# SECTION BRC
# BRAKE CONTROL SYSTEM



## CONTENTS

### ABS

## ESP/TCS/ABS

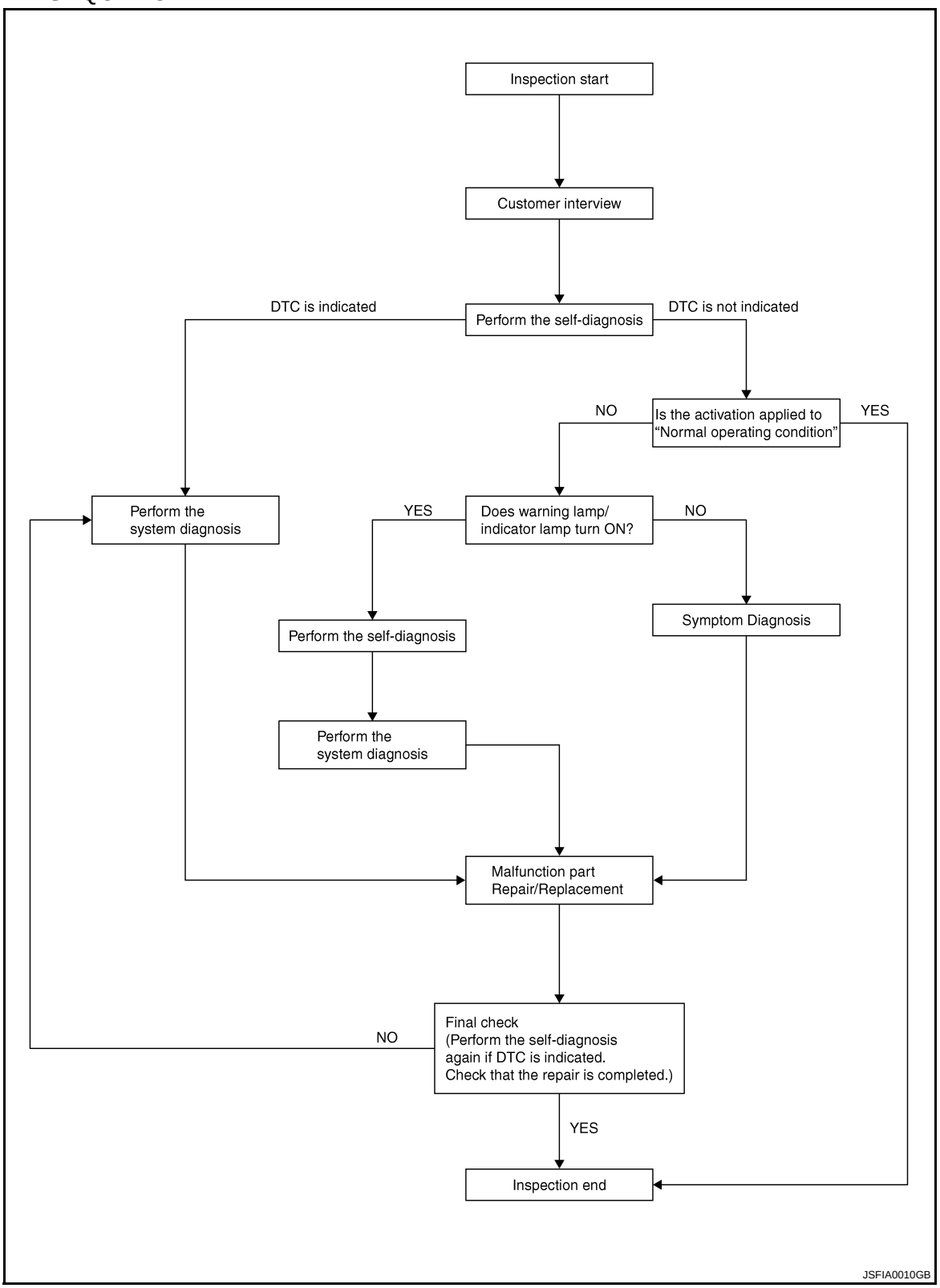
# BASIC INSPECTION

## DIAGNOSIS AND REPAIR WORKFLOW

### Work Flow

INFOID:0000000001181608

OVERALL SEQUENCE




DETAIED FLOW

## 1.COLLECT THE INFORMATION FROM THE CUSTOMER

Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using the diagnosis worksheet. Refer to BRC-8, "Diagnostic Work Sheet".

>> GO TO 2.

## 2.PERFORM THE SELF-DIAGNOSIS

Check the DTC display with the self-diagnosis function. Refer to BRC-17, "CONSULT-III Function (ABS)".

Is there any DTC displayed?

YES >> GO TO 3.
NO >> GO TO 4.

## 3.PERFORM THE SYSTEM DIAGNOSIS

Perform the diagnosis applicable to the displayed DTC. Refer to BRC-57, "DTC No. Index".

>> GO TO 7.

## 4.CHECK THE SYMPTOM THAT IS NOT CONSIDERED A SYSTEM MALFUNCTION

Check that the symptom is a normal operation that is not considered a system malfunction. Refer to BRC-63, "Description".

Is the symptom is a normal operation?

YES >> INSPECTION END
NO >> GO TO 5.

## 5.CHECK THE WARNING LAMP FOR ILLUMINATION

Check that the warning lamp illuminate.
- ABS warning lamp: Refer to BRC-49, "Description".
- Brake warning lamp: Refer to BRC-50, "Description".

Is ON/OFF timing normal?

YES >> GO TO 6.
NO >> GO TO 2.

## 6.PERFORM THE DIAGNOSIS BY SYMPTOM

Perform the diagnosis applicable to the symptom.

>> GO TO 7.

## 7.REPAIR OR REPLACE THE MALFUNCTIONING PARTS

Repair or replace the specified malfunctioning parts.

>> GO TO 8.

## 8.FINAL CHECK

Perform the self-diagnosis again, and check that the malfunction is repaired completely. After checking, erase the self-diagnosis memory. Refer to BRC-17, "CONSULT-III Function (ABS)".

Is any DTC indicated?

YES >> GO TO 3.
NO >> INSPECTION END

## Diagnostic Work Sheet

INFOID:0000000001181609

| | | | |
|---|---|---|---|
| Customer name MR/MS | Model & Year | | VIN |
| Engine # | Trans. | | Mileage |
| Incident Date | Manuf. Date | | In Service Date |
| Symptoms | ☐ Noise and vibration (from engine compartment)<br>☐ Noise and vibration (from axle) | ☐ Warning / Indicator activate | ☐ Firm pedal operation<br>Large stroke pedal operation |
| | ☐ ABS does not work (Wheels lock when braking) | ☐ Lack of sense of acceleration | |
| Engine conditions | ☐ When starting ☐ After starting | | |
| Road conditions | ☐ Low friction road ( ☐Snow ☐Gravel ☐Other )<br>☐ Bumps / potholes | | |
| Driving conditions | ☐ Full-acceleration<br>☐ High speed cornering<br>☐ Vehicle speed: Greater than 10 km/h (6 MPH)<br>☐ Vehicle speed: 10 km/h (6 MPH) or less<br>☐ Vehicle is stopped | | |
| Applying brake conditions | ☐ Suddenly<br>☐ Gradually | | |
| Other conditions | ☐ Operation of electrical equipment<br>☐ Shift change<br>☐ Other descriptions | | |

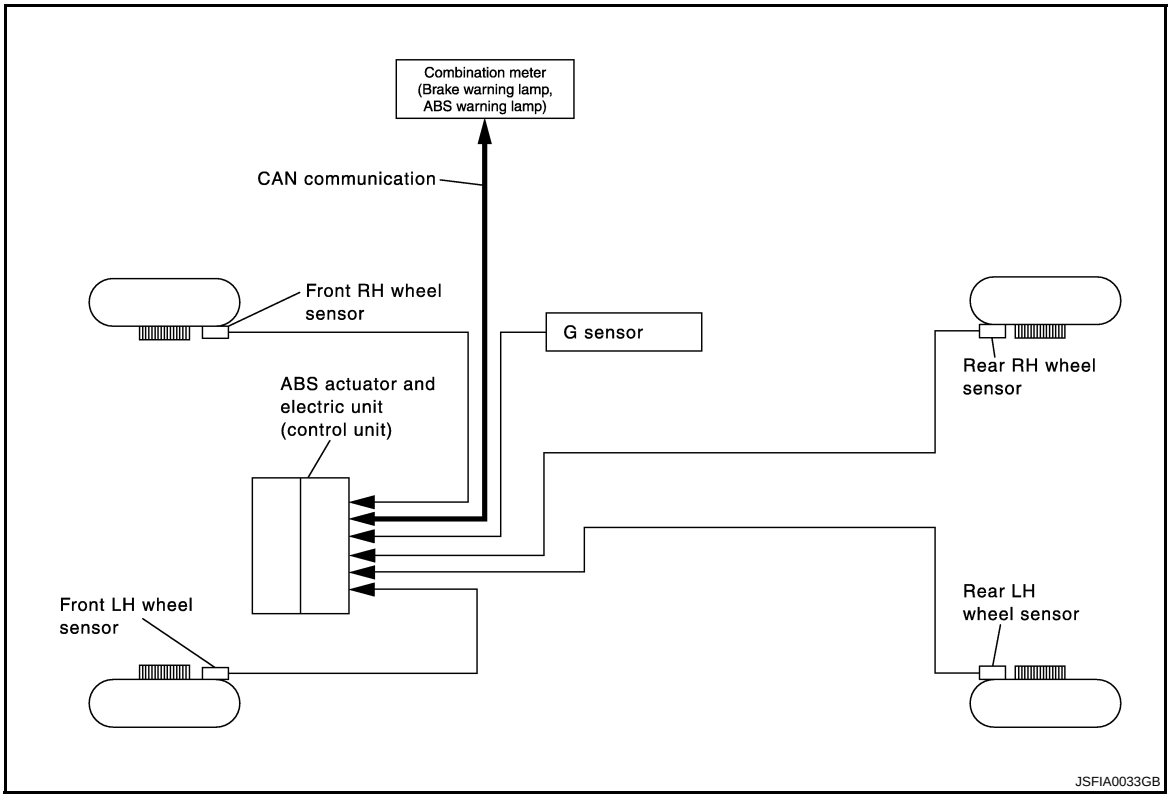
SFIA3264E

# FUNCTION DIAGNOSIS

## ABS

### System Diagram

INFOID:0000000001181610




### System Description

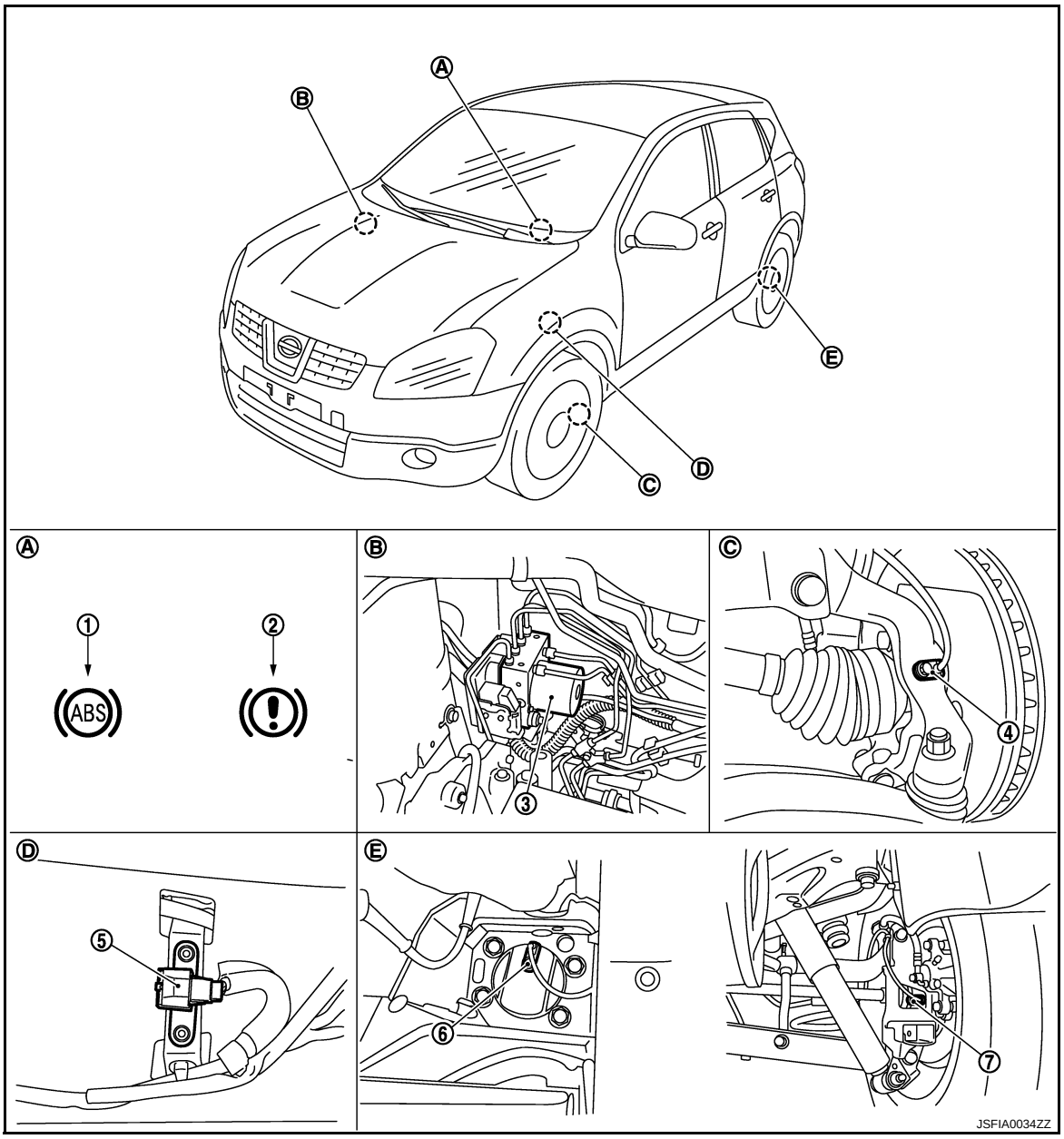
INFOID:0000000001181611

- Anti-Lock Braking System is a function that detects wheel revolution while braking, electronically controls braking force, and prevents wheel locking during sudden braking. It improves handling stability and maneuverability for avoiding obstacles.
- Electrical system diagnosis by CONSULT-III is available.

## Component Parts Location

INFOID:0000000001181612

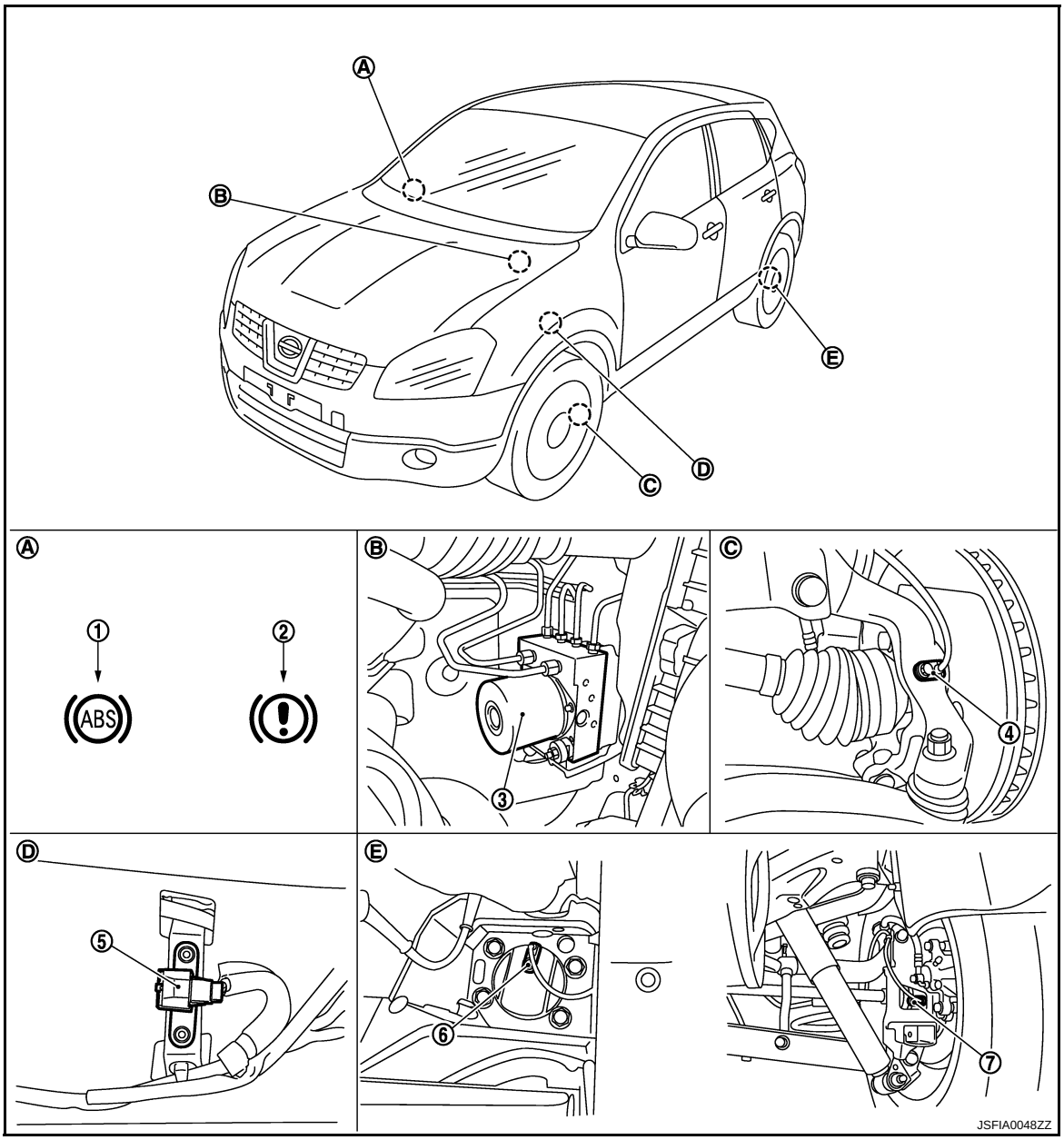
LHD models




1. ABS warning lamp
2. Brake warning lamp
3. ABS actuator and electric unit (control unit)
4. Front wheel sensor
5. G sensor
6. Rear wheel sensor (2WD models)
7. Rear wheel sensor (4WD models)

A. Combination meter
B. Engine room (right side)
C. Steering knuckle
D. Lower instrument cover RH
E. Rear axle

RHD models




1. ABS warning lamp
2. Brake warning lamp
3. ABS actuator and electric unit (control unit)
4. Front wheel sensor
5. G sensor
6. Rear wheel sensor (2WD models)
7. Rear wheel sensor (4WD models)

A. Combination meter
B. Engine room (left side)
C. Steering knuckle
D. Lower instrument cover RH
E. Rear axle

## Component Description

INFOID:0000000001181613

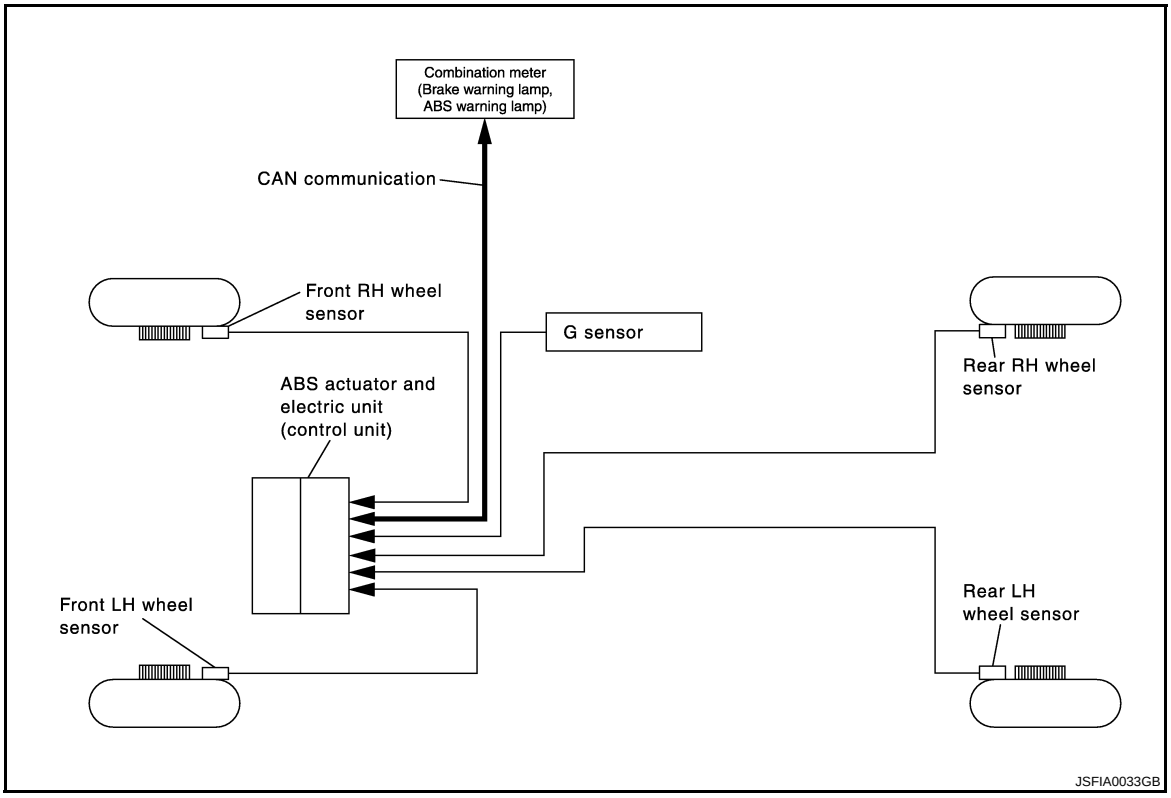
| Component parts | | Reference |
|---|---|---|
| ABS actuator and electric unit (control unit) | Pump | BRC-29, "Description" |
| | Motor | |
| | Actuator relay (Main relay) | BRC-33, "Description" |
| | Solenoid valve | BRC-40, "Description" |
| Wheel sensor | | BRC-20, "Description" |

| Component parts | Reference |
|---|---|
| ABS warning lamp | BRC-49, "Description" |
| Brake warning lamp | BRC-50, "Description" |

# EBD

## System Diagram

INFOID:0000000001181614




## System Description

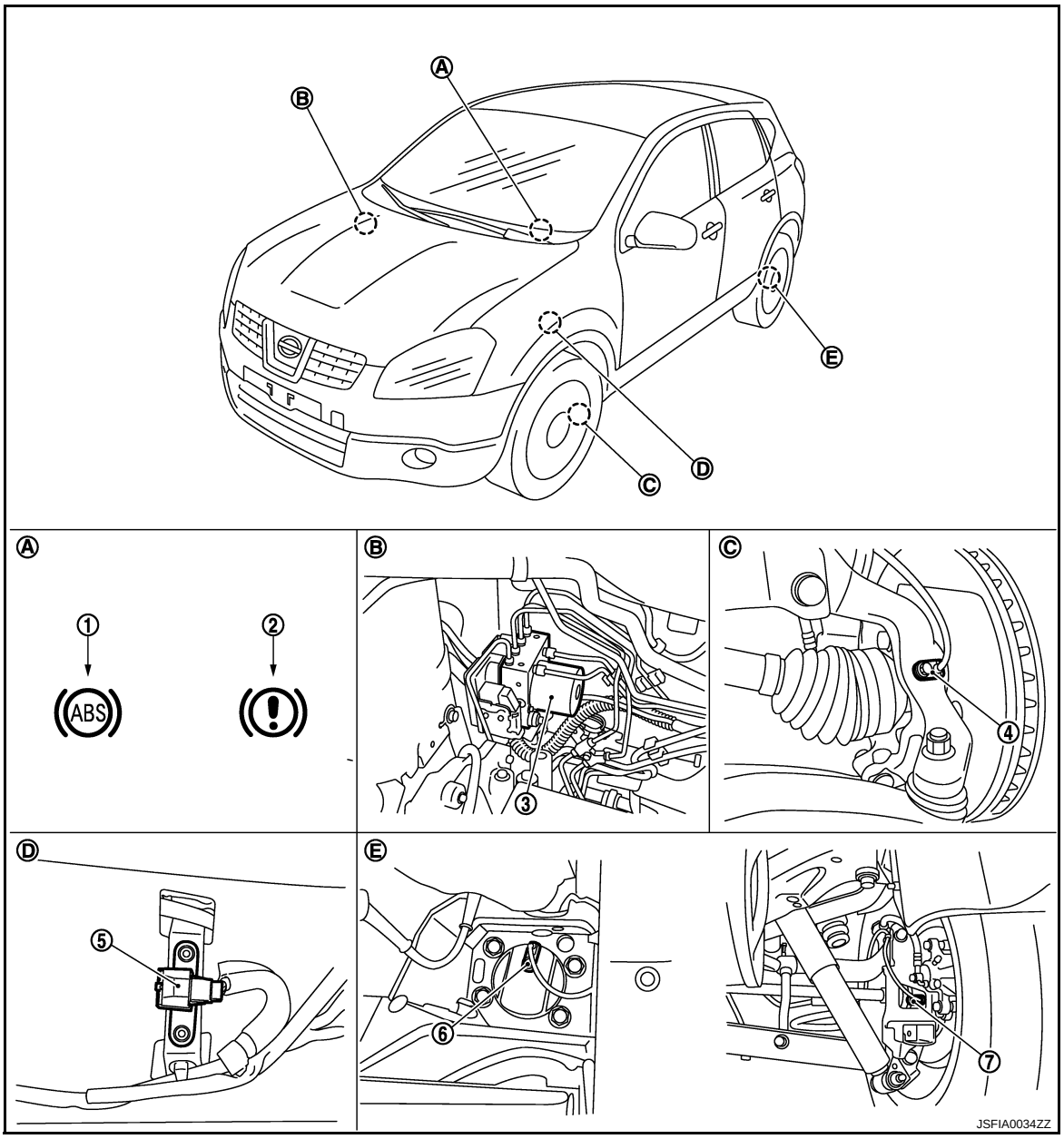
INFOID:0000000001181615

- Electric Brake force Distribution is a following function. ABS actuator and electric unit (control unit) detects subtle slippages between the front and rear wheels during braking. Then is electronically controls the rear braking force (brake fluid pressure) to reducing and reduces rear wheel slippage. Accordingly it improves vehicle stability.
- Electrical system diagnosis by CONSULT-III is available.

## Component Parts Location

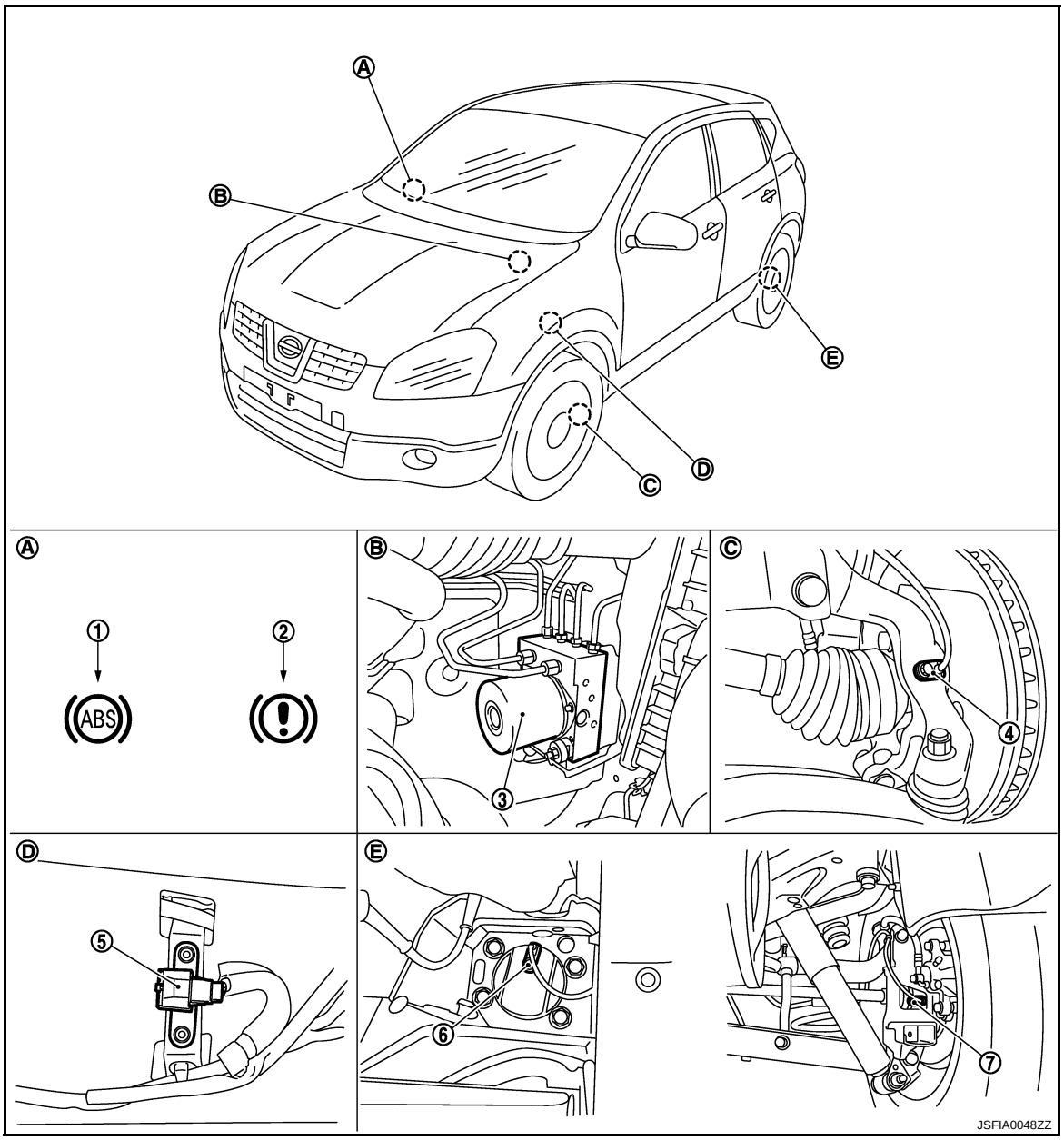
INFOID:0000000001181616

LHD models




| | | |
|---|---|---|
| 1. ABS warning lamp | 2. Brake warning lamp | 3. ABS actuator and electric unit (control unit) |
| 4. Front wheel sensor | 5. G sensor | 6. Rear wheel sensor (2WD models) |
| 7. Rear wheel sensor (4WD models) | | |
| A. Combination meter | B. Engine room (right side) | C. Steering knuckle |
| D. Lower instrument cover RH | E. Rear axle | |

RHD models




1. ABS warning lamp
2. Brake warning lamp
3. ABS actuator and electric unit (control unit)
4. Front wheel sensor
5. G sensor
6. Rear wheel sensor (2WD models)
7. Rear wheel sensor (4WD models)

A. Combination meter
B. Engine room (left side)
C. Steering knuckle
D. Lower instrument cover RH
E. Rear axle

## Component Description

INFOID:0000000001181617

| Component parts | | Reference |
|---|---|---|
| ABS actuator and electric unit (control unit) | Pump | BRC-29, "Description" |
| | Motor | |
| | Actuator relay (Main relay) | BRC-33, "Description" |
| | Solenoid valve | BRC-40, "Description" |
| Wheel sensor | | BRC-20, "Description" |

| Component parts | Reference |
|---|---|
| ABS warning lamp | BRC-49, "Description" |
| Brake warning lamp | BRC-50, "Description" |

# DIAGNOSIS SYSTEM [ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)]

## CONSULT-III Function (ABS)

INFOID:0000000001181618

### FUNCTION

CONSULT-III can display each diagnostic item using the diagnostic test modes shown following.

| Diagnostic test mode | Function |
|---|---|
| Self-diagnostic results | Self-diagnostic results can be read and erased quickly. |
| Data monitor | Input/Output data in the ABS actuator and electric unit (control unit) can be read. |
| Active test | Diagnostic test mode is which CONSULT-III drives some actuators apart from the ABS actuator and electric unit (control unit) and also shifts some parameters in a specified range. |
| ECU part number | ABS actuator and electric unit (control unit) part number can be read. |
| Function test | Performed by CONSULT-III instead of a technician to determine whether each system is “OK” or “NG”. |
| CAN diagnostic support monitor | The results of transmit/receive diagnosis of CAN communication can be read. |

### SELF-DIAG RESULTS MODE

Operation Procedure

1. Before performing the self-diagnosis, start engine and drive vehicle at 30 km/h (19 MPH) or more for approximately 1 minute.

How to Erase Self-diagnosis Results

1. After erasing DTC memory, start engine and drive vehicle at 30 km/h (19 MPH) or more for approximately 1 minute as the final inspection, and make sure that the ABS warning lamp and brake warning lamp turn OFF.
   **CAUTION:**
   **If memory cannot be erased, perform applicably diagnosis.**
   **NOTE:**
   - When the wheel sensor malfunctions, after inspecting the wheel sensor system, the ABS warning lamp and brake warning lamp will not turn OFF even when the system is normal unless the vehicle is driving at approximately 30 km/h (19 MPH) or more for approximately 1 minute.
   - Brake warning lamp will turn ON in case of parking brake operation (when switch is ON) or of brake fluid level switch operation (when brake fluid is insufficient).

Display Item List

Refer to BRC-57, "DTC No. Index".

### DATA MONITOR MODE

Display Item List

×: Applicable ❑: Optional item

| Monitor item (Unit) | SELECT MONITOR ITEM | | Remarks |
|---|---|---|---|
| | ECU INPUT SIGNALS | MAIN SIGNLAS | |
| FR LH SENSOR [km/h (MPH)] | × | × | Wheel speed |
| FR RH SENSOR [km/h (MPH)] | × | × | |
| RR LH SENSOR [km/h (MPH)] | × | × | |
| RR RH SENSOR [km/h (MPH)] | × | × | |
| STOP LAMP SW (On/Off) | × | × | Stop lamp switch signal status |

| Monitor item (Unit) | SELECT MONITOR ITEM | | Remarks |
|---|---|---|---|
| | ECU INPUT SIGNALS | MAIN SIGNLAS | |
| BATTERY VOLT (V) | × | × | Battery voltage supplied to the ABS actuator and electric unit (control unit) |
| DECEL G SENSOR (On/Off) NOTE 1 | × | × | Vehicle on level surface or on slope |
| FR RH IN SOL (On/Off) | ❑ | × | Operation status of each solenoid valve |
| FR RH OUT SOL (On/Off) | ❑ | × | |
| FR LH IN SOL (On/Off) | ❑ | × | |
| FR LH OUT SOL (On/Off) | ❑ | × | |
| RR RH IN SOL (On/Off) | ❑ | × | |
| RR RH OUT SOL (On/Off) | ❑ | × | |
| RR LH IN SOL (On/Off) | ❑ | × | |
| RR LH OUT SOL (On/Off) | ❑ | × | |
| MOTOR RELAY (On/Off) | ❑ | × | Motor and motor relay operation |
| ACTUATOR RLY (On/Off) NOTE 2 | ❑ | × | Actuator relay operation |
| ABS WARN LAMP (On/Off) | ❑ | × | ABS warning lamp |
| EBD SIGNAL (On/Off) | ❑ | ❑ | EBD operation |
| ABS SIGNAL (On/Off) | ❑ | ❑ | ABS operation |
| EBD FAIL SIG (On/Off) | ❑ | ❑ | EBD fail-safe signal |
| ABS FAIL SIG (On/Off) | ❑ | ❑ | ABS fail-safe signal |

**NOTE:**

1: Only 4WD models

2: Every 20 seconds momentary switch to OFF.

## ACTIVE TEST MODE

**CAUTION:**

- **Do not perform active test while driving vehicle.**
- **Make sure to completely bleed air from brake system.**
- **The active test cannot be performed with the ABS warning lamp and brake warning lamp are ON.**
- **ABS warning lamp and brake warning lamp are ON during active test.**

**NOTE:**

- When active test is performed while depressing the pedal, the pedal depression amount will change. This is normal. (Only solenoid valve and ABS motor.)
- “TEST IS STOPPED” is displayed 10 seconds after operation start.
- After “TEST IS STOPPED” is displayed, to perform test again.

Test Item

ABS SOLENOID VALVE

- For ABS solenoid valve, touch “UP”, “KEEP”, and “DOWN”. Then use screen monitor to check that solenoid valve operates as shown in solenoid valve operation chart.

Solenoid valve operation chart

| Test item | Display item | Display | | |
|---|---|---|---|---|
| | | UP | KEEP | DOWN |
| FR RH SOL | FR RH IN SOL | OFF | ON | ON |
| | FR RH OUT SOL | OFF | OFF | ON* |
| FR LH SOL | FR LH IN SOL | OFF | ON | ON |
| | FR LH OUT SOL | OFF | OFF | ON* |
| RR RH SOL | RR RH IN SOL | OFF | ON | ON |
| | RR RH OUT SOL | OFF | OFF | ON* |
| RR LH SOL | RR LH IN SOL | OFF | ON | ON |
| | RR LH OUT SOL | OFF | OFF | ON* |

*: ON for 1 to 2 seconds after the touch, and then OFF.

ABS MOTOR

- Touch “ON” and “OFF” on screen. Make sure motor relay and actuator relay operates as shown in table below.

| Test item | Display item | Display | |
|---|---|---|---|
| | | ON | OFF |
| ABS MOTOR | MOTOR RELAY | ON | OFF |
| | ACTUATOR RLY NOTE | ON | ON |

**NOTE:**

A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

# COMPONENT DIAGNOSIS

## C1101, C1102, C1103, C1104 WHEEL SENSOR-1

### Description

INFOID:0000000001181619

When the sensor rotor rotates, the magnetic field changes. The sensor converts the magnetic field changes to current signals (rectangular wave) and transmits them to the ABS actuator and electric unit (control unit).

### DTC Logic

INFOID:0000000001181620

#### DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|---|---|---|---|
| C1101 | RR RH SENSOR-1 | Circuit of rear RH wheel circuit is open or short circuit.<br>Current signal from sensor is outside limits. | • Harness or connector<br>• Wheel sensor<br>• ABS actuator and electric unit (control unit) |
| C1102 | RR LH SENSOR-1 | Circuit of rear LH wheel circuit is open or short circuit.<br>Current signal from sensor is outside limits. | |
| C1103 | FR RH SENSOR-1 | Circuit of front RH wheel circuit is open or short circuit.<br>Current signal from sensor is outside limits. | |
| C1104 | FR LH SENSOR-1 | Circuit of front LH wheel circuit is open or short circuit.<br>Current signal from sensor is outside limits. | |

#### DTC CONFIRMATION PROCEDURE

##### 1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

| Self-diagnosis results |
|---|
| RR RH SENSOR-1 |
| RR LH SENSOR-1 |
| FR RH SENSOR-1 |
| FR LH SENSOR-1 |

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-20, "Diagnosis Procedure".
NO >> INSPECTION END

### Diagnosis Procedure

INFOID:0000000001181621

**CAUTION:**
**Do not check between wheel sensor terminals.**

#### INSPECTION PROCEDURE

##### 1.CHECK SENSOR AND SENSOR ROTOR

- Check sensor rotor for damage.
- Check wheel sensor for damage, disconnection or looseness.

