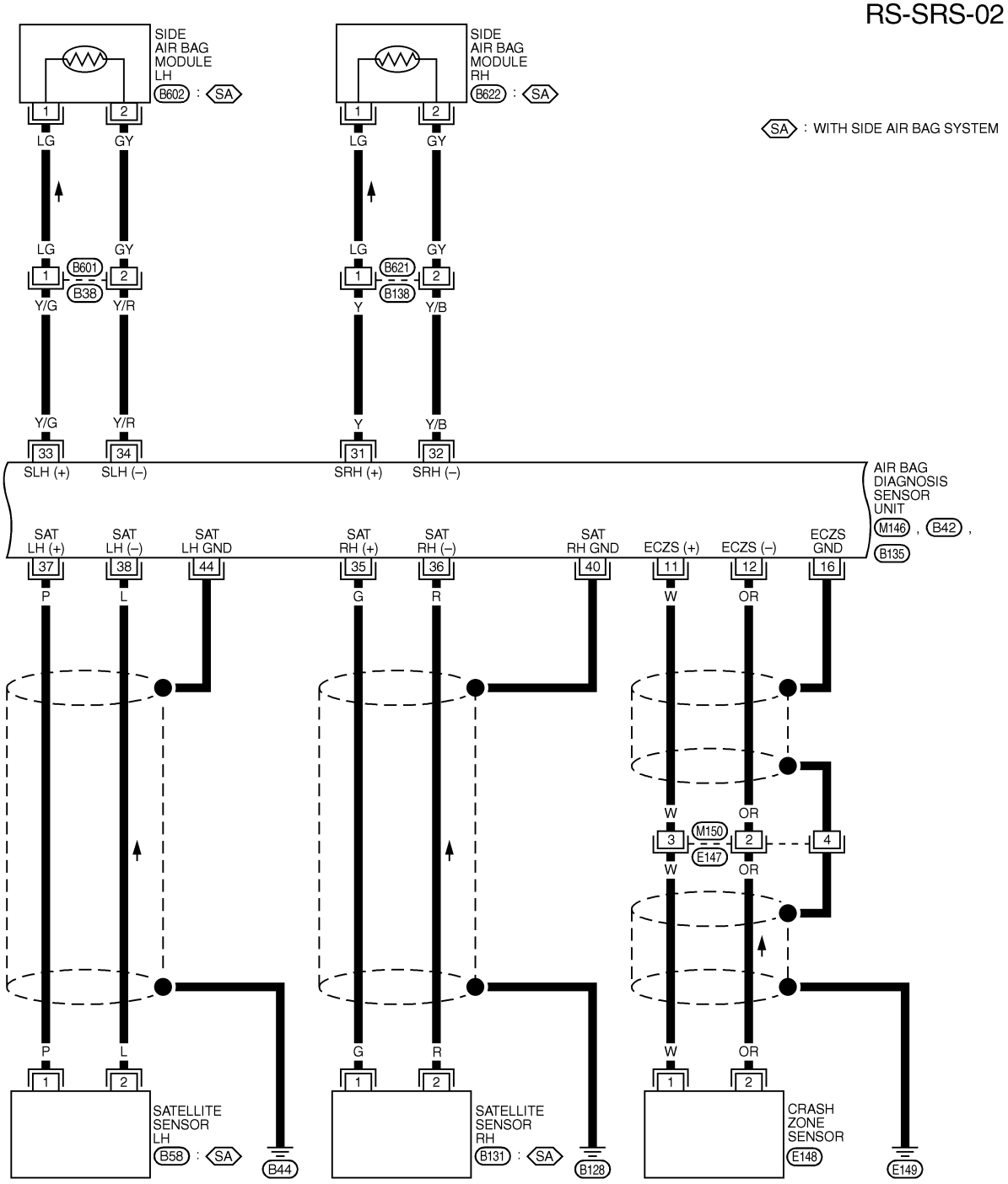


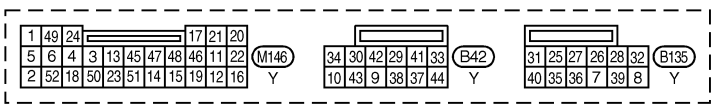
*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", EL SECTION.

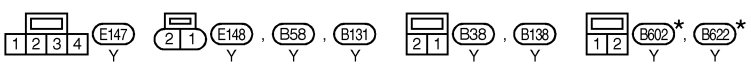
REFER TO THE FOLLOWING.
M19 -FUSE BLOCK-JUNCTION BOX (J/B)

MRS441A

RS-SRS-02



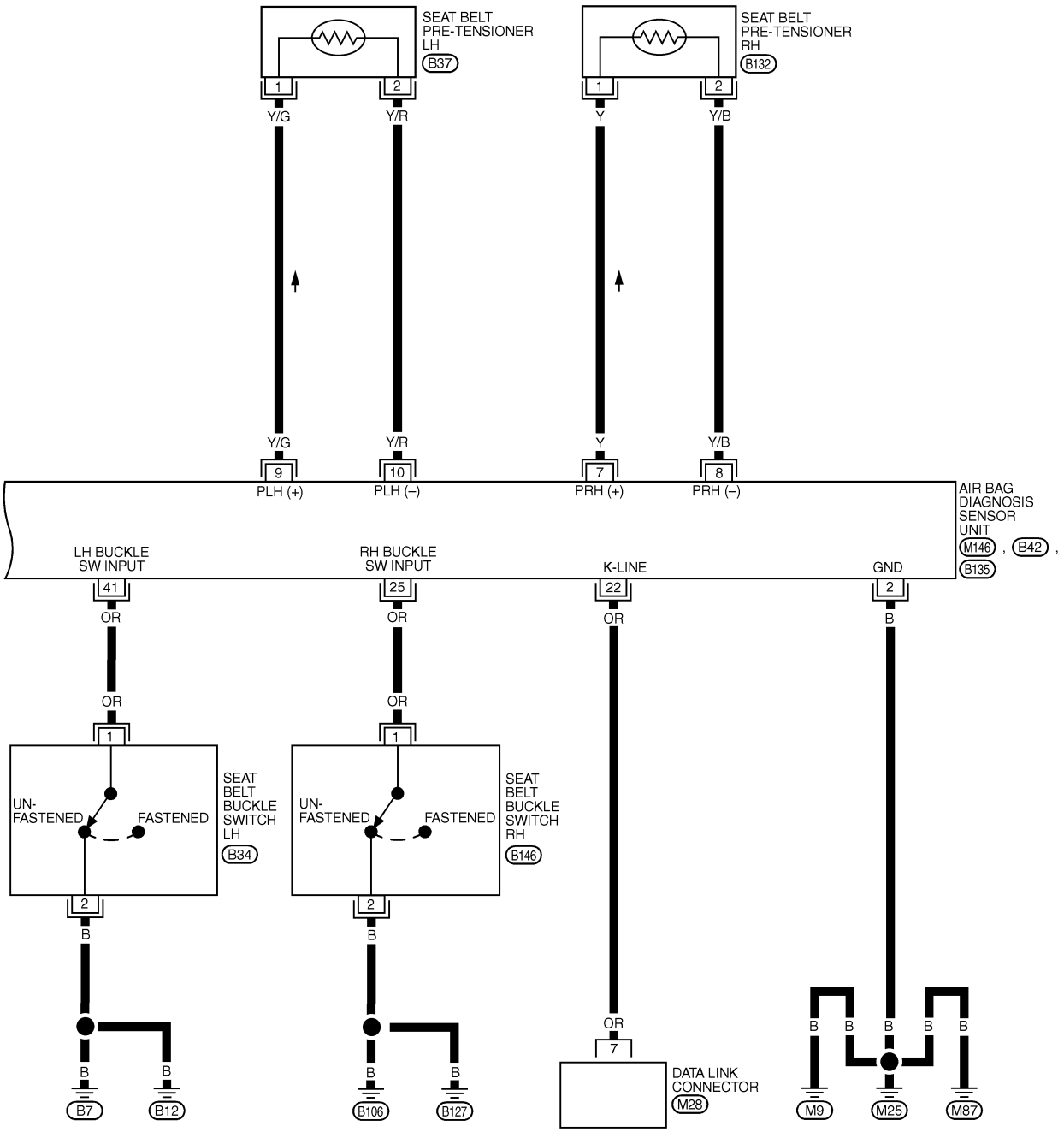


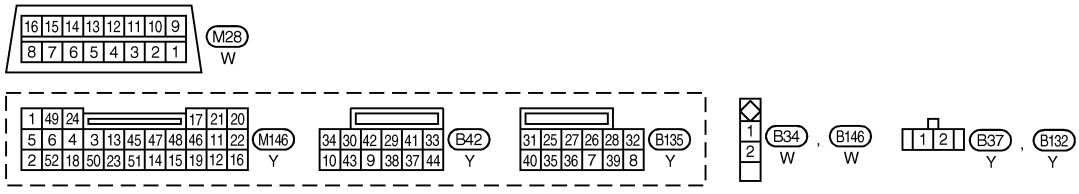


* : THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", EL SECTION.

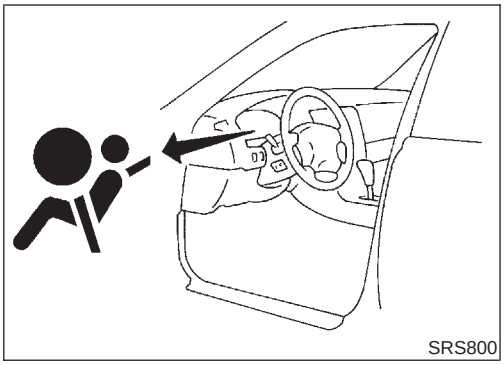
MRS377A

RS-SRS-03





MRS442A


SRS800

SRS Operation Check

NFRS0047

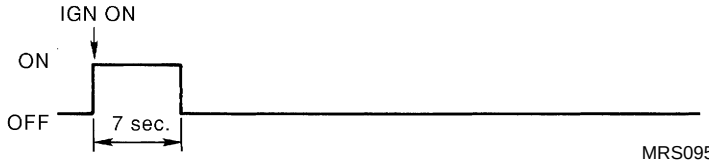
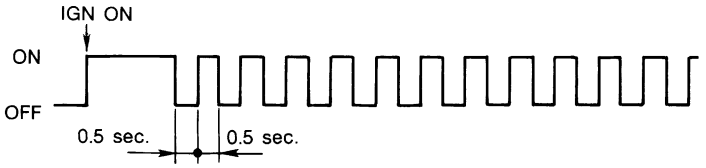
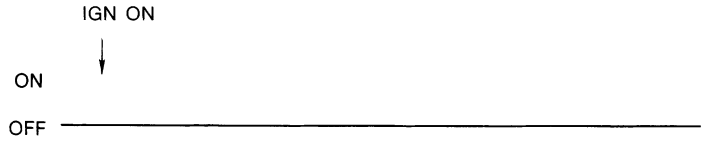
DIAGNOSTIC PROCEDURE 1

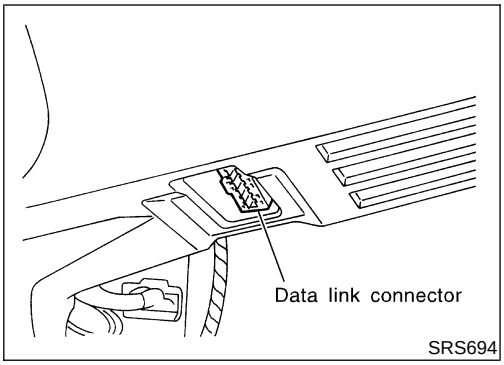
NFRS0047S01

Checking Air Bag Operation by Using "AIR BAG" Warning Lamp — User Mode

NFRS0047S0101

1. After turning ignition switch from "OFF" to "ON", "AIR BAG" warning lamp operates.
2. Compare "AIR BAG" warning lamp operation to the chart below.

"AIR BAG" warning lamp operation — User mode —	SRS condition	Reference item
 MRS095A	No malfunction is detected. No further action is necessary.	—
 MRS096A	The system is malfunctioning and needs to be repaired as indicated.	Go to DIAGNOSTIC PROCEDURE 2 or 6 (RS-42 or RS-51).
MRS097A	Air bag is deployed. Seat belt pre-tensioner is deployed.	Go to COLLISION DIAGNOSIS (RS-62).
	Air bag fuse, diagnosis sensor unit or harness is malfunctioning and needs to be repaired.	Go to DIAGNOSTIC PROCEDURE 9 (RS-59).
 MRS098A	One of the following has occurred and needs to be repaired. ● Meter fuse is blown. ● "AIR BAG" warning lamp circuit has open or short. ● Diagnosis sensor unit is malfunctioning.	Go to DIAGNOSTIC PROCEDURE 10 (RS-61).



SRS694

Trouble Diagnoses with CONSULT-II

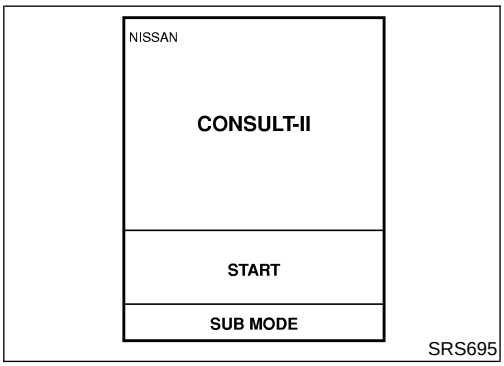
=NFRS0048

DIAGNOSTIC PROCEDURE 2

NFRS0048S01

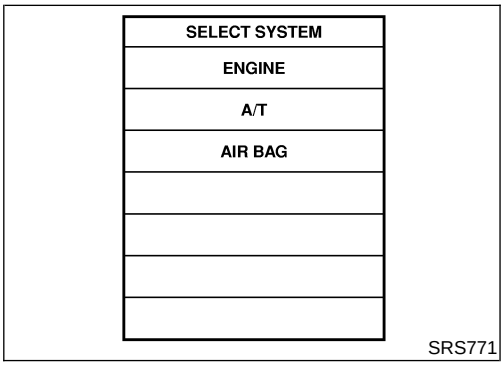
Inspecting SRS malfunctioning parts by using CONSULT-II — Diagnosis mode

1. Turn ignition switch “OFF”.
2. Connect “CONSULT-II” to data link connector.



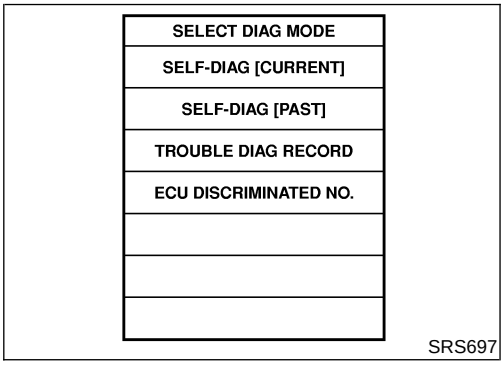
SRS695

3. Turn ignition switch “ON”.
4. Touch “START”.



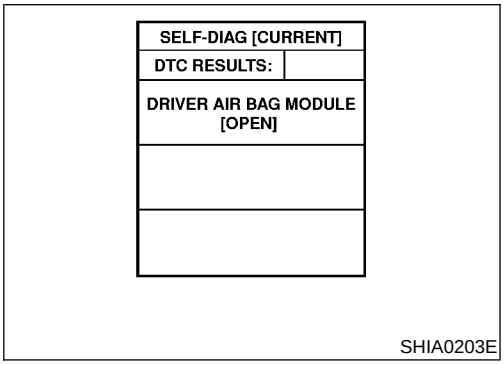
SRS771

5. Touch “AIR BAG”.



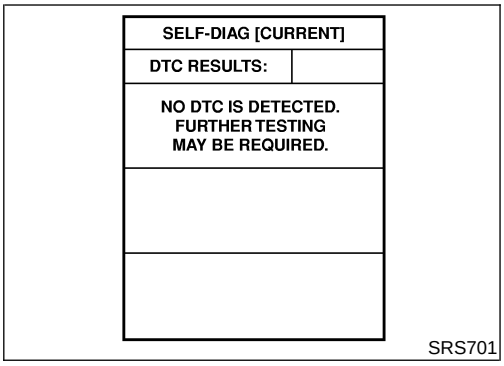
SRS697

6. Touch “SELF-DIAG [CURRENT]”.



SHIA0203E

7. Diagnostic codes are 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 9V, charge the battery. Then go to DIAGNOSTIC PROCEDURE 3, page RS-45.
If the battery voltage is OK, go to DIAGNOSTIC PROCEDURE 4, page RS-47, to 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.

8. Touch "PRINT".
9. Compare diagnostic codes to "CONSULT-II Diagnostic Code Chart", page RS-43.
10. Touch "BACK" key of CONSULT-II until "SELECT SYSTEM" appears in order to return to User mode from Diagnosis mode.
11. Turn ignition switch "OFF", then turn off and disconnect CONSULT-II, and disconnect both battery cables.
12. Repair the system as outlined by the "Repair order" in "CONSULT-II Diagnostic Code Chart", that corresponds to the self-diagnostic result. For replacement procedure of component parts, refer to RS-17.
13. After repairing the system, go to DIAGNOSTIC PROCEDURE 3, page RS-45 for final checking.

CONSULT-II Diagnostic Code Chart ("SELF-DIAG [CURRENT]")

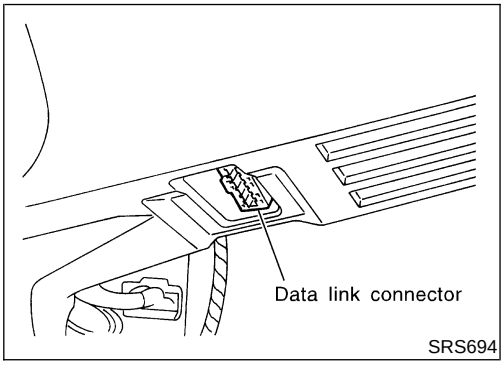
NFRS0048S0101

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 DIAGNOSTIC PROCEDURE 3 (RS-45) after charging 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 DIAGNOSTIC PROCEDURE 4 (RS-47).
	• No malfunction is detected.		• Go to DIAGNOSTIC PROCEDURE 3 (RS-45).
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 of it, it must be deployed.) 4. Replace the spiral cable. 5. Replace the diagnosis sensor unit. 6. Replace the related harness.

Diagnostic item	Explanation	Repair order **"Recheck SRS at each replacement."**
DRIVER AIRBAG MODULE [VB-SHORT]	• Driver air bag module circuit is shorted to some power supply circuit. (including the spiral cable)	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 of it, it must be deployed.) 5. Replace the diagnosis sensor unit. 6. Replace the related harness.
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 circuits are shorted to each other.	
ASSIST A/B MODULE [VB-SHORT]	• Front passenger air bag module circuit is shorted to some power supply 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 of it, it must be deployed.) 4. Replace the diagnosis sensor unit. 5. Replace the related harness.
ASSIST A/B MODULE [OPEN]	• Front passenger air bag module circuit is open.	
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 circuits are shorted to each other.	
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. Replace the crash zone sensor. 4. Replace the diagnosis sensor unit. 5. Replace the related harness.
SIDE MODULE LH [OPEN]	• Side air bag module (LH) circuit is open.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace side air bag module (LH). (Before disposal, it must be deployed.) 4. Replace the diagnosis sensor unit. 5. Replace the related harness.
SIDE MODULE LH [VB-SHORT]	• Side air bag module (LH) circuit is shorted to some power supply circuits.	
SIDE MODULE LH [GND-SHORT]	• Side air bag module (LH) circuit is shorted to ground.	
SIDE MODULE LH [SHORT]	• Side air bag module (LH) circuits are shorted to each other.	
SIDE MODULE RH [OPEN]	• Side air bag module (RH) circuit is open.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace side air bag module (RH). (Before disposal, it must be deployed.) 4. Replace the diagnosis sensor unit. 5. Replace the related harness.
SIDE MODULE RH [VB-SHORT]	• Side air bag module (RH) circuit is shorted to some power supply circuits.	
SIDE MODULE RH [GND-SHORT]	• Side air bag module (RH) circuit is shorted to ground.	
SIDE MODULE RH [SHORT]	• Side air bag module (RH) circuits are shorted to each other.	
SATELLITE SENS LH [UNIT FAIL] SATELLITE SENS LH [COMM FAIL]	• Satellite sensor (LH)	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the satellite sensor (LH). 4. Replace the diagnosis sensor unit. 5. Replace the related harness.

Diagnostic item	Explanation	Repair order **"Recheck SRS at each replacement."**
SATELLITE SENS RH [UNIT FAIL] SATELLITE SENS RH [COMM FAIL]	• Satellite sensor (RH)	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the satellite sensor (RH). 4. Replace the diagnosis sensor unit. 5. Replace the related harness.
PRE-TEN FRONT LH [OPEN]	• The circuit for seat belt pre-tensioner (LH) is open.	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace seat belt (LH). (Before disposing, it must be deactivated.) 4. Replace the diagnosis sensor unit. 5. Replace the related harness.
PRE-TEN FRONT LH [VB-SHORT]	• The circuit for seat belt pre-tensioner (LH) is shorted to some power supply circuit.	
PRE-TEN FRONT LH [GND-SHORT]	• The circuit for seat belt pre-tensioner (LH) is shorted to ground.	
PRE-TEN FRONT LH [SHORT]	• The circuits for seat belt pre-tensioner (LH) are shorted to each other.	
PRE-TEN FRONT RH [OPEN]	• The circuit for seat belt pre-tensioner (RH) is open.	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace seat belt (RH). (Before disposing, it must be deactivated.) 4. Replace the diagnosis sensor unit. 5. Replace the related harness.
PRE-TEN FRONT RH [VB-SHORT]	• The circuit for seat belt pre-tensioner (RH) is shorted to some power supply circuit.	
PRE-TEN FRONT RH [GND-SHORT]	• The circuit for seat belt pre-tensioner (RH) is shorted to ground.	
PRE-TEN FRONT RH [SHORT]	• The circuits for seat belt pre-tensioner (RH) are shorted to each other.	
CONTROL UNIT	• Diagnosis sensor unit is malfunctioning.	1. Visually check the wiring harness connection. 2. Replace the diagnosis sensor unit.

*** Follow the procedures in numerical order when repairing malfunctioning parts. Confirm whether malfunction is eliminated using the 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.**



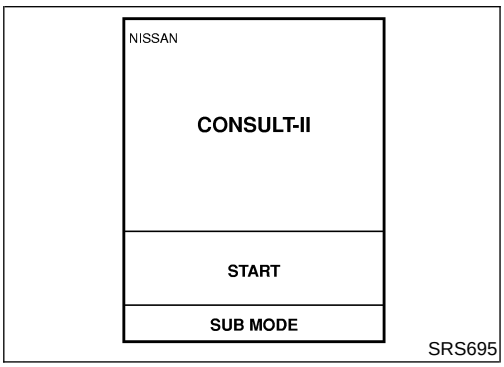
SRS694

DIAGNOSTIC PROCEDURE 3

NFRS0048S02

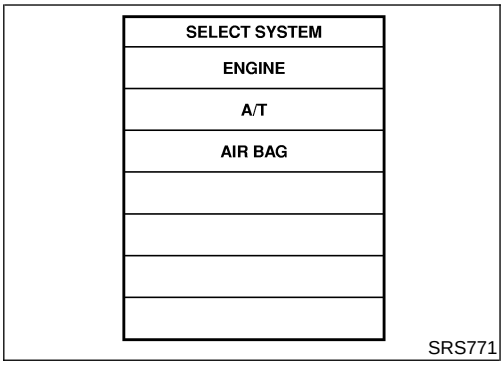
Final checking after repairing SRS by using CONSULT-II — Diagnosis mode

1. After repairing SRS, connect both battery cables.
2. Connect CONSULT-II to data link connector.
3. Turn ignition switch from "OFF" to "ON".

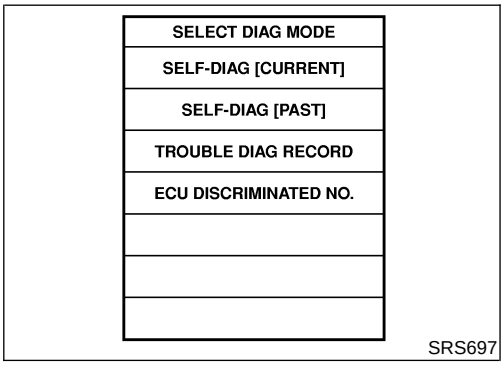


SRS695

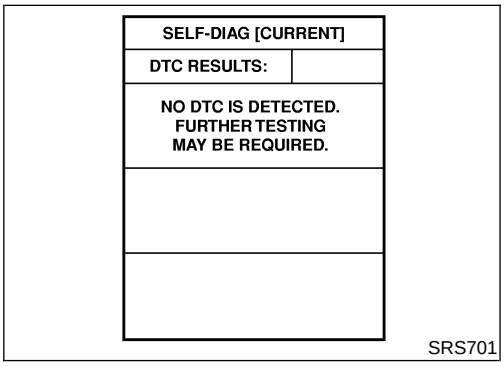
4. Touch "START".



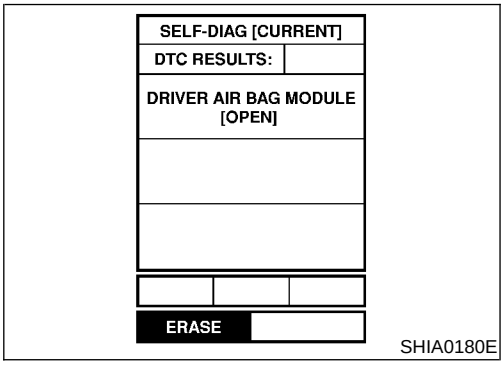
5. Touch "AIR BAG".



6. Touch "SELF-DIAG [CURRENT]".

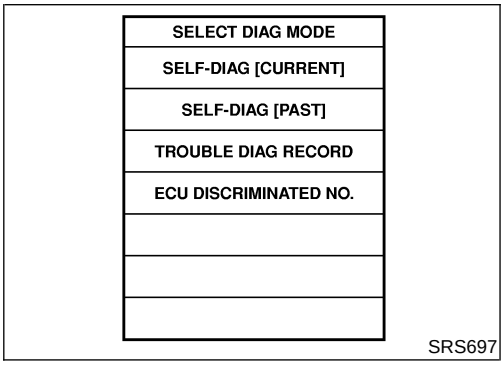


7. If no malfunction is detected on "SELF-DIAG [CURRENT]", repair of SRS is completed. Go to step 8.
   If any malfunction is displayed on "SELF-DIAG [CURRENT]", the malfunctioning part is not repaired completely or another malfunctioning part is detected. Go to DIAGNOSTIC PROCEDURE 2, page RS-42, and repair malfunctioning part completely.

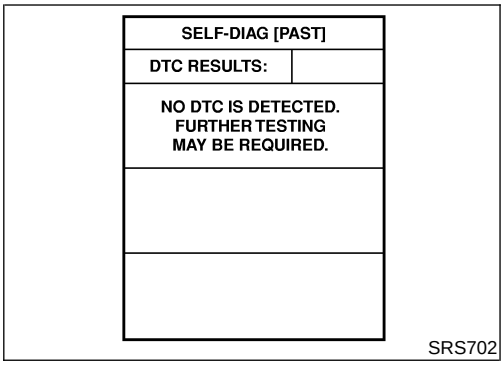


8. Touch "ERASE".

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 SYSTEM" screen. Touch "SELF-DIAG [PAST]".



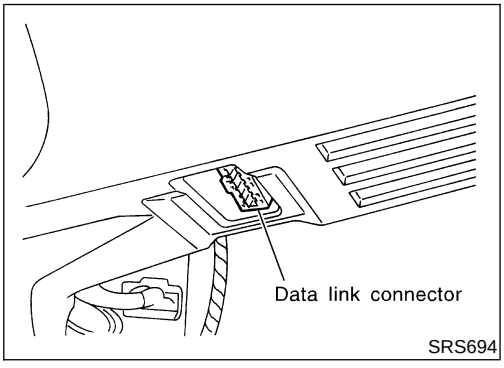
10. Check that no malfunction is detected on "SELF-DIAG [PAST]".
11. Touch "BACK" key of CONSULT-II until "SELECT SYSTEM" appears in order to return to User mode from Diagnosis mode.
12. Turn ignition switch "OFF", then turn off and disconnect CONSULT-II.
13. Go to "SRS Operation Check", page RS-41 to check SRS operation by using "AIR BAG" warning lamp with User mode.

DIAGNOSTIC PROCEDURE 4 (CONTINUED FROM DIAGNOSTIC PROCEDURE 2)

NFRS0048S03

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 DIAGNOSTIC PROCEDURE 5 (RS-47).
No	▶	Self-diagnostic result "SELF-DIAG [PAST]" (previously stored in the memory) might not be erased after repair. Go to DIAGNOSTIC PROCEDURE 3, step 8 (RS-45).

