

SECTION **BRC**

BRAKE CONTROL SYSTEM

A
B
C
D
E

CONTENTS

| VDC/TCS/ABS | |
|---|-----------|
| BASIC INSPECTION | 5 |
| DIAGNOSIS AND REPAIR WORKFLOW | 5 |
| Work Flow | 5 |
| INSPECTION AND ADJUSTMENT | 7 |
| PERFORM INITIALIZATION OF LINEAR SOLE-NOID VALVE AND CALIBRATION | 7 |
| PERFORM INITIALIZATION OF LINEAR SOLE-NOID VALVE AND CALIBRATION : Description | 7 |
| PERFORM INITIALIZATION OF LINEAR SOLE-NOID VALVE AND CALIBRATION : Special Repair Requirement | 7 |
| PERFORM ZERO POINT OF YAW RATE/SIDE/DECEL G SENSOR | 8 |
| PERFORM ZERO POINT OF YAW RATE/SIDE/DECEL G SENSOR : Description | 8 |
| PERFORM ZERO POINT OF YAW RATE/SIDE/DECEL G SENSOR : Special Repair Requirement | 8 |
| PERFORM ADJUSTMENT OF STROKE SENSOR | 9 |
| PERFORM ADJUSTMENT OF STROKE SENSOR : Description | 9 |
| PERFORM ADJUSTMENT OF STROKE SENSOR : Special Repair Requirement | 9 |
| PERFORM ZERO POINT OF STEERING ANGLE SENSOR | 9 |
| PERFORM ZERO POINT OF STEERING ANGLE SENSOR : Description | 9 |
| PERFORM ZERO POINT OF STEERING ANGLE SENSOR : Special Repair Requirement | 9 |
| BASIC INSPECTION | 11 |
| TEST MODE PROCEDURE | 11 |
| FUNCTION DIAGNOSIS | 14 |
| ELECTRONICALLY CONTROLLED BRAKE SYSTEM | |
| System Diagram | 14 |
| System Description | 14 |
| Component Parts Location | 15 |
| Component Description | 17 |
| ABS | 20 |
| System Diagram | 20 |
| System Description | 20 |
| Component Parts Location | 21 |
| Component Description | 23 |
| EBD | 26 |
| System Diagram | 26 |
| System Description | 26 |
| Component Parts Location | 27 |
| Component Description | 29 |
| TCS | 32 |
| System Diagram | 32 |
| System Description | 32 |
| Component Parts Location | 33 |
| Component Description | 35 |
| VDC | 38 |
| System Diagram | 38 |
| System Description | 38 |
| Component Parts Location | 39 |
| Component Description | 41 |
| INSPECTION MODE | 44 |
| System Description | 44 |
| DIAGNOSIS SYSTEM (VDC/TCS/ABS CONTROL UNIT) | 45 |
| CONSULT-III Function | 45 |
| COMPONENT DIAGNOSIS | 57 |
| C0200, C0205, C1271, C1272 | 57 |
| Description | 57 |

BRC

G
H
I
J
K
L
M
N
O
P

| | | | |
|--|-----------|--|------------|
| DTC Logic | 57 | Description | 95 |
| Diagnosis Procedure | 58 | DTC Logic | 95 |
| Special Repair Requirement | 61 | Diagnosis Procedure | 95 |
| C0210, C0215, C1273, C1274 | 62 | Special Repair Requirement | 98 |
| Description | 62 | C1252, C1253 | 99 |
| DTC Logic | 62 | Description | 99 |
| Diagnosis Procedure | 62 | DTC Logic | 99 |
| Special Repair Requirement | 67 | Diagnosis Procedure | 99 |
| C0371, C1234, C1232, C1243, C1244, C1245, | | Special Repair Requirement | 103 |
| C1279, C1381 | 68 | C1256 | 105 |
| Description | 68 | Description | 105 |
| DTC Logic | 68 | DTC Logic | 105 |
| Diagnosis Procedure | 68 | Diagnosis Procedure | 105 |
| Special Repair Requirement | 70 | Special Repair Requirement | 106 |
| C1155 | 71 | C1259, C1310 | 108 |
| Description | 71 | Description | 108 |
| DTC Logic | 71 | DTC Logic | 108 |
| Diagnosis Procedure | 71 | Diagnosis Procedure | 108 |
| Special Repair Requirement | 72 | Special Repair Requirement | 108 |
| C11A0, C1336 | 73 | C1290 | 109 |
| Description | 73 | Description | 109 |
| DTC Logic | 73 | DTC Logic | 109 |
| Diagnosis Procedure | 73 | Diagnosis Procedure | 109 |
| Special Repair Requirement | 74 | Special Repair Requirement | 110 |
| C1231 | 75 | C1300 | 111 |
| Description | 75 | Description | 111 |
| DTC Logic | 75 | DTC Logic | 111 |
| Diagnosis Procedure | 75 | Diagnosis Procedure | 111 |
| Special Repair Requirement | 76 | Special Repair Requirement | 111 |
| C1235, C1236, C1238, C1239, C1275, C1276, | | C1311, C1312, C1313, C1314 | 112 |
| C1277, C1278 | 77 | Description | 112 |
| Description | 77 | DTC Logic | 112 |
| DTC Logic | 77 | Diagnosis Procedure | 112 |
| Diagnosis Procedure | 77 | Special Repair Requirement | 114 |
| Special Repair Requirement | 82 | C1315, C1316, C1352, C1353, C1354, C1355, | |
| C1241, C1242 | 83 | C1356, C1357, C1358, C1359 | 115 |
| Description | 83 | Description | 115 |
| DTC Logic | 83 | DTC Logic | 115 |
| Diagnosis Procedure | 84 | Diagnosis Procedure | 116 |
| Special Repair Requirement | 85 | Special Repair Requirement | 119 |
| C1246, C1281, C1364 | 86 | C1319 | 120 |
| Description | 86 | Description | 120 |
| DTC Logic | 86 | DTC Logic | 120 |
| Diagnosis Procedure | 88 | Diagnosis Procedure | 120 |
| Special Repair Requirement | 90 | Special Repair Requirement | 121 |
| C1247, C1346, C1392 | 91 | C1341, C1342, C1343, C1344 | 122 |
| Description | 91 | Description | 122 |
| DTC Logic | 91 | DTC Logic | 122 |
| Diagnosis Procedure | 91 | Diagnosis Procedure | 122 |
| Special Repair Requirement | 94 | Special Repair Requirement | 124 |
| C1249 | 95 | C1345, C1368 | 126 |

| | | | | |
|--|------------|--|------------|-----|
| Description | 126 | Description | 176 | |
| DTC Logic | 126 | Diagnosis Procedure | 176 | A |
| Diagnosis Procedure | 126 | BRAKE WARNING LAMP REMAINS ON | 177 | |
| Special Repair Requirement | 127 | Description | 177 | B |
| C1365 | 128 | Diagnosis Procedure | 177 | |
| Description | 128 | BRAKE WARNING LAMP DOES NOT COME | | |
| DTC Logic | 128 | ON | 181 | C |
| Diagnosis Procedure | 128 | Description | 181 | |
| Special Repair Requirement | 129 | Diagnosis Procedure | 181 | |
| C1377 | 131 | ELECTRONICALLY CONTROLLED BRAKE | | D |
| Description | 131 | WARNING LAMP REMAINS ON | 182 | |
| DTC Logic | 131 | Description | 182 | E |
| Diagnosis Procedure | 131 | Diagnosis Procedure | 182 | |
| Special Repair Requirement | 134 | ELECTRONICALLY CONTROLLED BRAKE | | |
| C1378 | 135 | WARNING LAMP DOES NOT COME ON | 183 | BRC |
| Description | 135 | Description | 183 | |
| DTC Logic | 135 | Diagnosis Procedure | 183 | |
| Diagnosis Procedure | 135 | SLIP INDICATOR LAMP REMAINS ON | 185 | G |
| Special Repair Requirement | 137 | Description | 185 | |
| C1391 | 138 | Diagnosis Procedure | 185 | |
| Description | 138 | SLIP INDICATOR LAMP DOES NOT COME | | H |
| DTC Logic | 138 | ON | 186 | |
| Diagnosis Procedure | 138 | Description | 186 | I |
| Special Repair Requirement | 139 | Diagnosis Procedure | 186 | |
| U0073, U0123, U0124, U0126, U0293 | 140 | BRAKE WARNING BUZZER CIRCUIT | 187 | J |
| Description | 140 | Description | 187 | |
| DTC Logic | 140 | Diagnosis Procedure | 187 | |
| Diagnosis Procedure | 141 | PRECAUTION | 189 | K |
| ECU DIAGNOSIS | 143 | PRECAUTIONS | 189 | |
| ABS ACTUATOR AND ELECTRIC UNIT | | Precaution for Supplemental Restraint System | | L |
| (CONTROL UNIT) | 143 | (SRS) "AIR BAG" and "SEAT BELT PRE-TEN- | | |
| Reference Value | 143 | SIONER" | 189 | |
| Wiring Diagram - BRAKE CONTROL SYSTEM - .. | 148 | Precautions For High-Voltage System | 189 | M |
| DTC Index | 163 | Precautions for Inspecting the Hybrid Control Sys- | | |
| SYMPTOM DIAGNOSIS | 170 | tem | 189 | |
| VDC/TCS/ABS SYMPTOMS | 170 | Electronically Controlled Brake System | 190 | N |
| Symptom Table | 170 | PREPARATION | 192 | |
| ABS WARNING LAMP REMAINS ON | 172 | PREPARATION | 192 | O |
| Description | 172 | Special Service Tool | 192 | |
| Diagnosis Procedure | 172 | Commercial Service Tool | 192 | |
| ABS WARNING LAMP DOES NOT COME ON | | ON-VEHICLE MAINTENANCE | 193 | P |
| .. | 174 | BRAKE ECU | 193 | |
| Description | 174 | Inspection | 193 | |
| Diagnosis Procedure | 174 | BRAKE ACTUATOR | 194 | |
| VDC WARNING LAMP REMAINS ON | 175 | Inspection | 194 | |
| Description | 175 | WHEEL SENSOR | 195 | |
| Diagnosis Procedure | 175 | Inspection | 195 | |
| VDC WARNING LAMP DOES NOT COME ON | | | | |
| .. | 176 | | | |

| | | | |
|--|------------|---|------------|
| ABS RELAY NO. 1 AND NO. 2 | 196 | YAW RATE/SIDE/DECEL G SENSOR | 205 |
| Inspection | 196 | Removal and Installation | 205 |
| ABS MOTOR RELAY NO. 1 AND NO. 2 | 197 | STEERING ANGLE SENSOR | 206 |
| Inspection | 197 | Removal and Installation | 206 |
| ON-VEHICLE REPAIR | 198 | BRAKE WARNING BUZZER | 207 |
| BRAKE ECU | 198 | Removal and Installation | 207 |
| Exploded View | 198 | CAPACITOR | 208 |
| Removal and Installation | 198 | Exploded View | 208 |
| BRAKE ACTUATOR | 200 | Removal and Installation | 208 |
| Exploded View | 200 | BRAKE STROKE SENSOR | 209 |
| Removal and Installation | 200 | Exploded View | 209 |
| Disposal | 201 | Removal and Installation | 209 |
| WHEEL SENSOR | 202 | BRAKE SIMULATOR | 210 |
| Exploded View | 202 | Exploded View | 210 |
| Removal and Installation | 202 | Removal and Installation | 210 |
| SENSOR ROTOR | 204 | Disassembly and Assembly | 211 |
| Removal and Installation | 204 | | |

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:000000004212603

NOTE:

*: Use the CONSULT-III.

1.VEHICLE BROUGHT TO WORKSHOP

Vehicle brought to workshop.

>> GO TO 2.

2.CUSTOMER PROBLEM ANALYSIS

Interview the customer and confirm the trouble.

>> GO TO 3.

3.CHECK DTC AND FREEZE FRAME DATA*

1. Check and record a DTC and Freeze Frame Data.
2. Clear the DTC and Freeze Frame Data.
3. Reconfirm the DTC.
- Reconfirm the DTC based on the recorded DTC and Freeze Frame Data.

NOTE:

If any of the DTCs U0123, U0124, U0126, and U0293 is output together with a CAN communication DTC, first check the appropriate sensor for a momentary open circuit.

| Condition | Proceed to |
|---|------------|
| DTC is output. | A |
| DTC is not output (Problem symptom does not occur). | B |
| DTC is not output (Problem symptom occurs). | C |

- A >> GO TO 4.
- B >> GO TO 5.
- C >> GO TO 6.

4.DIAGNOSTIC TROUBLE CODE CHART

Proceed to Diagnostic Trouble Code Chart.

>> GO TO 7.

5.SYMPTOM SIMULATION

Proceed to Diagnostic System.

>> GO TO 6.

6.PROBLEM SYMPTOM TABLE

Proceed to Problem Symptom Table.

>> GO TO 7.

7.CIRCUIT INSPECTION*

Circuit inspection.

>> GO TO 8.

A
B
C
D
E
G
H
I
J
K
L
M
N
O
P

BRC

DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

[VDC/TCS/ABS]

8.IDENTIFICATION OF PROBLEM

Identification of problem.

>> GO TO 9.

9.REPAIR OR REPALCEMENT

Repair or replacement.

>> GO TO 10.

10.CONFIRMATION TEST*

Confirmation test.

>> END

INSPECTION AND ADJUSTMENT

PERFORM INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION

PERFORM INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION :

Description

INFOID:000000004212604

Perform initialization of linear solenoid valve and calibration when the brake ECU, brake actuator or brake stroke sensor is replaced. Follow the procedure to perform initialization.

NOTE:

- If there is a problem with the auxiliary battery (12 V) voltage, initialization of linear solenoid valve and calibration cannot be completed normally. Make sure to check the auxiliary battery voltage before performing initialization of linear solenoid valve and calibration.
- If the actuator's temperature is high, initialization of linear solenoid valve and calibration may not be completed normally. In such a case, wait until the temperature decreases and then perform initialization of linear solenoid valve and calibration.
- If the ignition switch is turned OFF, the brake pedal is operated or vehicle speed is input while the linear solenoid valve offset learning is being performed, the learning will be cancelled.

| Replacement parts | Necessary operation |
|--|--|
| Brake ECU | 1. Initialization of linear solenoid valve and calibration 2. Steering angle sensor zero point calibration |
| Brake actuator assembly | 1. Bleed air 2. Clearing stored value of linear solenoid valve and calibration data 3. Initialization of linear solenoid valve and calibration |
| <ul style="list-style-type: none"> • Brake stroke sensor • Brake pedal | 1. Inspection and adjustment of brake pedal height 2. Clearing stored value of linear solenoid valve and calibration data 3. Initialization of linear solenoid valve and calibration |

PERFORM INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION :

Special Repair Requirement

INFOID:000000004212605

1. Clear the stored value of linear solenoid valve and calibration data.
 - a. Turn the ignition switch OFF.
 - b. Connect the CONSULT-III.
 - c. Move the shift lever to the P position.
 - d. Turn the ignition switch ON with the brake pedal released.
 - e. Clear the stored value of initialization of linear solenoid valve and calibration. Refer to [BRC-45. "CONSULT-III Function"](#).
 - f. Using the CONSULT-III, perform initialization of linear solenoid valve and calibration.
2. Perform the initialization of linear solenoid valve and calibration.
 - a. Turn the ignition switch OFF.
 - b. Connect the CONSULT-III.
 - c. Move the shift lever to the P position.
 - d. Turn the ignition switch ON (READY) with the brake pedal depressed.

NOTE:

 - If the linear solenoid valve offset learning is performed without turning the ignition switch ON, the learning process may not be completed properly because of insufficient auxiliary battery voltage.
 - When the linear solenoid valve offset learning is interrupted, or the learning process is performed with the shift lever not in the P position, DTC C1345 will be stored.
 - e. Select "TEST MODE" in "WORK SOPPORT" to start TEST MODE.
 - f. Leave the vehicle stationary without depressing the brake pedal for 1 or 2 minutes.
 - g. Check that the interval between blinks of the Electronically Controlled Brake warning lamp changes from 1 second to 0.5 seconds.

NOTE:

INSPECTION AND ADJUSTMENT

< BASIC INSPECTION >

[VDC/TCS/ABS]

- While the linear solenoid valve is learning, the Electronically Controlled Brake warning lamp blinks at intervals of 1 second. It blinks at intervals of 0.5 seconds after the completion of the learning.
- The time needed to complete initialization of linear solenoid valve and calibration varies depending on auxiliary battery voltage.
- The Electronically Controlled Brake warning lamp blinks at 1 second intervals during initialization of linear solenoid valve.
- The Electronically Controlled Brake warning lamp blinks 0.25 seconds intervals if the CONSULT-III prompts.

h. Select "TEST MODE END".

PERFORM ZERO POINT OF YAW RATE/SIDE/DECEL G SENSOR

PERFORM ZERO POINT OF YAW RATE/SIDE/DECEL G SENSOR : Description

INFOID:000000004212606

- After replacing the VDC relevant components or performing "Front wheel alignment adjustment", clear and read the sensor calibration data.
- Follow the chart to perform calibration.

| Replacing parts/ operation | Necessary operation |
|----------------------------------|---|
| Brake ECU | Yaw rate/side/decel G sensor zero point calibration |
| Yaw rate/side/decel G sensor | 1. Clearing zero point calibration data 2. Yaw rate/side/decel G sensor zero point calibration |
| Front wheel alignment adjustment | 1. Clearing zero point calibration data 2. Yaw rate/side/decel G sensor zero point calibration |

PERFORM ZERO POINT OF YAW RATE/SIDE/DECEL G SENSOR : Special Repair Requirement

INFOID:000000004212607

CAUTION:

- While obtaining the zero point, keep the vehicle stationary and do not vibrate, tilt, move, or shake it.
- Be sure to perform this procedure on a level surface (with an inclination of less than 1 degree).

1. Clear the zero point calibration data.
 - a. Turn the ignition switch OFF.
 - b. Connect the CONSULT-III.
 - c. Check that the steering wheel is centered and move the shift lever to the P position.
 - d. Turn the ignition switch ON with the brake pedal released.
 - e. Operate the CONSULT-III to erase the codes.
 - f. Turn the ignition switch OFF.
2. Perform zero point calibration of the yaw rate/side/decel G sensor.
 - a. Turn the ignition switch OFF.
 - b. Check that the steering wheel is centered and move the shift lever to the P position.
 - CAUTION:**
DTCs C1210 and C1336 will be recorded if the shift lever is not in the P position.
 - c. Connect the CONSULT-III.
 - d. Turn the ignition switch ON (READY) with the brake pedal depressed.
 - e. Select "TEST MODE" in "WORK SUPPORT" to start TEST MODE.
 - f. Leave the vehicle stationary without depressing the brake pedal for 1 or 2 minutes.
 - g. Check that the interval between blinks of the Electronically Controlled Brake warning lamp changes from 1 second to 0.5 seconds.
 - NOTE:**
 - The zero point calibration is performed only once after the system enters the Test Mode.
 - Calibration cannot be performed again until the stored data is cleared.
 - h. Select "TEST MODE END".
 - i. Turn the ignition switch OFF and disconnect the CONSULT-III.
 - j. Perform the zero point of steering angle sensor.

PERFORM ADJUSTMENT OF STROKE SENSOR

PERFORM ADJUSTMENT OF STROKE SENSOR : Description

INFOID:000000004212608

After removing or adjusting brake stroke sensor, adjustments are necessary.

PERFORM ADJUSTMENT OF STROKE SENSOR : Special Repair Requirement

INFOID:000000004212609

1. Clear the stored value of stroke sensor data.
 - a. Connect the connector to the brake stroke sensor.
 - b. Connect the CONSULT-III with the ignition switch OFF.
 - c. Turn the ignition switch ON.
 - d. Reading the "STROKE SEN" value shown in the DATA MONITOR, slowly turn the brake stroke sensor to the right and left to adjust the value to the standard voltage.

Standard voltage : 0.8 to 1.2 V

- e. Fully tighten the mounting bolts.

CAUTION:
Do not depress the brake pedal after turning the ignition switch ON.
- f. Move the shift lever to the P position.
- g. Turn the ignition switch ON with the brake pedal released.
- h. Clear the stored value of stroke sensor.
- i. Using the CONSULT-III, perform adjustment of stroke sensor.
2. Perform the adjustment of stroke sensor.
 - a. Turn the ignition switch OFF.
 - b. Connect the CONSULT-III.
 - c. Move the shift lever to the P position.
 - d. Turn the ignition switch ON (READY) with the brake pedal depressed.

NOTE:

 - If the stroke sensor offset learning is performed without turning the ignition switch ON, the learning process may not be completed properly because of insufficient auxiliary battery voltage.
 - When the stroke sensor offset learning is interrupted, or the learning process is performed with the shift lever not in the P position.
 - e. Select "TEST MODE" in "WORK SUPPORT" to start TEST MODE.
 - f. Leave the vehicle stationary without depressing the brake pedal for 1 to 2 minutes.
 - g. Check that the interval between blinks of the Electronically Controlled Brake warning lamp.

NOTE:

 - The time needed to complete adjustment of stroke sensor varies depending on auxiliary battery voltage.
 - The Electronically Controlled Brake warning lamp blinks at 1 second interval during adjustment of stroke sensor.
 - h. Select "TEST MODE END".

PERFORM ZERO POINT OF STEERING ANGLE SENSOR

PERFORM ZERO POINT OF STEERING ANGLE SENSOR : Description

INFOID:000000004212610

When brake ECU or steering angle sensor is replaced, or battery is removed, perform zero adjustment for steering angle sensor.

PERFORM ZERO POINT OF STEERING ANGLE SENSOR : Special Repair Requirement

INFOID:000000004212611

1. After the procedure, perform straight-ahead driving for 5 seconds or more at 35 km/h (22 MPH) or more.
2. After driving, check that VDC warning lamp is OFF.

NOTE:

INSPECTION AND ADJUSTMENT

< BASIC INSPECTION >

[VDC/TCS/ABS]

If VDC warning lamp does not turn OFF, perform self-diagnosis for brake ECU.

BASIC INSPECTION

TEST MODE PROCEDURE

INFOID:000000004212612

WARNING LAMP AND INDICATOR LAMP INITIAL CHECK

1. Release the parking brake.

CAUTION:

Before releasing the parking brake, move the shift lever to the P position for safety.

NOTE:

When the parking brake is applied or the level of the brake fluid is low, the brake warning lamp comes on.

2. When the ignition switch is turned ON, check that the ABS warning lamp, brake warning lamp, VDC warning lamp, Electronically Controlled Brake warning lamp and SLIP indicator lamp come on and remain ON until the ignition switch is turned ON (READY).

NOTE:

If the ECU stored a DTC, the ABS warning lamp, brake warning lamp, VDC warning lamp, Electronically Controlled Brake warning lamp and SLIP indicator lamp come ON. If the indicator remains ON or does not come ON, proceed to troubleshooting for the lamp circuits listed below.

| Trouble area | Reference page |
|--|--|
| ABS warning lamp circuit | BRC-174, "Description" |
| Brake warning lamp circuit | BRC-181, "Description" |
| Electronically Controlled Brake warning lamp circuit | BRC-183, "Description" |
| VDC warning lamp circuit | BRC-176, "Description" |
| SLIP indicator lamp circuit | BRC-186, "Description" |

ACCELERATION SENSOR CHECK (CONSULT-III)

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

NOTE:

Acceleration sensor check can be performed with the master cylinder pressure sensor check below.

MASTER CYLINDER PRESSURE SENSOR CHECK (CONSULT-III)

1. Leave the vehicle in a stationary condition and release the brake pedal for 1 second or more, and quickly and continuously depress the brake pedal with a force of 98 N (10 kgf, 22 lbf) or more for 1 second.
2. Check that the ABS warning lamp stays ON for 3 seconds.

NOTE:

- Ensure that the ABS warning lamp comes ON.
- While the ABS warning lamp stays ON, continue to depress the brake pedal with a force of 98 N (10 kgf, 22 lbf) or more.
- The ABS warning lamp comes ON for 3 seconds every time brake pedal operation above is performed.
- Requirement for pedal operation are more than 50 MPa/sec. and 4 MPa at master cylinder pressure sensor.

WHEEL SENSOR CHECK (CONSULT-III)

1. Check the wheel sensor signal.
- a. Drive the vehicle straight ahead. Accelerate the vehicle to a speed 45 km/h (28 MPH) or more for several seconds and check that the ABS warning lamp goes OFF.

NOTE:

The sensor check may not be completed if wheelspin occurs.

2. Stop vehicle.

CAUTION:

- **Before performing the wheel sensor check, completed the acceleration sensor and master cylinder pressure sensor checks.**
- **The wheel sensor check may not be completed if the wheel sensor check is started while turning the steering wheel or spinning the wheels.**
- **After the ABS warning lamp goes OFF and if the vehicle speed exceeds 80 km/h (50 MPH), a signal check code will be stored again. Accelerate or stop the vehicle before the speed reaches 80 km/h (50 MPH).**

A
B
C
D
E
G
H
I
J
K
L
M
N
O
P

BRC

BASIC INSPECTION

< BASIC INSPECTION >

[VDC/TCS/ABS]

- If the signal check has not been completed, the ABS warning lamp comes ON while driving and the ABS system does not operate.

NOTE:

When the sensor check has been completed, the ABS warning lamp goes OFF while driving.

3. Check the VDC sensor.

YAW RATE SENSOR CHECK (CONSULT-III)

1. Check the zero point voltage of the yaw rate sensor.
 - a. Keep the vehicle in a stationary condition on a level surface for 1 second or more.
 2. Check the output of the yaw rate sensor.
 - a. Move the shift lever from P to the D position and drive the vehicle at a speed of approximately 5 km/h (3 MPH), and turn the steering wheel either to the left or right 90° or more until the vehicle makes a 180° turn.
 - b. Stop the vehicle and move the shift lever to the P position. Check that the brake warning buzzer sounds for 3 seconds.

NOTE:

- If the brake warning buzzer sounds, the sensor check is completed normally.
- If the brake warning buzzer does not sound, check the brake warning buzzer circuit, then perform the sensor check again.
- If the brake warning buzzer still does not sound, there is a malfunction in the yaw rate sensor, so check the DTC.
- Make a 180° turn. At the end of the turn, the direction of the vehicle should be within 180° ±5° of its start position.
- Do not spin the wheel.
- Do not turn the ignition switch OFF while turning.
- Do not move the shift lever to the P position while turning, but changing in the vehicle speed, or driving in reverse is possible.
- Complete the turn within 20 seconds.

END OF SENSOR CHECK (CONSULT-III)

1. If the sensor check is completed, the ABS warning lamp is off while the vehicle is driving.

CAUTION:

 - When the yaw rate sensor, acceleration sensor, wheel sensor, and master cylinder pressure sensor checks are completed, the sensor check is completed.
 - If the sensor check is not completed, the ABS warning lamp comes ON even while the vehicle is driving and the ABS does not operate.

READ DTC OF TEST MODE (SIGNAL CHECK) FUNCTION (CONSULT-III)

1. Read the DTC(s) by following the tester screen.

CAUTION:

 - If only the DTCs are displayed, repair the malfunction area and clear the DTCs.
 - If the DTCs or Test Mode codes (DTC of signal check function) are displayed, repair the malfunction area, clear the DTCs and perform the Test Mode inspection.

NOTE:

Refer to the list of DTC.

DTC OF TEST MODE (SIGNAL CHECK) FUNCTION

ABS sensor:

| DTC code | Detection item | Trouble area |
|----------|--|--|
| C1271 | Low output signal of front wheel sensor RH | <ul style="list-style-type: none">• Front wheel sensor RH• Sensor installation• Wheel sensor rotor |
| C1272 | Low output signal of front wheel sensor LH | <ul style="list-style-type: none">• Front wheel sensor LH• Sensor installation• Wheel sensor rotor |
| C1273 | Low output signal of rear wheel sensor RH | <ul style="list-style-type: none">• Rear wheel sensor RH• Sensor installation• Wheel sensor rotor |

BASIC INSPECTION

< BASIC INSPECTION >

[VDC/TCS/ABS]

| DTC code | Detection item | Trouble area |
|----------|---|---|
| C1274 | Low output signal of rear wheel sensor LH | <ul style="list-style-type: none"> • Rear wheel sensor LH • Sensor installation • Wheel sensor rotor |
| C1275 | Abnormal change in output signal is front wheel sensor RH | Wheel sensor rotor |
| C1276 | Abnormal change in output signal is front wheel sensor LH | Wheel sensor rotor |
| C1277 | Abnormal change in output signal is rear wheel sensor RH | Wheel sensor rotor |
| C1278 | Abnormal change in output signal is rear wheel sensor LH | Wheel sensor rotor |
| C1279 | Acceleration sensor output voltage malfunction | <ul style="list-style-type: none"> • Yaw rate/side/decel G sensor • Sensor installation |
| C1281 | Master cylinder pressure sensor output malfunction | <ul style="list-style-type: none"> • Stop lamp switch • Master cylinder pressure sensor |

VDC sensor:

| DTC code | Detection item | Trouble area |
|----------|-----------------|------------------------------|
| C0371 | Yaw rate sensor | Yaw rate/side/decel G sensor |

Electronically Controlled Brake sensor:

| DTC code | Detection item | Trouble area |
|----------|---|---------------------|
| C1346 | Stroke sensor zero point learning malfunction | Brake stroke sensor |

NOTE:

The codes in this table are output only in Test Mode (signal check).

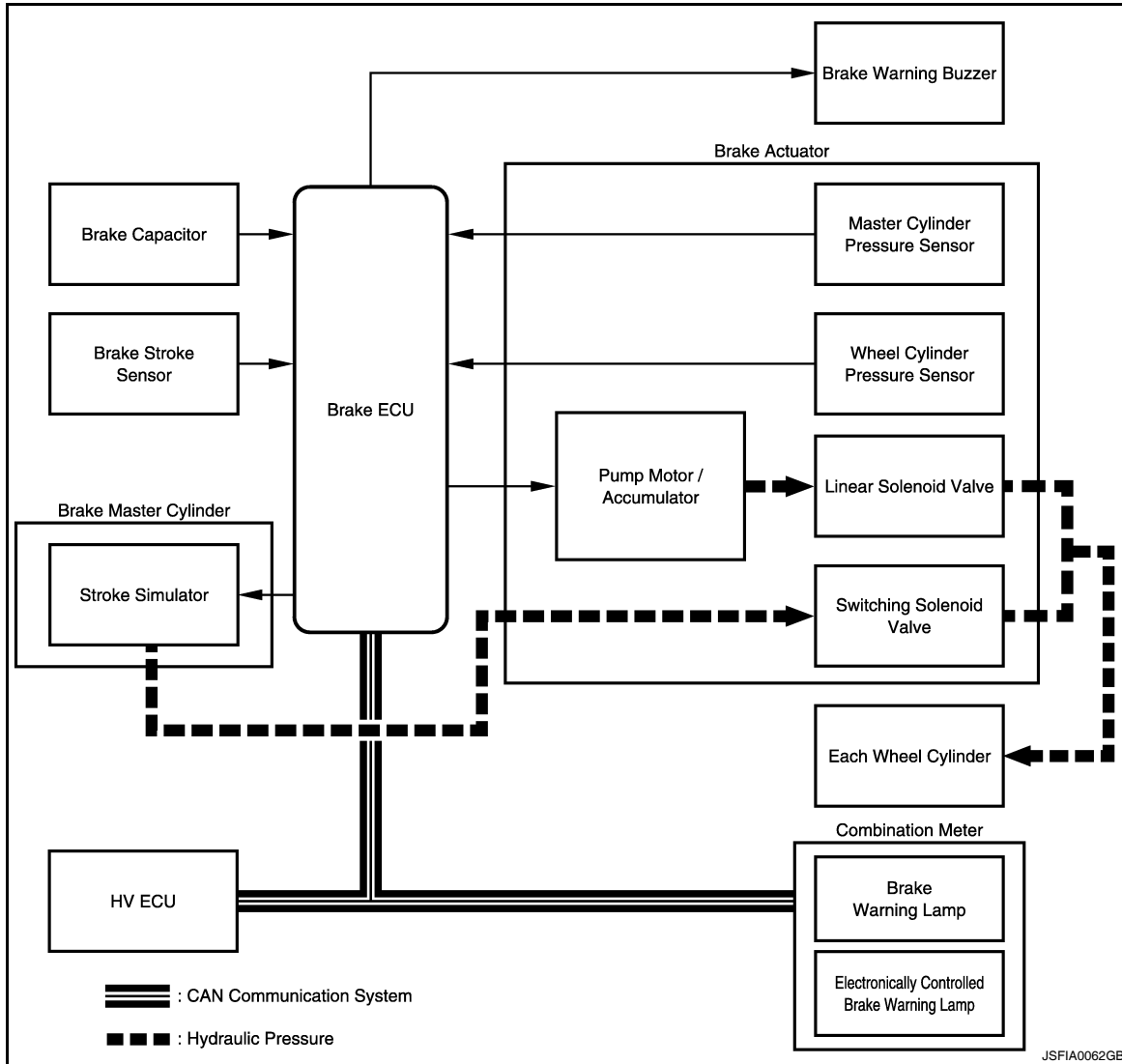
A
B
C
D
E
BRC
G
H
I
J
K
L
M
N
O
P

FUNCTION DIAGNOSIS

ELECTRONICALLY CONTROLLED BRAKE SYSTEM

System Diagram

INFOID:000000004212613



System Description

INFOID:000000004212614

1. The system detects the degree of brake pedal operation with a brake stroke sensor and two master cylinder pressure sensors, and calculates the optimum hydraulic brake force. The hydraulic pressure source is adjusted based on this so that the optimum hydraulic control is independently performed on all four wheels.
2. Meanwhile, the Electronically Controlled Brake system performs control of the normal brakes, ABS, TCS, VDC in accordance with the operations of the driver.
3. There is a hydraulic backup mechanism that applies master cylinder pressure generated by human power to the wheel cylinder when the brake control stops. In addition, as a fail safe mechanism, when the brake control is malfunctioning, the system excludes the malfunctioning sections and continues to perform brake control on the normal sections. A power backup unit (brake control power supply) is also used to ensure a stable supply of power to the system.

ELECTRONICALLY CONTROLLED BRAKE SYSTEM

< FUNCTION DIAGNOSIS >

[VDC/TCS/ABS]

Component Parts Location

INFOID:000000004212615

A

B

C

D

E

BRC

G

H

I

J

K

L

M

N

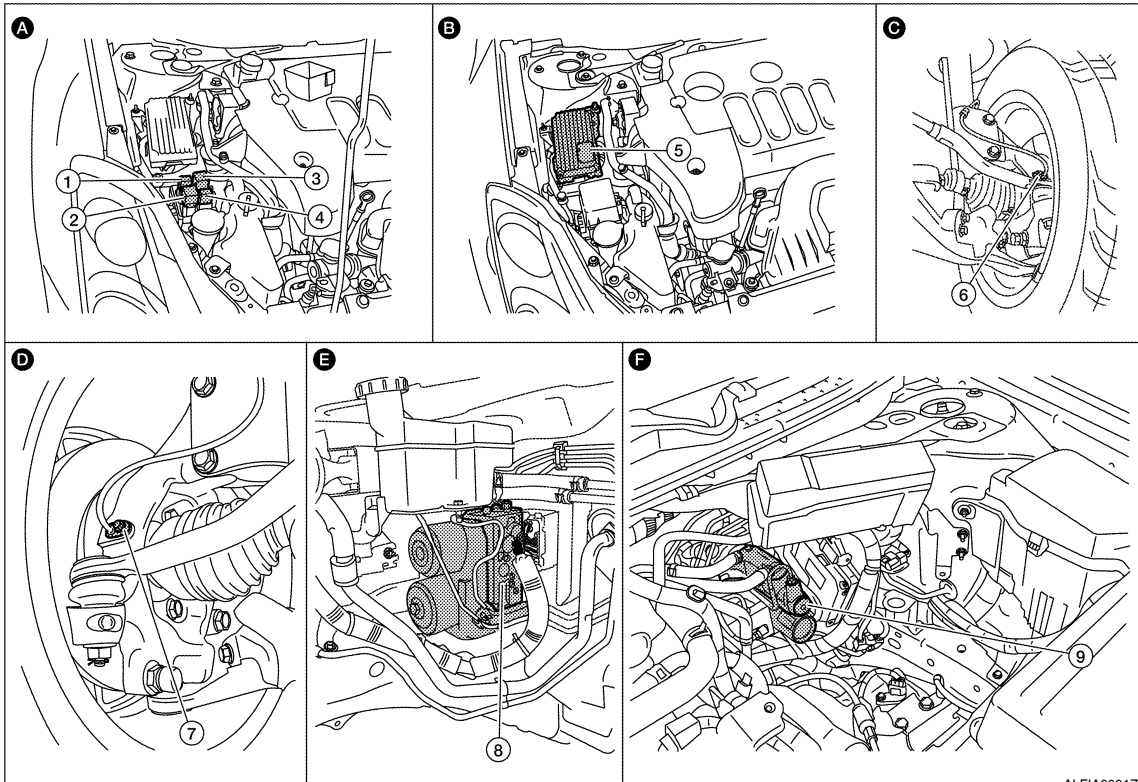
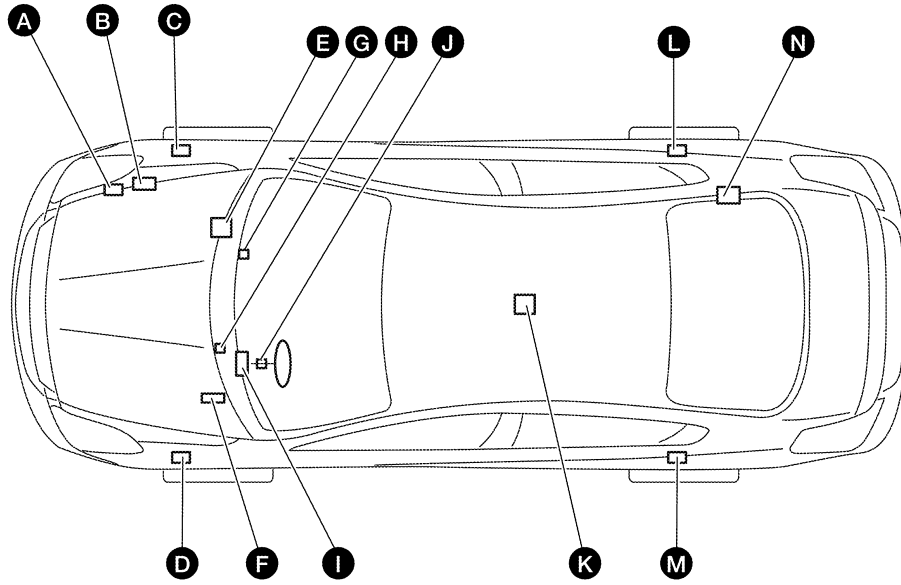
O

P

ELECTRONICALLY CONTROLLED BRAKE SYSTEM

< FUNCTION DIAGNOSIS >

[VDC/TCS/ABS]

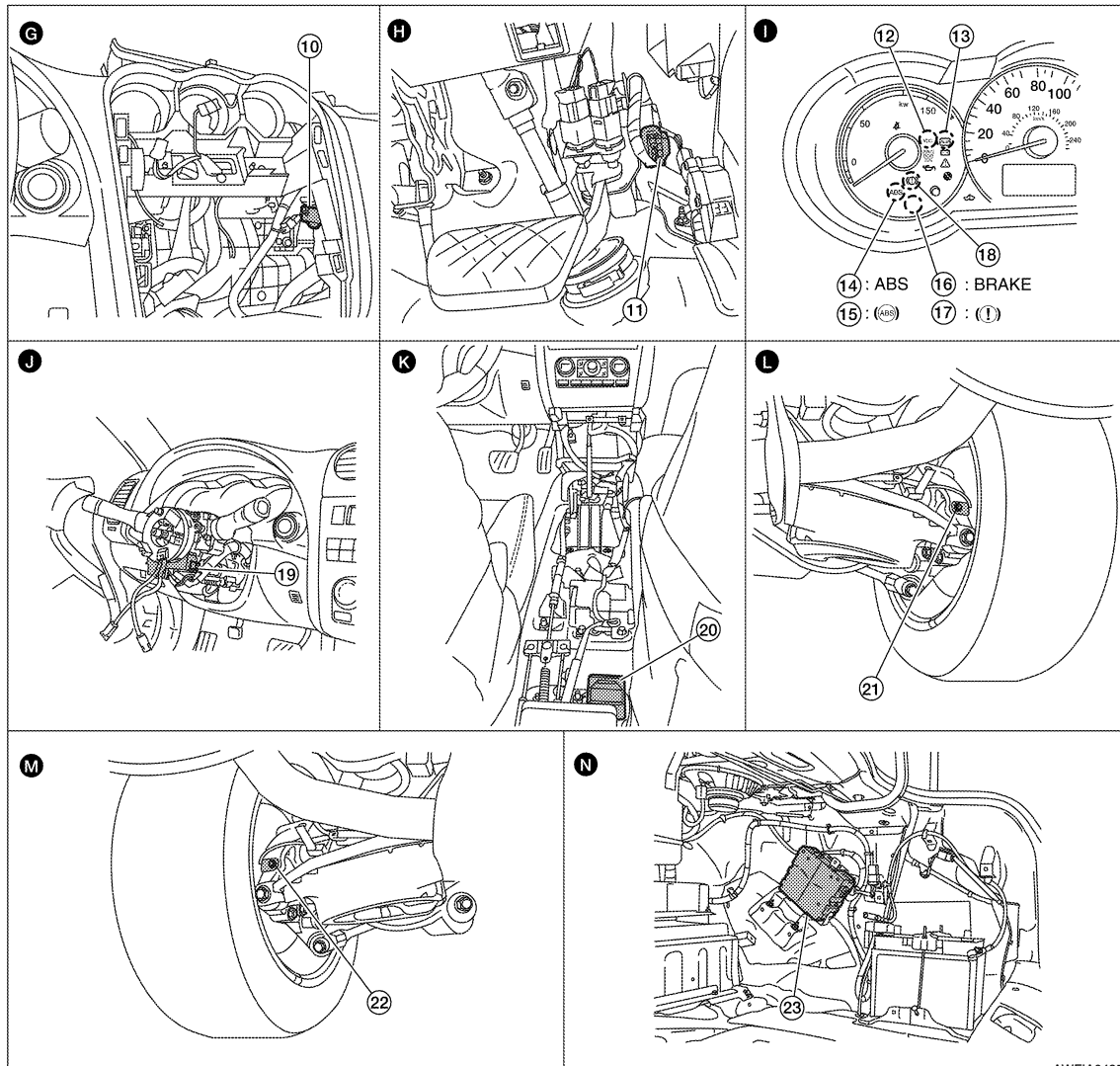


ALFIA0001ZZ

ELECTRONICALLY CONTROLLED BRAKE SYSTEM

< FUNCTION DIAGNOSIS >

[VDC/TCS/ABS]



AWFIA0495ZZ

- | | | |
|---------------------------------|-------------------------------------|--|
| 1. ABS relay No.1 | 2. ABS motor relay No.1 | 3. ABS motor relay No.2 |
| 4. ABS relay No.2 | 5. Brake ECU | 6. Front RH wheel sensor |
| 7. Front LH wheel sensor | 8. Brake actuator | 9. Brake simulator |
| 10. Brake warning buzzer | 11. Brake stroke sensor | 12. VDC warning lamp |
| 13. SLIP indicator lamp | 14. ABS warning lamp (For US) | 15. ABS warning lamp (For CANADA) |
| 16. Brake warning lamp (For US) | 17. Brake warning lamp (For CANADA) | 18. Electronically Controlled Brake warning lamp |
| 19. Steering angle sensor | 20. Yaw rate/side/decel G sensor | 21. Rear RH wheel sensor |
| 22. Rear LH wheel sensor | 23. Brake capacitor | |
| A. Engine room right side | B. Engine room right side | C. Steering knuckle (RH) |
| D. Steering knuckle (LH) | E. Engine room right side | F. Engine room left side |
| G. Cluster lid C | H. Instrument driver panel lower | I. Combination meter |
| J. Spiral cable assembly | K. Center Console | L. Rear knuckle (RH) |
| M. Rear knuckle | N. Trunk room right side | |

Component Description

INFOID:000000004212616

ELECTRONICALLY CONTROLLED BRAKE SYSTEM

< FUNCTION DIAGNOSIS >

[VDC/TCS/ABS]

| Components | Functions |
|--|--|
| Brake ECU | Processes the signals from each sensor to perform brake control for ABS, TCS, and VDC. In addition, it communicates with the HV control ECU to output a control signal. |
| ABS main relay (ABS relay No.1, 2) | Controlled by the brake ECU. In addition to supplying power to each solenoid, it supplies power to the brake ECU. |
| ABS motor relay (ABS motor relay No.1, 2) | Controlled by the brake ECU. Supplies power to the pump motor. |
| Wheel sensor | Detects the wheel speed and inputs the results to the brake ECU. |
| Stop lamp switch | Detects the brake operating conditions and inputs the result to the brake ECU. It supplies power to the brake ECU. |
| Brake stroke sensor | Detects the brake pedal stroke volume and inputs the result to the brake ECU. |
| Brake capacitor | Provides the system with a supplementary power supply by discharging the electric charge of the brake capacitor. It happens when an electric charge is accumulator in the brake capacitor in the unit and the vehicle power voltage (12 V) is reduced. |
| Brake warning buzzer | Sounds continuously to warn the driver of a reduction in accumulator hydraulic pressure in the brake actuator, an abnormality in the power supply system, or a reduction in the vehicle power voltage (12 V). |
| HV ECU | Controls the engine output during the operation of TCS and VDC by communicating with the brake ECU. |
| Yaw rate/side/decel G sensor | Detects the yaw rate (axial rotation) and the forward and lateral acceleration, and inputs the results to the brake ECU. |
| Steering angle sensor | Detects the steering angle and direction, and outputs the results to the brake ECU through CAN communication. |
| Master cylinder | Generates pressure in accordance with the force of the brake operation. |
| Brake fluid reservoir | Stores brake fluid for the master cylinder system and power supply system. |
| Brake fluid level switch | Detects a reduction in the level of the brake fluid in the reservoir. |
| Brake simulator | Generates a natural pedal stroke in accordance with the pedal force of the driver during system control. |
| Brake actuator | Controls the hydraulic pressure of each of the four wheel cylinders using the output signal of the brake ECU. |
| Pump motor | Pumps up the brake fluid from the reservoir and supplies the accumulator with high hydraulic pressure. |
| Accumulator | Accumulators for the hydraulic pressure that was generated by the pump. |
| Accumulator pressure sensor (PACC) | Built into the brake actuator to detect the accumulator hydraulic pressure. |
| Relief valve | Prevents excessive high pressure in the power supply system. It relieves the system by sending brake fluid to the reservoir when the pump has operated continuously, for example, during an accumulator hydraulic pressure sensor malfunction. |
| Master cylinder pressure sensor (PMC1, PMC2) | Built into the brake actuator to detect the pressure of the master cylinder and input the results to the brake ECU. |
| Wheel cylinder pressure sensor (PFR, PFL, PRR, PRL) | Built into the brake actuator to detect the brake hydraulic pressure of each wheel cylinder. |
| Switching solenoid valve (SMC1, SMC2) | Circuits from a master cylinder to a wheel cylinder are interrupted. |
| Linear solenoid valve (SLA##, SLR##) | Controls the wheel cylinder hydraulic pressure during normal brake operation, ABS, TCS, and VDC control. SLA## are solenoids for controlling pressure increases, while SLR## are solenoids for controlling pressure decreases. |
| ABS warning lamp | Comes on to inform the driver that a malfunction in the ABS have occurred. |
| Brake warning lamp | <ul style="list-style-type: none"> • When a malfunction occurs in the oil pressure system. • When EBD is not controlled. |
| Electronically Controlled Brake warning lamp | Comes on to inform the driver that a malfunction in the Electronically Controlled Brake or degenerative brake has occurred. |

ELECTRONICALLY CONTROLLED BRAKE SYSTEM

< FUNCTION DIAGNOSIS >

[VDC/TCS/ABS]

| Components | Functions |
|---------------------|--|
| SLIP indicator lamp | Blinks to inform the driver that ABS, TCS and VDC are operating. |
| VDC warning lamp | <ul style="list-style-type: none">• Comes on to inform the driver that a malfunction in VDC system have occurred.• Zero point of steering angle sensor is dislocated.• Remove the auxiliary battery. |

A

B

C

D

E

BRC

G

H

I

J

K

L

M

N

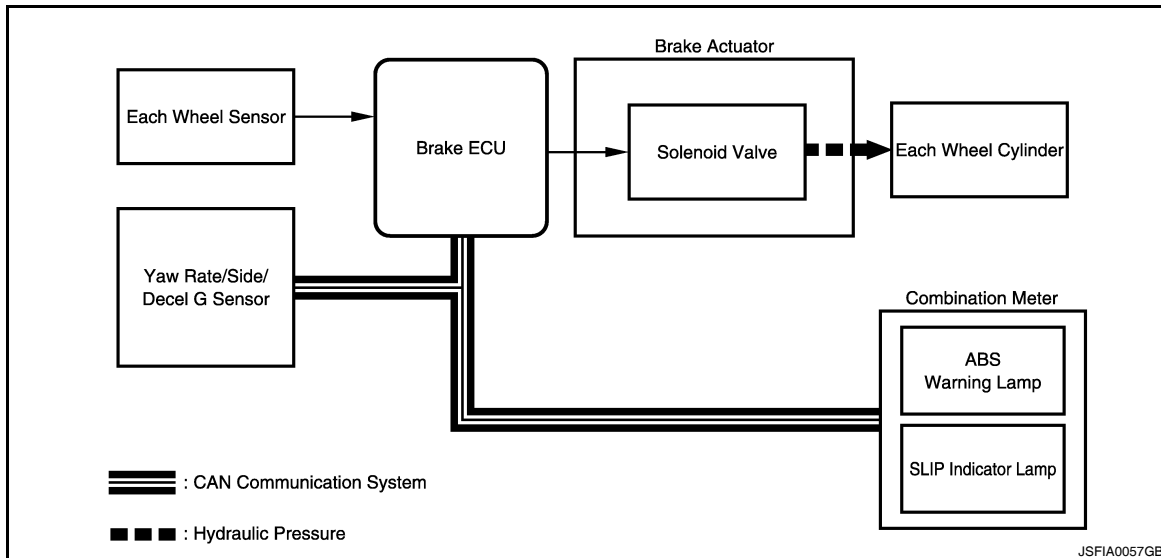
O

P

ABS

System Diagram

INFOID:000000004212617



System Description

INFOID:000000004212618

SYSTEM DESCRIPTION

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

OPERATION DESCRIPTION

The brake ECU detects wheel lock based on speed signals it receives from the wheel sensors. Based on this information, and yaw rate/side/decel G sensor signals, the brake ECU controls the solenoid valves are used to prevent wheel lock by controlling the hydraulic pressure applied to the brakes at each wheel. The SLIP indicator lamp blinks when the system is operating. The ABS warning lamp will come ON when the system is malfunctioning.

Component Parts Location

INFOID:000000004469725

A

B

C

D

E

BRC

G

H

I

J

K

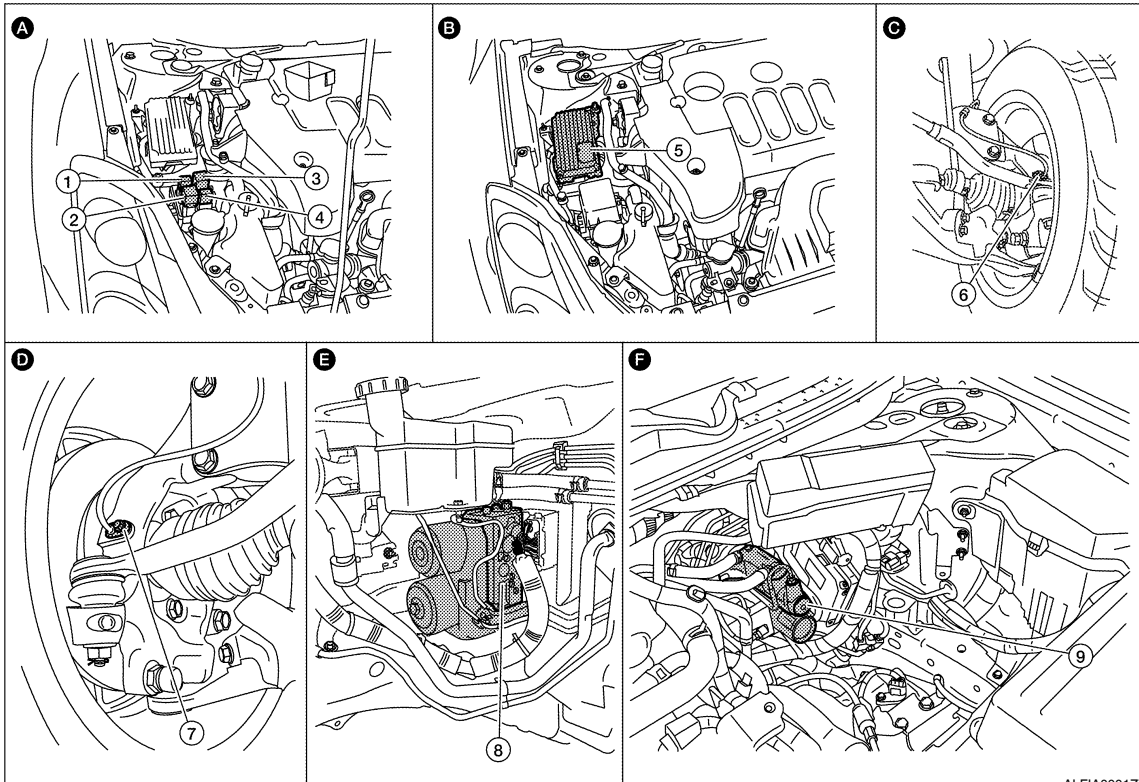
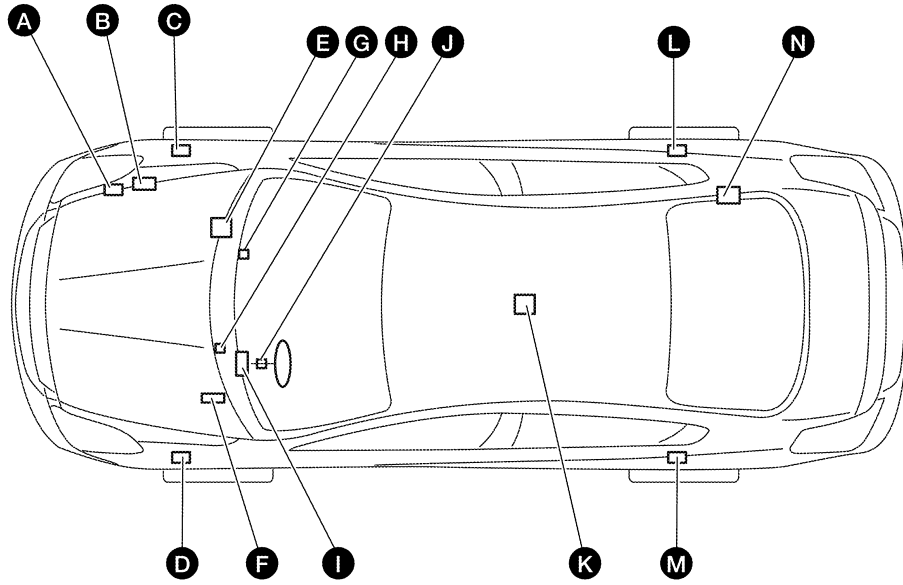
L

M

N

O

P

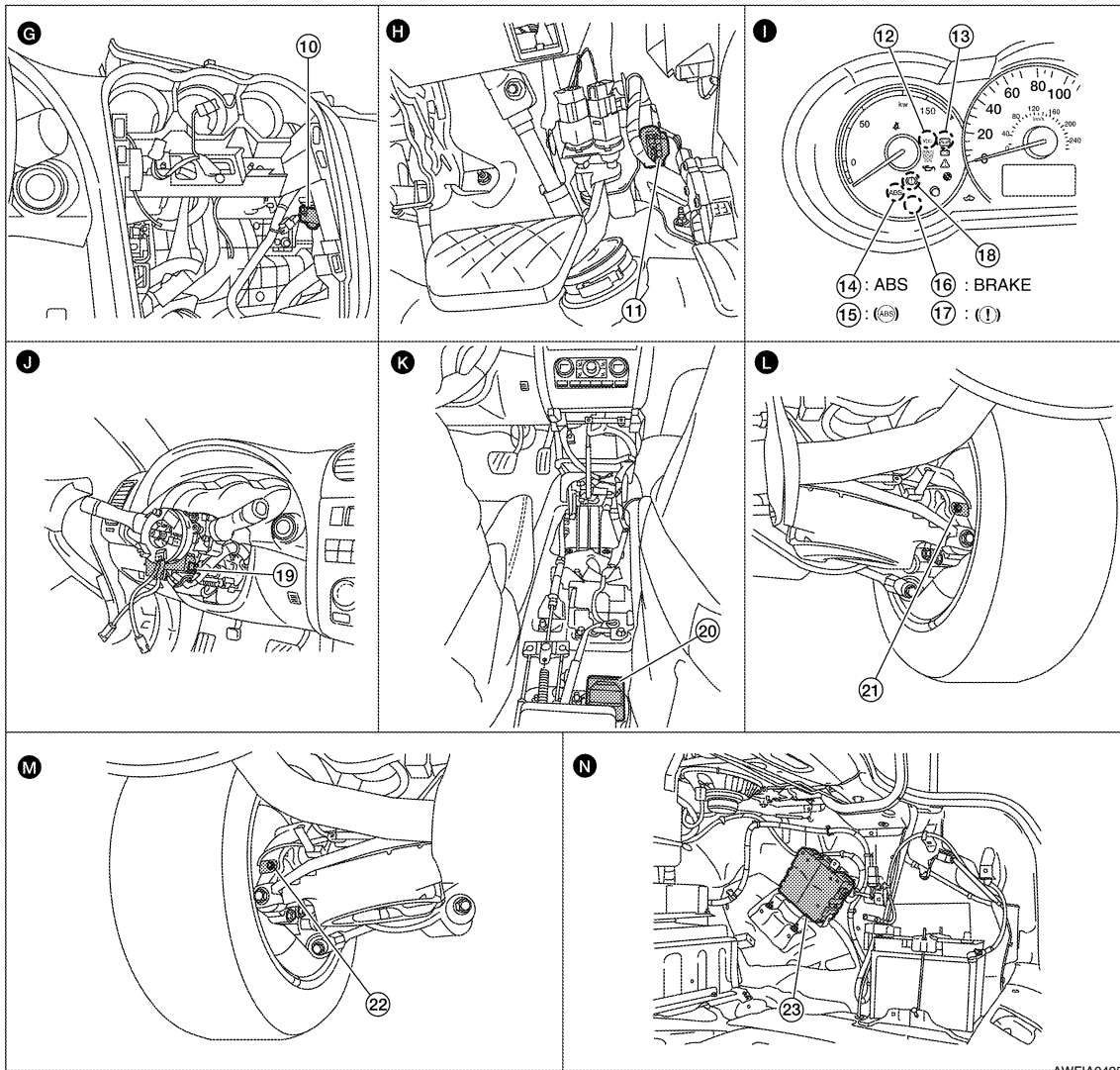


ALFIA0001ZZ

ABS

< FUNCTION DIAGNOSIS >

[VDC/TCS/ABS]



AWFIA0495ZZ

- | | | |
|---------------------------------|-------------------------------------|--|
| 1. ABS relay No.1 | 2. ABS motor relay No.1 | 3. ABS motor relay No.2 |
| 4. ABS relay No.2 | 5. Brake ECU | 6. Front RH wheel sensor |
| 7. Front LH wheel sensor | 8. Brake actuator | 9. Brake simulator |
| 10. Brake warning buzzer | 11. Brake stroke sensor | 12. VDC warning lamp |
| 13. SLIP indicator lamp | 14. ABS warning lamp (For US) | 15. ABS warning lamp (For CANADA) |
| 16. Brake warning lamp (For US) | 17. Brake warning lamp (For CANADA) | 18. Electronically Controlled Brake warning lamp |
| 19. Steering angle sensor | 20. Yaw rate/side/decel G sensor | 21. Rear RH wheel sensor |
| 22. Rear LH wheel sensor | 23. Brake capacitor | |
| A. Engine room right side | B. Engine room right side | C. Steering knuckle (RH) |
| D. Steering knuckle (LH) | E. Engine room right side | F. Engine room left side |
| G. Cluster lid C | H. Instrument driver panel lower | I. Combination meter |
| J. Spiral cable assembly | K. Center Console | L. Rear knuckle (RH) |
| M. Rear knuckle | N. Trunk room right side | |

Component Description

INFOID:000000004212620

ABS

< FUNCTION DIAGNOSIS >

[VDC/TCS/ABS]

| Components | Functions |
|--|--|
| Brake ECU | Processes the signals from each sensor to perform brake control for ABS, TCS, and VDC. In addition, it communicates with the HV control ECU to output a control signal. |
| ABS main relay (ABS relay No.1, 2) | Controlled by the brake ECU. In addition to supplying power to each solenoid, it supplies power to the brake ECU. |
| ABS motor relay (ABS motor relay No.1, 2) | Controlled by the brake ECU. Supplies power to the pump motor. |
| Wheel sensor | Detects the wheel speed and inputs the results to the brake ECU. |
| Stop lamp switch | Detects the brake operating conditions and inputs the result to the brake ECU. It supplies power to the brake ECU. |
| Brake stroke sensor | Detects the brake pedal stroke volume and inputs the result to the brake ECU. |
| Brake capacitor | Provides the system with a supplementary power supply by discharging the electric charge of the brake capacitor. It happens when an electric charge is accumulator in the brake capacitor in the unit and the vehicle power voltage (12 V) is reduced. |
| Brake warning buzzer | Sounds continuously to warn the driver of a reduction in accumulator hydraulic pressure in the brake actuator, an abnormality in the power supply system, or a reduction in the vehicle power voltage (12 V). |
| HV ECU | Controls the engine output during the operation of TCS and VDC by communicating with the brake ECU. |
| Yaw rate/side/decel G sensor | Detects the yaw rate (axial rotation) and the forward and lateral acceleration, and inputs the results to the brake ECU. |
| Steering angle sensor | Detects the steering angle and direction, and outputs the results to the brake ECU through CAN communication. |
| Master cylinder | Generates pressure in accordance with the force of the brake operation. |
| Brake fluid reservoir | Stores brake fluid for the master cylinder system and power supply system. |
| Brake fluid level switch | Detects a reduction in the level of the brake fluid in the reservoir. |
| Brake simulator | Generates a natural pedal stroke in accordance with the pedal force of the driver during system control. |
| Brake actuator | Controls the hydraulic pressure of each of the four wheel cylinders using the output signal of the brake ECU. |
| Pump motor | Pumps up the brake fluid from the reservoir and supplies the accumulator with high hydraulic pressure. |
| Accumulator | Accumulators for the hydraulic pressure that was generated by the pump. |
| Accumulator pressure sensor (PACC) | Built into the brake actuator to detect the accumulator hydraulic pressure. |
| Relief valve | Prevents excessive high pressure in the power supply system. It relieves the system by sending brake fluid to the reservoir when the pump has operated continuously, for example, during an accumulator hydraulic pressure sensor malfunction. |
| Master cylinder pressure sensor (PMC1, PMC2) | Built into the brake actuator to detect the pressure of the master cylinder and input the results to the brake ECU. |
| Wheel cylinder pressure sensor (PFR, PFL, PRR, PRL) | Built into the brake actuator to detect the brake hydraulic pressure of each wheel cylinder. |
| Switching solenoid valve (SMC1, SMC2) | Circuits from a master cylinder to a wheel cylinder are interrupted. |
| Linear solenoid valve (SLA##, SLR##) | Controls the wheel cylinder hydraulic pressure during normal brake operation, ABS, TCS, and VDC control. SLA## are solenoids for controlling pressure increases, while SLR## are solenoids for controlling pressure decreases. |
| ABS warning lamp | Comes on to inform the driver that a malfunction in the ABS have occurred. |
| Brake warning lamp | <ul style="list-style-type: none"> • When a malfunction occurs in the oil pressure system. • When EBD is not controlled. |
| Electronically Controlled Brake warning lamp | Comes on to inform the driver that a malfunction in the Electronically Controlled Brake or degenerative brake has occurred. |

ABS

< FUNCTION DIAGNOSIS >

[VDC/TCS/ABS]

| Components | Functions |
|---------------------|--|
| SLIP indicator lamp | Blinks to inform the driver that ABS, TCS and VDC are operating. |
| VDC warning lamp | <ul style="list-style-type: none">• Comes on to inform the driver that a malfunction in VDC system have occurred.• Zero point of steering angle sensor is dislocated.• Remove the auxiliary battery. |

A

B

C

D

E

BRC

G

H

I

J

K

L

M

N

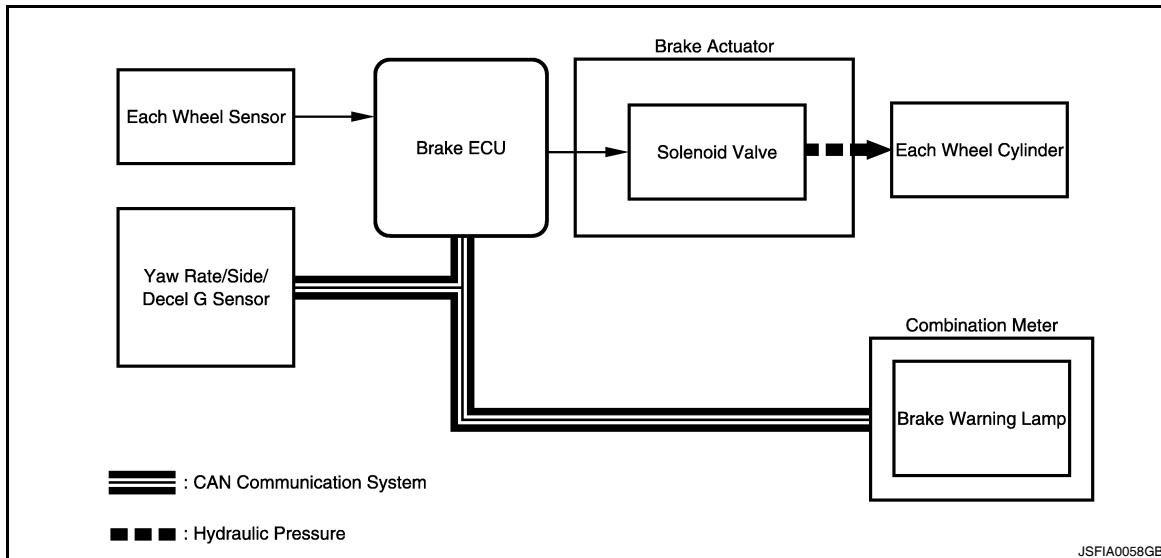
O

P

EBD

System Diagram

INFOID:000000004212621



System Description

INFOID:000000004212622

SYSTEM DESCRIPTION

The EBD (Electric Brake force Distribution) control utilizes ABS, performing proper brake force distribution between the front and rear wheels in accordance with driving conditions. When braking while cornering, it also controls the brake forces of the right and left wheels, helping to maintain vehicle behavior.

OPERATION DESCRIPTION

The brake ECU receives a speed signal from each wheel sensor, G sensor signals and uses these signals to detect locking of the wheels. The ECU uses this information in order to determine appropriate control of the solenoid valves. The solenoid valves control the hydraulic pressure applied to the brake cylinder at each wheel. In this way, the solenoid valves are used to control the brake power split between the front and rear, and left and right wheels. The brake warning lamp will come ON if there is a malfunction in the EBD system.

Component Parts Location

INFOID:000000004469726

A

B

C

D

E

BRC

G

H

I

J

K

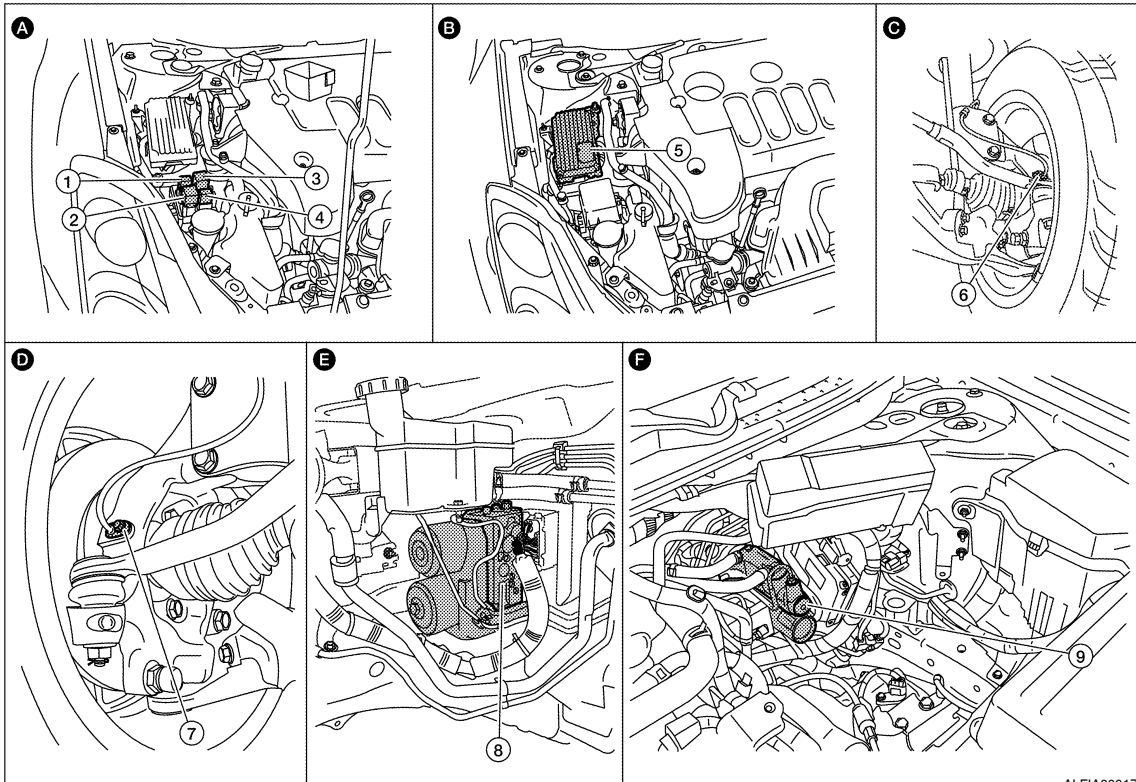
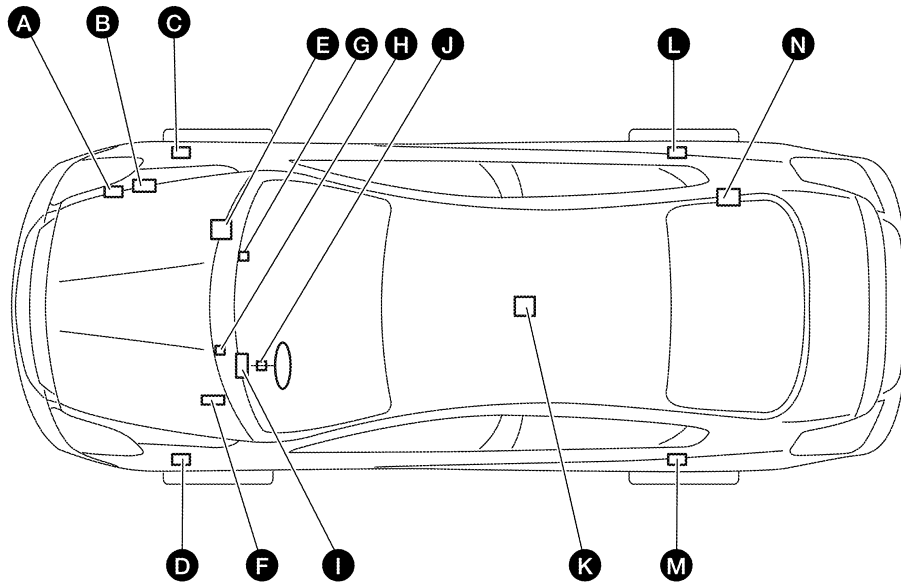
L

M

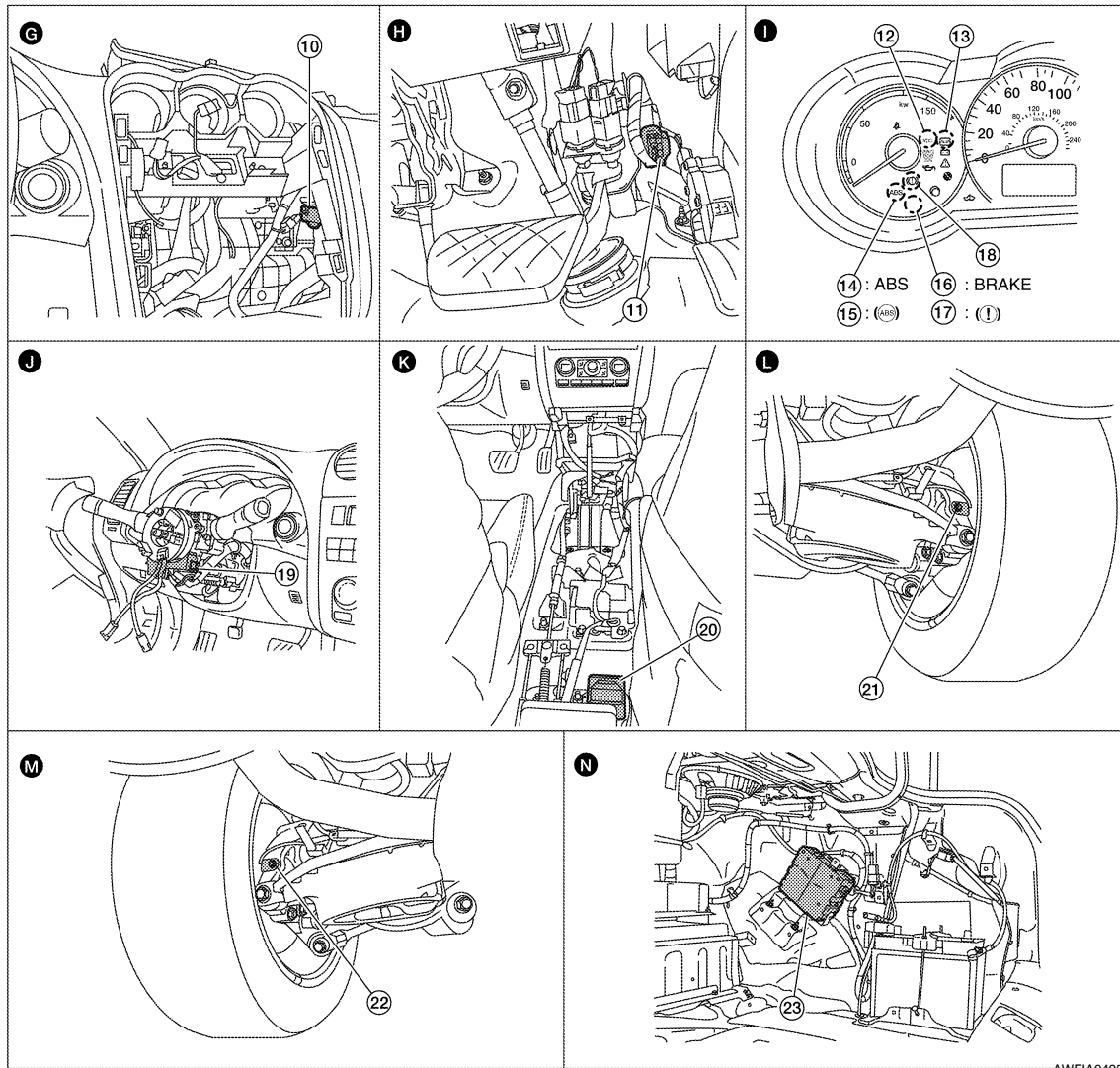
N

O

P



ALFIA0001ZZ



AWFIA0495ZZ

- | | | |
|---------------------------------|-------------------------------------|--|
| 1. ABS relay No.1 | 2. ABS motor relay No.1 | 3. ABS motor relay No.2 |
| 4. ABS relay No.2 | 5. Brake ECU | 6. Front RH wheel sensor |
| 7. Front LH wheel sensor | 8. Brake actuator | 9. Brake simulator |
| 10. Brake warning buzzer | 11. Brake stroke sensor | 12. VDC warning lamp |
| 13. SLIP indicator lamp | 14. ABS warning lamp (For US) | 15. ABS warning lamp (For CANADA) |
| 16. Brake warning lamp (For US) | 17. Brake warning lamp (For CANADA) | 18. Electronically Controlled Brake warning lamp |
| 19. Steering angle sensor | 20. Yaw rate/side/decel G sensor | 21. Rear RH wheel sensor |
| 22. Rear LH wheel sensor | 23. Brake capacitor | |
| A. Engine room right side | B. Engine room right side | C. Steering knuckle (RH) |
| D. Steering knuckle (LH) | E. Engine room right side | F. Engine room left side |
| G. Cluster lid C | H. Instrument driver panel lower | I. Combination meter |
| J. Spiral cable assembly | K. Center Console | L. Rear knuckle (RH) |
| M. Rear knuckle | N. Trunk room right side | |

Component Description

INFOID:000000004212624

A
B
C
D
E
BRC
G
H
I
J
K
L
M
N
O
P

EBD

< FUNCTION DIAGNOSIS >

[VDC/TCS/ABS]

| Components | Functions |
|--|--|
| Brake ECU | Processes the signals from each sensor to perform brake control for ABS, TCS, and VDC. In addition, it communicates with the HV control ECU to output a control signal. |
| ABS main relay (ABS relay No.1, 2) | Controlled by the brake ECU. In addition to supplying power to each solenoid, it supplies power to the brake ECU. |
| ABS motor relay (ABS motor relay No.1, 2) | Controlled by the brake ECU. Supplies power to the pump motor. |
| Wheel sensor | Detects the wheel speed and inputs the results to the brake ECU. |
| Stop lamp switch | Detects the brake operating conditions and inputs the result to the brake ECU. It supplies power to the brake ECU. |
| Brake stroke sensor | Detects the brake pedal stroke volume and inputs the result to the brake ECU. |
| Brake capacitor | Provides the system with a supplementary power supply by discharging the electric charge of the brake capacitor. It happens when an electric charge is accumulator in the brake capacitor in the unit and the vehicle power voltage (12 V) is reduced. |
| Brake warning buzzer | Sounds continuously to warn the driver of a reduction in accumulator hydraulic pressure in the brake actuator, an abnormality in the power supply system, or a reduction in the vehicle power voltage (12 V). |
| HV ECU | Controls the engine output during the operation of TCS and VDC by communicating with the brake ECU. |
| Yaw rate/side/decel G sensor | Detects the yaw rate (axial rotation) and the forward and lateral acceleration, and inputs the results to the brake ECU. |
| Steering angle sensor | Detects the steering angle and direction, and outputs the results to the brake ECU through CAN communication. |
| Master cylinder | Generates pressure in accordance with the force of the brake operation. |
| Brake fluid reservoir | Stores brake fluid for the master cylinder system and power supply system. |
| Brake fluid level switch | Detects a reduction in the level of the brake fluid in the reservoir. |
| Brake simulator | Generates a natural pedal stroke in accordance with the pedal force of the driver during system control. |
| Brake actuator | Controls the hydraulic pressure of each of the four wheel cylinders using the output signal of the brake ECU. |
| Pump motor | Pumps up the brake fluid from the reservoir and supplies the accumulator with high hydraulic pressure. |
| Accumulator | Accumulators for the hydraulic pressure that was generated by the pump. |
| Accumulator pressure sensor (PACC) | Built into the brake actuator to detect the accumulator hydraulic pressure. |
| Relief valve | Prevents excessive high pressure in the power supply system. It relieves the system by sending brake fluid to the reservoir when the pump has operated continuously, for example, during an accumulator hydraulic pressure sensor malfunction. |
| Master cylinder pressure sensor (PMC1, PMC2) | Built into the brake actuator to detect the pressure of the master cylinder and input the results to the brake ECU. |
| Wheel cylinder pressure sensor (PFR, PFL, PRR, PRL) | Built into the brake actuator to detect the brake hydraulic pressure of each wheel cylinder. |
| Switching solenoid valve (SMC1, SMC2) | Circuits from a master cylinder to a wheel cylinder are interrupted. |
| Linear solenoid valve (SLA##, SLR##) | Controls the wheel cylinder hydraulic pressure during normal brake operation, ABS, TCS, and VDC control. SLA## are solenoids for controlling pressure increases, while SLR## are solenoids for controlling pressure decreases. |
| ABS warning lamp | Comes on to inform the driver that a malfunction in the ABS have occurred. |
| Brake warning lamp | <ul style="list-style-type: none"> • When a malfunction occurs in the oil pressure system. • When EBD is not controlled. |
| Electronically Controlled Brake warning lamp | Comes on to inform the driver that a malfunction in the Electronically Controlled Brake or degenerative brake has occurred. |

EBD

< FUNCTION DIAGNOSIS >

[VDC/TCS/ABS]

| Components | Functions |
|---------------------|--|
| SLIP indicator lamp | Blinks to inform the driver that ABS, TCS and VDC are operating. |
| VDC warning lamp | <ul style="list-style-type: none">• Comes on to inform the driver that a malfunction in VDC system have occurred.• Zero point of steering angle sensor is dislocated.• Remove the auxiliary battery. |

A

B

C

D

E

BRC

G

H

I

J

K

L

M

N

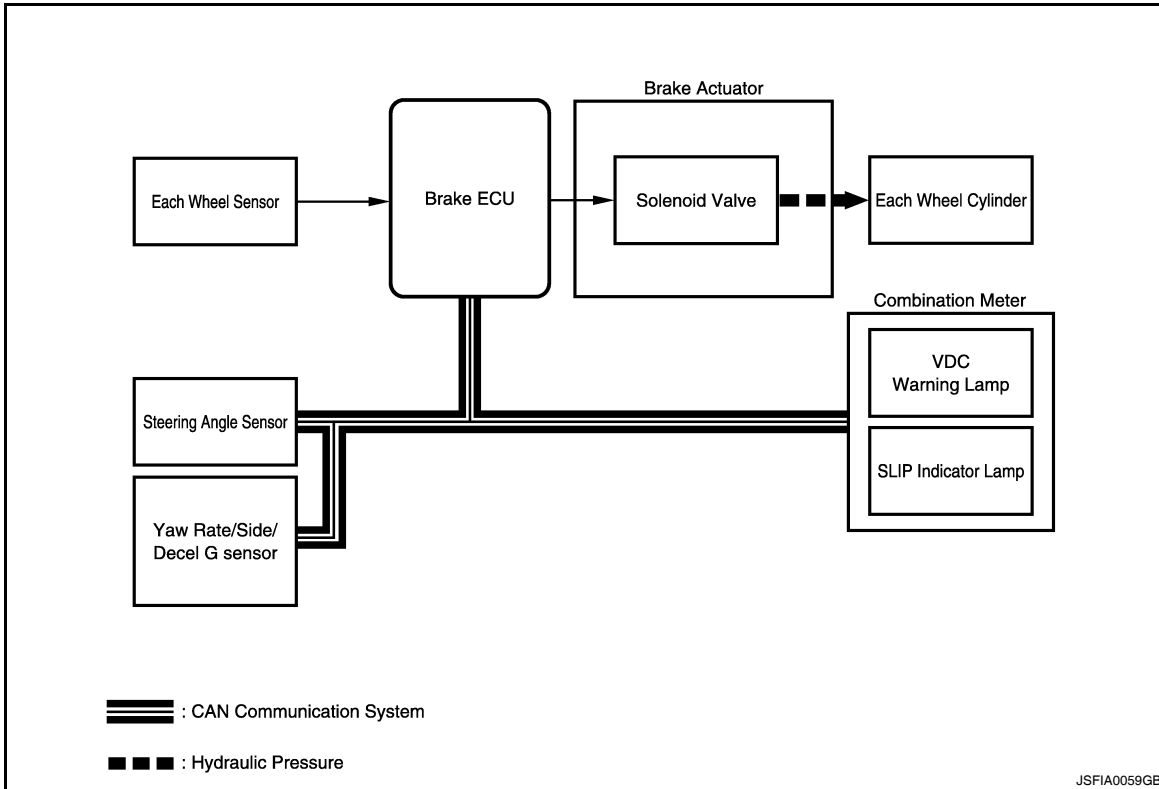
O

P

TCS

System Diagram

INFOID:000000004212625



System Description

INFOID:000000004212626

SYSTEM DESCRIPTION

The TCS (Traction Control System) helps prevent the drive wheels from slipping when the driver depresses the accelerator pedal excessively while starting off or accelerating on a slippery surface.

OPERATION DESCRIPTION

The brake ECU detects wheelspin by receiving signals from each wheel sensor. The brake ECU controls engine torque with the HV ECU via CAN communication and brake hydraulic pressure through the solenoid valve. The SLIP indicator lamp blinks when the system is operating. When there is a malfunction in the TCS system, the VDC warning lamp come ON.

Component Parts Location

INFOID:000000004469727

A

B

C

D

E

BRC

G

H

I

J

K

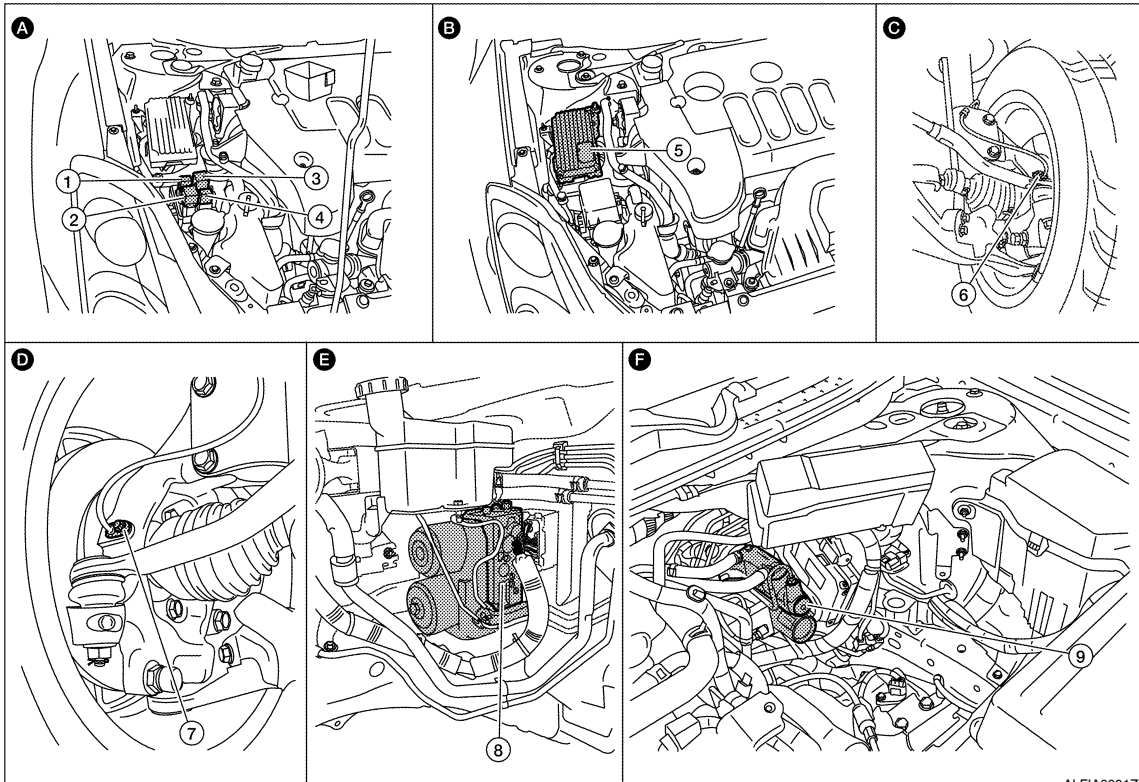
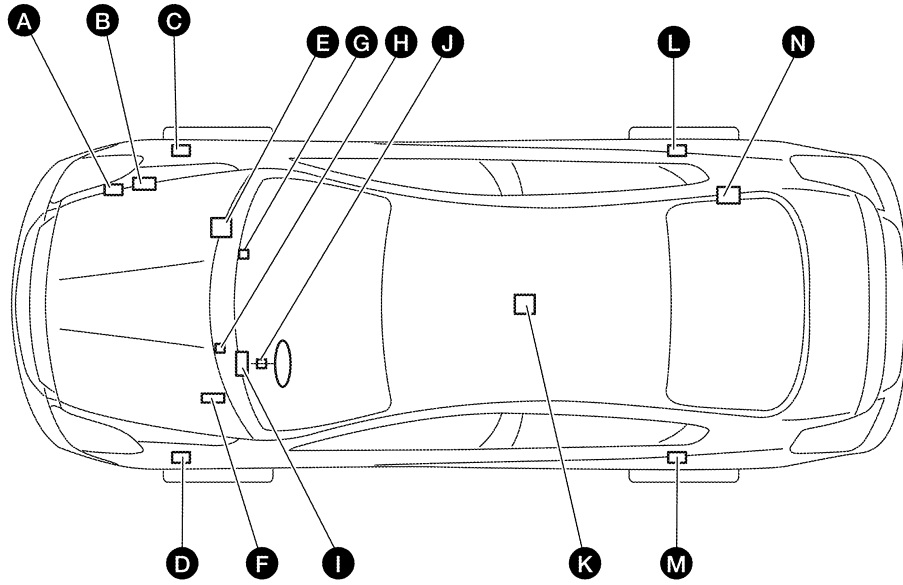
L

M

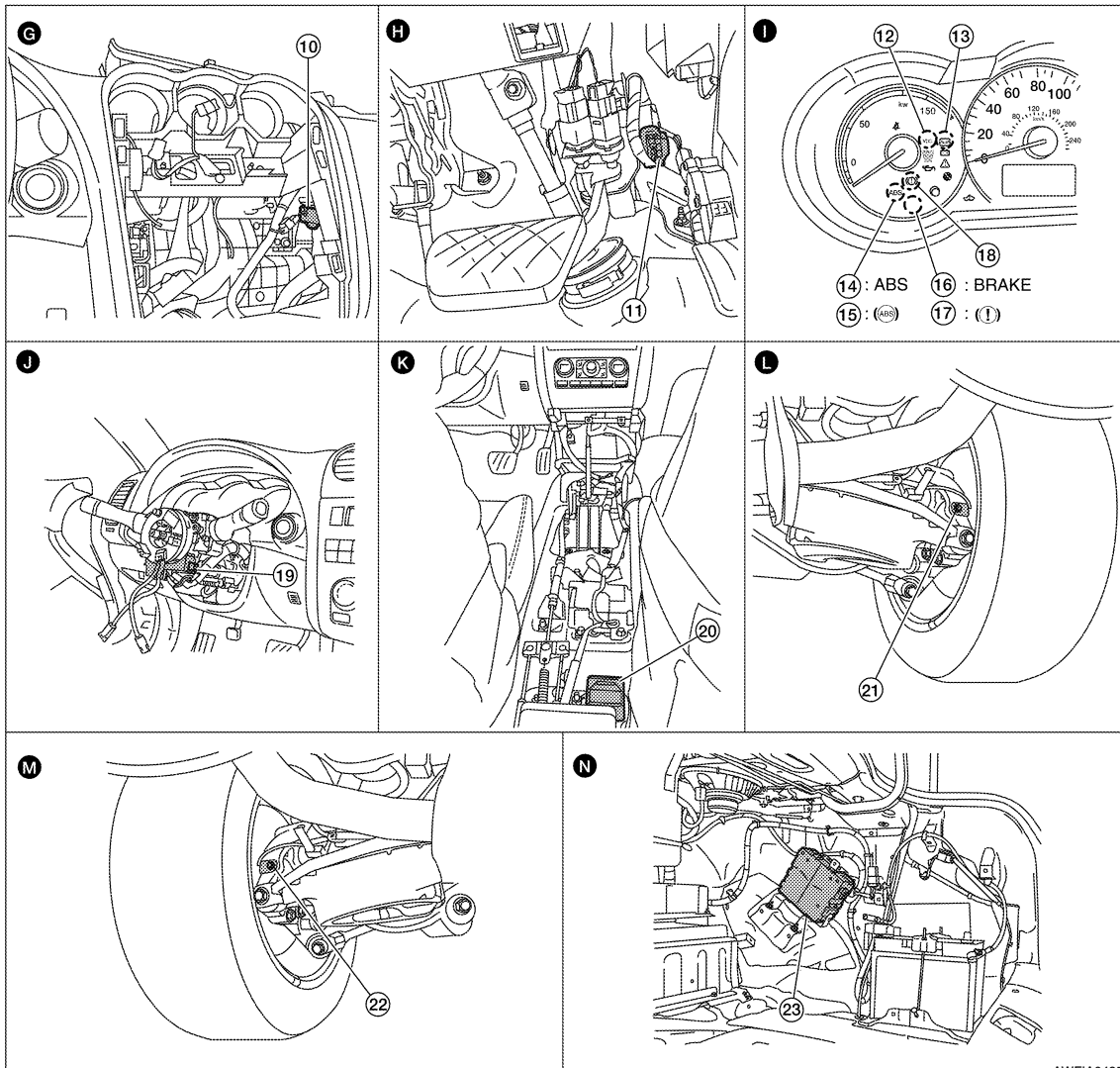
N

O

P



ALFIA0001ZZ



AWFIA0495ZZ

- | | | |
|---------------------------------|-------------------------------------|--|
| 1. ABS relay No.1 | 2. ABS motor relay No.1 | 3. ABS motor relay No.2 |
| 4. ABS relay No.2 | 5. Brake ECU | 6. Front RH wheel sensor |
| 7. Front LH wheel sensor | 8. Brake actuator | 9. Brake simulator |
| 10. Brake warning buzzer | 11. Brake stroke sensor | 12. VDC warning lamp |
| 13. SLIP indicator lamp | 14. ABS warning lamp (For US) | 15. ABS warning lamp (For CANADA) |
| 16. Brake warning lamp (For US) | 17. Brake warning lamp (For CANADA) | 18. Electronically Controlled Brake warning lamp |
| 19. Steering angle sensor | 20. Yaw rate/side/decel G sensor | 21. Rear RH wheel sensor |
| 22. Rear LH wheel sensor | 23. Brake capacitor | |
-
- | | | |
|---------------------------|----------------------------------|--------------------------|
| A. Engine room right side | B. Engine room right side | C. Steering knuckle (RH) |
| D. Steering knuckle (LH) | E. Engine room right side | F. Engine room left side |
| G. Cluster lid C | H. Instrument driver panel lower | I. Combination meter |
| J. Spiral cable assembly | K. Center Console | L. Rear knuckle (RH) |
| M. Rear knuckle | N. Trunk room right side | |

Component Description

INFOID:000000004212628

A
B
C
D
E
BRC
G
H
I
J
K
L
M
N
O
P

TCS

[VDC/TCS/ABS]

< FUNCTION DIAGNOSIS >

| Components | Functions |
|--|--|
| Brake ECU | Processes the signals from each sensor to perform brake control for ABS, TCS, and VDC. In addition, it communicates with the HV control ECU to output a control signal. |
| ABS main relay (ABS relay No.1, 2) | Controlled by the brake ECU. In addition to supplying power to each solenoid, it supplies power to the brake ECU. |
| ABS motor relay (ABS motor relay No.1, 2) | Controlled by the brake ECU. Supplies power to the pump motor. |
| Wheel sensor | Detects the wheel speed and inputs the results to the brake ECU. |
| Stop lamp switch | Detects the brake operating conditions and inputs the result to the brake ECU. It supplies power to the brake ECU. |
| Brake stroke sensor | Detects the brake pedal stroke volume and inputs the result to the brake ECU. |
| Brake capacitor | Provides the system with a supplementary power supply by discharging the electric charge of the brake capacitor. It happens when an electric charge is accumulator in the brake capacitor in the unit and the vehicle power voltage (12 V) is reduced. |
| Brake warning buzzer | Sounds continuously to warn the driver of a reduction in accumulator hydraulic pressure in the brake actuator, an abnormality in the power supply system, or a reduction in the vehicle power voltage (12 V). |
| HV ECU | Controls the engine output during the operation of TCS and VDC by communicating with the brake ECU. |
| Yaw rate/side/decel G sensor | Detects the yaw rate (axial rotation) and the forward and lateral acceleration, and inputs the results to the brake ECU. |
| Steering angle sensor | Detects the steering angle and direction, and outputs the results to the brake ECU through CAN communication. |
| Master cylinder | Generates pressure in accordance with the force of the brake operation. |
| Brake fluid reservoir | Stores brake fluid for the master cylinder system and power supply system. |
| Brake fluid level switch | Detects a reduction in the level of the brake fluid in the reservoir. |
| Brake simulator | Generates a natural pedal stroke in accordance with the pedal force of the driver during system control. |
| Brake actuator | Controls the hydraulic pressure of each of the four wheel cylinders using the output signal of the brake ECU. |
| Pump motor | Pumps up the brake fluid from the reservoir and supplies the accumulator with high hydraulic pressure. |
| Accumulator | Accumulators for the hydraulic pressure that was generated by the pump. |
| Accumulator pressure sensor (PACC) | Built into the brake actuator to detect the accumulator hydraulic pressure. |
| Relief valve | Prevents excessive high pressure in the power supply system. It relieves the system by sending brake fluid to the reservoir when the pump has operated continuously, for example, during an accumulator hydraulic pressure sensor malfunction. |
| Master cylinder pressure sensor (PMC1, PMC2) | Built into the brake actuator to detect the pressure of the master cylinder and input the results to the brake ECU. |
| Wheel cylinder pressure sensor (PFR, PFL, PRR, PRL) | Built into the brake actuator to detect the brake hydraulic pressure of each wheel cylinder. |
| Switching solenoid valve (SMC1, SMC2) | Circuits from a master cylinder to a wheel cylinder are interrupted. |
| Linear solenoid valve (SLA##, SLR##) | Controls the wheel cylinder hydraulic pressure during normal brake operation, ABS, TCS, and VDC control. SLA## are solenoids for controlling pressure increases, while SLR## are solenoids for controlling pressure decreases. |
| ABS warning lamp | Comes on to inform the driver that a malfunction in the ABS have occurred. |
| Brake warning lamp | <ul style="list-style-type: none"> • When a malfunction occurs in the oil pressure system. • When EBD is not controlled. |
| Electronically Controlled Brake warning lamp | Comes on to inform the driver that a malfunction in the Electronically Controlled Brake or degenerative brake has occurred. |

TCS

< FUNCTION DIAGNOSIS >

[VDC/TCS/ABS]

| Components | Functions |
|---------------------|--|
| SLIP indicator lamp | Blinks to inform the driver that ABS, TCS and VDC are operating. |
| VDC warning lamp | <ul style="list-style-type: none">• Comes on to inform the driver that a malfunction in VDC system have occurred.• Zero point of steering angle sensor is dislocated.• Remove the auxiliary battery. |

A

B

C

D

E

BRC

G

H

I

J

K

L

M

N

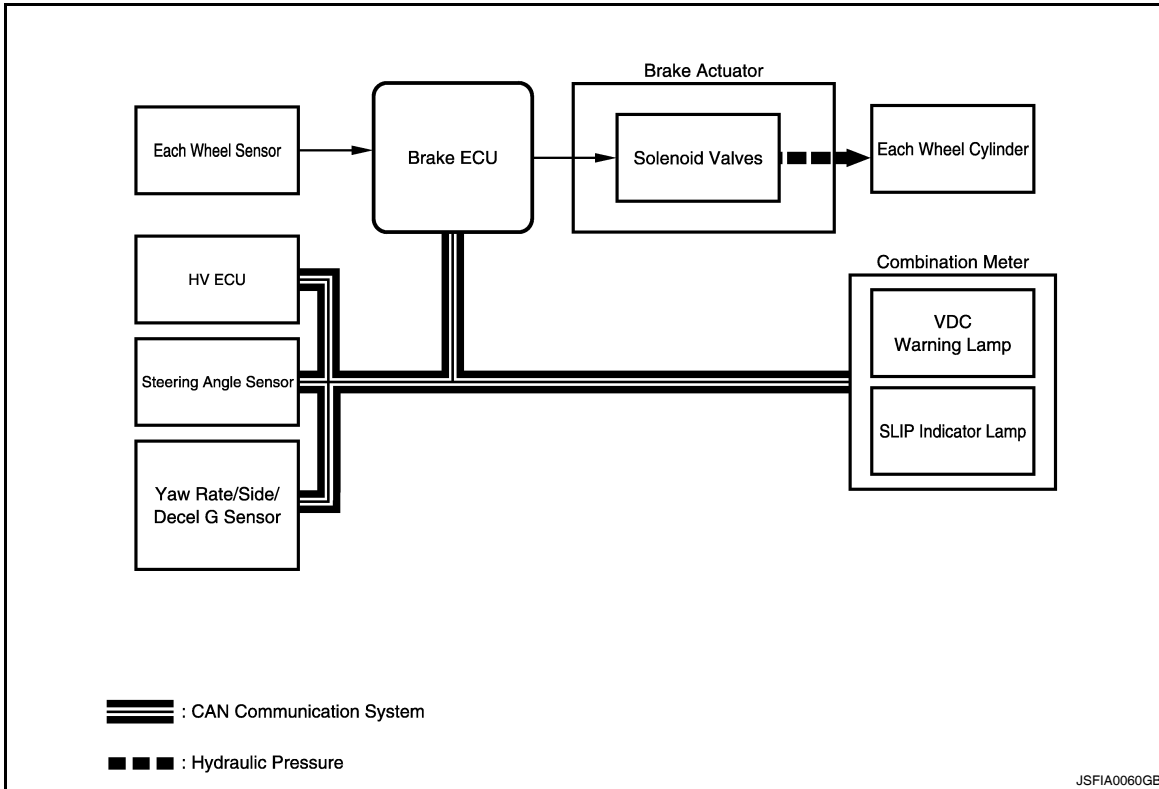
O

P

VDC

System Diagram

INFOID:000000004212629



System Description

INFOID:000000004212630

SYSTEM DESCRIPTION

The VDC (Vehicle Dynamics Control) helps prevent the vehicle from slipping sideways as a result of strong front or rear wheel slid during cornering.

OPERATION DESCRIPTION

The brake ECU determines the vehicle operating conditions based in signals received from the wheel sensors, yaw rate/side/decel G sensor, and steering angle sensor. The brake ECU sends signals via CAN communication to the HV ECU on order to control engine torque. The brake ECU controls brake hydraulic pressure using the solenoid valves. The SLIP indicator lamp will blink, when the system in operating. If a malfunction occurs in the VDC system, VDC warning lamp will come ON.

Component Parts Location

INFOID:000000004469728

A

B

C

D

E

BRC

G

H

I

J

K

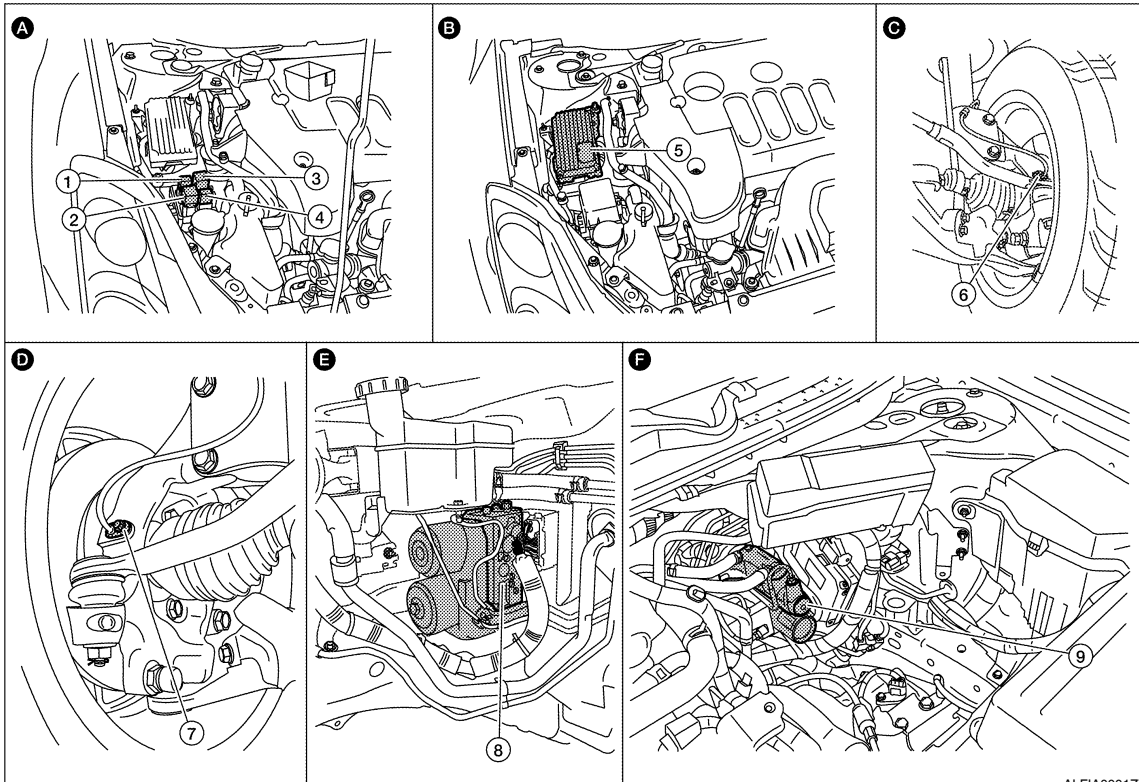
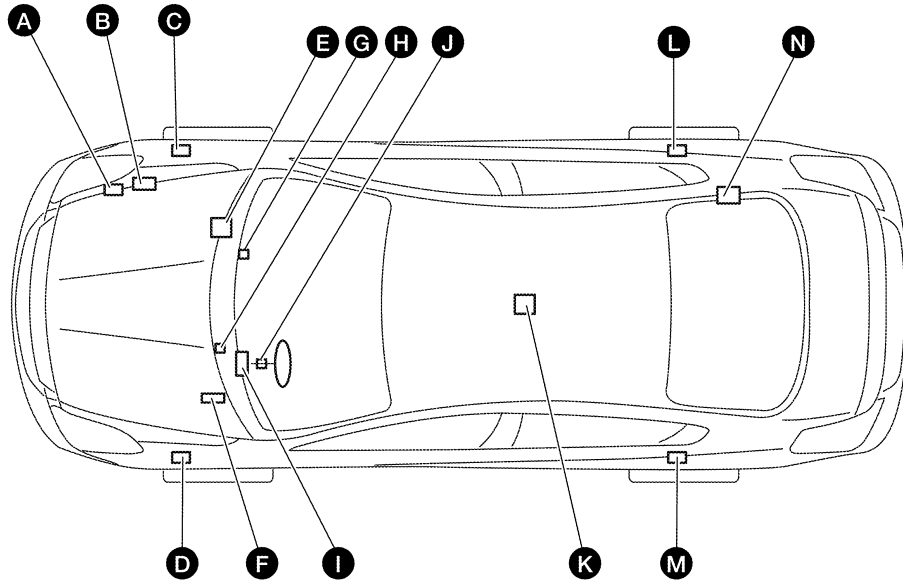
L

M

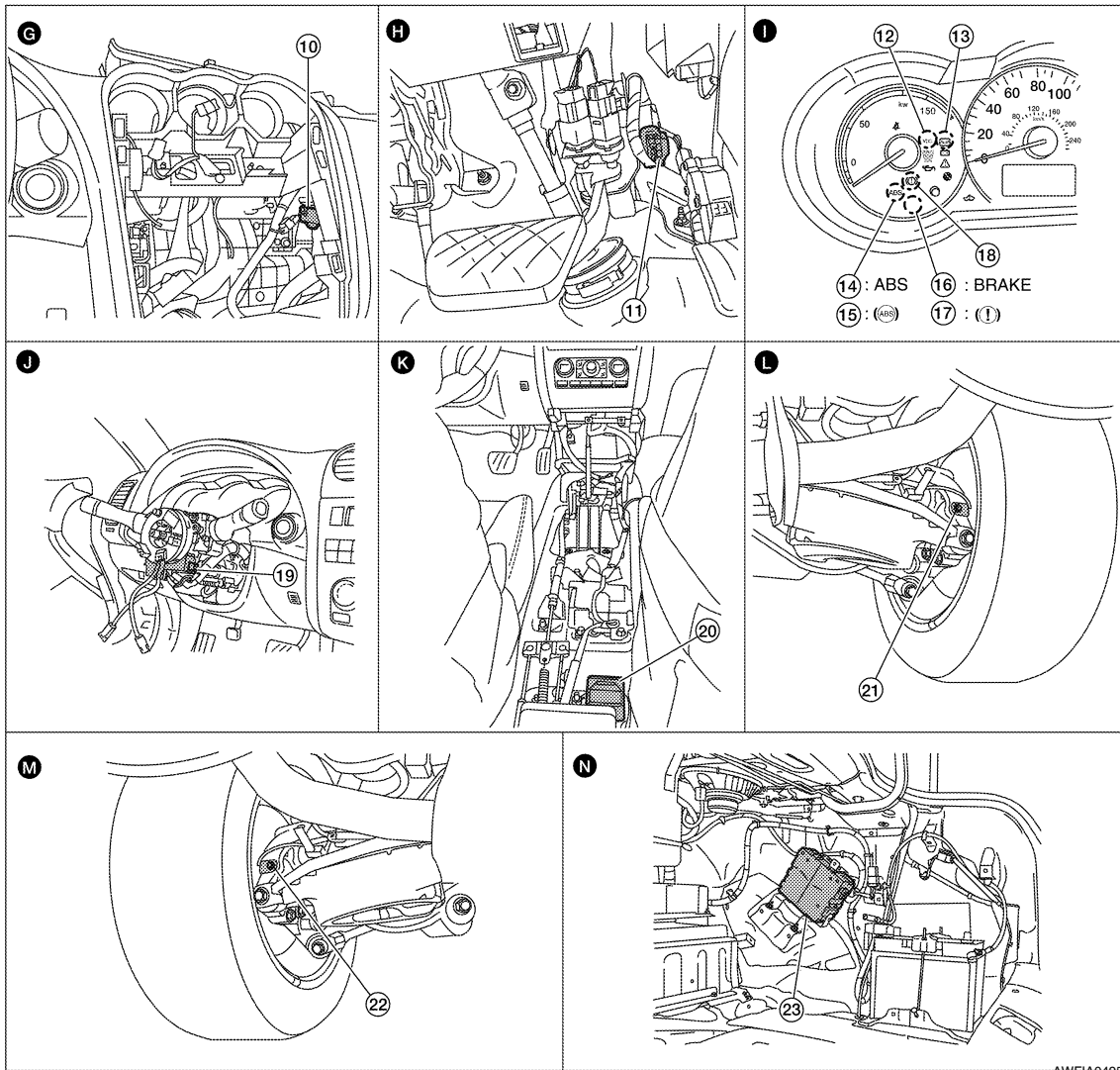
N

O

P



ALFIA0001ZZ



AWFIA0495ZZ

- | | | |
|---------------------------------|-------------------------------------|--|
| 1. ABS relay No.1 | 2. ABS motor relay No.1 | 3. ABS motor relay No.2 |
| 4. ABS relay No.2 | 5. Brake ECU | 6. Front RH wheel sensor |
| 7. Front LH wheel sensor | 8. Brake actuator | 9. Brake simulator |
| 10. Brake warning buzzer | 11. Brake stroke sensor | 12. VDC warning lamp |
| 13. SLIP indicator lamp | 14. ABS warning lamp (For US) | 15. ABS warning lamp (For CANADA) |
| 16. Brake warning lamp (For US) | 17. Brake warning lamp (For CANADA) | 18. Electronically Controlled Brake warning lamp |
| 19. Steering angle sensor | 20. Yaw rate/side/decel G sensor | 21. Rear RH wheel sensor |
| 22. Rear LH wheel sensor | 23. Brake capacitor | |
-
- | | | |
|---------------------------|----------------------------------|--------------------------|
| A. Engine room right side | B. Engine room right side | C. Steering knuckle (RH) |
| D. Steering knuckle (LH) | E. Engine room right side | F. Engine room left side |
| G. Cluster lid C | H. Instrument driver panel lower | I. Combination meter |
| J. Spiral cable assembly | K. Center Console | L. Rear knuckle (RH) |
| M. Rear knuckle | N. Trunk room right side | |

Component Description

INFOID:000000004212632

A
B
C
D
E
BRC
G
H
I
J
K
L
M
N
O
P

< FUNCTION DIAGNOSIS >

| Components | Functions |
|--|--|
| Brake ECU | Processes the signals from each sensor to perform brake control for ABS, TCS, and VDC. In addition, it communicates with the HV control ECU to output a control signal. |
| ABS main relay (ABS relay No.1, 2) | Controlled by the brake ECU. In addition to supplying power to each solenoid, it supplies power to the brake ECU. |
| ABS motor relay (ABS motor relay No.1, 2) | Controlled by the brake ECU. Supplies power to the pump motor. |
| Wheel sensor | Detects the wheel speed and inputs the results to the brake ECU. |
| Stop lamp switch | Detects the brake operating conditions and inputs the result to the brake ECU. It supplies power to the brake ECU. |
| Brake stroke sensor | Detects the brake pedal stroke volume and inputs the result to the brake ECU. |
| Brake capacitor | Provides the system with a supplementary power supply by discharging the electric charge of the brake capacitor. It happens when an electric charge is accumulator in the brake capacitor in the unit and the vehicle power voltage (12 V) is reduced. |
| Brake warning buzzer | Sounds continuously to warn the driver of a reduction in accumulator hydraulic pressure in the brake actuator, an abnormality in the power supply system, or a reduction in the vehicle power voltage (12 V). |
| HV ECU | Controls the engine output during the operation of TCS and VDC by communicating with the brake ECU. |
| Yaw rate/side/decel G sensor | Detects the yaw rate (axial rotation) and the forward and lateral acceleration, and inputs the results to the brake ECU. |
| Steering angle sensor | Detects the steering angle and direction, and outputs the results to the brake ECU through CAN communication. |
| Master cylinder | Generates pressure in accordance with the force of the brake operation. |
| Brake fluid reservoir | Stores brake fluid for the master cylinder system and power supply system. |
| Brake fluid level switch | Detects a reduction in the level of the brake fluid in the reservoir. |
| Brake simulator | Generates a natural pedal stroke in accordance with the pedal force of the driver during system control. |
| Brake actuator | Controls the hydraulic pressure of each of the four wheel cylinders using the output signal of the brake ECU. |
| Pump motor | Pumps up the brake fluid from the reservoir and supplies the accumulator with high hydraulic pressure. |
| Accumulator | Accumulators for the hydraulic pressure that was generated by the pump. |
| Accumulator pressure sensor (PACC) | Built into the brake actuator to detect the accumulator hydraulic pressure. |
| Relief valve | Prevents excessive high pressure in the power supply system. It relieves the system by sending brake fluid to the reservoir when the pump has operated continuously, for example, during an accumulator hydraulic pressure sensor malfunction. |
| Master cylinder pressure sensor (PMC1, PMC2) | Built into the brake actuator to detect the pressure of the master cylinder and input the results to the brake ECU. |
| Wheel cylinder pressure sensor (PFR, PFL, PRR, PRL) | Built into the brake actuator to detect the brake hydraulic pressure of each wheel cylinder. |
| Switching solenoid valve (SMC1, SMC2) | Circuits from a master cylinder to a wheel cylinder are interrupted. |
| Linear solenoid valve (SLA##, SLR##) | Controls the wheel cylinder hydraulic pressure during normal brake operation, ABS, TCS, and VDC control. SLA## are solenoids for controlling pressure increases, while SLR## are solenoids for controlling pressure decreases. |
| ABS warning lamp | Comes on to inform the driver that a malfunction in the ABS have occurred. |
| Brake warning lamp | <ul style="list-style-type: none"> • When a malfunction occurs in the oil pressure system. • When EBD is not controlled. |
| Electronically Controlled Brake warning lamp | Comes on to inform the driver that a malfunction in the Electronically Controlled Brake or degenerative brake has occurred. |

VDC

< FUNCTION DIAGNOSIS >

[VDC/TCS/ABS]

| Components | Functions |
|---------------------|--|
| SLIP indicator lamp | Blinks to inform the driver that ABS, TCS and VDC are operating. |
| VDC warning lamp | <ul style="list-style-type: none">• Comes on to inform the driver that a malfunction in VDC system have occurred.• Zero point of steering angle sensor is dislocated.• Remove the auxiliary battery. |

A

B

C

D

E

BRC

G

H

I

J

K

L

M

N

O

P

INSPECTION MODE

System Description

INFOID:000000004212633

VDC operation can be disabled by operating the CONSULT-III.

DIAGNOSIS SYSTEM (VDC/TCS/ABS CONTROL UNIT)

< FUNCTION DIAGNOSIS >

[VDC/TCS/ABS]

DIAGNOSIS SYSTEM (VDC/TCS/ABS CONTROL UNIT)

CONSULT-III Function

INFOID:000000004212634

DIAGNOSIS SYSTEM

Description

When troubleshooting a vehicle with the diagnosis system, the only difference from the usual troubleshooting procedure is connecting the CONSULT-III to the vehicle and reading various data output from the vehicle's brake ECU.

The brake ECU records DTCs when the computer detects a malfunction in the computer itself or in its circuits. To check for DTCs, activate the various actuators, and check the Freeze Frame Data and Data List.

1. Check the auxiliary battery voltage.

Standard voltage : 11 to 14 V

If the voltage is below 11 V, recharge the auxiliary battery before proceeding to the next step.

2. Check the DLC3.

The ECU uses ISO 15765-4 for communication. The terminal arrangement of the DLC3 complies with SAE J1962 and matches the ISO 15765-4 format.

If the result is not as specified, the DLC3 may have a malfunction. Repair or replace the harness and connector.

Verify the conditions listed in the table below.

| Symbols (Terminal No.) | Terminal description | Condition | Specified condition |
|------------------------|------------------------|----------------------|---------------------|
| 7 – 5 | Bus "+" line | During transmission | Pulse generation |
| 4 – Ground | Chassis ground | Always | Below 1 Ω |
| 5 – Ground | Signal ground | Always | Below 1 Ω |
| 16 – Ground | Battery positive | Always | 11 to 14 V |
| 6 – 14 | CAN communication line | Ignition switch OFF* | 54 to 69 Ω |
| 6 – 4 | CAN-H line | Ignition switch OFF* | 200 Ω or higher |
| 14 – 4 | CAN-L line | Ignition switch OFF* | 200 Ω or higher |
| 6 – 16 | CAN-H line | Ignition switch OFF* | 6 kΩ or higher |
| 14 – 16 | CAN-L line | Ignition switch OFF* | 6 kΩ or higher |

*: Before measuring the resistance, leave the vehicle as is for at least 1 minute and do not operate the ignition switch, any other switches or the doors.

NOTE:

- Connect the cable of the CONSULT-III to the DLC3, turn the ignition switch ON and attempt to use the tester. If the display indicates that a communication error has occurred, there is a problem either with the vehicle or with the tester.
- If communication is normal when the tester is connected to another vehicle, inspect the DLC3 on the original vehicle.
- If communication is still not possible when the tester is connected to another vehicle, the problem may be in the tester itself. CONSULT-III the Service Department listed in the tester operator's manual.

Diagnosis

1. If the brake ECU detects a malfunction, the ABS warning lamp, brake warning lamp, Electronically Controlled Brake warning lamp, VDC warning lamp, and SLIP indicator lamp will come ON.

The table below indicates which lamps will come ON when there is a malfunction in a particular function.

×: Light ON –: Light OFF

| Item / Trouble area | ABS | EBD | TCS | VDC |
|--|-----|-----|-----|-----|
| ABS warning lamp | × | × | — | — |
| Brake warning lamp | — | × | — | — |
| Electronically Controlled Brake warning lamp | × | × | — | — |
| VDC warning lamp | × | × | × | × |

DIAGNOSIS SYSTEM (VDC/TCS/ABS CONTROL UNIT)

< FUNCTION DIAGNOSIS >

[VDC/TCS/ABS]

Warning Lamp and Indicator Lamp Check

1. Release the parking brake.

CAUTION:

When replacing the parking brake, move the shift lever to the P position for safety.

NOTE:

When the parking brake is applied or the level of the brake fluid is low, the brake warning lamp comes on.

2. When the ignition switch is turned ON, check that the ABS warning, brake warning, Electronically Controlled Brake warning, and SLIP indicator lamps come ON and remain in until the ignition switch is turned ON (READY).

NOTE:

If the warning lamp and indicator lamp check result is not normal, proceed to troubleshooting for the ABS warning, brake warning, Electronically Controlled Brake warning, VDC warning, and SLIP indicator lamp circuits.

If the indicator remains ON, proceed to troubleshooting for the lamp circuit below.

| Trouble area | Reference page |
|--|--|
| ABS warning lamp circuit | BRC-172. "Description" |
| Brake warning lamp circuit | BRC-177. "Description" |
| Electronically Controlled Brake warning lamp circuit | BRC-182. "Description" |
| VDC warning lamp circuit | BRC-175. "Description" |
| SLIP indicator lamp circuit | BRC-185. "Description" |

Symptom Simulation

NOTE:

The most difficult case in troubleshooting is when no symptoms occur. In such cases, a thorough customer problem analysis must be carried out. Then the same or similar conditions and environment in which the problem occurred in the customer's vehicle should be reproduced. No matter how experienced or skilled a technician may be, if he proceeds to troubleshoot without confirming the problem symptoms, he will likely overlook something important and make a wrong guess at some points in the repair operation. This leads to a standstill in troubleshooting.

1. Vibration method: When vibration seems to be the major cause.

NOTE:

Perform the simulation method only during the primary check period (for approximately 6 seconds after the ignition switch is turned ON.)

- a. Slightly vibrate the part of the sensor considered to be the problem cause with your fingers and check whether the malfunction occurs.
- b. Slightly shake the connector vertically and horizontally.

NOTE:

Shaking the relays too strongly may result in open relays.

- c. Slightly shake the wire harness vertically and horizontally. The connector joint and fulcrum of the vibration are the major areas to be checked thoroughly.

FREEZE FRAME DATA

Freeze Frame Data/ Information

1. Whenever an ABS DTC is detected, the brake ECU stored the current vehicle (sensor) state as Freeze Frame Data.
2. The brake ECU stores the number of times (maximum: 31) the ignition switch has been turned from off to ON since the last time the ABS was activated.
3. For DTCs memorized in the brake ECU, information (INF) codes that are contained in the Freeze Frame Data can be displayed on the CONSULT-III.

NOTE:

- However, if the vehicle is stopped or at a low speed [7 km/h (4.3 MPH) or less], or if a DTC is detected, the brake ECU will stop counting the number.

- Freeze Frame Data at the time the ABS operates:

The brake ECU stores and updates data whenever the ABS system operates.

When the ECU stores data at time a DTC is detected, the data stored during ABS operation is erased.

- Freeze Frame Data at the time a DTC is detected:

DIAGNOSIS SYSTEM (VDC/TCS/ABS CONTROL UNIT)

< FUNCTION DIAGNOSIS >

[VDC/TCS/ABS]

When the brake ECU stores data at the time a DTC is detected, no updates will be performed until the data is cleared.

Check Freeze Frame Data and Information

| Tester display | Measurement item | Reference value | |
|----------------|--|--|--------------------------|
| VHCL BODY SPD | Vehicle speed reading | Min | 0 km/h (0 MPH) |
| | | Max | 326.4 km/h (202 MPH) |
| STP | Stop lamp switch signal | Stop lamp switch ON | ON |
| | | Stop lamp switch OFF | OFF |
| IG ON COUNT | Number of operations of ignition switch ON after storing Freeze Frame Data | 0 to 31 | |
| MC PRESS SEN 1 | Master cylinder pressure sensor reading | Brake pedal released | 0.3 to 0.9 V |
| MC PRESS SEN 2 | Master cylinder pressure sensor change | Min | - 30 MPa/s |
| | | Max | 225 MPa/s |
| YAW RATE SEN | Yaw rate sensor reading | Min | - 128 deg/s |
| | | Max | 127 deg/s |
| ST ANG SEN | Steering angle sensor reading | Left turn | Increase |
| | | Right turn | Decrease |
| DECEL G SEN | Decel G sensor reading | Min | - 25.11 m/s ² |
| | | Max | 24.91 m/s ² |
| BUZZER | Brake warning buzzer signal | Brake warning buzzer ON | ON |
| | | Brake warning buzzer OFF | OFF |
| ACC VALU RATE | Accelerator operating angle | Min | 0% |
| | | Max | 128% |
| PKB | Parking brake switch signal | Parking brake switch ON | ON |
| | | Parking brake switch OFF | OFF |
| FR SEN SIG | FR wheel speed | Min | 0 km/h (0 MPH) |
| | | Max | 326.4 km/h (202 MPH) |
| FL SEN SIG | FL wheel speed | Min | 0 km/h (0 MPH) |
| | | Max | 326.4 km/h (202 MPH) |
| RR SEN SIG | RR wheel speed | Min | 0 km/h (0 MPH) |
| | | Max | 326.4 km/h (202 MPH) |
| RL SEN SIG | RL wheel speed | Min | 0 km/h (0 MPH) |
| | | Max | 326.4 km/h (202 MPH) |
| SIDE G SEN | Side G sensor reading | Min | - 25.11 m/s ² |
| | | Max | 24.91 m/s ² |
| SFT LVR INFOR | Shift lever position information | FAIL 1st 2nd 3rd 4th 5th 6th/B D/M P, N R | |

DIAGNOSIS SYSTEM (VDC/TCS/ABS CONTROL UNIT)

< FUNCTION DIAGNOSIS >

[VDC/TCS/ABS]

| Tester display | Measurement item | Reference value | |
|----------------|---|----------------------|--------------|
| OPE SYSTEM | Operated system status | ABS activated | ABS |
| | | VDC activated | VDC |
| | | TCS activated | TCS |
| | | No system activated | NON |
| | | System prohibited | SYS |
| FREE TRIG EL | Elapsed time after freeze trigger | Min | 0 ms |
| | | Max | 500 ms |
| FIRST DTC | Freeze frame DTC | Displays output DTC | |
| STRK SEN 1 | Stroke sensor reading | Min | 0 V |
| | | Max | 5 V |
| STRK SEN 2 | Stroke sensor 2 reading | Min | 0 V |
| | | Max | 5 V |
| FR WC PRESS | FR wheel cylinder pressure sensor reading | Min | 0 V |
| | | Max | 5 V |
| FL WC PRESS | FL wheel cylinder pressure sensor reading | Min | 0 V |
| | | Max | 5 V |
| RR WC PRESS | RR wheel cylinder pressure sensor reading | Min | 0 V |
| | | Max | 5 V |
| RL WC PRESS | RL wheel cylinder pressure sensor reading | Min | 0 V |
| | | Max | 5 V |
| ACCUM SEN | Accumulator pressure sensor reading | Min | 0 V |
| | | Max | 5 V |
| MC PRESS SEN 2 | Master cylinder pressure sensor reading | Brake pedal released | 0.3 to 0.9 V |
| MTT | Motor relay voltage value | Min | 0 V |
| | | Max | 20 V |
| SLAFR VALUE | Linear solenoid (SLAFR) current | Min | 0 A |
| | | Max | 3 A |
| SLAFL VALUE | Linear solenoid (SLAFL) current | Min | 0 A |
| | | Max | 3 A |
| SLARR VALUE | Linear solenoid (SLARR) current | Min | 0 A |
| | | Max | 3 A |
| SLARL VALUE | Linear solenoid (SLARL) current | Min | 0 A |
| | | Max | 3 A |
| SLRFR VALUE | Linear solenoid (SLRFR) current | Min | 0 A |
| | | Max | 3 A |
| SLRFL VALUE | Linear solenoid (SLRFL) current | Min | 0 A |
| | | Max | 3 A |
| SLRRR VALUE | Linear solenoid (SLRRR) current | Min | 0 A |
| | | Max | 3 A |
| SLRRL VALUE | Linear solenoid (SLRRL) current | Min | 0 A |
| | | Max | 3 A |
| FR OIL PRESS | FR wheel target oil pressure reading | Min | 0 MPa |
| | | Max | 20 MPa |

DIAGNOSIS SYSTEM (VDC/TCS/ABS CONTROL UNIT)

< FUNCTION DIAGNOSIS >

[VDC/TCS/ABS]

| Tester display | Measurement item | Reference value | | |
|----------------|--|---------------------------------------|--------------------|-----|
| FL OIL PRESS | FL wheel target oil pressure reading | Min | 0 MPa | A |
| | | Max | 20 MPa | |
| RR OIL PRESS | RR wheel target oil pressure reading | Min | 0 MPa | B |
| | | Max | 20 MPa | |
| RL OIL PRESS | RL wheel target oil pressure reading | Min | 0 MPa | C |
| | | Max | 20 MPa | |
| DETAIL CODE | Detailed code for Freeze Frame DTC | Displays to output INF code | | |
| IG1 VOLT VAL | IG1 voltage value | Min | 0 V | D |
| | | Max | 20 V | |
| IG2 VOLT VAL | IG2 voltage value | Min | 0 V | E |
| | | Max | 20 V | |
| BS1 | BS1 voltage value | Min | 0 V | BRC |
| | | Max | 20 V | |
| BS2 | BS2 voltage value | Min | 0 V | |
| | | Max | 20 V | G |
| VM1 | VM1 voltage value | Min | 0 V | |
| | | Max | 20 V | |
| VM2 | VM2 voltage value | Min | 0 V | H |
| | | Max | 20 V | |
| B1 | +B1 voltage value | Min | 0 V | I |
| | | Max | 20 V | |
| B2 | +B2 voltage value | Min | 0 V | J |
| | | Max | 20 V | |
| IG ON ELAPS | Elapsed time after ignition switch ON | Min | 0 seconds | |
| | | Max | 100,661.76 seconds | K |
| CAPAC MODE | Brake capacitor mode | Brake capacitor mode ON | ON | |
| | | Brake capacitor mode OFF | OFF | |
| SCSS | Stroke simulator solenoid (SC-SS) signal | Stroke simulator solenoid (SC-SS) ON | ON | L |
| | | Stroke simulator solenoid (SC-SS) OFF | OFF | |
| SMC 1 | Master cut solenoid (SMC 1) signal | Master cut solenoid (SMC 1) ON | ON | |
| | | Master cut solenoid (SMC 1) OFF | OFF | M |
| SNC 2 | Master cut solenoid (SMC 2) signal | Master cut solenoid (SMC 2) ON | ON | N |
| | | Master cut solenoid (SMC 2) OFF | OFF | |
| MAIN RLY 1 | ABS relay No.1 signal | ABS relay No.1 ON | ON | O |
| | | ABS relay No.1 OFF | OFF | |
| MAIN RLY 2 | ABS relay No.2 signal | ABS relay No.2 ON | ON | P |
| | | ABS relay No.2 OFF | OFF | |
| MOTOR RLY 1 | ABS motor relay No.1 signal | ABS motor relay No.1 ON | ON | |
| | | ABS motor relay No.1 OFF | OFF | |

DIAGNOSIS SYSTEM (VDC/TCS/ABS CONTROL UNIT)

< FUNCTION DIAGNOSIS >

[VDC/TCS/ABS]

| Tester display | Measurement item | Reference value | |
|----------------|---------------------------------|------------------------------|-----|
| MOTOR RLY 2 | ABS motor relay 2 signal | ABS motor relay No.2 ON | ON |
| | | ABS motor relay No.2 OFF | OFF |
| RESERVOIR LVL | Brake fluid level switch signal | Brake fluid level switch ON | ON |
| | | Brake fluid level switch OFF | OFF |

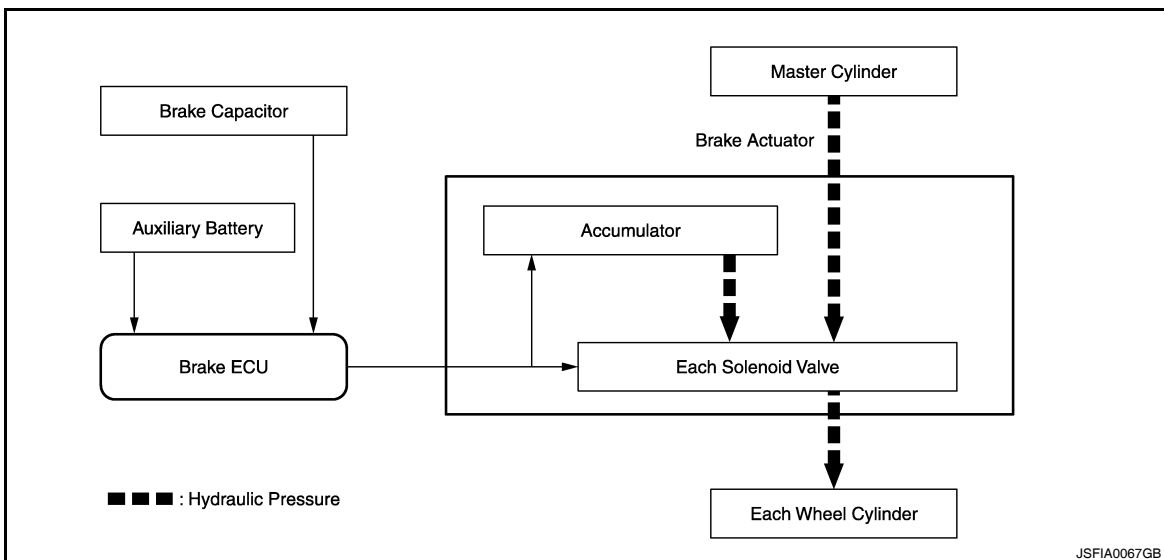
Clear Freeze Frame Data and Information

CAUTION:

Clearing the DTC will also clear the Freeze Frame Data and information (INF) cord.

1. Connect the CONSULT-III.
2. Turn the ignition switch ON.
3. Clear the DTC and Freeze Frame Data. Refer to [BRC-45, "CONSULT-III Function"](#).

FAIL-SAFE CHART



Fail-Safe Function

1. If a malfunction occurs in the brake ECU, sensor signal, or actuator, rest normally operating parts will maintain brake control.
2. When trouble occurs in the brake control system, the brake ECU turns the warning lamp ON, and prohibits ABS, TCS and VDC operations.

ABS, EBD and BA system:

| Malfunction area | Control method |
|------------------|--|
| ABS system | ABS, TCS and VDC control prohibited |
| EBD system | ABS, EBD, TCS and VDC control prohibited |

NOTE:

A malfunction in the ABS system will result in an identical operation, with ABS, TCS and VDC system control prohibited.

TCS and VDC system:

| Malfunction area | Control method |
|---|--|
| Hybrid control system (TCS and VDC systems) | Before control: Disables control During control: Uses only the brakes to effect control |
| Brake control system (TCS and VDC systems) | Before control: Disables control During control: Disables control (by gradually ending control) |

NOTE:

As for the TCS and VDC systems, different systems prohibit different controls depending on a malfunctioning part.

3. The brake ECU prevents operation of a malfunctioning hydraulic pressure system and continues brake control with the normal hydraulic pressure system.

DIAGNOSIS SYSTEM (VDC/TCS/ABS CONTROL UNIT)

< FUNCTION DIAGNOSIS >

[VDC/TCS/ABS]

NOTE:

- If control of the Electronically Controlled Brake for any of the 4 wheels is prohibited, that wheel loses brake booster function or braking ability.
 - If one of the 4 wheels loses brake booster function, the feeling when depressing the brake pedal changes.
 - If control of the Electronically Controlled Brake for all wheels is prohibited, the 2 front wheels will lose brake booster function.
4. If the brake control is stopped under such conditions as when trouble occurs with a hydraulic pressure source, the pressure generated in the master cylinder by the driver is applied to the wheel cylinder to ensure braking force.
 5. A power back-up until is built in as an additional power source to supply stable power to the system.
 6. If the regenerative brake alone does not operate under such conditions as a communication error with the HV ECU, control is switched so that all braking force is generated with the hydraulic pressure brake.

| Malfunction area | Control method |
|--------------------------------------|--|
| Brake ECU | Normally operating parts will control brake and generate braking force |
| Hydraulic pressure controlling parts | Normally operating parts will control brake and generate braking force |
| Hydraulic pressure source | Braking force generate by the driver |

DATA MONITOR

NOTE:

With the CONSULT-III connected to the DLC3 and the ignition switch ON, the Electronically Controlled Brake, ABS, and VDC Data List can be displayed. Follow the prompts on the tester screen to access the Data List.

| Tester display | Measurement item/ Range | Normal condition | Diagnostic note |
|----------------|---|--|---|
| MTR RLY 1 | ABS motor relay No.1 / ON or OFF | ON: Motor relay ON OFF: Motor relay OFF | — |
| STP LMP SW | Stop lamp switch / ON or OFF | ON: Brake pedal depressed OFF: Brake pedal released | — |
| PKB SW | Parking brake switch / ON or OFF | ON: Parking brake applied OFF: Parking brake released | — |
| SHIFT LVR POS | Shift lever position information / P/N, R, D/M, 1st – 6th/B, FAIL | — | — |
| VWFR | FR wheel sensor reading/ min: 0 km/h (0 MPH), max: 326 km/h (202 MPH) | Actual wheel speed | Similar speed indicated on speedometer |
| VWFL | FL wheel sensor reading/ min: 0 km/h (0 MPH), max: 326 km/h (202 MPH) | Actual wheel speed | Similar speed indicated on speedometer |
| VWRR | RR wheel sensor reading/ min: 0 km/h (0 MPH), max: 326 km/h (202 MPH) | Actual wheel speed | Similar speed indicated on speedometer |
| VWRL | RL wheel sensor reading/ min: 0 km/h (0 MPH), max: 326 km/h (202 MPH) | Actual wheel speed | Similar speed indicated on speedometer |
| G SEN 1 | Acceleration sensor 1 reading / min: - 1.889 G, max: 1.875 G | Approximately 0 ±0.13 G while stationary | Reading changes when vehicle is bounced |
| G SEN 2 | Acceleration sensor 2 reading / min: - 1.889 G, max: 1.875 G | Approximately 0 ±0.13 G while stationary | Reading changes when vehicle is bounced |
| VHCL SPD | Maximum wheel sensor reading / min: 0 km/h (0 MPH), max: 255 km/h (158 MPH) | Actual wheel speed | Speed indicated on speedometer |
| YAW SEN 1 | Yaw rate sensor 1 / min: - 128 deg/s, max: 127 deg/s | Min: - 128 deg/s Max: 127 deg/s | — |
| YAW SEN 2 | Yaw rate sensor 1 / min: - 128 deg/s, max: 127 deg/s | Min: - 128 deg/s Max: 127 deg/s | — |

DIAGNOSIS SYSTEM (VDC/TCS/ABS CONTROL UNIT)

< FUNCTION DIAGNOSIS >

[VDC/TCS/ABS]

| Tester display | Measurement item/ Range | Normal condition | Diagnostic note |
|----------------|---|---|---|
| STRG ANG SEN | Steering angle sensor / min: -3,276.8 deg, max: 3,276.7 deg | Left turn: Increase Right turn: Decrease | — |
| MC SEN COMP 1 | Master cylinder pressure sensor 1 reading / min: 0 V, max: 5 V | When brake pedal is released: 0.3 to 0.9 V | Reading increases when brake pedal is depressed |
| ACC VALU RATE | The difference of a present accelerator / min: 0%, max: 128% | Min: 0% Max: 128% | — |
| FR WH SEN OPN | FR wheel sensor open detection /ERROR or NORMAL | ERROR: Momentary interruption NORMAL: Normal | — |
| FL WH SEN OPN | FL wheel sensor open detection /ERROR or NORMAL | ERROR: Momentary interruption NORMAL: Normal | — |
| RR WH SEN OPN | RR wheel sensor open detection /ERROR or NORMAL | ERROR: Momentary interruption NORMAL: Normal | — |
| RL WH SEN OPN | RL wheel sensor open detection /ERROR or NORMAL | ERROR: Momentary interruption NORMAL: Normal | — |
| YAW SEN OPN | Yaw rate sensor open detection / ERROR or NORMAL | ERROR: Momentary interruption NORMAL: Normal | — |
| G SEN OPN | Acceleration sensor open detection / ERROR or NORMAL | ERROR: Momentary interruption NORMAL: Normal | — |
| STRG SEN OPN | Steering angle sensor open detection / ERROR or NORMAL | ERROR: Momentary interruption NORMAL: Normal | — |
| MC SEN OPN | Master cylinder pressure sensor open detection / ERROR or NORMAL | ERROR: Momentary interruption NORMAL: Normal | — |
| HV COMM OPN | HV communication open detection / ERROR or NORMAL | ERROR: Momentary interruption NORMAL: Normal | — |
| DIAG CODE | Number of DTC / min: 0, max: 255 | Min: 0 Max: 255 | — |
| ABS WARN LMP | ABS warning lamp / ON or OFF | ON: Warning lamp ON OFF: Warning lamp OFF | — |
| BRK WARN LMP | Brake warning lamp / ON or OFF | ON: Warning lamp ON OFF: Warning lamp OFF | — |
| SLIP IND LMP | SLIP indicator lamp / ON or OFF | ON: Indicator lamp ON OFF: Indicator lamp OFF | — |
| BUZZER | Brake warning buzzer / ON or OFF | ON: Buzzer ON OFF: Buzzer OFF | — |
| VDC WARN LMP | VDC warning lamp / ON or OFF | ON: Indicator ON OFF: Indicator OFF | — |
| DVWFR | FR wheel acceleration / min: -200.84 m/s ² , 199.27 m/s ² | Min: -200.84 m/s ² Max: 199.27 m/s ² | — |
| DVWFL | FL wheel acceleration / min: -200.84 m/s ² , 199.27 m/s ² | Min: -200.84 m/s ² Max: 199.27 m/s ² | — |
| DVWRR | RR wheel acceleration / min: -200.84 m/s ² , 199.27 m/s ² | Min: -200.84 m/s ² Max: 199.27 m/s ² | — |
| DVWRL | RL wheel acceleration / min: -200.84 m/s ² , 199.27 m/s ² | Min: -200.84 m/s ² Max: 199.27 m/s ² | — |
| SIDE G SEN | Side G / min: -25.11 m/s ² , max: 24.91 m/s ² | Min: -25.11 m/s ² Max: 24.91 m/s ² | — |
| DECEL G SEN | Decel G / min: -25.11 m/s ² , max: 24.91 m/s ² | Min: -25.11 m/s ² Max: 24.91 m/s ² | — |

DIAGNOSIS SYSTEM (VDC/TCS/ABS CONTROL UNIT)

< FUNCTION DIAGNOSIS >

[VDC/TCS/ABS]

| Tester display | Measurement item/ Range | Normal condition | Diagnostic note | |
|----------------|--|--|---|-----|
| YAW RATE VAL | Yaw rate value / min: - 128deg/s, max: 127 deg/s | Min: - 128 deg/s Max: 127 deg/s | — | A |
| STRG ANG SEN | Steering angle value / min: - 3,276.8 deg, max: 3,276.7 deg | Min: - 3,276.8 deg Max: 3,276.7 deg | — | B |
| MC SEN COMP 2 | Master cylinder pressure sensor 2 reading / min: 0 V, max: 5 V | When brake pedal is released: 0.3 to 0.9 V | Reading increases when brake pedal is depressed | C |
| STRK SEN 1 | Stroke sensor / min: 0 V, max: 5 V | When brake pedal is released: 0.7 to 1.3 V | — | |
| STRK SEN 2 | Stroke sensor 2 / min: 0 V, max: 5 V | When brake pedal is released: 3.7 to 4.3 V | — | D |
| ACC PRESS SEN | Accumulator pressure sensor / min: 0 V, max: 5 V | Specified value: 3.3 to 4.7 V | — | E |
| FR WC PRESS | FR wheel cylinder pressure sensor / min: 0 V, max: 5 V | When brake pedal is released: 0.3 to 0.9 V | — | |
| FL WC PRESS | FL wheel cylinder pressure sensor / min: 0 V, max: 5 V | When brake pedal is released: 0.3 to 0.9 V | — | BRC |
| RR WC PRESS | RR wheel cylinder pressure sensor / min: 0 V, max: 5 V | When brake pedal is released: 0.3 to 0.9 V | — | |
| RL WC PRESS | RL wheel cylinder pressure sensor / min: 0 V, max: 5 V | When brake pedal is released: 0.3 to 0.9 V | — | G |
| RESERVR LV | Brake fluid level switch / ON or OFF | ON: Reservoir level normal OFF: Reservoir level low | — | H |
| ELE BRK LMP | Electronically Controlled Brake warning lamp / ON or OFF | ON: Warning lamp ON OFF: Warning lamp OFF | — | I |
| MTR RELAY 2 | ABS motor relay No.2 / ON or OFF | ON: Motor relay ON OFF: Motor relay OFF | — | |
| MAIN RLY 1 | ABS main relay No.1 / ON or OFF | ON: Main relay ON OFF: Main relay OFF | — | J |
| MAIN RLY 2 | ABS main relay No.2 / ON or OFF | ON: Main relay ON OFF: Main relay OFF | — | |
| SLAFR | Linear solenoid (SLAFR) current / min: 0 A, max: 3 A | When brake pedal is released: 0 A | — | K |
| SLAFL | Linear solenoid (SLAFL) current / min: 0 A, max: 3 A | When brake pedal is released: 0 A | — | L |
| SLARR | Linear solenoid (SLARR) current / min: 0 A, max: 3 A | When brake pedal is released: 0 A | — | |
| SLARL | Linear solenoid (SLARL) current / min: 0 A, max: 3 A | When brake pedal is released: 0 A | — | M |
| SLRFR | Linear solenoid (SLRFR) current / min: 0 A, max: 3 A | When brake pedal is released: 0 A | — | N |
| SLRFL | Linear solenoid (SLRFL) current / min: 0 A, max: 3 A | When brake pedal is released: 0 A | — | |
| SLRRR | Linear solenoid (SLRRR) current / min: 0 A, max: 3 A | When brake pedal is released: 0 A | — | O |
| SLRRL | Linear solenoid (SLRRL) current / min: 0 A, max: 3 A | When brake pedal is released: 0 A | — | P |
| MC SEN2 OPN | Master cylinder pressure sensor 2 open detection / ERROR or NORMAL | ERROR: Momentary interruption NORMAL: Normal | — | |
| STRK SEN OPN | Stroke sensor open detection / ERROR or NORMAL | ERROR: Momentary interruption NORMAL: Normal | — | |

DIAGNOSIS SYSTEM (VDC/TCS/ABS CONTROL UNIT)

< FUNCTION DIAGNOSIS >

[VDC/TCS/ABS]

| Tester display | Measurement item/ Range | Normal condition | Diagnostic note |
|----------------|--|---|-----------------|
| FR WC SEN OPN | FR wheel cylinder pressure sensor open detection / ERROR or NORMAL | ERROR: Momentary interruption NORMAL: Normal | — |
| FL WC SEN OPN | FL wheel cylinder pressure sensor open detection / ERROR or NORMAL | ERROR: Momentary interruption NORMAL: Normal | — |
| RR WC SEN OPN | RR wheel cylinder pressure sensor open detection / ERROR or NORMAL | ERROR: Momentary interruption NORMAL: Normal | — |
| RL WC SEN OPN | RL wheel cylinder pressure sensor open detection / ERROR or NORMAL | ERROR: Momentary interruption NORMAL: Normal | — |
| ACC SEN OPN | Accumulator pressure sensor open detection / ERROR or NORMAL | ERROR: Momentary interruption NORMAL: Normal | — |
| SMC 1 | Master cut solenoid (SMC 1) / ON or OFF | ON: Operate OFF: Not operate | — |
| SMC 2 | Master cut solenoid (SMC 2) / ON or OFF | ON: Operate OFF: Not operate | — |
| SCSS | Stroke simulator solenoid (SCSS) / ON or OFF | ON: Operate OFF: Not operate | — |
| FR TRQ NEED | FR regenerative request torque / min: 0 N·m, max: 65,536 N·m | Min: 0 N·m Max: 65,536 N·m | — |
| FR TRQ ACT | FR regenerative request torque / min: 0 N·m, max: 65,536 N·m | Min: 0 N·m Max: 65,536 N·m | — |
| RR TRQ NEED | RR regenerative request torque / min: 0 N·m, max: 65,536 N·m | Min: 0 N·m Max: 65,536 N·m | — |
| RR TRQ ACT | RR regenerative request torque / min: 0 N·m, max: 65,536 N·m | Min: 0 N·m Max: 65,536 N·m | — |
| REGEN ALLIN | Regenerative operation / ON or OFF | ON: Operate OFF: Not operate | — |
| STRG SEN ZERO | Steering angle sensor zero point / ON or OFF | ON: Valid OFF: Invalid | — |
| DOOR SW | Door switch operation / ON or OFF | ON: Operate OFF: Not operate | — |

*: Electronically Controlled Brake

ACTIVE TEST

NOTE:

Performing the Active Test using the CONSULT-III allows the relay, actuator, and other items to operate without removing any parts. Performing the Active Test as the first step in troubleshooting is one of the methods to save labor time.

It is possible to display the Data List during the Active Test.

1. On the tester display, select the Active Test.

NOTE:

The ignition switch must be turned ON to proceed to the Active Test using the CONSULT-III.

| Tester display | Test part | Control range | Diagnostic note |
|-----------------|----------------------|-----------------------|---------------------------|
| ABS WARN LAMP | ABS warning lamp | Warning lamp ON/OFF | Observe combination meter |
| VDC WARN LAMP | VDC warning lamp | Warning lamp ON/OFF | Observe combination meter |
| SLIP INDI LAMP | SLIP indicator lamp | Indicator lamp ON/OFF | Observe combination meter |
| BRAKE WARN LAMP | Brake warning lamp | Warning lamp ON/OFF | Observe combination meter |
| BRAKE BUZZER | Brake warning buzzer | Buzzer ON/OFF | Buzzer can be heard |

DIAGNOSIS SYSTEM (VDC/TCS/ABS CONTROL UNIT)

< FUNCTION DIAGNOSIS >

[VDC/TCS/ABS]

| Tester display | Test part | Control range | Diagnostic note |
|--------------------|---|------------------------|---|
| ELE BRK WARN LAMP | Electronically Controlled Brake warning lamp | Warning lamp ON/OFF | Observe combination meter |
| MOTOR RELAY 1 | ABS motor relay | Relay ON/OFF | Operation sound of relay (clicking sound) and motor can be heard |
| MOTOR RELAY 2 | ABS motor relay 2 | Relay ON/OFF | Operation sound of relay (clicking sound) and motor can be heard |
| AIR REL INHIBIT | Electronically Controlled Brake control invalid | Control invalid ON/OFF | Electronically Controlled Brake control is blocked (braking with no boost assist) |
| ACC 0 DOWN | Accumulator zero down activation | Activation ON/OFF | Brake fluid existing the accumulator makes noise |
| AIR REL STROKE SIM | Stroke simulator cut valve pattern activation | Activation ON/OFF | — (Difficult to identify visually) |
| AIR REL DRAIN | Drain system air bleeding pattern activation | Activation ON/OFF | When accumulator pressure lowers, pump operation creates sound |
| AIR REL PWR SPLY 2 | Power supply air bleeding pattern activation 2 | Activation ON/OFF | When accumulator pressure lowers, pump operation creates sound |
| SMC 1 | Master cut solenoid (SMC 1) | Solenoid ON/OFF | Operation sound of solenoid (clicking sound) can be heard |
| SMC 2 | Master cut solenoid (SMC 2) | Solenoid ON/OFF | Operation sound of solenoid (clicking sound) can be heard |
| MAIN RELAY 1 | ABS main relay | Relay ON/OFF | Operation sound of relay (clicking sound) can be heard |
| MAIN RELAY 2 | ABS main relay 2 | Relay ON/OFF | Operation sound of relay (clicking sound) can be heard |
| SLRRL CLOSE | Linear solenoid (SLRRL) valve | Valve close ON/OFF | — |
| SLARL CLOSE | Linear solenoid (SLARL) valve | Valve close ON/OFF | — |
| SLRRR CLOSE | Linear solenoid (SLRFR) valve | Valve close ON/OFF | — |
| SLARR CLOSE | Linear solenoid (SLAFR) valve | Valve close ON/OFF | — |
| SLRFL CLOSE | Linear solenoid (SLRFL) valve | Valve close ON/OFF | — |
| SLAFL CLOSE | Linear solenoid (SLAFL) valve | Valve close ON/OFF | — |
| SLRFR CLOSE | Linear solenoid (SLRFR) valve | Valve close ON/OFF | — |
| SLAFR CLOSE | Linear solenoid (SLAFR) valve | Valve close ON/OFF | — |

A
B
C
D
E
BRC
G
H
I
J
K
L
M
N
O
P

WORK SUPPORT

| Item | Function |
|-----------------------------------|---|
| MEMORY ERASING | When erasing stored zero value of each sensor and offset leaning value of linear solenoid valve |
| TEST MODE ^{NOTE 1} | When using TEST MODE |
| TEST MODE EXTEN ^{NOTE 2} | When exiting TEST MODE |
| TEST MODE END | When prolonging TEST MODE |

NOTE:

- 1: Electronically Controlled Brake warning lamp turns ON during TEST MODE.
- 2: Where TEST MODE is prolonged, be sure to exit from TEST MODE after the completion of a work.

ERASE MEMORY

How to Erase Self-diagnosis Result

DIAGNOSIS SYSTEM (VDC/TCS/ABS CONTROL UNIT)

< FUNCTION DIAGNOSIS >

[VDC/TCS/ABS]

After erasing DTC memory, start engine and drive vehicle at 30 km/h (19 MPH) or more for approximately 1 minute as the final inspection, and make sure that the VDC warning lamp, SLIP indicator lamp and Electronically Controlled Brake warning lamp turn OFF.

CAUTION:

If memory cannot be erased, perform applicably diagnosis.

Erase Memory

1. Select "MEMORY ERASING" in "WORK SUPPORT" to erase memory of brake ECU.

CAUTION:

- Do not touch steering wheel while erasing memory.
- When a memory is erased, stored value of zero point for each sensor and leaning value of linear solenoid valve offset are also erased. Therefore, remember to perform zero adjustment for each sensor and initialization of linear solenoid valve.
- Steering angle sensor: [BRC-9, "PERFORM ZERO POINT OF STEERING ANGLE SENSOR : Description"](#).
- Yaw rate/side/decel G sensor: [BRC-8, "PERFORM ZERO POINT OF YAW RATE/SIDE/DECEL G SENSOR : Description"](#).
- Stroke sensor: [BRC-9, "PERFORM ADJUSTMENT OF STROKE SENSOR : Description"](#).
- Linear solenoid valve: [BRC-7, "PERFORM INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION : Description"](#).
- VDC warning lamp turns ON when stored zero point of steering angle sensor is erased. VDC warning lamp turns OFF after performing zero adjustment for steering angle sensor. If VDC warning lamp does not turn OFF, perform self-diagnosis for brake ECU.

COMPONENT DIAGNOSIS

C0200, C0205, C1271, C1272

Description

INFOID:000000004212635

The wheel sensors detect wheel speed and transmit the signals to the brake ECU. These signals are used for control of the ABS control system. Each of the front and rear rotors has 48 serrations.

When the rotors rotate, the magnetic field generated by the permanent magnet in the wheel sensor induces an AC voltage.

Since the frequency of this AC voltage changes in direct proportion to the speed of the rotor, the frequency is used by the ECU to detect the speed of each wheel.

DTCs C1271 and C1272 can be deleted when the wheel sensor sends a wheel speed signal or the Test Mode ends. DTCs C1271 and C1272 are output only in the Test Mode.

DTC Logic

INFOID:000000004212636

| DTC | INF code | Display item | DTC detection condition | Trouble area | |
|-------|----------|---------------|--|---|--|
| C0200 | 251 | FR RH SENSOR | At a vehicle speed of 10 km/h (6 MPH) or more, an open or short in the sensor signal circuit of the abnormal wheel continues for 1 second or more. | <ul style="list-style-type: none"> • Front wheel sensor RH • wheel sensor circuit • Sensor installation • wheel sensor rotor • Brake ECU | |
| | 252 | | More than 1 wheel is abnormal. | | |
| | 253 | | Wheel sensor signal circuit is open for 0.5 seconds or more. | | |
| | 254 | | Momentary interruption of sensor signal from the abnormal wheel occurs 255 times or more. | | |
| | 255 | | Frequency of 2.3 kHz or higher is input. | | <ul style="list-style-type: none"> • Front wheel sensor RH • wheel sensor circuit • wheel sensor rotor • Brake ECU |
| | 262 | | Wheel sensor power supply malfunction. | | <ul style="list-style-type: none"> • Brake ECU |
| C0205 | 264 | FR LH SENSOR | At a vehicle speed of 10 km/h (6 MPH) or more, an open or short in the sensor signal circuit of the abnormal wheel continues for 1 second or more. | <ul style="list-style-type: none"> • Front wheel sensor RH • wheel sensor circuit • Sensor installation • wheel sensor rotor • Brake ECU | |
| | 265 | | More than 1 wheel is abnormal. | | |
| | 266 | | Wheel sensor signal circuit is open for 0.5 seconds or more. | | |
| | 267 | | Momentary interruption of sensor signal from the abnormal wheel occurs 255 times or more. | | |
| | 268 | | Frequency of 2.3 kHz or higher is input. | | <ul style="list-style-type: none"> • Front wheel sensor RH • wheel sensor circuit • wheel sensor rotor • Brake ECU |
| | 275 | | Wheel sensor power supply malfunction. | | <ul style="list-style-type: none"> • Brake ECU |
| C1271 | — | FR SPD OUTPUT | Detected only during Test Mode. | <ul style="list-style-type: none"> • Front wheel sensor RH/LH • Sensor installation • wheel sensor rotor | |
| C1272 | — | FL SPD OUTPUT | | | |

NOTE:

- DTCs C0200 and C1271 are for the front wheel sensor RH.
- DTCs C0205 and C1272 are for the front wheel sensor LH.
- The brake warning light comes on when wheel sensor malfunctions are detected in two or more wheels.

Diagnosis Procedure

INFOID:000000004212637

CAUTION:

When replacing the brake ECU, perform initialization of linear solenoid valve and calibration.

1. CHECK MASTER CYLINDER PRESSURE SENSOR

Check master cylinder pressure sensor. Refer to [BRC-11, "TEST MODE PROCEDURE"](#).

>> GO TO 2.

2. CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)

Using the "DATA MONITOR" of CONSULT-III, check for any momentary interruption in the wire harness and connector corresponding to a DTC.

ABS/VDC:

| Tester display | Measurement item/ Range | Normal condition |
|------------------|--|--|
| FR WH SEN OPN | FR wheel sensor open detection/ ERROR or NORMAL | ERROR: Momentary inter- ruption NORMAL: Normal |
| FL WH SEN OPN | FL wheel sensor open detection/ ERROR or NORMAL | ERROR: Momentary inter- ruption NORMAL: Normal |

Result

| Condition | Proceed to |
|--------------------------------------|------------|
| There are no momentary interruption. | A |
| There are momentary interruption. | B |
| There is a constant open circuit. | C |

NOTE:

Perform the above inspection before removing the sensor and connector.

- A >> GO TO 3.
B >> GO TO 11.
C >> GO TO 6.

3. READ VALUE OF CONSULT-III (FRONT WHEEL SENSOR)

- Turn the ignition switch OFF.
- Connect the CONSULT-III.
- Turn the ignition switch ON (READY).
- Select the "DATA MONITOR" on the CONSULT-III.

ABS/VDC:

| Tester display | Measurement item/ Range | Normal condition |
|----------------|--|--------------------|
| VWFR | FR wheel speed sensor reading/ Min: 0 km/h (0 MPH), max: 326 km/h (202 MPH) | Actual wheel speed |
| VWFL | FL wheel speed sensor reading/ Min: 0 km/h (0 MPH), max: 326 km/h (202 MPH) | Actual wheel speed |

- Check that there is no difference between the speed value output from the wheel sensor displayed on the CONSULT-III and the speed value displayed on the speedometer when driving the vehicle.

NOTE:

Factors that affect the indicated vehicle speed include tire size, tire inflation, and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, see the reference chart.

Is the inspection result normal?

- YES >> GO TO 4.
NO >> GO TO 6.

4.PERFORM TEST MODE (SIGNAL CHECK)

Perform sensor check in the Test Mode procedure.

Is the inspection result normal?

- YES >> GO TO 5.
- NO >> GO TO 6.

5.RECONFIRM DTC

1. Turn the ignition switch OFF.
2. Clear the DTC.
3. Turn the ignition switch ON (READY).
4. Drive the vehicle at the speed of 32 km/h (20 MPH) or more for at least 60 seconds.
5. Check if the same DTC is recorded.

Result

| Condition | Proceed to |
|---|------------|
| DTCs (C0200 and/or C0205) are not output. | A |
| DTCs (C0200 and/or C0205) are output. | B |

NOTE:

If troubleshooting has been carried out according to the Problem Symptoms Table, Refer back to the table and proceed to the next step.

- A >> GO TO 6.
- B >> GO TO 8.

6.CHECK FRONT WHEEL SENSOR INSTALLATION

1. Turn the ignition switch OFF.
2. Check the wheel sensor installation.

Is an installation state normal?

- YES >> GO TO 7.
- NO >> Install front wheel sensor correctly.

7.CHECK FRONT WHEEL SENSOR TIP

1. Remove the front wheel sensor.
2. Check the wheel sensor tip.

CAUTION:

Check the wheel sensor signal after cleaning or replacement.

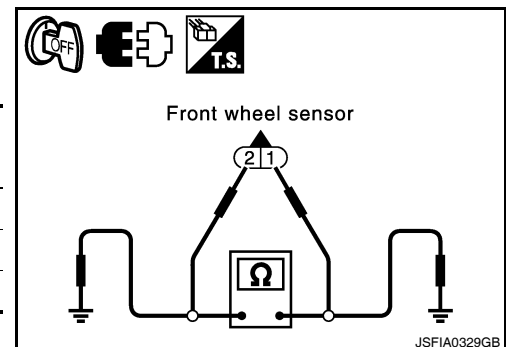
Is the inspection result normal?

- YES >> GO TO 8.
- NO >> Clean or replace front wheel sensor.

8.INSPECT FRONT WHEEL SENSOR

1. Turn the ignition switch OFF.
2. Install the front wheel sensor.
3. Disconnect the front wheel sensor connector.
4. Measure the resistance according to the value(s) in the table below.

| Front RH wheel sensor | | Condition | Specified condition |
|-----------------------|------------|-----------|---------------------|
| Connector | Terminal | | |
| E41 | 1 – 2 | Always | Not existed |
| E41 | 1 – Ground | Always | Existed |
| E41 | 2 – Ground | Always | Existed |



< COMPONENT DIAGNOSIS >

| Front LH wheel sensor | | Condition | Specified condition |
|-----------------------|------------|-----------|---------------------|
| Connector | Terminal | | |
| E19 | 1 – 2 | Always | Not existed |
| E19 | 1 – Ground | Always | Existed |
| E19 | 2 – Ground | Always | Existed |

NOTE:

Check the wheel sensor signal after replacement.

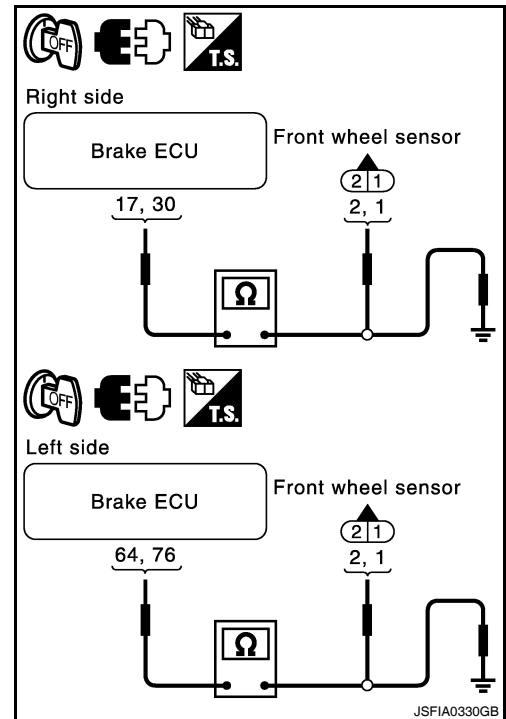
Is the inspection result normal?

YES >> GO TO 9.

NO >> Replace front wheel sensor.

9. CHECK HARNESS AND CONNECTOR (BRAKE ECU – FRONT WHEEL SENSOR)

1. Disconnect the brake ECU connectors.
2. Measure the resistance according to the value(s) in the table below.



RH

| Brake ECU | | Wheel sensor | | — | Condition | Specified condition |
|-----------|----------|--------------|----------|--------|-----------|---------------------|
| Connector | Terminal | Connector | Terminal | | | |
| E60 | 30 | E41 | 1 | — | Always | Below 1 Ω |
| E60 | 30 | — | — | Ground | Always | 10 kΩ or higher |
| E60 | 17 | E41 | 2 | — | Always | Below 1 Ω |
| E60 | 17 | — | — | Ground | Always | 10 kΩ or higher |

LH

| Brake ECU | | Wheel sensor | | — | Condition | Specified condition |
|-----------|----------|--------------|----------|--------|-----------|---------------------|
| Connector | Terminal | Connector | Terminal | | | |
| E61 | 76 | E19 | 1 | — | Always | Below 1 Ω |
| E61 | 76 | — | — | Ground | Always | 10 kΩ or higher |
| E61 | 64 | E19 | 2 | — | Always | Below 1 Ω |
| E61 | 64 | — | — | Ground | Always | 10 kΩ or higher |

Is the inspection result normal?

YES >> GO TO 10.

NO >> Repair or replace harness or connector.

10. RECONFIRM DTC

1. Turn ignition switch OFF.
2. Clear the DTC.
3. Turn the ignition switch ON (READY).
4. Drive the vehicle at the speed of 32 km/h (20 MPH) or more for at least 60 seconds.
5. Check if the same DTC is recorded.

Result

| Condition | Proceed to |
|---|------------|
| DTCs (C0200 and/or C0205) are not output. | A |
| DTCs (C0200 and/or C0205) are output. | B |

NOTE:

If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step.

- A >> Check for intermittent problems (symptom simulation).
- B >> Replace brake ECU.

11. REPAIR OR REPLACE HARNESS OR CONNECTOR

1. Turn ignition switch OFF.
2. Repair or replace the harness or connector.
3. Check for any momentary interruption between the brake ECU and front wheel sensor.
4. Check that there is no momentary interruption.

>> GO TO 12.

12. RECONFIRM DTC

1. Turn ignition switch OFF.
2. Clear the DTC.
3. Turn ignition switch ON (READY).
4. Drive the vehicle at the speed of 32 km/h (20 MPH) or more for at least 60 seconds.
5. Check if the same DTC is recorded.

Result

| Condition | Proceed to |
|---|------------|
| DTCs (C0200 and/or C0205) are not output. | A |
| DTCs (C0200 and/or C0205) are output. | B |

- A >> INSPECTION END
- B >> GO TO 1.

Special Repair Requirement

INFOID:000000004212638

1. ZERO ADJUSTMENT FOR EACH SENSOR AND OFFSET LEARNING FOR LINEAR SOLENOID VALVE

After erasing brake ECU memories, perform zero adjustment of following sensors and initialization of linear solenoid valve.

- Steering angle sensor: [BRC-9. "PERFORM ZERO POINT OF STEERING ANGLE SENSOR : Description"](#).
- Yaw rate/side/decel G sensor: [BRC-8. "PERFORM ZERO POINT OF YAW RATE/SIDE/DECEL G SENSOR : Description"](#).
- Brake stroke sensor: [BRC-9. "PERFORM ADJUSTMENT OF STROKE SENSOR : Description"](#).
- Linear solenoid valve: [BRC-7. "PERFORM INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION : Description"](#).

>> END

C0210, C0215, C1273, C1274

Description

INFOID:000000004212639

The wheel sensors detect wheel speed and transmit the signals to the brake ECU. These signals are used for control of the ABS control system. Each of the front and rear rotors has 48 serrations.

When the rotors rotate, the magnetic field generated by the permanent magnet in the wheel sensor induces an AC voltage.

Since the frequency of this AC voltage changes in direct proportion to the speed of the rotor, the frequency is used by the ECU to detect the speed of each wheel.

DTCs C1273 and C1274 can be deleted when the wheel sensor sends a wheel speed signal or the Test Mode ends. DTCs C1273 and C1274 are output only in the Test Mode.

DTC Logic

INFOID:000000004212640

| DTC | INF code | Display item | DTC detection condition | Trouble area | |
|-------|----------|---------------|--|--|---|
| C0210 | 277 | RR RH SENSOR | At a vehicle speed of 10 km/h (6 MPH) or more, an open or short in the sensor signal circuit of the abnormal wheel continues for 1 second or more. | <ul style="list-style-type: none"> • Rear wheel sensor RH • Wheel sensor circuit • Sensor installation • Wheel sensor rotor • Brake ECU | |
| | 278 | | More than 1 wheel is abnormal. | | |
| | 279 | | Wheel sensor signal circuit is open for 0.5 seconds or more. | | |
| | 280 | | Momentary interruption of sensor signal from the abnormal wheel occurs 255 times or more. | | |
| | 281 | | | Frequency of 2.3 kHz or higher is input. | <ul style="list-style-type: none"> • Rear wheel sensor RH • Wheel sensor circuit • Wheel sensor rotor • Brake ECU |
| | 288 | | | Wheel sensor power supply malfunction. | <ul style="list-style-type: none"> • Brake ECU |
| C0215 | 290 | RR LH SENSOR | At a vehicle speed of 10 km/h (6 MPH) or more, an open or short in the sensor signal circuit of the abnormal wheel continues for 1 second or more. | <ul style="list-style-type: none"> • Rear wheel sensor RH • Wheel sensor circuit • Sensor installation • Wheel sensor rotor • Brake ECU | |
| | 291 | | More than 1 wheel is abnormal. | | |
| | 292 | | Wheel sensor signal circuit is open for 0.5 seconds or more. | | |
| | 293 | | Momentary interruption of sensor signal from the abnormal wheel occurs 255 times or more. | | |
| | 294 | | | Frequency of 2.3 kHz or higher is input. | <ul style="list-style-type: none"> • Rear wheel sensor RH • Wheel sensor circuit • Wheel sensor rotor • Brake ECU |
| | 301 | | | Wheel sensor power supply malfunction. | <ul style="list-style-type: none"> • Brake ECU |
| C1273 | — | RR SPD OUTPUT | Detected only during Test Mode. | <ul style="list-style-type: none"> • Rear wheel sensor RH/LH • Sensor installation • Wheel sensor rotor | |
| C1274 | — | RL SPD OUTPUT | | | |

NOTE:

- DTCs C0210 and C1273 are for the rear wheel sensor RH.
- DTCs C0215 and C1274 are for the rear wheel sensor LH.
- The brake warning light comes on when wheel sensor malfunctions are detected in two or more wheels.

Diagnosis Procedure

INFOID:000000004212641

CAUTION:

When replacing the brake ECU, perform initialization of linear solenoid valve and calibration.

1. CHECK MASTER CYLINDER PRESSURE SENSOR

Check master cylinder pressure sensor. Refer to [BRC-11, "TEST MODE PROCEDURE"](#).

>> GO TO 2.

2. CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)

Using the "DATA MONITOR" of CONSULT-III, check for any momentary interruption in the wire harness and connector corresponding to a DTC.

ABS/VDC:

| Tester display | Measurement item/ Range | Normal condition |
|------------------|--|--|
| RR WH SEN OPN | RR wheel sensor open detection/ ERROR or NORMAL | ERROR: Momentary inter- ruption NORMAL: Normal |
| RL WH SEN OPN | RL wheel sensor open detection/ ERROR or NORMAL | ERROR: Momentary inter- ruption NORMAL: Normal |

Result

| Condition | Proceed to |
|--------------------------------------|------------|
| There are no momentary interruption. | A |
| There are momentary interruption. | B |
| There is a constant open circuit. | C |

NOTE:

Perform the above inspection before removing the sensor and connector.

- A >> GO TO 3.
B >> GO TO 11.
C >> GO TO 6.

3. READ VALUE OF CONSULT-III (REAR WHEEL SENSOR)

- Turn the ignition switch OFF.
- Connect the CONSULT-III.
- Turn the ignition switch ON (READY).
- Select the "DATA MONITOR" on the CONSULT-III.

ABS/VDC:

| Tester display | Measurement item/ Range | Normal condition |
|----------------|--|--------------------|
| VWRR | RR wheel speed sensor reading/ Min: 0 km/h (0 MPH), max: 326 km/h (202 MPH) | Actual wheel speed |
| VWRL | RL wheel speed sensor reading/ Min: 0 km/h (0 MPH), max: 326 km/h (202 MPH) | Actual wheel speed |

- Check that there is no difference between the speed value output from the wheel sensor displayed on the CONSULT-III and the speed value displayed on the speedometer when driving the vehicle.

NOTE:

Factors that affect the indicated vehicle speed include tire size, tire inflation, and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, see the reference chart.

Is the inspection result normal?

- YES >> GO TO 4.
NO >> GO TO 6.

4. PERFORM TEST MODE (SIGNAL CHECK)

Perform sensor check in the Test Mode procedure.

Is the inspection result normal?

< COMPONENT DIAGNOSIS >

- YES >> GO TO 5.
- NO >> GO TO 6.

5. RECONFIRM DTC

1. Turn the ignition switch OFF.
2. Clear the DTC.
3. Turn the ignition switch ON (READY).
4. Drive the vehicle at the speed of 32 km/h (20 MPH) or more for at least 60 seconds.
5. Check if the same DTC is recorded.

Result

| Condition | Proceed to |
|---|------------|
| DTCs (C0210 and/or C0215) are not output. | A |
| DTCs (C0210 and/or C0215) are output. | B |

NOTE:

If troubleshooting has been carried out according to the Problem Symptoms Table, Refer back to the table and proceed to the next step.

- A >> GO TO 6.
- B >> GO TO 8.

6. CHECK REAR WHEEL SENSOR INSTALLATION

1. Turn the ignition switch OFF.
2. Check the wheel sensor installation.

Is an installation state normal?

- YES >> GO TO 7.
- NO >> Install rear wheel sensor correctly.

7. INSPECT REAR WHEEL SENSOR

1. Turn the ignition switch OFF.
2. Disconnect the rear wheel sensor connector.
3. Measure the resistance according to the value(s) in the table below.

| Rear RH wheel sensor | | Condition | Specified condition |
|----------------------|------------|-----------|---------------------|
| Connector | Terminal | | |
| B43 | 3 – 4 | Always | Not existed |
| B43 | 3 – Ground | Always | Existed |
| B43 | 4 – Ground | Always | Existed |

| Rear LH wheel sensor | | Condition | Specified condition |
|----------------------|------------|-----------|---------------------|
| Connector | Terminal | | |
| B43 | 1 – 2 | Always | Not existed |
| B43 | 1 – Ground | Always | Existed |
| B43 | 2 – Ground | Always | Existed |

NOTE:

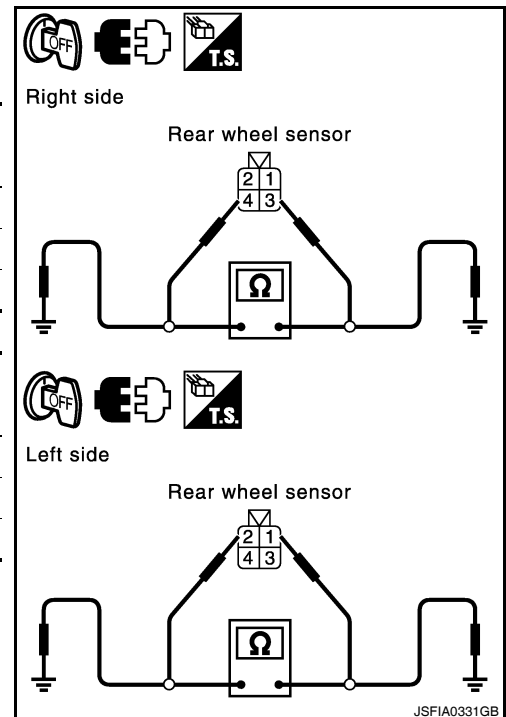
Check the wheel sensor signal after replacement.

Is the inspection result normal?

- YES >> GO TO 8.
- NO >> Replace rear wheel sensor.

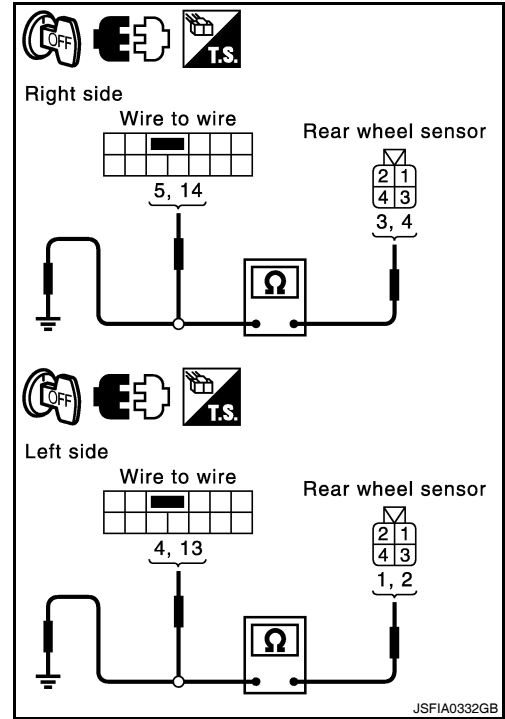
8. CHECK HARNESS AND CONNECTOR

1. Disconnect the skid control sensor wire.



< COMPONENT DIAGNOSIS >

2. Measure the resistance according to the value(s) in the table below.



RH

| Sensor side | Vehicle side | Condition | Specified condition |
|-------------|--------------|-----------|---------------------|
| 3 | 5 | Always | Below 1 Ω |
| 3 | 14 | Always | 10 kΩ or higher |
| 3 | Ground | Always | 10 kΩ or higher |
| 4 | 14 | Always | Below 1 Ω |
| 4 | 5 | Always | 10 kΩ or higher |
| 4 | Ground | Always | 10 kΩ or higher |

LH

| Sensor side | Vehicle side | Condition | Specified condition |
|-------------|--------------|-----------|---------------------|
| 1 | 4 | Always | Below 1 Ω |
| 1 | 13 | Always | 10 kΩ or higher |
| 1 | Ground | Always | 10 kΩ or higher |
| 2 | 13 | Always | Below 1 Ω |
| 2 | 4 | Always | 10 kΩ or higher |
| 2 | Ground | Always | 10 kΩ or higher |

NOTE:

Check the wheel sensor signal after replacement.

Is the inspection result normal?

YES >> GO TO 9.

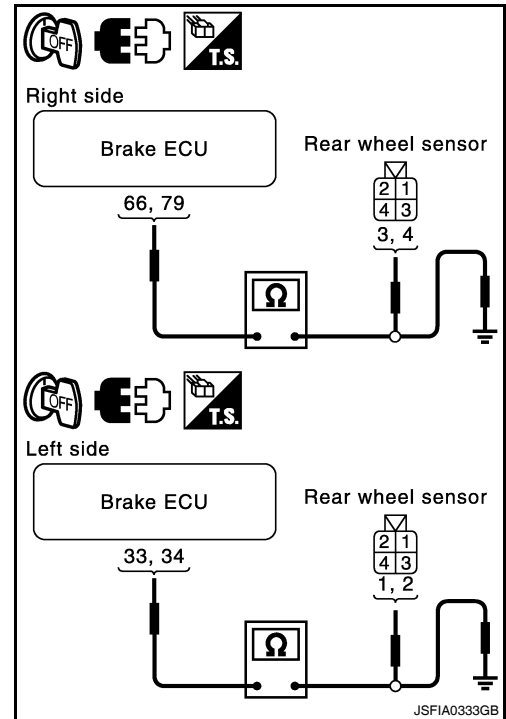
NO >> Replace skid control sensor wire.

9. CHECK HARNESS AND CONNECTOR (BRAKE ECU – REAR WHEEL SENSOR)

1. Disconnect the brake ECU connectors.

< COMPONENT DIAGNOSIS >

2. Measure the resistance according to the value(s) in the table below.



RH

| Brake ECU | | Wheel sensor | | — | Condition | Specified condition |
|-----------|----------|--------------|----------|--------|-----------|---------------------|
| Connector | Terminal | Connector | Terminal | | | |
| E61 | 79 | B43 | 3 | — | Always | Below 1 Ω |
| E61 | 79 | — | — | Ground | Always | 10 kΩ or higher |
| E61 | 66 | B43 | 4 | — | Always | Below 1 Ω |
| E61 | 66 | — | — | Ground | Always | 10 kΩ or higher |

LH

| Brake ECU | | Wheel sensor | | — | Condition | Specified condition |
|-----------|----------|--------------|----------|--------|-----------|---------------------|
| Connector | Terminal | Connector | Terminal | | | |
| E60 | 34 | B43 | 1 | — | Always | Below 1 Ω |
| E60 | 34 | — | — | Ground | Always | 10 kΩ or higher |
| E60 | 33 | B43 | 2 | — | Always | Below 1 Ω |
| E60 | 33 | — | — | Ground | Always | 10 kΩ or higher |

Is the inspection result normal?

YES >> GO TO 10.

NO >> Repair or replace harness or connector.

10.RECONFIRM DTC

1. Turn ignition switch OFF.
2. Clear the DTC.
3. Turn the ignition switch ON (READY).
4. Drive the vehicle at the speed of 32 km/h (20 MPH) or more for at least 60 seconds.
5. Check if the same DTC is recorded.

Result

| Condition | Proceed to |
|---|------------|
| DTCs (C0210 and/or C0215) are not output. | A |
| DTCs (C0210 and/or C0215) are output. | B |

NOTE:

If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step.

- A >> Check for intermittent problems (symptom simulation).
- B >> Replace brake ECU.

11. REPAIR OR REPLACE HARNESS OR CONNECTOR (BRAKE ECU – REAR WHEEL SENSOR)

1. Turn ignition switch OFF.
2. Repair or replace the harness or connector.
3. Check for any momentary interruption between the brake ECU and rear wheel sensor.
4. Check that there is no momentary interruption.

>> GO TO 12.

12. RECONFIRM DTC

1. Turn ignition switch OFF.
2. Clear the DTC.
3. Turn ignition switch ON (READY).
4. Drive the vehicle at the speed of 32 km/h (20 MPH) or more for at least 60 seconds.
5. Check if the same DTC is recorded.

Result

| Condition | Proceed to |
|---|------------|
| DTCs (C0210 and/or C0215) are not output. | A |
| DTCs (C0210 and/or C0215) are output. | B |

- A >> INSPECTION END
- B >> GO TO 1.

Special Repair Requirement

INFOID:000000004212642

1. ZERO ADJUSTMENT FOR EACH SENSOR AND OFFSET LEANING FOR LINEAR SOLENOID VALVE

After erasing brake ECU memories, perform zero adjustment of following sensors and initialization of linear solenoid valve.

- Steering angle sensor: [BRC-9, "PERFORM ZERO POINT OF STEERING ANGLE SENSOR : Description"](#).
- Yaw rate/side/decel G sensor: [BRC-8, "PERFORM ZERO POINT OF YAW RATE/SIDE/DECEL G SENSOR : Description"](#).
- Brake stroke sensor: [BRC-9, "PERFORM ADJUSTMENT OF STROKE SENSOR : Description"](#).
- Linear solenoid valve: [BRC-7, "PERFORM INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION : Description"](#).

>> END

C0371, C1234, C1232, C1243, C1244, C1245, C1279, C1381

Description

INFOID:000000004212643

The brake ECU receives signals from the yaw rate/side/decel G sensor through the CAN communication system.

The yaw rate sensor has a built in acceleration sensor and detects the vehicle's condition using 2 circuits (GL1, GL2).

If there is through in the bus lines between the yaw rate/side/decel G sensor and the CAN communication system, DTCs U0123 (malfunction in CAN communication with the yaw rate sensor) and U0124 (malfunction in CAN communication with the acceleration sensor) are output.

These DTCs are also output when calibration has not been completed.

DTCs C0371 and C1279 can be deleted when the yaw rate/side/decel G sensor sends a yaw rate and/or acceleration signal or the Test Mode ends. DTCs C0371 and C1279 are output only in the Test Mode.

DTC Logic

INFOID:000000004212644

| DTC | INF code | Display item | DTC detection condition | Trouble area |
|-------|--------------------------|--------------------|---|--|
| C1234 | 333 334 335 337 | YAW RATE SEN | Malfunction signal that is detected in sensor self check is received when communication with the sensors is valid. | <ul style="list-style-type: none"> Yaw rate/side/decel G sensor |
| C1243 | 317 | G SENSOR | Sensor sticking can be seen 16 times or more in a series at a speed between 30 km/h (19 MPH) and 0 km/h (0 MPH). | <ul style="list-style-type: none"> Yaw rate/side/decel G sensor |
| C1244 | 314 | G SEN CIRC | Difference between GL1 and GL2 is not less than 0.4 G for at least 60 seconds after the difference is 0.6 G or more when the vehicle speed is 0 km/h (0 MPH). Malfunction signal from acceleration sensor is received. | <ul style="list-style-type: none"> Yaw rate/side/decel G sensor Sensor installation |
| C1245 | 313 | G SEN OUTPUT | Difference between the G value calculated from deceleration sensor value and vehicle speed exceeds 0.35 G for at least 60 seconds when vehicle speed is 30 km/h (19 MPH). | <ul style="list-style-type: none"> Yaw rate/side/decel G sensor Sensor installation |
| C1381 | 315 | YAW RATE/G SEN PWR | Power source voltage is not within specified range when communication between brake ECU and sensor is valid. | <ul style="list-style-type: none"> Yaw rate/side/decel G sensor Yaw rate/side/decel G sensor power source circuit Brake ECU |
| C0371 | — | YAW SEN OUTPUT | Detected only during Test Mode. | <ul style="list-style-type: none"> Yaw rate/side/decel G sensor |
| C1232 | 311 312 | G SEN STUC 2 | When the following condition is maintained for 30 seconds or more: With vehicle speed 10 km/h (6 MPH) or more, one is 80 mV or less, and the other is 1.9 V or more. | <ul style="list-style-type: none"> Yaw rate/side/decel G sensor |
| C1279 | — | G SENSOR OUTPUT | Detected only during Test Mode. | <ul style="list-style-type: none"> Yaw rate/side/decel G sensor Sensor installation |

Diagnosis Procedure

INFOID:000000004212645

CAUTION:

When replacing the yaw rate/side/decel G sensor, perform zero point calibration.

1. CHECK DTC

1. Clear the DTC.
2. Turn ignition switch OFF.

C0371, C1234, C1232, C1243, C1244, C1245, C1279, C1381

< COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

3. At a speed of 30 km/h (19 MPH) or more, drive the vehicle, turn the steering wheel, and decelerate the vehicle (depress the brake pedal).
4. Turn the ignition switch ON again and check that no CAN communication system DTC is output.
5. Check if DTCs indicating that zero point calibration of the yaw rate sensor is undone (C11A0) or indicating that zero point calibration of the acceleration sensor is undone (C1336) are output.

Result

| Condition | Proceed to |
|--|------------|
| DTCs (C11A0, C1336, and/or CAN communication system DTC) are not output. | A |
| CAN communication system DTC is output. | B |
| DTCs (C11A0 and/or C1336) are output. | C |

- A >> GO TO 2.
 B >> Inspect CAN communication system
 C >> Repair circuit indicated by output DTC.

2. CHECK YAW RATE/SIDE/DECEL G SENSOR INSTALLATION

1. Turn the ignition switch OFF.
2. Check that the yaw rate/side/decel G sensor has been installed properly.

Is the inspection result normal?

- YES >> GO TO 3.
 NO >> Install yaw rate/side/decel G sensor correctly.

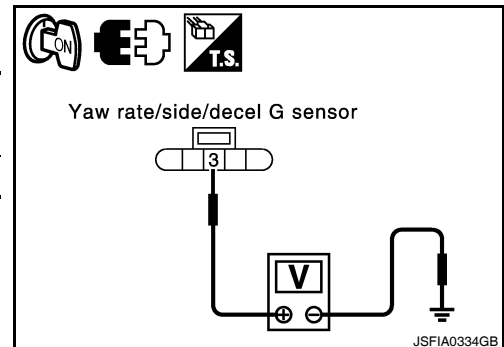
3. INSPECT YAW RATE/SIDE/DECEL G SENSOR (IG TERMINAL)

1. Disconnect the yaw rate/side/decel G sensor connector.
2. Turn ignition switch ON.
3. Measure the voltage according to the value(s) in the table below.

| Yaw rate/side/decel G sensor | | Condition | Specified condition |
|------------------------------|------------|--------------------|---------------------|
| Connector | Terminal | | |
| M55 | 3 – Ground | Ignition switch ON | 10 to 14 V |

Is the inspection result normal?

- YES >> GO TO 4.
 NO >> Repair or replace harness or connector (IG circuit).



4. INSPECT YAW RATE/SIDE/DECEL G SENSOR (GND TERMINAL)

1. Turn ignition switch OFF.
2. Measure the resistance according to the value(s) in the table below.

| Yaw rate/side/decel G sensor | | Condition | Specified condition |
|------------------------------|------------|-----------|---------------------|
| Connector | Terminal | | |
| M55 | 1 – Ground | Always | Below 1 Ω |

CAUTION:

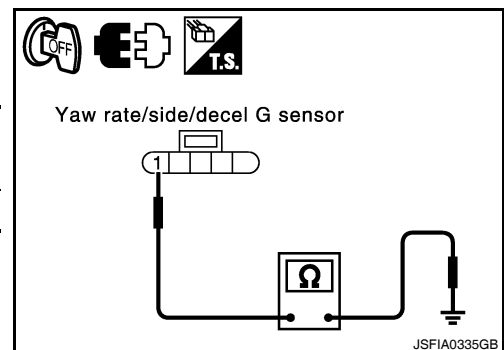
Check the yaw rate/side/decel G sensor signal after replacement.

NOTE:

If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step.

Is the inspection result normal?

- YES >> Replace yaw rate/side/decel G sensor.
 NO >> Repair or replace harness or connector (GND circuit).



Special Repair Requirement

INFOID:000000004212646

1.ZERO ADJUSTMENT FOR EACH SENSOR AND OFFSET LEARNING FOR LINEAR SOLENOID VALVE

After erasing brake ECU memories, perform zero adjustment of following sensors and initialization of linear solenoid valve.

- Steering angle sensor: [BRC-9, "PERFORM ZERO POINT OF STEERING ANGLE SENSOR : Description"](#).
- Yaw rate/side/decel G sensor: [BRC-8, "PERFORM ZERO POINT OF YAW RATE/SIDE/DECEL G SENSOR : Description"](#).
- Brake stroke sensor: [BRC-9, "PERFORM ADJUSTMENT OF STROKE SENSOR : Description"](#).
- Linear solenoid valve: [BRC-7, "PERFORM INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION : Description"](#).

>> END

C1155

Description

INFOID:000000004212647

When a fluid level drop in the master cylinder reservoir is detected, the signal is input to the brake ECU. When the DTC for the fluid level drop is memorized, the warning is canceled and the DTC is not stored if the fluid level returns to normal.

DTC Logic

INFOID:000000004212648

| DTC | INF code | Display item | DTC detection condition | Trouble area |
|-------|----------|--------------------|--|---|
| C1155 | — | BR FLUID LEVEL LOW | When either of the following is detected. 1. Pump motor operates for specified period when reservoir level drops. 2. Brake operation signal is input when the reservoir level is abnormal and the ignition switch is ON. | <ul style="list-style-type: none"> Fluid leakage Brake fluid level Brake fluid level switch Brake fluid level switch circuit Brake ECU |
| | 512 | | An open in the switch signal circuit continues for 2 seconds or more. | <ul style="list-style-type: none"> Brake fluid level switch Brake fluid level switch circuit Brake ECU |

Diagnosis Procedure

INFOID:000000004212649

CAUTION:

When replacing the brake ECU, perform initialization of linear solenoid valve and calibration.

NOTE:

When releasing the parking brake, set the chocks to hold the vehicle for safety.

1. CHECK BRAKE FLUID LEVEL IN RESRVOIR

Check that the brake fluid level is sufficient.

NOTE:

- If the fluid level drops, check for a fluid leak, and repair if found.
- If no leak exists, add and adjust fluid and then check that the trouble code is not output again.
- Brake fluid level is proper.

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Check and repair brake fluid leakage or add fluid.

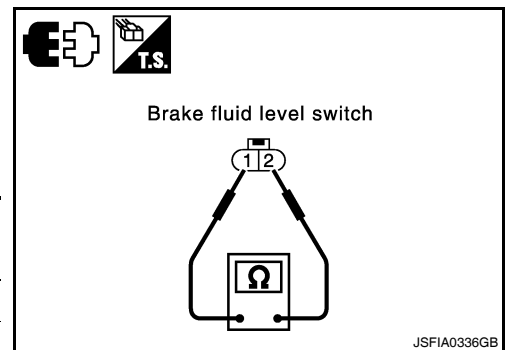
2. INSPECT BRAKE FLUID LEVEL SWITCH

- Remove the reservoir tank cap.
- Disconnect the brake fluid level switch.
- Measure the resistance according to the value(s) in the table below.

NOTE:

A float is located inside the reservoir. Its position can be changed by increasing or decreasing the level of brake fluid.

| Brake fluid level switch | Condition | Specified condition |
|--------------------------|------------------------|---------------------|
| Terminal | | |
| 1 – 2 | Float up (switch OFF) | 1.8 to 2.2 kΩ |
| | Float down (switch ON) | Below 1 Ω |



NOTE:

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

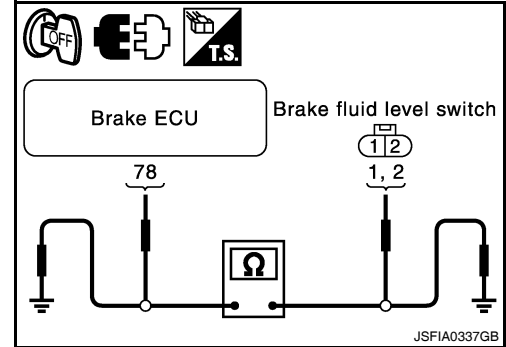
Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Replace brake master cylinder reservoir assembly (brake fluid level switch).

< COMPONENT DIAGNOSIS >

3. CHECK HARNESS AND CONNECTOR (BRAKE ECU – BRAKE FLUID LEVEL SWITCH)

1. Disconnect the brake ECU connector.
2. Measure the resistance according to the value(s) in the table below.



| Brake ECU | | Brake fluid level switch | | — | Condition | Specified condition |
|-----------|----------|--------------------------|----------|--------|-----------|---------------------|
| Connector | Terminal | Connector | Terminal | | | |
| E61 | 78 | E89 | 2 | — | Always | Below 1 Ω |
| E61 | 78 | — | — | Ground | Always | 10 kΩ or higher |
| — | — | E89 | 1 | Ground | Always | Below 1 Ω |

Is the inspection result normal?

- YES >> GO TO 4.
 NO >> Repair or replace harness or connector.

4. RECONFIRM DTC

1. Turn the ignition switch OFF.
2. Reconnect the brake fluid level switch connector.
3. Clean the DTC.
4. Turn the ignition switch ON.
5. Check if the same DTC is recorded.

Result

| Condition | Proceed to |
|-----------------------------|------------|
| DTC (C1155) are not output. | A |
| DTC (C1155) are output. | B |

NOTE:

If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step.

- A >> Check for intermittent problems (symptom simulation).
 B >> Replace brake ECU.

Special Repair Requirement

INFOID:000000004212650

1. ZERO ADJUSTMENT FOR EACH SENSOR AND OFFSET LEARNING FOR LINEAR SOLENOID VALVE

After erasing brake ECU memories, perform zero adjustment of following sensors and initialization of linear solenoid valve.

- Steering angle sensor: [BRC-9, "PERFORM ZERO POINT OF STEERING ANGLE SENSOR : Description"](#).
- Yaw rate/side/decel G sensor: [BRC-8, "PERFORM ZERO POINT OF YAW RATE/SIDE/DECEL G SENSOR : Description"](#).
- Brake stroke sensor: [BRC-9, "PERFORM ADJUSTMENT OF STROKE SENSOR : Description"](#).
- Linear solenoid valve: [BRC-7, "PERFORM INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION : Description"](#).

>> END

C11A0, C1336

Description

INFOID:000000004212651

The brake ECU receives signals from the yaw rate/side/decel G sensor through the CAN communication system.

The yaw rate sensor has the built in acceleration sensor and detects the vehicle's condition using 2 circuits (GL1, GL2).

If there is trouble in the bus lines between the yaw rate/side/decel G sensor and the CAN communication system, the DTCs U0123 (yaw rate sensor communication trouble) and U0124 (acceleration sensor communication trouble) are output.

The DTCs are also output when the calibration has not been completed.

DTC Logic

INFOID:000000004212652

| DTC | INF code | Display item | DTC detection condition | Trouble area |
|-------|----------|-------------------|--|--|
| C11A0 | — | YAW RATE SN CALIB | Yaw rate sensor zero point calibration is unfinished. | <ul style="list-style-type: none"> • Brake ECU • Yaw rate/side/decel G sensor • Zero point calibration undone (Perform zero point calibration and check DTC. If DTC is not output again, the sensor is normal.) |
| C1336 | — | G SEN CALIB | When either of the following is detected. <ol style="list-style-type: none"> 1. Vehicle speed increases with unfinished zero point calibration. 2. Zero point calibration is not within specified range when zero point calibration is finished. | <ul style="list-style-type: none"> • Brake ECU • Yaw rate/side/decel G sensor • Zero point calibration undone (Perform zero point calibration and check DTC. If DTC is not output again, the sensor is normal.) |

A
B
C
D
E
BRC
G
H
I
J
K
L
M
N
O
P

Diagnosis Procedure

INFOID:000000004212653

CAUTION:

When replacing the brake ECU, perform initialization of the linear solenoid valve and calibration.

NOTE:

When U0123, U0124 or U0126 is output along with C11A0 or C1336, inspect and repair trouble areas indicated by U0123, U0124 or U0126 first.

1. PERFORM ZERO POINT CALIBRATION OF YAW RATE/SIDE/DECEL G SENSOR

Perform zero point calibration of the yaw rate/side/decel G sensor.

>> GO TO 2.

2. RECONFIRM DTC

1. Turn the ignition switch OFF.
2. Clear the DTC.
3. Turn the ignition switch ON.
4. Check if the same DTC is recorded.

Result

| Condition | Proceed to |
|---|------------|
| DTCs (C11A0 and/or C1336) are output. | A |
| DTCs (C11A0 and/or C1336) are not output. | B |

< COMPONENT DIAGNOSIS >

NOTE:

- The DTCs are recorded because zero point calibration has not been completed.
- End the procedure as the same DTCs are not recorded after completion of zero point calibration.

A >> GO TO 3.

B >> INSPECTION END

3.CHECK YAW RATE/SIDE/DECEL G SENSOR INSTALLATION

1. Turn the ignition switch OFF.
2. Check that the yaw rate/side/decel G sensor has been installed properly.

Is the inspection result normal?

YES >> Replace brake ECU.

NO >> Install yaw rate/side/decel G sensor correctly.

Special Repair Requirement

INFOID:000000004212654

1.ZERO ADJUSTMENT FOR EACH SENSOR AND OFFSET LEANING FOR LINEAR SOLENOID VALVE

After erasing brake ECU memories, perform zero adjustment of following sensors and initialization of linear solenoid valve.

- Steering angle sensor: [BRC-9. "PERFORM ZERO POINT OF STEERING ANGLE SENSOR : Description"](#).
- Yaw rate/side/decel G sensor: [BRC-8. "PERFORM ZERO POINT OF YAW RATE/SIDE/DECEL G SENSOR : Description"](#).
- Brake stroke sensor: [BRC-9. "PERFORM ADJUSTMENT OF STROKE SENSOR : Description"](#).
- Linear solenoid valve: [BRC-7. "PERFORM INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION : Description"](#).

>> END

C1231

Description

INFOID:000000004212655

The brake ECU inputs the steering angle sensor signal through the CAN communication. When a malfunction occurs in the communication line with the steering angle sensor, DTC U0126 (malfunction in communication with steering angle sensor) is output.

DTC Logic

INFOID:000000004212656

| DTC | INF code | Display item | DTC detection condition | Trouble area |
|-------|----------|-------------------|---|---|
| C1231 | — | STR ANGLE SEN CIR | When either of the following is detected. 1. Steering angle sensor malfunction signal is received when data transmission is valid (internal malfunction is detected in sensor self check). 2. A signal of +B open in steering angle sensor is received when communication with sensor is valid. | <ul style="list-style-type: none"> Steering angle sensor Steering angle sensor circuit Steering angle sensor power supply Brake ECU |

Diagnosis Procedure

INFOID:000000004212657

NOTE:

- When U0126 is output together with C1231, inspect and repair the trouble areas indicated by U0126 first.
- When the wheel sensor or the yaw rate sensor has trouble, DTCs for the steering angle sensor may be output even when the steering angle sensor is normal. When DTCs for the wheel sensor or yaw rate sensor are output together with other DTCs for the steering angle sensor, inspect and repair the wheel sensor and yaw rate sensor first, and then inspect and repair the steering angle sensor.

1. CHECK DTC

- Clear the DTC.
- Turn the ignition switch OFF.
- Turn the ignition switch ON again and check that no CAN communication system DTC is output.
- Drive the vehicle and turn the steering wheel to the right and left at the speed of 35 km/h (22 MPH) and check that no wheel sensor and yaw rate sensor DTCs are output.

Result

| Condition | Proceed to |
|---|------------|
| No CAN communication system DTC and Wheel sensor or yaw rate sensor DTC are output. | A |
| CAN Communication system DTC is output. | B |
| Wheel sensor or yaw rate sensor DTC is output. | C |

NOTE:

- If there is a malfunction in the wheel sensor or the yaw rate sensor, an abnormal value may be output although the steering angle sensor is normal.
- If the wheel sensor and yaw rate sensor DTCs are output simultaneously, repair the sensors and inspect the steering angle sensor.

- A >> GO TO 2.
- B >> Inspect CAN communication system.
- C >> Repair circuit indicated by output DTC.

2. INSPECT STEERING ANGLE SENSOR (POWER SOURCE TERMINAL)

- Turn the ignition switch OFF.
- Remove the steering wheel and the column cover lower.
- Disconnect the steering angle sensor connector M53.

< COMPONENT DIAGNOSIS >

4. Measure the voltage according to the value(s) in the table below.

| Steering angle sensor | | Condition | Specified condition |
|-----------------------|------------|--------------------|---------------------|
| Connector | Terminal | | |
| M53 | 4 – Ground | Ignition switch ON | 10 to 14 V |
| M53 | 7 – Ground | Always | 10 to 14 V |

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Repair or replace harness or connector.

3.INSPECT STEERING ANGLE SENSOR (GROUND TERMINAL)

1. Turn the ignition switch OFF.
2. Measure the resistance according to the value(s) in the table below.

| Steering angle sensor | | Condition | Specified condition |
|-----------------------|------------|-----------|---------------------|
| Connector | Terminal | | |
| M53 | 1 – Ground | Always | Below 1 Ω |

NOTE:

If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step.

Is the inspection result normal?

- YES >> Replace steering angle sensor.
- NO >> Repair or replace harness or connector.

Special Repair Requirement

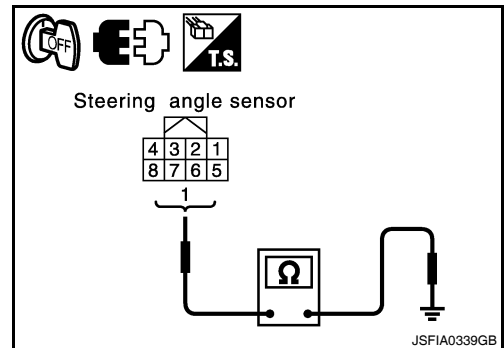
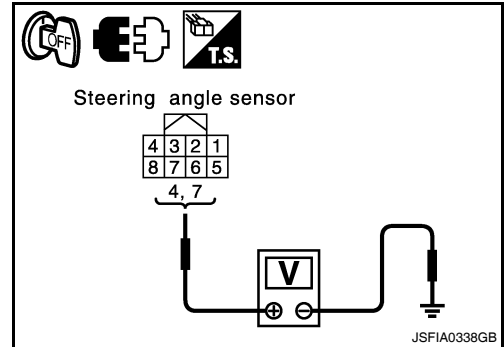
INFOID:000000004212658

1.ZERO ADJUSTMENT FOR EACH SENSOR AND OFFSET LEANING FOR LINEAR SOLENOID VALVE

After erasing brake ECU memories, perform zero adjustment of following sensors and initialization of linear solenoid valve.

- Steering angle sensor: [BRC-9, "PERFORM ZERO POINT OF STEERING ANGLE SENSOR : Description"](#).
- Yaw rate/side/decel G sensor: [BRC-8, "PERFORM ZERO POINT OF YAW RATE/SIDE/DECEL G SENSOR : Description"](#).
- Brake stroke sensor: [BRC-9, "PERFORM ADJUSTMENT OF STROKE SENSOR : Description"](#).
- Linear solenoid valve: [BRC-7, "PERFORM INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION : Description"](#).

>> END



C1235, C1236, C1238, C1239, C1275, C1276, C1277, C1278

Description

INFOID:000000004212659

The wheel sensors detect wheel speed and transmit the signals to the ECU. These signals are used for control of the ABS control system. Each of the front and rear rotors has 48 serrations.

When the rotors rotate, the magnetic field generated by the permanent magnet in the wheel sensor induces an AC voltage.

Since the frequency of this AC voltage changes in direct proportion to the speed of the rotor, the frequency is used by the ECU to detect the speed of each wheel.

When foreign matter adheres to the wheel sensor tip or wheel sensor rotor, or the rotor teeth are chipped, these DTCs are output. An abnormal waveform input from the sensor determines these conditions.

These DTCs may be detected when a malfunction occurs in the connector terminals or wire harness of the wheel sensor circuit.

DTCs C1275 to C1278 can be deleted when the wheel sensor sends a wheel speed signal or the Test Mode ends. DTCs from C1275 to C1278 are output only in the Test Mode.

DTC Logic

INFOID:000000004212660

A
B
C
D
E

BRC

| DTC | INF code | Display item | DTC detection condition | Trouble area |
|-------|----------|------------------|--|---|
| C1235 | 302 | FR SPD FRAGMENT | Pulse waveform of wheel sensor signal is abnormal for at least 5 seconds when vehicle speed is 20 km/h (12 MPH) or more. | <ul style="list-style-type: none"> • Front wheel sensor RH • Wheel sensor circuit • Sensor installation • Wheel sensor rotor • Brake ECU |
| C1236 | 303 | FL SPD FRAGMENT | Pulse waveform of wheel sensor signal is abnormal for at least 5 seconds when vehicle speed is 20 km/h (12 MPH) or more. | <ul style="list-style-type: none"> • Front wheel sensor LH • Wheel sensor circuit • Sensor installation • Wheel sensor rotor • Brake ECU |
| C1238 | 304 | RR SPD FRAGMENT | Pulse waveform of wheel sensor signal is abnormal for at least 5 seconds when vehicle speed is 20 km/h (12 MPH) or more. | <ul style="list-style-type: none"> • Rear wheel sensor RH • Wheel sensor circuit • Sensor installation • Wheel sensor rotor • Brake ECU |
| C1239 | 305 | RL SPD FRAGMENT | Pulse waveform of wheel sensor signal is abnormal for at least 5 seconds when vehicle speed is 20 km/h (12 MPH) or more. | <ul style="list-style-type: none"> • Rear wheel sensor LH • Wheel sensor circuit • Sensor installation • Wheel sensor rotor • Brake ECU |
| C1275 | — | FR SPD OUTPUT HI | Detected only during Test Mode. | <ul style="list-style-type: none"> • Wheel sensor rotor |
| C1276 | | FL SPD OUTPUT HI | | |
| C1277 | | RR SPD OUTPUT HI | | |
| C1278 | | RL SPD OUTPUT HI | | |

G
H
I
J
K
L
M
N

NOTE:

- DTCs C1235 and C1275 are for the front wheel sensor RH.
- DTCs C1236 and C1276 are for the front wheel sensor LH.
- DTCs C1238 and C1277 are for the rear wheel sensor RH.
- DTCs C1239 and C1278 are for the rear wheel sensor LH.

Diagnosis Procedure

INFOID:000000004212661

CAUTION:

When replacing the brake ECU, perform initialization of linear solenoid valve and calibration.

NOTE:

When C0200, C0205, C0210, or C0215 is output together with C1235, C1236, C1238, or C1239, inspect and repair the trouble areas indicated by C0200, C0205, C0210, or C0215 first.

1. RECONFIRM DTC

P

C1235, C1236, C1238, C1239, C1275, C1276, C1277, C1278

< COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

1. Turn the ignition switch OFF.
2. Clear the DTC.
3. Turn the ignition switch ON (READY).
4. Drive the vehicle at the speed of 20 km/h (12 MPH) or more for at least 60 seconds.
5. Check if the same DTC is recorded.

Result

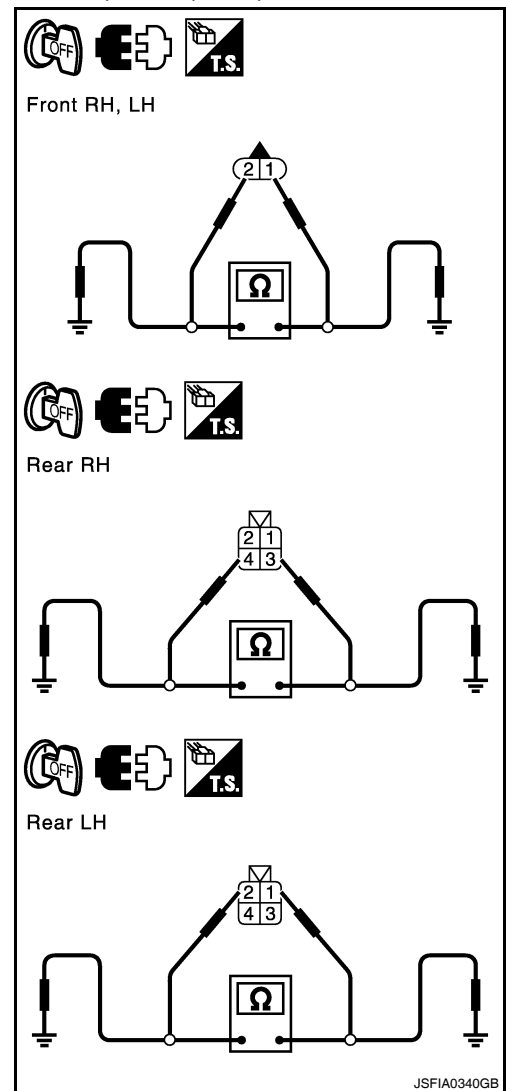
| Condition | Proceed to |
|---|------------|
| DTCs (C1235, C1236, C1238 and/or C1239) are not output. | A |
| DTCs (C1235, C1236, C1238 and/or C1239) are output. | B |

A >> GO TO 2.

B >> Replace brake ECU.

2. INSPECT EACH WHEEL SENSOR

1. Turn the ignition switch OFF.
2. Disconnect each wheel sensor connector E41 (Front RH), E19 (Front LH), B43 (Rear).
3. Measure the resistance according to the value(s) in the table below.



RH

| | Terminal | Condition | Specified condition |
|-------|------------|-----------|---------------------|
| Front | 1 – 2 | Always | Not existed |
| | 1 – Ground | Always | Existed |
| | 2 – Ground | Always | Existed |

C1235, C1236, C1238, C1239, C1275, C1276, C1277, C1278

< COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

| Terminal | Condition | Specified condition | |
|----------|------------|---------------------|-------------|
| Rear | 3 – 4 | Always | Not existed |
| | 3 – Ground | Always | Existed |
| | 4 – Ground | Always | Existed |

LH

| Terminal | Condition | Specified condition | |
|----------|------------|---------------------|-------------|
| Front | 1 – 2 | Always | Not existed |
| | 1 – Ground | Always | Existed |
| | 2 – Ground | Always | Existed |
| Rear | 1 – 2 | Always | Not existed |
| | 1 – Ground | Always | Existed |
| | 2 – Ground | Always | Existed |

Result

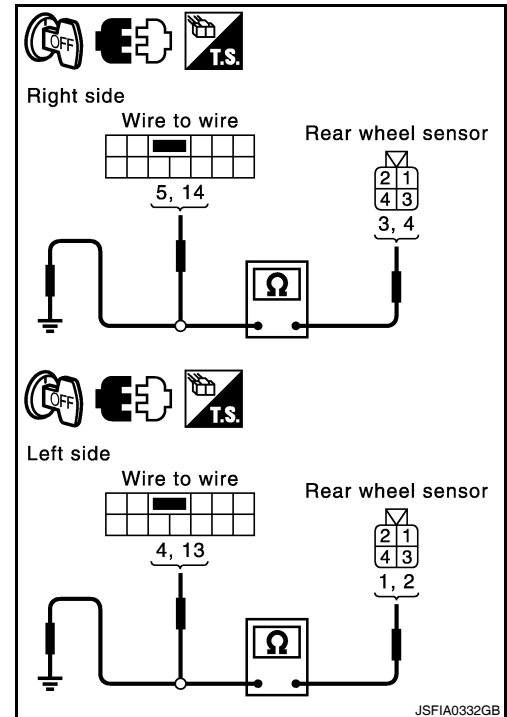
| Condition | Proceed to |
|-----------------|------------|
| Yes (for rear) | A |
| Yes (for front) | B |
| No | C |

Is the inspection result normal?

- A >> GO TO 3.
- B >> GO TO 4.
- C >> Replace each wheel sensor.

3. CHECK HARNESS AND CONNECTOR (BRAKE CONTROL SENSOR WIRE)

1. Disconnect the brake control sensor wire.
2. Measure the resistance according to the value(s) in the table below.



RH

| Sensor side | Vehicle side | Condition | Specified condition |
|-------------|--------------|-----------|---------------------|
| 3 | 5 | Always | Below 1 Ω |
| 3 | 14 | Always | 10 kΩ or higher |
| 3 | Ground | Always | 10 kΩ or higher |

| Sensor side | Vehicle side | Condition | Specified condition |
|-------------|--------------|-----------|---------------------|
| 4 | 14 | Always | Below 1 Ω |
| 4 | 5 | Always | 10 kΩ or higher |
| 4 | Ground | Always | 10 kΩ or higher |

LH

| Sensor side | Vehicle side | Condition | Specified condition |
|-------------|--------------|-----------|---------------------|
| 1 | 4 | Always | Below 1 Ω |
| 1 | 13 | Always | 10 kΩ or higher |
| 1 | Ground | Always | 10 kΩ or higher |
| 2 | 13 | Always | Below 1 Ω |
| 2 | 4 | Always | 10 kΩ or higher |
| 2 | Ground | Always | 10 kΩ or higher |

CAUTION:

Check the wheel sensor signal after replacement.

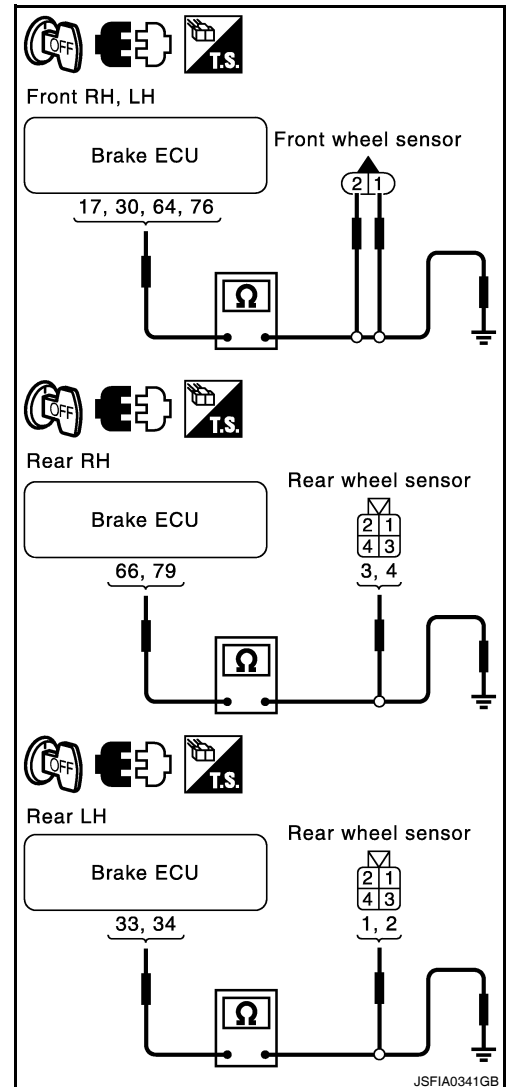
Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace skid control sensor wire.

4. CHECK HARNESS AND CONNECTOR (BRAKE ECU – EACH WHEEL SENSOR)

1. Disconnect the brake ECU connectors.
2. Measure the resistance according to the value(s) in the table below.



C1235, C1236, C1238, C1239, C1275, C1276, C1277, C1278

< COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

| RH | | | | | | |
|-----------|----------|--------------|----------|--------|-----------|---------------------|
| Brake ECU | | Wheel sensor | | — | Condition | Specified condition |
| Connector | Terminal | Connector | Terminal | | | |
| E60 | 30 | E41 | 1 | — | Always | Below 1 Ω |
| E60 | 30 | — | — | Ground | Always | 10 kΩ or higher |
| E60 | 17 | E41 | 2 | — | Always | Below 1 Ω |
| E60 | 17 | — | — | Ground | Always | 10 kΩ or higher |
| E61 | 79 | B43 | 3 | — | Always | Below 1 Ω |
| E61 | 79 | — | — | Ground | Always | 10 kΩ or higher |
| E61 | 66 | B43 | 4 | — | Always | Below 1 Ω |
| E61 | 66 | — | — | Ground | Always | 10 kΩ or higher |

| LH | | | | | | |
|-----------|----------|--------------|----------|--------|-----------|---------------------|
| Brake ECU | | Wheel sensor | | — | Condition | Specified condition |
| Connector | Terminal | Connector | Terminal | | | |
| E61 | 76 | E19 | 1 | — | Always | Below 1 Ω |
| E61 | 76 | — | — | Ground | Always | 10 kΩ or higher |
| E61 | 64 | E19 | 2 | — | Always | Below 1 Ω |
| E61 | 64 | — | — | Ground | Always | 10 kΩ or higher |
| E60 | 34 | B43 | 1 | — | Always | Below 1 Ω |
| E60 | 34 | — | — | Ground | Always | 10 kΩ or higher |
| E60 | 33 | B43 | 2 | — | Always | Below 1 Ω |
| E60 | 33 | — | — | Ground | Always | 10 kΩ or higher |

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace harness or connector.

5. RECONFIRM DTC

1. Reconnect the skid control sensor wire.
2. Reconnect the brake ECU connectors and the wheel sensor connector.
3. Clear the DTC.
4. Turn the ignition switch ON (READY).
5. Drive the vehicle at the speed of 20 km/h (12 MPH) or more for at least 60 seconds.
6. Check if the same DTC is recorded.

Result

| Condition | Proceed to |
|---|------------|
| DTCs (C1235, C1236, C1238 and/or C1239) are output (for front). | A |
| DTCs (C1235, C1236, C1238 and/or C1239) are output (for rear). | B |
| DTCs (C1235, C1236, C1238 and/or C1239) are not output. | C |

A >> GO TO 6.

B >> GO TO 7.

C >> Check for intermittent problems (symptom simulation).

6. CHECK FRONT WHEEL SENSOR TIP

1. Turn the ignition switch OFF.
2. Remove the front wheel sensor.
3. Check the wheel sensor tip.

NOTE:

- No scratches or foreign matter on the sensor tip.
- Check the wheel sensor signal after cleaning or replacement.

Is the inspection result normal?

- YES >> GO TO 7.
 NO >> Clean or replace front wheel sensor.

7. CHECK EACH WHEEL SENSOR ROTOR

1. Turn the ignition switch OFF.
2. Remove each wheel sensor rotor.
3. Check the wheel sensor rotor.

NOTE:

- No scratches, missing teeth or foreign matter on the rotors.
- Check the wheel sensor signal after cleaning or replacement.

Is the inspection result normal?

- YES >> GO TO 8.
 NO >> Clean or replace each wheel sensor rotor.

8. RECONFIRM DTC

1. Install the front wheel sensor and the wheel sensor rotor.
2. Clear the DTC.
3. Turn the ignition switch ON (READY).
4. Drive the vehicle at the speed of 20 km/h (12 MPH) or more for at least 60 seconds.
5. Check if the same DTC is recorded.

Result

| Condition | Proceed to |
|---|------------|
| DTCs (C1235, C1236, C1238 and/or C1239) are not output. | A |
| DTCs (C1235, C1236, C1238 and/or C1239) are output. | B |

- A >> Check for intermittent problems (symptom simulation).
 B >> Replace brake ECU.

Special Repair Requirement

INFOID:000000004212662

1. ZERO ADJUSTMENT FOR EACH SENSOR AND OFFSET LEARNING FOR LINEAR SOLENOID VALVE

After erasing brake ECU memories, perform zero adjustment of following sensors and initialization of linear solenoid valve.

- Steering angle sensor: [BRC-9. "PERFORM ZERO POINT OF STEERING ANGLE SENSOR : Description"](#).
- Yaw rate/side/decel G sensor: [BRC-8. "PERFORM ZERO POINT OF YAW RATE/SIDE/DECEL G SENSOR : Description"](#).
- Brake stroke sensor: [BRC-9. "PERFORM ADJUSTMENT OF STROKE SENSOR : Description"](#).
- Linear solenoid valve: [BRC-7. "PERFORM INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION : Description"](#).

>> END

C1241, C1242

Description

INFOID:000000004212663

These codes are memorized when the power source voltage for the brake ECU drops or the voltage for the ABS relay No.1 and ABS relay No.2 operation drops.
Codes may be memorized when the voltage of the auxiliary battery temporarily drops.

NOTE:

DTC C1256 (ACCUMULATOR LOW PRESSURE malfunction) may be memorized if the power source voltage drops.

DTC Logic

INFOID:000000004212664

| DTC | INF code | Display item | DTC detection condition | Trouble area |
|-------|----------|--------------|--|---|
| C1241 | 81 | POWER SUPPLY | System 1 is under the following conditions when the ignition switch is ON: <ul style="list-style-type: none"> Linear solenoid cannot receive enough current (brake is applied). BS voltage is less than 8.9 V for at least 3 seconds (brake is not applied). 12 V power source voltage inside ECU is less than 8.5 V when main relay is opened or VCM voltage is less than 4.7 V or 5.3 V or more for at least 0.05 seconds. | <ul style="list-style-type: none"> Auxiliary battery ABS relay No.1 ABS relay No.1 circuit Brake Capacitor Hybrid control system (Charging circuit) Brake ECU |
| | 82 | | System 2 is under the following conditions when the ignition switch is ON: <ul style="list-style-type: none"> Linear solenoid cannot receive enough current (brake is applied). BS voltage is less than 8.9 V for at least 3 seconds (brake is not applied). 12 V power source voltage inside ECU is less than 8.5 V when main relay is opened or VCM voltage is less than 4.7 V or 5.3 V or more for at least 0.05 seconds. | <ul style="list-style-type: none"> Auxiliary battery ABS relay No.2 ABS relay No.2 circuit Brake capacitor Hybrid control system (Charging circuit) Brake ECU |
| | 83 | | Brake capacitor mode signal is received from brake control power supply for 3 seconds or more when the ignition switch is ON. | <ul style="list-style-type: none"> Auxiliary battery Brake capacitor Hybrid control system (Charging circuit) |
| | 91 | | In system 1, 12 V power source voltage inside brake ECU is less than 8.5 V when vehicle speed is 3 km/h (1.9 MPH) or more for at least 10 seconds. | <ul style="list-style-type: none"> Auxiliary battery Hybrid control system (Charging circuit) ABS relay No.1 circuit Brake ECU |
| | 92 | | In system 2, 12 V power source voltage inside brake ECU is less than 8.5 V when vehicle speed is 3 km/h (1.9 MPH) or more for at least 10 seconds. | <ul style="list-style-type: none"> Auxiliary battery Hybrid control system (Charging circuit) ABS relay No.2 circuit Brake ECU |
| | 93 | | In system 1, 12 V power source voltage inside brake ECU is less than 8.5 V for at least 60 seconds. | <ul style="list-style-type: none"> Auxiliary battery Hybrid control system (Charging circuit) ABS relay No.1 circuit Brake ECU |
| | 94 | | In system 2, 12 V power source voltage inside brake ECU is less than 8.5 V for at least 60 seconds. | <ul style="list-style-type: none"> Auxiliary battery Hybrid control system (Charging circuit) ABS relay No.2 circuit Brake ECU |

A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P

BRC

< COMPONENT DIAGNOSIS >

| DTC | INF code | Display item | DTC detection condition | Trouble area |
|-------|----------|--------------|--|--|
| C1242 | 87 | IG1/IG2 | The power supply voltage is not applied to the IG1 terminal, power supply voltage is applied to the IG2 terminal, and DI1 terminal voltage is 9.5 V or more for 4 seconds or more. | <ul style="list-style-type: none"> • Auxiliary battery • IG1 power source circuit • Hybrid control system (Charging circuit) • Brake ECU |
| | 88 | | The power supply voltage is applied to the IG1 terminal, power supply voltage is applied to the IG2 terminal, and DI1 terminal voltage is 9.5 V or more for 4 seconds or more. | <ul style="list-style-type: none"> • Auxiliary battery • IG2 power source circuit • Hybrid control system (Charging circuit) • Brake ECU |

Diagnosis Procedure

INFOID:000000004212665

CAUTION:

When replacing the brake ECU, perform initialization of linear solenoid valve and calibration.

1. CHECK HYBRID CONTROL SYSTEM

Check if the hybrid control system DTC is output.

Result

| Condition | Proceed to |
|--------------------|------------|
| DTC is not output. | A |
| DTC is output. | B |

A >> GO TO 2.

B >> Inspect hybrid control system.

2. CHECK AUXILIARY BATTERY

Check the auxiliary battery voltage.

Standard voltage : 11 to 14 V

Is the inspection result normal?

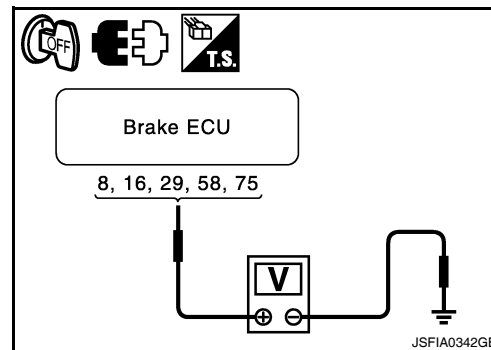
YES >> GO TO 3.

NO >> Charge or replace auxiliary battery.

3. INSPECT BRAKE ECU (IG AND +DI1 TERMINAL)

1. Disconnect the brake ECU connectors.
2. Measure the voltage according to the value(s) in the table below.

| Brake ECU | | Condition | Specified condition |
|-----------|-------------|--------------------|---------------------|
| Connector | Terminal | | |
| E60 | 29 – Ground | Ignition switch ON | 10 to 16 V |
| E61 | 75 – Ground | Ignition switch ON | 10 to 16 V |
| E60 | 16 – Ground | Always | 10 to 16 V |
| E60 | 8 – Ground | Always | 10 to 16 V |
| E61 | 58 – Ground | Always | 10 to 16 V |



Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace harness or connector (IG or +DI1 circuit).

4. INSPECT BRAKE ECU (GND TERMINAL)

1. Disconnect the brake ECU connectors.

< COMPONENT DIAGNOSIS >

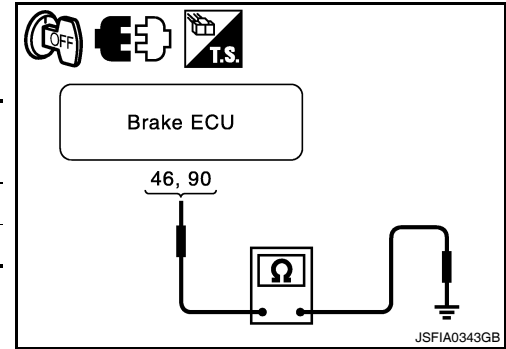
2. Measure the resistance according to the value(s) in the table below.

| Brake ECU | | Condition | Specified condition |
|-----------|-------------|-----------|---------------------|
| Connector | Terminal | | |
| E60 | 46 – Ground | Always | Below 1 Ω |
| E61 | 90 – Ground | Always | Below 1 Ω |

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace harness or connector (GND circuit).



5. RECONFIRM DTC

1. Turn the ignition switch OFF.
2. Clear the DTC.
3. Turn the ignition switch ON.
4. Check if the same DTC is recorded.

Result

| Condition | Proceed to |
|---|------------|
| DTCs (C1241 and/or C1242) are not output. | A |
| DTCs (C1241 and/or C1242) are output. | B |

A >> Check for intermittent problems (symptom simulation).

B >> Replace brake ECU.

Special Repair Requirement

INFOID:000000004212666

1. ZERO ADJUSTMENT FOR EACH SENSOR AND OFFSET LEANING FOR LINEAR SOLENOID VALVE

After erasing brake ECU memories, perform zero adjustment of following sensors and initialization of linear solenoid valve.

- Steering angle sensor: [BRC-9, "PERFORM ZERO POINT OF STEERING ANGLE SENSOR : Description"](#).
- Yaw rate/side/decel G sensor: [BRC-8, "PERFORM ZERO POINT OF YAW RATE/SIDE/DECEL G SENSOR : Description"](#).
- Brake stroke sensor: [BRC-9, "PERFORM ADJUSTMENT OF STROKE SENSOR : Description"](#).
- Linear solenoid valve: [BRC-7, "PERFORM INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION : Description"](#).

>> END

C1246, C1281, C1364

Description

INFOID:000000004212667

The master cylinder pressure sensor and the wheel cylinder pressure sensor are built into the brake actuator, and measure the master cylinder pressure and the wheel cylinder pressure sent to the brake ECU. DTC C1281 can be deleted when the master cylinder pressure sensor sends a master cylinder pressure signal or the Test Mode ends. DTC C1281 is output only in the Test Mode.

DTC Logic

INFOID:000000004212668

| DTC | INF code | Display item | DTC detection condition | Trouble area |
|-------|----------|-----------------|--|--|
| C1246 | 191 | MC PRESS SENSOR | Sensor power source 1 (VCM1) voltage is less than 4.7 V or 5.3 V or more for at least 0.05 seconds. | <ul style="list-style-type: none"> • Brake actuator assembly (Master cylinder pressure sensor) • Master cylinder pressure sensor circuit |
| | 194 | | Sensor power source 2 (VCM2) voltage is less than 4.7 V or 5.3 V or more for at least 0.05 seconds. | |
| | 192 | | Ratio of M/C pressure sensor output voltage 1 (PMC1) to sensor power source 1 (VCM1) is less than 5% or 90.5% or more for at least 0.05 seconds. | <ul style="list-style-type: none"> • Brake actuator assembly (Master cylinder pressure sensor) • Master cylinder pressure sensor circuit |
| | 195 | | Ratio of M/C pressure sensor output voltage 2 (PMC2) to sensor power source 2 (VCM2) is less than 5% or 90.5% or more for at least 0.05 seconds. | |
| | 197 | | M/C pressure sensor output voltage 1 (PMC1) is abnormal. | <ul style="list-style-type: none"> • Brake actuator assembly • Brake ECU |
| | 198 | | M/C pressure sensor output voltage 2 (PMC2) is abnormal. | |
| | 199 | | M/C pressure sensor output 1 (PMC1) is not approx. 0 Mpa when not braking. | <ul style="list-style-type: none"> • Brake actuator assembly (Master cylinder pressure sensor) • Master cylinder pressure sensor circuit |
| | 200 | | M/C pressure sensor output 2 (PMC2) is not approx. 0 Mpa when not braking. | |
| | 201 | | PMC1 and PMC2 voltages are different when braking. | <ul style="list-style-type: none"> • Brake actuator assembly • Brake ECU |
| | 202 | | M/C pressure sensor 1 data (PMC1) is invalid. | <ul style="list-style-type: none"> • Master cylinder pressure sensor power supply • Brake actuator assembly • Brake ECU |
| | 205 | | M/C pressure sensor 2 data (PMC2) is invalid. | |

C1246, C1281, C1364

< COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

| DTC | INF code | Display item | DTC detection condition | Trouble area | |
|-------|----------|--------------|--|--|-----|
| C1364 | 221 | WC PRESS SEN | Sensor power source 1 (VCM1) voltage is less than 4.7 V or 5.3 V or more for at least 0.05 seconds. | • Wheel cylinder pressure sensor power supply | A |
| | 227 | | Sensor power source 2 (VCM2) voltage is less than 4.7 V or 5.3 V or more for at least 0.05 seconds. | • Brake actuator assembly • Brake ECU | B |
| | 222 | | <ul style="list-style-type: none"> Ratio of FR right sensor output voltage (PFR) to sensor power source 1 (VCM1) is less than 5% or 90.5% or more for at least 0.05 seconds. Open or short in FR right sensor (PFR) circuit. | • Brake actuator assembly (wheel cylinder pressure sensor) • Wheel cylinder pressure sensor • Brake actuator assembly • Brake ECU | C |
| | 224 | | When any of the following is detected: 1. FR right sensor output (PFR) is not approx. 0 Mpa when not braking. 2. FR right sensor (PFR) zero point malfunction. | | D |
| | 225 | | Ratio of FR right sensor output voltage (PFR) to sensor power source 1 (VCM1) is less than 90.5% for at least 0.1 second when self diagnosis signal is output. | | E |
| | 228 | | <ul style="list-style-type: none"> Ratio of FR left sensor output voltage (PFL) to sensor power source 2 (VCM2) is less than 5% or 90.5% or more for at least 0.05 seconds. Open or short in FR left sensor (PFL) circuit. | • Brake actuator assembly (wheel cylinder pressure sensor) • Wheel cylinder pressure sensor • Brake actuator assembly • Brake ECU | BRC |
| | 230 | | When any of the following is detected: 1. FR left sensor output (PFL) is not approx. 0 Mpa when not braking. 2. FR left sensor (PFL) zero point malfunction. | | G |
| | 231 | | Ratio of FR left sensor output voltage (PFL) to sensor power source 2 (VCM2) is less than 90.5% for at least 0.1 second when self diagnosis signal is output. | | H |
| | 233 | | Sensor power source 2 (VCM2) voltage is less than 4.7 V or 5.3 V or more for at least 0.05 seconds. | • Wheel cylinder pressure sensor power supply • Brake actuator assembly • Brake ECU | I |
| | 239 | | Sensor power source 1 (VCM1) voltage is less than 4.7 V or 5.3 V or more for at least 0.05 seconds. | | J |
| | 234 | | <ul style="list-style-type: none"> Ratio of RR right sensor output voltage (PRR) to sensor power source 2 (VCM2) is less than 5% or 90.5% or more for at least 0.05 seconds. Open or short in RR right sensor (PRR) circuit. | | K |
| | 236 | | When any of the following is detected: 1. RR right sensor output (PRR) is not approx. 0 Mpa when not braking. 2. RR right sensor (PRR) zero point malfunction. | • Brake actuator assembly (wheel cylinder pressure sensor) • Wheel cylinder pressure sensor circuit • Brake actuator assembly • Brake ECU | L |
| | 237 | | Ratio of RR right sensor output voltage (PRR) to sensor power source 2 (VCM2) is less than 90.5% for at least 0.1 second when self diagnosis signal is output. | | M |
| | | | | | N |
| | | | | | O |
| | | | | | P |

| DTC | INF code | Display item | DTC detection condition | Trouble area |
|-------|----------|------------------|--|---|
| C1364 | 240 | WC PRESS SEN | <ul style="list-style-type: none"> Ratio of RR left sensor output voltage (PRL) to sensor power source 1 (VCM1) is less than 5% or 90.5% or more for at least 0.05 seconds. Open or short in RR left sensor (PRL) circuit. | <ul style="list-style-type: none"> Brake actuator assembly (wheel cylinder pressure sensor) Wheel cylinder pressure sensor circuit Brake actuator assembly Skid control ECU |
| | 242 | | When any of the following is detected: <ol style="list-style-type: none"> RR left sensor output (PRL) is not approx. 0 Mpa when not braking. RR left sensor (PRL) zero point malfunction. | |
| | 243 | | Ratio of RR left sensor output voltage (PRL) to sensor power source 1 (VCM1) is less than 90.5% for at least 0.1 second when self diagnosis signal is output. | |
| C1281 | — | MC SENSOR OUTPUT | Detected only during Test Mode. | <ul style="list-style-type: none"> Stop lamp switch Master cylinder pressure sensor |

Diagnosis Procedure

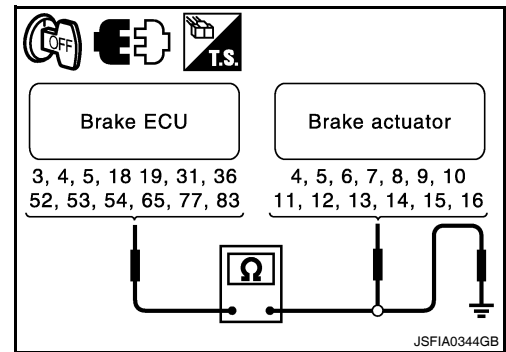
INFOID:000000004212669

CAUTION:

When replacing the brake ECU or brake actuator assembly, perform initialization of linear solenoid valve and calibration.

1. CHECK HARNESS AND CONNECTOR (BRAKE ECU – BRAKE ACTUATOR)

1. Disconnect the brake ECU connectors and the brake actuator connector.
2. Measure the resistance according to the value(s) in the table below.



| Brake ECU | | Brake actuator | | — | Condition | Specified condition |
|-----------|----------|----------------|----------|--------|-----------|---------------------|
| Connector | Terminal | Connector | Terminal | | | |
| E60 | 4 | E91 | 14 | — | Always | Below 1 Ω |
| E60 | 4 | — | — | Ground | Always | 10 kΩ or higher |
| E60 | 18 | E91 | 10 | — | Always | Below 1 Ω |
| E60 | 18 | — | — | Ground | Always | 10 kΩ or higher |
| E60 | 19 | E91 | 15 | — | Always | Below 1 Ω |
| E60 | 19 | — | — | Ground | Always | 10 kΩ or higher |
| E60 | 3 | E91 | 9 | — | Always | Below 1 Ω |
| E60 | 3 | — | — | Ground | Always | 10 kΩ or higher |
| E60 | 5 | E91 | 11 | — | Always | Below 1 Ω |
| E60 | 5 | — | — | Ground | Always | 10 kΩ or higher |
| E60 | 31 | E91 | 13 | — | Always | Below 1 Ω |
| E60 | 31 | — | — | Ground | Always | 10 kΩ or higher |

< COMPONENT DIAGNOSIS >

| Brake ECU | | Brake actuator | | — | Condition | Specified condition |
|-----------|----------|----------------|----------|--------|-----------|---------------------|
| Connector | Terminal | Connector | Terminal | | | |
| E60 | 36 | E91 | 12 | — | Always | Below 1 Ω |
| E60 | 36 | — | — | Ground | Always | 10 kΩ or higher |
| E61 | 65 | E91 | 5 | — | Always | Below 1 Ω |
| E61 | 65 | — | — | Ground | Always | 10 kΩ or higher |
| E61 | 83 | E91 | 7 | — | Always | Below 1 Ω |
| E61 | 83 | — | — | Ground | Always | 10 kΩ or higher |
| E61 | 52 | E91 | 4 | — | Always | Below 1 Ω |
| E61 | 52 | — | — | Ground | Always | 10 kΩ or higher |
| E61 | 77 | E91 | 8 | — | Always | Below 1 Ω |
| E61 | 77 | — | — | Ground | Always | 10 kΩ or higher |
| E61 | 53 | E91 | 16 | — | Always | Below 1 Ω |
| E61 | 53 | — | — | Ground | Always | 10 kΩ or higher |
| E61 | 54 | E91 | 6 | — | Always | Below 1 Ω |
| E61 | 54 | — | — | Ground | Always | 10 kΩ or higher |

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace harness or connector.

2. READ VALUE OF CONSULT-III (MASTER CYLINDER PRESSURE SENSOR)

1. Reconnect the brake actuator connector.
2. Connect the pedal effort gauge.
3. Connect the CONSULT-III.
4. Turn the ignition switch ON.
5. Select the "DATA MONITOR" on the CONSULT-III.

ABS/VDC

| Tester display | Measurement item/ Range | Normal condition |
|----------------|--|--|
| MC SEN COMP 1 | Master cylinder pressure sensor 1 reading/ min: 0 V, max: 5 V | When brake pedal is released: 0.3 to 0.9 V |
| MC SEN COMP 2 | Master cylinder pressure sensor 2 reading/ min: 0 V, max: 5 V | When brake pedal is released: 0.3 to 0.9 V |

6. Check the output value of the master cylinder pressure sensor at braking.

NOTE:

Output voltage must be proportional to the degree of pedal depression. There should not be a big difference between outputs of sensor 1 and sensor 2.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Replace brake actuator assembly.

3. READ VALUE OF CONSULT-III (WHEEL CYLINDER PRESSURE SENSOR)

1. Turn the ignition switch OFF.
2. Turn the ignition switch ON.
3. Select the "DATA MONITOR" on the CONSULT-III.

ABS/VDC

| Tester display | Measurement item/ Range | Normal condition |
|----------------|--|--|
| FR WC PRESS | FR wheel cylinder pressure sensor/ min: 0 V, max: 5 V | When brake pedal is released: 0.3 to 0.9 V |
| FL WC PRESS | FL wheel cylinder pressure sensor/ min: 0 V, max: 5 V | When brake pedal is released: 0.3 to 0.9 V |

< COMPONENT DIAGNOSIS >

| Tester display | Measurement item/ Range | Normal condition |
|----------------|--|--|
| RR WC PRESS | RR wheel cylinder pressure sensor/ min: 0 V, max: 5 V | When brake pedal is released: 0.3 to 0.9 V |
| RL WC PRESS | RL wheel cylinder pressure sensor/ min: 0 V, max: 5 V | When brake pedal is released: 0.3 to 0.9 V |

4. Check the output value of the wheel cylinder pressure sensor at each fluid pressure during the Electronically Controlled Brake control.

| Condition | Front wheel | Rear wheel |
|---|--------------|--------------|
| When fully depressing the brake pedal with the vehicle stopped. | 2.89 ±0.15 V | 1.32 ±0.15 V |

Is the inspection result normal?

- YES >> GO TO 4.
- NO >> Replace brake actuator assembly.

4.RECONFIRM DTC

1. Turn the ignition switch OFF.
2. Clear the DTC.
3. Perform the road and braking test.
4. Check if the same DTC is recorded.

Result

| Condition | Proceed to |
|---|------------|
| DTCs (C1246 and/or C1364) are not output. | A |
| DTCs (C1246 and/or C1364) are output. | B |

- A >> Check for intermittent problems (symptom simulation).
- B >> Replace brake ECU.

Special Repair Requirement

INFOID:000000004212670

1.ZERO ADJUSTMENT FOR EACH SENSOR AND OFFSET LEANING FOR LINEAR SOLENOID VALVE

After erasing brake ECU memories, perform zero adjustment of following sensors and initialization of linear solenoid valve.

- Steering angle sensor: [BRC-9, "PERFORM ZERO POINT OF STEERING ANGLE SENSOR : Description"](#).
- Yaw rate/side/decel G sensor: [BRC-8, "PERFORM ZERO POINT OF YAW RATE/SIDE/DECEL G SENSOR : Description"](#).
- Brake stroke sensor: [BRC-9, "PERFORM ADJUSTMENT OF STROKE SENSOR : Description"](#).
- Linear solenoid valve: [BRC-7, "PERFORM INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION : Description"](#).

>> END

C1247, C1346, C1392

Description

INFOID:000000004212671

The stroke sensor inputs the pedal stroke into the brake ECU.
 DTC C1346 can be deleted when the brake stroke sensor sends a stroke sensor signal or the Test Mode ends. DTC C1346 is output only in the Test Mode.

DTC Logic

INFOID:000000004212672

| DTC | INF code | Display item | DTC detection condition | Possible cause |
|-------|----------|------------------|---|---|
| C1247 | 171 | STROKE SENSOR | Sensor power source voltage (VCSK) is 3.6 V or less or 4.95 V or more for at least 1.2 seconds. | <ul style="list-style-type: none"> Brake stroke sensor Brake stroke sensor power supply Brake ECU |
| | 172 | | Ratio of sensor output voltage 1 (SKS1) to sensor power source voltage (VCSK) is less than 3% or 97% or more for at least 1.2 seconds. | <ul style="list-style-type: none"> Brake stroke sensor Brake stroke sensor circuit |
| | 173 | | Ratio of sensor output voltage 2 (SKS2) to sensor power source voltage (VCSK) is less than 3% or 97% or more for at least 1.2 seconds. | |
| | 174 | | Sensor output 1 (SKS1) calculation value becomes 20 mm or more for at least 1.2 seconds at an interval of 0.006 seconds (changes due to interference). | |
| | 175 | | Sensor output 2 (SKS2) calculation value becomes 20 mm or more for at least 1.2 seconds at an interval of 0.006 seconds (changes due to interference). | |
| | 176 | | Zero point stored value (ratio to power source voltage) or sensor output 1 (SKS1) is 0.46 or more or 0.03 or less. | <ul style="list-style-type: none"> Brake stroke sensor Brake stroke sensor circuit Brake ECU |
| | 177 | | Zero point stored value (ratio to power source voltage) or sensor output 2 (SKS2) is 0.97 or more or 0.48 or less. | |
| | 179 | | When either of the following is detected: 1. Sum of SKS1/VCSK and SKS2/VCSK is 1.155 or more or 0.845 or less for at least 1 second. 2. Difference between sensor output 1 (SKS1) and sensor output 2 (SKS2) is excessively large for at least 0.2 seconds. | <ul style="list-style-type: none"> Brake stroke sensor zero point calibration undone (initialization of linear solenoid valve and calibration undone) Brake ECU |
| C1392 | — | STROKE SEN SET | Zero point calibration of stroke sensor is unfinished. | <ul style="list-style-type: none"> Brake stroke sensor zero point calibration undone (initialization of linear solenoid valve and calibration undone) Brake ECU |
| C1346 | — | STROKE SEN CALIB | Detected only during Test Mode. | <ul style="list-style-type: none"> Brake stroke sensor |

Diagnosis Procedure

INFOID:000000004212673

CAUTION:

When replacing the brake ECU or brake stroke sensor, perform initialization of linear solenoid valve and calibration.

< COMPONENT DIAGNOSIS >

1. CHECK BRAKE PEDAL

1. Check that the brake pedal and the brake stroke sensor are properly installed and that the pedal can be operated normally.
2. Check the brake pedal height.

NOTE:

- The brake pedal is securely installed.
- The pedal height is within the specified range.

Is the inspection result normal?

- YES >> GO TO 2.
 NO >> Adjust brake pedal.

2. READ VALUE OF CONSULT-III (BRAKE STROKE SENSOR)

1. Connect the CONSULT-III.
2. Turn the ignition switch ON.
3. Select the "DATA MONITOR" on the CONSULT-III.

ABS/VDC:

| Tester display | Measurement item/ Range | Normal condition |
|----------------|-------------------------------------|--|
| STRK SEN 1 | Stroke sensor/ min: 0 V, max: 5 V | When brake pedal is released: 0.7 to 1.3 V |
| STRK SEN 2 | Stroke sensor 2/ min: 0 V, max: 5 V | When brake pedal is released: 3.7 to 4.3 V |

4. Read the brake stroke sensor voltage value on the CONSULT-III screen.

NOTE:

The normal condition value is displayed on the CONSULT-III.

Is the inspection result normal?

- YES >> GO TO 3.
 NO >> Adjust brake stroke sensor.

3. PERFORM INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION

Perform initialization of linear solenoid valve and calibration. Refer to [BRC-7. "PERFORM INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION : Description"](#).

>> GO TO 4.

4. RECONFIRM DTC

1. Turn the ignition switch OFF.
2. Clear the DTC.
3. Perform the road and braking test.
4. Check if the same DTC is recorded.

Result

| Condition | Proceed to |
|---|------------|
| DTCs (C1247 and/or C1392) are output. | A |
| DTCs (C1247 and/or C1392) are not output. | B |

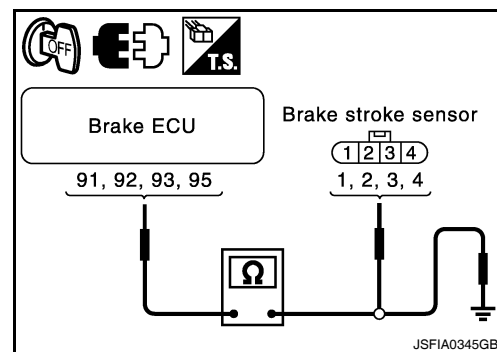
- A >> GO TO 5.
 B >> INSPECTION END

5. CHECK HARNESS AND CONNECTOR (BRAKE ECU – BRAKE STROKE SENSOR)

1. Turn ignition switch OFF.
2. Disconnect the brake ECU connector and the brake stroke sensor connector.

< COMPONENT DIAGNOSIS >

3. Measure the resistance according to the value(s) in the table below.



| Brake ECU | | Brake stroke sensor | | — | Condition | Specified condition |
|-----------|----------|---------------------|----------|--------|-----------|---------------------|
| Connector | Terminal | Connector | Terminal | | | |
| E62 | 91 | E88 | 3 | — | Always | Below 1 Ω |
| E62 | 91 | — | — | Ground | Always | 10 kΩ or higher |
| E62 | 92 | E88 | 1 | — | Always | Below 1 Ω |
| E62 | 92 | — | — | Ground | Always | 10 kΩ or higher |
| E62 | 93 | E88 | 2 | — | Always | Below 1 Ω |
| E62 | 93 | — | — | Ground | Always | 10 kΩ or higher |
| E62 | 95 | E88 | 4 | — | Always | Below 1 Ω |
| E62 | 95 | — | — | Ground | Always | 10 kΩ or higher |

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace harness or connector.

6. READ VALUE OF CONSULT-III (BRAKE STROKE SENSOR)

1. Reconnect the brake stroke sensor connector.
2. Connect the pedal effort gauge.
3. Connect the CONSULT-III.
4. Turn the ignition switch ON.
5. Select the "DATA MONITOR" on the CONSULT-III.

ABS/VDC:

| Tester display | Measurement item/ Range | Normal condition |
|----------------|-------------------------------------|--|
| STRK SEN 1 | Stroke sensor/ min: 0 V, max: 5 V | When brake pedal is released: 0.7 to 1.3 V |
| STRK SEN 2 | Stroke sensor 2/ min: 0 V, max: 5 V | When brake pedal is released: 3.7 to 4.3 V |

6. When depressing the brake pedal with the amount of force listed in the table below, check that the output value displayed on the CONSULT-III is normal.

In proportion to the degree of pedal depression, output voltages should increase in sensor 1, and decrease in sensor 2.

When the pedal is depressed as described above, a total output voltage of sensor 1 and sensor 2 should be in the range 4.6 to 5.4 V.

NOTE:

The brake pedal must be depressed gradually.

Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace brake stroke sensor.

7. RECONFIRM DTC

< COMPONENT DIAGNOSIS >

1. Turn the ignition switch OFF.
2. Clear the DTC.
3. Perform the road and braking test.
4. Check if the same DTC is recorded.

Result

| Condition | Proceed to |
|---|------------|
| DTCs (C1247 and/or C1392) are not output. | A |
| DTCs (C1247 and/or C1392) are output. | B |

- A >> Check for intermittent problems (symptom simulation).
- B >> Replace brake ECU.

Special Repair Requirement

INFOID:000000004212674

1. ZERO ADJUSTMENT FOR EACH SENSOR AND OFFSET LEARNING FOR LINEAR SOLENOID VALVE

After erasing brake ECU memories, perform zero adjustment of following sensors and initialization of linear solenoid valve.

- Steering angle sensor: [BRC-9, "PERFORM ZERO POINT OF STEERING ANGLE SENSOR : Description"](#).
- Yaw rate/side/decel G sensor: [BRC-8, "PERFORM ZERO POINT OF YAW RATE/SIDE/DECEL G SENSOR : Description"](#).
- Brake stroke sensor: [BRC-9, "PERFORM ADJUSTMENT OF STROKE SENSOR : Description"](#).
- Linear solenoid valve: [BRC-7, "PERFORM INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION : Description"](#).

>> END

C1249

Description

INFOID:000000004212675

The brake ECU inputs the stop lamp switch signal and the condition of brake operation. The brake ECU has an open detection circuit, which outputs this DTC when detecting an open in the stop lamp input line while the stop lamp switch is OFF.

DTC Logic

INFOID:000000004212676

| DTC | INF code | Display item | DTC detection condition | Trouble area |
|-------|----------|--------------|---|--|
| C1249 | 520 | STOP LAMP SW | When IG1 terminal voltage is 9.5 or more, an open circuit of the stop lamp switch continues for 10 seconds or more. | <ul style="list-style-type: none"> • Stop fuse • Stop lamp switch • Stop lamp switch circuit • Brake ECU |

Diagnosis Procedure

INFOID:000000004212677

CAUTION:

When replacing the brake ECU, perform initialization of linear solenoid valve and calibration.

1.INSPECT STOP FUSE

1. Remove the stop fuse from the main body ECU.
2. Measure the resistance according to the value(s) in the table below.

| Tester connection | Condition | Specified condition |
|-------------------|-----------|---------------------|
| Stop (10A) fuse | Always | Below 1 Ω |

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Replace stop fuse.

2.CHECK STOP LAMP OPERATION

1. Install the stop fuse.
2. Check that the stop lamp comes on when the brake pedal is depressed, and goes off when the brake pedal is released.

| Condition | Illumination condition |
|------------------------|------------------------|
| Brake pedal depressed. | ON |
| Brake pedal released. | OFF |

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> GO TO 7.

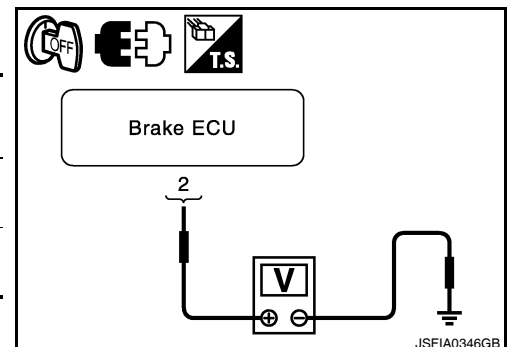
3.INSPECT BRAKE ECU (STP TERMINAL)

1. Disconnect the brake ECU connector.
2. Measure the voltage according to the value(s) in the table below.

| Brake ECU | | Condition | Specified condition |
|-----------|------------|--|---------------------|
| Connector | Terminal | | |
| E60 | 2 – Ground | Stop lamp switch ON (Brake pedal depressed.) | 8 to 14 V |
| E60 | 2 – Ground | Stop lamp switch OFF (Brake pedal released.) | Below 1.5 V |

Is the inspection result normal?

- YES >> GO TO 4.



< COMPONENT DIAGNOSIS >

NO >> Repair or replace harness or connector (STP circuit).

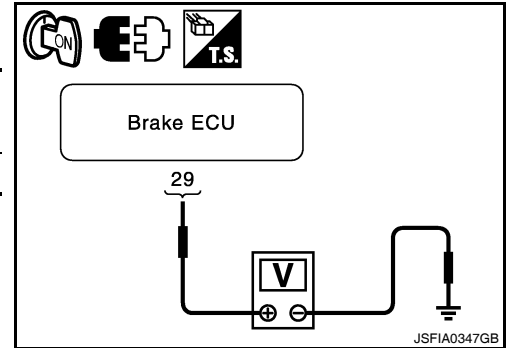
4.INSPECT BRAKE ECU (IG1 TERMINAL)

1. Turn the ignition switch ON.
2. Measure the voltage according to the value(s) in the table below.

| Brake ECU | | Condition | Specified condition |
|-----------|-------------|--------------------|---------------------|
| Connector | Terminal | | |
| E60 | 29 – Ground | Ignition switch ON | 10 to 14 V |

Is the inspection result normal?

- YES >> GO TO 5.
 NO >> Repair or replace harness or connector (IG1 circuit).



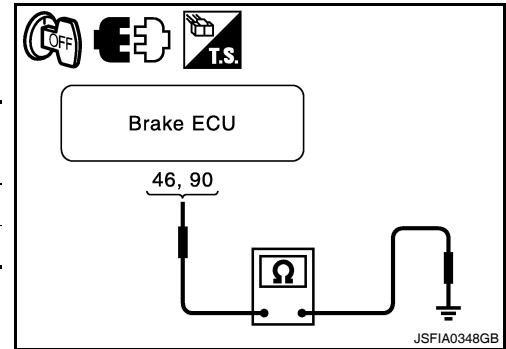
5.INSPECT BRAKE ECU (GND TERMINAL)

1. Turn the ignition switch OFF.
2. Disconnect the brake ECU connectors.
3. Measure the resistance according to the value(s) in the table below.

| Brake ECU | | Condition | Specified condition |
|-----------|-------------|-----------|---------------------|
| Connector | Terminal | | |
| E60 | 46 – Ground | Always | Below 1 Ω |
| E61 | 90 – Ground | Always | Below 1 Ω |

Is the inspection result normal?

- YES >> GO TO 6.
 NO >> Repair or replace harness or connector (GND circuit).



6.RECONFIRM DTC

1. Reconnect the brake ECU connectors.
2. Clear the DTC.
3. Turn the ignition switch ON (READY).
4. Depress the brake pedal several times to test the stop lamp circuit.
5. Check if the same DTC is recorded.

Result

| Condition | Proceed to |
|----------------------------|------------|
| DTC (C1249) is not output. | A |
| DTC (C1249) is output. | B |

NOTE:

If troubleshooting has been carried out according to the Problems Symptoms Table, refer back to the table and proceed to the next step.

- A >> Check for intermittent problems (symptom simulation).
 B >> Replace brake ECU.

7.INSPECT STOP LAMP SWITCH (POWER SOURCE TERMINAL)

1. Disconnect the stop lamp switch connector.

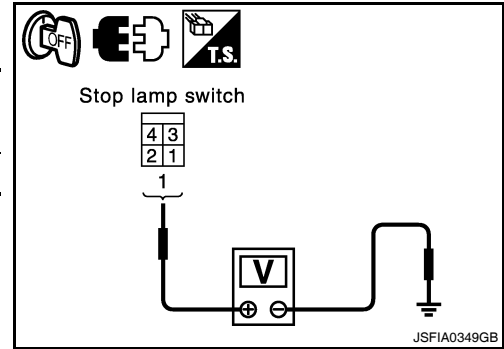
< COMPONENT DIAGNOSIS >

2. Measure the voltage according to the value(s) in the table below.

| Stop lamp switch | | Condition | Specified condition |
|------------------|------------|-----------|---------------------|
| Connector | Terminal | | |
| E38 | 1 – Ground | Always | 10 to 14 V |

Is the inspection result normal?

- YES >> GO TO 8.
- NO >> Repair or replace harness or connector (power source circuit).



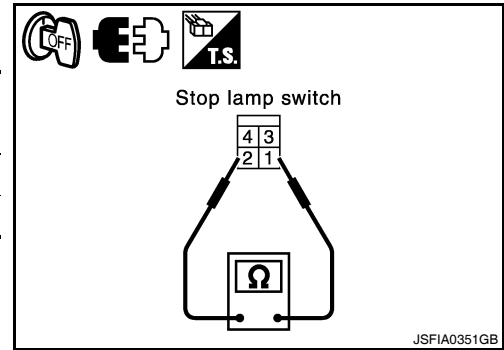
8.INSPECT STOP LAMP SWITCH

Measure the resistance according to the value(s) in the table below.

| Stop lamp switch | | Condition | Specified condition |
|------------------|--|----------------------|---------------------|
| Terminal | | | |
| 1 – 2 | | Switch pin free | Below 1 Ω |
| 1 – 2 | | Switch pin pushed in | 10 kΩ or higher |

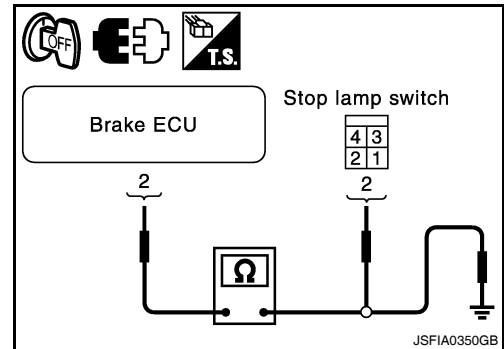
Is the inspection result normal?

- YES >> GO TO 9.
- NO >> Replace stop lamp switch.



9.CHECK HARNESS AND CONNECTOR

1. Disconnect the brake ECU connector.
2. Measure the resistance according to the value(s) in the table below.



| Brake ECU | | Stop lamp switch | | — | Condition | Specified condition |
|-----------|----------|------------------|----------|--------|-----------|---------------------|
| Connector | Terminal | Connector | Terminal | | | |
| E60 | 2 | E38 | 2 | — | Always | Below 1 Ω |
| E60 | 2 | — | — | Ground | Always | 10 kΩ or higher |

Is the inspection result normal?

- YES >> GO TO 10.
- NO >> Repair or replace harness or connector.

10.RECONFIRM DTC

1. Reconnect the brake ECU connector and the stop lamp switch connector.
2. Clear the DTC.
3. Turn the ignition switch ON (READY).
4. Depress the brake pedal several times to test the stop lamp switch circuit.
5. Check if the same DTC is recorded.

| Result | |
|----------------------------|------------|
| Condition | Proceed to |
| DTC (C1249) is not output. | A |
| DTC (C1249) is output. | B |

NOTE:

If troubleshooting has been carried out according to the Problems Symptoms Table, refer back to the table and proceed to the next step.

- A >> Inspect lighting system (stop lamp circuit).
 B >> Replace brake ECU.

Special Repair Requirement

INFOID:000000004212678

1. ZERO ADJUSTMENT FOR EACH SENSOR AND OFFSET LEANING FOR LINEAR SOLENOID VALVE

After erasing brake ECU memories, perform zero adjustment of following sensors and initialization of linear solenoid valve.

- Steering angle sensor: [BRC-9. "PERFORM ZERO POINT OF STEERING ANGLE SENSOR : Description"](#).
- Yaw rate/side/decel G sensor: [BRC-8. "PERFORM ZERO POINT OF YAW RATE/SIDE/DECEL G SENSOR : Description"](#).
- Brake stroke sensor: [BRC-9. "PERFORM ADJUSTMENT OF STROKE SENSOR : Description"](#).
- Linear solenoid valve: [BRC-7. "PERFORM INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION : Description"](#).

>> END

C1252, C1253

Description

INFOID:000000004212679

The brake ECU detects decreases in the accumulator pressure according to the data from the accumulator pressure sensor, and then starts and stops the pump motor by operating the motor relay.
The brake ECU usually drives the ABS motor relay No.1 for Electronically Controlled Brake control, and the ABS motor relay No.2 for ABS control. If either of them is malfunctioning, the other will substitute.

DTC Logic

INFOID:000000004212680

| DTC | INF code | Display item | DTC detection condition | Trouble area |
|-------|--|--|--|---|
| C1252 | 130 | MOTOR TIME LONG | Motor relay is on for at least 5 minutes. | <ul style="list-style-type: none"> • ABS motor relay No.1 • ABS motor relay No.1 circuit • ABS motor relay No.2 • ABS motor relay No.2 circuit • Brake actuator assembly (Accumulator pressure sensor circuit) |
| C1253 | 132 | MOTOR RELAY | ABS motor relay No.1 coil is energized for at least 1 second when linear solenoid power source voltage 1 (BS1) is 9.5 V or more and ABS motor relay No.1 is off. | <ul style="list-style-type: none"> • ABS MTR1 fuse • ABS motor relay No.1 • ABS motor relay No.1 circuit |
| | 133 | | ABS motor relay No.1 coil is energized for at least 1 second when linear solenoid power source voltage 1 (BS1) is 9.5 V or more and ABS motor relay No.1 is on. | |
| | 134 | | MTT input is 3.5 V or less for at least 1 second when linear solenoid power source voltage 1 (BS1) is 9.5 V or more and ABS motor relay No.1 is on. | <ul style="list-style-type: none"> • ABS MTR1 fuse • ABS motor relay No.1 • ABS motor relay No.1 circuit • Brake actuator assembly (pump motor) • Pump motor circuit |
| | 136 | | ABS motor relay No.2 coil is energized for at least 1 second when linear solenoid power source voltage 2 (BS2) is 9.5 V or more and ABS motor relay No.2 is off. | <ul style="list-style-type: none"> • ABS MTR2 fuse • ABS motor relay No.2 • ABS motor relay No.2 circuit |
| | 137 | | ABS motor relay No.2 coil is energized for at least 1 second when linear solenoid power source voltage 2 (BS2) is 9.5 V or more and ABS motor relay No.2 is on. | |
| | 138 | | MTT input is 3.5 V or less for at least 1 second when linear solenoid power source voltage 1 (BS1) is 9.5 V or more and ABS motor relay No.2 is on. | <ul style="list-style-type: none"> • ABS MTR2 fuse • ABS motor relay No.2 • ABS motor relay No.2 circuit • Brake actuator assembly (pump motor) • Pump motor circuit |
| 140 | MTT input is 3.5 V or less for at least 2 seconds when ABS motor relay No.1 and 2 are off. | <ul style="list-style-type: none"> • ABS motor relay No.1 • ABS motor relay No.2 • Brake actuator assembly (pump motor) • Pump motor circuit | | |

Diagnosis Procedure

INFOID:000000004212681

CAUTION:

A
B
C
D
E
BRC
G
H
I
J
K
L
M
N
O
P

< COMPONENT DIAGNOSIS >

When replacing the brake ECU or brake actuator assembly, perform initialization of linear solenoid valve and calibration.

1.INSPECT ABS MTR FUSE

1. Remove the fusible link from the engine room R/B.
 2. Check if the fusible link is melted.
- NOTE:**
The fusible link is melted.
3. Install the fusible link to the engine room R/B with the bolt.

Is the inspection result normal?

- YES >> GO TO 2.
NO >> Replace fusible link (ABS MTR FUSE).

2.PERFORM ACTIVE TEST BY CONSULT-III (ABS MOTOR RELAY)

1. Connect the CONSULT-III.
2. Turn the ignition switch ON.
3. Select the "ACTIVE TEST" on the CONSULT-III.

| Display item | Test part | Control range | Diagnostic note |
|---------------|-------------------|---------------|---|
| MOTOR RELAY 1 | ABS motor relay | Relay ON/OFF | Operate sound of relay (clicking sound) and motor can be heard. |
| MOTOR RELAY 2 | ABS motor relay 2 | Relay ON/OFF | Operate sound of relay (clicking sound) and motor can be heard. |

4. Check the operation sound of the ABS motor relay and motor when operating it with the CONSULT-III.

NOTE:

The operation sound of the ABS motor relay and motor should be heard.

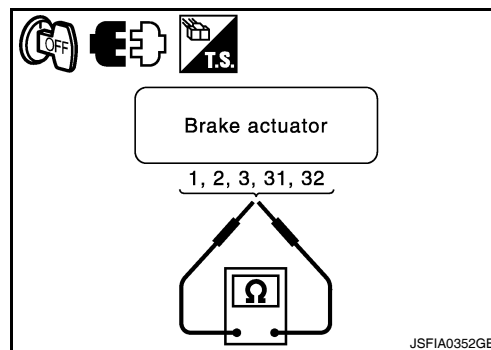
Is the inspection result normal?

- YES >> GO TO 3.
NO >> GO TO 7.

3.INSPECT BRAKE ACTUATOR ASSEMBLY

1. Turn the ignition switch OFF.
2. Disconnect the brake actuator connector.
3. Measure the resistance according to the value(s) in the table below.

| Brake actuator | | Condition | Specified condition |
|----------------|----------|-----------|---------------------|
| Connector | Terminal | | |
| E91 | 32 – 2 | Always | Below 10 Ω |
| E91 | 31 – 2 | Always | Below 10 Ω |
| E91 | 31 – 32 | Always | Below 1 Ω |
| E91 | 1 – 2 | Always | Below 1 Ω |
| E91 | 32 – 3 | Always | 450 to 550 Ω |
| E91 | 31 – 3 | Always | 450 to 550 Ω |



Is the inspection result normal?

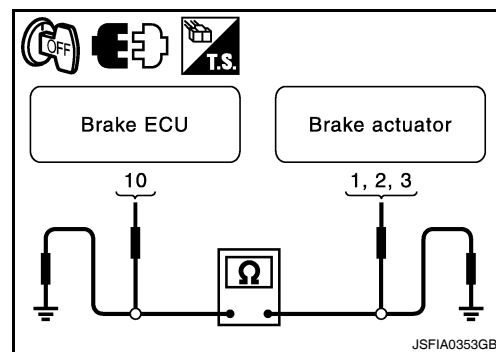
- YES >> GO TO 4.
NO >> Replace brake actuator assembly.

4.CHECK HARNESS AND CONNECTOR (BRAKE ECU – BRAKE ACTUATOR)

1. Disconnect the brake ECU connector.

< COMPONENT DIAGNOSIS >

2. Measure the resistance according to the value(s) in the table below.



| Brake ECU | | Brake actuator | | — | Condition | Specified condition |
|-----------|----------|----------------|----------|--------|-----------|---------------------|
| Connector | Terminal | Connector | Terminal | | | |
| E60 | 10 | E91 | 3 | — | Always | Below 1 Ω |
| E60 | 10 | — | — | Ground | Always | 10 kΩ or higher |
| — | — | E91 | 1 | Ground | Always | Below 1 Ω |
| — | — | E91 | 2 | Ground | Always | Below 1 Ω |

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace harness or connector.

5. READ VALUE OF CONSULT-III (ACCUMULATOR PRESSURE SENSOR)

1. Reconnect the brake ECU connector and the brake actuator connector.
2. Connect the CONSULT-III.
3. Turn the ignition switch ON.
4. Select the "DATA MONITOR" on the CONSULT-III.

ABS/VDC:

| Tester display | Measurement item/ Range | Normal condition |
|----------------|--|----------------------|
| ACC PRESS SEN | Accumulator pressure sensor/ min: 0 V, max: 5 V | Around: 3.3 to 4.7 V |

5. Depress the brake pedal 4 or 5 times to operate the pump motor, and check the output value on the CONSULT-III with the motor stopped (not braking).

NOTE:

Accumulator pressure sensor voltage does not drop.

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace brake actuator assembly.

6. RECONFIRM DTC

1. Turn the ignition switch OFF.
2. Clear the DTC.
3. Turn the ignition switch ON.
4. Check if the same DTC is recorded.

Result

| Condition | Proceed to |
|---|------------|
| DTCs (C1252 and/or C1253) are not output. | A |
| DTCs (C1252 and/or C1253) are output. | B |

A >> Check for intermittent problems (symptom simulation).

B >> Replace brake ECU.

7. INSPECT ABS MOTOR RELAY (ABS MOTOR RELAY NO.1 AND NO.2)

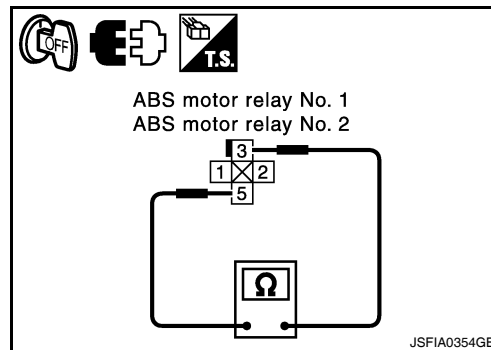
< COMPONENT DIAGNOSIS >

1. Turn the ignition switch OFF.
2. Remove the ABS motor relay No.1 and the ABS motor relay No.2.
3. Measure the resistance according to the value(s) in the table below.

| Terminal | Condition | Specified condition |
|----------|------------------------------------|---------------------|
| 3 – 5 | Always | 10 kΩ or higher |
| 3 – 5 | Apply B+ between terminals 1 and 2 | Below 1 Ω |

Is the inspection result normal?

- YES >> GO TO 8.
 NO >> Replace ABS motor relay (ABS motor relay No.1 or No.2).



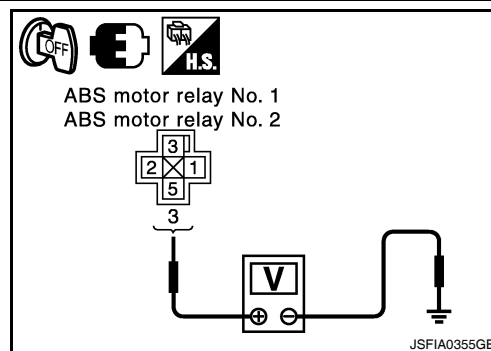
8. INSPECT ENGINE ROOM NO.3 RELAY BLOCK (POWER SOURCE TERMINAL)

Measure the voltage according to the value(s) in the table below.

| Relay | Terminal | Condition | Specified condition |
|----------------------|----------|-----------|---------------------|
| ABS motor relay No.1 | 3 | Always | 10 to 14 V |
| ABS motor relay No.2 | 3 | Always | 10 to 14 V |

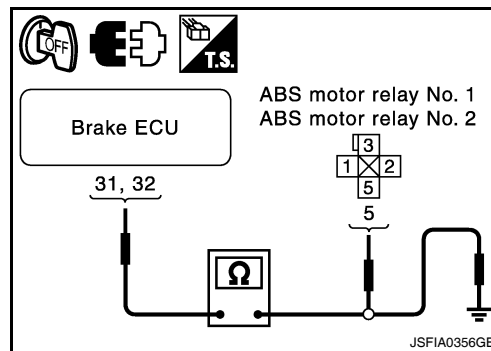
Is the inspection result normal?

- YES >> GO TO 9.
 NO >> Repair or replace harness or connector (power source circuit).



9. CHECK HARNESS AND CONNECTOR (BRAKE ACTUATOR – ENGINE ROOM NO.3 RELAY BLOCK)

1. Disconnect the brake actuator connector.
2. Measure the resistance according to the value(s) in the table below.



| Brake actuator | | ABS motor relay 1 | | — | Condition | Specified condition |
|----------------|----------|-------------------|----------|--------|-----------|---------------------|
| Connector | Terminal | Connector | Terminal | | | |
| E91 | 31 | E87 | 5 | — | Always | Below 1 Ω |
| E91 | 31 | — | — | Ground | Always | 10 kΩ or higher |

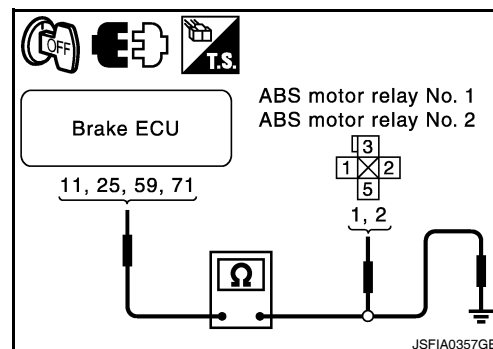
| Brake actuator | | ABS motor relay 2 | | — | Condition | Specified condition |
|----------------|----------|-------------------|----------|--------|-----------|---------------------|
| Connector | Terminal | Connector | Terminal | | | |
| E91 | 32 | E86 | 5 | — | Always | Below 1 Ω |
| E91 | 32 | — | — | Ground | Always | 10 kΩ or higher |

Is the inspection result normal?

- YES >> GO TO 10.
 NO >> Repair or replace harness or connector.

10. CHECK HARNESS OR CONNECTOR (BRAKE ECU – ENGINE ROOM NO.3 RELAY BLOCK)

1. Disconnect the brake ECU connectors.
2. Measure the resistance according to the value(s) in the table below.



| Brake ECU | | ABS motor relay 1 | | — | Condition | Specified condition |
|-----------|----------|-------------------|----------|--------|-----------|---------------------|
| Connector | Terminal | Connector | Terminal | | | |
| E60 | 11 | E87 | 2 | — | Always | Below 1 Ω |
| E60 | 11 | — | — | Ground | Always | 10 kΩ or higher |
| E60 | 25 | E87 | 1 | — | Always | Below 1 Ω |
| E60 | 25 | — | — | Ground | Always | 10 kΩ or higher |

| Brake ECU | | ABS motor relay 2 | | — | Condition | Specified condition |
|-----------|----------|-------------------|----------|--------|-----------|---------------------|
| Connector | Terminal | Connector | Terminal | | | |
| E61 | 71 | E86 | 2 | — | Always | Below 1 Ω |
| E61 | 71 | — | — | Ground | Always | 10 kΩ or higher |
| E61 | 59 | E86 | 1 | — | Always | Below 1 Ω |
| E61 | 59 | — | — | Ground | Always | 10 kΩ or higher |

Is the inspection result normal?

- YES >> GO TO 11.
 NO >> Repair or replace harness or connector.

11. RECONFIRM DTC

1. Clear the DTC.
2. Turn the ignition switch ON.
3. Check if the same DTC is recorded.

NOTE:

Reinstall the relays, connectors, etc. and restore the vehicle to its prior condition before rechecking for DTCs.

Result

| Condition | Proceed to |
|---|------------|
| DTCs (C1252 and/or C1253) are not output. | A |
| DTCs (C1252 and/or C1253) are output. | B |

- A >> Check for intermittent problems (symptom simulation).
 B >> Replace brake ECU.

Special Repair Requirement

INFOID:000000004212682

1. ZERO ADJUSTMENT FOR EACH SENSOR AND OFFSET LEARNING FOR LINEAR SOLENOID VALVE

After erasing brake ECU memories, perform zero adjustment of following sensors and initialization of linear solenoid valve.

< COMPONENT DIAGNOSIS >

- Steering angle sensor: [BRC-9, "PERFORM ZERO POINT OF STEERING ANGLE SENSOR : Description"](#).
- Yaw rate/side/decel G sensor: [BRC-8, "PERFORM ZERO POINT OF YAW RATE/SIDE/DECEL G SENSOR : Description"](#).
- Brake stroke sensor: [BRC-9, "PERFORM ADJUSTMENT OF STROKE SENSOR : Description"](#).
- Linear solenoid valve: [BRC-7, "PERFORM INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION : Description"](#).

>> END

C1256

Description

INFOID:000000004212683

The accumulator pressure sensor is built into the actuator and detects the accumulator pressure. The brake ECU turns on the brake warning lamp and sounds the brake warning buzzer if it senses a decrease in the accumulator pressure.

DTC Logic

INFOID:000000004212684

| DTC | INF code | Display item | DTC detection condition | Trouble area |
|-------|----------|------------------|--|---|
| C1256 | 141 | ACC PRESSURE LOW | When either of the following is detected: 1. Braking operation is input when accumulator pressure is less than 12.45 Mpa and vehicle speed is input (detected value changes if accumulator pressure is low after system start). 2. Accumulator pressure is less than 14.62 Mpa for 120 seconds (changes according to power source voltage) after system start (stores the DTC after the conditions are met, and drives buzzer). | <ul style="list-style-type: none"> Accumulator pressure Brake actuator assembly (Accumulator pressure sensor) Brake actuator assembly (Pump motor) |
| | 143 | | When any of the following is detected: 1. Any of the wheel cylinder pressure sensor value is lower than the target value for at least 0.5 seconds when accumulator pressure is less than 14.62 Mpa and vehicle speed is input. 2. Accumulator pressure changes little when accumulator pressure is less than 14.62 Mpa for at least 1 second without braking (pump motor is operating). 3. Accumulator pressure is less than 14.62 Mpa for at least 0.5 seconds when motor relay is malfunctioning. | |

Diagnosis Procedure

INFOID:000000004212685

CAUTION:

When replacing the brake ECU or brake actuator assembly, perform initialization of linear solenoid valve and calibration.

NOTE:

When C1241, C1252 or C1253 is output together with C1256, inspect and repair the trouble areas indicated by C1241, C1252 or C1253 first.

1. BRAKE PROBLEM CHECK

Ask the customer if frequent braking is performed when the brake control warning lamp comes on.

| Condition | Proceed to |
|------------------------------------|------------|
| Frequent braking is performed. | A |
| Frequent braking is not performed. | B |

NOTE:

This DTC is output even if the accumulator pressure drops only temporarily due to frequent braking.

- A >> GO TO 2.
- B >> INSPECTION END

2. READ VALUE OF CONSULT-III (ACCUMULATOR PRESSURE SENSOR)

1. Connect the CONSULT-III.
2. Turn the ignition switch ON.

< COMPONENT DIAGNOSIS >

3. Select the "DATA MONITOR" on the CONSULT-III.

ABS/VDC:

| Tester display | Measurement item/ Range | Normal condition |
|----------------|--|----------------------|
| ACC PRESS SEN | Accumulator pressure sensor/ min: 0 V, max: 5 V | Around: 3.3 to 4.7 V |

4. Depress the brake pedal 4 or 5 times to operate the pump motor, and check the output value on the CONSULT-III with the motor stopped (not braking).

NOTE:

Accumulator pressure sensor's output voltage does not drop.

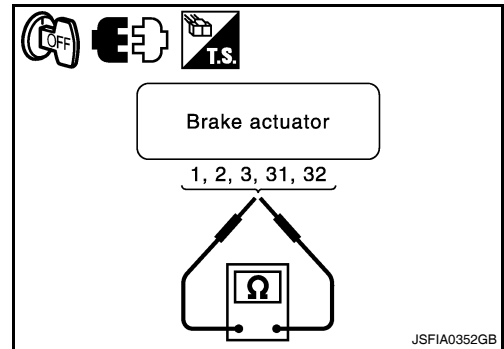
Is the inspection result normal?

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

3.INSPECT BRAKE ACTUATOR ASSEMBLY

1. Turn the ignition switch OFF.
2. Disconnect the brake actuator connector.
3. Measure the resistance according to the value(s) in the table below.

| Brake actuator | | Condition | Specified condition |
|----------------|----------|-----------|---------------------|
| Connector | Terminal | | |
| E91 | 32 – 2 | Always | Below 10 Ω |
| E91 | 31 – 2 | Always | Below 10 Ω |
| E91 | 31 – 32 | Always | Below 1 Ω |
| E91 | 1 – 2 | Always | Below 1 Ω |
| E91 | 32 – 3 | Always | 450 to 550 Ω |
| E91 | 31 – 3 | Always | 450 to 550 Ω |



Is the inspection result normal?

- YES >> GO TO 4.
- NO >> Replace brake actuator assembly.

4.RECONFIRM DTC

1. Reconnect the brake actuator connector.
2. Clear the DTC.
3. Perform the road and braking test.
4. Check if the same DTC is recorded.

Result

| Condition | Proceed to |
|---|------------|
| DTCs (C1252 and/or C1253) are not output. | A |
| DTCs (C1252 and/or C1253) are output. | B |

- A >> Check for intermittent problems (symptom simulation).
- B >> Replace brake ECU.

Special Repair Requirement

INFOID:000000004212686

1.ZERO ADJUSTMENT FOR EACH SENSOR AND OFFSET LEANING FOR LINEAR SOLENOID VALVE

After erasing brake ECU memories, perform zero adjustment of following sensors and initialization of linear solenoid valve.

- Steering angle sensor: [BRC-9, "PERFORM ZERO POINT OF STEERING ANGLE SENSOR : Description"](#).
- Yaw rate/side/decel G sensor: [BRC-8, "PERFORM ZERO POINT OF YAW RATE/SIDE/DECCEL G SENSOR : Description"](#).
- Brake stroke sensor: [BRC-9, "PERFORM ADJUSTMENT OF STROKE SENSOR : Description"](#).

- Linear solenoid valve: [BRC-7. "PERFORM INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION : Description"](#).

>> END

A

B

C

D

E

BRC

G

H

I

J

K

L

M

N

O

P

C1259, C1310

Description

INFOID:000000004212687

The brake ECU communicates with the HV ECU and controls braking force according to the motor's regenerative force.

The brake ECU sends enhanced VDC signal to the HV ECU and inputs operating signal from the HV control ECU.

The brake ECU uses CAN communication for communication with the HV ECU. If a part of Electronically Controlled Brake control by fail safe function.

C1259 is stored if the ignition switch ON with the HV battery service plug disconnected.

DTC Logic

INFOID:000000004212688

| DTC | INF code | Display item | DTC detection condition | Trouble area |
|-------|----------|--------------------|--|-------------------------|
| C1259 | 150 | HV SYSTEM REGNRTNG | The regeneration malfunction signal is input for at least 0.02 seconds when IG1 terminal voltage is 9.5 V or more for at least 2 seconds and communication with HV ECU is valid. | • Hybrid control system |
| C1310 | — | HV SYSTEM | The traction control prohibition signal is received for at least 0.07 seconds when IG1 terminal voltage is 10.5 V or more for at least 1.5 seconds and communication with HV ECU is valid. | |

NOTE:

This DTC is output from the brake ECU when the HV ECU sends a malfunction signal to the brake ECU.

Diagnosis Procedure

INFOID:000000004212689

1.CHECK HYBRID CONTROL SYSTEM

Check if the hybrid control system DTC is output.

DTC is not output>>Replace HV ECU.

DTC is output>>Inspect hybrid control system.

Special Repair Requirement

INFOID:000000004212690

1.ZERO ADJUSTMENT FOR EACH SENSOR AND OFFSET LEANING FOR LINEAR SOLENOID VALVE

After erasing brake ECU memories, perform zero adjustment of following sensors and initialization of linear solenoid valve.

- Steering angle sensor: [BRC-9, "PERFORM ZERO POINT OF STEERING ANGLE SENSOR : Description"](#).
- Yaw rate/side/decel G sensor: [BRC-8, "PERFORM ZERO POINT OF YAW RATE/SIDE/DECEL G SENSOR : Description"](#).
- Brake stroke sensor: [BRC-9, "PERFORM ADJUSTMENT OF STROKE SENSOR : Description"](#).
- Linear solenoid valve: [BRC-7, "PERFORM INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION : Description"](#).

>> END

C1290

Description

INFOID:000000004212691

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

If front wheel alignment or steering wheel position is adjusted without disconnecting the negative battery terminal, or if yaw rate and acceleration sensor zero point is not acquired after the adjustments have been completed, the brake ECU detects the difference between the previous zero point and newly acquired zero point and outputs this DTC to indicate a poor adjustment.

Warning of the steering angle sensor zero point malfunction will be cancelled by turning the ignition switch OFF.

DTC Logic

INFOID:000000004212692

| DTC | INF code | Display item | DTC detection condition | Trouble area |
|-------|----------|--------------------|---|--|
| C1290 | — | STR ANG SEN 0POINT | The steering angle sensor zero point calibration position vastly differs from the recorded value. | <ul style="list-style-type: none"> • Yaw rate/side/decel G sensor zero point calibration incomplete • Poor adjustment of the centered position of the steering wheel • Poor adjustment of front wheel alignment |

BRC

Diagnosis Procedure

INFOID:000000004212693

CAUTION:

When replacing the brake ECU, perform initialization of linear solenoid valve and calibration.

1. PERFORM ZERO POINT CALIBRATION OF YAW RATE/SIDE/DECEL G SENSOR

Perform zero point calibration of the yaw rate/side/decel G sensor.

NOTE:

- When the stored zero point of the yaw rate/side/decel G sensor is erased, steering angle sensor zero point will also be erased.
- If the zero point and output value of the yaw rate/side/decel G sensor and the output value of the wheel sensors are not normal, steering angle sensor zero point cannot be acquired normally even if the vehicle is driven straight ahead at 35 km/h (22 MPH) or more.

>> GO TO 2.

2. CHECK STEERING ANGLE SENSOR ZERO POINT CALIBRATION

1. Drive the vehicle straight ahead at 35 km/h (22 MPH) or more for at least 5 seconds.
2. Check that the centered position of the steering wheel is correctly set, while driving straight ahead.

NOTE:

- If front wheel alignment and steering position are adjusted as a result of abnormal centered position of the steering wheel, acquire yaw rate and acceleration sensor zero point again after the adjustments are completed.
- The centered position of the steering wheel is correctly set.

Is the inspection result normal?

- YES >> GO TO 3.
 NO >> Adjust front wheel alignment or steering position.

3. RECONFIRM DTC

1. Turn the ignition switch OFF.
2. Clear the DTC.
3. Turn the ignition switch ON (READY).
4. Drive the vehicle and turn the steering wheel to the right and left at the speed of 35 km/h (22 MPH) or more.

< COMPONENT DIAGNOSIS >

5. Check if the same DTC is recorded.

Result

| Condition | Proceed to |
|----------------------------|------------|
| DTC (C1290) is not output. | A |
| DTC (C1290) is output. | B |

- A >> INSPECTION END
 B >> Replace brake ECU.

Special Repair Requirement

INFOID:000000004212694

1. ZERO ADJUSTMENT FOR EACH SENSOR AND OFFSET LEARNING FOR LINEAR SOLENOID VALVE

After erasing brake ECU memories, perform zero adjustment of following sensors and initialization of linear solenoid valve.

- Steering angle sensor: [BRC-9, "PERFORM ZERO POINT OF STEERING ANGLE SENSOR : Description"](#).
- Yaw rate/side/decel G sensor: [BRC-8, "PERFORM ZERO POINT OF YAW RATE/SIDE/DECEL G SENSOR : Description"](#).
- Brake stroke sensor: [BRC-9, "PERFORM ADJUSTMENT OF STROKE SENSOR : Description"](#).
- Linear solenoid valve: [BRC-7, "PERFORM INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION : Description"](#).

>> END

C1300

Description

INFOID:000000004212695

The brake ECU outputs this DTC malfunctions are found in the circuit inside the computer by self diagnosis.

DTC Logic

INFOID:000000004212696

| DTC | INF code | Display item | DTC detection condition | Trouble area |
|-------|----------|--------------|-------------------------------|--------------|
| C1300 | — | ECU | Malfunction in the brake ECU. | • Brake ECU |

Diagnosis Procedure

INFOID:000000004212697

CAUTION:

When replacing the brake ECU, perform initialization of linear solenoid valve and calibration.

1. REPLACE BRAKE ECU

Replace the brake ECU.

>> INSPECTION END

Special Repair Requirement

INFOID:000000004212698

1. ZERO ADJUSTMENT FOR EACH SENSOR AND OFFSET LEANING FOR LINEAR SOLENOID VALVE

After erasing brake ECU memories, perform zero adjustment of following sensors and initialization of linear solenoid valve.

- Steering angle sensor: [BRC-9, "PERFORM ZERO POINT OF STEERING ANGLE SENSOR : Description"](#).
- Yaw rate/side/decel G sensor: [BRC-8, "PERFORM ZERO POINT OF YAW RATE/SIDE/DECEL G SENSOR : Description"](#).
- Brake stroke sensor: [BRC-9, "PERFORM ADJUSTMENT OF STROKE SENSOR : Description"](#).
- Linear solenoid valve: [BRC-7, "PERFORM INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION : Description"](#).

>> END

C1311, C1312, C1313, C1314

Description

INFOID:000000004212699

The ABS relay No.1 and ABS relay No.2 relay supplies power to the changeover solenoid and the linear solenoid.

The ABS relay No.1 and ABS relay No.2 relay remain ON for approximately 2 minutes after the ignition switch is turned OFF and the input of brake operation signal stops, and supplies power to the system to keep it ready to operate.

DTC Logic

INFOID:000000004212700

| DTC | INF code | Display item | DTC detection condition | Trouble area |
|-------|----------|-----------------|---|---|
| C1311 | 1 | MAIN RLY1 OPEN | When either of the following is detected: 1. Relay contact is off (BS1 terminal is less than 3.5 V) for at least 0.2 seconds when R1+ terminal voltage is 9.0 V or more and ABS relay No.1 is on. 2. R1+ terminal voltage is less than 9.0 V and No.1 relay cannot be on for at least 0.2 seconds when ABS relay No.1 is turned on (BS1 terminal is 3.5 V or more). | <ul style="list-style-type: none"> • ABS relay No.1 • ABS relay No.1 circuit • Brake ECU |
| C1312 | 3 | MAIN RLY1 SHORT | Relay contact is on for at least 4 seconds when ABS relay No.1 is off. | |
| C1313 | 4 | MAIN RLY2 OPEN | When either of the following is detected: 1. Relay contact is off (BS2 terminal is less than 3.5 V) for at least 0.2 seconds when R2+ terminal voltage is 9.0 V or more and ABS relay No.2 is on. 2. R2+ terminal voltage is less than 9.0 V and ABS relay No.2 cannot be on for at least 0.2 seconds when ABS relay No.2 is turned on (BS2 terminal is 3.5 V or more). | <ul style="list-style-type: none"> • ABS relay No.2 • ABS relay No.2 circuit • Brake ECU |
| C1314 | 6 | MAIN RLY2 SHORT | Relay contact is on for at least 4 seconds when ABS relay No.2 is off. | |

Diagnosis Procedure

INFOID:000000004212701

CAUTION:

When replacing the brake ECU, perform initialization of linear solenoid valve and calibration.

1. INSPECT ABS MAIN FUSE

1. Remove the ABS No.1 and ABS No.2 fuses from the engine room R/B.
2. Measure the resistance according to the value(s) in the table below.

| Tester connection | Condition | Specified condition |
|---------------------|-----------|---------------------|
| ABS No.1 (10A) fuse | Always | Below 1 Ω |
| ABS No.2 (15A) fuse | Always | Below 1 Ω |

Is the inspection result normal?

- YES >> GO TO 2.
NO >> Replace ABS MAIN fuse.

2. PERFORM ACTIVE TEST BY CONSULT-III (ABS MAIN RELAY)

1. Install the ABS No.1 and ABS No.2 fuses.
2. Connect the CONSULT-III.
3. Turn the ignition switch ON.
4. Select the "ACTIVE TEST" on the CONSULT-III.

| Display item | Test part | Control range | Diagnostic note |
|--------------|----------------|---------------|---|
| MAIN RELAY 1 | ABS relay No.1 | Relay ON/OFF | Operating sound of relay (clicking sound) can be heard. |
| MAIN RELAY 2 | ABS relay No.2 | Relay ON/OFF | Operating sound of relay (clicking sound) can be heard. |

5. Check the operating sound of the ABS relay No.1 and No.2 when operating it with the CONSULT-III.

NOTE:

The operating sound of the ABS relay No.1 and No.2 should be heard.

Is the inspection result normal?

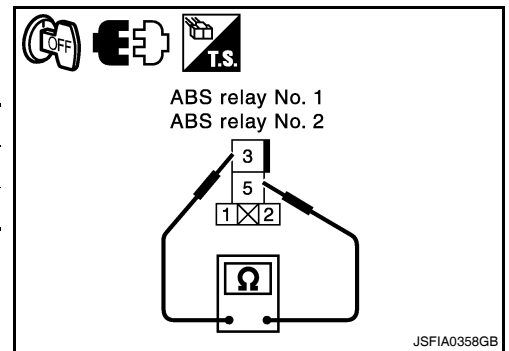
YES >> GO TO 3.

NO >> GO TO 4.

3.INSPECT ABS MAIN RELAY (ABS RELAY NO.1, 2)

1. Turn the ignition switch OFF.
2. Remove the ABS relay No.1 and ABS relay No.2.
3. Measure the resistance according to the value(s) in the table below.

| Terminal | Condition | Specified condition |
|----------|------------------------------------|---------------------|
| 3 – 5 | Always | 10 kΩ or higher |
| 3 – 5 | Apply B+ between terminals 1 and 2 | Below 1 Ω |



Is the inspection result normal?

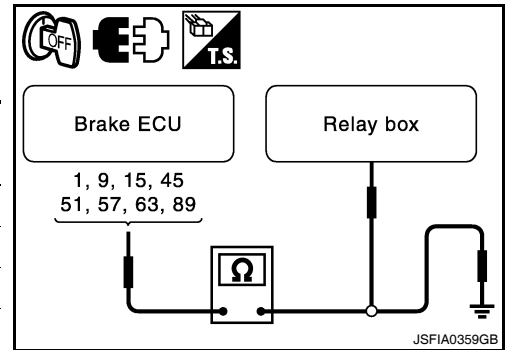
YES >> GO TO 4.

NO >> Replace ABS relay (ABS relay No.1 or No.2).

4.CHECK BRAKE ECU TERMINAL

1. Turn ignition switch OFF.
2. Disconnect brake ECU connector.
3. Check continuity between brake ECU terminals, relay box and ground.

| Brake ECU | | — | Continuity |
|-----------|----------|-----------|-------------|
| Connector | Terminal | | |
| E60 | 45 | Relay box | Existed |
| | | Ground | Not existed |
| E60 | 9 | Relay box | Existed |
| | | Ground | Not existed |
| E60 | 15 | Relay box | Existed |
| | | Ground | Not existed |
| E60 | 1 | Relay box | Existed |
| | | Ground | Not existed |
| E61 | 89 | Relay box | Existed |
| | | Ground | Not existed |
| E61 | 57 | Relay box | Existed |
| | | Ground | Not existed |
| E61 | 63 | Relay box | Existed |
| | | Ground | Not existed |
| E61 | 51 | Relay box | Existed |
| | | Ground | Not existed |



Is the inspection result normal?

A
B
C
D
E
G
H
I
J
K
L
M
N
O
P

BRC

< COMPONENT DIAGNOSIS >

- YES >> GO TO 5.
 NO >> Repair or replace harness or connector (BS circuit).

5.RECONFIRM DTC

1. Turn the ignition switch OFF.
2. Clear the DTC.
3. Turn the ignition switch ON.
4. Check if the same DTC is recorded.

Result

| Condition | Proceed to |
|---|------------|
| DTCs (C1311, C1312, C1313 and/or C1314) are not output. | A |
| DTCs (C1311, C1312, C1313 and/or C1314) are output. | B |

- A >> Check for intermittent problems (symptom simulation).
 B >> Replace brake ECU.

Special Repair Requirement

INFOID:000000004212702

1.ZERO ADJUSTMENT FOR EACH SENSOR AND OFFSET LEANING FOR LINEAR SOLENOID VALVE

After erasing brake ECU memories, perform zero adjustment of following sensors and initialization of linear solenoid valve.

- Steering angle sensor: [BRC-9. "PERFORM ZERO POINT OF STEERING ANGLE SENSOR : Description"](#).
- Yaw rate/side/decel G sensor: [BRC-8. "PERFORM ZERO POINT OF YAW RATE/SIDE/DECEL G SENSOR : Description"](#).
- Brake stroke sensor: [BRC-9. "PERFORM ADJUSTMENT OF STROKE SENSOR : Description"](#).
- Linear solenoid valve: [BRC-7. "PERFORM INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION : Description"](#).

>> END

C1315, C1316, C1352, C1353, C1354, C1355, C1356, C1357, C1358, C1359

< COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

C1315, C1316, C1352, C1353, C1354, C1355, C1356, C1357, C1358, C1359

Description

INFOID:000000004212703

Each solenoid adjusts pressure which affects each wheel cylinder according to signals from the brake ECU and controls the vehicle.

The master cut solenoid (SMC1/2) is closed and blocks the master cylinder pressure from the Electronically Controlled Brake control pressure when the system is normal. The master cut solenoid is open and sends the master cylinder fluid pressure to the non-assisted brake wheel cylinders during the fail safe due to a system malfunction.

DTC Logic

INFOID:000000004212704

| DTC | INF code | Display item | DTC detection condition | Trouble area |
|-------|----------|--------------|---|---|
| C1315 | 61 | SMC1 | When either of the following is detected: 1. SMC1 drive circuit is malfunctioning for 0.05 seconds or more. 2. Short to +B in SMC1. | <ul style="list-style-type: none"> Brake actuator assembly (SMC1) SMC1 circuit Brake ECU |
| | 62 | | Current leaks for 0.05 seconds or more when SMC1 is off. | |
| | 63 | | Open circuit in SMC1 continues for 0.05 seconds or more. | |
| | 64 | | Overcurrent in SMC1 continues for 0.05 seconds or more. | |
| C1316 | 66 | SMC2 | When either of the following is detected: 1. SMC2 drive circuit is malfunctioning for 0.05 seconds or more. 2. Short to +B in SMC2. | <ul style="list-style-type: none"> Brake actuator assembly (SMC2) SMC2 circuit Brake ECU |
| | 67 | | Current leaks for 0.05 seconds or more when SMC2 is off. | |
| | 68 | | Open circuit in SMC2 continues for 0.05 seconds or more. | |
| | 69 | | Overcurrent in SMC2 continues for 0.05 seconds or more. | |
| C1352 | 11 | SLA FR SOL | Open circuit in SLAFR continues for 0.05 seconds or more when SLAFR is off. | <ul style="list-style-type: none"> Brake actuator assembly (SLAFR) SLAFR circuit Brake ECU |
| | 12 | | Open circuit in SLAFR continues for 0.05 seconds or more when SLAFR is on. | |
| | 13 | | Short to +B or voltage leak in SLAFR continues for 0.05 seconds or more. | |
| | 14 | | Overcurrent in SLAFR continues for 0.05 seconds or more. | |
| C1353 | 21 | SLA FL SOL | Open circuit in SLAFL continues for 0.05 seconds or more when SLAFL is off. | <ul style="list-style-type: none"> Brake actuator assembly (SLAFL) SLAFL circuit Brake ECU |
| | 22 | | Open circuit in SLAFL continues for 0.05 seconds or more when SLAFL is on. | |
| | 23 | | Short to +B or voltage leak in SLAFL continues for 0.05 seconds or more. | |
| | 24 | | Overcurrent in SLAFL continues for 0.05 seconds or more. | |

A
B
C
D
E
BRC
G
H
I
J
K
L
M
N
O
P

C1315, C1316, C1352, C1353, C1354, C1355, C1356, C1357, C1358, C1359

< COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

| DTC | INF code | Display item | DTC detection condition | Trouble area |
|-------|----------|--------------|---|---|
| C1354 | 31 | SLA RR SOL | Open circuit in SLARR continues for 0.05 seconds or more when SLARR is off. | <ul style="list-style-type: none"> • Brake actuator assembly (SLARR) • SLARR circuit • Brake ECU |
| | 32 | | Open circuit in SLARR continues for 0.05 seconds or more when SLARR is on. | |
| | 33 | | Short to +B or voltage leak in SLARR continues for 0.05 seconds or more. | |
| | 34 | | Overcurrent in SLARR continues for 0.05 seconds or more. | |
| C1355 | 41 | SLA RL SOL | Open circuit in SLARL continues for 0.05 seconds or more when SLARL is off. | <ul style="list-style-type: none"> • Brake actuator assembly (SLARL) • SLARL circuit • Brake ECU |
| | 42 | | Open circuit in SLARL continues for 0.05 seconds or more when SLARL is on. | |
| | 43 | | Short to +B or voltage leak in SLARL continues for 0.05 seconds or more. | |
| | 44 | | Overcurrent in SLARL continues for 0.05 seconds or more. | |
| C1356 | 16 | SLR FR SOL | Open circuit in SLRFR continues for 0.05 seconds or more when SLRFR is off. | <ul style="list-style-type: none"> • Brake actuator assembly (SLRFR) • SLRFR circuit • Brake ECU |
| | 17 | | Open circuit in SLRFR continues for 0.05 seconds or more when SLRFR is on. | |
| | 18 | | Short to +B or voltage leak in SLRFR continues for 0.05 seconds or more. | |
| | 19 | | Overcurrent in SLRFR continues for 0.05 seconds or more. | |
| C1357 | 26 | SLR FL SOL | Open circuit in SLRFL continues for 0.05 seconds or more when SLRFL is off. | <ul style="list-style-type: none"> • Brake actuator assembly (SLRFL) • SLRFL circuit • Brake ECU |
| | 27 | | Open circuit in SLRFL continues for 0.05 seconds or more when SLRFL is on. | |
| | 28 | | Short to +B or voltage leak in SLRFL continues for 0.05 seconds or more. | |
| | 29 | | Overcurrent in SLRFL continues for 0.05 seconds or more. | |
| C1358 | 36 | SLR RR SOL | Open circuit in SLRRR continues for 0.05 seconds or more when SLRRR is off. | <ul style="list-style-type: none"> • Brake actuator assembly (SLRRR) • SLRRR circuit • Brake ECU |
| | 37 | | Open circuit in SLRRR continues for 0.05 seconds or more when SLRRR is on. | |
| | 38 | | Short to +B or voltage leak in SLRRR continues for 0.05 seconds or more. | |
| | 39 | | Overcurrent in SLRRR continues for 0.05 seconds or more. | |
| C1359 | 46 | SLR RL SOL | Open circuit in SLRRL continues for 0.05 seconds or more when SLRRL is off. | <ul style="list-style-type: none"> • Brake actuator assembly (SLRRL) • SLRRL circuit • Brake ECU |
| | 47 | | Open circuit in SLRRL continues for 0.05 seconds or more when SLRRL is on. | |
| | 48 | | Short to +B or voltage leak in SLRRL continues for 0.05 seconds or more. | |
| | 49 | | Overcurrent in SLRRL continues for 0.05 seconds or more. | |

Diagnosis Procedure

INFOID:000000004212705

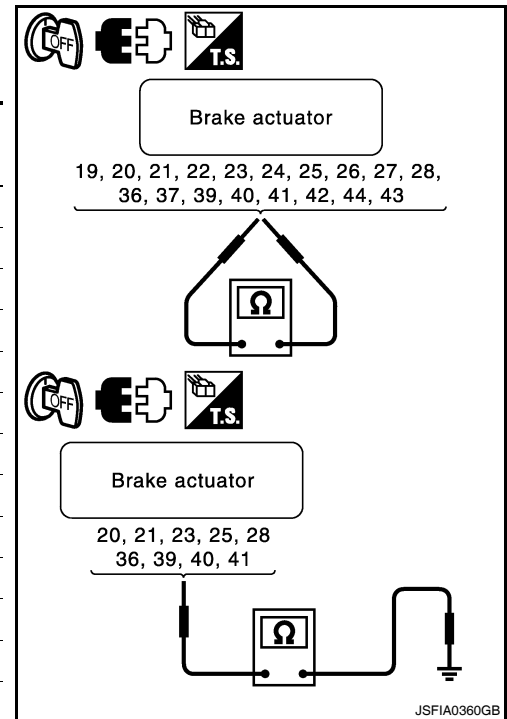
CAUTION:

When replacing the brake ECU or brake actuator assembly, perform initialization of linear solenoid valve and calibration.

1. INSPECT BRAKE ACTUATOR ASSEMBLY

1. Disconnect the brake actuator connector.
2. Measure the continuity according to the value(s) in the table below.

| Brake actuator | | Condition | Specified condition |
|----------------|-------------|-----------|---------------------|
| Connector | Terminal | | |
| E91 | 37 – 36 | Always | Existed |
| E91 | 36 – Ground | Always | Not existed |
| E91 | 19 – 20 | Always | Existed |
| E91 | 20 – Ground | Always | Not existed |
| E91 | 44 – 43 | Always | Existed |
| E91 | 44 – Ground | Always | Not existed |
| E91 | 21 – 22 | Always | Existed |
| E91 | 21 – Ground | Always | Not existed |
| E91 | 39 – 40 | Always | Existed |
| E91 | 39 – Ground | Always | Not existed |
| E91 | 41 – 42 | Always | Existed |
| E91 | 41 – Ground | Always | Not existed |
| E91 | 28 – 27 | Always | Existed |
| E91 | 28 – Ground | Always | Not existed |
| E91 | 21 – 22 | Always | Existed |
| E91 | 21 – Ground | Always | Not existed |
| E91 | 23 – 24 | Always | Existed |
| E91 | 23 – Ground | Always | Not existed |
| E91 | 25 – 26 | Always | Existed |
| E91 | 25 – Ground | Always | Not existed |

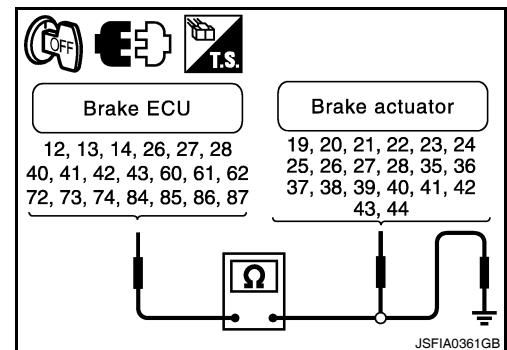


Is the inspection result normal?

- YES >> GO TO 2.
 NO >> Replace brake actuator assembly.

2. CHECK HARNESS AND CONNECTOR (BRAKE ECU – BRAKE ACTUATOR)

1. Turn the ignition switch OFF.
2. Disconnect the brake ECU connectors.
3. Measure the resistance to the value(s) in the table below.



C1315, C1316, C1352, C1353, C1354, C1355, C1356, C1357, C1358, C1359

< COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

| Brake ECU | | Brake actuator | | — | Condition | Specified condition |
|-----------|----------|----------------|----------|--------|-----------|---------------------|
| Connector | Terminal | Connector | Terminal | | | |
| E60 | 42 | E91 | 44 | — | Always | Below 1 Ω |
| E60 | 42 | — | — | Ground | Always | 10 kΩ or higher |
| E60 | 27 | E91 | 43 | — | Always | Below 1 Ω |
| E60 | 27 | — | — | Ground | Always | 10 kΩ or higher |
| E60 | 41 | E91 | 28 | — | Always | Below 1 Ω |
| E60 | 41 | — | — | Ground | Always | 10 kΩ or higher |
| E60 | 28 | E91 | 27 | — | Always | Below 1 Ω |
| E60 | 28 | — | — | Ground | Always | 10 kΩ or higher |
| E61 | 86 | E91 | 35 | — | Always | Below 1 Ω |
| E61 | 86 | — | — | Ground | Always | 10 kΩ or higher |
| E61 | 73 | E91 | 38 | — | Always | Below 1 Ω |
| E61 | 73 | — | — | Ground | Always | 10 kΩ or higher |
| E61 | 85 | E91 | 21 | — | Always | Below 1 Ω |
| E61 | 85 | — | — | Ground | Always | 10 kΩ or higher |
| E61 | 74 | E91 | 22 | — | Always | Below 1 Ω |
| E61 | 74 | — | — | Ground | Always | 10 kΩ or higher |
| E61 | 62 | E91 | 39 | — | Always | Below 1 Ω |
| E61 | 62 | — | — | Ground | Always | 10 kΩ or higher |
| E61 | 72 | E91 | 40 | — | Always | Below 1 Ω |
| E61 | 72 | — | — | Ground | Always | 10 kΩ or higher |
| E61 | 61 | E91 | 23 | — | Always | Below 1 Ω |
| E61 | 61 | — | — | Ground | Always | 10 kΩ or higher |
| E61 | 60 | E91 | 24 | — | Always | Below 1 Ω |
| E61 | 60 | — | — | Ground | Always | 10 kΩ or higher |
| E60 | 14 | E91 | 41 | — | Always | Below 1 Ω |
| E60 | 14 | — | — | Ground | Always | 10 kΩ or higher |
| E60 | 12 | E91 | 42 | — | Always | Below 1 Ω |
| E60 | 12 | — | — | Ground | Always | 10 kΩ or higher |
| E60 | 13 | E91 | 25 | — | Always | Below 1 Ω |
| E60 | 13 | — | — | Ground | Always | 10 kΩ or higher |
| E60 | 26 | E91 | 26 | — | Always | Below 1 Ω |
| E60 | 26 | — | — | Ground | Always | 10 kΩ or higher |
| E60 | 43 | E91 | 36 | — | Always | Below 1 Ω |
| E60 | 43 | — | — | Ground | Always | 10 kΩ or higher |
| E60 | 40 | E91 | 37 | — | Always | Below 1 Ω |
| E60 | 40 | — | — | Ground | Always | 10 kΩ or higher |
| E61 | 87 | E91 | 20 | — | Always | Below 1 Ω |
| E61 | 87 | — | — | Ground | Always | 10 kΩ or higher |
| E61 | 84 | E91 | 19 | — | Always | Below 1 Ω |
| E61 | 84 | — | — | Ground | Always | 10 kΩ or higher |

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace harness or connector.

3.RECONFIRM DTC

1. Reconnect the brake ECU connectors and the brake actuator connector.
2. Clear the DTC.
3. Turn the ignition switch ON (READY).
4. Check if the same DTC is recorded.

Result

| Condition | Proceed to |
|--|------------|
| DTCs (C1315, C1316, C1352, C1354, C1355, C1356, C1357, C1358 and/or C1359) are not output. | A |
| DTCs (C1315, C1316, C1352, C1354, C1355, C1356, C1357, C1358 and/or C1359) are output. | B |

- A >> Check for intermittent problems (symptom simulation).
- B >> Replace brake ECU.

Special Repair Requirement

INFOID:000000004212706



1.ZERO ADJUSTMENT FOR EACH SENSOR AND OFFSET LEANING FOR LINEAR SOLENOID VALVE

After erasing brake ECU memories, perform zero adjustment of following sensors and initialization of linear solenoid valve.

- Steering angle sensor: [BRC-9, "PERFORM ZERO POINT OF STEERING ANGLE SENSOR : Description"](#).
- Yaw rate/side/decel G sensor: [BRC-8, "PERFORM ZERO POINT OF YAW RATE/SIDE/DECEL G SENSOR : Description"](#).
- Brake stroke sensor: [BRC-9, "PERFORM ADJUSTMENT OF STROKE SENSOR : Description"](#).
- Linear solenoid valve: [BRC-7, "PERFORM INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION : Description"](#).

>> END

A
B
C
D
E
G
H
I
J
K
L
M
N
O
P

C1319

Description

INFOID:000000004212707

The stroke simulator solenoid (SCSS) generates pedal reactive effort during Electronically Controlled Brake control. If one or more of the front wheels loses brake booster function, the simulator operation is prohibited.

DTC Logic

INFOID:000000004212708

| DTC | INF code | Display item | DTC detection condition | Trouble area |
|-------|----------|--------------|---|---|
| C1319 | 71 | SCSS | When either of the following is detected: 1. SCSS drive circuit is malfunctioning for 0.05 seconds or more. 2. Short to +B in SCSS. | <ul style="list-style-type: none"> • Brake simulator • Brake simulator circuit • Brake ECU |
| | 72 | | Current leaks for 0.05 seconds or more when SCSS is off. | |
| | 73 | | Open circuit in SCSS continues for 0.05 seconds or more. | |
| | 74 | | Overcurrent in SCSS continues for 0.05 seconds or more. | |

Diagnosis Procedure

INFOID:000000004212709

CAUTION:

When replacing the brake ECU, perform initialization of linear solenoid valve and calibration.

1. INSPECT STROKE SIMULATOR

1. Disconnect the brake simulator connector E90.
2. Measure the resistance according to the value(s) in the table below.

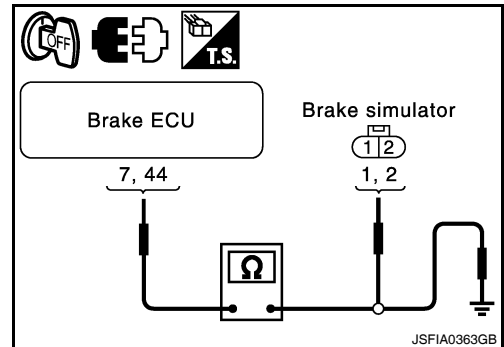
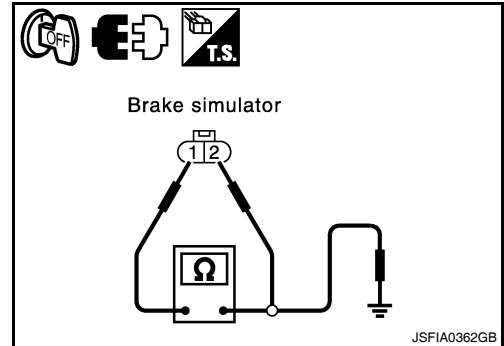
| Brake simulator | | Condition | Specified condition |
|-----------------|------------|-----------|---------------------|
| Connector | Terminal | | |
| E90 | 1 – 2 | Always | 19 to 38 Ω |
| E90 | 1 – Ground | Always | 10 kΩ or higher |

Is the inspection result normal?

- YES >> GO TO 2.
NO >> Replace brake simulator.

2. CHECK HARNESS AND CONNECTOR

1. Disconnect the brake ECU connector.
2. Measure the resistance to the value(s) in the table below.



C1319

< COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

| Brake ECU | | Brake simulator | | — | Condition | Specified condition |
|-----------|----------|-----------------|----------|--------|-----------|---------------------|
| Connector | Terminal | Connector | Terminal | | | |
| E60 | 7 | E90 | 2 | — | Always | Below 1 Ω |
| E60 | 7 | — | — | Ground | Always | 10 kΩ or higher |
| E60 | 44 | E90 | 1 | — | Always | Below 1 Ω |
| E60 | 44 | — | — | Ground | Always | 10 kΩ or higher |

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace harness or connector.

3.RECONFIRM DTC

1. Turn the ignition switch OFF.
2. Reconnect the brake simulator connector.
3. Clear the DTC.
4. Turn ignition switch ON (READY).
5. Check if the same DTC is recorded.

Result

| Condition | Proceed to |
|----------------------------|------------|
| DTC (C1319) is not output. | A |
| DTC (C1319) is output. | B |

A >> Check for intermittent problems (symptom simulation).

B >> Replace brake ECU.

Special Repair Requirement

INFOID:000000004212710

1.ZERO ADJUSTMENT FOR EACH SENSOR AND OFFSET LEANING FOR LINEAR SOLENOID VALVE

After erasing brake ECU memories, perform zero adjustment of following sensors and initialization of linear solenoid valve.

- Steering angle sensor: [BRC-9, "PERFORM ZERO POINT OF STEERING ANGLE SENSOR : Description"](#).
- Yaw rate/side/decel G sensor: [BRC-8, "PERFORM ZERO POINT OF YAW RATE/SIDE/DECEL G SENSOR : Description"](#).
- Brake stroke sensor: [BRC-9, "PERFORM ADJUSTMENT OF STROKE SENSOR : Description"](#).
- Linear solenoid valve: [BRC-7, "PERFORM INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION : Description"](#).

>> END

C1341, C1342, C1343, C1344

Description

INFOID:000000004212711

The brake ECU controls braking force according to the hybrid control system regenerative braking force and inputs the fluid pressure necessary for operating each wheel cylinder according to the wheel cylinder pressure sensor.

DTCs may be stored if brake fluid leaks, the wheel cylinder vibrates due to uneven wear of the brake disc rotor, or foreign matter enters the solenoid valve.

DTCs may be stored if the line pressure drops during air bleeding.

DTC Logic

INFOID:000000004212712

| DTC | INF code | Display item | DTC detection condition | Trouble area |
|-------|------------|-----------------|---|--|
| C1341 | 551 552 | FR RH HYDRAULIC | Hydraulic pressure control on FR wheel has deteriorated. | <ul style="list-style-type: none"> Fluid leakage Brake actuator assembly |
| | 553 | | There is a malfunction, such as leakage in the pressure increase control valve of FR wheel. | <ul style="list-style-type: none"> Fluid leakage Disc rotor Brake actuator assembly |
| | 554 555 | | There is a malfunction, such as leakage in the pressure decrease control valve of FR wheel. | <ul style="list-style-type: none"> Fluid leakage Disc rotor Brake actuator assembly |
| C1342 | 561 562 | FR LH HYDRAULIC | Hydraulic pressure control on FL wheel has deteriorated. | <ul style="list-style-type: none"> Fluid leakage Brake actuator assembly |
| | 563 | | There is a malfunction, such as leakage in the pressure increase control valve of FL wheel. | <ul style="list-style-type: none"> Fluid leakage Disc rotor Brake actuator assembly |
| | 564 565 | | There is a malfunction, such as leakage in the pressure decrease control valve of FL wheel. | <ul style="list-style-type: none"> Fluid leakage Disc rotor Brake actuator assembly |
| C1343 | 571 572 | RR RH HYDRAULIC | Hydraulic pressure control on RR wheel has deteriorated. | <ul style="list-style-type: none"> Fluid leakage Brake actuator assembly |
| | 573 | | There is a malfunction, such as leakage in the pressure increase control valve of RR wheel. | <ul style="list-style-type: none"> Fluid leakage Disc rotor Brake actuator assembly |
| | 574 575 | | There is a malfunction, such as leakage in the pressure decrease control valve of RR wheel. | <ul style="list-style-type: none"> Fluid leakage Disc rotor Brake actuator assembly |
| C1344 | 581 582 | RR LH HYDRAULIC | Hydraulic pressure control on RL wheel has deteriorated. | <ul style="list-style-type: none"> Fluid leakage Brake actuator assembly |
| | 583 | | There is a malfunction, such as leakage in the pressure increase control valve of RL wheel. | <ul style="list-style-type: none"> Fluid leakage Disc rotor Brake actuator assembly |
| | 584 585 | | There is a malfunction, such as leakage in the pressure decrease control valve of RL wheel. | <ul style="list-style-type: none"> Fluid leakage Disc rotor Brake actuator assembly |

Diagnosis Procedure

INFOID:000000004212713

CAUTION:

When replacing the brake actuator assembly, perform initialization of linear solenoid valve and calibration.

NOTE:

When C1364 is output together with C1341, C1342, C1343 or C1344, inspect and repair the trouble areas indicated by C1364 first.

1. CHECK FOR BRAKE FLUID LEAKS

1. Check that there is no fluid leakage in the brake line between the brake actuator and the wheel cylinder which is the cause of DTCs.
2. Check that the brake is no dragging.

NOTE:

There is no fluid leakage or dragging.

< COMPONENT DIAGNOSIS >

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Repair or replace applicable part.

2.PERFORM AIR BLEEDING

Bleed the air from the front and rear brake system.

>> GO TO 3.

3.RECONFIRM DTC

1. Clear the DTC.
2. Repeat the braking test under malfunction conditions recreated based on the Freeze Frame Data or customer problem analysis.

Result

| Condition | Proceed to |
|---|------------|
| DTCs (C1341, C1342, C1343 and/or C1344) are output. | A |
| DTCs (C1341, C1342, C1343 and/or C1344) are not output. | B |

NOTE:

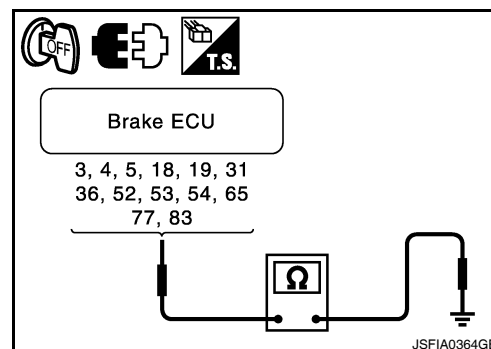
DTC may be stored if foreign matter or air enters the solenoid valve.

- A >> GO TO 4.
- B >> INSPECTION END

4.CHECK HARNESS AND CONNECTOR (BRAKE ECU – BODY GROUND)

1. Turn the ignition switch OFF.
2. Disconnect the brake ECU connectors.
3. Measure the resistance to the value(s) in the table below.

| Brake ECU | | Condition | Specified condition |
|-----------|-------------|-----------|---------------------|
| Connector | Terminal | | |
| E60 | 4 – Ground | Always | 10 kΩ or higher |
| E60 | 18 – Ground | Always | 10 kΩ or higher |
| E60 | 5 – Ground | Always | 10 kΩ or higher |
| E60 | 19 – Ground | Always | 10 kΩ or higher |
| E60 | 3 – Ground | Always | 10 kΩ or higher |
| E60 | 31 – Ground | Always | 10 kΩ or higher |
| E60 | 36 – Ground | Always | 10 kΩ or higher |
| E61 | 65 – Ground | Always | 10 kΩ or higher |
| E61 | 83 – Ground | Always | 10 kΩ or higher |
| E61 | 52 – Ground | Always | 10 kΩ or higher |
| E61 | 77 – Ground | Always | 10 kΩ or higher |
| E61 | 53 – Ground | Always | 10 kΩ or higher |
| E61 | 54 – Ground | Always | 10 kΩ or higher |



Is the inspection result normal?

- YES >> GO TO 5.
- NO >> Repair or replace harness or connector.

5.READ VALUE OF CONSULT-III (WHEEL CYLINDER PRESSURE SENSOR)

1. Reconnect the brake ECU connectors and the brake actuator connector.
2. Install the brake fluid pressure tester [SST: KV991V0010 (J-39528)] and bleed air.
3. Connect the CONSULT-III.
4. Turn the ignition switch ON.

< COMPONENT DIAGNOSIS >

5. Select the "DATA MONITOR" on the CONSULT-III.

ABS/VDC

| Tester display | Measurement item/ Range | Normal condition |
|----------------|--|--|
| FR WC PRESS | FR wheel cylinder pressure sensor/ min: 0 V, max: 5 V | When brake pedal is released: 0.3 to 0.9 V |
| FL WC PRESS | FL wheel cylinder pressure sensor/ min: 0 V, max: 5 V | When brake pedal is released: 0.3 to 0.9 V |
| RR WC PRESS | RR wheel cylinder pressure sensor/ min: 0 V, max: 5 V | When brake pedal is released: 0.3 to 0.9 V |
| RL WC PRESS | RL wheel cylinder pressure sensor/ min: 0 V, max: 5 V | When brake pedal is released: 0.3 to 0.9 V |

6. Check the output value of the wheel cylinder pressure at each fluid pressure during the Electronically Controlled Brake control.

Front wheel cylinder pressure sensor

| Condition | Front wheel | Rear wheel |
|---|--------------|--------------|
| When fully depressing the brake pedal with the vehicle stopped. | 2.89 ±0.15 V | 1.32 ±0.15 V |

Is the inspection result normal?

- YES >> GO TO 6.
- NO >> Replace brake actuator assembly.

6.CHECK BRAKE DISC

1. Turn the ignition switch OFF.
2. Disconnect the brake pedal stroke sensor connector.
3. Carry out the running and braking test according to Freeze Frame Data or customer problem analysis. Check the brake line pressure vibration caused due to uneven wear of the disc according to brake pedal vibration.

NOTE:

Brake pedal does not vibration during braking.

Is the inspection result normal?

- YES >> GO TO 7.
- NO >> Replace brake disc.

7.RECONFIRM DTC

1. Reconnect the brake pedal stroke sensor connector.
2. Clear the DTC.
3. Repeat the braking test under malfunction conditions recreated based on the Freeze Frame Data or customer problem analysis.
4. Check is the same DTC is recorded.

Result

| Condition | Proceed to |
|---|------------|
| DTCs (C1341, C1342, C1343 and/or C1344) are not output. | A |
| DTCs (C1341, C1342, C1343 and/or C1344) are output. | B |

- A >> Check for intermittent problems (symptom simulation).
- B >> Replace brake actuator assembly.

Special Repair Requirement

INFOID:000000004212714

1.ZERO ADJUSTMENT FOR EACH SENSOR AND OFFSET LEANING FOR LINEAR SOLENOID VALVE

After erasing brake ECU memories, perform zero adjustment of following sensors and initialization of linear solenoid valve.

- Steering angle sensor: [BRC-9, "PERFORM ZERO POINT OF STEERING ANGLE SENSOR : Description"](#).

C1341, C1342, C1343, C1344

< COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

- Yaw rate/side/decel G sensor: [BRC-8. "PERFORM ZERO POINT OF YAW RATE/SIDE/DECEL G SENSOR : Description"](#).
- Brake stroke sensor: [BRC-9. "PERFORM ADJUSTMENT OF STROKE SENSOR : Description"](#).
- Linear solenoid valve: [BRC-7. "PERFORM INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION : Description"](#).

>> END

A
B
C
D
E
G
H
I
J
K
L
M
N
O
P

BRC

C1345, C1368

Description

INFOID:000000004212715

The brake ECU stores and corrects the difference in each individual part such as the stroke sensor, actuator solenoids, and stroke simulator solenoid. Perform initialization of linear solenoid valve and calibration if these parts are replaced.

The brake ECU receives shift position P signals from the HV ECU through CAN communication system. The DTCs are cancelled when the result of linear valve offset learning is normal.

DTC Logic

INFOID:000000004212716

| DTC | INF code | Display item | DTC detection condition | Trouble area |
|-------|----------|------------------|---|---|
| C1345 | — | LINEAR VLV CALIB | Value of initialization of linear solenoid valve and calibration for the FR, FL, RR, and RL wheels is not stored. | <ul style="list-style-type: none"> Initialization of linear solenoid valve and calibration undone Brake ECU |
| C1368 | — | LINEAR S/V | Value of initialization of linear solenoid valve and calibration is not within the brake actuator's standard value. | |

Diagnosis Procedure

INFOID:000000004212717

CAUTION:

When replacing the brake actuator assembly, perform initialization of linear solenoid valve and calibration.

1. CHECK DTC

1. Clear the DTC.
2. Turn the ignition switch OFF.
3. Turn the ignition switch ON.
4. Check that the DTCs (Electronically Controlled Brake and hybrid control system) are recorded.

Result

| Condition | Proceed to |
|---|------------|
| DTCs (except C1345, C1368 and/or hybrid control system DTC) are not output. | A |
| Hybrid control system DTC is output. | B |
| DTCs (except C1345 and/or C1368) are output. | C |

- A >> GO TO 2.
- B >> Inspect hybrid control system.
- C >> Repair circuit indicated by output DTC.

2. PERFORM INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION

Perform initialization of linear solenoid valve and calibration.

>> GO TO 3.

3. RECONFIRM DTC

1. Turn the ignition switch OFF.
2. Clear the DTC.
3. Turn the ignition switch ON.
4. Check if the same DTC is recorded.

Result

| Condition | Proceed to |
|---|------------|
| DTCs (C1345 and/or C1368) are not output. | A |
| DTCs (C1345 and/or C1368) are output. | B |

YES >> INSPECTION END
NO >> Replace brake ECU.

A

Special Repair Requirement

INFOID:000000004212718

B

1. ZERO ADJUSTMENT FOR EACH SENSOR AND OFFSET LEANING FOR LINEAR SOLENOID VALVE

After erasing brake ECU memories, perform zero adjustment of following sensors and initialization of linear solenoid valve.

C

- Steering angle sensor: [BRC-9, "PERFORM ZERO POINT OF STEERING ANGLE SENSOR : Description"](#).
- Yaw rate/side/decel G sensor: [BRC-8, "PERFORM ZERO POINT OF YAW RATE/SIDE/DECEL G SENSOR : Description"](#).
- Brake stroke sensor: [BRC-9, "PERFORM ADJUSTMENT OF STROKE SENSOR : Description"](#).
- Linear solenoid valve: [BRC-7, "PERFORM INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION : Description"](#).

D

E

>> END

BRC

G

H

I

J

K

L

M

N

O

P

C1365

Description

INFOID:000000004212719

The accumulator pressure sensor is built into the brake actuator. The brake ECU detects the accumulator pressure from the data sent from the accumulator pressure sensor, and then runs and stops the pump motor by operating the motor relay. DTCs may be output if the accumulator pressure drops due to frequent braking (this is not a malfunction).

DTC Logic

INFOID:000000004212720

| DTC | INF code | Display item | DTC detection condition | Possible cause |
|-------|----------|---------------|---|--|
| C1365 | 211 | ACC PRESS SEN | Sensor power 1 (VCM1) voltage is 4.7 V or less or 5.3 V or more for at least 0.05 seconds. | <ul style="list-style-type: none"> • Brake actuator assembly (Accumulator pressure sensor) • Accumulator pressure sensor circuit • Accumulator pressure sensor power supply • Brake actuator assembly • Brake ECU |
| | 212 | | Ratio of accumulator pressure sensor output voltage (PACC) to sensor power 1 (VCM1) voltage is 5% or less or 90.5% or more for at least 0.05 seconds. | |
| | 214 | | Total wheel cylinder pressure sensor exceeds 18 MPa after depressing brake pedal, but accumulator pressure sensor output voltage (PACC) changes less than 0.5 MPa for at least 0.5 seconds. | |
| | 215 | | Ratio of accumulator pressure sensor output voltage (PACC) to sensor power 1 (VCM1) voltage is 90.5% or less for at least 0.1 second during self diagnosis. | |

Diagnosis Procedure

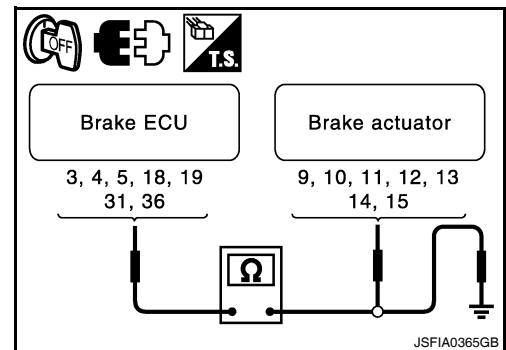
INFOID:000000004212721

CAUTION:

When replacing the brake ECU or brake actuator assembly, perform initialization of linear solenoid valve and calibrating.

1. CHECK HARNESS AND CONNECTOR (BRAKE ECU – BRAKE ACTUATOR)

1. Disconnect the brake ECU connector and the brake actuator connector.
2. Measure the resistance according to the value(s) in the table below.



| Brake ECU | | Brake actuator | | — | Condition | Specified condition |
|-----------|----------|----------------|----------|--------|-----------|---------------------|
| Connector | Terminal | Connector | Terminal | | | |
| E60 | 4 | E91 | 14 | — | Always | Below 1 Ω |
| E60 | 4 | — | — | Ground | Always | 10 kΩ or higher |
| E60 | 18 | E91 | 10 | — | Always | Below 1 Ω |
| E60 | 18 | — | — | Ground | Always | 10 kΩ or higher |
| E60 | 19 | E91 | 15 | — | Always | Below 1 Ω |
| E60 | 19 | — | — | Ground | Always | 10 kΩ or higher |

< COMPONENT DIAGNOSIS >

| Brake ECU | | Brake actuator | | — | Condition | Specified condition |
|-----------|----------|----------------|----------|--------|-----------|---------------------|
| Connector | Terminal | Connector | Terminal | | | |
| E60 | 36 | E91 | 12 | — | Always | Below 1 Ω |
| E60 | 36 | — | — | Ground | Always | 10 kΩ or higher |
| E60 | 31 | E91 | 13 | — | Always | Below 1 Ω |
| E60 | 31 | — | — | Ground | Always | 10 kΩ or higher |
| E60 | 3 | E91 | 9 | — | Always | Below 1 Ω |
| E60 | 3 | — | — | Ground | Always | 10 kΩ or higher |
| E60 | 5 | E91 | 11 | — | Always | Below 1 Ω |
| E60 | 5 | — | — | Ground | Always | 10 kΩ or higher |

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Repair or replace harness or connector.

2. READ VALUE OF CONSULT-III (ACCUMULATOR PRESSURE SENSOR)

1. Turn the ignition switch OFF.
2. Connect the CONSULT-III.
3. Turn the ignition switch ON.
4. Select the "DATA MONITOR" on the CONSULT-III.

ABS/VDC:

| Tester display | Measurement item/ Range | Normal condition |
|----------------|--|-------------------------------|
| ACC PRESS SEN | Accumulator pressure sensor/ min: 0 V, max: 5 V | Specified value: 3.3 to 4.7 V |

5. Depress the brake pedal 4 or 5 times to operate the pump motor, and check the output value on the CONSULT-III with the motor stopped (not braking).

NOTE:

Accumulator pressure sensor voltage does not drop.

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Replace brake actuator assembly.

3. RECONFIRM DTC

1. Turn the ignition switch OFF.
2. Clear the DTC.
3. Perform the road and braking test.
4. Check if the same DTC is recorded.

Result

| Condition | Proceed to |
|----------------------------|------------|
| DTC (C1365) is not output. | A |
| DTC (C1365) is output. | B |

- A >> Check for intermittent problems (symptom simulation).
- B >> Replace brake ECU.

Special Repair Requirement

INFOID:000000004212722

1. ZERO ADJUSTMENT FOR EACH SENSOR AND OFFSET LEARNING FOR LINEAR SOLENOID VALVE

After erasing brake ECU memories, perform zero adjustment of following sensors and initialization of linear solenoid valve.

- Steering angle sensor: [BRC-9, "PERFORM ZERO POINT OF STEERING ANGLE SENSOR : Description"](#).
- Yaw rate/side/decel G sensor: [BRC-8, "PERFORM ZERO POINT OF YAW RATE/SIDE/DECEL G SENSOR : Description"](#).
- Brake stroke sensor: [BRC-9, "PERFORM ADJUSTMENT OF STROKE SENSOR : Description"](#).

C1365

< COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

- Linear solenoid valve: [BRC-7. "PERFORM INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION : Description"](#).

>> END

C1377

Description

INFOID:000000004212723

The brake capacitor is used as auxiliary power for brake control when battery voltage is low.

DTC Logic

INFOID:000000004212724

| DTC | INF code | Display item | DTC detection condition | Trouble area |
|-------|----------|--------------|---|---|
| C1377 | 101 | CAPACITOR | Brake capacitor is deteriorated (indicates a need to replace). | • Brake capacitor |
| | 102 | | Self discharge (current leak) is excessive (internal malfunction). | |
| | 103 | | Overvoltage (16.4 V or more) continues to be applied from the auxiliary battery to the brake capacitor voltage input (+BC) for 10 seconds or more. | • Apply high voltage |
| | 105 | | Circuit inside the power back up unit (charge) is malfunctioning. | • Brake capacitor |
| | 106 | | Circuit inside the power back up unit (back up output circuit) is malfunctioning. | |
| | 108 | | Over voltage at brake capacitor cell. | |
| | 109 | | Open circuit between auxiliary battery (12 V) and brake capacitor power input (+BC terminal). | • ABS No.2 fuse • Brake capacitor circuit |
| | 110 | | when either of the following is detected: 1. Open or short circuit between auxiliary battery (12 V) and brake capacitor output 1 (OUT1). 2. Open or short circuit between auxiliary battery (12 V) and brake capacitor output 2 (OUT2). | • ABS No.1 fuse • ABS No.2 fuse • Brake capacitor circuit |

Diagnosis Procedure

INFOID:000000004212725

CAUTION:

When replacing the brake ECU, perform initialization of linear solenoid valve and calibration.

1. CHECK FREEZE FRAME DATA

Check the INF cord from the Freeze Frame Data memorized when the DTC (C1377) is stored.

Result

| Condition | Proceed to |
|--|------------|
| INF cords (109 and/or 110) are output. | A |
| INF cords (101, 102, 105, 106, 107 and/or 108) are output. | B |
| INF cord (103) is output. | C |

- A >> GO TO 2.
- B >> Replace brake capacitor.
- C >> GO TO 9.

2. INSPECT ABS MAIN NO.3 FUSE

1. Remove the ABS No.2 fuse from the engine room R/B.
2. Measure the resistance according to the value(s) in the table below.

| Tester connection | Condition | Specified condition |
|---------------------|-----------|---------------------|
| ABS No.2 (15A) fuse | Always | Below 1 Ω |

< COMPONENT DIAGNOSIS >

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Replace ABS No.2 fuse.

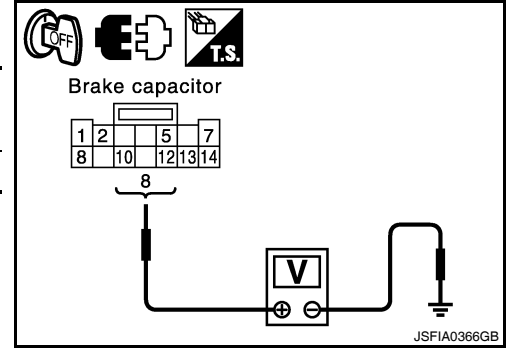
3.INSPECT BRAKE CAPACITOR (+BC TERMINAL)

1. Install the ABS No.2 fuse.
2. Disconnect the brake capacitor connector.
3. Measure the voltage according to the value(s) in the table below.

| Brake capacitor | | Condition | Specified condition |
|-----------------|------------|-----------|---------------------|
| Connector | Terminal | | |
| B131 | 8 – Ground | Always | 10 to 14 V |

Is the inspection result normal?

- YES >> GO TO 4.
- NO >> Repair or replace harness or connector (+BC circuit).



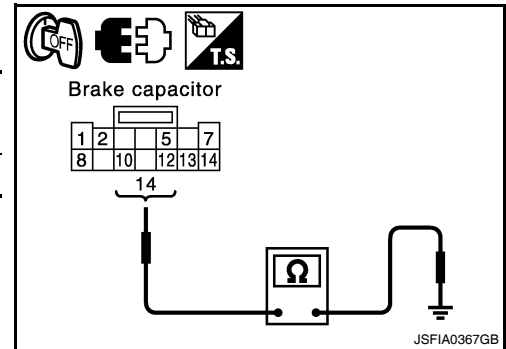
4.INSPECT BRAKE CAPACITOR (GND TERMINAL)

Measure the resistance according to the value(s) in the table below.

| Brake capacitor | | Condition | Specified condition |
|-----------------|-------------|-----------|---------------------|
| Connector | Terminal | | |
| B131 | 14 – Ground | Always | Below 1 Ω |

Is the inspection result normal?

- YES >> GO TO 5.
- NO >> Repair or replace harness or connector (GND circuit).



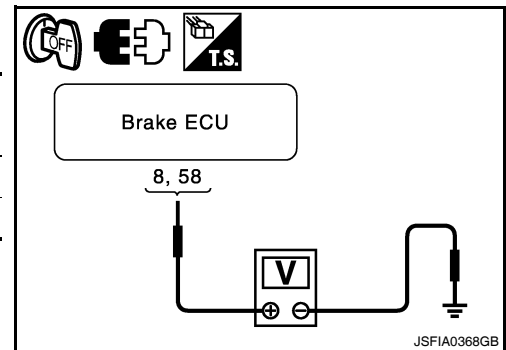
5.INSPECT BRAKE ECU (+DI TERMINAL)

1. Disconnect the brake ECU connectors.
2. Measure the voltage according to the value(s) in the table below.

| Brake ECU | | Condition | Specified condition |
|-----------|-------------|-----------|---------------------|
| Connector | Terminal | | |
| E60 | 8 – Ground | Always | 10 to 16 V |
| E61 | 58 – Ground | Always | 10 to 16 V |

Is the inspection result normal?

- YES >> GO TO 6.
- NO >> Repair or replace harness or connector (+DI circuit).



6.INSPECT BRAKE CAPACITOR (OUT AND CTY+ TERMINAL)

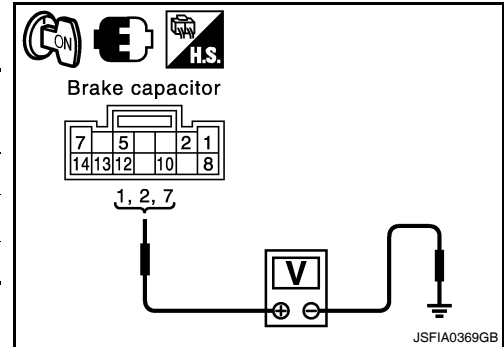
1. Reconnect the brake capacitor connector.
2. Turn the ignition switch ON.

< COMPONENT DIAGNOSIS >

3. Measure the voltage according to the value(s) in the table below.

| Brake capacitor | | Condition | Specified condition |
|-----------------|------------|-----------|---------------------|
| Connector | Terminal | | |
| B131 | 1 – Ground | Always | 10 to 14 V |
| B131 | 2 – Ground | Always | 10 to 14 V* |
| B131 | 7 – Ground | Always | 10 to 14 V |

*: For 5 seconds after the driver's door is opened.



Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace harness or connector (OUT or CTY+ circuit).

7.RECONFIRM DTC

1. Turn the ignition switch OFF.
2. Clear the DTC.
3. Turn the ignition switch ON.
4. Check if the same DTC is recorded.

Result

| Condition | Proceed to |
|----------------------------|------------|
| DTC (C1377) is not output. | A |
| DTC (C1377) is output. | B |

A >> Check for intermittent problems (symptom simulation).

B >> Replace brake ECU.

8.CHECK AUXILIARY BATTERY

Check the auxiliary battery voltage.

Standard voltage : 11 to 14 V

Is the inspection result normal?

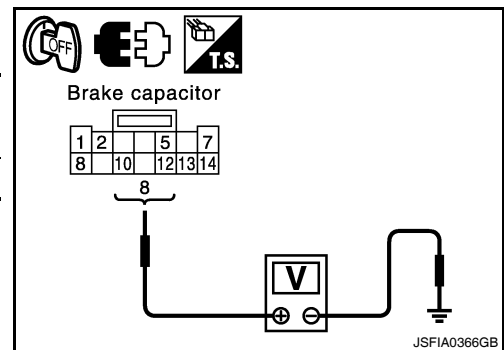
YES >> GO TO 9.

NO >> Charge or replace auxiliary battery.

9.INSPECT BRAKE CAPACITOR (+BC TERMINAL)

1. Disconnect the brake capacitor connector.
2. Measure the voltage according to the value(s) in the table below.

| Brake capacitor | | Condition | Specified condition |
|-----------------|------------|-----------|---------------------|
| Connector | Terminal | | |
| B131 | 8 – Ground | Always | 10 to 14 V |



Is the inspection result normal?

YES >> GO TO 10.

NO >> Repair or replace harness or connector (+BC circuit).

10.RECONFIRM DTC

1. Clear the DTC.
2. Turn the ignition switch ON.
3. Check if the same DTC is recorded.

< COMPONENT DIAGNOSIS >

| Result | |
|----------------------------|------------|
| Condition | Proceed to |
| DTC (C1377) is not output. | A |
| DTC (C1377) is output. | B |

- A >> Check for intermittent problems (symptom simulation).
B >> Replace brake capacitor.

Special Repair Requirement

INFOID:000000004212726

1. ZERO ADJUSTMENT FOR EACH SENSOR AND OFFSET LEARNING FOR LINEAR SOLENOID VALVE

After erasing brake ECU memories, perform zero adjustment of following sensors and initialization of linear solenoid valve.

- Steering angle sensor: [BRC-9, "PERFORM ZERO POINT OF STEERING ANGLE SENSOR : Description"](#).
- Yaw rate/side/decel G sensor: [BRC-8, "PERFORM ZERO POINT OF YAW RATE/SIDE/DECEL G SENSOR : Description"](#).
- Brake stroke sensor: [BRC-9, "PERFORM ADJUSTMENT OF STROKE SENSOR : Description"](#).
- Linear solenoid valve: [BRC-7, "PERFORM INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION : Description"](#).

>> END

C1378

Description

INFOID:000000004212727

The brake capacitor provides auxiliary power for brake control when an auxiliary battery (12 V) voltage drops. The FAIL and ENA lines are placed between the brake ECU and the brake capacitor. Signals indicating that the brake capacitor is in auxiliary mode are sent to the brake ECU through the FAIL line. Change permit prohibition signals are sent to the brake capacitor through the ENA line.

DTC Logic

INFOID:000000004212728

| DTC | INF code | Display item | DTC detection condition | Trouble area |
|-------|----------|----------------|---|--|
| C1378 | 112 | CAPACITOR COMM | When either of the following detected: 1. Open or short in FAIL line. 2. Malfunction inside the power back up unit. | <ul style="list-style-type: none"> • Brake capacitor • Brake capacitor circuit |
| | 113 | | When either of the following detected: 1. Open or short in ENA line. 2. Malfunction inside the Brake ECU. | <ul style="list-style-type: none"> • Brake ECU • Brake ECU circuit |

Diagnosis Procedure

INFOID:000000004212729

CAUTION:

When replacing the brake ECU, perform initialization of linear solenoid valve and calibration.

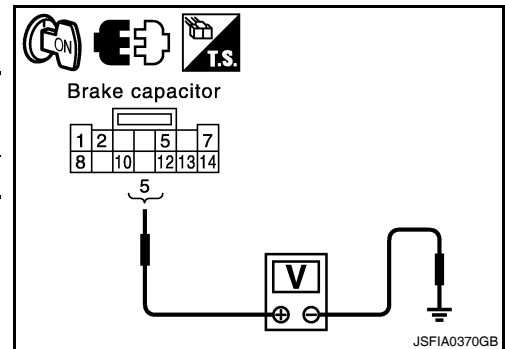
1. INSPECT BRAKE CAPACITOR (IG1 TERMINAL)

1. Disconnect the brake capacitor connector.
2. Turn the ignition switch ON.
3. Measure the voltage according to the value(s) in the table below.

| Brake capacitor | | Condition | Specified condition |
|-----------------|------------|--------------------|---------------------|
| Connector | Terminal | | |
| B131 | 5 – Ground | Ignition switch ON | 10 to 14 V |

Is the inspection result normal?

- YES >> GO TO 2.
NO >> Repair or replace harness or connector (IG1 circuit).



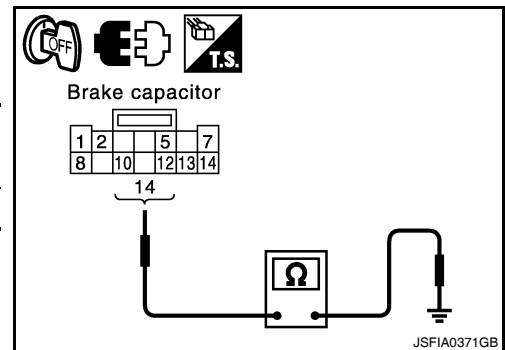
2. INSPECT BRAKE CAPACITOR (GND TERMINAL)

1. Turn the ignition switch OFF.
2. Measure the resistance according to the value(s) in the table below.

| Brake capacitor | | Condition | Specified condition |
|-----------------|-------------|-----------|---------------------|
| Connector | Terminal | | |
| B131 | 14 – Ground | Always | Below 1 Ω |

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Repair or replace harness or connector (GND circuit).



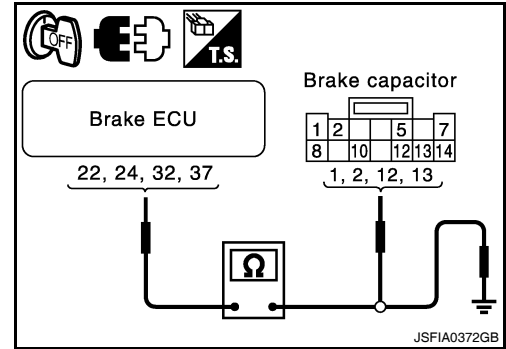
3. CHECK HARNESS AND CONNECTOR (BRAKE ECU – BRAKE CAPACITOR)

1. Disconnect the brake ECU connector.

A
B
C
D
E
BRC
G
H
I
J
K
L
M
N
O
P

< COMPONENT DIAGNOSIS >

2. Measure the resistance according to the value(s) in the table below.



| Brake ECU | | Brake capacitor | | — | Condition | Specified condition |
|-----------|----------|-----------------|----------|--------|-----------|---------------------|
| Connector | Terminal | Connector | Terminal | | | |
| E60 | 24 | B131 | 1 | — | Always | Below 1 Ω |
| E60 | 24 | — | — | Ground | Always | 10 kΩ or higher |
| E60 | 32 | B131 | 2 | — | Always | Below 1 Ω |
| E60 | 32 | — | — | Ground | Always | 10 kΩ or higher |
| E60 | 37 | B131 | 12 | — | Always | Below 1 Ω |
| E60 | 37 | — | — | Ground | Always | 10 kΩ or higher |
| E60 | 22 | B131 | 13 | — | Always | Below 1 Ω |
| E60 | 22 | — | — | Ground | Always | 10 kΩ or higher |

Is the inspection result normal?

- YES >> GO TO 4.
- NO >> Repair or replace harness or connector.

4.RECONFIRM DTC

1. Reconnect the brake ECU connector and the brake capacitor connector.
2. Clear the DTC.
3. Turn the ignition switch ON.
4. Check if the same DTC is recorded.

Result

| Condition | Proceed to |
|----------------------------|------------|
| DTC (C1378) is output. | A |
| DTC (C1378) is not output. | B |

- A >> GO TO 5.
- B >> Check for intermittent problems (symptom simulation).

5.CHECK FREEZE FRAME DATA

Check the INF code from the Freeze Frame Data memorized when the DTC (1378) is stored.

Result

| Condition | Proceed to |
|-------------------------------|------------|
| INF code (112) is not output. | A |
| INF code (112) is output. | B |

- A >> Replace brake ECU.
- B >> Replace brake capacitor.

Special Repair Requirement

INFOID:000000004212730

1. ZERO ADJUSTMENT FOR EACH SENSOR AND OFFSET LEARNING FOR LINEAR SOLENOID VALVE

After erasing brake ECU memories, perform zero adjustment of following sensors and initialization of linear solenoid valve.

- Steering angle sensor: [BRC-9, "PERFORM ZERO POINT OF STEERING ANGLE SENSOR : Description"](#).
- Yaw rate/side/decel G sensor: [BRC-8, "PERFORM ZERO POINT OF YAW RATE/SIDE/DECEL G SENSOR : Description"](#).
- Brake stroke sensor: [BRC-9, "PERFORM ADJUSTMENT OF STROKE SENSOR : Description"](#).
- Linear solenoid valve: [BRC-7, "PERFORM INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION : Description"](#).

>> END

A
B
C
D
E
G
H
I
J
K
L
M
N
O
P

BRC

C1391

Description

INFOID:000000004212731

The DTC is stored if a brake fluid, internal or other leak is detected due to improper sealing in the actuator. Internal leakage is suspected if the pump motor operates frequently without braking.

DTC Logic

INFOID:000000004212732

| DTC | INF code | Display item | DTC detection condition | Trouble area |
|-------|----------|--------------|---|--|
| C1391 | 591 | ACC LEAK | Accumulator performance is deteriorated (improper sealing inside the actuator, gas pressure drop inside the accumulator, leak in each pressure boosting valve). | <ul style="list-style-type: none"> Fluid leakage Brake actuator assembly |

Diagnosis Procedure

INFOID:000000004212733

CAUTION:

When replacing the brake ECU or brake actuator assembly, perform initialization of linear solenoid valve and calibration.

1. CHECK FOR BRAKE FLUID LEAKS

1. Check that there is no fluid leakage in the brake line between the brake actuator and the wheel cylinder which is the cause of DTCs.
2. Check that the brake is not dragging.

NOTE:

There is no fluid leakage or dragging.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace applicable part.

2. READ VALUE OF CONSULT-III (ACCUMULATOR PRESSURE SENSOR)

1. Connect the CONSULT-III.
2. Turn the ignition switch ON.
3. Select the "DATA MONITOR" on the CONSULT-III.

ABS/VDC:

| Tester display | Measurement item/ Range | Normal condition |
|----------------|--|----------------------|
| ACC PRESS SEN | Accumulator pressure sensor/ min: 0 V, max: 5 V | Around: 3.3 to 4.7 V |

4. Wait a few minutes without operating the brake pedal.
5. Check that the output value of the accumulator pressure sensor does not decrease and that the pump motor is not activated due to a decrease in accumulator pressure.

NOTE:

Accumulator pressure does not decrease and the pump motor is not activated due to a decrease in accumulator pressure.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Replace brake actuator assembly.

3. RECONFIRM DTC

1. Turn the ignition switch OFF.
2. Clear the DTC.
3. Turn the ignition switch ON.
4. Check if the same DTC is recorded.

< COMPONENT DIAGNOSIS >

| Result | | |
|----------------------------|------------|---|
| Condition | Proceed to | |
| DTC (C1391) is not output. | A | A |
| DTC (C1391) is output. | B | B |

- A >> Check for intermittent problems (symptom simulation).
- B >> Replace brake ECU.

Special Repair Requirement

INFOID:000000004212734

1. ZERO ADJUSTMENT FOR EACH SENSOR AND OFFSET LEANING FOR LINEAR SOLENOID VALVE

After erasing brake ECU memories, perform zero adjustment of following sensors and initialization of linear solenoid valve.

- Steering angle sensor: [BRC-9, "PERFORM ZERO POINT OF STEERING ANGLE SENSOR : Description"](#).
- Yaw rate/side/decel G sensor: [BRC-8, "PERFORM ZERO POINT OF YAW RATE/SIDE/DECEL G SENSOR : Description"](#).
- Brake stroke sensor: [BRC-9, "PERFORM ADJUSTMENT OF STROKE SENSOR : Description"](#).
- Linear solenoid valve: [BRC-7, "PERFORM INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION : Description"](#).

>> END

A
B
C
D
E
BRC
G
H
I
J
K
L
M
N
O
P

U0073, U0123, U0124, U0126, U0293

Description

INFOID:000000004212735

The brake ECU receives the signals from the HV ECU, steering angle sensor, and yaw rate/side/decel G sensor via the CAN communication system.

DTC Logic

INFOID:000000004212736

| DTC | INF code | Display item | DTC detection condition | Trouble area |
|-------|----------|--------------------|---|--|
| U0073 | 360 | LOST COMM YAW/STRG | When either of the following detected: 1. After the output of data from the brake ECU is completed, the sending continues for 5 seconds or more. 2. The condition that bus OFF state occurs once or more within 100 ms occurs 10 times in succession. (Sent signals cannot be received.) | <ul style="list-style-type: none"> CAN communication system |
| U0123 | 338 | LOST COMM(YAW) | When either of the following detected: 1. With the IG1 terminal voltage 9.5 V or more, data from the yaw rate sensor cannot be received for 1 second or more. 2. With the IG1 terminal voltage 9.5 V or more, the following occurs 10 times in succession. • The condition that data from the yaw rate sensor cannot be received occurs once or more within 5 seconds. | <ul style="list-style-type: none"> CAN communication system (Brake ECU to yaw rate/side/decel G sensor) |
| U0124 | 319 | LOST COMM(LATERAL) | When either of the following detected: 1. With the IG1 terminal voltage 9.5 V or more, data from the deceleration sensor cannot be received for 1 second or more. 2. With the IG1 terminal voltage 9.5 V or more, the following occurs 10 times in succession. • The condition that data from the deceleration sensor cannot be received occurs once or more within 5 seconds. | <ul style="list-style-type: none"> CAN communication system (Brake ECU to yaw rate/side/decel G sensor) |
| U0126 | 350 | LOST COMM(STRG) | When either of the following detected: 1. With the IG1 terminal voltage 9.5 V or more, data from the steering angle sensor cannot be received for 1 second or more. 2. With the IG1 terminal voltage 9.5 V or more, the following occurs 10 times in succession. • The condition that data from the steering angle sensor cannot be received occurs once or more within 5 seconds. | <ul style="list-style-type: none"> CAN communication system (Brake ECU to steering angle sensor) |

| DTC | INF code | Display item | DTC detection condition | Trouble area |
|-------|----------|-------------------|--|--|
| U0293 | 152 | LOST COMM(HV ECU) | With the IG1 terminal voltage 9.5 V or more for 2 seconds or more, communication with the HV ECU remains invalid for 2 seconds or more. | <ul style="list-style-type: none"> CAN communication system (Brake ECU to HV ECU) |
| | 153 | | With the IG1 terminal voltage 9.5 V or more for 2 seconds or more, communication with the HV ECU that occurs once or more within 5 seconds charges from being valid communication to being invalid communication 10 times or more within 1 minute. | |
| | 154 | | with the IG1 terminal voltage 9.5 V or more for 2 seconds or more, abnormal regenerative braking torque value or braking request torque value or abnormal shift position value is received for 2 seconds or more. | |
| | 155 | | With the IG1 terminal voltage 9.5 V or more for 2 seconds or more, communication error message from HV ECU is received for 5 seconds or more. | |

A
B
C
D
E
BRC

Diagnosis Procedure

INFOID:000000004212737

1.CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)

Using the "DATA MONITOR" of CONSULT-III, check for any momentary interruption in the wire harness and connector corresponding to a DTC.

| Tester display | Measurement item/ Range | Normal condition |
|----------------|--|---|
| HV COMM OPN | HV communication open detection/ ERROR or NORMAL | ERROR: Momentary interruption NORMAL: Normal |
| STRG SEN OPN | Steering sensor open detection/ ERROR or NORMAL | ERROR: Momentary interruption NORMAL: Normal |
| YAW SEN OPN | Yaw rate sensor open detection/ ERROR or NORMAL | ERROR: Momentary interruption NORMAL: Normal |

Result

| Condition | Proceed to |
|--------------------------------------|------------|
| There is a constant open circuit. | A |
| There are no momentary interruption. | B |
| There are momentary interruption. | C |

G
H
I
J
K
L
M
N
O
P

- A >> GO TO 2.
- B >> GO TO 3.
- C >> GO TO 4.

2.CHECK IF EACH SENSOR AND ECU CONNECTOR IS SUCURELY CONNECTED

1. Turn the ignition switch OFF.
2. Check if each sensor and ECU connector is securely connected.

NOTE:

The connector should be securely connected.

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Connect connector to each sensor or ECU correctly.

3. RECONFIRM DTC

1. Turn the ignition switch OFF.
2. Record the output DTCs (for ABS, VDC, Electronically Controlled Brake, and CAN communication).

NOTE:

If the CAN communication system DTC and the relevant sensor DTCs are output simultaneously, troubleshoot the relevant sensor DTCs (for ABS, VDC and Electronically Controlled Brake) after the CAN communication system returns to normal.

Result

| Condition | Proceed to |
|--|------------|
| DTC (CAN communication system DTC) is output. | A |
| DTC (ABS, VDC and/or Electronically Controlled Brake DTC) is output. | B |
| DTC is not output. | C |

- A >> Inspect CAN communication system.
- B >> Repair circuit indicated by output DTC.
- C >> Check for intermittent problems (symptom simulation).

4. REPAIR OR REPLACE HARNESS OR CONNECTOR

1. Turn the ignition switch OFF.
2. Repair or replace the harness or connector.
3. Check for any momentary interruption between the brake ECU and each sensor or ECU.
4. Check that there is no momentary interruption.

>> GO TO 5.

5. RECONFIRM DTC

1. Turn the ignition switch OFF.
2. Clear the DTC.
3. Turn the ignition switch ON (READY).
4. Drive the vehicle and turn the steering wheel to the right and left at a speed of 15 km/h (9 MPH) or more.
5. Check that no CAN communication system DTC is output.
6. If ABS, VDC and Electronically Controlled Brake DTCs are output, record them.

Result

| Condition | Proceed to |
|--|------------|
| DTC output for the CAN communication system. | A |
| No DTC is output (ABS, VDC and/or Electronically Controlled Brake DTC is output). | B |
| No DTC is output (No ABS, VDC and/or Electronically Controlled Brake DTC is output). | C |

NOTE:

The CAN communication system must be normal when repairing each sensor DTC (for ABS, VDC and Electronically Controlled Brake).

- A >> Inspect CAN communication system.
- B >> Repair circuit indicated by output DTC.
- C >> INSPECTION END

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS >

[VDC/TCS/ABS]

ECU DIAGNOSIS

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Reference Value

INFOID:000000004212738

VALUES ON THE DIAGNOSIS TOOL

CAUTION:

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

| Monitor item | Condition | | Value/Status |
|---------------|---|-----------------|--|
| MTR RLY 1 | ABS motor relay No.1: ON | | ON |
| | ABS motor relay No.1: OFF | | OFF |
| STP LMP SW | Brake pedal is depressed | | ON |
| | Brake pedal is released | | OFF |
| PKB SW | Parking brake is applied | | ON |
| | Parking brake is released | | OFF |
| SHIFT LVR POS | Select lever position | 1st | 1 |
| | | 2nd | 2 |
| | | 3rd | 3 |
| | | 4th | 4 |
| | | 5th | 5 |
| | | 6th/B | 6 |
| | | D/M | D |
| | | P/N R | P/N R |
| VWFR | Wheel speed | Vehicle stopped | 0 km/h (0 MPH) |
| | | Vehicle running | Nearly matches the speed meter display ($\pm 10\%$ or less) |
| VWFL | Wheel speed | Vehicle stopped | 0 km/h (0 MPH) |
| | | Vehicle running | Nearly matches the speed meter display ($\pm 10\%$ or less) |
| VWRR | Wheel speed | Vehicle stopped | 0 km/h (0 MPH) |
| | | Vehicle running | Nearly matches the speed meter display ($\pm 10\%$ or less) |
| VWRL | Wheel speed | Vehicle stopped | 0 km/h (0 MPH) |
| | | Vehicle running | Nearly matches the speed meter display ($\pm 10\%$ or less) |
| G SEN 1 | Vehicle stopped | | 0 G |
| | Approximately 0 ± 0.13 G while stationary | | - 1.889 – 1.875 G ^{Note 1} |
| G SEN 2 | Vehicle stopped | | 0 G |
| | Approximately 0 ± 0.13 G while stationary | | - 1.889 – 1.875 G ^{Note 1} |
| VHCL SPD | Vehicle speed | Vehicle stopped | 0 km/h (0 MPH) |
| | | Vehicle running | Nearly matches the speed meter display ($\pm 10\%$ or less) |
| YAW SEN 1 | Vehicle stopped | | 0 deg/s |
| | Vehicle turning | | - 128 – 127 deg/s |
| YAW SEN 2 | Vehicle stopped | | 0 deg/s |
| | Vehicle turning | | - 128 – 127 deg/s |

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS >

[VDC/TCS/ABS]

| Monitor item | Condition | Value/Status |
|---------------|------------------------------------|------------------------------------|
| STRG ANG SEN | Straight-ahead | 0 deg |
| | Steering wheel turned (Left turn) | Increase |
| | Steering wheel turned (Right turn) | Decrease |
| MC SEN COMP 1 | Normal condition (reference value) | 0 – 5 V |
| | Brake pedal is released | 0.3 – 0.9 V |
| ACCEL RATE | Accelerator pedal is released | 0 % |
| | Accelerator pedal is depressed | 0 – 128 % |
| FR WH SEN OPN | Momentary interruption | ERROR |
| | Normal | NORMAL |
| FL WH SEN OPN | Momentary interruption | ERROR |
| | Normal | NORMAL |
| RR WH SEN OPN | Momentary interruption | ERROR |
| | Normal | NORMAL |
| RL WH SEN OPN | Momentary interruption | ERROR |
| | Normal | NORMAL |
| YAW SEN OPN | Momentary interruption | ERROR |
| | Normal | NORMAL |
| G SEN OPN | Momentary interruption | ERROR |
| | Normal | NORMAL |
| STRG SEN OPN | Momentary interruption | ERROR |
| | Normal | NORMAL |
| MC SEN OPN | Momentary interruption | ERROR |
| | Normal | NORMAL |
| HV COMM OPN | Momentary interruption | ERROR |
| | Normal | NORMAL |
| DIAG CODE | Number of DTC | 0 – 255 |
| ABS WARN LMP | ABS warning lamp: ON | ON |
| | ABS warning lamp: OFF | OFF |
| BRK WARN LMP | Brake warning lamp: ON | ON |
| | Brake warning lamp: OFF | OFF |
| SLIP IND LMP | SLIP indicator lamp: ON | ON |
| | SLIP indicator lamp: OFF | OFF |
| BUZZER | Brake warning buzzer: ON | ON |
| | Brake warning buzzer: OFF | OFF |
| VDC WARN LMP | VDC warning lamp: ON | ON |
| | VDC warning lamp: OFF | OFF |
| DVWFR | Front RH wheel acceleration | – 200.84 – 199.27 m/s ² |
| DVWFL | Front LH wheel acceleration | – 200.84 – 199.27 m/s ² |
| DVWRR | Rear RH wheel acceleration | – 200.84 – 199.27 m/s ² |
| DVWRL | Rear LH wheel acceleration | – 200.84 – 199.27 m/s ² |
| SIDE G SEN | Side G sensor status | – 25.11 – 24.91 m/s ² |
| DECEL G SEN | Decel G sensor status | – 25.11 – 24.91 m/s ² |
| YAW RATE VAL | Yaw rate sensor value | – 128 – 127 deg/s |

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS >

[VDC/TCS/ABS]

| Monitor item | Condition | Value/Status | |
|---------------|---|-------------------------|-------------|
| STRG ANG SEN | Steering angle sensor value | - 3,276.8 – 3,276.7 deg | |
| MC SEN COMP 2 | Normal condition (reference value) | 0 – 5 V | |
| | Brake pedal is released | 0.3 – 0.9 V | |
| STRK SEN 1 | Normal condition (reference value) | 0 – 5 V | |
| | Brake pedal is released | 0.7 – 1.3 V | |
| STRK SEN 2 | Normal condition (reference value) | 0 – 5 V | |
| | Brake pedal is released | 3.7 – 4.3 V | |
| ACC PRESS SEN | Accumulator pressure sensor status | Reference value | 0 – 5 V |
| | | Specified value | 3.3 – 4.7 V |
| FR WC PRESS | Normal condition (reference value) | 0 – 5 V | |
| | Brake pedal is released | 0.3 – 0.9 V | |
| FL WC PRESS | Normal condition (reference value) | 0 – 5 V | |
| | Brake pedal is released | 0.3 – 0.9 V | |
| RR WC PRESS | Normal condition (reference value) | 0 – 5 V | |
| | Brake pedal is released | 0.3 – 0.9 V | |
| RL WC PRESS | Normal condition (reference value) | 0 – 5 V | |
| | Brake pedal is released | 0.3 – 0.9 V | |
| RESERVR LV | Brake fluid level switch: ON | ON | |
| | Brake fluid level switch: OFF | OFF | |
| ELE BRK LMP | Electronically Controlled Brake warning lamp: ON | ON | |
| | Electronically Controlled Brake warning lamp: OFF | OFF | |
| MTR RLY 2 | ABS motor relay No.2: ON | ON | |
| | ABS motor relay No.2: OFF | OFF | |
| MAIN RLY 1 | ABS main relay No.1: ON | ON | |
| | ABS main relay No.1: OFF | OFF | |
| MAIN RLY 2 | ABS main relay No.2: ON | ON | |
| | ABS main relay No.2: OFF | OFF | |
| SLAFR | Normal condition (reference value) | 0 – 3 A | |
| | Brake pedal is released | 0 A | |
| SLAFL | Normal condition (reference value) | 0 – 3 A | |
| | Brake pedal is released | 0 A | |
| SLARR | Normal condition (reference value) | 0 – 3 A | |
| | Brake pedal is released | 0 A | |
| SLARL | Normal condition (reference value) | 0 – 3 A | |
| | Brake pedal is released | 0 A | |
| SLRFR | Normal condition (reference value) | 0 – 3 A | |
| | Brake pedal is released | 0 A | |
| SLRFL | Normal condition (reference value) | 0 – 3 A | |
| | Brake pedal is released | 0 A | |
| SLRRR | Normal condition (reference value) | 0 – 3 A | |
| | Brake pedal is released | 0 A | |
| SLRRL | Normal condition (reference value) | 0 – 3 A | |
| | Brake pedal is released | 0 A | |

A

B

C

D

E

BRC

G

H

I

J

K

L

M

N

O

P

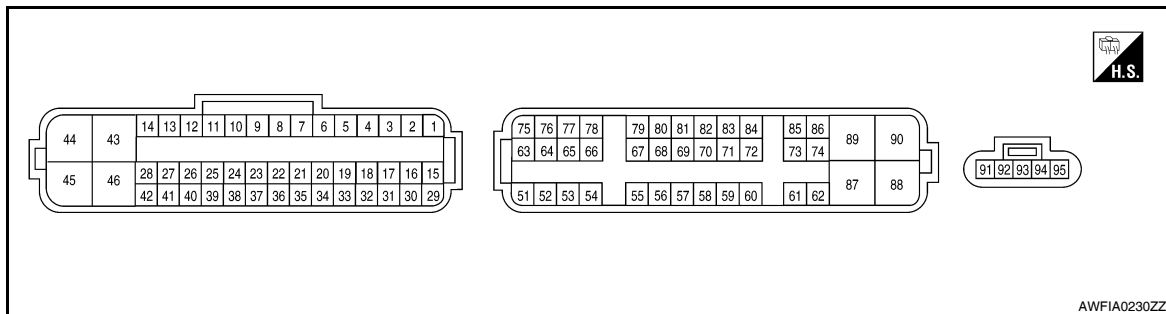
ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS >

[VDC/TCS/ABS]

| Monitor item | Condition | Value/Status | |
|---------------|---|----------------|-----|
| MC SEN2 OPN | Momentary interruption | ERROR | |
| | Normal | NORMAL | |
| STRK SEN OPN | Momentary interruption | ERROR | |
| | Normal | NORMAL | |
| FR WC SEN OPN | Momentary interruption | ERROR | |
| | Normal | NORMAL | |
| FL WC SEN OPN | Momentary interruption | ERROR | |
| | Normal | NORMAL | |
| RR WC SEN OPN | Momentary interruption | ERROR | |
| | Normal | NORMAL | |
| RL WC SEN OPN | Momentary interruption | ERROR | |
| | Normal | NORMAL | |
| ACC SEN OPN | Momentary interruption | ERROR | |
| | Normal | NORMAL | |
| SMC 1 | Master cut solenoid status | Operate | ON |
| | | Not operate | OFF |
| SMC 2 | Master cut solenoid status | Operate | ON |
| | | Not operate | OFF |
| SCSS | Stroke simulator solenoid status | Operate | ON |
| | | Not operate | OFF |
| FR TRQ NEED | FR regenerative request torque | 0 – 65,536 N·m | |
| FR TRQ ACT | FR regenerative request torque | 0 – 65,536 N·m | |
| RR TRQ NEED | RR regenerative request torque | 0 – 65,536 N·m | |
| RR TRQ ACT | RR regenerative request torque | 0 – 65,536 N·m | |
| REGEN ALLIN | Regenerative operation | Operate | ON |
| | | Not operate | OFF |
| STRG SEN ZERO | Steering angle sensor zero point status | Valid | ON |
| | | Invalid | OFF |
| DOOR SW | Door switch operation | Operate | ON |
| | | Not operate | OFF |

TERMINAL LAYOUT



PHYSICAL VALUES

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS >

[VDC/TCS/ABS]

| Terminal (Wire color) | | Description | | Condition | Reference value (Approx.) |
|--------------------------|--------|---------------------------------|--------------|--------------------------|------------------------------|
| + | - | Signal name | Input/Output | | |
| 46 (B) | Ground | GND | — | Always | Existed |
| 29 (G/R) | Ground | IG1 | Input | Ignition switch ON | 10 – 16 V |
| 16 (W/R) | Ground | Battery power supply | Input | Always | 10 – 16 V |
| 8 (L/R) | Ground | Battery power supply | Input | Always | 10 – 16 V |
| 2 (R/G) | Ground | Stop lamp switch signal | Input | Brake pedal is released | 3 V or less |
| | | | | Brake pedal is depressed | 8 – 14 V |
| 90 (B/Y) | Ground | GND | — | Always | Existed |
| 78 (V) | Ground | Brake fluid level switch signal | Input | | 2 ±0.16 kΩ |
| 75 (O) | Ground | IG2 | Input | Ignition switch ON | 10 – 16 V |
| 69 (LG) | Ground | Parking brake switch signal | Input | Parking brake switch ON | Existed |
| | | | | Parking brake switch OFF | Not existed |
| 58 (W/L) | Ground | Battery power supply | Input | Always | 10 – 16 V |

A
B
C
D
E
G
H
I
J
K
L
M
N
O
P

BRC

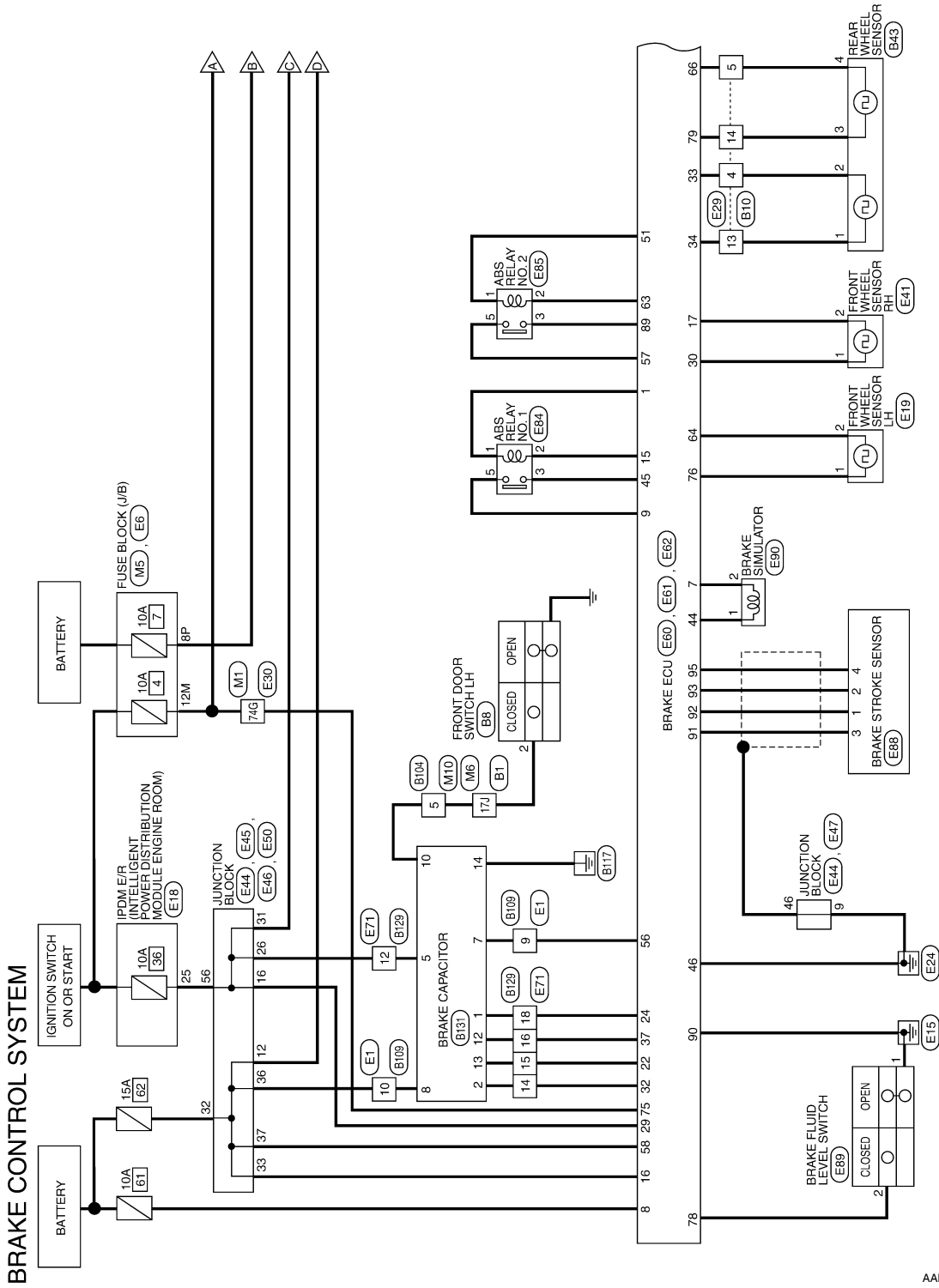
ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS >

[VDC/TCS/ABS]

Wiring Diagram - BRAKE CONTROL SYSTEM -

INFOID:000000004212739

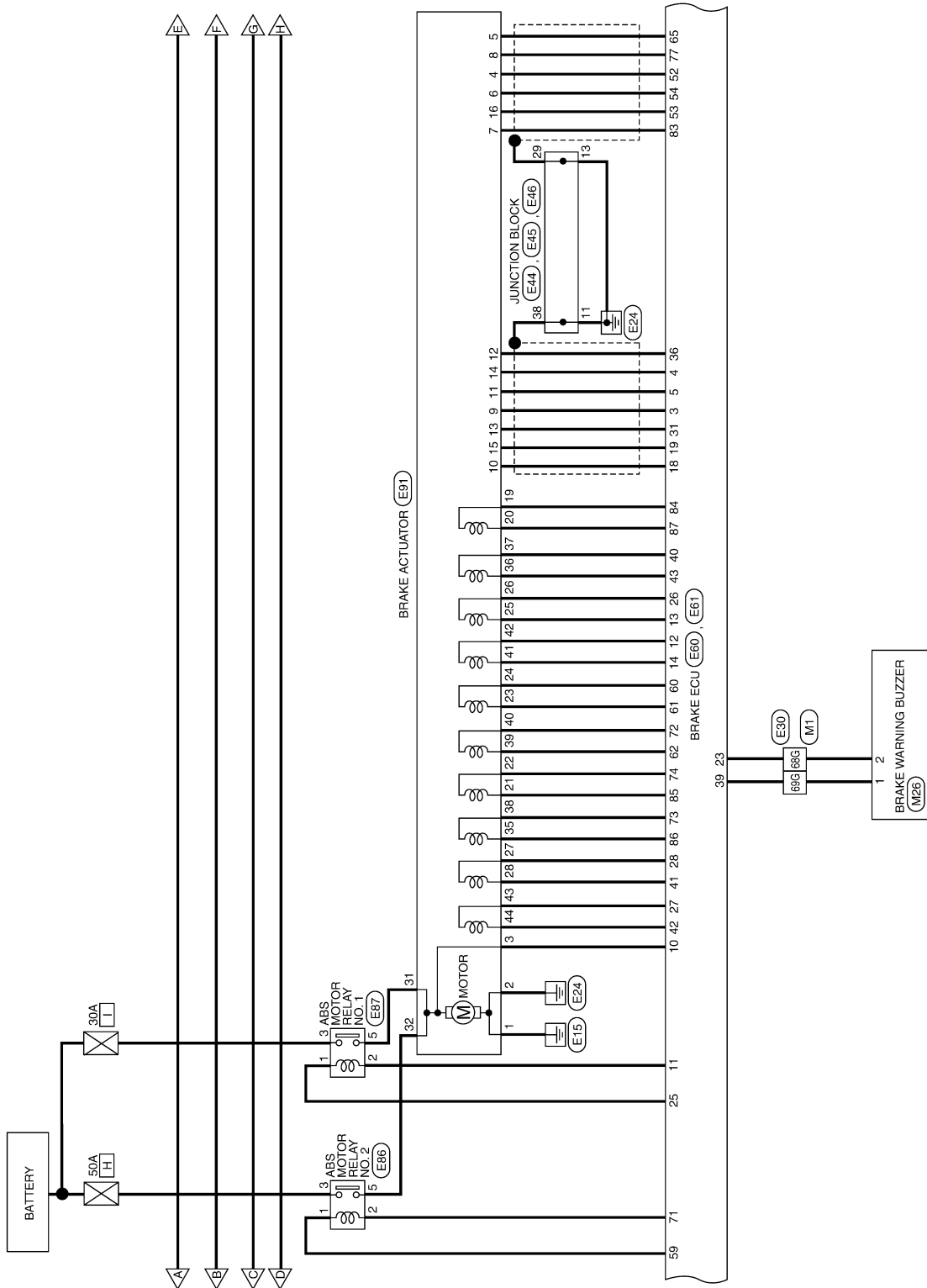


AAFWA0010GE

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS >

[VDC/TCS/ABS]



ALFWA0006GE

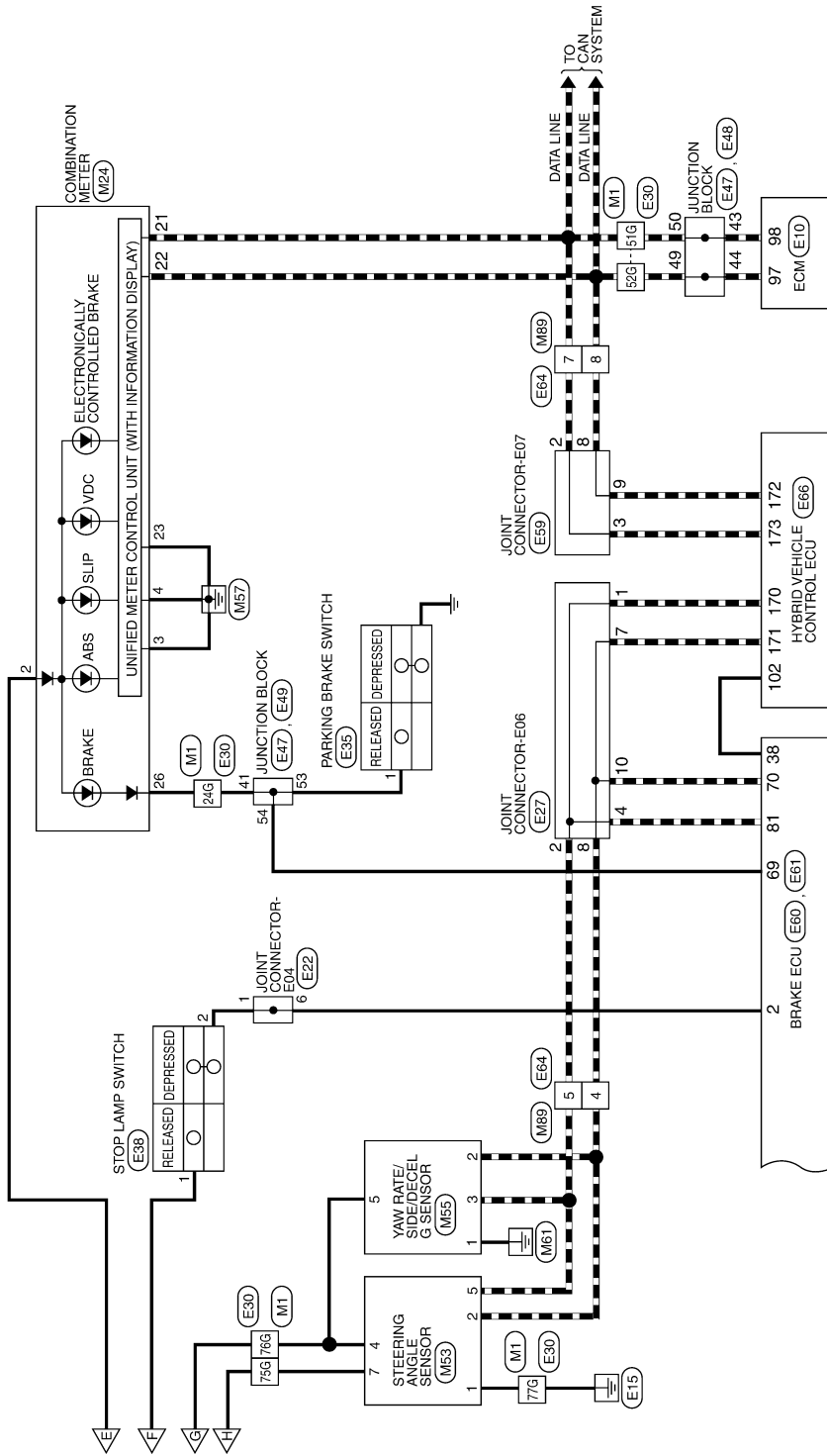
A
B
C
D
E
BRC
G
H
I
J
K
L
M
N
O
P

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS >

[VDC/TCS/ABS]

--- : DATA LINE



AAFWA0011GE

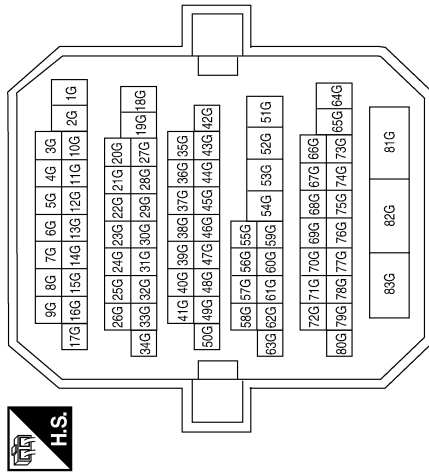
ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS >

[VDC/TCS/ABS]

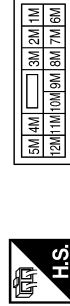
BRAKE CONTROL SYSTEM CONNECTORS

| | |
|-----------------|--------------|
| Connector No. | M1 |
| Connector Name | WIRE TO WIRE |
| Connector Color | WHITE |



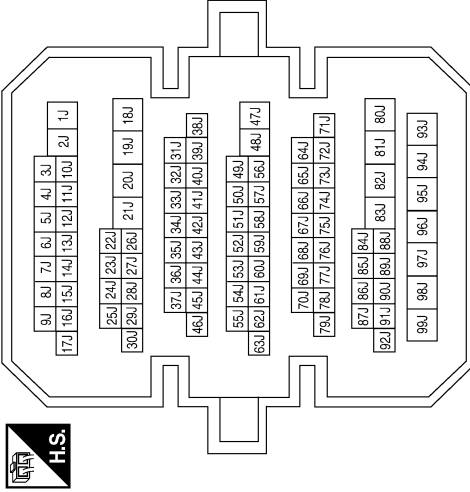
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 24G | G/R | - |
| 51G | L | - |
| 52G | P | - |
| 68G | P | - |
| 69G | G/B | - |
| 74G | O | - |
| 75G | W/R | - |
| 76G | G/R | - |
| 77G | B/Y | - |

| | |
|-----------------|------------------|
| Connector No. | M5 |
| Connector Name | FUSE BLOCK (J/B) |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 12M | O | - |

| | |
|-----------------|--------------|
| Connector No. | M6 |
| Connector Name | WIRE TO WIRE |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 17J | SB | - |

ABFIA0118GB

A
B
C
D
E
G
H
I
J
K
L
M
N
O
P

BRC

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS >

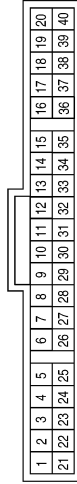
[VDC/TCS/ABS]

| | |
|-----------------|----------------------|
| Connector No. | M26 |
| Connector Name | BRAKE WARNING BUZZER |
| Connector Color | BROWN |



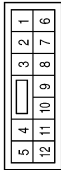
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | G/B | B2 |
| 2 | P | B2O |

| | |
|-----------------|-------------------|
| Connector No. | M24 |
| Connector Name | COMBINATION METER |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 2 | O | IGN |
| 3 | B | GND |
| 4 | B | GND |
| 21 | L | CAN-H |
| 22 | P | CAN-L |
| 23 | B | GND |
| 26 | G/R | PKB |

| | |
|-----------------|--------------|
| Connector No. | M10 |
| Connector Name | WIRE TO WIRE |
| Connector Color | BROWN |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 5 | SB | - |

| | |
|-----------------|--------------|
| Connector No. | M89 |
| Connector Name | WIRE TO WIRE |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 4 | BR | - |
| 5 | Y | - |
| 7 | L | - |
| 8 | P | - |

| | |
|-----------------|------------------------------|
| Connector No. | M55 |
| Connector Name | YAW RATE/SIDE/DECEL G SENSOR |
| Connector Color | BLACK |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | B | GND |
| 2 | BR | CAN-L |
| 3 | Y | CAN-H |
| 4 | - | - |
| 5 | GR | IG |

| | |
|-----------------|-----------------------|
| Connector No. | M53 |
| Connector Name | STEERING ANGLE SENSOR |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | B/Y | GND |
| 2 | BR | CAN-L |
| 4 | G/R | IG |
| 5 | Y | CAN-H |
| 7 | W/R | +B |

ABFIA0119GB

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS >

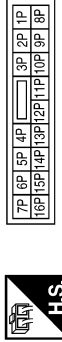
[VDC/TCS/ABS]

| | |
|-----------------|--------------|
| Connector No. | E1 |
| Connector Name | WIRE TO WIRE |
| Connector Color | WHITE |



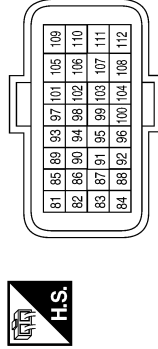
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 9 | LG/B | - |
| 10 | W/R | - |

| | |
|-----------------|------------------|
| Connector No. | E6 |
| Connector Name | FUSE BLOCK (J/B) |
| Connector Color | WHITE |



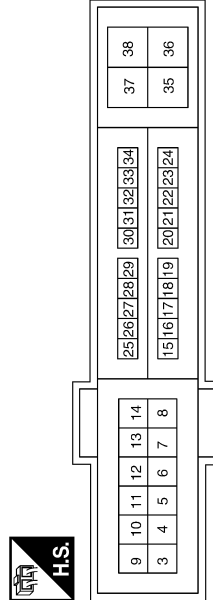
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 8P | Y/R | - |

| | |
|-----------------|-------|
| Connector No. | E10 |
| Connector Name | ECM |
| Connector Color | BLACK |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 97 | P | CAN-L |
| 98 | L | CAN-H |

| | |
|-----------------|--|
| Connector No. | E18 |
| Connector Name | IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 25 | GR | ABS_ECU |

| | |
|-----------------|-----------------------|
| Connector No. | E19 |
| Connector Name | FRONT WHEEL SENSOR LH |
| Connector Color | GRAY |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | G | - |
| 2 | R | - |

| | |
|-----------------|---------------------|
| Connector No. | E22 |
| Connector Name | JOINT CONNECTOR-E04 |
| Connector Color | BLACK |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | R/G | - |
| 6 | R/G | - |

A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P

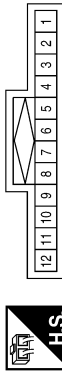
BRC

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS >

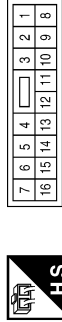
[VDC/TCS/ABS]

| | |
|-----------------|---------------------|
| Connector No. | E27 |
| Connector Name | JOINT CONNECTOR-E06 |
| Connector Color | BLUE |



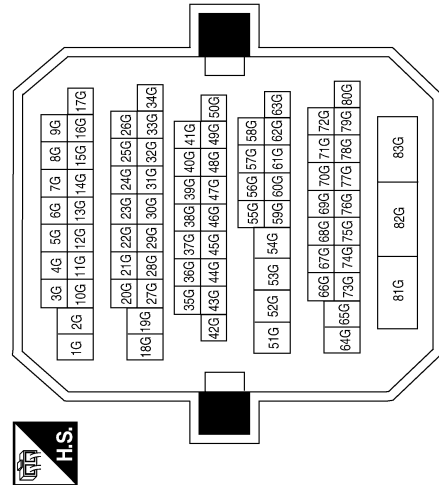
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | Y | - |
| 2 | Y | - |
| 4 | Y | - |
| 7 | BR | - |
| 8 | BR | - |
| 10 | BR | - |

| | |
|-----------------|--------------|
| Connector No. | E29 |
| Connector Name | WIRE TO WIRE |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 4 | R/W | - |
| 5 | B/R | - |
| 13 | L/Y | - |
| 14 | W/R | - |

| | |
|-----------------|--------------|
| Connector No. | E30 |
| Connector Name | WIRE TO WIRE |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 24G | G/R | - |
| 51G | L | - |
| 52G | P | - |
| 68G | P | - |
| 69G | G/B | - |
| 74G | O | - |
| 75G | W/R | - |
| 76G | G/R | - |
| 77G | B/Y | - |

| | |
|-----------------|----------------------|
| Connector No. | E35 |
| Connector Name | PARKING BRAKE SWITCH |
| Connector Color | BLACK |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | G/R | - |

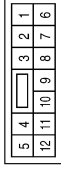
ABFIA0121GB

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS >

[VDC/TCS/ABS]

| | |
|-----------------|----------------|
| Connector No. | E44 |
| Connector Name | JUNCTION BLOCK |
| Connector Color | BROWN |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 9 | GR | - |
| 11 | GR | - |
| 12 | W/R | - |

| | |
|-----------------|-----------------------|
| Connector No. | E41 |
| Connector Name | FRONT WHEEL SENSOR RH |
| Connector Color | GRAY |



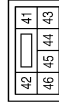
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | B | - |
| 2 | W | - |

| | |
|-----------------|------------------|
| Connector No. | E38 |
| Connector Name | STOP LAMP SWITCH |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | Y/R | - |
| 2 | R/G | - |

| | |
|-----------------|----------------|
| Connector No. | E47 |
| Connector Name | JUNCTION BLOCK |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 41 | G/R | - |
| 43 | L | - |
| 44 | P | - |
| 46 | GR | - |

| | |
|-----------------|----------------|
| Connector No. | E46 |
| Connector Name | JUNCTION BLOCK |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 26 | G/R | - |
| 29 | GR | - |
| 31 | G/R | - |
| 32 | W/R | - |
| 33 | W/R | - |
| 36 | W/R | - |
| 37 | W/L | - |
| 38 | GR | - |

| | |
|-----------------|----------------|
| Connector No. | E45 |
| Connector Name | JUNCTION BLOCK |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 13 | G/R | - |
| 16 | G/R | - |

ABFIA0122GB

A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P

BRC

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS >

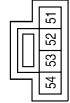
[VDC/TCS/ABS]

| | |
|-----------------|----------------|
| Connector No. | E50 |
| Connector Name | JUNCTION BLOCK |
| Connector Color | WHITE |



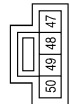
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 56 | G/R | - |

| | |
|-----------------|----------------|
| Connector No. | E49 |
| Connector Name | JUNCTION BLOCK |
| Connector Color | BROWN |



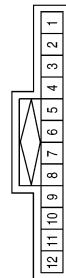
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 53 | G/R | - |
| 54 | G/R | - |

| | |
|-----------------|----------------|
| Connector No. | E48 |
| Connector Name | JUNCTION BLOCK |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 49 | P | - |
| 50 | L | - |

| | |
|-----------------|---------------------|
| Connector No. | E59 |
| Connector Name | JOINT CONNECTOR-E07 |
| Connector Color | BLUE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 2 | L | - |
| 3 | L | - |
| 8 | P | - |
| 9 | P | - |

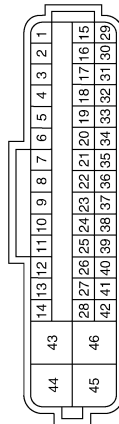
ABFIA0123GB

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS >

[VDC/TCS/ABS]

| | |
|-----------------|-----------|
| Connector No. | E60 |
| Connector Name | BRAKE ECU |
| Connector Color | BLACK |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | G/O | R3+ |
| 2 | R/G | STP |
| 3 | Y | PFR |
| 4 | B | E |
| 5 | BR | PRL |
| 6 | - | - |
| 7 | W/L | SS |
| 8 | L/R | DI1 |
| 9 | GR/L | DO1 |
| 10 | W/R | MTT |
| 11 | Y/R | MR1 |
| 12 | B/P | RLA- |
| 13 | R/Y | RLR+ |
| 14 | O | RLA+ |
| 15 | B/O | R1+ |
| 16 | W/R | B+ |
| 17 | W | FR- |
| 18 | W | VCM1 |
| 19 | R | PAC1 |

| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 20 | - | - |
| 21 | - | - |
| 22 | P/L | CIN |
| 23 | P | BZO (POWER) |
| 24 | GR/B | CBI1 |
| 25 | L/W | R1- |
| 26 | B/Y | RLR- |
| 27 | L/R | FRA- |
| 28 | R/Y | FRR- |
| 29 | G/R | IG1 |
| 30 | B | FR+ |
| 31 | G | PMC1 |
| 32 | W/G | B+CTY |
| 33 | R/W | RL- |
| 34 | L/Y | RL+ |
| 35 | - | - |
| 36 | L | PCK1 |
| 37 | BR/R | COU1 |
| 38 | L/O | SPI |
| 39 | G/B | BZ (SIGNAL) |
| 40 | R/B | SMC1 |
| 41 | W/B | FRR+ |
| 42 | B/W | FRA+ |
| 43 | V/W | BSO1 |
| 44 | BR/Y | BSO3 |
| 45 | R/L | BS1 |
| 46 | B | GND |

A
B
C
D
E
BRC
G
H
I
J
K
L
M
N
O
P

ABFIA0124GB

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS >

[VDC/TCS/ABS]

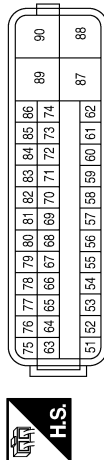
| | |
|-----------------|-----------|
| Connector No. | E62 |
| Connector Name | BRAKE ECU |
| Connector Color | BLACK |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 91 | G | VCSK |
| 92 | B | SKG |
| 93 | R | SKS |
| 94 | - | - |
| 95 | W | SKS2 |

| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 67 | - | - |
| 68 | - | - |
| 69 | LG | PKB |
| 70 | BR | CAN-L |
| 71 | G/W | MR2 |
| 72 | L/B | RRA- |
| 73 | L/Y | FLA- |
| 74 | GR/R | FLR- |
| 75 | O | IG2 |
| 76 | G | FL+ |
| 77 | R | PMC2 |
| 78 | V | LBL |
| 79 | W/R | RR+ |
| 80 | - | - |
| 81 | Y | CAN+H |
| 82 | - | - |
| 83 | L | PCK2 |
| 84 | G/B | SMC2 |
| 85 | GR | FLR+ |
| 86 | R/W | FLA+ |
| 87 | Y/B | BS02 |
| 88 | - | - |
| 89 | SB | BS2 |
| 90 | B/Y | GND |

| | |
|-----------------|-----------|
| Connector No. | E61 |
| Connector Name | BRAKE ECU |
| Connector Color | BLACK |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 51 | R/L | R4+ |
| 52 | G | PFL |
| 53 | B | E2 |
| 54 | Y | PRR |
| 55 | - | - |
| 56 | LG/B | CB12 |
| 57 | L/O | DO2 |
| 58 | W/L | D12 |
| 59 | P/B | R2- |
| 60 | BR | RRR- |
| 61 | BR/W | RRR+ |
| 62 | L/W | RRA+ |
| 63 | LG/R | R2+ |
| 64 | R | FL- |
| 65 | W | VMC2 |
| 66 | B/R | RR- |

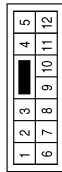
ABFIA0125GB

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS >

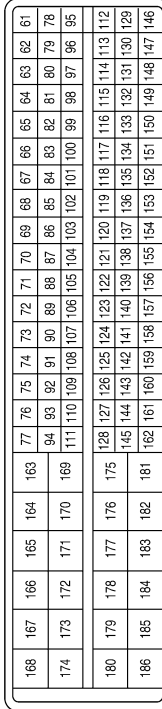
[VDC/TCS/ABS]

| | |
|-----------------|--------------|
| Connector No. | E64 |
| Connector Name | WIRE TO WIRE |
| Connector Color | WHITE |



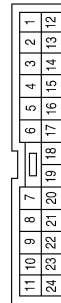
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 4 | BR | - |
| 5 | Y | - |
| 7 | L | - |
| 8 | P | - |

| | |
|-----------------|----------------------------|
| Connector No. | E66 |
| Connector Name | HYBRID VEHICLE CONTROL ECU |
| Connector Color | BLACK |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 102 | L/O | SPD1 |
| 170 | BR | CAN-L |
| 171 | Y | CAN-H |
| 172 | P | CAN-L |
| 173 | L | CAN-H |

| | |
|-----------------|--------------|
| Connector No. | E71 |
| Connector Name | WIRE TO WIRE |
| Connector Color | GRAY |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 12 | G/R | - |
| 14 | W/G | - |
| 15 | P/L | - |
| 16 | BR/R | - |
| 18 | GR/B | - |

| | |
|-----------------|-----------------|
| Connector No. | E84 |
| Connector Name | ABS RELAY NO. 1 |
| Connector Color | BLUE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | G/O | - |
| 2 | B/O | - |
| 3 | R/L | - |
| 5 | GR | - |

| | |
|-----------------|-----------------|
| Connector No. | E85 |
| Connector Name | ABS RELAY NO. 2 |
| Connector Color | BLUE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | R/L | - |
| 2 | LG/R | - |
| 3 | SB | - |
| 5 | L/O | - |

ABFIA0126GB

A
B
C
D
E
BRC
G
H
I
J
K
L
M
N
O
P

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS >

[VDC/TCS/ABS]

| | |
|-----------------|-----------------------|
| Connector No. | E86 |
| Connector Name | ABS MOTOR RELAY NO. 2 |
| Connector Color | BLUE |



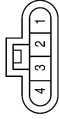
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | P/B | - |
| 2 | G/W | - |
| 3 | W/R | - |
| 5 | R/B | - |

| | |
|-----------------|-----------------------|
| Connector No. | E87 |
| Connector Name | ABS MOTOR RELAY NO. 1 |
| Connector Color | BLUE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | L/W | - |
| 2 | Y/R | - |
| 3 | R/B | - |
| 5 | R/W | - |

| | |
|-----------------|---------------------|
| Connector No. | E88 |
| Connector Name | BRAKE STROKE SENSOR |
| Connector Color | BLACK |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | B | - |
| 2 | R | - |
| 3 | G | - |
| 5 | W | - |

| | |
|-----------------|--------------------------|
| Connector No. | E89 |
| Connector Name | BRAKE FLUID LEVEL SWITCH |
| Connector Color | BLACK |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | V | - |
| 2 | B | - |

| | |
|-----------------|-----------------|
| Connector No. | E90 |
| Connector Name | BRAKE SIMULATOR |
| Connector Color | BLACK |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | BR/Y | - |
| 2 | W/L | - |

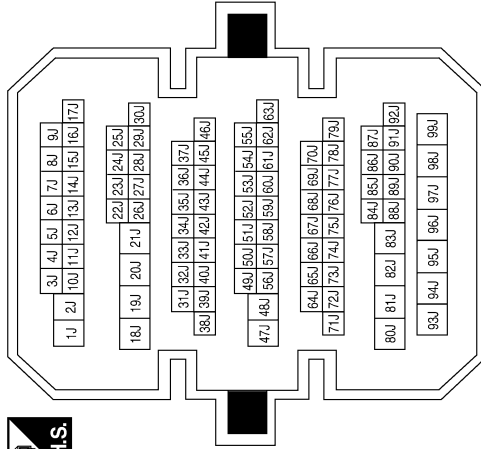
ABFIA0127GB

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS >

[VDC/TCS/ABS]

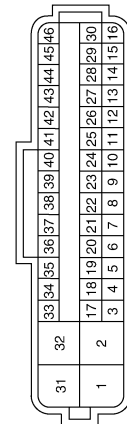
| | |
|-----------------|--------------|
| Connector No. | B1 |
| Connector Name | WIRE TO WIRE |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 17J | SB | - |

| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 19 | G/B | - |
| 20 | Y/B | - |
| 21 | GR | - |
| 22 | GR/R | - |
| 23 | BR/W | - |
| 24 | BR | - |
| 25 | R/Y | - |
| 26 | B/Y | - |
| 27 | R/Y | - |
| 28 | W/B | - |
| 29 | - | - |
| 30 | - | - |
| 31 | R/W | - |
| 32 | R/B | - |
| 33 | - | - |
| 34 | - | - |
| 35 | R/W | - |
| 36 | V/W | - |
| 37 | R/B | - |
| 38 | L/Y | - |
| 39 | L/W | - |
| 40 | L/B | - |
| 41 | O | - |
| 42 | B/P | - |
| 43 | L/R | - |
| 44 | B/W | - |
| 45 | - | - |
| 46 | - | - |

| | |
|-----------------|----------------|
| Connector No. | E91 |
| Connector Name | BRAKE ACTUATOR |
| Connector Color | BLACK |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | B/Y | - |
| 2 | B | - |
| 3 | W/R | - |
| 4 | G | - |
| 5 | W | - |
| 6 | Y | - |
| 7 | L | - |
| 8 | R | - |
| 9 | Y | - |
| 10 | W | - |
| 11 | BR | - |
| 12 | L | - |
| 13 | G | - |
| 14 | B | - |
| 15 | R | - |
| 16 | B | - |
| 17 | - | - |
| 18 | - | - |

A
B
C
D
E

BRC

G
H
I
J

K
L
M
N

O
P

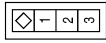
ABFIA0128GB

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS >

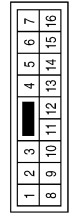
[VDC/TCS/ABS]

| | |
|-----------------|----------------------|
| Connector No. | B8 |
| Connector Name | FRONT DOOR SWITCH LH |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|--------------|
| 2 | SB | DOOR SW (DR) |

| | |
|-----------------|--------------|
| Connector No. | B10 |
| Connector Name | WIRE TO WIRE |
| Connector Color | WHITE |



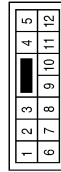
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 4 | R/W | - |
| 5 | B/R | - |
| 13 | L/Y | - |
| 14 | W/R | - |

| | |
|-----------------|-------------------|
| Connector No. | B43 |
| Connector Name | REAR WHEEL SENSOR |
| Connector Color | GRAY |



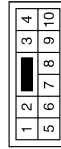
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | L/Y | POWER_LH |
| 2 | R/W | SIG_LH |
| 3 | W/R | POWER_RH |
| 4 | B/R | SIG_RH |

| | |
|-----------------|--------------|
| Connector No. | B104 |
| Connector Name | WIRE TO WIRE |
| Connector Color | BROWN |



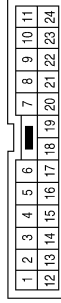
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 5 | SB | - |

| | |
|-----------------|--------------|
| Connector No. | B109 |
| Connector Name | WIRE TO WIRE |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 9 | LG/B | - |
| 10 | W/R | - |

| | |
|-----------------|--------------|
| Connector No. | B129 |
| Connector Name | WIRE TO WIRE |
| Connector Color | GRAY |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 12 | G/R | - |
| 14 | W/G | - |
| 15 | P/L | - |
| 16 | BR/R | - |
| 18 | GR/B | - |

ABFIA0129GB

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS >

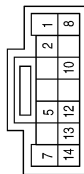
[VDC/TCS/ABS]

A
B
C
D
E

BRC

G
H
I
J
K
L
M
N
O

| | |
|-----------------|-----------------|
| Connector No. | B131 |
| Connector Name | BRAKE CAPACITOR |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | GR/B | OUT |
| 2 | W/G | +BCTY |
| 5 | G/R | IG |
| 7 | LG/B | OUT2 |
| 8 | W/R | +B |
| 10 | SB | CTY |
| 12 | BR/R | ENA |
| 13 | P/L | FAIL |
| 14 | B | GND |

ABFIA0130GB

INFOID:000000004212740

P

DTC Index

NOTE:

- If a trouble code is displayed during the DTC check, check the circuit indicated by the DTC. For details of each code, turn to the page for the respective DTC Code in the DTC chart.
 - Inspect the fuse and relay before investigation the trouble areas as shown in the table below.
1. Drive the vehicle at the speed of 50 km/h (31 MPH) and depress the brake pedal strongly for approximately 3 seconds.

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS >

[VDC/TCS/ABS]

2. Repeat the above operation 3 times or more and check that the ABS warning lamp goes OFF.

3. Clear DTC.

NOTE:

- In some case, the CONSULT-III cannot be used when the ABS warning lamp remains ON.
- When U0073, U0123, U0124, U0126, or U0293 is output, inspect and repair the trouble areas indicated by these codes first.

DTC chart of ABS:

| DTC code | Detection item | INF code | Trouble area | Reference page |
|----------|-----------------|--|--|---------------------------------------|
| C0200 | FR RH SENSOR | 251 252 253 254 255 262 | 1. Front wheel sensor RH 2. Wheel sensor circuit 3. Sensor installation 4. Wheel sensor rotor 5. Brake ECU | BRC-57. "Description" |
| C0205 | FR LH SENSOR | 264 265 266 267 268 275 | 1. Front wheel sensor LH 2. Wheel sensor circuit 3. Sensor installation 4. Wheel sensor rotor 5. Brake ECU | BRC-57. "Description" |
| C0210 | RR RH SENSOR | 277 278 279 280 281 288 | 1. Rear wheel sensor RH 2. Wheel sensor circuit 3. Sensor installation 4. Wheel sensor rotor 5. Brake ECU | BRC-62. "Description" |
| C0215 | RR LH SENSOR | 290 291 292 293 294 301 | 1. Rear wheel sensor LH 2. Wheel sensor circuit 3. Sensor installation 4. Wheel sensor rotor 5. Brake ECU | BRC-62. "Description" |
| C1235 | FR SPD FRAGMENT | 302 | 1. Front wheel sensor RH 2. Wheel sensor circuit 3. Sensor installation 4. Wheel sensor rotor 5. Brake ECU | BRC-77. "Description" |
| C1236 | FL SPD FRAGMENT | 303 | 1. Front wheel sensor LH 2. Wheel sensor circuit 3. Sensor installation 4. Wheel sensor rotor 5. Brake ECU | BRC-77. "Description" |
| C1238 | RR SPD FRAGMENT | 304 | 1. Rear wheel sensor RH 2. Wheel sensor circuit 3. Sensor installation 4. Wheel sensor rotor 5. Brake ECU | BRC-77. "Description" |
| C1239 | RL SPD FRAGMENT | 305 | 1. Rear wheel sensor LH 2. Wheel sensor circuit 3. Sensor installation 4. Wheel sensor rotor 5. Brake ECU | BRC-77. "Description" |
| C1243 | G SEN STUC | 317 | Yaw rate/side/decel G sensor | BRC-68. "Description" |
| C1244 | G SENSOR | 314 | 1. Yaw rate/side/decel G sensor 2. Sensor installation | BRC-68. "Description" |
| C1245 | G SEN OUTPUT | 313 | 1. Yaw rate/side/decel G sensor 2. Sensor installation | BRC-68. "Description" |
| C1336 | G SEN CALIB | — | 1. Brake ECU 2. Yaw rate/side/decel G sensor 3. Zero point calibration undone | BRC-73. "Description" |

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS >

[VDC/TCS/ABS]

| DTC code | Detection item | INF code | Trouble area | Reference page |
|----------|--------------------|----------|---|--|
| C1381 | YAW RATE/G SEN PWR | 315 | 1. Yaw rate/side/decel G sensor 2. Yaw rate/side/decel G sensor power source circuit 3. Brake ECU | BRC-68, "Description" |
| U0124 | LOST COMM (DECEL) | 319 | CAN communication system (Brake ECU to yaw rate/side/decel G sensor) | BRC-140, "Description" |

DTC chart of VDC:

| DTC code | Detection item | INF code | Trouble area | Reference page |
|----------|--------------------|--------------------------|---|--|
| C11A0 | YAW RATE SN CALIB | — | 1. Brake ECU 2. Yaw rate/side/decel G sensor 3. Zero point calibration undone | BRC-73, "Description" |
| C1231 | STR ANGLE SEN CIR | — | 1. Steering angle sensor 2. Steering angle sensor circuit 3. Steering angle sensor power source 4. Brake ECU | BRC-75, "Description" |
| C1232 | G SEN STUC 2 | 311 312 | Yaw rate/side/decel G sensor | BRC-68, "Description" |
| C1234 | YAW RATE SEN | 333 334 335 337 | Yaw rate/side/decel G sensor | BRC-68, "Description" |
| C1290 | STR ANG SEN 0POINT | — | 1. Yaw rate/side/decel G sensor zero point calibration incomplete 2. Poor adjustment of the centered position of the steering wheel 3. Poor adjustment of front wheel alignment | BRC-109, "Description" |
| C1310 | HV SYSTEM | — | Hybrid control system | BRC-108, "Description" |
| U0123 | LOST COMM (YAW) | 338 | CAN communication system (Brake ECU to yaw rate/side/decel G sensor) | BRC-140, "Description" |
| U0126 | LOST COMM (STRG) | 350 | CAN communication system (Brake ECU to steering angle sensor) | BRC-140, "Description" |

DTC chart of Electronically Controlled Brake:

| DTC code | Detection item | INF code | Trouble area | Reference page |
|----------|--------------------|--|---|---------------------------------------|
| C1155 | BR FLUID LEVEL LOW | 512 | 1. Fluid leakage 2. Brake fluid level 3. Brake fluid level switch 4. Brake fluid level switch circuit 5. Brake ECU | BRC-71, "Description" |
| C1241 | POWER SUPPLY | 81 82 83 91 92 93 94 | 1. Auxiliary battery 2. ABS relay No.1 3. ABS relay No.1 circuit 4. ABS relay No.2 5. ABS relay No.2 circuit 6. Brake capacitor 7. Hybrid control system (charging circuit) 8. Brake ECU | BRC-83, "Description" |
| C1242 | IG1/IG2 | 87 88 | 1. Auxiliary battery 2. IG1 power source circuit 3. IG2 power source circuit 4. Hybrid control system (charging circuit) 5. Brake ECU | BRC-83, "Description" |

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS >

[VDC/TCS/ABS]

| DTC code | Detection item | INF code | Trouble area | Reference page |
|----------|--------------------|---|--|--|
| C1246 | MC PRESS SENSOR | 191 192 194 195 197 198 199 200 201 202 205 | 1. Brake actuator assembly (master cylinder pressure sensor) 2. Master cylinder pressure sensor circuit 3. Master cylinder pressure sensor power supply 4. Brake actuator assembly 5. Brake ECU | BRC-86. "Description" |
| C1247 | STROKE SENSOR | 171 172 173 174 175 176 177 179 | 1. Brake stroke sensor 2. Brake stroke sensor circuit 3. Brake stroke sensor power supply 4. Sensor installation 5. Brake ECU | BRC-91. "Description" |
| C1249 | STOP LAMP SW | 520 | 1. STOP fuse 2. Stop lamp switch 3. Stop lamp switch circuit 4. Brake ECU | BRC-95. "Description" |
| C1252 | MOTOR TIME LONG | 130 | 1. ABS motor relay No.1 2. ABS motor relay No.1 circuit 3. ABS motor relay No.2 4. ABS motor relay No.2 circuit 5. Brake actuator assembly (accumulator pressure sensor circuit) | BRC-99. "Description" |
| C1253 | MOTOR RELAY | 132 133 134 136 137 138 140 | 1. ABS MTR1 fuse 2. ABS MTR2 fuse 3. ABS motor relay No.1 4. ABS motor relay No.1 circuit 5. ABS motor relay No.2 6. ABS motor relay No.2 circuit 7. Brake actuator assembly (pump motor) 8. Pump motor circuit | BRC-99. "Description" |
| C1256 | ACC PRESSURE LOW | 141 143 | 1. Accumulator pressure 2. Brake actuator assembly (accumulator pressure sensor) 3. Brake actuator assembly (pump motor) | BRC-105. "Description" |
| C1259 | HV SYSTEM PEGNRTNG | 150 | Hybrid control system | BRC-108. "Description" |
| C1300 | ECU | — | Brake ECU | BRC-111. "Description" |
| C1311 | MAIN RLY1 OPEN | 1 | 1. ABS relay No.1 2. ABS relay No.1 circuit 3. Brake ECU | BRC-112. "Description" |
| C1312 | MAIN RLY1 SHORT | 3 | 1. ABS relay No.1 2. ABS relay No.1 circuit 3. Brake ECU | BRC-112. "Description" |
| C1313 | MAIN RLY2 OPEN | 4 | 1. ABS relay No.2 2. ABS relay No.2 circuit 3. Brake ECU | BRC-112. "Description" |
| C1314 | MAIN RLY2 SHORT | 6 | 1. ABS relay No.2 2. ABS relay No.2 circuit 3. Brake ECU | BRC-112. "Description" |
| C1315 | SMC1 | 61 62 63 64 | 1. Brake actuator assembly (SMC1) 2. SMC1 circuit 3. Brake ECU | BRC-115. "Description" |

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS >

[VDC/TCS/ABS]

| DTC code | Detection item | INF code | Trouble area | Reference page |
|----------|------------------|---------------------------------|---|--|
| C1316 | SMC2 | 66 67 68 69 | 1. Brake actuator assembly (SMC2) 2. SMC2 circuit 3. Brake ECU | BRC-115, "Description" |
| C1319 | SCSS | 71 72 73 74 | 1. Brake simulator 2. Brake simulator circuit 3. Brake ECU | BRC-120, "Description" |
| C1341 | FR RH HYDRAULIC | 551 552 553 554 555 | 1. Fluid leakage 2. Disc rotor 3. Brake actuator assembly | BRC-122, "Description" |
| C1342 | FR LH HYDRAULIC | 561 562 563 564 565 | 1. Fluid leakage 2. Disc rotor 3. Brake actuator assembly | BRC-122, "Description" |
| C1343 | RR RH HYDRAULIC | 571 572 573 574 575 | 1. Fluid leakage 2. Disc rotor 3. Brake actuator assembly | BRC-122, "Description" |
| C1344 | RR LH HYDRAULIC | 581 582 583 584 585 | 1. Fluid leakage 2. Disc rotor 3. Brake actuator assembly | BRC-122, "Description" |
| C1345 | LINEAR VLV CALIB | — | 1. Initialization of linear solenoid valve and calibration undone 2. Brake ECU | BRC-126, "Description" |
| C1352 | SLA FR SOL | 11 12 13 14 | 1. Brake actuator assembly (SLAFR) 2. SLAFR circuit 3. Brake ECU | BRC-115, "Description" |
| C1353 | SLA FL SOL | 21 22 23 24 | 1. Brake actuator assembly (SLAFL) 2. SLAFL circuit 3. Brake ECU | BRC-115, "Description" |
| C1354 | SLA RR SOL | 31 32 33 34 | 1. Brake actuator assembly (SLARR) 2. SLARR circuit 3. Brake ECU | BRC-115, "Description" |
| C1355 | SLA RL SOL | 41 42 43 44 | 1. Brake actuator assembly (SLARL) 2. SLARL circuit 3. Brake ECU | BRC-115, "Description" |
| C1356 | SLR FR SOL | 16 17 18 19 | 1. Brake actuator assembly (SLRFR) 2. SLRFR circuit 3. Brake ECU | BRC-115, "Description" |
| C1357 | SLR FL SOL | 26 27 28 29 | 1. Brake actuator assembly (SLRFL) 2. SLRFL circuit 3. Brake ECU | BRC-115, "Description" |
| C1358 | SLR RR SOL | 36 37 38 39 | 1. Brake actuator assembly (SLRRR) 2. SLRRR circuit 3. Brake ECU | BRC-115, "Description" |

A
B
C
D
E
G
H
I
J
K
L
M
N
O
P

BRC

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS >

[VDC/TCS/ABS]

| DTC code | Detection item | INF code | Trouble area | Reference page |
|----------|--------------------|--|--|--|
| C1359 | SLR RL SOL | 41 42 43 44 | 1. Brake actuator assembly (SLRRL) 2. SLRRL circuit 3. Brake ECU | BRC-115, "Description" |
| C1364 | WC PRESS SEN | 221 222 224 225 227 228 230 231 233 234 236 237 239 240 242 243 | 1. Brake actuator assembly (wheel cylinder pressure sensor) 2. Wheel cylinder pressure sensor circuit 3. Wheel cylinder pressure sensor power supply 4. Brake actuator assembly 5. Brake ECU | BRC-86, "Description" |
| C1365 | ACC PRESS SEN | 211 212 214 215 | 1. Brake actuator assembly (accumulator pressure sensor) 2. Accumulator pressure sensor circuit 3. Accumulator pressure sensor power supply 4. Brake actuator assembly 5. Brake ECU | BRC-128, "Description" |
| C1368 | LINEAR S/V | — | 1. Initialization of linear solenoid valve and calibration undone 2. Brake ECU | BRC-126, "Description" |
| C1377 | CAPACITOR | 101 102 103 105 106 108 109 110 | 1. ABS No.1 fuse 2. ABS No.2 fuse 3. Apply high voltage 4. Brake capacitor 5. Brake capacitor circuit | BRC-131, "Description" |
| C1378 | CAPACITOR COMM | 112 | 1. Brake capacitor 2. Brake capacitor circuit 3. Brake ECU 4. Brake ECU circuit | BRC-135, "Description" |
| C1391 | ACC LEAK | 591 | 1. Fluid leakage 2. Brake actuator assembly | BRC-138, "Description" |
| C1392 | STROKE SEN CALIB | — | 1. Brake stroke sensor zero point calibration undone (initialization of linear solenoid valve and calibration undone) 2. Brake ECU | BRC-91, "Description" |
| U0073 | LOST COMM YAW/STRG | 360 | CAN communication system | BRC-140, "Description" |
| U0293 | LOST COMM (HV ECU) | 152 153 154 155 | CAN communication system (brake ECU to HV ECU) | BRC-140, "Description" |

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS >

[VDC/TCS/ABS]

TEST MODE DTC of ABS:

| DTC code | Detection item | INF code | Trouble area | Reference page |
|----------|------------------|----------|---|---------------------------------------|
| C1271 | FR SPD OUTPUT | — | 1. Front wheel sensor RH 2. Snesor installation 3. Wheel sensor rotor | BRC-57. "Description" |
| C1272 | FL SPD OUTPUT | — | 1. Front wheel sensor LH 2. Snesor installation 3. Wheel sensor rotor | BRC-57. "Description" |
| C1273 | RR SPD OUTPUT | — | 1. Rear wheel sensor RH 2. Snesor installation 3. Wheel sensor rotor | BRC-62. "Description" |
| C1274 | RL SPD OUTPUT | — | 1. Rear wheel sensor LH 2. Snesor installation 3. Wheel sensor rotor | BRC-62. "Description" |
| C1275 | FR SPD OUTPUT HI | — | Wheel sensor rotor | BRC-77. "Description" |
| C1276 | FL SPD OUTPUT HI | — | Wheel sensor rotor | BRC-77. "Description" |
| C1277 | RR SPD OUTPUT HI | — | Wheel sensor rotor | BRC-77. "Description" |
| C1278 | RL SPD OUTPUT HI | — | Wheel sensor rotor | BRC-77. "Description" |
| C1279 | G SEN OUTPUT | — | 1. Yaw rate/side/decel G sensor 2. Sensor installation | BRC-68. "Description" |
| C1281 | MC SENSOR OUTPUT | — | 1. Stop lamp switch 2. Master cylinder pressure sensor | BRC-68. "Description" |

TEST MODE DTC of VDC:

| DTC code | Detection item | INF code | Trouble area | Reference page |
|----------|----------------|----------|------------------------------|---------------------------------------|
| C0371 | YAW SEN OUTPUT | — | Yaw rate/side/decel G sensor | BRC-68. "Description" |

TEST MODE DTC of Electronically controlled Brake:

| DTC code | Detection item | INF code | Trouble area | Reference page |
|----------|------------------|----------|---------------------|---------------------------------------|
| C1346 | STROKE SEN CALIB | — | Brake stroke sensor | BRC-91. "Description" |

A
B
C
D
E
BRC
G
H
I
J
K
L
M
N
O
P

SYMPTOM DIAGNOSIS

VDC/TCS/ABS SYMPTOMS

Symptom Table

INFOID:000000004212741

PROBLEM SYMPTOMS TABLE

If there are no DTCs output but the problem still occurs, check the circuits for each problem symptom in the order given in the table below and proceed to the relevant troubleshooting page.

CAUTION:

When replacing the brake ECU, sensor, etc., make sure that the ignition switch is turned OFF, the stop lamp switch is off, and 2 minutes have elapsed since the driver's door was closed.

NOTE:

- Inspect the fuse and relay before investigating the suspected areas shown in the table below.
- Inspect each malfunctioning circuit in numerical order for the corresponding symptom.
- Since the oil passage is blocked off by the master cut solenoid during Electronically Controlled Brake control, there is no kickback (vibration) to the brake pedal, creating a quiet operating sound even while the ABS is operating.

| Symptom | Suspected area | Reference page |
|--|---|--|
| ABS and/or EBD does not operate | Use a chassis dynamometer, etc. to check the Electronically Controlled Brake operation. | — |
| | Check the DTC again and make sure that the normal system code is output. | — |
| | IG power source circuit | BRC-83, "Description" |
| | Front wheel sensor circuit | BRC-57, "Description" |
| | Rear wheel sensor circuit | BRC-62, "Description" |
| | Check the brake actuator assembly with the CONSULT-III. (Check brake actuator assembly operation using the Active Test function.) If abnormal, check the hydraulic circuit for leakage. | BRC-194, "Inspection" |
| | If the symptoms still occur even after the above circuits in suspected areas have been inspected and proved to be normal, replace the brake ECU. | — |
| ABS and/or EBD does not operate efficiently | Check the DTC again and make sure that the normal system code is output. | — |
| | Front wheel sensor circuit | BRC-57, "Description" |
| | Rear wheel sensor circuit | BRC-62, "Description" |
| | Check the brake actuator assembly with the CONSULT-III. (Check brake actuator assembly operation using the Active Test function.) If abnormal, check the hydraulic circuit for leakage. | BRC-194, "Inspection" |
| | If the symptoms still occur even after the above circuits in suspected areas have been inspected and proved to be normal, replace the brake ECU. | — |
| ABS warning lamp abnormal (Remains on) | ABS warning lamp circuit | BRC-172, "Description" |
| | Brake ECU | BRC-111, "Description" |
| ABS warning lamp abnormal (Does not come on) | ABS warning lamp circuit | BRC-174, "Description" |
| | Brake ECU | BRC-111, "Description" |
| Brake warning lamp (Remains on) | Brake fluid level switch circuit | BRC-177, "Description" |
| | Brake ECU | BRC-111, "Description" |

VDC/TCS/ABS SYMPTOMS

< SYMPTOM DIAGNOSIS >

[VDC/TCS/ABS]

| Symptom | Suspected area | Reference page | |
|--|--|--|------------|
| Brake warning lamp (Does not come on) | Brake fluid level switch circuit | BRC-181, "Description" | A |
| | Brake ECU | BRC-111, "Description" | |
| VDC and/or TCS does not operate | Check that traction control has not operated by carrying out diagnosis. | — | B |
| | Check the DTC again and make sure that the normal system code is output. | — | C |
| | IG power source circuit | BRC-83, "Description" | |
| | Check the hydraulic circuit for leakage | — | |
| | Front wheel sensor circuit | BRC-57, "Description" | D |
| | Rear wheel sensor circuit | BRC-62, "Description" | |
| | Yaw rate/side/decel G sensor circuit | BRC-68, "Description" | E |
| | Steering angle sensor circuit | BRC-75, "Description" | |
| | If the symptoms still occur even after the above circuits in suspected areas have been inspected and proved to be normal, replace the brake ECU. | — | BRC |
| Electronically Controlled Brake warning lamp abnormal (Remains on) | Electronically Controlled Brake warning lamp circuit | BRC-182, "Description" | G |
| | Brake ECU | BRC-111, "Description" | |
| Electronically Controlled Brake warning lamp abnormal (Does not come on) | Electronically Controlled Brake warning lamp circuit | BRC-183, "Description" | H |
| | Brake ECU | BRC-111, "Description" | |
| VDC warning abnormal (Remain on) | VDC warning lamp circuit | BRC-175, "Description" | I |
| | Brake ECU | BRC-111, "Description" | |
| VDC warning abnormal (Does not come on) | VDC warning lamp circuit | BRC-176, "Description" | J |
| | Brake ECU | BRC-111, "Description" | |
| SLIP indicator lamp abnormal (Remains on) | SLIP indicator lamp circuit | BRC-185, "Description" | K |
| | Brake ECU | BRC-111, "Description" | |
| SLIP indicator lamp abnormal (Does not come on) | SLIP indicator lamp circuit | BRC-186, "Description" | K |
| | Brake ECU | BRC-111, "Description" | |
| DTC check cannot be done | Check the DTC again and make sure that the normal system code is output. | — | L |
| | TC and CG terminal circuit | — | |
| | If the symptoms still occur even after the above circuit in suspected areas has been inspected and proved to be normal, replace the brake ECU. | — | M |
| Sensor check cannot be done | TS and CG terminal circuit | — | N |
| | Brake ECU | BRC-111, "Description" | |
| Brake warning buzzer abnormal | Brake warning buzzer | BRC-187, "Description" | O |
| | Brake ECU | BRC-111, "Description" | |

ABS WARNING LAMP REMAINS ON

< SYMPTOM DIAGNOSIS >

[VDC/TCS/ABS]

ABS WARNING LAMP REMAINS ON

Description

INFOID:000000004212742

The brake ECU is connected to the combination meter with CAN communication via HV ECU. If any of the following is detected, the ABS warning lamp remains on.

- The brake ECU connectors are disconnected from the brake ECU.
- There is a malfunction in the brake ECU internal circuit or in the HV ECU.
- There is an open in the harness between the combination meter, HV ECU and the brake ECU.

NOTE:

In some cases, the CONSULT-III cannot be used when the brake ECU is abnormal.

Diagnosis Procedure

INFOID:000000004212743

NOTE:

If a malfunction was detected in wheel sensor during the last travel, ABS warning lamp may remain ON until the wheel sensor can be checked that it is normal at 10 km/h (6 MPH) during the next travel.

CAUTION:

When replacing the brake ECU, perform initialization of linear solenoid valve and calibration.

1. CHECK CAN COMMUNICATION SYSTEM

Check if the CAN communication system DTC is output.

Result

| Condition | Proceed to |
|--------------------|------------|
| DTC is not output. | A |
| DTC is output. | B |

A >> GO TO 2.

B >> Inspect CAN communication system.

2. CHECK IF BRAKE ECU CONNECTOR IS SECURELY CONNECTED

Check if the brake ECU connector is securely connected.

NOTE:

The connector should be securely connected.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Connect connector to ECU correctly.

3. CHECK AUXILIARY BATTERY

Check the auxiliary battery voltage.

Standard voltage : 11 to 14 V

Is the inspection result normal?

YES >> GO TO 4.

NO >> Charge or replace auxiliary battery.

4. INSPECT BRAKE ECU (IG1 TERMINAL)

1. Disconnect the brake ECU connector.
2. Turn the ignition switch ON.

ABS WARNING LAMP REMAINS ON

[VDC/TCS/ABS]

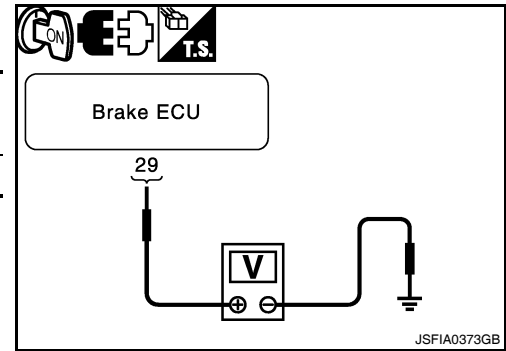
< SYMPTOM DIAGNOSIS >

3. Measure the voltage according to the value(s) in the table below.

| Brake ECU | | Condition | Specified condition |
|-----------|-------------|--------------------|---------------------|
| Connector | Terminal | | |
| E60 | 29 – Ground | Ignition switch ON | 10 to 14 V |

Is the inspection result normal?

- YES >> GO TO 5.
 NO >> Repair or replace harness or connector (IG1 circuit).



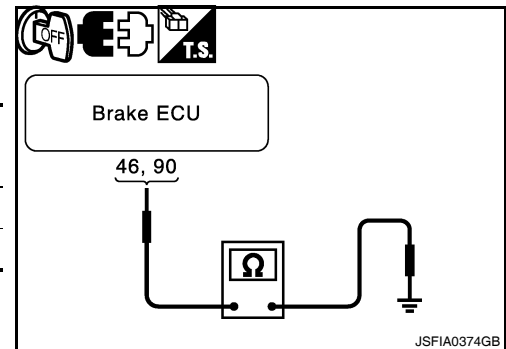
5. INSPECT BRAKE ECU (GND TERMINAL)

- Turn the ignition switch OFF.
- Disconnect the brake ECU connectors.
- Measure the resistance according to the value(s) in the table below.

| Brake ECU | | Condition | Specified condition |
|-----------|-------------|-----------|---------------------|
| Connector | Terminal | | |
| E60 | 46 – Ground | Always | Below 1 Ω |
| E61 | 90 – Ground | Always | Below 1 Ω |

Is the inspection result normal?

- YES >> GO TO 6.
 NO >> Repair or replace harness or connector (GND circuit).



6. INSPECT HV ECU

Perform HV ECU self-diagnosis.

Is the inspection result normal?

- YES >> Repair or replace malfunctioning components.
 NO >> GO TO 7.

7. INSPECT COMBINATION METER ASSEMBLY

- Reconnect the brake ECU connectors.
- Perform “ABS WARN LAMP” of the combination meter (meter CPU) using the “ACTIVE TEST”.

NOTE:

- The ABS warning lamp turns ON or OFF in accordance with the CONSULT-III.
- If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step before replacing part.

Is the inspection result normal?

- YES >> Replace brake ECU.
 NO >> Replace combination meter assembly.

A
B
C
D
E
BRC
G
H
I
J
K
L
M
N
O
P

ABS WARNING LAMP DOES NOT COME ON

< SYMPTOM DIAGNOSIS >

[VDC/TCS/ABS]

ABS WARNING LAMP DOES NOT COME ON

Description

INFOID:000000004212744

The brake ECU is connected to the combination meter with CAN communication via HV ECU.

Diagnosis Procedure

INFOID:000000004212745

CAUTION:

When replacing the brake ECU, perform initialization of linear solenoid valve and calibration.

1. CHECK CAN COMMUNICATION SYSTEM

Check if the CAN communication system DTC is output.

Result

| Condition | Proceed to |
|--------------------|------------|
| DTC is not output. | A |
| DTC is output. | B |

A >> GO TO 2.

B >> Inspect CAN communication system.

2. INSPECT HV ECU

Perform HV ECU self-diagnosis.

Is the inspection result normal?

YES >> Repair or replace malfunctioning components.

NO >> GO TO 3.

3. CHECK ABS WARNING LAMP

1. Disconnect the brake ECU connector.
2. Turn the ignition switch ON.
3. Check that the ABS warning lamp come ON.

NOTE:

- The ABS warning lamp comes ON.
- If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step before replacing the part.

Is the inspection result normal?

YES >> Replace brake ECU.

NO >> GO TO 4.

4. INSPECT COMBINATION METER ASSEMBLY

1. Turn the ignition switch OFF.
2. Reconnect the brake ECU connector.
3. Perform "ABS WARN LAMP" of the combination meter (meter CPU) using the "ACTIVE TEST".

NOTE:

- The ABS warning lamp turns ON or OFF in accordance with the CONSULT-III.
- If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step.

Is the inspection result normal?

YES >> Replace brake ECU.

NO >> Replace combination meter assembly.

VDC WARNING LAMP REMAINS ON

< SYMPTOM DIAGNOSIS >

[VDC/TCS/ABS]

VDC WARNING LAMP REMAINS ON

Description

INFOID:000000004212746

The brake ECU communicates with the combination meter with CAN communication via HV ECU. If the ECU stores a DTC, the VDC warning lamp will come ON.

Diagnosis Procedure

INFOID:000000004212747

NOTE:

When removing battery, VDC warning lamp turns ON because the stored zero point of steering angle is erased. In this case, when driving in a straight line at 35 km/h (22 MPH) for 5 seconds or more, zero adjustment completes and VDC warning lamp turns OFF.

CAUTION:

When replacing the brake ECU, perform initialization of linear solenoid valve and calibration.

1. CHECK CAN COMMUNICATION SYSTEM

Check if the CAN communication system DTC is output.

Result

| Condition | Proceed to |
|--------------------|------------|
| DTC is not output. | A |
| DTC is output. | B |

A >> GO TO 2.

B >> Inspect CAN communication system.

2. INSPECT HV ECU

Perform HV ECU self-diagnosis.

Is the inspection result normal?

YES >> Repair or replace malfunctioning components.

NO >> GO TO 3.

3. CHECK IF BRAKE ECU CONNECTOR IS SECURELY CONNECTED

Check if the brake ECU connector is securely connected.

NOTE:

The connector should be securely connected.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Connect connector to ECU correctly.

4. CHECK AUXILIARY BATTERY

Check the auxiliary battery voltage.

Standard voltage : 11 to 14 V

Is the inspection result normal?

YES >> GO TO 5.

NO >> Charge or replace auxiliary battery.

5. INSPECT COMBINATION METER ASSEMBLY

Perform "VDC WARN LAMP" of the combination meter (meter CPU) using the "ACTIVE TEST".

NOTE:

- The VDC warning lamp turns ON or OFF in accordance with the CONSULT-III.
- If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step.

Is the inspection result normal?

YES >> Replace brake ECU.

NO >> Replace combination meter assembly.

A

B

C

D

E

BRC

G

H

I

J

K

L

M

N

O

P

VDC WARNING LAMP DOES NOT COME ON

< SYMPTOM DIAGNOSIS >

[VDC/TCS/ABS]

VDC WARNING LAMP DOES NOT COME ON

Description

INFOID:000000004212748

The brake ECU communicates with the combination meter with CAN communication via HV ECU. If the ECU stores a DTC, the VDC warning lamp will come ON.

Diagnosis Procedure

INFOID:000000004212749

CAUTION:

When replacing the brake ECU, perform initialization of linear solenoid valve and calibration.

1. CHECK CAN COMMUNICATION SYSTEM

Check if the CAN communication system DTC is output.

Result

| Condition | Proceed to |
|--------------------|------------|
| DTC is not output. | A |
| DTC is output. | B |

A >> GO TO 2.

B >> Inspect CAN communication system.

2. INSPECT HV ECU

Perform HV ECU self-diagnosis.

Is the inspection result normal?

YES >> Repair or replace malfunctioning components.

NO >> GO TO 3.

3. CHECK VDC WARNING LAMP

1. Connect the CONSULT-III.
2. Turn the ignition switch ON (READY).
3. Select "VDC WARN LAMP" in the "ACTIVE TEST" and operate the VDC warning lamp using the CONSULT-III.

ABS/VDC:

| Tester display | Test part | Control range | Diagnostic note |
|----------------|------------------|---------------------|---------------------------|
| VDC WARN LAMP | VDC warning lamp | Warning lamp ON/OFF | Observe combination meter |

4. Check that "ON" and "OFF" of the VDC warning lamp are indicated on the combination meter when using the CONSULT-III.

NOTE:

- The VDC warning lamp turns ON or OFF in accordance with the CONSULT-III.
- If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace brake ECU.

4. INSPECT COMBINATION METER ASSEMBLY

1. Turn the ignition switch OFF.
2. Perform "VDC WARN LAMP" of the combination meter (meter CPU) using the "ACTIVE TEST".

NOTE:

- The VDC warning lamp turns ON or OFF in accordance with the CONSULT-III.
- If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step.

Is the inspection result normal?

YES >> Replace brake ECU.

NO >> Replace combination meter assembly.

BRAKE WARNING LAMP REMAINS ON

< SYMPTOM DIAGNOSIS >

[VDC/TCS/ABS]

BRAKE WARNING LAMP REMAINS ON

Description

INFOID:000000004212750

The brake ECU is connected to the combination meter with CAN communication via HV ECU. If any of the following is detected, the brake warning lamp remains on:

- The brake ECU connector is disconnected from the brake ECU.
- The brake fluid level is insufficient.
- The parking brake is applied.
- EBD operation is not possible.
- There is a malfunction in the brake ECU or HV ECU.
- There is an open in the harness between the combination meter, HV ECU and brake ECU.

Diagnosis Procedure

INFOID:000000004212751

CAUTION:

When replacing the brake ECU, perform initialization of linear solenoid valve and calibration.

1. CHECK DTC

Check if the ABS, VDC and/or Electronically Controlled Brake DTC is output.

Result

| Condition | Proceed to |
|--------------------|------------|
| DTC is not output. | A |
| DTC is output. | B |

A >> GO TO 2.

B >> Repair circuit indicated by output DTC.

2. CHECK CAN COMMUNICATION SYSTEM

Check if the CAN communication system DTC is output.

Result

| Condition | Proceed to |
|--------------------|------------|
| DTC is not output. | A |
| DTC is output. | B |

A >> GO TO 3.

B >> Inspect CAN communication system.

3. INSPECT HV ECU

Perform HV ECU self-diagnosis.

Is the inspection result normal?

YES >> Repair or replace malfunctioning components.

NO >> GO TO 4.

4. CHECK IF BRAKE ECU CONNECTOR IS SECURELY CONNECTED

Check if the brake ECU connector is securely connected.

NOTE:

The connector should be securely connected.

Is the inspection result normal?

YES >> GO TO 5.

NO >> Connect connector to ECU correctly.

5. CHECK AUXILIARY BATTERY

Check the auxiliary battery voltage.

Standard voltage : 11 to 14 V

A

B

C

D

E

BRC

G

H

I

J

K

L

M

N

O

P

BRAKE WARNING LAMP REMAINS ON

[VDC/TCS/ABS]

< SYMPTOM DIAGNOSIS >

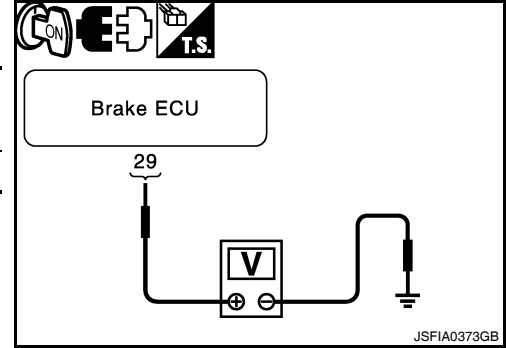
Is the inspection result normal?

- YES >> GO TO 6.
- NO >> Charge or replace auxiliary battery.

6.INSPECT BRAKE ECU (IG1 TERMINAL)

1. Disconnect the brake ECU connector.
2. Turn the ignition switch ON.
3. Measure the voltage according to the value(s) in the table below.

| Brake ECU | | Condition | Specified condition |
|-----------|-------------|--------------------|---------------------|
| Connector | Terminal | | |
| E60 | 29 – Ground | Ignition switch ON | 10 to 16 V |



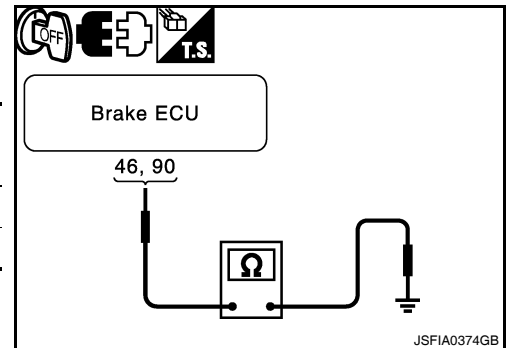
Is the inspection result normal?

- YES >> GO TO 7.
- NO >> Repair or replace harness or connector (IG1 circuit).

7.INSPECT BRAKE ECU (GND TERMINAL)

1. Turn the ignition switch OFF.
2. Disconnect the brake ECU connectors.
3. Measure the resistance according to the value(s) in the table below.

| Brake ECU | | Condition | Specified condition |
|-----------|-------------|-----------|---------------------|
| Connector | Terminal | | |
| E60 | 46 – Ground | Always | Below 1 Ω |
| E61 | 90 – Ground | Always | Below 1 Ω |



Is the inspection result normal?

- YES >> GO TO 8.
- NO >> Repair or replace harness or connector (GND circuit).

8.READ VALUE OF CONSULT-III (PARKING BRAKE SWITCH)

1. Reconnect the brake ECU connectors.
2. Connect the CONSULT-III.
3. Turn the ignition switch ON.
4. Select the “DATA MONITOR” on the CONSULT-III.

ABS/VDC:

| Tester display | Measurement item / Range | Normal condition |
|----------------|----------------------------------|--|
| PKB SW | Parking brake switch / ON or OFF | ON: Parking brake applied OFF: Parking brake released |

5. Using the CONSULT-III, check the input of switch operation when the parking brake pedal is operated.

NOTE:

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

Is the inspection result normal?

- YES >> GO TO 9.
- NO >> GO TO 11.

9.INSPECT PARKING BRAKE SWITCH

1. Turn the ignition switch OFF.
2. Disconnect the parking brake switch connector E35.

BRAKE WARNING LAMP REMAINS ON

[VDC/TCS/ABS]

< SYMPTOM DIAGNOSIS >

- Measure the resistance according to the value(s) in the table below.

| Tester connection | Condition | Specified condition |
|-------------------|--|---------------------|
| 1 – Ground | Parking brake switch ON (Switch pin free) | Below 1 Ω |
| 1 – Ground | Parking brake switch OFF (Switch pin pushed in) | 10 kΩ or higher |

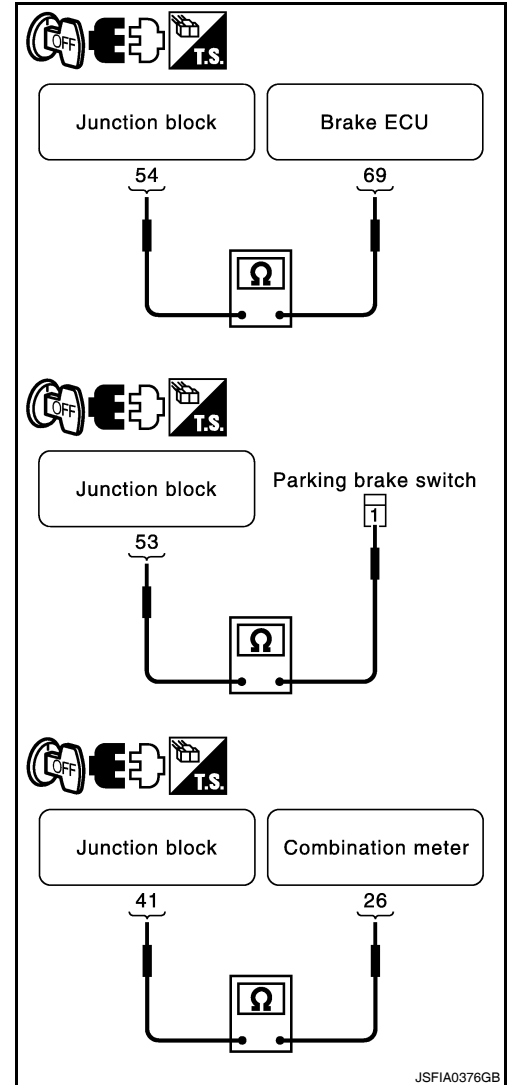
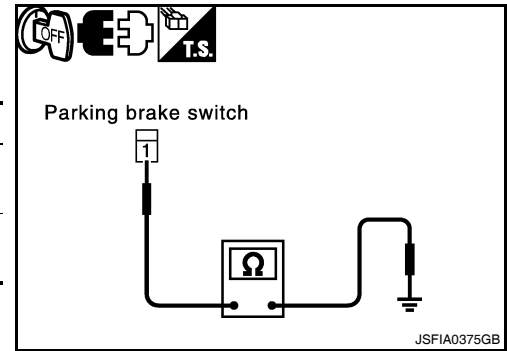
Is the inspection result normal?

YES >> GO TO 10.

NO >> Replace parking brake switch.

10. CHECK HARNESS AND CONNECTOR

- Disconnect the junction block, brake ECU, parking brake switch and combination meter connectors.
- Measure the resistance according to the value(s) in the table below.



| Junction block | | Brake ECU | | Condition | Specified condition |
|----------------|----------|-----------|----------|-----------|---------------------|
| Connector | Terminal | Connector | Terminal | | |
| E48 | 54 | E61 | 69 | Always | Existed |

BRAKE WARNING LAMP REMAINS ON

< SYMPTOM DIAGNOSIS >

[VDC/TCS/ABS]

| Junction block | | Parking brake switch | | Condition | Specified condition |
|----------------|----------|----------------------|----------|-----------|---------------------|
| Connector | Terminal | Connector | Terminal | | |
| E48 | 53 | E35 | 1 | Always | Existed |

| Junction block | | Combination meter | | Condition | Specified condition |
|----------------|----------|-------------------|----------|-----------|---------------------|
| Connector | Terminal | Connector | Terminal | | |
| E48 | 41 | M24 | 26 | Always | Existed |

NOTE:

If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step before replacing the part.

Is the inspection result normal?

- YES >> Replace brake ECU.
- NO >> Repair or replace harness or connector.

11.INSPECT COMBINATION METER ASSEMBLY

1. Turn the ignition switch OFF.
2. Perform "BRAKE WARN LAMP" of the combination meter (meter CPU) using the "ACTIVE TEST".

NOTE:

- The brake warning lamp turns ON or OFF in accordance with the CONSULT-III.
- If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step before replacing the part.

Is the inspection result normal?

- YES >> Replace brake ECU.
- NO >> Replace parking brake switch.

BRAKE WARNING LAMP DOES NOT COME ON

< SYMPTOM DIAGNOSIS >

[VDC/TCS/ABS]

BRAKE WARNING LAMP DOES NOT COME ON

Description

INFOID:000000004212752

The brake ECU is connected to the combination meter with CAN communication via HV ECU.

Diagnosis Procedure

INFOID:000000004212753

CAUTION:

When replacing the brake ECU, perform initialization of linear solenoid valve and calibration.

1. CHECK CAN COMMUNICATION SYSTEM

Check if the CAN communication system DTC is output.

Result

| Condition | Proceed to |
|--------------------|------------|
| DTC is not output. | A |
| DTC is output. | B |

A >> GO TO 2.

B >> Inspect CAN communication system.

2. INSPECT HV ECU

Perform HV ECU self-diagnosis.

Is the inspection result normal?

YES >> Repair or replace malfunctioning components.

NO >> GO TO 3.

3. CHECK BRAKE WARNING LAMP

1. Disconnect the brake ECU connector.
2. Turn the ignition switch ON.
3. Check that the brake warning lamp comes ON.

NOTE:

- The brake warning lamp comes ON.
- If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step.

Is the inspection result normal?

YES >> Replace brake ECU.

NO >> GO TO 4.

4. INSPECT COMBINATION METER ASSEMBLY

1. Turn the ignition switch OFF.
2. Reconnect the brake ECU connector.
3. Perform "BRAKE WARN LAMP" of the combination meter (meter CPU) using the "ACTIVE TEST".

NOTE:

- The brake warning lamp turns ON or OFF in accordance with the CONSULT-III.
- If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step.

Is the inspection result normal?

YES >> Replace brake ECU.

NO >> Replace combination meter assembly.

A

B

C

D

E

BRC

G

H

I

J

K

L

M

N

O

P

ELECTRONICALLY CONTROLLED BRAKE WARNING LAMP REMAINS ON

< SYMPTOM DIAGNOSIS >

[VDC/TCS/ABS]

ELECTRONICALLY CONTROLLED BRAKE WARNING LAMP REMAINS ON

Description

INFOID:000000004212754

The brake ECU is connected to the combination meter with CAN communication via HV ECU. If the ECU stores a DTC, the Electronically Controlled Brake warning lamp comes on in the combination meter.

Diagnosis Procedure

INFOID:000000004212755

NOTE:

Electronically Controlled Brake warning lamp blinks when brake ECU is in "TEST MODE".

CAUTION:

When replacing the brake ECU, perform initialization of linear solenoid valve and calibration.

1.CHECK CAN COMMUNICATION SYSTEM

Check if the CAN communication system DTC is output.

Result

| Condition | Proceed to |
|--------------------|------------|
| DTC is not output. | A |
| DTC is output. | B |

A >> GO TO 2.

B >> Inspect CAN communication system.

2.INSPECT HV ECU

Perform HV ECU self-diagnosis.

Is the inspection result normal?

YES >> Repair or replace malfunctioning components.

NO >> GO TO 3.

3.CHECK IF BRAKE ECU CONNECTOR IS SECURELY CONNECTED

Check if the brake ECU connector is securely connected.

NOTE:

The connector should be securely connected.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Connect connector to ECU correctly.

4.CHECK AUXILIARY BATTERY

Check the auxiliary battery voltage.

Standard voltage : 11 to 14 V

Is the inspection result normal?

YES >> GO TO 5.

NO >> Charge or replace auxiliary battery.

5.INSPECT COMBINATION METER ASSEMBLY

Perform "ELE BRK WARN LAMP" of the combination meter (meter CPU) using the "ACTIVE TEST".

NOTE:

- The Electronically Controlled Brake warning lamp turns ON or OFF in accordance with the CONSULT-III.
- If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step.

Is the inspection result normal?

YES >> Replace brake ECU.

NO >> Replace combination meter assembly.

ELECTRONICALLY CONTROLLED BRAKE WARNING LAMP DOES NOT COME ON

< SYMPTOM DIAGNOSIS >

[VDC/TCS/ABS]

ELECTRONICALLY CONTROLLED BRAKE WARNING LAMP DOES NOT COME ON

Description

INFOID:000000004212756

The brake ECU is connected to the combination meter with CAN communication via HV ECU. If the ECU stores a DTC, the Electronically Controlled Brake warning lamp comes ON in the combination meter.

Diagnosis Procedure

INFOID:000000004212757

CAUTION:

When replacing the brake ECU, perform initialization of linear solenoid valve and calibration.

1. CHECK CAN COMMUNICATION SYSTEM

Check if the CAN communication system DTC is output.

Result

| Condition | Proceed to |
|--------------------|------------|
| DTC is not output. | A |
| DTC is output. | B |

A >> GO TO 2.

B >> Inspect CAN communication system.

2. INSPECT HV ECU

Perform HV ECU self-diagnosis.

Is the inspection result normal?

YES >> Repair or replace malfunctioning components.

NO >> GO TO 3.

3. CHECK ELECTRONICALLY CONTROLLED BRAKE WARNING LAMP

1. Connect the CONSULT-III.
2. Turn the ignition switch ON (READY).
3. Select "ELE BRK WARN LAMP" in the "ACTIVE TEST" and operate the Electronically Controlled Brake warning lamp using the CONSULT-III.

ABS/VDC:

| Tester display | Test part | Control range | Diagnostic note |
|-------------------|--|---------------------|---------------------------|
| ELE BRK WARN LAMP | Electronically Controlled Brake warning lamp | Warning lamp ON/OFF | Observe combination meter |

4. Check that "ON" and "OFF" of the Electronically Controlled Brake warning lamp are indicated on the combination meter when using the CONSULT-III.

NOTE:

- The Electronically Controlled Brake warning lamp turns ON or OFF in accordance with the CONSULT-III.
- If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace brake ECU.

4. INSPECT COMBINATION METER ASSEMBLY

1. Turn the ignition switch OFF.
2. Perform "ELE BRK WARN LAMP" of the combination meter (meter CPU) using the "ACTIVE TEST".

NOTE:

- The Electronically Controlled Brake warning lamp turns ON or OFF in accordance with the CONSULT-III.

ELECTRONICALLY CONTROLLED BRAKE WARNING LAMP DOES NOT COME ON

< SYMPTOM DIAGNOSIS >

[VDC/TCS/ABS]

-
- If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step.

Is the inspection result normal?

YES >> Replace brake ECU.

NO >> Replace combination meter assembly.

SLIP INDICATOR LAMP REMAINS ON

< SYMPTOM DIAGNOSIS >

[VDC/TCS/ABS]

SLIP INDICATOR LAMP REMAINS ON

Description

INFOID:000000004212758

The brake ECU is connected to the combination meter with CAN communication HV ECU. The SLIP indicator blinks during ABS or VDC or TCS operation.

Diagnosis Procedure

INFOID:000000004212759

CAUTION:

When replacing the brake ECU, perform initialization of linear solenoid valve and calibration.

1. CHECK CAN COMMUNICATION SYSTEM

Check if the CAN communication system DTC is output.

Result

| Condition | Proceed to |
|--------------------|------------|
| DTC is not output. | A |
| DTC is output. | B |

- A >> GO TO 2.
B >> Inspect CAN communication system.

2. INSPECT HV ECU

Perform HV ECU self-diagnosis.

Is the inspection result normal?

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

3. CHECK IF BRAKE ECU CONNECTOR IS SECURELY CONNECTED

Check if the brake ECU connector is securely connected.

NOTE:

The connector should be securely connected.

Is the inspection result normal?

- YES >> GO TO 4.
NO >> Connect connector to ECU correctly.

4. CHECK AUXILIARY BATTERY

Check the auxiliary battery voltage.

Standard voltage : 11 to 14 V

Is the inspection result normal?

- YES >> GO TO 5.
NO >> Charge or replace auxiliary battery.

5. INSPECT COMBINATION METER ASSEMBLY

Perform "SLIP INDI LAMP" of the combination meter (meter CPU) using the "ACTIVE TEST".

NOTE:

- The SLIP indicator lamp turns ON or OFF in accordance with the CONSULT-III.
- If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step.

Is the inspection result normal?

- YES >> Replace brake ECU.
NO >> Replace combination meter assembly.

SLIP INDICATOR LAMP DOES NOT COME ON

< SYMPTOM DIAGNOSIS >

[VDC/TCS/ABS]

SLIP INDICATOR LAMP DOES NOT COME ON

Description

INFOID:000000004212760

The brake ECU is connected to the combination meter with CAN communication via HV ECU. The SLIP indicator blinks during ABS or VDC or TCS operation.

Diagnosis Procedure

INFOID:000000004212761

CAUTION:

When replacing the brake ECU, perform initialization of linear solenoid valve and calibration.

1. CHECK CAN COMMUNICATION SYSTEM

Check if the CAN communication system DTC is output.

Result

| Condition | Proceed to |
|--------------------|------------|
| DTC is not output. | A |
| DTC is output. | B |

A >> GO TO 2.

B >> Inspect CAN communication system.

2. INSPECT HV ECU

Perform HV ECU self-diagnosis.

Is the inspection result normal?

YES >> Repair or replace malfunctioning components.

NO >> GO TO 3.

3. CHECK SLIP INDICATOR LAMP

1. Connect the CONSULT-III.
2. Turn the ignition switch ON (READY).
3. Select "SLIP INDI LAMP" in the "ACTIVE TEST" and operate the SLIP indicator lamp using the CONSULT-III.

ABS/VDC:

| Tester display | Test part | Control range | Diagnostic note |
|----------------|---------------------|-----------------------|---------------------------|
| SLIP INDI LAMP | SLIP indicator lamp | Indicator lamp ON/OFF | Observe combination meter |

4. Check that "ON" and "OFF" of the brake control warning lamp are indicated on the combination meter when using the CONSULT-III.

NOTE:

- The SLIP indicator lamp turns ON or OFF in accordance with the CONSULT-III.
- If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace brake ECU.

4. INSPECT COMBINATION METER ASSEMBLY

1. Turn the ignition switch OFF.
2. Perform "SLIP INDI LAMP" of the combination meter (meter CPU) using the "ACTIVE TEST".

NOTE:

- The SLIP indicator lamp turns ON or OFF in accordance with the CONSULT-III.
- If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step.

Is the inspection result normal?

YES >> Replace brake ECU.

NO >> Replace combination meter assembly.

BRAKE WARNING BUZZER CIRCUIT

< SYMPTOM DIAGNOSIS >

[VDC/TCS/ABS]

BRAKE WARNING BUZZER CIRCUIT

Description

INFOID:000000004212762

The brake warning buzzer sounds while the accumulator pressure is abnormally low or when an abnormality causing low fluid pressure occurs.

Diagnosis Procedure

INFOID:000000004212763

CAUTION:

When replacing the brake ECU, perform initialization of linear solenoid valve and calibration.

1. PERFORM ACTIVE TEST BY CONSULT-III (BRAKE WARNING BUZZER)

1. Connect the CONSULT-III.
2. Turn ignition switch ON (READY).
3. Select the "ACTIVE TEST" mode on the CONSULT-III.

ABS/VDC:

| Tester display | Test part | Control range | Diagnostic note |
|----------------|----------------------|---------------|---------------------|
| BRAKE BUZZER | Brake warning buzzer | Buzzer ON/OFF | Buzzer can be heard |

4. Check that the buzzer sounds/stops when turning the brake warning buzzer on/off by using the CONSULT-III.

Result

| Condition | Proceed to |
|--|------------|
| Buzzer does not sound or sound constantly. | A |
| Buzzer sounds/stops. | B |

NOTE:

If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step.

- A >> GO TO 2.
B >> INSPECTION END

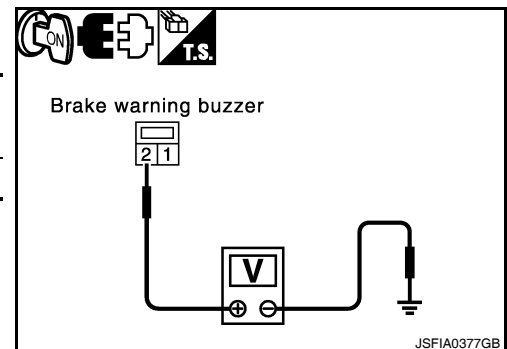
2. INSPECT BRAKE WARNING BUZZER (POWER SOURCE TERMINAL)

1. Turn the ignition switch OFF.
2. Disconnect the brake warning buzzer connector M26.
3. Turn the ignition switch ON.
4. Measure the voltage according to the value(s) in the table below.

| Brake warning buzzer | | Condition | Specified condition |
|----------------------|------------|--------------------|---------------------|
| Connector | Terminal | | |
| M26 | 2 – Ground | Ignition switch ON | 10 to 14 V |

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Repair or replace harness or connector (power source circuit).



3. INSPECT BRAKE WARNING BUZZER

Apply battery negative voltage to terminal 1, and battery positive voltage to terminal 2 of the brake warning buzzer, and then check that the buzzer sounds.

NOTE:

The brake warning buzzer sounds.

Is the inspection result normal?

- YES >> GO TO 4.
NO >> Replace brake warning buzzer.

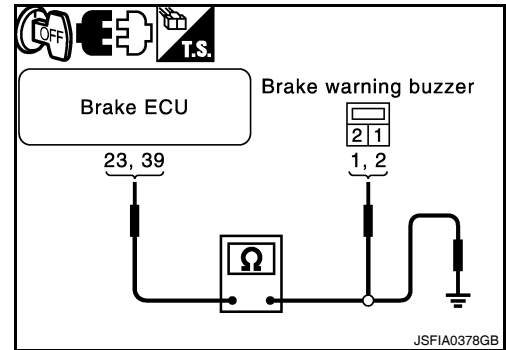
BRAKE WARNING BUZZER CIRCUIT

[VDC/TCS/ABS]

< SYMPTOM DIAGNOSIS >

4. CHECK HARNESS AND CONNECTOR (BRAKE ECU – BRAKE WARNING BUZZER)

1. Turn the ignition switch OFF.
2. Disconnect the brake ECU connector.
3. Measure the resistance according to the value(s) in the table below.



| Brake ECU | | Brake warning buzzer | | — | Condition | Specified condition |
|-----------|----------|----------------------|----------|--------|-----------|---------------------|
| Connector | Terminal | Connector | Terminal | | | |
| E60 | 39 | M26 | 1 | — | Always | Below 1 Ω |
| E60 | 39 | — | — | Ground | Always | 10 kΩ or higher |
| E60 | 23 | M26 | 2 | — | Always | Below 1 Ω |
| E60 | 23 | — | — | Ground | Always | 10 kΩ or higher |

Is the inspection result normal?

- YES >> GO TO 5.
 NO >> Repair or replace harness or connector.

5. INSPECT BRAKE ECU (GND TERMINAL)

1. Disconnect the brake ECU connectors.
2. Measure the resistance according to the value(s) in the table below.

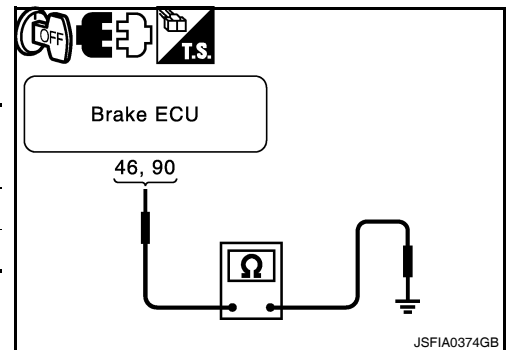
| Brake ECU | | Condition | Specified condition |
|-----------|-------------|-----------|---------------------|
| Connector | Terminal | | |
| E60 | 46 – Ground | Always | Below 1 Ω |
| E61 | 90 – Ground | Always | Below 1 Ω |

NOTE:

If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step.

Is the inspection result normal?

- YES >> Replace brake ECU.
 NO >> Repair or replace harness or connector (GND circuit).



PRECAUTION

PRECAUTIONS

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

INFOID:000000004212764

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 SR and SB section 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 SR section.
- 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 For High-Voltage System

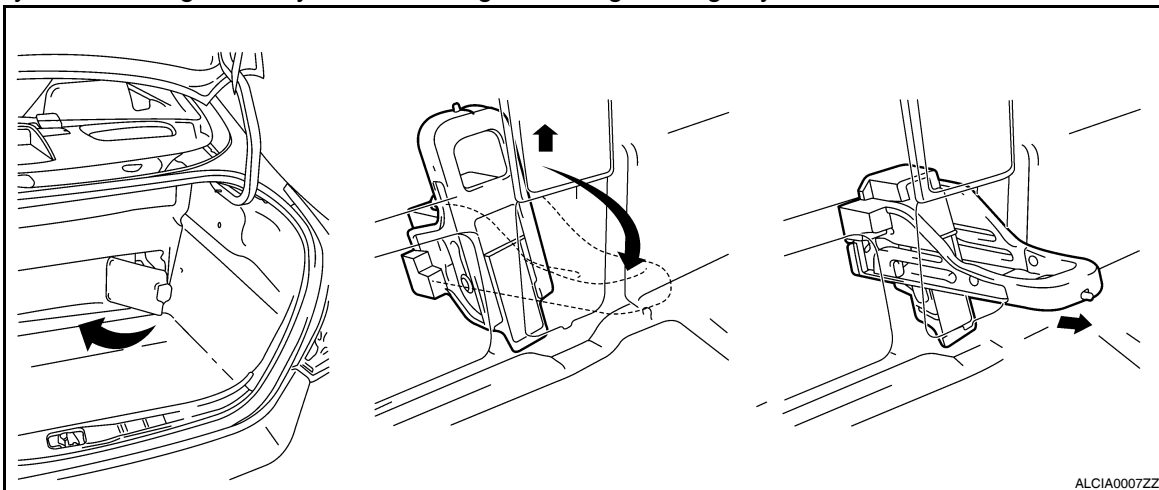
INFOID:000000004212765

Refer to [GI-24. "Precautions For High-Voltage System"](#).

Precautions for Inspecting the Hybrid Control System

INFOID:000000004212766

- Before inspecting the high-voltage system or disconnecting the low voltage connector of the inverter with converter assembly, take safety precautions, such as wearing insulated gloves and removing the service plug grip to prevent electrical shocks. Make sure to turn the ignition switch OFF before removing the service plug grip. After removing the service plug grip, put it in your pocket to prevent other technicians from accidentally reconnecting it while you are working on the high-voltage system.



ALCIA0007ZZ

NOTE:

Turning the ignition switch ON (READY) with the service plug grip removed could cause a malfunction. Do not turn the ignition switch ON (READY) unless instructed by the service manual.

- After disconnecting the service plug grip, wait for at least 10 minutes before touching any of the high-voltage connectors or terminals.

NOTE:

Waiting for at least 10 minutes is required to discharge the high-voltage capacitor inside the inverter with converter assembly.

A
B
C
D
E
BRC
G
H
I
J
K
L
M
N
O
P

PRECAUTIONS

[VDC/TCS/ABS]

< PRECAUTION >

- Turn the ignition switch OFF, wear insulated gloves, and disconnect the negative terminal of the auxiliary battery before touching any of the orange-colored wires of the high-voltage system.
- Turn the ignition switch OFF before performing any resistance checks.
- Turn the ignition switch OFF before disconnecting or reconnecting any connectors.

Electronically Controlled Brake System

INFOID:000000004212767

CAUTION:

When disconnecting the negative battery terminal, initialize the following system after the terminal is reconnected:

| |
|------------|
| System |
| SFI system |

TROUBLESHOOTING PRECAUTIONS

1. When there is a malfunction with terminal contact points or part installation problems, removal and installation of the suspected problem parts may return the system to the normal condition either completely or temporarily.
2. In order to determine the malfunctioning area, be sure to check the conditions at the time the malfunction occurred, such as DTC output and the Freeze Frame Data, and record it before disconnecting each connector or removing and installing parts.
3. Since the system may be influenced by malfunctions in systems other than the brake control system, be sure to check for DTCs in order systems.

HANDLING PRECAUTIONS

1. Do not remove or install Electronically Controlled Brake parts such as the steering angle sensor, yaw rate/side/decel G sensor or brake stroke sensor except when required, as they cannot be adjusted correctly after removal or installation.
2. Be sure to perform preparation before work and confirmation after work is completed by following the direction in the repair manual when working on the Electronically Controlled Brake system.
3. Be sure to remove and install the ECU, actuator, each sensor, etc. with the ignition switch OFF unless it is not specified in the inspection procedure.
4. Be sure to remove the 2 main relays before removal and installation, or replacement of the Electronically Controlled Brake parts.
5. The removal or installation of the actuator, master cylinder or stroke simulator as well as some other procedures can cause the fluid level to drop below the fluid reservoir port. If this happens when performing such work, be sure to remove the 2 motor relays until the bleeding of the air in the pipeline is completed.

NOTE:

- When the pump motor is operated with the air in the brake actuator hose, bleeding the air becomes difficult due to air in the actuator.
 - The brake ECU may operate the stroke simulator and drive the pump motor even when the ignition switch OFF.
 - With the ignition switch OFF, the brake ECU can be operated for 2 minutes after the brake operation is finished.
6. Removal of the main relay and motor relay.
 - a. Wait for 2 minutes after turning the ignition switch OFF, stopping the brake pedal operation and closing the driver door before removing the 2 relays.

NOTE:

The above situation occurs when the pump motor operates to prepare for the next operation just before the brake control system turns OFF.

7. If the ECU, brake actuator, or a sensor has been removed and installed, it is necessary to check the system for problems after the parts have been reassembled. Check for DTCs using the CONSULT-III, also check that system functions and signals received by the ECU are normal using Test Mode.

DTC PRECAUTION

Warnings for some DTCs cannot be cleared only by repairing the malfunctioning parts. If the warning is displayed after repair work, the DTC should be cleared after turning the ignition switch OFF.

CAUTION:

If a DTC for a malfunctioning part reappears after it was cleared, then it has been stored again.

PRECAUTIONS

< PRECAUTION >

[VDC/TCS/ABS]

CHASSIS DYNAMOMETER PRECAUTION

When checking with chassis dynamometer, place CONSULT-III in "INSPECTION MODE" to deactivate VDC and TCS. Refer to [HBC-104, "MODE 1 : Diagnosis Description"](#) (MODE 1), [HBC-105, "MODE 2 : Diagnosis Description"](#) (MODE 2).

NOTE:

The vehicle may move unexpectedly out of the dynamometer because of TCS and VDC operations.

CAUTION:

- **Make sure that the brake control warning, master caution indicator lamps blink and "CHECK VDC SYSTEM" is displayed on the multi information display (Test Mode is achieved).**
- **Secure the vehicle with the lock chain for safety.**

CAN COMMUNICATION SYSTEM PRECAUTIONS

1. The CAN communication system is used for the data communication between the brake ECU, the steering angle sensor, the yaw rate/side/decel G sensor and other ECUs. If there is trouble in the CAN communication line, corresponding DTCs in the communication line are output.
2. If the DTC in the CAN communication line is output, repair the malfunction in the communication line and troubleshoot the Electronically Controlled Brake system while data communication is normal.
3. In order to enable CAN communication, a specific type of wiring is used for the CAN communication lines. The wiring is used for each communication line is a twisted pair of wires that have an equal length. A bypass wire should not be used, because the data being transmitted will be corrupted.

A
B
C
D
E
BRC
G
H
I
J
K
L
M
N
O
P

PREPARATION

< PREPARATION >

[VDC/TCS/ABS]

PREPARATION

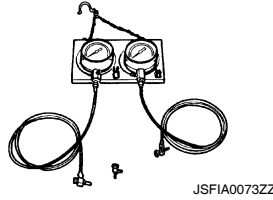
PREPARATION

Special Service Tool

INFOID:000000004212768

The actual shapes of Kent-Moore tools may be different from those of special service tools illustrated here.

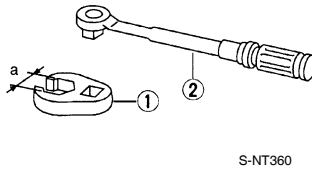
| Tool number (Kent-Moore No.) Tool name | Description |
|--|----------------------------------|
| KV991V0010 (J-39528) Brake fluid pressure tester | Brake fluid pressure measurement |



Commercial Service Tool

INFOID:000000004212769

| Tool name | Description |
|---|---|
| 1. Flare nut crowfoot 2. Torque wrench | Installing brake tube a: 10 mm (0.39 in) / 12 mm (0.47 in) |
| Insulation groves | Guaranteed insulation performance for 1000V/ 300A |



ON-VEHICLE MAINTENANCE

BRAKE ECU

Inspection

INFOID:000000004212770

INSPECT BRAKE ECU

1. Measure the voltage between each terminal or between each terminal and body ground.
2. Connect the CONSULT-III, and check the communication condition with the brake ECU.

CAUTION:

- Inspection should be performed from the back of the connector with the connected to the brake ECU.
- The voltage between the terminals of the brake actuator assembly may become 0 V due to the fail safe function when the brake warning lamp comes ON (malfunctioning).

A

B

C

D

E

BRC

G

H

I

J

K

L

M

N

O

P

BRAKE ACTUATOR

< ON-VEHICLE MAINTENANCE >

[VDC/TCS/ABS]

BRAKE ACTUATOR

Inspection

INFOID:000000004212771

INSPECT BRAKE ACTUATOR ASSEMBLY OPERATION

1. On "DATA MONITOR", select "FR WC PRESS", "FL WC PRESS", "RR WC PRESS" and "RL WC PRESS", and check the wheel cylinder pressure.

| Tester display | Measurement item/ Range | Normal condition | Diagnostic note |
|----------------|---|--|-----------------|
| FR WC PRESS | FR wheel cylinder pressure sensor/ min: 0 V, max: 5 V | When brake pedal is released: 0.3 to 0.9 V | — |
| FL WC PRESS | FL wheel cylinder pressure sensor/ min: 0 V, max: 5 V | When brake pedal is released: 0.3 to 0.9 V | — |
| RR WC PRESS | RR wheel cylinder pressure sensor/ min: 0 V, max: 5 V | When brake pedal is released: 0.3 to 0.9 V | — |
| RL WC PRESS | RL wheel cylinder pressure sensor/ min: 0 V, max: 5 V | When brake pedal is released: 0.3 to 0.9 V | — |

2. Check the output value of the wheel cylinder pressure sensor at each fluid pressure during the Electronically Controlled Brake control.

| Condition | Front wheel | Rear wheel |
|---|--------------|--------------|
| When fully depressing brake pedal with the vehicle stopped. | 2.89 ±0.15 V | 1.32 ±0.15 V |

INSPECT BRAKE ACTUATOR ASSEMBLY

Measure the resistance according to the value(s) in the table below.

| Tester connection | | Condition | Specified condition |
|-------------------|----------|-----------|---------------------|
| Brake actuator | | | |
| Connector | Terminal | | |
| E91 | 32 – 2 | Always | Below 10 Ω |
| E91 | 31 – 2 | Always | Below 10 Ω |
| E91 | 32 – 31 | Always | Below 1 Ω |
| E91 | 1 – 2 | Always | Below 1 Ω |
| E91 | 32 – 3 | Always | 450 to 550 Ω |
| E91 | 31 – 3 | Always | 450 to 550 Ω |

If the value is not as specified, replace the brake actuator assembly.

WHEEL SENSOR

< ON-VEHICLE MAINTENANCE >

[VDC/TCS/ABS]

WHEEL SENSOR

Inspection

INFOID:000000004212772

INSPECT FRONT WHEEL SENSOR

1. Inspect the front wheel sensor. If any of the following occurs, replace the front wheel sensor with a new one:
 - The surface of the front wheel sensor is cracked, dented, or chipped off.
 - The connector or wire harness is scratched, cracked, or damaged.
 - The front wheel sensor has been dropped.
2. Measure the resistance according to the value(s) in the table below.

RH

| Tester connection | | — | Condition | Specified condition |
|--------------------|----------|--------|-----------|---------------------|
| Front wheel sensor | | | | |
| Connector | Terminal | | | |
| E41 | 1 – 2 | — | Always | Not existed |
| E41 | 1 | Ground | Always | Existed |
| E41 | 2 | Ground | Always | Existed |

LH

| Tester connection | | — | Condition | Specified condition |
|--------------------|----------|--------|-----------|---------------------|
| Front wheel sensor | | | | |
| Connector | Terminal | | | |
| E19 | 1 – 2 | — | Always | Not existed |
| E19 | 1 | Ground | Always | Existed |
| E19 | 2 | Ground | Always | Existed |

If the value is not as specified, replace the front wheel sensor.

INSPECT REAR WHEEL SENSOR

1. Inspect the rear wheel sensor. If any of the following occurs, replace the rear wheel sensor with a new one:
 - The surface of the rear wheel sensor is cracked, dented, or chipped off.
 - The connector is scratched, cracked, or damaged.
 - The skid control sensor has been dropped.
2. Measure the resistance to the value(s) in the table below.

RH

| Tester connection | | — | Condition | Specified condition |
|--------------------|----------|--------|-----------|---------------------|
| Front wheel sensor | | | | |
| Connector | Terminal | | | |
| B43 | 3 – 4 | — | Always | Not existed |
| B43 | 3 | Ground | Always | Existed |
| B43 | 4 | Ground | Always | Existed |

LH

| Tester connection | | — | Condition | Specified condition |
|--------------------|----------|--------|-----------|---------------------|
| Front wheel sensor | | | | |
| Connector | Terminal | | | |
| B43 | 1 – 2 | — | Always | Not existed |
| B43 | 1 | Ground | Always | Existed |
| B43 | 2 | Ground | Always | Existed |

If the value is not as specified, replace rear wheel sensor.

A
B
C
D
E
BRC
G
H
I
J
K
L
M
N
O
P

ABS RELAY NO. 1 AND NO. 2

< ON-VEHICLE MAINTENANCE >

[VDC/TCS/ABS]

ABS RELAY NO. 1 AND NO. 2

Inspection

INFOID:000000004212773

INSPECT ABS RELAY NO.1 AND NO.2

Measure the resistance according to the value(s) in the table below.

| Tester connection | Condition | Specified condition |
|-------------------|--------------------------------------|-------------------------|
| 1 – 2 | Always | 10 k Ω or higher |
| 1 – 2 | Apply B+ between terminal is 3 and 4 | Below 1 Ω |

If the value is not as specified, replace the ABS relay No.1 or No.2.

ABS MOTOR RELAY NO. 1 AND NO. 2

< ON-VEHICLE MAINTENANCE >

[VDC/TCS/ABS]

ABS MOTOR RELAY NO. 1 AND NO. 2

Inspection

INFOID:000000004212774

INSPECT ABS MOTOR RELAY NO.1 AND NO.2

Measure the resistance according to the value(s) in the table below.

| Tester connection | Condition | Specified condition |
|-------------------|--------------------------------------|-------------------------|
| 3 – 5 | Always | 10 k Ω or higher |
| 3 – 5 | Apply B+ between terminal is 1 and 2 | Below 1 Ω |

If the value is not as specified, replace the ABS motor relay No.1 or No.2.

A

B

C

D

E

BRC

G

H

I

J

K

L

M

N

O

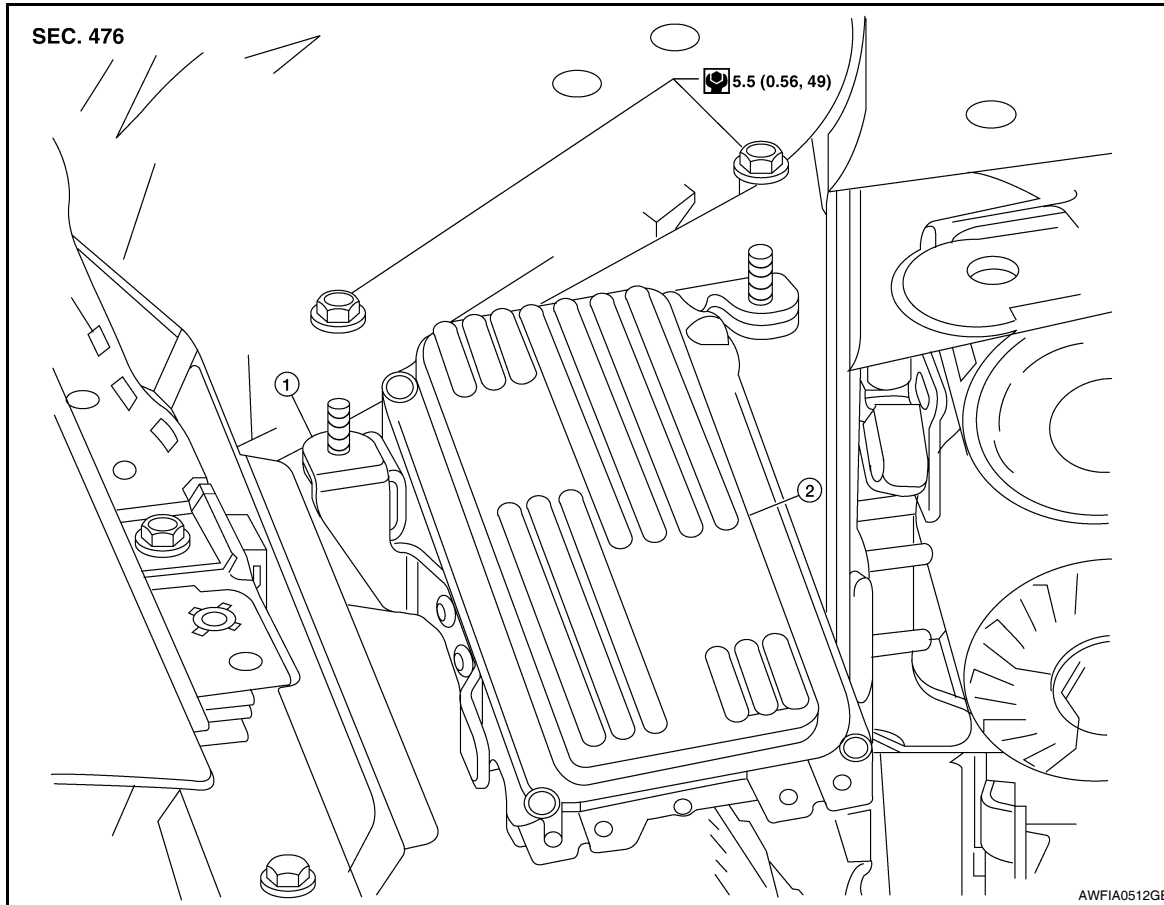
P

ON-VEHICLE REPAIR

BRAKE ECU

Exploded View

INFOID:000000004212775



1. Bracket

2. Brake ECU

Removal and Installation

INFOID:000000004212776

REMOVAL

CAUTION:**Do not apply excessive impact to brake ECU, such as dropping it.**

1. Disconnect brake ECU connector.
2. Remove two nuts and brake ECU from lower bracket.
3. Remove screws and bracket from brake ECU.

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:**After erasing Brake ECU memories, perform zero adjustment of following sensors and initialization of linear solenoid valve. These procedures should be performed on a flat place.**

- **Steering angle sensor.** Refer to [BRC-9, "PERFORM ZERO POINT OF STEERING ANGLE SENSOR : Description"](#).
- **Yaw rate/side/decel G sensor.** Refer to [BRC-8, "PERFORM ZERO POINT OF YAW RATE/SIDE/DECEL G SENSOR : Description"](#).
- **Brake stroke sensor.** Refer to [BRC-9, "PERFORM ADJUSTMENT OF STROKE SENSOR : Description"](#).

BRAKE ECU

< ON-VEHICLE REPAIR >

[VDC/TCS/ABS]

- Linear solenoid valve. Refer to [BRC-7, "PERFORM INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION : Description"](#).

A

B

C

D

E

BRC

G

H

I

J

K

L

M

N

O

P

BRAKE ACTUATOR

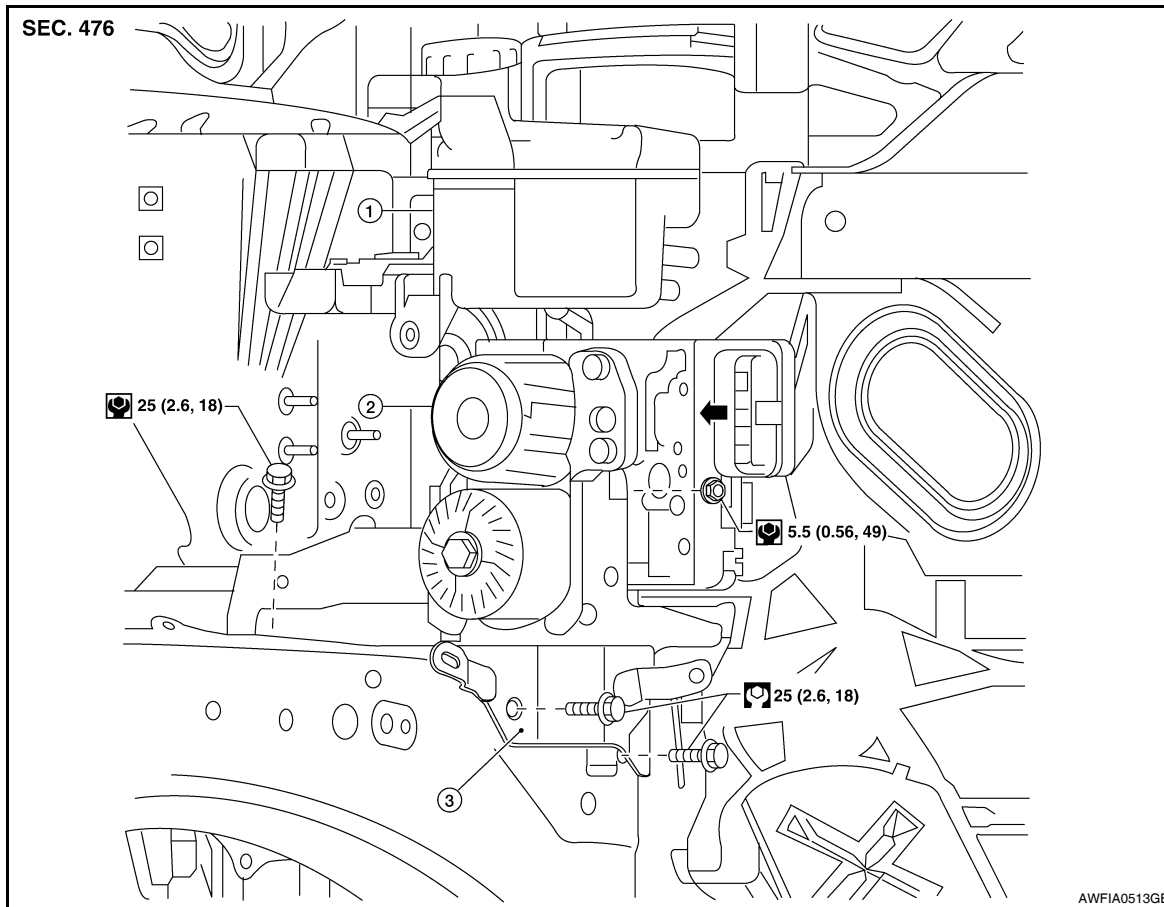
< ON-VEHICLE REPAIR >

[VDC/TCS/ABS]

BRAKE ACTUATOR

Exploded View

INFOID:000000004212777



1. Fluid reservoir
2. Brake actuator
3. Bracket

Removal and Installation

INFOID:000000004212778

REMOVAL

CAUTION:

- Disconnect the 12-volt battery negative terminal for two minutes after turning the Hybrid System OFF. During this period, do not open/close doors, nor step on the brake pedal.
- Note the location of each tube on removal to avoid mixing them up during installation.
- To remove brake tube, use a flare nut wrench to prevent flare nuts and brake tube from being damaged. To install, use flare nut torque wrench.
- Do not apply excessive impact to brake actuator, such as dropping it.
- Do not remove and install actuator by holding harness.
- After work is completed, bleed air from brake tube. Refer to [BR-14, "Bleeding Brake System"](#).
- If brake fluid spills on any painted surface, wash or otherwise remove it completely.
- Perform accumulator pressure zero down.

1. Disconnect the 12-volt battery negative terminal.
2. Remove ABS motor relay No. 1 and No. 2.

NOTE:

If the pump motor operates while air remains inside the brake actuator hose, the air will enter the actuator resulting in difficulty in bleeding the brakes.

3. Relieve fuel pressure. Refer to [FL-4, "Quick Connector"](#).
4. Drain brake fluid. Refer to [BR-14, "Bleeding Brake System"](#).
5. Remove front wiper arms. Refer to [WW-92, "FRONT WIPER ARMS : Removal and Installation"](#).

BRAKE ACTUATOR

[VDC/TCS/ABS]

< ON-VEHICLE REPAIR >

6. Remove cowl top and cowl top extension. Refer to [EXT-17. "Removal and Installation"](#).
7. Disconnect washer hose.
8. Remove tower bar. Refer to [FSU-13. "Exploded View"](#).
9. Remove air cleaner duct and air duct hose. Refer to [EM-24. "Removal and Installation"](#).
10. Remove fuel tube. Refer to [EM-35. "Removal and Installation"](#).
11. Remove intake manifold assembly and place throttle body assembly aside. Refer to [EM-25. "Removal and Installation"](#).
12. Remove brake reservoir.
13. Release brake actuator connector lever, then disconnect brake actuator connector in the direction of arrow as shown in [BRC-200. "Exploded View"](#).
14. Loosen brake tube flare nuts, then remove brake tubes from brake actuator.
NOTE:
Do not damage the brake lines.
15. Remove brake actuator nuts.
16. Remove brake actuator from vehicle.
17. Remove bracket as necessary.

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

- Disconnect the 12-volt battery negative terminal for two minutes after turning the Hybrid System OFF. During this period, do not open/close doors, nor step on the brake pedal.
- Do not remove the hole plug before connecting the brake line because a new brake actuator assembly is filled with brake fluid.
- Use a torque wrench with a fulcrum length of 250 mm (9.84 in).
- This torque value is effective when flare nut crowfoot is parallel to a torque wrench.
- To remove brake tube, use a flare nut wrench to prevent flare nuts and brake tube from being damaged. To install, use flare nut torque wrench.
- Do not apply excessive impact to brake actuator, such as dropping it.
- Do not remove and install brake actuator by holding harness.
- After work is completed, bleed air from brake tube. Refer to [BR-14. "Bleeding Brake System"](#).
- After installing connector in the brake actuator, make sure connector is securely locked.
- After erasing Brake ECU memories, perform zero adjustment of following sensors and initialization of linear solenoid valve. These procedures should be performed on a flat place.
- Steering angle sensor. Refer to [BRC-9. "PERFORM ZERO POINT OF STEERING ANGLE SENSOR : Description"](#).
- Yaw rate/side/decel G sensor. Refer to [BRC-8. "PERFORM ZERO POINT OF YAW RATE/SIDE/DECEL G SENSOR : Description"](#).
- Brake stroke sensor. Refer to [BRC-9. "PERFORM ADJUSTMENT OF STROKE SENSOR : Description"](#).
- Linear solenoid valve. Refer to [BRC-7. "PERFORM INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION : Description"](#).

Disposal

INFOID:000000004212779

DISPOSAL OF BRAKE ACTUATOR

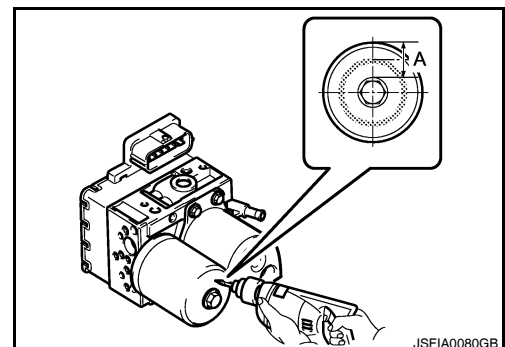
Using a drill, slowly make a hole on the circumference made by the center points of A and discharge the gas.

CAUTION:

Be sure to wear protective glasses to protect the eyes from fragments that may become airborne due to high pressure.

NOTE:

- The hole may be drilled up to approximately 5 to 10 mm (0.20 to 0.39 in) away from the circumference made by the center point of A without problem.
- The gas is nitrogen, which is colorless, odorless and harmless.



WHEEL SENSOR

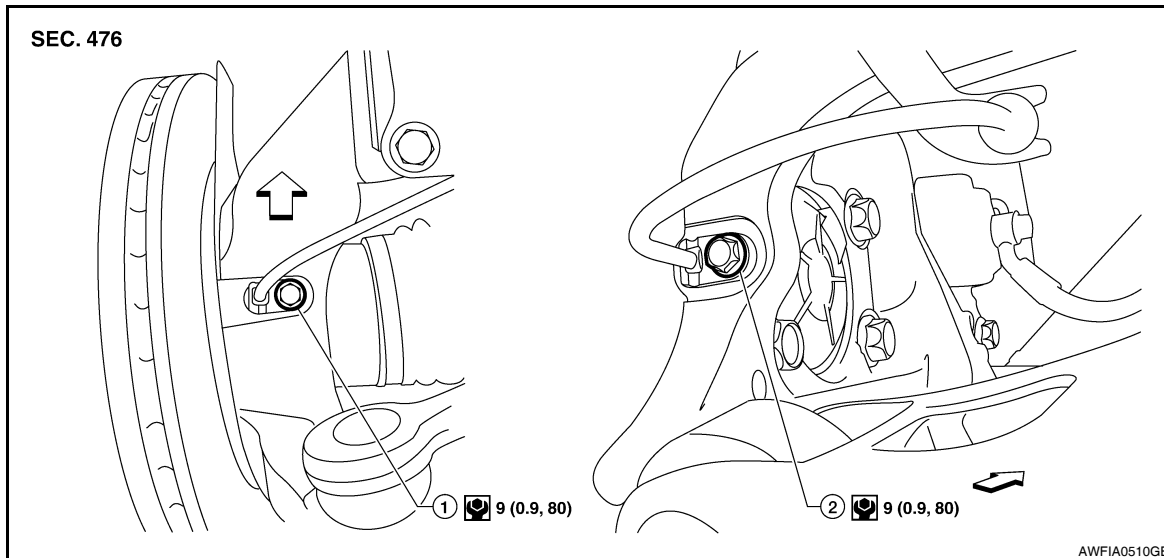
< ON-VEHICLE REPAIR >

[VDC/TCS/ABS]

WHEEL SENSOR

Exploded View

INFOID:000000004212780



1. Front wheel sensor

2. Rear wheel sensor

← Front

Removal and Installation

INFOID:000000004212781

CAUTION:

- Be careful not to damage wheel sensor edge and sensor rotor teeth.
- When removing the front or rear wheel hub assembly, first remove the wheel sensor from the assembly. Failure to do so may result in damage to the wheel sensor wires making the sensor inoperative.
- Pull out the wheel sensor, being careful to turn it as little as possible. Do not pull on the wheel sensor harness.
- Check if foreign objects such as iron fragments are adhered to the pick-up part of the sensor or to the inside of the hole for mounting the wheel sensor, or if a foreign object is caught on the mounting surface of the rotor. Repair as necessary and then install the wheel sensor.

REMOVAL

Front

1. Remove wheel and tire. Refer to [WT-62, "Adjustment"](#).
2. Partially remove front wheel fender protector. Refer to [EXT-18, "Removal and Installation"](#).
3. Remove wheel sensor bolt and wheel sensor.
4. Remove harness wire from mounts and disconnect wheel sensor harness connector.

Rear

NOTE:

Both rear wheel sensors share one harness and must be replaced as an assembly.

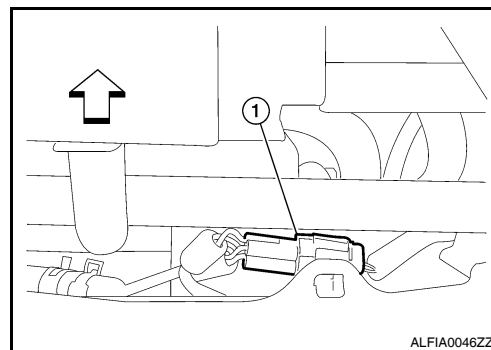
1. Remove wheel and tire using power tool.
2. Remove wheel sensor bolts and wheel sensors from both rear wheels.
3. Remove harness wire from mounts and harness wire clips from suspension member.

WHEEL SENSOR

[VDC/TCS/ABS]

< ON-VEHICLE REPAIR >

4. Disconnect wheel sensor harness connector (1).
 - ⇐: Front



INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

- Check if foreign objects such as iron fragments are adhered to the pick-up part of the sensor or to the inside of the hole for mounting the wheel sensor, or if a foreign object is caught on the mounting surface of the rotor. Repair as necessary and then install the wheel sensor.
- When installing wheel and tire, refer to [WT-62, "Adjustment"](#).
- After replacement, change to TEST MODE, check the M/C pressure, and run the vehicle for a while at a vehicle speed of 45km/h or more, less than 80km/h. After stopping, check the DIAG CODE, keeping at TEST MODE. Check as well that DTC is not detected at normal mode.

A
B
C
D
E
BRC
G
H
I
J
K
L
M
N
O
P

SENSOR ROTOR

Removal and Installation

INFOID:000000004212782

The front and rear wheel sensor rotors are an integral part of the wheel hub assemblies and can not be disassembled. When replacing the sensor rotor, replace the wheel hub assembly. Refer to [FAX-8. "Removal and Installation"](#) (Front), [RAX-7. "Removal and Installation"](#) (Rear).

- After replacement, change to TEST MODE, check the M/C pressure, and run the vehicle for a while at a vehicle speed of 45km/h or more, less than 80km/h. After stopping, check the DIAG CODE, keeping at TEST MODE. Check as well that DTC is not detected at normal mode.

YAW RATE/SIDE/DECEL G SENSOR

< ON-VEHICLE REPAIR >

[VDC/TCS/ABS]

YAW RATE/SIDE/DECEL G SENSOR

Removal and Installation

INFOID:000000004212783

REMOVAL

CAUTION:

Do not use power tool, drop, or strike yaw rate/side/decel G sensor, because it is sensitive to impact.

1. Remove center console. Refer to [IP-17, "Disassembly and Assembly"](#).
2. Disconnect yaw rate/side/decel G sensor harness connector.
3. Remove yaw rate/side/decel G sensor nuts and remove yaw rate/side/decel G sensor.

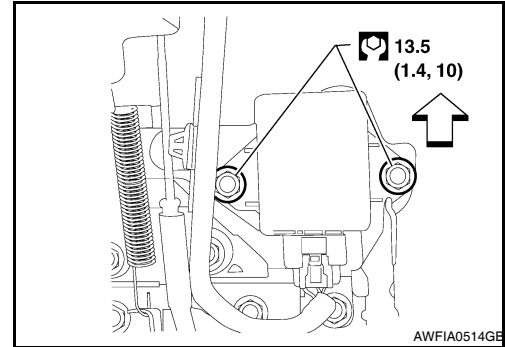
INSTALLATION

Installation is the reverse order of removal.

- ↩: Front

CAUTION:

- Do not use power tool, drop, or strike the yaw rate/side/decel G sensor, because it is sensitive to impact.
- After erasing Brake ECU memories, perform zero adjustment of following sensors and initialization of linear solenoid valve. These procedures should be performed on a flat place:
 - Steering angle sensor. Refer to [BRC-9, "PERFORM ZERO POINT OF STEERING ANGLE SENSOR : Description"](#).
 - Yaw rate/side/decel G sensor. Refer to [BRC-8, "PERFORM ZERO POINT OF YAW RATE/SIDE/DECEL G SENSOR : Description"](#).
 - Brake stroke sensor. Refer to [BRC-9, "PERFORM ADJUSTMENT OF STROKE SENSOR : Description"](#).
 - Linear solenoid valve. Refer to [BRC-7, "PERFORM INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION : Description"](#).



A
B
C
D
E
BRC
G
H
I
J
K
L
M
N
O
P

STEERING ANGLE SENSOR

Removal and Installation

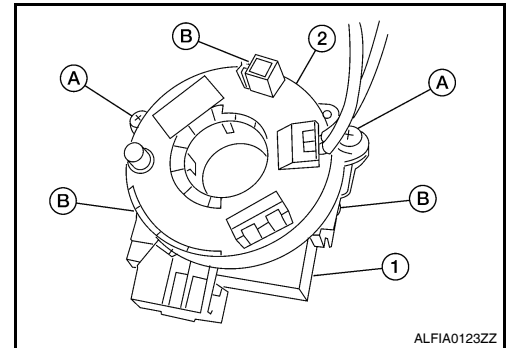
INFOID:000000004212784

REMOVAL

CAUTION:

Disconnect the 12-volt battery negative terminal two minutes after turning Hybrid System OFF. During this period, do not open/close doors, nor step on the brake pedal.

1. Disconnect the 12-volt battery negative and positive terminals.
2. Remove the spiral cable assembly. Refer to [SRS-8, "Removal and Installation"](#).
3. Remove the screws (A) and release the clips (B) to remove the steering angle sensor (1) from the spiral cable (2).



INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

After erasing Brake ECU memories, perform zero adjustment of following sensors and initialization of linear solenoid valve. These procedures should be performed on a flat place:

- Steering angle sensor. Refer to [BRC-9, "PERFORM ZERO POINT OF STEERING ANGLE SENSOR : Description"](#).
- Yaw rate/side/decel G sensor. Refer to [BRC-8, "PERFORM ZERO POINT OF YAW RATE/SIDE/DECEL G SENSOR : Description"](#).
- Brake stroke sensor. Refer to [BRC-9, "PERFORM ADJUSTMENT OF STROKE SENSOR : Description"](#).
- Linear solenoid valve. Refer to [BRC-7, "PERFORM INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION : Description"](#).

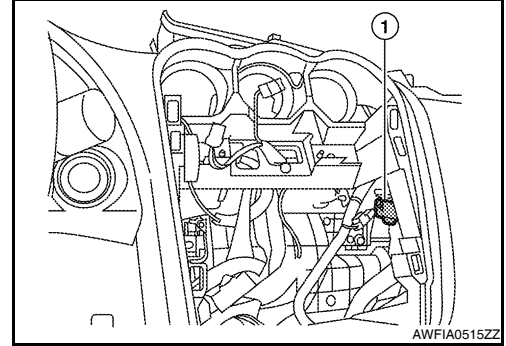
BRAKE WARNING BUZZER

Removal and Installation

INFOID:000000004212785

REMOVAL

1. Remove the audio unit. Refer to [AV-46. "Removal and Installation"](#).
2. Disconnect the brake warning buzzer connector and remove the brake warning buzzer (1).



INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

After the replacement, change the status of CONSULT-III to "ACTIVE TEST" and confirm the function of the brake warning buzzer.

A
B
C
D
E
G
H
I
J
K
L
M
N
O
P

BRC

CAPACITOR

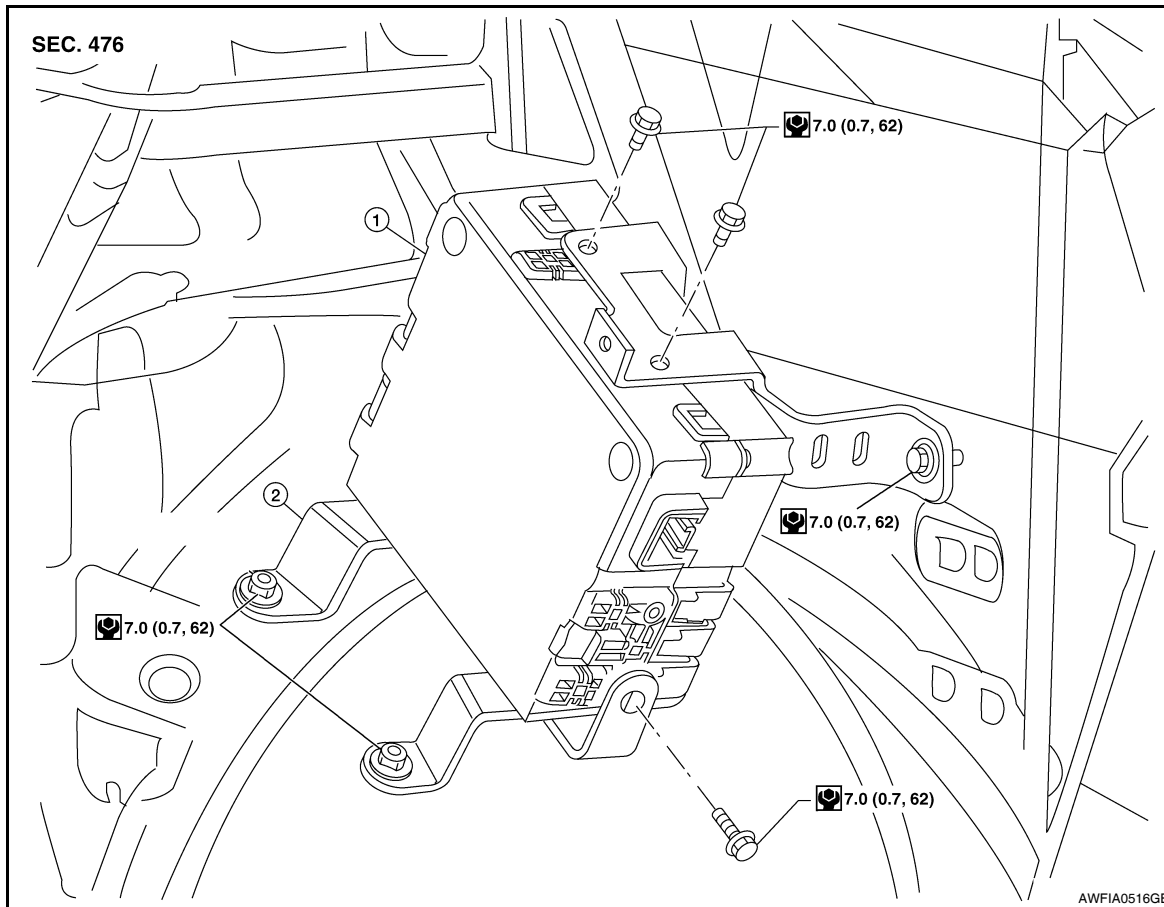
< ON-VEHICLE REPAIR >

[VDC/TCS/ABS]

CAPACITOR

Exploded View

INFOID:000000004212786



1. Capacitor

2. Bracket

Removal and Installation

INFOID:000000004212787

REMOVAL

CAUTION:

- Do not apply excessive impact to capacitor, such as dropping it.
- Do not remove and install capacitor by holding the harness.

1. Remove the trunk side finisher RH. Refer to [INT-27. "Removal and Installation"](#).
2. Disconnect capacitor connector.
3. Remove capacitor screws and remove capacitor.
4. Remove capacitor bracket as necessary.

INSTALLATION

Installation is the reverse order of removal.

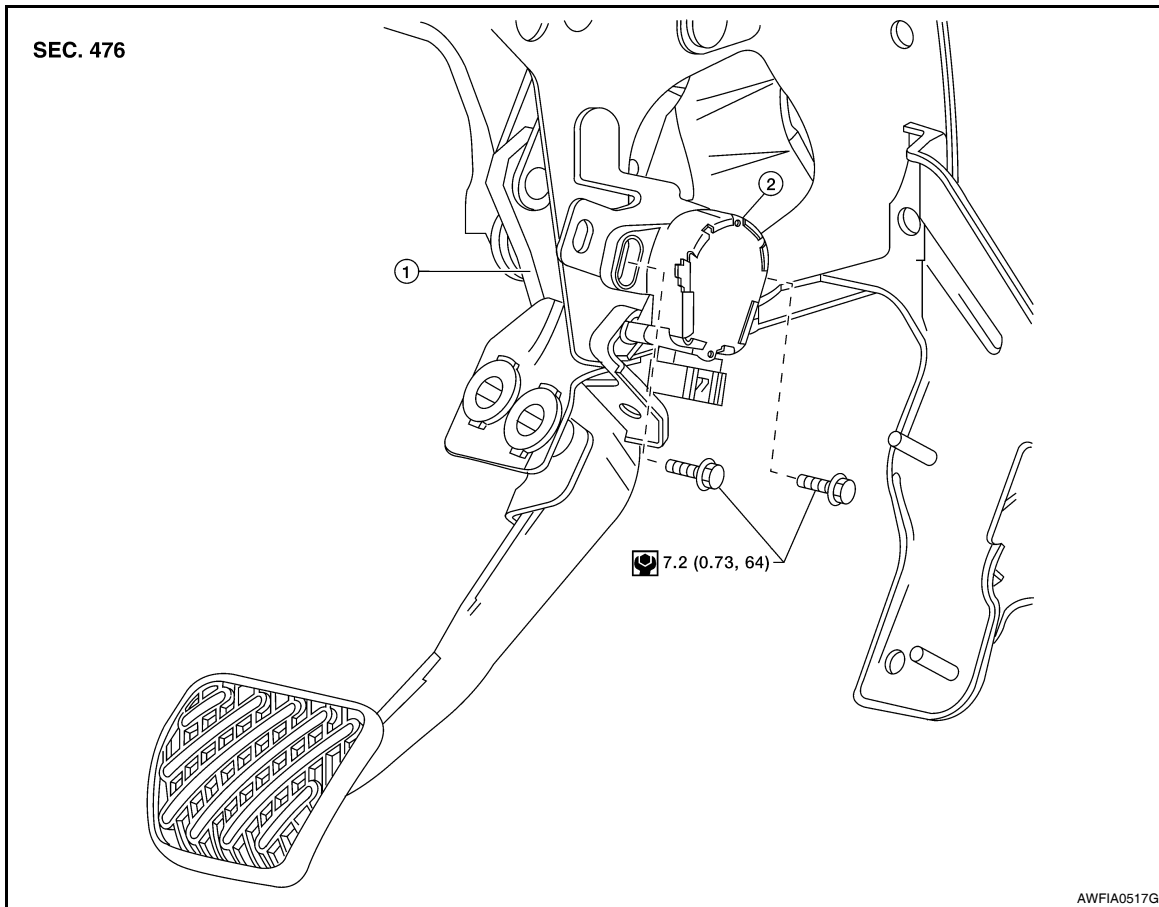
CAUTION:

- Do not apply excessive impact to capacitor, such as dropping it.
- Do not remove and install capacitor by holding the harness.

BRAKE STROKE SENSOR

Exploded View

INFOID:000000004212788



1. Brake pedal
2. Brake pedal stroke sensor

Removal and Installation

INFOID:000000004212789

REMOVAL

CAUTION:

Do not apply excessive impact to brake pedal stroke sensor, such as dropping it.

1. Disconnect the brake pedal stroke sensor connector.
2. Remove the brake pedal stroke sensor bolts and remove the brake pedal stroke sensor.

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

- After replacement, adjust the location to be between 0.8 and 1.2V, checking the voltage with CONSULT-III without stepping on the brake pedal. These procedures should be performed on a flat place.
- After erasing Brake ECU memories, perform zero adjustment of following sensors and initialization of linear solenoid valve. These procedures should be performed on a flat place.
- Steering angle sensor. Refer to [BRC-9, "PERFORM ZERO POINT OF STEERING ANGLE SENSOR : Description"](#).
- Yaw rate/side/decel G sensor. Refer to [BRC-8, "PERFORM ZERO POINT OF YAW RATE/SIDE/DECEL G SENSOR : Description"](#).
- Brake stroke sensor. Refer to [BRC-9, "PERFORM ADJUSTMENT OF STROKE SENSOR : Description"](#).
- Linear solenoid valve. Refer to [BRC-7, "PERFORM INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION : Description"](#).

BRAKE SIMULATOR

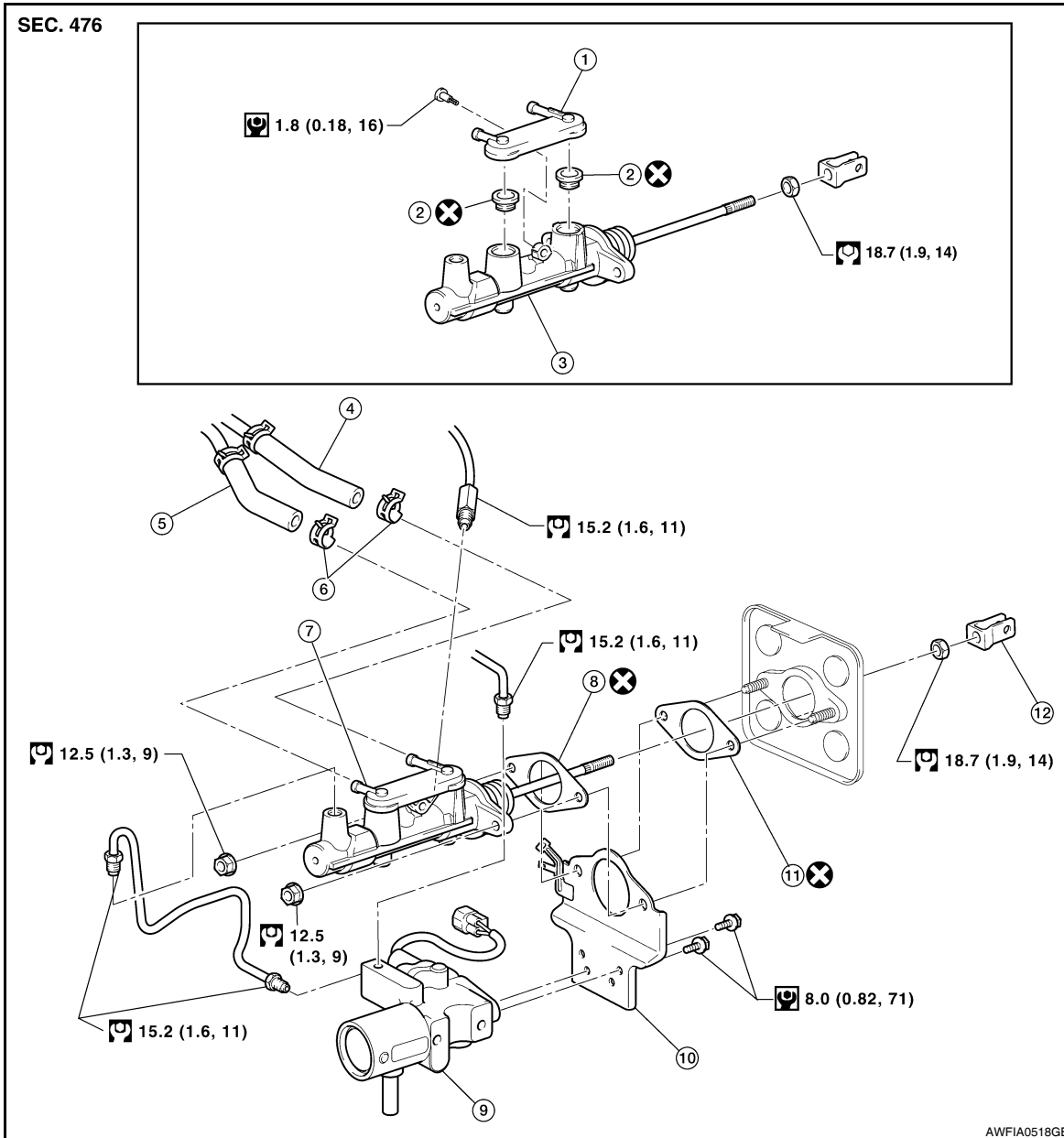
< ON-VEHICLE REPAIR >

[VDC/TCS/ABS]

BRAKE SIMULATOR

Exploded View

INFOID:000000004212790



AWFIA0518GE

- | | | |
|---------------------------------|------------------------|---------------------------------|
| 1. Brake fluid reservoir | 2. Grommet | 3. Master cylinder sub-assembly |
| 4. Reservoir hose No.1 | 5. Reservoir hose No.2 | 6. Clamp |
| 7. Master cylinder sub-assembly | 8. Gasket | 9. Brake simulator |
| 10. Brake simulator bracket | 11. Gasket | 12. Clevis |

Removal and Installation

INFOID:000000004212791

CAUTION:

- After the work is completed, bleed air from brake simulator and brake tube.
- Do not bend or damage the brake line.
- Do not allow any foreign material such as dirt and dust from entering the brake line from the connecting points.
- Use a torque wrench with a fulcrum length of 250mm (9.84 in).
- This torque value is effective when flare nut crowfoot is parallel to a torque wrench.

BRC-210

BRAKE SIMULATOR

< ON-VEHICLE REPAIR >

[VDC/TCS/ABS]

- Do not reuse gaskets.
- After replacement, adjust the brake pedal stroke sensor location to be between 0.8 and 1.2V, checking the voltage with CONSULT-III without stepping on the brake pedal. These procedures should be performed on a flat place.
- After erasing Brake ECU memories, perform zero adjustment of following sensors and initialization of linear solenoid valve. These procedures should be performed on a flat place.
- Steering angle sensor. Refer to [BRC-9, "PERFORM ZERO POINT OF STEERING ANGLE SENSOR : Description"](#).
- Yaw rate/side/decel G sensor. Refer to [BRC-8, "PERFORM ZERO POINT OF YAW RATE/SIDE/DECEL G SENSOR : Description"](#).
- Brake stroke sensor. Refer to [BRC-9, "PERFORM ADJUSTMENT OF STROKE SENSOR : Description"](#).
- Linear solenoid valve. Refer to [BRC-7, "PERFORM INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION : Description"](#).

REMOVAL

1. Disconnect the mass air flow sensor, and the wiring harness retainers on the air cleaner assembly.
2. Remove the air duct hose, front air duct and air cleaner assembly. Refer to [EM-24, "Removal and Installation"](#).
3. Disconnect the brake simulator connector.
4. Disconnect the hoses and brake tubes from the brake master cylinder and brake simulator.
5. Remove the instrument lower cover (LH). Refer to [IP-11, "Exploded View"](#).
6. Remove the brake pedal clevis pin.
7. Remove the master cylinder sub-assembly nuts.
8. Pull out the master cylinder sub-assembly and remove the brake simulator with bracket.
9. Remove the brake simulator bracket bolts.
10. Remove the brake simulator from the bracket.

INSTALLATION

Installation is in the reverse order of removal.

- Bleed the brake system. Refer to [BR-14, "Bleeding Brake System"](#).

Disassembly and Assembly

INFOID:000000004212792

CAUTION:

- Do not reuse grommets and gaskets.
- Do not bend or damage the brake tube.
- Do not allow any foreign matter such as dirt and dust to enter the brake line from the connecting points.
- Use a torque wrench with a fulcrum length of 250 mm (9.84 in).
- This torque value is effective when flare nut crowfoot is parallel to a torque wrench.

DISASSEMBLY

Remove screw, brake fluid reservoir and both grommets from master cylinder sub-assembly.

ASSEMBLY

Assembly is in the reverse order of disassembly.