Are the sensor and sensor rotor normal?

YES >> GO TO 2.
NO >> Repair wheel sensor mount or replace sensor rotor. Then perform the self-diagnosis.

##### 2.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect malfunctioning wheel sensor connector.
4. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.

5. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-17, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 3.
NO >> Poor connection of connector terminal. Repair or replace connector.

## 3. CHECK WHEEL SENSOR HARNESS

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect malfunctioning wheel sensor connector.
4. Check continuity between terminals. (Also check continuity when steering wheel is turned right and left and when sensor harness inside the wheel house is moved.)

Measurement terminal for power supply circuit

| ABS actuator and electric unit (control unit) | | Wheel sensor | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E34 | 9 | E39 (Front RH) | 2 | Existed |
| | 16 | E22 (Front LH) | | |
| | 8 | B41 (Rear RH) | | |
| | 6 | B44 (Rear LH) | | |

Measurement terminal for signal circuit

| ABS actuator and electric unit (control unit) | | Wheel sensor | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E34 | 10 | E39 (Front RH) | 1 | Existed |
| | 5 | E22 (Front LH) | | |
| | 19 | B41 (Rear RH) | | |
| | 17 | B44 (Rear LH) | | |

Measurement terminal for ground circuit

| ABS actuator and electric unit (control unit) | | | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E34 | 9, 10 | E34 | 1, 4 | Not existed |
| | 16, 5 | | | |
| | 8, 19 | | | |
| | 6, 17 | | | |

5. Reconnect ABS actuator and electric unit (control unit) connector.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace malfunctioning components.

## 4. CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between wheel sensor harness connector power supply terminal and ground.

| Wheel sensor | | — | Voltage |
|---|---|---|---|
| Connector | Terminal | | |
| E39 (Front RH) | 2 | Ground | 8 V or more |
| E22 (Front LH) | | | |
| B41 (Rear RH) | | | |
| B44 (Rear LH) | | | |

Is the inspection result normal?

YES >> Replace applicable wheel sensor.
NO >> Replace ABS actuator and electric unit (control unit).

## Component Inspection

INFOID:0000000001181622

### 1.CHECK DATA MONITOR

On “DATA MONITOR”, select “FR LH SENSOR”, “FR RH SENSOR”, “RR LH SENSOR”, and “RR RH SENSOR”, and check the vehicle speed.

| Wheel sensor | Vehicle speed (DATA MONITOR) |
|---|---|
| FR LH SENSOR | Nearly matches the speedometer display (±10% or less) |
| FR RH SENSOR | |
| RR LH SENSOR | |
| RR RH SENSOR | |

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-20, "Diagnosis Procedure".

# C1105, C1106, C1107, C1108 WHEEL SENSOR-2

## Description

INFOID:0000000001181623

ABS unit continually monitors wheel speed sensors to detect abnormal signals.

## DTC Logic

INFOID:0000000001181624

### DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|---|---|---|---|
| C1105 | RR RH SENSOR-2 | Signal from rear RH wheel sensor does not match other 3 wheel speed signals. | • Sensor not installed correctly<br>• Sensor rotor or encoder damaged<br>• Sensor rotor loose on axle<br>• Electrical interference<br>• Wheel not turning - e.g. vehicle driven on 2WD dyno<br>• Sensor damaged<br>• ABS unit damaged |
| C1106 | RR LH SENSOR-2 | Signal from rear LH wheel sensor does not match other 3 wheel speed signals. | |
| C1107 | FR RH SENSOR-2 | Signal from front RH wheel sensor does not match other 3 wheel speed signals. | |
| C1108 | FR LH SENSOR-2 | Signal from front LH wheel sensor does not match other 3 wheel speed signals. | |

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

| Self-diagnosis results |
|---|
| RR RH SENSOR-2 |
| RR LH SENSOR-2 |
| FR RH SENSOR-2 |
| FR LH SENSOR-2 |

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-23, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000001181625

**CAUTION:**
**Do not check between wheel sensor terminals.**

### INSPECTION PROCEDURE

#### 1.CHECK SENSOR AND SENSOR ROTOR

- Check sensor rotor for damage.
- Check wheel sensor for damage, disconnection or looseness.

Are the sensor and sensor rotor normal?

YES >> GO TO 2.
NO >> Repair wheel sensor mount or replace sensor rotor. Then perform the self-diagnosis.

#### 2.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect malfunctioning wheel sensor connector.
4. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
5. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-17, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 3.
NO >> Poor connection of connector terminal. Repair or replace connector.

## 3.CHECK WHEEL SENSOR HARNESS

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect malfunctioning wheel sensor connector.
4. Check continuity between terminals. (Also check continuity when steering wheel is turned right and left and when sensor harness inside the wheel house is moved.)

Measurement terminal for power supply circuit

| ABS actuator and electric unit (control unit) | | Wheel sensor | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E34 | 9 | E39 (Front RH) | 2 | Existed |
| | 16 | E22 (Front LH) | | |
| | 8 | B41 (Rear RH) | | |
| | 6 | B44 (Rear LH) | | |

Measurement terminal for signal circuit

| ABS actuator and electric unit (control unit) | | Wheel sensor | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E34 | 10 | E39 (Front RH) | 1 | Existed |
| | 5 | E22 (Front LH) | | |
| | 19 | B41 (Rear RH) | | |
| | 17 | B44 (Rear LH) | | |

Measurement terminal for ground circuit

| ABS actuator and electric unit (control unit) | | | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E34 | 9, 10 | E34 | 1, 4 | Not existed |
| | 16, 5 | | | |
| | 8, 19 | | | |
| | 6, 17 | | | |

5. Reconnect ABS actuator and electric unit (control unit) connector.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace malfunctioning components.

## 4.CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between wheel sensor harness connector power supply terminal and ground.

| Wheel sensor | | — | Voltage |
|---|---|---|---|
| Connector | Terminal | | |
| E39 (Front RH) | 2 | Ground | 8 V or more |
| E22 (Front LH) | | | |
| B41 (Rear RH) | | | |
| B44 (Rear LH) | | | |

Is the inspection result normal?

YES >> Replace applicable wheel sensor.
NO >> Replace ABS actuator and electric unit (control unit).

## Component Inspection

INFOID:0000000001181626

### 1. CHECK DATA MONITOR

On “DATA MONITOR”, select “FR LH SENSOR”, “FR RH SENSOR”, “RR LH SENSOR”, and “RR RH SENSOR”, and check the vehicle speed.

| Wheel sensor | Vehicle speed (DATA MONITOR) |
|---|---|
| FR LH SENSOR | Nearly matches the speedometer display (±10% or less) |
| FR RH SENSOR | |
| RR LH SENSOR | |
| RR RH SENSOR | |

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-35, "Diagnosis Procedure".

# C1109 POWER AND GROUND SYSTEM

## Description

INFOID:0000000001181627

Power is supply from the battery to ABS actuator and electric unit (control unit).

## DTC Logic

INFOID:0000000001181628

### DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|---|---|---|---|
| C1109 | BATTERY VOLTAGE [ABNORMAL] | When the ABS actuator and electric unit (control unit) power supply is lower than normal and vehicle speed is greater than 6 km/h (4 MPH). Power supply is greater than normal limits. | • Harness or connector<br>• ABS actuator and electric unit (control unit)<br>• Fuse<br>• Vehicle electrical power system |

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

| Self-diagnosis results |
|---|
| BATTERY VOLTAGE [ABNORMAL] |

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-26, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000001181629

### INSPECTION PROCEDURE

#### 1.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect connector and then perform the self-diagnosis. Refer to BRC-17, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2.
NO >> Poor connection of connector terminal. Repair or replace connector.

#### 2.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Turn ignition switch ON or OFF and check voltage between ABS actuator and electric unit (control unit) harness connector terminal and ground.

| ABS actuator and electric unit (control unit) | | — | Condition | Voltage |
|---|---|---|---|---|
| Connector | Terminal | | | |
| E34 | 18 | Ground | Ignition switch: ON | Battery voltage |
| | | | Ignition switch: OFF | Approx. 0 V |

4. Reconnect ABS actuator and electric unit (control unit) connector.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace malfunctioning components.

## 3. ABS POWER SUPPLY CHECK (UNDER LOAD CONDITIONS)

1. Use 12V lamp (normal rating 10 to 20W) connected between E34 terminals 18 and 4. With ignition switch ON check bulb illuminates correctly.
2. Check ABS motor supply under loaded condition (connector E34 terminals 1 and 2).

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check both power supply and ground circuit.

## 4. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

| ABS actuator and electric unit (control unit) | | — | Continuity |
|---|---|---|---|
| Connector | Terminal | | |
| E34 | 1, 4 | Ground | Existed |

Is the inspection result normal?

YES >> Check battery for terminal looseness, low voltage, etc. if any malfunction is found, repair malfunctioning parts.
NO >> Repair or replace malfunctioning components (check ABS earth bolt for tightness and corrosion).

# C1110, C1153 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

## Description

INFOID:0000000001181630

ABS unit is continuously monitoring ECU hardware and software for correct operation.

## DTC Logic

INFOID:0000000001181631

### DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|---|---|---|---|
| C1110 | CONTROLLER FAILURE | Possible internal failure of control unit components. | • Internal failure of control unit components<br>• ABS solenoid valve or motor power supply/ground abnormality |
| C1153 | EMERGENCY BRAKE | Continuous ABS/EBD control for more than 60 seconds. | • ABS control unit software failure<br>• Wheel speed sensor input abnormality |

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSIS RESULTS

1. Check both ABS solenoid valve and motor supply and ground circuits using a suitable electrical load.
2. Check wheel speed sensor inputs.
3. Check the self-diagnosis results.

| Self-diagnosis results |
|---|
| CONTROLLER FAILURE |
| EMERGENCY BRAKE |

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-28, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000001181632

### INSPECTION PROCEDURE

#### 1.REPLACE ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

**CAUTION:**
**Replace ABS actuator and electric unit (control unit) when self-diagnostic result shows items other than those applicable.**

>> Replace ABS actuator and electric unit (control unit).

# C1111 ABS MOTOR, MOTOR RELAY SYSTEM

## Description

INFOID:0000000001181633

### PUMP

The pump returns the brake fluid stored in the reservoir to the master cylinder by reducing the pressure.

### MOTOR

The motor drives the pump according to the signals transmitted by the ABS actuator and electric unit (control unit).

## DTC Logic

INFOID:0000000001181634

### DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|---|---|---|---|
| C1111 | PUMP MOTOR | During the actuator motor operating with ON, when the actuator motor turns OFF, or when the control line for actuator motor relay is open. | • Harness or connector<br>• ABS actuator and electric unit (control unit) |
| | | During the actuator motor operating with OFF, when the actuator motor turns ON, or when the control line for relay is shorted to ground. | |

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

| Self-diagnosis results |
|---|
| PUMP MOTOR |

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-29, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000001181635

### INSPECTION PROCEDURE

#### 1.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check terminal for deformation, disconnect, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect connector and then perform the self-diagnosis. Refer to BRC-17, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2.
NO >> Poor connection of connector terminal. Replace or repair connector.

#### 2.CHECK ABS MOTOR AND MOTOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check voltage between the ABS actuator and electric unit (control unit) harness connector terminal and ground.

| ABS actuator and electric unit (control unit) | | — | Voltage |
|---|---|---|---|
| Connector | Terminal | | |
| E34 | 2 | Ground | Battery voltage |

4. Reconnect ABS actuator and electric unit (control unit) connector.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace malfunctioning components.

## 3.ABS POWER SUPPLY CHECK (UNDER LOAD CONDITIONS)

Use 12V lamp (normal rating 10 to 20W) connected between E34 terminals 1 and 2. With ignition switch ON check bulb illuminates correctly.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check both power supply and ground circuit.

## 4.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

| ABS actuator and electric unit (control unit) | | — | Continuity |
|---|---|---|---|
| Connector | Terminal | | |
| E34 | 1, 4 | Ground | Existed |

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace malfunctioning components. (Check ABS each bolt for tightness and corrosion).

# Component Inspection

INFOID:0000000001181636

## 1.CHECK ACTIVE TEST

1. On “ACTIVE TEST”, select “ABS MOTOR”.
2. Touch “ON” and “OFF” on screen. Make sure motor relay and actuator relay operates as shown in table below.

| Test item | Display item | Display | |
|---|---|---|---|
| | | ON | OFF |
| ABS MOTOR | MOTOR RELAY | ON | OFF |
| | ACTUATOR RLY NOTE | ON | ON |

**NOTE:**

A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-29, "Diagnosis Procedure".

# C1113 G SENSOR

## Description

INFOID:0000000001181637

G sensor detects G affecting the vehicle, and transmits the data to the ABS actuator and electric unit (control unit) as an analog voltage signal.

## DTC Logic

INFOID:0000000001181638

### DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|---|---|---|---|
| C1113 | G SENSOR | G sensor is malfunctioning, or signal line of G sensor is open or shorted. | • Harness or connector<br>• ABS actuator and electric unit (control unit)<br>• G sensor<br>• Electrical interference<br>• Vehicle driven on 4WD rolling road |

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

| Self-diagnosis results |
|---|
| G SENSOR |

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-31, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000001181639

### INSPECTION PROCEDURE

#### 1.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect G sensor connector.
4. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
5. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-17, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2.
NO >> Poor connection of connector terminal. Replace or repair connector.

#### 2.CHECK G SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect G sensor connector.
3. Turn ignition switch ON or OFF and check voltage between G sensor harness connector terminal and ground.

| G sensor | | — | Condition | Voltage |
|---|---|---|---|---|
| Connector | Terminal | | | |
| M71 | 3 | Ground | Ignition switch: ON | Battery voltage |
| | | Ground | Ignition switch: OFF | Approx. 0 V |

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace malfunctioning components.

## 3.CHECK G SENSOR GROUND CIRCUIT

Check continuity between G sensor harness connector terminal and ground.

| G sensor | | — | Continuity |
|---|---|---|---|
| Connector | Terminal | | |
| M71 | 1 | Ground | Existed |

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace malfunctioning components.

## 4.CHECK G SENSOR HARNESS

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Check continuity between G sensor harness connector terminals and ABS actuator and electric unit (control unit) harness connector terminals.

| ABS actuator and electric unit (control unit) | | G sensor | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E34 | 14 | M71 | 1 | Existed |
| | 21 | | 2 | |
| | 24 | | 3 | |

Is the inspection result normal?

YES >> Replace G sensor.
NO >> Repair or replace malfunctioning components.

# Component Inspection

INFOID:0000000001181640

## 1.CHECK DATA MONITOR

Select “DECEL G SENSOR”, in “DATA MONITOR” and check G sensor signal.

| Monitor item | DATA MONITOR |
|---|---|
| DECEL G SENSOR | ON/OFF |

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-17, "CONSULT-III Function (ABS)".

# C1114 ACTUATOR RELAY SYSTEM

## Description

INFOID:0000000001181641

Activates or deactivates each solenoid valve according to the signals transmitted by the ABS actuator and electric unit (control unit).

## DTC Logic

INFOID:0000000001181642

### DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|---|---|---|---|
| C1114 | MAIN RELAY | During the actuator relay operating with OFF, when the actuator relay turns ON, or when the control line for the relay is shorted to the ground. | • Harness or connector<br>• ABS actuator and electric unit (control unit) |
| | | During the actuator relay operating with ON, when the actuator relay turns ON, or when the control line for the relay is open. | |

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

| Self-diagnosis results |
|---|
| MAIN RELAY |

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-33, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000001181643

### INSPECTION PROCEDURE

#### 1.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect connector and then perform the self-diagnosis. Refer to BRC-17, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2.
NO >> Poor connection of connector terminal. Replace or repair connector.

#### 2.CHECK ACTUATOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check voltage between ABS actuator and electric unit (control unit) harness connector terminal and ground.

| ABS actuator and electric unit (control unit) | | — | Voltage |
|---|---|---|---|
| Connector | Terminal | | |
| E34 | 3 | Ground | Battery voltage |

4. Reconnect ABS actuator and electric unit (control unit) connector.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace malfunctioning components.

## 3.ABS POWER SUPPLY CHECK (UNDER LOAD CONDITIONS)

Use 12V lamp (normal rating 10 to 20W) connected between E34 terminals 1 and 3. With ignition switch ON check bulb illuminates correctly.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check both power supply and ground circuit.

## 4.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

| ABS actuator and electric unit (control unit) | | — | Continuity |
|---|---|---|---|
| Connector | Terminal | | |
| E34 | 1, 4 | Ground | Existed |

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace malfunctioning components. (Check ABS each bolt for tightness and corrosion).

# Component Inspection

INFOID:0000000001181644

## 1.CHECK ACTIVE TEST

1. On “ACTIVE TEST”, select “ABS MOTOR”.
2. Touch “ON” and “OFF” on screen. Make sure motor relay and actuator relay operates as shown in table below.

| Test item | Display item | Display | |
|---|---|---|---|
| | | ON | OFF |
| ABS MOTOR | MOTOR RELAY | ON | OFF |
| | ACTUATOR RLY NOTE | ON | ON |

**NOTE:**

A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-33, "Diagnosis Procedure".

# C1115 WHEEL SENSOR

## Description

INFOID:0000000001181645

When the sensor rotor rotates, the magnetic field changes. The sensor converts the magnetic field changes to current signals (rectangular wave) and transmits them to the ABS actuator and electric unit (control unit).

## DTC Logic

INFOID:0000000001181646

### DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|---|---|---|---|
| C1115 | ABS SENSOR [ABNORMAL SIGNAL] | Miss-match between the 4 wheel speed sensor signals. | • Harness or connector not a possible cause.<br>• Other possible causes<br>- Tire radius (due to wrong size or pressure) interference. |

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

| Self-diagnosis results |
|---|
| ABS SENSOR [ABNORMAL SIGNAL] |

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-35, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000001181647

**CAUTION:**
**Do not check between wheel sensor terminals.**

### INSPECTION PROCEDURE

#### 1.CHECK SENSOR AND SENSOR ROTOR

- Check sensor rotor for damage.
- Check wheel sensor for damage, disconnection or looseness.

Are the sensor and sensor rotor normal?

YES >> GO TO 2.
NO >> Repair wheel sensor mount or replace sensor rotor. Then perform the self-diagnosis.

#### 2.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect malfunctioning wheel sensor connector.
4. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
5. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-17, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 3.
NO >> Poor connection of connector terminal. Repair or replace connector.

#### 3.CHECK WHEEL SENSOR HARNESS

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect malfunctioning wheel sensor connector.

4. Check continuity between terminals. (Also check continuity when steering wheel is turned right and left and when sensor harness inside the wheel house is moved.)

Measurement terminal for power supply circuit

| ABS actuator and electric unit (control unit) | | Wheel sensor | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E34 | 9 | E39 (Front RH) | 2 | Existed |
| | 16 | E22 (Front LH) | | |
| | 8 | B41 (Rear RH) | | |
| | 6 | B44 (Rear LH) | | |

Measurement terminal for signal circuit

| ABS actuator and electric unit (control unit) | | Wheel sensor | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E34 | 10 | E39 (Front RH) | 1 | Existed |
| | 5 | E22 (Front LH) | | |
| | 19 | B41 (Rear RH) | | |
| | 17 | B44 (Rear LH) | | |

Measurement terminal for ground circuit

| ABS actuator and electric unit (control unit) | | | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E34 | 9, 10 | E34 | 1, 4 | Not existed |
| | 16, 5 | | | |
| | 8, 19 | | | |
| | 6, 17 | | | |

5. Reconnect ABS actuator and electric unit (control unit) connector.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace malfunctioning components.

## 4. CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between wheel sensor harness connector power supply terminal and ground.

| Wheel sensor | | — | Voltage |
|---|---|---|---|
| Connector | Terminal | | |
| E39 (Front RH) | 2 | Ground | 8 V or more |
| E22 (Front LH) | | | |
| B41 (Rear RH) | | | |
| B44 (Rear LH) | | | |

Is the inspection result normal?

YES >> Replace applicable wheel sensor.
NO >> Replace ABS actuator and electric unit (control unit).

# Component Inspection

INFOID:0000000001181648

## 1. CHECK DATA MONITOR

On “DATA MONITOR”, select “FR LH SENSOR”, “FR RH SENSOR”, “RR LH SENSOR”, and “RR RH SENSOR”, and check the vehicle speed.

| Wheel sensor | Vehicle speed (DATA MONITOR) |
|---|---|
| FR LH SENSOR | Nearly matches the speedometer display (±10% or less) |
| FR RH SENSOR | |
| RR LH SENSOR | |
| RR RH SENSOR | |

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-35, "Diagnosis Procedure".

# C1116 STOP LAMP SWITCH

## Description

INFOID:0000000001181649

The stop lamp switch transmits the stop lamp switch signal (ON/OFF) to the ABS actuator and electric unit (control unit).

## DTC Logic

INFOID:0000000001181650

### DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|---|---|---|---|
| C1116 | STOP LAMP SW | When stop lamp switch circuit is open. | • Harness or connector<br>• Stop lamp switch<br>• ABS actuator and electric unit (control unit) |

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

| Self-diagnosis results |
|---|
| STOP LAMP SW |

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-38, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000001181651

### INSPECTION PROCEDURE

#### 1.CHECK STOP LAMP ILLUMINATE

Press brake pedal and check stop lamp illuminate.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace malfunctioning components.

#### 2.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect stop lamp switch connector.
4. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
5. Reconnect connectors securely.
6. Start engine.
7. Repeat pumping brake pedal carefully several times, and perform self-diagnosis.

Is any item indicated on the self-diagnosis display?

YES >> GO TO 3.
NO >> Poor connection of connector terminal. Replace or repair connector.

#### 3.CHECK STOP LAMP SWITCH

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch connector.
3. Check continuity between stop lamp switch connector terminals.

| Stop lamp switch<br>Terminal | Condition | Continuity |
|---|---|---|
| 1 – 2 | Release stop lamp switch<br>(When brake pedal is depressed.) | Existed |
| | Push stop lamp switch<br>(When brake pedal is released.) | Not existed |

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace stop lamp switch.

## 4.CHECK STOP LAMP SWITCH CIRCUIT

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Connect stop lamp switch connector.
3. Check voltage between ABS actuator and electric unit (control unit) harness connector terminal and ground.

| ABS actuator and electric unit (control unit) | | Condition | Voltage |
|---|---|---|---|
| Connector | Terminal | | |
| E34 | 20 | Brake pedal is depressed | Battery voltage |
| | | Brake pedal is released | Approx. 0 V |

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace malfunctioning components.

# Component Inspection

INFOID:0000000001181652

## 1.CHECK STOP LAMP SWITCH

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch connector.
3. Check continuity between stop lamp switch connector terminals.

| Stop lamp switch<br>Terminal | Condition | Continuity |
|---|---|---|
| 1 – 2 | Release stop lamp switch<br>(When brake pedal is depressed.) | Existed |
| | Push stop lamp switch<br>(When brake pedal is released.) | Not existed |

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace stop lamp switch.

# C1120, C1122, C1124, C1126 IN ABS SOL

## Description

INFOID:0000000001181653

The solenoid valve increases, holds or decreases the fluid pressure of each brake caliper according to the signals transmitted by the ABS actuator and electric unit (control unit).

## DTC Logic

INFOID:0000000001181654

### DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|---|---|---|---|
| C1120 | FR LH IN ABS SOL | When the control unit detects a malfunction in the front LH inlet solenoid circuit. | ABS actuator and electric unit (control unit) |
| C1122 | FR RH IN ABS SOL | When the control unit detects a malfunction in the front RH inlet solenoid circuit. | |
| C1124 | RR LH IN ABS SOL | When the control unit detects a malfunction in the rear LH inlet solenoid circuit. | |
| C1126 | RR RH IN ABS SOL | When the control unit detects a malfunction in the rear RH inlet solenoid circuit. | |

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

| Self-diagnosis results |
|---|
| FR LH IN ABS SOL |
| FR RH IN ABS SOL |
| RR LH IN ABS SOL |
| RR RH IN ABS SOL |

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-40, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000001181655

### INSPECTION PROCEDURE

#### 1.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect connector and then perform the self-diagnosis. Refer to BRC-17, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2.
NO >> Poor connection of connector terminal. Replace or repair connector.

#### 2.CHECK ACTUATOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check voltage between ABS actuator and electric unit (control unit) harness connector terminal and ground.

| ABS actuator and electric unit (control unit) | | — | Voltage |
|---|---|---|---|
| Connector | Terminal | | |
| E34 | 3 | Ground | Battery voltage |

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace malfunctioning components.

## 3.CHECK ACUATOR RELAY GROUND CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

| ABS actuator and electric unit (control unit) | | — | Continuity |
|---|---|---|---|
| Connector | Terminal | | |
| E34 | 1, 4 | Ground | Existed |

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace malfunctioning components.

# Component Inspection

INFOID:0000000001181656

## 1.CHECK ACTIVE TEST

1. Select each test menu item on ”ACTIVE TEST“.
2. On the display, touch “UP”, “KEEP”, and “DOWN”, and check that the system operates as shown in the table below.

| Test item | Display item | Display | | |
|---|---|---|---|---|
| | | UP | KEEP | DOWN |
| FR RH SOL | FR RH IN SOL | OFF | ON | ON |
| | FR RH OUT SOL | OFF | OFF | ON* |
| FR LH SOL | FR LH IN SOL | OFF | ON | ON |
| | FR LH OUT SOL | OFF | OFF | ON* |
| RR RH SOL | RR RH IN SOL | OFF | ON | ON |
| | RR RH OUT SOL | OFF | OFF | ON* |
| RR LH SOL | RR LH IN SOL | OFF | ON | ON |
| | RR LH OUT SOL | OFF | OFF | ON* |

*: ON for 1 to 2 seconds after the touch, and then OFF.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-40, "Diagnosis Procedure".

# C1121, C1123, C1125, C1127 OUT ABS SOL

## Description

INFOID:0000000001181657

The solenoid valve increases, holds or decreases the fluid pressure of each brake caliper according to the signals transmitted by the ABS actuator and electric unit (control unit).

## DTC Logic

INFOID:0000000001181658

### DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|---|---|---|---|
| C1121 | FR LH OUT ABS SOL | When the control unit detects a malfunction in the front LH outlet solenoid circuit. | ABS actuator and electric unit (control unit) |
| C1123 | FR RH OUT ABS SOL | When the control unit detects a malfunction in the front RH outlet solenoid circuit. | |
| C1125 | RR LH OUT ABS SOL | When the control unit detects a malfunction in the rear LH outlet solenoid circuit. | |
| C1127 | RR RH OUT ABS SOL | When the control unit detects a malfunction in the rear RH outlet solenoid circuit. | |

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

| Self-diagnosis results |
|---|
| FR LH OUT ABS SOL |
| FR RH OUT ABS SOL |
| RR LH OUT ABS SOL |
| RR RH OUT ABS SOL |

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-42, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000001181659

### INSPECTION PROCEDURE

#### 1.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect connector and then perform the self-diagnosis. Refer to BRC-17, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2.
NO >> Poor connection of connector terminal. Replace or repair connector.

#### 2.CHECK ACTUATOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check voltage between ABS actuator and electric unit (control unit) harness connector terminal and ground.

| ABS actuator and electric unit (control unit) | | — | Voltage |
|---|---|---|---|
| Connector | Terminal | | |
| E34 | 3 | Ground | Battery voltage |

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace malfunctioning components.

## 3.CHECK ACUATOR RELAY GROUND CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

| ABS actuator and electric unit (control unit) | | — | Continuity |
|---|---|---|---|
| Connector | Terminal | | |
| E34 | 1, 4 | Ground | Existed |

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace malfunctioning components.

# Component Inspection

INFOID:0000000001181660

## 1.CHECK ACTIVE TEST

1. Select each test menu item on ”ACTIVE TEST“.
2. On the display, touch “UP”, “KEEP”, and “DOWN”, and check that the system operates as shown in the table below.

| Test item | Display item | Display | | |
|---|---|---|---|---|
| | | UP | KEEP | DOWN |
| FR RH SOL | FR RH IN SOL | OFF | ON | ON |
| | FR RH OUT SOL | OFF | OFF | ON* |
| FR LH SOL | FR LH IN SOL | OFF | ON | ON |
| | FR LH OUT SOL | OFF | OFF | ON* |
| RR RH SOL | RR RH IN SOL | OFF | ON | ON |
| | RR RH OUT SOL | OFF | OFF | ON* |
| RR LH SOL | RR LH IN SOL | OFF | ON | ON |
| | RR LH OUT SOL | OFF | OFF | ON* |

*: ON for 1 to 2 seconds after the touch, and then OFF.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-42, "Diagnosis Procedure".

# U1000 CAN COMM CIRCUIT

## Description

INFOID:0000000001181661

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN-H line, CAN-L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

## DTC Logic

INFOID:0000000001181662

### DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|---|---|---|---|
| U1000 | CAN COMM CIRCUIT | When ABS actuator and electric unit (control unit) is not transmitting or receiving CAN communication signal for 2 seconds or more. | • CAN communication line<br>• ABS actuator and electric unit (control unit) |

## Diagnosis Procedure

INFOID:0000000001181663

### INSPECTION PROCEDURE

### 1.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect connector and perform self-diagnosis.

| Self-diagnosis results |
|---|
| CAN COMM CIRCUIT |

Is above displayed on the self-diagnosis display?

YES >> Go to LAN-13, "Trouble Diagnosis Flow Chart".
NO >> INSPECTION END

# BRAKE FLUID LEVEL SWITCH

## Description

INFOID:0000000001181664

The brake fluid level switch converts the brake fluid level to an electric signal and transmits it to the ABS actuator and electric unit (control unit).

## Component Function Check

INFOID:0000000001181665

### 1.CHECK BRAKE FLUID LEVEL SWITCH OPERATION

Operate the brake fluid level switch. Then check that the brake warning lamp in the combination meter turns ON/OFF correctly.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-45, "Diagnosis Procedure".

## Diagnosis Procedure

INFOID:0000000001181666

INSPECTION PROCEDURE

### 1.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect brake fluid level switch connector and combination meter connector.
3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect connectors and then perform component function check. Refer to BRC-45, "Component Function Check".

Is the inspection result normal?

YES >> Poor connection of connector terminal. Replace or repair connector.
NO >> GO TO 2.

### 2.CHECK BRAKE FLUID LEVEL SWITCH

1. Turn ignition switch OFF.
2. Disconnect brake fluid level switch connector.
3. Check continuity between brake fluid level switch connector terminals.

| Brake fluid level switch | | Condition | Continuity |
|---|---|---|---|
| Connector | Terminal | | |
| E37 | 1 – 2 | When brake fluid is full in the reservoir tank. | Not existed |
| | | When brake fluid is empty in the reservoir tank. | Existed |

Is the inspection result normal?

YES >> GO TO 3.
NO >> Brake fluid level switch is malfunction. Replace reservoir tank.

### 3.CHECK BRAKE FLUID LEVEL SWITCH CIRCUIT

1. Disconnect combination meter connector.
2. Check continuity between brake fluid level switch harness connector terminals and combination meter harness connector terminal and/or ground.

| Combination meter | | Brake fluid level switch | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| M34 | 27 | E37 | 1 | Existed |

| Combination meter | | — | Continuity |
|---|---|---|---|
| Connector | Terminal | | |
| M34 | 27 | Ground | Not existed |

| Brake fluid level switch | | — | Continuity |
|---|---|---|---|
| Connector | Terminal | | |
| E37 | 2 | Ground | Existed |

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair or replace malfunctioning components.

## Component Inspection

INFOID:0000000001181667

### 1. CHECK BRAKE FLUID LEVEL SWITCH

1. Turn ignition switch OFF.
2. Disconnect brake fluid level switch connector.
3. Check continuity between brake fluid level switch connector terminals.

| Brake fluid level switch | | Condition | Continuity |
|---|---|---|---|
| Connector | Terminal | | |
| E37 | 1 – 2 | When brake fluid is full in the reservoir tank. | Not existed |
| | | When brake fluid is empty in the reservoir tank. | Existed |

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace reservoir tank.

# PARKING BRAKE SWITCH

## Description

INFOID:0000000001181668

The parking brake switch converts the status of the parking brake pedal to an electric signal and transmits it to the ABS actuator and electric unit (control unit).

## Diagnosis Procedure

INFOID:0000000001181669

### 1.CHECK COMBINATION METER INPUT SIGNAL

1. Turn ignition switch ON.
2. Check voltage between combination meter harness connector terminal 26 and ground.

| 26 – Ground | |
|---|---|
| Parking brake ON | : Approx. 0 V |
| Parking brake OFF | : Approx. 5 V |

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

### 2.CHECK PARKING BRAKE SWITCH SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect combination meter connector and parking brake switch connector.
3. Check continuity between combination meter harness connector terminal 26 and parking brake switch harness connector terminal 1.

| 26 – 1 | : Continuity should exist. |
|---|---|

4. Check continuity between combination meter harness connector terminal 26 and ground.

| 26 – Ground | : Continuity should not exist. |
|---|---|

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair harness or connector.

## Component Function Check

INFOID:0000000001181670

### 1.CHECK PARKING BRAKE SWITCH OPERATION

Operate the parking brake pedal. Then check that the brake warning lamp in the combination meter turns on/off correctly.

| Condition | Brake warning lamp illumination status |
|---|---|
| When the parking brake switch is operation | ON |
| When the parking brake switch is not operation. | OFF |

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-47, "Diagnosis Procedure".

## Component Inspection

INFOID:0000000001181671

INSPECTION PROCEDURE

### 1.CHECK PARKING BRAKE SWITCH

1. Turn ignition switch OFF.
2. Disconnect parking brake switch connector.

3. Check continuity between parking brake switch terminal and ground.

| Parking brake switch | | — | Condition | Continuity |
|---|---|---|---|---|
| Connector | Terminal | | | |
| M103 | 1 | Ground | When the parking brake switch is operated. | Existed |
| | | | When the parking brake switch is not operated. | Not existed |

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace parking brake switch.

# ABS WARNING LAMP

## Description

INFOID:0000000001181672

×: ON –: OFF

| Condition | ABS warning lamp |
|---|---|
| Ignition switch OFF | – |
| For 1 second after turning ON ignition switch | × |
| 1 second later after turning ON ignition switch | – |
| ABS function is malfunctioning. | × |
| EBD function is malfunctioning. | × |

## Component Function Check

INFOID:0000000001181673

### 1.CHECK ABS WARNING LAMP OPERATION

Check that the lamp illuminates for approximately 1 second after the ignition switch is turned ON.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-49, "Diagnosis Procedure".

## Diagnosis Procedure

INFOID:0000000001181674

### 1.CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to BRC-17, "CONSULT-III Function (ABS)".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check items displayed by self-diagnosis.

### 2.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-25, "Diagnosis Description".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace combination meter.

# BRAKE WARNING LAMP

## Description

INFOID:0000000001181675

×: ON –: OFF

| Condition | Brake warning lamp NOTE 1 |
|---|---|
| Ignition switch OFF | – |
| For 1 second after turning ON ignition switch | × NOTE 2 |
| 1 second later after turning ON ignition switch | × NOTE 2 |
| EBD function is malfunctioning. | × |

**NOTE:**

- 1: Brake warning lamp will turn on in case of parking brake operation (when switch is ON) or of brake fluid level switch operation (when brake fluid is insufficient).
- 2: After starting engine, brake warning lamp is turned off.

## Component Function Check

INFOID:0000000001181676

### 1. BRAKE WARNING LAMP OPERATION CHECK 1

Check that the lamp illuminates for approximately 1 second after the ignition switch is turned ON.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Go to diagnosis procedure. Refer to BRC-50, "Diagnosis Procedure".

### 2. BRAKE WARNING LAMP OPERATION CHECK 2

Check that the brake warning lamp in the combination meter turns ON/OFF correctly when operating the parking brake pedal.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Check parking brake switch. Refer to BRC-47, "Diagnosis Procedure".

## Diagnosis Procedure

INFOID:0000000001181677

### 1. CHECK PARKING BRAKE SWITCH

Check that the brake warning lamp in the combination meter turns ON/OFF correctly when operating the parking brake pedal.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check parking brake switch. Refer to BRC-47, "Diagnosis Procedure".

### 2. CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check items displayed by self-diagnosis.

### 3. CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-25, "Diagnosis Description".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace combination meter.