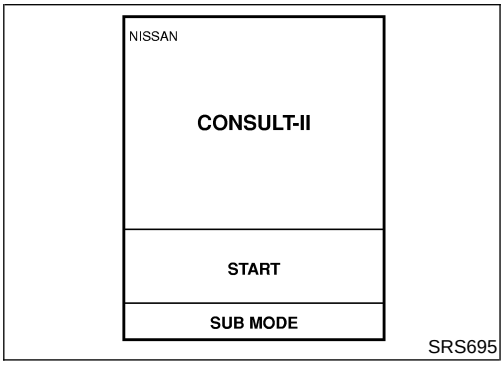


DIAGNOSTIC PROCEDURE 5

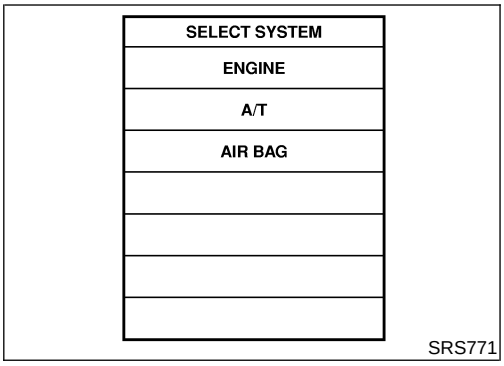
NFRS0048S04

Inspecting SRS intermittent malfunction by using CONSULT-II — Diagnosis mode

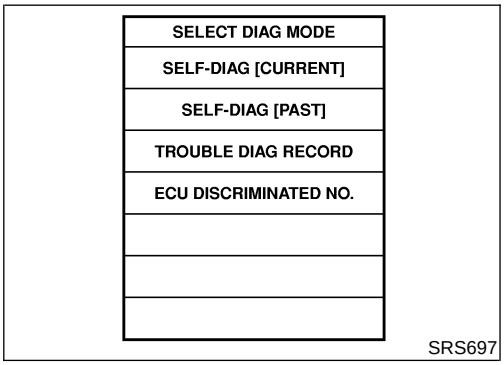
1. Turn ignition switch "OFF".
2. Connect "CONSULT-II" to data link connector.



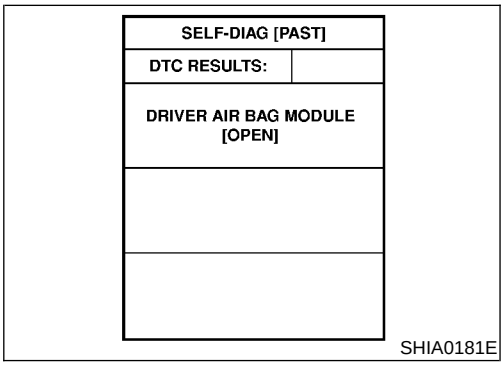
3. Turn ignition switch "ON".
4. Touch "START".



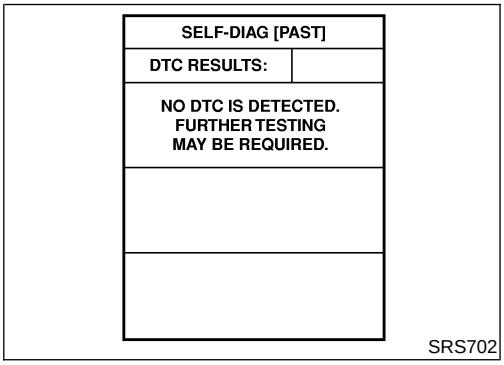
5. Touch "AIR BAG".



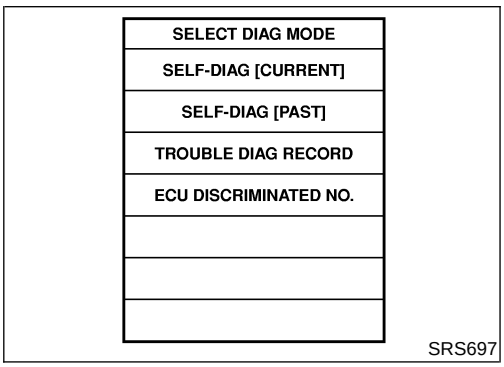
6. Touch "SELF-DIAG [PAST]".



7. If diagnostic codes are displayed on "SELF-DIAG [PAST]", go to step 10.

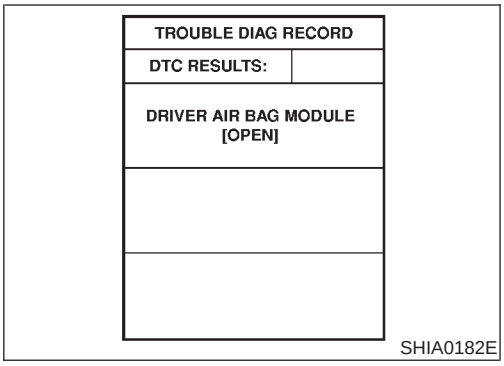


If no malfunction is detected on "SELF-DIAG [PAST]", touch "BACK" and go back to "SELECT DIAG MODE".



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 "Intermittent Malfunction Diagnostic Code Chart", page RS-49.
12. Touch "BACK" key of CONSULT-II until "SELECT SYSTEM" appears.
13. Turn ignition switch "OFF", then turn off and disconnect CONSULT-II, and disconnect 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 RS-17.
15. Go to DIAGNOSTIC PROCEDURE 3, page RS-45, for final checking.

Intermittent Malfunction Diagnostic Code Chart ("SELF-DIAG [PAST]" or "TROUBLE DIAG RECORD")

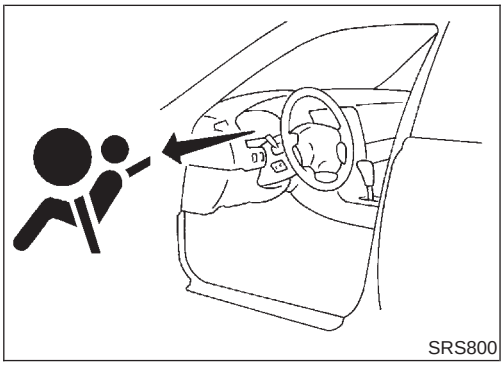
NFRS0048S0401

Diagnostic item	Explanation		Repair order
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 DIAGNOSTIC PROCEDURE 3 (RS-45) after charging battery.
	• No malfunction is detected.		• Go to DIAGNOSTIC PROCEDURE 3 (RS-45).
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 of it, it must be deployed.), diagnosis sensor unit and spiral cable.
DRIVER AIRBAG MODULE [VB-SHORT]	• Driver air bag module circuit is shorted to some 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 circuits are shorted to each other.		
ASSIST A/B MODULE [VB-SHORT]	• Front passenger air bag module circuit is shorted to some power supply circuit.		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 front air bag module (Before disposal of it, it must be deployed.), and diagnosis sensor unit.
ASSIST A/B MODULE [OPEN]	• Front passenger air bag module circuit is open.		
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 circuits are shorted to each other.		

Diagnostic item	Explanation	Repair order
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 is OK, replace the diagnosis sensor unit and crash zone sensor.
SIDE MODULE LH [OPEN]	• Side air bag module (LH) circuit is open.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. If the harness check is OK, replace the diagnosis sensor unit and side air bag module (LH). (Before disposing the side air bag module (LH), it must be deployed.)
SIDE MODULE LH [VB-SHORT]	• Side air bag module (LH) circuit is shorted to some power supply circuits.	
SIDE MODULE LH [GND-SHORT]	• Side air bag module (LH) circuit is shorted to ground.	
SIDE MODULE LH [SHORT]	• Side air bag module (LH) circuits are shorted to each other.	
SIDE MODULE RH [OPEN]	• Side air bag module (RH) circuit is open.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. If the harness check is OK, replace the diagnosis sensor unit and side air bag module (RH). (Before disposing the side air bag module (RH), it must be deployed.)
SIDE MODULE RH [VB-SHORT]	• Side air bag module (RH) circuit is shorted to some power supply circuits.	
SIDE MODULE RH [GND-SHORT]	• Side air bag module (RH) circuit is shorted to ground.	
SIDE MODULE RH [SHORT]	• Side air bag module (RH) circuits are shorted to each other.	
SATELLITE SENS LH [UNIT FAIL] SATELLITE SENS LH [COMM FAIL]	• Satellite sensor (LH)	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. If the harness check is OK, replace the diagnosis sensor unit and satellite sensor (LH).
SATELLITE SENS RH [UNIT FAIL] SATELLITE SENS RH [COMM FAIL]	• Satellite sensor (RH)	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. If the harness check is OK, replace the diagnosis sensor unit and satellite sensor (RH).
PRE-TEN FRONT LH [OPEN]	• The circuit for seat belt pre-tensioner (LH) is open.	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. If the harness check is OK, replace the diagnosis sensor unit and front LH seat belt. (Before disposing the seat belt pre-tensioner (LH), it must be deployed.)
PRE-TEN FRONT LH [VB-SHORT]	• The circuit for seat belt pre-tensioner (LH) is shorted to some power supply circuit.	
PRE-TEN FRONT LH [GND-SHORT]	• The circuit for seat belt pre-tensioner (LH) is shorted to ground.	
PRE-TEN FRONT LH [SHORT]	• The circuits for seat belt pre-tensioner (LH) are shorted to each other.	

Diagnostic item	Explanation	Repair order
PRE-TEN FRONT RH [OPEN]	• The circuit for front RH pre-tensioner is open.	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. If the harness check is OK, replace the diagnosis sensor unit and front RH seat belt. (Before disposing the seat belt pre-tensioner (RH), it must be deployed.)
PRE-TEN FRONT RH [VB-SHORT]	• The circuit for seat belt pre-tensioner (RH) is shorted to some power supply circuit.	
PRE-TEN FRONT RH [GND-SHORT]	• The circuit for seat belt pre-tensioner (RH) is shorted to ground.	
PRE-TEN FRONT RH [SHORT]	• The circuits for seat belt pre-tensioner (RH) are shorted to each other.	
CONTROL UNIT	• Diagnosis sensor unit is malfunctioning.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. If the harness check is OK, replace the diagnosis sensor unit.

* Follow the procedures in numerical order when repairing malfunctioning parts, then make the final system check.


SRS800

Trouble Diagnoses without CONSULT-II

NFRS0049

DIAGNOSTIC PROCEDURE 6

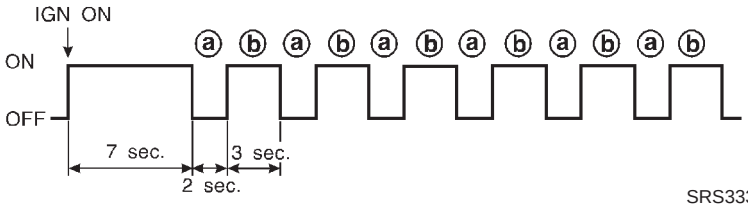
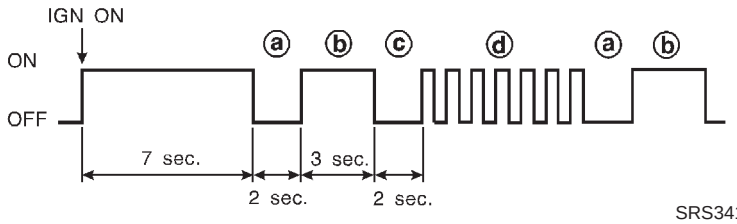
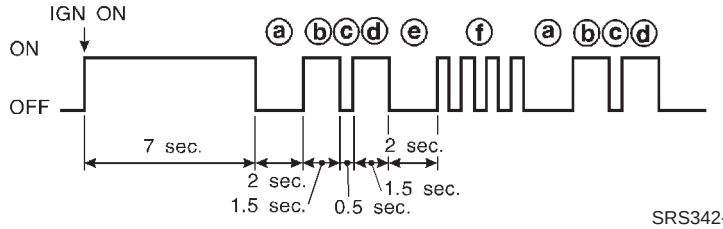
NFRS0049S01

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 steps 1 to 3 two times. (Perform 3 times in total.)
5. Turn ignition switch "ON".
   SRS is now in Diagnosis mode.
6. "AIR BAG" warning lamp operates in Diagnosis mode as follows:

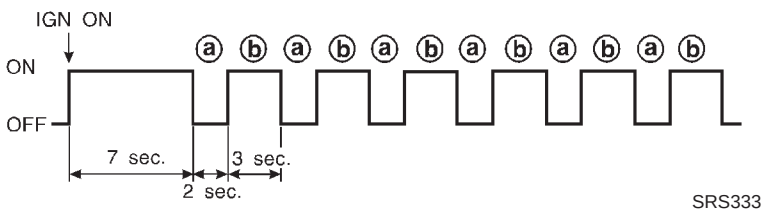
NOTE:
If SRS does not enter Diagnosis mode even though malfunction is detected in User mode, check the battery voltage.
If the battery voltage is less than 9V, charge the battery. Then go to DIAGNOSTIC PROCEDURE 7, page RS-56.
If the battery voltage is OK, replace the diagnosis sensor unit.

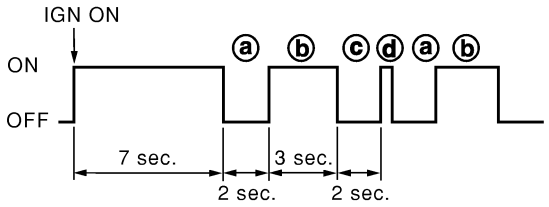
No.	"AIR BAG" warning lamp flash pattern — Diagnosis mode —		SRS condition
1	 SRS333	**a** through **b** are repeated.	• Diagnosis results (previously stored in the memory) might not be erased after repair. • Intermittent malfunction has been detected in the past. Go to DIAGNOSTIC PROCEDURE 8 (RS-58).
2	 SRS341	**a** through **d** are repeated. **b** — Driver and passenger air bag, seat belt pre-tensioner and crash zone sensor marker (For identifying driver air bag, passenger air bag, crash zone sensor and/or seat belt pre-tensioners malfunctioning) **d** — Indicates malfunctioning part. The number of flash varies with malfunctioning part (0.5 sec. ON and 0.5 sec. OFF is counted as one flash.)	The system is malfunctioning and needs to be repaired.
3	 SRS342-A	**a** through **f** are repeated. **b**, **c**, **d** — Side air bag marker (For identifying side air bag malfunctioning) **f** — Indicates malfunctioning part. The number of flash varies with malfunctioning part (0.5 sec. ON and 0.5 sec. OFF is counted as one flash.)	

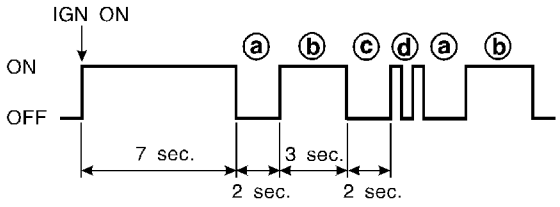
7. Malfunctioning part is indicated by the number of flashes (part **d** or **f**). Compare the number of flashes to "Air Bag Warning Lamp Flash Code Chart", page RS-53, and locate malfunctioning part.
8. Turn ignition switch "OFF", and disconnect both battery cables.
9. Repair the system as outlined by the "Repair order" in "Warning Lamp Flash Code Chart" that corresponds to the flash code. For replacement procedure of component parts, refer to RS-17.
10. After repairing the system, go to DIAGNOSTIC PROCEDURE 7, page RS-56.

Air Bag Warning Lamp Flash Code Chart (Diagnosis mode)

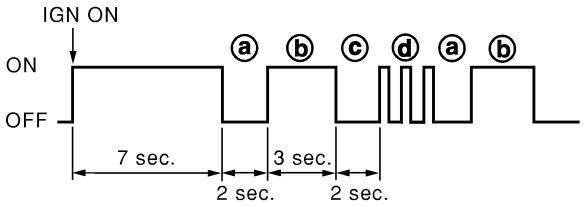
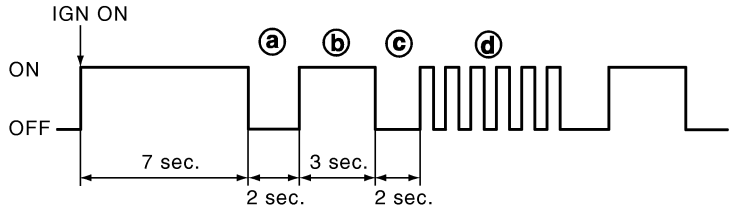
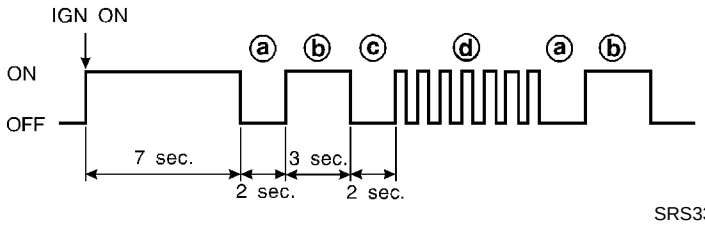
NFRS0049S0101

<table>
<tr><td rowspan="3">● Diagnosis results (previously stored in the memory) might not be erased after repair.
● Intermittent malfunction has been detected in the past.</td><td>Flash pattern</td></tr>
<tr><td> 

SRS333
a through b are repeated.</td></tr>
<tr><td>Repair order
● Go to DIAGNOSTIC PROCEDURE 8 (RS-58).</td></tr>
<tr><td rowspan="3">The seat belt pre-tensioner (RH) circuit is malfunctioning.
(d: 1 flash)</td><td>Flash pattern</td></tr>
<tr><td> 

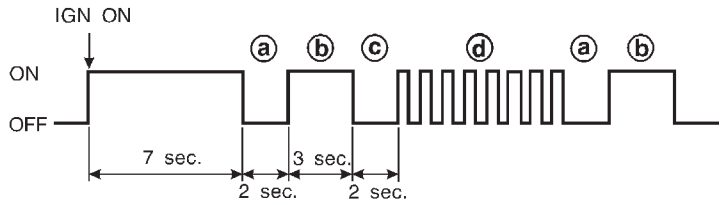
SRS801
a through d are repeated.
d — One flash indicates malfunctioning seat belt pre-tensioner (RH) circuit.</td></tr>
<tr><td>Repair order (“Recheck SRS at each replacement”).
1. Visually check the wiring harness connections.
2. Replace the harness if it has visible damage.
3. Replace seat belt pre-tensioner (RH).
(Before disposing, it must be deactivated.)
4. Replace the diagnosis sensor unit.
5. Replace the related harness.</td></tr>
<tr><td rowspan="3">The driver air bag module circuit is malfunctioning.
(d: 2 flashes)</td><td>Flash pattern</td></tr>
<tr><td> 

SRS334
a through d are repeated.
d — Two flashes indicate malfunctioning driver air bag module circuit.</td></tr>
<tr><td>Repair order (“Recheck SRS at each replacement.”)
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.</td></tr>
</table>

The seat belt pre-tensioner (LH) circuit is malfunctioning. (**d**: 3 flashes)	Flash pattern	
	 SRS802	**a** through **d** are repeated. **d** — Three flashes indicate malfunctioning seat belt pre-tensioner (LH) circuit.
	Repair order ("Recheck SRS at each replacement").	
	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace seat belt pre-tensioner (LH). (Before disposing, it must be deactivated.) 4. Replace the diagnosis sensor unit. 5. Replace the related harness.	
The crash zone sensor circuit is malfunctioning. (**d**: 6 flashes)	Flash pattern	
	 SRS911	**a** through **d** are repeated. **d** — Six flashes indicate malfunctioning crash zone sensor circuit.
	Repair order ("Recheck SRS at each replacement").	
	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace crash zone sensor. 4. Replace the diagnosis sensor unit. 5. Replace the related harness.	
The diagnosis sensor unit is malfunctioning. (**d**: 7 flashes)	Flash pattern	
	 SRS335	**a** through **d** are repeated. **d** — Seven flashes indicate malfunctioning diagnosis sensor unit.
	Repair order ("Recheck SRS at each replacement.")	
	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.	

The front passenger air bag module circuit is malfunctioning. (d: 8 flashes)

Flash pattern



SRS336

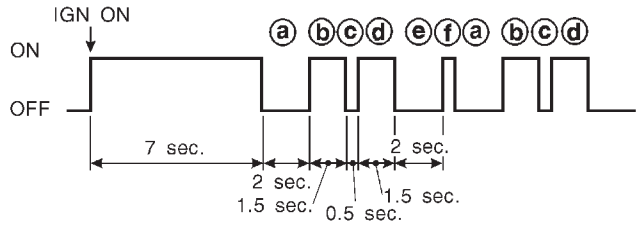
a through **d** are repeated.
d — Eight flashes indicate malfunctioning front passenger air bag module circuit.

Repair order ("Recheck SRS at each replacement.")

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.

The side air bag module (RH) circuit is malfunctioning. (f: 1 flash)

Flash pattern



SRS338

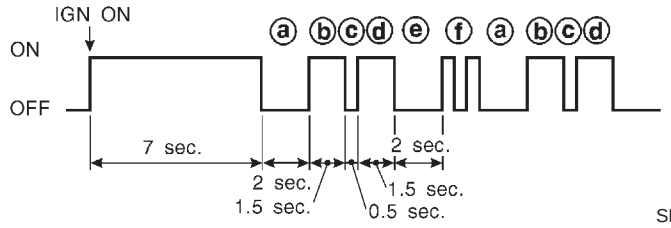
a through **f** are repeated.
f — One flash indicates malfunctioning side air bag module (RH) circuit.

Repair order ("Recheck SRS at each replacement.")

1. Visually check the wiring harness connection.
2. Replace the harness if it has visible damage.
3. Replace side air bag module (RH).
   (Before disposal, it must be deployed.)
4. Replace the diagnosis sensor unit.
5. Replace the related harness.

The side air bag module (LH) circuit is malfunctioning. (f: 2 flashes)

Flash pattern

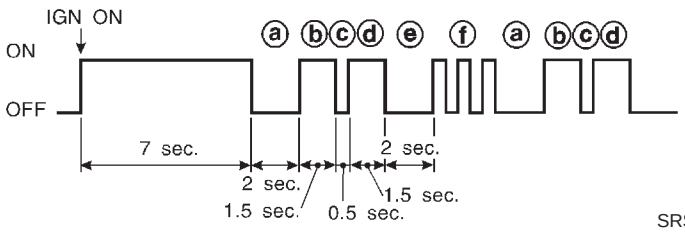
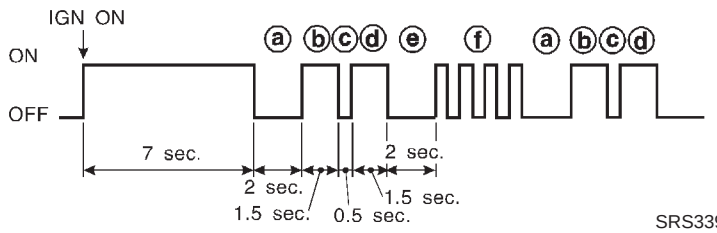


SRS337

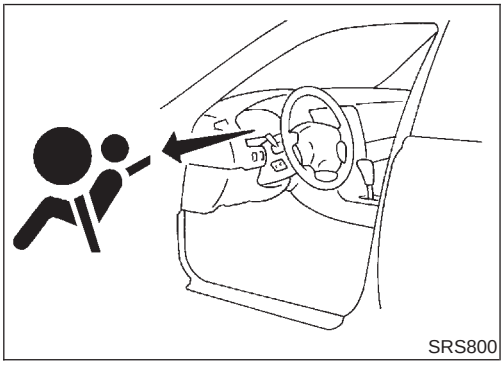
a through **f** are repeated.
f — Two flashes indicate malfunctioning side air bag module (LH) circuit.

Repair order ("Recheck SRS at each replacement.")

1. Visually check the wiring harness connection.
2. Replace the harness if it has visible damage.
3. Replace side air bag module (LH).
   (Before disposal, it must be deployed.)
4. Replace the diagnosis sensor unit.
5. Replace the related harness.

The satellite sensor (RH) is malfunctioning. (**f**: 3 flashes)	Flash pattern	
	 SRS340	**a** through **f** are repeated. **f** — Three flashes indicate malfunctioning satellite sensor (RH) circuit.
	Repair order ("Recheck SRS at each replacement.")	
	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the satellite sensor (RH). 4. Replace the diagnosis sensor unit. 5. Replace the related harness.	
The satellite sensor (LH) is malfunctioning. (**f**: 4 flashes)	Flash pattern	
	 SRS339-A	**a** through **f** are repeated. **f** — Four flashes indicate malfunctioning satellite sensor (LH) circuit.
	Repair order ("Recheck SRS at each replacement.")	
	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the satellite sensor (LH). 4. Replace the diagnosis sensor unit. 5. Replace the related harness.	

*** Follow the procedures in numerical order when repairing malfunctioning parts. Confirm whether malfunction is eliminated using the 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.**

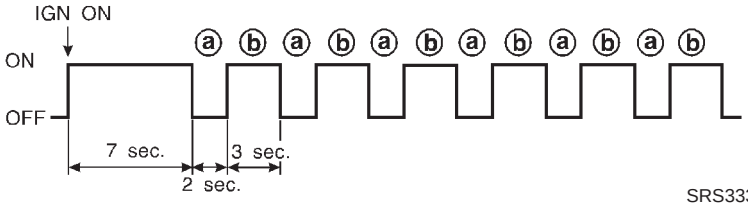
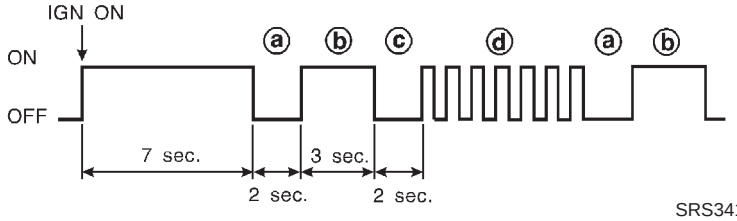
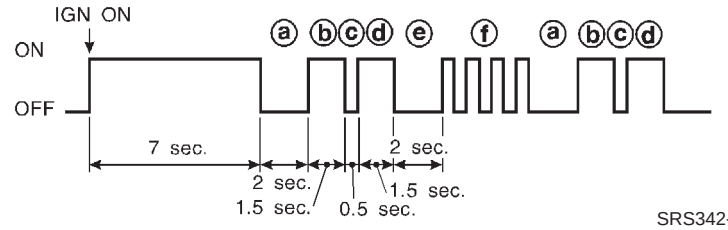

SRS800

DIAGNOSTIC PROCEDURE 7

NFRS0049S02

Final checking after repairing SRS by using "AIR BAG" warning lamp — Diagnosis mode and User mode

1. After repairing SRS connect both battery cables.
2. Open driver's door.
3. Turn ignition switch from "OFF" to "ON".
4. "AIR BAG" warning lamp operates in Diagnosis mode as follows:

No.	"AIR BAG" warning lamp flash pattern — Diagnosis mode —		SRS condition
1		**a** through **b** are repeated.	No malfunction is detected or repair is completed. No further action is necessary.
2		**a** through **d** are repeated. **b** — Driver and passenger air bag, seat belt pre-tensioner and crash zone sensor marker (For identifying driver air bag, passenger air bag, crash zone sensor and/or seat belt pre-tensioners malfunctioning) **d** — Indicates malfunctioning part. The number of flashes varies with malfunctioning part (0.5 sec. ON and 0.5 sec. OFF is counted as one flash.)	The system is malfunctioning and needs to be repaired.
3		**a** through **f** are repeated. **b**, **c**, **d** — Side air bag marker (For identifying side air bag malfunctioning) **f** — Indicates malfunctioning part. The number of flashes varies with malfunctioning part (0.5 sec. ON and 0.5 sec. OFF is counted as one flash.)	

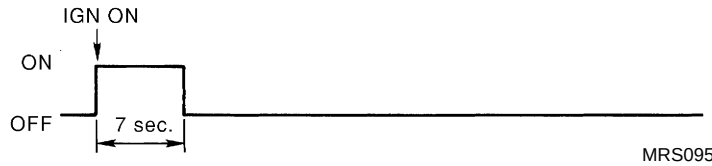
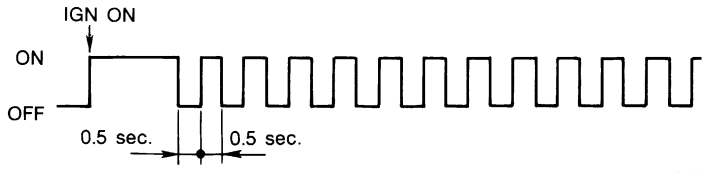
NOTE:
When diagnosis sensor unit is replaced with new one, "AIR BAG" warning lamp will operate in User mode. Checking "AIR BAG" warning lamp operation in Diagnosis mode is not required. Go to step 6.

5. If "AIR BAG" warning lamp operates as shown in No. 1 in chart above, turn ignition switch "OFF" to reset from Diagnosis mode to User mode and to erase the memory of the malfunction. Then go to step 6.
   If "AIR BAG" warning lamp operates as shown in No. 2 or No. 3 in chart above, the malfunctioning part is not repaired completely, or another malfunctioning part is detected. Go to DIAGNOSTIC PROCEDURE 6, page RS-51, and repair malfunctioning part completely.
6. Turn ignition switch "ON". "AIR BAG" warning lamp operates in User mode. Compare "AIR BAG" warning lamp operation to the chart below.

