VEHICLE STABILITY CONTROL SYSTEM

PRECAUTION

1. TROUBLESHOOTING PRECAUTION
   • When there are malfunctions in the contact points of the terminals or installation problems with any parts, removal and installation of the suspected problem parts may return the system to its normal condition either entirely or temporarily.
   • In order to determine the location of the malfunction, be sure to check the conditions at the time the malfunction occurred through data such as DTC and freeze frame data outputs. Record this information before disconnecting any connectors and removing or installing any parts.
   • Since the vehicle stability control system may be influenced by malfunctions in other systems, be sure to check for DTCs in other systems.
   • Be sure to remove and install the ABS and TRACTION actuator and each sensor with the ignition switch OFF, unless specified in the inspection procedures.
   • When removing and installing the ABS and TRACTION actuator and each sensor, be sure to check that the normal display is output during a test mode inspection and a DTC output inspection after reinstalling all the parts.
   • After replacing the ABS and TRACTION actuator and/or yaw rate sensor, be sure to perform yaw rate and deceleration sensor zero point calibration (see page BC-24).
   • The CAN communication system is used for data communication between the skid control ECU, the steering sensor and the yaw rate sensor (the deceleration sensor is included). If there is trouble in the CAN communication line, the DTC of the communication line is output.
   • If the DTC of the CAN communication line is output, repair the malfunction in the communication line and then troubleshoot the vehicle stability control system.
   • Since the CAN communication line has its own length and route, it cannot be repaired temporarily with a bypass wire, etc.
PARTS LOCATION

- MASTER CYLINDER
  - RESERVOIR
  - BRAKE FLUID LEVEL
  - WARNING SWITCH

- BRAKE ACTUATOR (SKID CONTROL ECU)

- FRONT SPEED SENSOR
  - SENSOR ROTOR RH

- REAR SPEED SENSOR
  - SENSOR ROTOR LH
  - SENSOR RH

- ECM

- ENGINE ROOM NO. 1 RELAY BLOCK,
  - ENGINE ROOM NO. 1 JUNCTION BLOCK
  - STOP LIGHT CONTROL Relay (Marking: BRK)
  - VSC MOTOR Relay (Marking: VSC MTR)
  - FAIL-SAFE Relay (Marking: VSC FAIL)
  - ABS1 H-FUSE
  - ABS2 H-FUSE

for 2WD

- SKID CONTROL
  - SENSOR ROTOR RH
  - SENSOR RH
  - SENSOR ROTOR LH

C126332E02
COMBINATION METER
- ABS WARNING LIGHT
- BRAKE WARNING LIGHT
- VSC WARNING LIGHT
- SLIP INDICATOR LIGHT
- DOWNHILL ASSIST CONTROL INDICATOR LIGHT*1
- AUTO LSD INDICATOR LIGHT*2
- SKID CONTROL BUZZER

AUTO LSD SWITCH*2

STOP LIGHT SWITCH

INSTRUMENT PANEL JUNCTION BLOCK
- MAIN BODY ECU
- ECU-IG1 FUSE
- STOP FUSE

INSTRUMENT PANEL JUNCTION BLOCK

BRAKE PEDAL SUPPORT ASSEMBLY
- BRAKE PEDAL LOAD SENSING SWITCH

*1: w/ Downhill Assist Control
*2: for 2WD w/ AUTO LSD
BC–4

BRAKE CONTROL – VEHICLE STABILITY CONTROL SYSTEM

SYSTEM DIAGRAM

Engine Room No. 1 Junction Block

VSC FAIL Relay (Fail-safe Relay) → VSC MTR Relay (Motor Relay)

ABS and TRACTION Actuator

Each Speed Sensor
Stop Light Switch
Downhill Assist Control Switch*1
BRK Relay (Stop Light Relay)
Stop Light
AUTO LSD Switch*2

Skid Control ECU

Pump Motor
Master Cylinder Pressure Sensor
Solenoid (Control)
Solenoid (Linear)
Solenoid Relay

*1: w/ Downhill Assist Control
*2: for 2WD w/ AUTO LSD

: CAN Communication System

C132092E03
BRAKE CONTROL – VEHICLE STABILITY CONTROL SYSTEM

1. Combination Meter
   - Steering Sensor
   - Yaw Rate and Deceleration Sensor
   - Main Body ECU
   - ECM

2. Parking Brake Switch
   - DLC3 (TS, TC)
   - Park / Neutral Position Switch
   - Crankshaft Position Sensor
   - Throttle Position Sensor

3. ABS Warning Light
   - VSC Warning Light
   - Brake Warning Light
   - Slip Indicator Light
   - Downhill Assist Control Indicator Light*1
   - AUTO LSD Indicator Light*2
   - Skid Control Buzzer
   - Speedometer

*: CAN Communication System
*1: w/ Downhill Assist Control
*2: for 2WD w/ AUTO LSD
1. **SYSTEM DESCRIPTION**

**HINT:**
The skid control ECU forms a single unit with the ABS and TRACTION actuator.

(a) **ABS (Anti-lock Brake System):**
The ABS helps prevent the wheels from locking when the brakes are applied firmly or on a slippery surface.

**Operation description:**
The skid control ECU detects wheel lock conditions by receiving vehicle speed signals from each speed sensor, and sends control signals to the pump motor and solenoid valve to prevent wheels from locking by controlling the brake fluid pressure of each wheel cylinder. The ABS warning light comes on when the ABS system malfunctions.

![Diagram of ABS and Traction Actuator System](image-url)
(b) EBD (Electronic Brake Force Distribution):
The EBD control utilizes the ABS to create the
proper brake force distribution between the front
and rear wheels in accordance with the driving
conditions and vehicle load. In addition, when the
brakes are applied while cornering, it also controls
the braking forces of the right and left wheels,
helping to maintain vehicle stability.

(1) Operation description:
The skid control ECU receives speed signals
from each speed sensor to detect the slip
conditions of the wheels and sends control
signals to the solenoid.
The solenoid valve controls the brake fluid
pressure of each wheel cylinder and divides the
control power properly between the front and
rear wheels and the right and left wheels.
The brake warning light comes on to indicate
malfunctions in the EBD system.
(c) BA (Brake Assist):
The primary purpose of the brake assist system is to provide auxiliary brake force to assist drivers who cannot generate a large enough brake force during emergency braking, thus helping to maximize the vehicle’s braking performance.

(1) Operation description:
The skid control ECU receives speed signals from each speed sensor and the fluid pressure signal from the master cylinder pressure sensor to determine whether brake assist is necessary. If brake assist is deemed necessary, the skid control ECU sends control signals to the pump motor and solenoid. The pump and the solenoid valve then control the pressure applied to each wheel cylinder. The ABS warning light comes on to indicate malfunctions in the BA (brake assist) system.

w/ 16-inch disc: The brake warning light and ABS warning light come on to indicate malfunctions in the BA system.
(d) TRC (Traction Control): The TRC system helps prevent the drive wheels from slipping if the driver presses down on the accelerator pedal excessively when starting off or accelerating on a slippery surface.
(1) Operation description:
The skid control ECU detects the vehicle’s slip condition by receiving signals from each speed sensor and the ECM via CAN communication. The skid control ECU controls engine torque with the ECM via CAN communication and brake fluid pressure through the pump and solenoid valve. The slip indicator light blinks when the system is operating.
for 4WD: The VSC warning light comes on when the TRC system malfunctions.
for 2WD: The VSC warning light and SLIP indicator light comes on when the TRC system malfunctions.
(e) VSC (Vehicle Stability Control):
The VSC system helps prevent the vehicle from slipping sideways when front or rear wheel skidding occurs while cornering.
(1) Operation description:
The skid control ECU determines the vehicle condition by receiving signals from the speed sensor, the yaw rate and deceleration sensor and the steering sensor. The skid control ECU controls engine torque with the ECM via CAN communication and brake fluid pressure through the pump and solenoid valve. The slip indicator light blinks and the skid control buzzer sounds when the system is operating.
for 4WD: The VSC warning light comes on when the TRC system malfunctions.
for 2WD: The VSC warning light and slip indicator light come on when the TRC system malfunctions.

(f) Downhill Assist Control:
When the downhill assist control switch is pressed with the shift lever on L or R range and the accelerator and brake pedals not depressed, downhill assist control is activated. When activated, 4-wheel hydraulic pressure control occurs in order to maintain a constant low vehicle speed without causing the wheels to become locked. Thus, the vehicle can descend a steep hill in a stable manner.

HINT:
• Depressing the accelerator and brake pedal cancels control of the downhill assist control.
• Downhill assist control begins operating when driving down on a slope at a speed of 25 km/h (16 mph) or less with the engine brake applied.
(1) Operation description:
The slip indicator light blinks and the downhill assist control indicator light and brake light come on when the system is in operation. The VSC warning light comes on and the downhill assist control indicator light blinks to indicate a malfunction in the downhill assist control.
(g) Hill-start assist control:
When the vehicle starts off on a steep hill, hill-start assist control effects 4-wheel hydraulic pressure control to prevent the vehicle from rolling backwards.
After a maximum of 2 seconds after the control has started, fluid pressure is gradually released and control will be complete.
HINT:
• Depressing the brake pedal cancels control of the hill-start assist control.
• Hill-start assist control does not operate when the shift lever is in the P position, or when the vehicle is running, the parking brake lever is set, or the accelerator pedal is depressed.
(1) Operation description:
When the system is in operation, the following occurs: 1) the slip indicator light blinks; 2) the VSC light comes on; and 3) when hill-start assist control operation starts, the skid control buzzer sounds once; when hill-start assist control operation ends, the skid control buzzer sounds twice.
The VSC warning light comes on when the hill-start assist control is malfunctioning.

(h) AUTO LSD (Auto Limited Slip Differential) for 2WD:
The AUTO LSD achieves the equivalent functions of an LSD (Limited Slip Differential) through the use of a traction control system. When the driver presses the AUTO LSD switch, this system achieves the LSD effect by regulating the hydraulic pressure that acts on the drive wheels and controlling the engine output in accordance with the amount of pedal effort applied on the accelerator. The AUTO LSD operates with the AUTO LSD switch on and the accelerator pedal depressed.
Auto LSD restrains brake pressure and reduces differential movement, thus transmitting the drive torque to the other drive wheel to ensure stability under the following conditions:
• Wheels run off the road.
• Drive wheels spin in place when starting on a slope with one wheel on snow/ice.
HINT:
Releasing the accelerator pedal cancels control of the AUTO LSD system.
BC–16 BRAKE CONTROL – VEHICLE STABILITY CONTROL SYSTEM

ABS and TRACTION Actuator

- Each Speed Sensor
- Auto LSD Switch*1
- Yaw Rate and Deceleration Sensor
- Steering Sensor
- ECM

Skid Control ECU

- Pump Motor
- Solenoid Valve

- Each Wheel Cylinder

Combination Meter

- VSC Warning Light
- Slip Indicator Light
- AUTO LSD Indicator Light

*1: for 2WD w/ AUTO LSD

CAN Communication System:

Brake Fluid Pressure:

C136090E01
(1) Operation description:
The skid control ECU determines that the vehicle is in a state in which the AUTO LSD can operate by using various sensors and switches to detect the operating conditions of the AUTO LSD switch, shift position, accelerator pedal, and brake pedal. When the vehicle is in a state in which the AUTO LSD can operate, the skid control ECU effects hydraulic pressure control of the wheel cylinder at the wheel with the faster wheel speed so that the wheel speeds of the right and left drive wheels will become equal. The slip indicator light blinks and the AUTO LSD indicator light comes on when the system is operating. Both the VSC warning light and SLIP indicator light come on when the AUTO LSD system malfunctions.

2. COOPERATIVE CONTROL FUNCTION
   (a) Description
   (1) Braking when Surface Resistance Differs Between Left and Right Wheels
   If the driver suddenly applies the brakes on a road surface with a considerable difference in friction coefficient between the right and left wheels, the difference in the brake force between the right and left wheels will cause the vehicle posture to become unstable and create a yaw movement. In this state, the skid control ECU controls the VSC to stabilize the vehicle posture. At the same time, it effects cooperative control with the EPS to provide steering torque assist, which facilitates the driver's steering maneuvers to stabilize the vehicle posture.

   (2) Accelerating when Surface Resistance Differs Between Left and Right Wheels
   If the driver suddenly starts off or accelerates on a road surface with a considerable difference in friction coefficient between the right and left wheels, the slippage of a drive wheel will cause the vehicle posture to become unstable and negatively affect its acceleration performance. In this state, the skid control ECU causes the TRC to control the hydraulic brake of the slipping drive wheel, and requests the engine ECU to effect engine output control. At the same time, it effects cooperative control with the EPS to provide steering torque assist, which facilitates the driver's steering maneuvers to stabilize the vehicle posture.
(3) Front Wheel Skid Tendency
When the skid control ECU determines that there is a front wheel skid tendency, it controls the VSC to dampen the front wheel skid. At the same time, it effects cooperative control with the EPS to provide steering torque assist, which facilitates the driver's steering maneuvers to stabilize the vehicle posture. To prevent excessive steering maneuvers, it provides a steering torque assist. This assist increases the resistance to counter the driver's steering effort, if the driver turns the steering wheel excessively.

(4) Rear Wheel Skid Tendency
When the skid control ECU determines that there is a rear wheel skid tendency, it controls the VSC to dampen the rear wheel skid. At the same time, it effects cooperative control with the EPS to provide steering torque assist, which facilitates the driver's steering maneuvers in the direction to correct the rear wheel skid.

(5) Acceleration During Cornering
A sudden acceleration of the vehicle during cornering may cause a drive wheel to freewheel, which could cause the front wheels or rear wheels to skid. If the skid control ECU determines that there is freewheeling of a drive wheel, a front wheel skid tendency, or a rear wheel skid tendency, it effects cooperative control with the 4WD system to optimally control the drive torque distribution to the front and rear wheels. Furthermore, it controls the TRC and the VSC as needed to ensure driving stability and acceleration performance.

(b) Operation
The operation of the solenoid valves under the cooperative control is the same as the TRC or VSC operation.

3. ABS WITH EBD, BA, TRC AND VSC OPERATION
(a) The skid control ECU calculates vehicle stability tendency based on the signals from the 4 wheel speed sensors, the yaw rate and deceleration sensor and the steering sensor. In addition, it evaluates the results of the calculations to determine whether any control actions (control of the engine output torque by electronic throttle control and of the brake fluid pressure by the ABS and TRACTION actuator) should be implemented.

(b) The slip indicator blinks and the skid control buzzer sounds to inform the driver that the VSC system is operating. The slip indicator also blinks when traction control is operating, and the operation being performed is displayed.
4. FAIL SAFE FUNCTION
   (a) When a failure occurs in the ABS with BA, TRC and VSC systems, the ABS and VSC warning lights illuminate, the slip indicator light comes on*1 or remains off*2, and the operations of those systems are prohibited. In addition to this, when a failure which disables the EBD operation occurs, the brake warning light comes on and its operation is prohibited.
   HINT:
   *1: for 2WD
   *2: for 4WD
   (b) If control is prohibited due to a malfunction during operation, control is disabled gradually to avoid sudden vehicle instability.

5. INITIAL CHECK
   (a) When the vehicle speed first reaches approximately 6 km/h (4 mph) or more after the ignition switch is turned ON, each solenoid valve and the motor of the ABS and TRACTION actuator are sequentially activated to perform electrical checks. During the initial check, the operating sound of the solenoid valve and motor can be heard from the engine compartment, but this does not indicate a malfunction.

6. SERVICE MODE
   (a) VSC operation can be disabled by operating the intelligent tester.
   HINT:
   Refer to the intelligent tester operator's manual for further details.

7. FUNCTION OF COMPONENTS

<table>
<thead>
<tr>
<th>Components</th>
<th>Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed Sensor (Semiconductor Type)</td>
<td>Detects the wheel speed and sends the signal to skid control ECU</td>
</tr>
<tr>
<td>Skid Control ECU (Housed in ABS and TRACTION Actuator)</td>
<td>• Processes the signals from each sensor to control the ABS, BA, TRC, and VSC</td>
</tr>
<tr>
<td></td>
<td>• Sends and receives control signals to and from the ECM, yaw rate and deceleration sensor, steering sensor, etc. via CAN communication.</td>
</tr>
<tr>
<td>ABS and TRACTION Actuator</td>
<td>• Consists of the master cylinder cut solenoid valve, holding solenoid valve, pressure reduction solenoid valve, pump motor, and reservoir, and adjusts the brake fluid pressure applied to each wheel cylinder</td>
</tr>
<tr>
<td></td>
<td>• Houses the skid control ECU</td>
</tr>
<tr>
<td>Solenoid Relay</td>
<td>• Supplies power to each solenoid</td>
</tr>
<tr>
<td></td>
<td>• Housed in the skid control ECU</td>
</tr>
<tr>
<td>Motor Relay (VSC MTR Relay)</td>
<td>• Supplies power to the pump motor</td>
</tr>
<tr>
<td></td>
<td>• Installed in engine room No. 1 relay block</td>
</tr>
<tr>
<td>Fail-safe Relay (VSC FAIL Relay)</td>
<td>• Cuts off power to the motor when the pump motor circuit malfunctions</td>
</tr>
<tr>
<td></td>
<td>• Installed in engine room No. 1 relay block</td>
</tr>
</tbody>
</table>
## Components and Functions

<table>
<thead>
<tr>
<th>Components</th>
<th>Functions</th>
</tr>
</thead>
</table>
| **Steering Sensor** | • Detects the steering extent and direction and sends signals to the skid control ECU via CAN communication  
  • Has a magnetic resistance element which detects the rotation of the magnet housed in the detection gear in order to detect the changes in magnetic resistance and the steering amount and direction |
| **Yaw Rate and Deceleration Sensor** | • Yaw rate sensor detects the vehicle's angular velocity (yaw rate) in the vertical direction based on the extent and direction of the deflection of the piezoelectric ceramics  
  • Deceleration sensor measures the capacity of the condenser that changes the distance between the electrodes depending on G force, which occurs when the vehicle is accelerated, and converts the measured value into electrical signals  
  • Sends signals to the skid control ECU via CAN communication |
| **Master Cylinder Pressure Sensor** | • Detects the brake fluid pressure in the master cylinder  
  • Housed in the ABS and TRACTION actuator |
| **ECM** | • Controls the engine output when TRC and VSC are operating with the skid control ECU via CAN communication |
| **Downhill Assist Control switch** | Allows the driver to turn downhill assist control ON and OFF |
| **AUTO LSD switch** | Allows the driver to turn AUTO LSD ON and OFF |
| **Combination Meter** |  |
| **ABS Warning Light** | • Illuminates to inform the driver that a malfunction in the ABS has occurred  
  • Blinks to indicate DTCs that relate to the ABS |
| **VSC Warning Light** | • Illuminates to inform the driver that a malfunction in the VSC system has occurred  
  • Blinks to indicate DTCs that relate to the VSC |
| **Brake Warning light** | • Illuminates to inform the driver that the parking brake is ON when the system is normal, and when the brake fluid has decreased  
  • Illuminates to inform the driver that a malfunction in the EBD has occurred |
| **Slip Indicator Light** | • Blinks to inform the driver that TRC, VSC, downhill assist control and hill-start assist control are operating  
  • Illuminates to inform the driver that a malfunction has occurred in the TRC or VSC system |
| **AUTO LSD Indicator Light** | Lights up to inform the driver when AUTO LSD operation is possible |
| **Downhill Assist Control Indicator Light** | Lights up to inform the driver when downhill assist control operation is possible |
| **Skid Control Buzzer** | • Intermittently sounds to inform the driver that the VSC is operating  
  • Housed in the combination meter |

**HINT:**

*1: w/ Downhill assist control  
*2: for 2WD w/ AUTO LSD
HOW TO PROCEED WITH TROUBLESHOOTING

HINT:
• Use these procedures to troubleshoot the vehicle stability control system.
• *: Use the intelligent tester.

1 VEHICLE BROUGHT TO WORKSHOP

2 INSPECT BATTERY VOLTAGE

Standard voltage: 11 to 14 V
If the voltage is below 11 V, recharge or replace the battery before proceeding.

3 CHECK AND CLEAR DTC*

4 PROBLEM SYMPTOM CONFIRMATION

Result

<table>
<thead>
<tr>
<th>Result</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptom does not occur</td>
<td>A</td>
</tr>
<tr>
<td>Symptom occurs</td>
<td>B</td>
</tr>
</tbody>
</table>

B Go to step 7

A

5 SYMPTOM SIMULATION

6 CHECK COMMUNICATION FUNCTION OF CONTROLLER AREA NETWORK (CAN)*

(a) Use the intelligent tester to check for normal functioning of the CAN communication system.
(1) Perform bus check (communication malfunction DTC).
### Check for DTC*

#### Result

<table>
<thead>
<tr>
<th>Result</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC is not output</td>
<td>A</td>
</tr>
<tr>
<td>DTC is output</td>
<td>B</td>
</tr>
</tbody>
</table>

#### Next
- **A**
- **B** Go to step 10

### Problem Symptoms Table

#### Result

<table>
<thead>
<tr>
<th>Result</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fault is not listed in problem symptoms table</td>
<td>A</td>
</tr>
<tr>
<td>Fault is listed in problem symptoms table</td>
<td>B</td>
</tr>
</tbody>
</table>

#### Next
- **A**
- **B** Go to step 10

### Overall Analysis and Troubleshooting

1. Terminals of ECU (see page BC-41)
2. Data List / Active Test (see page BC-52)

#### Next
- Go to step 11

### Check for Fluid Leakage

#### Next
11 REPAIR OR REPLACE

NEXT

12 CONFIRMATION TEST

NEXT

END
CHECK FOR INTERMITTENT PROBLEMS

1. CHECK FOR INTERMITTENT PROBLEMS

HINT:
A momentary interruption (open circuit) in the connectors and/or wire harness between the sensors and ECUs can be detected by using the ECU DATA LIST function of an intelligent tester.

(a) Turn the ignition switch OFF and connect the intelligent tester (with CAN VIM) to the DLC3.
(b) Turn the ignition switch ON.

(c) Follow the prompts on the intelligent tester to display the DATA LIST and select areas where a momentary interruption should be monitored.

HINT:
• A momentary interruption (open circuit) cannot be detected for 3 seconds after the ignition switch is turned ON (initial check).
• If the status remains on the ERROR display, check for continuity between the ECU and the sensors, or between ECUs.
• The ERROR display on the intelligent tester remains on for 1 second after the harness signal changes from a momentary interruption (open circuit) to normal condition.

<table>
<thead>
<tr>
<th>Item (Display)</th>
<th>Measurement Item / Range (Display)</th>
<th>Normal Condition</th>
<th>Diagnostic Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR SPD OPN</td>
<td>FR speed sensor open detection / ERROR or NORMAL</td>
<td>ERROR: Momentary interruption NORMAL: Normal</td>
<td>-</td>
</tr>
<tr>
<td>FL SPD OPN</td>
<td>FL speed sensor open detection / ERROR or NORMAL</td>
<td>ERROR: Momentary interruption NORMAL: Normal</td>
<td>-</td>
</tr>
<tr>
<td>RR SPD OPN</td>
<td>RR speed sensor open detection / ERROR or NORMAL</td>
<td>ERROR: Momentary interruption NORMAL: Normal</td>
<td>-</td>
</tr>
<tr>
<td>RL SPD OPN</td>
<td>RL speed sensor open detection / ERROR or NORMAL</td>
<td>ERROR: Momentary interruption NORMAL: Normal</td>
<td>-</td>
</tr>
<tr>
<td>EFI COM OPN</td>
<td>EFI communication open detection / ERROR or NORMAL</td>
<td>ERROR: Momentary interruption NORMAL: Normal</td>
<td>-</td>
</tr>
</tbody>
</table>
(d) While observing the screen, gently jiggle the connector or wire harness between the ECU and sensors, or between ECUs.

OK:

- **ERROR display does not change.**

**HINT:**
The connector and/or wire harness have a momentary interruption (open circuit) if the display changes. Repair or replace the connector and wire harness if either of them is faulty.
CALIBRATION

1. DESCRIPTION
   (a) After replacing components relating to the VSC or performing "Front wheel alignment adjustment", clear and read the sensor calibration data.
   (b) Follow the chart to perform calibration.

   2. CLEAR ZERO POINT CALIBRATION DATA (When Using Intelligent Tester)
      (a) Clear the zero point calibration data.
         (1) Connect the intelligent tester (with CAN VIM) to the DLC3.
         (2) Turn the ignition switch ON.
         (3) Operate the intelligent tester to erase the codes (select "Reset Memory").
         HINT:
         Refer to the intelligent tester operator's manual for further details.
         (4) Using the intelligent tester, perform the zero point calibration of the yaw rate and deceleration sensor.
         CAUTION:
         If the ignition switch is turned ON for more than 15 seconds with the shift lever in the P position after zero point of the yaw rate and acceleration sensor has been cleared, only the zero point of the yaw rate sensor will be stored. If the vehicle is driven under this condition, the skid control ECU will recognize that zero point calibration of the acceleration sensor is not completed and will indicate that there is a malfunction in the VSC system using the indicator light.

<table>
<thead>
<tr>
<th>Replacing Parts / Operation</th>
<th>Necessary Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skid Control ECU</td>
<td>Yaw rate and deceleration sensor zero point calibration.</td>
</tr>
<tr>
<td>Yaw Rate Sensor</td>
<td>1. Clearing zero point calibration data</td>
</tr>
<tr>
<td></td>
<td>2. Yaw rate and deceleration sensor zero point calibration</td>
</tr>
<tr>
<td>Front Wheel Alignment Adjustment</td>
<td>1. Clearing zero point calibration data</td>
</tr>
<tr>
<td></td>
<td>2. Yaw rate and deceleration sensor zero point calibration</td>
</tr>
</tbody>
</table>
3. **PREFORM ZERO POINT CALIBRATION OF YAW RATE AND DECELERATION SENSOR (When Using Intelligent Tester)**

**NOTICE:**
- While obtaining the zero point, do not vibrate the vehicle by tilting, moving or shaking it and keep it stationary. (Do not start the engine.)
- Perform this on a level surface (with an inclination of less than 1°).

(a) Procedures for Test Mode.

1. Check that the shift lever is in the P position and apply the parking brake.

**NOTICE:**
DTCs C1210/36 and C1336/39 will be recorded if the shift lever is not the P position (see page BC-88).

2. Connect the intelligent tester (with CAN VIM) to the DLC3.

3. Turn the ignition switch ON.

(b) Obtain the zero point of the yaw rate and deceleration sensor.

1. Keep the vehicle stationary on a level surface for 2 seconds or more.

2. Check that the VSC warning light blinks as shown in the illustration.

**HINT:**
- If the VSC warning light does not blink, perform the zero point calibration again.
- The zero point calibration is performed only once after the system enters test mode.
- Calibration cannot be performed again until the stored data is cleared once.

3. Turn the ignition switch OFF.
4. CLEAR ZERO POINT CALIBRATION DATA (When not Using Intelligent Tester)
   (a) Clear the zero point calibration data.
       (1) Turn the ignition switch ON.
       (2) The warning light and indicator light come on for 3 seconds to indicate that the initial check is completed.
       (3) Using SST, connect and disconnect terminals 12 (TS) and 4 (CG) of the DLC3 4 times or more within 8 seconds.
           SST 09843-18040
       (4) Check that the VSC warning light comes on.
       (5) Remove SST from the terminals of the DLC3.
       (6) Using a check wire, perform the zero point calibration of the yaw rate and deceleration sensor.
   CAUTION:
   If the ignition switch is turned ON for more than 15 seconds with the shift lever in the P position after zero point of the yaw rate and acceleration sensor has been cleared, only the zero point of the yaw rate sensor will be stored. If the vehicle is driven under this condition, the skid control ECU will recognize that zero point calibration of the acceleration sensor is not completed and will indicate that there is a malfunction in the VSC system using the indicator light.

5. PERFORM ZERO POINT CALIBRATION OF YAW RATE AND DECELERATION SENSOR (When not Using Intelligent Tester)
   NOTICE:
   • While obtaining the zero point, do not vibrate the vehicle by tilting, moving or shaking it and keep it stationary. (Do not start the engine.)
   • Perform this on a level surface (with an inclination of less than 1°).
   (a) Procedures for Test Mode.
       (1) Turn the ignition switch OFF.
       (2) Using SST, connect terminals 12 (TS) and 4 (CG) of the DLC3.
           SST 09843-18040
       (3) Check that the shift lever is in the P position and apply the parking brake.
           NOTICE:
           DTCs C1210/36 and C1336/39 will be recorded if the shift lever is not the P position (see page BC-88).
   (b) Obtain the zero point of the yaw rate and deceleration sensor.
       (1) Turn the ignition switch ON.
       (2) Keep the vehicle stationary on a level surface for 2 seconds or more.
(3) Check that the VSC warning light blinks as shown in the illustration.

**HINT:**
- If the VSC warning light does not blink, perform the zero point calibration again.
- The zero point calibration is performed only once after the system enters test mode.
- Calibration cannot be performed again until the stored data is cleared once.

(4) Turn the ignition switch OFF.
TEST MODE PROCEDURE

HINT:
- By switching the skid control ECU from normal mode to test mode, abnormality detection sensitivity is enhanced and troubleshooting can be conducted efficiently.
- Perform a sensor check in test mode after the speed sensor or sensor rotor has been repaired or replaced.
- If the ignition switch is turned from ON to ACC or OFF during test mode, DTCs related to the signal check function will be erased.
- During test mode, the skid control ECU stores all DTCs related to the signal check function, and the DTCs are erased if normality is confirmed. Any remaining DTCs are those indicating abnormalities that were found.

1. CHECK SENSOR SIGNAL BY TEST MODE (When Using Intelligent Tester)
   (a) Procedures for test mode:
      (1) Turn the ignition switch OFF.
      (2) Check that the steering wheel is in the centered position.
      (3) Check that the shift lever is in the P position and apply the parking brake.
      (4) Connect the intelligent tester (with CAN VIM) to the DLC3.
      (5) Turn the ignition switch ON.
      (6) Turn the tester on.
      (7) Set the intelligent tester to Test Mode (select "Signal Check").

HINT:
Refer to the intelligent tester operator’s manual for further details.
(8) Check that the ABS warning light and VSC warning light blink as shown in the illustration.
HINT:
If the ABS warning light and VSC warning light do not blink, check the TS and CG terminal circuit, and ABS and VSC warning light circuits.

(9) Start the engine.
(b) w/ 16-inch disc only:
Check the lost booster pressure judgment and perform the master cylinder pressure sensor zero point calibration.
NOTICE:
Preform the check in the lost booster pressure state (negative pressure in the booster is depressurized).
(1) Turn the ignition switch ON.
(2) Check that the brake warning light comes on when depressing the brake pedal with a force of 59 N (6 kgf, 13.2 lbf) or more for 1 second or more. (The lost booster pressure state is judged normal.)
(3) Start the engine depressing the brake pedal with a force of 59 N (6 kgf, 13.2 lbf) or more for 1 second or more.
(4) Check that the brake warning light goes off when quickly releasing the brake pedal. (The lost booster pressure state is judged normal.)
(5) Leave the vehicle for 1 second or more. (Master cylinder pressure sensor zero point calibration.)
NOTICE:
• If you slowly depress the brake pedal or depress it again, master cylinder pressure sensor zero point calibration is not performed normally.
• If the lost booster pressure judgment check is not completed normally, the master cylinder pressure sensor check is not judged.
• If a recheck is performed after the engine has started, end the Test Mode, enter Test Mode again, and release the vacuum in the booster by pumping the brake pedal prior to the recheck.
(c) Check the deceleration sensor.
(1) Keep the vehicle stationary on a level surface for 1 second or more.
HINT:
The deceleration sensor check can be performed together with the following master cylinder pressure sensor check.

(d) Check the master cylinder pressure sensor.
(1) Leave the vehicle in a stationary condition and release the brake pedal for 1 second or more, and quickly depress the brake pedal with a force of 98 N (10 kgf, 22 lbf) or more for 1 second. Check that the ABS warning light remains illuminated for 3 seconds.
HINT:
• Ensure that the ABS warning light comes on.
• While the ABS warning light remains illuminated, continue depressing the brake pedal with a force of 98 N (10 kgf, 22 lbf) or more.
• The ABS warning light comes on for 3 seconds every time the brake pedal operation above is performed.

(e) Check the speed sensor.
(1) Check that the ABS warning light is blinking as shown in the illustration.
(2) Check the speed sensor signal.
1. Drive the vehicle straight forward at a speed of 45 km/h (28 mph) or more for several seconds.
2. Check that the ABS warning light goes off.
NOTICE:
• The speed sensor check may not be completed if the sensor check is started with the steering wheel turned or one or more wheels spinning.
• If the speed sensor check is commenced while the steering wheel is turned, the ABS warning light may come on after the low speed check is finished.
• The ABS warning light comes on immediately when an abnormality is detected.
• When the speed sensor signal is normal, the ABS warning light goes off while driving at 45 km/h (28 mph) or more, and blinks in the test mode pattern while the vehicle is stationary.
• Do not drive the vehicle at a speed of 80 km/h (50 mph) or more after the ABS warning light turns off, because test mode DTCs are set again when the vehicle speed exceeds 80 km/h (50 mph).

