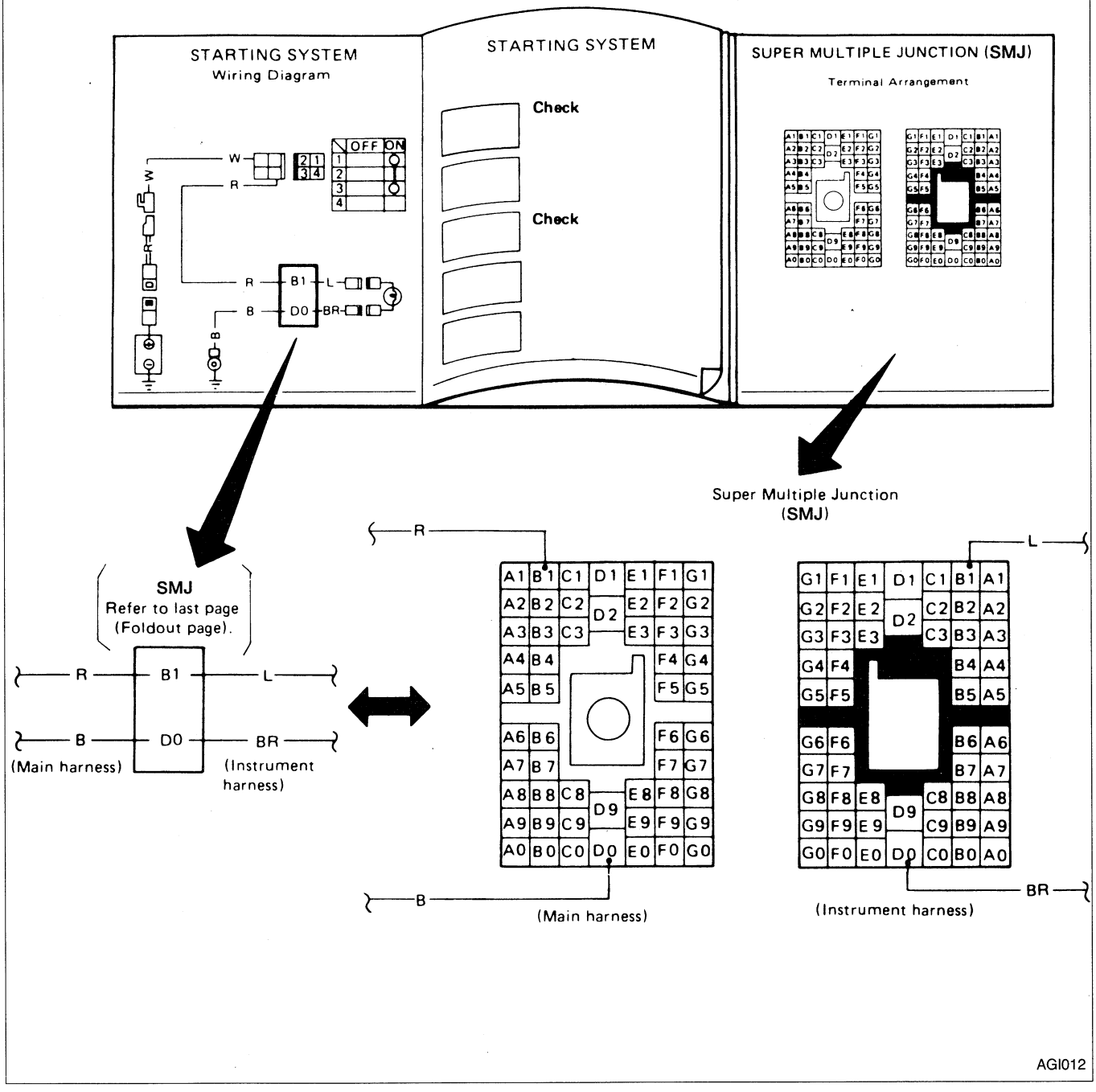
NISSAN
STANZA
ALTIMA
MODEL U13 SERIES

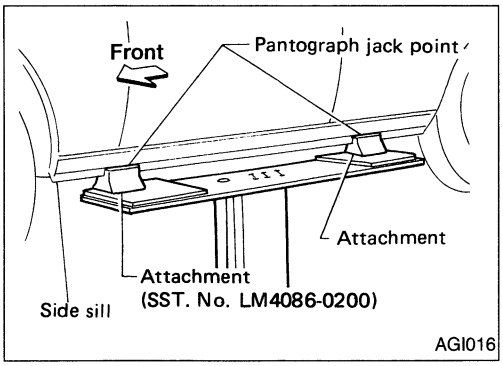
QUICK REFERENCE INDEX

SUPER MULTIPLE JUNCTION (SMJ)

- The "SMJ" indicated in wiring diagrams is shown in a simplified form. The terminal arrangement should therefore be referred to in the foldout at the end of the Service Manual.
- The foldout should be spread to read the entire wiring diagram.

Example





Board-on Lift

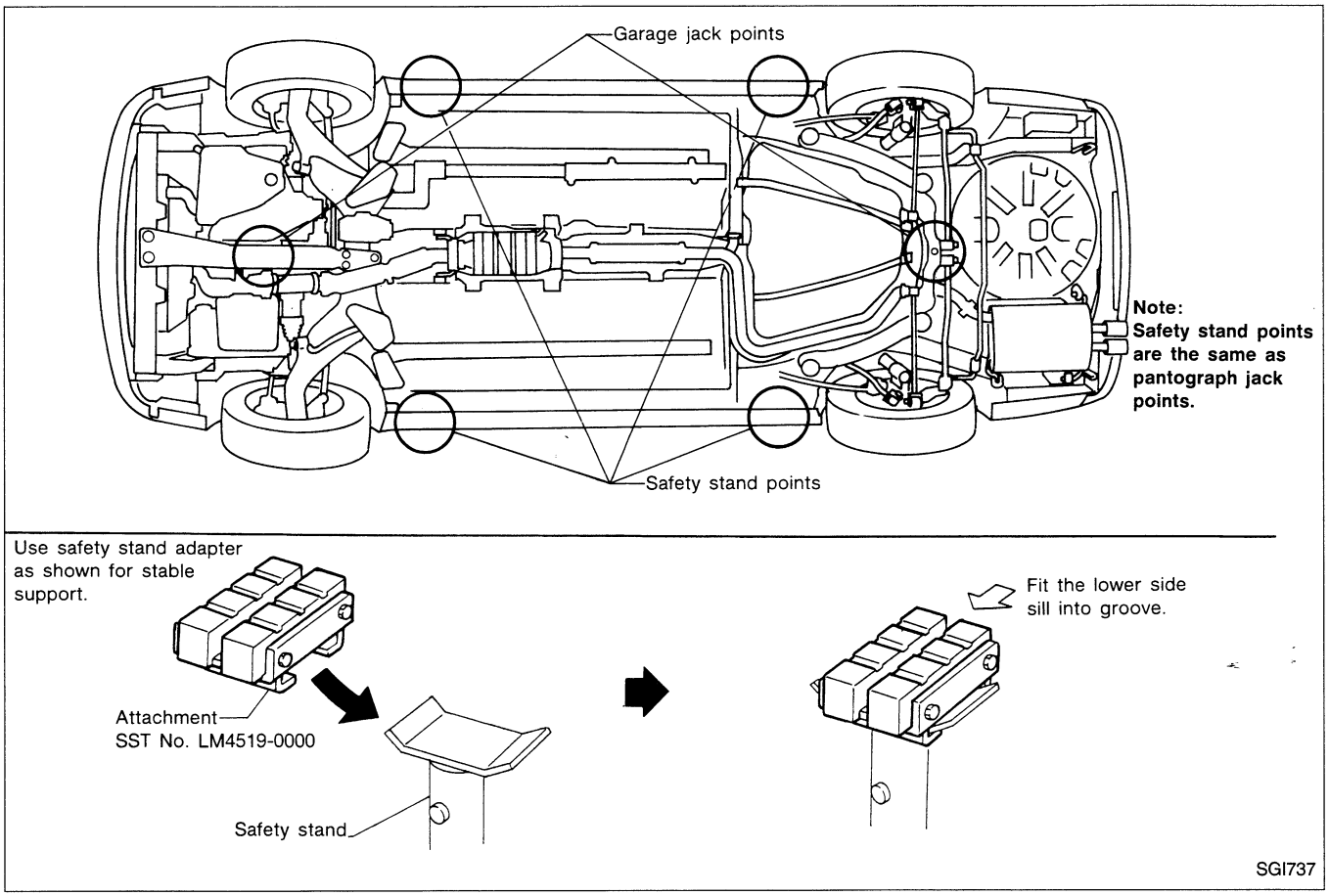
CAUTION:
Make sure vehicle is empty when lifting.

- **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.**

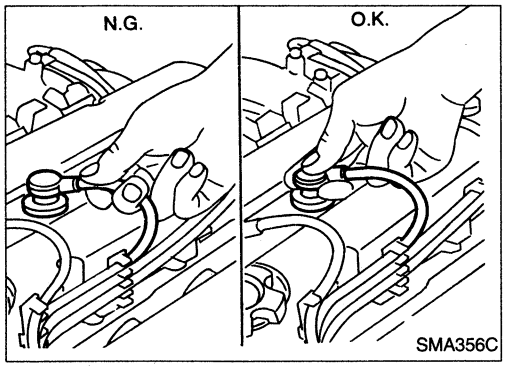
Garage Jack and Safety Stand

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.**

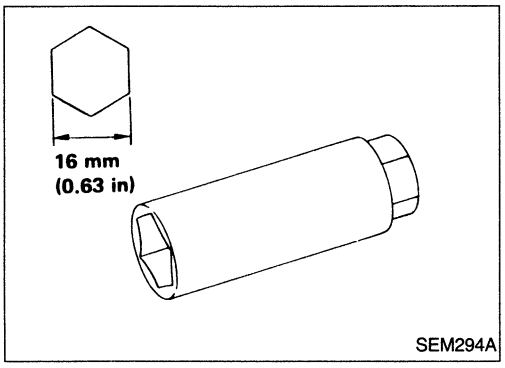


Item	Reference page
Parking brake Check that the lever has the proper travel and confirm that the vehicle is held securely on a fairly steep hill when only the parking brake is applied.	BR-33
Automatic transmission "Park" mechanism Check that the lock release button on the selector lever operates properly and smoothly. On a fairly steep hill check that your 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).	
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-20
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, rot or loose connections.	LC-8
Brake and clutch fluid levels Make sure that the brake and clutch fluid levels are between the "MAX" and "MIN" lines on the reservoir.	MA-14, 15
Battery Check the fluid level in each cell. It should be between the "MAX" and "MIN" lines.	EL-10
Engine drive belts Make sure that no belt is frayed, worn, cracked or oily.	MA-8
Engine oil level Check the level on the dipstick after parking the vehicle on a level spot and turning off the engine.	MA-11
Power steering fluid level and lines Check the level when the fluid is cold and the engine is turned off. Check the lines for proper attachment, leaks, cracks, etc.	MA-18
Automatic transaxle fluid level Check the level on the dipstick after putting the selector lever in "P" with the engine idling.	MA-15
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-18
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 conditioning after use is normal. If you should notice any leaks or if gasoline fumes are evident, check for the cause and correct it immediately.	—

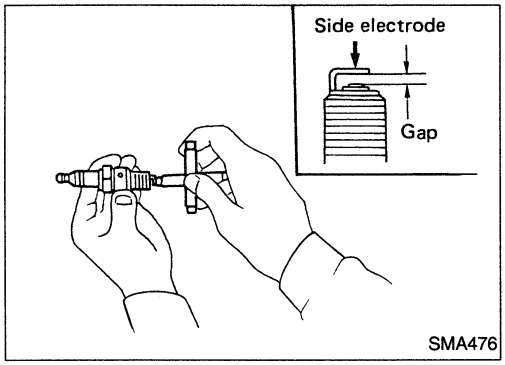


Changing Spark Plugs

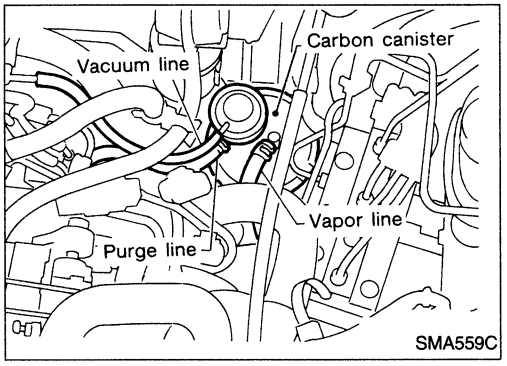
1. Disconnect ignition wires from spark plugs at boot. Do not pull on the wire.



2. Remove spark plugs with spark plug wrench.
   Spark plug:
   Standard type
   BKR5E-11
   Cold type
   BKR6E-11
   BKR7E-11



3. Check plug gap of each new spark plug.
   Gap: 1.0 - 1.1 mm (0.039 - 0.043 in)
4. Install spark plugs. Reconnect ignition wires according to Nos. indicated on them.
   Spark plug:
   ⧉: 20 - 29 N•m
   (2.0 - 3.0 kg-m, 14 - 22 ft-lb)



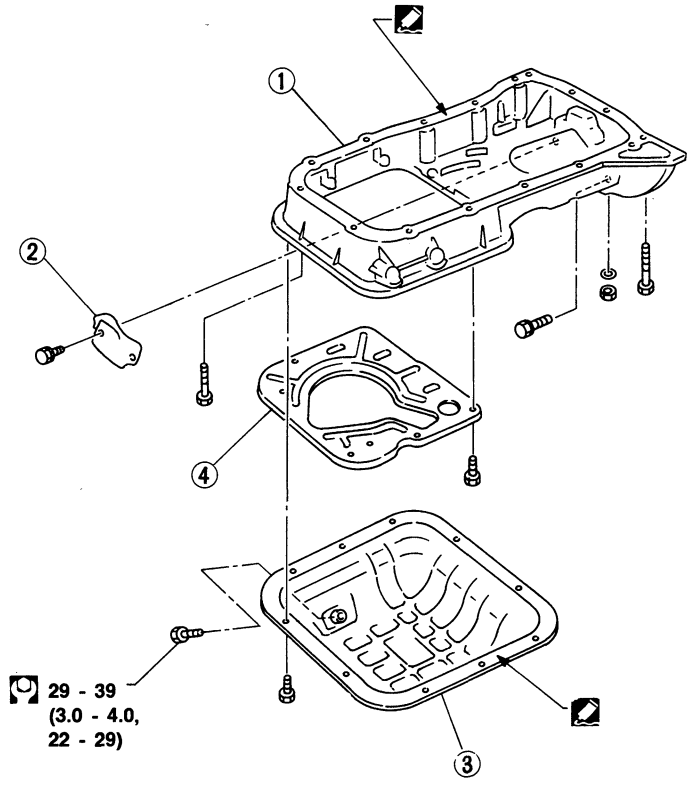
Checking Vapor Lines

1. Visually inspect vapor lines for improper attachment and for cracks, damage, loose connections, chafing and deterioration.
2. Inspect vacuum relief valve of fuel tank filler cap for clogging, sticking, etc.
   Refer to EF & EC section ("Inspection", "EVAPORATIVE EMISSION (EVAP) SYSTEM").

Checking Valve Clearance

If engine runs with unusual mechanical noise, refer to EM section ("Inspection", "CYLINDER HEAD").

CONTENTS (Cont'd.)



: N•m (kg-m, ft-lb)
: Apply liquid gasket.

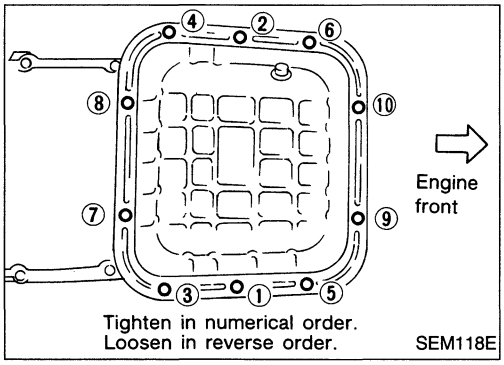
M6: 6.4 - 7.5 (0.65 - 0.76, 4.7 - 5.5)
M8.M10: 16 - 19 (1.6 - 1.9, 12 - 14)

① Aluminum oil pan
② Rear cover plate
③ Steel oil pan
④ Baffle plate

SEM117E

Removal

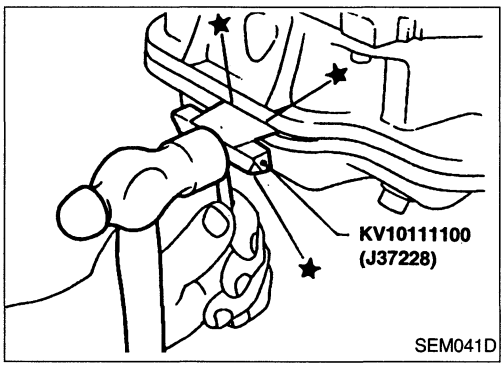
1. Remove engine under cover.
2. Drain engine oil.



Tighten in numerical order.
Loosen in reverse order.

SEM118E

3. Remove steel oil pan bolts.



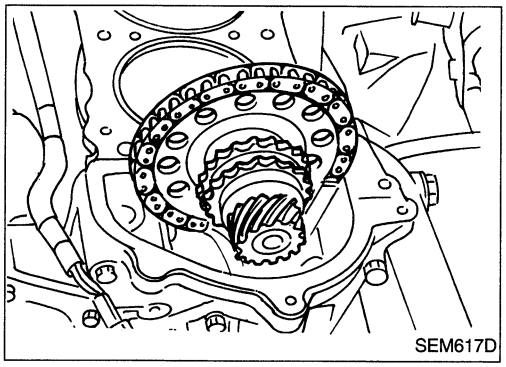
SEM041D

4. Remove steel oil pan.
(1) 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.**

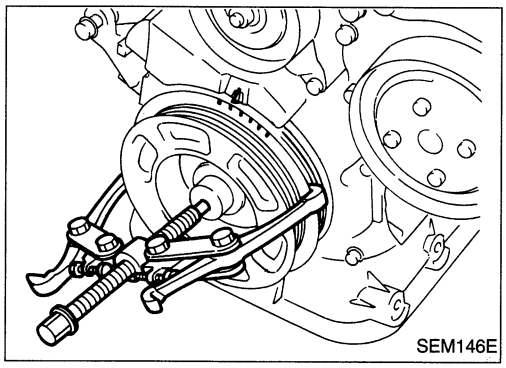
Removal (Cont'd)

LOWER TIMING CHAIN


SEM617D

1. Remove upper timing chain.

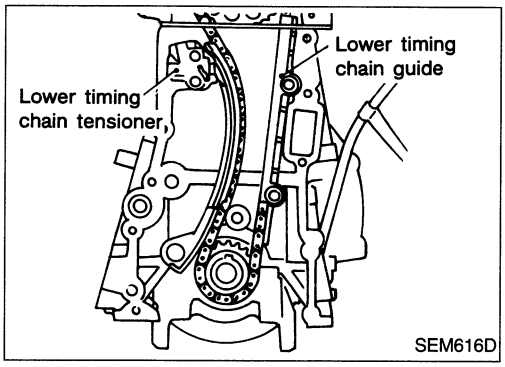
Refer to EM-18.


SEM146E

2. Remove oil pan.

Refer to EM-11.

3. Remove crankshaft pulley.
4. Remove front cover



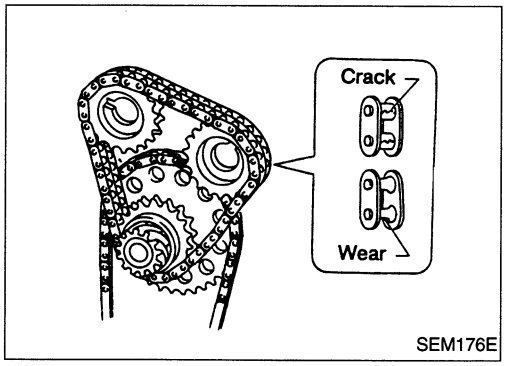
SEM616D

5. Remove the following parts.
- Lower timing chain tensioner
- Tension arm
- Lower timing chain guide

6. Remove lower timing chain and idler sprocket.

Inspection

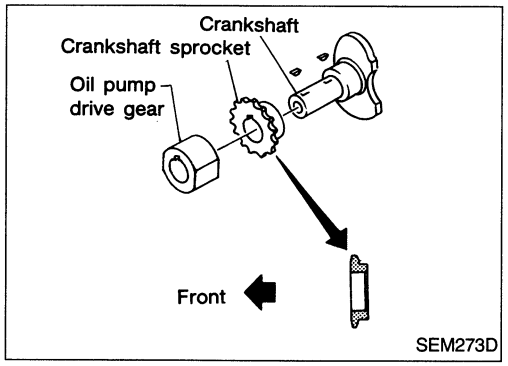
Check for cracks and excessive wear at roller links. Replace chain if necessary.



SEM176E

Installation

LOWER TIMING CHAIN

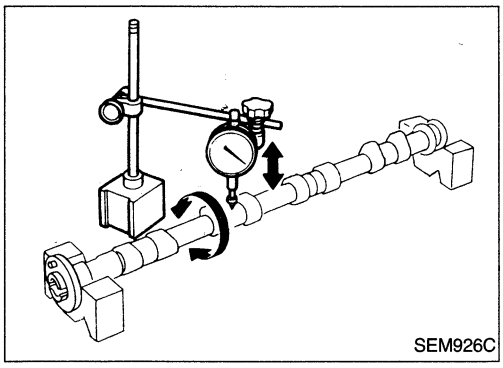


SEM273D

1. Install crankshaft sprocket.
- **Make sure that mating marks of crankshaft sprocket face front of engine.**

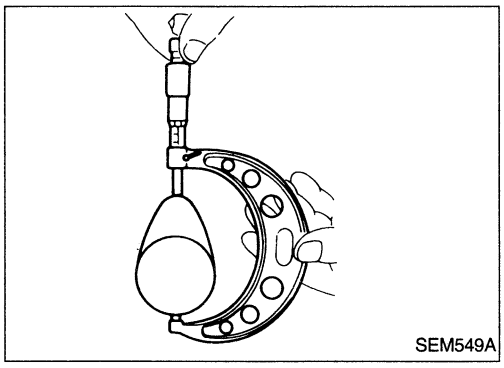
2. Position crankshaft so that No. 1 piston is set at TDC.

Inspection (Cont'd)


SEM926C

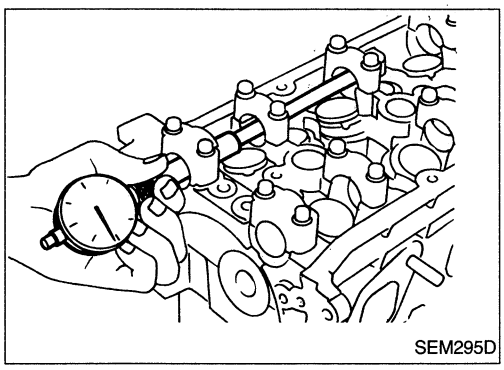
CAMSHAFT RUNOUT

1. Measure camshaft runout at the center journal.
   Runout (Total indicator reading):
   Standard
   Less than 0.02 mm (0.0008 in)
   Limit
   0.04 mm (0.0016 in)
2. If it exceeds the limit, replace camshaft.


SEM549A

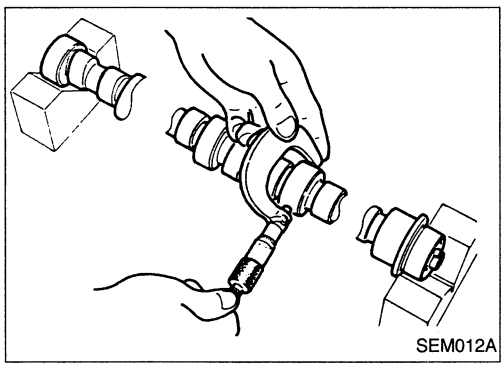
CAMSHAFT CAM HEIGHT

1. Measure camshaft cam height.
   Standard cam height:
   Intake
   42.415 - 42.605 mm (1.6699 - 1.6774 in)
   Exhaust
   42.415 - 43.005 mm (1.6699 - 1.6931 in)
   Cam wear limit:
   Intake & Exhaust
   0.2 mm (0.008 in)
2. If wear is beyond the limit, replace camshaft.

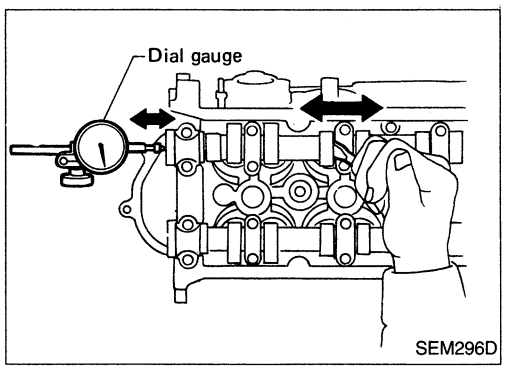

SEM295D

CAMSHAFT JOURNAL CLEARANCE

1. Install camshaft bracket and tighten bolts to the specified torque.
2. Measure inner diameter of camshaft bearing.
   Standard inner diameter:
   #1 journal
   28.000 - 28.025 mm (1.1024 - 1.1033 in)
   #2 to #5 journals
   24.000 - 24.025 mm (0.9449 - 0.9459 in)


SEM012A

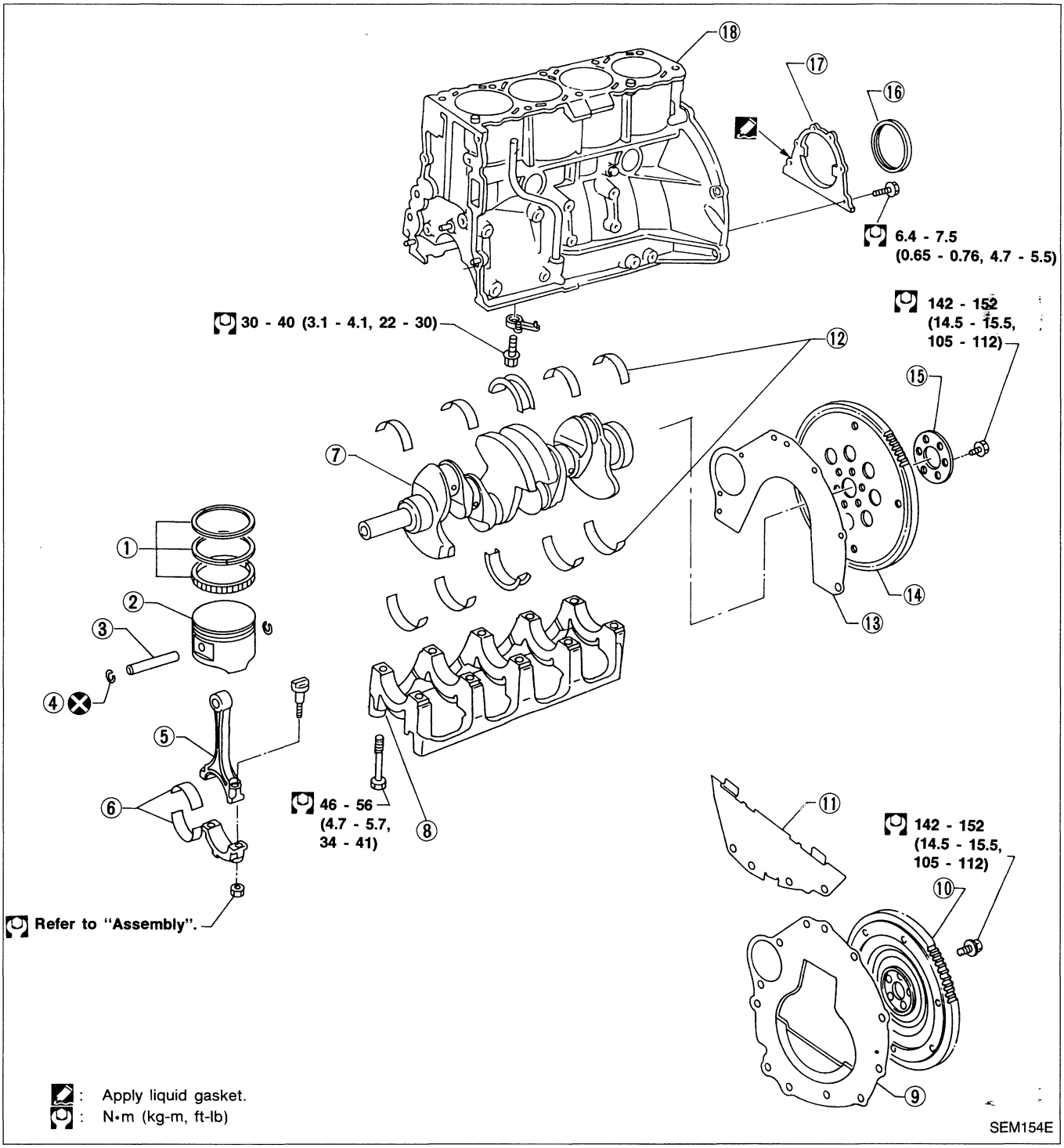
3. Measure outer diameter of camshaft journal.
   Standard outer diameter:
   #1 journal
   27.935 - 27.955 mm (1.0998 - 1.1006 in)
   #2 to #5 journals
   23.935 - 23.955 mm (0.9423 - 0.9431 in)
4. If clearance exceeds the limit, replace camshaft and/or cylinder head.
   Camshaft journal clearance:
   Standard 0.045 - 0.090 mm (0.0018 - 0.0035 in)
   Limit 0.12 mm (0.0047 in)



SEM296D

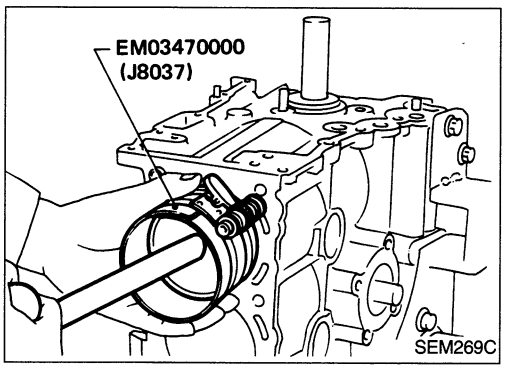
CAMSHAFT END PLAY

1. Install camshaft and thermostat housing in cylinder head.
2. Measure camshaft end play.
   Camshaft end play:
   Standard
   0.070 - 0.15 mm (0.0028 - 0.0059 in)
   Limit
   0.20 mm (0.0079 in)



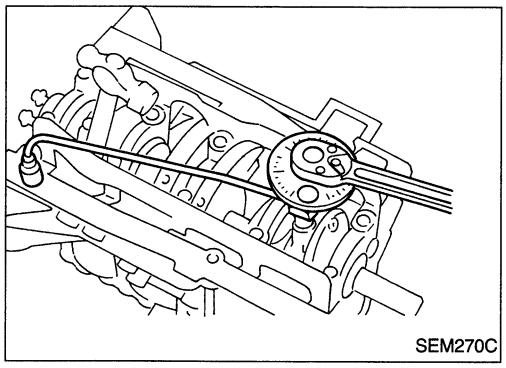
① Piston rings
② Piston
③ Piston pin
④ Snap ring
⑤ Connecting rod
⑥ Connecting rod bearing
⑦ Crankshaft
⑧ Main bearing cap
⑨ Rear plate (M/T)
⑩ Flywheel (M/T)
⑪ Dust cover (A/T)
⑫ Main bearing
⑬ Rear plate (A/T)
⑭ Drive plate (A/T)
⑮ Drive plate reinforcement
⑯ Rear oil seal
⑰ Rear oil seal retainer
⑱ Cylinder block

Assembly (Cont'd)



5. Install pistons with connecting rods.
a. Install them into corresponding cylinders with Tool.

- **Be careful not to scratch cylinder wall by connecting rod.**
- **Arrange so that front mark on piston head faces toward front of engine.**

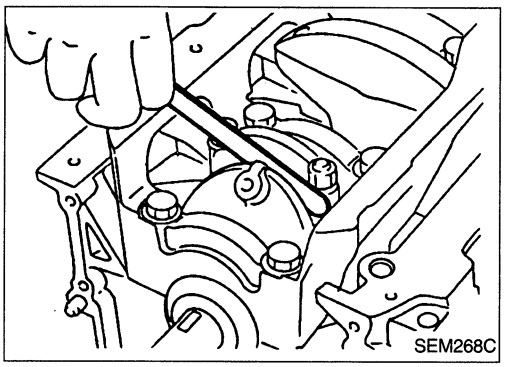


b. Install connecting rod bearing caps.
Tighten connecting rod bearing cap nuts to the specified torque.

Connecting rod bearing nut:

(1) Tighten to 14 to 16 N·m (1.4 to 1.6 kg-m, 10 to 12 ft-lb).

(2) Tighten bolts 60 to 65 degrees clockwise with an angle wrench, or if an angle wrench is not available, tighten them to 38 to 44 N·m (3.9 to 4.5 kg-m, 28 to 33 ft-lb).



6. Measure connecting rod side clearance.

Connecting rod side clearance:

Standard

0.2 - 0.4 mm (0.008 - 0.016 in)

Limit

0.6 mm (0.024 in)

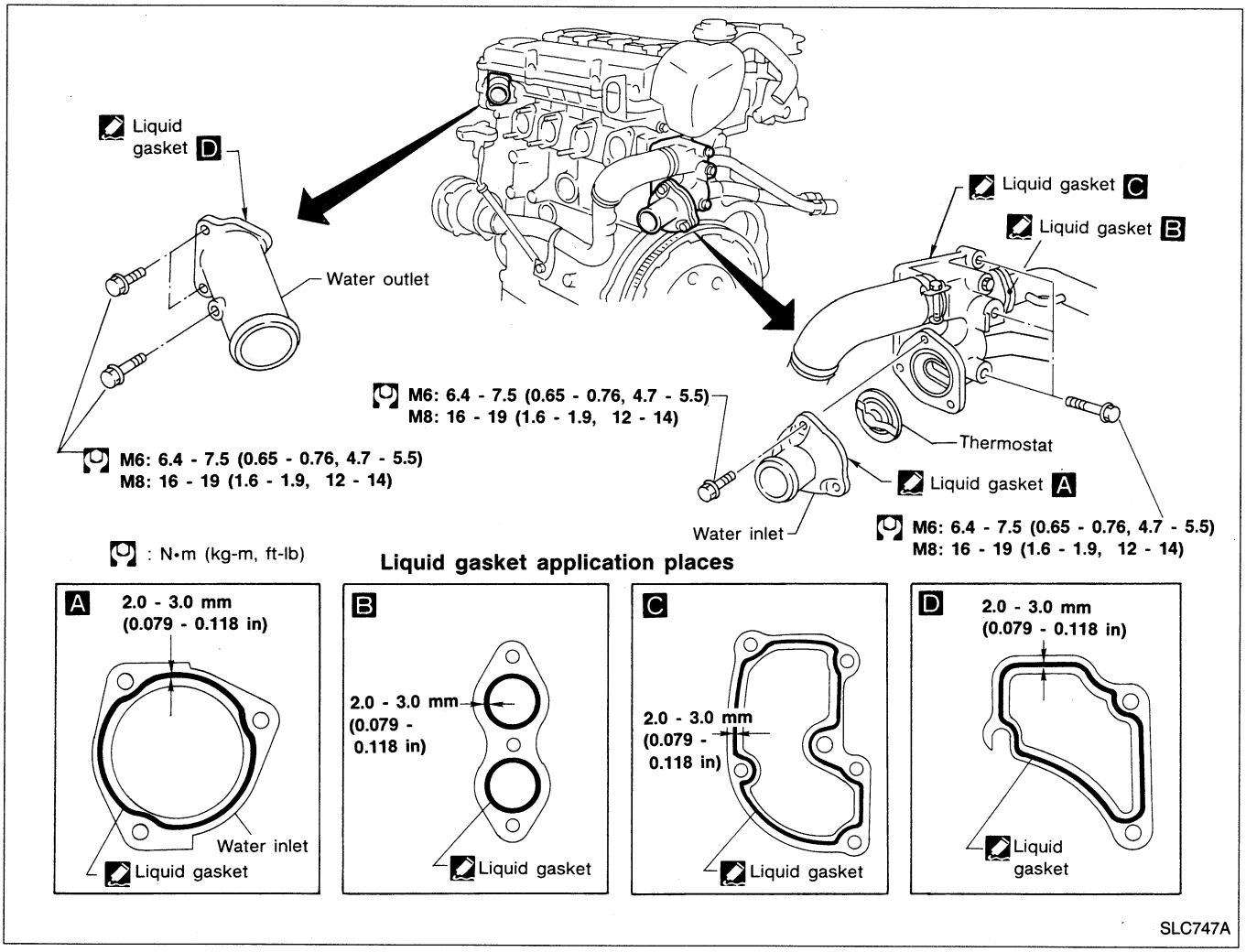
If beyond the limit, replace connecting rod and/or crankshaft.

