QUICK REFERENCE INDEX

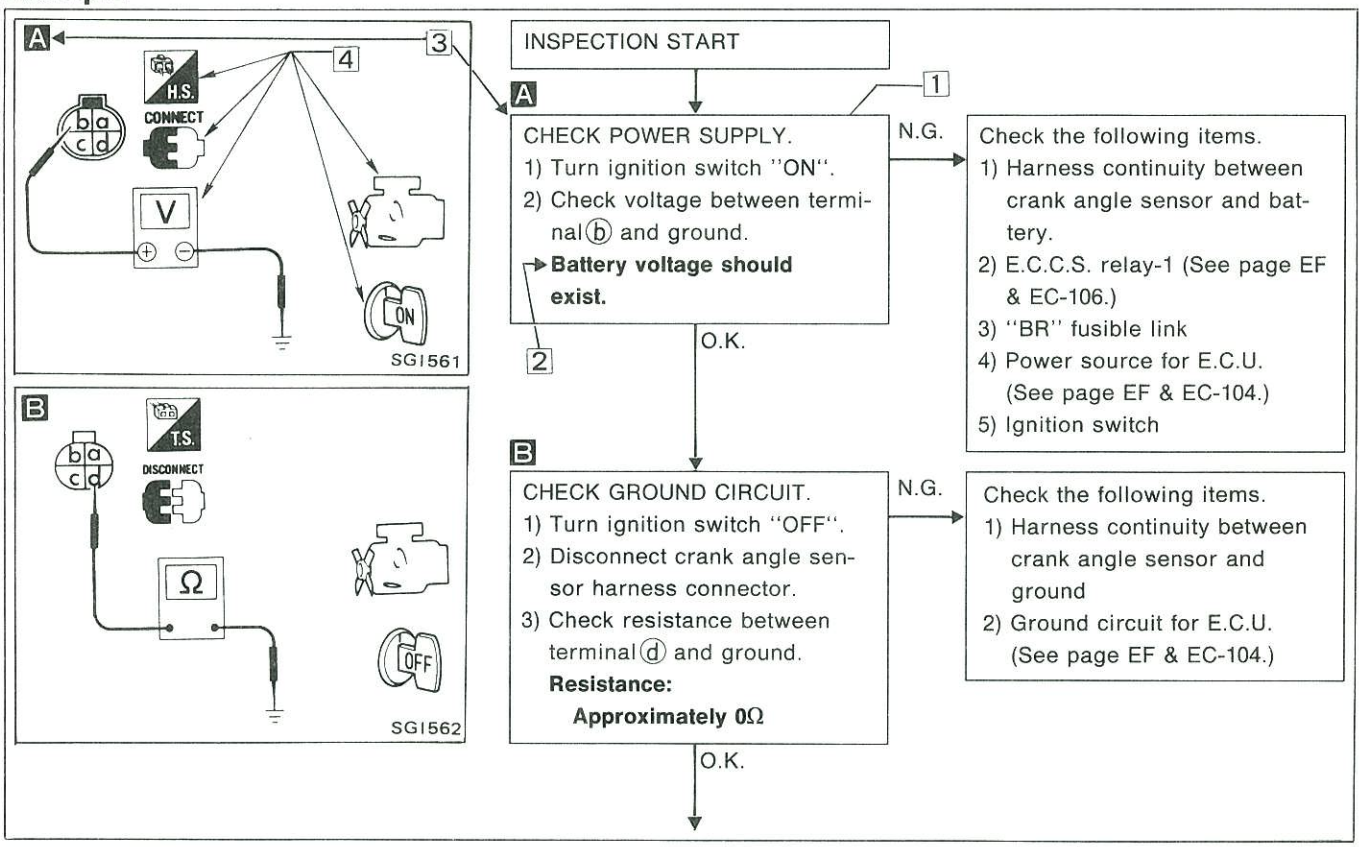
INFINITI®

Q45

MODEL G50 SERIES

INFINITI®

Example



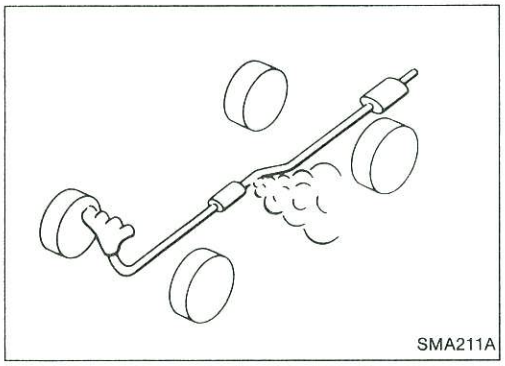
NOTICE

The flow chart indicates work procedures required to diagnose problems effectively. Observe the following instructions before diagnosing.

1) **Use the flow chart after locating probable causes of a problem following the "Preliminary Check" or the "Symptom Chart".**
2) **After repairs, re-check that the problem has been completely eliminated.**
3) **Refer to Component Parts Location and Harness Layout for the Systems described in each section for identification/ location of components and harness connectors.**
4) **Refer to the Circuit Diagram for Quick Pinpoint Check. If you must check circuit continuity between harness connectors in more detail, such as when a sub-harness is used, refer to Wiring Diagram and Harness Layout in EL section for identification of harness connectors.**
5) **When checking circuit continuity, ignition switch should be "OFF".**
6) **Before checking voltage at connectors, check battery voltage.**
7) **After accomplishing the Diagnostic Procedures and Electrical Components Inspection, make sure that all harness connectors are reconnected as they were.**

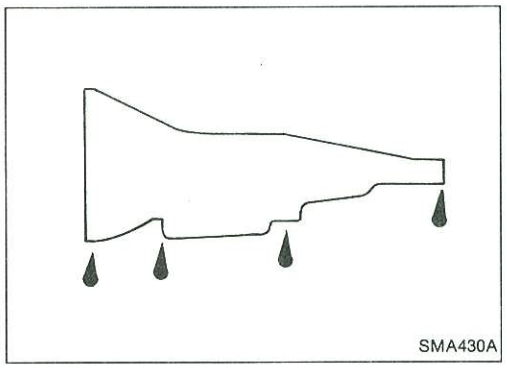
SPECIAL SERVICE TOOL

Tool number (Kent-Moore No.) Tool name	Description
KV10105900 (J34274) Oil filter wrench	


SMA211A

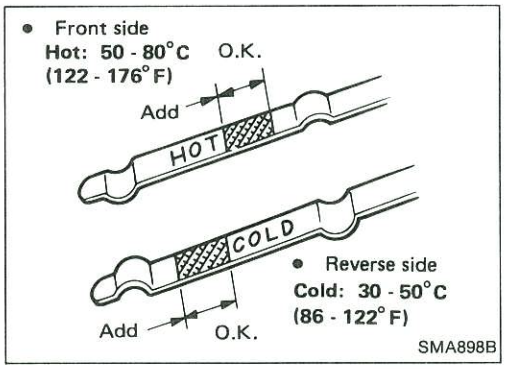
Checking Exhaust System

Check exhaust pipes, muffler and mounting for improper attachment and for leaks, cracks, damage, loose connections, chafing and deterioration.


SMA430A

Checking A/T Fluid

1. Check for fluid leakage.
2. If leakage is found, check fluid level.
   Fluid level should be checked using "HOT" range on dipstick at fluid temperatures of 50 to 80°C (122 to 176°F) after vehicle has been driven approximately 5 minutes in urban areas after engine is warmed up. But it can be checked at fluid temperatures of 30 to 50°C (86 to 122°F) using "COLD" range on dipstick for reference after engine is warmed up and before driving. However, fluid level must be rechecked using "HOT" range.



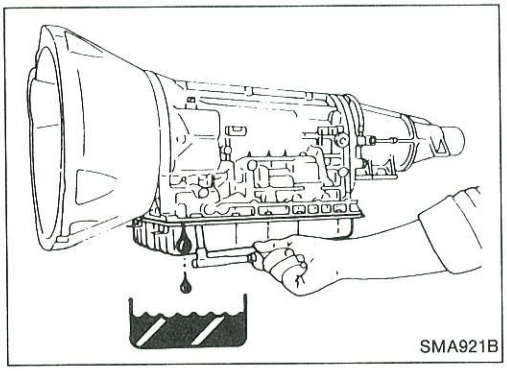
SMA898B

1) Park vehicle on level surface and set parking brake.
2) Start engine and then move selector lever through each gear range, ending in "P".
3) Check fluid level with engine idling.
4) Remove dipstick and wipe it clean with lint-free paper.
5) Reinsert dipstick into charging pipe as far as it will go.
6) Remove dipstick and note reading. If level is at low side of either range, add fluid to the charging pipe.

Do not overfill.


Check fluid for contamination.
SMA853B

3. Check fluid condition.
   Check fluid for contamination. If fluid is very dark or smells burned, or contains frictional material (clutches, band, etc.), check operation of A/T.
   Refer to section AT for checking operation of A/T.

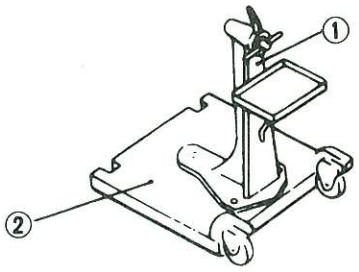
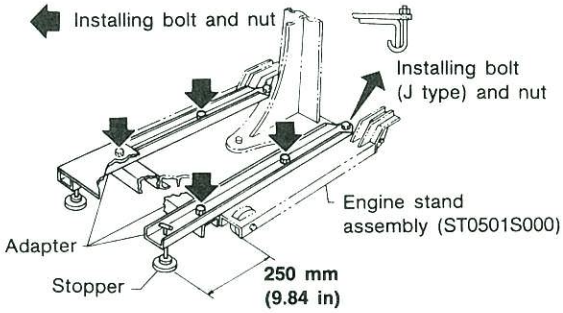
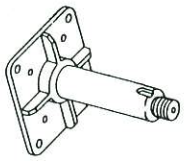
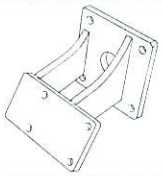
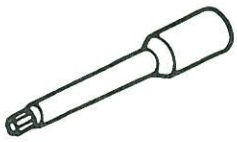
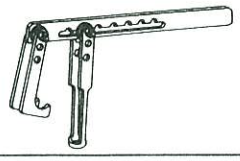
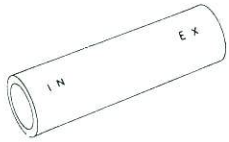

SMA921B

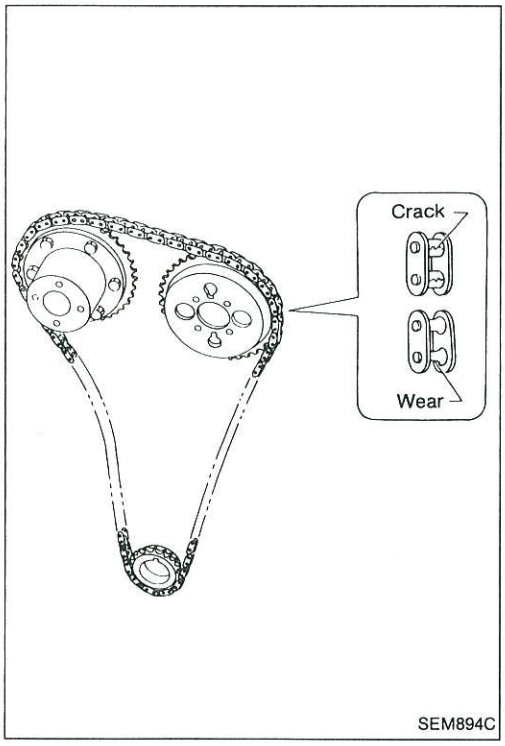
Changing A/T Fluid

1. Drain fluid by removing oil pan.
2. Replace gasket with new one.
3. Refill with fluid and then check fluid level.

Oil capacity (With torque converter):
10.2 ℓ (10-3/4 US qt, 9 Imp qt)

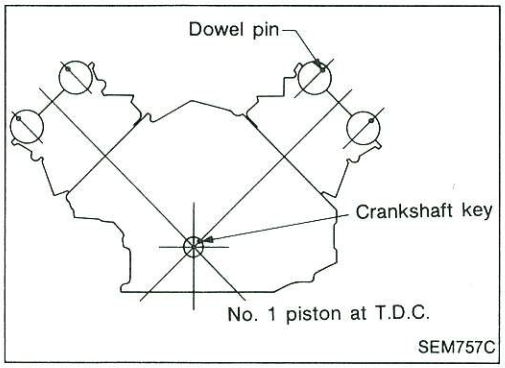
SPECIAL SERVICE TOOLS

Tool number (Kent-Moore No.) Tool name	Description
ST0501S000 (—) Engine stand assembly ① ST05011000 (—) Engine stand ② ST05012000 (—) Base	Disassembling and assembling 
KV10114900 (—) Engine stand support arm	Disassembling and assembling 
KV10106500 (—) Engine stand shaft	
KV10114600 (—) Engine sub-attachment	
ST10120000 (J24239-01) Cylinder head bolt wrench	Loosening and tightening cylinder head bolt 
KV10109210 (—) Valve spring compressor	Disassembling and assembling valve components 
KV10115000 (—) Valve oil seal drift	Installing valve oil seal 



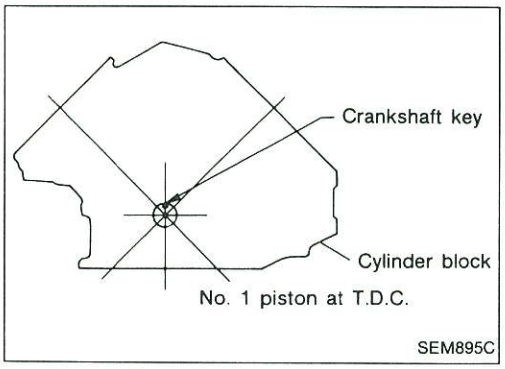
Inspection

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

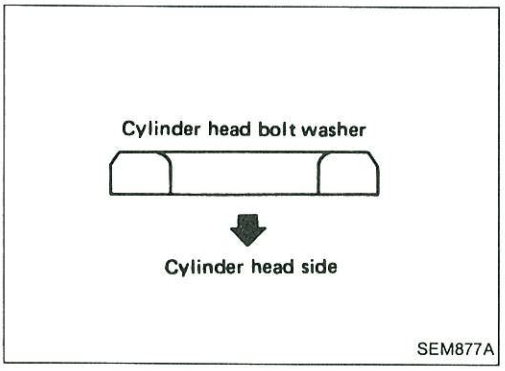


Installation

1. Position crankshaft so that No. 1 piston is set at T.D.C. on compression stroke.



2. Turn crankshaft until No. 1 piston is set at approximately 45° before T.D.C. on compression stroke. (At this point, No. 3 piston will be at the same height as No. 1 piston to prevent interference of valves and pistons.)

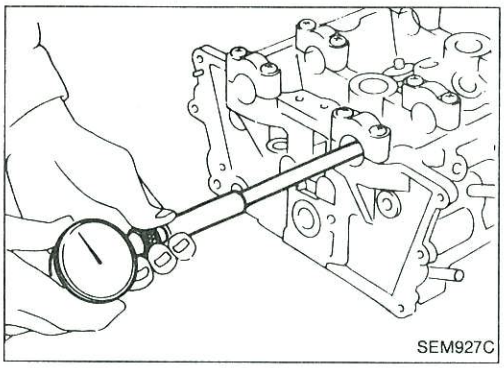


3. Install cylinder heads with new gaskets and temporarily tighten cylinder head bolts for both right and left bank cylinder heads when installing front cover.

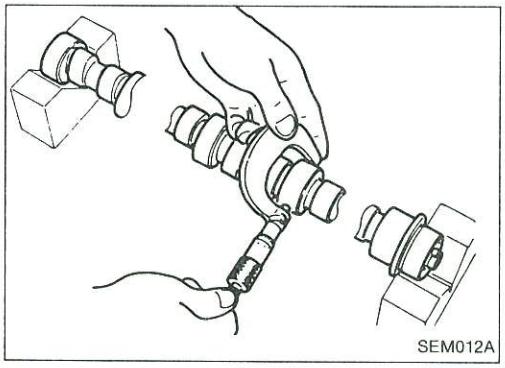
- Temporarily tighten cylinder head bolts. This is necessary to avoid damaging cylinder head gaskets.
- Be sure to install washers between bolts and cylinder head.
- Do not rotate crankshaft and camshaft separately, or valves will hit piston heads.

Inspection (Cont'd)

CAMSHAFT JOURNAL CLEARANCE

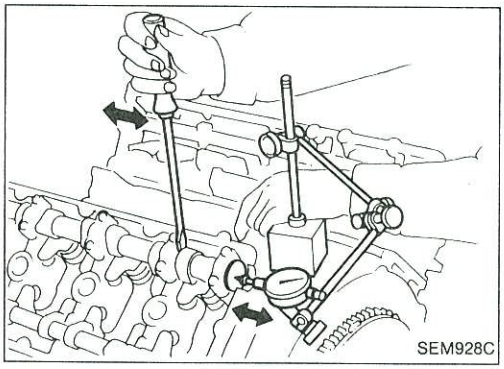

SEM927C

1. Install camshaft bracket and tighten bolts to the specified torque.
2. Measure inner diameter of camshaft bearing.
   Standard inner diameter:
   26.000 - 26.021 mm (1.0236 - 1.0244 in)


SEM012A

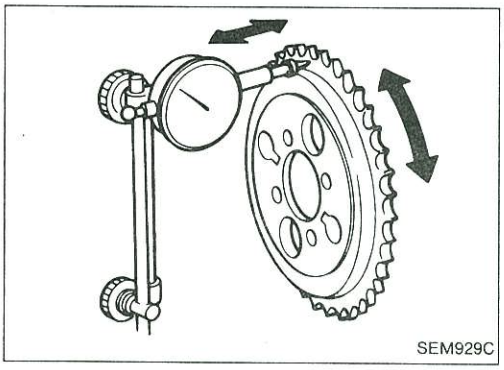
3. Measure outer diameter of camshaft journal.
   Standard outer diameter:
   25.935 - 25.955 mm (1.0211 - 1.0218 in)
4. If clearance exceeds the limit, replace camshaft and/or cylinder head.
   Camshaft journal clearance:
   Standard
   0.045 - 0.086 mm (0.0018 - 0.0034 in)
   Limit
   0.15 mm (0.0059 in)

CAMSHAFT END PLAY


SEM928C

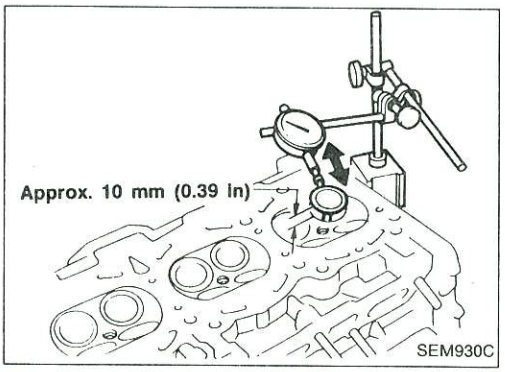
1. Install camshaft and thermostat housing in cylinder head.
2. Measure camshaft end play.
   Camshaft end play:
   Standard
   0.070 - 0.148 mm (0.0028 - 0.0058 in)
   Limit
   0.20 mm (0.0079 in)

CAMSHAFT SPROCKET RUNOUT


SEM929C

1. Install sprocket on camshaft.
2. Measure camshaft sprocket runout.
   Runout (Total indicator reading):
   Limit 0.15 mm (0.0059 in)
3. If it exceeds the limit, replace camshaft sprocket.

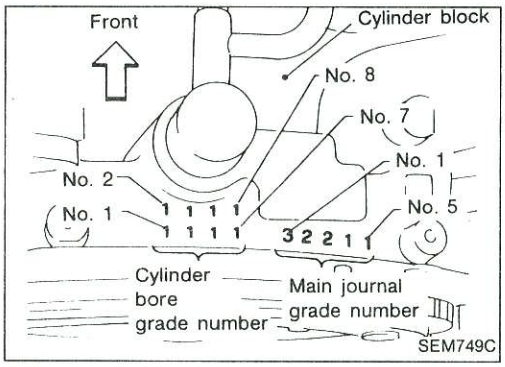
VALVE GUIDE CLEARANCE



SEM930C

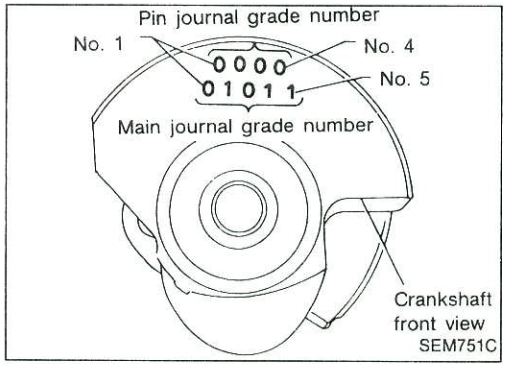
1. Measure valve deflection in a parallel direction with rocker arm. (Valve and valve guide mostly wear in this direction.)
   Valve deflection limit (Dial gauge reading):
   Intake & Exhaust
   0.15 mm (0.0059 in)

Inspection (Cont'd)



8. If crankshaft is reused, measure main bearing clearances and select thickness of main bearings.
   If crankshaft is replaced with a new one, it is necessary to select thickness of main bearings as follows:

a. Grade number of each cylinder block main journal is punched on the respective cylinder block.



b. Grade number of each crankshaft main journal is punched on the respective crankshaft.

c. Select main bearing with suitable thickness according to the following table.

How to select main bearings (Identification mark and color)

Crankshaft journal grade number \ Main journal grade number	0	1	2	3
0	0 (A, Black)	1 (B, Brown)	2 (C, Green)	3 (D, Yellow)
1	1 (B, Brown)	2 (C, Green)	3 (D, Yellow)	4 (E, Blue)
2	2 (C, Green)	3 (D, Yellow)	4 (E, Blue)	5 (F, Pink)
3	3 (D, Yellow)	4 (E, Blue)	5 (F, Pink)	6 (G, –)

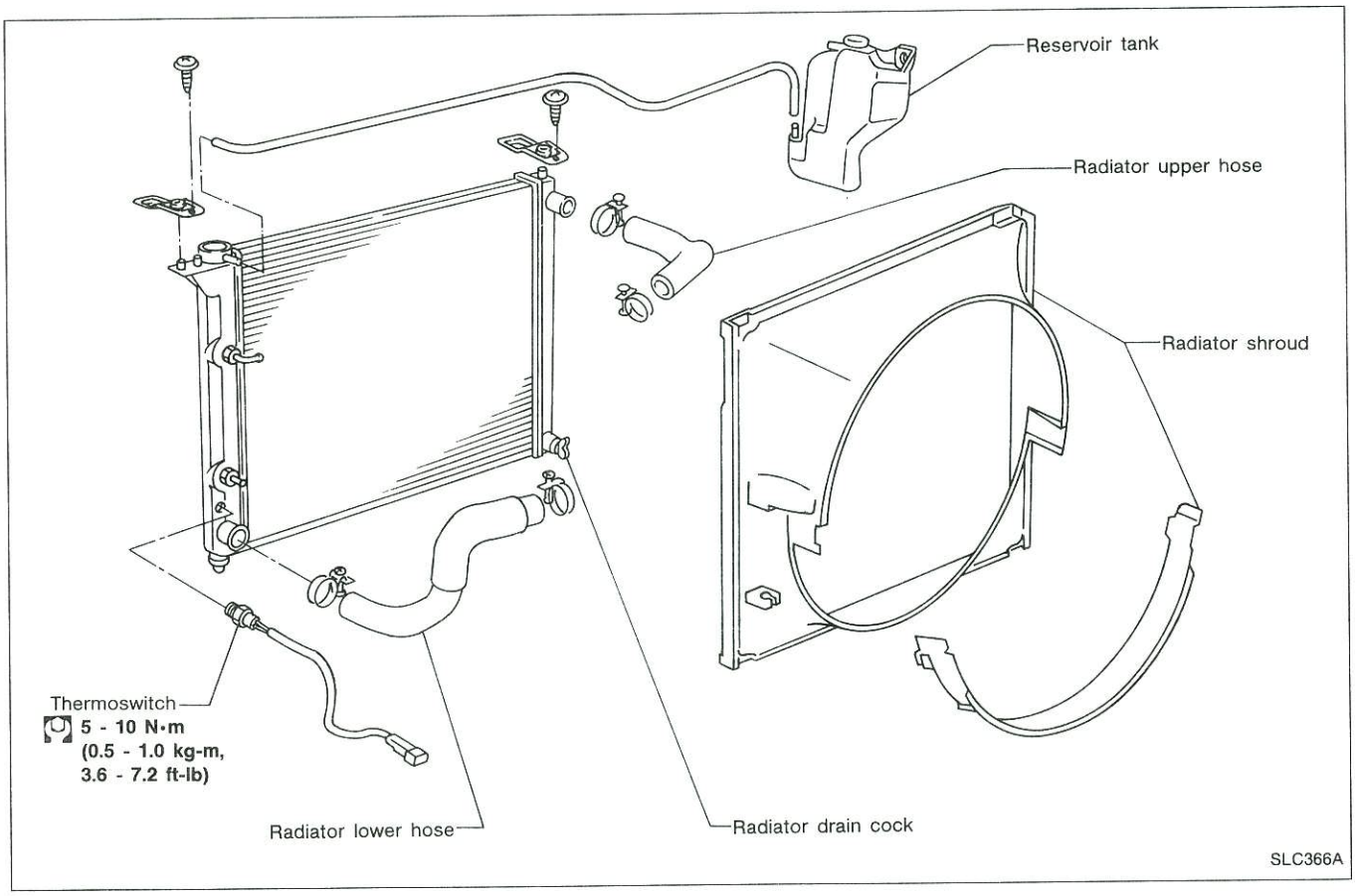
For example:
Main journal grade number: 1
Crankshaft journal grade number: 2
Main bearing grade number = 1 + 2
= 3 (D, Yellow)

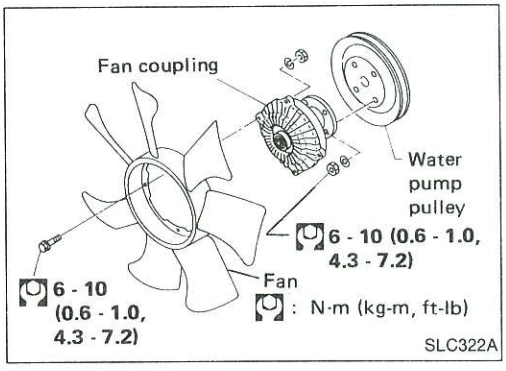
ENGINE LUBRICATION & COOLING SYSTEMS

SECTION LC

CONTENTS

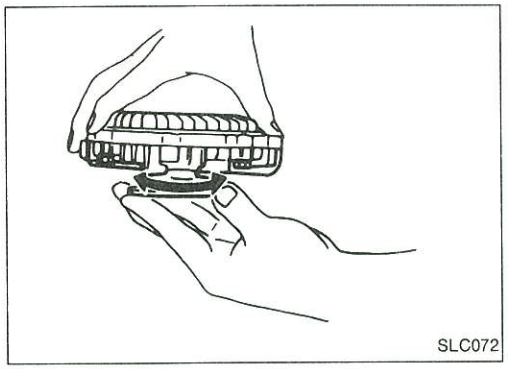
Radiator





Cooling Fan

DISASSEMBLY AND ASSEMBLY

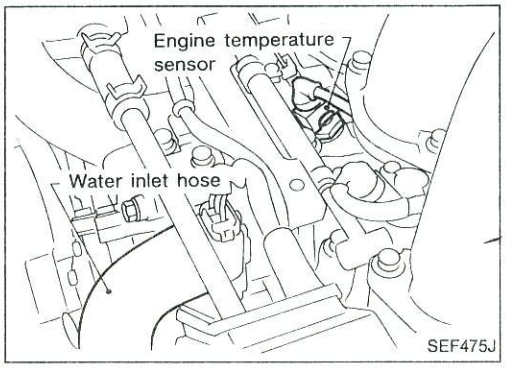


INSPECTION

Check fan coupling for rough operation, oil leakage or bent bimetal.

Air Flow Meter (Cont'd)

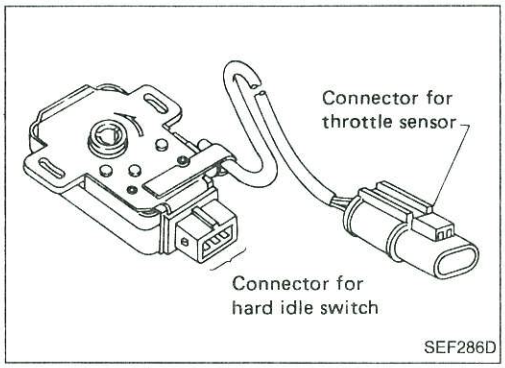
Therefore, it is necessary to supply the hot film with more electric current in order to maintain the temperature of the hot film. The E.C.U. detects the air flow by means of this current change.



Engine Temperature Sensor

The engine temperature sensor, located on the top of thermostat housing, detects engine coolant temperature and transmits a signal to the E.C.U.

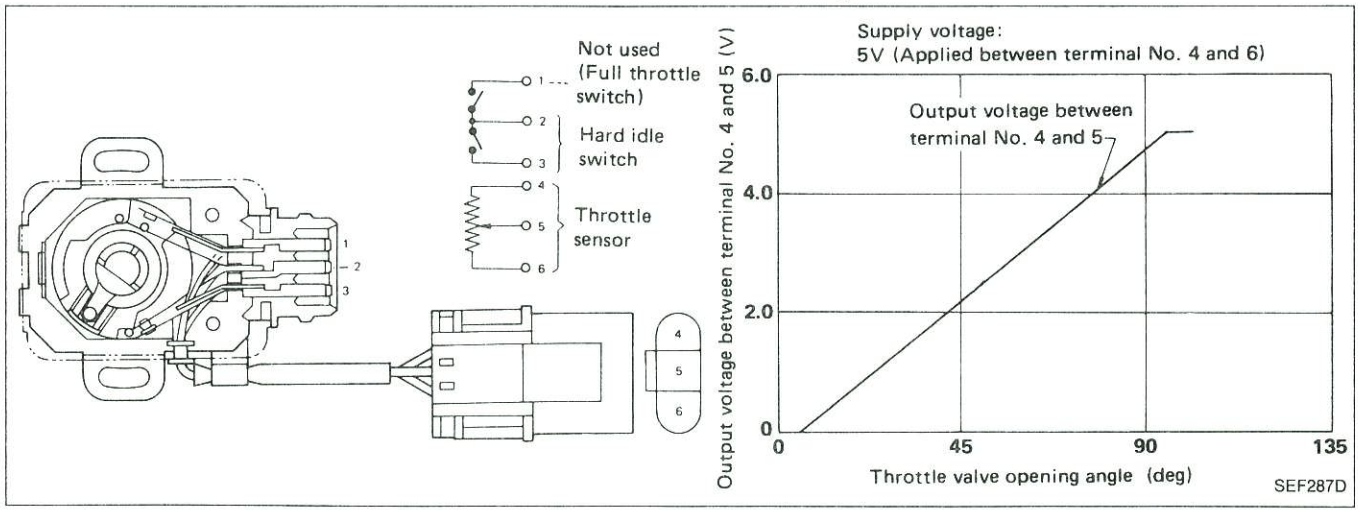
The temperature sensing unit employs a thermistor which is sensitive to the change in temperature. Electrical resistance of the thermistor decreases in response to the temperature rise.



Throttle Sensor & Soft/Hard Idle Switch

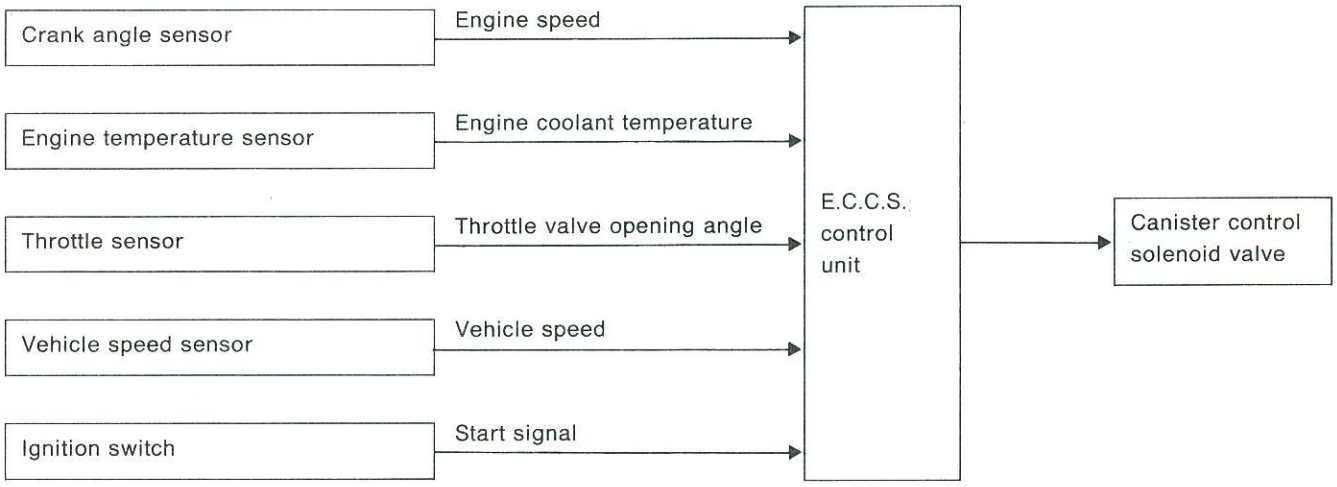
The throttle sensor responds to accelerator pedal movement. This sensor is a kind of potentiometer which transforms the throttle valve position into output voltage, and emits the voltage signal to the E.C.U. In addition, the sensor detects the opening and closing speed of the throttle valve and feeds the voltage signal to the E.C.U.

Idle position of the throttle valve is determined by the E.C.U. receiving the signal from the throttle sensor. This system is called "soft idle switch". It controls engine operation such as fuel cut. On the other hand, "hard idle switch", which is built in the throttle sensor unit, is used for engine control when soft idle switch is malfunctioning.



Canister Control

INPUT/OUTPUT SIGNAL LINE



SYSTEM DESCRIPTION

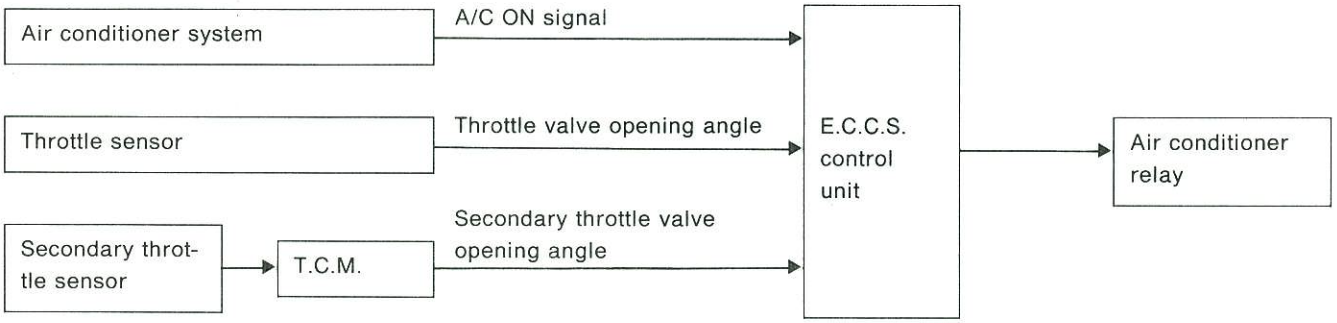
Also a system is provided which precisely cuts and controls the port vacuum applied to the canister to suit engine operating conditions.
This cut-and-control operation is accomplished through the E.C.U. When the E.C.U. detects any of the following conditions, current flows through the solenoid valve in the canister control vacuum line.

This causes the port vacuum to be discharged into the atmosphere so that the canister remains closed.

1) Start switch "ON"
2) Idle position
3) Low and high engine temperature
4) During deceleration
5) Engine stopped
6) Vehicle speed: below 20 km/h (12MPH)

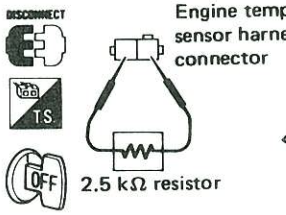
Acceleration Cut Control

INPUT/OUTPUT SIGNAL LINE



SYSTEM DESCRIPTION

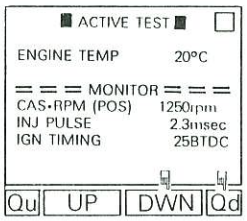
When the accelerator pedal is fully depressed, the air conditioner is turned off for a few seconds. This system improves acceleration when the air conditioner is used.



SEC242B

Ⓖ

1) Select "ENGINE TEMP" in "ACTIVE TEST" mode.
2) Set "ENGINE TEMP" to 20°C (68°F) by touching "DWN" and "Qd".

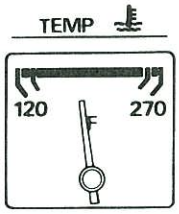


SEF878J

OR

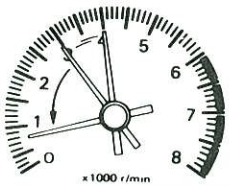
1) Disconnect engine temperature sensor harness connector.
2) Connect a resistor (2.5 kΩ) between terminals of engine temperature sensor harness connector.

Start engine and warm it up until water temperature indicator points to the middle of gauge.



SEF246F

Race engine two or three times under no-load, then run engine at idle speed.



SEF248F

Check "CO" %.

Idle CO: 0.2 ~ 8%

After checking CO%,
1) Disconnect the resistor from terminals of engine temperature sensor.
2) Connect engine temperature sensor harness connector to engine temperature sensor.

O.K. → Ⓙ

N.G.

Connect exhaust gas sensor harness connector to exhaust gas sensor.

Check fuel pressure regulator. ← Ⓚ

Check air flow meter.

Check injector.
Clean or replace if necessary.

Check engine temperature sensor.

Check E.C.U. function* by substituting another known good E.C.U. → Ⓗ

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

Self-diagnosis — Mode II (Self-diagnostic results) (Cont'd)

HOW TO ERASE SELF-DIAGNOSTIC RESULTS

The malfunction code is erased from the backup memory on the E.C.U. when the diagnostic mode is changed from Mode II to Mode I. (Refer to "HOW TO SWITCH MODES".)

- **When the battery terminal is disconnected, the malfunction code will be lost from the backup memory within 24 hours.**
- **Do not erase the stored memory before beginning self-diagnosis.**

Self-diagnosis — Mode II (Exhaust gas sensor monitor)

DESCRIPTION

In this mode, the CHECK ENGINE LIGHT and RED L.E.D. display the condition of the fuel mixture (lean or rich) which is monitored by the exhaust gas sensor.

