SECTION BRAKE CONTROL SYSTEM

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BRC-7

BASIC INSPECTION APPLICATION NOTICE

Application Notice

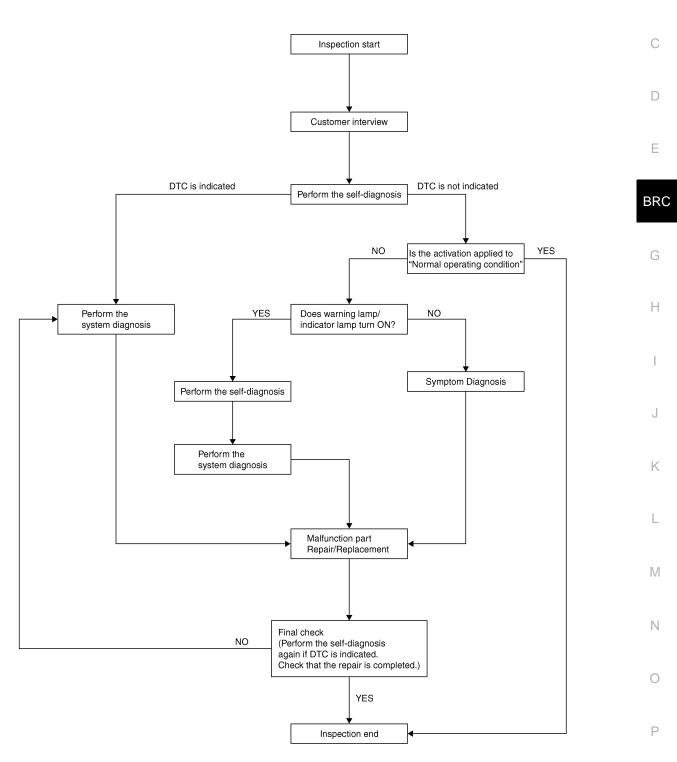
| Service information | Remarks |
|---------------------|--|
| TYPE 1 | ABS |
| TYPE 2 | ABLS/ABS |
| TYPE 3 | HILL DESCENT CONTROL/HILL START ASSIST/VDC/TCS/ABS |

< BASIC INSPECTION >

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow





INFOID:000000004055333

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DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

[TYPE 1]

Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using the diagnosis worksheet. Refer to <u>BRC-11</u>, "<u>Diagnostic Work Sheet</u>".

>> GO TO 2

2.PERFORM THE SELF-DIAGNOSIS

Check the DTC display with the self-diagnosis function. Refer to <u>BRC-20, "CONSULT-III Function (ABS)"</u>. Is there any DTC displayed?

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

3.PERFORM THE SYSTEM DIAGNOSIS

Perform the diagnosis applicable to the displayed DTC. Refer to BRC-56, "DTC No. Index".

>> GO TO 7

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

Check that the symptom is a normal operation that is not considered a system malfunction. Refer to <u>BRC-64.</u> "Description".

Is the symptom a normal operation?

YES >> Inspection End

NO >> GO TO 5

5.CHECK THE WARNING LAMP AND INDICATOR LAMP FOR ILLUMINATION

Check that the warning lamp and indicator lamp illuminate.

• ABS warning lamp: Refer to <u>BRC-45, "Description"</u>.

• Brake warning lamp: Refer to <u>BRC-46, "Description"</u>.

Is ON/OFF timing normal?

YES >> GO TO 6

NO >> GO TO 2

6.PERFORM THE DIAGNOSIS BY SYMPTOM

Perform the diagnosis applicable to the symptom.

>> GO TO 7

7.REPAIR OR REPLACE THE MALFUNCTIONING PARTS

Repair or replace the specified malfunctioning parts.

>> GO TO 8

8.FINAL CHECK

Perform the self-diagnosis again, and check that the malfunction is repaired completely. After checking, erase the self-diagnosis memory. Refer to <u>BRC-20, "CONSULT-III Function (ABS)"</u>.

Is no other DTC present and the repair completed?

YES >> Inspection End NO >> GO TO 3

DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

Diagnostic Work Sheet

INFOID:000000004055334

[TYPE 1]

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

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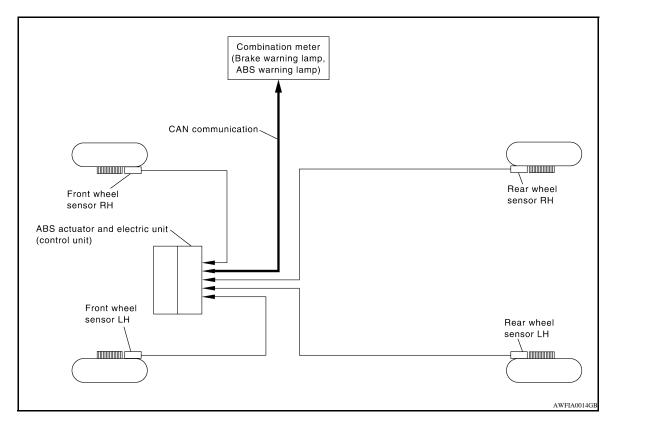
FUNCTION DIAGNOSIS APPLICATION NOTICE

Application Notice

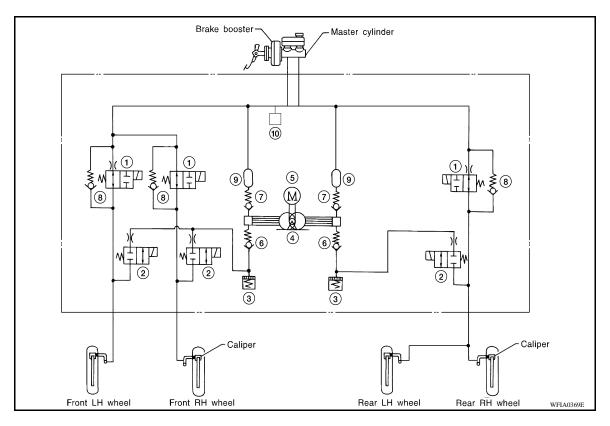
| Service information | Remarks |
|---------------------|--|
| TYPE 1 | ABS |
| TYPE 2 | ABLS/ABS |
| TYPE 3 | HILL DESCENT CONTROL/HILL START ASSIST/VDC/TCS/ABS |

ABS

System Diagram



HYDRAULIC CIRCUIT DIAGRAM



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< FUNCTION DIAGNOSIS >

- 1. Inlet solenoid valve
- Pump 4.
- 7. Outlet valve

- 2. Outlet solenoid valve
- 5. Motor
- 8. Bypass check valve
- 3. Reservoir
- 6. Inlet valve
- 9. Damper

10. Pressure switch

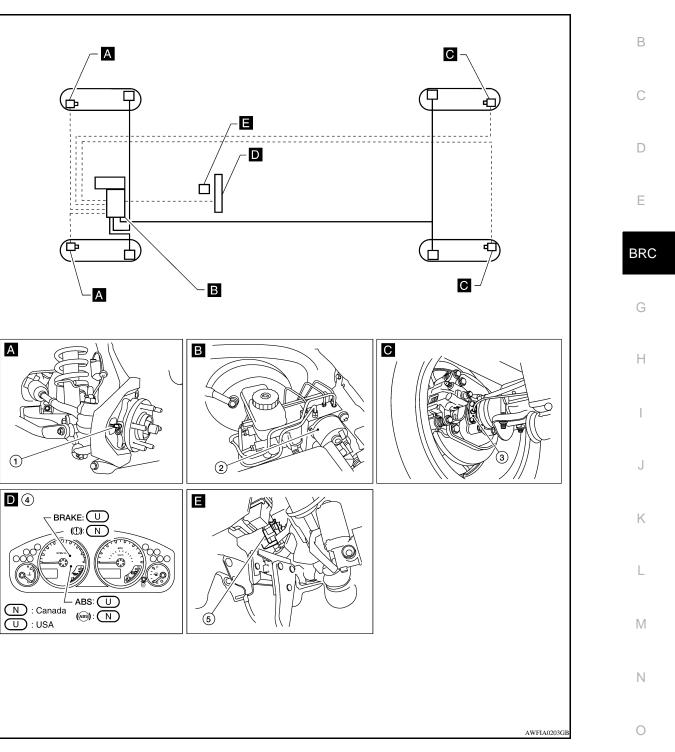
System Description

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

< FUNCTION DIAGNOSIS >

Component Parts Location

INFOID:000000004055338



ABS

- 1. Front wheel sensor LH E18 Front wheel sensor RH E117
- 4. Combination meter M24
- 2. ABS actuator and electric unit (con- 3. trol unit) E125
- 5. Stop lamp switch (with M/T) E38 Stop lamp switch (with A/T) E39
- Rear wheel sensor LH C11 Rear wheel sensor RH C10

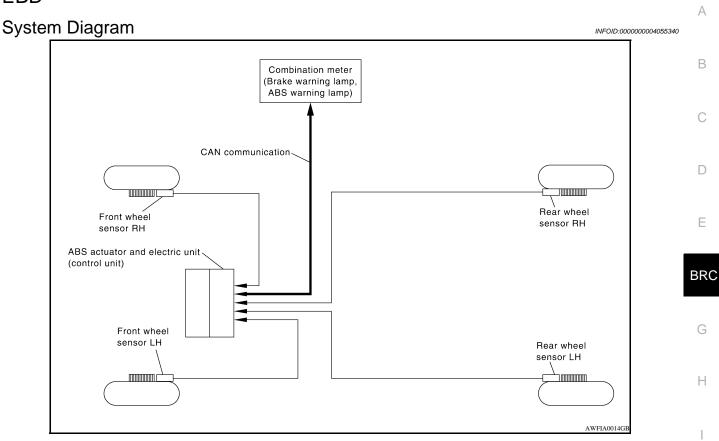
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Component Description

| Component parts | | Reference |
|---|----------------|-----------------------|
| | Pump | BRC-33, "Description" |
| | Motor | BRC-35, Description |
| ABS actuator and electric unit (control unit) | Actuator relay | BRC-42, "Description" |
| | Solenoid valve | BRC-38, "Description" |
| Wheel sensor | | BRC-24, "Description" |
| Stop lamp switch | | _ |
| ABS warning lamp | | BRC-45, "Description" |
| Brake warning lamp | | BRC-46, "Description" |

EBD



EBD

System Description

- INFOID:000000004055341
- Electric Brake force Distribution is a following function. ABS actuator and electric unit (control unit) detects subtle slippages between the front and rear wheels during braking. Then it electronically controls the rear braking force (brake fluid pressure) to reduce rear wheel slippage. Accordingly, it improves vehicle stability.
- Electrical system diagnosis by CONSULT-III is available.

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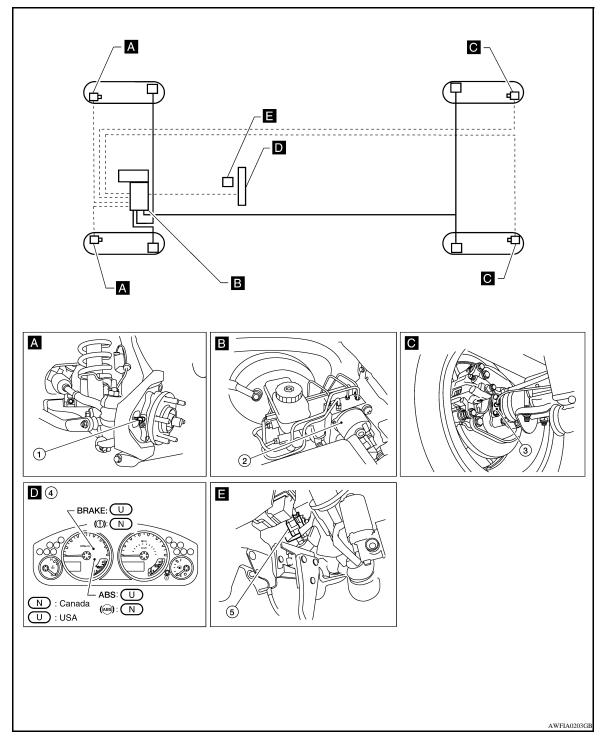
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Component Parts Location

INFOID:000000004448851



- 1. Front wheel sensor LH E18 Front wheel sensor RH E117
- 4. Combination meter M24
- 2. ABS actuator and electric unit (con- 3. trol unit) E125
- Rear wheel sensor LH C11 Rear wheel sensor RH C10
- Stop lamp switch (with M/T) E38 Stop lamp switch (with A/T) E39

5.

BRC-18

< FUNCTION DIAGNOSIS >

Component Description

| Сотро | nent parts | Reference |
|---|----------------|-----------------------|
| | Pump | BRC-33, "Description" |
| ABS actuator and electric unit (control unit) | Motor | |
| | Actuator relay | BRC-42, "Description" |
| | Solenoid valve | BRC-38, "Description" |
| Wheel sensor | | BRC-24, "Description" |
| Stop lamp switch | | _ |
| ABS warning lamp | | BRC-45, "Description" |
| Brake warning lamp | | BRC-46, "Description" |

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[TYPE 1]

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

< FUNCTION DIAGNOSIS >

[TYPE 1]

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

CONSULT-III Function (ABS)

INFOID:000000004055344

FUNCTION

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

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

SELF-DIAGNOSTIC RESULT MODE

Operation Procedure

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

How to Erase Self-diagnosis Results

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

CAUTION:

If memory cannot be erased, perform applicable diagnosis. NOTE:

- When the wheel sensor malfunctions, after inspecting the wheel sensor system, the ABS warning lamp and brake warning lamp will not turn OFF even when the system is normal unless the vehicle is driving at approximately 30 km/h (19 MPH) or more for approximately 1 minute.
- Brake warning lamp will turn ON in case of parking brake operation (when switch is ON) or of brake fluid level switch operation (when brake fluid is insufficient).

Display Item List Refer to <u>BRC-56, "DTC No. Index"</u>.

DATA MONITOR MODE

Display Item List

| ltem | Data | a monitor item sele | | |
|-----------------------------|----------------------|---------------------|------------------------|---|
| (Unit) | ECU INPUT SIGNALS | MAIN SIGNALS | SELECTION FROM MENU | Remarks |
| FR RH SENSOR (km/h, MPH) | × | × | × | Wheel speed calculated by front RH wheel sensor signal is displayed. |
| FR LH SENSOR (km/h, MPH) | × | × | × | Wheel speed calculated by front LH wheel sensor signal is displayed. |
| RR RH SENSOR (km/h, MPH) | × | × | × | Wheel speed calculated by rear RH wheel sensor signal is displayed. |
| RR LH SENSOR (km/h, MPH) | × | × | × | Wheel speed calculated by rear LH wheel sensor signal is displayed. |
| BATTERY VOLT (V) | × | × | × | Voltage supplied to ABS actuator and electric unit (control unit) is dis- played. |



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

< FUNCTION DIAGNOSIS >

[TYPE 1]

| | Data monitor item selection | | | |
|---------------------------|-----------------------------|-----------------|------------------------|---|
| Item (Unit) | ECU INPUT SIGNALS | MAIN SIGNALS | SELECTION FROM MENU | Remarks |
| STOP LAMP SW (ON/OFF) | × | × | × | Stop lamp switch (ON/OFF) status is displayed. |
| ABS WARN LAMP (ON/OFF) | _ | × | × | ABS warning lamp (ON/OFF) status is displayed. |
| FR LH IN SOL (ON/OFF) | _ | × | × | Front LH IN ABS solenoid (ON/ OFF) status is displayed. |
| FR LH OUT SOL (ON/OFF) | _ | × | × | Front LH OUT ABS solenoid (ON/ OFF) status is displayed. |
| FR RH IN SOL (ON/OFF) | - | × | × | Front RH IN ABS solenoid (ON/ OFF) status is displayed. |
| FR RH OUT SOL (ON/OFF) | - | × | × | Front RH OUT ABS solenoid (ON/ OFF) status is displayed. |
| REAR IN SOL (ON/OFF) | - | × | × | Rear IN ABS solenoid (ON/OFF) status is displayed. |
| REAR OUT SOL (ON/OFF) | - | × | × | Rear OUT ABS solenoid (ON/OFF) status is displayed. |
| MOTOR RELAY (ON/OFF) | _ | × | × | ABS motor relay signal (ON/OFF) status is displayed. |
| ACTUATOR RLY (ON/OFF) | _ | × | × | ABS actuator relay signal (ON/OFF) status is displayed. |
| ABS FAIL SIG (ON/OFF) | _ | _ | × | ABS fail signal (ON/OFF) status is displayed. |
| EBD FAIL SIG (ON/OFF) | _ | _ | × | EBD fail signal (ON/OFF) status is displayed. |
| EBD SIGNAL (ON/OFF) | _ | _ | × | EBD operation (ON/OFF) status is displayed. |
| ABS SIGNAL (ON/OFF) | _ | _ | × | ABS operation (ON/OFF) status is displayed. |
| EBD WARN LAMP (ON/OFF) | - | _ | × | Brake warning lamp (ON/OFF) sta- tus is displayed. |
| CRANKING SIG (ON/OFF) | _ | _ | × | The input state of the key SW START position signal is displayed. |

×: Applicable

-: Not applicable

ACTIVE TEST MODE

CAUTION:

- Do not perform active test while driving vehicle.
- Make sure to completely bleed air from brake system.
- The active test cannot be performed with the ABS warning lamp or brake warning lamp on.
- ABS warning lamp and brake warning lamp are on during active test.
- NOTE:
- When active test is performed while depressing the pedal, the pedal depression amount will change. This is normal. (Only solenoid valve and ABS motor.)
- "TEST IS STOPPED" is displayed 10 seconds after operation start.
- After "TEST IS STOPPED" is displayed, to perform test again, touch BACK.

Test Item

SOLENOID VALVE

- When performing an active test of the ABS function, select the "MAIN SIGNALS" for each test item.
- Touch "Up", "Keep", and "Down" on the display screen and confirm that solenoid valves operate as shown in the table below.

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

< FUNCTION DIAGNOSIS >

| | Operation | | ABS solenoid valve | | |
|-----------|---------------|-----|--------------------|------|--|
| | | | Keep | Down | |
| FR RH SOL | FR RH IN SOL | Off | On | On | |
| | FR RH OUT SOL | Off | Off | On* | |
| FR LH SOL | FR LH IN SOL | Off | On | On | |
| | FR LH OUT SOL | Off | Off | On* | |
| REAR SOL | RR RH IN SOL | Off | On | On | |
| | RR RH OUT SOL | Off | Off | On* | |
| | RR LH IN SOL | Off | On | On | |
| | RR LH OUT SOL | Off | Off | On* | |

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

ABS MOTOR

• Touch "On" and "Off" on screen. Make sure motor relay and actuator relay operate as shown in table below.

| Operation | On | Off |
|--------------|----|-----|
| MOTOR RELAY | On | Off |
| ACTUATOR RLY | On | On |

COMPONENT DIAGNOSIS APPLICATION NOTICE

Application Notice

| Service information | Remarks | C |
|---------------------|--|---|
| TYPE 1 | ABS | 0 |
| TYPE 2 | ABLS/ABS | |
| TYPE 3 | HILL DESCENT CONTROL/HILL START ASSIST/VDC/TCS/ABS | D |

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[TYPE 1]

INFOID:000000004055345

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C1101, C1102, C1103, C1104 WHEEL SENSOR-1

< COMPONENT DIAGNOSIS >

C1101, C1102, C1103, C1104 WHEEL SENSOR-1

Description

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

DTC Logic

INFOID:000000004055347

INFOID:000000004055346

DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|-------|----------------|---|---|
| C1101 | RR RH SENSOR-1 | Circuit of rear RH wheel sensor is open. Or when the sensor power voltage is outside the standard. | |
| C1102 | RR LH SENSOR-1 | Circuit of rear LH wheel sensor is open. Or when the sensor power voltage is outside the standard. | Harness or connectorWheel sensor |
| C1103 | FR RH SENSOR-1 | Circuit of front RH wheel sensor is open. Or when the sensor power voltage is outside the standard. | ABS actuator and electric unit (control unit) |
| C1104 | FR LH SENSOR-1 | Circuit of front LH wheel sensor is open. Or when the sensor power voltage is outside the standard. | |

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-24, "Diagnosis Procedure"</u>.

NO >> Inspection End

Diagnosis Procedure

INFOID:000000004055348

CAUTION:

Do not check between wheel sensor terminals.

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

Disconnect the ABS actuator and electric unit (control unit) connector and wheel sensor of malfunctioning code.

Check the terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

2.CHECK WHEEL SENSOR OUTPUT SIGNAL

1. Connect ABS active wheel sensor tester (J-45741) to wheel sensor using appropriate adapter.

- 2. Turn on the ABS active wheel sensor tester power switch.
- **NOTE:** The green POWER indicator should illuminate. If the POWER indicator does not illuminate, replace the battery in the ABS active wheel sensor tester before proceeding.
- 3. Spin the wheel of the vehicle by hand and observe the red SENSOR indicator on the ABS active wheel sensor tester. The red SENSOR indicator should flash on and off to indicate an output signal.

BRC-24

C1101, C1102, C1103. C1104 WHEEL SENSOR-1

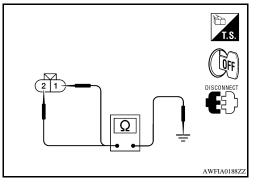
| CT101, CT102, CT103, CT104 WHEE | L SENSUR-I |
|---|---|
| < COMPONENT DIAGNOSIS > | [TYPE 1] |
| NOTE: If the red SENSOR indicator illuminates but does not flash, reverses. | erse the polarity of the tester leads and |
| Does the ABS active wheel sensor tester detect a signal? | |
| YES >> GO TO 3 NO >> Replace the wheel sensor. Refer to <u>BRC-68, "Removal an</u> | nd Installation". |
| 3. CHECK TIRES | |
| Check for inflation pressure, wear and size of each tire. | |
| Are tire pressure and size correct and is tire wear within specifications | <u>s?</u> |
| YES >> GO TO 4 NO >> Adjust tire pressure or replace tire(s). | |
| 4.CHECK WHEEL BEARINGS | |
| Check wheel bearing axial end play. Refer to <u>FAX-5</u> , "On-Vehicle "Rear Axle Bearing" (C200 rear axle), or <u>RAX-19</u> , "Rear Axle Bearing" | |
| Is the inspection result normal? | |
| YES >> GO TO 5 NO >> Repair or replace as necessary. Refer to <u>FAX-8</u> , "Ren <u>"Removal and Installation"</u> (C200 rear axle), or <u>RAX-24</u> , axle). | |
| 5. CHECK WIRING HARNESS FOR SHORT CIRCUIT | |
| Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No. Check continuity between wheel sensor harness connector terminals and ground | T.S. |
| minals and ground. | |

Continuity should not exist.

Is the inspection result normal?

YES >> GO TO 6

NO >> Repair the circuit.



6. Check wiring harness for open circuit

1. Check continuity between ABS actuator and electric unit (control unit) harness connector and the malfunctioning wheel sensor harness connector.

| Wheel sensor | | ABS actuator and electric unit (control unit) | | Wheel sensor | | M | |
|--------------|-----------|---|-----------|--------------|-------|-----|---|
| | Connector | Terminal | Connector | Terminal | | IV | |
| Front LH | 45 | 45 540 | E18 | 1 | | _ | |
| | | 46 | ETO | 2 | | Ν | |
| Front RH | E125 | 34 | E117 | 1 | - | | |
| | | 33 | | 2 | Yes | C | |
| Poor I H | E 125 | 36 | C11 | C11 1 2 | C11 1 | Tes | C |
| Rear LH | | 37 | | | - | | |
| Rear RH | | 43 | C10 | 1 | | P | |
| | | 42 | 010 | 2 | | | |

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-70, "Removal and Installation".

NO >> Repair the circuit. А

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C1101, C1102, C1103, C1104 WHEEL SENSOR-1

< COMPONENT DIAGNOSIS >

Component Inspection

INFOID:000000004055349

[TYPE 1]

1. CHECK DATA MONITOR

On "DATA MONITOR", select "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR", and "RR RH SEN-SOR", and check the vehicle speed.

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

Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-24, "Diagnosis Procedure"</u>.

C1105, C1106, C1107, C1108 WHEEL SENSOR-2

< COMPONENT DIAGNOSIS >

C1105, C1106, C1107, C1108 WHEEL SENSOR-2

Description

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

DTC Logic

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DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause | D |
|-------|---|---|---|-----|
| C1105 | RR RH SENSOR-2When the circuit in the rear RH wheel sensor is sho cuited. Or when the distance between the wheel se and sensor rotor is too large and the sensor pulse ca be recognized by the control unit. | | | Е |
| C1106 | RR LH SENSOR-2 | When the circuit in the rear LH wheel sensor is short-cir- cuited. Or when the distance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit. | Harness or connector Wheel sensor | BRC |
| C1107 | FR RH SENSOR-2 | When the circuit in the front RH wheel sensor is short-cir- cuited. Or when the distance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit. | ABS actuator and electric unit (control unit) | G |
| C1108 | FR LH SENSOR-2 | When the circuit in the front LH wheel sensor is short-cir- cuited. Or when the distance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit. | | H |

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

| Self-diagnosis results | К |
|---|-----|
| RR RH SENSOR-2 | r. |
| RR LH SENSOR-2 | |
| FR RH SENSOR-2 | L |
| FR LH SENSOR-2 | |
| Is above displayed on the self-diagnosis display? | М |
| YES >> Proceed to diagnosis procedure. Refer to <u>BRC-27, "Diagnosis Procedure"</u> . NO >> Inspection End | IVI |
| Diagnosis Procedure | Ν |
| CAUTION: Do not check between wheel sensor terminals. | 0 |
| INSPECTION PROCEDURE | 0 |
| 1.CONNECTOR INSPECTION | |
| Disconnect the ABS actuator and electric unit (control unit) connector and wheel sensor of malfunctioning code. | Ρ |
| Check the terminals for deformation, disconnection, looseness or damage. | |
| Is the inspection result normal? | |
| YES >> GO TO 2 | |

NO >> Repair or replace as necessary.

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C1105, C1106, C1107, C1108 WHEEL SENSOR-2

< COMPONENT DIAGNOSIS >

2. CHECK WHEEL SENSOR OUTPUT SIGNAL

- 1. Connect ABS active wheel sensor tester (J-45741) to wheel sensor using appropriate adapter.
- 2. Turn on the ABS active wheel sensor tester power switch.

NOTE:

The green POWER indicator should illuminate. If the POWER indicator does not illuminate, replace the battery in the ABS active wheel sensor tester before proceeding.

 Spin the wheel of the vehicle by hand and observe the red SENSOR indicator on the ABS active wheel sensor tester. The red SENSOR indicator should flash on and off to indicate an output signal.
 NOTE:

If the red SENSOR indicator illuminates but does not flash, reverse the polarity of the tester leads and retest.

Does the ABS active wheel sensor tester detect a signal?

YES >> GO TO 3

NO >> Replace the wheel sensor. Refer to <u>BRC-68, "Removal and Installation"</u>.

3.CHECK TIRES

Check for inflation pressure, wear and size of each tire.

Are tire pressure and size correct and is tire wear within specifications?

- YES >> GO TO 4
- NO >> Adjust tire pressure or replace tire(s).

4.CHECK WHEEL BEARINGS

Check wheel bearing axial end play. Refer to <u>FAX-5</u>, "On-Vehicle Inspection and Service" (front), <u>RAX-7</u>, "<u>Rear Axle Bearing</u>" (C200 rear axle), or <u>RAX-19</u>, "<u>Rear Axle Bearing</u>" (M226 rear axle).

Is the inspection result normal?

YES >> GO TO 5

NO

>> Repair or replace as necessary. Refer to <u>FAX-8, "Removal and Installation"</u> (front), <u>RAX-13,</u> <u>"Removal and Installation"</u> (C200 rear axle), or <u>RAX-24, "Removal and Installation"</u> (M226 rear axle).

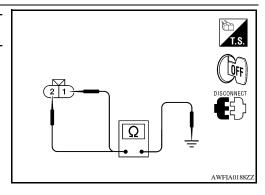
5.check wiring harness for short circuit

- 1. Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No.
- 2. Check continuity between wheel sensor harness connector terminals and ground.

Continuity should not exist.

Is the inspection result normal?

- YES >> GO TO 6
- NO >> Repair the circuit.



6. CHECK WIRING HARNESS FOR OPEN CIRCUIT

1. Check continuity between ABS actuator and electric unit (control unit) harness connector and the malfunctioning wheel sensor harness connector.

C1105, C1106, C1107, C1108 WHEEL SENSOR-2

< COMPONENT DIAGNOSIS >

[TYPE 1]

| Wheel sensor | ABS actuator and electric unit (control unit) | | Wheel sensor | | Continuity | |
|--------------|--|----------|--------------|----------|------------|---|
| | Connector | Terminal | Connector | Terminal | | |
| Front LH | | 45 | E10 | 1 | | _ |
| | | 46 | E18 | 2 | | |
| Front RH | E125 34 33 36 37 | E117 | 1 | | | |
| | | 33 | E III/ | 2 | Yes | |
| Rear LH | | 36 | C11 | 1 | Tes | |
| | | 37 | | 2 | | |
| Rear RH | | 43 | | 1 | | |
| Real RH | | 42 | C10 | 2 | | |

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-70, "Removal and Installa-</u> tion".

NO >> Repair the circuit.

Component Inspection

1. CHECK DATA MONITOR

On "DATA MONITOR", select "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR", and "RR RH SEN-SOR", and check the vehicle speed.

| Wheel sensor | Vehicle speed (DATA MONITOR) |
|----------------------------------|-------------------------------------|
| FR LH SENSOR | |
| FR RH SENSOR | Nearly matches the speedometer dis- |
| RR LH SENSOR | play (±10% or less) |
| RR RH SENSOR | - |
| Is the inspection result normal? | |

Is the inspection result normal?

| YES | >> Inspection End |
|-----|---|
| NO | >> Go to diagnosis procedure. Refer to <u>BRC-27, "Diagnosis Procedure"</u> . |

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< COMPONENT DIAGNOSIS >

C1109 POWER AND GROUND SYSTEM

Description

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

DTC Logic

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INFOID:000000004055354

DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|-------|-------------------------------|---|---|
| C1109 | BATTERY VOLTAGE [ABNORMAL] | When the ABS actuator and electric unit (control unit) power supply voltage is lower than normal. | Harness or connector ABS actuator and electric unit (control unit) |

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
BATTERY VOLTAGE [ABNORMAL]

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-30, "Diagnosis Procedure"</u>.

NO >> Inspection End

Diagnosis Procedure

INSPECTION PROCEDURE

1.CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-20. "CONSULT-III Function</u> (<u>ABS)"</u>.

Is any item indicated on the self-diagnosis display?

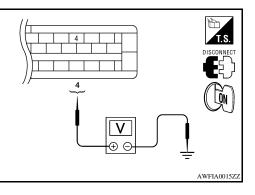
YES >> GO TO 2

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

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

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

| | or and elec- ontrol unit) | _ | Condition | Voltage |
|-----------|------------------------------|--------|----------------------|-----------------|
| Connector | Terminal | | | |
| E125 | 4 | Ground | Ignition switch: ON | Battery voltage |
| LIZJ | 4 | Gibunu | Ignition switch: OFF | Approx. 0V |



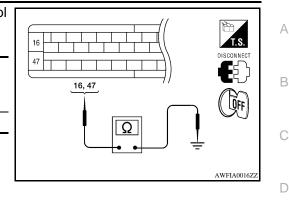
4. Turn ignition switch OFF.

C1109 POWER AND GROUND SYSTEM

< COMPONENT DIAGNOSIS >

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

| ABS actuator and electric unit (control unit) | | _ | Continuity |
|--|----------|--------|------------|
| Connector | Terminal | | |
| E125 | 16, 47 | Ground | Yes |



[TYPE 1]

Is the inspection result normal?

- YES >> Check battery for terminal looseness, low voltage, etc. If any malfunction is found, repair malfunctioning parts.
- NO >> Repair or replace malfunctioning components.

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C1110, C1113, C1170 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) < COMPONENT DIAGNOSIS > [TYPE 1]

C1110, C1113, C1170 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

DTC Logic

INFOID:000000004055357

DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|-------|--------------------|---|--------------------------------|
| C1110 | CONTROLLER FAILURE | When there is an internal malfunction in the ABS actuator and electric unit (control unit). | ABS actuator and electric unit |
| C1113 | G-SENSOR | G-sensor is malfunctioning. | (control unit) |
| C1170 | VARIANT CODING | In a case where VARIANT CODING is different. | |

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results

CONTROLLER FAILURE

G-SENSOR

VARIANT CODING

Is above displayed on the self-diagnosis display?

YES >> Refer to <u>BRC-32</u>, "Diagnosis Procedure".

NO >> Inspection End

Diagnosis Procedure

INFOID:000000004055358

INSPECTION PROCEDURE

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

>> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-70, "Removal and Installa-</u> tion".

C1111 ABS MOTOR, MOTOR RELAY SYSTEM

< COMPONENT DIAGNOSIS >

C1111 ABS MOTOR, MOTOR RELAY SYSTEM

Description

PUMP

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

MOTOR

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

DTC Logic

DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|---|----------------------------|--|--|
| C1111 PUMP MOTOR | | During the actuator motor operating with ON, when the actuator motor turns OFF, or when the control line for a tuator motor relay is open. | Harness or connector ABS actuator and electric unit |
| CIIII | | During the actuator motor operating with OFF, when the actuator motor turns ON, or when the control line for relay is shorted to ground. | (control unit) |
| DTC CC | NFIRMATION PROCE | DURE | |
| 1. CHEC | CK SELF-DIAGNOSIS RE | ESULTS | |
| Check th | e self-diagnosis results. | | |
| | 0.11.1 | | |
| | Self-diagnosis PUMP MOT | | |
| Is above | displayed on the self-dia | | |
| YES | | procedure. Refer to <u>BRC-33, "Diagnosis Proced</u> | ure". |
| Diagno | sis Procedure | | INFOID:000000004055361 |
| INSPEC [®] | TION PROCEDURE | | |
| 1. CHEC | CK CONNECTOR | | |
| Disco Cheo | | electric unit (control unit) connector. on, disconnect, looseness, and so on. If any ma | lfunction is found, repair or |
| | onnect connectors and the | hen perform the self-diagnosis. Refer to BRC-2 | 20, "CONSULT-III Function |
| • | m indicated on the self-di | iagnosis display? | |
| - | >> GO TO 2 | onnector terminal. Repair or replace connector. | |
| ^ | | OTOR RELAY POWER SUPPLY CIRCUIT | |
| | | | |

[TYPE 1]

INFOID:000000004055360

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C1111 ABS MOTOR, MOTOR RELAY SYSTEM

< COMPONENT DIAGNOSIS >

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

| AWIA001/LL | |
|------------|--|
| | |

(上

| ABS actuator and electric unit (control unit) | | _ | Voltage |
|---|----------|--------|-----------------|
| Connector | Terminal | | voltage |
| E125 | 1 | Ground | Battery voltage |

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

$\mathbf{3}$. Check abs actuator and electric unit (control unit) ground circuit

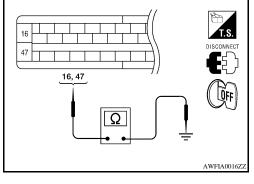
Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

| ABS actuator and ele | ABS actuator and electric unit (control unit) | | Continuity |
|----------------------|---|--------|------------|
| Connector | Terminal | | Continuity |
| E125 | 16, 47 | Ground | Yes |

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-70, "Removal and Installation"</u>.
- NO >> Repair or replace malfunctioning components.

Component Inspection



INFOID:000000004055362

1.CHECK ACTIVE TEST

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

| Operation | ON | OFF |
|--------------|----|-----|
| MOTOR RELAY | ON | OFF |
| ACTUATOR RLY | ON | ON |

Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-33. "Diagnosis Procedure"</u>.

[TYPE 1]

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< COMPONENT DIAGNOSIS >

C1115 WHEEL SENSOR

Description

INFOID:000000004055363

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

DTC Logic

INFOID:000000004055364

DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause | D |
|---|------------------------------------|--|---|-----|
| C1115 | ABS SENSOR [ABNORMAL SIGNAL] | When wheel sensor input signal is maltunctioning | | E |
| DTC CC | NFIRMATION PROCE | DURE | | |
| 1. CHEC | CK SELF-DIAGNOSIS RE | SULTS | В | BRC |
| Check th | e self-diagnosis results. | | | |
| | 0.16.15.000 | | (| G |
| <u> </u> | Self-diagnosis ABS SENSOR [ABNOF | | | |
| | - | - | | Н |
| YES | displayed on the self-diag | procedure. Refer to <u>BRC-35, "Diagnosis Procec</u> | lure" | |
| NO | >> Inspection End | | <u>, , , , , , , , , , , , , , , , , , , </u> | |
| Diagno | sis Procedure | | INFOID:00000004055365 | |
| CAUTIO | | | | |
| | heck between wheel se | nsor terminals. | | J |
| INSPEC | TION PROCEDURE | | | |
| 1.con | NECTOR INSPECTION | | | K |
| | | electric unit (control unit) connector and whe | | |
| code. | | | e eeneer e mananenen g | |
| | | n, disconnection, looseness or damage. | | L |
| | spection result normal? >> GO TO 2 | | | |
| NO | >> Repair or replace as n | ecessary. | 1 | M |
| 2.снес | CK WHEEL SENSOR OU | TPUT SIGNAL | | |
| | | nsor tester (J-45741) to wheel sensor using app | propriate adapter. | N |
| 2. Turn | on the ABS active wheel | sensor tester power switch. | | IN |
| NOT The | | should illuminate. If the POWER indicator doe | s not illuminate, replace the | |
| The green POWER indicator should illuminate. If the POWER indicator does not illuminate, replace the battery in the ABS active wheel sensor tester before proceeding. | | | | 0 |
| | | by hand and observe the red SENSOR indicat DR indicator should flash on and off to indicate a | | |
| NOT | | | | Р |
| If th retes | | illuminates but does not flash, reverse the pol- | arity of the tester leads and | |
| | ABS active wheel sensol | r tester detect a signal? | | |
| YES | >> GO TO 3 | | | |
| NO | >> Replace the wheel ser | nsor. Refer to <u>BRC-68, "Removal and Installation</u> | <u>on"</u> . | |
| 3.CHEC | CK TIRES | | | |

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C1115 WHEEL SENSOR

< COMPONENT DIAGNOSIS >

Check for inflation pressure, wear and size of each tire.

Are tire pressure and size correct and is tire wear within specifications?

- YES >> GO TO 4
- NO >> Adjust tire pressure or replace tire(s).

4.CHECK WHEEL BEARINGS

Check wheel bearing axial end play. Refer to <u>FAX-5, "On-Vehicle Inspection and Service"</u> (front), <u>RAX-7,</u> <u>"Rear Axle Bearing"</u> (C200 rear axle), or <u>RAX-19, "Rear Axle Bearing"</u> (M226 rear axle).

Is the inspection result normal?

YES >> GO TO 5

NO >> Repair or replace as necessary. Refer to <u>FAX-8</u>, "<u>Removal and Installation</u>" (front), <u>RAX-13</u>, <u>"Removal and Installation</u>" (C200 rear axle), or <u>RAX-24</u>, "<u>Removal and Installation</u>" (M226 rear axle).

5.CHECK WIRING HARNESS FOR SHORT CIRCUIT

- 1. Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No.
- 2. Check continuity between wheel sensor harness connector terminals and ground.

Continuity should not exist.

Is the inspection result normal?

YES >> GO TO 6

NO >> Repair the circuit.

6. CHECK WIRING HARNESS FOR OPEN CIRCUIT

1. Check continuity between ABS actuator and electric unit (control unit) harness connector and the malfunctioning wheel sensor harness connector.

| Wheel sensor | ABS actuator and electric unit (control unit) | | Wheel sensor | | Continuity |
|--------------|---|----------|--------------|----------|------------|
| | Connector | Terminal | Connector | Terminal | |
| Front LH | - E125 | 45 | E18 | 1 | Yes |
| | | 46 | | 2 | |
| Front RH | | 34 | E117 | 1 | |
| | | 33 | | 2 | |
| Rear LH | | 36 | C11 | 1 | |
| | | 37 | | 2 | |
| Rear RH | | 43 | C10 | 1 | |
| | | 42 | | 2 | |

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-70, "Removal and Installa-</u> tion".

NO >> Repair the circuit.

Component Inspection

1.CHECK DATA MONITOR

On "DATA MONITOR", select "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR", and "RR RH SEN-SOR", and check the vehicle speed.

C1115 WHEEL SENSOR

| < COMPONENT DIAGNOSIS > | | [TYPE 1] | |
|--|---|----------|---|
| FR LH SENSOR | | | 0 |
| FR RH SENSOR | Nearly matches the speedometer dis- | | А |
| RR LH SENSOR | play (±10% or less) | | |
| RR RH SENSOR | | | В |
| Is the inspection result normal? YES >> Inspection End NO >> Go to diagnosis proce | dure. Refer to <u>BRC-35, "Diagnosis Procedure"</u> . | | С |

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BRC-37

C1120, C1122, C1190 IN ABS SOL

Description

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

DTC Logic

INFOID:000000004055368

INFOID:000000004055369

INFOID:000000004055367

DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|-------|------------------|--|--|
| C1120 | FR LH IN ABS SOL | When the control unit detects a malfunction in the front LH inlet solenoid circuit. | |
| C1122 | FR RH IN ABS SOL | When the control unit detects a malfunction in the front RH inlet solenoid circuit. | ABS actuator and electric unit (control unit) |
| C1190 | R-EV | When the control unit detects a malfunction in the rear in- let solenoid circuit. | |

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

| Self-diagnosis results |
|------------------------|
| FR LH IN ABS SOL |
| FR RH IN ABS SOL |
| R-EV |

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-38, "Diagnosis Procedure"</u>.

NO >> Inspection End

Diagnosis Procedure

INSPECTION PROCEDURE

1.CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-20, "CONSULT-III Function</u> (<u>ABS)"</u>.

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

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

2.CHECK SOLENOID AND ACTUATOR RELAY POWER SUPPLY CIRCUIT

C1120, C1122, C1190 IN ABS SOL

< COMPONENT DIAGNOSIS >

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

| ABS actuator and electric unit (control unit) | | | Voltage |
|---|----------|--------|-----------------|
| Connector | Terminal | | voltage |
| E125 | 32 | Ground | Battery voltage |

Is the inspection result normal?

>> GO TO 3 YES

NO >> Repair or replace malfunctioning components.

${f 3.}$ CHECK SOLENOID AND ACTUATOR RELAY GROUND CIRCUIT

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

| ABS actuator and ele | electric unit (control unit) | | ABS actuator and electric unit (control unit) | | Continuity |
|----------------------|------------------------------|--------|---|--|------------|
| Connector | Terminal | | Continuity | | |
| E125 | 16, 47 | Ground | Yes | | |

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-70, "Removal and Installation".
- NO >> Repair or replace malfunctioning components.

Component Inspection

1. CHECK ACTIVE TEST

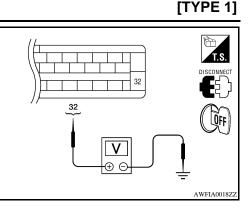
- Select each test menu item on "ACTIVE TEST". 1.
- On the display, touch "Up", "Keep", and "Down", and check that the system operates as shown in the table 2. below.

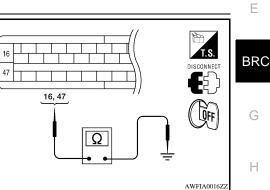
| Operation | | | ABS solenoid valve | 9 | _ |
|-----------|---------------|-----|--------------------|------|---|
| | Operation | Up | Keep | Down | |
| | FR RH IN SOL | Off | On | On | |
| FR RH SOL | FR RH OUT SOL | Off | Off | On* | |
| FR LH SOL | FR LH IN SOL | Off | On | On | _ |
| | FR LH OUT SOL | Off | Off | On* | - |
| | RR RH IN SOL | Off | On | On | |
| REAR SOL | RR RH OUT SOL | Off | Off | On* | _ |
| | RR LH IN SOL | Off | On | On | |
| | RR LH OUT SOL | Off | Off | On* | |

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

Is the inspection result normal?

- YES >> Inspection End
- NO >> Go to diagnosis procedure. Refer to <u>BRC-38, "Diagnosis Procedure"</u>.





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INFOID:000000004055370

< COMPONENT DIAGNOSIS >

C1121, C1123, C1191 OUT ABS SOL

Description

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

DTC Logic

INFOID:000000004055372

INFOID:000000004055373

INFOID:000000004055371

DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|-------|-------------------|--|---|
| C1121 | FR LH OUT ABS SOL | When the control unit detects a malfunction in the front LH outlet solenoid circuit. | |
| C1123 | FR RH OUT ABS SOL | When the control unit detects a malfunction in the front RH outlet solenoid circuit. | ABS actuator and electric unit (control unit) |
| C1191 | R-AV | When the control unit detects a malfunction in the rear outlet solenoid circuit. | |

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

| Self-diagnosis results |
|------------------------|
| FR LH OUT ABS SOL |
| FR RH OUT ABS SOL |
| R-AV |

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-40, "Diagnosis Procedure"</u>.

NO >> Inspection End

Diagnosis Procedure

INSPECTION PROCEDURE

1.CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-20, "CONSULT-III Function</u> (<u>ABS)"</u>.

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

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

2.CHECK SOLENOID AND ACTUATOR RELAY POWER SUPPLY CIRCUIT

C1121, C1123, C1191 OUT ABS SOL

< COMPONENT DIAGNOSIS >

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

| ABS actuator and ele | ABS actuator and electric unit (control unit) | | Voltage |
|----------------------|---|--------|-----------------|
| Connector | Terminal | | voltage |
| E125 | 32 | Ground | Battery voltage |

Is the inspection result normal?

>> GO TO 3 YES

NO >> Repair or replace malfunctioning components.

${f 3.}$ CHECK SOLENOID AND ACTUATOR RELAY GROUND CIRCUIT

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

| ABS actuator and ele | ectric unit (control unit) | rol unit) — Continuity | |
|----------------------|----------------------------|------------------------|------------|
| Connector | Terminal | | Continuity |
| E125 | 16, 47 | Ground | Yes |

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-70, "Removal and Installation".
- NO >> Repair or replace malfunctioning components.

Component Inspection

1. CHECK ACTIVE TEST

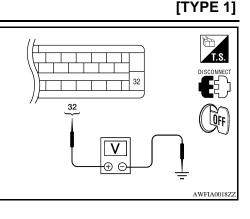
- Select each test menu item on "ACTIVE TEST". 1.
- On the display, touch "Up", "Keep", and "Down", and check that the system operates as shown in the table 2. below.

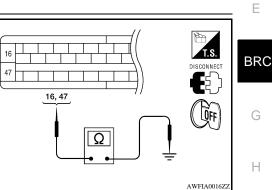
| Operation | | | ABS solenoid valve | 9 | _ |
|-----------|---------------|-----|--------------------|------|---|
| | Operation | Up | Keep | Down | |
| | FR RH IN SOL | Off | On | On | |
| FR RH SOL | FR RH OUT SOL | Off | Off | On* | |
| FR LH SOL | FR LH IN SOL | Off | On | On | _ |
| | FR LH OUT SOL | Off | Off | On* | - |
| | RR RH IN SOL | Off | On | On | |
| REAR SOL | RR RH OUT SOL | Off | Off | On* | _ |
| | RR LH IN SOL | Off | On | On | |
| | RR LH OUT SOL | Off | Off | On* | |

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

Is the inspection result normal?

- YES >> Inspection End
- NO >> Go to diagnosis procedure. Refer to <u>BRC-40, "Diagnosis Procedure"</u>.





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C1140 ACTUATOR RLY

Description

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

DTC Logic

INFOID:000000004055376

INFOID:000000004055375

DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|-------|--------------|--|---|
| C1140 | ACTUATOR RLY | ABS actuator relay or circuit malfunction. | Harness or connector ABS actuator and electric unit (control unit) |

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results ACTUATOR RLY

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-42, "Diagnosis Procedure"</u>.

NO >> Inspection End

INFOID:000000004055377

INSPECTION PROCEDURE

1.CHECK CONNECTOR

Diagnosis Procedure

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-20, "CONSULT-III Function</u> (<u>ABS)"</u>.

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

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

2.CHECK SOLENOID AND ACTUATOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.

- Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check voltage between ABS actuator and electric unit (control unit) harness connector terminal and ground.

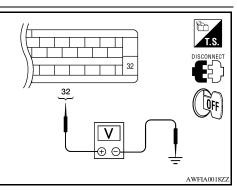
| ABS actuator and ele | ectric unit (control unit) | | Voltage | |
|----------------------|----------------------------|--------|-----------------|--|
| Connector | Terminal | | voltage | |
| E125 | 32 | Ground | Battery voltage | |

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

 ${
m 3.}$ CHECK SOLENOID AND ACTUATOR RELAY GROUND CIRCUIT



C1140 ACTUATOR RLY

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< COMPONENT DIAGNOSIS >

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

| ABS actuator and ele | ectric unit (control unit) | | Continuity |
|----------------------|----------------------------|--------|------------|
| Connector | Terminal | | Continuity |
| E125 | 16, 47 | Ground | Yes |

Is the inspection result normal?

>> Replace ABS actuator and electric unit (control unit). YES Refer to BRC-70, "Removal and Installation".

NO >> Repair or replace malfunctioning components.

Component Inspection

1. CHECK ACTIVE TEST

On "ACTIVE TEST", select "ABS MOTOR". 1.

2. Touch On and Off on screen. Make sure motor relay and actuator relay operates as shown in table below.

| | | | BRC |
|--------------|----|-----|-----|
| Operation | On | Off | |
| MOTOR RELAY | On | Off | |
| ACTUATOR RLY | On | On | G |

Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-42, "Diagnosis Procedure"</u>.

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INFOID:000000004055378

[TYPE 1]

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U1000 CAN COMM CIRCUIT

Description

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

DTC Logic

INFOID:000000004055380

INFOID:000000004055381

DTC DETECTION LOGIC

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

Diagnosis Procedure

INSPECTION PROCEDURE

1.CHECK CONNECTOR

- 1. Turn ignition switch OFF, disconnect the ABS actuator and electric unit (control unit) connector, and check the terminals for deformation, disconnection, looseness, and so on. If there is a malfunction, repair or replace the terminal.
- 2. Reconnect connector and perform self-diagnosis.

Is "CAN COMM CIRCUIT" displayed in self-diagnosis display items?

- YES >> Print out the self-diagnostic results, and refer to LAN-14, "Trouble Diagnosis Flow Chart".
- NO >> Connector terminal is loose, damaged, open, or shorted.

[TYPE 1]

ABS WARNING LAMP

< COMPONENT DIAGNOSIS >

ABS WARNING LAMP

[TYPE 1]

| Description | INFOID:00000004055382 |
|--|---|
| | ×: ON –: OFF |
| Condition | ABS warning lamp |
| Ignition switch OFF | _ |
| For 2 seconds after turning ON ignition switch | × |
| 2 seconds later after turning ON ignition switch | _ |
| ABS function is malfunctioning. | × |
| EBD function is malfunctioning. | × |
| Component Function Check | INF0ID:00000004055383 |
| CHECK ABS WARNING LAMP OPERATION | |
| Check that the lamp illuminates for approximately 2 se | econds after the ignition switch is turned ON. |
| s the inspection result normal? | |
| YES >> Inspection End | |
| NO >> Go to diagnosis procedure. Refer to <u>BRC</u> . | -45, "Diagnosis Procedure". |
| Diagnosis Procedure | INFOID:00000004055384 |
| .CHECK SELF-DIAGNOSIS | |
| | elf-diagnosis. Refer to <u>BRC-20. "CONSULT-III Function</u> |
| <u>ABS)"</u> | |
| s the inspection result normal? | |
| YES >> GO TO 2 NO >> Check items displayed by self-diagnosis. | |
| CHECK COMBINATION METER | |
| | |
| neck if the indication and operation of combination n on". | meter are normal. Refer to <u>MWI-23, "Diagnosis Descrip-</u> |
| s the inspection result normal? | |
| • | (control unit). Refer to BRC-70, "Removal and Installa- |
| tion". | |
| NO >> Replace combination meter. Refer to <u>MW</u> | I-93, "Removal and Installation". |
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BRAKE WARNING LAMP

< COMPONENT DIAGNOSIS >

BRAKE WARNING LAMP

Description

INFOID:000000004055385

×: ON –: OFF

[TYPE 1]

| Condition | Brake warning lamp (Note 1) |
|---------------------------------|-----------------------------|
| Ignition switch OFF | - |
| Ignition switch ON | × (Note 2) |
| EBD function is malfunctioning. | × |

NOTE:

• 1: Brake warning lamp will turn on in case of parking brake operation (when switch is ON) or of brake fluid level switch operation (when brake fluid is insufficient).

