BR

BRAKE (A.B.S)

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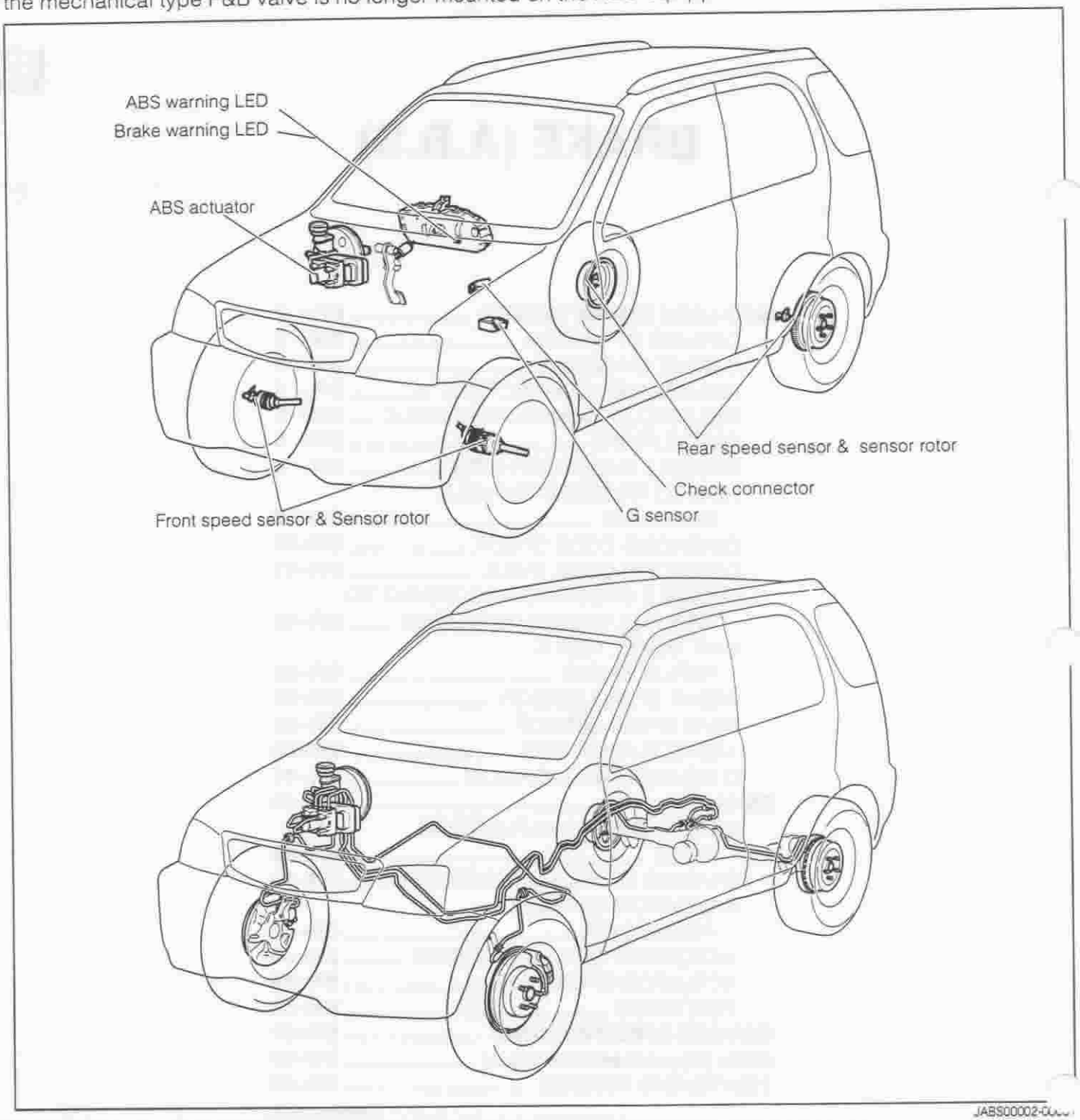
JABS00001-00000

braking/hard braking, except for the case of over-speeding or sharp turning in a corner.
Now, all ABS-equipped vehicles are provided with the EBD (Electronic Brake force Distribution) system, which is capable of controlling the distribution of braking forces between the front wheels and rear wheels, depending upon changes in loading conditions or load transfers due to deceleration, etc. Consequently, the mechanical type P&B valve is no longer mounted on the ABS-equipped vehicles.



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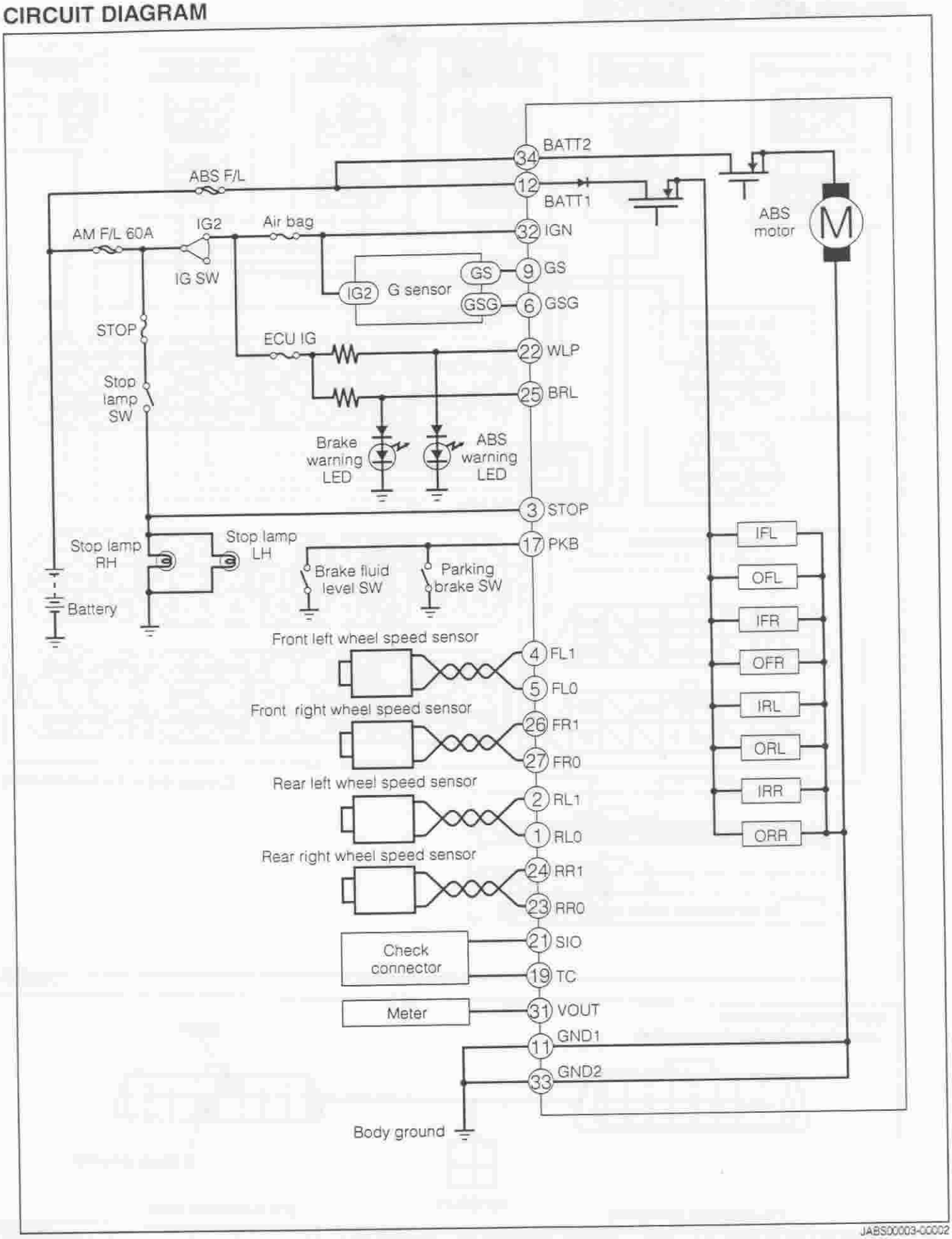
CIRCUIT DIAGRAM



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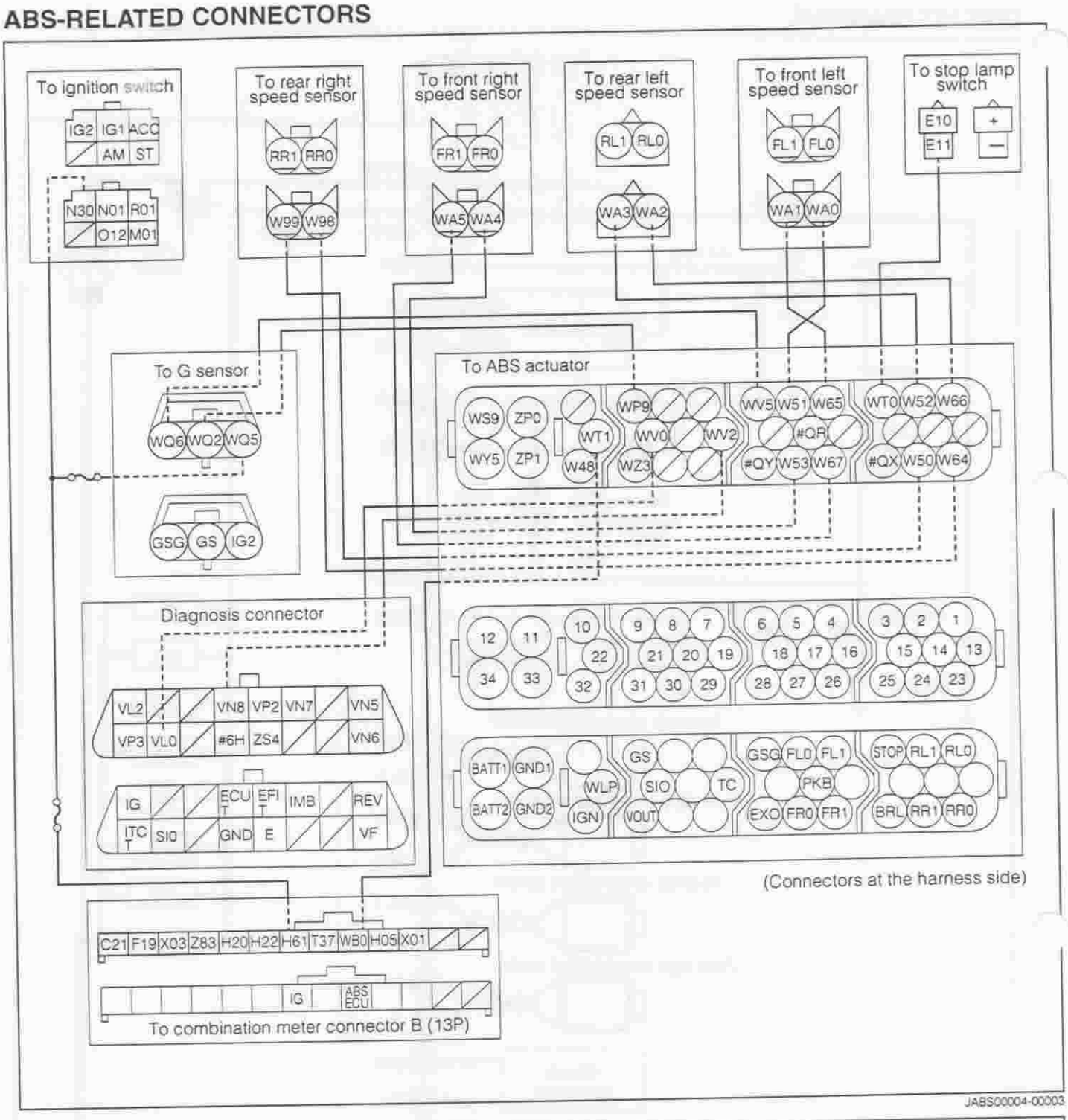
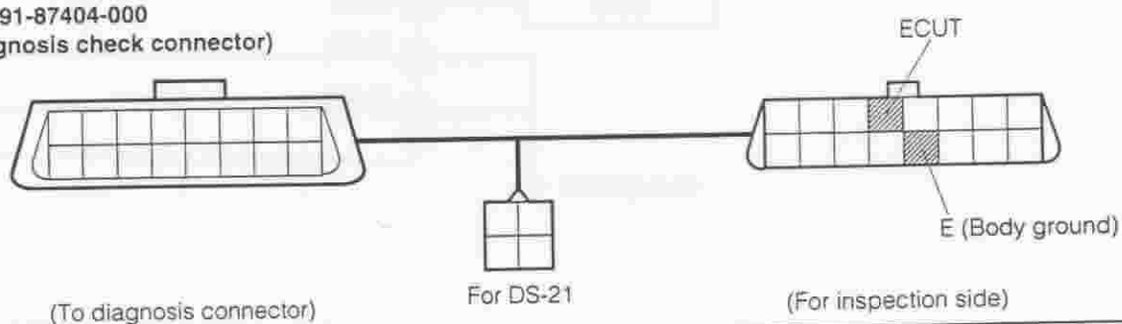
ABS-RELATED CONNECTORS



JABS00004-00003

SST: 09991-87404-000
(For diagnosis check connector)



JABS00005

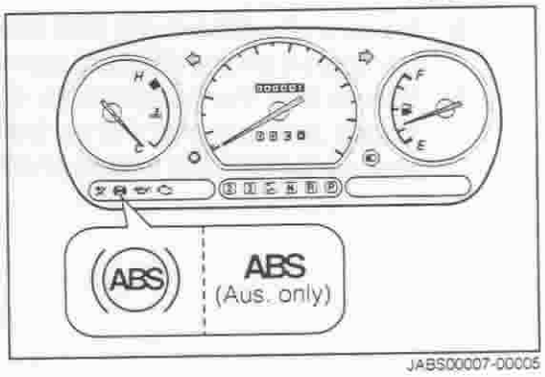
ABS CIRCUIT CONNECTION TABLE

No.	ABS actuator unit: Abbreviation code	ABS actuator unit: Terminal of ABS actuator unit to be connected	Wheel speed sensor: Front Right	Wheel speed sensor: Front Left	Wheel speed sensor: Rear Right	Wheel speed sensor: Rear Left	Ignition switch	ABS fuse	Diagnosis check connector	Others
1	RL0 (W66)	Speed sensor (Rear left)				○				
2	RL1 (W52)	Speed sensor (Rear left)				○				
3	STOP (WT0)	Stop lamp switch								○ Stop lamp switch
4	FL1 (W65)	Speed sensor (Front left)		○						
5	FL0 (W51)	Speed sensor (Front left)		○						
6	GSG (WV5)	G sensor (Ground)								○ G sensor
9	GS (WP9)	G sensor								○ G sensor
11	GND1 (ZP0)	Ground								○ Body ground
12	BATT1 (WS9)	ABS fuse						○		
19	TC (WV2)	Diagnosis check connector							○	
21	SIO (WV0)	External communication circuit (Diagnosis check connector)							○	
22	WLP (WT1)	ABS warning lamp								○ Combination meter
23	RR0 (W64)	Speed sensor (Rear right)			○					
24	RR1 (W50)	Speed sensor (Rear right)			○					
25	BRL (#QX)	Brake warning lamp								○ Combination meter
26	FR1 (W67)	Speed sensor (Front right)	○							
27	FR0 (W53)	Speed sensor (Front right)	○							
28	EXO (#QY)	EFI ECU								○ EFI ECU
31	VOUT (WZ3)	Speed meter								○ Combination meter
32	IGN (W48)	Ignition switch					○			
33	GND2 (ZP1)	Body ground								○ Body ground
34	BATT2 (WY5)	Battery						○		

JABS00006-00000

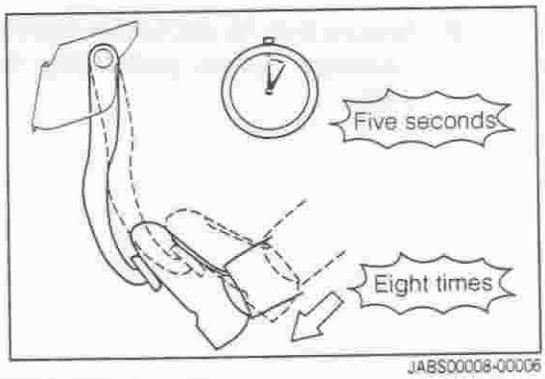
PRECAUTIONS

1. The ABS system has a self-diagnosis function. The ECU in the ABS actuator unit memorizes abnormality as diagnosis codes which are occurring at present or occurred in the past.



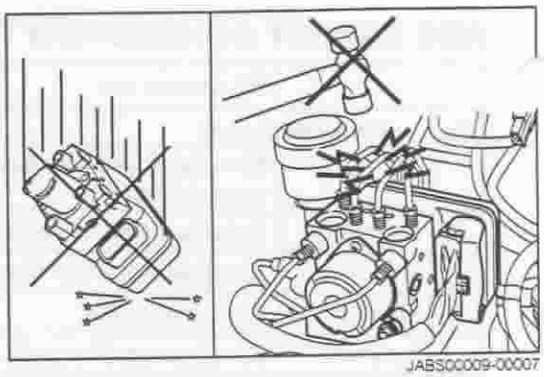
JABS00007-00005

2. Memorized diagnosis codes are erased when the brake pedal is depressed eight times or more within predetermined form. Therefore, no diagnosis code will be erased even when the battery power supply is shut off.
   NOTE:
   - Be sure to perform the sensor check by sensor check function after erasing the diagnosis code.

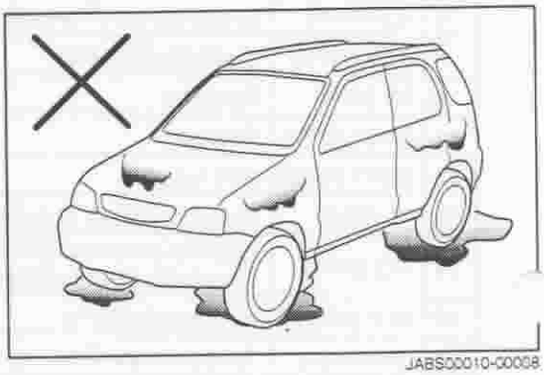


JABS00008-00006

3. The components of the ABS system are precise and delicate. Therefore, never apply any excessive impact during the removal, inspection and installation.
   CAUTION:
   - Never use components to which an impact has been applied by dropping or hitting with other objects.


JABS00009-00007

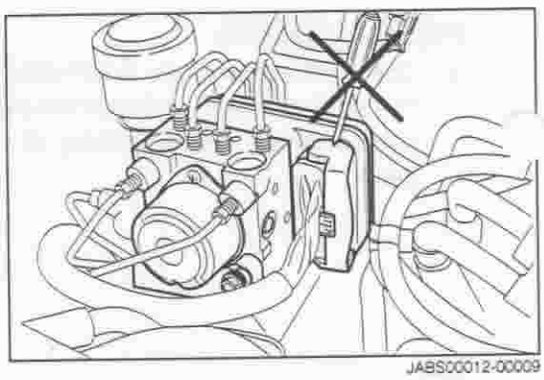
4. Never perform the inspection of the ABS system when the vehicle is wet, such as after running in rain or snow and after washing, in order to prevent water or dust, etc. from being admitted into the ABS and related connectors.
5. Never allow water and dust, etc. to enter into the ABS actuator unit and related connectors.
6. Prevent water from coming in contact with the ABS related parts and connectors during washing.


JABS00010-00008

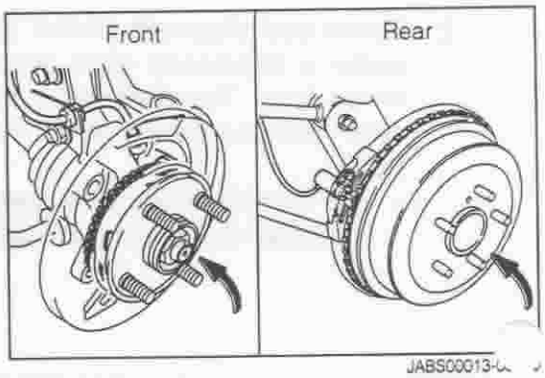
7. Prior to replacing the ABS actuator unit, thoroughly perform the trouble shooting for possible items other than the ABS actuator unit. The ABS actuator unit is a reliable, but an expensive part.
   Even when the ABS actuator unit is replaced according to the check results of the trouble shooting and the relevant trouble has been remedied, be sure to reinstall the old ABS actuator unit so as to confirm that the malfunction was obviously caused by the faulty ABS unit.

JABS00011-00000

8. Never try to remove the ABS actuator unit cover and touch the screws on the ABS actuator unit proper.
9. Ensure that the components of the brake system are installed properly and that no brake fluid leakage exists before performing the trouble shooting of the ABS.


JABS00012-00009

10. Ensure that no excessive rattle exists on each of the wheel bearings before performing the trouble shooting of the ABS.

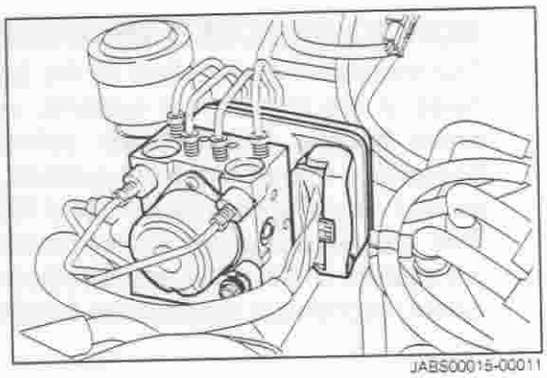


JABS00013-

11. When installing a wireless installation (Telephone, HAM, CB, etc.) :
The ABS actuator unit has been so designed that it is resistant to external influence.
However, if a vehicle is equipped with a wireless installation, such as CB, HAM, telephone and so forth, (even if its output is only 10 Watts) it may affect the ABS actuator unit adversely. Therefore, observe the following precautions.
   - Install the antenna at a place as far away as possible from the ABS actuator unit and related harnesses.
   - The antenna cord should be kept at least 30 cm from the ABS actuator unit and its related harnesses.
   - The antenna cord should not be routed in parallel to ABS related harnesses.
   - Adjust the antenna output correctly.
   - Never install a wireless installation with a high output into the vehicle.
   - Never use or place a handy telephone near the components of the ABS and its related harnesses.

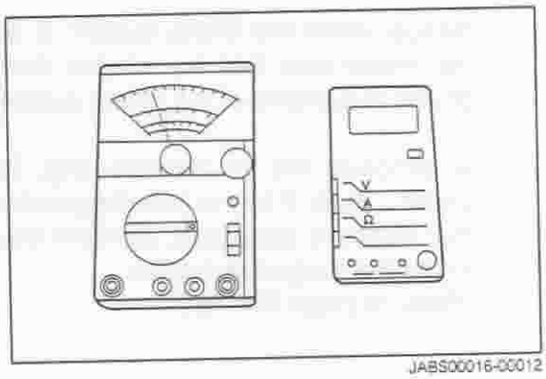
JABS00014-00000

12. When disconnecting or connecting connectors:
   - Prevent dust, water and foreign material, etc. from being admitted into the ABS-related connectors when disconnecting or connecting the connectors. Failure to observe this caution may cause serious malfunction, due to lowering the insulation of each terminal.
   - Never damage or lose the seal of connectors during disconnection or connection.
   - Be sure to confirm the shape of the lock and release the lock properly before disconnecting the connectors.