3. Stop the vehicle.

(f) Check the yaw rate sensor.
   1) Move the shift lever to P and set the parking brake lever.
   2) Check that the VSC warning light is blinking as shown in the illustration.
   3) Keep the vehicle stationary on a level surface for 1 second or more.
(4) Shift the shift lever to the D position and drive the vehicle at a speed of approximately 5 km/h (3 mph), and turn the steering wheel either to the left or right 90° or more to turn the vehicle through 180°.

(5) Stop the vehicle, move the shift lever into the P position, and then apply the parking brake.

(6) Check that the skid control buzzer sounds for 3 seconds.

HINT:
- If the skid control buzzer sounds, the signal check has been completed normally.
- If the skid control buzzer does not sound, check the skid control buzzer circuit (see page BC-172).
- If the skid control buzzer still does not sound, there is a malfunction in the yaw rate sensor, so check for DTCs.
- Drive the vehicle in a 180° semi circle. At the end of the turn, the direction of the vehicle should be within 180° ±5° of its start position.
- Complete the vehicle turn within 20 seconds.
- Do not spin the wheels.

(g) w/ Downhill assist control only:
Check the downhill assist control operation switch.
(1) Check that the VSC warning light is blinking as shown in the illustration.

(2) Check the downhill assist control switch.
1. Push the downhill assist control switch on.
2. Push the downhill assist control switch off.

(h) w/ Auto LSD only:
(1) Check that the AUTO LSD light illuminates only when the AUTO LSD switch is pressed.

(i) Check the end of sensor.
(1) When the sensor check is successfully completed, the ABS warning light blinks in the test mode pattern when the vehicle is stopped, and goes off when the vehicle is driven.

NOTICE:
If the sensor check is not completed, the ABS warning light blinks even while the vehicle is driving and the ABS does not operate.

(j) Read the DTCs of signal check function.
(1) Read the DTC(s) by following the instructions on the tester screen.

NOTICE:
- If only the DTCs are displayed, repair the malfunction area and clear the DTCs.
- If the DTCs or Test Mode codes (DTC of signal check function) are displayed, repair the malfunction area, clear the DTCs and perform the Test Mode inspection.
2. CHECK SENSOR SIGNAL BY TEST MODE (When not Using Intelligent Tester)

(a) Procedures for test mode:
   (1) Turn the ignition switch OFF.
   (2) Check that the steering wheel is in the centered position.
   (3) Check that the shift lever is in the P position and apply the parking brake.
   (4) Using SST, connect terminals 12 (TS) and 4 (CG) of the DLC3.
   SST 09843-18040
   (5) Turn the ignition switch ON.
   (6) Check that the ABS warning light and VSC warning light blink as shown in the illustration.
   HINT:
   If the ABS warning light and VSC warning light and multi information display and master caution indicator light do not blink, check the TS and CG terminal circuit, and ABS and VSC warning light circuits.
   (7) Start the engine.
   (b) w/ 16-inch disc:
   Check the lost booster pressure judgment and perform the master cylinder pressure sensor zero point calibration.
   NOTICE:
   Preform the check in the lost booster pressure state (negative pressure in the booster is depressurized).
   (1) Turn the ignition switch ON.
   (2) Check that the BRAKE warning light comes on when depressing the brake pedal with a force of 59 N (6 kgf, 13.2 lbf) or more for 1 second or more. (The lost booster pressure state is judged normal.)
   (3) Start the engine depressing the brake pedal with a force of 59 N (6 kgf, 13.2 lbf) or more for 1 second or more.
(4) Check that the brake warning light goes off when quickly releasing the brake pedal. (The lost booster pressure state is judged normal.)

(5) Leave the vehicle for 1 second or more. (Master cylinder pressure sensor zero point calibration.)

NOTICE:
• If you slowly depress the brake pedal or depress it again, master cylinder pressure sensor zero point calibration is not performed normally.
• If the lost booster pressure judgment check is not completed normally, the master cylinder pressure sensor check is not judged.
• If a recheck is performed after the engine has started, end the Test Mode, enter Test Mode again, and release the vacuum in the booster by pumping the brake pedal prior to the recheck.

(c) Check the deceleration sensor.
(1) Keep the vehicle stationary on a level surface for 1 second or more.

HINT:
The deceleration sensor check can be performed together with the following master cylinder pressure sensor check.

(d) Check the master cylinder pressure sensor.
(1) Leave the vehicle in a stationary condition and release the brake pedal for 1 second or more, and quickly depress the brake pedal with a force of 98 N (10 kgf, 22 lbf) or more for 1 second. Check that the ABS warning light remains illuminated for 3 seconds.

HINT:
• Ensure that the ABS warning light comes on.
• While the ABS warning light remains illuminated, continue depressing the brake pedal with a force of 98 N (10 kgf, 22 lbf) or more.
• The ABS warning light comes on for 3 seconds every time the brake pedal operation above is performed.

(e) Check the speed sensor.
(1) Check that the ABS warning light is blinking as shown in the illustration.

(2) Check the speed sensor signal.
1. Drive the vehicle straight forward at a speed of 45 km/h (28 mph) or more for several seconds.
2. Check that the ABS warning light goes off.

**NOTICE:**
- The speed sensor check may not be completed if the sensor check is started with the steering wheel turned or one or more wheels spinning.
- If the speed sensor check is commenced while the steering wheel is turned, the ABS warning light may come on after the low speed check is finished.
- The ABS warning light comes on immediately when an abnormality is detected.
- When the speed sensor signal is normal, the ABS warning light goes off while driving at 45 km/h (28 mph) or more, and blinks in the test mode pattern while the vehicle is stationary.
- Do not drive the vehicle at a speed of 80 km/h (50 mph) or more after the ABS warning light turns off, because test mode DTCs are set again when the vehicle speed exceeds 80 km/h (50 mph).

3. Stop the vehicle.
(f) Check the yaw rate sensor.
   (1) Move the shift lever to P and set the parking brake lever.
   (2) Check that the VSC warning light is blinking as shown in the illustration.
   (3) Keep the vehicle stationary on a level surface for 1 second or more.

   (4) Shift the shift lever to the D position and drive the vehicle at a speed of approximately 5 km/h (3 mph), and turn the steering wheel either to the left or right 90° or more to turn the vehicle through 180°.
   (5) Stop the vehicle, move the shift lever into the P position, and then apply the parking brake.
   (6) Check that the skid control buzzer sounds for 3 seconds.
   HINT:
   • If the skid control buzzer sounds, the signal check has been completed normally.
   • If the skid control buzzer does not sound, check the skid control buzzer circuit (see page BC-172).
   • If the skid control buzzer still does not sound, there is a malfunction in the yaw rate sensor, so check for DTCs.
   • Drive the vehicle in a 180° semi circle. At the end of the turn, the direction of the vehicle should be within 180 ± 5° of its start position.
   • Complete the vehicle turn within 20 seconds.
   • Do not spin the wheels.

(g) w/ Downhill assist control only:
Check the downhill assist control operation switch.
(1) Check that the VSC warning light is blinking as shown in the illustration.
(2) Check the downhill assist control switch.
   1. Push the downhill assist control switch on.
   2. Push the downhill assist control switch off.
(h) w/ Auto LSD only:
Check the end of the sensor.
(1) When the sensor check is successfully completed, the ABS warning light blinks in the test mode pattern when the vehicle is stopped, and goes off when the vehicle is driven.

**NOTICE:**
If the sensor check is not completed, the ABS warning light blinks even while the vehicle is driving and the ABS does not operate.

(i) Read the DTCs of the signal check function.
(1) Using SST, connect terminals 13 (TC) and 4 (CG) of the DLC3.
   **SST 09843-18040**
(2) Turn the ignition switch ON.
(3) Count the number of blinks of the ABS and VSC warning light.

**HINT:**
As an example, the blinking patters of DTCs 71 and 74 are shown below.

---

**NOTICE:**
- If only DTCs are displayed, repair the malfunctioning area and clear the DTCs.
- If the DTCs or test mode codes (DTC of signal check function) are displayed, repair the malfunctioning area, clear the DTCs and perform the test mode inspection.)

**HINT:**
- If more than 1 malfunction is detected at the same time, the lowest numbered code will be displayed first.
- See the list of DTCs (refer to "DTC OF TEST MODE FUNCTION (SIGNAL CHECK)" below).
If all sensors are normal, a normal system code is output (the light comes on for 0.25 seconds at intervals of 0.25 seconds).

(4) After the check, disconnect SST from terminals 13 (TC) and 4 (CG) of the DLC3.

(5) Turn the ignition switch OFF.

### 3. DTC OF TEST MODE FUNCTION (SIGNAL CHECK)

#### DTC of ABS sensor check function:

<table>
<thead>
<tr>
<th>DTC No.</th>
<th>Diagnosis</th>
<th>Trouble Areas</th>
</tr>
</thead>
</table>
| C1271/71 | Low output signal of front speed sensor RH | • Front speed sensor RH  
• Speed sensor circuit  
• Sensor installation |
| C1272/72 | Low output signal of front speed sensor LH | • Front speed sensor LH  
• Speed sensor circuit  
• Sensor installation |
| C1273/73 | Low output signal of rear speed sensor RH | • Rear speed sensor RH (for 4WD)  
• Skid control sensor RH (for 2WD)  
• Speed sensor circuit  
• Sensor installation |
| C1274/74 | Low output signal of rear speed sensor LH | • Rear speed sensor LH (4WD)  
• Skid control sensor LH (2WD)  
• Speed sensor circuit  
• Sensor installation |
| C1275/75 | Abnormal change in output signal of front speed sensor RH | • Sensor installation  
• Speed sensor rotor  
• Foreign matter on sensor tip or sensor rotor |
| C1276/76 | Abnormal change in output signal of front speed sensor LH | • Sensor installation  
• Speed sensor rotor  
• Foreign matter on sensor tip or sensor rotor |
| C1277/77 | Abnormal change in output signal of rear speed sensor RH | • Sensor installation  
• Speed sensor rotor  
• Foreign matter on sensor tip or sensor rotor |
| C1278/78 | Abnormal change in output signal of rear speed sensor LH | • Sensor installation  
• Speed sensor rotor  
• Foreign matter on sensor tip or sensor rotor |
| C1279/79 | Deceleration sensor output voltage malfunction | • Yaw rate sensor  
• Sensor installation |
| C1281/81 | Master cylinder pressure sensor output malfunction | • Master cylinder pressure sensor  
• Brake pedal load sensing switch (w/ 16-inch disc) |

#### DTC of VSC sensor check function:

<table>
<thead>
<tr>
<th>DTC No.</th>
<th>Diagnosis</th>
<th>Trouble Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>C0371/71</td>
<td>Yaw rate sensor</td>
<td>Yaw rate sensor</td>
</tr>
<tr>
<td>C1379/74*</td>
<td>Downhill assist control operation switch</td>
<td>Downhill assist control switch</td>
</tr>
</tbody>
</table>

**HINT:**
- *: w/ Downhill assist control
- The DTCs in this table are only output in Test Mode.
- The detection of DTCs from C1271/71 to C1274/74 is completed before the vehicle speed reaches 5 km/h (3 mph).
- The detection of DTCs from C1275/75 to C1278/78 is completed before the vehicle speed reaches 45 km/h (28 mph).
• C1271/71 to C1274/74: The speed output from only one wheel is extremely low despite other wheel speed outputs reaching 5 km/h (3 mph).

• C1275/75 to C1278/78: The abnormal speed sensor output frequency is as shown in the illustration.
PROBLEM SYMPTOMS TABLE

HINT:
- Use the table below to help determine the cause of the problem symptom. The potential causes of the symptoms are listed in order of probability in the "Suspected area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.
- Inspect the fuses and relays related to this system before inspecting the suspected areas below.

NOTICE:
When replacing the ABS and TRACTION actuator or sensor, turn the ignition switch OFF.

Vehicle stability control system

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Suspected area</th>
<th>See page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABS, BA and/or EBD does not operate</td>
<td>1. Check for DTCs again and make sure that normal system code displayed</td>
<td>BC-47</td>
</tr>
<tr>
<td></td>
<td>2. IG power source circuit</td>
<td>BC-99</td>
</tr>
<tr>
<td></td>
<td>3. Front speed sensor circuit</td>
<td>BC-62</td>
</tr>
<tr>
<td></td>
<td>4. Rear speed sensor circuit</td>
<td>BC-69</td>
</tr>
<tr>
<td></td>
<td>5. Check ABS and TRACTION actuator using intelligent tester (Check ABS and TRACTION actuator operation using ACTIVE TEST function). If abnormal, check hydraulic circuit for leakage.</td>
<td>BC-180</td>
</tr>
<tr>
<td></td>
<td>6. If symptoms still occur even after above circuits in suspected areas inspected and proved to be normal, replace ABS and TRACTION actuator (skid control ECU)</td>
<td>BC-181</td>
</tr>
<tr>
<td>ABS, BA and/or EBD does not operate efficiently</td>
<td>1. Check for DTCs again and make sure that normal system code displayed</td>
<td>BC-47</td>
</tr>
<tr>
<td></td>
<td>2. Front speed sensor circuit</td>
<td>BC-62</td>
</tr>
<tr>
<td></td>
<td>3. Rear speed sensor circuit</td>
<td>BC-69</td>
</tr>
<tr>
<td></td>
<td>4. Stop light switch circuit</td>
<td>BC-105</td>
</tr>
<tr>
<td></td>
<td>5. Check ABS and TRACTION actuator using intelligent tester (Check ABS and TRACTION actuator operation using ACTIVE TEST function). If abnormal, check hydraulic circuit for leakage.</td>
<td>BC-180</td>
</tr>
<tr>
<td></td>
<td>6. If symptoms still occur even after above circuits in suspected areas inspected and proved to be normal, replace ABS and TRACTION actuator (skid control ECU)</td>
<td>BC-181</td>
</tr>
<tr>
<td>VSC and/or TRC does not operate</td>
<td>1. Check for DTCs again and make sure that normal system code displayed</td>
<td>BC-47</td>
</tr>
<tr>
<td></td>
<td>2. IG power source circuit</td>
<td>BC-99</td>
</tr>
<tr>
<td></td>
<td>3. Check hydraulic circuit for leakage</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>4. Front speed sensor circuit</td>
<td>BC-62</td>
</tr>
<tr>
<td></td>
<td>5. Rear speed sensor circuit</td>
<td>BC-69</td>
</tr>
<tr>
<td></td>
<td>6. Yaw rate sensor circuit</td>
<td>BC-96</td>
</tr>
<tr>
<td></td>
<td>7. Steering angle sensor circuit</td>
<td>BC-92</td>
</tr>
<tr>
<td></td>
<td>8. If symptoms still occur even after above circuits in suspected areas inspected and proved to be normal, replace ABS and TRACTION actuator (skid control ECU)</td>
<td>BC-181</td>
</tr>
<tr>
<td>Sensor signal check cannot be performed</td>
<td>1. TS and CG terminal circuit</td>
<td>BC-177</td>
</tr>
<tr>
<td></td>
<td>2. ABS and TRACTION actuator (skid control ECU)</td>
<td>BC-181</td>
</tr>
</tbody>
</table>
# BRAKE CONTROL – VEHICLE STABILITY CONTROL SYSTEM

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Suspected area</th>
<th>See page</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC check cannot be performed</td>
<td>1. Check for DTCs again and make sure that normal system code displayed</td>
<td>BC-47</td>
</tr>
<tr>
<td></td>
<td>2. TC and CG terminal circuit</td>
<td>BC-174</td>
</tr>
<tr>
<td></td>
<td>3. If symptoms still occur even after above circuits in suspected areas inspected and proved to be normal, replace ABS and TRACTION actuator (skid control ECU)</td>
<td>BC-181</td>
</tr>
<tr>
<td>ABS warning light abnormal (Remains on)</td>
<td>1. ABS warning light circuit</td>
<td>BC-134</td>
</tr>
<tr>
<td></td>
<td>2. ABS and TRACTION actuator (skid control ECU)</td>
<td>BC-181</td>
</tr>
<tr>
<td>ABS warning light abnormal (Does not come on)</td>
<td>1. ABS warning light circuit</td>
<td>BC-138</td>
</tr>
<tr>
<td></td>
<td>2. ABS and TRACTION actuator (skid control ECU)</td>
<td>BC-181</td>
</tr>
<tr>
<td>VSC warning light abnormal (Remains on)</td>
<td>1. VSC warning light circuit</td>
<td>BC-139</td>
</tr>
<tr>
<td></td>
<td>2. ABS and TRACTION actuator (skid control ECU)</td>
<td>BC-181</td>
</tr>
<tr>
<td>VSC warning light abnormal (Does not come on)</td>
<td>1. VSC warning light circuit</td>
<td>BC-142</td>
</tr>
<tr>
<td></td>
<td>2. ABS and TRACTION actuator (skid control ECU)</td>
<td>BC-181</td>
</tr>
<tr>
<td>BRAKE warning light abnormal (Remains on)</td>
<td>1. BRAKE warning light circuit</td>
<td>BC-144</td>
</tr>
<tr>
<td></td>
<td>2. ABS and TRACTION actuator (skid control ECU)</td>
<td>BC-181</td>
</tr>
<tr>
<td>BRAKE warning light abnormal (Does not come on)</td>
<td>1. BRAKE warning light circuit</td>
<td>BC-151</td>
</tr>
<tr>
<td></td>
<td>2. ABS and TRACTION actuator (skid control ECU)</td>
<td>BC-181</td>
</tr>
<tr>
<td>SLIP indicator light abnormal (Remains on)</td>
<td>1. SLIP indicator light circuit</td>
<td>BC-152</td>
</tr>
<tr>
<td></td>
<td>2. ABS and TRACTION actuator (skid control ECU)</td>
<td>BC-181</td>
</tr>
<tr>
<td>SLIP indicator light abnormal (Does not come on)</td>
<td>1. SLIP indicator light circuit</td>
<td>BC-154</td>
</tr>
<tr>
<td></td>
<td>2. ABS and TRACTION actuator (skid control ECU)</td>
<td>BC-181</td>
</tr>
<tr>
<td>Skid control buzzer abnormal</td>
<td>1. Skid control buzzer circuit</td>
<td>BC-172</td>
</tr>
<tr>
<td></td>
<td>2. ABS and TRACTION actuator (skid control ECU)</td>
<td>BC-181</td>
</tr>
<tr>
<td>Downhill assist control does not operate*1</td>
<td>1. Check for DTCs again and make sure that normal system code displayed</td>
<td>BC-47</td>
</tr>
<tr>
<td></td>
<td>2. Downhill assist control switch circuit</td>
<td>BC-119</td>
</tr>
<tr>
<td></td>
<td>3. Downhill assist control indicator light circuit</td>
<td>BC-161</td>
</tr>
<tr>
<td></td>
<td>4. If symptoms still occur even after above circuits in suspected areas inspected and proved to be normal, replace ABS and TRACTION actuator (skid control ECU)</td>
<td>BC-181</td>
</tr>
<tr>
<td>Downhill assist control indicator light abnormal (Remains on)*1</td>
<td>1. Downhill assist control indicator light circuit</td>
<td>BC-156</td>
</tr>
<tr>
<td></td>
<td>2. ABS and TRACTION actuator (skid control ECU)</td>
<td>BC-181</td>
</tr>
<tr>
<td>Downhill assist control indicator light abnormal (Does not come on)*1</td>
<td>1. Downhill assist control indicator light circuit</td>
<td>BC-161</td>
</tr>
<tr>
<td></td>
<td>2. ABS and TRACTION actuator (skid control ECU)</td>
<td>BC-181</td>
</tr>
<tr>
<td>Hill-start assist control does not operate*2</td>
<td>1. ABS and TRACTION actuator (skid control ECU)</td>
<td>BC-181</td>
</tr>
<tr>
<td>AUTO LSD does not operate*3</td>
<td>1. Check for DTCs again and make sure that normal system code displayed</td>
<td>BC-47</td>
</tr>
<tr>
<td></td>
<td>2. Auto LSD switch circuit</td>
<td>BC-169</td>
</tr>
<tr>
<td></td>
<td>3. AUTO LSD indicator circuit</td>
<td>BC-169</td>
</tr>
<tr>
<td></td>
<td>4. If symptoms still occur even after above circuits in suspected areas inspected and proved to be normal, replace ABS and TRACTION actuator (skid control ECU)</td>
<td>BC-181</td>
</tr>
<tr>
<td>AUTO LSD indicator light abnormal (Remains on)*3</td>
<td>1. AUTO LSD indicator circuit</td>
<td>BC-164</td>
</tr>
<tr>
<td></td>
<td>2. ABS and TRACTION actuator (skid control ECU)</td>
<td>BC-181</td>
</tr>
<tr>
<td>AUTO LSD indicator light abnormal (Does not come on)*3</td>
<td>1. AUTO LSD indicator circuit</td>
<td>BC-169</td>
</tr>
<tr>
<td></td>
<td>2. ABS and TRACTION actuator (skid control ECU)</td>
<td>BC-181</td>
</tr>
</tbody>
</table>

**HINT:**
*1: w/ Downhill assist control  
*2: w/ Hill-start assist control  
*3: for 2WD w/ AUTO LSD
### TERMINALS OF ECU

#### 1. SKID CONTROL ECU

<table>
<thead>
<tr>
<th>Symbols (Terminal No.)</th>
<th>Terminal Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>GND2 (A19-1)</td>
<td>Motor ground</td>
</tr>
<tr>
<td>BM (A19-2)</td>
<td>Motor relay input</td>
</tr>
<tr>
<td>FR+ (A19-3)</td>
<td>Front RH wheel speed sensor power supply</td>
</tr>
<tr>
<td>FL- (A19-4)</td>
<td>Front LH wheel speed signal input</td>
</tr>
<tr>
<td>RR+ (A19-5)</td>
<td>Rear RH wheel speed signal power supply</td>
</tr>
<tr>
<td>RL- (A19-6)</td>
<td>Rear LH wheel speed signal input</td>
</tr>
<tr>
<td>FSW+ (A19-7)*1</td>
<td>Brake pedal load sensing switch input</td>
</tr>
<tr>
<td>CANH (A19-11)</td>
<td>CAN communication line H</td>
</tr>
<tr>
<td>SP1 (A19-12)</td>
<td>Speed signal output for combination meter</td>
</tr>
<tr>
<td>MRF (A19-14)</td>
<td>Fail safe motor relay output</td>
</tr>
<tr>
<td>MR (A19-15)</td>
<td>Motor relay output</td>
</tr>
<tr>
<td>STPO (A19-16)</td>
<td>Stop light relay output</td>
</tr>
<tr>
<td>FR- (A19-17)</td>
<td>Front RH wheel speed signal input</td>
</tr>
<tr>
<td>FL+ (A19-18)</td>
<td>Front LH wheel speed sensor power supply</td>
</tr>
<tr>
<td>RR- (A19-19)</td>
<td>Rear RH wheel speed signal input</td>
</tr>
<tr>
<td>RL+ (A19-20)</td>
<td>Rear LH wheel speed sensor power supply</td>
</tr>
<tr>
<td>STP2 (A19-21)</td>
<td>Stop light relay input</td>
</tr>
<tr>
<td>TS (A19-24)</td>
<td>Sensor diagnosis check input</td>
</tr>
<tr>
<td>CANL (A19-25)</td>
<td>CAN communication line L</td>
</tr>
<tr>
<td>STP1 (A19-27)</td>
<td>Stop light switch input</td>
</tr>
<tr>
<td>HDCS (A19-28)*2</td>
<td>Downhill assist control switch input</td>
</tr>
<tr>
<td>+BS (A19-31)</td>
<td>Solenoid valve power supply</td>
</tr>
<tr>
<td>GND1 (A19-32)</td>
<td>Skid control ECU ground</td>
</tr>
<tr>
<td>CSW (A19-43)*3</td>
<td>AUTO LSD switch input</td>
</tr>
<tr>
<td>R+ (A19-45)</td>
<td>Power supply for motor relay</td>
</tr>
<tr>
<td>IG1 (A19-46)</td>
<td>ECU power supply</td>
</tr>
</tbody>
</table>

**HINT:**

*1: w/ 16-inch disc
*2: w/ Downhill assist control
*3: for 2WD (w/ AUTO LSD)
2. CHECK SKID CONTROL ECU

(a) Disconnect the A19 ECU connector.
(b) Measure the voltage and resistance of the wire harness side connector.

**HINT:**
The voltage cannot be measured with the connector connected to the skid control ECU as the connector is water resistant.

### Skid control ECU:

<table>
<thead>
<tr>
<th>Symbols (Terminal No.)</th>
<th>Wiring Color</th>
<th>Terminal Description</th>
<th>Condition</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>GND2 (A19-1) - Body ground</td>
<td>W-B - Body ground</td>
<td>Skid control ECU ground</td>
<td>Always</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>STP1 (A19-27) - Body ground</td>
<td>L - Body ground</td>
<td>Stop light switch input</td>
<td>Stop light switch OFF Brake pedal released</td>
<td>Below 1.5 V</td>
</tr>
<tr>
<td>STP1 (A19-27) - Body ground</td>
<td>L - Body ground</td>
<td>Stop light switch input</td>
<td>Stop light switch ON Brake pedal depressed</td>
<td>8 to 16 V</td>
</tr>
<tr>
<td>STP2 (A19-21) - Body ground</td>
<td>L - Body ground</td>
<td>Stop light relay input</td>
<td>Stop light switch OFF Brake pedal released</td>
<td>Below 1.5 V</td>
</tr>
<tr>
<td>STP2 (A19-21) - Body ground</td>
<td>L - Body ground</td>
<td>Stop light relay input</td>
<td>Stop light switch ON Brake pedal depressed</td>
<td>8 to 16 V</td>
</tr>
<tr>
<td>STPO (A19-16) - Body ground</td>
<td>W - Body ground</td>
<td>Stop light relay output</td>
<td>Always</td>
<td>10 to 14 V</td>
</tr>
<tr>
<td>+BS (A19-31) - Body ground</td>
<td>W - Body ground</td>
<td>Solenoid relay power supply</td>
<td>Always</td>
<td>10 to 14 V</td>
</tr>
<tr>
<td>IG1 (A19-46) - Body ground</td>
<td>L - Body ground</td>
<td>ECU power supply</td>
<td>Ignition switch ON</td>
<td>10 to 14 V</td>
</tr>
<tr>
<td>HDCS (A19-28)*2</td>
<td>Y - Body ground</td>
<td>Downhill assist control switch input</td>
<td>Downhill assist control switch ON</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>HDCS (A19-28)*2</td>
<td>Y - Body ground</td>
<td>Downhill assist control switch input</td>
<td>Downhill assist control switch OFF</td>
<td>10 kΩ or higher</td>
</tr>
<tr>
<td>FSW+ (A19-7)*1</td>
<td>P - Body ground</td>
<td>Brake pedal load sensing switch input</td>
<td>Brake pedal load sensing switch ON Brake pedal released</td>
<td>202.4 to 223.7 Ω</td>
</tr>
<tr>
<td>FSW+ (A19-7)*1</td>
<td>P - Body ground</td>
<td>Brake pedal load sensing switch input</td>
<td>Brake pedal load sensing switch OFF Brake pedal released</td>
<td>0.95 to 1.05 kΩ</td>
</tr>
<tr>
<td>CSW (A19-43)*3</td>
<td>L - Body ground</td>
<td>AUTO LSD switch input</td>
<td>AUTO LSD switch ON</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>CSW (A19-43)*3</td>
<td>L - Body ground</td>
<td>AUTO LSD switch input</td>
<td>AUTO LSD switch OFF</td>
<td>10 kΩ or higher</td>
</tr>
</tbody>
</table>

**HINT:**

*1: w/ 16-inch disc  
*2: w/ Downhill assist control  
*3: for 2WD (w/ AUTO LSD)  
If the result is not as specified, there may be a malfunction on the wire harness side.
3. CHECK INSTRUMENT PANEL JUNCTION BLOCK (MAIN BODY ECU)

(a) Disconnect the ID junction block connector.
(b) Measure the resistance of the wire harness side connector.

<table>
<thead>
<tr>
<th>Symbols (Terminal No.)</th>
<th>Wiring Color</th>
<th>Terminal Description</th>
<th>Condition</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>PKB (ID-4) - Body ground</td>
<td>B - Body ground</td>
<td>Parking brake switch input</td>
<td>Parking brake switch ON</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>PKB (ID-4) - Body ground</td>
<td>B - Body ground</td>
<td>Parking brake switch input</td>
<td>Parking brake switch OFF</td>
<td>10 kΩ or higher</td>
</tr>
</tbody>
</table>

If the result is not as specified, there may be a malfunction on the wire harness side.

(c) Reconnect the ID junction block connector.
(d) Measure the voltage of the wire harness side connector.

<table>
<thead>
<tr>
<th>Symbols (Terminal No.)</th>
<th>Wiring Color</th>
<th>Terminal Description</th>
<th>Condition</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>PKB (ID-4) - Body ground</td>
<td>B - Body ground</td>
<td>Parking brake switch input</td>
<td>Parking brake switch ON</td>
<td>Below 1 V</td>
</tr>
<tr>
<td>PKB (ID-4) - Body ground</td>
<td>B - Body ground</td>
<td>Parking brake switch input</td>
<td>Parking brake switch OFF</td>
<td>10 to 14 V</td>
</tr>
</tbody>
</table>

If the result is not as specified, the junction block (ECU) may be a malfunction.
1. **DIAGNOSIS**

If the skid control ECU detects a malfunction, the ABS, VSC and brake warning lights and the slip, downhill assist control and AUTO LSD indicator lights come on in accordance with the trouble area to warn the driver. The table below indicates which lights come on when there are malfunctions in particular functions.

<table>
<thead>
<tr>
<th>Item / Trouble Area</th>
<th>ABS</th>
<th>EBD</th>
<th>BA (Brake Assist)</th>
<th>TRC</th>
<th>VSC</th>
<th>Downhill assist control*1</th>
<th>Hill-start assist control*2</th>
<th>AUTO LSD*3</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABS warning light</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Brake warning light</td>
<td>-</td>
<td>○</td>
<td>○*4</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>VSC warning light</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Slip indicator light</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Downhill assist control indicator light*1</td>
<td>(Downhill assist control switch ON)</td>
<td>(Downhill assist control switch ON)</td>
<td>(Downhill assist control switch ON)</td>
<td>(Downhill assist control switch ON)</td>
<td>(Downhill assist control switch ON)</td>
<td>(Downhill assist control switch ON)</td>
<td>(Downhill assist control switch ON)</td>
<td></td>
</tr>
<tr>
<td>AUTO LSD indicator light*3</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

○: Light ON  
●: Light ON (Blinking)  
- : Light OFF  

**HINT:**  
• *1: w/ Downhill Assist Control  
• *2: w/ Hill-start assist control  
• *3: for 2WD (w/ AUTO LSD)
- *4: w/ 16-inch disc
- The DTCs can be read by connecting SST (09843-18040) between the TC and CG terminals of the DLC3 and observing the blinking pattern of the ABS and VSC warning lights, or by using an intelligent tester (see page BC-47).
- This system has a sensor signal check function (see page BC-28).

2. CHECK WARNING LIGHT AND INDICATOR LIGHT
   (a) Release the parking brake lever.
   **NOTICE:**
   Before releasing the parking brake lever, set chocks to hold the vehicle for safety.
   **HINT:**
   When the parking brake is applied or the brake fluid level is low, the brake warning light comes on.
   (b) When the ignition switch is turned ON, check that the ABS, VSC and brake warning lights and the slip, downhill assist control and AUTO LSD indicator lights come on and go off in about 3 seconds.

<table>
<thead>
<tr>
<th>ABS Warning Light</th>
<th>VSC Warning Light</th>
<th>Brake Warning Light</th>
<th>Slip Indicator Light</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="ABS" alt="ABS" /></td>
<td>VSC</td>
<td><img src="%E2%80%A2" alt="•" /></td>
<td><img src="%E2%97%8F" alt="●" /></td>
</tr>
<tr>
<td>AUTO LSD Indicator Light*2</td>
<td>Downhill assist control Indicator Light*1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**AUTO LSD**

*1: w/ Downhill Assist Control

*2: for 2WD (w/ AUTO LSD)

**HINT:**
If the warning lights do not illuminate, confirm whether the bulbs have burned out, and also check for CAN communication system DTCs, since the skid control ECU and combination meter are connected by the CAN communication line. If the warning light remains on, perform relevant troubleshooting procedures. The relevant troubleshooting procedures are in the sections listed in the table below.