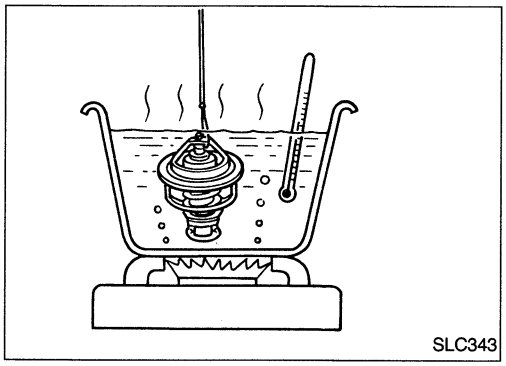
ENGINE LUBRICATION AND COOLING SYSTEM

SECTION LC

CONTENTS

Thermostat





INSPECTION

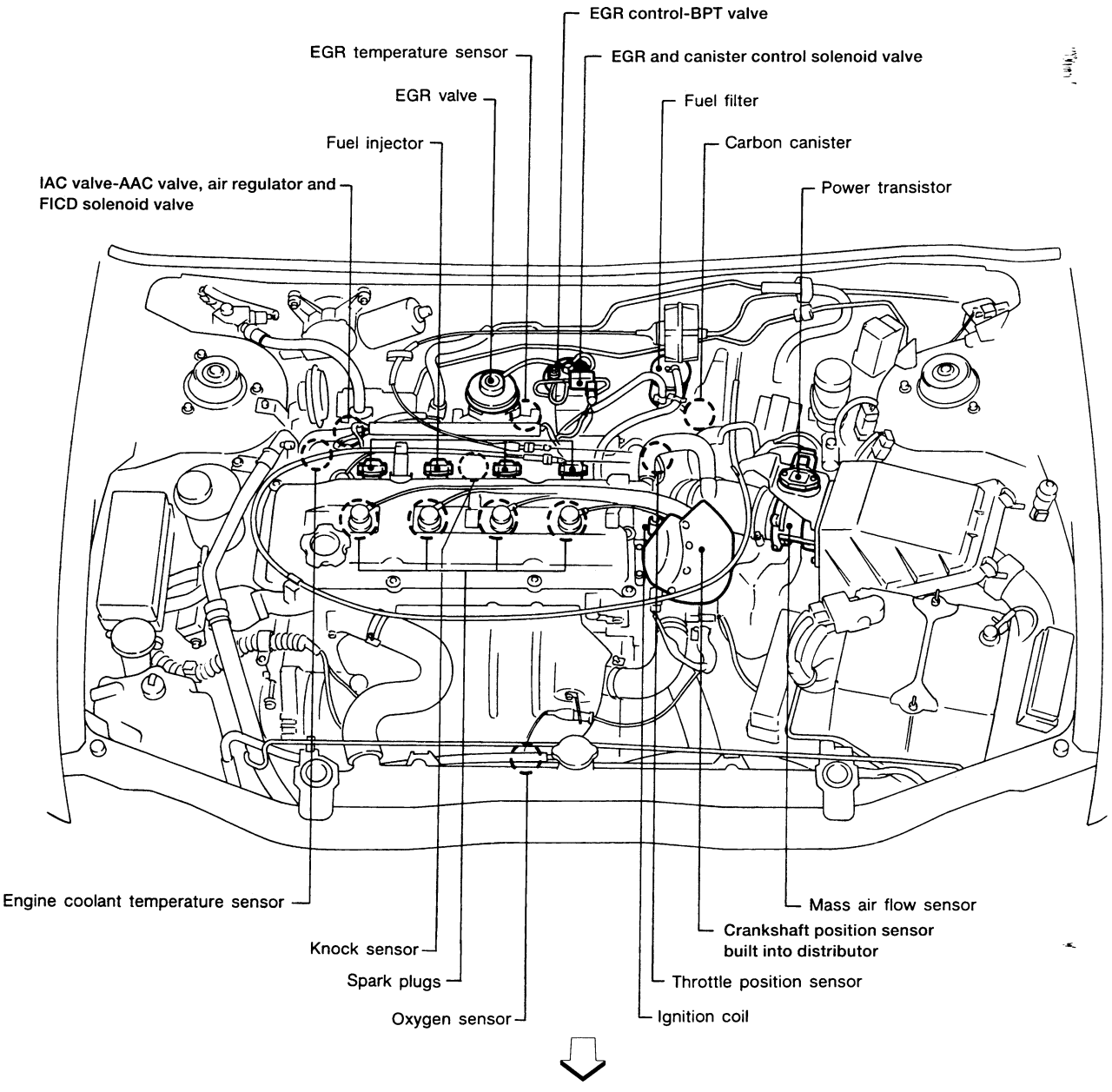
1. Check valve seating condition at ordinary room temperatures. It should seat tightly.
2. Check valve opening temperature and maximum valve lift.

		Standard
Valve opening temperature	°C (°F)	76.5 (170)
Maximum valve lift	mm/°C (in/°F)	10/90 (0.39/194)

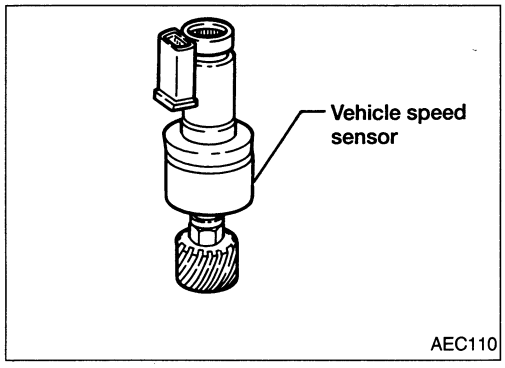
3. Then check if valve is closed at 5°C (9°F) below valve opening temperature.

- **Apply a continuous bead of liquid gasket to mating surface of water inlet.**
- **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.**

ECCS Component Parts Location

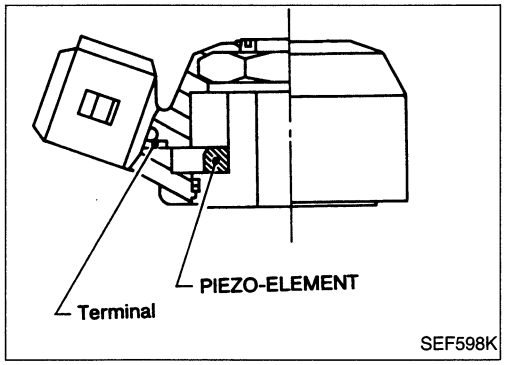


AEC201



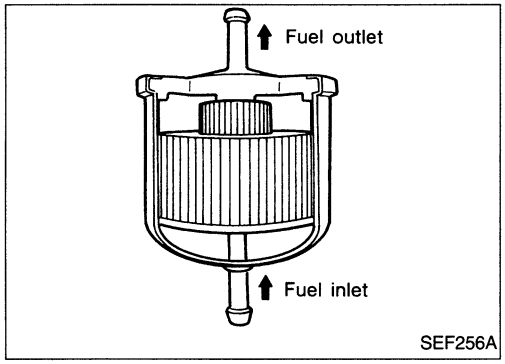
Vehicle Speed Sensor (VSS)

The vehicle speed sensor provides a vehicle speed signal to the speedometer and the speedometer sends a signal to the ECM. The speed sensor consists of a pulse generator, which is installed in the transaxle. For diagnosis, refer to EF & EC-103.



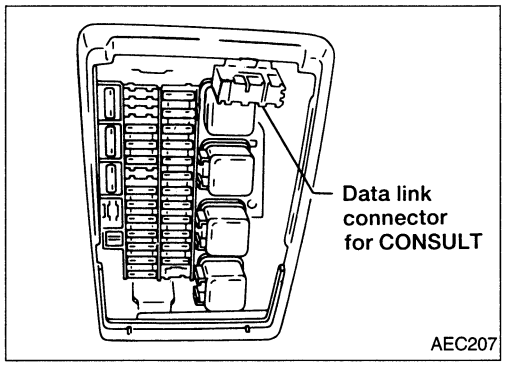
Knock Sensor (KS)

The knock sensor is attached to the cylinder block and senses engine knocking conditions.
A knocking vibration from the cylinder block is applied as pressure to the piezoelectric element. This vibrational pressure is then converted into a voltage signal which is sent to the ECM. For diagnosis, refer to EF & EC-118.



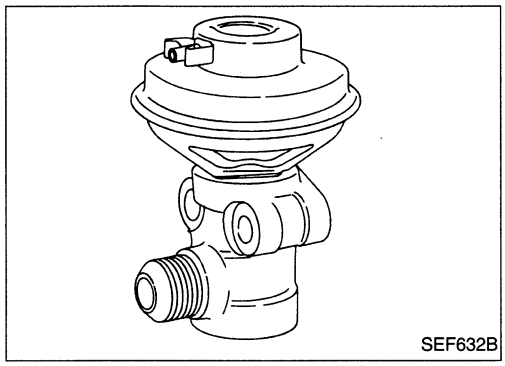
Fuel Filter

The specially designed fuel filter has a metal case in order to withstand high fuel pressure.



Data Link Connector (DLC) for CONSULT

The data link connector for CONSULT is located beside the fuse lid.



Exhaust Gas Recirculation (EGR) Valve

The EGR valve controls the quantity of exhaust gas to be led to the intake manifold through vertical movement of the taper valve connected to the diaphragm, to which vacuum is applied in response to the opening of the throttle valve. For diagnosis, refer to EF & EC-109.

Radiator Fan Control (Cont'd)

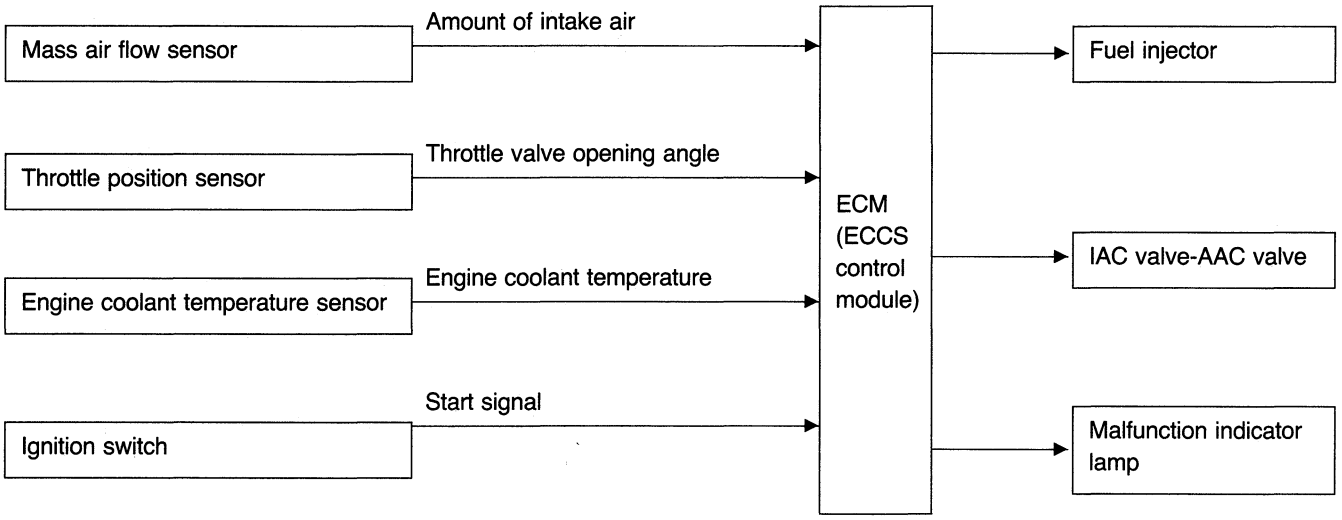
OPERATION

Vehicle speed km/h (MPH)	Air conditioning switch	Air conditioning triple-pressure switch	Engine coolant temperature °C(°F)		
			95 (203)	100 (212)	105 (221)
0 - 20 (0 - 12)	OFF	OFF	OFF	LOW	HIGH
	ON	OFF	LOW		HIGH
		ON	HIGH		
20 -80 (12 - 50)	OFF	OFF	OFF	LOW	HIGH
	ON	OFF	LOW		HIGH
		ON	LOW		HIGH
80 (50) or more	OFF	OFF	OFF	LOW	HIGH
	ON	OFF	OFF	LOW	HIGH
		ON	OFF	LOW	HIGH

Fail-safe System

CPU MALFUNCTION

Input/output signal line



Outline

The fail-safe system makes engine starting possible if there is something malfunctioning in the ECM's CPU circuit.
In former models, engine starting was difficult under the previously mentioned conditions. But with the provisions in this fail-safe system, it is possible to start the engine.

Fail-safe system activating condition when ECM is malfunctioning

The fail-safe mode operates when the computing function of the ECM is judged to be malfunctioning. When the fail-safe system activates, i.e. if a malfunction condition is detected in the CPU of the ECM, the MALFUNCTION INDICATOR LAMP on the instrument panel lights to warn the driver.

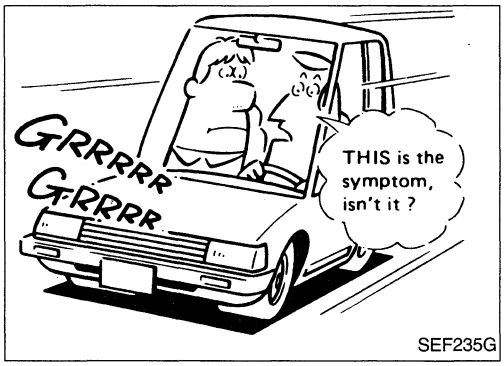
Engine control with fail-safe system, operates when ECM is malfunctioning

When the fail-safe system is operating, fuel injection, ignition timing, and so on are controlled under certain limitations.

Cancellation of fail-safe system when ECM is malfunctioning

Activation of the fail-safe system is canceled each time the ignition switch is turned OFF. The system is reactivated if all of the activating conditions are satisfied after turning the ignition switch from OFF to ON.

How to Perform Trouble Diagnoses for Quick and Accurate Repair (Cont'd)



SEF235G

INTERMITTENT PROBLEM SIMULATION

In order to duplicate an intermittent problem, it is effective to create similar conditions for component parts, under which the problem might occur.
Perform the activity listed under
Service procedure and note the result.

	Variable factor	Influential part	Target condition	Service procedure
1	Mixture ratio	Pressure regulator	Made lean	Remove vacuum hose and apply vacuum.
			Made rich	Remove vacuum hose and apply pressure.
2	Ignition timing	Crankshaft position sensor	Advanced	Rotate distributor clockwise.
			Retarded	Rotate distributor counterclockwise.
3	Mixture ratio feedback control	Oxygen sensor	Suspended	Disconnect oxygen sensor harness connector.
		ECM	Operation check	Perform on-board diagnostic system (On-board Diagnostic Test Mode II) at 2,000 rpm.
4	Idle speed	IAC valve-AAC valve	Raised	Turn idle adjusting screw counterclockwise.
			Lowered	Turn idle adjusting screw clockwise.
5	Electrical connection (Electric continuity)	Harness connectors and wires	Poor electrical connection or improper wiring	Tap or wiggle.
				Race engine rapidly. See if the torque reaction of the engine unit causes electric breaks.
6	Temperature	ECM	Cooled	Cool with an icing spray or similar device.
			Warmed	Heat with a hair drier. **[WARNING: Do not overheat the unit.]**
7	Moisture	Electric parts	Damp	Wet. **[WARNING: Do not directly pour water on components. Use a mist sprayer.]**
8	Electric loads	Load switches	Loaded	Turn on headlamps, air conditioning, rear defogger, etc.
9	Closed throttle position switch condition	ECM	ON-OFF switching	Rotate throttle position sensor body.
10	Ignition spark position	Timing light	Spark power check	Try to flash timing light for each cylinder using ignition coil adapter (SST).

- **Select the "Variable factor" when the symptom occurs. Perform the "Service procedure" to try to simulate the intermittent problem.**

Consult (Cont'd)

SELF-DIAGNOSTIC RESULTS DIAGNOSTIC TEST MODE

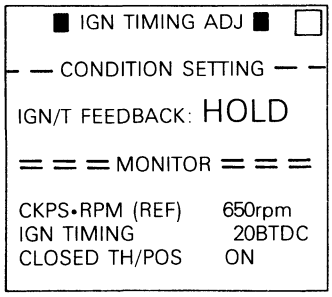
DIAGNOSTIC ITEM	DIAGNOSTIC ITEM IS DETECTED WHEN ...	CHECK ITEM (REMEDY)
CRANKSHAFT POSITION SEN*	• Either 1° or 180° signal is not entered for the first few seconds during engine cranking. • Either 1° or 180° signal is not input often enough while the engine speed is higher than the specified rpm.	• Harness and connector (If harness and connector are normal, replace crankshaft position sensor.)
MASS AIR FLOW SEN	• The mass air flow sensor circuit is open or shorted. (An abnormally high or low voltage is entered.)	• Harness and connector (If harness and connector are normal, replace mass air flow sensor.)
COOLANT TEMP SEN	• The engine coolant temperature sensor circuit is open or shorted. (An abnormally high or low output voltage is entered.)	• Harness and connector • Engine coolant temperature sensor
VEHICLE SPEED SEN	• The vehicle speed sensor circuit is open or shorted.	• Harness and connector • Vehicle speed sensor (pulse generator)
IGN SIGNAL-PRIMARY*	• The ignition signal in primary circuit is not entered during engine cranking or running.	• Harness and connector • Power transistor unit
ECM	• ECM calculation function is malfunctioning.	[Replace ECM (ECCS control module).]
EGR SYSTEM**	• EGR valve does not operate. (EGR valve spring does not lift.)	• EGR valve • EGR and canister control solenoid valve
OXYGEN SEN	• The oxygen sensor circuit is open or shorted. (An abnormally high or low output voltage is entered.)	• Harness and connector • Oxygen sensor • Fuel pressure • Injectors • Intake air leaks
KNOCK SENSOR	• The knock sensor circuit is open or shorted. (An abnormally high or low voltage is entered.)	• Harness and connector • Knock sensor
EGR TEMP SENSOR**	• The EGR temperature sensor circuit is open or shorted. (An abnormally high or low voltage is entered.)	• Harness and connector • EGR temperature sensor
THROTTLE POSI SEN	• The throttle position sensor circuit is open or shorted. (An abnormally high or low voltage is entered.)	• Harness and connector • Throttle position sensor
INJECTOR•LEAK**	• Fuel leaks from injector.	• Injector

*: Check items causing a malfunction of crankshaft position sensor circuit first, if both "CRANKSHAFT POSITION SENSOR" and "IGN SIGNAL-PRIMARY" come out at the same time.

:The diagnostic item marked "" is applicable to vehicles for California only.

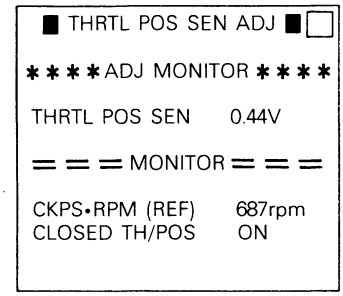
Basic Inspection (Cont'd)

5



SEF221M

6



SEF222M

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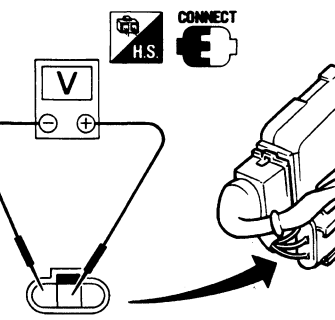
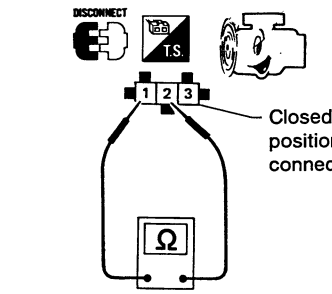


SEF148I

7



SEF096M

Ⓐ

5

CHECK IDLE ADJ. SCREW INITIAL SET RPM.

1. Select "IGN TIMING ADJ" in "WORK SUPPORT" mode.
2. When touching "START", does engine speed fall to 650 ± 50 rpm (A/T in "N" position)?

N.G. → Adjust engine speed by turning idle adjusting screw.

OR

When disconnecting throttle position sensor harness connector, does engine speed fall to 650 ± 50 rpm (A/T in "N" position)?

O.K.

6

CHECK THROTTLE POSITION SENSOR IDLE POSITION. (MT model only).

1. Perform "THRTL POS SEN. ADJ." in "WORK SUPPORT" mode.
2. Check that output voltage of throttle position sensor is approx. 0.3 to 0.7V. (Throttle valve fully closes.) and "CLOSED TH/POS" stays "ON".

N.G. →
1. Adjust output voltage by rotating throttle position sensor body.
2. Disconnect throttle position sensor harness connector for a few seconds and then reconnect it.
3. Confirm that "CLOSED TH/POS" stays "ON" using CONSULT.

OR

Measure output voltage of throttle position sensor using voltmeter, and check that it is approx. 0.3 to 0.7V. (Throttle valve fully closed.)

O.K.

7

CHECK CLOSED THROTTLE POSITION SWITCH IDLE POSITION (AT model only).

Check closed throttle position switch OFF → ON engine speed with circuit tester, closing throttle valve manually.

Closed throttle position switch OFF → ON engine speed
900 ± 150 rpm ("N" position)

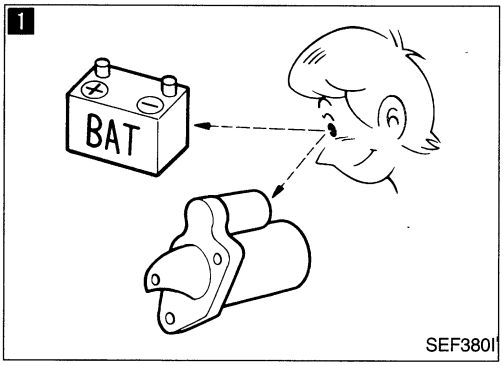
N.G. →
1. Adjust continuity signal by rotating throttle position sensor body.
2. Disconnect throttle position sensor harness connector for a few seconds and then reconnect it.
3. Confirm that "CLOSED TH/POS" stays "ON" using CONSULT.

O.K.

(Go to Ⓑ on next page.)

Diagnostic Procedure 6 — Hard to Start or Impossible to Start under Normal Conditions

1



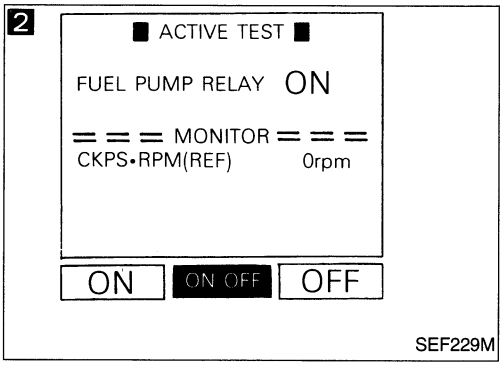
SEF380I

CHECK BATTERY AND STARTER.
Check battery and starter operation.
Refer to EL section ("SPECIFIC GRAVITY CHECK", "BATTERY") and ("SDS", "STARTING SYSTEM — Starter — ").

N.G. → Repair or replace.

O.K. ↓

2



SEF229M

CHECK FUEL PRESSURE.
1. Turn ignition switch "ON".
2. Perform "FUEL PUMP RELAY" in "ACTIVE TEST" mode.
3. Pinch fuel feed hose with fingers.

Is fuel pressure pulsation felt on the fuel feed hose?

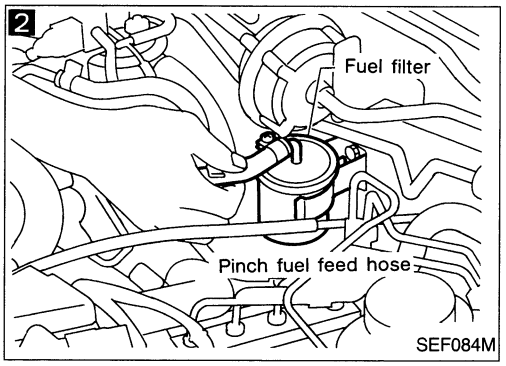
No → Check fuel pump and circuit. Refer to EF & EC-134.

— OR —

1. Pinch fuel feed hose with fingers.
2. When cranking the engine, is there any pressure on the fuel feed hose?

Yes ↓

2



SEF084M

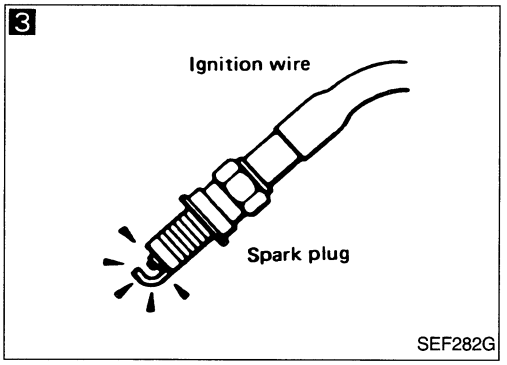
3

CHECK IGNITION SPARK.
1. Disconnect ignition wire from rocker cover.
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.

N.G. → Check ignition coil, power transistor unit and circuits. Refer to EF & EC-106.

O.K. ↓

3



SEF282G

4

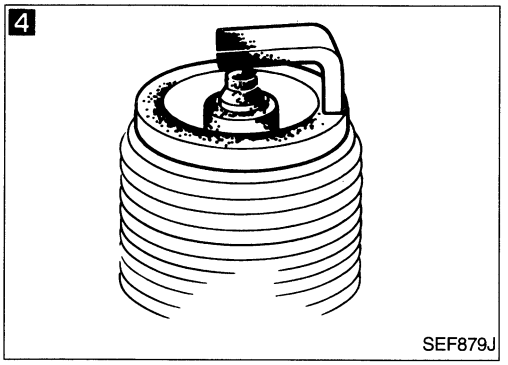
CHECK SPARK PLUGS.
Remove the spark plugs and check for fouling, etc.

N.G. → Repair or replace spark plug(s).

O.K. ↓

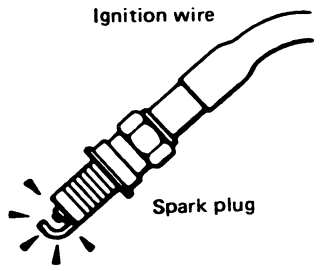
(Go to Ⓐ on next page.)

4


SEF879J

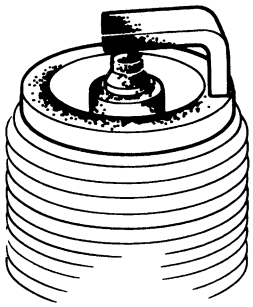
Diagnostic Procedure 12 — Engine Stalls when the Engine is Cold (Cont'd)

4



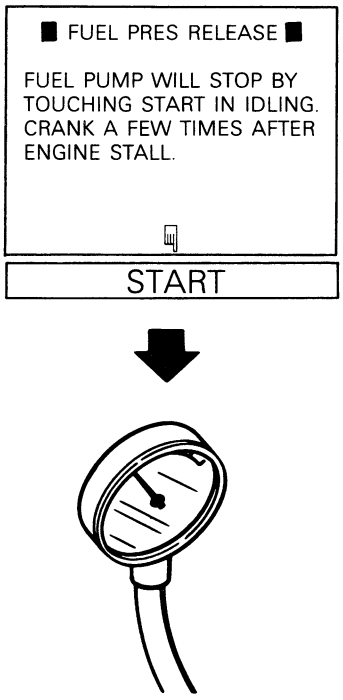
SEF282G

5



SEF879J

6



SEF379I

Ⓐ

4 **CHECK IGNITION SPARK.**
1. Disconnect ignition wire from rocker cover.
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.

N.G. → Check ignition coil, power transistor unit and circuits. Refer to EF & EC-106.

O.K. ↓

5 **CHECK SPARK PLUGS.**
Remove the spark plugs and check for fouling, etc.

N.G. → Repair or replace spark plug(s).

O.K. ↓

6 **CHECK FUEL PRESSURE.**

1. Perform "FUEL PRESSURE RELEASE" in "WORK SUPPORT" mode in order to release fuel pressure to zero.
2. Install fuel pressure gauge and check fuel pressure.
   A few seconds after ignition switch is turned OFF to ON:
   Approx.
   294 kPa (3.0 kg/cm², 43 psi)
   At idle:
   Approx.
   235 kPa (2.4 kg/cm², 34 psi)

N.G. → Check fuel pressure regulator diaphragm. Refer to EF & EC-168.

OR

1. Release fuel pressure to zero. Refer to EF & EC-167.
2. Install fuel pressure gauge and check fuel pressure.

O.K. ↓

7 **CHECK ECM HARNESS CONNECTOR.**
Check the ECM pin terminals for damage or poor connection of ECM harness connector. Refer to EF & EC-154.

N.G. → Repair or replace.

O.K. ↓

8 **CHECK ECM POWER SUPPLY AND GROUND CIRCUIT.**
Refer to EF & EC-91.

N.G. → Repair or replace.

O.K. ↓

9 **TRY A KNOWN GOOD ECM***

↓

INSPECTION END

*: ECM may be the cause of a problem, but this is rarely the case.

Diagnostic Procedure 16 — Engine Stalls when the Electrical Load is Heavy (Cont'd)

5

■ FUEL PRES RELEASE ■

FUEL PUMP WILL STOP BY TOUCHING START IN IDLING. CRANK A FEW TIMES AFTER ENGINE STALL.

START

SEF379I

Ⓐ

5

CHECK FUEL PRESSURE.

1. Perform "FUEL PRESSURE RELEASE" in "WORK SUPPORT" mode in order to release fuel pressure to zero.
2. Install fuel pressure gauge and check fuel pressure.

A few seconds after ignition switch is turned OFF to ON:
Approx.
294 kPa (3.0 kg/cm², 43 psi)
At idle:
Approx.
235 kPa (2.4 kg/cm², 34 psi)

N.G. → Check fuel pressure regulator diaphragm. Refer to EF & EC-168.

— OR —

1. Release fuel pressure to zero. Refer to EF & EC-167.
2. Install fuel pressure gauge and check fuel pressure.

O.K.

6

CHECK ECM HARNESS CONNECTOR.
Check the ECM pin terminals for damage or poor connection of ECM harness connector. Refer to EF & EC-154.

N.G. → Repair or replace.

O.K.

7

CHECK ECM POWER SUPPLY AND GROUND CIRCUIT.
Refer to EF & EC-91.

N.G. → Repair or replace.

O.K.

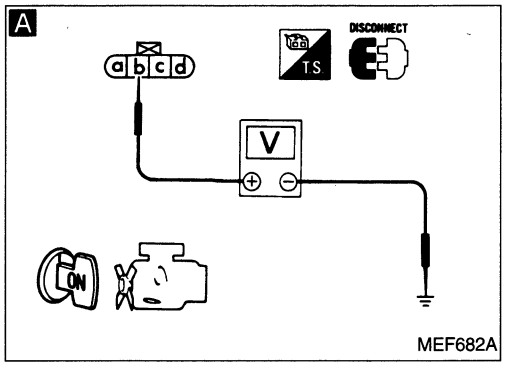
8

TRY A KNOWN GOOD ECM*

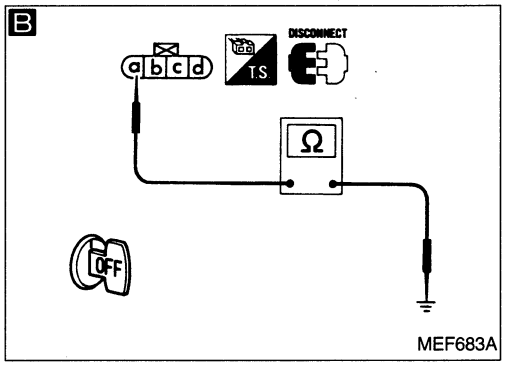
INSPECTION END

*: ECM may be the cause of a problem, but this is rarely the case.

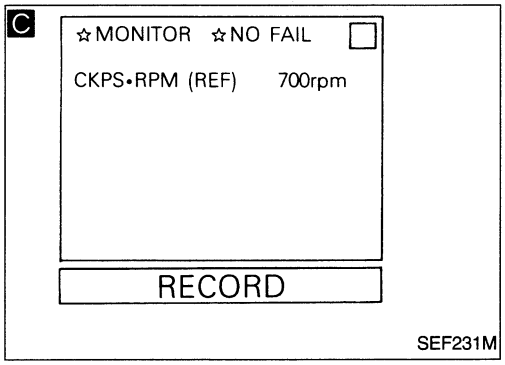
Diagnostic Procedure For Trouble Code 11 (Cont'd)



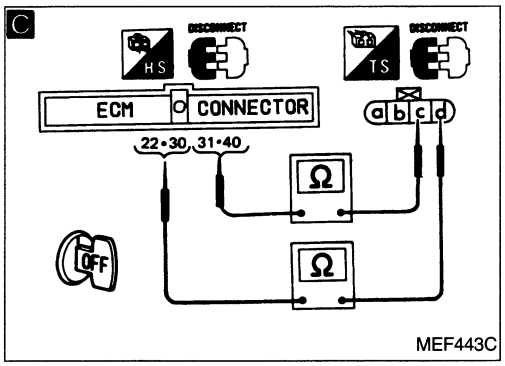
MEF682A



MEF683A



SEF231M



MEF443C

INSPECTION START

A

CHECK POWER SUPPLY.
1) Disconnect crankshaft position sensor harness connector.
2) Turn ignition switch "ON".
3) Check voltage between terminal ⓑ and ground.
Voltage: Battery positive voltage

N.G. → Repair harness or connectors.

O.K.

B

CHECK GROUND CIRCUIT.
1) Turn ignition switch "OFF".
2) Check harness continuity between terminal ⓐ and engine ground.
Continuity should exist.

N.G. → Repair harness or connectors.

O.K.

C

CHECK INPUT SIGNAL CIRCUIT.
1) Reconnect crankshaft position sensor harness connector.
2) Start engine.
3) Read crankshaft position sensor signals in "DATA MONITOR" mode with CONSULT.
rpm: 700 ± 50

OR

1) Disconnect ECM harness connector.
2) Check harness continuity between terminal ⓒ and ECM terminals ㉛, ㊵ (1° signal), terminal ⓓ and ECM terminals ㉒, ㉚ (180° signal).
Continuity should exist.

N.G. → Repair harness or connectors.

O.K.

CHECK COMPONENT
(Crankshaft position sensor).
Refer to EF & EC-159.

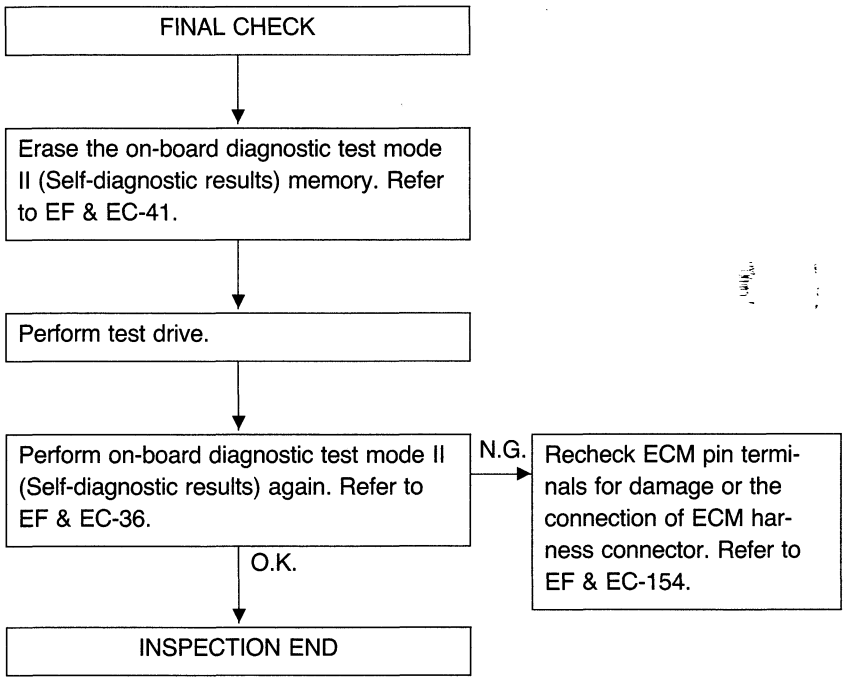
N.G. → Replace crankshaft position sensor.

O.K.

Check ECM pin terminals for damage or the connection of ECM harness connector. Refer to EF & EC-154.

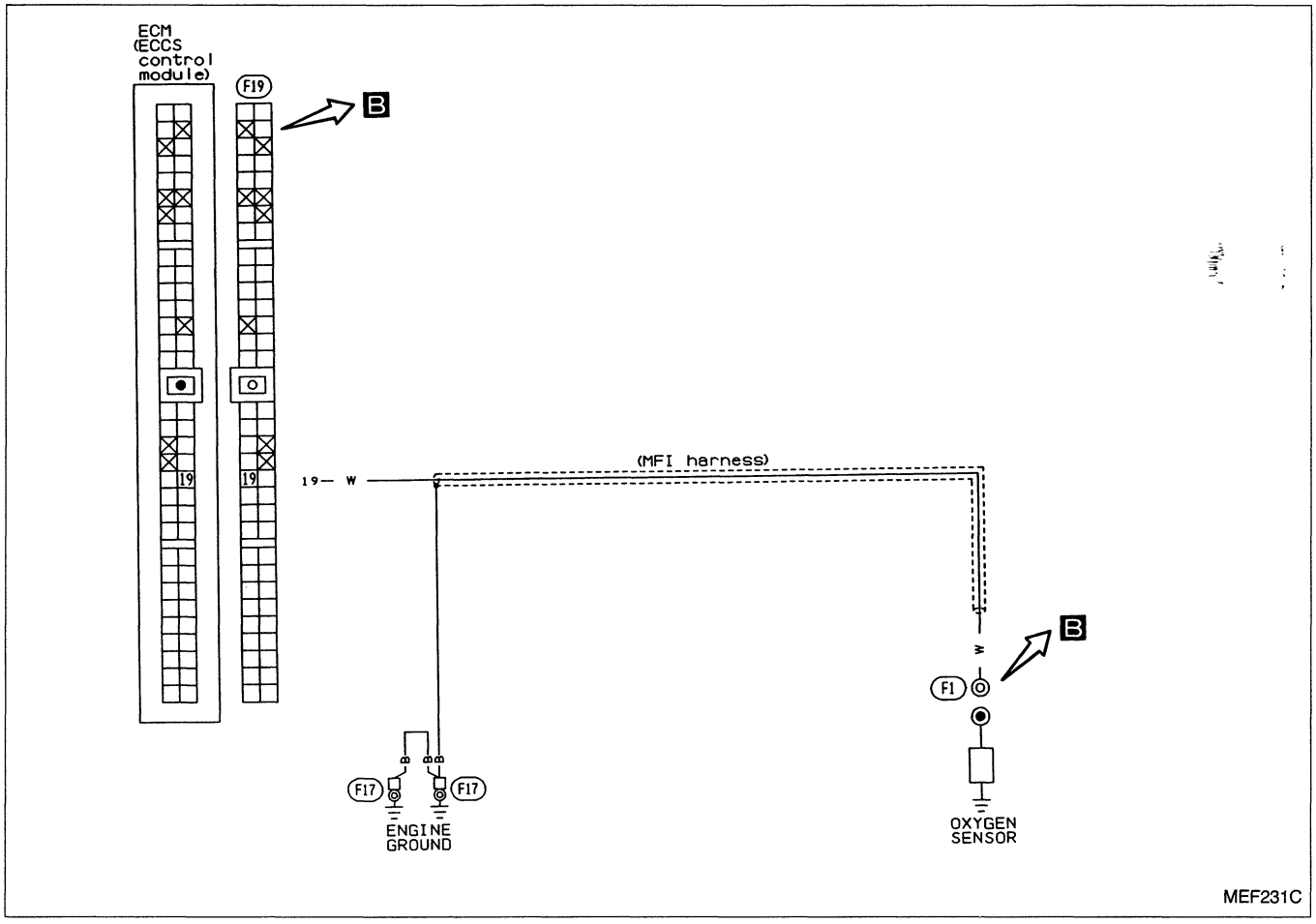
Diagnostic Procedure For Trouble Code 14 (Cont'd)

Perform FINAL CHECK by the following procedure after repair is completed.

