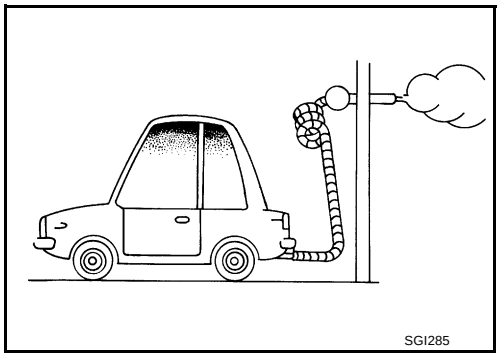
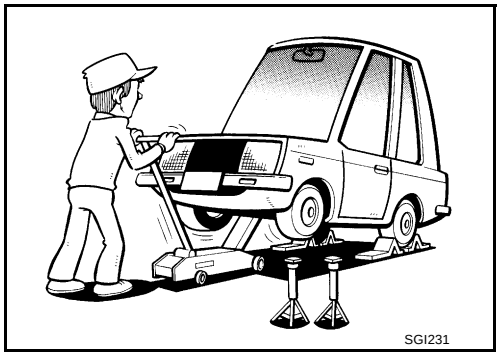
General Precautions

NAS0003K

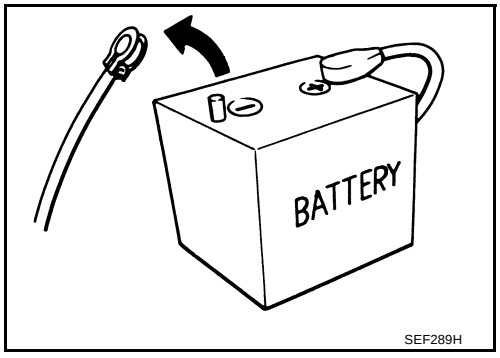
- Do not operate the engine for an extended period of time without proper exhaust ventilation.
  Keep the work area well ventilated and free of any inflammable materials. Special care should be taken when handling any inflammable or poisonous materials, such as gasoline, refrigerant gas, etc. When working in a pit or other enclosed area, be sure to properly ventilate the area before working with hazardous materials.
  Do not smoke while working on the vehicle.


SGI285

- Before jacking up the vehicle, apply wheel chocks or other tire blocks to the wheels to prevent the vehicle from moving. After jacking up the vehicle, support the vehicle weight with safety stands at the points designated for proper lifting before working on the vehicle.
  These operations should be done on a level surface.
- When removing a heavy component such as the engine or transaxle/transmission, be careful not to lose your balance and drop them. Also, do not allow them to strike adjacent parts, especially the brake tubes and master cylinder.

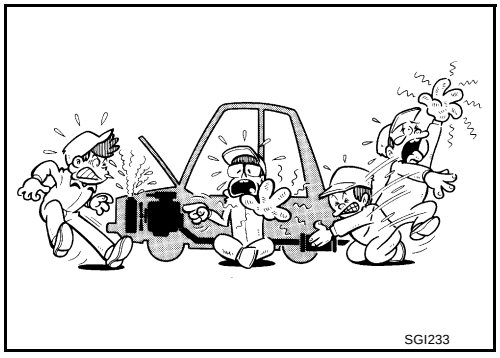

SGI231

- Before starting repairs which do not require battery power:
  Turn off ignition switch.
  Disconnect the negative battery terminal.
- If the battery terminals are disconnected, recorded memory of radio and each control unit is erased.



SEF289H

- To prevent serious burns:
  Avoid contact with hot metal parts.
  Do not remove the radiator cap when the engine is hot.
- Dispose of drained oil or the solvent used for cleaning parts in an appropriate manner.
- Do not attempt to top off the fuel tank after the fuel pump nozzle shuts off automatically.
  Continued refueling may cause fuel overflow, resulting in fuel spray and possibly a fire.
- Clean all disassembled parts in the designated liquid or solvent prior to inspection or assembly.

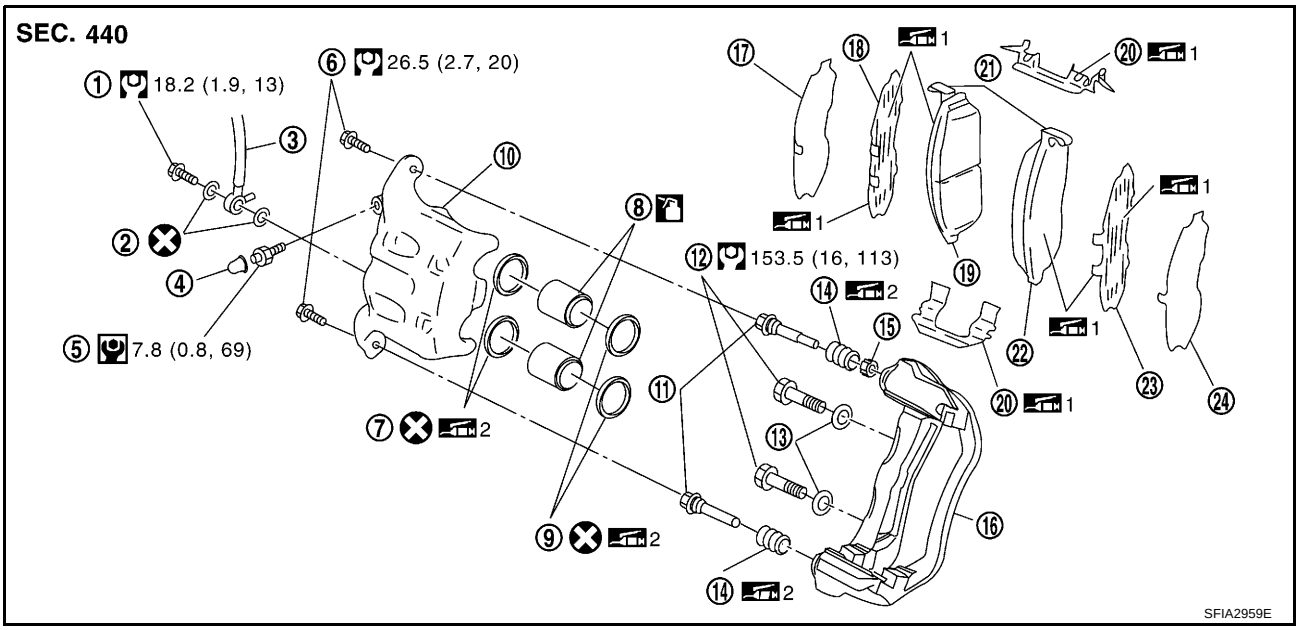

SGI233

- Replace oil seals, gaskets, packings, O-rings, locking washers, cotter pins, self-locking nuts, etc. with new ones.
- Replace inner and outer races of tapered roller bearings and needle bearings as a set.
- Arrange the disassembled parts in accordance with their assembled locations and sequence.
- Do not touch the terminals of electrical components which use microcomputers (such as ECM).
  Static electricity may damage internal electronic components.
- After disconnecting vacuum or air hoses, attach a tag to indicate the proper connection.
- Use only the fluids and lubricants specified in this manual.