• 2: After starting engine, brake warning lamp is turned off.

Component Function Check

INFOID:000000004055386

1.BRAKE WARNING LAMP OPERATION CHECK

Check that the lamp illuminates after the ignition switch is turned ON, and turns OFF after the engine is started.

Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-46. "Diagnosis Procedure"</u>.

Diagnosis Procedure

INFOID:000000004055387

1.CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-20, "CONSULT-III Function</u> (ABS)".

Is the inspection result normal?

YES >> GO TO 2

NO >> Check items displayed by self-diagnosis.

2. CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to <u>MWI-23, "Diagnosis Descrip-</u> tion".

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-70, "Removal and Installa-</u> tion".
- NO >> Replace combination meter. Refer to <u>MWI-93, "Removal and Installation"</u>.

APPLICATION NOTICE

< ECU DIAGNOSIS > ECU DIAGNOSIS APPLICATION NOTICE

Application Notice

| Service information | Remarks | C |
|---------------------|--|---|
| TYPE 1 | ABS | |
| TYPE 2 | ABLS/ABS | |
| TYPE 3 | HILL DESCENT CONTROL/HILL START ASSIST/VDC/TCS/ABS | D |

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< ECU DIAGNOSIS >

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Reference Value

INFOID:000000004055389

[TYPE 1]

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.

CONSULT-III MONITOR ITEM

| | | Data monitor | | | | | |
|---------------|---|--|--|--|--|--|--|
| Monitor item | Display content | Condition | Reference value in normal operation | | | | |
| | | 0 [km/h (MPH)] | Vehicle stopped | | | | |
| FR LH SENSOR | Wheel speed | Nearly matches the speed meter display $(\pm 10\% \text{ or less})$ | Vehicle running (Note 1) | | | | |
| | | 0 [km/h (MPH)] | Vehicle stopped | | | | |
| FR RH SENSOR | Wheel speed | Nearly matches the speed meter display $(\pm 10\% \text{ or less})$ | Vehicle running (Note 1) | | | | |
| | | 0 [km/h (MPH)] | Vehicle stopped | | | | |
| RR LH SENSOR | Wheel speed | Nearly matches the speed meter display $(\pm 10\% \text{ or less})$ | Vehicle running (Note 1) | | | | |
| | | 0 [km/h (MPH)] | Vehicle stopped | | | | |
| RR RH SENSOR | Wheel speed | Nearly matches the speed meter display $(\pm 10\% \text{ or less})$ | Vehicle running (Note 1) | | | | |
| | | When brake pedal is depressed | ON | | | | |
| STOP LAMP SW | Stop lamp switch signal status | When brake pedal is released | OFF | | | | |
| BATTERY VOLT | Battery voltage supplied to the ABS actuator and electric unit (control unit) | Ignition switch ON | 10 – 16 V | | | | |
| | | Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT-III) or actua- tor relay is inactive (in fail-safe mode) | ON | | | | |
| FR RH IN SOL | Operation status of each solenoid valve | When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON) | OFF | | | | |
| | | Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT-III) or actua- tor relay is inactive (in fail-safe mode) | ON | | | | |
| FR RH OUT SOL | Operation status of each solenoid valve | When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON) | OFF | | | | |
| FR LH IN SOL | Operation status of each solenoid valve | Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT-III) or actua- tor relay is inactive (in fail-safe mode) | ON | | | | |
| | | When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON) | OFF | | | | |
| | Operation status of each calencid water | Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT-III) or actua- tor relay is inactive (in fail-safe mode) | ON | | | | |
| FR LH OUT SOL | Operation status of each solenoid valve | When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON) | OFF | | | | |

BRC-48

< ECU DIAGNOSIS >

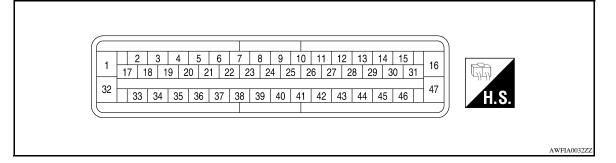
[TYPE 1]

| | | Data monitor | | | | | |
|---------------|---|--|-------------------------------------|-----|--|--|--|
| Monitor item | Display content | Condition | Reference value in normal operation | A | | | |
| REAR IN SOL | Operation status of each solenoid valve | Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT-III) or actua- tor relay is inactive (in fail-safe mode) | ON | В | | | |
| REAR IN SOL | | When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON) | OFF | С | | | |
| | Operation status of each solenoid valve | Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT-III) or actua- tor relay is inactive (in fail-safe mode) | ON | D | | | |
| REAR OUT SOL | | When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON) | OFF | E | | | |
| MOTOR RELAY | | When the motor relay and motor are operating | ON | | | | |
| | Motor and motor relay operation | When the motor relay and motor are not operating | OFF | BRC | | | |
| | Actuator relation | When the actuator relay is operating | ON | | | | |
| ACTUATOR RLY | Actuator relay operation | When the actuator relay is not operating | OFF | G | | | |
| ABS WARN LAMP | ABS warning lamp | When ABS warning lamp is ON | ON | | | | |
| ADS WARN LAWF | (Note 2) | When ABS warning lamp is OFF | OFF | Н | | | |
| EBD SIGNAL | EBD operation | EBD is active | ON | | | | |
| EBD SIGNAL | | EBD is inactive | OFF | | | | |
| ABS SIGNAL | ABS operation | ABS is active | ON | I | | | |
| ADO OIONAL | | ABS is inactive | OFF | | | | |
| EBD FAIL SIG | EBD fail-safe signal | In EBD fail-safe | ON | J | | | |
| | | EBD is normal | OFF | | | | |
| ABS FAIL SIG | ABS fail-safe signal | In ABS fail-safe | ON | | | | |
| | | ABS is normal | OFF | K | | | |
| CRANKING SIG | Crank operation | Crank is active | ON | | | | |
| | | Crank is inactive | OFF | L | | | |
| EBD WARN LAMP | EBD warning lamp | When EBD warning lamp is ON | ON | | | | |
| | | When EBD warning lamp is OFF | OFF | | | | |

NOTE:

- 1: Confirm tire pressure is normal.
- 2: On and off timing for warning lamp and indicator lamp.
- ABS warning lamp: Refer to BRC-45, "Description".
- Brake warning lamp: Refer to BRC-46, "Description".

TERMINAL LAYOUT



BRC-49

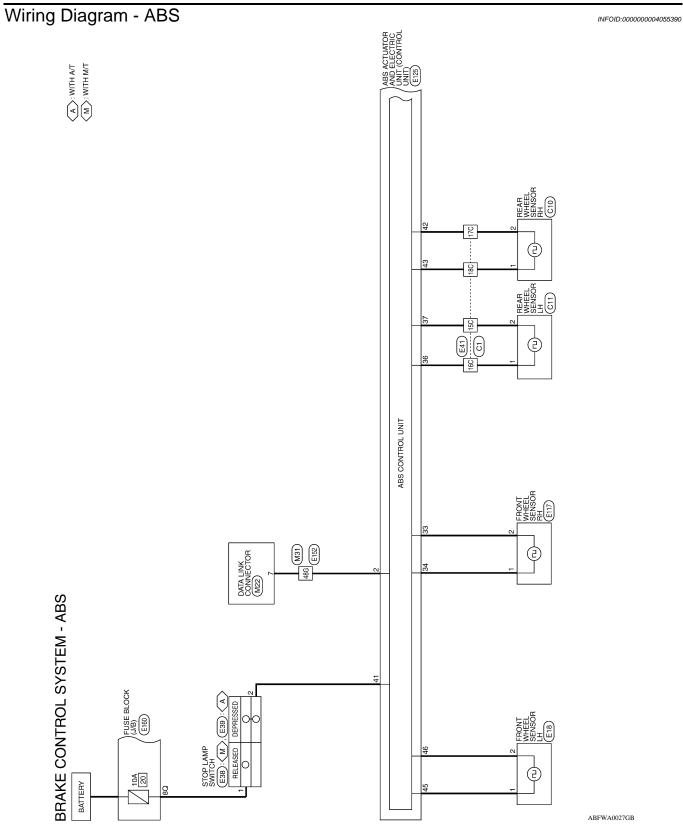
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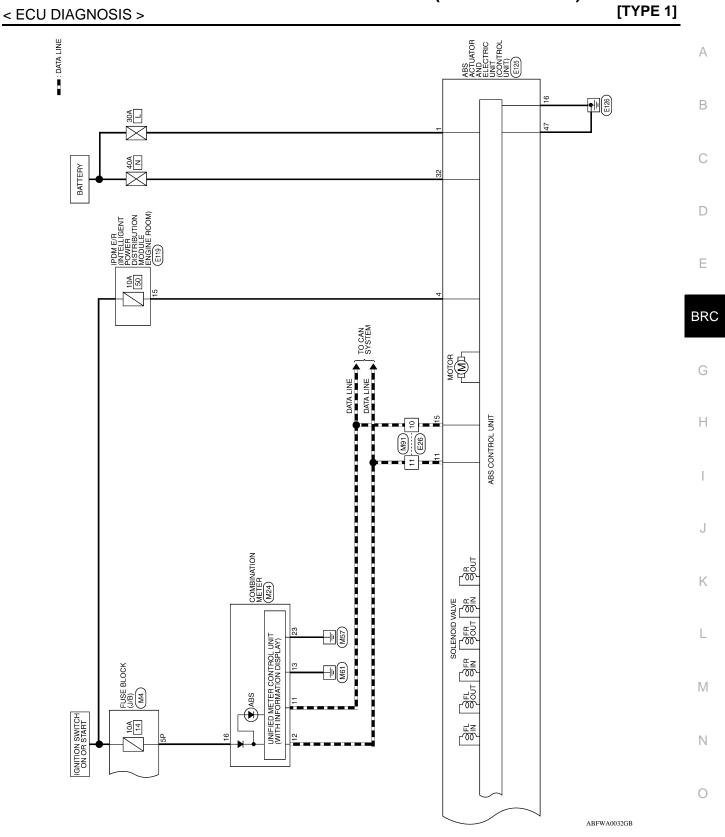
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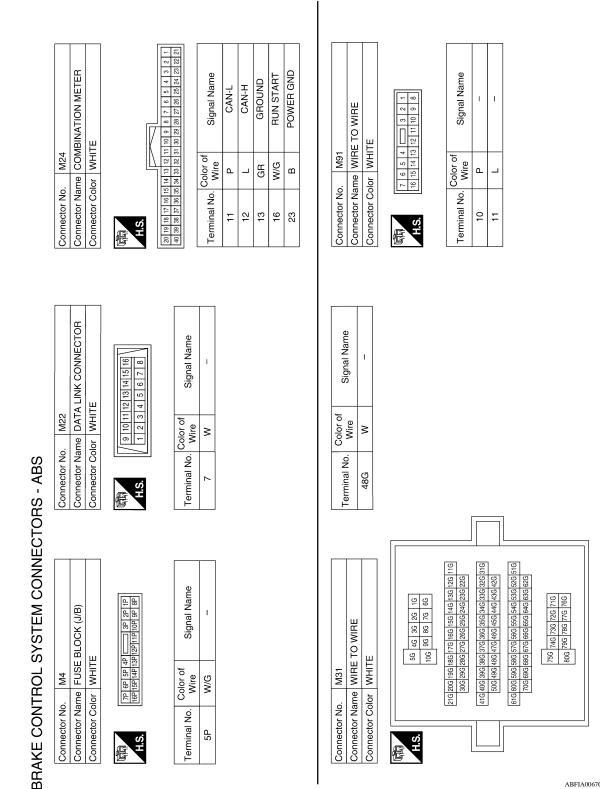






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[TYPE 1]

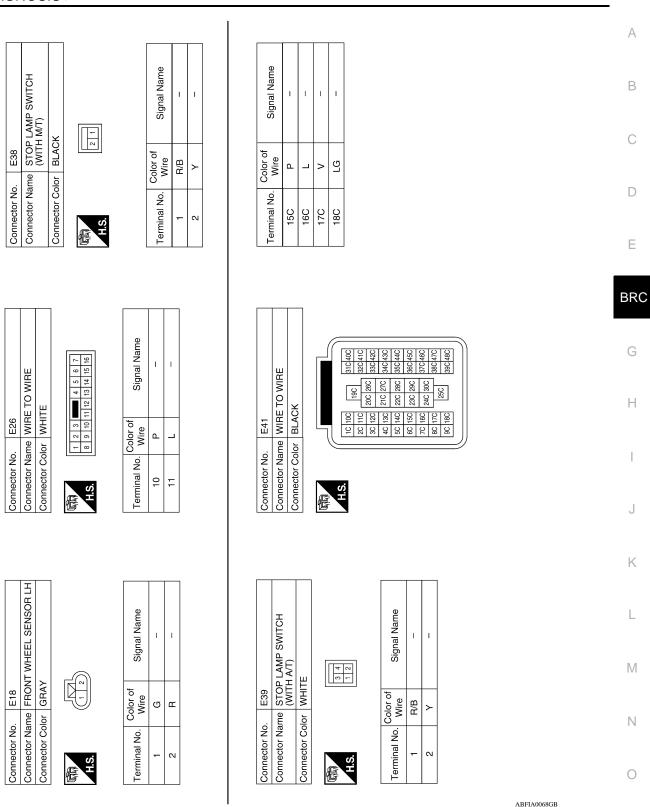


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[TYPE 1]

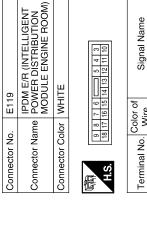
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BRC-53

33 33 33 35 35



| 18 17 16 15 14 13 12 11 10 | Signal Name | ABS IGN SUPPLY |
|----------------------------|------------------|----------------|
| 17 16 15 | Color of Wire | W/R |
| H.S. | Terminal No. | 15 |
| | | |

| | | | | | | | | | | | | | | | | | | | - |
|--|------------------|----|-------|----|----|----|-------|---------------|----|----|----|----|----|----|----|----|----|----|---|
| | Signal Name | Ι | CAN-H | I | I | I | CAN-L | VALVE ECU GND | - | - | I | I | - | I | - | I | I | I | |
| | Color of Wire | I | _ | I | I | I | ٩ | ш | Ι | Ι | I | I | Ι | I | I | I | I | I | |
| | Terminal No. | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 11 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | |



|) | Signal Name | I | I |
|---|------------------|---|---|
|) | Color of Wire | в | M |
| Ó | Terminal No. | - | 2 |

Т

| Connector No. | E125 |
|-----------------------|--|
| Connector Name | Connector Name ELECTRIC UNIT (CONTROL UNIT) (WITHOUT VDC) |
| Connector Color BLACK | BLACK |
| | |

| 33 34 | H.S. |
|-------|------|
|-------|------|

| | | - | | | | |
|---|----------------|----------|---|-------------|---|---|
| | 15 | 30 31 | | 46 | | |
| | 4 | 29 3 | | 45 | | |
| | 13 | 28 2 | | 44 | | |
| | 12 | | | 43 | | |
| | 10 11 12 13 14 | 26 27 | | 40 41 42 43 | | |
| | | 26 | | - | | l |
| | | 10 | 1 | 4 | | l |
| | 6 | 1 25 | | 40 | | |
| | 8 | 23 24 | | 39 | | |
| | 2 | 20 | | 38 | | |
| | 9 | 22 | | 37 | | ſ |
| | ъ | 20 21 22 | | 36 | | |
| | 4 | 9 20 | | 35 | | ŀ |
| | 3 | 18 19 | | 33 34 35 | | |
| 1 | ~ | 17 18 | | 33 | | |
| | | 1 | | | | I |
| | _ | | | | 1 | L |

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| _ | | | | | _ | | | | |
|-------------------|--------------|--------|---|-----|---|---|---|---|---|
| Signal Name | MOTOR SUPPLY | DIAG_K | I | IGN | I | I | I | I | ļ |
| Color of Wire | œ | SB | I | M/R | I | I | I | I | I |
| Terminal No. Wire | - | 2 | 3 | 4 | 5 | 9 | 7 | 8 | 6 |

ABFIA0069GB

VALVE ECU SUPPLY

Signal Name L Т I

Color of Wire

Terminal No.

I. I ≻ ≥ ш Т _ ۵ T L I.

30 29

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FR_RH_SIG

FR_RH_PWR

RR_LH_PWR

RR_LH_SIG

36 37 38

39 40 41 42 43 44 45 46

T I I. STOP_LAMP_SW

SB

RR_RH_PWR

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RR_RH_SIG

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FR_LH_PWR

MOTOR GND

FR_LH_SIG

I. I

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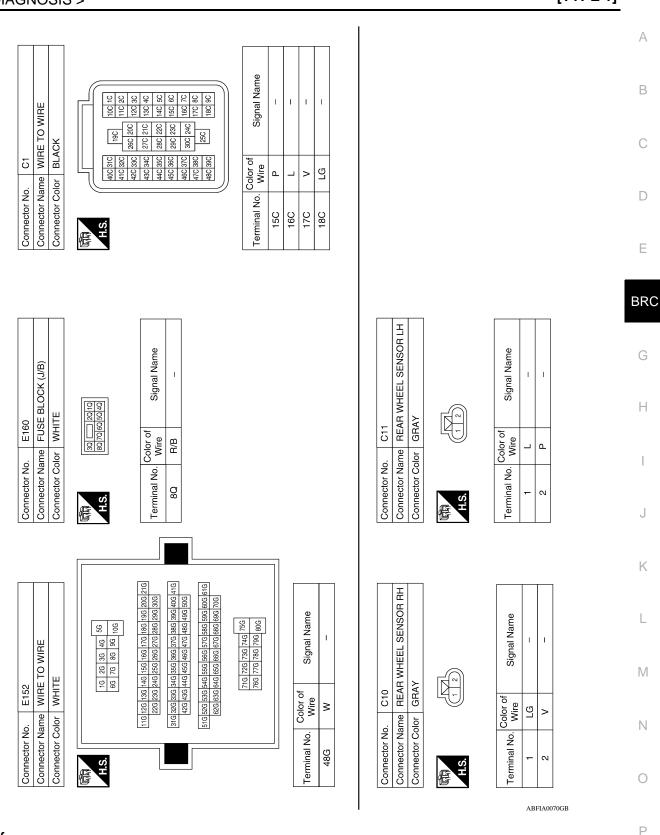
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< ECU DIAGNOSIS >

[TYPE 1]

< ECU DIAGNOSIS >

[TYPE 1]



Fail-Safe

INFOID:000000004055391

CAUTION:

If the Fail-Safe function is activated, perform Self Diagnosis for ABS system.

ABS/EBD SYSTEM

In case of an electrical malfunction with the ABS, the ABS warning lamp will turn on. In case of an electrical malfunction with the EBD system, the BRAKE warning lamp and the ABS warning lamp will turn on.

BRC-55

< ECU DIAGNOSIS >

The system will revert to one of the following conditions of the Fail-Safe function.

- 1. For ABS malfunction, only the EBD is operative and the condition of the vehicle is the same condition of vehicles without ABS system.
- 2. For EBD malfunction, the EBD and ABS become inoperative, and the condition of the vehicle is the same as the condition of vehicles without ABS or EBD system.

DTC No. Index

| DTC | Items (CONSULT screen terms) | Reference |
|-------|------------------------------|----------------------------|
| C1101 | RR RH SENSOR-1 | |
| C1102 | RR LH SENSOR-1 | BRC-24, "Description" |
| C1103 | FR RH SENSOR-1 | <u>BRC-24, Description</u> |
| C1104 | FR LH SENSOR-1 | _ |
| C1105 | RR RH SENSOR-2 | |
| C1106 | RR LH SENSOR-2 | BRC-27, "Description" |
| C1107 | FR RH SENSOR-2 | BRC-27, Description |
| C1108 | FR LH SENSOR-2 | _ |
| C1109 | BATTERY VOLTAGE [ABNORMAL] | BRC-30, "Description" |
| C1110 | CONTROLLER FAILURE | BRC-32, "DTC Logic" |
| C1111 | PUMP MOTOR | BRC-33, "Description" |
| C1113 | G-SENSOR | BRC-32, "DTC Logic" |
| C1115 | ABS SENSOR [ABNORMAL SIGNAL] | BRC-35, "Description" |
| C1120 | FR LH IN ABS SOL | BRC-38, "Description" |
| C1121 | FR LH OUT ABS SOL | BRC-40, "Description" |
| C1122 | FR RH IN ABS SOL | BRC-38, "Description" |
| C1123 | FR RH OUT ABS SOL | BRC-40, "Description" |
| C1140 | ACTUATOR RLY | BRC-42, "Description" |
| C1170 | VARIANT CODING | BRC-32, "DTC Logic" |
| C1190 | R-EV | BRC-38, "Description" |
| C1191 | R-AV | BRC-40, "Description" |
| U1000 | CAN COMM CIRCUIT | BRC-44, "Description" |

APPLICATION NOTICE

< SYMPTOM DIAGNOSIS >

SYMPTOM DIAGNOSIS APPLICATION NOTICE

Application Notice

[TYPE 1]

INFOID:000000004055393

| Service information | Remarks | |
|---------------------|--|---|
| TYPE 1 | ABS | 0 |
| TYPE 2 | ABLS/ABS | - |
| TYPE 3 | HILL DESCENT CONTROL/HILL START ASSIST/VDC/TCS/ABS | D |

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< SYMPTOM DIAGNOSIS >

ABS

Symptom Table

If ABS warning lamp turns ON, perform self-diagnosis.

| Symptom | Check item | Reference |
|---|--|------------------------------------|
| | Brake force distribution | |
| Excessive ABS function operation fre- quency | Looseness of front and rear axle | BRC-59, "Diagno- sis Procedure" |
| 4 | Wheel sensor and rotor system | <u></u> |
| | Brake pedal stroke | BRC-60, "Diagno- |
| Unexpected pedal reaction | Make sure the braking force is sufficient when the ABS is not operating. | sis Procedure" |
| The braking distance is long | Check stopping distance when the ABS is not operating. | BRC-61, "Diagno- sis Procedure" |
| ABS function does not operate (Note 1) | ABS actuator and electric unit (control unit) | BRC-62, "Diagno- sis Procedure" |
| Pedal vibration or ABS operation sound | Brake pedal | BRC-63, "Diagno- |
| occurs (Note 2) | ABS actuator and electric unit (control unit) | sis Procedure" |

NOTE:

- 1: The ABS does not operate when the speed is 10 km/h (6 MPH) or less.
- 2: Under the following conditions, ABS is activated and vibration is felt when brake pedal is lightly depressed. However, this is normal.
- When shifting gears
- When driving on slippery road
- During cornering at high speed
- When passing over bumps or grooves [at approximately 50 mm (1.97 in) or more]
- When pulling away just after starting engine [at approximately 10 km/h (6 MPH) or higher]

| EXCESSIVE ABS FUNCTION OPERATION FREQUENCY < SYMPTOM DIAGNOSIS > [TYPE 1 | 1 |
|---|-----------|
| EXCESSIVE ABS FUNCTION OPERATION FREQUENCY | <u>-</u> |
| Diagnosis Procedure | 205 |
| 1.CHECK START | 190 |
| Check front and rear brake force distribution using a brake tester. Is the inspection result normal? YES >> GO TO 2 NO >> Check brake system. 2.CHECK FRONT AND REAR AXLE | |
| Z.CHECK FRONT AND REAR AXLE Make sure that there is no excessive play in the front and rear axles. Refer to front: FAX-5, "On-Vehicl Inspection and Service", Rear: RAX-7, "Rear Axle Bearing" (C200) or RAX-19, "Rear Axle Bearing" (M226). Is the inspection result normal? YES >> GO TO 3 NO >> Repair or replace malfunctioning components. 3.CHECK WHEEL SENSOR AND SENSOR ROTOR | e |
| Check the following. Wheel sensor installation for damage. Sensor rotor installation for damage. Wheel sensor connector connection. Wheel sensor harness inspection. | — (|
| Is the inspection result normal? | |
| YES >> GO TO 4 NO >> • Replace wheel sensor or sensor rotor. Refer to <u>BRC-68, "Removal and Installation"</u> or <u>BRC-68</u> <u>"Removal and Installation"</u>. • Repair harness. | <u>).</u> |
| 4.CHECK ABS WARNING LAMP DISPLAY | |
| Make sure that the ABS warning lamp is turned off after the ignition switch is turned ON or when driving. Is the ABS warning lamp illuminated? YES >> Perform self-diagnosis. Refer to <u>BRC-20, "CONSULT-III Function (ABS)"</u> . NO >> Normal | |
| | |
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BRC-59

UNEXPECTED PEDAL REACTION

Diagnosis Procedure

INFOID:000000004055396

1.CHECK BRAKE PEDAL STROKE

Check brake pedal stroke. Refer to BR-18, "Inspection and Adjustment".

Is the stroke too large?

- YES >> Bleed air from brake tube and hose. Refer to <u>BR-20, "Bleeding Brake System"</u>.
 - Check brake pedal, brake booster, and master cylinder for mount play, looseness, brake system fluid leakage, etc. Refer to <u>BR-18</u>, "<u>Inspection and Adjustment</u>" (brake pedal), <u>BR-11</u>, "<u>On</u> <u>Board Inspection</u>" (master cylinder), <u>BR-9</u>, "<u>Inspection</u>" (brake booster).

NO >> GO TO 2

2.CHECK FUNCTION

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

Is the inspection result normal?

- YES >> Normal
- NO >> Check brake system.

< SYMPTOM DIAGNOSIS >

THE BRAKING DISTANCE IS LONG

Diagnosis Procedure

CAUTION:

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

1.CHECK FUNCTION

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

Is the inspection result normal?

YES >> Normal

NO >> Check brake system.

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ABS FUNCTION DOES NOT OPERATE

Diagnosis Procedure

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CAUTION:

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

1.CHECK ABS WARNING LAMP DISPLAY

Make sure that the ABS warning lamp turns OFF after ignition switch is turned ON or when driving. Is the inspection result normal?

YES >> Normal

NO >> Perform self-diagnosis. Refer to <u>BRC-20, "CONSULT-III Function (ABS)"</u>.

| PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS< SYMPTOM DIAGNOSIS >[TYPE 1]PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS | |
|---|----|
| Diagnosis Procedure | A |
| CAUTION: Under the following conditions, ABS is activated and vibration is felt when brake pedal is lightly depressed. However, this is normal. When shifting gears When driving on slippery road During cornering at high speed When passing over bumps or grooves [at approximately 50 mm (1.97 in) or more] When pulling away just after starting engine [at approximately 10 km/h (6 MPH) or higher] 1.SYMPTOM CHECK 1 | E |
| Check that there are pedal vibrations when the engine is started. <u>Do vibrations occur?</u> YES >> GO TO 2 | E |
| NO >> Inspect the brake pedal. 2.SYMPTOM CHECK 2 | BF |
| Check that there are ABS operation noises when the engine is started. <u>Do the operation noises occur?</u> YES >> GO TO 3 NO >> Perform self -diagnosis. Refer to <u>BRC-20, "CONSULT-III Function (ABS)"</u> . | 0 |
| 3. SYMPTOM CHECK 3 | ŀ |
| Check symptoms when electrical component (headlamps, etc.) switches are operated. <u>Do symptoms occur?</u> YES >> Check if there is a radio, antenna, antenna lead wire, or wiring close to the control unit. If there is, move it farther away. NO >> Normal | I |
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< SYMPTOM DIAGNOSIS >

NORMAL OPERATING CONDITION

Description

| Symptom | Result |
|--|---|
| Slight vibrations are felt on the brake pedal and the operation noises occur, when ABS is activated. | This is a normal condi- |
| Stopping distance is longer than that of vehicles without ABS when the vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads. | tion due to the ABS activation. |
| The brake pedal vibrates and motor operation noises occur from the engine room, after the engine starts and just after the vehicle starts. | This is normal, and it is caused by the ABS operation check. |
| The ABS warning lamp may turn ON when the vehicle is subject to strong shaking or large vibration, such as when the vehicle is rotating on a turntable or located on a ship while the engine is running. | In this case, restart the engine on a normal |
| ABS warning lamp may illuminate when running on a special road that is extremely slanted (e.g. bank in a circuit course). | road. If the normal con- dition is restored, there is no malfunction. At that time, erase the self- diagnosis memory. |

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< PRECAUTION > PRECAUTION PRECAUTIONS

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

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.

Precaution for Brake System

CAUTION:

- Refer to MA-12, "Fluids and Lubricants" for recommended brake fluid.
- Never reuse drained brake fluid.
- Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.
- To clean or wash all parts of master cylinder and disc brake caliper, use clean brake fluid.
- Never use mineral oils such as gasoline or kerosene. They will ruin rubber parts of the hydraulic system.
- Use flare nut wrench when removing and installing brake tube.
- If a brake fluid leak is found, the part must be disassembled without fail. Then it has to be replaced with a new one if a defect exists.
- Turn the ignition switch OFF and remove the connector of the ABS actuator and electric unit (control unit) or the battery terminal before performing the work.
- Always torque brake lines when installing.
- Burnish the brake contact surfaces after refinishing or replacing rotors, after replacing pads, or if a soft pedal occurs at very low mileage.

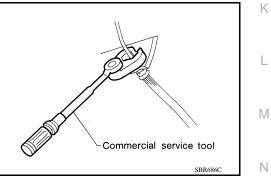
Refer to <u>BR-38, "Brake Burnishing"</u> (front disc brake) or <u>BR-43, "Brake Burnishing"</u> (rear disc brake). WARNING:

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

Precaution for Brake Control

- During ABS operation, the brake pedal may vibrate lightly and a mechanical noise may be heard. This is normal.
- Just after starting vehicle, the brake pedal may vibrate or a motor operating noise may be heard from engine compartment. This is a normal status of operation check.
- Stopping distance may be longer than that of vehicles without ABS when vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.

BRC-65



PRECAUTIONS

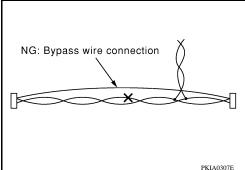
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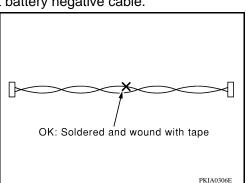
- When an error is indicated by ABS or another warning lamp, collect all necessary information from customer (what symptoms are present under what conditions) and check for simple causes before starting diagnosis. Besides electrical system inspection, check brake booster operation, brake fluid level, and fluid leaks.
- If incorrect tire sizes or types are installed on the vehicle or brake pads are not Genuine NISSAN parts, stopping distance or steering stability may deteriorate.
- If there is a radio, antenna or related wiring near control module, ABS function may have a malfunction or error.
- If aftermarket parts (car stereo, CD player, etc.) have been installed, check for incidents such as harness pinches, open circuits or improper wiring.

Precaution for CAN System

- Do not apply voltage of 7.0V or higher to terminal to be measured.
- Maximum open terminal voltage of tester in use must be less than 7.0V.
- Before checking harnesses, turn ignition switch OFF and disconnect battery negative cable.
- Area to be repaired must be soldered and wrapped with tape. Make sure that fraying of twisted wire is within 110 mm (4.33 in).

• Do not make a bypass connection to repaired area. (If the circuit is bypassed, characteristics of twisted wire will be lost.)





PREPARATION

< PREPARATION > PREPARATION

PREPARATION

Special Service Tool

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

| Tool number (Kent-Moore No.) Tool name | | Description |
|---|---------------|---|
| KV991J0080 (J-45741) ABS active wheel sensor tester | | Checking operation of ABS active wheel sen- sors |
| ST30031000 | U G WFIA0101E | Removing sensor rotor |
| (—) Bearing puller | | |
| ommercial Service To | ZZA0700D | INFOID:000000004458 |
| ommercial Service To | | |
| | | Description Removing and installing brake piping a: 10 mm (0.39 in)/12 mm (0.47 in) |
| ool name . Flare nut crowfoot | | Description Removing and installing brake piping |
| ool name . Flare nut crowfoot | | Description Removing and installing brake piping |
| ool name . Flare nut crowfoot | | Description Removing and installing brake piping |

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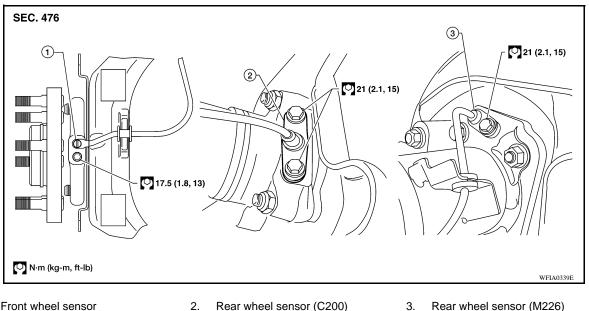
[TYPE 1]

< REMOVAL AND INSTALLATION >

REMOVAL AND INSTALLATION WHEEL SENSOR

Removal and Installation

INFOID:000000004458408



1. Front wheel sensor

Rear wheel sensor (C200)

Rear wheel sensor (M226)

REMOVAL

- Remove the wheel sensor bolt(s). 1.
 - When removing the front wheel sensor, first remove the disc rotor to gain access to the front wheel sensor. Refer to BR-39, "Removal and Installation of Brake Caliper and Disc Rotor".
- Pull the wheel sensor straight out, being careful to turn it as little as possible. 2. **CAUTION:**
 - Be careful not to damage the wheel sensor edge and sensor rotor teeth.
 - Do not pull on the wheel sensor harness.
- Disconnect the wheel sensor harness connector, then remove wheel sensor harness from the mounts to 3. remove the wheel sensor.

INSTALLATION

Installation is in the reverse order of removal.

- Before installing the wheel sensors do the following:
- Inspect and replace the wheel sensor if damaged.
- Clean the wheel sensor hole and mating surface with brake cleaner and a lint-free cloth. Be careful that dirt and debris do not enter the hub and bearing assembly or the rear axle.
- Replace the wheel sensor O-ring, then apply a coat of suitable grease to the new O-ring and sensor hole for installation.

SENSOR ROTOR

Removal and Installation

FRONT

Removal and Installation

The wheel sensor rotors are built into the wheel hubs and are not removable. If damaged, replace wheel hub and bearing assembly. Refer to <u>FAX-8</u>, "<u>Removal and Installation</u>".

REAR (C200)

Removal and Installation

It is necessary to disassemble the rear axle to replace the sensor rotor. Perform the axle shaft assembly removal procedure to replace sensor rotor. Refer to <u>RAX-8</u>, "<u>Removal and Installation</u>".

BRC-69

REAR (M226)

Removal

- 1. Remove the axle shaft assembly. Refer to <u>RAX-20, "Removal and Installation"</u>.
- 2. Pull the sensor rotor off of the axle shaft using Tool and a suitable press.

Tool number : ST30031000 (—)

Installation

1. Install the new sensor rotor on the axle shaft using a suitable length steel tube and a press. Make sure the sensor rotor is fully seated.

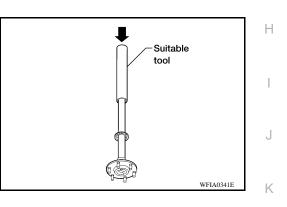
CAUTION:

Do not reuse the old sensor rotor.

from the axle shaft housing.

 Install the axle shaft assembly. Refer to <u>RAX-20, "Removal and</u> <u>Installation"</u>.

CAUTION: Do not reuse the axle oil seal. The axle oil seal must be replaced every time the axle shaft assembly is removed



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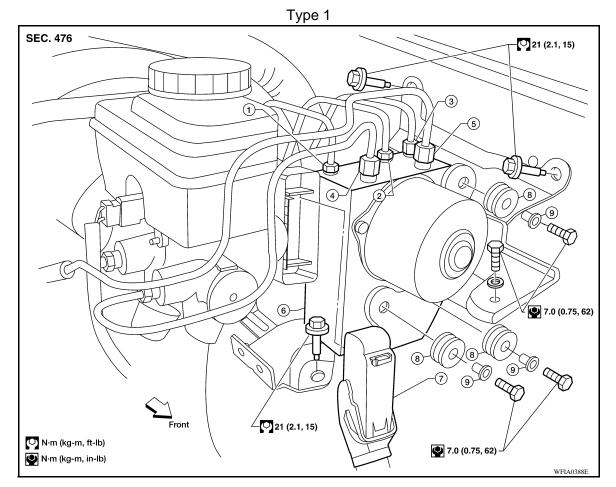
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ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

< REMOVAL AND INSTALLATION >

ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

Removal and Installation



- To rear left and right disc brake 1. 13.0 N·m (1.3 kg-m, 10 ft-lb)
 - From the master cylinder secondary side 5.

2.

8.

- 4. 18.2 N·m (1.9 kg-m, 13 ft-lb)
- 7. Harness connector

- To front left disc brake 13.0 N·m (1.3 kg-m, 10 ft-lb)
- From the master cylinder primary side 18.2 N·m (1.9 kg-m, 13 ft-lb)

Grommet

- To front right disc brake 3. 13.0 N·m (1.3 kg-m, 10 ft-lb)
- ABS actuator and electric unit 6. (control unit)
- 9. Collar

REMOVAL

- 1. Disconnect the negative battery terminal.
- Drain the brake fluid. Refer to BR-20, "Drain and Refill". 2.
- Disconnect the actuator harness from the ABS actuator and electric unit (control unit). 3. **CAUTION:**
 - To remove the brake tubes, use a flare nut wrench to prevent the flare nuts and brake tubes from being damaged.
 - Be careful not to splash brake fluid on painted areas.
- 4. Disconnect the brake tubes.
- Remove the bolts and remove the ABS actuator and electric unit (control unit). 5.

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

- All hoses and piping (tubes) must be free from excessive bending, twisting and pulling.
- Make sure there is no interference with other parts when turning steering both clockwise and counterclockwise.

BRC-70

ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

< REMOVAL AND INSTALLATION >

| • The brake piping is an important safety part. If a brake fluid leak is detected, always disassemble the parts. Replace applicable part with a new one, if necessary. | А |
|--|---|
| • Be careful not to splash brake fluid on painted areas; it way cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately. | |
| Do not bend or twist brake hose sharply, or strongly pull it. | В |
| • When removing components, cover connections so that no dirt, dust, or other foreign matter gets in. | В |
| Do not reuse drained brake fluid. | |
| • After installation of the ABS actuator and electric unit (control unit), refill brake system with new | |
| brake fluid. Then bleed the air from the system. Refer to <u>BR-20, "Bleeding Brake System"</u> . | С |

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BASIC INSPECTION APPLICATION NOTICE

Application Notice

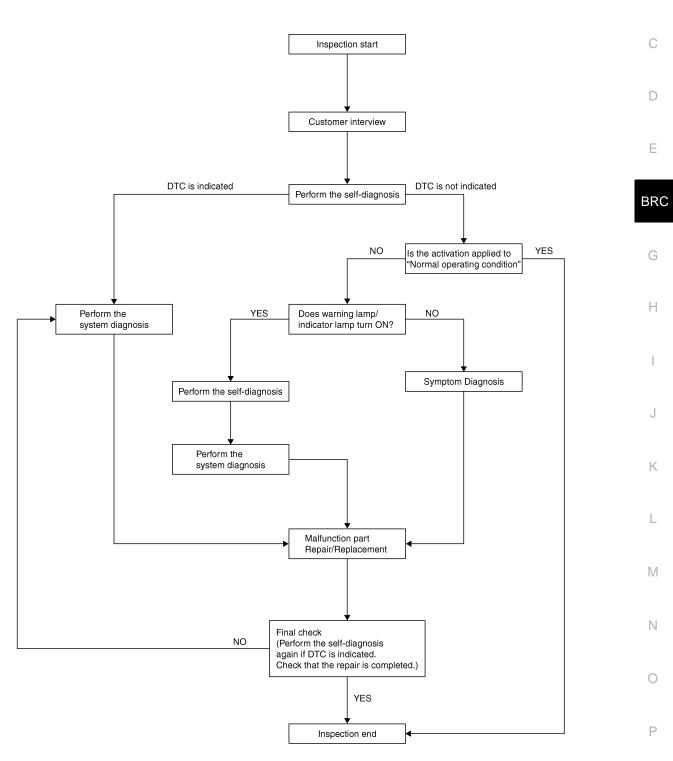
| Service information | Remarks |
|---------------------|--|
| TYPE 1 | ABS |
| TYPE 2 | ABLS/ABS |
| TYPE 3 | HILL DESCENT CONTROL/HILL START ASSIST/VDC/TCS/ABS |

< BASIC INSPECTION >

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow





DETAILED FLOW 1. COLLECT THE INFORMATION FROM THE CUSTOMER

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[TYPE 2]

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DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

[TYPE 2]

Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using the diagnosis worksheet. Refer to <u>BRC-75</u>, "Diagnostic Work Sheet".

>> GO TO 2

2.PERFORM THE SELF-DIAGNOSIS

Check the DTC display with the self-diagnosis function. Refer to <u>BRC-86, "CONSULT-III Function (ABS)"</u>. Is there any DTC displayed?

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

3.PERFORM THE SYSTEM DIAGNOSIS

Perform the diagnosis applicable to the displayed DTC. Refer to BRC-137, "DTC No. Index".

>> GO TO 7

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

Check that the symptom is a normal operation that is not considered a system malfunction. Refer to <u>BRC-146.</u> "Description".

Is the symptom a normal operation?

YES >> Inspection End

NO >> GO TO 5

5.CHECK THE WARNING LAMP AND INDICATOR LAMP FOR ILLUMINATION

Check that the warning lamp and indicator lamp illuminate.

• ABS warning lamp: Refer to <u>BRC-123, "Description"</u>.

• Brake warning lamp: Refer to <u>BRC-124, "Description"</u>.

• SLIP indicator lamp: Refer to <u>BRC-125. "Description"</u>.

Is ON/OFF timing normal?

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

6.PERFORM THE DIAGNOSIS BY SYMPTOM

Perform the diagnosis applicable to the symptom.

>> GO TO 7

7. REPAIR OR REPLACE THE MALFUNCTIONING PARTS

Repair or replace the specified malfunctioning parts.

>> GO TO 8

8.FINAL CHECK

Perform the self-diagnosis again, and check that the malfunction is repaired completely. After checking, erase the self-diagnosis memory. Refer to <u>BRC-86, "CONSULT-III Function (ABS)"</u>.

Is no other DTC present and the repair completed?

YES >> Inspection End NO >> GO TO 3

DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

Diagnostic Work Sheet

INFOID:000000004055412

[TYPE 2]

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

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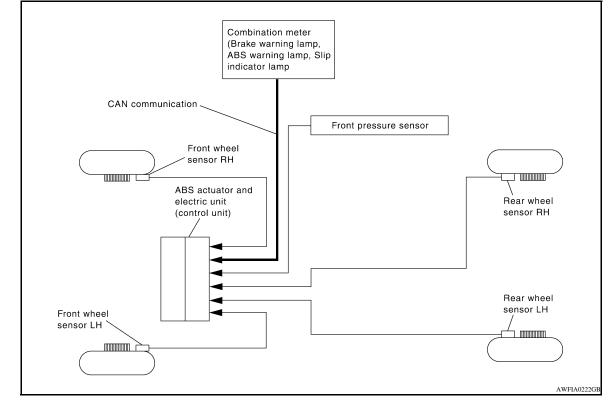
FUNCTION DIAGNOSIS APPLICATION NOTICE

Application Notice

| Service information | Remarks |
|---------------------|--|
| TYPE 1 | ABS |
| TYPE 2 | ABLS/ABS |
| TYPE 3 | HILL DESCENT CONTROL/HILL START ASSIST/VDC/TCS/ABS |

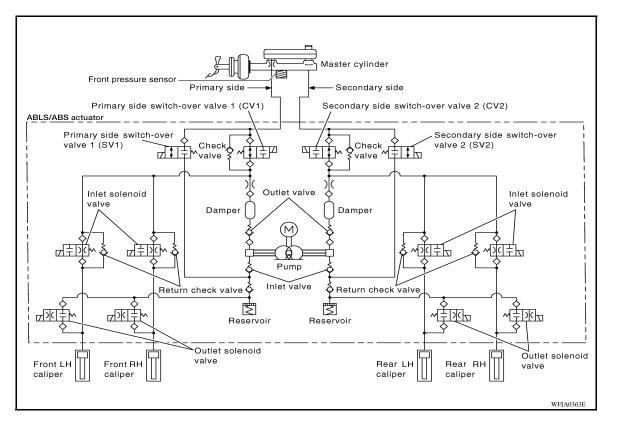
BRC-77

System Diagram



ABLS

HYDRAULIC CIRCUIT DIAGRAM



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ABLS

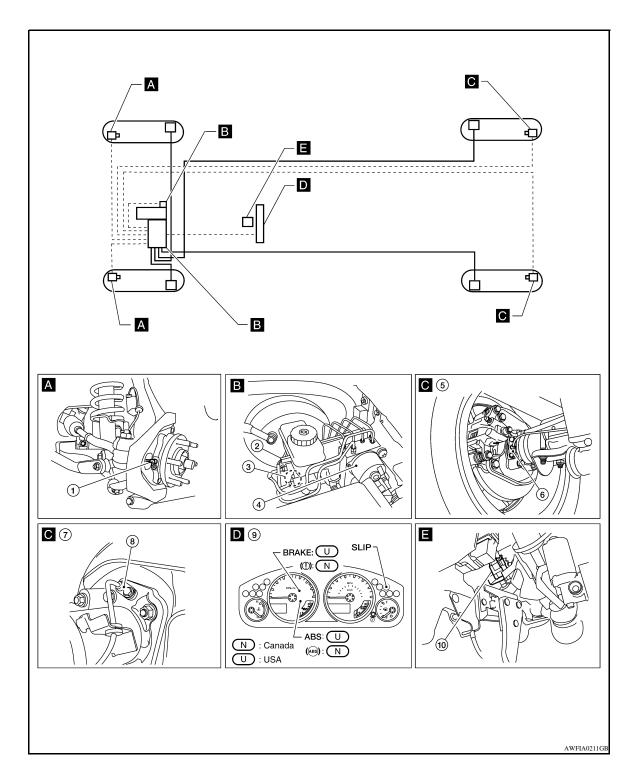
< FUNCTION DIAGNOSIS >

System Description

- · Active brake limited slip is a function to improve vehicle traction. Spinning of the drive wheels is detected by the ABS actuator and electric unit (control unit) using inputs from the wheel speed sensors. If wheel spin occurs, the ABLS system brakes the spinning wheel which distributes the driving power to the other drive wheel.
- During ABLS operation, it informs driver of system operation by flashing SLIP indicator lamp.
- Electrical system diagnosis by CONSULT-III is available.

Component Parts Location

INFOID:000000004055416



< FUNCTION DIAGNOSIS >

| 1. | Front wheel sensor LH E18 Front wheel sensor RH E117 | 2. | Brake fluid level switch E21 | 3. | Front pressure sensor E31 | А |
|-----|--|----|--|----|--|---|
| 4. | ABS actuator and electric unit (con- trol unit) E125 | 5. | C200 rear axle | 6. | Rear wheel sensor LH C11 Rear wheel sensor LH C10 | |
| 7. | M226 rear axle | 8. | Rear wheel sensor LH C11 Rear wheel sensor LH C10 | 9. | Combination meter M24 | В |
| 10. | Stop lamp switch (with M/T) E38 Stop lamp switch (with A/T) E39 | | | | | С |

Stop lamp switch (with A/T) E39

Component Description

INFOID:000000004055417

| Component parts | | Reference | |
|---|---|------------------------|-----|
| | Pump | PRC 100 "Description" | F |
| ABS actuator and electric unit (control unit) | Motor | BRC-100, "Description" | |
| | Actuator relay | BRC-112, "Description" | |
| | Solenoid valve | BRC-107, "Description" | BRC |
| | Switch-over valve (CV1, CV2, SV1, SV2) | BRC-118, "Description" | |
| Wheel sensor | | BRC-102, "Description" | G |
| ABS warning lamp | | BRC-123, "Description" | |
| Brake warning lamp | | BRC-124, "Description" | н |
| SLIP indicator lamp | | BRC-125, "Description" | |
| Front pressure sensor | | BRC-114, "Description" | |
| Brake fluid level switch | | BRC-116, "Description" | |
| Stop lamp switch | | BRC-105, "Description" | |

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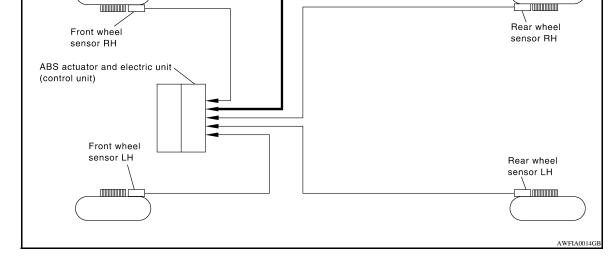
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ABS

System Diagram

ABS



System Description

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

Component Parts Location

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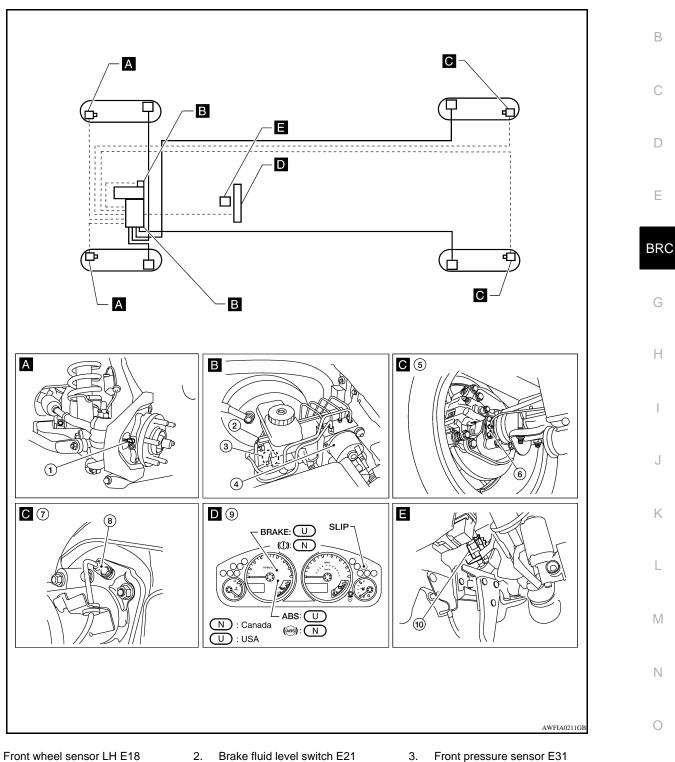
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[TYPE 2]



- 1. Front wheel sensor RH E117
- 4. ABS actuator and electric unit (con-5. trol unit) E125
- 7. M226 rear axle
- 10. Stop lamp switch (with M/T) E38 Stop lamp switch (with A/T) E39
- - C200 rear axle
- 8. Rear wheel sensor LH C11 Rear wheel sensor LH C10

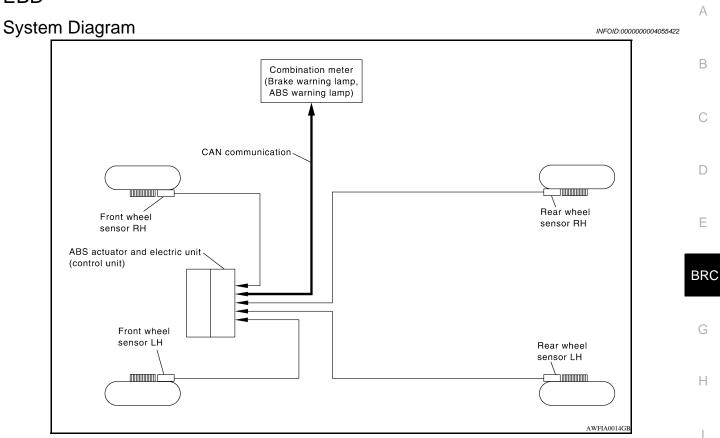
BRC-81

- Rear wheel sensor LH C11 6. Rear wheel sensor LH C10
- 9. Combination meter M24

< FUNCTION DIAGNOSIS > Component Description

| Compo | nent parts | Reference |
|---|---|------------------------|
| | Pump | BRC-100, "Description" |
| | Motor | BRC-100, Description |
| ABS actuator and electric unit (control unit) | Actuator relay | BRC-112, "Description" |
| | Solenoid valve | BRC-107, "Description" |
| | Switch-over valve (CV1, CV2, SV1, SV2) | BRC-118, "Description" |
| Wheel sensor | | BRC-102, "Description" |
| ABS warning lamp | | BRC-123, "Description" |
| Brake warning lamp | | BRC-124, "Description" |
| SLIP indicator lamp | | BRC-125, "Description" |
| Front pressure sensor | | BRC-114, "Description" |
| Brake fluid level switch | | BRC-116, "Description" |
| Stop lamp switch | | BRC-105, "Description" |

EBD



EBD

System Description

- INFOID:000000004055423
- Electric Brake force Distribution is a following function. ABS actuator and electric unit (control unit) detects subtle slippages between the front and rear wheels during braking. Then it electronically controls the rear braking force (brake fluid pressure) to reduce rear wheel slippage. Accordingly, it improves vehicle stability.
 Electrical system diagnosis by CONSULT III is available.
- Electrical system diagnosis by CONSULT-III is available.