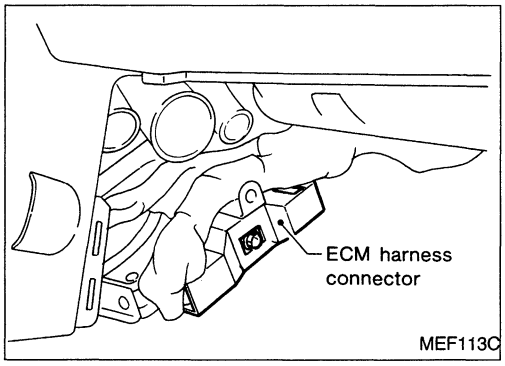


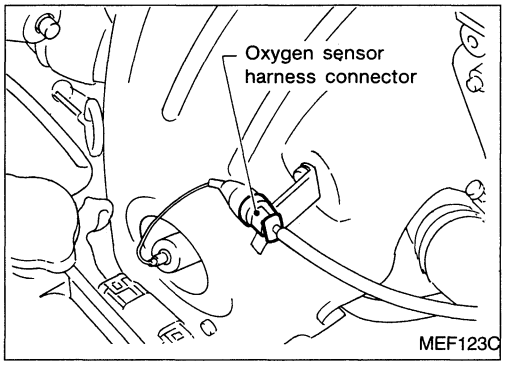
Diagnostic Procedure For Trouble Code 33

OXYGEN SENSOR (Diagnostic trouble code No. 33) CHECK (MALFUNCTION INDICATOR LAMP ITEM)



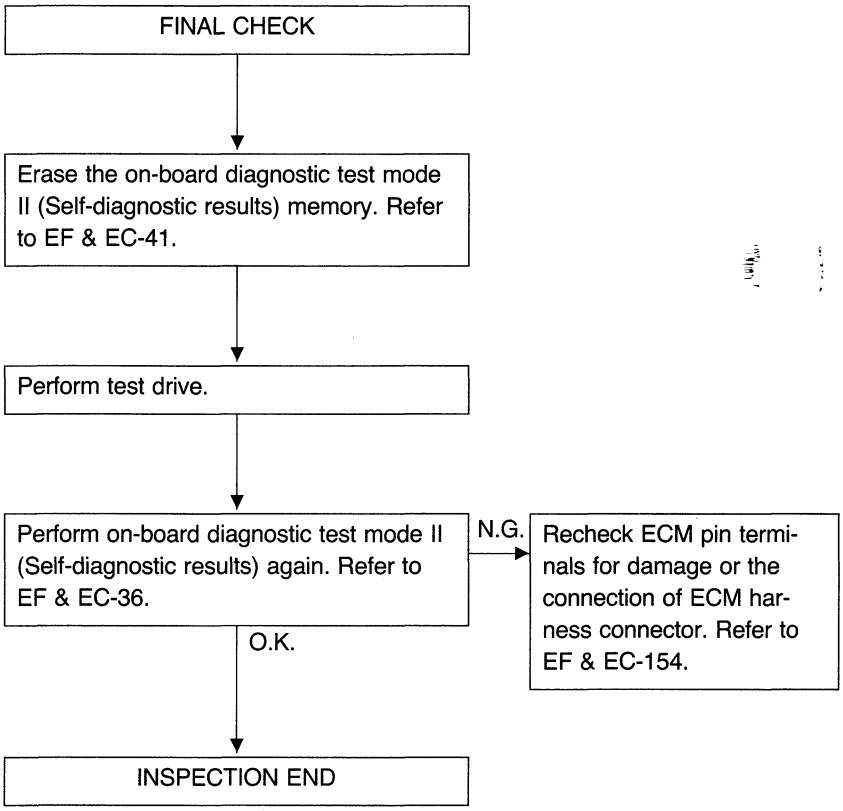
Harness layout



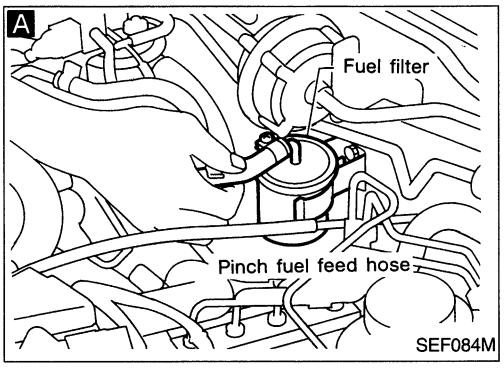


Diagnostic Procedure For Trouble Code 43 (Cont'd)

Perform FINAL CHECK by the following procedure after repair is completed.



Diagnostic Procedure 25 (Cont'd)



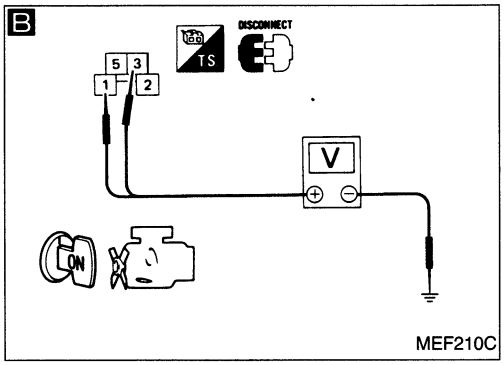
INSPECTION START

A

CHECK OVERALL FUNCTION.
1) Turn ignition switch "ON".
2) Pinch fuel feed hose with fingers.
Fuel pressure pulsation should be felt for 5 seconds after ignition switch is turned "ON".

O.K. → INSPECTION END

N.G.



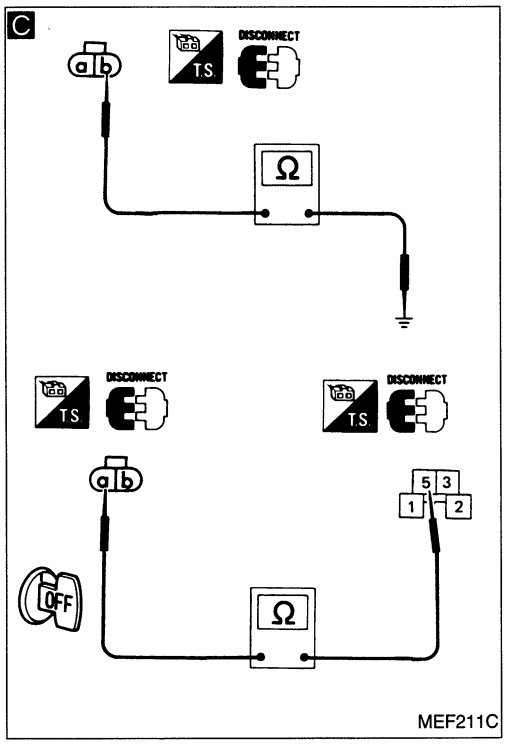
B

CHECK POWER SUPPLY.
1) Turn ignition switch "OFF".
2) Disconnect fuel pump relay.
3) Turn ignition switch "ON".
4) Check voltage between terminals ①, ③ and ground.
Voltage: Battery positive voltage

N.G. → Check the following.
- Harness connectors (E103) , (M7)
- Joint connector (E3)
- 15A fuse
- Harness continuity between fuse and fuel pump relay

If N.G., repair harness or connectors.

O.K.



C

CHECK GROUND CIRCUIT.
1) Turn ignition switch "OFF".
2) Disconnect fuel pump harness connector.
3) Check harness continuity between terminal (b) and body ground, terminal (a) and terminal ⑤.
Continuity should exist.

N.G. → Check the following.
- Harness connectors (B1) , (M6)
- Harness connectors (M7) , (E103)
- Harness continuity between fuel pump and body ground
- Harness continuity between fuel pump and fuel pump relay

If N.G., repair harness or connectors.

O.K.

D

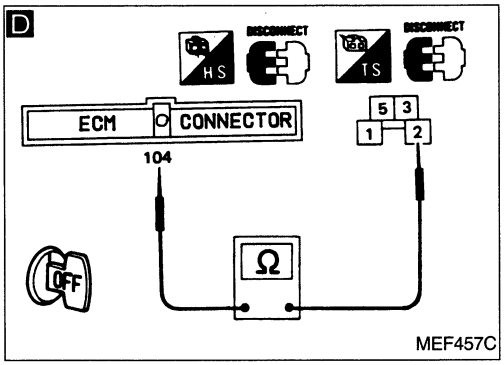
CHECK OUTPUT SIGNAL CIRCUIT.
1) Disconnect ECM harness connector.
2) Check harness continuity between ECM terminal (104) and terminal ②.
Continuity should exist.

N.G. → Check the following.
- Harness connectors (M7) , (E103)
- Harness connectors (M49) , (F23)
- Harness continuity between ECM and fuel pump relay

If N.G., repair harness or connectors.

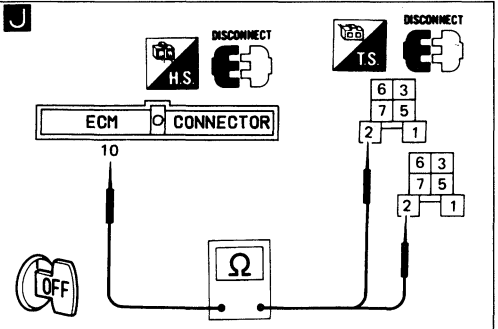
O.K.

Ⓐ



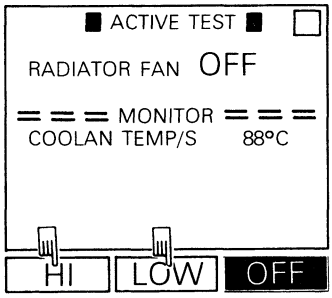
Diagnostic Procedure 27 (Cont'd)

J



MEF435C

K



SEF246M

Ⓐ

J

CHECK OUTPUT SIGNAL CIRCUIT.
1) Disconnect ECM harness connector.
2) Check harness continuity between ECM terminal ⑩ and terminal ②.
Continuity should exist.

N.G. → Check the following.
- Harness connectors (M7) , (E103)
- Harness connectors (F23) , (M49)
- Joint connector-2
- Harness continuity between ECM and radiator fan relays-2 and 3

If N.G., repair harness or connectors.

O.K. ↓

CHECK COMPONENT
(Radiator fan relays-2 and 3).
Refer to EF & EC-165.

N.G. → Replace radiator fan relay.

O.K. ↓

K

CHECK COMPONENTS
(Radiator fan motors-1 and -2).
1) Reconnect radiator fan relay-2, -3, radiator fan motor harness connector, engine coolant temperature sensor harness connector and ECM harness connector.
2) Start engine.
3) Perform "RADIATOR FAN TEST" in "ACTIVE TEST" mode with CONSULT.

OR

Refer to EF & EC-166.

N.G. → Replace radiator fan motors.

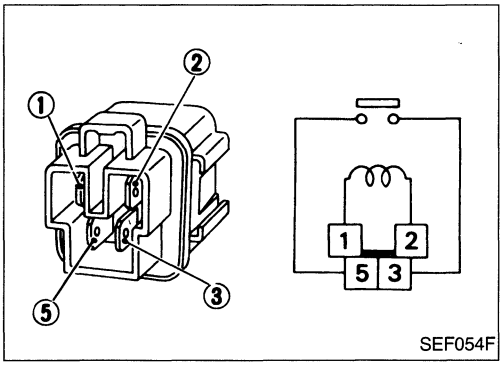
O.K. ↓

Check ECM pin terminals for damage or the connection of ECM harness connector. Refer to EF & EC-154.

ECM inspection table

TERMINAL NO.	ITEM	CONDITION	DATA
1	Ignition signal	Engine is running. └ Idle speed	0.2 - 0.3V
		Engine is running. └ Engine speed is 2,000 rpm.	Approximately 0.8V
3	Ignition check	Engine is running. └ Idle speed	BATTERY POSITIVE VOLTAGE (11 - 14V)
4	ECM relay (Self-shutoff)	Engine is running. Ignition switch "OFF" └ For approximately 1 second after turning ignition switch "OFF"	0 - 1V
		Ignition switch "OFF" └ Approximately 1 second after turning ignition switch "OFF"	BATTERY POSITIVE VOLTAGE (11 - 14V)
8	EGR temperature sensor	Engine is running. └ EGR system is not operating.	Less than 5V
		Engine is running. └ EGR system is operating.	0 - 1.0V
9	Radiator fan relay (Low speed)	Engine is running. └ Radiator fans are not operating.	BATTERY POSITIVE VOLTAGE (11 - 14V)
		Engine is running. └ Radiator fans are operating at low speed.	Approximately 0.7V
10	Radiator fan relay (High speed)	Engine is running. └ Radiator fans are not operating.	BATTERY POSITIVE VOLTAGE (11 - 14V)
		Engine is running. └ Radiator fans are operating at high speed.	Approximately 0.7V
11	Air conditioning relay	Engine is running. └ Both A/C switch and blower switch are "ON".	Approximately 0.7V
		Engine is running. └ A/C switch is "OFF".	BATTERY POSITIVE VOLTAGE (11 - 14V)
16	Mass air flow sensor	Engine is running. └ Idle speed	0.8 - 3.0V Output voltage varies with engine speed.
18	Engine coolant temperature sensor	Engine is running.	0 - 5.0V Output voltage varies with engine water temperature.

Electrical Components Inspection (Cont'd)



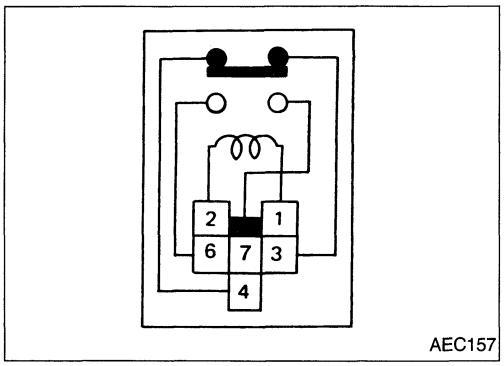
SEF054F

ECM RELAY AND FUEL PUMP RELAY

Check continuity between terminals ③ and ⑤.

Conditions	Continuity
12V direct current supply between terminals ① and ②	Yes
No current supply	No

If N.G., replace relay.



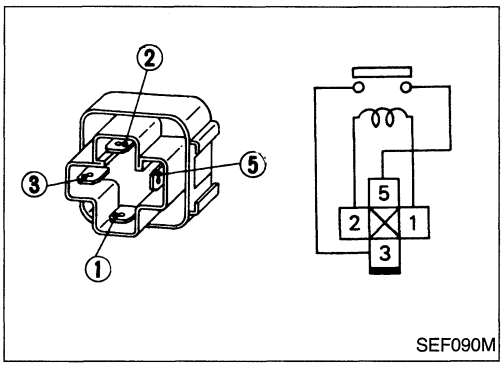
AEC157

INHIBITOR RELAY (A/T models with ASCD)

Check continuity between terminals ⑥ and ⑦.

Conditions	Continuity
12V direct current supply between terminals ① and ②.	Yes
No current supply	No

If N.G., replace relay.



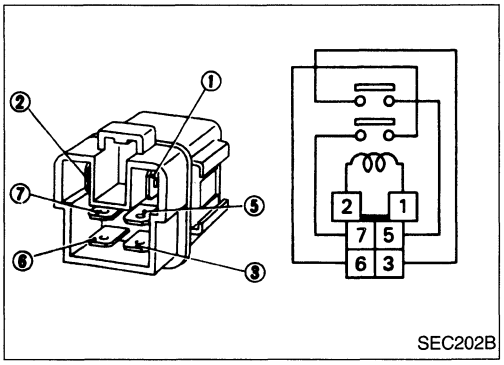
SEF090M

INHIBITOR RELAY (A/T models without ASCD) AND RADIATOR FAN RELAY-1

Check continuity between terminals ③ and ⑤.

Conditions	Continuity
12V direct current supply between terminals ① and ②.	Yes
No current supply	No

If N.G., replace relay.



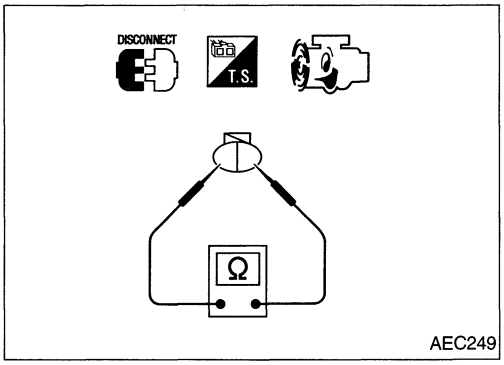
SEC202B

RADIATOR FAN RELAYS-2 AND -3

Check continuity between terminals ③ and ⑤, ⑥ and ⑦.

Conditions	Continuity
12V direct current supply between terminals ① and ②	Yes
No current supply	No

If N.G., replace relay.



AEC249

POWER STEERING PRESSURE SWITCH

1. Disconnect power steering pressure switch harness connector.
2. Check continuity between terminals.

Conditions	Continuity
Steering wheel is being turned	Yes
Steering wheel is not being turned	No

Fuel Tank

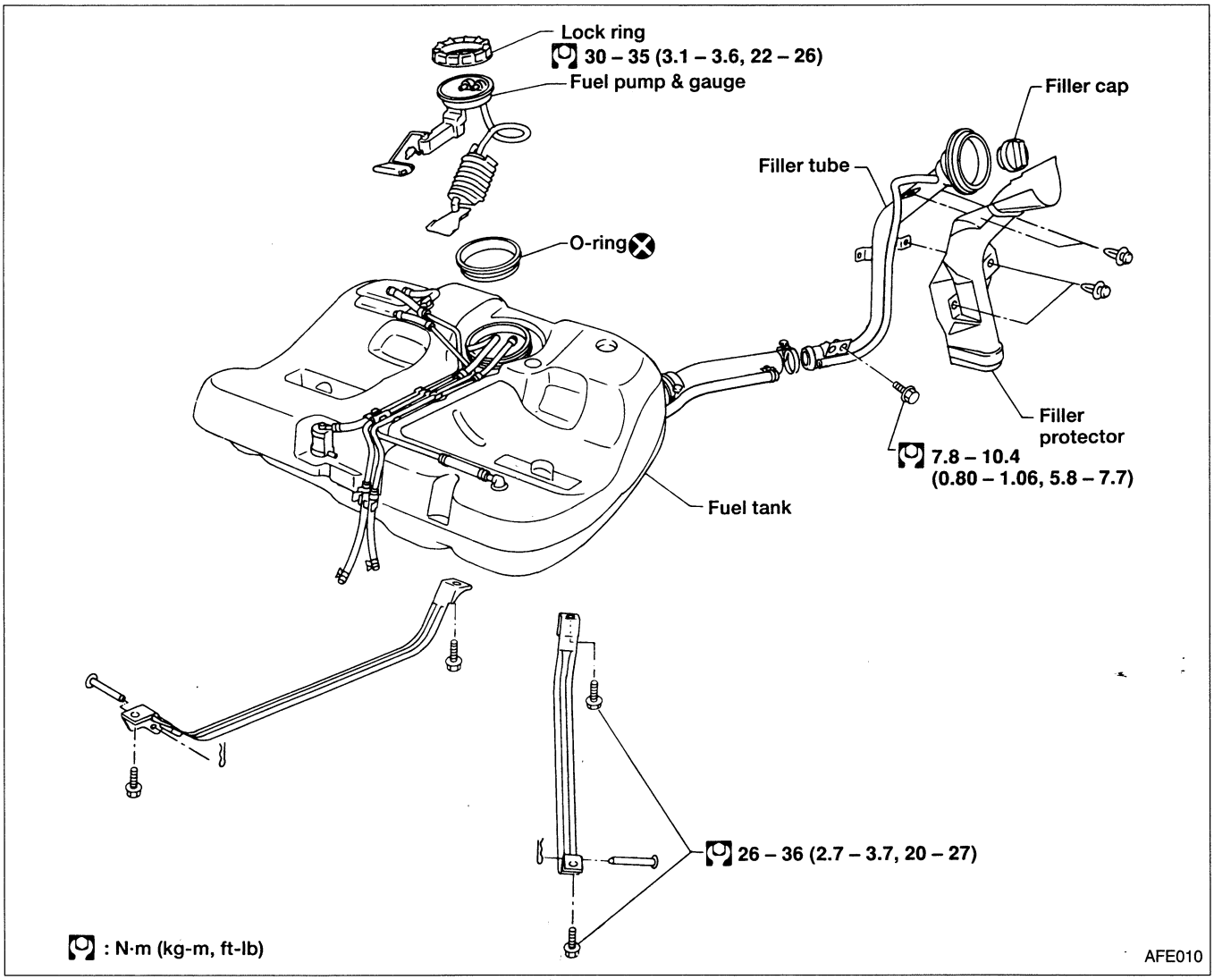
WARNING:

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

- **Put a "CAUTION: INFLAMMABLE" 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.**
- **Be sure to disconnect battery ground cable before conducting operations.**
- **Drain fuel from Fuel Tank and put drained fuel in an explosion-proof container and put lid on securely.**

CAUTION:

- **Before disconnecting fuel hose, release fuel pressure from fuel line. Refer to MA section ("Changing Fuel Filter", "ENGINE MAINTENANCE").**
- **Do not disconnect any fuel line unless absolutely necessary.**
- **Plug hose and pipe openings to prevent entry of dust or dirt.**
- **Do not kink or twist hose and tube when they are installed.**
- **Do not tighten hose clamps excessively to avoid damaging hoses.**
- **When installing fuel check valve, be careful of its designated direction. Refer to EF & EC section ("Inspection", "EVAPORATIVE EMISSION (EVAP) SYSTEM").**
- **Tighten bolts to specified torque.**
- **After installation, run engine and check for leaks at connections.**



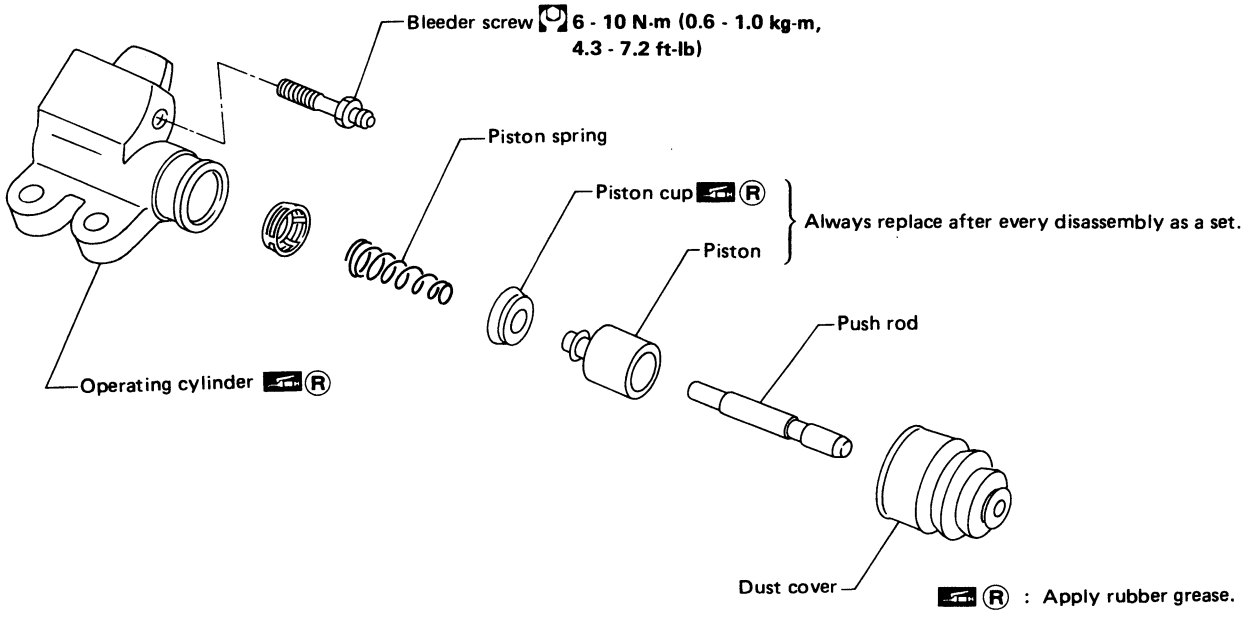
Clutch Master Cylinder (Cont'd)

INSPECTION

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

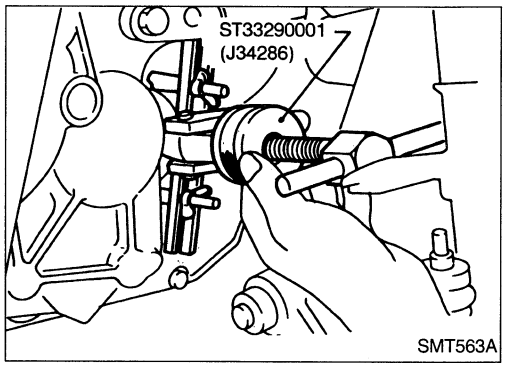
Operating Cylinder



INSPECTION

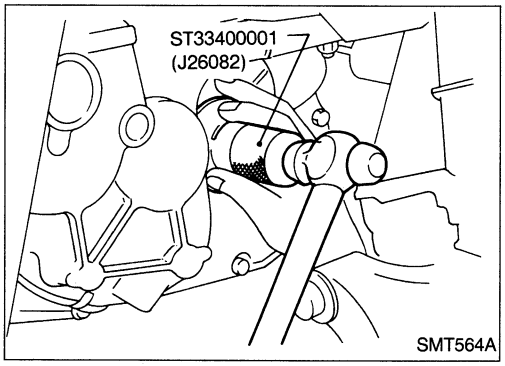
Check the following items, and replace if necessary.

- Rubbing surface of cylinder and piston, for uneven wear, rust or damage
- Piston with piston cup, for wear or damage
- Piston spring, for wear or damage
- Dust cover, for cracks, deformation or damage



Differential Side Oil Seal Replacement

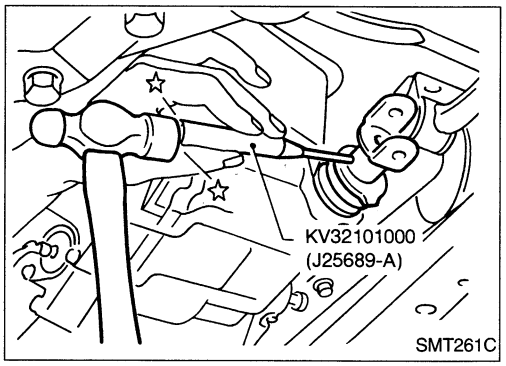
1. Drain gear oil from transaxle.
2. Remove drive shafts — Refer to FA section ("Removal", "FRONT AXLE — Drive Shaft").
3. Remove differential oil seal.



4. Install differential oil seal.

- **Apply multi-purpose grease to seal lip of oil seal before installing.**

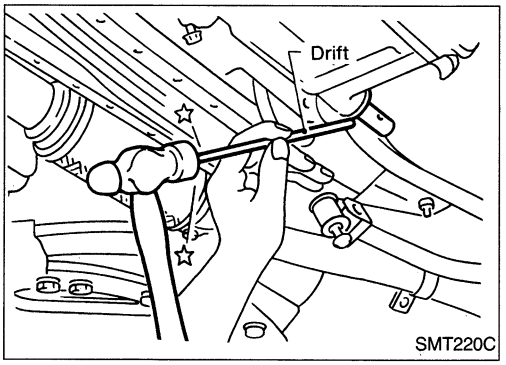
5. Install drive shafts — Refer to FA section ("Installation", "FRONT AXLE — Drive Shaft").



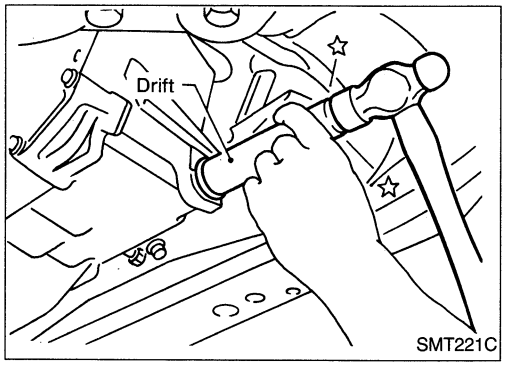
Striking Rod Oil Seal Replacement

1. Remove transaxle control rod from yoke.
2. Remove yoke retaining pin.

- **Be careful not to damage boot.**

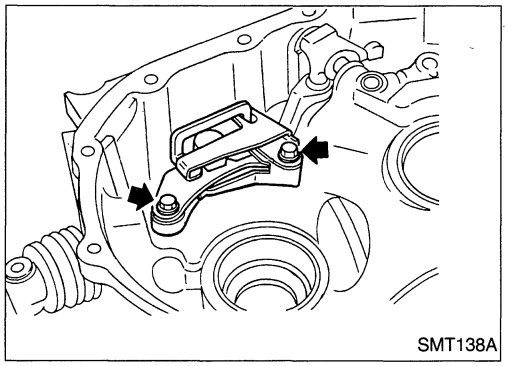


3. Remove striking rod oil seal.

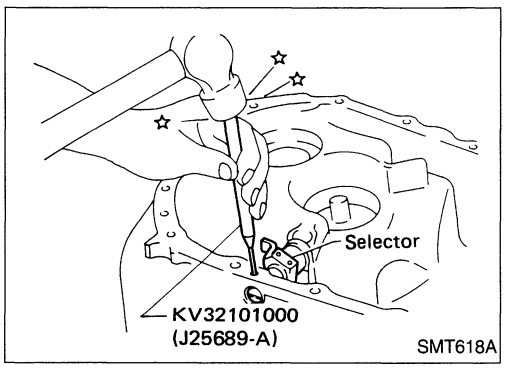


4. Install striking rod oil seal.

- **Apply multi-purpose grease to seal lip of oil seal before installing.**

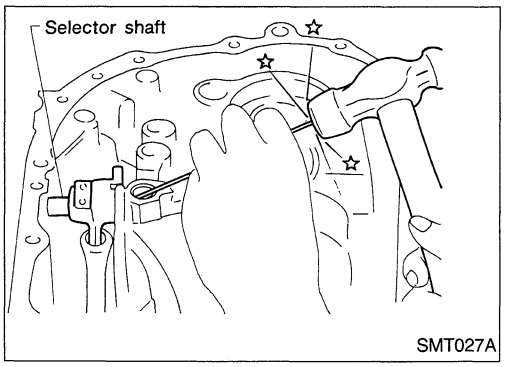

SMT138A

14. Remove reverse check assembly.

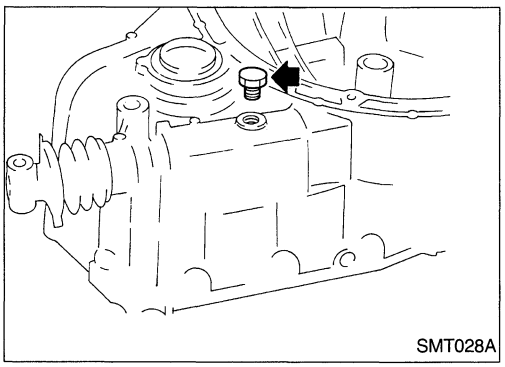


SMT618A

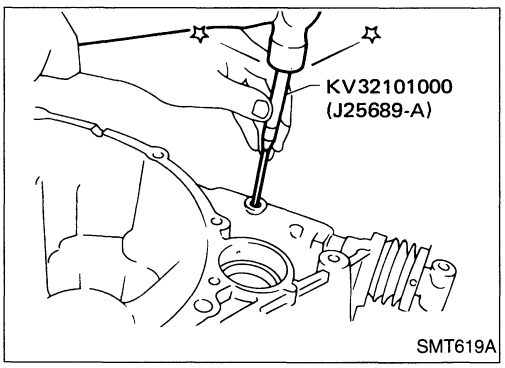
15. Remove retaining pin and detach the selector.



SMT027A

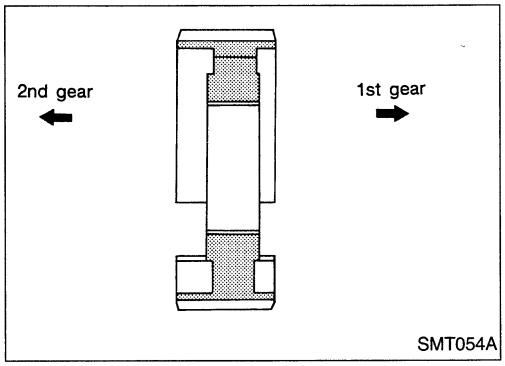

SMT028A

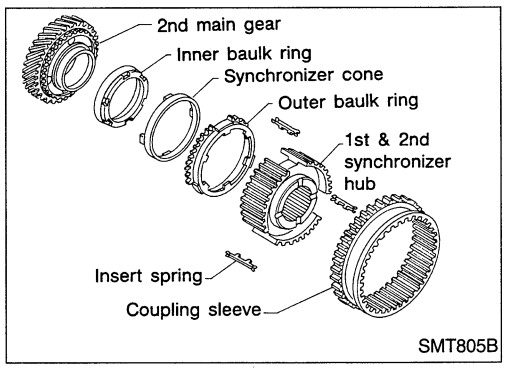
16. Remove drain plug for convenience in removing retaining pin which holds striking lever to striking rod.



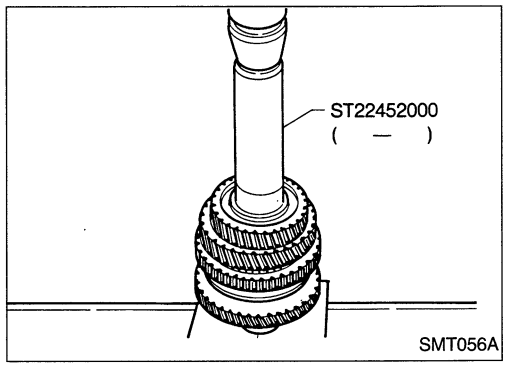
SMT619A

17. Remove retaining pin and then withdraw striking lever and striking rod.

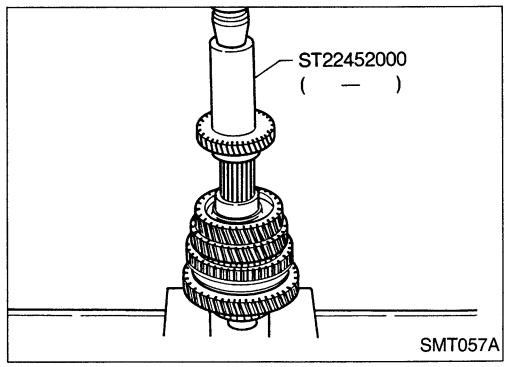




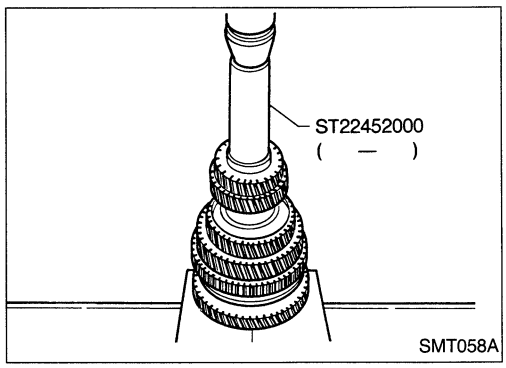
3. Install 2nd synchronizer cone, inner & outer baulk rings. Insert springs and 1st & 2nd coupling sleeve.
4. Install 2nd main gear.
- Ensure four protrusions of 2nd synchronizer cone are set in 2nd main gear holes.



5. Press on 3rd main gear.



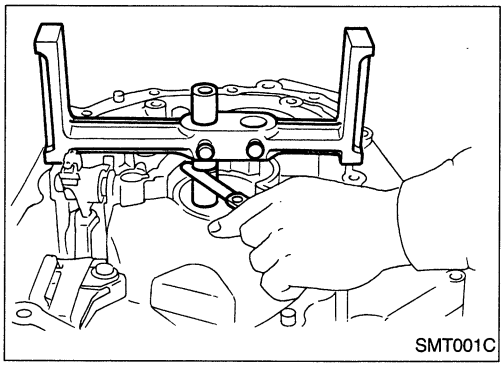
6. Press on 4th main gear.