Components

NAS0003V

- **THE LARGE ILLUSTRATIONS** are exploded views (see the following) and contain tightening torques, lubrication points, section number of the **PARTS CATALOG** (e.g. SEC. 440) and other information necessary to perform repairs.
  The illustrations should be used in reference to service matters only. When ordering parts, refer to the appropriate **PARTS CATALOG** .
  Components shown in an illustration may be identified by a circled number. When this style of illustration is used, the text description of the components will follow the illustration.



1. Union bolt	2. Copper washer	3. Brake hose
4. Cap	5. Bleed valve	6. Sliding pin bolt
7. Piston seal	8. Piston	9. Piston boot
10. Cylinder body	11. Sliding pin	12. Torque member mounting bolt
13. Washer	14. Sliding pin boot	15. Bushing
16. Torque member	17. Inner shim cover	18. Inner shim
19. Inner pad	20. Pad retainer	21. Pad wear sensor
22. Outer pad	23. Outer shim	24. Outer shim cover
1: PBC (Poly Butyl Cuprysil) grease or silicone-based grease	2: Rubber grease	: Brake fluid

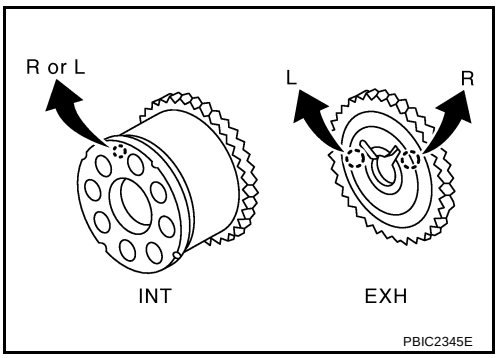
Refer to GI section for additional symbol definitions.

SYMBOLS

SYMBOL	DESCRIPTION		SYMBOL	DESCRIPTION
	Tightening torque The tightening torque specifications of bolts and nuts may be presented as either a range or a standard tightening torque.	: N•m (kg-m, ft-lb)		Always replace after every disassembly.
		: N•m (kg-m, in-lb)	Ⓟ	Apply petroleum jelly.
	Should be lubricated with grease. Unless otherwise indicated, use recommended multi-purpose grease.		Ⓜ	Apply molybdenum added petroleum jelly.
	Should be lubricated with oil.		ATF	Apply ATF.
	Sealing point		★	Select with proper thickness.
Ⓛ	Sealing point with locking sealant.		☆	Adjustment is required.
	Checking point			

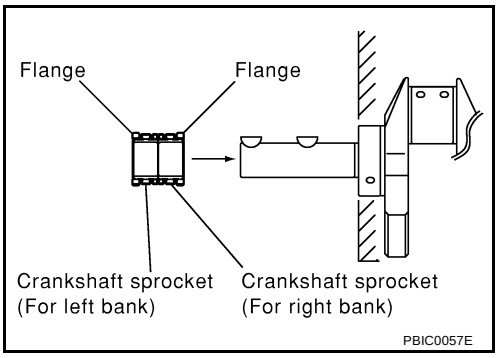
SAIA0749E

2. Install camshaft sprockets.
   - Install onto correct side by checking with identification mark on surface.
   - Install camshaft sprocket (EXH) by selectively using the groove of dowel pin according to the bank. (Common part used for both banks.)
   - Lock the hexagonal part of camshaft in the same way as for removal, and tighten fixing bolts.

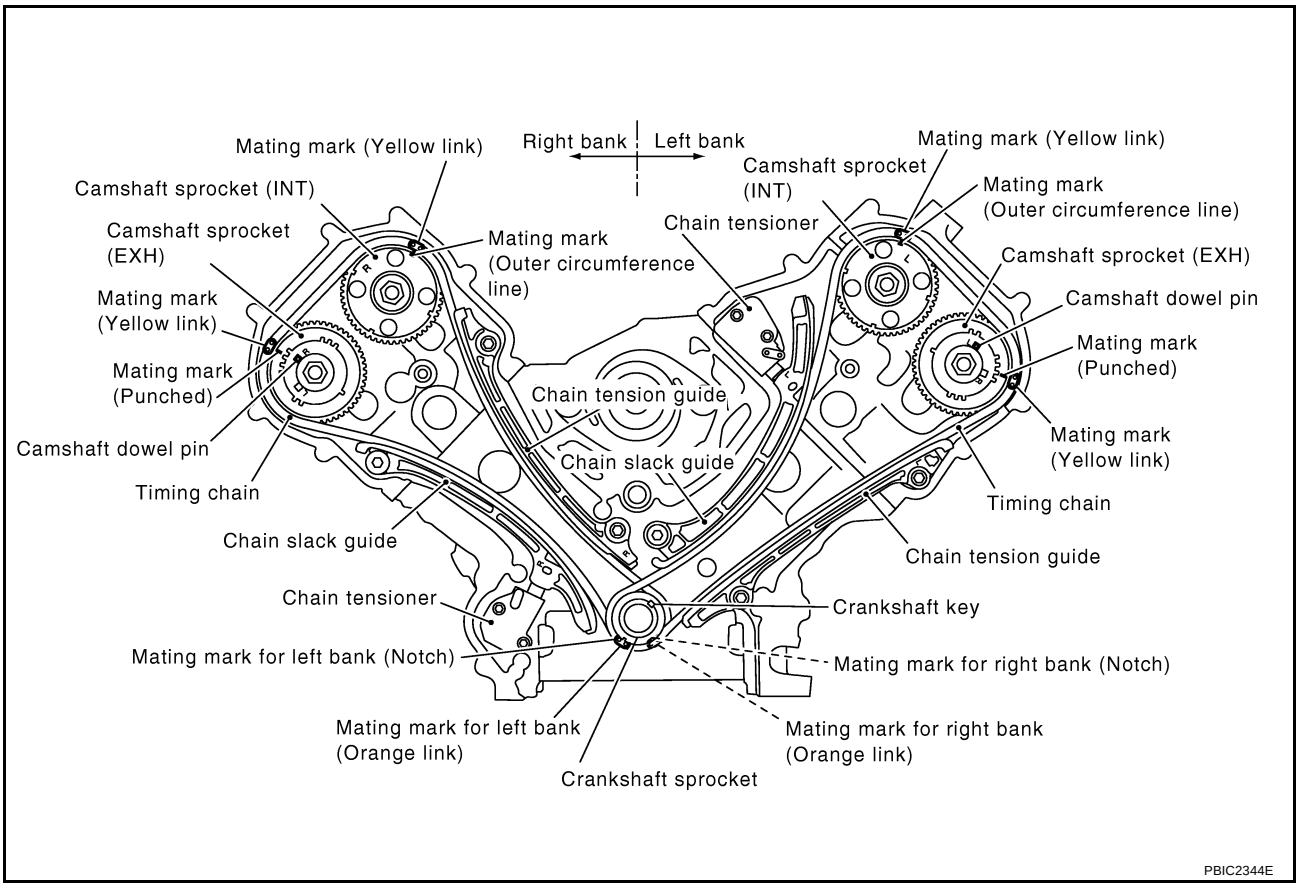


3. Install crankshaft sprockets for both banks.
   - Install each crankshaft sprocket so that its flange side (the larger diameter side without teeth) faces in the direction shown in figure.