NOTE:
If switching Diagnosis mode to User mode is required while malfunction is being detected, perform following procedures:

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 steps 1 to 3 two times. (Perform 3 times in total.)
5) Turn ignition switch "ON".

SRS is now in User mode.

"AIR BAG" warning lamp operation — User mode —	SRS condition	Reference item
 MRS095A	No malfunction is detected. No further action is necessary.	—
 MRS096A	The system is malfunctioning and needs to be repaired as indicated.	Go to DIAGNOSTIC PROCEDURE 6 (RS-51).
MRS097A	Air bag is deployed. Seat belt pre-tensioner is deployed.	Go to COLLISION DIAGNOSIS (RS-62).
	Air bag fuse, diagnosis sensor unit or harness is malfunctioning and needs to be repaired.	Go to DIAGNOSTIC PROCEDURE 9 (RS-59).
MRS098A	One of the following has occurred and needs to be repaired. ● Meter fuse is blown. ● "AIR BAG" warning lamp circuit has open or short. ● Diagnosis sensor unit is malfunctioning.	Go to DIAGNOSTIC PROCEDURE 10 (RS-61).

DIAGNOSTIC PROCEDURE 8 (CONTINUED FROM DIAGNOSTIC PROCEDURE 6)

NFRS0049S03

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 DIAGNOSTIC PROCEDURE 5 (RS-47). (Further inspection cannot be performed without CONSULT-II.)
No	▶	Diagnosis results (previously stored in the memory) might not be erased after repair. Go to DIAGNOSTIC PROCEDURE 7, step 5 (RS-56).

Trouble Diagnoses: "AIR BAG" Warning Lamp Does Not Turn Off

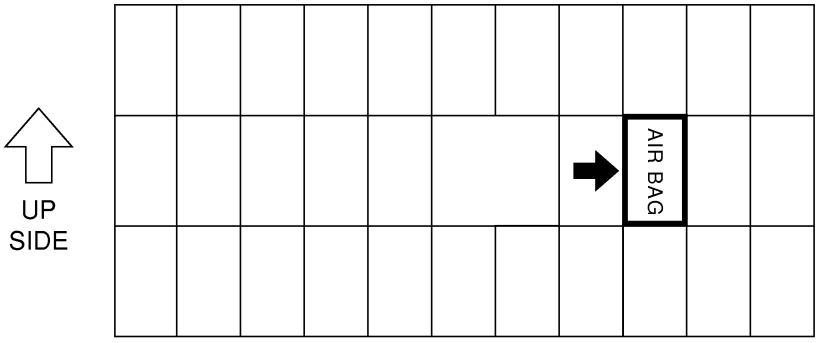
=NFRS0050

DIAGNOSTIC PROCEDURE 9

NFRS0050S01

1	SEE THE DEPLOYMENT OF AIR BAG MODULE	
Is air bag module deployed?		
Yes or No		
Yes	▶	Refer to COLLISION DIAGNOSIS (RS-62).
No	▶	GO TO 2.

2	CHECK AIR BAG FUSE	
Is SRS "Air Bag" fuse OK?		



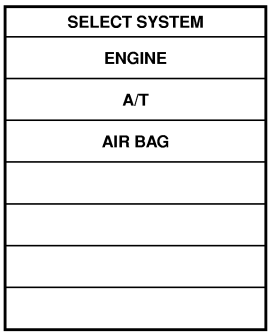
SRS707

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.		
Is "AIR BAG" fuse blown 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?



SRS771

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 Diagnoses: “AIR BAG” Warning Lamp Does Not Turn On

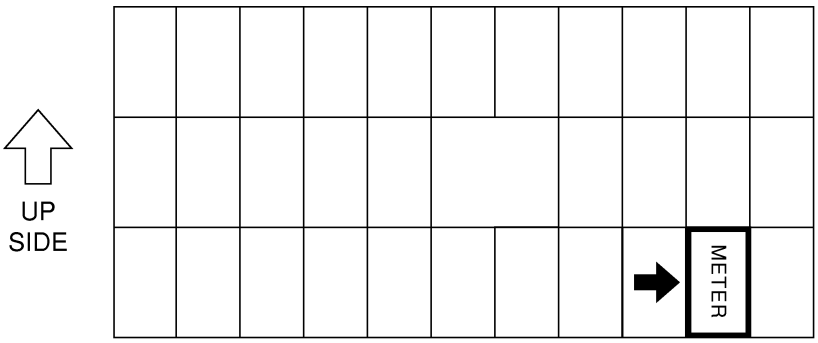
=NFRS0051

DIAGNOSTIC PROCEDURE 10

NFRS0051S01

1	CHECK “METER” FUSE

Is meter fuse OK?



SRS774

OK or NG

OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	CHECK “METER” FUSE AGAIN

Replace meter fuse and turn ignition switch ON.

Is meter fuse blown again?

Yes	▶	Repair main 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	▶	Check the ground circuit of “AIR BAG” warning lamp.

Collision Diagnosis

=NFRS0033

FOR FRONTAL COLLISION

NFRS0033S07

To repair the SRS, perform the following steps.

When SRS (except the side air bag) is activated in a collision:

1) Replace the diagnosis sensor unit.
2) Remove the air bag modules (except the side air bag module), crash zone sensor assembly, bracket and seat belt pre-tensioner assemblies.
3) Check the SRS components using the table shown below:

- Replace any SRS components showing visible signs of damage (dents, cracks and deformation).

4) Install new air bag modules (except the side air bag module) and seat belt pre-tensioner assemblies.
5) Conduct self-diagnosis using CONSULT-II or “AIR BAG” warning lamp. Refer to “SRS Operation Check” for details (RS-41). Ensure entire SRS operation properly.

When SRS is not activated in a collision:

1) Check the SRS components using the table shown below:

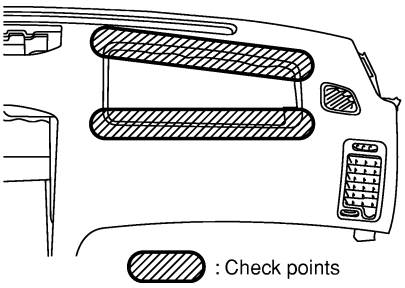
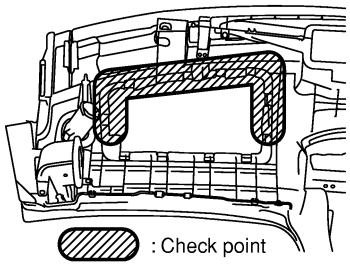
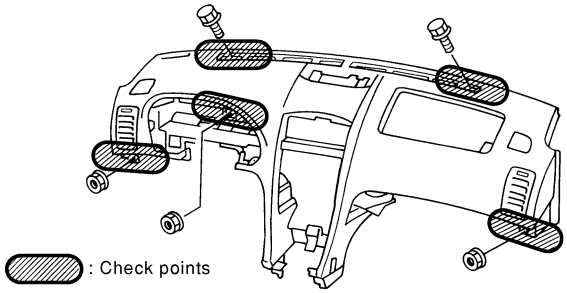
- Replace any SRS components showing visible signs of damage (dents, cracks and deformation).

2) Conduct self-diagnosis using CONSULT-II or “AIR BAG” warning lamp. Refer to “SRS Operation Check” for details (RS-41). Ensure entire SRS operation properly.

SRS Inspection (For frontal collision)

NFRS0033S0701

Part	SRS is activated	SRS is NOT activated
Air bag module (driver and passenger side)	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. a. Install driver air bag module into the steering wheel to check fit and alignment with the wheel. b. 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. Install air bag modules with new special bolts coated with bonding agent. Air bag must be deployed before discarding.
Crash zone sensor	REPLACE the crash zone sensor and bracket with new nuts and bolts.	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. If no damage is found, reinstall the crash zone sensor with new nuts. 5. If damaged—REPLACE the crash zone sensor and bracket with new nuts and bolts.
Seat belt pre-tensioner assembly	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. If no damage is found, reinstall seat belt pre-tensioner assembly. 5. If damaged—REPLACE. Install the seat belt pre-tensioners with new bolts. Seat belt pre-tensioners must be deployed before discarding.
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. Install diagnosis sensor unit with new bolts and ground bolt.
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 bolts. 6. If damaged—REPLACE.	

Part	SRS is activated	SRS is NOT activated
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 bolts. 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. Damaged—REPLACE damaged section of harness. Do not attempt to repair, splice or modify any SRS harness.	
Instrument panel	1. When passenger air bag inflates, check the following points for bending, deformities or cracks. ● Opening portion for passenger air bag  SRS794 ● Passenger air bag module brackets **Back face of instrument panel**  SRS795-A ● The portions securing the instrument panel  SRS796 2. If no damage is found, reinstall the instrument panel. 3. If damaged—REPLACE the instrument panel with bolts.	

FOR SIDE COLLISION

=NFRS0033S08

To repair the SRS for a side collision, perform the following steps.

When the side air bag is activated in the side collision:

1) Replace the following component:

− All parts of seatback (including seatback frame) with side air bag module (on the side on which side air bag is activated)
− Diagnosis sensor unit
− Satellite sensor

2) Check the SRS components and the related parts using the table shown below.

- 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 Operation Check" for details (RS-41). Ensure entire SRS operation properly.

When SRS is not activated in the side collision:

1) Check the SRS components and the related parts using the table shown below.

- 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 Operation Check" for details (RS-41). Ensure entire SRS operation properly.

SRS Inspection (For side collision)

NFRS0033S0801

Part	Side air bag is activated	SRS is NOT activated
Side air bags module (LH or RH)	REPLACE all parts of seat back with deployed side air bag module.	1. Check for visible signs of damage (dents, tears, deformation) of the seat back on the collision side. 2. If damaged—REPLACE the damaged seat parts with new bolts and remove the side air bag module. 3. Check for visible signs of damaged (tears etc.) of the side air bag module. 4. Check harness and connectors for damage, and terminals for deformities. 5. If no damaged is found, reinstall the side air bag module with new torx nuts coated with bonding agent. 6. If damaged—REPLACE the side air bag module with new torx nuts coated with bonding agent. Air bag must be deployed before disposing of it.
Satellite sensor (LH or RH)	REPLACE the satellite sensor on the collision side with new nuts coated with bonding agent. (Repair the center pillar inner, etc. before installing new one if damaged.)	1. Remove the 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 satellite sensor. 3. Install the satellite sensor to check fit. 4. If no damage is found, reinstall the satellite sensor with new nuts coated with bonding agent. 5. If damaged—REPLACE the satellite sensor with new nuts coated with bonding agent.
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. Install 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. If no damage is found, reinstall the seat belt pre-tensioner assembly. 5. If damaged—REPLACE the seat belt pre-tensioner assembly with new bolts coated with bonding agent. The seat belt pre-tensioner assembly must be deployed before disposing of it.	

Part	Side air bag is activated	SRS is NOT activated
Seat with side air bag	REPLACE all parts of seat back (including seat back 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 with new bolts.
Center pillar inner	1. Check the center pillar inner on the collision side for damage (dents, cracks, deformation). 2. If damaged—REPAIR the center pillar inner.	
Trim	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.	

NOTES

STARTING & CHARGING SYSTEM

SECTION SC

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

NFSC0001

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER” used along with a seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. The SRS system composition which is available to NISSAN MODEL A33 is as follows:

- For a frontal collision
  The Supplemental Restraint System consists of driver air bag module (located in the center of the steering wheel), front passenger air bag module (located on the instrument panel on passenger side), seat belt pre-tensioners, a diagnosis sensor unit, crash zone sensor, warning lamp, wiring harness and spiral cable.
- For a side collision
  The Supplemental Restraint System consists of front side air bag module (located in the outer side of front seat), satellite sensor, diagnosis sensor unit (one of components of air bags for a frontal collision), wiring harness, warning lamp (one of components of air bags for a frontal collision).

Information necessary to service the system safely is included in the **RS 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 should be performed by an authorized NISSAN 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 RS 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 harness connector (and by yellow harness protector or yellow insulation tape before the harness connectors).**

Wiring Diagrams and Trouble Diagnosis

NFSC0002

When you read wiring diagrams, refer to the following:

- GI-9, “HOW TO READ WIRING DIAGRAMS”
- EL-10, “POWER SUPPLY ROUTING” for power distribution circuit

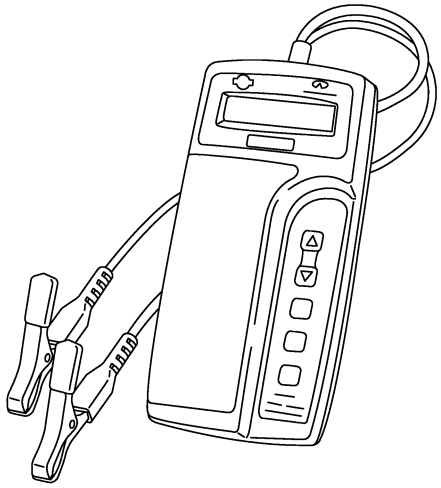
When you perform trouble diagnosis, refer to the following:

- GI-35, “HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES”
- GI-24, “HOW TO PERFORM EFFICIENT DIAGNOSES FOR AN ELECTRICAL INCIDENT”

Special Service Tool

NFSC0017

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

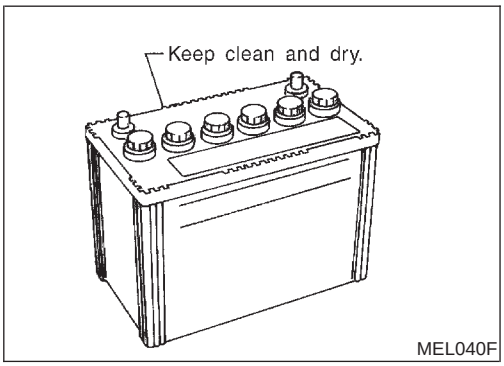
Tool number (Kent-Moore No.) Tool name	Description
— (J-44373 Model 620) Battery/Starting/Charging system tester	 SEL403X

How to Handle Battery

NFSC0003

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.**

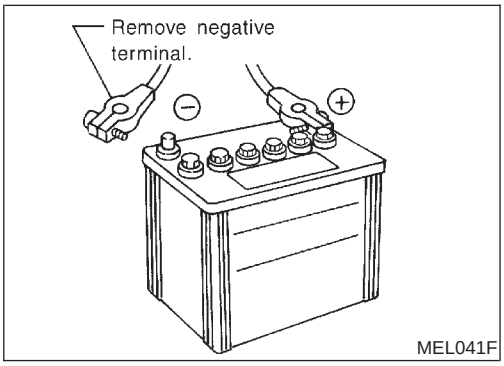


METHODS OF PREVENTING OVER-DISCHARGE

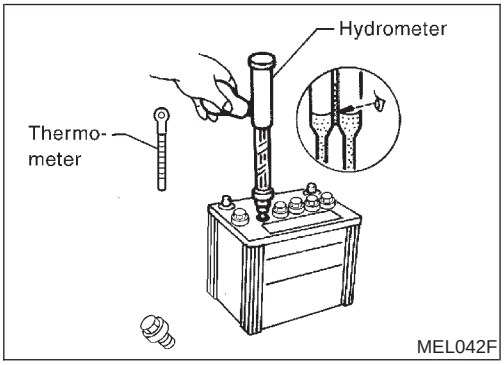
NFSC0003S01

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.)



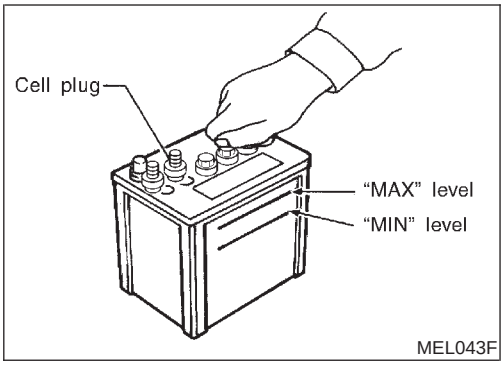
- Check the charge condition of the battery. Periodically check the specific gravity of the electrolyte. Keep a close check on charge condition to prevent over-discharge.

CHECKING ELECTROLYTE LEVEL

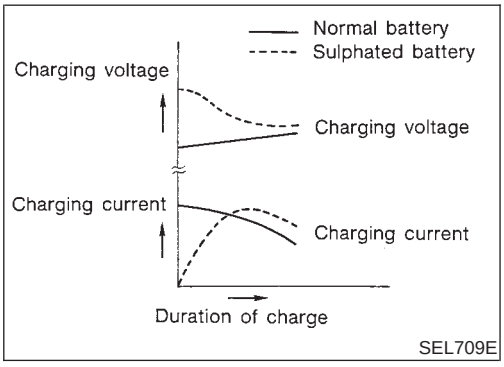
NFSC0003S02

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.



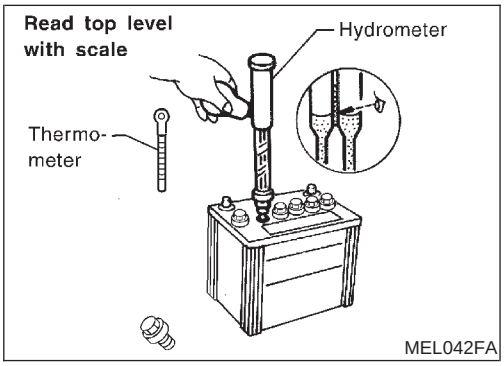
- Remove the cell plug using a suitable tool.
- Add distilled water up to the MAX level.



Sulphation

NFSC0003S0201

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

NFSC0003S03

1. Read hydrometer and thermometer indications at eye level.

2. Use the chart below to correct your hydrometer reading according to electrolyte temperature.

Hydrometer Temperature Correction

NFSC0003S0301

Battery electrolyte temperature °C (°F)	Add to specific gravity reading
71 (160)	0.032
66 (150)	0.028
60 (140)	0.024
54 (130)	0.020
49 (120)	0.016
43 (110)	0.012
38 (100)	0.008
32 (90)	0.004
27 (80)	0
21 (70)	−0.004
16 (60)	−0.008
10 (50)	−0.012

Battery electrolyte temperature °C (°F)	Add to specific gravity reading
4 (40)	−0.016
−1 (30)	−0.020
−7 (20)	−0.024
−12 (10)	−0.028
−18 (0)	−0.032

Corrected specific gravity	Approximate charge condition
1.260 - 1.280	Fully charged
1.230 - 1.250	3/4 charged
1.200 - 1.220	1/2 charged
1.170 - 1.190	1/4 charged
1.140 - 1.160	Almost discharged
1.110 - 1.130	Completely discharged

CHARGING THE BATTERY

NFSC0003S04

CAUTION:

- **Do not "quick charge" a fully discharged battery.**
- **Keep the battery away from open flame while it is being charged.**
- **When connecting the charger, connect the leads first, then turn on the charger. Do not turn on the charger first, as this may cause a spark.**
- **If battery electrolyte temperature rises above 60°C (140°F), stop charging. Always charge battery at a temperature below 60°C (140°F).**

Charging Rates

NFSC0003S0401

Amps	Time
50	1 hour
25	2 hours
10	5 hours
5	10 hours

Do not charge at more than 50 ampere rate.

NOTE:

The ammeter reading on your battery charger will automatically decrease as the battery charges. This indicates that the voltage of the battery is increasing normally as the state of charge improves. The charging amps indicated above refer to initial charge rate.

- If, after charging, the specific gravity of any two cells varies more than .050, the battery should be replaced.

Trouble Diagnoses with Battery/Starting/Charging System Tester

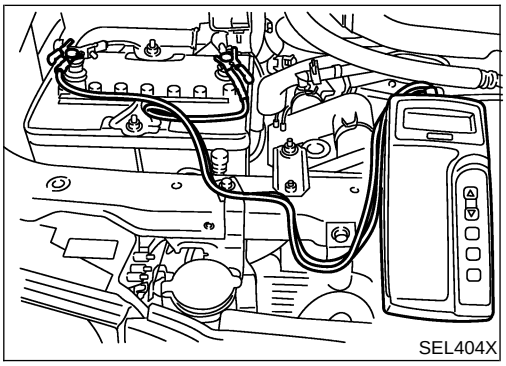
NFSC0018

CAUTION:

When working with batteries, always wear appropriate eye protection.

NOTE:

- To ensure a complete and thorough diagnosis, the battery, starter and alternator test segments must be done as a set from start to finish.
- If battery surface charge is detected while testing, the tester will prompt you to turn on the headlights to remove the surface charge.
- If necessary, the tester will prompt you to determine if the battery temperature is above or below 0°C (32°F). Choose the appropriate selection by pressing the up or down arrow button, then press “ENTER” to make the selection.



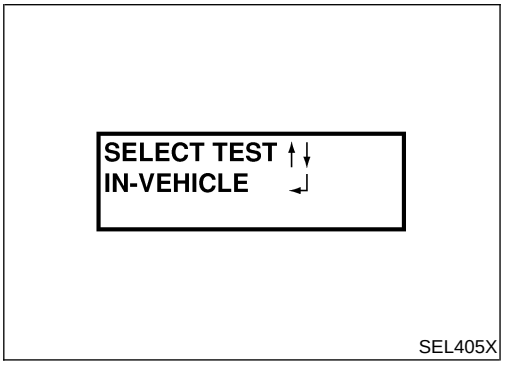
SEL404X

1. Turn off all loads on the vehicle electrical system. Clean or repair as necessary.
2. Visually inspect the battery, battery terminals and cable ends with ignition switch in “OFF” position.

NOTE:

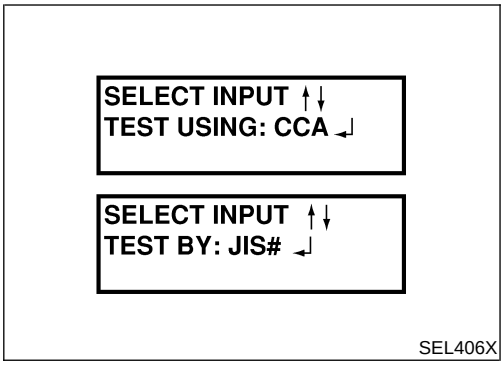
The contact surface between the battery terminals, cable ends and tester leads must be clean for a valid test. A poor connection will prevent testing and a “CHECK CONNECTION” message will appear during the test procedures. If this occurs, clean the battery post and terminals, reconnect them and restart the test.

3. Connect the red tester lead clamp to the positive battery terminal, and the black to the negative terminal.



SEL405X

4. The tester will turn on automatically. Using the arrow keys, select “IN VEHICLE” on the tester and then press the “ENTER” key.



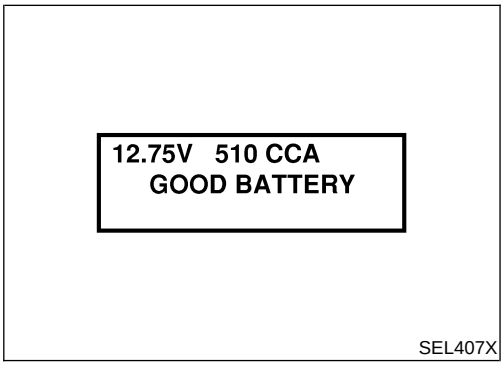
5. Locate the battery type and rating stamped or written on the top case of the battery to be tested.

NOTE:
The battery type and rating will have either of the following.

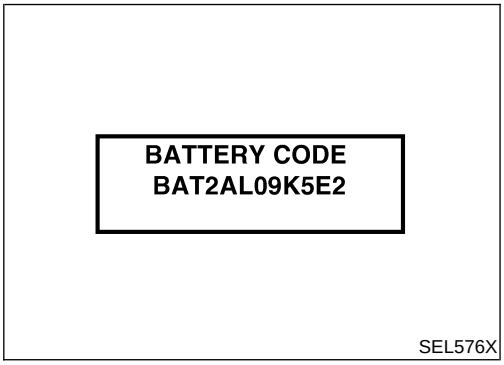
CCA: Cold Cranking Amps (490 CCA, 550 CCA, etc.)
JIS: Japanese Industrial Standard.
Battery is stamped with a number such as:
80D26L: 80 (rank of output), D (physical size-depth), 26 (width in cm). The last character L (post configuration) is not input into the tester.
The tester requires the rating for the battery be entered exactly as it is written or stamped on the battery. Do not attempt a CCA conversion for JIS stamped batteries. JIS must be input directly.

6. Using the arrow and "ENTER" keys alternately, select the battery type and rating.

NOTE:
The tester lists five choices; CCA, JIS, IEC, DIN, and EN. Only use CCA or JIS.



7. Press "ENTER" to begin the test. Diagnosis results are displayed on the tester. Refer to "DIAGNOSTIC RESULT ITEM CHART", SC-9.



8. Press "ENTER", then test output code is displayed. Record the test output code on the repair order.
9. Toggle back to the "DIAGNOSTIC SCREEN" for test results.

NOTE:
- If necessary, the tester will ask the user to determine if the battery has just been charged. Choose the appropriate selection by pressing the up or down arrow button and then press the "ENTER" button to make the selection.
- When testing a battery installed in a vehicle that has recently been driven, select "BEFORE CHANGE".
- If the battery has just been slow charged due to a "CHARGE & RETEST" decision by the tester, and the tester asks the user "BEFORE CHARGE/AFTER CHARGE", select "AFTER CHARGE".

DIAGNOSTIC RESULT ITEM CHART

NFSC0018S01

Diagnostic item	Service procedure
GOOD BATTERY	Battery is OK, go to "Trouble Diagnoses", "STARTING SYSTEM". Refer to SC-13.
REPLACE BATTERY	Replace battery. Before replacing battery, clean the battery cable clamps and battery posts. Perform battery test again with Battery/Starting/Charging system tester. If second test result is "Replace Battery", then do so. Perform battery test again to confirm repair.
BAD CELL-REPLACE	Replace the battery. Perform battery test again with Battery/Starting/Charging system tester to confirm repair.
GOOD-RECHARGE	Perform the slow battery charging procedure. (Initial rate of charge is 10A for 12 hours.) Perform battery test again with Battery/Starting/Charging system tester.
CHARGE & RETEST	Perform the slow battery charging. (Initial rate of charge is 10A for 12 hours.) Perform battery test again with Battery/Starting/Charging system tester to confirm repair. **NOTE:** **If the tester asks the user "BEFORE CHARGE/AFTER CHARGE", select "AFTER CHARGE".**

System Description

NFSC0021

M/T MODELS

NFSC0021S01

Power is supplied at all times

- through 40A fusible link (letter **C**, located in the fuse and fusible link box)
- to ignition switch terminal 1.

With the ignition switch in the START position, power is supplied

- through terminal 5 of the ignition switch
- to clutch interlock relay terminal 5.

With the ignition switch in the START position, power is supplied

- through 10A fuse [No. 21, located in the fuse block (J/B)]
- to clutch interlock relay terminal 1.

When the clutch pedal is depressed, ground is supplied to clutch interlock relay terminal 2 through the clutch interlock switch and body grounds E11, E22 and E53.
The clutch interlock relay is energized and power is supplied

- from terminal 3 of the clutch interlock relay
- to terminal 2 of the starter motor windings.

The starter motor plunger closes and provides a closed circuit between the battery and the starter motor. The starter motor is grounded to the cylinder block. With power and ground supplied, the starter motor operates.

A/T MODELS

NFSC0021S02

Power is supplied at all times

- through 40A fusible link (letter **C**, 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 15A fuse [No. 20, located in the fuse block (J/B)]
- to park/neutral position relay terminal 1.

Also, with the ignition switch in the START position, power is supplied

- from ignition switch terminal 5
- to park/neutral position relay terminal 6.

Ground is supplied, with the selector lever in the P or N position

- to park/neutral position relay terminal 2
- through park/neutral position switch.

The park/neutral position relay is energized and power is supplied

- from ignition switch terminal 5
- through park/neutral position relay terminals 6 and 7
- to terminal 2 of the starter motor windings.

The starter motor plunger closes and provides a closed circuit between the battery and the starter motor. The starter motor is grounded to the cylinder block. With power and ground supplied, the starter motor operates.

