SECTION BRC
BRAKE CONTROL SYSTEM

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BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000005440604

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.

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:0000000005440605

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
• 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:0000000005440606

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-40, "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:

- 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:0000000005440607

- 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:0000000005440608

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:0000000005440609

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

PERFORM ADJUSTMENT OF STROKE SENSOR : Special Repair Requirement

INFOID:0000000005440610

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:0000000005440611

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:0000000005440612

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:

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

BASIC INSPECTION

TEST MODE PROCEDURE

INFOID:0000000005440613

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-169, "Description"
Brake warning lamp circuit	BRC-176, "Description"
Electronically Controlled Brake warning lamp circuit	BRC-178, "Description"
VDC warning lamp circuit	BRC-171, "Description"
SLIP indicator lamp circuit	BRC-181, "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).**

- **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	• Front wheel sensor RH • Sensor installation • Wheel sensor rotor
C1272	Low output signal of front wheel sensor LH	• Front wheel sensor LH • Sensor installation • Wheel sensor rotor
C1273	Low output signal of rear wheel sensor RH	• Rear wheel sensor RH • Sensor installation • Wheel sensor rotor

DTC code	Detection item	Trouble area
C1274	Low output signal of rear wheel sensor LH	• 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	• Yaw rate/side/decel G sensor • Sensor installation
C1281	Master cylinder pressure sensor output malfunction	• 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

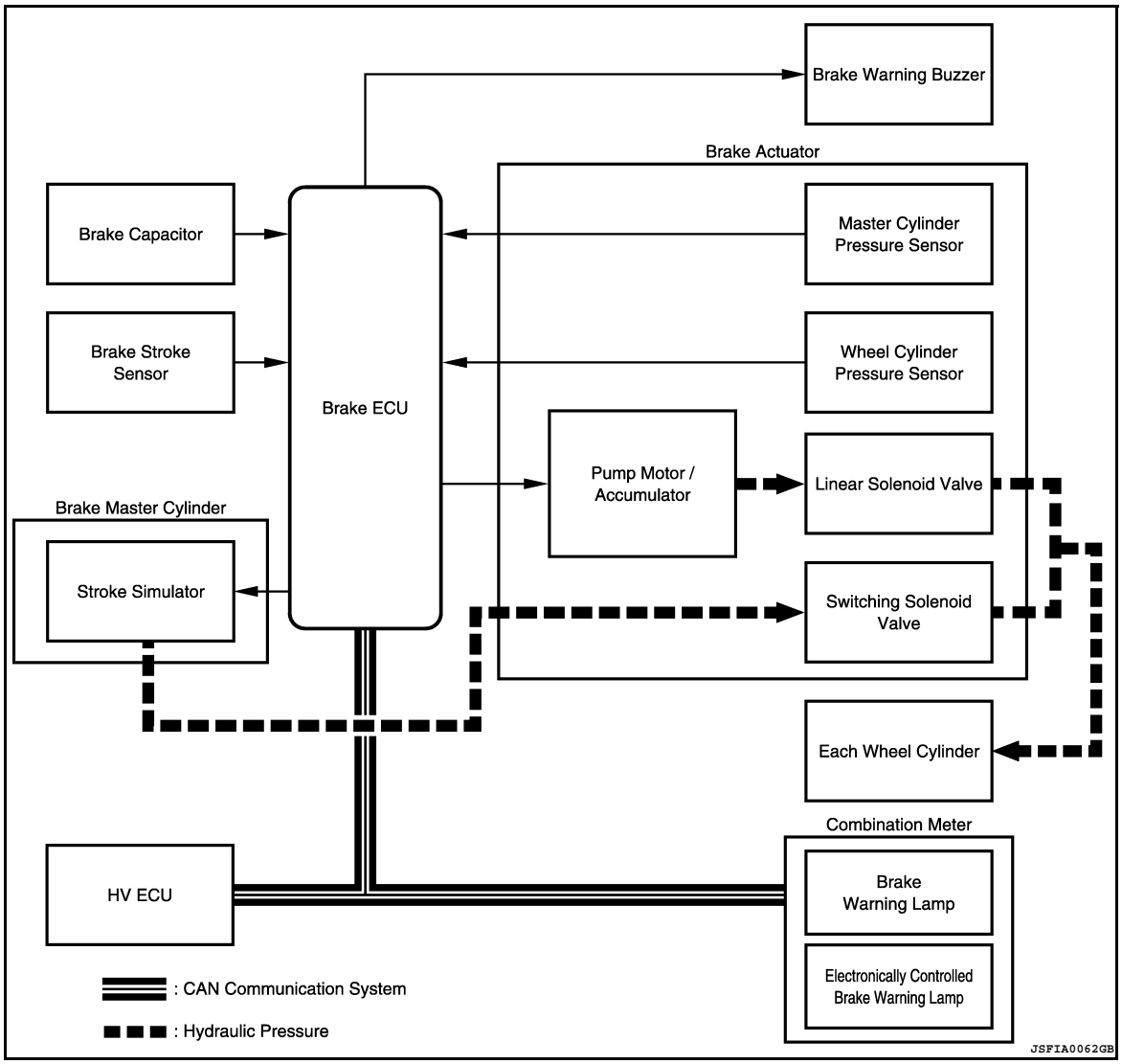
NOTE:
The codes in this table are output only in Test Mode (signal check).

FUNCTION DIAGNOSIS

ELECTRONICALLY CONTROLLED BRAKE SYSTEM

System Diagram

INFOID:0000000005440614



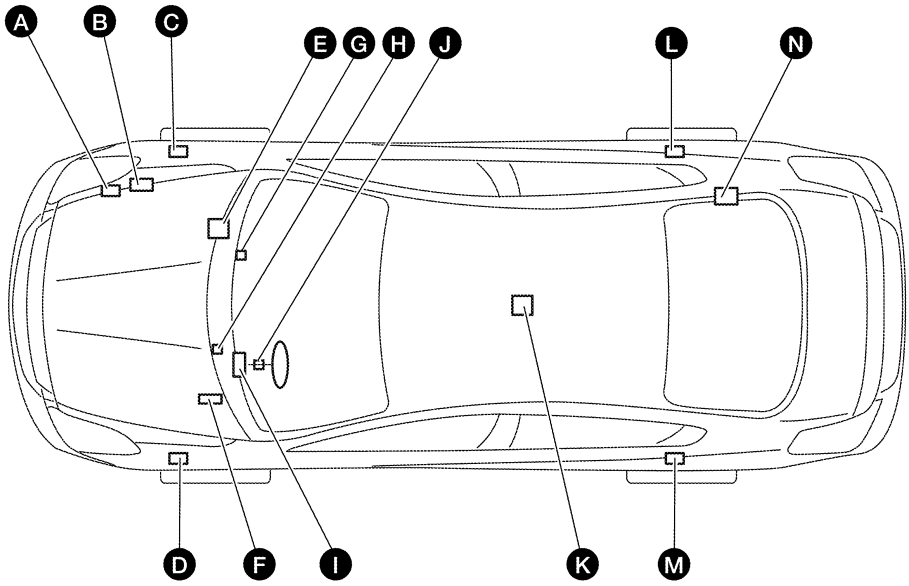
System Description

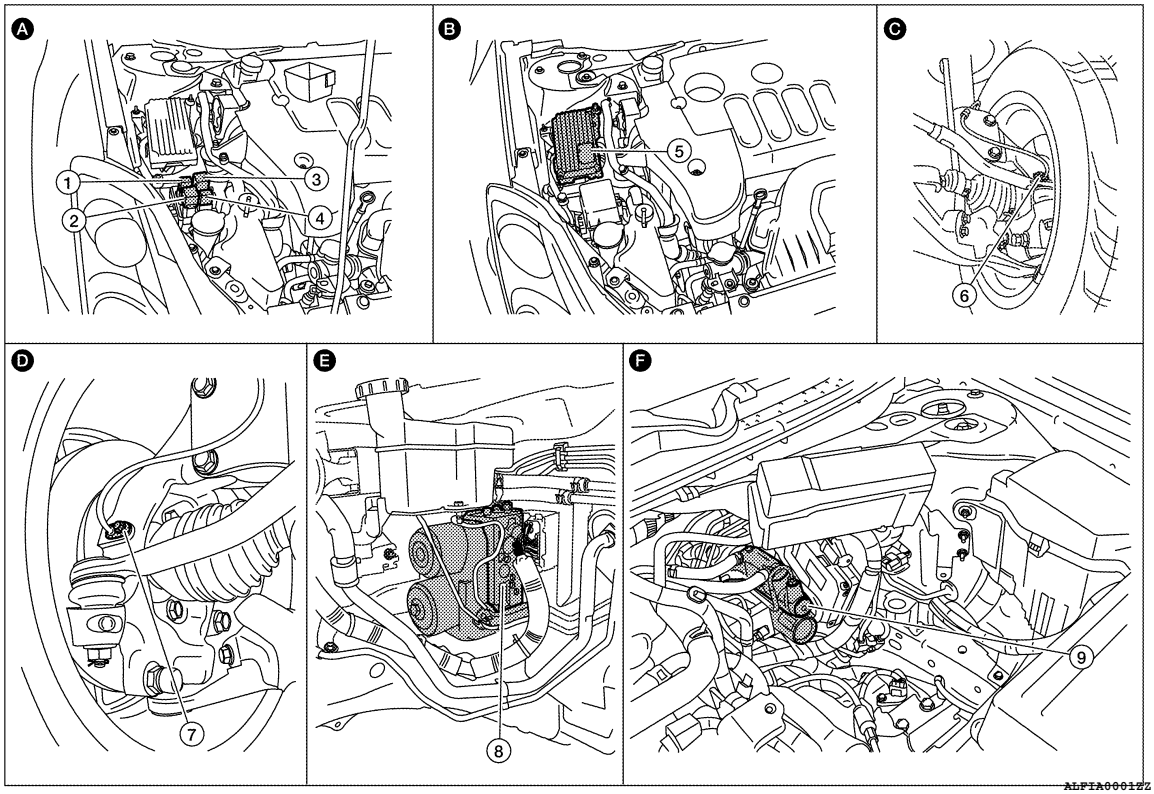
INFOID:0000000005440615

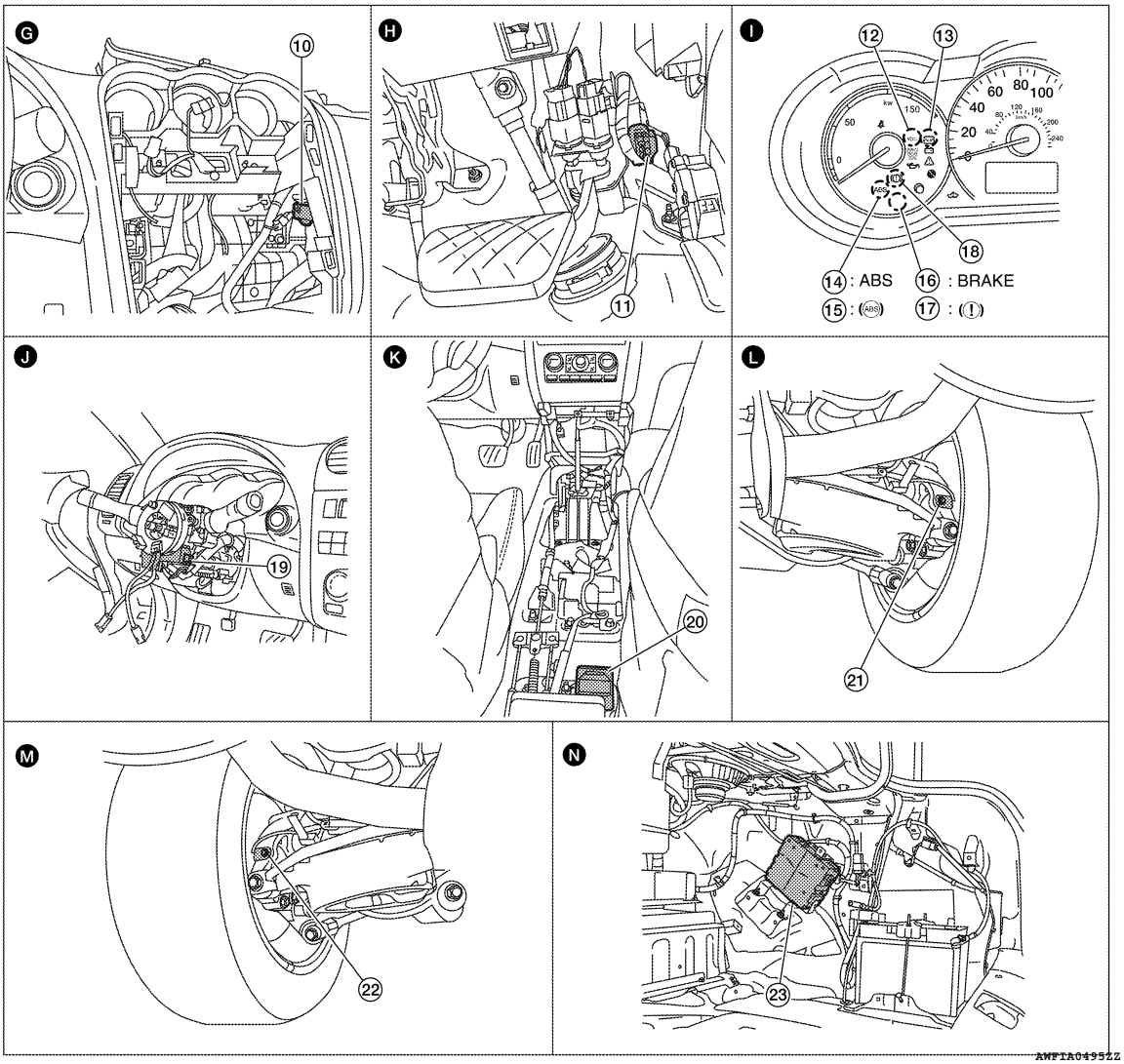
1. The system detects the degree of brake pedal operation with a brake stroke sensor and two master cylinder pressure sensors, and calculates the optimum hydraulic brake force. The hydraulic pressure source is adjusted based on this so that the optimum hydraulic control is independently performed on 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.

Component Parts Location

INFOID:0000000005440616







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:0000000005440617

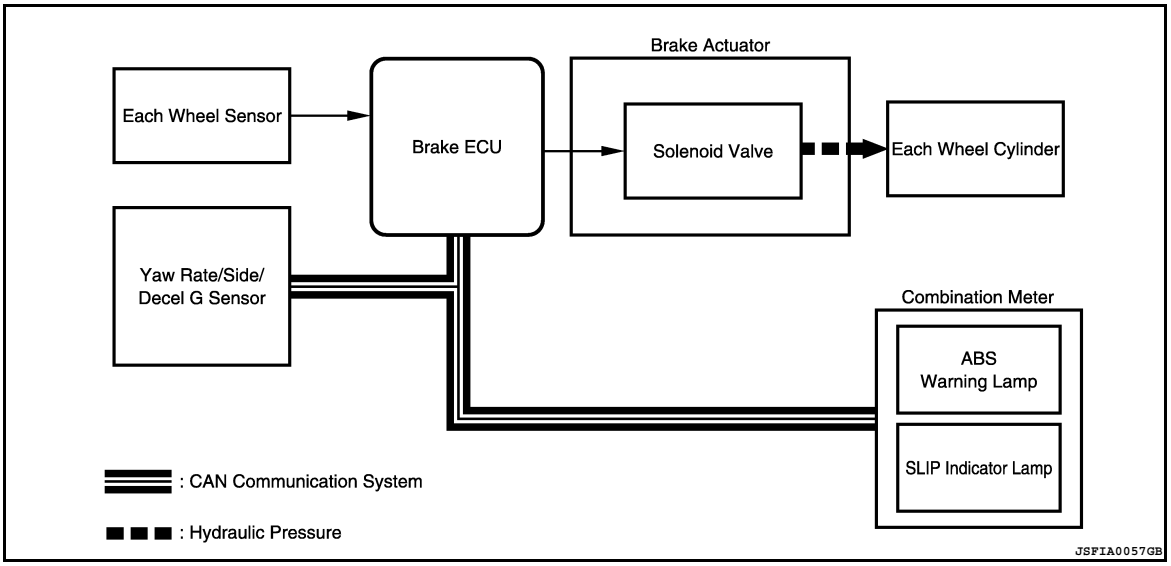
Components	Functions
Brake ECU	Processes the signals from each sensor to perform brake control for ABS, TCS, and VDC. In addition, it communicates with the HV control ECU to output a control signal.
ABS main relay (ABS relay No.1, 2)	Controlled by the brake ECU. In addition to supplying power to each 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 warm 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	• When a malfunction occurs in the brake fluid 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.

Components	Functions
SLIP indicator lamp	Blinks to inform the driver that ABS, TCS and VDC are operating.
VDC warning lamp	• 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.

ABS

System Diagram

INFOID:0000000005440618



System Description

INFOID:0000000005440619

SYSTEM DESCRIPTION

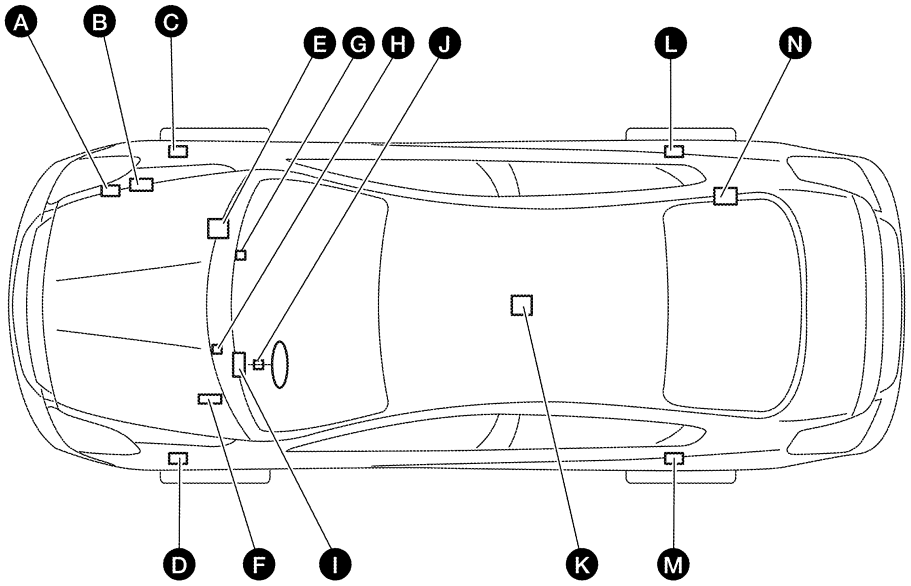
The ABS (Anti-lock Braking System) helps prevent the wheels from locking when the brakes are applied suddenly and firmly or applied on a slippery surface.

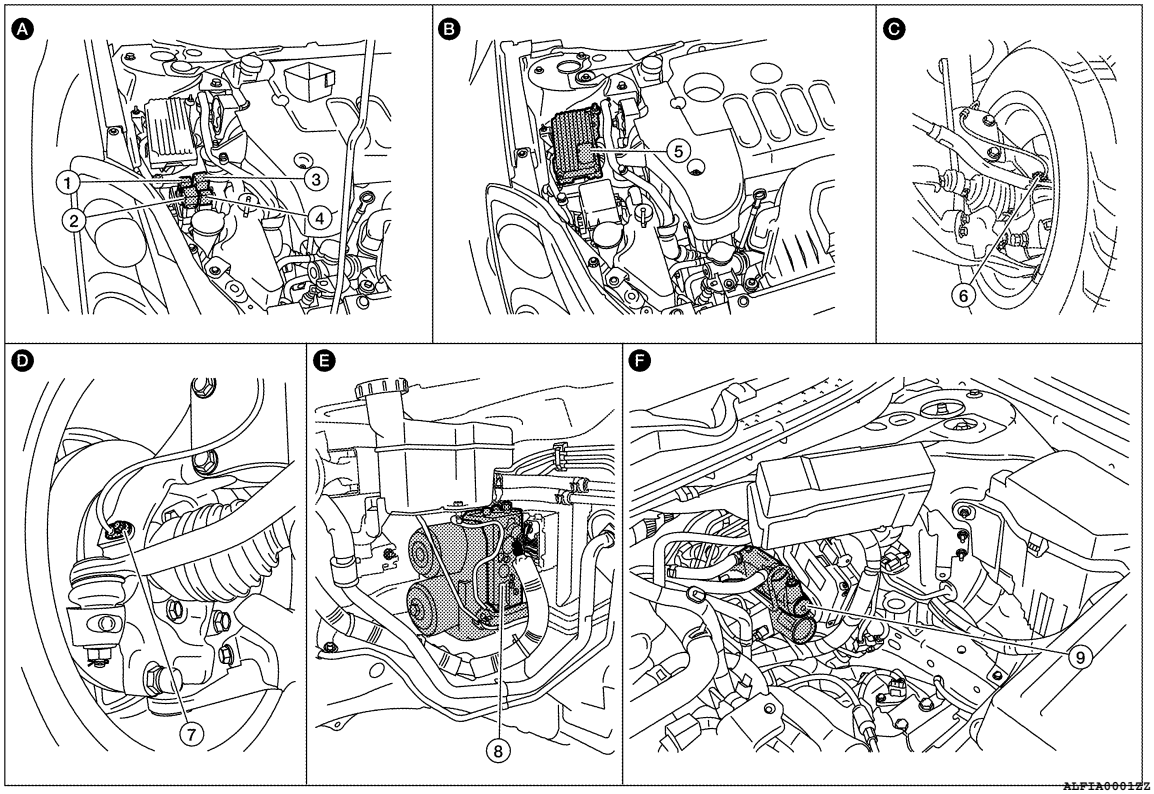
OPERATION DESCRIPTION

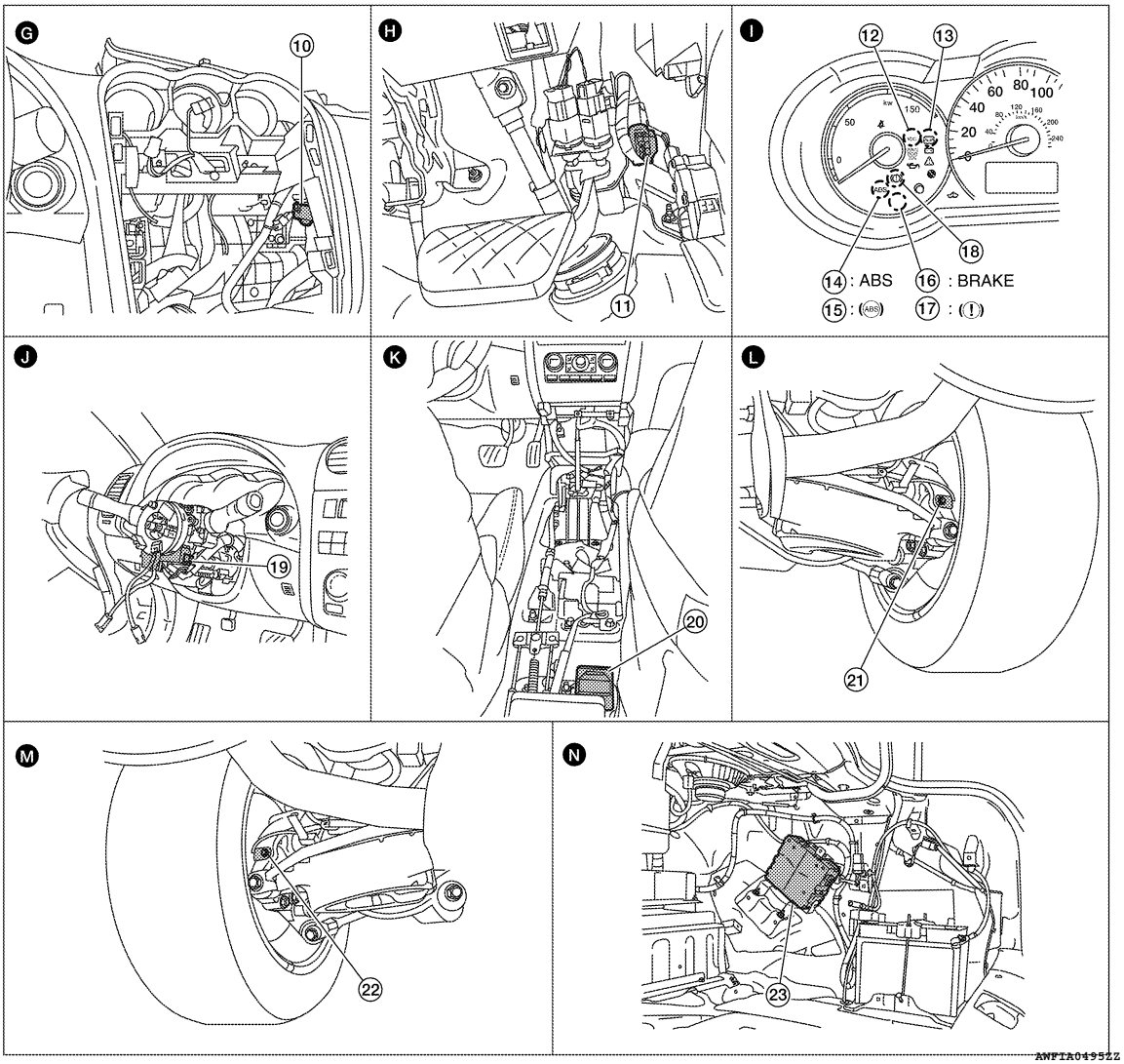
The brake ECU detects wheel lock based on speed signals it receives from the wheel sensors. Based on this information, and yaw rate/side/decel G sensor signals, the brake ECU controls the solenoid valves are used to prevent wheel lock by controlling the hydraulic pressure applied to the brakes at each 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:0000000005440620







1. ABS relay No.1
2. ABS motor relay No.2
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:0000000005440621

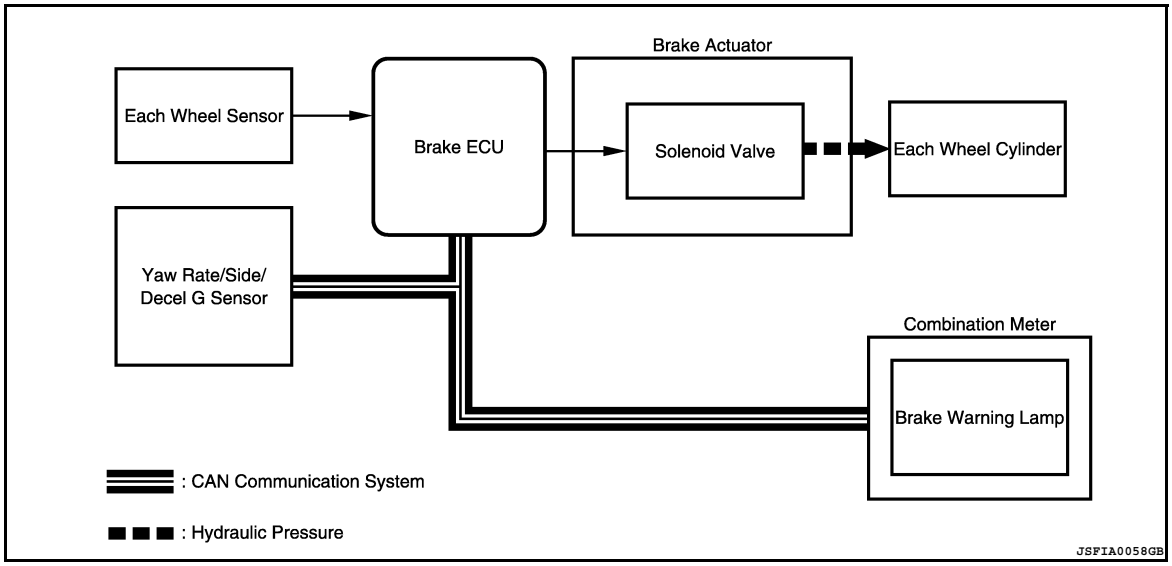
Components	Functions
Brake ECU	Processes the signals from each sensor to perform brake control for ABS, TCS, and VDC. In addition, it communicates with the HV control ECU to output a control signal.
ABS main relay (ABS relay No.1, 2)	Controlled by the brake ECU. In addition to supplying power to each 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 warm 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	• When a malfunction occurs in the brake fluid 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.