<table>
<thead>
<tr>
<th>Section Title</th>
<th>See procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABS Warning Light Remains ON</td>
<td>BC-134</td>
</tr>
</tbody>
</table>
**BC–50 BRAKE CONTROL – VEHICLE STABILITY CONTROL SYSTEM**

**DTC CHECK / CLEAR**

1. **CHECK DTC (When Using Intelligent Tester)**
   (a) Connect the intelligent tester (with CAN VIM) to the DLC3.
   (b) Turn the ignition switch ON.
   (c) Turn the tester on.
   (d) Read the DTCs by following the prompts on the tester screen.
   **HINT:**
   Refer to the intelligent tester operator’s manual for further details.

2. **CLEAR DTC (When Using Intelligent Tester)**
   (a) Connect the intelligent tester (with CAN VIM) to the DLC3.
   (b) Turn the ignition switch ON.
   (c) Turn the tester on.
   (d) Operate the intelligent tester to clear the codes.
   **HINT:**
   Refer to the intelligent tester operator’s manual for further details.

3. **CHECK DTC (When not Using Intelligent Tester)**
   (a) Using SST, connect terminals 13 (TC) and 4 (CG) of the DLC3.
   **SST 09843-18040**
   (b) Turn the ignition switch ON.
   (c) Read DTCs from the ABS warning light on the combination meter.
   **HINT:**
   • If the ABS warning light does not blink, perform relevant troubleshooting procedures. The relevant troubleshooting procedures are in the sections listed in the table below.

<table>
<thead>
<tr>
<th>Section Title</th>
<th>See procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>VSC Warning Light Remains ON</td>
<td>BC-139</td>
</tr>
<tr>
<td>Brake Warning Light Remains ON</td>
<td>BC-144</td>
</tr>
<tr>
<td>Slip Indicator Light Remains ON</td>
<td>BC-152</td>
</tr>
<tr>
<td>Downhill assist control Indicator Light Remains ON</td>
<td>BC-156</td>
</tr>
<tr>
<td>AUTO LSD Indicator Light Remains ON</td>
<td>BC-164</td>
</tr>
</tbody>
</table>

**Trouble Area**

<table>
<thead>
<tr>
<th>See Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABS warning light circuit</td>
</tr>
</tbody>
</table>
• As an example, the blinking patterns of the normal system code and DTCs 11 and 21 are shown below.

<table>
<thead>
<tr>
<th>Trouble Area</th>
<th>See Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>VSC warning light circuit</td>
<td>BC-139 or BC-142</td>
</tr>
<tr>
<td>TC and CG terminal circuit</td>
<td>BC-174</td>
</tr>
</tbody>
</table>

4. CLEAR DTC (When not Using Intelligent Tester)

(a) Using SST, connect terminals 13 (TC) and 4 (CG) of the DLC3.

SST 09843-18040

(b) Turn the ignition switch ON.
(c) Clear the DTCs stored in the skid control ECU by depressing the brake pedal 8 times or more within 5 seconds.
(d) Check that the ABS and VSC warning lights come on.
(e) Remove SST from the terminals of the DLC3.
(f) Turn the ignition switch OFF.

HINT:
Clearing the DTCs cannot be performed by removing the cable from the negative (-) battery terminal or the ECU-IG1 fuse.

5. END OF DTC CHECK/CLEAR
(a) Turn the ignition switch ON.
(b) Check that the ABS and VSC warning lights go off within approximately 3 seconds.
(c) Turn the ignition switch OFF.
FREEZE FRAME DATA

1. FREEZE FRAME DATA

HINT:
- Whenever a DTC is detected or the ABS operates, the skid control ECU stores the current vehicle (sensor) state as freeze frame data.
- The skid control ECU stores the number of times (maximum: 31) the ignition switch has been turned from OFF to ON since the last time the ABS was activated. However, if the vehicle was stationary or running at a low speed (7 km/h [4.3 mph] or less), or if a DTC is detected, the skid control ECU stops counting.
- Freeze frame data at the time the ABS operates: The skid control ECU stores and updates the data whenever the ABS system operates. When the ECU stores data at the time a DTC is detected, the data stored when the ABS operated is erased.
- Freeze frame data at the time a DTC is detected: When the skid control ECU stores data at the time a DTC is detected, no updates will be performed until the data is cleared.

(a) Connect the intelligent tester (with CAN VIM) to the DLC3.
(b) Turn the ignition switch ON.
(c) Turn the tester on.
(d) From the display on the tester, select "FREEZE FRAME DATA".

<table>
<thead>
<tr>
<th>Item (Display)</th>
<th>Measurement Item</th>
<th>Reference Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>FREEZE TIME</td>
<td>Elapsed time after freeze frame data recorded</td>
<td>Min.: 0 ms</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Max.: 500 ms</td>
</tr>
<tr>
<td>#IG ON</td>
<td>Number of ignition switch ON operations since freeze frame data stored</td>
<td>1 to 31</td>
</tr>
<tr>
<td>BUZZER</td>
<td>Skid control buzzer signal</td>
<td>ON: Skid control buzzer ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OFF: Skid control buzzer OFF</td>
</tr>
<tr>
<td>STOP LAMP SW</td>
<td>Stop light switch signal</td>
<td>ON: Stop light switch ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OFF: Stop light switch OFF</td>
</tr>
<tr>
<td>PARKING BRAKE SW</td>
<td>Parking brake switch signal</td>
<td>ON: Parking brake switch ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OFF: Parking brake switch OFF</td>
</tr>
<tr>
<td>BRK PEDAL SW</td>
<td>Brake pedal load sensing switch signal</td>
<td>ON: Brake pedal released</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OFF: Brake pedal depressed</td>
</tr>
<tr>
<td>Item (Display)</td>
<td>Measurement Item</td>
<td>Reference Values</td>
</tr>
<tr>
<td>----------------------------</td>
<td>---------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>GEAR POSITION</td>
<td>Gear position information</td>
<td>FAIL 1st 2nd 3rd 4th 5th 6th P N R NOT R</td>
</tr>
<tr>
<td>LEVER POSITION</td>
<td>Shift lever position information</td>
<td>FAIL 1st 2nd 3rd 4th 5th 6th/B D/M P N R</td>
</tr>
<tr>
<td>MAS CYL PRESS 1</td>
<td>Master cylinder pressure sensor reading</td>
<td>Brake pedal released: 0.3 V to 0.9 V Brake pedal depressed: 0.8 V to 4.5 V</td>
</tr>
<tr>
<td>M/C Sensor Grade</td>
<td>Master cylinder pressure sensor change</td>
<td>Min.: -30 MPa/s Max.: 225 MPa/s</td>
</tr>
<tr>
<td>YAW RATE</td>
<td>Yaw rate sensor reading</td>
<td>Min.: -128 deg/s Max.: 127 deg/s</td>
</tr>
<tr>
<td>STEERING SEN</td>
<td>Steering sensor reading</td>
<td>Left turn: Increase Right turn: Decrease</td>
</tr>
<tr>
<td>LATERAL G</td>
<td>Lateral G</td>
<td>Min.: -25.11 m/s² Max.: 24.91 m/s²</td>
</tr>
<tr>
<td>FORWARD&amp;REA G</td>
<td>Forward and backward G</td>
<td>Min.: -25.11 m/s² Max.: 24.91 m/s²</td>
</tr>
<tr>
<td>FR WHEEL SPD</td>
<td>FR wheel speed</td>
<td>Min.: 0 km/h (0 mph) Max.: 326.4 km/h (202.8 mph)</td>
</tr>
<tr>
<td>FL WHEEL SPD</td>
<td>FL wheel speed</td>
<td>Min.: 0 km/h (0 mph) Max.: 326.4 km/h (202.8 mph)</td>
</tr>
<tr>
<td>RR WHEEL SPD</td>
<td>RR wheel speed</td>
<td>Min.: 0 km/h (0 mph) Max.: 326.4 km/h (202.8 mph)</td>
</tr>
<tr>
<td>RL WHEEL SPD</td>
<td>RL wheel speed</td>
<td>Min.: 0 km/h (0 mph) Max.: 326.4 km/h (202.8 mph)</td>
</tr>
<tr>
<td>VEHICLE SPD</td>
<td>Vehicle speed</td>
<td>Min.: 0 km/h (0 mph) Max.: 326.4 km/h (202.8 mph)</td>
</tr>
<tr>
<td>SPD GARDE</td>
<td>Vehicle speed grade</td>
<td>Min.: -25.11 m/s² Max.: 24.91 m/s²</td>
</tr>
<tr>
<td>ENGINE TORQUE</td>
<td>Real engine torque</td>
<td>Min.: -1024 Nm Max.: 1023 Nm</td>
</tr>
<tr>
<td>ACCELERATOR %</td>
<td>Accelerator pedal opening angle %</td>
<td>Min.: 0% Max.: 128%</td>
</tr>
<tr>
<td>INSPECTION MODE</td>
<td>Inspection mode</td>
<td>OTHER: Normal INSPECT: Service</td>
</tr>
</tbody>
</table>
FAIL-SAFE CHART

1. FAIL SAFE OPERATION
   • If there is a problem with any sensor signals or actuator systems, the skid control ECU prohibits the power supply to the ABS and TRACTION actuator and informs the ECM of VSC system failure. The ABS and TRACTION actuator turns off the solenoids and the ECM shuts off VSC control (traction control signal) from the skid control ECU accordingly, the result being that it is as if the ABS, TRC and VSC systems were not installed.
   • ABS control is prohibited, but EBD control continues as far as possible. If EBD control is impossible, the BRAKE warning light comes on to warn the driver (see page BC-44).
   • If system components have any malfunctions before starting control, the operation stops immediately. If system components have any malfunctions during control, the control stops gradually so as not to trigger a sudden change in vehicle conditions. If it is impossible to control the systems, the warning light comes on to inform the driver of malfunctions in the systems (see page BC-44).
   HINT:
   • If the ABS system malfunctions, the brake system operates normally without the ABS system.
   • If the brake actuator malfunctions, a gradual loss of brake performance is expected, and ABS system control is prohibited.

<table>
<thead>
<tr>
<th>ABS, EBD and BA system</th>
<th>Fail-Safe Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABS system</td>
<td>ABS, BA, TRC and VSC control prohibited</td>
</tr>
<tr>
<td>BA system</td>
<td>ABS, BA, TRC and VSC control prohibited</td>
</tr>
<tr>
<td>EBD system</td>
<td>ABS, EBD, BA, TRC and VSC control prohibited</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TRC and VSC system:</th>
<th>Fail-Safe Operation</th>
</tr>
</thead>
</table>
| Engine control system | Before control: Disables control  
                        | During control: Uses only the brakes to effect control  |
| (TRC and VSC systems) |                      |
| Brake control system  | Before control: Disables control  
                        | During control: Uses only the engine to effect control  |
| (VSC system)          |                      |
| Brake control system  | Before control: Disables control  
                        | During control: Disables control (by gradually ending control)  |
| (TRC system)          |                      |
DATA LIST / ACTIVE TEST

1. READ DATA LIST

HINT:
Using the intelligent tester's DATA LIST allows switch, sensor, actuator and other item values to be read without removing any parts. Reading the DATA LIST early in troubleshooting is one way to save time.
(a) Connect the intelligent tester (with CAN VIM) to the DLC3.
(b) Turn the ignition switch ON.
(c) Turn the intelligent tester on.
(d) Read the DATA LIST according to the display on the tester.

<table>
<thead>
<tr>
<th>Tester Display</th>
<th>Measurement Item/Range</th>
<th>Normal Condition</th>
<th>Diagnostic Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABS WARN LAMP</td>
<td>ABS warning light / ON or OFF</td>
<td>ON: ABS warning light ON OFF: ABS warning light OFF</td>
<td>-</td>
</tr>
<tr>
<td>VSC WARN LAMP</td>
<td>VSC warning light / ON or OFF</td>
<td>ON: VSC warning light ON OFF: VSC warning light OFF</td>
<td>-</td>
</tr>
<tr>
<td>BRAKE WARN LAMP</td>
<td>Brake warning light / ON or OFF</td>
<td>ON: Brake warning light ON OFF: Brake warning light OFF</td>
<td>-</td>
</tr>
<tr>
<td>SLIP INDI LAMP</td>
<td>Slip indicator light / ON or OFF</td>
<td>ON: Slip indicator light ON OFF: Slip indicator light OFF</td>
<td>-</td>
</tr>
<tr>
<td>D-HILL LIGHT*9</td>
<td>Downhill assist control indicator light / ON or OFF</td>
<td>ON: Downhill assist control switch ON OFF: Downhill assist control switch OFF</td>
<td>-</td>
</tr>
<tr>
<td>AUTO LSD LAMP*10</td>
<td>AUTO LSD indicator light / ON or OFF</td>
<td>ON: Traction control switch ON OFF: Traction control switch OFF</td>
<td>-</td>
</tr>
<tr>
<td>BUZZER</td>
<td>Skid control buzzer / ON or OFF</td>
<td>ON: Buzzer ON OFF: Buzzer OFF</td>
<td>-</td>
</tr>
<tr>
<td>STOP LAMP SW</td>
<td>Stop light switch / ON or OFF</td>
<td>ON: Brake pedal depressed OFF: Brake pedal released</td>
<td>-</td>
</tr>
<tr>
<td>PARKING BRAKE SW</td>
<td>Parking brake switch / ON or OFF</td>
<td>ON: Parking brake applied OFF: Parking brake released</td>
<td>-</td>
</tr>
<tr>
<td>BRK PEDAL SW</td>
<td>Brake pedal load sensing switch / ON or OFF</td>
<td>ON: Brake pedal depressed beyond the specified point OFF: Brake pedal not depressed beyond the specified point</td>
<td>-</td>
</tr>
<tr>
<td>IDLE SW</td>
<td>Main idle switch / ON or OFF</td>
<td>ON: Accelerator pedal released OFF: Accelerator pedal depressed</td>
<td>-</td>
</tr>
<tr>
<td>DAC SW*9</td>
<td>Downhill assist control switch / ON or OFF</td>
<td>ON: Downhill assist control switch ON ON: Downhill assist control switch ON</td>
<td>-</td>
</tr>
<tr>
<td>AUTO LSD SW*10</td>
<td>AUTO LSD switch / ON or OFF</td>
<td>ON: AUTO LSD switch ON ON: AUTO LSD switch ON</td>
<td>-</td>
</tr>
<tr>
<td>GEAR POSITION</td>
<td>Gear position information / P/N, R, 1st-6th, FAIL, NOT R</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>LEVER POSITION</td>
<td>Shift lever position information / P/N, R, D/M, 1st-6th/B, FAIL</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>SHIFT INFO</td>
<td>Shift information / ON or OFF</td>
<td>ON: During gear change</td>
<td>-</td>
</tr>
<tr>
<td>MAS CYL PRESS 1</td>
<td>Master cylinder pressure sensor 1 reading / min.: 0 V, max.: 5 V</td>
<td>When brake pedal released: 0.3 to 0.9 V Reading increases when brake pedal depressed</td>
<td>-</td>
</tr>
<tr>
<td>ZERO M/C SEN</td>
<td>Memorized zero point value of master cylinder pressure sensor / min.: -12.5 MPa, max.: 12.4 MPa</td>
<td>Min.: -12.5 MPa Max.: 12.4 MPa</td>
<td>-</td>
</tr>
<tr>
<td>Tester Display</td>
<td>Measurement Item/Range</td>
<td>Normal Condition</td>
<td>Diagnostic Note</td>
</tr>
<tr>
<td>----------------------</td>
<td>---------------------------------------------------------------------------------------</td>
<td>--------------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>DECELERAT SEN</td>
<td>Deceleration sensor 1 reading / min.: -18.52 m/s², max.: 18.39 m/s²</td>
<td>Min.: -18.52 m/s²</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Max.: 18.39 m/s²</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Zero deceleration sensor 1 / min.: -25.11 m/s², max.: 24.91 m/s²</td>
<td>Min.: -25.11 m/s²</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Max.: 24.91 m/s²</td>
<td></td>
</tr>
<tr>
<td>DECELERAT SEN 2</td>
<td>Deceleration sensor 2 reading / min.: -18.52 m/s², max.: 18.39 m/s²</td>
<td>Min.: -18.52 m/s²</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Max.: 18.39 m/s²</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Zero deceleration sensor 2 / min.: -25.11 m/s², max.: 24.91 m/s²</td>
<td>Min.: -25.11 m/s²</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Max.: 24.91 m/s²</td>
<td></td>
</tr>
<tr>
<td>YAW RATE SENS 1</td>
<td>Yaw rate sensor 1 reading / min.: -128 deg/s, max.: 127 deg/s</td>
<td>Min.: -128 deg/s</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Max.: 127 deg/s</td>
<td></td>
</tr>
<tr>
<td>YAW RATE SENS 2</td>
<td>Yaw rate sensor 2 reading / min.: -128 deg/s, max.: 127 deg/s</td>
<td>Min.: -128 deg/s</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Max.: 127 deg/s</td>
<td></td>
</tr>
<tr>
<td>Zero yaw rate</td>
<td>Zero yaw rate sensor 1 / min.: -128 deg/s, max.: 127 deg/s</td>
<td>Min.: -128 deg/s</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Max.: 127 deg/s</td>
<td></td>
</tr>
<tr>
<td>STEERING SEN</td>
<td>Steering sensor reading / min.: -3276.8 deg, max.: 3276.7 deg</td>
<td>Left turn: Increase</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Right turn: Decrease</td>
<td></td>
</tr>
<tr>
<td>Zero steering</td>
<td>Zero steering sensor / min.: -3276.8 deg, max.: 3276.7 deg</td>
<td>Min.: -3276.8 deg</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Max.: 3276.7 deg</td>
<td></td>
</tr>
<tr>
<td>LATERAL G</td>
<td>Lateral G / min.: -25.11 m/s², max.: 24.91 m/s²</td>
<td>Min.: -25.11 m/s²</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Max.: 24.91 m/s²</td>
<td></td>
</tr>
<tr>
<td>FORWARD&amp;REA G</td>
<td>Forward and rearward G / min.: -25.11 m/s², max.: 24.91 m/s²</td>
<td>Min.: -25.11 m/s²</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Max.: 24.91 m/s²</td>
<td></td>
</tr>
<tr>
<td>YAW RATE VALUE</td>
<td>Yaw rate value / min.: -128 deg/s, max.: 127 deg/s</td>
<td>Min.: -128 deg/s</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Max.: 127 deg/s</td>
<td></td>
</tr>
<tr>
<td>STEERING ANGLE</td>
<td>Steering angle value / min.: -3276.8 deg, max.: 3276.7 deg</td>
<td>Min.: -3276.8 deg</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Max.: 3276.7 deg</td>
<td></td>
</tr>
<tr>
<td>FR WHEEL SPD</td>
<td>Wheel speed sensor (FR) reading / min.: 0 km/h (0 mph), max.: 326.4 km/h (202.8 mph)</td>
<td>Actual wheel speed</td>
<td>Similar to speed indicated on speedometer</td>
</tr>
<tr>
<td>FL WHEEL SPD</td>
<td>Wheel speed sensor (FL) reading / min.: 0 km/h (0 mph), max.: 326.4 km/h (202.8 mph)</td>
<td>Actual wheel speed</td>
<td>Similar to speed indicated on speedometer</td>
</tr>
<tr>
<td>RR WHEEL SPD</td>
<td>Wheel speed sensor (RR) reading / min.: 0 km/h (0 mph), max.: 326.4 km/h (202.8 mph)</td>
<td>Actual wheel speed</td>
<td>Similar to speed indicated on speedometer</td>
</tr>
<tr>
<td>RL WHEEL SPD</td>
<td>Wheel speed sensor (RL) reading / min.: 0 km/h (0 mph), max.: 326.4 km/h (202.8 mph)</td>
<td>Actual wheel speed</td>
<td>Similar to speed indicated on speedometer</td>
</tr>
<tr>
<td>VEHICLE SPD</td>
<td>Maximum speed sensor reading / min.: 0 km/h (0 mph), max.: 326.4 km/h (202.8 mph)</td>
<td>Actual wheel speed</td>
<td>Similar to speed indicated on speedometer</td>
</tr>
<tr>
<td>FR WHEEL ACCEL</td>
<td>FR wheel acceleration / min.: -200.84 m/s², max.: 199.27 m/s²</td>
<td>Min.: -200.84 m/s²</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Max.: 199.27 m/s²</td>
<td></td>
</tr>
<tr>
<td>FL WHEEL ACCEL</td>
<td>FL wheel acceleration / min.: -200.84 m/s², max.: 199.27 m/s²</td>
<td>Min.: -200.84 m/s²</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Max.: 199.27 m/s²</td>
<td></td>
</tr>
<tr>
<td>RR WHEEL ACCEL</td>
<td>RR wheel acceleration / min.: -200.84 m/s², max.: 199.27 m/s²</td>
<td>Min.: -200.84 m/s²</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Max.: 199.27 m/s²</td>
<td></td>
</tr>
<tr>
<td>RL WHEEL ACCEL</td>
<td>RL wheel acceleration / min.: -200.84 m/s², max.: 199.27 m/s²</td>
<td>Min.: -200.84 m/s²</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Max.: 199.27 m/s²</td>
<td></td>
</tr>
<tr>
<td>Tester Display</td>
<td>Measurement Item/Range</td>
<td>Normal Condition</td>
<td>Diagnostic Note</td>
</tr>
<tr>
<td>-------------------</td>
<td>-------------------------------------------------</td>
<td>-----------------------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>FR ABS STATUS</td>
<td>FR wheel ABS control status / ON or OFF</td>
<td>ON: During control</td>
<td>-</td>
</tr>
<tr>
<td>FL ABS STATUS</td>
<td>FL wheel ABS control status / ON or OFF</td>
<td>ON: During control</td>
<td>-</td>
</tr>
<tr>
<td>RR ABS STATUS</td>
<td>RR wheel ABS control status / ON or OFF</td>
<td>ON: During control</td>
<td>-</td>
</tr>
<tr>
<td>RL ABS STATUS</td>
<td>RL wheel ABS control status / ON or OFF</td>
<td>ON: During control</td>
<td>-</td>
</tr>
<tr>
<td>RR EBD STATUS</td>
<td>RR wheel EBD control status / ON or OFF</td>
<td>ON: During control</td>
<td>-</td>
</tr>
<tr>
<td>RL EBD STATUS</td>
<td>RL wheel EBD control status / ON or OFF</td>
<td>ON: During control</td>
<td>-</td>
</tr>
<tr>
<td>BA STATUS</td>
<td>BA control status / ON or OFF</td>
<td>ON: During control</td>
<td>-</td>
</tr>
<tr>
<td>TRAC STATUS</td>
<td>TRC control status / ON or OFF</td>
<td>ON: During control</td>
<td>-</td>
</tr>
<tr>
<td>TRAC ENG STATUS</td>
<td>TRC engine control status / ON or OFF</td>
<td>ON: During control</td>
<td>-</td>
</tr>
<tr>
<td>TRAC BRK STATUS</td>
<td>TRC brake control status / ON or OFF</td>
<td>ON: During control</td>
<td>-</td>
</tr>
<tr>
<td>FR VSC STATUS</td>
<td>FR wheel VSC control status / ON or OFF</td>
<td>ON: During control</td>
<td>-</td>
</tr>
<tr>
<td>FL VSC STATUS</td>
<td>FL wheel VSC control status / ON or OFF</td>
<td>ON: During control</td>
<td>-</td>
</tr>
<tr>
<td>RR VSC STATUS</td>
<td>RR wheel VSC control status / ON or OFF</td>
<td>ON: During control</td>
<td>-</td>
</tr>
<tr>
<td>RL VSC STATUS</td>
<td>RL wheel VSC control status / ON or OFF</td>
<td>ON: During control</td>
<td>-</td>
</tr>
<tr>
<td>ENG REVOLUTIONS</td>
<td>Engine revolutions / min.: 0 r/min, max.: 65535 r/min</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ENGINE TORQUE</td>
<td>Real engine torque / min.: -1024 Nm, max.: 1023 Nm</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ACCELERATOR %</td>
<td>Percentage of accelerator pedal opening angle / min.: 0%, max.: 128%</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>SOL RELAY</td>
<td>Solenoid relay / ON or OFF</td>
<td>ON: Solenoid relay ON</td>
<td>-</td>
</tr>
<tr>
<td>ELETRONICALLY CONTROLLED BRAKE SYSTEM MTR RELAY</td>
<td>Electronically Controlled Brake System Motor relay (VSC1 relay) / ON or OFF</td>
<td>ON: Motor relay ON OFF: Motor relay OFF</td>
<td>-</td>
</tr>
<tr>
<td>FAIL MTR RELAY</td>
<td>Fail-safe motor relay / ON or OFF</td>
<td>ON: Motor relay ON OFF: Motor relay OFF</td>
<td>-</td>
</tr>
<tr>
<td>SM2</td>
<td>TRC / VSC solenoid (SM2) / ON or OFF</td>
<td>ON: Operates</td>
<td>-</td>
</tr>
<tr>
<td>SM1</td>
<td>TRC / VSC solenoid (SM1) / ON or OFF</td>
<td>ON: Operates</td>
<td>-</td>
</tr>
<tr>
<td>SFRH*1</td>
<td>ABS solenoid (SFRH) / ON or OFF</td>
<td>ON: Operates OFF: Does not operate</td>
<td>-</td>
</tr>
<tr>
<td>SFRR*2</td>
<td>ABS solenoid (SFRR) / ON or OFF</td>
<td>ON: Operates OFF: Does not operate</td>
<td>-</td>
</tr>
<tr>
<td>SFLH*3</td>
<td>ABS solenoid (SFLH) / ON or OFF</td>
<td>ON: Operates OFF: Does not operate</td>
<td>-</td>
</tr>
<tr>
<td>SFLR*4</td>
<td>ABS solenoid (SFLR) / ON or OFF</td>
<td>ON: Operates OFF: Does not operate</td>
<td>-</td>
</tr>
<tr>
<td>SRRH*5</td>
<td>ABS solenoid (SRRH) / ON or OFF</td>
<td>ON: Operates OFF: Does not operate</td>
<td>-</td>
</tr>
<tr>
<td>SRRR*6</td>
<td>ABS solenoid (SRRR) / ON or OFF</td>
<td>ON: Operates OFF: Does not operate</td>
<td>-</td>
</tr>
<tr>
<td>SRLH*7</td>
<td>ABS solenoid (SRLH) / ON or OFF</td>
<td>ON: Operates OFF: Does not operate</td>
<td>-</td>
</tr>
</tbody>
</table>
## Tester Display

<table>
<thead>
<tr>
<th>Measurement Item/Range</th>
<th>Normal Condition</th>
<th>Diagnostic Note</th>
</tr>
</thead>
</table>
| SRLR*8  ABS solenoid (SRLR) / ON or OFF                   | ON: Operates  
OFF: Does not operate                      | -               |
| FR SPD OPN  FR speed sensor open detection / ERROR or NORMAL | ERROR: Momentary interruption  
NORMAL: Normal                                | -               |
| FL SPD OPN  FL speed sensor open detection / ERROR or NORMAL | ERROR: Momentary interruption  
NORMAL: Normal                                | -               |
| RR SPD OPN  RR speed sensor open detection / ERROR or NORMAL | ERROR: Momentary interruption  
NORMAL: Normal                                | -               |
| RL SPD OPN  RL speed sensor open detection / ERROR or NORMAL | ERROR: Momentary interruption  
NORMAL: Normal                                | -               |
| EFI COM OPN  EFI communication open detection / ERROR or NORMAL | ERROR: Momentary interruption  
NORMAL: Normal                                | -               |
| YAW RATE OPN  Yaw rate sensor open detection / ERROR or NORMAL | ERROR: Momentary interruption  
NORMAL: Normal                                | -               |
| DECELERAT OPN  Deceleration sensor open detection / ERROR or NORMAL | ERROR: Momentary interruption  
NORMAL: Normal                                | -               |
| STEERING OPN  Steering angle sensor open detection / ERROR or NORMAL | ERROR: Momentary interruption  
NORMAL: Normal                                | -               |
| M/C OPN  Master cylinder pressure sensor open detection / ERROR or NORMAL | ERROR: Momentary interruption  
NORMAL: Normal                                | -               |
| #DTC  Number of recorded DTCs/ min.: 0, max.: 255         | Min.: 0  
Max.: 255                                      | -               |
| INSPECTION MODE  Inspection mode / OTHER or INSPECT       | -                                           | -               |
| #IG ON2  Number of ignition switch ON operations after entering the inspection mode / min.: 0, max.: 255 | -                                           | -               |

### HINT:

- *1: SFRH (S: Solenoid, F: Front, R: Right, H: Holding)
- *2: SFRR (S: Solenoid, F: Front, R: Right, R: Reduction)
- *3: SFLH (S: Solenoid, F: Front, L: Left, H: Holding)
- *4: SFLR (S: Solenoid, F: Front, L: Left, R: Reduction)
- *5: SRRH (S: Solenoid, R: Rear, R: Right, H: Holding)
- *6: SRRR (S: Solenoid, R: Rear, R: Right, R: Reduction)
- *7: SRLH (S: Solenoid, R: Rear, L: Left, H: Holding)
- *8: SRLR (S: Solenoid, R: Rear, L: Left, R: Reduction)
- *9: w/ Downhill assist control
- *10: for 2WD (w/ AUTO LSD)
2. **PERFORM ACTIVE TEST**

**HINT:**
Performing the intelligent tester’s ACTIVE TEST allows relay, VSV, actuator and other items to be operated without removing any parts. Performing the ACTIVE TEST early in troubleshooting is one way to save time. The DATA LIST can be displayed during the ACTIVE TEST.

(a) Connect the intelligent tester (with CAN VIM) to the DLC3.
(b) Turn the ignition switch ON.
(c) Turn the intelligent tester on.
(d) Perform the ACTIVE TEST according to the display on the tester.

**HINT:**
- The ignition switch must be turned ON to proceed to the ACTIVE TEST using the intelligent tester.
- The ACTIVE TESTs of the ABS solenoid, ABS motor relay, ABS warning light and BRAKE warning light are available when the vehicle is stopped.
- The motors stop automatically after 5 seconds of activation to prevent them from being damaged. When the motors are driven repeatedly, certain intervals are required.
- Each solenoid stops automatically after 2 seconds of activation to prevent them from being damaged, and can be operated again after a certain interval.
- Do not depress the brake pedal while only the pressure reduction solenoid valves are on.
- Do not drive 2 or more solenoids simultaneously except to operate the pressure holding solenoid valves and pressure reduction solenoid valves of each wheel.

### Skid control ECU

<table>
<thead>
<tr>
<th>Tester Display</th>
<th>Test Part</th>
<th>Control Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABS WARN LAMP</td>
<td>Turns ABS warning light ON / OFF</td>
<td>Observe combination meter</td>
</tr>
<tr>
<td>VSC WARN LAMP</td>
<td>Turns VSC warning light ON / OFF</td>
<td>Observe combination meter</td>
</tr>
<tr>
<td>BRAKE WARN LAMP</td>
<td>Turns Brake warning light ON / OFF</td>
<td>Observe combination meter</td>
</tr>
<tr>
<td>SLIP INDI LAMP</td>
<td>Turns Slip indicator light ON / OFF</td>
<td>Observe combination meter</td>
</tr>
<tr>
<td>D-HILL LIGHT*1</td>
<td>Turns downhill assist control indicator light ON / OFF</td>
<td>Observe combination meter</td>
</tr>
<tr>
<td>AUTO LSD LAMP*2</td>
<td>Turns AUTO LSD indicator light ON / OFF</td>
<td>Observe combination meter</td>
</tr>
<tr>
<td>BUZZER</td>
<td>Turns skid control buzzer ON / OFF</td>
<td>Buzzer can be heard</td>
</tr>
<tr>
<td>STP LAMP RELAY</td>
<td>Turns stop light relay (BRK relay) ON / OFF</td>
<td>Operation sound of motor can be heard</td>
</tr>
<tr>
<td>SOL RELAY</td>
<td>Turns ABS solenoid relay ON / OFF</td>
<td>-</td>
</tr>
<tr>
<td>MOTOR RELAY</td>
<td>Turns ABS motor relay ON / OFF</td>
<td>Operation sound of motor can be heard</td>
</tr>
<tr>
<td>SRLR</td>
<td>Turns ABS solenoid (SRLR) ON / OFF</td>
<td>Operation sound of solenoid (clicking sound) can be heard</td>
</tr>
<tr>
<td>SRLH</td>
<td>Turns ABS solenoid (SRLH) ON / OFF</td>
<td>Operation sound of solenoid (clicking sound) can be heard</td>
</tr>
</tbody>
</table>
HINT:
*1: w/ Downhill assist control
*2: for 2WD (w/ AUTO LSD)
## DIAGNOSTIC TROUBLE CODE CHART

**HINT:**
- If no abnormality is found when inspecting parts, check the skid control ECU and check for poor contact at the ground points.
- If a DTC is displayed during the DTC check, check the circuit for the DTC listed in the table below. For details of each DTC, refer to the page indicated.
- When 2 or more DTCs are detected, perform circuit inspections one by one until the problem is identified.
- All DTCs in the table below are detected in accordance with 1 trip detection logic.