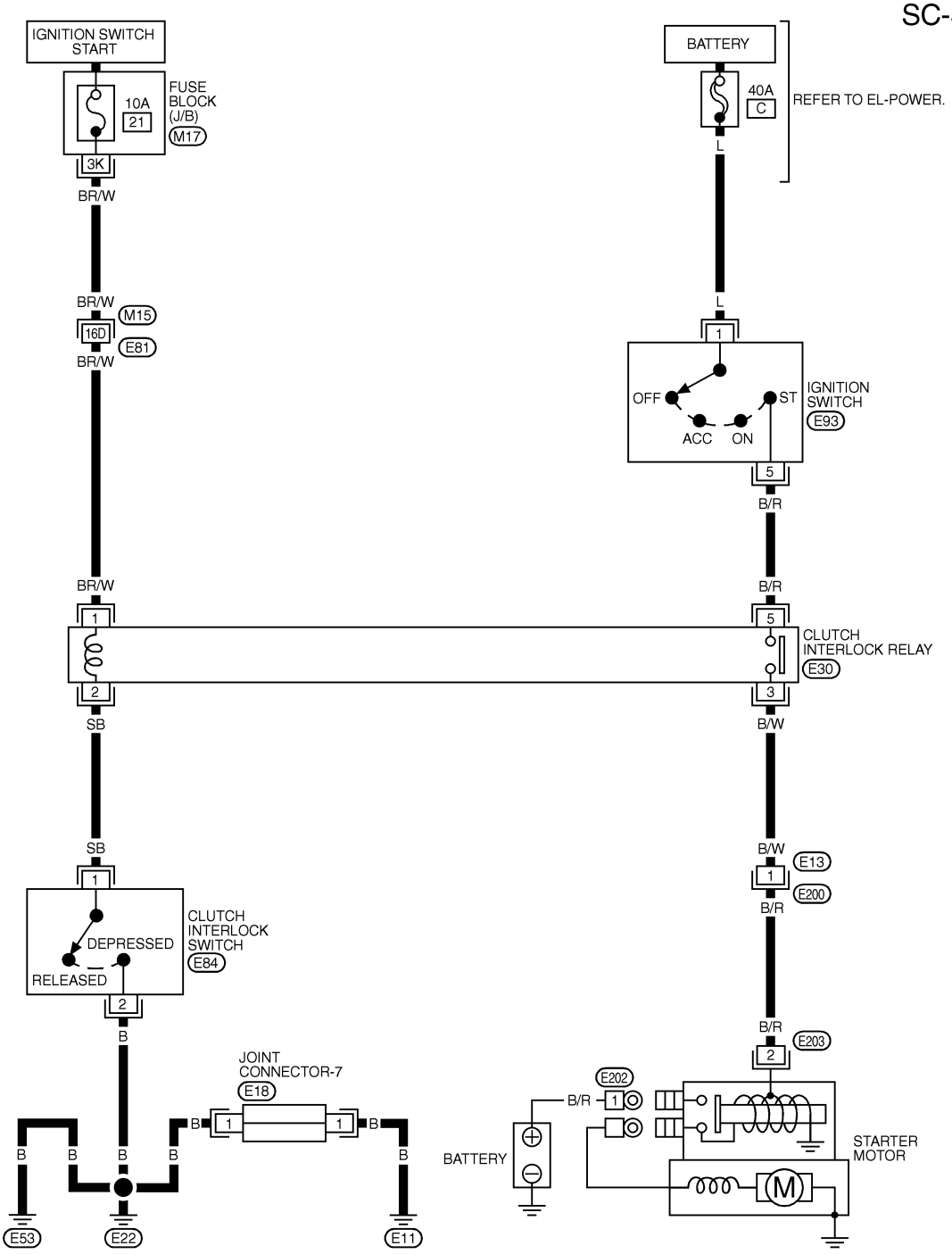
Wiring Diagram — START —

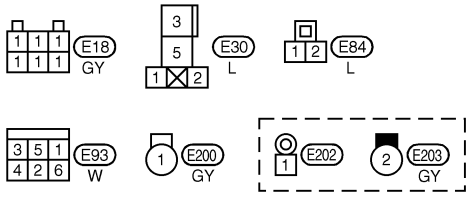
NFSC0005

M/T MODELS

NFSC0005S03

SC-START-01





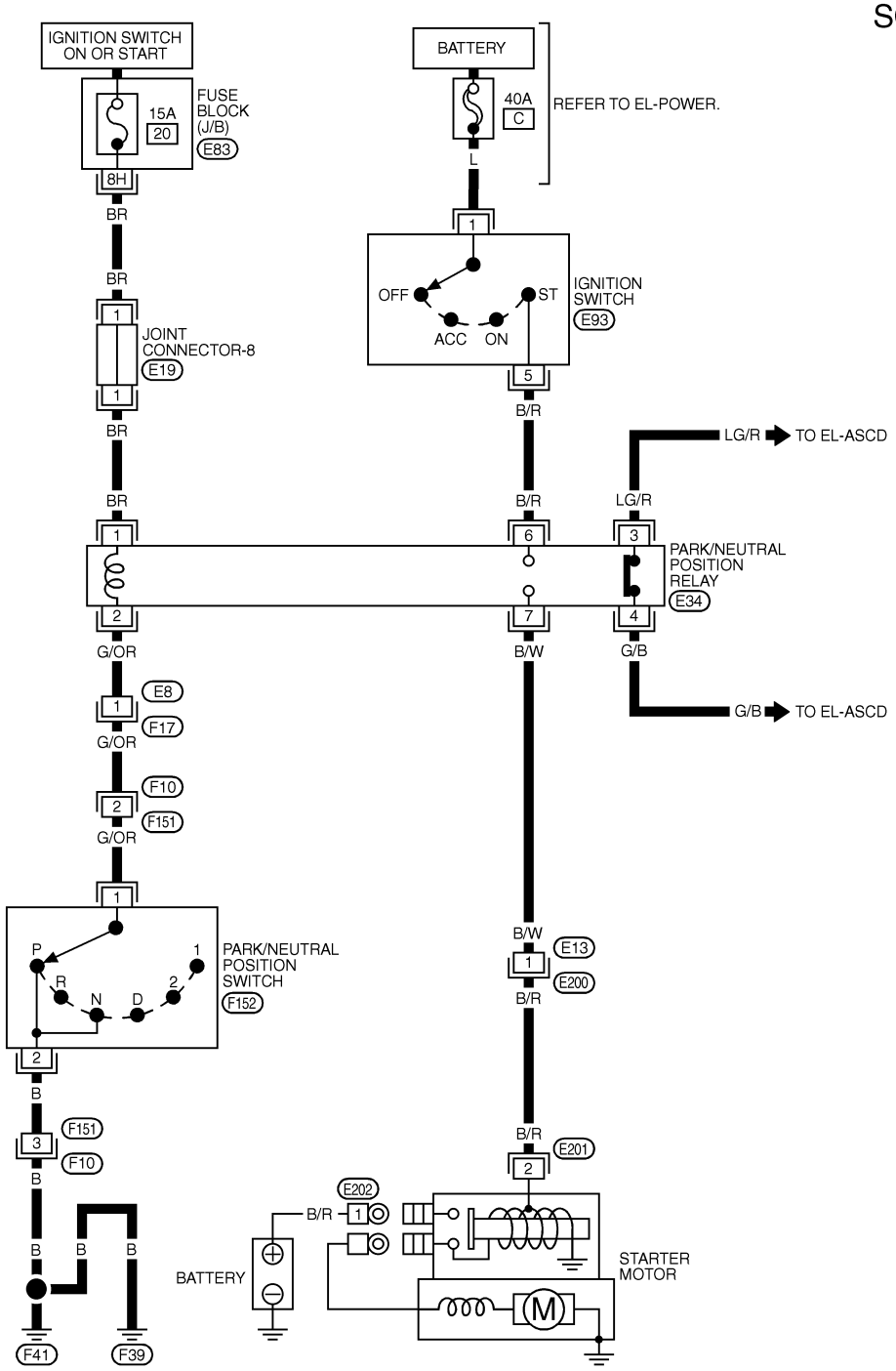
REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION(SMJ)
M17 -FUSE BLOCK-JUNCTION BOX(J/B)

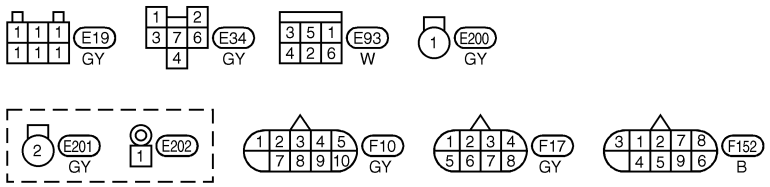
MEL390O

A/T MODELS

NFSC0005S04

SC-START-02





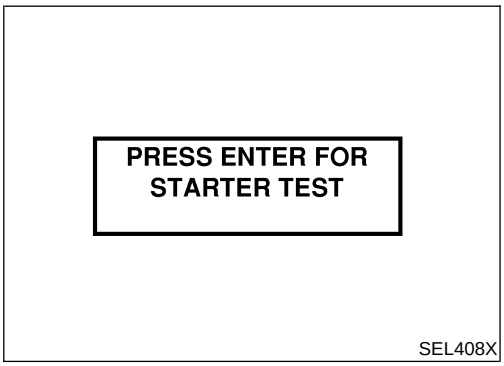
REFER TO THE FOLLOWING.
E83 -FUSE BLOCK-JUNCTION BOX(J/B)

MEL393O

Trouble Diagnoses with Battery/Starting/Charging System Tester

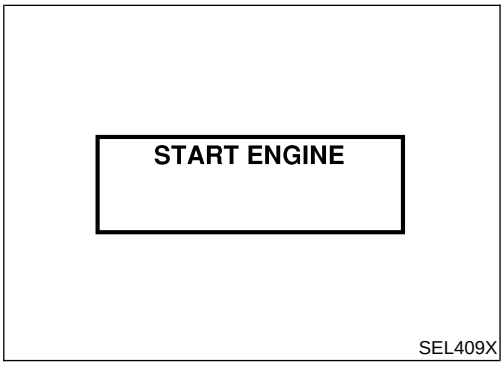
NFSC0019

NOTE:
To ensure a complete and thorough diagnosis, the battery, starter and alternator test segments must be done as a set from start to finish.



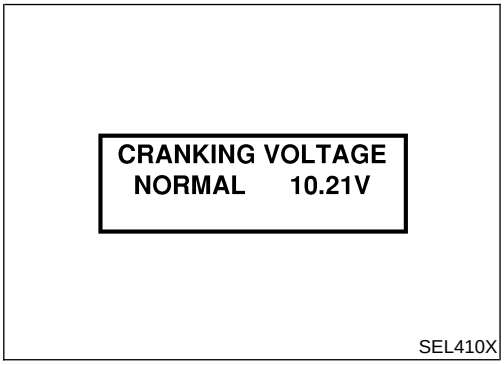
SEL408X

1. Turn off all loads on the vehicle electrical system.
2. Perform battery test with Battery/Starting/Charging system tester. Refer to SC-7.
3. Press “ENTER” to begin the starting system test.



SEL409X

4. Start the engine.



SEL410X

5. Diagnosis result is displayed on the tester. Refer to “DIAGNOSTIC RESULT ITEM CHART”, SC-14.

NOTE:
- If the starter performs normally but the engine does not start, perform engine diagnosis.
- For intermittent “NO CRANK” or “NO STARTER OPERATION” incidents, go to DIAGNOSTIC PROCEDURE 2.

Trouble Diagnoses with Battery/Starting/Charging System Tester (Cont'd)

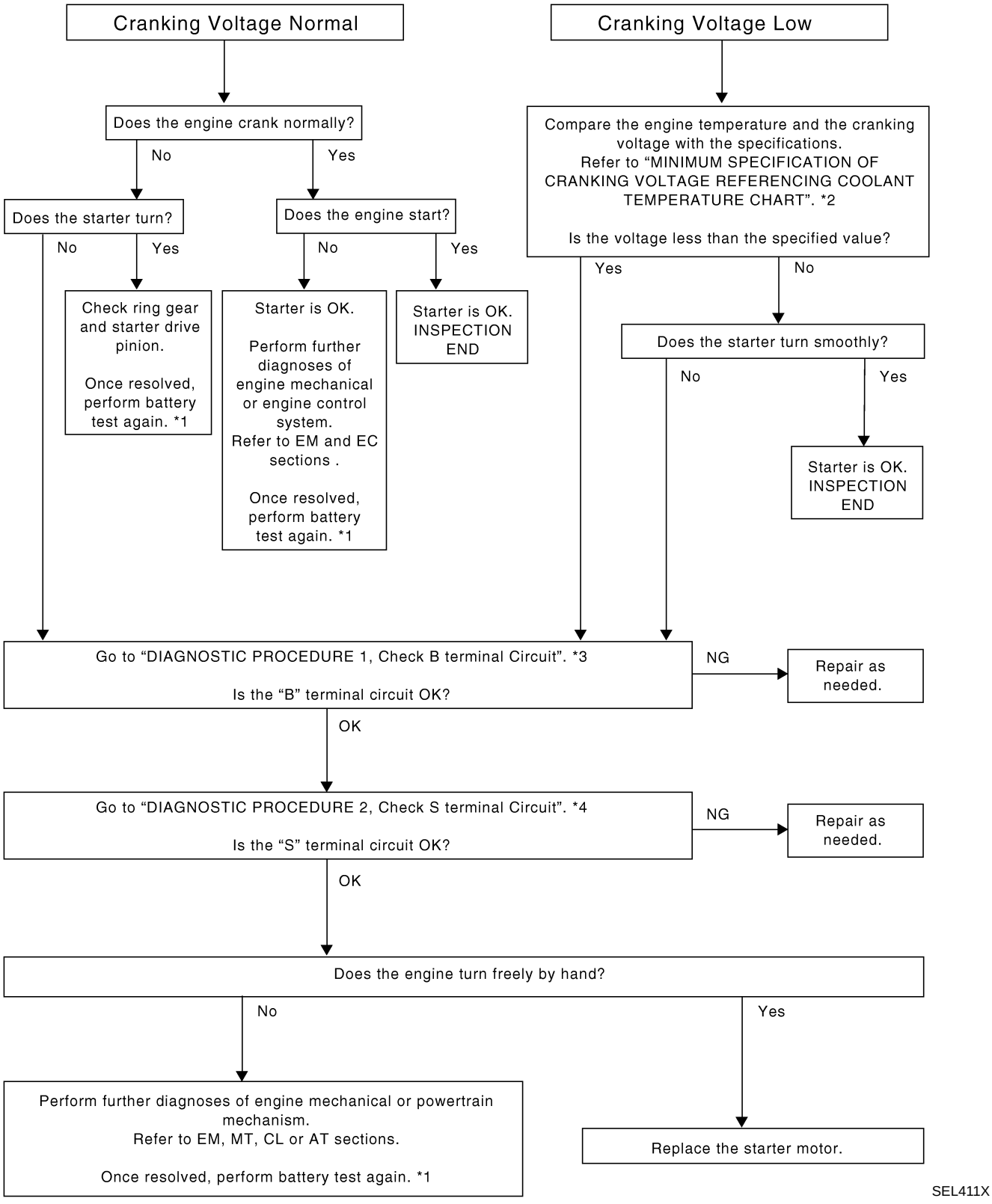
DIAGNOSTIC RESULT ITEM CHART

NFSC0019S01

Diagnostic item	Service procedure
CRANKING VOLTAGE NORMAL	Go to "WORK FLOW", SC-15.
CRANKING VOLTAGE LOW	Go to "WORK FLOW", SC-15.
CHARGE BATTERY	Perform the slow battery charging procedure. (Initial rate of charge is 10A for 12 hours.) Perform battery test again with Battery/Starting/Charging system tester. Refer to SC-7.
REPLACE BATTERY	Before replacing battery, clean the battery cable clamps and battery posts. Perform battery test again with Battery/Starting/Charging system tester. Refer to SC-7. If second test result is "REPLACE BATTERY", then do so. Perform battery test again to confirm repair.

WORK FLOW

NFSC0019S02



SEL411X

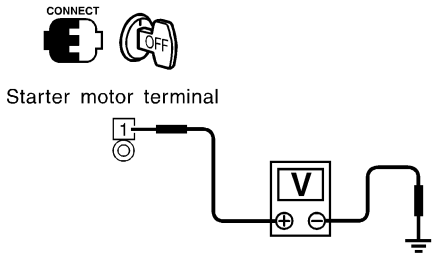
*1 SC-7 *3 SC-16 *4 SC-18
*2 SC-19

DIAGNOSTIC PROCEDURE 1
NFSC0019S03

Check "B" Terminal Circuit
NFSC0019S0301

1	CHECK POWER SUPPLY FOR STARTER MOTOR "B" TERMINAL

1. Remove the fuel pump fuse.
2. Crank or start the engine (where possible) until the fuel pressure is released.
3. Turn the ignition OFF.
4. Check that the starter motor connector E202 terminal 1 (B/R) connection is clean and tight.
5. Check voltage between starter motor connector E202 terminal 1 (B/R) and ground using a digital circuit tester.



Battery voltage should exist.

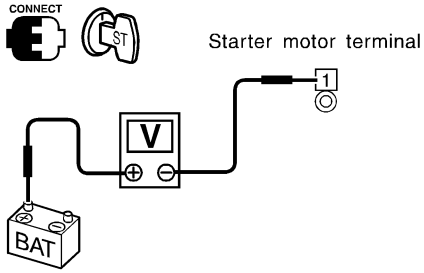
SEL961X

OK or NG

OK	▶	GO TO 2.
NG	▶	Check harness between the battery and the starter motor for open circuit.

2	CHECK BATTERY CABLE CONNECTION QUALITY (VOLTAGE DROP TEST)

1. Check voltage between starter motor connector E202 terminal 1 (B/R) and battery positive terminal using a digital circuit tester.



When the ignition switch is in START position,
Voltage: Less than 0.5V

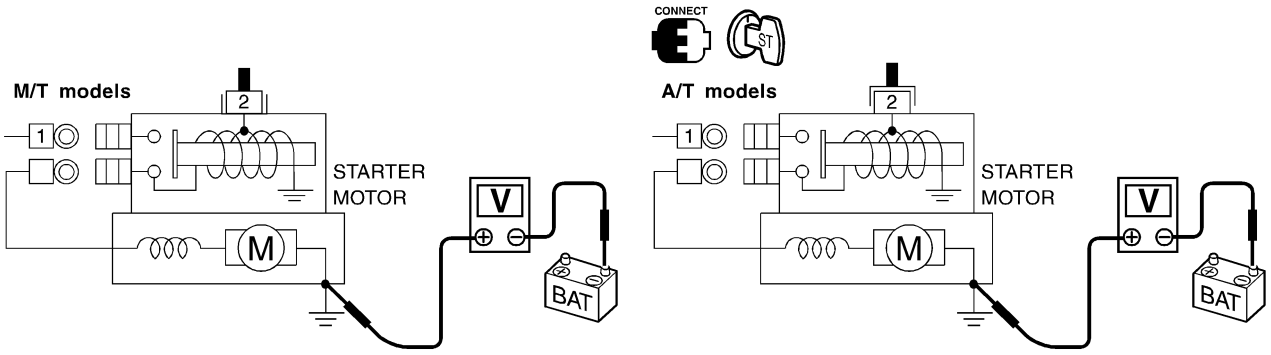
SEL962X

OK or NG

OK	▶	GO TO 3.
NG	▶	Check harness between the battery and the starter motor for poor continuity.

3	CHECK STARTER MOTOR GROUND CIRCUIT (VOLTAGE DROP TEST)

1. Check voltage between starter motor case and battery negative terminal using a digital circuit tester.



When the ignition switch is in START position,
Voltage: Less than 0.2V

SEL372Y

OK or NG

OK	▶	Starter motor "B" terminal circuit is OK. Further inspection necessary. Refer to "WORK FLOW", SC-15.
NG	▶	Check the starter motor case and ground for poor continuity.

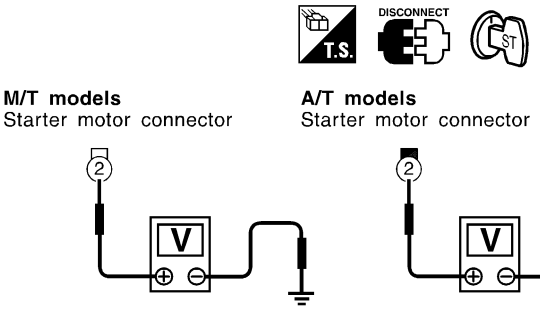
DIAGNOSTIC PROCEDURE 2
Check "S" Terminal Circuit

=NFSC0019S04

NFSC0019S0401

1	CHECK POWER SUPPLY FOR STARTER MOTOR "S" TERMINAL

1. Remove the fuel pump fuse.
2. Crank or start the engine (where possible) until the fuel pressure is released.
3. Turn the ignition OFF.
4. Disconnect starter motor connector.
5. Check voltage between starter motor connector E203 terminal 2 (B/R) (M/T models) or E201 terminal 2 (B/R) (A/T models) and ground using a digital circuit tester.



When the ignition switch is in START position,
Battery voltage should exist.

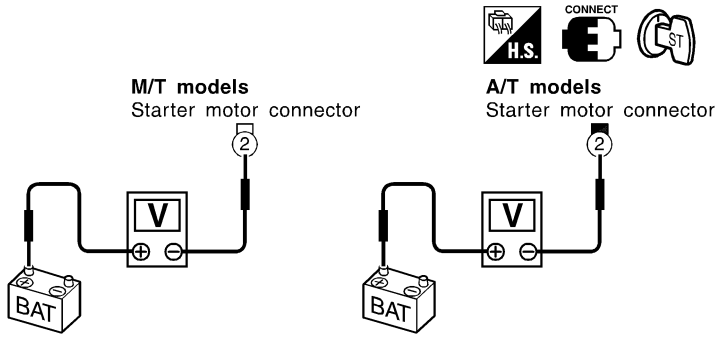
SEL373Y

OK or NG

OK	▶	GO TO 2.
NG	▶	**Check the following.** ● 40A fusible link (letter **C**, located in fuse and fusible link box) ● Park/neutral position relay ● Harness for open or short

2	CHECK "S" TERMINAL CONNECTION QUALITY (VOLTAGE DROP TEST)

1. Connect starter motor connector.
2. Check voltage between starter motor connector E203 terminal 2 (B/R) (M/T models) or E201 terminal 2 (B/R) (A/T models) and battery positive terminal using a digital tester.



When the ignition switch is in START position,
Voltage: Less than 1V

SEL374Y

OK or NG

OK	▶	Starter motor "S" terminal circuit is OK. Further inspection necessary. Refer to "WORK FLOW", SC-15.
NG	▶	Check harness between the battery and the starter motor "S" terminal for poor continuity.

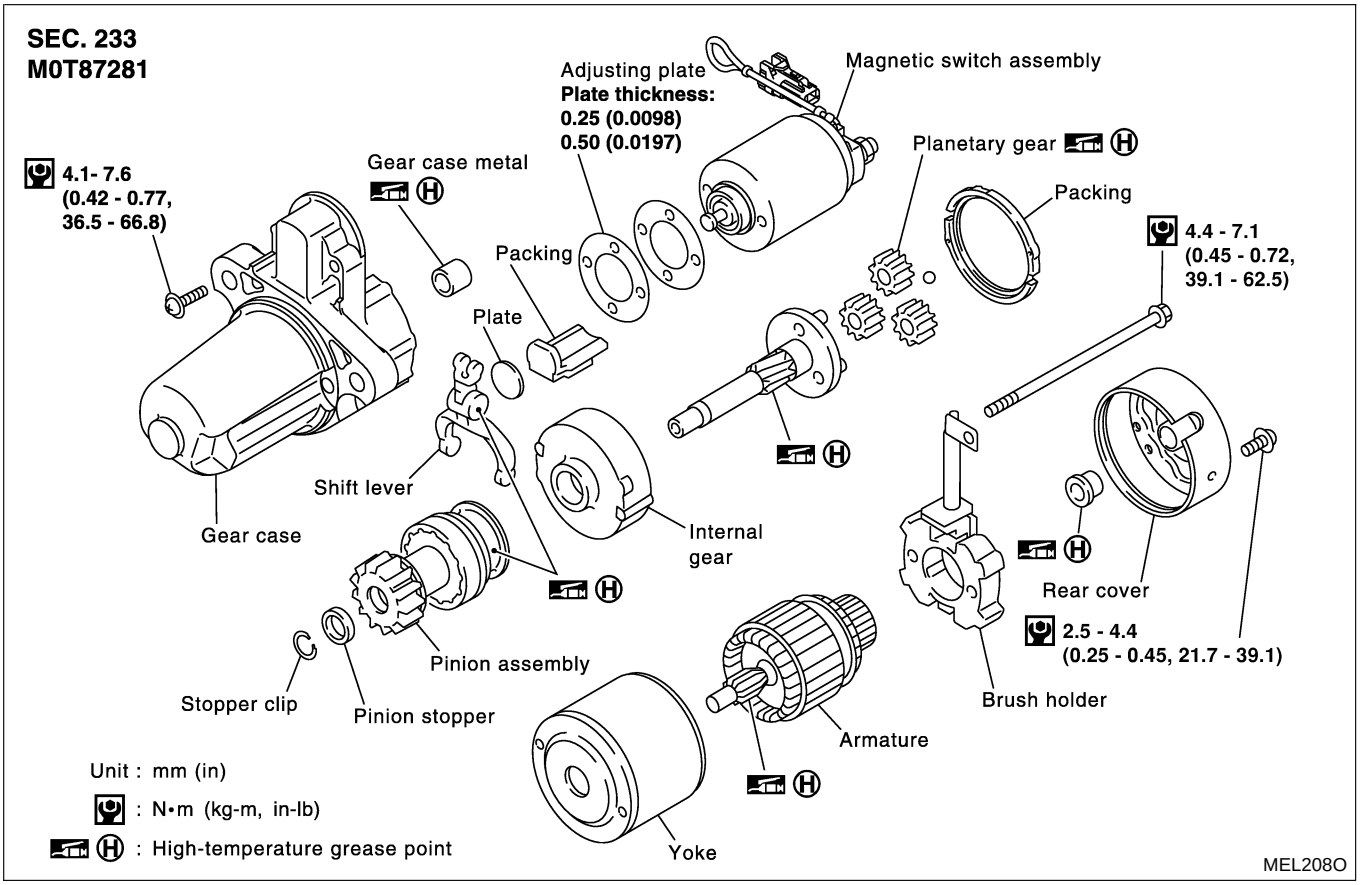
MINIMUM SPECIFICATION OF CRANKING VOLTAGE REFERENCING COOLANT TEMPERATURE

NFSC0019S05

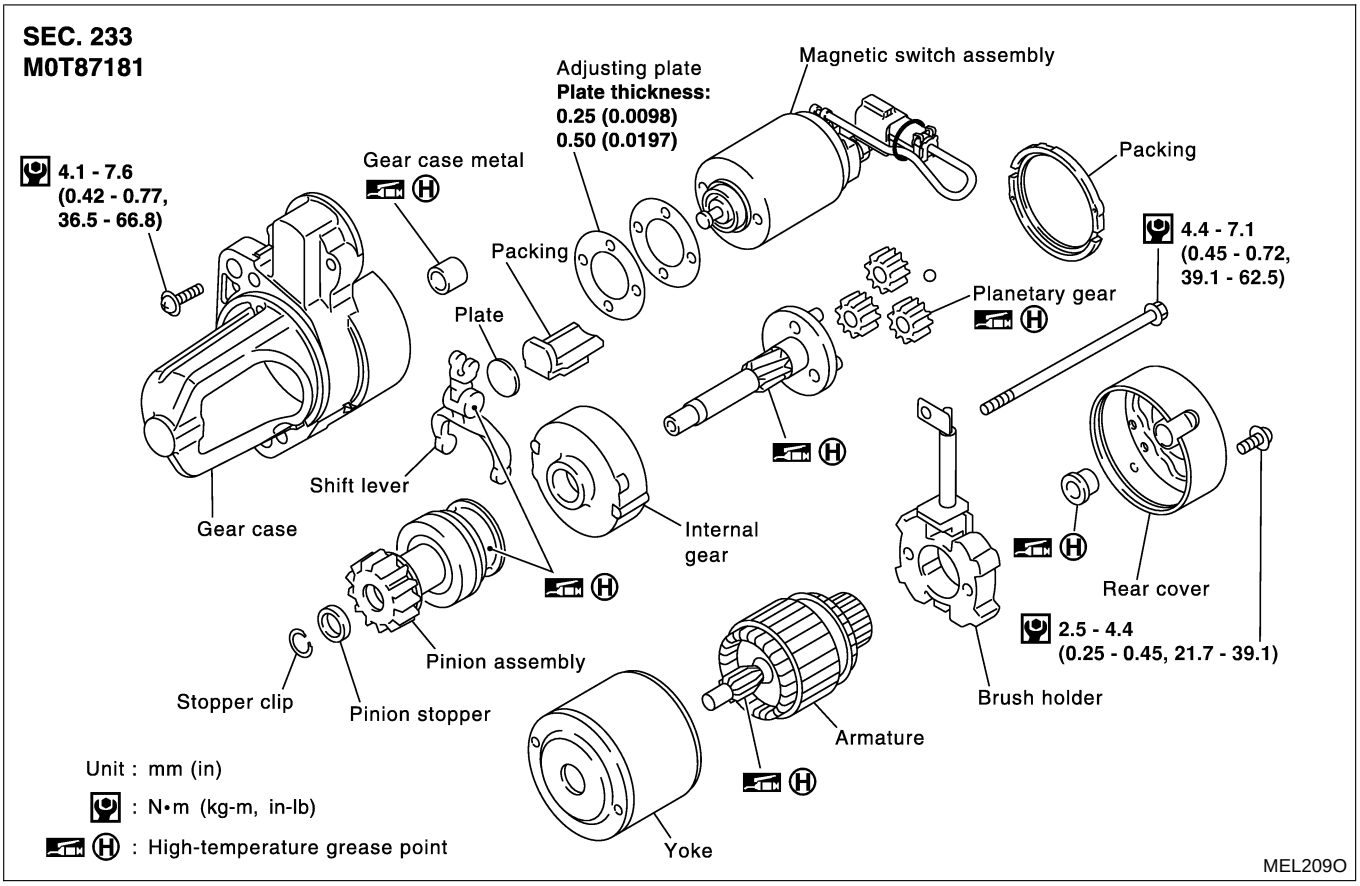
Engine coolant temperature	Voltage V
−30°C to −20°C (−22°F to −4°F)	8.2
−19°C to −10°C (−2°F to 14°F)	8.7
−9°C to 0°C (16°F to 32°F)	9.1
More than 1°C (More than 34°F)	9.4

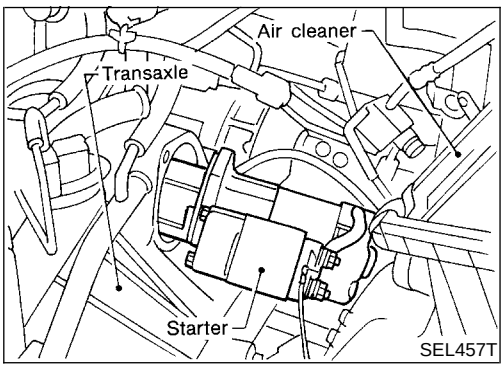
Construction

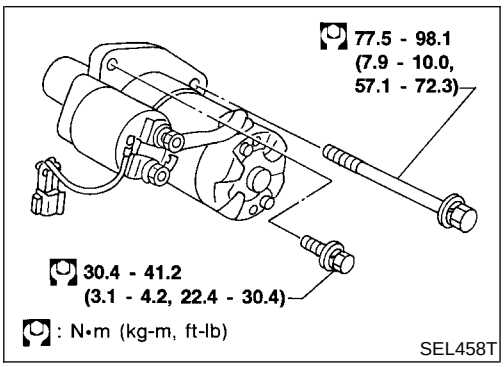
NFSC0006



Construction (Cont'd)







Removal and Installation

NFSC0007

REMOVAL

NFSC0007S01

1. Remove air duct assembly.
2. Remove harness protector from engine room harness.
3. Disconnect starter harness.
4. Remove starter bolts (two).
5. Remove starter.