CHECK ENGINE LIGHT and RED L.E.D.	Fuel mixture condition in the exhaust gas	Air fuel ratio feedback control condition
ON	Lean	Closed loop control
OFF	Rich	
*Remains ON or OFF	Any condition	Open loop control

*: Maintain conditions just before switching to open loop.

If two exhaust gas sensors (right bank and left bank) are fitted on the engine, the left bank exhaust gas sensor monitor operates first, when selecting this mode.

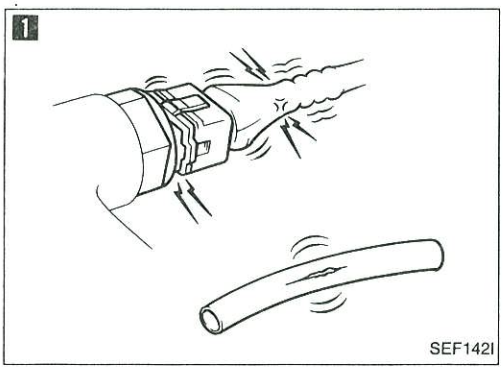
HOW TO CHANGE MONITOR FROM LEFT BANK (Right bank) TO RIGHT BANK (Left bank)

1. Turn diagnostic mode selector on E.C.U. fully clockwise.
2. Wait at least 2 seconds.
3. Turn diagnostic mode selector on E.C.U. fully counterclockwise.

- These procedures should be carried out when the engine is running.

Basic Inspection

1



BEFORE STARTING

1. Check service records for any recent repairs that may indicate a related problem, or the current need for scheduled maintenance.
2. Open engine hood and check the following:

- Harness connectors for proper connections
- Vacuum hoses for splits, kinks, and proper connections
- Wiring for proper connections, pinches, and cuts

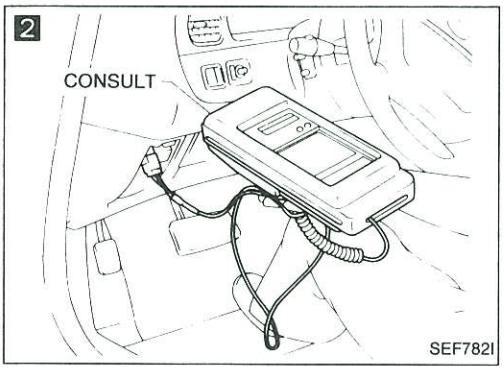
↓

2

CONNECT CONSULT TO THE VEHICLE.
Connect "CONSULT" to the diagnostic connector and select "ENGINE" from the menu. (Refer to page EF & EC-57.)

↓

2



3

DOES ENGINE START? — No → GO TO 6

Yes ↓

4

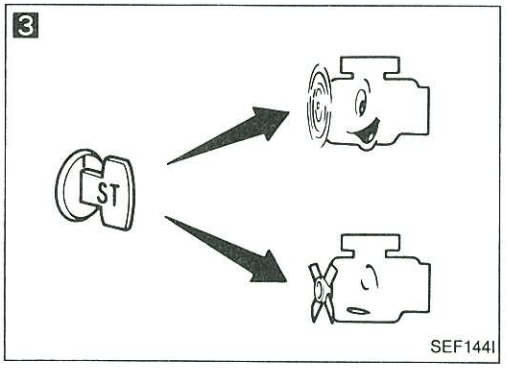
CHECK IGNITION TIMING.
Warm up engine sufficiently and check ignition timing at idle using timing light. (Refer to page EF & EC-33.)
Ignition timing: 15° ± 2° B.T.D.C.

N.G. → Adjust ignition timing by turning crank angle sensor.

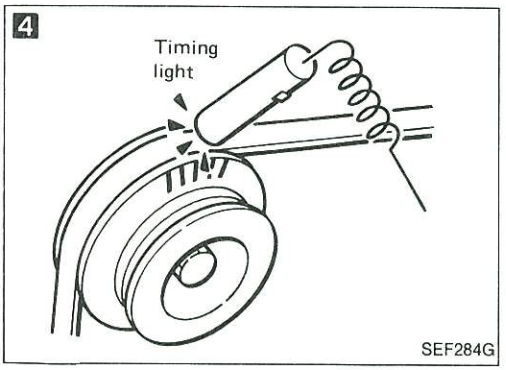
O.K. ↓

(Go to Ⓐ on next page.)

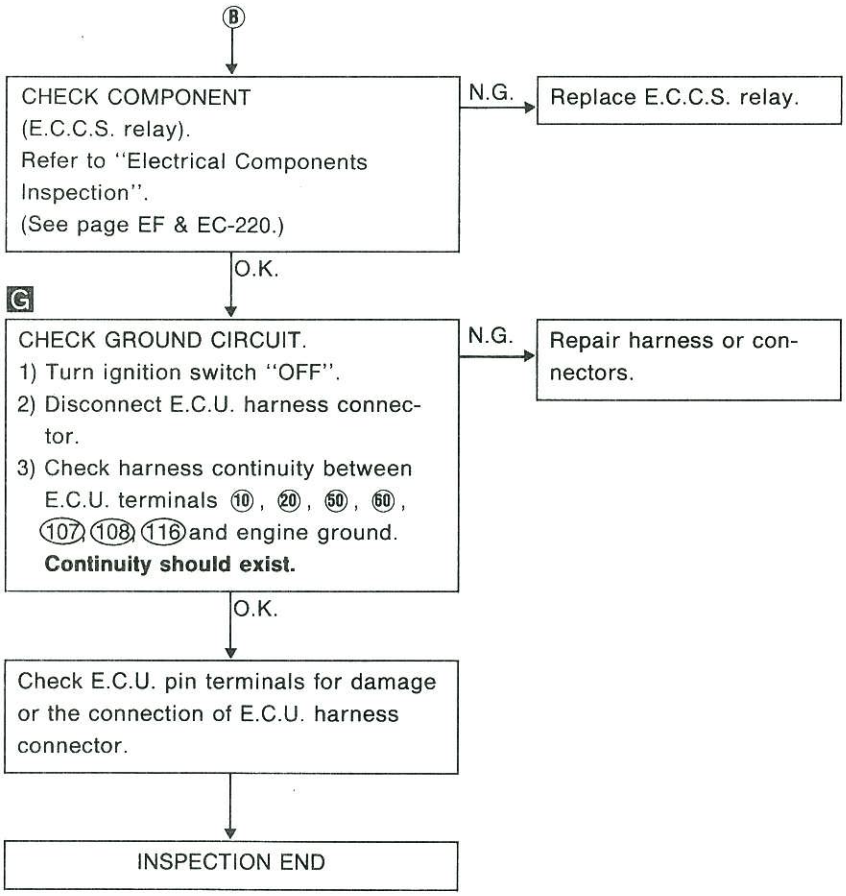
3



4

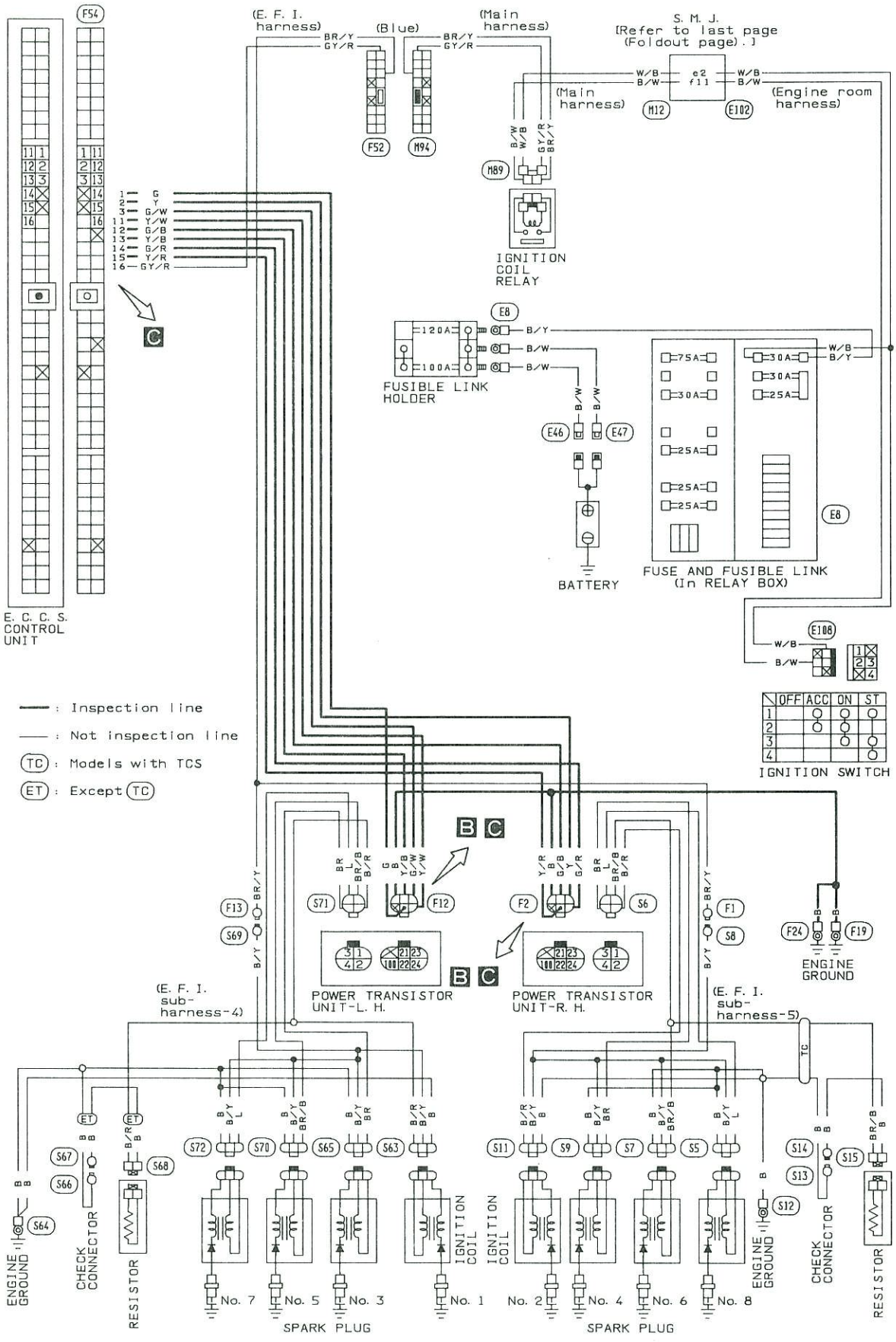


MAIN POWER SUPPLY AND GROUND CIRCUIT (Not self-diagnostic item)



Diagnostic Procedure 7

IGNITION SIGNAL (Code No. 21)

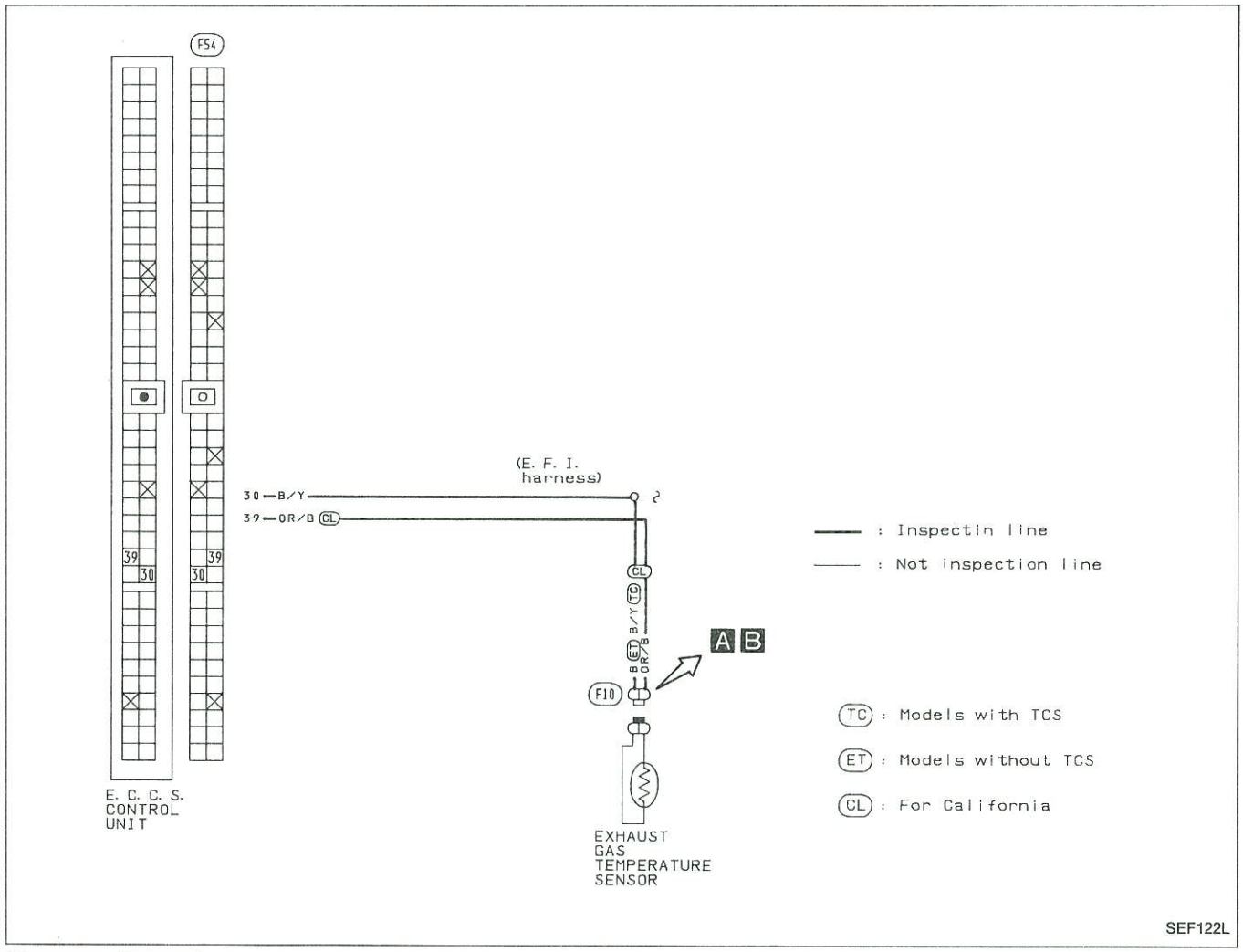


MEF805B

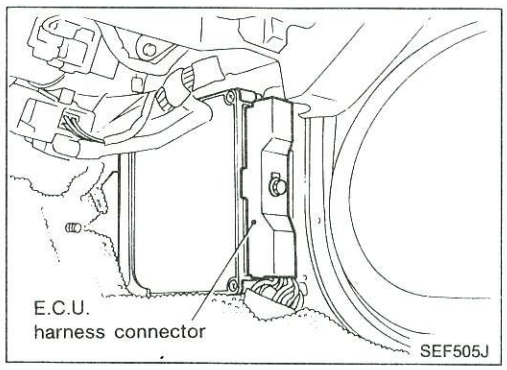
Diagnostic Procedure 12

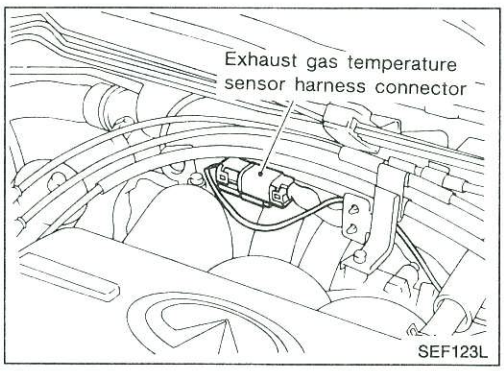
EXHAUST GAS TEMPERATURE SENSOR (Code No. 35) (Check engine light item):

California models only



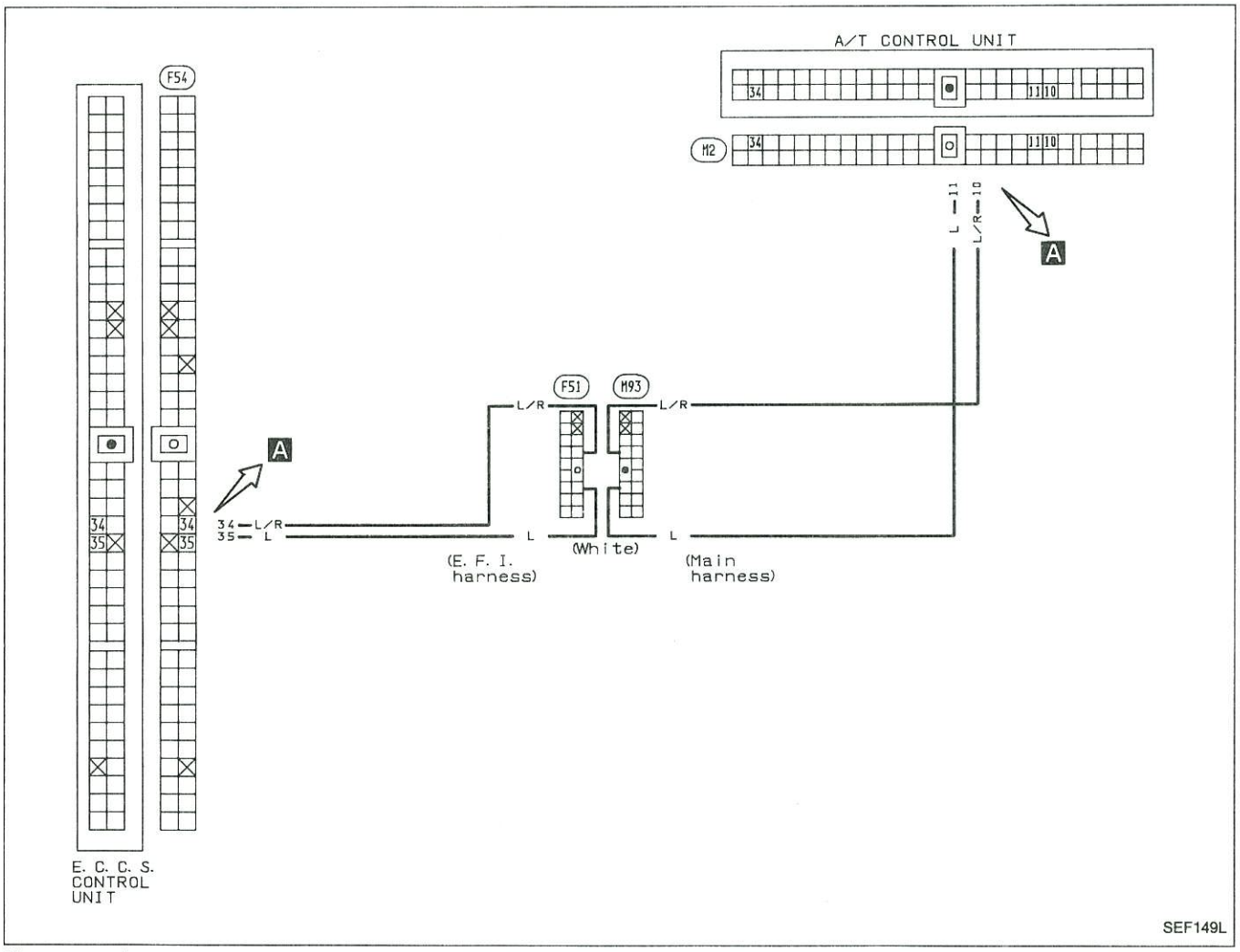
Harness layout



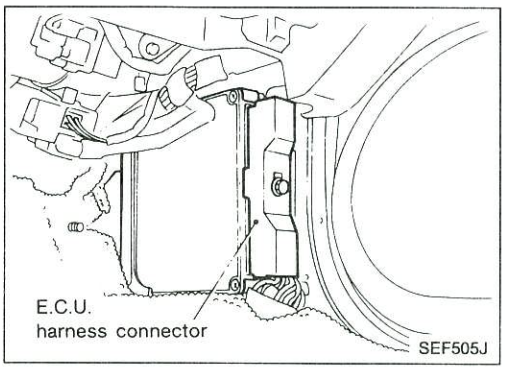


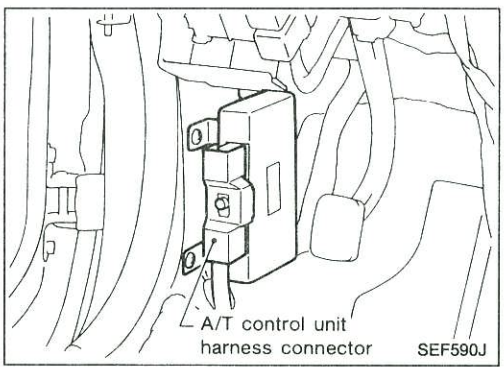
Diagnostic Procedure 17

A/T CONTROL (Code No. 54)



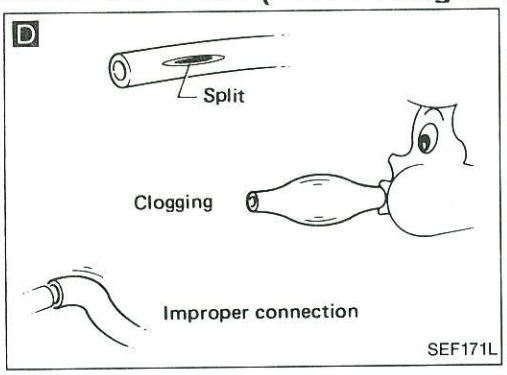
Harness layout





E.G.R. CONTROL (Not self-diagnostic item)

D



Ⓐ

E

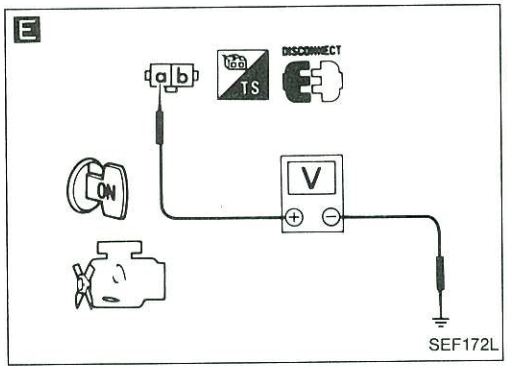
CHECK POWER SUPPLY.
1) Stop engine.
2) Disconnect E.G.R. control solenoid valve harness connector.
3) Turn ignition switch "ON".
4) Check voltage between terminal ⓐ and ground with CONSULT or tester.
Voltage: Battery voltage

N.G. → Check the following.
- Harness connectors (F52), (M94)
- 10A fuse
- Harness continuity between E.G.R. control solenoid valve and fuse

If N.G., repair harness or connectors.

O.K. ↓

E



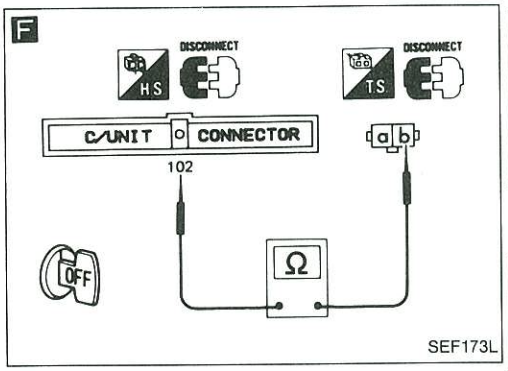
F

CHECK OUTPUT SIGNAL CIRCUIT.
1) Turn ignition switch "OFF".
2) Disconnect E.C.U. harness connector.
3) Check harness continuity between E.C.U. terminal (102) and terminal ⓑ.
Continuity should exist.

N.G. → Repair harness or connectors.

O.K. ↓

F



CHECK COMPONENT
(E.G.R. control solenoid valve).
Refer to "Electrical Components Inspection".
(See page EF & EC-215.)

N.G. → Replace E.G.R. control solenoid valve.

O.K. ↓

Check E.C.U. pin terminals for damage or the connection of E.C.U. harness connector.

California models →

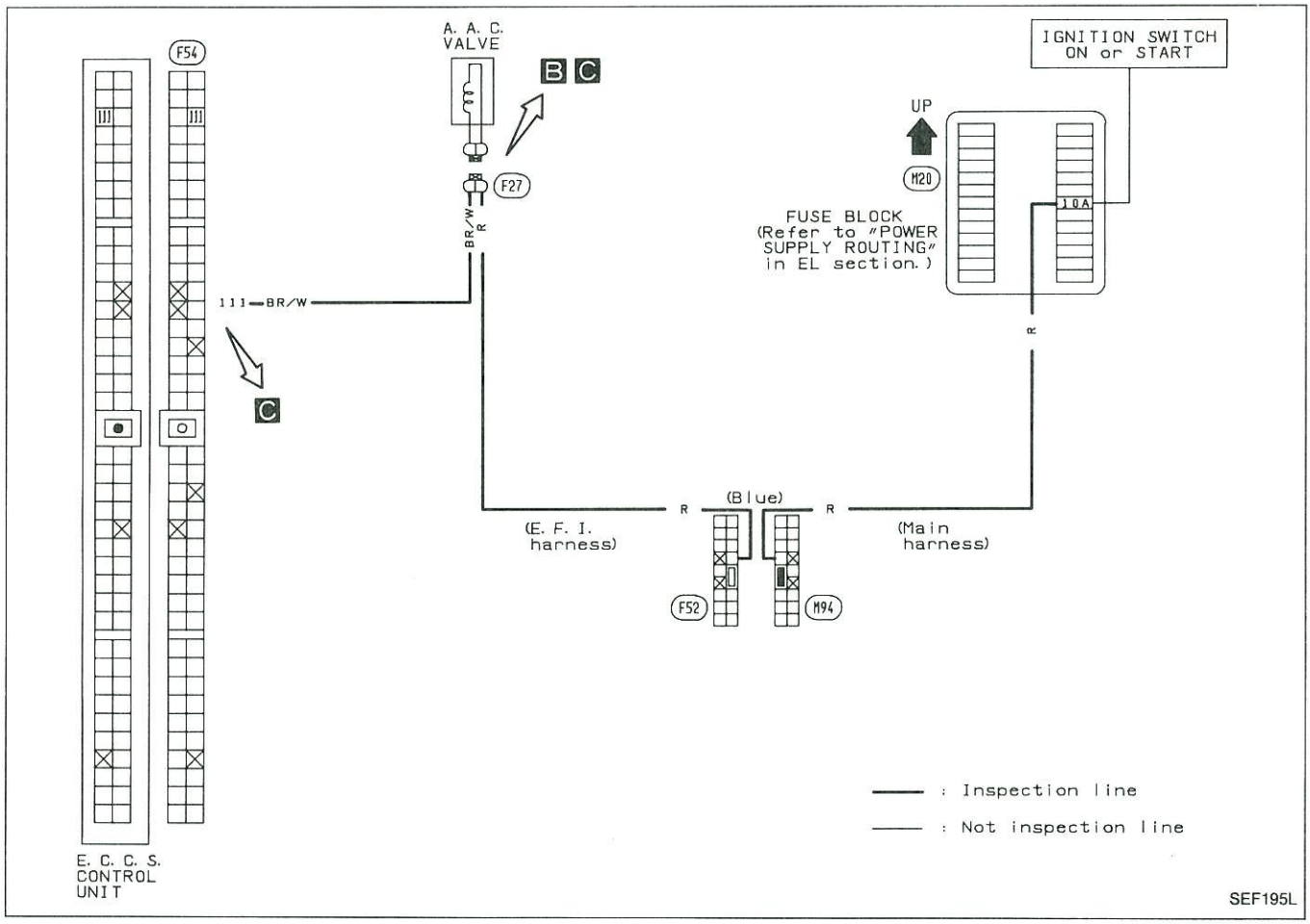
Check resistance of exhaust gas temperature sensor.
(See page EF & EC-216.)

Non-California models →

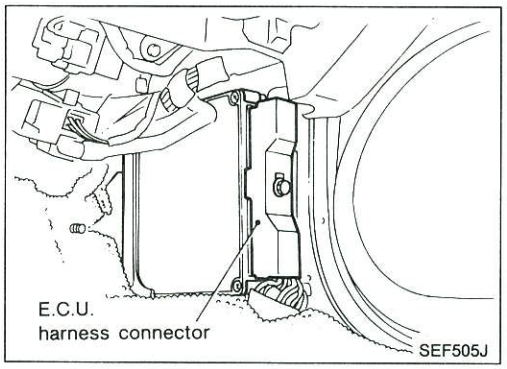
INSPECTION END

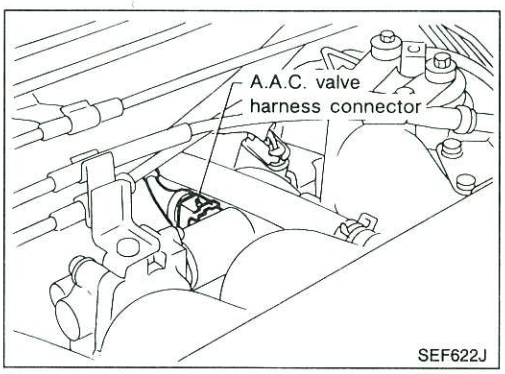
Diagnostic Procedure 27

A.A.C. VALVE (Not self-diagnostic item)

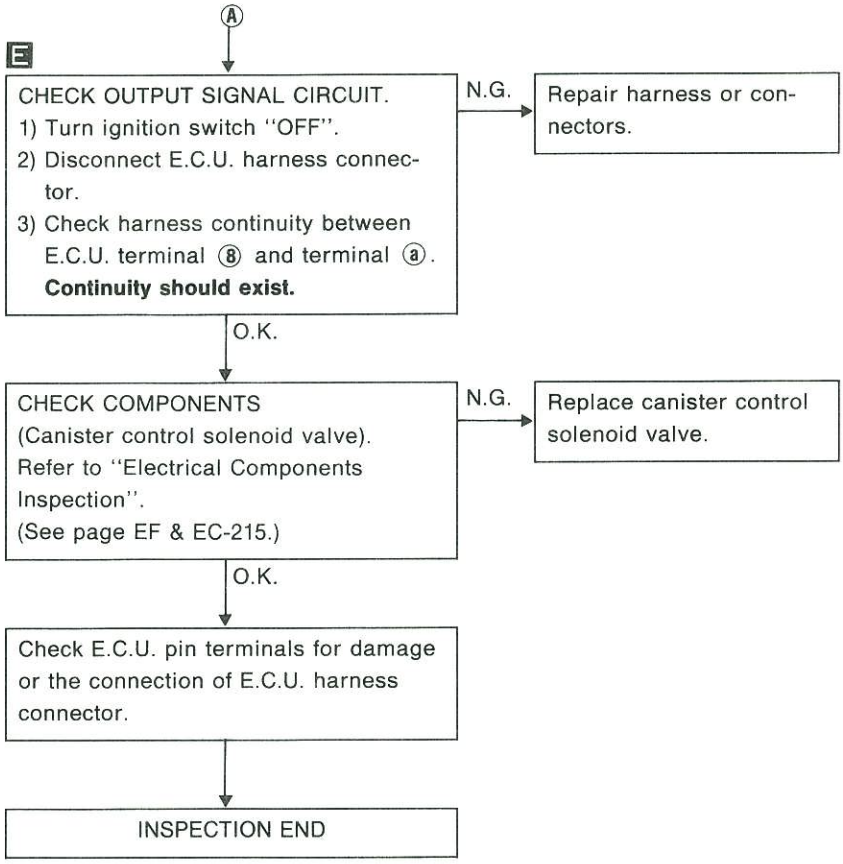


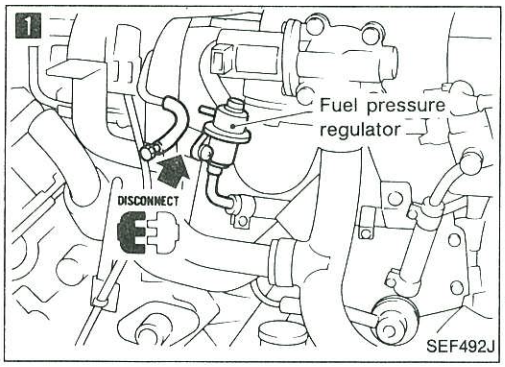
Harness layout

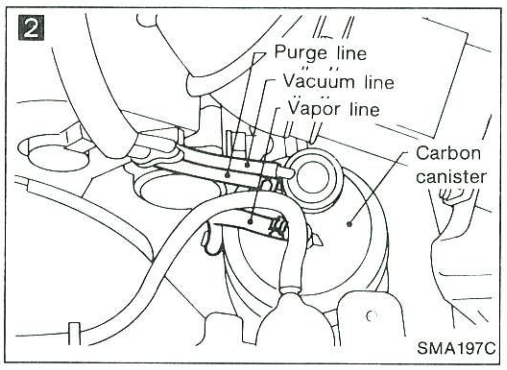




CANISTER PURGE CONTROL (Not self-diagnostic item)







Diagnostic Procedure 38 — Symptom — Hesitation when the Engine is Hot

1

CHECK FUEL VAPOR.
1. Disconnect fuel pressure regulator vacuum hose and plug hose.
2. Perform cruise test.
3. Does the hesitation disappear?

Yes → Check fuel properties.

No ↓

2

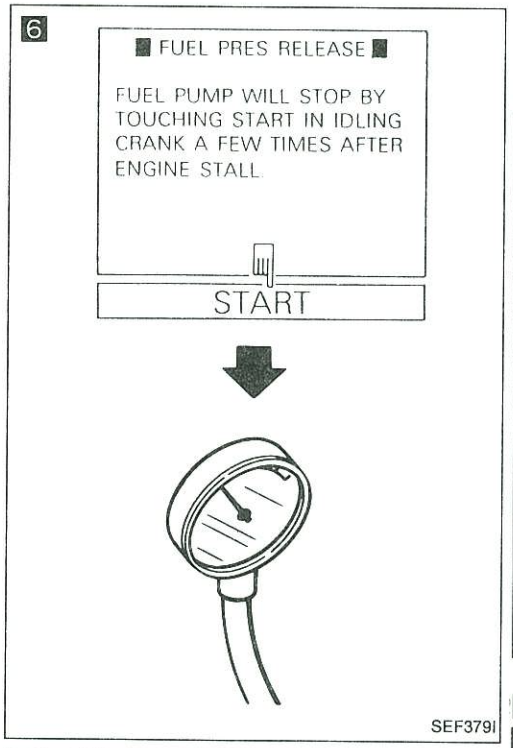
CHECK CANISTER PURGE.
1. Disconnect canister purge line hose and plug hose.
2. Perform cruise test.
3. Does the hesitation disappear?

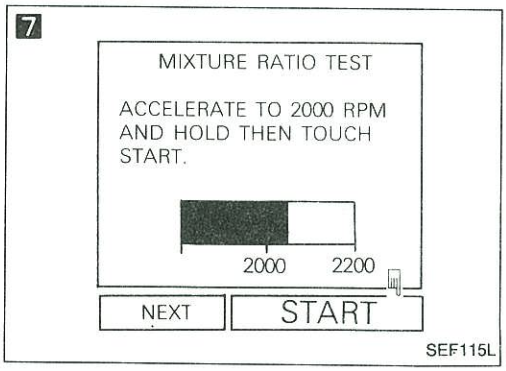
Yes → Check purge and vacuum lines.

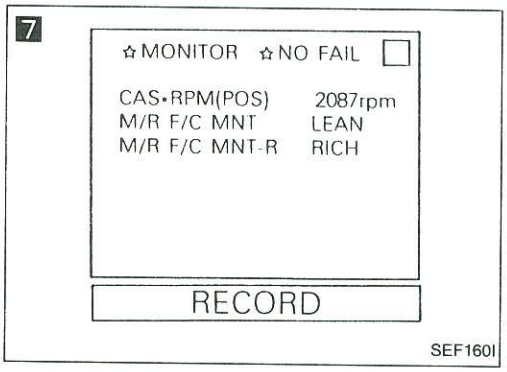
No ↓

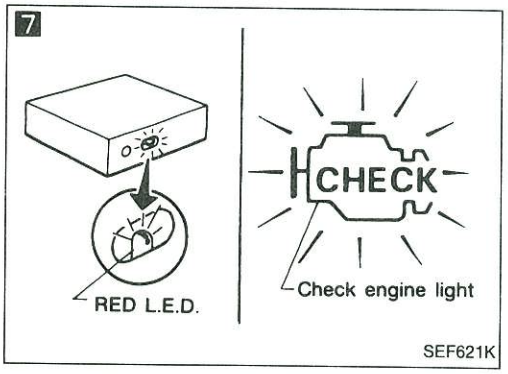
INSPECTION END

Diagnostic Procedure 45 — Symptom — Engine Stalls after Decelerating (Cont'd)









Ⓑ

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.
   At idle approx. 235 kPa (2.4 kg/cm², 34 psi)
   The moment throttle valve is fully open:
   approx. 294 kPa (3.0 kg/cm², 43 psi)

N.G. → Check fuel pressure regulator diaphragm.

OR

1. Release fuel pressure to zero. (Refer to page EF & EC-224.)
2. Install fuel pressure gauge and check fuel pressure.

O.K.

7

CHECK EXHAUST GAS SENSOR.

1. Start engine and warm it up sufficiently.
2. Perform "MIXTURE RATIO TEST" in "FUNCTION TEST" mode.

N.G. → Replace exhaust gas sensor(s).

OR

2. See "M/R F/C MNT (right and left sides)" in "DATA MONITOR" mode.
3. Maintaining engine at 2,000 rpm under no-load (with engine warmed up sufficiently.), check to make sure that the monitor fluctuates between "LEAN" and "RICH" more than 5 times during 10 seconds.
   RICH→LEAN→RICH→ (1 time, 2 times) LEAN→RICH.....

OR

2. Set "Exhaust gas sensor monitor" in the self-diagnostic Mode II. (See page EF & EC-55.)
3. Maintaining engine at 2,000 rpm under no-load, check that check engine light and RED LED on the E.C.U. go ON and OFF more than 5 times during 10 seconds.

O.K.

(Go to Ⓒ on next page.)

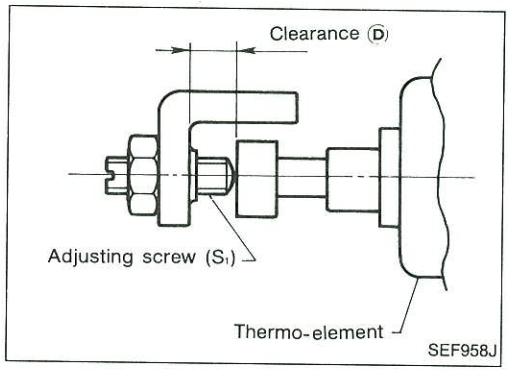
Electrical Components Inspection (Cont'd)

*Data are reference values.

