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Publication No. SM1E-1W22U2

NISSAN XTERRA

MODEL WD22 SERIES

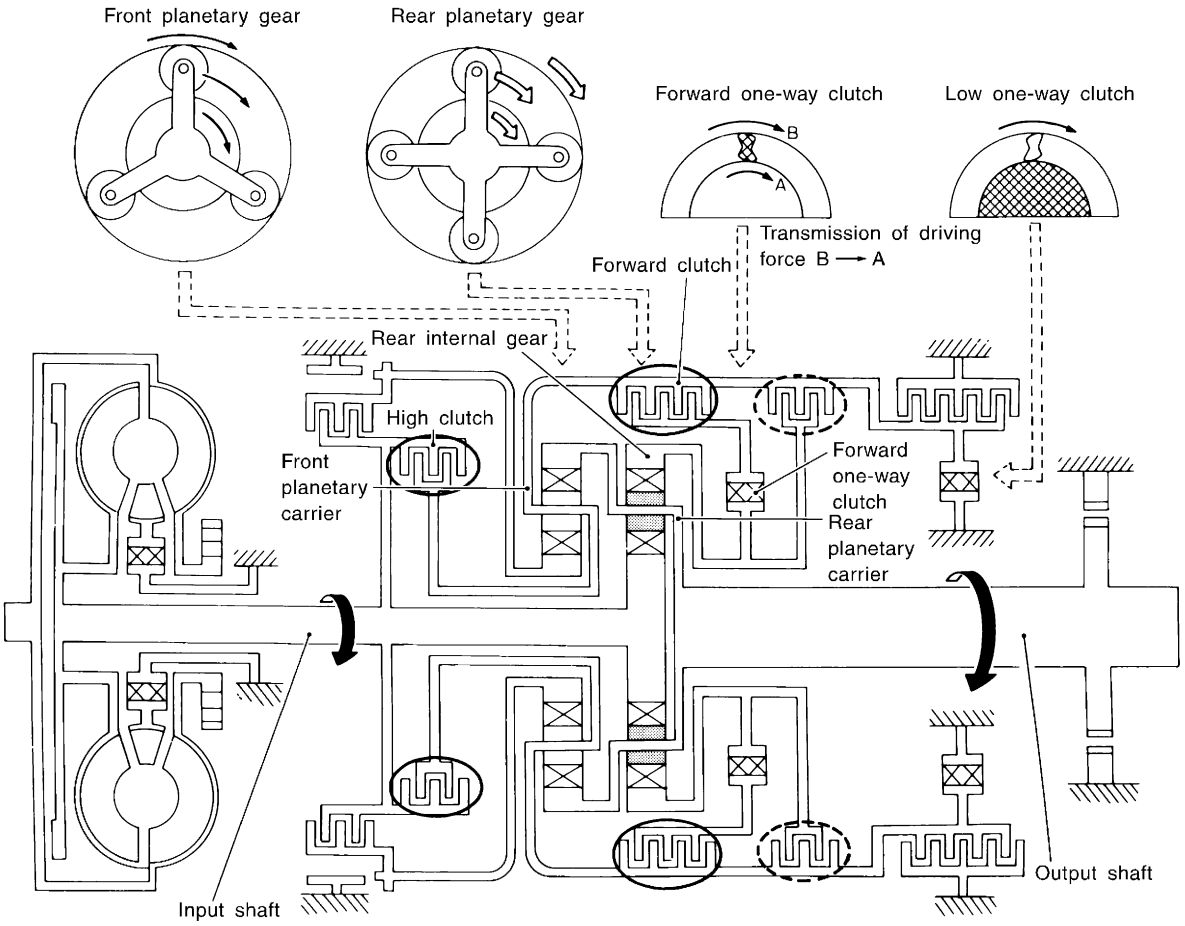
QUICK REFERENCE INDEX

Shift Mechanism (Cont'd)

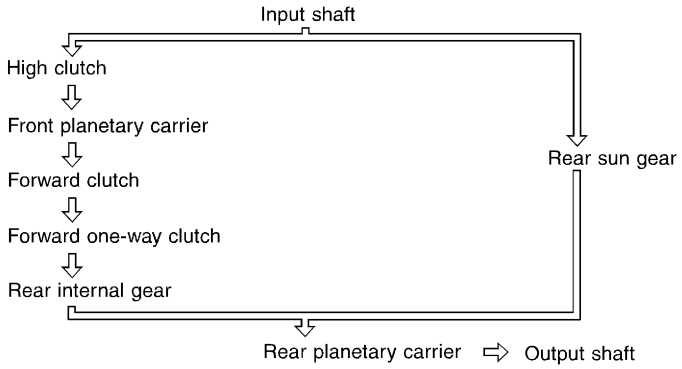
D_3 Position

=NGAT0012S0404

High clutch **Forward clutch** **Forward one-way clutch**	Input power is transmitted to front planetary carrier through high clutch. And front planetary carrier is connected to rear internal gear by operation of forward clutch and forward one-way clutch. This rear internal gear rotation and another input (the rear sun gear) accompany rear planetary carrier to turn at the same speed.
Overrun clutch engagement conditions	D_3: Overdrive control switch in OFF Throttle opening less than 3/16



Power flow



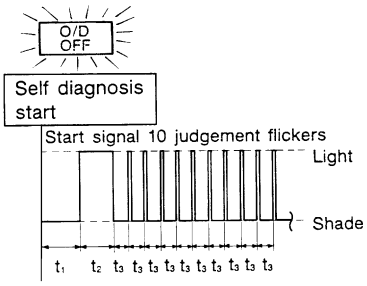
SAT098J

JUDGEMENT OF SELF-DIAGNOSIS CODE

NGAT0207S04

O/D OFF indicator lamp:

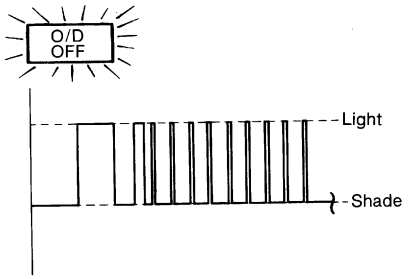
All judgement flickers are same.



SAT436F

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

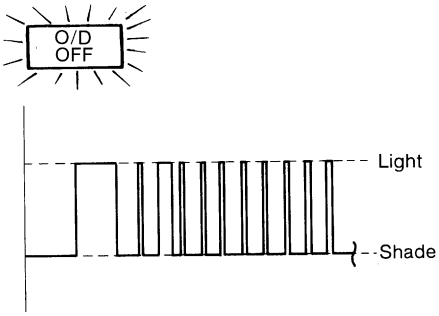
1st judgement flicker is longer than others.



SAT437F

Revolution sensor circuit is short-circuited or disconnected.
⇒ **Go to VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR) , AT-110.**

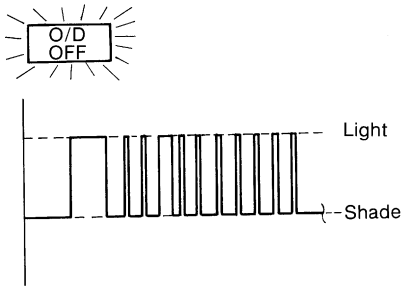
2nd judgement flicker is longer than others.



SAT439F

Vehicle speed sensor circuit is short-circuited or disconnected.
⇒ **Go to VEHICLE SPEED SENSOR·MTR, AT-193.**

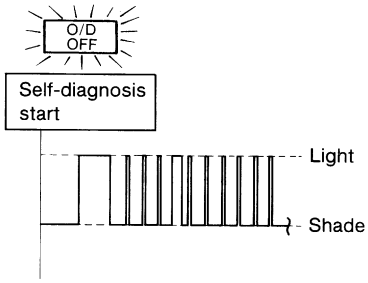
3rd judgement flicker is longer than others.



SAT441F

Throttle position sensor circuit is short-circuited or disconnected.
⇒ **Go to THROTTLE POSITION SENSOR , AT-173.**

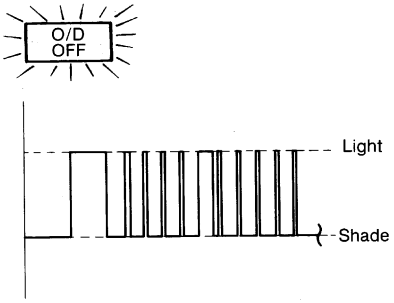
4th judgement flicker is longer than others.



SAT443F

Shift solenoid valve A circuit is short-circuited or disconnected.
⇒ **Go to SHIFT SOLENOID VALVE A , AT-163.**

5th judgement flicker is longer than others.



SAT445F

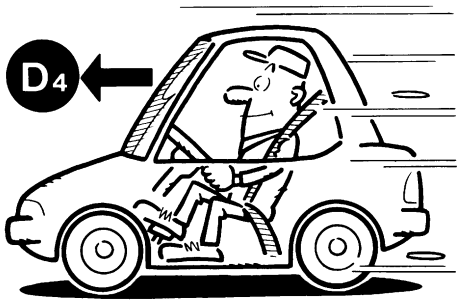
Shift solenoid valve B circuit is short-circuited or disconnected.
⇒ **Go to SHIFT SOLENOID VALVE B , AT-168.**

Cruise Test — Part 3

=NGAT0024S0406

1	VEHICLE SPEED D_4 POSITION

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



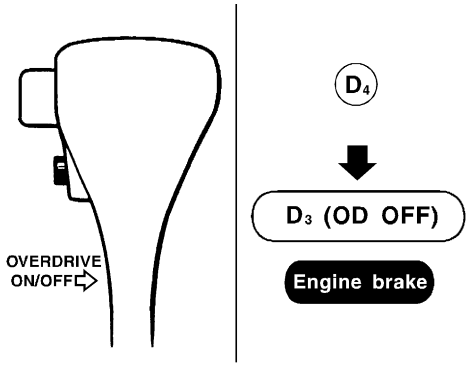
SAT812A

▶ GO TO 2.

2	CHECK SHIFT DOWN (D_4 TO D_3)

1. Release accelerator pedal.
2. Set overdrive control switch to OFF position while driving in D_4.
3. Does A/T shift from D_4 to D_3 (O/D OFF)?

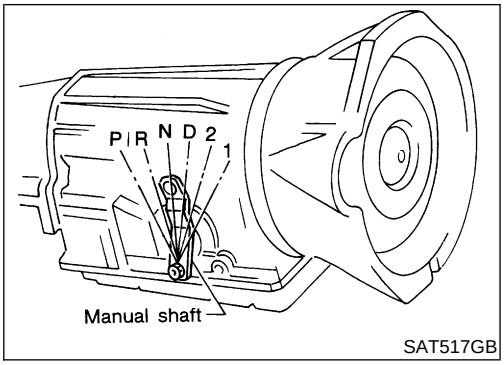
Ⓜ **Read gear position and vehicle speed.**



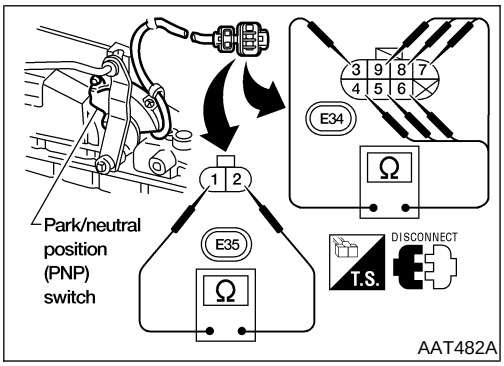
SAT999I

Yes or No

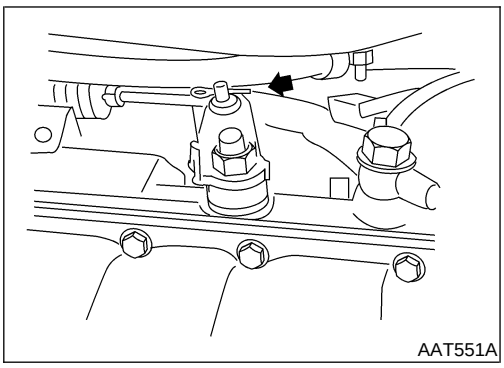
Yes	▶	GO TO 3.
No	▶	Go to "17. A/T Does Not Shift: $D_4 \rightarrow D_3$, When Overdrive Control Switch ON → OFF, AT-238.

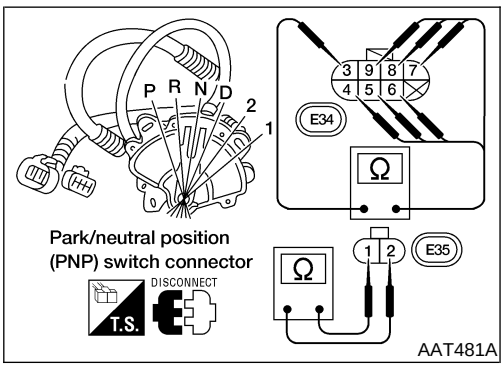


SAT517GB



AAT482A


AAT551A



AAT481A

Component Inspection

NGAT0030

PNP SWITCH

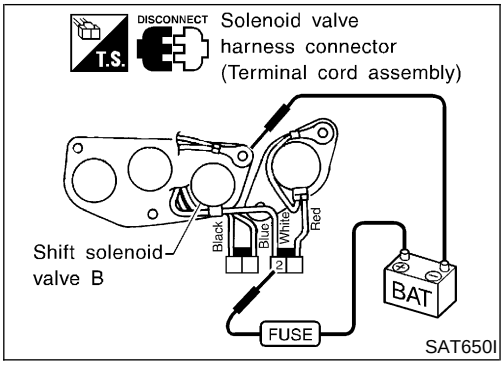
NGAT0030S02

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

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

2. If NG, check again with manual control linkage disconnected from manual shaft of A/T assembly. Refer to step 1.
3. If OK on step 2, adjust manual control linkage. Refer to AT-258.
4. If NG on step 2, remove PNP switch from A/T and check continuity of PNP switch terminals. Refer to step 1.
5. If OK on step 4, adjust PNP switch. Refer to AT-258.
6. If NG on step 4, replace PNP switch.

Component Inspection (Cont'd)

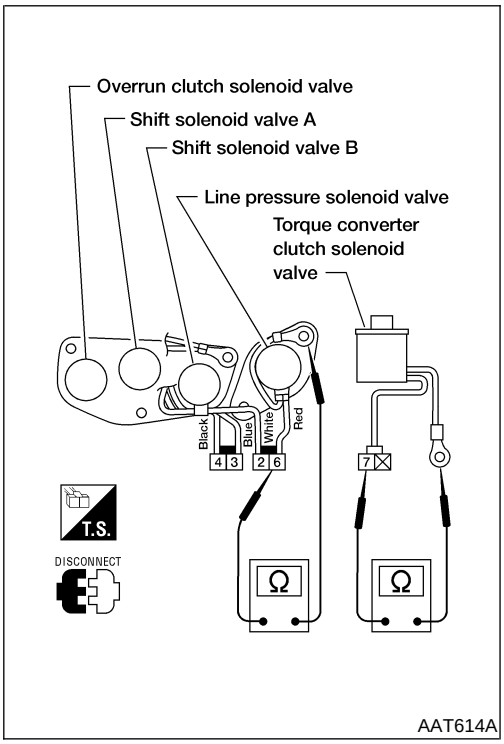


Operation Check

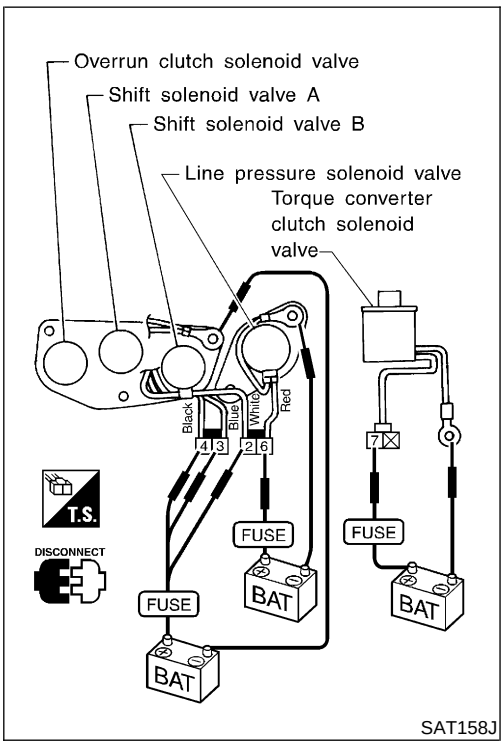
NGAT0044S0102

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

14	CHECK DTC	
Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE", AT-152.		
OK or NG		
OK	▶	**INSPECTION END**
NG	▶	Perform "Cruise test — Part 1" again and return to the start point of this flow chart.



AAT614A



SAT158J

Component Inspection

SOLENOID VALVES

NGAT0056

NGAT0056S01

- For removal, refer to "Control Valve Assembly and Accumulators", AT-256.

Resistance Check

NGAT0056S0101

- Check resistance between terminals (6 or 7) and ground.

Solenoid valve	Terminal No.		Resistance (Approx.)
Line pressure solenoid valve	6	Ground	2.5 - 5Ω
Torque converter clutch solenoid valve	7		10 - 20Ω

Operation Check

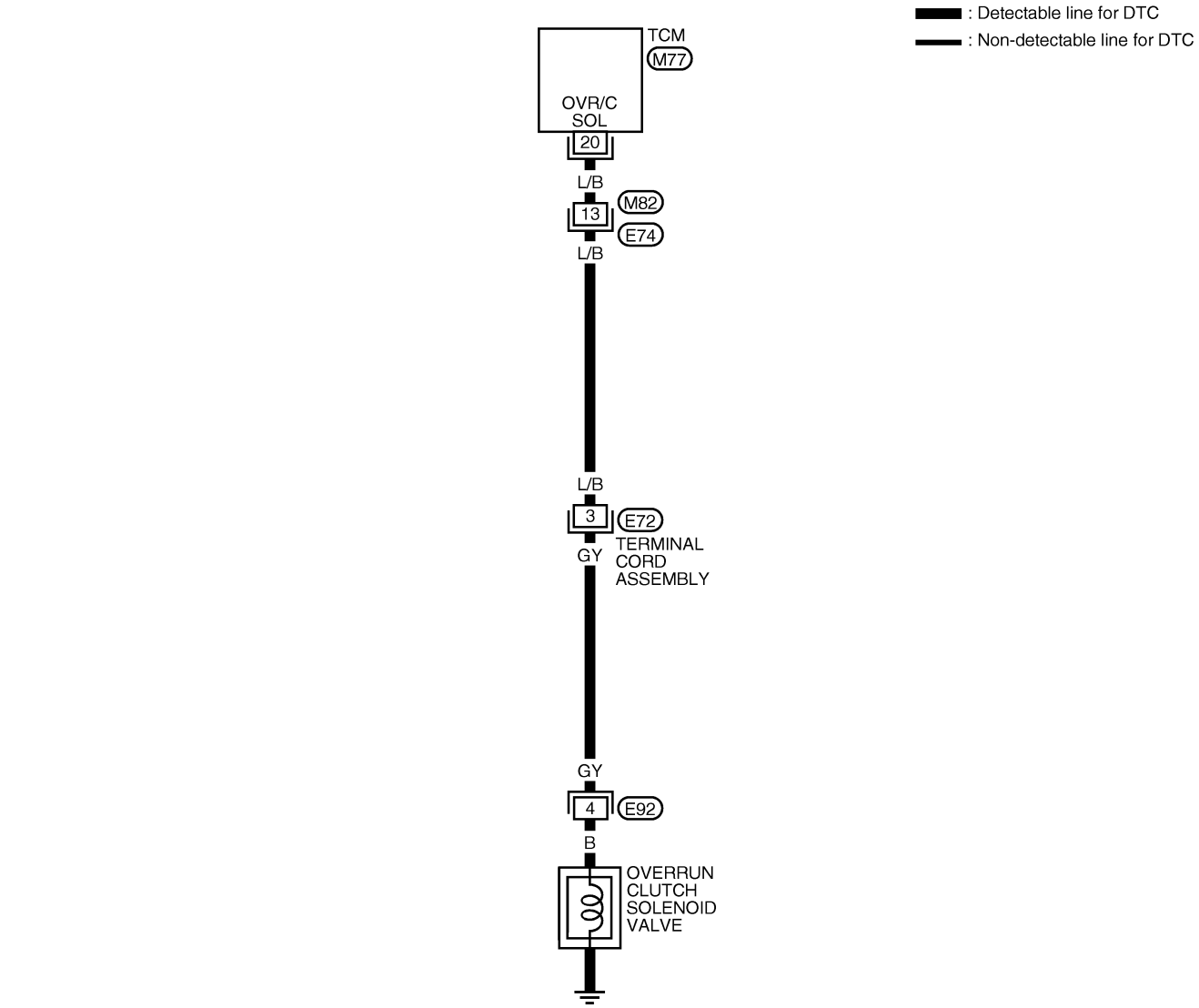
NGAT0056S0102

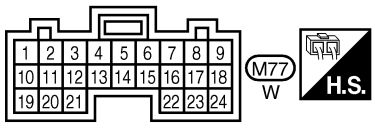
- Check solenoid valve by listening for its operating sound while applying battery voltage to the terminals (2, 3, 4, 6 or 7) and ground.

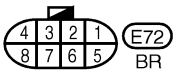
Wiring Diagram — AT — OVRCSV

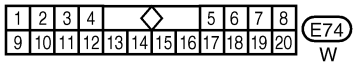
NGAT0200

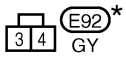
AT-OVRCSV-01









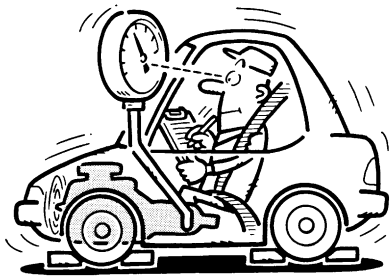


*: This connector is not shown in "HARNESS LAYOUT" of EL section.

AAT596A

3	CHECK LINE PRESSURE

Check line pressure at idle with selector lever in D position. Refer to "Line Pressure Test", AT-61.



SAT494G

OK or NG

OK	▶	GO TO 4.
NG	▶	1. Remove control valve assembly. Refer to "Control Valve Assembly and Accumulators", AT-256. 2. Check the following items: ● Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter) ● Line pressure solenoid valve

4	CHECK SYMPTOM

Check again.

OK or NG

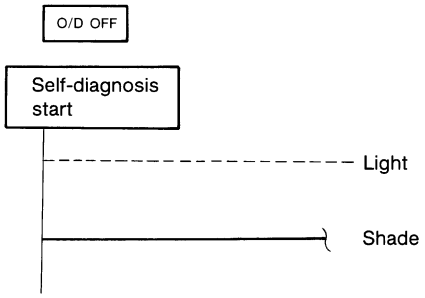
OK	▶	**INSPECTION END**
NG	▶	1. Perform TCM input/output signal inspection. 2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

17. A/T Does Not Shift: $D_4 \rightarrow D_3$, When Overdrive Control Switch ON $\rightarrow$ OFF

=NGAT0089

SYMPTOM:

A/T does not shift from D_4 to D_3 when changing overdrive control switch to OFF position.

1	CHECK OVERDRIVE CONTROL SWITCH CIRCUIT	
With CONSULT-II Does “TCM INPUT SIGNALS” in Data Monitor show damage to overdrive control switch circuit?		
Without CONSULT-II Does self-diagnosis show damage to overdrive control switch circuit?  SAT344H		
Yes or No		
Yes	▶	Check overdrive control switch circuit. Refer to “Diagnostic Procedure”, AT-242.
No	▶	Go to “10. A/T Does Not Shift: $D_2 \rightarrow D_3$”, AT-224.

Locations of Needle Bearings, Thrust Washers and Snap Rings

NGAT0110

Outer diameter of snap rings

Item number	Outer diameter mm (in)
②	161.0 (6.34)
③	140.1 (5.52)
④	156.4 (6.16)
⑥	142.0 (5.59)
⑦	159.2 (6.27)

Thrust washers

Item number	Color
①	Black
⑤	White

Outer diameter of needle bearings

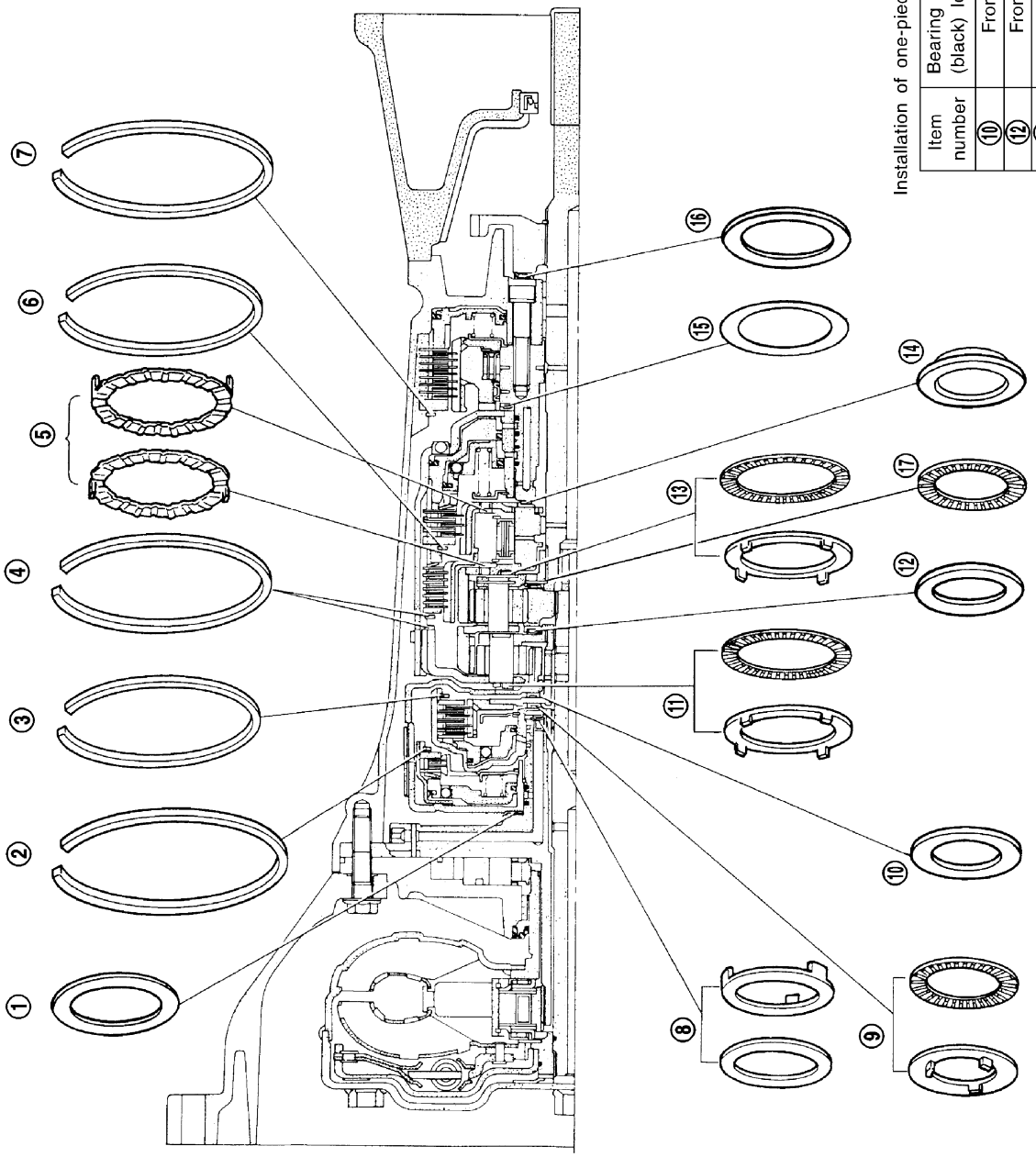
Item number	Outer diameter mm (in)
⑧	47 (1.85)
⑨	53 (2.09)
⑪	78 (3.07)
⑫	53 (2.09)
⑬	78 (3.07)
⑭	57 (2.24)
⑮	78.1 (3.075)
⑯	64 (2.52)
⑰	53 (2.09)

Inner diameter of bearing races

Item number	Outer diameter mm (in)
⑪	58.8 (2.315)
⑬	58.8 (2.315)

Installation of one-piece bearings

Item number	Bearing race (black) location
⑩	Front
⑫	Front
⑮	Rear side
⑯	Rear side

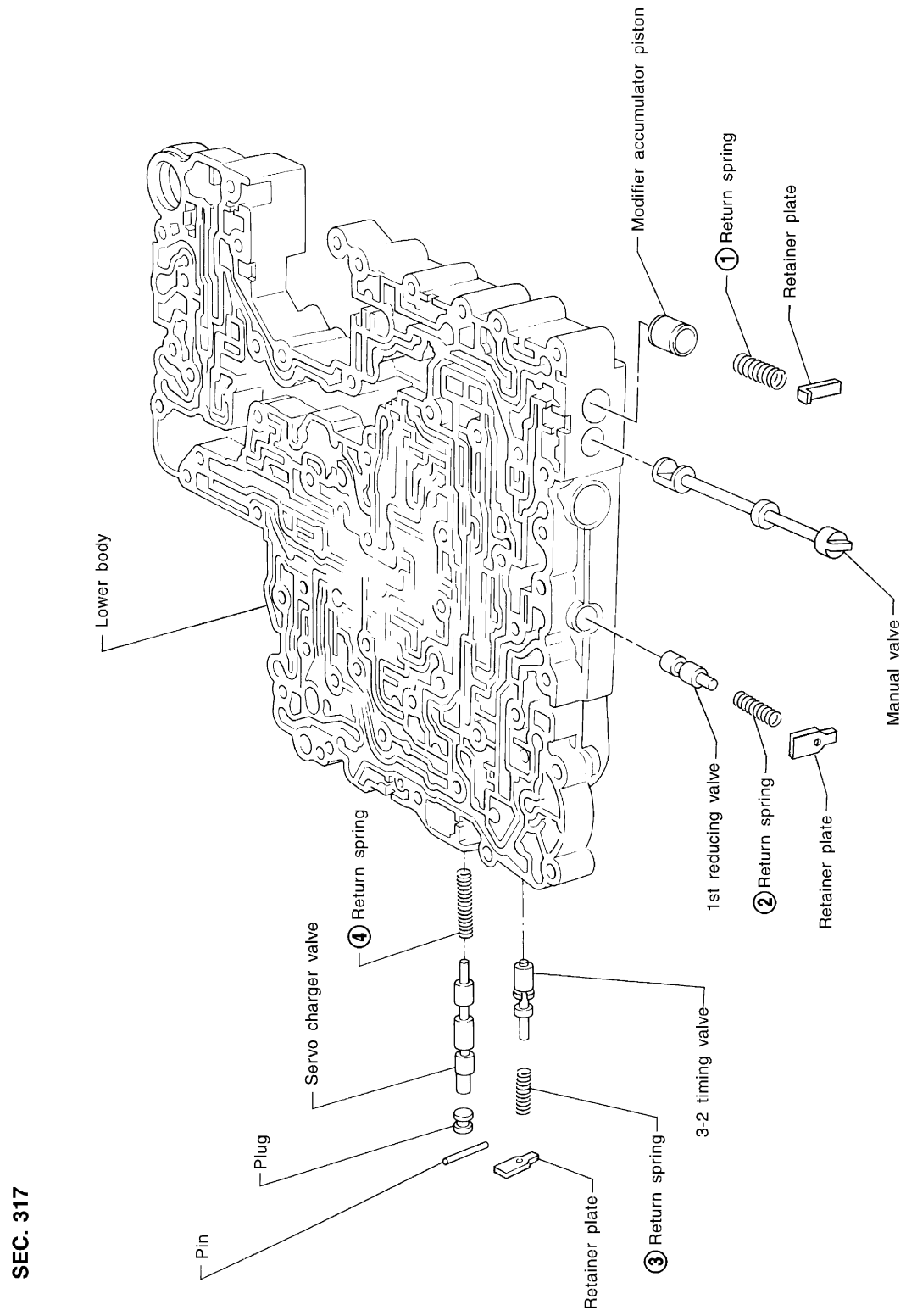


AAT555A

Control Valve Lower Body

COMPONENTS

NGAT0124

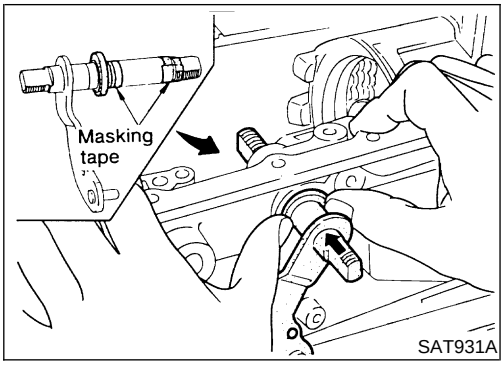


SAT966I

Apply ATF to all components before their installation.
Numbers preceding valve springs correspond with those shown in SDS on page AT-337.