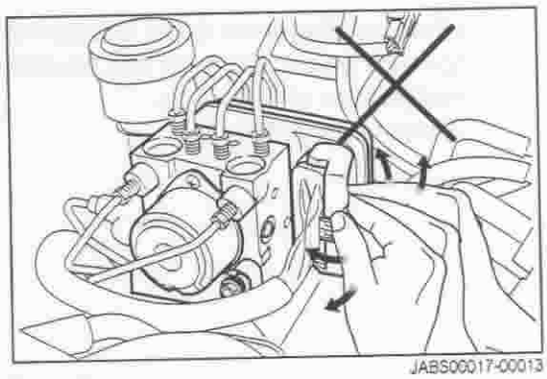
JABS00015-00011

13. Circuit tester
   - For trouble shooting, use a volt/ohmmeter whose internal resistance is more than 10 k ohm, whose resolution is 0.1 V or more and 0.5 ohm or more, and whose accuracy is 0 ± 2 % or more.
   Use of a volt/ohmmeter which has lower specifications than those described above for trouble shooting may lead to wrong diagnosis or mis-judgement.



JABS00016-00012

14. Never deform the terminals of connectors by applying an excessive force when checks are performed by attaching the probe electrodes of the volt/ohmmeter to the terminals.
15. Be sure to disconnect the ground cable from the negative terminal of the battery before disconnecting the connector of the wire harness from the ABS actuator unit. Failure to observe this caution may lead to ABS unit damage.

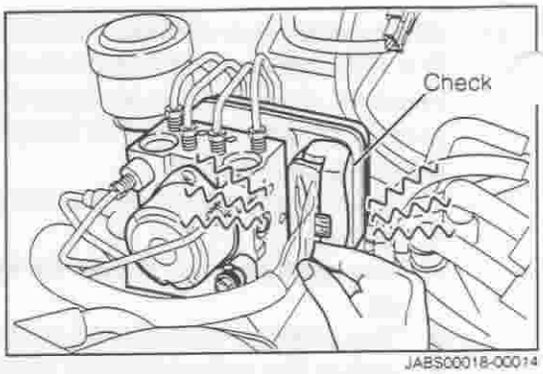


JABS00017-00013

TROUBLE SHOOTING HINTS

Most of troubles related to the electrical system of the ABS are merely caused by poor connections.
Ensure the following points carefully before and during the inspection.

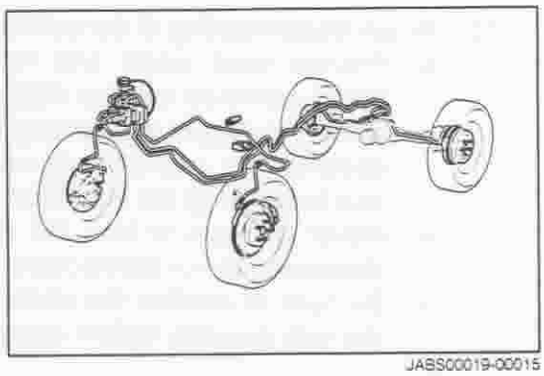
1. Visually inspect that the terminals are not damaged or bent.
2. Ensure that connectors are securely connected and locked.
3. Ensure that the measured continuity or resistance will not be changed when light vibration is applied to the connector or the wire harness connected to the related circuit of presumable parts of trouble.



JABS00018-00014

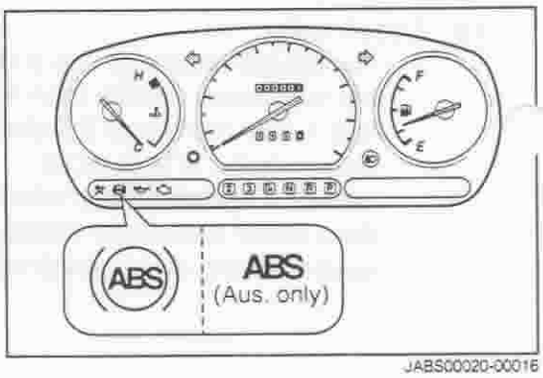
HOW TO PROCEED TROUBLE SHOOTING

The trouble or malfunction of the brake system mainly originates in the mechanical systems, such as the brake pedal, brake booster, brake master cylinder, wheel cylinders and brake fluid line, or electrical systems, such as the ABS actuator unit, wheel speed sensors and ABS related wiring harness. This manual describes mainly trouble shooting of the electrical system of the ABS control systems on the premise that the brake mechanical systems are functioning normally.


JABS00019-00015

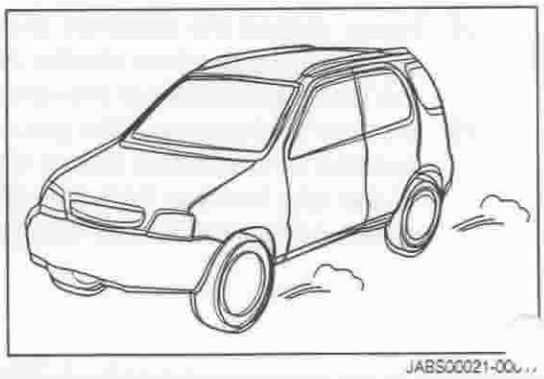
Hence, when the brake system is encountered with any trouble, make sure that the trouble does not originate in the mechanical systems of the brake systems.

To proceed the trouble shooting, first perform the diagnosis check. Then, if any of the diagnosis codes other than the normal codes is outputted, perform the trouble shooting according to the diagnosis codes.
(Refer to page BR–10.)



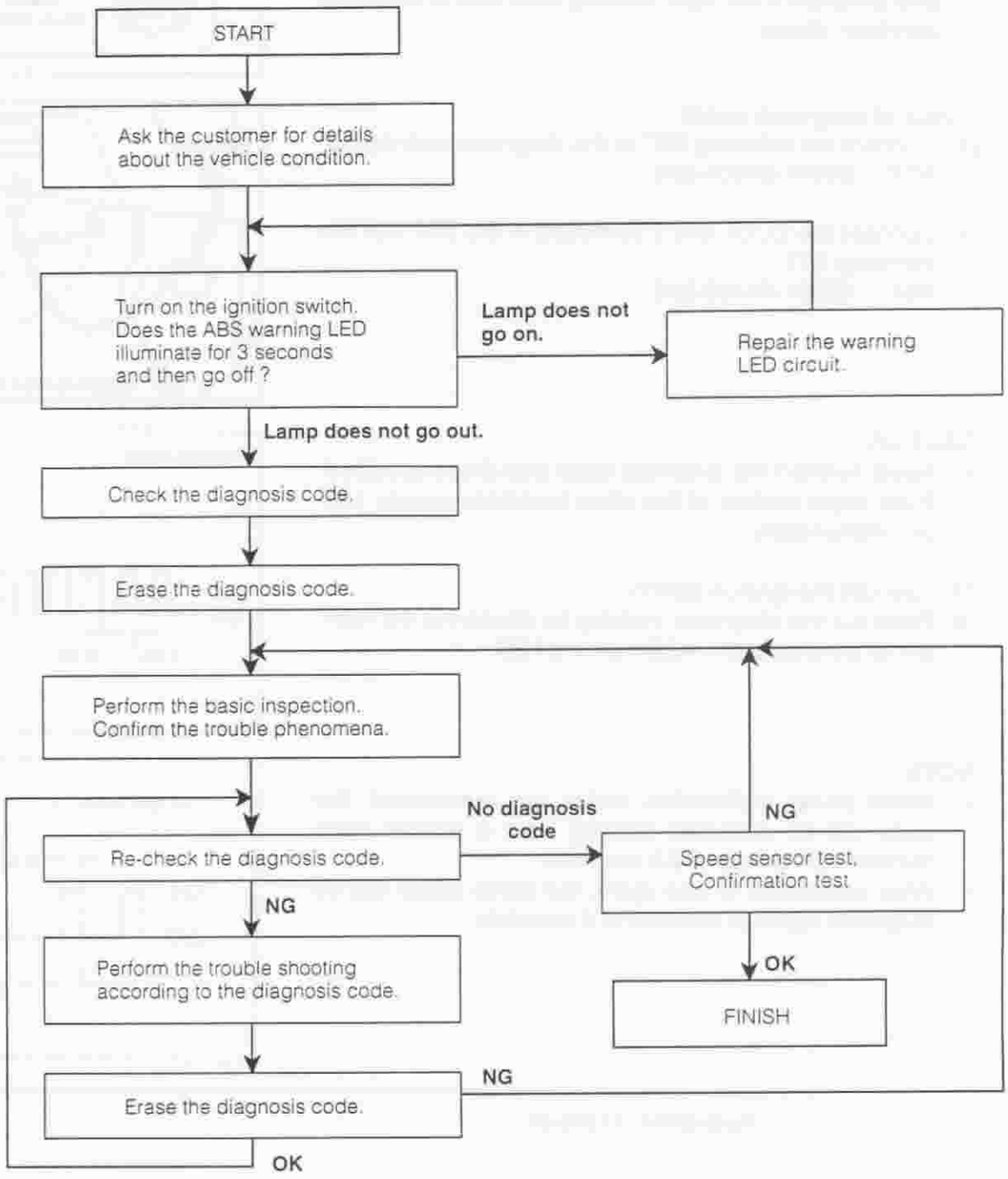
JABS00020-00016

When no diagnosis code is outputted even if malfunction phenomena exists, perform the trouble shooting according to the malfunction phenomena.
(Refer to page BR–18)


JABS00021-00...

The following diagram shows the basic procedure for the trouble shooting.
Actual approach may differ if you have much experience on this system. However, it is recommended to perform the trouble shooting according to this procedure.

TROUBLE SHOOTING FLOW CHART

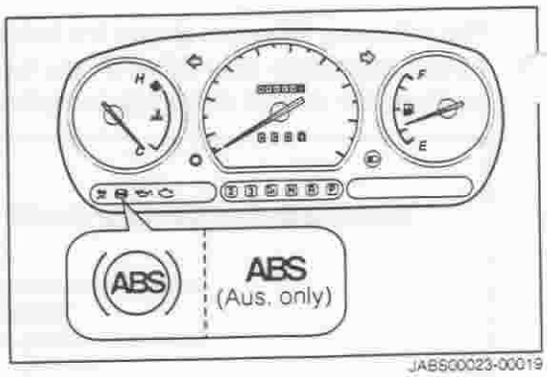


JABS00022-00018

DIAGNOSIS CODE CHECK

1. Checking of ABS warning LED
   (1) Ensure that the ABS warning LED will glow for about three seconds after the ignition switch is turned ON, and, then, the warning LED goes out.

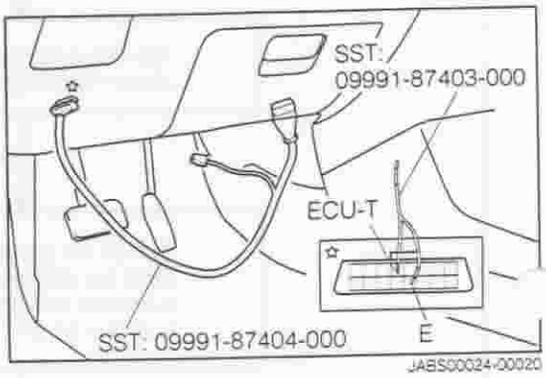
   NOTE:
   - Proceed to trouble shooting according to the trouble phenomenon if the ABS warning LED fails to meet the condition above.



JABS00023-00019

2. Output of diagnosis codes
   (1) Connect the following SST to the diagnosis connector.
   SST: 09991-87404-000

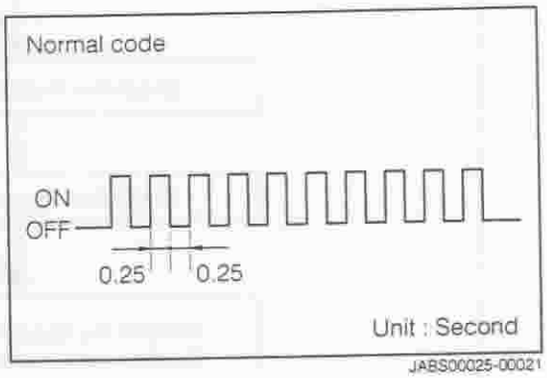
   (2) Connect the ECUT and E terminals in the SST with the following SST.
   SST: 09991-87403-000



JABS00024-00020

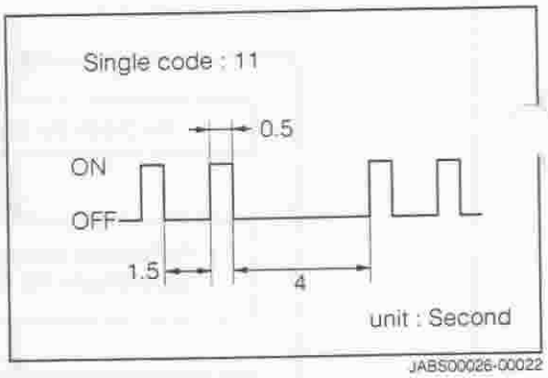
CAUTION:
- Never connect the terminals other than those specified. Even slight contact of the other terminals causes serious malfunction.

   (3) Turn ON the ignition switch.
   (4) Read out the diagnosis code(s) by observing the number of blinking of the ABS warning LED.

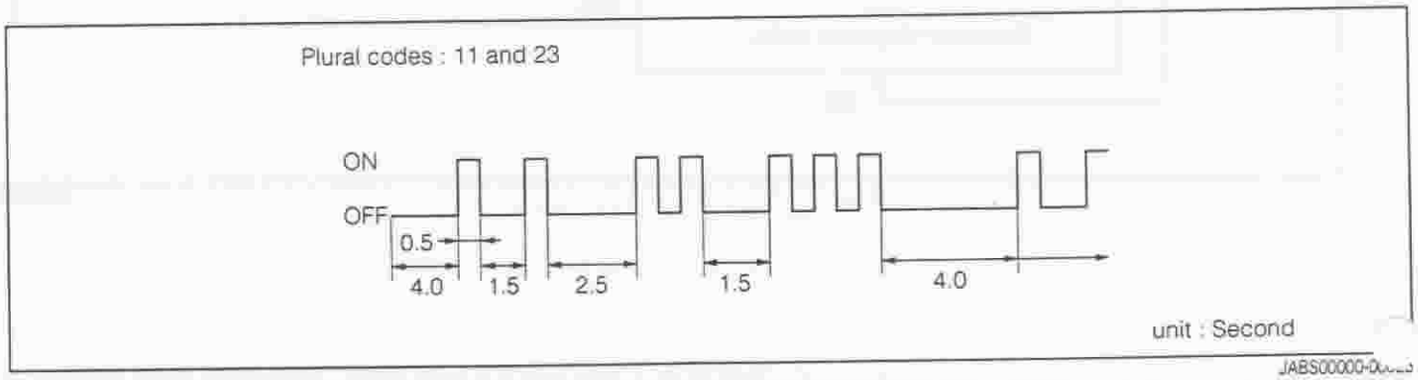


JABS00025-00021

NOTE:
- When plural malfunction codes are memorized, the code will be outputted starting from a smaller code number at intervals of 2.5 seconds.
- After completion of one cycle, the same codes will be outputted again at intervals of 4 seconds.



JABS00026-00022



JABS00000-0...

DIAGNOSIS CODE TABLE

To some extent, you will be able to narrow-down possible trouble items, based on the ON state of the brake warning LED and ABS warning LED, without entering the diagnosis mode.

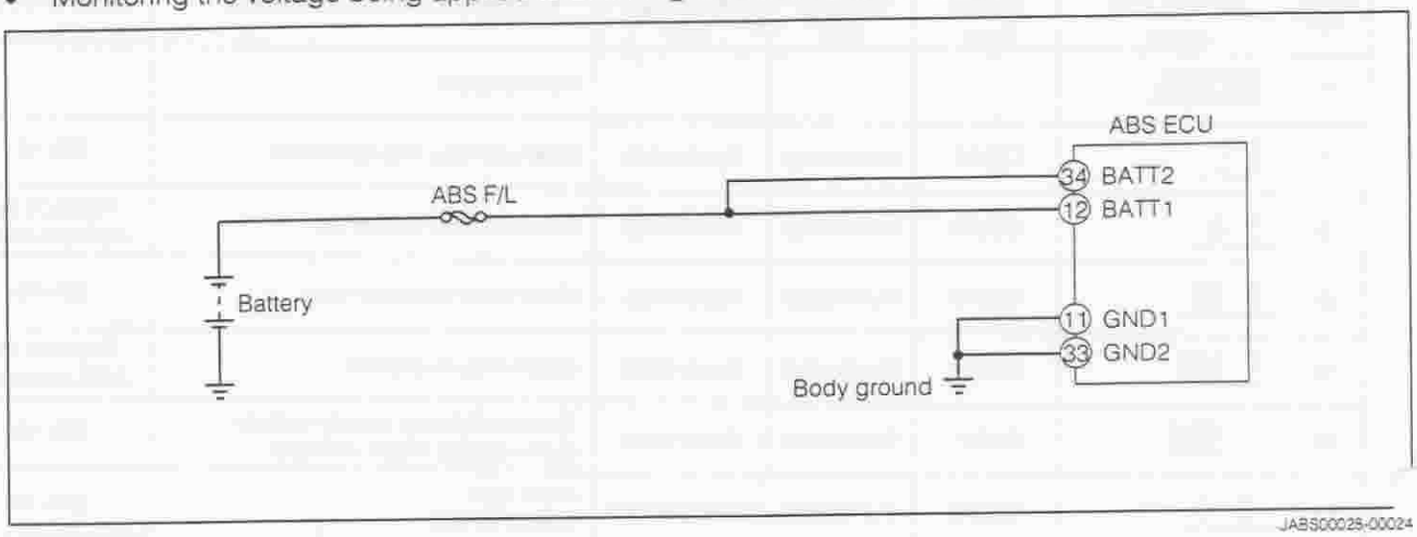
Code No.	Diagnosis code Warning LED output	Diagnostic Trouble Code	ABS Warning LED	Brake Warning LED	Diagnosis malfunction contents		Refer to page
—					Normal code		
11		C0278	Illuminated	Illuminated	Solenoid relay has open wire.		BR–12
12		C0279	Illuminated	Illuminated	Solenoid relay is shorted.		Replace the ABS actuaator
13		C0273	Illuminated	Illuminated	Motor relay has open wire.		BR–13
14		C0274	Illuminated	Illuminated	Motor relay is shorted.		Replace the ABS actuaator
15		C1241	Illuminated	Illuminated	Abnormal power supply voltage (Low voltage, Hight voltage)		BR–13
21		C0200	Illuminated	*Extinguished	Front right speed sensor	• Open wire • Short wire	BR–14
22		C0205	Illuminated	*Extinguished	Front left speed sensor		BR–14
23		C0210	Illuminated	*Extinguished	Rear right speed sensor		BR–14
24		C0215	Illuminated	*Extinguished	Rear left speed sensor		BR–14
31		C1245	Illuminated	Extinguished	Abnormal G sensor signal		BR–16
32		C1244	Illuminated	Extinguished	Open wire or short in G sensor system		BR–16
39		C1249	Illuminated	———	Open wire in stop lamp switch		BR–18
51		C1251	Illuminated	Extinguished	ABS pump motor malfunctioning		Replace the ABS actuator
52		C0226	Illuminated	Illuminated	Front left solenoid valve	• Open wire • Short circuit	Replace the ABS actuator
54		C0236	Illuminated	Illuminated	Front left solenoid valve		Replace the ABS actuator
56		C0246	Illuminated	Illuminated	Rear right solenoid valve		Replace the ABS actuator
58		C0256	Illumination	Illuminated	Rear left solenoid valve		Replace the ABS actuator

* The LED goes on when both two rear wheels encounter malfunction.

JABS00027-00000

DS-21 on screen	DTC No.C0278
Check lamp indication	Code No.11

- Monitoring circuit voltage at time when test pulse is sent to main relay.
- Monitoring the voltage being applied to BATT1 ⑫ and BATT2 ㉞ terminal.



JABS00025-00024

Turn OFF the ignition switch.

Disconnect the connector from the ABS actuator unit. Measure the voltage between the terminal BATT1 ⑫ at the harness side and the body earth.
Spec. : 10 - 14V

OK → Check if there is poor contact between the ABS actuator unit and the harness connector.

- Normal → Replace the ABS actuator unit.
- Poor contact → Repair the poor connection of the connector at the ABS actuator unit.

NG →

Pull out the ABS fusible link from the relay block. Measure the resistance of this fusible link
Spec. : 10Ω or less

NG → Measure the voltage of the wire harness between the body earth and the terminal BATT1 ⑫ of the ABS actuator unit at the harness side.
Spec. : 10 - 14V

- NG → Repair or replace the wire harness between the ABS actuator unit and the fusible link.
- OK → Replace the ABS fusible link with a new one.

Check if the fusible link would blow again.

- Blow → (back to Measure the voltage of the wire harness between the body earth and the terminal BATT1 ⑫ of the ABS actuator unit at the harness side.)
- Normal → Finish

OK →

Measure the voltage between the body earth and the fusible link terminal at the battery side of the relay block.
Spec. : 10 - 14V

- OK → Replace the poor connection of the connector at the relay block connector.
- NG → Check the battery. And then, repair or replace the wire harness between the battery and the relay block.

JABS00029-00

DS-21 on screen	DTC No.C0273
Check lamp indication	Code No.13

- Monitoring circuit voltage while ABS motor is driving and stopped.

Turn OFF the ignition switch.

↓

Disconnect the connector from the ABS actuator unit. Measure the resistance of the wire harness between the terminal BATT2 ㉞ of the ABS actuator unit at the harness side and the ABS fusible link terminal at the ABS actuator side of relay block.
Spec. : 10Ω or less

→ **OK** → Check if there is poor contact between the ABS actuator unit and the harness connector.

- **Normal** → Replace the ABS actuator unit.
- **Poor contact** → Repair the poor connection of the connector at the ABS actuator unit.

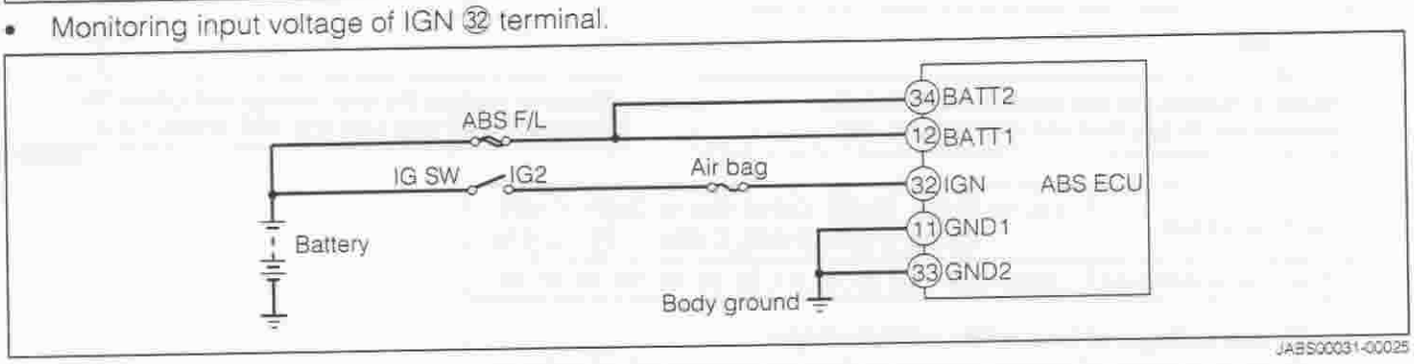
↓ **NG**

Repair or replace the wire harness and connector between the fusible link and ABS actuator unit.