### DTC chart of ABS

<table>
<thead>
<tr>
<th>DTC No.</th>
<th>Detection Item</th>
<th>Trouble Area</th>
<th>See page</th>
</tr>
</thead>
</table>
| C0200/31*1 | Right Front Wheel Speed Sensor Signal | - Front speed sensor  
- Front speed sensor circuit  
- Sensor installation  
- Foreign matter on sensor rotor | BC-62    |
| C0205/32*1 | Left Front Wheel Speed Sensor Signal  | - Front speed sensor  
- Front speed sensor circuit  
- Sensor installation  
- Foreign matter on sensor rotor | BC-62    |
| C0210/33*1 | Right Rear Wheel Speed Sensor Signal  | - Skid control sensor RH (2WD)  
- Rear speed sensor RH (4WD)  
- Skid control sensor RH circuit (2WD)  
- Rear speed sensor RH circuit (4WD)  
- Sensor installation  
- Foreign matter on sensor rotor | BC-69    |
| C0215/34*1 | Left Rear Wheel Speed Sensor Signal  | - Skid control sensor RH (2WD)  
- Rear speed sensor RH (4WD)  
- Skid control sensor RH circuit (2WD)  
- Rear speed sensor RH circuit (4WD)  
- Sensor installation  
- Foreign matter on sensor rotor | BC-69    |
| C0226/21  | SFR Solenoid Circuit                   | - ABS and TRACTION actuator                                                   | BC-76    |
| C0236/22  | SFL Solenoid Circuit                   | - ABS and TRACTION actuator                                                   | BC-76    |
| C0246/23  | SRR Solenoid Circuit                   | - ABS and TRACTION actuator                                                   | BC-76    |
| C0256/24  | SRL Solenoid Circuit                   | - ABS and TRACTION actuator                                                   | BC-76    |
| C0273/13*1 | Open in ABS Motor Relay Circuit        | - ABS1 H-fuse  
- VSC MTR relay  
- VSC MTR relay circuit  
- VSC FAIL relay  
- VSC FAIL relay circuit  
- ABS and TRACTION actuator | BC-78    |
| C0274/14  | Short to B+ in ABS Motor Relay Circuit | - ABS1 H-fuse  
- VSC MTR relay  
- VSC MTR relay circuit  
- VSC FAIL relay  
- VSC FAIL relay circuit  
- ABS and TRACTION actuator | BC-78    |
| C0278/11  | Open in ABS Solenoid Relay Circuit     | - ABS2 H-fuse  
- Wire harness (+BS circuit)  
- ABS and TRACTION actuator | BC-83    |
| C0279/12  | Short to B+ in ABS Solenoid Relay Circuit | - ABS2 H-fuse  
- Wire harness (+BS circuit)  
- ABS and TRACTION actuator | BC-83    |
<p>| C1225/25  | SM Solenoid Circuit                    | - ABS and TRACTION actuator                                                   | BC-76    |</p>
<table>
<thead>
<tr>
<th>DTC No.</th>
<th>Detection Item</th>
<th>Trouble Area</th>
<th>See page</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1235/35</td>
<td>Foreign Object is Attached on Tip of Front Speed Sensor RH</td>
<td>- Front speed sensor</td>
<td>BC-62</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Front speed sensor circuit</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Sensor installation</td>
<td></td>
</tr>
<tr>
<td>C1236/36</td>
<td>Foreign Object is Attached on Tip of Front Speed Sensor LH</td>
<td>- Front speed sensor</td>
<td>BC-62</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Front speed sensor circuit</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Sensor installation</td>
<td></td>
</tr>
<tr>
<td>C1238/38</td>
<td>Foreign Object is Attached on Tip of Rear Speed Sensor RH</td>
<td>- Skid control sensor RH (2WD)</td>
<td>BC-69</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Rear speed sensor RH (4WD)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Skid control sensor RH circuit (2WD)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Rear speed sensor RH circuit (4WD)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Sensor installation</td>
<td></td>
</tr>
<tr>
<td>C1239/39</td>
<td>Foreign Object is Attached on Tip of Rear Speed Sensor LH</td>
<td>- Skid control sensor RH (2WD)</td>
<td>BC-69</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Rear speed sensor RH (4WD)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Skid control sensor RH circuit (2WD)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Rear speed sensor RH circuit (4WD)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Sensor installation</td>
<td></td>
</tr>
<tr>
<td>C1241/41</td>
<td>Low Battery Positive Voltage</td>
<td>- Battery</td>
<td>BC-99</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Charging system</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Power source circuit</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Internal power supply circuit of skid control ECU</td>
<td></td>
</tr>
<tr>
<td>C1243/43*1</td>
<td>Acceleration Sensor Stuck Malfunction</td>
<td>- Yaw rate sensor</td>
<td>BC-96</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Yaw rate sensor circuit</td>
<td></td>
</tr>
<tr>
<td>C1244/44</td>
<td>Open or Short in Deceleration Sensor Circuit</td>
<td>- Yaw rate sensor</td>
<td>BC-96</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Yaw rate sensor circuit</td>
<td></td>
</tr>
<tr>
<td>C1245/45*1</td>
<td>Acceleration Sensor Output Malfunction</td>
<td>- Yaw rate sensor</td>
<td>BC-96</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Yaw rate sensor circuit</td>
<td></td>
</tr>
<tr>
<td>C1246/46*2</td>
<td>Master Cylinder Pressure Sensor Malfunction</td>
<td>- Master cylinder pressure sensor</td>
<td>BC-103</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Master cylinder pressure sensor circuit</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Stop light switch circuit</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- ABS and TRACTION actuator</td>
<td></td>
</tr>
<tr>
<td>C1249/49</td>
<td>Open in Stop Light Switch Circuit</td>
<td>- STOP fuse</td>
<td>BC-105</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Stop light switch</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Stop light switch circuit</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- ABS and TRACTION actuator</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Stop light control relay</td>
<td></td>
</tr>
<tr>
<td>C1251/51*1</td>
<td>Open in Pump Motor Circuit</td>
<td>- Wire harness</td>
<td>BC-109</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- ABS and TRACTION actuator</td>
<td></td>
</tr>
<tr>
<td>C1267/67*3</td>
<td>Brake Pedal Load Sensing Switch</td>
<td>- Brake pedal load sensing switch</td>
<td>BC-111</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Brake pedal load sensing switch circuit</td>
<td></td>
</tr>
<tr>
<td>C1337/37</td>
<td>Different Diameter Tire Malfunction</td>
<td>- Tire size</td>
<td>BC-117</td>
</tr>
<tr>
<td>C1361/91</td>
<td>Short Circuit in ABS Motor Fail Safe Relay Circuit</td>
<td>- ABS1 H-fuse</td>
<td>BC-78</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- VSC MTR relay</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- VSC MTR relay circuit</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- VSC FAIL relay</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- VSC FAIL relay circuit</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- ABS and TRACTION actuator</td>
<td></td>
</tr>
<tr>
<td>C1381/97</td>
<td>Yaw Rate and / or Acceleration Sensor Power Supply Voltage Malfunction</td>
<td>- Yaw rate sensor</td>
<td>BC-96</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Yaw rate sensor circuit</td>
<td></td>
</tr>
<tr>
<td>U0073/94</td>
<td>Control Module Communication Bus OFF</td>
<td>- CAN communication system</td>
<td>BC-130</td>
</tr>
</tbody>
</table>

**HINT:** *1, *2
Even after the trouble areas are repaired, the ABS warning light will not go off unless the following operations are performed.

- **1:**
  - (a) Drive the vehicle at 20 km/h (12 mph) for 30 seconds or more and check that the ABS warning light goes off.
  - (b) Clear the DTC(s).

- **2:**
  - (a) Keep the vehicle stationary for 5 seconds or more and depress the brake pedal lightly 2 or 3 times.
  - (b) Drive the vehicle at a vehicle speed of 50 km/h (31 mph) and keep depressing the brake pedal firmly for approximately 3 seconds.
  - (c) Repeat the above operation 3 times or more and check that the ABS warning light goes off.
  - (d) Clear the DTC(s).

- **3:** 16-inch disc

### DTC chart of VSC

<table>
<thead>
<tr>
<th>DTC No.</th>
<th>Detection Item</th>
<th>Trouble Area</th>
<th>See page</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1201/51</td>
<td>Engine Control System Malfunction</td>
<td>- Engine control system</td>
<td>BC-85</td>
</tr>
<tr>
<td>C1203/53</td>
<td>ECM Communication Circuit Malfunction</td>
<td>- ECM</td>
<td>BC-87</td>
</tr>
<tr>
<td>C1210/36</td>
<td>Zero Point Calibration of Yaw Rate Sensor Undone</td>
<td>- ABS and TRACTION actuator (skid control ECU) - Zero point calibration incomplete</td>
<td>BC-88</td>
</tr>
<tr>
<td>C1223/43</td>
<td>ABS Control System Malfunction</td>
<td>- Skid control ECU</td>
<td>BC-91</td>
</tr>
<tr>
<td>C1231/31</td>
<td>Steering Angle Sensor Circuit Malfunction</td>
<td>- Steering sensor - Steering sensor circuit - Steering sensor power supply - CAN communication system</td>
<td>BC-92</td>
</tr>
<tr>
<td>C1232/32</td>
<td>Stuck in Deceleration Sensor</td>
<td>- Yaw rate sensor - Yaw rate sensor circuit</td>
<td>BC-96</td>
</tr>
<tr>
<td>C1234/34</td>
<td>Yaw Rate Sensor Malfunction</td>
<td>- Yaw rate sensor - Yaw rate sensor circuit</td>
<td>BC-96</td>
</tr>
<tr>
<td>C1290/66</td>
<td>Steering Angle Sensor Zero Point Malfunction</td>
<td>- Yaw rate and deceleration sensor zero point calibration incomplete - Poor adjustment of centered position of steering wheel - Poor adjustment of front wheel alignment</td>
<td>BC-115</td>
</tr>
<tr>
<td>C1336/39</td>
<td>Zero Point Calibration of Acceleration Sensor Undone</td>
<td>- ABS and TRACTION actuator (skid control ECU) - Zero point calibration incomplete</td>
<td>BC-88</td>
</tr>
<tr>
<td>C1380/64</td>
<td>Stop Light Control Relay Malfunction</td>
<td>- Stop light assembly - Stop light switch circuit - STOP LP CTRL relay - ABS and TRACTION Actuator (skid control ECU)</td>
<td>BC-121</td>
</tr>
<tr>
<td>U0100/65</td>
<td>Lost Communication with ECM / PCM</td>
<td>- CAN communication system (Skid control ECU to ECM)</td>
<td>BC-130</td>
</tr>
<tr>
<td>U0123/62</td>
<td>Lost Communication with Yaw Rate Sensor Module</td>
<td>- CAN communication system (Skid control ECU to yaw rate and acceleration sensor)</td>
<td>BC-130</td>
</tr>
<tr>
<td>U0126/63</td>
<td>Lost Communication with Steering Angle Sensor Module</td>
<td>- CAN communication system</td>
<td>BC-130</td>
</tr>
</tbody>
</table>
## DTC of ABS sensor check function

<table>
<thead>
<tr>
<th>DTC No.</th>
<th>Detection Item</th>
<th>Trouble Area</th>
<th>See page</th>
</tr>
</thead>
</table>
| C1271/71   | Low Output Signal of Front Speed Sensor RH (Test Mode DTC) | - Front speed sensor  
- Front speed sensor circuit  
- Sensor installation  
- Foreign matter on sensor rotor | BC-62 |
| C1272/72   | Low Output Signal of Front Speed Sensor LH (Test Mode DTC) | - Front speed sensor  
- Front speed sensor circuit  
- Sensor installation  
- Foreign matter on sensor rotor | BC-62 |
| C1273/73   | Low Output Signal of Rear Speed Sensor RH (Test Mode DTC) | - Skid control sensor RH (2WD)  
- Rear speed sensor RH (4WD)  
- Skid control sensor RH circuit (2WD)  
- Rear speed sensor RH circuit (4WD)  
- Sensor installation  
- Foreign matter on sensor rotor | BC-69 |
| C1274/74   | Low Output Signal of Rear Speed Sensor LH (Test Mode DTC) | - Skid control sensor RH (2WD)  
- Rear speed sensor RH (4WD)  
- Skid control sensor RH circuit (2WD)  
- Rear speed sensor RH circuit (4WD)  
- Sensor installation  
- Foreign matter on sensor rotor | BC-69 |
| C1275/75   | Abnormal Change in Output Signal of Front Speed Sensor RH (Test Mode DTC) | - Front speed sensor  
- Front speed sensor circuit  
- Sensor installation | BC-62 |
| C1276/76   | Abnormal Change in Output Signal of Front Speed Sensor LH (Test Mode DTC) | - Front speed sensor  
- Front speed sensor circuit  
- Sensor installation | BC-62 |
| C1277/77   | Abnormal Change in Output Signal of Rear Speed Sensor RH (Test Mode DTC) | - Skid control sensor RH (2WD)  
- Rear speed sensor RH (4WD)  
- Skid control sensor RH circuit (2WD)  
- Rear speed sensor RH circuit (4WD)  
- Sensor installation | BC-69 |
| C1278/78   | Abnormal Change in Output Signal of Rear Speed Sensor LH (Test Mode DTC) | - Skid control sensor RH (2WD)  
- Rear speed sensor RH (4WD)  
- Skid control sensor RH circuit (2WD)  
- Rear speed sensor RH circuit (4WD)  
- Sensor installation | BC-69 |
| C1279/79   | Deceleration Sensor Output Voltage Malfunction (Test Mode DTC) | - Yaw rate sensor  
- Yaw rate sensor circuit | BC-96 |
| C1281/81   | Master Cylinder Pressure Sensor Output Malfunction (Test Mode DTC) | - Master cylinder pressure sensor  
- Master cylinder pressure sensor circuit  
- Stop light switch circuit  
- ABS and TRACTION actuator | BC-103 |
| U0124/95   | Lost Communication with Lateral Acceleration Sensor Module | - CAN communication system  
(Steer control ECU to yaw rate sensor and acceleration sensor) | BC-130 |

## DTC of VSC sensor check function

<table>
<thead>
<tr>
<th>DTC No.</th>
<th>Detection Item</th>
<th>Trouble Area</th>
<th>See page</th>
</tr>
</thead>
</table>
| C0371/71   | Yaw Rate Sensor (Test Mode DTC)                     | - Yaw rate sensor  
- Yaw rate sensor circuit | BC-96 |
| C1379/74*  | Downhill Assist Control Operation Switch (Test Mode DTC) | - Downhill assist control switch | BC-119 |
HINT:
*: w/ Downhill assist control
### BRAKE CONTROL – VEHICLE STABILITY CONTROL SYSTEM

<table>
<thead>
<tr>
<th>DTC</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C0200/31</td>
<td>Right Front Wheel Speed Sensor Signal</td>
</tr>
<tr>
<td>C0205/32</td>
<td>Left Front Wheel Speed Sensor Signal</td>
</tr>
<tr>
<td>C1235/35</td>
<td>Foreign Object is Attached on Tip of Front Speed Sensor RH</td>
</tr>
<tr>
<td>C1236/36</td>
<td>Foreign Object is Attached on Tip of Front Speed Sensor LH</td>
</tr>
<tr>
<td>C1271/71</td>
<td>Low Output Signal of Front Speed Sensor RH (Test Mode DTC)</td>
</tr>
<tr>
<td>C1272/72</td>
<td>Low Output Signal of Front Speed Sensor LH (Test Mode DTC)</td>
</tr>
<tr>
<td>C1275/75</td>
<td>Abnormal Change in Output Signal of Front Speed Sensor RH (Test Mode DTC)</td>
</tr>
<tr>
<td>C1276/76</td>
<td>Abnormal Change in Output Signal of Front Speed Sensor LH (Test Mode DTC)</td>
</tr>
</tbody>
</table>

### DESCRIPTION
The speed sensors detect the wheel speeds and send appropriate signals to the skid control ECU. Speed sensor rotors have rows of alternating N and S magnetic poles, and their magnetic fields change as the rotors turn.
The speed sensors detect those magnetic changes and send pulse signals to the skid control ECU. The ECU monitors the wheel speeds through these pulse signals to control the ABS control system.
DTCs C1271/71, C1272/72, C1275/75 and C1276/76 can be deleted when the speed sensor sends a vehicle speed signal or the test mode ends. DTCs C1271/71, C1272/72, C1275/75/75 and C1276/76 are output only in the test mode.
### DTC No. | DTC Detection Condition | Trouble Area
---|---|---
C0200/31, C0205/32 | When one of following conditions is met:
1. At vehicle speed of 10 km/h (6 mph) or more, open or short in sensor signal circuit continues for 1 second or more.
2. Momentary interruption of sensor signal from abnormal wheel occurs 255 times or more.
3. Open in speed sensor signal circuit continues for 0.5 seconds or more.
4. With IG1 terminal voltage 9.5 V or more, sensor power supply voltage decreases for 0.5 seconds or more. | • Front speed sensor
• Front speed sensor circuit
• Sensor installation
• Foreign matter on sensor rotor

C1235/35, C1236/36 | When either of following is detected:
1. At vehicle speed of 20 km/h (12 mph) or more, noise in malfunctioning wheel sensor signal condition continues for 5 seconds or more.
2. At vehicle speed of 10 km/h (6 mph) or more, noise input occurs once per rotor rotation for 15 seconds or more. | • Front speed sensor
• Front speed sensor circuit
• Sensor installation

C1271/71, C1272/72 | Detected only during test mode. | • Front speed sensor
• Front speed sensor circuit
• Sensor installation
• Foreign matter on sensor rotor

C1275/75, C1276/76 | Detected only during test mode. | • Front speed sensor
• Front speed sensor circuit
• Sensor installation

**HINT:**
- DTCs C0200/31 and C1235/35 relate to the front speed sensor RH.
- DTCs C0205/32 and C1236/36 relate to the front speed sensor LH.
INSPECTION PROCEDURE

NOTICE:
Check the speed sensor signal in test mode after cleaning or replacement (see page BC-28).

1. CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)

(a) Using the DATA LIST of the intelligent tester, check for any momentary interruption in the wire harness and connector corresponding to a DTC (see page BC-23).

<table>
<thead>
<tr>
<th>Skid control ECU</th>
<th>Measurement Item / Range (Display)</th>
<th>Normal Condition</th>
<th>Diagnostic Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR SPD OPN</td>
<td>FR speed sensor open detection / ERROR or NORMAL</td>
<td>ERROR: Momentary interruption NORMAL: Normal</td>
<td>-</td>
</tr>
<tr>
<td>FL SPD OPN</td>
<td>FL speed sensor open detection / ERROR or NORMAL</td>
<td>ERROR: Momentary interruption NORMAL: Normal</td>
<td>-</td>
</tr>
</tbody>
</table>

OK:
There are no momentary interruptions.

HINT:
Perform the above inspection before removing the sensor and connector.

NG
CHECK AND REPAIR HARNESS AND CONNECTOR (SPEED SENSOR CIRCUIT)
2 READ VALUE OF DATA LIST (FRONT SPEED SENSOR)

(a) Check the DATA LIST for proper functioning of the front speed sensor.

<table>
<thead>
<tr>
<th>Skid control ECU</th>
<th>Item (Display)</th>
<th>Measurement Item / Range (Display)</th>
<th>Normal Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR WHEEL SPD</td>
<td>Wheel speed sensor (FR) reading / min.: 0 km/h (0 mph), max.: 326 km/h (202.8 mph)</td>
<td>Similar to speed indicated on speedometer</td>
<td></td>
</tr>
<tr>
<td>FL WHEEL SPD</td>
<td>Wheel speed sensor (FL) reading / min.: 0 km/h (0 mph), max.: 326 km/h (202.8 mph)</td>
<td>Similar to speed indicated on speedometer</td>
<td></td>
</tr>
</tbody>
</table>

OK:
There is almost no difference between actual wheel speed and displayed speed value.

HINT:
There is a tolerance of +/−10% in the speedometer indication.

NG
Go to step 5

OK

3 PERFORM TEST MODE INSPECTION (SIGNAL CHECK)

(a) Perform a TEST MODE inspection and check for DTCs (see page BC-28).

OK:
No DTC output.

NG
CHECK AND REPAIR HARNESS AND CONNECTOR (SPEED SENSOR CIRCUIT)

OK

4 RECONFIRM DTC

(a) Clear the DTC(s) (see page BC-47).
(b) Start the engine.
(c) Drive the vehicle at a speed of 20 km/h (12 mph) or more for at least 60 seconds.
(d) Check if the same DTC(s) is output (see page BC-47).

Result

<table>
<thead>
<tr>
<th>Result</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC is not output</td>
<td>A</td>
</tr>
<tr>
<td>DTC is output</td>
<td>B</td>
</tr>
</tbody>
</table>

B
Go to step 10

A

END
5  INSPECT FRONT SPEED SENSOR (INSTALLATION)

(a) Check that the speed sensor installation bolt is tightened properly.

OK:
The installation bolt is tightened properly, and there is no clearance between the sensor and front steering knuckle.

Torque: 8.5 N*m (87 kgf*cm, 75 in.*lbf)

HINT:
If the installation portion of the sensor is dirty, clean it and reinstall the sensor.

Check the speed sensor after the speed sensor replacement (see page BC-28).

NG

TIGHTEN BOLT PROPERLY OR REPLACE FRONT SPEED SENSOR

OK

6  CHECK SPEED SENSOR (TIP)

(a) Remove the front speed sensor.
(b) Check the sensor tip.

OK:
No scratches or foreign matter on the sensor tip.

HINT:
Check the speed sensor signal after the speed sensor clearing or replacement (see page BC-28).

NG

CLEAN OR REPLACE FRONT SPEED SENSOR

OK
7 CHECK WIRE HARNESS (SKID CONTROL ECU - FRONT SPEED SENSOR)

(a) Disconnect the A19 ECU connector.
(b) Disconnect the A41 and A42 sensor connectors.
(c) Measure the resistance of the wire harness side connectors.

**Standard resistance:**
- for LH
- for RH

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A19-18 (FL+) - A41-1 (FL+)</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>A19-4 (FL-) - A41-2 (FL-)</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>A19-18 (FL+) - Body ground</td>
<td>10 kΩ or higher</td>
</tr>
<tr>
<td>A19-4 (FL-) - Body ground</td>
<td>10 kΩ or higher</td>
</tr>
</tbody>
</table>

NG  REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

8 CHECK SKID CONTROL ECU (SENSOR INPUT VOLTAGE)

(a) Disconnect the A41 and A42 sensor connectors.
(b) Measure the voltage of the wire harness side connector.

**Standard voltage**

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Condition</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A41-2 (FL-) - Body ground</td>
<td>Ignition switch ON</td>
<td>5.7 to 17.3 V</td>
</tr>
<tr>
<td>A42-2 (FR-) - Body ground</td>
<td>Ignition switch ON</td>
<td>5.7 to 17.3 V</td>
</tr>
</tbody>
</table>

NG  REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY

OK

9 RECONFIRM DTC

(a) Clear the DTC(s) (see page BC-47).
(b) Start the engine.
(c) Drive the vehicle at a speed of 20 km/h (12 mph) or more for at least 60 seconds.
(d) Check if the same DTC(s) is output (see page BC-47).

**Result**

<table>
<thead>
<tr>
<th>Result</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC is output</td>
<td>A</td>
</tr>
<tr>
<td>DTC is not output</td>
<td>B</td>
</tr>
</tbody>
</table>

**10 REPLACE FRONT SPEED SENSOR**

(a) Replace the front speed sensor.

**NEXT**

**11 RECONFIRM DTC**

(a) Clear the DTC(s) (see page BC-47).
(b) Start the engine.
(c) Drive the vehicle at a speed of 20 km/h (12 mph) or more for at least 60 seconds.
(d) Check if the same DTC(s) is output (see page BC-47).

**Result**

<table>
<thead>
<tr>
<th>Result</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC is output</td>
<td>A</td>
</tr>
<tr>
<td>DTC is not output</td>
<td>B</td>
</tr>
</tbody>
</table>

**B END**

**REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY**
**DESCRIPTION**

Refer to DTC C0200/31 (see page BC-62).

DTCs C1273/73, C1274/74, C1277/77 and C1278/78 can be deleted when the speed sensor sends a vehicle speed signal or the test mode ends. DTCs C1273/73, C1274/74, C1277/77 and C1278/78 are output only in the test mode.

<table>
<thead>
<tr>
<th>DTC No.</th>
<th>DTC Detection Condition</th>
<th>Trouble Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>C0210/33</td>
<td>When one of following conditions is met: 1. At vehicle speed of 10 km/h (6 mph) or more, open or short in sensor signal circuit continues for 1 second or more. 2. Momentary interruption of sensor signal from abnormal wheel occurs 255 times or more. 3. Open in speed sensor signal circuit continues for 0.5 seconds or more. 4. With IG1 terminal voltage 9.5 V or more, sensor power supply voltage decreases for 0.5 seconds or more.</td>
<td>• Skid control sensor (for 2WD) • Rear speed sensor (for 4WD) • Skid control sensor circuit (for 2WD) • Rear speed sensor circuit (4WD) • Sensor installation • Foreign matter on sensor rotor</td>
</tr>
<tr>
<td>C0215/34</td>
<td>When one of following conditions is met: 1. At vehicle speed of 20 km/h (12 mph) or more, noise in malfunctioning wheel sensor signal condition continues for 5 seconds or more. 2. At vehicle speed of 10 km/h (6 mph) or more, noise input occurs once per rotor rotation for 15 seconds or more.</td>
<td>• Skid control sensor (for 2WD) • Rear speed sensor (for 4WD) • Skid control sensor circuit (for 2WD) • Rear speed sensor circuit (4WD) • Sensor installation</td>
</tr>
<tr>
<td>C1238/38</td>
<td>When either condition below is met: 1. At vehicle speed of 20 km/h (12 mph) or more, noise in malfunctioning wheel sensor signal condition continues for 5 seconds or more. 2. At vehicle speed of 10 km/h (6 mph) or more, noise input occurs once per rotor rotation for 15 seconds or more.</td>
<td>• Skid control sensor (for 2WD) • Rear speed sensor (for 4WD) • Skid control sensor circuit (for 2WD) • Rear speed sensor circuit (4WD) • Sensor installation</td>
</tr>
<tr>
<td>C1239/39</td>
<td>Detected only during test mode.</td>
<td>• Skid control sensor (for 2WD) • Rear speed sensor (for 4WD) • skid control sensor circuit (for 2WD) • Rear speed sensor circuit (4WD) • Sensor installation • Foreign matter on sensor rotor</td>
</tr>
<tr>
<td>C1273/73</td>
<td></td>
<td>• Skid control sensor (for 2WD) • Rear speed sensor (for 4WD)</td>
</tr>
</tbody>
</table>
HINT:
• DTC C0210/33 and C1238/38 relate to the skid control sensor RH.
• DTC C0215/34 and C1239/39 relate to the skid control sensor LH.

WIRING DIAGRAM

INSPECTION PROCEDURE

NOTICE:
Check the speed sensor signal in test mode after cleaning or replacement (see page BC-28).

1 CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)

(a) Using the DATA LIST of the intelligent tester, check for any momentary interruption in the wire harness corresponding to a DTC (see page BC-23).

Skid control ECU

<table>
<thead>
<tr>
<th>Item (Display)</th>
<th>Measurement Item / Range (Display)</th>
<th>Normal Condition</th>
<th>Diagnostic Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>RR SPD OPN Open</td>
<td>RR speed sensor open detection / ERROR or NORMAL</td>
<td>ERROR: Momentary interruption</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NORMAL: Normal</td>
<td></td>
</tr>
<tr>
<td>RL SPD OPN</td>
<td>RL speed sensor open detection / ERROR or NORMAL</td>
<td>ERROR: Momentary interruption</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NORMAL: Normal</td>
<td></td>
</tr>
</tbody>
</table>

OK:
There are no momentary interruptions.
HINT: Perform this inspection before removing the sensor and connector.

NG  REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

2  READ VALUE OF INTELLIGENT TESTER (REAR SPEED SENSOR)

(a) Check the DATA LIST for proper functioning of the rear speed sensor.

Skid control ECU

<table>
<thead>
<tr>
<th>Item (Display)</th>
<th>Measurement Item / Range (Display)</th>
<th>Normal Condition</th>
<th>Diagnostic Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>RR WHEEL SPD</td>
<td>Wheel speed sensor (RR) reading : min.: 0 km/h (0 mph), max.: 326 km/h (202.8 mph)</td>
<td>Similar to speed indicated on speedometer</td>
<td>-</td>
</tr>
<tr>
<td>RL WHEEL SPD</td>
<td>Wheel speed sensor (RL) reading : min.: 0 km/h (0 mph), max.: 326 km/h (202.8 mph)</td>
<td>Similar to speed indicated on speedometer</td>
<td>-</td>
</tr>
</tbody>
</table>

OK:
There is almost no difference between actual wheel speed and displayed speed value.

HINT:
There is a tolerance of +-10% in the speedometer indication.

NG  Go to step 5

OK

3  PERFORM TEST MODE INSPECTION (SIGNAL CHECK)

(a) Perform a TEST MODE inspection and check for DTCs (see page BC-28).

OK:
No DTCs output.

NG  REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

4  RECONFIRM DTC

(a) Clear the DTC(s) (see page BC-47).
(b) Start the engine.
(c) Drive the vehicle at a speed of 20 km/h (12 mph) or more for at least 60 seconds.
(d) Check if the same DTC(s) is output (see page BC-47).

### Result

<table>
<thead>
<tr>
<th>Result</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC is not output</td>
<td>A</td>
</tr>
<tr>
<td>DTC is output</td>
<td>B</td>
</tr>
</tbody>
</table>

**B**  
Go to step 11

---

### 5 INSPECT SKID CONTROL SENSOR OR REAR SPEED SENSOR (INSTALLATION)

(a) Check the speed sensor installation.

**OK:**
- **for 2WD**
  - There is no clearance between the sensor and rear axle carrier.
- **for 4WD**
  - The installation bolt is tightened properly and there is no clearance between the sensor and rear axle carrier.

**Torque:** 8.5 N*m (87 kgf*cm, 75 in.*lbf)

**HINT:**
Check the speed sensor signal after the replacement (see page BC-28).

**NG**
CHECK AND REPLACE SKID CONTROL SENSOR OR REAR SPEED SENSOR

---

### 6 CHECK SKID CONTROL SENSOR OR REAR SPEED SENSOR (TIP)

(a) Remove the skid control sensor (for 2WD) or rear speed sensor (for 4WD).

(b) Check the sensor tip.

**OK:**
- No scratches or foreign matter on the sensor tip.

**NG**
CLEAR OR REPLACE SKID CONTROL SENSOR OR REAR SPEED SENSOR

---

END
7 CHECK WIRE HARNESS (SKID CONTROL ECU - REAR SPEED SENSOR)

(a) Disconnect the A19 ECU connector.
(b) Disconnect W1 and V1 sensor connectors for 2WD. Disconnect K23 and K22 sensor connectors for 4WD.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance:
for 2WD (LH Side)
- A19-20 (RL+) - W1-1 (RL+) Below 1 Ω
- A19-6 (RL-) - W1-2 (RL-) Below 1 Ω
- A19-20 (RL+) - Body ground 10 kΩ or higher
- A19-6 (RL-) - Body ground 10 kΩ or higher

for 2WD (RH Side)
- A19-5 (RR+) - V1-1 (RR+) Below 1 Ω
- A19-19 (RR-) - V1-2 (RR-) Below 1 Ω
- A19-5 (RR+) - Body ground 10 kΩ or higher
- A19-19 (RR-) - Body ground 10 kΩ or higher

for 4WD (LH Side)
- A19-20 (RL+) - K23-1 (RL+) Below 1 Ω
- A19-6 (RL-) - K23-2 (RL-) Below 1 Ω
- A19-20 (RL+) - Body ground 10 kΩ or higher
- A19-6 (RL-) - Body ground 10 kΩ or higher

for 4WD (RH Side)
- A19-5 (RR+) - K22-1 (RR+) Below 1 Ω
- A19-19 (RR-) - K22-2 (RR-) Below 1 Ω
- A19-5 (RR+) - Body ground 10 kΩ or higher
- A19-19 (RR+) - Body ground 10 kΩ or higher

NG REPAIR OR REPLACE HARNESS AND CONNECTOR

OK
8 CHECK SKID CONTROL ECU (SENSOR INPUT VOLTAGE)

(a) Disconnect the W1 and V1 sensor connectors for 2WD. Disconnect the K23 and K22 sensor connectors for 4WD.
(b) Measure the voltage of the wire harness side connectors.
Standard voltage:
for 2WD

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Condition</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>W1-1 (RL+) - Body ground</td>
<td>Ignition switch ON</td>
<td>5.7 to 17.3 V</td>
</tr>
<tr>
<td>V1-1 (RR+) - Body ground</td>
<td>Ignition switch ON</td>
<td>5.7 to 17.3 V</td>
</tr>
</tbody>
</table>

for 4WD

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Condition</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>K23-1 (RL+) - Body ground</td>
<td>Ignition switch ON</td>
<td>5.7 to 17.3 V</td>
</tr>
<tr>
<td>K22-1 (RR+) - Body ground</td>
<td>Ignition switch ON</td>
<td>5.7 to 17.3 V</td>
</tr>
</tbody>
</table>

NG REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY

OK

9 RECONFIRM DTC

(a) Clear the DTC(s) (see page BC-47).
(b) Start the engine.
(c) Drive the vehicle at a speed of 20 km/h (12 mph) or more for at least 60 seconds.
(d) Check if the same DTC(s) is output (see page BC-47).