Assembly (1)

NGAT0155



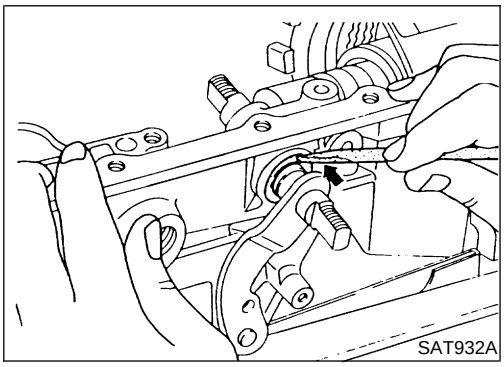
1. Install manual shaft components.

a. Install oil seal onto manual shaft.

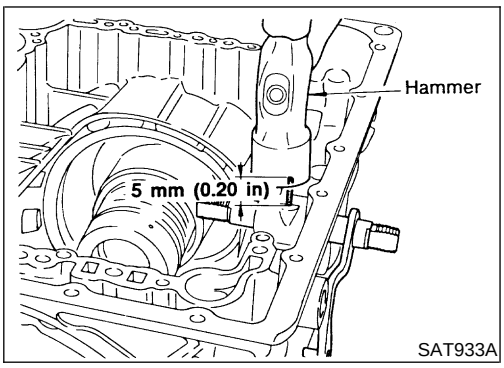
- **Apply ATF to oil seal.**
- **Wrap threads of manual shaft with masking tape.**

b. Insert manual shaft and oil seal as a unit into transmission case.

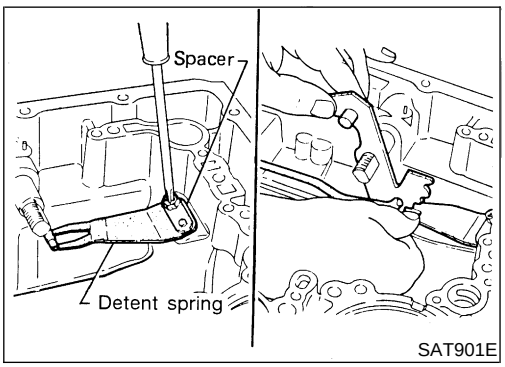
c. Remove masking tape.



d. Push oil seal evenly and install it onto transmission case.

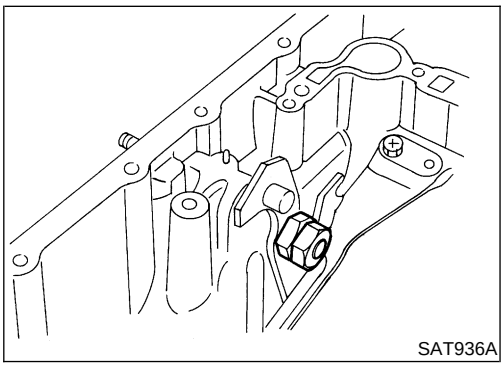


e. Align groove in shaft with drive pin hole, then drive pin into position as shown in figure at left.



f. Install detent spring and spacer.

g. While pushing detent spring down, install manual plate onto manual shaft.



h. Install lock nuts onto manual shaft.

Noise, Vibration and Harshness (NVH) Troubleshooting

=NGAX0004

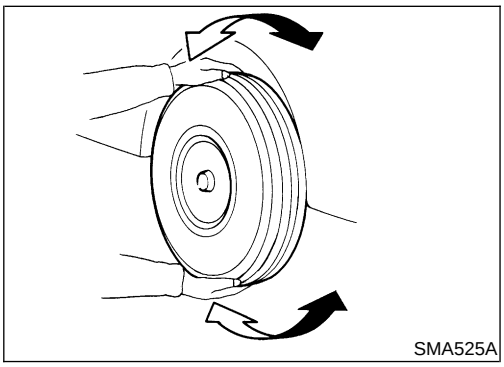
NVH TROUBLESHOOTING CHART

NGAX0004S01

Use the chart below to help you find the cause of the symptom. If necessary, repair or replace these parts.

Reference page			—	AX-19	—	AX-8, 29	—	AX-5, 28	NVH, ***PD-4***	NVH, ***PD-4***	Refer to DRIVE SHAFT in this chart.	Refer to AXLE in this chart.	NVH, ***SU-3***	NVH, ***SU-3***	NVH, ***SU-3***	NVH, ***BR-5***	NVH, ***ST-5***
Possible cause and SUSPECTED PARTS			Excessive joint angle	Joint sliding resistance	Imbalance	Improper installation, looseness	Parts interference	Wheel bearing damage	PROPELLER SHAFT	DIFFERENTIAL	DRIVE SHAFT	AXLE	SUSPENSION	TIRES	ROAD WHEEL	BRAKES	STEERING
Symptom	DRIVE SHAFT	Noise, Vibration	×	×					×	×		×	×	×	×	×	×
		Shake	×		×				×			×	×	×	×	×	×
	AXLE	Noise				×	×		×	×	×		×	×	×	×	×
		Shake				×	×		×		×		×	×	×	×	×
		Vibration				×	×		×		×		×	×			×
		Shimmy				×	×						×	×	×	×	×
		Judder				×							×	×	×	×	×
		Poor quality ride or handling				×	×	×					×	×	×		

×: Applicable


SMA525A

On-vehicle Service

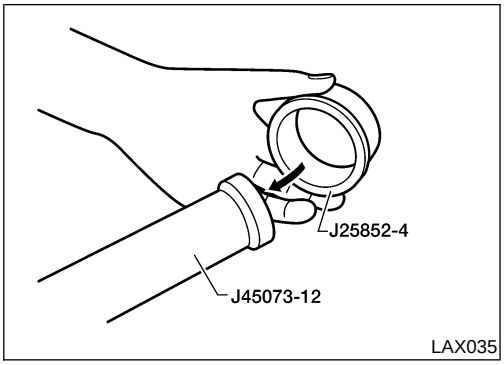
FRONT AXLE PARTS

NGAX0005

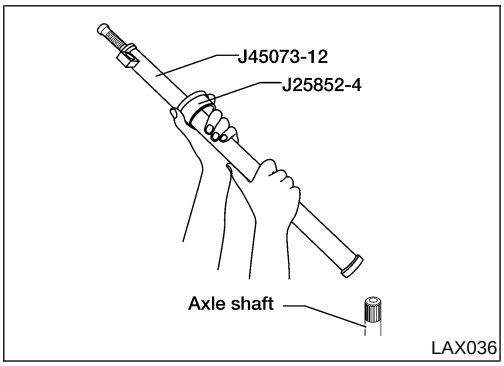
Check front axle parts for excessive play, cracks, wear and other damage.

- Shake each front wheel to check for excessive play.
  If looseness is noted, adjust wheel bearing end play, then check ball joint end play.
- Make sure that the cotter pin is inserted.
- Retighten all nuts and bolts to the specified torque.

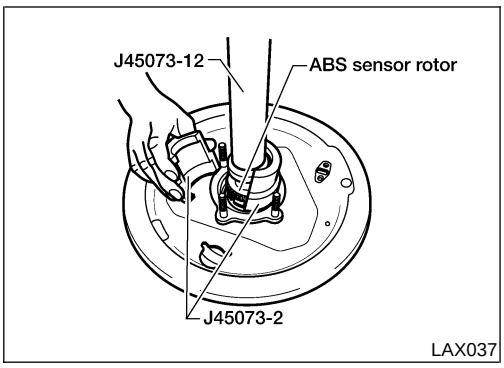
: Refer to *SU-12*, “FRONT SUSPENSION”.



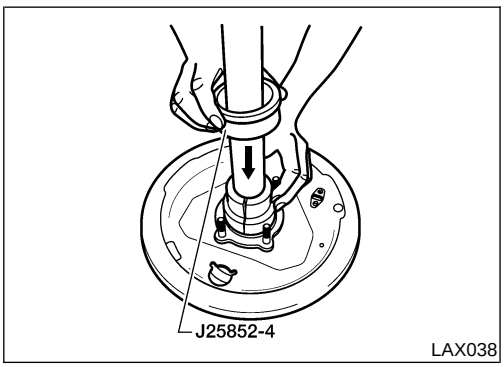
a. Slide the sleeve over the extension tube.



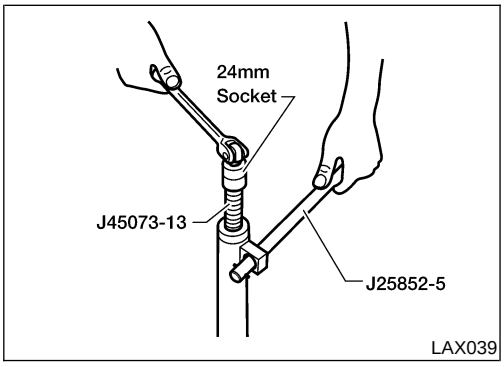
b. Slide the extension tube with sleeve over the axle shaft.



c. Install the two halves of the collet around the ABS sensor rotor making sure the lower lip of each collet is slid under the ABS sensor rotor edge.



d. Slide the sleeve over the collet.



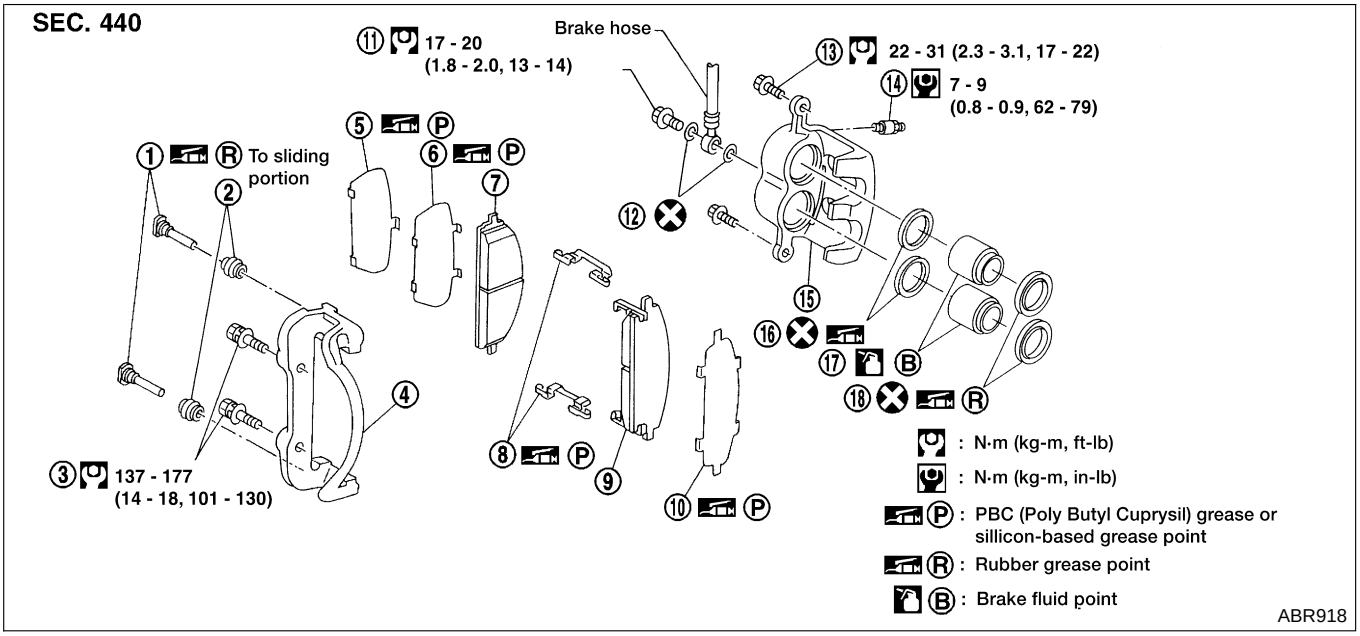
e. Tighten the forcing screw in the extension tube until the ABS sensor rotor is removed.

CAUTION:

Do not use an impact wrench to tighten the forcing screw.

f. Remove the Tool and ABS sensor rotor from the axle shaft.

Pad Replacement (Cont'd)



1. Main pin
2. Pin boot
3. Torque member fixing bolt
4. Torque member
5. Shim cover (if equipped)
6. Inner shim
7. Inner pad
8. Pad retainer
9. Outer pad
10. Outer shim
11. Connecting bolt
12. Copper washer
13. Main pin bolt
14. Bleed valve
15. Cylinder body
16. Piston seal
17. Piston
18. Piston boot

Removal

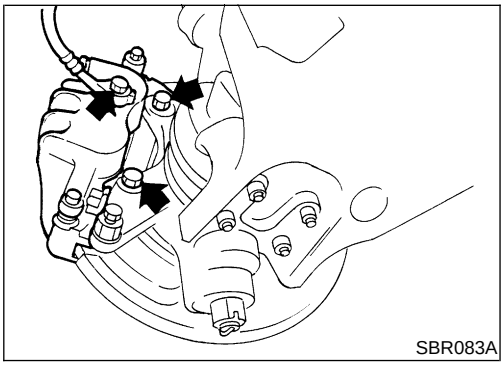
NGBR0033

WARNING:

Clean brake pads with a vacuum dust collector to minimize the hazard of airborne particles or other materials.

CAUTION:

Suspend caliper assembly with wire so as not to stretch brake hose.



Remove torque member fixing bolts and connecting bolt.

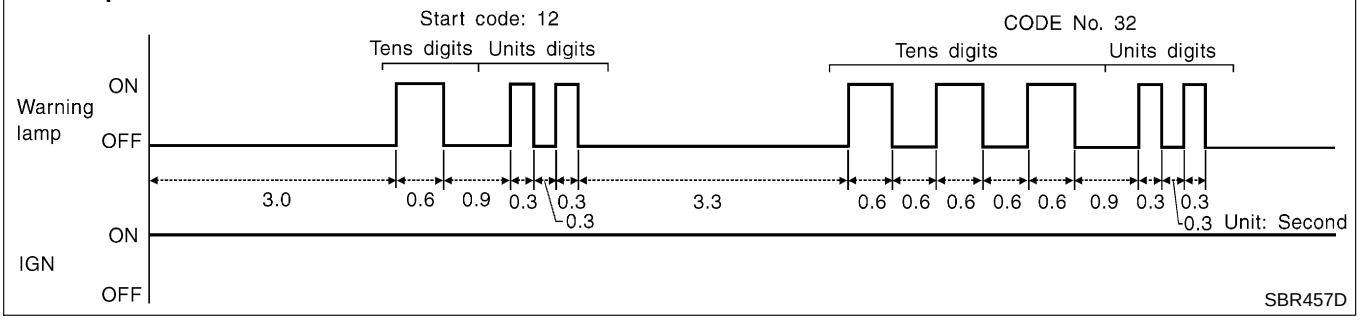
It is not necessary to remove connecting bolt except for disassembly or replacement of caliper assembly. In this case, suspend caliper assembly with wire so as not to stretch brake hose.

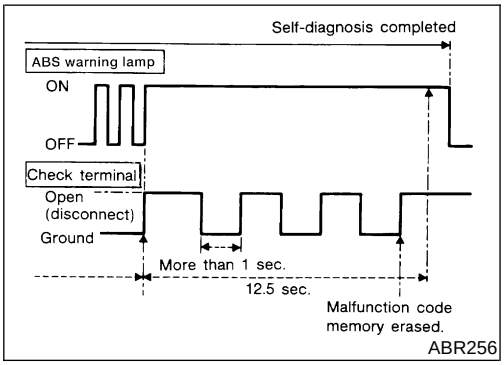
HOW TO READ SELF-DIAGNOSTIC RESULTS (MALFUNCTION CODES)

=NGBR0097S03

1. Determine the code No. by counting the number of times the warning lamp flashes on and off.
2. When several malfunctions occur at one time, up to three code numbers can be stored; the latest malfunction will be indicated first.
3. The indication begins with the start code 12. After that a maximum of three code numbers appear in the order of the lowesr to highest. The indication then returns to the start code 12 to repeat (the indication will stay on for five minutes at the most).
4. Refer to "Malfunction Code/Symptom Chart", BR-48.

Example: Code No. 32 REAR SENSOR SHORT-CIRCUIT





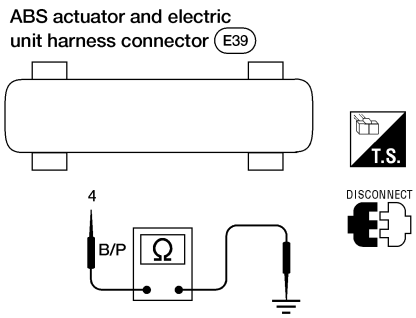
HOW TO ERASE SELF-DIAGNOSTIC RESULTS (MALFUNCTION CODES)

NGBR0097S04

1. Disconnect the check terminal from ground (ABS warning lamp will stay lit).
2. Within 12.5 seconds, ground the check terminal three times. Each terminal ground must last more than 1 second. The ABS warning lamp goes out after the erase operation has been completed.
3. Perform self-diagnosis again. Refer to "Self-diagnosis", BR-46. Only the startcode should appear, no malfunction codes.

9	CHECK ABS ACTUATOR AND ELECTRIC UNIT POWER SUPPLY CIRCUIT FOR SHORT

1. Disconnect battery cable and ABS actuator and electric unit connector.
2. Check continuity between ABS actuator and electric unit connector E39 (body side) terminal 4 and ground.

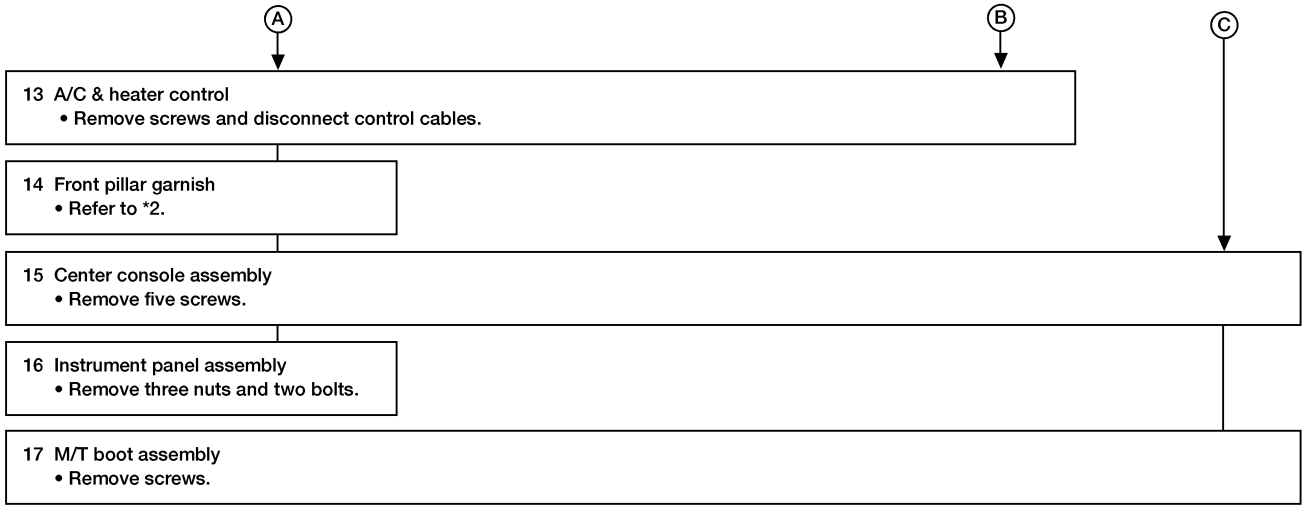


ABR894

Continuity should not exist.

Does continuity exist?

Yes	▶	**Check the following.** If NG, repair harness or connector. ● Harness connector E39 ● Harness for open or short between ABS actuator and electric unit and fuse
No	▶	Replace ABS actuator and electric unit.



WBT106

*2 BT-24

ENGINE COMPARTMENT

Measurement

NGBT0022S01

NGBT0022S0103

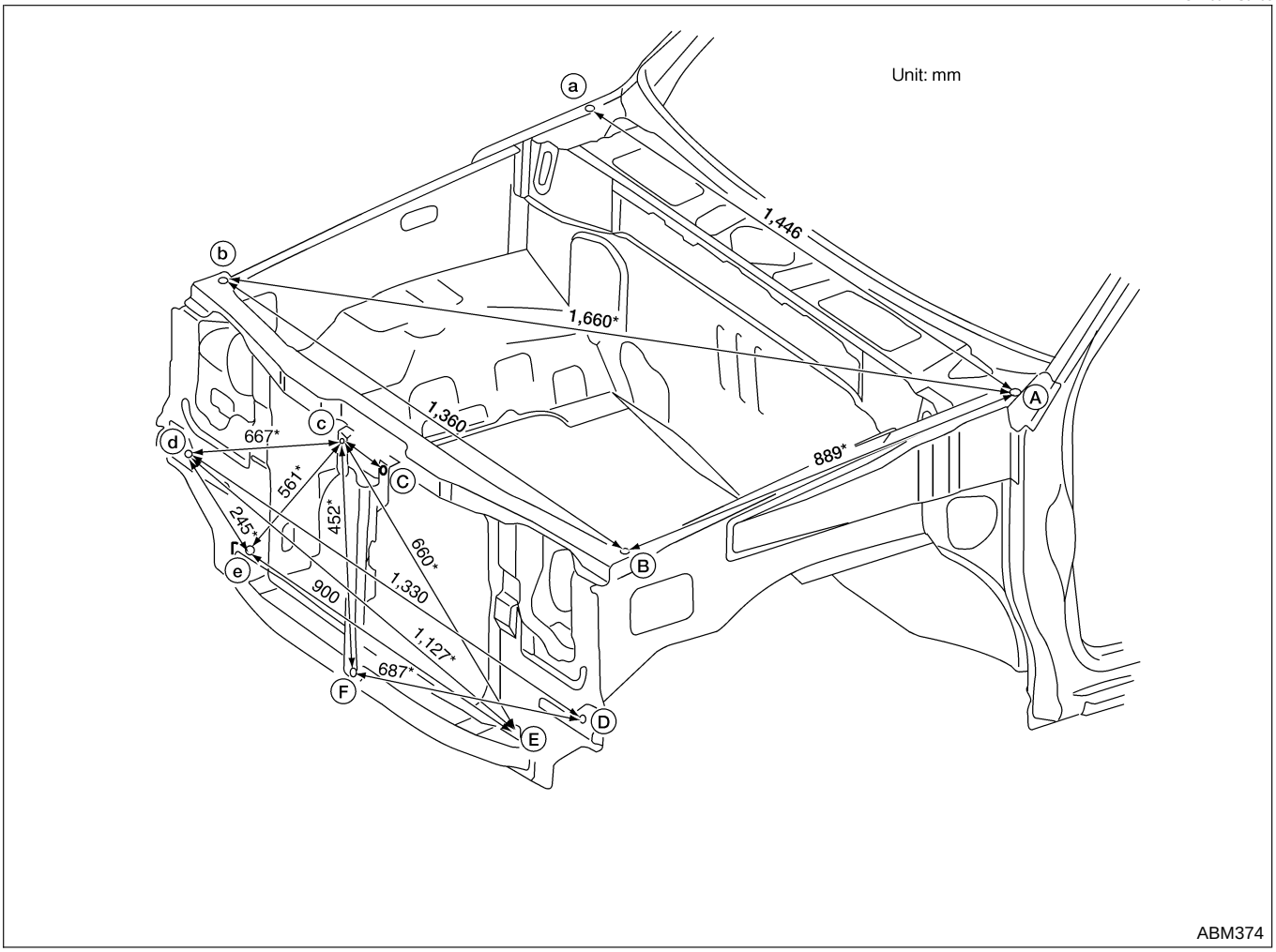
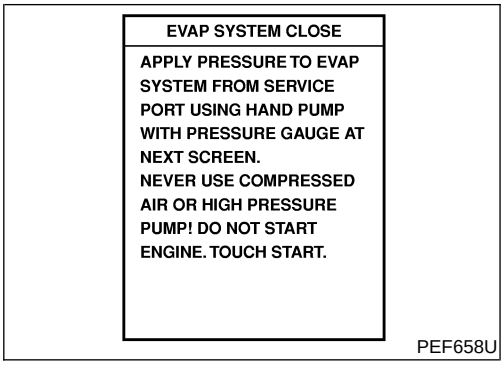
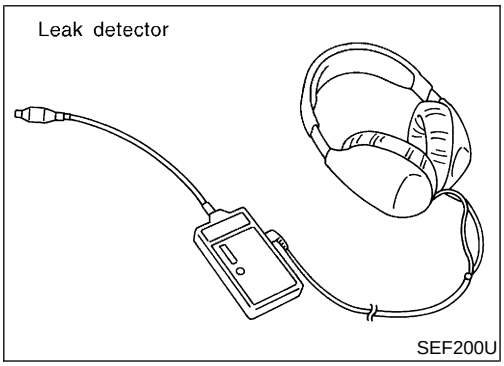


Figure marked with * indicate symmetrically identical dimensions on both right- and left-hand sides of the vehicle.

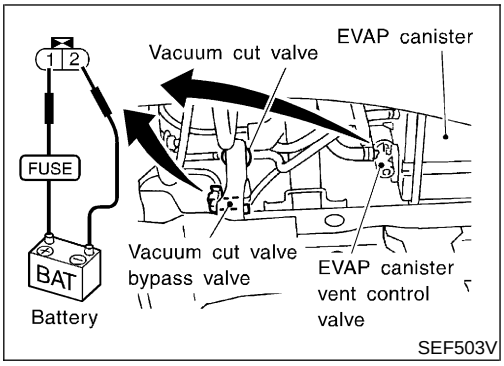
CONTENTS (Cont'd)



PEF658U



SEF200U



SEF503V

How to Detect Fuel Vapor Leakage

NGEC0019S10

CAUTION:

- **Never use compressed air or a high pressure pump.**
- **Do not start engine.**
- **Do not exceed 4.12 kPa (0.042 kg/cm^2, 0.6 psi) of pressure in EVAP system.**

NOTE:

Improper installation of adapter to the service port may cause a leak.

With CONSULT-II

1) Attach the EVAP service port adapter securely to the EVAP service port.
2) Also attach the pressure pump and hose.
3) Turn ignition switch "ON".
4) Select the "EVAP SYSTEM CLOSE" of "WORK SUPPORT MODE" with CONSULT-II.
5) Touch "START". A bar graph (Pressure indicating display) will appear on the screen.
6) Apply positive pressure to the EVAP system until the pressure indicator reaches the middle of the bar graph.
7) Remove the EVAP service port adapter and hose with pressure pump.
8) Locate the leak using a leak detector. Refer to "Evaporative Emission Line Drawing", EC-37.

Without CONSULT-II

1) Attach the EVAP service port adapter securely to the EVAP service port and pressure pump with pressure gauge to the EVAP service port.
2) Apply battery voltage to between the terminals of both EVAP canister vent control valve and vacuum cut valve bypass valve to make a closed EVAP system.
3) To locate the leak, deliver positive pressure to the EVAP system until pressure gauge points reach 1.38 to 2.76 kPa (0.014 to 0.028 kg/cm^2, 0.2 to 0.4 psi).
4) Remove the EVAP service port adapter and hose with pressure pump.
5) Locate the leak using a leak detector. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-37.

12	PREPARATION FOR IDLE SPEED ADJUSTING

With CONSULT-II

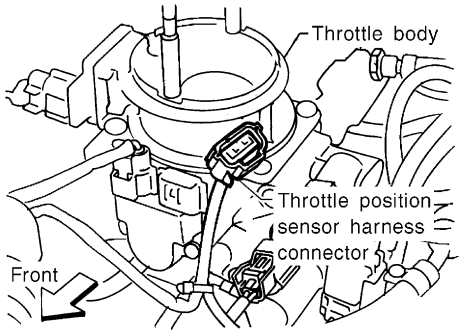
1. Select "IGNITION TIMING ADJ" in "WORK SUPPORT" mode.
2. Touch "START".

IGNITION TIMING ADJ
IGNITION TIMING FEEDBACK CONTROL WILL BE HELD BY TOUCHING START. AFTER DOING SO, ADJUST IGNITION TIMING WITH A TIMING LIGHT BY TURNING THE CAMSHAFT POSITION SENSOR.

PEF546N

Without CONSULT-II

1. Stop engine and disconnect throttle position sensor harness connector.



SEF265S

2. Start engine.

▶	GO TO 6.

CONSULT-II (Cont'd)

Freeze frame data item*	Description
FUEL SYS-B1	● "Fuel injection system status" at the moment a malfunction is detected is displayed. ● One mode in the following is displayed. "MODE 2": Open loop due to detected system malfunction "MODE 3": Open loop due to driving conditions (power enrichment, deceleration enrichment) "MODE 4": Closed loop - using oxygen sensor(s) as feedback for fuel control "MODE 5": Open loop - has not yet satisfied condition to go to closed loop
CAL/LD VALUE [%]	● The calculated load value at the moment a malfunction is detected is displayed.
COOLANT TEMP [°C] or [°F]	● The engine coolant temperature at the moment a malfunction is detected is displayed.
S-FUEL TRIM-B1 [%]	● "Short-term fuel trim" at the moment a malfunction is detected is displayed. ● The short-term fuel trim indicates dynamic or instantaneous feedback compensation to the base fuel schedule.
L-FUEL TRIM-B1 [%]	● "Long-term fuel trim" at the moment a malfunction is detected is displayed. ● The long-term fuel trim indicates much more gradual feedback compensation to the base fuel schedule than short-term fuel trim.
ENGINE SPEED [rpm]	● The engine speed at the moment a malfunction is detected is displayed.
VEHICLE SPEED [km/h] or [mph]	● The vehicle speed at the moment a malfunction is detected is displayed.
ABSOL TH-P/S [%]	● The throttle valve opening angle at the moment a malfunction is detected is displayed.
B/FUEL SCHDL [msec]	● The base fuel schedule at the moment a malfunction is detected is displayed.
INT/A TEMP SE [°C] or [°F]	● The intake air temperature at the moment a malfunction is detected is displayed.