INSTALLATION

NFSC0007S02

To install, reverse the removal procedure.

Pinion/Clutch Check

NFSC0008

1. Inspect pinion teeth.
- Replace pinion if teeth are worn or damaged. (Also check condition of ring gear teeth.)
2. Inspect reduction gear teeth.
- 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.

System Description

NFSC0009

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 3 (S) through:

- 120A fusible link (letter **A**, located in the fuse and fusible link box), and
- 10A fuse (No. 70, located in the fuse and fusible link box).

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 3 (S) detecting the input voltage. The charging circuit is protected by the 120A fusible link.
The alternator is grounded to the engine block.
With the ignition switch in the ON or START position, power is supplied

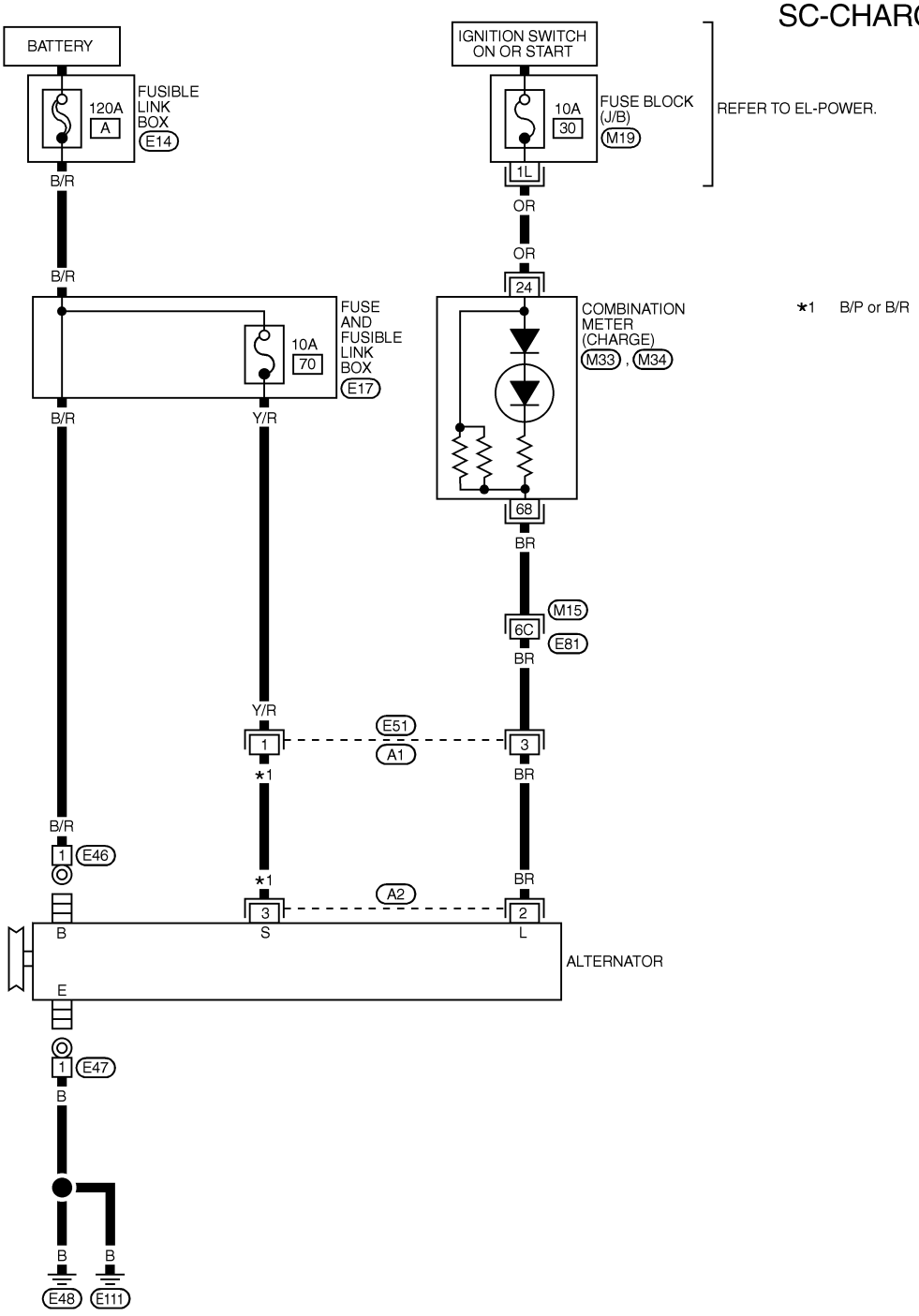
- through 10A fuse [No. 30, located in the fuse block (J/B)]
- to combination meter terminal 24 for the charge warning lamp.

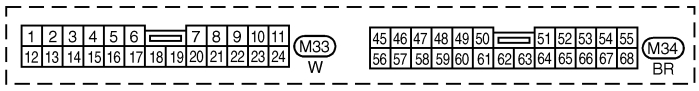
Ground is supplied to terminal 68 of the combination meter through terminal 2 (L) of the alternator. With power and ground supplied, the charge warning lamp will illuminate. When the alternator is providing sufficient voltage with the engine running, the ground is opened and the charge warning lamp will go off.
If the charge warning lamp illuminates with the engine running, a fault is indicated.

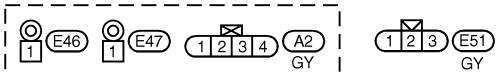
Wiring Diagram — CHARGE —

NFSC0010

SC-CHARGE-01







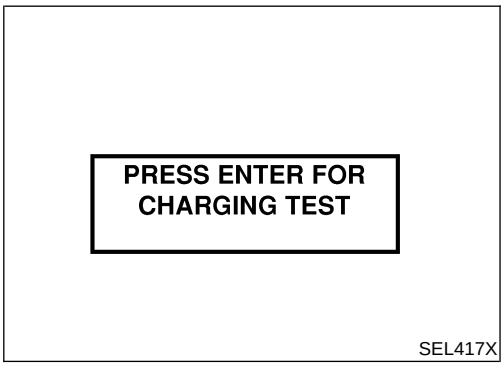
REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION(SMJ)
M19 -FUSE BLOCK-JUNCTION BOX(J/B)
E14 -FUSIBLE LINK BOX
E17 -FUSE AND FUSIBLE LINK BOX

MEL825P

Trouble Diagnoses with Battery/Starting/Charging System Tester

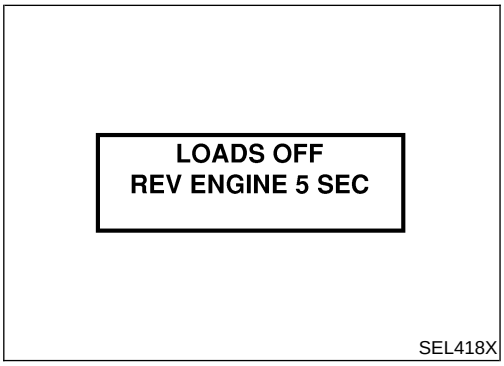
NFSC0020

NOTE:
To ensure a complete and thorough diagnosis, the battery, starter and alternator test segments must be done as a set from start to finish.



SEL417X

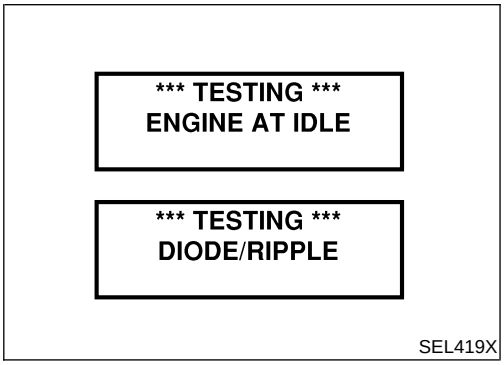
1. Turn off all loads on the vehicle electrical system.
2. Perform battery and starting system test with Battery/Starting/Charging system tester.
3. Press “ENTER” to begin the charging system test.
4. Start engine.



SEL418X

5. Press “ENTER” until “LOADS OFF REV ENGINE 5 SEC” is displayed.
6. Raise and hold the engine speed at 1,500 to 2,000 rpm for about 5 seconds, then return to the engine to idle.
   Once the increase in engine rpm is detected, press “ENTER” to continue.

NOTE:
- If after 30 seconds an increase in engine idle speed is not detected, “RPM NOT DETECTED” will display.
- Some engines may have a higher idle initially after starting, particularly when the engine is cold. The tester may detect this without any other action being taken. If this occurs, continue on with the testing process. The final results will not be affected.

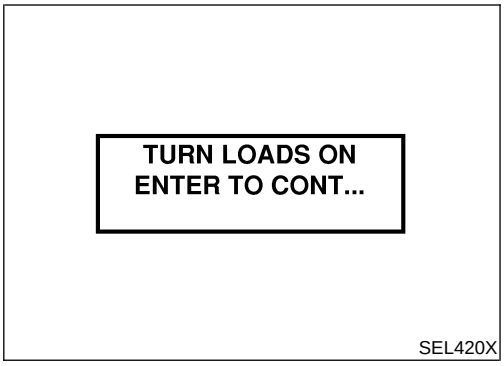


SEL419X

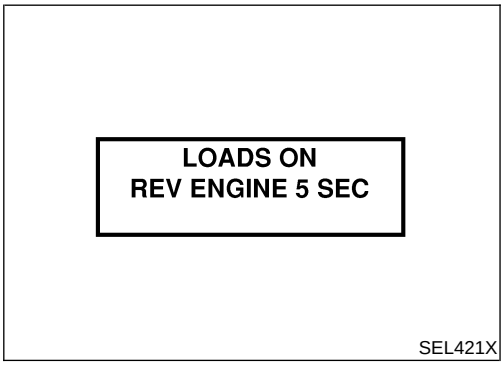
7. The tester now checks the engine at idle and performs the DIODE/RIPPLE check.
8. When complete, the tester will prompt you to turn on the following electrical loads.

- Heater fun set to highest. Do not run the A/C or windshield defroster.
- Headlamp high beam
- Rear window defogger

NOTE:
Do not run the windshield wipers or any other cyclical loads.

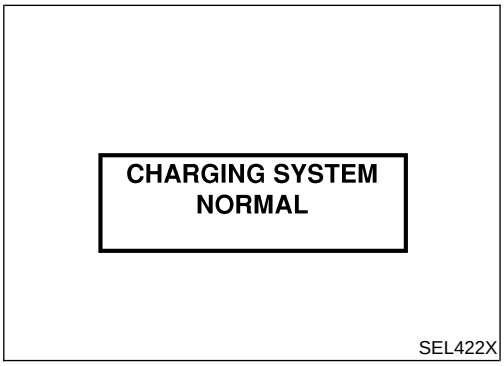


9. Press "ENTER" to continue.

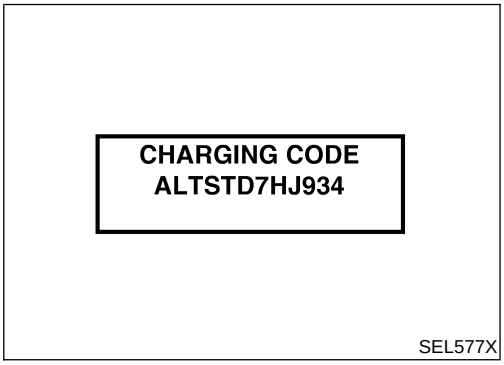


10. Raise and hold the engine speed at 1,500 to 2,000 rpm for about 5 seconds, then return the engine to idle. Once the increase in engine rpm is detected, press "ENTER" to continue.

NOTE:
If after 30 seconds an increase in engine idle speed is not detected, "RPM NOT DETECTED" will be displayed. Press "ENTER" to restart the test.



11. Diagnostic result is displayed on the tester. Refer to "DIAGNOSTIC RESULT ITEM CHART", SC-26.



12. Press "ENTER" then test output code is displayed. Record the test output code on the repair order.
13. Toggle back to the "DIAGNOSTIC SCREEN" for test results.

Trouble Diagnoses with Battery/Starting/Charging System Tester (Cont'd)

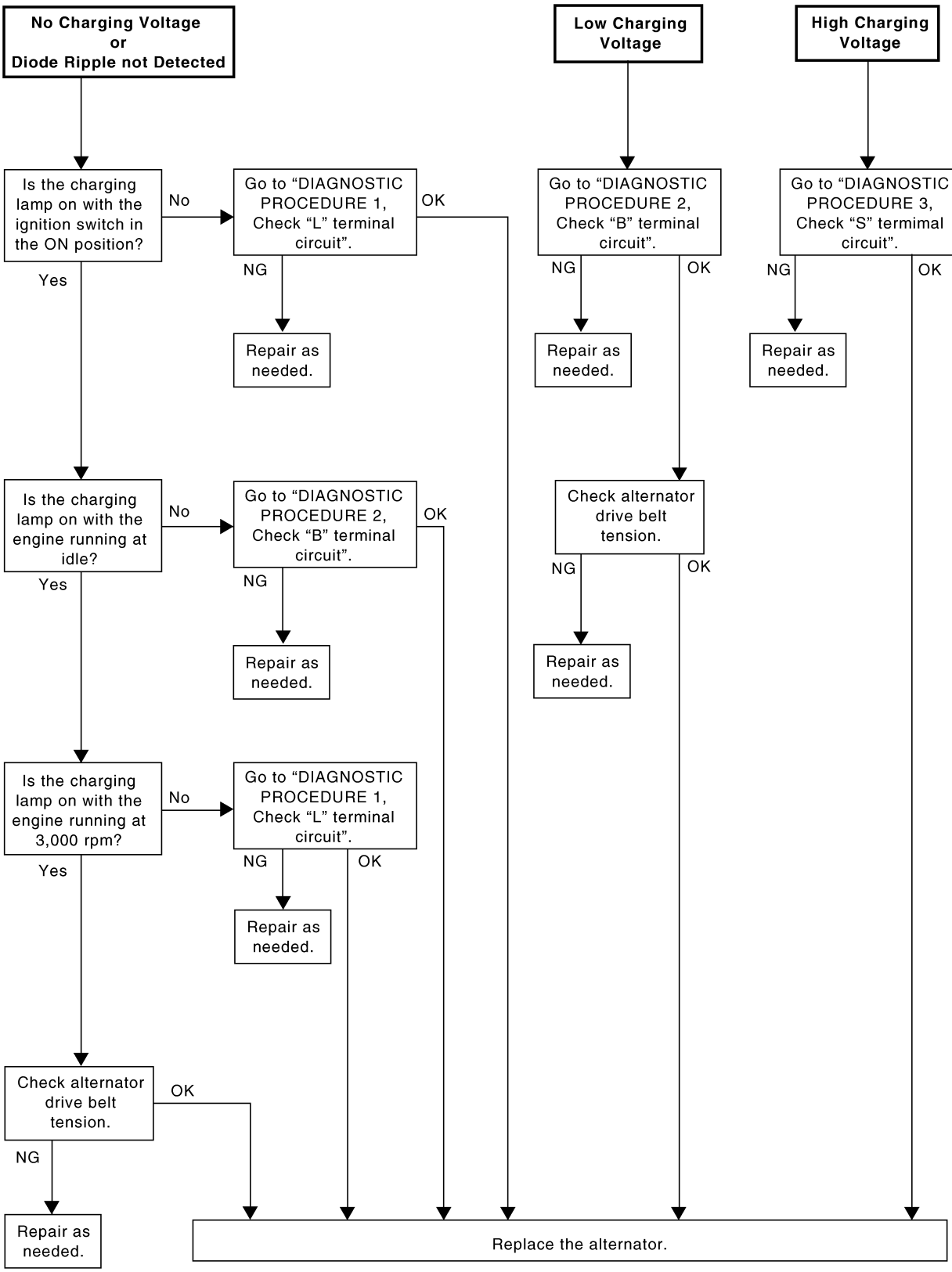
DIAGNOSTIC RESULT ITEM CHART

NFSC0020S01

Diagnostic item	Service procedure
CHARGING SYSTEM NORMAL	Charging system is normal and will also show DIODE RIPPLE test result.
NO CHARGING VOLTAGE	Go to "WORK FLOW", SC-27.
LOW CHARGING VOLTAGE	Go to "WORK FLOW", SC-27.
HIGH CHARGING VOLTAGE	Go to "WORK FLOW", SC-27.
DIODE RIPPLE NORMAL	Diode ripple is OK and will also show CHARGING VOLTAGE test result.
EXCESS RIPPLE DETECTED	Replace the alternator. Perform "DIODE RIPPLE" test again using Battery/Starting/ Charging system tester to confirm repair.
DIODE RIPPLE NOT DETECTED	Go to "WORK FLOW", SC-27.

WORK FLOW

NFSC0020S02



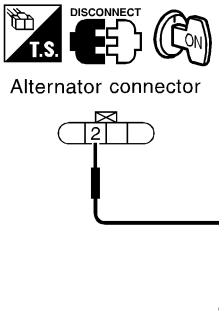
SEL423X

DIAGNOSTIC PROCEDURE 1
Check "L" Terminal Circuit

NFSC0020S03

NFSC0020S0301

1	CHECK "L" TERMINAL CONNECTION	
Check to see if "L" terminal is clean and tight. **OK or NG**		
OK	▶	GO TO 2.
NG	▶	Repair "L" terminal connection. Confirm repair by performing complete Battery/Starting/Charging system test.

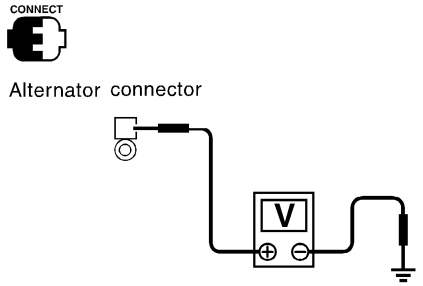
2	CHECK "L" TERMINAL CIRCUIT	
1. Disconnect alternator connector. 2. Apply ground to alternator connector A2 terminal 2 (BR) with the ignition switch in the ON position.  **CHARGE lamp should light up.** SEL966X **OK or NG**		
OK	▶	Replace the alternator. Confirm repair by performing complete Battery/Starting/Charging system test.
NG	▶	**Check the following.** ● 10A fuse [No. 30, located in fuse block (J/B)] ● CHARGE lamp ● Harness for open or short between combination meter and fuse ● Harness for open or short between combination meter and alternator

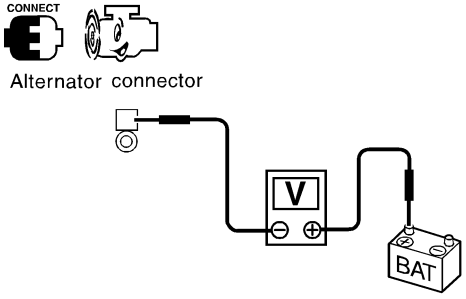
DIAGNOSTIC PROCEDURE 2
Check "B" Terminal Circuit

=NFSC0020S04

NFSC0020S0401

1	CHECK "B" TERMINAL CONNECTION	
Check to see if "B" terminal is clean and tight. **OK or NG**		
OK	▶	GO TO 2.
NG	▶	Repair "B" terminal connection. Confirm repair by performing complete Battery/Starting/Charging system test.

2	CHECK ALTERNATOR "B" TERMINAL CIRCUIT	
Check voltage between alternator connector E46 terminal B (B/R) and ground using a digital circuit tester.  **Battery voltage should exist.** SEL967X **OK or NG**		
OK	▶	GO TO 3.
NG	▶	**Check the following.** ● 120A fusible link (letter **A**, located in fuse and fusible link box) ● Harness for open or short between alternator and fusible link

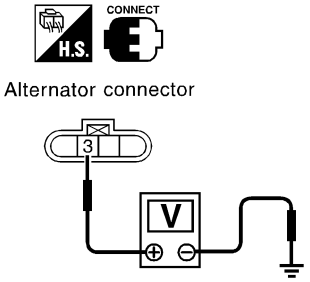
3	CHECK "B" TERMINAL CONNECTION QUALITY (VOLTAGE DROP TEST)	
Check voltage between alternator connector E46 terminal B (B/R) and battery positive terminal using a digital tester.  When the engine running at idle and warm, **Voltage: Less than 0.2V** SEL968X **OK or NG**		
OK	▶	Replace the alternator. Confirm repair by performing complete Battery/Starting/Charging system test.
NG	▶	Check harness between the battery and the alternator for poor continuity.

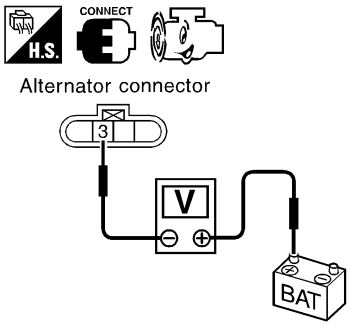
DIAGNOSTIC PROCEDURE 3
Check "S" Terminal Circuit

=NFSC0020S05

NFSC0020S0501

1	CHECK "S" TERMINAL CONNECTION	
Check to see if "S" terminal is clean and tight.		
OK or NG		
OK	▶	GO TO 2.
NG	▶	Repair "S" terminal connection. Confirm repair by performing complete Battery/Starting/Charging system test.

2	CHECK ALTERNATOR "S" TERMINAL CIRCUIT	
Check voltage between alternator connector A2 terminal 3 (B/P or B/R) and ground using a digital circuit tester.		
 SEL969X		**Battery voltage should exist.**
OK or NG		
OK	▶	GO TO 3.
NG	▶	**Check the following.** ● 10A fuse (No. 70, located in fuse and fusible link box) ● Harness for open or short between alternator and fuse

3	CHECK "S" TERMINAL CONNECTION QUALITY (VOLTAGE DROP TEST)	
Check voltage between alternator connector A2 terminal 3 (B/P or B/R) and battery positive terminal using a digital tester.		
 SEL970X		When the engine running at idle and warm, **Voltage: Less than 0.2V**
OK or NG		
OK	▶	Replace the alternator. Confirm repair by performing complete Battery/Starting/Charging system test.
NG	▶	Check harness between the battery and the alternator for poor continuity.

MALFUNCTION INDICATOR

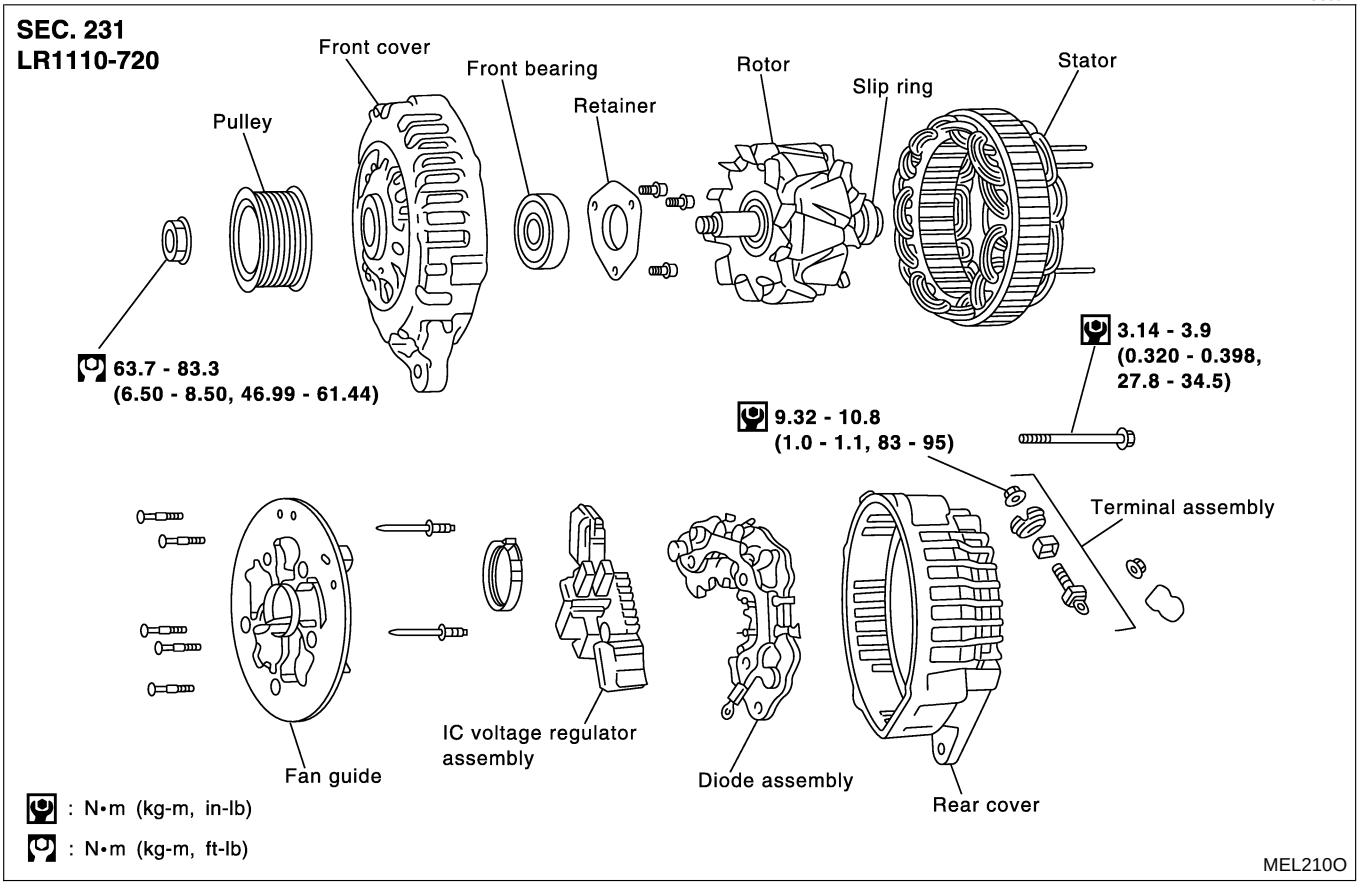
NFSC0020S06

The IC regulator warning function activates to illuminate "CHARGE" warning lamp, if any of the following symptoms occur while alternator is operating:

- Excessive voltage is produced.
- No voltage is produced.

Construction

NFSC0012



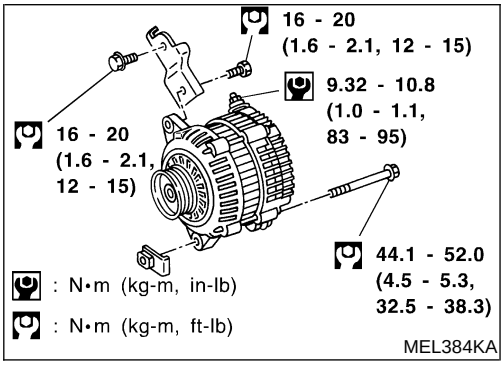
Removal and Installation

NFSC0013

REMOVAL

NFSC0013S01

1. Remove engine undercover RH.
2. Remove side inspection cover RH.
3. Remove radiator.
4. Loosen belt idler pulley.
5. Remove drive belt.
6. Disconnect alternator harness connector and A/C compressor harness connector.
7. Remove alternator upper bolt and lower bolt.



INSTALLATION

NFSC0013S02

To install, reverse the removal procedure.