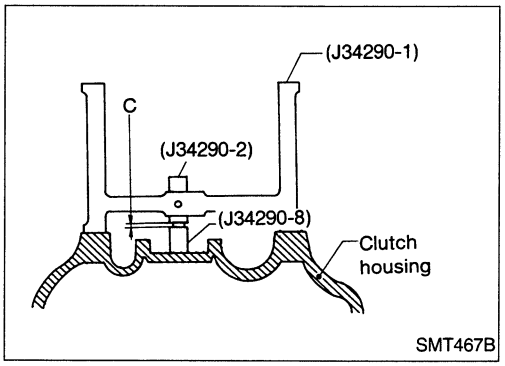


7. Press on 5th main gear.
8. Select proper snap ring of 5th main gear to minimize clearance of groove and then install it.

Allowable clearance of groove:
0 - 0.15 mm (0 - 0.0059 in)
Snap ring of 5th main gear:
Refer to MT-41.

Mainshaft Bearing Preload (Cont'd)


SMT001C



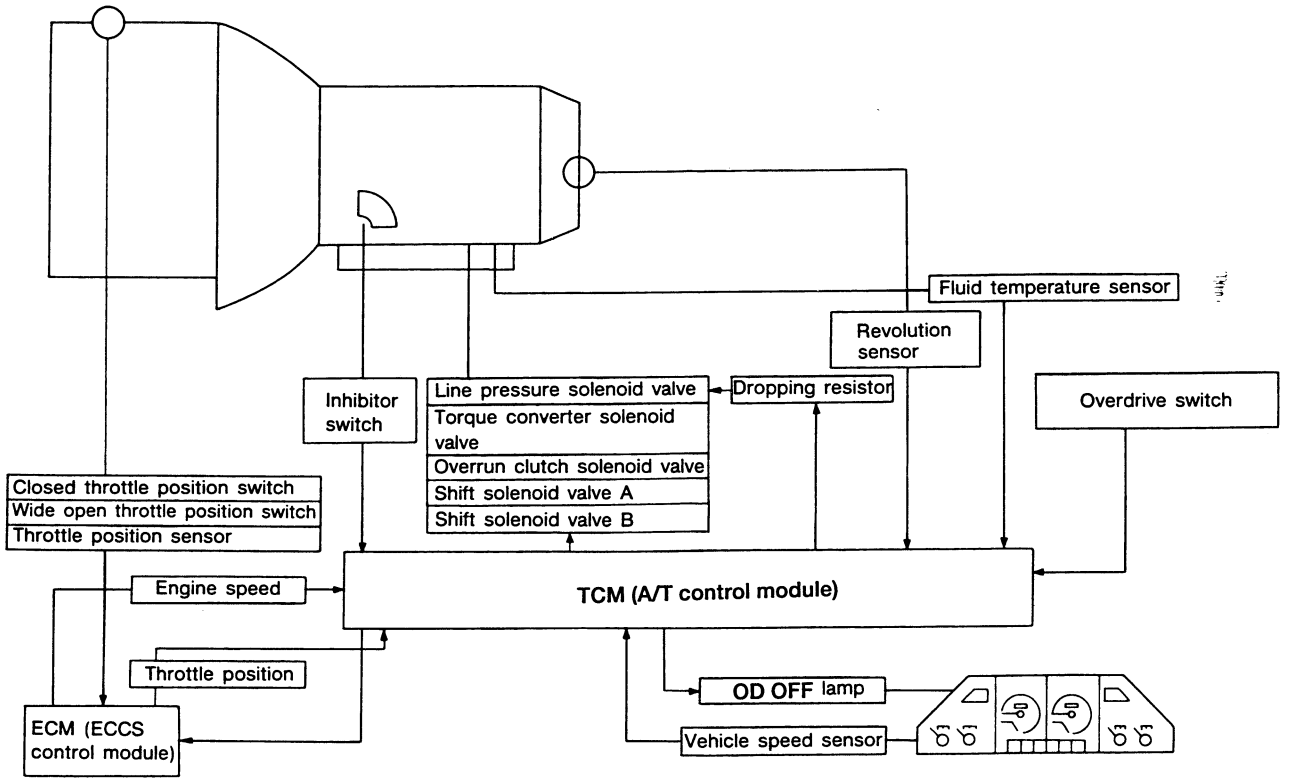
SMT467B

8. Measure with feeler gauge distance between gauging cylinder and shoulder of gauging plunger.
9. Use feeler gauge reading to select correct mainshaft preload shim(s).
   Mainshaft bearing adjusting shim:
   Refer to MT-42.
10. Install selected mainshaft bearing adjusting shim and mainshaft bearing outer race.
11. Check total turning torque after assembly — Refer to MT-36.

SECTION AT

CONTENTS

Electrical Control Chart

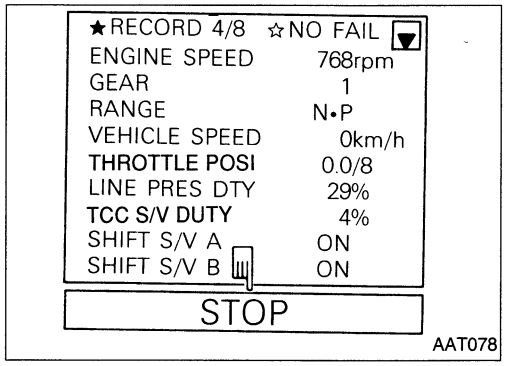


Mechanical Operation

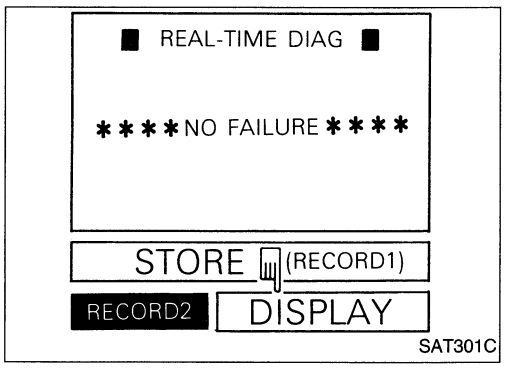
Shift position		Reverse clutch	High clutch	Forward clutch	Overrun clutch	Band servo 2nd apply	Band servo 3rd release	Band servo 4th apply	Forward one-way clutch	Low one-way clutch	Low & reverse brake	Lock-up	Remarks
P													PARK
R		○									○		REVERSE
N													NEUTRAL
D*4	1st			○	*1◎				●	●			Automatic shift 1 ↔ 2 ↔ 3 ↔ 4
	2nd			○	*1◎	○			●				
	3rd		○	○	*1◎	*2Ⓧ	Ⓧ		●			○	
	4th		○	Ⓧ		*3Ⓧ	Ⓧ	○				○	
2	1st			○	○				●	●			Automatic shift 1 ↔ 2 ← 3
	2nd			○	○	○			●				
1	1st			○	○				●		○		Locks (held stationary) in 1st speed 1 ← 2 ← 3
	2nd			○	○	○			●				

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

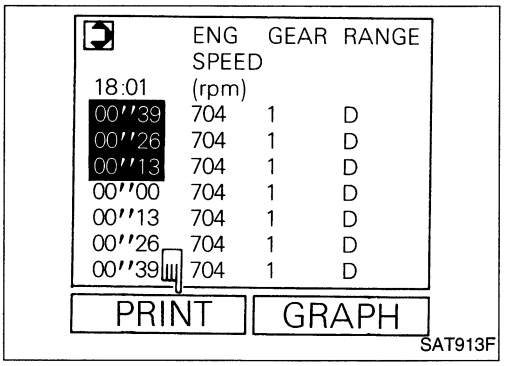
Preliminary Check (Cont'd)



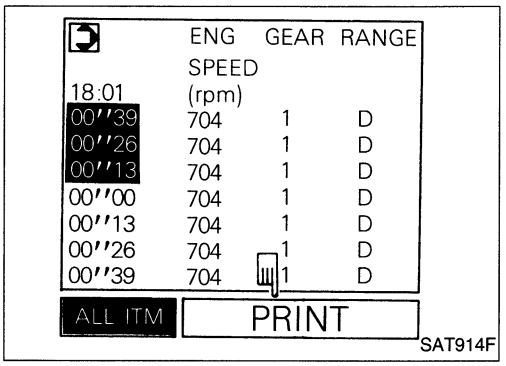
12. After finishing cruise test part 1, touch "STOP".



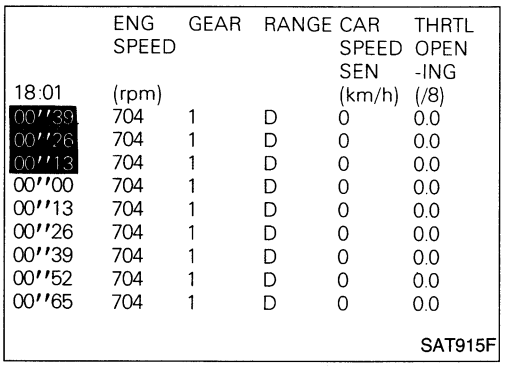
13. Touch "DISPLAY".



14. Touch "PRINT".



15. Touch "PRINT" again.



16. Check the monitor data printed out.
17. Continue cruise test part 2 and 3.

A/T COMPONENT PARTS APPLICATION

DIAGNOSTIC ITEM		MODE	
		SELF-DIAGNOSTIC RESULTS	DATA MONITOR
INPUT	Vehicle speed sensor 1 (A/T)	X	X
	Vehicle speed sensor 2 (meter)	X	X
	Throttle position sensor	X	X
	Fluid temperature sensor	X	X
	Battery positive voltage	X	X
	Engine speed (rpm)	X	X
	Selector lever switch (overdrive switch)	—	X
	ASCD — cruise signal	—	X
	ASCD — OD cut signal	—	X
	Kickdown switch	—	—
	Power shift switch	—	—
	Closed throttle position switch	—	X
	Wide open throttle position switch	—	X
	Shift solenoid valve A (feedback)	—	X
	Shift solenoid valve B (feedback)	—	X
	Overrun clutch solenoid valve (feedback)	—	X
	Hold mode switch	—	—
	"1" position switch	—	X
	"2" position switch	—	X
	"D" position switch	—	X
	Park/Neutral position switch	—	X
	"R" position switch	—	X
DATA	Gear position	—	X
	Range position	—	X
	Vehicle speed	—	X
	Throttle position	—	X
OUTPUT	Shift solenoid valve A	X	X
	Shift solenoid valve B	X	X
	Overrun clutch solenoid valve	X	X
	Line-pressure solenoid valve	X	X
	Torque converter clutch solenoid valve	X	X

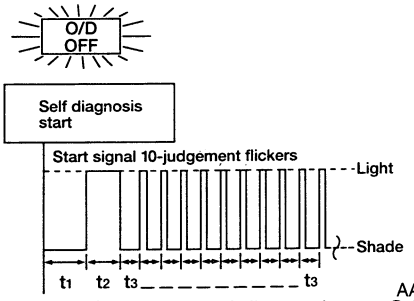
X: Applicable —: Not applicable
DATA = internal TCM calculation

Self-diagnosis (Cont'd)

JUDGEMENT OF SELF-DIAGNOSIS CODE

Flickers of OD OFF indicator lamp: Damaged circuit

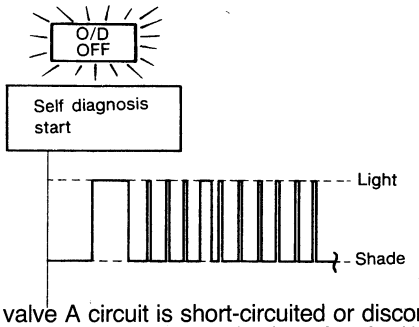
All judgement flickers are same.



AAT131

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

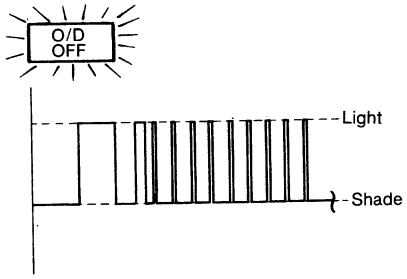
4th judgement flicker is longer than others.



SAT443F

Shift solenoid valve A circuit is short-circuited or disconnected.
Go to SHIFT SOLENOID VALVE A CIRCUIT CHECK (AT-44).

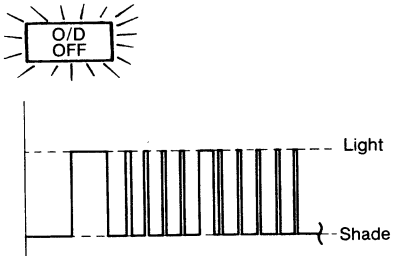
1st judgement flicker is longer than others.



SAT437F

Revolution sensor circuit is short-circuited or disconnected.
Go to REVOLUTION SENSOR CIRCUIT CHECK (AT-41).

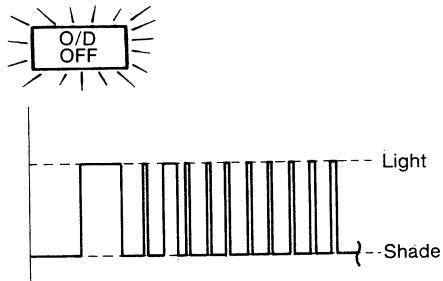
5th judgement flicker is longer than others.



SAT445F

Shift solenoid valve B circuit is short-circuited or disconnected.
Go to SHIFT SOLENOID VALVE B CIRCUIT CHECK (AT-45).

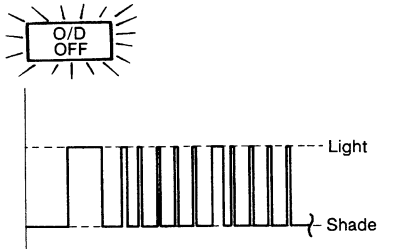
2nd judgement flicker is longer than others.



SAT439F

Vehicle speed sensor circuit is short-circuited or disconnected.
Go to VEHICLE SPEED SENSOR CIRCUIT CHECK (AT-42).

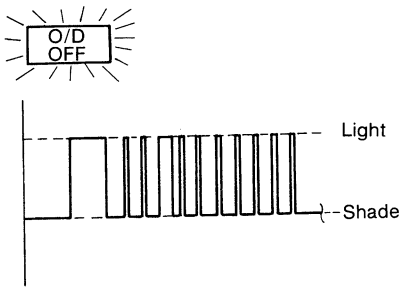
6th judgement flicker is longer than others.



SAT447F

Overrun clutch solenoid valve circuit is short-circuited or disconnected.
Go to OVERRUN CLUTCH SOLENOID VALVE CIRCUIT CHECK (AT-46).

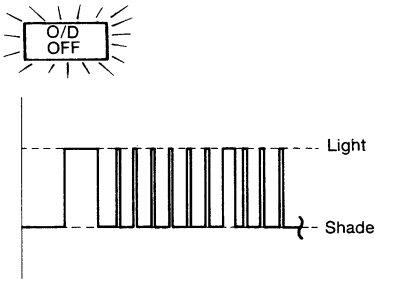
3rd judgement flicker is longer than others.



SAT441F

Throttle position sensor circuit is short-circuited or disconnected.
Go to THROTTLE POSITION SENSOR CIRCUIT CHECK (AT-43).

7th judgement flicker is longer than others.



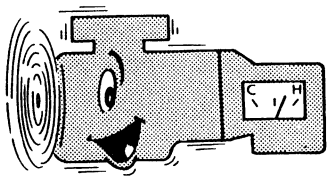
SAT449F

Torque converter clutch solenoid valve circuit is short-circuited or disconnected.
Go to TORQUE CONVERTER CLUTCH SOLENOID VALVE CIRCUIT CHECK (AT-47).

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

Self-diagnosis (Cont'd)

C

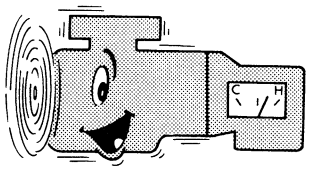


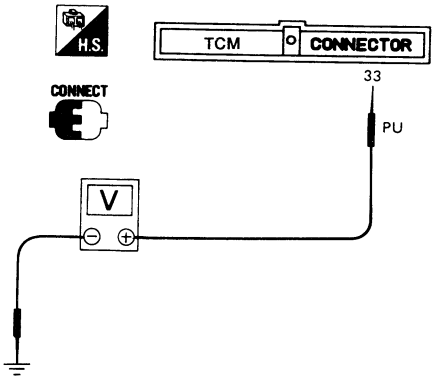
☆MONITOR	☆NO FAIL
VHCL/S SE•A/T	0km/h
VHCL/S SE•MTR	5km/h
THRTL POS SEN	0.4V
FLUID TEMP SE	1.2V
BATTERY VOLT	13.4V
ENGINE SPEED	1024rpm
SLCT LEVER SW	ON
R POSITION SW	OFF
P/N POSI SW	ON

RECORD

SAT952F

C



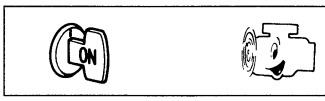


AAT084A

Ⓐ

C

CHECK INPUT SIGNAL OF FLUID TEMPERATURE SENSOR.

1. 

2. ● Select "ECU INPUT SIGNALS".
● Read out the value of "FLUID TEMPERATURE SENSOR".
Voltage:
Cold [20°C (68°F)] →
Hot [80°C (176°F)]:
Approximately
1.5V → 0.5V

OR

● Check voltage between TCM (A/T control module) terminal ㉝ and ground while warming up A/T.
Voltage:
Cold [20°C (68°F)] →
Hot [80°C (176°F)]:
Approximately
1.5V → 0.5V

N.G. → Check the following items.
● Harness continuity between TCM (A/T control module) and terminal cord assembly (Main harness)

O.K.

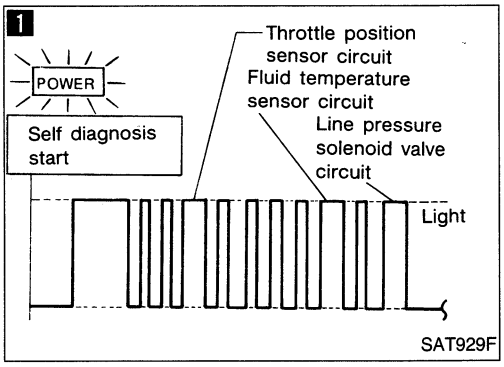
Perform self-diagnosis again after driving for a while.

N.G. → 1. Perform TCM (A/T control module) input/output signal inspection.
2. If N.G., recheck TCM (A/T control module) pin terminals for damage or connection of TCM harness connector.

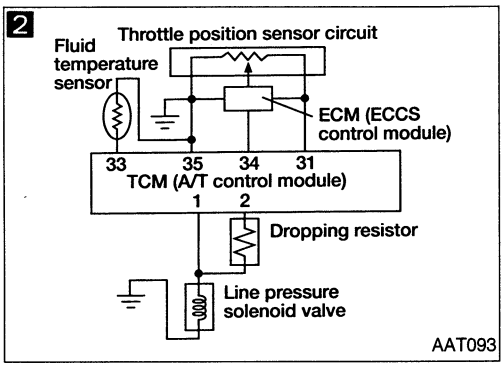
O.K.

INSPECTION END

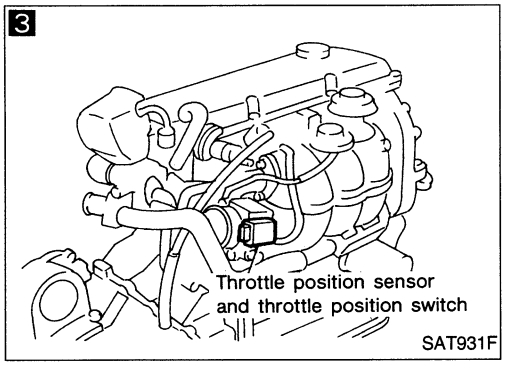
1



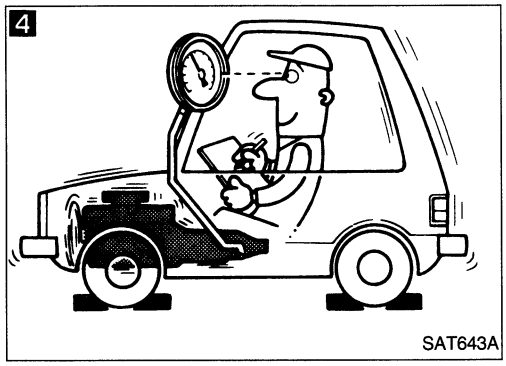
2



3



4



Diagnostic Procedure 5

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

1

Does self-diagnosis show damage to throttle position sensor, line pressure solenoid valve or fluid temperature sensor circuit?

Yes → **2** Check damaged circuit. — Refer to AT-43, AT-48, AT-51.

No ↓

3

Check throttle position sensor. — Refer to EF & EC section ("Diagnostic Procedure for Trouble Code 43", "TROUBLE DIAGNOSES").

N.G. → Repair or replace throttle position sensor.

O.K. ↓

4

Check line pressure at idle with selector lever in "D" position. — Refer to AT-83.

N.G. →
1. Remove control valve assembly. — Refer to AT-88.
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

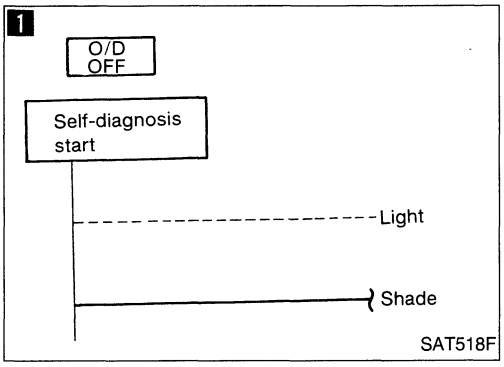
O.K. ↓

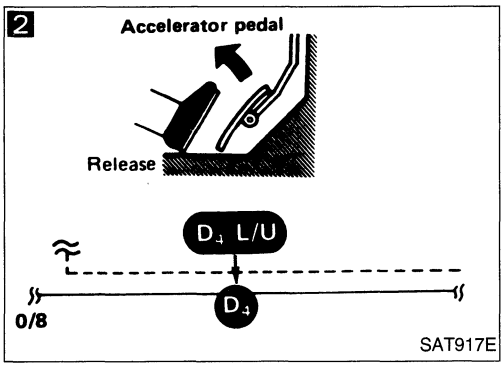
Check again.

N.G. →
1. Perform TCM (A/T control module) input/output signal inspection.
2. If N.G., recheck TCM (A/T control module) pin terminals for damage or connection of TCM harness connector.

O.K. ↓

INSPECTION END





Diagnostic Procedure 14

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

Does "ECU INPUT SIGNALS" show damage to closed throttle position switch circuit?

Yes → Check closed throttle position switch circuit. — Refer to AT-52.

OR

1

Does self-diagnosis show damage to closed throttle position switch circuit?

No

2

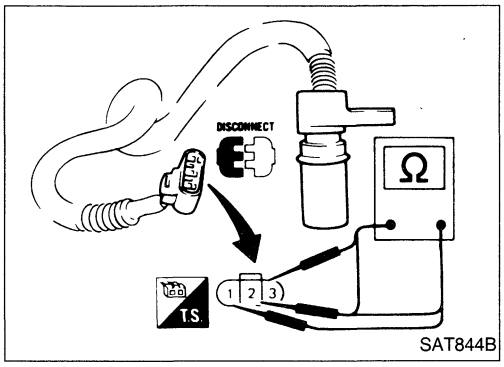
Check again.

N.G. →
1. Perform TCM (A/T control module) input/ output signal inspection.
2. If N.G., recheck TCM (A/T control module) pin terminals for damage or connection of TCM harness connector.

O.K.

INSPECTION END

Electrical Components Inspection (Cont'd)



SAT844B

REVOLUTION SENSOR

- For removal and installation, refer to AT-90.
- Check resistance between terminals ①, ② and ③.

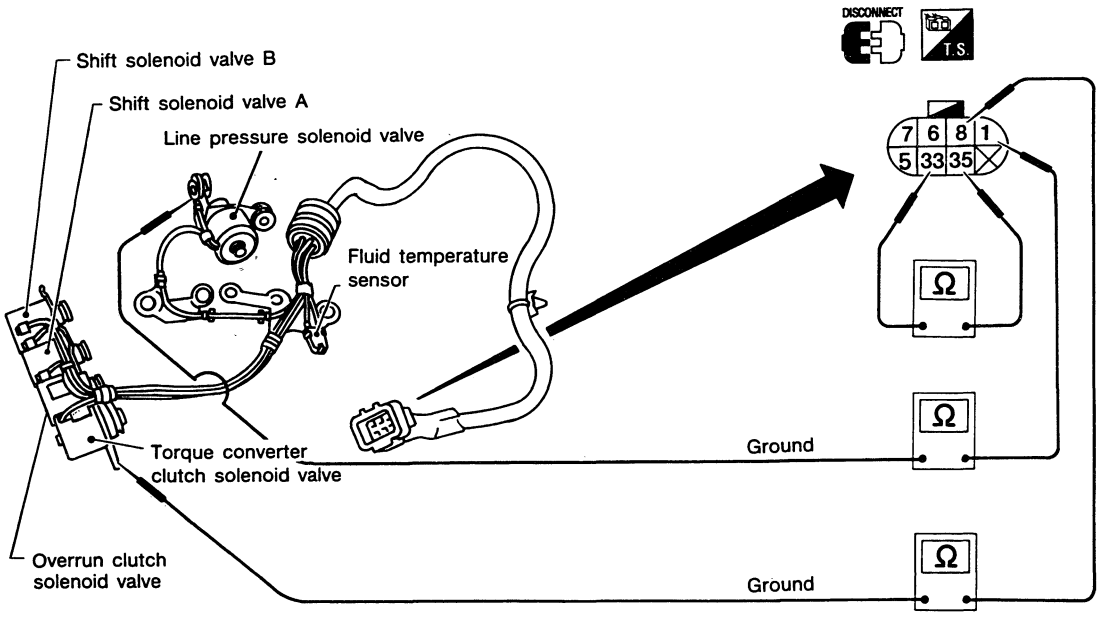
Terminal No.		Resistance
①	②	500 - 650Ω
②	③	No continuity
①	③	No continuity

SOLENOID VALVES AND FLUID TEMPERATURE SENSOR

- For removal and installation, refer to AT-88.
- Check resistance between two terminals.

Solenoids

Solenoid	Terminal No.		Resistance (Approx.)
Shift solenoid valve A	⑥	Ground (Bracket)	25Ω
Shift solenoid valve B	⑦		
Overrun clutch solenoid valve	⑧		
Line pressure solenoid valve	①		3.2Ω
Torque converter clutch solenoid valve	⑤		13.4Ω

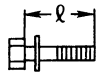


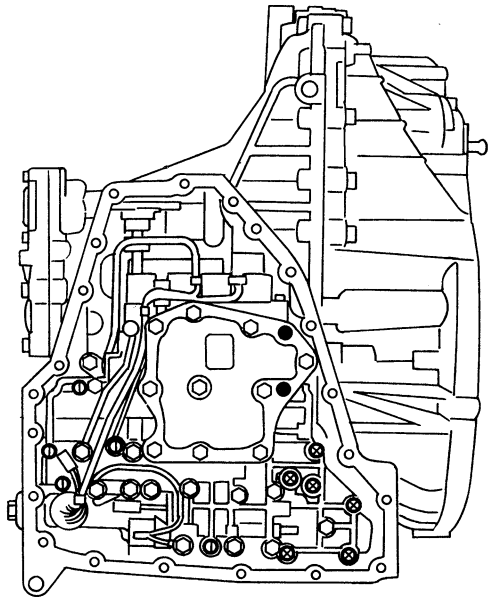
AAT188

Control Valve Assembly and Accumulator (Cont'd)

Unit: mm (in)

- ⓘ 5 bolts ℓ = 40 (1.57)
- ⊗ 6 bolts ℓ = 33 (1.30)
- ● 2 bolts ℓ = 43.5 (1.713)





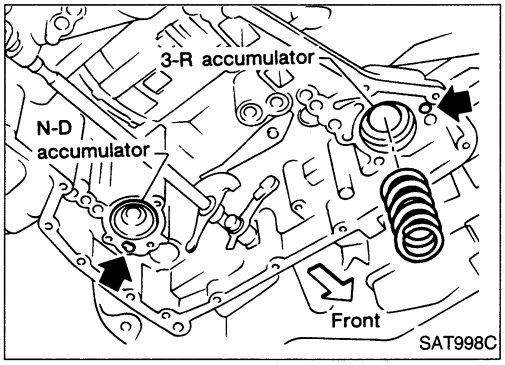
SAT647E

6. Remove control valve assembly by removing fixing bolts ⓘ, ⓧ and ●.

Bolt length, number and location are shown in the illustration.

- Be careful not to drop manual valve and 3-R accumulator return spring.

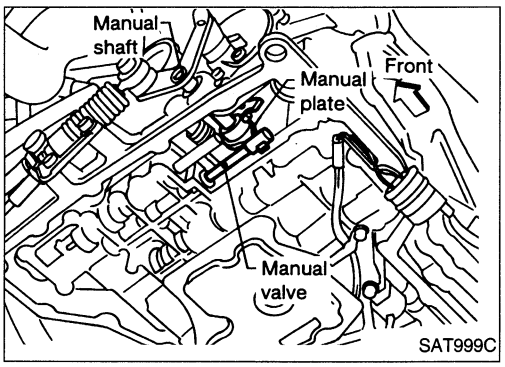
7. Disassemble and inspect control valve assembly if necessary — Refer to AT-130.



SAT998C

8. Remove 3-R and N-D accumulators by applying compressed air if necessary.

- **Hold each piston with a rag.**

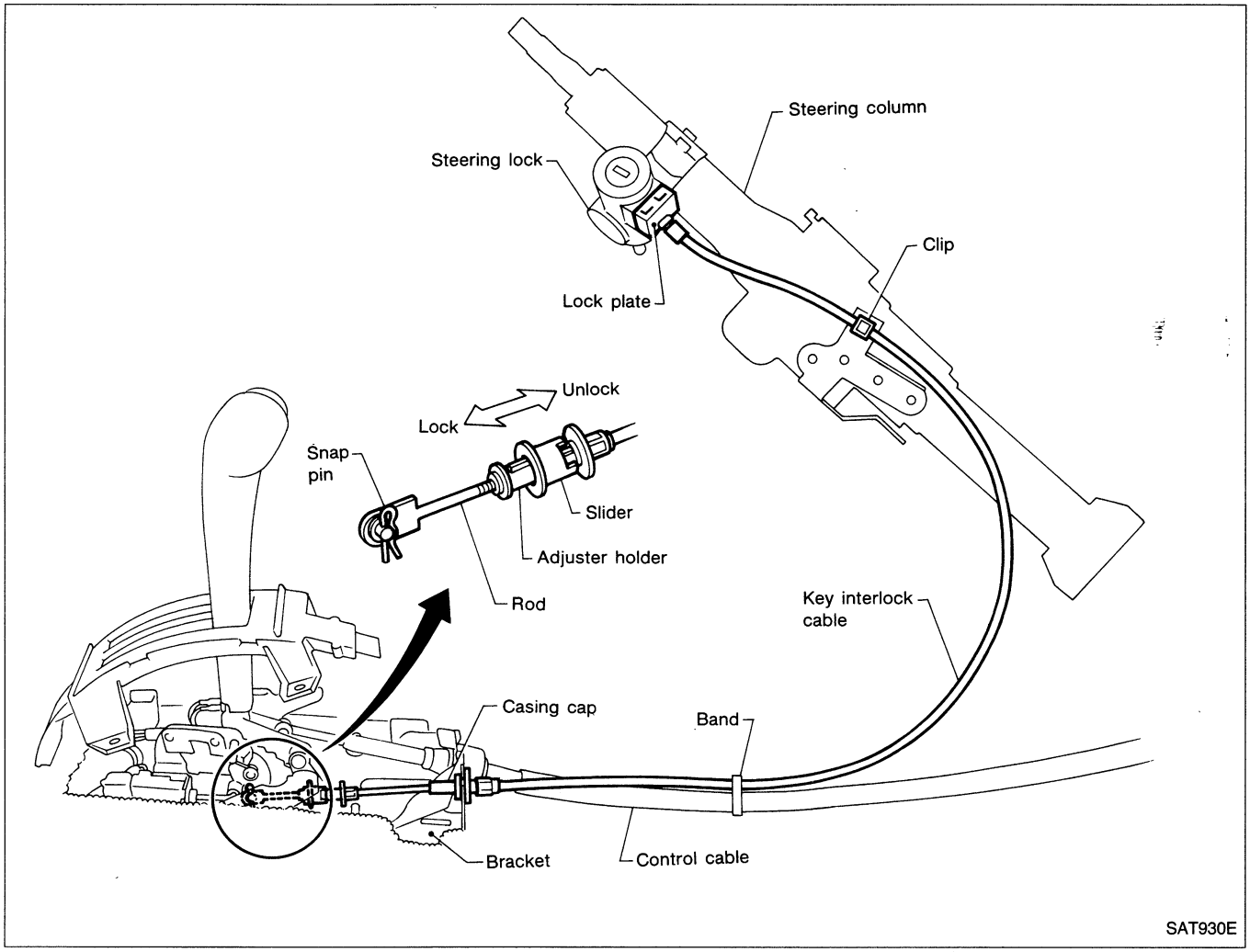


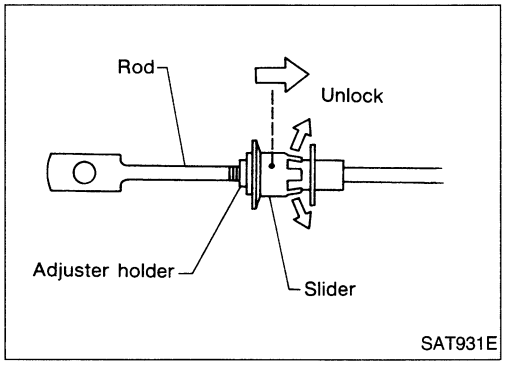
SAT999C

INSTALLATION

- **Set manual shaft in Neutral, then align manual plate with groove in manual valve.**
- **After installing control valve on to transmission case, make sure that selector lever can be moved to all positions.**

Key Interlock Cable





REMOVAL

1. Remove snap pin temporarily and remove key interlock cable from vehicle.
2. Unlock slider from adjuster holder and remove rod from cable.
3. Install rod to control device with snap pin.

INSTALLATION

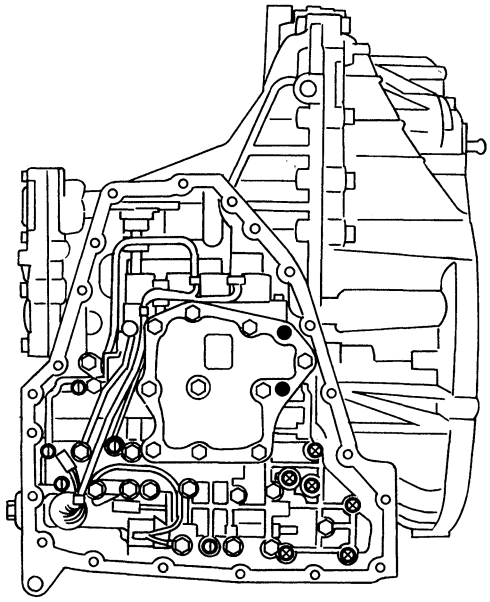
1. Set key interlock cable to steering lock assembly and install lock plate.
2. Clamp cable to steering column and fix to control cable with band.
3. Set control lever to "P".
4. Insert rod into adjuster holder.
5. Install casing cap to bracket.
6. Move slider in order to fix adjuster holder to rod.

Unit: mm (in)

ⓘ 5 bolts ℓ = 40 (1.57)

ⓧ 6 bolts ℓ = 33 (1.30)

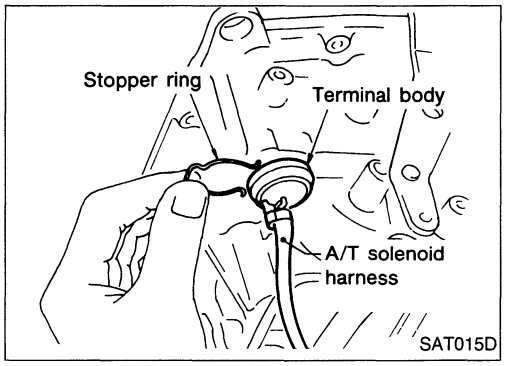
● 2 bolts ℓ = 43.5 (1.713)



SAT647E

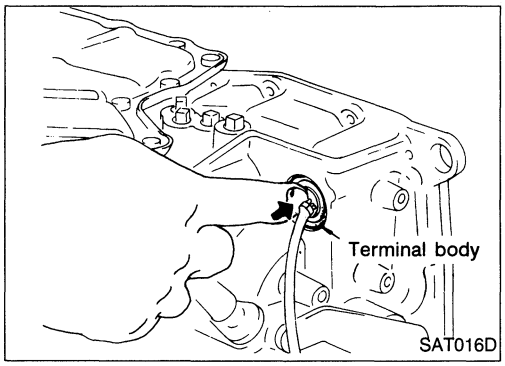
9. Remove control valve assembly according to the following procedures.

a. Remove control valve assembly mounting bolts ⓘ, ⓧ and ●.



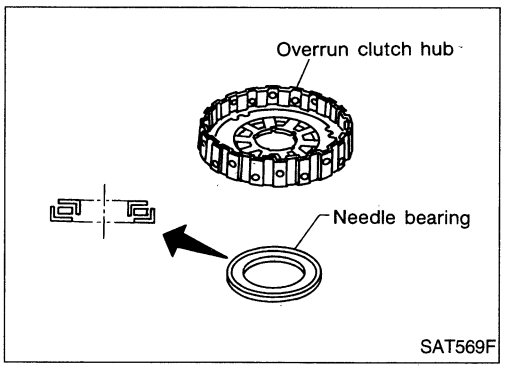
SAT015D

b. Remove stopper ring from terminal body.