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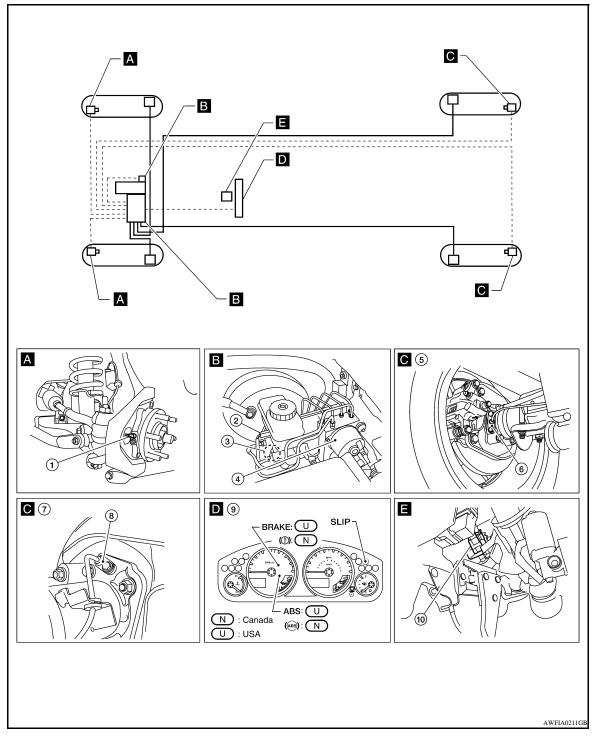
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Component Parts Location



- 1. Front wheel sensor LH E18 Front wheel sensor RH E117
- 4. ABS actuator and electric unit (con- 5. trol unit) E125
- 7. M226 rear axle
- 10. Stop lamp switch (with M/T) E38 Stop lamp switch (with A/T) E39
- 2. Brake fluid level switch E21
 - C200 rear axle
- 8. Rear wheel sensor LH C11 Rear wheel sensor LH C10
- 3. Front pressure sensor E31
- 6. Rear wheel sensor LH C11 Rear wheel sensor LH C10
- 9. Combination meter M24

Component Description

INFOID:000000004448880

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[TYPE 2]

| Component parts | | Reference | | |
|---|---|------------------------|------|--|
| | Pump | DDC 100 "Decerimtics" | В | |
| ABS actuator and electric unit (control unit) | Motor | BRC-100, "Description" | | |
| | Actuator relay | BRC-112, "Description" | | |
| | Solenoid valve | BRC-107, "Description" | - C | |
| | Switch-over valve (CV1, CV2, SV1, SV2) | BRC-118, "Description" | | |
| Wheel sensor | | BRC-102, "Description" | | |
| ABS warning lamp | | BRC-123, "Description" | _ | |
| Brake warning lamp | | BRC-124, "Description" | E | |
| SLIP indicator lamp | | BRC-125, "Description" | _ | |
| Front pressure sensor | | BRC-114, "Description" | | |
| Brake fluid level switch | | BRC-116, "Description" | – Br | |
| Stop lamp switch | | BRC-105, "Description" | | |

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

< FUNCTION DIAGNOSIS >

[TYPE 2]

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

CONSULT-III Function (ABS)

INFOID:000000004055426

FUNCTION

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

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

SELF-DIAGNOSTIC RESULT MODE

Operation Procedure

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

How to Erase Self-diagnosis Results

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

CAUTION:

If memory cannot be erased, perform applicable diagnosis. NOTE:

- When the wheel sensor malfunctions, after inspecting the wheel sensor system, the ABS warning lamp, SLIP indicator lamp and brake warning lamp will not turn OFF even when the system is normal unless the vehicle is driving at approximately 30 km/h (19 MPH) or more for approximately 1 minute.
- Brake warning lamp will turn ON in case of parking brake operation (when switch is ON) or of brake fluid level switch operation (when brake fluid is insufficient).

Display Item List Refer to <u>BRC-137, "DTC No. Index"</u>.

DATA MONITOR MODE

Display Item List

| ltem | Data | n monitor item sele | | |
|-----------------------------|----------------------|---------------------|------------------------|--|
| (Unit) | ECU INPUT SIGNALS | MAIN SIGNALS | SELECTION FROM MENU | Remarks |
| GEAR (1, 2, 3, 4, 5) | × | × | × | Gear position determined by TCM is displayed. |
| FR RH SENSOR (km/h, MPH) | × | × | × | Wheel speed calculated by front RH wheel sensor signal is displayed. |
| FR LH SENSOR (km/h, MPH) | × | × | × | Wheel speed calculated by front LH wheel sensor signal is displayed. |
| RR RH SENSOR (km/h, MPH) | × | × | × | Wheel speed calculated by rear RH wheel sensor signal is displayed. |
| RR LH SENSOR (km/h, MPH) | × | × | × | Wheel speed calculated by rear LH wheel sensor signal is displayed. |

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

< FUNCTION DIAGNOSIS >

[TYPE 2]

| | Data | a monitor item sele | ection | |
|---------------------------|----------------------|---------------------|------------------------|---|
| Item (Unit) | ECU INPUT SIGNALS | MAIN SIGNALS | SELECTION FROM MENU | Remarks |
| BATTERY VOLT (V) | × | × | × | Voltage supplied to ABS actuator and electric unit (control unit) is dis- played. |
| N POSI SIG (ON/OFF) | - | _ | × | Shift position judged by PNP switch signal. |
| P POSI SIG (ON/OFF) | _ | _ | × | Shift position judged by PNP switch signal. |
| ACCEL POS SIG (%) | × | _ | × | Throttle valve open/close status judged by CAN communication signal is displayed. |
| ENGINE SPEED (rpm) | × | × | × | Engine speed judged by CAN com- munication signal is displayed. |
| STOP LAMP SW (ON/OFF) | × | × | × | Stop lamp switch (ON/OFF) status is displayed. |
| ABS WARN LAMP (ON/OFF) | - | × | × | ABS warning lamp (ON/OFF) status is displayed. |
| SLIP LAMP (ON/OFF) | - | × | × | SLIP indicator lamp (ON/OFF) sta- tus is displayed. |
| FR LH IN SOL (ON/OFF) | - | × | × | Front LH IN ABS solenoid (ON/ OFF) status is displayed. |
| FR LH OUT SOL (ON/OFF) | - | × | × | Front LH OUT ABS solenoid (ON/ OFF) status is displayed. |
| RR RH IN SOL (ON/OFF) | - | × | × | Rear RH IN ABS solenoid (ON/ OFF) status is displayed. |
| RR RH OUT SOL (ON/OFF) | - | × | × | Rear RH OUT ABS solenoid (ON/ OFF) status is displayed. |
| FR RH IN SOL (ON/OFF) | - | × | × | Front RH IN ABS solenoid (ON/ OFF) status is displayed. |
| FR RH OUT SOL (ON/OFF) | - | × | × | Front RH OUT ABS solenoid (ON/ OFF) status is displayed. |
| RR LH IN SOL (ON/OFF) | - | × | × | Rear LH IN ABS solenoid (ON/OFF) status is displayed. |
| RR LH OUT SOL (ON/OFF) | - | × | × | Rear LH OUT ABS solenoid (ON/ OFF) status is displayed. |
| MOTOR RELAY (ON/OFF) | - | × | × | ABS motor relay signal (ON/OFF) status is displayed. |
| ACTUATOR RLY (ON/OFF) | - | × | × | ABS actuator relay signal (ON/OFF) status is displayed. |
| CV1 (ON/OFF) | - | _ | × | Front side switch-over solenoid valve (cut valve) (ON/OFF) status is displayed. |
| CV2 (ON/OFF) | - | _ | × | Rear side switch-over solenoid valve (cut-valve) (ON/OFF) status is displayed. |
| SV1 (ON/OFF) | - | _ | × | Front side switch-over solenoid valve (suction valve) (ON/OFF) status is displayed. |
| SV2 (ON/OFF) | - | _ | × | Rear side switch-over solenoid valve (suction valve) (ON/OFF) status is displayed. |
| TCS FAIL SIG (ON/OFF) | - | _ | × | TCS fail signal (ON/OFF) status is displayed. |

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

< FUNCTION DIAGNOSIS >

[TYPE 2]

| ltere | Data | a monitor item sele | ction | |
|-------------------------------|----------------------|---------------------|------------------------|---|
| Item (Unit) | ECU INPUT SIGNALS | MAIN SIGNALS | SELECTION FROM MENU | Remarks |
| ABS FAIL SIG (ON/OFF) | _ | _ | × | ABS fail signal (ON/OFF) status is displayed. |
| EBD FAIL SIG (ON/OFF) | _ | _ | × | EBD fail signal (ON/OFF) status is displayed. |
| FLUID LEV SW (ON/OFF) | × | _ | × | Brake fluid level switch (ON/OFF) status is displayed. |
| EBD SIGNAL (ON/OFF) | _ | _ | × | EBD operation (ON/OFF) status is displayed. |
| ABS SIGNAL (ON/OFF) | _ | _ | × | ABS operation (ON/OFF) status is displayed. |
| TCS SIGNAL (ON/OFF) | - | - | × | TCS operation (ON/OFF) status is displayed. |
| EBD WARN LAMP (ON/OFF) | - | - | × | Brake warning lamp (ON/OFF) sta- tus is displayed. |
| SLCT LVR POSI (P, R, N, D) | × | × | × | Shift position judged by PNP switch signal. |
| R POSI SIG (ON/OFF) | _ | - | × | Shift position judged by PNP switch signal. |
| 2WD/4WD (2WD/4WD) | _ | - | × | It recognizes on software whether it is 2WD and whether it is in 4WD state. |
| CRANKING SIG (ON/OFF) | _ | _ | × | The input state of the key SW START position signal is displayed. |
| DECEL G-SEN (G) | × | × | × | Longitudinal acceleration detected by decel G-sensor is displayed. |
| PRESS SENSOR (bar) | × | _ | × | Brake pressure detected by pres- sure sensor is displayed. |

×: Applicable

-: Not applicable

ACTIVE TEST MODE

CAUTION:

- Do not perform active test while driving vehicle.
- Make sure to completely bleed air from brake system.
- The active test cannot be performed with the ABS warning lamp, SLIP indicator lamp or brake warning lamp on.
- ABS warning lamp, SLIP indicator lamp and brake warning lamp are on during active test. NOTE:
- When active test is performed while depressing the pedal, the pedal depression amount will change. This is normal. (Only solenoid valve and ABS motor.)
- "TEST IS STOPPED" is displayed 10 seconds after operation start.
- After "TEST IS STOPPED" is displayed, to perform test again, touch BACK.

Test Item

SOLENOID VALVE

- When performing an active test of the ABS function, select the "MAIN SIGNALS" for each test item. In addition, when performing an active test of the VDC/TCS function, select the item menu for each test item.
- For ABS solenoid valve, touch "Up", "Keep", and "Down" on the display screen. For ABS solenoid valve (ACT), touch "Up", "ACT UP", "ACT KEEP" and confirm that solenoid valves operate as shown in the table below.

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

< FUNCTION DIAGNOSIS >

[TYPE 2]

| Operation | | AE | S solenoid v | alve | ABS | solenoid valv | e (ACT) |
|--------------------------|----------------------|---------------|--------------|------|-----|---------------|----------|
| Operation | | Up | Keep | Down | Up | ACT UP | ACT KEEP |
| FR RH SOL | FR RH IN SOL | Off | On | On | _ | — | _ |
| FR RH SOL | FR RH OUT SOL | Off | Off | On* | — | — | _ |
| FR LH SOL | FR LH IN SOL | Off | On | On | _ | — | _ |
| FR LH SOL | FR LH OUT SOL | Off | Off | On* | _ | — | _ |
| | RR RH IN SOL | Off | On | On | _ | — | _ |
| RR RH SOL | RR RH OUT SOL | Off | Off | On* | _ | — | _ |
| | RR LH IN SOL | Off | On | On | | — | _ |
| RR LH SOL | RR LH OUT SOL | Off | Off | On* | _ | — | _ |
| FR RH ABS SOLENOID (ACT) | FR RH IN SOL | — | — | — | Off | Off | Off |
| | FR RH OUT SOL | — | _ | — | Off | Off | Off |
| | CV1 | _ | | _ | Off | On | On |
| | SV1 | — | _ | — | Off | On* | Off |
| | FR LH IN SOL | — | _ | — | Off | Off | Off |
| | FR LH OUT SOL | _ | | — | Off | Off | Off |
| FR LH ABS SOLENOID (ACT) | CV1 | _ | | _ | Off | On | On |
| | SV1 | _ | | — | Off | On* | Off |
| | RR RH IN SOL | — | — | — | Off | Off | Off |
| | RR RH OUT SOL | _ | | _ | Off | Off | Off |
| RR RH ABS SOLENOID (ACT) | CV2 | — | _ | — | Off | On | On |
| | SV2 | — | — | _ | Off | On* | Off |
| | RR LH IN SOL | — | — | _ | Off | Off | Off |
| | RR LH OUT SOL | _ | | _ | Off | Off | Off |
| RR LH ABS SOLENOID (ACT) | CV2 | | | _ | Off | On | On |
| | SV2 | | _ | _ | Off | On* | Off |
| REAR SOL | This item is not use | d for this mo | del. | 1 1 | | l. | 1 |

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

ABS MOTOR

• Touch "On" and "Off" on screen. Make sure motor relay and actuator relay operates as shown in table below.

| | | | M |
|--------------|----|-----|---|
| Operation | On | Off | |
| MOTOR RELAY | On | Off | |
| ACTUATOR RLY | On | On | Ν |

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COMPONENT DIAGNOSIS APPLICATION NOTICE

Application Notice

| Service information | Remarks |
|---------------------|--|
| TYPE 1 | ABS |
| TYPE 2 | ABLS/ABS |
| TYPE 3 | HILL DESCENT CONTROL/HILL START ASSIST/VDC/TCS/ABS |

C1101, C1102, C1103, C1104 WHEEL SENSOR-1

< COMPONENT DIAGNOSIS >

C1101, C1102, C1103, C1104 WHEEL SENSOR-1

Description

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

DTC Logic

INFOID:000000004055429

INFOID:000000004055428

DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause | D |
|-------|----------------|---|----------------|-----|
| C1101 | RR RH SENSOR-1 | Circuit of rear RH wheel sensor is open. Or when the sensor power voltage is outside the standard. | - | |
| C1102 | RR LH SENSOR-1 | Circuit of rear LH wheel sensor is open. Or when the sensor power voltage is outside the standard. | | E |
| C1103 | FR RH SENSOR-1 | Circuit of front RH wheel sensor is open. Or when the sensor power voltage is outside the standard. | | BRC |
| C1104 | FR LH SENSOR-1 | Circuit of front LH wheel sensor is open. Or when the sensor power voltage is outside the standard. | | |

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-91, "Diagnosis Procedure"</u>.

NO >> Inspection End

Diagnosis Procedure

CAUTION:

Do not check between wheel sensor terminals.

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

Disconnect the ABS actuator and electric unit (control unit) connector and wheel sensor of malfunctioning N code.

Check the terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

2.CHECK WHEEL SENSOR OUTPUT SIGNAL

1. Connect ABS active wheel sensor tester (J-45741) to wheel sensor using appropriate adapter.

2. Turn on the ABS active wheel sensor tester power switch.

NOTE: The green POWER indicator should illuminate. If the POWER indicator does not illuminate, replace the battery in the ABS active wheel sensor tester before proceeding.

3. Spin the wheel of the vehicle by hand and observe the red SENSOR indicator on the ABS active wheel sensor tester. The red SENSOR indicator should flash on and off to indicate an output signal.

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INFOID:000000004055430

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C1101, C1102, C1103, C1104 WHEEL SENSOR-1

< COMPONENT DIAGNOSIS >

NOTE:

If the red SENSOR indicator illuminates but does not flash, reverse the polarity of the tester leads and retest.

Does the ABS active wheel sensor tester detect a signal?

YES >> GO TO 3

NO >> Replace the wheel sensor. Refer to <u>BRC-150, "Removal and Installation"</u>.

3.CHECK TIRES

Check for inflation pressure, wear and size of each tire.

Are tire pressure and size correct and is tire wear within specifications?

YES >> GO TO 4

NO >> Adjust tire pressure or replace tire(s).

4.CHECK WHEEL BEARINGS

Check wheel bearing axial end play. Refer to <u>FAX-5, "On-Vehicle Inspection and Service"</u> (front), <u>RAX-7,</u> "Rear Axle Bearing" (C200 rear axle), or <u>RAX-19, "Rear Axle Bearing"</u> (M226 rear axle).

Is the inspection result normal?

YES >> GO TO 5

NO >> Repair or replace as necessary. Refer to <u>FAX-8, "Removal and Installation"</u> (front), <u>RAX-13,</u> <u>"Removal and Installation"</u> (C200 rear axle), or <u>RAX-24, "Removal and Installation"</u> (M226 rear axle).

5.CHECK WIRING HARNESS FOR SHORT CIRCUIT

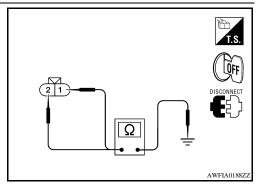
- 1. Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No.
- Check continuity between wheel sensor harness connector terminals and ground.

Continuity should not exist.

Is the inspection result normal?

YES >> GO TO 6

NO >> Repair the circuit.



6. CHECK WIRING HARNESS FOR OPEN CIRCUIT

1. Check continuity between ABS actuator and electric unit (control unit) harness connector and the malfunctioning wheel sensor harness connector.

| Wheel sensor | ABS actuator and electric unit (control unit) | | Wheel sensor | | Continuity |
|--------------|---|----------|--------------|----------|------------|
| | Connector | Terminal | Connector | Terminal | |
| Front LH | | 45 | E18 | 1 | |
| | E125 | 46 | | 2 | Yes |
| Front RH | | 34 | E117 | 1 | |
| | | 33 | | 2 | |
| Rear LH | | 36 | C11 | 1 | |
| | | 37 | | 2 | |
| Rear RH | | 43 | C10 | 1 | |
| | | 42 | | 2 | |

Is the inspection result normal?

NO >> Repair the circuit.

BRC-92

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-152, "Removal and Installation"</u>.

C1101, C1102, C1103, C1104 WHEEL SENSOR-1

< COMPONENT DIAGNOSIS >

Component Inspection

[TYPE 2]

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INFOID:000000004055431

1.CHECK DATA MONITOR

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

| Wheel sensor | Vehicle speed (DATA MONITOR) | |
|--|--|--|
| FR LH SENSOR | Nearly matches the speedometer dis- | |
| FR RH SENSOR | | |
| RR LH SENSOR | play (±10% or less) | |
| RR RH SENSOR | | |
| Is the inspection result normal? | | |
| YES >> Inspection End NO >> Go to diagnosis proce | edure. Refer to <u>BRC-91, "Diagnosi</u> | |
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C1105, C1106, C1107, C1108 WHEEL SENSOR-2

< COMPONENT DIAGNOSIS >

C1105, C1106, C1107, C1108 WHEEL SENSOR-2

Description

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

DTC Logic

INFOID:000000004055433

INFOID:000000004055432

DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|-------|----------------|---|---|
| C1105 | RR RH SENSOR-2 | When the circuit in the rear RH wheel sensor is short-cir- cuited. Or when the distance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit. | |
| C1106 | RR LH SENSOR-2 | When the circuit in the rear LH wheel sensor is short-cir- cuited. Or when the distance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit. | Harness or connectorWheel sensor |
| C1107 | FR RH SENSOR-2 | When the circuit in the front RH wheel sensor is short-cir- cuited. Or when the distance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit. | ABS actuator and electric unit (control unit) |
| C1108 | FR LH SENSOR-2 | When the circuit in the front LH wheel sensor is short-cir- cuited. Or when the distance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit. | |

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-94, "Diagnosis Procedure"</u>.

NO >> Inspection End

Diagnosis Procedure

CAUTION:

Do not check between wheel sensor terminals.

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

Disconnect the ABS actuator and electric unit (control unit) connector and wheel sensor of malfunctioning code.

Check the terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

BRC-94

C1105, C1106, C1107, C1108 WHEEL SENSOR-2

< COMPONENT DIAGNOSIS >

[TYPE 2]

| 2.CHECK WHEEL SENSOR OUTPUT SIGNAL | Λ |
|---|-----|
| Connect ABS active wheel sensor tester (J-45741) to wheel sensor using appropriate adapter. Turn on the ABS active wheel sensor tester power switch. NOTE: | ~ |
| The green POWER indicator should illuminate. If the POWER indicator does not illuminate, replace the battery in the ABS active wheel sensor tester before proceeding. | В |
| Spin the wheel of the vehicle by hand and observe the red SENSOR indicator on the ABS active wheel sensor tester. The red SENSOR indicator should flash on and off to indicate an output signal. NOTE: If the red SENSOR indicator illuminates but does not flash, reverse the polarity of the tester leads and | С |
| retest. | D |
| Does the ABS active wheel sensor tester detect a signal? YES >> GO TO 3 | |
| NO >> Replace the wheel sensor. Refer to <u>BRC-150, "Removal and Installation"</u> . | Е |
| 3.CHECK TIRES | |
| Check for inflation pressure, wear and size of each tire. | |
| Are tire pressure and size correct and is tire wear within specifications? | BRC |
| YES >> GO TO 4 NO >> Adjust tire pressure or replace tire(s). | |
| 4. CHECK WHEEL BEARINGS | G |
| Check wheel bearing axial end play. Refer to <u>FAX-5. "On-Vehicle Inspection and Service"</u> (front), <u>RAX-7.</u> "Rear Axle Bearing" (C200 rear axle), or <u>RAX-19. "Rear Axle Bearing"</u> (M226 rear axle). | Н |
| Is the inspection result normal? | |
| YES >> GO TO 5 NO >> Repair or replace as necessary. Refer to <u>FAX-8</u>, "<u>Removal and Installation</u>" (front), <u>RAX-13</u>, <u>"Removal and Installation"</u> (C200 rear axle), or <u>RAX-24</u>, "<u>Removal and Installation</u>" (M226 rear axle). | |
| 5. CHECK WIRING HARNESS FOR SHORT CIRCUIT | J |
| 1. Disconnect ABS actuator and electric unit (control unit) connec- | |
| tor and wheel sensor connector of malfunction code No. 2. Check continuity between wheel sensor harness connector ter- minals and ground. | Κ |
| Continuity should not exist. | 1 |
| Is the inspection result normal? | |
| YES >> GO TO 6 NO >> Repair the circuit. | M |
| 6.CHECK WIRING HARNESS FOR OPEN CIRCUIT | |
| 1. Check continuity between ABS actuator and electric unit (control unit) harness connector and the mal- | Ν |
| functioning wheel sensor harness connector. | |
| | 0 |
| | |

C1105, C1106, C1107, C1108 WHEEL SENSOR-2

< COMPONENT DIAGNOSIS >

| Wheel sensor | ABS actuator and electric unit (control unit) | | Wheel sensor | | Continuity |
|--------------|--|----------|--------------|----------|------------|
| | Connector | Terminal | Connector | Terminal | |
| Front LH | | 45 | E18 | 1 | |
| | - E125 | 46 | | 2 | Yes |
| Front RH | | 34 | E117 | 1 | |
| | | 33 | | 2 | |
| Rear LH | | 36 | C11 | 1 | |
| | | 37 | | 2 | |
| Rear RH | | 43 | C10 | 1 | |
| | | 42 | | 2 | |

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-152, "Removal and Instal-</u><u>lation"</u>.

NO >> Repair the circuit.

Component Inspection

INFOID:000000004055435

1. CHECK DATA MONITOR

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

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

Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-94. "Diagnosis Procedure"</u>.

А Description INFOID:000000004055436 Supplies electric power to the ABS actuator and electric unit (control unit). В DTC Logic INFOID:000000004055437 DTC DETECTION LOGIC DTC Malfunction detected condition Possible cause Display item D Harness or connector BATTERY VOLTAGE When the ABS actuator and electric unit (control unit) C1109 ABS actuator and electric unit [ABNORMAL] power supply voltage is lower than normal. (control unit) Е DTC CONFIRMATION PROCEDURE 1.CHECK SELF-DIAGNOSIS RESULTS Check the self-diagnosis results. BRC Self-diagnosis results BATTERY VOLTAGE [ABNORMAL] Is above displayed on the self-diagnosis display? YES >> Proceed to diagnosis procedure. Refer to <u>BRC-97, "Diagnosis Procedure"</u>. Н >> Inspection End NO **Diagnosis** Procedure INFOID:000000004055438 INSPECTION PROCEDURE 1.CHECK CONNECTOR 1. Turn ignition switch OFF. Disconnect ABS actuator and electric unit (control unit) connector. 2. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or 3. Κ replace terminal. 4. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-86, "CONSULT-III Function (ABS)". Is any item indicated on the self-diagnosis display? L YES >> GO TO 2 NO >> Poor connection of connector terminal. Repair or replace connector. M 2.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY CIRCUIT AND **GROUND CIRCUIT** 1. Turn ignition switch OFF. Ν Disconnect ABS actuator and electric unit (control unit) connector. 2. Turn ignition switch ON or OFF and check voltage between ABS 3. actuator and electric unit (control unit) harness connector terminal and ground. ABS actuator and elec-Ρ tric unit (control unit) Ĩ Condition Voltage Connector Terminal Ignition switch: ON Battery voltage E125 4 Ground Ignition switch: OFF Approx. 0V

C1109 POWER AND GROUND SYSTEM

[TYPE 2]

AWFIA0015Z

4. Turn ignition switch OFF.

< COMPONENT DIAGNOSIS >

C1109 POWER AND GROUND SYSTEM

C1109 POWER AND GROUND SYSTEM

Continuity

Yes

< COMPONENT DIAGNOSIS >

ABS actuator and electric unit (control unit)

Connector E125 Terminal

16, 47

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

Ground

| 16, 47 16, 47 Ω | |
|-----------------------|-------------|
| | AWFIA0016ZZ |

[TYPE 2]

Is the inspection result normal?

- YES >> Check battery for terminal looseness, low voltage, etc. If any malfunction is found, repair malfunctioning parts.
- NO >> Repair or replace malfunctioning components.

C1110, C1113, C1160, C1170 ABS ACTUATOR AND ELECTRIC UNIT (CON-TROL UNIT)

< COMPONENT DIAGNOSIS >

C1110, C1113, C1160, C1170 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

DTC Logic

INFOID:000000004055439

[TYPE 2]

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DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause | С |
|-------|--------------------|--|---|---|
| C1110 | CONTROLLER FAILURE | When there is an internal malfunction in the ABS actuator and electric unit (control unit). | | |
| C1113 | G-SENSOR | Longitudinal G-sensor is malfunctioning, or signal line of longitudinal G-sensor is open or shorted. | ABS actuator and electric unit (control unit) | |
| C1160 | DECEL G SEN SET | ABS decel sensor adjustment is incomplete. | | |
| C1170 | VARIANT CODING | In a case where VARIANT CODING is different. | | |

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

| | | G |
|---|------------------------|---|
| Self-diagnosis results | | |
| CONTROLLER FAILURE | | |
| G-SENSOR | | Н |
| DECEL G SEN SET | | |
| VARIANT CODING | | 1 |
| Is above displayed on the self-diagnosis display? | | 1 |
| YES >> Proceed to diagnosis procedure. Refer to <u>BRC-99, "Diagnosis Procedure"</u>. NO >> Inspection End | | J |
| Diagnosis Procedure | INFOID:000000004055440 | |
| INSPECTION PROCEDURE | | Κ |
| 1. REPLACE ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) | | |

>> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-152</u>, "<u>Removal and Installa-</u> <u>tion</u>".

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C1111 ABS MOTOR, MOTOR RELAY SYSTEM

< COMPONENT DIAGNOSIS >

C1111 ABS MOTOR, MOTOR RELAY SYSTEM

Description

INFOID:000000004055441

[TYPE 2]

PUMP

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

MOTOR

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

DTC Logic

INFOID:000000004055442

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results

PUMP MOTOR

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-100, "Diagnosis Procedure"</u>.

NO >> Inspection End

Diagnosis Procedure

INFOID:000000004055443

INSPECTION PROCEDURE

1.CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check terminal for deformation, disconnect, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-86, "CONSULT-III Function</u> (<u>ABS)"</u>.

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

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

2.CHECK ABS MOTOR AND MOTOR RELAY POWER SUPPLY CIRCUIT

C1111 ABS MOTOR, MOTOR RELAY SYSTEM

< COMPONENT DIAGNOSIS >

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

| ABS actuator and ele | ectric unit (control unit) | | Voltage | |
|----------------------|----------------------------|--------|-----------------|--|
| Connector | Terminal | | Voltage | |
| E125 | 1 | Ground | Battery voltage | |

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

 $\mathbf{3.}$ CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) GROUND CIRCUIT

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

| ABS actuator and electric unit (control unit) | | | Continuity |
|---|----------|--------|------------|
| Connector | Terminal | | Continuity |
| E125 | 16, 47 | Ground | Yes |

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-152</u>, "Removal and Installation".
- NO >> Repair or replace malfunctioning components.

Component Inspection

1.CHECK ACTIVE TEST

- 1. On "ACTIVE TEST", select "ABS MOTOR".
- 2. Touch On and Off on screen. Make sure motor relay and actuator relay operates as shown in table below.

| Operation | On | Off | Κ |
|--------------|----|-----|---|
| MOTOR RELAY | On | Off | |
| ACTUATOR RLY | On | On | 1 |

Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-100, "Diagnosis Procedure"</u>.



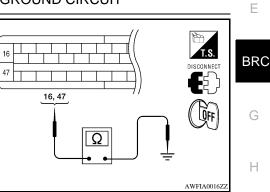


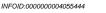
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C1115 WHEEL SENSOR

Description

INFOID:000000004055445

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

DTC Logic

INFOID:000000004055446

DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|-------|---------------------------------|---|---|
| C1115 | ABS SENSOR [ABNORMAL SIGNAL] | When wheel sensor input signal is malfunctioning. | Harness or connector Wheel sensor ABS actuator and electric unit (control unit) |

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results

ABS SENSOR [ABNORMAL SIGNAL]

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-102, "Diagnosis Procedure"</u>.

NO >> Inspection End

Diagnosis Procedure

CAUTION:

Do not check between wheel sensor terminals.

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

Disconnect the ABS actuator and electric unit (control unit) connector and wheel sensor of malfunctioning code.

Check the terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

2.CHECK WHEEL SENSOR OUTPUT SIGNAL

1. Connect ABS active wheel sensor tester (J-45741) to wheel sensor using appropriate adapter.

2. Turn on the ABS active wheel sensor tester power switch.

NOTE:

The green POWER indicator should illuminate. If the POWER indicator does not illuminate, replace the battery in the ABS active wheel sensor tester before proceeding.

3. Spin the wheel of the vehicle by hand and observe the red SENSOR indicator on the ABS active wheel sensor tester. The red SENSOR indicator should flash on and off to indicate an output signal. **NOTE:**

If the red SENSOR indicator illuminates but does not flash, reverse the polarity of the tester leads and retest.

Does the ABS active wheel sensor tester detect a signal?

YES >> GO TO 3

NO >> Replace the wheel sensor. Refer to <u>BRC-150</u>, "Removal and Installation".

3.CHECK TIRES

BRC-102

C1115 WHEEL SENSOR

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INFOID:000000004055448

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| < COMPONENT DIAGNOSIS > | [TYPE 2] |
|---|----------|
| Check for inflation pressure, wear and size of each tire. | |
| Are tire pressure and size correct and is tire wear within specifications | <u>?</u> |
| YES >> GO TO 4 | |
| NO >> Adjust tire pressure or replace tire(s). | |
| 4.CHECK WHEEL BEARINGS | |
| Check wheel bearing axial end play. Refer to <u>FAX-5, "On-Vehicle I</u> "Rear Axle Bearing" (C200 rear axle), or <u>RAX-19, "Rear Axle Bearing"</u> | |
| Is the inspection result normal? | |
| YES >> GO TO 5 | |
| NO >> Repair or replace as necessary. Refer to <u>FAX-8</u> , "Rem <u>"Removal and Installation"</u> (C200 rear axle), or <u>RAX-24</u> , axle). | |
| 5. CHECK WIRING HARNESS FOR SHORT CIRCUIT | |
| 1. Disconnect ABS actuator and electric unit (control unit) connec- | |
| tor and wheel sensor connector of malfunction code No. 2. Check continuity between wheel sensor harness connector ter- | |
| Check continuity between wheel sensor harness connector ter- minals and ground. | |
| | |
| Continuity should not exist. | |
| Is the inspection result normal? | |

YES >> GO TO 6

NO >> Repair the circuit.

6.CHECK WIRING HARNESS FOR OPEN CIRCUIT

1. Check continuity between ABS actuator and electric unit (control unit) harness connector and the malfunctioning wheel sensor harness connector.

| Wheel sensor | ABS actuat electric unit (co | | Wheel se | nsor | Continuity | | |
|--------------|---------------------------------|----------|-------------|----------|------------|-----|--|
| | Connector | Terminal | Connector | Terminal | | | |
| Frentlill | | 45 | F 40 | 1 | | — ł | |
| Front LH | | 46 | E18 | 2 | | | |
| Front RH | + | 34 | E117 | 1 | | l | |
| | E125 | 33 | E117 | E117 | 2 | Yes | |
| Rear LH | E 125 | 36 | C11 | 1 | res | _ | |
| | | 37 | CII | 2 | | Ν | |
| Rear RH | † | 43 | C10 | 1 | | | |
| | | 42 | 010 | 2 | | ľ | |

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-152, "Removal and Instal-</u> lation".

NO >> Repair the circuit.

Component Inspection

1. CHECK DATA MONITOR

On "DATA MONITOR", select "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR", and "RR RH SEN-SOR", and check the vehicle speed.

| Wheel sensor | Vehicle speed (DATA MONITOR) |
|--------------|------------------------------|
|--------------|------------------------------|

BRC-103

C1115 WHEEL SENSOR

< COMPONENT DIAGNOSIS >

| FR | LH | SENSOR |
|----|----|--------|
| | | |

FR RH SENSOR

Nearly matches the speedometer display ($\pm 10\%$ or less)

RR LH SENSOR RR RH SENSOR

Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-102</u>, "<u>Diagnosis Procedure</u>".

C1116 STOP LAMP SWITCH

< COMPONENT DIAGNOSIS >

C1116 STOP LAMP SWITCH

Description

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

DTC Logic

INFOID:000000004055450

DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | on Possible cause |
|----------------|--|---|---|
| C1116 | STOP LAMP SW | When stop lamp switch circuit is open. | Harness or connector Stop lamp switch ABS actuator and electric unit (control unit) |
| отс сс | NFIRMATION PROC | EDURE | |
| 1. снес | CK SELF-DIAGNOSIS R | ESULTS | |
| Check th | e self-diagnosis results. | | |
| | | | |
| | Self-diagnosi | | |
| | STOP LAN | - | |
| | displayed on the self-dia | | |
| YES NO | >> Inspection End | s procedure. Refer to <u>BRC-105, "Diac</u> | UNDER FILLEURE |
| Diagno | sis Procedure | | INFOID:000000004055451 |
| Jiagiie | | | |
| | TION PROCEDURE | | |
| 1. CONI | NECTOR INSPECTION | | |
| | | | ector and stop lamp switch connector. |
| | ck the terminals for defo | rmation, disconnection, looseness or | damage. |
| YES | >> GO TO 2 | | |
| NO | >> Repair or replace as | necessary. | |
| 2.stop | P LAMP SWITCH INSPE | CTION | |
| | nect the stop lamp switc | | |
| | | the ABS actuator and electric unit 5 terminal 41 and body ground. | T.S. |
| (0011 | | i commar i r ana body ground. | |
| E | rake pedal depressed | : Battery voltage | |
| | arake pedal not depres | (approx. 12V) | |
| | | | |
| YES | spection result normal? | osis again. If the same results | |
| . 20 | appear, replace ABS | S actuator and electric unit (control | |
| NO | unit). Refer to <u>BRC-1</u> >> GO TO 3 | 152, "Removal and Installation". | |
| ~ | > GO TO 3 P LAMP SWITCH CIRCL | | |
| 2.010 | | | |

INFOID:000000004055449

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C1116 STOP LAMP SWITCH

< COMPONENT DIAGNOSIS >

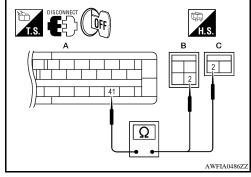
[TYPE 2]

- 1. Disconnect the stop lamp switch connector.
- Check the continuity between the ABS actuator and electric unit (control unit) connector E125 (A) terminal 41 and stop lamp switch connector E39 (B) terminal 2 (with A/T) or E38 (C) terminal 2 (with M/T).

Continuity should exist.

Is the inspection result normal?

- YES >> Refer to <u>BRC-73, "Work Flow"</u>.
- NO >> Repair or replace malfunctioning components.



< COMPONENT DIAGNOSIS >

C1120, C1122, C1124, C1126 IN ABS SOL

Description

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

DTC Logic

DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause | | |
|----------------|----------------------------|---|--------------------------------|-----|--|
| C1120 | FR LH IN ABS SOL | When the control unit detects a malfunction in the front LH inlet solenoid circuit. | | | |
| C1122 | FR RH IN ABS SOL | When the control unit detects a malfunction in the front RH inlet solenoid circuit. | ABS actuator and electric unit | E | |
| C1124 | RR LH IN ABS SOL | When the control unit detects a malfunction in the rear LH inlet solenoid circuit. | (control unit) | BRO | |
| C1126 | RR RH IN ABS SOL | When the control unit detects a malfunction in the rear RH inlet solenoid circuit. | | | |
| DTC CC | NFIRMATION PROCE | DURE | | C | |
| 1. CHEC | CK SELF-DIAGNOSIS RE | SULTS | | | |
| Check th | e self-diagnosis results. | | | F | |
| 1 | | | | | |
| | Self-diagnosis | results | | | |
| | FR LH IN ABS | SSOL | | I | |
| | FR RH IN ABS | S SOL | | | |
| | RR LH IN ABS | S SOL | | | |
| | RR RH IN AB | S SOL | | | |
| | displayed on the solf diag | anosis display? | | | |

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-107</u>, "Diagnosis Procedure". NO >> Inspection End

Diagnosis Procedure

INSPECTION PROCEDURE

1.CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or Ν replace terminal.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-86, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

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

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

BRC-107

[TYPE 2]

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C1120, C1122, C1124, C1126 IN ABS SOL

< COMPONENT DIAGNOSIS >

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

| ABS actuator and ele | ctric unit (control unit) | | Voltage | |
|----------------------|---------------------------|--------|-----------------|--|
| Connector | Terminal | | Voltage | |
| E125 | 32 | Ground | Battery voltage | |

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

${f 3.}$ CHECK SOLENOID, SWITCH-OVER VALVE AND ACTUATOR RELAY GROUND CIRCUIT

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

| ABS actuator and ele | ectric unit (control unit) | | Continuity | |
|----------------------|----------------------------|--------|------------|--|
| Connector | Terminal | | Continuity | |
| E125 | 16, 47 | Ground | Yes | |

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-152, "Removal and Installation"</u>.
- NO >> Repair or replace malfunctioning components.

Component Inspection

1.CHECK ACTIVE TEST

- 1. Select each test menu item on "ACTIVE TEST".
- 2. On the display, touch "Up", "Keep", and "Down", and check that the system operates as shown in the table below.

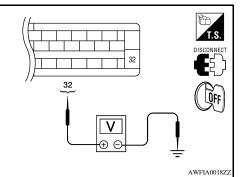
| Operation | | | ABS solenoid valve | | |
|-----------|------------------------------------|--------------------------------------|--------------------|------|--|
| | | Up | Keep | Down | |
| FR RH SOL | FR RH IN SOL | Off | On | On | |
| FR RH SOL | FR RH OUT SOL | Off | Off | On* | |
| FR LH SOL | FR LH IN SOL | Off | On | On | |
| FR LH SOL | FR LH OUT SOL | Off | Off | On* | |
| RR RH SOL | RR RH IN SOL | Off | On | On | |
| KK KH SUL | RR RH OUT SOL | Off | Off | On* | |
| | RR LH IN SOL | Off | On | On | |
| RR LH SOL | RR LH OUT SOL | Off | Off | On* | |
| REAR SOL | This item is not used for this mod | This item is not used for this model | | | |

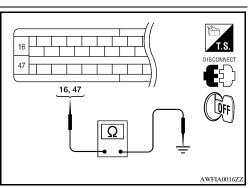
*: ON for 1 to 2 seconds after the touch, and then OFF

Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-107, "Diagnosis Procedure"</u>.





C1121, C1123, C1125, C1127 OUT ABS SOL

< COMPONENT DIAGNOSIS >

C1121, C1123, C1125, C1127 OUT ABS SOL

Description

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

DTC Logic

DTC DETECTION LOGIC

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

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

>> Proceed to diagnosis procedure. Refer to <u>BRC-109</u>, "Diagnosis Procedure". YES NO >> Inspection End

Diagnosis Procedure

INSPECTION PROCEDURE

1.CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or Ν replace terminal.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-86, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

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

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

BRC-109

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C1121, C1123, C1125, C1127 OUT ABS SOL

< COMPONENT DIAGNOSIS >

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

| ABS actuator and electric unit (control unit) | | | Voltage |
|---|-------------------|--------|-----------------|
| Connector | onnector Terminal | | voltage |
| E125 | 32 | Ground | Battery voltage |

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

${f 3.}$ CHECK SOLENOID, SWITCH-OVER VALVE AND ACTUATOR RELAY GROUND CIRCUIT

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

| ABS actuator and electric unit (control unit) | | | Continuity | |
|---|----------|--------|------------|--|
| Connector | Terminal | | Continuity | |
| E125 | 16, 47 | Ground | Yes | |

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-152, "Removal and Installation"</u>.
- NO >> Repair or replace malfunctioning components.

Component Inspection

1.CHECK ACTIVE TEST

- 1. Select each test menu item on "ACTIVE TEST".
- 2. On the display, touch "Up", "Keep", and "Down", and check that the system operates as shown in the table below.

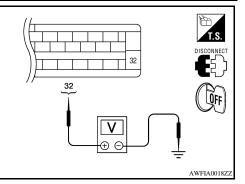
| Operation | | ABS solenoid valve | |) |
|-----------|--------------------------------------|--|------|------|
| | | Up | Keep | Down |
| | FR RH IN SOL | Off | On | On |
| FR RH SOL | FR RH OUT SOL | Off | Off | On* |
| | FR LH IN SOL | Off | On | On |
| FR LH SOL | FR LH OUT SOL | Off | Off | On* |
| | RR RH IN SOL | Off | On | On |
| RR RH SOL | RR RH OUT SOL | SOL Off DL Off SOL Off OL Off OL Off OL Off DL Off OL Off OL Off OL Off OL Off | Off | On* |
| | RR LH IN SOL | Off | On | On |
| RR LH SOL | RR LH OUT SOL | Off | Off | On* |
| REAR SOL | This item is not used for this model | This item is not used for this model | | |

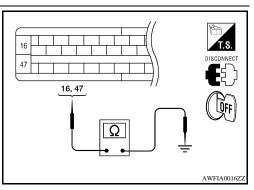
*: ON for 1 to 2 seconds after the touch, and then OFF

Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-109, "Diagnosis Procedure"</u>.





< COMPONENT DIAGNOSIS >

C1130, C1131, C1136 ENGINE SIGNAL

Description

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

DTC Logic

INFOID:000000004055461

INFOID:000000004055462

INFOID:000000004055460

DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause | D | |
|-------|-----------------|--|--|---|--|
| C1130 | ENGINE SIGNAL 1 | | Harness or connector | | |
| C1131 | ENGINE SIGNAL 2 | Based on the signal from ECM, ABS actuator and electric unit (control unit) judges that engine fuel cut system is | | ABS actuator and electric unit (control unit) | |
| C1136 | ENGINE SIGNAL 6 | malfunctioning. | ECMCAN communication line | E | |

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

| Self-diagnosis results |
|------------------------|
| ENGINE SIGNAL 1 |
| ENGINE SIGNAL 2 |
| ENGINE SIGNAL 6 |
| |

<u>Is above displayed on the self-diagnosis display?</u> YES >> Proceed to diagnosis procedure. Refer to <u>BRC-111, "Diagnosis Procedure"</u>.

NO >> Inspection End

Diagnosis Procedure

INSPECTION PROCEDURE

1.CHECK ENGINE SYSTEM

 Perform ECM self-diagnosis. Repair or replace items indicated, then perform ECM self-diagnosis again. Refer to <u>EC-523. "CONSULT-III Function (ENGINE)"</u>.

 Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-86, "CONSULT-III</u> <u>Function (ABS)"</u>.

Is any item indicated on the self-diagnosis display?

YES >> Repair or replace the affected part.

NO >> Inspection End

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C1140 ACTUATOR RLY

Description

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

DTC Logic

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INFOID:000000004055463

DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|-------|--------------|--|---|
| C1140 | ACTUATOR RLY | ABS actuator relay or circuit malfunction. | Harness or connector ABS actuator and electric unit (control unit) |

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results ACTUATOR RLY

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-112, "Diagnosis Procedure"</u>.

NO >> Inspection End

INFOID:000000004055465

INSPECTION PROCEDURE

1.CHECK CONNECTOR

Diagnosis Procedure

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-86, "CONSULT-III Function</u> (<u>ABS)"</u>.

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

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

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

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

| ABS actuator and ele | ectric unit (control unit) | | Voltage |
|----------------------|----------------------------|--------|-----------------|
| Connector Terminal | | | Voltage |
| E125 | 32 | Ground | Battery voltage |

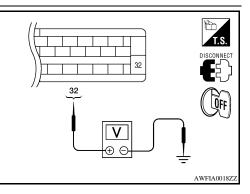
Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

 ${f 3.}$ CHECK SOLENOID, SWITCH-OVER VALVE AND ACTUATOR RELAY GROUND CIRCUIT

BRC-112



C1140 ACTUATOR RLY

< COMPONENT DIAGNOSIS >

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

| ABS actuator and electric unit (control unit) | | | Continuity |
|---|----------|--------|------------|
| Connector | Terminal | | Continuity |
| E125 | 16, 47 | Ground | Yes |

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-152</u>, "Removal and Installation".

NO >> Repair or replace malfunctioning components.

Component Inspection

1. CHECK ACTIVE TEST

1. On "ACTIVE TEST", select "ABS MOTOR".

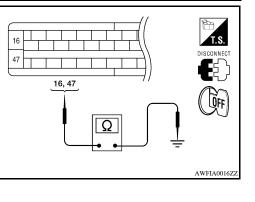
2. Touch On and Off on screen. Make sure motor relay and actuator relay operates as shown in table below.

| | | | BRC |
|--------------|----|-----|-----|
| Operation | On | Off | |
| MOTOR RELAY | On | Off | |
| ACTUATOR RLY | On | On | G |

Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-112, "Diagnosis Procedure"</u>.



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[TYPE 2]

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C1142 PRESS SENSOR

Description

The front pressure sensor converts the brake fluid pressure to an electric signal and transmits it to the ABS actuator and electric unit (control unit).

DTC Logic

INFOID:000000004055468

DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|-------|-------------------|--|--|
| C1142 | PRESS SEN CIRCUIT | Pressure sensor signal line is open or shorted, or pres- sure sensor is malfunctioning. | Harness or connector Pressure sensor ABS actuator and electric unit (control unit) |

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results

PRESS SEN CIRCUIT

Is above displayed on the self-diagnosis display?

>> Proceed to diagnosis procedure. Refer to <u>BRC-114, "Diagnosis Procedure"</u>. YES

NO >> Inspection End

Diagnosis Procedure

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

- Turn the ignition switch OFF. 1.
- 2. Disconnect the front pressure sensor connector and ABS actuator and electric unit (control unit) connector and inspect the terminals for deformation, disconnection, looseness, or damage.

Is the inspection result normal?

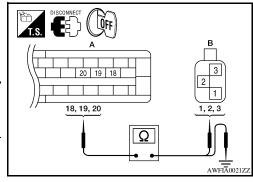
YES >> GO TO 2

NO >> Repair connector.

2.FRONT PRESSURE SENSOR CIRCUIT INSPECTION

1. Measure the continuity between the ABS actuator and electric unit (control unit) harness connector E125 (A) terminals 18, 19, 20 and front pressure sensor harness connector E31 (B) terminals 3, 1, 2.

| | ABS actuator and electric unit (control unit) | | Front pressure sensor | |
|-----------|---|-----------|-----------------------|-----|
| Connector | Terminal | Connector | Terminal | |
| | 18 | | 3 | |
| E125 (A) | 19 | E31 (B) | 1 | Yes |
| | 20 | † | 2 | |



2. Measure the continuity between the ABS actuator and electric unit (control unit) harness connector E125 (A) terminals 18, 19, 20 and body ground.

BRC-114

INFOID:000000004055467

[TYPE 2]

C1142 PRESS SENSOR

< COMPONENT DIAGNOSIS >

[TYPE 2]

| | electric unit (control nit) | | | | A |
|----------------------------------|--------------------------------|----------------|---------------------|--------------------------------------|-----|
| Connector | Terminal | — | Continuity | | |
| | 18 | | | | В |
| E125 (A) | 19 | Ground | No | | |
| E125 (A) | 20 | Giouna | INU | | |
| le the increation | - | | | | С |
| Is the inspection YES >> GO T | | | | | |
| | air or replace harnes | s or connect | or. | | D |
| <u> </u> | SSURE SENSOR IN | | | | |
| | | | Sactuator and elect | tric unit (control unit) connectors. | |
| 2. Use "DATA N | MONITOR" to check | if the status | of "PRESS SENSC | DR" is normal. | E |
| | | | | | |
| | Condition | | PRESS SENSOR | | BRC |
| | | | (DATA MONITOR) | | DNC |
| | turned ON and brake pe | | Approx. 0 bar | | |
| With ignition switch | turned ON and brake pe | dal depressed. | Positive value | | G |
| Is the inspection | result normal? | | | | |
| | ection End. | *** | | | |
| - | ace the front pressu | re sensor. | | | Н |
| Component Ir | nspection | | | INFOID:000000004055470 | |
| 1. CHECK DATA | | | | | 1 |
| | | | | the fluid success | |
| ON DATA MONI | TOR", select "PRES | S SENSUR | and check the brai | ke huid pressure. | |
| | | | PRESS SENSOR | | J |
| | Condition | | (DATA MONITOR) | | |
| With ignition switch | turned ON and brake pe | dal released. | Approx. 0 bar | | К |
| With ignition switch | turned ON and brake pe | dal depressed. | Positive value | | |
| Is the inspection | result normal? | | | | |
| | ection End | | | | |
| NO >> Go to | o diagnosis procedu | re. Refer to E | RC-114, "Diagnosi | <u>is Procedure"</u> . | |
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< COMPONENT DIAGNOSIS >

C1155 BRAKE FLUID LEVEL SWITCH

Description

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

DTC Logic

INFOID:000000004055472

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DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|-------|--------------------|---|---|
| C1155 | BR FLUID LEVEL LOW | Brake fluid level is low or communication line between the ABS actuator and electric unit (control unit) and brake fluid level switch is open or shorted. | Harness or connectorBrake fluid level switchBrake fluid level |

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results BR FLUID LEVEL LOW

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-116. "Diagnosis Procedure"</u>.

