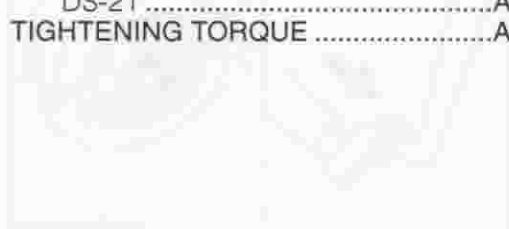


## ANTI-LOCK BRAKE SYSTEM

|                                               |        |
|-----------------------------------------------|--------|
| ABS ACTUATOR UNIT .....                       | ABS-2  |
| FUNCTION CHECK.....                           | ABS-2  |
| REMOVAL AND INSTALLATION .....                | ABS-3  |
| FRONT SPEED SENSOR.....                       | ABS-6  |
| INSPECTION.....                               | ABS-6  |
| REMOVAL AND INSTALLATION .....                | ABS-6  |
| REAR SPEED SENSOR.....                        | ABS-8  |
| REMOVAL AND INSTALLATION .....                | ABS-8  |
| GLAVITY SENSOR.....                           | ABS-10 |
| INSPECTION.....                               | ABS-10 |
| REMOVAL AND INSTALLATION .....                | ABS-10 |
| ANTI-LOCK BRAKE SYSTEM.....                   | ABS-12 |
| OUTLINE OF SYSTEMS .....                      | ABS-12 |
| PRECAUTIONS.....                              | ABS-14 |
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| TROUBLE SHOOTING TO<br>DIAGNOSIS CODE .....   | ABS-21 |
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| UNIT CHECK.....                               | ABS-40 |
| DS-21 .....                                   | ABS-45 |
| TIGHTENING TORQUE .....                       | ABS-53 |

ABS



## ABS-2

### 1 ABS ACTUATOR UNIT

#### 1-1 FUNCTION CHECK

##### WARNING

- Keep the position of the jack-up point to avoid causing serious accident due to inclining of the vehicle.

##### CAUTION

- When conducting the ABS actuator operation inspection, do so when there are no problems, such as damage or air in the system, in the entire brake system.

ABS-ACT-F-Z-00001

#### 1-1-1 OPERATION BEFORE INSPECTION

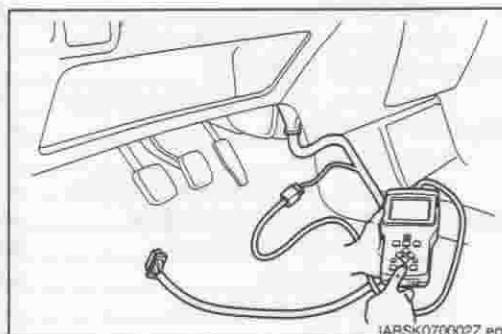
1. Jack up the vehicle and support it with rigid racks.
2. Make sure all four wheels can be turned by hand.

ABS-ACT-F-B-00001

#### 1-1-2 INSPECTION

##### (1) PRESSURE REDUCTION OPERATION TEST

1. Connect the DS-21 to the DLC.  
SST: 09991-87404-000

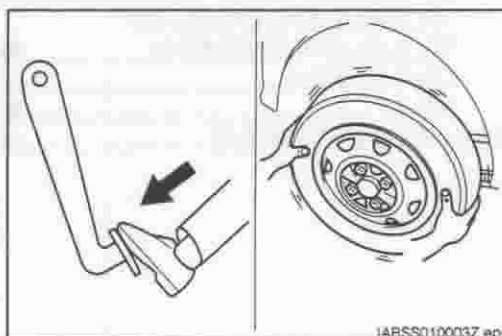


2. Start up the DS-21, select "Individual function," from this select "Vehicle communication," and then start up "Actuator driving."

##### CAUTION

- When executing "Actuator driving," be sure to cancel security.

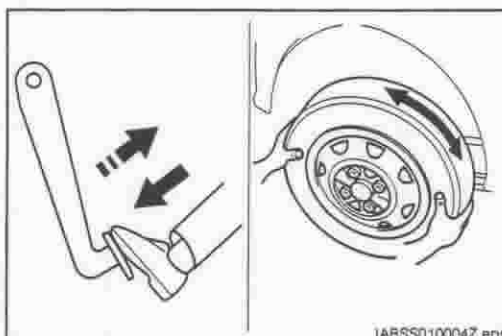
3. Two people conduct the work with one person pressing the brake and the other person checking to see if the left front wheel locks.



4. With the brake pedal depressed, execute left front wheel actuator drive and check to make sure that 1. the left front wheel lock releases and the wheel can be turned, 2. the brake pedal returns, and 3. the ABS pump motor can be heard operating.

##### CAUTION

- When turning the wheel, make sure that the wheel speed does not exceed 2km/h.



5. Conduct the same inspection for the other wheels.

ABS-ACT-F-C-00001

### 1-1-3 OPERATION AFTER INSPECTION

1. Jack down the vehicle.

ABS-ACT-F-A-00001

## 1-2 REMOVAL AND INSTALLATION

### 1-2-1 PREPARATION TOOLS

|       |               |
|-------|---------------|
| Gauge | Torque wrench |
|-------|---------------|

ABS-ACT-D-P-00001

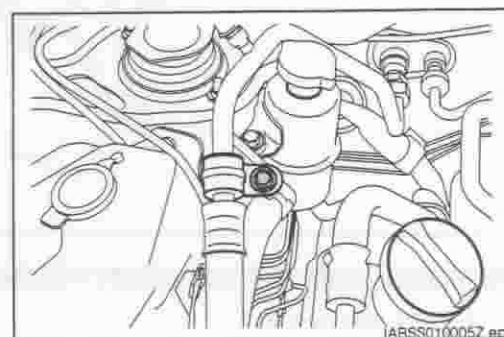
### 1-2-2 OPERATION BEFORE REMOVAL

1. Disconnect the negative terminal of the battery.

#### CAUTION

- When the negative terminal of the battery is disconnected, the memories of all system ECUs and the radio settings will be erased, so after the power is restored these need to be reset.

2. Remove the air intake hose.
3. Separate the power steering reservoir tank from the vehicle.
4. Remove the air-conditioner suction hose from the power steering reservoir tank bracket.



5. Remove the washer motor connector from the washer tank. (LHD vehicles)
6. Separate the washer tank from the vehicle. (LHD vehicles)

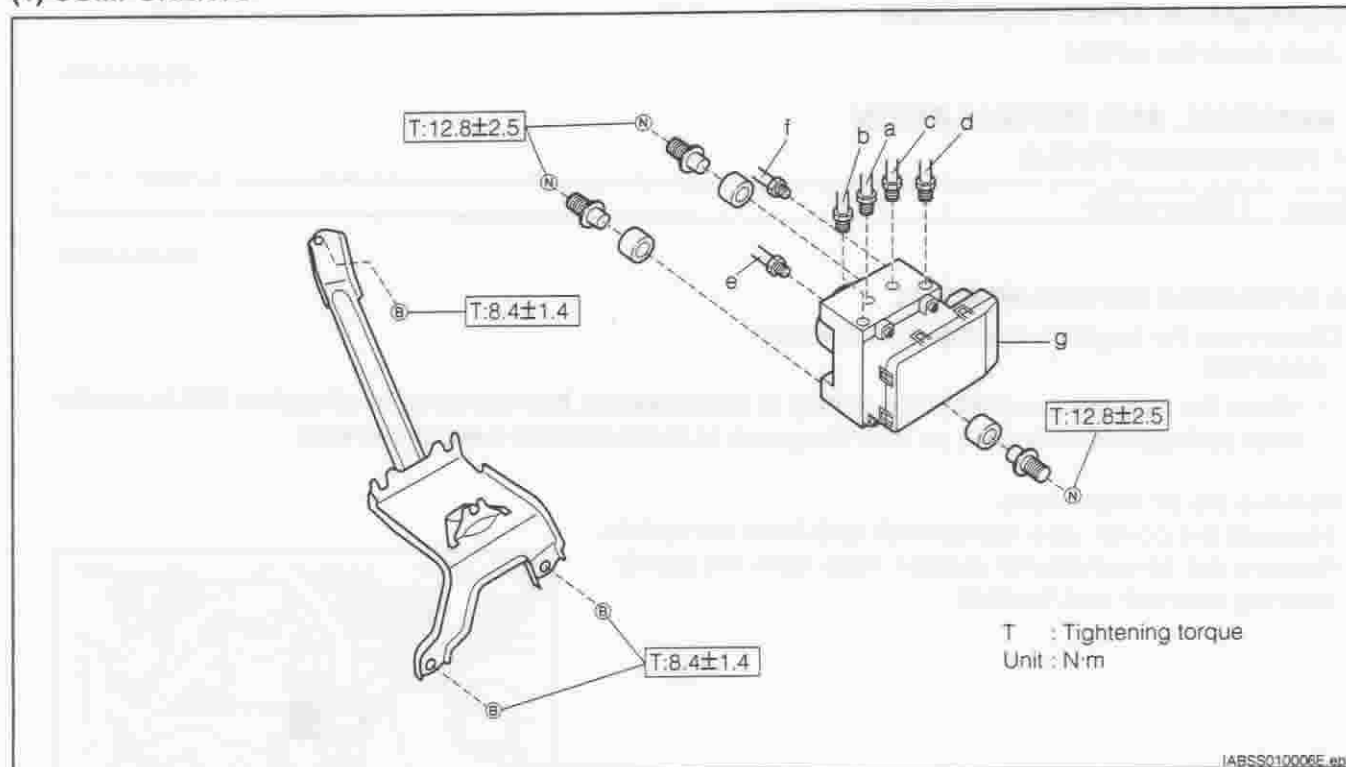
ABS-ACT-D-B-00001



## ABS-4

### 1-2-3 REMOVAL AND INSTALLATION PROCEDURES

#### (1) COMPONENTS



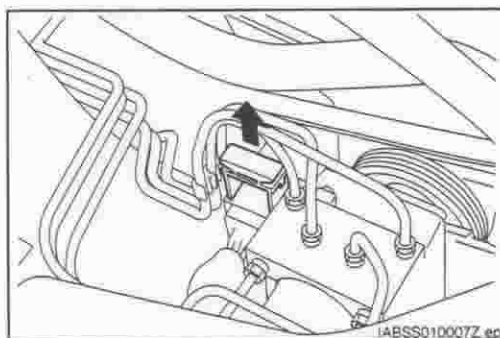
#### (2) REMOVAL AND INSTALLATION PROCEDURES

- |   |   |   |                        |   |   |   |                        |
|---|---|---|------------------------|---|---|---|------------------------|
| 1 | 7 | a | Tube, rear brake No.4  | 6 | 2 | f | Tube, front brake No.1 |
| 2 | 6 | b | Tube, front brake No.2 | ⑦ | ① | g | Actuator Ay, brake     |
| 3 | 5 | c | Tube, front brake No.2 |   |   |   |                        |
| 4 | 4 | d | Tube, rear brake No.4  |   |   |   |                        |
| 5 | 3 | e | Tube, front brake No.3 |   |   |   |                        |

ABS-ACT-D-T-00001

#### 1-2-4 POINTS OF REMOVAL

- Removal of brake actuator Ay
  - Pull the lock lever all the way up and remove the connector.



- Remove the ABS actuator from the vehicle.

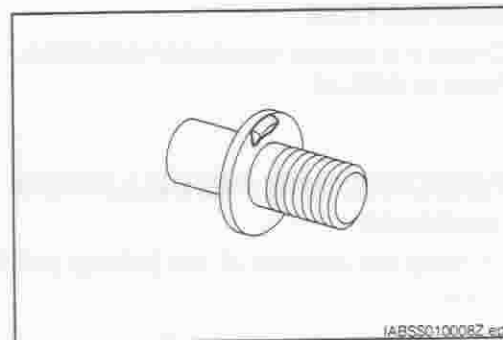
#### CAUTION

- The brake fluid will soak into the paint, so be careful not to spill it. Cap off the port of the removed ABS actuator to prevent the brake fluid from leaking out of the actuator or debris from getting in.

ABS-ACT-D-D-00001

### 1-2-5 POINTS OF INSTALLATION

1. Install the brake actuator Ay.  
(1) Turn the flange bolt's whirl stop end up and pressure fit it into the mounting rubber.



2. Connect the brake tube to the ABS actuator.

#### CAUTION

- With your fingers screw on the union nut until the brake tube flare touches the seat and then tighten it to the specified torque.

ABS-ACT-D-S-00001

### 1-2-6 OPERATION AFTER INSTALLATION

1. Bleed the air from the brake system.
2. Check for brake fluid leaks.
3. Fill the master cylinder reservoir to the MAX reference line with brake fluid.
4. Install the washer tank in the vehicle. (LHD vehicles)
5. Attach the washer motor connector to the washer tank. (LHD vehicles)
6. Connect the air-conditioner suction hose to the power steering reservoir tank bracket.
7. Install the power steering reservoir tank in the vehicle.
8. Attach the air intake hose.
9. Connect the negative terminal of the battery.

ABS-ACT-D-A-00001

## ABS-6

### 2 FRONT SPEED SENSOR

#### 2-1 INSPECTION

1. Check the sensor installation condition.  
Refer to ABS-41.

ABS-FSS-C-Z-00001

#### 2-2 REMOVAL AND INSTALLATION

##### WARNING

- Keep the position of the jack-up point to avoid causing serious accident due to inclining of the vehicle.

ABS-FSS-D-Z-00001

##### 2-2-1 PREPARATION TOOLS

|       |               |
|-------|---------------|
| Gauge | Torque wrench |
|-------|---------------|

ABS-FSS-D-P-00001

##### 2-2-2 OPERATION BEFORE REMOVAL

1. Disconnect the negative terminal of the battery.

##### CAUTION

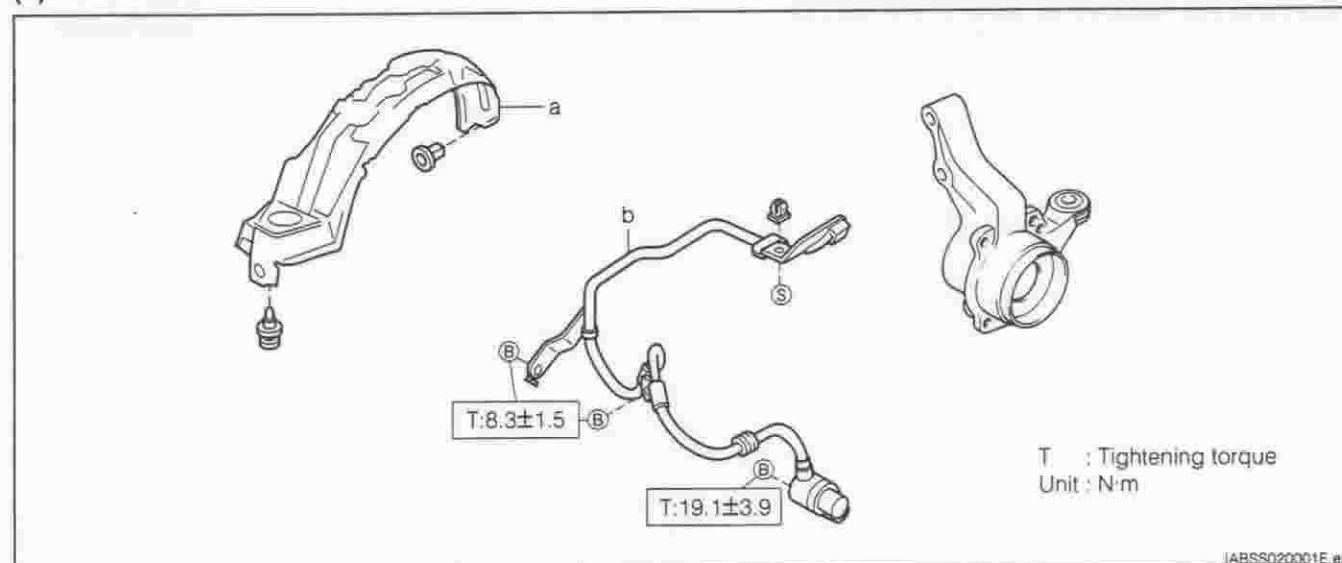
- When the negative terminal of the battery is disconnected, the memories of all system ECUs and the radio settings will be erased, so after the power is restored these need to be reset.

2. Jack up the vehicle.
3. Remove the front wheels.

ABS-FSS-D-B-00001

##### 2-2-3 REMOVAL AND INSTALLATION PROCEDURES

###### (1) COMPONENTS



###### (2) REMOVAL AND INSTALLATION PROCEDURES

- 1 2 a Liner, front fender
- 2 1 b Sensor, skid control front

ABS-FSS-D-T-00001

#### 2-2-4 INSPECTION

1. Conduct an individual inspection of the skid control front sensor.  
Refer to ABS-41.

ABS-FSS-D-C-00001

#### 2-2-5 OPERATION AFTER INSTALLATION

1. Install the front wheels.  
TIGHTENING TORQUE:  $103.0 \pm 14.7\text{N}\cdot\text{m}$
2. Jack down the vehicle.

ABS-FSS-D-A-00001



## ABS-8

### 3 REAR SPEED SENSOR

#### 3-1 REMOVAL AND INSTALLATION

##### WARNING

- Keep the position of the jack-up point to avoid causing serious accident due to inclining of the vehicle.

ABS-RSS-D-Z-00001

##### 3-1-1 PREPARATION TOOLS

|       |               |
|-------|---------------|
| Gauge | Torque wrench |
|-------|---------------|

ABS-RSS-D-P-00001

##### 3-1-2 OPERATION BEFORE REMOVAL

1. Remove the battery minus terminal.

##### CAUTION

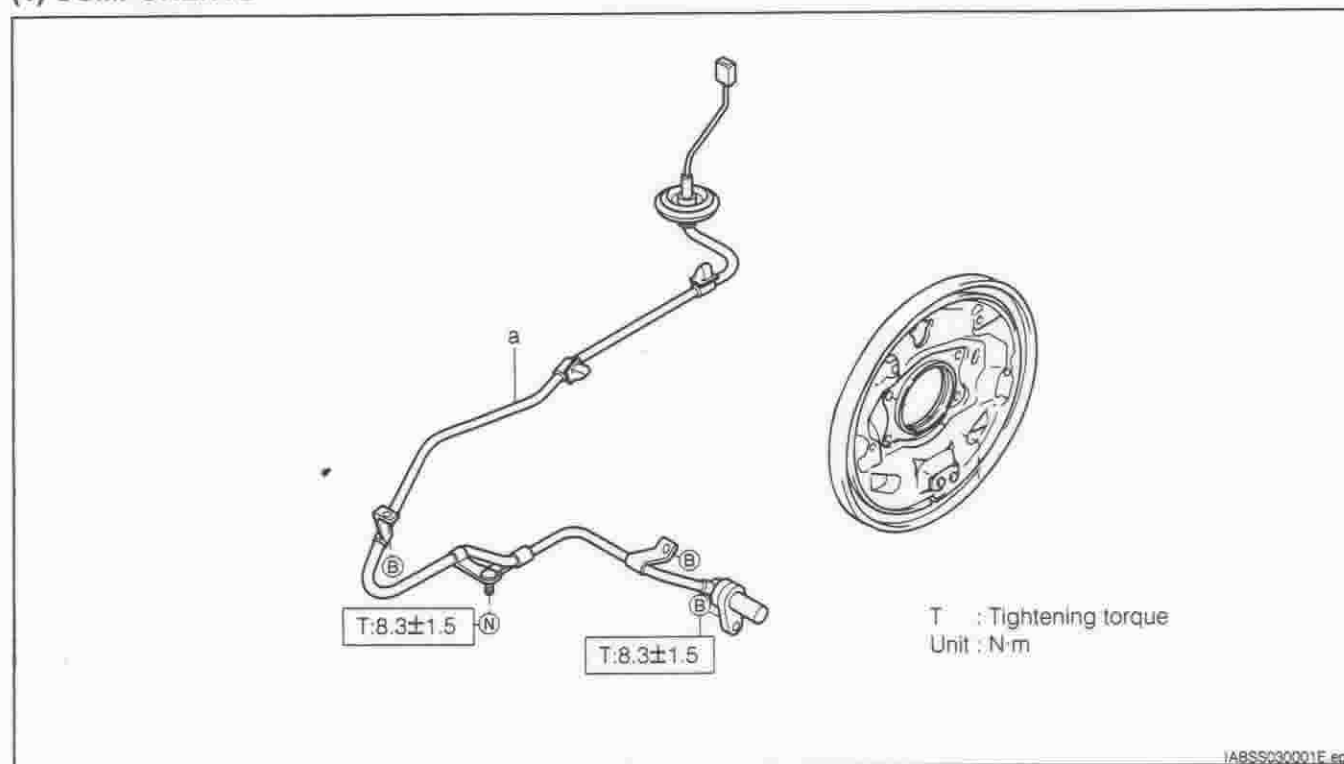
- When the negative terminal of the battery is disconnected, the memories of all system ECUs and the radio settings will be erased, so after the power is restored these need to be reset.