Result

<table>
<thead>
<tr>
<th>Result</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC is output</td>
<td>A</td>
</tr>
<tr>
<td>DTC is not output</td>
<td>B</td>
</tr>
</tbody>
</table>

B END

10 REPLACE SKID CONTROL SENSOR OR REAR SPEED SENSOR

(a) Replace the skid control sensor (2WD) or rear speed sensor (4WD).
11 RECONFIRM DTC

(a) Clear the DTC(s) (see page BC-47).
(b) Start the engine.
(c) Drive the vehicle at a speed of 20 km/h (12 mph) or more for at least 60 seconds.
(d) Check if the same DTC(s) is output (see page BC-47).

Result

<table>
<thead>
<tr>
<th>Result</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC is output</td>
<td>A</td>
</tr>
<tr>
<td>DTC is not output</td>
<td>B</td>
</tr>
</tbody>
</table>

END

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY
DESCRIPTION
This solenoid is turned on in accordance with signals from the skid control ECU and controls the pressure on the wheel cylinders to control the braking force. The solenoid and solenoid relay are built into the ABS and TRACTION actuator.

<table>
<thead>
<tr>
<th>DTC No.</th>
<th>DTC Detection Condition</th>
<th>Trouble Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>C0226/21, C0236/22, C0246/23, C0256/24</td>
<td>Open or short in solenoid circuit continues for 0.05 seconds or more.</td>
<td>ABS and TRACTION actuator</td>
</tr>
<tr>
<td>C1225/25</td>
<td>When one of following conditions is met: 1. During switching solenoid (SM1 or SM2) ON signal input, overcurrent continues for 0.05 seconds or more. 2. During switching solenoid (SM1 or SM2) OFF signal input, open circuit continues for 0.05 seconds or more. 3. During switching solenoid (SM1 or SM2) OFF signal input, current continues to be applied for 0.1 second or more. 4. Short to GND in switching solenoid (SM1 or SM2) continues for 0.1 second or more. 5. Switching solenoids SM1 and SM2 are shorted for 0.1 second or more. 6. Switch solenoids (SM1 or SM2) ON signal output occurs for 0.1 seconds or more.</td>
<td>ABS and TRACTION actuator</td>
</tr>
</tbody>
</table>

HINT:
DTCs C0226/21, C0236/22, C0246/23, C0256/24 and C1225/25: The skid control ECU begins to detect these DTCs when the vehicle speed exceeds 6 km/h (4 mph).
INSPECTION PROCEDURE

1  RECONFIRM DTC

(a) Clear the DTC(s) (see page BC-47).
(b) Start the engine.
(c) Drive the vehicle at 6 km/h (4 mph) or more to activate the initial check.
(d) Check if the same DTC(s) is output (see page BC-47).

Result

<table>
<thead>
<tr>
<th>Result</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC is output</td>
<td>A</td>
</tr>
<tr>
<td>DTC is not output</td>
<td>B</td>
</tr>
</tbody>
</table>

HINT:
The DTCs may be stored due to a malfunction in the connector terminal.

END

REPLACE ABS AND TRACTION ACTUATOR
**DESCRIPTION**

If a DTC related to the motor line is stored, the VSC FAIL (fail-safe) relay cuts off the power supply to the VSC MTR relay and performs the fail-safe operation. While the ABS, TRC, VSC, or BA is operating, the skid control ECU turns the VSC FAIL relay on and activates the pump motor in the ABS and TRACTION actuator. These DTCs may be stored if the motor relay (+BM) voltage becomes lower than the DTC detecting condition due to insufficient output from the battery or alternator.

<table>
<thead>
<tr>
<th>DTC No.</th>
<th>DTC Detection Condition</th>
<th>Trouble Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>C0273/13</td>
<td>When either condition below is met: 1. All of following conditions continue for 0.12 seconds or more. (a) IG1 terminal voltage between 9.5 V and 17.2 V. (b) During initial check or ABS/TRC/VSC/BA. (c) Relay contact open when relay on. 2. Both of following conditions continue for 0.12 seconds or more. (a) IG1 terminal voltage 9.5 V or less. (b) Relay contact remains open when relay on.</td>
<td>• ABS1 H-fuse  • VSC MTR relay  • VSC MTR relay circuit  • VSC FAIL relay  • VSC FAIL relay circuit  • ABS and TRACTION actuator</td>
</tr>
<tr>
<td>C0274/14</td>
<td>Despite motor relay (VSC MTR relay) off, motor relay remains closed for 4 seconds or more.</td>
<td>• ABS1 H-fuse  • VSC MTR relay  • VSC MTR relay circuit  • VSC FAIL relay  • VSC FAIL relay circuit  • ABS and TRACTION actuator</td>
</tr>
<tr>
<td>C1361/91</td>
<td>Immediately after ignition switch ON, motor fail-safe relay (VSC FAIL relay) contact closed for 4 seconds when motor fail-safe relay (VSC FAIL relay) off.</td>
<td>• ABS1 H-fuse  • VSC MTR relay  • VSC MTR relay circuit  • VSC FAIL relay  • VSC FAIL relay circuit  • ABS and TRACTION actuator</td>
</tr>
</tbody>
</table>

**HINT:**
DTCs C0273/13, C0274/14 and C1361/91: The skid control ECU begins to detect these DTCs when the vehicle speed exceeds 6 km/h (4 mph).
INSPECTION PROCEDURE

1. PERFORM ACTIVE TEST BY INTELLIGENT TESTER (MOTOR RELAY)

   (a) Select the ACTIVE TEST, generate a control command, and then check that the ABS motor relay operates.

   **Skid control ECU**

<table>
<thead>
<tr>
<th>Item (Display)</th>
<th>Test Details</th>
<th>Diagnostic Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOTOR RELAY</td>
<td>Turns ABS motor relay ON / OFF</td>
<td>Operating sound of motor can be heard</td>
</tr>
</tbody>
</table>

   **OK:**
   The operation sound of the ABS motor can be heard.

   **NG**
   
   **OK**
   Go to step 8
2 INSPECT FUSE (ABS1)
   (a) Remove the ABS1 H-fuse from the engine room No. 1 relay block.
   (b) Measure the resistance of the fuse.
       **Standard resistance:**
       Below 1 Ω
       **NG**
       REPLACE FUSE

3 INSPECT VSC MOTOR RELAY (Marking: VSC MTR)
   (a) Remove the VSC motor relay from the engine room No. 1 relay block.
   (b) Measure the resistance of the relay.
       **Standard resistance**
       | Tester Connection | Specified Condition                      |
       |-------------------|------------------------------------------|
       | 3 - 5             | 10 kΩ or higher                          |
       | 3 - 5             | Below 1 Ω (when battery voltage is applied to terminals 1 and 2) |
       **NG**
       REPLACE VSC MOTOR RELAY

4 INSPECT FAIL-SAFE RELAY (Marking: VSC FAIL)
   (a) Remove the faile-safe relay from the engine room No. 1 relay block.
   (b) Measure the resistance of the relay.
       **Standard resistance**
       | Tester Connection | Specified Condition                      |
       |-------------------|------------------------------------------|
       | 3 - 5             | 10 kΩ or higher                          |
       | 3 - 5             | Below 1 Ω (when battery voltage is applied to terminals 1 and 2) |
       **NG**
       REPLACE FAIL-SAFE RELAY
5  CHECK WIRE HARNESS (FAIL-SAFE RELAY - BATTERY)

(a) Remove the fail-safe relay from the engine room No. 1 relay block.
(b) Measure the voltage of the wire harness side connector.

**Standard voltage**

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>VSC FAIL relay terminal 5 - Body ground</td>
<td>10 to 14 V</td>
</tr>
</tbody>
</table>

**NG**

REPAIR OR REPLACE HARNESS AND CONNECTOR

6  CHECK ENGINE ROOM NO. 1 RELAY BLOCK (FAIL-SAFE RELAY - VSC MOTOR RELAY AND BODY GROUND)

(a) Remove the fail-safe and VSC motor relays from the engine room No. 1 relay block.
(b) Measure the resistance of the relay terminals.

**Standard resistance**

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>VSC FAIL relay terminal 3 - VSC MTR relay terminal 5</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>VSC FAIL relay terminal 3 - Body ground</td>
<td>10 kΩ or higher</td>
</tr>
</tbody>
</table>

**NG**

REPLACE ENGINE ROOM NO. 1 RELAY BLOCK
7 CHECK WIRE HARNESS (ENGINE ROOM NO. 1 RELAY BLOCK - SKID CONTROL ECU)

(a) Disconnect the A19 ECU connector.
(b) Remove the fail-safe and VSC motor relays from the engine room No. 1 relay block.
(c) Measure the resistance of the wire harness connectors.

**Standard resistance**

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A19-2 (BM) - VSC MTR relay terminal 3</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>A19-14 (MRF) - VSC FAIL relay terminal 2</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>A19-15 (MR) - VSC MTR relay terminal 2</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>A19-45 (R+) - VSC FAIL relay terminal 1</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>A19-2 (BM) - Body ground</td>
<td>10 kΩ or higher</td>
</tr>
<tr>
<td>A19-14 (MRF) - Body ground</td>
<td>10 kΩ or higher</td>
</tr>
<tr>
<td>A19-15 (MR) - Body ground</td>
<td>10 kΩ or higher</td>
</tr>
<tr>
<td>A19-45 (R+) - Body ground</td>
<td>10 kΩ or higher</td>
</tr>
</tbody>
</table>

NG REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

8 RECONFIRM DTC

(a) Clear the DTC(s) (see page BC-47).
(b) Start the engine.
(c) Drive the vehicle at 6 km/h (4 mph) or more to activate the initial check.
(d) Check if the same DTC(s) is output (see page BC-47).

**Result**

<table>
<thead>
<tr>
<th>Result</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC is output</td>
<td>A</td>
</tr>
<tr>
<td>DTC is not output</td>
<td>B</td>
</tr>
</tbody>
</table>

B END

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY
### DESCRIPTION
The solenoid relay supplies power to the ABS solenoid and TRC solenoid. After the ignition switch is turned ON, the vehicle speed has reached 6 km/h (4 mph) and the solenoid is determined to be normal by the initial check self-diagnosis, the relay switches on. If any open or short circuits are detected, the relay switches off. These DTCs may be set if the voltage supply to the solenoid relay (+BS) falls below the DTC detection threshold due to the battery or alternator outputs being insufficient.

<table>
<thead>
<tr>
<th>DTC No.</th>
<th>DTC Detection Condition</th>
<th>Trouble Area</th>
</tr>
</thead>
</table>
| C0278/11 | When either condition below is met:  
1. Both of following conditions continue for 0.2 seconds or more.  
   (a) IG1 terminal voltage between 9.5 V and 17.2 V.  
   (b) Solenoid relay contact open when relay on.  
2. Both of following conditions continue for 0.2 seconds or more.  
   (a) IG1 terminal voltage becomes lower than 9.5 V when relay turned on.  
   (b) Relay contact remains open. | • ABS2 H-fuse  
• Wire harness (+BS circuit)  
• ABS and TRACTION actuator |
| C0279/12 | Immediately after ignition switch turned ON, solenoid relay contact closed for 0.2 seconds or more when relay off. | • ABS2 H-fuse  
• Wire harness (+BS circuit)  
• ABS and TRACTION actuator |

**HINT:**
DTCs C0278/11 and C0279/12: The skid control ECU begins to detect these DTCs when the vehicle speed exceeds 6 km/h (4 mph).

### WIRING DIAGRAM
Refer to DTC C0273/13, C0274/14, C1361/91 (see page BC-79).

### INSPECTION PROCEDURE

1. **INSPECT FUSES (ABS2)**
   (a) Remove the ABS2 H-fuse from the engine room No. 1 relay block.  
   (b) Measure the resistance of the fuse.  
   **Standard resistance:**  
   Below 1 Ω  
   **NG**  
   REPLACE FUSE  
   **OK**
2 CHECK WIRE HARNESS (SKID CONTROL ECU - BATTERY AND BODY GROUND)

(a) Disconnect the A19 ECU connector.
(b) Measure the voltage of the wire harness side connector.
   **Standard voltage**
   
<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A19-31 (+BS) - Body ground</td>
<td>10 to 14 V</td>
</tr>
</tbody>
</table>

(c) Measure the resistance of the wire harness side connector.
   **Standard resistance**
   
<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A19-32 (GND1) - Body ground</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>A19-1 (GND2) - Body ground</td>
<td>Below 1 Ω</td>
</tr>
</tbody>
</table>

NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

3 RECONFIRM DTC

(a) Clear the DTCs (see page BC-47).
(b) Start the engine.
(c) Drive the vehicle at 6 km/h (4 mph) or more to activate the initial check.
(d) Check if the same DTCs is output (see page BC-47).

**Result**

<table>
<thead>
<tr>
<th>Result</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC is output</td>
<td>A</td>
</tr>
<tr>
<td>DTC is not output</td>
<td>B</td>
</tr>
</tbody>
</table>

B → END

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY
DTC | C1201/51 | Engine Control System Malfunction

**DESCRIPTION**
If a malfunction in the engine control system is detected, the operations of VSC and TRC are prohibited by the fail-safe function. When the signals from the engine are input normally, the fail-safe is canceled and the DTC is not stored.

<table>
<thead>
<tr>
<th>DTC No.</th>
<th>DTC Detection Condition</th>
<th>Trouble Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1201/51</td>
<td>Engine control system malfunction signal continues for 5 seconds.</td>
<td>Engine control system</td>
</tr>
</tbody>
</table>

**INSPECTION PROCEDURE**

1. **CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)**
   (a) Using the DATA LIST of the intelligent tester, check for any momentary interruption in the wire harness corresponding to the DTC (see page BC-23).

   **Skid control ECU**

<table>
<thead>
<tr>
<th>Item</th>
<th>Measurement Item / Range (Display)</th>
<th>Normal Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>EFI COM OPN</td>
<td>EFI communication open detection / ERROR or NORMAL</td>
<td>ERROR: Momentary interruption</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NORMAL: Normal</td>
</tr>
</tbody>
</table>

   **OK:**
   There are no momentary interruptions.

   **HINT:**
   Perform the above inspection before removing the sensor and connector.

   **NG** Go to step 3

2. **CHECK DTC FOR ENGINE CONTROL SYSTEM**
   (a) Clear the DTC (engine control system).
   (b) Check the DTC (engine control system).

   **Result**

<table>
<thead>
<tr>
<th>Result</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC is output</td>
<td>A</td>
</tr>
<tr>
<td>DTC is not output</td>
<td>B</td>
</tr>
</tbody>
</table>

   **B** REPLACE ECM

   **A** REPAIR ENGINE CONTROL SYSTEM
3  REPAIR OR REPLACE HARNESS AND CONNECTOR (ECM - SKID CONTROL ECU)

NEXT

4  RECONFIRM DTC

(a) Clear the DTC (see page BC-47).
(b) Perform a road test.
(c) Check if the same DTC is recorded (see page BC-47).

Result

<table>
<thead>
<tr>
<th>Result</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC is not output</td>
<td>A</td>
</tr>
<tr>
<td>DTC C1201/51 is output</td>
<td>B</td>
</tr>
</tbody>
</table>

Go to step 2

A
DESCRIPTION
The circuit is used to send TRC and VSC control information from the skid control ECU to the ECM, and engine control information from the ECM to the skid control ECU.

<table>
<thead>
<tr>
<th>DTC No.</th>
<th>DTC Detection Condition</th>
<th>Trouble Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1203/53</td>
<td>Information relating to engine, drive source or destination stored in ECM does not match information stored in skid control ECU.</td>
<td>ECM</td>
</tr>
</tbody>
</table>

INSPECTION PROCEDURE
HINT:
Check that the part numbers of the installed ECM and skid control ECU are correct before performing the following procedure.

1. RECONFIRM DTC
   (a) Clear the DTC (see page BC-47).
   (b) Start the engine.
   (c) Check if the same DTC is output (see page BC-47).

   Result
<table>
<thead>
<tr>
<th>Result</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC is output</td>
<td>A</td>
</tr>
<tr>
<td>DTC is not output</td>
<td>B</td>
</tr>
</tbody>
</table>

A

REPLACE ECM
DESCRIPTION
The ABS and TRACTION actuator (Skid control ECU) receives signals from the yaw rate and deceleration sensor via the CAN communication system. The yaw rate sensor has a built-in deceleration sensor and detects the vehicle's condition using 2 circuits (GL1, GL2). If there are problems in the bus lines between the yaw rate and deceleration sensor and the CAN communication system, DTCs U0123/62 (yaw rate sensor communication trouble) and U0124/95 (deceleration sensor communication trouble) are output. The DTCs are also output when the calibration has not been completed.

<table>
<thead>
<tr>
<th>DTC No.</th>
<th>DTC Detection Condition</th>
<th>Trouble Area</th>
</tr>
</thead>
</table>
| C1210/36 | Zero point calibration of yaw rate sensor not completed | • ABS and TRACTION actuator (skid control ECU)  
• Zero point calibration incomplete  
• Yaw rate sensor |
| C1336/39 | When either condition below is met:  
• Vehicle driven without completion of zero point calibration  
• After zero point has been obtained, zero point voltage of sensor not between 2.38 V and 2.62 V | • ABS and TRACTION actuator (skid control ECU)  
• Zero point calibration incomplete  
• Yaw rate sensor |
INSPECTION PROCEDURE

NOTICE:
When replacing the ABS and TRACTION actuator, perform the zero point calibration (see page BC-24).

HINT:
When DTC U0123/62, U0124/95 or U0126/63 is output together with DTC C1210/36 or C1336/39, inspect and repair trouble areas indicated by DTC U0123/62, U0124/95 or U0126/63 first.

1 CHECK YAW RATE SENSOR INSTALLATION

(a) Check that the yaw rate sensor has been installed properly (see page BC-211).

OK:
The sensor is tightened to the specified torque.
The sensor is not tilted.

NG
INSTALL YAW RATE SENSOR CORRECTLY
2 PERFORM ZERO POINT CALIBRATION OF YAW RATE SENSOR

(a) Perform zero point calibration of the yaw rate and deceleration sensor (see page BC-24).

3 RECONFIRM DTC

(a) Clear the DTC(s) (see page BC-47).
(b) Start the engine.
(c) Drive the vehicle and turn the steering wheel to the right and left at a speed of 45 km/h (28 mph) or more.
(d) Check if the same DTC(s) is recorded (See page BC-47).

Result

<table>
<thead>
<tr>
<th>Result</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC is output</td>
<td>A</td>
</tr>
<tr>
<td>DTC is not output</td>
<td>B</td>
</tr>
</tbody>
</table>

HINT:
- The DTC(s) is set if the zero point calibration has not been completed successfully.
- End the procedure when the same DTC(s) is not set after completion of the zero point calibration.

A

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY
### DESCRIPTION
This DTC is output when the VSC system detects a malfunction in the ABS system.

<table>
<thead>
<tr>
<th>DTC No.</th>
<th>DTC Detecting Condition</th>
<th>Trouble Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1223/43</td>
<td>Malfunction in ABS control system</td>
<td>Skid control ECU</td>
</tr>
</tbody>
</table>

### INSPECTION PROCEDURE

1. **CHECK DTC FOR ABS SYSTEM**

   (a) Clear the DTC (see page BC-47).
   (b) Turn the ignition switch ON.
   (c) Check if the same DTC is recorded (see page BC-47).

   **Result**

<table>
<thead>
<tr>
<th>Result</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC is output</td>
<td>A</td>
</tr>
<tr>
<td>DTC is not output</td>
<td>B</td>
</tr>
</tbody>
</table>

   **B** END

**REPAIR CIRCUIT INDICATED BY OUTPUT DTC**
**DESCRIPTION**

The steering sensor signal is sent to the skid control ECU via the CAN communication system. When there is a malfunction in the CAN communication system, it is detected by the steering sensor zero point malfunction diagnostic function.

<table>
<thead>
<tr>
<th>DTC No.</th>
<th>DTC Detection Condition</th>
<th>Trouble Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1231/31</td>
<td>When IG1 terminal voltage 9.5 V or more, steering angle sensor malfunction signal received.</td>
<td>• Steering sensor&lt;br&gt;• Steering sensor circuit&lt;br&gt;• Steering sensor power supply&lt;br&gt;• CAN communication system</td>
</tr>
</tbody>
</table>

**WIRING DIAGRAM**
INSPECTION PROCEDURE

HINT:
• When U0073/94, U0123/62, U0124/95 or U0126/63 is output together with C1231/31, inspect and repair the trouble areas indicated by U0073/94, U0123/62, U0124/95 or U0126/63 first.
• When there are problems with the speed sensor or the yaw rate sensor, DTCs for the steering sensor may be output even when the steering sensor is normal. When DTCs for the speed sensor or yaw rate sensor are output together with other DTCs for the steering sensor, inspect and repair the speed sensor and yaw rate sensor first, and then inspect and repair the steering sensor.

1 CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)

(a) Using the DATA LIST of the intelligent tester, check for any momentary interruptions in the wire harness and connectors between the skid control ECU and the steering sensor (see page BC-23).

Skid control ECU

<table>
<thead>
<tr>
<th>Item (Display)</th>
<th>Measurement Item / Range (Display)</th>
<th>Normal Condition</th>
<th>Diagnostic Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>STEERING OPN</td>
<td>Steering angle sensor open detection / ERROR or NORMAL</td>
<td>ERROR: Momentary interruption NORMAL: Normal</td>
<td>-</td>
</tr>
</tbody>
</table>

OK:
There are no momentary interruptions.

HINT:
Perform the above inspection before removing the sensor and connector.

NG

Go to step 4

2 CHECK DTC

(a) Clear the DTC (see page BC-47).
(b) Turn the ignition switch OFF.
(c) Turn the ignition switch ON again and check that no CAN communication system DTC is output.
(d) Drive the vehicle and turn the steering wheel to the right and left at a speed of 35 km/h (24 mph) and check that no speed and yaw rate sensor DTCs are output.

Result

<table>
<thead>
<tr>
<th>Result</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC is not output</td>
<td>A</td>
</tr>
<tr>
<td>CAN communication system DTC is output</td>
<td>B</td>
</tr>
<tr>
<td>Speed sensor or yaw rate sensor DTC is output</td>
<td>C</td>
</tr>
</tbody>
</table>

B CHECK CAN COMMUNICATION SYSTEM

C REPAIR CIRCUIT INDICATED BY OUTPUT DTC
3 CHECK WIRE HARNESS (STEERING SENSOR - BATTERY AND BODY GROUND)

(a) Remove the steering wheel assembly and the column cover.
(b) Disconnect the E11 sensor connector.
(c) Measure the voltage of the wire harness side connector.
   **Standard voltage**
   
<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Condition</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>E11-1(IG) - Body ground</td>
<td>Ignition switch ON</td>
<td>10 to 14 V</td>
</tr>
<tr>
<td>E11-3 (BAT) - Body ground</td>
<td>Always</td>
<td>10 to 14 V</td>
</tr>
</tbody>
</table>

(d) Measure the resistance of the wire harness side connector.
   **Standard resistance**
   
<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>E11-2 (ESS) - Body ground</td>
<td>Below 1Ω</td>
</tr>
</tbody>
</table>

NG REPAIR OR REPLACE HARNESS AND CONNECTOR

OK REPLACE STEERING SENSOR

4 REPAIR OR REPLACE HARNESS AND CONNECTOR (STEERING SENSOR TO SKID CONTROL ECU)

5 RECONFIRM DTC

(a) Clear the DTC (see page BC-47).
(b) Start the engine.
(c) Drive the vehicle and turn the steering wheel to the right and left at a speed of 45 km/h (28 mph) or more for several seconds.
(d) Check if the same DTC is recorded (see page BC-47).
   **Result**
   
<table>
<thead>
<tr>
<th>Result</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC is not output</td>
<td>A</td>
</tr>
<tr>
<td>DTC is output</td>
<td>B</td>
</tr>
</tbody>
</table>

B Go to step 2
END
DESCRIPTION
The skid control ECU receives signals from the yaw rate and deceleration sensor via the CAN communication system.
The yaw rate sensor has a built-in deceleration sensor and detects the vehicle's condition using 2 circuits (GL1: G sensor 1, GL2: G sensor 2).
If there is trouble in the bus lines between the yaw rate and deceleration sensor and the CAN communication system, DTC U0123/62 (malfunction in CAN communication with the yaw rate sensor) and U0124/95 (malfunction in CAN communication with the deceleration sensor) are output. These DTCs are also output when the calibration has not been completed.
DTCs C0371/71 and C1279/79 are deleted when the yaw rate and deceleration sensor sends a yaw rate and/or deceleration signal or test mode ends. DTCs C0371/71 and C1279/79 are output only in test mode.

<table>
<thead>
<tr>
<th>DTC No.</th>
<th>DTC Detection Condition</th>
<th>Trouble Area</th>
</tr>
</thead>
</table>
| C1232/32 | At vehicle speed of 10 km/h (6 mph) or more, either GL1 or GL2 (input signal) does not change for 30 seconds or more. | • Yaw rate sensor  
• Yaw rate sensor circuit |
| C0371/71 | Detected only during test mode | • Yaw rate sensor  
• Yaw rate sensor circuit |
| C1234/34 | Sensor malfunction signal received from yaw rate sensor. | • Yaw rate sensor  
• Yaw rate sensor circuit |
| C1243/43 | While vehicle speed changes from 30 km/h (19 mph) to 0 km/h (0 mph), condition that values of GL1 and GL2 do not change occurs 16 times or more. | • Yaw rate sensor  
• Yaw rate sensor circuit |
| C1244/44 | When either condition below is met:  
1. IG terminal voltage is 9.5 V to 17.2 V and YD1 malfunction signal from yaw rate sensor is received.  
2. After difference between GL1 and GL2 becomes 0.6 G or more with vehicle stationary, difference remains 0.4 G or more for 60 seconds or more. | • Yaw rate sensor  
• Yaw rate sensor circuit |
WIRING DIAGRAM
Refer to DTC C1210/23, C1336/39 (see page BC-89).

INSPECTION PROCEDURE
NOTICE:
When replacing yaw rate and deceleration sensor, perform zero point calibration (see page BC-24).
HINT:
When DTC U0123/62, U0124/95 or U0126/63 is output together with DTC C1232/32, C1234/34, C1243/43, C1244/44, C1245/45, or C1387/97, inspect and repair the trouble areas indicated by DTC U0123/62, U0124/95 or U0126/63 first.

1 CHECK DTC

(a) Clear the DTC (see page BC-47).
(b) Turn the ignition switch OFF.
(c) Turn the ignition switch ON again and check that no CAN communication system DTC(s) is output.
(d) Drive the vehicle at a speed of 30 km/h (19 mph) or more and check that no DTCs are output.

<table>
<thead>
<tr>
<th>Result</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC is output (relating to yaw rate and deceleration sensor)</td>
<td>A</td>
</tr>
<tr>
<td>DTC is output (relating to CAN communication system)</td>
<td>B</td>
</tr>
<tr>
<td>DTC is not output</td>
<td>C</td>
</tr>
</tbody>
</table>

B REPAIR CAN COMMUNICATION SYSTEM
C END

A

2 CHECK YAW RATE SENSOR INSTALLATION

(a) Check that the yaw rate sensor has been installed correctly (see page BC-211).
OK:
The sensor is tightened to the specified torque.
The sensor is not tilted.
BRAKE CONTROL – VEHICLE STABILITY CONTROL SYSTEM

NG → INSTALL YAW RATE SENSOR CORRECTLY

OK

3 CHECK WIRE HARNESS (YAW RATE SENSOR - BATTERY AND BODY GROUND)

(a) Disconnect the K6 sensor connector.
(b) Measure the voltage of the wire harness side connector.
   **Standard voltage**
   
<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Condition</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>K6-5 (IG) - Body ground</td>
<td>Ignition switch ON</td>
<td>10 to 14 V</td>
</tr>
</tbody>
</table>

(c) Measure the resistance of the wire harness side connector.
   **Standard resistance**
   
<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>K6-1 (GND) - Body ground</td>
<td>Below 1 Ω</td>
</tr>
</tbody>
</table>

NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE YAW RATE SENSOR
DESCRIPTION
When there is an abnormality in the power supply circuit of the brake actuator (skid control ECU), the skid control ECU sets a DTC and the operation is prohibited by the fail-safe function. This DTC is set when the voltage supplied to terminal IG1 is outside the DTC detection threshold, due to abnormalities of the battery, power source circuits or charging circuits such as the alternator circuit. The fail-safe function is canceled when the voltage to terminal IG1 returns to normal.

<table>
<thead>
<tr>
<th>DTC No.</th>
<th>DTC Detection Condition</th>
<th>Trouble Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1241/41</td>
<td>When one of following conditions is met: 1. At vehicle speed of 3 km/h (2 mph) or more, IG1 terminal voltage 9.5 V or less for 10 seconds or more. 2. When solenoid relay remains ON and IG1 terminal voltage 9.5 V or less, relay contact open for 0.2 seconds or more. 3. When motor relay terminals ON and IG terminal voltage 9.5 V or less, actuator pump activation motor OFF status continues for 0.1 seconds or more. 4. When IG1 terminal voltage 9.5 V or less, vehicle speed sensor power supply decreases for 60 seconds or more.</td>
<td>• Battery  • Charging system  • Power source circuit  • Internal power supply circuit of skid control ECU</td>
</tr>
</tbody>
</table>
INSPECTION PROCEDURE

1 INSPECT FUSE (ECU-IG1)

(a) Remove the ECU-IG1 fuse from the instrument panel junction block.
(b) Measure the resistance of the fuse.
Standard resistance:
Below 1 Ω

NG  REPLACE FUSE

OK

2  INSPECT BATTERY

(a) Check the battery voltage.

Standard voltage:
11 to 14 V

NG  CHECK CHARGING SYSTEM

OK

3  CHECK WIRE HARNESS (SKID CONTROL ECU - BATTERY)

(a) Disconnect the A19 ECU connector.
(b) Measure the voltage of the wire harness side connector.

Standard voltage

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Condition</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A19-46 (IG1) - Body ground</td>
<td>Ignition switch ON</td>
<td>10 to 14 V</td>
</tr>
</tbody>
</table>

NG  REPAIR OR REPLACE HARNESS AND CONNECTOR

OK
4 CHECK WIRE HARNESS (SKID CONTROL ECU - BODY GROUND)

(a) Disconnect the A19 ECU connector.
(b) Measure the resistance of the wire harness side connector.

Standard resistance

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A19-32 (GND1) - Body ground</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>A19-1 (GND2) - Body ground</td>
<td>Below 1 Ω</td>
</tr>
</tbody>
</table>

NG REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

5 RECONFIRM DTC

(a) Clear the DTC (see page BC-47).
(b) Drive the vehicle at 3 km/h (2 mph) or more for several seconds.
(c) Check if the same DTC is output (see page BC-47).

Result

<table>
<thead>
<tr>
<th>Result</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC is output</td>
<td>A</td>
</tr>
<tr>
<td>DTC is not output</td>
<td>B</td>
</tr>
</tbody>
</table>

A

B END

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY
DESCRIPTION
The master cylinder pressure sensor is connected to the skid control ECU in the ABS and TRACTION actuator.
DTC C1281/81 can be detected when the master cylinder pressure sensor sends a master cylinder pressure signal or test mode ends. DTC C1281/81 is output only in test mode.

<table>
<thead>
<tr>
<th>DTC No.</th>
<th>DTC Detection Condition</th>
<th>Trouble Area</th>
</tr>
</thead>
</table>
| C1246/46 | When one of following conditions is met:  
1. At vehicle speed of 7 km/h (4.3 mph) or more, when PMC terminal voltage over 0.86 V, voltage does not change by 0.005 V or more for 30 seconds.  
2. Noise occurs in the PMC terminal 7 times or more within 5 seconds.  
3. When stop light switch OFF, PMC terminal voltage more than 0.86 V or less than 0.3 V for 5 seconds or more.  
4. With IG1 terminal voltage between 9.5 V and 17.2 V, VCM terminal voltage not between 4.4 V and 5.6 V for 1.2 seconds or more.  
5. When VCM terminal voltage between 4.4 V and 5.6 V, PCM terminal voltage not between 0.14 V and 4.85 V for 1.2 seconds or more. |  
- Master cylinder pressure sensor  
- Master cylinder pressure sensor circuit  
- Stop light switch circuit  
- ABS and TRACTION actuator |
| C1281/81 | Detected only during test mode. |  
- Master cylinder pressure sensor  
- Master cylinder pressure sensor circuit  
- Stop light switch circuit  
- ABS and TRACTION actuator |

INSPECTION PROCEDURE
NOTICE:
When replacing the ABS and TRACTION actuator, perform zero point calibration (see page BC-24).