NO >> Inspection End

Diagnosis Procedure

INFOID:000000004055473

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

Disconnect ABS actuator and electric unit (control unit) connector and brake fluid level switch connector.
 Check the terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

2.CHECK HARNESS BETWEEN BRAKE FLUID LEVEL SWITCH AND ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

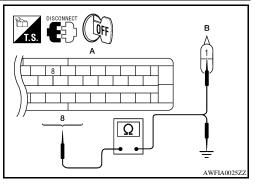
 Check continuity between ABS actuator and electric unit (control unit) harness connector E125 (A) terminal 8 and brake fluid level switch harness connector E21 (B) terminal 1.

| ABS actuator and electric unit (control unit) | | Brake fluid level switch | | Continuity |
|--|---|--------------------------|----------|------------|
| Connector Terminal | | Connector | Terminal | |
| E125 (A) | 8 | E21 (B) | 1 | Yes |

2. Check continuity between ABS actuator and electric unit (control unit) harness connector E125 (A) terminal 8 and ground.

| ABS actuator and electric unit (control unit) | | | Continuity | |
|---|-----------------|--------|------------|--|
| Connector | nector Terminal | | Continuity | |
| E125 (A) | 8 | Ground | No | |

Is the inspection result normal?



C1155 BRAKE FLUID LEVEL SWITCH

Ground

< COMPONENT DIAGNOSIS >

E21 terminal 2 and ground.

Is the inspection result normal?

>> GO TO 4

Connector E21

YES

NO

3. CHECK BRAKE FLUID LEVEL SWITCH GROUND

Terminal

2

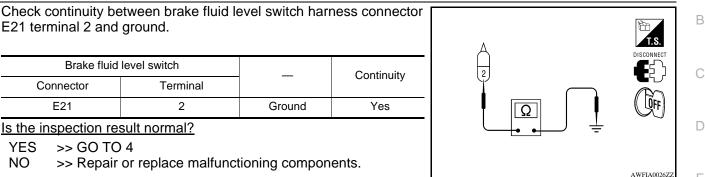
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4.CHECK BRAKE FLUID LEVEL SWITCH

Brake fluid level switch

Check continuity between brake fluid level switch terminals.

| Brake fluid level switch | Condition | Continuity | |
|--------------------------|--|------------|--|
| Terminal | Condition | Continuity | |
| 1-2 | When brake fluid is full in the reservoir tank. | No | |
| 1 – 2 | When brake fluid is empty in the reservoir tank. | Yes | |

>> Repair or replace malfunctioning components.

Is the inspection result normal?

- ALFIA0026ZZ YES >> Perform self-diagnosis again. If the same results appear, replace ABS actuator and electric unit (control unit). Refer to BRC-152, "Removal and Installation".
- NO >> Replace brake fluid level switch.

Component Inspection

1. CHECK BRAKE FLUID LEVEL SWITCH

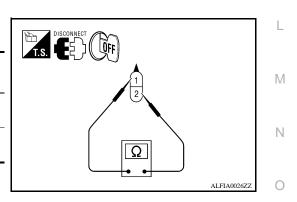
- 1. Turn ignition switch OFF.
- 2. Disconnect brake fluid level switch connector.
- 3. Check continuity between brake fluid level switch terminals.

| Brake fluid level switch | Condition | Continuity |
|--------------------------|--|------------|
| Terminal | Condition | Continuity |
| 1 – 2 | When brake fluid is full in the reservoir tank. | No |
| | When brake fluid is empty in the reservoir tank. | Yes |

Is the inspection result normal?

YES >> Inspection End

NO >> Replace brake fluid level switch.



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C1164, C1165, C1166, C1167 CV/SV SYSTEM

< COMPONENT DIAGNOSIS >

C1164, C1165, C1166, C1167 CV/SV SYSTEM

Description

CV1, CV2 (CUT VALVE) The cut valve shuts off the normal brake fluid path from the master cylinder, when ABLS is activated.

SV1, SV2 (SUCTION VALVE)

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

DTC Logic

INFOID:000000004055476

DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|-------|--------------|--|--|
| C1164 | CV1 | Switch-over solenoid valve (CV1) on the primary side is open circuit or shorted, or the control line is open or short- ed to the power supply or the ground. | |
| C1165 | CV2 | Switch-over solenoid valve (CV2) on the primary side is open circuit or shorted, or the control line is open or short- ed to the power supply or the ground. | Harness or connector ABS actuator and electric unit |
| C1166 | SV1 | Switch-over solenoid valve (SV1) on the primary side is open circuit or shorted, or the control line is open or short- ed to the power supply or the ground. | (control unit) |
| C1167 | SV2 | Switch-over solenoid valve (SV2) on the primary side is open circuit or shorted, or the control line is open or short- ed to the power supply or the ground. | |

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

| Self-diagnosis results |
|------------------------|
| CV1 |
| CV2 |
| SV1 |
| SV2 |

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-118, "Diagnosis Procedure"</u>.

NO >> Inspection End

Diagnosis Procedure

INSPECTION PROCEDURE

1.CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-86. "CONSULT-III Function</u> (<u>ABS)"</u>.

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

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

BRC-118

INFOID:000000004055475

INFOID:000000004055477

C1164, C1165, C1166, C1167 CV/SV SYSTEM

< COMPONENT DIAGNOSIS >

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

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

| ABS actuator and electric unit (control unit) | | | Voltage | |
|---|----|--------|-----------------|--|
| Connector Terminal | | | voltage | |
| E125 | 32 | Ground | Battery voltage | |

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

 $\mathbf{3.}$ CHECK SOLENOID, SWITCH-OVER VALVE AND ACTUATOR RELAY GROUND CIRCUIT

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

| ABS actuator and electric unit (control unit) | | | Continuity | |
|---|--------|--------|------------|--|
| Connector Terminal | | | Continuity | |
| E125 | 16, 47 | Ground | Yes | |

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-152</u>, "Removal and Installation".

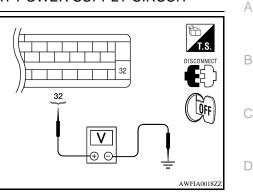
NO >> Repair or replace malfunctioning components.

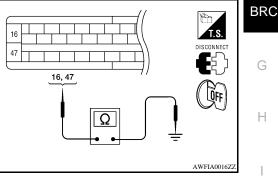
Component Inspection

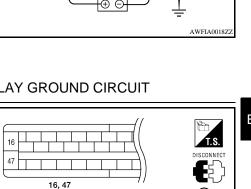
1.CHECK ACTIVE TEST

- 1. Select each test menu item on "ACTIVE TEST".
- On the display, touch "Up", "ACT UP", and "ACT KEEP", and check that the system operates as shown in the table below.

| Operation | | A | BS solenoid valve (| ACT) | • |
|--------------------------|---------------|-----|---------------------|----------|-----|
| | | Up | ACT UP | ACT KEEP | - |
| | FR RH IN SOL | Off | Off | Off | - |
| | FR RH OUT SOL | Off | Off | Off | - |
| FR RH ABS SOLENOID (ACT) | CV1 | Off | On | On | - |
| | SV1 | Off | On* | Off | - |
| | FR LH IN SOL | Off | Off | Off | - |
| | FR LH OUT SOL | Off | Off | Off | - |
| FR LH ABS SOLENOID (ACT) | CV1 | Off | On | On | (|
| | SV1 | Off | On* | Off | - |
| | RR RH IN SOL | Off | Off | Off | - |
| RR RH ABS SOLENOID (ACT) | RR RH OUT SOL | Off | Off | Off | - 1 |
| | CV2 | Off | On | On | - |
| | SV2 | Off | On* | Off | - |







INFOID:000000004055478

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C1164, C1165, C1166, C1167 CV/SV SYSTEM

< COMPONENT DIAGNOSIS >

[TYPE 2]

| Operation | | A | ABS solenoid valve (ACT) | | |
|--------------------------|---------------------------------------|-----|--------------------------|----------|--|
| | | Up | ACT UP | ACT KEEP | |
| | RR LH IN SOL | Off | Off | Off | |
| RR LH ABS SOLENOID (ACT) | RR LH OUT SOL | Off | Off | Off | |
| | CV2 | Off | On | On | |
| | SV2 | Off | On* | Off | |
| REAR SOL | This item is not used for this model. | | | | |

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

Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-118, "Diagnosis Procedure"</u>.

C1187 DIFFERENTIAL LOCK CONTROL UNIT

< COMPONENT DIAGNOSIS >

C1187 DIFFERENTIAL LOCK CONTROL UNIT

Description

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

DTC Logic

INFOID:000000004055480

DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause | |
|---|--|--|---|---|
| C1187 | ABS DIFLOCK CONTROL- LER NG | Differential lock controller malfunction. | Harness or connector CAN communication line Differential lock control unit ABS actuator and electric unit (control unit) | В |
| DTC CC | ONFIRMATION PROCE | DURE | | |
| 1.снес | CK SELF-DIAGNOSIS RE | SULTS | | |
| Check th | ne self-diagnosis results. | | | |
| | | | | |
| | Self-diagnosis | | | |
| | ABS DIFLOCK CONT | | | |
| YES | displayed on the self-diag | procedure. Refer to <u>BRC-121, "Diagnosis F</u> | Procedure". | |
| NO | >> Inspection End | | | |
| | • | | | |
| | sis Procedure | | INFOID:000000004055481 | |
| Diagno | | | INFOID:00000004055481 | |
| Diagno | TION PROCEDURE | | INFOID:000000004055481 | |
| Diagno INSPEC 1. CHEC | TION PROCEDURE CK CONNECTOR | disconnect ABS actuator and electric un | | |
| Diagno INSPEC 1.CHEC 1. Turr chec | TION PROCEDURE CK CONNECTOR in ignition switch OFF and ck terminal for deformation | I disconnect ABS actuator and electric uni n, disconnection, looseness, and so on. If ar | it (control unit) connector E125, | |
| Diagno INSPEC 1.CHEC 1. Turr chec repla | TION PROCEDURE CK CONNECTOR in ignition switch OFF and the terminal for deformation ace terminal. | n, disconnection, looseness, and so on. If ar | it (control unit) connector E125, | |
| Diagno INSPEC 1.CHEC 1. Turr chec repla | TION PROCEDURE CK CONNECTOR in ignition switch OFF and ck terminal for deformation | n, disconnection, looseness, and so on. If ar | it (control unit) connector E125, | |
| Diagno INSPEC 1.CHEC 1. Turr chec repla | TION PROCEDURE CK CONNECTOR in ignition switch OFF and the terminal for deformation ace terminal. | n, disconnection, looseness, and so on. If an form self-diagnosis. | it (control unit) connector E125, | |
| Diagno INSPEC 1.CHEC 1. Turr chec repla | TION PROCEDURE CK CONNECTOR in ignition switch OFF and ck terminal for deformation ace terminal. onnect connector and per | n, disconnection, looseness, and so on. If an form self-diagnosis. | it (control unit) connector E125, | [|
| Diagno INSPEC 1.CHEC 1. Turr chec repla 2. Rec <u>Is above</u> | TION PROCEDURE CK CONNECTOR in ignition switch OFF and ck terminal for deformation ace terminal. onnect connector and per Self-diagnosis ABS DIFLOCK CONT displayed on the self-diag | n, disconnection, looseness, and so on. If a form self-diagnosis. results FROLLER NG gnosis display? | it (control unit) connector E125, | |
| Diagno INSPEC 1.CHEC 1. Turr chec repla 2. Rec | TION PROCEDURE CK CONNECTOR in ignition switch OFF and ck terminal for deformation ace terminal. onnect connector and per Self-diagnosis ABS DIFLOCK CONT displayed on the self-diag | n, disconnection, looseness, and so on. If ar form self-diagnosis. results FROLLER NG | it (control unit) connector E125, | |

[TYPE 2]

INFOID:000000004055479

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U1000 CAN COMM CIRCUIT

Description

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

DTC Logic

INFOID:000000004055483

INFOID:000000004055484

DTC DETECTION LOGIC

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

Diagnosis Procedure

INSPECTION PROCEDURE

1.CHECK CONNECTOR

- 1. Turn ignition switch OFF, disconnect the ABS actuator and electric unit (control unit) connector, and check the terminals for deformation, disconnection, looseness, and so on. If there is a malfunction, repair or replace the terminal.
- 2. Reconnect connector and perform self-diagnosis.

Is "CAN COMM CIRCUIT" displayed in self-diagnosis display items?

- YES >> Print out the self-diagnostic results, and refer to LAN-14, "Trouble Diagnosis Flow Chart".
- NO >> Connector terminal is loose, damaged, open, or shorted.

INFOID:000000004055482

ABS WARNING LAMP

< COMPONENT DIAGNOSIS >

ABS WARNING LAMP

[TYPE 2]

| escription | INFOID:000000004055485 | ŀ |
|--|--|---|
| | | |
| Condition | XE ON -: OFF | E |
| | ABS warning lamp | |
| gnition switch OFF | - | (|
| For 2 seconds after turning ON ignition switch | × | |
| 2 seconds later after turning ON ignition switch | - | |
| ABS function is malfunctioning. | × | [|
| EBD function is malfunctioning. | × | |
| component Function Check | INFOID:000000004055486 | |
| CHECK ABS WARNING LAMP OPERATION | | |
| heck that the lamp illuminates for approximately 2 second | ands after the ignition switch is turned ON | |
| the inspection result normal? | onds alter the ignition switch is turned ON. | В |
| YES >> Inspection End | | |
| NO >> Go to diagnosis procedure. Refer to <u>BRC-12</u> | 23, "Diagnosis Procedure". | |
| Piagnosis Procedure | | |
| | INFOID:000000004055487 | |
| .CHECK SELF-DIAGNOSIS | | |
| erform ABS actuator and electric unit (control unit) self | f-diagnosis. Refer to <u>BRC-86, "CONSULT-III Function</u> | |
| <u>\BS)"</u> . | | |
| the inspection result normal? | | |
| YES >> GO TO 2 NO >> Check items displayed by self-diagnosis. | | |
| CHECK COMBINATION METER | | |
| | | |
| heck if the indication and operation of combination me | eter are normal. Refer to MWI-23, "Diagnosis Descrip- | |
| the inspection result normal? | | |
| | ntrol unit). Refer to <u>BRC-152, "Removal and Installa-</u> | |
| NO >> Replace combination meter. Refer to MWI-9 | 3. "Removal and Installation". | |
| | | |
| | | |
| | | |
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BRAKE WARNING LAMP

< COMPONENT DIAGNOSIS >

BRAKE WARNING LAMP

Description

INFOID:000000004055488

×: ON –: OFF

| Condition | Brake warning lamp (Note 1) | |
|---------------------------------|-----------------------------|--|
| Ignition switch OFF | - | |
| Ignition switch ON | × (Note 2) | |
| EBD function is malfunctioning. | × | |

NOTE:

• 1: Brake warning lamp will turn on in case of parking brake operation (when switch is ON) or of brake fluid level switch operation (when brake fluid is insufficient).

• 2: After starting engine, brake warning lamp is turned off.

Component Function Check

INFOID:000000004055489

1.BRAKE WARNING LAMP OPERATION CHECK

Check that the lamp illuminates after the ignition switch is turned ON, and turns OFF after the engine is started.

Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-124, "Diagnosis Procedure"</u>.

Diagnosis Procedure

INFOID:000000004055490

1.CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-86, "CONSULT-III Function</u> (ABS)".

Is the inspection result normal?

YES >> GO TO 2

NO >> Check items displayed by self-diagnosis.

2. CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to <u>MWI-23, "Diagnosis Descrip-</u> tion".

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-152, "Removal and Installa-</u> tion".
- NO >> Replace combination meter. Refer to <u>MWI-93, "Removal and Installation"</u>.

SLIP INDICATOR LAMP

[TYPE 2]

| SLIP INDICATOR LAMP | |
|---|---|
| Description | INFOID:000000004055491 |
| | ×: ON –: OFF |
| Condition | SLIP indicator lamp |
| Ignition switch OFF | - |
| For 2 seconds after turning ON ignition switch | X |
| 2 seconds later after turning ON ignition switch | - |
| VDC/TCS function is malfunctioning. | × |
| ABS function is malfunctioning. | × |
| EBD function is malfunctioning. | × |
| Component Function Check | INF01D:000000004055492 |
| 1. CHECK SLIP INDICATOR LAMP OPERATION | |
| Check that the lamp illuminates for approximately 2 second | nds after the ignition switch is turned ON. |
| Is the inspection result normal? | , in the second s |
| YES >> Inspection End | |
| NO >> Go to diagnosis procedure. Refer to <u>BRC-12</u> | 5. "Diagnosis Procedure". |
| Diagnosis Procedure | INFOID:000000004055493 |
| 1.CHECK SELF-DIAGNOSIS | |
| Perform ABS actuator and electric unit (control unit) self- | diagnosis Refer to BRC-86 "CONSULT-III Function |
| (ABS)". | |
| Is the inspection result normal? | |
| YES >> GO TO 2 | |
| NO >> Check items displayed by self-diagnosis. | |
| 2. CHECK COMBINATION METER | |
| Check if the indication and operation of combination metotion". | er are normal. Refer to MWI-23, "Diagnosis Descrip- |
| <u>Is the inspection result normal?</u> | |
| | trol unit). Refer to <u>BRC-152, "Removal and Installa-</u> |
| tion". | |
| NO >> Replace combination meter. Refer to <u>MWI-93</u> | 3. "Removal and Installation". |
| | |
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ECU DIAGNOSIS APPLICATION NOTICE

Application Notice

INFOID:000000004055494

| Service information | Remarks |
|---------------------|--|
| TYPE 1 | ABS |
| TYPE 2 | ABLS/ABS |
| TYPE 3 | HILL DESCENT CONTROL/HILL START ASSIST/VDC/TCS/ABS |

< ECU DIAGNOSIS >

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Reference Value

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.

CONSULT-III MONITOR ITEM

| | | Data monitor | | |
|----------------|---|---|--|-----|
| Monitor item | Display content | Condition | Reference value in normal operation | D |
| | | 0 [km/h (MPH)] | Vehicle stopped | |
| FR LH SENSOR | Wheel speed | Nearly matches the speed meter display $(\pm 10\% \text{ or less})$ | Vehicle running (Note 1) | E |
| | | 0 [km/h (MPH)] | Vehicle stopped | |
| FR RH SENSOR | Wheel speed | Nearly matches the speed meter display $(\pm 10\% \text{ or less})$ | Vehicle running (Note 1) | BRC |
| | | 0 [km/h (MPH)] | Vehicle stopped | - |
| RR LH SENSOR | Wheel speed | Nearly matches the speed meter display $(\pm 10\% \text{ or less})$ | Vehicle running (Note 1) | G |
| | | 0 [km/h (MPH)] | Vehicle stopped | Н |
| RR RH SENSOR | Wheel speed | Nearly matches the speed meter display $(\pm 10\% \text{ or less})$ | Vehicle running (Note 1) | П |
| | Step Jamp quitch signal status | When brake pedal is depressed | ON | |
| STOP LAMP SW | Stop lamp switch signal status | When brake pedal is released | OFF | |
| BATTERY VOLT | Battery voltage supplied to the ABS actuator and electric unit (control unit) | Ignition switch ON | 10 – 16 V | J |
| | | 1st gear 2nd gear | 1 2 | |
| GEAR | Gear position determined by TCM | 3rd gear 4th gear | 3 4 | К |
| | | 5th gear | 5 | |
| | | P position | Р | |
| SLCT LVR POSI | A/T selector lever position | R position | R | L |
| | | N position D position | D N | |
| | Throttle actuator opening/closing is dis- | Accelerator pedal not depressed (ignition switch is ON) | 0 % | Μ |
| ACCEL POS SIG | played (linked with accelerator pedal) | Accelerator pedal depressed (ignition switch is ON) | 0 - 100 % | NI |
| | Brake fluid pressure detected by front pres- | With ignition switch turned ON and brake pedal released | Approx. 0 bar | Ν |
| PRESS SENSOR | sure sensor | With ignition switch turned ON and brake pedal depressed | -40 to 300 bar | 0 |
| | | With engine stopped | 0 rpm | |
| ENGINE SPEED | With engine running | Engine running | Almost in accor- dance with tachome- ter display | Ρ |
| FLUID LEV SW | Brake fluid level switch signal status | When brake fluid level switch ON | ON | |
| . 1015 117 017 | | When brake fluid level switch OFF | OFF | |

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INFOID:000000004055495

< ECU DIAGNOSIS >

| | | Data monitor | |
|---------------|---|--|-------------------------------------|
| Monitor item | Display content | Condition | Reference value in normal operation |
| FR RH IN SOL | | Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT-III) or actua- tor relay is inactive (in fail-safe mode) | ON |
| | Operation status of each solenoid valve | When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON) | OFF |
| FR RH OUT SOL | | Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT-III) or actua- tor relay is inactive (in fail-safe mode) | ON |
| | Operation status of each solenoid valve | When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON) | OFF |
| FR LH IN SOL | Operation status of each solenoid valve | Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT-III) or actua- tor relay is inactive (in fail-safe mode) | ON |
| | | When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON) | OFF |
| FR LH OUT SOL | Operation status of each solenoid valve | Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT-III) or actua- tor relay is inactive (in fail-safe mode) | ON |
| | | When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON) | OFF |
| RR RH IN SOL | Operation status of each solenoid valve | Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT-III) or actua- tor relay is inactive (in fail-safe mode) | ON |
| | | When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON) | OFF |
| RR RH OUT SOL | Operation status of each solenoid valve | Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT-III) or actua- tor relay is inactive (in fail-safe mode) | ON |
| KK KH OUT SOL | | When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON) | OFF |
| RR LH IN SOL | Operation status of each solenoid valve | Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT-III) or actua- tor relay is inactive (in fail-safe mode) | ON |
| RR LH IN SOL | Operation status of each solehold valve | When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON) | OFF |
| RR LH OUT SOL | Operation status of each solenoid valve | Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT-III) or actua- tor relay is inactive (in fail-safe mode) | ON |
| | | When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON) | OFF |
| MOTOR RELAY | Motor and motor relay operation | When the motor relay and motor are operating | ON |
| | | When the motor relay and motor are not operating | OFF |
| ACTUATOR RLY | Actuator relay operation | When the actuator relay is operating | ON |
| | | When the actuator relay is not operating | OFF |

< ECU DIAGNOSIS >

[TYPE 2]

| | | Data monitor | |
|---------------|---|---|-------------------------------------|
| Monitor item | Display content | Condition | Reference value in normal operation |
| | ABS warning lamp | When ABS warning lamp is ON | ON |
| ABS WARN LAMP | (Note 2) | When ABS warning lamp is OFF | OFF |
| | SLIP indicator lamp | When SLIP indicator lamp is ON | ON |
| SLIP LAMP | (Note 2) | When SLIP indicator lamp is OFF | OFF |
| | | EBD is active | ON |
| EBD SIGNAL | EBD operation | EBD is inactive | OFF |
| | 100 | ABS is active | ON |
| ABS SIGNAL | ABS operation | ABS is inactive | OFF |
| | 700 | TCS is active | ON |
| TCS SIGNAL | TCS operation | TCS is inactive | OFF |
| | | In EBD fail-safe | ON |
| EBD FAIL SIG | EBD fail-safe signal | EBD is normal | OFF |
| | | In ABS fail-safe | ON |
| ABS FAIL SIG | ABS fail-safe signal | ABS is normal | OFF |
| | | In TCS fail-safe | ON |
| TCS FAIL SIG | TCS fail-safe signal | TCS is normal | OFF |
| | | Crank is active | ON |
| CRANKING SIG | Crank operation | Crank is inactive | OFF |
| CV1 | VDC switch-over valve | When actuator (switch-over valve) is ac- tive ("ACTIVE TEST" with CONSULT-III) or actuator relay is inactive (when in fail- safe mode) | ON |
| | When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON) | OFF | |
| CV2 | VDC switch-over valve | When actuator (switch-over valve) is ac- tive ("ACTIVE TEST" with CONSULT-III) or actuator relay is inactive (when in fail- safe mode) | ON |
| | | When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON) | OFF |
| SV1 | VDC switch-over valve | When actuator (switch-over valve) is ac- tive ("ACTIVE TEST" with CONSULT-III) or actuator relay is inactive (when in fail- safe mode) | ON |
| | | When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON) | OFF |
| SV2 | VDC switch-over valve | When actuator (switch-over valve) is ac- tive ("ACTIVE TEST" with CONSULT-III) or actuator relay is inactive (when in fail- safe mode) | ON |
| | | When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON) | OFF |
| DECEL G-SEN | Longitudinal acceleration detected by Decel | Vehicle stopped | Approx. 0 G |
| DLGEL G-SEIN | G-Sensor | Vehicle running | -1.7 to 1.7 G |

BRC-129

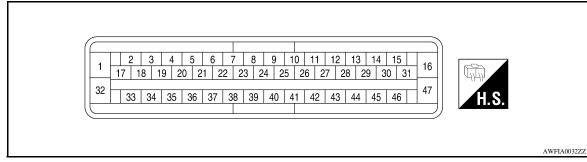
< ECU DIAGNOSIS >

| | | Data monitor | | |
|---------------|------------------------------------|--|-------------------------------------|--|
| Monitor item | Display content | Condition | Reference value in normal operation | |
| EBD WARN LAMP | EBD warning lamp | When EBD warning lamp is ON | ON | |
| | | When EBD warning lamp is OFF | OFF | |
| N POSI SIG | PNP switch signal ON/OFF condition | A/T shift position = N position | ON | |
| N PO31313 | | A/T shift position = other than N position | OFF | |
| P POSI SIG | PNP switch signal ON/OFF condition | A/T shift position = P position | ON | |
| P POSI SIG | | A/T shift position = other than P position | OFF | |
| R POSI SIG | PNP switch signal ON/OFF condition | A/T shift position = R position | ON | |
| | | A/T shift position = other than R position | OFF | |
| | Drive axle | 2WD model | 2WD | |
| 2WD/4WD | | 4WD model | 4WD | |

NOTE:

- 1: Confirm tire pressure is normal.
- 2: On and off timing for warning lamp and indicator lamp.
- ABS warning lamp: Refer to <u>BRC-123, "Description"</u>.
- Brake warning lamp: Refer to BRC-124, "Description".
- SLIP indicator lamp: Refer to BRC-125, "Description".

TERMINAL LAYOUT



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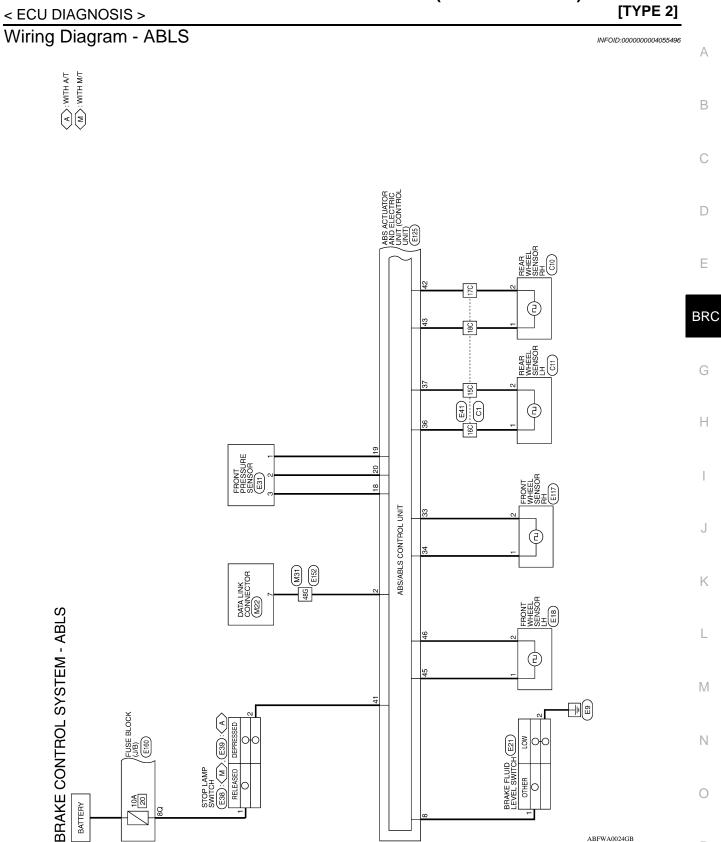
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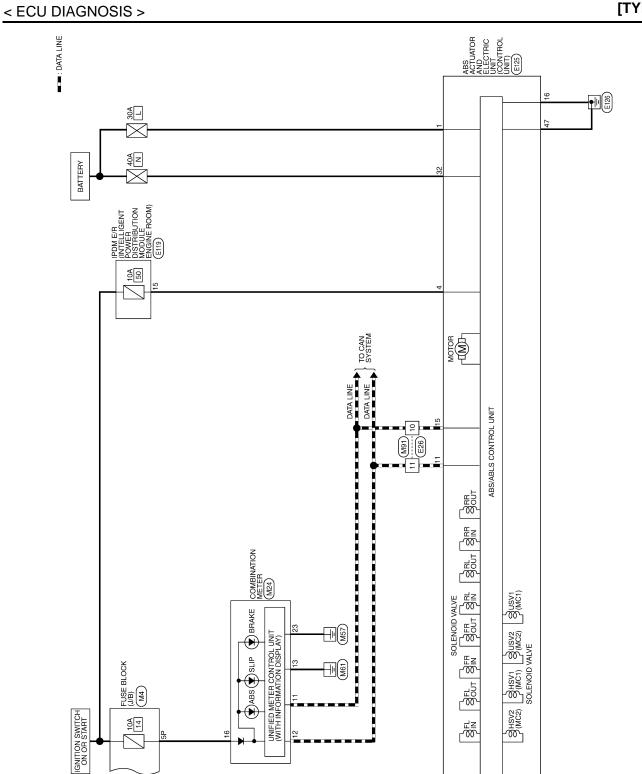
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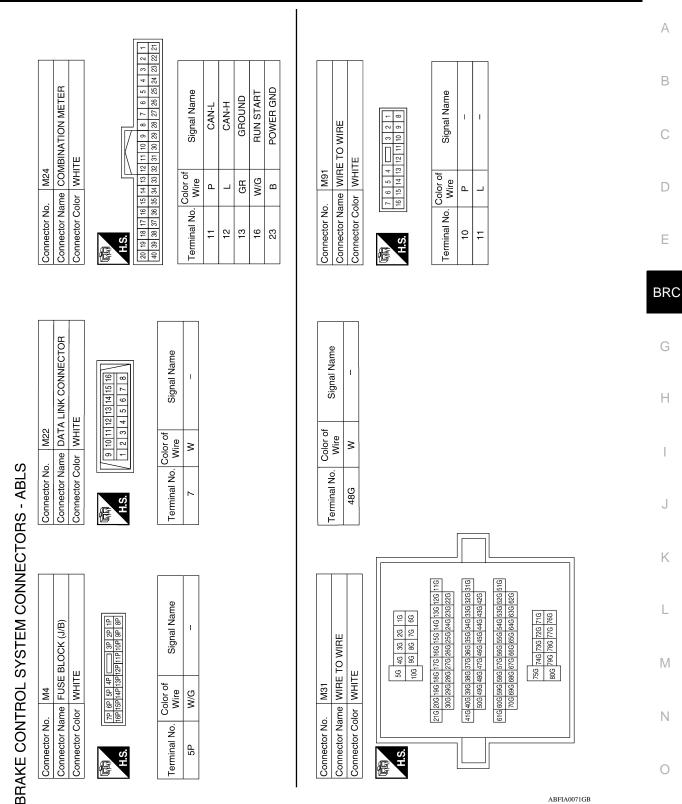


[TYPE 2]

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< ECU DIAGNOSIS >

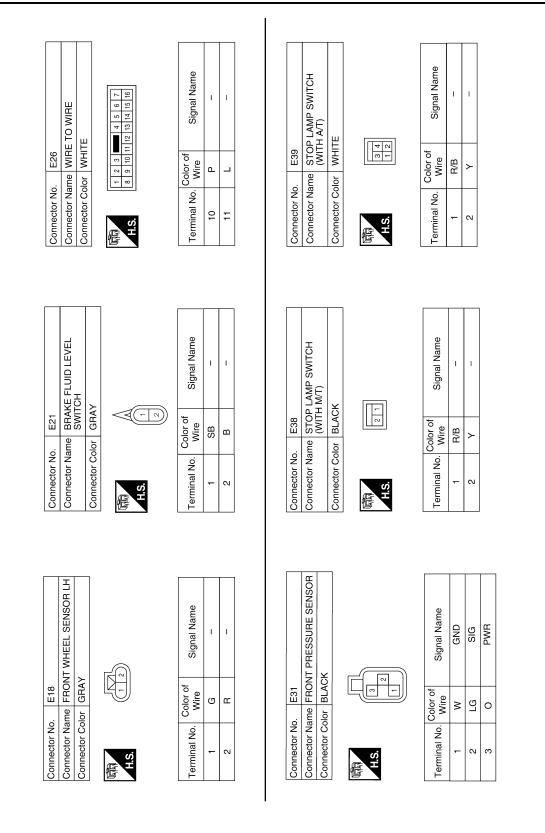
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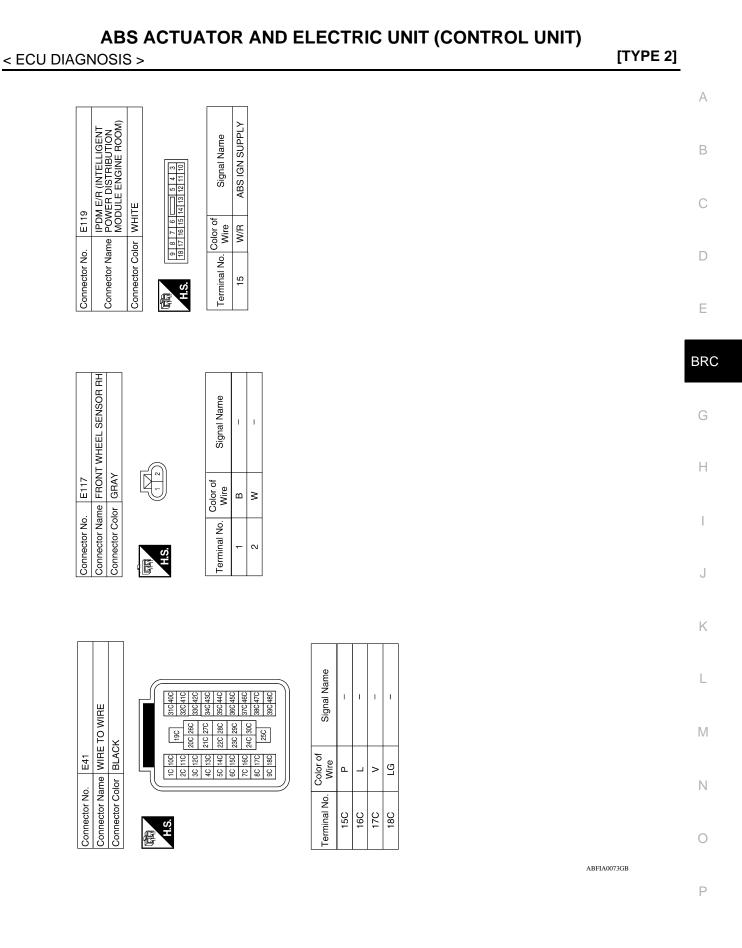
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< ECU DIAGNOSIS >

[TYPE 2]



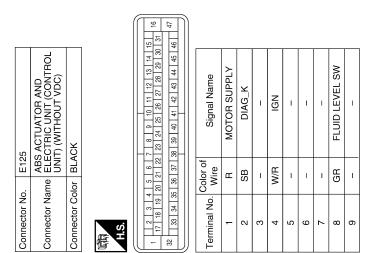
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< ECU DIAGNOSIS >

| Terminal No. | Color of Wire | Signal Name |
|--------------|------------------|------------------|
| 31 | Ι | I |
| 32 | ≻ | VALVE ECU SUPPLY |
| 33 | 8 | FR_RH_SIG |
| 34 | в | FR_RH_PWR |
| 35 | I | I |
| 36 | Γ | RR_LH_PWR |
| 37 | Ч | RR_LH_SIG |
| 38 | I | I |
| 39 | I | I |
| 40 | Ι | I |
| 41 | SB | STOP_LAMP_SW |
| 42 | > | RR_RH_SIG |
| 43 | ЪJ | RR_RH_PWR |
| 44 | Ι | Ι |
| 45 | G | FR_LH_PWR |
| 46 | В | FR_LH_SIG |
| 47 | В | MOTOR GND |
| | | |

| Signal Name | I | CAN-H | I | I | I | CAN-L | VALVE ECU GND | I | DRIV1_SENSEP | DRIV1_GND | DRIV1_SIG | I | 1 | I | I | I | I | I | I | 1 | I |
|------------------|----|-------|----|----|----|-------|---------------|----|--------------|-----------|-----------|----|----|----|----|----|----|----|----|----|----|
| Color of Wire | I | Γ | I | I | I | ٩ | ш | I | 0 | 3 | ГG | I | I | I | Ι | I | - | - | I | I | I |
| Terminal No. | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |



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INFOID:000000004055497

Fail-Safe

CAUTION:

If the Fail-Safe function is activated, perform Self Diagnosis for ABS/ABLS system.

ABS/EBD SYSTEM

In case of an electrical malfunction with the ABS, the ABS warning lamp will turn on. In case of an electrical malfunction with the EBD system, the BRAKE warning lamp and ABS warning lamp will turn on.

BRC-136

< ECU DIAGNOSIS >

The system will revert to one of the following conditions of the Fail-Safe function.

- 1. For ABS malfunction, only the EBD is operative and the condition of the vehicle is the same condition of A vehicles without ABS/ABLS system.
- 2. For EBD malfunction, the EBD and ABS become inoperative, and the condition of the vehicle is the same as the condition of vehicles without ABS/ABLS or EBD system.

ABLS SYSTEM

In case of ABLS system malfunction, the SLIP indicator lamp will turn on. The condition of the vehicle is the same as the condition of vehicles without ABS/ABLS system.

DTC No. Index

INFOID:000000004055498

В

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D

[TYPE 2]

| Reference | Items (CONSULT screen terms) | DTC |
|----------------------------|------------------------------|-------|
| | RR RH SENSOR-1 | C1101 |
| | RR LH SENSOR-1 | C1102 |
| BRC-91, "Description" | FR RH SENSOR-1 | C1103 |
| | FR LH SENSOR-1 | C1104 |
| | RR RH SENSOR-2 | C1105 |
| | RR LH SENSOR-2 | C1106 |
| BRC-94, "Description" | FR RH SENSOR-2 | C1107 |
| | FR LH SENSOR-2 | C1108 |
| BRC-97, "Description" | BATTERY VOLTAGE [ABNORMAL] | C1109 |
| BRC-99, "DTC Logic" | CONTROLLER FAILURE | C1110 |
| BRC-100, "Description" | PUMP MOTOR | C1111 |
| BRC-99, "DTC Logic" | G-SENSOR | C1113 |
| BRC-102, "Description" | ABS SENSOR [ABNORMAL SIGNAL] | C1115 |
| BRC-105, "Description" | STOP LAMP SW | C1116 |
| BRC-107, "Description" | FR LH IN ABS SOL | C1120 |
| BRC-109, "Description" | FR LH OUT ABS SOL | C1121 |
| BRC-107, "Description" | FR RH IN ABS SOL | C1122 |
| BRC-109, "Description" | FR RH OUT ABS SOL | C1123 |
| BRC-107, "Description" | RR LH IN ABS SOL | C1124 |
| BRC-109, "Description" | RR LH OUT ABS SOL | C1125 |
| BRC-107, "Description" | RR RH IN ABS SOL | C1126 |
| BRC-109, "Description" | RR RH OUT ABS SOL | C1127 |
| | ENGINE SIGNAL 1 | C1130 |
| BRC-111, "Description" | ENGINE SIGNAL 2 | C1131 |
| | ENGINE SIGNAL 6 | C1136 |
| BRC-112, "Description" | ACTUATOR RLY | C1140 |
| BRC-114, "Description" | PRESS SEN CIRCUIT | C1142 |
| BRC-116, "Description" | BR FLUID LEVEL LOW | C1155 |
| BRC-99, "DTC Logic" | DECEL G SEN SET | C1160 |
| | CV1 | C1164 |
| | CV2 | C1165 |
| BRC-118, "Description" | SV1 | C1166 |
| | SV2 | C1167 |
| BRC-99, "DTC Logic" | VARIANT CODING | C1170 |

< ECU DIAGNOSIS >

| DTC | Items (CONSULT screen terms) | Reference |
|-------|------------------------------|------------------------|
| C1187 | ABS DIFLOCK CONTROLLER NG | BRC-121, "Description" |
| U1000 | CAN COMM CIRCUIT | BRC-122, "Description" |

APPLICATION NOTICE

< SYMPTOM DIAGNOSIS >

SYMPTOM DIAGNOSIS APPLICATION NOTICE

Application Notice

INFOID:000000004055499 B

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| Service information | Remarks | |
|---------------------|--|-----|
| TYPE 1 | ABS | - 0 |
| TYPE 2 | ABLS/ABS | |
| TYPE 3 | HILL DESCENT CONTROL/HILL START ASSIST/VDC/TCS/ABS | D |

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< SYMPTOM DIAGNOSIS >

ABLS/ABS

If ABS warning lamp turns ON, perform self-diagnosis.

| Symptom | Check item | Reference |
|---|--|--|
| | Brake force distribution | |
| Excessive ABS function operation fre- quency | Looseness of front and rear axle | <u>BRC-141, "Diag-</u> nosis Procedure" |
| | Wheel sensor and rotor system | |
| Unexpected pedal reaction | Brake pedal stroke | BRC-142, "Diag- |
| onexpected pedal reaction | Make sure the braking force is sufficient when the ABS is not operating. | nosis Procedure" |
| The braking distance is long | Check stopping distance when the ABS is not operating. | BRC-143, "Diag- nosis Procedure" |
| ABS function does not operate (Note 1) | ABS actuator and electric unit (control unit) | BRC-144, "Diag- nosis Procedure" |
| Pedal vibration or ABS operation sound | Brake pedal | BRC-145, "Diag- |
| occurs (Note 2) | ABS actuator and electric unit (control unit) | nosis Procedure" |

NOTE:

- 1: The ABS does not operate when the speed is 10 km/h (6 MPH) or less.
- 2: Under the following conditions, ABS is activated and vibration is felt when brake pedal is lightly depressed. However, this is normal.
- When shifting gears
- When driving on slippery road
- During cornering at high speed
- When passing over bumps or grooves [at approximately 50 mm (1.97 in) or more]
- When pulling away just after starting engine [at approximately 10 km/h (6 MPH) or higher]

INFOID:000000004055500

| EXCESSIVE ABS FUNCTION OPERATION FREQUENCY < SYMPTOM DIAGNOSIS > [TYPE 2] | |
|--|---|
| EXCESSIVE ABS FUNCTION OPERATION FREQUENCY | • |
| Diagnosis Procedure | , |
| 1. CHECK START | |
| Check front and rear brake force distribution using a brake tester. | - |
| Is the inspection result normal? | |
| YES >> GO TO 2 | (|
| NO >> Check brake system. 2.CHECK FRONT AND REAR AXLE | |
| Make sure that there is no excessive play in the front and rear axles. Refer to front: <u>FAX-5</u> , "On-Vehicle | |
| Inspection and Service", Rear: RAX-7, "Rear Axle Bearing" (C200) or RAX-19, "Rear Axle Bearing" (M226). | |
| Is the inspection result normal? | |
| YES >> GO TO 3 NO >> Repair or replace malfunctioning components. | |
| 3. CHECK WHEEL SENSOR AND SENSOR ROTOR | В |
| Check the following. | |
| Wheel sensor installation for damage. Sensor rotor installation for damage. | (|
| Wheel sensor connector connection. | |
| Wheel sensor harness inspection. <u>Is the inspection result normal?</u> | |
| YES >> GO TO 4 | |
| NO >> • Replace wheel sensor or sensor rotor. Refer to <u>BRC-150</u> , "Removal and Installation" or <u>BRC-151</u> , "Removal and Installation". | |
| Repair harness. | |
| 4.CHECK ABS WARNING LAMP DISPLAY | _ |
| Make sure that the ABS warning lamp is turned off after the ignition switch is turned ON or when driving. | , |
| <u>Is the ABS warning lamp illuminated?</u> YES >> Perform self-diagnosis. Refer to <u>BRC-86, "CONSULT-III Function (ABS)"</u> . | |
| NO >> Normal | |
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BRC-141

UNEXPECTED PEDAL REACTION

Diagnosis Procedure

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[TYPE 2]

1.CHECK BRAKE PEDAL STROKE

Check brake pedal stroke. Refer to BR-18, "Inspection and Adjustment".

Is the stroke too large?

- YES >> Bleed air from brake tube and hose. Refer to <u>BR-20, "Bleeding Brake System"</u>.
 - Check brake pedal, brake booster, and master cylinder for mount play, looseness, brake system fluid leakage, etc. Refer to <u>BR-18</u>, "<u>Inspection and Adjustment</u>" (brake pedal), <u>BR-11</u>, "<u>On</u> <u>Board Inspection</u>" (master cylinder), <u>BR-9</u>, "<u>Inspection</u>" (brake booster).

NO >> GO TO 2

2.CHECK FUNCTION

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

Is the inspection result normal?

- YES >> Normal
- NO >> Check brake system.

THE BRAKING DISTANCE IS LONG

Diagnosis Procedure

CAUTION:

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

1.CHECK FUNCTION

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

Is the inspection result normal?

YES >> Normal

NO >> Check brake system.

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INFOID:000000004055503

ABS FUNCTION DOES NOT OPERATE

Diagnosis Procedure

INFOID:000000004055504

CAUTION:

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

1.CHECK ABS WARNING LAMP DISPLAY

Make sure that the ABS warning lamp turns OFF after ignition switch is turned ON or when driving. Is the inspection result normal?

YES >> Normal

NO >> Perform self-diagnosis. Refer to <u>BRC-86, "CONSULT-III Function (ABS)"</u>.

| PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS < SYMPTOM DIAGNOSIS > [TYPE 2] PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS | |
|---|-------------|
| Diagnosis Procedure | А |
| CAUTION: Under the following conditions, ABS is activated and vibration is felt when brake pedal is lightly depressed. However, this is normal. When shifting gears When driving on slippery road During cornering at high speed When passing over bumps or grooves [at approximately 50 mm (1.97 in) or more] When pulling away just after starting engine [at approximately 10 km/h (6 MPH) or higher] 1.SYMPTOM CHECK 1 | B C D |
| Check that there are pedal vibrations when the engine is started. Do vibrations occur? | Е |
| YES >> GO TO 2 NO >> Inspect the brake pedal. 2.SYMPTOM CHECK 2 | BRO |
| Check that there are ABS operation noises when the engine is started. | G |
| <u>Do the operation noises occur?</u> YES >> GO TO 3 NO >> Perform self -diagnosis. Refer to <u>BRC-86, "CONSULT-III Function (ABS)"</u> . 3. SYMPTOM CHECK 3 | Н |
| Check symptoms when electrical component (headlamps, etc.) switches are operated. Do symptoms occur? YES >> Check if there is a radio, antenna, antenna lead wire, or wiring close to the control unit. If there is, move it farther away. | I |
| NO >> Normal | J |
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< SYMPTOM DIAGNOSIS >

NORMAL OPERATING CONDITION

Description

| Symptom | Result | |
|--|--|--|
| Slight vibrations are felt on the brake pedal and the operation noises occur, when ABLS or ABS is activated. | | |
| Stopping distance is longer than that of vehicles without ABS when the vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads. | This is a normal condi- tion due to the ABLS or | |
| The brake pedal moves and generates noises, when ABLS is activated due to rapid acceleration or sharp turn. | ABS activation. | |
| The brake pedal vibrates and motor operation noises occur from the engine room, after the engine starts and just after the vehicle starts. | This is normal, and it is caused by the ABS operation check. | |
| Depending on the road conditions, the driver may experience a sluggish feel. | This is normal, because | |
| ABLS may activate momentarily if wheel speed changes when driving over location where friction coefficient varies, when downshifting, or when fully depressing accelerator pedal. | ABLS places the high- est priority on the opti- mum traction (stability). | |
| The ABS warning lamp and SLIP indicator lamp may turn ON when the vehicle is subject to strong shaking or large vibration, such as when the vehicle is rotating on a turntable or located on a ship while the engine is running. | In this case, restart the engine on a normal road. If the normal con- | |
| ABS warning lamp and SLIP indicator lamp may illuminate, when running on a special road that is extremely slanted (e.g. bank in a circuit course). | dition is restored, there is no malfunction. At that time, erase the se diagnosis memory. | |
| SLIP indicator lamp may turn on when low tire pressure warning lamp turns on. | This error results from characteristic change of tire. | |

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< PRECAUTION > PRECAUTION PRECAUTIONS

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

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.

Precaution for Brake System

CAUTION:

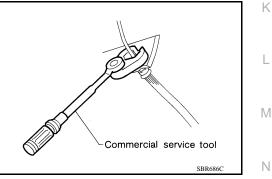
- Refer to MA-12, "Fluids and Lubricants" for recommended brake fluid.
- Never reuse drained brake fluid.
- Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.
- To clean or wash all parts of master cylinder and disc brake caliper, use clean brake fluid.
- Never use mineral oils such as gasoline or kerosene. They will ruin rubber parts of the hydraulic system.
- Use flare nut wrench when removing and installing brake tube.
- If a brake fluid leak is found, the part must be disassembled without fail. Then it has to be replaced with a new one if a defect exists.
- Turn the ignition switch OFF and remove the connector of the ABS actuator and electric unit (control unit) or the battery terminal before performing the work.
- Always torque brake lines when installing.
- Burnish the brake contact surfaces after refinishing or replacing rotors, after replacing pads, or if a soft pedal occurs at very low mileage.

Refer to <u>BR-38, "Brake Burnishing"</u> (front disc brake) or <u>BR-43, "Brake Burnishing"</u> (rear disc brake). WARNING:

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

Precaution for Brake Control

- During ABS operation, the brake pedal may vibrate lightly and a mechanical noise may be heard. This is normal.
- Just after starting vehicle, the brake pedal may vibrate or a motor operating noise may be heard from engine compartment. This is a normal status of operation check.
- Stopping distance may be longer than that of vehicles without ABS when vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.