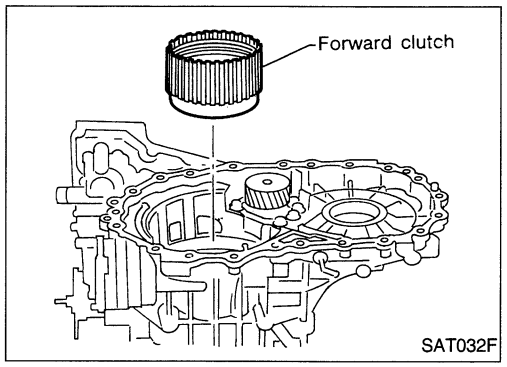


SAT016D

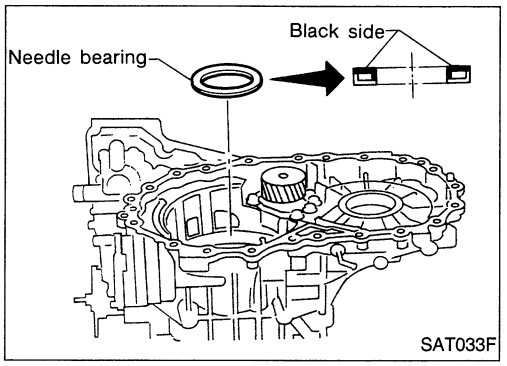
c. Push terminal body into transmission case and draw out solenoid harness.



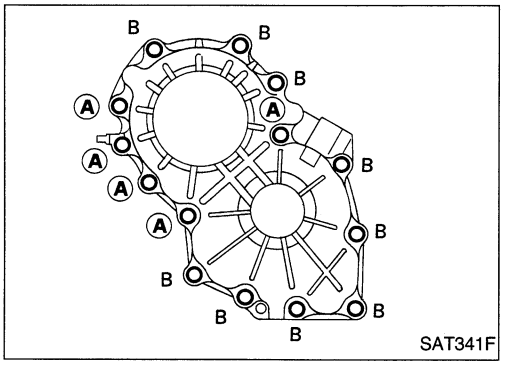
36. Remove needle bearing from overrun clutch hub and check for damage or wear.



37. Remove forward clutch assembly from transmission case.



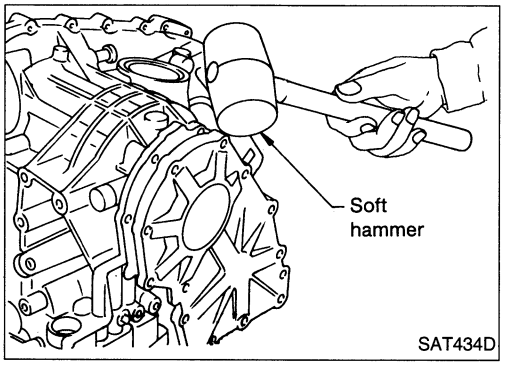
38. Remove needle bearing from transmission case.



39. Remove output shaft assembly according to the following procedures.

a. Remove side cover bolts.

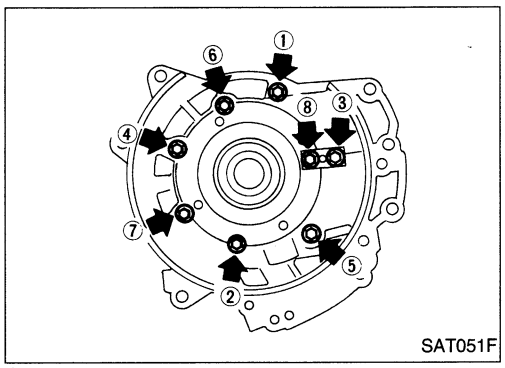
- **Do not mix bolts Ⓐ and Ⓑ.**
- **Always replace bolts Ⓐ as they are self-sealing bolts.**



b. Remove side cover by lightly tapping it with a soft hammer.

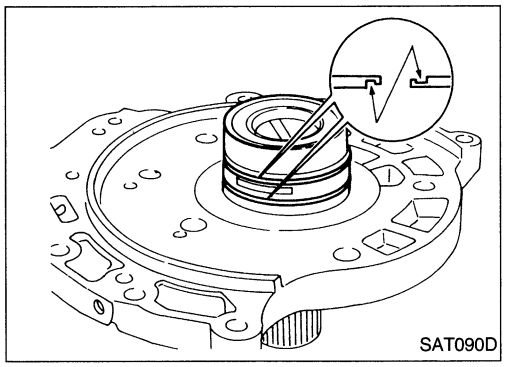
- **Be careful not to drop output shaft assembly as output shaft assembly may be removed together with side cover.**

Oil Pump (Cont'd)



SAT051F

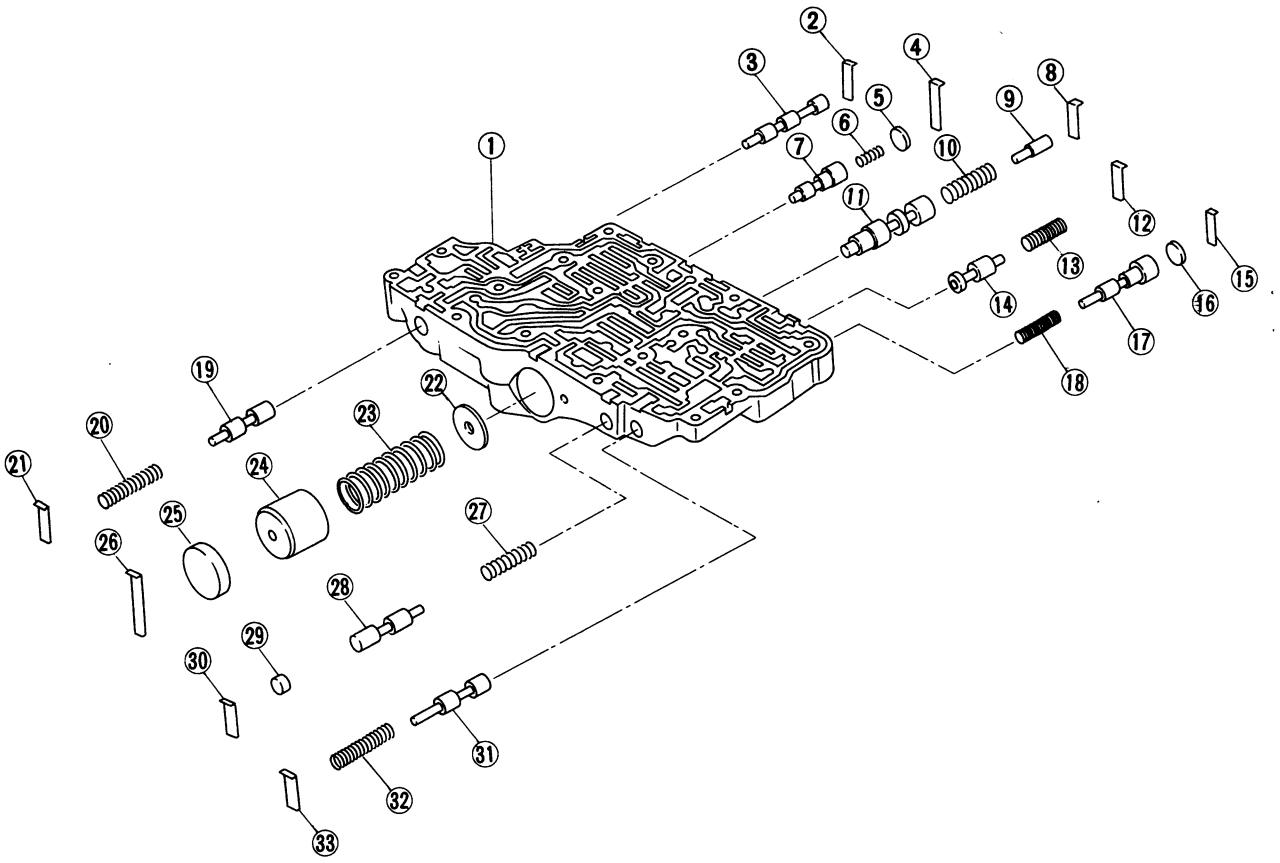
4. Install oil pump cover on oil pump housing.
a. Wrap masking tape around splines of oil pump cover assembly to protect seal. Position oil pump cover assembly on oil pump housing assembly, then remove masking tape.
b. Tighten bolts in a crisscross pattern.


SAT090D

5. Install new seal rings carefully after packing ring groove with petroleum jelly and attach hooks.

- **Do not spread gap of seal ring excessively while installing. The ring may be deformed.**

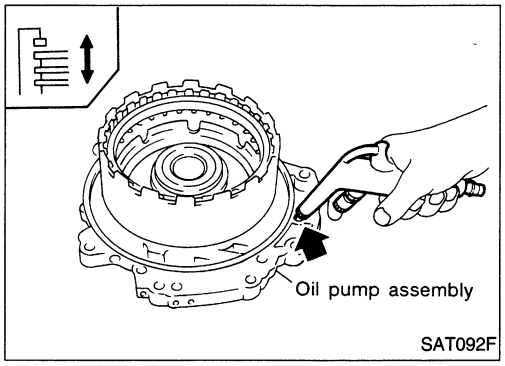
Control Valve Upper Body



SAT538F

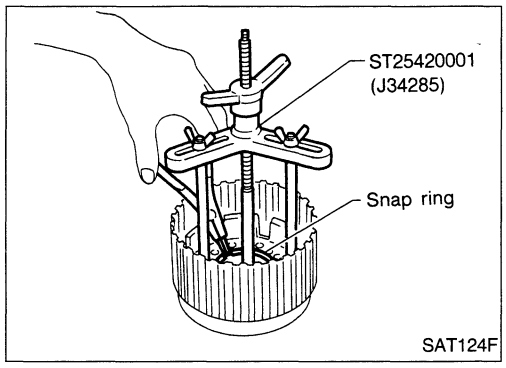
① Upper body
② Retainer plate
③ Sequence valve
④ Retainer plate
⑤ Plug
⑥ Return spring
⑦ 1-2 accumulator valve
⑧ Retainer plate
⑨ Plug
⑩ Return spring
⑪ Lock-up control valve
⑫ Retainer plate
⑬ Return spring
⑭ Torque converter relief valve
⑮ Retainer plate
⑯ Plug
⑰ Overrun clutch reducing valve
⑱ Return spring
⑲ Pilot valve
⑳ Return spring
㉑ Retainer plate
㉒ 1-2 accumulator retainer plate
㉓ Return spring
㉔ 1-2 accumulator piston
㉕ Plug
㉖ Retainer plate
㉗ Return spring
㉘ 1st reducing valve
㉙ Plug
㉚ Retainer plate
㉛ 2-3 timing valve
㉜ Return spring
㉝ Retainer plate

Reverse Clutch (Cont'd)



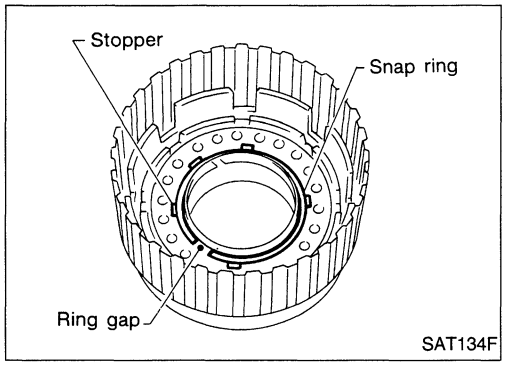
8. Check operation of reverse clutch.
   Refer to AT-146.

Forward Clutch and Overrun Clutch (Cont'd)



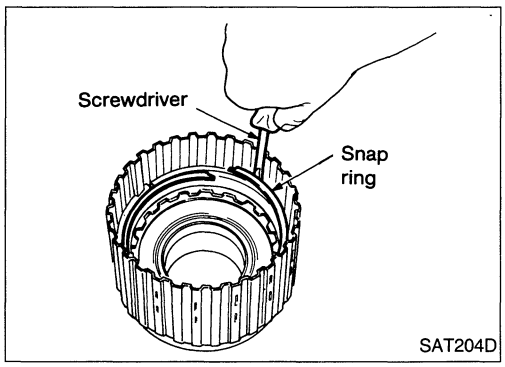
SAT124F

5. Set Tool on spring retainer and install snap ring while compressing return springs.
- **Set Tool directly over return springs.**



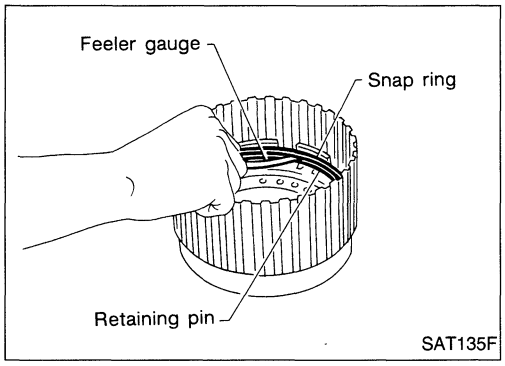
SAT134F

- **Do not align snap ring gap with spring retainer stopper.**



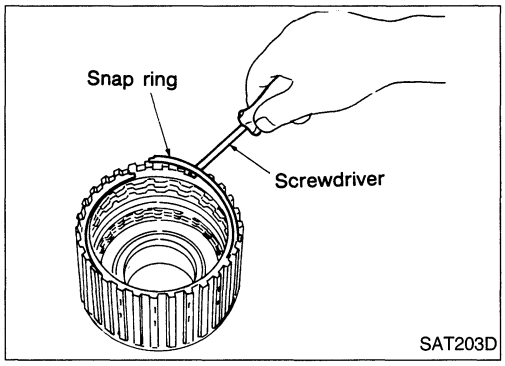
SAT204D

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.



SAT135F

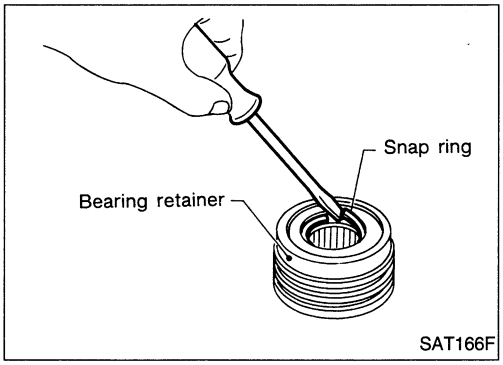
8. Measure clearance between overrun clutch retaining plate and snap ring.
   If not within allowable limit, select proper retaining plate.
   Specified clearance:
   Standard 0.7 - 1.1 mm (0.028 - 0.043 in)
   Allowable limit 1.7 mm (0.067 in)
   Overrun clutch retaining plate: Refer to AT-211.



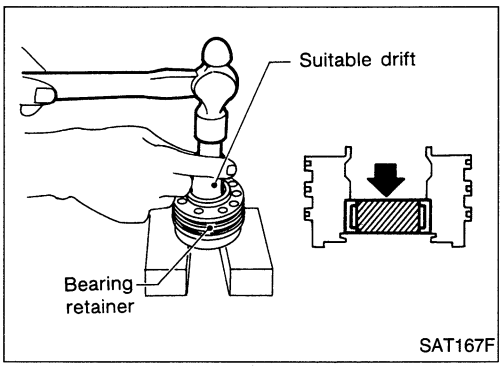
SAT203D

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.

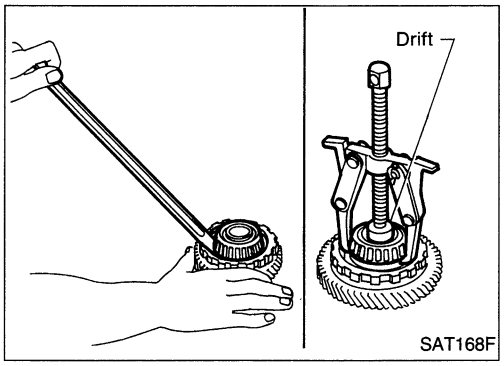
Output Shaft, Idler Gear, Reduction Gear and Bearing Retainer (Cont'd)



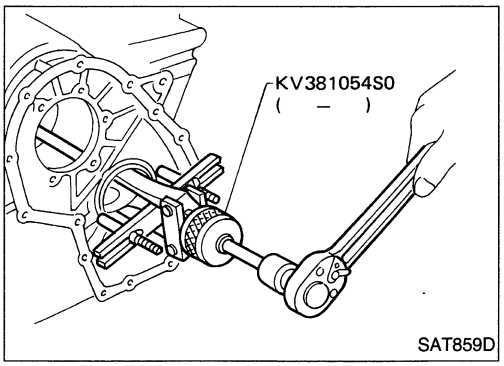
3. Remove snap ring from bearing retainer.



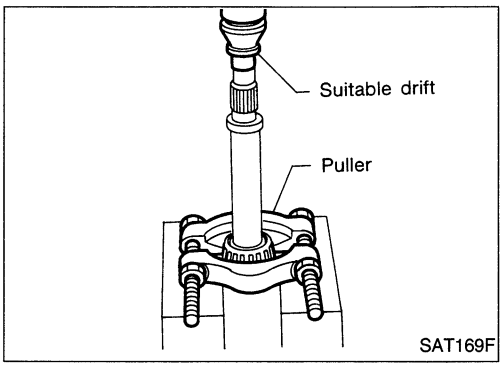
4. Remove needle bearing from bearing retainer.



5. Remove idler gear bearing inner race from idler gear.

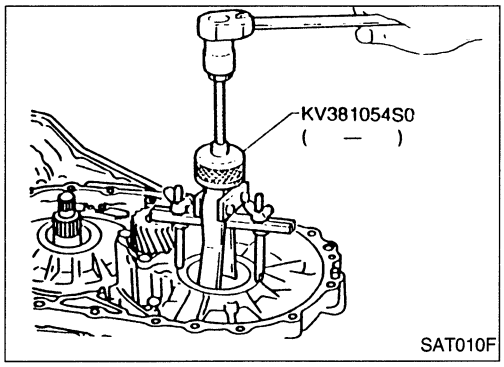


6. Remove idler gear bearing outer race from transmission case.



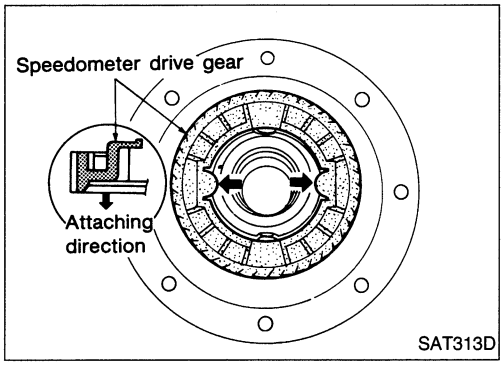
7. Press out reduction gear bearing inner race from reduction gear.

Final Drive — RE4F04A (Cont'd)



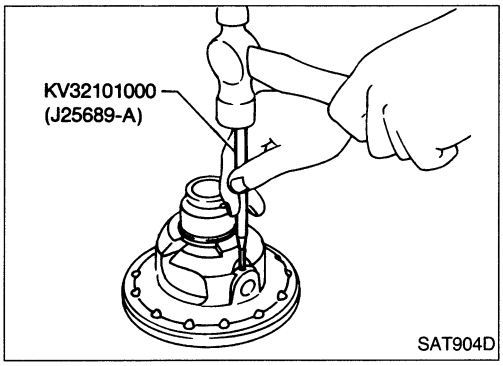
SAT010F

3. Remove differential side bearing outer race, and side bearing adjusting shim from transmission case.



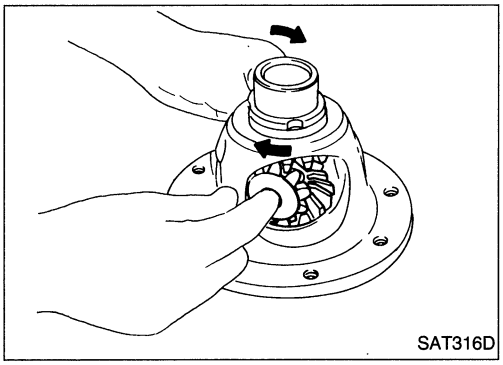
SAT313D

4. Remove speedometer drive gear.

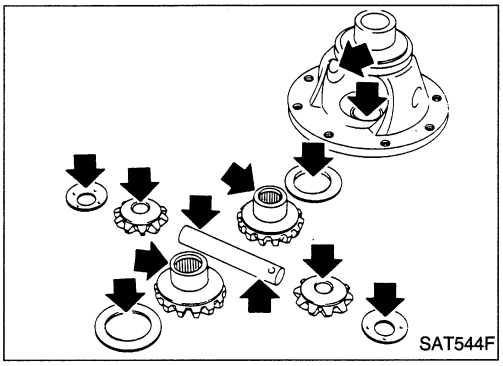


SAT904D

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.

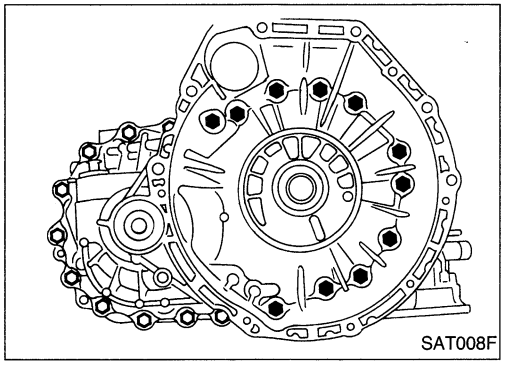

SAT544F

INSPECTION

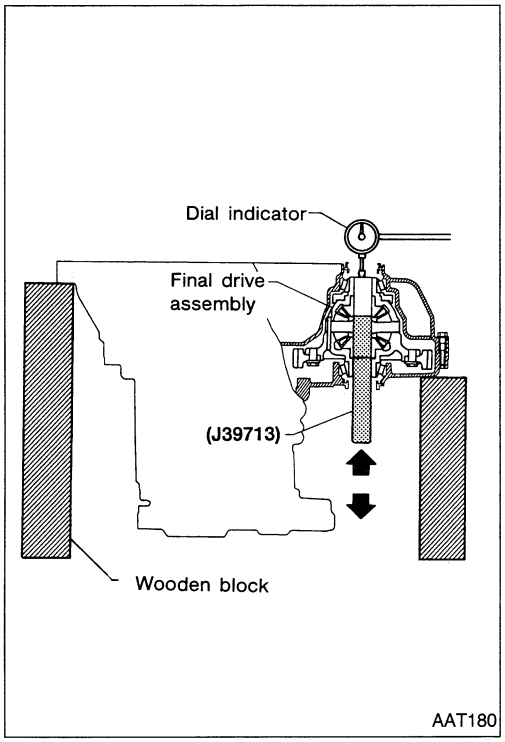
Gear, washer, shaft and case

- Check mating surfaces of differential case, side gears and pinion mate gears.
- Check washers for wear.

Adjustment (Cont'd)


SAT008F

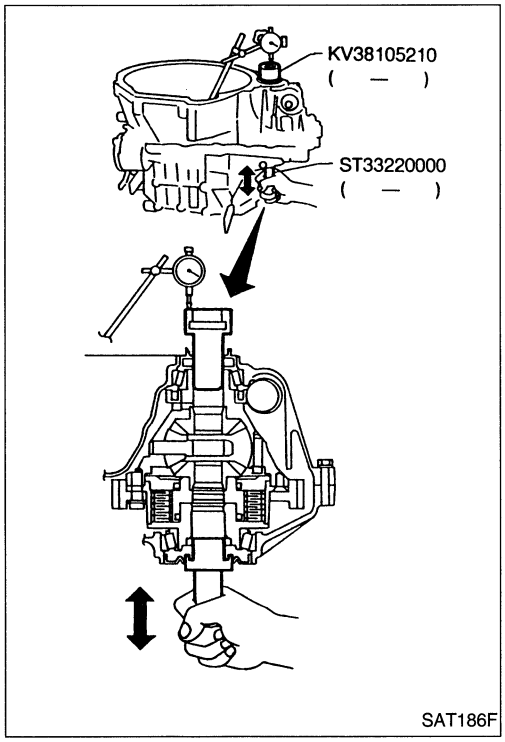
3. Place final drive assembly on transmission case.
4. Install transmission case on converter housing and tighten transmission case fixing bolts to the specified torque.



AAT180

— RE4F04A —

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.



SAT186F

— RE4F04V —

5. Set Tool on differential case at converter housing side and attach dial indicator on Tool.
6. Insert the other Tool viscous coupling from transmission case side.
7. Move Tool up and down and measure dial indicator deflection.

— RE4F04A and RE4F04V —

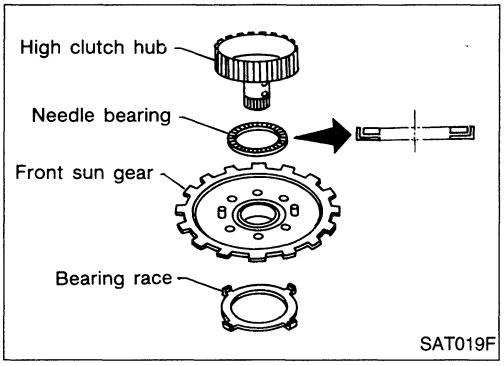
8. Select proper thickness of differential side bearing adjusting shim(s).

Suitable shim thickness = Dial indicator deflection + Specified bearing preload

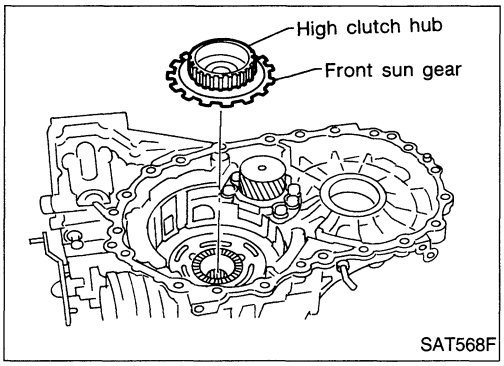
Differential side bearing adjusting shim:
Refer to AT-212.

Bearing preload:
0.05 - 0.09 mm (0.0020 - 0.0035 in)

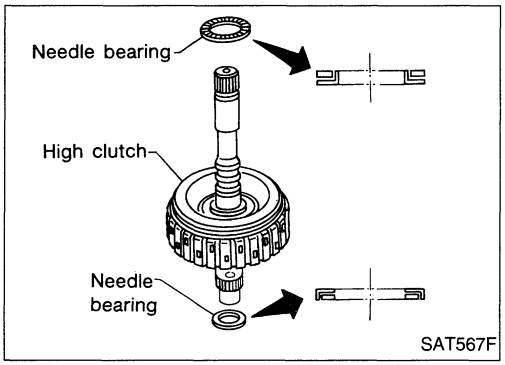
Assembly (Cont'd)



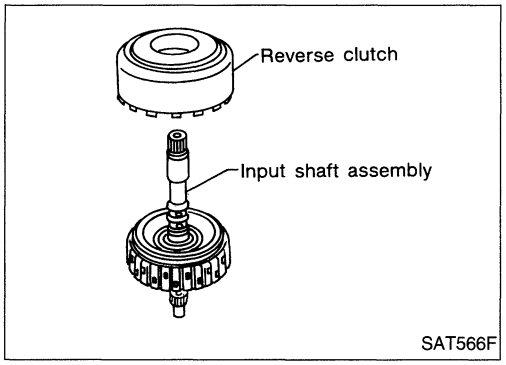
17. Install bearing race, needle bearing and high clutch hub on front sun gear.
- **Apply petroleum jelly to needle bearing.**
- **Pay attention to direction of needle bearing.**



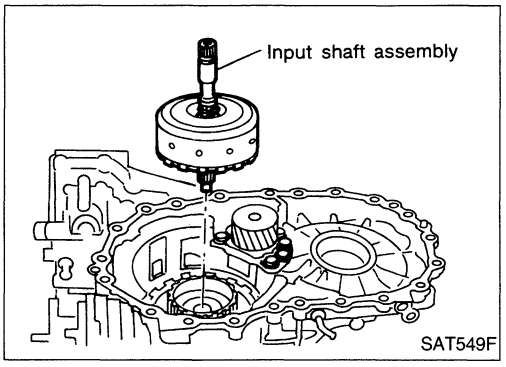
18. Install high clutch hub and front sun gear on transmission case.



19. Install needle bearings on high clutch drum.
- **Apply petroleum jelly to needle bearings.**
- **Pay attention to direction of needle bearings.**



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.**

General Specifications

Engine	KA24DE	
Automatic transaxle model	RE4F04A	RE4F04V
Automatic transaxle assembly Model code number	80X05	80X06
Transaxle gear ratio		
1st	2.785	
2nd	1.545	
3rd	1.000	
4th	0.694	
Reverse	2.272	
Final drive	3.619	
Recommended oil	Genuine Nissan Automatic Transmission Fluid (ATF) or equivalent DEXRON II E™ type fluid	
Oil capacity ℓ (US qt, Imp qt)	8.3 (8-3/4, 7-1/4)	8.5 (9, 7-1/2)

Specifications and Adjustments

VEHICLE SPEED WHEN SHIFTING GEARS

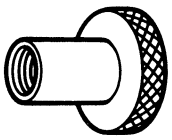
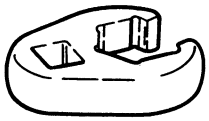
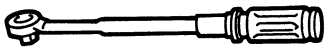
Throttle position	Shift pattern	Vehicle speed km/h (MPH)						
		$D_1 \rightarrow D_2$	$D_2 \rightarrow D_3$	$D_3 \rightarrow D_4$	$D_4 \rightarrow D_3$	$D_3 \rightarrow D_2$	$D_2 \rightarrow D_1$	$1_2 \rightarrow 1_1$
Full throttle	Comfort	62 - 70 (39 - 43)	114 - 122 (71 - 76)	179 - 187 (111 - 116)	175 - 183 (109 - 114)	105 - 113 (65 - 70)	41 - 49 (25 - 30)	62 - 70 (39 - 43)
	Auto power	62 - 70 (39 - 43)	114 - 122 (71 - 76)	179 - 187 (111 - 116)	175 - 183 (109 - 114)	105 - 113 (65 - 70)	41 - 49 (25 - 30)	62 - 70 (39 - 43)
Half throttle	Comfort	42 - 50 (26 - 31)	78 - 86 (48 - 53)	124 - 132 (77 - 82)	74 - 82 (46 - 51)	40 - 48 (25 - 30)	5 - 13 (3 - 8)	62 - 70 (39 - 43)
	Auto power	45 - 53 (28 - 33)	84 - 92 (52 - 57)	132 - 140 (82 - 87)	86 - 94 (53 - 58)	52 - 60 (32 - 37)	5 - 13 (3 - 8)	62 - 70 (39 - 43)

VEHICLE SPEED WHEN PERFORMING LOCK-UP

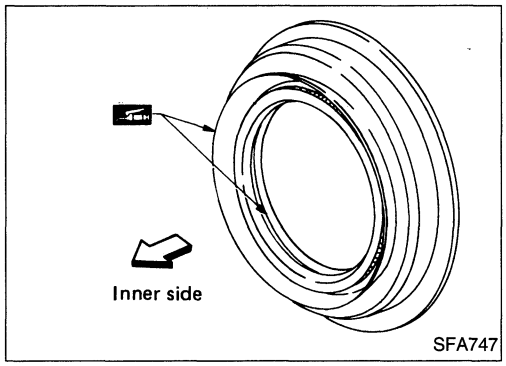
Throttle position	Shift pattern	OD switch (shift range)	Vehicle speed km/h (MPH)	
			Lock-up "ON"	Lock-up "OFF"
2/8	Comfort	ON [D_4]	105 - 113 (65 - 70)	53 - 61 (33 - 38)
		OFF [D_3]	86 - 94 (53 - 58)	83 - 91 (52 - 57)
	Auto power	ON [D_4]	108 - 116 (67 - 72)	53 - 61 (33 - 38)
		OFF [D_3]	88 - 94 (55 - 58)	83 - 91 (52 - 57)

Preparation (Cont'd)

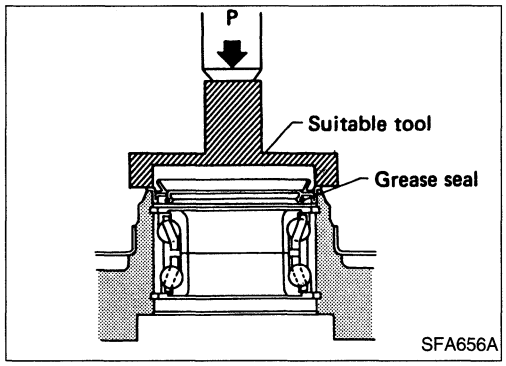
COMMERCIAL SERVICE TOOLS

Tool name	Description
Attachment Wheel alignment	
Flare nut crows foot	
Torque wrench	

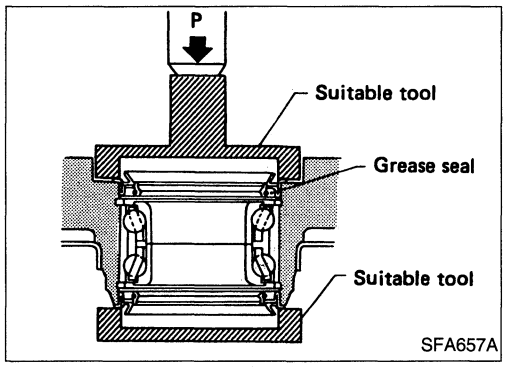
Assembly (Cont'd)



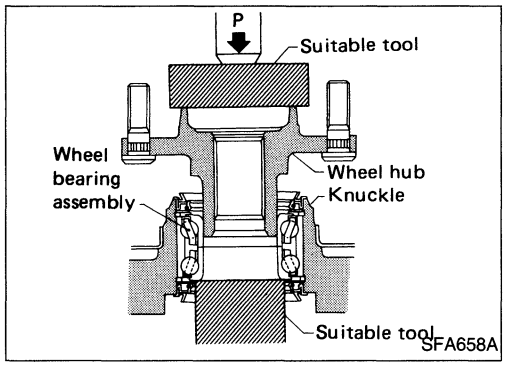
4. Pack grease seal lip with multi-purpose grease.



5. Install outer grease seal.

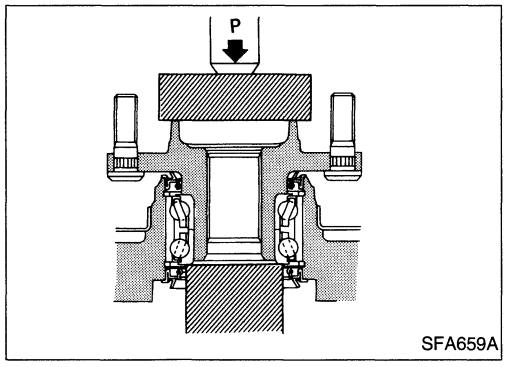


6. Install inner grease seal.



7. Press wheel hub into knuckle.
   Maximum load P:
   29 kN (3 ton, 3.3 US ton, 3.0 Imp ton)

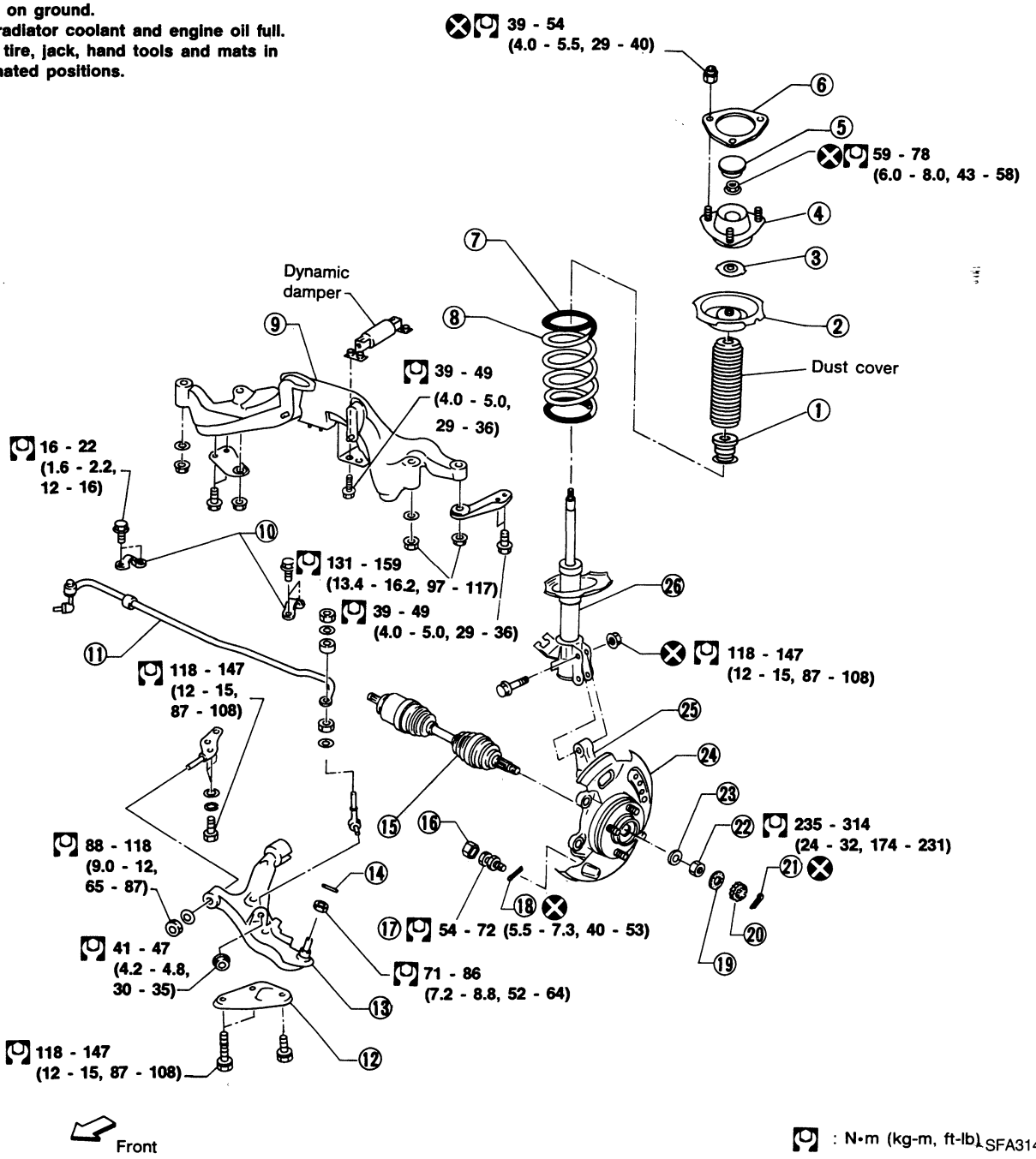
Be careful not to damage grease seal.