     NOTE:
     The same parts are used but facing directions are different.



4. Install timing chains and associated parts.



   - Align the mating mark on each sprocket and the timing chain for installation.

     NOTE:
     Before installing chain tensioner, it is possible to change the position of mating mark on timing chain for that on each sprocket for alignment.

8. CHECK REFUELING CONTROL VALVE

Refer to EC-41, "Component Inspection" .

OK or NG

OK >> GO TO 9.
NG >> Replace refueling control valve with fuel tank.

9. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to EC-41, "Component Inspection" .

OK or NG

OK >> GO TO 10.
NG >> Replace refueling EVAP vapor cut valve with fuel tank.

10. CHECK FUEL FILLER TUBE

Check filler neck tube and hose connected to the fuel tank for clogging, dents and cracks.

OK or NG

OK >> GO TO 11.
NG >> Replace fuel filler tube.

11. CHECK ONE-WAY FUEL VALVE-I

Check one-way valve for clogging.

OK or NG

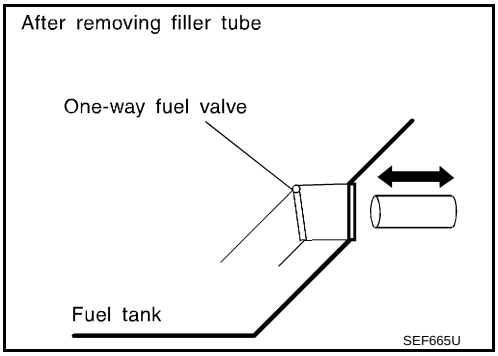
OK >> GO TO 12.
NG >> Repair or replace one-way fuel valve with fuel tank.

12. CHECK ONE-WAY FUEL VALVE-II

1. Make sure that fuel is drained from the tank.
2. Remove fuel filler tube and hose.
3. Check one-way fuel valve for operation as follows.
   When a stick is inserted, the valve should open, when removing stick it should close.
   Do not drop any material into the tank.

OK or NG

OK >> **INSPECTION END**
NG >> Replace fuel filler tube or replace one-way fuel valve with fuel tank.