*: The items are the same as those of 1st trip freeze frame data.

DATA MONITOR MODE

NGEC0034S06

Monitored item [Unit]	ECM input signals	Main signals	Description	Remarks
ENG SPEED [rpm]	○	○	● Indicates the engine speed computed from the REF signal (180° signal) of the camshaft position sensor.	● Accuracy becomes poor if engine speed drops below the idle rpm. ● If the signal is interrupted while the engine is running, an abnormal value may be indicated.
MAS A/F SE-B1 [V]	○	○	● The signal voltage of the mass air flow sensor is displayed.	● When the engine is stopped, a certain value is indicated.
B/FUEL SCHDL [msec]		○	● "Base fuel schedule" indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction.	
A/F ALPHA-B1 [%]			● Indicates the mean value of the air-fuel ratio feedback correction factor per cycle.	● When the engine is stopped, a certain value is indicated. ● This data also includes the data for the air-fuel ratio learning control.
COOLAN TEMP/S [°C] or [°F]	○	○	● The engine coolant temperature (determined by the signal voltage of the engine coolant temperature sensor) is displayed.	● When the engine coolant temperature sensor is open or short-circuited, ECM enters fail-safe mode. The engine coolant temperature determined by the ECM is displayed.

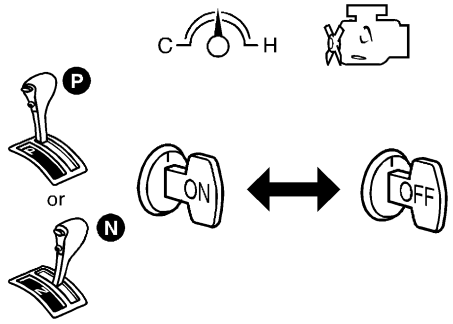
21	RESET THROTTLE POSITION SENSOR IDLE POSITION MEMORY

Without CONSULT-II

NOTE:

Always warm up engine to normal operating temperature. If engine is cool, the throttle position sensor idle position memory will not be reset correctly.

1. Start engine.
2. Warm up engine to normal operating temperature.
3. Stop engine. (Turn ignition switch "OFF".)
4. Turn ignition switch "ON" and wait at least 5 seconds.



SEF864V

5. Turn ignition switch "OFF" and wait at least 5 seconds.
6. Repeat steps 4 and 5, 20 times.

▶	GO TO 22.

22	CHECK TARGET IDLE SPEED

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed.

MT: 800±50 rpm

OK or NG

OK	▶	GO TO 23.
NG	▶	1. Adjust target idle speed. Refer to "Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment", EC-53. 2. GO TO 23.

23	ERASE UNNECESSARY DTC

After this inspection, unnecessary DTC No. might be displayed.
Erase the stored memory in ECM and TCM.
Refer to "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", (EC-79) .

▶	**INSPECTION END**

ECM TERMINALS AND REFERENCE VALUE

NGEC0048

Specification data are reference values and are measured between each terminal and 32 (ECM ground).

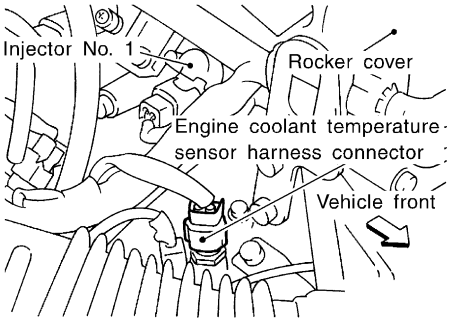
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
4	LG/R	ECM relay (Self shut-off)	**[Engine is running]** **[Ignition switch OFF]** ● For a few seconds after turning ignition switch OFF	0 - 1V
			[Ignition switch OFF] ● A few seconds passed after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14V)
10	B/R	ECM ground	**[Engine is running]** ● Idle speed	Engine ground
19	B/R	ECM ground	**[Engine is running]** ● Idle speed	Engine ground
24	W/G	Ignition switch	**[Ignition switch OFF]**	0V
			[Ignition switch ON]	BATTERY VOLTAGE (11 - 14V)
25	B/Y	ECM ground	**[Engine is running]** ● Idle speed	Engine ground
32	B/Y	ECM ground	**[Engine is running]** ● Idle speed	Engine ground (Probe this terminal with (−) tester probe when measuring)
67	B/P	Power supply for ECM	**[Ignition switch ON]**	BATTERY VOLTAGE (11 - 14V)
72	B/P			
80	SB	Power supply (Back-up)	**[Ignition switch OFF]**	BATTERY VOLTAGE (11 - 14V)
116	B/R	ECM ground	**[Engine is running]** ● Idle speed	Engine ground
117	B/P	Current return	**[Engine is running]** ● Idle speed	BATTERY VOLTAGE (11 - 14V)
124	B/R	ECM ground	**[Engine is running]** ● Idle speed	Engine ground

Diagnostic Procedure

NGEC0077

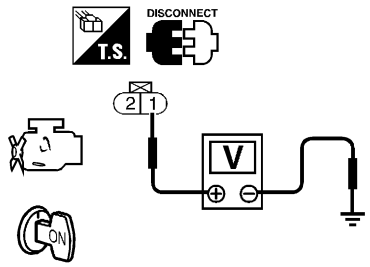
1	CHECK POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect engine coolant temperature sensor harness connector.



SEF330V

3. Turn ignition switch ON.
4. Check voltage between engine coolant temperature sensor terminal 1 and ground with CONSULT-II or tester.



SEF206W

Voltage: Approximately 5V

OK or NG

OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	DETECT MALFUNCTIONING PART

Check the harness for open or short between ECM and engine coolant temperature sensor.

	▶	Repair harness or connectors.

3	CHECK GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check harness continuity between engine coolant temperature sensor terminal 2 and engine ground. Refer to ***EL-140***.
   Continuity should exist.
3. Also check harness for short to power.

OK or NG

OK	▶	GO TO 5.
NG	▶	GO TO 4.

4	DETECT MALFUNCTIONING PART

Check the harness for open or short between ECM and engine coolant temperature sensor.

	▶	Repair open circuit or short to ground or short to power in harness or connectors.

3	CHECK HEATED OXYGEN SENSOR 1 (FRONT)

With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "MANU TRIG" in "DATA MONITOR" mode, and the trigger point is adjusted to 100%.
3. Select "HO2S1 (B1)" AND "HO2S1 MNTR (B1)" in Item Selection.
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch "START" on CONSULT-II screen.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
COOLAN TEMP/S	XXX °C
HO2S1 (B1)	XXX V
HO2S1 MNTR (B1)	LEAN

SEF646Y

6. Check the following.

- "HO2S1 MNTR (B1)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" 5 times in 10 seconds.
  5 times (cycles) are counted as shown below:

cycle	1	2	3	4	5
HO2S1 MNTR (B1)	R-L-R-L-R	L-R-L-R-L	R-L-R-L-R	L-R-L-R-L	R-L-R-L-R

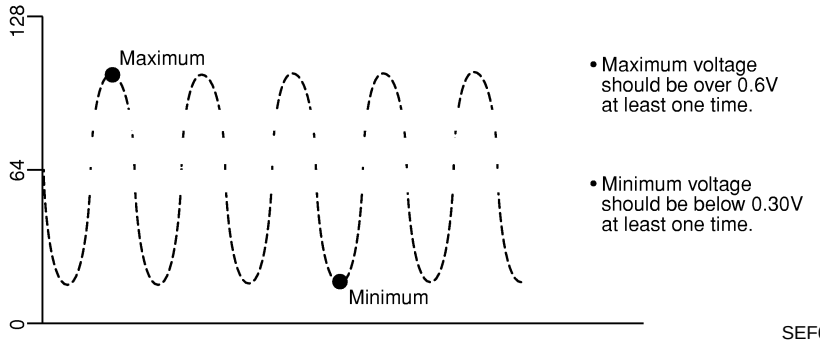
R means HO2S1 MNTR (B1) indicates RICH
L means HO2S1 MNTR (B1) indicates LEAN

SEF217YA

R = "HO2S1 MNTR (B1)", "RICH"
L = "HO2S1 MNTR (B1)", "LEAN"

- "HO2S1 (B1)" voltage goes above 0.6V at least once.
- "HO2S1 (B1)" voltage goes below 0.3V at least once.
- "HO2S1 (B1)" voltage never exceeds 1.0V.

Trigger	ENG SPEED	HO2S1 (B1)
	rpm	V
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX



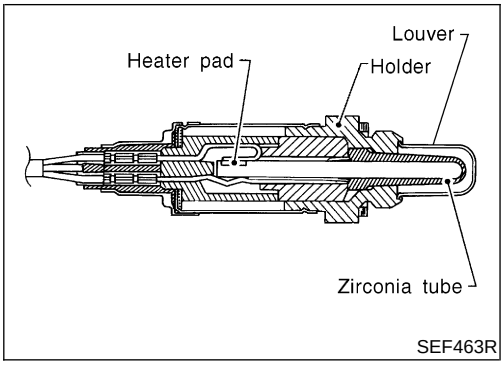
SEF648Y

CAUTION:

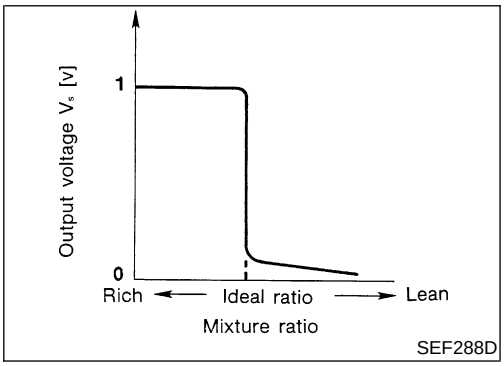
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

OK or NG

OK	▶	GO TO 5.
NG	▶	Replace heated oxygen sensor 1 (front).



SEF463R



SEF288D

Component Description

NGEC0128

The heated oxygen sensor 1 (front) is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 (front) has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 (front) signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.

CONSULT-II Reference Value in Data Monitor Mode

NGEC0129

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ⟷ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1)			LEAN ⟷ RICH Changes more than 5 times during 10 seconds.

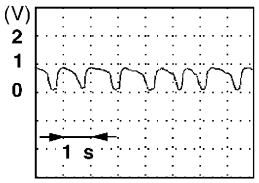
ECM Terminals and Reference Value

NGEC0130

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

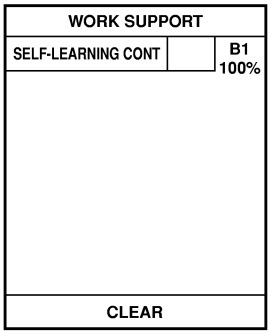
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
50	B	Heated oxygen sensor 1 (front)	**[Engine is running]** ● After warming up to normal operating temperature and engine speed is 2,000 rpm	0 - Approximately 1.0V  SEF008W

Diagnostic Procedure (Cont'd)

2	CLEAR THE SELF-LEARNING DATA

With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".

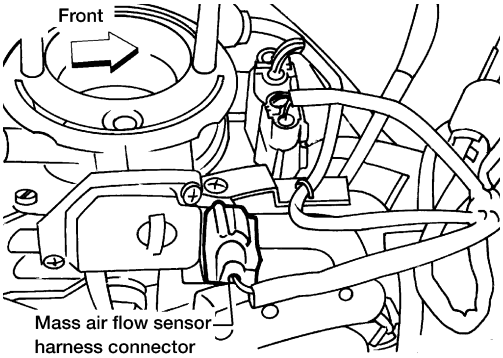


SEF215Z

4. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0171 detected? Is it difficult to start engine?

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 3 seconds at idle speed.



AEC131A

4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure 1st trip DTC P0100 is displayed.
6. Erase the 1st trip DTC memory. Refer to "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-79.
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0171 or P0172 detected? Is it difficult to start engine?

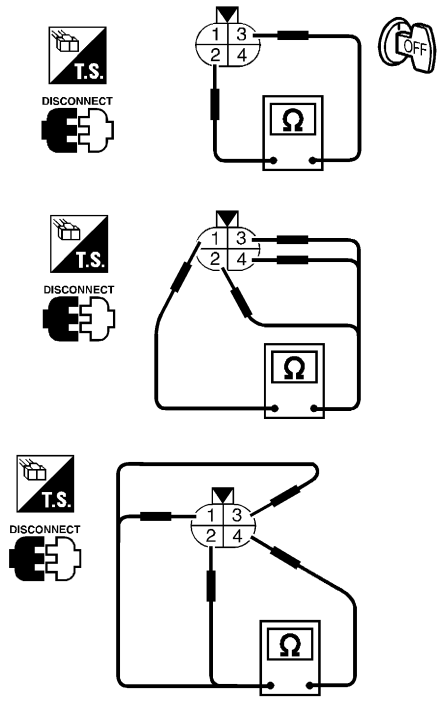
Yes or No

Yes	▶	Perform trouble diagnosis for DTC P0171. Refer to EC-280.
No	▶	GO TO 3.

5	CHECK HEATED OXYGEN SENSOR 2 HEATER (REAR)

Check the following.

1. Check resistance between terminals 2 and 3.



SEF221W

Resistance: 2.3 - 4.3Ω at 25°C (77°F)

2. Check continuity.

Terminal No.	Continuity
1 and 2, 3, 4	No
4 and 1, 2, 3	

MTBL0330

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

OK or NG

OK	▶	GO TO 6.
NG	▶	Replace heated oxygen sensor 2 (rear).

6	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-142.	
▶	**INSPECTION END**

13	CHECK HEATED OXYGEN SENSOR 1 (FRONT)

With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "MANU TRIG" in "DATA MONITOR" mode, and the trigger point is adjusted to 100%.
3. Select "HO2S1 (B1)" and "HO2S1 MNTR (B1)" in item selection.
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch "START" on CONSULT-II screen.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
COOLAN TEMP/S	XXX °C
HO2S1 (B1)	XXX V
HO2S1 MNTR (B1)	LEAN

SEF646Y

6. Check the following.

- "HO2S1 MNTR (B1)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" 5 times in 10 seconds.
  5 times (cycles) are counted as shown below:

cycle	1	2	3	4	5
HO2S1 MNTR (B1)	R-L-R-L-R	L-R-L-R-L	R-L-R-L-R	L-R-L-R-L	R-L-R-L-R

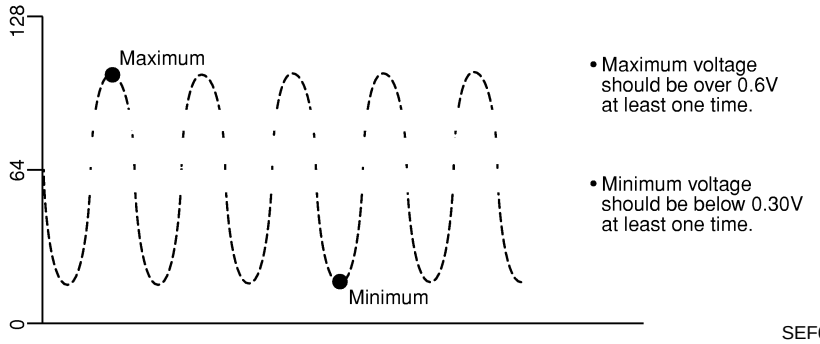
R means HO2S1 MNTR (B1) indicates RICH
L means HO2S1 MNTR (B1) indicates LEAN

SEF217YA

R = "HO2S1 MNTR (B1)", "RICH"
L = "HO2S1 MNTR (B1)", "LEAN"

- "HO2S1 (B1)" voltage goes above 0.6V at least once.
- "HO2S1 (B1)" voltage goes below 0.3V at least once.
- "HO2S1 (B1)" voltage never exceeds 1.0V.

Trigger	ENG SPEED	HO2S1 (B1)
	rpm	V
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX



SEF648Y

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

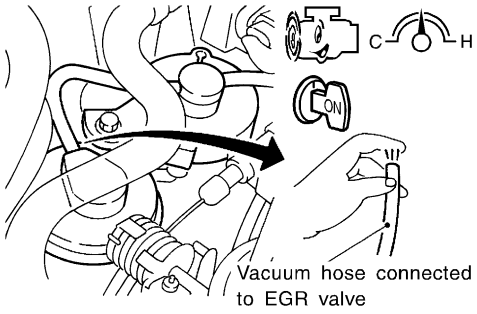
OK or NG

OK	▶	GO TO 15.
NG	▶	Replace heated oxygen sensor 1 (front).

2	CHECK VACUUM SOURCE TO EGR VALVE

With CONSULT-II

1. Warm engine up to normal operating temperature.
2. Disconnect vacuum hose to EGR valve.
3. Check for vacuum existence at idle.



SEF337V

Vacuum should not exist at idle.

4. Select "EGRC SOLENOID VALVE" in "ACTIVE TEST" mode with CONSULT-II and turn the solenoid valve ON.
5. Check for vacuum existence when revving engine from 2,000 rpm up to 4,000 rpm.

ACTIVE TEST	
EGRC SOL/V	ON
(EGR)	CUT
MONITOR	
ENG SPEED	XXX rpm

SEF716Z

Vacuum should exist when revving engine.

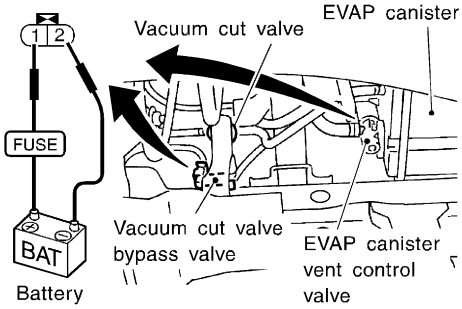
OK or NG

OK	▶	GO TO 4.
NG	▶	GO TO 5.

7	CHECK FOR EVAP LEAK

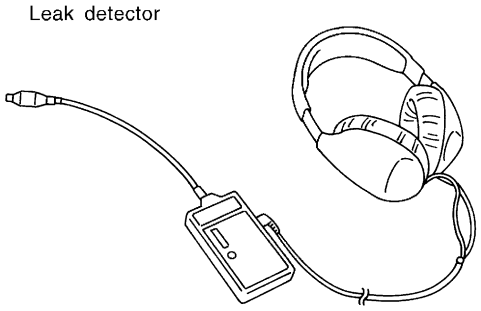
Without CONSULT-II

1. Turn ignition switch OFF.
2. Apply 12 volts DC to EVAP canister vent control valve. The valve will close. (Continue to apply 12 volts until the end of test.)



SEF503V

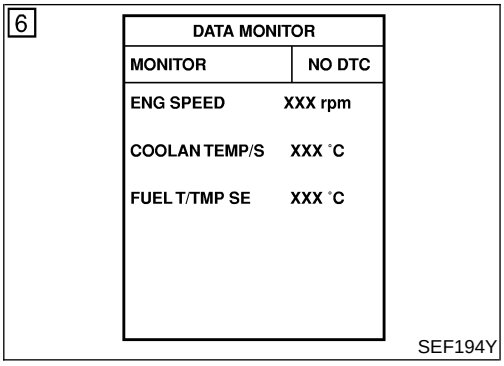
3. Apply 12 volts DC to vacuum cut valve bypass valve. The valve will open. (Continue to apply 12 volts until the end of test.) Shown in the above figure.
4. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg).
   NOTE:
   - **Never use compressed air or a high pressure pump.**
   - **Do not exceed 4.12 kPa (0.042 kg/cm^2, 0.6 psi) of pressure in the system.**
5. Using EVAP leak detector, locate the leak. For the leak detector, refer to instruction manual for more details. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-37.



SEF200U

OK or NG

OK	▶	GO TO 8.
NG	▶	Repair or replace.



DTC Confirmation Procedure

=NGEC0268

NOTE:

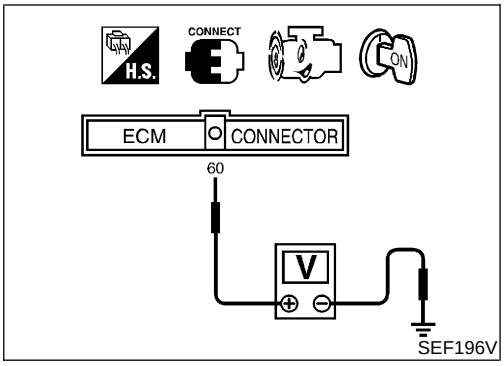
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch OFF and wait at least 5 seconds before conducting the next test.

TESTING CONDITION:

- **Always perform test at a temperature above 5°C (41°F).**
- **Before performing the following procedure, confirm battery voltage is more than 11V at idle.**

With CONSULT-II

1) Start engine and warm it up to normal operating temperature.
2) Turn ignition switch OFF and wait at least 5 seconds.
3) Turn ignition switch ON.
4) Select "DATA MONITOR" mode with CONSULT-II.
5) Make sure that "TANK F/TEMP SE" is more than 0°C (32°F).
6) Start engine and wait at least 20 seconds.
7) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-389.



With GST

1) Start engine and warm it up to normal operating temperature.
2) Check that voltage between ECM terminal 60 (Fuel tank temperature sensor signal) and ground is less than 4.2V.
3) Turn ignition switch OFF and wait at least 5 seconds.
4) Start engine and wait at least 11 seconds.
5) Select "MODE 7" with GST.
6) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-389.

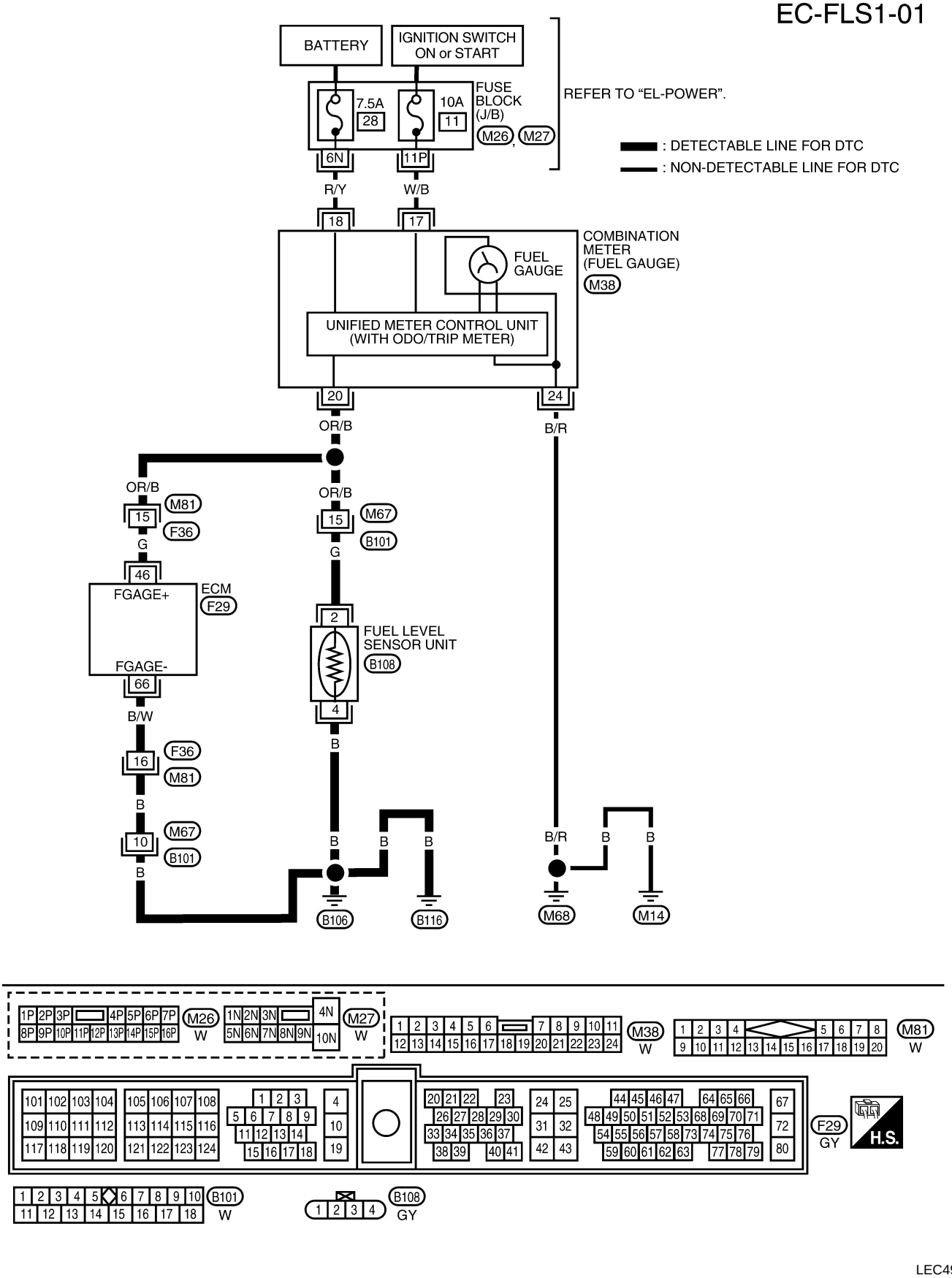
No Tools

1) Start engine and warm it up to normal operating temperature.
2) Check that voltage between ECM terminal 60 (Fuel tank temperature sensor signal) and ground is less than 4.2V.
3) Turn ignition switch OFF and wait at least 5 seconds.
4) Start engine and wait at least 11 seconds.
5) Turn ignition switch OFF, wait at least 5 seconds and then turn ON.
6) Perform "Diagnostic Test Mode II (Self-diagnostic results)" with ECM.
7) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-389.

Wiring Diagram

NGEC1016

EC-FLS1-01



LEC490

Diagnostic Procedure

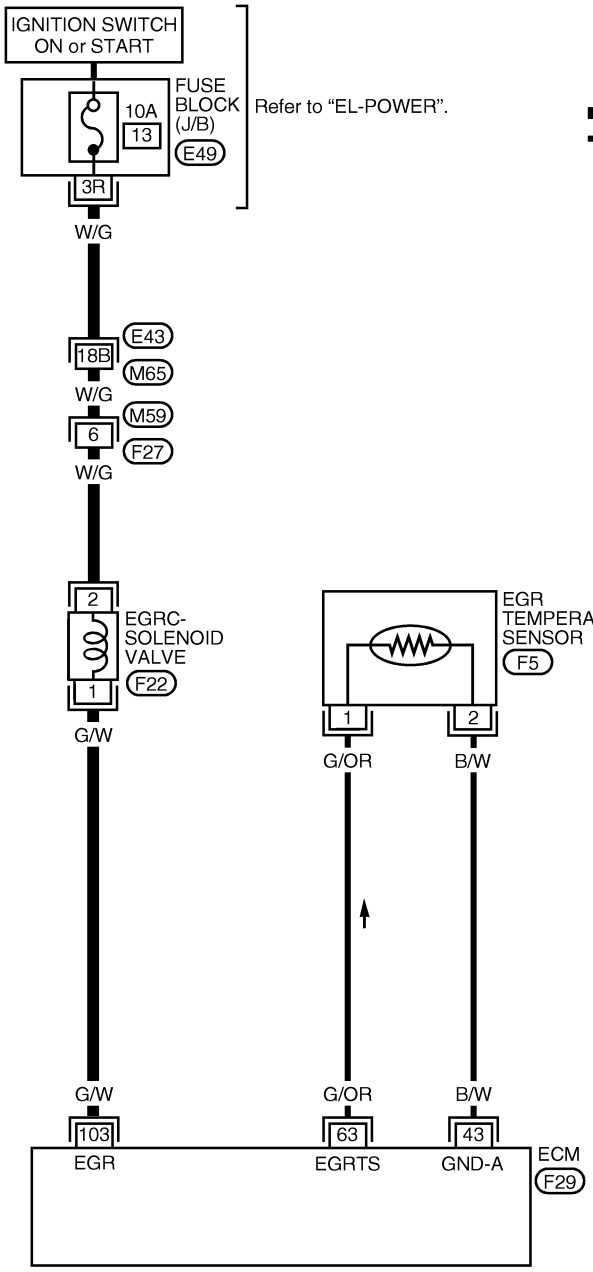
NGEC0298

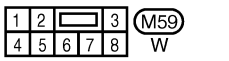
1	INSPECTION START	
With CONSULT-II 1. Turn ignition switch ON. 2. Select “SELF DIAG RESULTS” mode with CONSULT-II. 3. Touch “ERASE”. 4. Perform “DTC Confirmation Procedure”. See previous page. 5. Is the 1st trip DTC P0605 displayed again?		
With GST 1. Turn ignition switch ON. 2. Select MODE 4 with GST. 3. Touch “ERASE”. 4. Perform “DTC Confirmation Procedure”. See previous page. 5. Is the 1st trip DTC P0605 displayed again?		
Yes or No		
Yes	▶	Replace ECM.
No	▶	**INSPECTION END**

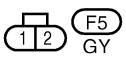
Wiring Diagram

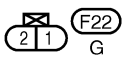
NGEC0352

EC-EGRC1-01

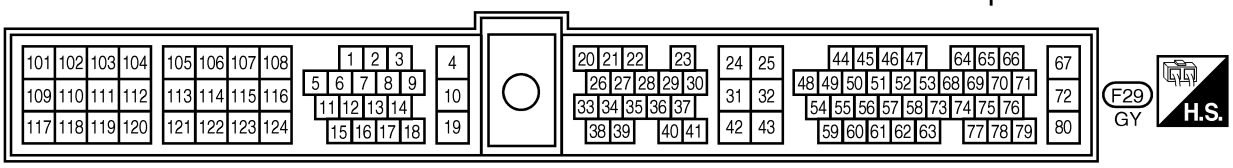








Refer to the following.
M65 , E43 - SUPER MULTIPLE JUNCTION (SMJ)



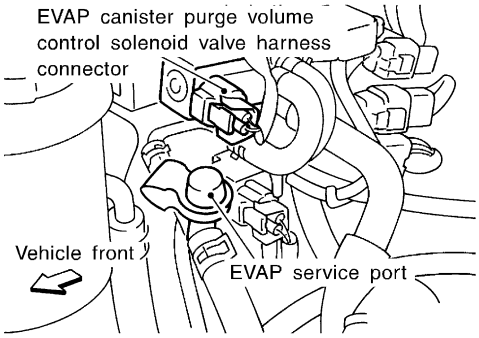
AEC995A

Diagnostic Procedure

=NGEC0364

1	CHECK POWER SUPPLY

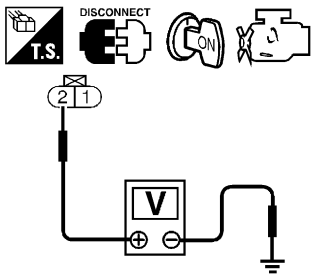
1. Turn ignition switch OFF.
2. Disconnect EVAP canister purge volume control solenoid valve harness connector.



SEF339V

3. Turn ignition switch ON.
4. Check voltage between terminal 2 and engine ground with CONSULT-II or tester.

Voltage: Battery voltage



SEF192V

OK or NG

OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	DETECT MALFUNCTIONING PART

Check the following.