8. Check bearing operation.
(1) Add load P with press.
   Load P:
   34.3 - 49.0 kN
   (3.5 - 5.0 ton, 3.9 - 5.5 US ton, 3.44 - 4.92 Imp ton)

When installing rubber parts, final tightening must be carried out under unladen condition* with tires on ground.

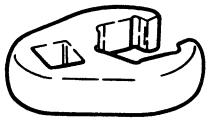
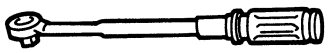
*** Fuel, radiator coolant and engine oil full. Spare tire, jack, hand tools and mats in designated positions.**



① Bound bumper assembly
② Upper spring seat
③ Strut mounting insulator
④ Plain washer
⑤ Cap
⑥ Spacer
⑦ (Polyuretane tube)
⑧ Coil spring
⑨ Front suspension member
⑩ Stabilizer clamp
⑪ Stabilizer
⑫ Compression rod bushing
⑬ Transverse link
⑭ Cotter pin
⑮ Drive shaft
⑯ Cap
⑰ Stopper bolt
⑱ Cotter pin
⑲ Insulator (Rubber)
⑳ Adjusting cap
㉑ Cotter pin
㉒ Wheel bearing cap
㉓ Washer
㉔ Baffle plate
㉕ Knuckle
㉖ Strut assembly
㉗ Dynamic damper assembly

Preparation (Cont'd)

COMMERCIAL SERVICE TOOLS

Tool name	Description
Flare nut crows foot	
Torque wrench	

Inspection (Cont'd)

UPPER RUBBER SEAT AND BUSHING

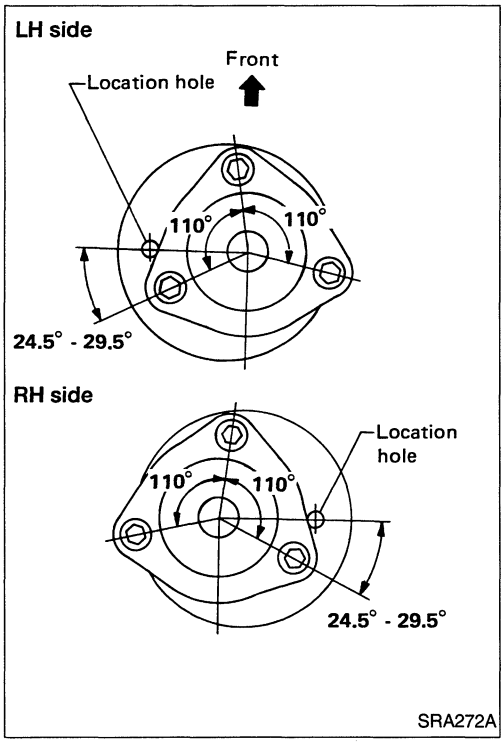
Check rubber parts for deterioration or cracks.
Replace if necessary.

STRUT MOUNTING INSULATOR

- Check cemented rubber-to-metal portion for melting or cracks.
- Check rubber parts for deterioration.

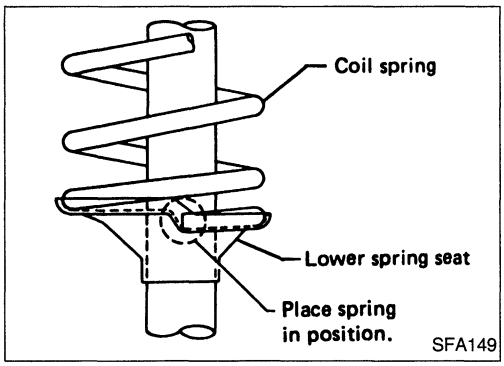
COIL SPRING

Check for cracks, deformation or other damage.
Replace if necessary.

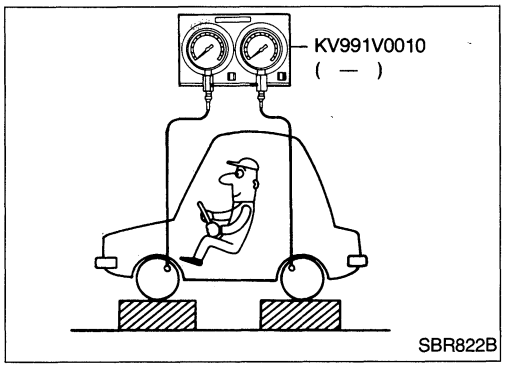


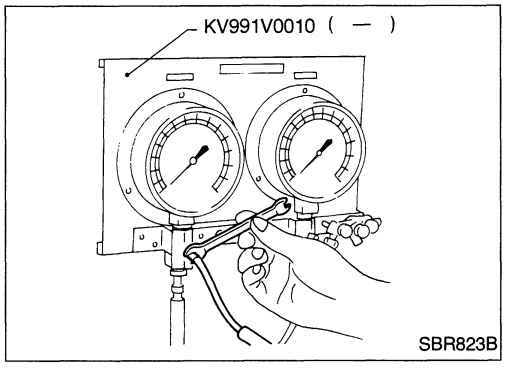
Assembly

1. Locate upper spring seat as shown.



2. After placing coil spring in position on lower spring seat, release spring compressor gradually.





Proportioning Valve

INSPECTION

CAUTION:

- **Carefully monitor brake fluid level at master cylinder.**
- **Use new brake fluid "DOT 3".**
- **Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on paint areas, wash it away with water immediately.**
- **Depress pedal slowly when raising front brake pressure.**
- **Check rear brake pressure 2 seconds after front brake pressure reaches specified value.**
- **For models with ABS, disconnect harness connectors from ABS actuator relay before checking.**

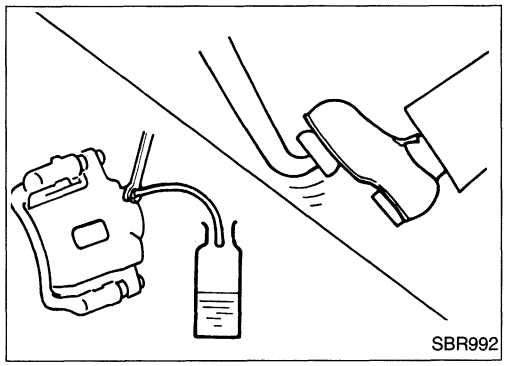
1. Connect Tool to air bleeders of front and rear brakes on either LH and RH side.
2. Bleed air from the Tool.
3. Check rear brake pressure by depressing brake pedal (increasing front brake pressure).

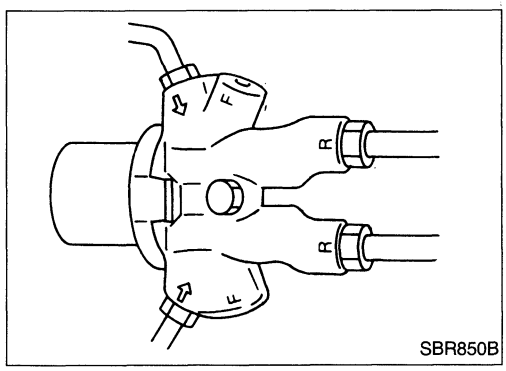
Unit: kPa (kg/cm^2, psi)

	Without ABS	With ABS
Applied pressure (Front brake) D_1	5,394 (55, 782)	5,884 (60, 853)
Output pressure (Rear brake) D_2	2,452 - 2,844 (25 - 29, 356 - 412)	3,334 - 3,727 (34 - 38, 483 - 540)

If output pressure is out of specifications, replace dual proportioning valve (separated type) or master cylinder assembly (built-in type).

4. Bleed air after disconnecting the Tool. Refer to BR-5.





REMOVAL (Separated type)

CAUTION:

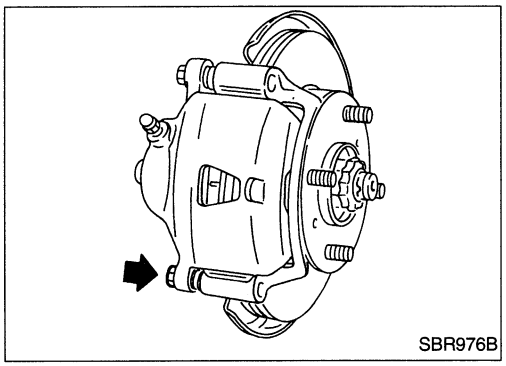
- **Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.**

1. Connect a vinyl tube to air bleeder valve.
2. Drain brake fluid from each air bleeder valve by depressing brake pedal.
3. Loosen flare nut.
4. Remove proportioning valve mounting bolt, then remove flare nut.

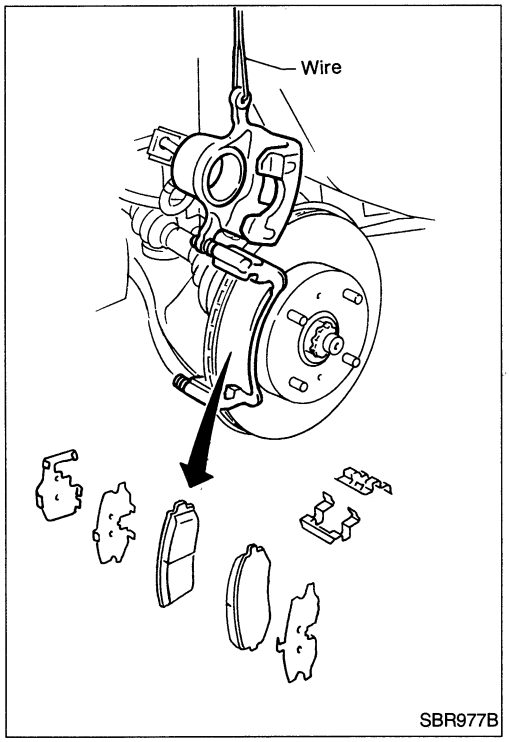
Pad Replacement

WARNING:
Clean brakes with a vacuum dust collector to minimize risk of health hazard from powder caused by friction.

CAUTION:
- **When cylinder body is open, do not depress brake pedal or 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.**


SBR976B

1. Remove master cylinder reservoir cap.
2. Remove lower pin bolt.

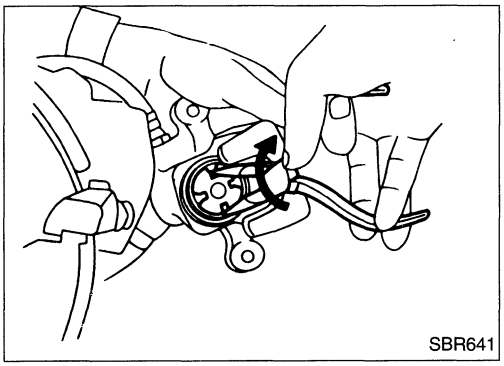


SBR977B

3. Open cylinder body upward. Then remove pad retainers and inner and outer shims.
   Standard pad thickness:
   11.0 mm (0.433 in)
   Pad wear limit:
   2.0 mm (0.079 in)

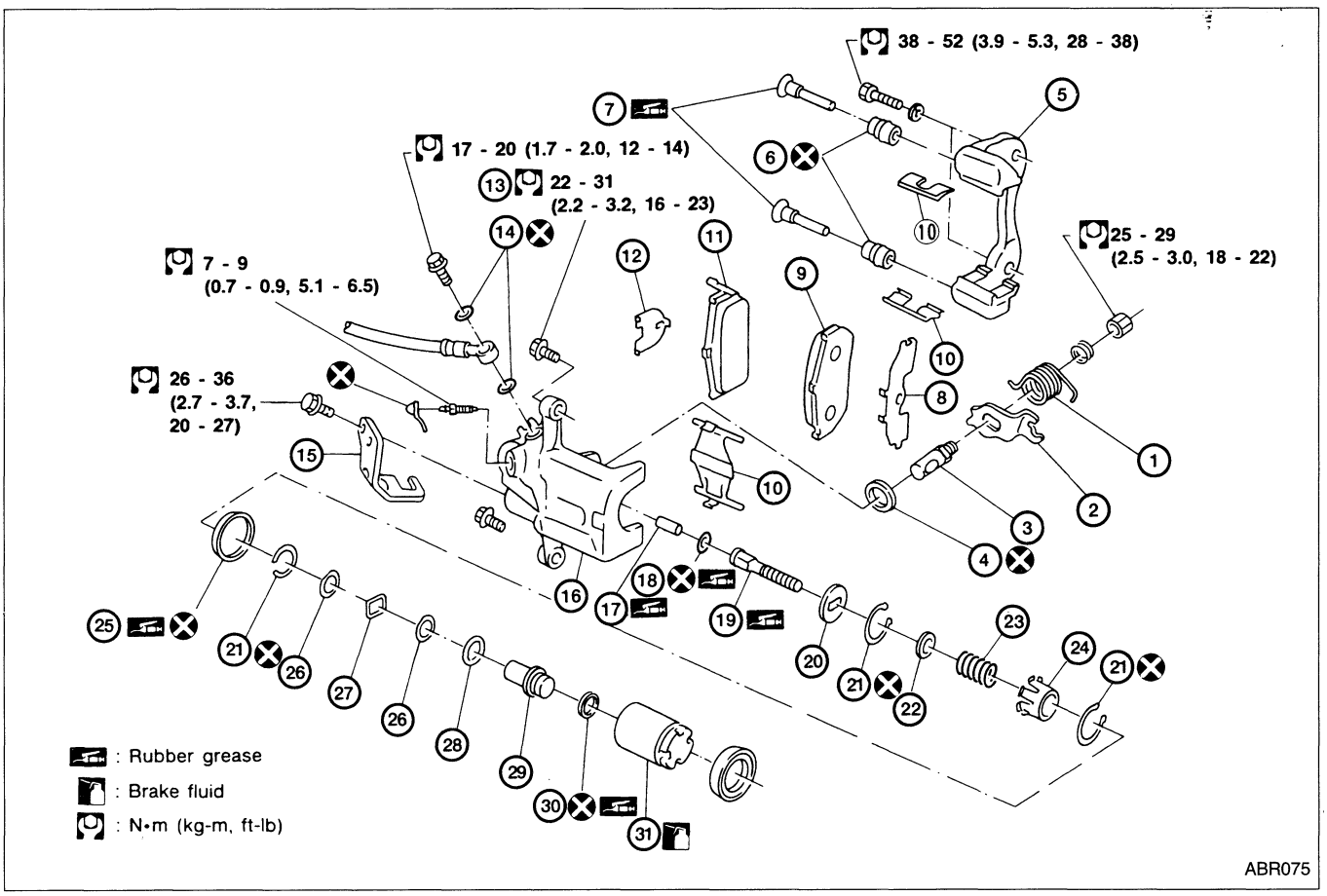
- **Carefully monitor brake fluid level because brake fluid will return to reservoir when pushing back piston.**

Pad Replacement (Cont'd)


SBR641

6. When installing new pads, push piston into cylinder body by turning piston clockwise.

Carefully monitor brake fluid level because brake fluid will return to reservoir when pushing back piston.

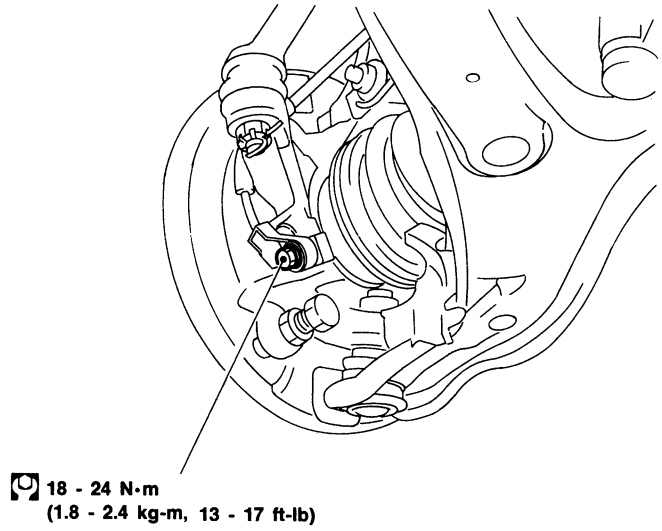


① Spring
② Toggle lever
③ Cam
④ Cam boot
⑤ Torque member
⑥ Pin boot
⑦ Side pin
⑧ Outer shim
⑨ Outer pad
⑩ Pad retainer
⑪ Inner pad
⑫ Inner shim
⑬ Pin bolt
⑭ Copper washer
⑮ Cable guide
⑯ Cylinder
⑰ Strut
⑱ O-ring
⑲ Push rod
⑳ Key plate
㉑ Snap ring
㉒ Spring seat
㉓ Spring
㉔ Spring cover
㉕ Piston seal
㉖ Spacer
㉗ Wave washer
㉘ Bearing
㉙ Adjuster nut
㉚ Piston cup
㉛ Piston
㉜ Piston boot

Removal and Installation

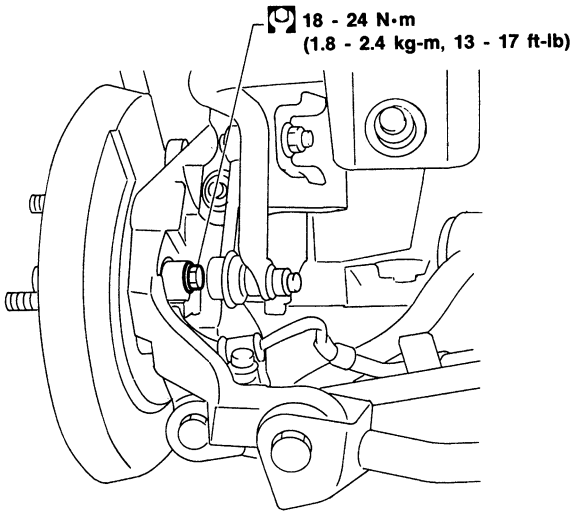
CAUTION:
Be careful not to damage sensor edge and sensor rotor teeth.

FRONT WHEEL SENSOR



SBR080C

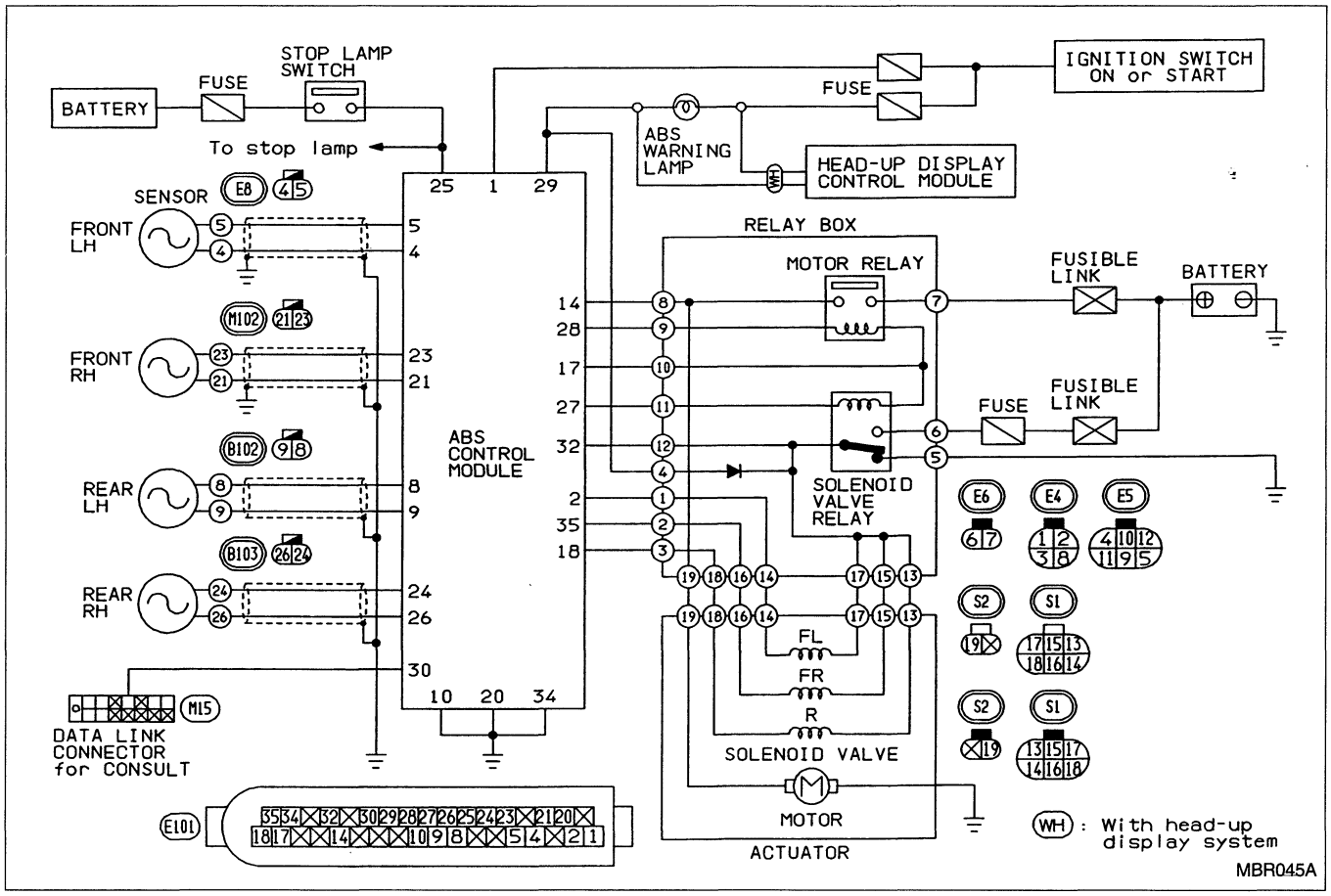
REAR WHEEL SENSOR

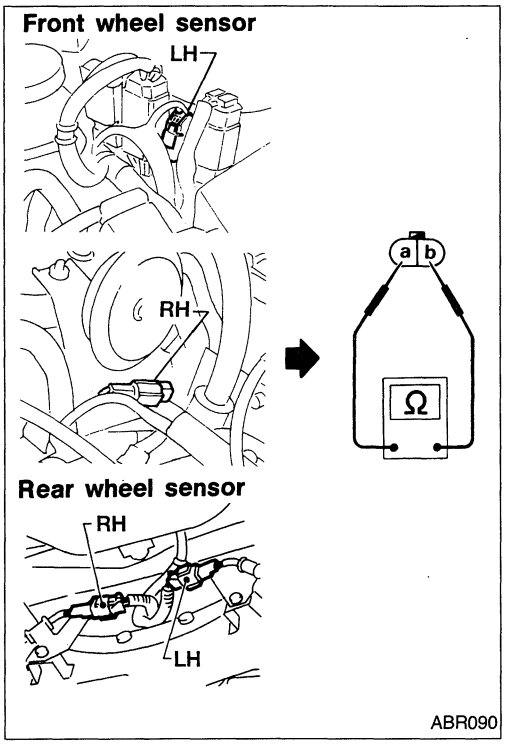


SBR081C

Circuit Diagram for Quick Pinpoint Check

- The unit side connectors with a double circle "⬭" are connected to the harness side connectors shown on BR-44.
- The terminal numbers in the connector coincide with the circuit numbers surrounded by a single circle "○".





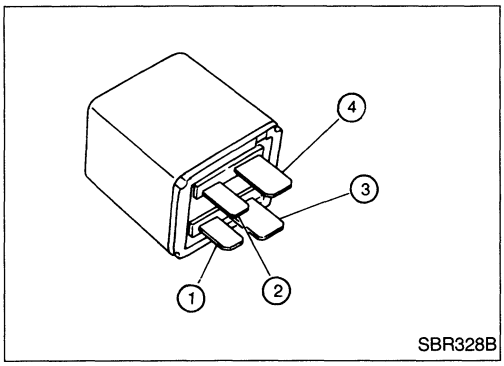
ABR090

Electrical Components Inspection

WHEEL SENSOR

Check resistance between terminals ⓐ and ⓑ.

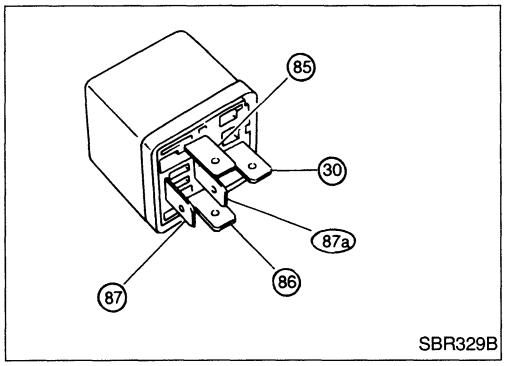
Resistance: 1.0 - 1.25kΩ



SBR328B

MOTOR RELAY

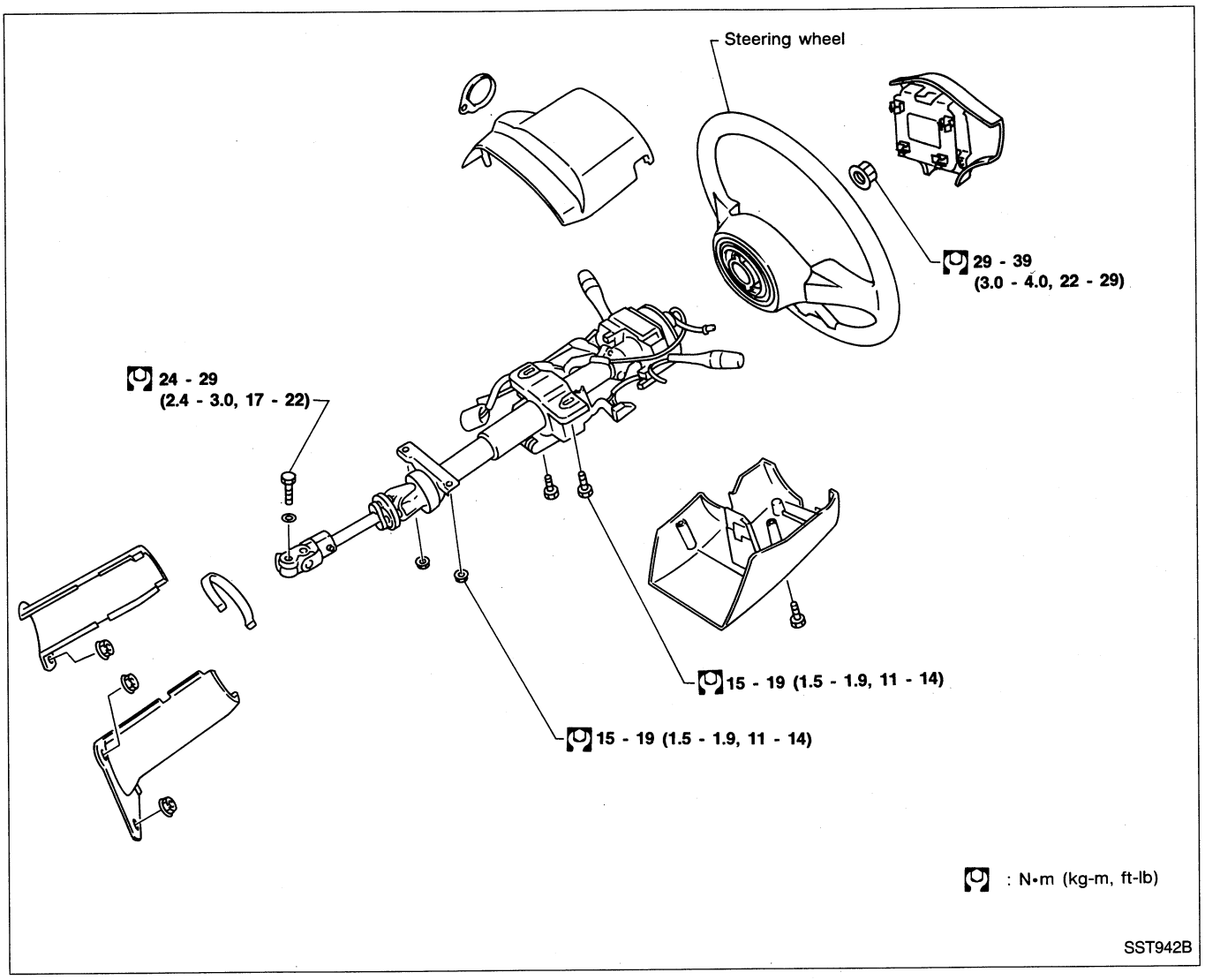
Condition	Continuity existence between terminals ③ and ④
Battery positive voltage not applied between terminals ① and ②.	No
Battery positive voltage applied between terminals ① and ②.	Yes

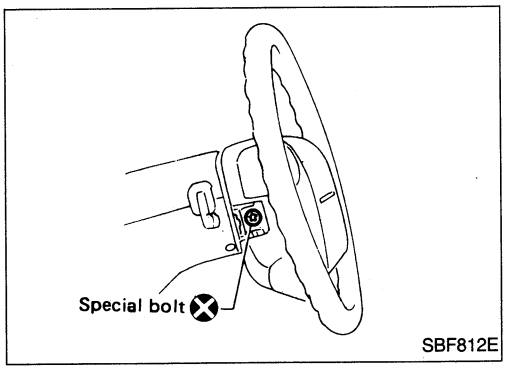


SBR329B

SOLENOID VALVE RELAY

Condition	Continuity existence between terminals 30 and 87a	Continuity existence between terminals 30 and 87
Battery positive voltage not applied between terminals 85 and 86.	Yes	No
Battery positive voltage applied between terminals 85 and 86.	No	Yes

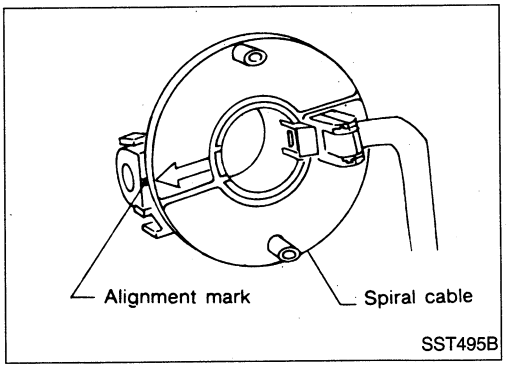




Removal (With air bag)

STEERING WHEEL

Remove air bag module and spiral cable. Refer to BF section ("Removal — Air Bag Module and Spiral Cable", "SUPPLEMENTAL RESTRAINT SYSTEM").

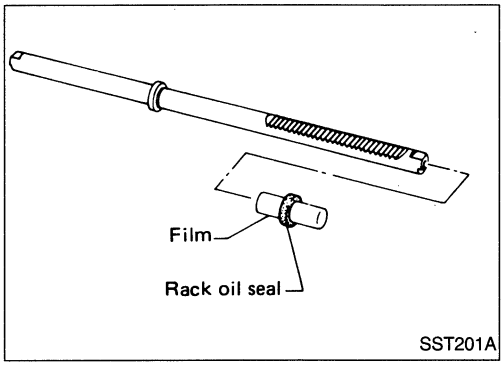


STEERING COLUMN

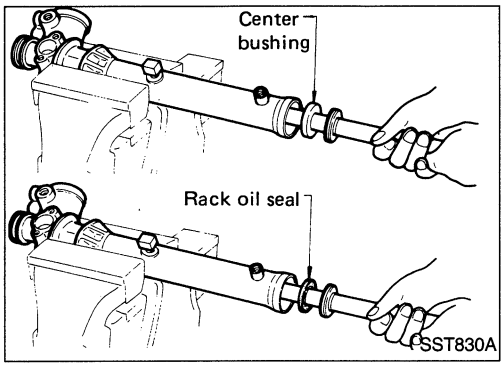
CAUTION:

The rotation of the spiral cable (SRS "Airbag" 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.

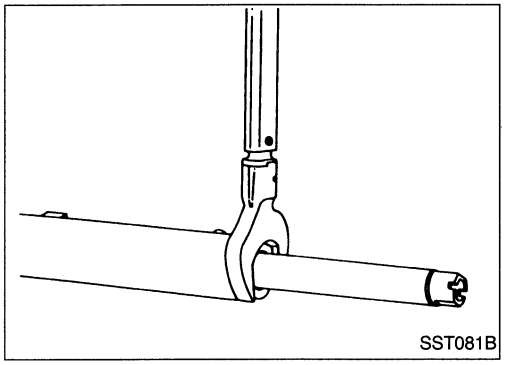
Assembly (Cont'd)



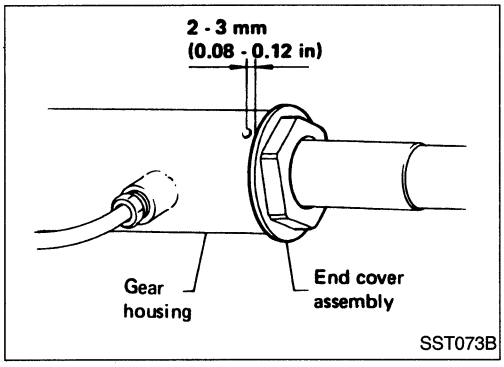
3. Insert new rack oil seal.
- **Place plastic film into rack oil seal to prevent damage by rack teeth.**
- **Do not forget to remove plastic film after rack oil seal is positioned properly.**
- **Make sure lips of rack oil seal face each other.**



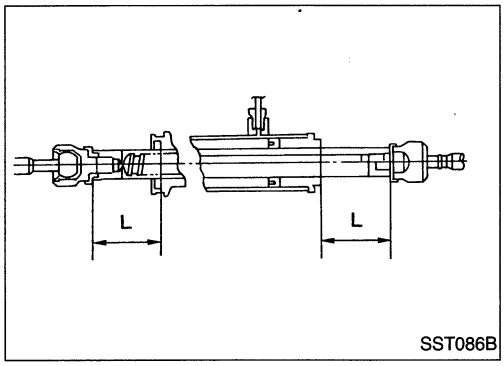
4. Install center bushing and rack oil seal with rack assembly.



5. Tighten end cover assembly with a suitable tool.



6. Fasten end cover assembly to gear housing by staking.



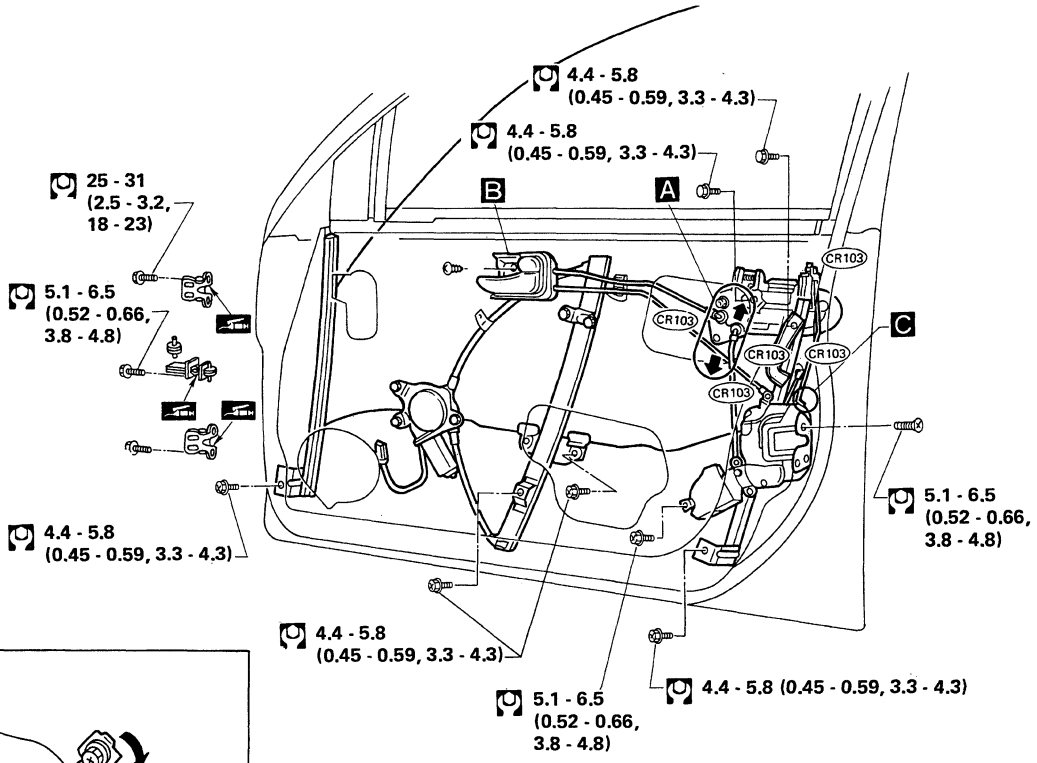
7. Set rack gear in neutral position.
   Rack stroke "L":
   Refer to SDS, ST-28.

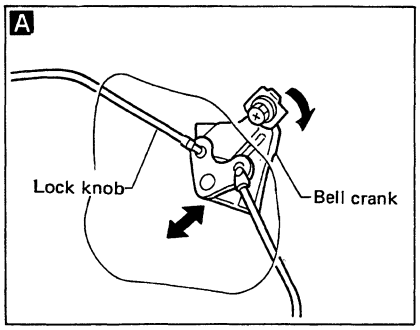
SECTION BF

CONTENTS

Front Door

- When removing door, be sure not to scratch vehicle body.
- After adjusting door or door lock, check door lock operation.