JABS00030-00000

DS-21 on screen	DTC No.C1241
Check lamp indication	Code No.15

- Monitoring input voltage of IGN ㉜ terminal.



JABS00031-00025

Turn OFF the ignition switch.
Disconnect the connector from the ABS actuator unit.
Turn ON the ignition switch.

↓

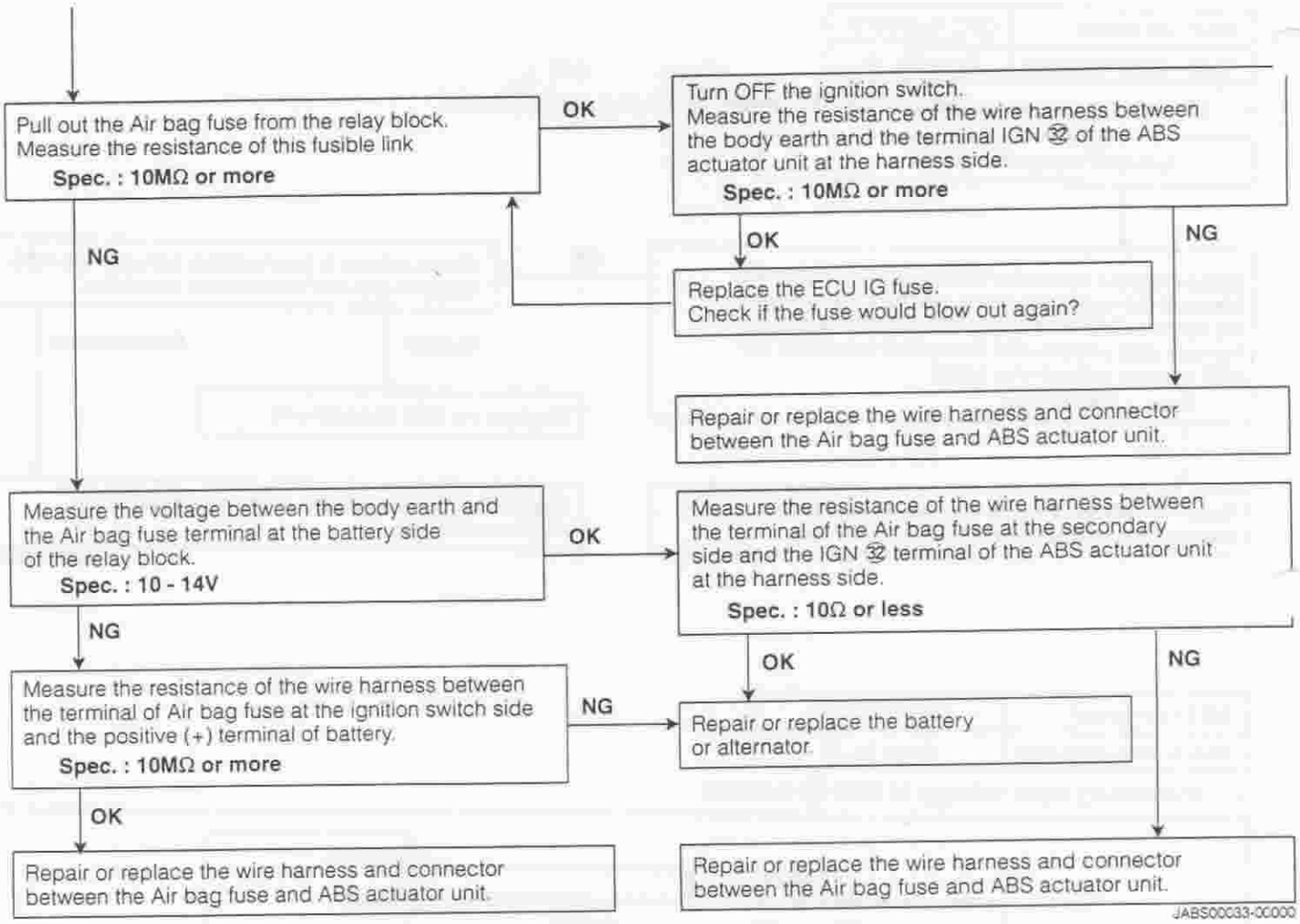
Measure the voltage of the wire harness between the terminal IGN ㉜ and the body earth of the ABS actuator unit at the harness side.
Spec. : 10 - 14V

→ **OK** → Check if there is poor contact between the ABS actuator unit and the harness connector.

- **Normal** → Replace the ABS actuator unit.
- **Poor contact** → Repair the poor connection of the connector at the ABS actuator unit.

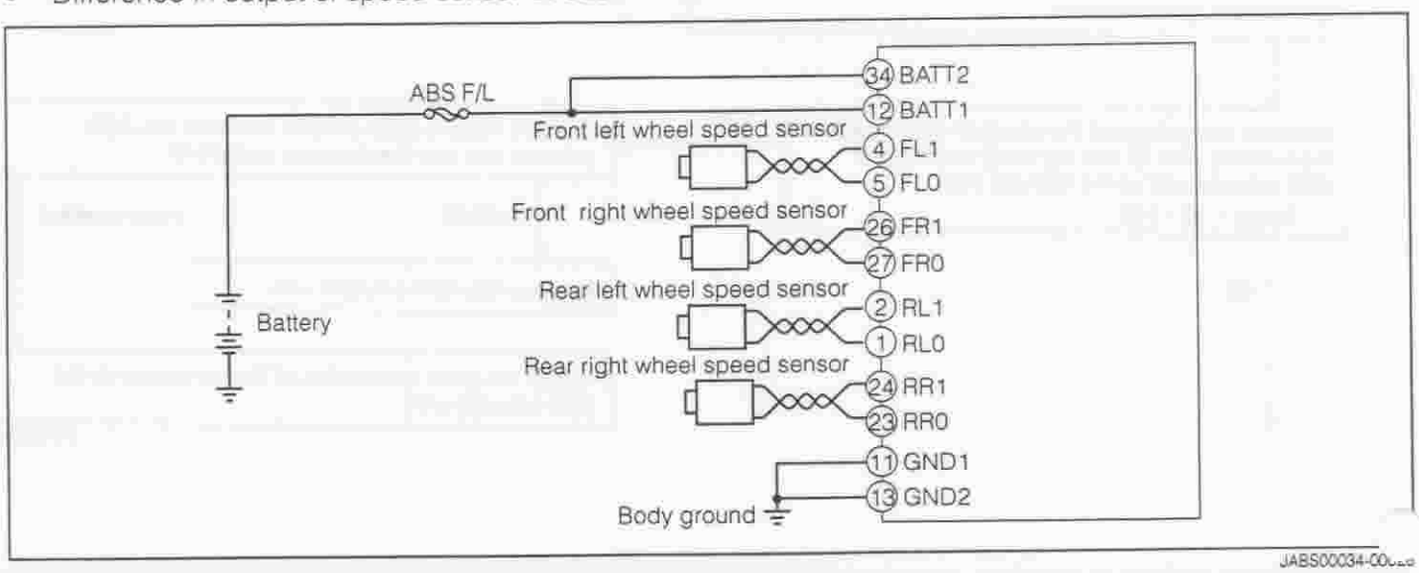
↓ **NG**

JABS00032-00000



DS-21 on screen	DTC No.C0200, C0205, C0210, C0215, C1271, C1272, C1273, C1274, C1275, C1276, C1277, C1278
Check lamp indication	Code No.21, 22, 23, 24, 81, 82, 83, 84, 85, 86, 87, 88

- Circuit voltage at time when vehicle stops.
- Output voltage of speed sensor at time of moving-off of vehicle.
- Pressure reduction during ABS control / Length of retention signal. (Solenoid valve operation faulty.)
- Difference in output of speed sensor of each wheel.



Diagnosis code 21, 81, 85 : Front right speed sensor
22, 82, 86 : Front left speed sensor
23, 83, 87 : Rear right speed sensor
24, 84, 88 : Rear left speed sensor

Turn OFF the ignition switch.

Disconnect the connector from the ABS actuator unit.
Measure the resistance of the wire harness.
Code No. 21, 81, 85 :
- Between the terminal FR0 ㉗ and FR1 ㉖ of the ABS actuator unit at the harness side.

Code No. 22, 82, 86 :
- Between the terminal FL0 ⑤ and FL1 ④ of the ABS actuator unit at the harness side.

Code No. 23, 83, 87 :
- Between the terminal RR0 ㉓ and RR1 ㉔ of the ABS actuator unit at the harness side.

Code No. 24, 84, 88 :
- Between the terminal RL0 ① and RL1 ② of the ABS actuator unit at the harness side.

Spec. : 0.9 - 1.3kΩ

NG → Check the resistance between the terminal of the speed sensor.
Spec. : 0.9 - 1.3kΩ

NG → Replace the speed sensor.

OK → Repair or replace the wire harness and connector between the speed sensor and the ABS actuator unit.

OK → Has any foreign matter stuck to the speed sensor? Or is there any external damage?

YES → Remove the foreign matter from the speed sensor.

NO → Check the tightening torque of speed sensor.
Spec. : FR 6.9 - 9.8 N·m
RR 6.9 - 9.8 N·m

NG → Tighten the attaching bolts to the specified torque.

OK → Is there damage in speed sensor rotor?

YES → Replace the speed sensor rotor.

NO → Is the air gap between the sensor tip and the sensor rotor within the spec.?
Spec. : FR 0.2 - 1.2 mm, RR 0.8 - 2.8 mm

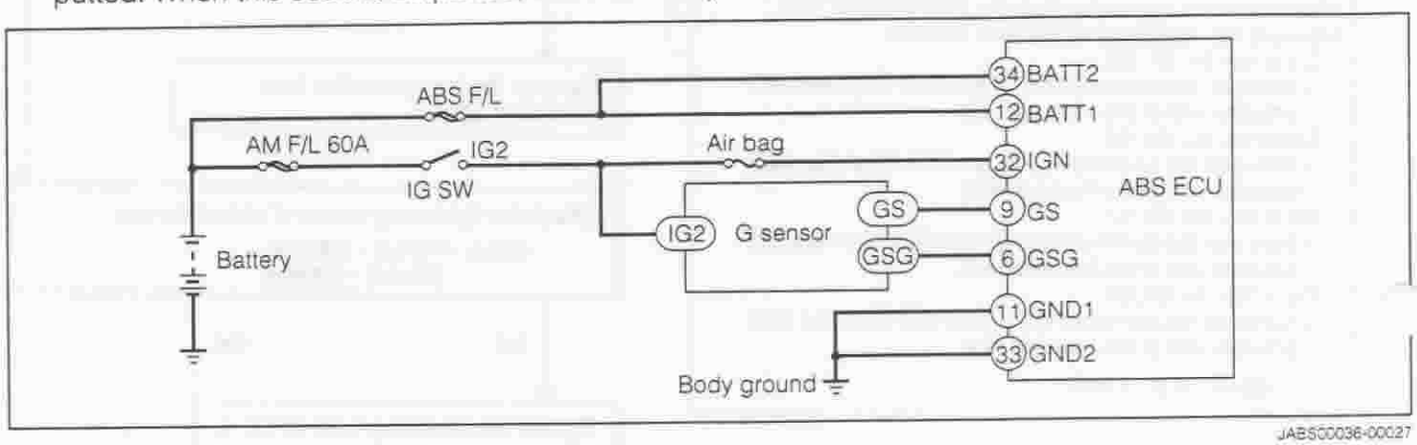
OK → Replace the ABS actuator unit.

NG → Adjust the air gap between the speed sensor and the sensor rotor to the specified value.
Spec. : FR 0.2 - 1.2 mm, RR 0.8 - 2.8 mm

JABS00035-00000

DS-21 on screen	DTC No.C1245, C1244, C1279
Check lamp indication	Code No.31, 32, 91

- Output condition of diagnosis code No. 31
  This abnormality code will be outputted when abnormal acceleration is detected continuousty for more than 60 seconds in the output value sent from the G sensor. When this code is outputted, check not only the G sensor itself, but also the installation of the G sensor, etc.
- Output condition of diagnosis code No. 32
  When open wire or short circuit detected in the G sensor system, this abnormality code will be outputted. When this code is outputted, check not only the circuit but also the installation of the G sensor.



JABS00036-00027

Remove the front right side seat assembly.
Keep the front floor carpet turned over so as to inspect the G sensor.

↓

Is there abnormality in the G sensor installing section and the bracket?

Normal → Is there abnormality in the installing direction of the G sensor?

Excessive play or deformation exists. → Repair and replace the G sensor installing section and bracket.

Is there abnormality in the installing direction of the G sensor?

No abnormality → Turn OFF the ignition switch.

Wrong direction → Install the G sensor in such a way that its arrow faces toward the vehicle front.

↓

Turn OFF the ignition switch.

↓

Disconnect the connector from the ABS actuator unit.

↓

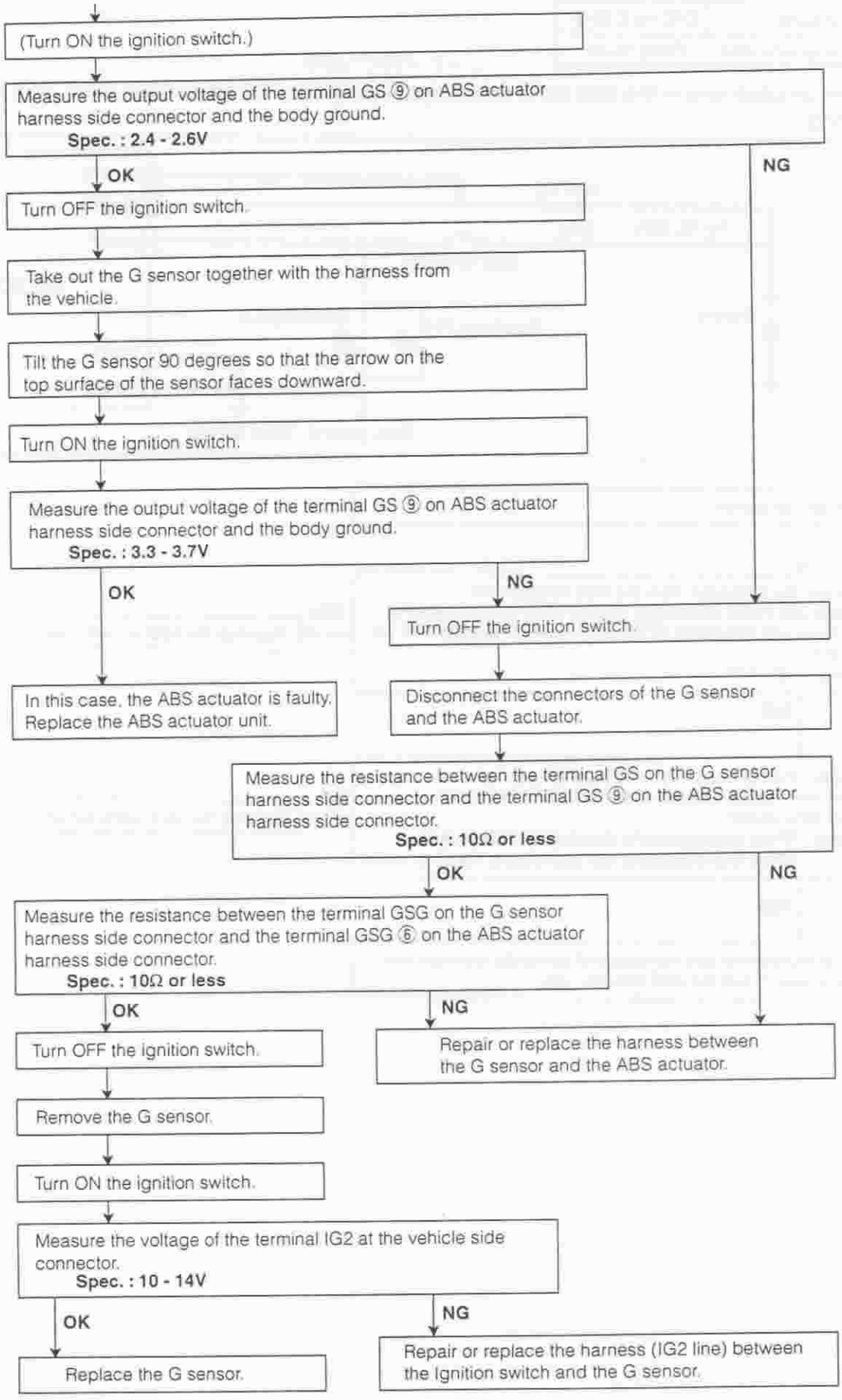
Short the terminal GSG ⑮ on ABS actuator harness side connector to the body ground.

↓

Turn ON the ignition switch.

↓

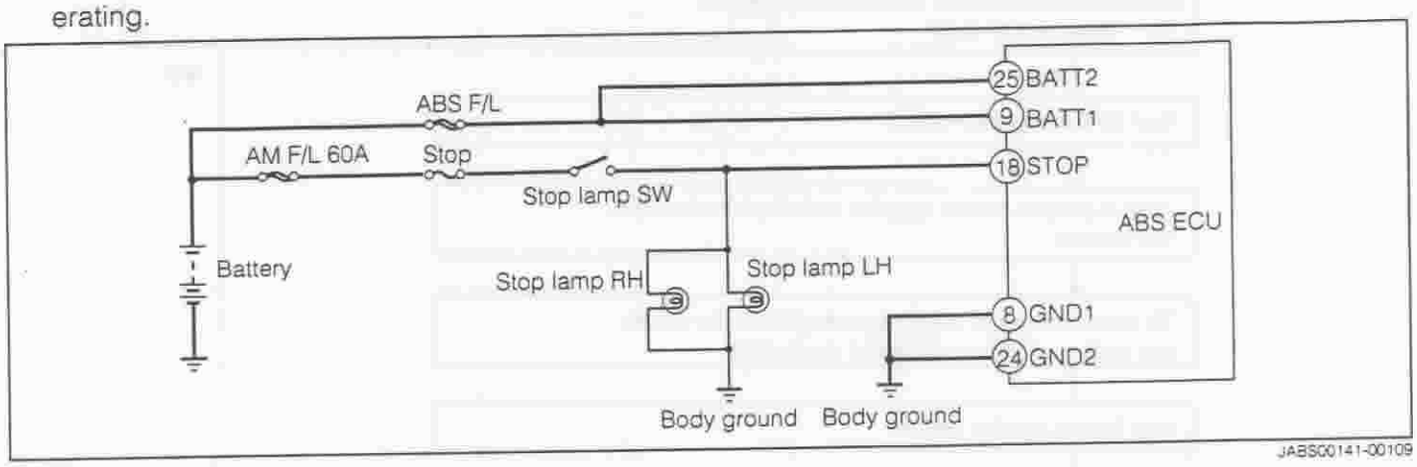
JABS00037-00000



JABS00038-00000

DS-21 on screen	DTC No.C1249
Check lamp indication	Code No.39

- When an open wire in the stop lamp switch system exists for 1.3 seconds or more, with the ABS not operating.



JABS00141-00109

Turn off ignition switch.

↓

Disconnect the connector from the ABS actuator unit.
With the brake pedal depressed, measure the voltage between the harness-side connector STOP ⑱ of the ABS actuator and the body earth.
Spec. : 10 - 14V

→ **YES** → Replace the ABS actuator unit.

↓ **NO**

Disconnect the connector from the stop lamp switch.
Measure the voltage between the connector terminals of the stop lamp switch.
Spec. : When brake pedal is depressed, 10Ω or less
When brake pedal is not depressed, 10MΩ or more

→ **NO** → Replace the stop lamp switch.

↓ **YES**

Repair or replace the wire harness and connector between the stop lamp switch and the ABS actuator unit.

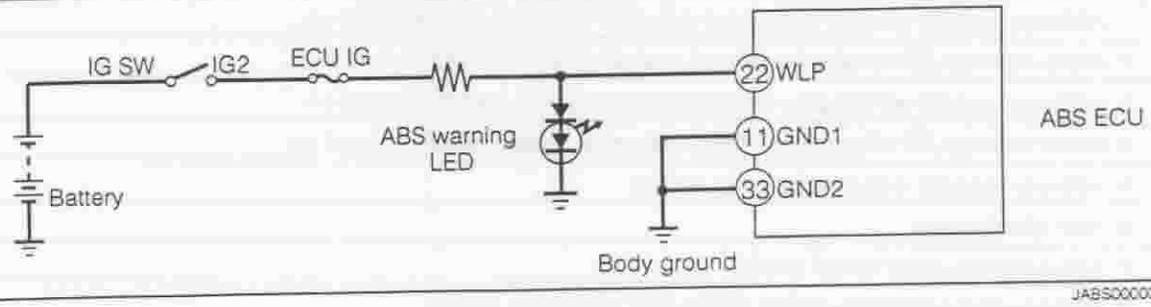
JABS00142-00000

TROUBLE PHENOMENA	Refer to page
1. ABS warning LED remains illuminated even after ignition switch is turned on.	BR-20
2. Brake warning LED remains illuminated even after ignition switch is turned on.	BR-21
3. ABS warning LED will not glow immediately after ignition switch is turned on.	BR-22
4. Brake warning LED will not glow immediately after ignition switch is turned on.	BR-23
5. ABS warning LED is illuminated while driving.	BR-24
6. Poor effectiveness	BR-24
7. ABS operates under normal braking.	BR-24
8. ABS operates just before vehicle stops under the normal driving.	BR-24
9. Brake pedal vibrates excessively.	BR-24
10. Wheel locks frequently during ABS operation.	BR-24
11. Brake pedal working travel is too small.	BR-25
12. Brake pedal working travel is too large. (Reserve travel is too small.)	BR-26
13. Diagnosis code will not be erased.	BR-27
14. Unable to communicate with DS-21	BR-28

JABS00039-00000

TROUBLE PHENOMENA TABLE ITEM 1

TROUBLE PHENOMENA : ABS warning LED remains illuminated even after ignition switch is turned on.



JABS00000-00028

Checking point:

1. Wire harness between terminal WLP ㉒ or ABS actuator unit and combination meter (ABS warning LED) for open circuit.
2. ABS warning LED circuit in the combination lamp
3. ABS actuator unit

Connect a jump wire between the terminal ECUT and E of the check connector.

↓

Turn ON the ignition switch.
Are diagnosis codes memorized?

YES → Perform trouble shooting according to trouble phenomenon.

↓ **NO**

Check if the ECU fuse at the junction block.

Blown out → Repair or replace the wire harness between the ABS actuator unit and the ECU fuse.

↓ **Normal**

Under this state, does the ABS warning LED at the combination meter show the normal code or go out?

YES → Replace the ABS actuator unit.

↓ **NO**

Turn OFF the ignition switch.
Disconnect the connector from the ABS actuator unit.

↓

Connect a jump wire between the terminal WLP ㉒ of the ABS actuator unit at the wire harness side and the body earth.

↓

Under this state, turn ON the ignition switch.
Check the ABS warning LED go out?

YES → Repair or replace the wire harness between the ABS actuator unit and the combination meter.

↓ **NO**

Turn OFF the ignition switch.
Measure the resistance between the terminal TC ⑲ of the ABS actuator unit at the harness side and the terminal ECUT of the check connector at the harness side.
Spec. : 10Ω or less

NG → Repair or replace the wire harness between the ABS actuator unit and the check connector.

↓ **OK**

Measure the resistance between the terminal E of the check connector at the harness side and the body earth.
Spec. : 10Ω or less

NG → Repair or replace the wire harness between the ABS actuator unit and the check connector.