1 READ VALUE OF INTELLIGENT TESTER (STOP LIGHT SWITCH)

(a) Check the DATA LIST for proper functioning of the stop light switch.

Skid control ECU

<table>
<thead>
<tr>
<th>Item (Display)</th>
<th>Measurement Item / Range (Display)</th>
<th>Normal Condition</th>
<th>Diagnostic Note</th>
</tr>
</thead>
</table>
| STOP LAMP SW   | Stop light switch / ON or OFF     | ON: Brake pedal applied  
OFF: Brake pedal released | - |

OK:
ON (brake pedal is depressed) appears on the screen.

NG CHECK STOP LIGHT SWITCH CIRCUIT
2  READ VALUE OF INTELLIGENT TESTER (MASTER CYLINDER PRESSURE SENSOR)

(a) Check the DATA LIST for proper functioning of the master cylinder pressure sensor.

Skid control ECU

<table>
<thead>
<tr>
<th>Item (Display)</th>
<th>Measurement Item / Range (Display)</th>
<th>Normal Condition</th>
<th>Diagnostic Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAS CYL PRESS 1</td>
<td>Master cylinder pressure sensor 1 reading / min.: 0 V, max.: 5 V</td>
<td>When brake pedal released: 0.3 to 0.9 V</td>
<td>-</td>
</tr>
</tbody>
</table>

OK:
When the pedal is depressed, the sensor output voltage increases.

NG  REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY

OK

3  RECONFIRM DTC

(a) Clear the DTC(s) (see page BC-47).
(b) Drive the vehicle at a speed of 30 km/h (18 mph) or more and perform a braking test (decelerate the vehicle by depressing the brake pedal).
(c) Check if the same DTC(s) is recorded (see page BC-47).

Result

<table>
<thead>
<tr>
<th>Result</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC is output</td>
<td>A</td>
</tr>
<tr>
<td>DTC is not output</td>
<td>B</td>
</tr>
</tbody>
</table>

B  END

A

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY
**DESCRIPTION**

The skid control ECU detects the brake operating conditions through a signal transmitted by the stop light switch. The skid control ECU incorporates an open circuit detection circuit. This DTC is set under either of the following conditions:

- An open is detected in the stop light signal input line when the stop light switch is off.
- An open is detected in the stop light circuit lead to the ground when the stop light switch is off.

<table>
<thead>
<tr>
<th>DTC No.</th>
<th>DTC Detection Condition</th>
<th>Trouble Area</th>
</tr>
</thead>
</table>
| C1249/49| When either condition below is met:  
1. When IG1 terminal voltage 9.5 to 17.2 V, open circuit of stop light switch continues for 0.3 seconds more.  
2. w/ 16-inch disc: With brake pedal load sensing switch ON, master pressure 2 MPa or more, vehicle deceleration 0.2 G or more (calculated based on vehicle speed), stop switch OFF condition continues for 2 seconds or more. |  
- ECU-IG1 fuse  
- STOP fuse  
- BRK relay  
- Stop light switch  
- Stop light switch circuit  
- ABS and TRACTION actuator |
INSPECTION PROCEDURE

1 READ VALUE OF INTELLIGENT TESTER (STOP LIGHT SWITCH)

(a) Check the DATA LIST for proper functioning of the stop light switch.

Skid control ECU

<table>
<thead>
<tr>
<th>Item (Display)</th>
<th>Measurement Item / Range (Display)</th>
<th>Normal Conditions</th>
<th>Diagnostic Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>STOP LAMP SW</td>
<td>Stop light switch / ON or OFF</td>
<td>ON: Brake pedal depressed</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>OFF: Brake pedal released</td>
<td></td>
</tr>
</tbody>
</table>

OK: ON (brake pedal is depressed) appears on the screen.

NG Go to step 3

OK

2 CHECK WIRE HARNESS (STP VOLTAGE)

(a) Disconnect the A19 ECU connector.
(b) Measure the voltage of the wire harness side connector.

Standard voltage

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Switch Condition</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A19-21 (STP2) - Body ground</td>
<td>Brake pedal depressed</td>
<td>8 to 14 V</td>
</tr>
<tr>
<td>A19-21 (STP2) - Body ground</td>
<td>Brake pedal released</td>
<td>Below 4.0 V</td>
</tr>
</tbody>
</table>

NG Go to step 6

OK

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY

3 INSPECT FUSE (STOP, ECU-IG1)

(a) Remove the STOP fuse and ECU-IG1 fuse from the instrument panel junction block.
(b) Measure the resistance of the fuse.

Standard resistance:
Below 1 Ω

NG REPLACE FUSE
4  INSPECT STOP LIGHT CONTROL RELAY (Marking: BRK)

(a) Remove the stop light control relay from the engine room No. 1 relay block.
(b) Measure the resistance of the relay.

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 - 4</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>3 - 5</td>
<td>10 kΩ or higher</td>
</tr>
<tr>
<td>3 - 4</td>
<td>10 kΩ or higher (when battery voltage is applied to terminals 1 and 2)</td>
</tr>
<tr>
<td>3 - 5</td>
<td>Below 1 Ω (when battery voltage is applied to terminals 1 and 2)</td>
</tr>
</tbody>
</table>

NG  REPLACE STOP LIGHT CONTROL RELAY

5  INSPECT STOP LIGHT SWITCH ASSEMBLY

(a) Disconnect the stop light switch connector.
(b) Measure the resistance of the switch.

**Standard resistance**

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Switch Condition</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 2</td>
<td>Pin not pushed</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>1 - 2</td>
<td>Pin pushed</td>
<td>10 kΩ or higher</td>
</tr>
<tr>
<td>3 - 4</td>
<td>Pin not pushed</td>
<td>10 kΩ or higher</td>
</tr>
<tr>
<td>3 - 4</td>
<td>Pin pushed</td>
<td>Below 1 Ω</td>
</tr>
</tbody>
</table>

NG  REPLACE STOP LIGHT SWITCH ASSEMBLY
6 CHECK WIRE HARNESS (SKID CONTROL ECU - STOP LIGHT SWITCH)

(a) Disconnect the A19 ECU connector.
(b) Disconnect the A3 switch connector.
(c) Measure the resistance of the wire harness side connectors.

**Standard resistance**

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A19-21 (STP2) - A3-1</td>
<td>Below 1 Ω</td>
</tr>
</tbody>
</table>

**NG** REPAIR OR REPLACE HARNESS AND CONNECTOR

7 RECONFIRM DTC

(a) Clear the DTC (see page BC-47).
(b) Check if the same DTC is output (see page BC-47).

**Result**

<table>
<thead>
<tr>
<th>Result</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC is output</td>
<td>A</td>
</tr>
<tr>
<td>DTC is not output</td>
<td>B</td>
</tr>
</tbody>
</table>

B END

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY
**DESCRIPTION**
The motor relay drives the pump motor based on a signal from the skid control ECU.

**WIRING DIAGRAM**
Refer to DTC C0273/13, C0274/14, C1361/91 (see page BC-79).

**INSPECTION PROCEDURE**

1. **PERFORM ACTIVE TEST BY INTELLIGENT TESTER (MOTOR RELAY)**
   
   (a) Select the ACTIVE TEST, generate a control command, and then check that the ABS motor relay operates.

<table>
<thead>
<tr>
<th>Item</th>
<th>Test Details</th>
<th>Diagnosis Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOTOR RELAY</td>
<td>Turn ABS motor relay ON / OFF</td>
<td>Operation sound of motor can be heard</td>
</tr>
</tbody>
</table>

   **OK:**
   Operation sound of ABS motor is heard.

   **NG**
   Go to step 3

2. **RECONFIRM DTC**
   
   (a) Clear the DTC (see page BC-47).
   (b) Start the engine.
   (c) Drive the vehicle at a speed of 6 km/h (4 mph) or more for several seconds.
   (d) Check if the same DTC is output (see page BC-47).

   **Result**
   
<table>
<thead>
<tr>
<th>Result</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC is output</td>
<td>A</td>
</tr>
<tr>
<td>DTC is not output</td>
<td>B</td>
</tr>
</tbody>
</table>

   **B**
   END

**REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY**
3 INSPECT FUSE (ABS1)

(a) Remove the ABS1 H-fuse from the engine room No. 1 relay block.
(b) Measure the resistance of the fuse.
   **Standard resistance:**
   Below 1 Ω
   [NG] REPLACE FUSE

OK

4 CHECK WIRE HARNESS (SKID CONTROL ECU - BATTERY AND BODY GROUND)

(a) Disconnect the A19 connector.
(b) Measure the resistance of the wire harness side connector.
   **Standard resistance**
<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A19-32 (GND1) - Body ground</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>A19-1 (GND2) - Body ground</td>
<td>Below 1 Ω</td>
</tr>
</tbody>
</table>
   (c) Measure the voltage of the wire harness side connector.
   **Standard voltage**
<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A19-2 (BM) - Body ground</td>
<td>10 to 14 V</td>
</tr>
</tbody>
</table>

[NG] REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY
DESCRIPTION
The brake pedal load sensing switch is turned on when the brake pedal is depressed with force exceeding a predetermined level.
The skid control ECU detects if the brake pedal is depressed or not via this circuit.

<table>
<thead>
<tr>
<th>DTC No.</th>
<th>DTC Detection Condition</th>
<th>Trouble Area</th>
</tr>
</thead>
</table>
| C1267/67 | When one of following conditions is met:  
1. An open or short in the brake pedal load sensing switch continues for 0.3 seconds or more.  
2. Immediately after the ignition switch is turned ON, the brake pedal load sensing switch is ON and the stop light switch is OFF for 10 seconds or more.  
3. While the vehicle speed change from 0 mph (0 km/h) to 18 mph (30 km/h), the condition that the brake pedal load sensing switch remains ON occurs 5 times in succession.  
4. With the stop light switch ON, the brake pedal load sensing switch OFF, and the master cylinder pressure 6 Mpa or more, the deceleration is 0.4 G or more for 1 second or more.  
5. With the stop light switch ON, the brake pedal load sensing switch OFF, and the master cylinder pressure 6 Mpa or more, the vehicle speed is 0 mph (0 km/h) for 5 seconds or more. | • Brake pedal load sensing switch  
• Brake pedal load sensing switch circuit |

WIRING DIAGRAM
INSPECTION PROCEDURE

NOTICE:
When replacing the brake actuator assembly, perform zero point calibration (see page BC-24).

HINT:
If DTC C1249/49 is output, repair it before repairing DTC C1267/67 based on the flowchart below.

1 READ VALUE OF INTELLIGENT TESTER (BRAKE PEDAL LOAD SENSING SWITCH)

(a) Check the DATA LIST for proper functioning of the brake pedal load sensing switch.

<table>
<thead>
<tr>
<th>Skid control ECU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item (Display)</td>
</tr>
<tr>
<td>BRAKE PEDAL SW</td>
</tr>
</tbody>
</table>

OK: ON (brake pedal is depressed) appears on the screen.

OK → Go to step 4

NG

2 INSPECT BRAKE PEDAL LOAD SENSING SWITCH

NOTICE:
- Do not remove the brake pedal load sensing switch from the brake pedal.
- When there is a malfunction in the brake pedal load sensing switch, replace the brake pedal.

(a) Turn the ignition switch OFF.
(b) Disconnect the brake pedal load sensing switch connector.
(c) Measure the resistance of the switch.

**Standard resistance**

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Condition</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 - 1</td>
<td>Brake pedal depressed (OFF)</td>
<td>0.95 to 1.05 kΩ</td>
</tr>
<tr>
<td>2 - 1</td>
<td>Brake pedal released (ON)</td>
<td>202.4 to 223.7 Ω</td>
</tr>
</tbody>
</table>

**NG**

REPLACE BRAKE PEDAL SUPPORT ASSEMBLY

**OK**

3 CHECK WIRE HARNESS (SKID CONTROL ECU - BRAKE PEDAL LOAD SENSING SWITCH)

(a) Disconnect the A19 ECU connector.
(b) Measure the resistance of the wire harness side connectors.

**Standard resistance**

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A19-7 (FSW+) - A2-2</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>19-7 (FSW+) - Body ground</td>
<td>10 kΩ or higher</td>
</tr>
<tr>
<td>A2-1 - Body ground</td>
<td>Below 1 Ω</td>
</tr>
</tbody>
</table>

**NG**

REPAIR OR REPLACE HARNESS AND CONNECTOR

**OK**

4 RECONFIRM DTC

(a) Clear the DTC (see page BC-47).
(b) Check if the same DTC is recorded (see page BC-47).

**Result**

<table>
<thead>
<tr>
<th>Result</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC (C1267/67) is not output</td>
<td>A</td>
</tr>
<tr>
<td>DTC (C1267/67) is output</td>
<td>B</td>
</tr>
</tbody>
</table>

**B**

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY
A

USE SIMULATION METHOD TO CHECK
**DESCRIPTION**

The skid control ECU learns the steering sensor zero point every time the ignition switch is turned ON and the vehicle is driven at 35 km/h (22 mph) or more for approximately 5 seconds. The ECU also stores the previous zero point.

If front wheel alignment or the steering wheel position is adjusted without disconnecting the negative battery terminal, or if the yaw rate and deceleration sensor zero point is not set after the adjustments have been completed, the skid control ECU detects the difference between the previously stored zero point and the newly learned zero point and outputs this DTC to indicate a poor adjustment.

Indication of the steering sensor zero point malfunction is canceled by turning the ignition switch OFF.

---

**DTC | C1290/66 Steering Angle Sensor Zero Point Malfunction**

**DESCRIPTION**

The skid control ECU learns the steering sensor zero point every time the ignition switch is turned ON and the vehicle is driven at 35 km/h (22 mph) or more for approximately 5 seconds. The ECU also stores the previous zero point.

If front wheel alignment or the steering wheel position is adjusted without disconnecting the negative battery terminal, or if the yaw rate and deceleration sensor zero point is not set after the adjustments have been completed, the skid control ECU detects the difference between the previously stored zero point and the newly learned zero point and outputs this DTC to indicate a poor adjustment.

Indication of the steering sensor zero point malfunction is canceled by turning the ignition switch OFF.

### DTC | DTC Detection Condition | Trouble Area
---|---|---
C1290/66 | Steering sensor zero point calibration position differs significantly from recorded value | • Yaw rate and deceleration sensor zero point calibration incomplete  
| | | • Poor adjustment of centered position of steering wheel  
| | | • Poor adjustment of front wheel alignment

**INSPECTION PROCEDURE**

**NOTICE:**

When replacing the ABS and TRACTION actuator, perform zero point calibration (see page BC-24).

---

### 1 PERFORM YAW RATE AND DECELERATION SENSOR ZERO POINT CALIBRATION

(a) Perform the zero point calibration of the yaw rate and deceleration sensor (see page BC-24).

**HINT:**

• When the stored zero point of the yaw rate and deceleration sensor is erased, the steering sensor zero point is also erased.

• If the zero point and output value of the yaw rate and deceleration sensor and the output values of the speed sensors are not normal, the steering sensor zero point cannot be learned normally even if the vehicle is driven straight ahead at 35 km/h (22 mph) or more.

---

### 2 CHECK STEERING SENSOR

(a) Drive the vehicle straight ahead at 35 km/h (22 mph) or more for 5 seconds or more.

(b) Check that the centered position of the steering wheel is correctly set while driving straight ahead.

**HINT:**

If the front wheel alignment and steering position are adjusted due to an incorrectly centered position of the steering wheel, set the yaw rate and deceleration sensor zero point again after the adjustments are completed.
OK:
The center position of the steering wheel is correctly set.

NG → ADJUST FRONT WHEEL ALIGNMENT

OK

3 RECONFIRM DTC

(a) Turn the ignition switch OFF.
(b) Clear the DTC (see page BC-47).
(c) Check if the same DTC is recorded (see page BC-47).

<table>
<thead>
<tr>
<th>Result</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC (C1290/66) is not output</td>
<td>A</td>
</tr>
<tr>
<td>DTC (C1290/66) is output</td>
<td>B</td>
</tr>
</tbody>
</table>

B → REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY

A

USE SIMULATION METHOD TO CHECK
DESCRIPTION
The skid control ECU measures the speed of each wheel by receiving signals from the speed sensor. These signals are used for recognizing that all 4 wheels are operating properly. Therefore, all wheel signals must be equal.

<table>
<thead>
<tr>
<th>DTC No.</th>
<th>DTC Detection Condition</th>
<th>Trouble Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1337/37</td>
<td>With vehicle speed at 20 km/h (12 mph), condition that difference in average speed between front wheels and rear wheels is 20% or more continues for 20 seconds, and occurs consecutively 3 times each time the vehicle is driven.</td>
<td>Tire size</td>
</tr>
</tbody>
</table>

INSPECTION PROCEDURE

1. CHECK TIRE SIZE
   (a) Check the diameter of all 4 tires.
      **OK:** Diameter of all 4 tires are equal.
      **NG** REPLACE TIRES WITH 4 EQUAL SIZE TIRES

   **OK**

2. CHECK SPEED SENSOR ROTOR
   (a) Remove the drive shaft, and check around the speed sensor rotor.
      **OK:** No scratches or foreign matter on the sensor tip.
      **NG** REPLACE SPEED SENSOR ROTOR

   **OK**

3. CHECK SPEED SENSOR
   (a) Check the speed sensor circuit (see page BC-64 or BC-70).
      **NG** REPLACE SPEED SENSOR

   **OK**

4. CHECK WIRE HARNESS (SKID CONTROL ECU - EACH SPEED SENSOR)
   (a) Check the speed sensor circuit (see page BC-69 or BC-70).
NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

5 RECONFIRM DTC

(a) Clear the DTCs (see page BC-47).
(b) Drive the vehicle at more than 20 km/h (12 mph) for more than 60 seconds.
(c) Check if the same DTCs are detected.

<table>
<thead>
<tr>
<th>Result</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC is output</td>
<td>A</td>
</tr>
<tr>
<td>DTC is not output</td>
<td>B</td>
</tr>
</tbody>
</table>

B END

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY
**BC–124 BRAKE CONTROL – VEHICLE STABILITY CONTROL SYSTEM**

**DESCRIPTION**
The downhill assist control switch is connected to the skid control ECU in the ABS and TRACTION actuator.
DTC C1379/74 can be detected when the downhill assist control switch sends the downhill assist control switch signal or test mode ends. DTC C1379/74 is output only in test mode.

<table>
<thead>
<tr>
<th>DTC No. DTC</th>
<th>DTC Detection Condition</th>
<th>Trouble Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1379/74</td>
<td>Detected only during test mode.</td>
<td>Downhill assist control switch</td>
</tr>
</tbody>
</table>

**WIRING DIAGRAM**
Refer to downhill assist control switch circuit (see page BC-157).

**INSPECTION PROCEDURE**
**NOTICE:**
When replacing the ABS and TRACTION actuator, perform zero point calibration (see page BC-24).

1. **CHECK WIRE HARNESS (SKID CONTROL ECU - BODY GROUND)**

   (a) Disconnect the A19 ECU.
   (b) Measure the resistance of the wire harness side connector.

   **Standard resistance**

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Switch Condition</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A19-28 (HDCS) - Body ground</td>
<td>Downhill assist control switch is not pushed</td>
<td>10 kΩ or higher</td>
</tr>
</tbody>
</table>

   ![Wire Harness Side Diagram]

   **OK**
   REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY

   **NG**
2 INSPECT DOWNHILL ASSIST CONTROL SWITCH

(a) Remove the downhill assist control switch.
(b) Measure the resistance of the switch.

**Standard resistance**

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Switch Condition</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 - 1</td>
<td>Switch is pushed</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>4 - 1</td>
<td>Switch is not pushed</td>
<td>10 kΩ or higher</td>
</tr>
</tbody>
</table>

NG > REPLACE DOWNHILL ASSIST CONTROL SWITCH

OK

3 CHECK WIRE HARNESS (SKID CONTROL ECU - DOWNHILL ASSIST CONTROL SWITCH)

(a) Disconnect the A19 ECU connector.
(b) Disconnect the E31 switch connector.
(c) Measure the resistance of the wire harness side connectors.

**Standard resistance**

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A19-28 (HDCS) - E31-4</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>E31-4 - Body ground</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>A19-28 (HDCS) - Body ground</td>
<td>10 kΩ or higher</td>
</tr>
</tbody>
</table>

NG > REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY
### DTC C1380/64 Stop Light Control Relay Malfunction

**DESCRIPTION**
The skid control ECU inputs the stop light switch signal and detects the status of the brake operation.

<table>
<thead>
<tr>
<th>DTC No.</th>
<th>DTC Detection Condition</th>
<th>Trouble Area</th>
</tr>
</thead>
</table>
| C1380/64 | When one of following conditions is met:  
  1. When stop light control relay is ON, relay OFF condition continues for 5 seconds or more.  
  2. When stop light control relay is OFF, relay ON condition continues for 5 seconds.  
  3. When stop light control relay is OFF, stop switch monitor (STP2) OFF condition continues for 5 seconds or more.  |  
  - Stop light  
  - Stop light switch circuit  
  - Stop light control (BRK) relay  
  - ABS and TRACTION actuator (skid control ECU)  |
INSPECTION PROCEDURE

NOTICE:
When replacing the ABS and TRACTION actuator, perform zero point calibration (see page BC-24).
1 CHECK STOP LIGHT (OPERATION)

(a) Check that the light illuminates when the brake pedal is depressed, and turns off when the brake pedal is released.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Stop Light Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brake pedal depressed</td>
<td>Illuminates</td>
</tr>
<tr>
<td>Brake pedal released</td>
<td>Turn off</td>
</tr>
</tbody>
</table>

NG → Go to step 9

2 CHECK WIRE HARNESS (SKID CONTROL ECU - BATTERY)

(a) Disconnect the A19 ECU connector.
(b) Measure the voltage of the wire harness side connector.

**Standard voltage**

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Switch Condition</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A19-21 (STP2) - Body</td>
<td>Brake pedal depressed</td>
<td>8 to 16 V</td>
</tr>
<tr>
<td>ground</td>
<td>Brake pedal released</td>
<td>Below 1.5 V</td>
</tr>
</tbody>
</table>

NG → REPAIR OR REPLACE HARNESS AND CONNECTOR
3  CHECK WIRE HARNESS (SKID CONTROL ECU)

(a) Disconnect the A19 ECU connector.
(b) Measure the resistance of the wire harness side connector.

**Standard resistance**

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A19-21 (STP2) - A19-27 (STP1)</td>
<td>Below 1 Ω</td>
</tr>
</tbody>
</table>

NG  REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

4  PERFORM ACTIVE TEST BY INTELLIGENT TESTER (STOP LIGHT RELAY)

(a) Select the ACTIVE TEST, generate a control command, and then check that the stop light relay operates.

**Skid control ECU**

<table>
<thead>
<tr>
<th>Item</th>
<th>Test Details</th>
<th>Diagnosis Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>STP LAMP RELAY</td>
<td>Turn stop light relay ON / OFF</td>
<td>Observe stop light</td>
</tr>
</tbody>
</table>

OK: The stop lights illuminate or turn off.

NG  Go to step 6

OK

5  RECONFIRM DTC

(a) Clear the DTC (see page BC-47).
(b) Start the engine.
(c) Drive the vehicle at a speed of 5 km/h (3 mph) or more for several seconds.
(d) Check if the same DTC is output (see page BC-47).

**Result**

<table>
<thead>
<tr>
<th>Result</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC is not output</td>
<td>A</td>
</tr>
<tr>
<td>DTC is output</td>
<td>B</td>
</tr>
</tbody>
</table>

B  END
(a) Remove the stop light control relay from the engine room No. 1 relay block.

(b) Measure the resistance of the relay.

**Standard resistance**

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 - 4</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>3 - 5</td>
<td>10 kΩ or higher</td>
</tr>
<tr>
<td>3 - 4</td>
<td>10 kΩ or higher (when battery voltage is applied to terminals 1 and 2)</td>
</tr>
<tr>
<td>3 - 5</td>
<td>Below 1 Ω (when battery voltage is applied to terminals 1 and 2)</td>
</tr>
</tbody>
</table>

NG → REPLACE STOP LIGHT CONTROL RELAY
(a) Remove the stop light control relay.
(b) Disconnect the A19 ECU connector.
(c) Measure the voltage of the wire harness side connector.
   **Standard voltage**
<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Condition</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>BRK relay terminal 5 - Body ground</td>
<td>Always</td>
<td>8 to 16 V</td>
</tr>
<tr>
<td>BRK relay terminal 2- Body ground</td>
<td>Ignition switch ON</td>
<td>8 to 16 V</td>
</tr>
</tbody>
</table>
(d) Measure the resistance of the wire harness side connector.
   **Standard resistance**
<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>BRK relay terminal 1 - A19-16 (STPO)</td>
<td>Below 1 Ω</td>
</tr>
</tbody>
</table>

NG  REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

8 RECONFIRM DTC

(a) Clear the DTC (see page BC-47).
(b) Start the engine.
(c) Drive the vehicle at a speed of 5 km/h (3 mph) or more for several seconds.
(d) Check if the same DTC is output (see page BC-47).
   **Result**
<table>
<thead>
<tr>
<th>Result</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC is not output</td>
<td>A</td>
</tr>
<tr>
<td>DTC is output</td>
<td>B</td>
</tr>
</tbody>
</table>

B END

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY
9  CHECK WIRE HARNESS (STOP LIGHT SWITCH - BATTERY)

(a) Disconnect the A3 switch connector.
(b) Measure the voltage of the wire harness side connector.

**Standard voltage**

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A3-2 - Body ground</td>
<td>10 to 14 V</td>
</tr>
</tbody>
</table>

NG  →  REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

10  INSPECT STOP LIGHT SWITCH ASSEMBLY

(a) Remove the stop light switch connector.
(b) Measure the resistance of the switch.

**Standard resistance**

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Switch Condition</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 2</td>
<td>Switch pin not pushed</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>1 - 2</td>
<td>Switch pin pushed</td>
<td>10 kΩ or higher</td>
</tr>
<tr>
<td>3 - 4</td>
<td>Switch pin not pushed</td>
<td>10 kΩ or higher</td>
</tr>
<tr>
<td>3 - 4</td>
<td>Switch pin pushed</td>
<td>Below 1 Ω</td>
</tr>
</tbody>
</table>

NG  →  REPLACE STOP LIGHT SWITCH ASSEMBLY

OK
11 CHECK WIRE HARNESS (STOP LIGHT SWITCH - STOP LIGHT CONTROL RELAY)

(a) Disconnect the A3 switch connector.
(b) Remove the stop light control relay.
(c) Measure the resistance of the wire harness side connectors.

**Standard resistance**

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A3-1 - BKR relay terminal 4</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>A3-1 - Body ground</td>
<td>10 kΩ or higher</td>
</tr>
</tbody>
</table>

NG  REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

12 INSPECT STOP LIGHT CONTROL RELAY (Marking: BRK)

(a) Remove the stop light control relay from the engine room No. 1 relay block.
(b) Measure the resistance of the relay.

**Standard resistance**

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 - 4</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>3 - 5</td>
<td>10 kΩ or higher</td>
</tr>
<tr>
<td>3 - 4</td>
<td>10 kΩ or higher (when battery voltage is applied to terminals 1 and 2)</td>
</tr>
<tr>
<td>3 - 5</td>
<td>Below 1 Ω (when battery voltage is applied to terminals 1 and 2)</td>
</tr>
</tbody>
</table>

NG  REPLACE STOP LIGHT CONTROL RELAY

OK
(a) Disconnect the Q1, K12 and K14 light connectors.
(b) Remove the stop light control relay.
(c) Measure the resistance of the wire harness side connectors.

**Standard resistance**

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>K14-4 - BKR relay terminal 3</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>K14-4 - Body ground</td>
<td>10 kΩ or higher</td>
</tr>
<tr>
<td>K14-1 - Body ground</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>K12-4 - BKR relay terminal 3</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>K12-4 - Body ground</td>
<td>10 kΩ or higher</td>
</tr>
<tr>
<td>K12-1 - Body ground</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>Q1-2 - BKR relay terminal 3</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>Q1-2 - Body ground</td>
<td>10 kΩ or higher</td>
</tr>
<tr>
<td>Q1-1 - Body ground</td>
<td>Below 1 Ω</td>
</tr>
</tbody>
</table>

**NG** REPAIR OR REPLACE HARNESS AND CONNECTOR

**OK**

CHECK FOR INTERMITTENT PROBLEMS
**DESCRIPTION**

<table>
<thead>
<tr>
<th>DTC No.</th>
<th>DTC Detection Condition</th>
<th>Trouble Area</th>
</tr>
</thead>
</table>
| U0073/94 | When one of following conditions is met:  
1. With the IG1 terminal voltage 10 V or more, after the output of data from the skid control ECU is completed, the sending continues for 5 seconds or more.  
2. The condition that bus OFF state occurs once or more within 100 ms occurs 10 times in succession. (Sent signals cannot be received.)  
3. With the IG1 terminal voltage 10 V or more, a delay in receiving data from the yaw rate and acceleration sensor and steering angle sensor continues for 1 second or more.  
4. With the IG1 terminal voltage 10 V or more, the condition that a delay in receiving data from the yaw rate and acceleration sensor occurs more than once within 5 seconds occurs 10 times in succession. | CAN communication system |
| U0100/65 | When either condition below is met:  
1. With the IG1 terminal voltage 10 V or more and the vehicle speed 15 km/h (9 mph) or more, data cannot be sent to the ECM for 2 seconds or more.  
2. With the IG1 terminal voltage 10 V or more and the vehicle speed 15 km/h (9 mph) or more for 2 seconds or more. | CAN communication system (Skid control ECU to ECM) |
| U0123/62 | When either condition below is met:  
1. With the IG1 terminal voltage 10 V or more, data from the acceleration sensor cannot be received for 1 second or more.  
2. With the IG1 terminal voltage 10 V or more, the following occurs 10 times in succession within 60 seconds.  
   (a) The condition that data from the acceleration sensor cannot be received occurs once or more within 5 seconds. | CAN communication system (Skid control ECU to yaw rate and acceleration sensor) |
| U0124/95 | When either condition below is met:  
1. With the IG1 terminal voltage 10 V or more, data from the acceleration sensor cannot be received for 1 second or more.  
2. With the IG1 terminal voltage 10 V or more, the following occurs 10 times in succession within 60 seconds.  
   (a) The condition that data from the acceleration sensor cannot be received occurs once or more within 5 seconds. | CAN communication system (Skid control ECU to yaw rate and acceleration sensor) |
INSPECTION PROCEDURE

The skid control ECU inputs the signals from the ECM, steering angle sensor, and yaw rate and acceleration sensor via CAN communication system.

1 CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)

(a) Using the DATA LIST of the intelligent tester, check for any momentary interruption in the wire harness and connector corresponding to a DTC (see page BC-23).

Skid control ECU:

<table>
<thead>
<tr>
<th>DTC No.</th>
<th>DTC Detection Condition</th>
<th>Trouble Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>U0126/63</td>
<td>When either of following conditions detected: 1. When IG1 terminal voltage 10 V or more, data from steering sensor cannot be received for 1 second or more. 2. When IG1 terminal voltage 10 V or more, following condition occurs 10 times in succession.</td>
<td>CAN communication system</td>
</tr>
</tbody>
</table>

Result

<table>
<thead>
<tr>
<th>Condition</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is a constant open circuit</td>
<td>A</td>
</tr>
<tr>
<td>There are no momentary interruptions</td>
<td>B</td>
</tr>
<tr>
<td>There are momentary interruptions</td>
<td>C</td>
</tr>
</tbody>
</table>

HINT:
Perform the above inspection before removing the sensor and connector.

Go to step 3

Go to step 4

2 CHECK IF EACH SENSOR AND ECM CONNECTOR IS SECURELY CONNECTED

(a) Check if each sensor or ECM connector is securely connected.

OK:
The connector should be securely connected.

NG CONNECT CONNECTOR TO EACH SENSOR OR ECM CORRECTLY
3 RECONFIRM DTC

(a) Record the output DTCs (for ABS, VSC and CAN communication) (see page BC-47).

HINT:
If the CAN communication system DTC and the relevant sensor DTCs are output simultaneously, troubleshoot the relevant sensor DTCs (for ABS and VSC) after the CAN communication system returns to normal.