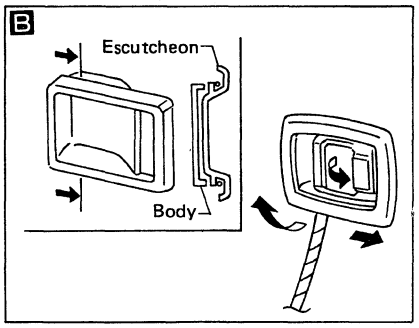




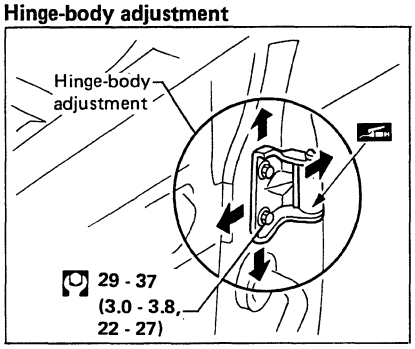
Bell crank adjustment

Lock door after setting door lock assembly and inside handle in position.

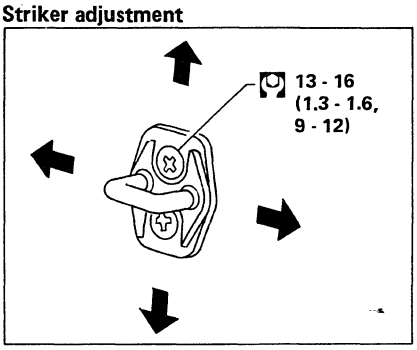
Move bell crank in direction of arrow (shown in figure at left) to take up knob free play, and secure with bolts.



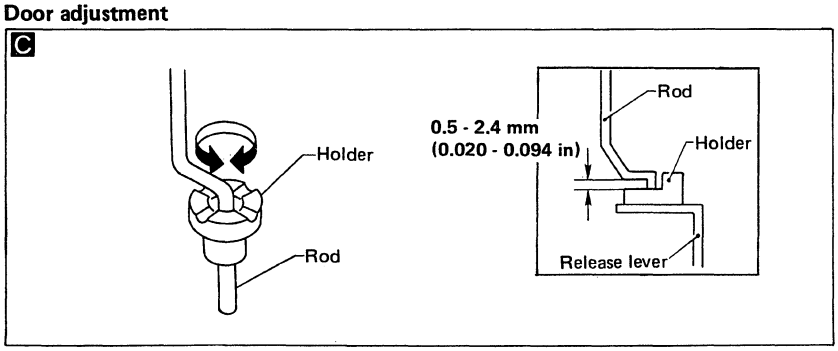
Hinge-body adjustment



Striker adjustment



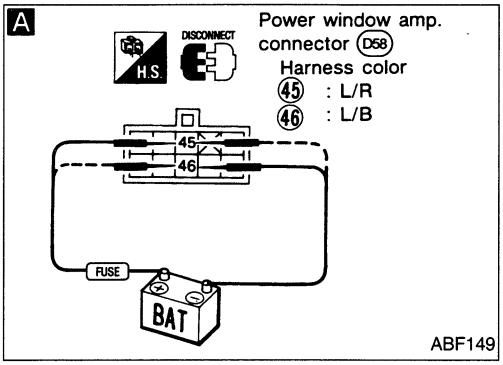
Door adjustment



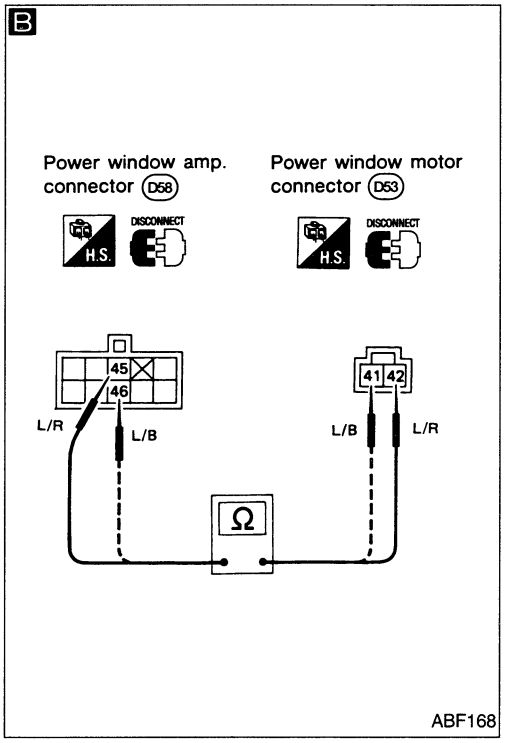
: N·m (kg-m, ft-lb)

MBF553A

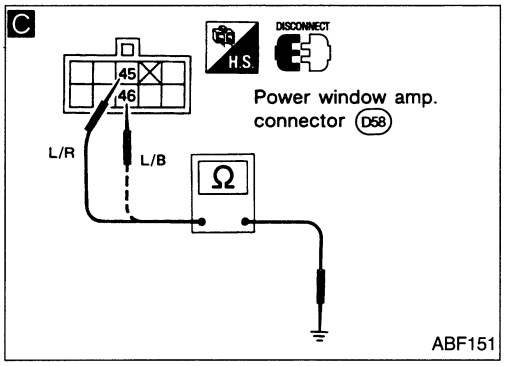
A



B



C



Diagnostic Procedure 2

SYMPTOM:
Passenger power windows cannot be operated by main switch and passenger switch.

START

A

CHECK PASSENGER POWER WINDOW CIRCUIT.
1) Disconnect connector from power window amp.
2) Check power window.

Terminals ⊕	Terminals ⊖	Window operation
45	46	Up
46	45	Down

O.K. → Perform Diagnostic Procedure 3. (Refer to BF-20.)

N.G.

B

1) Disconnect connector from power window motor.
2) Check continuity.

Terminals
45 - 42
46 - 41

Continuity should exist.

N.G. → Repair harness.

O.K.

C

Does continuity exist?

Terminals
45 - Ground
46 - Ground

Yes → Repair harness. There will be incorrect grounding.

No

Go to POWER WINDOW MOTOR in Electrical Components Inspection. (Refer to BF-22.)

O.K. → Check system again.

N.G.

Check power window motor harness for open or short circuit.

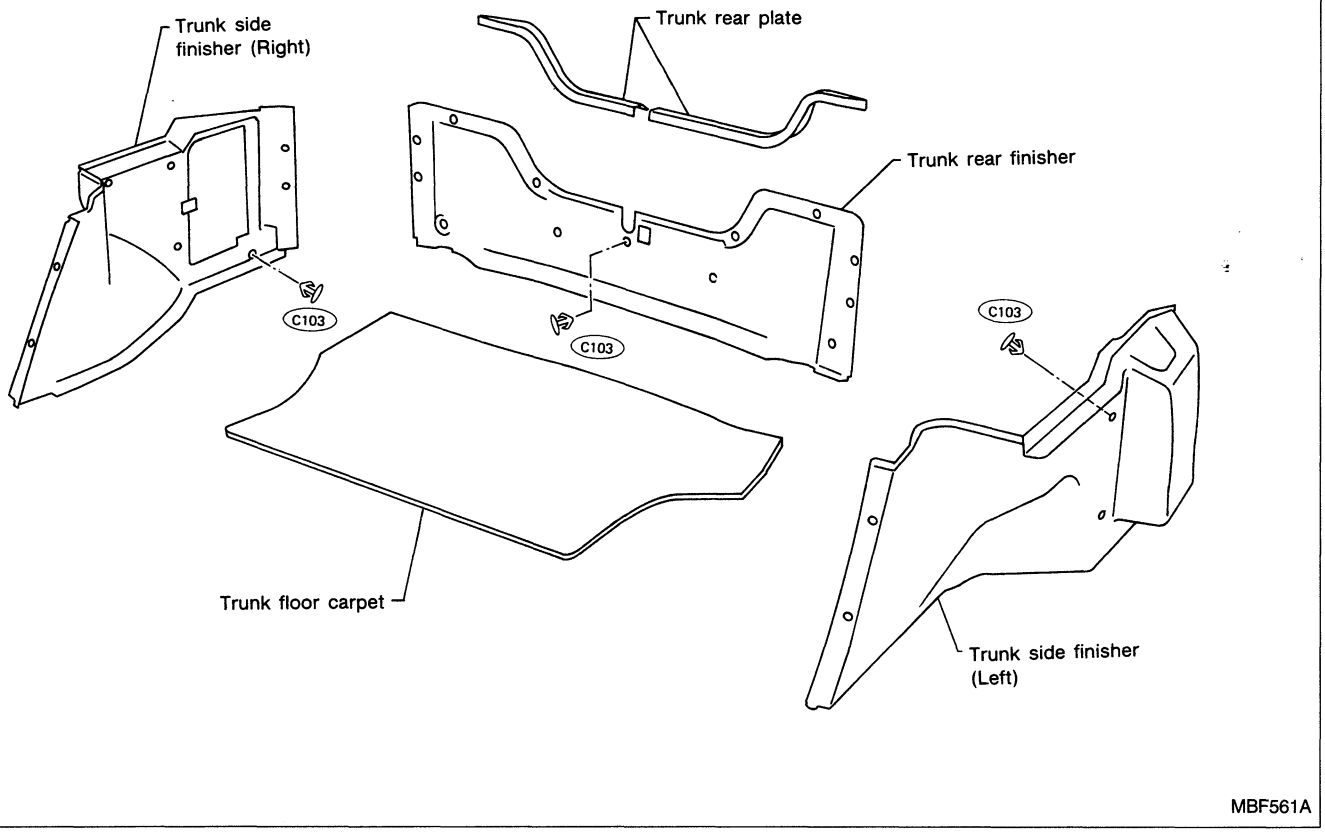
N.G. → Repair harness.

O.K.

Replace power window motor.

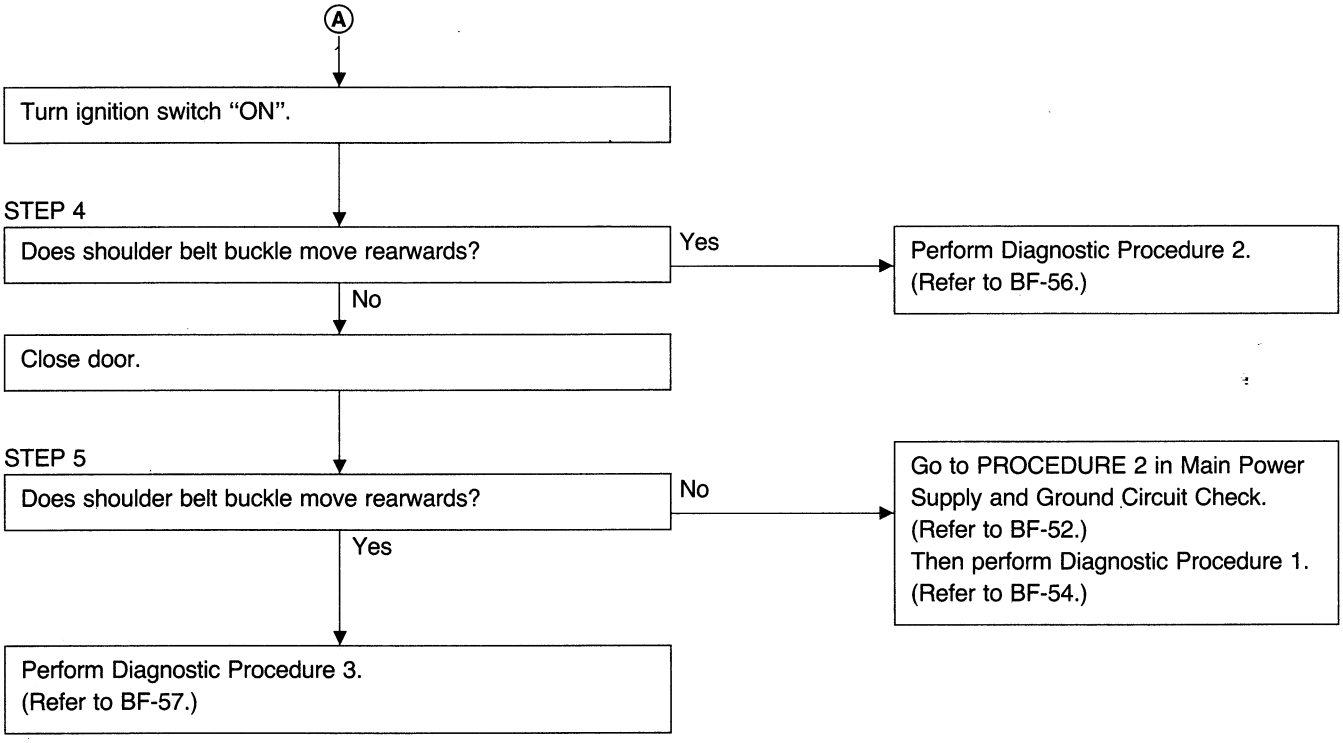
Interior (Cont'd)

LUGGAGE ROOM TRIM

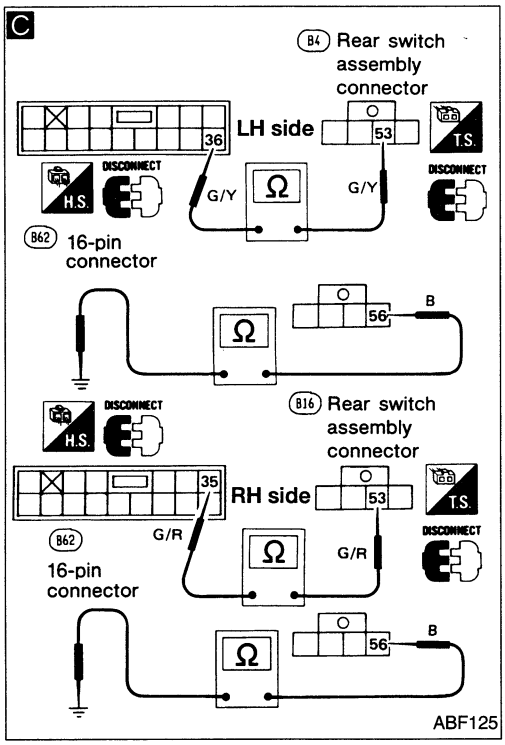


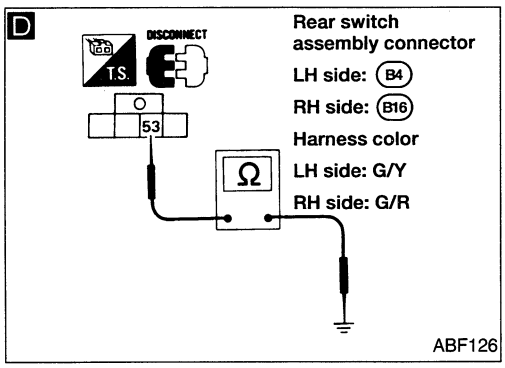
NOTE

Preliminary Check (Cont'd)



Diagnostic Procedure 4 (Cont'd)





Ⓐ

C

1) Disconnect connector from rear switch assembly.
2) Check continuity.

	Terminals
LH side	36 - 53 56 - Ground (B6 , B14)
RH side	35 - 53 56 - Ground (B6 , B14)

Continuity should exist.

N.G. → Repair harness.

O.K. ↓

D

Does continuity exist?

	Connector	Terminals
LH side	B4	53 - Ground
RH side	B16	53 - Ground

Yes → Repair harness. There will be incorrect grounding between terminals 36 and 53 or 35 and 53.

No ↓

Go to REAR LIMIT SWITCH in Electrical Components Inspection. (Refer to BF-67.)

O.K. → (Go to Ⓑ below.)

N.G. ↓

Check rear limit switch harness for open or short circuit.

N.G. → Repair rear limit switch harness.

O.K. ↓

Replace rear switch assembly.

Ⓑ

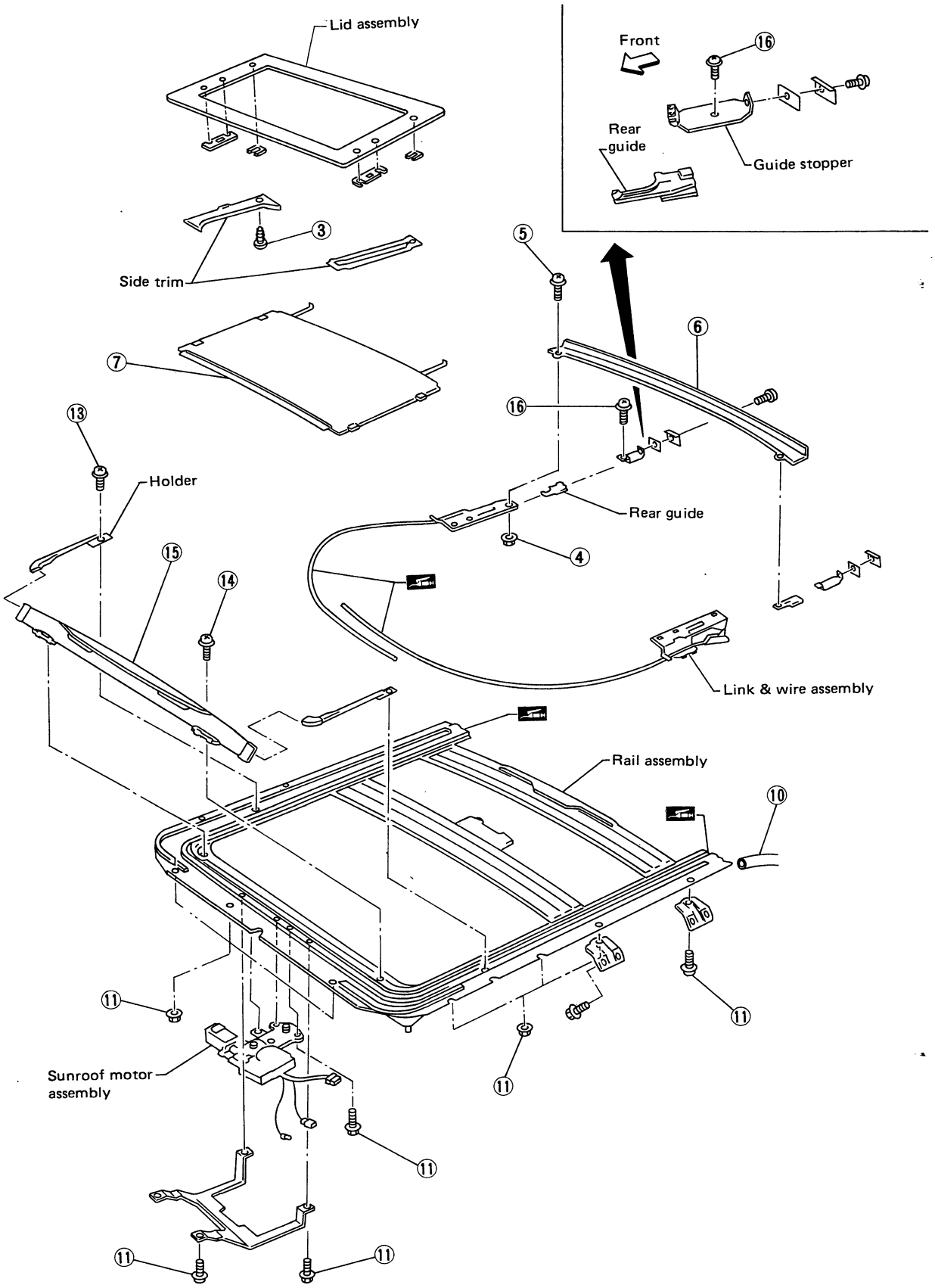
Is this the second time?

Yes → Replace control module.

No ↓

Reinstall any part removed.

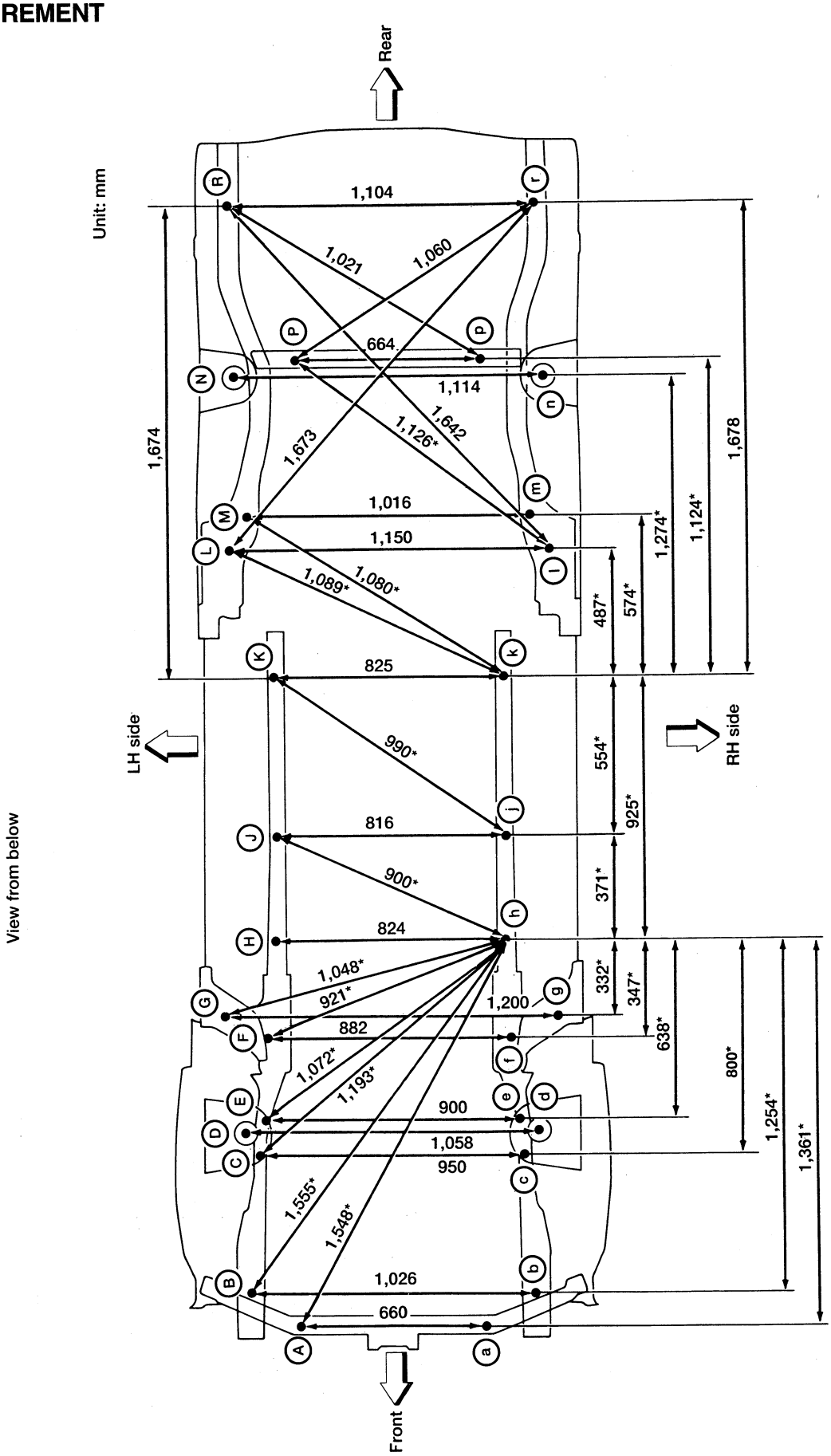
Go to PROCEDURE 1 (STEP 3) or PROCEDURE 2 (STEP 3) in Preliminary Check. (Refer to BF-48 or BF-50.)


Lid assembly
Front
16
Rear guide
Guide stopper
3
Side trim
5
7
6
16
13
Holder
Rear guide
4
15
14
Link & wire assembly
Rail assembly
10
11
Sunroof motor assembly
11
11
11
11

MBF580A

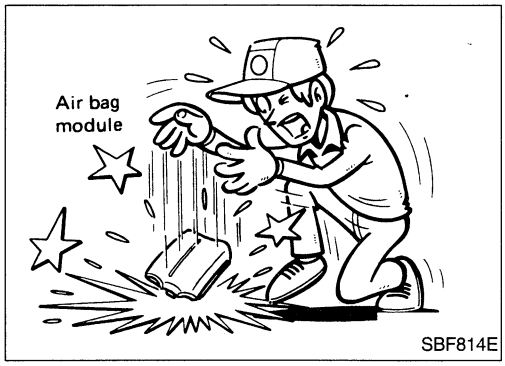
Underbody

MEASUREMENT



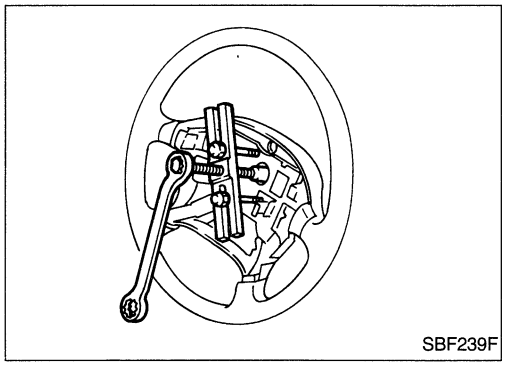
ABF157

Removal — Air Bag Module and Spiral Cable (Cont'd)

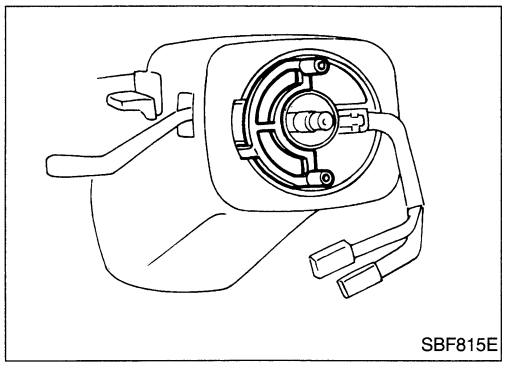


SBF814E

- **Do not drop or impact air bag module. If any portion is deformed or cracked, replace the module.**
- **Do not expose the air bag module to temperatures exceeding 100°C (212°F).**
- **Do not allow oil, grease or water to come in contact with the air bag module.**


SBF239F

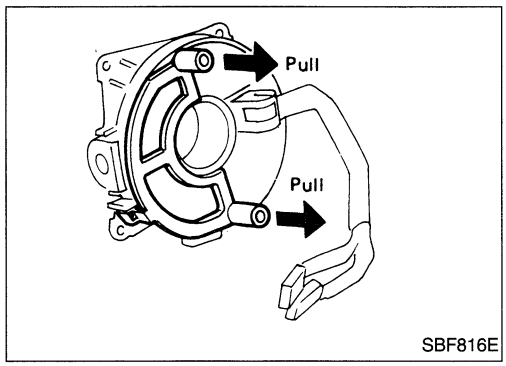
3. Set steering wheel in the neutral position.
4. Disconnect horn connector and remove nuts.
5. Using steering wheel puller, remove steering wheel. Be careful not to over-tighten puller bolt on steering wheel.


SBF815E

6. Attach spiral cable to stopper.
7. Remove steering column cover.
8. Disconnect connector and remove the four screws. The spiral cable can then be removed.

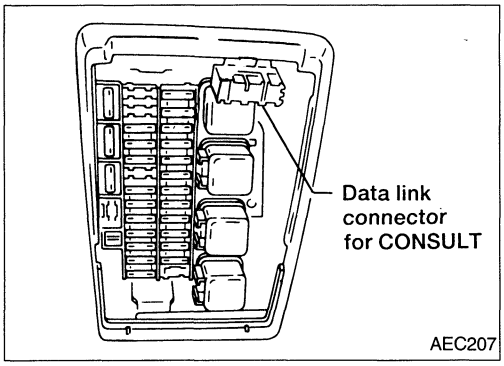
Installation — Air Bag Module and Spiral Cable

1. Connect spiral cable connector and tighten with screws. Install steering column cover.



SBF816E

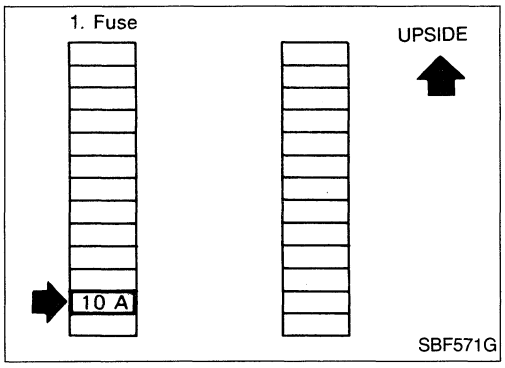
2. Remove stopper by pulling two pin guides.



Diagnostic Procedure 1

SYMPTOM: Warning lamp flashes.

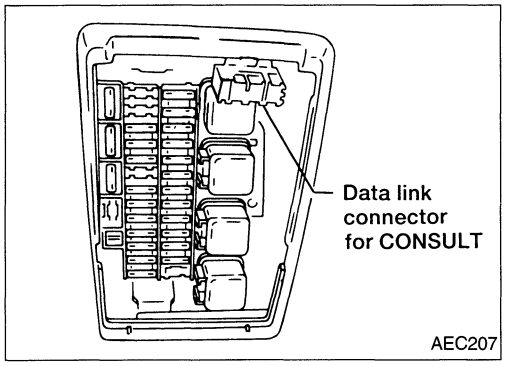
Connect CONSULT and operate it. Read the SELF-DIAGNOSIS RESULTS 1 and 2.	→ Refer to SELF-DIAGNOSIS RESULTS and repair.
OR	
Refer to warning lamp self-diagnosis.	→ Refer to the number of warning lamp flashes. Repair as necessary.



Diagnostic Procedure 2

SYMPTOM: Warning lamp does not come on.

1. Check the warning lamp fuse. — N.G. → Replace the fuse.
   ↓ O.K.
2. Connect CONSULT and begin diagnosis.
   • Is "AIR BAG" displayed on the CONSULT screen? — N.G. → Replace the control module.
   ↓ O.K.
3. Read the SELF-DIAGNOSIS RESULTS 1 and 2. — N.G. → Refer to SELF-DIAGNOSIS RESULTS and repair.
   ↓ O.K.
4. Check the warning lamp bulb. — N.G. → Replace the warning lamp bulb.
   ↓ O.K.
5. Check the warning lamp harness connection. — N.G. → Replace the harness.
   ↓ O.K.
6. Replace the control module.



Precautions for Servicing Compressor

- Attach a blind plug to the suction port (low pressure) and discharge port (high pressure) of the compressor to prevent oil from leaking out and dust from getting inside.
- Do not keep the compressor in the upside down position or laid on its side for more than 10 minutes.
- When replacing or repairing compressor, be sure to remove oil from the compressor and check the oil quantity extracted.
- When replacing with a new compressor, be sure to remove oil from the new compressor so that the quantity of oil remaining in the new compressor is equal to the quantity collected from the removed compressor. See the section "LUBRICATION OIL".
- Pay attention so as not to allow dirt and oil to attach on the friction surfaces between clutch and pulley. If the surface is contaminated with oil, wipe it off by using a clean waste cloth moistened with thinner.
- After completing the compressor service operation, be sure to rotate the compressor shaft more than five turns in both directions by hand to equalize oil distribution inside the compressor, then run the compressor for about one hour by idling the engine.
- When the compressor magnet clutch has been replaced, be sure to check the magnet clutch for normal operation by applying voltage to the clutch.

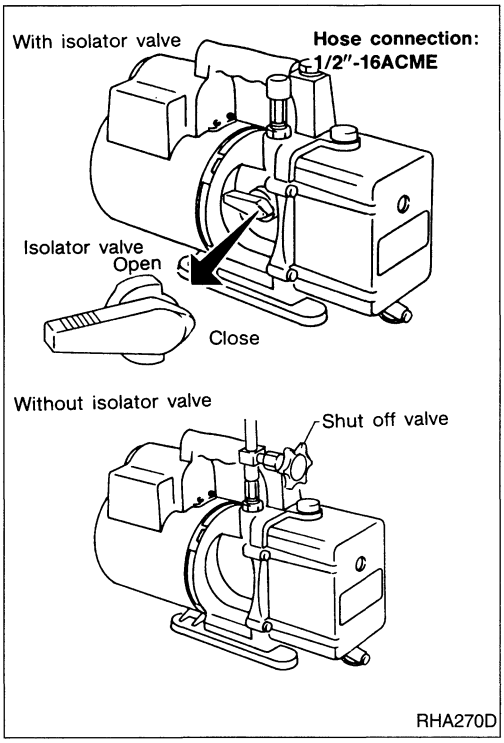
Precautions for Service Equipment

RECOVERY/RECYCLING EQUIPMENT

Be certain to follow the manufacturers instructions for machine operation and machine maintenance. Never introduce any refrigerant other than that specified into the machine.

ELECTRONIC LEAK DETECTOR

Be certain to follow the manufactures instructions for tester operation and tester maintenance.



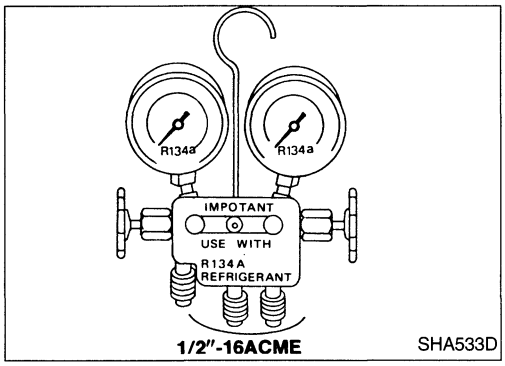
VACUUM PUMP

The lubrication oil contained inside the vacuum pump is not compatible with the specified lubrication oil for HFC-134a (R-134a) A/C systems. Since the vent side of the vacuum pump is exposed to atmospheric pressure, it is possible for the vacuum pump lubrication oil to migrate out of the pump into the service hose if the pump is switched off after evacuation (vacuuming) and the service hose is not isolated from the vacuum pump.

To prevent the migration of vacuum pump lubrication oil into service hoses, it is necessary to use a valve (which can be manually opened or closed) near the connection of the service hose to the pump.

- On a vacuum pump which is equipped with an isolator valve (usually part of the vacuum pump), closing this valve will isolate the service hose from the pump.
- For pumps without an isolator valve, be certain that the service hose is equipped with a manual shut off valve near the pump end of the hose.
- Hoses which contain an automatic shut off valve at the end of the service hose must be disconnected from the vacuum pump to prevent the migration of lubrication oil: as long as the hose is connected, the valve is open and lubrication oil may migrate.

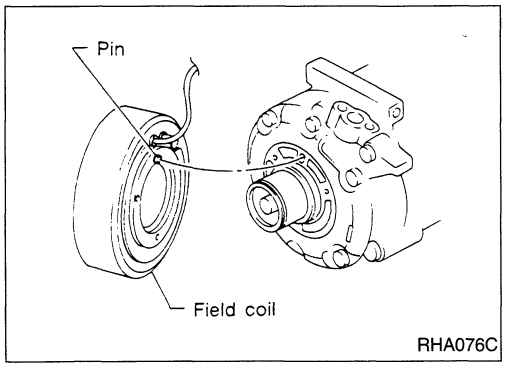
One-way valves which open when vacuum is applied and close under a no vacuum condition are not recommended, because this valve may restrict the pump's ability to pull a deep vacuum.



MANIFOLD GAUGE SET

Be certain that the gauge face indicates R-134a or 134a. Be certain that the manifold gauge set has the 1/2"-16 ACME threaded connections for service hoses, and that no refrigerants other than HFC-134a (R-134a) (along with only specified lubrication oils) have been used with the manifold gauge set.

Compressor Clutch (Cont'd)

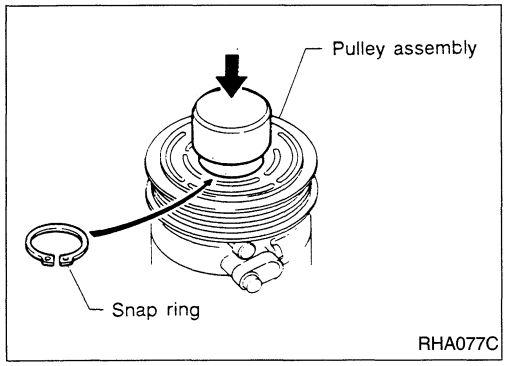


INSTALLATION

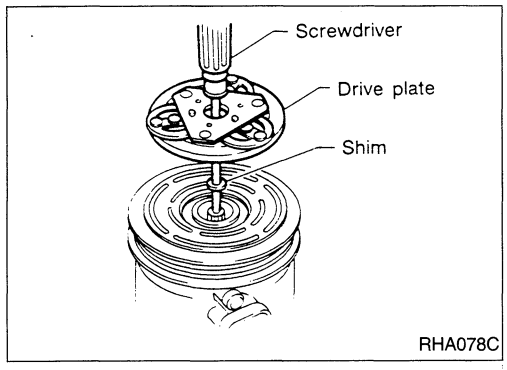
- Install the field coil.

Be sure to align the coil's pin with the hole in the compressor's front head.

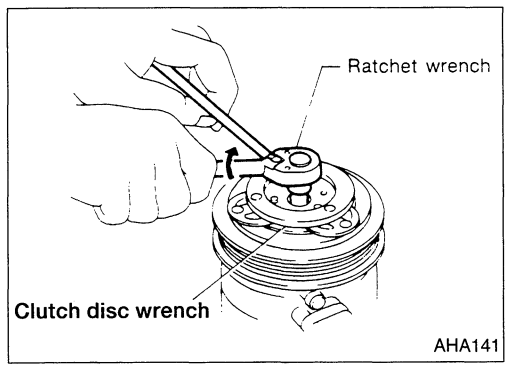
- Install the field coil harness clip using a screwdriver.