Battery

NFSC0014

Type	80D26L
Capacity V-AH	12-55
Cold cranking current A (For reference value)	582

Starter

NFSC0015

Type		M0T87281	M0T87181
		MITSUBISHI make	
		Reduction gear type	
Applied model		M/T	A/T
System voltage		12V	
No-load	Terminal voltage	11.0V	
	Current	Less than 90A	
	Revolution	More than 2,800 rpm	
Minimum diameter of commutator		28.8 mm (1.134 in)	
Minimum length of brush		7.0 mm (0.276 in)	
Brush spring tension		18.3 - 24.8 N (1.87 - 2.53 kg, 4.12 - 5.58 lb)	
Clearance between bearing metal and armature shaft		Less than 0.2 mm (0.008 in)	
Clearance between pinion front edge and pinion stopper		0.5 - 2.0 mm (0.020 - 0.079 in)	

Alternator

NFSC0016

Type	LR1110-720
	HITACHI make
Nominal rating	12V-110A
Ground polarity	Negative
Minimum revolution under no-load (When 13.5 volts is applied)	Less than 1,100 rpm
Hot output current (When 13.5 volts is applied)	(More than 24A/1,300 rpm) More than 67A/1,800 rpm More than 87A/2,500 rpm More than 105A/5,000 rpm
Regulated output voltage	14.1 - 14.7V
Minimum length of brush	More than 6.00 mm (0.2362 in)
Brush spring pressure	1.000 - 3.432 N (102 - 350 g, 3.60 - 12.34 oz)
Slip ring minimum outer diameter	More than 26.0 mm (1.024 in)
Rotor (Field coil) resistance	2.16 - 2.46Ω

STEERING SYSTEM

SECTION ST

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

NFST0038

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER” used along with a seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. The SRS system composition which is available to NISSAN MODEL A33 is as follows:

- For a frontal collision
  The Supplemental Restraint System consists of driver air bag module (located in the center of the steering wheel), front passenger air bag module (located on the instrument panel on passenger side), seat belt pre-tensioners, a diagnosis sensor unit, crash zone sensor, warning lamp, wiring harness and spiral cable.
- For a side collision
  The Supplemental Restraint System consists of front side air bag module (located in the outer side of front seat), satellite sensor, diagnosis sensor unit (one of components of air bags for a frontal collision), wiring harness, warning lamp (one of components of air bags for a frontal collision).

Information necessary to service the system safely is included in the **RS 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 should be performed by an authorized NISSAN 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 RS 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 with yellow harness connector.**

Precautions for Steering System

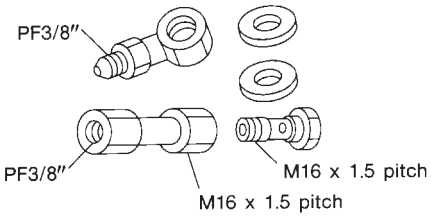
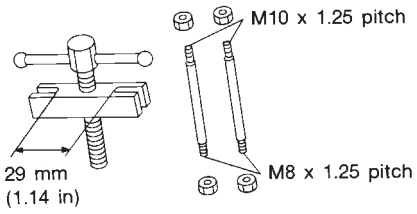
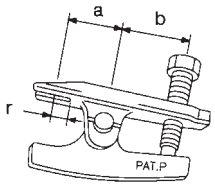
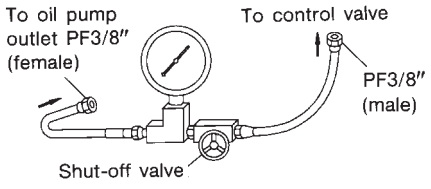
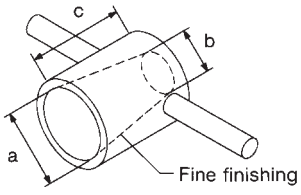
NFST0003

- **Before disassembly, thoroughly clean the outside of the unit.**
- **Disassembly should be done in a clean work area. It is important to prevent the internal parts from becoming contaminated by dirt or other foreign matter.**
- **Place disassembled parts in order, on a parts rack, for easier and proper assembly.**
- **Use nylon cloths or paper towels to clean the parts; common shop rags can leave lint that might interfere with their operation.**
- **Before inspection or reassembly, carefully clean all parts with a general purpose, non-flammable solvent.**
- **Before assembly, apply a coat of recommended power steering fluid* to hydraulic parts. Vaseline may be applied to O-rings and seals. Do not use any grease.**
- **Replace all gaskets, seals and O-rings. Avoid damaging O-rings, seals and gaskets during installation. Perform functional tests whenever designated.**
  ***: Genuine Nissan PSF II or equivalent. Refer to MA-11, “Fluids and Lubricants”.**

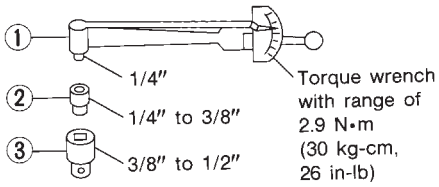
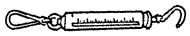
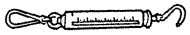
Special Service Tools

NFST0004

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

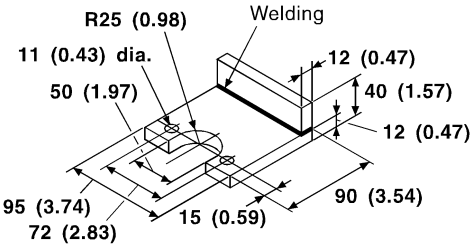
Tool number (Kent-Moore No.) Tool name	Description	
KV48100700 (J26364) Torque adapter	NT169	Measuring pinion rotating torque
KV48102500 (J33914) Pressure gauge adapter	 NT542	Measuring oil pressure
ST27180001 (J25726-A) Steering wheel puller	 NT544	Removing steering wheel
HT72520000 (J25730-B) Ball joint remover	 NT546	Removing ball joint **a: 33 mm (1.30 in)** **b: 50 mm (1.97 in)** **r: R11.5 mm (0.453 in)**
KV48103500 (J26357 and J26357-10) Pressure gauge	 NT547	Measuring oil pressure
KV48104400 (—) Rack seal ring reformer	 NT550	Reforming teflon ring **a: 50 mm (1.97 in) dia.** **b: 36 mm (1.42 in) dia.** **c: 100 mm (3.94 in)**

Special Service Tools (Cont'd)

Tool number (Kent-Moore No.) Tool name	Description	
ST3127S000 1 GG91030000 (See J25765-A) Torque wrench 2 HT62940000 (—) Socket adapter 3 HT62900000 (—) Socket adapter	 NT541	Measuring turning torque
(J-44372) Spring gauge	 LST024	Measuring steering wheel turning force
(J-44183-A) Spring gauge	 LST025	Measuring rack sliding force

Commercial Service Tool

NFST0005

Tool number	Description	
Oil pump attachment	 NT774	Disassembling and assembling oil pump Unit: mm (in)

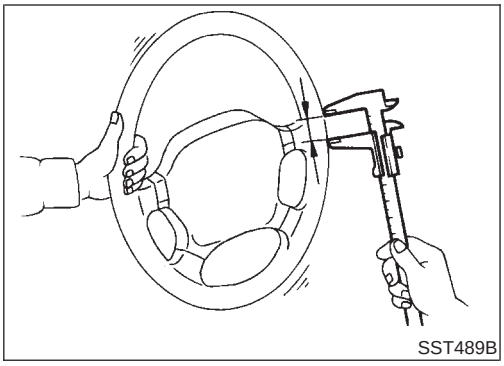
NVH Troubleshooting Chart

NFST0006S01

Use the chart below to help you find the cause of the symptom. If necessary, repair or replace these parts.

Reference page			ST-7	ST-7	ST-18	ST-18	ST-18	ST-7	ST-6	ST-8	Refer to MA-13.	—	ST-10	ST-6	ST-13	ST-12	ST-14	NVH in AX section Refer to AX-3.	NVH in AX section Refer to AX-3.	NVH in SU section Refer to SU-4.	NVH in SU section Refer to SU-4.	NVH in SU section Refer to SU-4.	NVH in BR section Refer to BR-7.
Possible cause and SUSPECTED PARTS			Fluid level	Air in hydraulic system	Tie-rod ball joint swinging force	Tie-rod ball joint rotating torque	Tie-rod ball joint end play	Steering gear fluid leakage	Steering wheel play	Steering gear rack sliding force	Drive belt looseness	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	DRIVE SHAFT	AXLE	SUSPENSION	TIRES	ROAD WHEEL	BRAKES
Symptom	STEERING	Noise	×	×	×	×	×	×	×	×	×							×	×	×	×	×	×
		Shake										×	×	×				×	×	×	×	×	×
		Vibration										×	×	×	×	×		×	×	×	×		
		Shimmy										×	×	×			×		×	×	×	×	×
		Judder												×			×		×	×	×	×	×

×: Applicable


SST489B

Checking Steering Wheel Play

NFST0007

- With wheels in a straight-ahead position, check steering wheel play.

  Steering wheel play:

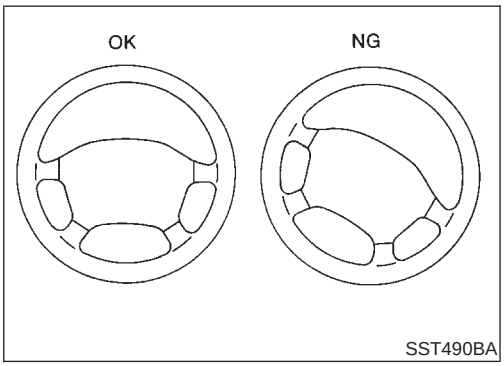
  35 mm (1.38 in) or less

- If it is not within specification, check the following for loose or worn components.

  Steering gear assembly

  Steering column

  Front suspension and axle



SST490BA

Checking Neutral Position on Steering Wheel

NFST0008

PRE-CHECKING

NFST0008S01

- Make sure that wheel alignment is correct.

  Wheel alignment:

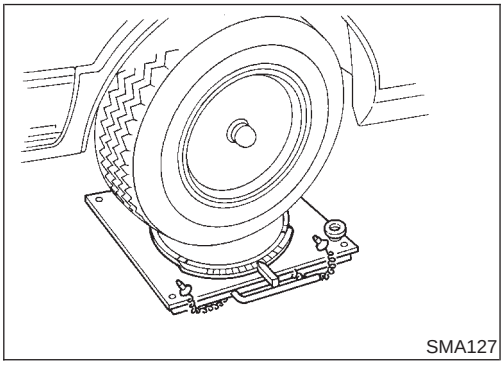
  Refer to SU-14, SDS.

- Verify that the steering gear is centered before removing the steering wheel.

CHECKING

NFST0008S02

1. Check that the steering wheel is in the neutral position when driving straight ahead.
2. If it is not in the neutral position, remove the steering wheel and reinstall it correctly.
3. If the neutral position is between two teeth, loosen tie-rod lock nuts. Turn the tie-rods by the same amount in opposite directions on both left and right sides.


SMA127

Front Wheel Turning Angle

NFST0009

1. Rotate steering wheel all the way right and left; measure turning angle.

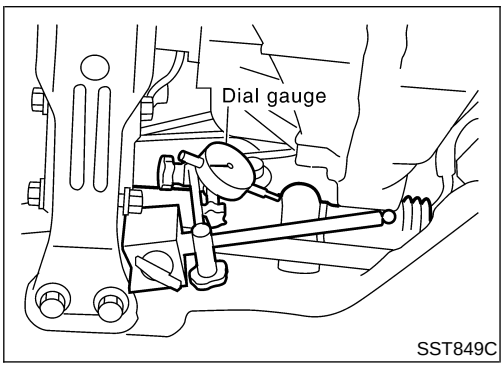
   Turning angle of full turns:

   Refer to SU-14, SDS.

2. If it is not within specification, check rack stroke.

   Rack stroke “S”:

   Refer to SDS, ST-29.



SST849C

Checking Gear Housing Movement

NFST0010

1. Check the movement of steering gear housing during stationary steering on a dry paved surface.

- Apply a force of 49 N (5 kg, 11 lb) to steering wheel to check the gear housing movement.
  Turn off ignition key while checking.

  Movement of gear housing:

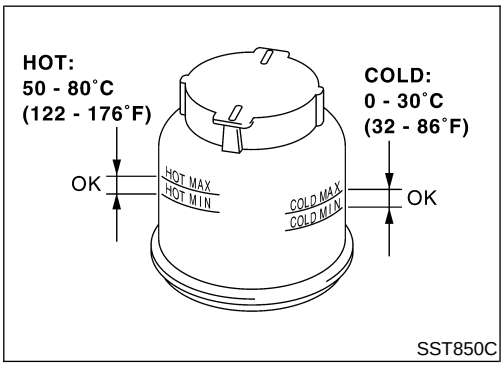
  ±2 mm (±0.08 in) or less

2. If movement exceeds the limit, replace mount insulator after confirming proper installation of gear housing clamps.

Checking and Adjusting Drive Belts

NFST0011

Refer to MA-13, “Checking Drive Belts”.



SST850C

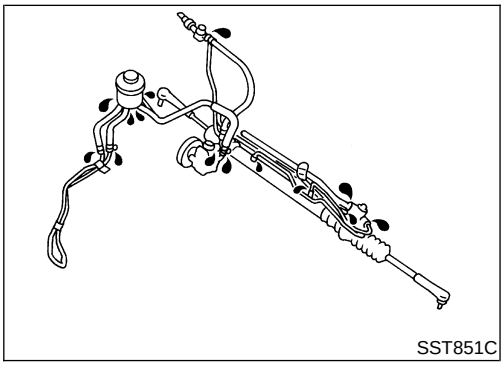
Checking Fluid Level

NFST0012

Check fluid level, referring to the scale on reservoir tank.
Use “HOT” range for fluid temperatures of 50 to 80°C (122 to 176°F).
Use “COLD” range for fluid temperatures of 0 to 30°C (32 to 86°F).

CAUTION:

- **Do not overfill.**
- **Recommended fluid is Genuine Nissan PSF II or equivalent. Refer to MA-11, “Fluids and Lubricants”.**


SST851C

Checking Fluid Leakage

NFST0013

Check the lines for improper attachment and for leaks, cracks, damage, loose connections, chafing and deterioration.

1. Run engine between idle speed and 1,000 rpm.

Make sure temperature of fluid in oil tank rises to 60 to 80°C (140 to 176°F).

2. Turn steering wheel right-to-left several times.
3. Hold steering wheel at each “lock” position for five seconds and carefully check for fluid leakage.

CAUTION:

Do not hold the steering wheel in a locked position for more than 15 seconds.

4. If fluid leakage at connectors is noticed, loosen flare nut and then retighten.

Do not overtighten connector as this can damage O-ring, washer and connector.

5. If fluid leakage from power steering pump is noticed, check power steering pump. Refer to ST-24.
6. Check rack boots for accumulation of power steering fluid.

Bleeding Hydraulic System

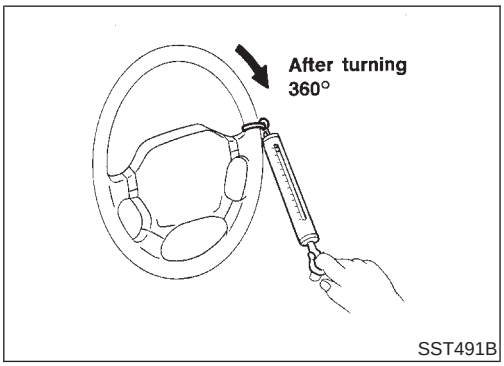
NFST0014

1. Raise front end of vehicle until wheels are clear of the ground.
2. Add fluid into oil tank to specified level. Then quickly turn steering wheel fully to right and left and lightly touch steering stoppers.
   Repeat steering wheel operation until fluid level no longer decreases.
3. Start engine.
   Repeat step 2. above.

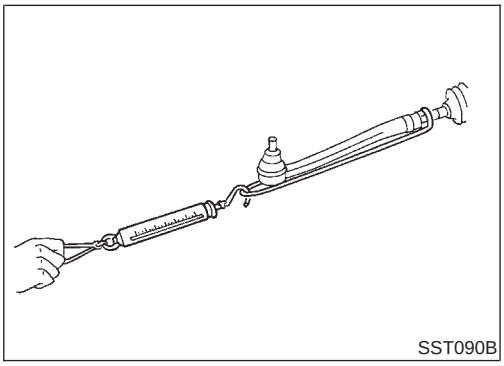
- Incomplete air bleeding will cause the following to occur. When this happens, bleed air again.

a) Air bubbles in reservoir tank
b) Clicking noise in oil pump
c) Excessive buzzing in oil pump

Fluid noise may occur in the valve or oil pump. This is common when the vehicle is stationary or while turning the steering wheel slowly. This does not affect the performance or durability of the system.



SST491B


SST090B

Checking Steering Wheel Turning Force

NFST0015

1. Park vehicle on a level, dry surface and set parking brake.
2. Start engine.
3. Bring power steering fluid up to adequate operating temperature. [Make sure temperature of fluid is approximately 60 to 80°C (140 to 176°F).]

Tires need to be inflated to normal pressure.

4. Check steering wheel turning force when steering wheel has been turned 360° from the neutral position.

   Steering wheel turning force:
   39 N (4 kg, 9 lb) or less

5. If steering wheel turning force is out of specification, check rack sliding force.

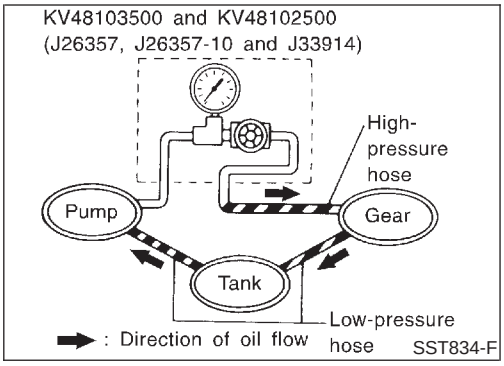
a. Disconnect steering column lower joint and knuckle arms from the gear.
b. Start and run engine at idle to make sure steering fluid has reached normal operating temperature.
c. Pull tie-rod slowly to move it from neutral position to ±11.5 mm (±0.453 in) at speed of 3.5 mm (0.138 in)/s. Check that rack sliding force is within specification.

   Average rack sliding force:
   215.8 - 274.6 N (22 - 28 kg, 48.5 - 61.7 lb)
   Maximum force deviation:
   117.7 N (12 kg, 26.5 lb)

d. Check sliding force outside the above range at rack speed of 40 mm (1.75 in)/s.

   Rack sliding force:
   Not more than 294 N (30 kg, 66 lb)
   Maximum force deviation:
   147 N (15 kg, 33 lb)

6. If rack sliding force is not within specification, overhaul steering gear assembly.
7. If rack sliding force is OK, inspect steering column. Refer to ST-12.



Checking Hydraulic System

NFST0016

Before starting, check belt tension, driving pulley and tire pressure.

1. Set Tool. Open shut-off valve. Then bleed air. Refer to “Bleeding Hydraulic System”, ST-7.
2. Run engine at idle speed or 1,000 rpm.

Make sure temperature of fluid in tank rises to 60 to 80°C (140 to 176°F).

WARNING:

Warm up engine with shut-off valve fully opened. If engine is started with shut-off valve closed, fluid pressure in oil pump increases to maximum. This will raise oil temperature abnormally.

3. Check pressure with steering wheel fully turned to left and right positions with engine idling at 1,000 rpm.

CAUTION:

Do not hold the steering wheel in a locked position for more than 15 seconds.

Oil pump maximum standard pressure:

8,100 - 8,700 kPa (82.62 - 88.74 kg/cm^2, 1,174.5 - 1,261.5 psi)

- If pressure reaches maximum operating pressure, system is OK.
- If pressure increases above maximum operating pressure, check power steering pump flow control valve. Refer to ST-24.

4. If power steering pressure is below the maximum operating pressure, slowly close shut-off valve and check pressure again.

CAUTION:

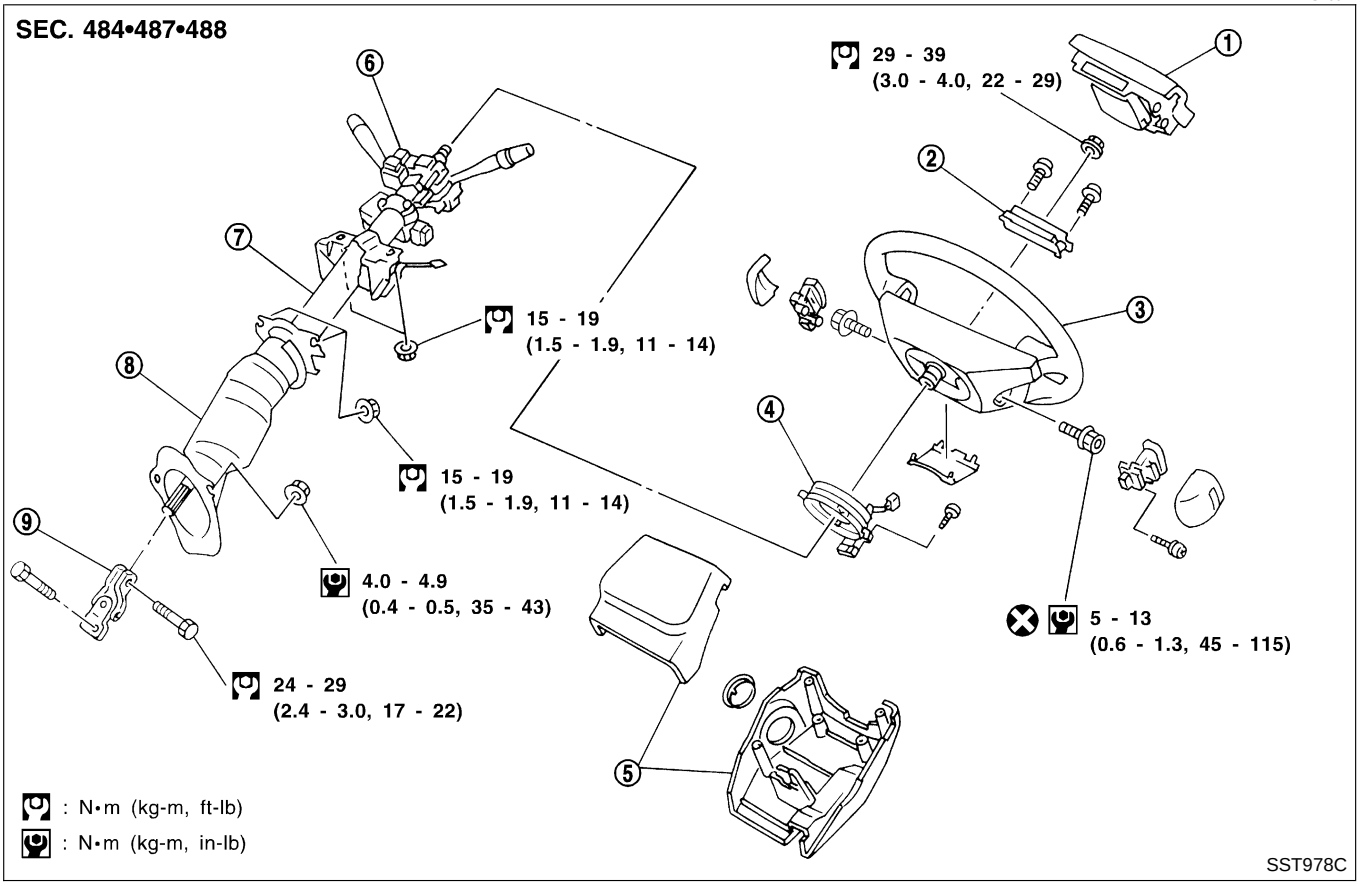
Do not close shut-off valve for more than 15 seconds.

- If pressure increases to maximum operating pressure, gear is damaged. Refer to “Removal and Installation”, ST-15.
- If pressure remains below maximum operating pressure, pump is damaged. Refer to “Disassembly”, ST-25.

5. After checking hydraulic system, remove Tool and add fluid as necessary. Then completely bleed air out of system. Refer to ST-7.

Components

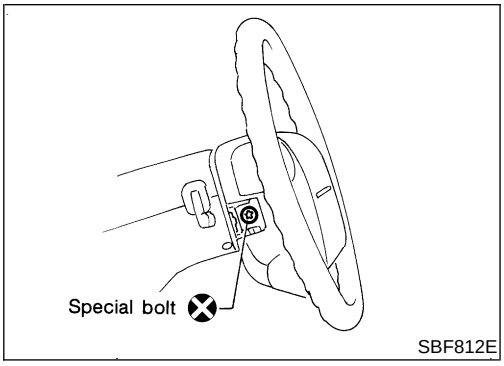
NFST0017



1. Air bag module
2. Damper
3. Steering wheel
4. Spiral cable
5. Column cover
6. Combination switch
7. Steering column assembly
8. Boot
9. Lower joint

CAUTION:

- **The rotation of the spiral cable (SRS "Air bag" component part) is limited. If the steering gear must be removed, set the front wheels in the straight-ahead direction. Do not rotate the steering column while the steering gear is removed.**
- **Remove the steering wheel before removing the steering lower joint to avoid damaging the SRS spiral cable.**



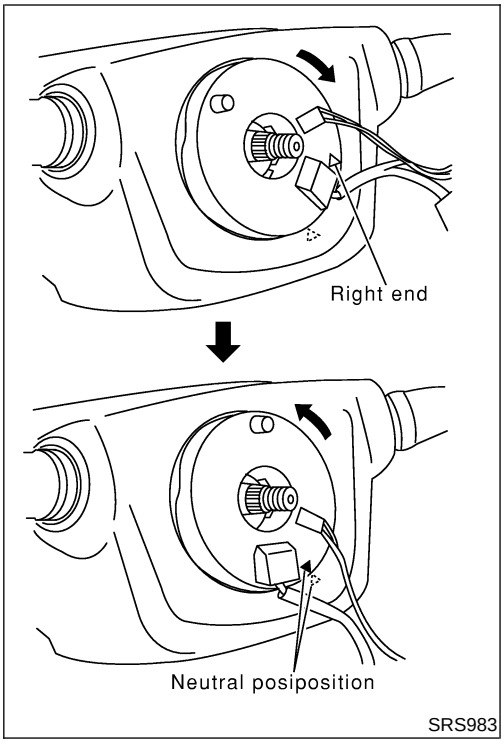
Removal and Installation

NFST0018

STEERING WHEEL

NFST0018S01

- Remove air bag module and spiral cable.
  Refer to RS-20, "Removal — Air Bag Module and Spiral Cable".



- Align spiral cable correctly when installing steering wheel.

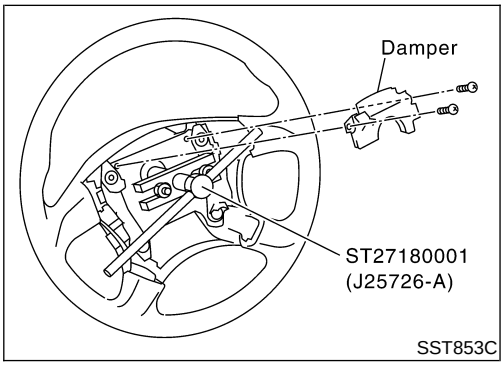
a) Set the front wheels in the straight-ahead position.

b) Make sure that the spiral cable is in the neutral position. The neutral position is detected by turning left 2.5 revolutions from the right end position. Align the two marks (⧗).

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 up to 2.5 turns from the neutral position to both the right and left.)

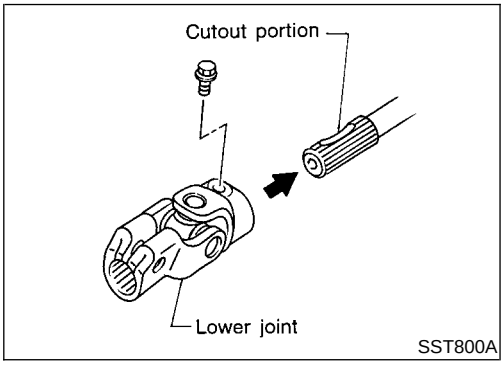


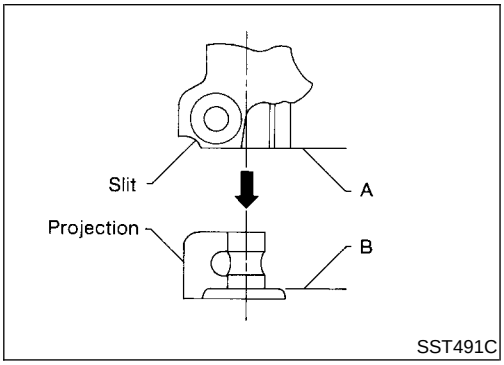
- Remove damper for steering wheel.
- Remove steering wheel with Tool.

STEERING COLUMN

NFST0018S02

- When installing steering column, fingertighten all lower bracket and clamp retaining bolts; then tighten them securely. Do not apply undue stress to steering column.
- When attaching coupling joint, be sure tightening bolt faces cutout portion.