Result

<table>
<thead>
<tr>
<th>Condition</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC (CAN communication system DTC) is not output</td>
<td>A</td>
</tr>
<tr>
<td>DTC (ABS and/or VSC DTC) is output</td>
<td>B</td>
</tr>
<tr>
<td>DTC is not output</td>
<td>C</td>
</tr>
</tbody>
</table>

B REPAIR CIRCUIT INDICATED BY OUTPUT CODE

C USE SIMULATION METHOD TO CHECK

INSPECT CAN COMMUNICATION SYSTEM

4 REPAIR OR REPLACE HARNESS AND CONNECTOR

(a) Repair or replace the harness or connector.
(b) Check for any momentary interruption between the skid control ECU and each sensor or ECM (see page BC-23).
(c) Check that there is no momentary interruption.

NEXT

5 RECONFIRM DTC

(a) Clear the DTC (see page BC-47).
(b) Turn the ignition switch ON.
(c) Drive the vehicle and turn the steering wheel to the right and left at a speed of 15 km/h (9 mph) or more.
(d) Check that no CAN communication system DTC is output (see page BC-47).
(e) If ABS and/or VSC DTCs are output, record them.

Result

<table>
<thead>
<tr>
<th>Condition</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC for the CAN communication system is not output</td>
<td>A</td>
</tr>
<tr>
<td>No DTC is output (ABS and/or VSC DTC are output)</td>
<td>B</td>
</tr>
</tbody>
</table>
HINT:
The CAN communication system must be normal when repairing the sensor DTCs (for ABS and VSC).

<table>
<thead>
<tr>
<th>Condition</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>No DTC is output (No ABS and/or VSC DTC are output)</td>
<td>C</td>
</tr>
</tbody>
</table>

B  REPAIR CIRCUIT INDICATED BY OUTPUT CODE

C  END

A

INSPECT CAN COMMUNICATION SYSTEM
### ABS Warning Light Remains ON

**DESCRIPTION**

If any of the following conditions are detected, the ABS warning light remains on:

1. The ECU connectors are disconnected from the skid control ECU.
2. There is a malfunction in the skid control ECU internal circuit.
3. There is an open or short in the wire harness between the combination meter and the skid control ECU.

**HINT:**
The intelligent tester may not be used when there is a malfunction in the skid control ECU.
INSPECTION PROCEDURE

1 CHECK CAN COMMUNICATION SYSTEM

(a) Check if the CAN communication system DTC is output (see page CA-34).

<table>
<thead>
<tr>
<th>Result</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC is not output</td>
<td>A</td>
</tr>
<tr>
<td>DTC is output</td>
<td>B</td>
</tr>
</tbody>
</table>

B REPAIR CAN COMMUNICATION SYSTEM

2 INSPECT SKID CONTROL ECU CONNECTOR

(a) Check if the skid control ECU connector is properly installed.

OK: The skid control ECU connector is properly installed.

NG CONNECT CONNECTOR TO ECU SECURELY

OK

3 CHECK WIRE HARNESS (SKID CONTROL ECU - BATTERY AND BODY GROUND)

(a) Disconnect the A19 ECU connector.
(b) Measure the resistance of the wire harness side connector.

Standard resistance

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A19-32 (GND1) - Body ground</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>A19-1 (GND2) - Body ground</td>
<td>Below 1 Ω</td>
</tr>
</tbody>
</table>

(c) Measure the voltage of the wire harness side connector.

Standard voltage

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Condition</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A19-48 (IG1) - Body ground</td>
<td>Ignition switch ON</td>
<td>10 to 14 V</td>
</tr>
</tbody>
</table>

NG REPAIR OR REPLACE HARNESS AND CONNECTOR

OK
(a) Select the ACTIVE TEST, generate a control command, and then check that the ABS warning light operates.

**Skid control ECU**

<table>
<thead>
<tr>
<th>Item (Display)</th>
<th>Test Details</th>
<th>Diagnostic Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABS WARN LAMP</td>
<td>Turns ABS warning light / ON or OFF</td>
<td>Observe combination meter</td>
</tr>
</tbody>
</table>

**OK:**

The ABS warning light is turned on or off.

**HINT:**

When the ABS warning light remains illuminated, opens in the wire harness of the combination meters or abnormalities in the meter circuit should be considered.

**NG**

CHECK METER / GAUGE SYSTEM

**OK**

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY
ABS Warning Light does not Come ON

WIRING DIAGRAM
Refer to the ABS warning light circuit (see page BC-135).

INSPECTION PROCEDURE

1 CHECK CAN COMMUNICATION SYSTEM

(a) Check if the CAN communication system DTC is output (see page CA-34).

<table>
<thead>
<tr>
<th>Result</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC is not output</td>
<td>A</td>
</tr>
<tr>
<td>DTC is output</td>
<td>B</td>
</tr>
</tbody>
</table>

A REPAIR CAN COMMUNICATION SYSTEM

B

2 PERFORM ACTIVE TEST BY INTELLIGENT TESTER (ABS WARNING LIGHT)

(a) Select the ACTIVE TEST, generate a control command, and then check that the ABS warning light operates.

Skid control ECU

<table>
<thead>
<tr>
<th>Item (Display)</th>
<th>Test Details</th>
<th>Diagnostic Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABS WARN LAMP</td>
<td>Turns ABS warning light / ON or OFF</td>
<td>Observe combination meter</td>
</tr>
</tbody>
</table>

OK:
The ABS warning light turns on or off.

NG CHECK METER / GAUGE SYSTEM

OK

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY
VSC Warning Light Remains ON

DESCRIPTION
The skid control ECU is connected to the combination meter via the CAN communication system.

w/o Multi information display:
If the skid control ECU stores any DTCs which relate to the VSC system, the VSC warning light comes on in the combination meter.

w/ Multi information display:
If the skid control ECU stores any DTCs which relate to the VSC system, the master caution indicator light comes on and the warning message is displayed on the multi information display in the combination meter.
INSPECTION PROCEDURE
NOTICE:
When replacing the ABS and TRACTION actuator, perform the zero point calibration (see page BC-24).
1. CHECK CAN COMMUNICATION SYSTEM

(a) Check if the CAN communication system DTC is output (see page BC-47).

<table>
<thead>
<tr>
<th>Result</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC is not output</td>
<td>A</td>
</tr>
<tr>
<td>DTC is output</td>
<td>B</td>
</tr>
</tbody>
</table>

NG > REPAIR CAN COMMUNICATION SYSTEM

OK

2. INSPECT SKID CONTROL ECU CONNECTOR

(a) Check if the skid control ECU connector is securely connected. 

OK: The connector is securely connected.

NG > CONNECT CONNECTOR CORRECTLY

OK

3. CHECK COMBINATION METER ASSEMBLY

(a) Check the combination meter (see page ME-15).

NG > REPLACE COMBINATION METER ASSEMBLY

OK

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY
VSC Warning Light does not Come ON

DESCRIPTION
Refer to the description of "VSC Warning Light Remains ON" (see page BC-139).

WIRING DIAGRAM
Refer to the VSC warning light circuit (see page BC-140).

INSPECTION PROCEDURE
NOTICE:
When replacing the ABS and TRACTION actuator, perform the zero point calibration (see page BC-24).

1 Inspect CAN communication system

(a) Check if the CAN communication system DTC is output (see page BC-47).

<table>
<thead>
<tr>
<th>Result</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC is not output</td>
<td>A</td>
</tr>
<tr>
<td>DTC is output</td>
<td>B</td>
</tr>
</tbody>
</table>

B Repair CAN communication system

2 Perform active test by intelligent tester (VSC warning light)

(a) Select the ACTIVE TEST, generate a control command, and then check that the VSC warning light operates.

Skid control ECU

<table>
<thead>
<tr>
<th>Item (Display)</th>
<th>Test Details</th>
<th>Diagnostic Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>VSC WARN LAMP</td>
<td>Turn VSC warning light ON / OFF</td>
<td>Observe combination meter</td>
</tr>
</tbody>
</table>

OK:
The VSC warning light turns on or off.

OK Replace ABS and Traction actuator assembly

NG

3 Check combination meter assembly

(a) Check the combination meter (see page CA-34).

NG Replace combination meter assembly
REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY
Brake Warning Light Remains ON

DESCRIPTION
If any of the following conditions are detected, the brake warning light remains on:
1. The ECU connectors are disconnected from the skid control ECU.
2. The brake fluid level is insufficient.
3. The parking brake is applied.
4. The EBD is defective.
Combination Meter

CAN I/F

CAN Controller

CPU

LED Driver

BRAKE

Brake Fluid Level Warning Switch

SW

FC

GAUGE2

FL MAIN

Parking Brake Switch Assembly

P KB

CANL

Instrument Panel Junction Block
(Main Body ECU)

CANH

CAN L

Skid Control ECU

GND1

GND2

ECU-IG1

ALT

IA I

AM1

AM2
INSPECTION PROCEDURE

1  PREPARE FOR INSPECTION

(a) Check that both of the following conditions are satisfied.
   • The brake fluid level in the brake master cylinder reservoir is correct.
   • The parking brake is released.
   HINT:
   When the ABS warning light remains illuminated, repair the malfunctions in the ABS system first.

2  CHECK DTC FOR ABS

(a) Check if any ABS DTCs are output (see page BC-47).

<table>
<thead>
<tr>
<th>Result</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC is not output</td>
<td>A</td>
</tr>
<tr>
<td>DTC is output</td>
<td>B</td>
</tr>
</tbody>
</table>

B  REPAIR CIRCuits INDICATED BY OUTPUT DTCS

A

3  CHECK CAN COMMUNICATION SYSTEM

(a) Check if the CAN communication system DTC is output (see page CA-34).

<table>
<thead>
<tr>
<th>Result</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC is not output</td>
<td>A</td>
</tr>
<tr>
<td>DTC is output</td>
<td>B</td>
</tr>
</tbody>
</table>

B  REPAIR CAN COMMUNICATION SYSTEM

A

4  INSPECT SKID CONTROL ECU CONNECTOR

(a) Check if the skid control ECU connector is properly installed.

OK:
The skid control ECU connector is properly installed.

NG  CONNECT CONNECTOR TO ECU SECURELY
5  CHECK WIRE HARNESS (SKID CONTROL ECU - BATTERY AND BODY GROUND)

(a) Disconnect the A19 ECU connector.
(b) Measure the resistance of the wire harness side connector.
   **Standard resistance**
   
<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A19-32 (GND1) - Body ground</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>A19-1 (GND2) - Body ground</td>
<td>Below 1 Ω</td>
</tr>
</tbody>
</table>
(c) Measure the voltage of the wire harness side connector.
   **Standard voltage**
   
<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Condition</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A19-46 (IG1) - Body ground</td>
<td>Ignition switch ON</td>
<td>10 to 14 V</td>
</tr>
</tbody>
</table>

NG  REPAIR OR REPLACE HARNESS AND CONNECTOR

6  READ VALUE OF INTELLIGENT TESTER (PARKING BRAKE SWITCH)

(a) Using the DATA LIST, check for proper functioning of the parking brake switch.

**Skid control ECU**

<table>
<thead>
<tr>
<th>Item (Display)</th>
<th>Measurement Item / Range (Display)</th>
<th>Normal Condition</th>
<th>Diagnostic Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>PARKING BRAKE SW</td>
<td>Parking brake switch / ON or OFF</td>
<td>ON: Parking brake applied\n                        \nOFF: Parking brake released</td>
<td>-</td>
</tr>
</tbody>
</table>

OK: When the parking brake lever is operated, the display changes as shown above.

NG  Go to step 10
7  INSPECT BRAKE FLUID LEVEL WARNING SWITCH

(a) Remove the reservoir tank cap and strainer.
(b) Disconnect the brake fluid level warning switch connector.
(c) Measure the resistance of the switch.

HINT:
A float is placed inside the reservoir. Its position can be changed by increasing or decreasing the brake fluid level.

Standard resistance

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Condition</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 2</td>
<td>Float up (Switch OFF)</td>
<td>10 kΩ or higher</td>
</tr>
<tr>
<td>1 - 2</td>
<td>Float down (Switch ON)</td>
<td>Below 1 Ω</td>
</tr>
</tbody>
</table>

HINT:
If there is no problem after the above check is finished, adjust the brake fluid level to the MAX level.

NG  REPLACE BRAKE MASTER CYLINDER RESERVOIR SUB-ASSEMBLY

OK  

8  CHECK WIRE HARNESS (LEVEL WARNING SWITCH - COMBINATION METER AND BODY GROUND)

(a) Disconnect the E19 combination meter connector.
(b) Disconnect the A8 switch connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>E19-14 (SW) - A8-1</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>E19-14 (SW) - Body ground</td>
<td>10 kΩ or higher</td>
</tr>
<tr>
<td>A8-2 - Body ground</td>
<td>Below 1 Ω</td>
</tr>
</tbody>
</table>

NG  REPAIR OR REPLACE HARNESS AND CONNECTOR

OK
9  INSPECT COMBINATION METER

(a) Inspect the combination meter (see page ME-15).

NG  REPLACE COMBINATION METER

OK

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY

10  INSPECT PARKING BRAKE SWITCH ASSEMBLY

(a) Remove the parking brake switch.
(b) Measure the resistance of the switch.

**Standard resistance**

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Condition</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - Body ground</td>
<td>Parking brake switch ON (Switch pin not pushed)</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>1 - Body ground</td>
<td>Parking brake switch OFF (Switch pin pushed)</td>
<td>10 kΩ or higher</td>
</tr>
</tbody>
</table>

NG  REPLACE PARKING BRAKE SWITCH ASSEMBLY

OK
(a) Disconnect the 1D junction block connector.
(b) Disconnect the E41 switch connector.
(c) Measure the resistance of the wire harness side connectors.

**Standard resistance**

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1D-4 (PKB) - E41-1</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>1D-4 (PKB) - Body ground</td>
<td>10 kΩ or higher</td>
</tr>
</tbody>
</table>

**NG** REPAIR OR REPLACE HARNESS AND CONNECTOR

REPLACE INSTRUMENT PANEL JUNCTION BLOCK
Brake Warning Light does not Come ON

WIRING DIAGRAM
Refer to the brake warning light circuit (see page BC-145).

INSPECTION PROCEDURE

1 CHECK CAN COMMUNICATION SYSTEM

(a) Check if the CAN communication system DTC is output (see page CA-34).

<table>
<thead>
<tr>
<th>Result</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC is not output</td>
<td>A</td>
</tr>
<tr>
<td>DTC is output</td>
<td>B</td>
</tr>
</tbody>
</table>

B REPAIR CAN COMMUNICATION SYSTEM

2 PERFORM ACTIVE TEST BY INTELLIGENT TESTER (BRAKE WARNING LIGHT)

(a) Select the ACTIVE TEST, generate a control command, and then check that BRAKE warning light operates.

Skid control ECU

<table>
<thead>
<tr>
<th>Item (Display)</th>
<th>Test Details</th>
<th>Diagnostic Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>BRAKE WARN LAMP</td>
<td>Turns BRAKE warning light / ON or OFF</td>
<td>Observe combination meter</td>
</tr>
</tbody>
</table>

OK: The BRAKE warning light turns on or off.

OK REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY

NG

3 INSPECT COMBINATION METER

(a) Inspect the combination meter (see page ME-15).

NG REPLACE COMBINATION METER

OK REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY
**DESCRIPTION**

The slip indicator blinks during VSC and/or TRC operation. When the system fails, the slip indicator comes on to warn the driver.

For 2WD: With Auto LSD switch ON, when the hydraulic brake booster is at a high temperature, the slip indicator illuminates.

**WIRING DIAGRAM**
INSPECTION PROCEDURE

NOTICE:
When replacing the ABS and TRACTION actuator, perform the zero point calibration (see page BC-24).

1 CHECK CAN COMMUNICATION SYSTEM

(a) Check if the CAN communication system DTC is output (see page CA-34).

<table>
<thead>
<tr>
<th>Result</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC is not output</td>
<td>A</td>
</tr>
<tr>
<td>DTC is output</td>
<td>B</td>
</tr>
</tbody>
</table>

B REPAIR CAN COMMUNICATION SYSTEM

2 CHECK SKID CONTROL ECU CONNECTOR

(a) Check if the skid control ECU connector is securely connected.

OK: The connector is securely connected.

NG CONNECT CONNECTOR CORRECTLY

OK

3 CHECK COMBINATION METER

(a) Check the combination meter (see page ME-15).

NG REPLACE COMBINATION METER

OK

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY
Slip Indicator Light does not Come ON

DESCRIPTION
Refer to the description of "Slip Indicator Light Remains ON" (see page BC-152).

WIRING DIAGRAM
Refer to the SLIP indicator light circuit (see page BC-152).

INSPECTION PROCEDURE
NOTICE:
When replacing the ABS and TRACTION actuator, perform the zero point calibration (see page BC-24).

1 CHECK CAN COMMUNICATION SYSTEM

(a) Check if the CAN communication system DTC is output (see page CA-34).

<table>
<thead>
<tr>
<th>Result</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC is not output</td>
<td>A</td>
</tr>
<tr>
<td>DTC is output</td>
<td>B</td>
</tr>
</tbody>
</table>

B REPAIR CAN COMMUNICATION SYSTEM

2 PERFORM ACTIVE TEST BY INTELLIGENT TESTER (SLIP INDICATOR LIGHT)

(a) Using the intelligent tester’s ACTIVE TEST, generate a control command, and then check that the SLIP indicator light operates.

<table>
<thead>
<tr>
<th>Item (Display)</th>
<th>Test Details</th>
<th>Diagnostic Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLIP INDI LAMP</td>
<td>Turn slip indicator light ON / OFF</td>
<td>Observe combination meter</td>
</tr>
</tbody>
</table>

OK:
The SLIP indicator light turns ON and OFF.

NG Go to step 3

OK

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY

3 CHECK COMBINATION METER

(a) Inspect the combination meter (see page ME-15).

NG REPLACE COMBINATION METER
OK

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY
Downhill Assist Control Indicator Light Remains ON

DESCRIPTION
When the downhill assist control switch is pushed on, the downhill assist control function is available and the downhill assist control indicator light illuminates.

HINT:
Even if the downhill assist control switch is pressed, the downhill assist control indicator light will blink and downhill assist control will not be activated under the following conditions:
- Gear position is not L or R.
- The system is malfunctioning.
- Temperature of the hydraulic brake booster increases and downhill assist control is temporarily canceled.
- The vehicle speed is 25 km/h (15 mph) or more.
INSPECTION PROCEDURE

1 CHECK CAN COMMUNICATION SYSTEM

(a) Check if the CAN communication system DTC is output (see page CA-34).

<table>
<thead>
<tr>
<th>Result</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC not output</td>
<td>A</td>
</tr>
<tr>
<td>DTC output</td>
<td>B</td>
</tr>
</tbody>
</table>

B REPAIR CAN COMMUNICATION SYSTEM

A

2 CHECK SKID CONTROL ECU CONNECTOR

(a) Check if the skid control ECU connector is securely connected.

OK: The connector is securely connected.

NG CONNECT CONNECTOR CORRECTLY

OK

3 CHECK WIRE HARNESS (SKID CONTROL ECU - BODY GROUND)

(a) Disconnect the A19 ECU connector.

(b) Measure the resistance of the wire harness side connector.

Standard resistance

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Switch Condition</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A19-28 (HDCS) - Body ground</td>
<td>Downhill assist control switch is pushed</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>A19-28 (HDCS) - Body ground</td>
<td>Downhill assist control switch is not pushed</td>
<td>10 kΩ or higher</td>
</tr>
</tbody>
</table>

OK Go to step 6

NG
## 4 INSPECT DOWNHILL ASSIST CONTROL SWITCH

(a) Remove the downhill assist control switch.

(b) Measure the resistance of the switch.

### Standard resistance

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Switch Condition</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 4</td>
<td>Switch is pushed</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>1 - 4</td>
<td>Switch is not pushed</td>
<td>10 kΩ or higher</td>
</tr>
</tbody>
</table>

NG  REPLACE DOWNHILL ASSIST CONTROL SWITCH

OK

## 5 CHECK WIRE HARNESS (CONTROL SWITCH - SKID CONTROL ECU AND BODY GROUND)

(a) Disconnect the A19 ECU connector.

(b) Disconnect the E31 switch connector.

(c) Measure the resistance of the wire harness side connectors.

### Standard resistance

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A19-28 (HDCS) - E31-4</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>E31-1 - Body ground</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>A19-28 (HDCS) - Body ground</td>
<td>10 kΩ or higher</td>
</tr>
</tbody>
</table>

NG  REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

## 6 CHECK COMBINATION METER

(a) Check the combination meter (see page ME-15).
NG   REPLACE COMBINATION METER

OK

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY
Downhill Assist Control Indicator Light does not Come ON

DESCRIPTION
Refer to the description of "Downhill Assist Control Indicator Light Remains ON" (see page BC-156).

WIRING DIAGRAM
Refer to the downhill assist control indicator light circuit (see page BC-157).

INSPECTION PROCEDURE

1. CHECK CAN COMMUNICATION SYSTEM

(a) Check if the CAN communication system DTC is output (see page CA-34)

<table>
<thead>
<tr>
<th>Result</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC is not output</td>
<td>A</td>
</tr>
<tr>
<td>DTC is output</td>
<td>B</td>
</tr>
</tbody>
</table>

2. READ VALUE OF INTELLIGENT TESTER (DOWNHILL ASSIST CONTROL SWITCH)

(a) Check the DATA LIST for proper functioning of the downhill assist control switch.

<table>
<thead>
<tr>
<th>Item (Display)</th>
<th>Measurement Item / Range (Display)</th>
<th>Normal Condition</th>
<th>Diagnostic Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Downhill assist control SW</td>
<td>Downhill assist control switch / ON or OFF</td>
<td>ON: Downhill assist control switch is ON OFF: Downhill assist control switch is OFF</td>
<td>-</td>
</tr>
</tbody>
</table>

OK:
ON (downhill assist control switch is ON) appears on the screen.

3. PERFORM ACTIVE TEST BY INTELLIGENT TESTER (DAC INDICATOR LIGHT)

(a) Select the ACTIVE TEST, generate a control command, and then check that the downhill assist control indicator light operates.

<table>
<thead>
<tr>
<th>Item (Display)</th>
<th>Test Details</th>
<th>Diagnostic Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Downhill assist INDI LAMP</td>
<td>Turn downhill assist control indicator light ON / OFF</td>
<td>Observe combination meter</td>
</tr>
</tbody>
</table>
OK:
The downhill assist control indicator light turns ON and OFF.

OK ➞ REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY

NG

4 INSPECT COMBINATION METER

(a) Inspect the combination meter (see page ME-15).

NG ➞ REPLACE COMBINATION METER ASSEMBLY

OK

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY

5 INSPECT DOWNHILL ASSIST CONTROL SWITCH

(a) Remove the downhill assist control switch.
(b) Measure the resistance of the switch.

**Standard resistance**

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Switch Condition</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 - 1</td>
<td>Switch is pushed</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>4 - 1</td>
<td>Switch is not pushed</td>
<td>10 kΩ or higher</td>
</tr>
</tbody>
</table>

NG ➞ REPLACE DOWNHILL ASSIST CONTROL SWITCH

OK
(a) Disconnect the A19 ECU connector.
(b) Disconnect the E31 switch connector.
(c) Measure the resistance of the wire harness side connectors.

**Standard resistance**

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A19-28 (HDCS) - E31-4</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>E31-1 - Body ground</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>A19-28 (HDCS) - Body ground</td>
<td>10 kΩ or higher</td>
</tr>
</tbody>
</table>

NG -> **REPAIR OR REPLACE HARNESS AND CONNECTOR**

**REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY**
### AUTO LSD Indicator Light Remains ON

**DESCRIPTION**
This is the auto LSD switch for 2WD. When the auto LSD switch is pushed on, the auto LSD function is available and the auto LSD indicator light illuminates.

**HINT:**
The auto LSD does not operate even if the auto LSD switch is pressed under the following conditions:
- The TRC or VSC system is faulty.
- The temperature inside the hydraulic brake booster increases and the auto LSD operation is suspended.
INSPECTION PROCEDURE

1  CHECK CAN COMMUNICATION SYSTEM

(a) Check if the CAN communication system DTC is output (see page CA-34).
Result

<table>
<thead>
<tr>
<th>Result</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC is not output</td>
<td>A</td>
</tr>
<tr>
<td>DTC is output</td>
<td>B</td>
</tr>
</tbody>
</table>

**OK:**
The connector is securely connected.

B ➔ REPAIR CAN COMMUNICATION SYSTEM

---

### 2 CHECK SKID CONTROL ECU CONNECTOR

(a) Check if the skid control ECU connector is securely connected.

**OK:**
The connector is securely connected.

NG ➔ CONNECTOR CORRECTLY

---

### 3 CHECK WIRE HARNESS (SKID CONTROL ECU - BODY GROUND)

(a) Disconnect the A19 ECU connector.

(b) Measure the resistance of the wire harness side connector.

**Standard resistance**

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Switch Condition</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A19-43 (CSW) - Body ground</td>
<td>AUTO LSD switch is not pushed</td>
<td>Above 10 kΩ</td>
</tr>
<tr>
<td>A19-43 (CSW) - Body ground</td>
<td>AUTO LSD switch is pushed</td>
<td>Below 1Ω</td>
</tr>
</tbody>
</table>

**OK** ➔ Go to step 6

---

NG ➔
4  INSPECT AUTO LSD SWITCH

(a) Remove the auto LSD switch.
(b) Measure the resistance of the switch.

**Standard resistance**

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Switch Condition</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 - 6</td>
<td>Not pushed</td>
<td>10 kΩ or higher</td>
</tr>
<tr>
<td>3 - 6</td>
<td>Pushed</td>
<td>Below 1 Ω</td>
</tr>
</tbody>
</table>

NG  REPLACE TRACTION CONTROL SWITCH

OK

5  CHECK WIRE HARNESS (SKID CONTROL ECU - TRACTION CONTROL SWITCH)

(a) Disconnect the A19 ECU connector.
(b) Disconnect the E51 switch connector.
(c) Measure the resistance of the wire harness side connectors.

**Standard resistance**

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A19-43 (CSW) - E51-6</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>E51-3 - Body ground</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>A19-43 (CSW) - Body ground</td>
<td>10 kΩ or higher</td>
</tr>
</tbody>
</table>

NG  REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

6  CHECK COMBINATION METER

(a) Check the combination meter (see page ME-15).
NG
REPLACE COMBINATION METER ASSEMBLY

OK

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY
AUTO LSD Indicator Light does not Come ON

DESCRIPTION
Refer to the description of "AUTO LSD Indicator Light Remains ON" (see page BC-164).

WIRING DIAGRAM
Refer to the AUTO LSD indicator light circuit (see page BC-165).

INSPECTION PROCEDURE

1 CHECK CAN COMMUNICATION SYSTEM
   
   (a) Check if the CAN communication system DTC is output (see page CA-34).
   
<table>
<thead>
<tr>
<th>Result</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC is not output</td>
<td>A</td>
</tr>
<tr>
<td>DTC is output</td>
<td>B</td>
</tr>
</tbody>
</table>
   
   B REPAIR CAN COMMUNICATION SYSTEM

2 READ VALUE OF INTELLIGENT TESTER (AUTO LSD SWITCH)

   (a) Check the Data List for proper functioning of the Auto LSD switch.

<table>
<thead>
<tr>
<th>Skid control ECU</th>
<th>Measurement Item / Range (Display)</th>
<th>Normal Condition</th>
<th>Diagnostic Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUTO LSD SW</td>
<td>Auto LSD switch (AUTO LSD switch) / ON or OFF</td>
<td>ON: Auto LSD switch is ON OFF: Auto LSD switch is OFF</td>
<td>-</td>
</tr>
</tbody>
</table>
   
   OK: ON (downhill assist control switch is ON) appears on the screen.

   NG Go to step 5

3 PERFORM ACTIVE TEST BY INTELLIGENT TESTER (AUTO LSD INDICATOR LIGHT)

   (a) Select the ACTIVE TEST, generate a control command, and then check that the AUTO LSD indicator light operates.

<table>
<thead>
<tr>
<th>Skid control ECU</th>
<th>Test Details</th>
<th>Diagnostic Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUTO LSD LAMP</td>
<td>Turn AUTO LSD indicator light ON / OFF</td>
<td>Observe combination meter</td>
</tr>
</tbody>
</table>
   
   OK: The AUTO LSD indicator light turns ON and OFF.
NG → REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY

OK

4 INSPECT COMBINATION METER ASSEMBLY

(a) Inspect the combination meter (see page ME-15).

NG → REPLACE COMBINATION METER ASSEMBLY

OK

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY

5 INSPECT AUTO LSD SWITCH

(a) Disconnect the auto LSD switch switch.
(b) Measure the resistance of the switch.

Standard resistance

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Switch Condition</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 - 6</td>
<td>Not pushed</td>
<td>10 kΩ or higher</td>
</tr>
<tr>
<td>3 - 6</td>
<td>Pushed</td>
<td>Below 1 Ω</td>
</tr>
</tbody>
</table>

NG → REPLACE AUTO LSD SWITCH

OK
(a) Disconnect the A19 ECU connector.
(b) Disconnect the E51 switch connector.
(c) Measure the resistance of the wire harness side connectors.

**Standard resistance**

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A19-43 (CSW) - E51-6</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>E51-3 - Body ground</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>A19-43 (CSW) - Body ground</td>
<td>10 kΩ or higher</td>
</tr>
</tbody>
</table>

**NG**  REPAIR OR REPLACE HARNESS AND CONNECTOR

**OK**

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY
**DESCRIPTION**
The skid control buzzer sounds while the VSC is activated.

**WIRING DIAGRAM**

**INSPECTION PROCEDURE**
**NOTICE:**
When replacing the ABS and TRACTION actuator, perform the zero point calibration (see page BC-24).

1. **CHECK CAN COMMUNICATION SYSTEM**
   (a) Check if the CAN communication DTC is output (see page CA-34).

<table>
<thead>
<tr>
<th>Result</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC is not output</td>
<td>A</td>
</tr>
</tbody>
</table>
BC-178 BRAKE CONTROL – VEHICLE STABILITY CONTROL SYSTEM

A

B

REPAIR CAN COMMUNICATION SYSTEM

PERFORM ACTIVE TEST BY INTELLIGENT TESTER (SKID CONTROL BUZZER)

(a) Select the ACTIVE TEST, generate a control command, and then check that the skid control buzzer operate.

Skid control ECU

<table>
<thead>
<tr>
<th>Item (Display)</th>
<th>Test Details</th>
<th>Diagnostic Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUZZER</td>
<td>Turns skid control buzzer ON / OFF</td>
<td>Buzzer can be heard</td>
</tr>
</tbody>
</table>

OK: The skid control buzzer can be heard.

OK

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY

NG

INSPECT COMBINATION METER

(a) Inspect the combination meter (see page ME-15).

NG

REPLACE COMBINATION METER

OK

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY
ABS AND TRACTION ACTUATOR

COMPONENTS

<table>
<thead>
<tr>
<th>Component</th>
<th>Specified Torque N·m (kgf·cm, ft.*lbf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brake Actuator Bolt Cushion</td>
<td>5.4 (55, 48 in.*lbf)</td>
</tr>
<tr>
<td>Brake Actuator Bolt Holder</td>
<td>15.2 (155, 11)</td>
</tr>
<tr>
<td>Brake Actuator Connector</td>
<td>19 (194, 14)</td>
</tr>
<tr>
<td>Brake Actuator Bracket Assembly</td>
<td>15.2 (155, 11)</td>
</tr>
<tr>
<td>Brake Actuator Bolt Holder</td>
<td>14 (144, 10)*</td>
</tr>
</tbody>
</table>

* For use with SST
ON-VEHICLE INSPECTION

1. CONNECT INTELLIGENT TESTER
   (a) Connect the intelligent tester to the DLC3.
   (b) Start the engine and idle it.
   (c) Select the Active Test mode on the intelligent tester.
      HINT:
      Please refer to the intelligent tester operator's manual for further details.

2. CHECK ACTUATOR MOTOR OPERATION
   NOTICE:
   Do not keep a motor relay ON for more than 5 seconds. When operating it consecutively, wait 20 seconds between each operation.
   (a) Turn the motor relay ON and check the actuator motor operation noise.
   (b) Turn the motor relay OFF.
   (c) Fully depress the brake pedal and hold it for approximately 15 seconds. Check that the pedal's initial depth is maintained for the entire 15 seconds.
   (d) Turn the motor relay ON and check that the pedal does not pulsate.
   (e) Turn the motor relay OFF and release the pedal.

3. CHECK BRAKE ACTUATOR SOLENOID (for Front Right Wheel)
   NOTICE:
   - Be sure to follow the procedures below when turning ON a solenoid.
   - Do not keep a solenoid ON for more than 10 seconds. When operating it consecutively, wait 20 seconds between each operation.
   - Do not keep a motor relay ON for more than 5 seconds. When operating it consecutively, wait 20 seconds between each operation.
   (a) With the pedal depressed as much as possible, perform the following operations.
      (1) Turn the SFRH and SFRR solenoids ON simultaneously, and check that the pedal cannot be depressed further.
      (2) Turn the SFRH and SFRR solenoids OFF simultaneously, and check that the pedal can be depressed further.
      (3) Turn the motor relay ON. Check that the pedal returns to the "depressed as much as possible" position.
   (b) Turn the motor relay OFF and release the pedal.