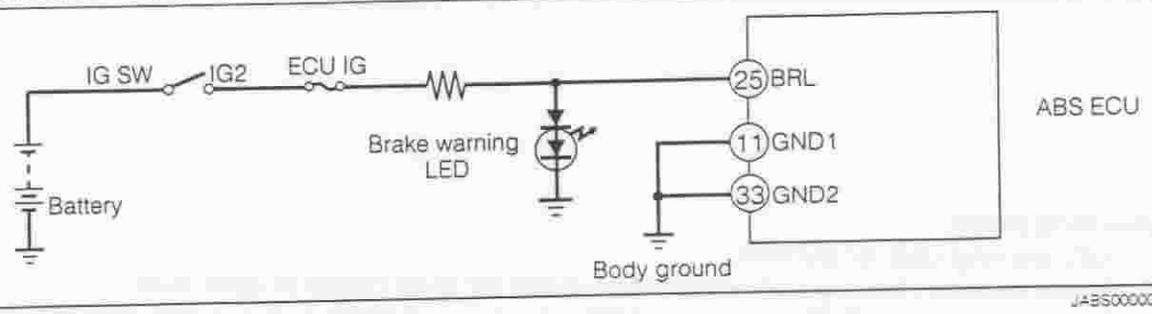
↓ **OK**

Replace the combination meter.

JABS00040-00

TROUBLE PHENOMENA TABLE ITEM 2

TROUBLE PHENOMENA : Brake warning LED remains illuminated even after ignition switch is turned on.



JABS00000-00029

Checking point:

1. Wire harness between terminal BRL ㉕ or ABS actuator unit and combination meter (Brake warning LED) for open circuit.
2. Brake warning LED circuit in the combination lamp
3. ABS actuator unit

Connect a jump wire between the terminal ECUT and E of the check connector.

↓

Turn ON the ignition switch.
Are diagnosis codes memorized?

YES → Perform trouble shooting according to trouble phenomenon.

↓ NO

Check if the ECU fuse at the junction block.

Blown out → Repair or replace the wire harness between the ABS actuator unit and the ECU fuse.

↓ Normal

Under this state, does the Brake warning LED at the combination meter show the normal code or go out?

YES → Replace the ABS actuator unit.

↓ NO

Turn OFF the ignition switch.
Disconnect the connector from the ABS actuator unit.

↓

Connect a jump wire between the terminal BRL ㉕ of the ABS actuator unit at the wire harness side and the body earth.

↓

Under this state, turn ON the ignition switch.
Check the Brake warning LED go out?

YES → Repair or replace the wire harness between the ABS actuator unit and the combination meter.

↓ NO

Turn OFF the ignition switch.
Measure the resistance between the terminal TC ⑲ of the ABS actuator unit at the harness side and the terminal ECUT of the check connector at the harness side.
Spec. : 10Ω or less

NG → Repair or replace the wire harness between the ABS actuator unit and the check connector.

↓ OK

Measure the resistance between the terminal E of the check connector at the harness side and the body earth.
Spec. : 10Ω or less

NG → Repair or replace the wire harness between the ABS actuator unit and the check connector.

↓ OK

Replace the combination meter.

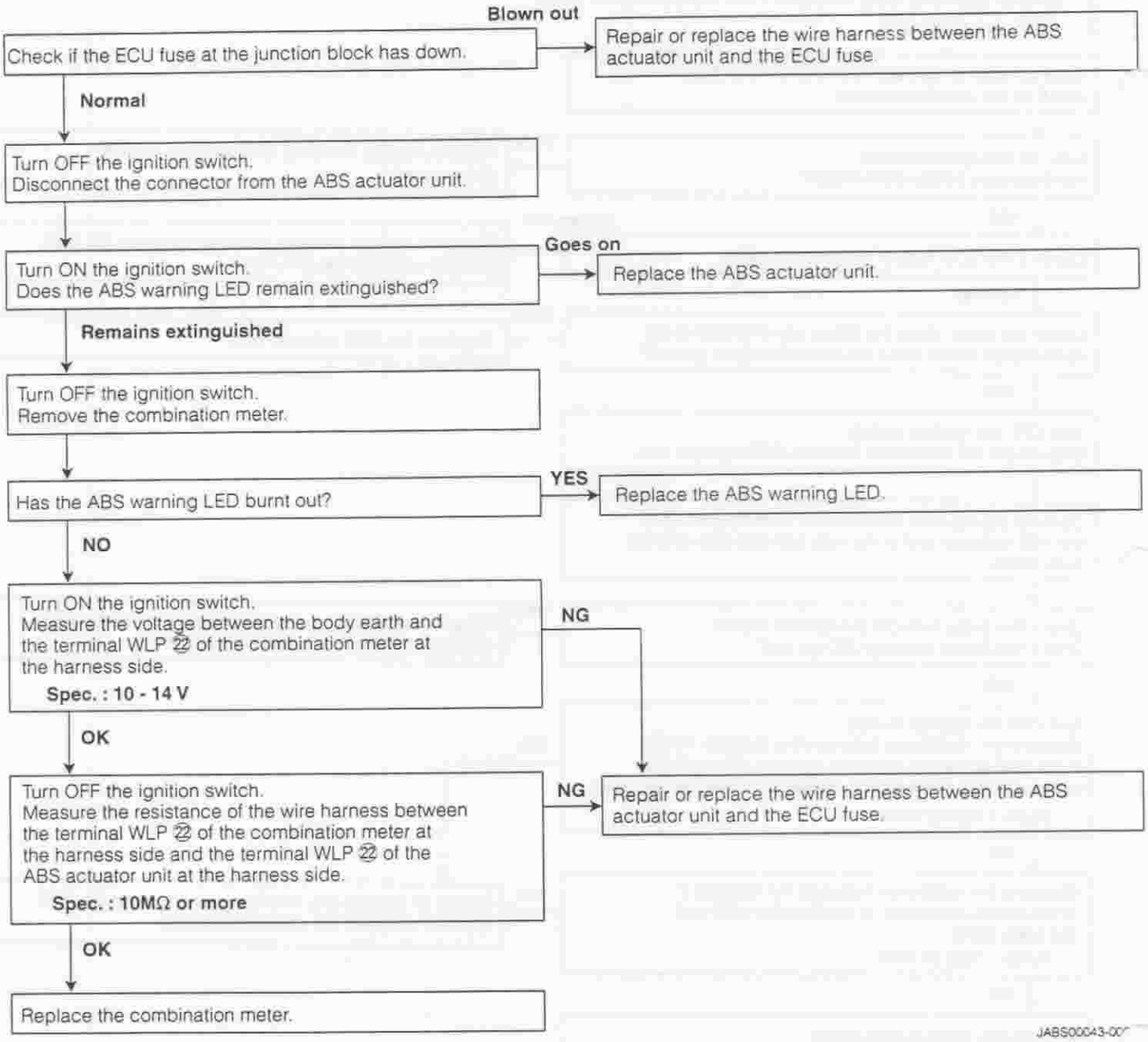
JABS00041-00000

TROUBLE PHENOMENA TABLE ITEM 3
TROUBLE PHENOMENA : ABS warning LED will not glow immediately after ignition switch is turned on.

JABS00042-00000

Checking point:

1. ABS warning LED for burnout.
2. Circuit between battery and combination meter for short circuit or open wire.
3. Circuit between WLP ㉒ terminal or ABS actuator and combination meter for short circuit with positive circuit.
4. ABS warning LED circuit in the combination meter.
5. ABS actuator unit



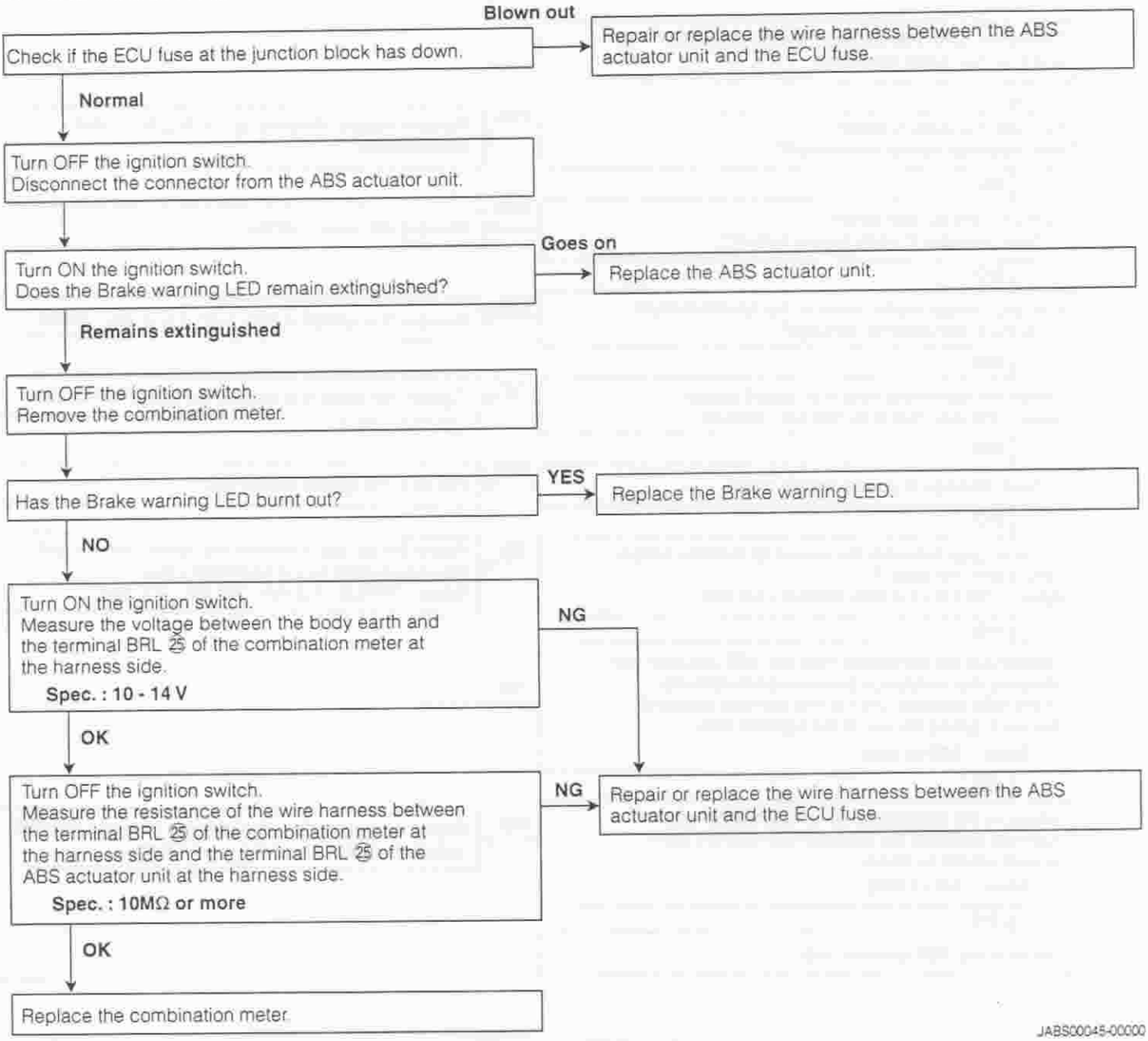
JABS00043-00

TROUBLE PHENOMENA TABLE ITEM 4	
TROUBLE PHENOMENA :	Brake warning LED will not glow immediately after ignition switch is turned on.

JABS00044-00000

Checking point:

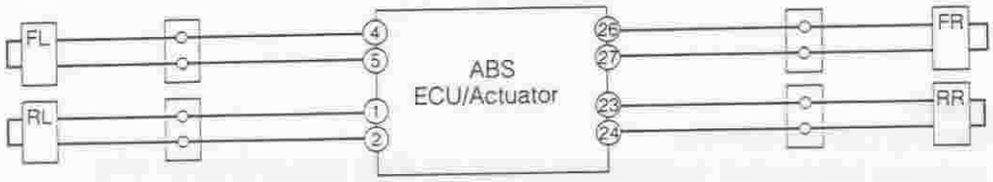
1. Brake warning LED for burnout.
2. Circuit between battery and combination meter for short circuit or open wire.
3. Circuit between BRL ㉕ terminal or ABS actuator and combination meter for short circuit with positive circuit.
4. Brake warning LED circuit in the combination meter.
5. ABS actuator unit



JABS00045-00000

TROUBLE PHENOMENA TABLE ITEM 5, 6, 7, 8, 9, 10

TROUBLE PHENOMENA :
- ABS warning LED is illuminated while driving.
- Poor effectiveness
- ABS operates under normal braking.
- ABS operates just before vehicle stops under the normal driving.
- Brake pedal vibrates excessively.
- Wheel locks frequently during ABS operation.



JABS0000-00030

Checking point:
1. Wheel speed sensor and related wire harness.
2. ABS actuator unit

Connect a jump wire between the terminal ECUT and E of the check connector.

↓

Turn ON the ignition switch.
Are diagnosis codes memorized?
- YES → Perform trouble shooting according to trouble phenomenon.
- NO ↓

Turn OFF the ignition switch.
Is there damage in each speed sensor?
- YES → Replace the speed sensor.
- NO ↓

Has any foreign matter stuck to the speed sensor?
Or is there any external damage?
- YES → Remove the foreign matter from the speed sensor.
- NO ↓

Check the tightening torque of speed sensor.
Spec. : FR 6.9 - 9.8 N·m, RR 6.9 - 9.8N·m
- OK → Tighten the attaching bolts to the specified torque.
- NG ↓

Is there damage in speed sensor rotor?
- YES → Replace the speed sensor rotor.
- NO ↓

Is the air gap between the sensor tip and the sensor rotor within the spec.?
Spec. : FR 0.2 - 1.2 mm, RR 0.8 - 2.8 mm
- OK → Adjust the air gap between the speed sensor and the sensor rotor to the specified value.
  Spec. : FR 0.2 - 1.2 mm, RR 0.8 - 2.8 mm
- NG ↓

Disconnect the connector from the ABS actuator unit.
Measure the resistance between each terminal of the ABS actuator unit t at the harness side and the each speed sensor at the harness side.
Spec. : 10Ω or less
- NG → Repair or replace the wire harness between the ABS actuator unit and the each speed sensor.
- OK ↓

Measure the resistance, while moving the wire harness between the actuator unit and the each speed sensor by hand.
Spec. : 0.9 - 1.3kΩ
- NG → Repair or replace the wire harness between the ABS actuator unit and the each speed sensor.
- OK ↓

Replace the ABS actuator unit.

JABS00046-00000

TROUBLE PHENOMENA TABLE ITEM 11	
TROUBLE PHENOMENA :	Brake pedal working travel is too small.

JABS00047-00000

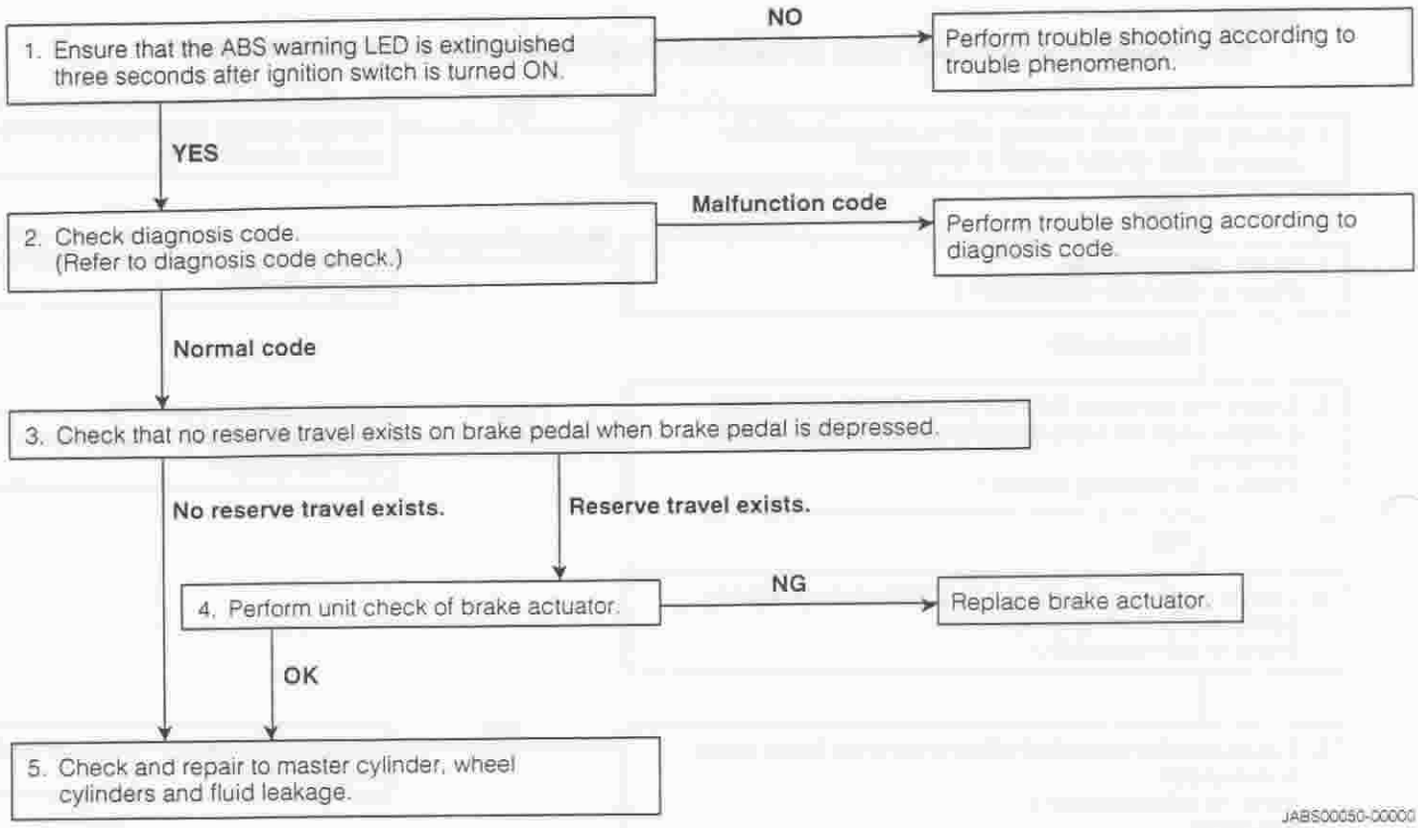
NOTE:
- No consideration has been taken for function of each wheel cylinder in this procedure.

1. Ensure that the ABS warning LED is extinguished three seconds after ignition switch is turned ON.
   - NO → Perform trouble shooting according to trouble phenomenon.
   - YES ↓
2. Check diagnosis code.
   (Refer to diagnosis code check.)
   - Malfunction code → Perform trouble shooting according to diagnosis code.
   - Normal code ↓
3. Ensure that the brake fluid will flow out from each wheel cylinder when the same operation as the air bleeding is performed.
   (Refer to air bleeding section.)
   - OK → Check abnormality in each wheel cylinder system.
   - NG ↓
4. Loosen the flare nuts of brake fluid inlet pipes of actuator connected to the master cylinder.
   (Refer to unit inspection.)
5. Ensure that the brake fluid will flow out when brake pedal is depressed.
   (Refer to unit inspection.)
   CAUTION:
   - Depress the brake pedal gradually, otherwise quite a large amount of the brake fluid will flow out.
     (Refer to caution in air bleeding section.)
   - NO → Check abnormality in brake pedal and master cylinder.
   - YES ↓
6. Tighten the loosened brake fluid inlet pipes.
   (Refer to unit inspection.)
7. Loosen the flare nut of brake fluid pipes on actuator connected to each wheel cylinder.
   (Refer to unit inspection.)
8. Ensure that the brake fluid will flow out from each outlet pipe when brake pedal is depressed.
   (Refer to unit inspection.)
   CAUTION:
   - Depress the brake pedal gradually, otherwise quite a large amount of the brake fluid will flow out.
     (Refer to caution in air breeding section.)
   - OK → Check brake pipes and hoses between actuator and wheel cylinder.
   - NG ↓
9. Replace the actuator with a new one.

JABS00048-00000

TROUBLE PHENOMENA TABLE ITEM 10
TROUBLE PHENOMENA : Brake pedal working travel is too large. (Reserve travel is too small.)

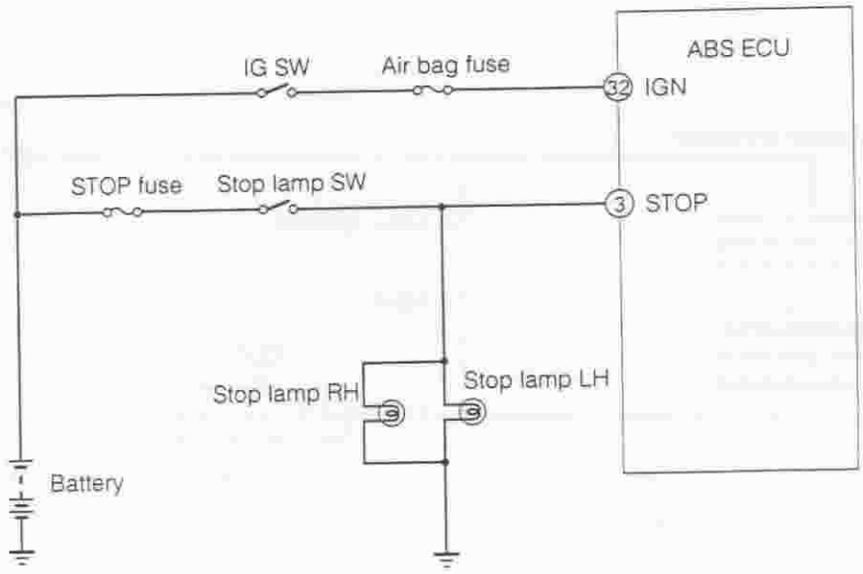
JABS00049-00000



JABS00050-00000

TROUBLE PHENOMENA TABLE ITEM 11

TROUBLE PHENOMENA : Diagnosis code will not be erased.



JABS00000-00031

Checking point:

1. Stop lamp switch signal
2. ABS actuator unit

1. Diagnosis code will not be erased.

2. Repeat the diagnosis code erasing procedure described in the "Erasing procedure for diagnosis codes" properly.

Erased → End.

Not erased

3. Turn off ignition switch.
4. Disconnect the wire harness connector from the ABS actuator unit

5. Ensure that approximate battery voltage will be applied to the STOP ③ terminal of ABS actuator unit connector of the wire harness when brake pedal is depressed.

NO → Ensure that continuity exists between stop lamp switch and STOP ③ terminal of the ABS actuator unit.

YES → Check fuse, stop lamp switch and related harness for open wire. Repair, as required.

NO → Repair wire harness.