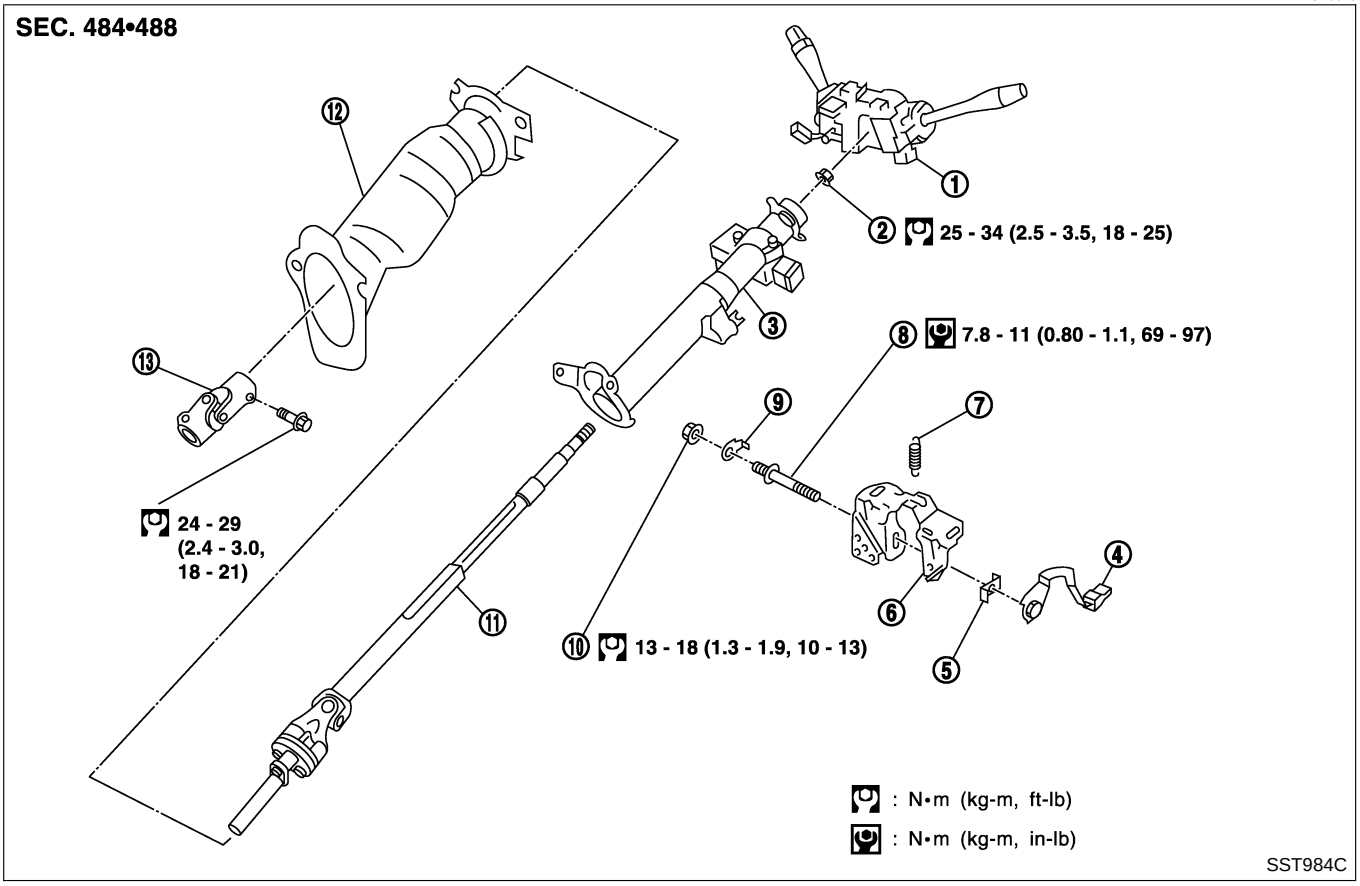
- Align slit of lower joint with projection on dust cover. Insert joint until surface A contacts surface B.

CAUTION:

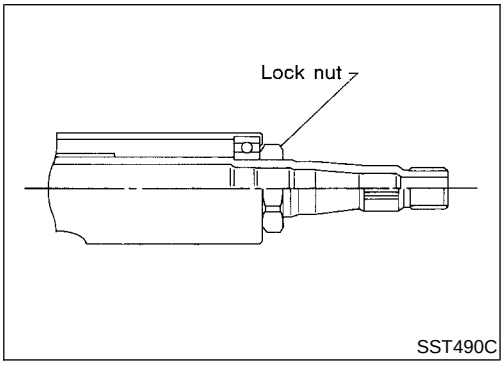
After installation, turn steering wheel to make sure it moves smoothly. Ensure the number of turns are the same from the straight forward position to left and right locks. Be sure that the steering wheel is in a neutral position when driving straight ahead.

Disassembly and Assembly

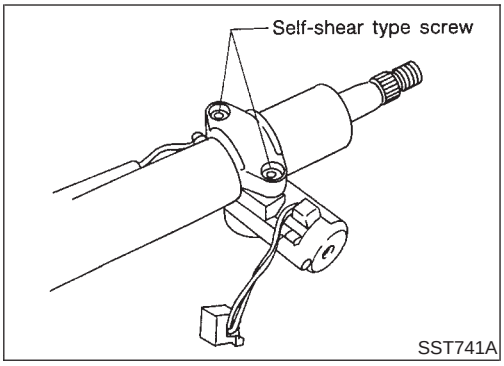
=NFST0019



1. Combination switch
2. Lock nut
3. Jacket tube assembly
4. Tilt lever
5. Tilt lever stopper
6. Steering column mounting bracket
7. Spring
8. Adjust bolt
9. Adjust bolt stopper
10. Nut
11. Column shaft assembly
12. Steering column lower cover
13. Lower joint

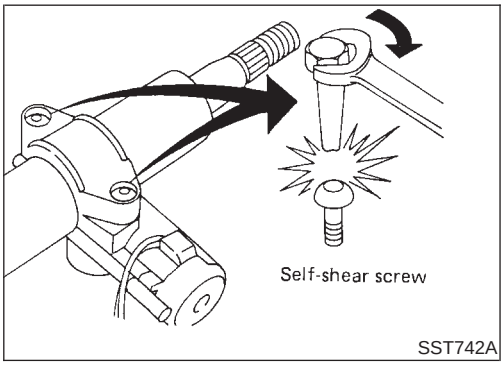


- When disassembling and assembling, unlock steering lock with key.
- Remove combination switch.
- Install lock nut on steering column shaft and tighten the nut.



- Steering lock

a) Break self-shear type screws with a drill or other appropriate tool.



b) Install new self-shear type screws and then cut off self-shear type screw heads.

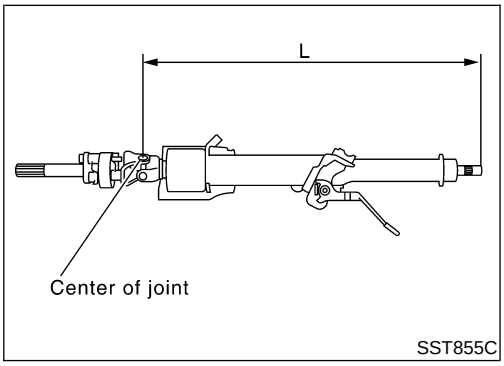
Inspection

NFST0020

- When steering wheel does not turn smoothly, check the steering column as follows and replace damaged parts.

a) Check column bearings for damage or unevenness. Lubricate with recommended multi-purpose grease or replace steering column as an assembly, if necessary.

b) Check jacket tube for deformation or breakage. Replace if necessary.



- When the vehicle comes into a light collision, check length "L".

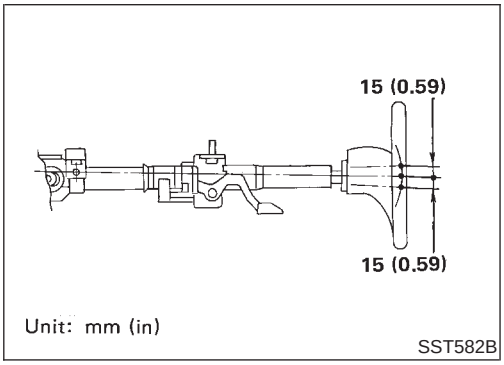
Steering column length "L":
542 - 544 mm (21.34 - 21.42 in)

If out of the specifications, replace steering column as an assembly.

TILT MECHANISM

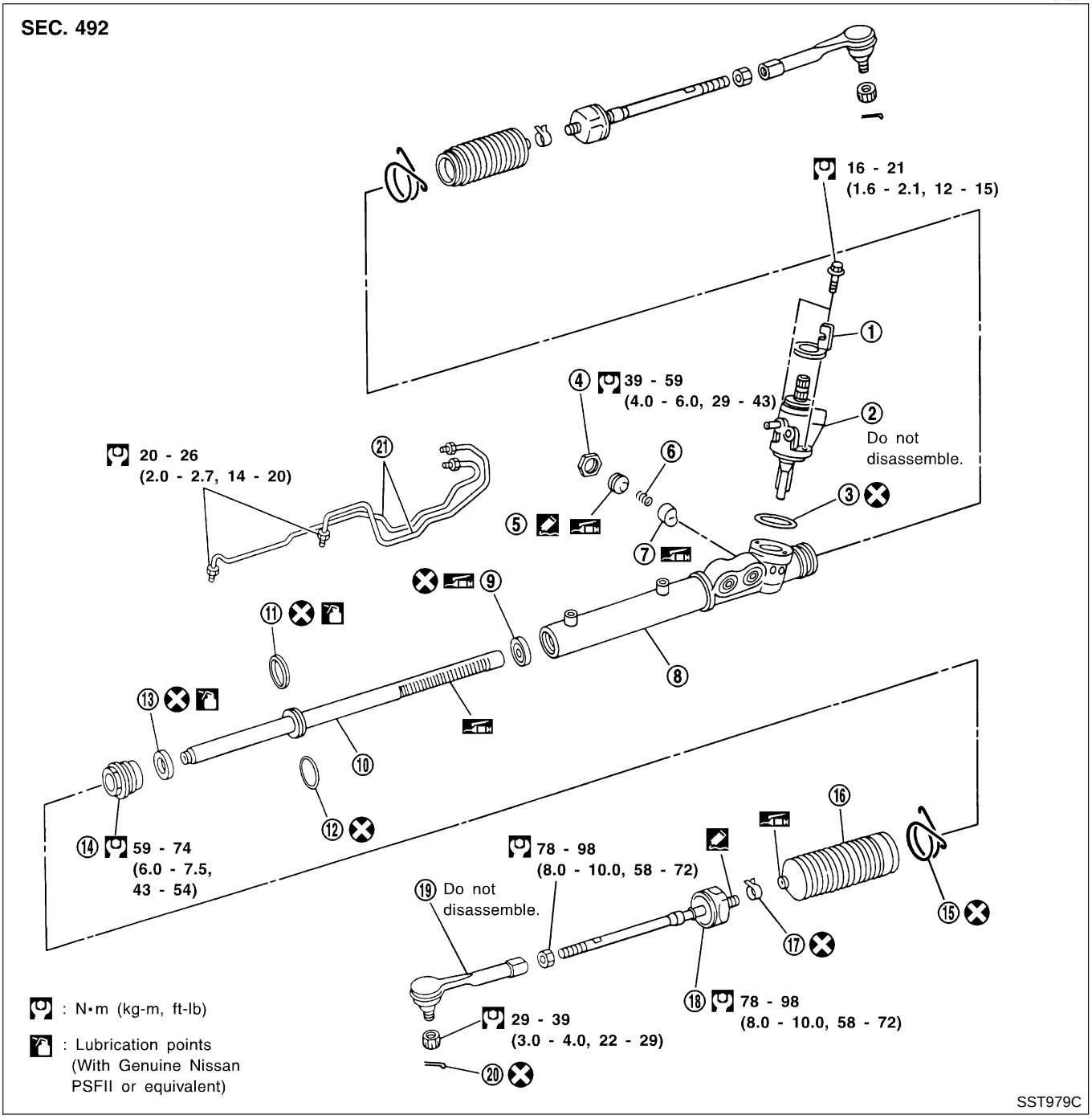
NFST0020S01

- After installing steering column, check tilt mechanism operation.



Components

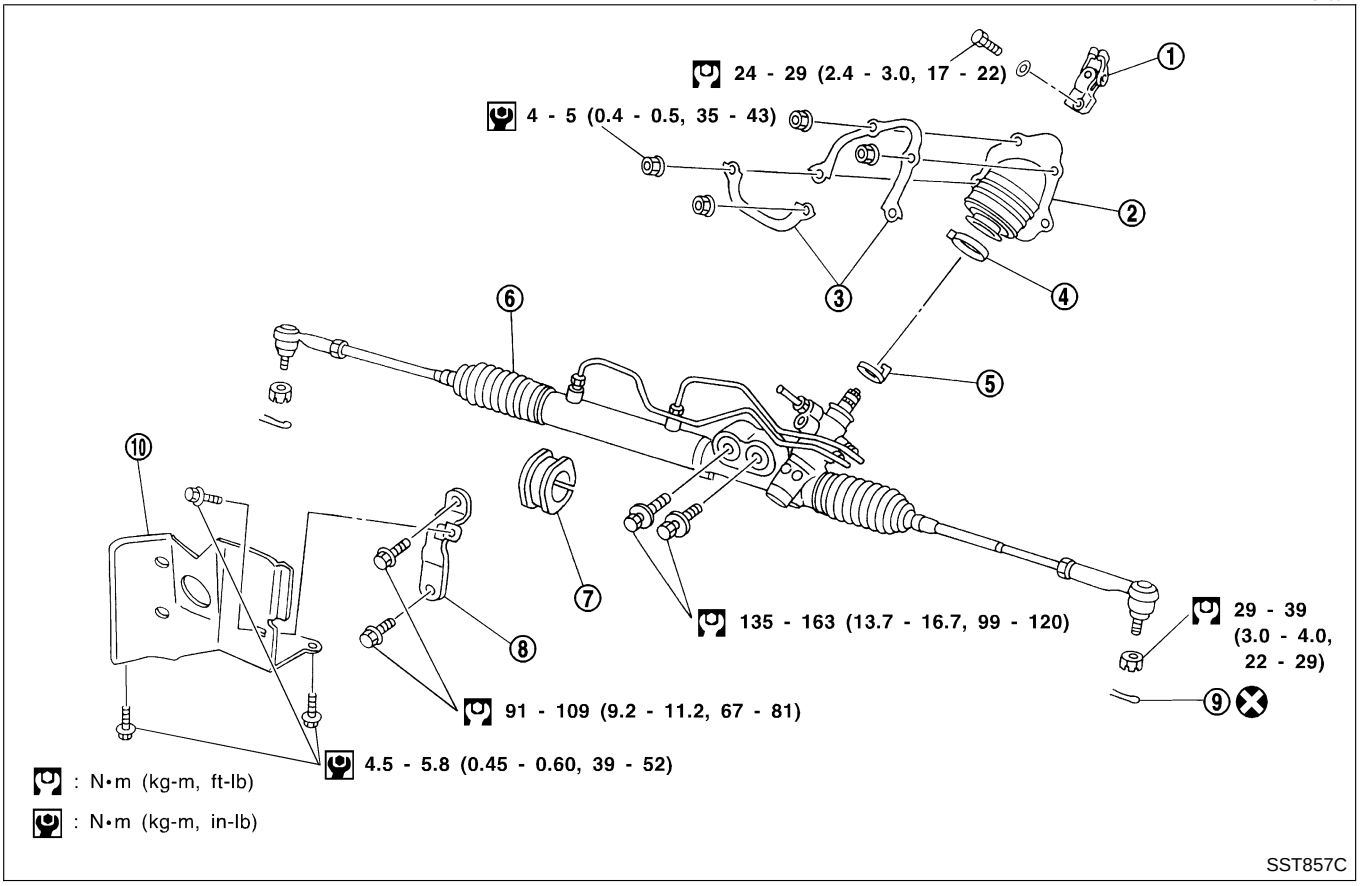
NFST0021



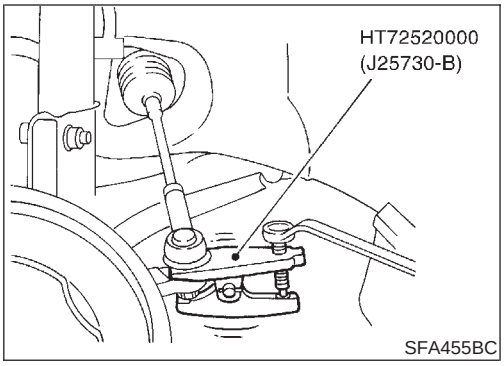
1. Rear cover cap
2. Gear sub-assembly
3. O-ring
4. Lock nut
5. Adjusting screw
6. Spring
7. Retainer
8. Gear housing
9. Rack oil seal
10. Rack assembly
11. Rack seal ring
12. O-ring
13. Rack oil seal
14. End cover assembly
15. Boot band
16. Dust boot
17. Boot clamp
18. Tie-rod inner socket
19. Tie-rod outer socket
20. Cotter pin
21. Gear housing tube

Removal and Installation

NFST0022



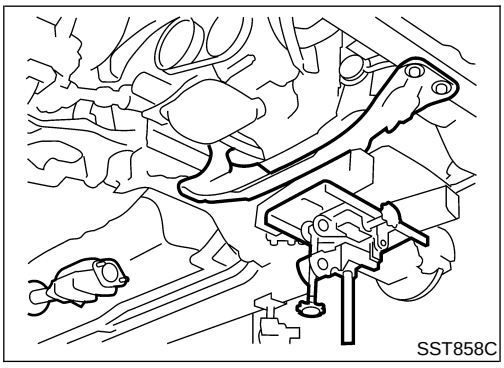
1. Lower joint
2. Hole cover
3. Insulator bracket
4. Clamp
5. Rear cover cap
6. Gear and linkage assembly
7. Rack mounting insulator
8. Gear housing mounting bracket
9. Cotter pin
10. Heat insulator

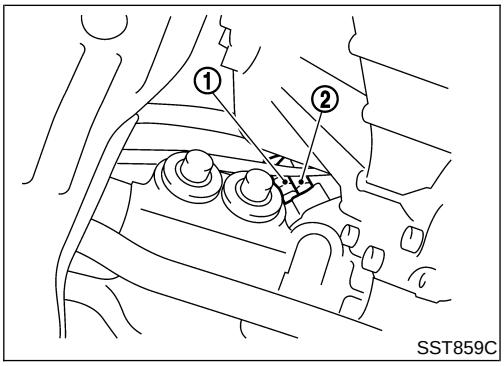


CAUTION:

- **The rotation of the spiral cable (SRS "Air bag" component part) is limited. If the steering gear must be removed, set the front wheels in the straight-ahead direction. Do not rotate the steering column while the steering gear is removed.**
- **Remove the steering wheel before removing the steering lower joint to avoid damaging the SRS spiral cable.**
- **Detach tie-rod outer sockets from knuckle arms with Tool.**

1. Remove front exhaust tube. Refer to FE-9, "Removal and Installation".
2. Set a suitable transmission jack under transaxle.
3. Remove center member and rear engine mounting. Refer to EM-60, "Removal".
4. Remove front stabilizer bar. Refer to SU-11, "Removal and Installation".
5. Remove steering gear assembly.





- Install pipe connector.
- Observe specified tightening torque when tightening high-pressure and low-pressure pipe connectors. Excessive tightening will damage threads of connector or O-ring.

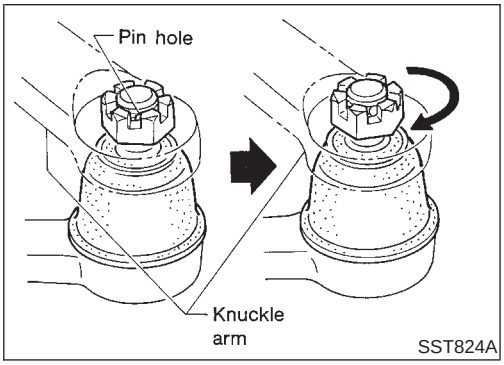
  Connector tightening torque:

  1 Low-pressure side

  27 - 39 N·m (2.8 - 4.0 kg-m, 20 - 29 ft-lb)

  2 High-pressure side

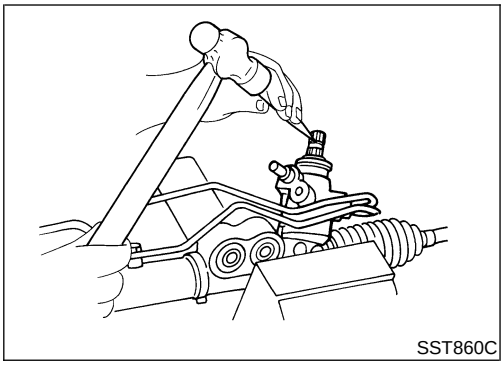
  15 - 25 N·m (1.5 - 2.5 kg-m, 11 - 18 ft-lb)
- The O-ring in low-pressure pipe connector is larger than that in high-pressure connector. Take care to install the proper O-ring.



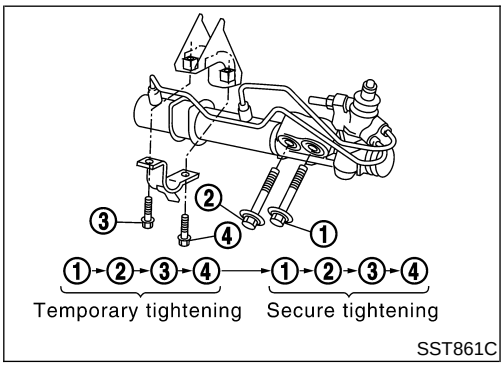
- Initially, tighten nut on tie-rod outer socket and knuckle arm to 29 to 39 N·m (3 to 4 kg-m, 22 to 29 ft-lb). Then tighten further to align nut groove with first pin hole so that cotter pin can be installed.

CAUTION:

Tightening torque must not exceed 49 N·m (5 kg-m, 36 ft-lb).


SST860C

- Before removing lower joint from gear, set gear in neutral (wheels in straight-ahead position). After removing lower joint, put matching mark on pinion shaft and pinion housing to record neutral position.
- To install, set left and right dust boots to equal deflection. Attach lower joint by aligning matching marks of pinion shaft and pinion housing.



SST861C

- Tighten gear housing mounting bracket bolts in the order shown.

Disassembly

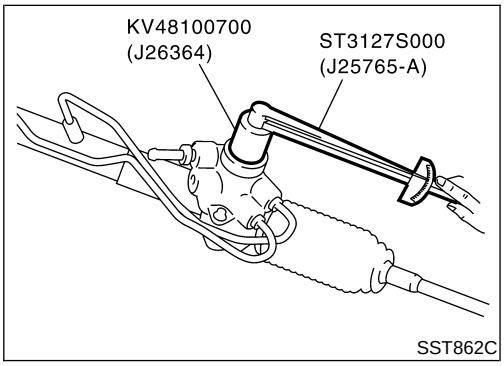
NFST0023

1. Prior to disassembling, measure pinion rotating torque. Record the pinion rotating torque as a reference.

- **Before measuring, disconnect gear housing tube and drain fluid.**
- **Use soft jaws when holding steering gear housing. Handle gear housing carefully, as it is made of aluminum. Do not grip cylinder in a vise.**

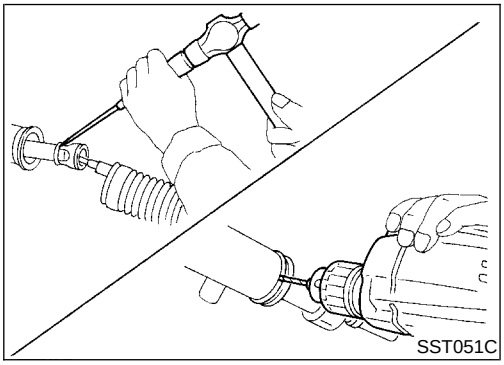
2. Remove gear sub-assembly and O-ring.

Gear sub-assembly cannot be disassembled. If it is faulty, replace with a new one.



SST862C

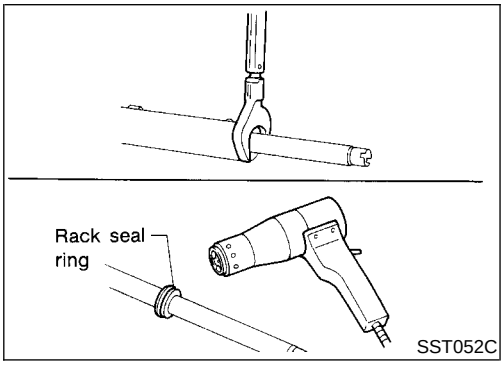
3. Remove tie-rod outer sockets and boots.
4. Loosen tie-rod inner socket by prying up staked portion, and remove socket.
5. Remove retainer.
6. Use a 2 to 2.5 mm (0.079 to 0.098 in) diameter drill to completely remove staked portion of gear housing end.


SST051C

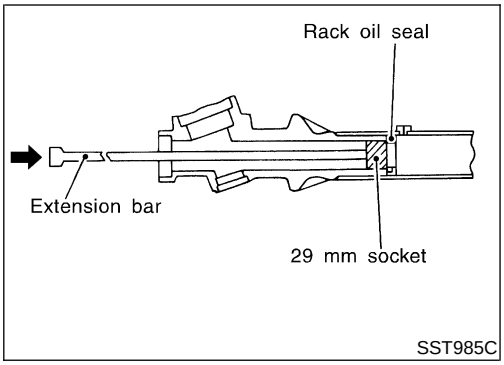
7. Remove end cover assembly with a suitable tool.
8. Draw out rack assembly.
9. Remove rack seal ring.

- Using a heat gun, heat rack seal to approximately 40°C (104°F).
- Remove rack seal ring.

Be careful not to damage rack.



SST052C



10. Remove rack oil seal using tape wrapped socket and extension bar.

Do not scratch inner surfaces of pinion housing.

Inspection

NFST0024

Thoroughly clean all parts in cleaning solvent or Genuine NISSAN PSF II or equivalent. Blow dry with compressed air, if available.

BOOT

NFST0024S01

- Check condition of boot. If cracked excessively, replace it.
- Check boots for accumulation of power steering fluid.

RACK

NFST0024S02

Thoroughly examine rack gear. If damaged, cracked or worn, replace it.

GEAR SUB-ASSEMBLY

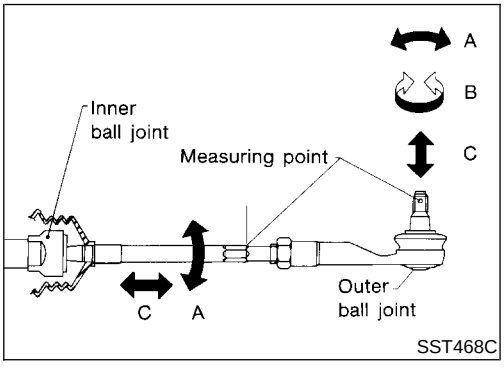
NFST0024S03

- Check pinion gear. If it is worn or damaged, replace as a gear sub-assembly.
- Manually spin bearing. If torque variations or free play are noted, replace as a gear sub-assembly.

GEAR HOUSING CYLINDER

NFST0024S04

Check gear housing cylinder bore for scratches or other damage. Replace if necessary.



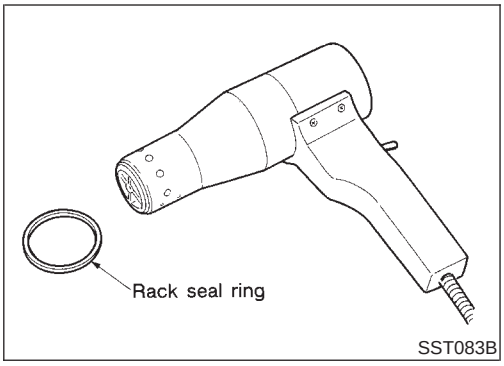
TIE-ROD OUTER AND INNER SOCKETS

NFST0024S05

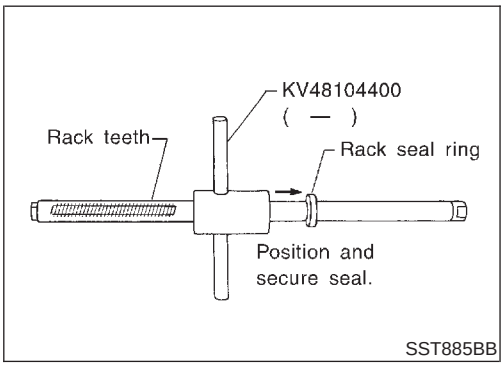
- Check ball joints for swinging force.
  Tie-rod outer and inner ball joints swinging force "A":
  Refer to SDS, ST-29.
- Check ball joint for rotating torque.
  Tie-rod outer ball joint rotating torque "B":
  Refer to SDS, ST-29.
- Check ball joints for axial end play.
  Tie-rod outer and inner ball joints axial end play "C":
  Refer to SDS, ST-29.
- Check condition of dust cover. If cracked excessively, replace outer tie-rod.