- Harness for open or short between EVAP canister purge volume control solenoid valve and ECM relay
- Harness for open or short between EVAP canister purge volume control solenoid valve and ECM

	▶	Repair harness or connectors.

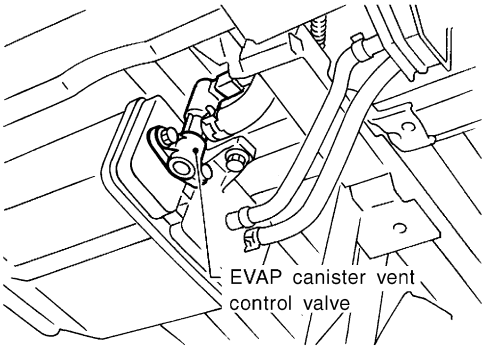
Diagnostic Procedure (Cont'd)

2	CHECK EVAP CANISTER VENT CONTROL VALVE AND O-RING

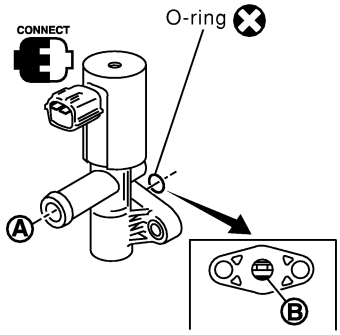
With CONSULT-II

Check air passage continuity.

Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.



SEF143S



ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
HO2S1 (B1)	XXX V
THRTL POS SEN	XXX V

Condition VENT CONTROL/V	Air passage continuity between A and B
ON	No
OFF	Yes

Operation takes less than 1 second.

SEF803Y

OK or NG

OK	▶	GO TO 4.
NG	▶	Replace EVAP canister vent control valve and O-ring.

DATA MONITOR	
MONITOR	NO DTC
P/N POSI SW	ON

SEF212Y

5

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h
P/N POSI SW	OFF
B/FUEL SCHDL	XXX msec

SEF213Y

DTC Confirmation Procedure

=NGEC0428

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 5 seconds before conducting the next test.

With CONSULT-II

1) Turn ignition switch ON.

2) Select "P/N POSI SW" in "DATA MONITOR" mode with CONSULT-II. Then check the "P/N POSI SW" signal under the following conditions.

Position (Selector lever)	Known good signal
"N"	ON
Except the above position	OFF

If NG, go to "Diagnostic Procedure", EC-552.
If OK, go to following step.

3) Select "DATA MONITOR" mode with CONSULT-II.
4) Start engine and warm it up to normal operating temperature.
5) Maintain the following conditions for at least 60 consecutive seconds.

ENG SPEED	1,400 - 4,000 rpm
COOLAN TEMP/S	More than 70°C (158°F)
B/FUEL SCHDL	3.5 - 17 msec
VHCL SPEED SE	More than 64 km/h (40 MPH)
Selector lever	Suitable position

6) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-552.

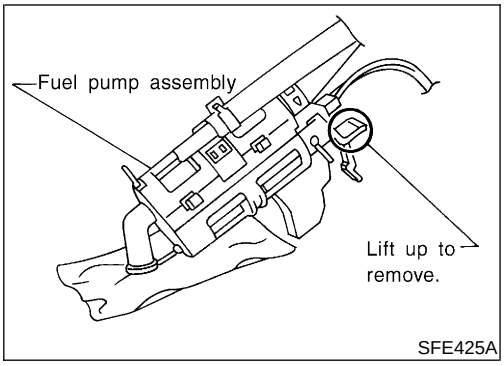
System Description

NGEC0444

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor	Engine speed	ECM	Fuel pump relay
Ignition switch	Start signal		

The ECM activates the fuel pump for several seconds after the ignition switch is turned on to improve engine startability. If the ECM receives a 180° signal from the camshaft position sensor, it knows that the engine is rotating, and causes the pump to perform. If the 180° signal is not received when the ignition switch is on, the engine stalls. The ECM stops pump operation and prevents battery discharging, thereby improving safety. The ECM does not directly drive the fuel pump. It controls the ON/OFF fuel pump relay, which in turn controls the fuel pump.

Condition	Fuel pump operation
Ignition switch is turned to ON.	Operates for 5 seconds.
Engine running and cranking	Operates.
Except as shown above	Stops.



Component Description

NGEC0501

The fuel pump with a fuel damper is an in-tank type (the pump and damper are located in the fuel tank).

CONSULT-II Reference Value in Data Monitor Mode

NGEC0445

MONITOR ITEM	CONDITION	SPECIFICATION
FUEL PUMP RLY	• Ignition switch is turned to ON (Operates for 5 seconds) • Engine running and cranking	ON
	• Except as shown above	OFF

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

NGEC0523

The supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER” used along with a seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. The Supplemental Restraint System consists of driver air bag module (located in the center of the steering wheel), front passenger air bag module (located on the instrument panel on passenger side), seat belt pre-tensioners, a diagnosis sensor unit, a crash zone sensor (4WD models), warning lamp, wiring harness and spiral cable.
Information necessary to service the system safely is included in the **RS section** of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the RS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. Spiral cable and wiring harnesses (except “SEAT BELT PRE-TENSIONER”) covered with yellow insulation either just before the harness connectors or for the complete harness are related to the SRS.**

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

NGEC0524

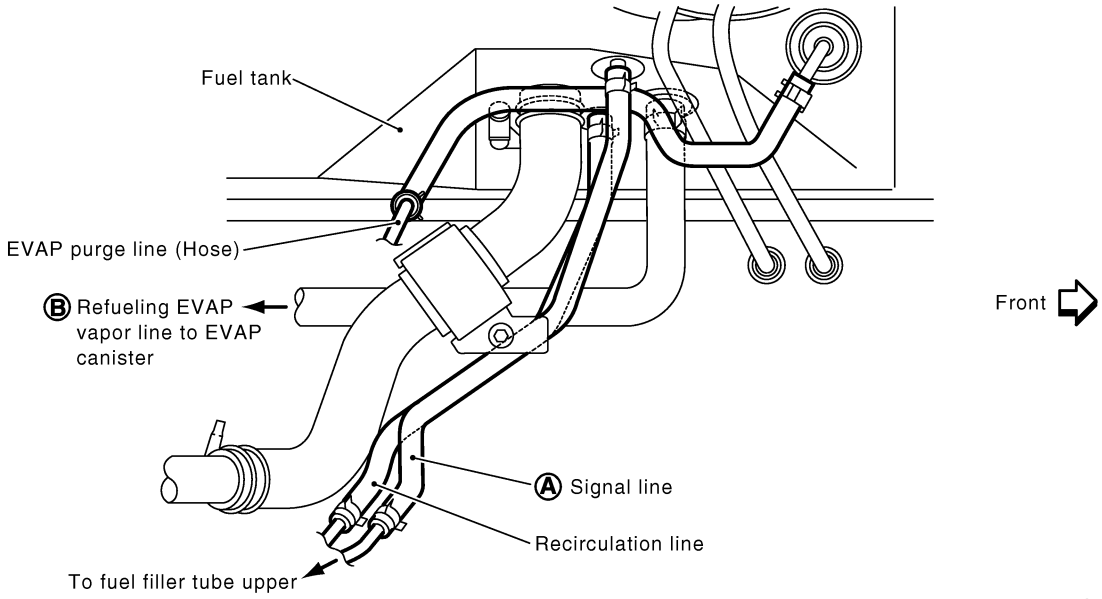
The ECM has an on board diagnostic system. It will light up the malfunction indicator lamp (MIL) to warn the driver of a malfunction causing emission deterioration.

CAUTION:

- **Be sure to turn the ignition switch OFF and disconnect the negative battery terminal before any repair or inspection work. The open/short circuit of related switches, sensors, solenoid valves, etc. will cause the MIL to light up.**
- **Be sure to connect and lock the connectors securely after work. A loose (unlocked) connector will cause the MIL to light up due to the open circuit. (Be sure the connector is free from water, grease, dirt, bent terminals, etc.)**
- **Certain systems and components, especially those related to OBD, may use a new style slide-locking type harness connector. For description and how to disconnect, refer to EL section, “Description”, “HARNESS CONNECTOR”.**
- **Be sure to route and secure the harnesses properly after work. The interference of the harness with a bracket, etc. may cause the MIL to light up due to the short circuit.**
- **Be sure to connect rubber tubes properly after work. A misconnected or disconnected rubber tube may cause the MIL to light up due to the malfunction of the EGR system or fuel injection system, etc.**
- **Be sure to erase the unnecessary malfunction information (repairs completed) from the ECM and TCM (Transmission control module) before returning the vehicle to the customer.**

8	CHECK REFUELING CONTROL VALVE

1. Remove fuel filler cap.
2. Check air continuity between hose ends A and B.
   Blow air into the hose end B. Air should flow freely into the fuel tank.
3. Blow air into hose end A and check there is no leakage.
4. Apply pressure to both hose ends A and B [20 kPa (150 mmHg, 5.91 inHg)] using a pressure pump and a suitable 3-way connector. Check that there is no leakage.



SEF706Z

OK or NG

OK	▶	**INSPECTION END**
NG	▶	Replace refueling control valve with fuel tank.

Symptom: Cannot Refuel/Fuel Odor From The Fuel Filler Opening Is Strong While Refueling.

NGEC0957S0202

1	CHECK EVAP CANISTER

1. Remove EVAP canister with EVAP canister vent control valve attached.
2. Weigh the EVAP canister with EVAP canister vent control valve attached.
   The weight should be less than 1.8 kg (4.0 lb).

OK or NG

OK	▶	GO TO 2.
NG	▶	GO TO 3.

Self-diagnosis result		Example				
		Diagnosis	Ignition OFF – ON – OFF	Ignition OFF – ON – OFF	Ignition OFF – ON – OFF	Ignition OFF – ON – OFF
All OK	Case 1	P0400	OK (1)	– (1)	OK (2)	– (2)
		P0402	OK (1)	– (1)	– (1)	OK (2)
		P1402	OK (1)	OK (2)	– (2)	– (2)
		SRT of EGR	"CMPLT"	"CMPLT"	"CMPLT"	"CMPLT"
	Case 2	P0400	OK (1)	– (1)	– (1)	– (1)
		P0402	– (0)	– (0)	OK (1)	– (1)
		P1402	OK (1)	OK (2)	– (2)	– (2)
		SRT of EGR	"INCMP"	"INCMP"	"CMPLT"	"CMPLT"
NG exists	Case 3	P0400	OK	OK	–	–
		P0402	–	–	–	–
		P1402	NG	–	NG	NG (Consecutive NG)
		(1st trip) DTC	1st trip DTC	–	1st trip DTC	DTC (=MIL "ON")
		SRT of EGR	"INCMP"	"INCMP"	"INCMP"	"CMPLT"

OK: Self-diagnosis is carried out and the result is OK.
NG: Self-diagnosis is carried out and the result is OK.
–: Self-diagnosis is not carried out.

When all SRT related self-diagnoses showed OK results in a same cycle (Ignition OFF – ON – OFF), the SRT will indicate "CMPLT".
→ Case 1 above
When all SRT related self-diagnoses show OK results through several different cycles, the SRT will indicate "CMPLT" at the time the respective self-diagnoses have at least one OK result.
→ Case 2 above
If one or more SRT related self-diagnoses showed NG results in 2 consecutive cycles, the SRT will also indicate "CMPLT".
→ Case 3 above
The previous table shows that the minimum number of cycles for setting SRT as "INCMP" is one (1) for each self-diagnosis (Case 1 and 2) or two (2) for one self-diagnosis (Case 3). However, in preparation for the State emissions inspection, it is unnecessary of each self-diagnosis to be executed twice (Case 3) because of the following reasons;

- The SRT will indicate "CMPLT" at the time the respective self-diagnoses have one (1) OK result.
- The emissions inspection requires "CMPLT" of the SRT only with OK self-diagnosis result.
- When, during SRT driving pattern, 1st trip DTC (NG) is detected prior to "CMPLT" of SRT, the self-diagnosis memory must be erased from ECM after repair.
- If the 1st trip DTC is erased, all the SRT will indicate "INCMP".

NOTE:
SRT can be set as "CMPLT" together with the DTC(s). Therefore, DTC check must always be carried out prior to the State emission inspection even though the SRT indicates "CMPLT".

SRT Service Procedure

NGEC0552S0302

If a vehicle has been rejected for the State emissions inspection due to one or more SRT items indicating "INCMP", review the following flowchart diagnostic sequence on the next page.

CONSULT-II (Cont'd)

DATA MONITOR (SPEC) MODE

NGEC0555S11

Monitored item [Unit]	ECM input signals	Main signals	Description	Remarks
MAS A/F SE-B1 [V]	○	○	• The signal voltage of the mass air flow sensor specification is displayed.	• When the engine is running, specification range is indicated.
B/FUEL SCHDL [msec]			• "Base fuel schedule" indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction.	• When the engine is running, specification range is indicated.
A/F ALPHA-B1 [%]		○	• Indicates the mean value of the air-fuel ratio feedback correction factor per cycle.	• When the engine is running, specification range is indicated. • This data also includes the data for the air-fuel ratio learning control.
A/F ALPHA-B2 [%]		○		

NOTE:

- Any monitored item that does not match the vehicle being diagnosed is deleted from the display automatically.
- Regarding D22 model, "B1" indicates bank 1 and "B2" indicates bank 2.

ACTIVE TEST MODE

NGEC0555S07

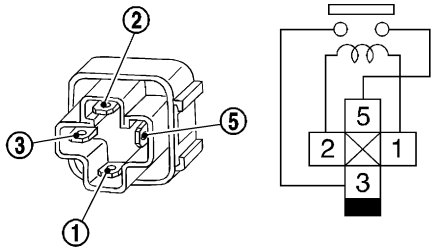
TEST ITEM	CONDITION	JUDGEMENT	CHECK ITEM (REMEDY)
FUEL INJECTION	• Engine: Return to the original trouble condition • Change the amount of fuel injection using CONSULT-II.	If trouble symptom disappears, see CHECK ITEM.	• Harness and connector • Fuel injectors • Front heated oxygen sensor
IGNITION TIMING	• Engine: Return to the original trouble condition • Timing light: Set • Retard the ignition timing using CONSULT-II.	If trouble symptom disappears, see CHECK ITEM.	• Adjust initial ignition timing
IACV-AAC/V OPENING	• Engine: After warming up, idle the engine. • Change the IACV-AAC valve opening percent using CONSULT-II.	Engine speed changes according to the opening percent.	• Harness and connector • IACV-AAC valve
POWER BALANCE	• Engine: After warming up, idle the engine. • A/C switch "OFF" • Shift lever "N" • Cut off each injector signal one at a time using CONSULT-II.	Engine runs rough or dies.	• Harness and connector • Compression • Injectors • Power transistor • Spark plugs • Ignition coils
ENG COOLANT TEMP	• Engine: Return to the original trouble condition • Change the engine coolant temperature using CONSULT-II.	If trouble symptom disappears, see CHECK ITEM.	• Harness and connector • Engine coolant temperature sensor • Fuel injectors
COOLING FAN*	• Ignition switch: ON • Turn the cooling fan "ON" and "OFF" using CONSULT-II.	Cooling fan moves and stops.	• Harness and connector • Cooling fan motor • Cooling fan relay
FUEL PUMP RELAY	• Ignition switch: ON (Engine stopped) • Turn the fuel pump relay "ON" and "OFF" using CONSULT-II and listen to operating sound.	Fuel pump relay makes the operating sound.	• Harness and connector • Fuel pump relay

	SYMPTOM													Reference page
	HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code	AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Camshaft position sensor circuit	1	1	2	2	2		2	2			2			EC-946
Mass air flow sensor circuit				3										EC-739
Heated oxygen sensor 1 (front) circuit														EC-778
Engine coolant temperature sensor circuit	1	2	3		3	3			2		3			EC-755, 773
Throttle position sensor circuit		1	2		2	2					2			EC-760
Incorrect throttle position sensor adjustment		3	1		1	1	1	1	1		1			EC-694
Vehicle speed sensor circuit		2	3		3						3			EC-1023
Knock sensor circuit				3										EC-936
ECM	2	2				3	3	2	2	1				EC-1045, 709
Start signal circuit	1													EC-1174
Park/neutral position (PNP) switch circuit			3		3		3	2			3			EC-1153
Power steering oil pressure switch circuit		2												EC-1185

1 - 6: The numbers refer to the order of inspection.
(continued on next page)

13	CHECK ECM RELAY

1. Apply 12V direct current between relay terminals 1 and 2.
2. Check continuity between relay terminals 3 and 5.



SEF039W

12V (1 - 2) applied: Continuity exists.
No voltage applied: No continuity

OK or NG

OK	▶	GO TO 14.
NG	▶	Replace ECM relay.

14	CHECK ECM GROUND CIRCUIT-II FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminals 10, 19, 25, 32, 116, 124 and engine ground.
   Refer to WIRING DIAGRAM.
   Continuity should exist.
4. Also check harness for short to power.

OK or NG

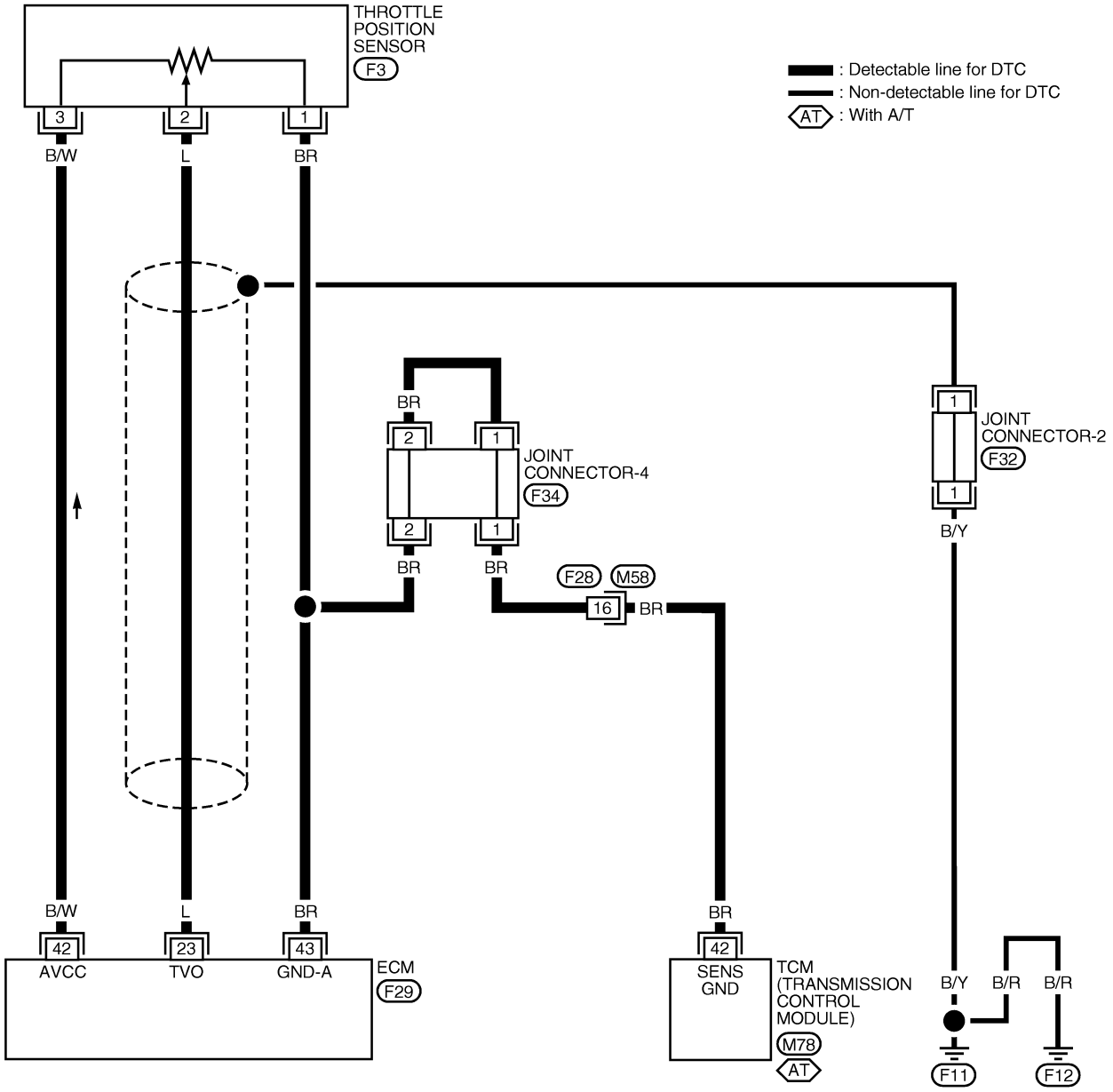
OK	▶	GO TO 15.
NG	▶	GO TO 5.

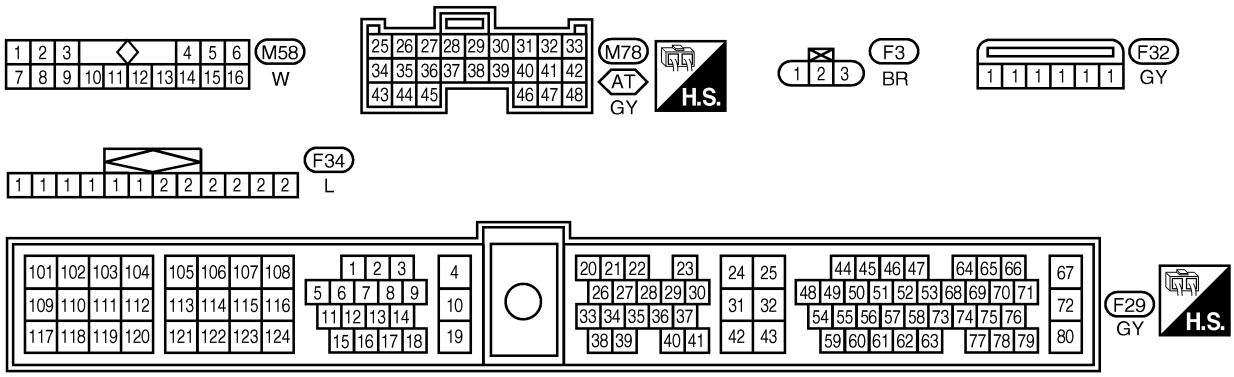
15	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-732.	
▶	**INSPECTION END**

Wiring Diagram

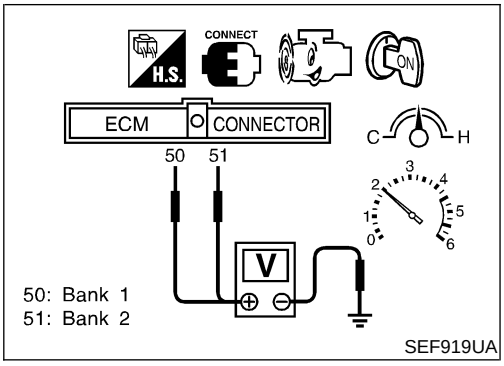
NGEC0600

EC-TPS-01





AEC943A



Overall Function Check

NGEC0620

Use this procedure to check the overall function of the heated oxygen sensor 1 (front) circuit. During this check, a 1st trip DTC might not be confirmed.

Without CONSULT-II

1) Start engine and warm it up to normal operating temperature.
2) Set voltmeter probes between ECM terminal 50 (bank 1 signal) or 51 (bank 2 signal) and engine ground.
3) Check one of the following with engine speed held at 2,000 rpm constant under no load.

- The maximum voltage is over 0.6V at least one time.
- The minimum voltage is over 0.1V at least one time.

4) If NG, go to “Diagnostic Procedure”, EC-792.

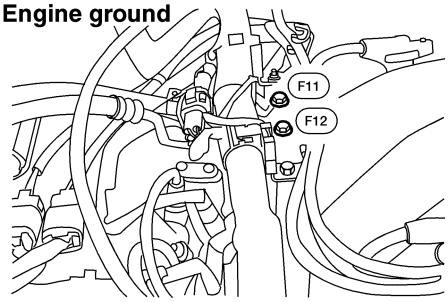
Diagnostic Procedure

NGEC0621

1	RETIGHTEN GROUND SCREWS

1. Turn ignition switch OFF.
2. Loosen and retighten engine ground screws.

Engine ground



LEC518

▶	GO TO 2.

2	RETIGHTEN HEATED OXYGEN SENSOR 1 (FRONT)

Loosen and retighten corresponding heated oxygen sensor 1 (front).

Tightening torque:

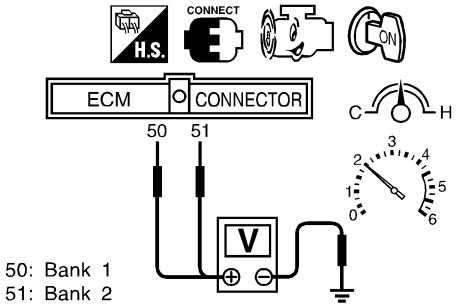
40 - 60 N·m (4.1 - 6.1 kg-m, 30 - 44 ft-lb)

▶	GO TO 3.

11	CHECK FRONT HEATED OXYGEN SENSOR 1 (FRONT)

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 50 (bank 1 signal) or 51 (bank 2 signal) and engine ground.
3. Check the following with engine speed held at 2,000 rpm constant under no load.



50: Bank 1
51: Bank 2

- The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds.
- The maximum voltage is over 0.6V at least one time.
- The minimum voltage is below 0.3V at least one time.
- The voltage never exceeds 1.0V.

1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V
2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V

SEF796Z

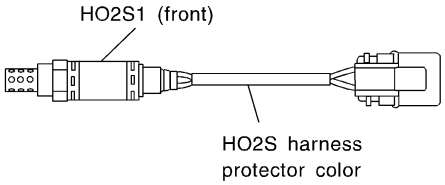
CAUTION:
Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.

OK or NG

OK	▶	GO TO 13.
NG	▶	GO TO 12.

12	REPLACE HEATED OXYGEN SENSOR 1 (FRONT)

1. Turn ignition switch "OFF".
2. Check heated oxygen sensor 1 (front) harness protector color.

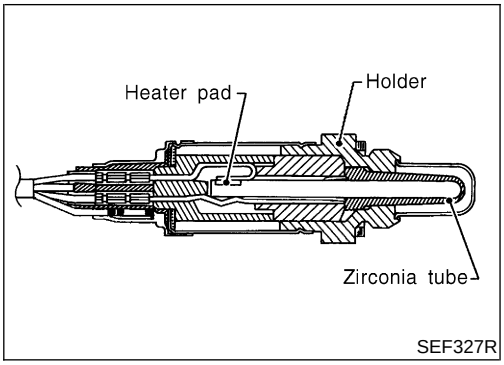


HO2S1 (front) (bank 1): Black
HO2S1 (front) (bank 2): Blue

SEF505Y

CAUTION:
Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

	▶	Replace malfunctioning heated oxygen sensor 1 (front).



Component Description

NGEC0659

The heated oxygen sensor 2 (rear), after three way catalyst, monitors the oxygen level in the exhaust gas on each bank.
Even if switching characteristics of the heated oxygen sensor 1 (front) are shifted, the air fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2 (rear).
This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.
Under normal conditions the heated oxygen sensor 2 (rear) is not used for engine control operation.

CONSULT-II Reference Value in Data Monitor Mode

NGEC0660

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1) HO2S2 (B2)	● Engine: After warming up	Revving engine from idle up to 2,000 rpm	0 - 0.3V ⟷ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1) HO2S2 MNTR (B2)			LEAN ⟷ RICH

ECM Terminals and Reference Value

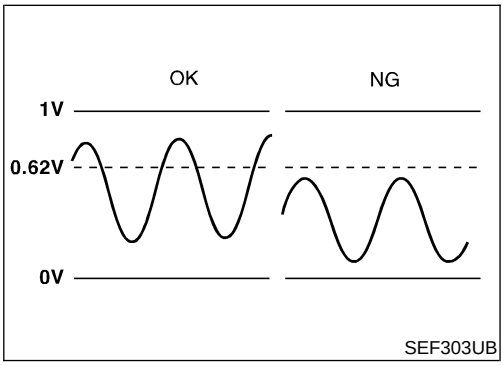
NGEC0661

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than the ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
56	OR	Heated oxygen sensor 2 (rear) (bank 1)	**[Engine is running]** ● **Warm-up condition** ● Revving engine from idle up to 2,000 rpm	0 - Approximately 1.0V
57	Y	Heated oxygen sensor 2 (rear) (bank 2)		



On Board Diagnosis Logic

NGEC0662

The heated oxygen sensor 2 (rear) has a much longer switching time between rich and lean than the heated oxygen sensor 1 (front). The oxygen storage capacity before the three way catalyst causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2 (rear), ECM monitors whether the maximum voltage of the sensor is sufficiently high during the various driving condition such as fuel-cut.
Malfunction is detected when the maximum voltage from the sensor is not reached to the specified voltage.

5	CHECK HO2S2 (REAR) CONNECTORS FOR WATER

Check heated oxygen sensor 2 (rear) connector and harness connector for water.
Water should not exist.

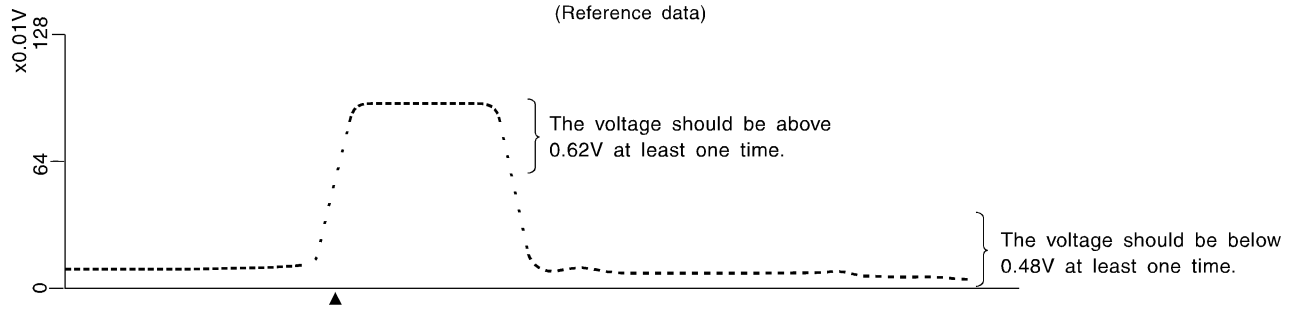
OK or NG

OK (With CONSULT-II)	▶	GO TO 6.
OK (Without CONSULT-II)	▶	GO TO 7.
NG	▶	Repair or replace harness or connectors.

6	CHECK HEATED OXYGEN SENSOR 2 (REAR)

With CONSULT-II

1. Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
2. Stop vehicle with engine running.
3. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)/(B2)" as the monitor item with CONSULT-II.
4. Check "HO2S2 (B1)/(B2)" at idle speed when adjusting "FUEL INJECTION" to ±25%.



"HO2S2 (B1)/(B2)" should be above 0.62V at least once when the "FUEL INJECTION" is +25%.
"HO2S2 (B1)/(B2)" should be below 0.48V at least once when the "FUEL INJECTION" is −25%.

CAUTION:
Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.

OK or NG

OK	▶	GO TO 9.
NG	▶	GO TO 8.