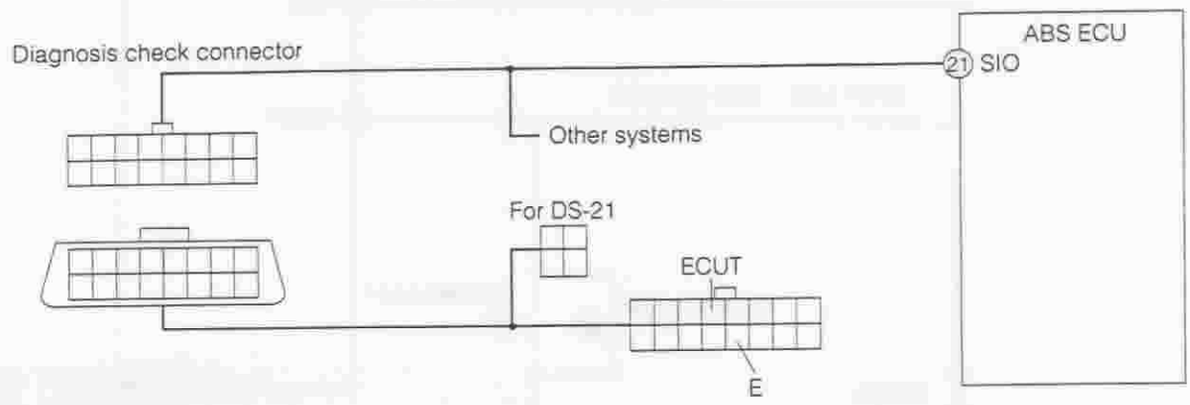
YES

6. Check ABS actuator unit.
(Refer to unit inspection of ABS actuator unit.)

JABS00051-00000

TROUBLE PHENOMENA TABLE ITEM 12

TROUBLE PHENOMENA : Unable to communicate with DS-21



JABS00000-00032

Checking point:

1. Wire harness between terminal SIO ㉑ of ABS actuator unit and diagnosis check connector for open wire or short circuit.
2. Failure of other system.
3. ABS actuator unit.

1. Turn off the ignition switch.

2. Ensure that the IC card for DS-21 is applicable to this model.
   - Wrong → Replace IC card with a correct one.
   - Correct ↓

3. Check to see if communication is possible with other systems. (Refer to individual section of the service manual.)
   - NO → 5
   - YES ↓

4. Check continuity between SIO ㉑ terminal of wire harness connector of the ABS actuator unit and SIO ㉑ terminal of the diagnosis check connector.
   - NO → Repair or replace the wire harness.
   - YES ↓

5. Check ABS actuator unit. (Refer to unit inspection.)

6. Turn off the ignition switch.
7. Disconnect the connector which is connected to each ECU of individual system which is able to communicate to the DS-21.
   WARNING:
   - Be sure to follow the instruction of disconnecting method of individual systems.

8. Ensure that no voltages is applied to the SIO terminal of the diagnosis check connector.
   - Voltage applied → Repair or replace the wire harness.
   - No voltage ↓

JABS00052

No voltage

9. Ensure that no continuity exists between the SIO terminal of the diagnosis check connector and body ground.

Continuity → Repair or replace the wire harness.

No continuity

10. Turn on the ignition switch.

11. Ensure that no voltages is applied to the SIO terminal of the diagnosis check connector.

Voltage applied → Repair or replace the short circuit in wire harness.

No voltage applied

12. Turn off the ignition switch.

13. Ensure that continuity exists between the SIO terminal of the diagnosis check connector and SIO ㉑ terminal of ABS actuator unit.

No continuity → Repair or replace the open wire in wire harness.

Continuity

14. Connect the ABS actuator unit side connector of the wire harness to the ABS actuator unit.

15. Turn on the ignition switch.

16. Ensure that the approximate battery voltage is applied to the SIO terminal of the diagnosis check connector.

No Voltage applied → Check the ABS actuator unit. (Refer to the unit inspection.)

Voltage applied

17. Turn off ignition switch.

18. Check to see if communication is possible by connecting the ECU of another system. (Refer to individual section of the service manual.)

NO → DS-21 or IC card faulty

YES

19. Replace ABS actuator unit. (Refer to the unit inspection.)

OK

20. Check to see if communication is possible with DS-21. (Check to see if communication is possible by means of DS-21.)

YES → END

NO

21. DS-21 or IC card faulty

NOTE:

- In cases where a problem occurs when the ECU of another system is connected, most likely the ECU concerned is faulty. Therefore, refer to the repair section of each system.

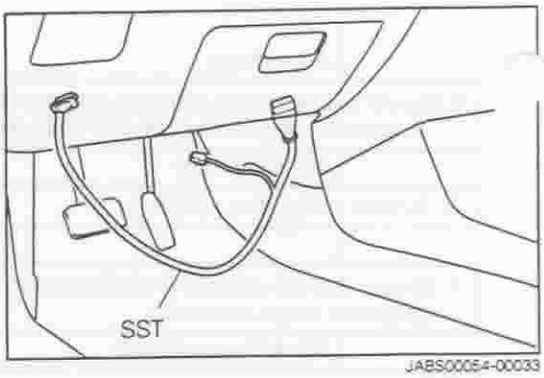
JAB500053-00000

Erasing procedure for diagnosis codes

NOTE:

- The diagnosis codes will not be erased even if the battery power supply is shut off.

1. Erasing procedure by brake pedal
   (1) Connect the following SST to the diagnosis connector.
   SST: 09991-87404-000

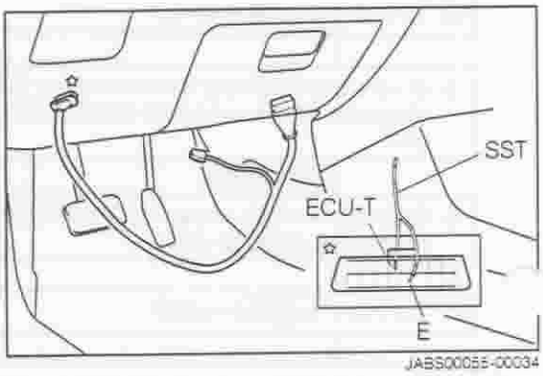


JABS00054-00033

   (2) Connect the ECUT and E terminals in the SST terminal with the following SST.
   SST: 09991-87403-000

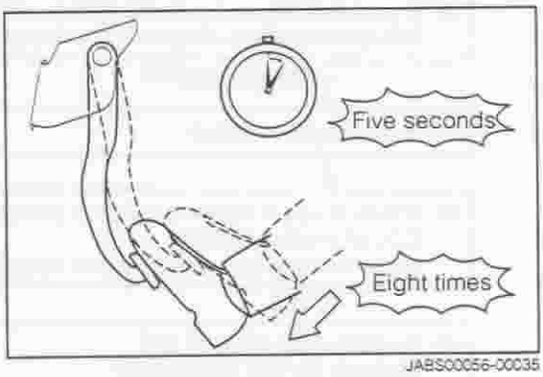
CAUTION:

- Never connect the terminals other than those specified, for even slight contact of other terminals may lead to serious malfunction or damage.



JABS00055-00034

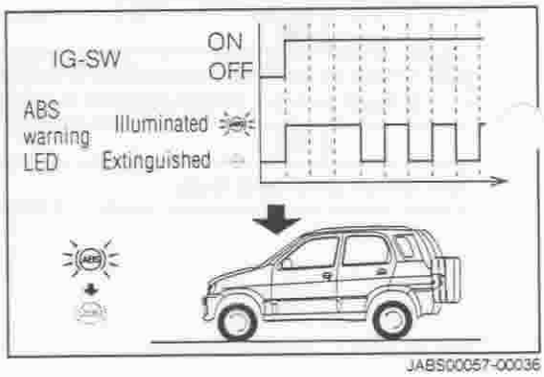
   (3) Turn ON the ignition switch. (Never start the engine.)
   (4) Depress the brake pedal more than 8 times within five seconds in order to repeat the ON/OFF operation of the stop lamp switch immediately after the ignition switch is turned ON.



JABS00056-00035

NOTE:

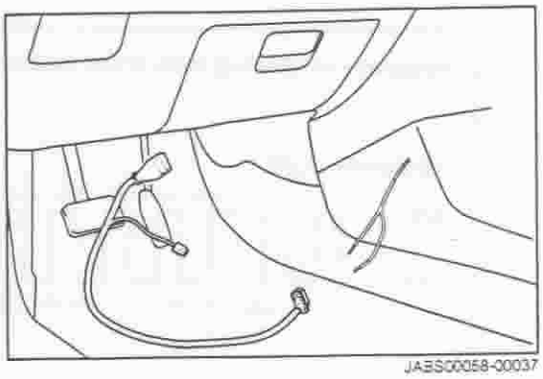
- When no change in ON/OFF state of the stop lamp switch is inputted within three seconds after the ignition switch has been turned ON, or when no change in ON/OFF state of the stop lamp of the second time onward is inputted within one second, the diagnosis code remains indicated and no diagnosis code will be erased.
- If any malfunction persists even after the diagnosis code has been erased, the warning LED will not go out.
- After the diagnosis code is erased, the mode will automatically move on to the sensor check mode.
  (Refer to the section under "Wheel speed sensor check by sensor check function.")



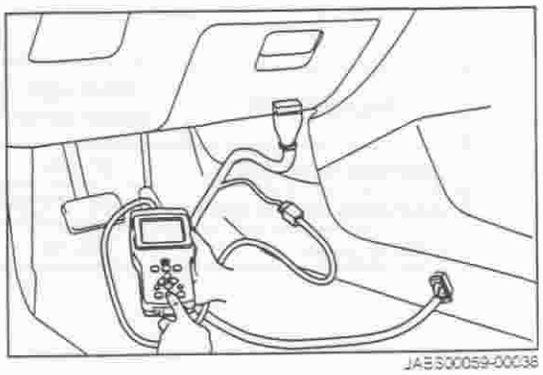
JABS00057-00036

(5) Turn off the ignition switch.
(6) Remove the SST (jump wire) from the SST (sub harness).
(7) Remove the SST from the diagnosis connector.
(8) Proceed to check the wheel speed sensor by the sensor check function.

NOTE:
- The wheel speed sensor check function will take place when erasing the diagnosis code or replacing the ABS actuator unit with a new one.

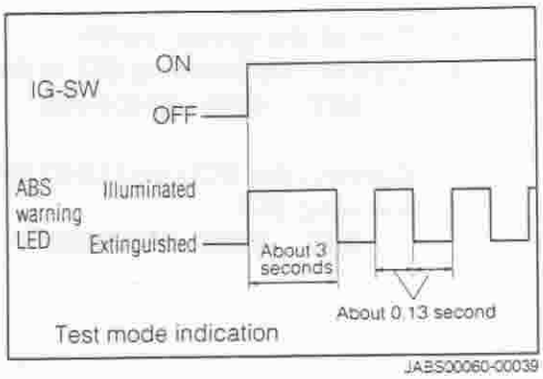

JABS00058-00037

2. Erasing procedure by means of trouble shooting device (DS-21)
Connect the DS-21 to the check connector. Erase diagnosis codes, using the erasing function.


JABS00059-00038

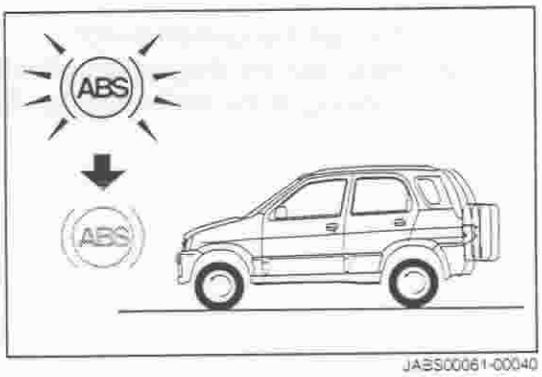
Wheel speed sensor check by sensor check function

1. Turn on the ignition switch.
2. Ensure that the ABS warning LED starts to blink at intervals of 0.13 second after the ABS warning LED illuminates for 3 seconds.



JABS00060-00039

3. Perform the test driving at speed of more than 7 km/h.
4. Ensure that the ABS warning LED is turned off.

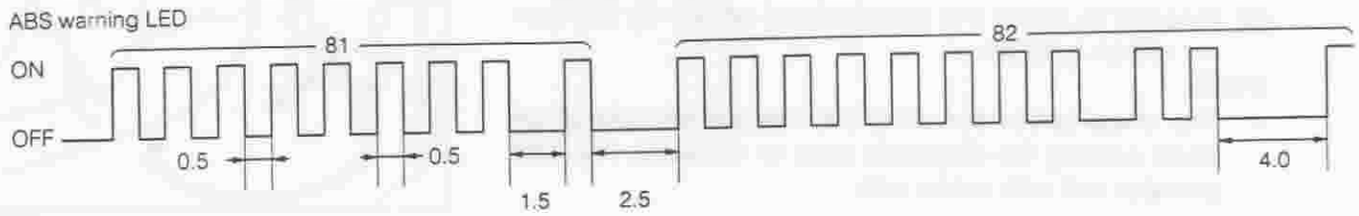


JABS00061-00040

NOTE:
- The ABS warning LED starts to blink to indicate the malfunction codes by form mentioned below, if any malfunction is found in this check.
- Perform the trouble shooting according to the diagnosis code, if the trouble code is indicates.
- Perform the test driving by speed of 10 km/h in straight direction, if ABS warning LED is remain illuminated after test driving by speed of 7 km/h.
  Perform the trouble shooting, if ABS warning LED is remain illuminated.

JABS00062-00000

<Example of blinking form of the ABS warning LED>



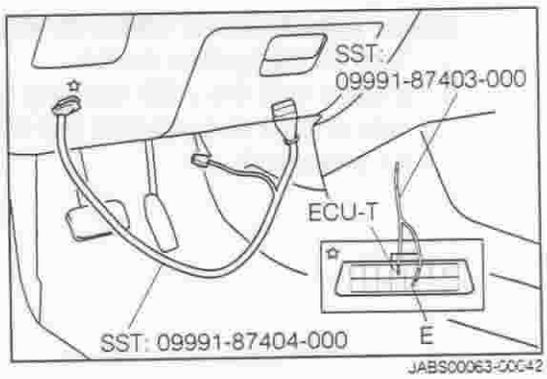
Unit: Second

Diagnosis item	Front right speed sensor	Front left speed sensor	Rear right speed sensor	Rear left speed sensor	G sensor
Diagnosis lamp code	81, 85	82, 86	83, 87	84, 88	91
Diagnostic trouble code	C1271, C1275	C1272, C1276	C1273, C1277	C1274, C1278	C1279
Refer to page	BR–14	BR–14	BR–14	BR–14	BR–16

JABS00060-00041

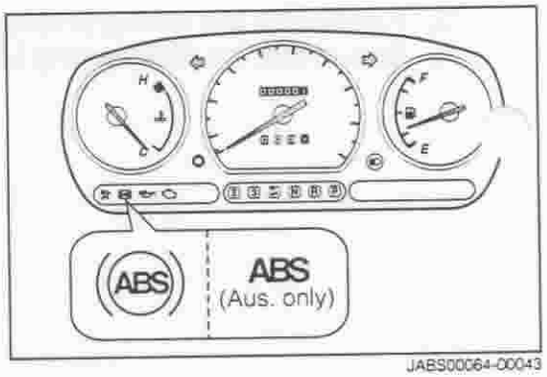
5. Turn off the ignition switch.
6. Connect the following SST to the diagnosis connector.
   SST: 09991-87404-000

   Connect the ECU and GND terminals in the SST with the following SST.
   SST: 09991-87403-000



JABS00063-00042

7. Turn on the ignition switch.
8. Read out the diagnosis codes by observing the number of blinking of the ABS warning LED.



JABS00064-00043

UNIT INSPECTION & REPLACEMENT

CAUTION:

- Be very careful not to deform the terminal in the related connector during the inspection. Failure to observe this caution may lead to system malfunction.

NOTE:

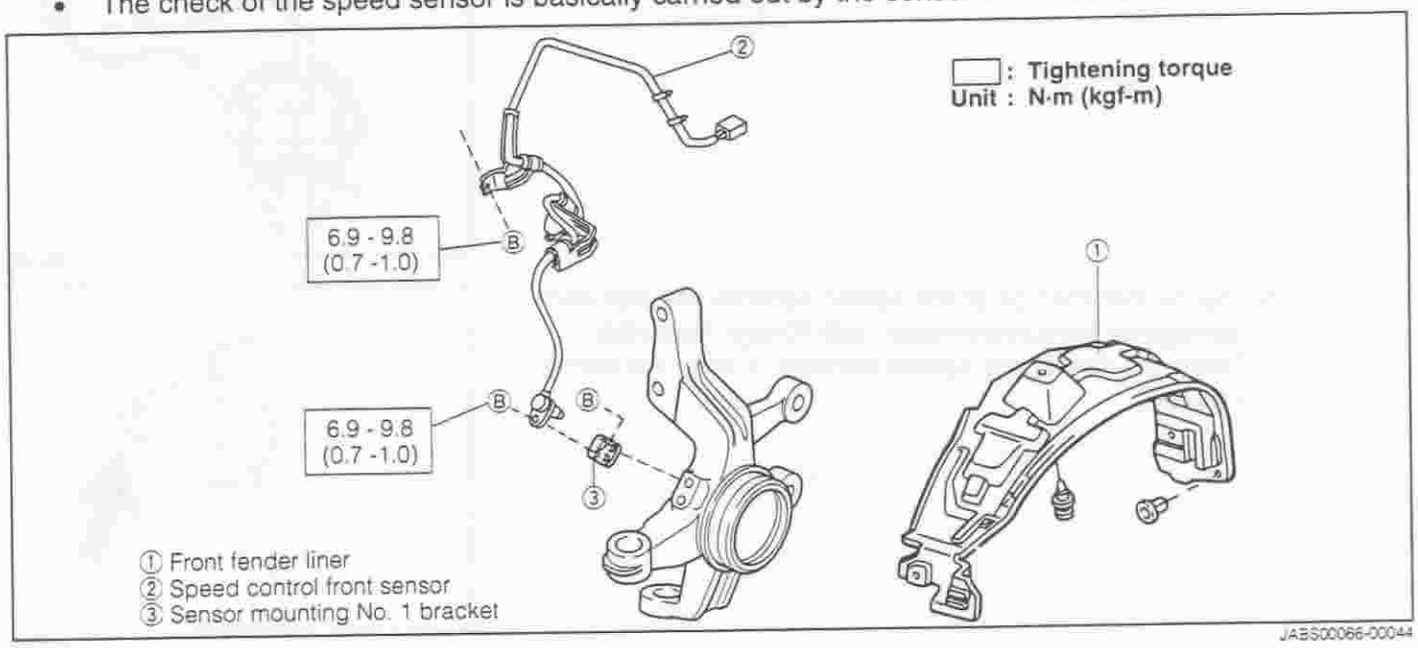
- The inspection of each sensor circuit should be performed by referring to the ABS RELATED CONNECTORS and ABS CIRCUIT CONNECTION TABLE (BR–4, 5).

JABS00065-00000

FRONT SPEED SENSOR

NOTE:

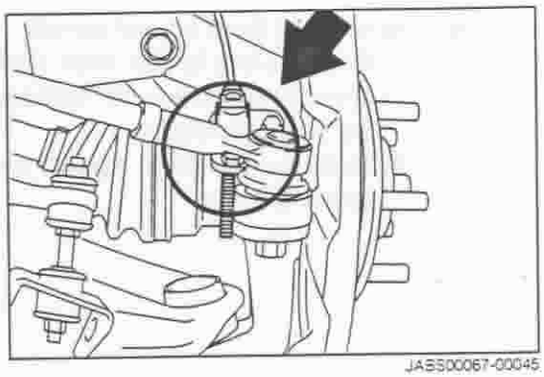
- The check of the speed sensor is basically carried out by the sensor check function.



JABS00066-00044

1. Checking of air gap
   Ensure that the air gap between the sensor tip and the sensor rotor is within the specified value.
   Air Gap: 0.7 ± 0.5 mm

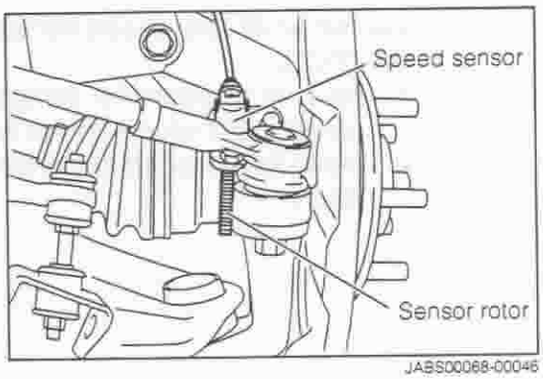
   If the air gap fails to meet the specified air gap, adjust the clearance by adjusting the sensor attaching condition or replace the speed sensor, knuckle or sensor rotor (drive shaft), as required.



JABS00067-00045

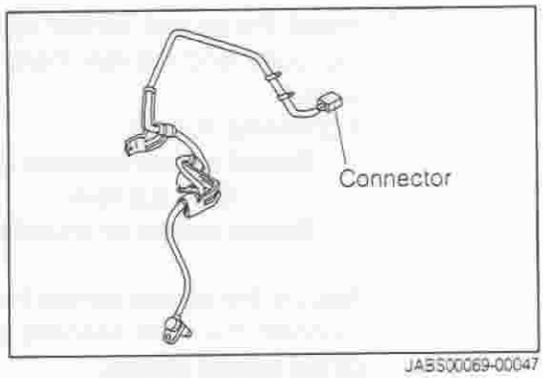
2. Checking of sensor rotor
   Inspect the sensor rotor for the following points.
   - Ensure that the sensor rotor is pressed into the hub properly, is free from damage and is not contaminated by foreign materials.
   - Ensure that the wheel bearing has no excessive play.

   If any trouble exists, clean, repair or replace the sensor rotor (drive shaft) or wheel bearing, as required. (Refer to FS section.)



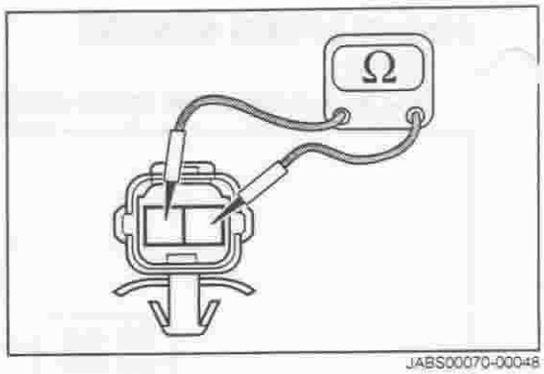
JABS00068-00046

3. Inspection of speed sensor
   (1) Ensure that the front speed sensor resistance is within the specified value, using an ohmmeter.
   Specified Resistance: 1.1 ± 0.2 kΩ (at 20°C)



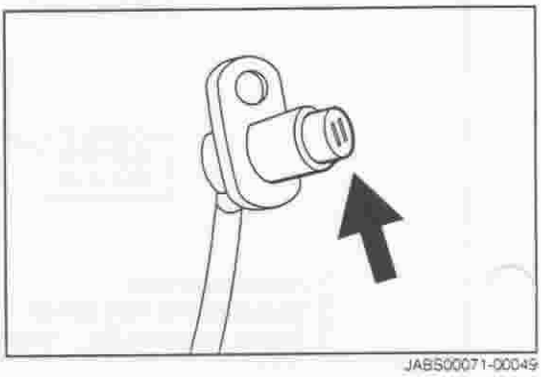
JABS00069-00047

If the measured resistance fails to meet the specified value above, replace the speed sensor with a new one.

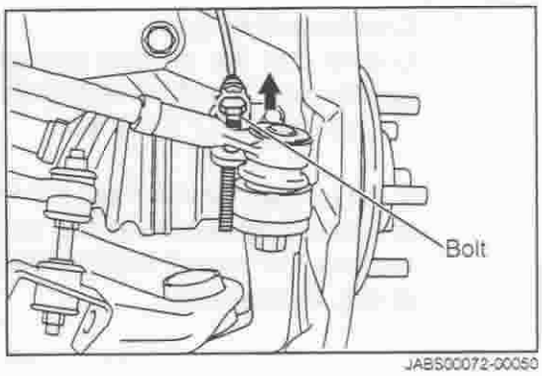


JABS00070-00048

(2) Ensure that the tips of the speed sensors are free from damage or no contamination with foreign materials. Clean the tips of the speed sensors, if they are contaminated.