2. Jack up the vehicle.
3. Remove the front wheels.

ABS-RSS-D-B-00001

##### 3-1-3 REMOVAL AND INSTALLATION PROCEDURES

###### (1) COMPONENTS



###### (2) REMOVAL AND INSTALLATION PROCEDURES

- 1 1 a Sensor, skid control rear

ABS-RSS-D-T-00001

##### 3-1-4 INSPECTION

1. Conduct an individual inspection of the skid control rear sensor.  
Refer to ABS-42.

ABS-RSS-D-C-00001

### 3-1-5 OPERATION AFTER INSTALLATION

1. Install the rear wheels.  
TIGHTENING TORQUE:  $103.0 \pm 14.7\text{N}\cdot\text{m}$
2. Jack down the vehicle.

ABS-RSS-D-A-00001



## ABS-10

### 4 GLAVITY SENSOR

#### 4-1 INSPECTION

1. Check the sensor installation condition.  
Refer to ABS-42.

ABS-GS-C-Z-00001

#### 4-2 REMOVAL AND INSTALLATION

##### 4-2-1 PREPARATION TOOLS

|       |               |
|-------|---------------|
| Gauge | Torque wrench |
|-------|---------------|

ABS-GS-D-P-00001

##### 4-2-2 OPERATION BEFORE REMOVAL

1. Disconnect the negative terminal of the battery.

##### CAUTION

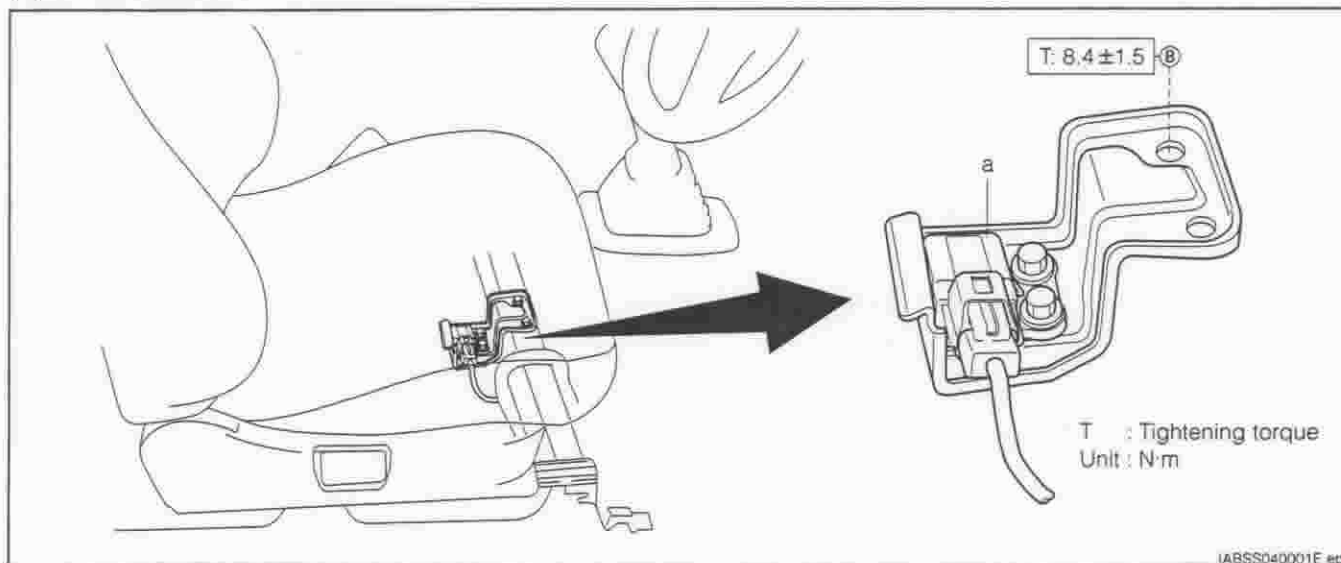
- When the negative terminal of the battery is disconnected, the memories of all system ECUs and the radio settings will be erased, so after the power is restored these need to be reset.

2. Remove the front seat (right side).
3. Remove the cowl side trim board (right side).
4. Remove the front door scuff plate (right side).
5. Turn up the carpet.

ABS-GS-D-B-00001

##### 4-2-3 REMOVAL AND INSTALLATION PROCEDURES

###### (1) COMPONENTS



###### (2) REMOVAL AND INSTALLATION PROCEDURES

- 1 ① a Sensor, gravity

ABS-GS-D-T-00001

#### 4-2-4 INSPECTION

1. Conduct an individual inspection of the gravity sensor.  
Refer to ABS-42.

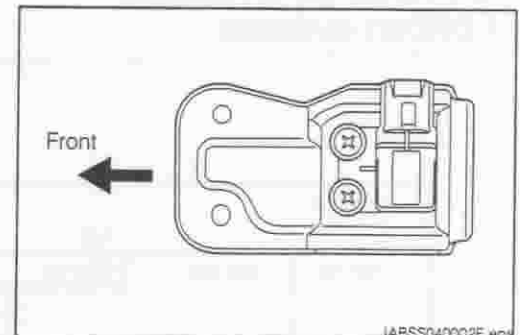
ABS-GS-D-C-00001

#### 4-2-5 POINTS OF INSTALLATION

1. Installation of gravity sensor  
(1) Install it so that the gravity sensor arrow direction is oriented toward the front of the vehicle.

##### CAUTION

- Do not strike or drop the sensor. Also, do not deform the G-sensor installation bracket.



1ABSS040002E wpt  
ABS-GS-D-S-00001

#### 4-2-6 OPERATION AFTER INSTALLATION

1. Replace the carpet.
2. Install the front door scuff plate (right side).
3. Install the cowl side trim (right side).
4. Install the front seat (right side).
5. Connect the negative terminal of the battery.

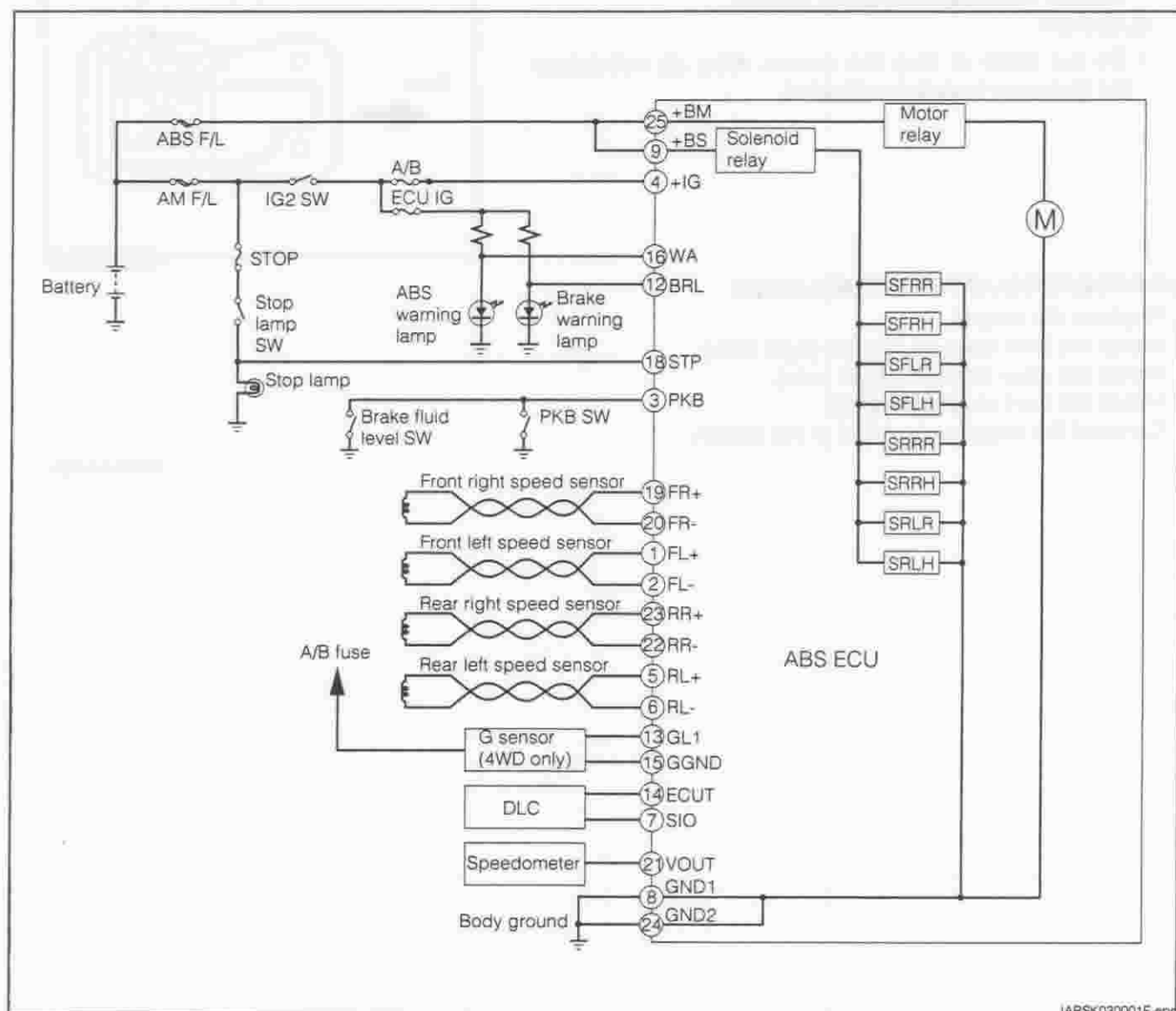
ABS-GS-D-A-00001

# ABS-12

## 5 ANTI-LOCK BRAKE SYSTEM

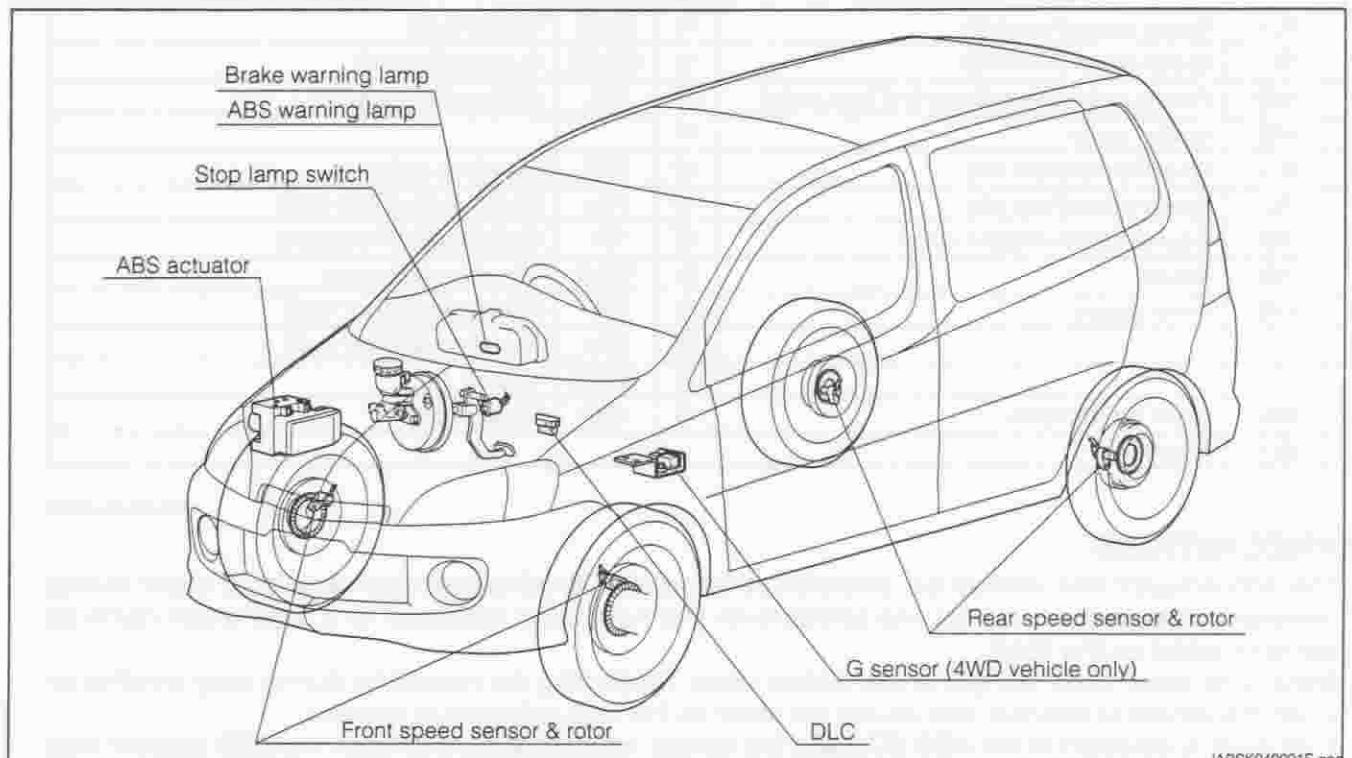
### 5-1 OUTLINE OF SYSTEMS

#### 5-1-1 CIRCUIT DIAGRAM



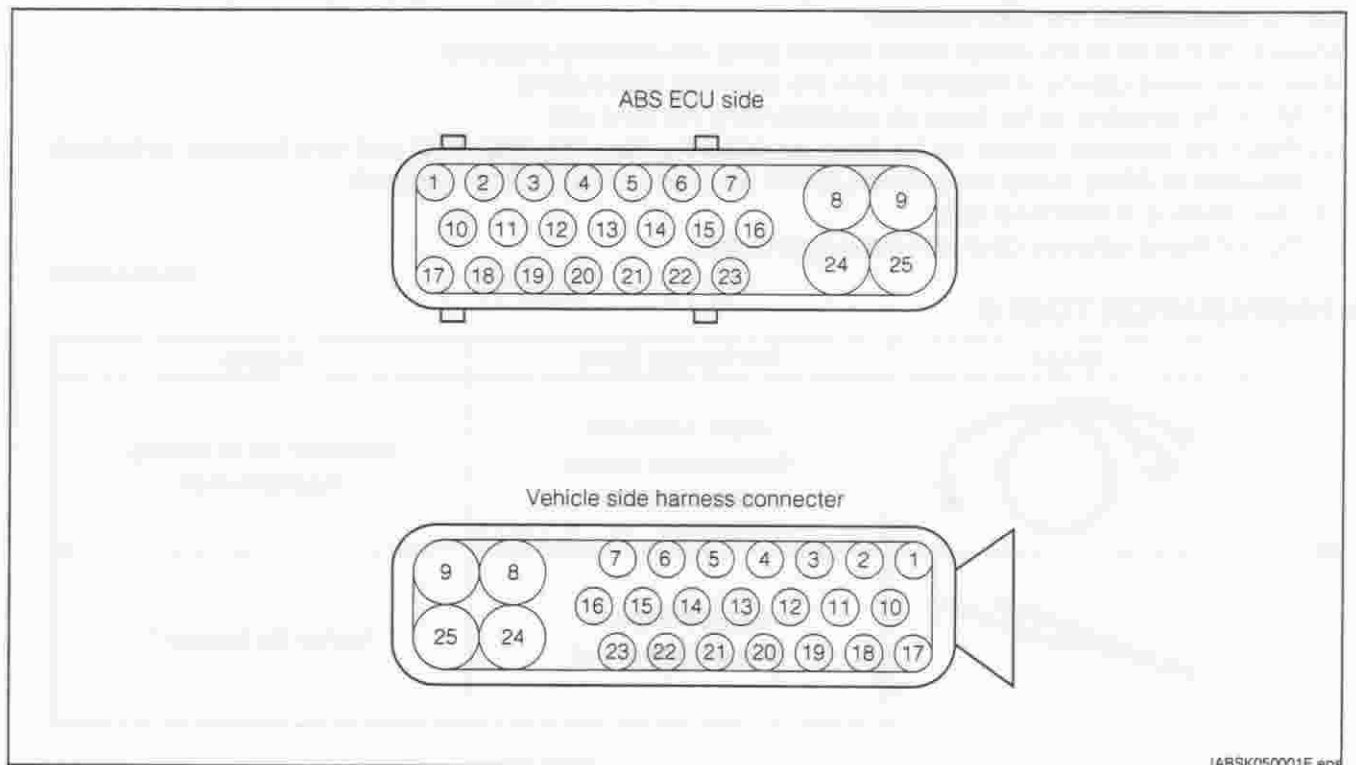
IABSK030001E.eps  
ABS-ABS-C-w-00001

### 5-1-2 COMPONENTS LAYOUT



IABSK040001E.eps  
ABS-ABS-C-p-00001

### 5-1-3 ARRANGEMENT OF ECU TERMINAL



IABSK050001E.eps

## ABS-14

| No. |      | Contents of connection                        | No. |      | Contents of connection    |
|-----|------|-----------------------------------------------|-----|------|---------------------------|
| 1   | FL+  | Speed sensor(Front left)                      | 14  | ECUT | Test terminal             |
| 2   | FL-  | Speed sensor(Front left)                      | 15  | GGND | G sensor(Ground)          |
| 3   | PKB  | Parking brake switch/Brake fluid level switch | 16  | WA   | ABS warning lamp          |
| 4   | +IG  | Ignition switch                               | 17  |      |                           |
| 5   | RL+  | Speed sensor(Rear left)                       | 18  | STP  | Stop lamp switch          |
| 6   | RL-  | Speed sensor(Rear left)                       | 19  | FR+  | Speed sensor(Front right) |
| 7   | SIC  | External communication circuit                | 20  | FR-  | Speed sensor(Front right) |
| 8   | GND1 | Ground                                        | 21  | VOU  | Vehicle speedometer       |
| 9   | +BS  | Power supply                                  | 22  | RR-  | Speed sensor(Rear right)  |
| 10  |      |                                               | 23  | RR+  | Speed sensor(Rear right)  |
| 11  |      |                                               | 24  | GND2 | Ground                    |
| 12  | BRL  | Brake warning lamp                            | 25  | +BM  | Power supply              |
| 13  | GL1  | G sensor                                      |     |      |                           |

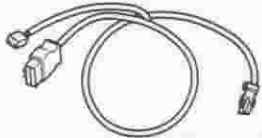
ABS-ABS-O-e-00001

### 5-2 PRECAUTIONS

1. The ABS actuator and sensors are precision components. Do not subject them to a large shock during removal and installation. Do not use components that have been subjected to a large shock (such as being dropped on the floor).
2. Make sure water does not get in the system when conducting an inspection during rainy weather or when the vehicle is washed, and do not get water on the ABS actuators or sensors.
3. If an error is detected in the ABS ECU and the vehicle returned to normal when the ABS actuator was replaced, reinstall the replaced ABS actuator (the one that was deemed to be faulty) and confirm that the initial error occurred again before finally determining that the ABS ECU is defective.
4. Do not disassemble the ABS actuator.
5. Make sure that all of the wheel brake related parts are installed properly.
6. When a wireless device is installed, take the following precautions.
  - (1) Move the antenna as far away as possible from the ECU unit.
  - (2) Place the antenna feeder as far away as possible from the ABS ECU and wire harness (minimum distance of 30cm). Keep the antenna feeder level and avoid pulling it around.
  - (3) The antenna is matched well.
  - (4) Do not install wireless devices with a high output.

ABS-ABS-N-Z-00001

### 5-3 PREPARATION TOOLS

|     | Shape                                                                               | Part Number, Name                                           | Purpose                                      |
|-----|-------------------------------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------------|
| SST |  | 09991-87404-000<br>Engine control system<br>inspection wire | Additional use for reading<br>diagnosis code |
|     |  | 09991-87403-000<br>Diagnosis check wire                     | To short the terminal T                      |

ABS-ABS-P-Z-00001

## 5-4 DIAGNOSIS

### 5-4-1 OUTPUT OF DIAGNOSIS CODE

#### (1) ABS WARNING LAMP DISPLAY

1. While the vehicle is stopped, use the SST to short circuit the ECUT terminal in the check connector with the E terminal.

SST: 0991-87404-000

0991-87403-000

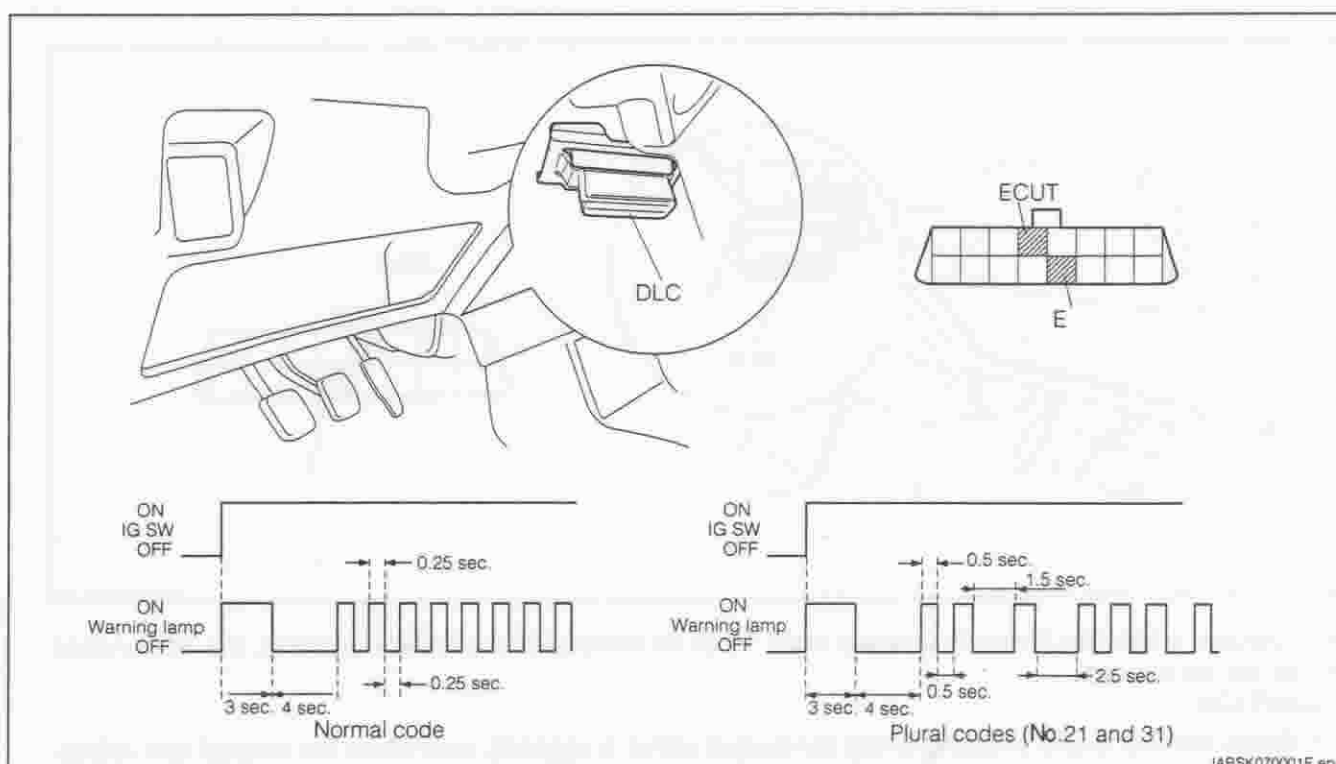
2. Turn the ignition switch to "ON" and read the number of times the ABS warning lamp flashes.

#### CAUTION

- Connecting the connector in the wrong location could cause a malfunction, so make sure the connection is correct.

#### NOTE

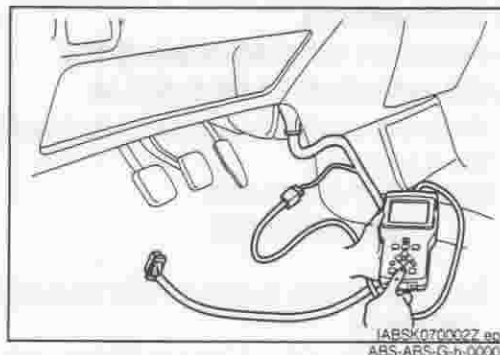
- When the situation is normal, the flashing interval is 0.25 seconds.
- If there is one malfunction code, the lamp will flash at an interval of 4 seconds and the same code will be output. If multiple codes are output, the respective codes will be output in order at an interval of 2.5 seconds, and after all the codes have been output, there will be another 4 second pause before output of the codes starts over again.
- When multiple codes are output, the codes will be output in the order of smallest code number first.



## ABS-16

### (2) DISPLAY FROM THE DIAGNOSTIC TESTER (DS-21)

1. Connect the diagnostic tester (DS-21) to the check connector and display "Diagnosis Inspection."  
SST: 09991-87404-000

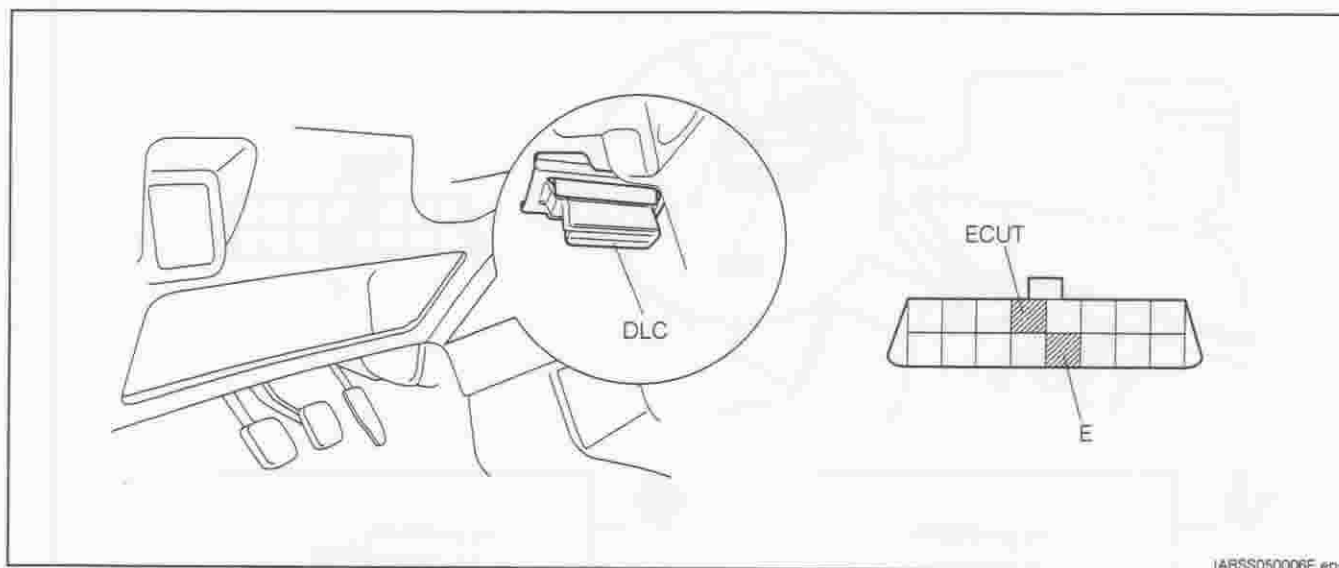


### 5-4-2 ERASE OF DIAGNOSIS CODE

1. This system diagnosis has a backup that uses an EEPROM (non-volatile ROM), so the diagnosis code is stored in memory even if the power is cut off. Therefore, the following method is the only the diagnosis code can be deleted.

#### (1) DELETE BY PRESSING THE BRAKE PEDAL

1. Use the SST to short circuit the check connector ECUT terminal with the E terminal, and then turn the ignition switch to "ON."  
SST: 09991-87404-000  
09991-87403-000

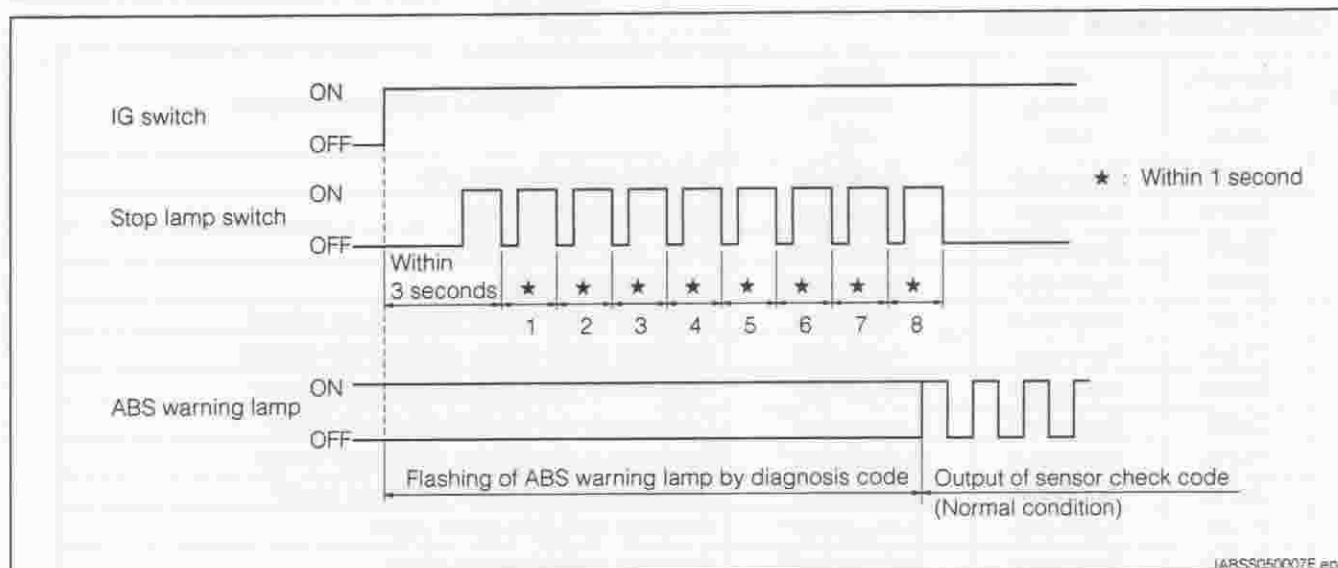


2. In addition, when the brake is pressed eight times or more with the following timing, the malfunction code will be deleted.

#### CAUTION

- When the first brake pressing is not conducted within 3 seconds, and when the second and subsequent brake pressings are not conducted within one second, the ABS warning lamp will remain lit.
- When the diagnosis code has been deleted but the trouble continues, the ABS warning lamp will remain lit.
- When the diagnostic code is deleted, the ABS warning lamp will output a test mode code and the sensor checking function (test mode) will be automatically executed. At this time eliminate the short circuit, and after turning the ignition switch to "OFF," drive the vehicle and inspect the function of each sensor.

Refer to ABS-19.



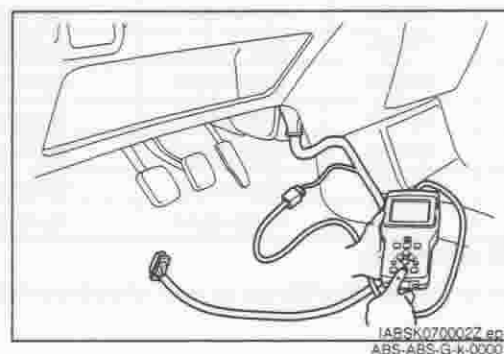
## (2) DELETE USING THE DIAGNOSTIC TESTER (DS-21)

1. Connect the diagnostic tester (DS-21) to the check connector and delete the code by using the "Erasing of malfunction code" function of "Individual function."

### NOTE

- After deleting the diagnosis code, the sensor checking function (test mode) will be automatically executed.

SST: 09991-87404-000



## ABS-18

### 5-4-3 DIAGNOSIS CODE TABLE

| Code No. | Diagnostic Trouble Code | ABS Warning LED | Brake Warning LED | Diagnosis malfunction contents                          |
|----------|-------------------------|-----------------|-------------------|---------------------------------------------------------|
| 11       | C0278                   | Illuminated     | Illuminated       | Solenoid relay has open wire.                           |
| 12       | C0279                   | Illuminated     | Illuminated       | Solenoid relay is shorted                               |
| 13       | C0273                   | Illuminated     | Extinguished      | Motor relay has open wire.                              |
| 14       | C0274                   | Illuminated     | Extinguished      | Motor relay is shorted                                  |
| 15       | C1241                   | Illuminated     | Illuminated       | Abnormal power supply voltage (Low voltage)             |
| 16       | C1224                   | Illuminated     | Illuminated       | Abnormal power supply voltage (High voltage)            |
| 21       | C0200                   | Illuminated     | Extinguished**    | Open wire or short in front right speed sensor          |
| 22       | C0205                   | Illuminated     | Extinguished**    | Open wire or short in front left speed sensor           |
| 23       | C0210                   | Illuminated     | Extinguished**    | Open wire or short in rear right speed sensor           |
| 24       | C0215                   | Illuminated     | Extinguished**    | Open wire or short in rear left speed sensor            |
| 25       | C1235                   | Illuminated     | Extinguished**    | Abnormal front right sensor signal                      |
| 26       | C1236                   | Illuminated     | Extinguished**    | Abnormal front left sensor signal                       |
| 27       | C1238                   | Illuminated     | Extinguished**    | Abnormal rear right sensor signal                       |
| 28       | C1239                   | Illuminated     | Extinguished**    | Abnormal rear left sensor signal                        |
| 31*      | C1245                   | Illuminated     | Extinguished      | Abnormal G sensor signal                                |
| 32*      | C1244                   | Illuminated     | Extinguished      | Open wire or short in G sensor system                   |
| 51       | C1251                   | Illuminated     | Extinguished      | ABS pump motor malfunction                              |
| 52       | C0226                   | Illuminated     | Illuminated       | Open wire or short in front right inlet solenoid valve  |
| 53       | C0226                   | Illuminated     | Illuminated       | Open wire or short in front right outlet solenoid valve |
| 54       | C0236                   | Illuminated     | Illuminated       | Open wire or short in front left inlet solenoid valve   |
| 55       | C0236                   | Illuminated     | Illuminated       | Open wire or short in front left outlet solenoid valve  |
| 56       | C0246                   | Illuminated     | Illuminated       | Open wire or short in rear right inlet solenoid valve   |
| 57       | C0246                   | Illuminated     | Illuminated       | Open wire or short in rear right outlet solenoid valve  |
| 58       | C0256                   | Illuminated     | Illuminated       | Open wire or short in rear left inlet solenoid valve    |
| 59       | C0256                   | Illuminated     | Illuminated       | Open wire or short in rear left outlet solenoid valve   |
| 77       | C1251                   | Illuminated     | Illuminated       | ABS ECU malfunctioning                                  |

\* : 4WD vehicle only

\*\* : The lamp goes on while two or more wheels are malfunctioning

ABS-ABS-G-m-00001

### 5-5 SENSOR CHECKING FUNCTION (TEST MODE)

#### 1. Regarding the test mode

The test mode is automatically executed 1. immediately after a malfunction code is deleted, and 2. when the ignition switch is turned to "ON" the first time after a new ABS actuator is installed.

When switching from the regular mode to the test mode, first, all of the test mode codes are stored in the ABS ECU memory. When the vehicle is driven, all the sensors are checked and the test mode codes for all items determined to be normal by the ABS ECU are deleted from memory. Therefore, when not driving or when driving when the test mode inspection conditions have not been met, the test mode codes in memory will not be deleted but will be displayed as erroneous test mode codes.

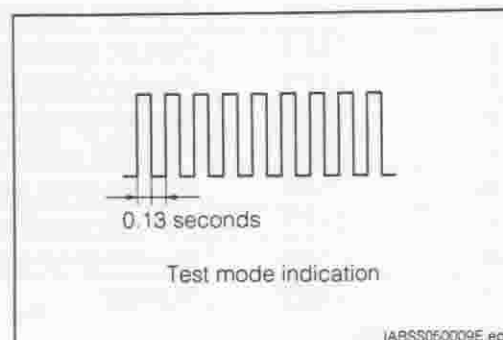
ABS-ABS-I-Z-00001

### 5-5-1 OUTPUT OF TEST MODE CODE

1. Eliminate the short circuit in the DLC and then turn the ignition switch to "ON."
  - (1) For 2WD vehicles, after the ABS warning lamp has been lit for approximately 3.0 seconds, check that it flashes at an interval of about 0.13 seconds.
  - (2) For 4WD vehicles, after the ABS warning lamp has been lit for approximately 3.0 seconds, check that it flashes slowly twice and then flashes at an interval of 0.13 seconds.

#### CAUTION

- At this time, if the ABS warning lamp remains lit, then there is probably a problem with the system. Check the diagnosis code and make repairs.



2. Start the engine.
3. Drive for at least 45km/h.

#### CAUTION

- When starting off or stopping, keep the steering wheel straight and accelerate and decelerate slowly. (Do not peel out.)

#### NOTE

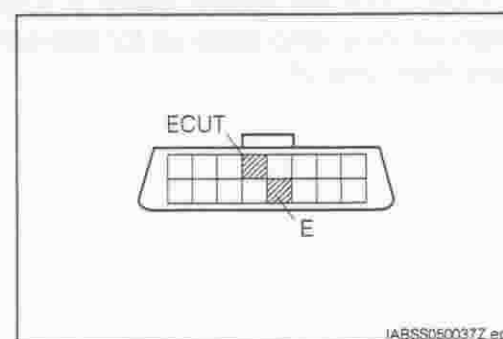
- If all of the check items are normal, all of the codes in memory will be deleted and the ABS warning lamp will turn off.

4. Stop the vehicle.
5. Use the SST to short circuit the check connector ECUT terminal with the E terminal, and then read how many times the ABS warning lamp flashes.

#### NOTE

- When the situation is normal, the flashing interval is 0.25 seconds.
- If there is one malfunction code, the lamp will flash at an interval of 4 seconds and the same code will be output. If multiple codes are output, the respective codes will be output in order at an interval of 2.5 seconds, and after all the codes have been output, there will be another 4 second pause before output of the codes starts over again.
- When multiple codes are output, the codes will be output in the order of smallest code number first.

SST: 09991-87404-000  
09991-87403-000



## ABS-20

### 5-5-2 TEST MODE CODE TABLE

| Code No. | Diagnostic Trouble Code | Diagnosis malfunction contents |                                      |
|----------|-------------------------|--------------------------------|--------------------------------------|
| 81       | C1271                   | Front right speed sensor       | Abnormal Speed sensor signal voltage |
| 82       | C1272                   | Front left speed sensor        |                                      |
| 83       | C1273                   | Rear right speed sensor        |                                      |
| 84       | C1274                   | Rear left speed sensor         |                                      |
| 85       | C1275                   | Front right speed sensor       | Abnormal Speed sensor signal         |
| 86       | C1276                   | Front left speed sensor        |                                      |
| 87       | C1277                   | Rear right speed sensor        |                                      |
| 88       | C1278                   | Rear left speed sensor         |                                      |
| *91      | C1279                   | G sensor                       | Abnormal G sensor signal             |

\*: 4WD vehicle only

ABS-ABS-I-m-00001

## 5-6 BASIC CHECK

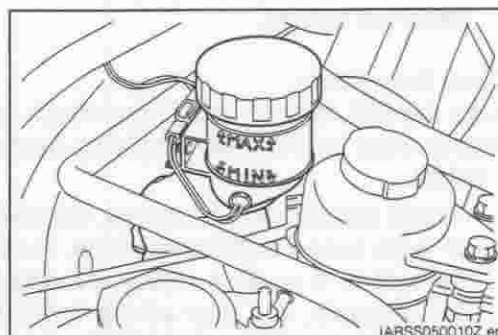
### 5-6-1 Battery voltage measurement

1. Measure the battery voltage while the engine is off.  
SPECIFIED VALUE: 10-14V (while engine is off)

ABS-ABS-I-B-00001

### 5-6-2 Brake fluid inspection

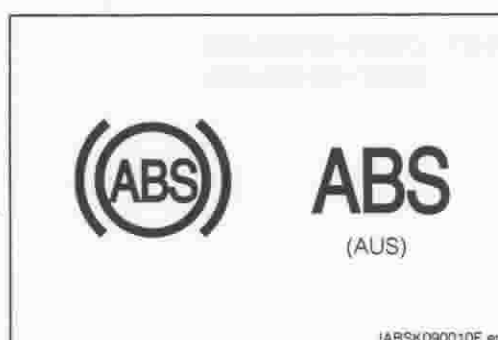
1. Check if the specified amount of brake fluid is in the master cylinder reservoir and make sure there are no brake system fluid leaks.



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ABS-ABS-I-F-00001

### 5-6-3 CHECKING OF ABS WARNING LAMP

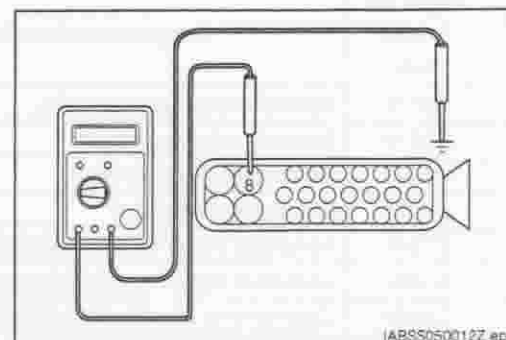
1. Check when the ignition switch is turned to "ON" if the ABS warning lamp lights up for approximately 3 seconds and then turns off.



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ABS-ABS-I-W-00001

#### 5-6-4 POWER VOLTAGE AND GROUND INSPECTION

1. Disconnect the ABS actuator connector and conduct a conductivity test between the vehicle's connector terminal ⑧ and the body ground.



ABS-ABS-F-Z-00001

#### 5-7 FAIL-SAFE FUNCTION

1. When an error occurs in the ABS ECU signal system, the ABS warning lamp will flash to indicate that an error has occurred. At the same time, the solenoid relay in the ABS actuator will be turned off, the sending of control signals to the solenoid prohibited, and the system returned to the normal brake function.
2. When an error occurs in the ABS ECU, the ABS warning lamp will flash, the error will be displayed, and the solenoid relay will be turned off.
3. In addition, if an error occurs that prevents the EBD from operating, the brake warning lamp will also turn on at the same time and EBD control will be prohibited.

ABS-ABS-F-Z-00001

#### 5-8 TROUBLE SHOOTING TO DIAGNOSIS CODE

1. To conduct troubleshooting for a particular system, conduct the appropriate troubleshooting based on the following table.

## ABS-22

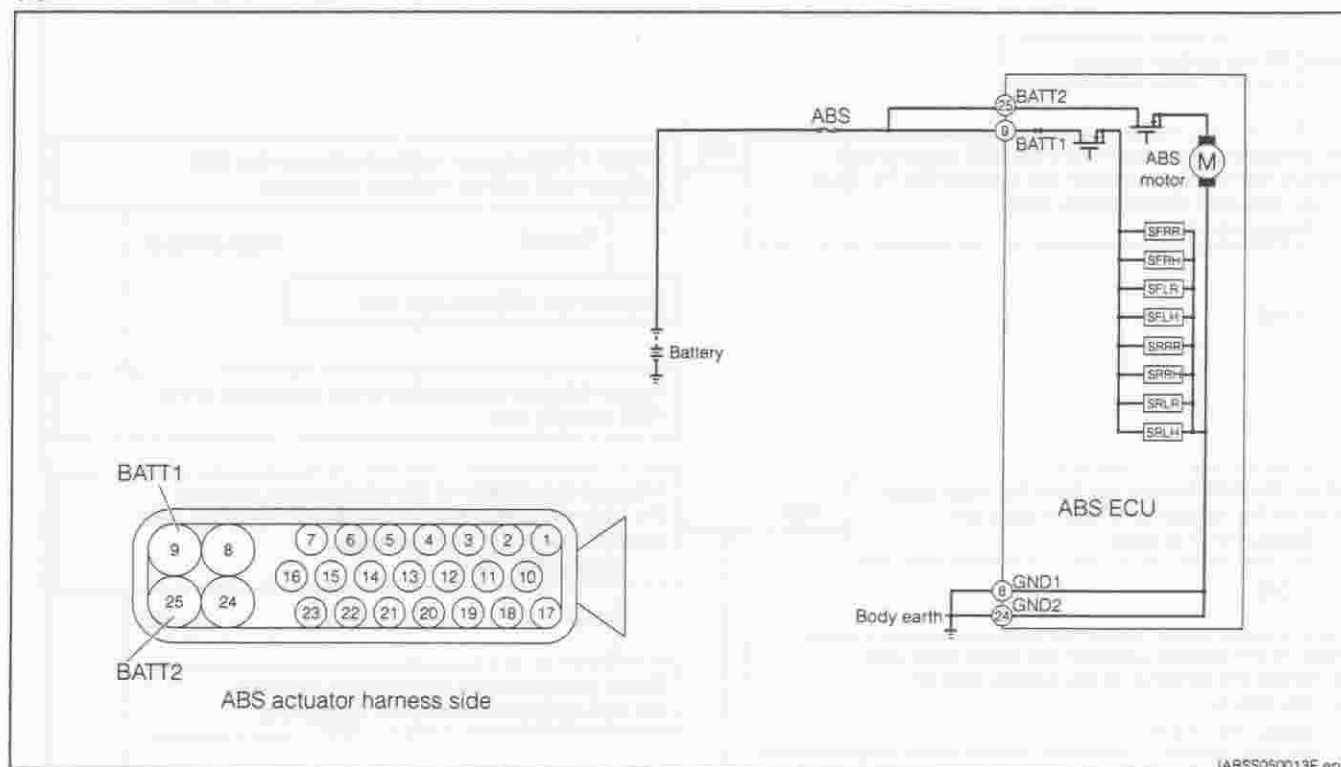
| Code No. | Diagnostic Trouble Code | Diagnosis malfunction contents                          | Refer to page                                 |
|----------|-------------------------|---------------------------------------------------------|-----------------------------------------------|
| 11       | C0278                   | Solenoid relay has open wire.                           | DIAGNOSIS CODE 11                             |
| 12       | C0279                   | Solenoid relay is shorted                               | Replace the ABS actuator                      |
| 13       | C0273                   | Motor relay has open wire.                              | DIAGNOSIS CODE 13                             |
| 14       | C0274                   | Motor relay is shorted                                  | Replace the ABS actuator                      |
| 15       | C1241                   | Abnormal power supply voltage (Low voltage)             | DIAGNOSIS CODE 15, 16                         |
| 16       | C1224                   | Abnormal power supply voltage (High voltage)            |                                               |
| 21       | C0200                   | Open wire or short in front right speed sensor          |                                               |
| 22       | C0205                   | Open wire or short in front left speed sensor           |                                               |
| 23       | C0210                   | Open wire or short in rear right speed sensor           |                                               |
| 24       | C0215                   | Open wire or short in rear left speed sensor            | DIAGNOSIS CODE 21, 22, 23, 24, 25, 26, 27, 28 |
| 25       | C1235                   | Abnormal front right sensor signal                      |                                               |
| 26       | C1236                   | Abnormal front left sensor signal                       |                                               |
| 27       | C1238                   | Abnormal rear right sensor signal                       |                                               |
| 28       | C1239                   | Abnormal rear left sensor signal                        |                                               |
| 31*      | C1245                   | Abnormal G sensor signal                                | DIAGNOSIS CODE 15, 16                         |
| 32*      | C1244                   | Open wire or short in G sensor system                   |                                               |
| 51       | C1251                   | ABS pump motor malfunction                              | Replace the ABS actuator                      |
| 52       | C0226                   | Open wire or short in front right inlet solenoid valve  |                                               |
| 53       | C0226                   | Open wire or short in front right outlet solenoid valve |                                               |
| 54       | C0236                   | Open wire or short in front left inlet solenoid valve   |                                               |
| 55       | C0236                   | Open wire or short in front left outlet solenoid valve  |                                               |
| 56       | C0246                   | Open wire or short in rear right inlet solenoid valve   | Replace the ABS actuator                      |
| 57       | C0246                   | Open wire or short in rear right outlet solenoid valve  |                                               |
| 58       | C0256                   | Open wire or short in rear left inlet solenoid valve    |                                               |
| 59       | C0256                   | Open wire or short in rear left outlet solenoid valve   |                                               |
| 77       | C1251                   | ABS ECU malfunctioning                                  | Replace the ABS actuator                      |

\* : 4WD vehicle only

ABS-ABS-L-Z-00001

# 5-8-1 DIAGNOSIS CODE 11

## (1) MAIN RELAY SYSTEM DIAGRAM



## (2) DIAGNOSIS CODE NO.11 OUTPUT CONDITIONS

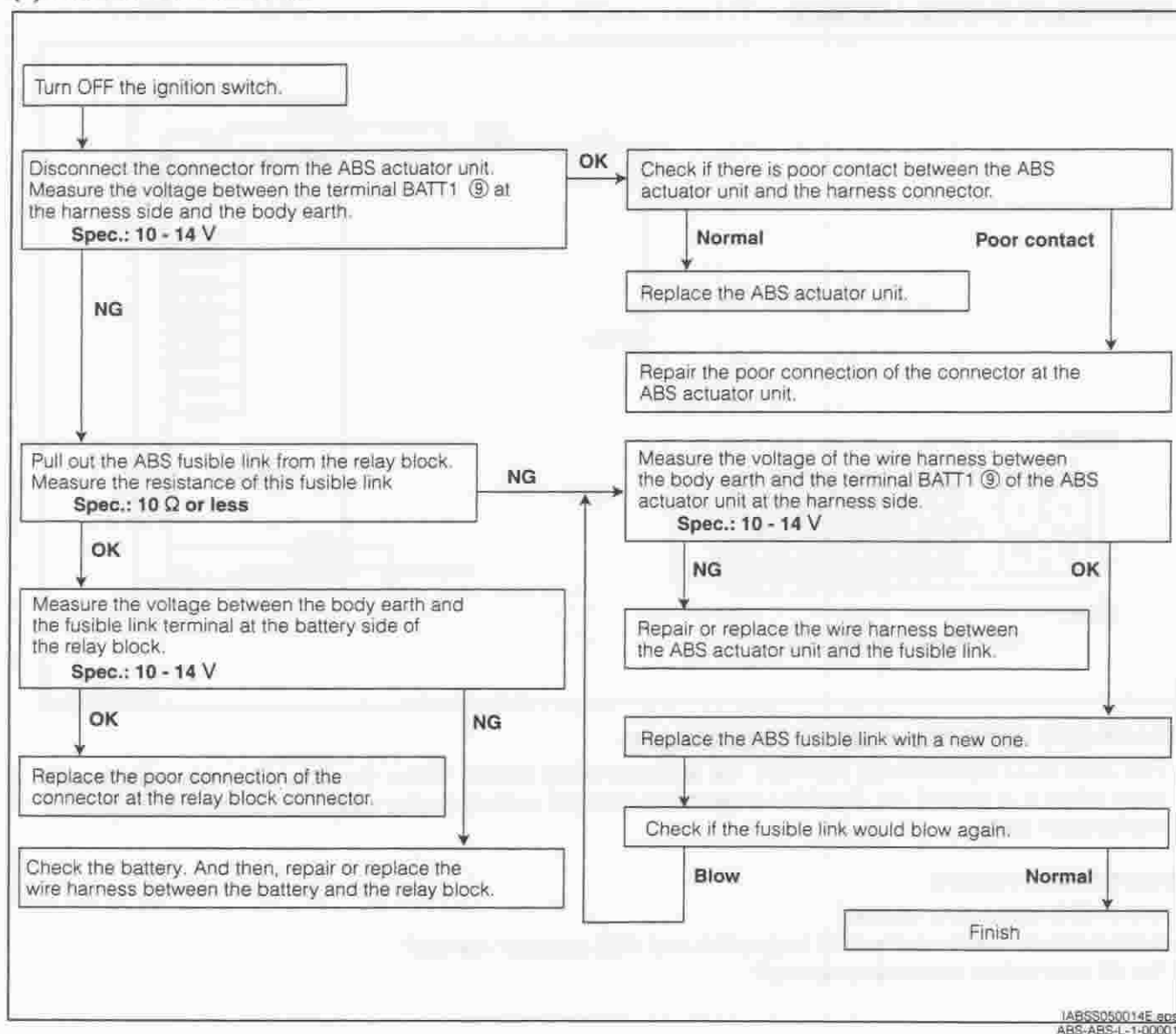
1. The ABS ECU continuously monitors the solenoid relay circuit. When the solenoid relay remains off even when it is turned on, the ECU determines that the solenoid relay system is open and outputs a malfunction code.

## (3) INSPECTION POINTS

1. Is the ABS fusible link normal?
2. Is the harness between the ABS fusible link and ABS actuator normal?
3. Are all connected connectors normal?

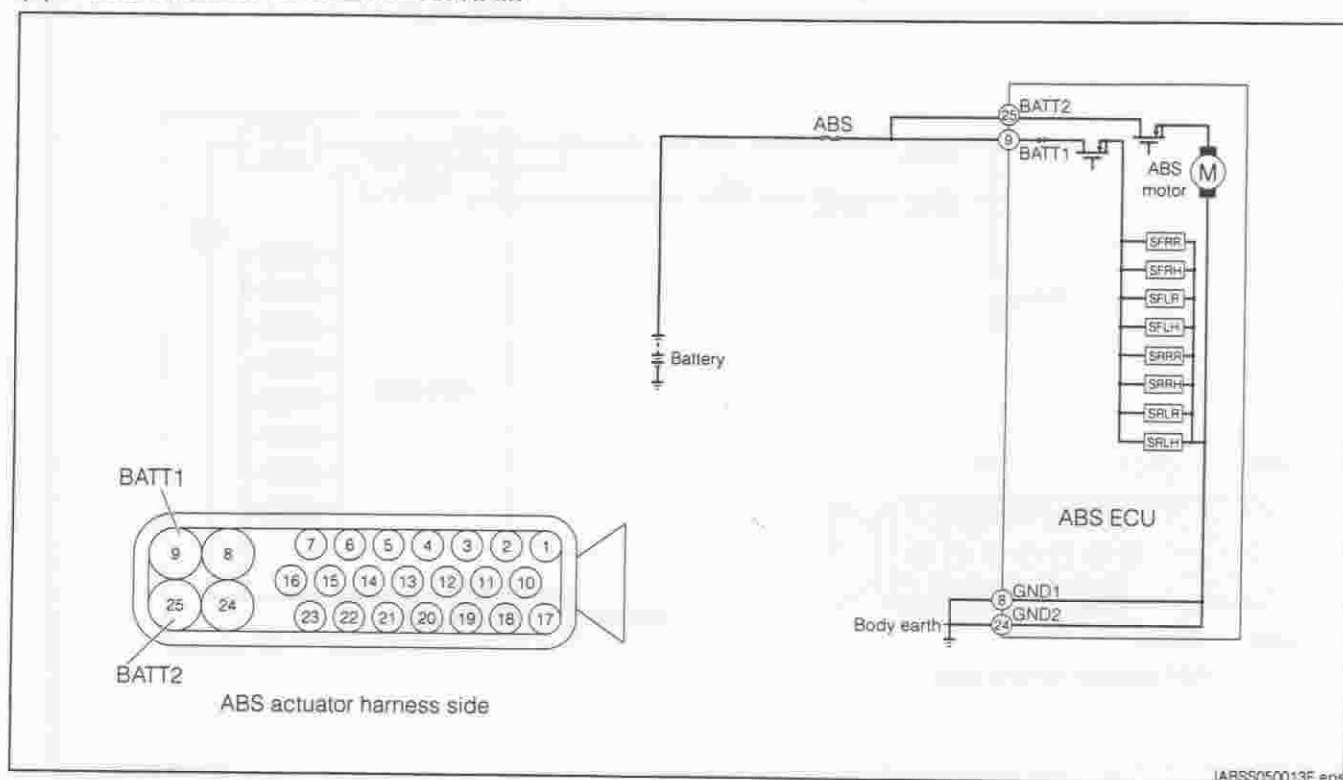
## ABS-24

### (4) INSPECTION METHOD



# 5-8-2 DIAGNOSIS CODE 13

## (1) MOTOR RELAY SYSTEM DIAGRAM



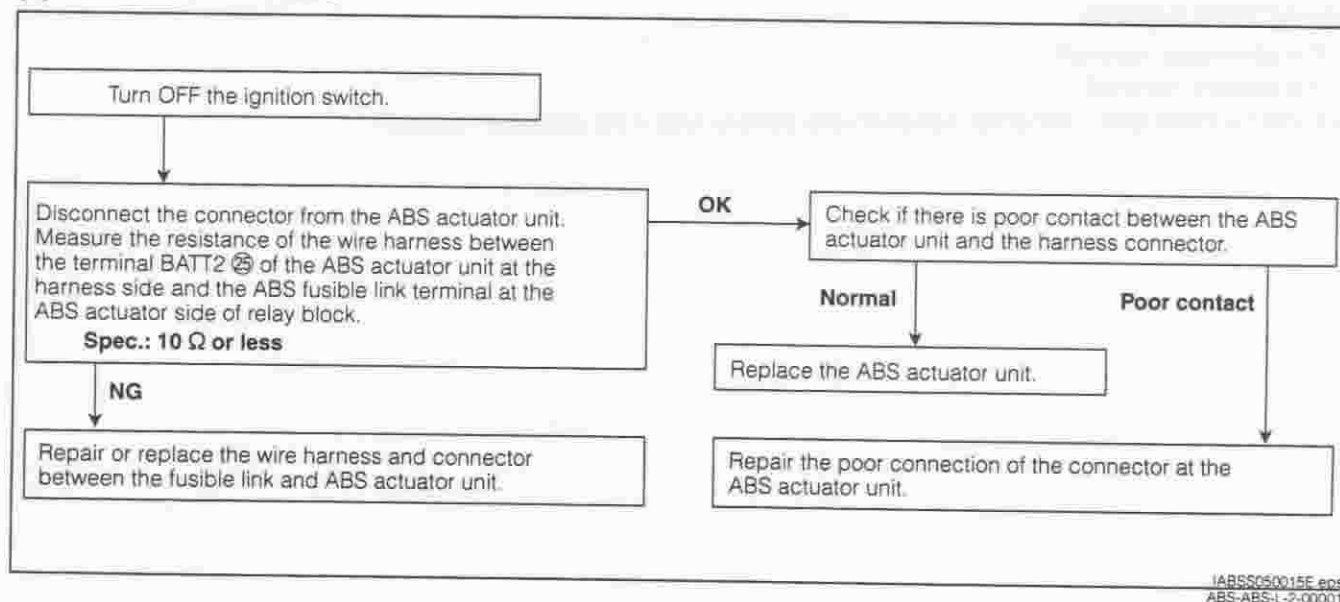
## (2) DIAGNOSIS CODE NO.13 OUTPUT CONDITIONS

1. The ABS ECU continuously monitors the motor relay circuit. When voltage is not applied to the ABS motor even when the motor relay is turned on, the ECU determines that the motor relay system is open and outputs a malfunction code.

## (3) INSPECTION POINTS

1. Is the harness between the ABS fusible link and ABS actuator normal?
2. Are all connected connectors normal?

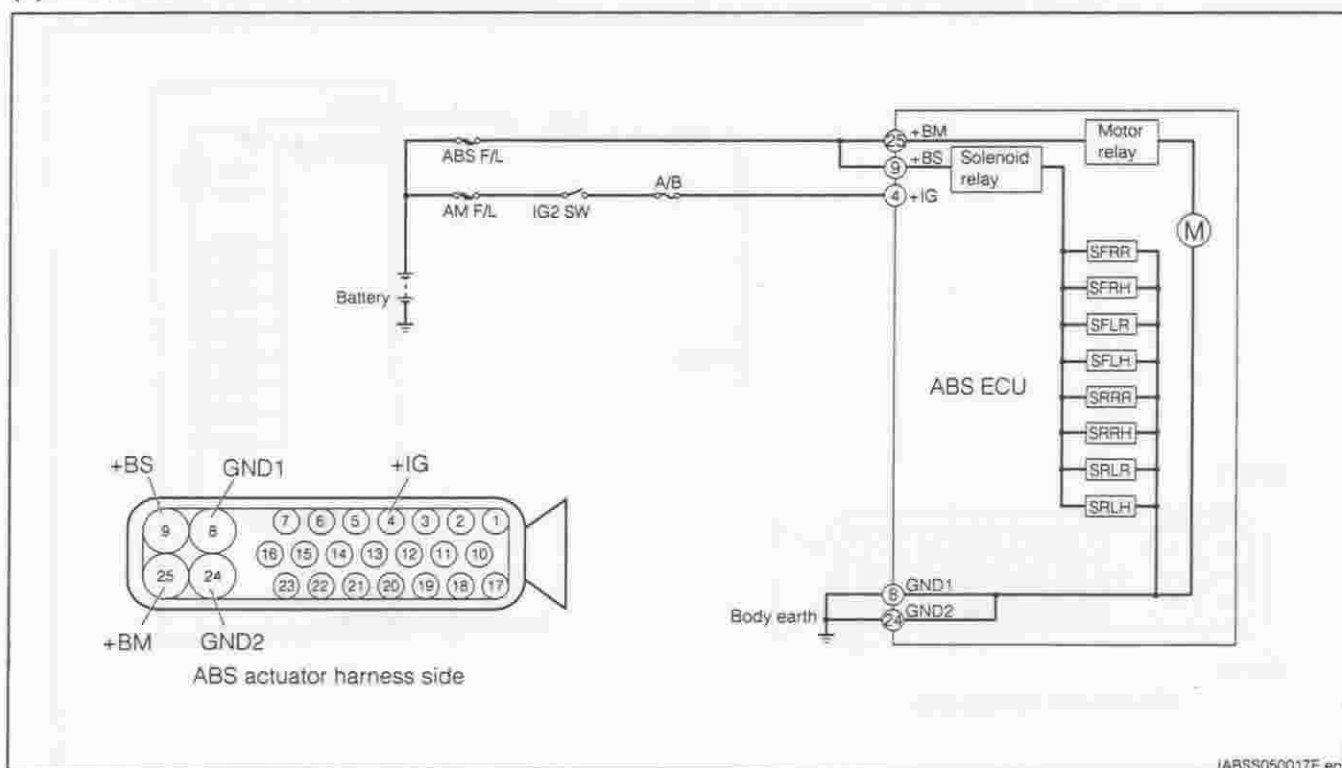
## (4) INSPECTION POINTS



## ABS-26

### 5-8-3 DIAGNOSIS CODE 15, 16

#### (1) ABS ECU POWER SYSTEM DIAGRAM



#### (2) DIAGNOSTIC CODE NO.15 OUTPUT CONDITIONS

1. The ABS ECU monitors the power voltage. When the ABS ECU power voltage remains at 9V or less while driving (3km/h or more), it is determined that there is a power voltage problem and a malfunction code is output.

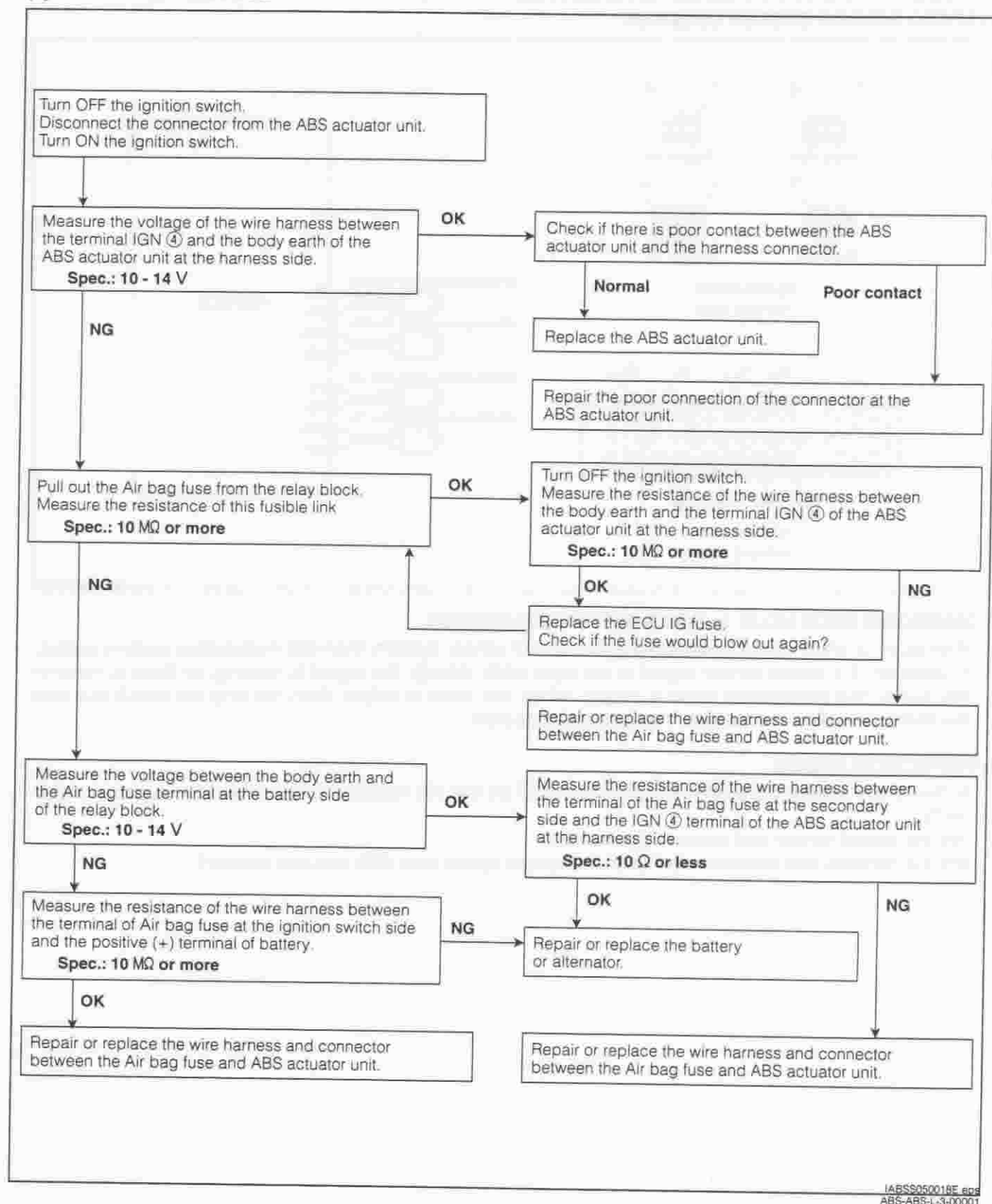
#### (3) DIAGNOSTIC CODE NO.16 OUTPUT CONDITIONS

1. The ABS ECU monitors the power voltage. When the ABS ECU power voltage remains at 18V or less while driving (3km/h or more), it is determined that there is a power voltage problem and a malfunction code is output.

#### (4) INSPECTION POINTS

1. Is the alternator normal?
2. Is the battery normal?
3. Are the harness and connector between the battery and ABS actuator normal?

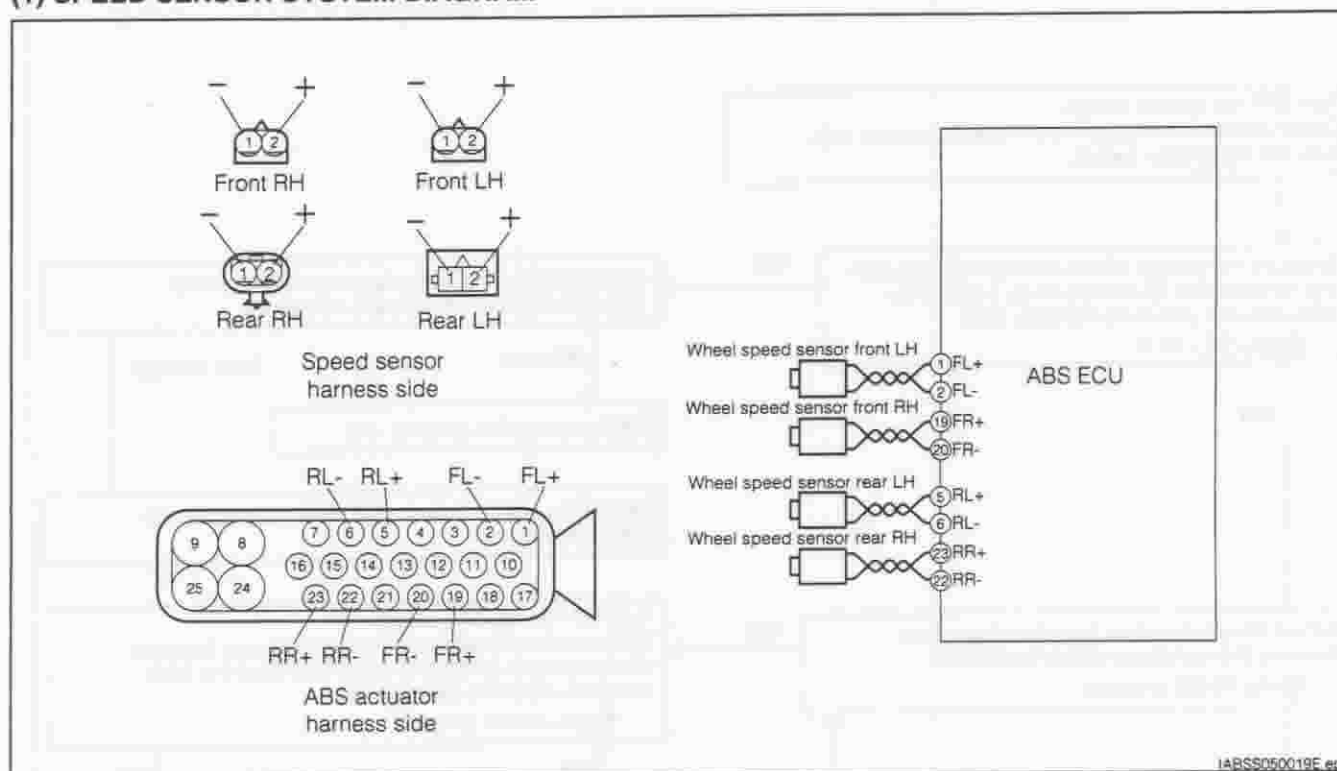
(5) INSPECTION METHOD



## ABS-28

5-8-4 DIAGNOSIS CODE 21, 22, 23, 24, 25, 26, 27, 28

### (1) SPEED SENSOR SYSTEM DIAGRAM



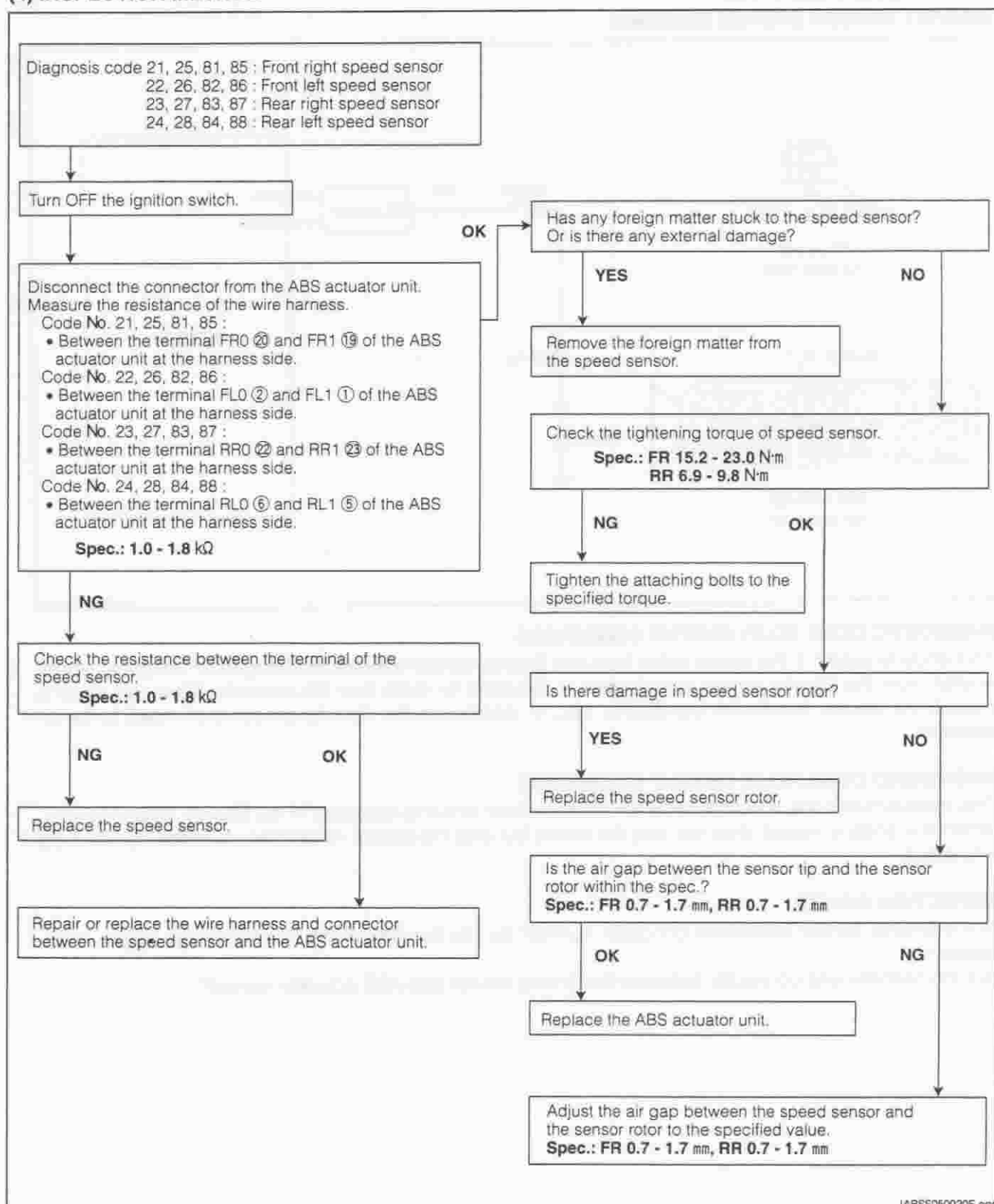
### (2) DIAGNOSIS CODE NO.21 to NO.28 OUTPUT CONDITIONS

1. If an open or short circuit is detected in the speed sensor system, then this malfunction code is output. In addition, if a speed sensor signal is not input while driving, the signal is missing, or there is noise in the signal, this malfunction code is output. When this code is output, then not only the circuit but also the sensor installation condition needs to be inspected.

### (3) INSPECTION POINTS

1. Is the speed sensor installation condition normal? (Is this the reason the speed sensor output is unstable?)
2. Are the speed sensor and sensor rotor normal?
3. Are the harness and connector between the speed sensor and ABS actuator normal?

#### (4) INSPECTION METHOD

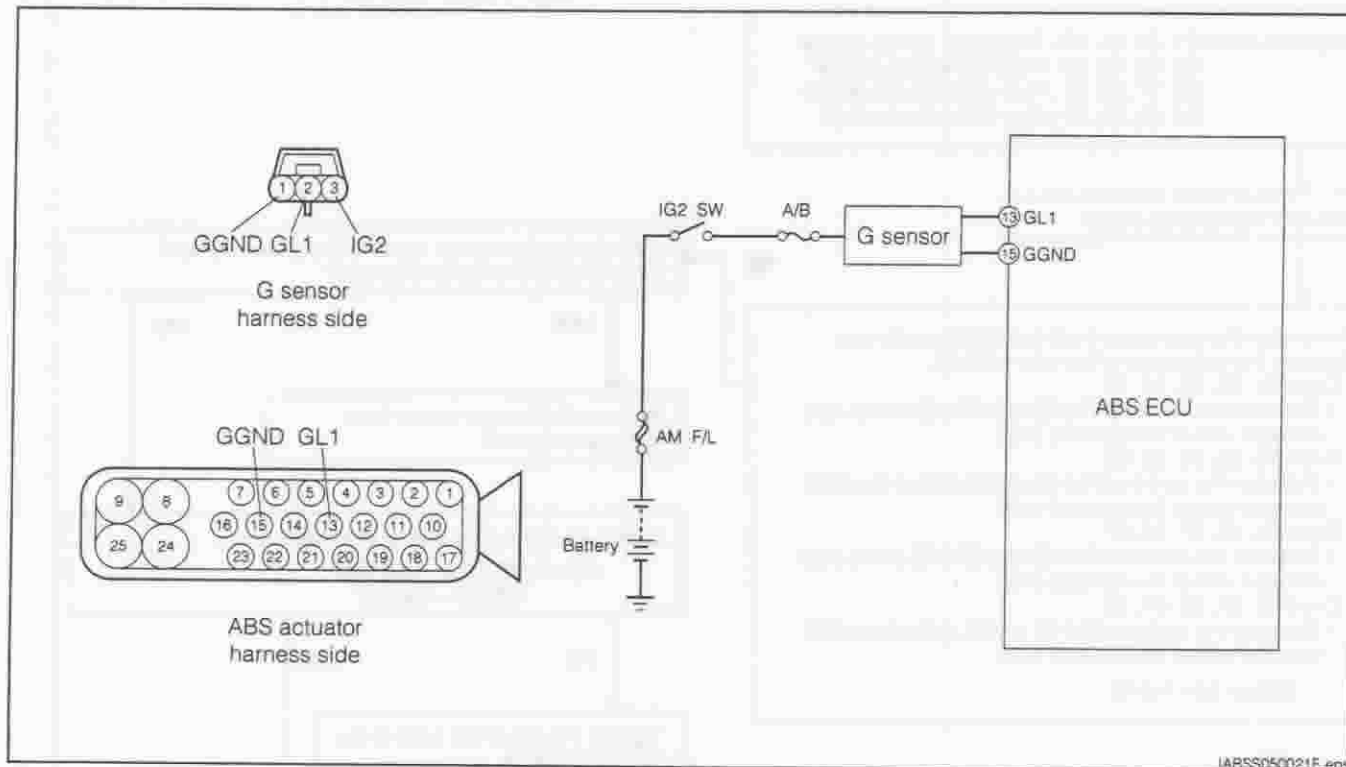


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ABS-ABS-L-4-00001

## ABS-30

### 5-8-5 DIAGNOSIS CODE 31, 32

#### (1) GRAVITY SENSOR SYSTEM DIAGRAM



#### (2) DIAGNOSTIC CODE NO.31 OUTPUT CONDITIONS

1. This code is output if the output value from the Gravity sensor remains unchanged or abnormal acceleration from the Gravity sensor output value is detected for more than 60 seconds. When this code is output, the sensor installation conditions, etc., in addition to the Gravity sensor itself need to be inspected.

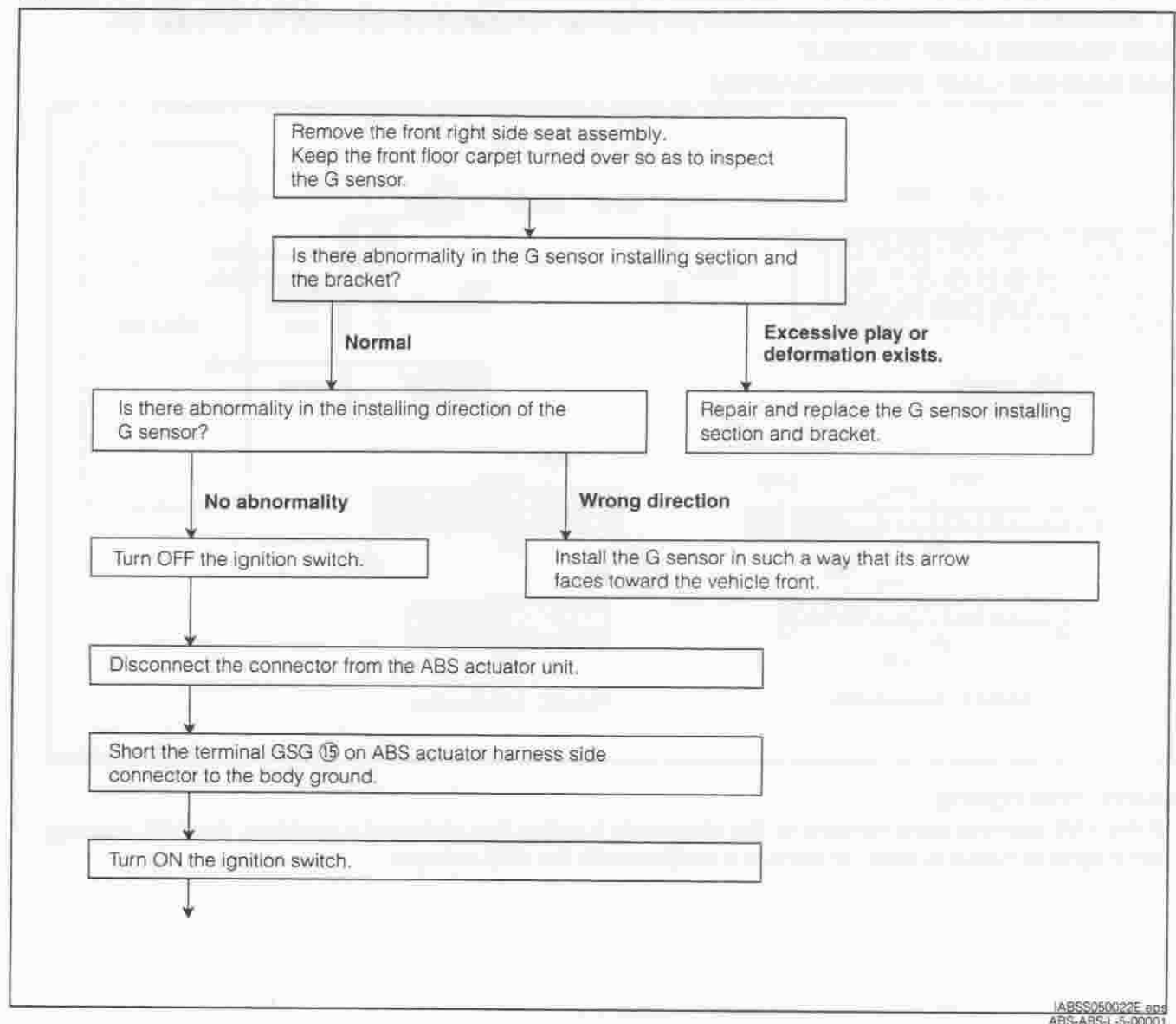
#### (3) DIAGNOSTIC CODE NO.32 OUTPUT CONDITIONS

1. This malfunction code is output when an open or short circuit is detected in the Gravity sensor system. When this code is output, then not only the circuit but also the sensor installation condition needs to be inspected.

#### (4) INSPECTION POINTS

1. Is the Gravity sensor installation condition normal? (Is this the reason the Gravity sensor output is unstable?)
2. Are the harness and connector between the Gravity sensor and ABS actuator normal?

(5) INSPECTION METHOD



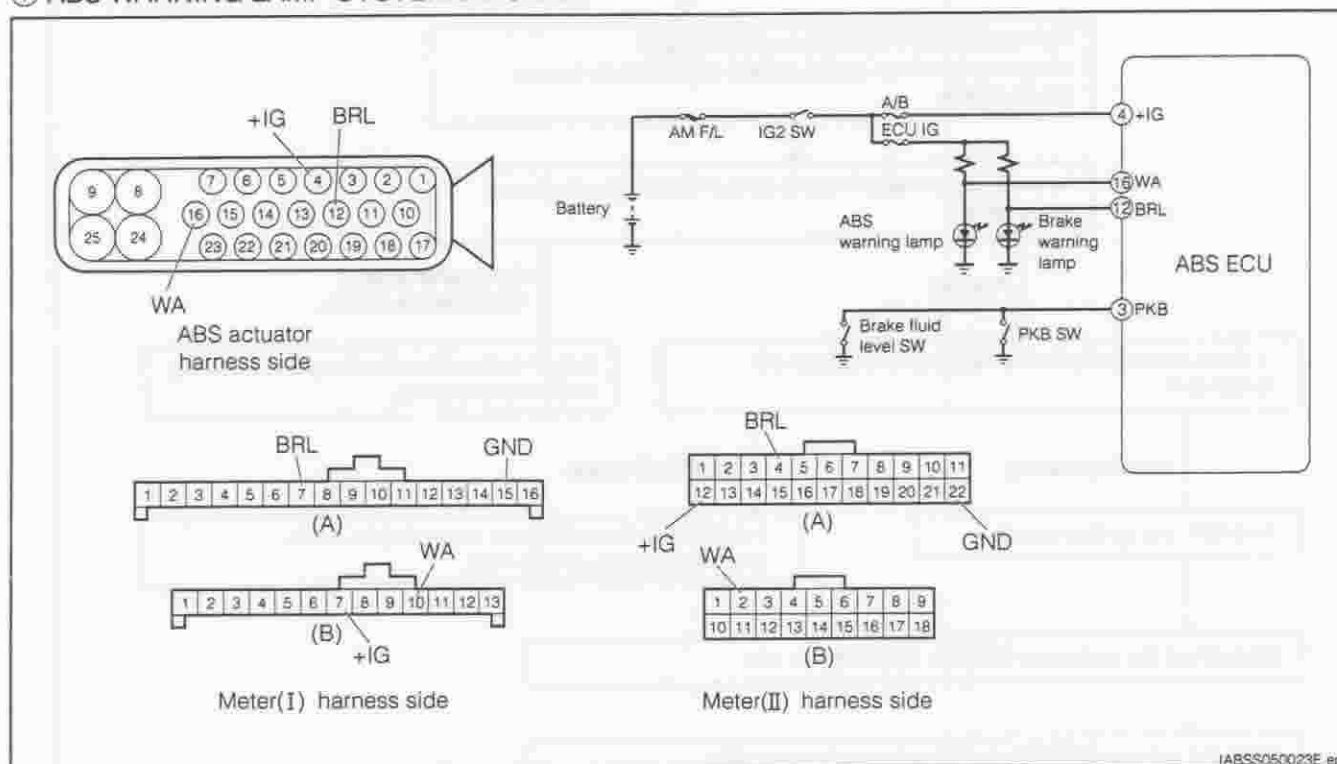
## ABS-32

### 5-9 TROUBLE SHOOTING TO TROUBLE PHENOMENA

#### 5-9-1 WARNING LAMP REMAINS ILLUMINATED EVEN AFTER IGNITION SWITCH IS TURNED ON.

##### (1) ABS WARNING LAMP TROUBLE

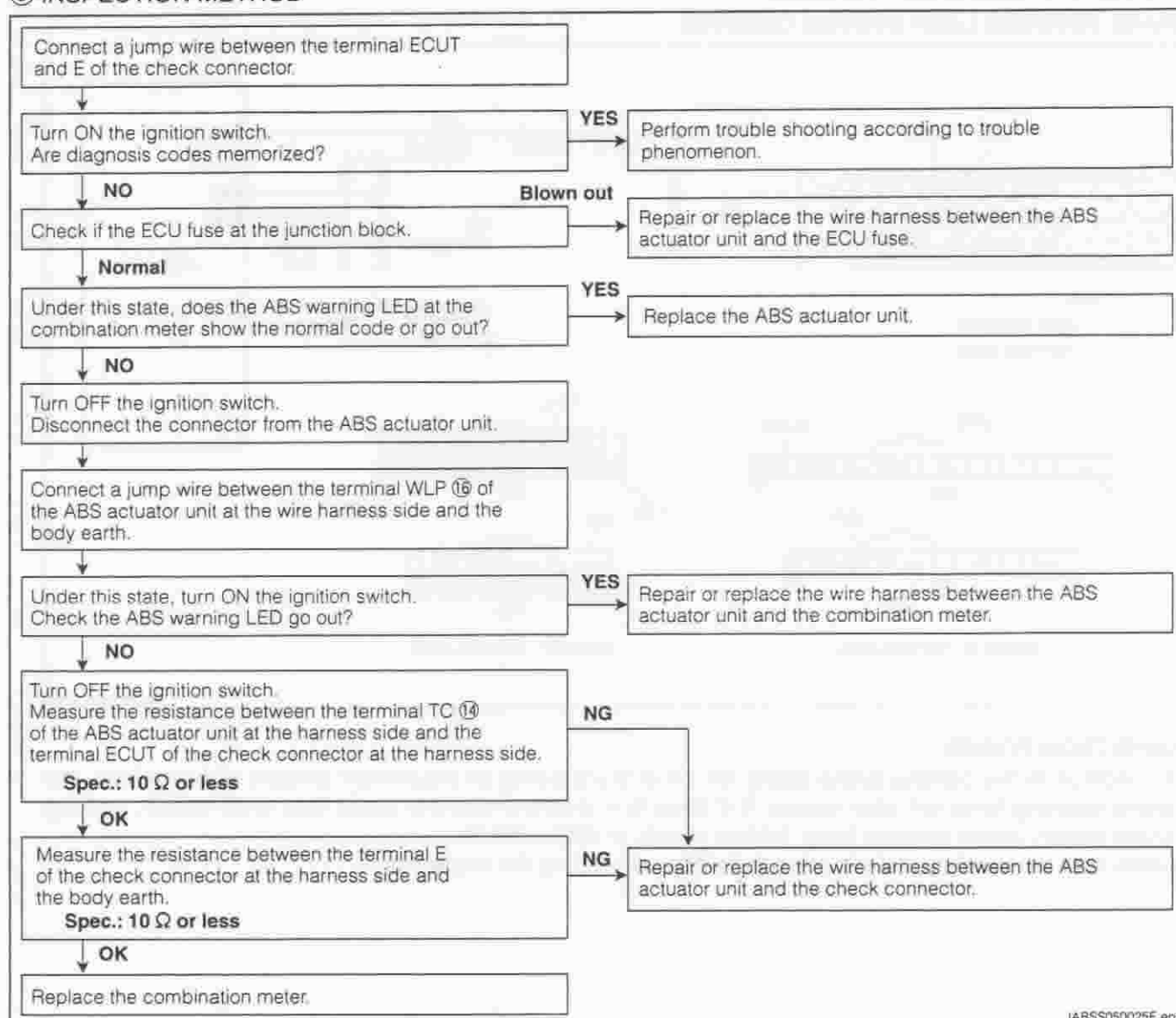
##### ① ABS WARNING LAMP SYSTEM DIAGRAM



##### ② INSPECTION POINTS

1. If the ABS warning lamp remains lit, the diagnostic function has detected a problem, the ABS warning lamp lighting circuit is open, or there is a problem with the ABS actuator.

③ INSPECTION METHOD

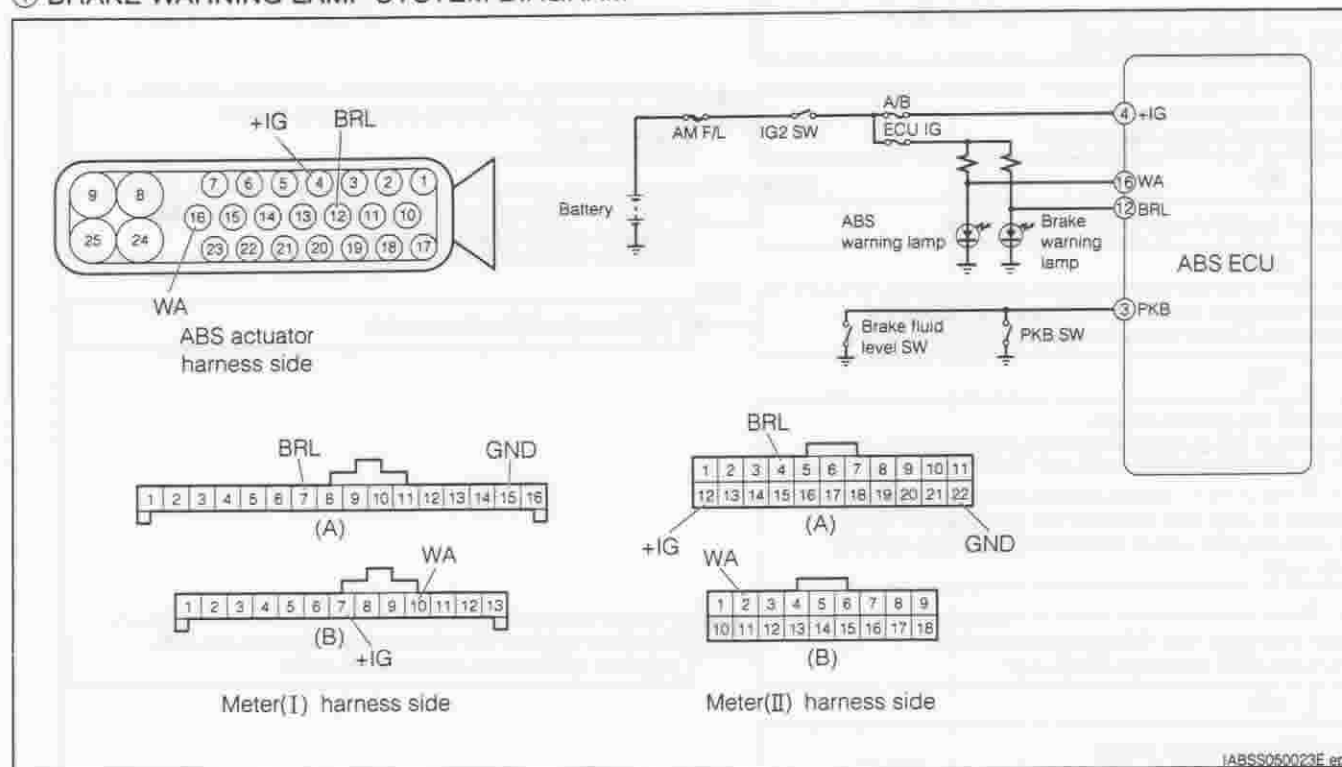


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## ABS-34

### (2) BRAKE WARNING LAMP TROUBLE

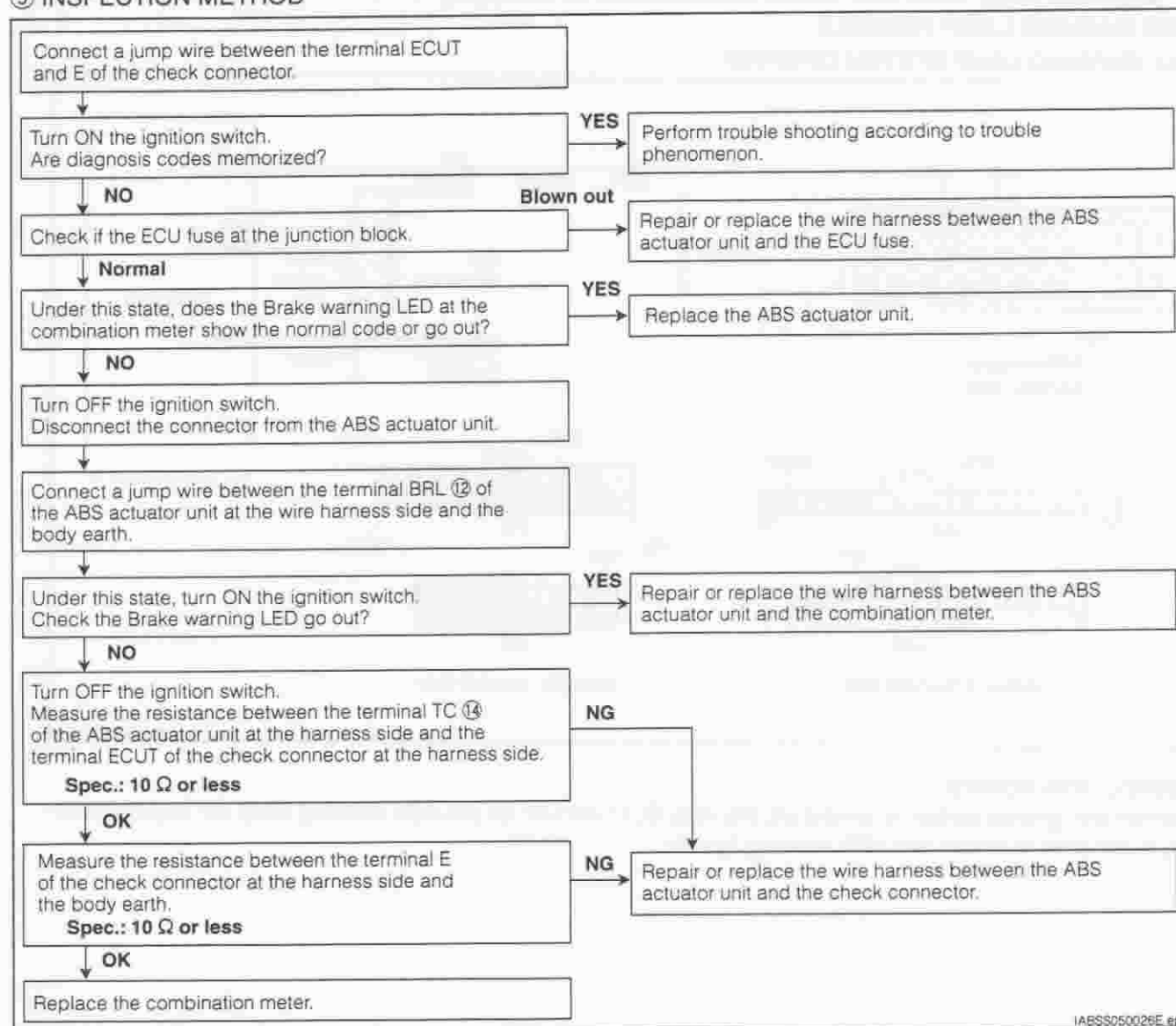
#### ① BRAKE WARNING LAMP SYSTEM DIAGRAM



#### ② INSPECTION POINTS

1. In addition to the parking brake being left on or there being an insufficient amount of brake fluid, the brake warning lamp will also remain lit if there is a problem with the brake fluid level switch, parking brake switch, brake warning lamp lighting circuit, or ABS actuator. Make sure the parking brake is released while conducting the inspection.

### ③ INSPECTION METHOD

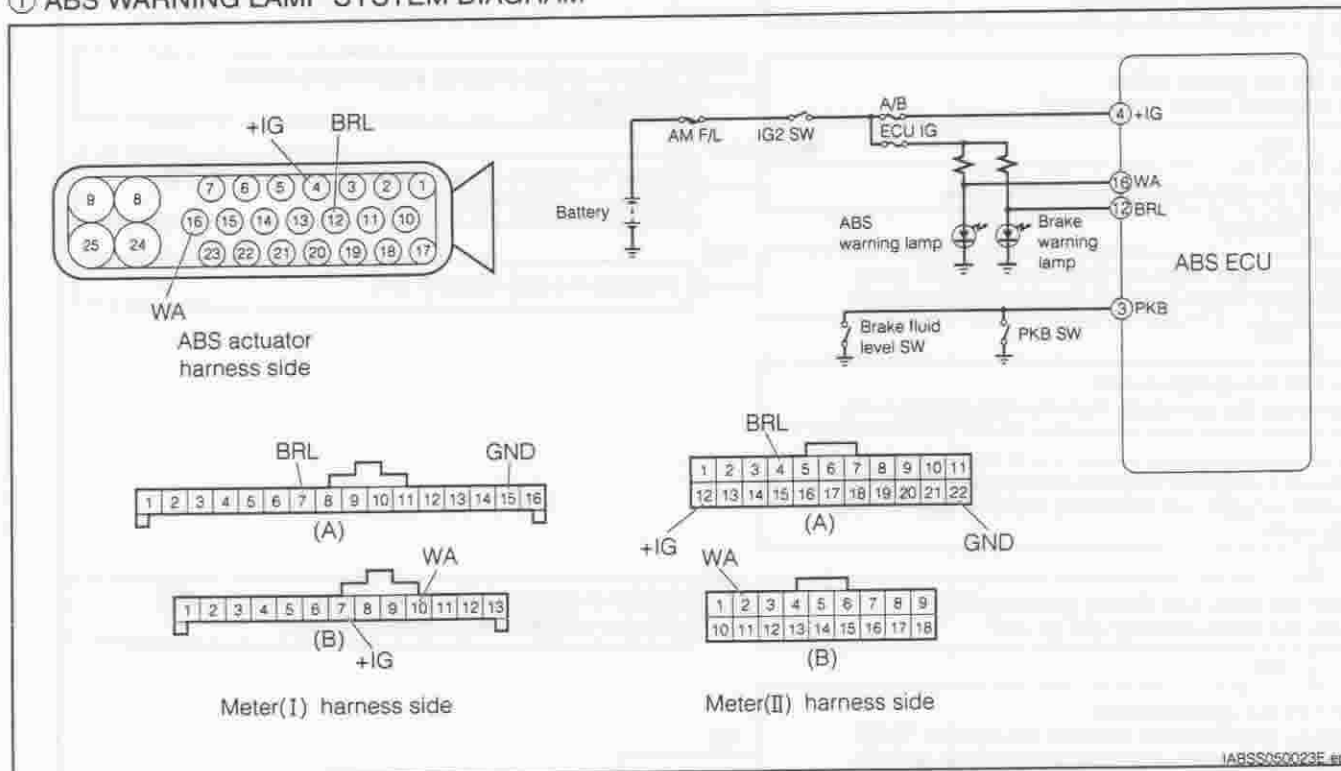


## ABS-36

### 5-9-2 WARNING LAMP WILL NOT GLOW IMMEDIATELY AFTER IGNITION SWITCH IS TURNED ON

#### (1) ABS WARNING LAMP TROUBLE

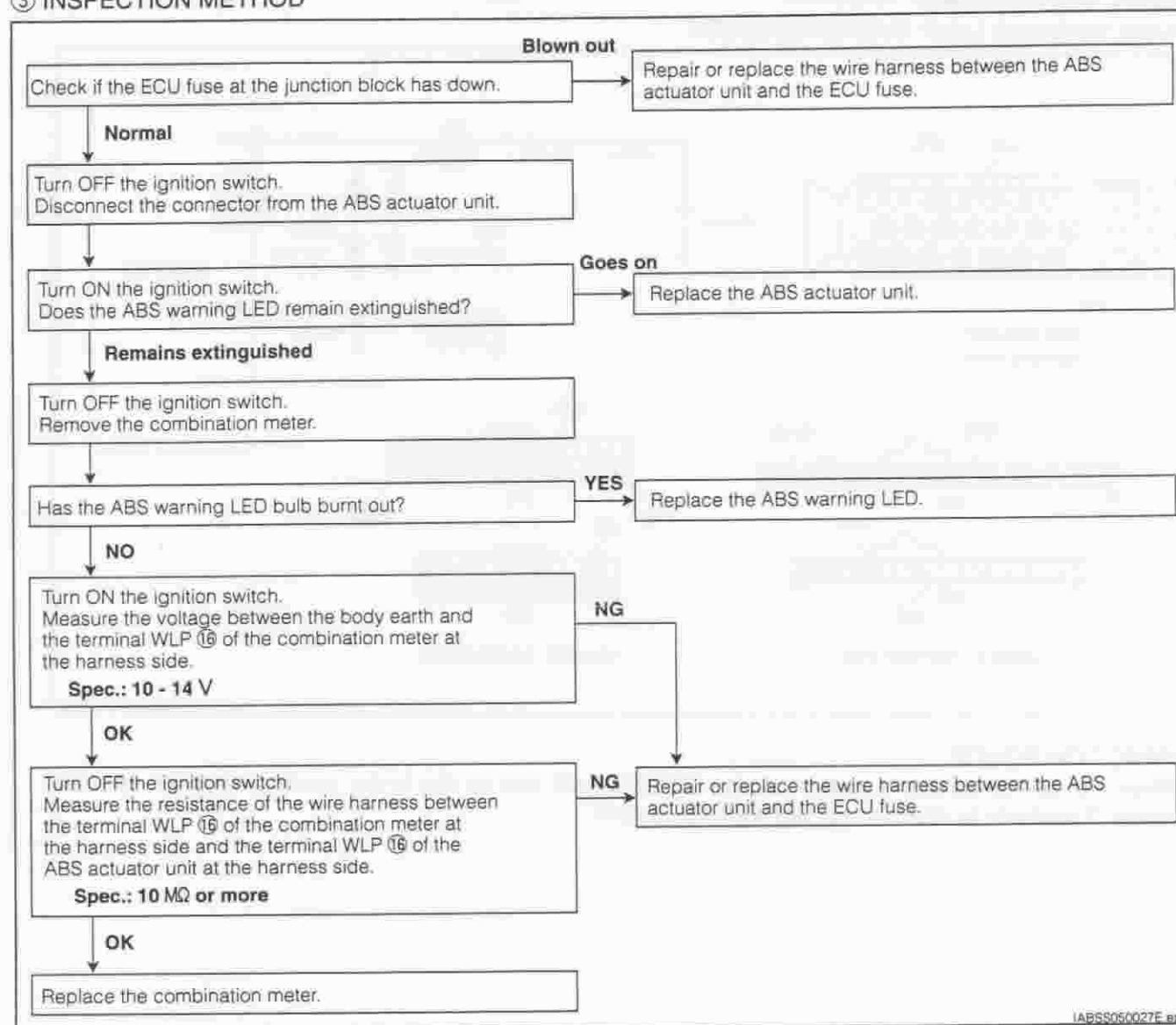
##### ① ABS WARNING LAMP SYSTEM DIAGRAM



##### ② INSPECTION POINTS

1. When the ignition switch is turned on, the ABS ECU will turn on the ABS warning lamp for approximately 3 seconds to check the ABS warning system.

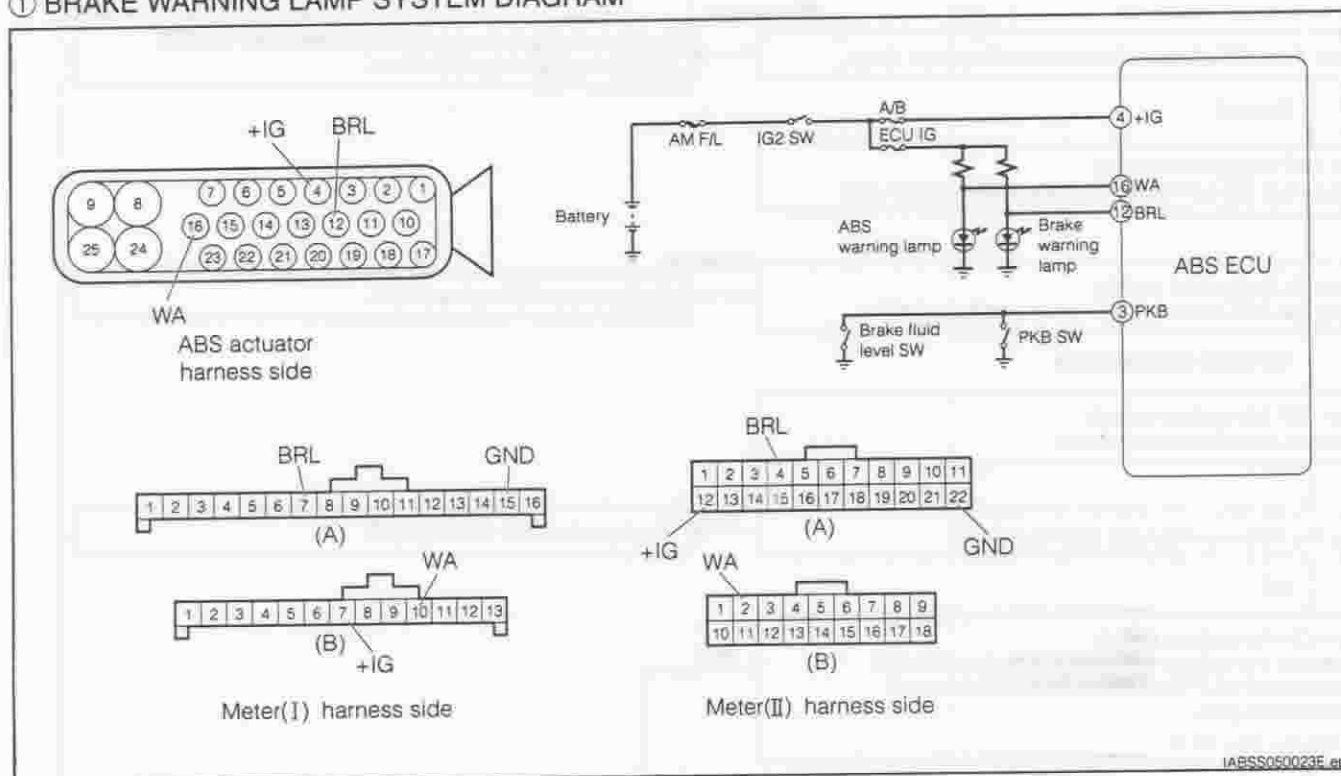
③ INSPECTION METHOD



## ABS-38

### (2) BRAKE WARNING LAMP TROUBLE

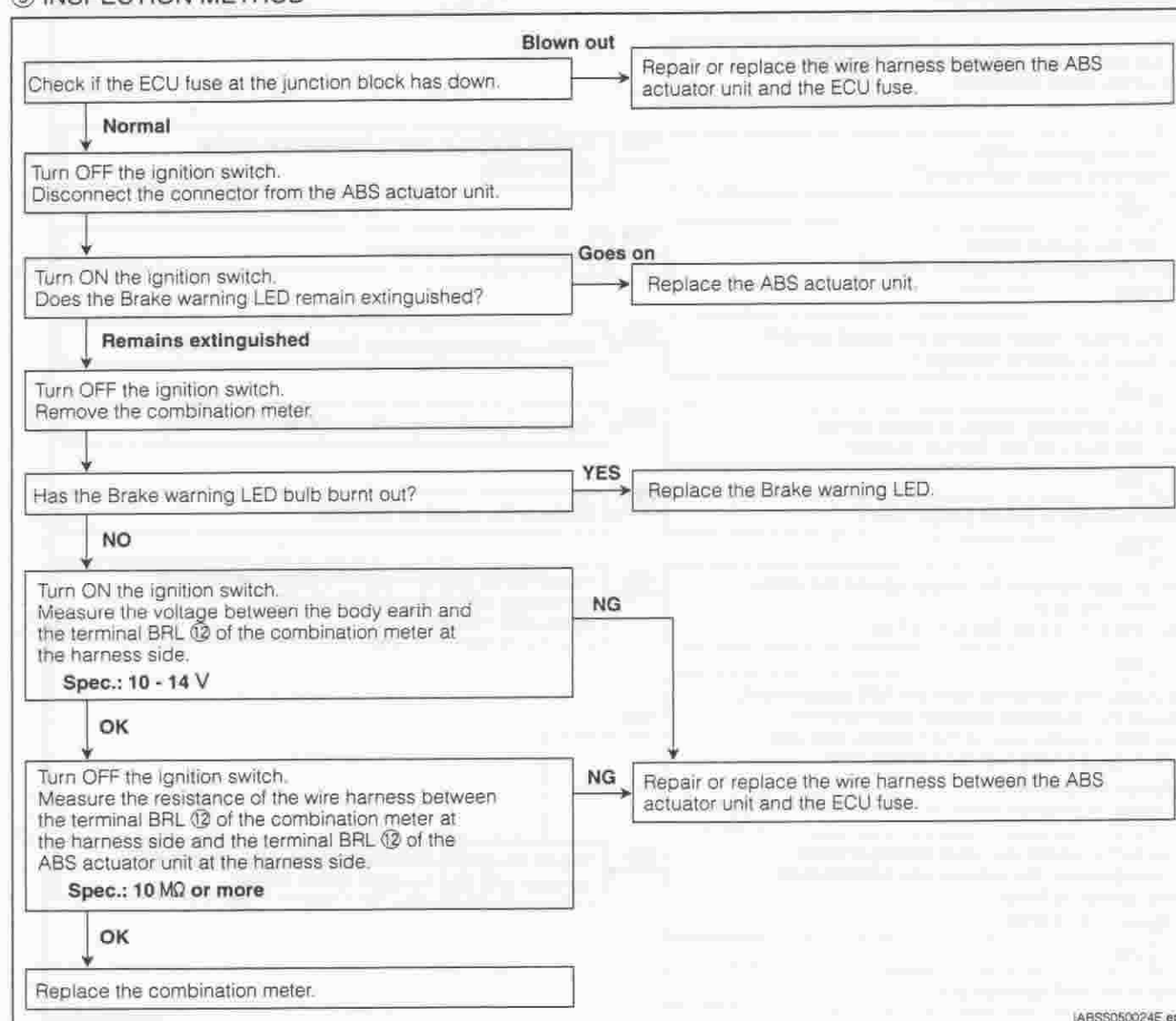
#### ① BRAKE WARNING LAMP SYSTEM DIAGRAM



#### ② INSPECTION POINTS

1. When the ignition switch is turned on, the ABS ECU will turn on the brake warning lamp for approximately 3 seconds to check the brake warning system.

### ③ INSPECTION METHOD



IABSS050024E.eps  
ABS-ABS-H-2-00001

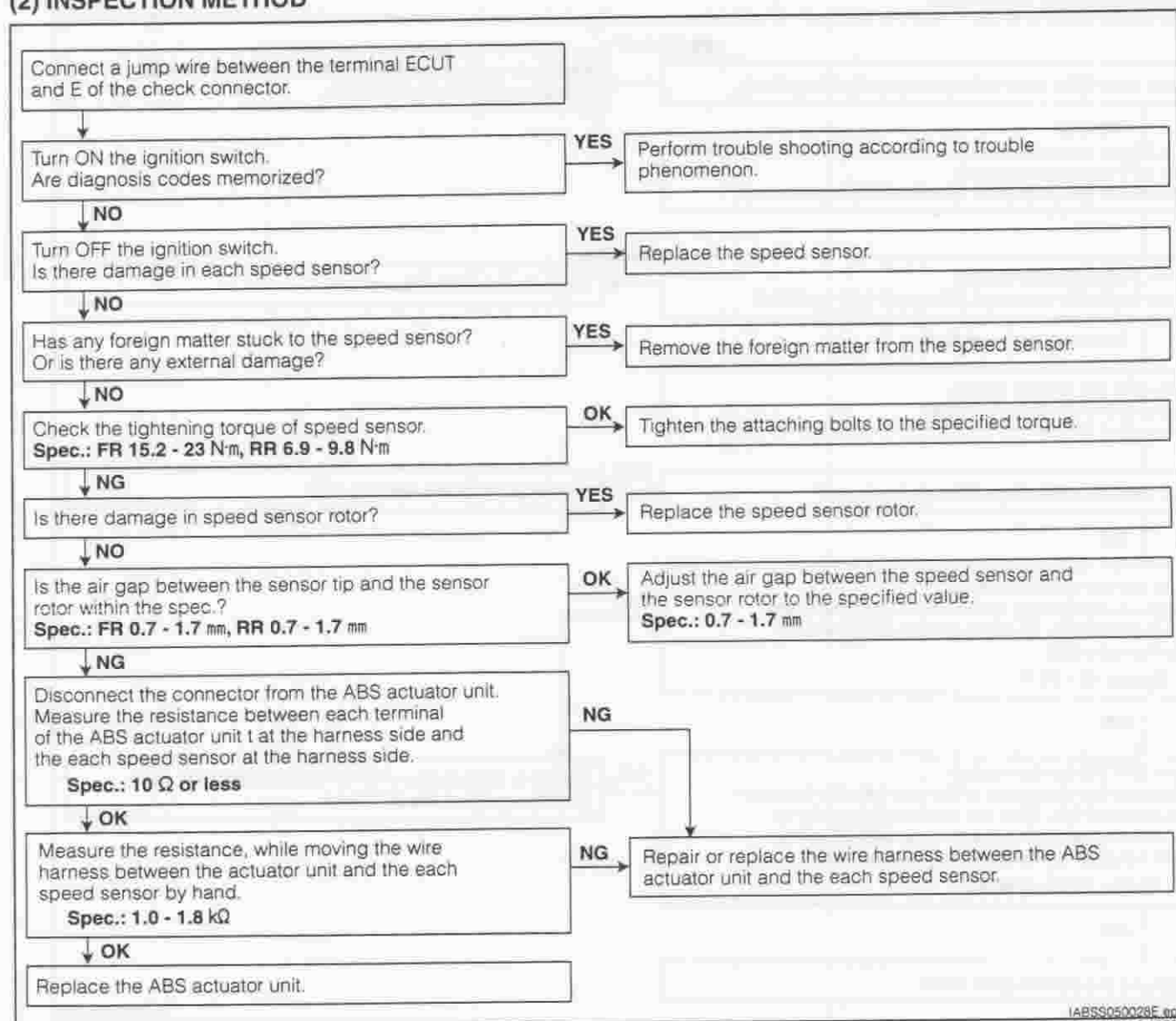
**5-9-3 THE ABS WARNING LAMP TURNS ON WHEN THERE IS A PROBLEM WITH BRAKE OPERATION (ONLY THE BRAKES ON ONE SIDE WORK, THE BRAKING EFFECT IS INSUFFICIENT, THE ABS OPERATES DURING NORMAL BRAKING, THE PEDAL VIBRATES DURING ABS OPERATION) AND WHILE DRIVING.**

#### (1) INSPECTION POINTS

1. Different driving conditions and road conditions make it difficult to determine the problem, when the diagnostic code shows a normal code, conduct an inspection following the flow chart.

# ABS-40

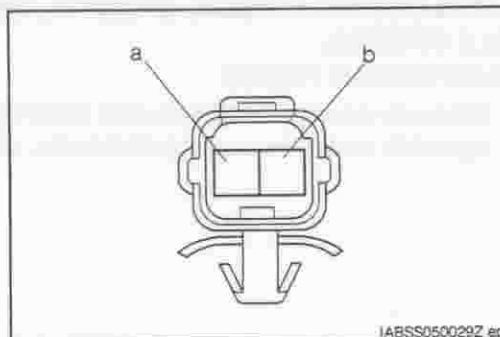
## (2) INSPECTION METHOD



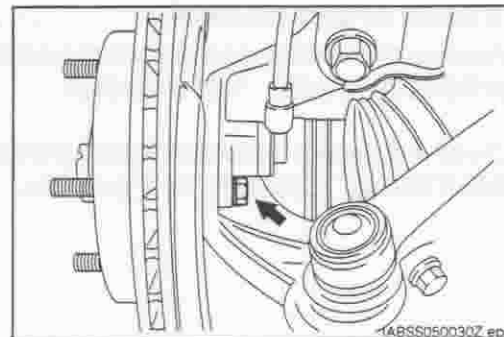
## 5-10 UNIT CHECK

### 5-10-1 FRONT SPEED SENSOR

1. Measure the resistance between the connector terminals.  
SPECIFIED VALUE:  $1.25 \pm 0.15 \text{ k}\Omega$



2. Check the sensor installation condition.  
SPECIFIED VALUE: The sensor should not float up from the sensor installation surface.



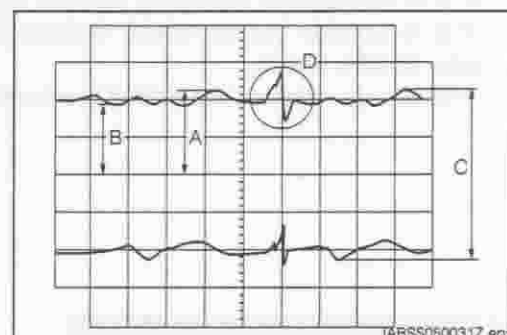
3. Check the sensor installation bolt tightness.  
TIGHTENING TORQUE:  $19.1 \pm 3.9\text{N}\cdot\text{m}$
4. Check if debris is stuck to the end of the sensor.  
SPECIFIED VALUE: There should not be more than 1mm stuck to the end of the sensor.
5. Remove the brake disc and check the air gap between the sensor and rotor.  
TIGHTENING TORQUE:  $1.2 \pm 0.5\text{mm}$

#### (1) INSPECTION USING AN OSCILLOSCOPE

1. The skid control sensor output waveform when driving at 20km/h or more should be as shown in the illustration.  
SPECIFIED VALUE: C is 0.5V or more  
B is 70% or more of A  
D does not occur

#### NOTE

- If C is outside the standard, replace the speed sensor.
- If B is outside the standard, replace the speed sensor rotor (front axle hub).
- If D occurs, inspect the end of the sensor.



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ABS-ABS-U-2-00001

#### 5-10-2 FRONT SPEED SENSOR ROTOR

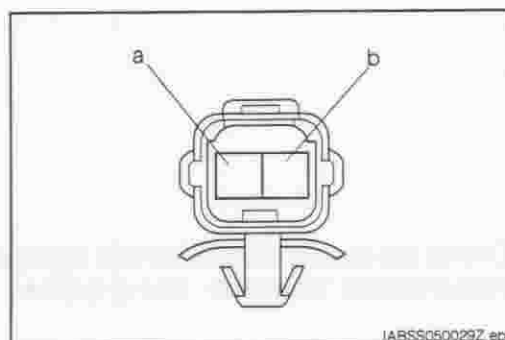
1. Inspect the axle hub speed sensor rotor.  
SPECIFIED VALUE: There should be no problems with the rotor, such as scratches, nicks, or deformation.

ABS-ABS-U-3-00001

## ABS-42

### 5-10-3 REAR SPEED SENSOR

1. Measure the resistance between the connector terminals.  
SPECIFIED VALUE:  $1.25 \pm 0.15\text{k}\Omega$
2. Check the sensor installation bolt tightness.  
TIGHTENING TORQUE:  $19.1 \pm 0.4\text{N}\cdot\text{m}$



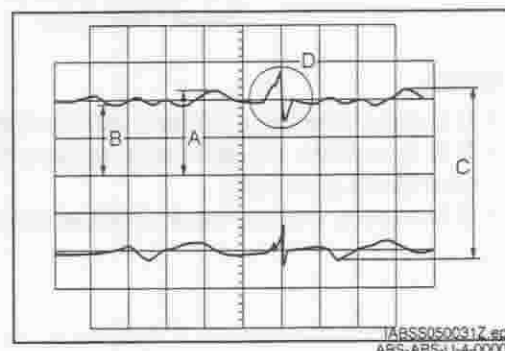
3. Check if debris is stuck to the end of the sensor.  
SPECIFIED VALUE: There should not be more than 1mm stuck to the end of the sensor.

### (1) INSPECTION USING AN OSCILLOSCOPE

1. The skid control sensor output waveform when driving at 20km/h or more should be as shown in the illustration.  
SPECIFIED VALUE: C is 0.5V or more  
B is 70% or more of A  
D does not occur

#### NOTE

- If C is outside the standard, replace the speed sensor.
- If B is outside the standard, replace the speed sensor rotor (brake drum).
- If D occurs, inspect the end of the sensor.



### 5-10-4 REAR SPEED SENSOR ROTOR

1. Remove the rear brake drum and inspect the speed sensor rotor.  
SPECIFIED VALUE: There should be no problems with the rotor, such as scratches, nicks, or deformation.

ABS-ABS-U-5-00001

### 5-10-5 GRAVITY SENSOR

1. Inspect the separate system troubleshooting No.31 and No.32 Gravity sensor systems.  
Refer to ABS-31.

ABS-ABS-U-8-00001

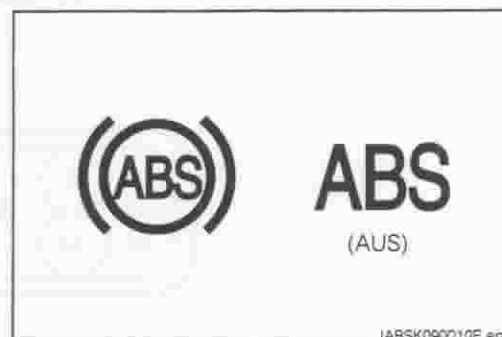
### 5-10-6 STOP LAMP SWITCH

1. Inspect the conductivity between the stop lamp switch connector terminals.  
SPECIFIED VALUE: When the brake pedal is depressed: There is conductivity  
When the brake pedal is not depressed: There is no conductivity

ABS-ABS-U-1-00001

### 5-10-7 ABS WARNING LAMP

1. Turn the ignition switch to "OFF," and disconnect the ABS actuator connector.
2. In this state, check if the ABS warning lamp comes on when the ignition switch is turned to "ON."



3. Next, check if the ABS warning lamp turns off when the disconnected ABS actuator's vehicle side connector ⑮ terminal is connected to the ground.

ABS-ABS-U-6-00001

### 5-10-8 BRAKE WARNING LAMP

1. Turn the ignition switch to "OFF," and disconnect the ABS actuator connector.
2. In this state, check if the brake warning lamp comes on when the ignition switch is turned to "ON."



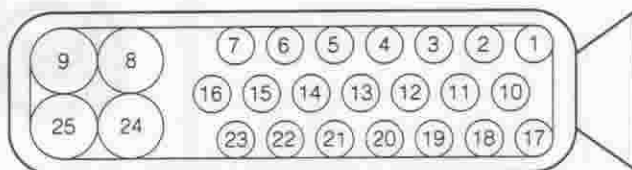
3. Next, check if the ABS warning lamp turns off when the disconnected ABS actuator's vehicle side connector ⑮ terminal is connected to the ground.

ABS-ABS-U-7-00001

### 5-10-9 ABS ECU

1. Conduct the following inspection with the engine turned off.
2. Check the battery voltage.  
SPECIFIED VALUE: 10-14V (when the ignition switch is "ON")
3. Check the conductivity between the ground terminal and the body ground.  
SPECIFIED VALUE: The resistance is 5Ω or less (when the ignition switch is "OFF")
4. Turn the ignition switch to "OFF," disconnect the actuator connector, and then check the voltage, resistance, and conductivity between the terminals or the body ground using the vehicle side connector.

## ABS-44



ABS actuator harness side

(ABSS050036E.eps)

| Terminals       | Standard voltage or resistance  | Condition                          | Remedies                                                               |
|-----------------|---------------------------------|------------------------------------|------------------------------------------------------------------------|
| ① - ②           | 0 volt                          | Ignition switch turned ON and OFF. | • Front left speed sensor                                              |
|                 | $1.25 \pm 0.15 \text{ k}\Omega$ | Ignition switch turned OFF.        |                                                                        |
| ④ - ⑧ or ②④     | 0 volt                          | Ignition switch turned OFF.        | • Battery<br>• ECU fuse 10 A<br>• Ignition switch<br>• Related circuit |
|                 | Approx. battery voltage         | Ignition switch turned ON.         |                                                                        |
| ⑤ - ⑥           | 0 volt                          | Ignition switch turned ON and OFF. | • Rear left speed sensor                                               |
|                 | $1.25 \pm 0.15 \text{ k}\Omega$ | Ignition switch turned OFF.        |                                                                        |
| ⑦ - ⑧ or ②④     | 0 volt                          | Ignition switch turned OFF.        | • Open wire or short circuit                                           |
|                 |                                 | Ignition switch turned ON.         |                                                                        |
| ⑧ - Body ground | 0 volt                          | Ignition switch turned OFF.        | • Ground circuit                                                       |
|                 |                                 | Ignition switch turned ON.         |                                                                        |
| ⑨ - ⑧ or ②④     | Approx. battery voltage         | At all time                        | • Battery<br>• ABS F/L 50 A<br>• Related circuit                       |
| ⑫ - ⑧ or ②④     | 0 volt                          | Ignition switch turned OFF.        |                                                                        |
|                 | Approx. battery voltage         | Ignition switch turned ON.         |                                                                        |
| ⑭ - ⑧ or ②④     | 0 volt                          | Ignition switch turned OFF.        | • Open wire or short circuit                                           |
|                 |                                 | Ignition switch turned ON.         |                                                                        |
| ⑯ - ⑧ or ②④     | 0 volt                          | Ignition switch turned OFF.        |                                                                        |
|                 | Approx. battery voltage         | Ignition switch turned ON.         |                                                                        |
| ⑰ - ⑧ or ②④     | 0 volt                          | The brake pedal is not depressed.  |                                                                        |
|                 | Approx. battery voltage         | The brake pedal is depressed.      |                                                                        |
| ⑲ - ⑳           | 0 volt                          | Ignition switch turned ON and OFF. | • Front right speed sensor                                             |
|                 | $1.25 \pm 0.15 \text{ k}\Omega$ | Ignition switch turned OFF.        |                                                                        |
| ㉒ - ㉓           | 0 volt                          | Ignition switch turned ON and OFF. | • Rear right speed sensor                                              |
|                 | $1.25 \pm 0.15 \text{ k}\Omega$ | Ignition switch turned OFF.        |                                                                        |
| ㉔ - Body ground | 0 volt                          | At all time                        | • Open wire or short circuit                                           |
| ㉕ - ⑧ or ②④     | Approx. battery voltage         | At all time                        | • Battery<br>• ABS F/L 50 A<br>• Related circuit                       |

ABS-ABS-U-9-00001

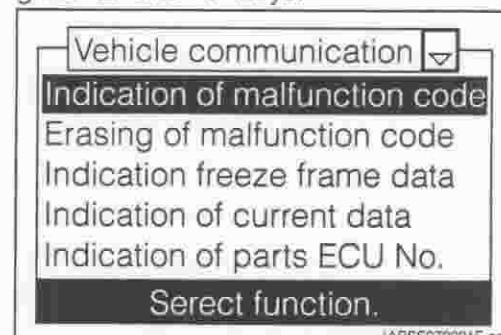
## 5-11 DS-21

### 5-11-1 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.



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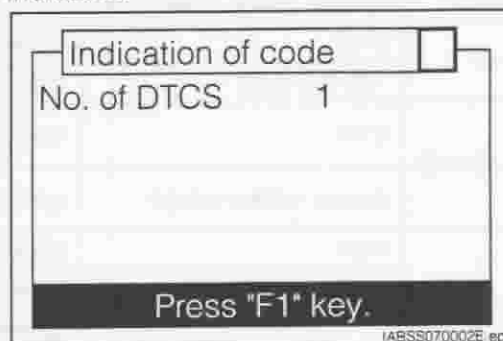
## ABS-46

(3) The number of malfunction codes memorized in the ECU is indicated.

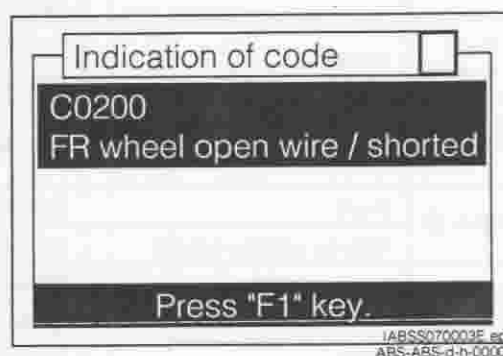
(4) Press the [F1] key to proceed to the next operation.

### NOTE

- If there is no malfunction code, the message "Not found" is indicated.



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

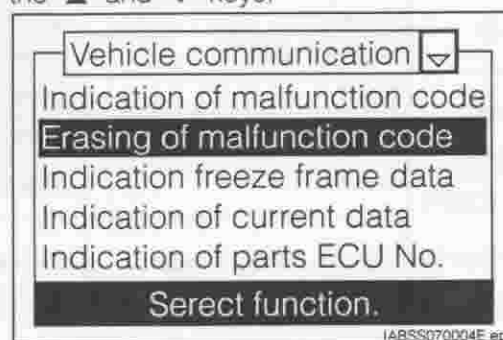


### 5-11-2 ERASING OF MALFUNCTION CODE

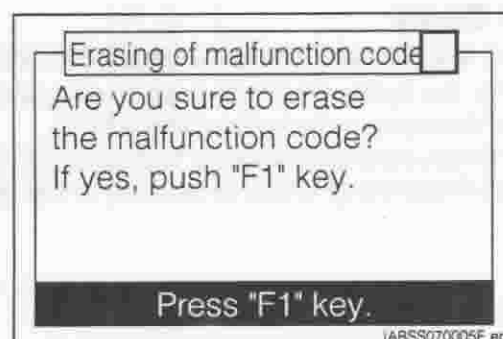
1. For the system that has been already selected, it is possible to erase the malfunction code number memorized in the ECU.

(1) Move the cursor to the "Erasing of malfunction code," using the "▲" and "▼" keys.

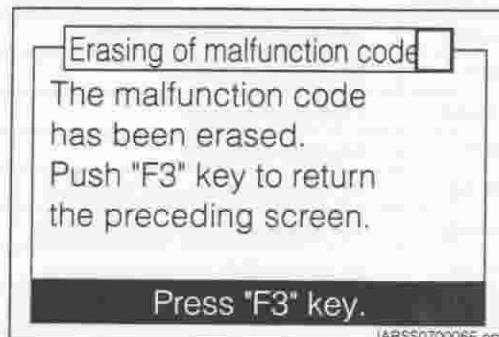
(2) Press the [F1] key to proceed to the next operation.



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



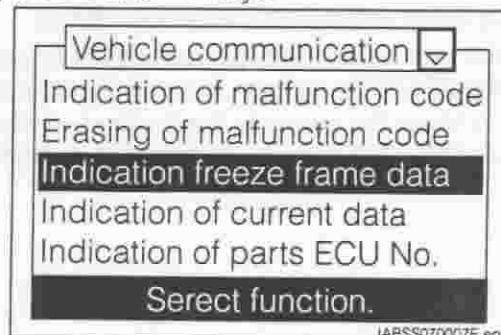
- (4) When the screen indicated in the right figure appears; it means that the malfunction codes have been erased.
- (5) Press the [F3] key to return to the preceding screen.



IABSS070006E.eps  
ABS-ABS-d-k-00001

### 5-11-3 INDICATION OF FREEZE FRAME DATA

1. 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.

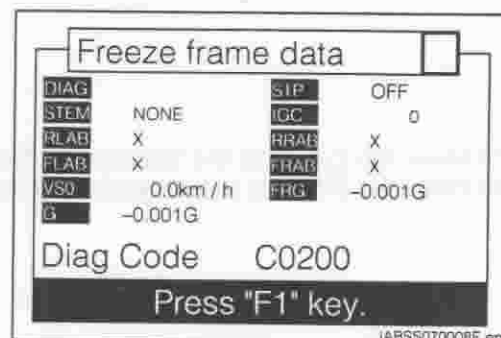


IABSS070007E.eps

- (3) The freeze frame data is indicated.

#### NOTE

- The following table shows the original words of abbreviations.



IABSS070008E.eps

## ABS-48

### (1) Table showing abbreviations of freeze frame data

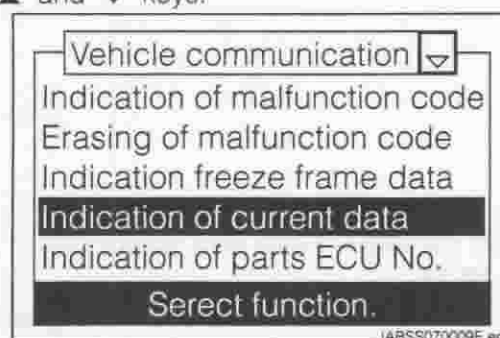
| Abbreviation | Original words                |
|--------------|-------------------------------|
| DIAG         | Number of diagnosis code      |
| STP          | Stop lamp switch              |
| STEM         | Operation system              |
| IGC          | Number of IG ON               |
| RLAB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

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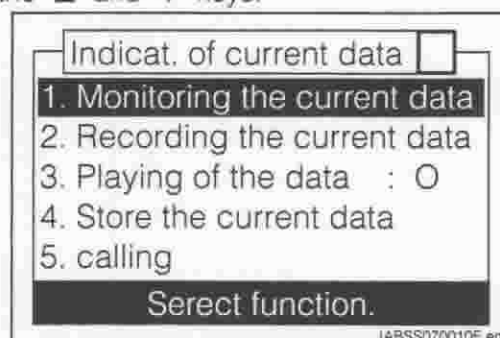
### 5-11-4 INDICATION OF CURRENT DATA

- 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.

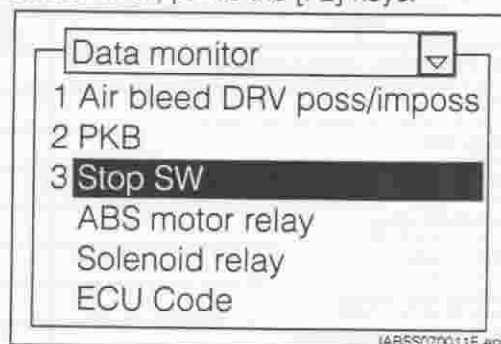
- Move the cursor to the "Indication current data," using the "▲" and "▼" keys.
- Press the [F1] key to proceed to the next operation.



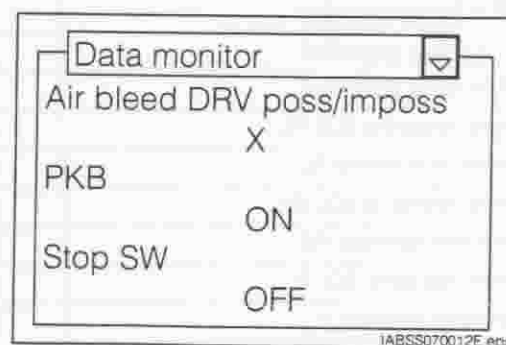
- Move the cursor to the "Monitoring the current data," using the "▲" and "▼" keys.
- Press the [F1] key to proceed to the next operation.



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



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



- (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.

The screenshot shows the 'Data monitor' window displaying a table of 28 items and their current data:

|      |       |      |             |
|------|-------|------|-------------|
| AIRK | X     | PKB  | ON          |
| STP  | OFF   | ABSM | OFF         |
| SOL  | ON    | ECUC | 8954-87402  |
| TEST | GENE  | ABRL | UNCON       |
| ABRR | UNCON | ABFL | UNCON       |
| ABFR | UNCON | SRLR | OFF         |
| SRLH | OFF   | SRRL | OFF         |
| SRAH | OFF   | SFLR | OFF         |
| SFLH | OFF   | SFRH | OFF         |
| SFRH | OFF   | SFFR | 0.00 km / h |

IABS070013E.eps

## ABS-50

### (1) CURRENT DATA ITEMS

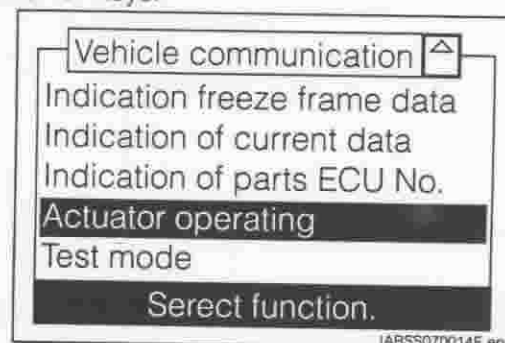
| ITEM                        | Abbreviation | Original words                             |
|-----------------------------|--------------|--------------------------------------------|
| Air bleed DRV poss / imposs | AIRK         | Air bleeding driving possible / impossible |
| PKB                         | 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                  |

ABS-ABS-d-C-00001

### 5-11-5 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.

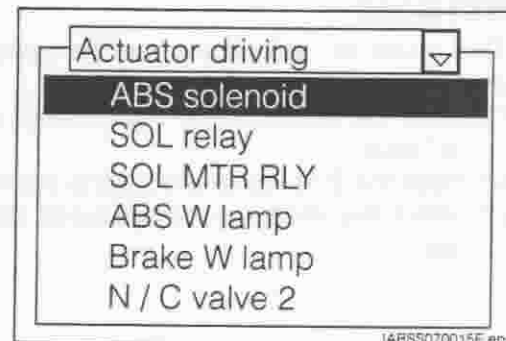
- (1) Move the cursor to the "Actuator operation," using the "▲" and "▼" keys.
- (2) Press the [F1] key to proceed to the next operation.



- (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 items. Furthermore, some items cannot be driven. For details, refer to the following table.



**(1) 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 |                                               |

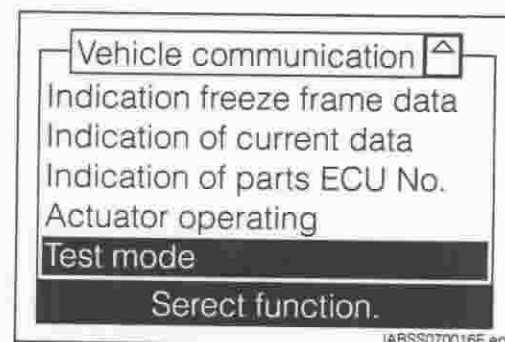
ABS-ABS-d-A-00001

**5-11-6 TEST MODE**

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

**(1) NORMAL MODE**

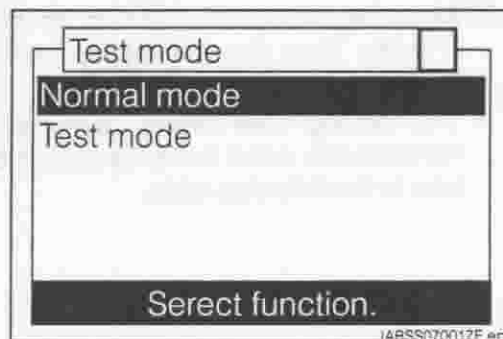
- When the normal malfunction code is checked, the normal mode is selected.



## ABS-52

### (2) TEST MODE

1. 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.



ABS-ABS-d-1-00001

## ABS-53

|                      |   |                      |                |              |
|----------------------|---|----------------------|----------------|--------------|
| G sensor             | × | body                 | $8.4 \pm 1.4$  | $85 \pm 15$  |
| ABS actuator         | × | ABS actuator bracket | $12.8 \pm 2.5$ | $130 \pm 25$ |
| ABS actuator bracket | × | body                 | $8.4 \pm 1.4$  | $85 \pm 15$  |

ABS-TQE-Z-Z-00001