4. CHECK BRAKE ACTUATOR SOLENOID (for Front Left Wheel)
   (a) Use the same procedures described for the front right wheel to check the solenoids of the front left wheel.
      HINT:
      Front left wheel: SFLH, SFLR
5. CHECK BRAKE ACTUATOR SOLENOID (for Rear Right Wheel)
   (a) Use the same procedures described for the front right wheel to check the solenoids of the rear right wheel. 
       HINT: 
       Rear right wheel: SRRH, SRRR

6. CHECK BRAKE ACTUATOR SOLENOID (for Rear Left Wheel)
   (a) Use the same procedures described for the front right wheel to check the solenoids of the rear left wheel. 
       HINT: 
       Rear left wheel: SRLH, SRLR

7. CHECK AND CLEAR DTC
   (a) Check and clear the DTC (see page BC-47).
REMOVAL
(2005/11-2006/01)

1.  DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.

2.  REMOVE AIR CLEANER CASE SUB-ASSEMBLY
   (a) Remove the air cleaner case (see page EM-98).
   HINT:
   Refer to the procedures from the removal of the purge VSV up until the removal of the air cleaner case.

3.  DRAIN BRAKE FLUID
   NOTICE:
   Wash off brake fluid immediately if it comes in contact with any painted surface.

4.  DISCONNECT BRAKE LINES
   (a) Using SST, disconnect the 6 brake lines from the actuator.
       SST  09023-00101
   (b) Place tags or marks to identify the installation locations of each brake line.
5. REMOVE ABS AND TRACTION ACTUATOR ASSEMBLY WITH BRACKET

(a) Pull the lock lever upward and disconnect the connector.

(b) Disconnect the brake tube clamp from the bracket.

(c) Remove the 3 nuts and actuator with bracket.

**NOTICE:**
Be careful not to damage the brake tubes.
TC and CG Terminal Circuit

**DESCRIPTION**
Connecting terminals TC and CG of the DLC3 causes the skid control ECU to display 2-digit DTCs by flashing the ABS warning light.

**WIRING DIAGRAM**

**INSPECTION PROCEDURE**

**1 CHECK DLC3 (TC VOLTAGE)**

(a) Turn the ignition switch ON.
(b) Measure the voltage of the DLC3.

**Standard voltage**

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>E13-13 (TC) - Body ground</td>
<td>10 to 14 V</td>
</tr>
</tbody>
</table>

NG Go to step 3

OK
2 CHECK CAN COMMUNICATION SYSTEM

(a) Check the DTC (see page CA-34).

<table>
<thead>
<tr>
<th>Result</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC is not output</td>
<td>A</td>
</tr>
<tr>
<td>DTC is output</td>
<td>B</td>
</tr>
</tbody>
</table>

B REPAIR CIRCUIT INDICATED BY OUTPUT DTC

A

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY

3 CHECK WIRE HARNESS (DLC3 - ECM AND BODY GROUND)

(a) Turn the ignition switch OFF.
(b) Disconnect the A12 ECM connector.
(c) Measure the resistance of the wire harness side connectors.

**Standard resistance**

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>E13-13 (TC) - A9-27 (TC)</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>A9-27 (TC) - Body ground</td>
<td>10 kΩ or higher</td>
</tr>
</tbody>
</table>

NG REPAIR OR REPLACE HARNESS AND CONNECTOR

OK
4 CHECK WIRE HARNESS (DLC3 - BODY GROUND)

(a) Measure the resistance of the DLC3.

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>E13-4 (CG) - Body ground</td>
<td>Below 1 Ω</td>
</tr>
</tbody>
</table>

NG REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

5 CHECK CAN COMMUNICATION SYSTEM

(a) Check if the CAN communication DTC is output (see page CA-34).

<table>
<thead>
<tr>
<th>Result</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTC is not output</td>
<td>A</td>
</tr>
<tr>
<td>DTC is output</td>
<td>B</td>
</tr>
</tbody>
</table>

B REPAIR CIRCUIT INDICATED BY OUTPUT DTC

A

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY
**DESCRIPTION**
If the vehicle is stationary during sensor check mode, speed sensor malfunctions cannot be detected. The vehicle must be driven for speed sensor malfunctions to be detected.

**HINT:**
Change to sensor check mode by connecting terminals TC and CG of the DLC3, and turning the ignition switch from OFF to ON.

**WIRING DIAGRAM**
INSPECTION PROCEDURE

1 CHECK WIRE HARNESS (DLC3 - SKID CONTROL ECU AND BODY GROUND)

(a) Disconnect the A27 ECU connector.
(b) Measure the resistance of the wire harness side connectors.

Standard resistance

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>E13-4 (CG) - Body ground</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>E13-12 (TS) - A19-15 (TS)</td>
<td>Below 1 Ω</td>
</tr>
<tr>
<td>A19-15 (TS) - Body ground</td>
<td>10 kΩ or higher</td>
</tr>
</tbody>
</table>

NG REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY
REMOVAL

(2006/01-

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.

2. REMOVE AIR CLEANER CASE SUB-ASSEMBLY (for 2AZ-FE)
   (a) Remove the air cleaner case (see page EM-98).
       HINT:
       Refer to the procedures from the removal of the purge VSV up until the removal of the air cleaner case.

3. REMOVE AIR CLEANER CASE (for 2GR-FE)
   (a) Remove the air cleaner case (see page EM-21).
       HINT:
       Refer to the procedures from the removal of the air cleaner cap sub-assembly up until the removal of the air cleaner case.

4. DRAIN BRAKE FLUID
   NOTICE:
   Wash off brake fluid immediately if it comes in contact with any painted surface.

5. DISCONNECT BRAKE LINES
   (a) Using SST, disconnect the 6 brake lines from the actuator.
       SST 09023-00101
6. REMOVE ABS AND TRACTION ACTUATOR ASSEMBLY WITH BRACKET

(a) Pull the lock lever upward and disconnect the connector.

(b) Disconnect the brake tube clamp from the bracket.

(c) Remove the 3 nuts and actuator with bracket.

**NOTICE:**
Be careful not to damage the brake tubes.
DISASSEMBLY

1. REMOVE ABS AND TRACTION ACTUATOR ASSEMBLY
   (a) Remove the 2 nuts and actuator from the bracket.

2. REMOVE BRAKE ACTUATOR BOLT HOLDER
   (a) Remove the 2 bolt holders from the actuator.

3. REMOVE BRAKE ACTUATOR BOLT CUSHION
   (a) Remove the 3 cushions from the actuator.
REASSEMBLY

1. INSTALL BRAKE ACTUATOR BOLT CUSHION
   (a) Install the 3 cushions to the actuator.

2. INSTALL BRAKE ACTUATOR BOLT HOLDER
   (a) Install the 2 bolt holders to the actuator.

3. INSTALL ABS AND TRACTION ACTUATOR ASSEMBLY

   NOTICE:
   Do not remove the hole plug before connecting the brake tube. New actuators are filled with brake fluid.
   (a) Set the actuator on the bracket.

   NOTICE:
   • Insert the cushion to the pin of the bracket securely.

   • The clearance between the bolt holder and bracket is less than 1.0 mm (0.039 in.).
   • The projection should be set as shown in the illustration.
(b) Install the 2 nuts to assemble the actuator and bracket.
   Torque: 5.4 N\(\cdot\)m (55 kgf\(\cdot\)cm, 48 in\(\cdot\)lb)
INSTALLATION
(2005/11-2006/01)
1. INSTALL ABS AND TRACTION ACTUATOR ASSEMBLY WITH BRACKET

NOTICE:
Do not remove the hole plug before connecting the brake tube. New actuators are filled with brake fluid.

(a) Install the actuator with bracket with the 3 nuts. Torque: 19 N*m (194 kgf*cm, 14 ft.*lb)
HINT:
The nuts should be tightened in order from 1 to 3 as shown in the illustration.
NOTICE:
Be careful not to damage the brake tubes.

(b) Connect the brake tube clamp to the bracket.

(c) Connect the connector and push the lock lever downward.
2. CONNECT BRAKE LINES
   (a) Using SST, connect the 6 brake lines to the correct locations on the actuator, as shown in the illustration.
   SST 09023-00101
   Torque: 15.2 N*m (155 kgf*cm, 11 ft.*lbf) without SST
   14 N*m (144 kgf*cm, 10 ft.*lbf) with SST
   HINT:
   Use a torque wrench with a fulcrum length of 30 cm (11.81 in.).

3. FILL RESERVOIR WITH BRAKE FLUID (See page BR-6)

4. BLEED AIR FROM BRAKE MASTER CYLINDER (See page BR-7)

5. BLEED AIR FROM BRAKE LINE (See page BR-7)

6. BLEED AIR FROM ABS AND TRACTION ACTUATOR ASSEMBLY (See page BR-8)

7. CHECK BRAKE FLUID LEVEL IN RESERVOIR (See page BR-6)

8. CHECK FOR BRAKE FLUID LEAKAGE

9. INSTALL AIR CLEANER CASE SUB-ASSEMBLY
   (a) Install the air cleaner case (see page EM-105).
   HINT:
   Refer to the procedures from the installation of the air cleaner case up until the installation of the purge VSV.

10. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

11. CHECK ABS AND TRACTION ACTUATOR ASSEMBLY WITH INTELLIGENT TESTER
   (a) Check the ABS and traction actuator with the intelligent tester (see page BC-180).
FRONT SPEED SENSOR

COMPONENTS

FRONT FENDER LINER LH

Front Speed Sensor LH

N*m (kgf*cm, ft.*lbf) - Specified torque
REMOVAL

HINT:
• Use the same procedures for the LH side and RH side.
• The procedures listed below are for the LH side.

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.

2. REMOVE FRONT WHEEL

3. REMOVE FRONT FENDER LINER LH

4. REMOVE FRONT SPEED SENSOR LH
   (a) Disconnect the sensor connector.
(b) Remove the sensor clip (labeled A), bolt (labeled B) and sensor clamp (labeled C).
(c) Remove the sensor clip (labeled D), bolt (labeled E) and sensor clamp (labeled F).
(d) Remove the bolt and sensor body from the knuckle.

**NOTICE:**
Keep the sensor tip and sensor installation hole free from foreign matter.
INSTALLATION

(2006/01-)

1. INSTALL ABS AND TRACTION ACTUATOR ASSEMBLY WITH BRACKET

NOTICE:
Do not remove the hole plug before connecting the brake tube. New actuators are filled with brake fluid.

(a) Install the actuator with bracket with the 3 nuts.
Torque: 19 N*m (194 kgf*cm, 14 ft.*lbf)
HINT:
The nuts should be tightened in order from 1 to 3 as shown in the illustration.
NOTICE:
Be careful not to damage the brake tubes.

(b) Connect the brake tube clamp to the bracket.

(c) Connect the connector and push the lock lever downward.
2. CONNECT BRAKE LINES  
   (a) Using SST, connect the 6 brake lines to the correct locations on the actuator, as shown in the illustration.  
   SST  09023-00101  
   Torque: 15.2 N·m (155 kgf·cm, 11 ft·lbf) without SST  
   14 N·m (144 kgf·cm, 10 ft·lbf) with SST  
   HINT:  
   Use a torque wrench with a fulcrum length of 30 cm (11.81 in.).

3. FILL RESERVOIR WITH BRAKE FLUID (See page BR-6)  

4. BLEED AIR FROM BRAKE MASTER CYLINDER (See page BR-7)  

5. BLEED AIR FROM BRAKE LINE (See page BR-7)  

6. BLEED AIR FROM ABS AND TRACTION ACTUATOR ASSEMBLY (See page BR-8)  

7. CHECK BRAKE FLUID LEVEL IN RESERVOIR (See page BR-6)  

8. CHECK FOR BRAKE FLUID LEAKAGE  

9. INSTALL AIR CLEANER CASE SUB-ASSEMBLY (for 2AZ-FE)  
   (a) Install the air cleaner case (see page EM-105).  
   HINT:  
   Refer to the procedures from the installation of the air cleaner case up until the installation of the purge VSV.  

10. INSTALL AIR CLEANER CASE (for 2GR-FE)  
   (a) Install the air cleaner case (see page EM-31).  
   HINT:  
   Refer to the procedures from the installation of the air cleaner case up until the installation of the air cleaner cap sub-assembly.  

11. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL  

12. CHECK ABS AND TRACTION ACTUATOR ASSEMBLY WITH INTELLIGENT TESTER  
   (a) Check the ABS and traction actuator with the intelligent tester (see page BC-180).
INSPECTION

1. INSPECT FRONT SPEED SENSOR
   (a) Check the speed sensor. If any of the following occurs, replace the speed sensor with a new one.
   • The surface of the speed sensor is cracked, dented, or chipped.
   • The connector or wire harness is scratched, cracked, or damaged.
   • The speed sensor has been dropped.
INSTALLATION

HINT:
• Use the same procedures for the LH side and RH side.
• The procedures listed below are for the LH side.

1. INSTALL SPEED SENSOR FRONT LH

NOTICE:
To prevent interference with other parts, do not twist the sensor wire's painted line areas when installing it.

(a) Set the sensor body to the knuckle, and then install the sensor with the bolt.
Torque: 8.5 N*m (87 kgf*cm, 75 in.*lbf)

NOTICE:
• Keep the sensor tip and sensor installation hole free from foreign matter.
• Firmly insert the sensor body into the knuckle before tightening the bolt.
• After installing the sensor to the knuckle, make sure that there is no clearance between the sensor stay and knuckle. Also make sure that no foreign matter is stuck between the parts.
• To prevent interference between the sensor and magnetic rotor, do not rotate the sensor body during or after the insertion of the sensor body to the knuckle.
(b) Install the sensor clamp and sensor clip as follows.

1. Set the flexible hose clamp on the flexible hose bracket.
2. Simultaneously perform the following: 1) hang the hook part of the sensor clamp (labeled A) on the flexible hose bracket (labeled C); and 2) insert the hook part of the sensor clamp (labeled B) into the flexible hose bracket (labeled D).
   
   **NOTICE:**
   Do not twist the sensor wire when installing the clamp.

3. Tighten together the sensor clamp, flexible hose clamp and flexible hose bracket with the bolt (labeled E).
   
   **Torque:** 18.5 N*m (189 kgf*cm, 14 ft.*lbf)

4. Insert the sensor clip (labeled F) into the hole on the absorber lower bracket.
(c) Install the sensor clamp, and sensor clip as follows.
(1) Set the sensor clamp (labeled G) on the side member, and then tighten it with the bolt (labeled H).
   Torque: 8.5 N*m (87 kgf*cm, 75 in.*lbf)
   NOTICE: Do not twist the sensor wire when installing the clamp.
(2) Insert the sensor clip (labeled I) into the hole on the apron.

(d) Connect the sensor connector.
2. **INSTALL FRONT FENDER LINER LH**
   **HINT:**
   Install the fender liner so that the sensor wire harness passes beyond the fender liner installation clip towards the rear side of the vehicle.

3. **INSTALL FRONT WHEEL**
   Torque: 103 N\*m (1,050 kgf\*cm, 76 ft.\*lb)

4. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**

5. **CHECK ABS SPEED SENSOR SIGNAL**
   (a) Check the speed sensor signal (see page BC-28).
SKID CONTROL SENSOR (for 2WD)

COMPONENTS

- REAR AXLE HUB AND BEARING ASSEMBLY LH
- REAR DISC BRAKE CYLINDER MOUNTING LH
- SKID CONTROL SENSOR LH
- REAR DISC BRAKE CYLINDER MOUNTING LH
- SKID CONTROL SENSOR WIRE

Specified torque:
- 88 (897, 65) N*m (kgf*cm, ft.lbf)
- 5.0 (51, 44 in.*lbf)
- 8.5 (87, 75 in.*lbf)

N*m (kgf*cm, ft.*lbf) : Specified torque
REMOVAL

HINT:
• Use the same procedures for the LH side and RH side.
• The procedures listed below are for the LH side.

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.

2. REMOVE REAR WHEEL

3. REMOVE DECK TRIM SIDE PANEL ASSEMBLY LH
   (a) Remove the deck trim side panel LH (see page IR-26).
   HINT:
   Refer to the procedures from the removal of the rear door scuff plate LH up until the removal of the deck trim side panel LH.

4. REMOVE SKID CONTROL SENSOR WIRE
   (a) Disconnect the skid control sensor wire connector.

   (b) Disconnect the grommet of the skid control sensor wire from the hole of the wheel house.
(c) Remove the bolt (labeled A) and sensor clamp (labeled B) from the side member.
(d) Remove the 2 nuts (labeled C) and sensor clamps (labeled D) from the upper arm.

(e) Remove the bolt (labeled E) and sensor clamp (labeled F) from the carrier.
(f) Disconnect the skid control sensor wire connector (labeled G) from the speed sensor.

5. REMOVE REAR DISC BRAKE CYLINDER MOUNTING LH (See page BR-55)

6. REMOVE REAR DISC (See page BR-57)

7. REMOVE REAR AXLE HUB AND BEARING ASSEMBLY LH
   (a) Remove the rear axle hub and bearing LH (see page AH-16).

8. REMOVE SKID CONTROL SENSOR LH
   (a) Mount the front axle hub in a soft jaw vise.
   NOTICE:
   Replace the hub and bearing if it is dropped or receives a strong shock.
   (b) Using a pin punch and hammer, tap out the 2 pins and remove the 2 attachments from SST.
(c) Using SST and the 2 bolts (diameter: 12 mm; pitch: 1.5 mm), remove the skid control sensor from the hub and bearing.

**SST** 09520-00031 (09520-00040), 09521-00020, 09950-00020

**NOTICE:**
- If the sensor rotor is damaged, replace the axle hub.
- Do not scratch the contacting surface of the hub and bearing and skid control sensor.
INSPECTION

1. INSPECT SKID CONTROL SENSOR
   (a) Check the speed sensor. If any of the following occurs, replace the speed sensor with a new one.
      • The surface of the speed sensor is cracked, dented, or chipped.
      • The speed sensor has been dropped.

2. INSPECT SKID CONTROL SENSOR WIRE
   (a) Check the sensor wire. If any of the following occurs, replace the sensor wire with a new one.
      The connector or wire harness is scratched, cracked, or damaged.
INSTALLATION

HINT:
• Use the same procedures for the LH side and RH side.
• The procedures listed below are for the LH side.

1. INSTALL SKID CONTROL SENSOR LH
   (a) Clean the contact surfaces of the axle hub and speed sensor.
   NOTICE:
   Make sure the sensor rotor is clean.
   (b) Place the speed sensor on the axle hub so that the connector position is as high as possible when the axle hub is installed to the vehicle.
   (c) Using SST and a press, press the speed sensor into the hub and bearing.
   SST 09214-76011
   NOTICE:
   • Do not tap the speed sensor directly with a hammer.
   • Check that the speed sensor detection part is clean.
   • Press in the speed sensor straight and slowly.

2. INSTALL REAR AXLE HUB AND BEARING ASSEMBLY LH
   (a) Install the rear axle hub and bearing LH (see page AH-18).

3. INSTALL REAR DISC (See page BR-58)

4. INSTALL REAR DISC BRAKE CYLINDER MOUNTING LH (See page BR-60)

5. INSTALL SKID CONTROL SENSOR WIRE
   NOTICE:
   To prevent interference with other parts, do not twist the sensor wire’s painted line areas when installing it.
(a) Connect the skid control sensor wire connector (labeled A) to the speed sensor.
(b) Install the sensor clamp (labeled B) with the bolt (labeled C).
   **Torque: 8.5 N\*m (87 kgf\*cm, 75 in.\*lbf)**
   **NOTICE:**
   Do not twist the sensor wire when installing the clamp.

(c) Install the 2 sensor clamps (labeled D) with the 2 nuts (labeled E).
   **Torque: 5.0 N\*m (51 kgf\*cm, 44 in.\*lbf)**
   **NOTICE:**
   Do not twist the sensor wire when installing the clamps.

(d) Install the sensor clamp (labeled F) with the bolt (labeled G).
   **Torque: 8.5 N\*m (87 kgf\*cm, 75 in.\*lbf)**
   **NOTICE:**
   Do not twist the sensor wire when installing the clamp.
(e) Insert the connector and grommet to the inside of the vehicle through the hole in the wheel house.

**NOTICE:**
Make sure the grommet's band clamp remains on the outside of the vehicle.

(f) Hold the grommet and pull it from the inside of the vehicle to the outside of the vehicle. Then fix it in place so that it is not tilted.

**NOTICE:**
- When pulling out the grommet, do not grip the sensor wire.
- Fix the grommet in place within the range shown in the illustration.

(g) Connect the skid control sensor wire connector.

6. **INSTALL DECK TRIM SIDE PANEL ASSEMBLY LH**
   (a) Install the deck trim side panel LH (see page IR-49).

   **HINT:**
   Refer to the procedures from the installation of the deck trim side panel LH up until the installation of the rear door scuff plate LH.

7. **INSTALL REAR WHEEL**
   Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)
8. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

9. CHECK SPEED SENSOR SIGNAL
   (a) Check the speed sensor signal (see page BC-28).
REAR SPEED SENSOR (for 4WD)

COMPONENTS

N*m (kgf*cm, ft.*lbf) : Specified torque
REMOVAL

HINT:
• Use the same procedures for the LH side and RH side.
• The procedures listed below are for the LH side.

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.

2. REMOVE REAR WHEEL

3. REMOVE DECK TRIM SIDE PANEL ASSEMBLY LH
   (a) Remove the deck trim side panel LH (see page IR-26).
   HINT:
   Refer to the procedures from the removal of the rear door scuff plate LH up until the removal of the deck trim side panel assembly LH.

4. REMOVE REAR SPEED SENSOR LH
   (a) Disconnect the speed sensor connector.
   (b) Disconnect the grommet of the speed sensor wire from the hole of the wheel house.
(c) Remove the bolt (labeled A) and sensor clamp (labeled B) from the side member.
(d) Remove the 2 nuts (labeled C) and sensor clamps (labeled D) from the upper arm.

(e) Remove the nut (labeled E) and sensor clamp (labeled F) from the trailing arm.
(f) Remove the bolt (labeled G) and sensor body (labeled H) from the carrier.

**NOTICE:**
Keep the sensor tip and sensor installation hole free from foreign matter.
INSPECTION

1. INSPECT REAR SPEED SENSOR
   (a) Check the speed sensor. If any of the following occurs, replace the speed sensor with a new one.
   • The surface of the speed sensor is cracked, dented, or chipped off.
   • The connector or wire harness is scratched, cracked, or damaged.
   • The speed sensor has been dropped.
INSTALLATION

HINT:
• Use the same procedures for the LH side and RH side.
• The procedures listed below are for the LH side.

1. **INSTALL REAR SPEED SENSOR LH**

**NOTICE:**
To prevent interference with other parts, do not twist the sensor wire's painted line areas when installing it.

(a) Install the sensor (labeled A) with the bolt (labeled B).
Torque: 8.5 N•m (87 kgf•cm, 75 in.•lbf)
**NOTICE:**
• Keep the sensor tip and sensor installation hole free from foreign matter.
• To prevent interference with the bearing rotor, do not rotate the sensor body when inserting the sensor body or after inserting the sensor body.

(b) Install the sensor clamp (labeled C) with the nut (labeled D).
Torque: 5.0 N•m (51 kgf•cm, 44 in.•lbf)

(c) Install the sensor clamps (labeled E) with the 2 nuts (labeled F).
Torque: 5.0 N•m (51 kgf•cm, 44 in.•lbf)
**NOTICE:**
Do not twist the sensor wire when installing the clamps.

(d) Install the sensor clamp (labeled G) with the bolt (labeled H).
Torque: 8.5 N•m (87 kgf•cm, 75 in.•lbf)
**NOTICE:**
Do not twist the sensor wire when installing the clamp.
(e) Insert the connector and grommet to the inside of the vehicle through the passage hole in the wheel house.

**NOTICE:**
Make sure the grommet's band clamp remains on the outside of the vehicle.

(f) Hold the grommet and pull it from the inside of the vehicle to the outside of the vehicle. Then fix it in place so that it is not tilted.

**NOTICE:**
- When pulling out the grommet, do not grip the sensor wire.
- Fix the grommet in place within the range shown in the illustration.

(g) Connect the speed sensor connector.

2. **INSTALL DECK TRIM SIDE PANEL ASSEMBLY LH**
   (a) Install the deck trim side panel LH (see page IR-49).
   **HINT:**
   Refer to the procedures from the installation of the deck trim side panel LH up until the installation of the rear door scuff plate LH.

3. **INSTALL REAR WHEEL**
   Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)
4. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**

5. **CHECK SPEED SENSOR SIGNAL**
   (a) Check the speed sensor signal (see page BC-28).
YAW RATE AND DECELERATION SENSOR

COMPONENTS

FRONT SEAT ASSEMBLY LH

FRONT DOOR SCUFF PLATE LH

YAW RATE SENSOR ASSEMBLY

YAW RATE SENSOR BRACKET

Specified torque N·m (kgf·cm, ft·lbf)

14.5 (148, 11)

37 (377, 27)

N·m (kgf·cm, ft·lbf) : Specified torque
REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.

2. REMOVE FRONT SEAT ASSEMBLY LH
   (a) for Manual Seat:
       Remove the front seat LH (see page SE-11).
   (b) for Power Seat:
       Remove the front seat LH (see page SE-27).

3. REMOVE FRONT DOOR SCUFF PLATE LH (See page IR-26)

4. REMOVE YAW RATE SENSOR BRACKET
   (a) Remove the bolt and yaw rate sensor bracket.

5. REMOVE YAW RATE SENSOR ASSEMBLY
   (a) Disconnect the yaw rate sensor connector.
   (b) Remove the 2 bolts and yaw rate sensor.
   NOTICE:
   Do not remove the sensor from the bracket.
INSPECTION

1. INSPECT YAW RATE SENSOR
   (a) Inspect the yaw rate sensor. If any of the following occurs, replace the yaw rate sensor with a new one.
      • The surface of the sensor is cracked, dented, or chipped.
      • The connector or wire harness is scratched, cracked, or damaged.
      • The sensor has been dropped.

INSTALLATION

1. INSTALL YAW RATE SENSOR ASSEMBLY
   (a) Install the yaw rate sensor with the 2 bolts.
      Torque: 14.5 N\(\times\)m (148 kgf\(\times\)cm, 11 ft.\(\times\)lbf)
      NOTICE:
      • Do not damage the yaw rate sensor.
      • Make sure that the yaw rate sensor is installed securely.
   (b) Connect the yaw rate sensor connector.

2. INSTALL YAW RATE SENSOR BRACKET
   (a) Install the bracket with the bolt.
      Torque: 14.5 N\(\times\)m (148 kgf\(\times\)cm, 11 ft.\(\times\)lbf)

3. INSTALL FRONT DOOR SCUFF PLATE LH (See page IR-59)

4. INSTALL FRONT SEAT ASSEMBLY LH
   (a) for Manual Seat:
      Install the front seat (see page SE-22).
   (b) for Power Seat:
      Install the front seat (see page SE-37).

5. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

6. PERFORM ZERO POINT CALIBRATION OF YAW RATE AND DECELERATION SENSOR
   (a) Perform the yaw rate and deceleration sensor zero point calibration (see page BC-24).

7. INSPECT YAW RATE SENSOR SIGNAL
   (a) Inspect the yaw rate sensor signal (see page BC-28).
STEERING ANGLE SENSOR

COMPONENTS

- STEERING COLUMN COVER
- SPIRAL CABLE SUB-ASSEMBLY
- STEERING PAD ASSEMBLY
- STEERING WHEEL ASSEMBLY

N*°m (kgf*cm, ft.*lb) : Specified torque

w/ Steering Pad Switch
REMOVAL

1. PRECAUTION
   CAUTION:
   Be sure to read the "PRECAUTION" thoroughly before servicing (see page RS-1).

2. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.

3. PLACE FRONT WHEELS FACING STRAIGHT AHEAD

4. REMOVE STEERING PAD ASSEMBLY (See page RS-336)

5. REMOVE STEERING WHEEL ASSEMBLY (See page SR-12)

6. REMOVE STEERING COLUMN COVER (See page SR-12)

7. REMOVE SPIRAL CABLE SUB-ASSEMBLY (See page SR-13)

8. REMOVE STEERING ANGLE SENSOR
   (a) Detach the 6 claws and remove the sensor from the spiral cable.
INSPECTION
1. INSPECT STEERING ANGLE SENSOR
   (a) Inspect the sensor. If any of the following occurs, replace the sensor with a new one:
      • The surface of the sensor is cracked, dented, or chipped.
      • The connector or wire harness is scratched, cracked, or damaged.
      • The sensor has been dropped.

INSTALLATION
1. INSTALL STEERING ANGLE SENSOR
   (a) Align the locating pins, attach the 6 claws and install the sensor to the spiral cable.

2. INSTALL SPIRAL CABLE SUB-ASSEMBLY (See page SR-20)

3. INSTALL STEERING COLUMN COVER (See page SR-20)

4. INSTALL STEERING WHEEL ASSEMBLY (See page SR-21)

5. INSTALL STEERING PAD ASSEMBLY (See page RS-336)

6. INSPECT STEERING WHEEL CENTER POINT

7. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL
   NOTICE:
   When reconnecting the cable to the negative (-) battery terminal after installing the steering angle sensor, check that the front tires and steering wheel are kept aligned straight ahead before and after connecting the cable to the negative (-) battery terminal.

8. INSPECT STEERING PAD ASSEMBLY (See page RS-337)

9. CHECK SRS WARNING LIGHT
   (a) Check the SRS warning light (see page RS-37).
BRAKE PEDAL LOAD SENSING SWITCH

ON-VEHICLE INSPECTION

1. INSPECT BRAKE PEDAL LOAD SENSING SWITCH

HINT:
- Do not remove the brake pedal load sensing switch from the brake pedal support.
- When there is a malfunction in the brake pedal load sensing switch, replace the brake pedal support.

(a) Disconnect the brake pedal load sensing switch connector.

(b) Measure the resistance of the switch.

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Condition</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 2</td>
<td>Brake pedal depressed</td>
<td>Approx. 1 kΩ</td>
</tr>
<tr>
<td>1 - 2</td>
<td>Brake pedal released</td>
<td>Approx. 213 Ω</td>
</tr>
</tbody>
</table>

If the value is not as specified, replace the brake pedal support assembly (see page BR-12).
DOWNHILL ASSIST CONTROL SWITCH

COMPONENTS
REMOVAL
1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. REMOVE DOWNHILL ASSIST CONTROL SWITCH
   (a) Detach the 2 claws and remove the switch.

INSPECTION
1. CHECK DOWNHILL ASSIST CONTROL SWITCH
   (a) Measure the resistance of the switch.
   Standard resistance
<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Switch Condition</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 4</td>
<td>Released</td>
<td>10 kΩ or higher</td>
</tr>
<tr>
<td>1 - 4</td>
<td>Pushed in</td>
<td>Below 25 Ω</td>
</tr>
</tbody>
</table>
   
   If the result is not as specified, replace the switch.
   (b) Check illumination operation.
   (1) Connect the battery’s positive (+) lead to terminal 3 and negative (-) lead to terminal 2. Then check that the bulb illuminates.
   OK:
   Bulb illuminates.
   If the result is not as specified, replace the switch.

INSTALLATION
1. INSTALL DOWNHILL ASSIST CONTROL SWITCH
   (a) Attach the 2 claws to install the switch.
2. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL
TRACTION CONTROL SWITCH (for 2WD)

COMPONENTS

TRACTION CONTROL SWITCH (AUTO LSD SWITCH)
**REMOVAL**

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.

2. REMOVE TRACTION CONTROL SWITCH (AUTO LSD SWITCH)
   (a) Detach the 2 claws and remove the switch.

**INSPECTION**

1. CHECK TRACTION CONTROL SWITCH (AUTO LSD SWITCH)
   (a) Measure the resistance of the switch.
      **Standard resistance**
      | Tester Connection | Switch Condition | Specified Condition |
      |-------------------|------------------|---------------------|
      | 3 - 6             | Released         | 10 kΩ or higher     |
      | 3 - 6             | Pushed in        | Below 25 Ω          |
   
   If the result is not as specified, replace the switch.
   (b) Check illumination operation.
      (1) Connect the battery’s positive (+) lead to terminal 5 and negative (-) lead to terminal 4. Then check that the bulb illuminates.
         **OK:**
         Bulb illuminates.
         If the result is not as specified, replace the switch.

**INSTALLATION**

1. INSTALL TRACTION CONTROL SWITCH (AUTO LSD SWITCH)
   (a) Attach the 2 claws to install the switch.

2. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL