# SECTION BRC
# BRAKE CONTROL SYSTEM



## CONTENTS

### ABS

## VDC/TCS/ABS

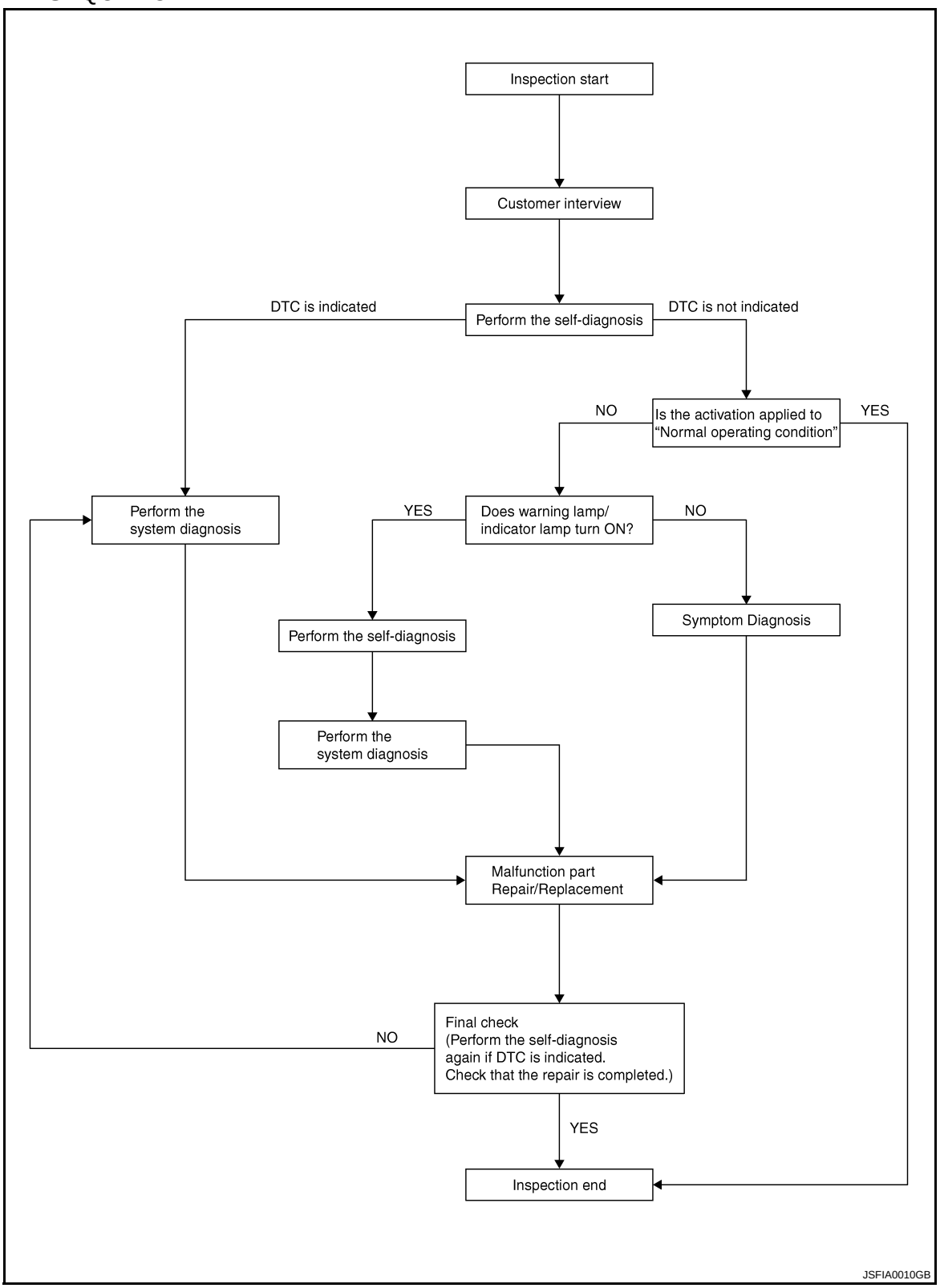
# BASIC INSPECTION

## DIAGNOSIS AND REPAIR WORKFLOW

### Work Flow

INFOID:0000000005255384

OVERALL SEQUENCE




DETAILED 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

Perform self-diagnosis for “ABS” with CONSULT-III. Refer to BRC-15, "CONSULT-III Function".

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 of “ABS” with CONSULT-III. Refer to BRC-56, "DTC 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-62, "Description".

Is the symptom 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-47, "Description".
- Brake warning lamp: Refer to BRC-48, "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 displayed DTC of “ABS” with CONSULT-III.

>> GO TO 7.

## 7.REPAIR OR REPLACE THE MALFUNCTIONING PARTS

Repair or replace the specified malfunctioning parts.

>> GO TO 8.

## 8.MEMORY CLEAR

Perform self-diagnosis memory clear for “ABS” with CONSULT-III.

>> GO TO 9.

## 9.FINAL CHECK

Perform the again, and check that the malfunction is repaired completely.

Is no other DTC present and the repair completed?

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

## Diagnostic Work Sheet

INFOID:0000000005255385

| | | | |
|---|---|---|---|
| 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 | | |

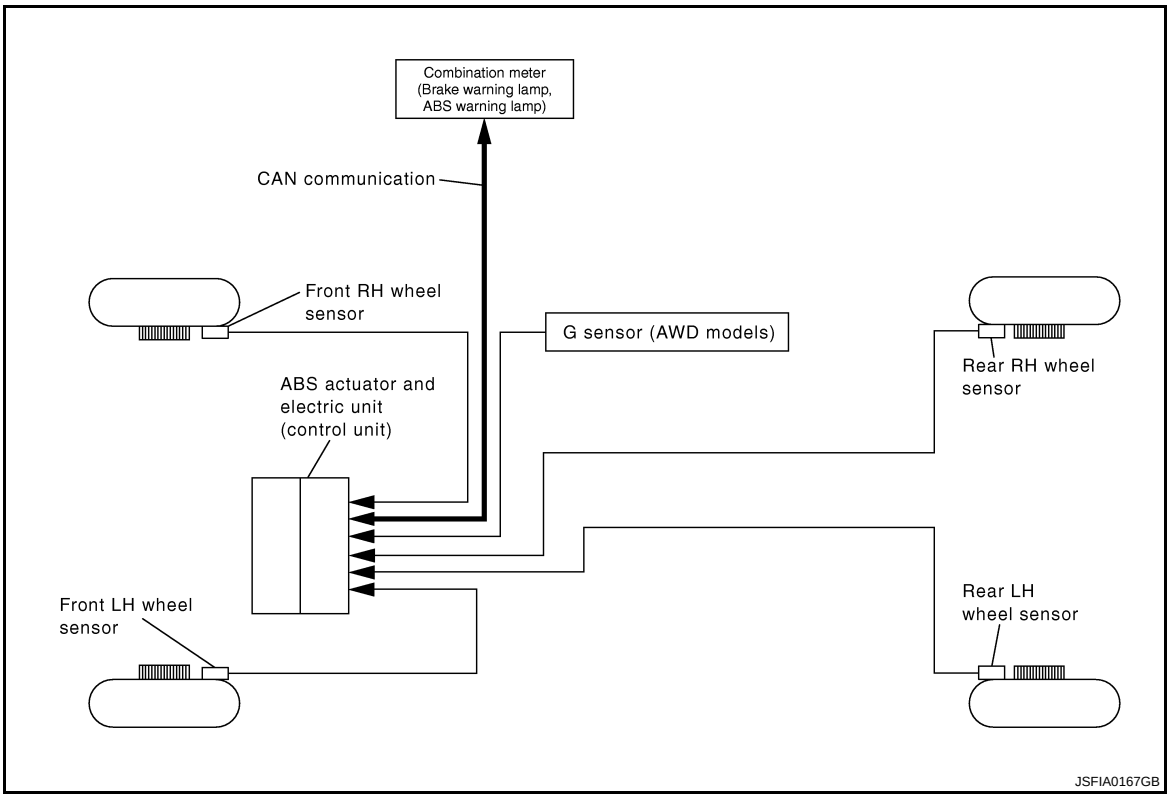
SFIA3264E

# SYSTEM DESCRIPTION

## ABS

### System Diagram

INFOID:0000000005255386



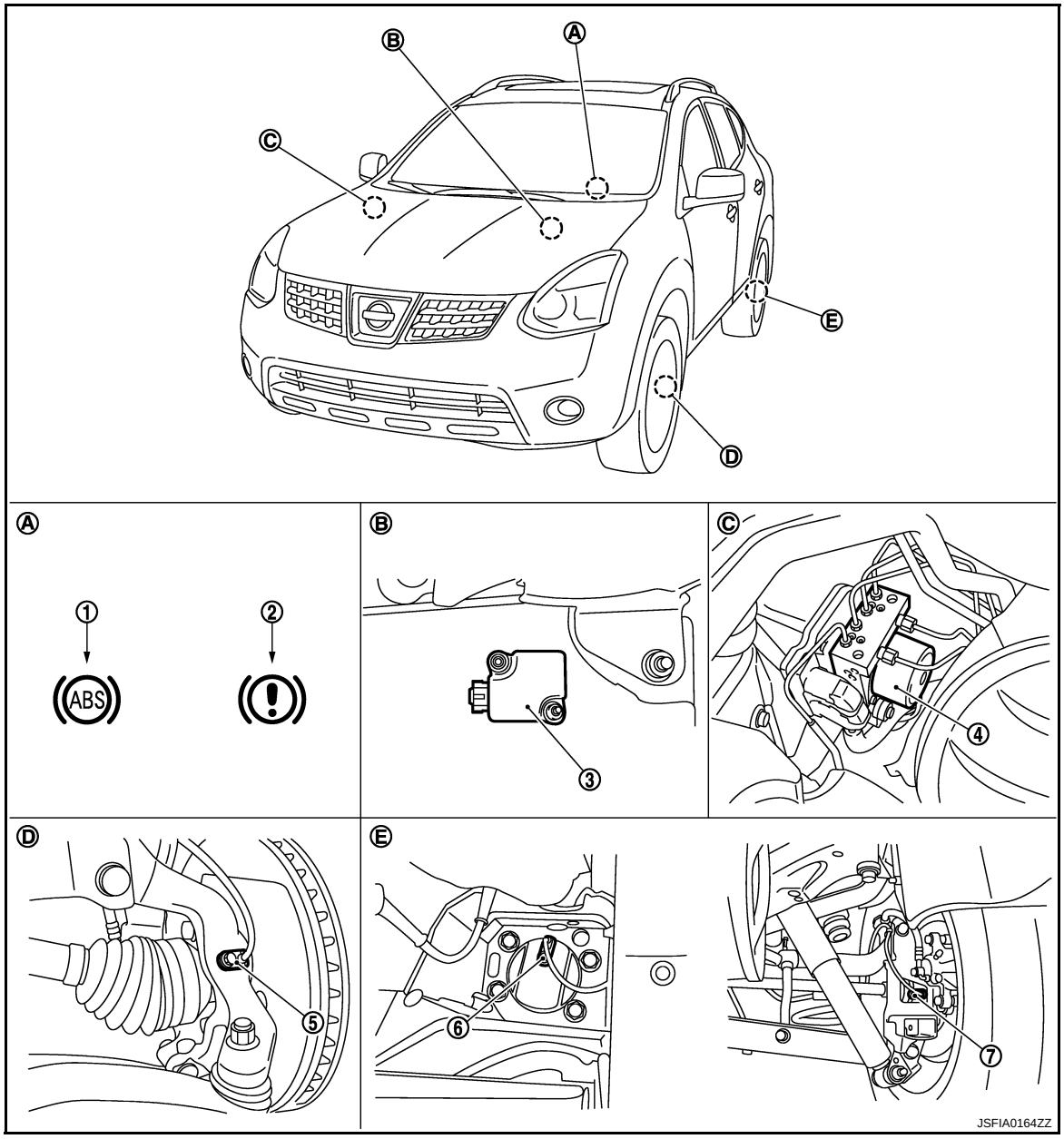

### System Description

INFOID:0000000005255387

- 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:0000000005255388




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

A. Combination meter
B. Center console
C. Engine room (right side)
D. Steering knuckle
E. Rear axle

## Component Description

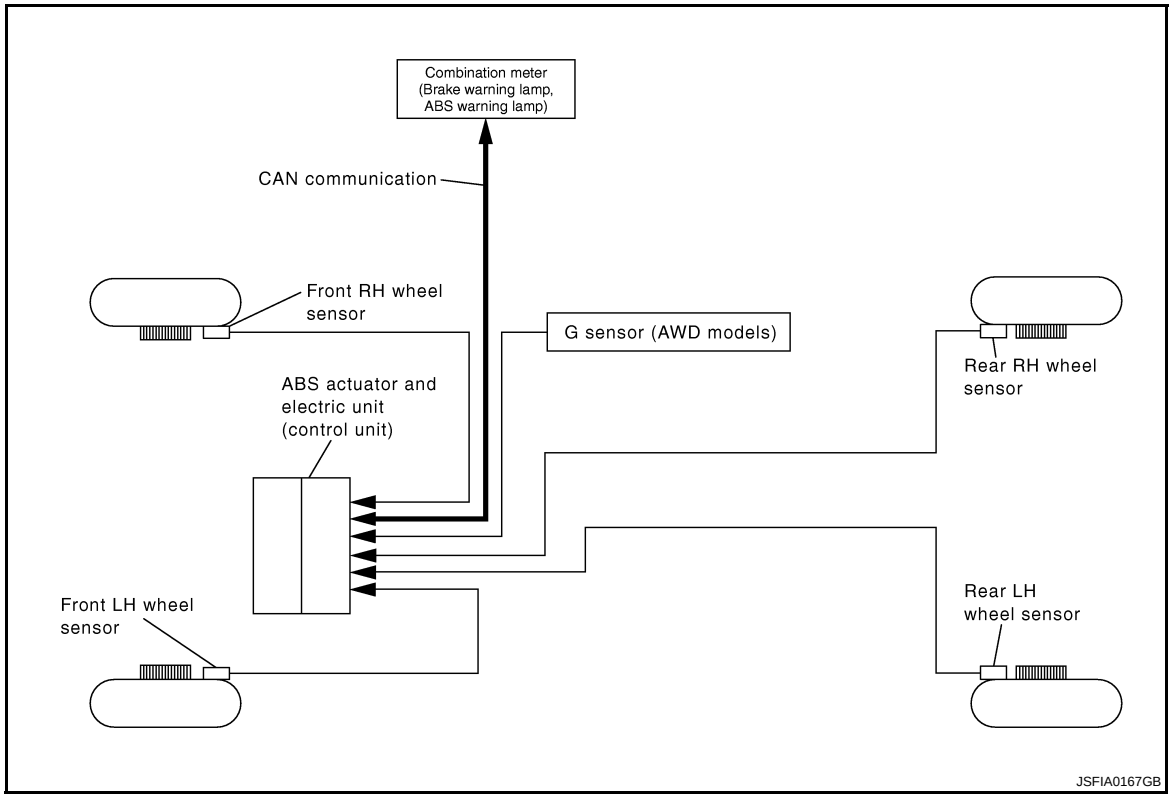
INFOID:0000000005255389

| Component parts | | Reference |
|---|---|---|
| ABS actuator and electric unit (control unit) | Pump | BRC-27, "Description" |
| | Motor | |
| | Actuator relay (Main relay) | BRC-39, "Description" |
| | Solenoid valve | BRC-35, "Description" |
| Wheel sensor | | BRC-18, "Description" |
| G sensor (AWD models) | | BRC-29, "Description" |
| ABS warning lamp | | BRC-47, "Description" |
| Brake warning lamp | | BRC-48, "Description" |

# EBD

## System Diagram

INFOID:0000000005255390



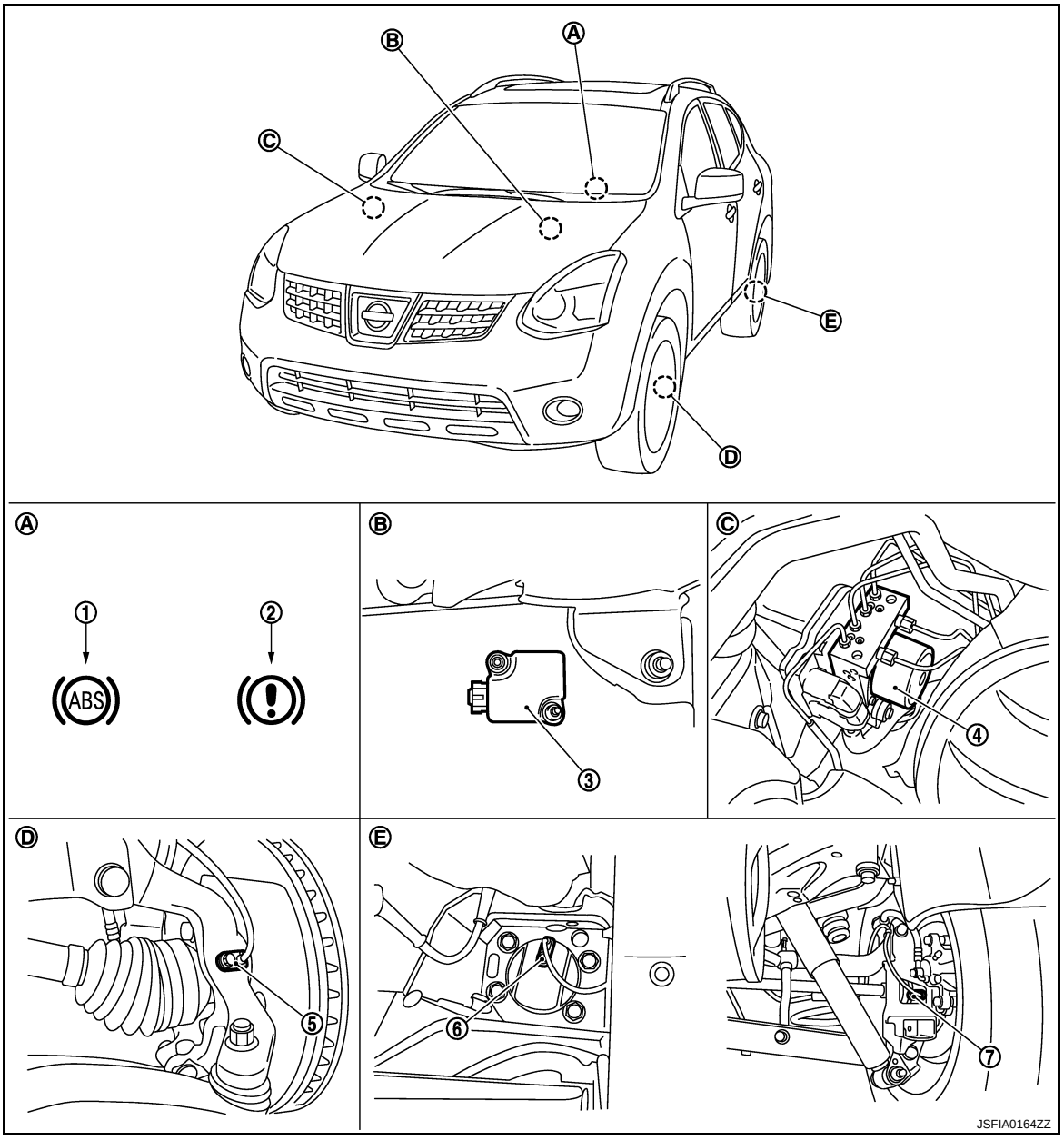

## System Description

INFOID:0000000005255391

- 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:0000000005255392




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

A. Combination meter
B. Center console
C. Engine room (right side)
D. Steering knuckle
E. Rear axle

## Component Description

INFOID:0000000005255393

| Component parts | | Reference |
|---|---|---|
| ABS actuator and electric unit (control unit) | Pump | BRC-27, "Description" |
| | Motor | |
| | Actuator relay (Main relay) | BRC-39, "Description" |
| | Solenoid valve | BRC-35, "Description" |
| Wheel sensor | | BRC-18, "Description" |
| G sensor (AWD models) | | BRC-29, "Description" |
| ABS warning lamp | | BRC-47, "Description" |
| Brake warning lamp | | BRC-48, "Description" |

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

## CONSULT-III Function

INFOID:0000000005255394

### FUNCTION

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

| Diagnostic test mode | Function |
|---|---|
| Self diagnostic result | 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 identification | ABS actuator and electric unit (control unit) part number can be read. |

### SELF DIAGNOSTIC RESULT

Operation Procedure

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

How to Erase Self-diagnosis Results

After erasing DTC memory for “ABS” with CONSULT-III, 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 applicable 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-56, "DTC Index".

### DATA MONITOR

Display Item List

×: Applicable ▼: Optional item

| Monitor item (Unit) | SELECT MONITOR ITEM | | Remarks |
|---|---|---|---|
| | ECU INPUT SIGNALS | MAIN SIGNALS | |
| 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 |
| BATTERY VOLT (V) | × | × | Battery voltage supplied to the ABS actuator and electric unit (control unit) |

| Monitor item (Unit) | SELECT MONITOR ITEM | | Remarks |
|---|---|---|---|
| | ECU INPUT SIGNALS | MAIN SIGNALS | |
| DECEL G-SEN1 (On/Off) (AWD models) | × | × | Vehicle on level surface or on slope |
| DECEL G-SEN2 (On/Off) (AWD models) | × | × | |
| 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) | ▼ | × | 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 |

## ACTIVE TEST

**CAUTION:**

- **Never 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” in “ABS” with CONSULT-III is displayed 10 seconds after operation start.
- After “TEST IS STOPPED” in “ABS” with CONSULT-III is displayed, to perform test again.

Test Item

ABS SOLENOID VALVE

- Select “Up”, “Keep” and “Down” of “ACTIVE TEST” in “ABS” with CONSULT-III. Then use screen monitor to check that solenoid valve operates as shown in 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 select, and then Off.

ABS MOTOR

- Select “On” and “Off” of “ACTIVE TEST” in “ABS” with CONSULT-III 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.

## ECU IDENTIFICATION

ABS actuator and electric unit (control unit) part number can be read.

# DTC/CIRCUIT DIAGNOSIS

## C1101, C1102, C1103, C1104 WHEEL SENSOR

### Description

INFOID:0000000005255395

When the sensor rotor rotates, the magnetic field changes. It 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:0000000005255396

#### 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

Perform self-diagnosis for “ABS” with CONSULT-III.

| 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-18, "Diagnosis Procedure".
NO >> INSPECTION END

### Diagnosis Procedure

INFOID:0000000005255397

**CAUTION:**
**Never check between wheel sensor terminals.**

##### 1.CHECK TIRES

Check air pressure, wear and size.

Are air pressure, wear and size within standard?

YES >> GO TO 2.
NO >> Adjust air pressure, or replace tire.

##### 2.CHECK WHEEL SENSOR AND SENSOR ROTOR

- Check that there is no damage or adherence of foreign matter on the sensor rotor surface.
- Check sensor rotor for damage.
- Check wheel sensor for damage, disconnection or looseness.
- Check that there is no deformation on the wheel sensor mounting surface.

Are the sensor and sensor rotor normal?

YES >> GO TO 3.
NO >> Repair wheel sensor mount or replace sensor rotor. Then perform self-diagnosis for “ABS” with CONSULT-III.

## 3.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 to see if it is deformed, disconnected, loose, etc., Repair or replace it if any malfunction condition is found.
5. Reconnect connectors and then perform self-diagnosis for “ABS” with CONSULT-III.

Is any item indicated on the self-diagnosis display?

YES >> GO TO 4.
NO >> Poor connection of connector terminal. Repair or replace connector.

## 4.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 signal circuit

| ABS actuator and electric unit (control unit) | | Wheel sensor | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E36 | 12 | E39 (Front RH) | 4 | Existed |
| | 27 | E22 (Front LH) | 2 | |
| | 15 | B41 (Rear RH) | 8 | |
| | 30 | B44 (Rear LH) | 6 | |

Measurement terminal for power supply circuit

| ABS actuator and electric unit (control unit) | | Wheel sensor | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E36 | 21 | E39 (Front RH) | 3 | Existed |
| | 23 | E22 (Front LH) | 1 | |
| | 11 | B41 (Rear RH) | 7 | |
| | 26 | B44 (Rear LH) | 5 | |

Measurement terminal for ground circuit

| ABS actuator and electric unit (control unit) | | | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E36 | 12, 21 | E36 | 3, 4 | Not existed |
| | 27, 23 | | | |
| | 15, 11 | | | |
| | 30, 26 | | | |

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

Is the inspection result normal?

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

## 5.REPLACE WHEEL SENSOR

1. Replace wheel sensor.
2. Erase self-diagnosis results for “ABS” with CONSULT-III.
3. Turn the ignition switch OFF.
4. Turn the ignition switch ON.

**CAUTION:**
**Never start engine.**

5. Perform self-diagnosis for “ABS” with CONSULT-III.

Is DTC “C1101”, “C1102”, “C1103” or “C1104” detected?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> INSPECTION END

## Component Inspection

INFOID:0000000005255398

### 1.CHECK DATA MONITOR

Select “ABS”, “DATA MONITOR” in order with CONSULT-III, 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-18, "Diagnosis Procedure".

# C1105, C1106, C1107, C1108 WHEEL SENSOR

## Description

INFOID:0000000005255399

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

## DTC Logic

INFOID:0000000005255400

### 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 currently<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

Perform self-diagnosis for “ABS” with CONSULT-III.

| 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-21, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000005255401

**CAUTION:**
**Never check between wheel sensor terminals.**

#### 1.CHECK TIRES

Check air pressure, wear and size.

Are air pressure, wear and size within standard?

YES >> GO TO 2.
NO >> Adjust air pressure, or replace tire.

#### 2.CHECK SENSOR AND SENSOR ROTOR

- Check that there is no damage or adherence of foreign matter on the sensor rotor surface.
- Check sensor rotor for damage.
- Check wheel sensor for damage, disconnection or looseness.
- Check that there is no deformation on the wheel sensor mounting surface.

Are the sensor and sensor rotor normal?

YES >> GO TO 3.
NO >> Repair wheel sensor mount or replace sensor rotor. Then perform self-diagnosis for “ABS” with CONSULT-III.

#### 3.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 to see if it is deformed, disconnected, loose, etc., Repair or replace it if any malfunction condition is found.
5. Reconnect connectors and then perform self-diagnosis for “ABS” with CONSULT-III.

Is any item indicated on the self-diagnosis display?

YES >> GO TO 4.
NO >> Poor connection of connector terminal. Repair or replace connector.

## 4. 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 signal circuit

| ABS actuator and electric unit (control unit) | | Wheel sensor | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E36 | 12 | E39 (Front RH) | 4 | Existed |
| | 27 | E22 (Front LH) | 2 | |
| | 15 | B41 (Rear RH) | 8 | |
| | 30 | B44 (Rear LH) | 6 | |

Measurement terminal for power supply circuit

| ABS actuator and electric unit (control unit) | | Wheel sensor | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E36 | 21 | E39 (Front RH) | 3 | Existed |
| | 23 | E22 (Front LH) | 1 | |
| | 11 | B41 (Rear RH) | 7 | |
| | 26 | B44 (Rear LH) | 5 | |

Measurement terminal for ground circuit

| ABS actuator and electric unit (control unit) | | | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E36 | 12, 21 | E36 | 3, 4 | Not existed |
| | 27, 23 | | | |
| | 15, 11 | | | |
| | 30, 26 | | | |

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

Is the inspection result normal?

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

## 5. REPLACE WHEEL SENSOR

1. Replace wheel sensor.
2. Erase self-diagnosis results for “ABS” with CONSULT-III.
3. Turn the ignition switch OFF.
4. Turn the ignition switch ON.

**CAUTION:**
**Never start engine.**

5. Perform self-diagnosis for “ABS” with CONSULT-III.

Is DTC “C1105”, “C1106”, “C1107” or “C1108” detected?

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

NO >> INSPECTION END

## Component Inspection

INFOID:0000000005255402

### 1. CHECK DATA MONITOR

Select “ABS”, “DATA MONITOR” in order with CONSULT-III, 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-21, "Diagnosis Procedure".

# C1109 POWER AND GROUND SYSTEM

## Description

INFOID:0000000005255403

Supplies electric power to the ABS actuator and electric unit (control unit).

## DTC Logic

INFOID:0000000005255404

### 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 6km/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

Perform self-diagnosis for “ABS” with CONSULT-III.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-24, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000005255405

#### 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 self-diagnosis for “ABS” with CONSULT-III.

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 | | | |
| E36 | 16 | Ground | Ignition switch: ON | Battery voltage |
| | | | Ignition switch: OFF | Approx. 0 V |

4. Check 10A fusible link (59).
5. Check continuity between ABS actuator and electric unit (control unit) harness connector and IPDM E/R.

| ABS actuator and electric unit (control unit) | | IPDM E/R | | continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E36 | 16 | E15 | 59 | Existed |

6. 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 12 V lamp (normal rating 10 to 20 W) connected between E36 terminals 16 and 4. With ignition switch ON check bulb illuminates correctly.
2. Check ABS motor supply under loaded condition (connector E36 terminals 1 and 3).

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 | 3, 4 | Ground | Existed |

Is the inspection result normal?

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

# C1110 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

## Description

INFOID:0000000005255406

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

## DTC Logic

INFOID:0000000005255407

### 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. ABS solenoid valve or motor power supply/ ground 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. Perform self-diagnosis for “ABS” with CONSULT-III.

| Self-diagnosis results |
|---|
| CONTROLLER FAILURE |

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:0000000005255408

#### 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:0000000005255409

### 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:0000000005255410

### 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

Perform self-diagnosis for “ABS” with CONSULT-III.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-27, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000005255411

#### 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 self-diagnosis for “ABS” with CONSULT-III.

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 | 1 | 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 12 V lamp (normal rating 10 to 20 W) 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 | 3, 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:0000000005255412

## 1. CHECK ACTIVE TEST

1. Select “ABS”, “ACTIVE TEST” and “ABS MOTOR” in order with CONSULT-III.
2. Select “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-27, "Diagnosis Procedure".

# C1113 G SENSOR

## Description

INFOID:0000000005255413

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:0000000005255414

### 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 AWD rolling road |

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSIS RESULTS

Perform self-diagnosis for “ABS” with CONSULT-III.

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

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:0000000005255415

#### 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 self-diagnosis for “ABS” with CONSULT-III.

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 HARNESS

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect G sensor connector.
4. 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 | 13 | B32 | 2 | Existed |
| | 29 | | 3 | |
| | 14 | | 4 | |
| | 28 | | 5 | |

Is the inspection result normal?

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

## 3.CHECK G SENSOR POWER SUPPLY CIRCUIT

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

| G sensor | | — | Condition | Voltage |
|---|---|---|---|---|
| Connector | Terminal | | | |
| B32 | 1 | 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 G SENSOR

1. Remove G sensor from the vehicle. Refer to BRC-71, "Exploded View".
2. Connect the following terminals between G sensor and connector.

| G sensor | Harness connector | |
|---|---|---|
| Terminal | Connector | Terminal |
| 1 | B32 | 1 |
| 2 | | 2 |
| 3 | | 3 |
| 4 | | 4 |
| 5 | | 5 |

3. Turn ignition switch ON.
4. Check voltage between G sensor terminals.

| Condition | G sensor | |
|---|---|---|
| | Terminals 4 – 5 | Terminals 3 – 5 |
| Horizontal | 1.50 – 1.95 V | 1.50 – 1.95 V |
| Longitudinally 20° | 3.51 – 4.14 V | 3.51 – 4.14 V |
| Longitudinally 40° | 1.50 – 1.95 V | 3.51 – 4.14 V |

Is the inspection result normal?

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

# Component Inspection

INFOID:0000000005255416

## 1.CHECK DATA MONITOR

Select “ABS”, “DATA MONITOR”, “DECEL G-SEN1” and “DECEL G-SEN2”, in order with CONSULT-III“ and check G sensor signal.

| Monitor item | Condition | DATA MONITOR |
|---|---|---|
| DECEL G-SEN1 | Changes according to an indication shown by the decel G sensor | On |
| | | Off |
| DECEL G-SEN2 | Changes according to an indication shown by the decel G sensor | On |
| | | Off |

Is the inspection result normal?

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

# C1115 WHEEL SENSOR

## Description

INFOID:0000000005255417

When the sensor rotor rotates, the magnetic field changes. It 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:0000000005255418

### 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. Other possible causes tire radius (due to wrong size or pressure) interference. |

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSIS RESULTS

Perform self-diagnosis for “ABS” with CONSULT-III.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-32, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000005255419

**CAUTION:**
**Never check between wheel sensor terminals.**

#### 1.CHECK TIRES

Check air pressure, wear and size.

Are air pressure, wear and size within standard?

YES >> GO TO 2.
NO >> Adjust air pressure, or replace tire.

#### 2.CHECK SENSOR AND SENSOR ROTOR

- Check that there is no damage or adherence of foreign matter on the sensor rotor surface.
- Check that there is no deformation, misalignment, float, and backlash on the wheel sensor and wheel sensor mounting surface.
- Check that the wheel sensor in installed with no misalignment and backlash.

Are the sensor and sensor rotor normal?

YES >> GO TO 3.
NO >> Repair wheel sensor mount or replace sensor rotor. Then perform self-diagnosis for “ABS” with CONSULT-III.

#### 3.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 to see if it is deformed, disconnected, loose, etc., Repair or replace it if any malfunction condition is found.
5. Reconnect connectors and then perform self-diagnosis for “ABS” with CONSULT-III.

Is any item indicated on the self-diagnosis display?

YES >> GO TO 4.

NO >> Poor connection of connector terminal. Repair or replace connector.

## 4.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 signal circuit

| ABS actuator and electric unit (control unit) | | Wheel sensor | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E36 | 12 | E39 (Front RH) | 4 | Existed |
| | 27 | E22 (Front LH) | 2 | |
| | 15 | B41 (Rear RH) | 8 | |
| | 30 | B44 (Rear LH) | 6 | |

Measurement terminal for power supply circuit

| ABS actuator and electric unit (control unit) | | Wheel sensor | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E36 | 21 | E39 (Front RH) | 3 | Existed |
| | 23 | E22 (Front LH) | 1 | |
| | 11 | B41 (Rear RH) | 7 | |
| | 26 | B44 (Rear LH) | 5 | |

Measurement terminal for ground circuit

| ABS actuator and electric unit (control unit) | | | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E36 | 12, 21 | E36 | 3, 4 | Not existed |
| | 27, 23 | | | |
| | 15, 11 | | | |
| | 30, 26 | | | |

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

Is the inspection result normal?

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

## 5.REPLACE WHEEL SENSOR

1. Replace wheel sensor.
2. Erase self-diagnosis results for “ABS” with CONSULT-III.
3. Turn the ignition switch OFF.
4. Turn the ignition switch ON.

**CAUTION:**
**Never start engine.**

5. Perform self-diagnosis for “ABS” with CONSULT-III.

Is DTC “C1115” detected?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> INSPECTION END

# Component Inspection

INFOID:0000000005255420

## 1.CHECK DATA MONITOR

Select “ABS”, “DATA MONITOR” in order with CONSULT-III, 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-32, "Diagnosis Procedure".

# C1120, C1122, C1124, C1126 IN ABS SOL

## Description

INFOID:0000000005255421

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:0000000005255422

### 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

Perform self-diagnosis for “ABS” with CONSULT-III.

| 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-35, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000005255423

#### 1.CHECK SENSOR AND SENSOR ROTOR

- Check that there is no damage or adherence of foreign matter on the sensor rotor surface.
- Check sensor rotor for damage.
- Check wheel sensor for damage, disconnection or looseness.
- Check that there is no deformation on the wheel sensor mounting surface.

Are the sensor and sensor rotor normal?

YES >> GO TO 2.
NO >> Repair wheel sensor mount or replace sensor rotor. Then perform self-diagnosis for “ABS” with CONSULT-III.

#### 2.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 self-diagnosis for “ABS” with CONSULT-III.

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 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 | 2 | Ground | Battery voltage |

Is the inspection result normal?

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

## 4.CHECK ACTUATOR 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 | 3, 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:0000000005255424

## 1.CHECK ACTIVE TEST

1. Select “ABS”, “ACTIVE TEST” and each test item in order with CONSULT-III.
2. On the display, select “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 select, and then Off.

Is the inspection result normal?

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

# C1121, C1123, C1125, C1127 OUT ABS SOL

## Description

INFOID:0000000005255425

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:0000000005255426

### 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

Perform self-diagnosis for “ABS” with CONSULT-III.

| 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-37, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000005255427

#### 1.CHECK SENSOR AND SENSOR ROTOR

- Check that there is no damage or adherence of foreign matter on the sensor rotor surface.
- Check sensor rotor for damage.
- Check wheel sensor for damage, disconnection or looseness.
- Check that there is no deformation on the wheel sensor mounting surface.

Are the sensor and sensor rotor normal?

YES >> GO TO 2.
NO >> Repair wheel sensor mount or replace sensor rotor. Then perform self-diagnosis for “ABS” with CONSULT-III.

#### 2.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 self-diagnosis for “ABS” with CONSULT-III.

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 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 | 2 | Ground | Battery voltage |

Is the inspection result normal?

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

## 4.CHECK ACTUATOR 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 | 3, 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:0000000005255428

## 1.CHECK ACTIVE TEST

1. Select “ABS”, “ACTIVE TEST” and each test item in order with CONSULT-III.
2. On the display, select “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 select, and then Off.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-37, "Diagnosis Procedure".

# C1140 ACTUATOR RELAY SYSTEM

## Description

INFOID:0000000005255429

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

## DTC Logic

INFOID:0000000005255430

### DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|---|---|---|---|
| C1140 | ACTUATOR RLY | 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

Perform self-diagnosis for “ABS” with CONSULT-III.

| Self-diagnosis results |
|---|
| ACTUATOR RLY |

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-39, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000005255431

#### 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 self-diagnosis for “ABS” with CONSULT-III.

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 | | |
| 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 CONDITIONS)

Use 12 V lamp (normal rating 10 to 20 W) 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 | 3, 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:0000000005255432

## 1.CHECK ACTIVE TEST

1. Select “ABS”, “ACTIVE TEST” and “ABS MOTOR” in order with CONSULT-III,
2. Select “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-39, "Diagnosis Procedure".

# U1000 CAN COMM CIRCUIT

## Description

INFOID:0000000005255433

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:0000000005255434

### 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) |

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSIS RESULTS

Perform self-diagnosis for “ABS” with CONSULT-III.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-41, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000005255435

#### 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 for “ABS” with CONSULT-III.

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

Is above displayed on the self-diagnosis display?

YES >> Go to LAN-16, "Trouble Diagnosis Flow Chart".
NO >> INSPECTION END

# U1010 CONTROL UNIT (CAN)

## Description

INFOID:0000000005255436

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:0000000005255437

### DTC DETECTION LOGIC

| DTC | Items | Diagnostic item is detected when... | Possible cause |
|---|---|---|---|
| U1010 | CONTROL UNIT (CAN) | When detecting error during the initial diagnosis of CAN controller of ABS actuator and electric unit (control unit). | ABS actuator and electric unit (control unit) error |

### DTC CONFIRMATION PROCEDURE

#### 1.RECHECK DTC

1. Turn the ignition switch OFF to ON.
2. Perform self-diagnosis for “ABS” with CONSULT-III.

Is DTC “U1010” detected?

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

## Diagnosis Procedure

INFOID:0000000005255438

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

Check that there is no malfunction in ABS actuator and electric unit (control unit) harness connector or disconnection.

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace the harnesses and connectors.

# BRAKE FLUID LEVEL SWITCH

## Description

INFOID:0000000005255439

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:0000000005255440

### 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-43, "Diagnosis Procedure".

## Diagnosis Procedure

INFOID:0000000005255441

### 1.CHECK BRAKE FLUID LEVEL

Check brake fluid level. Refer to BR-12, "Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Refill brake fluid. Refer to BR-12, "Refilling".

### 2.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-43, "Component Function Check".

Is the inspection result normal?

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

### 3.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 4.
NO >> Brake fluid level switch is malfunction. Replace reservoir tank.

### 4.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:0000000005255442

### 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:0000000005255443

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).

## Component Function Check

INFOID:0000000005255444

### 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-45, "Diagnosis Procedure".

## Diagnosis Procedure

INFOID:0000000005255445

### 1.CHECK PARKING BRAKE SWITCH

1. Turn ignition switch OFF.
2. Disconnect parking brake switch connector.
3. Check continuity between parking brake switch connector terminal and ground.

| Parking brake switch | | Condition | Continuity |
|---|---|---|---|
| Connector | Terminal | | |
| E103 | 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 >> GO TO 2.
NO >> Replace parking brake switch.

### 2.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-32, "Diagnosis Description".

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair or replace combination meter.

## Component Inspection

INFOID:0000000005255446

### 1.CHECK PARKING BRAKE SWITCH

1. Turn ignition switch OFF.
2. Disconnect parking brake switch connector.
3. Check continuity between parking brake switch connector terminal and ground.

| Parking brake switch | | Condition | Continuity |
|---|---|---|---|
| Connector | Terminal | | |
| E103 | 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. Refer to PB-6, "Exploded View".

# ABS WARNING LAMP

## Description

INFOID:0000000005255447

×: ON –: OFF

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

## Component Function Check

INFOID:0000000005255448

### 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-47, "Diagnosis Procedure".

## Diagnosis Procedure

INFOID:0000000005255449

### 1.CHECK SELF-DIAGNOSIS

Perform self-diagnosis for “ABS” with CONSULT-III.

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-32, "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:0000000005255450

×: ON –: OFF

| Condition | Brake warning lamp (Note 1) |
|---|---|
| Ignition switch OFF | – |
| For 1 second after turning ignition switch ON | × (Note 2) |
| 1 second later after turning ignition switch ON | × (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:0000000005255451

### 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-48, "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-45, "Diagnosis Procedure".

## Diagnosis Procedure

INFOID:0000000005255452

### 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-45, "Diagnosis Procedure".

### 2. CHECK SELF-DIAGNOSIS

Perform self-diagnosis for “ABS” with CONSULT-III.

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-32, "Diagnosis Description".

Is the inspection result normal?

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

# ECU DIAGNOSIS INFORMATION

## ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

### Reference Value

INFOID:0000000005255453

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 | Display content | Data monitor | |
|---|---|---|---|
| | | Condition | Reference value in normal operation |
| 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-SEN1 (Note 2) | Decel G detected by decel G sensor | Changes according to an indication shown by the decel G sensor | On |
| | | | Off |
| DECEL G-SEN2 (Note 2) | Decel G detected by decel G sensor | Changes according to an indication shown by the decel G sensor | On |
| | | | Off |
| FR RH IN SOL | Operation status of each solenoid valve | Actuator (solenoid valve) is active (“ACTIVE TEST” in “ABS” with CONSULT-III) | 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 each solenoid valve | Actuator (solenoid valve) is active (“ACTIVE TEST” in “ABS” with CONSULT-III) | On |
| | | When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON) | Off |

| Monitor item | Display content | Data monitor | |
|---|---|---|---|
| | | Condition | Reference value in normal operation |
| FR LH IN SOL | Operation status of each solenoid valve | Actuator (solenoid valve) is active (“ACTIVE TEST” in “ABS” with CONSULT-III) | 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 each solenoid valve | Actuator (solenoid valve) is active (“ACTIVE TEST” in “ABS” with CONSULT-III) | 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 each solenoid valve | Actuator (solenoid valve) is active (“ACTIVE TEST” in “ABS” with CONSULT-III) | 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 each solenoid valve | Actuator (solenoid valve) is active (“ACTIVE TEST” in “ABS” with CONSULT-III) | 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 each solenoid valve | Actuator (solenoid valve) is active (“ACTIVE TEST” in “ABS” with CONSULT-III) | 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 each solenoid valve | Actuator (solenoid valve) is active (“ACTIVE TEST” in “ABS” with CONSULT-III) | 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 |

| Monitor item | Display content | Data monitor | |
|---|---|---|---|
| | | Condition | Reference value in normal operation |
| ABS FAIL SIG | ABS fail-safe signal | In ABS fail-safe | On |
| | | ABS is normal | Off |

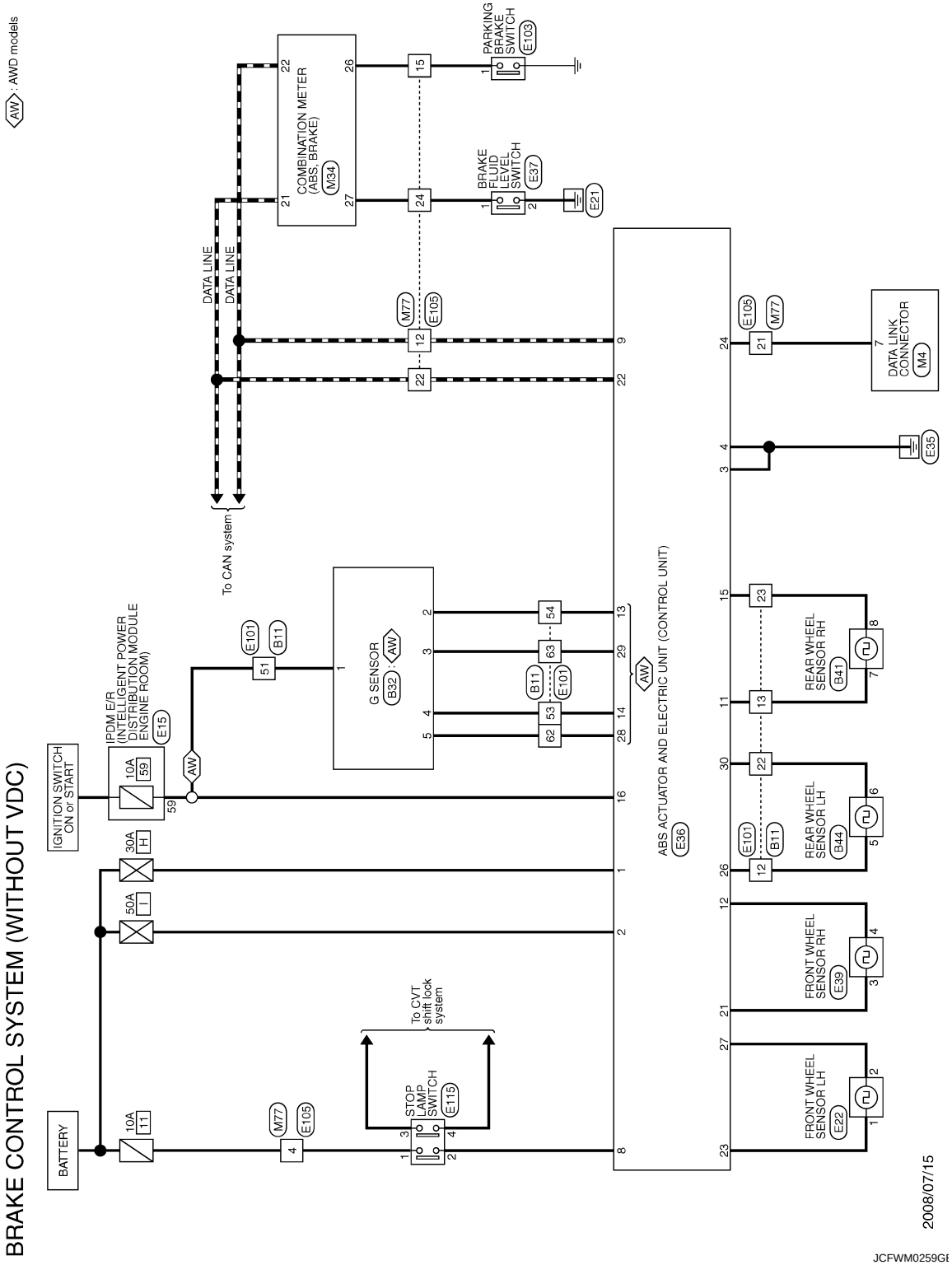
**NOTE:**

- 1: Confirm tire pressure is normal.
- 2: Only AWD models.
- 3: Every 20 seconds momentary switch to Off.
- 4: On and off timing for warning lamp and indicator lamp.

- ABS warning lamp: Refer to BRC-47, "Description".

# Wiring Diagram -BRAKE CONTROL SYSTEM-

INFOID:0000000005255454

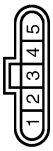


BRAKE CONTROL SYSTEM (WITHOUT VDC)

| Connector No. | B11 |
|---|---|
| Connector Name | WIRE TO WIRE |
| Connector Type | TH80MW-CS16-TM4 |

| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 12 | BR | – |
| 13 | O | – |
| 22 | G | – |
| 23 | SB | – |
| 51 | GR | – |
| 53 | L | – |
| 54 | B | – |
| 62 | Y | – |
| 63 | R | – |

| Connector No. | B32 |
|---|---|
| Connector Name | G SENSOR |
| Connector Type | YDZ05FW |



| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 1 | GR | IGN |
| 2 | B | GST |
| 3 | R | GS2 |
| 4 | L | GS1 |
| 5 | Y | GND |

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

| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 7 | O | – |
| 8 | SB | – |

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

| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 5 | BR | – |
| 6 | G | – |

| Connector No. | E15 |
|---|---|
| Connector Name | IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) |
| Connector Type | NS16FW-CS |



| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 59 | BR | – |

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



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

| Connector No. | E36 |
|---|---|
| Connector Name | ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) |
| Connector Type | RH28FB-NU4-DH |



| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 1 | Y | MOTOR |
| 2 | BR | ACTR |
| 3 | B | GND A |
| 4 | B | GND M |
| 8 | SB | STOP LAMP SW |
| 9 | P | CAN L |
| 11 | O | RR SENSOR VB |
| 12 | R | FR SENSOR SIG |
| 13 | B | G CHECK |
| 14 | L | G SW1 |
| 15 | SB | RR SENSOR SIG |
| 16 | BR | IGN |
| 21 | G | FR SENSOR VB |
| 22 | L | CAN H |
| 23 | W | FL SENSOR VB |
| 24 | GR | DIAG K |
| 26 | BR | RL SENSOR VB |
| 27 | P | FL SENSOR SIG |
| 28 | Y | G GND |
| 29 | R | G SW2 |
| 30 | G | RL SENSOR SIG |

JCFWM0260GE

BRAKE CONTROL SYSTEM (WITHOUT VDC)

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

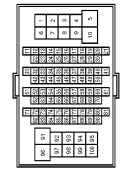


| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 1 | LG | – |
| 2 | B | – |

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

| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 3 | G | – |
| 4 | R | – |

| Connector No. | E101 |
|---|---|
| Connector Name | WIRE TO WIRE |
| Connector Type | TH80FW-CS16-TM4 |



| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 12 | BR | – |
| 13 | O | – |
| 22 | G | – |
| 23 | SB | – |
| 51 | GR | – |
| 53 | L | – |
| 54 | B | – |
| 62 | Y | – |
| 63 | R | – |

| Connector No. | E103 |
|---|---|
| Connector Name | PARKING BRAKE SWITCH |
| Connector Type | P01FB-A |

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

| Connector No. | E105 |
|---|---|
| Connector Name | WIRE TO WIRE |
| Connector Type | TH80FW-CS16-TM4 |

| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 4 | V | – |
| 12 | P | – |
| 15 | V | – |
| 21 | L | – |
| 22 | L | – |
| 24 | LG | – |

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



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

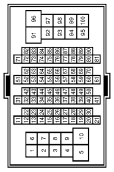


| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 21 | L | CAN-H |
| 22 | P | CAN-L |
| 26 | V | PARKING BRAKE SW |
| 27 | BR | BRAKE FLUID LEVEL SE |

JCFWM0261GB

BRAKE CONTROL SYSTEM (WITHOUT VDC)

| Connector No. | M77 |
|---|---|
| Connector Name | WIRE TO WIRE |
| Connector Type | TH80MW-CS16-TM4 |



| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 4 | Y | – |
| 12 | P | – |
| 15 | V | – |
| 21 | O | – |
| 22 | L | – |
| 24 | BR | – |

JCFWM0262GE

## Fail-Safe

*INFOID:0000000005255455*

### 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 Index

INFOID:0000000005255456

| DTC | Items (CONSULT screen terms) | Reference |
|---|---|---|
| C1101 | RR RH SENSOR-1 | BRC-18, "DTC Logic" |
| C1102 | RR LH SENSOR-1 | |
| C1103 | FR RH SENSOR-1 | |
| C1104 | FR LH SENSOR-1 | |
| C1105 | RR RH SENSOR-2 | BRC-21, "DTC Logic" |
| C1106 | RR LH SENSOR-2 | |
| C1107 | FR RH SENSOR-2 | |
| C1108 | FR LH SENSOR-2 | |
| C1109 | BATTERY VOLTAGE [ABNORMAL] | BRC-24, "DTC Logic" |
| C1110 | CONTROLLER FAILURE | BRC-26, "DTC Logic" |
| C1111 | PUMP MOTOR | BRC-27, "DTC Logic" |
| C1113 | G SENSOR | BRC-29, "DTC Logic" |
| C1115 | ABS SENSOR [ABNORMAL SIGNAL] | BRC-32, "DTC Logic" |
| C1120 | FR LH IN ABS SOL | BRC-35, "DTC Logic" |
| C1121 | FR LH OUT ABS SOL | BRC-37, "DTC Logic" |
| C1122 | FR RH IN ABS SOL | BRC-35, "DTC Logic" |
| C1123 | FR RH OUT ABS SOL | BRC-37, "DTC Logic" |
| C1124 | RR LH IN ABS SOL | BRC-35, "DTC Logic" |
| C1125 | RR LH OUT ABS SOL | BRC-37, "DTC Logic" |
| C1126 | RR RH IN ABS SOL | BRC-35, "DTC Logic" |
| C1127 | RR RH OUT ABS SOL | BRC-37, "DTC Logic" |
| C1140 | ACTUATOR RLY | BRC-39, "DTC Logic" |
| U1000 | CAN COMM CIRCUIT | BRC-41, "DTC Logic" |
| U1010 | CONTROL UNIT (CAN) | BRC-42, "DTC Logic" |

# SYMPTOM DIAGNOSIS

## EXCESSIVE ABS FUNCTION OPERATION FREQUENCY

### Diagnosis Procedure

INFOID:0000000005255457

**1.** CHECK START

Check front and rear brake force distribution using a brake tester. Refer to BR-49, "General Specifications".

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
  - 2WD models: Refer to FAX-8, "Inspection".
  - AWD models: Refer to FAX-32, "Inspection".
- Rear
  - 2WD models: Refer to RAX-4, "Inspection".
  - AWD models: Refer to RAX-11, "Inspection".

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 for “ABS” with CONSULT-III.
NO >> Normal

# UNEXPECTED PEDAL REACTION

## Diagnosis Procedure

INFOID:0000000005255458

### 1.CHECK BRAKE PEDAL STROKE

Check brake pedal stroke. Refer to BR-9, "Inspection and Adjustment".

Is the stroke too large?

YES >> • Bleed air from brake tube and hose. Refer to BR-13, "Bleeding Brake System".
• Check brake pedal, brake booster, and master cylinder for mount play, looseness, brake system fluid leakage, etc.
- Brake pedal: Refer to BR-9, "Inspection and Adjustment".
- Master cylinder: Refer to BR-14, "Inspection".
- Brake booster: Refer to BR-15, "Inspection".

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 >> Normal
NO >> Check brake system.

# THE BRAKING DISTANCE IS LONG

## Diagnosis Procedure

INFOID:0000000005255459

**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 >> Normal
NO >> Check brake system.

# ABS FUNCTION DOES NOT OPERATE

## Diagnosis Procedure

INFOID:0000000005255460

**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 >> Normal
NO >> Perform self-diagnosis for “ABS” with CONSULT-III.

# PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

## Diagnosis Procedure

INFOID:0000000005255461

**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 for “ABS” with CONSULT-III.

### 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 >> Normal

# NORMAL OPERATING CONDITION

## Description

INFOID:0000000005255462

| 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

## FOR USA AND CANADA

### FOR USA AND CANADA : Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000005530481

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. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the “SRS AIR BAG” 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 AIR BAG”.**
- **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.**

### PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

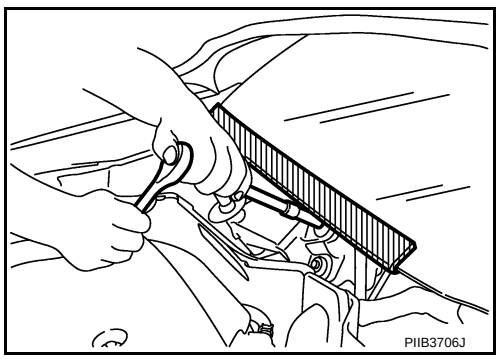
**WARNING:**

- **When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

### FOR USA AND CANADA : Precaution for Procedure without Cowl Top Cover

INFOID:0000000005530484

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.




### FOR USA AND CANADA : Precaution for Brake System

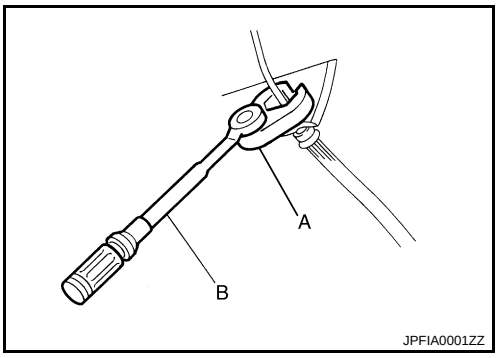
INFOID:0000000005255465

**WARNING:**

**Clean any dust from the front brake and rear brake with a vacuum dust collector. Never blow with compressed air.**

- Only use “DOT 3” brake fluid. Refer to MA-14, "FOR NORTH AMERICA : Fluids and Lubricants".
- Never reuse drained brake fluid.
- Never 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 use mineral oils such as gasoline or light oil to clean. 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 crow-foot (A) and torque wrench (B).
- Always confirm the specified tightening torque when installing the brake pipes.
- 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.
- Check that no brake fluid leakage is present after replacing the parts.




## FOR USA AND CANADA : Precaution for Brake Control

INFOID:0000000005255466

- When starting engine or when starting vehicle just after starting engine, 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 estimate 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.

## FOR MEXICO

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

INFOID:0000000005530482

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 AIR BAG” 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 AIR BAG”.**
- **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.**

### PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

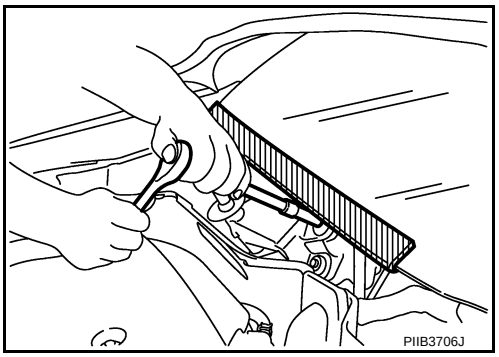
**WARNING:**

- **When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

## FOR MEXICO : Precaution for Procedure without Cowl Top Cover

INFOID:0000000005530486

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



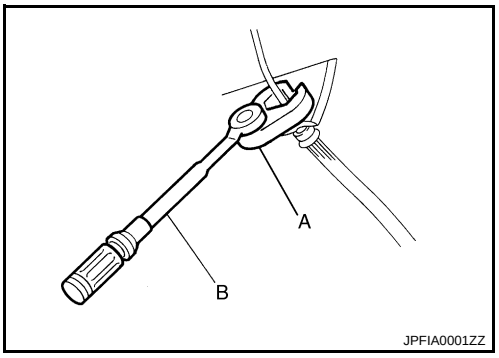

## FOR MEXICO : Precaution for Brake System

INFOID:0000000005255469

**WARNING:**

**Clean any dust from the front brake and rear brake with a vacuum dust collector. Never blow with compressed air.**

- Only use “DOT 3” brake fluid. Refer to MA-15, "FOR MEXICO : Fluids and Lubricants".
- Never reuse drained brake fluid.
- Never 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 use mineral oils such as gasoline or light oil to clean. 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 crowfoot (A) and torque wrench (B).
- Always confirm the specified tightening torque when installing the brake pipes.
- 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.
- Check that no brake fluid leakage is present after replacing the parts.




## FOR MEXICO : Precaution for Brake Control

INFOID:0000000005255470

- When starting engine or when starting vehicle just after starting engine, 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 estimate 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.

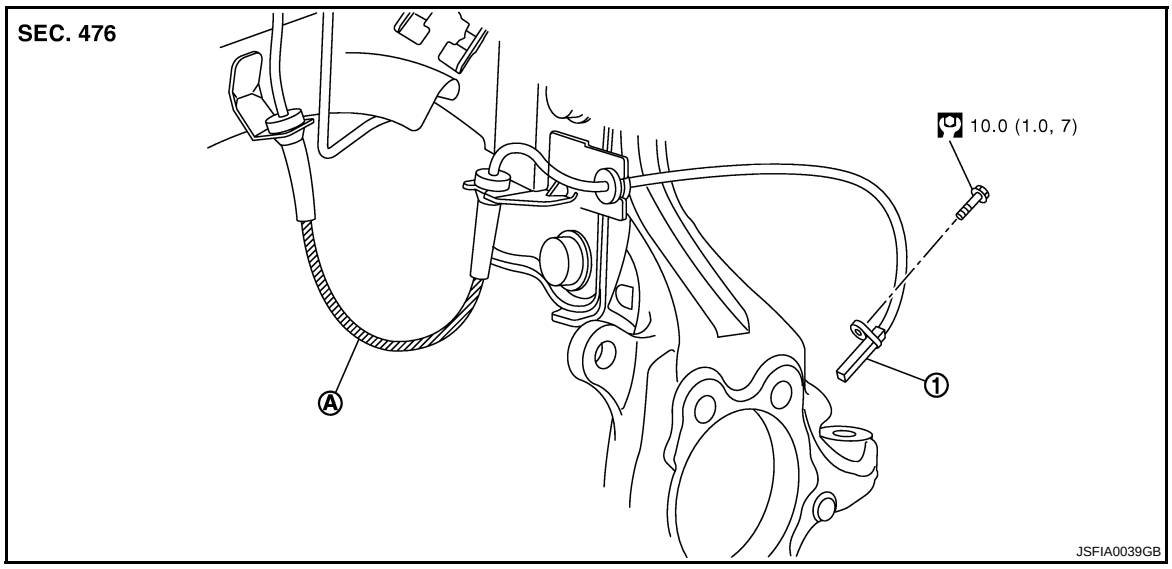
# REMOVAL AND INSTALLATION

## WHEEL SENSOR

### FRONT WHEEL SENSOR

#### FRONT WHEEL SENSOR : Exploded View

INFOID:0000000005255471




1. Front LH wheel sensor

A. Yellow line (slant line)

Refer to GI-4, "Components" for symbol 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:0000000005255472

##### REMOVAL

Pay attention to the following when removing sensor.

**CAUTION:**

- **Never twist sensor harness as much as possible, when removing it. Pull sensors out without pulling 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 yellow lines (A) are not twisted.**

##### INSTALLATION

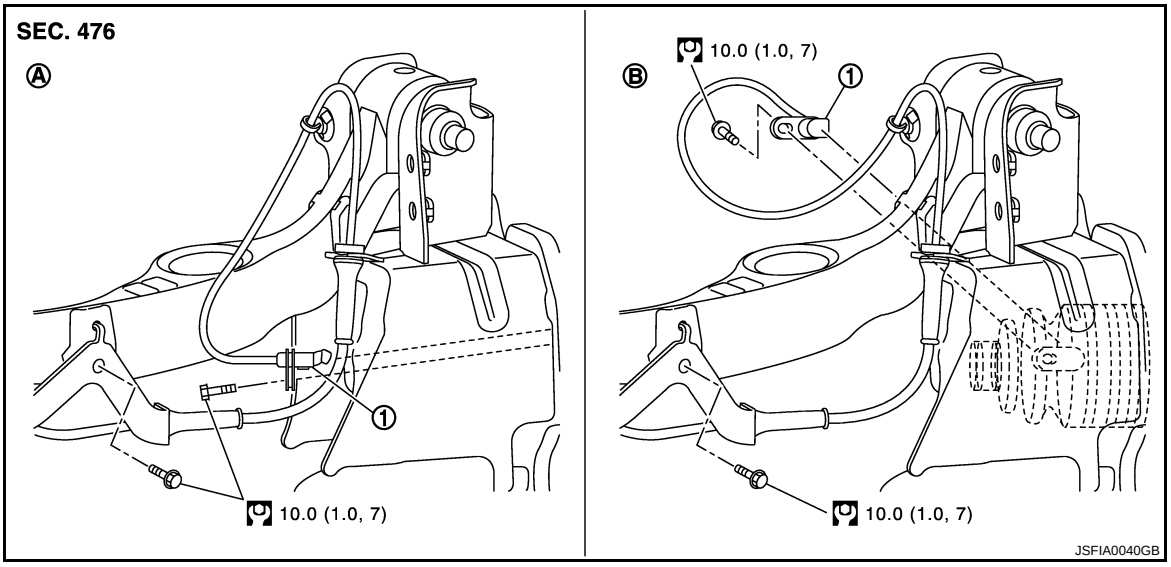
Pay attention to the following when installing wheel sensor. Tighten installation bolts to the specified torques.

- 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:0000000005255473




1. Rear LH wheel sensor

A. 2WD models B. AWD models

Refer to GI-4, "Components" for symbol 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:0000000005255474

### REMOVAL

Pay attention to the following when removing sensor.

**CAUTION:**

- **Never twist sensor harness as much as possible, when removing it. Pull sensors out without pulling 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.

- 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:0000000005255475

Refer to FAX-10, "Exploded View" (2WD models), FAX-34, "Exploded View" (AWD models).

### FRONT SENSOR ROTOR : Removal and Installation

INFOID:0000000005255476

REMOVAL

Sensor rotor cannot be disassembled. Remove the sensor rotor together with hub bearing assembly. Refer to FAX-10, "Removal and Installation" (2WD models), FAX-34, "Removal and Installation" (AWD models).

INSTALLATION

Sensor rotor cannot be disassembled. Installation the sensor rotor together with hub bearing assembly. Refer to FAX-10, "Removal and Installation" (2WD models), FAX-34, "Removal and Installation" (AWD models).

## REAR SENSOR ROTOR

### REAR SENSOR ROTOR : Exploded View

INFOID:0000000005255477

Refer to RAX-5, "Exploded View" (2WD models), RAX-13, "Exploded View" (AWD models).

### REAR SENSOR ROTOR : Removal and Installation

INFOID:0000000005255478

2WD MODELS

Removal

Sensor rotor cannot be disassembled. Remove the sensor rotor together with hub bearing assembly. Refer to RAX-5, "Removal and Installation".

Installation

Sensor rotor cannot be disassembled. Installation the sensor rotor together with hub bearing assembly. Refer to RAX-5, "Removal and Installation".

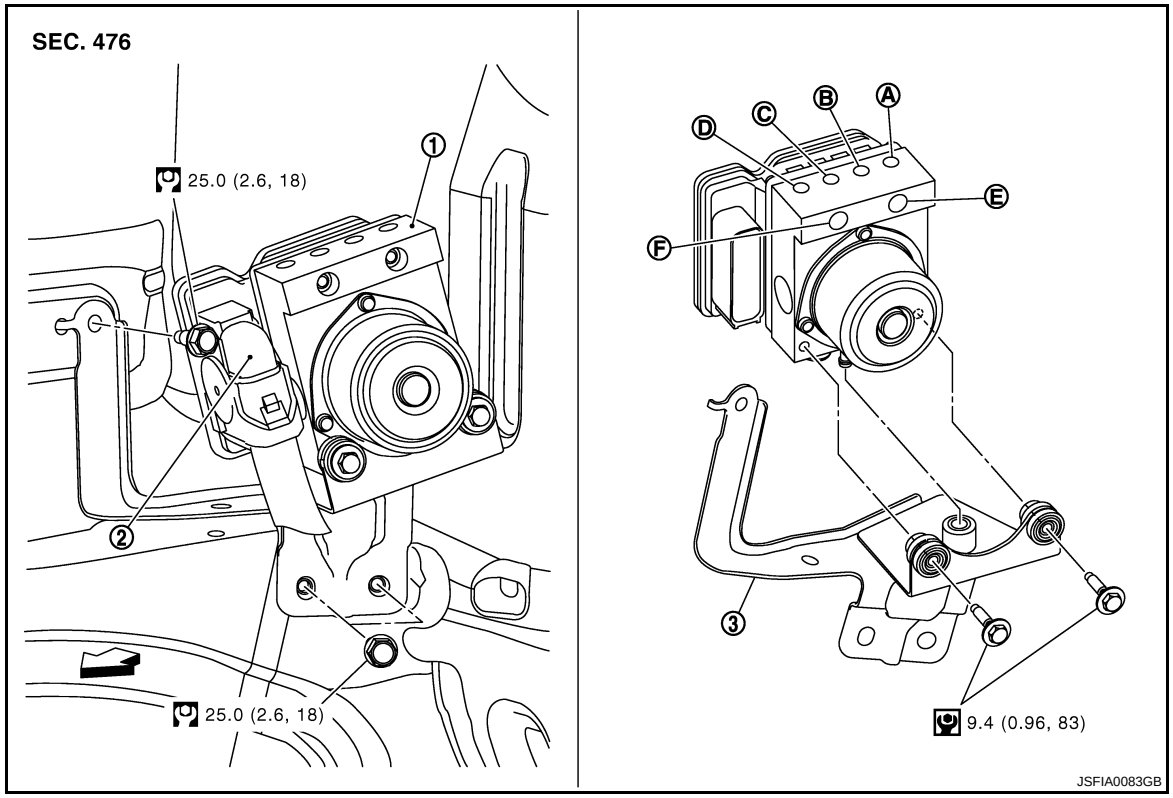
AWD MODELS

For removal and installation of sensor rotor, refer to RAX-16, "Disassembly and Assembly".

# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

## Exploded View

INFOID:0000000005255479




| | | | | | |
|---|---|---|---|---|---|
| 1. | ABS actuator and electric unit (control unit) | 2. | Connector | 3. | 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 primary side | F. | From master cylinder secondary side |

⇦: Vehicle front

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

## Removal and Installation

INFOID:0000000005255480

### 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.**
- **Never apply excessive impact to ABS actuator and electric unit (control unit), such as dropping it.**
- **Never remove and install actuator by holding harness.**
- **After work is completed, bleed air from brake tube. Refer to BR-13, "Bleeding Brake System".**

1. Remove cowl top. Refer to EXT-20, "Exploded View".
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Loosen brake tube flare nuts, then remove brake tubes from ABS actuator and electric unit (control unit).
4. Remove tire (front LH side).
5. Remove fender protector (rear): (front LH side). Refer to EXT-22, "Exploded View".
6. Remove ABS actuator and electric unit (control unit) bracket mounting nut.
7. Remove ABS actuator and electric unit (control unit) from vehicle.

### INSTALLATION

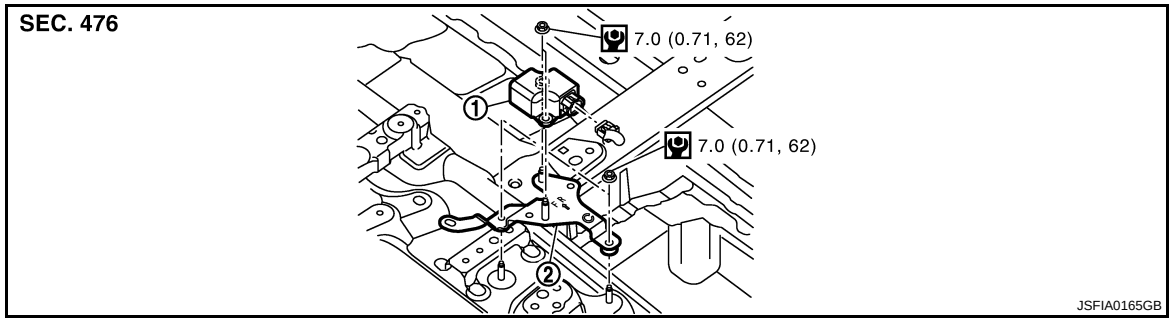
Note the following, and install in the reverse order of removal.

- 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.
- Never apply excessive impact to ABS actuator and electric unit (control unit), such as dropping it.
- Never remove and install actuator by holding harness.
- After work is completed, bleed air from brake tube. Refer to BR-13, "Bleeding Brake System".
- After installing harness connector in the ABS actuator and electric unit (control unit), make sure connector is securely locked.

# G SENSOR

## Exploded View

INFOID:0000000005255481




1. G sensor
2. Bracket

⇦: Vehicle front

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

## Removal and Installation

INFOID:0000000005255482

### REMOVAL

**CAUTION:**

**Never drop or strike G sensor, or never use power tool etc., because G sensor is sensitive to the impact.**

1. Remove center console assembly. Refer to IP-21, "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.

- Never drop or strike G sensor, or never use power tool etc., because G sensor is sensitive to the impact.

# BASIC INSPECTION

## DIAGNOSIS AND REPAIR WORKFLOW

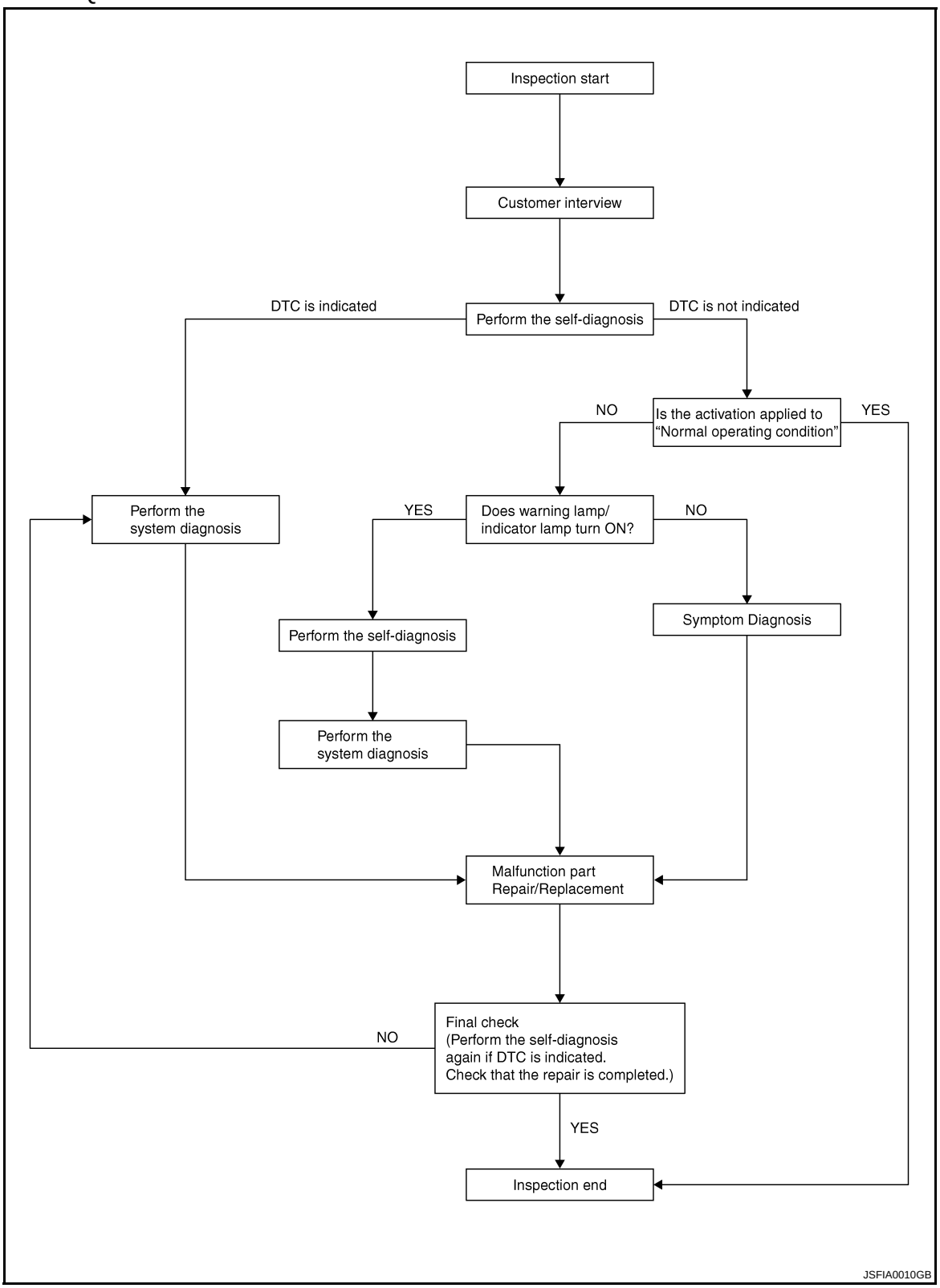
### Work Flow

INFOID:0000000005255483

#### 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-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

OVERALL SEQUENCE




DETAILED 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-75, "Diagnostic Work Sheet".

>> GO TO 2.

## 2.PERFORM THE SELF-DIAGNOSIS

Perform self-diagnosis for ”ABS“ with CONSULT-III. Refer to BRC-94, "CONSULT-III Function".

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 of “ABS” with CONSULT-III. Refer to BRC-161, "DTC 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-169, "Description".

Is the symptom 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-147, "Description".
- Brake warning lamp: Refer to BRC-148, "Description".
- VDC OFF indicator lamp: Refer to BRC-150, "Description".
- SLIP indicator lamp: Refer to BRC-152, "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 displayed DTC of “ABS” with CONSULT-III.

>> GO TO 7.

## 7.REPAIR OR REPLACE THE MALFUNCTIONING PARTS

Repair or replace the specified malfunctioning parts.

>> GO TO 8.

## 8.MEMORY CLEAR

Perform self-diagnosis memory clear for “ABS” with CONSULT-III.

>> GO TO 9.

## 9.FINAL CHECK

Perform the self-diagnosis again, and check that the malfunction is repaired completely.

Is no other DTC present and the repair completed?

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

## Diagnostic Work Sheet

INFOID:0000000005255484

| | | | |
|---|---|---|---|
| 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

## ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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

INFOID:0000000005255485

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 steering angle sensor | × |
| Replacing steering angle sensor | × |
| Removing/Installing steering wheel | × |
| Replacing steering wheel | × |
| 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:0000000005255486

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. Select“ABS”, "WORK SUPPORT" and "ST ANGLE SENSOR ADJUSTMENT" in order with CONSULT-III.
2. Select “START”.
   **CAUTION:**
   **Never touch steering wheel while adjusting steering angle sensor.**
3. After approximately 10 seconds, select “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 “ABS”, “DATA MONITOR” and “STR ANGLE SIG” in order with CONSULT-III, and check steering angle sensor signal.

**STR ANGLE SIG : 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 for “ABS” and “ENGINE” with CONSULT-III.
- “ABS”: Refer to BRC-94, "CONSULT-III Function".
- “ENGINE”
  - For CALIFORNIA: Refer to EC-107, "CONSULT-III Function".
  - For USA (FEDERAL) and CANADA: Refer to EC-588, "CONSULT-III Function".
  - For MEXICO: Refer to EC-1022, "CONSULT-III Function".

Are the memories erased?

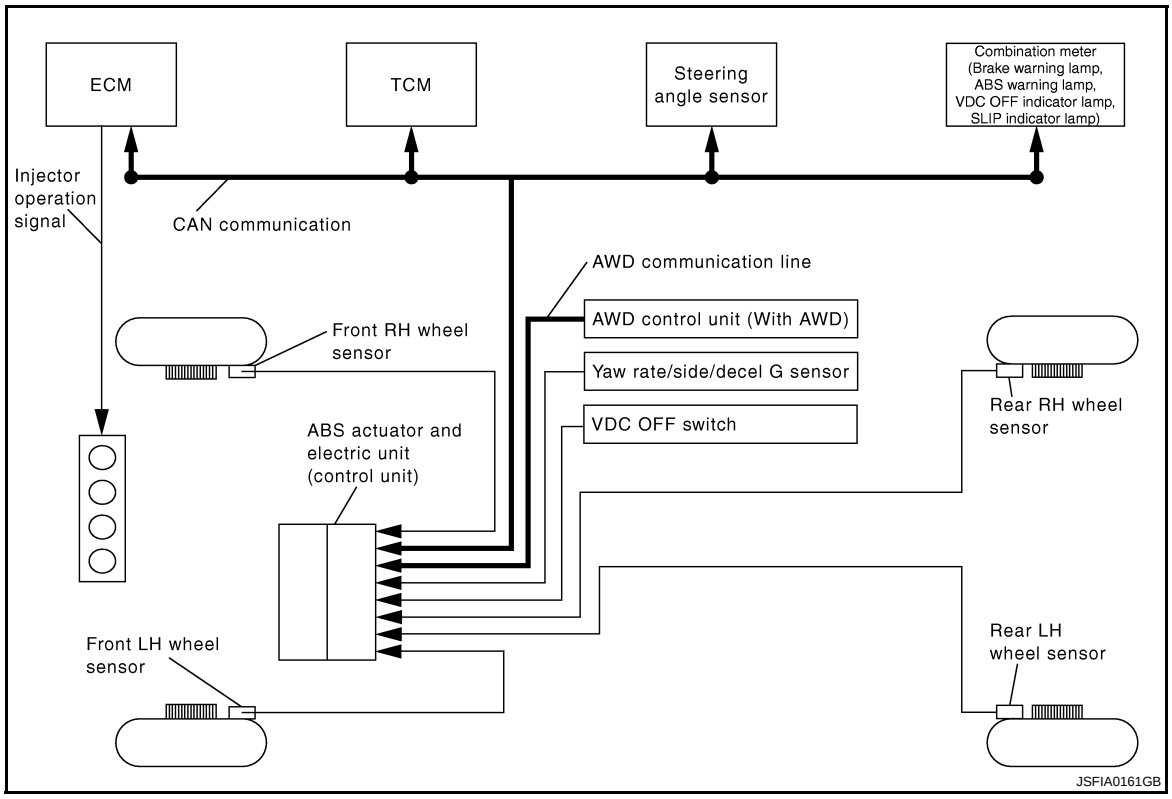
YES >> INSPECTION END
NO >> Check the items indicated by the self-diagnosis.

# SYSTEM DESCRIPTION

## VDC

### System Diagram

INFOID:0000000005255487




### System Description

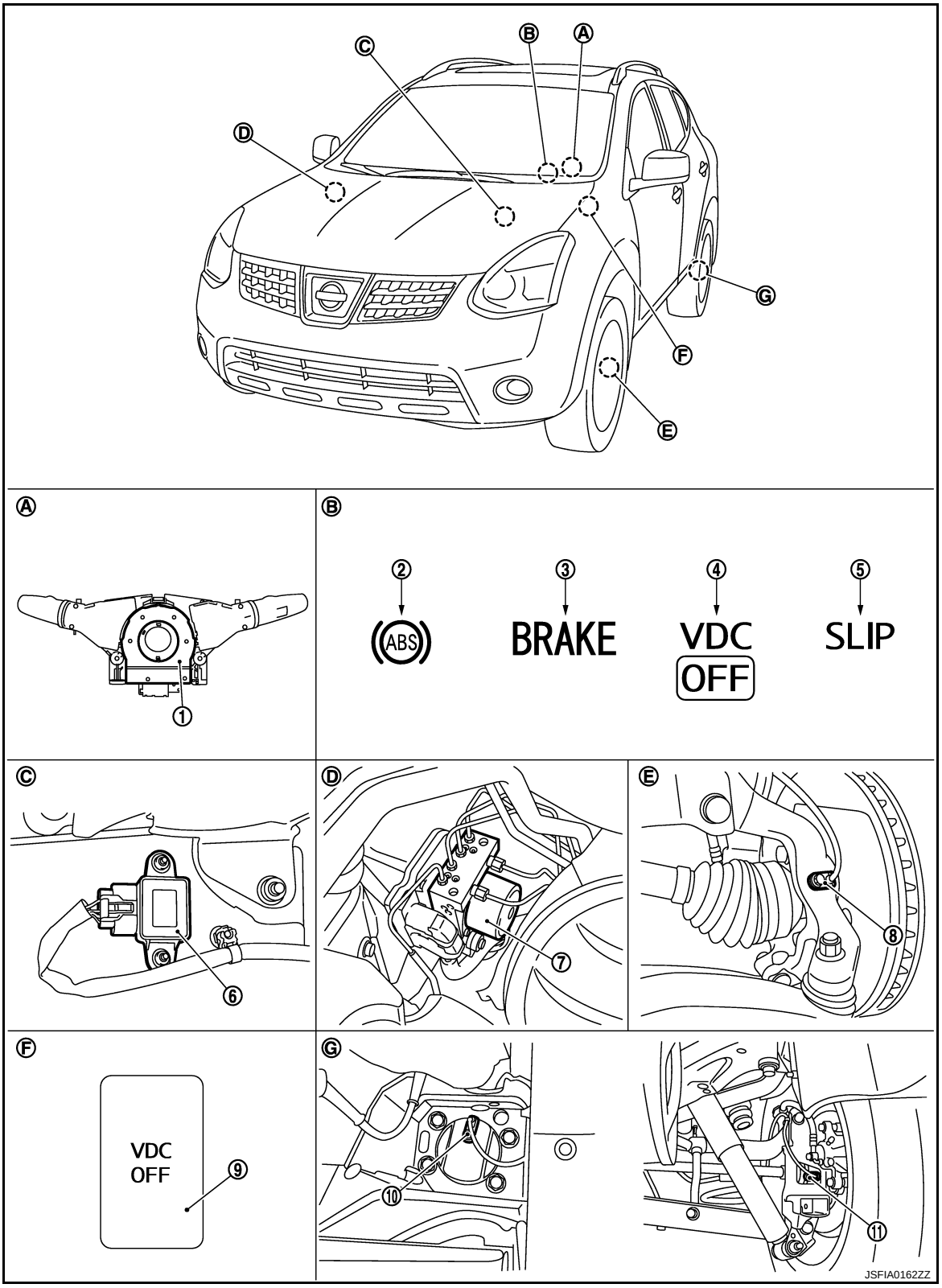
INFOID:0000000005255488

- Vehicle Dynamics Control system detects driver's steering operation amount and brake pedal travel from steering angle sensor and pressure sensor. Using information from yaw rate/side/decel G sensor and wheel sensor, VDC 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 VDC operation, it informs driver of system operation by flashing SLIP indicator lamp.
- Electrical system diagnosis by CONSULT-III is available.

### Component Parts Location

INFOID:0000000005255489

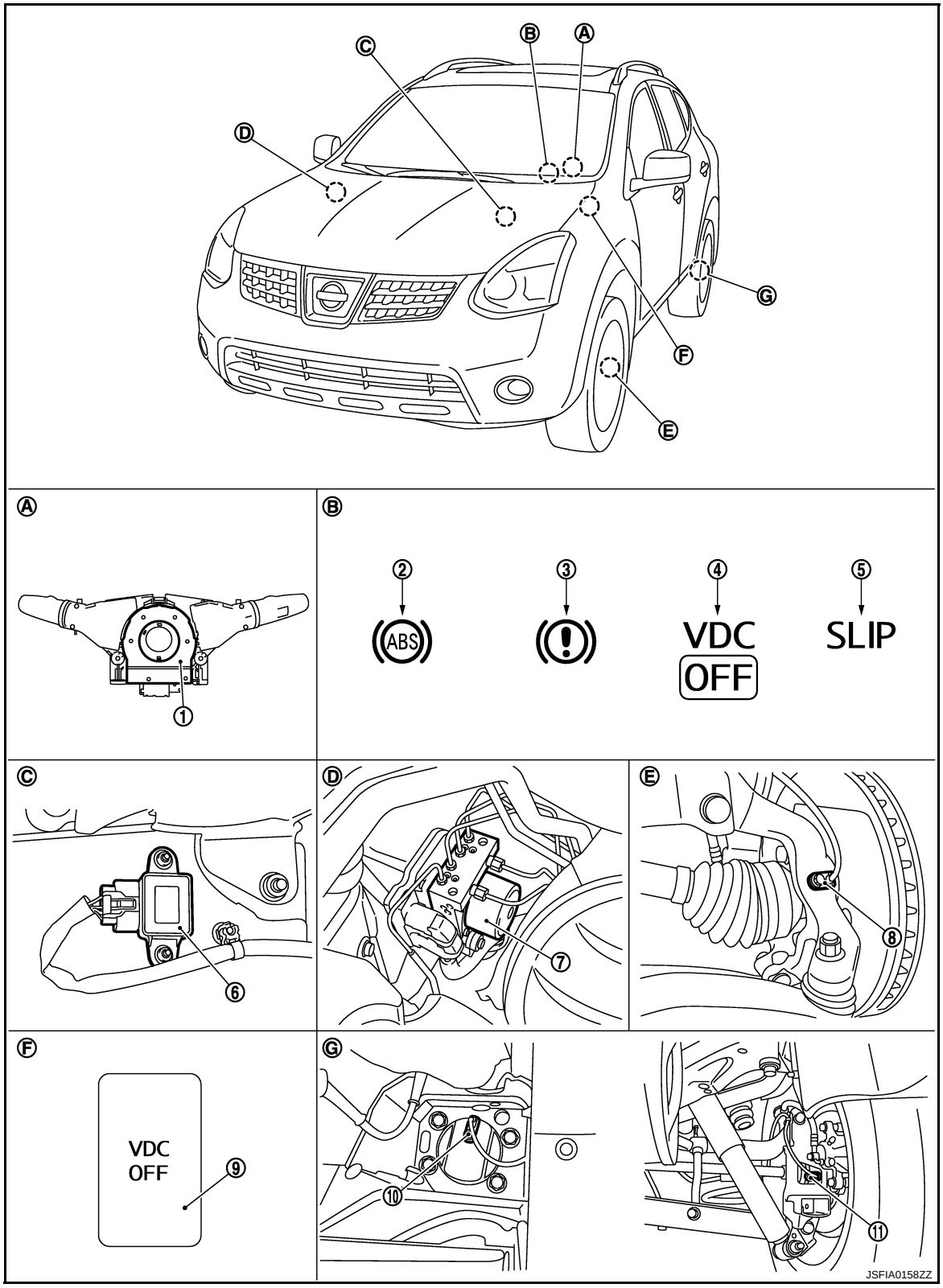
FOR USA




1. Steering angle sensor
2. ABS warning lamp
3. Brake warning lamp
4. VDC OFF indicator lamp
5. SLIP indicator lamp
6. Yaw rate/side/decel G sensor
7. ABS actuator and electric unit (control unit)
8. Front wheel sensor
9. VDC OFF switch
10. Rear wheel sensor (2WD models)
11. Rear wheel sensor (AWD models)

A. Back of spiral cable assembly
B. Combination meter
C. Center console
D. Engine room (right side)
E. Steering knuckle
F. Instrument driver lower panel
G. Rear axle

EXCEPT FOR USA




1. Steering angle sensor
2. ABS warning lamp
3. Brake warning lamp
4. VDC OFF indicator lamp
5. SLIP indicator lamp
6. Yaw rate/side/decel G sensor

7. ABS actuator and electric unit (control unit)
8. Front wheel sensor
9. VDC OFF switch
10. Rear wheel sensor (2WD models)
11. Rear wheel sensor (AWD models)

A. Back of spiral cable assembly
B. Combination meter
C. Center console
D. Engine room (right side)
E. Steering knuckle
F. Instrument driver lower panel
G. Rear axle

## Component Description

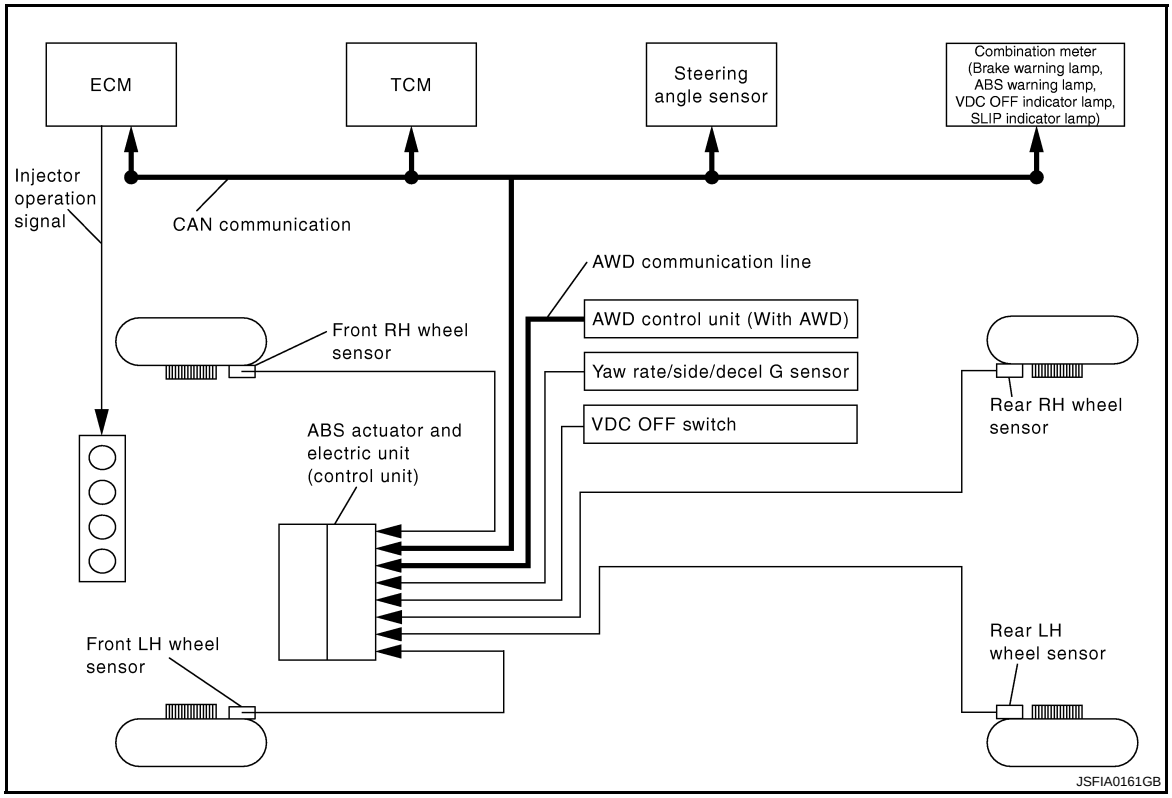
INFOID:0000000005255490

| Component parts | | Reference |
|---|---|---|
| ABS actuator and electric unit (control unit) | Pump | BRC-109, "Description" |
| | Motor | |
| | Actuator relay (Main relay) | BRC-128, "Description" |
| | Solenoid valve | BRC-121, "Description" |
| | VDC switch-over valve (CV1, CV2) | BRC-135, "Description" |
| | VDC switch-over valve (SV1, SV2) | BRC-137, "Description" |
| Wheel sensor | | BRC-99, "Description" |
| Yaw rate/side/decel G sensor | | BRC-111, "Description" |
| Steering angle sensor | | BRC-130, "Description" |
| VDC OFF switch | | BRC-145, "Description" |
| ABS warning lamp | | BRC-147, "Description" |
| Brake warning lamp | | BRC-148, "Description" |
| VDC OFF indicator lamp | | BRC-150, "Description" |
| SLIP indicator lamp | | BRC-152, "Description" |

# TCS

## System Diagram

INFOID:0000000005255491




## System Description

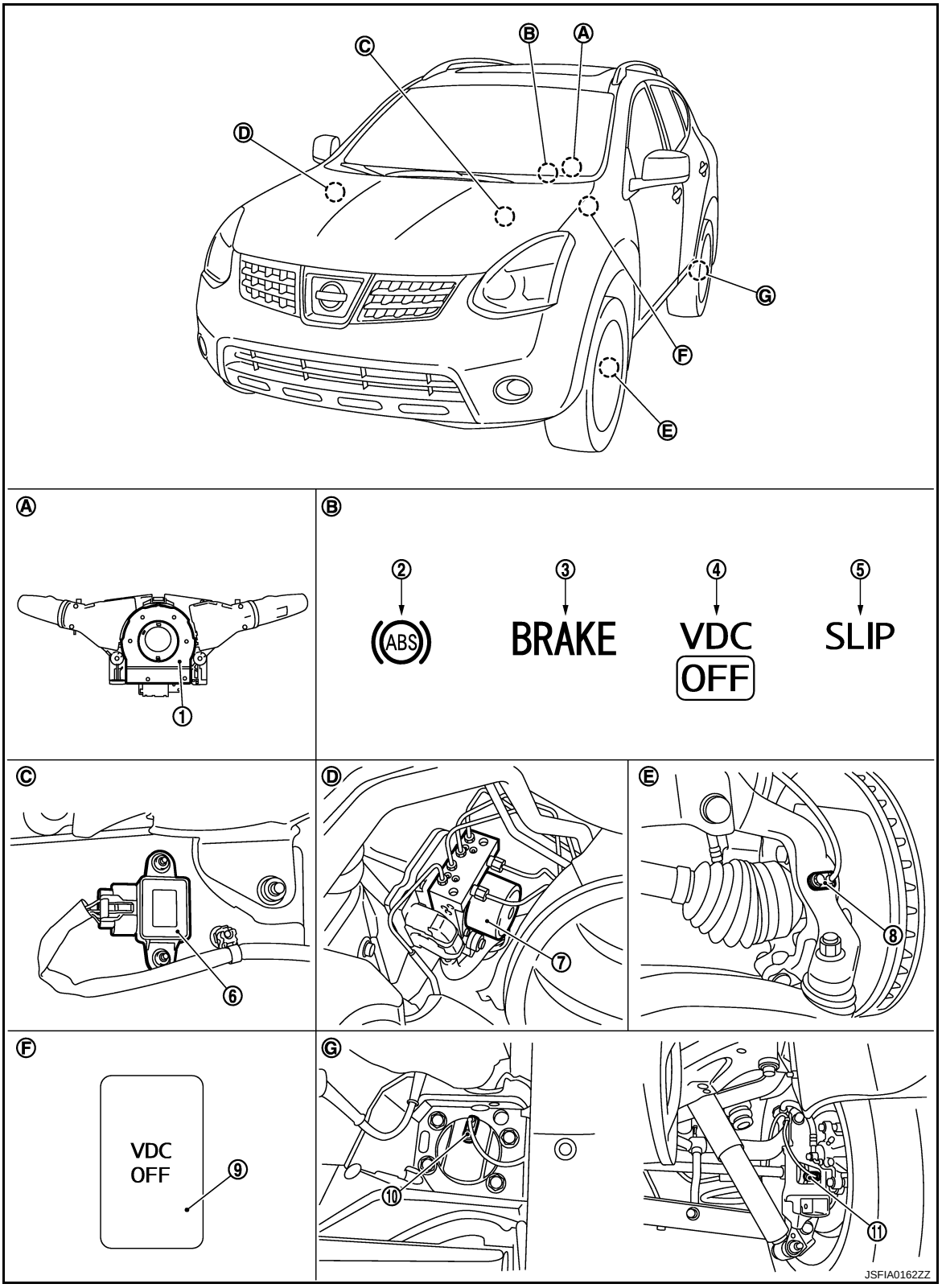
INFOID:0000000005255492

- Traction Control System is a function that electronically controls engine torque, brake fluid pressure and CVT shift position 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:0000000005255493

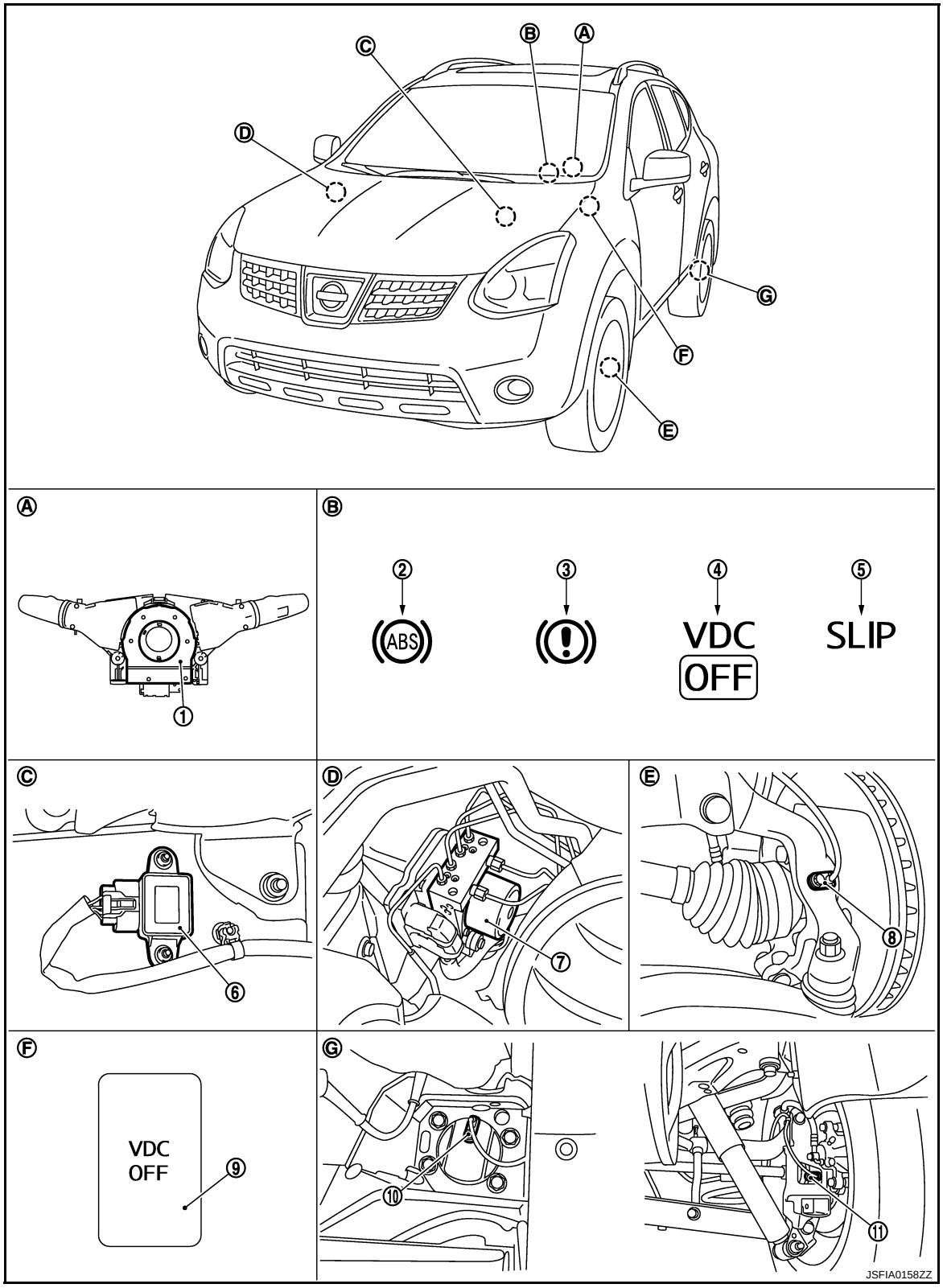
FOR USA




1. Steering angle sensor
2. ABS warning lamp
3. Brake warning lamp
4. VDC OFF indicator lamp
5. SLIP indicator lamp
6. Yaw rate/side/decel G sensor
7. ABS actuator and electric unit (control unit)
8. Front wheel sensor
9. VDC OFF switch
10. Rear wheel sensor (2WD models)
11. Rear wheel sensor (AWD models)

A. Back of spiral cable assembly
B. Combination meter
C. Center console
D. Engine room (right side)
E. Steering knuckle
F. Instrument driver lower panel
G. Rear axle

EXCEPT FOR USA




1. Steering angle sensor
2. ABS warning lamp
3. Brake warning lamp
4. VDC OFF indicator lamp
5. SLIP indicator lamp
6. Yaw rate/side/decel G sensor

7. ABS actuator and electric unit (control unit)
8. Front wheel sensor
9. VDC OFF switch
10. Rear wheel sensor (2WD models)
11. Rear wheel sensor (AWD models)

A. Back of spiral cable assembly
B. Combination meter
C. Center console
D. Engine room (right side)
E. Steering knuckle
F. Instrument driver lower panel
G. Rear axle

## Component Description

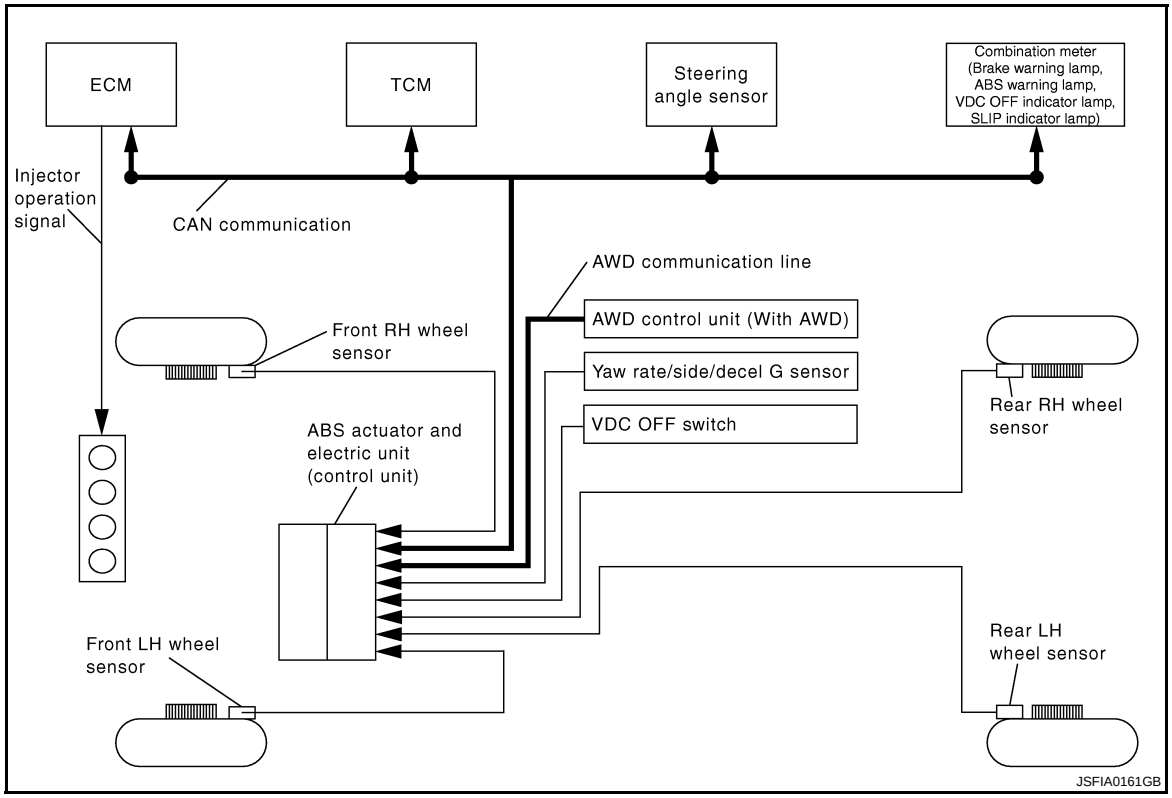
INFOID:0000000005255494

| Component parts | | Reference |
|---|---|---|
| ABS actuator and electric unit (control unit) | Pump | BRC-109, "Description" |
| | Motor | |
| | Actuator relay (Main relay) | BRC-128, "Description" |
| | Solenoid valve | BRC-121, "Description" |
| | VDC switch-over valve (CV1, CV2) | BRC-135, "Description" |
| | VDC switch-over valve (SV1, SV2) | BRC-137, "Description" |
| Wheel sensor | | BRC-99, "Description" |
| Yaw rate/side/decel G sensor | | BRC-111, "Description" |
| Steering angle sensor | | BRC-130, "Description" |
| VDC OFF switch | | BRC-145, "Description" |
| ABS warning lamp | | BRC-147, "Description" |
| Brake warning lamp | | BRC-148, "Description" |
| VDC OFF indicator lamp | | BRC-150, "Description" |
| SLIP indicator lamp | | BRC-152, "Description" |

# ABS

## System Diagram

INFOID:0000000005255495




## System Description

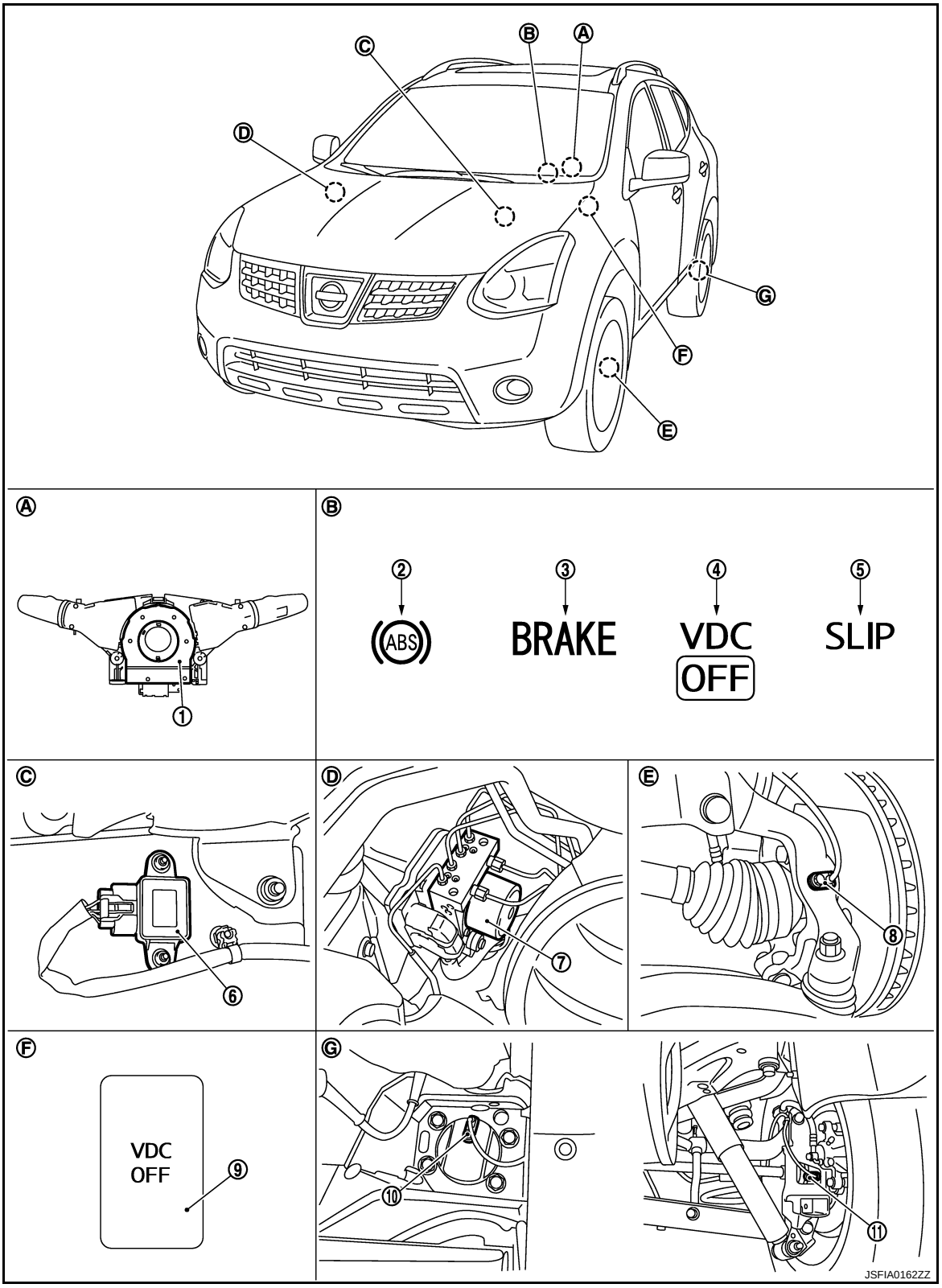
INFOID:0000000005255496

- 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:0000000005255497

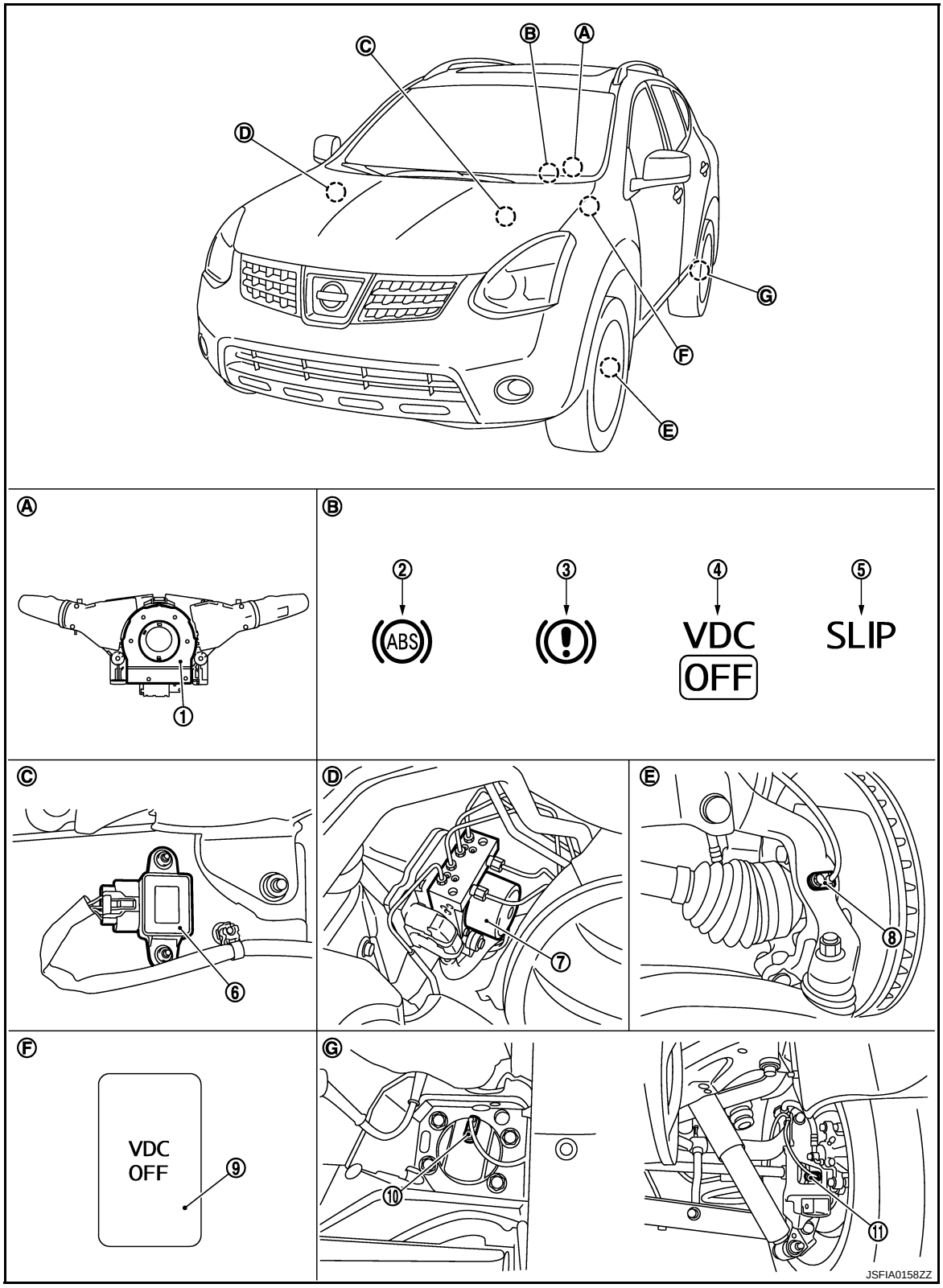
FOR USA




1. Steering angle sensor
2. ABS warning lamp
3. Brake warning lamp
4. VDC OFF indicator lamp
5. SLIP indicator lamp
6. Yaw rate/side/decel G sensor
7. ABS actuator and electric unit (control unit)
8. Front wheel sensor
9. VDC OFF switch
10. Rear wheel sensor (2WD models)
11. Rear wheel sensor (AWD models)

A. Back of spiral cable assembly
B. Combination meter
C. Center console
D. Engine room (right side)
E. Steering knuckle
F. Instrument driver lower panel
G. Rear axle

EXCEPT FOR USA




1. Steering angle sensor
2. ABS warning lamp
3. Brake warning lamp
4. VDC OFF indicator lamp
5. SLIP indicator lamp
6. Yaw rate/side/decel G sensor

7. ABS actuator and electric unit (control unit)
8. Front wheel sensor
9. VDC OFF switch
10. Rear wheel sensor (2WD models)
11. Rear wheel sensor (AWD models)

A. Back of spiral cable assembly
B. Combination meter
C. Center console
D. Engine room (right side)
E. Steering knuckle
F. Instrument driver lower panel
G. Rear axle

## Component Description

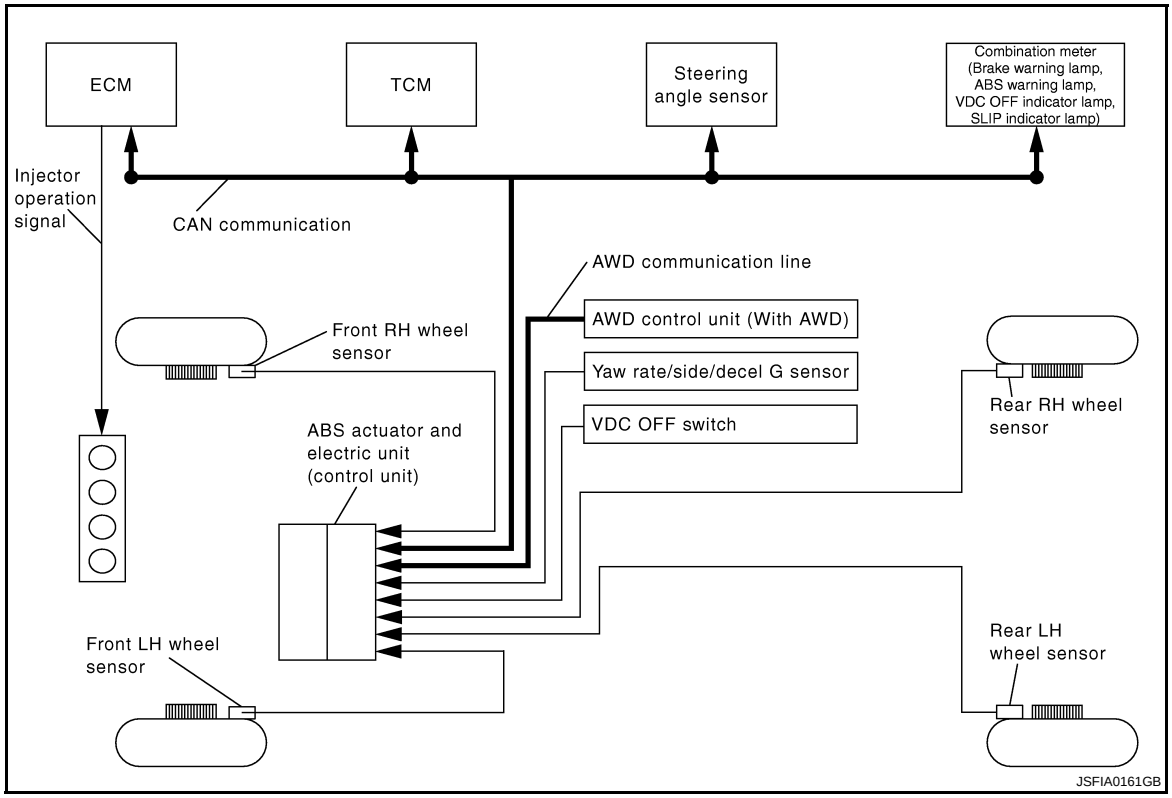
INFOID:0000000005255498

| Component parts | | Reference |
|---|---|---|
| ABS actuator and electric unit (control unit) | Pump | BRC-109, "Description" |
| | Motor | |
| | Actuator relay (Main relay) | BRC-128, "Description" |
| | Solenoid valve | BRC-121, "Description" |
| | VDC switch-over valve (CV1, CV2) | BRC-135, "Description" |
| | VDC switch-over valve (SV1, SV2) | BRC-137, "Description" |
| Wheel sensor | | BRC-99, "Description" |
| Yaw rate/side/decel G sensor | | BRC-111, "Description" |
| Steering angle sensor | | BRC-130, "Description" |
| VDC OFF switch | | BRC-145, "Description" |
| ABS warning lamp | | BRC-147, "Description" |
| Brake warning lamp | | BRC-148, "Description" |
| VDC OFF indicator lamp | | BRC-150, "Description" |
| SLIP indicator lamp | | BRC-152, "Description" |

# EBD

## System Diagram

INFOID:0000000005255499




## System Description

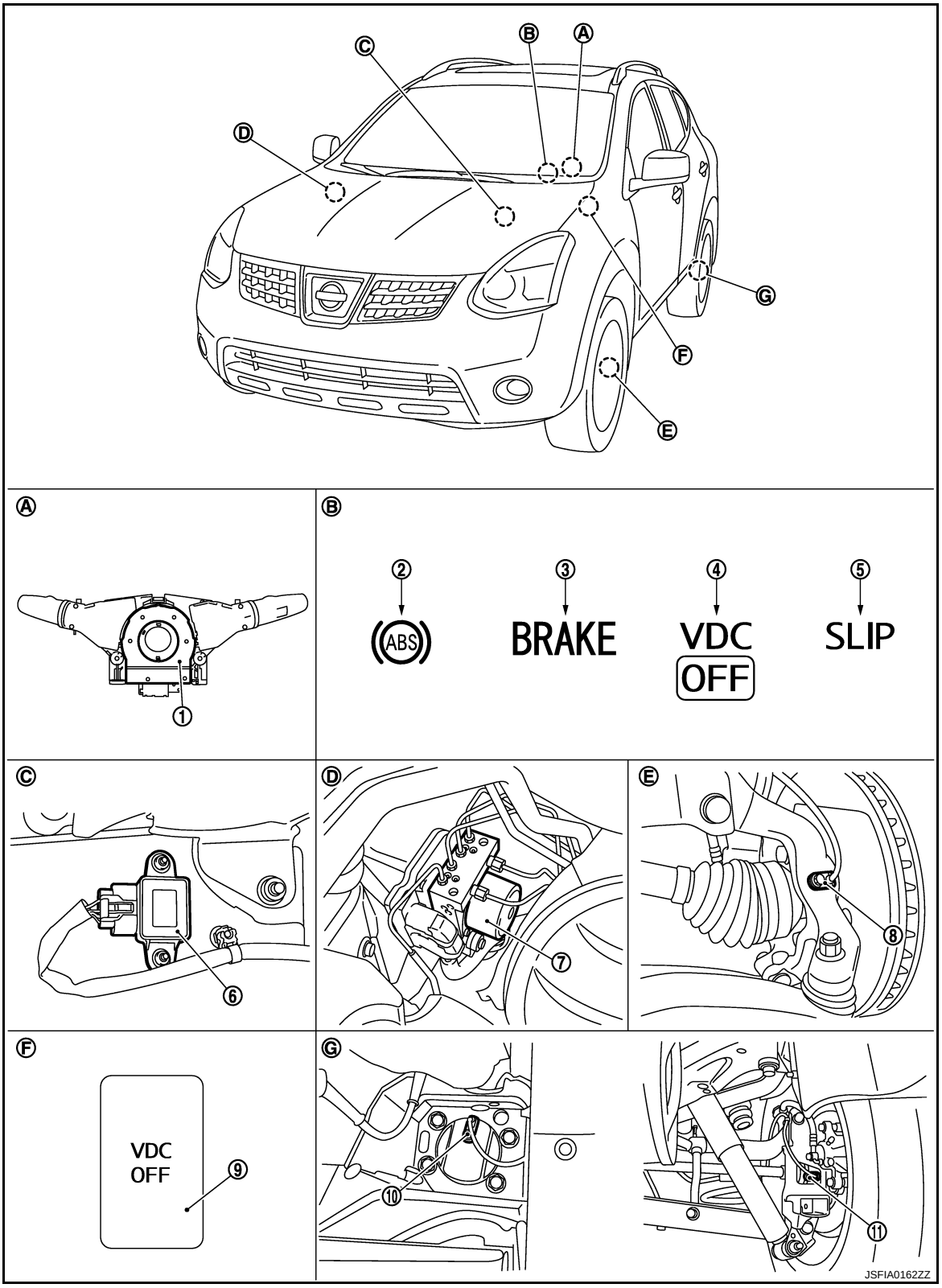
INFOID:0000000005255500

- 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:0000000005255501

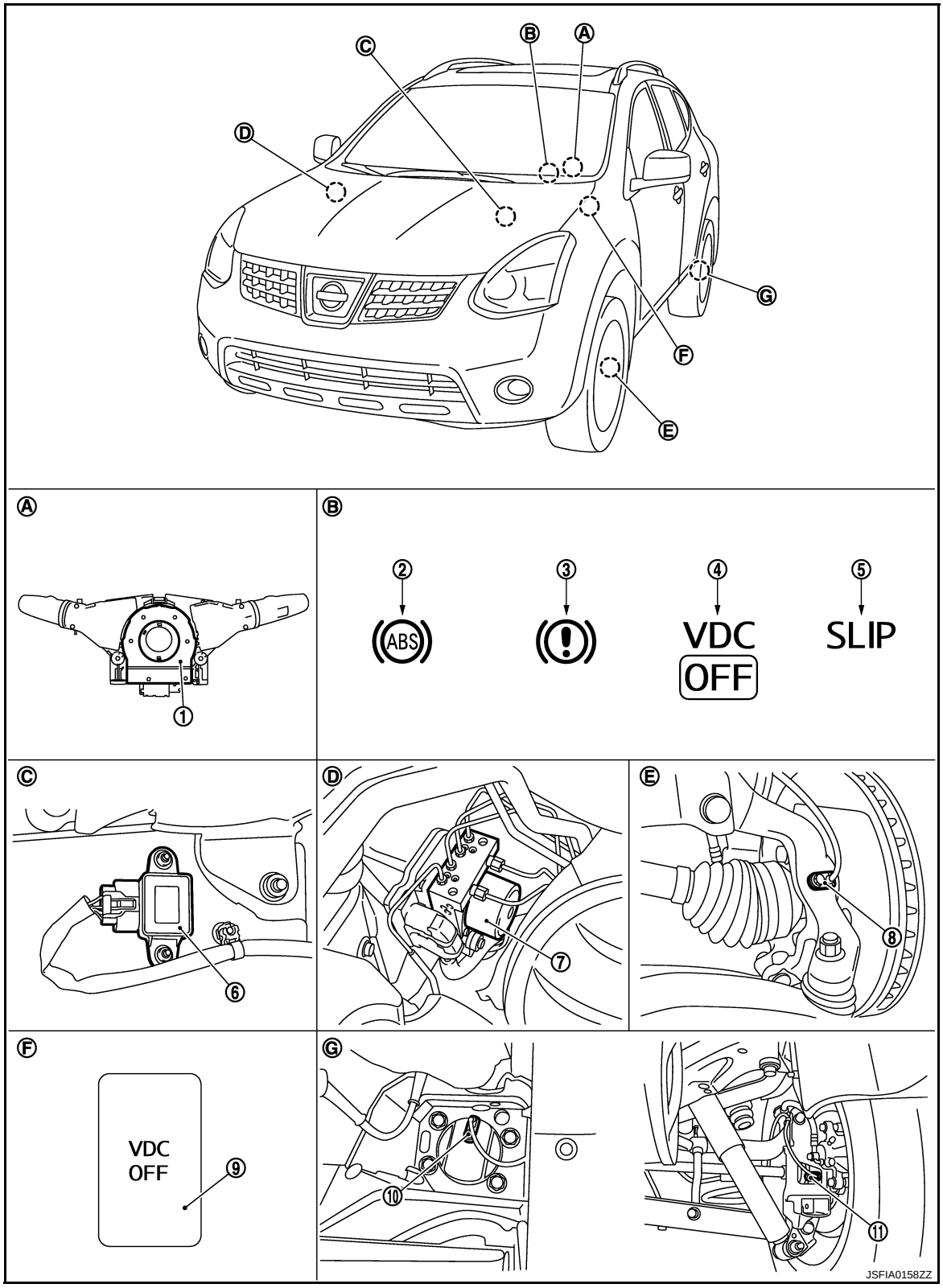
FOR USA




1. Steering angle sensor
2. ABS warning lamp
3. Brake warning lamp
4. VDC OFF indicator lamp
5. SLIP indicator lamp
6. Yaw rate/side/decel G sensor
7. ABS actuator and electric unit (control unit)
8. Front wheel sensor
9. VDC OFF switch
10. Rear wheel sensor (2WD models)
11. Rear wheel sensor (AWD models)

A. Back of spiral cable assembly
B. Combination meter
C. Center console
D. Engine room (right side)
E. Steering knuckle
F. Instrument driver lower panel
G. Rear axle

EXCEPT FOR USA




1. Steering angle sensor
2. ABS warning lamp
3. Brake warning lamp
4. VDC OFF indicator lamp
5. SLIP indicator lamp
6. Yaw rate/side/decel G sensor

7. ABS actuator and electric unit (control unit)
8. Front wheel sensor
9. VDC OFF switch
10. Rear wheel sensor (2WD models)
11. Rear wheel sensor (AWD models)

A. Back of spiral cable assembly
B. Combination meter
C. Center console
D. Engine room (right side)
E. Steering knuckle
F. Instrument driver lower panel
G. Rear axle

## Component Description

INFOID:0000000005255502

| Component parts | | Reference |
|---|---|---|
| ABS actuator and electric unit (control unit) | Pump | BRC-109, "Description" |
| | Motor | |
| | Actuator relay (Main relay) | BRC-128, "Description" |
| | Solenoid valve | BRC-121, "Description" |
| | VDC switch-over valve (CV1, CV2) | BRC-135, "Description" |
| | VDC switch-over valve (SV1, SV2) | BRC-137, "Description" |
| Wheel sensor | | BRC-99, "Description" |
| Yaw rate/side/decel G sensor | | BRC-111, "Description" |
| Steering angle sensor | | BRC-130, "Description" |
| VDC OFF switch | | BRC-145, "Description" |
| ABS warning lamp | | BRC-147, "Description" |
| Brake warning lamp | | BRC-148, "Description" |
| VDC OFF indicator lamp | | BRC-150, "Description" |
| SLIP indicator lamp | | BRC-152, "Description" |

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

## CONSULT-III Function

INFOID:0000000005255503

### 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 result | 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 identification | ABS actuator and electric unit (control unit) part number can be read. |

### WORK SUPPORT

| Item | Description |
|---|---|
| ST ANGLE SENSOR ADJUSTMENT | Adjusts the neutral position of the steering angle sensor. |

### SELF DIAGNOSTIC RESULT

Operation Procedure

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

How to Erase Self-diagnosis Results

After erasing DTC memory for “ABS” with CONSULT-III, 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, VDC OFF indicator lamp, SLIP indicator lamp and brake warning lamp turn OFF.

**CAUTION:**

**If memory cannot be erased, perform applicable diagnosis.**

**NOTE:**

- When the wheel sensor malfunctions, after inspecting the wheel sensor system, the ABS warning lamp, VDC 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).
- VDC OFF switch should not stay “ON” position.

Display Item List

Refer to BRC-161, "DTC Index".

### DATA MONITOR MODE

Display Item List

×: Applicable ▼: Optional item

| Monitor item (Unit) | SELECT MONITOR ITEM | | Remarks |
|---|---|---|---|
| | ECU INPUT SIGNALS | MAIN SIGNALS | |
| 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 |
| BATTERY VOLT (V) | × | × | Battery voltage supplied to the ABS actuator and electric unit (control unit) |
| GEAR | × | × | Gear position determined by TCM |
| OFF SW (On/Off) | × | × | VDC OFF switch |
| YAW RATE SEN (d/s) | × | × | Yaw rate detected by yaw rate/side/decel G sensor |
| DECEL G-SEN (G) | × | × | Decel G detected by yaw rate/side/decel 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/decel G sensor |
| STR ANGLE SIG (°) | × | ▼ | Steering angle detected by steering angle sensor |
| ENGINE RPM [tr/min (rpm)] | × | ▼ | Engine speed |
| FLUID LEV SW (On/Off) | × | ▼ | Brake fluid level 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 (On/Off) | ▼ | × | Actuator relay operation |

| Monitor item (Unit) | SELECT MONITOR ITEM | | Remarks |
|---|---|---|---|
| | ECU INPUT SIGNALS | MAIN SIGNALS | |
| ABS WARN LAMP (On/Off) | ▼ | × | ABS warning lamp |
| OFF LAMP (On/Off) | ▼ | × | VDC OFF indicator lamp |
| SLIP LAMP (On/Off) | ▼ | × | SLIP indicator lamp |
| N POSI SIG (On/Off) | ▼ | ▼ | N range status |
| P POSI SIG (On/Off) | ▼ | ▼ | P range status |
| R POSI SIG (On/Off) | ▼ | ▼ | R range status |
| CRAKING SIG (On/Off) | ▼ | ▼ | CAN mask request for cranking |
| CV1 (On/Off) | ▼ | ▼ | Cut valve 1 monitor |
| CV2 (On/Off) | ▼ | ▼ | Cut valve 2 monitor |
| SV1 (On/Off) | ▼ | ▼ | Suction valve 1 monitor |
| SV2 (On/Off) | ▼ | ▼ | Suction valve 2 monitor |
| STOP LAMP SW2 (On/Off) | ▼ | ▼ | ASCD brake switch signal status |
| EBD SIGNAL (On/Off) | ▼ | ▼ | EBD operation |
| ABS SIGNAL (On/Off) | ▼ | ▼ | ABS operation |
| TCS SIGNAL (On/Off) | ▼ | ▼ | TCS operation |
| VDC SIGNAL (On/Off) | ▼ | ▼ | VDC operation |
| EBD FAIL SIG (On/Off) | ▼ | ▼ | EBD fail-safe status |
| ABS FAIL SIG (On/Off) | ▼ | ▼ | ABS fail-safe status |
| TCS FAIL SIG (On/Off) | ▼ | ▼ | TCS fail-safe status |
| VDC FAIL SIG (On/Off) | ▼ | ▼ | VDC fail-safe status |
| 4WD MODE MON (On/Off) | ▼ | ▼ | AWD mode monitor |

## ACTIVE TEST MODE

**CAUTION:**

- **Never 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, VDC OFF indicator lamp, SLIP indicator lamp and brake warning lamp are on.**
- **ABS warning lamp, VDC 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" in "ABS" with CONSULT-III is displayed 10 seconds after operation start.
- After "TEST IS STOPPED" in "ABS" with CONSULT-III is displayed, to perform test again.

Test Item

ABS SOLENOID VALVE
- Select "Up", "Keep" and "Down" of "ACTIVE TEST" in "ABS" with CONSULT-III. Then use screen monitor to check that solenoid valve operates as shown in 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* |
| | CV1 | Off | Off | Off |
| | SV1 | Off | Off | Off |
| FR LH SOL | FR LH IN SOL | Off | On | On |
| | FR LH OUT SOL | Off | Off | On* |
| | CV2 | Off | Off | Off |
| | SV2 | Off | Off | Off |
| RR RH SOL | RR RH IN SOL | Off | On | On |
| | RR RH OUT SOL | Off | Off | On* |
| | CV2 | Off | Off | Off |
| | SV2 | Off | Off | Off |
| RR LH SOL | RR LH IN SOL | Off | On | On |
| | RR LH OUT SOL | Off | Off | On* |
| | CV1 | Off | Off | Off |
| | SV1 | Off | Off | Off |

*: On for 1 to 2 seconds after the select, and then Off.

ABS SOLENOID VALVE (ACT)
- Select "Up", "Keep" and "Down" of "ACTIVE TEST" in "ABS" with CONSULT-III. Then use screen monitor to check that solenoid valve operates as shown in solenoid valve operation chart.

| Test item | Display item | Display | | |
|---|---|---|---|---|
| | | Up | ACT UP | ACT KEEP |
| FR RH ABS SOLENOID (ACT) | FR RH IN SOL | Off | Off | Off |
| | FR RH OUT SOL | Off | Off | Off |
| | CV1 | Off | On | On |
| | SV1 | Off | On* | Off |
| FR LH ABS SOLENOID (ACT) | FR LH IN SOL | Off | Off | Off |
| | FR LH OUT SOL | Off | Off | Off |
| | CV2 | Off | On | On |
| | SV2 | Off | On* | Off |
| RR RH ABS SOLENOID (ACT) | RR RH IN SOL | Off | Off | Off |
| | RR RH OUT SOL | Off | Off | Off |
| | CV2 | Off | On | On |
| | SV2 | Off | On* | Off |

| Test item | Display item | Display | | |
|---|---|---|---|---|
| | | Up | ACT UP | ACT KEEP |
| RR LH ABS SOLENOID (ACT) | RR LH IN SOL | Off | Off | Off |
| | RR LH OUT SOL | Off | Off | Off |
| | CV1 | Off | On | On |
| | SV1 | Off | On* | Off |

*: On for 1 to 2 seconds after the select, and then Off.

ABS MOTOR

- Select “On” and “Off” of “ACTIVE TEST” in “ABS” with CONSULT-III 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 | On | On |

## ECU IDENTIFICATION

ABS actuator and electric unit (control unit) part number can be read.

# DTC/CIRCUIT DIAGNOSIS

## C1101, C1102, C1103, C1104 WHEEL SENSOR

### Description

INFOID:0000000005255504

When the sensor rotor rotates, the magnetic field changes. It 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:0000000005255505

#### 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

Perform self-diagnosis for “ABS” with CONSULT-III.

| 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:0000000005255506

**CAUTION:**
**Never check between wheel sensor terminals.**

##### 1.CHECK TIRES

Check air pressure, wear and size.

Are air pressure, wear and size within standard?

YES >> GO TO 2.
NO >> Adjust air pressure, or replace tire.

##### 2.CHECK SENSOR AND SENSOR ROTOR

- Check that there is no damage or adherence of foreign matter on the sensor rotor surface.
- Check sensor rotor for damage.
- Check wheel sensor for damage, disconnection or looseness.
- Check that there is no deformation on the wheel sensor mounting surface.

Are the sensor and sensor rotor normal?

YES >> GO TO 3.
NO >> Repair wheel sensor mount or replace sensor rotor. Then perform self-diagnosis for “ABS” with CONSULT-III.

## 3.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 to see if it is deformed, disconnected, loose, etc., Repair or replace it if any malfunction condition is found.
5. Reconnect connectors and then perform self-diagnosis for “ABS” with CONSULT-III.

Is any item indicated on the self-diagnosis display?

YES >> GO TO 4.
NO >> Poor connection of connector terminal. Repair or replace connector.

## 4.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 signal circuit

| ABS actuator and electric unit (control unit) | | Wheel sensor | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E36 | 12 | E39 (Front RH) | 4 | Existed |
| | 27 | E22 (Front LH) | 2 | |
| | 15 | B41 (Rear RH) | 8 | |
| | 30 | B44 (Rear LH) | 6 | |

Measurement terminal for power supply circuit

| ABS actuator and electric unit (control unit) | | Wheel sensor | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E36 | 21 | E39 (Front RH) | 3 | Existed |
| | 23 | E22 (Front LH) | 1 | |
| | 11 | B41 (Rear RH) | 7 | |
| | 26 | B44 (Rear LH) | 5 | |

Measurement terminal for ground circuit

| ABS actuator and electric unit (control unit) | | | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E36 | 12, 21 | E36 | 3, 4 | Not existed |
| | 27, 23 | | | |
| | 15, 11 | | | |
| | 30, 26 | | | |

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

Is the inspection result normal?

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

## 5.REPLACE WHEEL SENSOR

1. Replace wheel sensor.
2. Erase self-diagnosis results for “ABS” with CONSULT-III.
3. Turn the ignition switch OFF.
4. Turn the ignition switch ON.

**CAUTION:**

**Never start engine.**

5. Perform self-diagnosis results for “ABS” with CONSULT-III.

IS DTC “C1101”, “C1102”, “C1103” or “C1104” detected?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> INSPECTION END

## Component Inspection

INFOID:0000000005255507

### 1.CHECK DATA MONITOR

Select “ABS”, “DATA MONITOR” in order with CONSULT-III, 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:0000000005522786

### 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) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

# C1105, C1106, C1107, C1108 WHEEL SENSOR

## Description

INFOID:0000000005255508

When the sensor rotor rotates, the magnetic field changes. It 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:0000000005255509

### 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 currently<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

Perform self-diagnosis for “ABS” with CONSULT-III.

| 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:0000000005255510

**CAUTION:**
**Never check between wheel sensor terminals.**

#### 1.CHECK TIRES

Check air pressure, wear and size.

Are air pressure, wear and size within standard?

YES >> GO TO 2.
NO >> Adjust air pressure, or replace tire.

#### 2.CHECK SENSOR AND SENSOR ROTOR

- Check that there is no damage or adherence of foreign matter on the sensor rotor surface.
- Check sensor rotor for damage.
- Check wheel sensor for damage, disconnection or looseness.
- Check that there is no deformation on the wheel sensor mounting surface.

Are the sensor and sensor rotor normal?

YES >> GO TO 3.
NO >> Repair wheel sensor mount or replace sensor rotor. Then perform self-diagnosis for “ABS” with CONSULT-III.

#### 3.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 to see if it is deformed, disconnected, loose, etc., Repair or replace it if any malfunction condition is found.
5. Reconnect connectors and then perform self-diagnosis for “ABS” with CONSULT-III.

Is any item indicated on the self-diagnosis display?

YES >> GO TO 4.
NO >> Poor connection of connector terminal. Repair or replace connector.

## 4. 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 signal circuit

| ABS actuator and electric unit (control unit) | | Wheel sensor | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E36 | 12 | E39 (Front RH) | 4 | Existed |
| | 27 | E22 (Front LH) | 2 | |
| | 15 | B41 (Rear RH) | 8 | |
| | 30 | B44 (Rear LH) | 6 | |

Measurement terminal for power supply circuit

| ABS actuator and electric unit (control unit) | | Wheel sensor | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E36 | 21 | E39 (Front RH) | 3 | Existed |
| | 23 | E22 (Front LH) | 1 | |
| | 11 | B41 (Rear RH) | 7 | |
| | 26 | B44 (Rear LH) | 5 | |

Measurement terminal for ground circuit

| ABS actuator and electric unit (control unit) | | | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E36 | 12, 21 | E36 | 3, 4 | Not existed |
| | 27, 23 | | | |
| | 15, 11 | | | |
| | 30, 26 | | | |

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

Is the inspection result normal?

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

## 5. REPLACE WHEEL SENSOR

1. Replace wheel sensor.
2. Erase self-diagnosis results for “ABS” with CONSULT-III.
3. Turn the ignition switch OFF.
4. Turn the ignition switch ON.
   **CAUTION:**
   **Never start engine.**
5. Perform self-diagnosis results for “ABS” with CONSULT-III.

IS DTC “C1105”, “C1106”, “C1107” or “C1108” detected?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> INSPECTION END

## Component Inspection

INFOID:0000000005255511

### 1.CHECK DATA MONITOR

Select “ABS”, “DATA MONITOR” in order with CONSULT-III, 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:0000000005522802

### 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) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

# C1109 POWER AND GROUND SYSTEM

## Description

INFOID:0000000005255512

Supplies electric power to the ABS actuator and electric unit (control unit).

## DTC Logic

INFOID:0000000005255513

### 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. 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

Perform self-diagnosis for “ABS” with CONSULT-III.

| 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:0000000005255514

#### 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 self-diagnosis for “ABS” with CONSULT-III.

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 | 16 | Ground | Ignition switch: ON | Battery voltage |
| | | | Ignition switch: OFF | Approx. 0 V |

4. Check 10A fusible link (59).
5. Check continuity between ABS actuator and electric unit (control unit) harness connector and IPDM E/R.

| ABS actuator and electric unit (control unit) | | IPDM E/R | | continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E36 | 16 | E15 | 59 | Existed |

6. 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 12 V lamp (normal rating 10 to 20 W) connected between E36 terminals 16 and 4. With ignition switch ON check bulb illuminates correctly.
2. Check ABS motor supply under loaded condition (connector E36 terminals 1 and 3).

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 | 3, 4 | Ground | Existed |

Is the inspection result normal?

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

# Diagnosis Procedure

INFOID:0000000005522803

## 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 self-diagnosis for “ABS” with CONSULT-III.

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 | 16 | Ground | Ignition switch: ON | Battery voltage |
| | | | Ignition switch: OFF | Approx. 0 V |

4. Check 10A fusible link (59).

5. Check continuity between ABS actuator and electric unit (control unit) harness connector and IPDM E/R.

| ABS actuator and electric unit (control unit) | | IPDM E/R | | continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E36 | 16 | E15 | 59 | Existed |

6. 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 12 V lamp (normal rating 10 to 20 W) connected between E36 terminals 16 and 4. With ignition switch ON check bulb illuminates correctly.
2. Check ABS motor supply under loaded condition (connector E36 terminals 1 and 3).

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 | 3, 4 | Ground | Existed |

Is the inspection result normal?

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

# C1110 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

## Description

INFOID:0000000005255515

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

## DTC Logic

INFOID:0000000005255516

### 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. ABS solenoid valve or motor power supply / ground abnormal. |

### 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. Perform self-diagnosis for “ABS” with CONSULT-III.

| Self-diagnosis results |
|---|
| CONTROLLER FAILURE |

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-108, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000005255517

#### 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:0000000005522804

#### 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) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

# C1111 ABS MOTOR, MOTOR RELAY SYSTEM

## Description

INFOID:0000000005255518

### 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:0000000005255519

### 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

Perform self-diagnosis for “ABS” with CONSULT-III.

| 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:0000000005255520

#### 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 self-diagnosis for “ABS” with CONSULT-III.

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 | 1 | 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 12 V lamp (normal rating 10 to 20 W) connected between E36 terminals 2 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 | 3, 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:0000000005255521

## 1. CHECK ACTIVE TEST

1. Select “ABS”, “ACTIVE TEST” and “ABS MOTOR” in order with CONSULT-III.
2. Select “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 | On | On |

Is the inspection result normal?

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

# Special Repair Requirement

INFOID:0000000005522805

## 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) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

# C1113, C1145, C1146 YAW RATE/SIDE/DECEL G SENSOR

## Description

INFOID:0000000005255522

Yaw rate/side/decel G sensor detects yaw rate/side/decel 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:0000000005255523

### DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|---|---|---|---|
| C1113 | G SENSOR | Yaw rate/side/decel G sensor is malfunctioning, or signal line of yaw rate/side/decel G sensor is open or shorted. | • Harness or connector<br>• ABS actuator and electric unit (control unit)<br>• Yaw rate/side/decel G sensor<br>• Electrical interference<br>• Vehicle driven on AWD rolling road |
| C1145 | YAW RATE SENSOR | | |
| C1146 | SIDE G-SEN CIRCUIT | | |

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSIS RESULTS

Perform self-diagnosis for “ABS” with CONSULT-III.

| Self-diagnosis results |
|---|
| G SENSOR |
| YAW RATE SENSOR |
| SIDE G-SEN CIRCUIT |

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-111, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000005255524

#### 1.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect yaw rate/side/decel 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 self-diagnosis for “ABS” with CONSULT-III.

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 YAW RATE/SIDE/DECEL G SENSOR HARNESS

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect yaw rate/side/decel G sensor connector.
4. Check continuity between yaw rate/side/decel G sensor harness connector terminals and ABS actuator and electric unit (control unit) harness connector terminals.

| ABS actuator and electric unit (control unit) | | Yaw rate/side/decel G sensor | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E36 | 13 | B38 | 4 | Existed |
| | 14 | | 5 | |
| | 28 | | 2 | |
| | 29 | | 6 | |

Is the inspection result normal?

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

## 3.CHECK YAW RATE/SIDE/DECEL G SENSOR HARNESS CONNECTOR

Check continuity between G sensor harness connector terminal and ground.

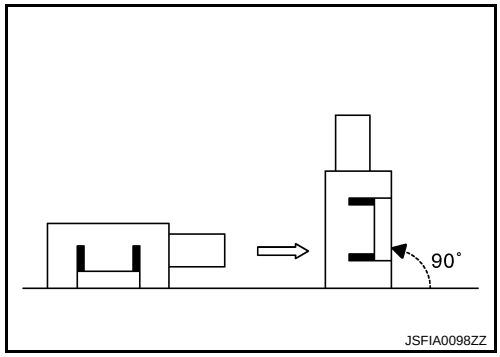
| Yaw rate/side/decel G sensor | | Continuity |
|---|---|---|
| Connector | Terminal | |
| B38 | 2 – 4 | Not existed |
| | 2 – 5 | |
| | 2 – 6 | |
| | 4 – 5 | |
| | 4 – 6 | |
| | 5 – 6 | |

Is the inspection result normal?

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

## 4.CHECK YAW RATE/SIDE/DECEL G SENSOR 1

1. Connect yaw rate/side/decel G sensor connector.
2. Connect ABS actuator and electric unit (control unit) connector.
3. Turn ignition switch ON.
4. Move yaw rate/side/decel G sensor as shown in the figure to check the output of before and after moving the sensor with the “ABS”, “DATA MONITOR” and “DECEL G-SEN” in order with CONSULT-III.




| Condition | DATA MONITOR |
|---|---|
| Horizontal | Approx. 0 G |
| Vertical | Approx. +1 G |

Is the inspection result normal?

YES >> Replace yaw rate/side/decel G sensor.
NO >> GO TO 5.

## 5.CHECK YAW RATE/SIDE/DECEL G SENSOR 2

1. Turn ignition switch OFF.
2. Connect following terminals between yaw rate/side/decel G sensor and connector.

| Yaw rate/side/decel G sensor | Harness connector | |
|---|---|---|
| | Connector | Terminal |
| 2 | B38 | 2 |
| 4 | | 4 |
| 5 | | 5 |
| 6 | | 6 |

3. Turn ignition switch ON.
4. Check voltage between yaw rate/side/decel G sensor harness connector terminals.
**CAUTION:**
**Never short out the terminals while measuring voltages.**

| Yaw rate/side/decel G sensor | | Voltage |
|---|---|---|
| connector | Terminal | |
| B38 | 5 – 2 | 2.5 – 4.5 V |
| | 6 – 2 | 0.5 – 2.5 V |

Is the inspection result normal?

YES >> Replace ABS actuator end electric unit (control unit). Perform self-diagnosis for “ABS” with CONSULT-III.
NO >> Replace yaw rate/side/decel G sensor. Perform self-diagnosis for “ABS” with CONSULT-III.

## Component Inspection

INFOID:0000000005255525

### 1.CHECK DATA MONITOR

Select “ABS”, “DATA MONITOR” and “YAW RATE SENSOR”, “SIDE G-SENSOR” and/or “DECEL G-SEN” in order with CONSULT-III, and check yaw rate/side/decel G sensor signal.

YAW RATE SENSOR

| Vehicle condition | DATA MONITOR |
|---|---|
| Vehicle stopped | Approx. 0 d/s |
| Vehicle turning | –100 to 100 d/s |

SIDE G SENSOR

| Vehicle condition | DATA MONITOR |
|---|---|
| Vehicle stopped | Approx. 0 $m/s^2$ |
| Vehicle turning right | Negative value |
| Vehicle turning left | Positive value |

DECEL G SENSOR

| Vehicle condition | DATA MONITOR |
|---|---|
| Vehicle stopped | –0.11 to +0.11 G |
| During acceleration | Negative value |
| During deceleration | Positive value |

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-111, "Diagnosis Procedure".

## Special Repair Requirement

INFOID:0000000005522806

### 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) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

# C1115 WHEEL SENSOR

## Description

INFOID:0000000005255526

When the sensor rotor rotates, the magnetic field changes. It 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:0000000005255527

### 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. Other possible causes tire radius (due to wrong size or pressure) interference. |

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSIS RESULTS

Perform self-diagnosis for “ABS” with CONSULT-III.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-115, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000005255528

**CAUTION:**
**Never check between wheel sensor terminals.**

#### 1.CHECK TIRES

Check air pressure, wear and size.

Are air pressure, wear and size within standard?

YES >> GO TO 2.
NO >> Adjust air pressure, or replace tire.

#### 2.CHECK SENSOR AND SENSOR ROTOR

- Check that there is no damage or adherence of foreign matter on the sensor rotor surface.
- Check that there is no deformation, misalignment, float, and backlash on the wheel sensor and wheel sensor mounting surface.
- Check that the wheel sensor in installed with no misalignment and backlash.

Are the sensor and sensor rotor normal?

YES >> GO TO 3.
NO >> Repair wheel sensor mount or replace sensor rotor. Then perform self-diagnosis for “ABS” with CONSULT-III.

#### 3.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 to see if it is deformed, disconnected, loose, etc., Repair or replace it if any malfunction condition is found.
5. Reconnect connectors and then perform self-diagnosis for “ABS” with CONSULT-III.

Is any item indicated on the self-diagnosis display?

YES >> GO TO 4.

NO >> Poor connection of connector terminal. Repair or replace connector.

## 4.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 signal circuit

| ABS actuator and electric unit (control unit) | | Wheel sensor | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E36 | 12 | E39 (Front RH) | 4 | Existed |
| | 27 | E22 (Front LH) | 2 | |
| | 15 | B41 (Rear RH) | 8 | |
| | 30 | B44 (Rear LH) | 6 | |

Measurement terminal for power supply circuit

| ABS actuator and electric unit (control unit) | | Wheel sensor | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E36 | 21 | E39 (Front RH) | 3 | Existed |
| | 23 | E22 (Front LH) | 1 | |
| | 11 | B41 (Rear RH) | 7 | |
| | 26 | B44 (Rear LH) | 5 | |

Measurement terminal for ground circuit

| ABS actuator and electric unit (control unit) | | | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E36 | 12, 21 | E36 | 3, 4 | Not existed |
| | 27, 23 | | | |
| | 15, 11 | | | |
| | 30, 26 | | | |

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

Is the inspection result normal?

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

## 5.REPLACE WHEEL SENSOR

1. Replace wheel sensor.
2. Erase self-diagnosis results for “ABS” with CONSULT-III.
3. Turn the ignition switch OFF.
4. Turn the ignition switch ON.

**CAUTION:**
**Never start engine.**

5. Perform self-diagnosis results for “ABS” with CONSULT-III.

IS DTC “C1115” detected?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> INSPECTION END

## Component Inspection

INFOID:0000000005255529

## 1.CHECK DATA MONITOR

Select “ABS”, “DATA MONITOR” in order with CONSULT-III, 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-115, "Diagnosis Procedure".

## Special Repair Requirement

INFOID:0000000005522807

### 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) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

# C1116 STOP LAMP SWITCH

## Description

INFOID:0000000005255530

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

## DTC Logic

INFOID:0000000005255531

### DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|---|---|---|---|
| C1116 | STOP LAMP SW | When a stop lamp switch signal is not input where the brake pedal is depressed. | • Harness or connector<br>• Stop lamp switch<br>• ABS actuator and electric unit (control unit) |

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSIS RESULTS

Perform self-diagnosis for “ABS” with CONSULT-III.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-118, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000005255532

#### 1.CHECK STOP LAMP 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 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, etc.
5. Reconnect ABS actuator and electric unit (control unit) and stop lamp switch connectors securely.
6. Start engine.
7. Repeat pumping brake pedal carefully several times, and perform self-diagnosis for “ABS” with CONSULT-III.

Is any item indicated in the self-diagnosis display?

YES >> GO TO 3.
NO >> Poor connection of connector terminal. Replace or repair error-detected parts.

#### 3.CHECK STOP LAMP SWITCH CLEARANCE

Check stop lamp switch clearance. Refer to BR-9, "Inspection and Adjustment".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Adjust stop lamp switch clearance. Refer to BR-9, "Inspection and Adjustment".

#### 4.CHECK STOP LAMP SWITCH 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) | | — | Condition | Voltage |
|---|---|---|---|---|
| Connector | Terminal | | | |
| E36 | 8 | Ground | Brake pedal is depressed | Battery voltage |
| | | | Brake pedal is released | Approx. 0 V |

Is the inspection result normal?

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

## 5.CHECK STOP LAMP SWITCH

Check stop lamp switch. Refer to BRC-119, "Component Inspection".

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace stop lamp switch. Refer to BR-20, "Exploded View".

# Component Inspection

INFOID:0000000005255533

## 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 | Condition | Continuity |
|---|---|---|
| Terminal | | |
| 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. Refer to BR-20, "Exploded View".

# Component Inspection

INFOID:0000000005522808

## 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 | Condition | Continuity |
|---|---|---|
| Terminal | | |
| 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. Refer to BR-20, "Exploded View".

# C1118 AWD SYSTEM

## Description

INFOID:0000000005255534

It transmits the value calculated by AWD control unit to ABS actuator and electric unit (control unit) with AWD communication line (line for AWD system only). ABS actuator and electric unit (control unit) controls AWD solenoid valve according to the received command value.

## DTC Logic

INFOID:0000000005255535

### DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|---|---|---|---|
| C1118 | 4WD SYSTEM | An error is detected on AWD control unit side. (AWD control unit fail-safe mode) | • Harness or connector<br>• AWD communication line<br>• AWD control unit<br>• ABS actuator and electric unit (control unit) |

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSIS RESULTS

Perform self-diagnosis for “ABS” with CONSULT-III.

| Self-diagnosis results |
|---|
| 4WD SYSTEM |

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:0000000005255536

#### 1.CHECK AWD CONTROL UNIT

Perform self-diagnosis for “ALL MODE AWD/4WD” with CONSULT-III.

Is any error system detected?

YES >> Check the error system. Refer to DLN-40, "DTC Index".
NO >> Replace ABS actuator and electric unit (control unit).

## Special Repair Requirement

INFOID:0000000005522809

#### 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) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

# C1120, C1122, C1124, C1126 IN ABS SOL

## Description

INFOID:0000000005255537

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:0000000005255538

### 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

Perform self-diagnosis for “ABS” with CONSULT-III.

| 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-121, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000005255539

#### 1.CHECK SENSOR AND SENSOR ROTOR

- Check that there is no damage or adherence of foreign matter on the sensor rotor surface.
- Check sensor rotor for damage.
- Check wheel sensor for damage, disconnection or looseness.
- Check that there is no deformation on the wheel sensor mounting surface.

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. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect connector and then perform self-diagnosis for “ABS” with CONSULT-III.

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 SOLENOID, VDC 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 | 2 | Ground | Battery voltage |

Is the inspection result normal?

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

## 4.CHECK SOLENOID, VDC SWITCH-OVER VALVE AND ACTUATOR 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 | 3, 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:0000000005255540

## 1.CHECK ACTIVE TEST

1. Select “ABS”, ”ACTIVE TEST“ and each test menu item in order with CONSULT-III.
2. On the display, select “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* |
| | CV1 | Off | Off | Off |
| | SV1 | Off | Off | Off |
| FR LH SOL | FR LH IN SOL | Off | On | On |
| | FR LH OUT SOL | Off | Off | On* |
| | CV2 | Off | Off | Off |
| | SV2 | Off | Off | Off |
| RR RH SOL | RR RH IN SOL | Off | On | On |
| | RR RH OUT SOL | Off | Off | On* |
| | CV2 | Off | Off | Off |
| | SV2 | Off | Off | Off |
| RR LH SOL | RR LH IN SOL | Off | On | On |
| | RR LH OUT SOL | Off | Off | On* |
| | CV1 | Off | Off | Off |
| | SV1 | Off | Off | Off |

*: On for 1 to 2 seconds after the select, and then Off.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-121, "Diagnosis Procedure".

## Special Repair Requirement

INFOID:0000000005522810

### 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) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

# C1121, C1123, C1125, C1127 OUT ABS SOL

## Description

INFOID:0000000005255541

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:0000000005255542

### 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

Perform self-diagnosis for “ABS” with CONSULT-III.

| 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-124, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000005255543

#### 1.CHECK SENSOR AND SENSOR ROTOR

- Check that there is no damage or adherence of foreign matter on the sensor rotor surface.
- Check sensor rotor for damage.
- Check wheel sensor for damage, disconnection or looseness.
- Check that there is no deformation on the wheel sensor mounting surface.

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. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect connector and then perform self-diagnosis for “ABS” with CONSULT-III.

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 SOLENOID, VDC 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 | 2 | Ground | Battery voltage |

Is the inspection result normal?

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

## 4.CHECK SOLENOID, VDC SWITCH-OVER VALVE AND ACTUATOR 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 | 3, 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:0000000005255544

## 1.CHECK ACTIVE TEST

1. Select “ABS”, ”ACTIVE TEST“ and each test menu item in order with CONSULT-III.
2. On the display, select “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* |
| | CV1 | Off | Off | Off |
| | SV1 | Off | Off | Off |
| FR LH SOL | FR LH IN SOL | Off | On | On |
| | FR LH OUT SOL | Off | Off | On* |
| | CV2 | Off | Off | Off |
| | SV2 | Off | Off | Off |
| RR RH SOL | RR RH IN SOL | Off | On | On |
| | RR RH OUT SOL | Off | Off | On* |
| | CV2 | Off | Off | Off |
| | SV2 | Off | Off | Off |
| RR LH SOL | RR LH IN SOL | Off | On | On |
| | RR LH OUT SOL | Off | Off | On* |
| | CV1 | Off | Off | Off |
| | SV1 | Off | Off | Off |

*: On for 1 to 2 seconds after the select, and then Off.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-124, "Diagnosis Procedure".

## Special Repair Requirement

INFOID:0000000005522811

### 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) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

# C1130 ENGINE SIGNAL

## Description

INFOID:0000000005255545

ABS actuator and electric unit (control unit) and ECM exchange the engine signal via CAN communication line.

## DTC Logic

INFOID:0000000005255546

### 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 |

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSIS RESULTS

Perform self-diagnosis for “ABS” with CONSULT-III.

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

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:0000000005255547

#### 1.CHECK ENGINE SYSTEM

1. Perform self-diagnosis for “ENGINE” with CONSULT-III. Repair or replace items indicated, then Perform self-diagnosis for “ENGINE” with CONSULT-III.
2. Perform self-diagnosis for “ABS” with CONSULT-III.

Is any item indicated on the self-diagnosis display?

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

## Diagnosis Procedure

INFOID:0000000005522812

#### 1.CHECK ENGINE SYSTEM

1. Perform self-diagnosis for “ENGINE” with CONSULT-III. Repair or replace items indicated, then Perform self-diagnosis for “ENGINE” with CONSULT-III.
2. Perform self-diagnosis for “ABS” with CONSULT-III.

Is any item indicated on the self-diagnosis display?

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

# C1140 ACTUATOR RELAY SYSTEM

## Description

INFOID:0000000005255548

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

## DTC Logic

INFOID:0000000005255549

### DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|---|---|---|---|
| C1140 | ACTUATOR RLY | 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

Perform self-diagnosis for “ABS” with CONSULT-III.

| Self-diagnosis results |
|---|
| ACTUATOR RLY |

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-128, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000005255550

#### 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 self-diagnosis for “ABS” with CONSULT-III.

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, VDC 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 | 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 12 V lamp (normal rating 10 to 20 W) 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 | 3, 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:0000000005255551

## 1. CHECK ACTIVE TEST

1. Select “ABS”, “ACTIVE TEST” and “ABS MOTOR” in order with CONSULT-III.
2. Select “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 | On | On |

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-128, "Diagnosis Procedure".

# Special Repair Requirement

INFOID:0000000005522813

## 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) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

# C1143, C1144 STEERING ANGLE SENSOR

## Description

INFOID:0000000005255552

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:0000000005255553

### 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

Perform self-diagnosis for “ABS” with CONSULT-III.

| 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-130, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000005255554

#### 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 self-diagnosis for “ABS” with CONSULT-III.

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 “ABS”, “DATA MONITOR” and “STR ANGLE SIG” in order with CONSULT-III, 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 switch.
NO >> Check sensor output is correct from lock to lock.

# Component Inspection

INFOID:0000000005255555

## 1. CHECK DATA MONITOR

Select “ABS”, “DATA MONITOR” and “STR ANGLE SIG” in order with CONSULT-III, 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-130, "Diagnosis Procedure".

# Special Repair Requirement

INFOID:0000000005522814

## 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) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

# C1155 BRAKE FLUID LEVEL SWITCH

## Description

INFOID:0000000005255557

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 VDC unit via the CAN bus.

## DTC Logic

INFOID:0000000005255558

### 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 low<br>• Brake fluid level switch failure<br>• Wiring to brake fluid level switch short circuit<br>• CAN bus failure<br>• Combination meter failure |

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSIS RESULTS

Perform self-diagnosis for “ABS” with CONSULT-III.

| Self-diagnosis results |
|---|
| BR FLUID LEVEL LOW |

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:0000000005255559

#### 1.CHECK BRAKE FLUID LEVEL

Check brake fluid level. Refer to BR-12, "Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Refill brake fluid. Refer to BR-12, "Refilling".

#### 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 sensor and brake fluid level sensor.

#### 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.

#### 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 self-diagnosis for “ABS” with CONSULT-III.

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:0000000005255560

## 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 >> Go to diagnosis procedure. Refer to BRC-132, "Diagnosis Procedure".

## Special Repair Requirement

INFOID:0000000005522815

### 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) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

# C1164, C1165 CV SYSTEM

## Description

INFOID:0000000005255561

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

## DTC Logic

INFOID:0000000005255562

### DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|---|---|---|---|
| C1164 | CV1 | VDC switch-over solenoid valve (CV1) 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) |
| C1165 | CV2 | VDC switch-over solenoid valve (CV2) on the secondary 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

Perform self-diagnosis for “ABS” with CONSULT-III.

| Self-diagnosis results |
|---|
| CV1 |
| CV2 |

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:0000000005255563

#### 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 connectors and then perform self-diagnosis for “ABS” with CONSULT-III.

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, VDC 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 | 2 | Ground | Battery voltage |

Is the inspection result normal?

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

#### 3.CHECK SOLENOID, VDC SWITCH-OVER VALVE AND ACTUATOR 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 | 3, 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:0000000005255564

### 1.CHECK ACTIVE TEST

1. Select “ABS”, ”ACTIVE TEST“ and each test menu item in order with CONSULT-III.
2. On the display, select “Up”, “ACT UP”, and “ACT KEEP”, and check that the system operates as shown in the table below.

| Test item | Display item | Display | | |
|---|---|---|---|---|
| | | Up | ACT UP | ACT KEEP |
| FR RH ABS SOLENOID (ACT) | FR RH IN SOL | Off | Off | Off |
| | FR RH OUT SOL | Off | Off | Off |
| | CV1 | Off | On | On |
| | SV1 | Off | On* | Off |
| FR LH ABS SOLENOID (ACT) | FR LH IN SOL | Off | Off | Off |
| | FR LH OUT SOL | Off | Off | Off |
| | CV2 | Off | On | On |
| | SV2 | Off | On* | Off |
| RR RH ABS SOLENOID (ACT) | RR RH IN SOL | Off | Off | Off |
| | RR RH OUT SOL | Off | Off | Off |
| | CV2 | Off | On | On |
| | SV2 | Off | On* | Off |
| RR LH ABS SOLENOID (ACT) | RR LH IN SOL | Off | Off | Off |
| | RR LH OUT SOL | Off | Off | Off |
| | CV1 | Off | On | On |
| | SV1 | Off | On* | Off |

*: On for 1 to 2 seconds after the select, and then Off.

Is the inspection result normal?

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

## Special Repair Requirement

INFOID:0000000005522816

### 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) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

# C1166, C1167 SV SYSTEM

## Description

INFOID:0000000005255565

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

## DTC Logic

INFOID:0000000005255566

### DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|---|---|---|---|
| C1166 | SV1 | VDC switch-over solenoid valve (SV1) 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) |
| C1167 | SV2 | VDC switch-over solenoid valve (SV2) on the secondary 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

Perform self-diagnosis for “ABS” with CONSULT-III.

| Self-diagnosis results |
|---|
| SV1 |
| SV2 |

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:0000000005255567

#### 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 connectors and then perform self-diagnosis for “ABS” with CONSULT-III.

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, VDC 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 | 2 | Ground | Battery voltage |

Is the inspection result normal?

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

#### 3.CHECK SOLENOID, VDC SWITCH-OVER VALVE AND ACTUATOR 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 | 3, 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:0000000005255568

### 1.CHECK ACTIVE TEST

1. Select “ABS”, ”ACTIVE TEST“ and each test menu item in order with CONSULT-III.
2. On the display, select “Up”, “ACT UP”, and “ACT KEEP”, and check that the system operates as shown in the table below.

| Test item | Display item | Display | | |
|---|---|---|---|---|
| | | Up | ACT UP | ACT KEEP |
| FR RH ABS SOLENOID (ACT) | FR RH IN SOL | Off | Off | Off |
| | FR RH OUT SOL | Off | Off | Off |
| | CV1 | Off | On | On |
| | SV1 | Off | On* | Off |
| FR LH ABS SOLENOID (ACT) | FR LH IN SOL | Off | Off | Off |
| | FR LH OUT SOL | Off | Off | Off |
| | CV2 | Off | On | On |
| | SV2 | Off | On* | Off |
| RR RH ABS SOLENOID (ACT) | RR RH IN SOL | Off | Off | Off |
| | RR RH OUT SOL | Off | Off | Off |
| | CV2 | Off | On | On |
| | SV2 | Off | On* | Off |
| RR LH ABS SOLENOID (ACT) | RR LH IN SOL | Off | Off | Off |
| | RR LH OUT SOL | Off | Off | Off |
| | CV1 | Off | On | On |
| | SV1 | Off | On* | Off |

*: On for 1 to 2 seconds after the select, and then Off.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-137, "Diagnosis Procedure".

## Special Repair Requirement

INFOID:0000000005522817

### 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) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

# C1176 STOP LAMP SW2

## Description

INFOID:0000000005255569

When the brake pedal is depressed, ASCD brake switch is turned OFF and stop lamp switch is turned ON.

## DTC Logic

INFOID:0000000005255570

### DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|---|---|---|---|
| C1176 | STOP LAMP SW2 | When a ASCD brake switch signal is not input where the brake pedal is depressed. | • Harness or connector<br>• ASCD brake switch<br>• ABS actuator and electric unit (control unit) |

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSIS RESULTS

Perform self-diagnosis for “ABS” with CONSULT-III.

| Self-diagnosis results |
|---|
| STOP LAMP SW2 |

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-139, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000005255571

#### 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 connectors and then perform self-diagnosis for “ABS” with CONSULT-III.

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 ASCD BRAKE SWITCH CLEARANCE

Check ASCD brake switch clearance. Refer to BR-9, "Inspection and Adjustment".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Adjust ASCD brake switch clearance. Refer to BR-9, "Inspection and Adjustment"

#### 3.CHECK ASCD BRAKE SWITCH

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

| ASCD brake switch Terminal | Condition | Continuity |
|---|---|---|
| 1 – 2 | Brake pedal is fully released. | Existed |
| | Brake pedal is slightly depressed. | Not existed |

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace ASCD brake switch. Refer to BR-20, "Exploded View".

## 4.CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch connector.
3. Turn ignition switch ON.
4. Check voltage between ASCD brake switch harness connector and ground.

| ASCD brake switch | | — | Voltage |
|---|---|---|---|
| Connector | Terminal | | |
| E112 | 1 | Ground | Battery voltage |

Is the inspection result normal?

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

## 5.CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT

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

| ASCD brake switch | | ABS actuator and electric unit (control unit) | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E112 | 2 | E36 | 6 | Existed |

Is the inspection result normal?

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

# Component Inspection

INFOID:0000000005255572

## 1.CHECK ASCD BRAKE SWITCH

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

| ASCD brake switch | Condition | Continuity |
|---|---|---|
| Terminal | | |
| 1 – 2 | Brake pedal is fully released. | Existed |
| | Brake pedal is slightly depressed. | Not existed |

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace ASCD brake switch. Refer to BR-20, "Exploded View".

# Special Repair Requirement

INFOID:0000000005522818

## 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) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

# U1000 CAN COMM CIRCUIT

## Description

INFOID:0000000005255573

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:0000000005255574

### 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) |

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSIS RESULTS

Perform self-diagnosis for “ABS” with CONSULT-III.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-141, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000005255575

#### 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 for “ABS” with CONSULT-III.

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

Is above displayed on the self-diagnosis display?

YES >> Go to LAN-16, "Trouble Diagnosis Flow Chart".
NO >> INSPECTION END

## Special Repair Requirement

INFOID:0000000005522819

#### 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) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

# U1010 CONTROL UNIT (CAN)

## Description

INFOID:0000000005255576

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:0000000005255577

### DTC DETECTION LOGIC

| DTC | Items | Diagnostic item is detected when... | Possible cause |
|---|---|---|---|
| U1010 | CONTROL UNIT (CAN) | When detecting error during the initial diagnosis of CAN controller of ABS actuator and electric unit (control unit). | ABS actuator and electric unit (control unit) error |

### DTC CONFIRMATION PROCEDURE

#### 1.RECHECK DTC

1. Turn the ignition switch OFF to ON.
2. Perform self-diagnosis for “ABS” with CONSULT-III.

Is DTC “U1010” detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-142, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000005255578

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

Check that there is no malfunction in ABS actuator and electric unit (control unit) harness connector or disconnection.

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-178, "Exploded View".
NO >> Repair or replace the harnesses and connectors.

## Special Repair Requirement

INFOID:0000000005522820

#### 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) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

# PARKING BRAKE SWITCH

## Description

INFOID:0000000005255579

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).

## Component Function Check

INFOID:0000000005255580

### 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-143, "Diagnosis Procedure".

## Diagnosis Procedure

INFOID:0000000005255581

### 1.CHECK PARKING BRAKE SWITCH

1. Turn ignition switch OFF.
2. Disconnect parking brake switch connector.
3. Check continuity between parking brake switch connector terminal and ground.

| Parking brake switch | | — | Condition | Continuity |
|---|---|---|---|---|
| Connector | Terminal | | | |
| E103 | 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 >> GO TO 2.
NO >> Replace parking brake switch.

### 2.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-32, "Diagnosis Description".

Is the inspection result normal?

YES >> INSPECTION END
NO >> Check ABS actuator and electric unit (control unit). Refer to BRC-94, "CONSULT-III Function".

## Component Inspection

INFOID:0000000005255582

### 1.CHECK PARKING BRAKE SWITCH

1. Turn ignition switch OFF.
2. Disconnect parking brake switch connector.
3. Check continuity between parking brake switch connector terminal and ground.

| Parking brake switch | | — | Condition | Continuity |
|---|---|---|---|---|
| Connector | Terminal | | | |
| E103 | 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. Refer to PB-6, "Exploded View".

# VDC OFF SWITCH

## Description

INFOID:0000000005255583

VDC OFF switch can deactivate (turn OFF) the VDC/TCS function by pressing the VDC OFF switch.

## Component Function Check

INFOID:0000000005255584

### 1.CHECK VDC OFF SWITCH OPERATION

Turn ON/OFF the VDC OFF switch and check that the VDC OFF indicator lamp in the combination meter turns ON/OFF correctly.

| Condition | VDC OFF indicator lamp illumination status |
|---|---|
| VDC OFF switch: ON | ON |
| VDC OFF switch: OFF | OFF |

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-145, "Diagnosis Procedure".

## Diagnosis Procedure

INFOID:0000000005255585

### 1.CHECK VDC OFF SWITCH

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

| VDC OFF switch | Condition | Continuity |
|---|---|---|
| Terminal | | |
| 1 – 2 | When VDC OFF switch is hold pressed. | Existed |
| | When releasing VDC OFF switch. | Not existed |

Is the inspection result normal?

YES >> GO TO 2.
NO >> VDC OFF switch is malfunctioning. Replace VDC OFF switch.

### 2.CHECK VDC OFF SWITCH HARNESS

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Check continuity between VDC OFF switch connector terminals and ABS actuator and electric unit (control unit) connector terminal and/or ground.

| ABS actuator and electric unit (control unit) | | VDC OFF switch | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E36 | 5 | M5 | 1 | Existed |

| ABS actuator and electric unit (control unit) | | — | Continuity |
|---|---|---|---|
| Connector | Terminal | | |
| E36 | 5 | Ground | Not existed |

| VDC 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-32, "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:0000000005255586

## 1.CHECK VDC OFF SWITCH

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

| VDC OFF switch<br>Terminal | Condition | Condition |
|---|---|---|
| 1 – 2 | When VDC OFF switch is hold pressed. | Existed |
| | When releasing VDC OFF switch. | Not existed |

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace VDC OFF switch.

# Special Repair Requirement

INFOID:0000000005522821

## 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) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

# ABS WARNING LAMP

## Description

INFOID:0000000005255587

×: ON –: OFF

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

## Component Function Check

INFOID:0000000005255588

### 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-147, "Diagnosis Procedure".

## Diagnosis Procedure

INFOID:0000000005255589

### 1.CHECK SELF-DIAGNOSIS

Perform self-diagnosis for “ABS” with CONSULT-III.

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-32, "Diagnosis Description".

Is the inspection result normal?

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

## Special Repair Requirement

INFOID:0000000005522822

### 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) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

# BRAKE WARNING LAMP

## Description

INFOID:0000000005255590

×: ON –: OFF

| Condition | Brake warning lamp (Note 1) |
|---|---|
| Ignition switch OFF | – |
| For 1 second after turning ignition switch ON | × (Note 2) |
| 1 second later after turning ignition switch ON | × (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:0000000005255591

### 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-148, "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-143, "Diagnosis Procedure".

## Diagnosis Procedure

INFOID:0000000005255592

### 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-143, "Diagnosis Procedure".

### 2.CHECK SELF-DIAGNOSIS

Perform self-diagnosis for “ABS” with CONSULT-III.

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-32, "Diagnosis Description".

Is the inspection result normal?

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

## Special Repair Requirement

INFOID:0000000005522823

### 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) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

# VDC OFF INDICATOR LAMP

## Description

INFOID:0000000005255593

×: ON –: OFF

| Condition | VDC OFF indicator lamp |
|---|---|
| Ignition switch OFF | – |
| For 1 second after turning ignition switch ON | × |
| 1 second later after turning ignition switch ON | – |
| VDC OFF switch turned ON. (VDC function is OFF.) | × |
| VDC/TCS function is malfunctioning. | × |
| ABS function is malfunctioning. | × |
| EBD function is malfunctioning. | × |

## Component Function Check

INFOID:0000000005255594

### 1.VDC 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.VDC OFF INDICATOR LAMP OPERATION CHECK 2

Check that the VDC OFF indicator lamp in the combination meter turns ON/OFF correctly when operating the VDC OFF switch.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Check VDC OFF switch. Refer to BRC-145, "Diagnosis Procedure".

## Diagnosis Procedure

INFOID:0000000005255595

### 1.CHECK VDC OFF SWITCH

Check that the VDC OFF indicator lamp in the combination meter turns ON/OFF correctly when operating the VDC OFF switch.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check VDC OFF switch. Refer to BRC-145, "Diagnosis Procedure".

### 2.CHECK SELF-DIAGNOSIS

Perform self-diagnosis for “ABS” with CONSULT-III.

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-32, "Diagnosis Description".

Is the inspection result normal?

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

## Special Repair Requirement

INFOID:0000000005522824

### 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) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

# SLIP INDICATOR LAMP

## Description

INFOID:0000000005255596

×: ON –: OFF

| Condition | SLIP indicator lamp |
|---|---|
| Ignition switch OFF | – |
| For 1 second after turning ignition switch ON | × |
| 1 second later after turning ignition switch ON | – |
| VDC/TCS function is malfunctioning. | × |
| ABS function is malfunctioning. | × |
| EBD function is malfunctioning. | × |

## Component Function Check

INFOID:0000000005255597

### 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-152, "Diagnosis Procedure".

## Diagnosis Procedure

INFOID:0000000005255598

### 1.CHECK SELF-DIAGNOSIS

Perform self-diagnosis for “ABS” with CONSULT-III.

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-32, "Diagnosis Description".

Is the inspection result normal?

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

## Special Repair Requirement

INFOID:0000000005522825

### 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) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

# ECU DIAGNOSIS INFORMATION

## ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

### Reference Value

INFOID:0000000005255599

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 | Display content | Data monitor | |
|---|---|---|---|
| | | Condition | Reference value in normal operation |
| 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 | First gear (1GR)<br>Second gear (2GR)<br>Third gear (3GR)<br>Forth gear (4GR)<br>Fifth gear (5GR)<br>Sixth gear (6GR) | 1<br>2<br>3<br>4<br>5<br>6 |
| OFF SW | VDC OFF switch ON/OFF | VDC OFF switch ON<br>(When VDC OFF indicator lamp is ON) | On |
| | | VDC OFF switch OFF<br>(When VDC OFF indicator lamp is OFF) | Off |
| YAW RATE SEN | Yaw rate detected by yaw rate sensor | Vehicle stopped | Approx. 0 d/s |
| | | Vehicle turning | –100 to 100 d/s |
| DECEL G-SEN | Decel G detected by decel G sensor | Vehicle stopped | –0.11 – +0.11 G |
| | | During acceleration | Negative value |
| | | During deceleration | Positive value |
| 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 | Display content | Data monitor | |
|---|---|---|---|
| | | Condition | Reference value in normal operation |
| SIDE G-SENSOR | Transverse G detected by side G sensor | Vehicle stopped | Approx. 0 $m/s^2$ |
| | | Vehicle turning right | Negative value |
| | | Vehicle turning left | Positive value |
| STR ANGLE SIG | Steering angle detected by steering angle sensor | During straight | Approx. 0° |
| | | Steering wheel turned | –720 to 720° |
| ENGINE SPEED | With engine running | With engine stopped | 0 [tr/min (rpm)] |
| | | 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 |
| FR RH IN SOL | Operation status of each solenoid valve | Actuator (solenoid valve) is active (“ACTIVE TEST” in “ABS” with CONSULT-III) | 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 each solenoid valve | Actuator (solenoid valve) is active (“ACTIVE TEST” in “ABS” with CONSULT-III) | 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 each solenoid valve | Actuator (solenoid valve) is active (“ACTIVE TEST” in “ABS” with CONSULT-III) | 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 each solenoid valve | Actuator (solenoid valve) is active (“ACTIVE TEST” in “ABS” with CONSULT-III) | 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 each solenoid valve | Actuator (solenoid valve) is active (“ACTIVE TEST” in “ABS” with CONSULT-III) | 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 each solenoid valve | Actuator (solenoid valve) is active (“ACTIVE TEST” in “ABS” with CONSULT-III) | On |
| | | When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON) | Off |

| Monitor item | Display content | Data monitor | |
|---|---|---|---|
| | | Condition | Reference value in normal operation |
| RR LH IN SOL | Operation status of each solenoid valve | Actuator (solenoid valve) is active (“ACTIVE TEST” in “ABS” with CONSULT-III) | 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 each solenoid valve | Actuator (solenoid valve) is active (“ACTIVE TEST” in “ABS” with CONSULT-III) | 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 | 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 2) | When ABS warning lamp is ON | On |
| | | When ABS warning lamp is OFF | Off |
| OFF LAMP | VDC OFF indicator lamp (Note 2) | When VDC OFF indicator lamp is ON | On |
| | | When VDC OFF indicator lamp is OFF | Off |
| SLIP LAMP | SLIP indicator lamp (Note 2) | When SLIP indicator lamp is ON | On |
| | | When SLIP indicator 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 |
| TCS SIGNAL | TCS operation | TCS is active | On |
| | | TCS is inactive | Off |
| VDC SIGNAL | VDC operation | VDC is active | On |
| | | VDC 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 |
| TCS FAIL SIG | TCS fail-safe signal | In TCS fail-safe | On |
| | | TCS is normal | Off |
| VDC FAIL SIG | VDC fail-safe signal | In VDC fail-safe | On |
| | | VDC is normal | Off |
| CRANKING SIG | Crank operation | Crank is active | On |
| | | Crank is inactive | Off |
| N POSI SIG | N position signal | For N range | On |
| | | Except for N range | Off |
| P POSI SIG | P position signal | For P range | On |
| | | Except for P range | Off |

| Monitor item | Display content | Data monitor | |
|---|---|---|---|
| | | Condition | Reference value in normal operation |
| R POSI SIG | R position signal | For R range | On |
| | | Except for R range | Off |
| 4WD MODE MON | Axle condition | AUTO is active | AUTO |
| | | LOCK is active | LOCK |
| | | 2WD is active | 2WD |
| CV1 | Operation status of each solenoid valve | Actuator (solenoid valve) is active (“ACTIVE TEST” in “ABS” with CONSULT-III) | On |
| | | When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON) | Off |
| CV2 | Operation status of each solenoid valve | Actuator (solenoid valve) is active (“ACTIVE TEST” in “ABS” with CONSULT-III) | On |
| | | When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON) | Off |
| SV1 | Operation status of each solenoid valve | Actuator (solenoid valve) is active (“ACTIVE TEST” in “ABS” with CONSULT-III) | On |
| | | When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON) | Off |
| SV2 | Operation status of each solenoid valve | Actuator (solenoid valve) is active (“ACTIVE TEST” in “ABS” with CONSULT-III) | On |
| | | When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON) | Off |
| STOP LAMP SW2 | Stop lamp switch signal status | When brake pedal is depressed | On |
| | | When brake pedal is not depressed | Off |

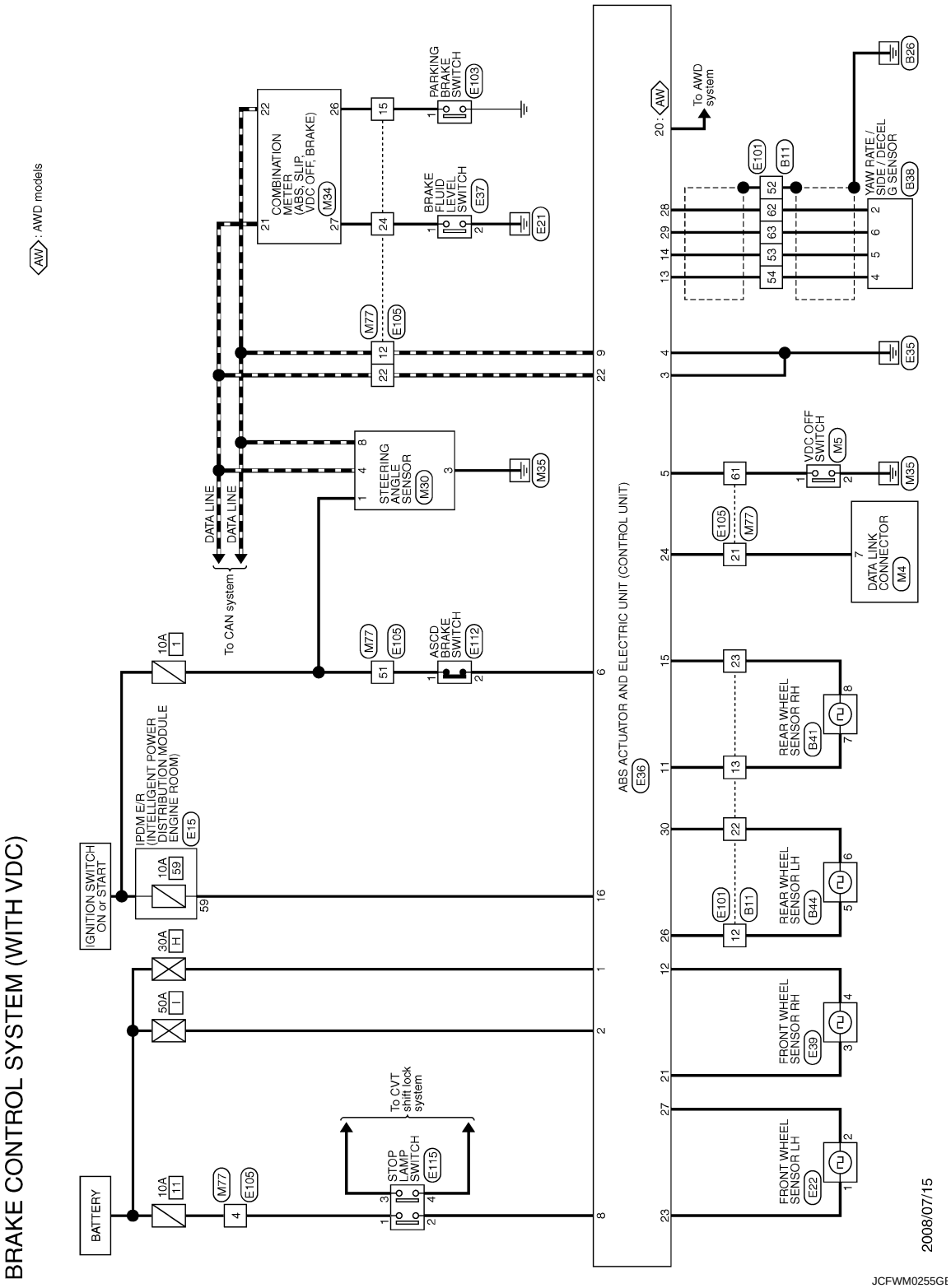
**NOTE:**

- 1: Confirm tire pressure is normal.
- 2: On and off timing for warning lamp and indicator lamp.

- ABS warning lamp: Refer to BRC-147, "Description".
- Brake warning lamp: Refer to BRC-148, "Description".
- VDC OFF indicator lamp: Refer to BRC-150, "Description".
- SLIP indicator lamp: Refer to BRC-152, "Description".

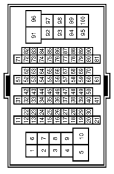
# Wiring Diagram -BRAKE CONTROL SYSTEM-

INFOID:0000000005255600



BRAKE CONTROL SYSTEM (WITH VDC)

| Connector No. | B11 |
|---|---|
| Connector Name | WIRE TO WIRE |
| Connector Type | TH80MW-CS16-TM4 |



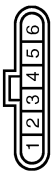
| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 12 | BR | – |
| 13 | O | – |
| 22 | G | – |
| 23 | SB | – |
| 52 | SHIELD | – |
| 53 | L | – |
| 54 | B | – |
| 62 | Y | – |
| 63 | R | – |

| Connector No. | E15 |
|---|---|
| Connector Name | IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) |
| Connector Type | NS16FW-CS |



| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 59 | BR | – |

| Connector No. | B38 |
|---|---|
| Connector Name | YAW RATE / SIDE / DECEL G SENSOR |
| Connector Type | SCZ06FB |



| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 2 | Y | GND |
| 4 | B | VCC(POWER) |
| 5 | L | SERIAL+ |
| 6 | R | SERIAL– |

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

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

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



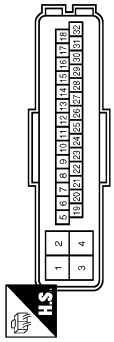
| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 7 | O | – |
| 8 | SB | – |

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



| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 5 | BR | – |
| 6 | G | – |

| Connector No. | E36 |
|---|---|
| Connector Name | ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) |
| Connector Type | RH28FB-NU4-DH |



| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 1 | Y | MOTOR |
| 2 | BR | ACTR |
| 3 | B | GND A |
| 4 | B | GND M |
| 5 | BR | VDC OFF SW |
| 6 | GR | ASCD CANCEL SW |
| 8 | SB | STOP LAMP SW |
| 9 | P | CAN L |
| 11 | O | RR SENSOR VB |
| 12 | R | FR SENSOR SIG |
| 13 | B | G CHECK |
| 14 | L | G SW1 |
| 15 | SB | RR SENSOR SIG |
| 16 | BR | IGN |
| 20 | Y | 4WD COMM |
| 21 | G | FR SENSOR VB |
| 22 | L | CAN H |
| 23 | W | FL SENSOR VB |
| 24 | GR | DIAG K |
| 26 | BR | RL SENSOR VB |
| 27 | P | FL SENSOR SIG |
| 28 | Y | G GND |
| 29 | R | G SW2 |
| 30 | G | RL SENSOR SIG |

JCFWM0256GB

BRAKE CONTROL SYSTEM (WITH VDC)

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

H.S.

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

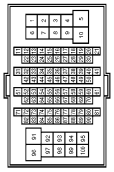
| Connector No. | E39 |
|---|---|
| Connector Name | FRONT WHEEL SENSOR RH |
| Connector Type | RK02MGY |

H.S.

| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 3 | G | – |
| 4 | R | – |

| Connector No. | E101 |
|---|---|
| Connector Name | WIRE TO WIRE |
| Connector Type | TH80FW-CS16-TM4 |

H.S.



| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 12 | BR | – |
| 13 | O | – |
| 22 | G | – |
| 23 | SB | – |
| 52 | SHIELD | – |
| 53 | L | – |
| 54 | B | – |
| 62 | Y | – |
| 63 | R | – |

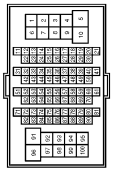
| Connector No. | E103 |
|---|---|
| Connector Name | PARKING BRAKE SWITCH |
| Connector Type | P01FB-A |

H.S.

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

| Connector No. | E105 |
|---|---|
| Connector Name | WIRE TO WIRE |
| Connector Type | TH80FW-CS16-TM4 |

H.S.



| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 4 | V | – |
| 12 | P | – |
| 15 | V | – |
| 21 | L | – |
| 22 | L | – |
| 24 | LG | – |
| 51 | L | – |
| 61 | BR | – |

| Connector No. | E112 |
|---|---|
| Connector Name | ASCD BRAKE SWITCH |
| Connector Type | M02FBR-LC |

H.S.

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

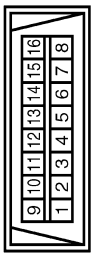
| Connector No. | E115 |
|---|---|
| Connector Name | STOP LAMP SWITCH |
| Connector Type | M04FW-LC |

H.S.

| Terminal No. | Color of Wire | Signal Name [Specification] |
|---|---|---|
| 1 | V | – |
| 2 | Y | – |
| 3 | G | – |
| 4 | L | – |

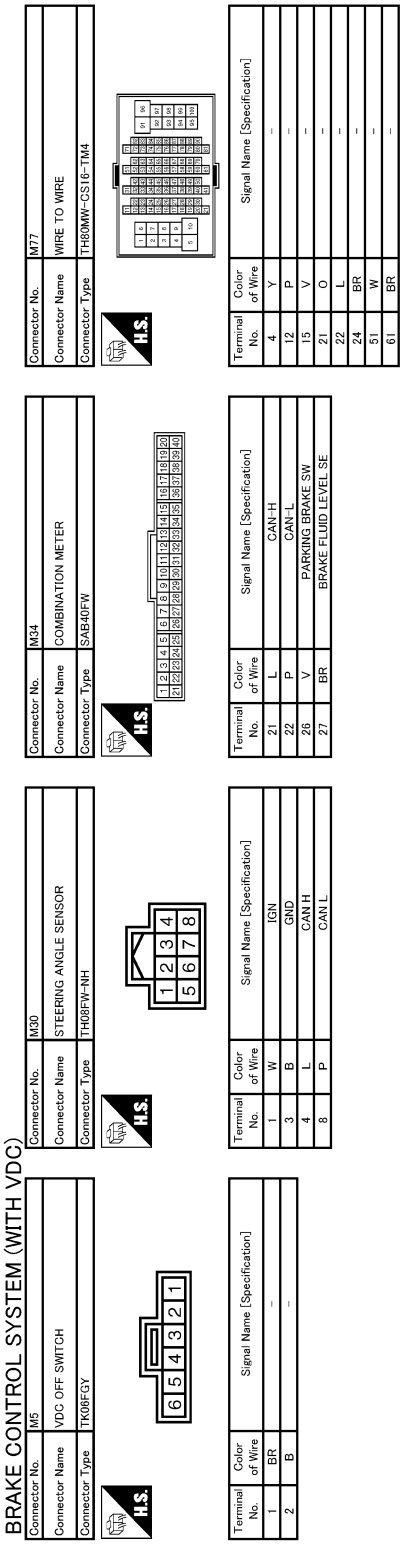
| Connector No. | M4 |
|---|---|
| Connector Name | DATA LINK CONNECTOR |
| Connector Type | BD16FW |

H.S.



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

JCFWM0257GE




JCFWM0258GE

## Fail-Safe

*INFOID:0000000005255601*

ABS, EBD SYSTEM

In case of electrical malfunctions with the ABS, ABS warning lamp, VDC OFF indicator lamp, SLIP indicator lamp will turn on. In case of electrical malfunctions with the EBD, brake warning lamp, ABS warning lamp, VDC OFF indicator lamp and SLIP indicator lamp will turn on. Simultaneously, the VDC/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.

### VDC/TCS

In case of malfunction in the VDC/TCS/ABS system, VDC OFF indicator lamp, SLIP indicator lamp are turned on, and the condition of vehicle is the same as the condition of vehicles without VDC/TCS control.