# ECU DIAGNOSIS

## ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

### Reference Value

INFOID:0000000001181678

VALUES ON THE DIAGNOSIS TOOL

**CAUTION:**

**The display shows the control unit calculation data, so a normal value might be displayed even in the event the output circuit (harness) is open or short-circuited.**

| Monitor item | Condition | | Value/Status |
|---|---|---|---|
| FR LH SENSOR | Wheel speed | Vehicle stopped | 0 [km/h (MPH)] |
| | | Vehicle running NOTE 1 | Nearly matches the speed meter display (± 10% or less) |
| FR RH SENSOR | Wheel speed | Vehicle stopped | 0 [km/h (MPH)] |
| | | Vehicle running NOTE 1 | Nearly matches the speed meter display (± 10% or less) |
| RR LH SENSOR | Wheel speed | Vehicle stopped | 0 [km/h (MPH)] |
| | | Vehicle running NOTE 1 | Nearly matches the speed meter display (± 10% or less) |
| RR RH SENSOR | Wheel speed | Vehicle stopped | 0 [km/h (MPH)] |
| | | Vehicle running NOTE 1 | Nearly matches the speed meter display (± 10% or less) |
| STOP LAMP SW | Stop lamp switch signal status | When brake pedal is depressed | On |
| | | When brake pedal is not depressed | Off |
| BATTERY VOLT | Battery voltage supplied to the ABS actuator and electric unit (control unit) | Ignition switch ON | 10 – 16 V |
| DECEL G SENSOR NOTE 2 | Decel G detected by decel G sensor | Vehicle on level surface or on slope | On/Off |
| FR RH IN SOL | Operation status of front RH inlet solenoid valve | Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode) | On |
| | | When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON) | Off |
| FR RH OUT SOL | Operation status of front RH outlet solenoid valve | Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode) | On |
| | | When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON) | Off |
| FR LH IN SOL | Operation status of front LH inlet solenoid valve | Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode) | On |
| | | When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON) | Off |

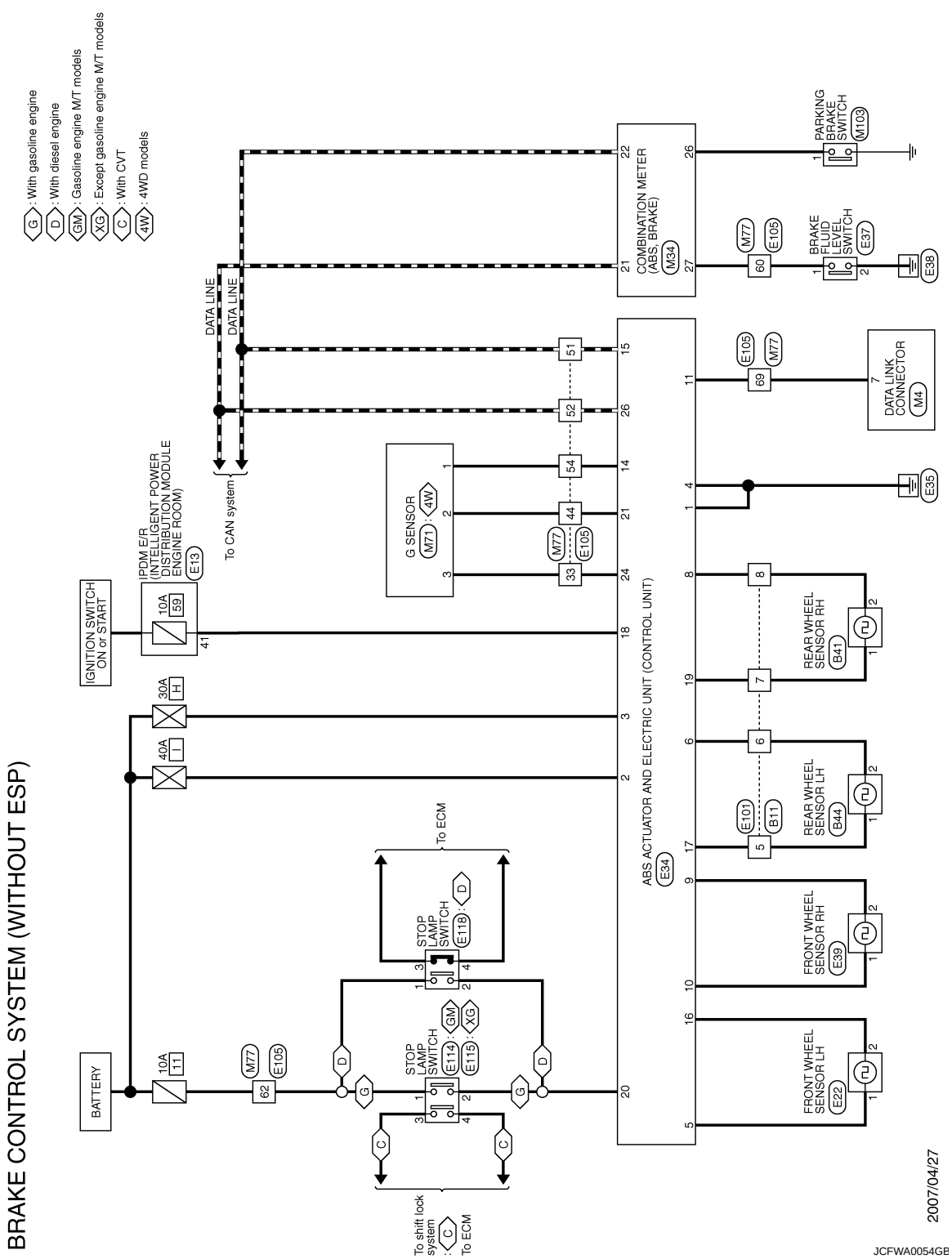
| Monitor item | Condition | | Value/Status |
|---|---|---|---|
| FR LH OUT SOL | Operation status of front LH outlet solenoid valve | Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode) | On |
| | | When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON) | Off |
| RR RH IN SOL | Operation status of rear RH inlet solenoid valve | Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode) | On |
| | | When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON) | Off |
| RR RH OUT SOL | Operation status of rear RH outlet solenoid valve | Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode) | On |
| | | When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON) | Off |
| RR LH IN SOL | Operation status of rear LH inlet solenoid valve | Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode) | On |
| | | When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON) | Off |
| RR LH OUT SOL | Operation status of rear LH outlet solenoid valve | Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode) | On |
| | | When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON) | Off |
| MOTOR RELAY | Motor and motor relay operation | When the motor relay and motor are operating | On |
| | | When the motor relay and motor are not operating | Off |
| ACTUATOR RLY NOTE 3 | Actuator relay operation | When the actuator relay is operating | On |
| | | When the actuator relay is not operating | Off |
| ABS WARN LAMP | ABS warning lamp NOTE 4 | When ABS warning lamp is ON | On |
| | | When ABS warning lamp is OFF | Off |
| EBD SIGNAL | EBD operation | EBD is active | On |
| | | EBD is inactive | Off |
| ABS SIGNAL | ABS operation | ABS is active | On |
| | | ABS is inactive | Off |
| EBD FAIL SIG | EBD fail-safe signal | In EBD fail-safe | On |
| | | EBD is normal | Off |
| ABS FAIL SIG | ABS fail-safe signal | In ABS fail-safe | On |
| | | ABS is normal | Off |

**NOTE:**

- 1: Confirm tire pressure is normal.
- 2: Only 4WD models.
- 3: Every 20 seconds momentary switch to OFF.
- 4: On and off timing for warning lamp and indicator lamp. Refer to BRC-49, "Description".

# Wiring Diagram - BRAKE CONTROL SYSTEM -

INFOID:0000000001181679



BRAKE CONTROL SYSTEM (WITHOUT ESP)

| Connector No. | B11 |
|---|---|
| Connector Name | WIRE TO WIRE |
| Connector Type | TK10MW-NS8 |




| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 5 | G/O | – |
| 6 | G/Y | – |
| 7 | LG | – |
| 8 | P | –[2WD models without ESP] |

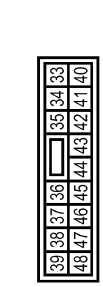
| Connector No. | B41 |
|---|---|
| Connector Name | REAR WHEEL SENSOR RH |
| Connector Type | RK02FGY |


| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 1 | LG | – |
| 2 | P | –[2WD models without ESP] |

| Connector No. | B44 |
|---|---|
| Connector Name | REAR WHEEL SENSOR LH |
| Connector Type | RK02FGY |


| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 1 | G/O | – |
| 2 | G/Y | – |

| Connector No. | E13 |
|---|---|
| Connector Name | IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) |
| Connector Type | NS16FW-CS |




| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 41 | P | – |

| Connector No. | E22 |
|---|---|
| Connector Name | FRONT WHEEL SENSOR LH |
| Connector Type | RK02MGY |




| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 1 | R/L | –[Without ESP] |
| 2 | Y | – |

| Connector No. | E34 |
|---|---|
| Connector Name | ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) |
| Connector Type | BAA22FB-AH24-LH |




| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 1 | B | GND(MTR) |
| 2 | Y | +B(MTR) |
| 3 | W/R | +B(SOL) |
| 4 | B | GND(SOL) |
| 5 | R/L | DS FL |
| 6 | G/Y | DP RL |
| 8 | P | DP RR[2WD models] |
| 8 | V | DP RR[4WD models] |
| 9 | W | DP FR |
| 10 | B | DS FR |
| 11 | O | DIAG-K |
| 14 | L | AGND |
| 15 | P | CAN-L |
| 16 | Y | DP FL |
| 17 | G/O | DS RL |
| 18 | P | IGN |
| 19 | LG | DS RR |
| 20 | R/W | STOP L SIG |
| 21 | W | AX |
| 24 | BR | UST |
| 26 | L | CAN-H |

| Connector No. | E37 |
|---|---|
| Connector Name | BRAKE FLUID LEVEL SWITCH |
| Connector Type | YV02FGY |




| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 1 | R/B | – |
| 2 | B | – |

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BRAKE CONTROL SYSTEM (WITHOUT ESP)

| Connector No. | E39 |
|---|---|
| Connector Name | FRONT WHEEL SENSOR RH |
| Connector Type | RK02MGY |





| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 1 | B | – |
| 2 | W | – |

| Connector No. | E101 |
|---|---|
| Connector Name | WIRE TO WIRE |
| Connector Type | TK10FW-NS8 |







| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 5 | G/O | – |
| 6 | G/Y | – |
| 7 | LG | – |
| 8 | P | –[2WD models without ESP] |
| 8 | V | –[Except 2WD models without ESP] |

| Connector No. | E105 |
|---|---|
| Connector Name | WIRE TO WIRE |
| Connector Type | TH80MW-NS16-TM4 |







| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 33 | BR | – |
| 44 | W | –[4WD models without ESP] |
| 51 | P | – |
| 52 | L | – |
| 54 | L | –[4WD models without ESP] |
| 60 | R/B | – |
| 62 | V | – |
| 69 | O | – |

| Connector No. | E114 |
|---|---|
| Connector Name | STOP LAMP SWITCH |
| Connector Type | M02FB |







| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 1 | V | – |
| 2 | R/W | – |

| Connector No. | E115 |
|---|---|
| Connector Name | STOP LAMP SWITCH |
| Connector Type | M04FW-LC |





| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 1 | V | – |
| 2 | R/W | – |
| 3 | G | – |
| 4 | B | – |

| Connector No. | E118 |
|---|---|
| Connector Name | STOP LAMP SWITCH |
| Connector Type | M04FW-LC |







| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 1 | V | – |
| 2 | R/W | – |
| 3 | O | – |
| 4 | W/L | – |

| Connector No. | M4 |
|---|---|
| Connector Name | DATA LINK CONNECTOR |
| Connector Type | BD16FW |





| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 7 | O | – |

| Connector No. | M34 |
|---|---|
| Connector Name | COMBINATION METER |
| Connector Type | SAB40FW |





| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 21 | L | CAN-H |
| 22 | P | CAN-L |
| 26 | V | PARKING BRAKE SW |
| 27 | BR | BRAKE FLUID LEVEL SW |

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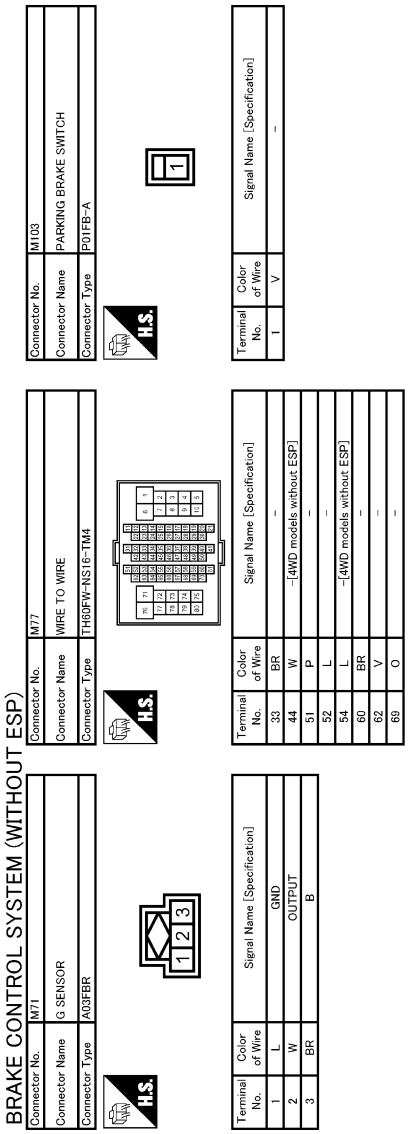



JCFWA0057GE

## Fail-Safe

*INFOID:0000000001181680*

### ABS, EBD SYSTEM

In case of electrical malfunctions with the ABS, ABS warning lamp will turn ON. In case of electrical malfunctions with the EBD, brake warning lamp, ABS warning lamp will turn ON. Simultaneously, the ABS become one of the following conditions of the fail-safe function.

- For malfunction of ABS, only the EBD is activated and the condition of vehicle is the same condition of vehicles without ABS system.
  **NOTE:**
  ABS self-diagnosis sound may be heard. That is a normal condition because a self-diagnosis for “Ignition switch ON” and “The first starting” are being performed.
- For malfunction of EBD, EBD and ABS become inoperative, and the condition of vehicle is the same as the condition of vehicles without ABS, EBD system.

## DTC No. Index

INFOID:0000000001181681

| DTC | Items (CONSULT screen terms) | Reference |
|---|---|---|
| C1101 | RR RH SENSOR-1 | BRC-20, "Description" |
| C1102 | RR LH SENSOR-1 | |
| C1103 | FR RH SENSOR-1 | |
| C1104 | FR LH SENSOR-1 | |
| C1105 | RR RH SENSOR-2 | BRC-23, "Description" |
| C1106 | RR LH SENSOR-2 | |
| C1107 | FR RH SENSOR-2 | |
| C1108 | FR LH SENSOR-2 | |
| C1109 | BATTERY VOLTAGE [ABNORMAL] | BRC-26, "Description" |
| C1110 | CONTROLLER FAILURE | BRC-28, "Description" |
| C1111 | PUMP MOTOR | BRC-29, "Description" |
| C1113 | G SENSOR | BRC-31, "Description" |
| C1114 | MAIN RELAY | BRC-33, "Description" |
| C1115 | ABS SENSOR [ABNORMAL SIGNAL] | BRC-35, "Description" |
| C1116 | STOP LAMP SW | BRC-38, "Description" |
| C1120 | FR LH IN ABS SOL | BRC-40, "Description" |
| C1121 | FR LH OUT ABS SOL | BRC-42, "Description" |
| C1122 | FR RH IN ABS SOL | BRC-40, "Description" |
| C1123 | FR RH OUT ABS SOL | BRC-42, "Description" |
| C1124 | RR LH IN ABS SOL | BRC-40, "Description" |
| C1125 | RR LH OUT ABS SOL | BRC-42, "Description" |
| C1126 | RR RH IN ABS SOL | BRC-40, "Description" |
| C1127 | RR RH OUT ABS SOL | BRC-42, "Description" |
| C1153 | EMERGENCY BRAKE | BRC-28, "Description" |
| U1000 | CAN COMM CIRCUIT | BRC-44, "Description" |

# SYMPTOM DIAGNOSIS

## EXCESSIVE ABS FUNCTION OPERATION FREQUENCY

### Diagnosis Procedure

INFOID:0000000001181682

#### 1.CHECK START

Check front and rear brake force distribution using a brake tester. Refer to BR-49, "General Specifications" (LHD models), BR-96, "General Specifications" (RHD models).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check brake system.

#### 2.CHECK FRONT AND REAR AXLE

Make sure that there is no excessive play in the front and rear axles.
- Front: FAX-7, "Inspection" (2WD models), FAX-59, "Inspection" (4WD models)
- Rear: RAX-3, "Inspection" (2WD models), RAX-9, "Inspection" (4WD models)

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace malfunctioning components.

#### 3.CHECK WHEEL SENSOR AND SENSOR ROTOR

Check the following.
- Wheel sensor installation for damage.
- Sensor rotor installation for damage.
- Wheel sensor connector connection.
- Wheel sensor harness inspection.

Is the inspection result normal?

YES >> GO TO 4.
NO >>
- Replace wheel sensor or sensor rotor.
- Repair harness.

#### 4.CHECK ABS WARNING LAMP DISPLAY

Make sure that the ABS warning lamp is turned off after the ignition switch is turned ON or when driving.

Is the ABS warning lamp illuminated?

YES >> Perform self-diagnosis. Refer to BRC-17, "CONSULT-III Function (ABS)".
NO >> INSPECTION END

# UNEXPECTED PEDAL REACTION

## Diagnosis Procedure

INFOID:0000000001181683

### 1.CHECK BRAKE PEDAL STROKE

Check brake pedal stroke. Refer to BR-8, "Inspection and Adjustment" (LHD models), BR-55, "Inspection and Adjustment" (RHD models).

Is the stroke too large?

YES >> • Bleed air from brake tube and hose. Refer to BR-12, "Bleeding Brake System" (LHD models), BR-59, "Bleeding Brake System" (RHD models).
- Check brake pedal, brake booster, and master cylinder for mount play, looseness, brake system fluid leakage, etc.
  - Brake pedal: BR-17, "Exploded View" (LHD models), BR-64, "Exploded View" (RHD models).
  - Brake booster: BR-30, "Exploded View" (LHD models), BR-77, "Exploded View" (RHD models).
  - Brake master cylinder: BR-27, "Exploded View" (LHD models), BR-74, "Exploded View" (RHD models).
  - Brake fluid: BR-11, "Inspection" (LHD models), BR-58, "Inspection" (RHD models).

NO >> GO TO 2.

### 2.CHECK FUNCTION

Disconnect ABS actuator and electric unit (control unit) connector to deactivate ABS. Check if braking force is normal in this condition. Connect connector after inspection.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Check brake system.

# THE BRAKING DISTANCE IS LONG

## Diagnosis Procedure

INFOID:0000000001181684

**CAUTION:**

**The stopping distance on slippery road surfaces might be longer with the ABS operating than when the ABS is not operating.**

1. CHECK FUNCTION

Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector to deactivate ABS. In this condition, check stopping distance. After inspection, connect connector.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Check brake system.

# ABS FUNCTION DOES NOT OPERATE

## Diagnosis Procedure

INFOID:0000000001181685

**CAUTION:**
**ABS does not operate when speed is 10 km/h (6 MPH) or lower.**

1. CHECK ABS WARNING LAMP DISPLAY

Make sure that the ABS warning lamp turns OFF after ignition switch is turned ON or when driving.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Perform self-diagnosis. Refer to BRC-17, "CONSULT-III Function (ABS)".

# PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

## Diagnosis Procedure

INFOID:0000000001181686

**CAUTION:**

**Under the following conditions, ABS is activated and vibration is felt when brake pedal is lightly depressed (just place a foot on it). However, this is normal.**

- **When shifting gears**
- **When driving on slippery road**
- **During cornering at high speed**
- **When passing over bumps or grooves [at approximately 50 mm (1.97 in) or more]**
- **When pulling away just after starting engine [at approximately 10 km/h (6 MPH) or higher]**

### 1. SYMPTOM CHECK 1

Check that there are pedal vibrations when the engine is started.

Do vibrations occur?

YES >> GO TO 2.
NO >> Inspect the brake pedal.

### 2. SYMPTOM CHECK 2

Check that there are ABS operation noises when the engine is started.

Do the operation noises occur?

YES >> GO TO 3.
NO >> Perform self-diagnosis. Refer to BRC-17, "CONSULT-III Function (ABS)".

### 3. SYMPTOM CHECK 3

Check symptoms when electrical component (headlamps, etc.) switches are operated.

Do symptoms occur?

YES >> Check if there is a radio, antenna, antenna lead wire, or wiring close to the control unit. If there is, move it farther away.
NO >> INSPECTION END

# NORMAL OPERATING CONDITION

## Description

INFOID:0000000001181687

| Symptom | Result |
|---|---|
| Slight vibrations are felt on the brake pedal and the operation noises occur, when ABS is activated. | This is a normal condition due to the ABS activation. |
| Stopping distance is longer than that of vehicles without ABS when the vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads. | |
| The brake pedal vibrates and motor operation noises occur from the engine room, after the engine starts and just after the vehicle starts. | This is a normal, and it is caused by the ABS operation check. |

# PRECAUTION

## PRECAUTIONS

### Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001583058

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the “SRS AIRBAG” and “SEAT BELT” of this Service Manual.

**WARNING:**

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the “SRS AIRBAG”.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

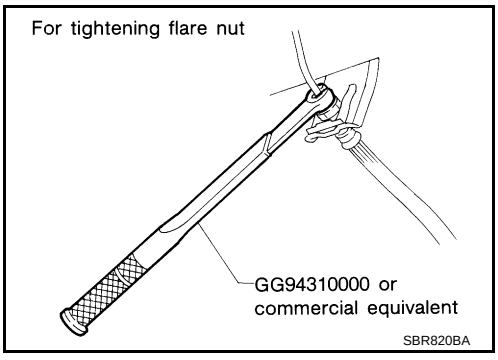
### Precaution for Brake System

INFOID:0000000001181689

**WARNING:**

**Clean brake pads and shoes with a waste cloth, then wipe with a dust collector.**

- Only use DOT 3 brake fluid. Refer to MA-27, "Fluids and Lubricants".
- Never to reuse drained brake fluid.
- Never to spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface.
- Never to use mineral oils such as gasoline or light oil. They may damage rubber parts and cause improper operation.
- Always loosen the brake tube flare nut with a flare nut wrench.
- Tighten the brake tube flare nut to the specified torque with a flare nut torque wrench.
- Always conform the specified tightening torque when installing the brake pipes.
- Brake system is an important safety part. If a brake fluid leak is detected, always disassemble the affected part. If a malfunction is detected, replace part with a new one.
- Turn the ignition switch OFF and disconnect the ABS actuator and electric unit (control unit) connector or the battery negative terminal before performing the work.




### Precaution for Brake Control

INFOID:0000000001181690

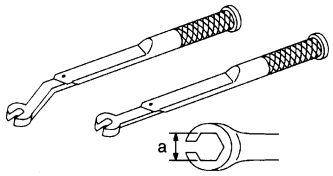
- Just after starting vehicle after ignition switch ON, brake pedal may vibrate or motor operating noise may be heard from engine compartment. This is normal condition.
- When an error is indicated by ABS or another warning lamp, collect all necessary information from customer (what symptoms are present under what conditions) and check for simple causes before starting diagnostic servicing. Besides electrical system inspection, check brake booster operation, brake fluid level, and oil leaks.
- If tire size and type are used in an improper combination, or brake pads are not Genuine NISSAN parts, stopping distance or steering stability may deteriorate.
- ABS might be out of order or malfunctions by putting a radio (wiring inclusive), an antenna and a lead-in wire near the control unit.
- If aftermarket parts (car stereo, CD player, etc.) have been installed, check for incidents such as harness pinches, open circuits, and improper wiring.

# PREPARATION

## PREPARATION

### Special Service Tool

INFOID:0000000001181691

| Tool number<br>Tool name | | Description |
|---|---|---|
| GG94310000<br>Flare nut torque wrench<br>a: 10 mm (0.39 in)/ 12 mm (0.47 in) |  S-NT406 | Installing each brake piping |

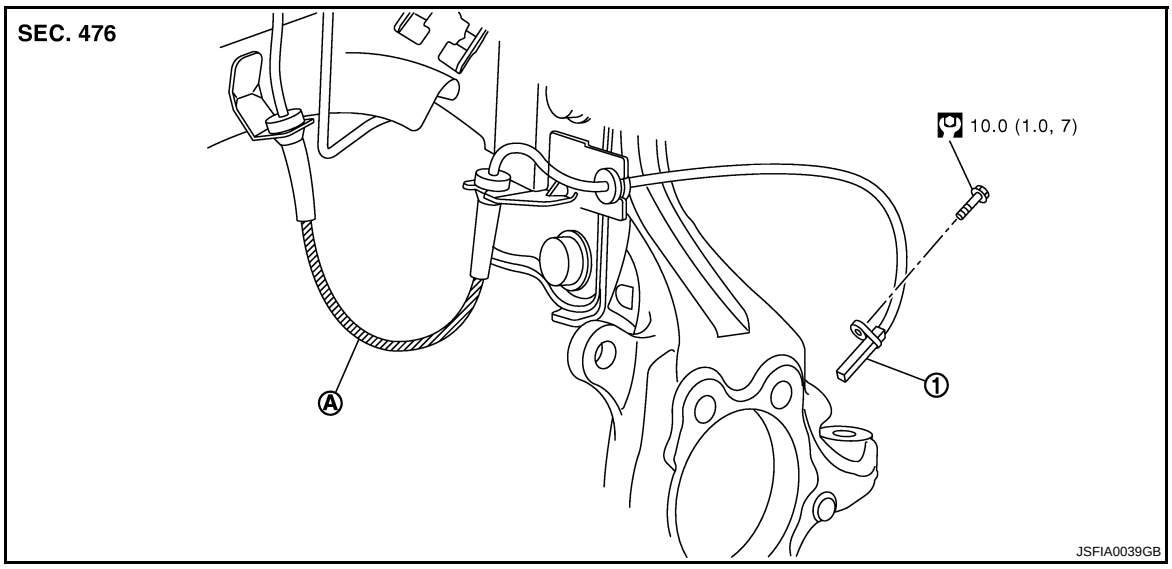
# ON-VEHICLE REPAIR

## WHEEL SENSOR

### FRONT WHEEL SENSOR

#### FRONT WHEEL SENSOR : Exploded View

INFOID:0000000001181692




1. Front LH wheel sensor

A. White line (slant line)

Refer to GI section GI-4, "Components" for symbols in the figure.

**NOTE:**
The above figure (front side) shows left side. Right side is the mirror image.

#### FRONT WHEEL SENSOR : Removal and Installation

INFOID:0000000001181693

REMOVAL

Pay attention to the following when removing sensor.

**CAUTION:**

- **Do not twist sensor harness as much as possible, when removing it. Pull sensors out without pulling on sensor harness.**
- **Take care to avoid damaging sensor edges or rotor teeth. Remove wheel sensor first before removing front or rear wheel hub. This is to avoid damage to sensor wiring and loss of sensor function.**
- **When you see the harness of the wheel sensor from the front side of the vehicle ensure that the white lines (A) are not twisted.**

INSTALLATION

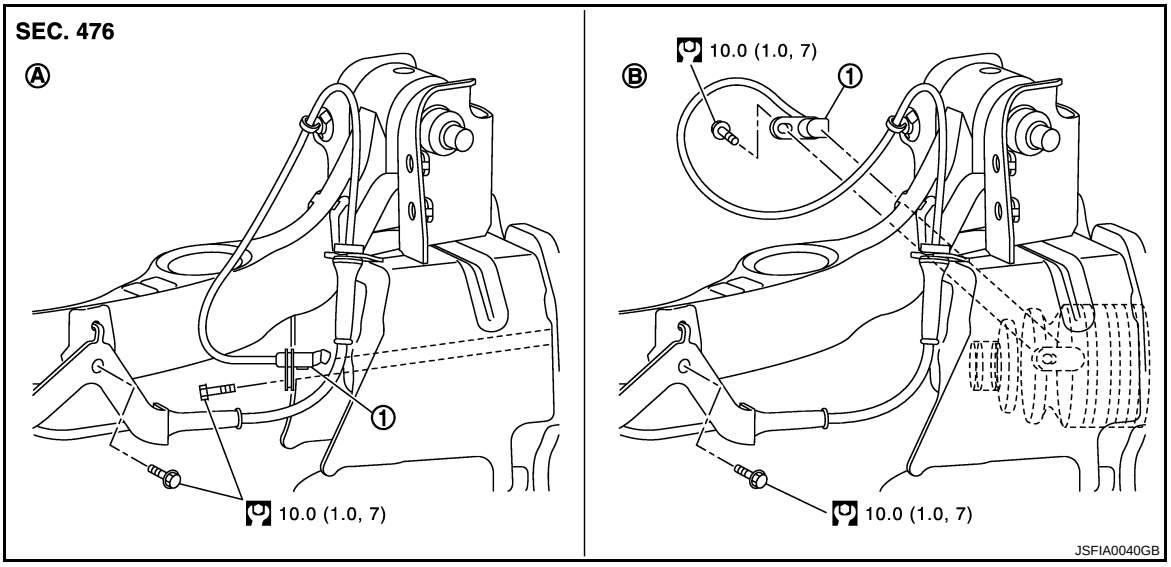
Pay attention to the following when installing wheel sensor. Tighten installation bolts to the specified torques. Refer to BRC-66, "FRONT WHEEL SENSOR : Exploded View".

- When installing, make sure there is no foreign material such as iron chips on and in the mounting hole of the wheel sensor. Make sure no foreign material has been caught in the sensor rotor. Remove any foreign material and clean the mount.
- When installing wheel sensor, be sure to press rubber grommets in until they lock at locations shown above in the figure. When installed, harness must not be twisted.

### REAR WHEEL SENSOR

## REAR WHEEL SENSOR : Exploded View

INFOID:0000000001181694




1. Rear LH wheel sensor

A. 2WD models B. 4WD models

Refer to GI section GI-4, "Components" for symbols in the figure.

**NOTE:**
The above figure (front side) shows left side. Right side is the mirror image.

## REAR WHEEL SENSOR : Removal and Installation

INFOID:0000000001181695

### REMOVAL

Pay attention to the following when removing sensor.

**CAUTION:**

- **Do not twist sensor harness as much as possible, when removing it. Pull sensors out without pulling on sensor harness.**
- **Take care to avoid damaging sensor edges or rotor teeth. Remove wheel sensor first before removing front or rear wheel hub. This is to avoid damage to sensor wiring and loss of sensor function.**

### INSTALLATION

Pay attention to the following when installing wheel sensor. Tighten installation bolts to the specified torques. Refer to BRC-67, "REAR WHEEL SENSOR : Exploded View".

- When installing, make sure there is no foreign material such as iron chips on and in the mounting hole of the wheel sensor. Make sure no foreign material has been caught in the sensor rotor. Remove any foreign material and clean the mount.
- When installing wheel sensor, be sure to press rubber grommets in until they lock at locations shown above in the figure. When installed, harness must not be twisted.

# SENSOR ROTOR

## FRONT SENSOR ROTOR

### FRONT SENSOR ROTOR : Exploded View

INFOID:0000000001181696

Refer to FAX-9, "Exploded View" (2WD models), FAX-61, "Exploded View" (4WD models).

### FRONT SENSOR ROTOR : Removal and Installation

INFOID:0000000001181697

REMOVAL

Sensor rotor cannot be disassembled. Remove the sensor rotor together with wheel hub and bearing assembly. Refer to FAX-9, "Removal and Installation" (2WD models), FAX-61, "Removal and Installation" (4WD models).

INSTALLATION

Sensor rotor cannot be disassembled. Installation the sensor rotor together with wheel hub and bearing assembly. Refer to FAX-9, "Removal and Installation" (2WD models), FAX-61, "Removal and Installation" (4WD models).

## REAR SENSOR ROTOR

### REAR SENSOR ROTOR : Exploded View

INFOID:0000000001181698

Refer to RAX-4, "Exploded View" (2WD models), RAX-13, "Exploded View" (4WD models).

### REAR SENSOR ROTOR : Removal and Installation

INFOID:0000000001181699

2WD MODELS

Removal

Sensor rotor cannot be disassembled. Remove the sensor rotor together with wheel hub and bearing assembly. Refer to RAX-4, "Removal and Installation".

Installation

Sensor rotor cannot be disassembled. Installation the sensor rotor together with wheel hub and bearing assembly. Refer to RAX-4, "Removal and Installation".

4WD MODELS

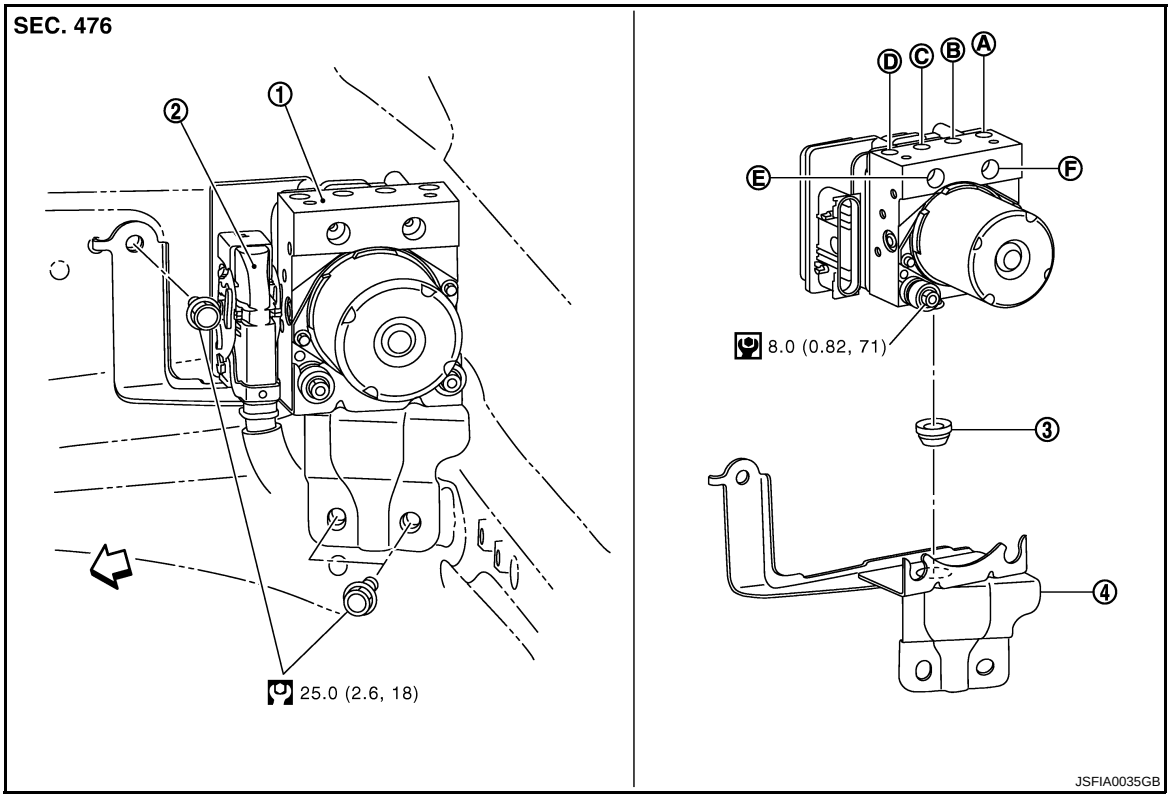
For removal and installation of sensor rotor, refer to RAX-14, "Disassembly and Assembly".

# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

## Exploded View

INFOID:0000000001181700

LHD models



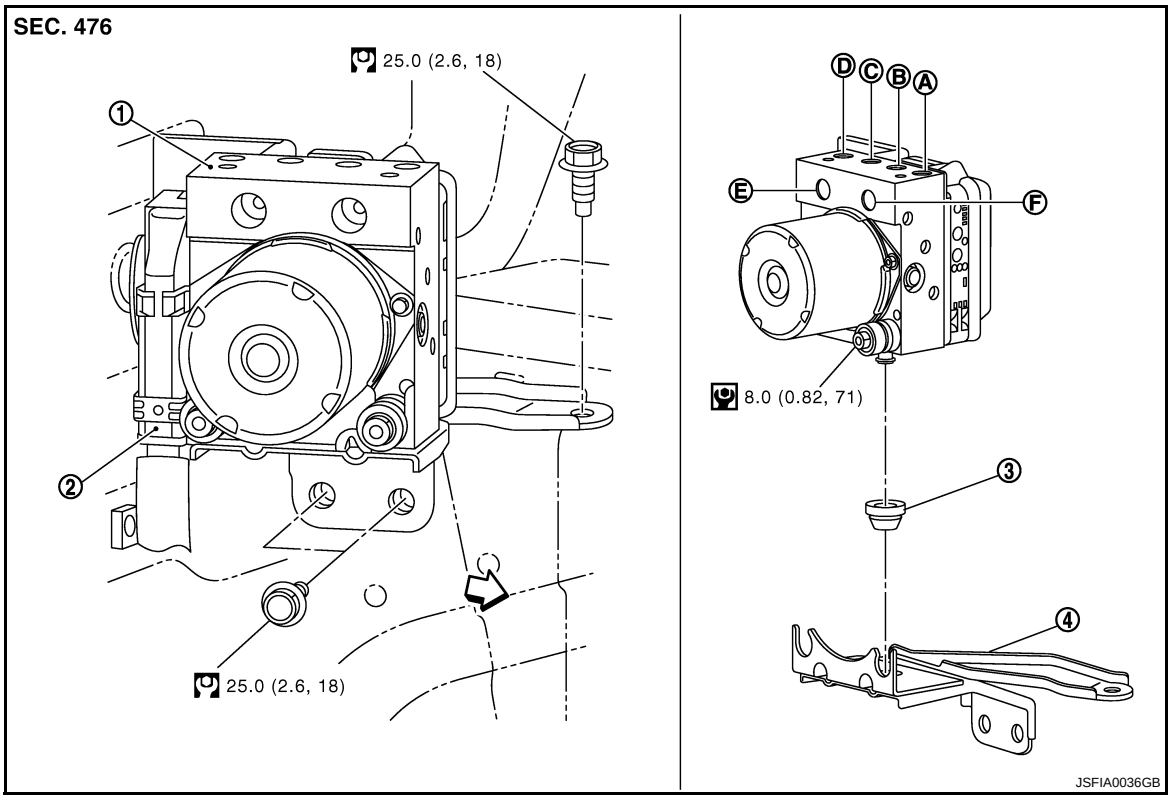

| | | | | | |
|---|---|---|---|---|---|
| 1. | ABS actuator and electric unit (control unit) | 2. | Connector | 3. | Bushing |
| 4. | Bracket | | | | |

| | | | | | |
|---|---|---|---|---|---|
| A. | To front LH brake caliper | B. | To rear RH brake caliper | C. | To Rear LH brake caliper |
| D. | To front RH brake caliper | E. | From master cylinder secondary side | F. | From master cylinder primary side |

⇦: Vehicle front

Refer to GI section GI-4, "Components" for symbols in the figure.

RHD models




| | | | | | |
|---|---|---|---|---|---|
| 1. | ABS actuator and electric unit (control unit) | 2. | Connector | 3. | Bushing |
| 4. | Bracket | | | | |
| A. | To front LH brake caliper | B. | To rear RH brake caliper | C. | To Rear LH brake caliper |
| D. | To front RH brake caliper | E. | From master cylinder secondary side | F. | From master cylinder primary side |

⇦: Vehicle front

Refer to GI section GI-4, "Components" for symbols in the figure.

## Removal and Installation

INFOID:0000000001181701

### LHD MODELS

Removal

**CAUTION:**

- **Before servicing, disconnect the battery cable from negative terminal.**
- **To remove brake tube, use a flare nut wrench to prevent flare nuts and brake tube from being damaged. To install, use flare nut crowfoot and torque wrench.**
- **Do not apply excessive impact to ABS actuator and electric unit (control unit), such as dropping it.**
- **Do not remove and install actuator by holding harness.**
- **After work is completed, bleed air from brake tube. Refer to BR-12, "Bleeding Brake System" (LHD models), BR-59, "Bleeding Brake System" (RHD models).**

1. Remove cowl top cover. Refer to EXT-19, "Exploded View".
2. Remove exhaust manifold.
   - HR16DE: EX-5, "Exploded View".
   - MR20DE: EX-10, "Exploded View".
   - K9K: EX-15, "Exploded View".
   - M9R: EM-369, "Exploded View".
3. Disconnect ABS actuator and electric unit (control unit) connector.
4. Loosen brake tube flare nuts, then remove brake tubes from ABS actuator and electric unit (control unit).
5. Remove ABS actuator and electric unit (control unit) bracket mounting nut.
6. Remove ABS actuator and electric unit (control unit) from vehicle.

Installation

Note the following, and install in the reverse order of removal.