Components	Functions
SLIP indicator lamp	Blinks to inform the driver that ABS, TCS and VDC are operating.
VDC warning lamp	• 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.

EBD

System Diagram

INFOID:0000000005440622



System Description

INFOID:0000000005440623

SYSTEM DESCRIPTION

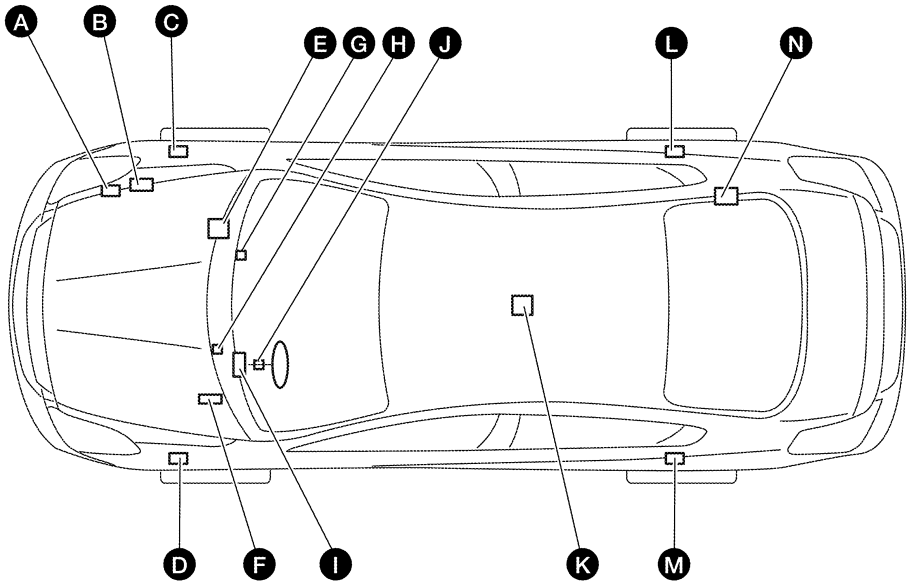
The EBD (Electric Brake force Distribution) control utilizes ABS, performing proper brake force distribution between the front and rear wheels in accordance with driving conditions. When braking while cornering, it also controls the brake forces of the right and left wheels, helping to maintain vehicle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

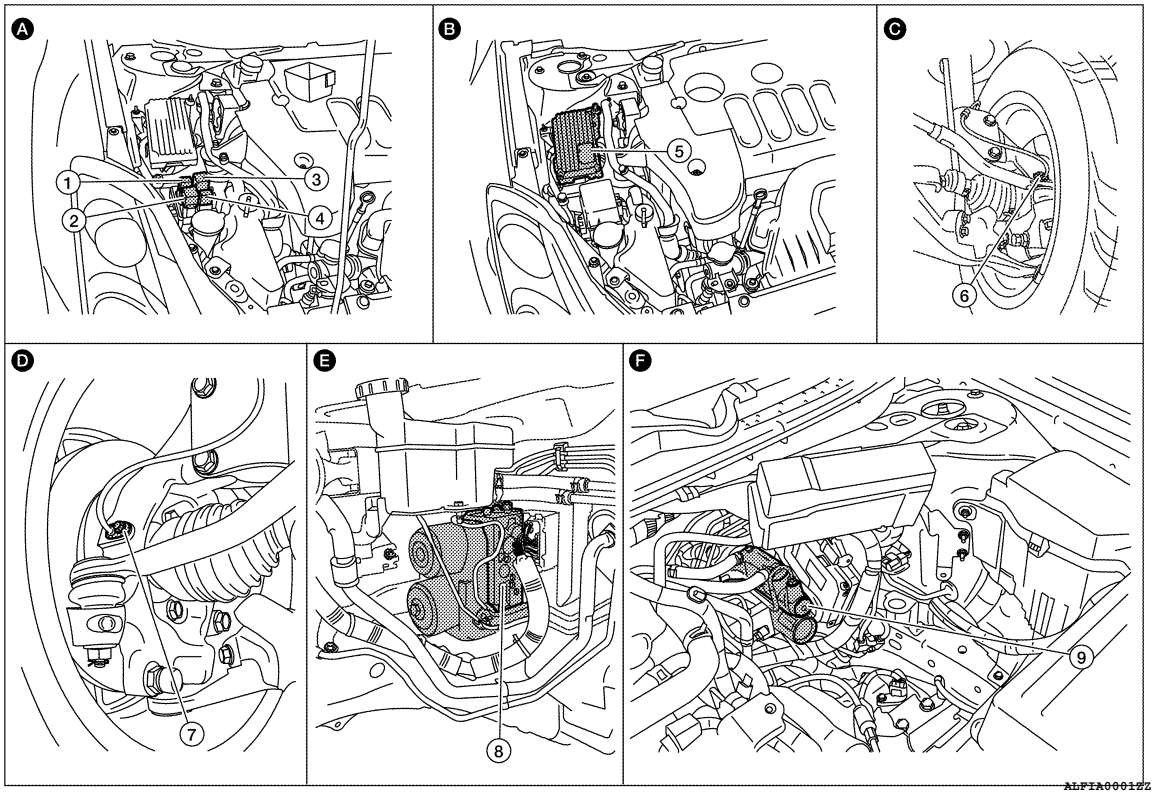
OPERATION DESCRIPTION

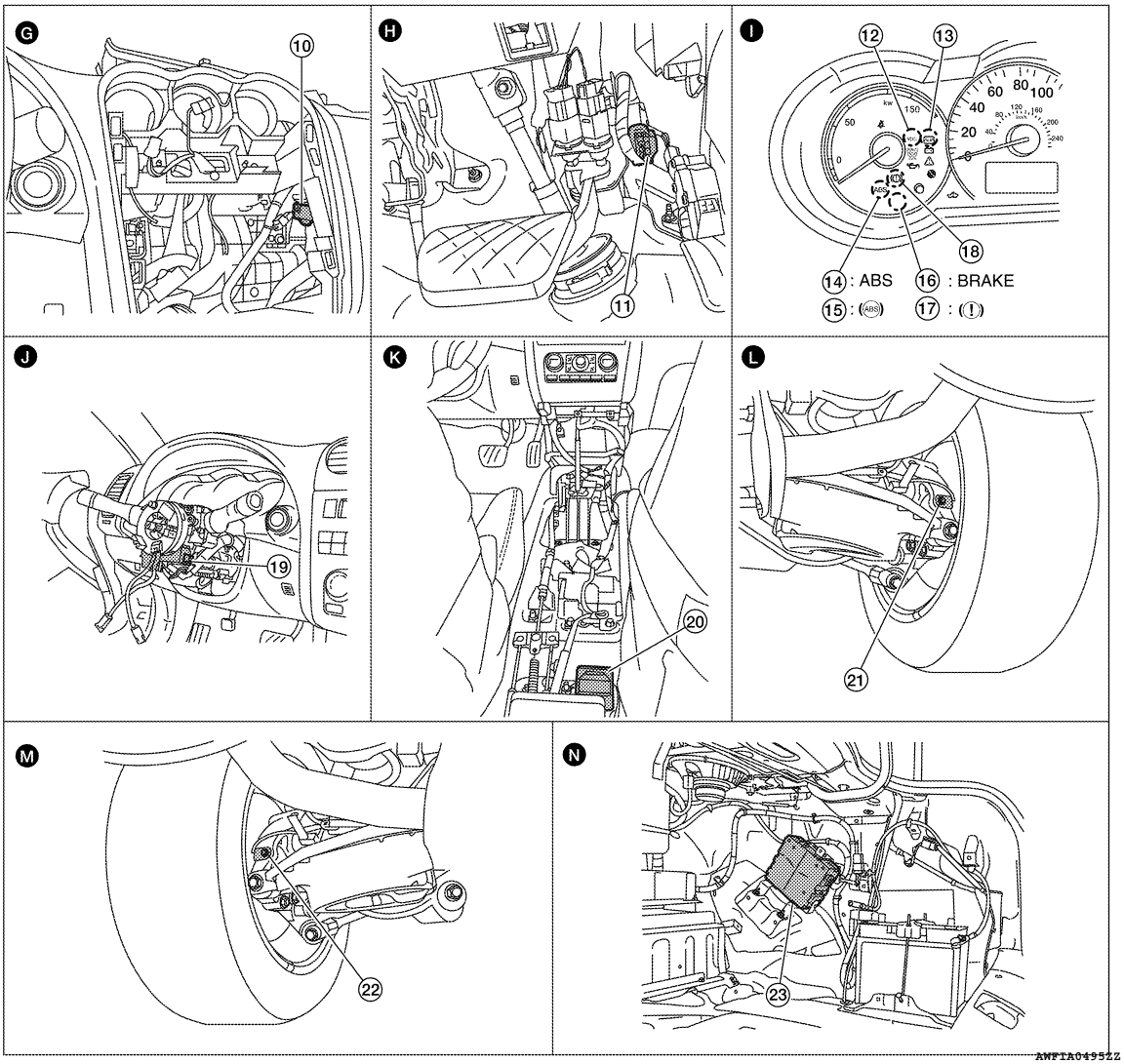
The brake ECU receives a speed signal from each wheel sensor, G sensor signals and uses these signals to detect locking of the wheels. The ECU uses this information in order to determine appropriate control of the solenoid valves. The solenoid valves control the hydraulic pressure applied to the brake 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:0000000005440624







1. ABS relay No.1
2. ABS motor relay No.2
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:0000000005440625

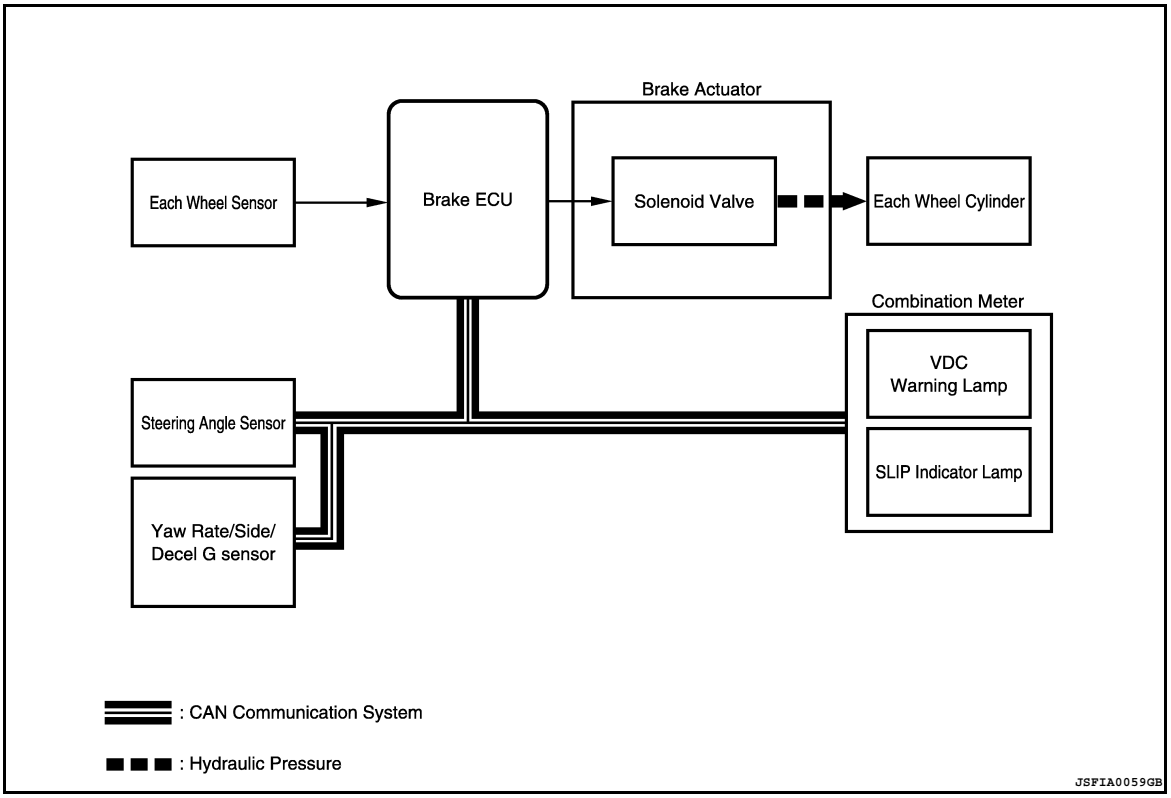
Components	Functions
Brake ECU	Processes the signals from each sensor to perform brake control for ABS, TCS, and VDC. In addition, it communicates with the HV control ECU to output a control signal.
ABS main relay (ABS relay No.1, 2)	Controlled by the brake ECU. In addition to supplying power to each 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 warm 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	• When a malfunction occurs in the brake fluid 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.

Components	Functions
SLIP indicator lamp	Blinks to inform the driver that ABS, TCS and VDC are operating.
VDC warning lamp	• 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.

TCS

System Diagram

INFOID:0000000005440626



System Description

INFOID:0000000005440627

SYSTEM DESCRIPTION

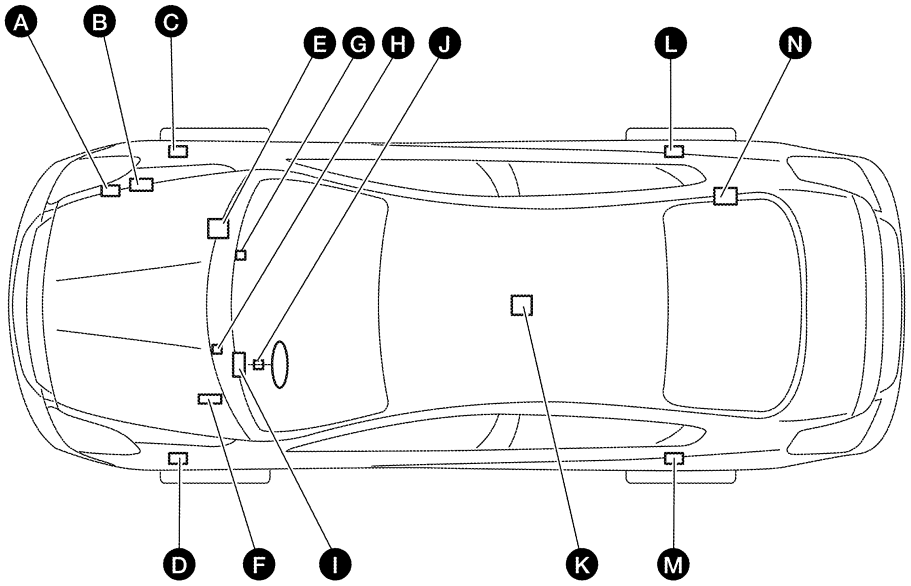
The TCS (Traction Control System) helps prevent the drive wheels from slipping when the driver depresses the accelerator pedal excessively while starting off or accelerating on a slippery surface.

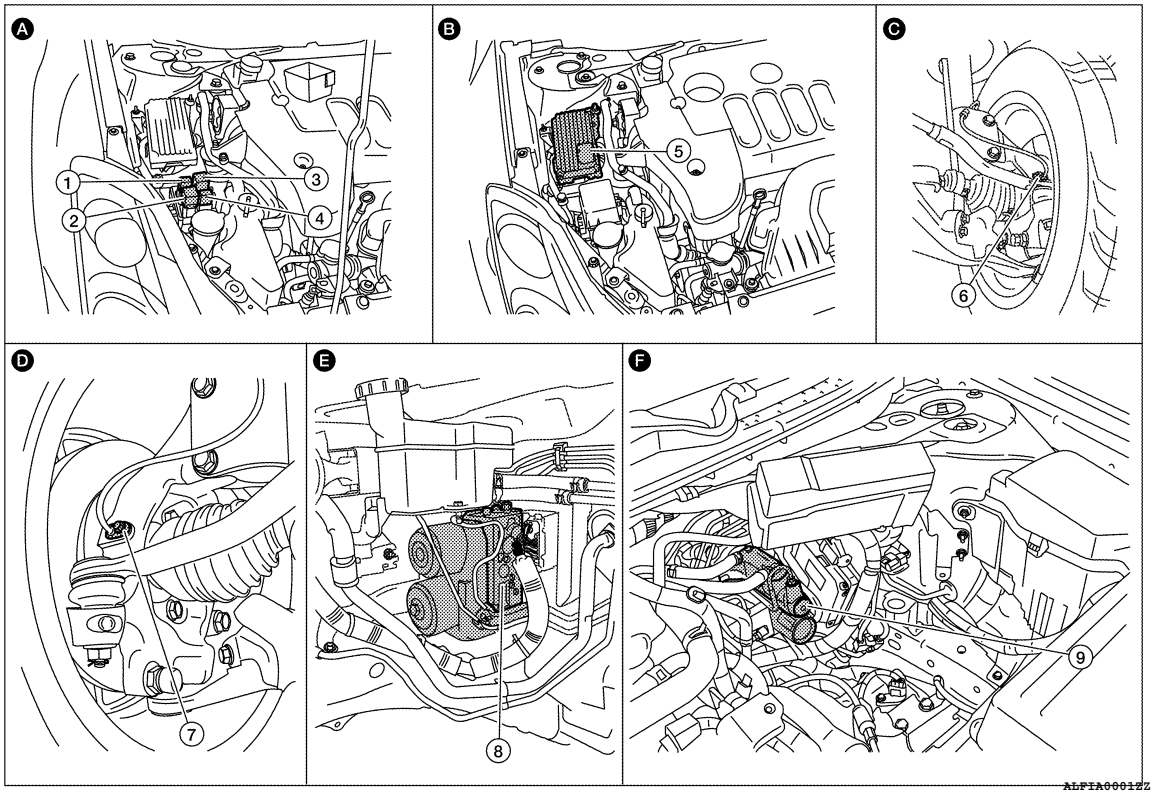
OPERATION DESCRIPTION

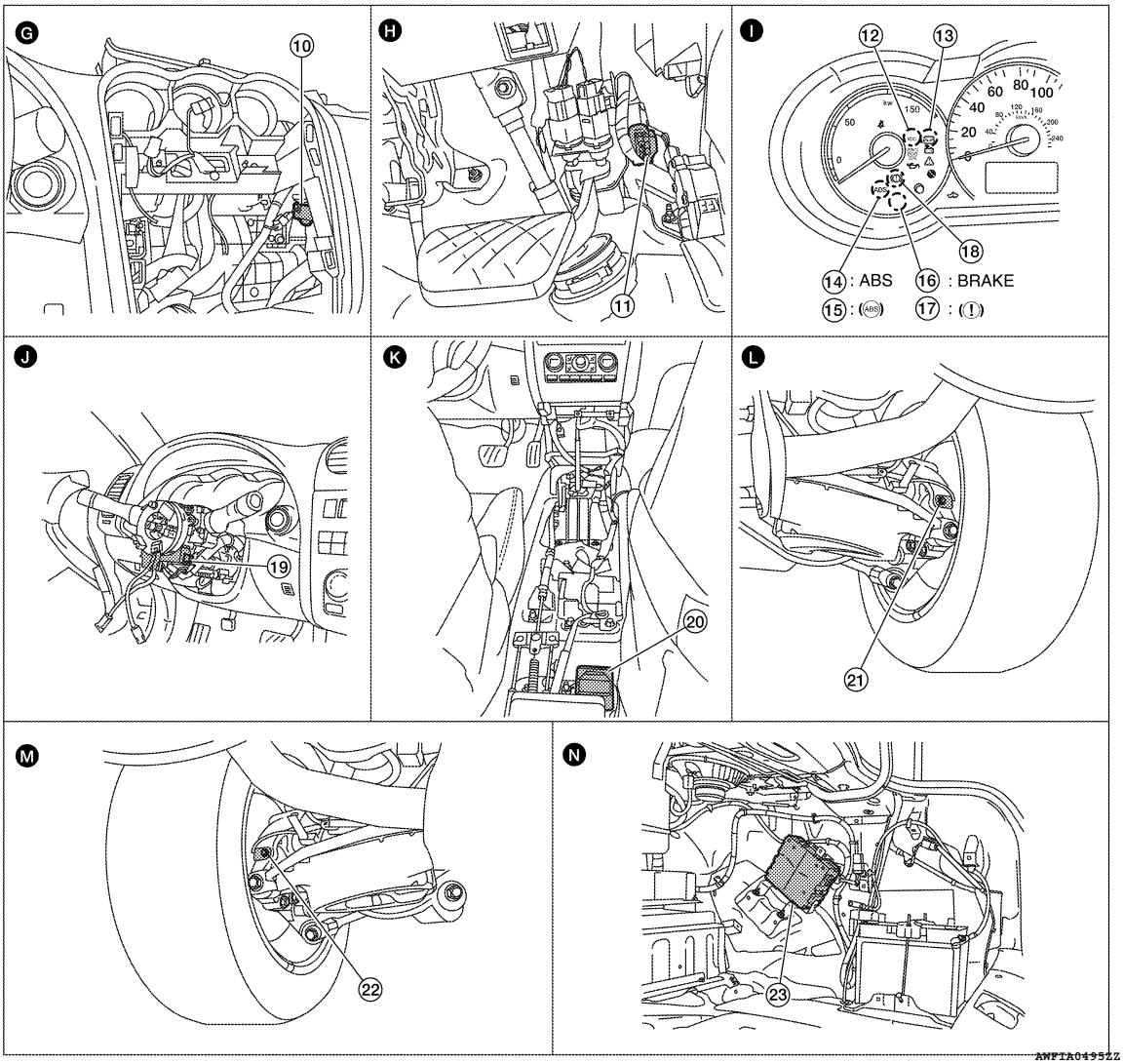
The brake ECU detects wheelspin by receiving signals from each wheel sensor. The brake ECU controls engine torque with the HV ECU via CAN communication and brake hydraulic pressure through the solenoid valve. The SLIP indicator lamp blinks when the system is operating. When there is a malfunction in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

Component Parts Location

INFOID:0000000005440628







1. ABS relay No.1
2. ABS motor relay No.2
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:0000000005440629

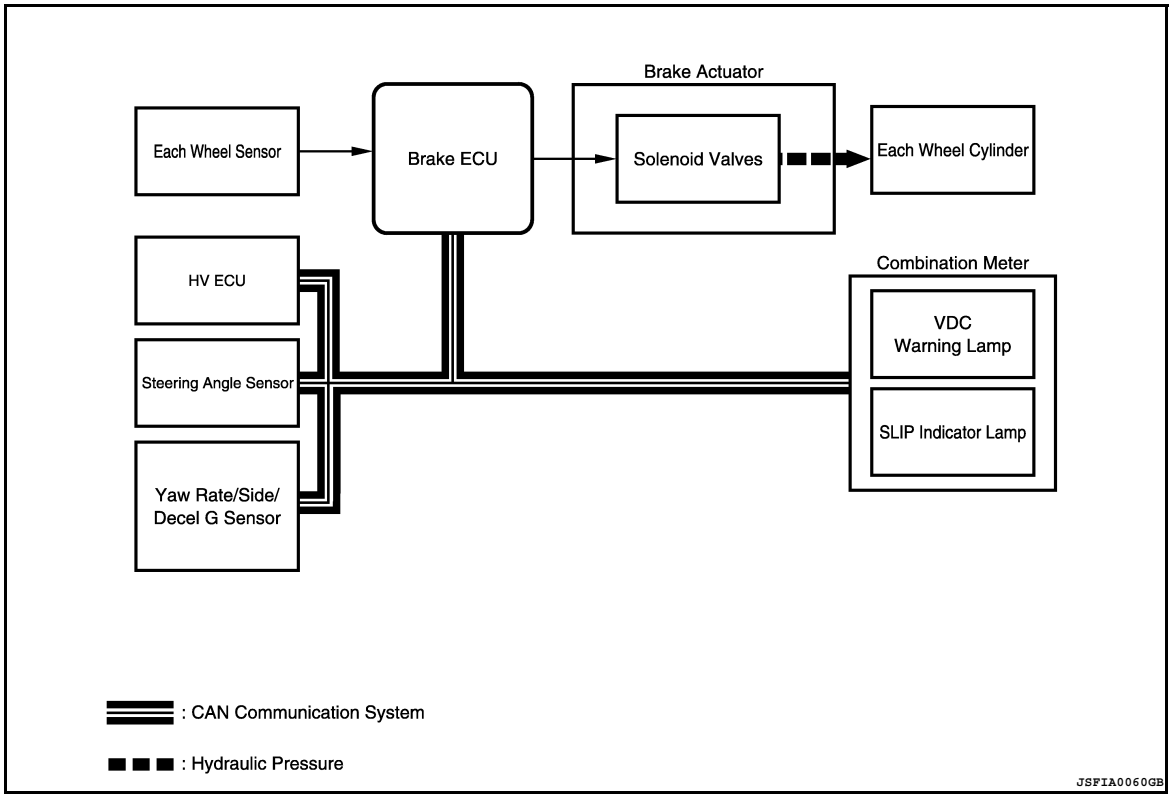
Components	Functions
Brake ECU	Processes the signals from each sensor to perform brake control for ABS, TCS, and VDC. In addition, it communicates with the HV control ECU to output a control signal.
ABS main relay (ABS relay No.1, 2)	Controlled by the brake ECU. In addition to supplying power to each 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 warm 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	• When a malfunction occurs in the brake fluid 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.