PRECAUTIONS

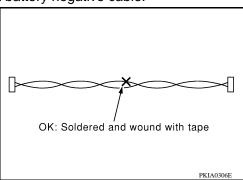
< PRECAUTION >

- When an error is indicated by ABS or another warning lamp, collect all necessary information from customer (what symptoms are present under what conditions) and check for simple causes before starting diagnosis. Besides electrical system inspection, check brake booster operation, brake fluid level, and fluid leaks.
- If incorrect tire sizes or types are installed on the vehicle or brake pads are not Genuine NISSAN parts, stopping distance or steering stability may deteriorate.
- If there is a radio, antenna or related wiring near control module, ABS function may have a malfunction or error.
- If aftermarket parts (car stereo, CD player, etc.) have been installed, check for incidents such as harness pinches, open circuits or improper wiring.
- If the following components are replaced with non-genuine components or modified, the SLIP indicator lamp may turn on and the ABLS system may not operate properly. Components related to suspension (shock absorbers, struts, springs, bushings, etc.), tires, wheels (exclude specified size), components related to brake system (pads, rotors, calipers, etc.), components related to engine (muffler, ECM, etc.), components related to body reinforcement (roll bar, tower bar, etc.).
- Driving with broken or excessively worn suspension components, tires or brake system components may cause the SLIP indicator lamp to turn on, and the ABLS system may not operate properly.
- When the ABLS is activated by sudden acceleration or sudden turn, some noise may occur. The noise is a
 result of the normal operation of the ABLS.
- When driving on roads which have extreme slopes (such as mountainous roads) or high banks (such as sharp curves on a freeway), the ABLS may not operate normally, and the SLIP indicator lamp may turn on. This is not a problem if normal operation can be resumed after restarting the engine.

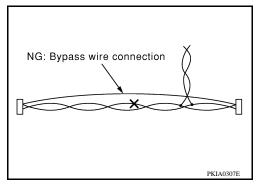
Precaution for CAN System

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- Do not apply voltage of 7.0V or higher to terminal to be measured.
- Maximum open terminal voltage of tester in use must be less than 7.0V.
- Before checking harnesses, turn ignition switch OFF and disconnect battery negative cable.
- Area to be repaired must be soldered and wrapped with tape. Make sure that fraying of twisted wire is within 110 mm (4.33 in).



• Do not make a bypass connection to repaired area. (If the circuit is bypassed, characteristics of twisted wire will be lost.)



PREPARATION

< PREPARATION > PREPARATION

PREPARATION

Special Service Tool

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

| Tool number (Kent-Moore No.) Tool name | | Description |
|---|------------|---|
| (V991J0080 J-45741) ABS active wheel sensor tester | Vertaolole | Checking operation of ABS active wheel sen- sors |
| ST30031000 —) Bearing puller | | Removing sensor rotor |
| | ZZA0700D | |
| ommercial Service Toc | | INFOID:000000004458 |
| | | INFOID:00000004458 |
| ommercial Service Toc ool name . Flare nut crowfoot 2. Torque wrench | | |
| ool name . Flare nut crowfoot | | Description Removing and installing brake piping |
| ool name . Flare nut crowfoot | | Description Removing and installing brake piping |
| ool name . Flare nut crowfoot | | Description Removing and installing brake piping |

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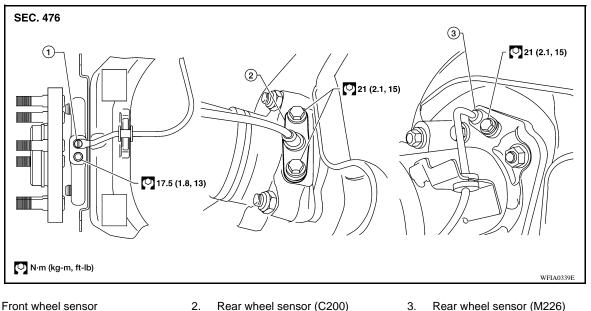
[TYPE 2]

< REMOVAL AND INSTALLATION >

REMOVAL AND INSTALLATION WHEEL SENSOR

Removal and Installation

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1. Front wheel sensor

REMOVAL

- 1. Remove the wheel sensor bolt(s).
 - When removing the front wheel sensor, first remove the disc rotor to gain access to the front wheel sensor. Refer to <u>BR-39</u>, "Removal and Installation of Brake Caliper and Disc Rotor".
- 2. Pull the wheel sensor straight out, being careful to turn it as little as possible. CAUTION:
 - Be careful not to damage the wheel sensor edge and sensor rotor teeth.
 - Do not pull on the wheel sensor harness.
- 3. Disconnect the wheel sensor harness connector, then remove wheel sensor harness from the mounts to remove the wheel sensor.

INSTALLATION

Installation is in the reverse order of removal.

- Before installing the wheel sensors do the following:
- Inspect and replace the wheel sensor if damaged.
- Clean the wheel sensor hole and mating surface with brake cleaner and a lint-free cloth. Be careful that dirt and debris do not enter the hub and bearing assembly or the rear axle.
- Replace the wheel sensor O-ring, then apply a coat of suitable grease to the new O-ring and sensor hole for installation.

SENSOR ROTOR

Removal and Installation

FRONT

Removal and Installation

The wheel sensor rotors are built into the wheel hubs and are not removable. If damaged, replace wheel hub and bearing assembly. Refer to <u>FAX-8</u>, "<u>Removal and Installation</u>".

REAR (C200)

Removal and Installation

It is necessary to disassemble the rear axle to replace the sensor rotor. Perform the axle shaft assembly removal procedure to replace sensor rotor. Refer to <u>RAX-8</u>, "<u>Removal and Installation</u>".

REAR (M226)

Removal

- 1. Remove the axle shaft assembly. Refer to <u>RAX-20, "Removal and Installation"</u>.
- 2. Pull the sensor rotor off of the axle shaft using Tool and a suitable press.

Tool number : ST30031000 (—)

Installation

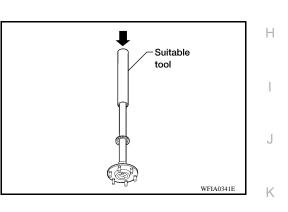
1. Install the new sensor rotor on the axle shaft using a suitable length steel tube and a press. Make sure the sensor rotor is fully seated.

CAUTION:

Do not reuse the old sensor rotor.

 Install the axle shaft assembly. Refer to <u>RAX-20, "Removal and</u> <u>Installation"</u>.

CAUTION: Do not reuse the axle oil seal. The axle oil seal must be replaced every time the axle shaft assembly is removed from the axle shaft housing.



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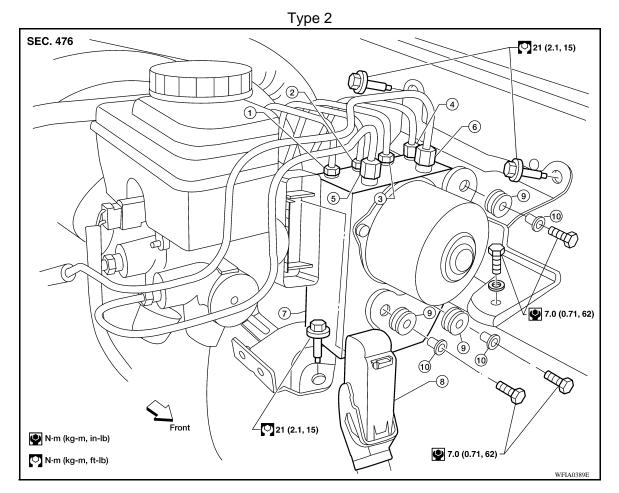
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ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

< REMOVAL AND INSTALLATION >

ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

Removal and Installation



- To rear left disc brake 1. 13.0 N·m (1.3 kg-m, 10 ft-lb) To front right disc brake
- To rear right disc brake 2. 13.0 N·m (1.3 kg-m, 10 ft-lb)

Harness connector

- From the master cylinder secondary side 6. 5. 18.2 N·m (1.9 kg-m, 13 ft-lb)
- 7. ABS actuator and electric unit 8. (control unit)

13.0 N·m (1.3 kg-m, 10 ft-lb)

10. Collar

REMOVAL

4.

- 1. Disconnect the negative battery terminal.
- Drain the brake fluid. Refer to <u>BR-20, "Drain and Refill".</u>
- 3. Disconnect the actuator harness from the ABS actuator and electric unit (control unit). **CAUTION:**
 - To remove the brake tubes, use a flare nut wrench to prevent the flare nuts and brake tubes from being damaged.
 - Be careful not to splash brake fluid on painted areas.
- 4. Disconnect the brake tubes.
- 5. Remove the bolts and remove the ABS actuator and electric unit (control unit).

INSTALLATION

Installation is in the reverse order of removal. CAUTION:

All hoses and piping (tubes) must be free from excessive bending, twisting and pulling.

BRC-152

- To front left disc brake 3. 13.0 N·m (1.3 kg-m, 10 ft-lb)
 - From the master cylinder primary side 18.2 N·m (1.9 kg-m, 13 ft-lb)
- 9. Grommet

ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

< REMOVAL AND INSTALLATION >

[TYPE 2]

- Make sure there is no interference with other parts when turning steering both clockwise and counterclockwise.
- The brake piping is an important safety part. If a brake fluid leak is detected, always disassemble the parts. Replace applicable part with a new one, if necessary.
- Be careful not to splash brake fluid on painted areas; it way cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.
- Do not bend or twist brake hose sharply, or strongly pull it.
- When removing components, cover connections so that no dirt, dust, or other foreign matter gets in.
- Do not reuse drained brake fluid.
- After installation of the ABS actuator and electric unit (control unit), refill brake system with new brake fluid. Then bleed the air from the system. Refer to <u>BR-20, "Bleeding Brake System"</u>.

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BASIC INSPECTION APPLICATION NOTICE

Application Notice

| Service information | Remarks |
|---------------------|--|
| TYPE 1 | ABS |
| TYPE 2 | ABLS/ABS |
| TYPE 3 | HILL DESCENT CONTROL/HILL START ASSIST/VDC/TCS/ABS |

< BASIC INSPECTION >

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

PRECAUTIONS FOR DIAGNOSIS

If steering angle sensor, steering system parts, suspension system parts, ABS actuator and electric unit (control unit) or tires have been replaced, or if wheel alignment has been adjusted, be sure to adjust neutral position of steering angle sensor before driving. Refer to <u>BRC-159</u>, "ADJUSTMENT OF STEERING ANGLE С SENSOR NEUTRAL POSITION : Description".

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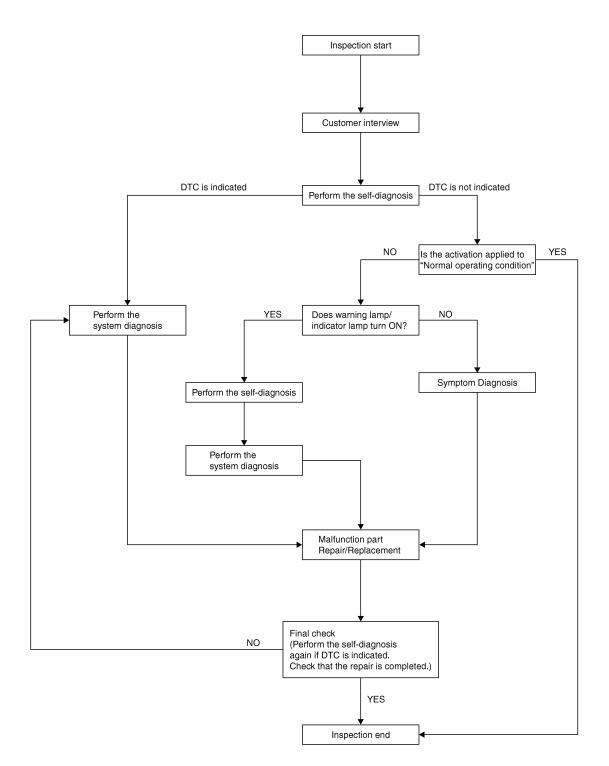
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BRC-155

DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

OVERALL SEQUENCE



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DETAILED FLOW

1. collect the information from the customer

Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using the diagnosis worksheet. Refer to <u>BRC-158</u>, "<u>Diagnostic Work</u> <u>Sheet</u>".

DIAGNOSIS AND REPAIR WORKFLOW

| DIAGNOSIS AND REPAIR WORKFLOW |
|---|
| < BASIC INSPECTION > [TYPE 3] |
| >> GO TO 2 |
| 2.PERFORM THE SELF-DIAGNOSIS |
| Check the DTC display with the self-diagnosis function. Refer to <u>BRC-182</u> , "CONSULT-III Function (ABS)". |
| Is there any DTC displayed? |
| YES >> GO TO 3 NO >> GO TO 4 |
| 3. PERFORM THE SYSTEM DIAGNOSIS |
| |
| Perform the diagnosis applicable to the displayed DTC. Refer to <u>BRC-254, "DTC No. Index"</u> . |
| >> GO TO 7 |
| 4. CHECK THE SYMPTOM THAT IS NOT CONSIDERED A SYSTEM MALFUNCTION |
| Check that the symptom is a normal operation that is not considered a system malfunction. Refer to <u>BRC-264</u> . " <u>Description</u> ". |
| Is the symptom a normal operation? |
| YES >> Inspection End NO >> GO TO 5 |
| 5. CHECK THE WARNING LAMP AND INDICATOR LAMP FOR ILLUMINATION |
| Check that the warning lamp and indicator lamp illuminate. |
| ABS warning lamp: Refer to <u>BRC-235, "Description"</u>. |
| Brake warning lamp: Refer to <u>BRC-236, "Description"</u> . |
| VDC OFF indicator lamp: Refer to <u>BRC-237, "Description"</u>. SLIP indicator lamp: Refer to <u>BRC-239, "Description"</u>. |
| • Hill descent control indicator lamp: Refer to <u>BRC-240, "Description"</u> . |
| Is ON/OFF timing normal? |
| YES >> GO TO 6 |
| NO >> GO TO 2 6.PERFORM THE DIAGNOSIS BY SYMPTOM |
| |
| Perform the diagnosis applicable to the symptom. |
| >> GO TO 7 |
| 7. REPAIR OR REPLACE THE MALFUNCTIONING PARTS |
| Repair or replace the specified malfunctioning parts. |
| |
| >> GO TO 8 |
| 8.FINAL CHECK |
| Perform the self-diagnosis again, and check that the malfunction is repaired completely. After checking, erase the self-diagnosis memory. Refer to <u>BRC-182</u> , <u>"CONSULT-III Function (ABS)"</u> . |
| Is no other DTC present and the repair completed? |
| YES >> Inspection End NO >> GO TO 3 |
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DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

Diagnostic Work Sheet

INFOID:000000004055518

[TYPE 3]

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

SFIA3265E

| INSPECTION AN | ID ADJUSTIMENT |
|--|---|
| < BASIC INSPECTION > | [TYPE 3] |
| INSPECTION AND ADJUSTMENT | |
| ADDITIONAL SERVICE WHEN REPLAC | CING CONTROL UNIT |
| ADDITIONAL SERVICE WHEN REPLACI | NG CONTROL UNIT : Description |
| After replacing the ABS actuator and electric unit (cont • Neutral position adjustment for the steering angle se • Calibration of the decel G sensor | |
| ADDITIONAL SERVICE WHEN REPLACI | NG CONTROL UNIT : Special Repair Re- |
| 1. PERFORM THE NEUTRAL POSITION ADJUSTME | ENT FOR THE STEERING ANGLE SENSOR |
| Perform the neutral position adjustment for the steerin | a angle sensor. |
| | |
| Special Repair Requirement", GO TO 2 | STEERING ANGLE SENSOR NEUTRAL POSITION : |
| | |
| 2. PERFORM CALIBRATION OF THE DECEL G SEN | NSOR |
| PERFORM CALIBRATION OF THE DECEL G SEN Perform calibration of the decel G sensor. | NSOR |
| Perform calibration of the decel G sensor. >> Refer to <u>BRC-160. "CALIBRATION OF DE</u> ADJUSTMENT OF STEERING ANGLE S | ECEL G SENSOR : Special Repair Requirement". |
| Perform calibration of the decel G sensor. >> Refer to <u>BRC-160. "CALIBRATION OF DE</u> ADJUSTMENT OF STEERING ANGLE SE ADJUSTMENT OF STEERING ANGLE SE | ECEL G SENSOR : Special Repair Requirement". SENSOR NEUTRAL POSITION ENSOR NEUTRAL POSITION : Description |
| Perform calibration of the decel G sensor. >> Refer to <u>BRC-160. "CALIBRATION OF DE</u> ADJUSTMENT OF STEERING ANGLE SE ADJUSTMENT OF STEERING ANGLE SE | ECEL G SENSOR : Special Repair Requirement". SENSOR NEUTRAL POSITION ENSOR NEUTRAL POSITION : Description INFOID:000000000000000000000000000000000000 |
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| Perform calibration of the decel G sensor. >> Refer to <u>BRC-160, "CALIBRATION OF DE</u> ADJUSTMENT OF STEERING ANGLE SE ADJUSTMENT OF STEERING ANGLE SE Refer to the table below to determine if adjustment of se Situation | ECEL G SENSOR : Special Repair Requirement". SENSOR NEUTRAL POSITION ENSOR NEUTRAL POSITION : Description INFOID:000000004055521 steering angle sensor neutral position is required. x: Required -: Not required |
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ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

CAUTION:

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

1.ALIGN THE VEHICLE STATUS

Stop vehicle with front wheels in straight-ahead position.

INSPECTION AND ADJUSTMENT

< BASIC INSPECTION >

>> GO TO 2

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

- 1. On the CONSULT-III screen, touch "WORK SUPPORT" and "ST ANG SEN ADJUSTMENT" in order.
- 2. Touch "START". CAUTION:

Do not touch steering wheel while adjusting steering angle sensor.

3. After approximately 10 seconds, touch "END". NOTE:

After approximately 60 seconds, it ends automatically.

4. Turn ignition switch OFF, then turn it ON again. CAUTION:

Be sure to perform above operation.

>> GO TO 3

3.CHECK DATA MONITOR

1. Run vehicle with front wheels in straight-ahead position, then stop.

2. Select "DATA MONITOR". Then make sure "STR ANGLE SIG" is within 0±2.5°.

Is the steering angle within the specified range?

YES >> GO TO 4

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

4.ERASE THE SELF-DIAGNOSIS MEMORY

Erase the self-diagnosis memory of the ABS actuator and electric unit (control unit) and ECM.

ABS actuator and electric unit (control unit): Refer to <u>BRC-182, "CONSULT-III Function (ABS)"</u>.

• ECM: Refer to EC-523, "CONSULT-III Function (ENGINE)".

Are the memories erased?

YES >> Inspection End

NO >> Check the items indicated by the self-diagnosis.

CALIBRATION OF DECEL G SENSOR

CALIBRATION OF DECEL G SENSOR : Description

INFOID:000000004055523

Refer to the table below to determine if calibration of the decel G sensor is required.

×: Required -: Not required

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

CALIBRATION OF DECEL G SENSOR : Special Repair Requirement

INFOID:000000004055524

CALIBRATION OF DECEL G SENSOR CAUTION: To calibrate the decel G sensor, make sure to use CONSULT-III (Calibration cannot be done without CONSULT-III)

INSPECTION AND ADJUSTMENT

| < BASIC INSPECTION > [T | YPE 3] |
|---|--------|
| 1. ALIGN THE VEHICLE STATUS | |
| Stop vehicle with front wheels in straight-ahead position. | |
| >> GO TO 2 | |
| 2.PERFORM CALIBRATION OF DECEL G SENSOR | |
| On the CONSULT-III screen, touch "WORK SUPPORT" and "DECEL G SEN CALIBRATION" in o Touch "START". After approximately 10 seconds, touch "END". NOTE: After approximately 60 seconds, it ends automatically. | rder. |
| 4. Turn ignition switch OFF, then turn it ON again. | |
| CAUTION: Be sure to perform above operation. | |
| | |
| >> GO TO 3 3.CHECK DATA MONITOR | |
| | |
| Run vehicle with front wheels in straight-ahead position, then stop. Select "DATA MONITOR". Then make sure "DECEL G SEN" is within ±. | |
| Is the inspection result normal? | |
| YES >> GO TO 4 | |
| NO >> Perform calibration of decel G sensor again, GO TO 1 4.ERASE THE SELF-DIAGNOSIS MEMORY | |
| | |
| Erase the self-diagnosis memory of the ABS actuator and electric unit (control unit) and ECM. ABS actuator and electric unit (control unit): Refer to <u>BRC-182</u>, "<u>CONSULT-III Function (ABS)</u>". ECM: Refer to <u>EC-523</u>, "<u>CONSULT-III Function (ENGINE</u>)". | |
| Are the memories erased? | |
| YES >> Inspection End | |
| NO >> Check the items indicated by the self-diagnosis. | |
| | |
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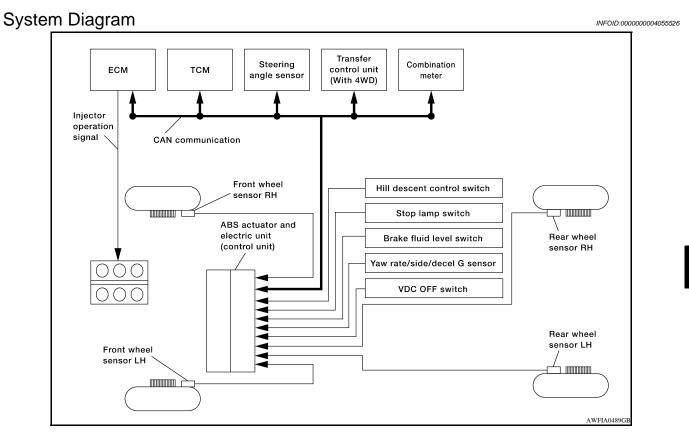
FUNCTION DIAGNOSIS APPLICATION NOTICE

Application Notice

| Service information | Remarks |
|---------------------|--|
| TYPE 1 | ABS |
| TYPE 2 | ABLS/ABS |
| TYPE 3 | HILL DESCENT CONTROL/HILL START ASSIST/VDC/TCS/ABS |

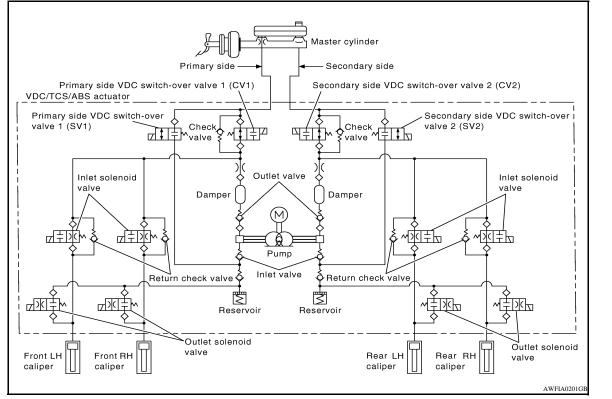
< FUNCTION DIAGNOSIS >

VDC



VDC

HYDRAULIC CIRCUIT DIAGRAM



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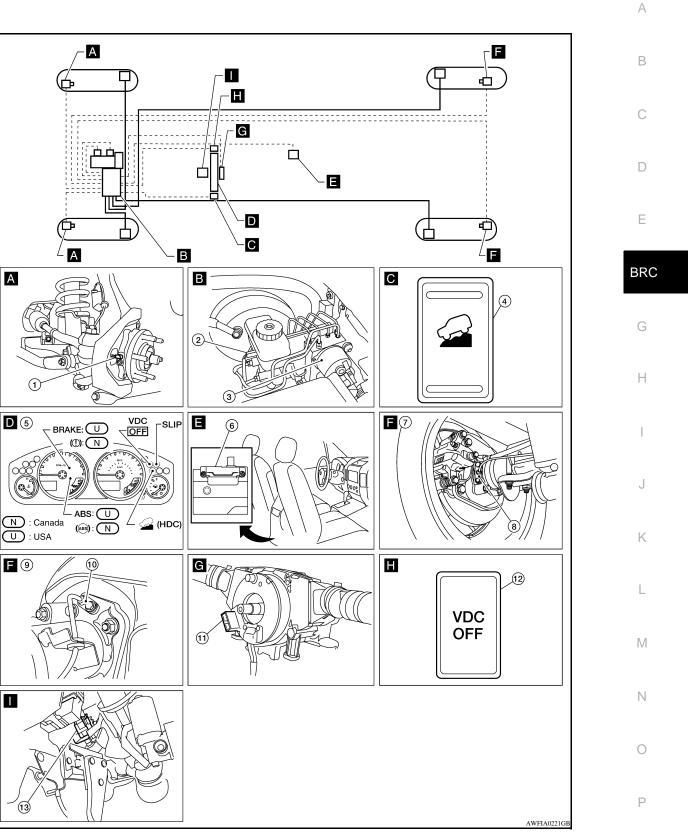
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System Description

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

Component Parts Location



VDC

- 1. Front wheel sensor LH E18 Front wheel sensor RH E117
- 4. Hill descent control switch M155 5.
- 7. C200 rear axle

Brake fluid level switch E21

2.

8.

- Combination meter M24
- Rear wheel sensor LH C11 Rear wheel sensor RH C10
- 3. ABS actuator and electric unit (control unit) E127
- 6. Yaw rate/side/decel G sensor B73
- 9. M226 rear axle

BRC-165

[TYPE 3]

< FUNCTION DIAGNOSIS >

10. Rear wheel sensor LH C11 Rear wheel sensor RH C10

Steering angle sensor (behind spiral ca- 12. VDC OFF switch M154 ble) M47 (Steering wheel removed for clarity)

13. Stop lamp switch E39

Component Description

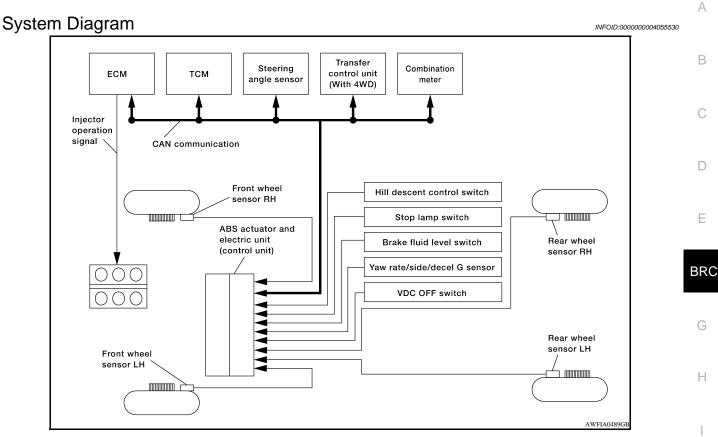
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| Component parts | | Reference |
|---|---|------------------------|
| | Pump | PPC 107 "Description" |
| ABS actuator and electric unit (control unit) | Motor | BRC-197, "Description" |
| | Actuator relay | BRC-215, "Description" |
| | Solenoid valve | BRC-207, "Description" |
| | VDC switch-over valve (CV1, CV2, SV1, SV2) | BRC-225, "Description" |
| Wheel sensor | | BRC-202, "Description" |
| Yaw rate/side/decel G sensor | | BRC-199, "Description" |
| Brake fluid level switch | | BRC-217, "Description" |
| Steering angle sensor | | BRC-217, "Description" |
| Stop lamp switch | | BRC-205, "Description" |
| VDC OFF switch | | BRC-233, "Description" |
| Hill descent control switch | | BRC-230, "Description" |
| ABS warning lamp | | BRC-235, "Description" |
| Brake warning lamp | | BRC-236, "Description" |
| VDC OFF indicator lamp | | BRC-237, "Description" |
| SLIP indicator lamp | | BRC-239, "Description" |
| Hill descent control indicator lamp | | BRC-240, "Description" |

VDC

< FUNCTION DIAGNOSIS >

TCS



System Description

INFOID:000000004055531

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

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[TYPE 3]

Component Parts Location

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- 1. Front wheel sensor LH E18 Front wheel sensor RH E117
- 4. Hill descent control switch M155 5.
- 7. C200 rear axle

Brake fluid level switch E21

2.

8.

Combination meter M24

Rear wheel sensor LH C11 Rear wheel sensor RH C10

- 3. ABS actuator and electric unit (control unit) E127
- 6. Yaw rate/side/decel G sensor B73
- 9. M226 rear axle

< FUNCTION DIAGNOSIS >

10. Rear wheel sensor LH C11 Rear wheel sensor RH C10

Steering angle sensor (behind spiral ca- 12. VDC OFF switch M154 ble) M47 (Steering wheel removed for clarity)

13. Stop lamp switch E39

Component Description

INFOID:000000004458377

| Component parts | | Reference | С |
|---|---|------------------------|-----|
| | Pump | PDC 107 "Description" | |
| | Motor | BRC-197, "Description" | |
| ABS actuator and electric unit (control unit) | Actuator relay | BRC-215, "Description" | D |
| | Solenoid valve | BRC-207, "Description" | |
| | VDC switch-over valve (CV1, CV2, SV1, SV2) | BRC-225, "Description" | E |
| Wheel sensor | | BRC-202, "Description" | |
| Yaw rate/side/decel G sensor | | BRC-199, "Description" | BRC |
| Brake fluid level switch | | BRC-217, "Description" | |
| Steering angle sensor | | BRC-217, "Description" | |
| Stop lamp switch | | BRC-205, "Description" | G |
| VDC OFF switch | | BRC-233, "Description" | |
| Hill descent control switch | | BRC-230, "Description" | Н |
| ABS warning lamp | | BRC-235, "Description" | |
| Brake warning lamp | | BRC-236, "Description" | |
| VDC OFF indicator lamp | | BRC-237, "Description" | |
| SLIP indicator lamp | | BRC-239, "Description" | |
| Hill descent control indicator lamp | | BRC-240, "Description" | |

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TCS

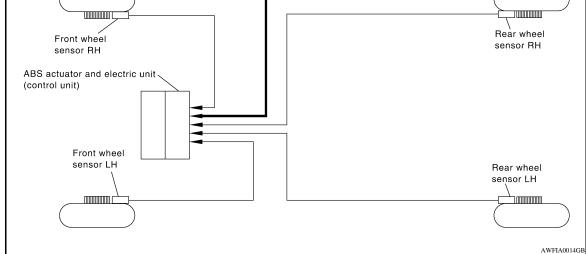
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ABS

System Diagram

ABS



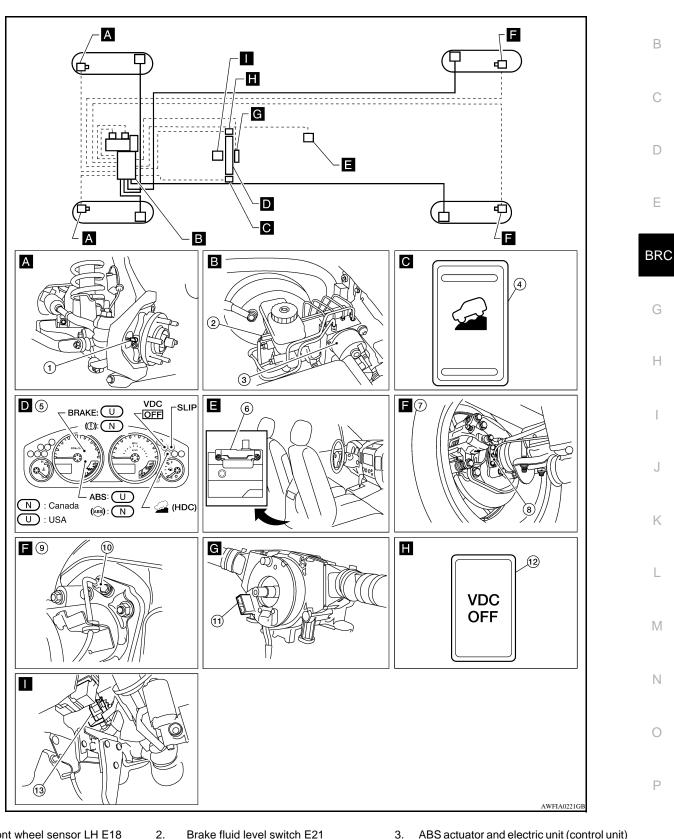
System Description

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

Component Parts Location

INFOID:000000004458378

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ABS

- Front wheel sensor LH E18 1. Front wheel sensor RH E117
- Hill descent control switch M155 5. 4.
- 7. C200 rear axle

Brake fluid level switch E21

Combination meter M24

8.

Rear wheel sensor LH C11 Rear wheel sensor RH C10

- 3. ABS actuator and electric unit (control unit) E127
- Yaw rate/side/decel G sensor B73 6.
- 9. M226 rear axle

< FUNCTION DIAGNOSIS >

10. Rear wheel sensor LH C11 Rear wheel sensor RH C10

Steering angle sensor (behind spiral ca- 12. VDC OFF switch M154 ble) M47 (Steering wheel removed for clarity)

13. Stop lamp switch E39

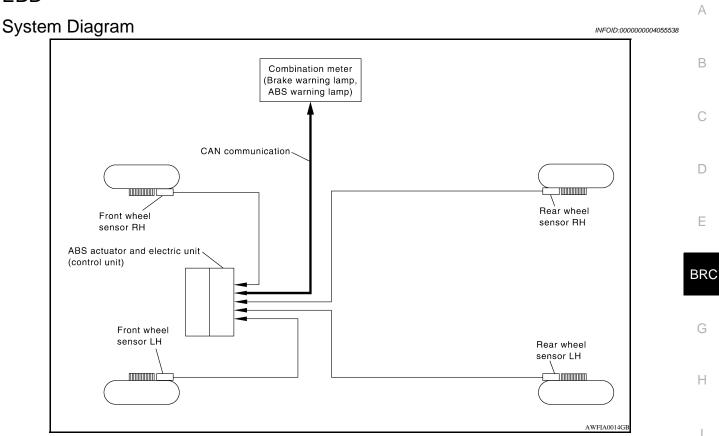
Component Description

INFOID:000000004458379

[TYPE 3]

| Component parts | | Reference |
|---|---|------------------------|
| ABS actuator and electric unit (control unit) | Pump | |
| | Motor | BRC-197, "Description" |
| | Actuator relay | BRC-215, "Description" |
| | Solenoid valve | BRC-207, "Description" |
| | VDC switch-over valve (CV1, CV2, SV1, SV2) | BRC-225, "Description" |
| Wheel sensor | | BRC-202, "Description" |
| Yaw rate/side/decel G sensor | | BRC-199, "Description" |
| Brake fluid level switch | | BRC-217, "Description" |
| Steering angle sensor | | BRC-217, "Description" |
| Stop lamp switch | | BRC-205, "Description" |
| VDC OFF switch | | BRC-233, "Description" |
| Hill descent control switch | | BRC-230, "Description" |
| ABS warning lamp | | BRC-235, "Description" |
| Brake warning lamp | | BRC-236, "Description" |
| VDC OFF indicator lamp | | BRC-237, "Description" |
| SLIP indicator lamp | | BRC-239, "Description" |
| Hill descent control indicator lamp | | BRC-240, "Description" |

EBD



EBD

System Description

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

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INFOID:000000004055539

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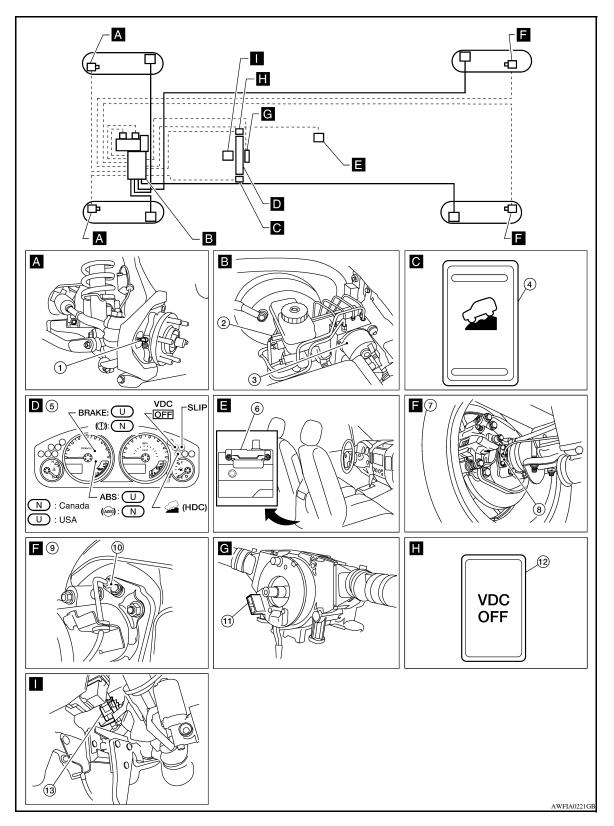
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Component Parts Location

INFOID:000000004458380

[TYPE 3]



- 1. Front wheel sensor LH E18 Front wheel sensor RH E117
- 4. Hill descent control switch M155 5.
- 7. C200 rear axle

Brake fluid level switch E21

2.

8.

Combination meter M24

Rear wheel sensor LH C11 Rear wheel sensor RH C10

- 3. ABS actuator and electric unit (control unit) E127
- 6. Yaw rate/side/decel G sensor B73
- 9. M226 rear axle

< FUNCTION DIAGNOSIS >

10. Rear wheel sensor LH C11 Rear wheel sensor RH C10

Steering angle sensor (behind spiral ca- 12. VDC OFF switch M154 ble) M47 (Steering wheel removed for clarity)

EBD

13. Stop lamp switch E39

Component Description

INFOID:000000004458381

| Component parts | | Reference | С |
|---|---|------------------------|-----|
| ABS actuator and electric unit (control unit) | Pump | PPC 107 "Description" | |
| | Motor | BRC-197, "Description" | |
| | Actuator relay | BRC-215, "Description" | D |
| | Solenoid valve | BRC-207, "Description" | |
| | VDC switch-over valve (CV1, CV2, SV1, SV2) | BRC-225, "Description" | E |
| Wheel sensor | | BRC-202, "Description" | |
| Yaw rate/side/decel G sensor | | BRC-199, "Description" | BRO |
| Brake fluid level switch | | BRC-217, "Description" | |
| Steering angle sensor | | BRC-217, "Description" | |
| Stop lamp switch | | BRC-205, "Description" | G |
| VDC OFF switch | | BRC-233, "Description" | |
| Hill descent control switch | | BRC-230, "Description" | Н |
| ABS warning lamp | | BRC-235, "Description" | |
| Brake warning lamp | | BRC-236, "Description" | |
| VDC OFF indicator lamp | | BRC-237, "Description" | |
| SLIP indicator lamp | | BRC-239, "Description" | |
| Hill descent control indicator lamp | BRC-240, "Description" | | |

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BRC-175

[TYPE 3]

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HILL DESCENT CONTROL

System Description

- The hill descent control system will help maintain vehicle speed when driving under 25-35 km/h (15-21 MPH) on steeper downhill grades. Hill descent control will provide braking allowing the driver to concentrate on steering while reducing the burden of brake and accelerator operation.
- To operate the system, set the 4WD switch to 4H or 4LO and push the hill descent control switch. The hill descent control indicator in the combination meter will turn on. While hill descent control is operating, the stop/tail lamps will illuminate.
- If the accelerator or brake pedal is depressed while the hill descent control system is on, the system will stop operating.
- During hill descent control operation, a mechanical noise may be heard. This is normal.
- Electrical system diagnosis by CONSULT-III is available.

HILL DESCENT CONTROL

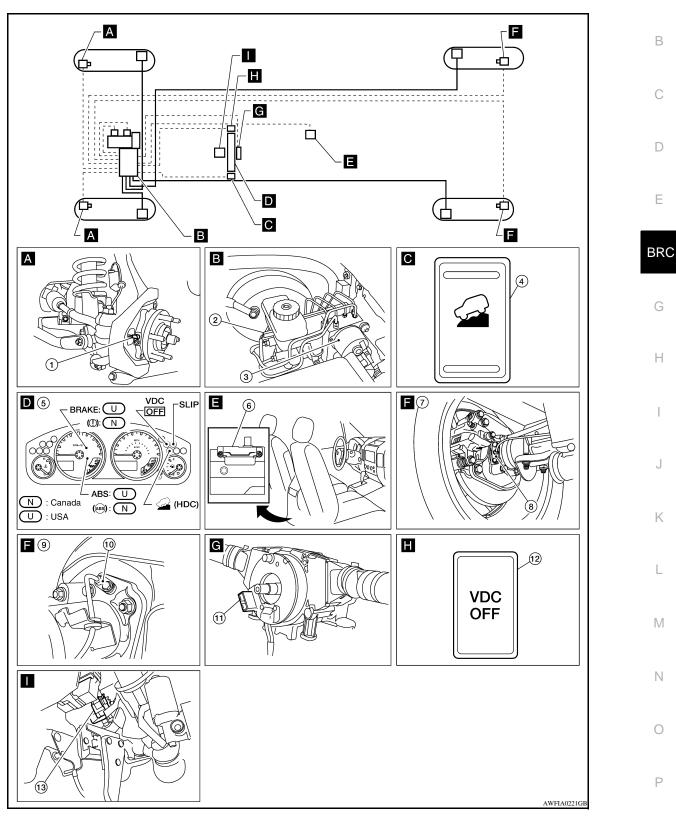
< FUNCTION DIAGNOSIS >

Component Parts Location

[TYPE 3]

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- 1. Front wheel sensor LH E18 Front wheel sensor RH E117
- 4. Hill descent control switch M155 5.
- 7. C200 rear axle

Brake fluid level switch E21

2.

8.

Combination meter M24

- Rear wheel sensor LH C11 Rear wheel sensor RH C10
- 3. ABS actuator and electric unit (control unit) E127
- 6. Yaw rate/side/decel G sensor B73
- 9. M226 rear axle

HILL DESCENT CONTROL

< FUNCTION DIAGNOSIS >

- 10. Rear wheel sensor LH C11 Rear wheel sensor RH C10
- Steering angle sensor (behind spiral ca- 12. VDC OFF switch M154 ble) M47 (Steering wheel removed for clarity)
- 13. Stop lamp switch E39

Component Description

INFOID:000000004458383

| Component parts | | Reference |
|---|---|------------------------|
| ABS actuator and electric unit (control unit) | Pump | |
| | Motor | BRC-197, "Description" |
| | Actuator relay | BRC-215, "Description" |
| | Solenoid valve | BRC-207, "Description" |
| | VDC switch-over valve (CV1, CV2, SV1, SV2) | BRC-225, "Description" |
| Wheel sensor | | BRC-202, "Description" |
| Yaw rate/side/decel G sensor | | BRC-199, "Description" |
| Brake fluid level switch | | BRC-217, "Description" |
| Steering angle sensor | | BRC-217, "Description" |
| Stop lamp switch | | BRC-205, "Description" |
| VDC OFF switch | | BRC-233, "Description" |
| Hill descent control switch | | BRC-230, "Description" |
| ABS warning lamp | | BRC-235, "Description" |
| Brake warning lamp | | BRC-236, "Description" |
| VDC OFF indicator lamp | | BRC-237, "Description" |
| SLIP indicator lamp | | BRC-239, "Description" |
| Hill descent control indicator lamp | | BRC-240, "Description" |

HILL START ASSIST

< FUNCTION DIAGNOSIS >

HILL START ASSIST

System Description

- The hill start assist system will assist the driver by applying the brake automatically and preventing the vehicle from rolling backward when starting on an uphill.
- The maximum holding time is 2 seconds. After 2 seconds, the vehicle will begin to roll back gradually and then hill start assist will stop operating completely.

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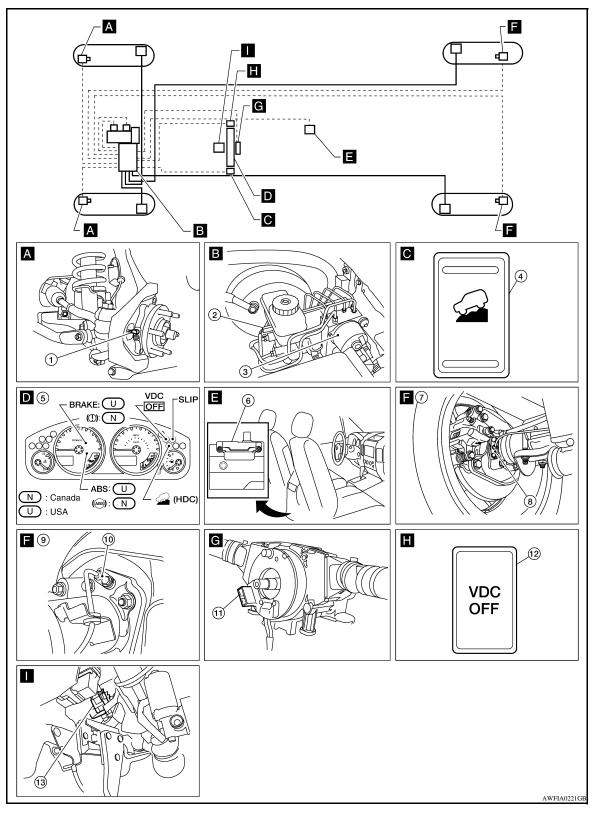
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HILL START ASSIST

< FUNCTION DIAGNOSIS >

Component Parts Location

INFOID:000000004458384



- 1. Front wheel sensor LH E18 Front wheel sensor RH E117
- 4. Hill descent control switch M155 5.
- 7. C200 rear axle

Brake fluid level switch E21

2.

8.

Combination meter M24

Rear wheel sensor LH C11 Rear wheel sensor RH C10

- 3. ABS actuator and electric unit (control unit) E127
- 6. Yaw rate/side/decel G sensor B73
- 9. M226 rear axle

HILL START ASSIST

< FUNCTION DIAGNOSIS >

- 10. Rear wheel sensor LH C11 Rear wheel sensor RH C10
- Steering angle sensor (behind spiral ca- 12. VDC OFF switch M154 ble) M47 (Steering wheel removed for clarity)
- [TYPE 3]

13. Stop lamp switch E39

Component Description

INFOID:000000004458385

| Compo | Component parts | | С |
|---|---|------------------------|-----|
| Pump | | BRC-197, "Description" | |
| | Motor | | D |
| ABS actuator and electric unit (control unit) | Actuator relay | BRC-215, "Description" | D |
| | Solenoid valve | BRC-207, "Description" | |
| | VDC switch-over valve (CV1, CV2, SV1, SV2) | BRC-225, "Description" | E |
| Wheel sensor | | BRC-202, "Description" | |
| Yaw rate/side/decel G sensor | | BRC-199, "Description" | BR |
| Brake fluid level switch | | BRC-217, "Description" | |
| Steering angle sensor | | BRC-217, "Description" | |
| Stop lamp switch | | BRC-205. "Description" | — G |
| VDC OFF switch | | BRC-233, "Description" | |
| Hill descent control switch | | BRC-230, "Description" | Н |
| ABS warning lamp | | BRC-235, "Description" | |
| Brake warning lamp | | BRC-236, "Description" | |
| VDC OFF indicator lamp | | BRC-237, "Description" | |
| SLIP indicator lamp | | BRC-239, "Description" | |
| Hill descent control indicator lamp | | BRC-240, "Description" | |

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

< FUNCTION DIAGNOSIS >

[TYPE 3]

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

CONSULT-III Function (ABS)

INFOID:000000004055548

FUNCTION

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

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

SELF-DIAGNOSTIC RESULT MODE

Operation Procedure

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

How to Erase Self-diagnosis Results

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

CAUTION: If memory cannot be erased, perform applicable diagnosis.

NOTE:

- When the wheel sensor malfunctions, after inspecting the wheel sensor system, the ABS warning lamp, VDC OFF indicator lamp, SLIP indicator lamp and brake warning lamp will not turn OFF even when the system is normal unless the vehicle is driving at approximately 30 km/h (19 MPH) or more for approximately 1 minute.
- Brake warning lamp will turn ON in case of parking brake operation (when switch is ON) or of brake fluid level switch operation (when brake fluid is insufficient).
- VDC OFF switch should not stay "ON" position.

Display Item List Refer to <u>BRC-254, "DTC No. Index"</u>.

DATA MONITOR MODE

Display Item List

| 14 | Data | a monitor item sele | | | |
|-----------------------------|----------------------|---------------------|------------------------|--|--|
| Item (Unit) | ECU INPUT SIGNALS | MAIN SIGNALS | SELECTION FROM MENU | Remarks | |
| GEAR (1, 2, 3, 4, 5) | × | × | × | Gear position determined by TCM is displayed. | |
| FR RH SENSOR (km/h, MPH) | × | × | × | Wheel speed calculated by front RH wheel sensor signal is displayed. | |
| FR LH SENSOR (km/h, MPH) | × | × | × | Wheel speed calculated by front LH wheel sensor signal is displayed. | |
| RR RH SENSOR (km/h, MPH) | × | × | × | Wheel speed calculated by rear RH wheel sensor signal is displayed. | |

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

< FUNCTION DIAGNOSIS >

[TYPE 3]

| | Data monitor item selection | | | |
|--------------------------------------|-----------------------------|-----------------|------------------------|---|
| ltem (Unit) | ECU INPUT SIGNALS | MAIN SIGNALS | SELECTION FROM MENU | Remarks |
| RR LH SENSOR (km/h, MPH) | × | × | × | Wheel speed calculated by rear LH wheel sensor signal is displayed. |
| BATTERY VOLT (V) | × | × | × | Voltage supplied to ABS actuator and electric unit (control unit) is dis- played. |
| N POSI SIG (ON/OFF) | - | - | × | Shift position judged by PNP switch signal. |
| P POSI SIG (ON/OFF) | - | - | × | Shift position judged by PNP switch signal. |
| ACCEL POS SIG (%) | × | - | × | Throttle valve open/close status judged by CAN communication signal is displayed. |
| ENGINE SPEED (rpm) | × | × | × | Engine speed judged by CAN com- munication signal is displayed. |
| STR ANGLE SIG (deg) | × | - | × | Steering angle detected by steering angle sensor is displayed. |
| YAW RATE SEN (d/s) | × | × | × | Yaw rate detected by yaw rate sen- sor is displayed. |
| SIDE G-SENSOR (m/s ²) | × | _ | × | Transverse acceleration detected by side G-sensor is displayed. |
| STOP LAMP SW (ON/OFF) | × | × | × | Stop lamp switch (ON/OFF) status is displayed. |
| OFF SW (ON/OFF) | × | × | × | VDC OFF switch (ON/OFF) status is displayed. |
| ABS WARN LAMP (ON/OFF) | - | × | × | ABS warning lamp (ON/OFF) status is displayed. |
| SLIP LAMP (ON/OFF) | - | × | × | SLIP indicator lamp (ON/OFF) sta- tus is displayed. |
| FR LH IN SOL (ON/OFF) | - | × | × | Front LH IN ABS solenoid (ON/ OFF) status is displayed. |
| FR LH OUT SOL (ON/OFF) | - | × | × | Front LH OUT ABS solenoid (ON/ OFF) status is displayed. |
| RR RH IN SOL (ON/OFF) | - | × | × | Rear RH IN ABS solenoid (ON/ OFF) status is displayed. |
| RR RH OUT SOL (ON/OFF) | - | × | × | Rear RH OUT ABS solenoid (ON/ OFF) status is displayed. |
| FR RH IN SOL (ON/OFF) | - | × | × | Front RH IN ABS solenoid (ON/ OFF) status is displayed. |
| FR RH OUT SOL (ON/OFF) | - | × | × | Front RH OUT ABS solenoid (ON/ OFF) status is displayed. |
| RR LH IN SOL (ON/OFF) | - | × | × | Rear LH IN ABS solenoid (ON/OFF) status is displayed. |
| RR LH OUT SOL (ON/OFF) | - | × | × | Rear LH OUT ABS solenoid (ON/ OFF) status is displayed. |
| OFF LAMP (ON/OFF) | - | × | × | OFF Lamp (ON/OFF) status is displayed. |
| MOTOR RELAY (ON/OFF) | - | × | × | ABS motor relay signal (ON/OFF) status is displayed. |
| ACTUATOR RLY (ON/OFF) | - | × | × | ABS actuator relay signal (ON/OFF) status is displayed. |

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

< FUNCTION DIAGNOSIS >

[TYPE 3]

| ltom | Data | a monitor item sele | | |
|-------------------------------|----------------------|---------------------|------------------------|--|
| Item (Unit) | ECU INPUT SIGNALS | MAIN SIGNALS | SELECTION FROM MENU | Remarks |
| CV1 (ON/OFF) | _ | _ | × | Front side switch-over solenoid valve (cut valve) (ON/OFF) status is displayed. |
| CV2 (ON/OFF) | _ | _ | × | Rear side switch-over solenoid valve (cut-valve) (ON/OFF) status is displayed. |
| SV1 (ON/OFF) | _ | _ | × | Front side switch-over solenoid valve (suction valve) (ON/OFF) status is displayed. |
| SV2 (ON/OFF) | - | _ | × | Rear side switch-over solenoid valve (suction valve) (ON/OFF) sta- tus is displayed. |
| VDC FAIL SIG (ON/OFF) | _ | _ | × | VDC fail signal (ON/OFF) status is displayed. |
| TCS FAIL SIG (ON/OFF) | _ | _ | × | TCS fail signal (ON/OFF) status is displayed. |
| ABS FAIL SIG (ON/OFF) | _ | _ | × | ABS fail signal (ON/OFF) status is displayed. |
| EBD FAIL SIG (ON/OFF) | _ | _ | × | EBD fail signal (ON/OFF) status is displayed. |
| FLUID LEV SW (ON/OFF) | × | _ | × | Brake fluid level switch (ON/OFF) status is displayed. |
| EBD SIGNAL (ON/OFF) | _ | _ | × | EBD operation (ON/OFF) status is displayed. |
| ABS SIGNAL (ON/OFF) | _ | _ | × | ABS operation (ON/OFF) status is displayed. |
| TCS SIGNAL (ON/OFF) | _ | _ | × | TCS operation (ON/OFF) status is displayed. |
| VDC SIGNAL (ON/OFF) | _ | _ | × | VDC operation (ON/OFF) status is displayed. |
| EBD WARN LAMP (ON/OFF) | _ | _ | × | Brake warning lamp (ON/OFF) sta- tus is displayed. |
| SLCT LVR POSI (P, R, N, D) | × | × | × | Shift position judged by PNP switch signal. |
| R POSI SIG (ON/OFF) | _ | _ | × | Shift position judged by PNP switch signal. |
| 2WD/4WD (2WD/4WD) | _ | _ | × | It recognizes on software whether it is 2WD and whether it is in 4WD state. |
| CRANKING SIG (ON/OFF) | _ | _ | × | The input state of the key SW START position signal is displayed. |
| DECEL G-SEN (G) | × | × | × | Longitudinal acceleration detected by decel G-sensor is displayed. |
| PRESS SENSOR (bar) | × | _ | × | Brake pressure detected by pres- sure sensor is displayed. |
| HDC SW (ON/OFF) | _ | _ | × | Hill descent control switch (ON/ OFF) status is displayed. |
| HDC SIG (ON/OFF) | _ | _ | × | Hill descent control operation (ON/ OFF) status is displayed. |
| HSA SIG (ON/OFF) | - | _ | × | Hill start assist operation (ON/OFF) status is displayed. |

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

< FUNCTION DIAGNOSIS >

[TYPE 3]

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| ltem | Dat | Data monitor item selection | | | |
|--------------------------|----------------------|-----------------------------|------------------------|---|---|
| (Unit) | ECU INPUT SIGNALS | MAIN SIGNALS | SELECTION FROM MENU | Remarks | A |
| DLOCK SW (ON/OFF) | _ | _ | × | Condition of differential lock mode switch (ON/OFF) is displayed. | В |
| DLOCK CHG SW (ON/OFF) | _ | _ | × | Condition of differential lock position switch (ON/OFF) is displayed. | |
| STP ON RLY (ON/OFF) | - | _ | × | Stop lamp relay signal (ON/OFF) status is displayed. | С |
| ×: Applicable | | | | | _ |
| -: Not applicable | | | | | D |

ACTIVE TEST MODE

CAUTION:

- Do not perform active test while driving vehicle.
- Make sure to completely bleed air from brake system.
- The active test cannot be performed with the ABS warning lamp, VDC OFF indicator lamp, SLIP indicator lamp or brake warning lamp on.
- ABS warning lamp, VDC OFF indicator lamp, SLIP indicator lamp and brake warning lamp are on during active test.

NOTE:

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

Test Item

SOLENOID VALVE

- When performing an active test of the ABS function, select the "MAIN SIGNALS" for each test item. In addition, when performing an active test of the VDC/TCS function, select the item menu for each test item.
- For ABS solenoid valve, touch "Up", "Keep", and "Down" on the display screen. For ABS solenoid valve (ACT), touch "Up", "ACT UP", "ACT KEEP" and confirm that solenoid valves operate as shown in the table below.

| Oneration | | AE | 3S solenoid v | alve | ABS solenoid valve (ACT) | | |
|--------------------------|---------------|-----|---------------|------|--------------------------|--------|----------|
| Operation – | | Up | Keep | Down | Up | ACT UP | ACT KEEP |
| FR RH SOL | FR RH IN SOL | Off | On | On | — | — | _ |
| | FR RH OUT SOL | Off | Off | On* | _ | _ | _ |
| FR LH SOL | FR LH IN SOL | Off | On | On | _ | _ | _ |
| | FR LH OUT SOL | Off | Off | On* | — | — | _ |
| RR RH SOL | RR RH IN SOL | Off | On | On | — | — | _ |
| KK KH SUL | RR RH OUT SOL | Off | Off | On* | _ | _ | _ |
| | RR LH IN SOL | Off | On | On | _ | _ | _ |
| RR LH SOL | RR LH OUT SOL | Off | Off | On* | — | — | _ |
| | FR RH IN SOL | _ | _ | — | Off | Off | Off |
| | FR RH OUT SOL | _ | _ | — | Off | Off | Off |
| FR RH ABS SOLENOID (ACT) | CV1 | _ | _ | _ | Off | On | On |
| | SV1 | _ | _ | — | Off | On* | Off |
| | FR LH IN SOL | _ | — | — | Off | Off | Off |
| | FR LH OUT SOL | _ | — | _ | Off | Off | Off |
| FR LH ABS SOLENOID (ACT) | CV1 | | _ | _ | Off | On | On |
| | SV1 | | _ | _ | Off | On* | Off |

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

< FUNCTION DIAGNOSIS >

[TYPE 3]

| Operation | | ABS solenoid valve | | | ABS solenoid valve (ACT) | | |
|--------------------------|----------------------|--------------------|------|------|--------------------------|--------|----------|
| Operation | | Up | Keep | Down | Up | ACT UP | ACT KEEP |
| | RR RH IN SOL | _ | — | — | Off | Off | Off |
| RR RH ABS SOLENOID (ACT) | RR RH OUT SOL | _ | — | — | Off | Off | Off |
| KK KH ABS SOLENOID (ACT) | CV2 | _ | — | — | Off | On | On |
| | SV2 | - | — | — | Off | On* | Off |
| RR LH ABS SOLENOID (ACT) | RR LH IN SOL | _ | _ | _ | Off | Off | Off |
| | RR LH OUT SOL | | — | — | Off | Off | Off |
| | CV2 | | — | — | Off | On | On |
| | SV2 | | — | — | Off | On* | Off |
| REAR SOL | This item is not use | d for this mo | del. | 1 | 1 | | . |

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

ABS MOTOR

• Touch "On" and "Off" on screen. Make sure motor relay and actuator relay operates as shown in table below.

| Operation | On | Off |
|--------------|----|-----|
| MOTOR RELAY | On | Off |
| ACTUATOR RLY | On | On |

COMPONENT DIAGNOSIS APPLICATION NOTICE

Application Notice

INFOID:000000004055549

[TYPE 3]

| Service information | Remarks | C |
|---------------------|--|---|
| TYPE 1 | ABS | C |
| TYPE 2 | ABLS/ABS | |
| TYPE 3 | HILL DESCENT CONTROL/HILL START ASSIST/VDC/TCS/ABS | D |

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C1101, C1102, C1103, C1104 WHEEL SENSOR-1

< COMPONENT DIAGNOSIS >

C1101, C1102, C1103, C1104 WHEEL SENSOR-1

Description

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

DTC Logic

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DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|-------|----------------|---|---|
| C1101 | RR RH SENSOR-1 | Circuit of rear RH wheel sensor is open. Or when the sensor power voltage is outside the standard. | |
| C1102 | RR LH SENSOR-1 | Circuit of rear LH wheel sensor is open. Or when the sensor power voltage is outside the standard. | Harness or connectorWheel sensor |
| C1103 | FR RH SENSOR-1 | Circuit of front RH wheel sensor is open. Or when the sensor power voltage is outside the standard. | ABS actuator and electric unit (control unit) |
| C1104 | FR LH SENSOR-1 | Circuit of front LH wheel sensor is open. Or when the sensor power voltage is outside the standard. | |

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-188</u>, "Diagnosis Procedure".

NO >> Inspection End

Diagnosis Procedure

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CAUTION:

Do not check between wheel sensor terminals.

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

Disconnect the ABS actuator and electric unit (control unit) connector and wheel sensor of malfunctioning code.

Check the terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

2.CHECK WHEEL SENSOR OUTPUT SIGNAL

1. Connect ABS active wheel sensor tester (J-45741) to wheel sensor using appropriate adapter.

2. Turn on the ABS active wheel sensor tester power switch.

NOTE: The green POWER indicator should illuminate. If the POWER indicator does not illuminate, replace the battery in the ABS active wheel sensor tester before proceeding.

3. Spin the wheel of the vehicle by hand and observe the red SENSOR indicator on the ABS active wheel sensor tester. The red SENSOR indicator should flash on and off to indicate an output signal.

BRC-188

C1101, C1102, C1103, C1104 WHEEL SENSOR-1 **[TYPE 3]** < COMPONENT DIAGNOSIS > NOTE: If the red SENSOR indicator illuminates but does not flash, reverse the polarity of the tester leads and А retest. Does the ABS active wheel sensor tester detect a signal? YES >> GO TO 3 В NO >> Replace the wheel sensor. Refer to BRC-269, "Removal and Installation". **3.**CHECK TIRES Check for inflation pressure, wear and size of each tire. Are tire pressure and size correct and is tire wear within specifications? YES >> GO TO 4 D NO >> Adjust tire pressure or replace tire(s). **4.**CHECK WHEEL BEARINGS Check wheel bearing axial end play. Refer to FAX-5, "On-Vehicle Inspection and Service" (front), RAX-7, Е "Rear Axle Bearing" (C200 rear), or RAX-19, "Rear Axle Bearing" (M226 rear). Is the inspection result normal? BRC YES >> GO TO 5 NO

>> Repair or replace as necessary. Refer to <u>FAX-8</u>, "<u>Removal and Installation</u>" (front), <u>RAX-13</u>, <u>"Removal and Installation</u>" (C200 rear), or <u>RAX-24</u>, "<u>Removal and Installation</u>" (M226 rear).

5. CHECK WIRING HARNESS FOR SHORT CIRCUIT

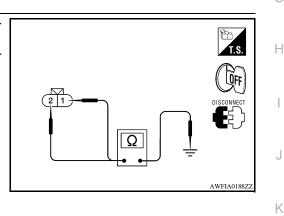
- Disconnect ABS actuator and electric unit (control unit) connec-1 tor and wheel sensor connector of malfunction code No.
- 2. Check continuity between wheel sensor harness connector terminals and ground.

Continuity should not exist.

Is the inspection result normal?

>> GO TO 6 YES

>> Repair the circuit. NO



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$\mathbf{6}.$ CHECK WIRING HARNESS FOR OPEN CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) harness connector and the mal-1. functioning wheel sensor harness connector.

| Wheel sensor | ABS actuator and electric unit (control unit) | | Wheel sensor | | Continuity | |
|--------------|--|----------|--------------|----------|------------|---|
| | Connector | Terminal | Connector | Terminal | | |
| Front LH | | 45 | E18 | 1 | | _ |
| | | 46 | ETO | 2 | | |
| Front RH | E 107 | 34 | E117 | 1 | Yes | |
| | | 33 | | 2 | | |
| Rear LH | E127 | 36 | C11 | 1 | Tes | |
| Real LIT | | 37 | | 2 | | |
| Rear RH | | 43 | C10 | C10 1 | | |
| | | 42 | 010 | 2 | | |

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-271, "Removal and Installation".

>> Repair the circuit. NO

C1101, C1102, C1103, C1104 WHEEL SENSOR-1

< COMPONENT DIAGNOSIS >

Component Inspection

INFOID:000000004055553

[TYPE 3]

1.CHECK DATA MONITOR

On "DATA MONITOR", select "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR", and "RR RH SEN-SOR", and check the vehicle speed.

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

Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-188, "Diagnosis Procedure"</u>.

Special Repair Requirement

INFOID:000000004055554

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-159</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description".

>> GO TO 2

2.calibration of decel g sensor

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-160</u>, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

C1105, C1106, C1107, C1108 WHEEL SENSOR-2

< COMPONENT DIAGNOSIS >

C1105, C1106, C1107, C1108 WHEEL SENSOR-2

Description

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

DTC Logic

INFOID:000000004055556

INFOID:000000004055555

DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause | D | | |
|-------|----------------|---|---|---|--|-----|
| C1105 | RR RH SENSOR-2 | When the circuit in the rear RH wheel sensor is short-cir- cuited. Or when the distance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit. | | E | | |
| C1106 | RR LH SENSOR-2 | When the circuit in the rear LH wheel sensor is short-cir- cuited. Or when the distance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit. | Harness or connector Wheel sensor ABS actuator and electric unit (control unit) | | | BRC |
| C1107 | FR RH SENSOR-2 | When the circuit in the front RH wheel sensor is short-cir- cuited. Or when the distance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit. | | G | | |
| C1108 | FR LH SENSOR-2 | When the circuit in the front LH wheel sensor is short-cir- cuited. Or when the distance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit. | | H | | |

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

| Self-diagnosis results | |
|--|----|
| RR RH SENSOR-2 | |
| RR LH SENSOR-2 | |
| FR RH SENSOR-2 | |
| FR LH SENSOR-2 | |
| Is above displayed on the self-diagnosis display? | |
| YES >> Proceed to diagnosis procedure. Refer to <u>BRC-191, "Diagnosis Procedure"</u>. NO >> Inspection End | |
| Diagnosis Procedure | 57 |
| CAUTION: Do not check between wheel sensor terminals. | |
| INSPECTION PROCEDURE | |
| 1.CONNECTOR INSPECTION | |
| Disconnect the ABS actuator and electric unit (control unit) connector and wheel sensor of malfunctioning code. | J |
| Check the terminals for deformation, disconnection, looseness or damage. | |
| Is the inspection result normal? | |
| YES >> GO TO 2 | |

NO >> Repair or replace as necessary.

BRC-191

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C1105, C1106, C1107, C1108 WHEEL SENSOR-2

< COMPONENT DIAGNOSIS >

2. CHECK WHEEL SENSOR OUTPUT SIGNAL

- 1. Connect ABS active wheel sensor tester (J-45741) to wheel sensor using appropriate adapter.
- 2. Turn on the ABS active wheel sensor tester power switch.

NOTE:

The green POWER indicator should illuminate. If the POWER indicator does not illuminate, replace the battery in the ABS active wheel sensor tester before proceeding.

 Spin the wheel of the vehicle by hand and observe the red SENSOR indicator on the ABS active wheel sensor tester. The red SENSOR indicator should flash on and off to indicate an output signal.
 NOTE:

If the red SENSOR indicator illuminates but does not flash, reverse the polarity of the tester leads and retest.

Does the ABS active wheel sensor tester detect a signal?

YES >> GO TO 3

NO >> Replace the wheel sensor. Refer to <u>BRC-269</u>, "Removal and Installation".

3.CHECK TIRES

Check for inflation pressure, wear and size of each tire.

Are tire pressure and size correct and is tire wear within specifications?

- YES >> GO TO 4
- NO >> Adjust tire pressure or replace tire(s).

4.CHECK WHEEL BEARINGS

Check wheel bearing axial end play. Refer to <u>FAX-5</u>, "On-Vehicle Inspection and Service" (front), <u>RAX-7</u>, "<u>Rear Axle Bearing</u>" (C200 rear), or <u>RAX-19</u>, "<u>Rear Axle Bearing</u>" (M226 rear).

Is the inspection result normal?

- YES >> GO TO 5
- NO >> Repair or replace as necessary. Refer to <u>FAX-8</u>, "<u>Removal and Installation</u>" (front), <u>RAX-13</u>, <u>"Removal and Installation"</u> (C200 rear), or <u>RAX-24</u>, "<u>Removal and Installation</u>" (M226 rear).

5.CHECK WIRING HARNESS FOR SHORT CIRCUIT

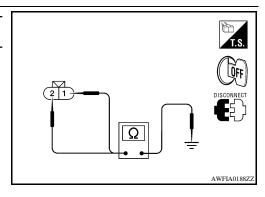
- 1. Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No.
- 2. Check continuity between wheel sensor harness connector terminals and ground.

Continuity should not exist.

Is the inspection result normal?

YES >> GO TO 6

NO >> Repair the circuit.



6.CHECK WIRING HARNESS FOR OPEN CIRCUIT

1. Check continuity between ABS actuator and electric unit (control unit) harness connector and the malfunctioning wheel sensor harness connector.

C1105, C1106, C1107, C1108 WHEEL SENSOR-2

< COMPONENT DIAGNOSIS >

[TYPE 3]

| Connector Terminal Connector Terminal Front LH 45 E18 1 Front RH 34 E117 1 Rear LH 34 E117 2 Rear RH 43 C11 1 Rear RH 43 C10 1 Is the inspection result normal? 43 C10 2 Yes Rear RH 42 0 2 Is the inspection result normal? Yes Yes Yes YES >> Replate the ABS actuator and electric unit (control unit). Refer to BRC-271. "Removal and Instilation". NO NO >> Repair the circuit. Yes Yes Component Inspection ************************************ | | ABS actuat | | Wheel se | ensor | | |
|--|---|---|---|--|-------------------------------|------------------------------|--|
| Front LH 45 E18 1 Front RH 33 E17 1 Rear LH 33 C11 1 Rear RH 43 C10 1 Is the inspection result normal? 43 C10 2 YES >> Repair the circuit. 43 C10 2 ON >> Repair the circuit. ************************************ | Wheel sensor | | , | Connector | Terminal | Continuity | |
| From RH E127 $\frac{46}{34}$ $\frac{2}{117}$ $\frac{1}{2}$ Rear LH $\frac{34}{42}$ C11 $\frac{1}{2}$ Yes Rear RH $\frac{43}{42}$ C10 $\frac{1}{2}$ Sthe inspection result normal? YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-271. "Removal and Insignation". NO >> Repair the circuit. Somponent Inspection Someoneses CHECK DATA MONITOR Select "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR", and "RR RH SENSOR", and check the vehicle speed. TH H SENSOR Nearly matches the speedometer display (±10% or less) RR H SENSOR Nearly matches the speedometer display (±10% or less) RR H SENSOR Nearly matches the speedometer display (±10% or less) RR H SENSOR Nearly matches the speedometer display (±10% or less) RR H SENSOR Nearly matches the speedometer display (±10% or less) RR H SENSOR Nearly matches the speedometer display (±10% or less) RR H SENSOR Nearly matches the speedometer display (±10% or less) RR H SENSOR Nearly matches the speedometer display (±10% or less) RR H SENSOR Nearly matches the speedometer display (±10% or less) RR H SENSOR Nearly matches the speedometer display (±10% or les | | | | | | | |
| Front RH E127 33 E117 2 Rear LH 33 C11 2 Rear RH 43 C10 1 43 C10 1 es the inspection result normal? YES >> Repair the circuit. Component Inspection errore Inton: NO >> Repair the circuit. Component Inspection errore Interface Processes | Front LH | | 46 | E18 | 2 | | |
| Rear LH E127 $\frac{33}{36}$ C11 2 Yes Rear RH 43 C10 1 43 C10 2 1 sthe inspection result normal? YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-271, "Removal and Instation". NO >> Replate the circuit. Component Inspection areacconstants Component Inspection areacconstants areacconstants areacconstants 1.CHECK DATA MONITOR Select "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR", and "RR RH SESOR", and check the vehicle speed. areacconstants 1.CHECK DATA MONITOR Nearly matches the speedometer disconstants play (±10% or less) FR RH SENSOR Nearly matches the speedometer disconstants play (±10% or less) R R H SENSOR Nearly matches the speedometer disconstants play (±10% or less) R R H SENSOR Nearly matches the speedometer disconstants play (±10% or less) R R H SENSOR Nearly matches the speedometer disconstants play (±10% or less) R H SENSOR No > Go to diagnosis procedure. Refer to BRC-191, "Diagnosis Procedure". Special Repair Requirement Areacconstants areaconstants ADJUSTMEN | | - | 34 | | 1 | | |
| Rear LH 36 C11 1 Rear RH 43 C10 1 Is the inspection result normal? YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-271, "Removal and Institution"</u> . NO >> Repair the circuit. | Front RH | | 33 | E117 | 2 | | |
| Rear RH 37 2 43 C10 1 42 C10 2 Is the inspection result normal? YES > Replace the ABS actuator and electric unit (control unit). Refer to BRC-271, "Removal and Insignation". NO >> Repair the circuit. Component Inspection #################################### | | – E127 | 36 | | 1 | Yes | |
| Rear RH 42 C10 2 Is the inspection result normal? YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-271, "Removal and Instation". NO >> Repair the circuit. Component Inspection #################################### | Rear LH | | 37 | C11 | 2 | | |
| YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-271, "Removal and Instruction". NO >> Repair the circuit. Component Inspection #################################### | Rear RH | - | | C10 | | | |
| YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-271, "Removal and Instruction". NO >> Repair the circuit. Component Inspection #################################### | s the inspection result r | ormal? | | | | | |
| FR LH SENSOR Nearly matches the speedometer display (±10% or less) RR LH SENSOR play (±10% or less) RR HH SENSOR play (±10% or less) RR HH SENSOR play (±10% or less) Stete inspection result normal? YES >> Inspection End NO >> Go to diagnosis procedure. Refer to BRC-191. "Diagnosis Procedure". Special Repair Requirement INFORCOMMENTION .ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION Jways perform neutral position adjustment for the steering angle sensor when replacing the ABS actuand electric unit (control unit). Refer to BRC-159. "ADJUSTMENT OF STEERING ANGLE SENSOR NEURAL POSITION : Description". >> GO TO 2 .CALIBRATION OF DECEL G SENSOR Jways perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit) control unit). ways perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit) control unit). | .CHECK DATA MON | ITOR select "FR LH SEN | ISOR", "FR RH | SENSOR", "RR | LH SENSOR", a | INFOID:00000000405 | |
| FR RH SENSOR Nearly matches the speedometer display (±10% or less) RR LH SENSOR play (±10% or less) Is the inspection result normal? YES >> Inspection End NO >> Go to diagnosis procedure. Refer to BRC-191, "Diagnosis Procedure". Special Repair Requirement Information adjustment for the steering angle sensor when replacing the ABS actuated and electric unit (control unit). Refer to BRC-159, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuated and electric unit (control unit). Refer to BRC-159, "ADJUSTMENT OF STEERING ANGLE SENSOR NETRAL POSITION : Description". >> GO TO 2 2.CALIBRATION OF DECEL G SENSOR Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit Refer to BRC-160, "CALIBRATION OF DECEL G SENSOR : Description". | Wheel sensor | Vehic | e speed (DATA MC | DNITOR) | | | |
| RR LH SENSOR play (±10% or less) Play (±10% or less) play (±10% or less) Is the inspection result normal? YES >> Inspection End NO >> Go to diagnosis procedure. Refer to BRC-191. "Diagnosis Procedure". Special Repair Requirement 1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actua and electric unit (control unit). Refer to BRC-159. "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description". >> GO TO 2 2.CALIBRATION OF DECEL G SENSOR Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit Refer to BRC-160. "CALIBRATION OF DECEL G SENSOR : Description". | FR LH SENSOR | | | | | | |
| RR RH SENSOR st the inspection result normal? YES >> Inspection End NO >> Go to diagnosis procedure. Refer to BRC-191. "Diagnosis Procedure". Special Repair Requirement Important of the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-159. "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuation and electric unit (control unit). Refer to BRC-159. "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description". >> GO TO 2 2.CALIBRATION OF DECEL G SENSOR Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit Refer to BRC-160, "CALIBRATION OF DECEL G SENSOR : Description". | FR RH SENSOR | | | neter dis- | | | |
| Is the inspection result normal? YES >> Inspection End NO >> Go to diagnosis procedure. Refer to <u>BRC-191. "Diagnosis Procedure"</u> . Special Repair Requirement 1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actua and electric unit (control unit). Refer to <u>BRC-159</u> . "ADJUSTMENT OF STEERING ANGLE SENSOR NE TRAL POSITION : Description". >> GO TO 2 2.CALIBRATION OF DECEL G SENSOR Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control un Refer to <u>BRC-160</u> , "CALIBRATION OF DECEL G SENSOR : Description". | RR LH SENSOR | play (±10 | % or less) | | | | |
| YES >> Inspection End NO >> Go to diagnosis procedure. Refer to BRC-191, "Diagnosis Procedure". Special Repair Requirement Image: Control Contrelectuate Control Control Contrelectuate Control Contro | RR RH SENSOR | | | | | | |
| 1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actua and electric unit (control unit). Refer to <u>BRC-159, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description"</u> . >> GO TO 2 2.CALIBRATION OF DECEL G SENSOR Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control un Refer to <u>BRC-160, "CALIBRATION OF DECEL G SENSOR : Description"</u> . | | IO | | | | | |
| 1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actual and electric unit (control unit). Refer to <u>BRC-159</u> , "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description". >> GO TO 2 2.CALIBRATION OF DECEL G SENSOR Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit (control unit)). | Is the inspection result r YES >> Inspection E | End | fer to <u>BRC-191,</u> | "Diagnosis Proc | <u>edure"</u> . | | |
| Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actua and electric unit (control unit). Refer to <u>BRC-159</u> , "ADJUSTMENT OF STEERING ANGLE SENSOR NE TRAL POSITION : Description". >> GO TO 2 2.CALIBRATION OF DECEL G SENSOR Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control un Refer to <u>BRC-160</u> , "CALIBRATION OF DECEL G SENSOR : Description". | Is the inspection result r YES >> Inspection E NO >> Go to diagn | End nosis procedure. Re | fer to <u>BRC-191.</u> | "Diagnosis Proc | edure". | INF01D:000000004055 | |
| and electric unit (control unit). Refer to <u>BRC-159, "ADJUSTMENT OF STEERING ANGLE SENSOR NE</u> <u>TRAL POSITION : Description"</u> . >> GO TO 2 2.CALIBRATION OF DECEL G SENSOR Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control un Refer to <u>BRC-160, "CALIBRATION OF DECEL G SENSOR : Description"</u> . | Is the inspection result r YES >> Inspection E NO >> Go to diagn Special Repair Rec | End losis procedure. Re quirement | | - | | INF01D:000000004055 | |
| 2.CALIBRATION OF DECEL G SENSOR Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control un Refer to <u>BRC-160, "CALIBRATION OF DECEL G SENSOR : Description"</u> . | <u>s the inspection result r</u> YES >> Inspection E NO >> Go to diagn Special Repair Rec 1.ADJUSTMENT OF S | End nosis procedure. Re quirement STEERING ANGLE | SENSOR NEUT | TRAL POSITION | | | |
| 2.CALIBRATION OF DECEL G SENSOR Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control un Refer to <u>BRC-160, "CALIBRATION OF DECEL G SENSOR : Description"</u> . | Is the inspection result r YES >> Inspection E NO >> Go to diagn Special Repair Rec 1.ADJUSTMENT OF S Always perform neutral and electric unit (contro | End nosis procedure. Re quirement STEERING ANGLE position adjustmer of unit). Refer to <u>BF</u> | SENSOR NEUT | TRAL POSITION | when replacing | the ABS actuat | |
| Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control un Refer to <u>BRC-160, "CALIBRATION OF DECEL G SENSOR : Description"</u> . | Is the inspection result r YES >> Inspection E NO >> Go to diagn Special Repair Rec 1.ADJUSTMENT OF S Always perform neutral and electric unit (contro TRAL POSITION : Desc | End nosis procedure. Re quirement STEERING ANGLE position adjustmer of unit). Refer to <u>BF</u> | SENSOR NEUT | TRAL POSITION | when replacing | the ABS actuat | |
| Refer to BRC-160, "CALIBRATION OF DECEL G SENSOR : Description". | Is the inspection result r YES >> Inspection F NO >> Go to diagn Special Repair Rec 1.ADJUSTMENT OF S Always perform neutral and electric unit (contro TRAL POSITION : Desc >> GO TO 2 | End nosis procedure. Re quirement STEERING ANGLE position adjustmer of unit). Refer to <u>BF</u> cription". | SENSOR NEUT | TRAL POSITION | when replacing | the ABS actua | |
| >> FND | s the inspection result r YES >> Inspection F NO >> Go to diagn Special Repair Rec 1.ADJUSTMENT OF S Always perform neutral and electric unit (contro TRAL POSITION : Desc >> GO TO 2 2.CALIBRATION OF D | End nosis procedure. Re quirement STEERING ANGLE position adjustmer of unit). Refer to <u>BF</u> cription". | SENSOR NEUT | TRAL POSITION ng angle sensor STMENT OF ST | when replacing EERING ANGL | the ABS actua E SENSOR NE | |
| | Is the inspection result r YES >> Inspection F NO >> Go to diagn Special Repair Rec 1.ADJUSTMENT OF S Always perform neutral and electric unit (contro TRAL POSITION : Desc >> GO TO 2 2.CALIBRATION OF D Always perform calibrat | End nosis procedure. Re quirement STEERING ANGLE position adjustmer of unit). Refer to <u>Br</u> cription". | SENSOR NEUT nt for the steerir RC-159, "ADJUS | TRAL POSITION ng angle sensor STMENT OF ST | when replacing EERING ANGL | the ABS actuat | |

< COMPONENT DIAGNOSIS >

C1109 POWER AND GROUND SYSTEM

Description

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

DTC Logic

INFOID:000000004055561

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INFOID:000000004055560

DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|-------|-------------------------------|---|---|
| C1109 | BATTERY VOLTAGE [ABNORMAL] | When the ABS actuator and electric unit (control unit) power supply voltage is lower than normal. | Harness or connector ABS actuator and electric unit (control unit) |

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
BATTERY VOLTAGE [ABNORMAL]

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-194, "Diagnosis Procedure"</u>.

NO >> Inspection End

Diagnosis Procedure

INSPECTION PROCEDURE

1.CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-182</u>, "CONSULT-III Function (<u>ABS</u>)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

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

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

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

| - // (| AWFIA0189ZZ |
|--------|-------------|

- ABS actuator and electric unit (control unit)

 Condition
 Voltage

 Connector
 Terminal

 Ignition switch: ON
 Battery voltage

 E127
 8
 Ground
 Ignition switch: OFF
 Approx. 0V
- 4. Turn ignition switch OFF.

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-160, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

Is the inspection result normal?

Terminal

16, 47

- YES >> Check battery for terminal looseness, low voltage, etc. If any malfunction is found, repair malfunctioning parts.
- NO >> Repair or replace malfunctioning components.

Special Repair Requirement

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Ground

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-159, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description".

>> GO TO 2

2.calibration of decel g sensor

C1109 POWER AND GROUND SYSTEM

Continuity

Yes

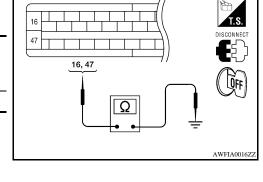
< COMPONENT DIAGNOSIS >

ABS actuator and electric unit (control unit)

Connector

E127

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



[TYPE 3]

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C1110, C1170 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) < COMPONENT DIAGNOSIS > [TYPE 3]

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

DTC Logic

INFOID:000000004055564

DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|-------|--------------------|---|---|
| C1110 | CONTROLLER FAILURE | When there is an internal malfunction in the ABS actuator and electric unit (control unit). | ABS actuator and electric unit (control unit) |
| C1170 | VARIANT CODING | In a case where VARIANT CODING is different. | |

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results

CONTROLLER FAILURE

VARIANT CODING

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-196, "Diagnosis Procedure"</u>.

NO >> Inspection End

Diagnosis Procedure

INSPECTION PROCEDURE

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

>> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-271, "Removal and Installa-</u> tion".

Special Repair Requirement

INFOID:000000004055566

INFOID:000000004055565

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-159</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description".

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-160, "CALIBRATION OF DECEL G SENSOR : Description"</u>.

>> END

C1111 ABS MOTOR, MOTOR RELAY SYSTEM

< COMPONENT DIAGNOSIS >

C1111 ABS MOTOR, MOTOR RELAY SYSTEM

Description

PUMP

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

MOTOR

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

DTC Logic

DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause | E |
|------------------|--|--|-------------------------------|---|
| C1111 PUMP MOTOR | During the actuator motor operating with ON, when the actuator motor turns OFF, or when the control line for a tuator motor relay is open. | Harness or connector ABS actuator and electric unit | В | |
| CIIII | | During the actuator motor operating with OFF, when the actuator motor turns ON, or when the control line for relay is shorted to ground. | (control unit) | |
| DTC CC | NFIRMATION PROCE | DURE | | |
| 1. CHEC | K SELF-DIAGNOSIS RE | SULTS | | ŀ |
| Check th | e self-diagnosis results. | | | |
| | 0.16.15 | | | I |
| | Self-diagnosis PUMP MOT | | | |
| ls above | displayed on the self-diad | - | | |
| | | procedure. Refer to <u>BRC-197, "Diagnosis Proce</u> | dure". | |
| | >> Inspection End | | | |
| Diagno | sis Procedure | | INFOID:00000004055569 | ł |
| INSPEC | TION PROCEDURE | | | |
| | CK CONNECTOR | | | I |
| | ignition switch OFF. | | | |
| 2. Disc | onnect ABS actuator and | electric unit (control unit) connector. | | Ν |
| | ck terminal for deformatio ace terminal. | n, disconnect, looseness, and so on. If any ma | Ifunction is found, repair or | |
| 4. Reco | onnect connectors and th | en perform the self-diagnosis. Refer to BRC-1 | 82, "CONSULT-III Function | 1 |
| (ABS | | annaria diantava | | |
| • | m indicated on the self-di >> GO TO 2 | <u>agriosis uispiay :</u> | | |
| - | | nnector terminal. Repair or replace connector. | | (|
| 2.снес | K ABS MOTOR AND MC | TOR RELAY POWER SUPPLY CIRCUIT | | |
| | | | | F |

[TYPE 3]

INFOID:000000004055567

INFOID:000000004055568

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C1111 ABS MOTOR, MOTOR RELAY SYSTEM

< COMPONENT DIAGNOSIS >

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

| AWFIA0017ZZ |
|-------------|
| |

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| ABS actuator and ele | ABS actuator and electric unit (control unit) Connector Terminal | | Voltage |
|----------------------|--|--------|-----------------|
| Connector | | | voitage |
| E127 | 1 | Ground | Battery voltage |

Is the inspection result normal?

>> GO TO 3 YES

NO >> Repair or replace malfunctioning components.

${f 3.}$ CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) GROUND CIRCUIT

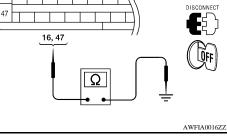
Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

| ABS actuator and electric unit (control unit) | | | Continuity |
|---|----------|--------|------------|
| Connector | Terminal | | Continuity |
| E127 | 16, 47 | Ground | Yes |

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-271, "Removal and Installation".
- NO >> Repair or replace malfunctioning components.

Component Inspection



INFOID:000000004055570

1.CHECK ACTIVE TEST

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

| Operation | ON | OFF |
|--------------|----|-----|
| MOTOR RELAY | ON | OFF |
| ACTUATOR RLY | ON | ON |

Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-197</u>, "Diagnosis Procedure".

Special Repair Requirement

INFOID:000000004055571

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-159, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description".

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-160, "CALIBRATION OF DECEL G SENSOR : Description".

[TYPE 3]

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

< COMPONENT DIAGNOSIS >

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

Description

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

DTC Logic

INFOID:000000004055573

INFOID:000000004055574

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INFOID:000000004055572

DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause | D | |
|-------|--------------------|--|---|----------------|---|
| C1113 | G-SENSOR | Longitudinal G-sensor is malfunctioning, or signal line of longitudinal G-sensor is open or shorted. | Harness or connector | | |
| C1145 | YAW RATE SENSOR | Yaw rate sensor is malfunctioning, or the yaw rate sensor signal line is open or shorted. | ABS actuator and electric unit (control unit) Yaw rate/side/decel G sensor | (control unit) | E |
| C1146 | SIDE G-SEN CIRCUIT | Side G sensor is malfunctioning, or circuit of side G sensor is open or shorted. | | BRC | |

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

| Se | elf-diagnosis results | |
|--------------------------|-------------------------------|-------------------------------|
| | G-SENSOR | |
| YA | W RATE SENSOR | |
| SID | DE G-SEN CIRCUIT | |
| Is above displayed on th | e self-diagnosis display? | |
| YES >> Proceed to c | diagnosis procedure. Refer to | BRC-199, "Diagnosis Procedure |

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-199, "Diagnosis F</u> NO >> Inspection End

Diagnosis Procedure

CAUTION:

- Sudden turns (such as spin turns, acceleration turns), drifting, etc. when VDC function is OFF may
 cause the yaw rate/side/decel G sensor system to indicate a malfunction. This is not a malfunction if
 normal operation can be resumed after restarting the engine.
- If vehicle is on turn table at entrance to parking garage, or on other moving surface, VDC OFF indicator lamp may illuminate and CONSULT-III self-diagnosis may indicate yaw rate sensor system malfunction. However, in this case there is no malfunction in yaw rate sensor system. Take vehicle off of turn table or other moving surface, and start engine. Results will return to normal.

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

Disconnect the ABS actuator and electric unit (control unit) connector and yaw rate/side/decel G sensor connector.

Check the terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

2. YAW RATE/SIDE/DECEL G SENSOR HARNESS INSPECTION

[TYPE 3]

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

Continuity

Yes

< COMPONENT DIAGNOSIS >

ABS actuator and electric unit

(control unit)

Connector

E127 (A)

Check continuity between the ABS actuator and electric unit (control unit) connector E127 (A) terminals 18, 19, 22, 29 and the yaw rate/ side/decel G sensor connector B73 (B) terminals 2, 1, 3, 5.

Connector

B73 (B)

Yaw rate/side/decel G sensor

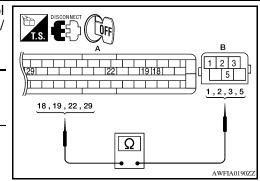
Terminal

2

1

3

5



[TYPE 3]

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace as necessary.

Terminal

18

19

22

29

 ${f 3.}$ YAW RATE/SIDE/DECEL G SENSOR INSPECTION

1. Connect the yaw rate/side/decel G sensor connector B73 and ABS actuator and electric unit (control unit) connector E127.

2. Use "DATA MONITOR" to check if the yaw rate/side/decel G sensor signals are normal.

| Vehicle condition | YAW RATE SEN | SIDE G-SENSOR | DECEL G-SEN |
|-------------------|----------------|------------------|--------------------|
| | (DATA MONITOR) | (DATA MONITOR) | (DATA MONITOR) |
| Stopped | -4 to +4 deg/s | -1.1 to +1.1 m/s | -0.08 G to +0.08 G |
| Turning right | Negative value | Negative value | - |
| Turning left | Positive value | Positive value | - |
| Speed up | - | - | Negative value |
| Speed down | - | - | Positive value |

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-271, "Removal and Instal-</u> lation".

NO >> Replace the yaw rate/side/decel G sensor. Refer to <u>BRC-274, "Removal and Installation"</u>.

Component Inspection

INFOID:000000004055575

INFOID:000000004055576

1.CHECK DATA MONITOR

Select "YAW RATE SEN", "SIDE G-SENSOR", "DECEL G-SEN" in "DATA MONITOR" and check yaw rate/ side/decel G sensor signal.

| Vehicle condition | YAW RATE SEN (DATA MONITOR) | SIDE G-SENSOR (DATA MONITOR) | DECEL G-SEN (DATA MONITOR) |
|-------------------|--------------------------------|---------------------------------|-------------------------------|
| Stopped | -4 to +4 deg/s | -1.1 to +1.1 m/s | -0.08 G to +0.08 G |
| Turning right | Negative value | Negative value | - |
| Turning left | Positive value | Positive value | - |
| Speed up | - | - | Negative value |
| Speed down | - | - | Positive value |

Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-199</u>, "Diagnosis Procedure".

Special Repair Requirement

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

BRC-200

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

< COMPONENT DIAGNOSIS >

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-159</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description".

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-160</u>, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

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[TYPE 3]

C1115 WHEEL SENSOR

Description

INFOID:000000004055577

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

DTC Logic

INFOID:000000004055578

DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|-------|---------------------------------|---|---|
| C1115 | ABS SENSOR [ABNORMAL SIGNAL] | When wheel sensor input signal is malfunctioning. | Harness or connector Wheel sensor ABS actuator and electric unit (control unit) |

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results

ABS SENSOR [ABNORMAL SIGNAL]

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-202, "Diagnosis Procedure"</u>.

NO >> Inspection End

Diagnosis Procedure

CAUTION:

Do not check between wheel sensor terminals.

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

Disconnect the ABS actuator and electric unit (control unit) connector and wheel sensor of malfunctioning code.

Check the terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

2.CHECK WHEEL SENSOR OUTPUT SIGNAL

1. Connect ABS active wheel sensor tester (J-45741) to wheel sensor using appropriate adapter.

2. Turn on the ABS active wheel sensor tester power switch.

NOTE:

The green POWER indicator should illuminate. If the POWER indicator does not illuminate, replace the battery in the ABS active wheel sensor tester before proceeding.

3. Spin the wheel of the vehicle by hand and observe the red SENSOR indicator on the ABS active wheel sensor tester. The red SENSOR indicator should flash on and off to indicate an output signal. **NOTE:**

If the red SENSOR indicator illuminates but does not flash, reverse the polarity of the tester leads and retest.

Does the ABS active wheel sensor tester detect a signal?

YES >> GO TO 3

NO >> Replace the wheel sensor. Refer to <u>BRC-269</u>, "Removal and Installation".

3.CHECK TIRES

BRC-202

INFOID:000000004055579

C1115 WHEEL SENSOR

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INFOID:000000004055580

| | 1 A A A A A A A A A A A A A A A A A A A |
|--|---|
| < COMPONENT DIAGNOSIS > | [TYPE 3] |
| Check for inflation pressure, wear and size of each tire. | |
| Are tire pressure and size correct and is tire wear within specifications | <u>\$?</u> |
| YES >> GO TO 4 | |
| NO >> Adjust tire pressure or replace tire(s). | |
| 4.CHECK WHEEL BEARINGS | |
| Check wheel bearing axial end play. Refer to <u>FAX-5, "On-Vehicle</u> " "Rear Axle Bearing" (C200 rear), or <u>RAX-19, "Rear Axle Bearing"</u> (M2 | |
| Is the inspection result normal? | |
| YES >> GO TO 5 NO >> Repair or replace as necessary. Refer to <u>FAX-8</u> , "Rem | |
| <u>"Removal and Installation"</u> (C200 rear), or <u>RAX-24. "Rem</u> 5. CHECK WIRING HARNESS FOR SHORT CIRCUIT | ovar and installation (M226 fear). |
| | |
| Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No. Check continuity between wheel sensor harness connector terminals and ground. | T.S. |
| Continuity should not exist. | |
| Is the inspection result normal? YES >> GO TO 6 NO >> Repair the circuit. | |
| | AWFIA0188ZZ |

6.CHECK WIRING HARNESS FOR OPEN CIRCUIT

1. Check continuity between ABS actuator and electric unit (control unit) harness connector and the malfunctioning wheel sensor harness connector.

| Wheel sensor | | ABS actuator and electric unit (control unit) Wheel sensor Contir | | Wheel sensor | | ty |
|--------------|-----------|---|-----------|--------------|-----|----|
| | Connector | Terminal | Connector | Terminal | | |
| Front LH | | 45 | E19 | 1 | | - |
| | | 46 | E18 | 2 | | |
| E DU | - | 34 | E117 1 | 1 | | |
| Front RH | E127 | 33 | | 2 | Yes | I |
| Poor I H | | 36 | C11 | 1 | res | |
| Rear LH | | 37 | CII | 2 | | ľ |
| Rear RH | 1 | 43 | C10 | 1 | | 1 |
| | | 42 | 010 | 2 | | |

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-271, "Removal and Instal-</u><u>lation"</u>.

NO >> Repair the circuit.

Component Inspection

1.CHECK DATA MONITOR

On "DATA MONITOR", select "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR", and "RR RH SEN-SOR", and check the vehicle speed.

| Wheel sensor | Vehicle speed (DATA MONITOR) |
|--------------|------------------------------|

C1115 WHEEL SENSOR

< COMPONENT DIAGNOSIS >

FR LH SENSOR

FR RH SENSOR

RR LH SENSOR

Nearly matches the speedometer display (±10% or less)

RR RH SENSOR

Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-202. "Diagnosis Procedure"</u>.

Special Repair Requirement

INFOID:000000004055581

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-159</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description".

>> GO TO 2

2. CALIBRATION OF DECEL G SENSOR

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-160</u>, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

C1116 STOP LAMP SWITCH

< COMPONENT DIAGNOSIS >

C1116 STOP LAMP SWITCH

Description

| The stop lamp switch transmits the stop lamp switch signal (ON/OFF) t | o the ABS actuator and electric unit |
|---|--------------------------------------|
| (control unit). | la |

DTC Logic

INFOID:000000004055583

INFOID:000000004055582

DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause | D |
|-----------------|--|--|---|-----|
| C1116 | STOP LAMP SW | When stop lamp switch circuit is open. | Harness or connector Stop lamp switch ABS actuator and electric unit (control unit) | Е |
| DTC CC | NFIRMATION PROCE | DURE | | |
| 1. CHEC | CK SELF-DIAGNOSIS RE | SULTS | | BRC |
| Check th | e self-diagnosis results. | | | |
| | | | | G |
| | Self-diagnosis | | | |
| | STOP LAMP | - | | Н |
| Is above YES | displayed on the self-diag | <u>gnosis display?</u> procedure. Refer to <u>BRC-205, "Diagr</u> | posis Procedure" | |
| NO | >> Inspection End | procedure. Relei to <u>BRC-203, Diagr</u> | | |
| Diagno | sis Procedure | | INF0/D:00000004055584 | |
| - | | | | |
| | TION PROCEDURE | | | J |
| 1.CON | NECTOR INSPECTION | | | |
| | | and electric unit (control unit) connec nation, disconnection, looseness or d | | К |
| | spection result normal? | | lamage. | |
| YES | | | | 1 |
| NO | >> Repair or replace as r | - | | L |
| | P LAMP SWITCH INSPEC | | | |
| | nect the stop lamp switch | harness connector. he ABS actuator and electric unit | | Μ |
| (con | trol unit) harness conne | ctor E127 terminal 39 and body | | |
| grou | nd. | | | Ν |
| E | rake pedal depressed | : Battery voltage | | |
| | | (approx. 12V) | | 0 |
| | rake pedal not depress | ed : Approx. 0V | | 0 |
| - | spection result normal? | | | |
| YES | >> Perform self-diagnos appear. replace ABS | sis again. If the same results actuator and electric unit (control | AWFIA0191ZZ | Ρ |
| | unit). Refer to BRC-27 | 71, "Removal and Installation". | | |
| | >> GO TO 3 P LAMP SWITCH CIRCUI | | | |
| U .310F | | | | |

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C1116 STOP LAMP SWITCH

< COMPONENT DIAGNOSIS >

1. Disconnect the stop lamp switch harness connector.

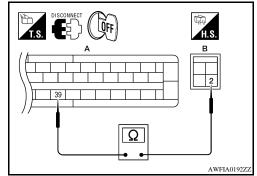
2. Check the continuity between the ABS actuator and electric unit (control unit) harness connector E127 (A) terminal 39 and stop lamp switch harness connector E39 (B) terminal 2.

Continuity should exist.

Is the inspection result normal?

- YES >> Refer to <u>BRC-155, "Work Flow"</u>.
- NO >> Repair or replace malfunctioning components.

Special Repair Requirement



INFOID:000000004055585

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-159</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description".

>> GO TO 2

2. CALIBRATION OF DECEL G SENSOR

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-160</u>, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

[TYPE 3]

< COMPONENT DIAGNOSIS >

C1120, C1122, C1124, C1126 IN ABS SOL

Description

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

DTC Logic

INFOID:000000004055587

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-207, "Diagnosis Procedure"</u>. NO >> Inspection End

Diagnosis Procedure

INSPECTION PROCEDURE

1.CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or N replace terminal.
- Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-182</u>, "<u>CONSULT-III Function</u> (<u>ABS</u>)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2 NO >> Poor connection of connector

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

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

BRC-207

INFOID:000000004055586

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INFOID:000000004055588

C1120, C1122, C1124, C1126 IN ABS SOL

< COMPONENT DIAGNOSIS >

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

| ABS actuator and ele | r and electric unit (control unit) | | Voltage | |
|----------------------|------------------------------------|--------|-----------------|--|
| Connector | Terminal | | Voltage | |
| E127 | 32 | Ground | Battery voltage | |

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

${f 3.}$ check solenoid, vdc switch-over valve and actuator relay ground circuit

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

| ABS actuator and ele | ectric unit (control unit) | | Continuity | |
|----------------------|----------------------------|--------|------------|--|
| Connector | Terminal | _ | | |
| E127 | 16, 47 | Ground | Yes | |

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-271, "Removal and Installation"</u>.
- NO >> Repair or replace malfunctioning components.

Component Inspection

1.CHECK ACTIVE TEST

- 1. Select each test menu item on "ACTIVE TEST".
- 2. On the display, touch "Up", "Keep", and "Down", and check that the system operates as shown in the table below.

| Operation | | | ABS solenoid valve | | |
|-----------|---------------|-----|--------------------|------|--|
| | | Up | Кеер | Down | |
| FR RH SOL | FR RH IN SOL | Off | On | On | |
| | FR RH OUT SOL | Off | Off | On* | |
| FR LH SOL | FR LH IN SOL | Off | On | On | |
| | FR LH OUT SOL | Off | Off | On* | |
| RR RH SOL | RR RH IN SOL | Off | On | On | |
| | RR RH OUT SOL | Off | Off | On* | |
| RR LH SOL | RR LH IN SOL | Off | On | On | |
| | RR LH OUT SOL | Off | Off | On* | |

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

Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-207, "Diagnosis Procedure"</u>.

Special Repair Requirement

INFOID:000000004055590

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-159</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description".

BRC-208

| 32 | OFF |
|----|-----|
| | 0 |



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C1120, C1122, C1124, C1126 IN ABS SOL

< COMPONENT DIAGNOSIS >

| >> GO TO 2 2.CALIBRATION OF DECEL G SENSOR | А |
|--|-----|
| Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-160</u> , "CALIBRATION OF DECEL G SENSOR : Description". | В |
| >> END | С |
| | D |
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C1121, C1123, C1125, C1127 OUT ABS SOL

< COMPONENT DIAGNOSIS >

C1121, C1123, C1125, C1127 OUT ABS SOL

Description

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

DTC Logic

INFOID:000000004055592

INFOID:000000004055593

INFOID:000000004055591

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-210, "Diagnosis Procedure"</u>.

NO >> Inspection End

Diagnosis Procedure

INSPECTION PROCEDURE

1.CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-182</u>, "CONSULT-III Function (<u>ABS</u>)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

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

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

BRC-210

C1121, C1123, C1125, C1127 OUT ABS SOL

< COMPONENT DIAGNOSIS >

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

| ABS actuator and ele | ectric unit (control unit) | | Voltage | |
|----------------------|----------------------------|--------|-----------------|--|
| Connector | Terminal | | Voltage | |
| E127 | 32 | Ground | Battery voltage | |

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

 ${f 3.}$ CHECK SOLENOID, VDC SWITCH-OVER VALVE AND ACTUATOR RELAY GROUND CIRCUIT

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

| ABS actuator and ele | ectric unit (control unit) | | Continuity | |
|----------------------|----------------------------|--------|------------|--|
| Connector | Terminal | | Continuity | |
| E127 | 16, 47 | Ground | Yes | |

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-271, "Removal and Installation"</u>.
- NO >> Repair or replace malfunctioning components.