**CAUTION:**

- **Before servicing, disconnect the battery cable from negative terminal.**
- **To remove brake tube, use a flare nut wrench to prevent flare nuts and brake tube from being damaged. To install, use flare nut crowfoot and torque wrench.**
- **Do not apply excessive impact to ABS actuator and electric unit (control unit), such as dropping it.**
- **Do not remove and install actuator by holding harness.**
- **After work is completed, bleed air from brake tube. Refer to BR-12, "Bleeding Brake System" (LHD models), BR-59, "Bleeding Brake System" (RHD models).**
- **After installing harness connector in the ABS actuator and electric unit (control unit), make sure connector is securely locked.**

RHD MODELS

Removal

**CAUTION:**

- **Before servicing, disconnect the battery cable from negative terminal.**
- **To remove brake tube, use a flare nut wrench to prevent flare nuts and brake tube from being damaged. To install, use flare nut crowfoot and torque wrench.**
- **Do not apply excessive impact to ABS actuator and electric unit (control unit), such as dropping it.**
- **Do not remove and install actuator by holding harness.**
- **After work is completed, bleed air from brake tube. Refer to BR-12, "Bleeding Brake System" (LHD models), BR-59, "Bleeding Brake System" (RHD models).**

1. Remove cowl top cover. Refer to EXT-19, "Exploded View".
2. Remove air cleaner and air duct.
   - HR16DE: EM-28, "Exploded View".
   - MR20DE: EM-145, "Exploded View".
   - K9K: EM-266, "Exploded View".
   - M9R: EM-354, "Exploded View".
3. Disconnect ABS actuator and electric unit (control unit) connector.
4. Loosen brake tube flare nuts, then remove brake tubes from ABS actuator and electric unit (control unit).
5. Remove ABS actuator and electric unit (control unit) bracket mounting nut.
6. Remove ABS actuator and electric unit (control unit) from vehicle.

Installation

Note the following, and install in the reverse order of removal.

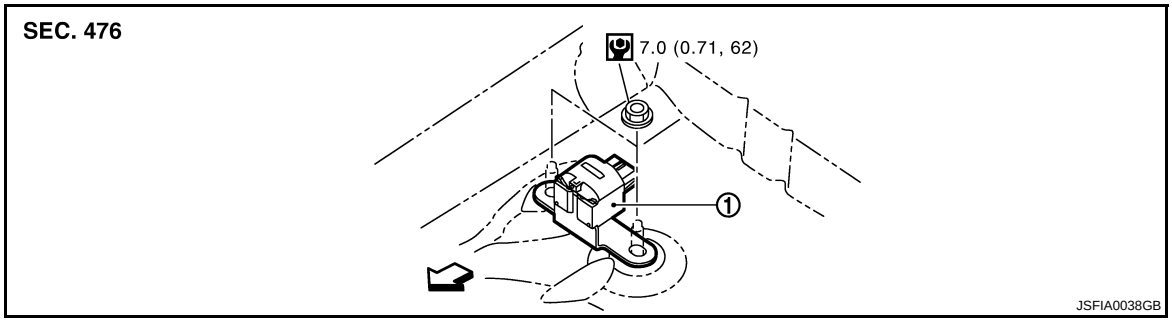
**CAUTION:**

- **Before servicing, disconnect the battery cable from negative terminal.**
- **To remove brake tube, use a flare nut wrench to prevent flare nuts and brake tube from being damaged. To install, use flare nut crowfoot and torque wrench.**
- **Do not apply excessive impact to ABS actuator and electric unit (control unit), such as dropping it.**
- **Do not remove and install actuator by holding harness.**
- **After work is completed, bleed air from brake tube. Refer to BR-12, "Bleeding Brake System" (LHD models), BR-59, "Bleeding Brake System" (RHD models).**
- **After installing harness connector in the ABS actuator and electric unit (control unit), make sure connector is securely locked.**

# G SENSOR

## Exploded View

INFOID:0000000001181702




1. G sensor

⇦: Vehicle front

Refer to GI section GI-4, "Components" for symbols in the figure.

## Removal and Installation

INFOID:0000000001181703

### REMOVAL

**CAUTION:**

- **Do not drop or strike G sensor, because it has little endurance to impact.**
- **Do not use power tool etc., because G sensor is sensitive for the impact.**

1. Remove lower instrument cover RH. Refer to IP-11, "Exploded View".
2. Disconnect G sensor harness connector.
3. Remove mounting nuts. Remove G sensor.

### INSTALLATION

Note the following, and install in the reverse order of removal.

**CAUTION:**

- **Do not drop or strike G sensor, because it has little endurance to impact.**
- **Do not use power tool etc., because G sensor is sensitive for the impact.**

# BASIC INSPECTION

## DIAGNOSIS AND REPAIR WORKFLOW

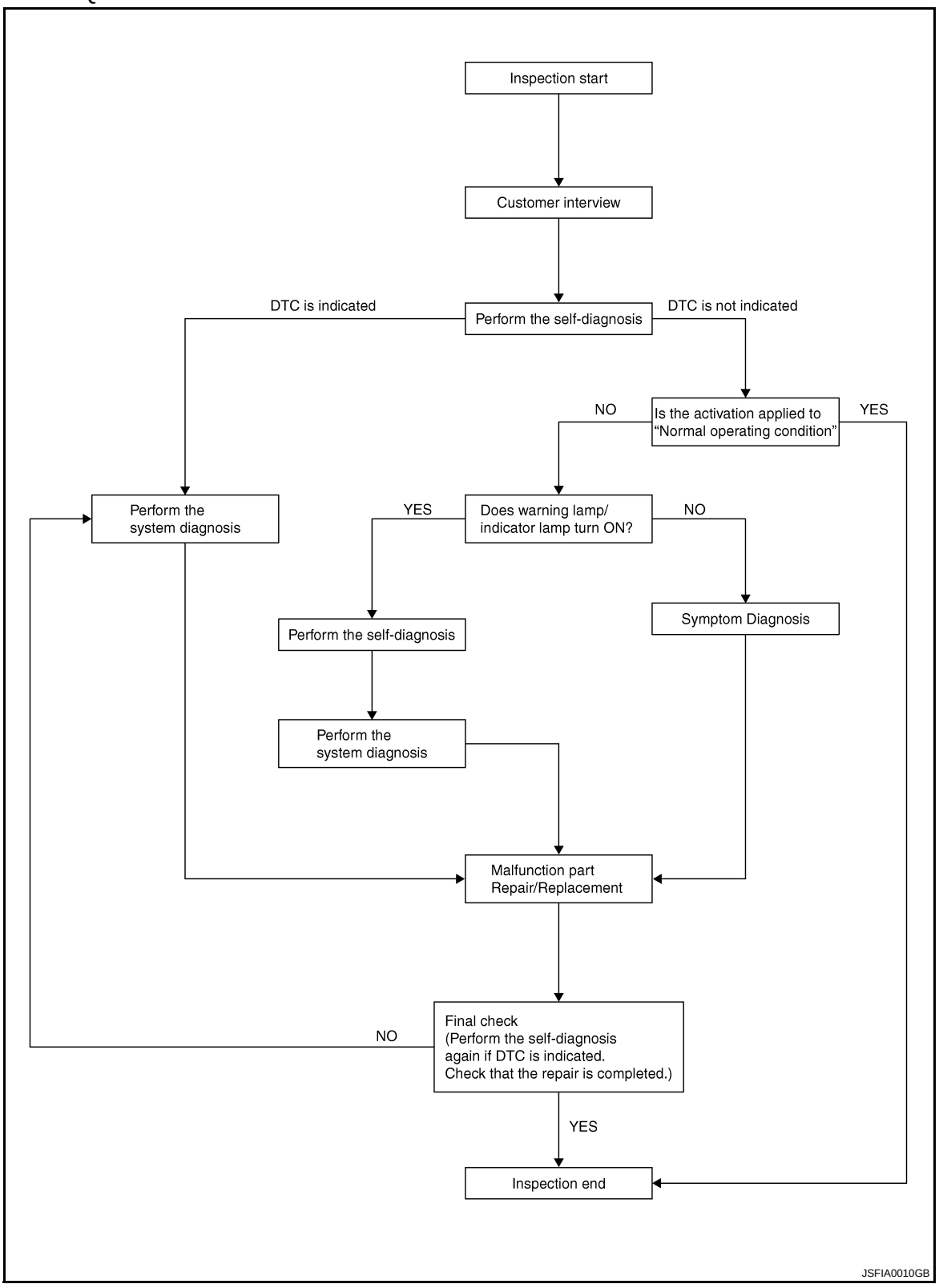
### Work Flow

INFOID:0000000001181704

#### PRECAUTIONS FOR DIAGNOSIS

If steering angle sensor, steering system parts, suspension system parts, ABS actuator and electric unit (control unit) or tires have been replaced, or if wheel alignment has been adjusted, be sure to adjust neutral position of steering angle sensor before driving. Refer to BRC-77, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

OVERALL SEQUENCE




DETAIED FLOW

## 1. COLLECT THE INFORMATION FROM THE CUSTOMER

Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using the diagnosis worksheet. Refer to BRC-76, "Diagnostic Work Sheet".

>> GO TO 2.

## 2.PERFORM THE SELF-DIAGNOSIS

Check the DTC display with the self-diagnosis function. Refer to BRC-95, "CONSULT-III Function (ABS)".

Is there any DTC displayed?

YES >> GO TO 3.
NO >> GO TO 4.

## 3.PERFORM THE SYSTEM DIAGNOSIS

Perform the diagnosis applicable to the displayed DTC. Refer to BRC-159, "DTC No. Index".

>> GO TO 7.

## 4.CHECK THE SYMPTOM THAT IS NOT CONSIDERED A SYSTEM MALFUNCTION

Check that the symptom is a normal operation that is not considered a system malfunction. Refer to BRC-167, "Description".

Is the symptom is a normal operation?

YES >> INSPECTION END
NO >> GO TO 5.

## 5.CHECK THE WARNING LAMP AND INDICATOR LAMP FOR ILLUMINATION

Check that the warning lamp and indicator lamp illuminate.
- ABS warning lamp: Refer to BRC-148, "Description".
- Brake warning lamp: Refer to BRC-149, "Description".
- ESP OFF indicator lamp: Refer to BRC-150, "Description".
- SLIP indicator lamp: Refer to BRC-151, "Description".

Is ON/OFF timing normal?

YES >> GO TO 6.
NO >> GO TO 2.

## 6.PERFORM THE DIAGNOSIS BY SYMPTOM

Perform the diagnosis applicable to the symptom.

>> GO TO 7.

## 7.REPAIR OR REPLACE THE MALFUNCTIONING PARTS

Repair or replace the specified malfunctioning parts.

>> GO TO 8.

## 8.FINAL CHECK

Perform the self-diagnosis again, and check that the malfunction is repaired completely. After checking, erase the self-diagnosis memory. Refer to BRC-95, "CONSULT-III Function (ABS)".

Is any DTC indicated?

YES >> GO TO 3.
NO >> INSPECTION END

## Diagnostic Work Sheet

INFOID:0000000001181705

| | | | |
|---|---|---|---|
| Customer name MR/MS | Model & Year | | VIN |
| Engine # | Trans. | | Mileage |
| Incident Date | Manuf. Date | | In Service Date |
| Symptoms | ☐ Noise and vibration (from engine compartment)<br>☐ Noise and vibration (from axle) | ☐ Warning / Indicator activate | ☐ Firm pedal operation<br>Large stroke pedal operation |
| | ☐ TCS does not work (Rear wheels slip when accelerating) | ☐ ABS does not work (Wheels lock when braking) | ☐ Lack of sense of acceleration |
| Engine conditions | ☐ When starting ☐ After starting | | |
| Road conditions | ☐ Low friction road ( ☐Snow ☐Gravel ☐Other )<br>☐ Bumps / potholes | | |
| Driving conditions | ☐ Full-acceleration<br>☐ High speed cornering<br>☐ Vehicle speed: Greater than 10 km/h (6 MPH)<br>☐ Vehicle speed: 10 km/h (6 MPH) or less<br>☐ Vehicle is stopped | | |
| Applying brake conditions | ☐ Suddenly<br>☐ Gradually | | |
| Other conditions | ☐ Operation of electrical equipment<br>☐ Shift change<br>☐ Other descriptions | | |

SFIA3265E

# INSPECTION AND ADJUSTMENT

## ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT

### ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description

INFOID:0000000001181706

After replacing the ABS actuator and electric unit (control unit), perform the neutral position adjustment for the steering angle sensor.

### ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement

INFOID:0000000001181707

**1.** PERFORM THE NEUTRAL POSITION ADJUSTMENT FOR THE STEERING ANGLE SENSOR

Perform the neutral position adjustment for the steering angle sensor.

>> Refer to BRC-77, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

## ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

### ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description

INFOID:0000000001181708

In case of doing work that applies to the list below, make sure to adjust neutral position of steering angle sensor before running vehicle.

×: Required –: Not required

| Situation | Adjustment of steering angle sensor neutral position |
|---|---|
| Removing/Installing ABS actuator and electric unit (control unit) | — |
| Replacing ABS actuator and electric unit (control unit) | × |
| Removing/Installing steering angle sensor | × |
| Replacing steering angle sensor | × |
| Removing/Installing steering components | × |
| Replacing steering components | × |
| Removing/Installing suspension components | × |
| Replacing suspension components | × |
| Change tires to new ones | — |
| Tire rotation | — |
| Adjusting wheel alignment | × |

### ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement

INFOID:0000000001181709

ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

**CAUTION:**

**To adjust neutral position of steering angle sensor, make sure to use CONSULT-III.**
**(Adjustment cannot be done without CONSULT-III).**

**1.** ALIGN THE VEHICLE STATUS

Stop vehicle with front wheels in straight-ahead position.

>> GO TO 2.

**2.** PERFORM THE NEUTRAL POSITION ADJUSTMENT FOR THE STEERING ANGLE SENSOR

1. On the CONSULT-III screen, touch "WORK SUPPORT" and "ST ANG SENS ADJUSTMENT" in order.
2. Touch “START”.

**CAUTION:**
**Do not touch steering wheel while adjusting steering angle sensor.**

3. After approximately 10 seconds, touch “END”.
**NOTE:**
After approximately 60 seconds, it ends automatically.
4. Turn ignition switch OFF, then turn it ON again.
**CAUTION:**
**Be sure to perform above operation.**

>> GO TO 3.

## 3.CHECK DATA MONITOR

1. Run vehicle with front wheels in straight-ahead position, then stop.
2. Select “DATA MONITOR”. Then make sure “STR ANGLE SIG” is within 0±2.5°.

Is the steering angle within the specified range?

YES >> GO TO 4.
NO >> Perform the neutral position adjustment for the steering angle sensor again, GO TO 1.

## 4.ERASE THE SELF-DIAGNOSIS MEMORY

Erase the self-diagnosis memories of the ABS actuator and electric unit (control unit) and ECM.
• ABS actuator and electric unit (control unit): Refer to BRC-95, "CONSULT-III Function (ABS)".
• ECM
- HR16DE (With EURO-OBD): ECH-89, "CONSULT-III Function".
- HR16DE (Without EURO-OBD): ECH-419, "CONSULT-III Function".
- MR20DE (With EURO-OBD): ECM-91, "CONSULT-III Function".
- MR20DE (Without EURO-OBD): ECM-425, "CONSULT-III Function".
- K9K: ECK-63, "Diagnosis Description".
- M9R: ECR-101, "CONSULT-III Function".

Are the memories erased?

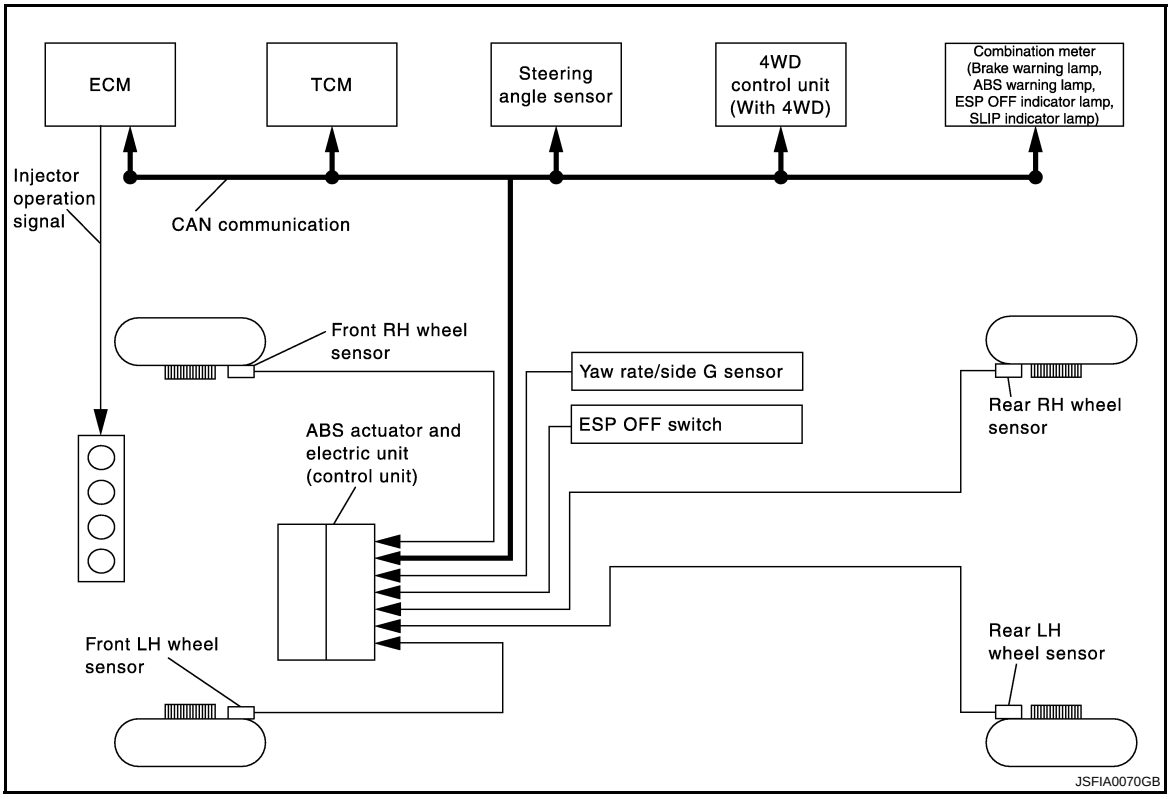
YES >> INSPECTION END
NO >> Check the items indicated by the self-diagnosis.

# FUNCTION DIAGNOSIS

## ESP

### System Diagram

INFOID:0000000001181710




### System Description

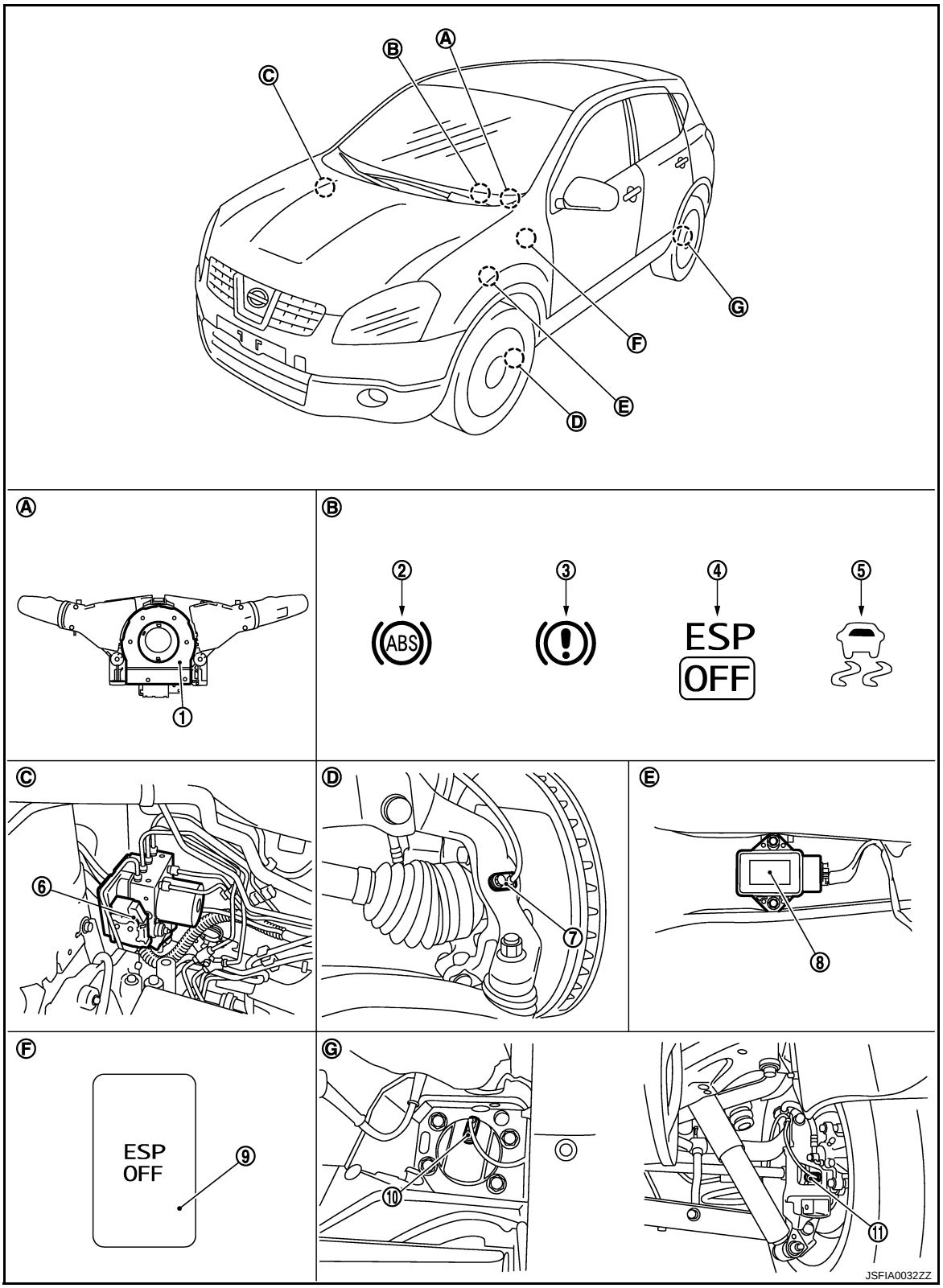
INFOID:0000000001181711

- Electronic Stability Program system detects driver's steering operation amount and brake pedal travel from steering angle sensor and pressure sensor. Using information from yaw rate sensor, G sensor and wheel sensor, ESP judges driving condition (conditions of under steer and over steer) to improve vehicle driving stability by controlling brake application to 4 wheels and engine output.
- During ESP operation, it informs driver of system operation by flashing SLIP indicator lamp.
- Electrical system diagnosis by CONSULT-III is available.

## Component Parts Location

INFOID:0000000001181712

LHD models

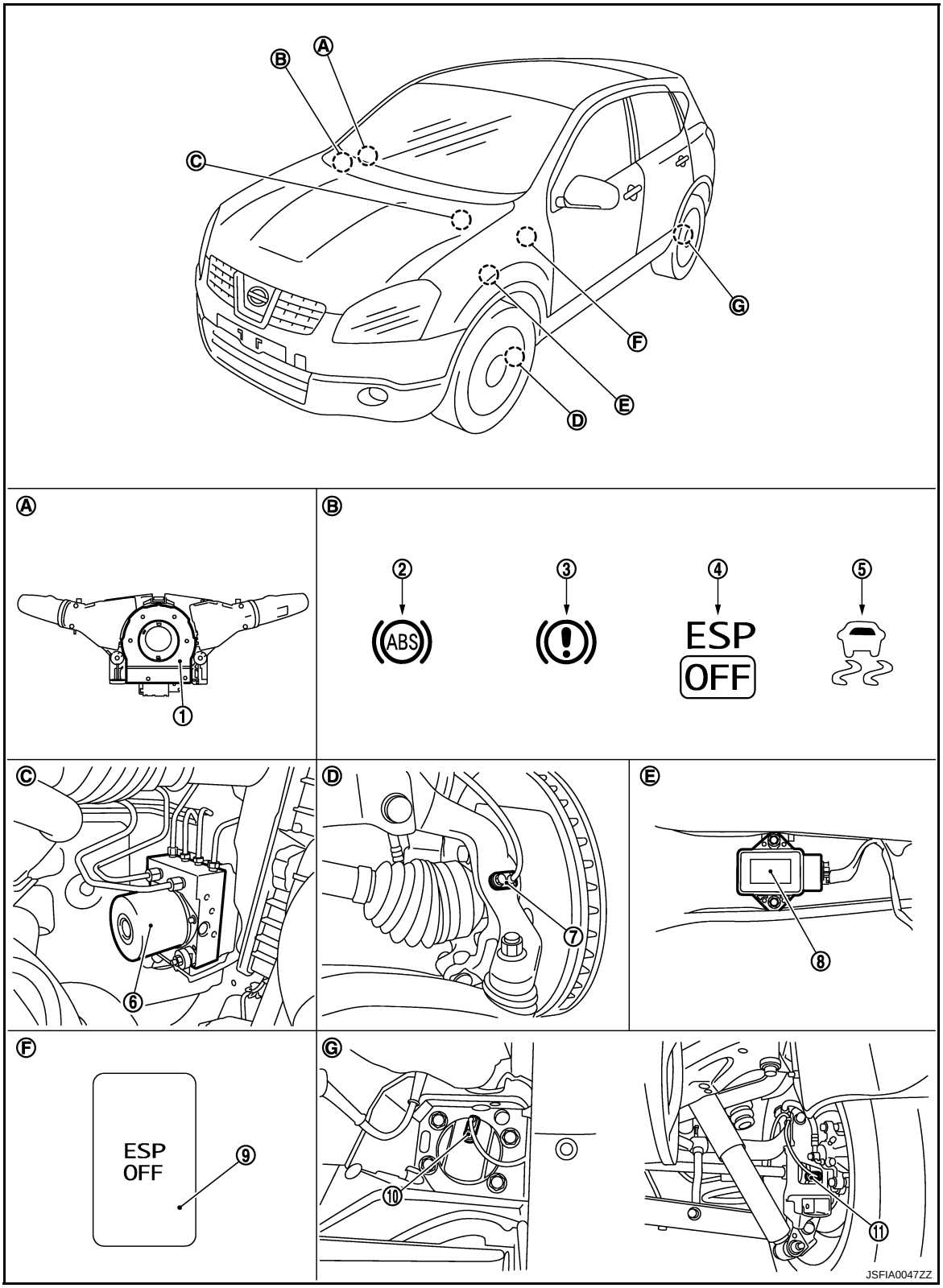



1. Steering angle sensor
2. ABS warning lamp
3. Brake warning lamp
4. ESP OFF indicator lamp
5. SLIP indicator lamp
6. ABS actuator and electric unit (control unit)
7. Front wheel sensor
8. Yaw rate/side G sensor
9. ESP OFF switch

10. Rear wheel sensor (2WD models)
11. Rear wheel sensor (4WD models)

A. Back of spiral cable assembly
B. Combination meter
C. Right side in engine room
D. Steering knuckle
E. Lower instrument cover RH
F. Instrument driver lower panel
G. Rear suspension arm

RHD models



1. Steering angle sensor
2. ABS warning lamp
3. Brake warning lamp
4. ESP OFF indicator lamp
5. SLIP indicator lamp
6. ABS actuator and electric unit (control unit)
7. Front wheel sensor
8. Yaw rate/side G sensor
9. ESP OFF switch
10. Rear wheel sensor (2WD models)
11. Rear wheel sensor (4WD models)
A. Back of spiral cable assembly
B. Combination meter
C. Left side in engine room
D. Steering knuckle
E. Lower instrument cover RH
F. Instrument driver lower panel
G. Rear suspension arm

## Component Description

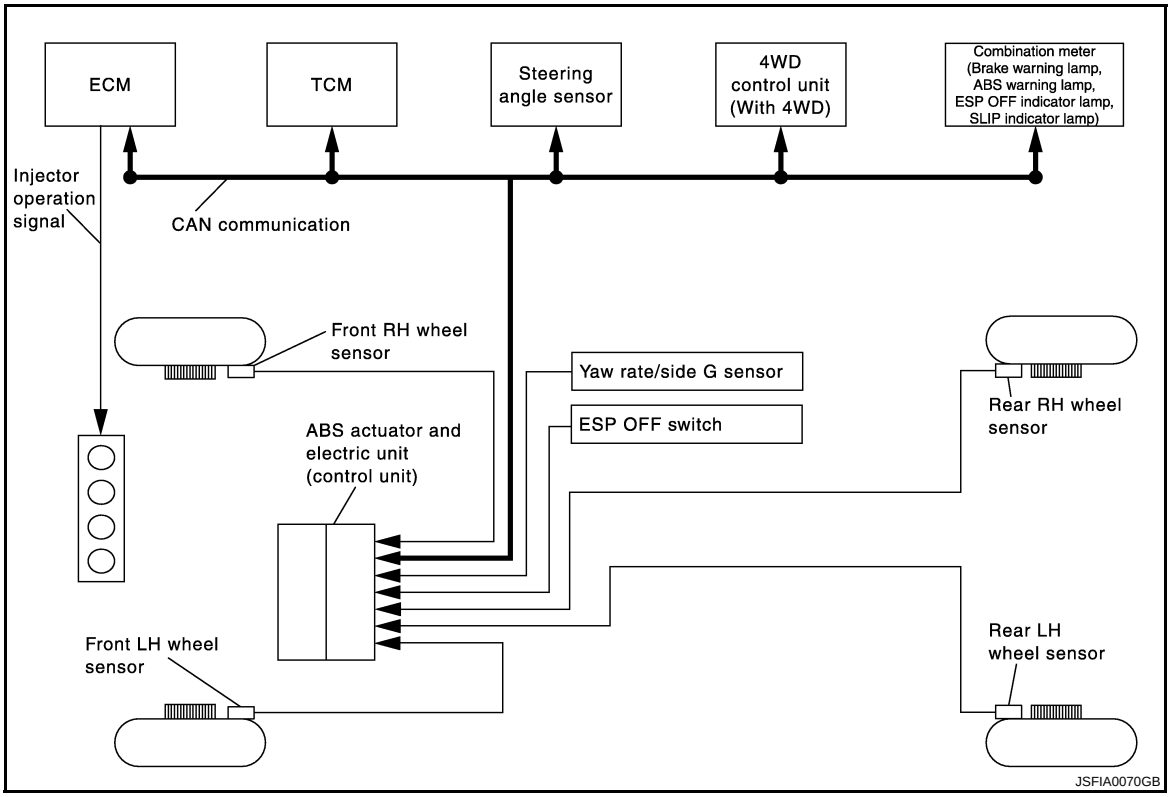
INFOID:0000000001181713

| Component parts | | Reference |
|---|---|---|
| ABS actuator and electric unit (control unit) | Pump | BRC-109, "Description" |
| | Motor | |
| | Actuator relay (Main relay) | BRC-112, "Description" |
| | Solenoid valve | BRC-120, "Description" |
| | Pressure sensor | BRC-127, "Description" |
| | ESP switch-over valve (USV1, USV2, HSV1, HSV2) | BRC-137, "Description" |
| Wheel sensor | | BRC-99, "Description" |
| Yaw rate sensor | | BRC-132, "Description" |
| G sensor | | BRC-135, "Description" |
| Steering angle sensor | | BRC-129, "Description" |
| ESP OFF switch | | BRC-146, "Description" |
| ABS warning lamp | | BRC-148, "Description" |
| Brake warning lamp | | BRC-149, "Description" |
| ESP OFF indicator lamp | | BRC-150, "Description" |
| SLIP indicator lamp | | BRC-151, "Description" |

# TCS

## System Diagram

INFOID:0000000001181714




## System Description

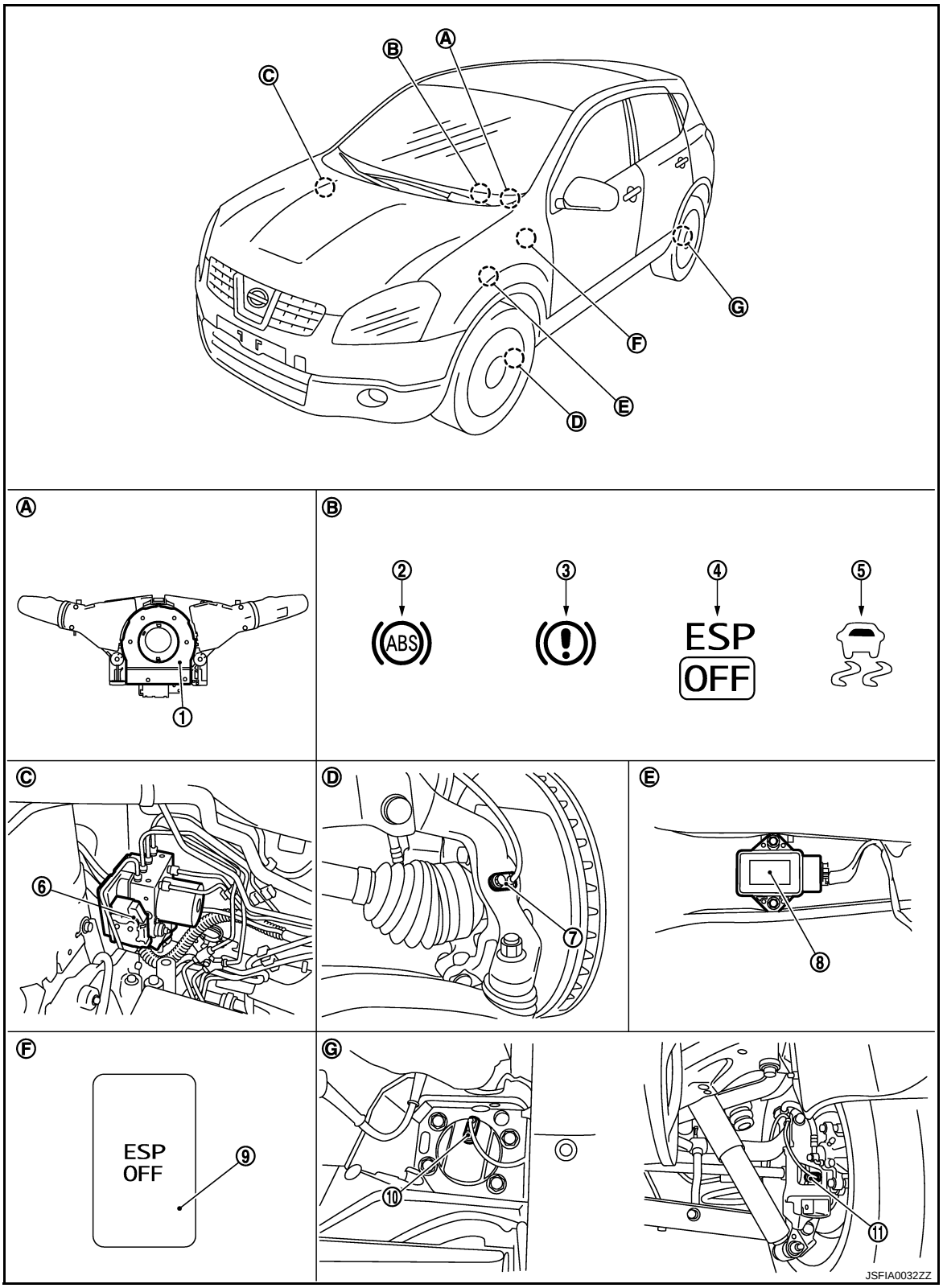
INFOID:0000000001181715

- Traction Control System is a function that electronically controls engine torque, brake fluid pressure and gear ratio (except M/T) to ensure the optimum slippage ratio at drive wheels by computing wheel speed signals from 4 wheel sensors. When ABS actuator and electric unit (control unit) detects a spin at drive wheels (rear wheels), it compares wheel speed signals from all 4 wheels. At this time, LH and RH rear brake fluid pressure are controlled, while fuel being cut to engine and throttle valve being closed to reduce engine torque by the control unit. Further more, throttle position is continuously controlled to ensure the optimum engine torque at all times.
- During TCS operation, it informs driver of system operation by flashing SLIP indicator lamp.
- Electrical system diagnosis by CONSULT-III is available.