Components	Functions
SLIP indicator lamp	Blinks to inform the driver that ABS, TCS and VDC are operating.
VDC warning lamp	• 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.

VDC

System Diagram

INFOID:0000000005440630



System Description

INFOID:0000000005440631

SYSTEM DESCRIPTION

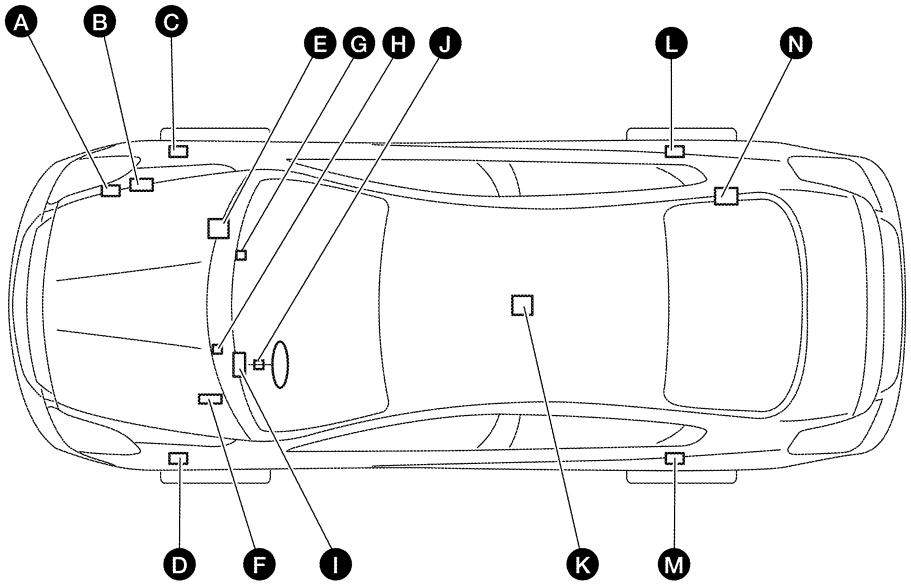
The VDC (Vehicle Dynamics Control) helps prevent the vehicle from slipping sideways as a result of strong front or rear wheel slid during cornering.

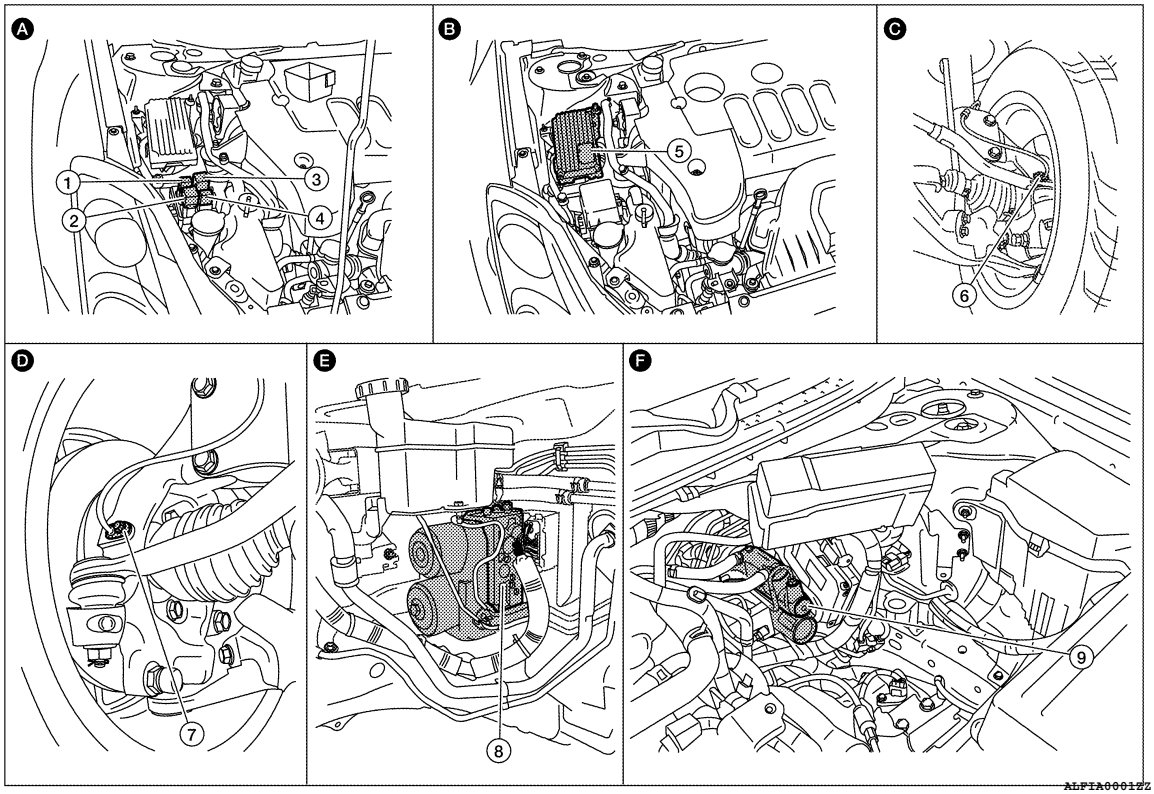
OPERATION DESCRIPTION

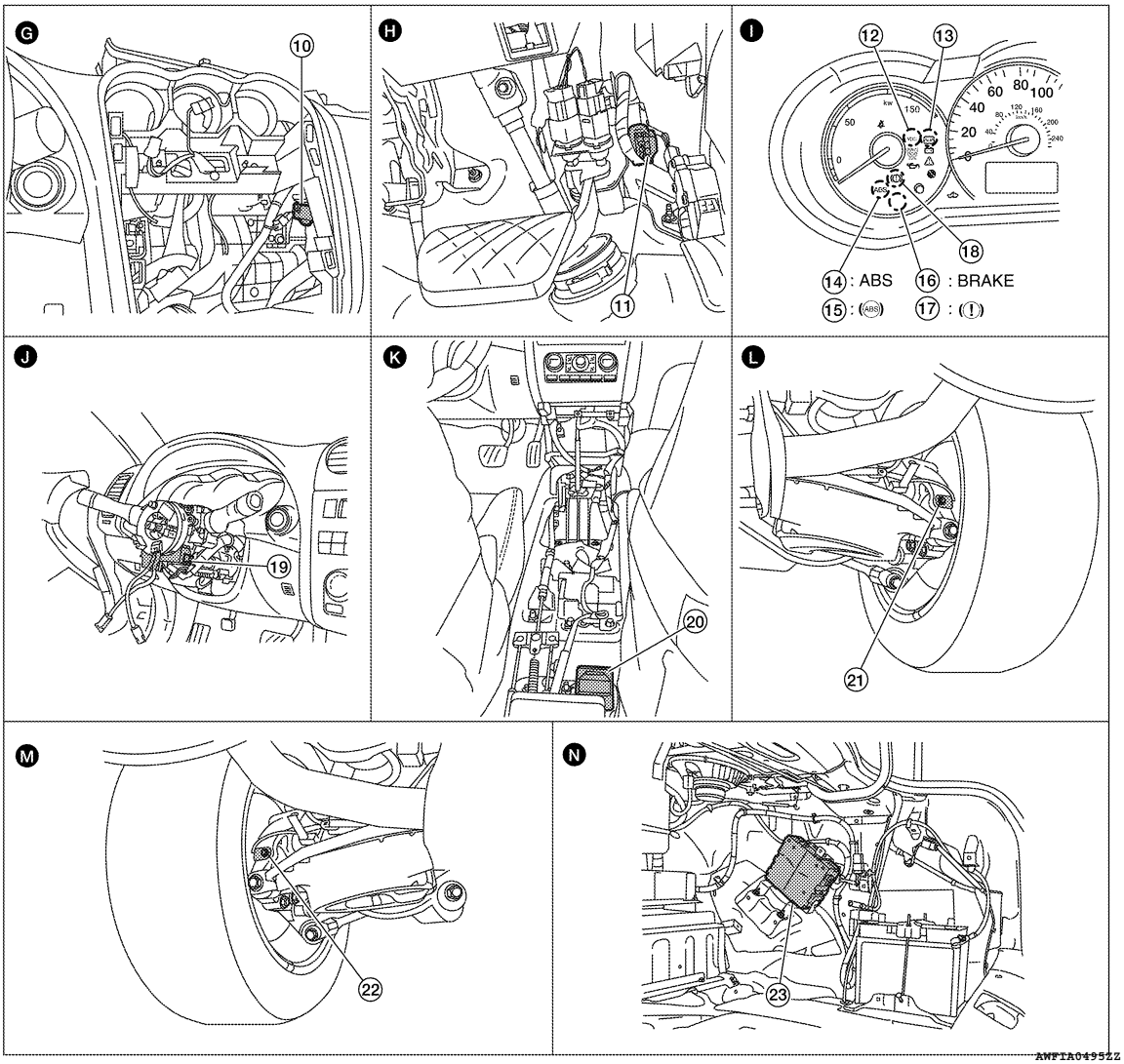
The brake ECU determines the vehicle operating conditions based in signals received from the wheel sensors, yaw rate/side/decel G sensor, and steering angle sensor. The brake ECU sends signals via CAN communication to the HV ECU on order to control engine torque. The brake ECU controls brake hydraulic 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:0000000005440632







1. ABS relay No.1
2. ABS motor relay No.2
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:0000000005440633

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 warm 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	• When a malfunction occurs in the brake fluid 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.

Components	Functions
SLIP indicator lamp	Blinks to inform the driver that ABS, TCS and VDC are operating.
VDC warning lamp	• 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.

INSPECTION MODE

System Description

INFOID:0000000005440634

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

DIAGNOSIS SYSTEM (VDC/TCS/ABS CONTROL UNIT)

CONSULT-III Function

INFOID:0000000005440635

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	×	×	×	×

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-167, "Description"
Brake warning lamp circuit	BRC-172, "Description"
Electronically Controlled Brake warning lamp circuit	BRC-177, "Description"
VDC warning lamp circuit	BRC-170, "Description"
SLIP indicator lamp circuit	BRC-180, "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:

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	

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

Tester display	Measurement item	Reference value	
FL OIL PRESS	FL wheel target oil pressure reading	Min	0 MPa
		Max	20 MPa
RR OIL PRESS	RR wheel target oil pressure reading	Min	0 MPa
		Max	20 MPa
RL OIL PRESS	RL wheel target oil pressure reading	Min	0 MPa
		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
		Max	20 V
IG2 VOLT VAL	IG2 voltage value	Min	0 V
		Max	20 V
BS1	BS1 voltage value	Min	0 V
		Max	20 V
BS2	BS2 voltage value	Min	0 V
		Max	20 V
VM1	VM1 voltage value	Min	0 V
		Max	20 V
VM2	VM2 voltage value	Min	0 V
		Max	20 V
B1	+B1 voltage value	Min	0 V
		Max	20 V
B2	+B2 voltage value	Min	0 V
		Max	20 V
IG ON ELAPS	Elapsed time after ignition switch ON	Min	0 seconds
		Max	100,661.76 seconds
CAPAC MODE	Brake capacitor mode	Brake capacitor mode ON	ON
		Brake capacitor mode OFF	OFF
SCSS	Stroke simulator solenoid (SCSS) signal	Stroke simulator solenoid (SCSS) ON	ON
		Stroke simulator solenoid (SCSS) OFF	OFF
SMC 1	Master cut solenoid (SMC 1) signal	Master cut solenoid (SMC 1) ON	ON
		Master cut solenoid (SMC 1) OFF	OFF
SNC 2	Master cut solenoid (SMC 2) signal	Master cut solenoid (SMC 2) ON	ON
		Master cut solenoid (SMC 2) OFF	OFF
MAIN RLY 1	ABS relay No.1 signal	ABS relay No.1 ON	ON
		ABS relay No.1 OFF	OFF
MAIN RLY 2	ABS relay No.2 signal	ABS relay No.2 ON	ON
		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

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

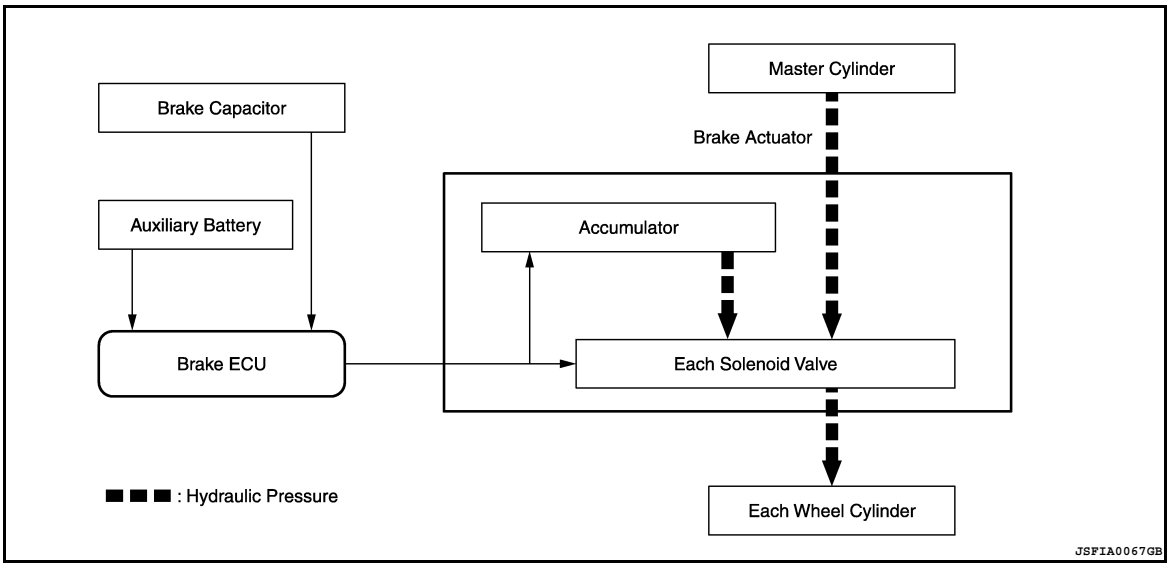
Clear Freeze Frame Data and Information

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-40, "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.

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 DLC 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	—

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	—

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	—
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	—
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
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	—
ACC PRESS SEN	Accumulator pressure sensor / min: 0 V, max: 5 V	Specified value: 3.3 to 4.7 V	—
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	—
RESERVR LV	Brake fluid level switch / ON or OFF	ON: Reservoir level normal OFF: Reservoir level low	—
ELE BRK LMP	Electronically Controlled Brake warning lamp / ON or OFF	ON: Warning lamp ON OFF: Warning lamp OFF	—
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	—
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	—
SLAFL	Linear solenoid (SLAFL) current / min: 0 A, max: 3 A	When brake pedal is released: 0 A	—
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	—
SLRFR	Linear solenoid (SLRFR) current / min: 0 A, max: 3 A	When brake pedal is released: 0 A	—
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	—
SLRRL	Linear solenoid (SLRRL) current / min: 0 A, max: 3 A	When brake pedal is released: 0 A	—
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	—

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 indictor 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

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 sir 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	—

WORK SUPPORT

Item	Function
MEMORY ERASING	When erasing stored zero value of each sensor and offset leaning value of linear solenoid valve
TEST MODE NOTE1	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

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:0000000005440636

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:0000000005440637

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.	• 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.	• Front wheel sensor RH • wheel sensor circuit • wheel sensor rotor • Brake ECU
	262		Wheel sensor power supply malfunction.	• 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.	• 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.	• Front wheel sensor RH • wheel sensor circuit • wheel sensor rotor • Brake ECU
	275		Wheel sensor power supply malfunction.	• Brake ECU
C1271	—	FR SPD OUTPUT	Detected only during Test Mode.	• 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:0000000005440638

Regarding Wiring Diagram information, refer to BRC-149, "Wiring Diagram".

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 interruption NORMAL: Normal
FL WH SEN OPN	FL wheel sensor open detection/ ERROR or NORMAL	ERROR: Momentary interruption 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)

1. Turn the ignition switch OFF.
2. Connect the CONSULT-III.
3. Turn the ignition switch ON (READY).
4. 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

5. Check that these 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.

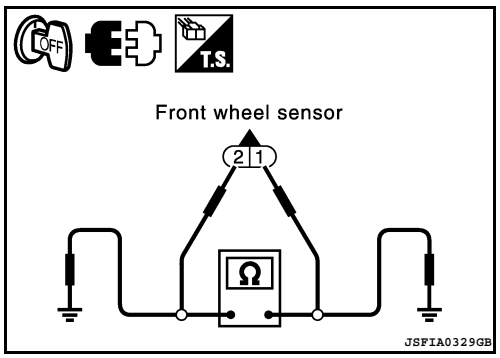
Is the inspection result normal?

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

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

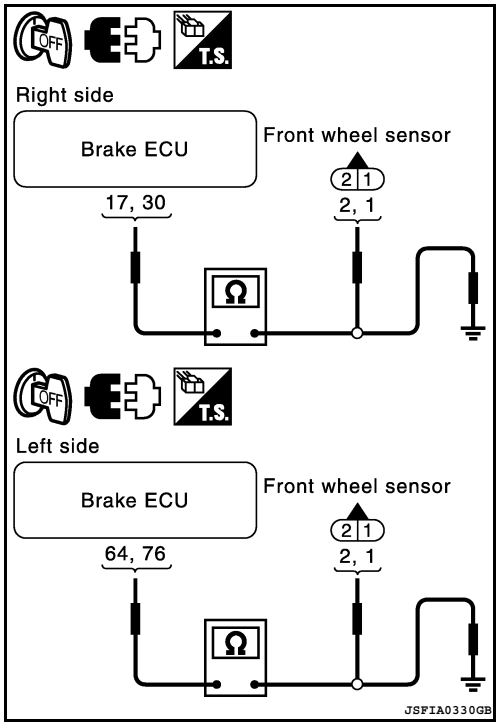
NOTE:
Check the wheel sensor signal after replacement.

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:0000000005440639

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

C0210, C0215, C1273, C1274

Description

INFOID:0000000005440640

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:0000000005440641

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.	• 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.	• Rear wheel sensor RH • Wheel sensor circuit • Wheel sensor rotor • Brake ECU
	288		Wheel sensor power supply malfunction.	• 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.	• 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.	• Rear wheel sensor RH • Wheel sensor circuit • Wheel sensor rotor • Brake ECU
	301		Wheel sensor power supply malfunction.	• Brake ECU
C1273	—	RR SPD OUTPUT	Detected only during Test Mode.	• 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:0000000005440642

Regarding Wiring Diagram information, refer to BRC-149, "Wiring Diagram".

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 interruption NORMAL: Normal
RL WH SEN OPN	RL wheel sensor open detection/ ERROR or NORMAL	ERROR: Momentary interruption 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)

1. Turn the ignition switch OFF.
2. Connect the CONSULT-III.
3. Turn the ignition switch ON (READY).
4. 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

5. Check that these 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 (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.

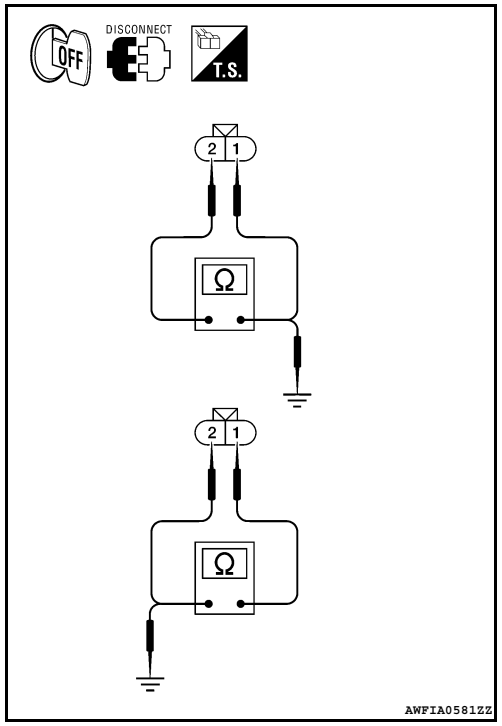
Is an installation state normal?

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

Rear wheel sensor Terminal	Condition	Specified condition
1 – 2	Always	Not existed
1 – Ground	Always	Existed
2 – Ground	Always	Existed



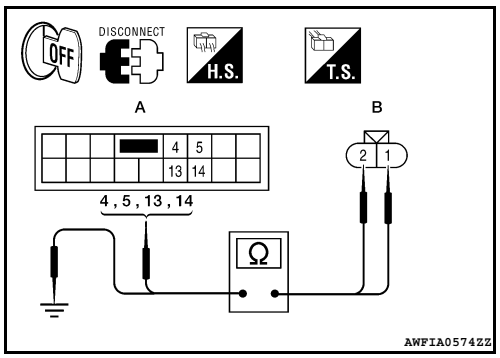
NOTE:
Check the wheel sensor signal after replacement.

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



Vehicle side (A)	Sensor side (B)	Condition	Specified condition
5	2	Always	Below 1 Ω
14	1	Always	Below 1 Ω
5	1	Always	10 kΩ or higher
4	2	Always	Below 1 Ω
13	1	Always	Below 1 Ω
4	1	Always	10 kΩ or higher
Ground	1	Always	10 kΩ or higher
Ground	2	Always	10 kΩ or higher

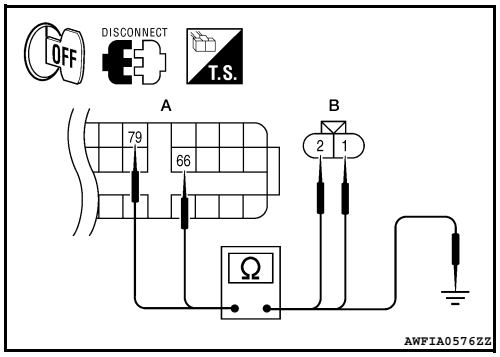
NOTE:
Check the wheel sensor signal after replacement.

Is the inspection result normal?

YES >> GO TO 9.
NO >> Replace skid control sensor wire.

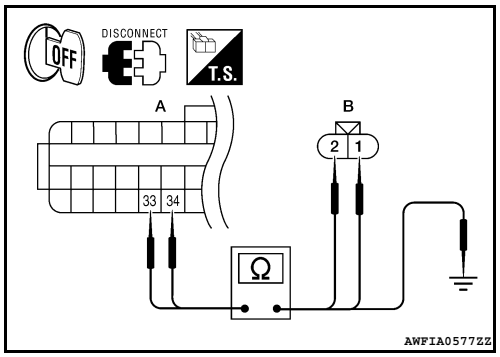
9. CHECK HARNESS AND CONNECTOR (BRAKE ECU – REAR WHEEL SENSOR)

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



Brake ECU connector E61 (A)	Wheel sensor connector C3 (B)	—	Condition	Specified condition
Terminal	Terminal			
79	1	—	Always	Below 1 Ω
	—	Ground	Always	10 kΩ or higher
66	2	—	Always	Below 1 Ω
	—	Ground	Always	10 kΩ or higher

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



Brake ECU connector E60 (A)	Wheel sensor connector C2 (B)	—	Condition	Specified condition
Terminal	Terminal			
34	1	—	Always	Below 1 Ω
	—	Ground	Always	10 kΩ or higher
33	2	—	Always	Below 1 Ω
	—	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:0000000005440643

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:0000000005440644

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:0000000005440645

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.	• 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).	• 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.	• 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).	• 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.	• 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.	• 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.	• Yaw rate/side/decel G sensor
C1279	—	G SENSOR OUTPUT	Detected only during Test Mode.	• Yaw rate/side/decel G sensor • Sensor installation

Diagnosis Procedure

INFOID:0000000005440646

Regarding Wiring Diagram information, refer to BRC-149, "Wiring Diagram".

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.
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

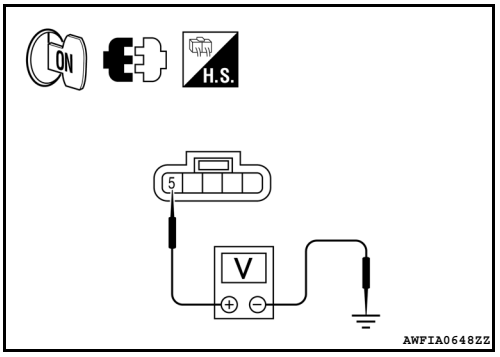
1. Turn the ignition switch OFF.
2. Check that the yaw rate/side/decel G sensor has been installed properly.

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.



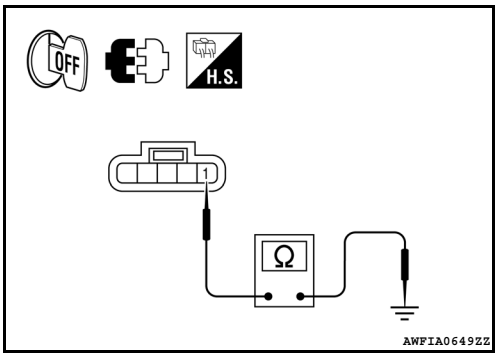
Yaw rate/side/decel G sensor		Condition	Specified condition
Connector	Terminal		
M55	5 – Ground	Ignition switch ON	10 to 14 V

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 stop.

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:0000000005440647

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

C1155

Description

INFOID:0000000005440648

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:0000000005440649

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.	• 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.	• Brake fluid level switch • Brake fluid level switch circuit • Brake ECU

Diagnosis Procedure

INFOID:0000000005440650

Regarding Wiring Diagram information, refer to BRC-149, "Wiring Diagram".

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

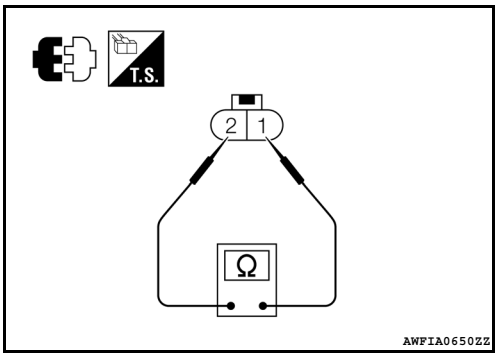
Check that the brake fluid level is sufficient.
NOTE:
- If the fluid level drops, check for a fluid leak, and repair if found.
- If no leak exists, add and adjust fluid and then check that the trouble code is not output again.
- Brake fluid level is proper.

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

1. Remove the reservoir tank cap.
2. Disconnect the brake fluid level switch.
3. 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 Terminal	Condition	Specified condition
1 – 2	Float up (switch OFF)	1.8 to 2.2 kΩ
	Float down (switch ON)	Below 1 Ω

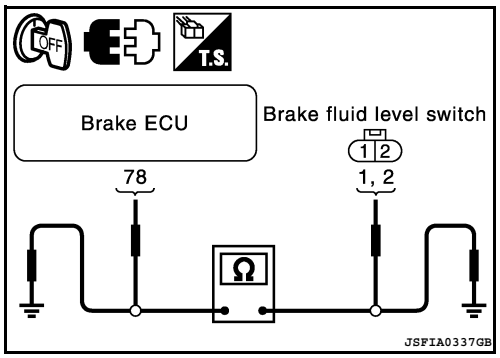
NOTE:
If there is no problem after finishing the above check, adjust the brake fluid level to the MAX level.

Is the inspection result normal?

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

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:0000000005440651

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

C11A0, C1336

Description

INFOID:0000000005440652

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:0000000005440653

DTC	INF code	Display item	DTC detection condition	Trouble area
C11A0	—	YAW RATE SN CALIB	Yaw rate sensor zero point calibration is unfinished.	• 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. 1. Vehicle speed increases with unfinished zero point calibration. 2. Zero point calibration is not within specified range when zero point calibration is finished.	• 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.)

Diagnosis Procedure

INFOID:0000000005440654

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

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:0000000005440655

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:0000000005440656

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:0000000005440657

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.	• Steering angle sensor • Steering angle sensor circuit • Steering angle sensor power supply • Brake ECU

Diagnosis Procedure

INFOID:0000000005440658

Regarding Wiring Diagram information, refer to BRC-149, "Wiring Diagram".

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

1. Clear the DTC.
2. Turn the ignition switch OFF.
3. Turn the ignition switch ON again and check that no CAN communication system DTC is output.
4. 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

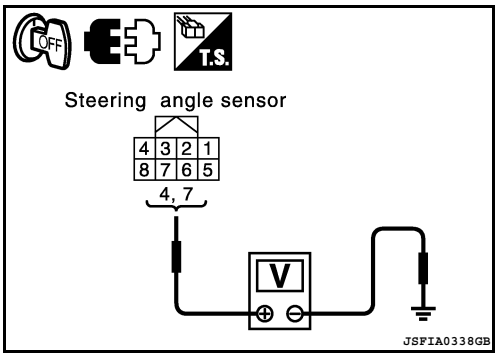
NOTE:
- If there is a malfunction in the wheel sensor or the yaw rate sensor, an abnormal value may be output although the steering angle sensor is normal.
- If the wheel sensor and yaw rate sensor DTCs are output simultaneously, repair the sensors and inspect the steering angle sensor.

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

2.INSPECT STEERING ANGLE SENSOR (POWER SOURCE TERMINAL)

1. Turn the ignition switch OFF.
2. Remove the steering wheel and the column cover lower.

3. Disconnect the steering angle sensor connector M53.
4. Measure the voltage according to the value(s) in the table below.



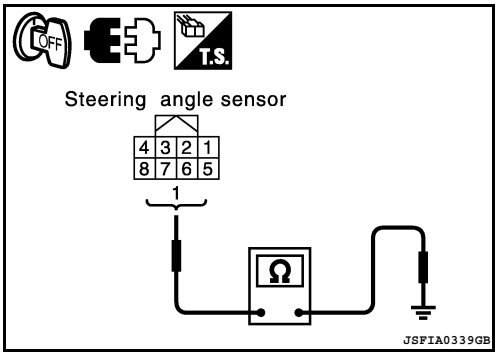
Steering angle sensor		Condition	Specified condition
Connector	Terminal		
M53	4 – Ground	Ignition switch ON	10 to 14 V
M53	7 – Ground	Always	10 to 14 V

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:0000000005440659

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:0000000005440660

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:0000000005440661

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.	• 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.	• 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.	• 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.	• Rear wheel sensor LH • Wheel sensor circuit • Sensor installation • Wheel sensor rotor • Brake ECU
C1275	—	FR SPD OUTPUT HI	Detected only during Test Mode.	• Wheel sensor rotor
C1276		FL SPD OUTPUT HI		
C1277		RR SPD OUTPUT HI		
C1278		RL SPD OUTPUT HI		

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:0000000005440662

Regarding Wiring Diagram information, refer to BRC-149, "Wiring Diagram".

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

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

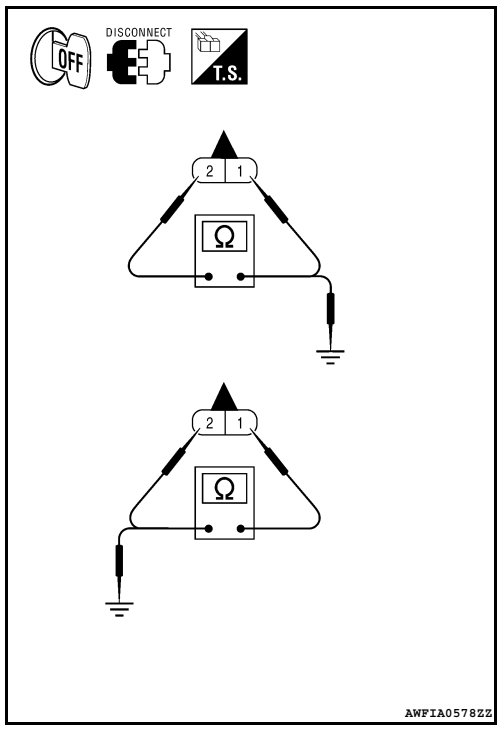
Condition	Proceed to
DTCs (C1235, C1236, C1238 and/or C1239) are not output.	A
DTCs (C1235, C1236, C1238 and/or C1239) are output.	B

A >> GO TO 2.
B >> Replace brake ECU.

2.INSPECT EACH WHEEL SENSOR

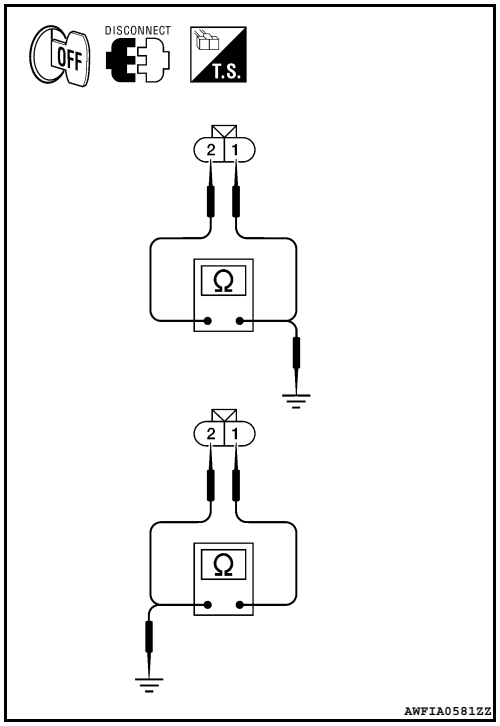
1. Turn the ignition switch OFF.
2. Disconnect front wheel sensor connectors.
3. Measure the resistance according to the value(s) in the table below.

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



4. Disconnect rear wheel sensor connectors.

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



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

Result

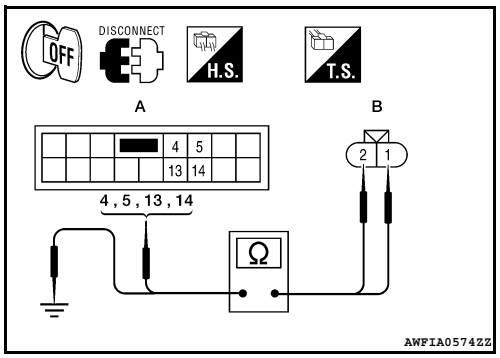
Condition	Proceed to
Yes (for rear)	A
Yes (for front)	B
No	C

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 skid control sensor wires.
2. Measure the resistance according to the value(s) in the table below.



Vehicle side (A)	Sensor side (B)	Condition	Specified condition
5	2	Always	Below 1 Ω
14	1	Always	Below 1 Ω
5	1	Always	10 kΩ or higher
4	2	Always	Below 1 Ω
13	1	Always	Below 1 Ω
4	1	Always	10 kΩ or higher
Ground	1	Always	10 kΩ or higher
Ground	2	Always	10 kΩ or higher

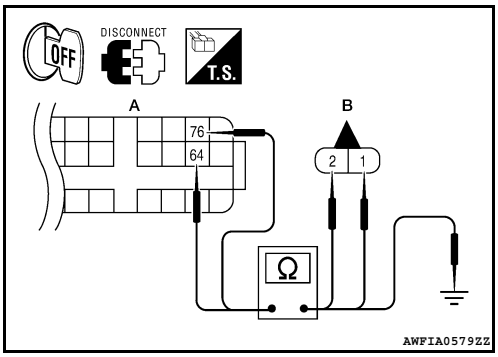
NOTE:
Check the wheel sensor signal after replacement.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace skid control sensor wire.

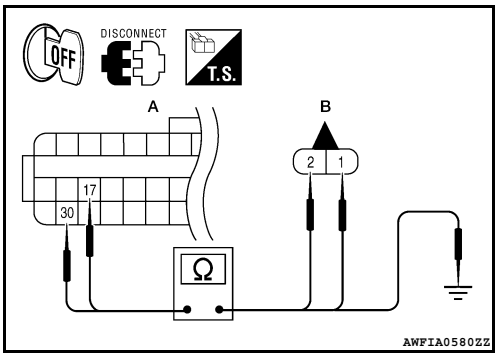
4. CHECK HARNESS AND CONNECTOR (BRAKE ECU – EACH WHEEL SENSOR)

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



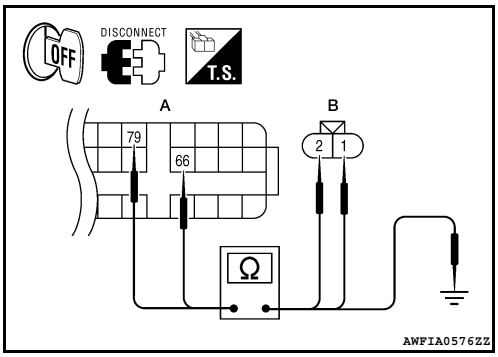
Brake ECU connector E61 (A)	Wheel sensor connector E19 (B)	—	Condition	Specified condition
Terminal	Terminal			
76	1	—	Always	Below 1 Ω
	—	Ground	Always	10 kΩ or higher
64	2	—	Always	Below 1 Ω
	—	Ground	Always	10 kΩ or higher

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



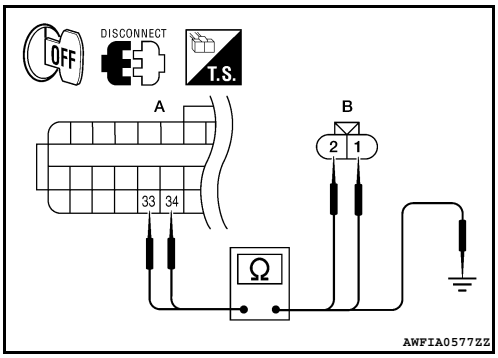
Brake ECU connector E60 (A)	Wheel sensor connector E41 (B)	—	Condition	Specified condition
Terminal	Terminal			
30	1	—	Always	Below 1 Ω
	—	Ground	Always	10 kΩ or higher
17	2	—	Always	Below 1 Ω
	—	Ground	Always	10 kΩ or higher

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



Brake ECU connector E61 (A)	Wheel sensor connector C3 (B)	—	Condition	Specified condition
Terminal	Terminal			
79	1	—	Always	Below 1 Ω
	—	Ground	Always	10 kΩ or higher
66	2	—	Always	Below 1 Ω
	—	Ground	Always	10 kΩ or higher

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



Brake ECU connector E60 (A)	Wheel sensor connector C2 (B)	—	Condition	Specified condition
Terminal	Terminal			
34	1	—	Always	Below 1 Ω
	—	Ground	Always	10 kΩ or higher
33	2	—	Always	Below 1 Ω
	—	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:0000000005440663

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

C1241, C1242

Description

INFOID:0000000005440664

These codes are memorized when the power source voltage for the brake ECU drops or the voltage for the AB S 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:0000000005440665

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: • 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.	• 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: • 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.	• 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.	• 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.	• 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.	• 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.	• 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.	• Auxiliary battery • Hybrid control system (Charging circuit) • ABS relay No.2 circuit • Brake ECU

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.	• 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.	• Auxiliary battery • IG2 power source circuit • Hybrid control system (Charging circuit) • Brake ECU

Diagnosis Procedure

INFOID:0000000005440666

Regarding Wiring Diagram information, refer to BRC-149, "Wiring Diagram".

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

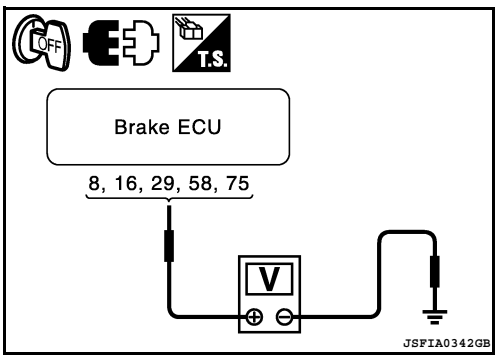
Is the inspection result normal?

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

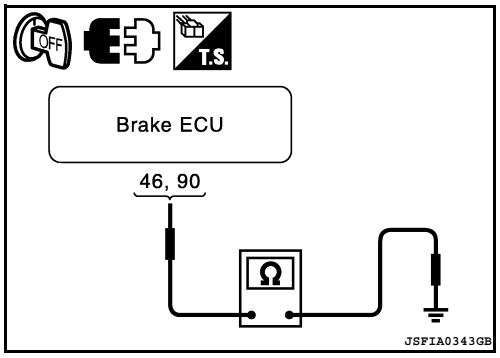


Is the inspection result normal?

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.
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:0000000005440667

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:0000000005440668

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:0000000005440669

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.	• Brake actuator assembly (Master cylinder pressure sensor) • Master cylinder pressure sensor circuit • Master cylinder pressure sensor power supply • Brake actuator assembly • Brake ECU
	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.	• Brake actuator assembly (Master cylinder pressure sensor) • Master cylinder pressure sensor circuit • Brake actuator assembly • Brake ECU
	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.	• 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.	• Brake actuator assembly (Master cylinder pressure sensor) • Master cylinder pressure sensor circuit • Brake actuator assembly • Brake ECU
	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.	
	202		M/C pressure sensor 1 data (PMC1) is invalid.	• Master cylinder pressure sensor power supply • Brake actuator assembly • Brake ECU
	205		M/C pressure sensor 2 data (PMC2) is invalid.	

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 • Brake actuator assembly • Brake ECU
	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.	
	222		• 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
	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.	
	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.	
	228		• 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
	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.	
	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.	
	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
	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.	
	234		• 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) sircuit.	• Brake actuator assembly (wheel cylinder pressure sensor) • Wheel cylinder pressure sensor circuit • Brake actuator assembly • Brake ECU
	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.	
	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.	

DTC	INF code	Display item	DTC detection condition	Trouble area
C1364	240	WC PRESS SEN	• 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) sircuit.	• 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: 1. RR left sensor output (PRL) is not approx. 0 Mpa when not braking. 2. 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.	• Stop lamp switch • Master cylinder pressure sensor

Diagnosis Procedure

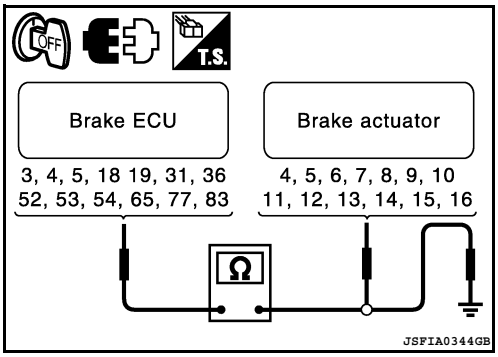
INFOID:0000000005440670

Regarding Wiring Diagram information, refer to BRC-149, "Wiring Diagram".

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

Brake ECU		Brake actuator		—	Condition	Specified condition
Connector	Terminal	Connector	Terminal			
E60	5	—	—	Ground	Always	10 kΩ or higher
E60	31	E91	13	—	Always	Below 1 Ω
E60	31	—	—	Ground	Always	10 kΩ or higher
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
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:0000000005440671

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:0000000005440672

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:0000000005440673

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.	• 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.	• 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.	• 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.	• 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.	• 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.	• Brake stroke sensor

Diagnosis Procedure

INFOID:0000000005440674

Regarding Wiring Diagram information, refer to BRC-149, "Wiring Diagram".

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

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

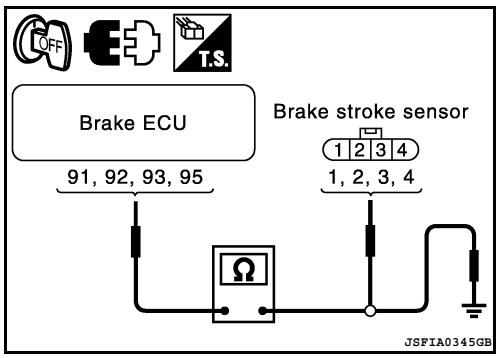
Condition	Proceed to
DTCs (C1247 and/or C1392) are output.	A
DTCs (C1247 and/or C1392) are not output.	B

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.

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

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:0000000005440675

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

C1249

Description

INFOID:0000000005440676

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:0000000005440677

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.	• Stop fuse • Stop lamp switch • Stop lamp switch circuit • Brake ECU

Diagnosis Procedure

INFOID:0000000005440678

Regarding Wiring Diagram information, refer to BRC-149, "Wiring Diagram".

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

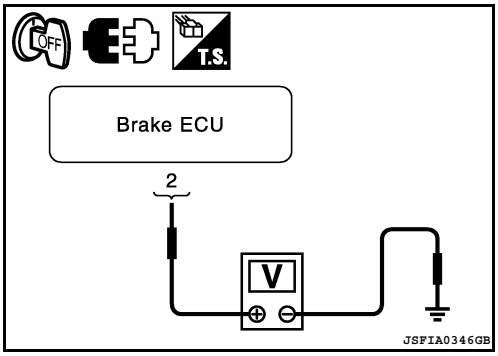
Is the inspection result normal?

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.



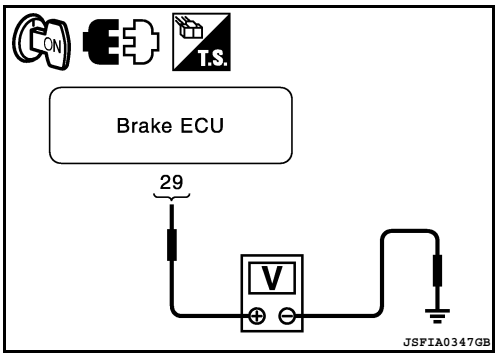
Brake ECU		Condition	Specified condition
Connector	Terminal		
E60	2 – Ground	Stop lamp switch ON (Brake pedal depressed.)	8 to 14 V
E60	2 – Ground	Stop lamp switch OFF (Brake pedal released.)	Below 1.5 V

Is the inspection result normal?

YES >> GO TO 4.
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.



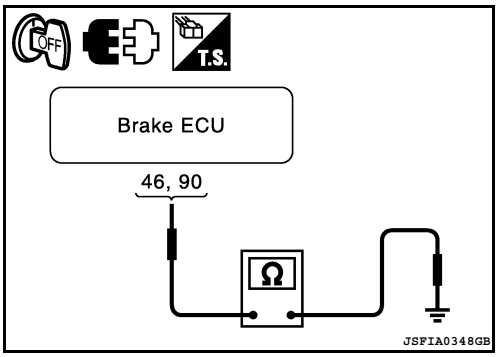
Brake ECU		Condition	Specified condition
Connector	Terminal		
E60	29 – Ground	Ignition switch ON	10 to 14 V

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

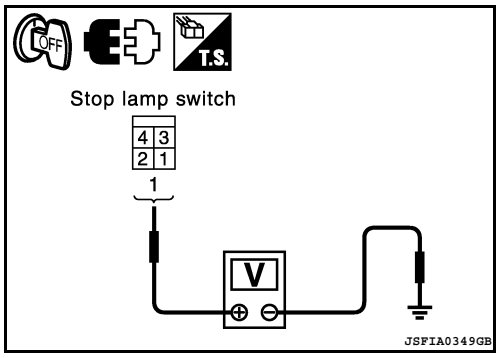
NOTE:
If troubleshooting has been carried out according to the Problems Symptoms Table, refer back to the table and proceed to the next step.

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.
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



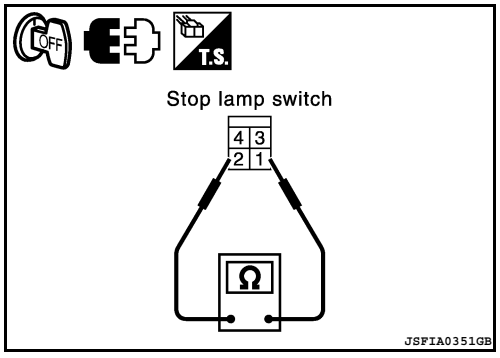
Is the inspection result normal?

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

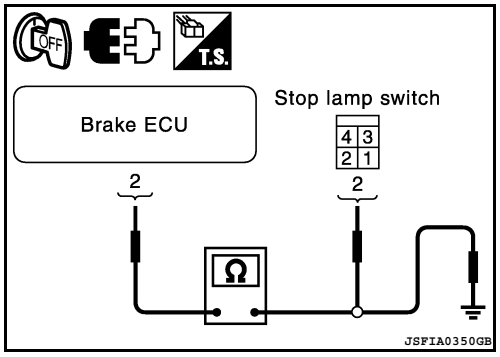


Is the inspection result normal?

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:0000000005440679

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:0000000005440680

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:0000000005440681

DTC	INF code	Display item	DTC detection condition	Trouble area
C1252	130	MOTOR TIME LONG	Motor relay is on for at least 5 minutes.	• 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.	• 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.	• 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.	• 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.	• 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.	• ABS motor relay No.1 • ABS motor relay No.2 • Brake actuator assembly (pump motor) • Pump motor circuit

Diagnosis Procedure

INFOID:0000000005440682

Regarding Wiring Diagram information, refer to BRC-149, "Wiring Diagram".

CAUTION:
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.

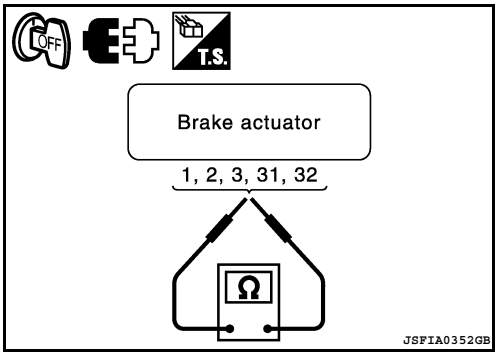
4. Check the operation sound of the ABS motor relay and motor when operating it with the CONSULT-III.
   NOTE:
   The operation sound of the ABS motor relay and motor should be heard.