Assembly

NFST0025

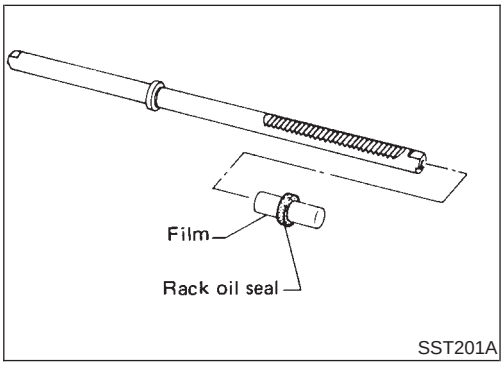


1. Using a heat gun, heat new teflon rack seal ring to approximately 40°C (104°F). Then place it onto rack.



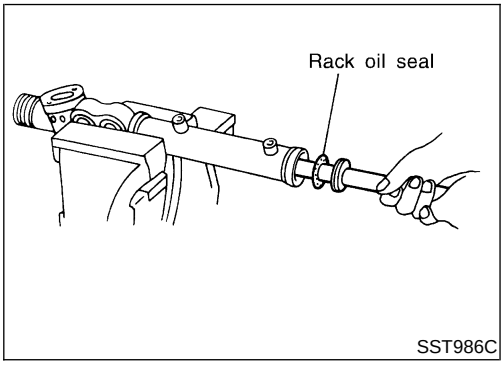
2. Using Tool, compress rack seal ring securely onto rack.

Always insert Tool from the rack gear side.

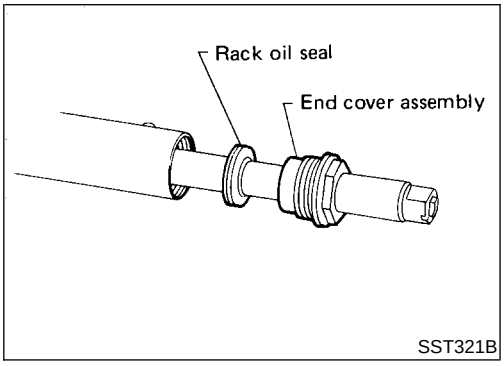


3. Insert new rack oil seal.

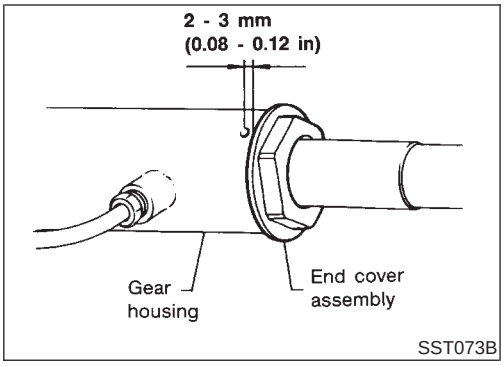
- **Place plastic film into rack oil seal to prevent damage by rack teeth.**
- **Do not forget to remove plastic film after rack oil seal is positioned properly.**
- **Make sure lips of rack oil seal face each other.**



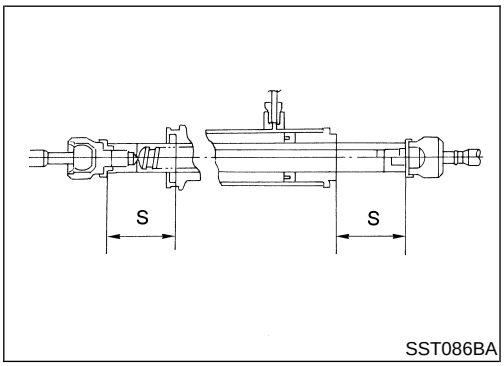
4. Install rack oil seal with rack assembly.



5. Insert rack oil seal and end cover assembly to rack. Then tighten end cover assembly.



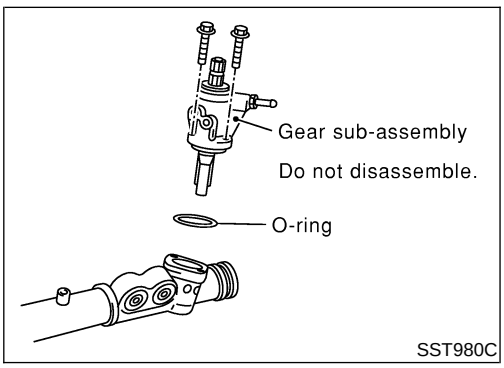
6. Fasten end cover assembly to gear housing by staking.



7. Set rack gear in neutral position.

Rack stroke "S":

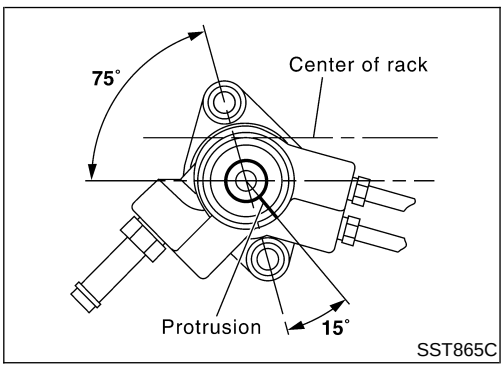
Refer to SDS, ST-29.



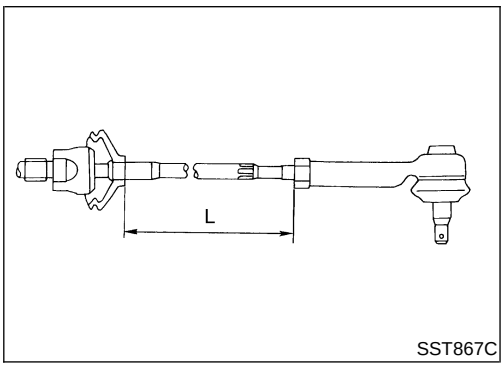
8. Install O-rings to gear sub-assembly.

- Discard old O-rings; replace with new ones.

9. Tighten gear subassembly securing bolts to specified tightening torque.



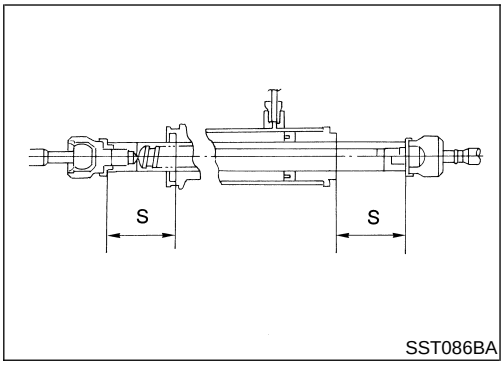
10. Ensure that the rack is centered. Install rear cover cap so that its protrusion is positioned as shown in figure.
11. Install retainer, spring and adjusting screw temporarily.
12. Apply a coat of locking sealant to inner socket threads. Screw inner socket into rack and tighten to specified torque.



13. Tighten outer socket lock nut.

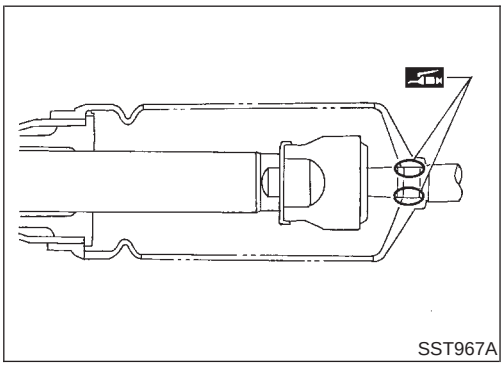
Tie-rod length "L":

Refer to SDS, ST-29.

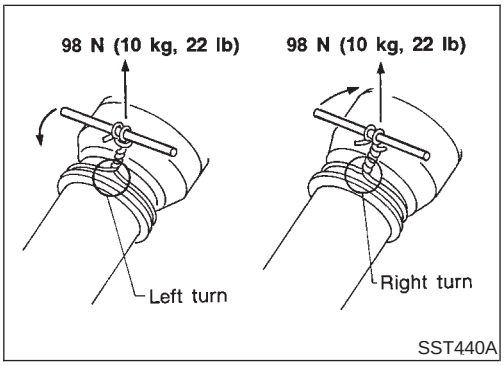


SST086BA

14. Measure rack stroke.
Rack stroke "S":
Refer to SDS, ST-29.

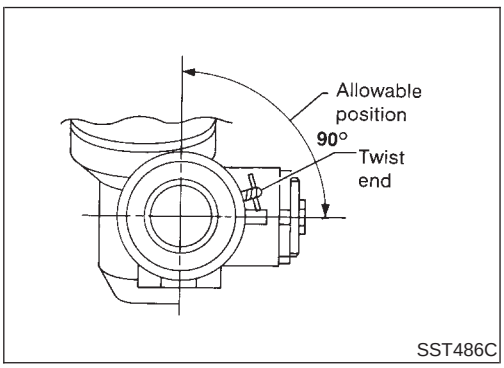

SST967A

15. Before installing boot, coat the contact surfaces between boot and tie-rod with grease.



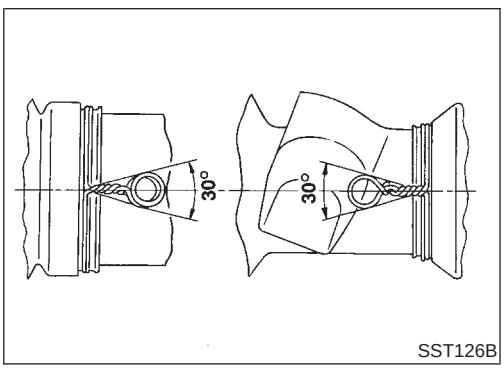
SST440A

16. Install boot clamps.
- To install, wrap boot clamp around boot groove twice. To tighten clamp, place a screwdriver through both rings. Twist rings 4 to 4-1/2 turns while pulling with a force of approx. 98 N (10 kg, 22 lb).



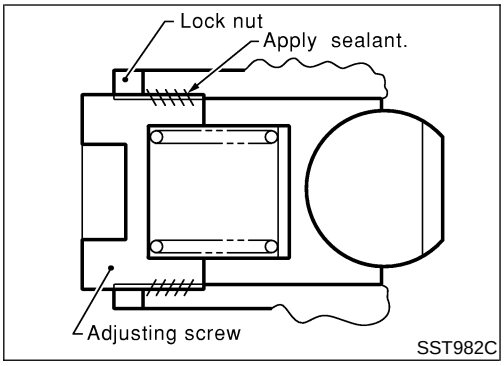
SST486C

- Twist boot clamp in the direction shown in figure on the left.



SST126B

- After twisting boot clamp, bend and twist it diagonally so it does not contact boot.

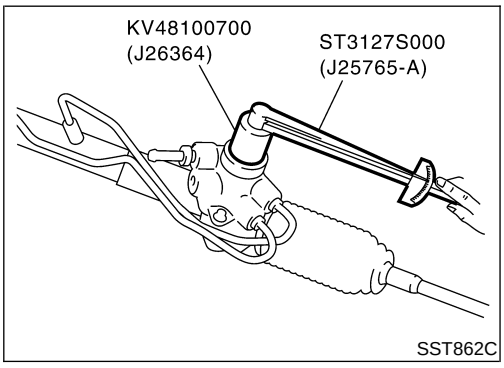


Adjustment

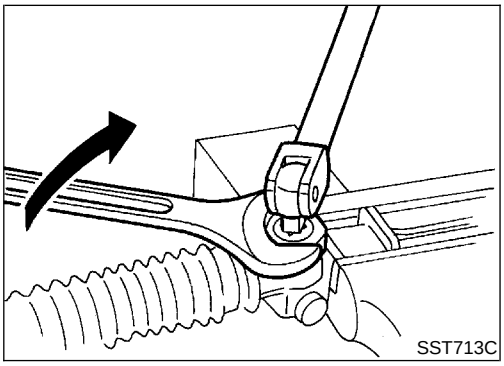
NFST0026

Adjust pinion rotating torque as follows:

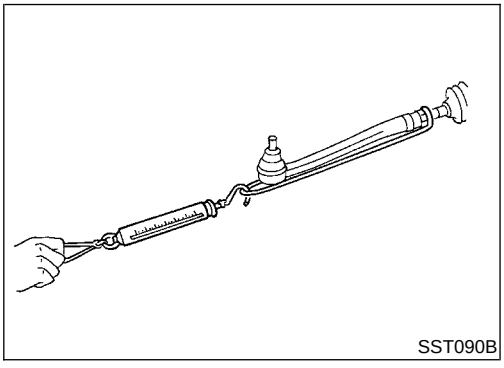
1. Set rack to the neutral position without fluid in the gear.
2. Coat the adjusting screw with locking sealant and screw it in.
3. Lightly tighten lock nut.
4. Tighten adjusting screw to a torque of 4.9 to 5.9 N·m (50 to 60 kg-cm, 43 to 52 in-lb).
5. Loosen adjusting screw, then retighten it to 0.2 N·m (2 kg-cm, 1.7 in-lb).



6. Move rack over its entire stroke several times.
7. Measure pinion rotating torque within the range of 180° from neutral position.
   Stop the gear at the point of maximum torque.
8. Loosen adjusting screw, then retighten it to 4.9 N·m (50 kg-cm, 43 in-lb).
9. Loosen adjusting screw by 50° to 70°.



10. Prevent adjusting screw from turning, and tighten lock nut to specified torque.



11. Check rack sliding force on vehicle as follows.

a. Install steering gear onto vehicle, but do not connect tie-rod to knuckle arm.
b. Connect all piping and fill with steering fluid.
c. Start engine and bleed air completely.
d. Disconnect steering column lower joint from the gear.
e. Keep engine at idle and make sure steering fluid has reached normal operating temperature.
f. Pull tie-rod slowly to move it from neutral position to ±11.5 mm (±0.453 in) at speed of 3.5 mm (0.138 in)/s. Check that rack sliding force is within specification.

Average rack sliding force:
215.8 - 274.6 N (22 - 28 kg, 48.5 - 61.7 lb)
Maximum force deviation:
117.7 N (12 kg, 26.5 lb)

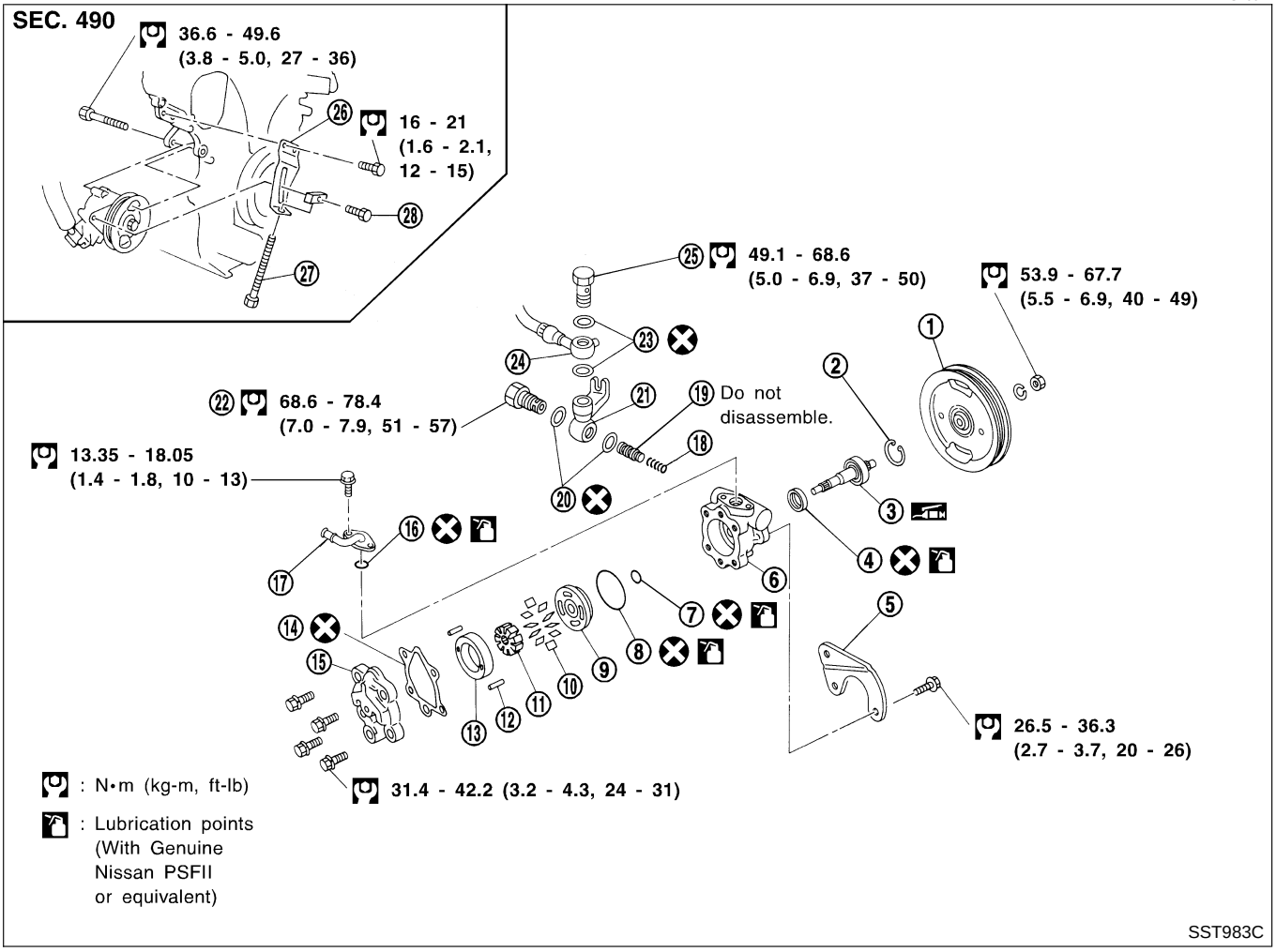
g. Check sliding force outside above range at rack speed of 40 mm (1.57 in)/s.

Maximum rack sliding force:
294 N (30 kg, 66 lb)
Maximum force deviation:
147 N (15 kg, 33 lb)

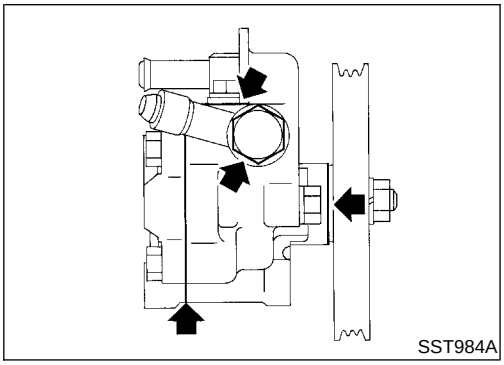
- If rack sliding force is not within specification, readjust by repeating adjustment procedure from the beginning.
- If rack sliding force is still out of specification after readjustment, gear assembly needs to be replaced.

Components

NFST0027



1. Pulley
2. Snap ring
3. Drive shaft
4. Oil seal
5. Bracket
6. Front housing
7. O-ring
8. O-ring
9. Front side plate
10. Vane
11. Rotor
12. Pin
13. Cam ring
14. Gasket
15. Rear housing
16. O-ring
17. Suction pipe
18. Spring
19. Flow control valve
20. Washer
21. Joint
22. Connector
23. Washer
24. Hose
25. Connector bolt
26. Adjusting bracket
27. Adjusting bolt
28. Lock bolt



Pre-disassembly Inspection

NFST0028

Disassemble the power steering oil pump only if the following items are found.

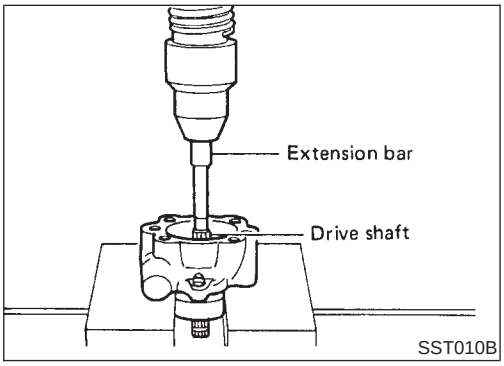
- Oil leak from any point shown in the figure
- Deformed or damaged pulley
- Poor performance

Disassembly

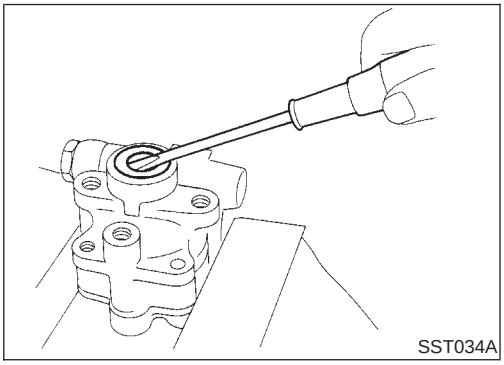
NFST0029

CAUTION:

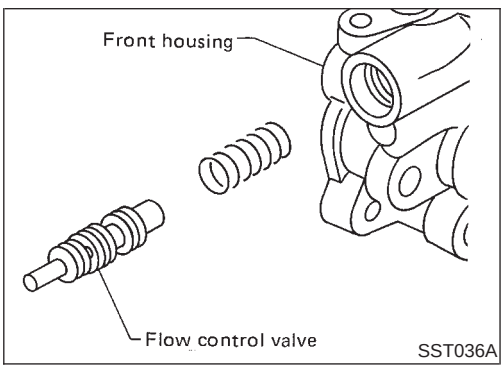
- **Parts which can be disassembled are strictly limited. Never disassemble parts other than those specified.**
- **Disassemble in as clean a place as possible.**
- **Clean your hands before disassembly.**
- **Do not use rags; use nylon cloths or paper towels.**
- **Follow the procedures and cautions in the Service Manual.**
- **When disassembling and reassembling, do not let foreign matter enter or contact the parts.**



- Remove snap ring, then draw drive shaft out.
  Be careful not to drop drive shaft.



- Remove oil seal.
  Be careful not to damage front housing.



- Remove connector and flow control valve with spring.
  Be careful not to drop flow control valve.
  Do not disassemble flow control valve.

Inspection

NFST0030

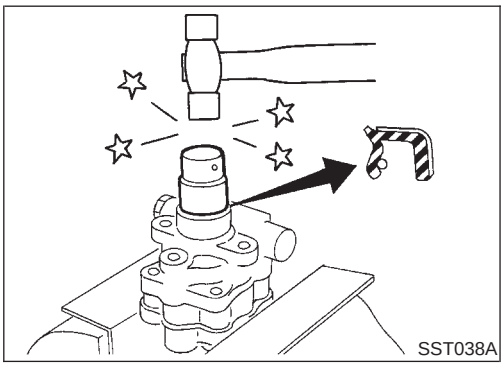
- If pulley is cracked or deformed, replace it.
- If an oil leak is found around pulley shaft oil seal, replace the seal.
- If serration on pulley or pulley shaft is deformed or worn, replace it.

Assembly

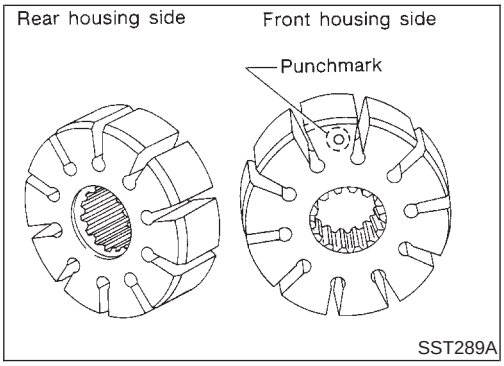
NFST0031

Assemble oil pump, noting the following instructions.

- Make sure O-rings and oil seal are properly installed.
- Always install new O-rings and oil seal.
- Be careful of oil seal direction.
- Cam ring, rotor and vanes must be replaced as a set if necessary.
- Coat each part with Genuine Nissan PSF II or equivalent when assembling.

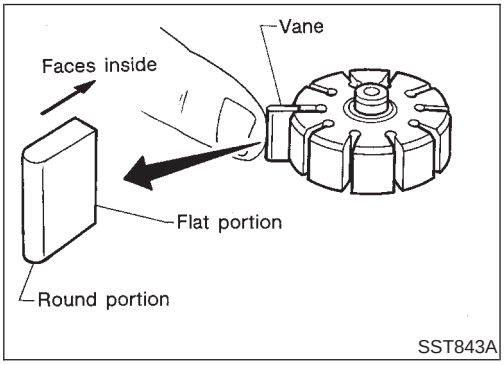

SST038A

- Pay attention to the direction of rotor.

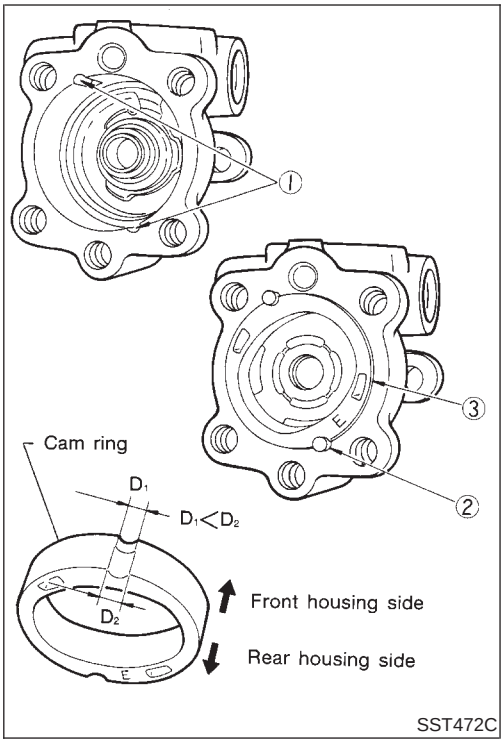


SST289A

- When assembling vanes to rotor, rounded surfaces of vanes must face cam ring side.



SST843A



- Insert pin 2 into pin groove 1 of front housing and front side plate. Then install cam ring 3 as shown at left.

  Cam ring:

  D_1 is less than D_2.

General Specifications

NFST0032

Steering model	Power steering	
	16-inch tire	17-inch tire
Steering gear type	PR26AD	
Steering overall gear ratio	16.6	
Turns of steering wheel (Lock to lock)	2.9	2.6
Steering column type	Collapsible, tilt	

Steering Wheel

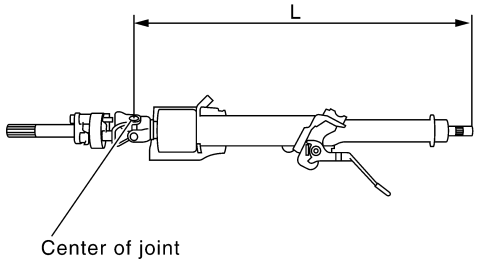
NFST0033

Steering wheel axial play mm (in)	0 (0)
Steering wheel play mm (in)	35 (1.38) or less
Movement of gear housing mm (in)	±2 (±0.08) or less

Steering Column

NFST0034

Applied model	All
Steering column length “L” mm (in)	542 - 544 (21.34 - 21.42)



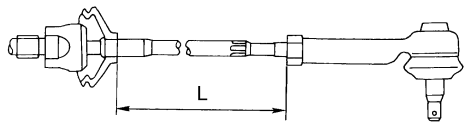
SST855C

Steering Gear and Linkage

NFST0035

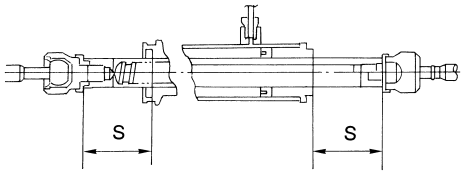
Applied model		Model with 16-inch tire	Model with 17-inch tire
Steering gear type		PR26AD	
Tie-rod outer ball joint	Swinging force at cotter pin hole: “A” N (kg, lb)	6.47 - 64.63 (0.66 - 6.59, 1.46 - 14.53)	
	Rotating torque: “B” N·m (kg-cm, in-lb)	0.29 - 2.94 (3.0 - 30.0, 2.6 - 26.0)	
	Axial end play: “C” mm (in)	0.4 (0.016) or less	
Tie-rod inner ball joint	Swinging force*: “A” N (kg, lb)	5.69 - 45.60 (0.58 - 4.65, 1.28 - 10.25)	
	Axial end play: “C” mm (in)	0.2 (0.008) or less	
Tie-rod standard length “L” mm (in)		193.2 (7.606)	

*: Measuring point [ℓ: 172 mm (6.77 in)]



SST867C

Retainer adjustment Adjusting screw	Initial tightening torque N·m (kg-cm, in-lb)	4.9 - 5.9 (50 - 60, 43 - 52)	
	Retightening torque after loosening N·m (kg-cm, in-lb)	0.2 (2, 1.7)	
	Tightening torque after gear has settled N·m (kg-cm, in-lb)	4.9 - 5.9 (50 - 60, 43 - 52)	
	Returning angle degree	50° - 70°	
Steering gear type		PR26AD	
Rack stroke “S” mm (in)		70.5 (2.776)	63.0 (2.480)



SST086BA

Power Steering

NFST0036

Steering gear type			PR26AD
Rack sliding force N (kg, lb) Under normal operating oil pressure	Range within ±11.5 mm (±0.453 in) from the neutral position at rack speed of 3.5 mm (0.138 in)/s	Average force	215.8 - 274.6 (22 - 28, 48.5 - 61.7)
		Maximum force deviation	117.7 (12, 26.5)
	Except for the above range	Maximum sliding force	294 (30, 66)
		Maximum force deviation	147 (15, 33)
Steering wheel turning force (Measured at one full turn from the neutral position) N (kg, lb)			39 (4, 9) or less
Fluid capacity (Approximate) ℓ (US qt, Imp qt)			1.0 (1-1/8, 7/8)
Oil pump maximum pressure kPa (kg/cm^2, psi)			8,100 - 8,700 (82.62 - 88.74, 1,174.5 - 1,261.5)