TERMINAL NO.	ITEM	CONDITION	*DATA
18	Fuel pump relay	Ignition switch "ON" └For 5 seconds after turning ignition switch "ON".	Approximately 0.8V
		Ignition switch "ON" └5 seconds after turning ignition switch "ON".	BATTERY VOLTAGE (11 - 14V)
		Engine is running. └Idle speed	Approximately 0.9V
23 24	Detonation sensor	Engine is running. └Idle speed	Approximately 2.5V
27	Air flow meter	Engine is running. (Warm-up condition) └Idle speed	1.0 - 1.4V
		Engine is running. (Warm-up condition) └Engine speed is 2,000 rpm	1.4 - 1.9V
28	Engine temperature sensor	Engine is running.	0 - 5.0V Output voltage varies with engine temperature.
29 55	Exhaust gas sensor R.H. Exhaust gas sensor L.H.	Engine is running. (Warm-up condition) └Engine speed is 2,000 rpm	0 - Approximately 1.0V
36*	TCS signal	Ignition switch "ON"	Approximately 9V
		Ignition switch "ON" ├Disconnect throttle motor harness connector. └Fully close secondary throttle valve by hand.	Approximately 0V
37*	Secondary throttle sensor	Ignition switch "ON" └Approximately 3 seconds after ignition switch "ON"	Approximately 3.4V
		Ignition switch "ON" ├Disconnect throttle motor harness connector. └Fully close secondary throttle valve by hand.	Approximately 0.4V
38	Throttle sensor	Engine is running. (Warm-up condition)	Approximately 0.4 - 4V Output voltage varies with the throttle valve opening angle.

***WARNING:**
Before touching the secondary throttle valve, be sure to disconnect the throttle motor connector; otherwise, injury may occur due to accidental actuation of the valve.

Fast Idle Cam (F.I.C.) Inspection and Adjustment (Cont'd)



8. Adjust clearance Ⓓ to the specified value by turning adjusting screw (S_1).
   Clearance Ⓓ:
   3.8 mm (0.150 in)
9. Rotate adjusting screw (S_1) clockwise or counterclockwise by Z turns according to the following equation, then tighten the adjusting screw lock nut.

$$Z = \frac{L\ (mm) - Ls^*\ (mm)}{0.50\ (mm)} \quad / \quad Z = \frac{L\ (in) - Ls^*\ (in)}{0.0197\ (in)}$$

*: Value of the specified line (Ls) at the temperature of thermo-element actually measured.

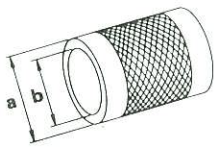
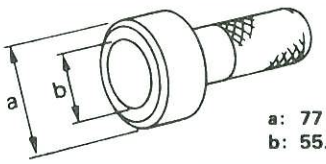
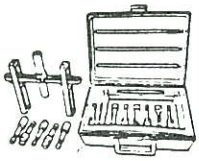
- Direction of adjusting screw (S_1) rotation

(1) Positive (+) Z: Counterclockwise
(2) Negative (−) Z: Clockwise

For example:

	Case I	Case II
Thermo-element temperature °C (°F)	25 (77)	0 (32)
Thermo-element specified stroke (Ls) mm (in)	5.0 (0.197)	2.75 (0.1083)
Thermo-element stroke (L) mm (in)	5.5 (0.217)	2.00 (0.0787)
Revolutions of adjusting screw (Z) mm /in	$Z = \frac{5.5 - 5.0}{0.50} = 1.0$ / $\frac{0.217 - 0.197}{0.0197} = 1.0$	$Z = \frac{2.00 - 2.75}{0.50} = -1.5$ / $\frac{0.0787 - 0.1083}{0.0197} = -1.5$
Direction of revolution	Counterclockwise	Clockwise

Preparation (Cont'd)

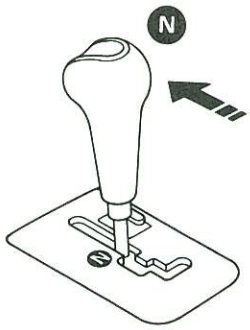
Tool number (Kent-Moore No.) Tool name	Description	
ST33200000 (J26082) Drift	 a: 60 mm (2.36 in) dia. b: 44.5 mm (1.752 in) dia.	Installing oil pump housing oil seal Installing rear oil seal
ST30720000 (J34331) Drift	 a: 77 mm (3.03 in) dia. b: 55.5 mm (2.185 in) dia.	Installing rear oil seal
(J34291) Shim setting gauge set		Selecting oil pump cover bearing race and oil pump thrust washer

Precautions

- Before proceeding with disassembly, thoroughly clean the outside of the transmission. It is important to prevent the internal parts from becoming contaminated by dirt or other foreign matter.
- Disassembly should be done in a clean work area.
- Use lint-free cloth or towels for wiping parts clean. Common shop rags can leave fibers that could interfere with the operation of the transmission.
- When disassembling parts, place them in order in a parts rack so that they can be put back into the unit in their proper positions.
- All parts should be carefully cleaned with a general purpose, non-flammable solvent before inspection or reassembly.
- Gaskets, seals and O-rings should be replaced any time the transmission is disassembled.
- It is very important to perform functional tests whenever they are indicated.
- The valve body contains precision parts and requires extreme care when parts are removed and serviced. Place removed parts in order on a parts rack so they can be put back in the valve body in the same positions and sequences. Care will also prevent springs and small parts from becoming scattered or lost.
- Properly installed valves, sleeves, plugs, etc. will slide along their bores in the valve body under their own weight.
- Before assembly, apply a coat of recommended A.T.F. to all parts. Petroleum jelly may be applied to O-rings and seals and used to hold small bearings and washers in place during reassembly. Do not use grease.
- Extreme care should be taken to avoid damage to O-rings, seals and gaskets when assembling.
- After overhaul, refill the transmission with new A.T.F.

Preliminary Check (Cont'd)

6

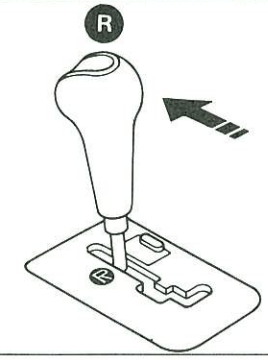


SAT814C

7

SAT797A

8

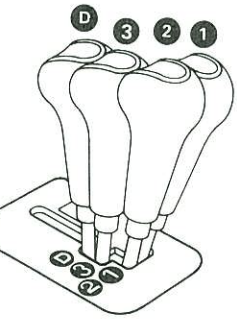


SAT815C

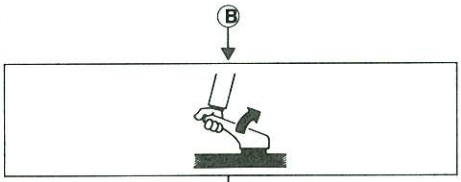
9

SAT799A

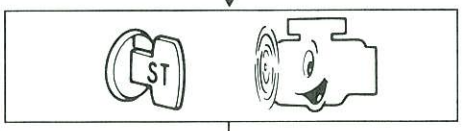
10

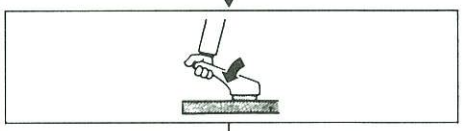


SAT816C



6 Move selector lever to "N" range.





Does vehicle move forward or backward.

Yes → Go to Diagnostic Procedure 3.

No

7 Apply foot brake.

8 Move selector lever to "R" range.

Is there large shock when changing from "N" to "R" range?

Yes → Go to Diagnostic Procedure 4.

No

9 Release foot brake for several seconds.

Does vehicle creep backward when foot brake is released?

No → Go to Diagnostic Procedure 5.

Yes

10 Move selector lever to "D", "1", "2" and "3" ranges and check if vehicle creeps forward.

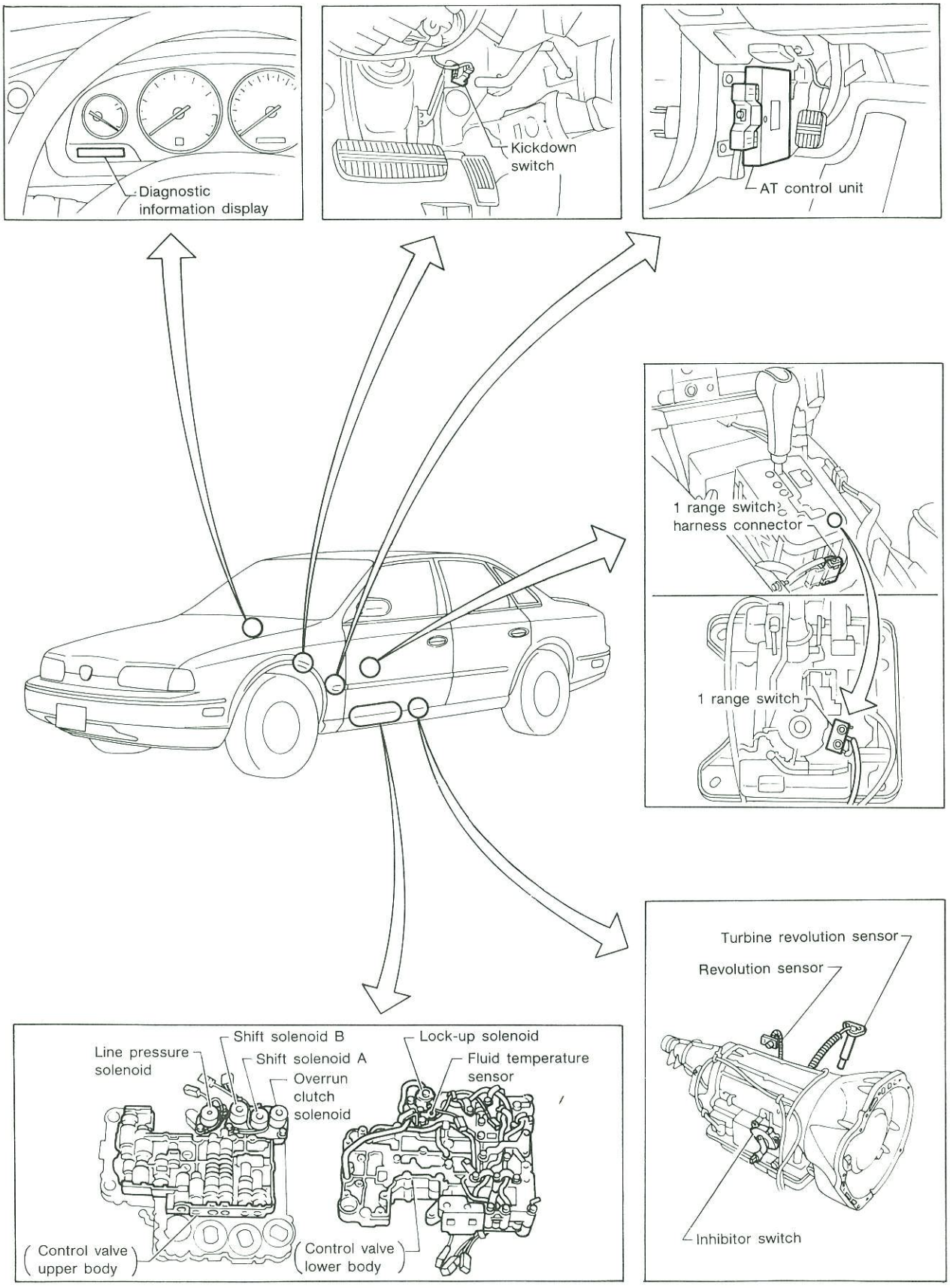
Does vehicle creep forward in all four ranges?

Yes → Go to Cruise test.

No

Go to Diagnostic Procedure 6.

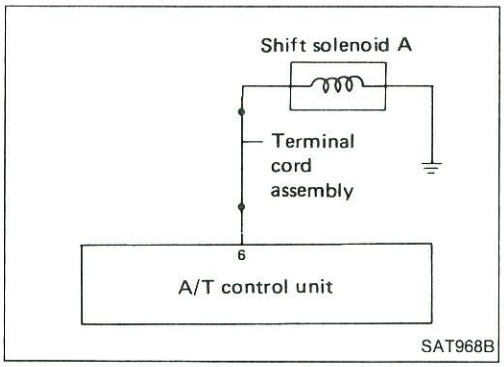
A/T Electrical Parts Location

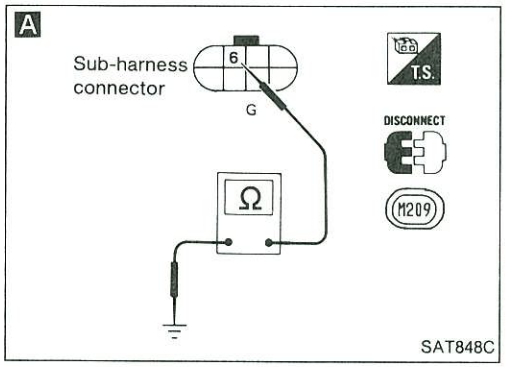


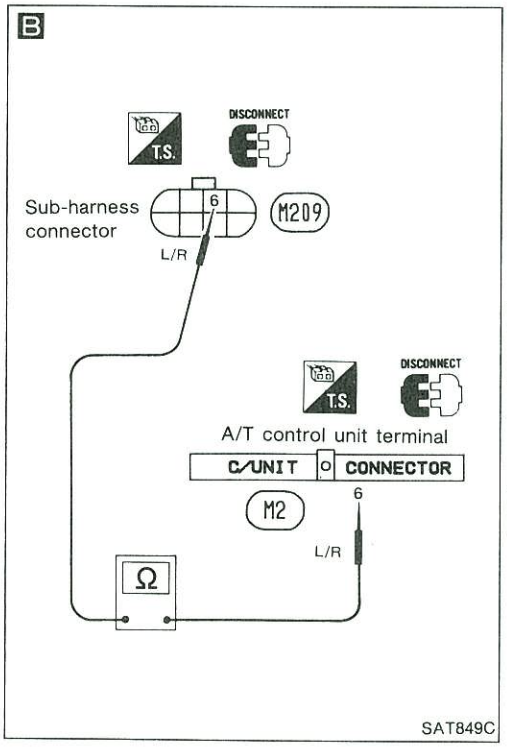
SAT477C

Self-diagnosis (Cont'd)

SHIFT SOLENOID A CIRCUIT CHECK







A

CHECK GROUND CIRCUIT.

1. 

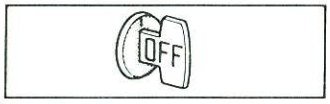
2. Disconnect terminal cord assembly connector at the end of A/T assembly.
3. Check resistance between terminal ⑥ and ground.
   Resistance: 20 - 40Ω

N.G. →
1. Remove control valve assembly. — Refer to "ON-VEHICLE SERVICE".
2. Check the following items.
- Shift solenoid A — Refer to "Electrical Components Inspection".
- Harness continuity of terminal cord assembly

O.K. ↓

B

CHECK POWER SOURCE CIRCUIT.

1. 

2. Disconnect A/T control unit connector.
3. Check resistance between terminal ⑥ and A/T control unit terminal ⑥.
   Resistance:
   Approximately 0Ω
4. Reinstall any part removed.

N.G. → Repair or replace harness between A/T control unit and terminal cord assembly.

O.K. ↓

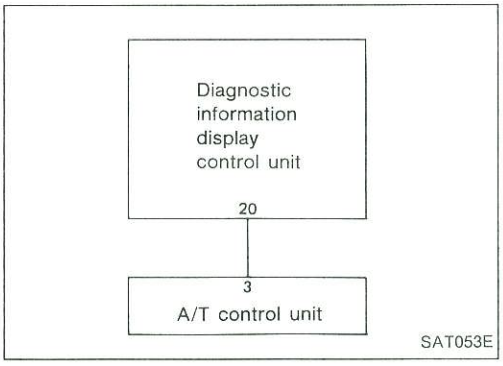
Perform self-diagnosis after driving for a while.

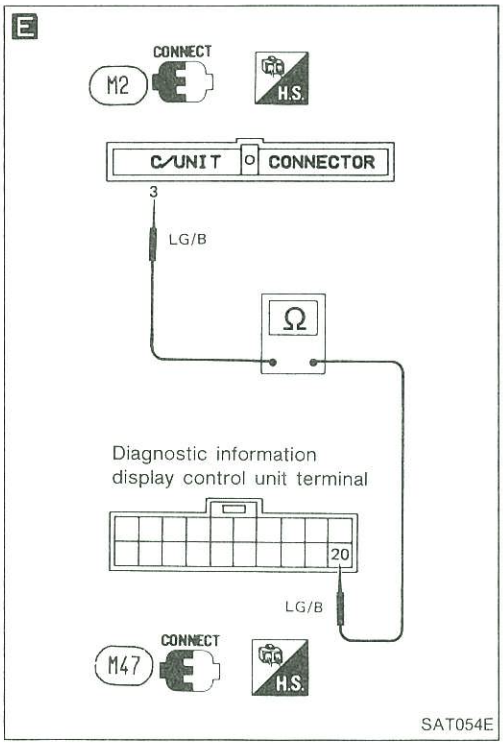
N.G. →
1. Perform A/T control unit input/output signal inspection.
2. If N.G., recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.

O.K. ↓

INSPECTION END

Self-diagnosis (Cont'd)





Ⓓ

E

CHECK DIAGNOSTIC INFORMATION DISPLAY CIRCUIT.

1. 

2. Check continuity between A/T control unit terminal ③ and diagnostic information display control unit terminal ⑳.
   Continuity should exist.

N.G. → Repair or replace harness and connectors between A/T control unit and diagnostic information display control unit.

O.K. ↓

Check diagnostic information display system. — Refer to section EL.

N.G. → Repair or replace damaged parts.

O.K. ↓

Perform self-diagnosis again after driving for a while.

N.G. → Recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.

O.K. ↓

INSPECTION END

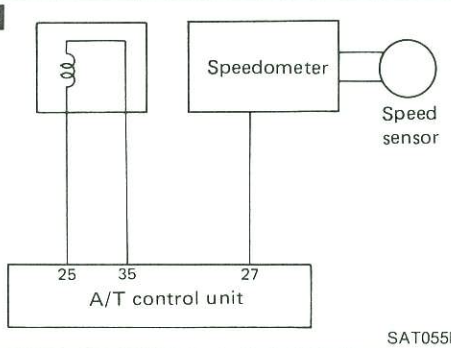
Diagnostic Procedure 16

SYMPTOM: A/T does not shift from D_2 to D_1 when depressing accelerator pedal fully at the specified speed.

1

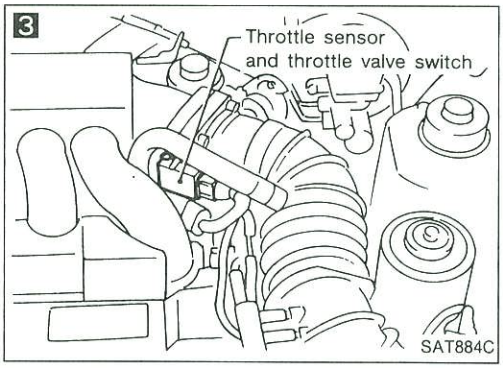
SAT489C

2



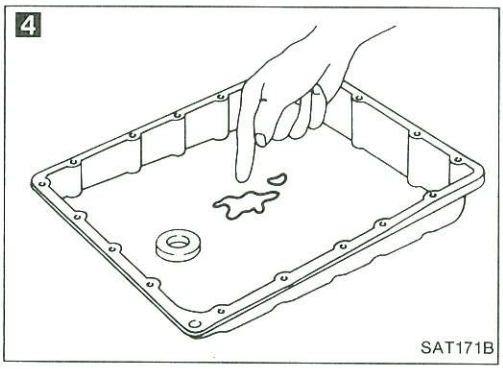
SAT055E

3



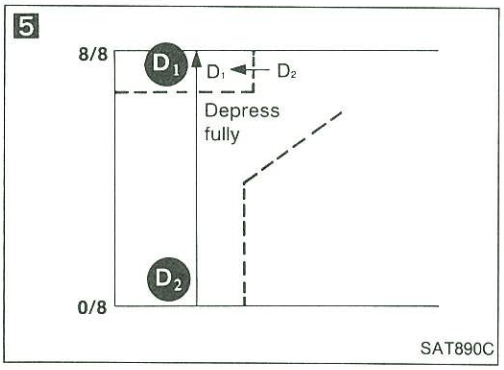
SAT884C

4



SAT171B

5



SAT890C

Are Diagnostic Procedures 6 and 7 O.K.? — No → Go to Diagnostic Procedure 6 or 7.

Yes

Does "E.C.U. INPUT SIGNAL" show damage to inhibitor switch and 1 range switch circuit? — Yes → Check inhibitor switch 1 range switch circuit. — Refer to "Self-diagnosis".

OR

1 Does self-diagnosis show damage to inhibitor switch circuit?

No

2 Check revolution sensor and speed sensor circuits. — Refer to "Self-diagnosis". — N.G. → Repair or replace revolution sensor and speed sensor circuits.

O.K.

3 Check throttle sensor. — Refer to section EF & EC. — N.G. → Repair or replace throttle sensor.

O.K.

4 1. Remove oil pan.
2. Check A/T fluid condition. — N.G. →
1. Remove control valve. — Refer to "ON-VEHICLE SERVICE".
2. Check the following items.
- Shift valve A
- Shift solenoid A
- Pilot valve
- Pilot filter

O.K. ↓

O.K. (from control valve items) →
3. Disassemble A/T.
4. Check the following items.
- Servo piston assembly
- Brake band
- Oil pump assembly

5 Check again. — N.G. →
1. Perform A/T control unit input/output signal inspection.
2. If N.G., recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.

O.K.

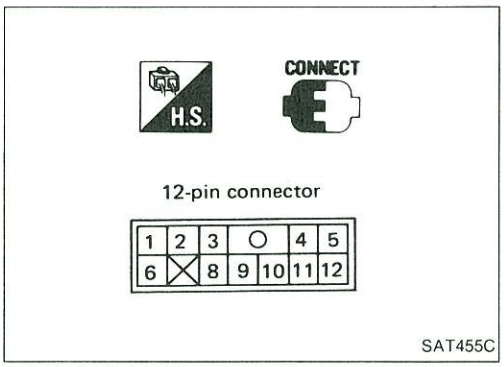
INSPECTION END

Symptom Chart

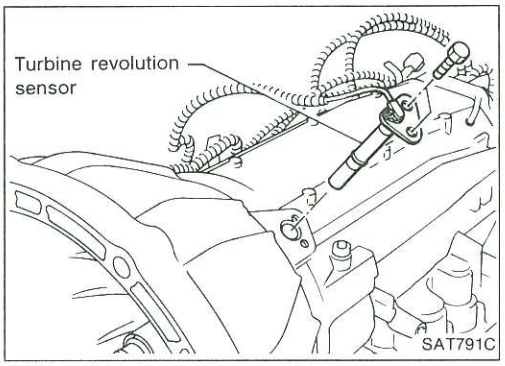
Reference page (AT-)		ON vehicle									OFF vehicle					
	Reference page (AT-)	10, 14	80	81	85	81, 128	82	82	8, 82	8	8	112, 124	142, 146	148, 159	148, 156	152, 162	81, 166
Reference page (AT-)	Numbers are arranged in order of probability. Perform inspections starting with number one and work up. Circled numbers indicate that the transmission must be removed from the vehicle.	Fluid level Control linkage	Inhibitor switch and 1 range switch Throttle sensor (Adjustment)	Revolution sensor and speed sensor Engine revolution signal	Engine idling rpm Line pressure	Control valve assembly Shift solenoid A	Shift solenoid B Line pressure solenoid	Lock-up solenoid Overrun clutch solenoid	Fluid temperature sensor Accumulator N-D	Accumulator 1-2 Accumulator 2-3	Accumulator 3-4 (N-R) Ignition switch and starter	Torque converter Oil pump	Reverse clutch High clutch	Forward clutch Forward one-way clutch	Overrun clutch Low one-way clutch	Low & reverse brake Brake band	Turbine revolution sensor Parking components
60	Engine does not start in "N", "P" ranges.	2	3								1						
60	Engine starts in range other than "N" and "P".	1	2														
—	Transmission noise in "P" and "N" ranges.	1	3	4 5	2							⑦ ⑥					
60	Vehicle moves when changing into "P" range or parking gear does not disengage when shifted out of "P" range.	1															②
61	Vehicle runs in "N" range.	1									4		③	②	⑤		
63	Vehicle will not run in "R" range (but runs in "D", "3", "2" and "1" ranges). Clutch slips. Very poor acceleration.	1			2	4	3						⑤ ⑥	⑦	⑧	⑨	
—	Vehicle braked when shifting into "R" range.	1 2			3	5	4						⑥	⑧	⑨	⑦	
—	Sharp shock in shifting from "N" to "D" range.		2	5	1 3	7	6		4 8					⑩			⑨
—	Vehicle will not run in "D", "3" and "2" ranges (but runs in "1" and "R" range).	1													②		
64	Vehicle will not run in "D", "1", "2" and "3" ranges (but runs in "R" range). Clutch slips. Very poor acceleration.	1			2	4	3		5				⑥ ⑦	⑧ ⑨	⑩		
—	Clutches or brakes slip somewhat in starting.	1 2	3		4	6	5		7		8	⑬ ②	⑩	⑨		⑪	
—	Excessive creep.				1												
63-64	No creep at all.	1			2	3						⑥ ⑤		④			
—	Failure to change gear from "D_1" to "D_2".	2	1	5		4 3										⑥	
—	Failure to change gear from "D_2" to "D_3".	2	1	5		4	3						⑥			⑦	
—	Failure to change gear from "D_3" to "D_4".	2	1	4		3			5							⑥	
66- 67	Too high a gear change point from "D_1" to "D_2", from "D_2" to "D_3", from "D_3" to "D_4".		1	2		3	4										
—	Gear change directly from "D_1" to "D_3" occurs.	1								2						③	
—	Engine stops when shifting lever into "R", "D", "3", "2" and "1".				1	3		2				④					
—	Too sharp a shock in change from "D_1" to "D_2".		1		2	4			5	3						⑥	
—	Too sharp a shock in change from "D_2" to "D_3".		1		2	4				3			⑤			⑥	

A/T Shift Lock System (Cont'd)

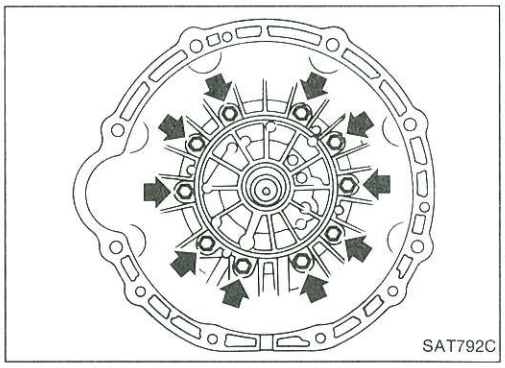
SHIFT LOCK CONTROL UNIT INSPECTION



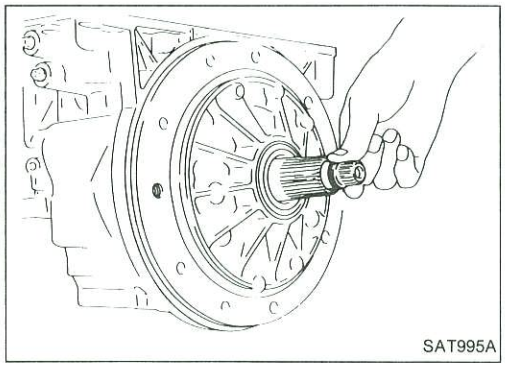
- Measure voltage between each terminal by following "SHIFT LOCK CONTROL UNIT INSPECTION TABLE".
- Pin connector terminal layout.



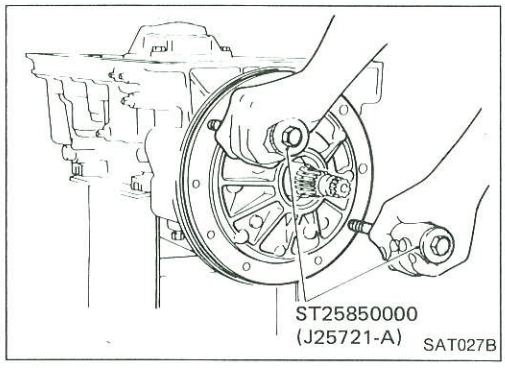
11. Remove turbine revolution sensor.



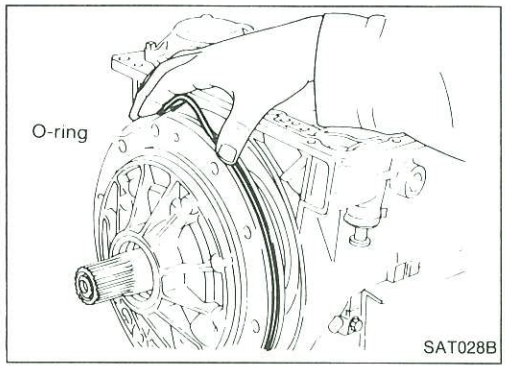
12. Remove converter housing.
a. Remove converter housing from transmission case.
b. Remove traces of sealant
- **Be careful not to scratch converter housing.**



13. Remove O-ring from input shaft.



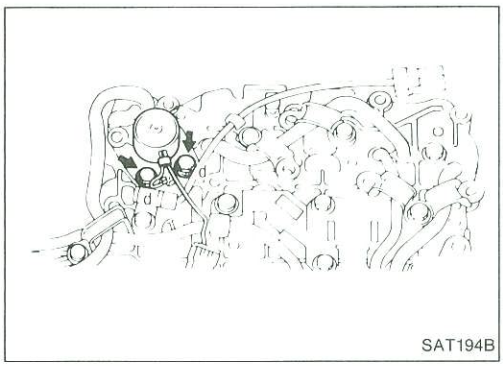
14. Remove oil pump assembly.
a. Attach Tool to oil pump assembly and extract it evenly from transmission case.



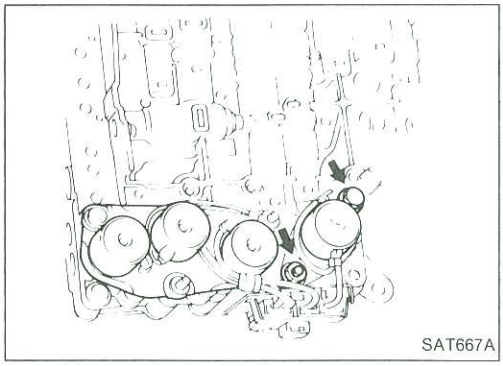
b. Remove O-ring from oil pump assembly.
c. Remove traces of sealant from oil pump housing.
- **Be careful not to scratch pump housing.**

Control Valve Assembly (Cont'd)

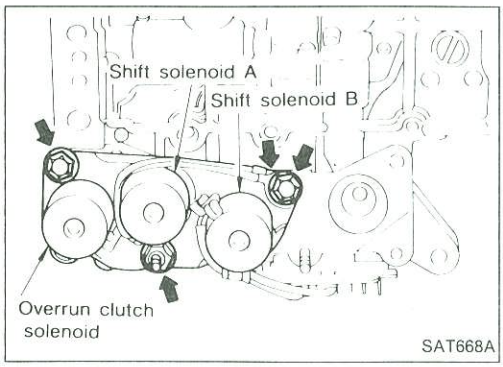
DISASSEMBLY


SAT194B

1. Remove solenoids.
a. Remove lock-up solenoid and side plate from lower body.
b. Remove O-ring from solenoid.

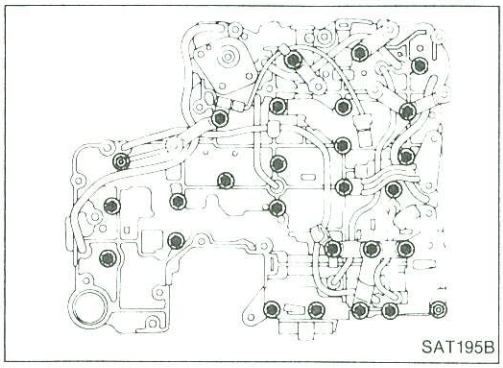

SAT667A

c. Remove line pressure solenoid from upper body.
d. Remove O-ring from solenoid.



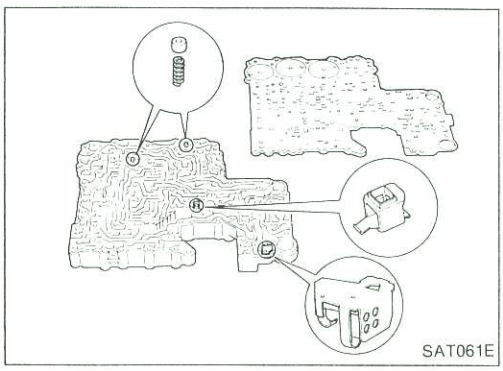
SAT668A

e. Remove 3-unit solenoid assembly from upper body.
f. Remove O-rings from solenoids.


SAT195B

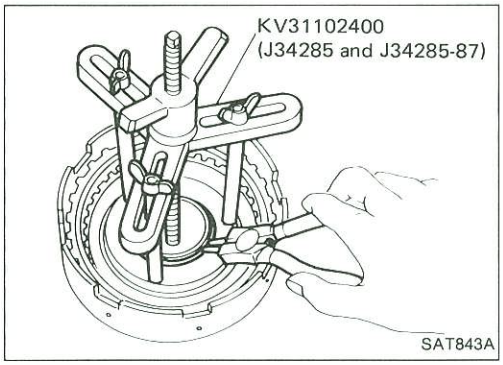
2. Disassemble upper and lower bodies.
a. Place upper body facedown, and remove bolts, reamer bolts and support plates.
b. Remove lower body, separator plate and separate gasket as a unit from upper body.

- **Be careful not to drop pilot filter, orifice check valve, spring and steel balls.**

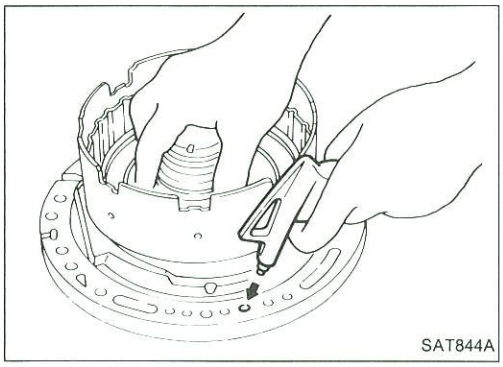

SAT061E

c. Place lower body facedown, and remove separate gasket and separator plate.
d. Remove pilot filter, orifice check valves and orifice check springs.

Reverse Clutch (Cont'd)



3. Remove snap ring from clutch drum while compressing clutch springs.
- **Do not expand snap ring excessively.**
4. Remove spring retainer and return spring.

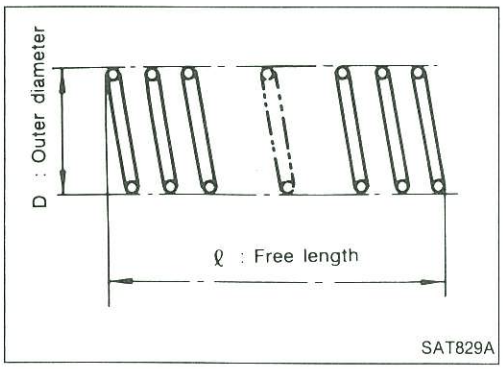


5. Install seal ring onto oil pump cover and install reverse clutch drum. While holding piston, gradually apply compressed air to oil hole until piston is removed.
- **Do not apply compressed air abruptly.**
6. Remove D-ring and oil seal from piston.

INSPECTION

Reverse clutch snap ring and spring retainer

- Check for deformation, fatigue or damage.



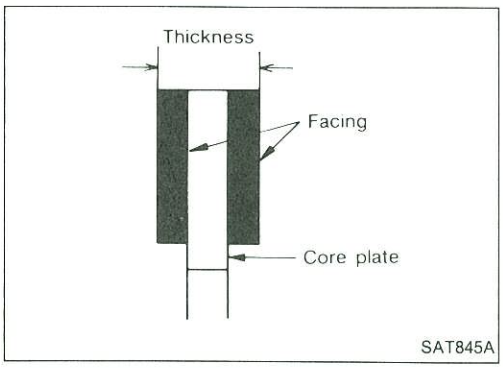
Reverse clutch return springs

- Check for deformation or damage. Also measure free length and outside diameter.

Inspection standard:

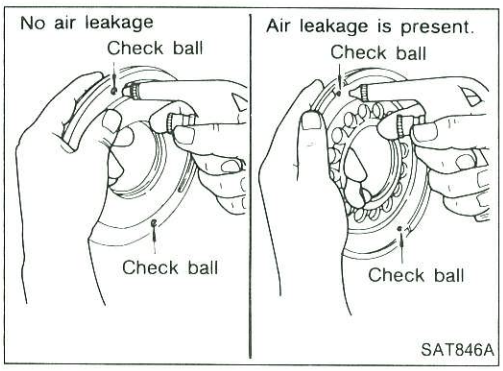
Unit: mm (in)

Parts	Part No.	ℓ	D
Spring	31505-51X00	37.8 (1.488)	14.8 (0.583)



Reverse clutch drive plates

- Check facing for burns, cracks or damage.
- Measure thickness of facing.
  Thickness of drive plate:
  Standard value: 1.90 - 2.05 mm (0.0748 - 0.0807 in)
  Wear limit: 1.8 mm (0.071 in)
- If not within wear limit, replace.



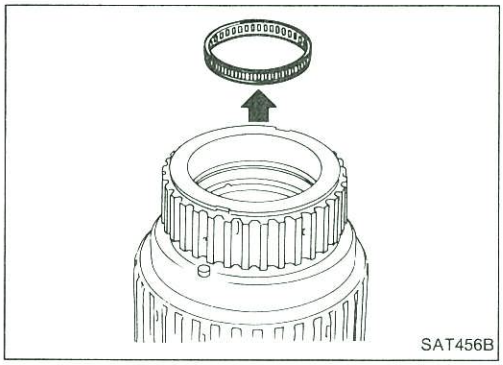
Reverse clutch dish plate

- Check for deformation or damage.

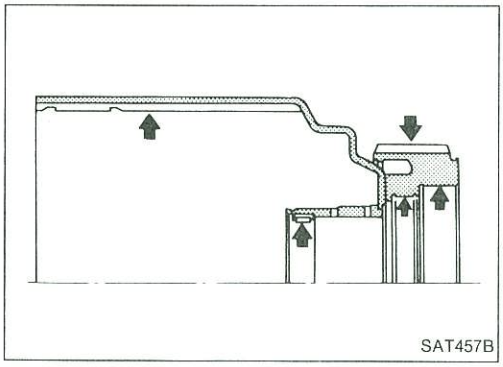
Reverse clutch piston

- Shake piston to assure that balls are not seized.
- Apply compressed air to check ball oil hole opposite the return spring to assure that there is no air leakage.
- Also apply compressed air to oil hole on return spring side to assure that air leaks past ball.

Forward Clutch Drum Assembly (Cont'd)


SAT456B

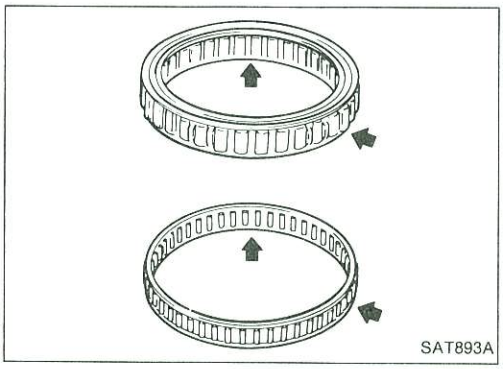
4. Remove needle bearing from forward clutch drum.