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

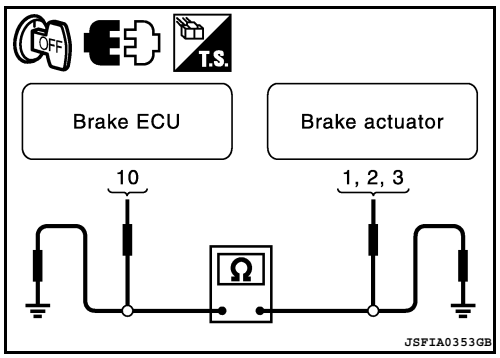
Is the inspection result normal?

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

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

1. Disconnect the brake ECU connector.

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.

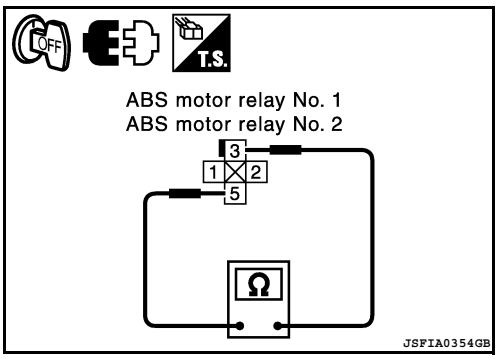
Result

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)

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.



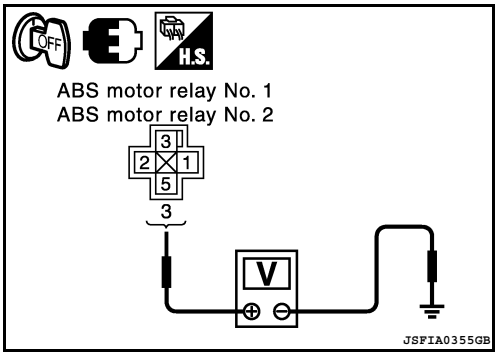
Terminal	Condition	Specified condition
3 – 5	Always	10 kΩ or higher
3 – 5	Apply B+ between terminals 1 and 2	Below 1 Ω

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.



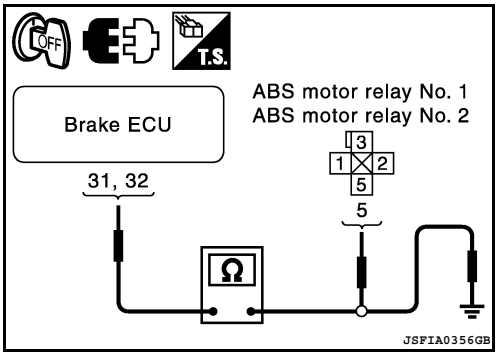
Relay	Terminal	Condition	Specified condition
ABS motor relay No.1	3	Always	10 to 14 V
ABS motor relay No.2	3	Always	10 to 14 V

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

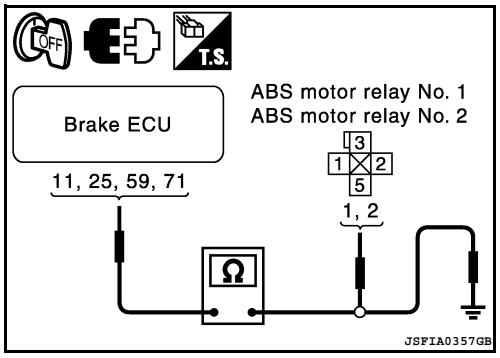
Brake actuator		ABS motor relay 2		—	Condition	Specified condition
Connector	Terminal	Connector	Terminal			
E91	32	E86	5	—	Always	Below 1 Ω
E91	32	—	—	Ground	Always	10 kΩ or higher

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:0000000005440683

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

C1256

Description

INFOID:0000000005440684

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:0000000005440685

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).	• 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:0000000005440686

Regarding Wiring Diagram information, refer to BRC-149, "Wiring Diagram".

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.
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

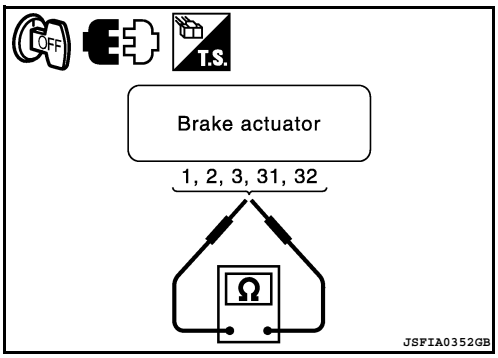
4. Depress the brake pedal 4 or 5 times to operate the pump motor, and check the output value on the CONSULT-III with the motor stopped (not braking).
   NOTE:
   Accumulator pressure sensor’s output voltage does not drop.

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:0000000005440687

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

C1259, C1310

Description

INFOID:0000000005440688

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:0000000005440689

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:0000000005440690

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:0000000005440691

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:0000000005440692

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:0000000005440693

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.	• 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

Diagnosis Procedure

INFOID:0000000005440694

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.

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:0000000005440695

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

C1300

Description

INFOID:0000000005440696

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

DTC Logic

INFOID:0000000005440697

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

Diagnosis Procedure

INFOID:0000000005440698

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:0000000005440699

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:0000000005440700

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:0000000005440701

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).	• 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).	• 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:0000000005440702

Regarding Wiring Diagram information, refer to BRC-149, "Wiring Diagram".

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.

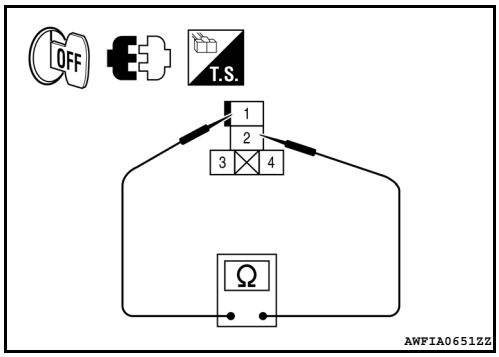
5. Check the operating sound of the ABS relay No.1 and No.2 when operating it with the CONSULT-III.
NOTE:
The operating sound of the ABS relay No.1 and No.2 should be heard.

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.



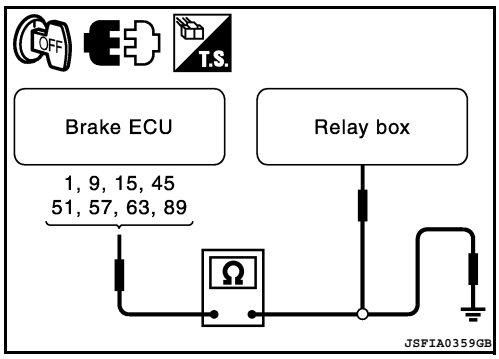
Terminal	Condition	Specified condition
1 – 2	Always	10 kΩ or higher
1 – 2	Apply B+ between terminals 3 and 4	Below 1 Ω

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

Brake ECU		—	Continuity
Connector	Terminal		
E61	51	Relay box	Existed
		Ground	Not existed

Is the inspection result normal?

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:0000000005440703

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

Description

INFOID:0000000005440704

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:0000000005440705

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.	• 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.	• 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.	• 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.	• 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.	

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.	• 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.	• 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.	• 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.	• 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.	• 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.	• 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

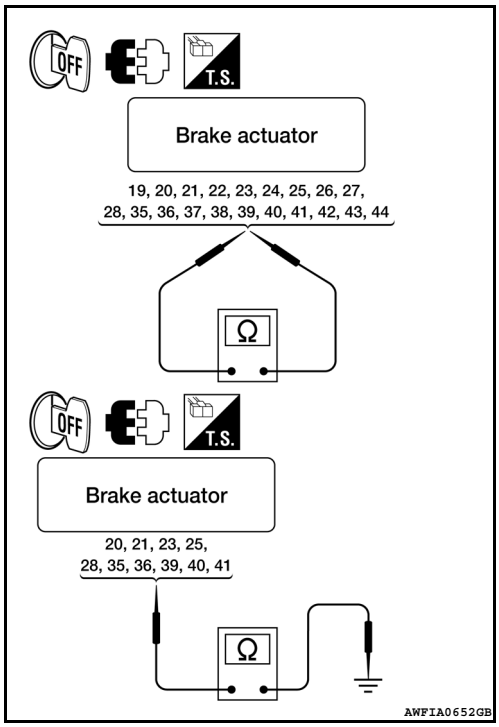
INFOID:0000000005440706

Regarding Wiring Diagram information, refer to BRC-149, "Wiring Diagram".

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.



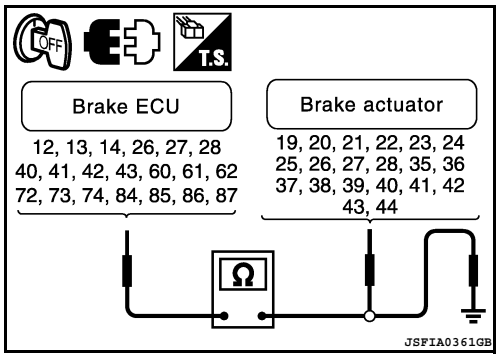
Brake actuator		Condition	Specified condition
Connector	Terminal		
E91	37 – 36	Always	Existed
E91	36 – Ground	Always	Not existed
E91	19 – 20	Always	Existed
E91	20 – Ground	Always	Not existed
E91	44 – 43	Always	Existed
E91	44 – Ground	Always	Not existed
E91	21 – 22	Always	Existed
E91	21 – Ground	Always	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	35 – 38	Always	Existed
E91	35 – 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.



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:0000000005440707

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

C1319

Description

INFOID:0000000005440708

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:0000000005440709

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.	• 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

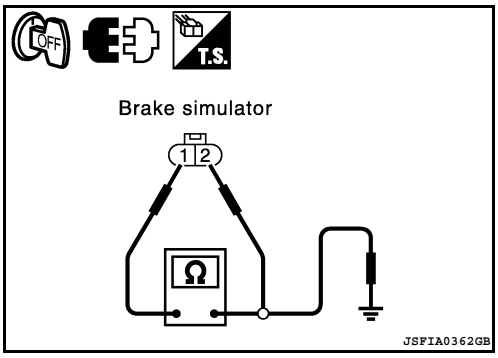
INFOID:0000000005440710

Regarding Wiring Diagram information, refer to BRC-149, "Wiring Diagram".

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.



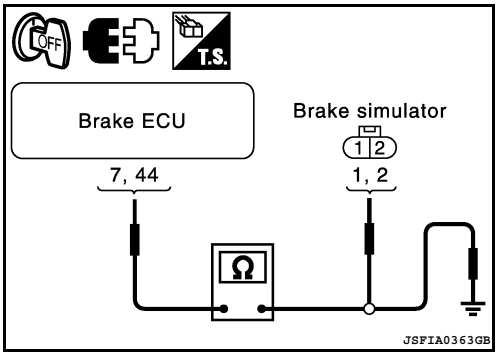
Brake simulator		Condition	Specified condition
Connector	Terminal		
E90	1 – 2	Always	19 to 38 Ω
E90	1 – Ground	Always	10 kΩ or higher

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.



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:0000000005440711

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:0000000005440712

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:0000000005440713

DTC	INF code	Display item	DTC detection condition	Trouble area
C1341	551 552	FR RH HYDRAULIC	Hydraulic pressure control on FR wheel has deteriorated.	• Fluid leakage • Brake actuator assembly
	553		There is a malfunction, such as leakage in the pressure increase control valve of FR wheel.	• 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.	
C1342	561 562	FR LH HYDRAULIC	Hydraulic pressure control on FL wheel has deteriorated.	• Fluid leakage • Brake actuator assembly
	563		There is a malfunction, such as leakage in the pressure increase control valve of FL wheel.	• 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.	
C1343	571 572	RR RH HYDRAULIC	Hydraulic pressure control on RR wheel has deteriorated.	• Fluid leakage • Brake actuator assembly
	573		There is a malfunction, such as leakage in the pressure increase control valve of RR wheel.	• 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.	
C1344	581 582	RR LH HYDRAULIC	Hydraulic pressure control on RL wheel has deteriorated.	• Fluid leakage • Brake actuator assembly
	583		There is a malfunction, such as leakage in the pressure increase control valve of RL wheel.	• 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.	

Diagnosis Procedure

INFOID:0000000005440714

Regarding Wiring Diagram information, refer to BRC-149, "Wiring Diagram".

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.

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

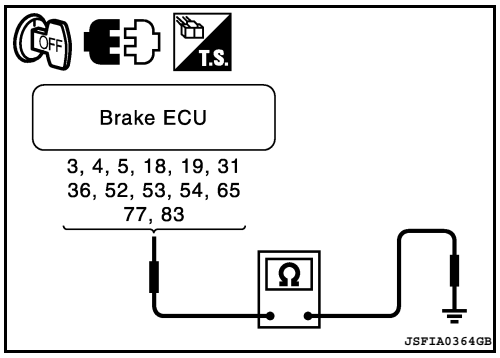
Condition	Proceed to
DTCs (C1341, C1342, C1343 and/or C1344) are output.	A
DTCs (C1341, C1342, C1343 and/or C1344) are not output.	B

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.
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:0000000005440715

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

C1345, C1368

Description

INFOID:0000000005440716

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:0000000005440717

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.	• 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:0000000005440718

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.

Special Repair Requirement

INFOID:0000000005440719

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

C1365

Description

INFOID:0000000005440720

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:0000000005440721

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.	• 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

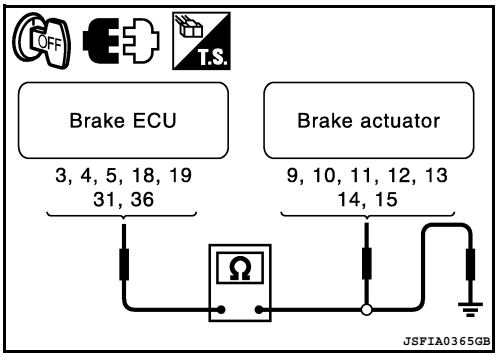
INFOID:0000000005440722

Regarding Wiring Diagram information, refer to BRC-149, "Wiring Diagram".

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

Brake ECU		Brake actuator		—	Condition	Specified condition
Connector	Terminal	Connector	Terminal			
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	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:0000000005440723

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

C1377

Description

INFOID:0000000005440724

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

DTC Logic

INFOID:0000000005440725

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:0000000005440726

Regarding Wiring Diagram information, refer to BRC-149, "Wiring Diagram".

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.

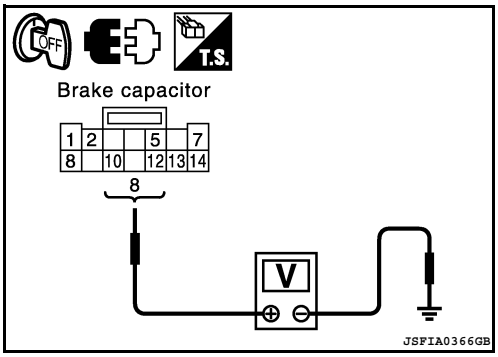
Tester connection	Condition	Specified condition
ABS No.2 (15A) fuse	Always	Below 1 Ω

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.



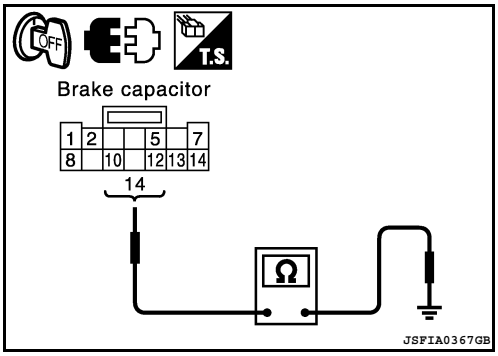
Brake capacitor		Condition	Specified condition
Connector	Terminal		
B131	8 – Ground	Always	10 to 14 V

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.



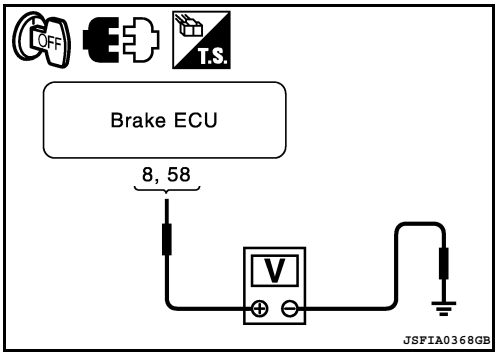
Brake capacitor		Condition	Specified condition
Connector	Terminal		
B131	14 – Ground	Always	Below 1 Ω

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).

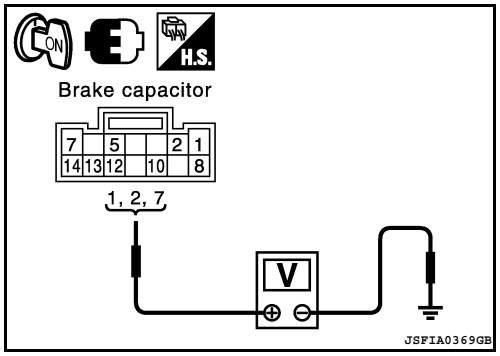
6. INSPECT BRAKE CAPACITOR (OUT AND CTY+ TERMINAL)

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

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

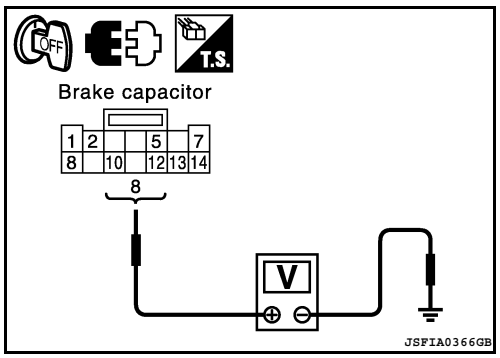
Is the inspection result normal?

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.

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:0000000005440727

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

C1378

Description

INFOID:0000000005440728

The brake capacitor provides auxiliary power for brake control when an auxiliary battery (12 V) voltage drops.
The FAIL and ENA lines are place 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:0000000005440729

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.	• 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.	• Brake ECU • Brake ECU circuit

Diagnosis Procedure

INFOID:0000000005440730

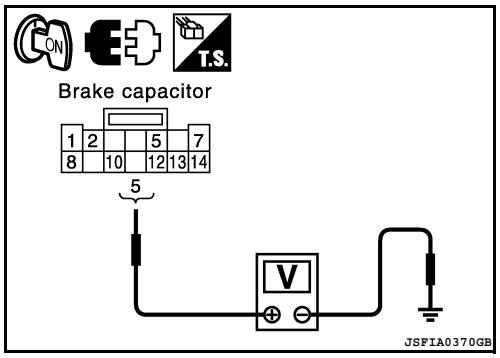
Regarding Wiring Diagram information, refer to BRC-149, "Wiring Diagram".

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



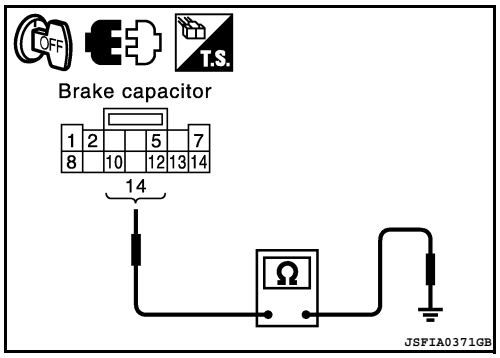
Is the inspection result normal?

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

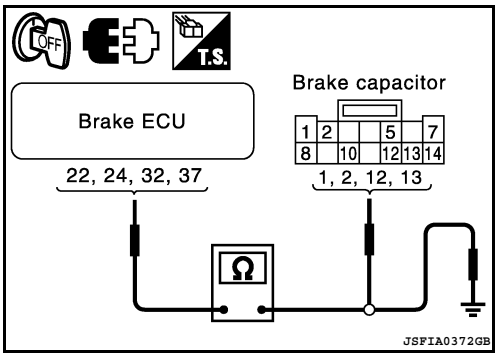


Is the inspection result normal?

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.
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:0000000005440731

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

C1391

Description

INFOID:0000000005440732

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:0000000005440733

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).	• Fluid leakage • Brake actuator assembly

Diagnosis Procedure

INFOID:0000000005440734

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.

Result

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

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

Special Repair Requirement

INFOID:0000000005440735

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

U0073, U0123, U0124, U0126, U0293

Description

INFOID:0000000005440736

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:0000000005440737

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.)	• 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.	• 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.	• 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.	• 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.	• 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.	

Diagnosis Procedure

INFOID:0000000005440738

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

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

ECU DIAGNOSIS

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Reference Value

INFOID:0000000005440739

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.

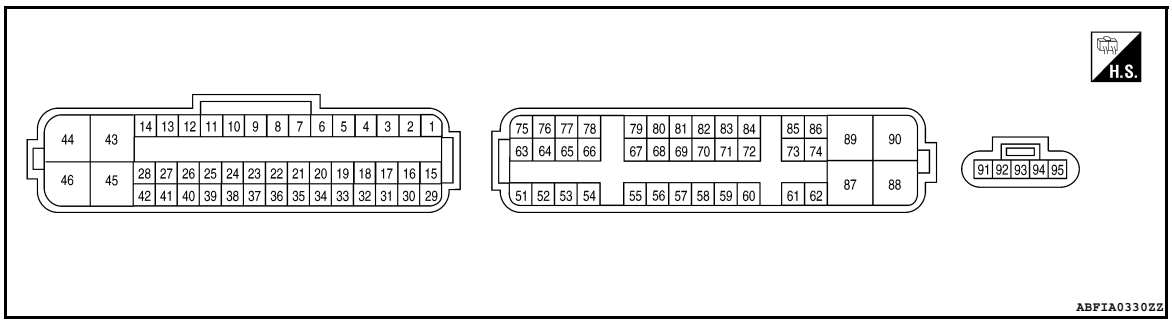
Monitor item	Condition		Value/Status
MTR RLY 1	ABS motor relay No.1: ON		ON
	ABS motor relay No.1: OFF		OFF
STP LMP SW	Brake pedal is depressed		ON
	Brake pedal is released		OFF
PKB SW	Parking brake is applied		ON
	Parking brake is released		OFF
SHIFT LVR POS	Select lever position	1st 2nd 3rd 4th 5th 6th/B D/M P/N R	1 2 3 4 5 6 D P/N R
VWFR	Wheel speed	Vehicle stopped	0 km/h (0 MPH)
		Vehicle running	Nearly matches the speed meter display (±10% or less)
VWFL	Wheel speed	Vehicle stopped	0 km/h (0 MPH)
		Vehicle running	Nearly matches the speed meter display (±10% or less)
VWRR	Wheel speed	Vehicle stopped	0 km/h (0 MPH)
		Vehicle running	Nearly matches the speed meter display (±10% or less)
VWRL	Wheel speed	Vehicle stopped	0 km/h (0 MPH)
		Vehicle running	Nearly matches the speed meter display (±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 (±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

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

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

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

Terminal (Wire color)		Description		Condition	Reference value (Approx.)
+	–	Signal name	Input/Output		
46 (B)	Ground	GND	—	Always	Existed
29 (B)	Ground	IG1	Input	Ignition switch ON	10 – 16 V
16 (SB)	Ground	Battery power supply	Input	Always	10 – 16 V
8 (V)	Ground	Battery power supply	Input	Always	10 – 16 V
2 (O)	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 (B)	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)	Ground	Battery power supply	Input	Always	10 – 16 V

DTC Index

INFOID:0000000005440741

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.
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-52, "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-52, "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-58, "Description"

DTC code	Detection item	INF code	Trouble area	Reference page
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-58, "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-73, "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-73, "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-73, "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-73, "Description"
C1243	G SEN STUC	317	Yaw rate/side/decel G sensor	BRC-63, "Description"
C1244	G SENSOR	314	1. Yaw rate/side/decel G sensor 2. Sensor installation	BRC-63, "Description"
C1245	G SEN OUTPUT	313	1. Yaw rate/side/decel G sensor 2. Sensor installation	BRC-63, "Description"
C1336	G SEN CALIB	—	1. Brake ECU 2. Yaw rate/side/decel G sensor 3. Zero point calibration undone	BRC-69, "Description"
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-63, "Description"
U0124	LOST COMM (DECEL)	319	CAN communication system (Brake ECU to yaw rate/side/decel G sensor)	BRC-136, "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-69, "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-71, "Description"
C1232	G SEN STUC 2	311 312	Yaw rate/side/decel G sensor	BRC-63, "Description"
C1234	YAW RATE SEN	333 334 335 337	Yaw rate/side/decel G sensor	BRC-63, "Description"

DTC code	Detection item	INF code	Trouble area	Reference page
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-105, "Description"
C1310	HV SYSTEM	—	Hybrid control system	BRC-104, "Description"
U0123	LOST COMM (YAW)	338	CAN communication system (Brake ECU to yaw rate/side/decel G sensor)	BRC-136, "Description"
U0126	LOST COMM (STRG)	350	CAN communication system (Brake ECU to steering angle sensor)	BRC-136, "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-66, "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-79, "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-79, "Description"
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-82, "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-87, "Description"
C1249	STOP LAMP SW	520	1. STOP fuse 2. Stop lamp switch 3. Stop lamp switch circuit 4. Brake ECU	BRC-91, "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-95, "Description"

DTC code	Detection item	INF code	Trouble area	Reference page
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-95, "Description"
C1256	ACC PRESSURE LOW	141 143	1. Accumulator pressure 2. Brake actuator assembly (accumulator pressure sensor) 3. Brake actuator assembly (pump motor)	BRC-101, "Description"
C1259	HV SYSTEM PEGNRTNG	150	Hybrid control system	BRC-104, "Description"
C1300	ECU	—	Brake ECU	BRC-107, "Description"
C1311	MAIN RLY1 OPEN	1	1. ABS relay No.1 2. ABS relay No.1 circuit 3. Brake ECU	BRC-108, "Description"
C1312	MAIN RLY1 SHORT	3	1. ABS relay No.1 2. ABS relay No.1 circuit 3. Brake ECU	BRC-108, "Description"
C1313	MAIN RLY2 OPEN	4	1. ABS relay No.2 2. ABS relay No.2 circuit 3. Brake ECU	BRC-108, "Description"
C1314	MAIN RLY2 SHORT	6	1. ABS relay No.2 2. ABS relay No.2 circuit 3. Brake ECU	BRC-108, "Description"
C1315	SMC1	61 62 63 64	1. Brake actuator assembly (SMC1) 2. SMC1 circuit 3. Brake ECU	BRC-111, "Description"
C1316	SMC2	66 67 68 69	1. Brake actuator assembly (SMC2) 2. SMC2 circuit 3. Brake ECU	BRC-111, "Description"
C1319	SCSS	71 72 73 74	1. Brake simulator 2. Brake simulator circuit 3. Brake ECU	BRC-116, "Description"
C1341	FR RH HYDRAULIC	551 552 553 554 555	1. Fluid leakage 2. Disc rotor 3. Brake actuator assembly	BRC-118, "Description"
C1342	FR LH HYDRAULIC	561 562 563 564 565	1. Fluid leakage 2. Disc rotor 3. Brake actuator assembly	BRC-118, "Description"
C1343	RR RH HYDRAULIC	571 572 573 574 575	1. Fluid leakage 2. Disc rotor 3. Brake actuator assembly	BRC-118, "Description"
C1344	RR LH HYDRAULIC	581 582 583 584 585	1. Fluid leakage 2. Disc rotor 3. Brake actuator assembly	BRC-118, "Description"

DTC code	Detection item	INF code	Trouble area	Reference page
C1345	LINEAR VLV CALIB	—	1. Initialization of linear solenoid valve and calibration undone 2. Brake ECU	BRC-122, "Description"
C1352	SLA FR SOL	11 12 13 14	1. Brake actuator assembly (SLAFR) 2. SLAFR circuit 3. Brake ECU	BRC-111, "Description"
C1353	SLA FL SOL	21 22 23 24	1. Brake actuator assembly (SLAFL) 2. SLAFL circuit 3. Brake ECU	BRC-111, "Description"
C1354	SLA RR SOL	31 32 33 34	1. Brake actuator assembly (SLARR) 2. SLARR circuit 3. Brake ECU	BRC-111, "Description"
C1355	SLA RL SOL	41 42 43 44	1. Brake actuator assembly (SLARL) 2. SLARL circuit 3. Brake ECU	BRC-111, "Description"
C1356	SLR FR SOL	16 17 18 19	1. Brake actuator assembly (SLRFR) 2. SLRFR circuit 3. Brake ECU	BRC-111, "Description"
C1357	SLR FL SOL	26 27 28 29	1. Brake actuator assembly (SLRFL) 2. SLRFL circuit 3. Brake ECU	BRC-111, "Description"
C1358	SLR RR SOL	36 37 38 39	1. Brake actuator assembly (SLRRR) 2. SLRRR circuit 3. Brake ECU	BRC-111, "Description"
C1359	SLR RL SOL	41 42 43 44	1. Brake actuator assembly (SLRRL) 2. SLRRL circuit 3. Brake ECU	BRC-111, "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-82, "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-124, "Description"

DTC code	Detection item	INF code	Trouble area	Reference page
C1368	LINEAR S/V	—	1. Initialization of linear solenoid valve and calibration undone 2. Brake ECU	BRC-122, "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-127, "Description"
C1378	CAPACITOR COMM	112	1. Brake capacitor 2. Brake capacitor circuit 3. Brake ECU 4. Brake ECU circuit	BRC-131, "Description"
C1391	ACC LEAK	591	1. Fluid leakage 2. Brake actuator assembly	BRC-134, "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-87, "Description"
U0073	LOST COMM YAW/STRG	360	CAN communication system	BRC-136, "Description"
U0293	LOST COMM (HV ECU)	152 153 154 155	CAN communication system (brake ECU to HV ECU)	BRC-136, "Description"

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. Sensor installation 3. Wheel sensor rotor	BRC-52, "Description"
C1272	FL SPD OUTPUT	—	1. Front wheel sensor LH 2. Sensor installation 3. Wheel sensor rotor	BRC-52, "Description"
C1273	RR SPD OUTPUT	—	1. Rear wheel sensor RH 2. Sensor installation 3. Wheel sensor rotor	BRC-58, "Description"
C1274	RL SPD OUTPUT	—	1. Rear wheel sensor LH 2. Sensor installation 3. Wheel sensor rotor	BRC-58, "Description"
C1275	FR SPD OUTPUT HI	—	Wheel sensor rotor	BRC-73, "Description"
C1276	FL SPD OUTPUT HI	—	Wheel sensor rotor	BRC-73, "Description"
C1277	RR SPD OUTPUT HI	—	Wheel sensor rotor	BRC-73, "Description"
C1278	RL SPD OUTPUT HI	—	Wheel sensor rotor	BRC-73, "Description"
C1279	G SEN OUTPUT	—	1. Yaw rate/side/decel G sensor 2. Sensor installation	BRC-63, "Description"
C1281	MC SENSOR OUTPUT	—	1. Stop lamp switch 2. Master cylinder pressure sensor	BRC-63, "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-63, "Description"

TEST MODE DTC of Electronically controlled Brake:

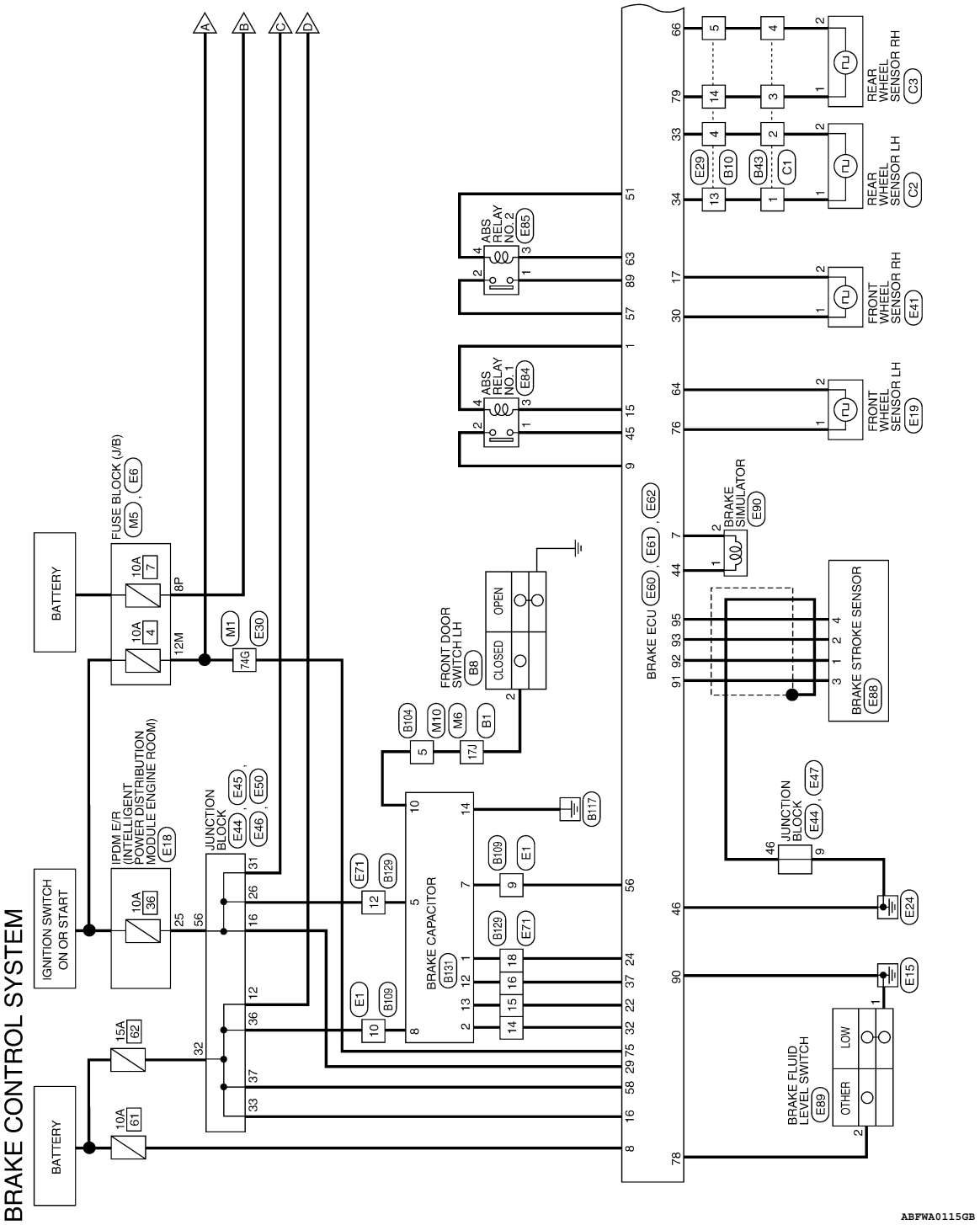
DTC code	Detection item	INF code	Trouble area	Reference page
C1346	STROKE SEN CALIB	—	Brake stroke sensor	BRC-87, "Description"

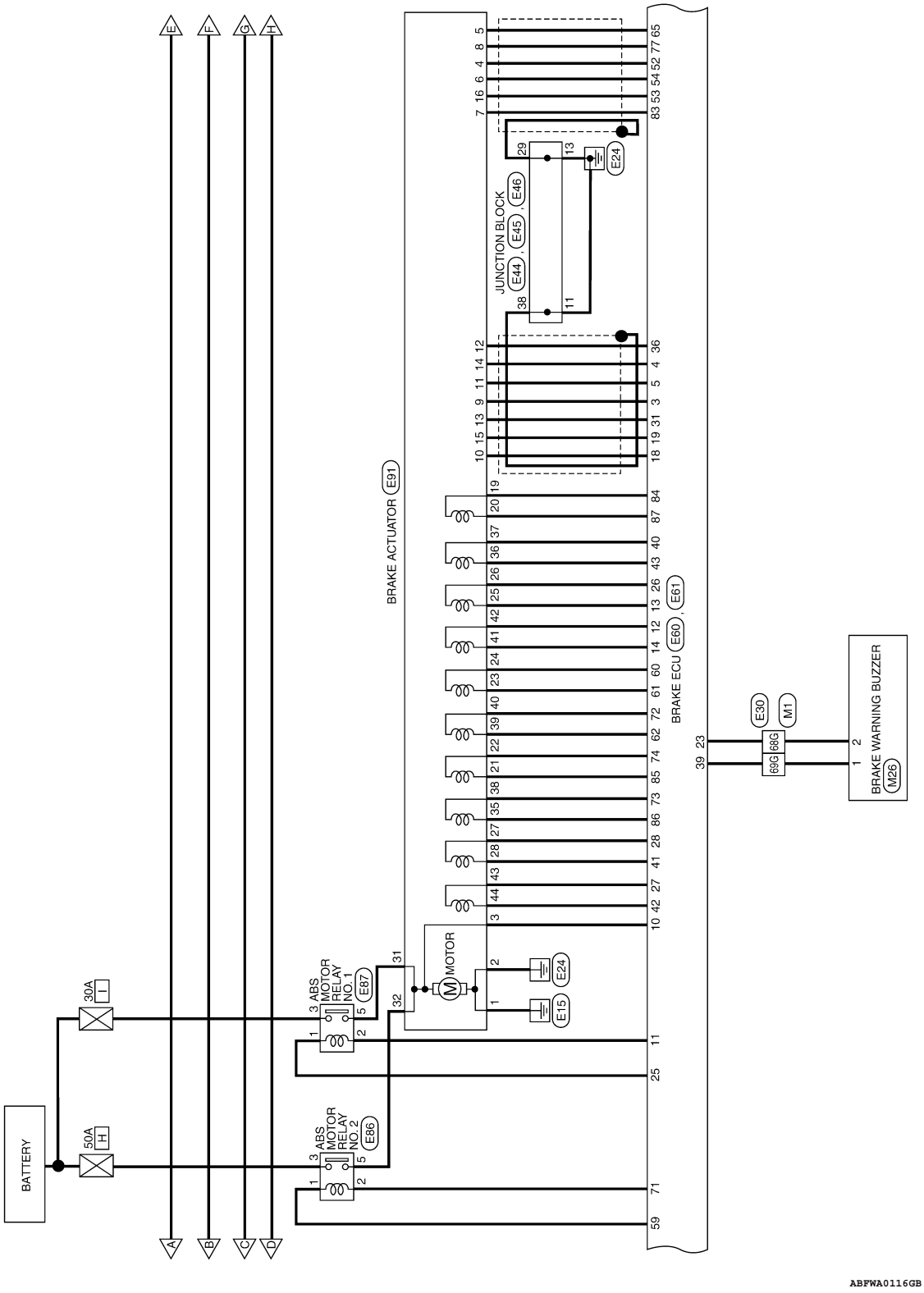
WIRING DIAGRAM

BRAKE CONTROL SYSTEM

Wiring Diagram

INFOID:0000000005806076

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30A
I
50A
H
ABS MOTOR RELAY NO. 1
E87
ABS MOTOR RELAY NO. 2
E86
MOTOR
E24
E15
BRAKE ACTUATOR
E91
JUNCTION BLOCK
E44
E45
E46
E24
BRAKE ECU
E60
E61
E30
M1
69G
68G
BRAKE WARNING BUZZER
M26
A
B
C
D
E
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G
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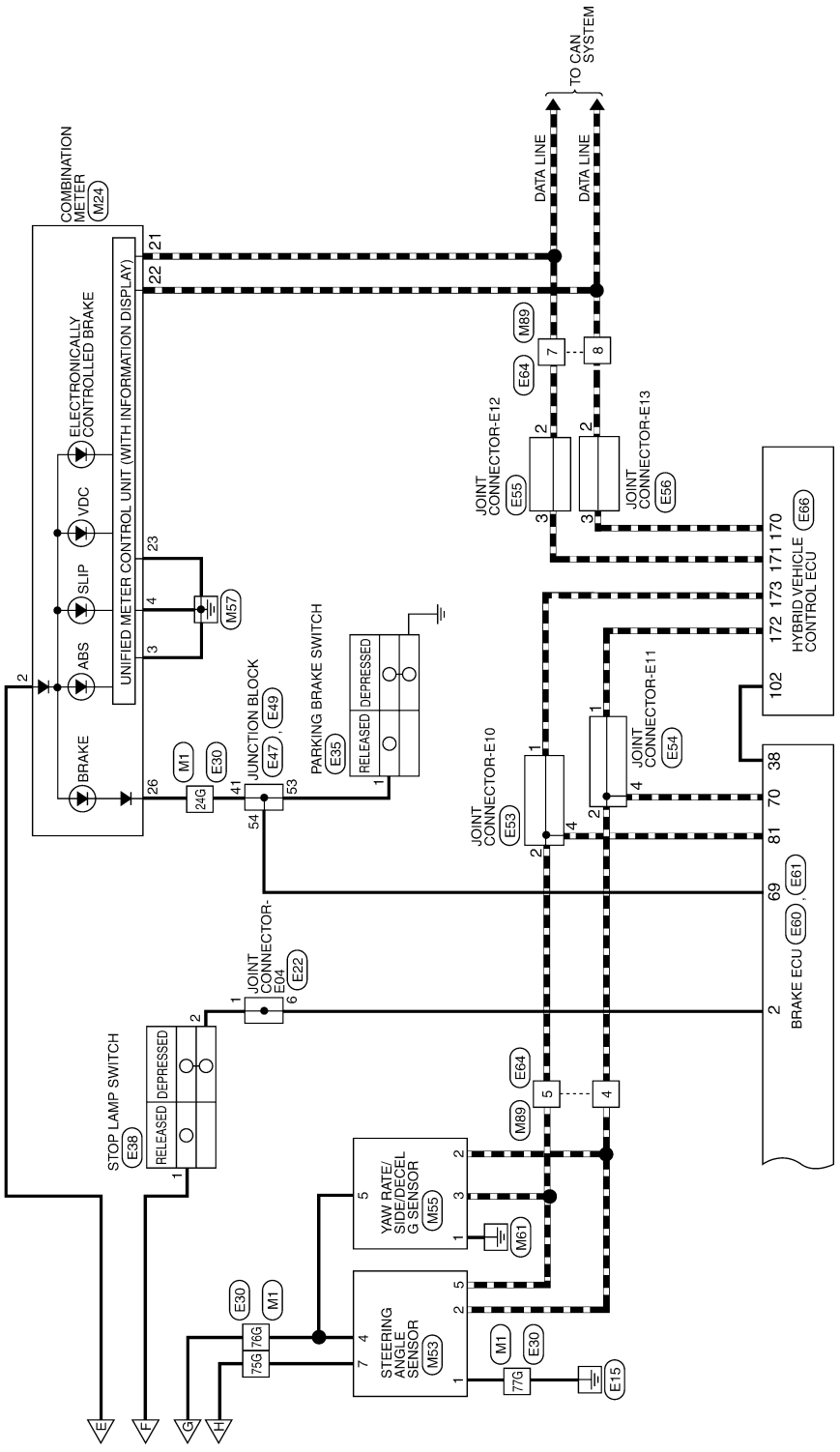
ABFWA0116GB

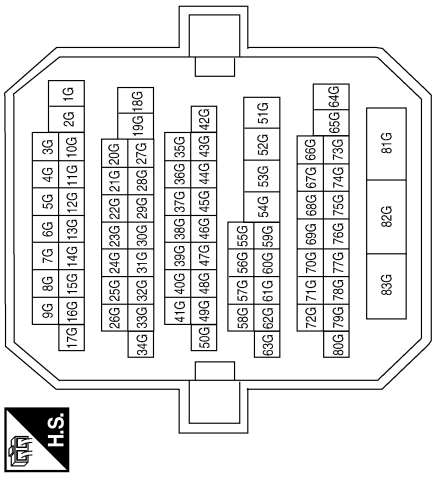


ABFWA0117GB

BRAKE CONTROL SYSTEM CONNECTORS

Connector No.	M1
Connector Name	WIRE TO WIRE
Connector Color	WHITE

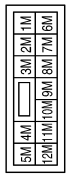
H.S.



Terminal No.	Color of Wire	Signal Name
24G	G/R	–
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

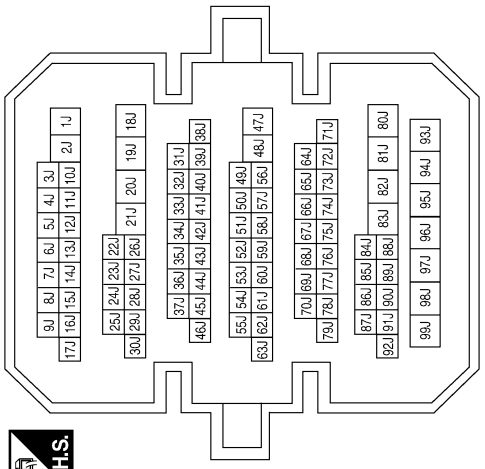
H.S.



Terminal No.	Color of Wire	Signal Name
12M	O	–

Connector No.	M6
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.



Terminal No.	Color of Wire	Signal Name
17J	SB	–

ABFIA0286GB

Connector No.	M26
Connector Name	BRAKE WARNING BUZZER
Connector Color	BROWN

H.S.

1	2

Terminal No.	Color of Wire	Signal Name
1	G/B	BZ
2	P	BZO

Connector No.	M24
Connector Name	COMBINATION METER
Connector Color	WHITE

H.S.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

Terminal No.	Color of Wire	Signal Name
2	O	IGN
3	B	GND (POWER)
4	B	GND (ILL)
21	L	CAN-H
22	P	CAN-L
23	B	GND (CIRCUIT)
26	G/R	PKB

Connector No.	M89
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

5	4	3	2	1
12	11	10	9	8	7	6

Terminal No.	Color of Wire	Signal Name
4	BR	–
5	Y	–
7	L	–
8	P	–

Connector No.	M10
Connector Name	WIRE TO WIRE
Connector Color	BROWN

H.S.

5	4	3	2	1
12	11	10	9	8	7	6

Terminal No.	Color of Wire	Signal Name
5	SB	–

Connector No.	M55
Connector Name	YAW RATE/SIDE/DECEL G SENSOR
Connector Color	BLACK

H.S.

5	4	3	2	1

Terminal No.	Color of Wire	Signal Name
1	B	GND
2	BR	CAN-L
3	Y	CAN-H
5	G/R	IG

Connector No.	M53
Connector Name	STEERING ANGLE SENSOR
Connector Color	WHITE

H.S.

1	2	3	4
5	6	7	8

Terminal No.	Color of Wire	Signal Name
1	B/Y	ESS
2	BR	CAN-L
4	G/R	IG
5	Y	CAN-H
7	W/R	+B

ABFIA0287GB

Connector No.	E1
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

4	3		2	1
10	9	8	7	6	5

Terminal No.	Color of Wire	Signal Name
9	SB	–
10	GR	–

Connector No.	E6
Connector Name	FUSE BLOCK (J/B)
Connector Color	WHITE

H.S.

7P	6P	5P	4P		3P	2P	1P
16P	15P	14P	13P	12P	11P	10P	9P	8P

Terminal No.	Color of Wire	Signal Name
8P	R	–

Connector No.	E18
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	WHITE

H.S.

9	10	11	12	13	14		25	26	27	28	29		30	31	32	33	34		37	38
3	4	5	6	7	8		15	16	17	18	19		20	21	22	23	24		35	36

Terminal No.	Color of Wire	Signal Name
25	R	ABS ECU

Connector No.	E19
Connector Name	FRONT WHEEL SENSOR LH
Connector Color	GRAY

H.S.

1	2

Terminal No.	Color of Wire	Signal Name
1	BR	–
2	GR	–

Connector No.	E22
Connector Name	JOINT CONNECTOR-E04
Connector Color	BLACK

H.S.

5	4	3	2	1
10	9	8	7	6

Terminal No.	Color of Wire	Signal Name
1	P	–
6	R/G	–

Connector No.	E29
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

7	6	5	4		3	2	1
16	15	14	13	12	11	10	9	8

Terminal No.	Color of Wire	Signal Name
4	O	–
5	P	–
13	G	–
14	GR	–

ABFIA0288GB

Connector No.	E35
Connector Name	PARKING BRAKE SWITCH
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	P	–

Connector No.	E44
Connector Name	JUNCTION BLOCK
Connector Color	BROWN

H.S.

Terminal No.	Color of Wire	Signal Name
9	B/W	–
11	B/W	–
12	R	–

Terminal No.	Color of Wire	Signal Name
24G	BR	–
68G	BR	–
69G	LG	–
74G	B	–
75G	R	–
76G	R	–
77G	B/Y	–

Connector No.	E41
Connector Name	FRONT WHEEL SENSOR RH
Connector Color	GRAY

H.S.

Terminal No.	Color of Wire	Signal Name
1	P	–
2	V	–

Connector No.	E30
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

Connector No.	E38
Connector Name	STOP LAMP SWITCH
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1	R	–
2	P	–

ABFIA0289GB

Connector No.	E45
Connector Name	JUNCTION BLOCK
Connector Color	WHITE

H.S.

17	16		15	14	13
24	23	22	21	20	19	18

Terminal No.	Color of Wire	Signal Name
13	B/W	–
16	B	–

Connector No.	E46
Connector Name	JUNCTION BLOCK
Connector Color	WHITE

H.S.

31	30	29	28		27	26	25
40	39	38	37	36	35	34	33	32

Terminal No.	Color of Wire	Signal Name
26	LG	–
29	GR	–
31	R	–
32	BR	–
33	SB	–
36	GR	–
37	W	–
38	GR	–

Connector No.	E47
Connector Name	JUNCTION BLOCK
Connector Color	WHITE

H.S.

42		41
46	45	44	43

Terminal No.	Color of Wire	Signal Name
41	BR	–
46	GR	–

Connector No.	E49
Connector Name	JUNCTION BLOCK
Connector Color	BROWN

H.S.

54	53	52	51

Terminal No.	Color of Wire	Signal Name
53	P	–
54	G/R	–

Connector No.	E50
Connector Name	JUNCTION BLOCK
Connector Color	WHITE

H.S.

56	55

Terminal No.	Color of Wire	Signal Name
56	R	–

Connector No.	E53
Connector Name	JOINT CONNECTOR-E10
Connector Color	WHITE

H.S.

4	3	2	1

Terminal No.	Color of Wire	Signal Name
1	Y	–
2	Y	–
4	Y	–

ABFIA0290GB

Connector No.	E54
Connector Name	JOINT CONNECTOR-E11
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1	BR	–
2	BR	–
4	BR	–

Connector No.	E55
Connector Name	JOINT CONNECTOR-E12
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
2	L	–
3	L	–

Connector No.	E56
Connector Name	JOINT CONNECTOR-E13
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
2	P	–
3	P	–

Connector No.	E60
Connector Name	BRAKE ECU
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	L	R3+
2	O	STP
3	Y	PFR
4	B	E
5	BR	PRL
6	–	–
7	LG	SS
8	V	DI1
9	P	DO1
10	SB	MTT
11	W	MR1
12	G	RLA-
13	R	RLR+
14	GR	RLA+
15	LG	R1+
16	SB	B+
17	V	FR-
18	W	VCM1
19	R	PAC1
20	–	–
21	–	–
22	G	CIN
23	BR	BZO (POWER)
24	L	CBI1
25	O	R1-
26	GR	RLR-
27	Y	FRA-
28	P	FRR-
29	B	IG1
30	P	FR+
31	G	PMC1
32	GR	B+CTY
33	O	RL-
34	G	RL+
35	–	–
36	L	PCK1
37	Y	COUT
38	G	SPI
39	LG	BZ (SIGNAL)
40	BR	SMC1
41	V	FRR+
42	W	FRA+
43	V	BSO1
44	BR	BSO3
45	SB	BS1
46	B	GND

ABFIA0291GB

Connector No.	E61
Connector Name	BRAKE ECU
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
51	R	R4+
52	G	PFL
53	B	E2
54	Y	PRR
55	–	–
56	SB	CB12
57	GR	DO2
58	W	D12
59	LG	R2-
60	L	RRR-
61	BR	RRR+
62	O	RRA+
63	Y	R2+
64	GR	FL-
65	W	VMC2
66	P	RR-

Terminal No.	Color of Wire	Signal Name
67	–	–
68	–	–
69	LG	PKB
70	BR	CAN-L
71	V	MR2
72	B	RRA-
73	SB	FLA-
74	G	FLR-
75	B	IG2
76	BR	FL+
77	R	PMC2
78	V	LBL
79	GR	RR+
80	–	–
81	Y	CAN-H
82	–	–
83	L	PCK2
84	O	SMC2
85	W	FLR+
86	P	FLA+
87	B	BS02
88	–	–
89	SB	BS2
90	B/Y	GND

Connector No.	E62
Connector Name	BRAKE ECU
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
91	G	VCSK
92	B	SKG
93	R	SKS
94	–	–
95	W	SKS2

ABFIA0292GB

Connector No.	E64
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

1	2	3		4	5
6	7	8	9	10	11	12

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

H.S.

168	167	166	165	164	163	77	76	75	74	73	72	71	70	69	68	67	66	65	64	63	62	61
						94	93	92	91	90	89	88	87	86	85	84	83	82	81	80	79	78
174	173	172	171	170	169	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	96	95
180	179	178	177	176	175	128	127	126	125	124	123	122	121	120	119	118	117	116	115	114	113	112
						145	144	143	142	141	140	139	138	137	136	135	134	133	132	131	130	129
186	185	184	183	182	181	162	161	160	159	158	157	156	155	154	153	152	151	150	149	148	147	146

Terminal No.	Color of Wire	Signal Name
102	G	SPD1
170	P	CAN-L
171	L	CAN-H
172	BR	CAN-L
173	Y	CAN-H

Connector No.	E71
Connector Name	WIRE TO WIRE
Connector Color	GRAY

H.S.

11	10	9	8	7		6	5	4	3	2	1
24	23	22	21	20	19	18	17	16	15	14	13	12

Terminal No.	Color of Wire	Signal Name
12	LG	–
14	GR	–
15	G	–
16	Y	–
18	L	–

Connector No.	E84
Connector Name	ABS RELAY NO. 1
Connector Color	BLUE

H.S.

1	
2	
3	4

Terminal No.	Color of Wire	Signal Name
1	SB	–
2	P	–
3	LG	–
4	L	–

Connector No.	E85
Connector Name	ABS RELAY NO. 2
Connector Color	BLUE

H.S.

1	
2	
3	4

Terminal No.	Color of Wire	Signal Name
1	SB	–
2	GR	–
3	Y	–
4	R	–

ABFIA0293GB

Connector No.	E86
Connector Name	ABS MOTOR RELAY NO. 2
Connector Color	BLUE

H.S.

Terminal No.	Color of Wire	Signal Name
1	LG	–
2	V	–
3	W	–
5	R	–

Connector No.	E87
Connector Name	ABS MOTOR RELAY NO. 1
Connector Color	BLUE

H.S.

Terminal No.	Color of Wire	Signal Name
1	O	–
2	W	–
3	R	–
5	G	–

Connector No.	E88
Connector Name	BRAKE STROKE SENSOR
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	B	–
2	R	–
3	G	–
4	W	–

Connector No.	E89
Connector Name	BRAKE FLUID LEVEL SWITCH
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	B	–
2	V	–

Connector No.	E90
Connector Name	BRAKE SIMULATOR
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	BR	–
2	LG	–

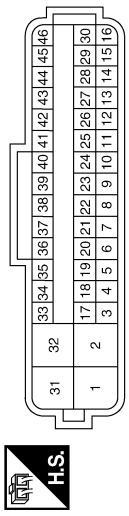
ABFIA0294GB

Connector No.	C1
Connector Name	WIRE TO WIRE
Connector Color	GRAY

Terminal No.	Color of Wire	Signal Name
1	G	–
2	O	–
3	LG	–
4	BR	–

Terminal No.	Color of Wire	Signal Name
19	O	–
20	B	–
21	W	–
22	G	–
23	BR	–
24	L	–
25	R	–
26	GR	–
27	P	–
28	V	–
29	–	–
30	–	–
31	G	–
32	R	–
33	–	–
34	–	–
35	P	–
36	V	–
37	BR	–
38	SB	–
39	O	–
40	B	–
41	GR	–
42	G	–
43	Y	–
44	W	–
45	–	–
46	–	–

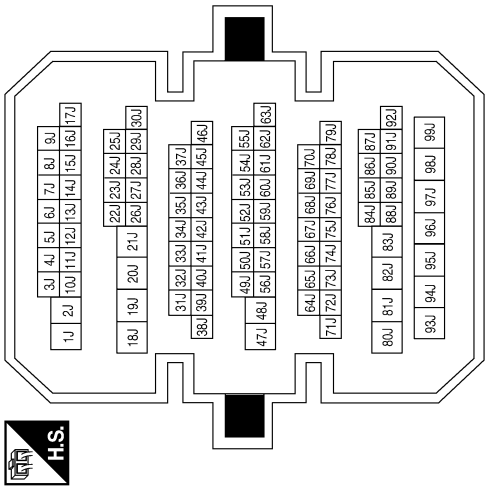
Connector No.	E91
Connector Name	BRAKE ACTUATOR
Connector Color	BLACK



Terminal No.	Color of Wire	Signal Name
1	B/Y	–
2	B	–
3	SB	–
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	–	–

ABFIA0295GB

Connector No.	B1
Connector Name	WIRE TO WIRE
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
17J	SB	–

Connector No.	C3
Connector Name	REAR WHEEL SENSOR RH
Connector Color	GRAY

Terminal No.	Color of Wire	Signal Name
1	LG	POWER
2	BR	SIG

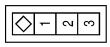
Connector No.	C2
Connector Name	REAR WHEEL SENSOR LH
Connector Color	BLACK

Terminal No.	Color of Wire	Signal Name
1	G	POWER
2	O	SIG

ABFIA0296GB

Connector No.	B8
Connector Name	FRONT DOOR SWITCH LH
Connector Color	WHITE

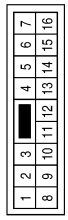
H.S.



Terminal No.	Color of Wire	Signal Name
2	SB	DOOR SW (DR)

Connector No.	B10
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.



Terminal No.	Color of Wire	Signal Name
4	O	–
5	BR	–
13	G	–
14	LG	–

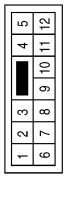
Connector No.	B43
Connector Name	WIRE TO WIRE
Connector Color	GRAY

H.S.

Terminal No.	Color of Wire	Signal Name
1	G	–
2	O	–
3	LG	–
4	BR	–

Connector No.	B104
Connector Name	WIRE TO WIRE
Connector Color	BROWN

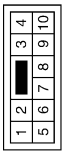
H.S.



Terminal No.	Color of Wire	Signal Name
5	V	–

Connector No.	B109
Connector Name	WIRE TO WIRE
Connector Color	WHITE

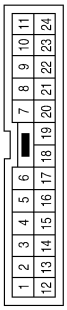
H.S.



Terminal No.	Color of Wire	Signal Name
9	BR	–
10	LG	–

Connector No.	B129
Connector Name	WIRE TO WIRE
Connector Color	GRAY

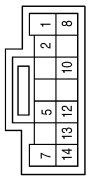
H.S.



Terminal No.	Color of Wire	Signal Name
12	Y	–
14	O	–
15	GR	–
16	G	–
18	P	–

ABFIA0297GB

Connector No.	B131
Connector Name	BRAKE CAPACITOR
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
1	P	OUT
2	O	+BCTY
5	Y	IG
7	BR	OUT2
8	LG	+B
10	V	CTY
12	G	ENA
13	GR	FAIL
14	B	GND

ABFIA0298GB

SYMPTOM DIAGNOSIS

VDC/TCS/ABS SYMPTOMS

Symptom Table

INFOID:0000000005440742

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-79, "Description"
	Front wheel sensor circuit	BRC-52, "Description"
	Rear wheel sensor circuit	BRC-58, "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-189, "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-52, "Description"
	Rear wheel sensor circuit	BRC-58, "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-189, "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-167, "Description"
	Brake ECU	BRC-107, "Description"
ABS warning lamp abnormal (Does not come on)	ABS warning lamp circuit	BRC-169, "Description"
	Brake ECU	BRC-107, "Description"
Brake warning lamp (Remains on)	Brake fluid level switch circuit	BRC-172, "Description"
	Brake ECU	BRC-107, "Description"

Symptom	Suspected area	Reference page
Brake warning lamp (Does not come on)	Brake fluid level switch circuit	BRC-176, "Description"
	Brake ECU	BRC-107, "Description"
VDC and/or TCS does not operate	Check that traction control has not operated by carrying out diagnosis.	—
	Check the DTC again and make sure that the normal system code is output.	—
	IG power source circuit	BRC-79, "Description"
	Check the hydraulic circuit for leakage	—
	Front wheel sensor circuit	BRC-52, "Description"
	Rear wheel sensor circuit	BRC-58, "Description"
	Yaw rate/side/decel G sensor circuit	BRC-63, "Description"
	Steering angle sensor circuit	BRC-71, "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.	—
Electronically Controlled Brake warning lamp abnormal (Remains on)	Electronically Controlled Brake warning lamp circuit	BRC-177, "Description"
	Brake ECU	BRC-107, "Description"
Electronically Controlled Brake warning lamp abnormal (Does not come on)	Electronically Controlled Brake warning lamp circuit	BRC-178, "Description"
	Brake ECU	BRC-107, "Description"
VDC warning abnormal (Remain on)	VDC warning lamp circuit	BRC-170, "Description"
	Brake ECU	BRC-107, "Description"
VDC warning abnormal (Does not come on)	VDC warning lamp circuit	BRC-171, "Description"
	Brake ECU	BRC-107, "Description"
SLIP indicator lamp abnormal (Remains on)	SLIP indicator lamp circuit	BRC-180, "Description"
	Brake ECU	BRC-107, "Description"
SLIP indicator lamp abnormal (Does not come on)	SLIP indicator lamp circuit	BRC-181, "Description"
	Brake ECU	BRC-107, "Description"
DTC check cannot be done	Check the DTC again and make sure that the normal system code is output.	—
	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.	—
Sensor check cannot be done	TS and CG terminal circuit	—
	Brake ECU	BRC-107, "Description"
Brake warning buzzer abnormal	Brake warning buzzer	BRC-182, "Description"
	Brake ECU	BRC-107, "Description"

ABS WARNING LAMP REMAINS ON

Description

INFOID:0000000005440743

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:0000000005440744

Regarding Wiring Diagram information, refer to BRC-149, "Wiring Diagram".

NOTE:
If a malfunction was detected in wheel sensor during the last travel, ABS warning lamp may remains 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

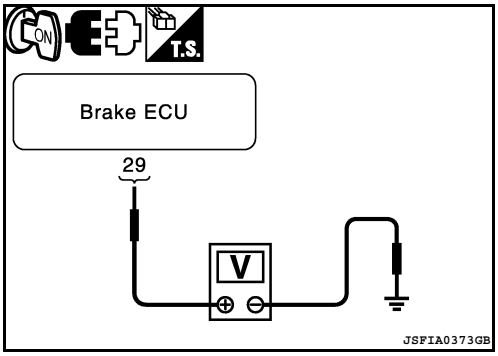
Is the inspection result normal?

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.

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



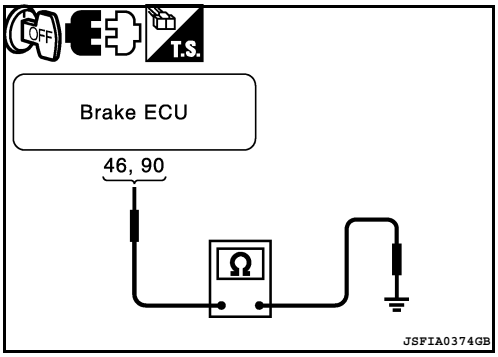
Brake ECU		Condition	Specified condition
Connector	Terminal		
E60	29 – Ground	Ignition switch ON	10 to 14 V

Is the inspection result normal?

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

5. INSPECT BRAKE ECU (GND TERMINAL)

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. 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

1. Reconnect the brake ECU connectors.
2. 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.

ABS WARNING LAMP DOES NOT COME ON

Description

INFOID:0000000005440745

The brake ECU is connected to the combination meter with CAN communication via HV ECU.

Diagnosis Procedure

INFOID:0000000005440746

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

Description

INFOID:0000000005440747

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:0000000005440748

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.

VDC WARNING LAMP DOES NOT COME ON

Description

INFOID:0000000005440749

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:0000000005440750

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

Description

INFOID:0000000005440751

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:0000000005440752

Regarding Wiring Diagram information, refer to BRC-149, "Wiring Diagram".

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.

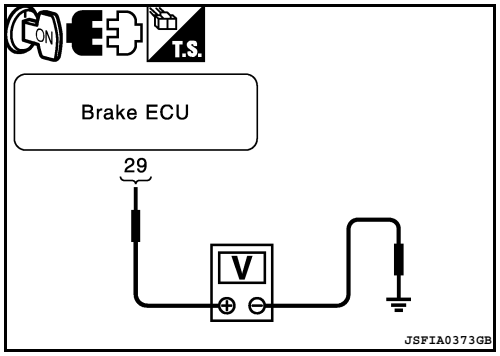
Standard voltage : 11 to 14 V

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.



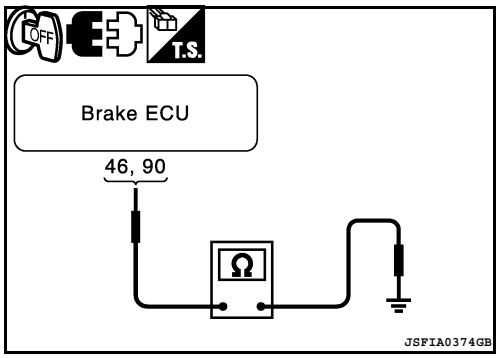
Brake ECU		Condition	Specified condition
Connector	Terminal		
E60	29 – Ground	Ignition switch ON	10 to 16 V

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.

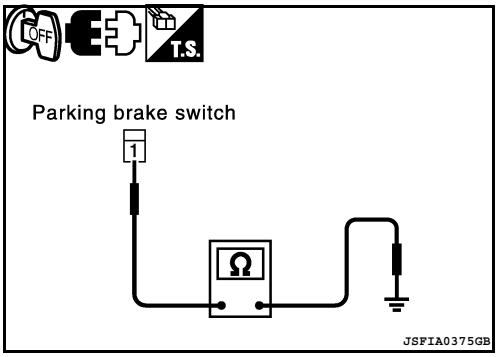
Is the inspection result normal?

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



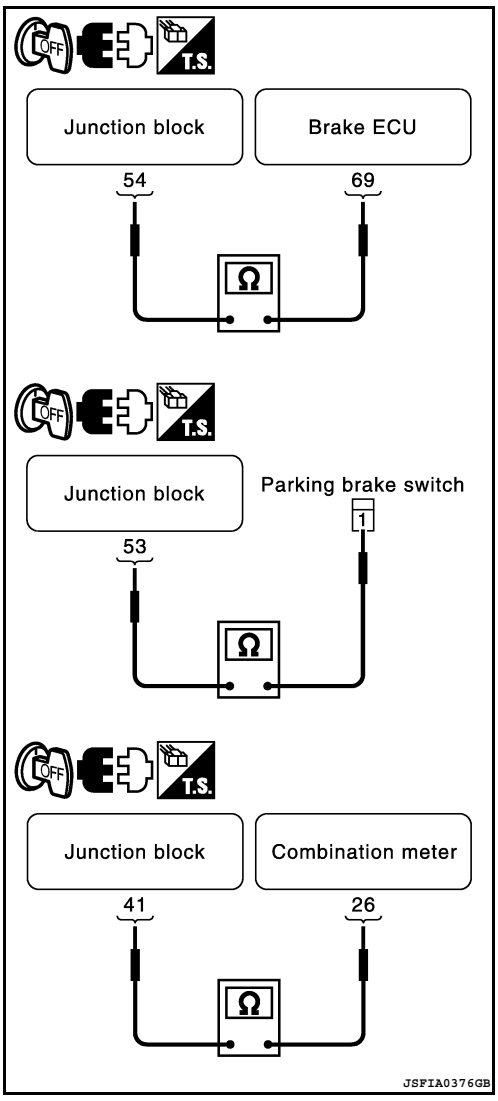
Tester connection	Condition	Specified condition
1 – Ground	Parking brake switch ON (Switch pin free)	Below 1 Ω
1 – Ground	Parking brake switch OFF (Switch pin pushed in)	10 kΩ or higher

Is the inspection result normal?

YES >> GO TO 10.
NO >> Replace parking brake switch.

10. CHECK HARNESS AND CONNECTOR

1. Disconnect the junction block, brake ECU, parking brake switch and combination meter connectors.
2. 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

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

Description

INFOID:0000000005440753

The brake ECU is connected to the combination meter with CAN communication via HV ECU.

Diagnosis Procedure

INFOID:0000000005440754

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.

ELECTRONICALLY CONTROLLED BRAKE WARNING LAMP REMAINS ON

Description

INFOID:0000000005440755

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:0000000005440756

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

Description

INFOID:0000000005440757

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:0000000005440758

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.

- 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

Description

INFOID:0000000005440759

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:0000000005440760

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

Description

INFOID:0000000005440761

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:0000000005440762

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

Description

INFOID:0000000005440763

The brake warning buzzer sounds while the accumulator pressure is abnormally low or when an abnormality causing low fluid pressure occurs.

Diagnosis Procedure

INFOID:0000000005440764

Regarding Wiring Diagram information, refer to BRC-149, "Wiring Diagram".

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

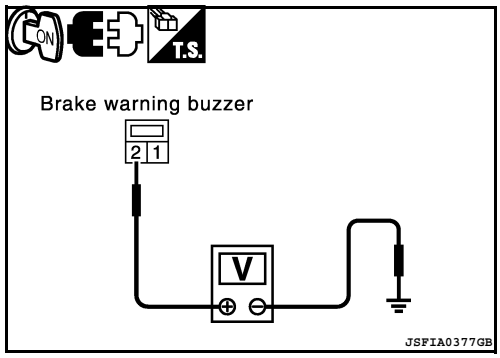
Condition	Proceed to
Buzzer does not sound or sound constantly.	A
Buzzer sounds/stops.	B

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.

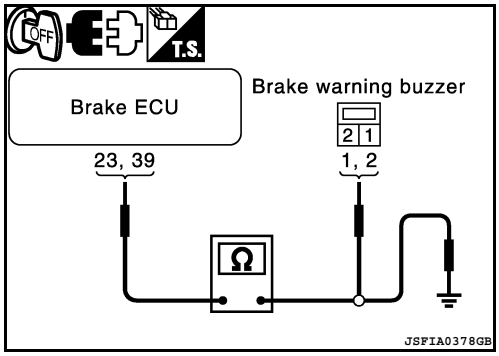
NOTE:
The brake warning buzzer sounds.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace brake warning buzzer.

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.



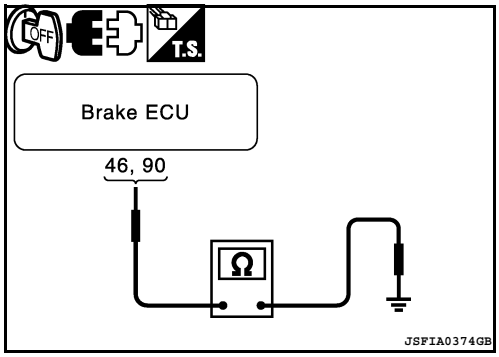
Brake ECU		Brake warning buzzer		—	Condition	Specified condition
Connector	Terminal	Connector	Terminal			
E60	39	M26	1	—	Always	Below 1 Ω
E60	39	—	—	Ground	Always	10 kΩ or higher
E60	23	M26	2	—	Always	Below 1 Ω
E60	23	—	—	Ground	Always	10 kΩ or higher

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:0000000005818780

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 WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

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

Precautions For High-Voltage System

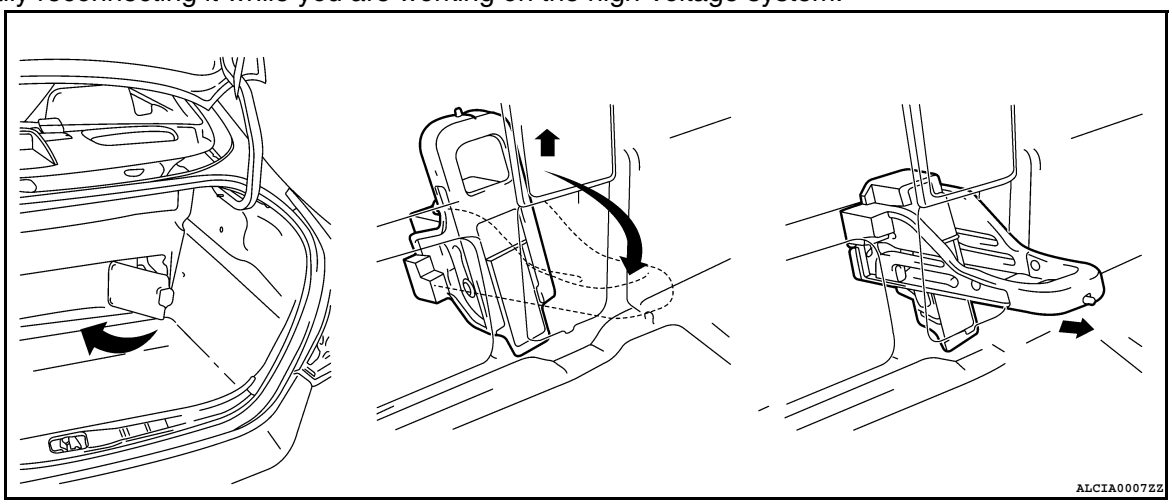
INFOID:0000000005440766

Refer to GI-24, "Precautions For High-Voltage System".

Precautions for Inspecting the Hybrid Control System

INFOID:0000000005440767

- 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.



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.

- 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:0000000005440768

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.

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.

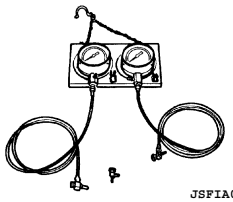
PREPARATION

PREPARATION

Special Service Tool

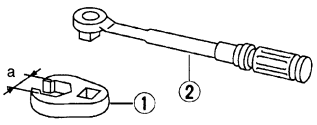
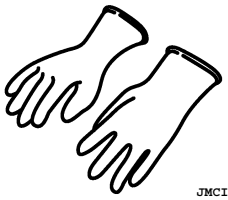
INFOID:0000000005440769

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  JSFIA0073ZZ	Brake fluid pressure measurement

Commercial Service Tool

INFOID:0000000005440770

Tool name	Description
1. Flare nut crowfoot 2. Torque wrench  S-NT360	Installing brake tube a: 10 mm (0.39 in) / 12 mm (0.47 in)
Insulation groves  JMCIA0149ZZ	Guaranteed insulation performance for 1000V/ 300A

ON-VEHICLE MAINTENANCE

BRAKE ECU

Inspection

INFOID:0000000005440771

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).**

BRAKE ACTUATOR

Inspection

INFOID:0000000005440772

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

Inspection

INFOID:0000000005440773

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.

ABS RELAY NO. 1 AND NO. 2

Inspection

INFOID:0000000005440774

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 kΩ 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

Inspection

INFOID:0000000005440775

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 kΩ or higher
3 – 5	Apply B+ between terminal is 1 and 2	Below 1 Ω

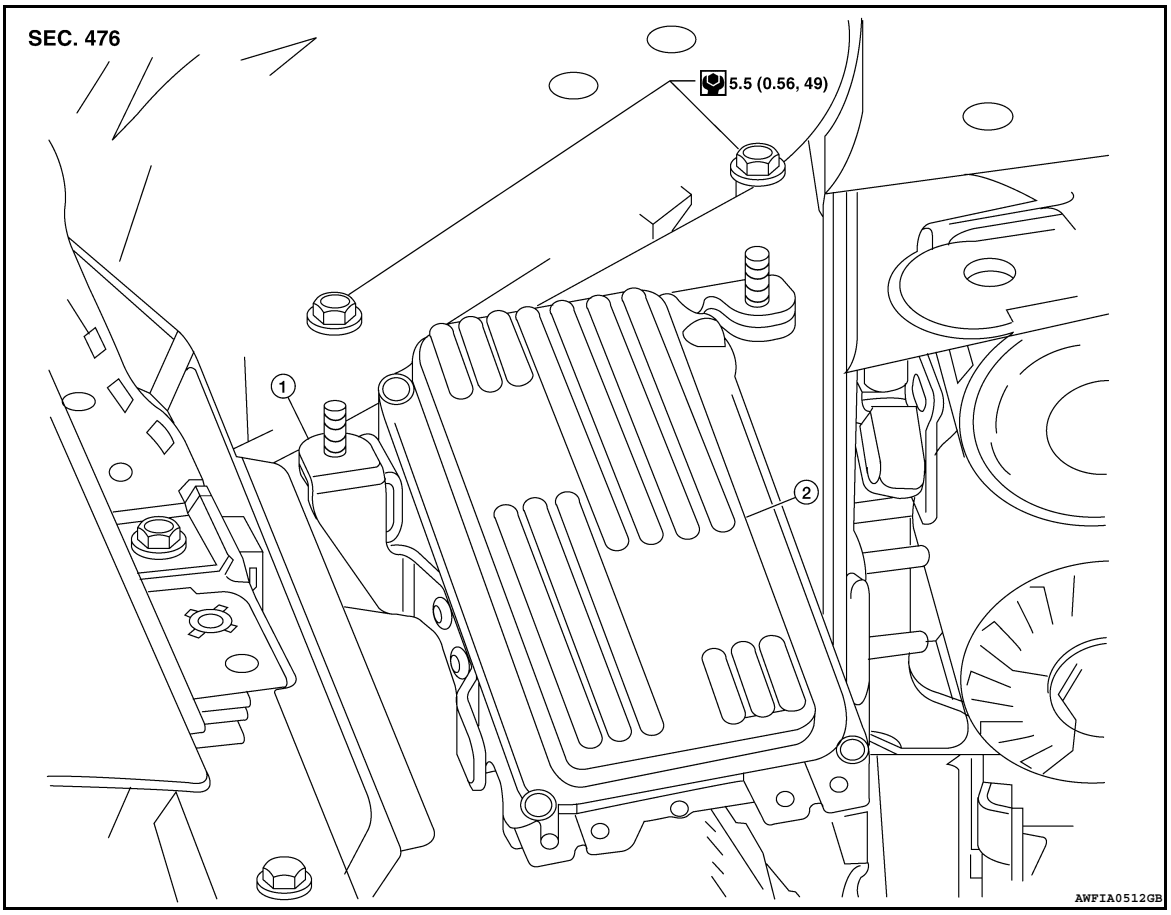
If the value is not as specified, replace the ABS motor relay No.1 or No.2.

ON-VEHICLE REPAIR

BRAKE ECU

Exploded View

INFOID:0000000005440776



1. Bracket
2. Brake ECU

Removal and Installation

INFOID:0000000005440777

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".**

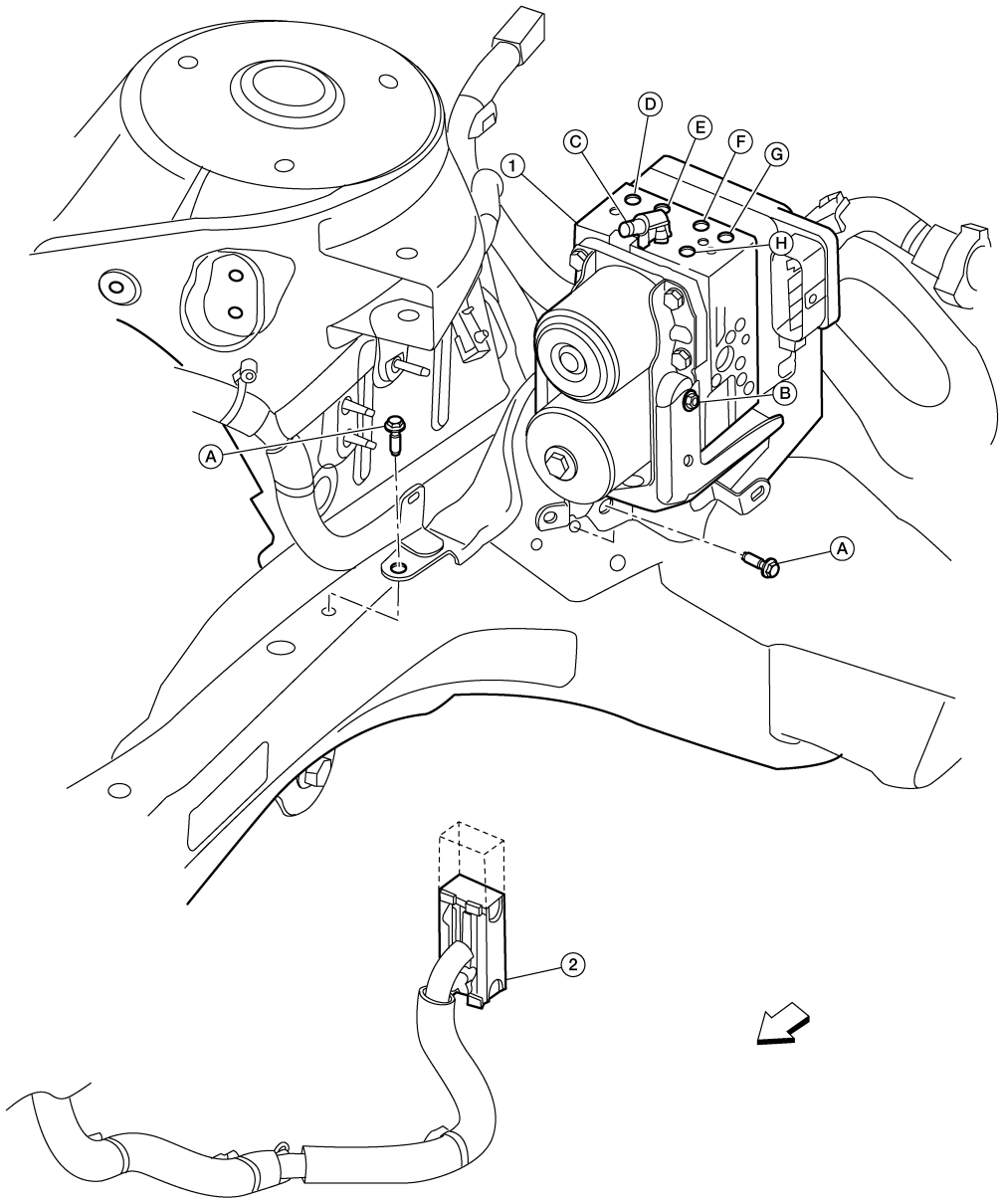
- **Linear solenoid valve. Refer to BRC-7, "PERFORM INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION : Description".**

BRAKE ACTUATOR

Exploded View

INFOID:0000000005440778

SEC. 476



ALFIA0178ZZ

1. Brake actuator
2. Brake actuator connector
A. Bracket bolts
B. Brake actuator nuts
C. From the master cylinder (rubber hose)
D. To front left caliper (16.2 N·m, 1.7 kg-m, 12 ft-lb)
E. To rear right caliper (16.2 N·m, 1.7 kg-m, 12ft-lb)
F. To rear left caliper (16.2 N·m, 1.7 kg-m, 12ft-lb)
G. To front right caliper (16.2 N·m, 1.7 kg-m, 12ft-lb)
H. From the master cylinder (18.2 N·m, 1.9 kg-m, 13 ft-lb)
⇦ Front

Removal and Installation

INFOID:0000000005440779

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-73, "FRONT WIPER ARMS : Removal and Installation".
6. Remove cowl top and cowl top extension. Refer to EXT-18, "Removal and Installation".
7. Disconnect washer hose.
8. Remove tower bar. Refer to FSU-12, "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 as shown in BRC-195, "Exploded View".
14. Loosen brake tube flare nuts, then remove brake tubes from brake actuator.
    CAUTION:
    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:0000000005440780

DISPOSAL OF BRAKE ACTUATOR

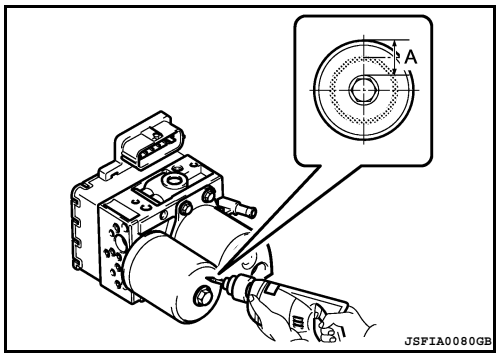
Using a drill, slowly make a hole on the circumference made by the center points of A and discharge the gas.

CAUTION:

Be sure to wear protective glasses to protect the eyes from fragments that may become airborne due to high pressure.

NOTE:

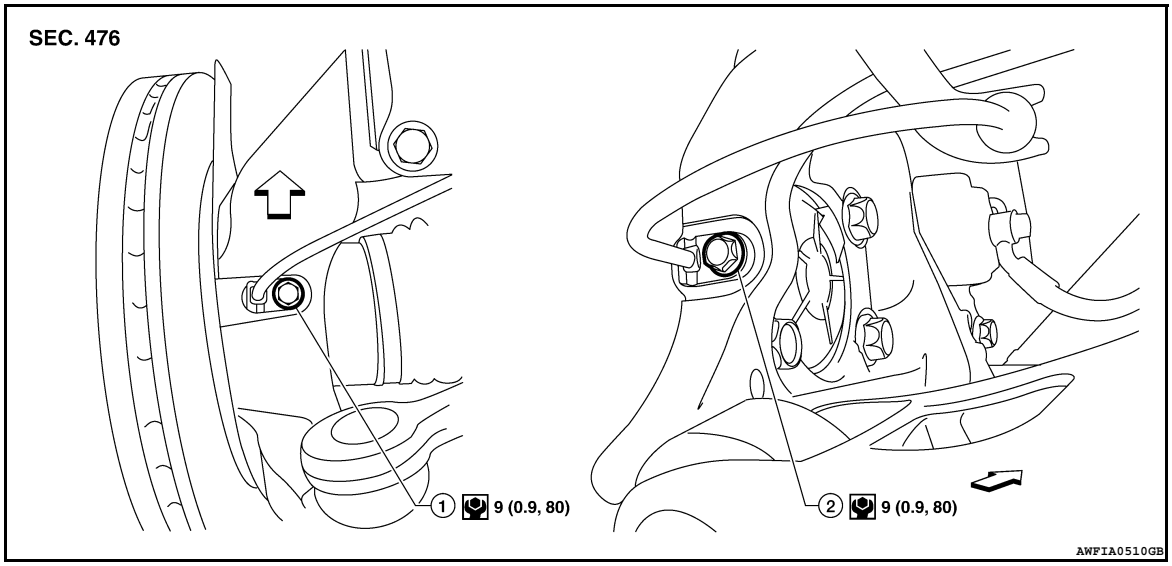
- The hole may be drilled up to approximately 5 to 10 mm (0.20 to 0.39 in) away from the circumference made by the center point of A without problem.
- The gas is nitrogen, which is colorless, odorless and harmless.



WHEEL SENSOR

Exploded View

INFOID:0000000005440781



1. Front wheel sensor
2. Rear wheel sensor
⇦ Front

Removal and Installation

INFOID:0000000005440782

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.**

FRONT

Removal

1. Remove wheel and tire. Refer to WT-60, "Adjustment".
2. Partially remove front wheel fender protector. Refer to EXT-19, "Removal and Installation".
3. Remove wheel sensor bolt and wheel sensor.
4. Remove harness wire from mounts and disconnect wheel sensor harness connector.

Installation

Installation is in the reverse order of removal.
- When installing wheel and tire, refer to WT-60, "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.

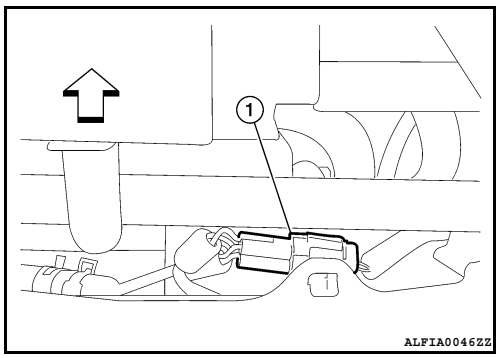
CAUTION:
- **Check if foreign objects such as iron fragments are adhered to the pick-up part of the sensor or to the inside of the hole for mounting the wheel sensor, or if a foreign object is caught on the mounting surface of the rotor. Repair as necessary and then install the wheel sensor.**

REAR

Removal

1. Remove wheel and tire. Refer toWT-60, "Adjustment".

2. Disconnect wheel sensor harness connector (1).
   - ⇦: Front



3. Remove harness wire clips from suspension member.
4. Remove wheel sensor bolt and wheel sensor.

Installation

Installation is in the reverse order of removal.

- When installing wheel and tire, refer to WT-60, "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.

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.**

SENSOR ROTOR

Removal and Installation

INFOID:0000000005440783

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-7, "Removal and Installation" (Front), RAX-6, "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

Removal and Installation

INFOID:0000000005440784

REMOVAL

CAUTION:

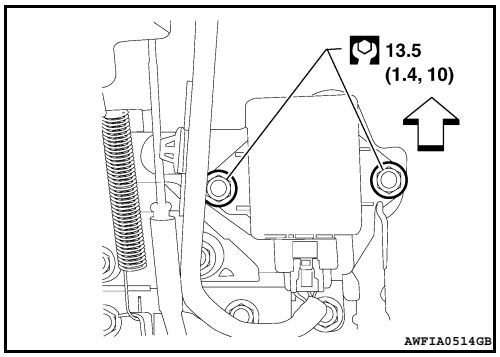
Do not use power tool, drop, or strike yaw rate/side/decel G sensor, because it is sensitive to impact.

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".

STEERING ANGLE SENSOR

Removal and Installation

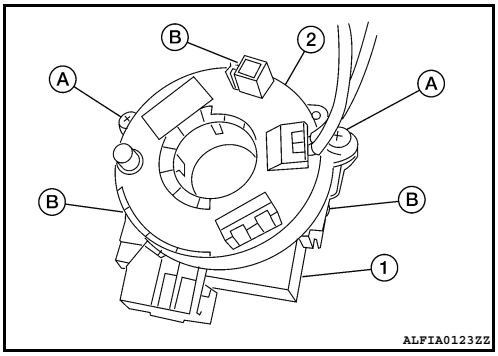
INFOID:0000000005440785

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 SR-7, "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".**

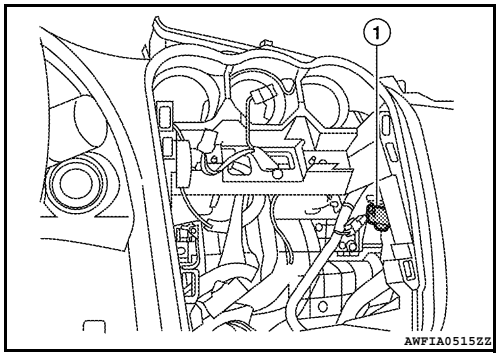
BRAKE WARNING BUZZER

Removal and Installation

INFOID:0000000005440786

REMOVAL

1. Remove the audio unit. Refer to AV-48, "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.

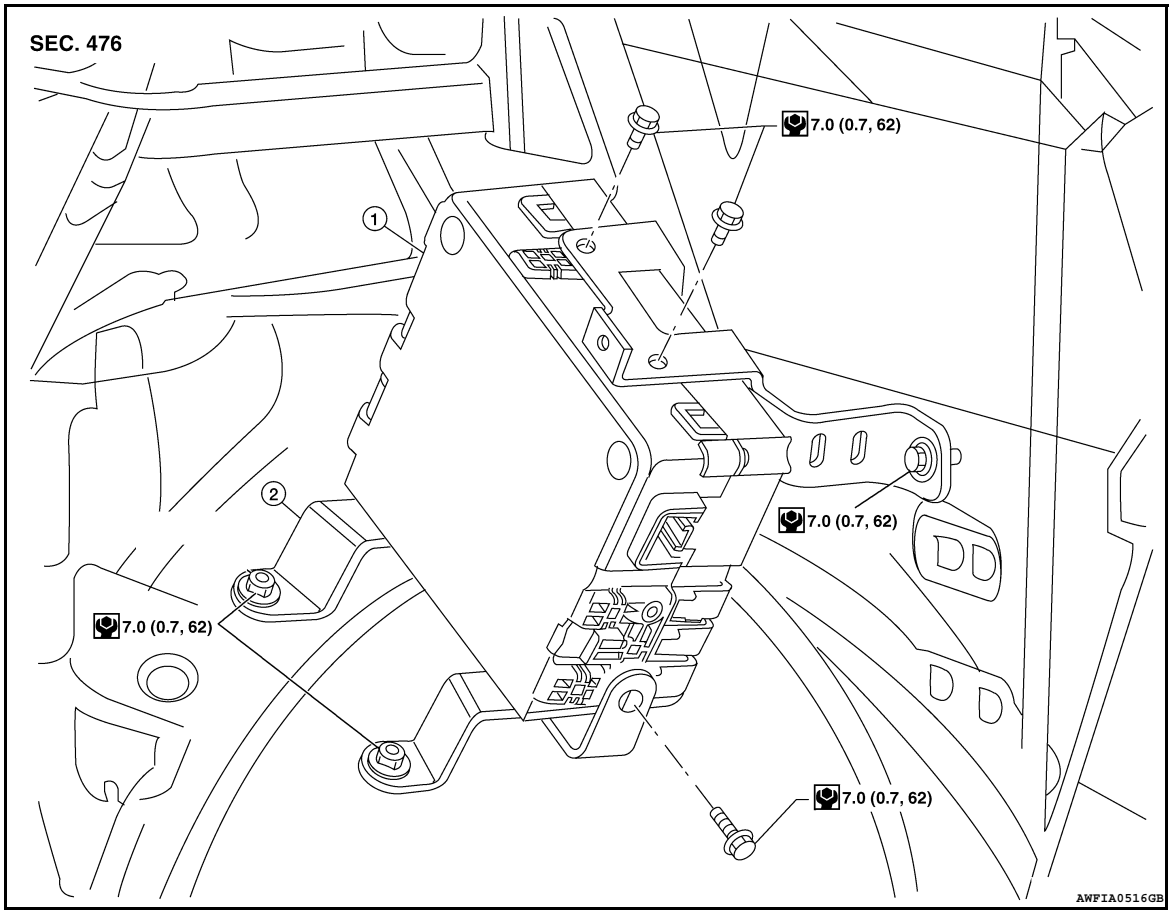
CAUTION:

After the replacement, change the status of CONSULT-III to “ACTIVE TEST” and confirm the function of the brake warning buzzer.

CAPACITOR

Exploded View

INFOID:0000000005440787



1. Capacitor
2. Bracket

Removal and Installation

INFOID:0000000005440788

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 rear finisher. Refer to INT-30, "Removal and Installation".
2. Remove the trunk side finisher RH. Refer to INT-30, "Removal and Installation".
3. Disconnect capacitor connector.
4. Remove capacitor screws and remove capacitor.
5. Remove capacitor bracket as necessary.

INSTALLATION

Installation is the reverse order of removal.

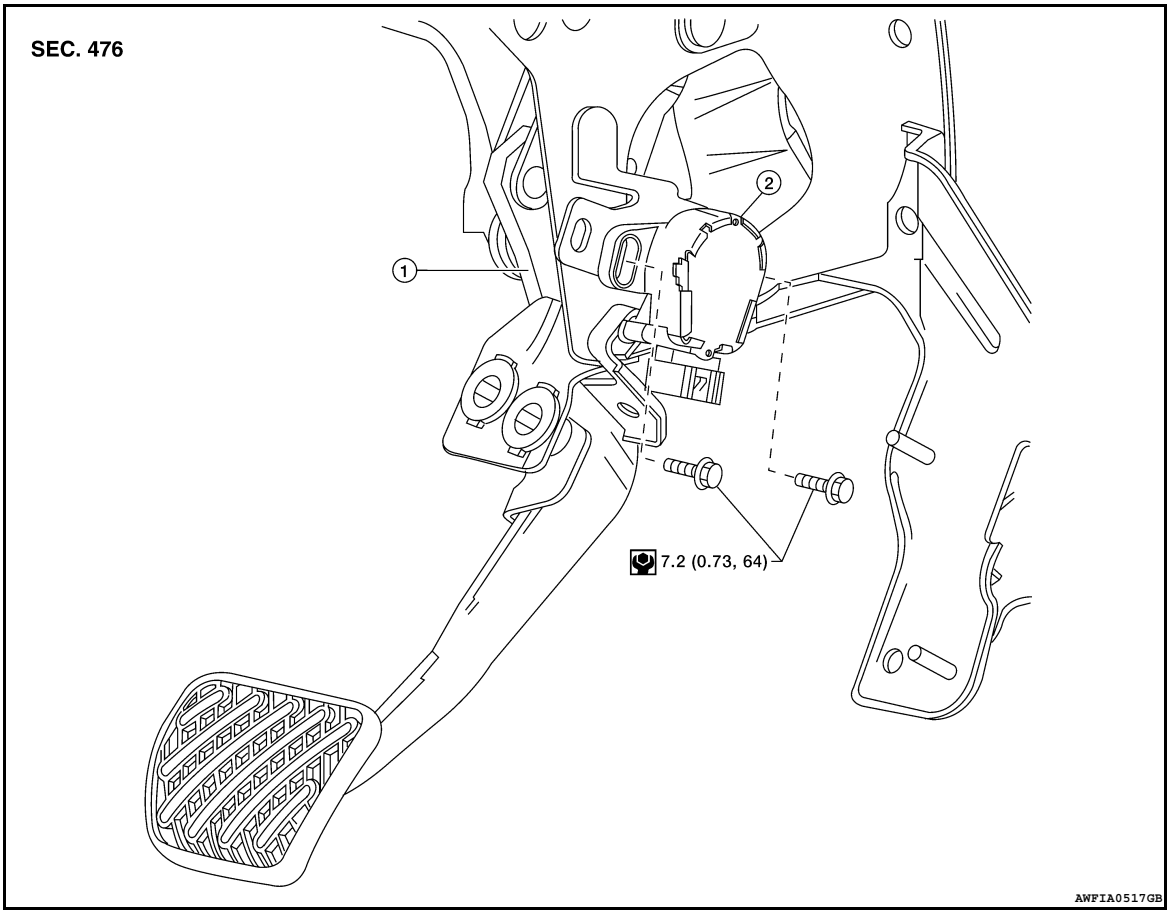
CAUTION:

- **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:0000000005440789



1. Brake pedal
2. Brake pedal stroke sensor

Removal and Installation

INFOID:0000000005440790

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:

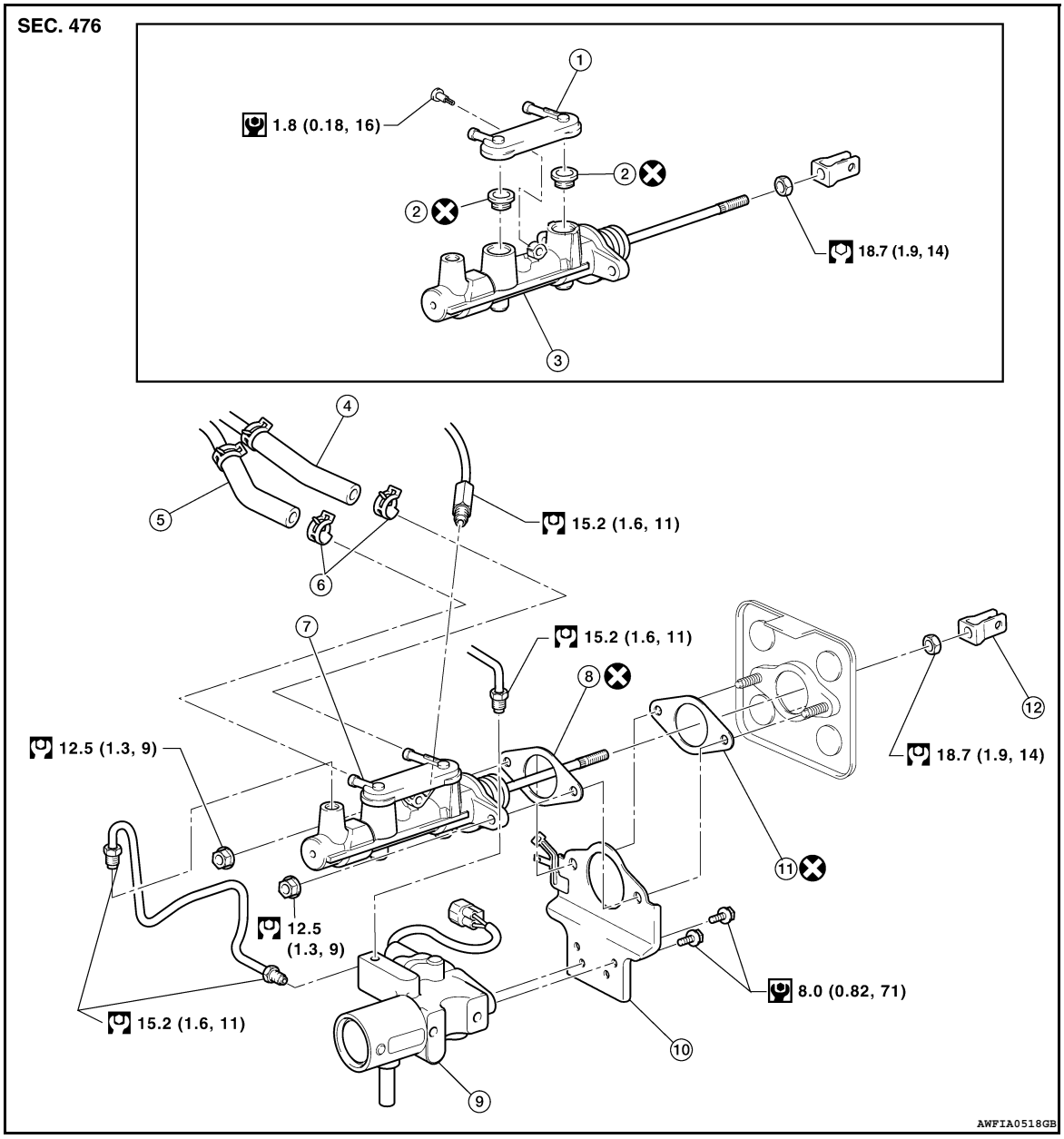
- **After replacement, adjust the location to be between 0.8 and 1.2V, checking the voltage with CONSULT-III without stepping on the brake pedal. These procedures should be performed on a flat place.**
- **After erasing Brake ECU memories, perform zero adjustment of following sensors and initialization 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

Exploded View

INFOID:0000000005440791



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:0000000005440792

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.**

- **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-10, "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".