Component Inspection

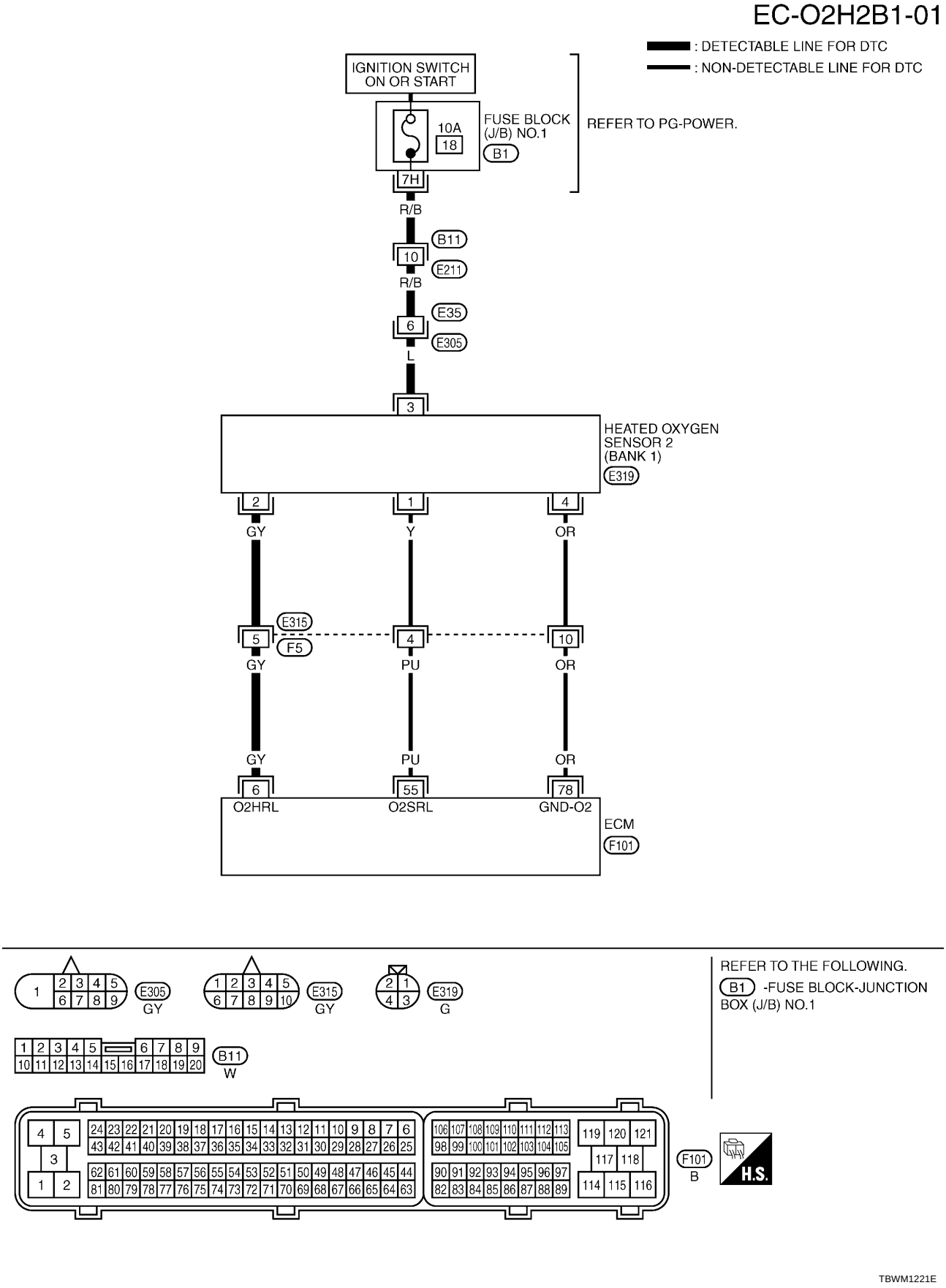
NBS001QI

WATER SEPARATOR

1. Check visually for insect nests in the water separator air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.

Wiring Diagram
BANK 1

NBS001SB



TBWM1221E

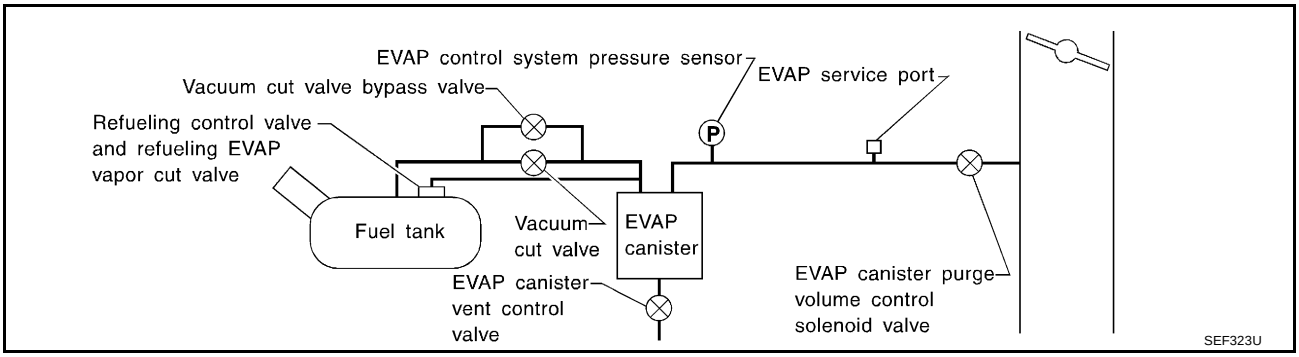
DTC P0441 EVAP CONTROL SYSTEM

PFP:14950

System Description

NBS001WT

NOTE:
If DTC P0441 is displayed with other DTC such as P2122, P2123, P2127, P2128 or P2138, first perform trouble diagnosis for other DTC.



In this evaporative emission (EVAP) control system, purge flow occurs during non-closed throttle conditions. Purge volume is related to air intake volume. Under normal purge conditions (non-closed throttle), the EVAP canister purge volume control solenoid valve is open to admit purge flow. Purge flow exposes the EVAP control system pressure sensor to intake manifold vacuum.

On Board Diagnosis Logic

NBS001WU

Under normal conditions (non-closed throttle), sensor output voltage indicates if pressure drop and purge flow are adequate. If not, a malfunction is determined.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0441 0441	EVAP control system incorrect purge flow	EVAP control system does not operate properly, EVAP control system has a leak between intake manifold and EVAP control system pressure sensor.	● EVAP canister purge volume control solenoid valve stuck closed ● EVAP control system pressure sensor and the circuit ● Loose, disconnected or improper connection of rubber tube ● Blocked rubber tube ● Cracked EVAP canister ● EVAP canister purge volume control solenoid valve circuit ● Accelerator pedal position sensor ● Blocked purge port ● EVAP canister vent control valve

DTC Confirmation Procedure

NBS001WV

CAUTION:
Always drive vehicle at a safe speed.

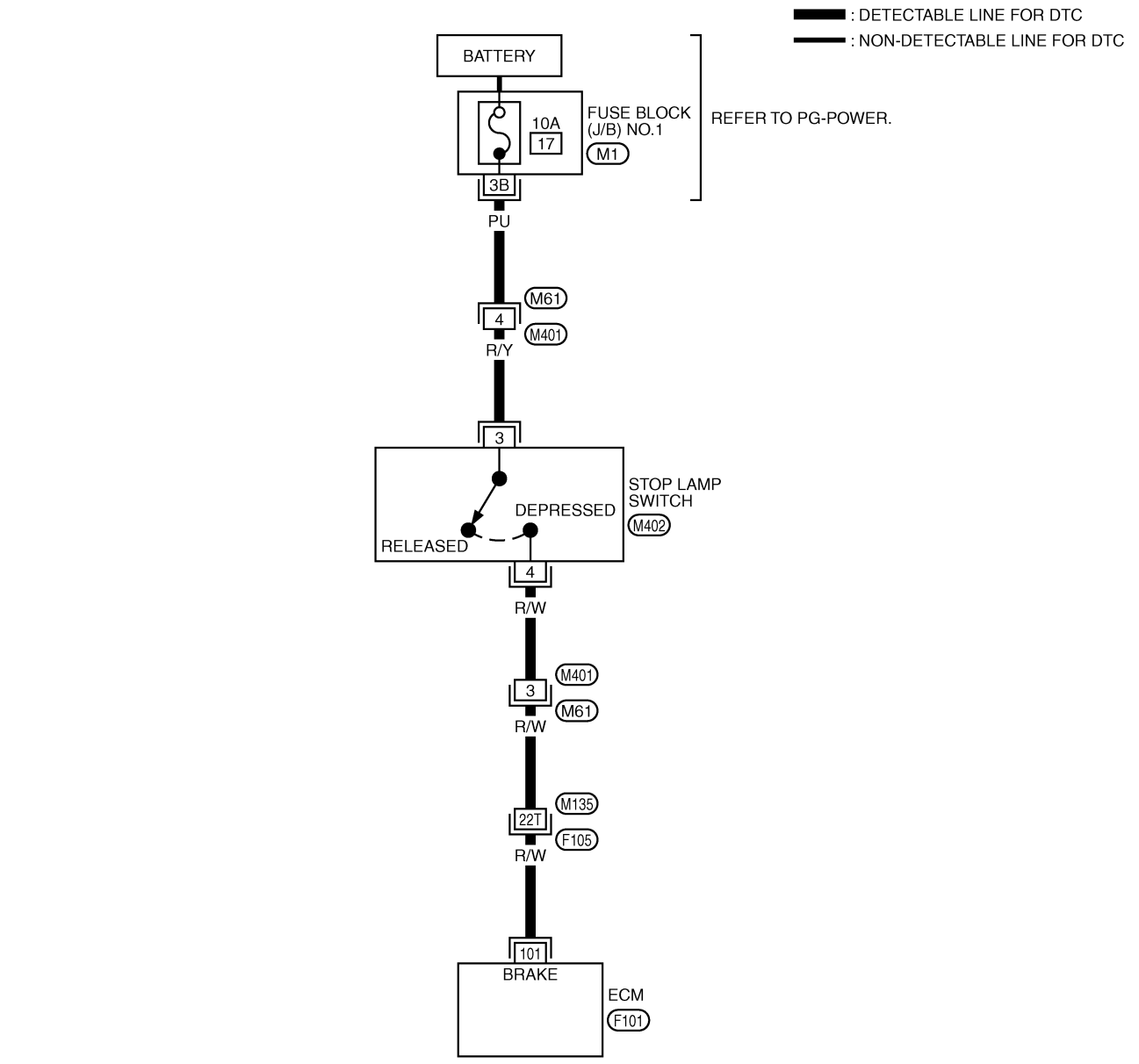
NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