- Install the pulley assembly using the installer and a hand press, and then install the snap ring using snap ring pliers.



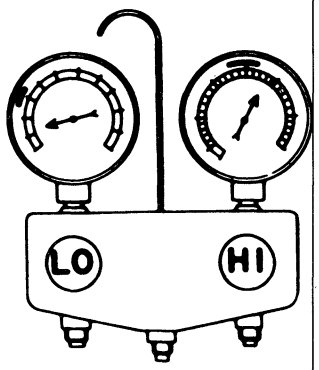
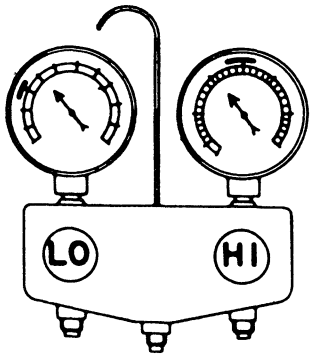
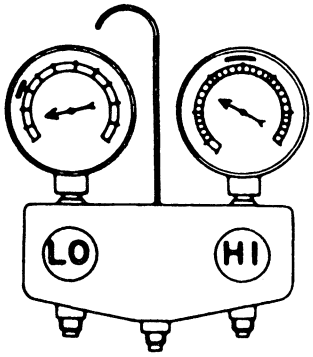
- Install the drive plate on the drive shaft, together with the original shim(s). Press the drive plate down by hand.



- Using the clutch disc wrench to prevent drive plate rotation, tighten the bolt to 12 to 15 N•m (1.2 to 1.5 kg-m, 9 to 11 ft-lb) torque.

After tightening the bolt, check that the pulley rotates smoothly.

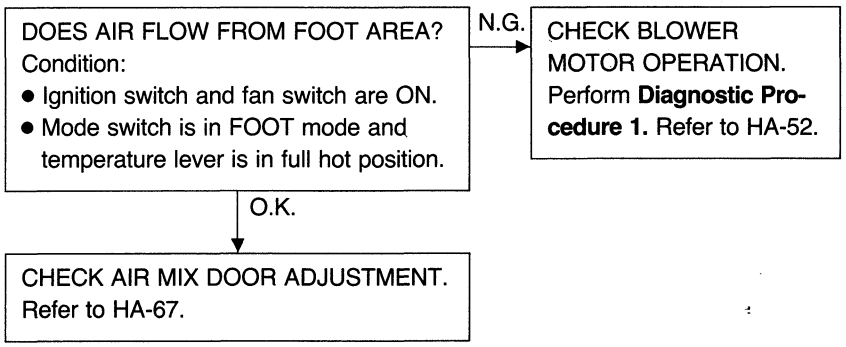
Performance Test Diagnoses (Cont'd)

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 compressor oil for contamination.
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 discharge capacity does not change. (Compressor stroke is set at maximum.)	Replace compressor.
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.	Liquid tank inside is clogged a little.	• Replace liquid tank. • Check compressor oil 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 compressor oil for contamination.

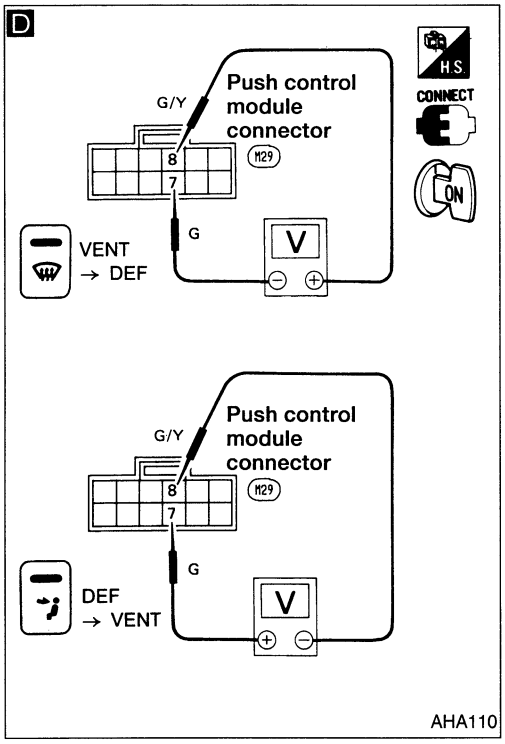
Preliminary Check (Cont'd)

PRELIMINARY CHECK 6

Insufficient heating



Diagnostic Procedure 2 (Cont'd)



Ⓐ

Reconnect push control module and mode door motor harness connectors.

D

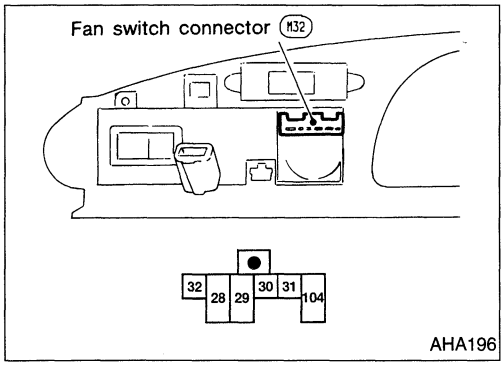
CHECK FOR OUTPUT OF PUSH CONTROL MODULE.
Do approx. 12 volts exist between push control module harness terminal No. ⑦ and ⑧ when mode is switched from "VENT" to "DEF" or when mode is switched from "DEF" to "VENT"?

N.G. → Replace push control module.

Terminal No.		Mode door motor	
⑦	⑧	Mode door operation	Direction of linkage rotation
⊖	⊖	Stop	Stop
⊖	⊕	VENT → DEF	Clockwise
⊕	⊖	DEF → VENT	Counterclockwise

O.K.

Replace mode door motor.

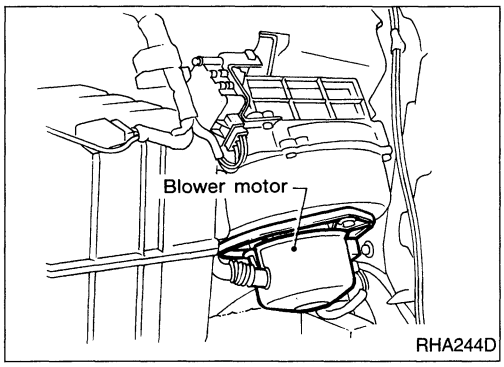


Electrical Components Inspection

FAN SWITCH

Check continuity between terminals at each position.

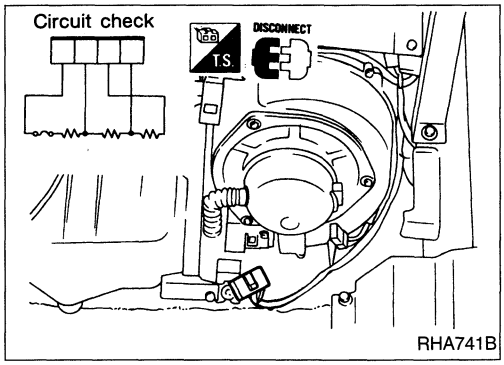
TERMINAL	POSITION				
	OFF	1	2	3	4
28					○
29				○	
30			○		
31		○			
32		○	○	○	○
104		○	○	○	○



BLOWER MOTOR

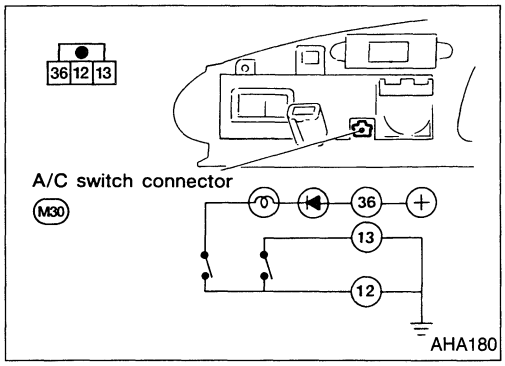
Check blower motor for smooth rotation.

- Ensure that there are no foreign particles inside the intake unit.



BLOWER RESISTOR

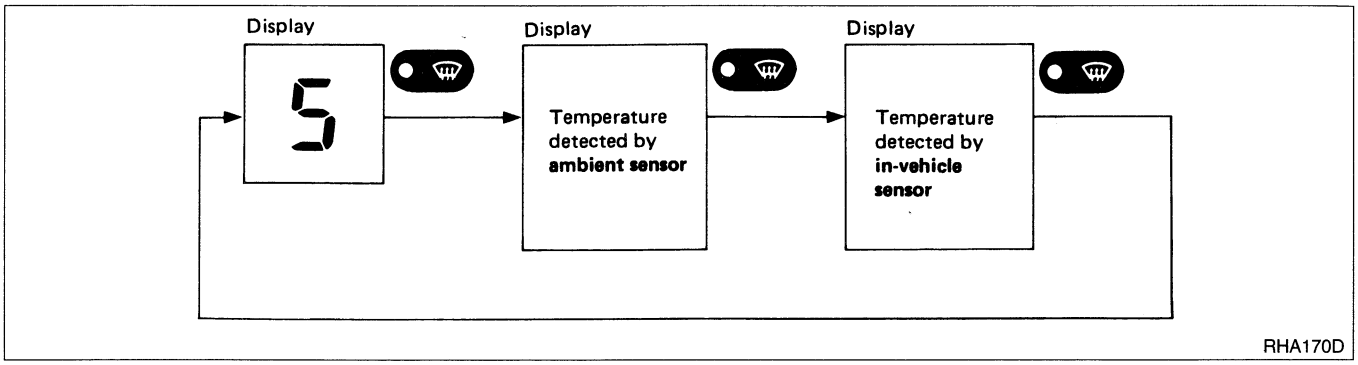
Check continuity between terminals.



A/C SWITCH

Check continuity between terminals.

Self-diagnosis (Cont'd)

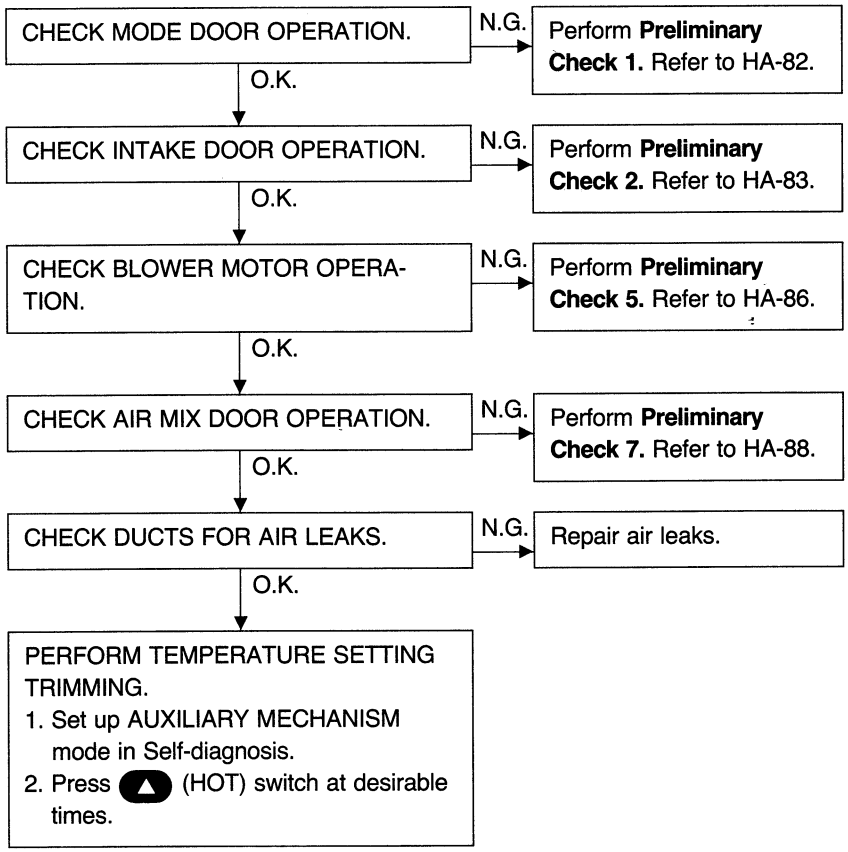


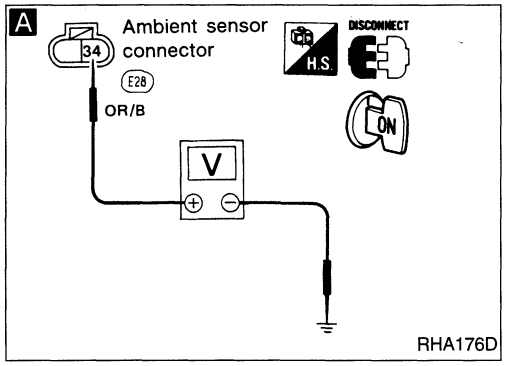
If temperature shown on display greatly differs from actual temperature, check sensor circuit at first then inspect sensor itself according to the procedures described in **Control System Input Components**. Refer to HA-114.

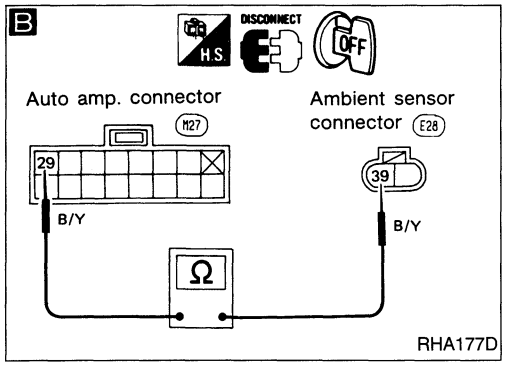
Preliminary Check (Cont'd)

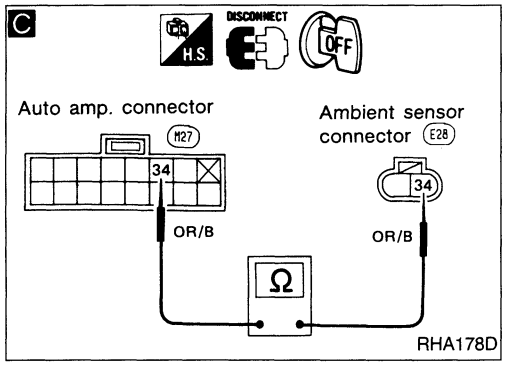
PRELIMINARY CHECK 4

Insufficient heating









Diagnostic Procedure 1

SYMPTOM: Ambient sensor circuit is open or shorted. (21 or ECON 21 is indicated on auto amp. as a result of conducting Self-diagnosis STEP 2.)

A

CHECK AMBIENT SENSOR CIRCUIT BETWEEN AMBIENT SENSOR AND AUTO AMP.
Disconnect ambient sensor harness connector.
Do approx. 5 volts exist between ambient sensor harness terminal No. (34) and body ground?

N.G. → Disconnect auto amp. harness connector.

C Note

Check circuit continuity between ambient sensor harness terminal No. (34) and auto amp. harness terminal No. (34).

O.K. → Replace auto amp.

O.K. → Disconnect auto amp. harness connector.

B Note

Check circuit continuity between ambient sensor harness terminal No. (39) and auto amp. harness terminal No. (29).

O.K. →

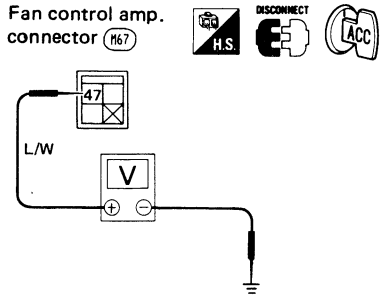
CHECK AMBIENT SENSOR. (Refer to HA-115.)

N.G. → Replace ambient sensor.

O.K. → Replace auto amp.

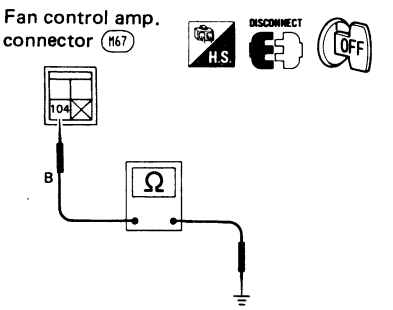
Note:
If the result is N.G. after checking circuit continuity, repair harness or connector.

A



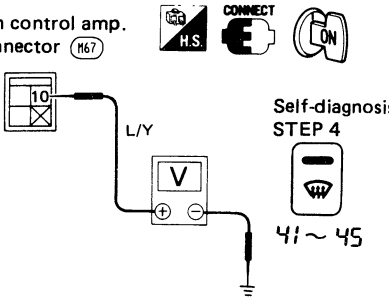
RHA206D

B



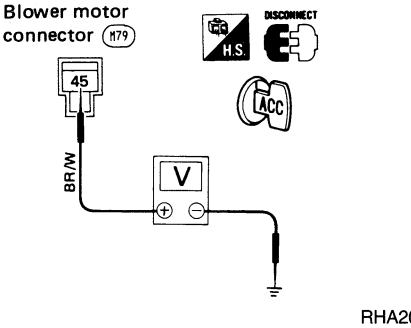
RHA207D

C



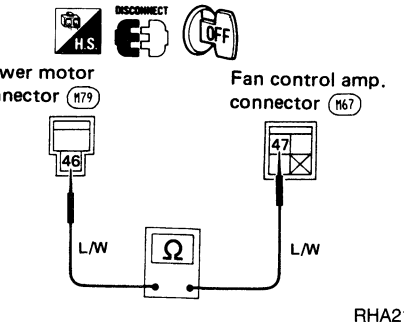
RHA208D

D



RHA209D

E



RHA210D

Diagnostic Procedure 9

SYMPTOM: Blower motor operation is malfunctioning under out of Starting Fan Speed Control.

- **Perform Preliminary Check 5 before referring to the following flow chart.**

A

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. (47) and body ground?

N.G. → **D**

CHECK POWER SUPPLY FOR BLOWER MOTOR.
Disconnect blower motor harness connector.
Do approx. 12 volts exist between blower motor harness terminal No. (45) and body ground?

O.K. → **B**

N.G. → Check 20A fuses at fuse block. Refer to EL section ("Wiring Diagram", "POWER SUPPLY ROUTING") and HA-92.

B Note

CHECK BODY GROUND CIRCUIT FOR FAN CONTROL AMP.
Does continuity exist between fan control amp. harness terminal No. (104) and body ground?

O.K.

Reconnect fan control amp. harness connector.

C

CHECK FOR AUTO AMP. OUTPUT.
Set up Self-diagnosis STEP 4.
Measure voltage across fan control amp. harness terminal No. (10) and body ground.

Code No.	Terminal No. ⊕	Terminal No. ⊖	Voltage
41 -45	(10)	Body ground	Approx. 1 - 3V

O.K.

Replace fan control amp.

N.G.

E Note

Check circuit continuity between blower motor harness terminal No. (46) and fan control amp. harness terminal No. (47).

O.K.

CHECK BLOWER MOTOR.
(Refer to HA-65.)

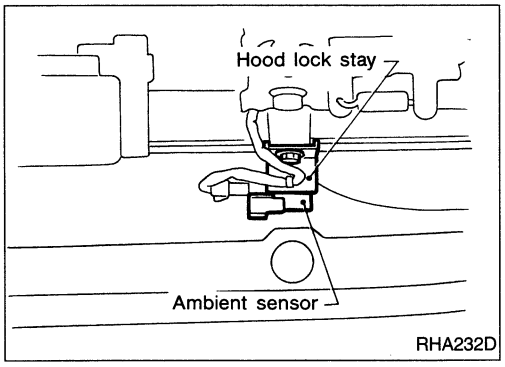
N.G.

Replace blower motor.

Ⓐ (Go to next page.)

Note:
If the result is N.G. after checking circuit continuity, repair harness or connector.

Control System Input Components (Cont'd)

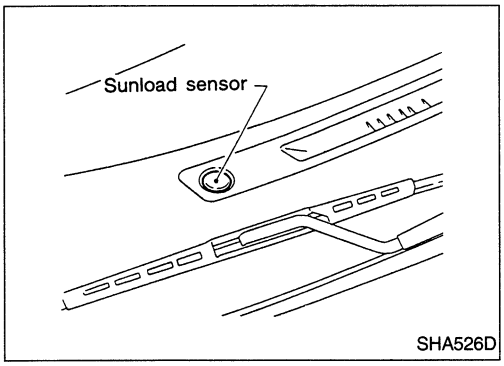


AMBIENT SENSOR

The ambient sensor is attached to hood lock stay. It detects ambient temperature and converts it into a resistance value which is then input to the auto amplifier.

After disconnecting ambient sensor harness connector, measure resistance between terminals ㉞ and ㊴ 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



SUNLOAD SENSOR

The sunload sensor is located on the right defroster grille. It detects sunload entering through windshield by means of a photo diode and converts it into a current value which is then input to the auto amplifier.

Measure voltage between terminals ㉖ and ㊳ at vehicle harness side, using the table below.

Input current mA	Output voltage V
0	5.0
0.1	4.1
0.2	3.1
0.3	2.2
0.4	1.3
0.5	0.4

- **When checking sunload sensor, select a place where sun shines directly on it.**

General Specifications

COMPRESSOR

Model	DKV-14C
Type	Vane rotary
Displacement cm^3 (cu in)/Rev	140 (8.54)
Direction of rotation	Clockwise (Viewed from drive end)
Drive belt	Poly V type

LUBRICATION OIL

Model	ZEXEL make DKV-14C
Name	Nissan A/C System Oil Type R
Part No.	KLH00-RAGR0
Capacity mℓ (US fl oz, Imp fl oz)	
Total in system	200 (6.8, 7.0)
Compressor (Service part) charging amount	200 (6.8, 7.0)

REFRIGERANT

Type	HFC-134a (R-134a)
Capacity kg (lb)	0.70 - 0.80 (1.54 - 1.76)

Inspection and Adjustment

ENGINE IDLING SPEED

When A/C is ON

- **Refer to EF & EC section ("Inspection and Adjustments", "SERVICE DATA AND SPECIFICATIONS").**

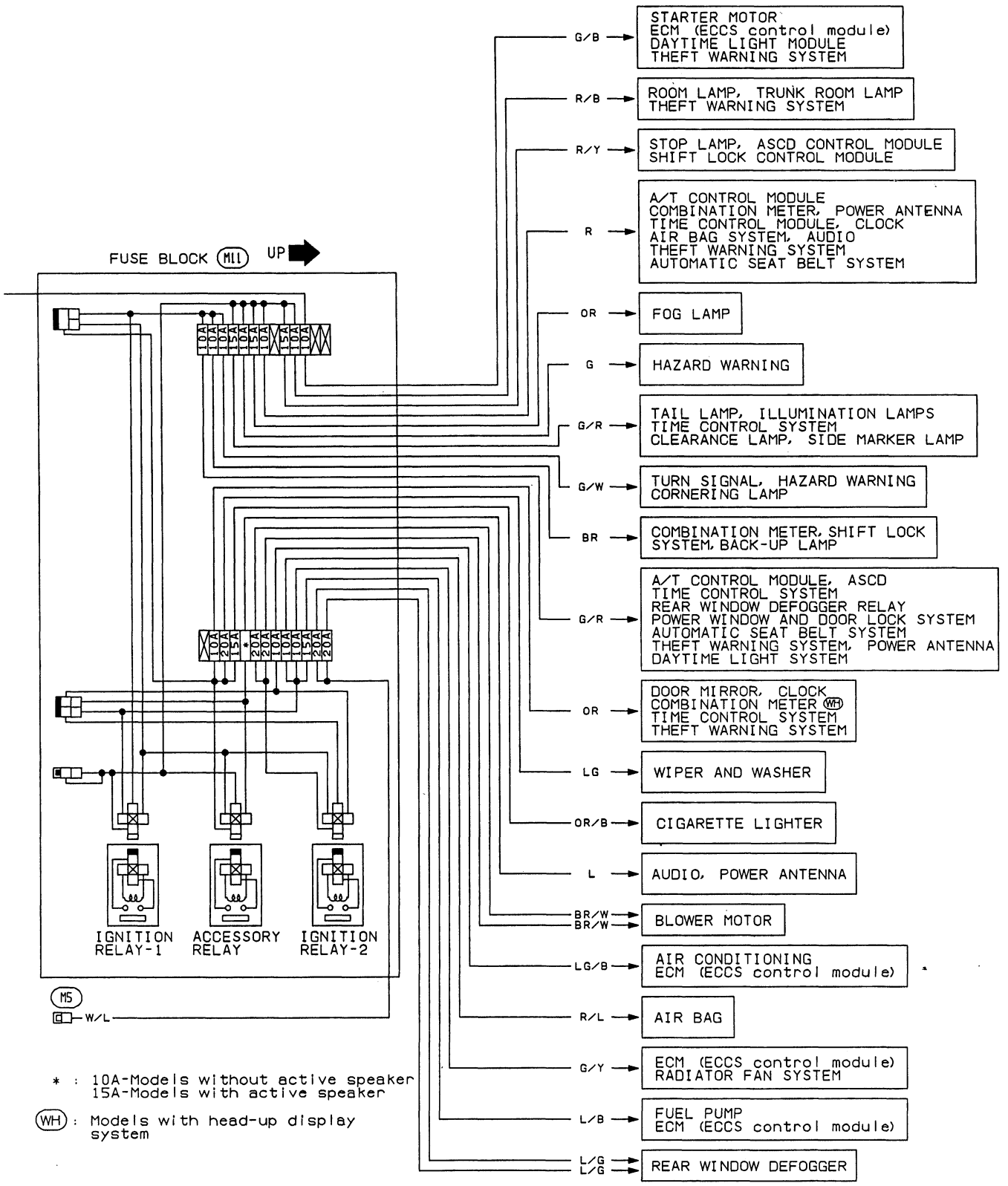
BELT TENSION

- **Refer to MA section ("Checking Drive Belts", "ENGINE MAINTENANCE").**

COMPRESSOR

Model	DKV-14C
Clutch disc-pulley clearance mm (in)	0.3 - 0.6 (0.012 - 0.024)

Wiring Diagram (Cont'd)



MEL312B

Pinion/Clutch Check

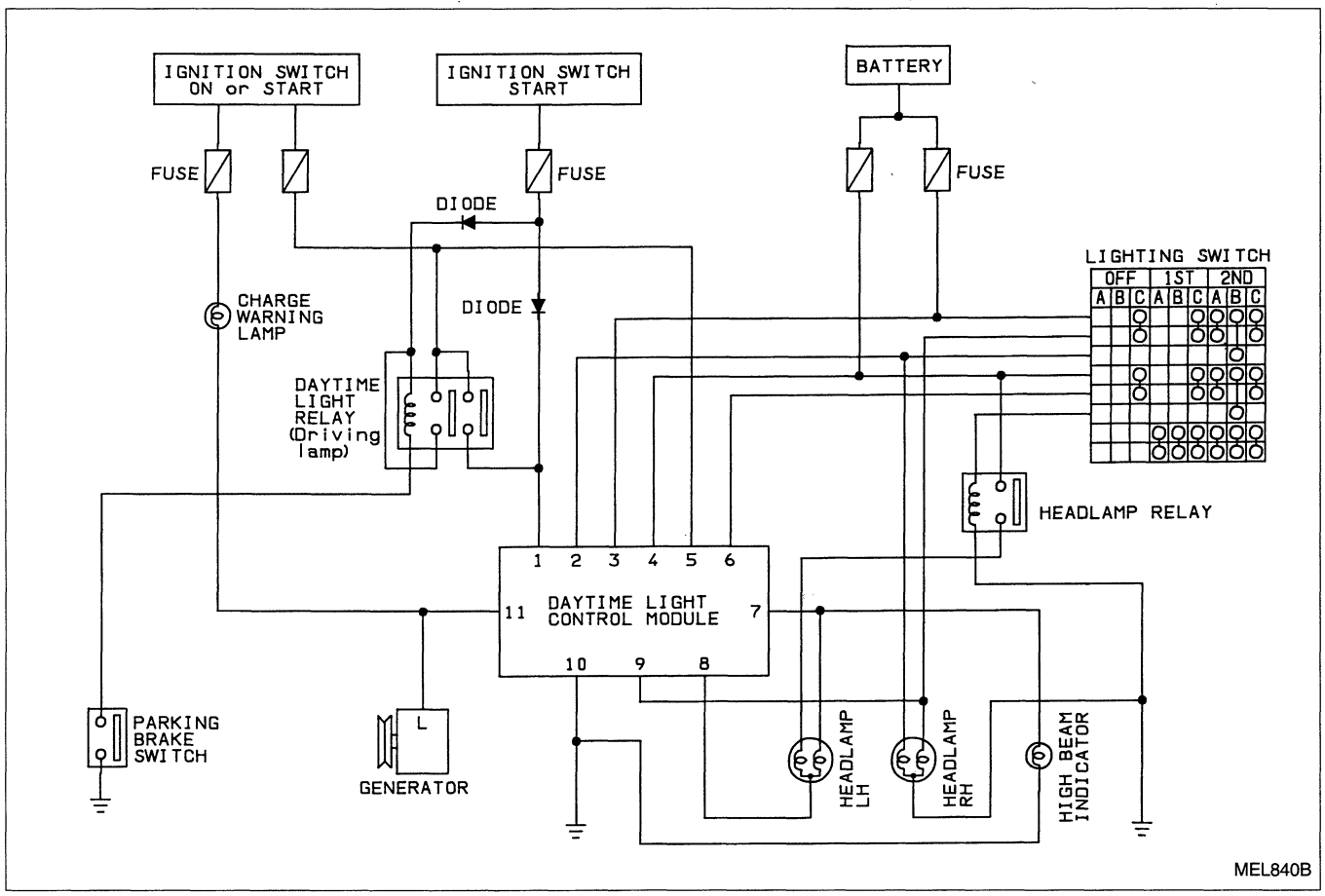
1. Inspect pinion teeth.
- Replace pinion if teeth are worn or damaged. (Also check condition of ring gear teeth.)
2. Inspect reduction gear teeth.
- Replace reduction gear if teeth are worn or damaged. (Also check condition of armature shaft gear teeth.)
3. Check to see if pinion locks in one direction and rotates smoothly in the opposite direction.
- If it locks or rotates in both directions, or unusual resistance is evident. ... Replace.

Service Data and Specifications (SDS)

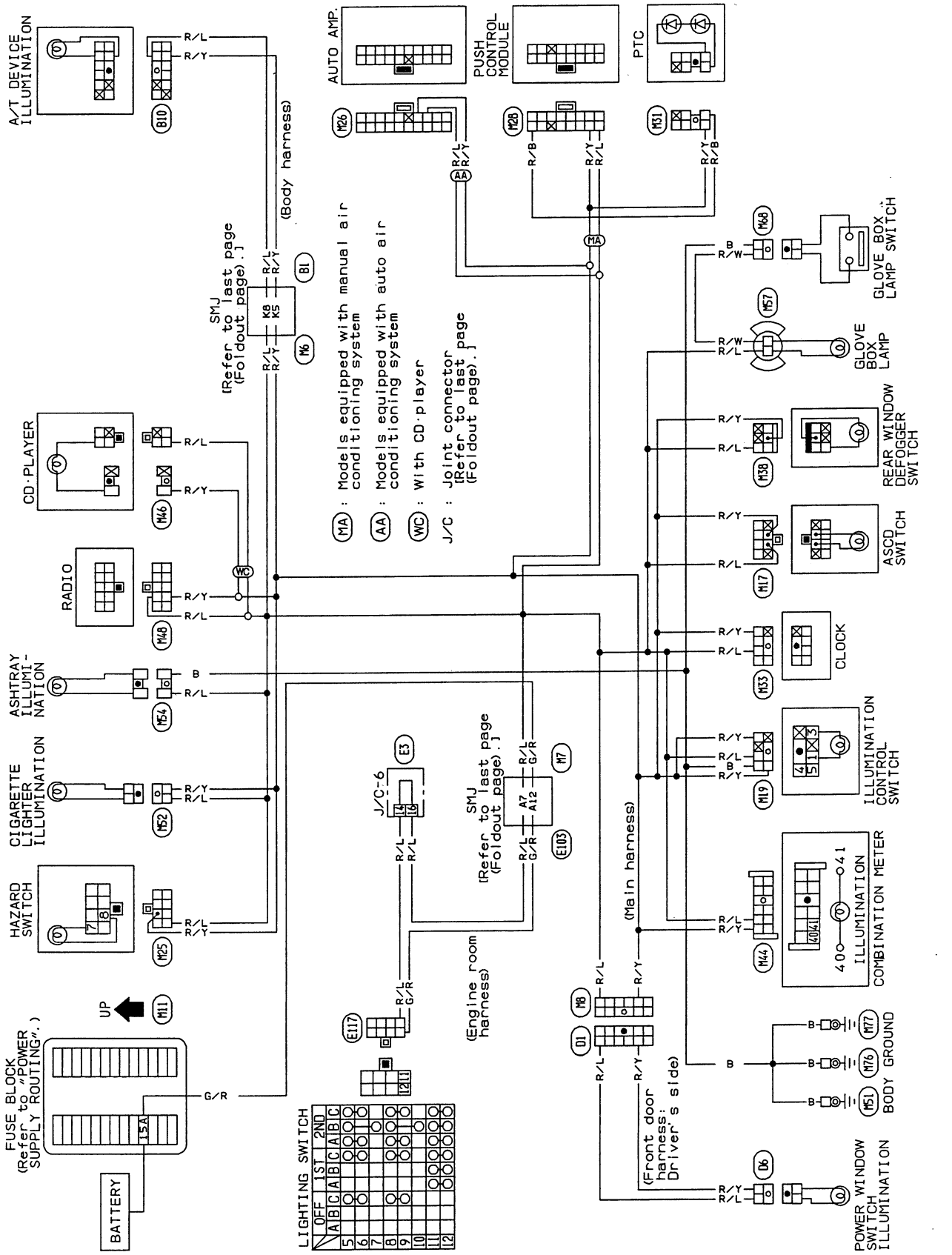
STARTER

Type		M1T73881ZC	S114-754
		MELMAC	HAP
		Reduction gear type	
Applied model		A/T	M/T
System voltage	V	12	
No-load			
Terminal voltage	V	11.0	
Current	A	Less than 88	Less than 85
Revolution	rpm	More than 3,000	More than 2,950
Minimum diameter of commutator	mm (in)	28.8 (1.134)	28.0 (1.102)
Minimum length of brush	mm (in)	12.0 (0.472)	10.5 (0.413)
Brush spring tension	N (kg, lb)	13.7 - 25.5 (1.4 - 2.6, 3.1 - 5.7)	14.7 - 17.7 (1.5 - 1.8, 3.3 - 4.0)
Clearance of bearing metal and armature shaft	mm (in)	—	0.03 - 0.3 (0.0012 - 0.0118)
Clearance "ℓ" between pinion front edge and pinion stopper	mm (in)	0.5 - 2.0 (0.020 - 0.079)	0.05 - 1.5 (0.0020 - 0.0591)
Installed current	A	140	120

Schematic (For Canada)



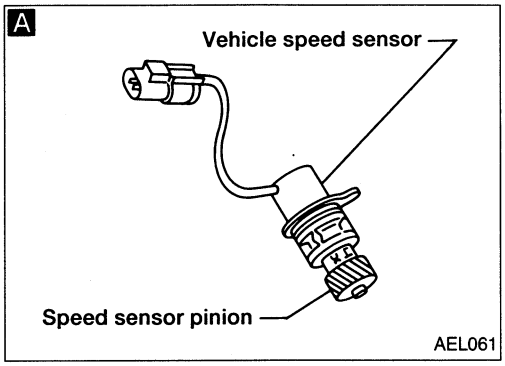
Illumination/Wiring Diagram

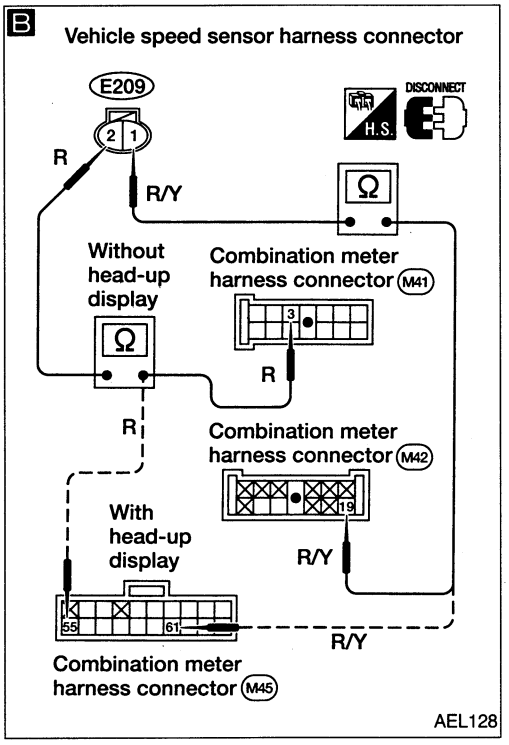


MEL324B

Inspection/Speedometer and Vehicle Speed Sensor (Cont'd)

SYMPTOM: Speedometer indication flutters.





INSPECTION START

↓

Is vehicle speed sensor installed properly? Check looseness and so on. — N.G. → Install vehicle speed sensor properly.

↓ O.K.

A

Do you feel resistance when turning vehicle speed sensor pinion? — No → Replace vehicle speed sensor.

↓ Yes

B

(Without head-up display)
Check continuity between speedometer terminal ⑲ and vehicle speed sensor terminal ①, and between ③ and ②.
(With head-up display)
Check continuity between speedometer terminal ⑥① and vehicle speed sensor terminal ①, and between ⑤⑤ and ②.
Continuity should exist. — N.G. → Repair harness and connector.

↓ O.K.

Replace speedometer.

Inspection/Speedometer and Fuse

SYMPTOM: Speedometer does not go back to 0 km/h (0 MPH).

INSPECTION START

↓

Check fuse related to speedometer. — N.G. → Replace fuse.

↓ O.K.

Drive at over 80 km/h (50 MPH).

↓ N.G.

Replace speedometer.