## Component Parts Location

INFOID:0000000001181716

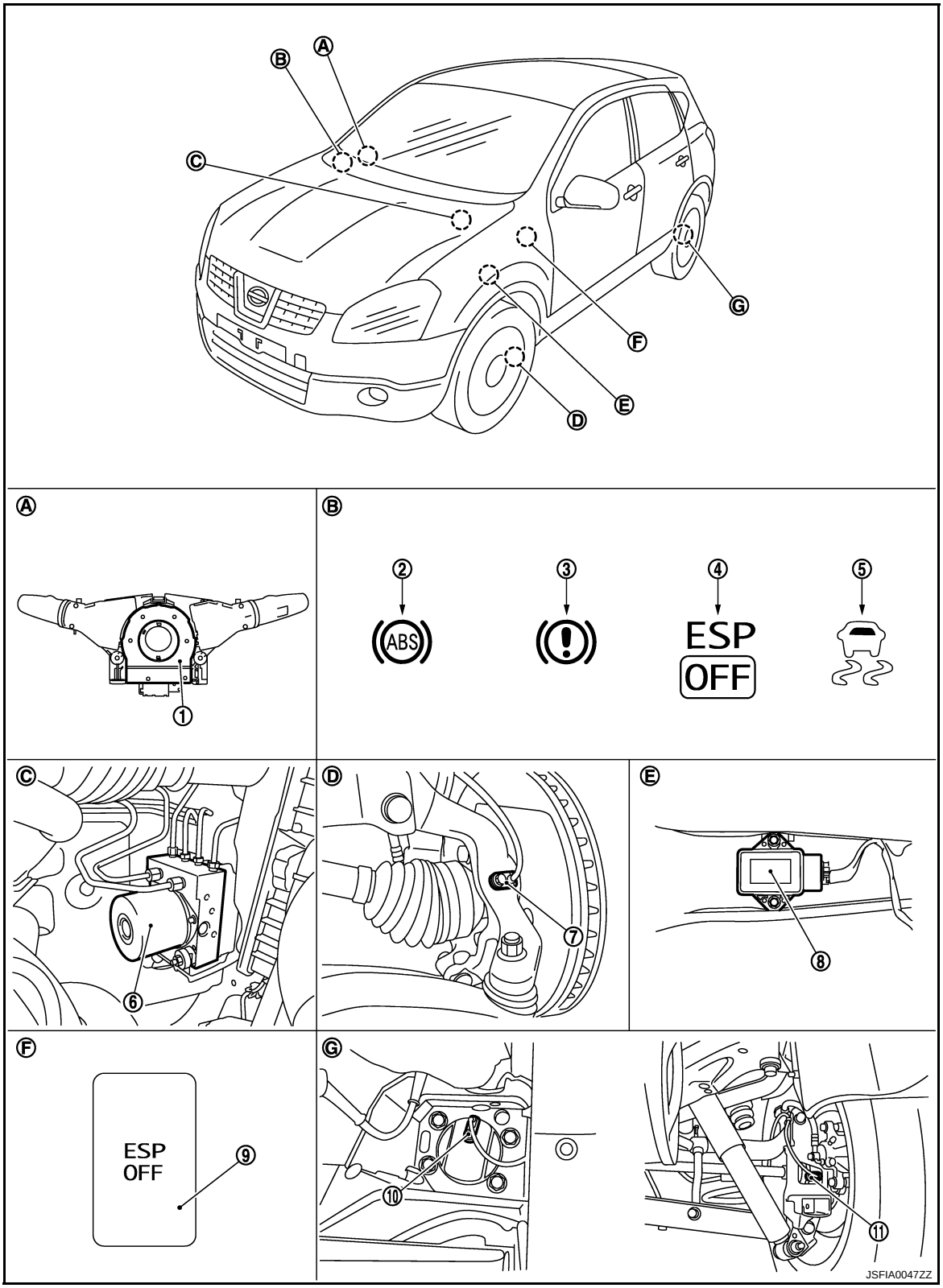
LHD models




1. Steering angle sensor
2. ABS warning lamp
3. Brake warning lamp
4. ESP OFF indicator lamp
5. SLIP indicator lamp
6. ABS actuator and electric unit (control unit)
7. Front wheel sensor
8. Yaw rate/side G sensor
9. ESP OFF switch

10. Rear wheel sensor (2WD models)
11. Rear wheel sensor (4WD models)
A. Back of spiral cable assembly
B. Combination meter
C. Right side in engine room
D. Steering knuckle
E. Lower instrument cover RH
F. Instrument driver lower panel
G. Rear suspension arm

RHD models



1. Steering angle sensor
2. ABS warning lamp
3. Brake warning lamp
4. ESP OFF indicator lamp
5. SLIP indicator lamp
6. ABS actuator and electric unit (control unit)
7. Front wheel sensor
8. Yaw rate/side G sensor
9. ESP OFF switch
10. Rear wheel sensor (2WD models)
11. Rear wheel sensor (4WD models)
A. Back of spiral cable assembly
B. Combination meter
C. Left side in engine room
D. Steering knuckle
E. Lower instrument cover RH
F. Instrument driver lower panel
G. Rear suspension arm

## Component Description

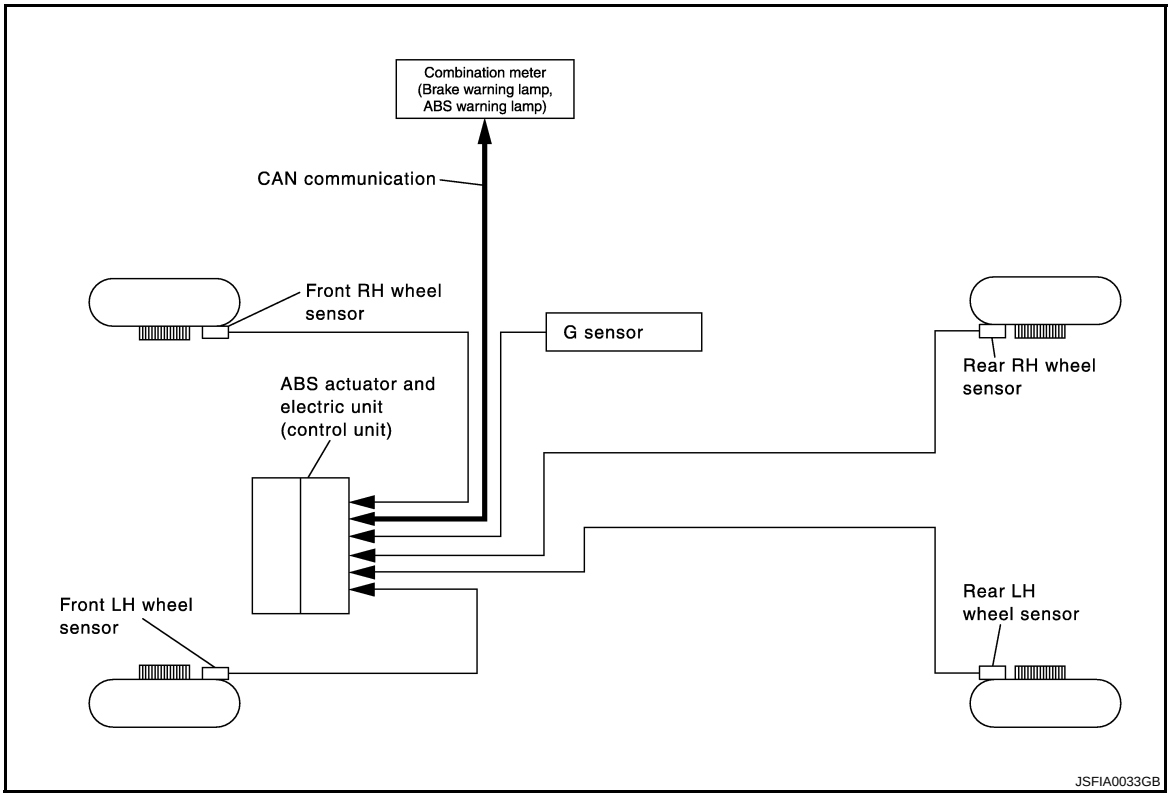
INFOID:0000000001181717

| Component parts | | Reference |
|---|---|---|
| ABS actuator and electric unit (control unit) | Pump | BRC-109, "Description" |
| | Motor | |
| | Actuator relay (Main relay) | BRC-112, "Description" |
| | Solenoid valve | BRC-120, "Description" |
| | Pressure sensor | BRC-127, "Description" |
| | ESP switch-over valve (USV1, USV2, HSV1, HSV2) | BRC-137, "Description" |
| Wheel sensor | | BRC-99, "Description" |
| Yaw rate sensor | | BRC-132, "Description" |
| G sensor | | BRC-135, "Description" |
| Steering angle sensor | | BRC-129, "Description" |
| ESP OFF switch | | BRC-146, "Description" |
| ABS warning lamp | | BRC-148, "Description" |
| Brake warning lamp | | BRC-149, "Description" |
| ESP OFF indicator lamp | | BRC-150, "Description" |
| SLIP indicator lamp | | BRC-151, "Description" |

# ABS

## System Diagram

INFOID:0000000001181718




## System Description

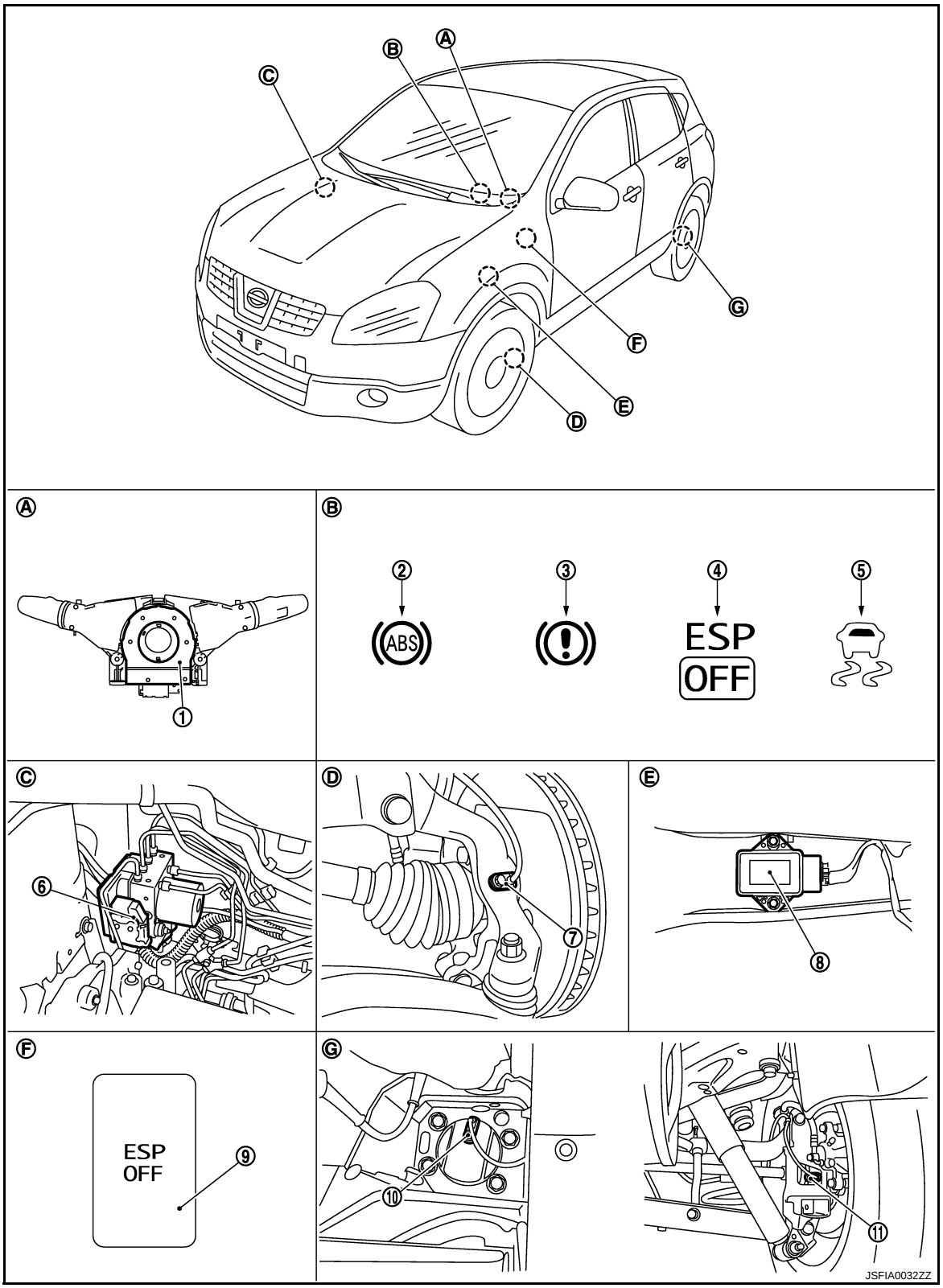
INFOID:0000000001181719

- Anti-Lock Braking System is a function that detects wheel revolution while braking, electronically controls braking force, and prevents wheel locking during sudden braking. It improves handling stability and maneuverability for avoiding obstacles.
- Electrical system diagnosis by CONSULT-III is available.

## Component Parts Location

INFOID:0000000001181720

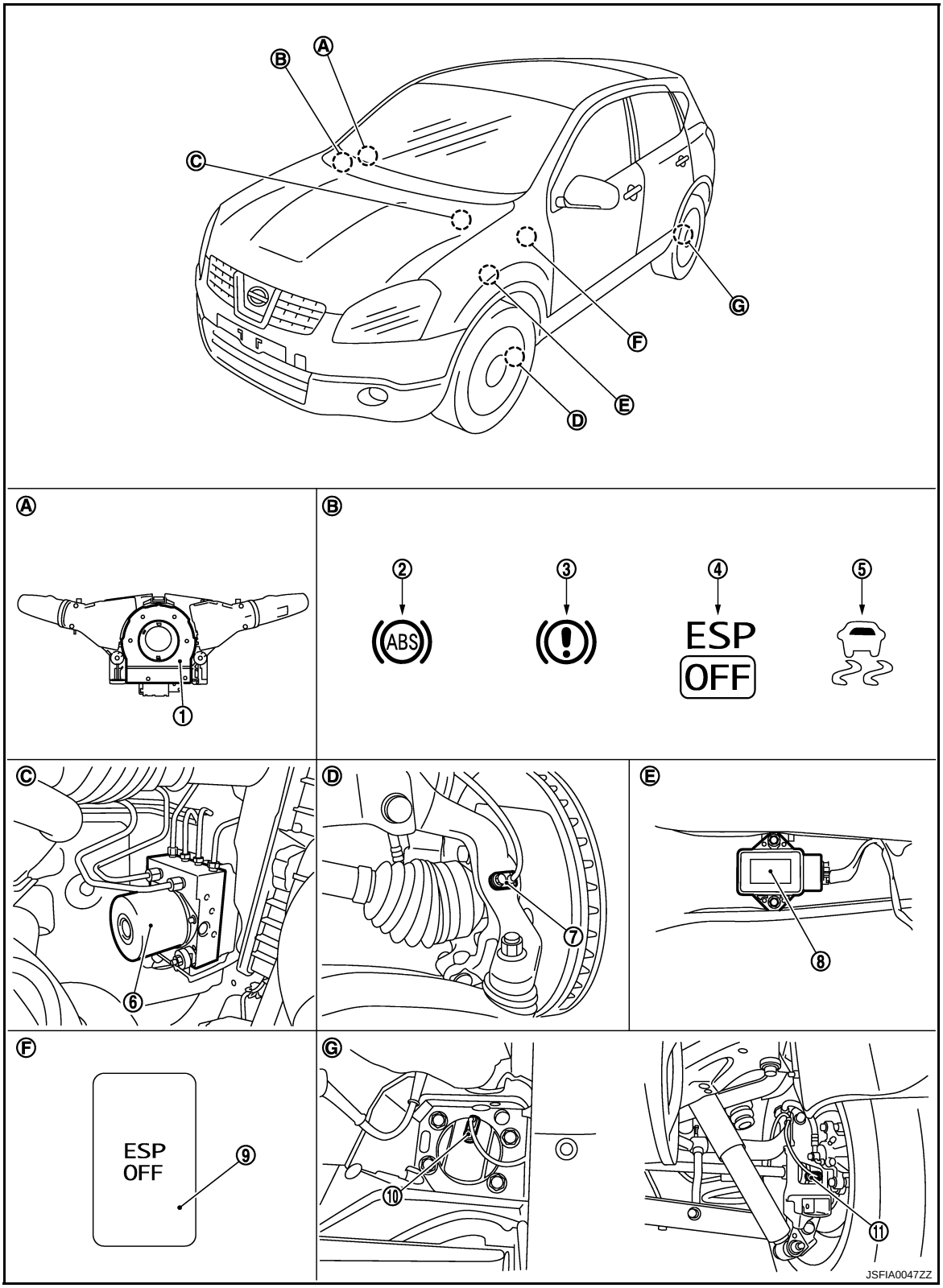
LHD models




1. Steering angle sensor
2. ABS warning lamp
3. Brake warning lamp
4. ESP OFF indicator lamp
5. SLIP indicator lamp
6. ABS actuator and electric unit (control unit)
7. Front wheel sensor
8. Yaw rate/side G sensor
9. ESP OFF switch

10. Rear wheel sensor (2WD models)
11. Rear wheel sensor (4WD models)
A. Back of spiral cable assembly
B. Combination meter
C. Right side in engine room
D. Steering knuckle
E. Lower instrument cover RH
F. Instrument driver lower panel
G. Rear suspension arm

RHD models



1. Steering angle sensor
2. ABS warning lamp
3. Brake warning lamp
4. ESP OFF indicator lamp
5. SLIP indicator lamp
6. ABS actuator and electric unit (control unit)
7. Front wheel sensor
8. Yaw rate/side G sensor
9. ESP OFF switch
10. Rear wheel sensor (2WD models)
11. Rear wheel sensor (4WD models)
A. Back of spiral cable assembly
B. Combination meter
C. Left side in engine room
D. Steering knuckle
E. Lower instrument cover RH
F. Instrument driver lower panel
G. Rear suspension arm

## Component Description

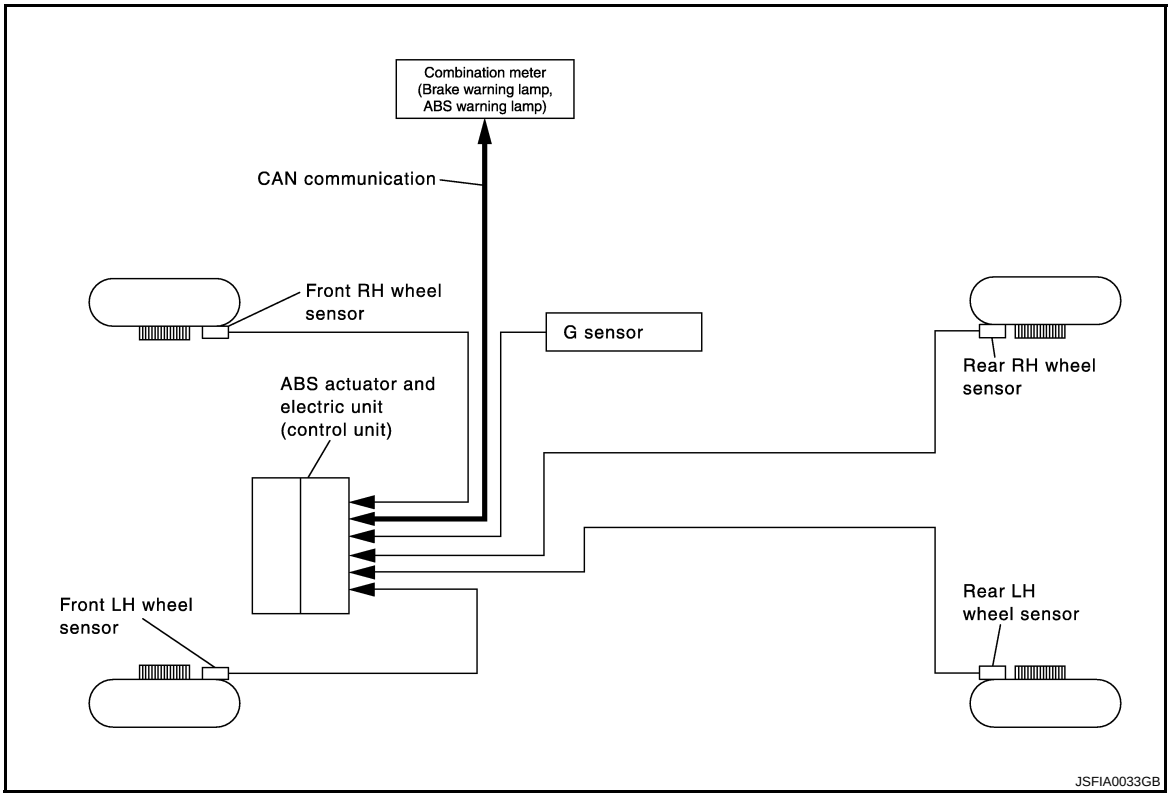
INFOID:0000000001181721

| Component parts | | Reference |
|---|---|---|
| ABS actuator and electric unit (control unit) | Pump | BRC-109, "Description" |
| | Motor | |
| | Actuator relay (Main relay) | BRC-112, "Description" |
| | Solenoid valve | BRC-120, "Description" |
| Wheel sensor | | BRC-99, "Description" |
| ABS warning lamp | | BRC-148, "Description" |
| Brake warning lamp | | BRC-149, "Description" |

# EBD

## System Diagram

INFOID:0000000001181722




## System Description

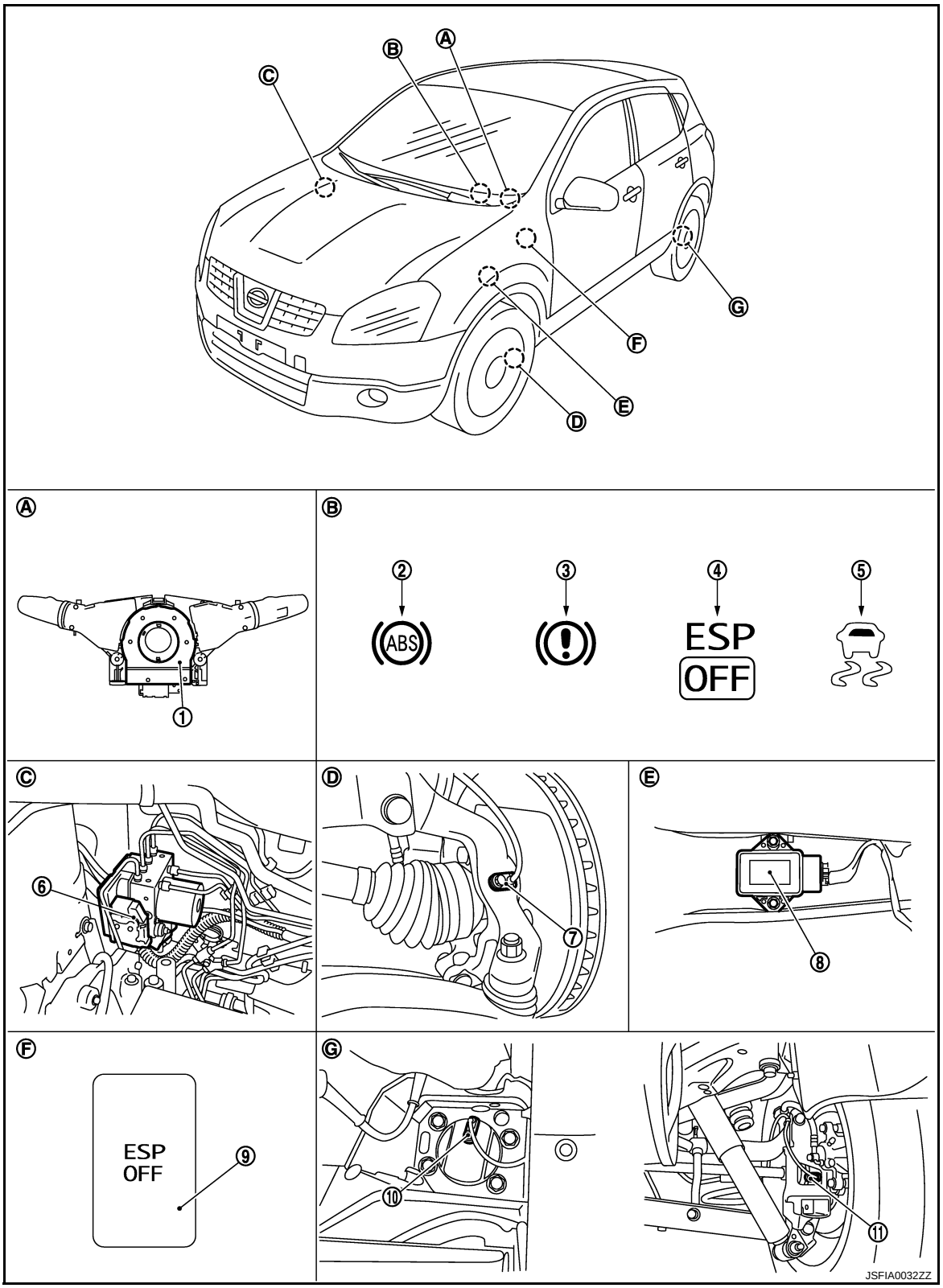
INFOID:0000000001181723

- Electric Brake force Distribution is a following function. ABS actuator and electric unit (control unit) detects subtle slippages between the front and rear wheels during braking. Then is electronically controls the rear braking force (brake fluid pressure) to reducing and reduces rear wheel slippage. Accordingly it improves vehicle stability.
- Electrical system diagnosis by CONSULT-III is available.

## Component Parts Location

INFOID:0000000001181724

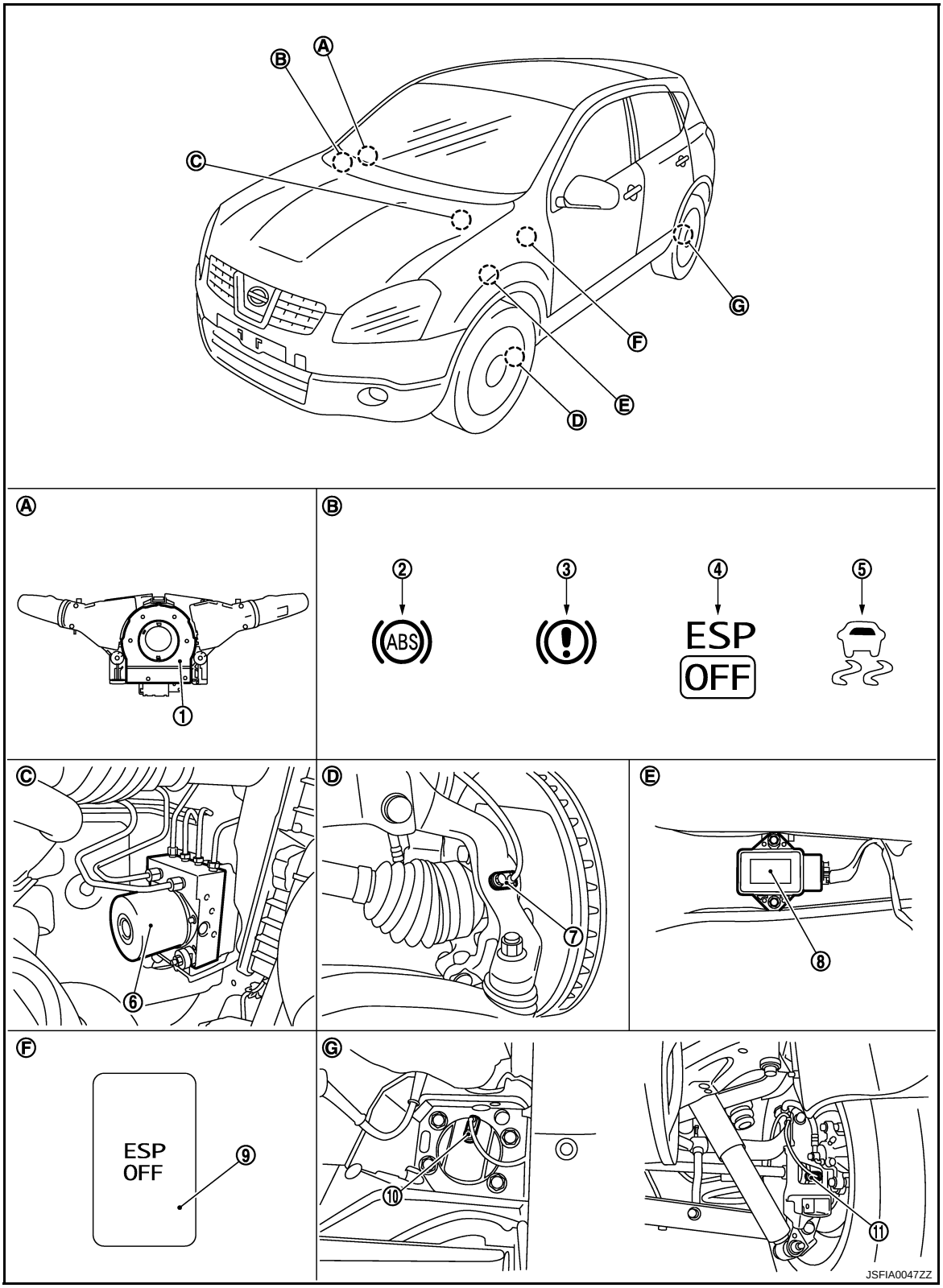
LHD models




1. Steering angle sensor
2. ABS warning lamp
3. Brake warning lamp
4. ESP OFF indicator lamp
5. SLIP indicator lamp
6. ABS actuator and electric unit (control unit)
7. Front wheel sensor
8. Yaw rate/side G sensor
9. ESP OFF switch

10. Rear wheel sensor (2WD models)
11. Rear wheel sensor (4WD models)
A. Back of spiral cable assembly
B. Combination meter
C. Right side in engine room
D. Steering knuckle
E. Lower instrument cover RH
F. Instrument driver lower panel
G. Rear suspension arm

RHD models



1. Steering angle sensor
2. ABS warning lamp
3. Brake warning lamp
4. ESP OFF indicator lamp
5. SLIP indicator lamp
6. ABS actuator and electric unit (control unit)
7. Front wheel sensor
8. Yaw rate/side G sensor
9. ESP OFF switch
10. Rear wheel sensor (2WD models)
11. Rear wheel sensor (4WD models)
A. Back of spiral cable assembly
B. Combination meter
C. Left side in engine room
D. Steering knuckle
E. Lower instrument cover RH
F. Instrument driver lower panel
G. Rear suspension arm

## Component Description

INFOID:0000000001181725

| Component parts | | Reference |
|---|---|---|
| ABS actuator and electric unit (control unit) | Pump | BRC-109, "Description" |
| | Motor | |
| | Actuator relay (Main relay) | BRC-112, "Description" |
| | Solenoid valve | BRC-120, "Description" |
| Wheel sensor | | BRC-99, "Description" |
| ABS warning lamp | | BRC-148, "Description" |
| Brake warning lamp | | BRC-149, "Description" |

# DIAGNOSIS SYSTEM [ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)]

## CONSULT-III Function (ABS)

INFOID:0000000001181726

### FUNCTION

CONSULT-III can display each diagnostic item using the diagnostic test modes shown following.

| Diagnostic test mode | Function |
|---|---|
| Work support | This mode enables a technician to adjust some devices faster and more accurately by following the indications on CONSULT-III. |
| Self-diagnostic results | Self-diagnostic results can be read and erased quickly. |
| Data monitor | Input/Output data in the ABS actuator and electric unit (control unit) can be read. |
| Active test | Diagnostic test mode is which CONSULT-III drives some actuators apart from the ABS actuator and electric unit (control unit) and also shifts some parameters in a specified range. |
| ECU part number | ABS actuator and electric unit (control unit) part number can be read. |
| CAN diagnostic support monitor | The results of transmit/receive diagnosis of CAN communication can be read. |

### SELF-DIAG RESULTS MODE

Operation Procedure

1. Before performing the self-diagnosis, start engine and drive vehicle at 30 km/h (19 MPH) or more for approximately 1 minute.

How to Erase Self-diagnosis Results

1. After erasing DTC memory, start engine and drive vehicle at 30 km/h (19 MPH) or more for approximately 1 minute as the final inspection, and make sure that the ABS warning lamp, ESP OFF indicator lamp, SLIP indicator lamp and brake warning lamp turn OFF.
   **CAUTION:**
   **If memory cannot be erased, perform applicably diagnosis.**
   **NOTE:**
   - When the wheel sensor malfunctions, after inspecting the wheel sensor system, the ABS warning lamp, ESP OFF indicator lamp, SLIP indicator lamp and brake warning lamp will not turn OFF even when the system is normal unless the vehicle is driving at approximately 30 km/h (19 MPH) or more for approximately 1 minute.
   - Brake warning lamp will turn ON in case of parking brake operation (when switch is ON) or of brake fluid level switch operation (when brake fluid is insufficient).
   - ESP OFF switch should not stay “ON” position.

Display Item List

Refer to BRC-159, "DTC No. Index".

### DATA MONITOR MODE

Display Item List

×: Applicable ❑: Optional item

| Monitor item (Unit) | SELECT MONITOR ITEM | | Remarks |
|---|---|---|---|
| | ECU INPUT SIGNALS | MAIN SIGNLAS | |
| FR LH SENSOR [km/h (MPH)] | × | × | Wheel speed |
| FR RH SENSOR [km/h (MPH)] | × | × | |
| RR LH SENSOR [km/h (MPH)] | × | × | |
| RR RH SENSOR [km/h (MPH)] | × | × | |

| Monitor item (Unit) | SELECT MONITOR ITEM | | Remarks |
|---|---|---|---|
| | ECU INPUT SIGNALS | MAIN SIGNLAS | |
| STOP LAMP SW (On/Off) | × | × | Stop lamp switch signal status |
| BATTERY VOLT (V) | × | × | Battery voltage supplied to the ABS actuator and electric unit (control unit) |
| GEAR | × | × | Gear position determined by TCM |
| SLCT LVR POSI | × | × | Selector lever position (except M/T) |
| OFF SW (On/Off) | ❑ | × | ESP OFF switch |
| YAW RATE SEN (°/s) | × | × | Yaw rate detected by yaw rate/side G sensor |
| ACCEL POS SIG (%) | × | ❑ | Throttle actuator opening/closing is displayed (Linked with accelerator pedal) |
| SIDE G-SENSOR ($m/s^2$) | × | ❑ | Transverse G detected by yaw rate/side G sensor |
| STR ANGLE SIG (°) | × | ❑ | Steering angle detected by steering angle sensor |
| PRESS SENSOR (bar) | × | ❑ | Brake fluid pressure detected by pressure sensor |
| ENGINE RPM [tr/min (rpm)] | × | ❑ | Engine speed |
| FLUID LEV SW (On/Off) | × | ❑ | Brake fluid level switch signal status |
| PARK BRAKE SW (On/Off) | × | ❑ | Parking brake switch signal status |
| FR RH IN SOL (On/Off) | ❑ | × | Operation status of each solenoid valve |
| FR RH OUT SOL (On/Off) | ❑ | × | |
| FR LH IN SOL (On/Off) | ❑ | × | |
| FR LH OUT SOL (On/Off) | ❑ | × | |
| RR RH IN SOL (On/Off) | ❑ | × | |
| RR RH OUT SOL (On/Off) | ❑ | × | |
| RR LH IN SOL (On/Off) | ❑ | × | |
| RR LH OUT SOL (On/Off) | ❑ | × | |
| MOTOR RELAY (On/Off) | ❑ | × | Motor and motor relay operation |
| ACTUATOR RLY NOTE (On/Off) | ❑ | × | Actuator relay operation |
| ABS WARN LAMP (On/Off) | ❑ | × | ABS warning lamp |
| OFF LAMP (On/Off) | ❑ | × | ESP OFF indicator lamp |
| SLIP LAMP (On/Off) | ❑ | × | SLIP indicator lamp |

**NOTE:**

Every 20 seconds momentary switch to OFF.

## ACTIVE TEST MODE

**CAUTION:**

- **Do not perform active test while driving vehicle.**
- **Make sure to completely bleed air from brake system.**
- **The active test cannot be performed with the ABS warning lamp, ESP OFF indicator lamp, SLIP indicator lamp and brake warning lamp are on.**
- **ABS warning lamp, ESP OFF indicator lamp, SLIP indicator lamp and brake warning lamp are on during active test.**
- **Erase memory of ICC system after implementing active test.**

**NOTE:**

- When active test is performed while depressing the pedal, the pedal depression amount will change. This is normal. (Only solenoid valve and ABS motor.)
- “TEST IS STOPPED” is displayed 10 seconds after operation start.
- After “TEST IS STOPPED” is displayed, to perform test again.

Test Item

ABS SOLENOID VALVE

- For ABS solenoid valve, touch “UP”, “KEEP” and “DOWN”. Then use screen monitor to check that solenoid valve operates as shown in the table below.

| Test item | Display item | Display | | |
|---|---|---|---|---|
| | | UP | KEEP | DOWN |
| FR RH SOL | FR RH IN SOL | OFF | ON | ON |
| | FR RH OUT SOL | OFF | OFF | ON* |
| | USV [FR-RL] | OFF | OFF | OFF |
| | HSV [FR-RL] | OFF | OFF | OFF |
| FR LH SOL | FR LH IN SOL | OFF | ON | ON |
| | FR LH OUT SOL | OFF | OFF | ON* |
| | USV [FL-RR] | OFF | OFF | OFF |
| | HSV [FL-RR] | OFF | OFF | OFF |
| RR RH SOL | RR RH IN SOL | OFF | ON | ON |
| | RR RH OUT SOL | OFF | OFF | ON* |
| | USV [FL-RR] | OFF | OFF | OFF |
| | HSV [FL-RR] | OFF | OFF | OFF |
| RR LH SOL | RR LH IN SOL | OFF | ON | ON |
| | RR LH OUT SOL | OFF | OFF | ON* |
| | USV [FR-RL] | OFF | OFF | OFF |
| | HSV [FR-RL] | OFF | OFF | OFF |

*: ON for 1 to 2 seconds after the touch, and then OFF.

**NOTE:**

A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is malfunction because it is an operation for checking.

ABS SOLENOID VALVE (ACT)

- For ABS solenoid valve (ACT), touch “UP”, “ACT UP” and “ACT KEEP”. Then use screen monitor to check that solenoid valve operates as shown in the table below.

| Test item | Display item | Display | | |
|---|---|---|---|---|
| | | UP | KEEP | DOWN |
| FR RH SOL | FR RH IN SOL | OFF | OFF | OFF |
| | FR RH OUT SOL | OFF | OFF | OFF |
| | USV [FR-RL] | OFF | ON | ON |
| | HSV [FR-RL] | OFF | ON* | OFF |
| FR LH SOL | FR LH IN SOL | OFF | OFF | OFF |
| | FR LH OUT SOL | OFF | OFF | OFF |
| | USV [FL-RR] | OFF | ON | ON |
| | HSV [FL-RR] | OFF | ON* | OFF |
| RR RH SOL | RR RH IN SOL | OFF | OFF | OFF |
| | RR RH OUT SOL | OFF | OFF | OFF |
| | USV [FL-RR] | OFF | ON | ON |
| | HSV [FL-RR] | OFF | ON* | OFF |
| RR LH SOL | RR LH IN SOL | OFF | OFF | OFF |
| | RR LH OUT SOL | OFF | OFF | OFF |
| | USV [FR-RL] | OFF | ON | ON |
| | HSV [FR-RL] | OFF | ON* | OFF |

*: ON for 1 to 2 seconds after the touch, and then OFF.

**NOTE:**

A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is malfunction because it is an operation for checking.

ABS MOTOR

- Touch “ON” and “OFF” on screen. Make sure motor relay and actuator relay operates as shown in table below.

| Test item | Display item | Display | |
|---|---|---|---|
| | | ON | OFF |
| ABS MOTOR | MOTOR RELAY | ON | OFF |
| | ACTUATOR RLY NOTE | ON | ON |

**NOTE:**

A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

# COMPONENT DIAGNOSIS

## C1101, C1102, C1103, C1104 WHEEL SENSOR-1

### Description

INFOID:0000000001181727

When the sensor rotor rotates, the magnetic field changes. The sensor converts the magnetic field changes to current signals (rectangular wave) and transmits them to the ABS actuator and electric unit (control unit).

### DTC Logic

INFOID:0000000001181728

#### DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|---|---|---|---|
| C1101 | RR RH SENSOR-1 | Circuit of rear RH wheel sensor is open or short circuit.<br>Current signal from sensor is outside limits. | • Harness or connector<br>• Wheel sensor<br>• ABS actuator and electric unit (control unit) |
| C1102 | RR LH SENSOR-1 | Circuit of rear LH wheel sensor is open or short circuit.<br>Current signal from sensor is outside limits. | |
| C1103 | FR RH SENSOR-1 | Circuit of front RH wheel sensor is open or short circuit.<br>Current signal from sensor is outside limits. | |
| C1104 | FR LH SENSOR-1 | Circuit of front LH wheel sensor is open or short circuit.<br>Current signal from sensor is outside limits. | |

#### DTC CONFIRMATION PROCEDURE

##### 1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

| Self-diagnosis results |
|---|
| RR RH SENSOR-1 |
| RR LH SENSOR-1 |
| FR RH SENSOR-1 |
| FR LH SENSOR-1 |

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-99, "Diagnosis Procedure".
NO >> INSPECTION END

### Diagnosis Procedure

INFOID:0000000001181729

**CAUTION:**
**Do not check between wheel sensor terminals.**

#### INSPECTION PROCEDURE

##### 1.CHECK SENSOR AND SENSOR ROTOR

- Check sensor rotor for damage.
- Check wheel sensor for damage, disconnection or looseness.

Are the sensor and sensor rotor normal?

YES >> GO TO 2.
NO >> Repair wheel sensor mount or replace sensor rotor. Then perform the self-diagnosis.

##### 2.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect malfunctioning wheel sensor connector.
4. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.

5. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-95, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 3.
NO >> Poor connection of connector terminal. Repair or replace connector.

## 3. CHECK WHEEL SENSOR HARNESS

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect malfunctioning wheel sensor connector.
4. Check continuity between terminals. (Also check continuity when steering wheel is turned right and left and when sensor harness inside the wheel house is moved.)

Measurement terminal for power supply circuit

| ABS actuator and electric unit (control unit) | | Wheel sensor | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E36 | 9 | E39 (Front RH) | 2 | Existed |
| | 16 | E22 (Front LH) | | |
| | 8 | B41 (Rear RH) | | |
| | 6 | B44 (Rear LH) | | |

Measurement terminal for signal circuit

| ABS actuator and electric unit (control unit) | | Wheel sensor | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E36 | 10 | E39 (Front RH) | 1 | Existed |
| | 5 | E22 (Front LH) | | |
| | 19 | B41 (Rear RH) | | |
| | 17 | B44 (Rear LH) | | |

Measurement terminal for ground circuit

| ABS actuator and electric unit (control unit) | | | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E36 | 10, 9 | E36 | 1, 4 | Not existed |
| | 5, 16 | | | |
| | 19, 8 | | | |
| | 17, 6 | | | |

5. Reconnect ABS actuator and electric unit (control unit) connector.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace malfunctioning components.

## 4. CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between wheel sensor harness connector power supply terminal and ground.

| Wheel sensor | | — | Voltage |
|---|---|---|---|
| Connector | Terminal | | |
| E39 (Front RH) | 2 | Ground | 8 V or more |
| E22 (Front LH) | | | |
| B41 (Rear RH) | | | |
| B44 (Rear LH) | | | |

Is the inspection result normal?

YES >> Replace applicable wheel sensor.
NO >> Replace ABS actuator and electric unit (control unit).

## Component Inspection

INFOID:0000000001181730

### 1.CHECK DATA MONITOR

On “DATA MONITOR”, select “FR LH SENSOR”, “FR RH SENSOR”, “RR LH SENSOR”, and “RR RH SENSOR”, and check the vehicle speed.

| Wheel sensor | Vehicle speed (DATA MONITOR) |
|---|---|
| FR LH SENSOR | Nearly matches the speedometer display (±10% or less) |
| FR RH SENSOR | |
| RR LH SENSOR | |
| RR RH SENSOR | |

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-99, "Diagnosis Procedure".

## Special Repair Requirement

INFOID:0000000001181731

### 1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to BRC-77, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> END

# C1105, C1106, C1107, C1108 WHEEL SENSOR-2

## Description

INFOID:0000000001181732

ABS unit continually monitors wheel speed sensors to detect abnormal signals.

## DTC Logic

INFOID:0000000001181733

### DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|---|---|---|---|
| C1105 | RR RH SENSOR-2 | Signal from rear RH wheel sensor does not match other 3 wheel speed signal. | • Sensor not installed corretly<br>• Sensor rotor or encoder damaged<br>• Sensor rotor loose on axle<br>• Electrical interference<br>• Wheel not turning - e.g. vehicle driven on 2WD dyno<br>• Sensor damaged<br>• ABS unit damaged |
| C1106 | RR LH SENSOR-2 | Signal from rear LH wheel sensor does not match other 3 wheel speed signal. | |
| C1107 | FR RH SENSOR-2 | Signal from front RH wheel sensor does not match other 3 wheel speed signal. | |
| C1108 | FR LH SENSOR-2 | Signal from front LH wheel sensor does not match other 3 wheel speed signal. | |

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

| Self-diagnosis results |
|---|
| RR RH SENSOR-2 |
| RR LH SENSOR-2 |
| FR RH SENSOR-2 |
| FR LH SENSOR-2 |

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-102, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000001181734

**CAUTION:**
**Do not check between wheel sensor terminals.**

### INSPECTION PROCEDURE

#### 1.CHECK SENSOR AND SENSOR ROTOR

- Check sensor rotor for damage.
- Check wheel sensor for damage, disconnection or looseness.

Are the sensor and sensor rotor normal?

YES >> GO TO 2.
NO >> Repair wheel sensor mount or replace sensor rotor. Then perform the self-diagnosis.

#### 2.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect malfunctioning wheel sensor connector.
4. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
5. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-95, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 3.
NO >> Poor connection of connector terminal. Repair or replace connector.

## 3. CHECK WHEEL SENSOR HARNESS

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect malfunctioning wheel sensor connector.
4. Check continuity between terminals. (Also check continuity when steering wheel is turned right and left and when sensor harness inside the wheel house is moved.)

Measurement terminal for power supply circuit

| ABS actuator and electric unit (control unit) | | Wheel sensor | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E36 | 9 | E39 (Front RH) | 2 | Existed |
| | 16 | E22 (Front LH) | | |
| | 8 | B41 (Rear RH) | | |
| | 6 | B44 (Rear LH) | | |

Measurement terminal for signal circuit

| ABS actuator and electric unit (control unit) | | Wheel sensor | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E36 | 10 | E39 (Front RH) | 1 | Existed |
| | 5 | E22 (Front LH) | | |
| | 19 | B41 (Rear RH) | | |
| | 17 | B44 (Rear LH) | | |

Measurement terminal for ground circuit

| ABS actuator and electric unit (control unit) | | | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E36 | 10, 9 | E36 | 1, 4 | Not existed |
| | 5, 16 | | | |
| | 19, 8 | | | |
| | 17, 6 | | | |

5. Reconnect ABS actuator and electric unit (control unit) connector.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace malfunctioning components.

## 4. CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between wheel sensor harness connector power supply terminal and ground.

| Wheel sensor | | — | Voltage |
|---|---|---|---|
| Connector | Terminal | | |
| E39 (Front RH) | 2 | Ground | 8 V or more |
| E22 (Front LH) | | | |
| B41 (Rear RH) | | | |
| B44 (Rear LH) | | | |

Is the inspection result normal?

YES >> Replace applicable wheel sensor.
NO >> Replace ABS actuator and electric unit (control unit).

## Component Inspection

INFOID:0000000001181735

### 1.CHECK DATA MONITOR

On “DATA MONITOR”, select “FR LH SENSOR”, “FR RH SENSOR”, “RR LH SENSOR”, and “RR RH SENSOR”, and check the vehicle speed.

| Wheel sensor | Vehicle speed (DATA MONITOR) |
|---|---|
| FR LH SENSOR | Nearly matches the speedometer display (±10% or less) |
| FR RH SENSOR | |
| RR LH SENSOR | |
| RR RH SENSOR | |

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-102, "Diagnosis Procedure".

## Special Repair Requirement

INFOID:0000000001181736

### 1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to BRC-77, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> END

# C1109 POWER AND GROUND SYSTEM

## Description

INFOID:0000000001181737

Power is supplied from the battery to ABS actuator and electric unit (control unit).

## DTC Logic

INFOID:0000000001181738

### DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|---|---|---|---|
| C1109 | BATTERY VOLTAGE [ABNORMAL] | When the ABS actuator and electric unit (control unit) power supply is lower than normal and vehicle speed is greater than 6 km/h (4 MPH). Power supply is greater than normal limits. | • Harness or connector<br>• ABS unit<br>• Fuse<br>• Vehicle electrical power system |

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

| Self-diagnosis results |
|---|
| BATTERY VOLTAGE [ABNORMAL] |

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-105, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000001181739

### INSPECTION PROCEDURE

#### 1.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect connector and then perform the self-diagnosis. Refer to BRC-95, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2.
NO >> Poor connection of connector terminal. Repair or replace connector.

#### 2.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY CIRCUIT AND GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Turn ignition switch ON or OFF and check voltage between ABS actuator and electric unit (control unit) harness connector terminal and ground.

| ABS actuator and electric unit (control unit) | | — | Condition | Voltage |
|---|---|---|---|---|
| Connector | Terminal | | | |
| E36 | 18 | Ground | Ignition switch: ON | Battery voltage |
| | | | Ignition switch: OFF | Approx. 0 V |

4. Reconnect ABS actuator and electric unit (control unit) connector.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace malfunctioning components.

## 3.ABS POWER SUPPLY CHECK (UNDER LOAD CONDITIONS)

1. Use 12V lamp (normal rating 10 to 20W) connected between E36 terminals 18 and 4. With ignition switch ON check bulb illuminates correctly.
2. Check ABS motor supply under loaded condition (connector E36 terminals 1 and 2).

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check both power supply and ground circuit.

## 4.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

| ABS actuator and electric unit (control unit) | | — | Continuity |
|---|---|---|---|
| Connector | Terminal | | |
| E36 | 1, 4 | Ground | Existed |

Is the inspection result normal?

YES >> Check battery for terminal looseness, low voltage, etc. if any malfunction is found, repair malfunctioning parts.
NO >> Repair or replace malfunctioning components. (Check ABS earth bolt for tightness and corrosion.)

# Special Repair Requirement

INFOID:0000000001181740

## 1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to BRC-77, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> END

# C1110, C1153, C1170 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

## Description

INFOID:0000000001181741

ABS unit is continuously monitoring ECU hardware and software for correct operation.

## DTC Logic

INFOID:0000000001181742

### DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|---|---|---|---|
| C1110 | CONTROLLER FAILURE | Possible internal failure of control unit components. | • Internal failure of control unit components.<br>• ABS solenoid valve or motor power supply / ground abnormal. |
| C1153 | EMERGENCY BRAKE | Continuous ABS/EBD control for more than 60 seconds. | • ABS control unit software failure<br>• Wheel speed sensor input abnormality. |
| C1170 | VARIANT CODING | In a case where VARIANT CODING is different. | ABS actuator and electric unit (control unit) |

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSIS RESULTS

1. Check both ABS solenoid valve and motor supply and ground circuits using a suitable electrical load.
2. Check wheel speed sensor inputs.
3. Check the self-diagnosis results.

| Self-diagnosis results |
|---|
| CONTROLLER FAILURE |
| EMERGENCY BRAKE |
| VARIANT CODING |

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-107, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000001181743

### INSPECTION PROCEDURE

#### 1.REPLACE ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

**CAUTION:**
**Replace ABS actuator and electric unit (control unit) when self-diagnostic result shows items other than those applicable.**

>> Replace ABS actuator and electric unit (control unit).

## Special Repair Requirement

INFOID:0000000001181744

#### 1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to BRC-77, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> END

# C1111 ABS MOTOR, MOTOR RELAY SYSTEM

## Description

INFOID:0000000001181745

### PUMP

The pump returns the brake fluid stored in the reservoir to the master cylinder by reducing the pressure.

### MOTOR

The motor drives the pump according to the signals transmitted by the ABS actuator and electric unit (control unit).

## DTC Logic

INFOID:0000000001181746

### DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|---|---|---|---|
| C1111 | PUMP MOTOR | During the actuator motor operating with ON, when the actuator motor turns OFF, or when the control line for actuator motor relay is open. | • Harness or connector<br>• ABS actuator and electric unit (control unit) |
| | | During the actuator motor operating with OFF, when the actuator motor turns ON, or when the control line for relay is shorted to ground. | |

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

| Self-diagnosis results |
|---|
| PUMP MOTOR |

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-109, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000001181747

### INSPECTION PROCEDURE

#### 1.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check terminal for deformation, disconnect, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect connector and then perform the self-diagnosis. Refer to BRC-95, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2.
NO >> Poor connection of connector terminal. Replace or repair connector.

#### 2.CHECK ABS MOTOR AND MOTOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check voltage between the ABS actuator and electric unit (control unit) harness connector terminal and ground.

| ABS actuator and electric unit (control unit) | | — | Voltage |
|---|---|---|---|
| Connector | Terminal | | |
| E36 | 2 | Ground | Battery voltage |

4. Reconnect ABS actuator and electric unit (control unit) connector.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace malfunctioning components.

### 3.ABS POWER SUPPLY CHECK (UNDER LOAD CONDITION)

Use 12V lamp (normal rating 10 to 20W) connected between E36 terminals 1 and 2. With ignition switch ON check bulb illuminates correctly.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check both power supply and ground circuit.

### 4.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

| ABS actuator and electric unit (control unit) | | — | Continuity |
|---|---|---|---|
| Connector | Terminal | | |
| E36 | 1, 4 | Ground | Existed |

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace malfunctioning components. (Check ABS each bolt for tightness and corrosion.)

## Component Inspection

INFOID:0000000001181748

### 1.CHECK ACTIVE TEST

1. On “ACTIVE TEST”, select “ABS MOTOR”.
2. Touch ON and OFF on screen. Make sure motor relay and actuator relay operates as shown in table below.

| Test item | Display item | Display | |
|---|---|---|---|
| | | ON | OFF |
| ABS MOTOR | MOTOR RELAY | ON | OFF |
| | ACTUATOR RLY NOTE | ON | ON |

**NOTE:**

A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-109, "Diagnosis Procedure".

## Special Repair Requirement

INFOID:0000000001181749

### 1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to BRC-77, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> END

# C1114 ACTUATOR RELAY SYSTEM

## Description

INFOID:0000000001181750

Activates or deactivates each solenoid valve according to the signals transmitted by the ABS actuator and electric unit (control unit).

## DTC Logic

INFOID:0000000001181751

### DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|---|---|---|---|
| C1114 | MAIN RELAY | During the actuator relay operating with OFF, when the actuator relay turns ON, or when the control line for the relay is shorted to the ground. | • Harness or connector<br>• ABS actuator and electric unit (control unit) |
| | | During the actuator relay operating with ON, when the actuator relay turns ON, or when the control line for the relay is open. | |

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

| Self-diagnosis results |
|---|
| MAIN RELAY |

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-112, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000001181752

### INSPECTION PROCEDURE

#### 1.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect connector and then perform the self-diagnosis. Refer to BRC-95, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2.
NO >> Poor connection of connector terminal. Replace or repair connector.

#### 2.CHECK SOLENOID, ESP SWITCH-OVER VALVE AND ACTUATOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check voltage between ABS actuator and electric unit (control unit) harness connector terminal and ground.

| ABS actuator and electric unit (control unit) | | — | Voltage |
|---|---|---|---|
| Connector | Terminal | | |
| E36 | 3 | Ground | Battery voltage |

4. Reconnect ABS actuator and electric unit (control unit) connector.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace malfunctioning components.

## 3. ABS POWER SUPPLY CHECK (UNDER LOAD CONDITION)

Use 12V lamp (normal rating 10 to 20W) connected between E36 terminals 1 and 3. With ignition switch ON check bulb illuminates correctly.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check both power supply and ground circuit.

## 4. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

| ABS actuator and electric unit (control unit) | | — | Continuity |
|---|---|---|---|
| Connector | Terminal | | |
| E36 | 1, 4 | Ground | Existed |

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace malfunctioning components. (Check ABS each bolt for tightness and corrosion.)

# Component Inspection

INFOID:0000000001181753

## 1. CHECK ACTIVE TEST

1. On “ACTIVE TEST”, select “ABS MOTOR”.
2. Touch ON and OFF on screen. Make sure motor relay and actuator relay operates as shown in table below.

| Test item | Display item | Display | |
|---|---|---|---|
| | | ON | OFF |
| ABS MOTOR | MOTOR RELAY | ON | OFF |
| | ACTUATOR RLY NOTE | ON | ON |

**NOTE:**

A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-33, "Diagnosis Procedure".

# Special Repair Requirement

INFOID:0000000001181754

## 1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to BRC-77, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> END

# C1115 WHEEL SENSOR

## Description

INFOID:0000000001181755

When the sensor rotor rotates, the magnetic field changes. The sensor converts the magnetic field changes to current signals (rectangular wave) and transmits them to the ABS actuator and electric unit (control unit).

## DTC Logic

INFOID:0000000001181756

### DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|---|---|---|---|
| C1115 | ABS SENSOR [ABNORMAL SIGNAL] | Miss-match between the 4 wheel speed sensor signals. | • Harness or connector is not a possible cause<br>• Other possible causes<br>- Tire radius (due to wrong size or pressure) interference. |

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

| Self-diagnosis results |
|---|
| ABS SENSOR [ABNORMAL SIGNAL] |

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-114, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000001181757

**CAUTION:**
**Do not check between wheel sensor terminals.**

### INSPECTION PROCEDURE

#### 1.CHECK SENSOR AND SENSOR ROTOR

- Check sensor rotor for damage.
- Check wheel sensor for damage, disconnection or looseness.

Are the sensor and sensor rotor normal?

YES >> GO TO 2.
NO >> Repair wheel sensor mount or replace sensor rotor. Then perform the self-diagnosis.

#### 2.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect malfunctioning wheel sensor connector.
4. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
5. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-95, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 3.
NO >> Poor connection of connector terminal. Repair or replace connector.

#### 3.CHECK WHEEL SENSOR HARNESS

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect malfunctioning wheel sensor connector.

4. Check continuity between terminals. (Also check continuity when steering wheel is turned right and left and when sensor harness inside the wheel house is moved.)

Measurement terminal for power supply circuit

| ABS actuator and electric unit (control unit) | | Wheel sensor | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E36 | 9 | E39 (Front RH) | 2 | Existed |
| | 16 | E22 (Front LH) | | |
| | 8 | B41 (Rear RH) | | |
| | 6 | B44 (Rear LH) | | |

Measurement terminal for signal circuit

| ABS actuator and electric unit (control unit) | | Wheel sensor | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E36 | 10 | E39 (Front RH) | 1 | Existed |
| | 5 | E22 (Front LH) | | |
| | 19 | B41 (Rear RH) | | |
| | 17 | B44 (Rear LH) | | |

Measurement terminal for ground circuit

| ABS actuator and electric unit (control unit) | | | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E36 | 10, 9 | E36 | 1, 4 | Not existed |
| | 5, 16 | | | |
| | 19, 8 | | | |
| | 17, 6 | | | |

5. Reconnect ABS actuator and electric unit (control unit) connector.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace malfunctioning components.

## 4. CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between wheel sensor harness connector power supply terminal and ground.

| Wheel sensor | | — | Voltage |
|---|---|---|---|
| Connector | Terminal | | |
| E39 (Front RH) | 2 | Ground | 8 V or more |
| E22 (Front LH) | | | |
| B41 (Rear RH) | | | |
| B44 (Rear LH) | | | |

Is the inspection result normal?

YES >> Replace applicable wheel sensor.
NO >> Replace ABS actuator and electric unit (control unit).

# Component Inspection

INFOID:0000000001181758

## 1. CHECK DATA MONITOR

On “DATA MONITOR”, select “FR LH SENSOR”, “FR RH SENSOR”, “RR LH SENSOR”, and “RR RH SENSOR”, and check the vehicle speed.

| Wheel sensor | Vehicle speed (DATA MONITOR) |
|---|---|
| FR LH SENSOR | Nearly matches the speedometer display (±10% or less) |
| FR RH SENSOR | |
| RR LH SENSOR | |
| RR RH SENSOR | |

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-114, "Diagnosis Procedure".

## Special Repair Requirement

INFOID:0000000001181759

### 1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to BRC-77, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> END

# C1116 STOP LAMP SWITCH

## Description

INFOID:0000000001181760

The stop lamp switch transmits the stop lamp switch signal (ON/OFF) to the ABS actuator and electric unit (control unit).

## DTC Logic

INFOID:0000000001181761

### DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|---|---|---|---|
| C1116 | STOP LAMP SW | When stop lamp switch circuit is open. | • Harness or connector<br>• Stop lamp switch<br>• ABS actuator and electric unit (control unit) |

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

| Self-diagnosis results |
|---|
| STOP LAMP SW |

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-117, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000001181762

### INSPECTION PROCEDURE

#### 1.CHECK STOP LAMPS ILLUMINATE

Check stop lamps illuminate when brake pedal is pressed.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check stop lamp circuit.

#### 2.CHECK DATA MONITOR

Using “DATA MONITOR” check both pressure sensor signal and brake lamp switch signal.

Pressure sensor

| Condition | PRESS SEN (DATA MONITOR) |
|---|---|
| Brake pedal released | Approx. 3 bar |
| Brake pedal pressed | 0 to 200 bar |

Stop lamp switch

| Condition | STOP LAMP SW (DATA MONITOR) |
|---|---|
| Brake pedal released | OFF |
| Brake pedal pressed | ON |

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace malfunctioning parts.

#### 3.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.

3. Disconnect stop lamp switch connector.
4. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
5. Reconnect connectors securely.
6. Start engine.
7. Repeat pumping brake pedal carefully several times, and perform self-diagnosis. Refer to BRC-95, "CONSULT-III Function (ABS)"

Is any item indicated in the self-diagnosis display?

YES >> GO TO 4.
NO >> Poor connection of connector terminal. Replace or repair connector.

## 4.CHECK STOP LAMP SWITCH

1. Disconnect stop lamp switch connector.
2. Check continuity between stop lamp switch connector terminals.

| Stop lamp switch Terminal | Condition | Continuity |
|---|---|---|
| 1 – 2 | Release stop lamp switch (When brake pedal is depressed.) | Existed |
| | Push stop lamp switch (When brake pedal is released.) | Not existed |

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace stop lamp switch.

## 5.CHECK STOP LAMP SWITCH CIRCUIT

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Connect stop lamp switch connector.
3. Check voltage between ABS actuator and electric unit (control unit) harness connector terminal and ground.

| ABS actuator and electric unit (control unit) | | Condition | Voltage |
|---|---|---|---|
| Connector | Terminal | | |
| E36 | 20 | Brake pedal is depressed | Battery voltage |
| | | Brake pedal is released | Approx. 0 V |

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace malfunctioning components.

# Component Inspection

INFOID:0000000001181763

## 1.CHECK STOP LAMP SWITCH

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch connector.
3. Check continuity between stop lamp switch connector terminals.

| Stop lamp switch Terminal | Condition | Continuity |
|---|---|---|
| 1 – 2 | Release stop lamp switch (When brake pedal is depressed.) | Existed |
| | Push stop lamp switch (When brake pedal is released.) | Not existed |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace stop lamp switch.

## Special Repair Requirement

INFOID:0000000001181764

### 1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to BRC-77, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> END

# C1120, C1122, C1124, C1126 IN ABS SOL

## Description

INFOID:0000000001181765

The solenoid valve increases, holds or decreases the fluid pressure of each brake caliper according to the signals transmitted by the ABS actuator and electric unit (control unit).

## DTC Logic

INFOID:0000000001181766

### DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|---|---|---|---|
| C1120 | FR LH IN ABS SOL | When the control unit detects a malfunction in the front LH inlet solenoid circuit. | ABS actuator and electric unit (control unit) |
| C1122 | FR RH IN ABS SOL | When the control unit detects a malfunction in the front RH inlet solenoid circuit. | |
| C1124 | RR LH IN ABS SOL | When the control unit detects a malfunction in the rear LH inlet solenoid circuit. | |
| C1126 | RR RH IN ABS SOL | When the control unit detects a malfunction in the rear RH inlet solenoid circuit. | |

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

| Self-diagnosis results |
|---|
| FR LH IN ABS SOL |
| FR RH IN ABS SOL |
| RR LH IN ABS SOL |
| RR RH IN ABS SOL |

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-120, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000001181767

### INSPECTION PROCEDURE

#### 1.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect connector and then perform the self-diagnosis. Refer to BRC-95, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2.
NO >> Poor connection of connector terminal. Replace or repair connector.

#### 2.CHECK SOLENOID, ESP SWITCH-OVER VALVE AND ACTUATOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check voltage between ABS actuator and electric unit (control unit) harness connector terminal and ground.

| ABS actuator and electric unit (control unit) | | — | Voltage |
|---|---|---|---|
| Connector | Terminal | | |
| E36 | 3 | Ground | Battery voltage |

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace malfunctioning components.

## 3. CHECK SOLENOID, ESP SWITCH-OVER VALVE AND ACUATOR RELAY GROUND CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

| ABS actuator and electric unit (control unit) | | — | Continuity |
|---|---|---|---|
| Connector | Terminal | | |
| E36 | 1, 4 | Ground | Existed |

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace malfunctioning components.

# Component Inspection

INFOID:0000000001181768

## 1. CHECK ACTIVE TEST

1. Select each test menu item on ”ACTIVE TEST“.
2. On the display, touch “UP”, “KEEP”, and “DOWN”, and check that the system operates as shown in the table below.

| Test item | Display item | Display | | |
|---|---|---|---|---|
| | | UP | KEEP | DOWN |
| FR RH SOL | FR RH IN SOL | OFF | ON | ON |
| | FR RH OUT SOL | OFF | OFF | ON* |
| | USV [FR-RL] | OFF | OFF | OFF |
| | HSV [FR-RL] | OFF | OFF | OFF |
| FR LH SOL | FR LH IN SOL | OFF | ON | ON |
| | FR LH OUT SOL | OFF | OFF | ON* |
| | USV [FL-RR] | OFF | OFF | OFF |
| | HSV [FL-RR] | OFF | OFF | OFF |
| RR RH SOL | RR RH IN SOL | OFF | ON | ON |
| | RR RH OUT SOL | OFF | OFF | ON* |
| | USV [FL-RR] | OFF | OFF | OFF |
| | HSV [FL-RR] | OFF | OFF | OFF |
| RR LH SOL | RR LH IN SOL | OFF | ON | ON |
| | RR LH OUT SOL | OFF | OFF | ON* |
| | USV [FR-RL] | OFF | OFF | OFF |
| | HSV [FR-RL] | OFF | OFF | OFF |

*: ON for 1 to 2 seconds after the touch, and then OFF.

**NOTE:**

A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to BRC-120, "Diagnosis Procedure".

## Special Repair Requirement

INFOID:0000000001181769

### 1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to BRC-77, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> END

# C1121, C1123, C1125, C1127 OUT ABS SOL

## Description

INFOID:0000000001181770

The solenoid valve increases, holds or decreases the fluid pressure of each brake caliper according to the signals transmitted by the ABS actuator and electric unit (control unit).

## DTC Logic

INFOID:0000000001181771

### DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|---|---|---|---|
| C1121 | FR LH OUT ABS SOL | When the control unit detects a malfunction in the front LH outlet solenoid circuit. | ABS actuator and electric unit (control unit) |
| C1123 | FR RH OUT ABS SOL | When the control unit detects a malfunction in the front RH outlet solenoid circuit. | |
| C1125 | RR LH OUT ABS SOL | When the control unit detects a malfunction in the rear LH outlet solenoid circuit. | |
| C1127 | RR RH OUT ABS SOL | When the control unit detects a malfunction in the rear RH outlet solenoid circuit. | |

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

| Self-diagnosis results |
|---|
| FR LH OUT ABS SOL |
| FR RH OUT ABS SOL |
| RR LH OUT ABS SOL |
| RR RH OUT ABS SOL |

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-123, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000001181772

### INSPECTION PROCEDURE

#### 1.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect connector and then perform the self-diagnosis. Refer to BRC-95, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2.
NO >> Poor connection of connector terminal. Replace or repair connector.

#### 2.CHECK SOLENOID, ESP SWITCH-OVER VALVE AND ACTUATOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check voltage between ABS actuator and electric unit (control unit) harness connector terminal and ground.

| ABS actuator and electric unit (control unit) | | — | Voltage |
|---|---|---|---|
| Connector | Terminal | | |
| E36 | 3 | Ground | Battery voltage |

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace malfunctioning components.

## 3.CHECK SOLENOID, ESP SWITCH-OVER VALVE AND ACUATOR RELAY GROUND CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

| ABS actuator and electric unit (control unit) | | — | Continuity |
|---|---|---|---|
| Connector | Terminal | | |
| E36 | 1, 4 | Ground | Existed |

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace malfunctioning components.

# Component Inspection

INFOID:0000000001181773

## 1.CHECK ACTIVE TEST

1. Select each test menu item on ”ACTIVE TEST“.
2. On the display, touch “UP”, “KEEP”, and “DOWN”, and check that the system operates as shown in the table below.

| Test item | Display item | Display | | |
|---|---|---|---|---|
| | | UP | KEEP | DOWN |
| FR RH SOL | FR RH IN SOL | OFF | ON | ON |
| | FR RH OUT SOL | OFF | OFF | ON* |
| | USV [FR-RL] | OFF | OFF | OFF |
| | HSV [FR-RL] | OFF | OFF | OFF |
| FR LH SOL | FR LH IN SOL | OFF | ON | ON |
| | FR LH OUT SOL | OFF | OFF | ON* |
| | USV [FL-RR] | OFF | OFF | OFF |
| | HSV [FL-RR] | OFF | OFF | OFF |
| RR RH SOL | RR RH IN SOL | OFF | ON | ON |
| | RR RH OUT SOL | OFF | OFF | ON* |
| | USV [FL-RR] | OFF | OFF | OFF |
| | HSV [FL-RR] | OFF | OFF | OFF |
| RR LH SOL | RR LH IN SOL | OFF | ON | ON |
| | RR LH OUT SOL | OFF | OFF | ON* |
| | USV [FR-RL] | OFF | OFF | OFF |
| | HSV [FR-RL] | OFF | OFF | OFF |

*: ON for 1 to 2 seconds after the touch, and then OFF.

**NOTE:**

A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to BRC-123, "Diagnosis Procedure".

## Special Repair Requirement

INFOID:0000000001181774

### 1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to BRC-77, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> END

# C1130, C1131, C1132 ENGINE SIGNAL

## Description

INFOID:0000000001181775

ABS actuator and electric unit (control unit) receives the engine signel from ECM with CAN communication line.

## DTC Logic

INFOID:0000000001181776

### DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|---|---|---|---|
| C1130 | ENGINE SIGNAL 1 | ECM signals are invalid or ECM self diagnosis indicates a fault that prevents correct TCS operation. | • Harness or connector<br>• ABS actuator and electric unit (control unit)<br>• ECM<br>• CAN communication line |
| C1131 | ENGINE SIGNAL 2 | | |
| C1132 | ENGINE SIGNAL 3 | | |

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

| Self-diagnosis results |
|---|
| ENGINE SIGNAL 1 |
| ENGINE SIGNAL 2 |
| ENGINE SIGNAL 3 |

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-126, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000001181777

### INSPECTION PROCEDURE

#### 1.CHECK ENGINE SYSTEM

1. Perform ECM self-diagnosis. Repair or replace items indicated, then perform ECM self-diagnosis again.
- HR16DE (with EURO-OBD): ECH-89, "CONSULT-III Function".
- HR16DE (without EURO-OBD): ECH-419, "CONSULT-III Function".
- MR20DE (with EURO-OBD: ECM-91, "CONSULT-III Function".
- MR20DE (without EURO-OBD: ECM-425, "CONSULT-III Function".
- K9K: ECK-63, "Diagnosis Description".
- M9R: ECR-101, "CONSULT-III Function".

2. Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to BRC-95, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> Repair or replace the affected part.
NO >> INSPECTION END

## Special Repair Requirement

INFOID:0000000001181778

#### 1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to BRC-77, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> END

# C1142 PRESS SENSOR

## Description

INFOID:0000000001181779

The pressure sensor converts the brake fluid pressure to an electric signal and transmits it to the ABS actuator and electric unit (control unit). [The pressure sensor is integrated in the ABS actuator and electric unit (control unit).]

## DTC Logic

INFOID:0000000001181780

### DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|---|---|---|---|
| C1142 | PRESS SEN CIRCUIT | Pressure sensor signal line is open or shorted, or pressure sensor is malfunctioning. | • Harness or connector<br>• Stop lamp switch<br>• ABS actuator and electric unit (control unit) |

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

| Self-diagnosis results |
|---|
| PRESS SEN CIRCUIT |

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-127, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000001181781

### INSPECTION PROCEDURE

#### 1.CHECK STOP LAMP SWITCH CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect stop lamp switch connector.
4. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
5. Reconnect connectors securely.
6. Start engine.
7. Repeat pumping brake pedal carefully several times, and perform self-diagnosis.

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2.
NO >> Poor connection of connector terminal. Replace or repair connector.

#### 2.CHECK STOP LAMP SWITCH

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch connector.
3. Check continuity between stop lamp switch connector terminals.

| Stop lamp switch<br>Terminal | Condition | Continuity |
|---|---|---|
| 1 – 2 | Release stop lamp switch<br>(When brake pedal is depressed.) | Existed |
| | Push stop lamp switch<br>(When brake pedal is released.) | Not existed |

Is the inspection result normal?

YES >> GO TO 3.
NO >> Replace stop lamp switch.

## 3.CHECK STOP LAMP SWITCH CIRCUIT

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Connect stop lamp switch connector.
3. Check voltage between ABS actuator and electric unit (control unit) harness connector terminal and ground.

| ABS actuator and electric unit (control unit) | | Condition | Voltage |
|---|---|---|---|
| Connector | Terminal | | |
| E36 | 20 | Brake pedal is depressed | Battery voltage |
| | | Brake pedal is released | Approx. 0 V |

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace malfunctioning components.

# Component Inspection

INFOID:0000000001181782

## 1.CHECK DATA MONITOR

On “DATA MONITOR”, select “PRESS SENSOR” and check the brake fluid pressure.

| Condition | PRESS SENSOR (DATA MONITOR) |
|---|---|
| With ignition switch turned ON and brake pedal released. | Approx. 3 bar |
| With ignition switch turned ON and brake pedal depressed. | 0 to 200 bar |

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-127, "Diagnosis Procedure".

# Special Repair Requirement

INFOID:0000000001181783

## 1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to BRC-77, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> END

# C1143, C1144 STEERING ANGLE SENSOR

## Description

INFOID:0000000001181784

The steering angle sensor detects the rotation amount, angular velocity and direction of the steering wheel, and transmits the data to the ABS actuator and electric unit (control unit) via CAN communication.

## DTC Logic

INFOID:0000000001181785

### DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|---|---|---|---|
| C1143 | ST ANG SEN CIRCUIT | Neutral position of steering angle sensor is dislocated, or the steering angle sensor is malfunctioning. | • Harness or connector<br>• Steering angle sensor<br>• ABS actuator and electric unit (control unit) |
| C1144 | ST ANG SEN SIGNAL | Neutral position of steering angle sensor is not finished. | |

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

| Self-diagnosis results |
|---|
| ST ANG SEN CIRCUIT |
| ST ANG SEN SIGNAL |

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-129, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000001181786

### INSPECTION PROCEDURE

#### 1.CHECK VEHICLE STATE

Check vehicle for any suspension/steering misalignment or damage.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Correct any damage found.

#### 2.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect steering angle sensor connector.
4. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
5. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-95, "CONSULT-III Function (ABS)"

Is any item indicated on the self-diagnosis display?

YES >> GO TO 3.
NO >> Poor connection of connector terminal. Replace or repair connector.

#### 3.CHECK STEERING ANGLE SENSOR HARNESS

1. Turn ignition switch OFF.
2. Disconnect steering angle sensor connector.
3. Check continuity between steering angle sensor harness connector terminal and ground.

| Steering angle sensor | | — | Continuity |
|---|---|---|---|
| Connector | Terminal | | |
| M30 | 3 | Ground | Existed |

4. Turn ignition switch ON.
5. Check voltage between steering angle sensor harness connector terminal and ground.

| Steering angle sensor | | — | Voltage |
|---|---|---|---|
| Connector | Terminal | | |
| M30 | 1 | Ground | Battery voltage |

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace malfunctioning components.

### 4.CHECK DATA MONITOR

1. Connect the steering angle sensor connector and ABS actuator and electric unit (control unit) connector.
2. Select “STR ANGLE SIG” in “DATA MONITOR” and check steering angle sensor signal.

| Steering condition | STR ANGLE SIG (DATA MONITOR) |
|---|---|
| Driving straight | ±2.5 ° |
| Turn 90 ° to right | Approx. +90 ° |
| Turn 90 ° to left | Approx. –90 ° |

Is the inspection result normal?

YES >> GO TO 5.
NO >> Adjust neutral position of steering angle sensor.

### 5.CHECK FOR BACKLASH

1. Check for backlash [turn wheel to left then straight then right then straight (approx. 90)].
2. Check straight position is always similar value.

Is there noticeable backlash?

YES >> Check sensor is correctly fitted to combination witch.
NO >> Check sensor output is correct from lock to lock.

## Component Inspection

INFOID:0000000001181787

### 1.CHECK DATA MONITOR

Select “STR ANGLE SIG” in “DATA MONITOR” and check steering angle sensor signal.

| Steering condition | STR ANGLE SIG (DATA MONITOR) |
|---|---|
| Driving straight | ±2.5 ° |
| Turn 90 ° to right | Approx. +90 ° |
| Turn 90 ° to left | Approx. –90 ° |

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-129, "Diagnosis Procedure".

## Special Repair Requirement

INFOID:0000000001181788

### 1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the steering angle sensor or the ABS actuator and electric unit (control unit). Refer to BRC-77, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> END

# C1145 YAW RATE SENSOR

## Description

INFOID:0000000001181789

The yaw rate sensor detects the yaw rate affecting the vehicle, and transmits the data to the ABS actuator and electric unit (control unit) as an analog voltage signal.

## DTC Logic

INFOID:0000000001181790

### DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|---|---|---|---|
| C1145 | YAW RATE SENSOR | Yaw rate sensor is malfunctioning, or the yaw rate sensor signal line is open or shorted. | • Harness or connector<br>• ABS actuator and electric unit (control unit)<br>• Yaw rate sensor |

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

| Self-diagnosis results |
|---|
| YAW RATE SENSOR |

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-132, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000001181791

**CAUTION:**

- **Driving on high speed banked corners can also indicate yaw rate sensor malfunction.**
- **If vehicle is on turn-table at entrance to parking garage, or on other moving surface, VDC OFF indicator lamp may illuminate and CONSULT-III self-diagnosis may indicate yaw rate sensor system malfunction. However, in this case there is no malfunction in yaw rate sensor system. Take vehicle off of turn-table or other moving surface, and start engine. Results will return to normal. And after doing spin turns or acceleration turns with VDC function is being off (VDC OFF switch “ON”), too, the results will return to a normal condition by re-starting vehicle.**

### INSPECTION PROCEDURE

#### 1.CHECK INSTALLATION STATE OF YAW RATE SENSOR

Check yaw rate sensor is correctly attached to vehicle. Refer to BRC-177, "Exploded View".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace malfunctioning parts.

#### 2.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect yaw rate sensor connector.
4. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
5. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-95, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 3.
NO >> Poor connection of connector terminal. Replace or repair connector.

## 3.CHECK YAW RATE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect yaw rate sensor connector.
3. Turn ignition switch ON or OFF and check voltage between yaw rate sensor harness connector terminal and ground.

| Yaw rate sensor | | — | Condition | Voltage |
|---|---|---|---|---|
| Connector | Terminal | | | |
| M72 | 4 | Ground | Ignition switch: ON | Battery voltage |
| | | | Ignition switch: OFF | Approx. 0 V |

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace malfunctioning components.

## 4.CHECK YAW RATE SENSOR GROUND CIRCUIT

Check continuity between yaw rate sensor harness connector terminal and ground.

| Yaw rate sensor | | — | Continuity |
|---|---|---|---|
| Connector | Terminal | | |
| M72 | 1 | Ground | Existed |

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace malfunctioning components.

## 5.CHECK YAW RATE SENSOR HARNESS

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Check continuity between yaw rate sensor harness connector terminals and ABS actuator and electric unit (control unit) harness connector terminals.

| ABS actuator and electric unit (control unit) | | Yaw rate sensor | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E36 | 14 | M72 | 2 | Existed |
| | 25 | | 3 | |

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace malfunctioning components.

## 6.CHECK DATA MONITOR

1. Connect the yaw rate sensor connector and ABS actuator and electric unit (control unit) connector.
2. Select “YAW RATE SEN”, in “DATA MONITOR” and check yaw rate sensor signal.

| Vehicle condition | YAW RATE SEN (DATA MONITOR) |
|---|---|
| Stopped | Approx. 0 d/s |
| Turning right | Negative value |
| Turning left | Positive value |

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Replace yaw rate sensor.

## Component Inspection

INFOID:0000000001181792

### 1.CHECK DATA MONITOR

Select “YAW RATE SEN” in “DATA MONITOR” and check yaw rate sensor signal.

| Vehicle condition | YAW RATE SEN (DATA MONITOR) |
|---|---|
| Stopped | Approx. 0 d/s |
| Turning right | Negative value |
| turning left | Positive value |

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-132, "Diagnosis Procedure".

## Special Repair Requirement

INFOID:0000000001181793

### 1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to BRC-77, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> END

# C1146 G SENSOR

## Description

INFOID:0000000001181794

G sensor detects G affecting the vehicle, and transmits the data to the ABS actuator and electric unit (control unit) as an analog voltage signal.

## DTC Logic

INFOID:0000000001181795

### DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|---|---|---|---|
| C1146 | SIDE G-SEN CIRCUIT | Side G sensor is malfunctioning, or circuit of side G sensor is open or shorted. | • Harness or connector<br>• ABS actuator and electric unit (control unit)<br>• G sensor |

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

| Self-diagnosis results |
|---|
| SIDE G-SEN CIRCUIT |

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-135, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000001181796

**CAUTION:**
**Sudden turns (such as spin turns, acceleration turns), drifting, etc., when VDC function is off (VDC OFF switch “ON”) may cause G sensor system to indicate a malfunction. However, this is not a malfunction, if normal operation can be resumed after restarting engine. Then erase memory of self-diagnosis.**

### INSPECTION PROCEDURE

#### 1.CHECK INSTALLATION STATE OF G SENSOR

Check G sensor is correctly attached to vehicle. Refer to BRC-177, "Exploded View".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace malfunctioning parts.

#### 2.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect G sensor connector.
4. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
5. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-135, "Diagnosis Procedure".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 3.
NO >> Poor connection of connector terminal. Replace or repair connector.

#### 3.CHECK G SENSOR HARNESS

1. Turn ignition switch OFF.
2. Disconnect G sensor connector and ABS actuator and electric unit (control unit) connector.

3. Check continuity between G sensor harness connector terminals and ABS actuator and electric unit (control unit) harness connector terminals.

| ABS actuator and electric unit (control unit) | | G sensor | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E36 | 14 | M71 | 1 | Existed |
| | 21 | | 2 | |
| | 24 | | 3 | |

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace malfunctioning components.

## 4.CHECK DATA MONITOR

1. Connect the G sensor connector and ABS actuator and electric unit (control unit) connector.
2. Select “SIDE G-SENSOR” in “DATA MONITOR” and check G sensor signal.

| Vehicle condition | SIDE G-SENOR (DATA MONITOR) |
|---|---|
| Stopped | Approx. 0 m/s$^2$ |
| Turning right | Negative value |
| Turning left | Positive value |

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Replace G sensor.

# Component Inspection

INFOID:0000000001181797

## 1.CHECK DATA MONITOR

Select “SIDE G-SENSOR” in “DATA MONITOR” and check G sensor signal.

| Vehicle condition | SIDE G-SENSOR (DATA MONITOR) |
|---|---|
| Stopped | Approx. 0 m/s$^2$ |
| Turning right | Negative value |
| Turning left | Positive value |

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-135, "Diagnosis Procedure".

# Special Repair Requirement

INFOID:0000000001181798

## 1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to BRC-77, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> END

# C1147, C1148, C1149, C1150 USV/HSV LINE

## Description

INFOID:0000000001181799

### USV1, USV2 (CUT VALVE)

The cut valve shuts off the normal brake fluid path from the master cylinder, when ESP/TCS is activated.

### HSV1, HSV2 (SUCTION VALVE)

The suction valve supplies the brake fluid from the master cylinder to the pump, when ESP/TCS is activated.

## DTC Logic

INFOID:0000000001181800

### DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|---|---|---|---|
| C1147 | USV LINE [FL-RR] | ESP switch-over solenoid valve (USV1) on the primary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground. | • Harness or connector<br>• ABS actuator and electric unit (control unit) |
| C1148 | USV LINE [FR-RL] | ESP switch-over solenoid valve (USV2) on the primary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground. | |
| C1149 | HSV LINE [FL-RR] | ESP switch-over solenoid valve (HSV1) on the primary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground. | |
| C1150 | HSV LINE [FR-RL] | ESP switch-over solenoid valve (HSV2) on the primary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground. | |

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

| Self-diagnosis results |
|---|
| USV LINE [FL-RR] |
| USV LINE [FR-RL] |
| HSV LINE [FL-RR] |
| HSV LINE [FR-RL] |

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-137, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000001181801

### INSPECTION PROCEDURE

#### 1.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect connector and then perform the self-diagnosis. Refer to BRC-95, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2.
NO >> Poor connection of connector terminal. Replace or repair connector.

## 2.CHECK SOLENOID, ESP SWITCH-OVER VALVE AND ACTUATOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check voltage between ABS actuator and electric unit (control unit) harness connector terminal and ground.

| ABS actuator and electric unit (control unit) | | — | Voltage |
|---|---|---|---|
| Connector | Terminal | | |
| E36 | 3 | Ground | Battery voltage |

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace malfunctioning components.

## 3.CHECK SOLENOID, ESP SWITCH-OVER VALVE AND ACUATOR RELAY GROUND CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

| ABS actuator and electric unit (control unit) | | — | Continuity |
|---|---|---|---|
| Connector | Terminal | | |
| E36 | 1, 4 | Ground | Existed |

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace malfunctioning components.

# Component Inspection

INFOID:0000000001181802

## 1.CHECK ACTIVE TEST

1. Select each test menu item on ”ACTIVE TEST“.
2. On the display, touch “UP”, “ACT UP”, and “ACT KEEP”, and check that the system operates as shown in the table below.

| Test item | Display item (Note) | Display | | |
|---|---|---|---|---|
| | | UP | ACT UP | ACT KEEP |
| FR RH SOL | FR RH IN SOL | OFF | OFF | OFF |
| | FR RH OUT SOL | OFF | OFF | OFF |
| | USV [FR-RL] | OFF | ON | ON |
| | HSV [FR-RL] | OFF | ON* | OFF |
| FR LH SOL | FR LH IN SOL | OFF | OFF | OFF |
| | FR LH OUT SOL | OFF | OFF | OFF |
| | USV [FL-RR] | OFF | ON | ON |
| | HSV [FL-RR] | OFF | ON* | OFF |
| RR RH SOL | RR RH IN SOL | OFF | OFF | OFF |
| | RR RH OUT SOL | OFF | OFF | OFF |
| | USV [FL-RR] | OFF | ON | ON |
| | HSV [FL-RR] | OFF | ON* | OFF |
| RR LH SOL | RR LH IN SOL | OFF | OFF | OFF |
| | RR LH OUT SOL | OFF | OFF | OFF |
| | USV [FR-RL] | OFF | ON | ON |
| | HSV [FR-RL] | OFF | ON* | OFF |

*: ON for 1 to 2 seconds after the touch, and then OFF.

**NOTE:**

A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-137, "Diagnosis Procedure".

## Special Repair Requirement

INFOID:0000000001181803

### 1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to BRC-77, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> END

# C1155 BRAKE FLUID LEVEL SWITCH

## Description

INFOID:0000000001181804

Brake fluid level switch contacts close when brake fluid level is low. This is detected by the combination meter which sends the status of fluid level to the ABS actuator and electric unit (control unit) via the CAN communication.

## DTC Logic

INFOID:0000000001181805

### DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|---|---|---|---|
| C1155 | BR FLUID LEVEL LOW | Ignition switch ON and brake fluid signal low or not available for 10 seconds. | • Brake fluid level is low<br>• Brake fluid level switch<br>• Harness or connector<br>• CAN communication line<br>• Combination meter |

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

| Self-diagnosis results |
|---|
| BR FLUID LEVEL LOW |

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-140, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000001181806

### INSPECTION PROCEDURE

#### 1.CHECK BRAKE FLUID LEVEL

Check the brake fluid level.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Investigate and fix.

#### 2.CHECK BRAKE WARNING LAMP 1

Check that the brake warning lamp illuminates after the ignition switch is turned ON.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check wiring to brake fluid level switch and combination meter.

#### 3.CHECK BRAKE WARNING LAMP 2

Check that the brake warning lamp in the combination meter turns ON/OFF correctly when operating the parking brake.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check parking brake switch. Refer to BRC-144, "Diagnosis Procedure".

#### 4.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect brake fluid level switch connector and combination meter connector.
3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.

4. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-95, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 5.
NO >> Poor connection of connector terminal. Replace or repair connector.

## 5.CHECK BRAKE FLUID LEVEL SWITCH

1. Turn ignition switch OFF.
2. Disconnect brake fluid level switch connector.
3. Check continuity between brake fluid level switch connector terminals.

| Brake fluid level switch | | Condition | Continuity |
|---|---|---|---|
| Connector | Terminal | | |
| E37 | 1 – 2 | When brake fluid is full in the reservoir tank. | Not existed |
| | | When brake fluid is empty in the reservoir tank. | Existed |

Is the inspection result normal?

YES >> GO TO 6.
NO >> Brake fluid level switch is malfunction. Replace reservoir tank.

## 6.CHECK BRAKE FLUID LEVEL SWITCH CIRCUIT

1. Disconnect combination meter connector.
2. Check continuity between brake fluid level switch harness connector terminals and combination meter harness connector terminal and/or ground.

| Combination meter | | Brake fluid level switch | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| M34 | 27 | E37 | 1 | Existed |

| Combination meter | | — | Continuity |
|---|---|---|---|
| Connector | Terminal | | |
| M34 | 27 | Ground | Not existed |

| Brake fluid level switch | | — | Continuity |
|---|---|---|---|
| Connector | Terminal | | |
| E37 | 2 | Ground | Existed |

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace malfunctioning components.

# Component Inspection

INFOID:0000000001181807

## 1.CHECK BRAKE FLUID LEVEL SWITCH

1. Turn ignition switch OFF.
2. Disconnect brake fluid level switch connector.
3. Check continuity between brake fluid level switch connector terminals.

| Brake fluid level switch | | — | Condition | Continuity |
|---|---|---|---|---|
| Connector | Terminal | | | |
| E37 | 1 | Ground | When brake fluid is full in the reservoir tank. | Not existed |
| | | | When brake fluid is empty in the reservoir tank. | Existed |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace reservoir tank.

## Special Repair Requirement

INFOID:0000000001181808

### 1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to BRC-77, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> END

# U1000, U1002 CAN COMM CIRCUIT

## Description

INFOID:0000000001181809

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN-H line, CAN-L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

## DTC Logic

INFOID:0000000001181810

### DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|---|---|---|---|
| U1000 | CAN COMM CIRCUIT | When ABS actuator and electric unit (control unit) is not transmitting or receiving CAN communication signal for 2 seconds or more. | • CAN communication line<br>• ABS actuator and electric unit (control unit) |
| U1002 | SYSTEM COMM | When ABS actuator and electric unit (control unit) is not transmitting or receiving CAN communication signal for 2 seconds or less. | |

## Diagnosis Procedure

INFOID:0000000001181811

### INSPECTION PROCEDURE

### 1.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect connector and perform self-diagnosis.

| Self-diagnosis results |
|---|
| CAN COMM CIRCUIT |
| SYSTEM COMM |

Is above displayed on the self-diagnosis display?

YES >> Go to LAN-13, "Trouble Diagnosis Flow Chart".
NO >> INSPECTION END

## Special Repair Requirement

INFOID:0000000001181812

### 1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to BRC-77, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> END

# PARKING BRAKE SWITCH

## Description

INFOID:0000000001181813

The parking brake switch converts the status of the parking brake pedal to an electric signal and transmits it to the ABS actuator and electric unit (control unit).

## Diagnosis Procedure

INFOID:0000000001181814

### 1.CHECK COMBINATION METER INPUT SIGNAL

1. Turn ignition switch ON.
2. Check voltage between combination meter harness connector terminal 26 and ground.

| 26 – Ground | |
|---|---|
| Parking brake ON | : Approx. 0 V |
| Parking brake OFF | : Approx. 5 V |

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

### 2.CHECK PARKING BRAKE SWITCH SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect combination meter connector and parking brake switch connector.
3. Check continuity between combination meter harness connector terminal 26 and parking brake switch harness connector terminal 1.

| 26 – 1 | : Continuity should exist. |
|---|---|

4. Check continuity between combination meter harness connector terminal 26 and ground.

| 26 – Ground | : Continuity should not exist. |
|---|---|

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair harness or connector.

## Component Function Check

INFOID:0000000001181815

### 1.CHECK PARKING BRAKE SWITCH OPERATION

Operate the parking brake pedal. Then check that the brake warning lamp in the combination meter turns on/off correctly.

| Condition | Brake warning lamp illumination status |
|---|---|
| When the parking brake switch is operation | ON |
| When the parking brake switch is not operation. | OFF |

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-144, "Diagnosis Procedure".

## Component Inspection

INFOID:0000000001181816

INSPECTION PROCEDURE

### 1.CHECK PARKING BRAKE SWITCH

1. Turn ignition switch OFF.
2. Disconnect parking brake switch connector.

3. Check continuity between parking brake switch terminal and ground.

| Parking brake switch | | — | Condition | Continuity |
|---|---|---|---|---|
| Connector | Terminal | | | |
| M103 | 1 | Ground | When the parking brake switch is operated. | Existed |
| | | | When the parking brake switch is not operated. | Not existed |

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace parking brake switch.

# ESP OFF SWITCH

## Description

INFOID:0000000001181817

ESP OFF switch can deactivate (turn OFF) the ESP/TCS function by pressing the ESP OFF switch.

## Component Function Check

INFOID:0000000001181818

### 1.CHECK ESP OFF SWITCH OPERATION

Turn ON/OFF the ESP OFF switch and check that the ESP OFF indicator lamp in the combination meter turns ON/OFF correctly.

| Condition | ESP OFF indicator lamp illumination status |
|---|---|
| ESP OFF switch: ON | ON |
| ESP OFF switch: OFF | OFF |

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-146, "Diagnosis Procedure".

## Diagnosis Procedure

INFOID:0000000001181819

### 1.CHECK ESP OFF SWITCH

1. Turn ignition switch OFF.
2. Disconnect ESP OFF switch connector.
3. Check continuity between ESP OFF switch connector terminals.

| ESP OFF switch | | Condition | Continuity |
|---|---|---|---|
| Connector | Terminal | | |
| M5 | 1 – 2 | When ESP OFF switch is hold pressed. | Existed |
| | | When releasing ESP OFF switch. | Not existed |

Is the inspection result normal?

YES >> GO TO 2.
NO >> ESP OFF switch is malfunctioning. Replace ESP OFF switch.

### 2.CHECK ESP OFF SWITCH HARNESS

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Check continuity between ESP OFF switch connector terminals and ABS actuator and electric unit (control unit) connector terminal and/or ground.

| ABS actuator and electric unit (control unit) | | ESP OFF switch | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E36 | 21 | M5 | 1 | Existed |

| ABS actuator and electric unit (control unit) | | — | Continuity |
|---|---|---|---|
| Connector | Terminal | | |
| E36 | 21 | Ground | Not existed |

| ESP OFF switch | | — | Continuity |
|---|---|---|---|
| Connector | Terminal | | |
| M5 | 2 | Ground | Existed |

Is the inspection result normal?

YES >> GO TO 3.
NO >> If the open or short in harness, repair or replace harness.

## 3.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-25, "Diagnosis Description".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace combination meter.

# Component Inspection

INFOID:0000000001181820

INSPECTION PROCEDURE

## 1.CHECK ESP OFF SWITCH

1. Turn ignition switch OFF.
2. Disconnect ESP OFF switch connector.
3. Check continuity between ESP OFF switch connector terminals.

| ESP OFF switch | | Condition | Continuity |
|---|---|---|---|
| Connector | Terminal | | |
| M5 | 1 – 2 | When ESP OFF switch is hold pressed. | Existed |
| | | When releasing ESP OFF switch. | Not existed |

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace ESP OFF switch.

# ABS WARNING LAMP

## Description

INFOID:0000000001181821

×: ON –: OFF

| Condition | ABS warning lamp |
|---|---|
| Ignition switch OFF | – |
| For 1 second after turning ON ignition switch | × |
| 1 second later after turning ON ignition switch | – |
| ABS function is malfunctioning. | × |
| EBD function is malfunctioning. | × |

## Component Function Check

INFOID:0000000001181822

### 1.CHECK ABS WARNING LAMP OPERATION

Check that the lamp illuminates for approximately 1 second after the ignition switch is turned ON.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-148, "Diagnosis Procedure".

## Diagnosis Procedure

INFOID:0000000001181823

### 1.CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to BRC-95, "CONSULT-III Function (ABS)".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check items displayed by self-diagnosis.

### 2.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-25, "Diagnosis Description".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace combination meter.

# BRAKE WARNING LAMP

## Description

INFOID:0000000001181824

×: ON –: OFF

| Condition | Brake warning lamp NOTE 1 |
|---|---|
| Ignition switch OFF | – |
| For 1 second after turning ON ignition switch | × NOTE 2 |
| 1 second later after turning ON ignition switch | × NOTE 2 |
| EBD function is malfunctioning. | × |

**NOTE:**

- 1: Brake warning lamp will turn on in case of parking brake operation (when switch is ON) or of brake fluid level switch operation (when brake fluid is insufficient).
- 2: After starting engine, brake warning lamp is turned off.

## Component Function Check

INFOID:0000000001181825

### 1. BRAKE WARNING LAMP OPERATION CHECK 1

Check that the lamp illuminates for approximately 1 second after the ignition switch is turned ON.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Go to diagnosis procedure. Refer to BRC-149, "Diagnosis Procedure".

### 2. BRAKE WARNING LAMP OPERATION CHECK 2

Check that the brake warning lamp in the combination meter turns ON/OFF correctly when operating the parking brake pedal.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Check parking brake switch. Refer to BRC-144, "Diagnosis Procedure".

## Diagnosis Procedure

INFOID:0000000001181826

### 1. CHECK PARKING BRAKE SWITCH

Check that the brake warning lamp in the combination meter turns ON/OFF correctly when operating the parking brake pedal.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check parking brake switch. Refer to BRC-144, "Diagnosis Procedure".

### 2. CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to BRC-95, "CONSULT-III Function (ABS)".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check items displayed by self-diagnosis.

### 3. CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-25, "Diagnosis Description".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace combination meter.

# ESP OFF INDICATOR LAMP

## Description

INFOID:0000000001181827

×: ON –: OFF

| Condition | ESP OFF indicator lamp |
|---|---|
| Ignition switch OFF | – |
| For 1 second after turning ON ignition switch | × |
| 1 second later after turning ON ignition switch | – |
| ESP OFF switch turned ON. (ESP function is OFF.) | × |
| ESP/TCS function is malfunctioning. | × |
| ABS function is malfunctioning. | × |
| EBD function is malfunctioning. | × |

## Component Function Check

INFOID:0000000001181828

### 1.ESP OFF INDICATOR LAMP OPERATION CHECK 1

Check that the lamp illuminates for approximately 1 second after the ignition switch is turned ON.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Go to diagnosis procedure. Refer to BRC-150, "Diagnosis Procedure".

### 2.ESP OFF INDICATOR LAMP OPERATION CHECK 2

Check that the ESP OFF indicator lamp in the combination meter turns ON/OFF correctly when operating the ESP OFF switch.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Check ESP OFF switch. Refer to BRC-146, "Diagnosis Procedure".

## Diagnosis Procedure

INFOID:0000000001181829

### 1.CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to BRC-95, "CONSULT-III Function (ABS)".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check items displayed by self-diagnosis.

### 2.CHECK ESP OFF SWITCH

Check that the ESP OFF indicator lamp in the combination meter turns ON/OFF correctly when operating the ESP OFF switch.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check ESP OFF switch. Refer to BRC-146, "Diagnosis Procedure".

### 3.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-25, "Diagnosis Description".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace combination meter.

# SLIP INDICATOR LAMP

## Description

INFOID:0000000001181830

×: ON –: OFF

| Condition | SLIP indicator lamp |
|---|---|
| Ignition switch OFF | – |
| For 1 second after turning ON ignition switch | × |
| 1 second later after turning ON ignition switch | – |
| VDC/TCS function is malfunctioning. | × |
| ABS function is malfunctioning. | × |
| EBD function is malfunctioning. | × |

## Component Function Check

INFOID:0000000001181831

### 1.CHECK SLIP INDICATOR LAMP OPERATION

Check that the lamp illuminates for approximately 1 second after the ignition switch is turned ON.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-151, "Diagnosis Procedure".

## Diagnosis Procedure

INFOID:0000000001181832

### 1.CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to BRC-95, "CONSULT-III Function (ABS)".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check items displayed by self-diagnosis.

### 2.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-25, "Diagnosis Description".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace combination meter.

# ECU DIAGNOSIS

## ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

### Reference Value

INFOID:0000000001181833

VALUES ON THE DIAGNOSIS TOOL

**CAUTION:**

**The display shows the control unit calculation data, so a normal value might be displayed even in the event the output circuit (harness) is open or short-circuited.**

| Monitor item | Condition | | Value/Status |
|---|---|---|---|
| FR LH SENSOR | Wheel speed | Vehicle stopped | 0 [km/h (MPH)] |
| | | Vehicle running NOTE 1 | Nearly matches the speed meter display (± 10% or less) |
| FR RH SENSOR | Wheel speed | Vehicle stopped | 0 [km/h (MPH)] |
| | | Vehicle running NOTE 1 | Nearly matches the speed meter display (± 10% or less) |
| RR LH SENSOR | Wheel speed | Vehicle stopped | 0 [km/h (MPH)] |
| | | Vehicle running NOTE 1 | Nearly matches the speed meter display (± 10% or less) |
| RR RH SENSOR | Wheel speed | Vehicle stopped | 0 [km/h (MPH)] |
| | | Vehicle running NOTE 1 | Nearly matches the speed meter display (± 10% or less) |
| STOP LAMP SW | Stop lamp switch signal status | When brake pedal is depressed | ON |
| | | When brake pedal is not depressed | OFF |
| BATTERY VOLT | Battery voltage supplied to the ABS actuator and electric unit (control unit) | Ignition switch ON | 10 – 16 V |
| GEAR | Gear position determined by TCM | 1st gear<br>2nd gear<br>3rd gear<br>4th gear<br>5th gear<br>6th gear | 1<br>2<br>3<br>4<br>5<br>6 |
| SLCT LVR POSI | Selector lever position | P position<br>R position<br>N position<br>D position | P<br>R<br>N<br>D |
| OFF SW | ESP OFF switch ON/OFF | ESP OFF switch ON<br>(When ESP OFF indicator lamp is ON) | ON |
| | | ESP OFF switch OFF<br>(When ESP OFF indicator lamp is OFF) | OFF |
| YAW RATE SEN | Yaw rate detected by yaw rate/side G sensor | When vehicle stop | Approx. 0 °/s |
| | | When vehicle turning | –75 to 75 °/s |
| ACCEL POS SIG | Throttle actuator opening/closing is displayed (linked with accelerator pedal) | Accelerator pedal not depressed (ignition switch is ON) | 0 % |
| | | Depress accelerator pedal (ignition switch is ON) | 0 - 100 % |

| Monitor item | Condition | | Value/Status |
|---|---|---|---|
| SIDE G-SENSOR | Transverse G detected by side G sensor | Vehicle stopped | Approx. 0 $m/s^2$ |
| | | Vehicle turning right | Negative value ($m/s^2$) |
| | | Vehicle turning left | Positive value ($m/s^2$) |
| STR ANGLE SIG | Steering angle detected by steering angle sensor | Straight-ahead | Approx. 0° |
| | | Steering wheel turned | –720 to 720° |
| PRESS SENSOR | Brake fluid pressure detected by pressure sensor | With ignition switch turned ON and brake pedal released | Approx. 3 bar |
| | | With ignition switch turned ON and brake pedal depressed | 0 to 200 bar |
| ENGINE RPM | With engine running | With engine stopped | 0 tr/min |
| | | Engine running | Almost in accordance with tachometer display |
| FLUID LEV SW | Brake fluid level switch signal status | When brake fluid level switch ON | ON |
| | | When brake fluid level switch OFF | OFF |
| PARK BRAKE SW | Parking brake switch signal status | Parking brake switch is active | ON |
| | | Parking brake switch is inactive | OFF |
| FR RH IN SOL | Operation status of front RH inlet solenoid valve | Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode) | ON |
| | | When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON) | OFF |
| FR RH OUT SOL | Operation status of front RH outlet solenoid valve | Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode) | ON |
| | | When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON) | OFF |
| FR LH IN SOL | Operation status of front LH inlet solenoid valve | Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode) | ON |
| | | When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON) | OFF |
| FR LH OUT SOL | Operation status of front RH inlet solenoid valve | Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode) | ON |
| | | When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON) | OFF |
| RR RH IN SOL | Operation status of rear RH inlet solenoid valve | Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode) | ON |
| | | When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON) | OFF |

| Monitor item | Condition | | Value/Status |
|---|---|---|---|
| RR RH OUT SOL | Operation status of rear RH outlet solenoid valve | Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode) | ON |
| | | When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON) | OFF |
| RR LH IN SOL | Operation status of rear LH inlet solenoid valve | Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode) | ON |
| | | When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON) | OFF |
| RR LH OUT SOL | Operation status of rear RH inlet solenoid valve | Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode) | ON |
| | | When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON) | OFF |
| MOTOR RELAY | Motor and motor relay operation | When the motor relay and motor are operating | ON |
| | | When the motor relay and motor are not operating | OFF |
| ACTUATOR RLY NOTE 2 | Actuator relay operation | When the actuator relay is operating | ON |
| | | When the actuator relay is not operating | OFF |
| ABS WARN LAMP | ABS warning lamp NOTE 3 | When ABS warning lamp is ON | ON |
| | | When ABS warning lamp is OFF | OFF |
| OFF LAMP | ESP OFF indicator lamp NOTE 3 | When ESP OFF indicator lamp is ON | ON |
| | | When ESP OFF indicator lamp is OFF | OFF |
| SLIP LAMP | SLIP indicator lamp NOTE 3 | When SLIP indicator lamp is ON | ON |
| | | When SLIP indicator lamp is OFF | OFF |

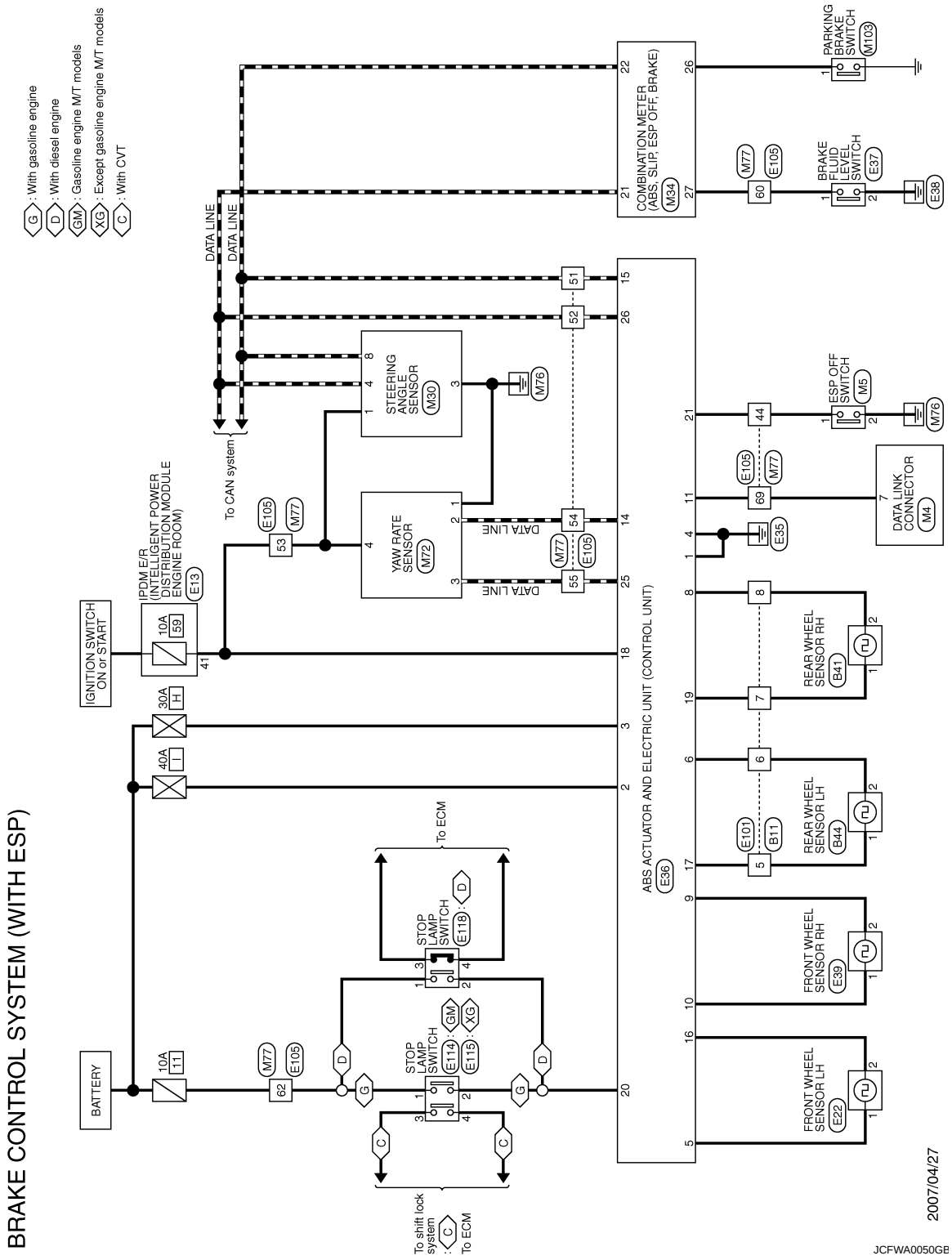
**NOTE:**

- 1: Confirm tire pressure is normal.
- 2: Every 20 seconds momentary switch to OFF.
- 3: On and off timing for warning lamp and indicator lamp.

- ABS warning lamp: BRC-148, "Description".
- ESP OFF indicator lamp: BRC-150, "Description".
- SLIP indicator lamp: BRC-151, "Description".

# Wiring Diagram - BRAKE CONTROL SYSTEM -

INFOID:0000000001181834



BRAKE CONTROL SYSTEM (WITH ESP)

| Connector No. | B11 |
|---|---|
| Connector Name | WIRE TO WIRE |
| Connector Type | TK10MW-NS8 |



| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 5 | G/O | – |
| 6 | G/Y | – |
| 7 | LG | – |
| 8 | V | –[Except 2WD models without ESP] |

| Connector No. | B41 |
|---|---|
| Connector Name | REAR WHEEL SENSOR RH |
| Connector Type | RK02FGY |



| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 1 | LG | – |
| 2 | V | –[Except 2WD models without ESP] |

| Connector No. | B44 |
|---|---|
| Connector Name | REAR WHEEL SENSOR LH |
| Connector Type | RK02FGY |



| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 1 | G/O | – |
| 2 | G/Y | – |

| Connector No. | E13 |
|---|---|
| Connector Name | IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) |
| Connector Type | NS16FW-CS |



| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 41 | P | – |

| Connector No. | E22 |
|---|---|
| Connector Name | FRONT WHEEL SENSOR LH |
| Connector Type | RK02MGY |



| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 1 | R | –[With ESP] |
| 2 | Y | – |

| Connector No. | E36 |
|---|---|
| Connector Name | ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) |
| Connector Type | BAA22FB-AH24-LH |



| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 1 | B | GND(MTR) |
| 2 | Y | +B(MTR) |
| 3 | W/R | +B(SOL) |
| 4 | B | GND(SOL) |
| 5 | R | DS FL |
| 6 | G/Y | DP FL |
| 8 | V | DP RR |
| 9 | W | DP FR |
| 10 | B | DS FR |
| 11 | O | DIAG–K |
| 14 | O | CAN–L(YRS) |

| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 15 | P | CAN–L |
| 16 | Y | DP FL |
| 17 | G/O | DS RL |
| 18 | P | IGN |
| 19 | LG | DS RR |
| 20 | R/W | STOP L SIG |
| 21 | G | VDC OFF SW |
| 25 | G | CAN–H(YRS) |
| 26 | L | CAN–H |

| Connector No. | E37 |
|---|---|
| Connector Name | BRAKE FLUID LEVEL SWITCH |
| Connector Type | YV02FGY |



| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 1 | R/B | – |
| 2 | B | – |

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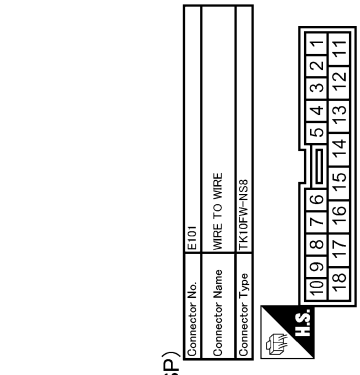
BRAKE CONTROL SYSTEM (WITH ESP)

| Connector No. | E39 |
|---|---|
| Connector Name | FRONT WHEEL SENSOR RH |
| Connector Type | RK02MGY |



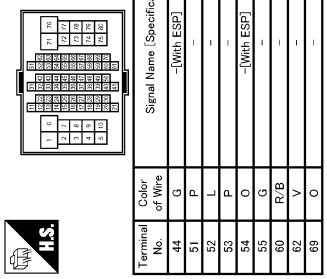
| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 1 | B | – |
| 2 | W | – |

| Connector No. | E101 |
|---|---|
| Connector Name | WIRE TO WIRE |
| Connector Type | TK10FW-NS8 |



| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 5 | G/O | – |
| 6 | G/Y | – |
| 7 | LG | – |
| 8 | V | –[Except 2WD models without ESP] |

| Connector No. | E105 |
|---|---|
| Connector Name | WIRE TO WIRE |
| Connector Type | TH80MW-NS16-TM4 |



| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 44 | G | –[With ESP] |
| 51 | P | – |
| 52 | L | – |
| 53 | P | –[With ESP] |
| 54 | O | – |
| 55 | G | – |
| 60 | R/B | – |
| 62 | V | – |
| 69 | O | – |

| Connector No. | E114 |
|---|---|
| Connector Name | STOP LAMP SWITCH |
| Connector Type | M02FB |

| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 1 | V | – |
| 2 | R/W | – |

| Connector No. | E115 |
|---|---|
| Connector Name | STOP LAMP SWITCH |
| Connector Type | M04FW-LC |

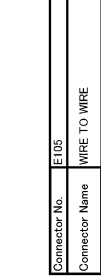
| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 1 | V | – |
| 2 | R/W | – |
| 3 | G | – |
| 4 | B | – |

| Connector No. | E118 |
|---|---|
| Connector Name | STOP LAMP SWITCH |
| Connector Type | M04FW-LC |



| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 1 | V | – |
| 2 | R/W | – |
| 3 | O | – |
| 4 | W/L | – |

| Connector No. | M4 |
|---|---|
| Connector Name | DATA LINK CONNECTOR |
| Connector Type | BD16FW |



| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 7 | O | – |

| Connector No. | M5 |
|---|---|
| Connector Name | ESP OFF SWITCH |
| Connector Type | TK06FGY |

| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 1 | G | – |
| 2 | B | – |

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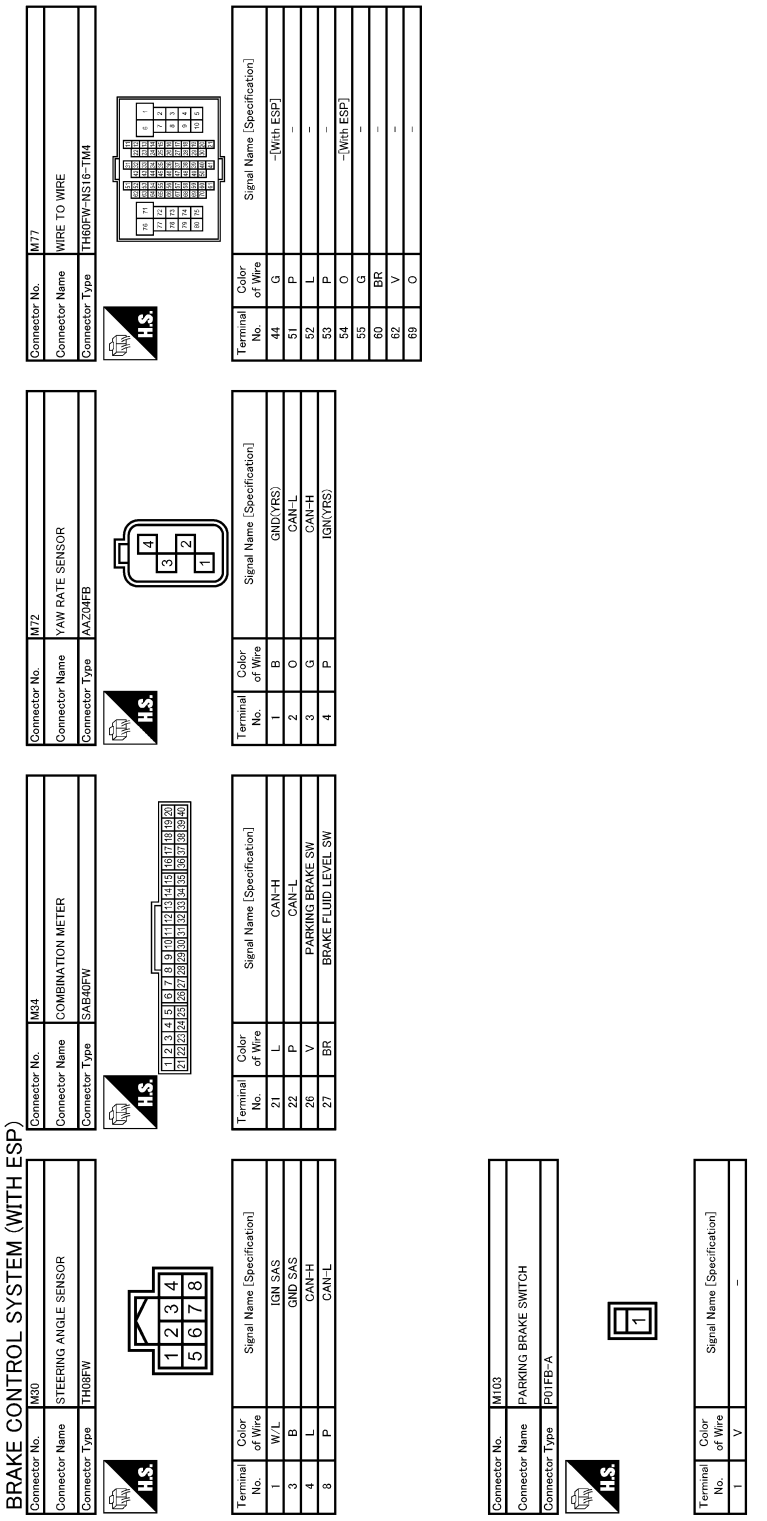


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## Fail-Safe

*INFOID:0000000001181835*

ABS, EBD SYSTEM

In case of electrical malfunctions with the ABS, ABS warning lamp, ESP OFF indicator lamp, SLIP indicator lamp will turn on. In case of electrical malfunctions with the EBD, brake warning lamp, ABS warning lamp, ESP OFF indicator lamp and SLIP indicator lamp will turn on. Simultaneously, the ESP/TCS/ABS become one of the following conditions of the fail-safe function.

- For malfunction of ABS, only the EBD is activated and the condition of vehicle is the same condition of vehicles without TCS/ABS system.
  **NOTE:**
  ABS self-diagnosis sound may be heard. That is a normal condition because a self-diagnosis for “Ignition switch ON” and “The first starting” are being performed.
- For malfunction of EBD, EBD and ABS become inoperative, and the condition of vehicle is the same as the condition of vehicles without TCS/ABS, EBD system.

## ESP/TCS SYSTEM

In case of malfunction in the ESP/TCS/ABS system, ESP OFF indicator lamp, SLIP indicator lamp are turned on, and the condition of vehicle is the same as the condition of vehicles without ESP/TCS control.

**CAUTION:**
**If the Fail-Safe function is activated, then perform self-diagnosis for ESP/TCS/ABS control system.**

## DTC No. Index

INFOID:0000000001181836

| DTC | Items (CONSULT screen terms) | Reference |
|---|---|---|
| C1101 | RR RH SENSOR-1 | BRC-99, "Description" |
| C1102 | RR LH SENSOR-1 | |
| C1103 | FR RH SENSOR-1 | |
| C1104 | FR LH SENSOR-1 | |
| C1105 | RR RH SENSOR-2 | BRC-102, "Description" |
| C1106 | RR LH SENSOR-2 | |
| C1107 | FR RH SENSOR-2 | |
| C1108 | FR LH SENSOR-2 | |
| C1109 | BATTERY VOLTAGE [ABNORMAL] | BRC-105, "Description" |
| C1110 | CONTROLLER FAILURE | BRC-107, "Description" |
| C1111 | PUMP MOTOR | BRC-109, "Description" |
| C1114 | MAIN RELAY | BRC-112, "Description" |
| C1115 | ABS SENSOR [ABNORMAL SIGNAL] | BRC-114, "Description" |
| C1116 | STOP LAMP SW | BRC-117, "Description" |
| C1120 | FR LH IN ABS SOL | BRC-120, "Description" |
| C1121 | FR LH OUT ABS SOL | BRC-123, "Description" |
| C1122 | FR RH IN ABS SOL | BRC-120, "Description" |
| C1123 | FR RH OUT ABS SOL | BRC-123, "Description" |
| C1124 | RR LH IN ABS SOL | BRC-120, "Description" |
| C1125 | RR LH OUT ABS SOL | BRC-123, "Description" |
| C1126 | RR RH IN ABS SOL | BRC-120, "Description" |
| C1127 | RR RH OUT ABS SOL | BRC-123, "Description" |
| C1130 | ENGINE SIGNAL 1 | BRC-126, "Description" |
| C1131 | ENGINE SIGNAL 2 | |
| C1132 | ENGINE SIGNAL 3 | |
| C1142 | PRESS SEN CIRCUIT | BRC-127, "Description" |
| C1143 | ST ANG SEN CIRCUIT | BRC-129, "Description" |
| C1144 | ST ANG SEN SIGNAL | |
| C1145 | YAW RATE SENSOR | BRC-132, "Description" |
| C1146 | SIDE G-SEN CIRCUIT | BRC-135, "Description" |

| DTC | Items (CONSULT screen terms) | Reference |
|---|---|---|
| C1147 | USV LINE [FL-RR] | BRC-137, "Description" |
| C1148 | USV LINE [FR-RL] | |
| C1149 | HSV LINE [FL-RR] | |
| C1150 | HSV LINE [FR-RL] | |
| C1153 | EMERGENCY BRAKE | BRC-107, "Description" |
| C1155 | BR FLUID LEVEL LOW | BRC-140, "Description" |
| C1170 | VARIANT CORDING | BRC-107, "Description" |
| U1000 | CAN COMM CIRCUIT | BRC-143, "Description" |
| U1002 | SYSTEM COMM | BRC-143, "Description" |

# SYMPTOM DIAGNOSIS

## EXCESSIVE ABS FUNCTION OPERATION FREQUENCY

### Diagnosis Procedure

INFOID:0000000001181837

### 1.CHECK START

Check front and rear brake force distribution using a brake tester. Refer to BR-49, "General Specifications" (LHD models), BR-96, "General Specifications" (RHD models).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check brake system.

### 2.CHECK FRONT AND REAR AXLE

Make sure that there is no excessive play in the front and rear axles.
- Front: FAX-7, "Inspection" (2WD models), FAX-59, "Inspection" (4WD models)
- Rear: RAX-3, "Inspection" (2WD models), RAX-9, "Inspection" (4WD models)

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace malfunctioning components.

### 3.CHECK WHEEL SENSOR AND SENSOR ROTOR

Check the following.
- Wheel sensor installation for damage.
- Sensor rotor installation for damage.
- Wheel sensor connector connection.
- Wheel sensor harness inspection.

Is the inspection result normal?

YES >> GO TO 4.
NO >>
- Replace wheel sensor or sensor rotor.
- Repair harness.

### 4.CHECK ABS WARNING LAMP DISPLAY

Make sure that the ABS warning lamp is turned off after the ignition switch is turned ON or when driving.

Is the ABS warning lamp illuminated?

YES >> Perform self-diagnosis. Refer to BRC-95, "CONSULT-III Function (ABS)".
NO >> INSPECTION END

# UNEXPECTED PEDAL REACTION

## Diagnosis Procedure

INFOID:0000000001181838

### 1.CHECK BRAKE PEDAL STROKE

Check brake pedal stroke. Refer to BR-8, "Inspection and Adjustment" (LHD models), BR-55, "Inspection and Adjustment" (RHD models).

Is the stroke too large?

YES >>
- Bleed air from brake tube and hose. Refer to BR-12, "Bleeding Brake System" (LHD models), BR-59, "Bleeding Brake System" (RHD models).
- Check brake pedal, brake booster, and master cylinder for mount play, looseness, brake system fluid leakage, etc.
  - Brake pedal: BR-17, "Exploded View" (LHD models), BR-64, "Exploded View" (RHD models).
  - Brake booster: BR-30, "Exploded View" (LHD models), BR-77, "Exploded View" (RHD models).
  - Brake master cylinder: BR-27, "Exploded View" (LHD models), BR-74, "Exploded View" (RHD models).
  - Brake fluid: BR-11, "Inspection" (LHD models), BR-58, "Inspection" (RHD models).

NO >> GO TO 2.

### 2.CHECK FUNCTION

Disconnect ABS actuator and electric unit (control unit) connector to deactivate ABS. Check if braking force is normal in this condition. Connect connector after inspection.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Check brake system.

# THE BRAKING DISTANCE IS LONG

## Diagnosis Procedure

INFOID:0000000001181839

**CAUTION:**

**The stopping distance on slippery road surfaces might be longer with the ABS operating than when the ABS is not operating.**

### 1.CHECK FUNCTION

Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector to deactivate ABS. In this condition, check stopping distance. After inspection, connect connector.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Check brake system.

# ABS FUNCTION DOES NOT OPERATE

## Diagnosis Procedure

INFOID:0000000001181840

**CAUTION:**
**ABS does not operate when speed is 10 km/h (6 MPH) or lower.**

1. CHECK ABS WARNING LAMP DISPLAY

Make sure that the ABS warning lamp turns OFF after ignition switch is turned ON or when driving.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Perform self-diagnosis. Refer to BRC-95, "CONSULT-III Function (ABS)".

# PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

## Diagnosis Procedure

INFOID:0000000001181841

**CAUTION:**

**Under the following conditions, ABS is activated and vibration is felt when brake pedal is lightly depressed (just place a foot on it). However, this is normal.**

- **When shifting gears**
- **When driving on slippery road**
- **During cornering at high speed**
- **When passing over bumps or grooves [at approximately 50 mm (1.97 in) or more]**
- **When pulling away just after starting engine [at approximately 10 km/h (6 MPH) or higher]**

### 1. SYMPTOM CHECK 1

Check that there are pedal vibrations when the engine is started.

Do vibrations occur?

YES >> GO TO 2.
NO >> Inspect the brake pedal.

### 2. SYMPTOM CHECK 2

Check that there are ABS operation noises when the engine is started.

Do the operation noises occur?

YES >> GO TO 3.
NO >> Perform self-diagnosis. Refer to BRC-95, "CONSULT-III Function (ABS)".

### 3. SYMPTOM CHECK 3

Check symptoms when electrical component (headlamps, etc.) switches are operated.

Do symptoms occur?

YES >> Check if there is a radio, antenna, antenna lead wire, or wiring close to the control unit. If there is, move it farther away.
NO >> INSPECTION END

# VEHICLE JERKS DURING ESP/TCS/ABS CONTROL

## Diagnosis Procedure

INFOID:0000000001181842

### 1.SYMPTOM CHECK

Check if the vehicle jerks during ESP/TCS/ABS control.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

### 2.CHECK SELF-DIAGNOSIS RESULTS

Perform self-diagnostic of ABS actuator and electric unit (control unit). Refer to BRC-95, "CONSULT-III Function (ABS)".

Are self-diagnosis results indicated?

YES >> Check corresponding items, make repairs, and perform ABS actuator and electric unit (control unit) self-diagnosis.
NO >> GO TO 3.

### 3.CHECK CONNECTOR

- Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector and check terminal for deformation, disconnection, looseness, etc.
- Securely connect connectors and perform ABS actuator and electric unit (control unit) self-diagnosis.

Are self-diagnosis results indicated?

YES >> If poor contact, damage, open or short circuit of connector terminal is found, repair or replace.
NO >> GO TO 4.

### 4.CHECK ECM AND TCM SELF-DIAGNOSIS RESULTS

Perform ECM and TCM self-diagnosis.

Are self-diagnosis results indicated?

YES >> Check the corresponding items.
- ECM:
  - HR16DE (with EURO-OBD): ECH-89, "CONSULT-III Function".
  - HR16DE (without EURO-OBD): ECH-419, "CONSULT-III Function".
  - MR20DE (with EURO-OBD): ECM-91, "CONSULT-III Function".
  - MR20DE (without EURO-OBD): ECM-425, "CONSULT-III Function".
  - K9K: ECK-63, "Diagnosis Description".
  - M9R: ECR-101, "CONSULT-III Function"
- TCM: Refer to TM-432, "CONSULT-III Function (TRANSMISSION)".

NO >> Replace ABS actuator and electric unit (control unit).

# NORMAL OPERATING CONDITION

## Description

INFOID:0000000001181843

| Symptom | Result |
|---|---|
| Slight vibrations are felt on the brake pedal and the operation noises occur, when ESP, TCS or ABS is activated. | This is a normal condition due to the ESP, TCS or ABS activation. |
| Stopping distance is longer than that of vehicles without ABS when the vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads. | |
| The brake pedal moves and generates noises, when TCS or ESP is activated due to rapid acceleration or sharp turn. | |
| The brake pedal vibrates and motor operation noises occur from the engine room, after the engine starts and just after the vehicle starts. | This is a normal, and it is caused by the ABS operation check. |
| Depending on the road conditions, the driver may experience a sluggish feel. | This is normal, because TCS places the highest priority on the optimum traction (stability). |
| TCS may activate momentarily if wheel speed changes when driving over location where friction coefficient varies, when downshifting, or when fully depressing accelerator pedal. | |
| The ABS warning lamp, ESP OFF indicator lamp and SLIP indicator lamp may turn ON when the vehicle is subject to strong shaking or large vibration, such as when the vehicle is rotating on a turntable or located on a ship while the engine is running. | In this case, restart the engine on a normal road. If the normal condition is restored, there is no malfunction. At that time, erase the self-diagnosis memory. |
| ESP may not operate normally or the ABS warning lamp, ESP OFF indicator lamp, and SLIP indicator lamp may illuminate, when running on a special road that is extremely slanted (e.g. bank in a circuit course). | |
| A malfunction may occur in the yaw rate/side G sensor system, when the vehicle turns sharply, such as during a spin turn, axle turn, or drift driving, while the ESP function is off (ESP OFF indicator lamp illuminated). | |
| The vehicle speed will not increase even though the accelerator pedal is depressed, when inspecting the speedometer on a 2-wheel chassis dynamometer. | Normal (Deactivate the ESP/TCS function before performing an inspection on a chassis dynamometer.) |

# PRECAUTION

## PRECAUTIONS

### Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001583060

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the “SRS AIRBAG” and “SEAT BELT” of this Service Manual.

**WARNING:**

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the “SRS AIRBAG”.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

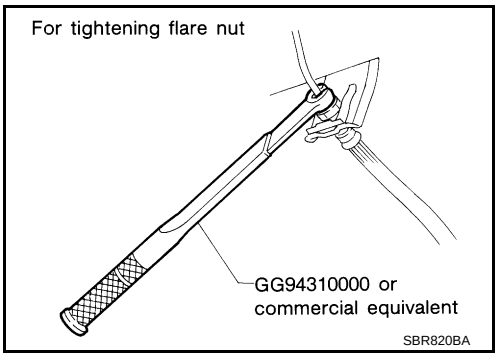
### Precaution for Brake System

INFOID:0000000001181845

**WARNING:**

**Clean brake pads and shoes with a waste cloth, then wipe with a dust collector.**

- Only use DOT 3 brake fluid. Refer to MA-27, "Fluids and Lubricants".
- Never to reuse drained brake fluid.
- Never to spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface.
- Never to use mineral oils such as gasoline or light oil. They may damage rubber parts and cause improper operation.
- Always loosen the brake tube flare nut with a flare nut wrench.
- Tighten the brake tube flare nut to the specified torque with a flare nut torque wrench.
- Always conform the specified tightening torque when installing the brake pipes.
- Brake system is an important safety part. If a brake fluid leak is detected, always disassemble the affected part. If a malfunction is detected, replace part with a new one.
- Turn the ignition switch OFF and disconnect the ABS actuator and electric unit (control unit) connector or the battery negative terminal before performing the work.




### Precaution for Brake Control

INFOID:0000000001181846

- Just after starting vehicle after ignition switch ON, brake pedal may vibrate or motor operating noise may be heard from engine compartment. This is normal condition.
- When an error is indicated by ABS or another warning lamp, collect all necessary information from customer (what symptoms are present under what conditions) and check for simple causes before starting diagnostic servicing. Besides electrical system inspection, check brake booster operation, brake fluid level, and oil leaks.
- If tire size and type are used in an improper combination, or brake pads are not Genuine NISSAN parts, stopping distance or steering stability may deteriorate.
- ABS might be out of order or malfunctions by putting a radio (wiring inclusive), an antenna and a lead-in wire near the control unit.
- If aftermarket parts (car stereo, CD player, etc.) have been installed, check for incidents such as harness pinches, open circuits, and improper wiring.
- ESP system may not operate normally or a ESP OFF indicator lamp or SLIP indicator lamp may light.

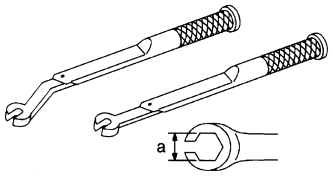
- When replacing the following parts with parts other than genuine parts or making modifications: Suspension-related parts (shock absorber, spring, bushing, etc.), tires, wheels (other than specified sizes), brake-related parts (pad, rotor, caliper, etc.), engine-related parts (muffler, ECM, etc.) and body reinforcement-related parts (roll bar, tower bar, etc.).
- When driving with worn or deteriorated suspension, tires and brake-related parts.

# PREPARATION

## PREPARATION

### Special Service Tool

INFOID:0000000001181847

| Tool number<br>Tool name | | Description |
|---|---|---|
| GG94310000<br>Flare nut torque wrench<br>a: 10 mm (0.39 in)/ 12 mm (0.47 in) |  S-NT406 | Installing each brake piping |

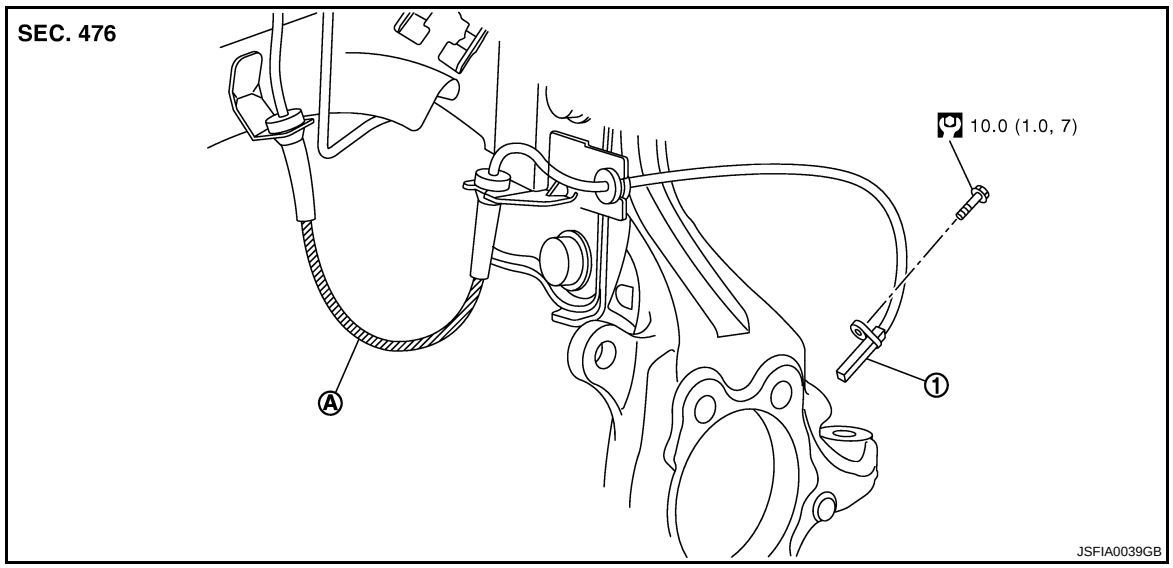
# ON-VEHICLE REPAIR

## WHEEL SENSOR

### FRONT WHEEL SENSOR

#### FRONT WHEEL SENSOR : Exploded View

INFOID:0000000001181848




1. Front LH wheel sensor

A. White line (slant line)

Refer to GI section GI-4, "Components" for symbols in the figure.

**NOTE:**
The above figure (front side) shows left side. Right side is the mirror image.

#### FRONT WHEEL SENSOR : Removal and Installation

INFOID:0000000001181849

REMOVAL

Pay attention to the following when removing sensor.

**CAUTION:**

- **Do not twist sensor harness as much as possible, when removing it. Pull sensors out without pulling on sensor harness.**
- **Take care to avoid damaging sensor edges or rotor teeth. Remove wheel sensor first before removing front or rear wheel hub. This is to avoid damage to sensor wiring and loss of sensor function.**
- **When you see the harness of the wheel sensor from the front side of the vehicle ensure that the white lines (A) are not twisted.**

INSTALLATION

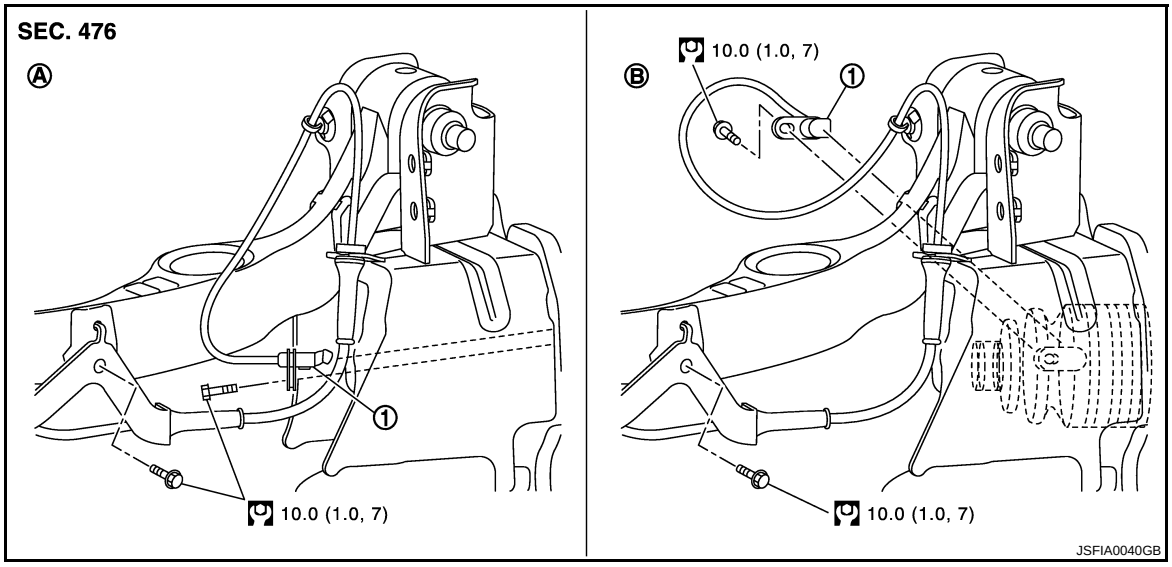
Pay attention to the following when installing wheel sensor. Tighten installation bolts to the specified torques. Refer to BRC-66, "FRONT WHEEL SENSOR : Exploded View".

- When installing, make sure there is no foreign material such as iron chips on and in the mounting hole of the wheel sensor. Make sure no foreign material has been caught in the sensor rotor. Remove any foreign material and clean the mount.
- When installing wheel sensor, be sure to press rubber grommets in until they lock at locations shown above in the figure. When installed, harness must not be twisted.

### REAR WHEEL SENSOR

## REAR WHEEL SENSOR : Exploded View

INFOID:0000000001181850




1. Rear LH wheel sensor

A. 2WD models B. 4WD models

Refer to GI section GI-4, "Components" for symbols in the figure.

**NOTE:**
The above figure (front side) shows left side. Right side is the mirror image.

## REAR WHEEL SENSOR : Removal and Installation

INFOID:0000000001181851

### REMOVAL

Pay attention to the following when removing sensor.

**CAUTION:**

- **Do not twist sensor harness as much as possible, when removing it. Pull sensors out without pulling on sensor harness.**
- **Take care to avoid damaging sensor edges or rotor teeth. Remove wheel sensor first before removing front or rear wheel hub. This is to avoid damage to sensor wiring and loss of sensor function.**

### INSTALLATION

Pay attention to the following when installing wheel sensor. Tighten installation bolts to the specified torques. Refer to BRC-67, "REAR WHEEL SENSOR : Exploded View".

- When installing, make sure there is no foreign material such as iron chips on and in the mounting hole of the wheel sensor. Make sure no foreign material has been caught in the sensor rotor. Remove any foreign material and clean the mount.
- When installing wheel sensor, be sure to press rubber grommets in until they lock at locations shown above in the figure. When installed, harness must not be twisted.

# SENSOR ROTOR

## FRONT SENSOR ROTOR

### FRONT SENSOR ROTOR : Exploded View

INFOID:0000000001181852

Refer to FAX-9, "Exploded View" (2WD models), FAX-61, "Exploded View" (4WD models).

### FRONT SENSOR ROTOR : Removal and Installation

INFOID:0000000001181853

REMOVAL

Sensor rotor cannot be disassembled. Remove the sensor rotor together with wheel hub and bearing assembly. Refer to FAX-9, "Removal and Installation" (2WD models), FAX-61, "Removal and Installation" (4WD models).

INSTALLATION

Sensor rotor cannot be disassembled. Installation the sensor rotor together with wheel hub and bearing assembly. Refer to FAX-9, "Removal and Installation" (2WD models), FAX-61, "Removal and Installation" (4WD models).

## REAR SENSOR ROTOR

### REAR SENSOR ROTOR : Exploded View

INFOID:0000000001181854

Refer to RAX-4, "Exploded View" (2WD models), RAX-13, "Exploded View" (4WD models).

### REAR SENSOR ROTOR : Removal and Installation

INFOID:0000000001181855

2WD MODELS

Removal

Sensor rotor cannot be disassembled. Remove the sensor rotor together with wheel hub and bearing assembly. Refer to RAX-4, "Removal and Installation".

Installation

Sensor rotor cannot be disassembled. Installation the sensor rotor together with wheel hub and bearing assembly. Refer to RAX-4, "Removal and Installation".

4WD MODELS

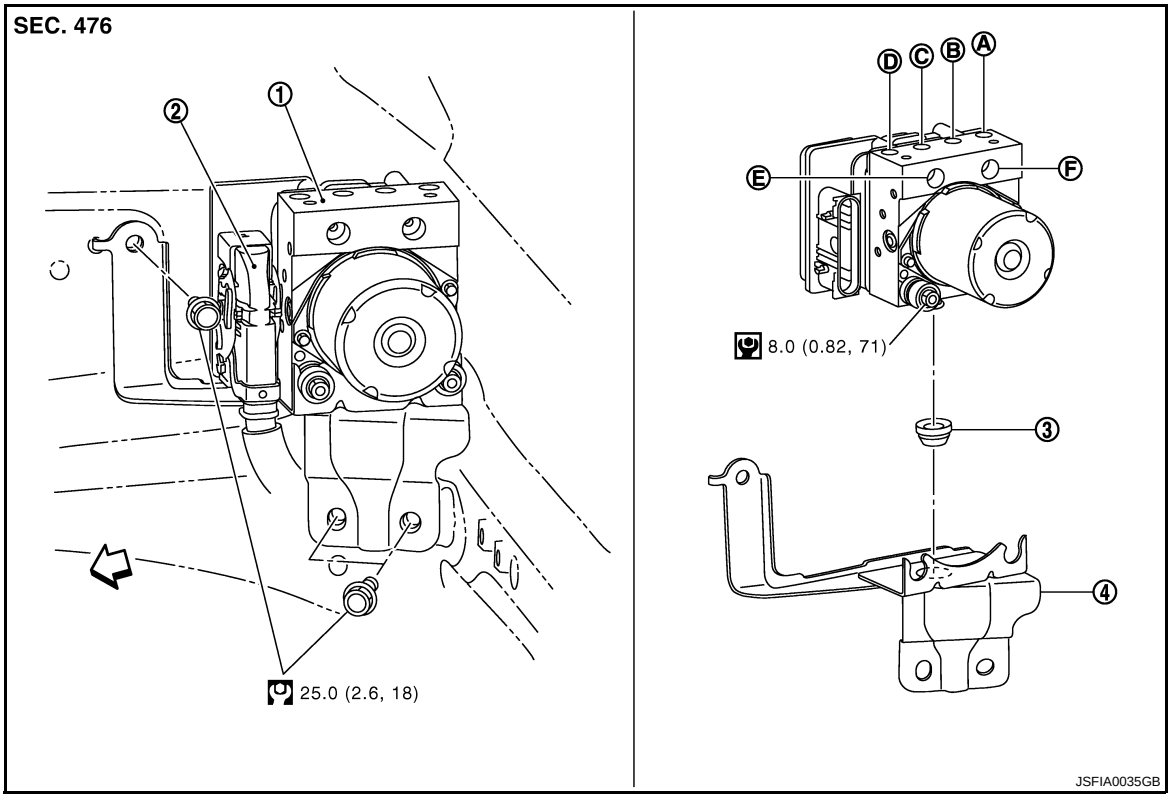
For removal and installation of sensor rotor, refer to RAX-14, "Disassembly and Assembly".

# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

## Exploded View

INFOID:0000000001181856

LHD models



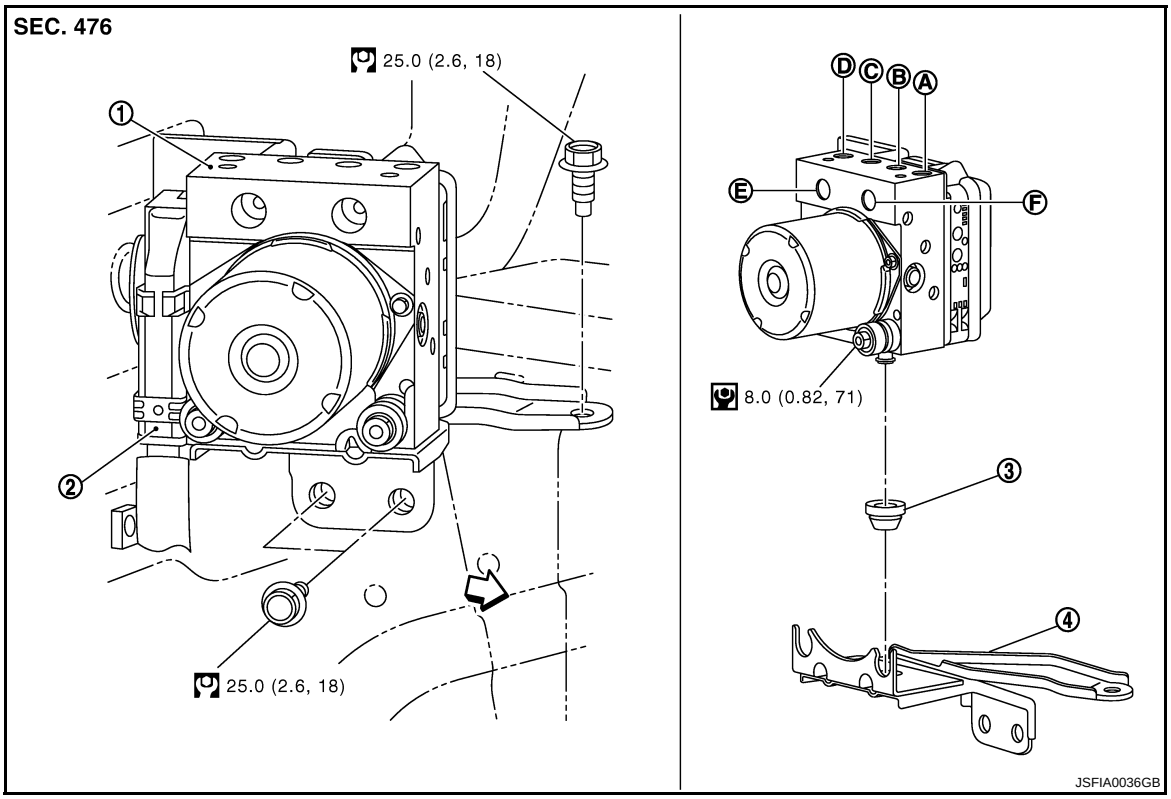

| | | | | | |
|---|---|---|---|---|---|
| 1. | ABS actuator and electric unit (control unit) | 2. | Connector | 3. | Bushing |
| 4. | Bracket | | | | |

| | | | | | |
|---|---|---|---|---|---|
| A. | To front LH brake caliper | B. | To rear RH brake caliper | C. | To Rear LH brake caliper |
| D. | To front RH brake caliper | E. | From master cylinder secondary side | F. | From master cylinder primary side |

⇦: Vehicle front

Refer to GI section GI-4, "Components" for symbols in the figure.

RHD models




| | | | | | |
|---|---|---|---|---|---|
| 1. | ABS actuator and electric unit (control unit) | 2. | Connector | 3. | Bushing |
| 4. | Bracket | | | | |
| A. | To front LH brake caliper | B. | To rear RH brake caliper | C. | To Rear LH brake caliper |
| D. | To front RH brake caliper | E. | From master cylinder secondary side | F. | From master cylinder primary side |

⇦: Vehicle front

Refer to GI section GI-4, "Components" for symbols in the figure.

## Removal and Installation

INFOID:0000000001181857

### LHD MODELS

Removal

**CAUTION:**

- **Before servicing, disconnect the battery cable from negative terminal.**
- **To remove brake tube, use a flare nut wrench to prevent flare nuts and brake tube from being damaged. To install, use flare nut crowfoot and torque wrench.**
- **Do not apply excessive impact to ABS actuator and electric unit (control unit), such as dropping it.**
- **Do not remove and install actuator by holding harness.**
- **After work is completed, bleed air from brake tube. Refer to BR-12, "Bleeding Brake System" (LHD models), BR-59, "Bleeding Brake System" (RHD models).**

1. Remove cowl top cover. Refer to EXT-19, "Exploded View".
2. Remove exhaust manifold.
   - HR16DE: EX-5, "Exploded View".
   - MR20DE: EX-10, "Exploded View".
   - K9K: EX-15, "Exploded View".
   - M9R: EM-369, "Exploded View".
3. Disconnect ABS actuator and electric unit (control unit) connector.
4. Loosen brake tube flare nuts, then remove brake tubes from ABS actuator and electric unit (control unit).
5. Remove ABS actuator and electric unit (control unit) bracket mounting nut.
6. Remove ABS actuator and electric unit (control unit) from vehicle.

Installation

Note the following, and install in the reverse order of removal.

**CAUTION:**

- **Before servicing, disconnect the battery cable from negative terminal.**
- **To remove brake tube, use a flare nut wrench to prevent flare nuts and brake tube from being damaged. To install, use flare nut crowfoot and torque wrench.**
- **Do not apply excessive impact to ABS actuator and electric unit (control unit), such as dropping it.**
- **Do not remove and install actuator by holding harness.**
- **After work is completed, bleed air from brake tube. Refer to BR-12, "Bleeding Brake System" (LHD models), BR-59, "Bleeding Brake System" (RHD models).**
- **After installing harness connector in the ABS actuator and electric unit (control unit), make sure connector is securely locked.**
- **When replacing ABS actuator and electric unit (control unit), make sure to adjust neutral position of steering angle sensor. Refer to BRC-77, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".**

RHD MODELS

Removal

**CAUTION:**

- **Before servicing, disconnect the battery cable from negative terminal.**
- **To remove brake tube, use a flare nut wrench to prevent flare nuts and brake tube from being damaged. To install, use flare nut crowfoot and torque wrench.**
- **Do not apply excessive impact to ABS actuator and electric unit (control unit), such as dropping it.**
- **Do not remove and install actuator by holding harness.**
- **After work is completed, bleed air from brake tube. Refer to BR-12, "Bleeding Brake System" (LHD models), BR-59, "Bleeding Brake System" (RHD models).**

1. Remove cowl top cover. Refer to EXT-19, "Exploded View".
2. Remove air cleaner and air duct.
   - HR16DE: EM-28, "Exploded View".
   - MR20DE: EM-145, "Exploded View".
   - K9K: EM-266, "Exploded View".
   - M9R: EM-354, "Exploded View".
3. Disconnect ABS actuator and electric unit (control unit) connector.
4. Loosen brake tube flare nuts, then remove brake tubes from ABS actuator and electric unit (control unit).
5. Remove ABS actuator and electric unit (control unit) bracket mounting nut.
6. Remove ABS actuator and electric unit (control unit) from vehicle.

Installation

Note the following, and install in the reverse order of removal.

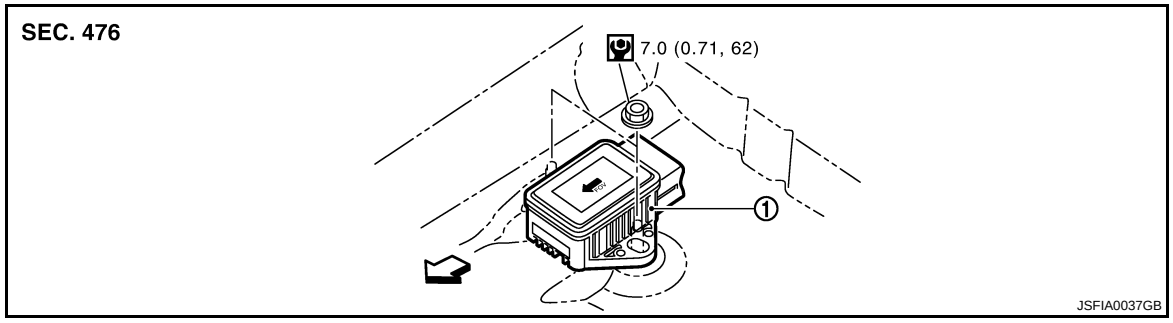
**CAUTION:**

- **Before servicing, disconnect the battery cable from negative terminal.**
- **To remove brake tube, use a flare nut wrench to prevent flare nuts and brake tube from being damaged. To install, use flare nut crowfoot and torque wrench.**
- **Do not apply excessive impact to ABS actuator and electric unit (control unit), such as dropping it.**
- **Do not remove and install actuator by holding harness.**
- **After work is completed, bleed air from brake tube. Refer to BR-12, "Bleeding Brake System" (LHD models), BR-59, "Bleeding Brake System" (RHD models).**
- **After installing harness connector in the ABS actuator and electric unit (control unit), make sure connector is securely locked.**
- **When replacing ABS actuator and electric unit (control unit), make sure to adjust neutral position of steering angle sensor. Refer to BRC-77, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".**

# YAW RATE/SIDE G SENSOR

## Exploded View

INFOID:0000000001181858




1. Yaw rate/side G sensor

⇦: Vehicle front

Refer to GI section GI-4, "Components" for symbol makes in the figure.

## Removal and Installation

INFOID:0000000001181859

### REMOVAL

**CAUTION:**

- **Do not drop or strike yaw rate/side G sensor, because it has little endurance to impact.**
- **Do not use power tool etc., because yaw rate/side G sensor is sensitive for the impact.**

1. Remove lower instrument cover RH. Refer to IP-11, "Exploded View".
2. Disconnect yaw rate/side G sensor harness connector.
3. Remove mounting nuts. Remove yaw rate/side G sensor.

### INSTALLATION

Note the following, and install in the reverse order of removal.

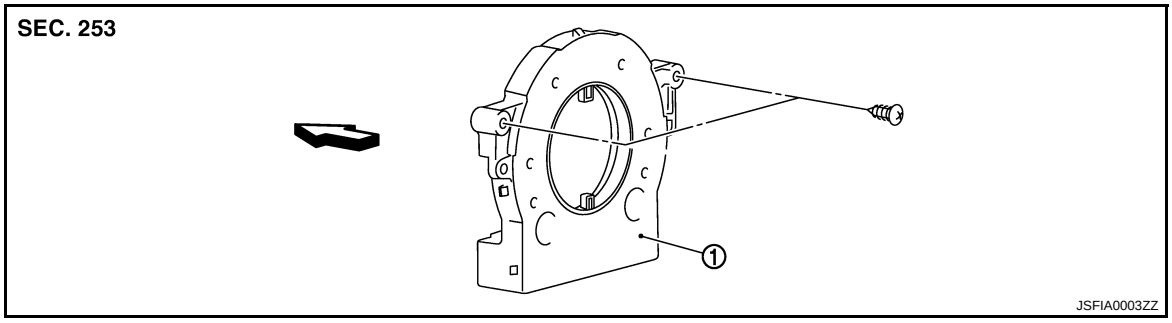
**CAUTION:**

- **Do not drop or strike yaw rate/side G sensor, because it has little endurance to impact.**
- **Do not use power tool etc., because yaw rate/side G sensor is sensitive for the impact.**

# STEERING ANGLE SENSOR

## Exploded View

INFOID:0000000001181860




1. Steering angle sensor

⇦: Vehicle front

## Removal and Installation

INFOID:0000000001181861

### REMOVAL

1. Remove spiral cable assembly. Refer to SR-6, "Exploded View".
2. Remove steering angle sensor from spiral cable assembly.

### INSTALLATION

Note the following, and install in the reverse order of removal.

**CAUTION:**

**After work, make sure to adjust neutral position of steering angle sensor. Refer to BRC-77, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".**