7	CHECK FUNCTION OF INJECTORS

With CONSULT-II

1. Start engine.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II.

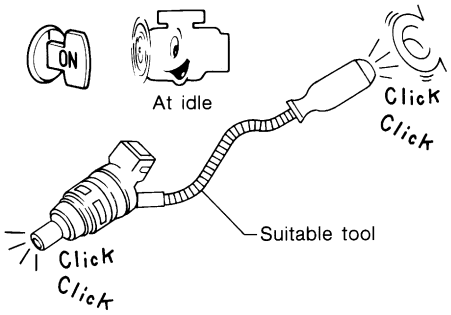
ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
IACV-AAC/V	XXX %

SEF981Z

3. Make sure that each circuit produces a momentary engine speed drop.

Without CONSULT-II

1. Start engine.
2. Listen to each injector operating sound.



MEC703B

Clicking noise should be heard.

OK or NG

OK	▶	GO TO 8.
NG	▶	Perform trouble diagnosis for "INJECTORS", EC-1169.

8	CHECK INJECTOR

1. Remove injector assembly. Refer to EC-638.
   Keep fuel hose and all injectors connected to injector gallery.
2. Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
3. Disconnect injector harness connectors left bank (for DTC P0172), right bank (for P0175).
   The injector harness connectors on right bank (for P0172), left bank (for P0175) should remain connected.
4. Disconnect all ignition coil harness connectors.
5. Prepare pans or saucers under each injectors.
6. Crank engine for about 3 seconds.
   Make sure fuel does not drip from injector.

OK or NG

OK (Does not drip)	▶	GO TO 9.
NG (Drips)	▶	Replace the injectors from which fuel is dripping. Always replace O-ring with new one.

9	CHECK INTERMITTENT INCIDENT

Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-732.

▶ **INSPECTION END**

On Board Diagnosis Logic

NGEC0708

When a misfire occurs, engine speed will fluctuate. If the engine speed fluctuates enough to cause the CKP sensor signal to vary, ECM can determine that a misfire is occurring.

Sensor	Input Signal to ECM	ECM function
Crankshaft position sensor (OBD)	Engine speed	On board diagnosis of misfire

The misfire detection logic consists of the following two conditions.

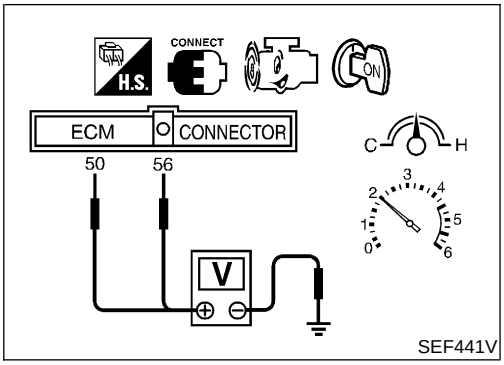
1. One Trip Detection Logic (Three Way Catalyst Damage)
   On the first trip that a misfire condition occurs that can damage the three way catalyst (TWC) due to overheating, the MIL will blink.
   When a misfire condition occurs, the ECM monitors the CKP sensor signal every 200 engine revolutions for a change.
   When the misfire condition decreases to a level that will not damage the TWC, the MIL will turn off. If another misfire condition occurs that can damage the TWC on a second trip, the MIL will blink. When the misfire condition decreases to a level that will not damage the TWC, the MIL will remain on. If another misfire condition occurs that can damage the TWC, the MIL will begin to blink again.
2. Two Trip Detection Logic (Exhaust quality deterioration)
   For misfire conditions that will not damage the TWC (but will affect vehicle emissions), the MIL will only light when the misfire is detected on a second trip. During this condition, the ECM monitors the CKP sensor signal every 1,000 engine revolutions.
   A misfire malfunction can be detected on any one cylinder or on multiple cylinders.

Malfunction is detected when multiple cylinders misfire, No. 1 cylinder misfires, No. 2 cylinder misfires, No. 3 cylinder misfires, No. 4 cylinder misfires, No. 5 cylinder misfires and No. 6 cylinder misfires.

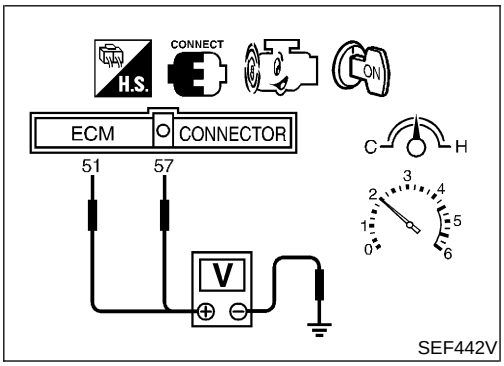
POSSIBLE CAUSE

NGEC0708S01

- Improper spark plug
- Insufficient compression
- Incorrect fuel pressure
- The injector circuit is open or shorted
- Injectors
- Intake air leak
- The ignition secondary circuit is open or shorted
- Lack of fuel
- Drive plate or flywheel
- Heated oxygen sensor 1 (front)
- Incorrect distributor rotor



SEF441V



SEF442V

Overall Function Check

NGEC0742

Use this procedure to check the overall function of the warm-up three way catalyst. During this check, a 1st trip DTC might not be confirmed.

CAUTION:

Always drive vehicle at a safe speed.

Without CONSULT-II

1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
2) Stop vehicle with engine running.
3) Set voltmeters probes between ECM terminals 50 [heated oxygen sensor 1 (front) (bank 1) signal], 51 [heated oxygen sensor 1 (front) (bank 2) signal] and engine ground, and ECM terminals 56 [heated oxygen sensor 2 (rear) (bank 1) signal], 57 [heated oxygen sensor 2 (rear) (bank 2) signal] and engine ground.
4) Keep engine speed at 2,000 rpm constant under no load.
5) Make sure that the voltage switching frequency (high & low) between ECM terminals 56 and engine ground, or 57 and engine ground is very less than that of ECM terminals 50 and engine ground, or 51 and engine ground.
   Switching frequency ratio = A/B
   A: Heated oxygen sensor 2 (rear) voltage switching frequency
   B: Heated oxygen sensor 1 (front) voltage switching frequency
   This ratio should be less than 0.75.
   If the ratio is greater than above, it means warm-up three way catalyst does not operate properly. Go to “Diagnostic Procedure”, EC-955.

NOTE:

If the voltage at terminal 50 or 51 does not switch periodically more than 5 times within 10 seconds at step 5, perform trouble diagnosis for “DTC P0133, P0153” first. (See EC-807.)

On Board Diagnosis Logic

=NGEC0757

Malfunction is detected when an improper voltage signal is sent to ECM through EVAP canister vent control valve.

POSSIBLE CAUSE

NGEC0757S01

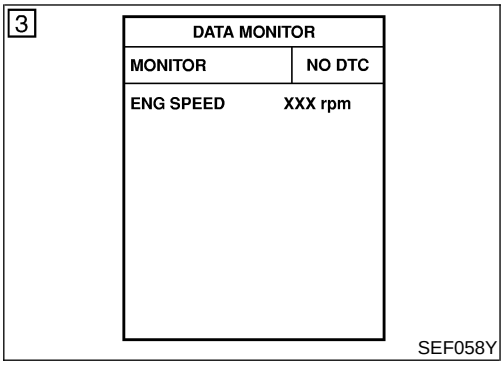
- Harness or connectors
  (The valve circuit is open or shorted.)
- EVAP canister vent control valve

DTC Confirmation Procedure

NGEC0758

NOTE:
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch OFF and wait at least 5 seconds before conducting the next test.

TESTING CONDITION:
Before performing the following procedure, confirm battery voltage is more than 11V at idle.



With CONSULT-II

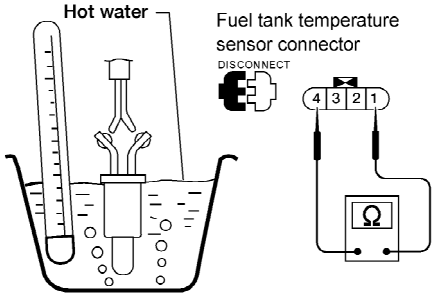
1) Turn ignition switch ON.
2) Select "DATA MONITOR" mode with CONSULT-II.
3) Start engine and wait at least 8 seconds.
4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-983.

With GST

Follow the procedure "With CONSULT-II".

17	CHECK FUEL TANK TEMPERATURE SENSOR

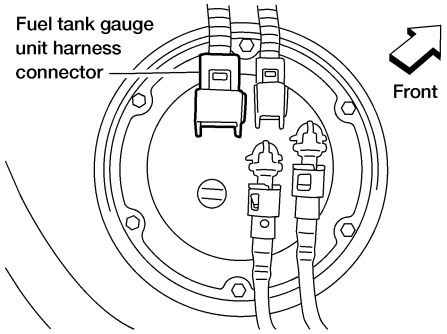
Check resistance by heating with hot water or heat gun as shown in the figure.



AEC052B

Temperature °C (°F)	Resistance kΩ
20 (68)	2.3 - 2.7
50 (122)	0.79 - 0.90

MTBL0234



AEC933A

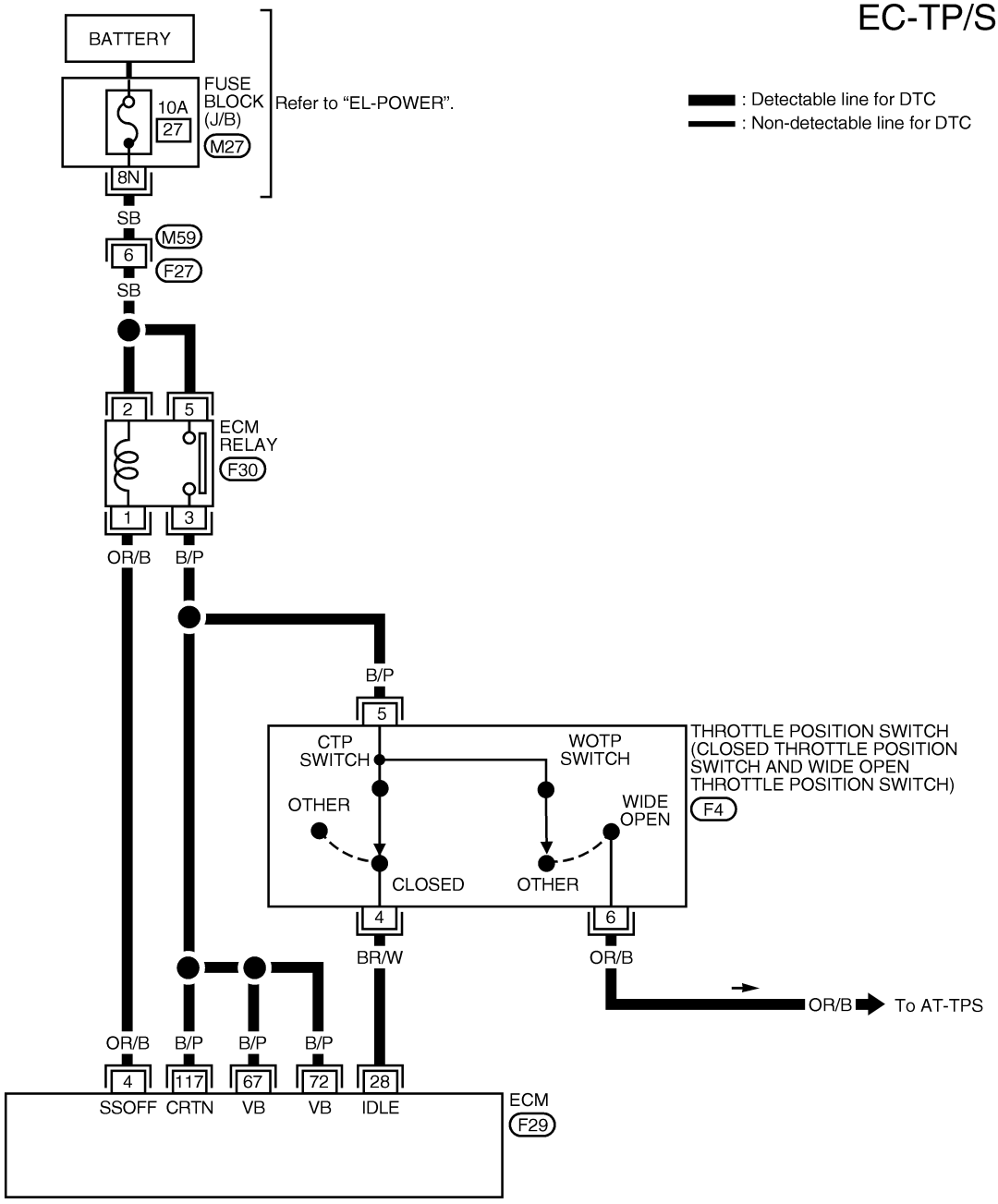
OK or NG

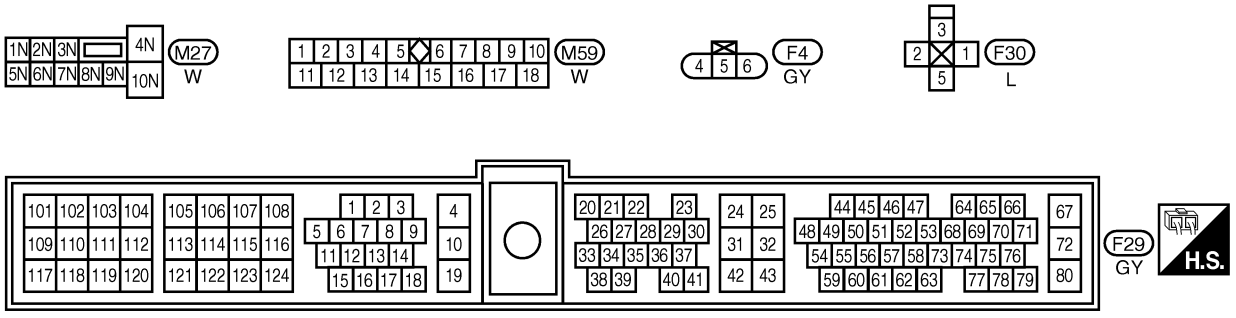
OK	▶	GO TO 18.
NG	▶	Replace fuel tank temperature sensor.

Wiring Diagram

NGEC0788

EC-TP/SW-01





AEC964A

Main 12 Causes of Overheating

NGEC0908

Engine	Step	Inspection item	Equipment	Standard	Reference page
OFF	1	• Blocked radiator • Blocked condenser • Blocked radiator grille • Blocked bumper	• Visual	No blocking	—
	2	• Coolant mixture	• Coolant tester	50 - 50% coolant mixture	See “RECOMMENDED FLUIDS AND LUBRICANTS”,***MA-13***.
	3	• Coolant level	• Visual	Coolant up to MAX level in reservoir tank and radiator filler neck	See “Changing Engine Coolant”, “ENGINE MAINTENANCE”, ***MA-26***.
	4	• Radiator cap	• Pressure tester	59 - 98 kPa (0.6 - 1.0 kg/cm^2, 9 - 14 psi) (Limit)	See “System Check”, “ENGINE COOLING SYSTEM”, ***LC-26***.
ON*2	5	• Coolant leaks	• Visual	No leaks	See “System Check”, “ENGINE COOLING SYSTEM”, ***LC-26***.
ON*2	6	• Thermostat	• Touch the upper and lower radiator hoses	Both hoses should be hot	See “Thermostat” and “Radiator”, “ENGINE COOLING SYSTEM”, ***LC-29***, ***LC-31***.
ON*1	7	• Cooling fan	• CONSULT-II	Operating	See “TROUBLE DIAGNOSIS FOR OVERHEAT” EC-1051.
OFF	8	• Combustion gas leak	• Color checker chemical tester 4 Gas analyzer	Negative	—
ON*3	9	• Coolant temperature gauge	• Visual	Gauge less than 3/4 when driving	—
		• Coolant overflow to reservoir tank	• Visual	No overflow during driving and idling	See “Changing Engine Coolant”, “ENGINE MAINTENANCE”, ***MA-26***.
OFF*4	10	• Coolant return from reservoir tank to radiator	• Visual	Should be initial level in reservoir tank	See “ENGINE MAINTENANCE”, ***MA-25***.
OFF	11	• Cylinder head	• Straight gauge feeler gauge	0.1 mm (0.004 in) Maximum distortion (warping)	See “Inspection”, “CYLINDER HEAD DISTORTION”, ***EM-88***.
	12	• Cylinder block and pistons	• Visual	No scuffing on cylinder walls or piston	See “Inspection”, “CYLINDER BLOCK DISTORTION AND WEAR”, ***EM-47***.

*1: Turn the ignition switch ON.

*2: Engine running at 3,000 rpm for 10 minutes.

*3: Drive at 90 km/h (55 MPH) for 30 minutes and then let idle for 10 minutes.

*4: After 60 minutes of cool down time.

For more information, refer to “Engine Cooling System”, “OVERHEATING CAUSE ANALYSIS”, ***LC-34***.

18	CHECK ABSOLUTE PRESSURE SENSOR

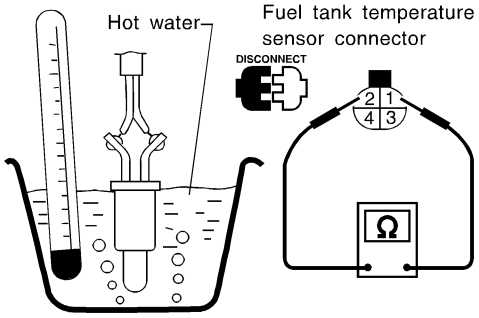
With CONSULT-II
1. Turn ignition switch ON.
2. Select "SELF DIAG RESULTS" mode with CONSULT-II.
3. Touch "ERASE".
4. **Perform "DTC Confirmation Procedure".**
   See EC-748.
5. Is the 1st trip DTC P0105 displayed again?

OK or NG

OK	▶	GO TO 19.
NG	▶	Replace ECM.

19	CHECK FUEL TANK TEMPERATURE SENSOR

1. Remove fuel level sensor unit.
2. Check resistance between fuel level sensor unit and fuel pump terminals 1 and 2 by heating with hot water or heat gun as shown in the figure.



Temperature °C (°F)	Resistance kΩ
20 (68)	2.3 - 2.7
50 (122)	0.79 - 0.90

SEF974Y

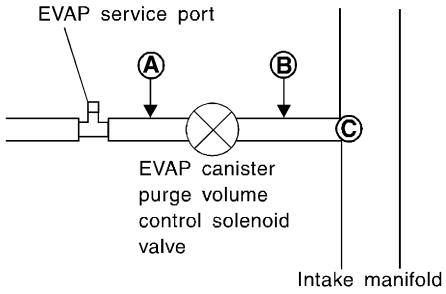
OK or NG

OK	▶	GO TO 20.
NG	▶	Replace fuel level sensor unit.

Diagnostic Procedure (Cont'd)

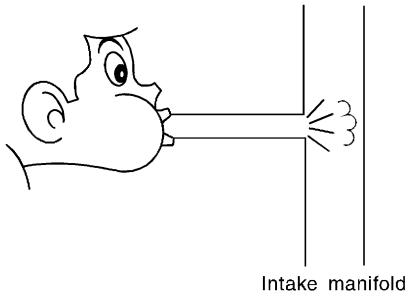
5	CHECK EVAP PURGE HOSE AND PURGE PORT

1. Disconnect purge hoses connected to EVAP service port **A** and EVAP canister purge volume control solenoid valve **B**.



SEF367U

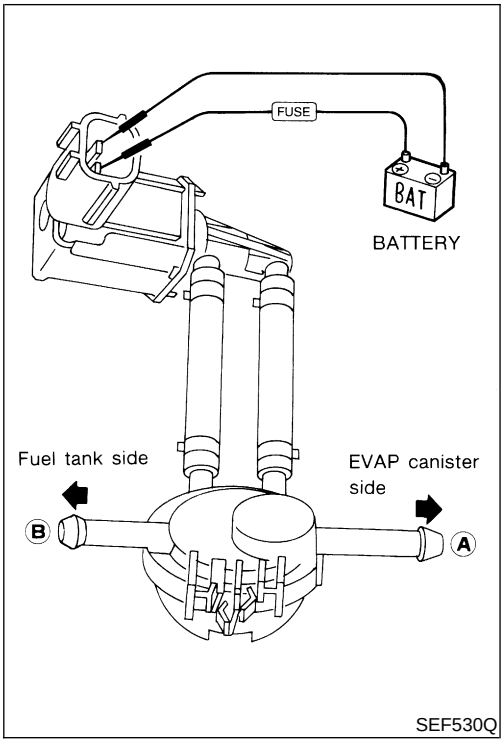
2. Blow air into each hose and EVAP purge port **C**.
3. Check that air flows freely.



SEF368U

OK or NG

OK (with CONSULT-II)	▶	GO TO 6.
OK (without CONSULT-II)	▶	GO TO 7.
NG	▶	Repair or clean hoses and/or purge port.



Overall Function Check

NGEC0884

Use this procedure to check the overall function of vacuum cut valve bypass valve. During this check, the 1st trip DTC might not be confirmed.

Without CONSULT-II

1) Remove vacuum cut valve and vacuum cut valve bypass valve as an assembly.
2) Apply vacuum to port **A** and check that there is no suction from port **B**.
3) Apply vacuum to port **B** and check that there is suction from port **A**.
4) Blow air in port **B** and check that there is a resistance to flow out of port **A**.
5) Supply battery voltage to the terminal.
6) Blow air in port **A** and check that air flows freely out of port **B**.
7) Blow air in port **B** and check that air flows freely out of port **A**.
8) If NG, go to “Diagnostic Procedure”, EC-1145.

Diagnostic Procedure

NGEC0913

1	INSPECTION START

Turn ignition switch to START.
Is any cylinder ignited?

Yes or No

Yes	▶	GO TO 2.
No	▶	GO TO 3.

2	CHECK OVERALL FUNCTION

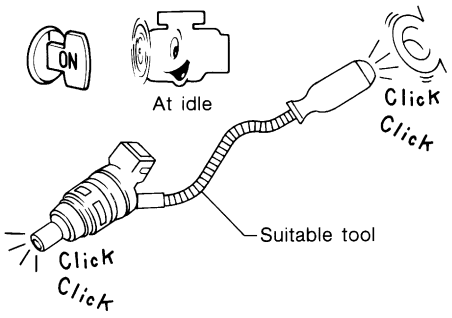
With CONSULT-II
1. Start engine.
2. Perform “POWER BALANCE” in “ACTIVE TEST” mode with CONSULT-II.

ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS AIR/FL SE	XXX V
IACV-AAC/V	XXX %

SEF806Z

3. Make sure that each circuit produces a momentary engine speed drop.

Without CONSULT-II
1. Start engine.
2. Listen to each injector operating sound.



MEC703B

Clicking noise should be heard.

OK or NG

OK	▶	**INSPECTION END**
NG	▶	GO TO 3.

Injector

NGEC0943

Resistance [at 25°C (77°F)]	10 - 14Ω

Throttle Position Sensor

NGEC0945

Throttle valve conditions	Voltage [at normal operating temperature, engine off, ignition switch ON, (throttle opener disengaged, if so equipped)]
Completely closed (a)	0.15 - 0.85V
Partially open	Between (a) and (b)
Completely open (b)	3.5 - 4.7V

Calculated Load Value

NGEC0946

	Calculated load value % (Using CONSULT or GST)
At idle	18.0 - 26.0
At 2,500 rpm	18.0 - 21.0

Intake Air Temperature Sensor

NGEC0947

Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
80 (176)	0.27 - 0.38

Heated Oxygen Sensor 2 Heater (Rear)

NGEC0948

Resistance [at 25°C (77°F)]	2.3 - 4.3Ω

Crankshaft Position Sensor (OBD)

NGEC0949

Resistance [at 20°C (68°F)]	512 - 632Ω

Fuel Tank Temperature Sensor

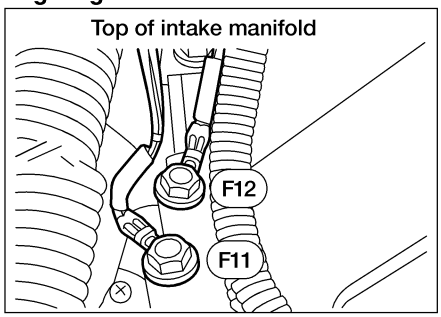
NGEC0950

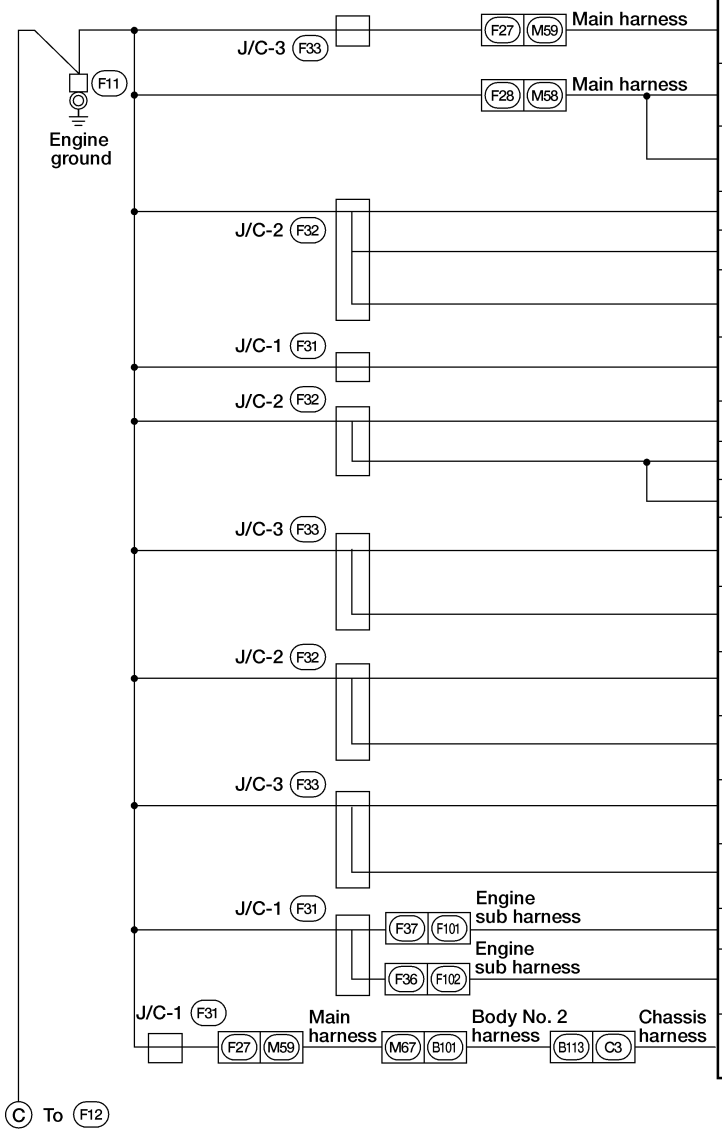
Temperature °C (°F)	Resistance kΩ
20 (68)	2.3 - 2.7
50 (122)	0.79 - 0.90

VG33E

NGEL0171S0402

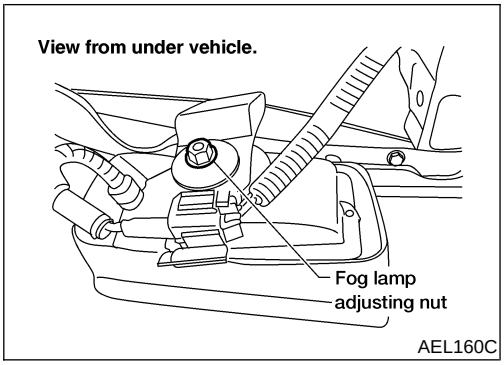
Engine ground



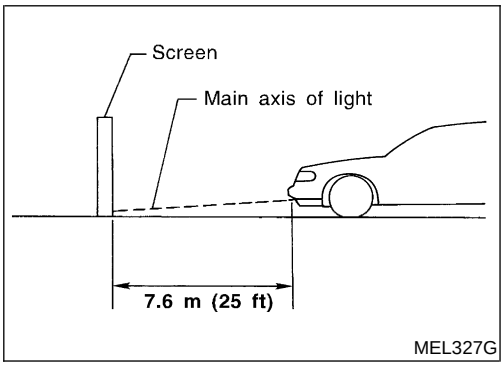


CONNECTOR NUMBER	CONNECT TO
M32	Data link connector (Terminal No. 5)
M78	TCM (transmission control module) (Terminal No. 25) (with A/T)
M78	TCM (transmission control module) (Terminal No. 48) (with A/T)
F1	Mass air flow sensor (shield wire)
F3	Throttle position sensor (shield wire)
F13	Distributor (camshaft position sensor) (Terminal No. 6)
F13	Distributor (camshaft position sensor) (shield wire)
F14	Resistor (ignition coil) (shield wire)
F29	ECM (Terminal No. 25)
F29	ECM (Terminal No. 32)
F39	Heated oxygen sensor 2 (rear) (bank2) (shield wire)
F39	Heated oxygen sensor 2 (rear) (bank2) (Terminal No. 4)
F40	Heated oxygen sensor 1 (front) (bank2) (shield wire)
F41	Heated oxygen sensor 1 (front) (bank1) (shield wire)
F42	Heated oxygen sensor 2 (rear) (bank1) (shield wire)
F42	Heated oxygen sensor 2 (rear) (bank1) (Terminal No. 4)
F109	Knock sensor (shield wire)
F110	Crankshaft position sensor (OBD) (shield wire)
C4	Evap control system pressure sensor (shield wire)

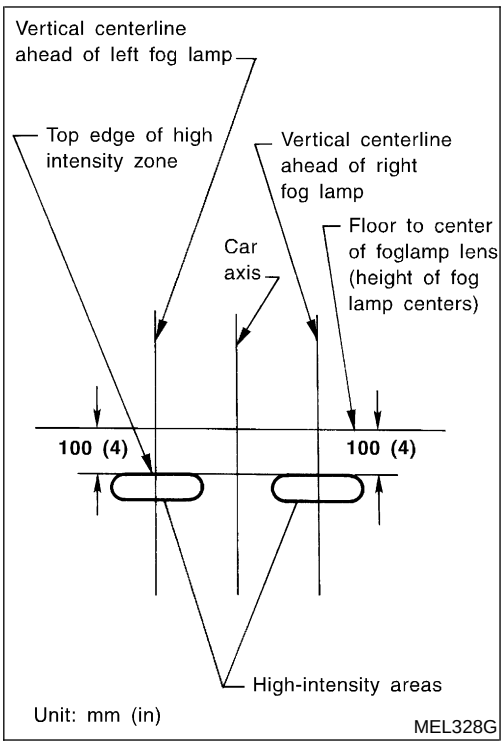
LEL733



AEL160C



MEL327G



MEL328G

Aiming Adjustment

NGEL0029

Before performing aiming adjustment, make sure of the following.

1) Keep all tires inflated to correct pressure.
2) Place vehicle on level ground.
3) See that vehicle is unloaded (except for full levels of coolant, engine oil and fuel, and spare tire, jack, and tools). Have the driver or equivalent weight placed in driver's seat.

Loosen front fog lamp adjusting nuts and adjust aiming by moving front fog lamps.

1. Set the distance between the screen and the center of the front fog lamp lens as shown at left.
2. Turn front fog lamps ON.
3. Adjust front fog lamps so that the top edge of the high intensity zone is 100 mm (4 in) below the height of the fog lamp centers as shown at left.