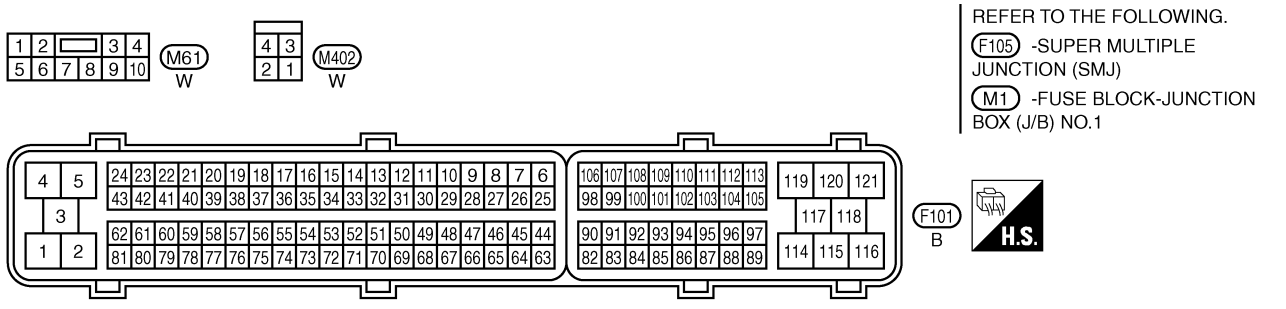
TESTING CONDITION:
Always perform test at a temperature of more than 5°C (41°F).

Wiring Diagram

NBS0025U

EC-BRK/SW-01





TBWM1249E

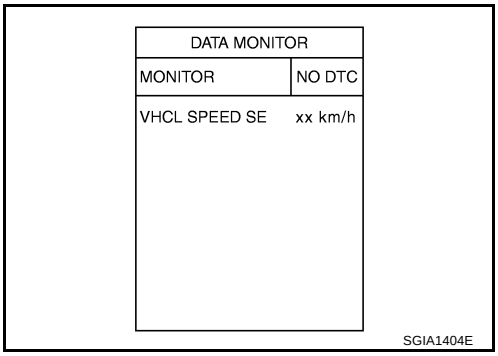
DIAGNOSTIC PROCEDURE

1. CHECK VEHICLE SPEED SENSOR

With CONSULT-II

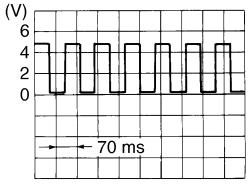
1. Start engine.
2. Select “DATA MONITOR” mode for “ACT D/SUS” with CONSULT-II.
3. Read out the value of “VHCL SPEED SE”.

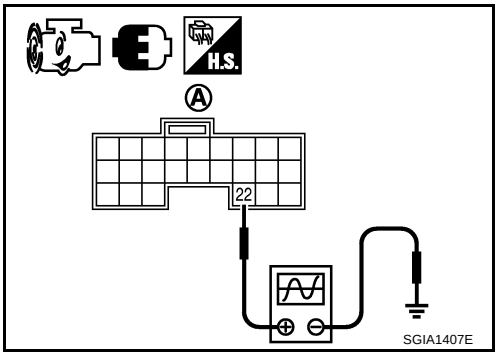
Condition	Display value
Vehicle stopped	0 km/h (0 MPH)
Vehicle running **CAUTION:** **Check air pressure of tire under standard condition.**	Approximately equal to the indication on speedometer (Inside of ±10%)



Without CONSULT-II

1. Start engine.
2. Check signal between active damper suspension control unit harness connector (A) terminal and ground with oscilloscope.

Connector	Terminal	Condition	Data (Approx.)
B37	22 - Ground	Vehicle speed: 40 km/h (25 MPH)	

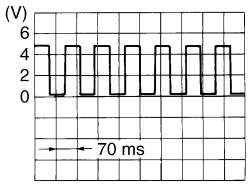


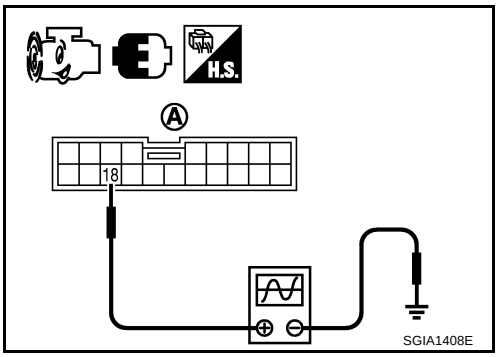
OK or NG

OK >> GO TO 4.
NG >> GO TO 2.

2. CHECK COMBINATION METER

1. Turn ignition switch “OFF”.
2. Disconnect active damper suspension control unit harness connector.
3. Check signal between combination meter harness connector (A) terminal and ground with oscilloscope.

Connector	Terminal	Condition	Data (Approx.)
M41	18 - Ground	Vehicle speed: 40 km/h (25 MPH)	



Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 3.
NG >> Check combination meter. Refer to DI-16, "Trouble Diagnosis" .

Check Key Switch

NIS000UR

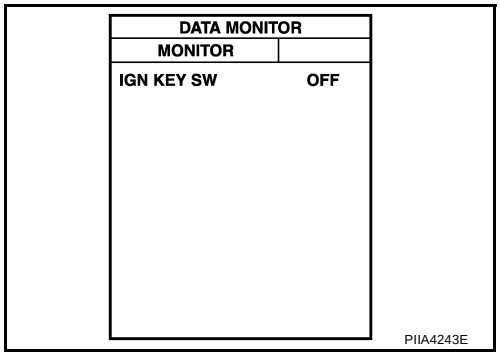
1. CHECK KEY SWITCH

With CONSULT-II

Check key switch “IGN KEY SW” in “DATA MONITOR” mode with CONSULT-II.

Key is inserted in ignition key cylinder : IGN KEY SW ON

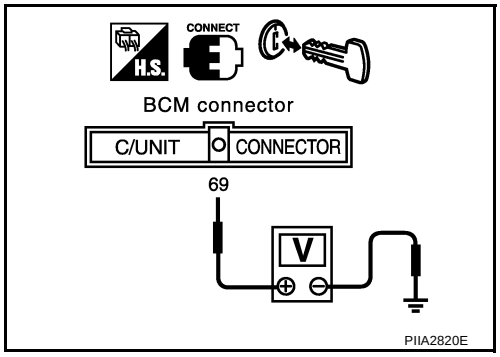
Key is removed from ignition key cylinder : IGN KEY SW OFF



Without CONSULT-II

Check voltage between BCM connector and ground.

Connector	Terminal (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(–)		
M4	69 (PU/W)	Ground	Key is inserted	Battery Voltage
			Key is removed	0



OK or NG

OK >> Key switch is OK.
NG >> GO TO 2.

2. CHECK KEY SWITCH CIRCUIT

1. Disconnect BCM connecotr and key switch connectors.
2. Check continuity between BCM connector M4 terminal 69 and key switch connector M64 terminal 4.