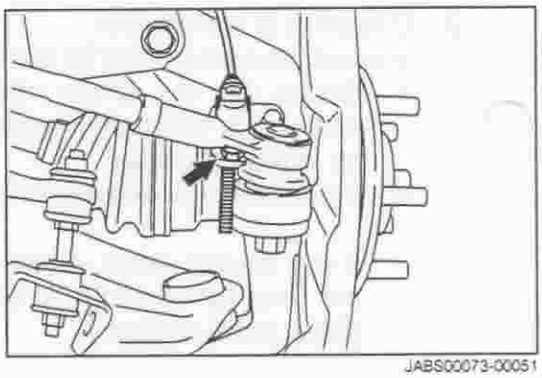

JABS00071-00049

4. Removal of front speed sensor
   (1) Remove the fender liner. (Refer to the BO section.)
   (2) Disconnect the wire harness side connector from the sensor connector.
   (3) Remove the front speed sensor by removing the attaching bolts.



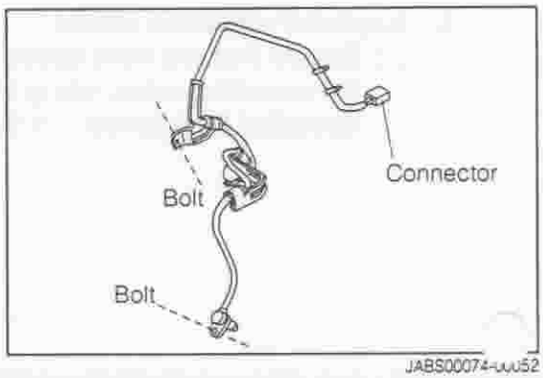
JABS00072-00050

5. Installation of front speed sensor
   CAUTION:
   - Be sure to clean the contacting surfaces of the speed sensors and speed sensor before the installation.
   - Never twist the speed sensor harness during the installation.


JABS00073-00051

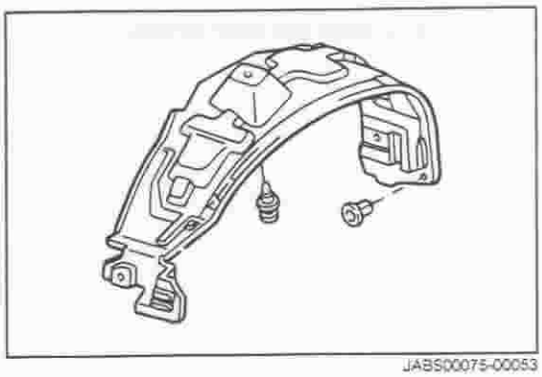
   (1) Install the speed sensor to the vehicle with the attaching bolts and tighten them to the specified tightening torque.
   Tightening Torque:
   Speed sensor harness clamp to inner fender:
   6.9 - 9.8 N·m
   Speed sensor to knuckle: 6.9 - 9.8 N·m

   (2) Secure the speed sensor harness by harness clamps.
   (3) Connect the wire harness connector to the connector of the speed sensor.



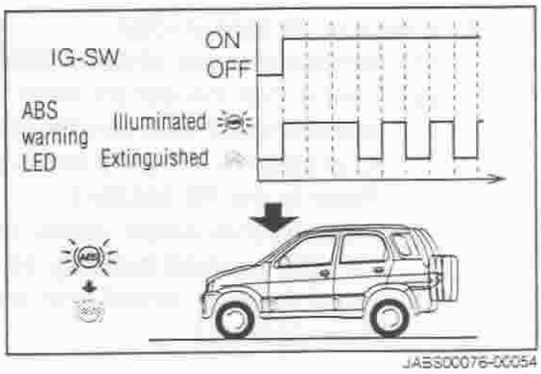
JABS00074-00052

6. Install the fender liner. (Refer to the BO section.)
   NOTE:
   - The check of the speed sensor is basically carried out by the sensor check function.



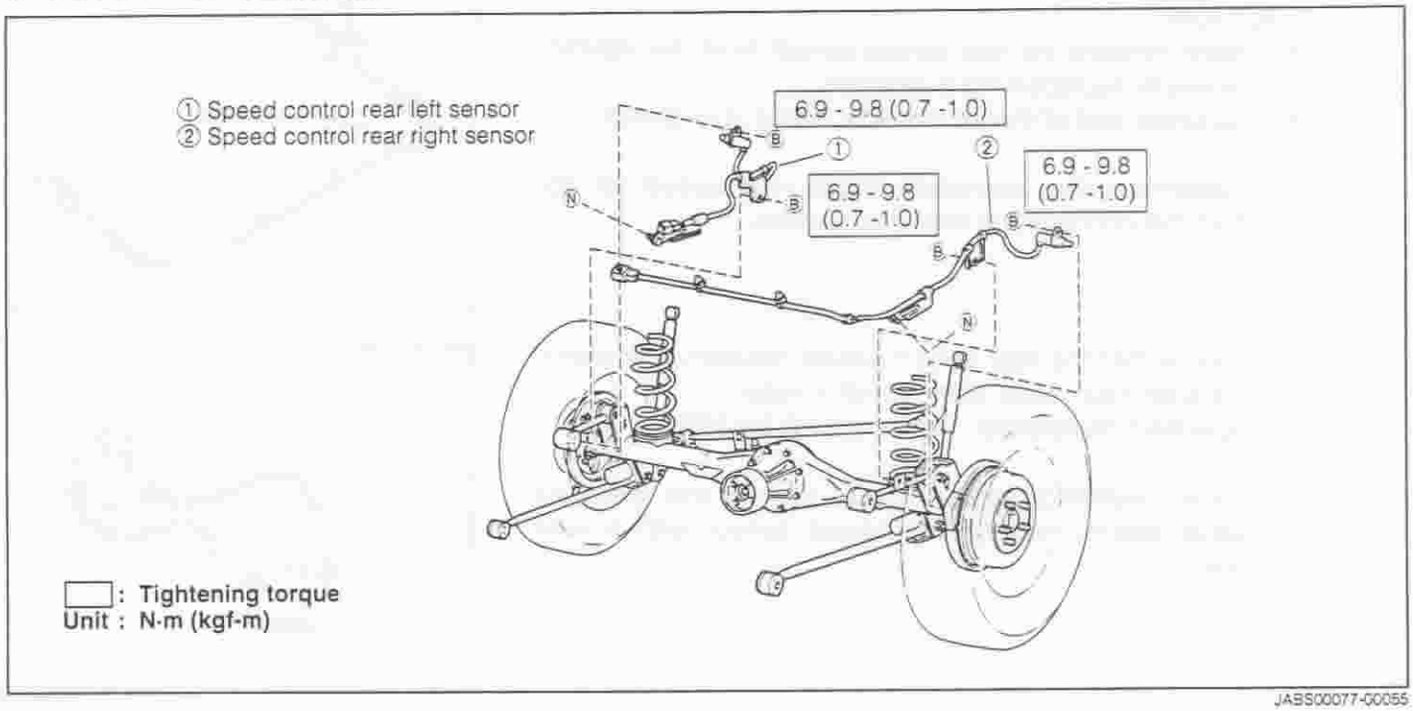
JABS00075-00053

7. Check the speed sensor by performing the sensor check function of the ABS.



JABS00076-00054

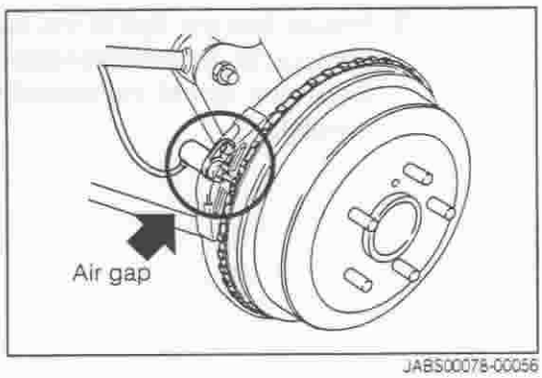
REAR SPEED SENSOR



JABS00077-00055

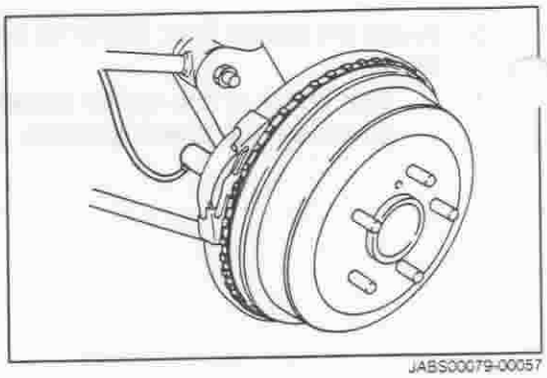
1. Checking of air gap.
   (1) Remove the rear wheel. (Refer to the RS section.)
   (2) Ensure that the air gap between the sensor tip and the sensor rotor is within the specified value.
   Air Gap: 1.8 ± 1.0 mm

   If the air gap fails to meet the specified air gap, adjust the air gap by adjusting the attaching condition of the speed sensor or replace the speed sensor, brake backing plate (refer to the BR section.) or sensor rotor, as required.



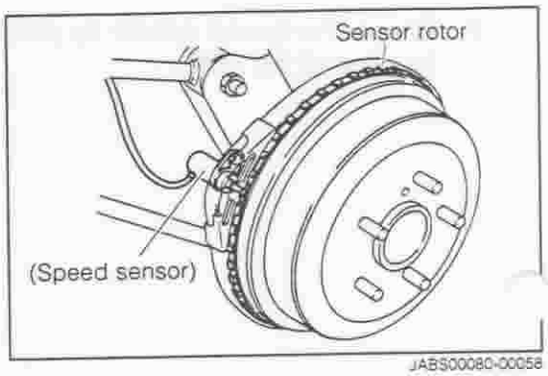
JABS00078-00056

(3) Install the rear wheel.



JABS00079-00057

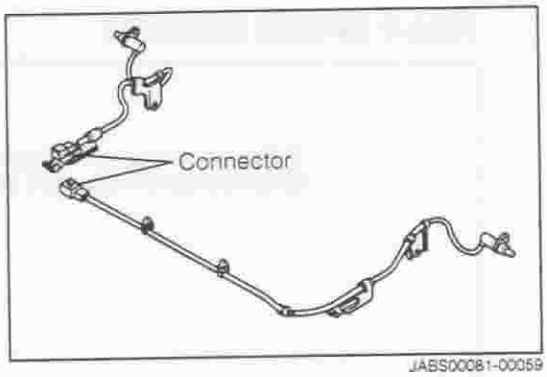
2. Checking of sensor rotor.
   (1) Remove the rear wheel. (Refer to the RS section.)
   (2) Ensure that the sensor rotor is free from damage and contamination with foreign materials. Also, check that no excessive free play exists on the wheel bearings. (Refer to the RS section)
   If any trouble exists, clean, repair or replace the sensor rotor or wheel bearing, as required.
   (3) Install the rear wheel and brake drum. (Refer to rear brake section.)



JABS00080-00058

3. Inspection of speed sensor
   CAUTION:
   - Never remove the rear speed sensor from the vehicle, unless its replacement is required.
   - No spare part of the sensor wire clamp is available.

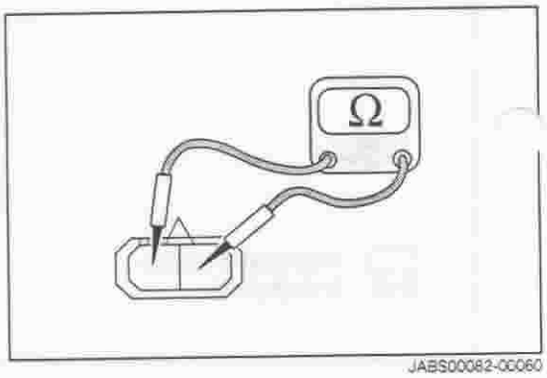
   (1) Disconnect the connector of the rear speed sensor from the connector of the wire harness.



JABS00081-00059

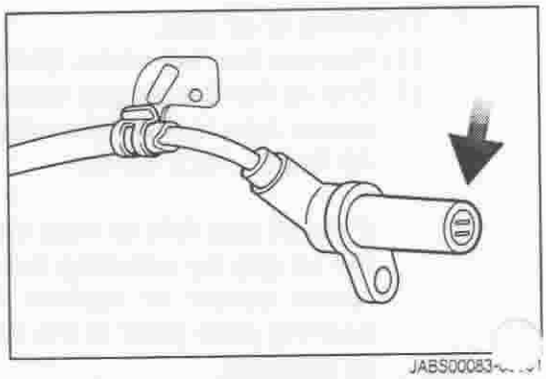
   (2) Ensure that the rear speed sensor resistance is within the specified value, using an ohmmeter.
   Specified Resistance: 1.1 ± 0.2 kΩ (at 20°C)

   If the measured resistance fails to meet the specified value above, replace the speed sensor with a new one.



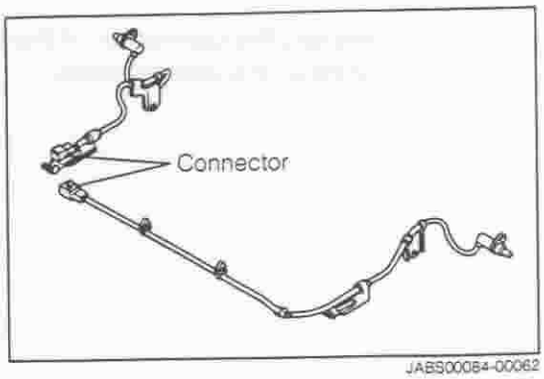
JABS00082-00060

   (3) Ensure that the tips of the speed sensors are free from damage or no contamination with foreign materials.
   Clean the tips of the speed sensors, if they are contaminated.



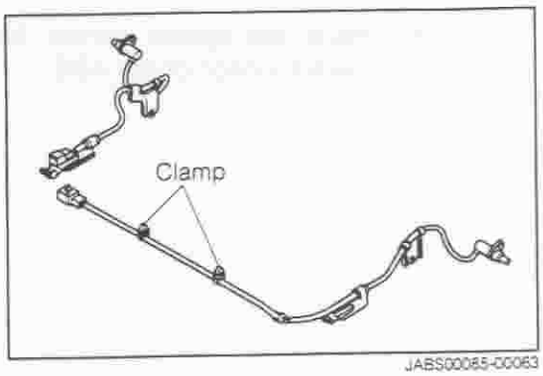
JABS00083-

4. Removal of speed sensor
   (1) Turn off the ignition switch.
   (2) Disconnect the connector of the speed sensor from the connector of the wire harness.



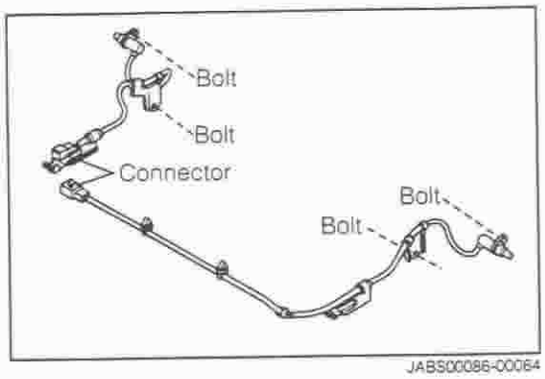
JABS00084-00062

   (3) Disconnect the sensor harness clamp by removing the attaching bolts.
   (4) Disconnect the sensor harness clamp from the floor panel by retracting its lock sections, using a minor screwdriver or the like.



JABS00085-00063

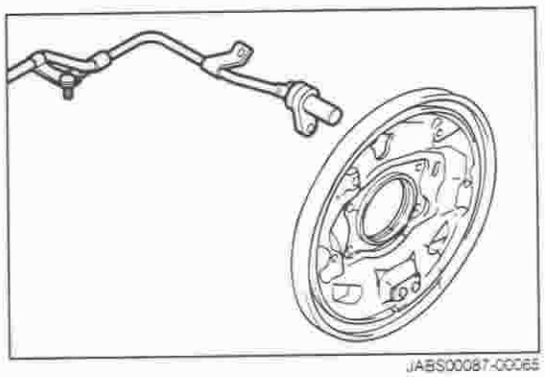
   (3) Remove the speed sensor by removing the attaching bolts.



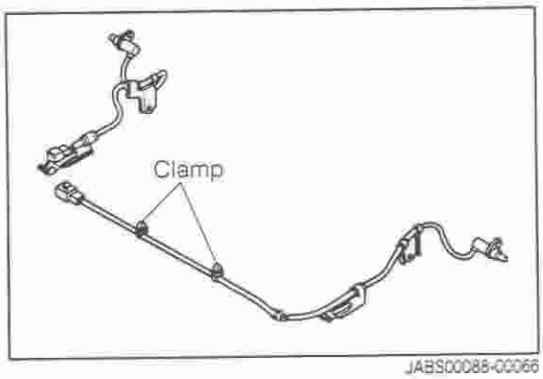
JABS00086-00064

5. Installation of speed sensor
   (1) Clean the attaching surface of the speed sensor and backing plate.
   (2) Install the speed sensor with the attaching bolt and tightening it to the specified tightening torque.
   Tightening Torque: 6.9 - 9.8 N·m

   CAUTION:
   - After the installation, be sure to check that the clearance between the speed sensor and the speed sensor rotor is within the specified value.

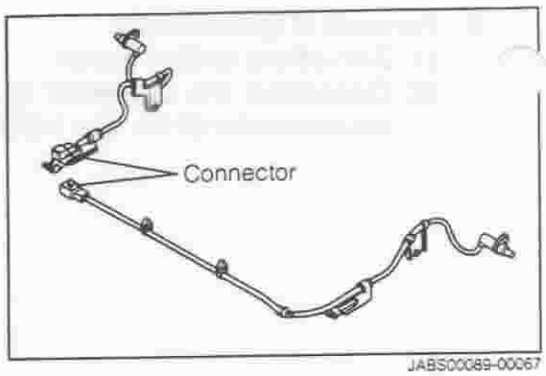

JABS00087-00065

   (3) Connect the sensor harness clamp to the floor panel and ensure that the locking section is properly engaged by pulling it lightly.
   (4) Connect the sensor harness clamp with the attaching bolts and tighten them to the specified tightening torque.
   Tightening Torque: 6.9 - 9.8 N·m



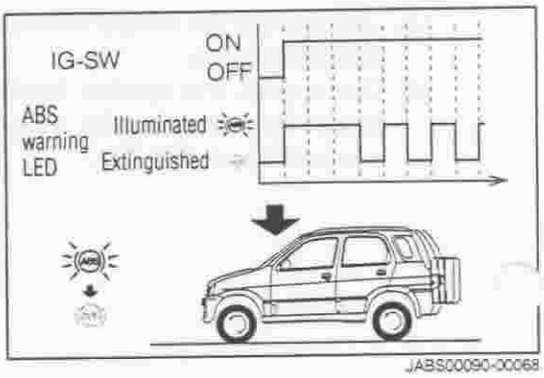
JABS00088-00066

(5) Connect the connector of the speed sensor to the connector to the wire harness.



JABS00089-00067

(6) Check the speed sensor by performing the sensor check function of the ABS.

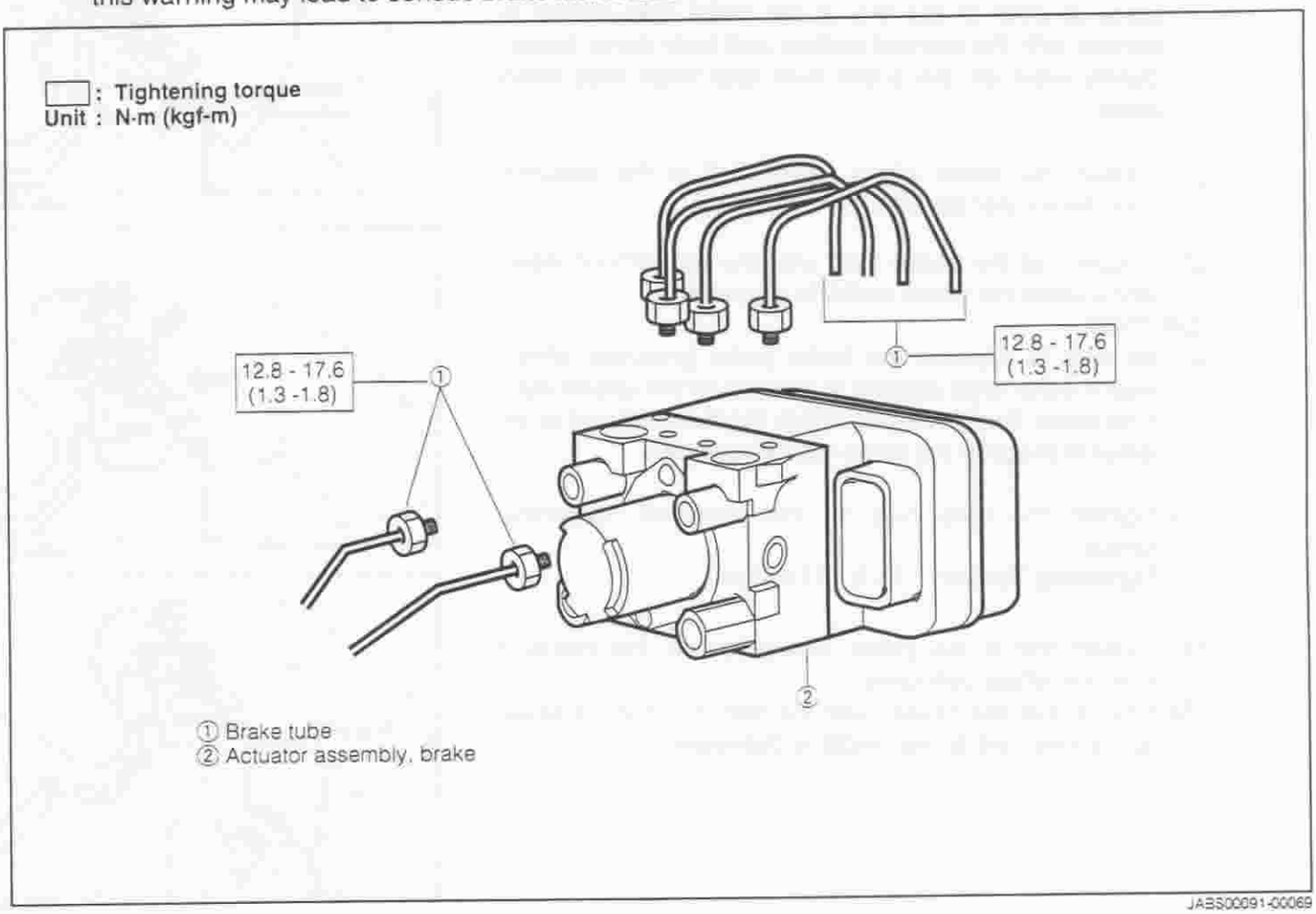


JABS00090-00068

ABS ACTUATOR UNIT

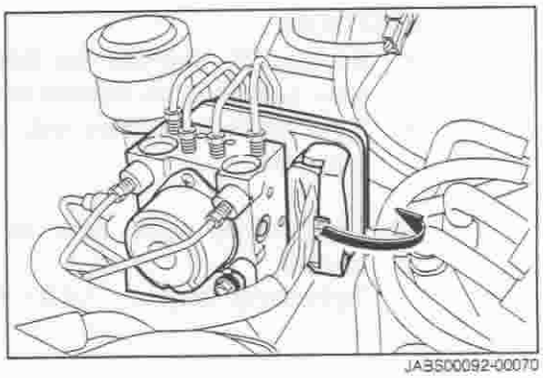
WARNING:

- Be sure to prevent foreign substances from being admitted into the brake actuator. Failure to observe this warning may lead to serious brake malfunction.