- **When performing adjustment, if necessary, cover the headlamps and opposite fog lamp.**

4. Tighten the front fog lamp adjusting nuts.

Meter/Gauge Operation and Odo/Trip Meter Segment Check in Diagnosis Mode

NGEL0151

DIAGNOSIS FUNCTION

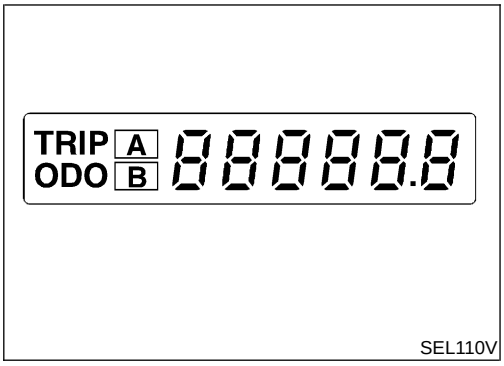
NGEL0151S01

- Odo/trip meter segment can be checked in diagnosis mode.
- Meters/gauges can be checked in diagnosis mode.

HOW TO ALTERNATE DIAGNOSIS MODE

NGEL0151S02

1. Turn ignition switch ON and change odo/trip meter to TRIP A or TRIP B.
2. Turn ignition switch OFF.
3. Turn ignition switch ON while pressing and holding odo/trip meter switch.
4. Confirm that trip meter indicates “000.0”.
5. Push odo/trip meter switch more than 3 times within 7 seconds.

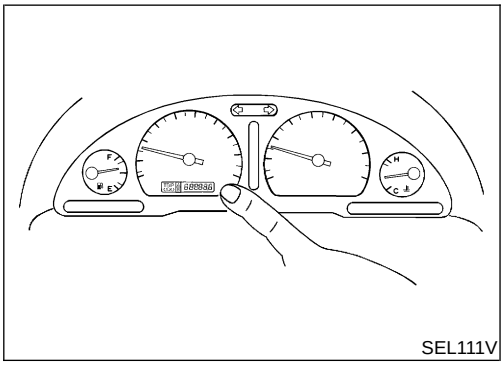


SEL110V

6. All odo/trip meter segments should be turned on.

NOTE:
If some segments are not turned on, speedometer (unified meter control unit) with odo/trip meter should be replaced.

At this point, the unified meter control unit is in diagnosis mode.


SEL111V

7. Push odo/trip meter switch. Indication of each meter/gauge should be as shown in figure at left while pushing odo/trip meter switch if it is not malfunctioning.

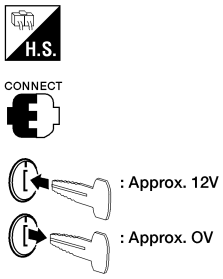
NOTE:
It takes about 1 minute for indication of fuel gauge to become stable.

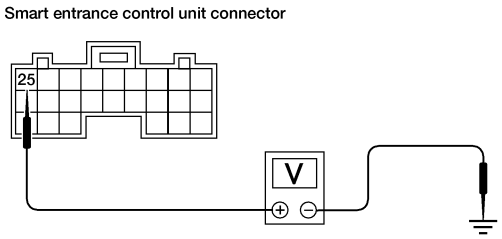
Models with Power Door Locks

NGEL0055S0402

1	CHECK KEY SWITCH INPUT SIGNAL

Check voltage between smart entrance control unit connector M111 terminal 25 (W/G) and ground.





Voltage [V]:
Condition of key switch: Key is INSERTED.
Approx. 12
Condition of key switch: Key is REMOVED.
Approx. 0

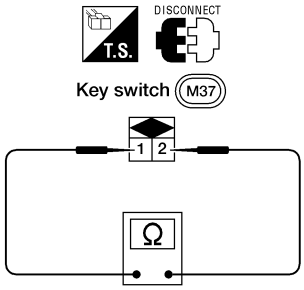
LEL010A

OK or NG

OK	▶	Key switch is OK.
NG	▶	GO TO 2.

2	CHECK KEY SWITCH (INSERTED)

Check continuity between terminals 1 and 2.



AEL416B

Continuity:
Condition of key switch: Key is INSERTED.
Yes
Condition of key switch: Key is REMOVED.
No

OK or NG

OK	▶	**Check the following.** • 7.5A fuse [No. 28, located in fuse block (J/B)] • Harness for open or short between key switch and fuse • Harness for open or short between smart entrance control unit and key switch
NG	▶	Replace key switch.

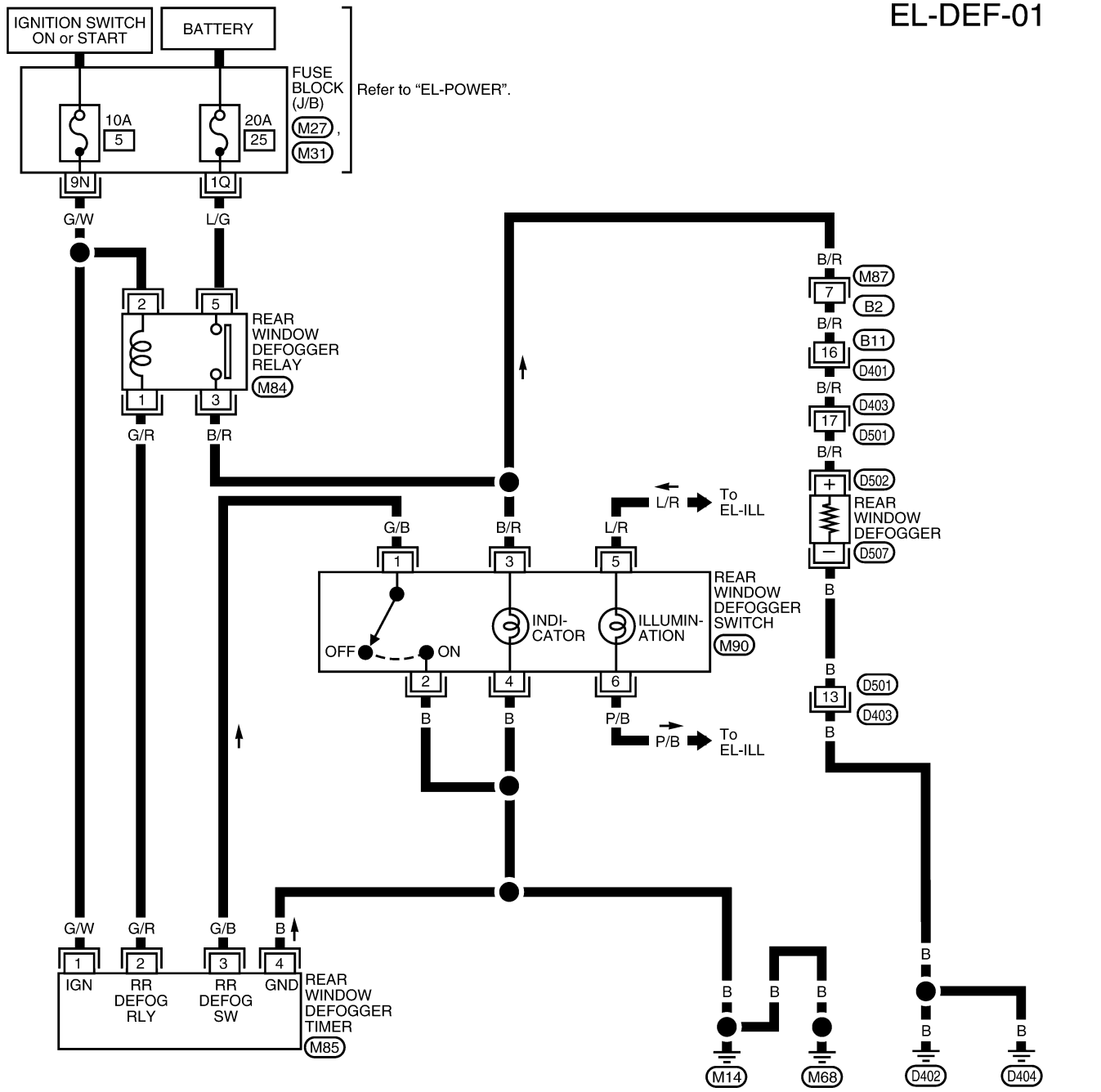
Wiring Diagram — DEF —

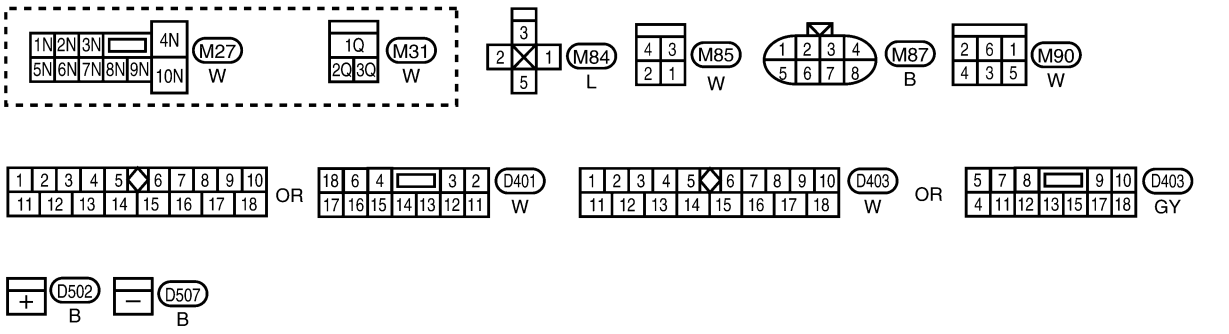
NGEL0074

MODELS WITHOUT POWER DOOR LOCKS

NGEL0074S01

EL-DEF-01





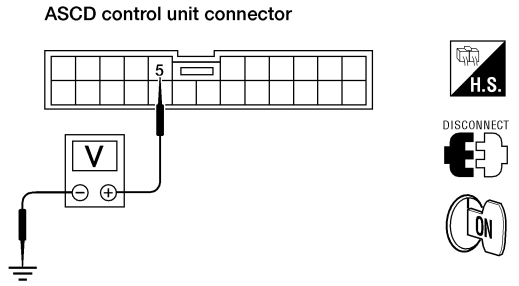
WEL644A

POWER SUPPLY AND GROUND CIRCUIT CHECK

=NGEL0203S03

1	CHECK POWER SUPPLY CIRCUIT FOR ASCD CONTROL UNIT

1. Disconnect ASCD control unit harness connector.
2. Turn ignition switch ON.
3. Check voltage between ASCD control unit harness connector M119 terminal 5 (G/W) and ground.



Does battery voltage exist?

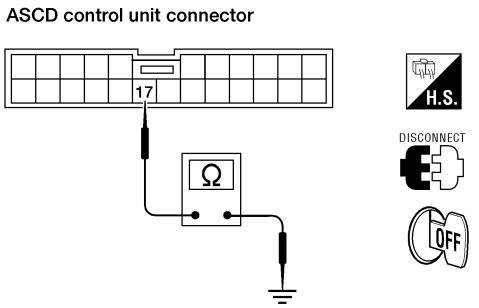
WEL018A

Refer to "Wiring Diagram —ASCD—", EL-155.

Yes	▶	GO TO 2.
No	▶	**Check the following.** ● 10A fuse (No. 5 located in the fuse block) ● Harness for open or short

2	CHECK GROUND CIRCUIT FOR ASCD CONTROL UNIT

Check continuity between ASCD control unit harness connector M119 terminal 17 (B) and body ground.

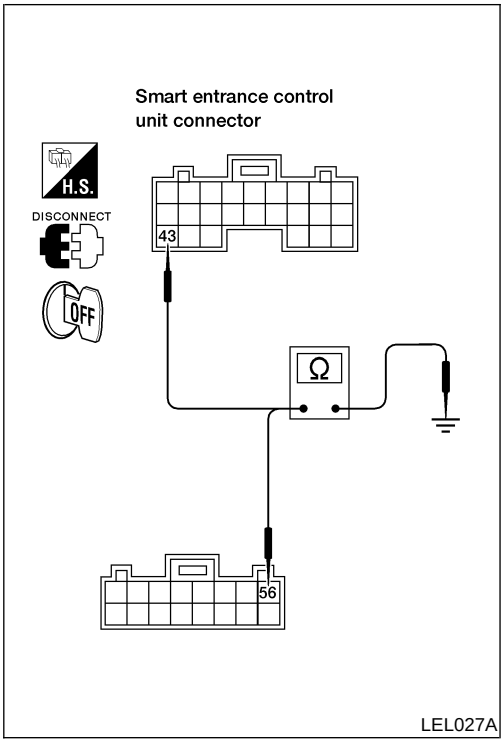


Does continuity exist?

WEL019A

Refer to "Wiring Diagram —ASCD—", EL-155.

Yes	▶	Power supply and ground circuit is OK.
No	▶	Repair harness.



Ground Circuit Check

NGEL0110S0202

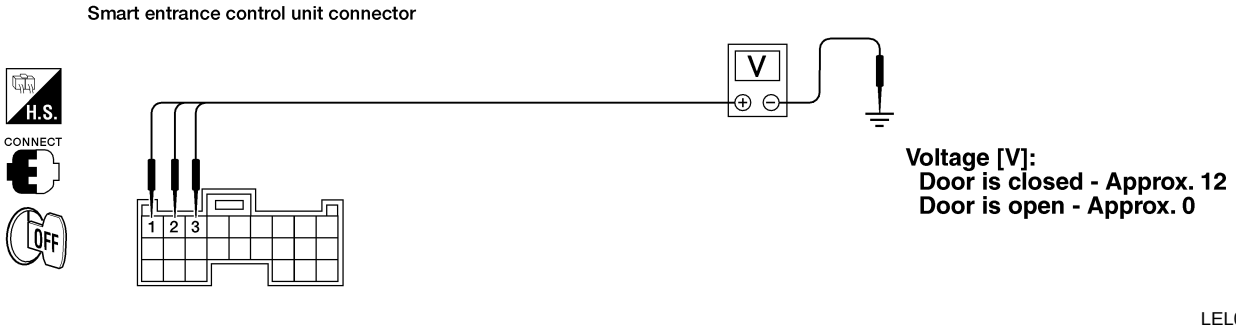
Terminals	Continuity
M111 - 43 (B) - Ground	Yes
M112 - 64 (B) - Ground	

DOOR SWITCH CHECK

NGEL0110S05

1 **CHECK DOOR SWITCHES INPUT SIGNAL**

Check voltage between smart entrance control unit harness connector M110 terminals 1 (G/R), 2 (G/B) or 3 (R/B) and ground.

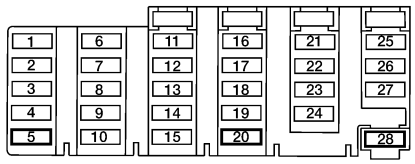


Refer to "Wiring Diagram —D/LOCK—", EL-183.

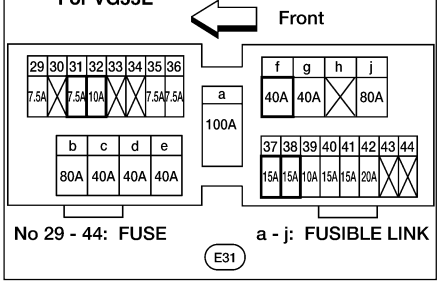
OK or NG

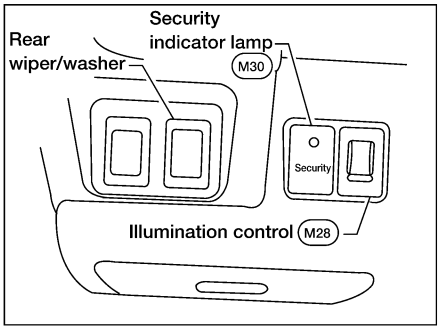
OK	▶	Door switch is OK.
NG	▶	GO TO 2.

Fuse block (J/B)

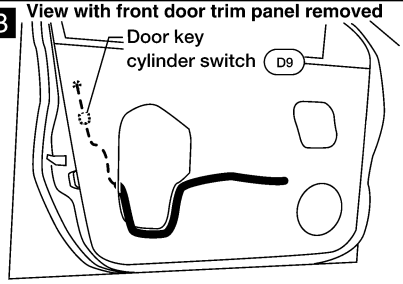


A **Fuse and fusible link box**
For VG33E

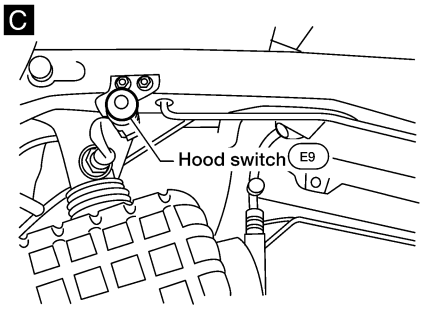




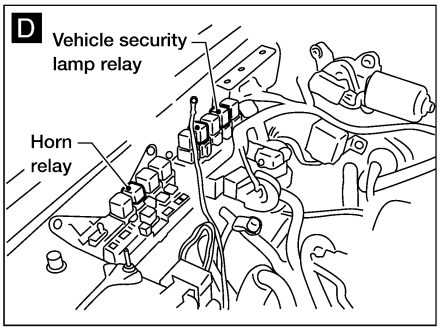
B **View with front door trim panel removed**



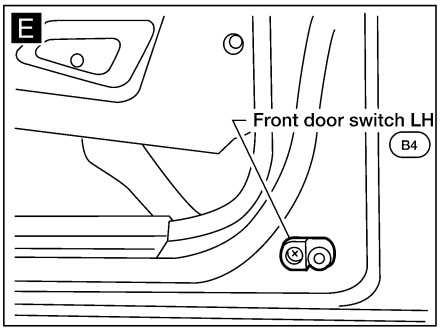
C



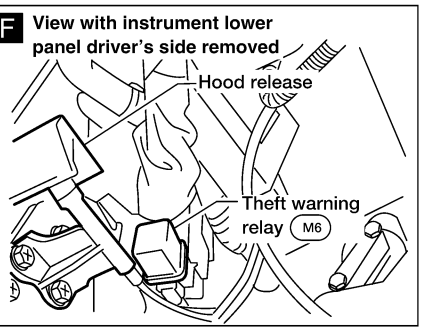
D



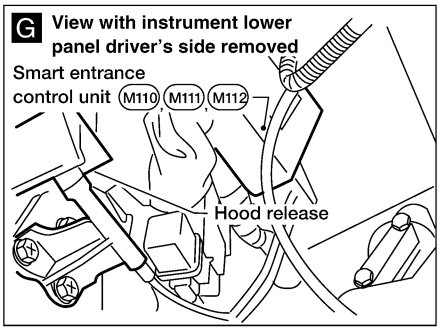
E



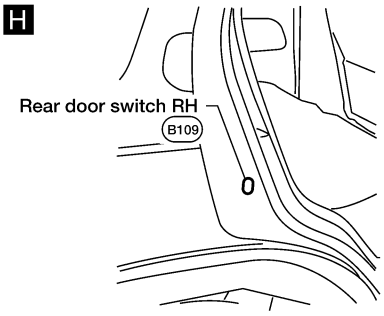
F **View with instrument lower panel driver's side removed**



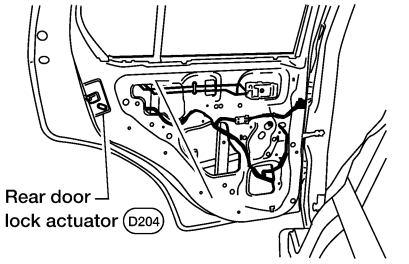
G **View with instrument lower panel driver's side removed**



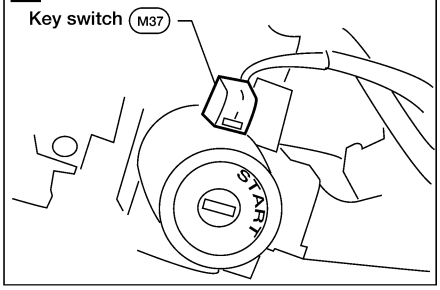
H



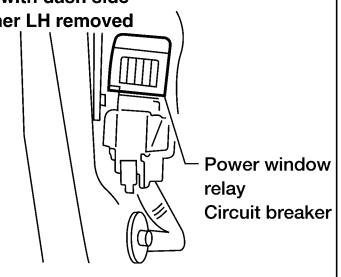
I **View with rear door trim panel removed**



J **View with steering column covers removed**



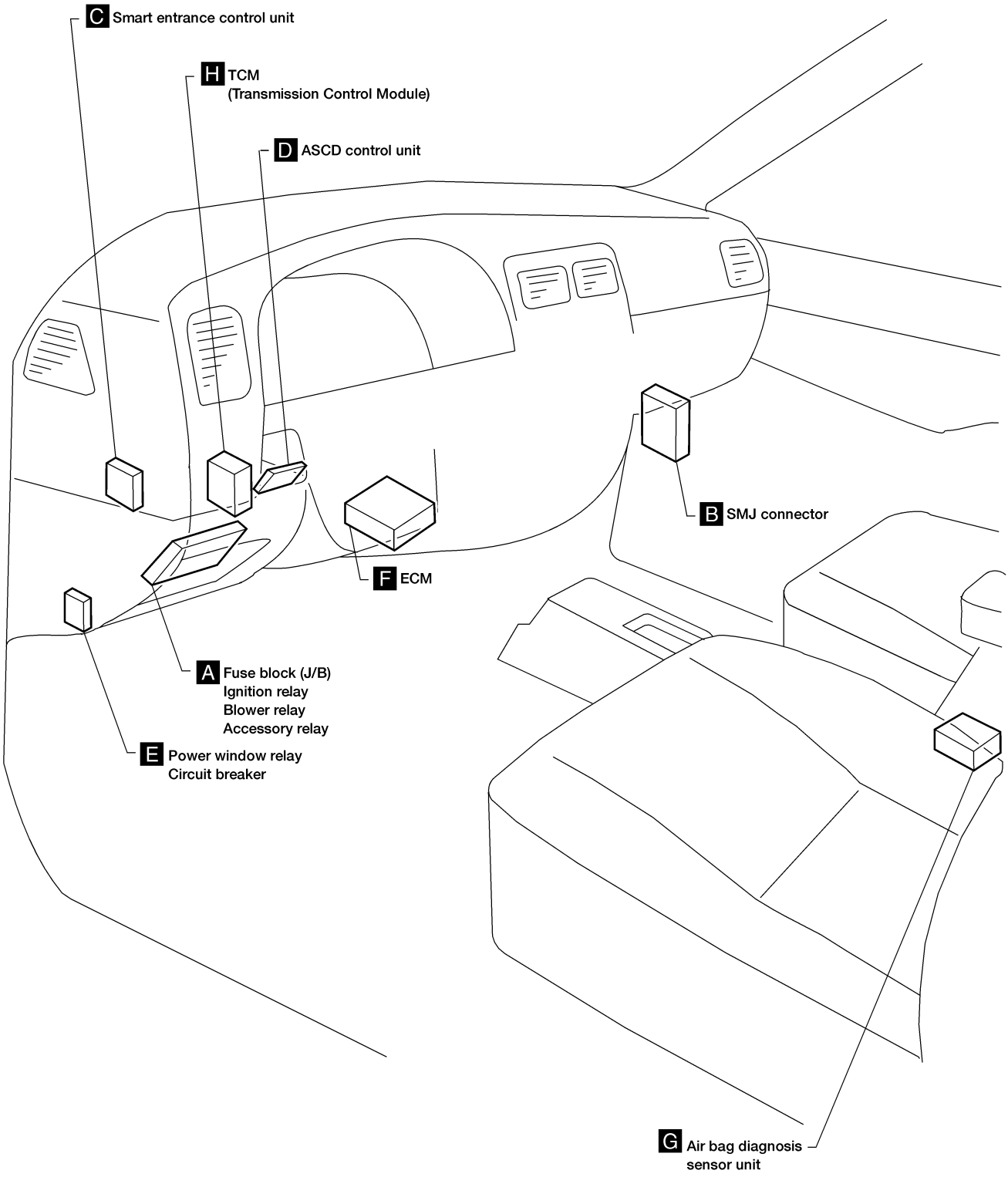
K **View with dash side finisher LH removed**



LEL166A

Passenger Compartment

NGEL0130



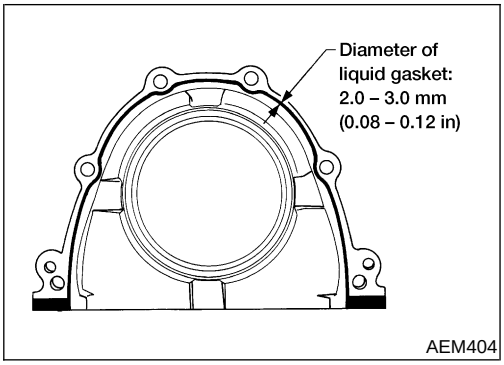
AEL157C

ENGINE MECHANICAL

SECTION EM

CONTENTS

Replacement (Cont'd)



b. Apply a continuous bead of liquid gasket to mating surface of rear oil seal retainer.

- **Use Genuine RTV Silicone Sealant, Part No. 999MP-A7007 or equivalent.**
- **Apply around inner side of bolt holes.**

General Specifications

NGEM0069

Cylinder arrangement		In-line 4
Displacement		2,389 cm^3 (145.78 cu in)
Bore and stroke		89 x 96 mm (3.50 x 3.78 in)
Valve arrangement		DOHC
Firing order		1-3-4-2
Number of piston rings	Compression	2
	Oil	1
Number of main bearings		5
Compression ratio		9.2

COMPRESSION PRESSURE

NGEM0069S01

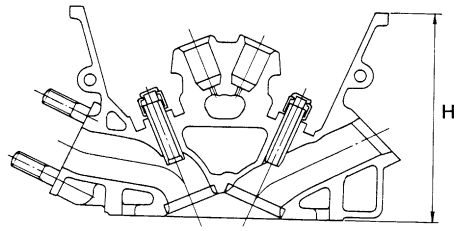
Unit: kPa (kg/cm^2, psi)/300 rpm

Standard	1,226 (12.5, 178)
Minimum	1,030 (10.5, 149)
Differential limit between cylinders	98 (1.0, 14)

Cylinder Head

NGEM0070

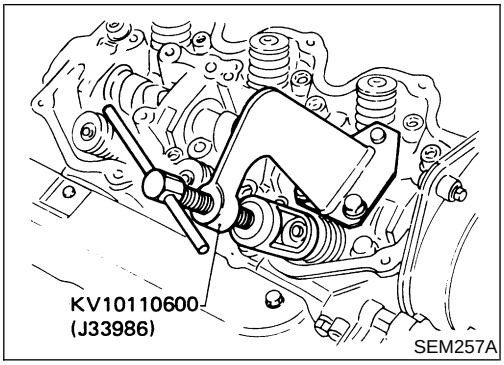
Unit: mm (in)



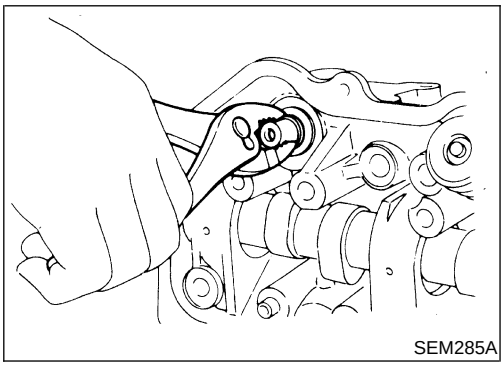
Nominal cylinder head height:
H = 126.3 - 126.5 (4.972 - 4.980)

SEM519E

	Standard	Limit
Head surface distortion	Less than 0.03 (0.0012)	0.1 (0.004)



SEM257A


SEM285A

Replacement

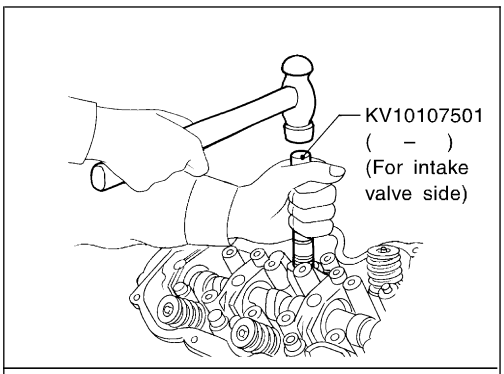
NGEM0013

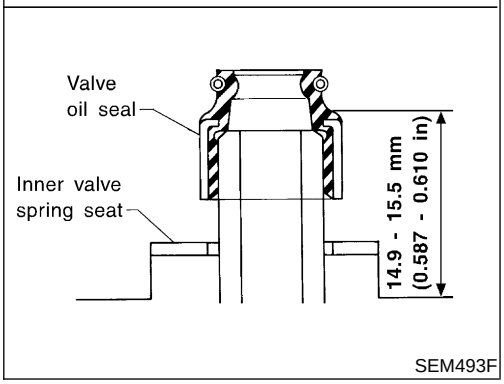
VALVE OIL SEAL

NGEM0013S01

1. Remove rocker cover.
2. Remove rocker shaft assembly and valve lifters with valve lifter guide.
3. Remove valve springs and valve oil seal.

- Piston concerned should be set at TDC to prevent valve from falling.
- When removing intake side valve oil seal, use Tool or suitable tool.
- When removing exhaust side valve oil seal, pull it out with suitable tool.





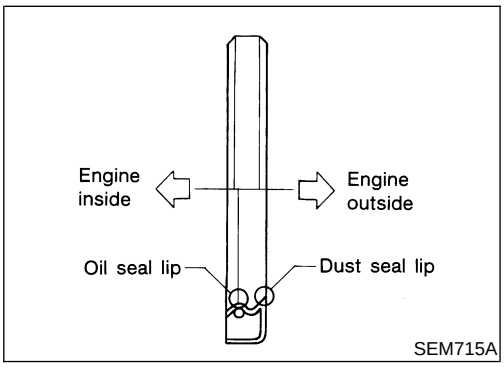
SEM493F

4. Apply engine oil to new valve oil seal and install it.

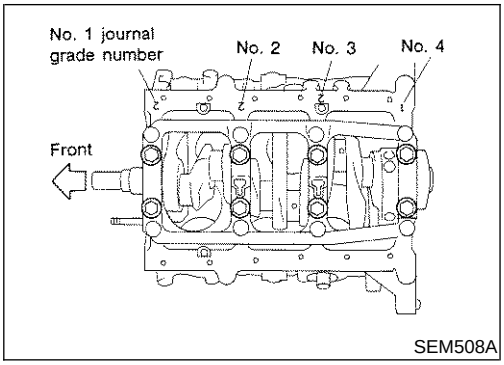
- Before installing valve oil seal, install inner valve spring seat.
- When installing intake side valve oil seal, use Tool.
- When installing exhaust side valve oil seal, set it by hand.

OIL SEAL INSTALLING DIRECTION

NGEM0013S02



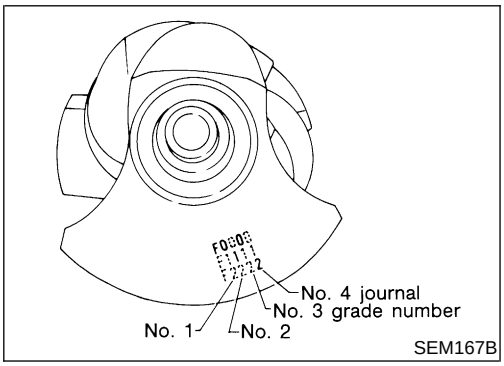
SEM715A



SEM508A

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. These numbers are punched in either Arabic or Roman numerals.