Component Inspection

1.CHECK ACTIVE TEST

- 1. Select each test menu item on "ACTIVE TEST".
- 2. On the display, touch "Up", "Keep", and "Down", and check that the system operates as shown in the table below.

| Operation | | | ABS solenoid valve | | |
|-----------|---------------|-----|--------------------|------|-----|
| | | Up | Keep | Down | _ |
| | FR RH IN SOL | Off | On | On | _ |
| FR RH SOL | FR RH OUT SOL | Off | Off | On* | _ |
| FR LH SOL | FR LH IN SOL | Off | On | On | - |
| | FR LH OUT SOL | Off | Off | On* | - 1 |
| RR RH SOL | RR RH IN SOL | Off | On | On | _ |
| | RR RH OUT SOL | Off | Off | On* | - |
| RR LH SOL | RR LH IN SOL | Off | On | On | _ |
| | RR LH OUT SOL | Off | Off | On* | _ |

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

Is the inspection result normal?

YES >> Inspection End

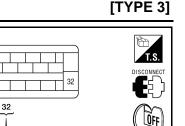
NO >> Go to diagnosis procedure. Refer to <u>BRC-210, "Diagnosis Procedure"</u>.

Special Repair Requirement

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-159</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description".

BRC-211



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INFOID:000000004055595

< COMPONENT DIAGNOSIS >

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-160</u>, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

C1130, C1131, C1132, C1133, C1136 ENGINE SIGNAL

< COMPONENT DIAGNOSIS >

C1130, C1131, C1132, C1133, C1136 ENGINE SIGNAL

Description

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

DTC Logic

INFOID:000000004055597

DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause | D | |
|-------|-----------------|---|--|----------------|--|
| C1130 | ENGINE SIGNAL 1 | | | | |
| C1131 | ENGINE SIGNAL 2 | Based on the signal from ECM, ABS actuator and electric unit (control unit) judges that engine fuel cut system is malfunctioning. | Harness or connector ABS actuator and electric unit | E | |
| C1132 | ENGINE SIGNAL 3 | | unit (control unit) judges that engine fuel cut system is (control unit) | (control unit) | |
| C1133 | ENGINE SIGNAL 4 | | ECM CAN communication line | | |
| C1136 | ENGINE SIGNAL 6 | | | BF | |

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

| Self-diagnosis results | |
|--|---|
| ENGINE SIGNAL 1 | |
| ENGINE SIGNAL 2 | |
| ENGINE SIGNAL 3 | |
| ENGINE SIGNAL 4 | |
| ENGINE SIGNAL 6 | |
| le cheve dienteved en the celf die messie dientev. | · |

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-213</u>, "<u>Diagnosis Procedure</u>". NO >> Inspection End

NO >> Inspection End

Diagnosis Procedure

INSPECTION PROCEDURE

1.CHECK ENGINE SYSTEM

- Perform ECM self-diagnosis. Repair or replace items indicated, then perform ECM self-diagnosis again. Refer to <u>EC-523</u>, "CONSULT-III Function (ENGINE)".
- Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-182, "CONSULT-III</u> <u>Function (ABS)"</u>.

Is any item indicated on the self-diagnosis display?

YES >> Repair or replace the affected part.

NO >> Inspection End

Special Repair Requirement

INFOID:000000004055599

INFOID:000000004055598

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-159</u>, <u>"ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description"</u>.

BRC-213

INFOID:000000004055596

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< COMPONENT DIAGNOSIS >

 $2. {\sf CALIBRATION} \ {\sf OF} \ {\sf DECEL} \ {\sf G} \ {\sf SENSOR}$

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-160</u>, "CALIBRATION OF DECEL G SENSOR : <u>Description</u>".

>> END

< COMPONENT DIAGNOSIS >

C1140 ACTUATOR RLY

Description

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

DTC Logic

INFOID:000000004055601

DTC DETECTION LOGIC

| DTC | Display item | | Malfunct | ion detected condition | on | Possible cause | D |
|---------------------------------------|----------------------------------|------------|----------------------|------------------------|---------------------|---|-----|
| C1140 | ACTUATOR RLY | AB | S actuator relay or | circuit malfunction. | | Harness or connector ABS actuator and electric unit (control unit) | E |
| DTC CC | ONFIRMATION PROC | EDUF | RE | | | | |
| 1. CHEC | CK SELF-DIAGNOSIS F | RESUL | TS | | | | BRO |
| Check th | ne self-diagnosis results | | | | | | DK |
| | | | | | | | |
| | Self-diagnos | sis result | ts | | | | G |
| | ACTUATO | OR RLY | | | | | |
| <u>Is above</u> | displayed on the self-d | iagnos | <u>is display?</u> | | | | Н |
| YES | >> Proceed to diagnosi | is proc | edure. Refer to | BRC-215, "Diag | <u>gnosis Proce</u> | <u>dure"</u> . | |
| NO | >> Inspection End | | | | | | |
| Diagno | sis Procedure | | | | | INFOID:000000004055602 | |
| | TION PROCEDURE | | | | | | |
| | | | | | | | 1 |
| | CK CONNECTOR | | | | | | 0 |
| Disc Che | | | | | | alfunction is found, repair or | K |
| | ace terminal. | thon r | perform the sel | f-diagnosis Ref | er to BRC-1 | 82, "CONSULT-III Function | |
| 4. Rec (AB) | | | | -diagnosis. Ren | | | L |
| Is any ite | em indicated on the self | -diagno | <u>osis display?</u> | | | | |
| YES | >> GO TO 2 | | | | | | |
| NO | >> Poor connection of | | | • • | | | M |
| 2.CHEC | CK SOLENOID, VDC S | NITCH | I-OVER VALVE | AND ACTUAT | OR RELAY F | POWER SUPPLY CIRCUIT | |
| | ignition switch OFF. | | | | 11 | | Ν |
| 2. Disc tor. | connect ABS actuator ar | nd elec | etric unit (contro | oi unit) connec- | | T.S. | |
| | ck voltage between AB | S actu | ator and elect | ric unit (control | | | |
| unit) | harness connector terr | ninal a | nd ground. | • | | | 0 |
| | | | 1 | ; | <u>ئ</u> | | |
| ABS ac | tuator and electric unit (contro | , | _ | Voltage | | | D |
| | nnector Termina | al | | - | | | Г |
| E | 32 | | Ground | Battery voltage | | | |
| - | E127 32 | | Ground | Battery voltage | | | z |

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

 ${f 3.}$ CHECK SOLENOID, VDC SWITCH-OVER VALVE AND ACTUATOR RELAY GROUND CIRCUIT

INFOID:000000004055600

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[TYPE 3]

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C1140 ACTUATOR RLY

< COMPONENT DIAGNOSIS >

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

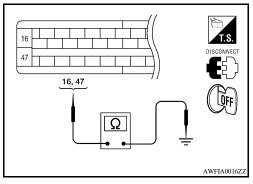
| ABS actuator and ele | ABS actuator and electric unit (control unit) | | | |
|----------------------|---|--------|------------|--|
| Connector | Terminal | | Continuity | |
| E127 | 16, 47 | Ground | Yes | |

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-271, "Removal and Installation"</u>.

NO >> Repair or replace malfunctioning components.

Component Inspection



INFOID:000000004055603

1.CHECK ACTIVE TEST

1. On "ACTIVE TEST", select "ABS MOTOR".

2. Touch On and Off on screen. Make sure motor relay and actuator relay operates as shown in table below.

| Operation | On | Off |
|--------------|----|-----|
| MOTOR RELAY | On | Off |
| ACTUATOR RLY | On | On |

Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-215, "Diagnosis Procedure"</u>.

Special Repair Requirement

INFOID:000000004055604

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-159</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description".

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-160</u>, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

[TYPE 3]

C1143, C1144 STEERING ANGLE SENSOR

< COMPONENT DIAGNOSIS >

C1143, C1144 STEERING ANGLE SENSOR

Description

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

DTC Logic

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INFOID:000000004055605

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results ST ANG SEN CIRCUIT

ST ANG SEN SIGNAL

Is above displayed on the self-diagnosis display?

| YES | >> Proceed to diagnosis procedure. Refer to <u>BRC-217, "Diagnosis Procedure"</u> . |
|-----|---|
| | |

NO >> Inspection End

Diagnosis Procedure

INSPECTION PROCEDURE

1.CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Disconnect steering angle sensor connector.
- 4. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-182</u>, "CONSULT-III Function (<u>ABS</u>)".

Is any item indicated on the self-diagnosis display?

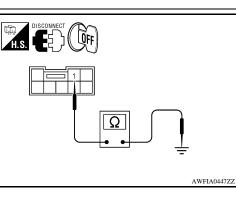
YES >> GO TO 2

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

2.CHECK STEERING ANGLE SENSOR HARNESS

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

| Steering a | ngle sensor | | Continuity | |
|------------|-------------|--------|------------|--|
| Connector | Terminal | | Continuity | |
| M47 | 1 | Ground | Yes | |



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C1143, C1144 STEERING ANGLE SENSOR

< COMPONENT DIAGNOSIS >

4. Turn ignition switch ON.

 Check voltage between steering angle sensor harness connector terminal and ground.

| Steering a | ngle sensor | | Voltage | |
|------------|-------------|--------|-----------------|--|
| Connector | Terminal | | | |
| M47 | 2 | Ground | Battery voltage | |

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

3.CHECK DATA MONITOR

1. Connect the steering angle sensor connector and ABS actuator and electric unit (control unit) connector.

2. Select "STR ANGLE SIG" in "DATA MONITOR" and check steering angle sensor signal.

| Steering condition | STR ANGLE SIG (DATA MONITOR) |
|--------------------|------------------------------|
| Driving straight | 0±2.5 ° |
| Turn 90 ° to left | Approx. +90 ° |
| Turn 90 ° to right | Approx. –90 ° |

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-271, "Removal and Installa-</u> tion".
- NO >> Replace steering angle sensor and adjust neutral position of steering angle sensor. Refer to <u>BRC-</u> <u>273. "Removal and Installation"</u>.

Component Inspection

1.CHECK DATA MONITOR

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

| Steering condition | STR ANGLE SIG (DATA MONITOR) |
|--------------------|------------------------------|
| Driving straight | 0±2.5 ° |
| Turn 90 ° to left | Approx. +90 ° |
| Turn 90 ° to right | Approx. –90 ° |

Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-217, "Diagnosis Procedure"</u>.

Special Repair Requirement

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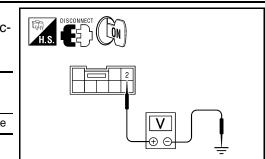
1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-159</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description".

>> GO TO 2

2. CALIBRATION OF DECEL G SENSOR

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-160</u>, "CALIBRATION OF DECEL G SENSOR : Description".



[TYPE 3]

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< COMPONENT DIAGNOSIS >

C1155 BRAKE FLUID LEVEL SWITCH

Description

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

DTC Logic

INEOID:000000004055611

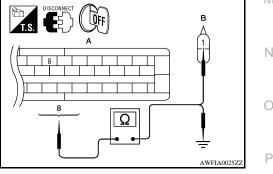
INFOID:000000004055610

DTC DETECTION LOGIC

| DTC | Display item | | Malfunctio | on detected condition | Possible cause | D |
|----------------|---|-----------------|-----------------|---|---|-----|
| C1155 | BR FLUID LEVEL LO | W the AB | | or communication line between lectric unit (control unit) and brake n or shorted. | Harness or connector Brake fluid level switch Brake fluid level | Е |
| DTC CC | NFIRMATION PI | ROCEDURE | | | | |
| 1. CHEC | CK SELF-DIAGNOS | SIS RESULTS | 3 | | | BRC |
| Check th | e self-diagnosis re | sults. | | | | DI |
| | Salf-di | agnosis results | | | | G |
| | | ID LEVEL LOW | | | | 0 |
| | displayed on the se | - | dieplay? | | | |
| | | | | BRC-219, "Diagnosis Proc | edure" | Н |
| | >> Inspection End | | | DICO-213, Diagnosis 1100 | <u>edure</u> . | |
| Diagno | sis Procedure | | | | INFOID:000000004055612 | |
| Diagno | | | | | INFOL:0000004055012 | 1 |
| INSPEC | TION PROCEDUP | RE | | | | |
| 1.com | NECTOR INSPECT | ION | | | | J |
| 1. Disc | onnect ABS actuat | or and electric | c unit (control | unit) connector and brake | fluid level switch connector. | |
| | | , | disconnection | n, looseness or damage. | | K |
| | pection result norm | <u>nal?</u> | | | | 1. |
| - | >> GO TO 2 >> Repair or replace | na se nacaes | ar\/ | | | |
| - | | | • | | CTUATOR AND ELECTRIC | L |
| | | | | VEL SWITCH AND ADS A | CTOATOR AND ELECTRIC | |
| · · · · | ck continuity betwe | en ABS actua | tor and electr | ic unit (control | | M |
| unit) | harness connecto | r E127 (A) T | erminal 28 a | nd brake fluid | П СТЕР | |
| level | switch harness co | nnector E21 (| B) terminal 1. | | | |
| | | | | | | Ν |
| | uator and electric unit (control unit) | Brake fluid | level switch | Continuity | | |
| Connec | | Connector | Terminal | | | 0 |
| E127 (| (Δ) 28 | E21 (B) | 1 | | | 0 |

E127 (A) 28 E21 (B) 1 Yes 2. Check continuity between ABS actuator and electric unit (control unit) harness connector E127 (A) Terminal 28 and ground.

| ABS actuator and ele | ectric unit (control unit) | | Continuity | |
|----------------------|----------------------------|--------|------------|--|
| Connector Terminal | | | Continuity | |
| E127 (A) | 28 | Ground | No | |



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[TYPE 3]

Is the inspection result normal?

BRC-219

C1155 BRAKE FLUID LEVEL SWITCH

< COMPONENT DIAGNOSIS >

$\mathbf{3}$.check brake fluid level switch ground

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Check continuity between brake fluid level switch harness connector E21 terminal 2 and ground.

| Brake fluid | level switch | | Continuity | |
|-------------|--------------|--------|------------|--|
| Connector | Terminal | | Continuity | |
| E21 | 2 | Ground | Yes | |

Is the inspection result normal?

YES >> GO TO 4

NO >> Repair or replace malfunctioning components.

4.CHECK BRAKE FLUID LEVEL SWITCH

Check continuity between brake fluid level switch terminals.

| Brake fluid level switch | Condition | Continuity | |
|--------------------------|--|------------|--|
| Terminal | Condition | Continuity | |
| 1-2 | When brake fluid is full in the reservoir tank. | No | |
| 1 – 2 | When brake fluid is empty in the reservoir tank. | Yes | |

Is the inspection result normal?

- >> Perform self-diagnosis again. If the same results YES appear, replace ABS actuator and electric unit (control unit). Refer to BRC-271, "Removal and Installation".
- NO >> Replace brake fluid level switch.

Component Inspection

1. CHECK BRAKE FLUID LEVEL SWITCH

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

| Brake fluid level switch | Condition | Continuity | |
|--------------------------|--|------------|--|
| Terminal | Condition | Continuity | |
| 1-2 | When brake fluid is full in the reservoir tank. | No | |
| 1 – 2 | When brake fluid is empty in the reservoir tank. | Yes | |

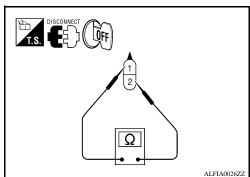
Is the inspection result normal?

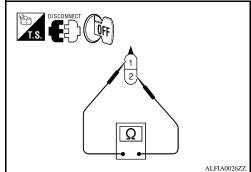
- YES >> Inspection End
- NO >> Replace brake fluid level switch.

Special Repair Requirement

1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-159</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description".

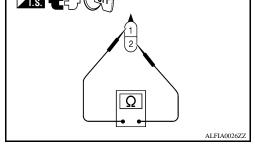




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INFOID:000000004055613



C1155 BRAKE FLUID LEVEL SWITCH

| < COMPONENT DIAGNOSIS > | [TYPE 3] | |
|--|---------------|---|
| >> GO TO 2 | | |
| 2. CALIBRATION OF DECEL G SENSOR | | А |
| Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (c Refer to <u>BRC-160</u> , <u>"CALIBRATION OF DECEL G SENSOR : Description"</u> . | ontrol unit). | В |
| >> END | | |
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BRC-221

C1156 ST ANG SEN COM CIR

Description

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

DTC Logic

INFOID:000000004055616

INFOID:000000004055617

DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|-------|--------------------|---|--|
| C1156 | ST ANG SEN COM CIR | When steering angle sensor is not transmitting CAN communication signal to the ABS actuator and electric unit (control unit). | Harness or connector CAN communication line Steering angle sensor ABS actuator and electric unit (control unit) |

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results ST ANG SEN COM CIR

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-222, "Diagnosis Procedure"</u>.

NO >> Inspection End

Diagnosis Procedure

INSPECTION PROCEDURE

1.CHECK CONNECTOR

- 1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E127, check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 2. Reconnect connector and perform self-diagnosis.

| Self-diagnosis results | |
|------------------------|--|
| CAN COMM CIRCUIT | |
| ST ANG SEN COM CIR | |

Is above displayed on the self-diagnosis display?

YES >> Refer to LAN-14, "Trouble Diagnosis Flow Chart".

NO >> Inspection End

INFOID:000000004055615

< COMPONENT DIAGNOSIS >

C1160 DECEL G SEN SET

Description

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

DTC Logic

INFOID:000000004055619

INFOID:000000004055618

DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause | D |
|------------------------|--|--|---|-----|
| C1160 | DECEL G SEN SET | ABS decel G sensor adjustment is incomplete. | Decel G sensor calibration Yaw rate/side/decel G sensor ABS actuator and electric unit (control unit) | Е |
| DTC CC | DNFIRMATION PROCE | DURE | | |
| 1. CHEC | CK SELF-DIAGNOSIS RE | SULTS | | BRC |
| Check th | ne self-diagnosis results. | | | |
| | | | | G |
| | Self-diagnosis | | | |
| | DECEL G SEN | | | Н |
| <u>is above</u> YES | displayed on the self-diag | <u>prosis display?</u> procedure. Refer to <u>BRC-223, "Diagnosis Proce</u> | dure" | |
| NO | >> Inspection End | biocedure. Refer to <u>BRC-225, Blaghosis Proce</u> | <u>aure</u> . | |
| Diagno | sis Procedure | | INFOID:00000004055620 | |
| Ũ | | | | |
| | TION PROCEDURE | | | J |
| | FORM SELF-DIAGNOSIS | | | |
| Perform | ABS actuator and electric | unit (control unit) self-diagnosis. | | Κ |
| | elf-diagnosis results | | | |
| | ECEL G SEN SET | | | |
| Do self-o | diagnosis results indicate a | anything other than shown above? | | L |
| YES | >> Perform repair or repla | acement for the item indicated. | | |
| NO | >> Perform calibration of <u>SOR : Description</u> ". G | decel G sensor. Refer to <u>BRC-160, "CALIBR/</u> | ATION OF DECEL G SEN- | M |
| | FORM SELF-DIAGNOSIS | | | |
| - | | and then to ON and erase self-diagnosis resul | Ito | Ν |
| | | ctric unit (control unit) self-diagnosis again. | | |
| | self-diagnosis results disp | | | |
| YES | | /decel G sensor. Refer to <u>BRC-274, "Removal a</u> | and Installation". | 0 |
| NO | >> Inspection End | | | |
| | | | | Ρ |
| | | | | |

BRC-223

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C1163 ST ANGLE SEN SAFE

Description

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[TYPE 3]

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

DTC Logic

INFOID:000000004055622

DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|-------|------------------|---|---|
| C1163 | ST ANGL SEN SAFE | When steering angle sensor is in safe mode. | Adjust steering angle sensor neutral position |

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results ST ANGL SEN SAFE

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-224, "Diagnosis Procedure"</u>.

NO >> Inspection End

Diagnosis Procedure

INFOID:000000004055623

INSPECTION PROCEDURE

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Adjust steering angle sensor neutral position. Refer to <u>BRC-159. "ADJUSTMENT OF STEERING ANGLE</u> <u>SENSOR NEUTRAL POSITION : Description"</u>.

>> GO TO 2

2.INDICATOR LAMP CHECK

Check that VDC OFF indicator lamp is off.

Is VDC OFF indicator lamp off?

YES >> Inspection End

NO >> Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-182, "CON-</u> <u>SULT-III Function (ABS)"</u>.

C1164, C1165, C1166, C1167 CV/SV SYSTEM

< COMPONENT DIAGNOSIS >

C1164, C1165, C1166, C1167 CV/SV SYSTEM

Description

CV1, CV2 (CUT VALVE) The cut valve shuts off the normal brake fluid path from the master cylinder, when VDC/TCS is activated.

SV1, SV2 (SUCTION VALVE)

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

DTC Logic

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INFOID:000000004055626

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DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause | E | |
|-------|--------------|--|----------------------|---|-----|
| C1164 | CV1 | VDC switch-over solenoid valve (CV1) on the primary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground. | Harness or connector | | BRC |
| C1165 | CV2 | VDC switch-over solenoid valve (CV2) on the primary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground. | | | |
| C1166 | SV1 | VDC switch-over solenoid valve (SV1) on the primary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground. | | G | |
| C1167 | SV2 | VDC switch-over solenoid valve (SV2) on the primary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground. | | Η | |

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

| Self-diagnosis results | |
|---|--|
| CV1 | |
| CV2 | |
| SV1 | |
| SV2 | |
| Is above displayed on the self-diagnosis display? | |

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-225, "Diagnosis Procedure"</u>. NO >> Inspection End

Diagnosis Procedure

INSPECTION PROCEDURE

1.CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or P replace terminal.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-182</u>, <u>"CONSULT-III Function</u> (<u>ABS)"</u>.
- Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

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

BRC-225

INFOID:000000004055624

INFOID:000000004055625

C1164, C1165, C1166, C1167 CV/SV SYSTEM

< COMPONENT DIAGNOSIS >

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

1. Turn ignition switch OFF.

- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check voltage between ABS actuator and electric unit (control unit) harness connector terminal and ground.

| ABS actuator and ele | ectric unit (control unit) | | Voltage |
|----------------------|----------------------------|--------|-----------------|
| Connector Terminal | | | voltage |
| E127 | 32 | Ground | Battery voltage |

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

 ${f 3.}$ CHECK SOLENOID, VDC SWITCH-OVER VALVE AND ACTUATOR RELAY GROUND CIRCUIT

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

| ABS actuator and electric unit (control unit) | | | Continuity | |
|---|--------|--------|------------|--|
| Connector Terminal | | | Continuity | |
| E127 | 16, 47 | Ground | Yes | |

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-271, "Removal and Installation"</u>.

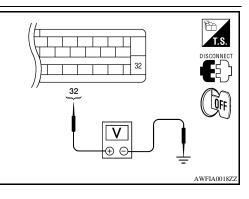
NO >> Repair or replace malfunctioning components.

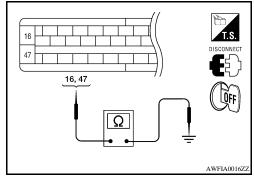
Component Inspection

1.CHECK ACTIVE TEST

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

| | acretion | ABS solenoid valve (ACT) | | |
|--------------------------|---------------|--------------------------|--------|----------|
| U, | Operation | | ACT UP | ACT KEEP |
| | FR RH IN SOL | Off | Off | Off |
| | FR RH OUT SOL | Off | Off | Off |
| FR RH ABS SOLENOID (ACT) | CV1 | Off | On | On |
| | SV1 | Off | On* | Off |
| | FR LH IN SOL | Off | Off | Off |
| | FR LH OUT SOL | Off | Off | Off |
| FR LH ABS SOLENOID (ACT) | CV1 | Off | On | On |
| | SV1 | Off | On* | Off |
| | RR RH IN SOL | Off | Off | Off |
| | RR RH OUT SOL | Off | Off | Off |
| RR RH ABS SOLENOID (ACT) | CV2 | Off | On | On |
| | SV2 | Off | On* | Off |





INFOID:000000004055627

C1164, C1165, C1166, C1167 CV/SV SYSTEM

< COMPONENT DIAGNOSIS >

[TYPE 3]

| YES >> Inspection End NO >> Go to diagnosis procedure. Refer to <u>BRC-225. "Diagnosis Procedure"</u> . Special Repair Requirement INFORMATION OF STEERING ANGLE SENSOR NEUTRAL POSITION ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION Information adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-159. "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-RAL POSITION : Description"</u> . >> GO TO 2 CALIBRATION OF DECEL G SENSOR Naways perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). | RR LH ABS SOLENOID (ACT) | RR LH IN SOL RR LH OUT SOL | Off Off | Off | |
|--|--|--|--------------------------------------|-------------------|------------------------|
| RR LH ABS SOLENOID (ACT) RL H OUT SOL Off Off Off Off V2 Off On On On On On *: ON for 1 to 2 seconds after the touch, and then OFF Off On* Off On* Off *: ON for 1 to 2 seconds after the touch, and then OFF Ethe inspection result normal? YES >> Inspection End Off On* Off NO >> Go to diagnosis procedure. Refer to BRC-225, "Diagnosis Procedure". Pecial Repair Requirement INFOLOD00000000000000000000000000000000000 | | RR LH OUT SOL | Off | | 0" |
| CV2 Off On On SV2 Off On* Off *: ON for 1 to 2 seconds after the touch, and then OFF Off On* Off the inspection result normal? YES >> Inspection End Off On* Off VO >> Go to diagnosis procedure. Refer to BRC-225. "Diagnosis Procedure". Pecial Repair Requirement INFOLE-000000000000000000000000000000000000 | | | | Off | Oli |
| CV2 Off On On SV2 Off On* Off On* Off *: ON for 1 to 2 seconds after the touch, and then OFF *: on for 1 to 2 seconds after the touch, and then OFF *: on for 1 to 2 seconds after the touch, and then OFF at the inspection result normal? YES >> Inspection End *: on or other Off On* Off NO >> Go to diagnosis procedure. Refer to BRC-225, "Diagnosis Procedure". *: on other *: on other | | CV2 | | Oli | Off |
| *: ON for 1 to 2 seconds after the touch, and then OFF e the inspection result normal? YES >> Inspection End NO >> Go to diagnosis procedure. Refer to <u>BRC-225</u> , "Diagnosis Procedure". Pecial Repair Requirement ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION Iways perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator nd electric unit (control unit). Refer to <u>BRC-159</u> , "ADJUSTMENT OF STEERING ANGLE SENSOR NEU- RAL POSITION : Description". >> GO TO 2 CALIBRATION OF DECEL G SENSOR Iways perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). efer to <u>BRC-160</u> , "CALIBRATION OF DECEL G SENSOR : Description". | *: ON for 1 to 2 seconds after | | Off | On | On |
| s the inspection result normal? YES >> Inspection End NO >> Go to diagnosis procedure. Refer to <u>BRC-225. "Diagnosis Procedure"</u> . Special Repair Requirement ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION Aways perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-159. "ADJUSTMENT OF STEERING ANGLE SENSOR NEU- TRAL POSITION : Description".</u> >> GO TO 2 CALIBRATION OF DECEL G SENSOR Aways perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-160. "CALIBRATION OF DECEL G SENSOR : Description"</u> . | *: ON for 1 to 2 seconds after | SV2 | Off | On* | Off |
| ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION Iways perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-159</u> , "ADJUSTMENT OF STEERING ANGLE SENSOR NEU- RAL POSITION : Description". >> GO TO 2CALIBRATION OF DECEL G SENSOR Iways perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). efer to <u>BRC-160</u> , "CALIBRATION OF DECEL G SENSOR : Description". | the inspection result norm YES >> Inspection End NO >> Go to diagnosis | al? procedure. Refer to <u>BRC-225,</u> | "Diagnosis Proc | edure". | |
| Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-159</u> , "ADJUSTMENT OF STEERING ANGLE SENSOR NEU- TRAL POSITION : Description". >> GO TO 2 CALIBRATION OF DECEL G SENSOR Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-160</u> , "CALIBRATION OF DECEL G SENSOR : Description". | special Repair Requir | ement | | | INFOID:000000004055628 |
| Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-159</u> , "ADJUSTMENT OF STEERING ANGLE SENSOR NEU- TRAL POSITION : Description". >> GO TO 2 2.CALIBRATION OF DECEL G SENSOR Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-160</u> , "CALIBRATION OF DECEL G SENSOR : Description". | ADJUSTMENT OF STEE | RING ANGLE SENSOR NEUT | TRAL POSITION | | |
| 2.CALIBRATION OF DECEL G SENSOR Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-160, "CALIBRATION OF DECEL G SENSOR : Description"</u> . | and electric unit (control un | it). Refer to BRC-159, "ADJUS | | | |
| 2.CALIBRATION OF DECEL G SENSOR Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-160, "CALIBRATION OF DECEL G SENSOR : Description"</u> . | >> GO TO 2 | | | | |
| Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-160, "CALIBRATION OF DECEL G SENSOR : Description"</u> . | | EL G SENSOR | | | |
| >> END | Always perform calibration c | of decel G sensor when replaci | ng the ABS actu R : Description". | ator and electric | unit (control unit). |
| | >> END | | | | |
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C1187 DIFFERENTIAL LOCK CONTROL UNIT

< COMPONENT DIAGNOSIS >

C1187 DIFFERENTIAL LOCK CONTROL UNIT

Description

INFOID:000000004055629

[TYPE 3]

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

DTC Logic

INFOID:000000004055630

INFOID:000000004055631

DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause |
|-------|--------------------------------|---|---|
| C1187 | ABS DIFLOCK CONTROL- LER NG | Differential lock controller malfunction. | Harness or connector CAN communication line Differential lock control unit ABS actuator and electric unit (control unit) |

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
ABS DIFLOCK CONTROLLER NG

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-228</u>, "Diagnosis Procedure".

NO >> Inspection End

Diagnosis Procedure

INSPECTION PROCEDURE

1.CHECK CONNECTOR

- 1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E127, check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 2. Reconnect connector and perform self-diagnosis.

Self-diagnosis results

ABS DIFLOCK CONTROLLER NG

Is above displayed on the self-diagnosis display?

YES >> Refer to LAN-14, "Trouble Diagnosis Flow Chart".

NO >> Inspection End

U1000 CAN COMM CIRCUIT

Description

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

DTC Logic

INFOID:000000004055633

DTC DETECTION LOGIC

| DTC | Display item | Malfunction detected condition | Possible cause | E |
|----------------|----------------------------|---|---|----|
| U1000 | CAN COMM CIRCUIT | When ABS actuator and electric unit (control unit) is not transmitting or receiving CAN communication signal for 2 seconds or more. | CAN communication line ABS actuator and electric unit (control unit) | BF |
| Diagno | sis Procedure | | INF0ID:000000004055634 | |
| INSPEC | TION PROCEDURE | | | (|
| 1. CHEC | K CONNECTOR | | | |
| chec | | sconnect the ABS actuator and electric unit (c nation, disconnection, looseness, and so on. If the | | F |
| 2. Reco | onnect connector and per | 0 | | |
| YES | >> Print out the self-diag | <u>ed in self-diagnosis display items?</u> nostic results, and refer to <u>LAN-14, "Trouble Dia</u> loose, damaged, open, or shorted. | gnosis Flow Chart". | J |
| Specia | l Repair Requireme | nt | INFOID:00000004055635 | |
| 1.ADJU | STMENT OF STEERING | ANGLE SENSOR NEUTRAL POSITION | | k |
| and elec | | adjustment for the steering angle sensor when of <u>BRC-159, "ADJUSTMENT OF STEERIN</u> | | L |
| | >> GO TO 2 | | | N |
| 2.CALIE | BRATION OF DECEL G S | SENSOR | | |
| | | el G sensor when replacing the ABS actuator an N OF DECEL G SENSOR : Description". | d electric unit (control unit). | Ν |
| | >> END | | | C |
| | | | | |
| | | | | _ |

INFOID:000000004055632

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HILL DESCENT CONTROL SWITCH

< COMPONENT DIAGNOSIS >

HILL DESCENT CONTROL SWITCH

Description

The hill descent control switch activates (turn ON) the hill descent control function when the hill descent control switch is pressed.

Component Function Check

1. CHECK HILL DESCENT CONTROL SWITCH OPERATION

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

| Condition | Hill descent control indicator lamp illumina- tion status |
|----------------------------------|--|
| Hill descent control switch: ON | ON |
| Hill descent control switch: OFF | OFF |

Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-230, "Diagnosis Procedure"</u>.

Diagnosis Procedure

INFOID:000000004055638

AWFIA0218Z2

1. CHECK HILL DESCENT CONTROL SWITCH

- 1. Turn ignition switch OFF.
- 2. Disconnect hill descent control switch connector.
- 3. Check continuity between hill descent control switch terminals.

| Hill descent control switch | Condition | Continuity |
|-----------------------------|---|------------|
| Terminal | | |
| 1 – 2 | When hill descent control switch is pressed. | Yes |
| 1 – 2 | When hill descent control switch is released. | No |

Is the inspection result normal?

YES >> GO TO 2

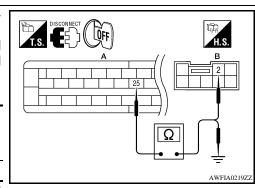
NO >> Replace hill descent control switch.

2.check hill descent control switch harness

- 1. Disconnect ABS actuator and electric unit (control unit) connector.
- Check continuity between ABS actuator and electric unit (control unit) connector E127 (A) terminal 25 and hill descent control switch connector M155 (B) terminal 2.

| ABS actuator and electric unit (control unit) | | Hill descent control switch | | Continuity |
|--|----------|-----------------------------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E127 (A) | 25 | M155 (B) | 2 | Yes |

3. Check continuity between ABS actuator and electric unit (control unit) connector E127 (A) terminal 25 and ground.



H.S.

[TYPE 3]

INFOID:000000004055636

INFOID:000000004055637

HILL DESCENT CONTROL SWITCH

Ground

Continuity

No

< COMPONENT DIAGNOSIS >

Connector

E127 (A)

1.

2. 3.

ABS actuator and electric unit (control unit)

Terminal

25

Is the inspection result normal? YES >> GO TO 3 NO >> Repair or replace harness. $\mathbf{3}.$ check hill descent control switch ground Check continuity between hill descent control switch connector M155 terminal 1 and ground. ŨFF Hill descent control switch Continuity Connector Terminal M155 1 Ground Yes Is the inspection result normal? Ω YES >> GO TO 4 NO >> Repair or replace harness. AWFIA0220Z2 **4.**CHECK COMBINATION METER Check if the indication and operation of combination meter are normal. Refer to MWI-23, "Diagnosis Description". Is the inspection result normal? YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-271, "Removal and Installation". NO >> Replace combination meter. Refer to MWI-93, "Removal and Installation". Component Inspection INEOID:000000004055639 INSPECTION PROCEDURE 1. CHECK HILL DESCENT CONTROL SWITCH Turn ignition switch OFF. H.S. Disconnect hill descent control switch connector. Check continuity between hill descent control switch terminals. Hill descent control switch Condition Continuity Terminal When hill descent control switch is Yes pressed. Ω 1 – 2 When hill descent control switch is No released. AWFIA0218Z Is the inspection result normal? YES >> Inspection End >> Replace hill descent control switch. NO Special Repair Requirement INFOID:000000004458369 1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-159, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description".

BRC-231

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< COMPONENT DIAGNOSIS >

 $\overline{2.}$ CALIBRATION OF DECEL G SENSOR

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-160</u>, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

VDC OFF SWITCH

< COMPONENT DIAGNOSIS >

VDC OFF SWITCH

Description

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

Component Function Check

CHECK VDC OFF SWITCH OPERATION

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

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

Is the inspection result normal?

YES >> Inspection End

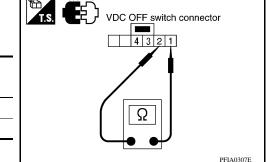
NO >> Go to diagnosis procedure. Refer to <u>BRC-233, "Diagnosis Procedure"</u>.

Diagnosis Procedure

1.CHECK VDC OFF SWITCH

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

| VDC OFF switch | Condition | Continuity |
|----------------|----------------------------------|------------|
| Terminal | Condition | Continuity |
| 1 – 2 | When VDC OFF switch is pressed. | Yes |
| 1 – 2 | When VDC OFF switch is released. | No |



Is the inspection result normal?

YES >> GO TO 2

NO >> Replace VDC OFF switch.

2. CHECK VDC OFF SWITCH HARNESS

- 1. Disconnect ABS actuator and electric unit (control unit) connector.
- Check continuity between ABS actuator and electric unit (control unit) connector E127 (A) terminal 6 and VDC OFF switch connector M154 (B) terminal 1.

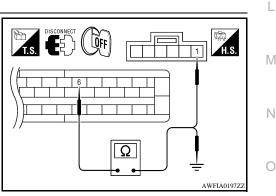
| ABS actuator and electric unit (control unit) | | VDC OFF switch | | Continuity |
|---|----------|----------------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E127 (A) | 6 | M154 (B) | 1 | Yes |

Check continuity between ABS actuator and electric unit (control unit) connector E127 (A) terminal 6 and ground.

| ABS actuator and electric unit (control unit) | | | Continuity |
|---|----------|--------|------------|
| Connector | Terminal | | Continuity |
| E127 (A) | 6 | Ground | No |

Is the inspection result normal?

BRC-233



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INFOID:000000004055641

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VDC OFF SWITCH

< COMPONENT DIAGNOSIS >

NO >> Repair or replace harness.

3.CHECK VDC OFF SWITCH GROUND

Check continuity between VDC OFF switch connector M154 and ground.

| VDC OF | VDC OFF switch | | Continuity |
|-----------|----------------|--------|------------|
| Connector | Terminal | | Continuity |
| M154 | 2 | Ground | Yes |

Is the inspection result normal?

YES >> GO TO 4

NO >> Repair or replace harness.

4.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to <u>MWI-23</u>, "<u>Diagnosis Description</u>".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-271. "Removal and Installa-</u> tion".

NO >> Replace combination meter. Refer to <u>MWI-93, "Removal and Installation"</u>.

Component Inspection

INSPECTION PROCEDURE

1.CHECK VDC OFF SWITCH

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

| VDC OFF switch | Condition | Continuity |
|----------------|----------------------------------|------------|
| Terminal | Condition | Continuity |
| 1 – 2 | When VDC OFF switch is pressed. | Yes |
| 1 – 2 | When VDC OFF switch is released. | No |

Is the inspection result normal?

YES >> Inspection End

NO >> Replace VDC OFF switch.

Special Repair Requirement

INFOID:000000004458370

INFOID:000000004055643

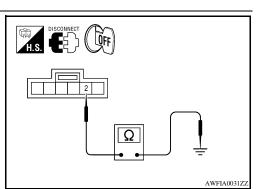
1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-159</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description".

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-160</u>, "CALIBRATION OF DECEL G SENSOR : Description".



VDC OFF switch connector

ABS WARNING LAMP

< COMPONENT DIAGNOSIS >

ABS WARNING LAMP

Description

| < COMPONENT DIAGNOSIS > | [TYPE 3] |
|---|--|
| ABS WARNING LAMP | |
| Description | INFOID:000000004055644 |
| • | ×: ON –: OFF |
| Condition | ABS warning lamp |
| Ignition switch OFF | _ |
| For 2 seconds after turning ON ignition switch | × |
| 2 seconds later after turning ON ignition switch | - |
| ABS function is malfunctioning. | × |
| EBD function is malfunctioning. | × |
| Component Function Check | INFOID:000000004055645 |
| LCHECK ABS WARNING LAMP OPERATION | |
| Check that the lamp illuminates for approximately 2 se | econds after the ignition switch is turned ON. |
| s the inspection result normal? | |
| YES >> Inspection End NO >> Go to diagnosis procedure. Refer to <u>BRC</u> | -235, "Diagnosis Procedure". |
| Diagnosis Procedure | INFOID:000000004055646 |
| 1.CHECK SELF-DIAGNOSIS | |
| | elf-diagnosis. Refer to BRC-182, "CONSULT-III Function |
| <u>ABS)"</u> . | |
| <u>s the inspection result normal?</u> YES >> GO TO 2 | |
| NO >> Check items displayed by self-diagnosis. | |
| 2. CHECK COMBINATION METER | |
| Check if the indication and operation of combination r ion". | neter are normal. Refer to MWI-23, "Diagnosis Descrip- |
| s the inspection result normal? | |
| | control unit). Refer to BRC-271, "Removal and Installa- |
| NO >> Replace combination meter. Refer to <u>MW</u> | I-03 "Removal and Installation" |
| | <u>1-35. Removal and installation</u> . |
| Special Repair Requirement | INFOID:000000004458371 |
| 1.ADJUSTMENT OF STEERING ANGLE SENSOR I | NEUTRAL POSITION |
| and electric unit (control unit). Refer to BRC-159, "A | teering angle sensor when replacing the ABS actuator DJUSTMENT OF STEERING ANGLE SENSOR NEU- |
| TRAL POSITION : Description". | |
| >> GO TO 2 | |
| 2. CALIBRATION OF DECEL G SENSOR | |
| Always perform calibration of decel G sensor when re | placing the ABS actuator and electric unit (control unit). |
| Refer to BRC-160. "CALIBRATION OF DECEL G SEI | <u>toon: boonption</u> . |
| | |

BRC-235

BRAKE WARNING LAMP

< COMPONENT DIAGNOSIS >

BRAKE WARNING LAMP

Description

INFOID:000000004055647

×: ON –: OFF

| Condition | Brake warning lamp (Note 1) |
|---------------------------------|-----------------------------|
| Ignition switch OFF | - |
| Ignition switch ON | × (Note 2) |
| EBD function is malfunctioning. | × |

NOTE:

• 1: Brake warning lamp will turn on in case of parking brake operation (when switch is ON) or of brake fluid level switch operation (when brake fluid is insufficient).

• 2: After starting engine, brake warning lamp is turned off.

Component Function Check

INFOID:000000004055648

1.BRAKE WARNING LAMP OPERATION CHECK

Check that the lamp illuminates after the ignition switch is turned ON, and turns OFF after the engine is started.

Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-236, "Diagnosis Procedure"</u>.

Diagnosis Procedure

INFOID:000000004055649

1.CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. refer to <u>BRC-182, "CONSULT-III Function</u> (ABS)".

Is the inspection result normal?

YES >> GO TO 2

NO >> Check items displayed by self-diagnosis.

2. CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to <u>MWI-23</u>, "<u>Diagnosis Descrip-</u> tion".

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-271, "Removal and Installa-</u> tion".
- NO >> Replace combination meter. Refer to <u>MWI-93</u>, "Removal and Installation".

Special Repair Requirement

INFOID:000000004458372

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-159</u>. "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description".

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-160</u>, "CALIBRATION OF DECEL G SENSOR : Description".

BRC-236

VDC OFF INDICATOR LAMP

< COMPONENT DIAGNOSIS >

VDC OFF INDICATOR LAMP

Description

INFOID:000000004055650

| Condition | ×: ON –: OFF |
|--|--|
| Condition | VDC OFF indicator lamp |
| Ignition switch OFF | _ |
| For 2 seconds after turning ON ignition switch | × |
| 2 seconds later after turning ON ignition switch | _ |
| VDC OFF switch turned ON. (VDC function is OFF.) | × |
| VDC/TCS function is malfunctioning. | × |
| ABS function is malfunctioning. | X |
| EBD function is malfunctioning. | × |
| Component Function Check | INF01D:00000004055651 |
| 1.VDC OFF INDICATOR LAMP OPERATION CHEC | СК 1 |
| Check that the lamp illuminates for approximately 2 se | econds after the ignition switch is turned ON. |
| Is the inspection result normal? | , and the second s |
| YES >> GO TO 2 | |
| NO >> Go to diagnosis procedure. Refer to <u>BRC</u> | |
| 2.VDC OFF INDICATOR LAMP OPERATION CHEC | CK 2 |
| Check that the VDC OFF indicator lamp in the combir VDC OFF switch. | nation meter turns ON/OFF correctly when operating the |
| Is the inspection result normal? | |
| YES >> Inspection End NO >> Check VDC OFF switch. Refer to <u>BRC-23</u> | 33, "Diagnosis Procedure". |
| Diagnosis Procedure | INF0ID:00000004055652 |
| 1. CHECK VDC OFF SWITCH | |
| | nation meter turns ON/OFF correctly when operating the |
| VDC OFF switch. Is the inspection result normal? | |
| YES >> GO TO 2 | |
| NO >> Check VDC OFF switch. Refer to <u>BRC-23</u> | 33, "Diagnosis Procedure". |
| 2. CHECK SELF-DIAGNOSIS | |
| | |
| | elf-diagnosis. Refer to <u>BRC-182, "CONSULT-III Function</u> |
| <u>(ABS)"</u> . | elf-diagnosis. Refer to <u>BRC-182, "CONSULT-III Function</u> |
| (ABS)". Is the inspection result normal? | elf-diagnosis. Refer to <u>BRC-182, "CONSULT-III Function</u> |
| (ABS)". Is the inspection result normal? YES >> GO TO 3 | elf-diagnosis. Refer to <u>BRC-182, "CONSULT-III Function</u> |
| (ABS)". Is the inspection result normal? YES >> GO TO 3 NO >> Check items displayed by self-diagnosis. | elf-diagnosis. Refer to <u>BRC-182, "CONSULT-III Function</u> |
| (ABS)". Is the inspection result normal? YES >> GO TO 3 NO >> Check items displayed by self-diagnosis. 3. CHECK COMBINATION METER | |
| (ABS)". Is the inspection result normal? YES >> GO TO 3 NO >> Check items displayed by self-diagnosis. 3. CHECK COMBINATION METER | elf-diagnosis. Refer to <u>BRC-182, "CONSULT-III Function</u> meter are normal. Refer to <u>MWI-23, "Diagnosis Descrip-</u> |
| (ABS)". Is the inspection result normal? YES >> GO TO 3 NO >> Check items displayed by self-diagnosis. 3.CHECK COMBINATION METER Check if the indication and operation of combination r | |
| (ABS)". Is the inspection result normal? YES >> GO TO 3 NO >> Check items displayed by self-diagnosis. 3. CHECK COMBINATION METER Check if the indication and operation of combination r tion". Is the inspection result normal? | |

>> Replace combination meter. Refer to <u>MWI-93. "Removal and Installation"</u>.

BRC-237

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< COMPONENT DIAGNOSIS >

INFOID:000000004458373

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-159</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description".

>> GO TO 2

 $2. {\sf CALIBRATION} \text{ OF DECEL G SENSOR}$

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-160</u>, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

SLIP INDICATOR LAMP

SLIP INDICATOR LAMP

Description

[TYPE 3]

INFOID:000000004055653

| | ×: ON –: OFF | В |
|--|--|--------|
| Condition | SLIP indicator lamp | |
| Ignition switch OFF | - | |
| For 2 seconds after turning ON ignition switch | × | С |
| 2 seconds later after turning ON ignition switch | _ | |
| VDC/TCS function is malfunctioning. | × | D |
| ABS function is malfunctioning. | × | |
| EBD function is malfunctioning. | × | _ |
| Component Function Check | INFOID:000000004055654 | E |
| 1. CHECK SLIP INDICATOR LAMP OPERATION | | BRC |
| Check that the lamp illuminates for approximately 2 see | conds after the ignition switch is turned ON. | DRU |
| Is the inspection result normal? | - | |
| YES >> Inspection End | | G |
| NO >> Go to diagnosis procedure. Refer to <u>BRC-2</u> | 239, "Diagnosis Procedure". | |
| Diagnosis Procedure | INF01D:000000004055655 | Ш |
| 1.CHECK SELF-DIAGNOSIS | | Н |
| Perform ABS actuator and electric unit (control unit) sel | f-diagnosis. Refer to BRC-182, "CONSULT-III Function | |
| <u>(ABS)"</u> . | | I |
| Is the inspection result normal? | | |
| YES >> GO TO 2 NO >> Check items displayed by self-diagnosis. | | J |
| 2.CHECK COMBINATION METER | | |
| | | |
| tion". | eter are normal. Refer to <u>MWI-23, "Diagnosis Descrip-</u> | K |
| ls the inspection result normal? | | |
| | ontrol unit). Refer to BRC-271, "Removal and Installa- | L |
| tion" | | |
| NO >> Replace combination meter. Refer to <u>MWI</u> | -93. "Removal and Installation". | |
| Special Repair Requirement | INFOID:000000004458374 | Μ |
| 1. ADJUSTMENT OF STEERING ANGLE SENSOR N | IEUTRAL POSITION | |
| | eering angle sensor when replacing the ABS actuator | Ν |
| and electric unit (control unit). Refer to <u>BRC-159, "AI</u> | DJUSTMENT OF STEERING ANGLE SENSOR NEU- | |
| TRAL POSITION : Description". | | \sim |
| | | 0 |
| >> GO TO 2 | | |
| 2. CALIBRATION OF DECEL G SENSOR | | Ρ |
| | placing the ABS actuator and electric unit (control unit). | |
| Refer to BRC-160, "CALIBRATION OF DECEL G SEN | SOR : Description". | |

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HILL DESCENT CONTROL INDICATOR LAMP

< COMPONENT DIAGNOSIS >

HILL DESCENT CONTROL INDICATOR LAMP

Description

INFOID:000000004055656

×: ON -: OFF

| Condition | Hill descent control indicator lamp |
|--|-------------------------------------|
| Ignition switch OFF | - |
| For 2 seconds after turning ON ignition switch | × |
| 2 seconds later after turning ON ignition switch | - |
| Hill descent control function is malfunctioning. | - |

Component Function Check

1.CHECK HILL DESCENT CONTROL INDICATOR LAMP OPERATION

Check that the lamp illuminates for approximately 2 seconds after the ignition switch is turned ON. Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-240, "Diagnosis Procedure"</u>.

Diagnosis Procedure

INFOID:000000004055658

INFOID:000000004055657

1.CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-182. "CONSULT-III Function</u> (ABS)".

Is the inspection result normal?

YES >> GO TO 2

NO >> Check items displayed by self-diagnosis.

2.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to <u>MWI-23</u>, "<u>Diagnosis Descrip-</u> tion".

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-271, "Removal and Installa-</u> tion".
- NO >> Replace combination meter. Refer to <u>MWI-93</u>, "Removal and Installation".

Special Repair Requirement

INFOID:000000004458375

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-159</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description".

>> GO TO 2

2. CALIBRATION OF DECEL G SENSOR

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-160</u>, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

BRC-240

[TYPE 3]

APPLICATION NOTICE

< ECU DIAGNOSIS > ECU DIAGNOSIS APPLICATION NOTICE

Application Notice

| INFOID-0000000000000000 | |
|-------------------------|------------------------|
| INFUID:000000004055659 | INFOID:000000004055659 |

| Service information | Remarks | C |
|---------------------|--|---|
| TYPE 1 | ABS | 0 |
| TYPE 2 | ABLS/ABS | |
| TYPE 3 | HILL DESCENT CONTROL/HILL START ASSIST/VDC/TCS/ABS | D |

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BRC-241

< ECU DIAGNOSIS >

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Reference Value

INFOID:000000004055660

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.