**CAUTION:**
**If the Fail-Safe function is activated, then perform self-diagnosis for “ABS” with CONSULT-III.**

## DTC Index

INFOID:0000000005255602

| DTC | Items (CONSULT screen terms) | Reference |
|---|---|---|
| C1101 | RR RH SENSOR-1 | BRC-99, "DTC Logic" |
| C1102 | RR LH SENSOR-1 | |
| C1103 | FR RH SENSOR-1 | |
| C1104 | FR LH SENSOR-1 | |
| C1105 | RR RH SENSOR-2 | BRC-102, "DTC Logic" |
| C1106 | RR LH SENSOR-2 | |
| C1107 | FR RH SENSOR-2 | |
| C1108 | FR LH SENSOR-2 | |
| C1109 | BATTERY VOLTAGE [ABNORMAL] | BRC-105, "DTC Logic" |
| C1110 | CONTROLLER FAILURE | BRC-108, "DTC Logic" |
| C1111 | PUMP MOTOR | BRC-109, "DTC Logic" |
| C1113 | G SENSOR | BRC-111, "DTC Logic" |
| C1115 | ABS SENSOR [ABNORMAL SIGNAL] | BRC-115, "DTC Logic" |
| C1116 | STOP LAMP SW | BRC-118, "DTC Logic" |
| C1118 | 4WD SYSTEM | BRC-120, "DTC Logic" |
| C1120 | FR LH IN ABS SOL | BRC-121, "DTC Logic" |
| C1121 | FR LH OUT ABS SOL | BRC-124, "DTC Logic" |
| C1122 | FR RH IN ABS SOL | BRC-121, "DTC Logic" |
| C1123 | FR RH OUT ABS SOL | BRC-124, "DTC Logic" |
| C1124 | RR LH IN ABS SOL | BRC-121, "DTC Logic" |
| C1125 | RR LH OUT ABS SOL | BRC-124, "DTC Logic" |
| C1126 | RR RH IN ABS SOL | BRC-121, "DTC Logic" |
| C1127 | RR RH OUT ABS SOL | BRC-124, "DTC Logic" |
| C1130 | ENGINE SIGNAL 1 | BRC-127, "DTC Logic" |
| C1140 | ACTUATOR RLY | BRC-128, "DTC Logic" |
| C1143 | ST ANG SEN CIRCUIT | BRC-130, "DTC Logic" |
| C1144 | ST ANG SEN SIGNAL | |
| C1145 | YAW RATE SENSOR | BRC-111, "DTC Logic" |
| C1146 | SIDE G-SEN CIRCUIT | |
| C1155 | BR FLUID LEVEL LOW | BRC-132, "DTC Logic" |
| C1164 | CV1 | BRC-135, "DTC Logic" |
| C1165 | CV2 | |

| DTC | Items (CONSULT screen terms) | Reference |
|---|---|---|
| C1166 | SV1 | BRC-137, "DTC Logic" |
| C1167 | SV2 | |
| C1176 | STOP LAMP SW2 | BRC-139, "DTC Logic" |
| U1000 | CAN COMM CIRCUIT | BRC-141, "DTC Logic" |
| U1010 | CONTROL UNIT(CAN) | BRC-142, "DTC Logic" |

# SYMPTOM DIAGNOSIS

## EXCESSIVE ABS FUNCTION OPERATION FREQUENCY

### Diagnosis Procedure

INFOID:0000000005255603

**1.** CHECK START

Check front and rear brake force distribution using a brake tester. Refer to BR-49, "General Specifications".

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
  - 2WD models: Refer to FAX-8, "Inspection".
  - AWD models: Refer to FAX-32, "Inspection".
- Rear
  - 2WD models: Refer to RAX-4, "Inspection".
  - AWD models: Refer to RAX-11, "Inspection".

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 for “ABS” with CONSULT-III.
NO >> Normal

# UNEXPECTED PEDAL REACTION

## Diagnosis Procedure

INFOID:0000000005255604

### 1.CHECK BRAKE PEDAL STROKE

Check brake pedal stroke. Refer to BR-9, "Inspection and Adjustment".

Is the stroke too large?

YES >> • Bleed air from brake tube and hose. Refer to BR-13, "Bleeding Brake System".
• Check brake pedal, brake booster, and master cylinder for mount play, looseness, brake system fluid leakage, etc.
- Brake pedal: Refer to BR-9, "Inspection and Adjustment".
- Master cylinder: Refer to BR-14, "Inspection".
- Brake booster: Refer to BR-15, "Inspection".

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 >> Normal
NO >> Check brake system.

# THE BRAKING DISTANCE IS LONG

## Diagnosis Procedure

INFOID:0000000005255605

**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 >> Normal
NO >> Check brake system.

# ABS FUNCTION DOES NOT OPERATE

## Diagnosis Procedure

INFOID:0000000005255606

**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 >> Normal
NO >> Perform self-diagnosis for “ABS” with CONSULT-III.

# PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

## Diagnosis Procedure

INFOID:0000000005255607

**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 for “ABS” with CONSULT-III.

### 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 >> Normal

# VEHICLE JERKS DURING VDC/TCS/ABS CONTROL

## Diagnosis Procedure

INFOID:0000000005255608

### 1.SYMPTOM CHECK

Check if the vehicle jerks during VDC/TCS/ABS control.

Is the inspection result normal?

YES >> Normal.
NO >> GO TO 2.

### 2.CHECK SELF-DIAGNOSIS RESULTS

Perform self-diagnosis for “ABS” with CONSULT-III.

Are self-diagnosis results indicated?

YES >> Check corresponding items, make repairs, and perform self-diagnosis for “ABS” with CONSULT-III.
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 self-diagnosis for “ABS” with CONSULT-III.

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 self-diagnosis for “ENGINE” and “TRANSMISSION” with CONSULT-III.

Are self-diagnosis results indicated?

YES >> Check the corresponding items.
- “ENGINE”
  - For CALIFORNIA: Refer to EC-107, "CONSULT-III Function".
  - For USA (FEDERAL) and CANADA: Refer to EC-588, "CONSULT-III Function".
  - For MEXICO: Refer to EC-1022, "CONSULT-III Function".
- “TRANSMISSION”: Refer to TM-42, "Diagnosis Description".

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

# NORMAL OPERATING CONDITION

## Description

INFOID:0000000005255609

| Symptom | Result |
|---|---|
| Slight vibrations are felt on the brake pedal and the operation noises occur, when VDC, TCS or ABS is activated. | This is a normal condition due to the VDC, 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 VDC 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, VDC 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. |
| VDC may not operate normally or the ABS warning lamp, VDC 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 VDC function is off (VDC 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 VDC/TCS function before performing an inspection on a chassis dynamometer.) |

# PRECAUTION

## PRECAUTIONS

## FOR USA AND CANADA

### FOR USA AND CANADA : Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000005530547

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. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the “SRS AIR BAG” 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 AIR BAG”.**
- **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.**

### PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

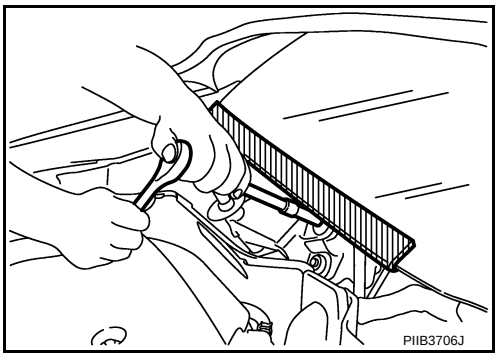
**WARNING:**

- **When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

### FOR USA AND CANADA : Precaution for Procedure without Cowl Top Cover

INFOID:0000000005530587

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.




### FOR USA AND CANADA : Precaution for Brake System

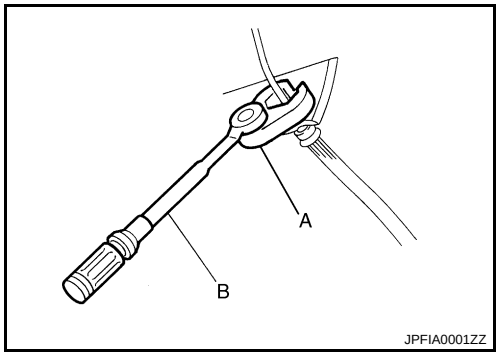
INFOID:0000000005255612

**WARNING:**

**Clean any dust from the front brake and rear brake with a vacuum dust collector. Never blow with compressed air.**

- Only use “DOT 3” brake fluid. Refer to MA-14, "FOR NORTH AMERICA : Fluids and Lubricants".
- Never reuse drained brake fluid.
- Never 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 use mineral oils such as gasoline or light oil to clean. 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 crowfoot (A) and torque wrench (B).
-
- Always confirm the specified tightening torque when installing the brake pipes.
- 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.
- Check that no brake fluid leakage is present after replacing the parts.




## FOR USA AND CANADA : Precaution for Brake Control

INFOID:0000000005255613

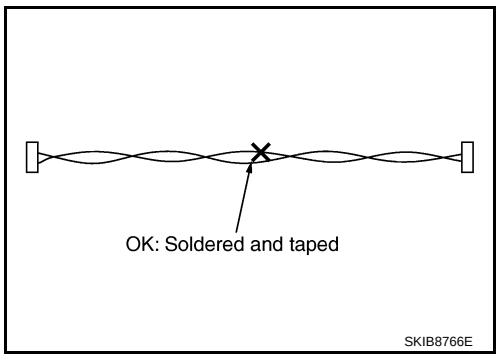
- When starting engine or when starting vehicle just after starting engine, brake pedal may vibrate or motor operating noise may be heard from engine compartment. This is normal condition.
- When an error is indicated by ABS or another warning lamp, collect all necessary information from customer (what symptoms are present under what conditions) and check for estimate 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.
- VDC system may not operate normally or a VDC 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.

## FOR USA AND CANADA : Precautions for Harness Repair

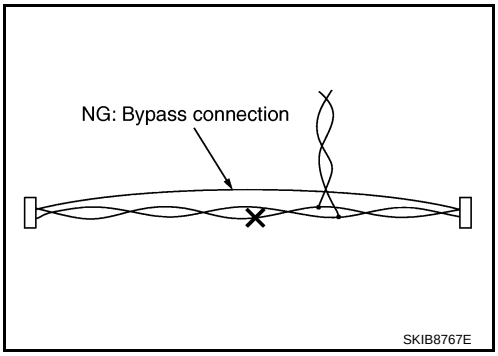
INFOID:0000000005530646

COMMUNICATION LINE

- Solder the repaired area and wrap tape around the soldered area.
  **NOTE:**
  A fray of twisted lines must be within 110 mm (4.33 in).



- Bypass connection is never allowed at the repaired area.
  **NOTE:**
  Bypass connection may cause communication error as spliced wires that are separate from the main line or twisted lines lose noise immunity.
- Replace the applicable harness as an assembly if error is detected on the shield lines of communication line.




## FOR MEXICO

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

INFOID:0000000005530548

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 AIR BAG” 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 AIR BAG”.**
- **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.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

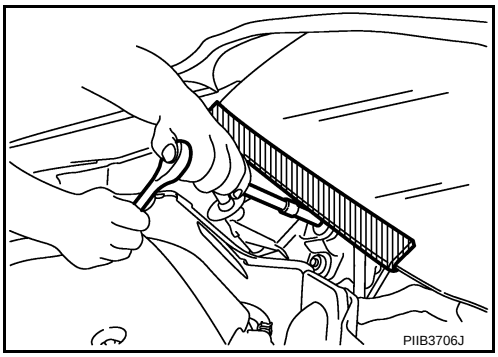
**WARNING:**

- **When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

### FOR MEXICO : Precaution for Procedure without Cowl Top Cover

INFOID:0000000005530607

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.




### FOR MEXICO : Precaution for Brake System

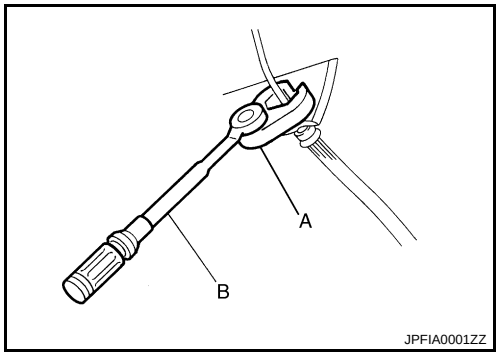
INFOID:0000000005255616

**WARNING:**

**Clean any dust from the front brake and rear brake with a vacuum dust collector. Never blow with compressed air.**

- Only use “DOT 3” brake fluid. Refer to MA-15, "FOR MEXICO : Fluids and Lubricants".

- Never reuse drained brake fluid.
- Never 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 use mineral oils such as gasoline or light oil to clean. 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 crow-foot (A) and torque wrench (B).
- Always confirm the specified tightening torque when installing the brake pipes.
- 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.
- Check that no brake fluid leakage is present after replacing the parts.




## FOR MEXICO : Precaution for Brake Control

INFOID:0000000005255617

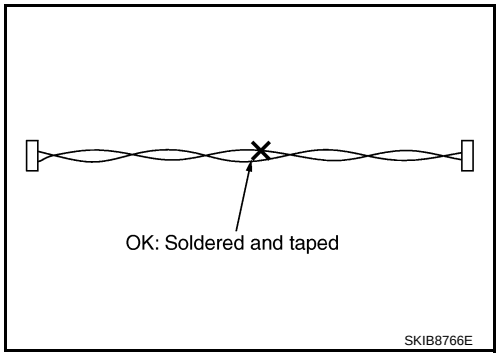
- When starting engine or when starting vehicle just after starting engine, brake pedal may vibrate or motor operating noise may be heard from engine compartment. This is normal condition.
- When an error is indicated by ABS or another warning lamp, collect all necessary information from customer (what symptoms are present under what conditions) and check for estimate 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.
- VDC system may not operate normally or a VDC 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.

## FOR MEXICO : Precautions for Harness Repair

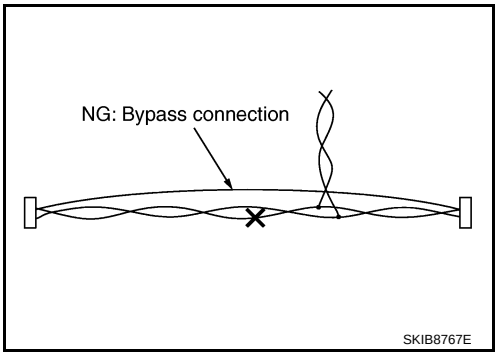
INFOID:0000000005530647

### COMMUNICATION LINE

- Solder the repaired area and wrap tape around the soldered area.
  **NOTE:**
  A fray of twisted lines must be within 110 mm (4.33 in).



- Bypass connection is never allowed at the repaired area.
  **NOTE:**
  Bypass connection may cause communication error as spliced wires that are separate from the main line or twisted lines lose noise immunity.
- Replace the applicable harness as an assembly if error is detected on the shield lines of communication line.



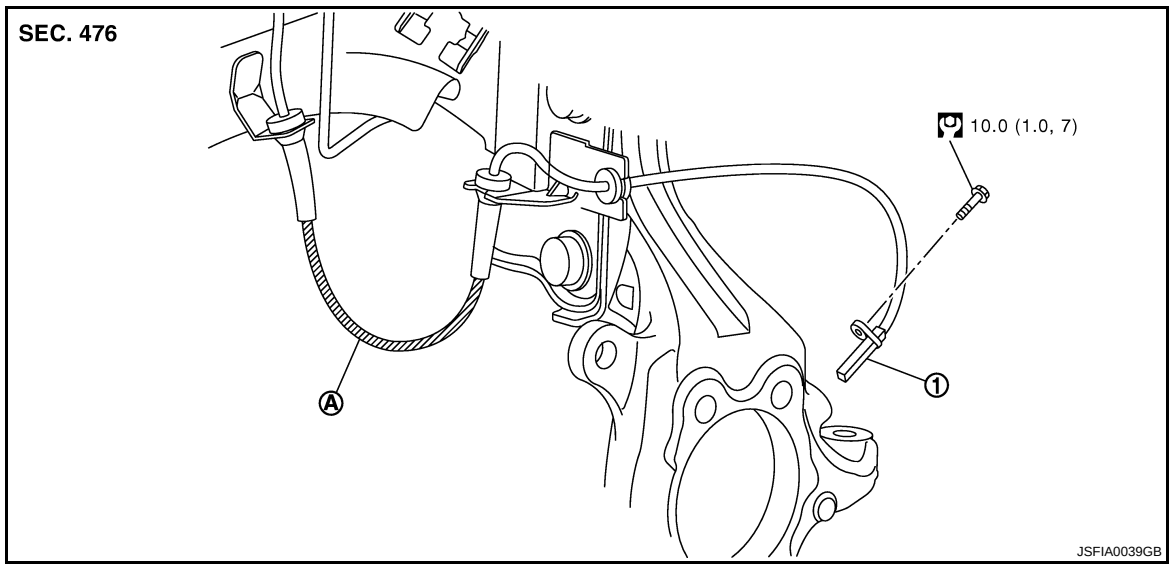
# REMOVAL AND INSTALLATION

## WHEEL SENSOR

### FRONT WHEEL SENSOR

#### FRONT WHEEL SENSOR : Exploded View

INFOID:0000000005255618




1. Front LH wheel sensor

A. Yellow line (slant line)

Refer to GI-4, "Components" for symbol 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:0000000005255619

##### REMOVAL

Pay attention to the following when removing sensor.

**CAUTION:**

- **Never twist sensor harness as much as possible, when removing it. Pull sensors out without pulling 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 yellow lines (A) are not twisted.**

##### INSTALLATION

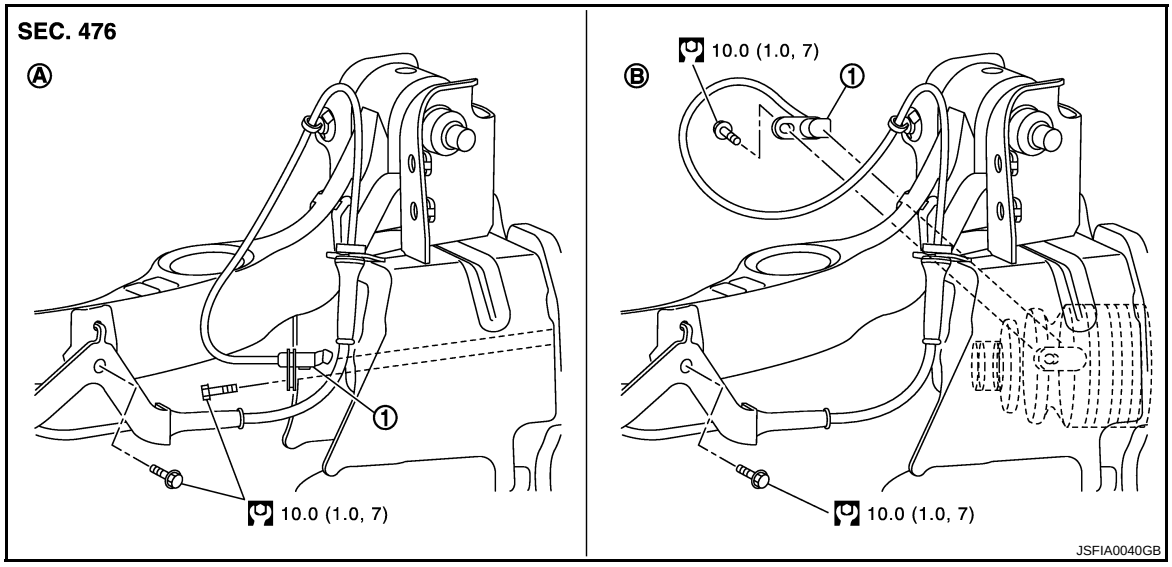
Pay attention to the following when installing wheel sensor. Tighten installation bolts to the specified torques.

- 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:0000000005255620




1. Rear LH wheel sensor

A. 2WD models B. AWD models

Refer to GI-4, "Components" for symbol 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:0000000005255621

### REMOVAL

Pay attention to the following when removing sensor.

**CAUTION:**

- **Never twist sensor harness as much as possible, when removing it. Pull sensors out without pulling 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.

- 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:0000000005255622

Refer to FAX-10, "Exploded View" (2WD models), FAX-34, "Exploded View" (AWD models).

### FRONT SENSOR ROTOR : Removal and Installation

INFOID:0000000005255623

REMOVAL

Sensor rotor cannot be disassembled. Remove the sensor rotor together with hub bearing assembly. Refer to FAX-10, "Removal and Installation" (2WD models), FAX-34, "Removal and Installation" (AWD models).

INSTALLATION

Sensor rotor cannot be disassembled. Installation the sensor rotor together with hub bearing assembly. Refer to FAX-34, "Removal and Installation" (2WD models), FAX-34, "Removal and Installation" (AWD models).

## REAR SENSOR ROTOR

### REAR SENSOR ROTOR : Exploded View

INFOID:0000000005255624

Refer to RAX-5, "Exploded View" (2WD models), RAX-15, "Exploded View" (AWD models).

### REAR SENSOR ROTOR : Removal and Installation

INFOID:0000000005255625

2WD MODELS

Removal

Sensor rotor cannot be disassembled. Remove the sensor rotor together with hub bearing assembly. Refer to RAX-5, "Removal and Installation".

Installation

Sensor rotor cannot be disassembled. Installation the sensor rotor together with hub bearing assembly. Refer to RAX-5, "Removal and Installation".

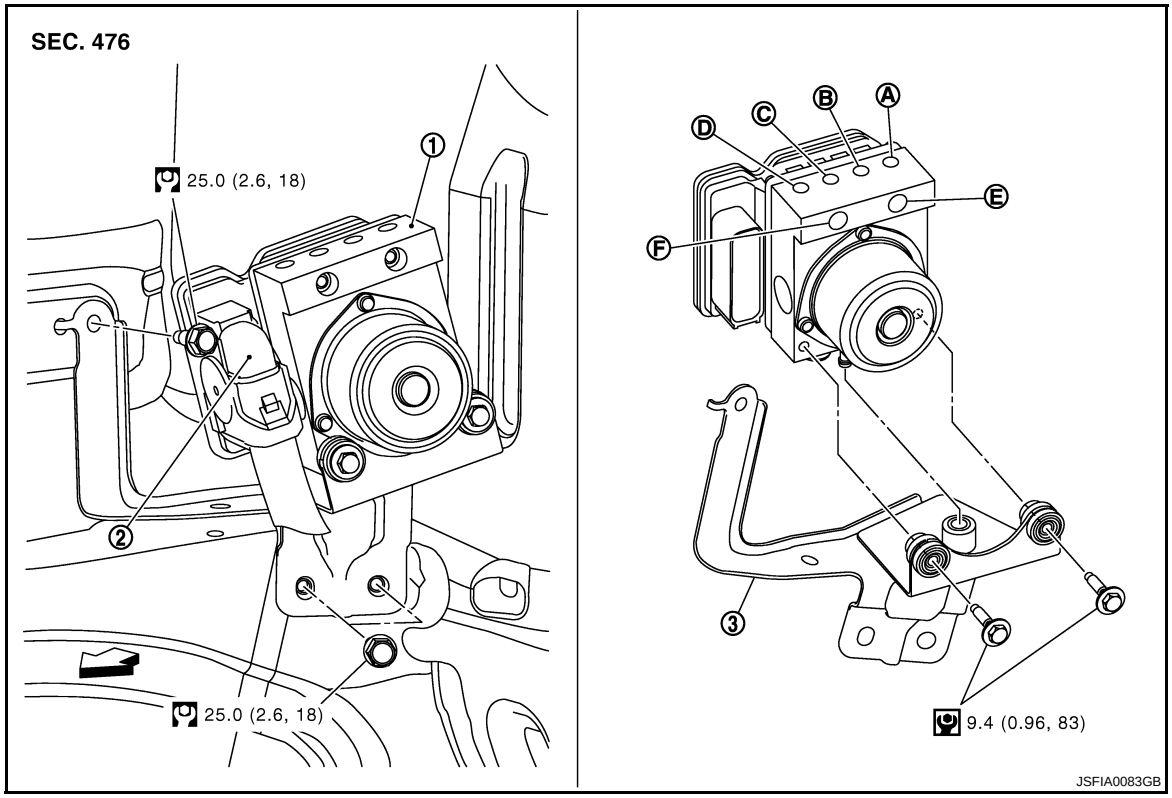
AWD MODELS

For removal and installation of sensor rotor, refer to RAX-16, "Disassembly and Assembly".

# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

## Exploded View

INFOID:0000000005255626




1. ABS actuator and electric unit (control unit)
2. Connector
3. 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 primary side
F. From master cylinder secondary side

⇦: Vehicle front

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

## Removal and Installation

INFOID:0000000005255627

### 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.**
- **Never apply excessive impact to ABS actuator and electric unit (control unit), such as dropping it.**
- **Never remove and install actuator by holding harness.**
- **After work is completed, bleed air from brake tube. Refer to BR-13, "Bleeding Brake System".**

1. Remove cowl top. Refer to EXT-20, "Exploded View".
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Loosen brake tube flare nuts, then remove brake tubes from ABS actuator and electric unit (control unit).
4. Remove tire (front LH side).
5. Remove fender protector (rear): (front LH side). Refer to EXT-22, "Exploded View".
6. Remove ABS actuator and electric unit (control unit) bracket mounting nut.
7. Remove ABS actuator and electric unit (control unit) from vehicle.

### INSTALLATION

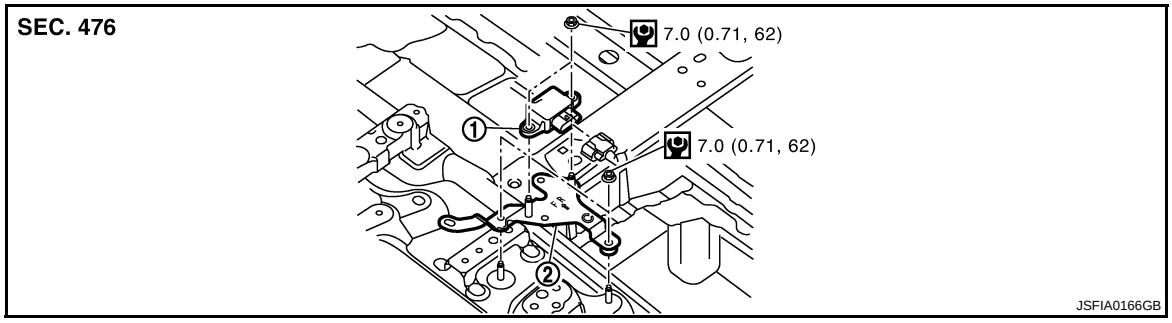
Note the following, and install in the reverse order of removal.

- 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.
- Never apply excessive impact to ABS actuator and electric unit (control unit), such as dropping it.
- Never remove and install actuator by holding harness.
- After work is completed, bleed air from brake tube. Refer to BR-13, "Bleeding Brake System".
- 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 sdjust neutral position of steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

# G SENSOR

## Exploded View

INFOID:0000000005255628




1. yaw rate/side/decel G sensor
2. Bracket

⇦: Vehicle front

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

## Removal and Installation

INFOID:0000000005255629

### REMOVAL

**CAUTION:**

**Never drop or strike yaw rate/side/decel G sensor, or never use power tool etc., because yaw rate/side/decel G sensor is sensitive to the impact.**

1. Remove center console assembly. Refer to IP-21, "Exploded View".
2. Disconnect yaw rate/side/decel G sensor harness connector.
3. Remove mounting bolts. Remove yaw rate/side/decel G sensor.

### INSTALLATION

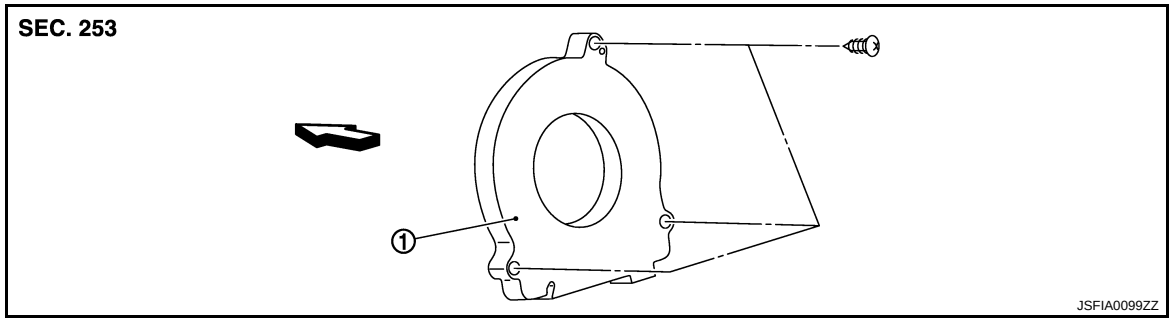
Note the following, and install in the reverse order of removal.

- Never drop or strike yaw rate/side/decel G sensor, or never use power tool etc., because yaw rate/side/decel G sensor is sensitive to the impact.

# STEERING ANGLE SENSOR

## Exploded View

INFOID:0000000005255630




1. Steering angle sensor

⇦: Vehicle front

## Removal and Installation

INFOID:0000000005255631

### REMOVAL

1. Remove spiral cable assembly. Refer to SR-14, "Exploded View" (for USA and Canada), SR-39, "Exploded View" (for Mexico).
2. Remove steering angle sensor from spiral cable assembly.

### INSTALLATION

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

- After work, make sure to adjust neutral position of steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".