SAT457B

INSPECTION

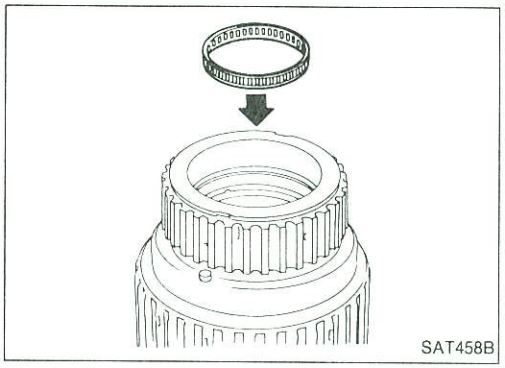
Forward clutch drum

- Check spline portion for wear or damage.
- Check frictional surfaces of low one-way clutch and needle bearing for wear or damage.


SAT893A

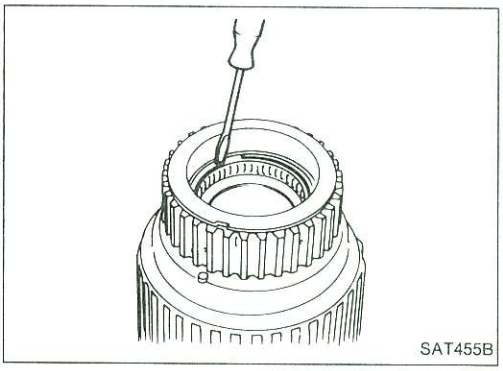
Needle bearing and low one-way clutch

- Check frictional surface for wear or damage.


SAT458B

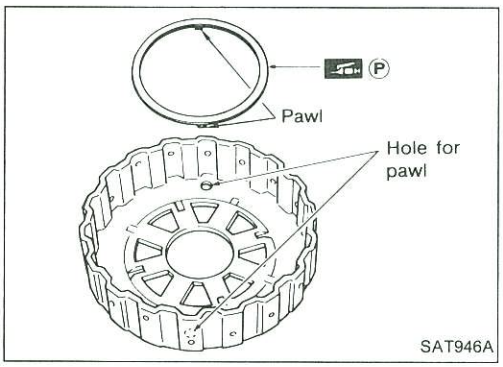
ASSEMBLY

1. Install needle bearing in forward clutch drum.


SAT455B

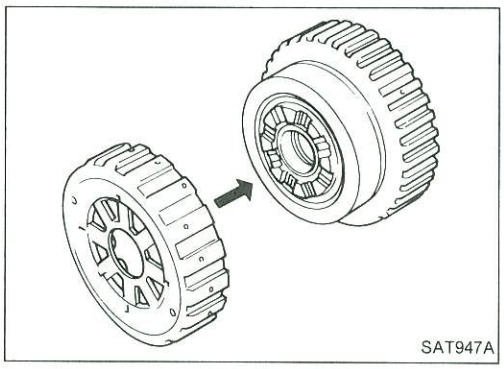
2. Install snap ring onto forward clutch drum.

Assembly (Cont'd)

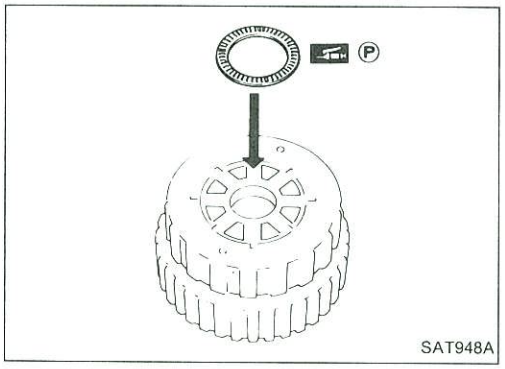


d. Install thrust washer onto front of overrun clutch hub.

- **Apply petroleum jelly to the thrust washer.**
- **Insert pawls of thrust washer securely into holes in overrun clutch hub.**

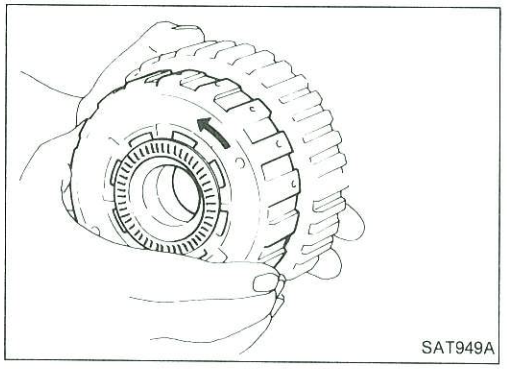


e. Install overrun clutch hub onto rear internal gear assembly.

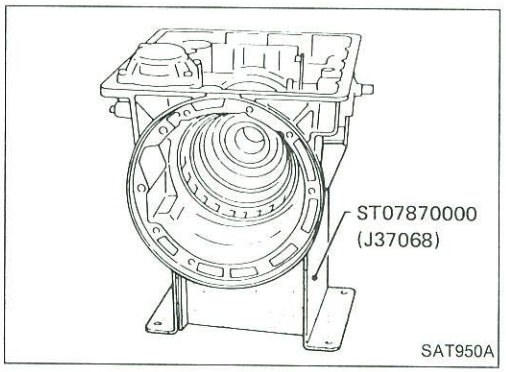


f. Install needle bearing onto rear of overrun clutch hub.

- **Apply petroleum jelly to needle bearing.**

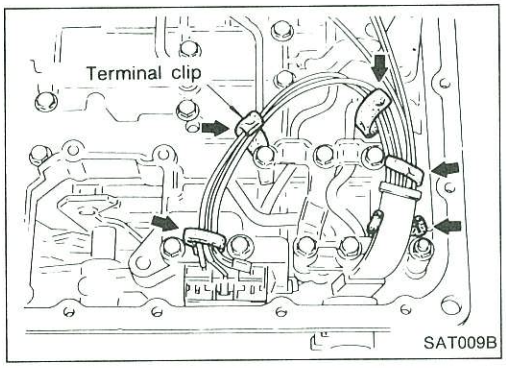


g. Check that overrun clutch hub rotates as shown while holding forward clutch hub.

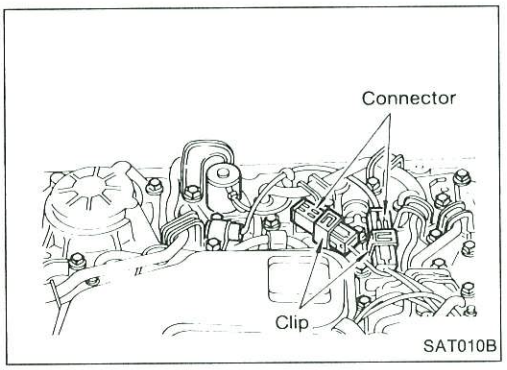


h. Place transmission case into horizontal position.

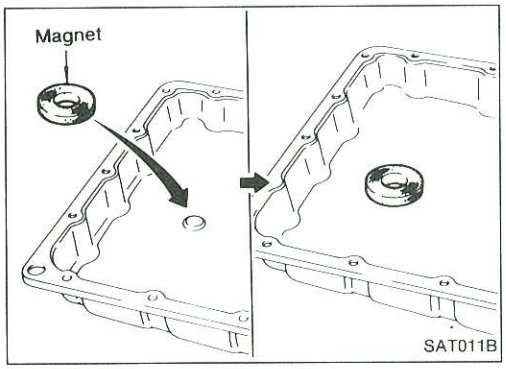
Assembly (Cont'd)



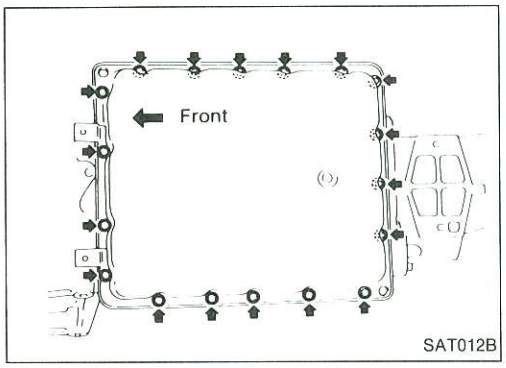
i. Securely fasten terminal harness with clips.



j. Install lock-up solenoid and fluid temperature sensor connectors.

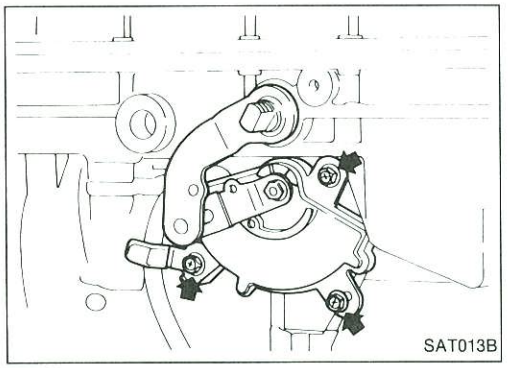


14. Install oil pan.
a. Attach a magnet to oil pan.

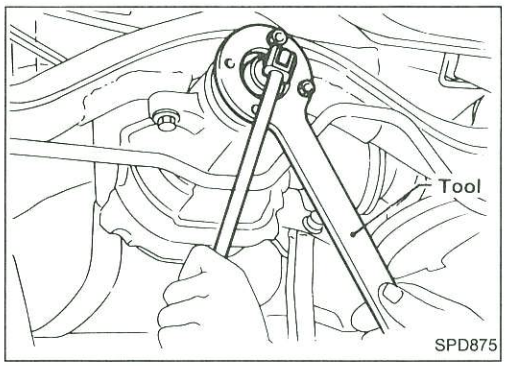


b. Install oil pan gasket on transmission case.
c. Install oil pan and bracket on transmission case.

- **Tighten four bolts in a criss-cross pattern to prevent dislocation of gasket.**

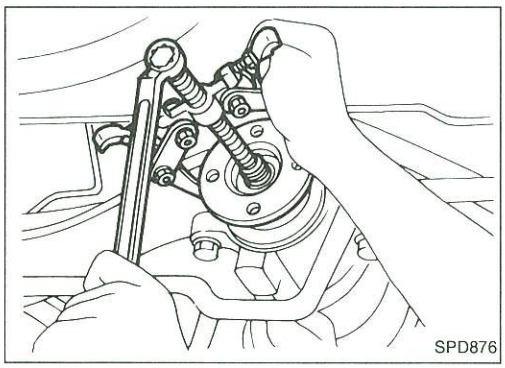


15. Install inhibitor switch.
a. Check that manual shaft is in "1" range.
b. Temporarily install inhibitor switch on manual shaft.
c. Move manual shaft to "N".

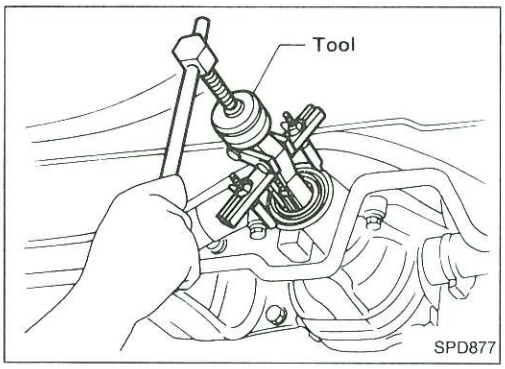


Front Oil Seal Replacement

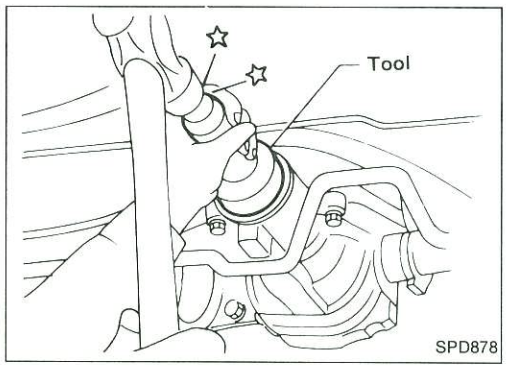
1. Remove propeller shaft.
2. Loosen drive pinion nut with Tool.
   Tool number: ST38060002 (J34311)



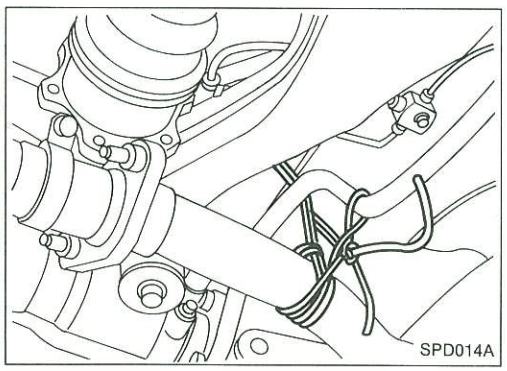
3. Remove companion flange.



4. Remove front oil seal.



5. Apply multi-purpose grease to sealing lips of oil seal. Press front oil seal into carrier.
6. Install companion flange and drive pinion nut.
7. Install propeller shaft.



Side Oil Seal Replacement

CAUTION:

- **Do not damage drive shaft rubber boots with final drive side flange.**
- **Do not tap brake back plate with sliding hammer.**

1. Disconnect final drive side flange and drive shaft flange and suspend drive shaft flange with wire.

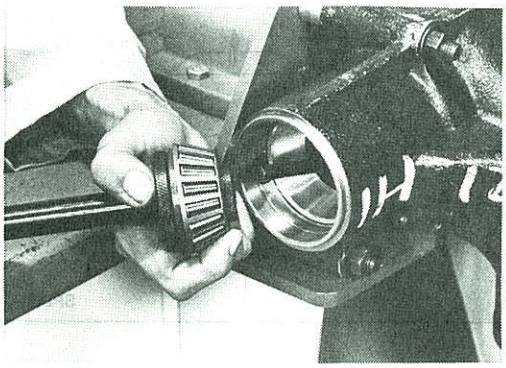
Pinion Gear Height and Pinion Bearing Preload (Cont'd)

Pinion head height number	Add or remove from the standard pinion height washer thickness measurement
- 6	Add 0.06 mm (0.0024 in)
- 5	Add 0.05 mm (0.0020 in)
- 4	Add 0.04 mm (0.0016 in)
- 3	Add 0.03 mm (0.0012 in)
- 2	Add 0.02 mm (0.0008 in)
- 1	Add 0.01 mm (0.0004 in)
0	Use the selected washer thickness
+ 1	Subtract 0.01 mm (0.0004 in)
+ 2	Subtract 0.02 mm (0.0008 in)
+ 3	Subtract 0.03 mm (0.0012 in)
+ 4	Subtract 0.04 mm (0.0016 in)
+ 5	Subtract 0.05 mm (0.0020 in)
+ 6	Subtract 0.06 mm (0.0024 in)

15. Select the correct pinion height washer from the following chart.

Drive pinion height adjusting washer (R200):

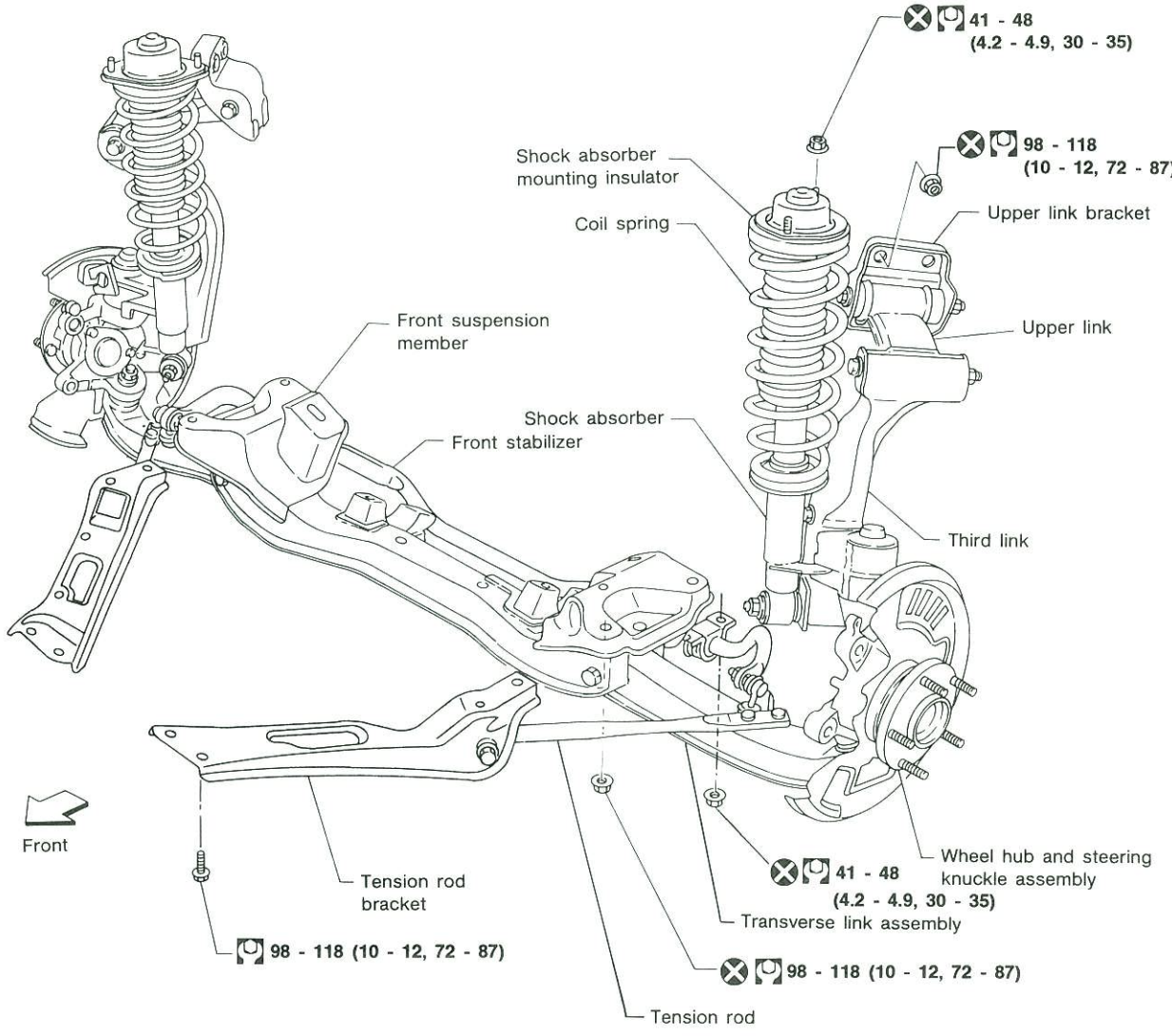
Thickness mm (in)	Part No.
3.09 (0.1217)	38154-P6017
3.12 (0.1228)	38154-P6018
3.15 (0.1240)	38154-P6019
3.18 (0.1252)	38154-P6020
3.21 (0.1264)	38154-P6021
3.24 (0.1276)	38154-P6022
3.27 (0.1287)	38154-P6023
3.30 (0.1299)	38154-P6024
3.33 (0.1311)	38154-P6025
3.36 (0.1323)	38154-P6026
3.39 (0.1335)	38154-P6027
3.42 (0.1346)	38154-P6028
3.45 (0.1358)	38154-P6029
3.48 (0.1370)	38154-P6030
3.51 (0.1382)	38154-P6031
3.54 (0.1394)	38154-P6032
3.57 (0.1406)	38154-P6033
3.60 (0.1417)	38154-P6034
3.63 (0.1429)	38154-P6035
3.66 (0.1441)	38154-P6036



16. Remove the J-34309 pinion preload shim selector Tool from the final drive housing and disassemble to retrieve the pinion bearings.

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

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



: N•m (kg-m, ft-lb)

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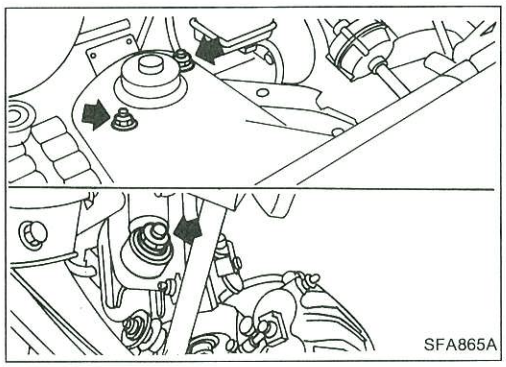
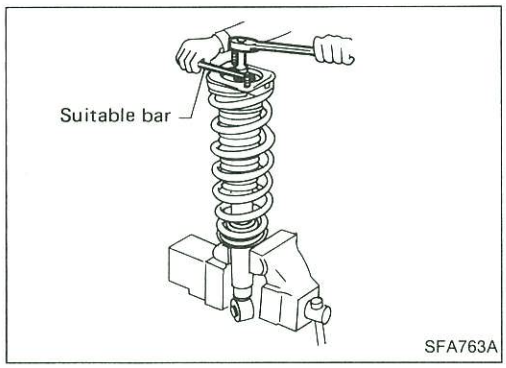


Removal

Remove shock absorber fixing nuts.

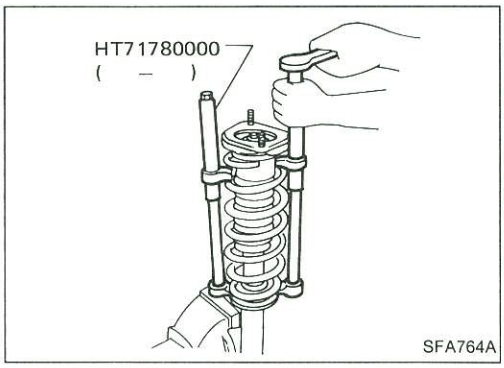
Do not remove piston rod lock nut.



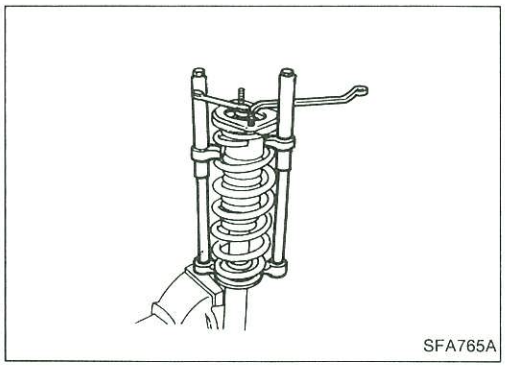
Disassembly

1. Set shock absorber on vise with Tool, then loosen piston rod lock nut.

Do not remove piston rod lock nut.



2. Compress spring with Tool so that shock absorber mounting insulator can be turned by hand.



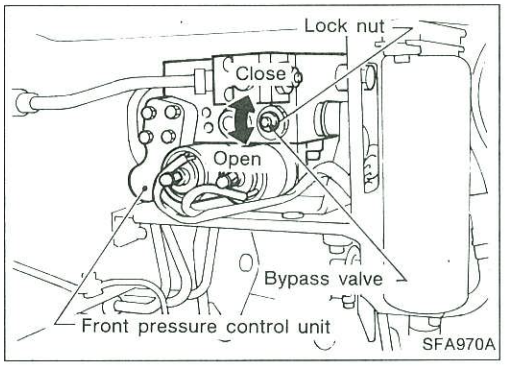
3. Remove piston rod lock nut.

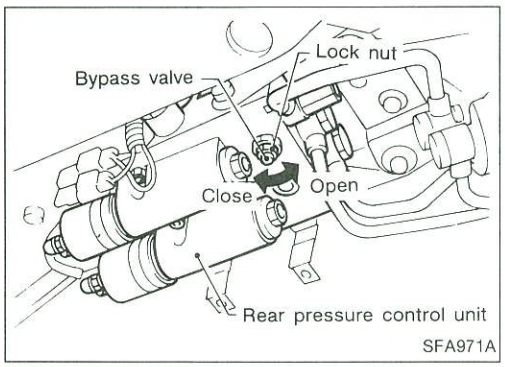
Inspection

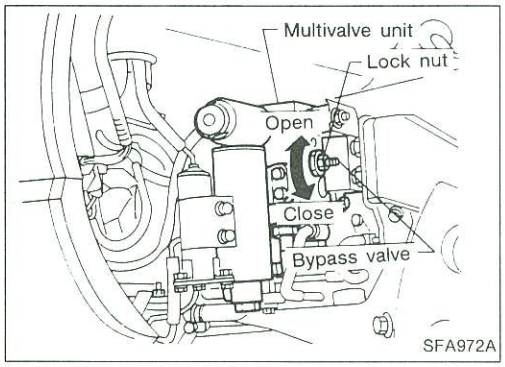
SHOCK ABSORBER ASSEMBLY

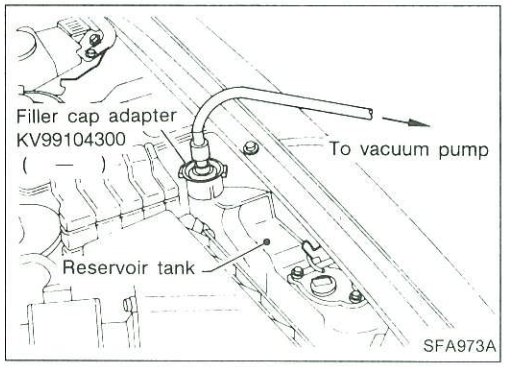
- Check for smooth operation through a full stroke, both compression and extension.
- Check for oil leakage occurring on welded or gland packing portions.
- Check piston rod for cracks, deformation or other damage. Replace if necessary.

Repair of Component Parts (Cont'd)









RELIEVING PRESSURE

Before relieving pressure from hydraulic parts, carefully read "Service Notice" and familiarize yourself with its contents.

- Move vehicle to lift-up position and stop engine. Wait for at least 3 minutes before lifting vehicle.
- Lift vehicle until all four wheels are completely off the ground.
- Remove left and right fender protectors and rear pressure control unit protectors.
- Loosen lock nuts on bypass valve for front and rear pressure control units. Slowly open bypass valve until they are fully open.

Always use a closed wrench to prevent slippage when loosening lock nuts [6 mm (0.24 in) across flats].

- Loosen lock nut bypass valve on multivalve unit, and slowly tighten cock until it is fully open.

CAUTION:
Multivalve unit bypass valve is opened when tightened.

- After replacing parts or flushing hydraulic lines, close all three bypass valves securely.

  Bypass valve:
  : 11 - 13 N·m (1.1 - 1.3 kg-m, 8 - 9 ft-lb)
  Lock nut:
  : 11 - 13 N·m (1.1 - 1.3 kg-m, 8 - 9 ft-lb)
  (Loosen Multivalve unit bypass valve completely.)

EVACUATING HYDRAULIC LINES

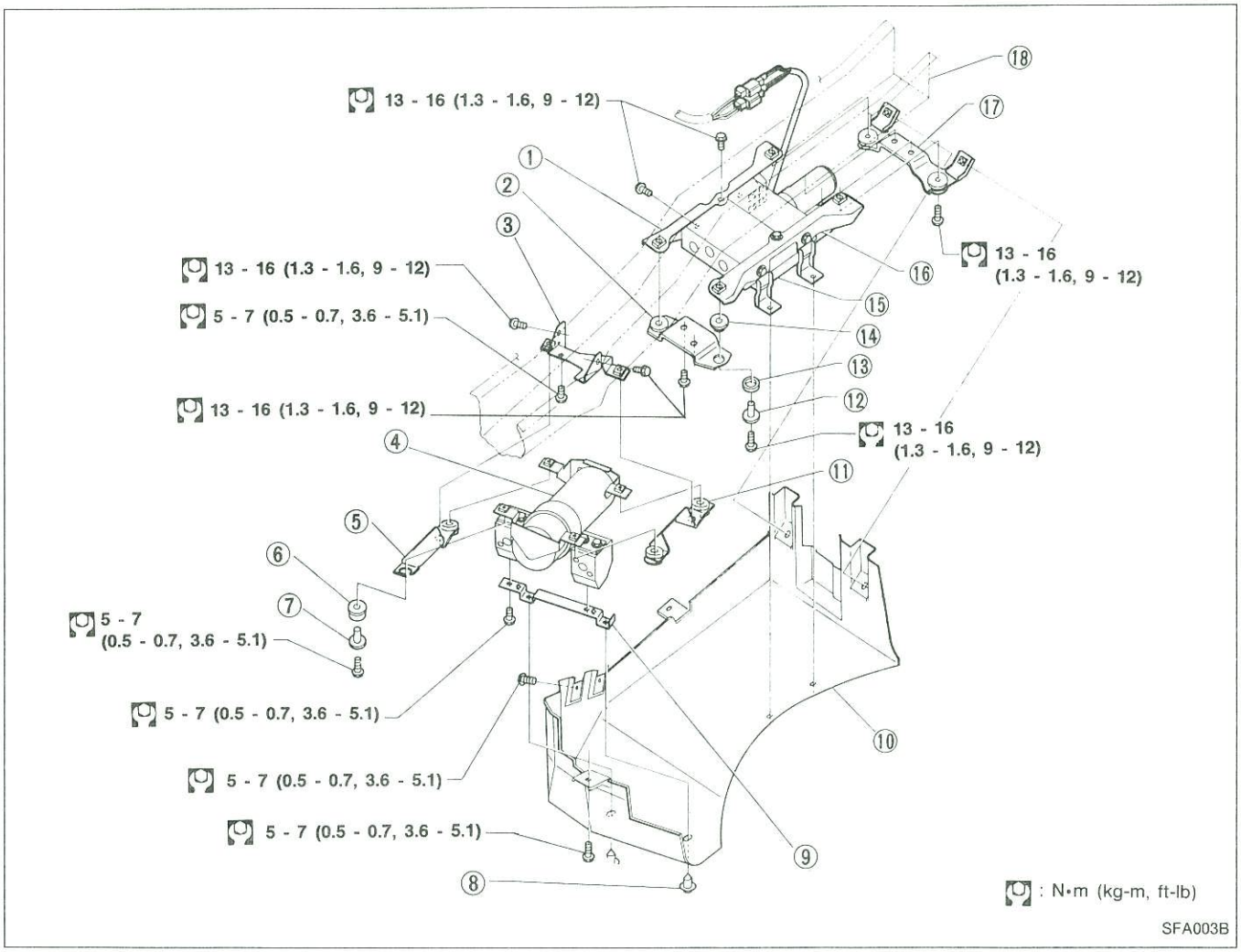
After pump, etc., is replaced, air may enter line between reservoir tank and pump, which in turn degrades oil discharge efficiency. To evacuate hydraulic line, proceed as follows:

- After parts are replaced, make sure all pipe connections are tight and secure.
- Make sure oil level in reservoir tank is correct.
- Install oil level gauge securely.
- Remove filler cap from reservoir tank and install a filler cap adapter instead.
- Connect vacuum pump (used for air conditioning system) and vacuum hose to filler cap adapter, and evacuate for at least two minutes.

If possible, use a gauge manifold to check for complete evacuation.

Repair of Component Parts (Cont'd)

Removal and installation of rear pressure control unit and rear main accumulator



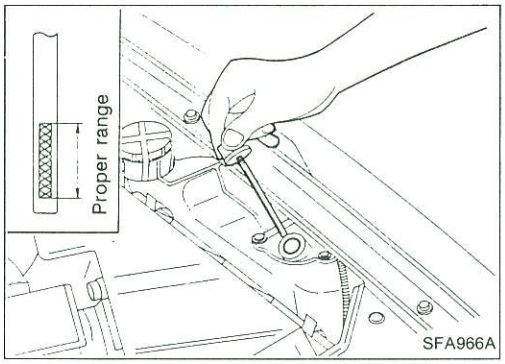
① Control unit bracket C
② Control unit bracket A
③ Accumulator bracket C
④ Rear main accumulator
⑤ Accumulator bracket A
⑥ Insulator
⑦ Insulator collar
⑧ Clip
⑨ Control unit protector stay
⑩ Control unit protector
⑪ Accumulator bracket B
⑫ Insulator collar
⑬ Mount outer insulator
⑭ Mount inner insulator
⑮ Rear pressure control unit
⑯ Control unit bracket D
⑰ Control unit bracket B
⑱ Side member

— Disposal of rear pressure control unit —

Before discarding rear pressure control unit, drill holes in accumulator to completely discharge nitrogen gas as instructed on caution label. Caution label is located on return accumulator of pressure control unit.

— Disposal of rear main accumulator —

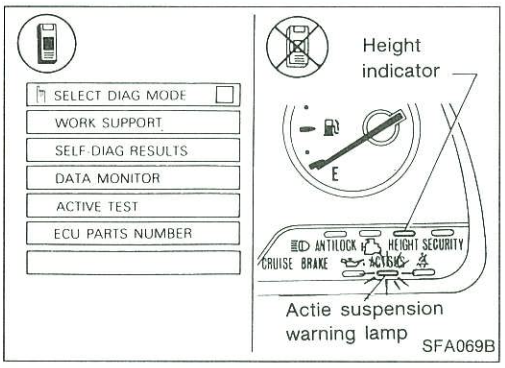
Before discarding rear main accumulator, drill holes in accumulator to completely discharge nitrogen gas as instructed on accumulator caution label.



Preliminary Check

CHECK 1

Check hydraulic fluid level and condition. Refer to "FULL-ACTIVE SUSPENSION — On-vehicle Service". FA-27



CHECK 2

Perform self-diagnosis.
Refer to "Self-diagnosis". FA-68

Self-diagnosis (Cont'd)

LATERAL G SENSOR 1 (OR 2) CIRCUIT CHECK

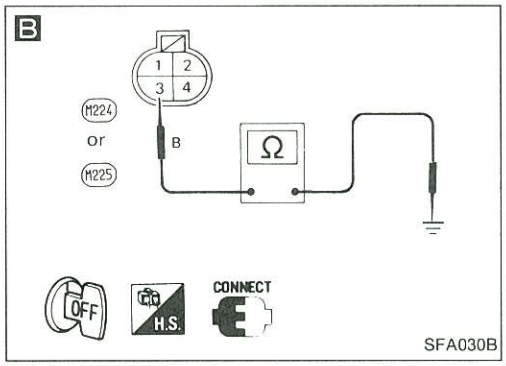
A

☆ MONITOR	★ FAILURE
SPEED SE1•MTR	0km/h
SPEED SE2	0km/h
LATER G SE1	RO.01G
LATER G SE2	LO.01G
FOR&AFT G SEN	–0.01G
VERTI G SE F	U0.03G
VERTI G SE RR	0.00G
VERTI G SE RL	D0.01G
HEIGHT SEN FR	–2mm

RECORD

SFA063B

B



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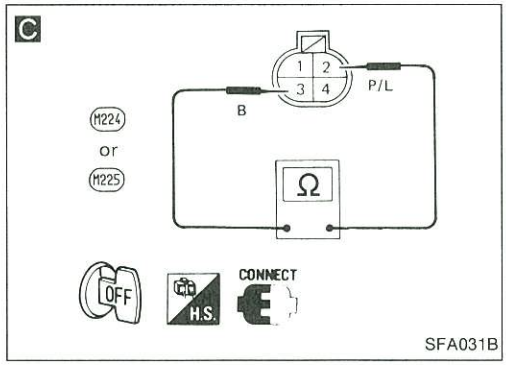
C



SFA031B

START

- Place vehicle on a flat surface and stop engine.
- Connect CONSULT and turn ignition switch "ON". (Do not start engine.)

A

Check output of lateral G sensor 1 or 2 using CONSULT data monitor.

Greater than 1.5G → B

B

CHECK GROUND CIRCUIT.
Turn ignition switch "OFF".
Check continuity between lateral sensor 1 (or 2) connector ③ and GND (body metal).
Continuity should exist.

O.K. → Replace lateral sensor 1 (or 2). See Note 1 below.

N.G. → Open harness circuit.
Check and repair harness between control unit and lateral G sensor.

Less than 1.5G

Check output of lateral G sensor 1 (or 2) using CONSULT data monitor.

Less than –1.5G → C

C

CHECK CONTINUITY.
Turn ignition switch "OFF".
Check resistance between lateral G sensor 1 (or 2) connector terminals ② and ③ .
Continuity should exist.

N.G. → Open harness circuit or faulty lateral G sensor 1 (or 2). Replace. See NOTE 1 below.

O.K. → Shorted harness circuit
Check and repair harness between control unit and lateral G sensor.

Greater than –1.5G

Check output of lateral G sensor 1 (or 2) using CONSULT data monitor.

Outside ±0.15G → Replace lateral G sensor 1 (or 2). See NOTE 1 below.

Within ±0.15G

O.K. See NOTE 2.

NOTES:

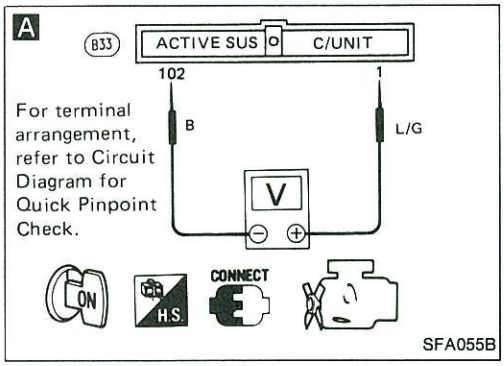
(1) When one lateral G sensor is found to be "faulty", replace both G sensors.

(2) Also check with CONSULT set to field test mode as needed.

Self-diagnosis (Cont'd)

ENGINE STALL WARNING CIRCUIT CHECK

When "WARN ENGINE STALL" appears on the display with CONSULT set in the self-diagnostic mode, it indicates that the engine is running at speeds less than 400 rpm while the vehicle is operating, it is at rest with the ignition "ON" or the engine revolution signal line to the ECCS control unit is open. If CONSULT judges the problem to be an "engine stall", the active suspension warning lamp will illuminate and, at the same time, the fail-safe valve will be deenergized. The result is a fail-safe condition (control is stopped) which may cause vehicle posture to change while vehicle is operating.



START

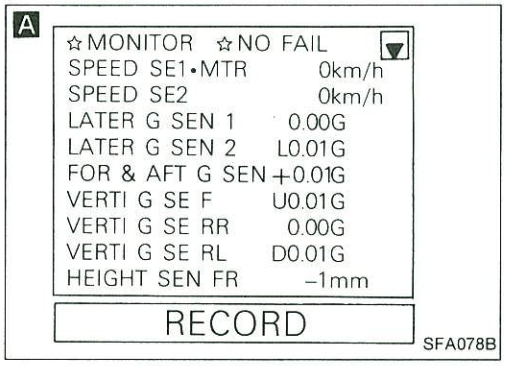
Start engine and check for rotation.
N.G. → Faulty engine system
O.K.

Check active suspension warning lamp. It should illuminate.
N.G. → Poor harness and/or connector connection
O.K.

A

CHECK INPUT SIGNAL.
Turn ignition switch "ON". (Do not start engine.) Measure voltage across control unit connector terminals ① and (102).
Voltage: Approx. 5V
N.G. → Shorted harness circuit or shorted/faulty control unit
O.K.

Open harness circuit or faulty E.C.C.S. control unit



Diagnostic Procedure 6

SYMPTOM:

Abnormalities in roll control

1) The vehicle body moved in the roll direction while parking. The vehicle body rolled (moved sideways) after starting the engine, but it gradually returned level.

START

- Park vehicle on level ground, and stop engine.
- Connect CONSULT, and set ignition switch to ON. (Engine OFF)

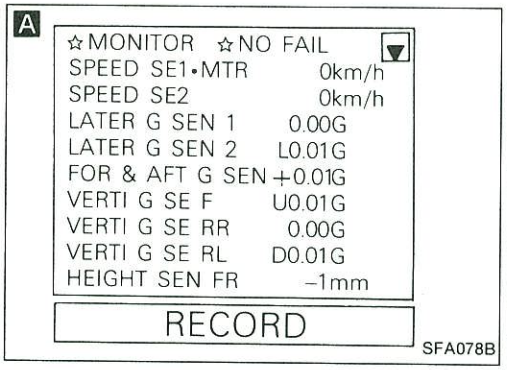
A

Check output signal on CONSULT data monitor screen. Are output values of lateral G sensors 1 and 2 within ±0.15G?
Gravity ±0.15G

N.G. → Faulty lateral G sensor 1 or 2 (Replace both sensors as a set.)

O.K.

Go to "Hydraulic System Diagnostic Procedures".
Refer to Diagnostic Procedures 8 to 12. FA-106



2) The vehicle body moved in the roll direction while driving. The vehicle body rolled, but gradually returned level.

START

- Park vehicle on level ground, and stop engine.
- Connect CONSULT, and set ignition switch to ON. (Engine OFF)

A

Check output signal on CONSULT data monitor screen. Are output values of lateral G sensors 1 and 2 and vertical G sensors (rear right and rear left) within ±0.15G?
Gravity ±0.15G

N.G. → Faulty G sensor (Replace)

O.K.

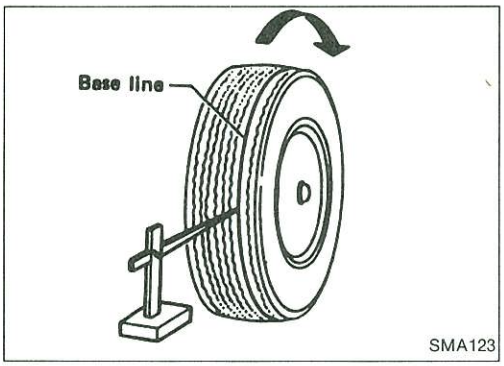
Go to "Hydraulic System Diagnostic Procedures".
Refer to Diagnostic Procedures 8 to 12.
FA-106

Diagnostic Procedure 12 (Cont'd)

No.	Noise and features	Occurrence	Phenomenon accompanying noise	Check method and remedy
4	Creaking noise Like the noise heard when underfloor plumbing is vibrating	Heard when suspension oscillates slowly and broadly up and down, particularly during its compression stroke. Front side or rear side is the source of noise.	Often accompanied by noise of No. 5	Check by using methods (a) or (b), preferably method (a). a Drive vehicle with CONSULT set in fail-safe mode. *1 Noise is heard. → Check other causes. No noise is heard. Bleed air from suspect pressure control unit. b Move all four wheels up and down simultaneously using CONSULT's active test mode. Noise is heard. No noise is heard. → Check other causes. Check again during driving. No noise is heard. → END Noise is heard. Replace pressure control unit.
5	Squeaking noise Like short, abrupt repetition of a whistle	Heard when suspension is abruptly caused to oscillate up and down during driving. Front side or rear side is the source of noise.	Accompanied by noise No. 4	Drive vehicle with CONSULT set in fail-safe mode. *1 Noise is heard. → Check other causes. No noise is heard. Replace suspect pressure control unit.

Notes: *1: Note that the maximum vehicle speed is less than 30 km/h (19MPH) when fail-safe valve is closed by CONSULT.
*2: This noise resembles A/T pump noise, but pitch is lower than that of A/T pump noise.
*3: Note that rattling noise can also be heard from engine. Rattling noise originating from pump will be heard distinctly at the inner side of front left tire house.
*4: The term "re-check" means inspection under normal condition (not in the CONSULT fail-safe mode, etc.).

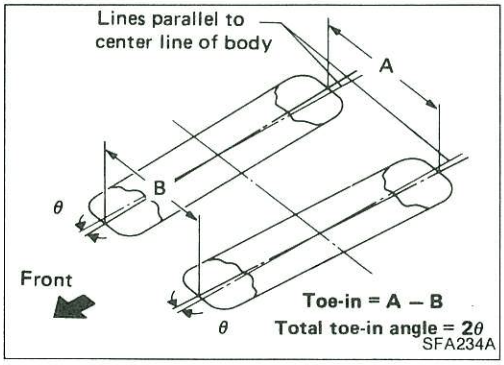
Rear Wheel Alignment (Cont'd)



TOE-IN

1. Draw a base line across the tread.

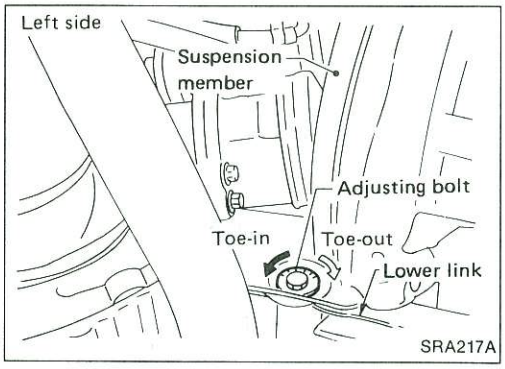
After lowering rear of vehicle, move it up and down to eliminate friction.



2. Measure toe-in.

Measure distance "A" and "B" at the same height as hub center.

Toe-in:
Refer to S.D.S.

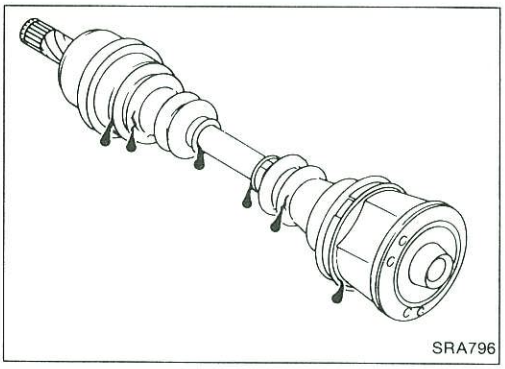


3. Adjust toe-in by turning adjusting bolts. For models equipped with SUPER HICAS system, refer to SUPER HICAS.

Toe changes about 1.5 mm (0.059 in) [One side] with each graduation of the adjusting bolt.

4. Tighten to the specified torque.

: 69 - 88 N·m
(7.0 - 9.0 kg-m, 51 - 65 ft-lb)



Drive Shaft

Check boot and drive shaft for cracks, wear, damage or grease leakage.

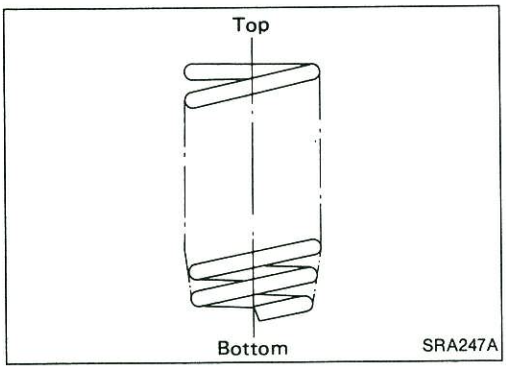
Inspection (Cont'd)

UPPER RUBBER SEAT AND BUSHING

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

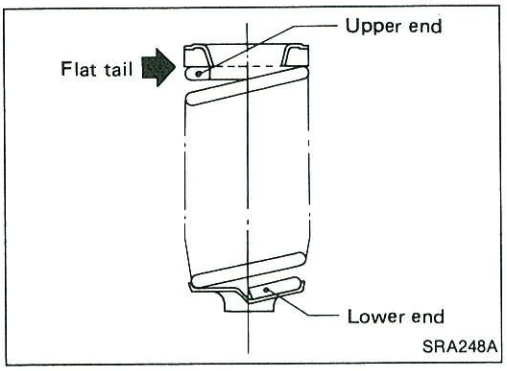
COIL SPRING

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

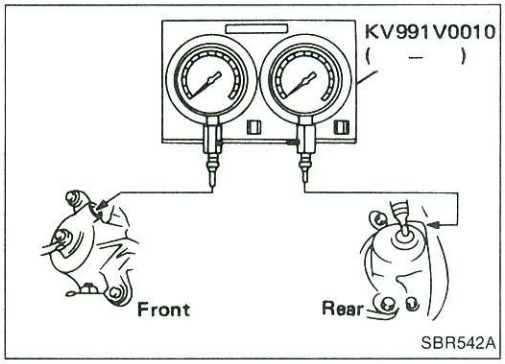


Assembly

- When installing coil spring, be careful not to reverse top and bottom direction. (Top end is flat.)



- When installing coil spring on strut, it must be positioned as shown in figure at left.



Proportioning Valve

INSPECTION

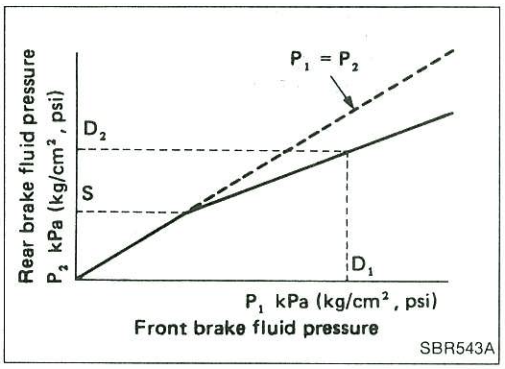
CAUTION:

- **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.**
- **Disconnect harness connectors from ABS actuator before checking.**

1. Connect tool to air bleeders of front and rear brakes on either L.H. and R.H. side.
   Tool number: KV991V0010
   (—)
2. Bleed air from Tool.
3. Check fluid pressure by depressing brake pedal. .

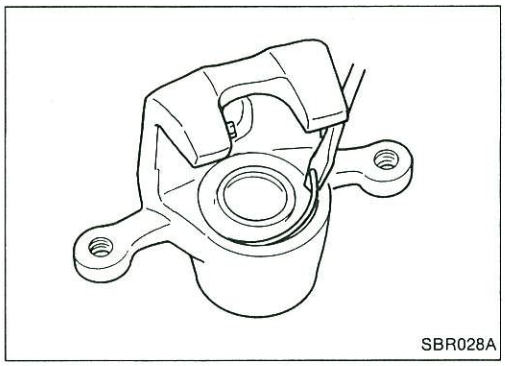
Unit: kPa (kg/cm^2, psi)

Applied pressure (Front brake)	D_1	7,355 (75, 1,067)
Output pressure (Rear brake)	D_2	5,100 - 5,492 (52 - 56, 739 - 796)



If output pressure is out of specifications, replace master cylinder assembly.

4. Bleed air after disconnecting Tool. Refer to "Bleeding Procedure" in "AIR BLEEDING".

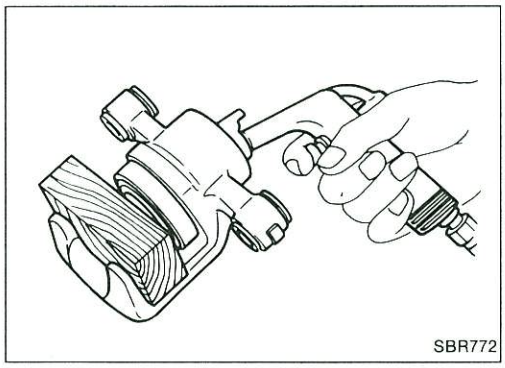

SBR028A

Disassembly

WARNING:
Do not place your fingers in front of piston.

CAUTION:
Do not scratch or score cylinder wall.

1. Remove dust cover retainer with a screwdriver.


SBR772

2. Push out piston and dust seal with compressed air.
3. Remove piston seal with a suitable tool.

Inspection — Caliper

CYLINDER BODY

- Check inside surface of cylinder for score, rust, wear, damage or presence of foreign materials. If any of the above conditions are observed, replace cylinder body.
- Minor damage from rust or foreign materials may be eliminated by polishing surface with a fine emery paper. Replace cylinder body if necessary.

CAUTION:
Use brake fluid to clean. Never use mineral oil.

PISTON

CAUTION:
Piston sliding surface is plated. Do not polish with emery paper even if rust or foreign materials are stuck to sliding surface.

Check piston for score, rust, wear, damage or presence of foreign materials. Replace if any of the above conditions are observed.

SLIDE PIN, PIN BOLT AND PIN BOOT

Check for wear, cracks or other damage. Replace if any of the above conditions are observed.

Inspection — Rotor

RUBBING SURFACE

Check rotor for roughness, cracks or chips.

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

KEY POINTS

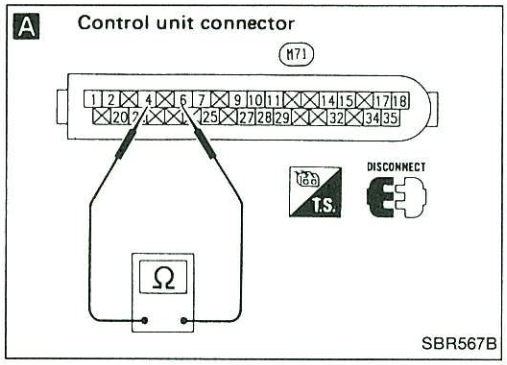
WHAT ..... **Vehicle model**
WHEN ..... **Date, Frequencies**
WHERE ..... **Road conditions**
HOW ..... **Operating conditions, Weather conditions, Symptoms**

DIAGNOSTIC WORKSHEET

There are many kinds of operating conditions that lead to customer complaints, even if the system is normal.
A good grasp of such conditions can make trouble-shooting faster and more accurate.
In general, feelings for a problem depend on each customer's information. It is therefore important to fully understand the symptoms or under what conditions a customer complains.
Make good use of a diagnostic worksheet such as the one shown below in order to utilize all the complaints for trouble-shooting.

Worksheet sample

Customer name MR/MS		Model & Year			VIN		
Engine #		Trans.			Mileage		
Incident Date		Manuf. Date			In Service Date		
Symptoms	☐ Pedal vibration and noise	☐ Warning activates	☐ Long stopping distance	☐ Abnormal pedal action	☐ ABS doesn't work	☐ ABS works but warning activates	☐ ABS works frequently
Engine conditions		☐ When starting ☐ After starting ☐ Engine speed: 5,000 rpm or more					
Road conditions		☐ Low friction road (☐ Snow ☐ Gravel ☐ Other) ☐ Protrusion					
Driving conditions		☐ High speed cornering ☐ Vehicle speed: Greater than 10 km/h (6 MPH) ☐ Vehicle speed: 10 km/h (6 MPH) or less ☐ Vehicle is stopped					
Applying brake conditions		☐ Suddenly ☐ Gradually					
Other conditions		☐ Operation of electrical equipment ☐ Large pedal stroke ☐ Operation of clutch					



Diagnostic Procedure 7

WHEEL SPEED SENSOR (L.E.D. flashing number 5 - 8)

INSPECTION START
Remove battery negative terminal connector.

A

CHECK SPEED SENSOR RESISTANCE.
Disconnect control unit connector.
Check resistance between control unit connector (vehicle side) terminals.
Flashing number 5:
Terminals ④ and ⑥
Flashing number 6:
Terminals ⑪ and ㉑
Flashing number 7 or 8:
Terminals ⑦ and ⑨
Resistance: 0.8 - 1.2kΩ

O.K. → Replace control unit.

N.G.

Refer to Preliminary Check 3 result.
Check whether sensor has 0.8 - 1.2 kΩ resistance.

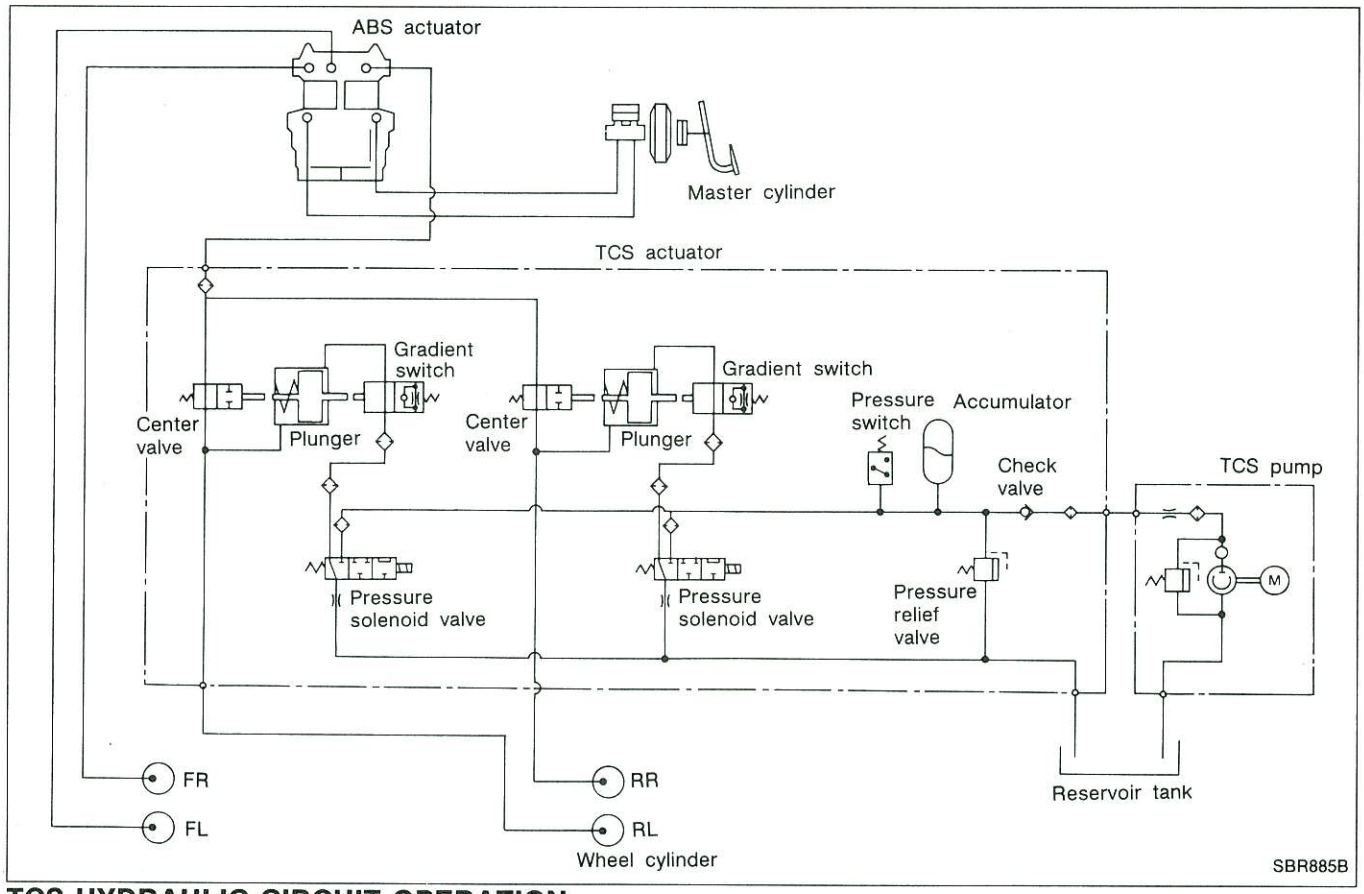
N.G. → Replace sensor.

N.G.

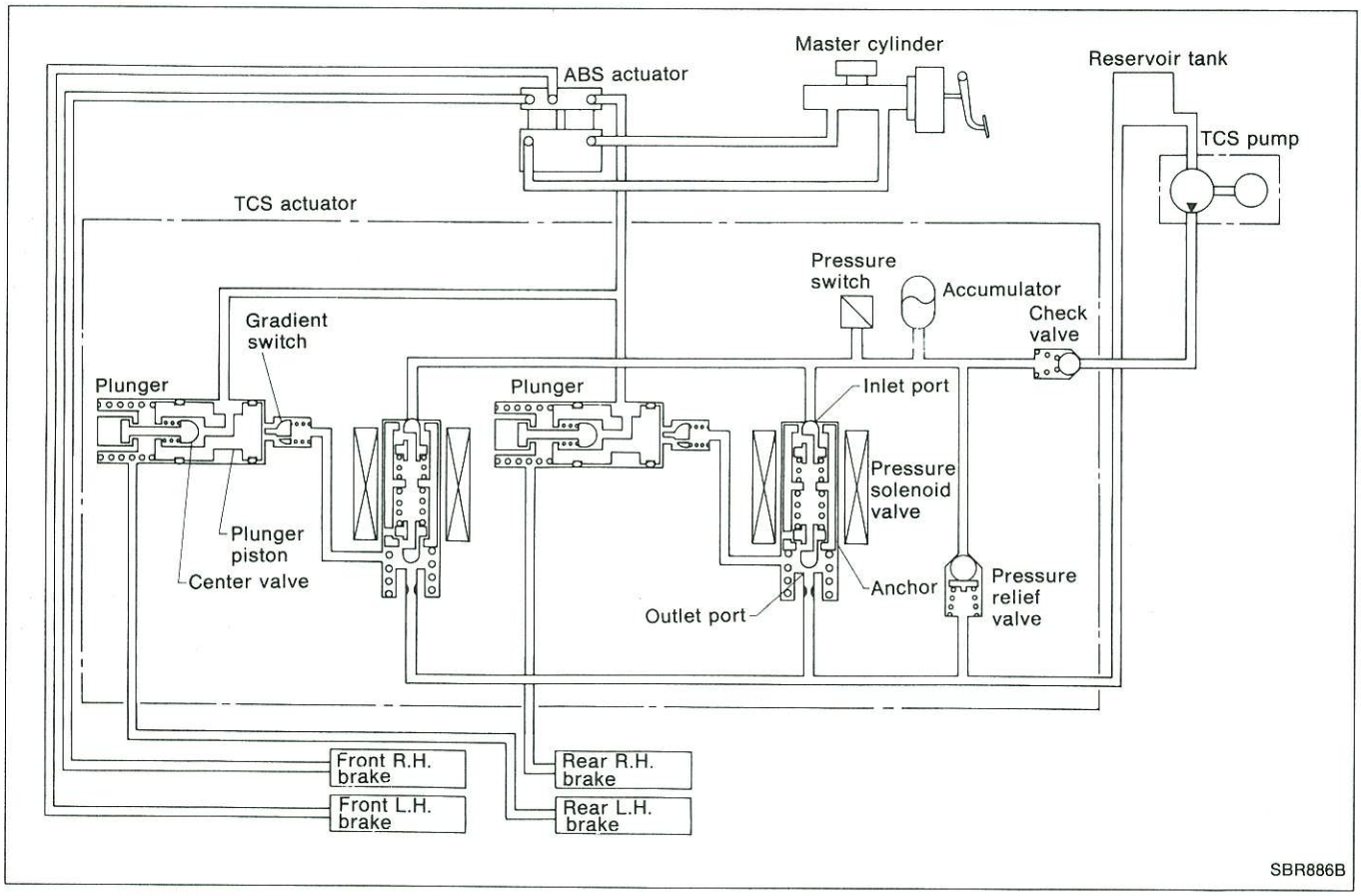
Repair harness between sensor connector and control unit connector.

Components for TCS Brake System (Cont'd)

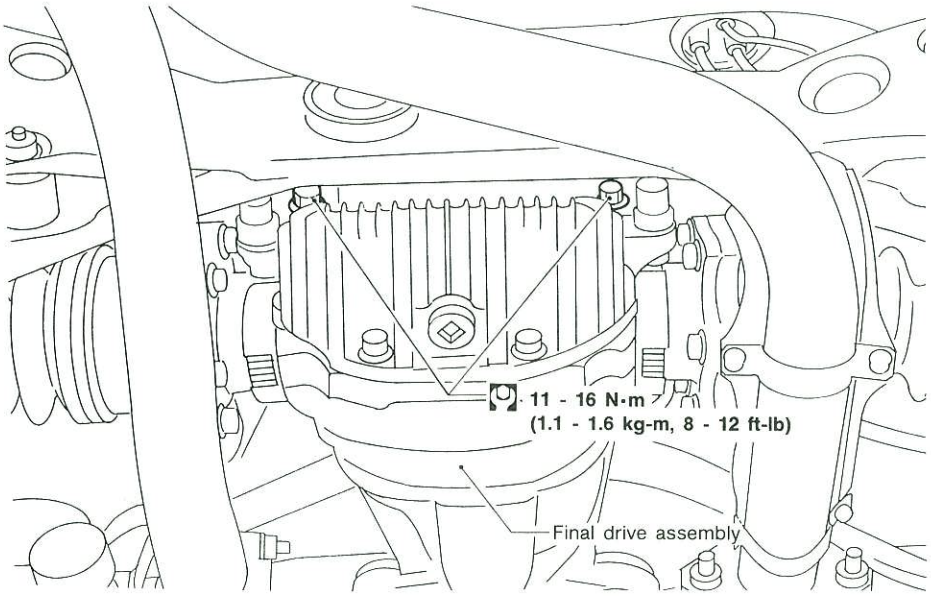
TCS ACTUATOR HYDRAULIC CIRCUIT DIAGRAM



TCS HYDRAULIC CIRCUIT OPERATION



Removal and Installation of Rear Wheel Sensor



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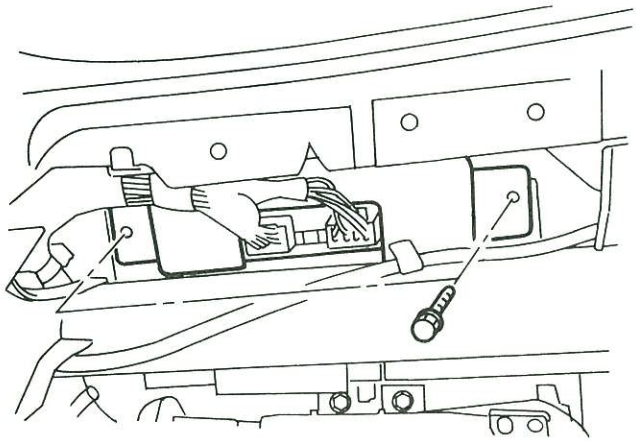
Removal and Installation of T.C.M.

Remove glove box and cover. Then remove T.C.M.



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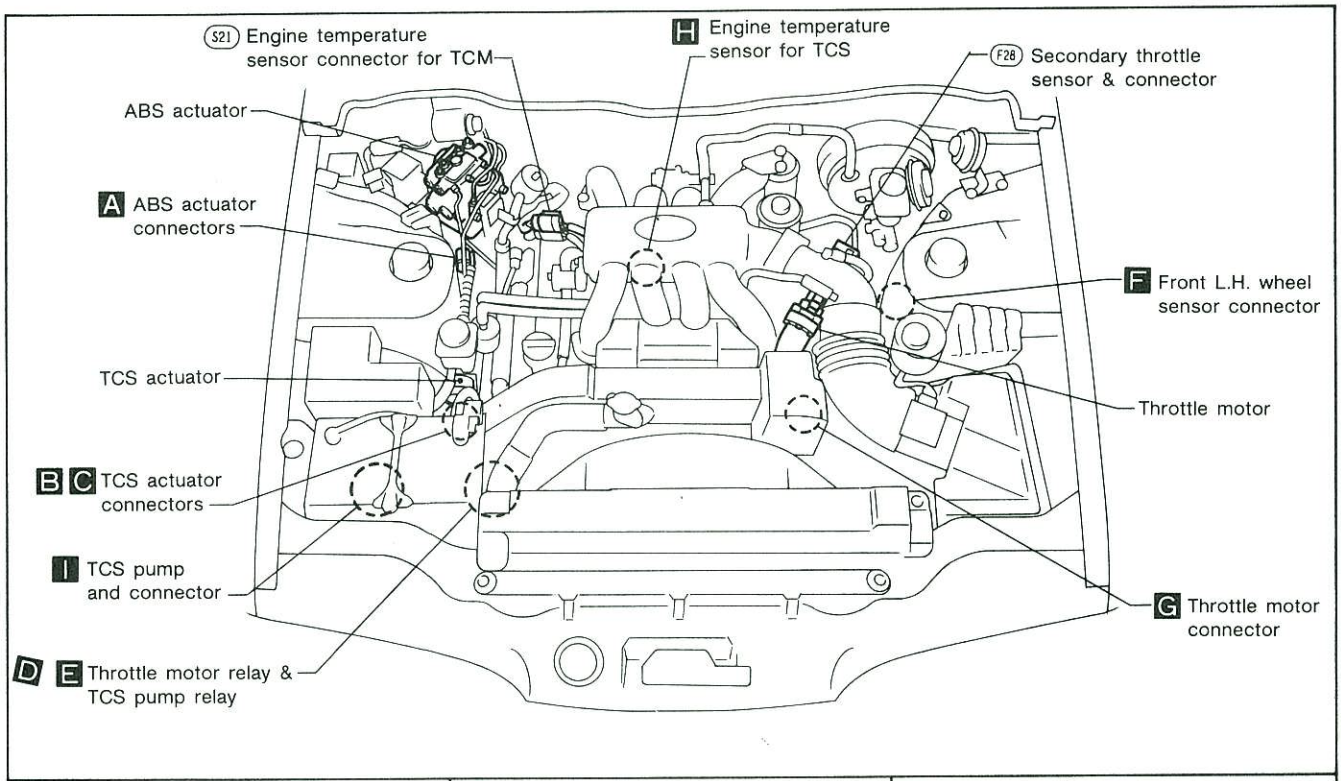
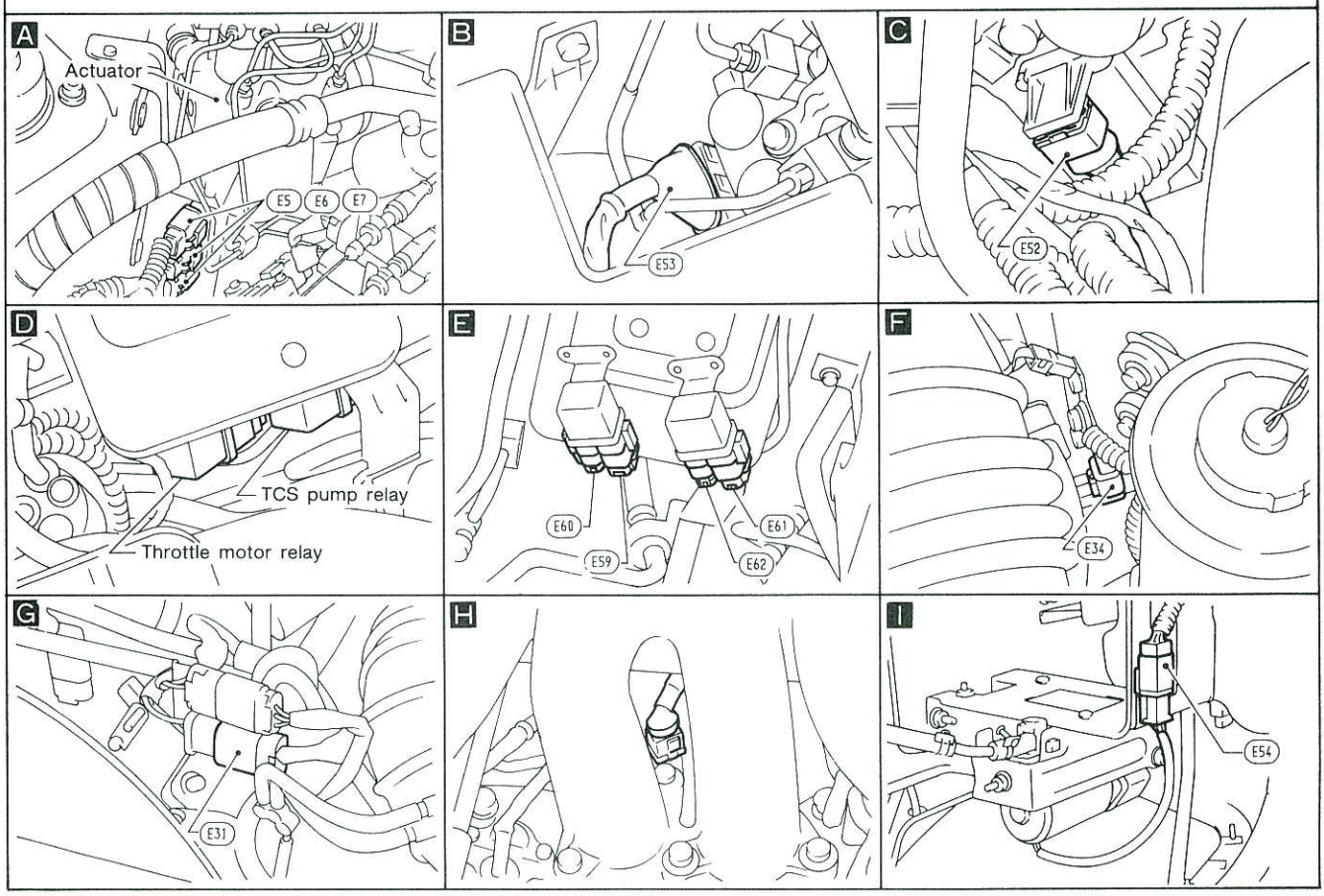
Component Parts and Connector Location

ENGINE ROOM





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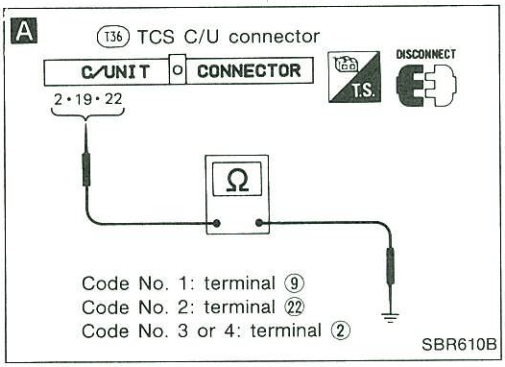
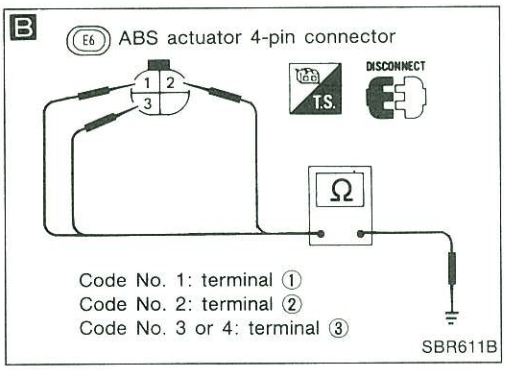




Diagnostic Procedure 10

SOLENOID CIRCUIT FOR ABS ACTUATOR (Code No. 1, 2, 3 or 4)

A

SOLENOID CIRCUIT FOR ABS ACTUATOR

Check resistance between TCS C/U connector terminals and ground.
Code No. 1:
Terminal (19) and ground
Code No. 2:
Terminal (22) and ground
Code No. 3 or 4:
Terminal (2) and ground
Resistance: 0.8 - 1.2Ω

O.K. → Replace TCS C/U.

N.G. ↓

B

- Disconnect 4-pin connector from ABS actuator.
- Check resistance between ABS actuator connector (actuator side) terminals and ground.
  Code No. 1:
  Terminal (1) and ground
  Code No. 2:
  Terminal (2) and ground
  Code No. 3 or 4:
  Terminal (3) and ground
  Resistance: 0.8 - 1.2Ω

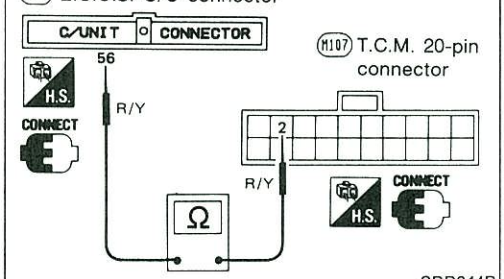
N.G. → Replace actuator.

O.K. ↓

Repair harness and connectors between actuator connector and TCS C/U connector.

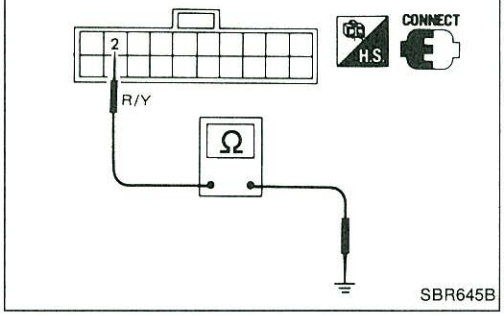
A

(F54) E.C.C.S. C/U connector



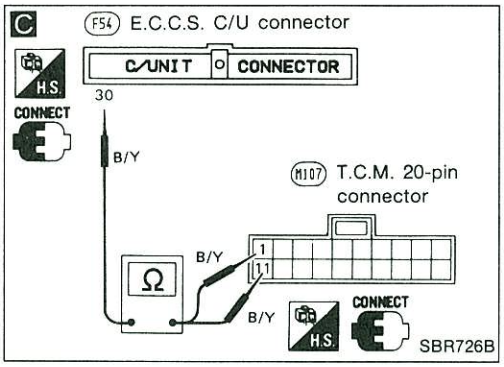
B

(M107) T.C.M. 20-pin connector

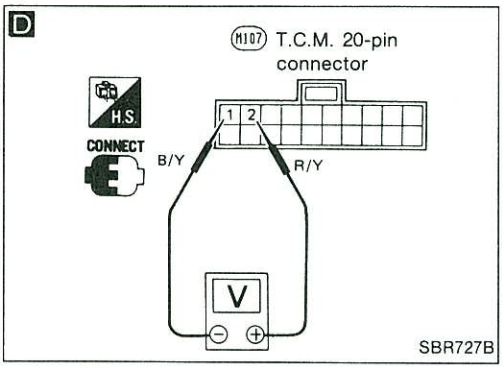


C

(F54) E.C.C.S. C/U connector



D



Diagnostic Procedure 21

THROTTLE SENSOR SIGNAL INPUT CIRCUIT (Code No. 11)

Does TCS C/U display code No. 13?
- No → Inspect system referring to code No. displayed by TCS C/U.
- Yes ↓

Does E.C.C.S. C/U display code No. 43?
- Yes → Check E.C.C.S. Refer to section EF & EC.
- No ↓

A

THROTTLE SENSOR SIGNAL INPUT CIRCUIT
- N.G. → Repair harness and connectors.

- Check continuity between terminal ② for T.C.M. and terminal ⑤⑥ for E.C.U.
  Continuity should exist.

O.K. ↓

B

- Check continuity between terminal ② for T.C.M. and ground.
  Continuity should not exist.
- N.G. → Repair harness and connectors.

O.K. ↓

C

Check continuity between terminals ①, ⑪ for T.C.M. and terminal ㉚ for E.C.C.S. C/U.
Continuity should exist.
- N.G. → Repair harness and connector.

O.K. ↓

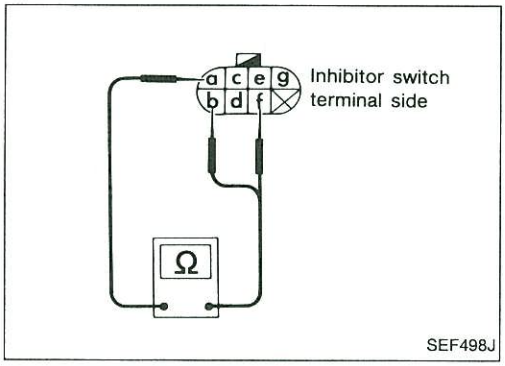
D

Check voltage between terminal ② and terminal ① for T.C.M.
0.3V to 3.3V should exist depending on accelerator position.
- N.G. → Replace E.C.C.S. control unit.

O.K. ↓

Replace T.C.M.

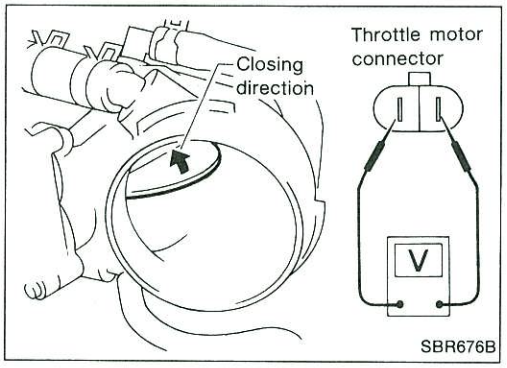
Electrical Component Inspection (Cont'd)



INHIBITOR SWITCH

Check continuity between terminals ⓐ and ⓑ, ⓕ.

Condition	Continuity between terminals ⓐ and ⓑ	Continuity between terminals ⓐ and ⓕ
Shift to "P" position	Yes	No
Shift to "N" position	No	Yes
Shift to positions other than "P" and "N"	No	No



THROTTLE MOTOR

WARNING:

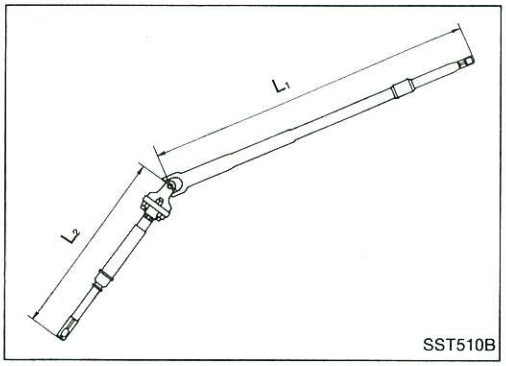
Before touching the secondary throttle valve, be sure to disconnect the throttle valve motor connector; otherwise, injury may occur due to accidental actuation of the valve.

Check voltage produced by motor by opening/closing secondary throttle valve as quickly as possible.

Use needle type voltmeter.

Needle should fluctuate.

Make sure throttle valve moves smoothly from fully closed to fully open position without binding.



Inspection

- When steering wheel can not be rotated smoothly, check the steering column for the following matters and replace damaged parts.

a. Check column bearings for damage or unevenness. Lubricate with recommended multi-purpose grease or replace steering column as an assembly, if necessary.

b. Check steering column lower shaft for deformation or breakage. Replace if necessary.

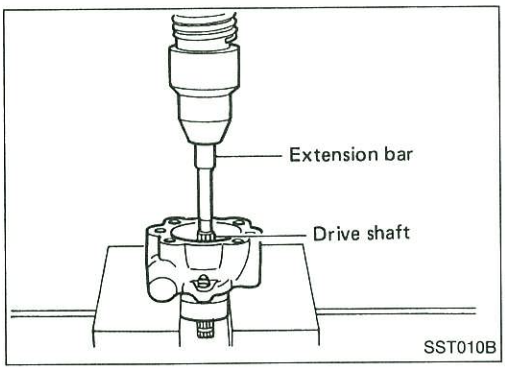
- When the vehicle is involved in a light collision, check steering column length "L_1" and steering column lower shaft length "L_2". If it is not within specifications, replace steering column as an assembly.

Steering column length "L_1":
618.7 - 620.3 mm (24.36 - 24.42 in)
Steering column lower shaft length "L_2":
356.8 - 358.4 mm (14.05 - 14.11 in)

Disassembly

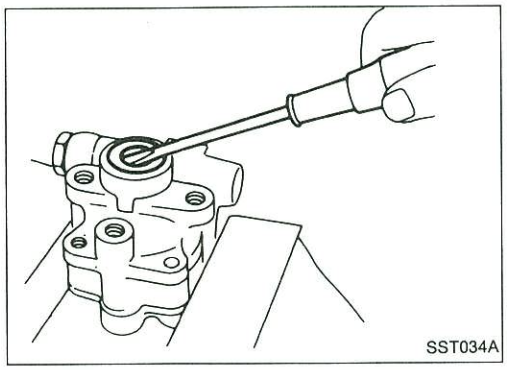
CAUTION:

- **Parts which can be disassembled are strictly limited. Never disassemble parts other than those specified.**
- **Disassemble in as clean a place as possible.**
- **Clean your hands before disassembly.**
- **Do not use rags; use nylon cloths or paper towels.**
- **Follow the procedures and cautions in the Service Manual.**
- **When disassembling and reassembling, do not let foreign matter enter or contact the parts.**



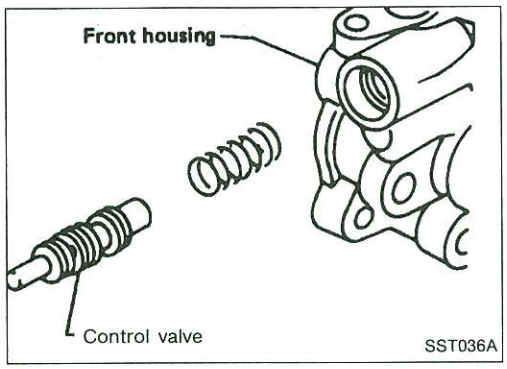
- Remove snap ring, then draw drive shaft out.

Be careful not to drop drive shaft.



- Remove oil seal.

Be careful not to damage front housing.



- Remove connector.

Be careful not to drop control valve.

Inspection

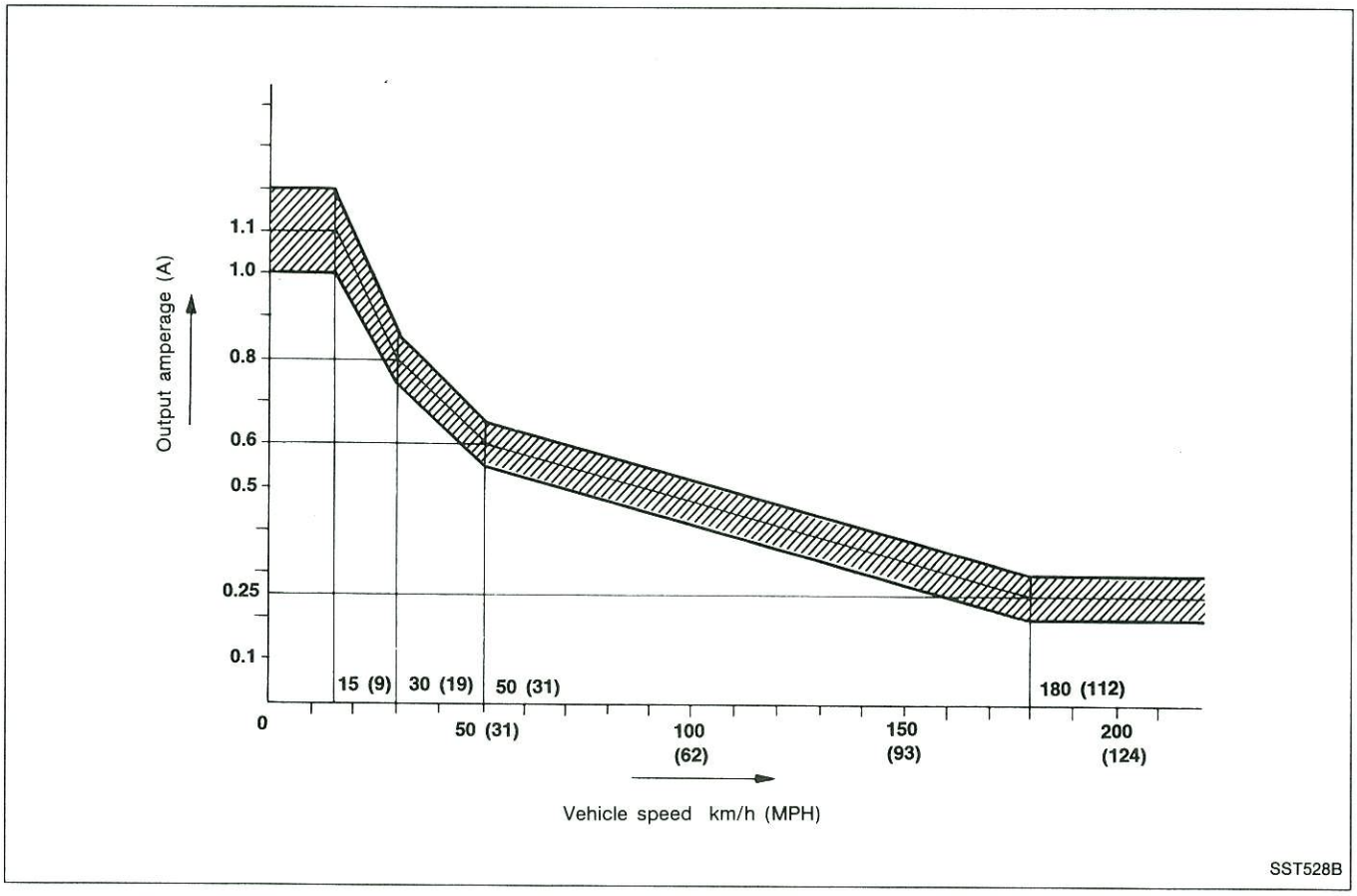
Inspect each component part for wear, deformation, scratches, and cracks. If damage is found, replace the part.

Control Unit Inspection Table

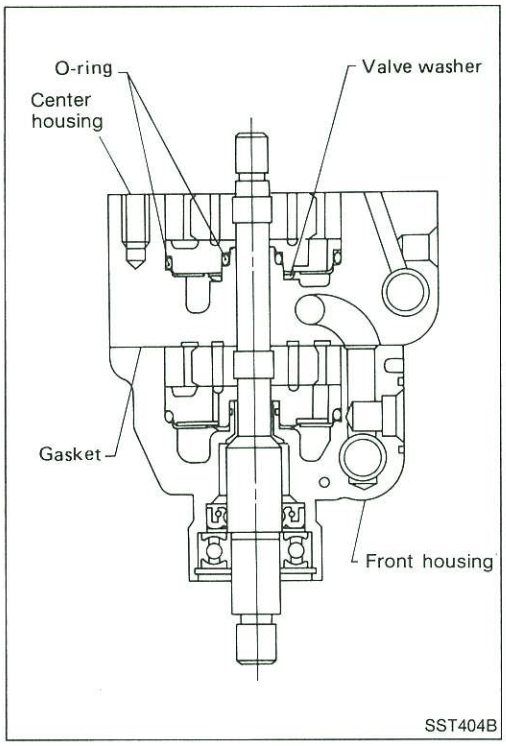
The standard values (voltage), measured with an analog tester in contact with the control unit terminal, are shown below:

Terminal No.	Application	Standard value
1	Power	Approx. 12V
2	Ground	0V
3	Vehicle speed sensor input	1 volt (min.) and 5 volts (max.) are alternately repeated when vehicle is driven at very slow speeds.
4	Stop lamp switch input	Pressed: Approx. 12V Released: 0V
5	Neutral switch input	0V (selector lever in "N" or "P") 4 - 5V (except for the above)
6	Parking brake switch input	Applied: 0V Released: Approx. 12V
7	Power steering solenoid valve output	0 km/h 4.4 - 6.6V 100 km/h 1.8 - 2.8V Fail-safe 1.0 - 1.5V
8	Ground	0V

Performance of Controller

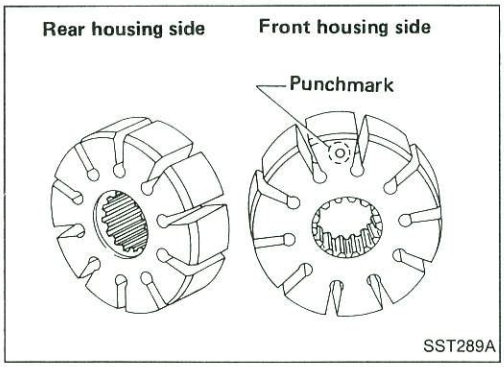


Assembly (Cont'd)

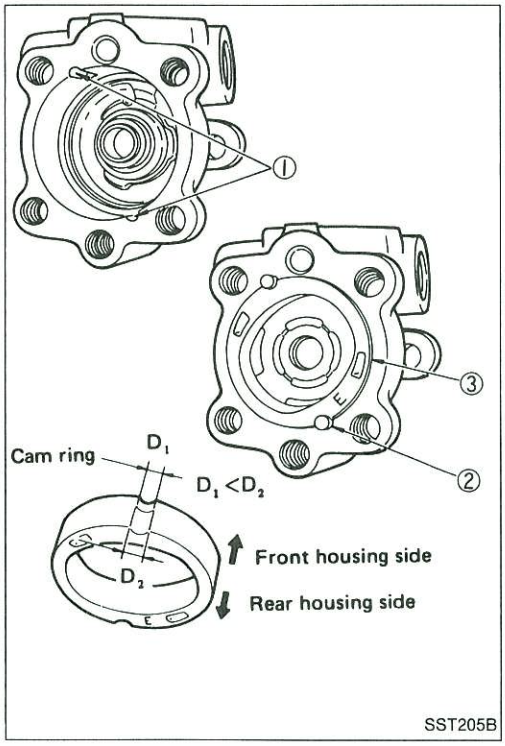


3. Install component parts on front housing in the order indicated below:
1) O-ring x 2
2) Wave washer
3) Side plate
4) Rotor
5) Vane
6) Pin
7) Cam ring
4. Place packing on front housing and position center housing on the packing. In the manner similar to step 3. above, install component parts on front housing.

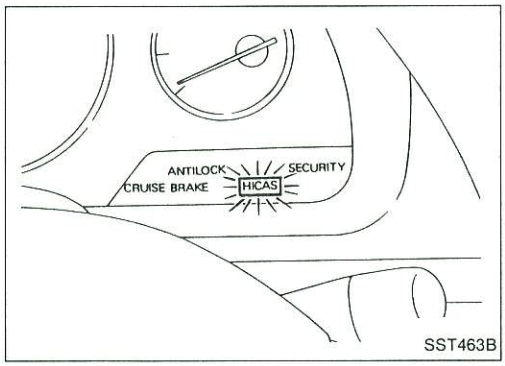
CAUTION:
- **Ensure that O-rings are positioned properly.**
- **Ensure that vane is installed with curved side facing cam ring.**
- **Use cam, rotor vane as original single unit.**
- **Ensure that control valve moves smoothly.**



- Pay attention to rotor direction.

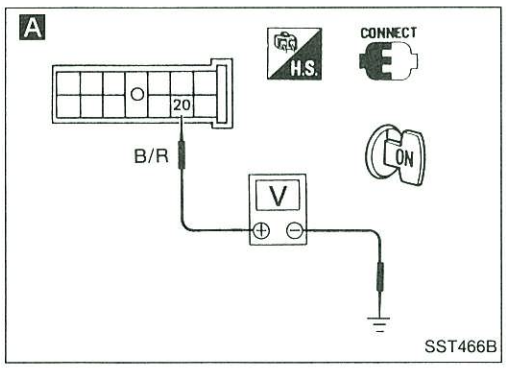


- Pay attention to cam ring direction.



Diagnostic Procedure 1

SYMPTOM:
No warning lamp comes on when ignition switch is turned "ON".



START

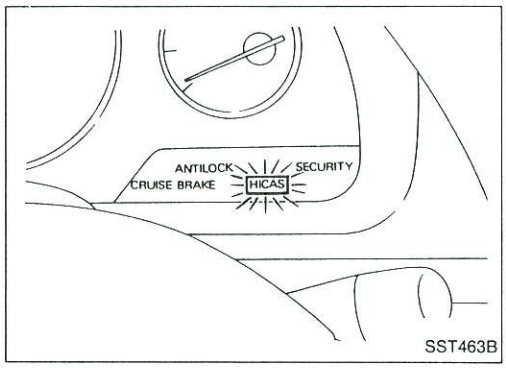
A

CHECK WARNING LAMP POWER SUPPLY.
1) Turn ignition switch "ON".
2) Measure voltage across warning lamp connector terminal 20 and ground.
Voltage:
Approximately 12V

N.G. → Check and repair wiring.

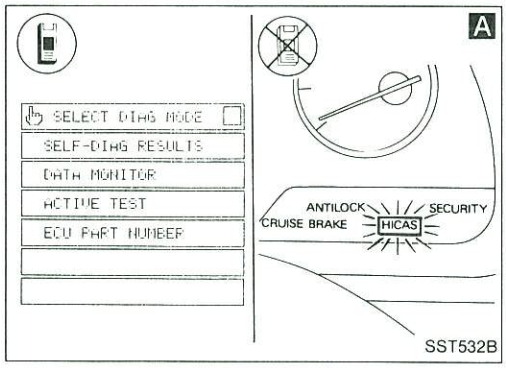
O.K.

Replace warning lamp.



Diagnostic Procedure 2

SYMPTOM (A):
Warning lamp comes on during operation.



START

A

Check in self-diagnosis mode.
Refer to page ST-66.

Repair malfunctioning part detected by self-diagnosis.
Refer to Diagnostic Procedures 5 to 12.

O.K. → END

N.G.

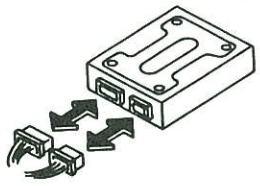
Check connectors for improper contact.

O.K. → END

N.G.

Check steering neutral position.
Refer to page ST-56.

A



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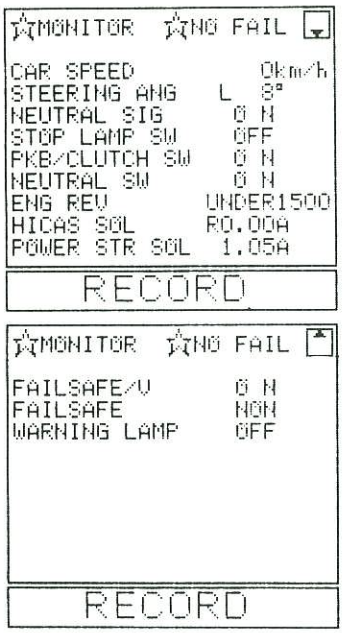
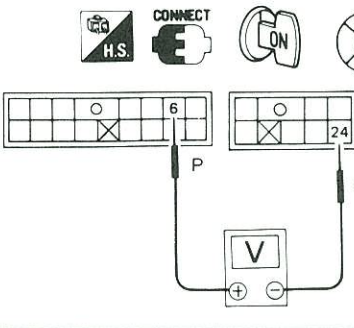
B



SST416B

B



SST766B

Diagnostic Procedure 9

SYMPTOM:

Vehicle speed signal is not present.

START

A

CHECK CONNECTOR CONTINUITY.
Disconnect control unit connector and reconnect it firmly. Conduct self-diagnosis.

O.K. → Poor connector connection

N.G.

B

CHECK CONTROL UNIT INPUT SIGNAL.
1) Raise rear end of vehicle so that rear wheels rotate freely.
2) Set CONSULT in DATA MONITOR mode.
Vehicle speed display (km/h)
OR
2) Measure voltage variations between control unit connector terminals ⑥ and ㉔ while slowly rotating rear wheels using your hand.
Voltage must change between 0 and 5V.

O.K. → Replace control unit.

N.G.

Repair or replace harness between speed sensor or control unit and speedometer.

Body Rear End and Opener

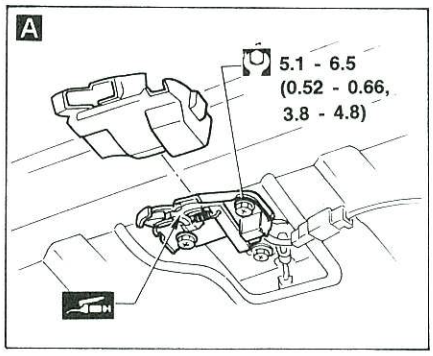
- Trunk lid adjustment: Adjust at hinge-trunk lid portion for proper trunk lid fit.
- Trunk lid lock system adjustment: Adjust striker so that it is in the center of the lock. After adjustment, check trunk lid lock operation.
- Opener cable: Do not attempt to bend cable using excessive force.
- After installation, make sure that trunk lid and fuel filler lid open smoothly.

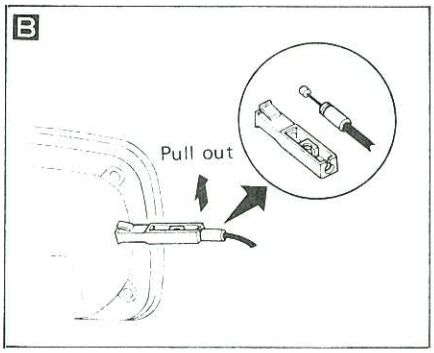
CAUTION:

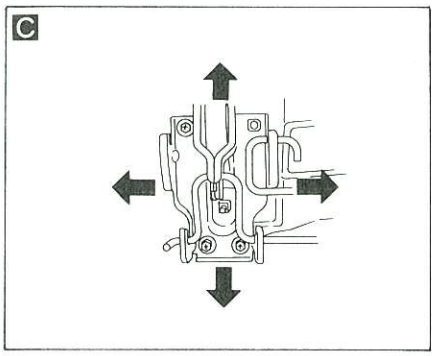
Do not touch reinforcement with bare hands. Wear leather working gloves, since reinforcement surface is covered with fiberglass.

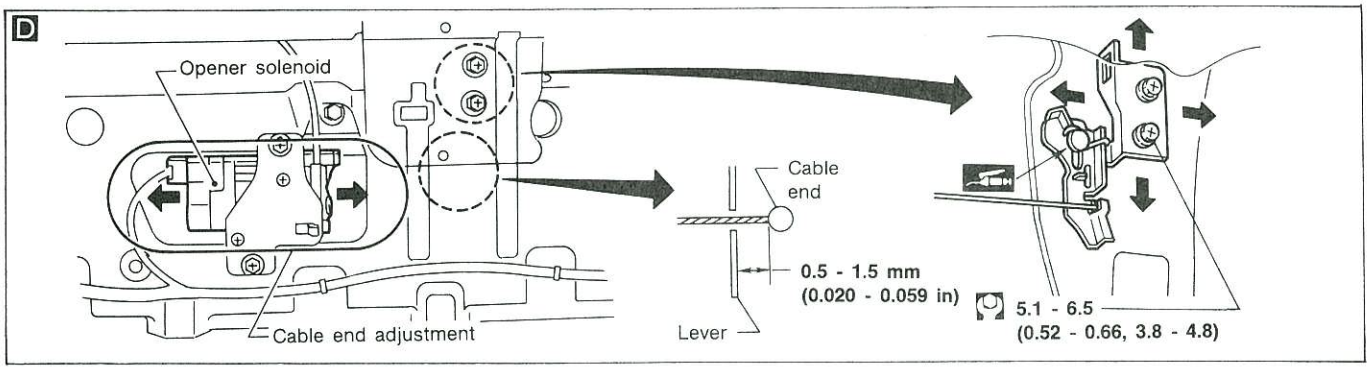
REMOVAL — Rear bumper assembly

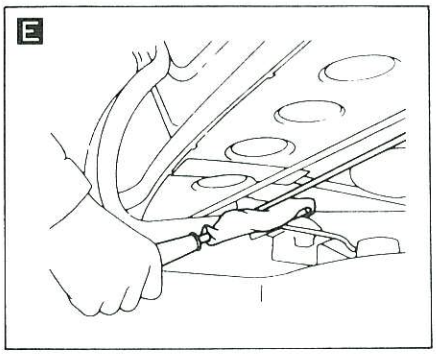
① Remove license plate.
② Remove eight bolts from lower side of rear bumper.
③ Remove two screws from lower side of each side bumper.
④ Remove trunk trim. Refer to "LUGGAGE COMPARTMENT TRIM" in "Interior" for details.
⑤ Working inside trunk, remove three bolts securing each bumper side to fender.
⑥ Working inside trunk, remove three nuts securing each corner of bumper fascia.
⑦ Also remove ten nuts from center of trunk compartment.
⑧ Remove screws securing wheelarch to each bumper side.
⑨ Pull bumper fascia out. Remove side marker lamp and license lamp harness connectors.
⑩ Remove bumper stays. Working inside trunk, remove left and right plugs from floor, then remove bolts.

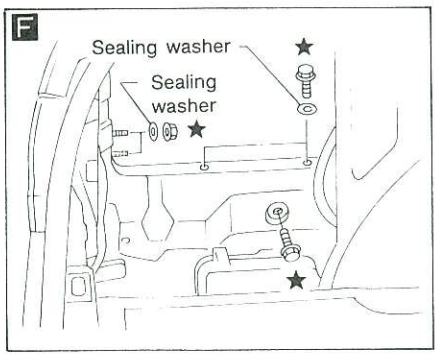




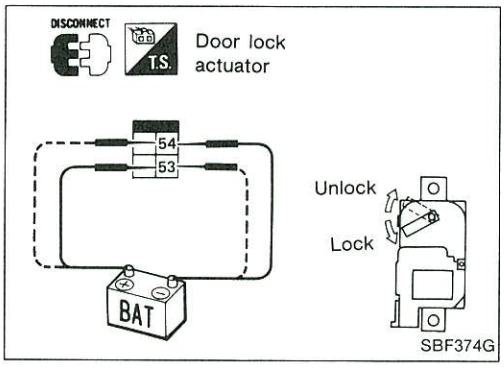








Power Door Lock (Cont'd)

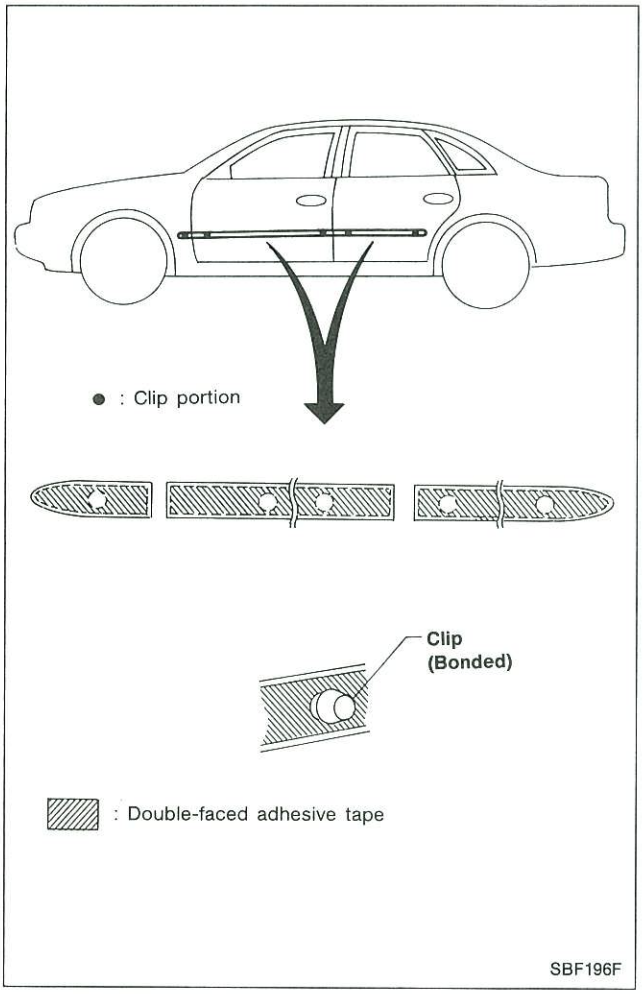


Door lock actuator

Terminals		Operation
⊕	⊖	
⑤③	⑤④	Lock
⑤④	⑤③	Unlock

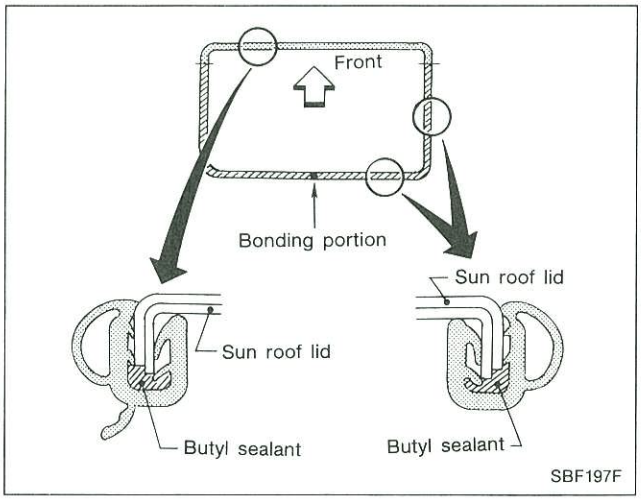
Exterior (Cont'd)

⑰ Side guard molding



SBF196F

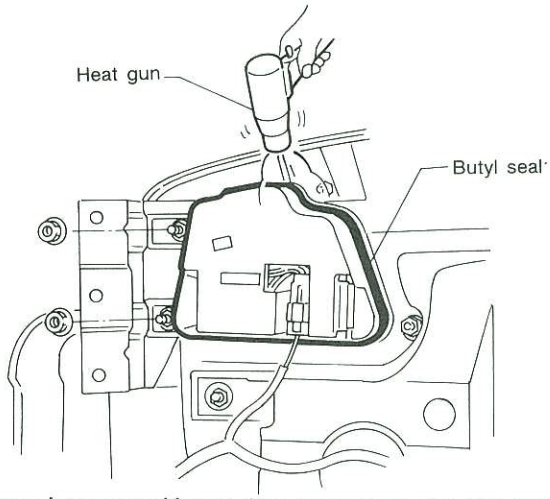
⑱ Sun roof weatherstrip



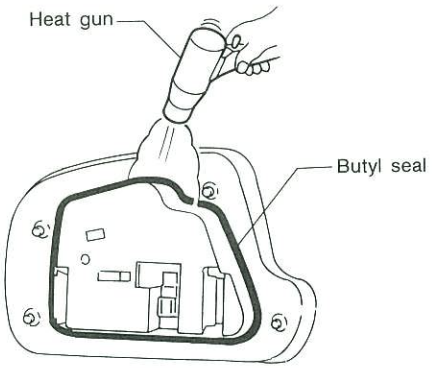
SBF197F

⑲ Rear combination lamp

● Rear combination lamps are installed with nuts and butyl seal.



● **Warm up lamp assembly area to a temperature of a little below 60°C (140°F).**

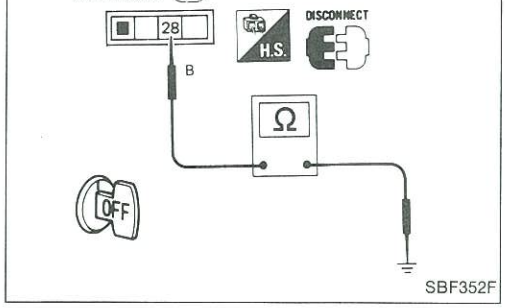


● **Apply butyl seal evenly as it tends to become thin in the corners.**
● **Warm up lamp assembly area to a temperature of a little below 60°C (140°F).**

SBF198F

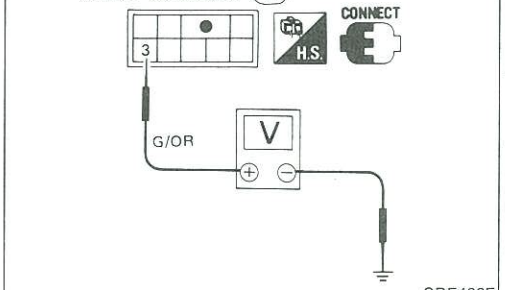
Diagnostic Procedure 2 (Cont'd)

E Sliding limit switch connector (S4)



SBF352F

F Driver's side power seat control switch connector (D6)



SBF466F

(A)

E Note

CHECK GROUND CIRCUIT FOR SLIDING LIMIT SWITCH.
Check harness continuity between sliding limit switch harness terminal (28) and body ground.
Continuity should exist.

O.K.

CHECK SLIDING LIMIT SWITCH.
(Refer to Electrical Components Inspection.)

N.G. → Replace sliding limit switch.

O.K.

Reconnect power seat control unit harness connector (S1) and sliding limit switch harness connector (S4).

CHECK MULTIPLEX SIGNAL FROM DRIVER'S SIDE POWER SEAT CONTROL SWITCH.

1) Remove driver's side power seat control switch with harness connected.
2) Remove armrest.
3) Remove door trim with harnesses connected.

F 4) Check voltage between driver's side power seat control switch harness terminal (3) and body ground while turning sliding switch ON and OFF.

Control switch	Voltage
Sliding switch ON	Approximately 1.0 - 1.6V
All switches OFF	0V

Note: Do not use a digital type voltmeter.

N.G. → Replace driver's side power seat control switch.

O.K.

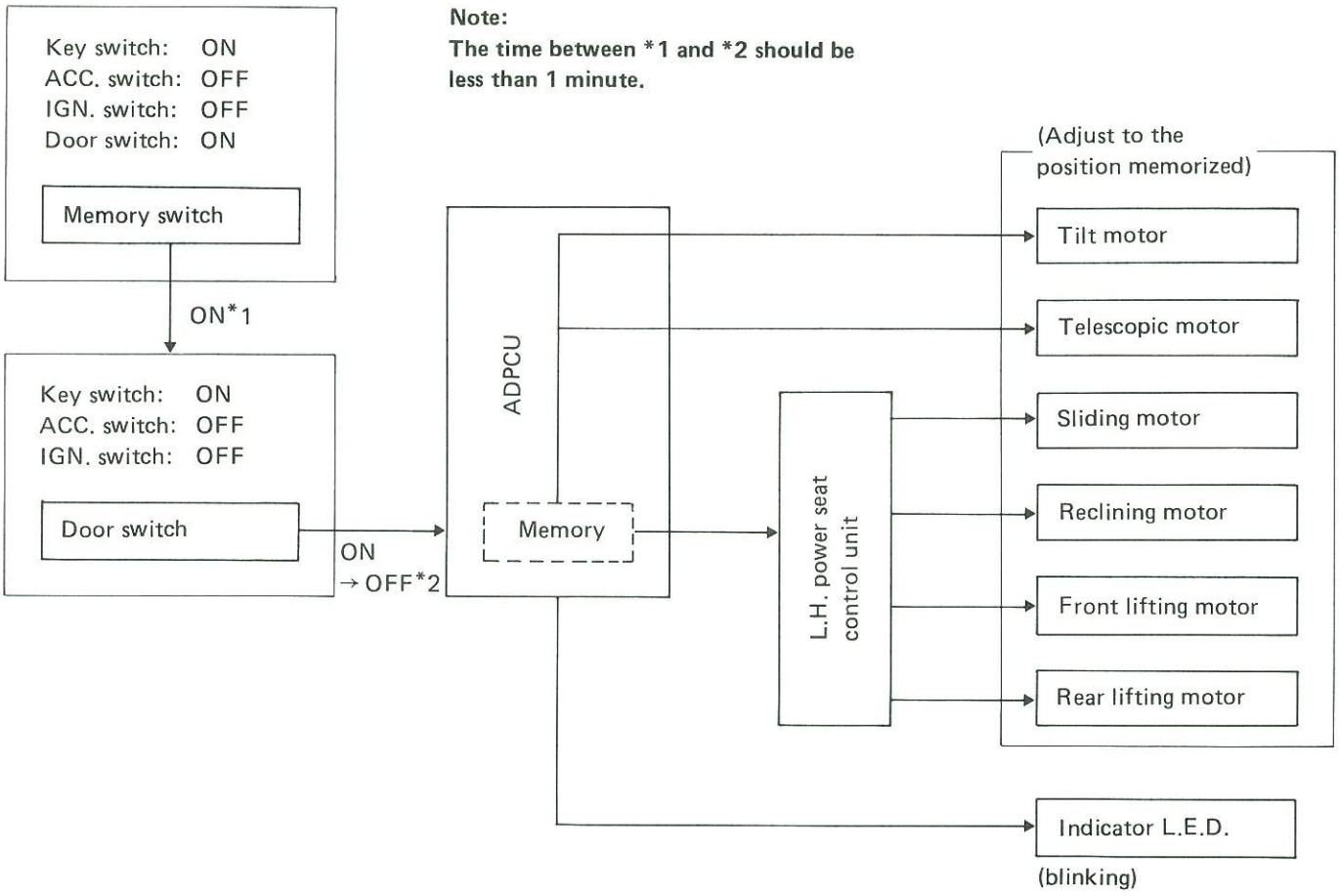
Replace driver's side power seat control unit.

Note:
If the result is N.G. after checking, repair harness, terminals or connectors.

System Operation (Cont'd)

Pattern C

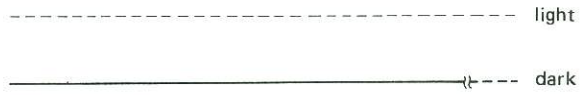
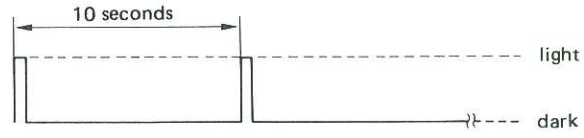
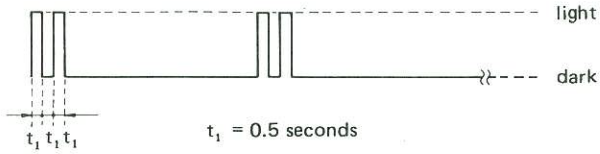
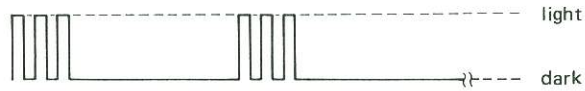
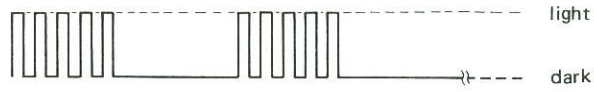
If either memory switch 1 or 2 is touched with the driver's door open and the ignition key inserted into the ignition switch and then the door is closed within approximately 1 minute after the memory switch is touched, the driver's seat and the steering column are adjusted to the position memorized by the ADPCU.



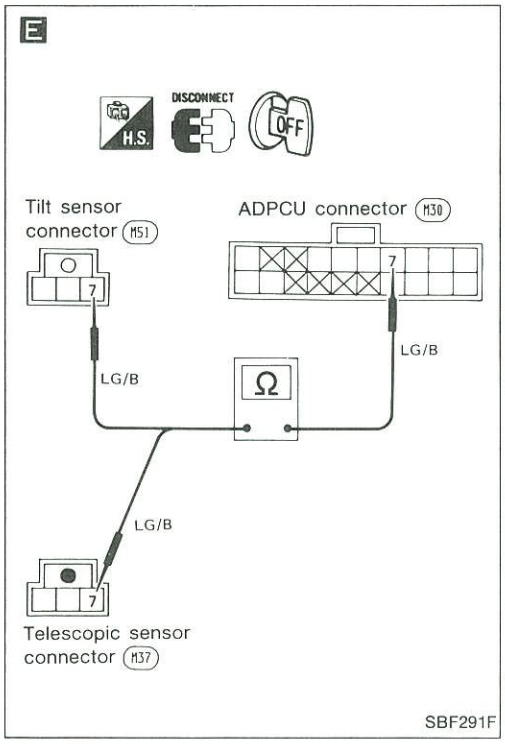
Note:
The time between *1 and *2 should be less than 1 minute.

Self-diagnosis without CONSULT (Cont'd)

JUDGMENT OF SELF-DIAGNOSIS CODE

Indicator LEDs	Damaged circuit
LEDs do not come on. 	All circuits that can be confirmed by self-diagnosis are O.K.
LEDs flicker once in one cycle. 	Driver's seat sliding device circuit
LEDs flicker twice in one cycle. 	Driver's seat reclining device circuit
LEDs flicker 3 times in one cycle. 	Driver's seat front lifting device circuit
LEDs flicker 4 times in one cycle. 	Driver's seat rear lifting device circuit
LEDs flicker 5 times in one cycle. 	Steering column telescopic device circuit
LEDs flicker 6 times in one cycle. 	Steering column tilt device circuit
LEDs flicker 7 times in one cycle. 	Vehicle speed sensor circuit

Diagnostic Procedure 3 (Cont'd)



Ⓐ

E

Note

CHECK TILT AND TELESCOPIC SENSOR HARNESSES.

1) Disconnect tilt, telescopic harness connectors and ADPCU harness connector (M30).
2) Check harness continuity between ADPCU harness terminal (7) and harness terminal (7) of both tilt sensor and telescopic sensor.
   Continuity should exist.

O.K.

Note

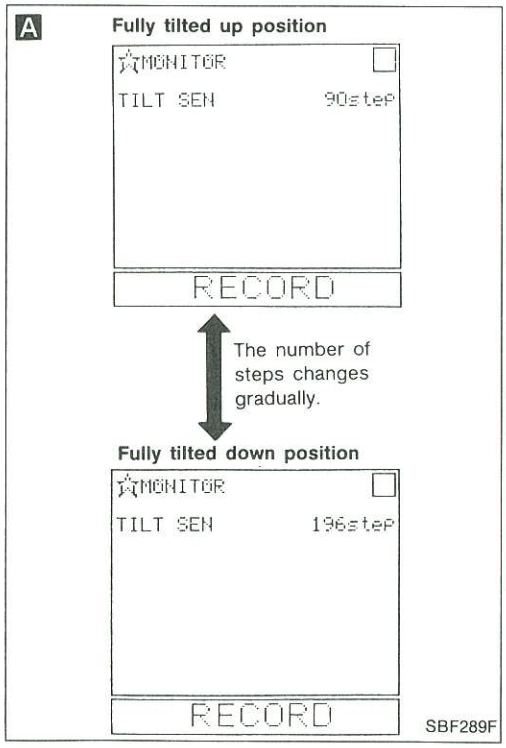
- CHECK THE ADPCU PIN TERMINALS FOR DAMAGE.
- CHECK THE CONNECTION AT THE ADPCU HARNESS CONNECTOR (M30).

O.K.

Replace ADPCU.

Note:
If the result is N.G. after checking, repair harness, terminals or connectors.

Diagnostic Procedure 3-2: Procedure with CONSULT



Connect CONSULT to vehicle.

A

CHECK TILT SENSOR SIGNALS FOR ADPCU.
See "TILT SEN" in DATA MONITOR mode.

- **The more downward the position of the steering column, the more the number of steps displayed increases.**
- **The more upward the position of the steering column, the more the number of steps displayed decreases.**

N.G. → Ⓑ (Go to next page.)

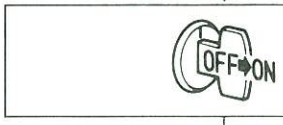
O.K.

Ⓐ

Diagnostic Procedure 7 (Cont'd)

Diagnostic Procedure 7-3: Procedure with CONSULT when one of the manual operations (tilt or telescopic) is malfunctioning.

Connect CONSULT to vehicle.



A

CHECK TILT UP SWITCH.
See "TILT SW-UP" in DATA MONITOR mode.
"TILT SW-UP" should change from "OFF" to "ON" when tilt up switch is turned ON.

N.G. → Go to **Diagnostic Procedure 7-1.**

O.K.

B

CHECK TILT DOWN SWITCH.
See "TILT SW-DW" in DATA MONITOR mode.
"TILT SW-DW" should change from "OFF" to "ON" when tilt down switch is turned ON.

N.G. → Go to **Diagnostic Procedure 7-1.**

O.K.

C

CHECK TELESCOPIC FRONT SWITCH.
See "TELESCO SW-FR" in DATA MONITOR mode.
"TELESCO SW-FR" should change from "OFF" to "ON" when telescopic front switch is turned ON.

N.G. → Go to **Diagnostic Procedure 7-2.**

O.K.

D

CHECK TELESCOPIC REAR SWITCH.
See "TELESCO SW-RR" in DATA MONITOR mode.
"TELESCO SW-RR" should change from "OFF" to "ON" when telescopic rear switch is turned ON.

N.G. → Go to **Diagnostic Procedure 7-2.**

O.K.

INSPECTION END

A

SBF302F

B

SBF303F

C

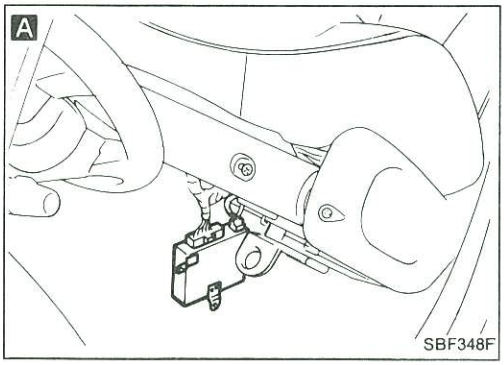
SBF304F

D

SBF305F

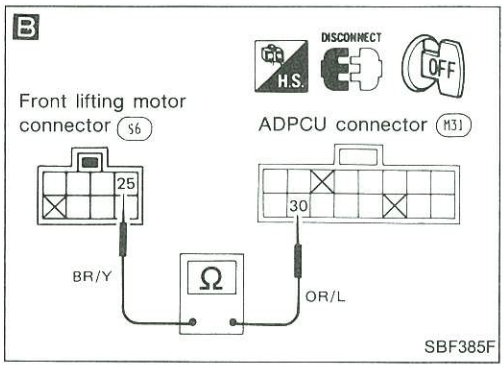
Diagnostic Procedure 15 (Cont'd)

Diagnostic Procedure 15-3: When front lifting device circuit is judged N.G. by self-diagnosis.



A

1) Remove driver's side seat mounting bolts and lay the seat down in the vehicle protecting it with a cloth.
2) Remove power seat control unit mounting screws.



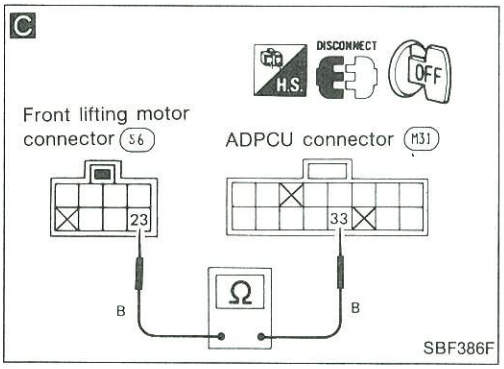
B Note

CHECK FRONT LIFTING SENSOR HARNESS.

1) Disconnect front lifting motor harness connector S6.
2) Remove driver's side instrument front lower cover.
3) Disconnect ADPCU harness connector M31.
4) Check harness continuity between ADPCU harness terminal 30 and front lifting motor harness terminal 25.

Continuity should exist.

O.K.



C Note

CHECK FRONT LIFTING SENSOR GROUND CIRCUIT.

Check harness continuity between front lifting motor harness terminal 23 and ADPCU harness terminal 33.

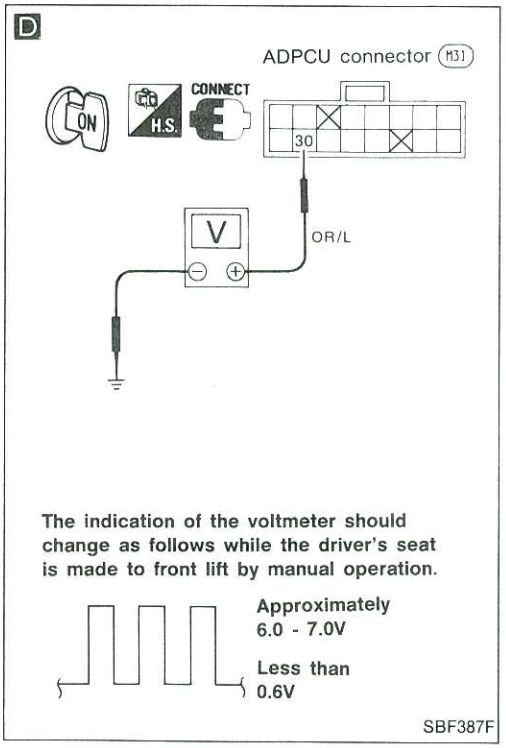
Continuity should exist.

O.K.

CHECK FRONT LIFTING SENSOR. (Refer to Electrical Components Inspection.)

O.K. — N.G.

Replace front lifting motor.



Note

- CHECK THE ADPCU PIN TERMINALS FOR DAMAGE.
- CHECK THE CONNECTION AT THE ADPCU HARNESS CONNECTOR M31.

O.K.

D

CHECK ADPCU.

1) Reconnect ADPCU harness connector M31 and front lifting motor harness terminal S6.
2) Check voltage between ADPCU harness terminal 30 and body ground while moving driver's seat by manual front lifting operation.

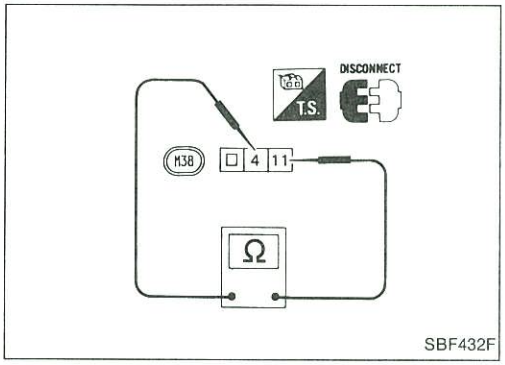
O.K. — N.G.

Replace ADPCU.

INSPECTION END

Note:
If the result is N.G. after checking, repair harness, terminals or connectors.

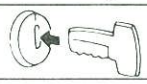
Electrical Components Inspection (Cont'd)

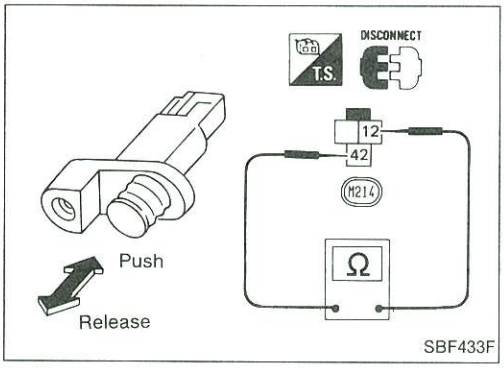


SBF432F

KEY SWITCH

1. Disconnect key switch harness connector (M38) .
2. Check continuity between terminal (4) and (11) .

Key	Continuity
	should exist.
	should not exist.

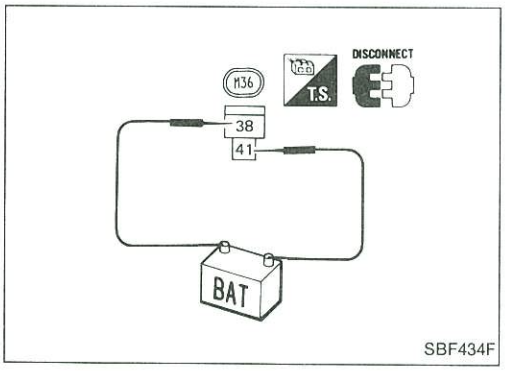


SBF433F

L.H. FRONT DOOR SWITCH

1. Disconnect L.H. front door switch harness connector (M214) .
2. Check continuity between terminal (21) and (42) .

Door switch	Continuity
Pushed (Door closed)	should not exist.
Released (Door open)	should exist.

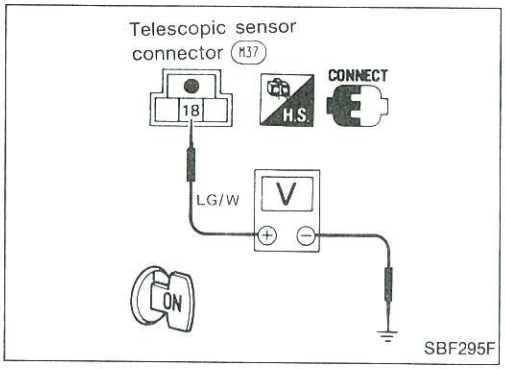


SBF434F

TELESCOPIC MOTOR

1. Disconnect telescopic motor harness connector (M36) .
2. Check steering column operation by supplying battery voltage to terminals (38) and (41) .

⊕	⊖	Steering column operation
(38)	(41)	Forward
(41)	(38)	Backward

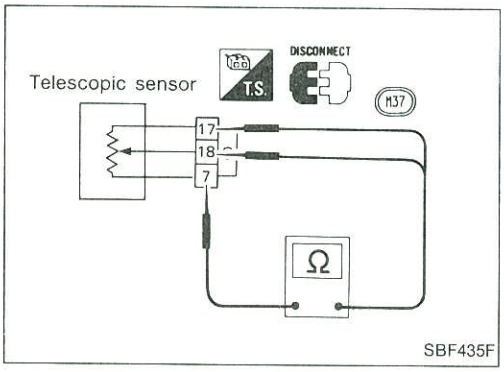


SBF295F

TELESCOPIC SENSOR

1. Check voltage between telescopic sensor harness terminal (18) and body ground.

Steering column position	Voltage
Fully backward	Approximately 0V
Fully forward	Approximately 5.0V

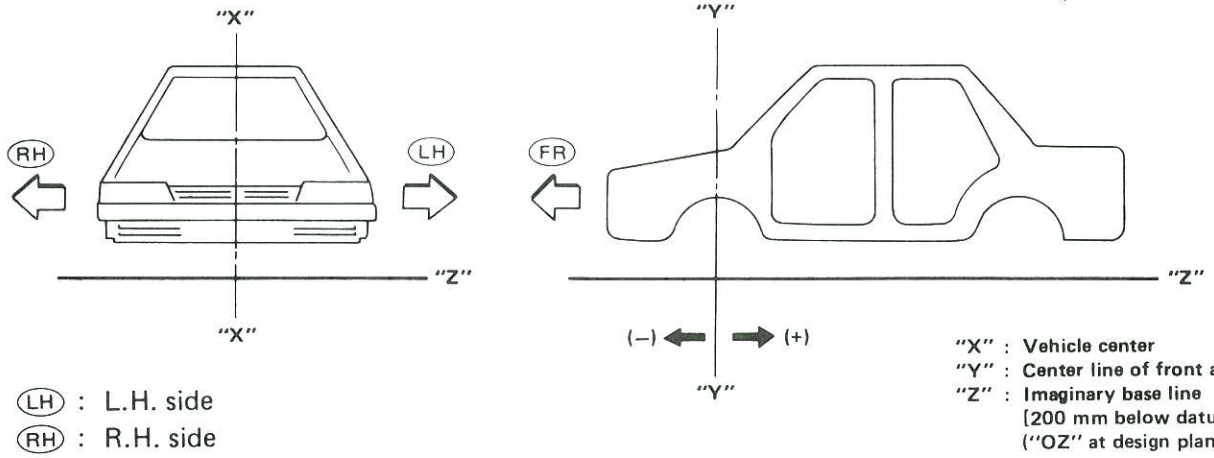


SBF435F

2. Disconnect telescopic sensor harness connector (M37) .
3. Check continuity between terminals (17) and (18) , and (7) .

Continuity should exist.

- All dimensions indicated in figures are actual ones.
- When a tram tracking gauge is used, adjust both pointers to equal length and check the pointers and gauge itself to make sure there is no free play.
- When a measuring tape is used, check to be sure there is no elongation, twisting or bending.
- Measurements should be taken at the center of the mounting holes.
- An asterisk (*) following the value at the measuring point indicates that the measuring point on the other side is symmetrically the same value.
- The coordinates of the measurement points are the distances measured from the standard line of "X", "Y" and "Z".

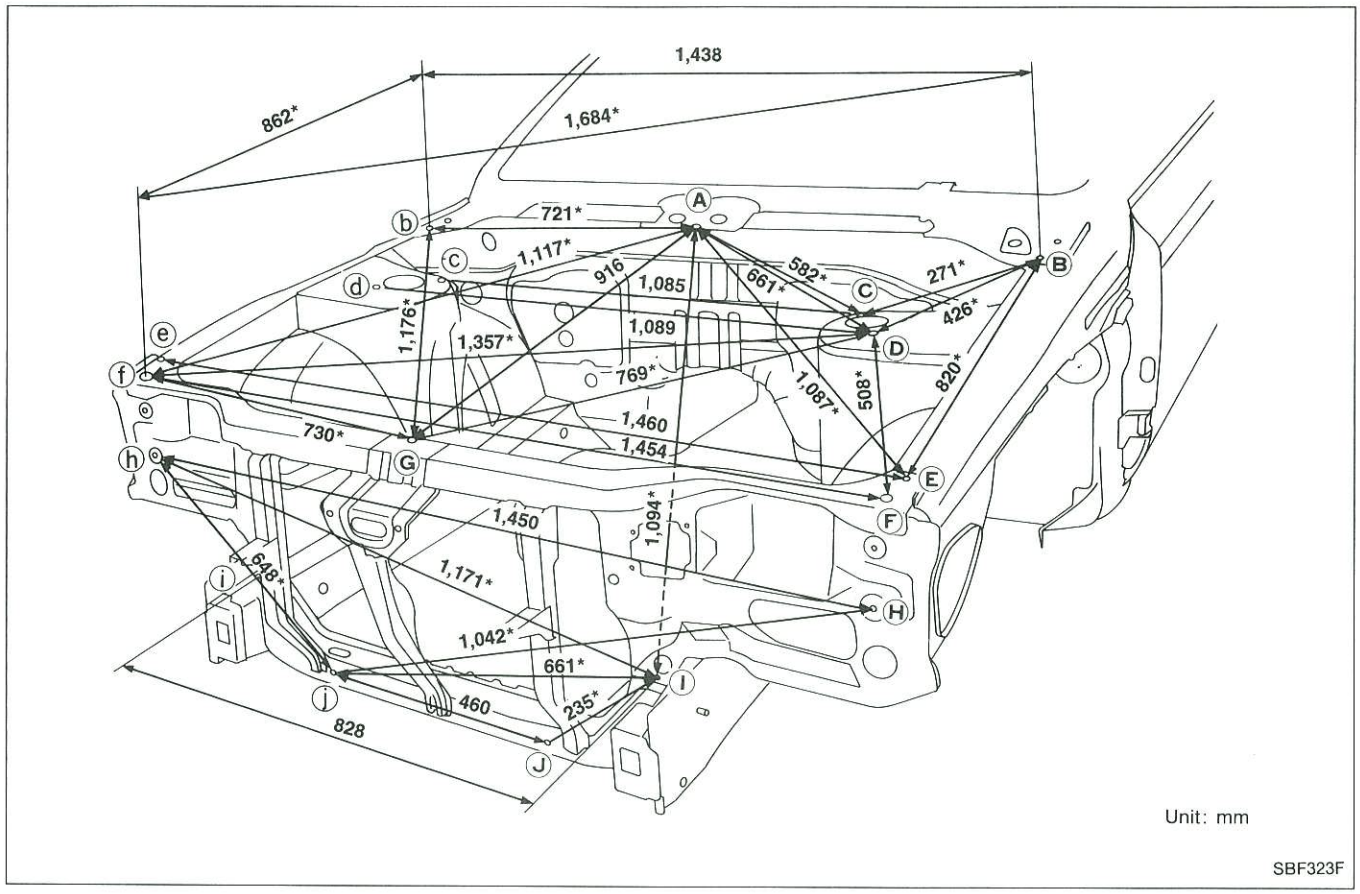


(LH) : L.H. side
(RH) : R.H. side

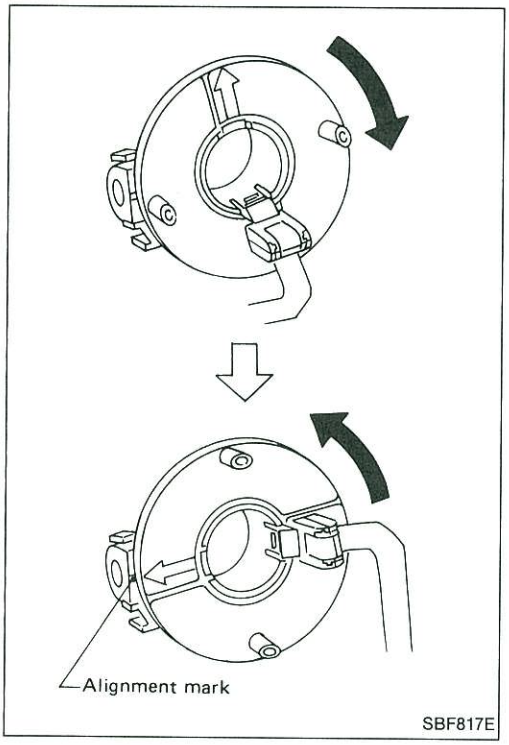
"X" : Vehicle center
"Y" : Center line of front axle
"Z" : Imaginary base line [200 mm below datum line ("OZ" at design plan)]

Engine Compartment

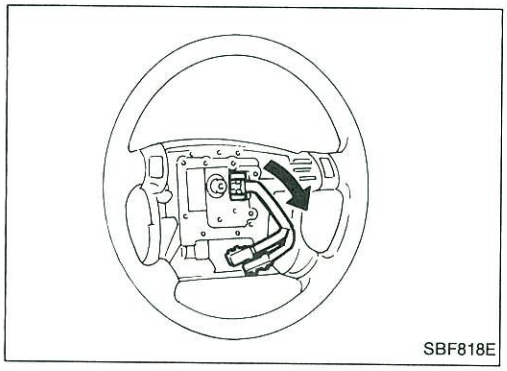
MEASUREMENT



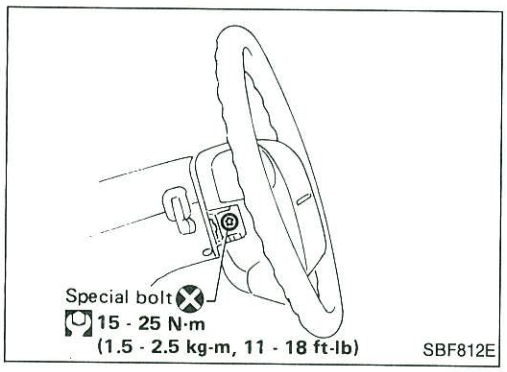
Installation — Air Bag Module and Spiral Cable (Cont'd)



- Alignment of spiral cable with neutral position
  If stopper is not used, align spiral cable with neutral position as follows:
  Turn spiral cable clockwise until it catches stopper. Then, back spiral cable off approximately two turns until yellow alignment mark appears on left gear. Align arrow mark "⇦" of spiral cable with this yellow mark.



3. Install steering wheel setting spiral cable pin guides, and pull spiral cable through.
4. Connect horn connector and engage spiral cable with pawls in steering wheel.
5. Tighten nuts.



6. Position air bag module and tighten with new special bolts.
7. Connect air bag module connector.
8. Install all lids.

9. Conduct self-diagnosis to ensure entire SRS operates properly. (Use CONSULT or warning lamp check.)

HEATER & AIR CONDITIONER

SECTION HA

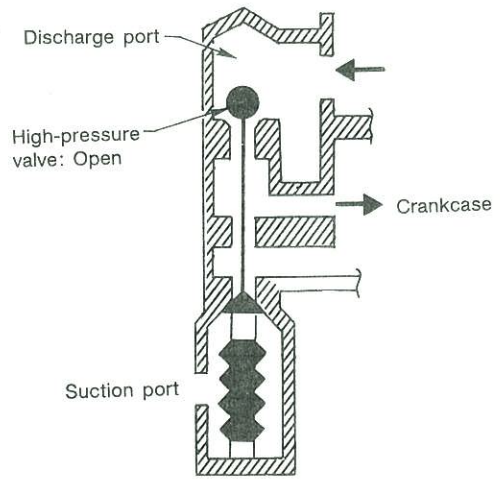
CONTENTS

When you read wiring diagrams:
- **Read GI section, "HOW TO READ WIRING DIAGRAMS".**
- **See EL section, "POWER SUPPLY ROUTING" for power distribution circuit.**

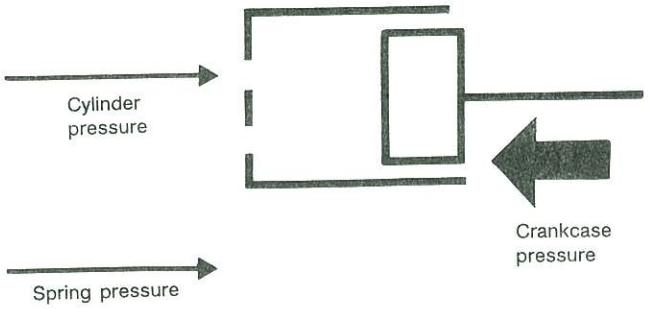
When you perform trouble diagnoses, read GI section, "HOW TO FOLLOW FLOW CHART IN TROUBLE DIAGNOSES".

3. Capacity control

- Refrigerant pressure on suction side is low during high speed driving or when ambient or interior temperature is low.
- The bellows expands when refrigerant pressure on the suction pressure side drops below approximately 177 kPa (1.8 kg/cm^2, 26 psi).
  Since suction pressure is low, it makes the suction port close and the discharge port open. Thus, crankcase pressure becomes high as high pressure enters the crankcase.
- The force acts around the journal pin near the swash plate, and is generated by the pressure difference before and behind the piston.
  The drive lug and journal pin are located where the piston generates the highest pressure. Piston pressure is between suction pressure Ps and discharge pressure Pd, which is near suction pressure Ps. If crankcase pressure Pc rises due to capacity control, the force around the journal pin makes the swash plate angle decrease and also the piston stroke decrease. In other words, the pressure difference between the piston and the crankcase according to crankcase pressure increase changes the angle of the swash plate.



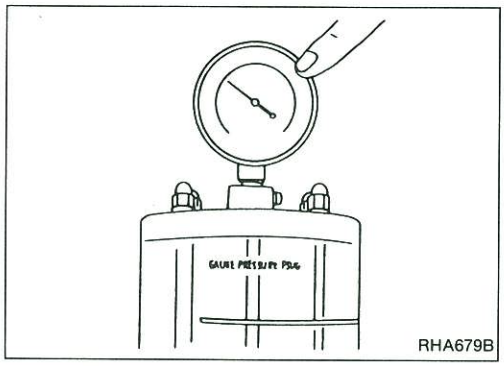
Valve position for raising crankcase pressure



Forces needed to decrease stroke

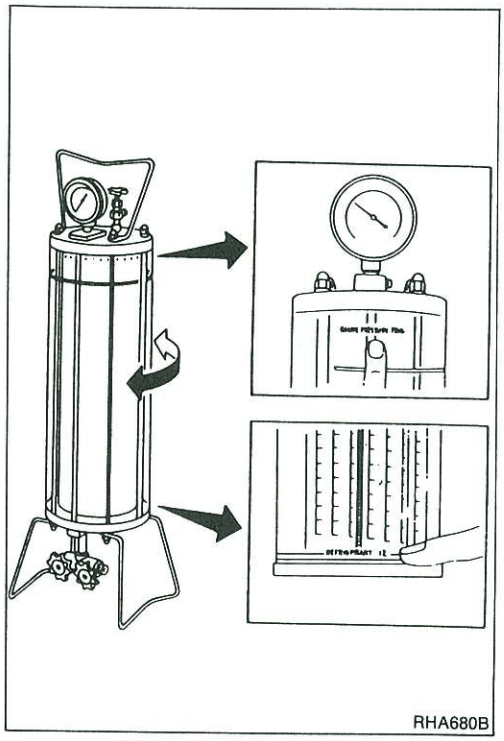
RHA474C

Charging Refrigerant (Cont'd)


RHA679B

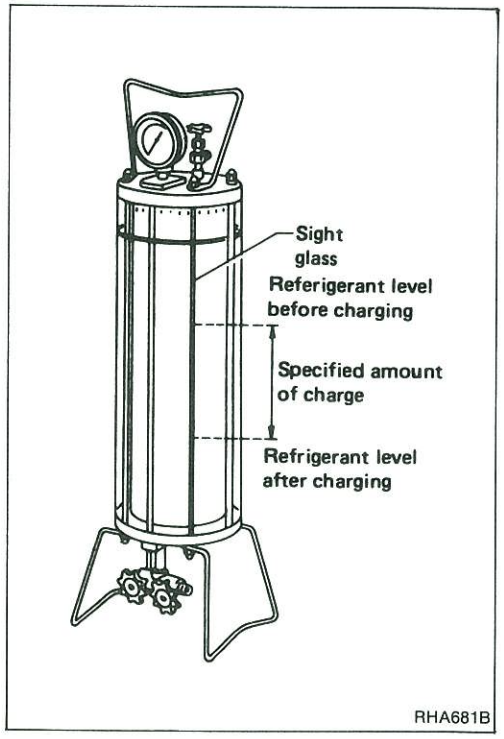
6. Turn on heater switch (charging cylinder is provided with a heater.)

The refrigerant charging time can be reduced by heating refrigerant to increase its pressure. In this case, do not allow the pressure in cylinder to rise higher than 1,030 kPa (10.5 kg/cm^2, 150 psi). (If pressure rises above this level, turn off the heater.) The pressure in the charging cylinder can be measured by upper pressure gauge.


RHA680B

SETTING OF FLOW METER

1. Rotate charging cylinder main body until scale for R12 is at the correct position on sight glass.
2. Read charging cylinder pressure gauge.
3. Rotate charging cylinder so that scale of charging cylinder agrees with pressure value indicated on pressure gauge.



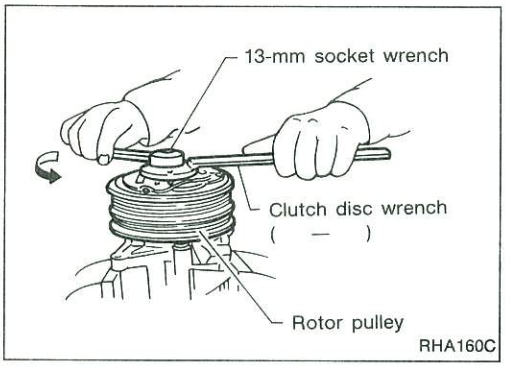
RHA681B

CALCULATING CHARGING AMOUNT OF REFRIGERANT

1. Record the amount of refrigerant in the sight glass before charging.
2. Subtract the required amount of refrigerant (charge quantity specified for the vehicle) from the amount of refrigerant recorded in step 1. Charge refrigerant into the system until the remaining value equals to the value indicated on the sight glass.

Example:

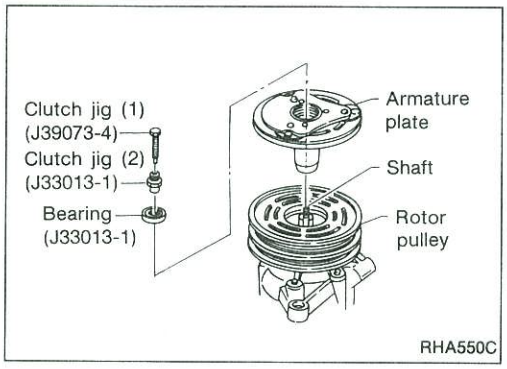
Level in sight glass: 3 lb 8 oz
Charge specification (from Service Manual) 2.0 - 2.4 lb.
Calculate charge quantity into lb and oz as follows: 1 lb = 16 oz, and 0.1 lb = 1.6 oz, so that 2.0 lb = 32 oz, 2.4 lb = 32 + (4 x 1.6) = 32 + 6.4 = 38.4, round off to 38. Therefore our charge quantity will be between 32 and 38 oz, or 2 lb 0 oz to 2 lb 6 oz.
Subtract 2 lb 6 oz from level in sight glass (3 lb 8 oz) = 1 lb 2 oz.
This will be our ending point.



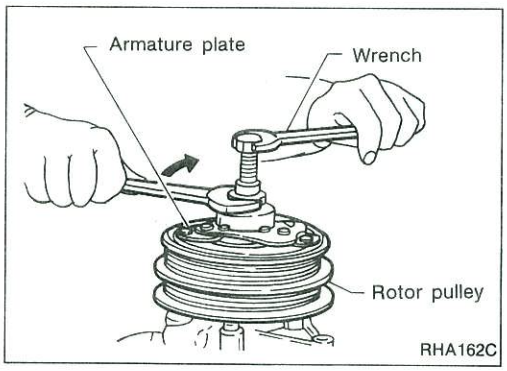
Gap Adjusting Procedure

WHEN GAP IS LARGE

- Remove center nut while holding armature plate.



- Install clutch jigs in the sequence shown.



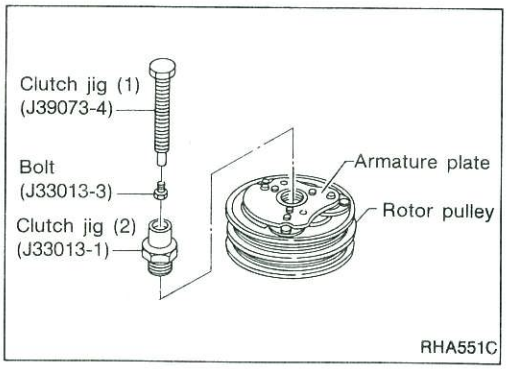
- Press fit the armature plate by tightening clutch jig (2) while holding clutch jig (1) with wrench.

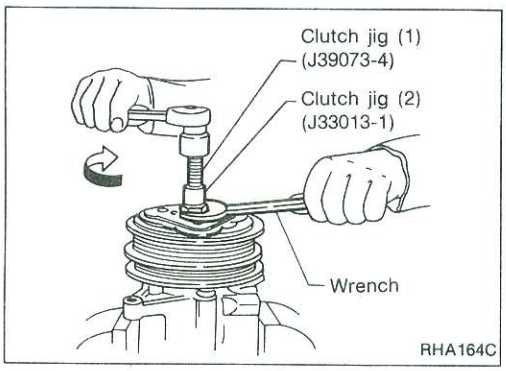
Tighten clutch jig (1) into shaft.

- Measure the gap again.
  After achieving the specified gap, install center nut using clutch disc wrench.

WHEN GAP IS SMALL

- Install jigs as shown.





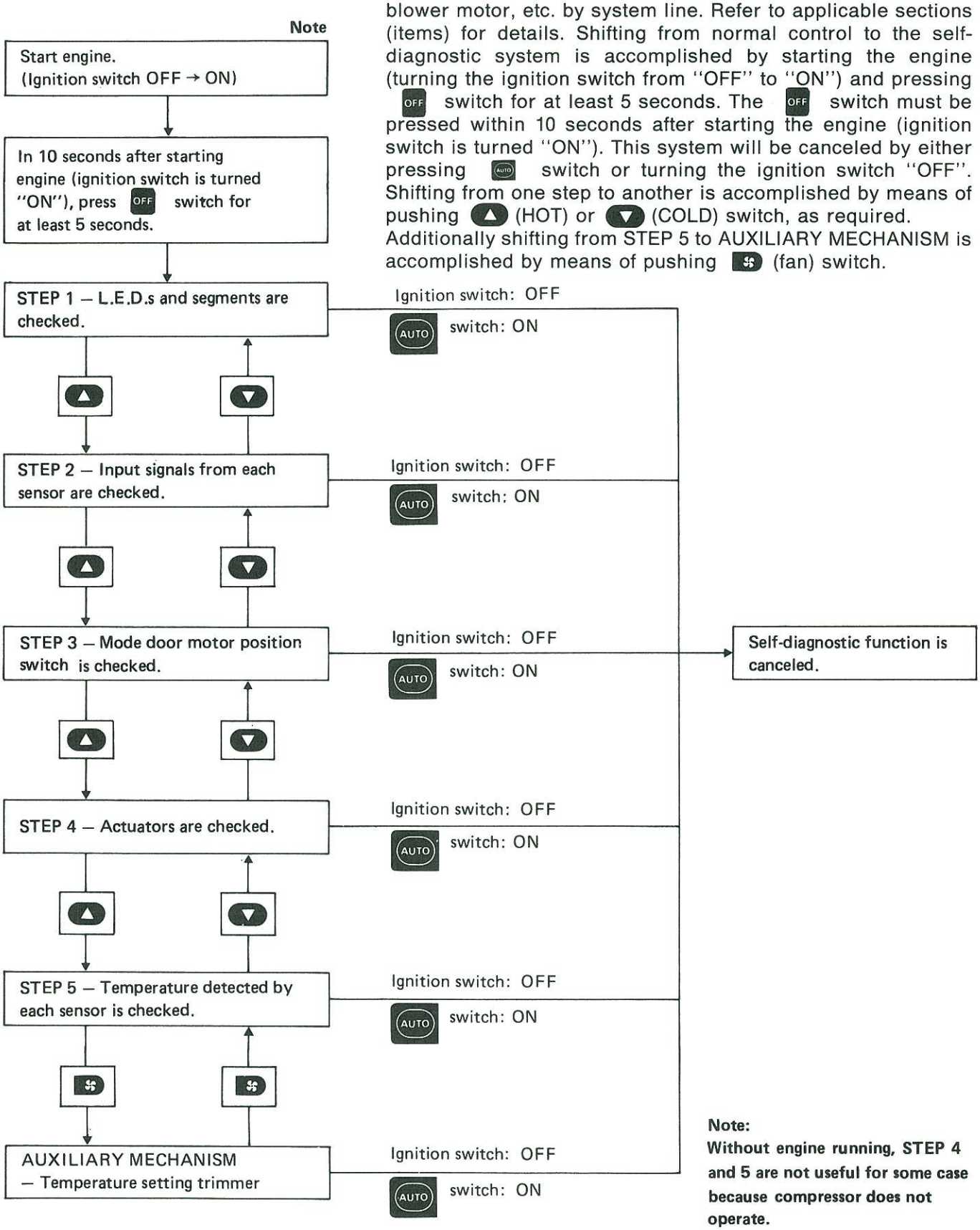
- Expand the gap by lifting up armature plate. To lift up armature plate, tighten clutch jig (1) while holding clutch jig (2) with wrench.

Center nut need not be removed when expanding the gap.

Self-diagnosis

INTRODUCTION AND GENERAL DESCRIPTION

The self-diagnostic system diagnoses sensors, door motors, blower motor, etc. by system line. Refer to applicable sections (items) for details. Shifting from normal control to the self-diagnostic system is accomplished by starting the engine (turning the ignition switch from "OFF" to "ON") and pressing OFF switch for at least 5 seconds. The OFF switch must be pressed within 10 seconds after starting the engine (ignition switch is turned "ON"). This system will be canceled by either pressing AUTO switch or turning the ignition switch "OFF". Shifting from one step to another is accomplished by means of pushing ▲ (HOT) or ▼ (COLD) switch, as required.
Additionally shifting from STEP 5 to AUXILIARY MECHANISM is accomplished by means of pushing (fan) switch.



Note:
Without engine running, STEP 4 and 5 are not useful for some case because compressor does not operate.

Preliminary Check (Cont'd)

PRELIMINARY CHECK 2

Intake door does not change.

- **Perform Self-diagnosis STEP 1 before referring to the following flow chart.**

CHECK SENSOR CIRCUIT.
Set up Self-diagnosis STEP 2.
Is each sensor circuit normal?
Code No. 20 should be indicated on the display after approx. 4 seconds later.

N.G. →

CHECK SENSOR CIRCUIT IN DETAIL ACCORDING TO THE DIAGNOSTIC PROCEDURE BELOW CORRESPONDED TO EACH CODE NO.

Code No.	How to repair	Reference page
21	Go to Diagnostic Procedure 1.	HA-84
22	Go to Diagnostic Procedure 2.	HA-85
23	Go to Diagnostic Procedure 3.	HA-86
24	Go to Diagnostic Procedure 4.	HA-87
25	Go to Diagnostic Procedure 5.	HA-88
26	Go to Diagnostic Procedure 6.	HA-89
-21	Go to Diagnostic Procedure 7.	HA-90
-22	Go to Diagnostic Procedure 8.	HA-91
-23	Go to Diagnostic Procedure 9.	HA-92
-24	Go to Diagnostic Procedure 10.	HA-93
-25	Go to Diagnostic Procedure 11.	HA-94
-26	Go to Diagnostic Procedure 12.	HA-95

When malfunctioning sensor circuits for ambient sensor, in-vehicle sensor and intake sensor, are suspected it is useful to check temperature detected by each sensor with Self-diagnosis STEP 5 to confirm the temperature is within normal range before performing Diagnostic Procedures.

O.K. ↓

CHECK INTAKE DOOR MOTOR OPERATION.
Set up Self-diagnosis STEP 4.
Does intake air change according to each code No.?

41	42	43	44	45	46
REC	REC	20% FRE	FRE	FRE	FRE

N.G. → CHECK INTAKE DOOR ROD or LEVER MECHANISM.
Refer to DOOR CONTROL.

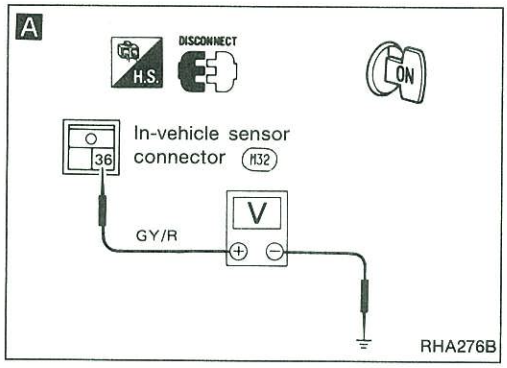
N.G. → Repair or adjust.

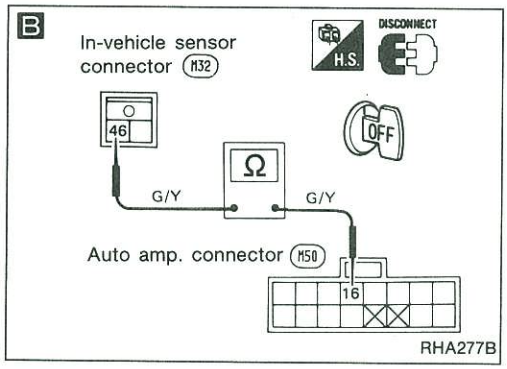
O.K. ↓

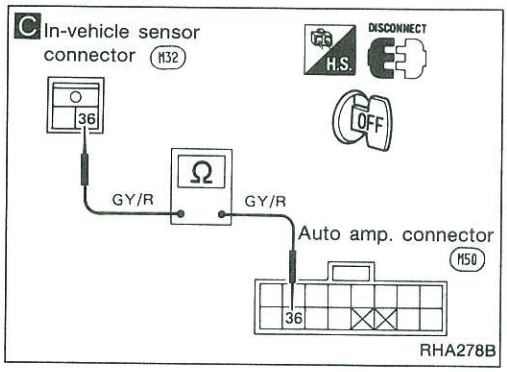
Go to **Diagnostic Procedure 15.**

O.K. ↓

Intake door control system is normal.
Refer to **Intake door control specification.**







Diagnostic Procedure 2

SYMPTOM: In-vehicle sensor circuit is open. (22 is indicated on auto amp. as a result of conducting Self-diagnosis STEP 2.)

A

CHECK IN-VEHICLE SENSOR CIRCUIT BETWEEN IN-VEHICLE SENSOR AND AUTO AMP.
Disconnect in-vehicle sensor harness connector.
Do approx. 5 volts exist between in-vehicle sensor harness terminal No. (36) and body ground?

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

C Note

Check circuit continuity between in-vehicle sensor harness terminal No. (36) and auto amp. harness terminal No. (36).

O.K. → Replace auto amp.

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

B Note

Check circuit continuity between in-vehicle sensor harness terminal No. (46) and auto amp. harness terminal No. (16).

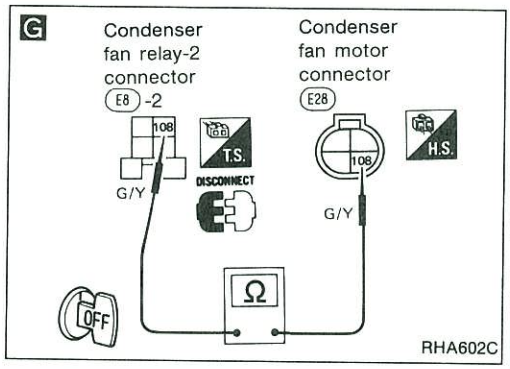
O.K. → CHECK IN-VEHICLE SENSOR. (Refer to Control System Input Components.)

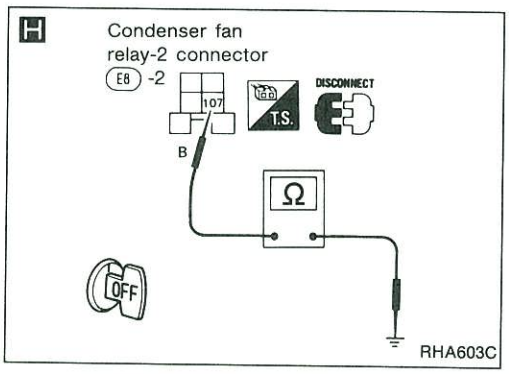
N.G. → Replace in-vehicle sensor.

O.K. → Replace auto amp.

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

Diagnostic Procedure 13 (Cont'd)





Ⓑ

↓

Disconnect condenser fan relay-2 and condenser fan motor harness connector.

↓

G Note

Check circuit continuity between condenser fan motor harness terminal No. (108) and condenser fan relay-2 harness terminal No. (108).

↓ O.K.

H Note

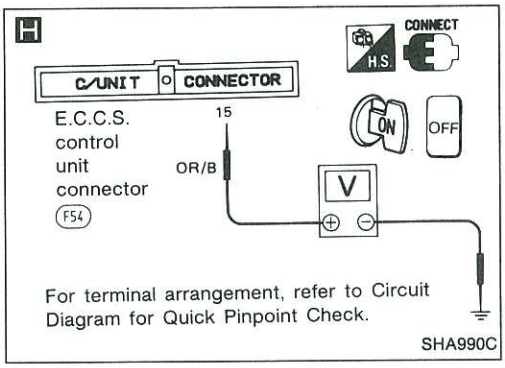
CHECK BODY GROUND CIRCUIT FOR CONDENSER FAN RELAY-2.
Does continuity exist between condenser fan relay-2 harness terminal No. (107) and body ground?

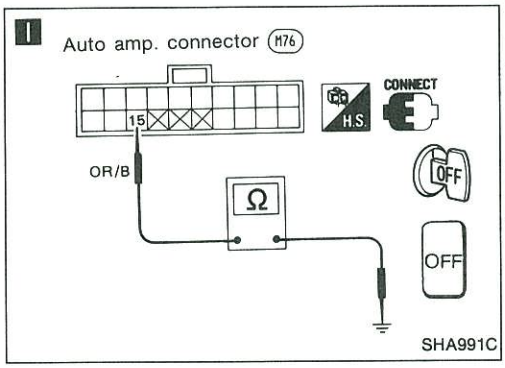
↓ O.K.

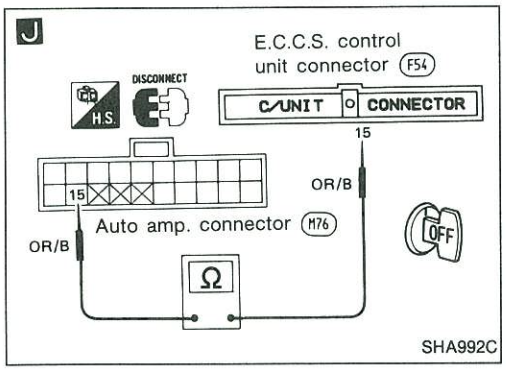
Replace condenser fan motor.

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

Diagnostic Procedure 18 (Cont'd)







Ⓑ

H

CHECK COIL SIDE CIRCUIT OF A/C RELAY CONTROLLED BY E.C.C.S. CONTROL UNIT.
Do approx. 8 to 9 volts exist between E.C.C.S. control unit harness terminal No. ⑮ and body ground?

N.G. → CHECK E.C.C.S. CONTROL UNIT. (Refer to EF & EC section.)

O.K. ↓

Disconnect auto amp. harness connector.

↓

I

CHECK AUTO AMP. CIRCUIT BETWEEN E.C.C.S. CONTROL UNIT AND AUTO AMP.
Do approx. 8 to 9 volts exist between auto amp. harness terminal No. ⑮ and body ground?

N.G. → **J** Note: Check circuit continuity between auto amp. harness terminal No. ⑮ and E.C.C.S. control unit harness terminal No. ⑮.

O.K. ↓

Replace auto amp.

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

Diagnostic Procedure 19

SYMPTOM: Self-diagnosis cannot be performed.

CHECK MAIN POWER SUPPLY AND GROUND CIRCUIT FOR AUTO AMP. (Refer to page HA-68.)

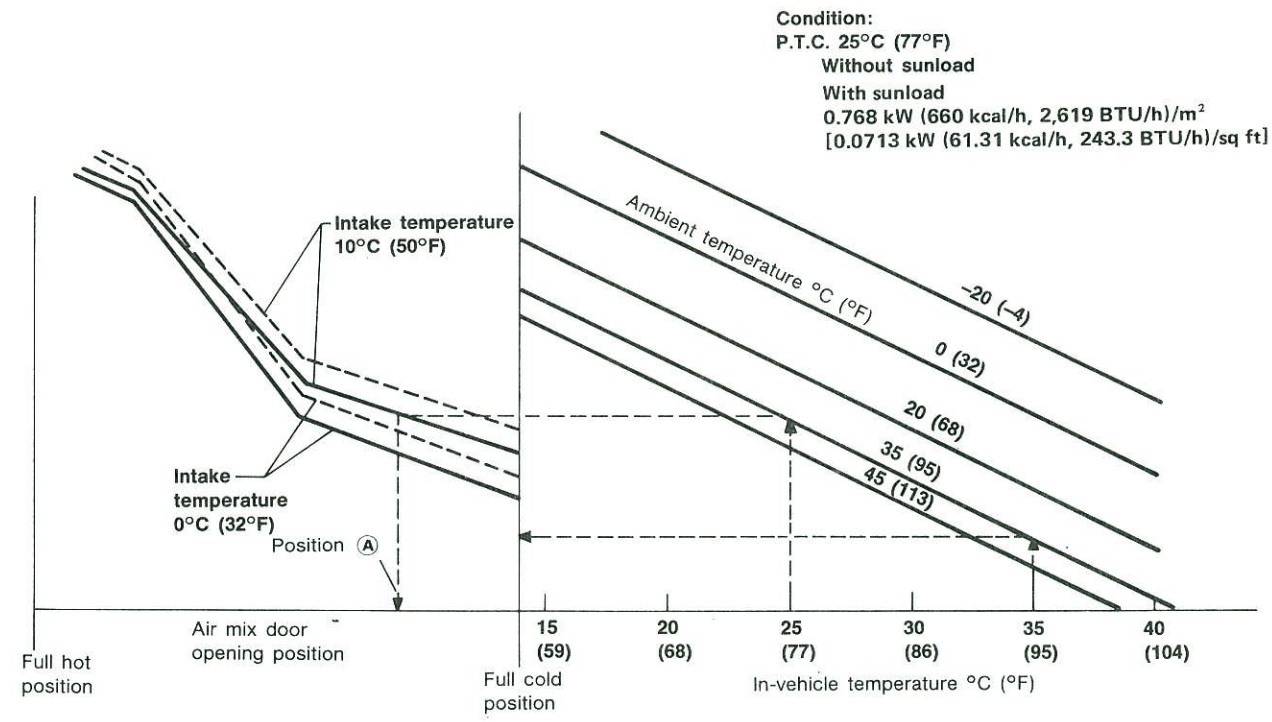
N.G. → Repair Main Power Supply and Ground Circuit.

O.K. ↓

Replace auto amp.

Control System Output Components (Cont'd)

Air mix door control specification



Example:

- **If temperature setting is set at 25°C (77°F) under no sunload condition when ambient and in-vehicle temperature is 35°C (95°F), air mix door is initially automatically set in full cold position.**
- **Within some period, in-vehicle temperature will lower towards the objective temperature, and the air mix door position will shift incrementally towards the hot side and finally stay in this position Ⓐ if intake temperature is 10°C (50°F).**
  Air mix door opening position is always fed back to auto amplifier by P.B.R. built-in air mix door motor.

RHA348B

Supplemental Restraint System "AIR BAG"

The Supplemental Restraint System "Air Bag" helps to reduce the risk or severity of injury to the driver in a frontal collision. The Supplemental Restraint System consists of an air bag (located in the center of the steering wheel), sensors, a control unit, warning lamp, wiring harness and spiral cable. Information necessary to service the system safely is included in the **BF section** of this Service Manual.

WARNING:

a. **To avoid rendering the SRS inoperative, which could lead to personal injury or death in the event of a severe frontal collision, all maintenance must be performed by an authorized INFINITI dealer.**
b. **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system.**
c. **All SRS electrical wiring harnesses and connectors are covered with yellow outer insulation. Do not use electrical test equipment on any circuit related to the SRS "Air Bag".**

Battery Test and Charging Chart (Cont'd)

B: STANDARD CHARGE

Determine initial charging current from specific gravity, referring to Fig. 4.

↓

Charge battery for 8 hours.

↓

CHECKING SPECIFIC GRAVITY
Refer to "Specific Gravity Check".

↓

Conduct additional charge as per Fig. 5, if necessary.

↓

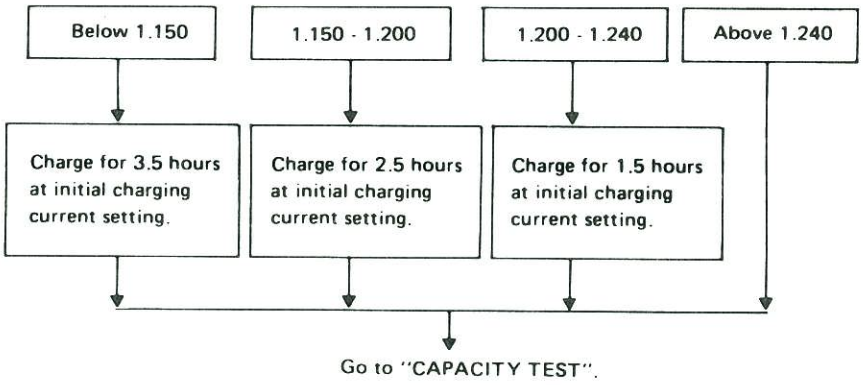
Go to "CAPACITY TEST".

Fig. 4 INITIAL CHARGING CURRENT SETTING
(Standard charge)

BATTERY TYPE / CONVERTED SPECIFIC GRAVITY	28B19R(L) 34B19R(L)	46B24R(L) 55B24R(L)	50D23R(L) 55D23R(L)	65D26R(L) 80D26R(L)	75D31R(L)	95D31R(L) 95E41R(L)	130E41R(L)
1.100 - 1.130	4.0 (A)	5.0 (A)	6.0 (A)	7.0 (A)	8.0 (A)	9.0 (A)	13.0 (A)
1.130 - 1.160	3.0 (A)	4.0 (A)	5.0 (A)	6.0 (A)	7.0 (A)	8.0 (A)	11.0 (A)
1.160 - 1.190	2.0 (A)	3.0 (A)	4.0 (A)	5.0 (A)	6.0 (A)	7.0 (A)	9.0 (A)
1.190 - 1.220	2.0 (A)	2.0 (A)	3.0 (A)	4.0 (A)	5.0 (A)	5.0 (A)	7.0 (A)

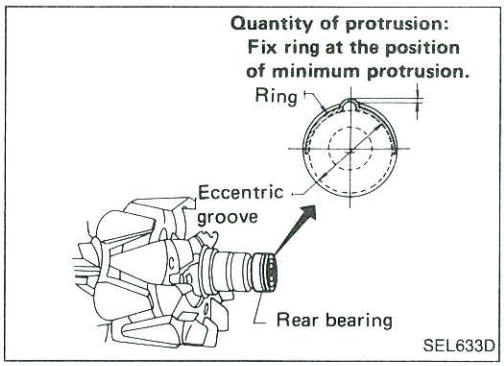
- Check battery type and determine the specified current using the table shown above.
- After starting charging, adjustment of charging current is not necessary.

Fig. 5 ADDITIONAL CHARGE (Standard charge)



CAUTION:

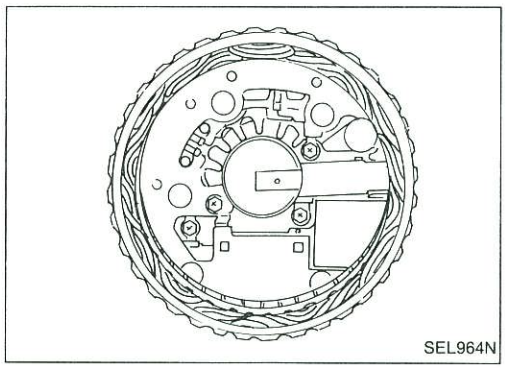
a. **Do not use standard charge method on a battery whose specific gravity is less than 1.100.**
b. **Set charging current to value specified in Fig. 4. If charger is not capable of producing specified current value, set its charging current as close to that value as possible.**
c. **Keep battery away from open flame while it is being charged.**
d. **When connecting charger, connect leads first, then turn on charger. Do not turn on charger first, as this may cause a spark.**
e. **If battery temperature rises above 60°C (140°F), stop charging. Always charge battery when its temperature is below 60°C (140°F).**



Assembly

RING FITTING IN REAR BEARING

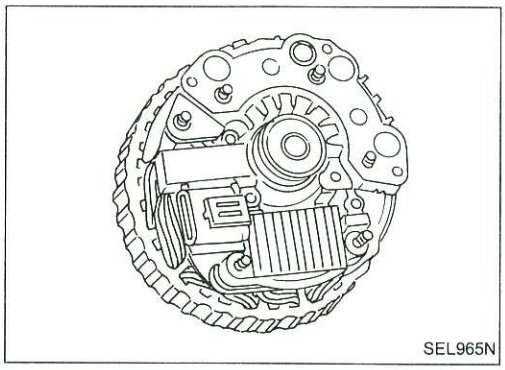
- Fix ring into groove in rear bearing so that it is as close to the adjacent area as possible.



REAR COVER INSTALLATION

(1) Fit brush assembly, diode assembly, regulator assembly and stator.
(2) Push brushes up with fingers and install them to rotor.

Take care not to damage slip ring sliding surface.



Service Data and Specifications (S.D.S.)

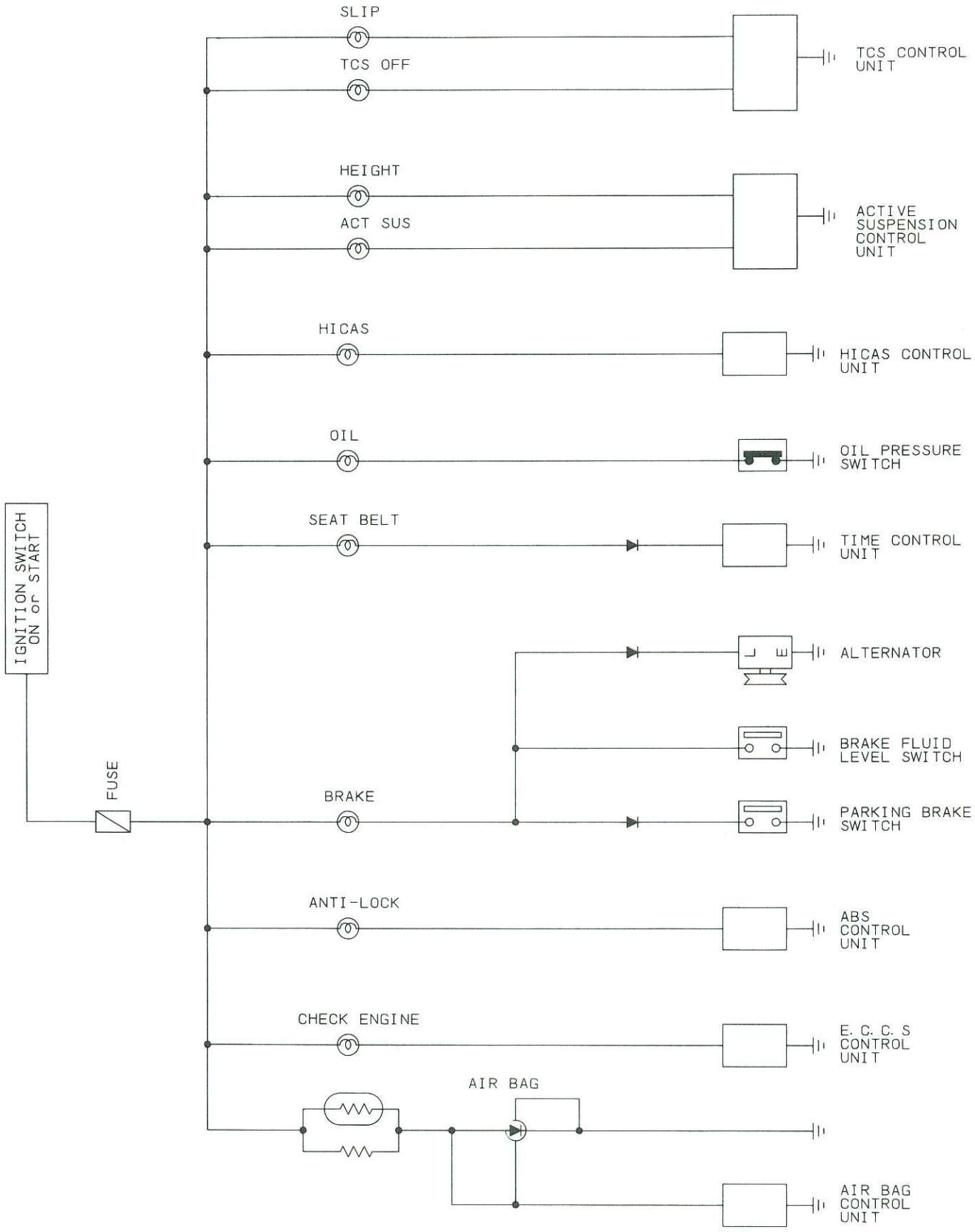
ALTERNATOR

Type		LR1110-702 HITACHI make
Applied engine		VH45DE
Nominal rating	V-A	12-110
Ground polarity		Negative
Minimum revolution under no-load (when 13.5 volts is applied)	rpm	Less than 950
Hot output current	A/rpm	More than 34/1,300 More than 82/2,500 More than 105/5,000
Regulated output voltage	V	14.1 - 14.7
Minimum length of brush	mm (in)	More than 6 (0.24)
Slip ring minimum outer diameter	mm (in)	More than 30.6 (1.205)

Bulb Specifications

	Wattage (12 volt)	Bulb No.
Headlamp		
High beam (Inside)	65	9005
Low beam (Outside)	55	9006
Front combination lamp		
Turn signal/Clearance	27/8	1157NA
Front side marker lamp	3.8	194
Rear combination lamp		
Turn signal	27	1156
Stop/Tail	27/8	1157
Back-up lamp	27	1156
Rear side marker lamp	3.8	194
License plate lamp	5	—
High-mounted stop lamp	18	921
Interior lamp	10	—
Spot lamp		
(Type A)	10	—
(Type B)	8	—
Step lamp	3.4	—
Trunk room lamp	3.4	—

Warning Lamps/Schematic



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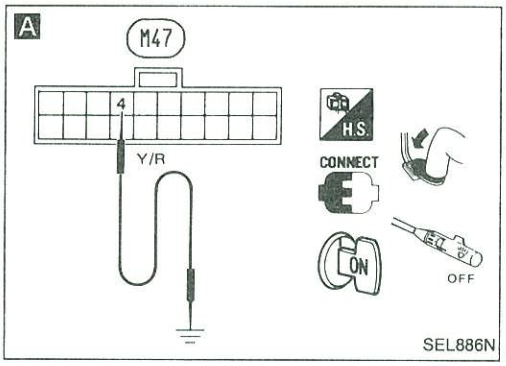
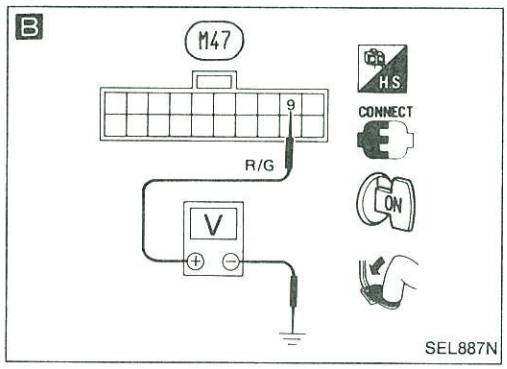
Trouble Diagnoses (Cont'd)





Warning Display: STOP LAMP INOPERATIVE

A

STOP LAMP INPUT SIGNAL CHECK
1) Light switch position is OFF.
2) Depress brake pedal.
3) Connect control unit harness terminal ④ and body ground to see if warning display appears.

N.G. → Replace control unit.

O.K. ↓

Check stop & tail lamp sensor.
Refer to "EXTERIOR LAMP".

N.G. → Replace stop & tail lamp sensor.

O.K. ↓

B

STOP LAMP CIRCUIT CHECK
Check if voltage across terminal ⑨ and body ground is battery voltage when brake pedal is depressed.

N.G. → Replace or repair stop lamp switch and harness.

O.K. ↓

Check headlamp relay or illumination control switch.

N.G. → Replace headlamp relay or illumination control switch.

O.K. ↓

Repair harness or connector.

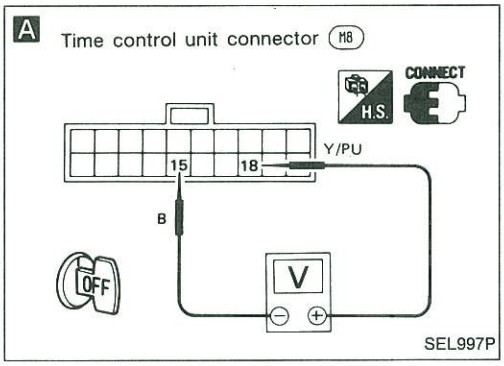
Trouble Diagnoses (Cont'd)

DIAGNOSTIC PROCEDURE 5

SYMPTOM: Ignition key warning chime does not activate.

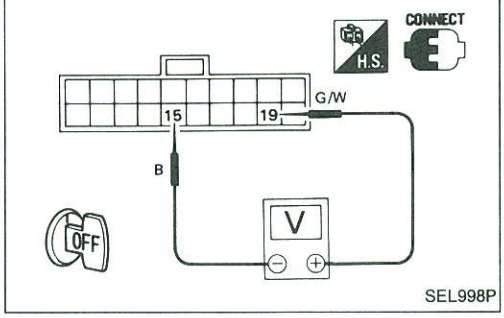
- Perform "PRELIMINARY CHECK — Procedure 2" before referring to the following flow chart.

A Time control unit connector (M8)



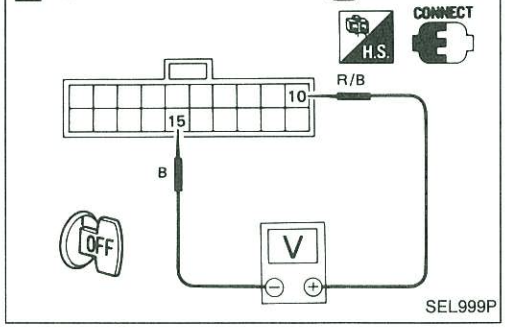
SEL997P

B Time control unit connector (M8)



SEL998P

C Time control unit connector (M8)



SEL999P

A Step 3

DOOR SWITCH INPUT SIGNAL CHECK
Measure voltage between control unit harness terminals ⑱ and ⑮.

Condition of driver's door	Voltage [V]
Door is closed	Approx. 12
Door is open	0

N.G. → Check door switch. Check harness continuity between T.C.U. and door switch.

O.K. ↓

B Step 2

CHIME OUTPUT SIGNAL CHECK
Measure voltage between control unit harness between ⑲ and ⑮.

Condition of driver's door	Voltage [V]
Door is closed	Approx. 12
Door is open	Pointer deflects intermittently

O.K. → Check chime. Check harness continuity between T.C.U. and chime.

N.G. ↓

C Step 1

IGNITION KEY SWITCH INPUT SIGNAL CHECK
Measure voltage between control unit harness terminals ⑩ and ⑮.

Condition	Voltage [V]
Key is inserted	Approx. 12
Key is pulled	0

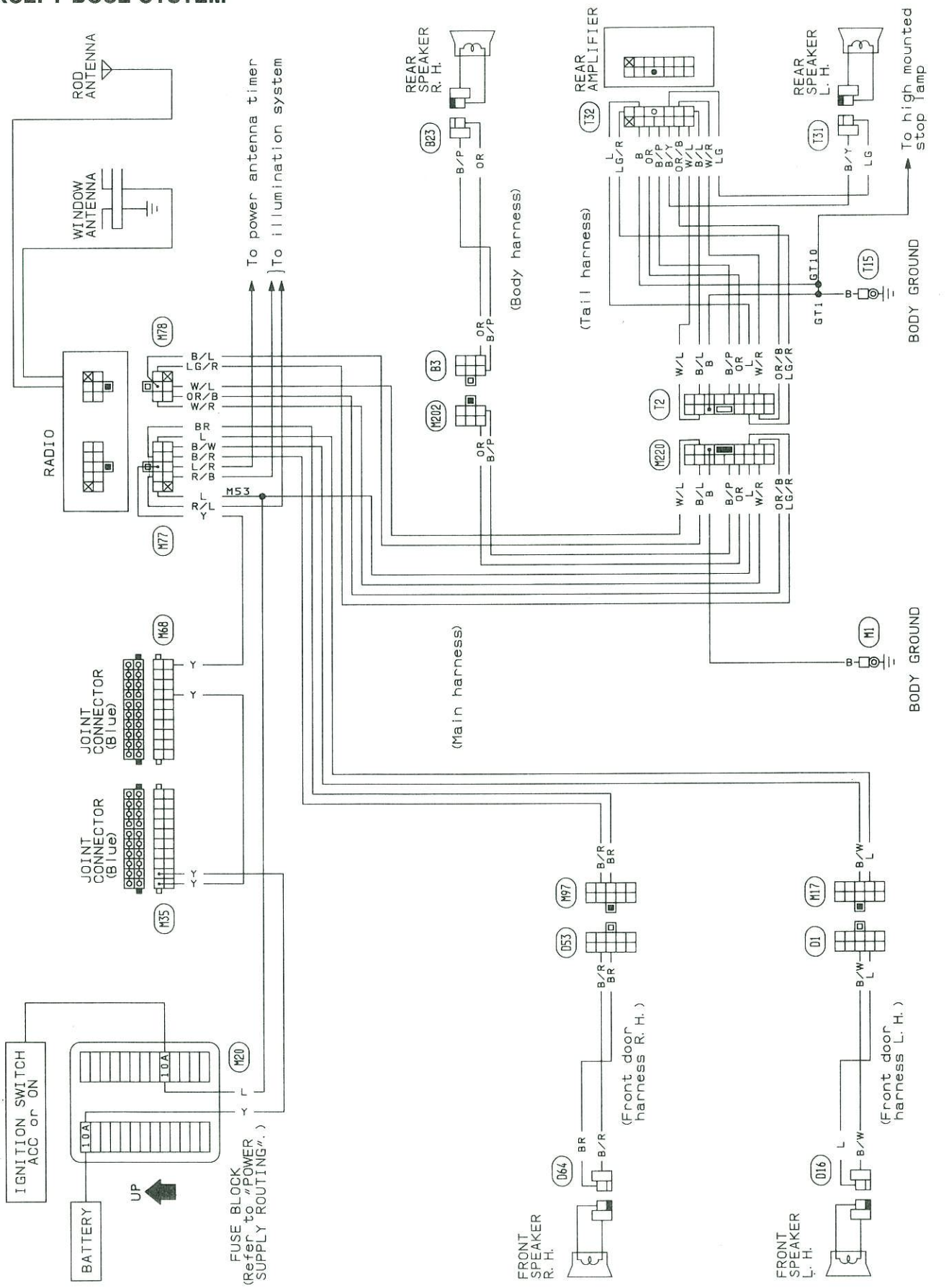
N.G. → Check ignition key switch. Check harness continuity between T.C.U. and ignition key switch.

O.K. ↓

Replace control unit.

Audio/Wiring Diagram (Cont'd)

EXCEPT BOSE SYSTEM



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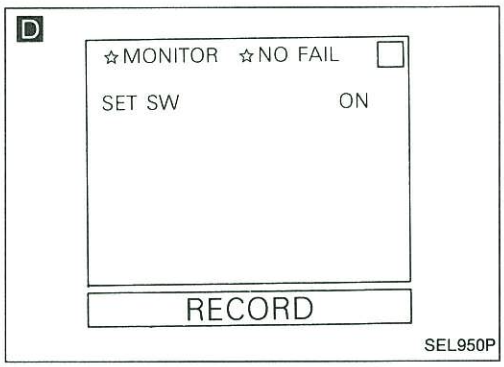
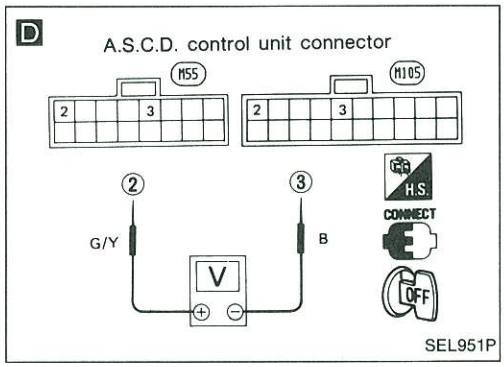
Trouble Diagnoses (Cont'd)

D



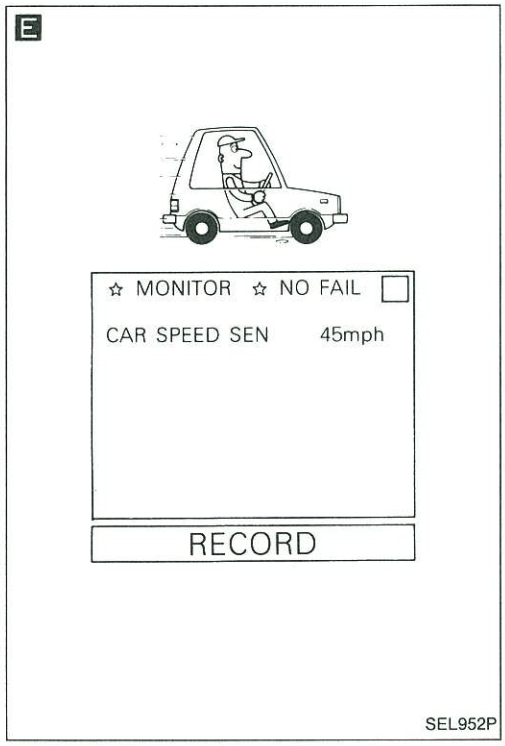
SEL950P

D



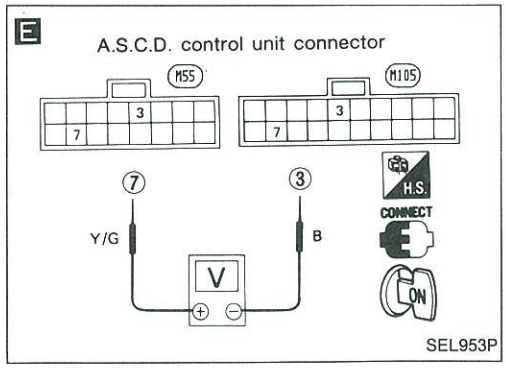
SEL951P

E



SEL952P

E



SEL953P

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D

CHECK SET/COAST SWITCH CIRCUIT FOR A.S.C.D. CONTROL UNIT.

See "SET SW" in "Data monitor" mode.

SET SW
When switch is pressed: ON
When switch is released: OFF

N.G. → Does horn work?

No → Check fuse and horn relay.

Yes → CHECK A.S.C.D. STEERING SWITCH.
Refer to "Electrical Components Inspection".

OR

1. Push and hold SET/COAST button on A.S.C.D. steering switch.
2. Check voltage between control unit harness terminals ② and ③.
   Battery voltage should exist.

O.K.

E

CHECK SPEED SENSOR CIRCUIT.

See "CAR SPEED SEN" in "Data monitor" mode while driving.

N.G. → CHECK SPEED SENSOR.
Refer to "Electrical Components Inspection".

OR

1. Apply wheel chocks and jack up rear of vehicle.
2. Connect voltmeter between control unit harness terminals ⑦ and ③.
3. Slowly turn front wheel.
4. Check deflection of voltmeter pointer.

O.K.

CHECK A.S.C.D. ACTUATOR/A.S.C.D. PUMP.
Refer to "Electrical Components Inspection".

N.G. → Replace A.S.C.D. actuator/A.S.C.D. pump.

O.K.

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