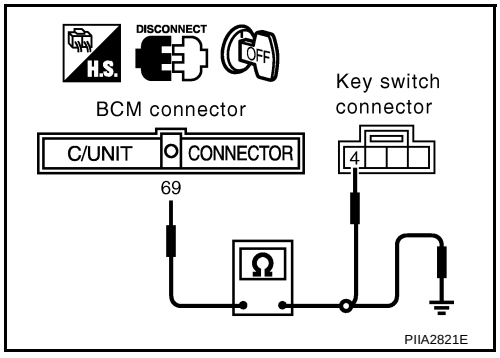
69 (PU/W) – 4 (PU/W) : Continuity should exist.

3. Check continuity between BCM connector M4 terminal 69 and ground.

69 (PU/W) – Ground : Continuity should not exist.

OK or NG

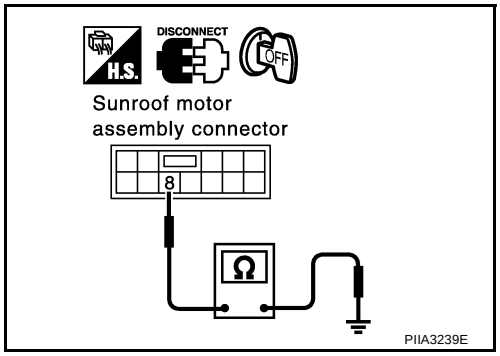
OK >> GO TO 3.
NG >> Repair or replace harness.



2. CHECK GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check continuity between sunroof motor assembly connector R8 terminal 8 and ground.

8 (B) – Ground : Continuity should exist.



OK or NG

OK >> Sunroof motor assembly power supply and ground is OK.
NG >> Repair or replace harness.

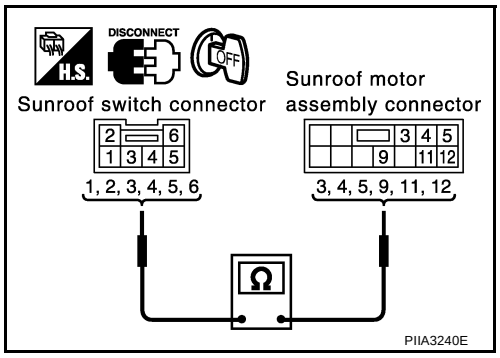
Sunroof Motor Assembly Circuit System Check

NIS0010T

1. CHECK HARNESS CONTINUITY

1. Turn the ignition switch OFF.
2. Disconnect sunroof switch and sunroof motor assembly connectors.
3. Check continuity between sunroof switch connector R7 terminals1, 2, 3, 4, 5, 6 and sunroof motor assembly connector R8 terminals 3, 4, 5, 9, 11, 12.

1 (PU) – 3 (PU) : Continuity should exist.
2 (R) – 9 (R) : Continuity should exist.
3 (L) – 11 (L) : Continuity should exist.
4 (SB) – 5 (SB) : Continuity should exist.
5 (P) – 4 (P) : Continuity should exist.
6 (G) – 12 (G) : Continuity should exist.



OK or NG

OK >> Check the condition of the harness and the connector.
NG >> Repair or replace harness.