SEM167B

b. Grade number of each crankshaft main journal is punched on the respective crankshaft. These numbers are punched in either Arabic or Roman numerals.

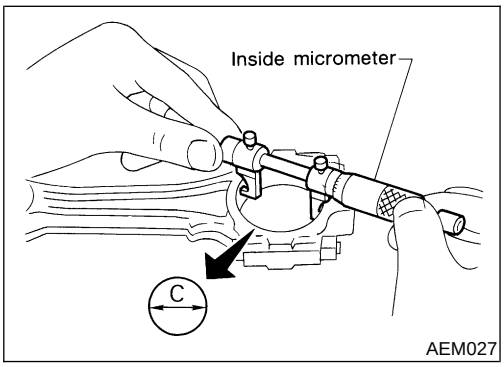
c. Select main bearing with suitable thickness according to the following example or table.

No. 1 main bearing grade number (Identification color):

Crankshaft journel grade number	Main journal grade number			
	"3"	"4"	"5"	"6"
"3"	0 (Black)	1 (Brown)	2 (Green)	3 (Yellow)
"4"	1 (Brown)	2 (Green)	3 (Yellow)	4 (Blue)
"5"	2 (Green)	3 (Yellow)	4 (Blue)	5 (Pink)
″6″	3 (Yellow)	4 (Blue)	5 (Pink)	6 (Purple)

Except No. 1 main bearing grade number (Identification color):

Crankshaft journel grade number	Main journal grade number		
	"0"	"1"	"2"
"0"	0 (Black)	1 (Brown)	2 (Green)
"1"	1 (Brown)	2 (Green)	3 (Yellow)
"2"	2 (Green)	3 (Yellow)	4 (Blue)



AEM027

Connecting Rod Bearing (Big end)

NGEM0024S0802

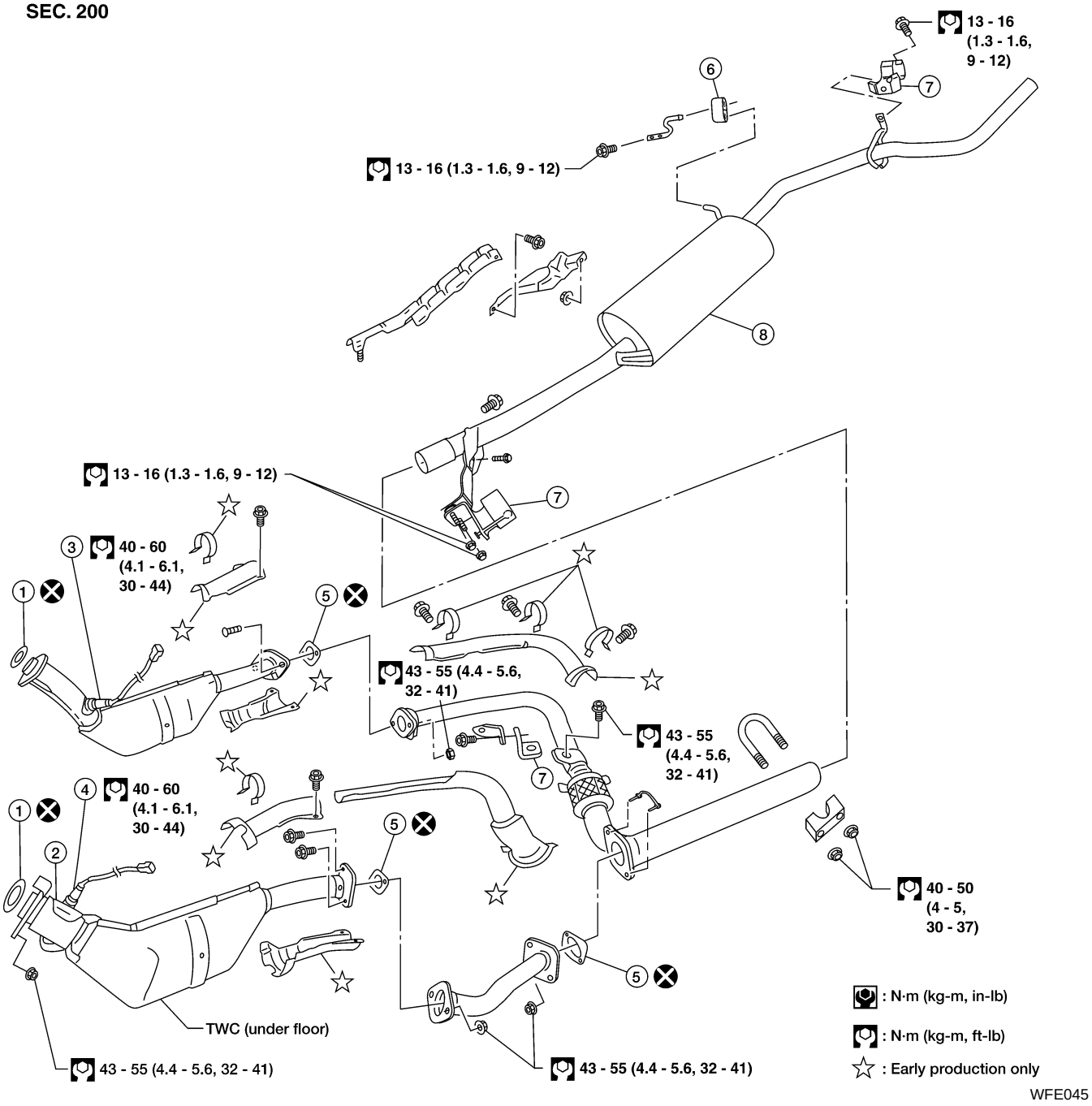
1. Install connecting rod bearing to connecting rod and cap.
2. Install connecting rod cap to connecting rod.

Tighten bolts to the specified torque.

3. Measure inner diameter "C" of each bearing.

VG33E 4WD Models

SEC. 200



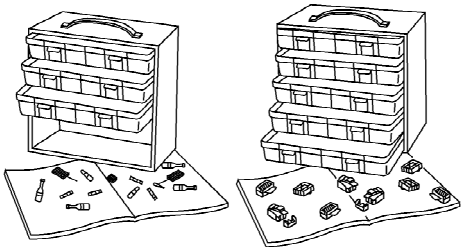
1. Gasket
2. Front tube
3. Heated oxygen sensor 2 (rear) (bank 1)
4. Heated oxygen sensor 2 (rear) (bank 2)
5. Gasket
6. Mounting rubber
7. Mounting bracket
8. Center muffler

Connector and Terminal Pin Kit

NGGI0011S01

Use the connector and terminal pin kit listed below when replacing connectors or terminals.

The connector and terminal pin kit contains some of the most commonly used NISSAN connectors and terminals.

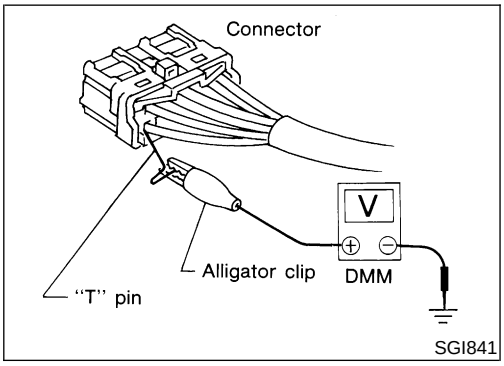
Tool number (Kent-Moore No.) Tool name	Description
— (J38751-95NI) Connector and terminal pin kit — (J42992-98KIT OBD Terminal Repair Kit	J42992-98KIT J38751-95NI  AGI121

How to Probe Connectors

NGGI0011S02

Connector damage and an intermittent connection can result from improperly probing of the connector during circuit checks.

The probe of a digital multimeter (DMM) may not correctly fit the connector cavity. To correctly probe the connector, follow the procedures below using a “T” pin. For the best contact grasp the “T” pin using an alligator clip.



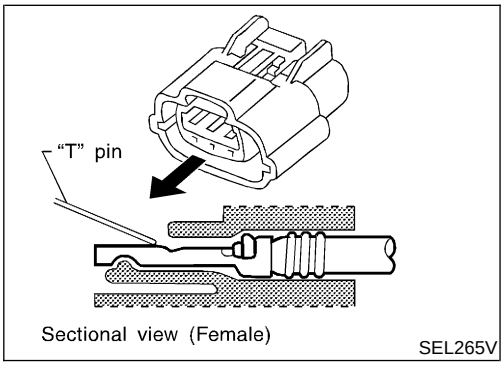
SGI841

PROBING FROM HARNESS SIDE

NGGI0011S0201

Standard type (not waterproof type) connector should be probed from harness side with “T” pin.

- **If the connector has a rear cover such as an ECM connector, remove the rear cover before probing the terminal.**
- **Do not probe waterproof connector from harness side. Damage to the seal between wire and connector may result.**



SEL265V

PROBING FROM TERMINAL SIDE

NGGI0011S0202

Female Terminal

- There is a small notch above each female terminal. Probe each terminal with the “T” pin through the notch.
  Do not insert any object other than the same type male terminal into female terminal.

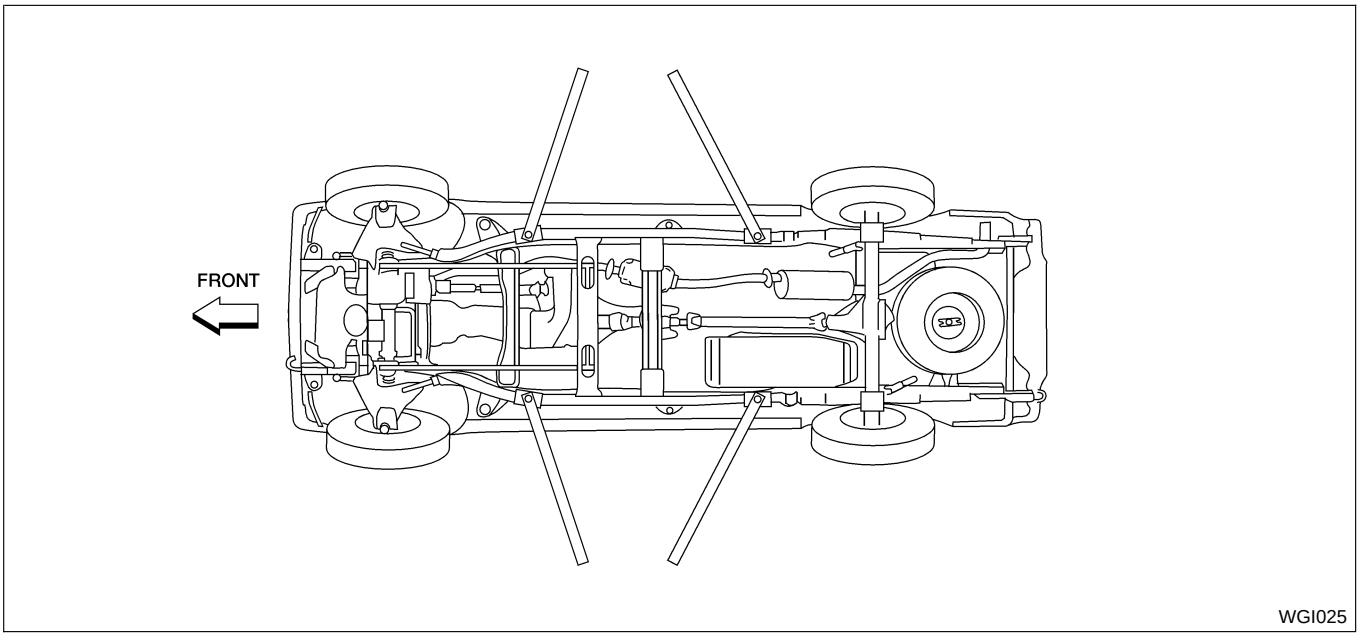
2-pole Lift

=NGGI0008S03

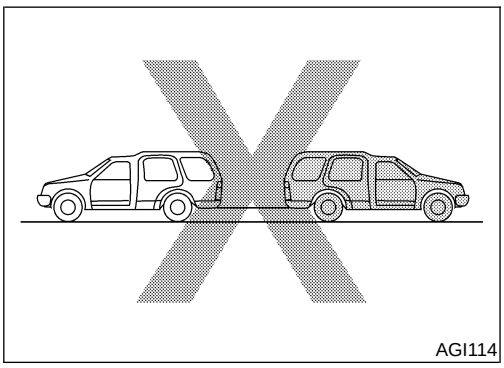
WARNING:

When lifting the vehicle, open the lift arms as wide as possible and ensure that the front and rear of the vehicle are well balanced.

When setting the lift arm, do not allow the arm to contact the brake tubes, brake cable, or fuel lines.



WGI025



AGI114

Tow Truck Towing

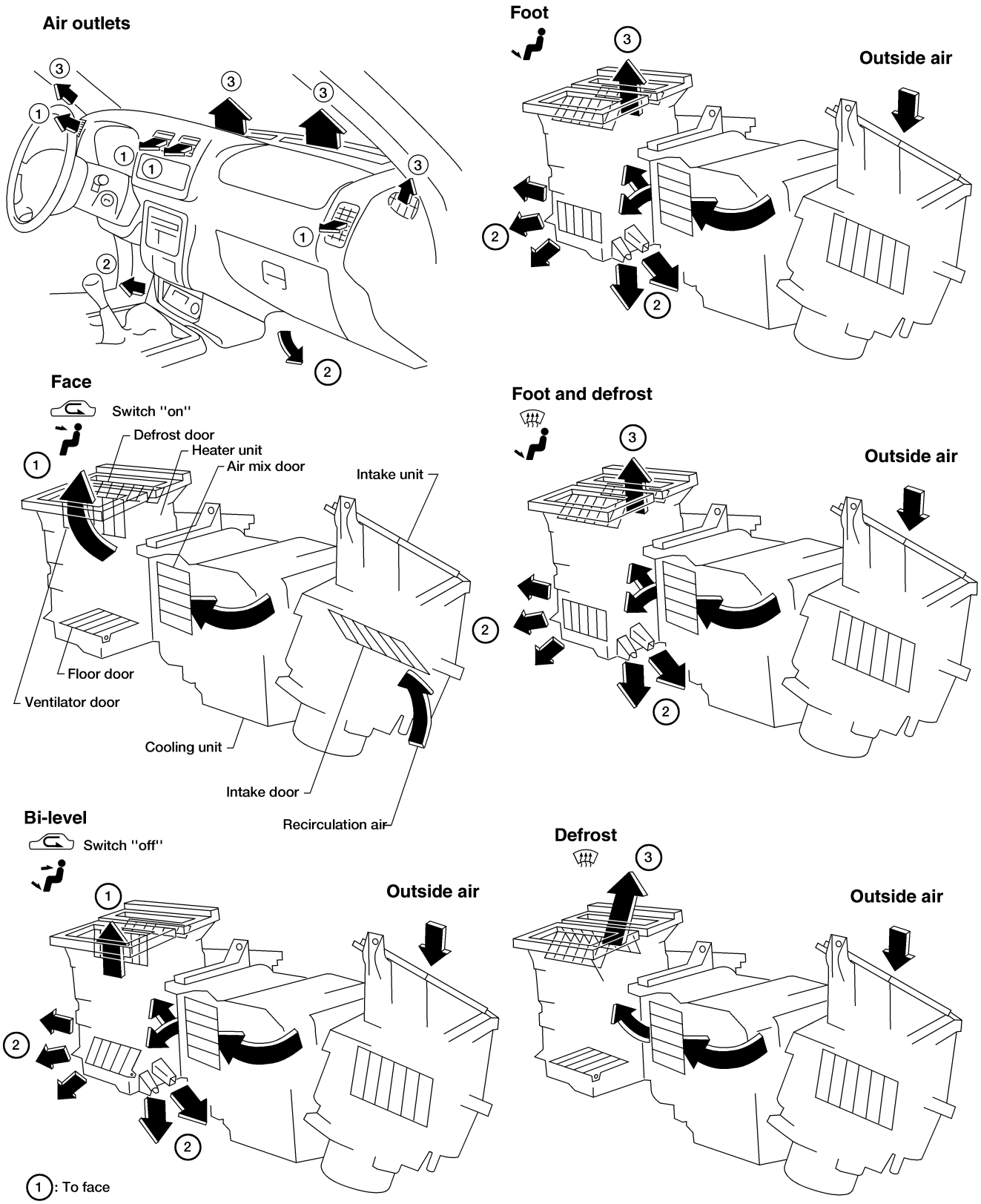
NGGI0008S04

CAUTION:

- **All applicable State or Provincial (in Canada) laws and local laws regarding the towing operation must be obeyed.**
- **It is necessary to use proper towing equipment to avoid possible damage during towing operation. Towing is in accordance with Towing Procedure Manual at dealer.**
- **Always attach safety chains before towing.**
- **When towing, make sure that the transmission, steering system and power train are in good order. If any unit is damaged, dollies must be used.**
- **Never tow an automatic transmission model from the rear (i.e., backward) with four wheels on the ground as this may cause serious and expensive damage to the transmission.**

Discharge Air Flow

NGHA0073



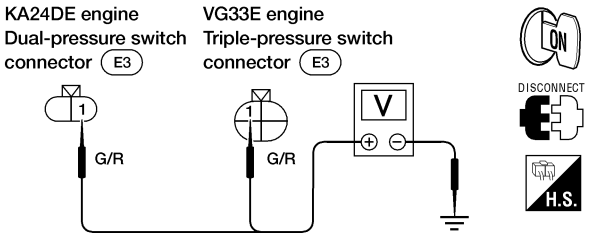
For air flow %, refer to "DESCRIPTION".

AHA290A

Magnet Clutch (Cont'd)

8	CHECK CIRCUIT CONTINUITY

1. Disconnect dual pressure switch (KA24DE models) or triple pressure switch (VG33E models) harness connector E3.
2. Check voltage from terminal 1 to ground.



AHA469A

Do approx. 5 volts exist?

3. Also, check harness for short.

Yes or No

Yes (KA24DE models)	▶	GO TO 9.
Yes (VG33E models)	▶	GO TO 11.
No	▶	Repair harness or connector.

9	CHECK DUAL PRESSURE SWITCH (KA24DE MODELS)

Refer to "Dual Pressure Switch (KA24DE Models)", HA-51.

OK or NG

OK	▶	GO TO 10.
NG	▶	Replace dual pressure switch.

Magnet Clutch

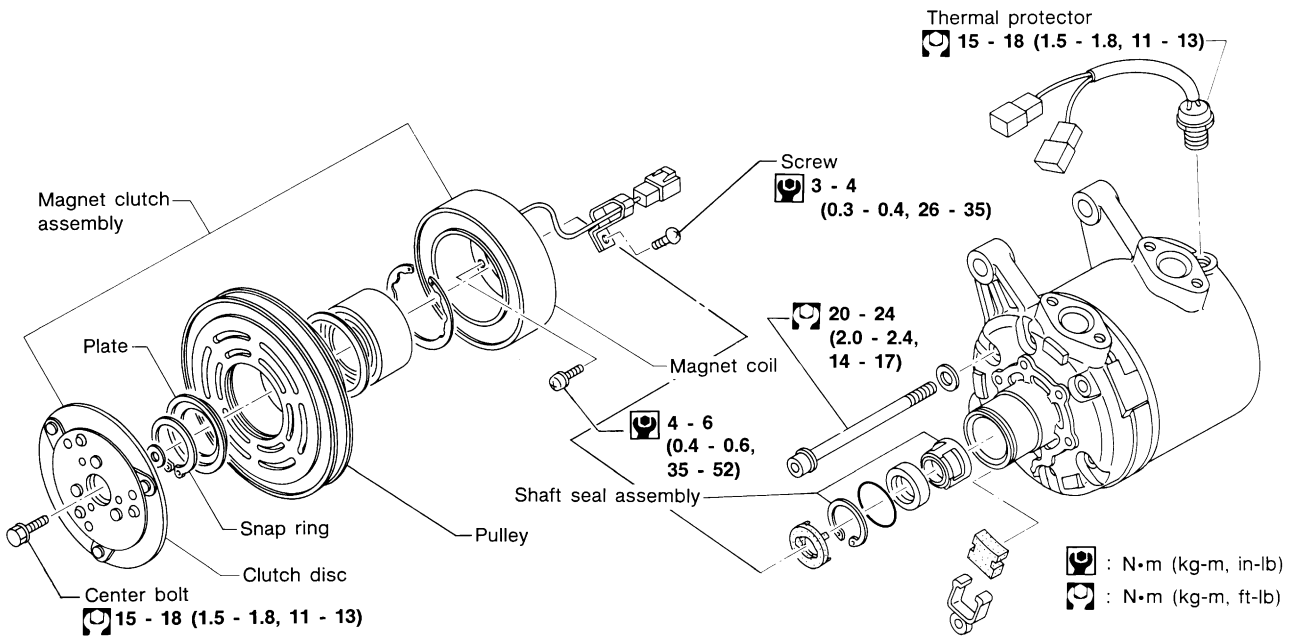
MAGNET CLUTCH MOUNTING

KA24DE Models

NGHA0098

NGHA0098S04

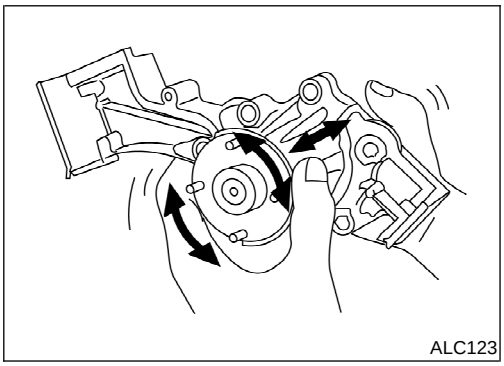
SEC. 274



AHA510A

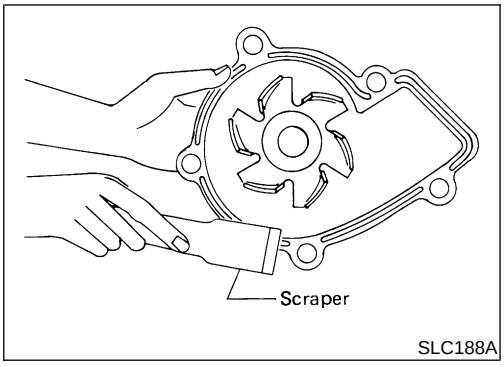
CONTENTS (Cont'd)

2. Remove radiator hoses (upper and lower) and fan shroud. Refer to "Radiator".
3. Remove drive belts. Refer to ***MA-25***, "Checking Drive Belts".
4. Remove water pump pulley.
5. Remove crankshaft pulley and front (upper and lower) belt cover. Refer to ***EM-75***, "TIMING BELT".
6. Remove water pump.


ALC123

INSPECTION
NGLC0019

1. Check for badly rusted or corroded body assembly and vanes.
2. Check for rough operation due to excessive end play.

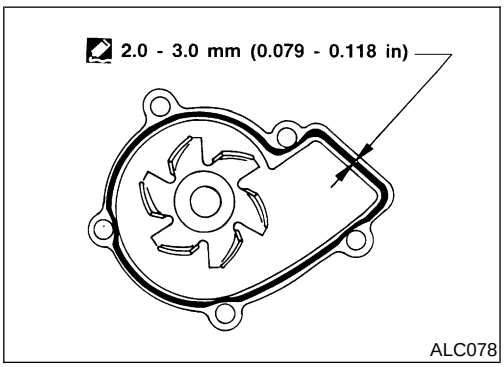


SLC188A

INSTALLATION
NGLC0132

1. Use a scraper to remove liquid gasket from water pump.

- **Also remove traces of liquid gasket from mating surface of cylinder block.**



ALC078

2. Apply a continuous bead of liquid gasket to mating surface of the water pump.

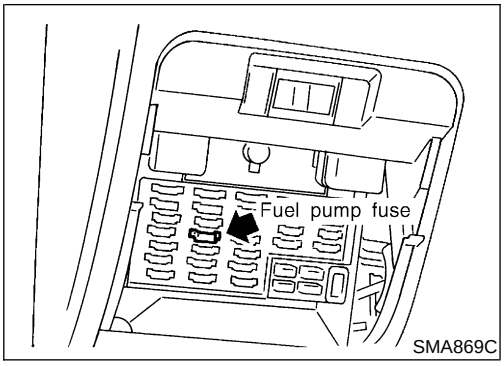
- **Use Genuine RTV Silicone Sealant Part No. 999MP-A7007 or equivalent.**

Fill the radiator with a mix of 50% coolant and 50% soft tap water. Refer to *MA-26*, "Changing Engine Coolant".
Install the engine drive belts. Refer to *MA-25*, "Checking Drive Belts".

Thermostat

REMOVAL
NGLC0020

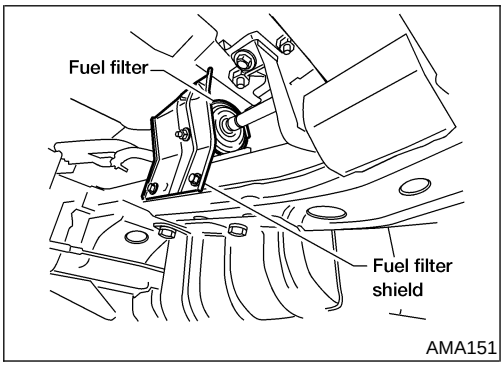
1. Drain engine coolant from drain plugs on radiator.
2. Remove radiator hoses (upper and lower) and fan shroud.
3. Remove drive belts.
4. Remove pulley bracket.
5. Remove water inlet and thermostat assembly.



WITHOUT CONSULT - II

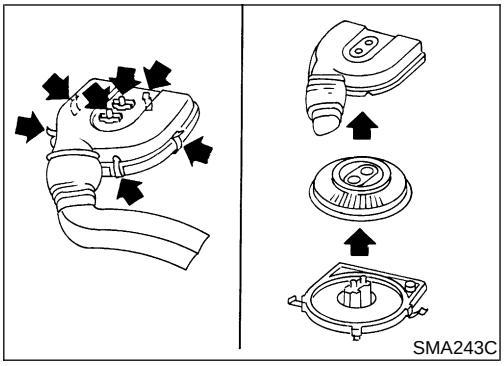
NGMA0059S02

1. Remove fuel pump fuse. For correct fuse location, refer to label on fuse block cover.
2. Start engine.
3. After engine stalls, crank engine two or three times to make sure that fuel pressure is released.
4. Turn ignition switch "OFF" and install fuel pump fuse.



5. Remove the fuel filter shield.
6. Loosen fuel hose clamps.
7. Replace fuel filter.

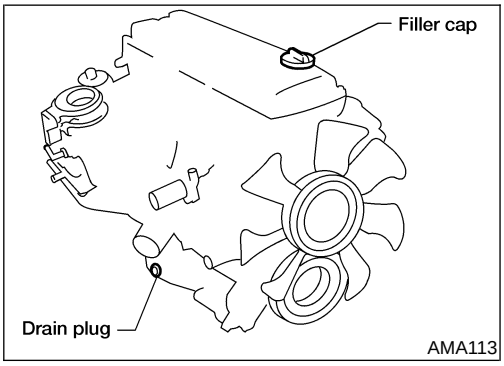
- **Be careful not to spill fuel over engine compartment. Place a shop towel to absorb fuel.**
- **Use a high-pressure type fuel filter. Do not use a synthetic resinous fuel filter.**
- **Properly tighten fuel hose clamps. Refer to "Checking Fuel Lines", MA-19.**



Changing Air Cleaner Filter

NGMA0060

The viscous paper type filter does not need cleaning between renewals.



Changing Engine Oil

NGMA0061

WARNING:

- **Be careful not to burn yourself, as the engine oil is hot.**
- **Prolonged and repeated contact with used engine oil may cause skin cancer; try to avoid direct skin contact with used oil. If skin contact is made, wash thoroughly with soap or hand cleaner as soon as possible.**

1. Warm up engine, and check for oil leakage from engine components.
2. Remove drain plug and oil filler cap.
3. Drain oil and refill with new engine oil.

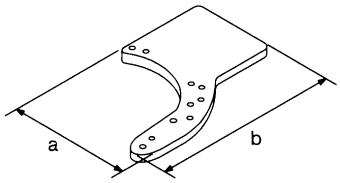
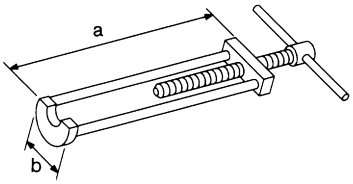
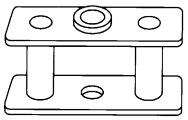
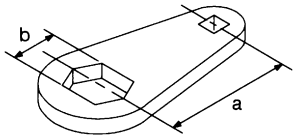
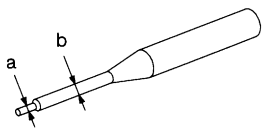
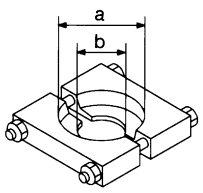
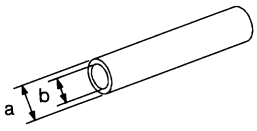
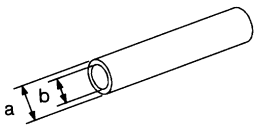
Oil specification and viscosity:

- **API Certification Mark**
- **API grade SG/SH, Energy Conserving I & II or API grade SJ, Energy Conserving**
- **ILSAC grade GF-I & GF-II**
- **Refer to "RECOMMENDED FLUIDS AND LUBRICANTS", MA-13.**

Special Service Tools

NGMT0045

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

Tool number (Kent-Moore No.) Tool name	Description	
ST23810001 (—) Adapter setting plate	 NT407	Fixing adapter plate with gear assembly **a: 166 mm (6.54 in)** **b: 270 mm (10.63 in)**
KV32101330 (See J26349-A) Puller	 NT408	Removing overdrive mainshaft bearing **a: 447 mm (17.60 in)** **b: 100 mm (3.94 in)**
KV31100401 (—) Transmission press stand	 NT068	Pressing counter gear and mainshaft
ST22520000 (J26348) Wrench	 NT409	Tightening mainshaft lock nut **a: 100 mm (3.94 in)** **b: 41 mm (1.61 in)**
ST23540000 (J25689-A) Pin punch	 NT442	Removing and installing fork rod retaining pin **a: 2.3 mm (0.091 in) dia.** **b: 4 mm (0.16 in) dia.**
ST30031000 (J22912-01) Puller	 NT411	Removing and installing 1st gear bushing Removing main drive gear bearing **a: 90 mm (3.54 in) dia.** **b: 50 mm (1.97 in) dia.**
ST23860000 (—) Drift	 NT065	Installing counter drive gear **a: 38 mm (1.50 in) dia.** **b: 33 mm (1.30 in) dia.**
ST22360002 (J25679-01) Drift	 NT065	Installing counter gear front and rear end bearings **a: 29 mm (1.14 in) dia.** **b: 23 mm (0.91 in) dia.**

General Specifications

NGMT0040

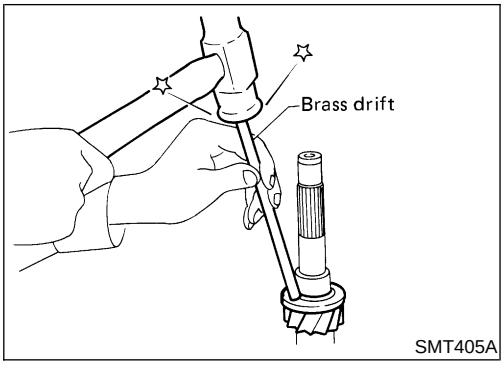
Applied model		KA24DE (2WD)
Transmission		FS5W71C
Number of speed		5
Shift pattern		 MT-SDS-2
Synchromesh type		Warner
Gear ratio	1st	3.592
	2nd	2.246
	3rd	1.415
	4th	1.000
	OD	0.821
	Reverse	3.657
Mainshaft (Number of teeth)	Drive	21
	1st	33
	2nd	28
	3rd	26
	OD	21
	Reverse	36
Countershaft gear (Number of teeth)	Drive	32
	1st	14
	2nd	19
	3rd	28
	OD	39
	Reverse	15
Reverse idler gear (Number of teeth)		21
Oil capacity ℓ (US pt, Imp pt)		2.0 (4-1/4, 3-1/2)
Remarks	Reverse synchronizer	Installed
	Double cone synchronizer	2nd & 3rd
	Sub-gear	Counter drive gear & reverse idler gear

Gear End Play

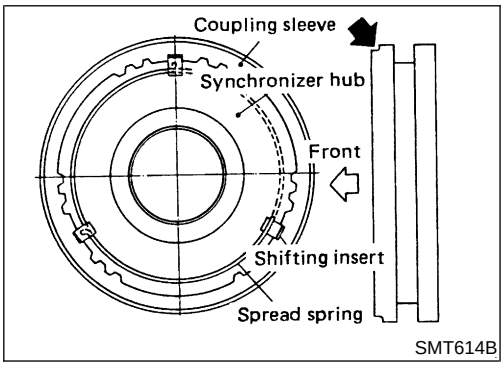
NGMT0041

Unit: mm (in)

1st gear	0.31 - 0.41 (0.0122 - 0.0161)
2nd gear	0.11 - 0.21 (0.0043 - 0.0083)
3rd gear	0.11 - 0.21 (0.0043 - 0.0083)
Overdrive gear	0.24 - 0.41 (0.0094 - 0.0161)

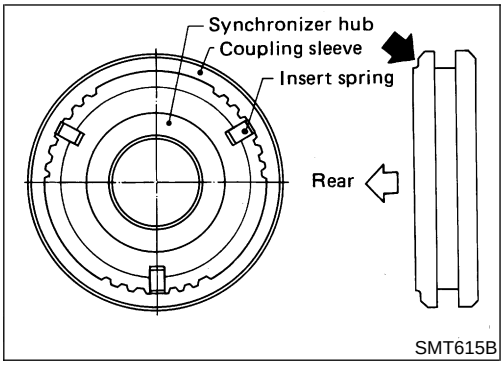


b. Install counter gear rear thrust bearing.