CONSULT-III MONITOR ITEM

| | | Data monitor | | | |
|---------------|---|---|---------------------------------------|--|--|
| Monitor item | Display content | Condition | Reference value in normal operation | | |
| | | 0 [km/h (MPH)] | Vehicle stopped | | |
| FR LH SENSOR | Wheel speed | Nearly matches the speed meter display $(\pm 10\% \text{ or less})$ | Vehicle running (Note 1) | | |
| | | 0 [km/h (MPH)] | Vehicle stopped | | |
| FR RH SENSOR | Wheel speed | Nearly matches the speed meter display $(\pm 10\% \text{ or less})$ | Vehicle running (Note 1) | | |
| | | 0 [km/h (MPH)] | Vehicle stopped | | |
| RR LH SENSOR | Wheel speed | Nearly matches the speed meter display $(\pm 10\% \text{ or less})$ | Vehicle running (Note 1) | | |
| | | 0 [km/h (MPH)] | Vehicle stopped | | |
| RR RH SENSOR | Wheel speed | Nearly matches the speed meter display $(\pm 10\% \text{ or less})$ | Vehicle running (Note 1) | | |
| STOP LAMP SW | Stop lamp switch signal status | When brake pedal is depressed | ON | | |
| STOP LAWF SW | Stop lamp switch signal status | When brake pedal is released | OFF | | |
| BATTERY VOLT | Battery voltage supplied to the ABS actuator and electric unit (control unit) | Ignition switch ON | 10 – 16 V | | |
| GEAR | Gear position determined by TCM | 1st gear 2nd gear 3rd gear 4th gear 5th gear | 1 2 3 4 5 | | |
| SLCT LVR POSI | A/T selector lever position | P position R position N position D position | P R N D | | |
| | VDC OFF switch ON/OFF | VDC OFF switch ON (When VDC OFF indicator lamp is ON) | ON | | |
| OFF SW | VDC OFF Switch UN/OFF | VDC OFF switch OFF (When VDC OFF indicator lamp is OFF) | OFF | | |
| YAW RATE SEN | Yaw rate detected by yaw rate/side/decel G | When vehicle is stopped | Approx. 0 d/s | | |
| TAW NATE SEN | sensor | When vehicle turning | –75 to 75 d/s | | |
| ACCEL POS SIG | Throttle actuator opening/closing is dis- | Accelerator pedal not depressed (ignition switch is ON) | 0 % | | |
| AUUEL FUS SIG | played (linked with accelerator pedal) | Accelerator pedal depressed (ignition switch is ON) | 0 - 100 % | | |
| | | Vehicle stopped | Approx. 0 m/s ² | | |
| SIDE G-SENSOR | Transverse G detected by side G sensor | Vehicle turning right | Negative value (m/s ²) | | |
| | | Vehicle turning left | Positive value (m/s ²) | | |

BRC-242

< ECU DIAGNOSIS >

[TYPE 3]

| | | Data monitor | | | | | |
|---------------|--|--|--|--|--|--|--|
| Monitor item | Display content | Condition | Reference value in normal operation | | | | |
| | Steering angle detected by steering angle | Straight-ahead | Approx. 0±2.5° | | | | |
| STR ANGLE SIG | sensor | Steering wheel turned | –720 to 720° | | | | |
| PRESS SENSOR | Brake fluid pressure detected by front pres- | With ignition switch turned ON and brake pedal released | Approx. 0 bar | | | | |
| PRESS SENSOR | sure sensor | With ignition switch turned ON and brake pedal depressed | -40 to 300 bar | | | | |
| | | With engine stopped | 0 rpm | | | | |
| ENGINE SPEED | With engine running | Engine running | Almost in accor- dance with tachome- ter display | | | | |
| FLUID LEV SW | Brake fluid level switch signal status | When brake fluid level switch ON | ON | | | | |
| FLUID LEV SW | Drake huid level switch signal status | When brake fluid level switch OFF | OFF | | | | |
| | | Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT-III) or actua- tor relay is inactive (in fail-safe mode) | ON | | | | |
| FR RH IN SOL | Operation status of each solenoid valve | When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON) | OFF | | | | |
| FR RH OUT SOL | | Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT-III) or actua- tor relay is inactive (in fail-safe mode) | ON | | | | |
| | Operation status of each solenoid valve | When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON) | OFF | | | | |
| | | Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT-III) or actua- tor relay is inactive (in fail-safe mode) | ON | | | | |
| FR LH IN SOL | Operation status of each solenoid valve | When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON) | OFF | | | | |
| | | Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT-III) or actua- tor relay is inactive (in fail-safe mode) | ON | | | | |
| FR LH OUT SOL | Operation status of each solenoid valve | When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON) | OFF | | | | |
| RR RH IN SOL | Operation status of each colonaid value | Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT-III) or actua- tor relay is inactive (in fail-safe mode) | ON | | | | |
| | Operation status of each solenoid valve | When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON) | OFF | | | | |
| | Operation status of each solonoid value | Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT-III) or actua- tor relay is inactive (in fail-safe mode) | ON | | | | |
| RR RH OUT SOL | Operation status of each solenoid valve | When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON) | OFF | | | | |

< ECU DIAGNOSIS >

| | | Data monitor | | | | | |
|---------------|---|--|-------------------------------------|--|--|--|--|
| Monitor item | Display content | Condition | Reference value in normal operation | | | | |
| | Operation status of each colonaid value | Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT-III) or actua- tor relay is inactive (in fail-safe mode) | ON | | | | |
| RR LH IN SOL | Operation status of each solenoid valve | When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON) | OFF | | | | |
| RR LH OUT SOL | Operation status of each solenoid valve | Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT-III) or actua- tor relay is inactive (in fail-safe mode) | ON | | | | |
| | | When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON) | OFF | | | | |
| MOTOR RELAY | Motor and motor rolay operation | When the motor relay and motor are operating | ON | | | | |
| MOTOR RELAT | Motor and motor relay operation | When the motor relay and motor are not operating | OFF | | | | |
| | Actuator relay aparation | When the actuator relay is operating | ON | | | | |
| ACTUATOR RLY | Actuator relay operation | When the actuator relay is not operating | OFF | | | | |
| ABS WARN LAMP | ABS warning lamp | When ABS warning lamp is ON | ON | | | | |
| ADS WARN LAWP | (Note 2) | When ABS warning lamp is OFF | OFF | | | | |
| OFF LAMP | VDC OFF indicator lamp | When VDC OFF indicator lamp is ON | ON | | | | |
| OTT LAWF | (Note 2) | When VDC OFF indicator lamp is OFF | OFF | | | | |
| SLIP LAMP | SLIP indicator lamp | When SLIP indicator lamp is ON | ON | | | | |
| | (Note 2) | When SLIP indicator lamp is OFF | OFF | | | | |
| 4WD FAIL REQ | Transfer control unit fail-safe signal | When transfer control unit is in fail-safe mode | ON | | | | |
| | | When transfer control unit is normal | OFF | | | | |
| EBD SIGNAL | EBD operation | EBD is active | ON | | | | |
| EBD SIGNAL | | EBD is inactive | OFF | | | | |
| ABS SIGNAL | ABS operation | ABS is active | ON | | | | |
| ADO OIONAL | | ABS is inactive | OFF | | | | |
| TCS SIGNAL | TCS operation | TCS is active | ON | | | | |
| 100 CICINAL | | TCS is inactive | OFF | | | | |
| VDC SIGNAL | VDC operation | VDC is active | ON | | | | |
| | | VDC is inactive | OFF | | | | |
| EBD FAIL SIG | EBD fail-safe signal | In EBD fail-safe | ON | | | | |
| | | EBD is normal | OFF | | | | |
| ABS FAIL SIG | ABS fail-safe signal | In ABS fail-safe | ON | | | | |
| | | ABS is normal | OFF | | | | |
| TCS FAIL SIG | TCS fail-safe signal | In TCS fail-safe | ON | | | | |
| | | TCS is normal | OFF | | | | |
| VDC FAIL SIG | VDC fail-safe signal | In VDC fail-safe | ON | | | | |
| | | VDC is normal | OFF | | | | |
| CRANKING SIG | Crank operation | Crank is active | ON | | | | |
| | | Crank is inactive | OFF | | | | |

BRC-244

< ECU DIAGNOSIS >

[TYPE 3]

| | | Data monitor | | | | | |
|---|------------------------------------|---|-------------------------------------|--|--|--|--|
| Monitor item | Display content | Condition | Reference value in normal operation | | | | |
| CV1 | VDC switch-over valve | When actuator (switch-over valve) is ac- tive ("ACTIVE TEST" with CONSULT-III) or actuator relay is inactive (when in fail- safe mode) | ON | | | | |
| | | When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON) | OFF | | | | |
| CV2 | VDC switch-over valve | When actuator (switch-over valve) is ac- tive ("ACTIVE TEST" with CONSULT-III) or actuator relay is inactive (when in fail- safe mode) | ON | | | | |
| | | When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON) | OFF | | | | |
| SV1 | VDC switch-over valve | When actuator (switch-over valve) is ac- tive ("ACTIVE TEST" with CONSULT-III) or actuator relay is inactive (when in fail- safe mode) | ON | | | | |
| | | When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON) | OFF | | | | |
| SV2 | VDC switch-over valve | When actuator (switch-over valve) is ac- tive ("ACTIVE TEST" with CONSULT-III) or actuator relay is inactive (when in fail- safe mode) | ON | | | | |
| | | When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON) | OFF | | | | |
| DECEL G-SEN Longitudinal acceleration detected by Decel | | Vehicle stopped | Approx. 0 G | | | | |
| | G-Sensor | Vehicle running | -1.7 to 1.7 G | | | | |
| EBD WARN LAMP | EBD warning lamp | When EBD warning lamp is ON | ON | | | | |
| | | When EBD warning lamp is OFF | OFF | | | | |
| N POSI SIG | PNP switch signal ON/OFF condition | A/T shift position = N position | ON | | | | |
| | | A/T shift position = other than N position | OFF | | | | |
| P POSI SIG | PNP switch signal ON/OFF condition | A/T shift position = P position | ON | | | | |
| 1 1 001 010 | | A/T shift position = other than P position | OFF | | | | |
| R POSI SIG | PNP switch signal ON/OFF condition | A/T shift position = R position | ON | | | | |
| N 1 00 00 | | A/T shift position = other than R position | OFF | | | | |
| 2WD/4WD | Drive axle | 2WD model | 2WD | | | | |
| | | 4WD model | 4WD | | | | |

NOTE:

• 1: Confirm tire pressure is normal.

• 2: On and off timing for warning lamp and indicator lamp.

- ABS warning lamp: Refer to BRC-235, "Description".

- Brake warning lamp: Refer to BRC-236, "Description".

- VDC OFF indicator lamp: Refer to BRC-237, "Description".

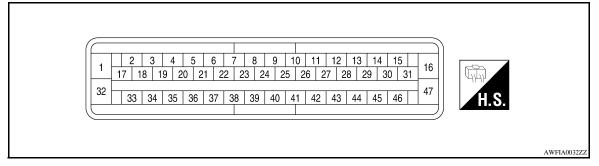
- SLIP indicator lamp: Refer to BRC-239, "Description".

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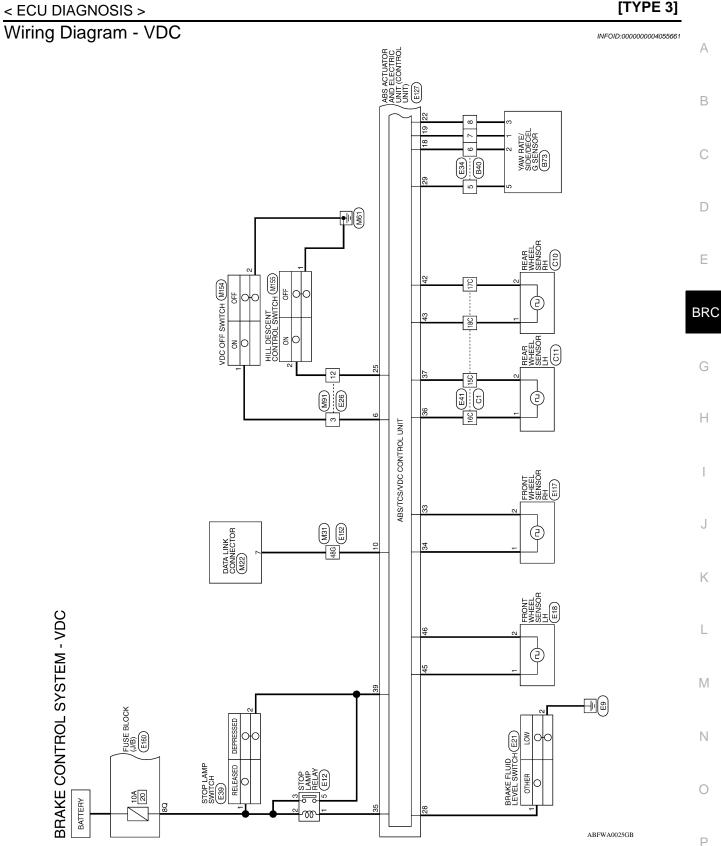
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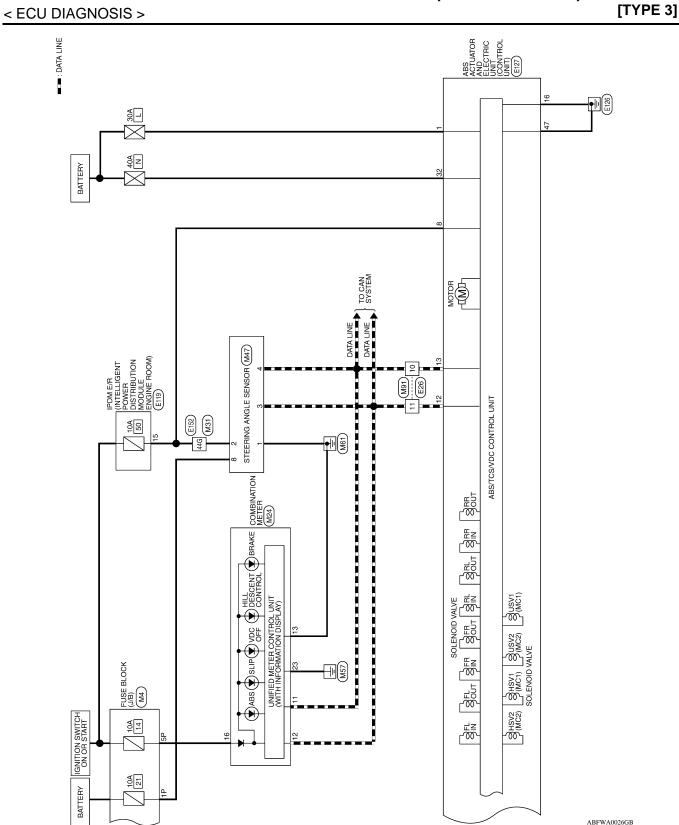
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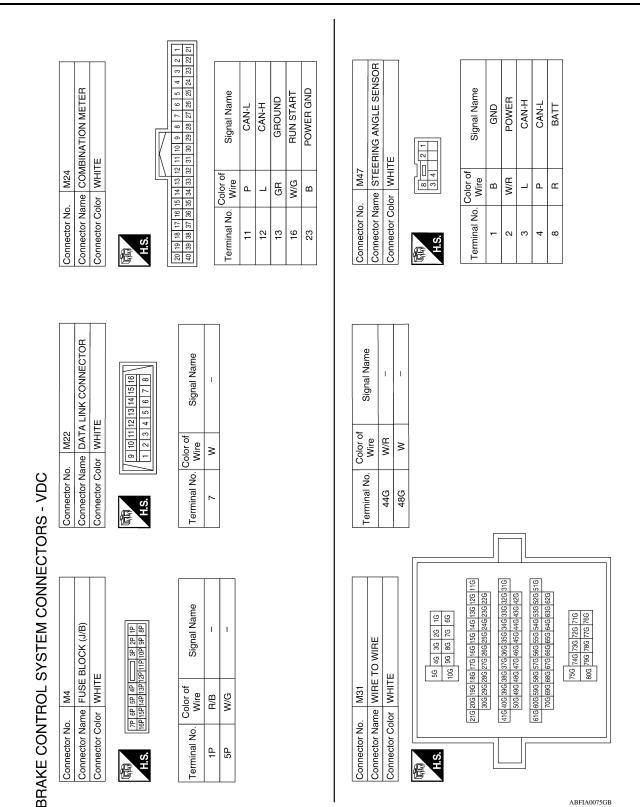
TERMINAL LAYOUT



[TYPE 3]







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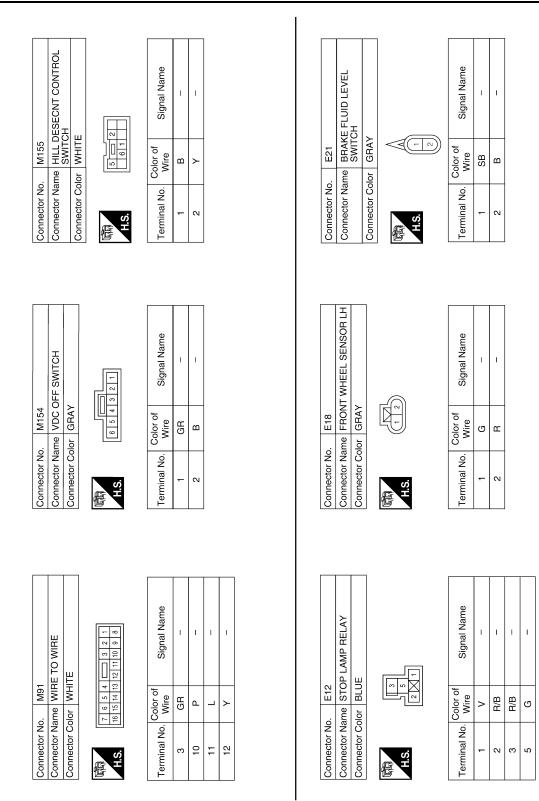
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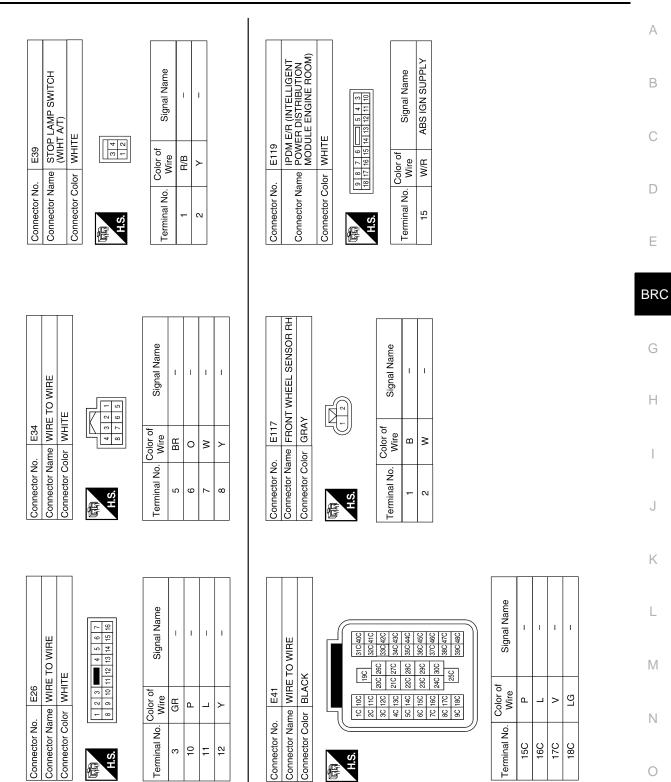
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|---------------|----------------|-----------------|-----------------------------|---|--|--|---|------------------|
| | WIRE TO WIRE | ш | 26 36 46 56 76 86 96 106 | 116 256 336 446 556 665 776 386 396 206 216 226 236 246 556 565 276 280 290 306 316 326 336 346 356 366 377 386 396 406 416 | 42G 44G 44G 45G 46G 47G 48G 49G 50G 50G 51G 52C 53G 56G 51G 52G 55G 55G 55G 55G 55G 55G 55G 55G 55 | 71G 72G 73G 74G 75G 76G 77G 78G 79G 80G | | Signal Name |
| E152 | | or WHITE | 0 0 | 16 126 136 14 226 236 24 16 326 336 34 | 42G 43G 44 62G 53G 54 62G 63G 64 | 79 | | Color of Wire |
| Connector No. | Connector Name | Connector Color | H.S. | | | | | Terminal No. |

| Signal Name | I | I | HDC_SW | I | I | FLUID_LEVEL_SW | CLUS_GND | I | I | VALVE ECU SUPPLY | FR_RH_SIG | FR_RH_PWR | STOP_LAMP_SW_ON | RR_LH_PWR | RR_LH_SIG | I | STOP_LAMP_SW | I | I | RR_RH_SIG | RR_RH_PWR | 1 | FR_LH_PWR | FR_LH_SIG | MOTOR GND |
|------------------|----|----|--------|----|----|----------------|----------|----|----|------------------|-----------|-----------|-----------------|-----------|-----------|----|--------------|----|----|-----------|-----------|----|-----------|-----------|-----------|
| Color of Wire | I | I | ≻ | I | I | GR | BR | I | I | ≻ | N | в | > | L | Р | I | SB | I | I | > | ГG | I | თ | В | в |
| Terminal No. | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 |

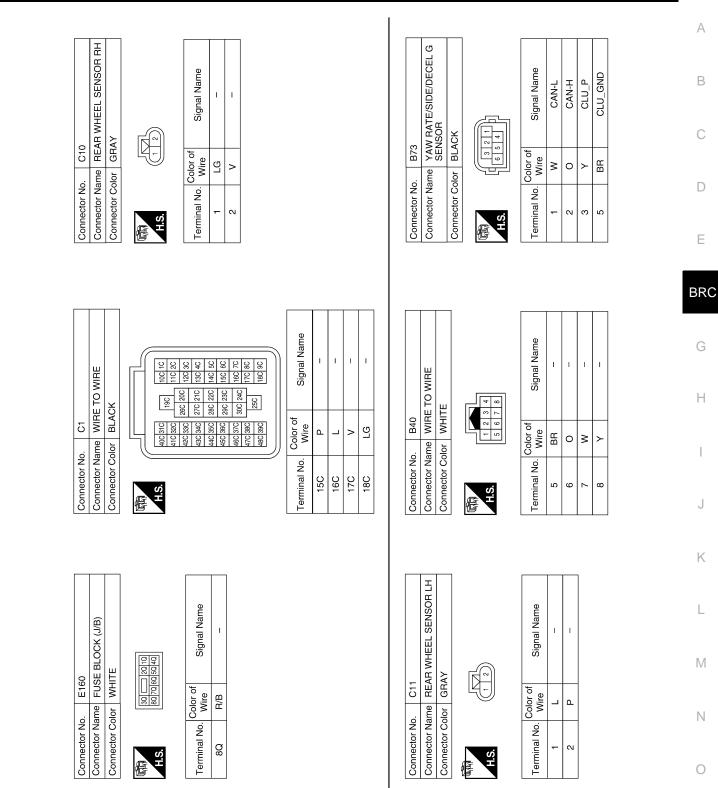
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|---------------|--|-----------------------|-----------|---|
| | DR AND LIT (CONTROL /DC) | | | |
| E127 | ABS ACTUATOR AND ELECTRIC UNIT (CON UNIT) (WITH VDC) | ACK | | _ |
| | ne EL UN | or BL | | |
| Connector No. | Connector Name ELECTRIC UNIT (CONTROL UNIT) (WITH VDC) | Connector Color BLACK | 朝 H.S. | |

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|---|---------------------------|----------------------------------|----|-------------------------------|---|---|
| | 6 7 8 9 10 11 12 13 14 15 | 21 22 23 24 25 26 27 28 29 30 31 | | 37 38 39 40 41 42 43 44 45 46 | | |
| | 4 5 | 20 | | 35 36 | | |
| | 2 3 | 17 18 19 | | 33 34 | | |
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| Signal Name | MOTOR SUPPLY | I | I | Ι | I | VDC OFF SW | 1 | IGN | I | DIAG_K | I | CAN-H | CAN-L | I | Ι | VALVE ECU GND | I | CAN2-H | CAN2-L | I | Ι | CLUS_SUP |
|------------------|--------------|---|---|---|---|------------|---|-----|---|--------|---|-------|-------|----|----|---------------|----|--------|--------|----|----|----------|
| Color of Wire | н | I | I | Ι | I | GR | I | W/R | I | SB | I | _ | ٩ | ı | Ι | В | I | 0 | M | Ι | Ι | ۲ |
| Terminal No. | ۰, | 2 | e | 4 | 5 | 9 | 7 | 80 | 6 | 10 | ÷ | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |

ABFIA0077GB





Fail-Safe

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ABFIA0116GB

[TYPE 3]

CAUTION:

If the Fail-Safe function is activated, perform Self Diagnosis for ABS/TCS/VDC system.

ABS/EBD SYSTEM

BRC-253

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS >

[TYPE 3]

In case of an electrical malfunction with the ABS, the ABS warning lamp, VDC OFF indicator lamp and SLIP indicator lamp will turn on. In case of an electrical malfunction with the EBD system, the BRAKE warning lamp, ABS warning lamp, VDC OFF indicator lamp and SLIP indicator lamp will turn on.

The system will revert to one of the following conditions of the Fail-Safe function.

- 1. For ABS malfunction, only the EBD is operative and the condition of the vehicle is the same condition of vehicles without ABS/TCS/VDC system.
- 2. For EBD malfunction, the EBD and ABS become inoperative, and the condition of the vehicle is the same as the condition of vehicles without ABS/TCS/VDC or EBD system.

HILL DESCENT CONTROL/HILL START ASSIST SYSTEM

In case of hill descent control system malfunction, the hill descent control indicator lamp will remain off even though the hill descent control switch is operated and the condition of the vehicle is the same as the condition of vehicles without hill descent control system.

In case of hill start assist system malfunction, the VDC OFF and SLIP indicator lamps are turned on and the condition of the vehicle is the same as the condition of vehicles without hill start assist system.

VDC/TCS SYSTEM

In case of TCS/VDC system malfunction, the VDC OFF indicator lamp and SLIP indicator lamp are turned on and the condition of the vehicle is the same as the condition of vehicles without TCS/VDC system. In case of an electrical malfunction with the TCS/VDC system, the ABS control continues to operate normally without TCS/VDC control.

DTC No. Index

| DTC | Items (CONSULT screen terms) | Reference | |
|-------|------------------------------|------------------------|--|
| C1101 | RR RH SENSOR-1 | RPC-188 "Description" | |
| C1102 | RR LH SENSOR-1 | | |
| C1103 | FR RH SENSOR-1 | BRC-188, "Description" | |
| C1104 | FR LH SENSOR-1 | | |
| C1105 | RR RH SENSOR-2 | | |
| C1106 | RR LH SENSOR-2 | RRC 101 "Description" | |
| C1107 | FR RH SENSOR-2 | BRC-191, "Description" | |
| C1108 | FR LH SENSOR-2 | | |
| C1109 | BATTERY VOLTAGE [ABNORMAL] | BRC-194, "Description" | |
| C1110 | CONTROLLER FAILURE | BRC-196, "DTC Logic" | |
| C1111 | PUMP MOTOR | BRC-197, "Description" | |
| C1113 | G-SENSOR | BRC-199, "Description" | |
| C1115 | ABS SENSOR [ABNORMAL SIGNAL] | BRC-202, "Description" | |
| C1116 | STOP LAMP SW | BRC-205, "Description" | |
| C1120 | FR LH IN ABS SOL | BRC-207, "Description" | |
| C1121 | FR LH OUT ABS SOL | BRC-210, "Description" | |
| C1122 | FR RH IN ABS SOL | BRC-207, "Description" | |
| C1123 | FR RH OUT ABS SOL | BRC-210, "Description" | |
| C1124 | RR LH IN ABS SOL | BRC-207, "Description" | |
| C1125 | RR LH OUT ABS SOL | BRC-210, "Description" | |
| C1126 | RR RH IN ABS SOL | BRC-207, "Description" | |
| C1127 | RR RH OUT ABS SOL | BRC-210, "Description" | |

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS >

[TYPE 3]

| DTC | Items (CONSULT screen terms) | Reference | |
|-------|------------------------------|------------------------|-----|
| C1130 | ENGINE SIGNAL 1 | | — A |
| C1131 | ENGINE SIGNAL 2 | | |
| C1132 | ENGINE SIGNAL 3 | BRC-213, "Description" | В |
| C1133 | ENGINE SIGNAL 4 | | |
| C1136 | ENGINE SIGNAL 6 | | |
| C1140 | ACTUATOR RLY | BRC-215, "Description" | С |
| C1143 | ST ANG SEN CIRCUIT | BRC-217, "Description" | |
| C1144 | ST ANG SEN SIGNAL | BRC-217, Description | D |
| C1145 | YAW RATE SENSOR | BRC-199, "Description" | |
| C1146 | SIDE G-SEN CIRCUIT | BRC-199, Description | |
| C1155 | BR FLUID LEVEL LOW | BRC-219, "Description" | E |
| C1156 | ST ANG SEN COM CIR | BRC-222, "Description" | |
| C1160 | DECEL G SEN SET | BRC-223, "Description" | BRO |
| C1163 | ST ANGL SEN SAFE | BRC-224, "Description" | |
| C1164 | CV1 | | |
| C1165 | CV2 | BRC-225, "Description" | G |
| C1166 | SV1 | | |
| C1167 | SV2 | | |
| C1170 | VARIANT CODING | BRC-196, "DTC Logic" | — H |
| C1187 | ABS DIFLOCK CONTROLLER NG | BRC-228, "Description" | |
| U1000 | CAN COMM CIRCUIT | BRC-229, "Description" | |

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BRC-255

SYMPTOM DIAGNOSIS APPLICATION NOTICE

Application Notice

| Service information | Remarks | |
|---------------------|--|--|
| TYPE 1 | ABS | |
| TYPE 2 | ABLS/ABS | |
| TYPE 3 | HILL DESCENT CONTROL/HILL START ASSIST/VDC/TCS/ABS | |

VDC/TCS/ABS

< SYMPTOM DIAGNOSIS >

VDC/TCS/ABS

[TYPE 3]

Symptom Table

INFOID:000000004055665

| Symptom | Check item | Reference |
|---|--|--|
| | Brake force distribution | |
| Excessive ABS function operation fre- quency | Looseness of front and rear axle | BRC-258, "Diag- nosis Procedure" |
| 400.109 | Wheel sensor and rotor system | <u></u> |
| | Brake pedal stroke | BRC-259, "Diag- |
| Unexpected pedal reaction | Make sure the braking force is sufficient when the ABS is not operating. | nosis Procedure" |
| The braking distance is long | Check stopping distance when the ABS is not operating. | BRC-260, "Diag- nosis Procedure" |
| ABS function does not operate (Note 1) | ABS actuator and electric unit (control unit) | BRC-261, "Diag- nosis Procedure" |
| Pedal vibration or ABS operation sound | Brake pedal | BRC-262, "Diag- |
| occurs (Note 2) | ABS actuator and electric unit (control unit) | nosis Procedure" |
| | ABS actuator and electric unit (control unit) | |
| Vehicle jerks during VDC/TCS/ABS control | ТСМ | <u>BRC-263, "Diag-</u> nosis Procedure" |
| control | ECM | |

NOTE:

• 1: The ABS does not operate when the speed is 10 km/h (6 MPH) or less.

• 2: Under the following conditions, ABS is activated and vibration is felt when brake pedal is lightly depressed. However, this is normal.

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

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EXCESSIVE ABS FUNCTION OPERATION FREQUENCY

< SYMPTOM DIAGNOSIS >

EXCESSIVE ABS FUNCTION OPERATION FREQUENCY

Diagnosis Procedure

INFOID:000000004055666

[TYPE 3]

1.CHECK START

Check front and rear brake force distribution using a brake tester.

Is the inspection result normal?

YES >> GO TO 2

NO >> Check brake system.

2. CHECK FRONT AND REAR AXLE

Make sure that there is no excessive play in the front and rear axles. Refer to front: <u>FAX-5</u>, <u>"On-Vehicle</u><u>Inspection and Service"</u>, Rear: <u>RAX-7</u>, <u>"Rear Axle Bearing"</u> (C200) or <u>RAX-19</u>, <u>"Rear Axle Bearing"</u> (M226).

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

3.CHECK WHEEL SENSOR AND SENSOR ROTOR

Check the following.

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

Is the inspection result normal?

YES >> GO TO 4

- NO >> Replace wheel sensor or sensor rotor. Refer to <u>BRC-269</u>, "<u>Removal and Installation</u>" or <u>BRC-270</u>, "<u>Removal and Installation</u>".
 - Repair harness.

4.CHECK ABS WARNING LAMP DISPLAY

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

- YES >> Perform self-diagnosis. Refer to <u>BRC-182, "CONSULT-III Function (ABS)"</u>.
- NO >> Normal

UNEXPECTED PEDAL REACTION

| < SYMPTOM DIAGNOSIS > [TYPE 3] |
|--|
| UNEXPECTED PEDAL REACTION |
| Diagnosis Procedure |
| 1.CHECK BRAKE PEDAL STROKE |
| Check brake pedal stroke. Refer to BR-18, "Inspection and Adjustment". |
| Is the stroke too large? |
| YES >> • Bleed air from brake tube and hose. Refer to <u>BR-20. "Bleeding Brake System"</u>. • Check brake pedal, brake booster, and master cylinder for mount play, looseness, brake system fluid leakage, etc. Refer to <u>BR-18. "Inspection and Adjustment"</u> (brake pedal), <u>BR-11. "On Board Inspection"</u> (master cylinder), <u>BR-9. "Inspection"</u> (brake booster). NO >> GO TO 2 |
| 2. CHECK FUNCTION |
| Disconnect ABS actuator and electric unit (control unit) connector to deactivate ABS. Check if braking force is normal in this condition. Connect connector after inspection. |
| Is the inspection result normal? |
| YES >> Normal |

NO >> Check brake system.

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THE BRAKING DISTANCE IS LONG

Diagnosis Procedure

INFOID:000000004055668

CAUTION:

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

1.CHECK FUNCTION

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

Is the inspection result normal?

YES >> Normal

NO >> Check brake system.

ABS FUNCTION DOES NOT OPERATE

| ABS FUNCTION DOES NOT OFERATE | | |
|--|------------------------|---|
| < SYMPTOM DIAGNOSIS > | [TYPE 3] | |
| ABS FUNCTION DOES NOT OPERATE | | |
| Diagnosis Procedure | INFOID:000000004055669 | |
| CAUTION: ABS does not operate when speed is 10 km/h (6 MPH) or lower. 1.CHECK ABS WARNING LAMP DISPLAY | | I |
| Make sure that the ABS warning lamp turns OFF after ignition switch is turned ON or when o | driving. | (|
| Is the inspection result normal? | | |
| YES >> Normal NO >> Perform self-diagnosis. Refer to <u>BRC-182, "CONSULT-III Function (ABS)"</u> . | | |

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PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

< SYMPTOM DIAGNOSIS >

PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

Diagnosis Procedure

CAUTION:

Under the following conditions, ABS is activated and vibration is felt when brake pedal is lightly depressed. However, this is normal.

- When shifting gears
- When driving on slippery road
- During cornering at high speed
- When passing over bumps or grooves [at approximately 50 mm (1.97 in) or more]
- When pulling away just after starting engine [at approximately 10 km/h (6 MPH) or higher]
- **1.**SYMPTOM CHECK 1

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

Do vibrations occur?

YES >> GO TO 2

NO >> Inspect the brake pedal.

2.SYMPTOM CHECK 2

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

Do the operation noises occur?

YES >> GO TO 3

NO >> Perform self -diagnosis. Refer to <u>BRC-182, "CONSULT-III Function (ABS)"</u>.

3.SYMPTOM CHECK 3

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

Do symptoms occur?

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

[TYPE 3]

| VEHICLE JERKS DURING VDC/TCS/ABS CONTROL < SYMPTOM DIAGNOSIS > [TYPE 3] |
|---|
| VEHICLE JERKS DURING VDC/TCS/ABS CONTROL |
| Diagnosis Procedure |
| 1. SYMPTOM CHECK |
| Check if the vehicle jerks during VDC/TCS/ABS control. |
| Is the inspection result normal? |
| YES >> Normal. NO >> GO TO 2 |
| 2. CHECK SELF-DIAGNOSIS RESULTS |
| Perform self-diagnosis of ABS actuator and electric unit (control unit). Refer to <u>BRC-182. "CONSULT-III Func-</u> tion (ABS)". |
| <u>Are self-diagnosis results indicated?</u> |
| YES >> Check corresponding items, make repairs, and perform ABS actuator and electric unit (control unit) self-diagnosis. |
| NO >> GO TO 3 3.CHECK CONNECTOR |
| |
| • Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector and check terminal for deformation, disconnection, looseness, etc. |
| Securely connect connectors and perform ABS actuator and electric unit (control unit) self-diagnosis. |
| <u>Are self-diagnosis results indicated?</u> YES >> If poor contact, damage, open or short circuit of connector terminal is found, repair or replace. |
| YES >> If poor contact, damage, open or short circuit of connector terminal is found, repair or replace. NO >> GO TO 4 |
| 4.CHECK ECM AND TCM SELF-DIAGNOSIS RESULTS |
| Perform ECM and TCM self-diagnosis. |
| Are self-diagnosis results indicated? |
| YES >> Check the corresponding items. ECM: Refer to <u>EC-523, "CONSULT-III Function (ENGINE)"</u>. TCM: Refer to <u>TM-150, "CONSULT-III Function (TRANSMISSION)"</u>. |
| NO >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-271, "Removal and Installa-</u> tion". |
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NORMAL OPERATING CONDITION

< SYMPTOM DIAGNOSIS >

NORMAL OPERATING CONDITION

Description

| Symptom | Result | |
|--|---|--|
| Slight vibrations are felt on the brake pedal and the operation noises occur, when VDC, TCS or ABS is ac- tivated. | This is a normal condi- tion due to the VDC, TCS or ABS activation. | |
| Stopping distance is longer than that of vehicles without ABS when the vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads. | | |
| The brake pedal moves and generates noises, when TCS or VDC is activated due to rapid acceleration or sharp turn. | | |
| The brake pedal vibrates and motor operation noises occur from the engine room, after the engine starts and just after the vehicle starts. | This is normal, and it is caused by the ABS operation check. | |
| Depending on the road conditions, the driver may experience a sluggish feel. | This is normal, because | |
| TCS may activate momentarily if wheel speed changes when driving over location where friction coefficient varies, when downshifting, or when fully depressing accelerator pedal. | TCS places the highest priority on the optimum traction (stability). | |
| The ABS warning lamp, VDC OFF indicator lamp and SLIP indicator lamp may turn ON when the vehicle is subject to strong shaking or large vibration, such as when the vehicle is rotating on a turntable or located on a ship while the engine is running. | In this case, restart the engine on a normal | |
| VDC may not operate normally or the ABS warning lamp, VDC OFF indicator lamp, and SLIP indicator lamp may illuminate, when running on a special road that is extremely slanted (e.g. bank in a circuit course). | road. If the normal con- dition is restored, there is no malfunction. At | |
| A malfunction may occur in the yaw rate/side/decel G sensor system, when the vehicle turns sharply, such as during a spin turn, axle turn, or drift driving, while the VDC function is off (VDC OFF indicator lamp illuminated). | that time, erase the self- diagnosis memory. | |
| The vehicle speed will not increase even though the accelerator pedal is depressed, when inspecting the speedometer on a 2-wheel chassis dynamometer. | Normal (Deactivate the VDC/TCS function be- fore performing an in- spection on a chassis dynamometer.) | |
| VDC OFF indicator lamp and SLIP indicator lamp may simultaneously turn on when low tire pressure warn- ing lamp turns on. | This is not a VDC sys- tem error but results from characteristic change of tire. | |

< PRECAUTION > PRECAUTION PRECAUTIONS

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

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.

Precaution for Brake System

CAUTION:

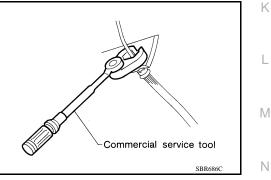
- Refer to MA-12, "Fluids and Lubricants" for recommended brake fluid.
- Never reuse drained brake fluid.
- Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.
- To clean or wash all parts of master cylinder and disc brake caliper, use clean brake fluid.
- Never use mineral oils such as gasoline or kerosene. They will ruin rubber parts of the hydraulic system.
- Use flare nut wrench when removing and installing brake tube.
- If a brake fluid leak is found, the part must be disassembled without fail. Then it has to be replaced with a new one if a defect exists.
- Turn the ignition switch OFF and remove the connector of the ABS actuator and electric unit (control unit) or the battery terminal before performing the work.
- Always torque brake lines when installing.
- Burnish the brake contact surfaces after refinishing or replacing rotors, after replacing pads, or if a soft pedal occurs at very low mileage.

Refer to <u>BR-38, "Brake Burnishing"</u> (front disc brake) or <u>BR-43, "Brake Burnishing"</u> (rear disc brake). WARNING:

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

Precaution for Brake Control

- During ABS operation, the brake pedal may vibrate lightly and a mechanical noise may be heard. This is normal.
- Just after starting vehicle, the brake pedal may vibrate or a motor operating noise may be heard from engine compartment. This is a normal status of operation check.
- Stopping distance may be longer than that of vehicles without ABS when vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.



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PRECAUTIONS

< PRECAUTION >

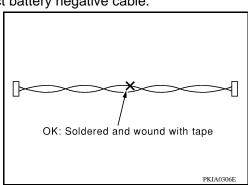
- When an error is indicated by ABS or another warning lamp, collect all necessary information from customer (what symptoms are present under what conditions) and check for simple causes before starting diagnosis. Besides electrical system inspection, check brake booster operation, brake fluid level, and fluid leaks.
- If incorrect tire sizes or types are installed on the vehicle or brake pads are not Genuine NISSAN parts, stopping distance or steering stability may deteriorate.
- If there is a radio, antenna or related wiring near control module, ABS function may have a malfunction or error.
- If aftermarket parts (car stereo, CD player, etc.) have been installed, check for incidents such as harness pinches, open circuits or improper wiring.
- If the following components are replaced with non-genuine components or modified, the VDC OFF indicator lamp and SLIP indicator lamp may turn on or the VDC system may not operate properly. Components related to suspension (shock absorbers, struts, springs, bushings, etc.), tires, wheels (exclude specified size), components related to brake system (pads, rotors, calipers, etc.), components related to engine (muffler, ECM, etc.), components related to body reinforcement (roll bar, tower bar, etc.).
- Driving with broken or excessively worn suspension components, tires or brake system components may
 cause the VDC OFF indicator lamp and the SLIP indicator lamp to turn on, and the VDC system may not
 operate properly.
- When the TCS or VDC is activated by sudden acceleration or sudden turn, some noise may occur. The noise is a result of the normal operation of the TCS and VDC.
- When driving on roads which have extreme slopes (such as mountainous roads) or high banks (such as sharp curves on a freeway), the VDC may not operate normally, or the VDC warning lamp and the SLIP indicator lamp may turn on. This is not a problem if normal operation can be resumed after restarting the engine.
- Sudden turns (such as spin turns, acceleration turns), drifting, etc. with VDC turned off may cause the yaw rate/side/decel G sensor to indicate a problem. This is not a problem if normal operation can be resumed after restarting the engine.
- If battery is removed or steering angle sensor is disconnected, power to steering angle sensor is lost and the screen goes into steering angle sensor safe mode.
- When screen goes into steering angle sensor safe mode, perform "Adjustment of Steering Angle Sensor Neutral Position" with CONSUT-III and check that VDC OFF indicator turns off. Additionally, perform selfdiagnosis, check that only "Steering Angle Sensor Safe Mode" is shown for self-diagnostic result, and then delete the memory. (If the self-diagnostic result shows an indication other than "Steering Angle Sensor Safe Mode", repair the relevant part and restart self-diagnosis.) The steering angle sensor is released and returns to normal condition by performing the above operation.
- When checking, if only "Steering Angle Sensor Safe Mode" is shown in the self-diagnostic result and VDC OFF indicator is off, delete history of malfunction. This happens when battery power supply is lost and the screen goes into Steering Angle Sensor Safe Mode, and then screen returns to normal mode automatically by driving the vehicle in a straight forward direction [for approximately 30 seconds at 20 km/h (12 MPH) or more] after power is supplied again.

NOTE:

VDC OFF indicator lamp is on when VDC OFF switch is on.

Precaution for CAN System

- Do not apply voltage of 7.0V or higher to terminal to be measured.
- Maximum open terminal voltage of tester in use must be less than 7.0V.
- Before checking harnesses, turn ignition switch OFF and disconnect battery negative cable.
- Area to be repaired must be soldered and wrapped with tape. Make sure that fraying of twisted wire is within 110 mm (4.33 in).

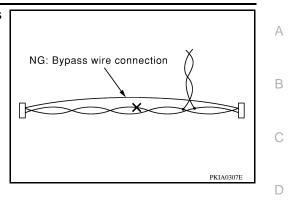


PRECAUTIONS

< PRECAUTION >

[TYPE 3]

• Do not make a bypass connection to repaired area. (If the circuit is bypassed, characteristics of twisted wire will be lost.)



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PREPARATION

PREPARATION PREPARATION

Special Service Tool

INFOID:000000004055677

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

| Tool number (Kent-Moore No.) Tool name | | Description |
|---|-----------|---|
| KV991J0080 (J-45741) ABS active wheel sensor tester | VFIA0101E | Checking operation of ABS active wheel sen sors |
| ST30031000 (—) Bearing puller | ZLA0700D | Removing sensor rotor |

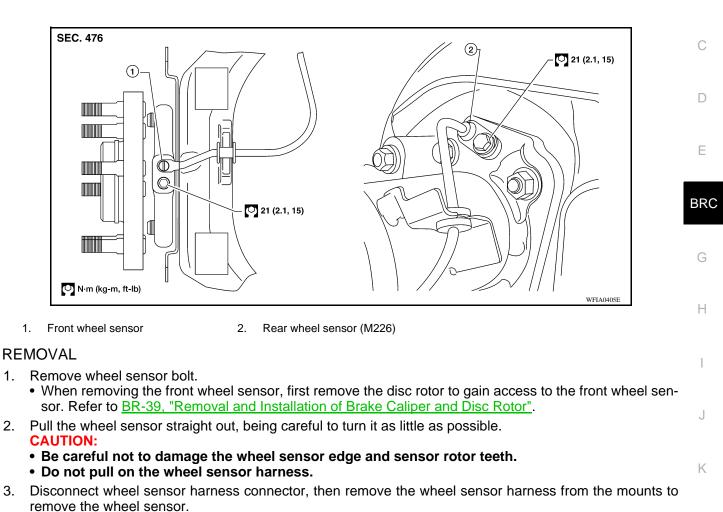
Commercial Service Tool

| Tool name | | Description |
|---|-----------|--|
| Flare nut crowfoot Torque wrench | | Removing and installing brake piping a: 10 mm (0.39 in)/12 mm (0.47 in) |
| | | |
| | | |
| | S-NT360 | |
| Power tool | | Removing nuts and bolts |
| | _ | |
| | | |
| | PIIB1407E | |

< REMOVAL AND INSTALLATION > **REMOVAL AND INSTALLATION** WHEEL SENSOR

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INFOID:000000004055679 В



INSTALLATION

1.

3.

Installation is in the reverse order of removal.

- Before installing wheel sensors do the following:
- Inspect and replace the wheel sensor if damaged.
- Clean the wheel sensor hole and mating surface with brake cleaner and a lint-free cloth. Be careful that dirt and debris do not enter the hub and bearing assembly or the rear axle.
- Replace the wheel sensor O-ring, then apply a coat of suitable grease to the new O-ring and sensor hole for Ν installation.

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SENSOR ROTOR

Removal and Installation

FRONT

Removal and Installation

The wheel sensor rotors are built into the wheel hubs and are not removable. If damaged, replace wheel hub and bearing assembly. Refer to <u>FAX-8, "Removal and Installation"</u>

REAR

Removal

- 1. Remove the axle shaft assembly. Refer to RAX-20. "Removal and Installation".
- 2. Pull the sensor rotor off of the axle shaft using Tool and a suitable press.

Tool number : ST30031000 (—)

Installation

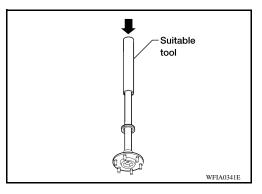
 Install the new sensor rotor on the axle shaft using a suitable length steel tube and a press. Make sure the sensor rotor is fully seated.

CAUTION:

Do not reuse the old sensor rotor.

 Install the axle shaft assembly. Refer to <u>RAX-20, "Removal and</u> <u>Installation"</u>. CAUTION:

Do not reuse the axle oil seal. The axle oil seal must be replaced every time the axle shaft assembly is removed from the axle shaft housing.



ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

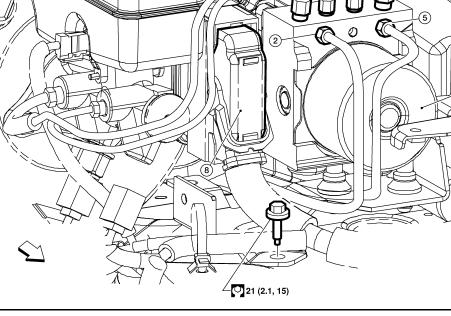
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< REMOVAL AND INSTALLATION >

ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

Removal and Installation

SEC. 476



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- 1. From master cylinder secondary side 18.2 N·m (1.9 kg-m, 13 ft-lb)
- 4. To front right disc brake 13.0 N⋅m (1.3 kg-m, 10 ft-lb)
- 7. ABS actuator and electric unit (control unit)
- To rear right disc brake
 13.0 N·m (1.3 kg-m, 10 ft-lb)
- 5. To front left disc brake 13.0 N·m (1.3 kg-m, 10 ft-lb)
 - Harness connector
- 3. To rear left disc brake 13.0 N·m (1.3 kg-m, 10 ft-lb)
- From master cylinder primary side 18.2 N⋅m (1.9 kg-m, 13 ft-lb)
 <□ Front

REMOVAL

- Disconnect the negative battery terminal.
 Drain the brake fluid. Refer to <u>BR-20, "Drain and Refill"</u>.
 Remove air cleaner case. Refer to <u>EM-138, "Exploded View"</u>.
 Disconnect the actuator harness from the ABS actuator and electric unit (control unit). CAUTION:

 To remove the brake tubes, use a flare nut wrench to prevent the flare nuts and brake tubes from being damaged.
 Be careful not to splash brake fluid on painted areas.

 Disconnect the brake tubes.
- 6. Remove the three bolts and remove the ABS actuator and electric unit (control unit).

8.

INSTALLATION

Installation is in the reverse order of removal.

 If the ABS actuator and electric unit (control unit) is replaced, make sure to adjust position of steering angle sensor. Refer to <u>BRC-159</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : <u>Special Repair Requirement</u>".

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< REMOVAL AND INSTALLATION >

CAUTION:

- All hoses and piping (tubes) must be free from excessive bending, twisting and pulling.
- Make sure there is no interference with other parts when turning steering both clockwise and counterclockwise.
- The brake piping is an important safety part. If a brake fluid leak is detected, always disassemble the parts. Replace applicable part with a new one, if necessary.
- Be careful not to splash brake fluid on painted areas; it way cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.
- Do not bend or twist brake hose sharply, or strongly pull it.
- When removing components, cover connections so that no dirt, dust, or other foreign matter gets in.
- Do not reuse drained brake fluid.
- After installation of the ABS actuator and electric unit (control unit), refill brake system with new brake fluid. Then bleed the air from the system. Refer to <u>BR-20, "Bleeding Brake System"</u>.

STEERING ANGLE SENSOR

< REMOVAL AND INSTALLATION >

STEERING ANGLE SENSOR **Removal and Installation** INFOID:000000004055682 REMOVAL Remove the spiral cable. Refer to SR-6, "Removal and Installation". 1. 2. Remove the screws and remove the steering angle sensor from the spiral cable. **INSTALLATION**

Installation is in the reverse order of removal.

• Reset the neutral position of the steering angle sensor. Refer to BRC-159, "ADJUSTMENT OF STEERING D ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

CAUTION:

Any time the steering angle sensor is removed and installed or replaced, you must reset the neutral position of the steering angle sensor. Refer to BRC-159, "ADJUSTMENT OF STEERING ANGLE SEN-SOR NEUTRAL POSITION : Special Repair Requirement".

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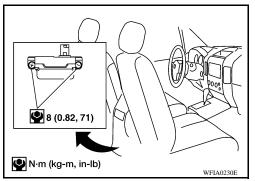
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G SENSOR

Removal and Installation

REMOVAL

- 1. Remove center console. Refer to <u>IP-10, "Exploded View"</u>.
- Remove yaw rate/side/decel G sensor attaching nuts as shown.
 The location of the sensor is the same for all models. CAUTION:
 - Do not use power tools to remove or install yaw rate/side/ decel G sensor.
 - Do not drop or strike the yaw rate/side/decel G sensor.
- 3. Disconnect harness connector and remove the yaw rate/side/ decel G sensor.



INSTALLATION

Installation is in the reverse order of removal. **NOTE:**

After performing the above work, calibrate the yaw decel G sensor. Refer to <u>BRC-160</u>, "CALIBRATION OF <u>DECEL G SENSOR</u> : Special Repair Requirement".