Door Switch Check

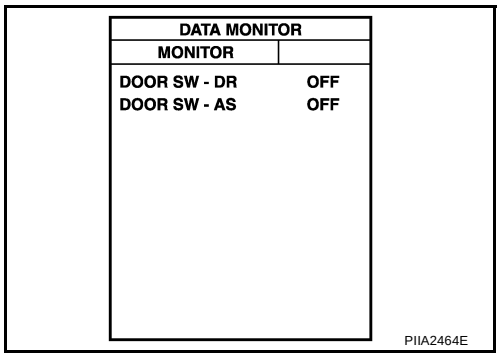
NIS0010U

1. CHECK DOOR SWITCH INPUT SIGNAL

With CONSULT-II

- Check door switch in “DATE MONITOR” mode with CONSULT-II. Refer to RF-16

When door is opened : DOOR SW ON
When door is closed : DOOR SW OFF



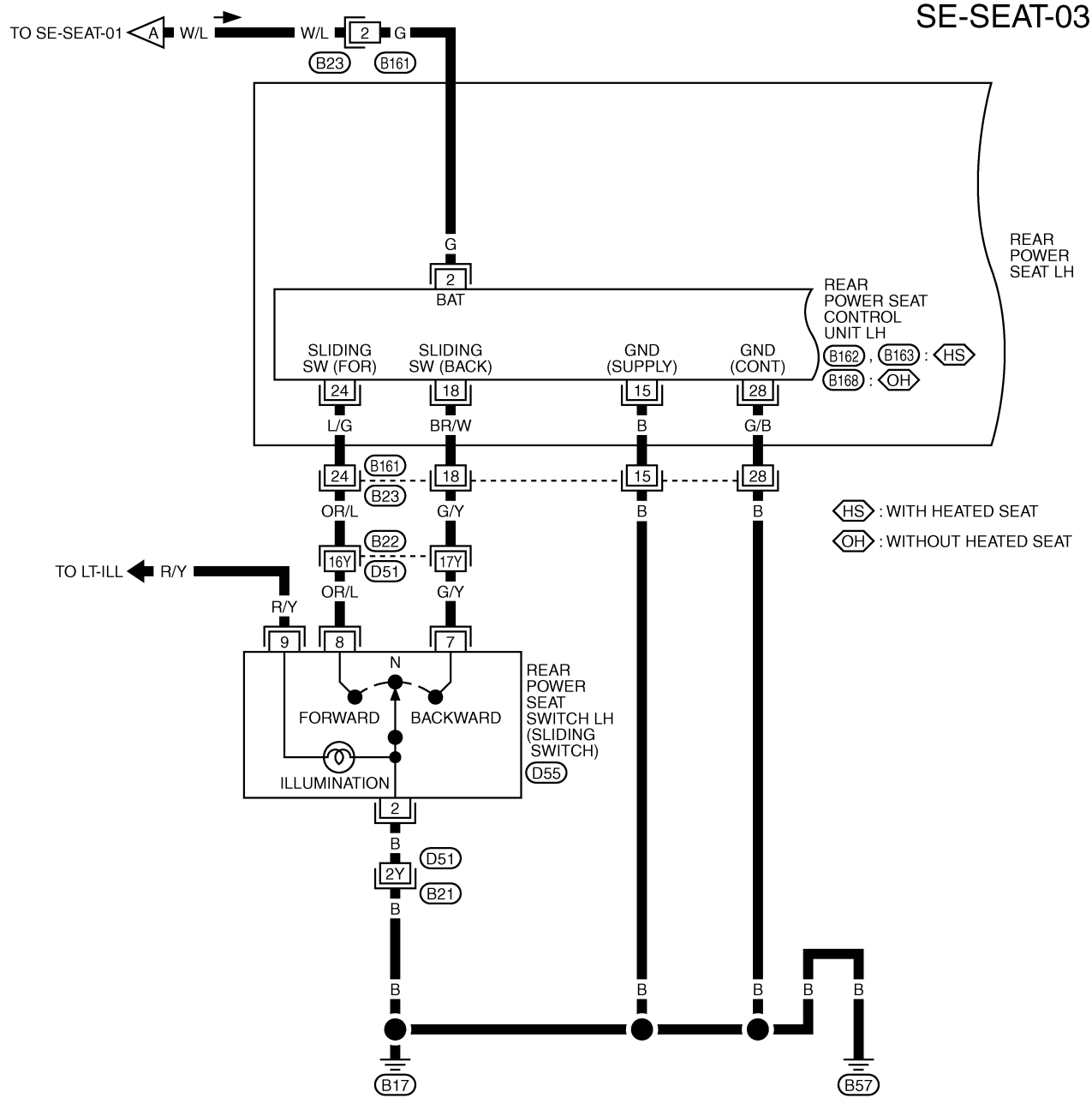
Without CONSULT-II

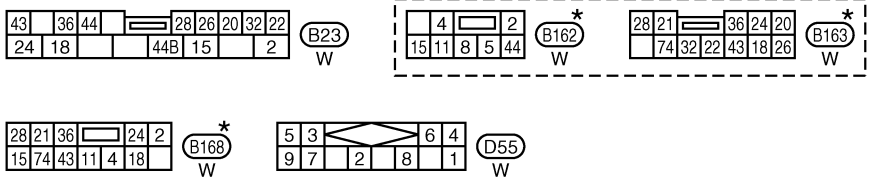
- Check all door switches in switch monitor mode.
  Refer to Remote keyless entry system BL-82, "SWITCH MONITOR" .

OK or NG

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

SE-SEAT-03





*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", PG SECTION.

REFER TO THE FOLLOWING.
B21 , B22 -SUPER MULTIPLE JUNCTION (SMJ)

TIWM0736E

- through headlamp relay-2 terminal 3
- to daytime light control unit terminals 4 and 5
- to combination meter terminal 48 for the HIGH BEAM indicator.

Ground is supplied

- to daytime light control unit terminals 6 or 7
- through each front combination lamp terminal 13
- to each front combination lamp terminal 14
- through daytime light control unit terminals 9 or 10
- to daytime light control unit terminals 13 and 14
- through lighting switch terminals 6 and 9
- to daytime light control unit terminal 13
- through combination meter terminal 47 for the HIGH BEAM indicator
- to lighting switch terminals 5 and 8
- through grounds M25 and M115.

With power and ground supplied, the high beam headlamps and HIGH BEAM indicator illuminate.

BATTERY SAVER CONTROL

When the ignition switch is turned from ON (or START) to OFF (or ACC) positions while headlamps are illuminated, The RAP signal is supplied to terminal 10 of the headlamp battery saver control unit from BCM terminal 135.
After counting 45 seconds by the RAP signal from the BCM to headlamp battery saver control unit, the ground supply to terminals 1 of headlamp relay-1 and -2 from headlamp battery saver control unit terminals 2 and 8 is terminated.
Then headlamps are turned off.
The headlamps are turned off when driver or passenger door is opened even if 45 seconds have not passed after the ignition switch is turned from ON (or START) to OFF (or ACC) positions while headlamps are illuminated.
When the lighting switch is turned from OFF to 2ND after headlamps are turned to off by the battery saver control, ground is supplied

- to headlamp battery saver control unit terminals 5 and 13 from lighting switch terminal 11, and then
- to headlamp relay-1 and -2 terminals 1 from headlamp battery saver control unit terminals 2 and 8
- through headlamp battery saver control unit terminals 3 and 9, and
- through lighting switch terminal 12.

Then headlamps illuminate again.

AUTO LIGHT OPERATION

For auto light operation, refer to LT-7, "AUTO LIGHT OPERATION" .

DAYTIME LIGHT OPERATION

With the engine running, the lighting switch in the OFF or 1ST position and parking brake released, power is supplied

- through daytime light control unit terminal 7
- to front combination lamp RH terminal 13
- through front combination lamp RH terminal 14
- to daytime light control unit terminal 9
- through daytime light control unit terminal 6
- to front combination lamp LH terminal 13.
- through front combination lamp LH terminal 14
- to daytime light control unit terminal 10.

Ground is supplied

- to daytime light control unit terminal 16
- through grounds E24, E42 and E62.

Because the high beam headlamps are now wired in series, they operate at half illumination.

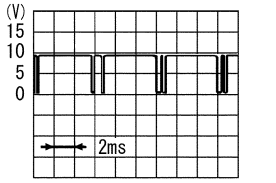
Terminals and Reference Values for BCM

NKS001AA

Terminal No.	Wire color	Item	Measuring condition			Reference value
			Ignition switch	Operation or condition		
17	BR/Y	Data link RX	—	—		—
18	G/B	Data link TX	—	—		—
33	W	Door rock assembly rear LH (door switch) signal	OFF	Rear LH door switch	ON (open)	Approx. 0 V
					OFF (closed)	Battery voltage
37	W/G	Front door switch (passenger side) signal	OFF	Passenger door switch	ON (open)	Approx. 0 V
					OFF (closed)	Battery voltage
56	B	Ground	—	—		—
67	G/W	Data line A-3	—	—		—
68	W/B	IGN power supply	ON	—		Battery voltage
105	Y/L	Battery power supply	OFF	—		Battery voltage
113	B	Ground	—	—		—
142	W/R	Front door switch (driver side) signal	OFF	Driver door switch	ON (open)	Approx. 0 V
					OFF (closed)	Battery voltage
143	W/L	Door lock assembly rear RH (door switch) signal	OFF	Rear RH door switch	ON (open)	Approx. 0 V
					OFF (closed)	Battery voltage

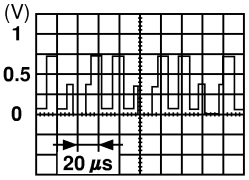
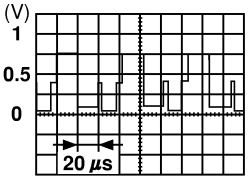
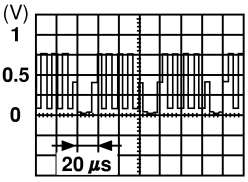
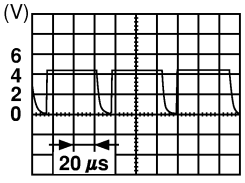
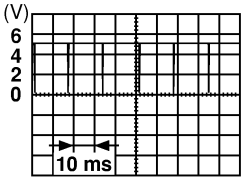
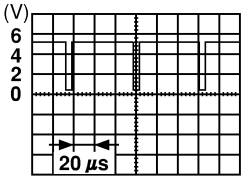
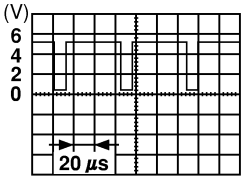
Terminals and Reference Values for Driver Door Control Unit (LCU01)