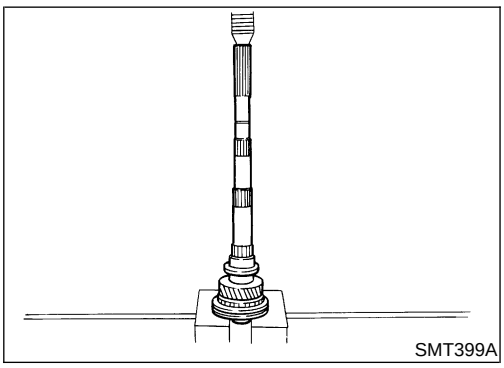


4. Install front side components on mainshaft.

a. Assemble 1st & 2nd synchronizer.

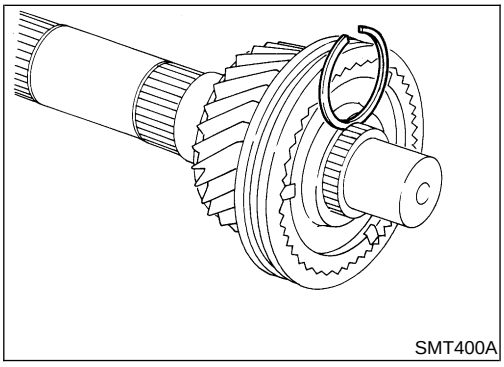


b. Assemble 3rd & 4th synchronizer.



c. Press on 3rd & 4th synchronizer assembly together with 3rd main gear and 3rd gear needle bearing.

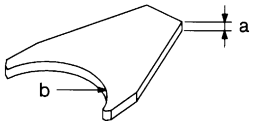
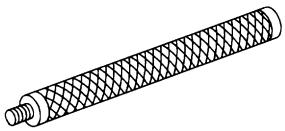
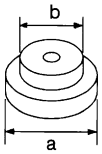
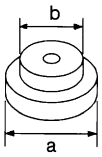
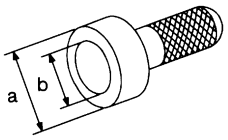
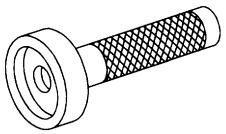
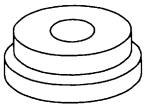
- **Pay attention to direction of synchronizer assembly.**

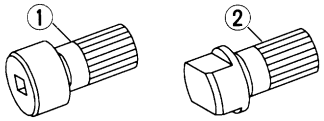


d. Select proper snap ring to minimize clearance of groove.

Allowable clearance of groove:
0 - 0.1 mm (0 - 0.004 in)
Mainshaft front snap ring:
Refer to "MAINSHAFT FRONT SNAP RING", MT-68.

e. Install selected snap ring on mainshaft.

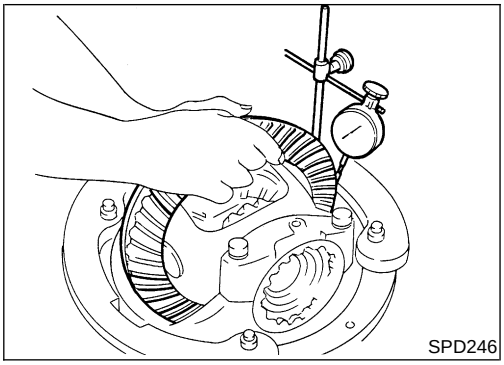
Tool number (Kent-Moore No.) Tool name	Description	
KV38100600 (J25267) Side bearing spacer drift	 NT528	Installing side bearing spacer **a: 8 mm (0.31 in)** **b: R42.5 mm (1.673 in)**
ST30611000 (J25742-1) Drift	 NT090	Installing pinion rear bearing outer race (Use with ST30621000 or ST30613000)
ST30621000 (J25742-5) Drift	 NT073	Installing pinion rear bearing outer race (Use with ST30611000) **a: 79 mm (3.11 in) dia.** **b: 59 mm (2.32 in) dia.**
ST30613000 (J25742-3) Drift	 NT073	Installing pinion front bearing outer race (Use with ST30611000) **a: 72 mm (2.83 in) dia.** **b: 48 mm (1.89 in) dia.**
KV38100500 (J25273) Gear carrier front oil seal drift	 NT115	Installing front oil seal **a: 85 mm (3.35 in) dia.** **b: 60 mm (2.36 in) dia.**
KV38100200 (J26233) Gear carrier side oil seal drift	 NT120	Installing side oil seal
(J34309) Differential shim selector	 NT134	Adjusting bearing pre-load and gear height
(J25269-4) Side bearing discs (2 Req'd)	 NT136	Selecting pinion height adjusting washer

Tool number (Kent-Moore No.) Tool name	Description
KV381051S0 (—) Rear axle shaft dummy 1 KV38105110 (—) Torque wrench side 2 KV38105120 (—) Vise side	 NT142 Checking differential torque on limited slip differential

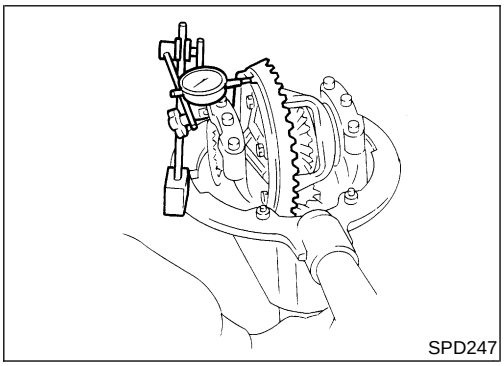
Noise, Vibration and Harshness (NVH) Troubleshooting

NGPD0053

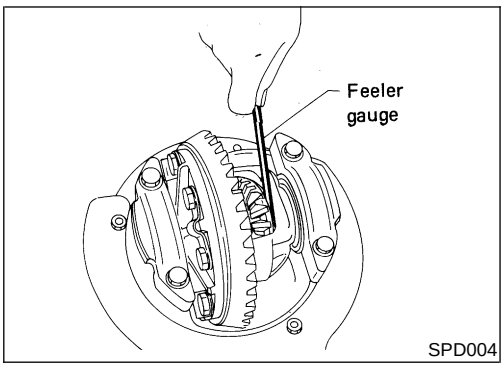
Refer to "NVH TROUBLESHOOTING CHART", PD-4.


SPD246

- Ring gear-to-pinion backlash
  Check backlash of ring gear with a dial indicator at several points.
  Ring gear-to-pinion backlash:
  0.13 - 0.18 mm (0.0051 - 0.0071 in)


SPD247

- Ring gear runout
  Check runout of ring gear with a dial indicator.
  Runout limit:
  0.08 mm (0.0031 in)

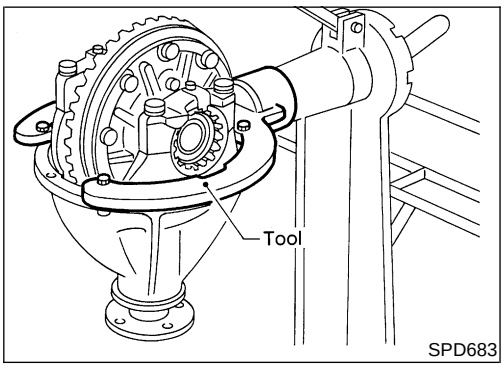


SPD004

- Tooth contact
  Check tooth contact. Refer to "TOOTH CONTACT", PD-81.
- Side gear to pinion mate gear backlash
  Measure clearance between side gear thrust washer and differential case with a feeler gauge.
  Clearance between side gear thrust washer and differential case:
  0.10 - 0.20 mm (0.0039 - 0.0079 in)

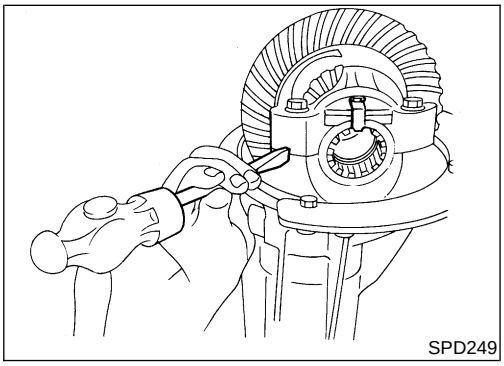
DIFFERENTIAL CARRIER

NGPD0033S02



SPD683

1. Mount final drive assembly on Tool.
   Tool number:
   ST06340000 (J24310, J34310)


SPD249

2. Put match marks on one side of side bearing cap with paint or punch to ensure that it is replaced in proper position during reassembly.

Bearing caps are line-bored during manufacture and should be put back in their original places.

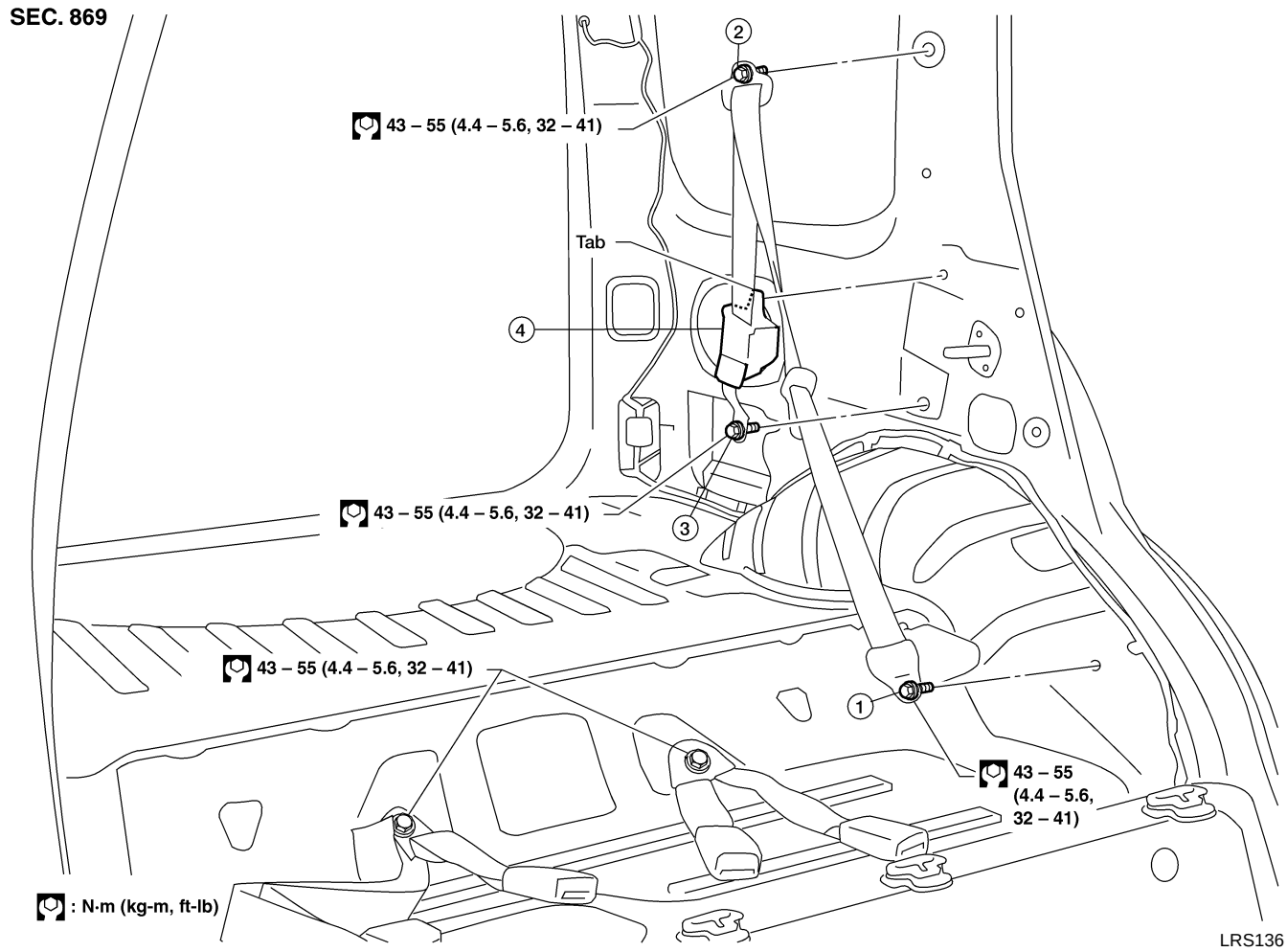
Rear Seat Belt

REMOVAL AND INSTALLATION

=NGRS0004

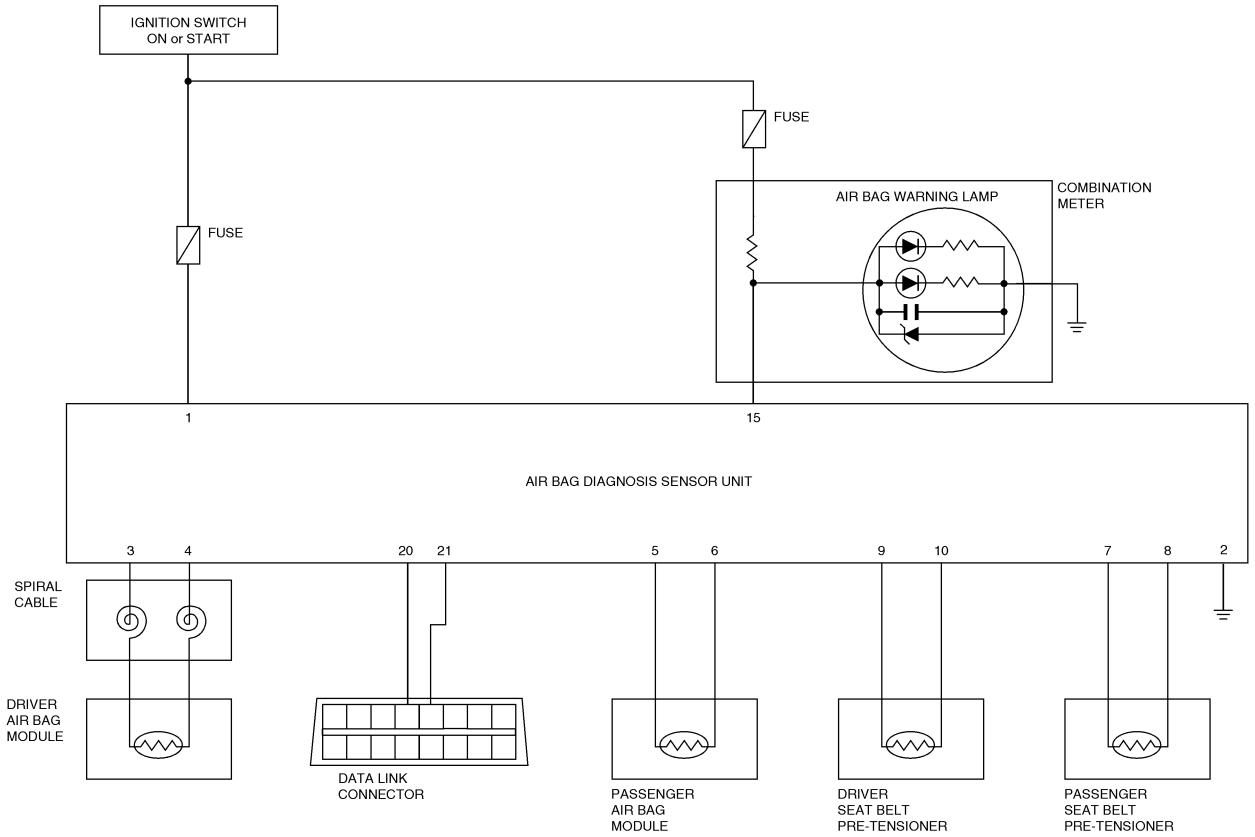
Remove rear seat. Refer to ***BT-38***, “REAR SEAT”.

1. Remove lower seat belt anchor bolt.
2. Remove shoulder anchor bolt.
3. Remove retractor bolt.
4. Remove retractor.

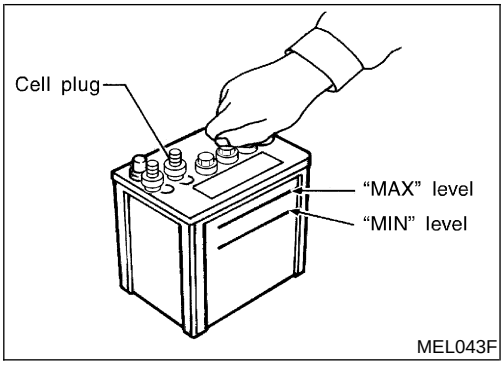


Schematic

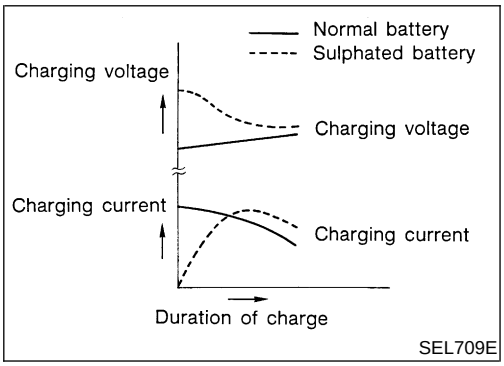
NGRS0057



LRS108



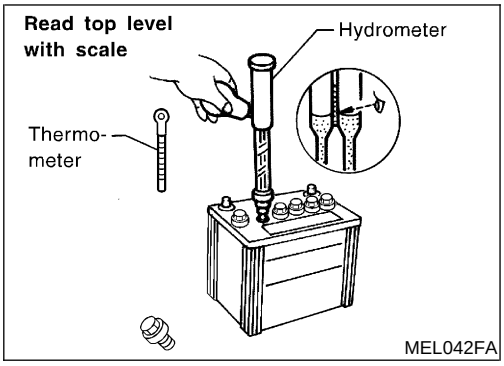
- Remove the cell plug using a suitable tool.
- Add distilled water up to the MAX level.



Sulphation

NGSC0003S0201

A battery will be completely discharged if it is left unattended for a long time and the specific gravity will become less than 1.100. This may result in sulphation on the cell plates.
To determine if a battery has been "sulphated", note its voltage and current when charging it. As shown in the figure, less current and higher voltage are observed in the initial stage of charging sulphated batteries.
A sulphated battery may sometimes be brought back into service by means of a long, slow charge, 12 hours or more, followed by a battery capacity test.



SPECIFIC GRAVITY CHECK

NGSC0003S03

1. Read hydrometer and thermometer indications at eye level.

2. Use the chart below to correct your hydrometer reading according to electrolyte temperature.

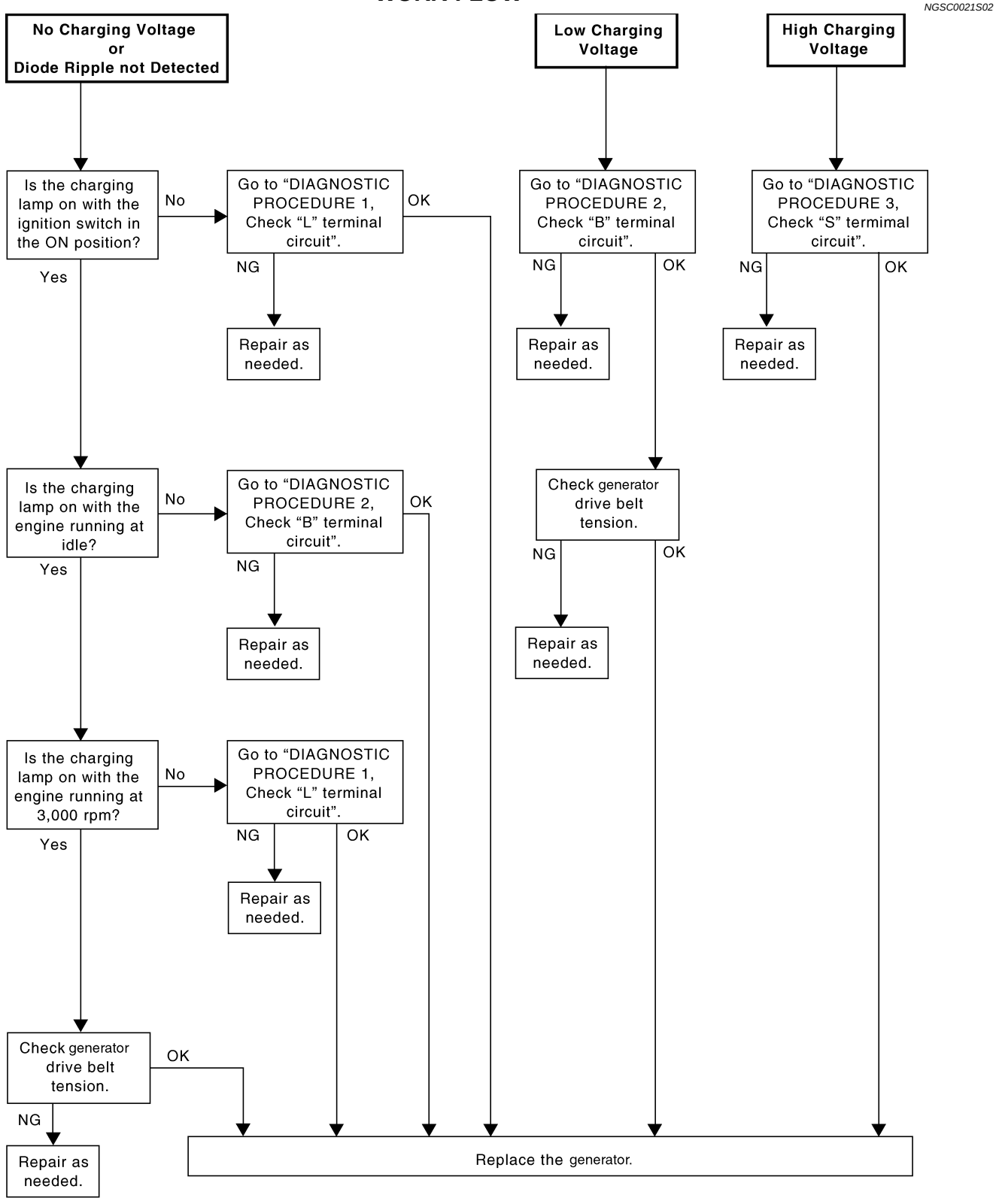
Hydrometer Temperature Correction

NGSC0003S0301

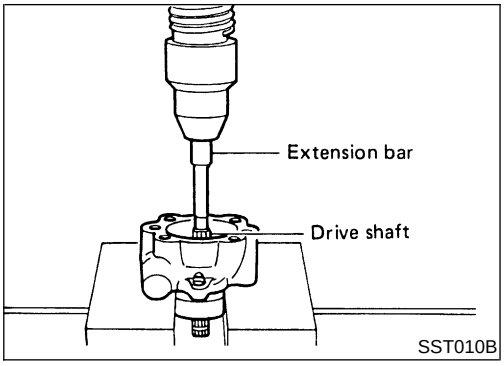
Battery electrolyte temperature °C (°F)	Add to specific gravity reading
71 (160)	0.032
66 (150)	0.028
60 (140)	0.024
54 (129)	0.020
49 (120)	0.016
43 (110)	0.012
38 (100)	0.008
32 (90)	0.004
27 (80)	0
21 (70)	−0.004
16 (60)	−0.008
10 (50)	−0.012

WORK FLOW

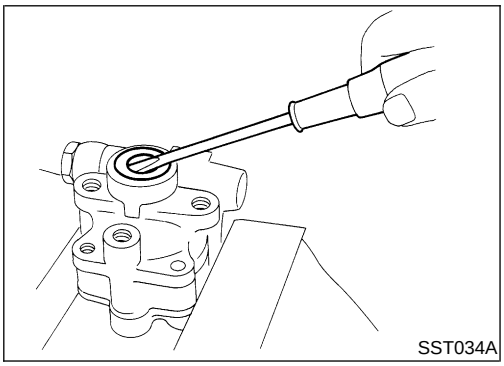
NGSC0021S02



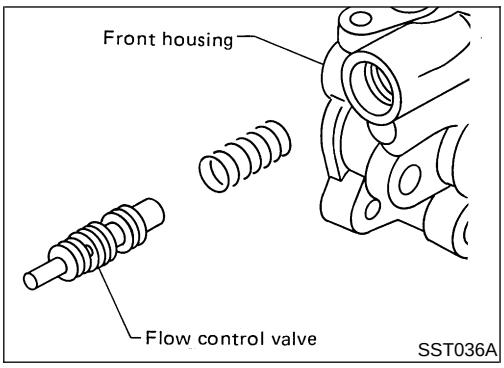
LSC047



- Remove snap ring, then draw drive shaft out.
- **Be careful not to drop drive shaft.**



- Remove oil seal.
- **Be careful not to damage front housing.**

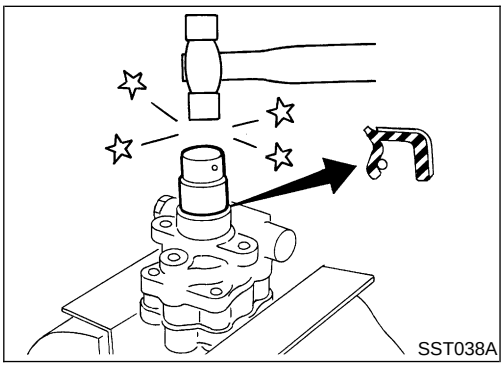


- Remove connector and flow control valve with spring.
- **Be careful not to drop control valve.**

Inspection

NGST0039

- If pulley is cracked or deformed, replace it.
- If fluid leak is found around the pulley shaft, replace the oil seal.



Assembly

NGST0040

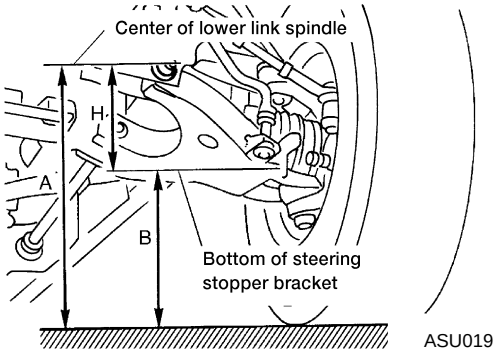
Assemble oil pump, noting the following instructions.

- Make sure O-rings and oil seal are properly installed.
- Always install new O-rings and oil seal.
- Be careful of oil seal direction.
- Cam ring, rotor and vanes must be replaced as a set if necessary.
- When assembling, coat each part with Genuine NISSAN PSF II or equivalent.

4WD Models

=NGSU0032S02

Camber Degree minute (Decimal degree)			Minimum		0°06′ (0.10°)	
			Nominal		0°36′ (0.60°)	
			Maximum		1°06′ (1.10°)	
			Left and right difference		45′ (0.75°) or less	
Caster Degree minute (Decimal degree)			Minimum		1°40′ (1.67°)	
			Nominal		2°10′ (2.17°)	
			Maximum		2°40′ (2.67°)	
			Left and right difference		45′ (0.75°) or less	
Kingpin inclination Degree minute (Decimal degree)			Minimum		10°18′ (10.30°)	
			Nominal		10°48′ (10.80°)	
			Maximum		11°18′ (11.30°)	
Total toe-in	Distance (A − B) mm (in)		Radial tire	Minimum	3 (0.12)	
				Nominal	4 (0.16)	
				Maximum	5 (0.20)	
	Angle (left plus right) Degree minute (Decimal degree)		Radial tire	Minimum	15′ (0.25°)	
				Nominal	20′ (0.33°)	
				Maximum	25′ (0.42°)	
Wheel turning angle	Full turn*2	Inside Degree minute (Decimal degree)			Except P265/70R15	P265/70R15
			Minimum		33°06′ (33.10°)	31°00′ (31.00°)
			Nominal		35°06′ (35.10°)	33°00′ (33.00°)
			Maximum		35°06′ (35.10°)	33°00′ (33.00°)
		Outside Degree minute (Decimal degree)	Minimum		31°12′ (31.20°)	29°00′ (29.00°)
			Nominal		33°12′ (33.20°)	31°00′ (31.00°)
			Maximum		33°12′ (33.20°)	31°00′ (31.00°)
Vehicle posture	Lower arm pivot height (H) mm (in)				45.5 - 49.5 (1.791 - 1.949)	



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

*2: On power steering models, wheel turning force (at circumference of steering wheel) of 98 to 147 N (10 to 15 kg, 22 to 33 lb) with engine idle.