JABS00091-00069

1. Check of terminal voltage and resistance of ABS actuator unit connector.
   (1) Turn off the ignition switch.
   (2) Pull up the lock of the connector lock lever to unlock the connector from the ABS actuator unit.
   (3) Disconnect the connector of the wire harness from the ABS actuator unit.
   (4) Ensure that the voltage or resistance between respective terminals mentioned below within the specified value by measuring with a circuit tester.



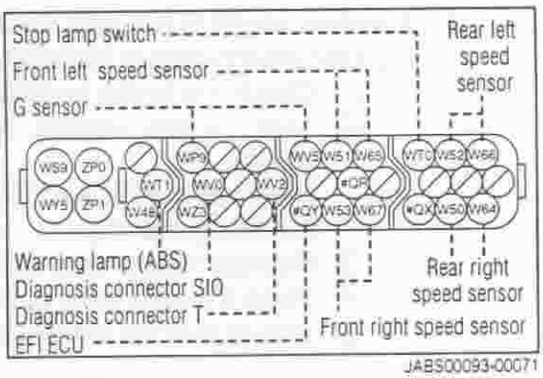
JABS00092-00070

CAUTION:

- Be very careful not to connect the tester probe to terminals other than those specified.

NOTE:

- Refer to page BR–4 under "ABS-RELATED CONNECTORS."



JABS00093-00071

(5) Connect the connector of the wire harness to the ABS actuator unit and lock the lock lever of connector securely.

2. Check of fluid lines in actuator

CAUTION:

- Be sure to prevent the brake fluid from coming in contact with the painted surface and resin parts, using a piece of cloth or the like. If the brake fluid comes in contact with the painted surface and resin parts, immediately wipe off the brake fluid and wash with fresh water.

(1) Loosen the brake pipes connected to the actuator from the master cylinder.

(2) Ensure that the brake fluid will flow out without resistance when the brake pedal is depressed.

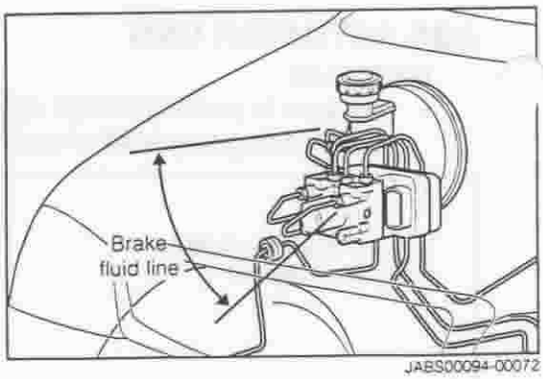
CAUTION:

- Be sure to depress the brake pedal gradually, otherwise a quite large amount of brake fluid will splash out.
- If no brake fluid flows out, check the fluid leakage or internal leakage in the brake master cylinder.

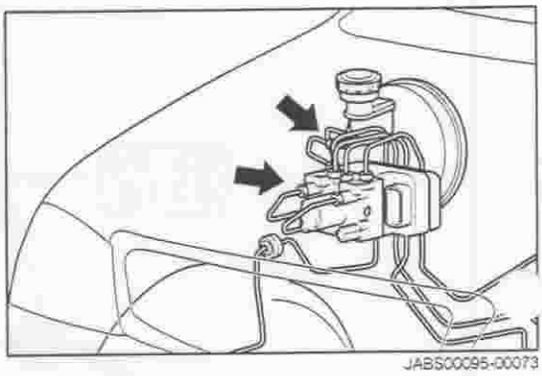
(3) Tighten the flare nuts to the specified tightening torque.
Tightening Torque: 12.8 - 17.6 N·m

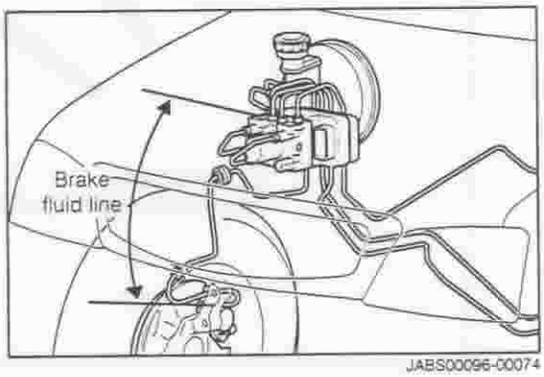
(4) Loosen the brake pipes connected to the actuator from the wheel cylinders.

(5) Ensure that the brake fluid will flow out without resistance when the brake pedal is depressed.



JABS00094-00072


JABS00095-00073

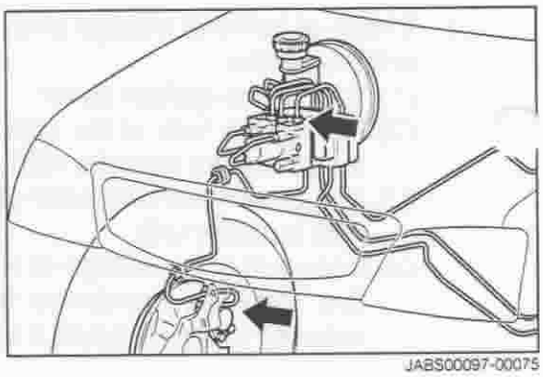


JABS00096-00074

CAUTION:

- Be sure to depress the brake pedal gradually, otherwise a quite large amount of brake fluid will splash out.
- If no brake fluid flows out, replace the actuator with a new one.

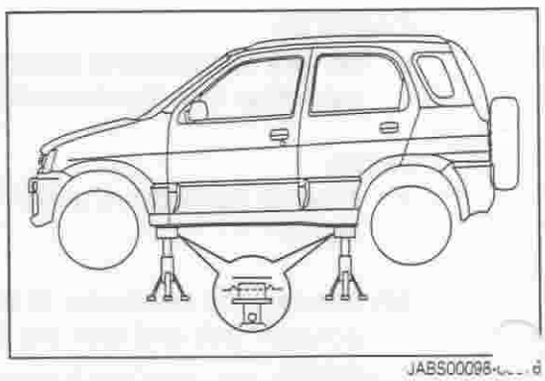
(6) Tighten the flare nuts to the specified tightening torque.
Tightening Torque: 12.8 - 17.6 N·m


JABS00097-00075

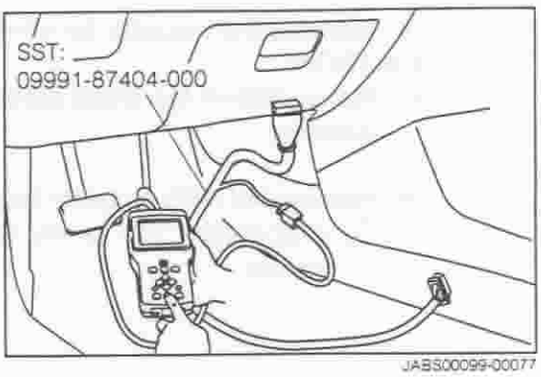
3. Function check of actuator using DS-21

(1) Preparation before inspection

① Check the brake system, using a brake tester.
② Jack up the vehicle and support it with safety stands.
(Refer to the GI section for supporting position of the safety stand.)
③ Release the parking brake.
④ Place the shift lever to the neutral position.
⑤ Ensure that the wheels turn properly.


JABS00098-00076

(2) Inspection
① Turn off the ignition switch.
② Connect the following SST to the diagnosis check connector.
SST: 09991-87404-000

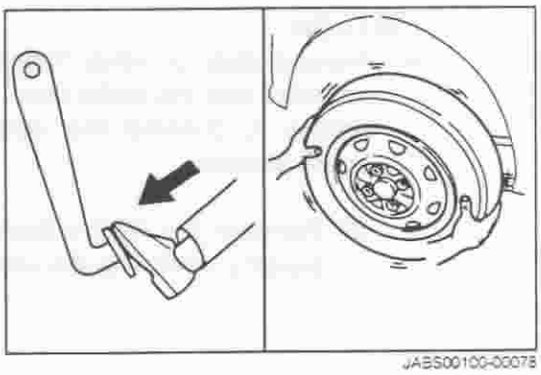


JABS00099-00077

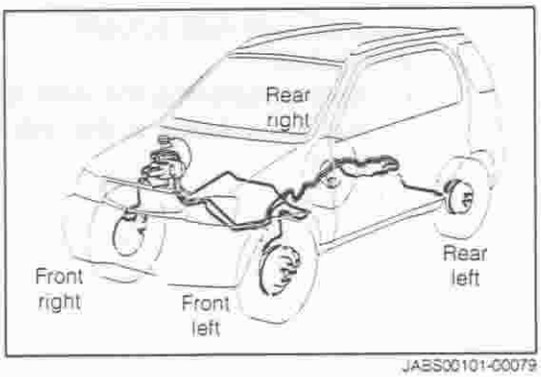
③ Connect the DS-21 to the SST connector.
④ Select the function of the actuator drive in DS-21.

NOTE:
- When selecting the actuator drive, release the security function of DS-21.

⑤ Ensure that the wheels turn properly.
⑥ Ensure that the wheels will be locked when the brake pedal is depressed.

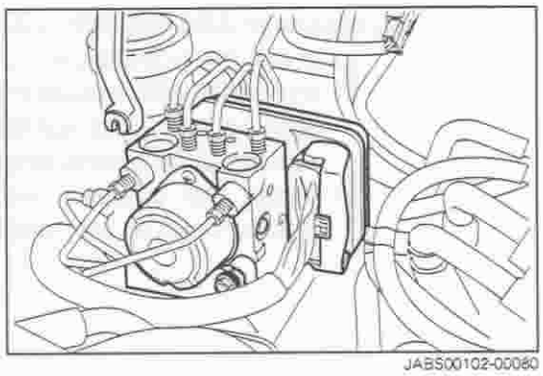

JABS00100-00078

⑦ Ensure that the locked state of the "front side left wheel will be released" and the wheel turns freely. Also ensure that the brake pedal will rise up slightly when the function of "actuating the front side left wheel brake solenoid valve in the actuator" is performed by DS-21.
⑧ Perform the remaining inspection one by one, following the steps ① to ⑦ mentioned above.



JABS00101-00079

4. Removal of ABS actuator
(1) Drain the brake fluid from the brake system.
(2) Remove the brake tube clamp.
(3) Disconnect the brake pipes from the actuator.

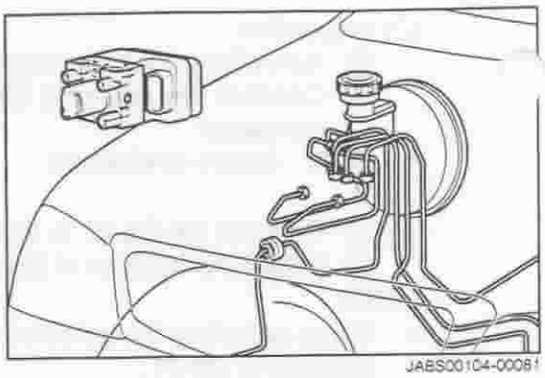

JABS00102-00080

CAUTION:
- Prevent dust or other foreign substances from being admitted into the actuator and brake line.
- Failure to observe this caution may lead to serious brake problem.

JABS00103-00000

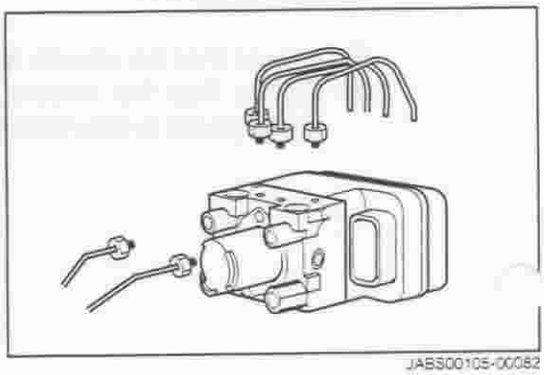
(4) Remove the actuator by removing the attaching nuts.
CAUTION:
- Never deform the brake pipes during the removal of the actuator.

(5) Removal of ABS actuator bracket
① Disconnect the brake pipe from the brake pipe clamp.

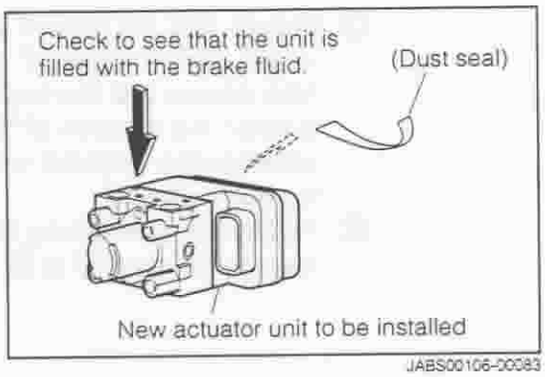

JABS00104-00081

CAUTION:
- Prevent dust or other foreign substances from being admitted into the brake line.
  Failure to observe this caution may lead to serious brake problem.

③ Remove the ABS actuator bracket with the brake pipe by removing the attaching bolts.

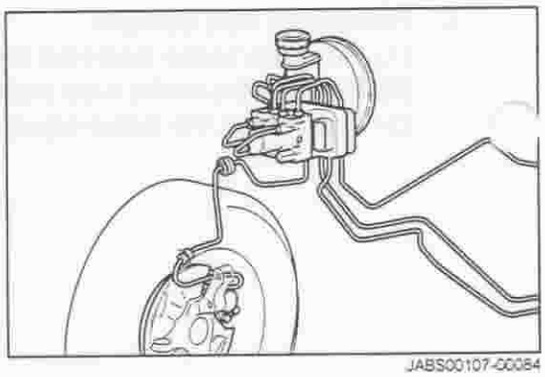

JABS00105-00082

5. Installation of ABS actuator
WARNING:
- Before replacing the ABS actuator, be sure to confirm that the actuator in the unit state is filled with the brake fluid.



JABS00106-00083

(1) Installation of ABS actuator bracket
① Insert the brake pipe in the brake actuator bracket.
② Install the ABS actuator bracket by installing the attaching bolts and tighten the attaching bolts to the specified tightening torque evenly.
③ Install the actuator with the attaching nuts and tighten them to the specified tightening torque.


JABS00107-00084

CAUTION:
- Never deform the brake pipes during the installation of the actuator.

JABS00108-00000

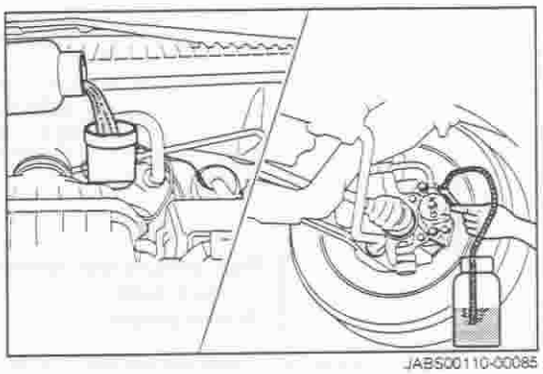
(2) Connect the brake pipes to the actuator and tighten the flare nuts of the brake pipes which are connected to the actuator valve to the specified tightening torque.

CAUTION:

- Prevent dust or other foreign substances from being admitted into the actuator and brake line.
  Failure to observe this caution may lead to serious brake problem.

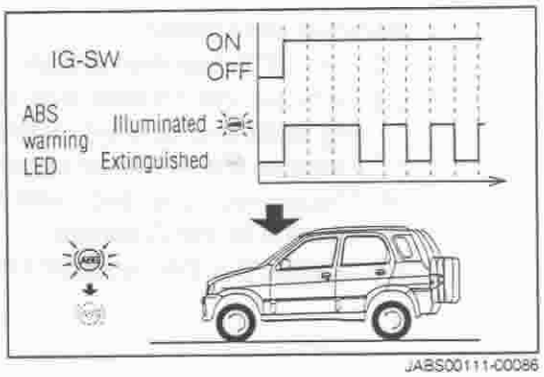
JABS00109-00000

(3) Fill brake fluid to the brake system and perform the air bleeding.
(4) Ensure that no brake fluid leakage exists.
(5) Connect the connector of the wire harness to the ABS actuator unit.



JABS00110-00085

(6) Perform the speed sensor check by the sensor check function.
(Refer to the "sensor check function" section.)



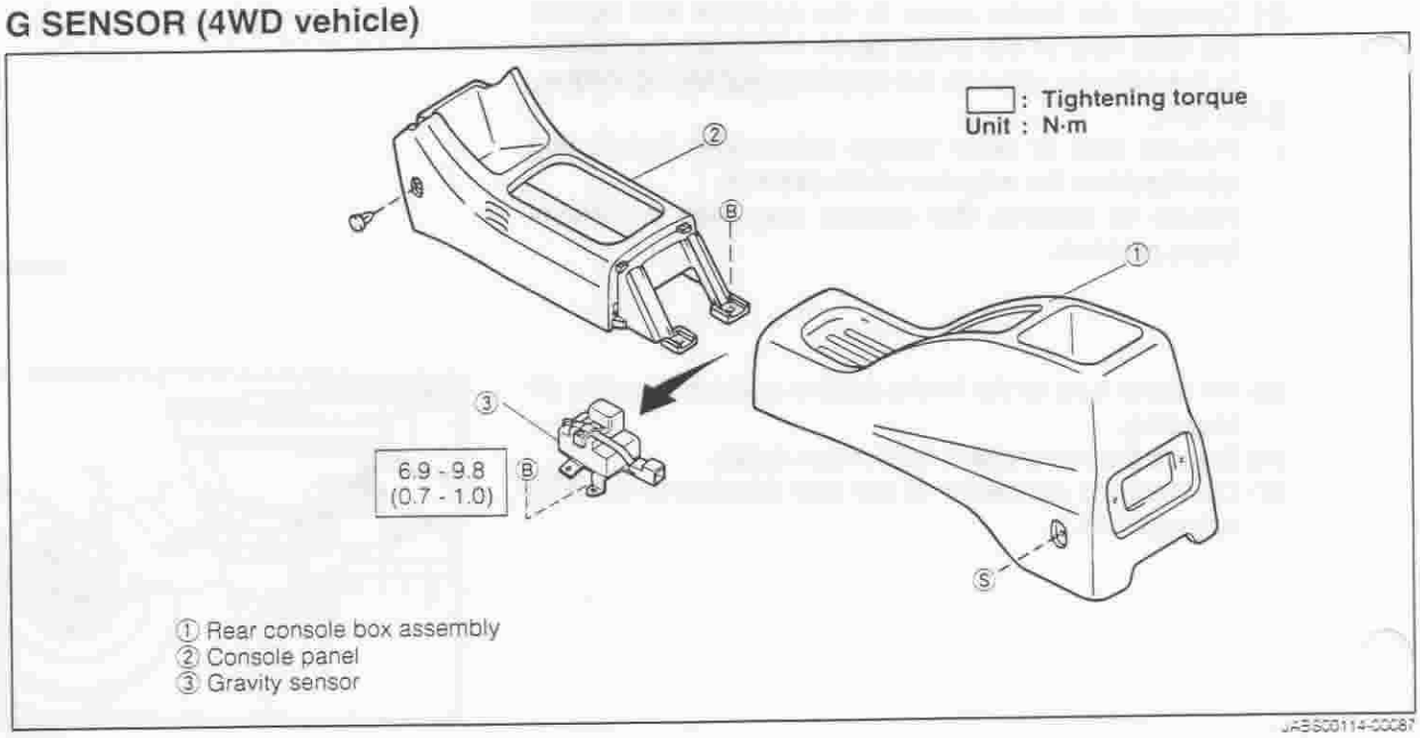
JABS00111-00086

NOTE:

- Resistance values in the following table given below denote values at an ambient temperature of 20°C.
- If any one of resistance or voltage fails to meet the specification in the following table, repair or replace the checking circuit and other related parts properly.
  Then, recheck the resistance or voltage.
- Replace the ABS actuator unit with a new one. if diagnosis codes will be memorized (except wheel speed sensors) even when the input voltage and resistance meet following specified value.

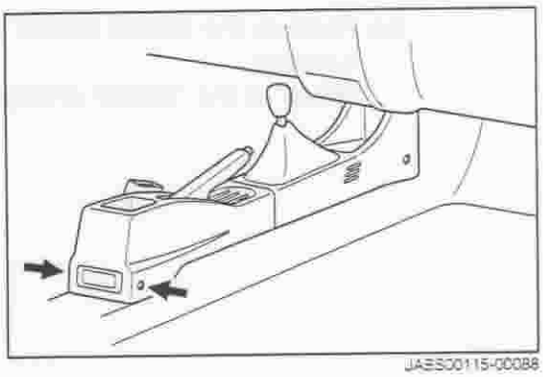
JABS00112-00000

G SENSOR (4WD vehicle)



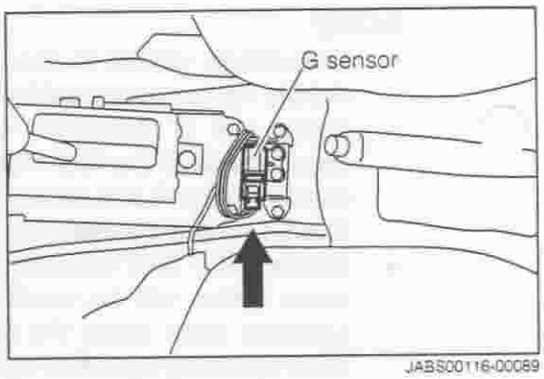
JABS00114-00087

1. Removal of G sensor
   (1) Turn off the ignition switch.
   (2) Remove the console box by removing the two attaching bolts and screw grommets. (Refer to BO section)
   (3) Remove the G sensor attaching bolts.
   (4) Disconnect the two wire harness clamps from the bracket of the G sensor.
   (5) Disconnect the connector from the G sensor.



JABS00115-00088

2. Check of G sensor
   Perform the G sensor unit check.
   (Refer to page BR–16.)

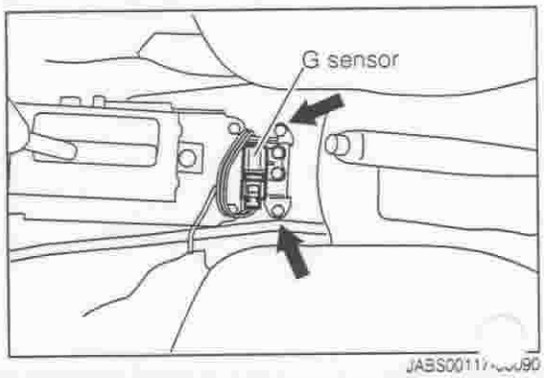


JABS00116-00089

3. Installation of G sensor
   (1) Connect the connector of the wire harness to the G sensor.
   (2) Connect the two wire harness clamps to the bracket of the G sensor.
   (3) Install the G sensor to the floor panel with two attaching bolts in such a direction that the connector provided on the G sensor faces toward backward.

   NOTE:
   - Never allow the sensor to be subject to any impacts nor drop it.
   - Be careful not to deform the bracket for G sensor installation.

   (4) Tighten the attaching bolts evenly in two or three stages to the specified tightening torque.
   Tightening Torque: 8.4 ± 1.5 N·m



JABS00117-00090

Input voltage and resistance of ABS actuator unit.