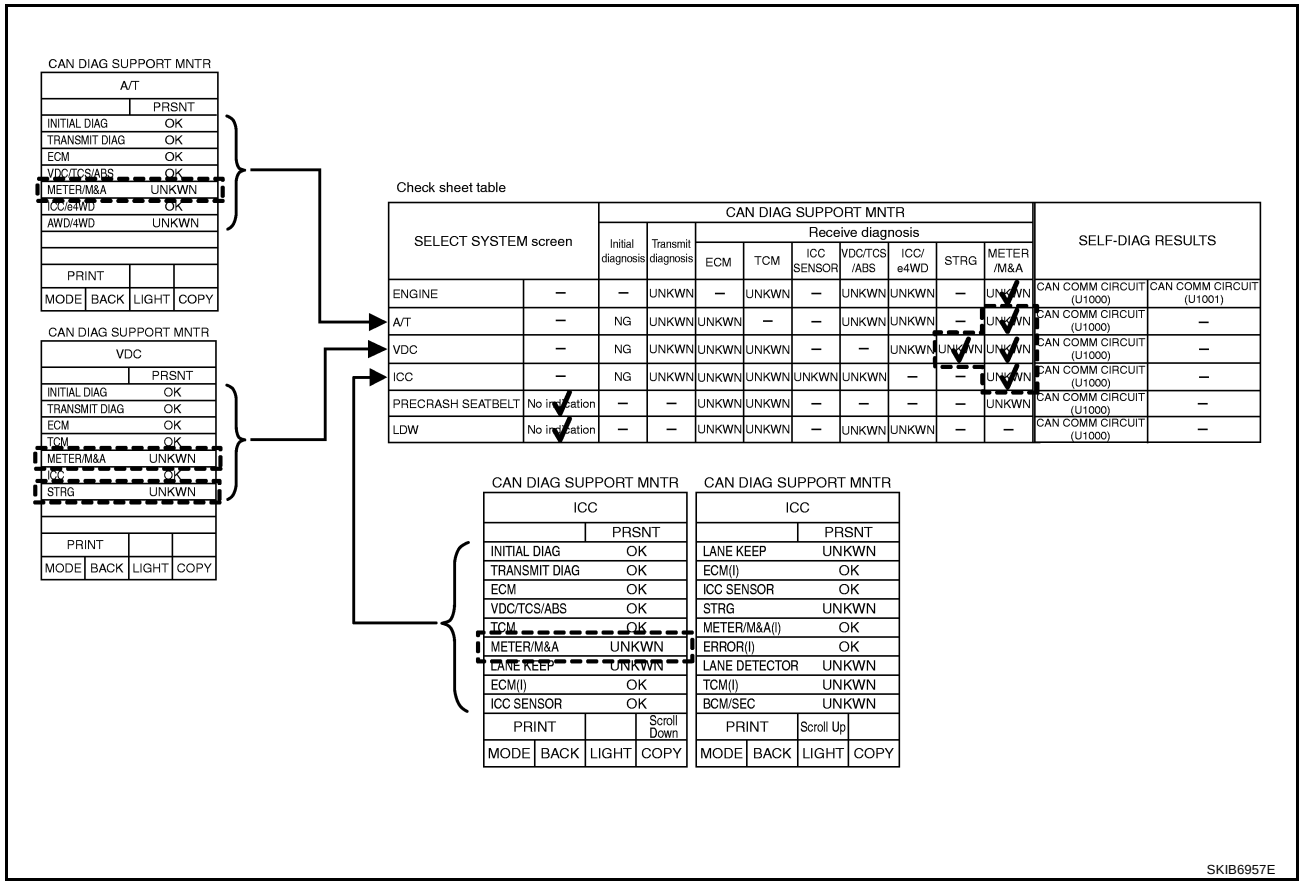
NKS001AB

Terminal No.	Wire color	Item	Measuring condition			Reference value
			Ignition switch	Operation or condition		
3	R	Step lamp	OFF	Each door switch	ON (open)	Approx. 0 V
					OFF (closed)	Battery voltage
5	G/OR	Local data line	—	—		 SIIA0591J
8	G/W	Data line A-3	—	—		—
14	Y/G	Power source (circuit breaker)	OFF	—		Battery voltage
15	B	Ground	ON	—		Approx. 0 V

Terminals and Reference Value for Display

NKS001CN

Terminal No. (Wire color) (+)	Terminal No. (Wire color) (–)	Item	Signal input/ output	Condition: Ignition switch	Condition: Operation	Reference value (Approx.)
1 (W/G)	4	RGB signal (R: Red)	Input	ON	Select “Display Color Spectrum Bar” of “Display Diagnosis” in Confirmation/Adjustment mode function.	 SKIA0165E
2 (W/L)	4	RGB signal (G: Green)	Input	ON	Select “Display Color Spectrum Bar” of “Display Diagnosis” in Confirmation/Adjustment mode function.	 SKIA0166E
3 (G)	4	RGB signal (B: Blue)	Input	ON	Select “Display Color Spectrum Bar” of “Display Diagnosis” in Confirmation/Adjustment mode function.	 SKIA0167E
4	Ground	RGB ground	—	ON	—	0 V
5 (L/Y)		Horizontal synchronizing signal	Output	ON	Select “Rearview” in “Confirmation/Adjustment” mode and display the rearview image on the screen.	 SKIA0163E
6 (OR)		Vertical synchronizing signal	Output	ON	Select “Rearview” in “Confirmation/Adjustment” mode and display the rearview image on the screen.	 SKIA0161E
7 (L/R)		RGB synchronizing signal	Input	ON	Select “Display Color Spectrum Bar” of “Display Diagnosis” in Confirmation/Adjustment mode function.	 SKIA0164E
8 (LG)		RGB area signal	Input	ON	Press the “INFO” switch.	 SKIA0162E



3. Confirm the unit name that “UNKWN” is displayed on the copy of “CAN DIAG SUPPORT MNTR” screen of “A/T”, “VDC” and “ICC” as well as “ENGINE”. And then, put a check mark to the check sheet table.

NOTE:

- For “A/T”, “UNKWN” is displayed on “METER/M&A” and “AWD/4WD”. But put a check mark only to “METER/M&A” because “UNKWN” is listed on the column of reception diagnosis on the check sheet table.
- For “VDC”, “UNKWN” is displayed on “METER/M&A” and “STRG”. Put check mark to them.
- For “ICC”, “UNKWN” is displayed on “METER/M&A”, “LANE KEEP”, “STRG”, “LANE DETECTOR”, “TCM(I)” and “BCM/SEC”. But put a check mark only to “METER/M&A” because “UNKWN” is listed on the column of reception diagnosis on the check sheet table.