Terminals	Standard voltage or resistance	Condition	Remedies
① – ②	0 volt	Ignition switch turned ON and OFF.	• Rear left speed sensor
	1.1 ± 0.2 kΩ	Ignition switch turned OFF.	
③ – ⑪or㉝	0 volt	The brake pedal is not depressed.	
	Approx. battery voltage	The brake pedal is depressed.	
④ – ⑤	0 volt	Ignition switch turned ON and OFF.	• Front left speed sensor
	1.1 ± 0.2 kΩ	Ignition switch turned OFF.	
⑪ – Body ground	0 volt	Ignition switch turned OFF.	• Ground circuit
		Ignition switch turned ON.	
⑫ – ⑪or㉝	Approx. battery voltage	At all time	• Battery • ABS F/L 50 A • Related circuit
⑲ – ⑪or㉝	0 volt	Ignition switch turned OFF.	• Open wire or short circuit
		Ignition switch turned ON.	
㉑ – ⑪or㉝	0 volt	Ignition switch turned OFF.	• Open wire or short circuit
		Ignition switch turned ON.	
㉒ – ⑪or㉝	0 volt	Ignition switch turned OFF.	
	Approx. battery voltage	Ignition switch turned ON.	
㉓ – ㉔	0 volt	Ignition switch turned ON and OFF.	• Rear right speed sensor
	1.1 ± 0.2 kΩ	Ignition switch turned OFF.	
㉕ – ⑪or㉝	0 volt	Ignition switch turned OFF.	
	Approx. battery voltage	Ignition switch turned ON.	
㉖ – ㉗	0 volt	Ignition switch turned ON and OFF.	• Front right speed sensor
	1.1 ± 0.2 kΩ	Ignition switch turned OFF.	
㉜ – ⑪or㉝	0 volt	Ignition switch turned OFF.	• Battery • ECU fuse 10 A • Ignition switch • Related circuit
	Approx. battery voltage	Ignition switch turned ON.	
㉝ – Body ground	0 volt	At all time	• Open wire or short circuit
㉞ – ⑪or㉝	Approx. battery voltage	At all time	• Battery • ABS F/L 50 A • Related circuit

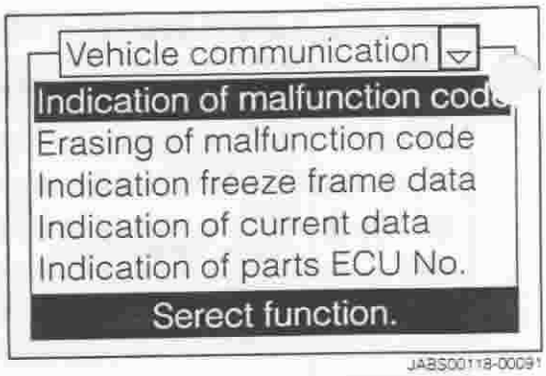
JABS00113-00000

DS-21

INDICATION OF MALFUNCTION CODE

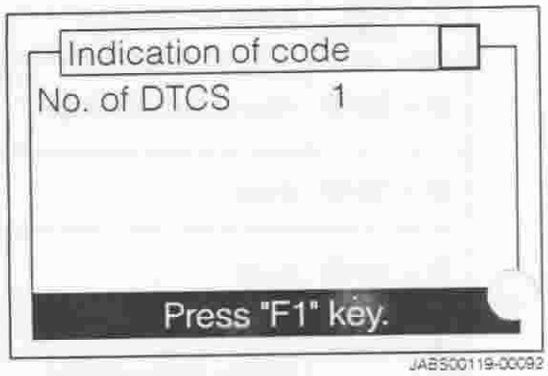
For the system that has been already selected, the screen indicates the malfunction code number and of the system memorized in the ECU.

1. Move the cursor to the "Indication of malfunction code," using the "▲" and "▼" keys.
2. Press the [F1] key to proceed to the next operation.



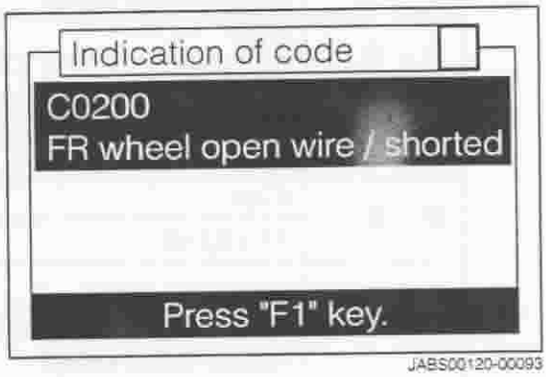
JABS00118-00091

3. The number of malfunction codes memorized in the ECU is indicated.
4. Press the [F1] key to proceed to the next operation.
   NOTE:
   - If there is no malfunction code, the message "Not fount" is indicated.



JABS00119-00092

5. The DTC (diagnostic trouble code), malfunction section and symptom are indicated.

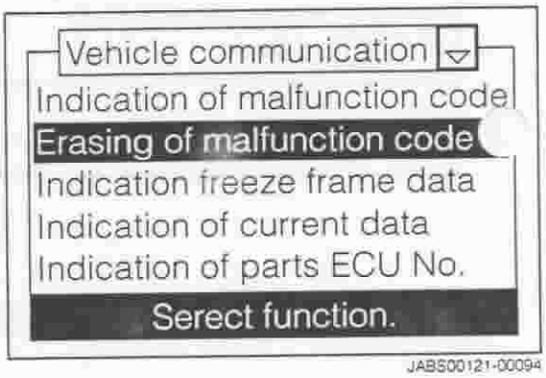


JABS00120-00093

ERASING OF MALFUNCTION CODE

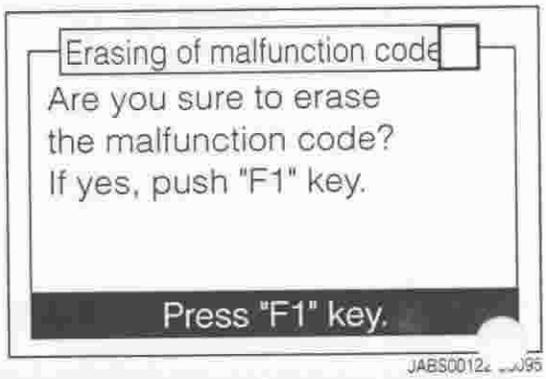
For the system that has been already selected, it is possible to erase the malfunction code number memorized in the ECU.

1. Move the cursor to the "Erasing of malfunction code," using the "▲" and "▼" keys.
2. Press the [F1] key to proceed to the next operation.



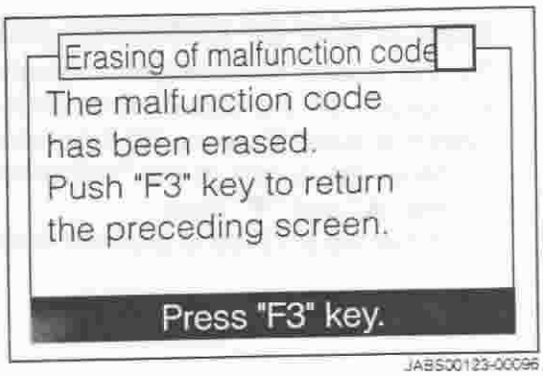
JABS00121-00094

3. Press the [F1] key to erase the malfunction codes.



JABS00122-00095

4. When the screen indicated in the right figure appears, it means that the malfunction codes have been erased. Press the [F3] key to return to the preceding screen.

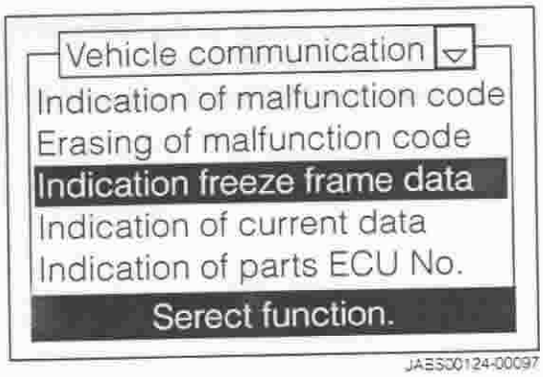


JABS00123-00096

INDICATION OF FREEZE FRAME DATA

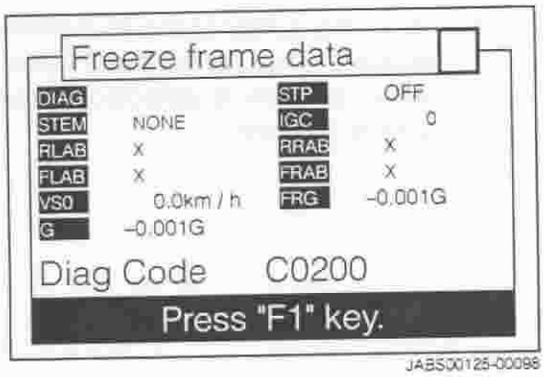
For the system that has been already selected, it is possible to indicate the freeze frame data memorized in the ECU at the moment when a malfunction took place.

1. Move the cursor to the "Indication freeze frame data," using the "▲" and "▼" keys.
2. Press the [F1] key to proceed to the next operation.



JABS00124-00097

3. The freeze frame data is indicated.
   NOTE:
   - The following table shows the original words of abbreviations.



JABS00125-00098

Table showing abbreviations of freeze frame data

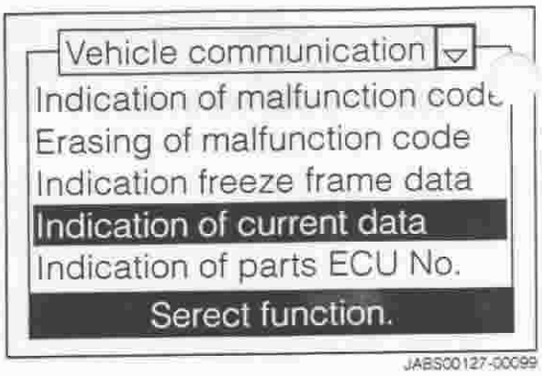
Abbreviation	Original words
DIAG	Number of diagnosis code
STP	Stop lamp switch
STEM	Operation system
IGC	Number of IG ON
RLAB	RL wheel ABS control provided
RRAB	RR wheel ABS control provided
FLAB	FL wheel ABS control provided
FRAB	FR wheel ABS control provided
VS0	Vehicle bidy speed
FRG	Front / rear G
G	Vehicle body deceleration

JABS00126-00000

INDICATION OF CURRENT DATA

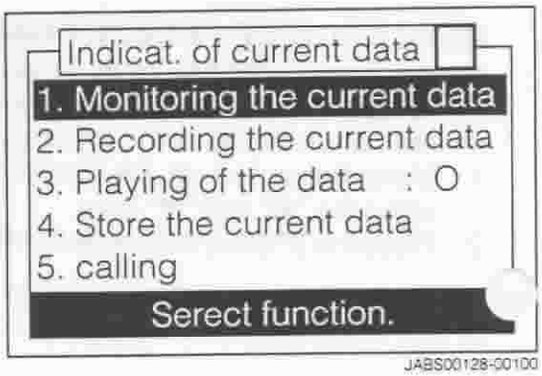
For the system that has been already selected, it is possible to indicate on the screen what kind of data the ECU of the system is currently receiving from various sensor.

1. Move the cursor to the "Indication of current data," using the "▲" and "▼" keys.
2. Press the [F1] key to proceed to the next operation.



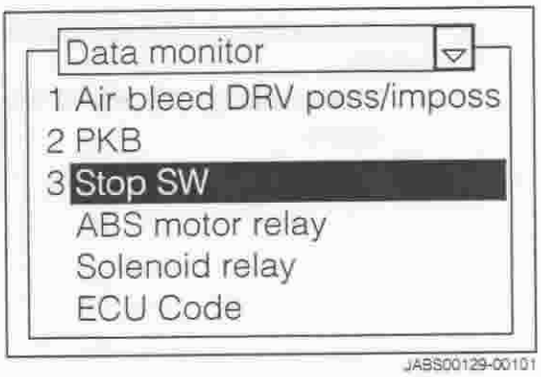
JABS00127-00099

3. Move the cursor to the "Monitoring the current data," using the "▲" and "▼" keys.
4. Press the [F1] key to proceed to the next operation.



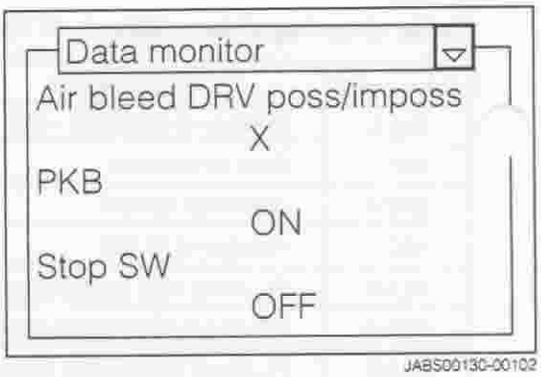
JABS00128-00100

5. Move the cursor to the item whose current data is to be indicated. Then, press the [F2] key.
6. When an item is selected, a number appears at the left side of the item.



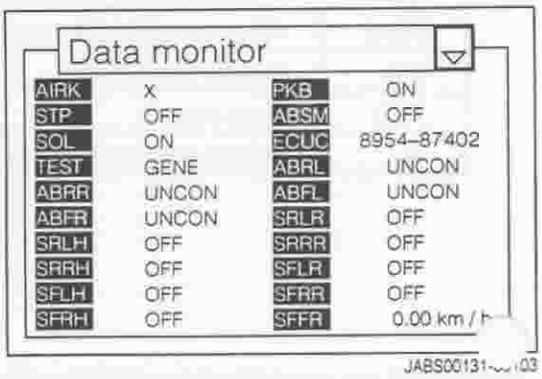
JABS00129-00101

7. Press the [F1] key to indicate the current data of the item selected.



JABS00130-00102

8. If you desire to have various current data indicated on the screen, press the [F4] key. Then, the screen switches.
   NOTE:
   - There are four patterns of the screen indication switching.
   - There are a total of 28 kinds of items whose current data can be indicated. The following table shows the original words of abbreviations.



JABS00131-00103

Current data item

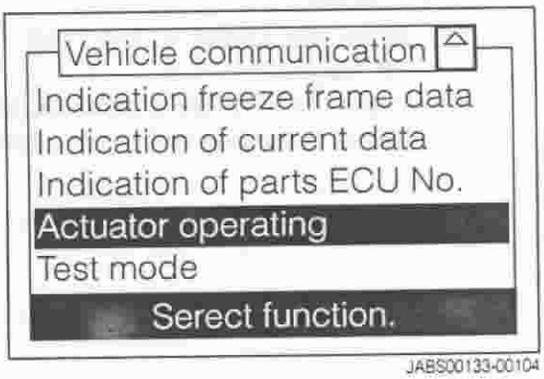
ITEM	Abbreviation	Original words
Air bleed DRV poss / imposs	AIRK	Air bleeding driving possible / impossible
PKB	PKB	Parking brake switch
Stop SW	STP	Stop lamp switch
ABS motor relay	ABSM	ABS motor relay
Solenoid relay	SOL	Solenoid relay
ECU Code	ECUC	ECU Code No.
During test mode	TEST	During test mode
RL is being controlled	ABRL	RL is being controlled
RR is being controlled	ABRR	RR is being controlled
FL is being controlled	ABFL	FL is being controlled
FR is being controlled	ABRL	FR is being controlled
Press. reducing SOL RL	SRLH	Pressure reducing solenoid RL
Retention solenoid RL	SRLR	Retention solenoid RL
Press. reducing SOL RR	SRRH	Pressure reducing solenoid RR
Retention solenoid RR	SRRR	Retention solenoid RR
Press. reducing SOL FL	SFLH	Pressure reducing solenoid FL
Retention solenoid FL	SFLR	Retention solenoid FL
Press. reducing SOL FR	SFRH	Pressure reducing solenoid FR
Retention solenoid FR	SFRR	Retention solenoid FR
Wheel speed FR	SFFR	Wheel speed FR
Wheel speed FL	SPFL	Wheel speed FL
Wheel speed RR	SPRR	Wheel speed RR
Wheel speed RL	SPRL	Wheel speed RL
Meter vehicle speed V out	SPD1	Meter vehicle speed V out
ECU power supply voltage	BATT	ECU power supply voltage
GL1	GL1	GL1
GL2	GL2	GL2
Number of diagnosis codes	DIAG	Number of diagnosis codes

JABS00132-00000

ACTUATOR OPERATING

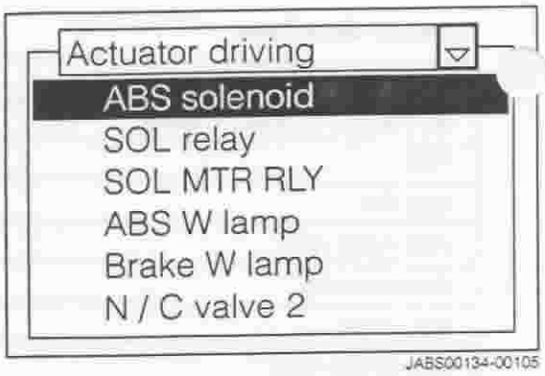
The actuator driving is a function whereby the actuator is directly driven by the actuator driving signal sent from the trouble-shooting device.

1. Move the cursor to the "Actuator operating," using the "▲" and "▼" keys.
2. Press the [F1] key to proceed to the next operation.



JABS00133-00104

3. Move the cursor to the item to be driven and press the [F1] key. Then, the selected item will be driven.
   NOTE:
   - The driving time differs, depending on the item. Furthermore, some items cannot be driven. For details, refer to the following table.



JABS00134-00105

Actuator item

ITEM	Original words	Driving time	ITEM	Original words	Driving time
ABS solenoid	ABS solenoid valve	Driving takes place for about 5 - 10 seconds.	N/C valve 2	Not supported	Driving takes place for about 5 - 10 seconds.
SFRH	Reducing solenoid valve FR		N/C valve 1	Not supported	
SFRR	Retention solenoid valve FR		SV valve	Not supported	
SFLH	Reducing solenoid valve FL		DVS valve	Not supported	
SFLR	Retention solenoid valve FL		SRC valve	Not supported	
SRRH	Reducing solenoid valve RR		N/C valve	Not supported	
SRRR	Retention solenoid valve RR		N/O valve	Not supported	
SRLH	Reducing solenoid valve RL		motor	Motor pump	
SRLR	Retention solenoid valve RL		Air—b DRV2	Not supported	
SOL relay	Solenoid relay		ACT RL	Rear left actuator	
SOL MTR RLY	Solenoid motor relay		ACT RR	Rear right actuator	
ABS W lamp	ABS warning lamp		ACT FL	Front left actuator	
Brake W lamp	Brake warning lamp		ACT FR	Front right actuator	

JABS00135-00000

TEST MODE

This is a function whereby each sensor can be checked while the vehicle is running.

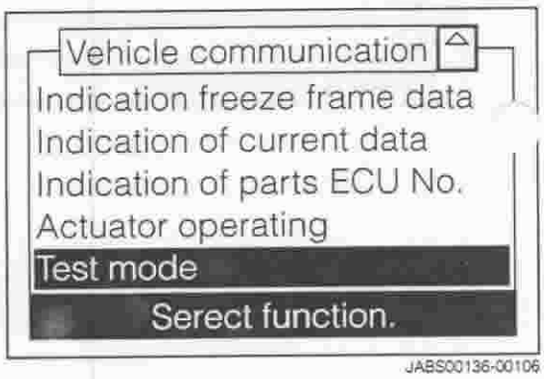
Normal mode

When the normal malfunction code is checked, the normal mode is selected.

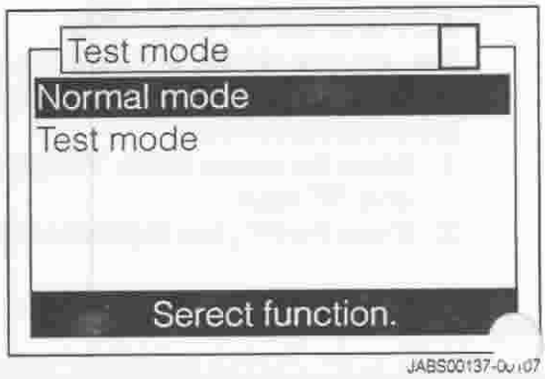
Test mode

This mode is selected when the speed sensor and G sensor are checked.

1. Move the cursor to the "Test mode," using the "▲" and "▼" keys.
2. Press the [F1] key to proceed to the next operation.
3. Select the mode to be executed and press the [F1] key.



JABS00136-00106



JABS00137-00107

SERVICE SPECIFICATIONS

Brake pedal	Pedal height	RHD	MT:	155.8 ± 5 mm
			AT:	155.8 ± 5 mm
		LHD	MT:	155.8 ± 5 mm
			AT:	155.8 ± 5 mm
	Free travel			0.5 - 2.0 mm
	Reserve travel	RHD		108.3 mm or more
		LHD		108.3 mm or more
Disc brake pad	Thickness	STD		10.0 mm
		Minimum		1.0 mm
Disc rotor	Thickness	STD		16.0 mm
		Minimum		15.0 mm
	Runout			0.1 mm
Brake lining	Thickness	STD		5.0 mm
		Minimum		1.0 mm
Brake drum	Inner diameter	STD		228.6 mm
		Minimum		230.6 mm
Parking brake	Specified number of notches			4 - 7 notches

JABS00138-00000

SSTs (Special service tools)

Shape	Part number	Part name	Remarks
	09991-87403-000	Diagnosis check wire	
	09991-87404-000	Engine control system inspection wire	

JABS00139-00108

TIGHTENING TORQUE

Tightening components		N·m	kgf-m
Brake pedal clevis		25.5 ± 2.9	2.6 ± 0.3
Bleeder plug		6.9 - 9.8	0.7 - 1.0
Piston stopper bolt × master cylinder		7.9 - 11.7	0.8 - 1.2
Master cylinder × brake booster		12.7 ± 2.5	1.3 ± 0.3
Brake pipe × master cylinder		12.7 - 17.7	1.3 - 1.8
Brake booster × dash panel		9.8 - 15.7	1.0 - 1.6
Disc brake cylinder mounting × knuckle		90.2 - 135.3	9.2 - 13.8
Main and sub cylinder slide pins	Main	78.5 - 88.3	8.0 - 9.0
	Sub	44.1 - 53.9	4.5 - 5.5
Wheel cylinder × backing plate		7.5 - 11.5	0.8 - 1.2
Flare nut × wheel cylinder		12.7 - 17.6	1.3 - 1.8
Rear wheel hub nut		103.0 ± 14.7	10.5 ± 1.5
Parking brake cable clamp		5.8 - 8.8	0.6 - 0.9
Parking brake handle assembly × floor panel		14.7 - 21.6	0.15 - 0.2
Flare nut		12.7 - 17.6	1.3 - 1.8
Brake hose clamp bolt		6.9 - 15.7	0.7 - 1.6
Brake hose × disc brake cylinder assembly		26.5 - 34.3	2.7 - 3.5
Gravity sensor × floor panel		6.9 - 9.8	0.7 - 1.0
Speed sensor harness clamp × inner fender		6.9 - 9.8	0.7 - 1.0
Speed sensor × knuckle		6.9 - 9.8	0.7 - 1.0
Speed sensor × fender apron		6.9 - 9.8	0.7 - 1.0
ABS actuator × ABS actuator bracket		4.3 - 6.5	0.44 - 0.66
Brake pipe × ABS actuator		15.5 ± 2.5	1.59 ± 0.26
ABS actuator bracket × fender apron		15.2 - 23.0	1.55 - 2.35
Flare nut		15.5 ± 2.5	1.59 ± 0.26

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