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[ABS] < BASIC INSPECTION >

# **BASIC INSPECTION**

# DIAGNOSIS AND REPAIR WORKFLOW

Work Flow INFOID:0000000003788445 В

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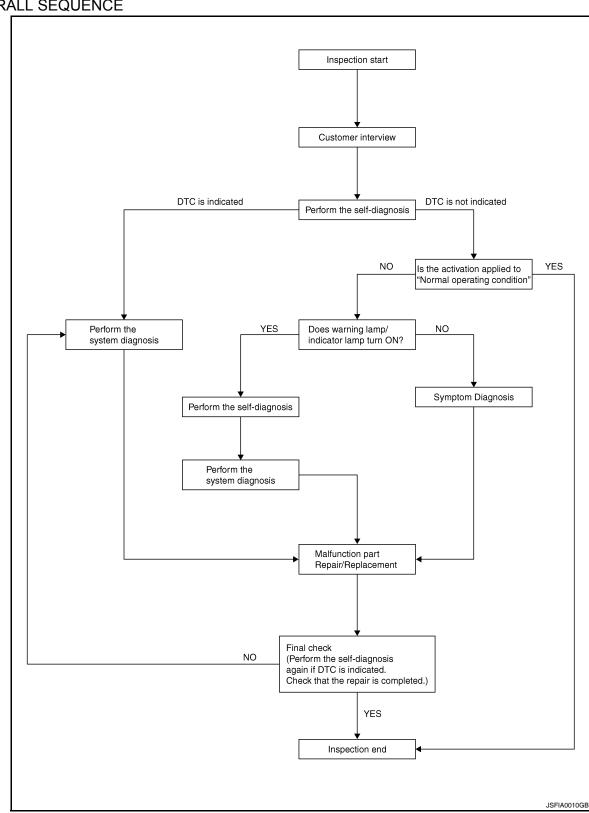
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#### **OVERALL SEQUENCE**



**DETAIED FLOW** 

[ABS] < BASIC INSPECTION >

# 1.collect the information from the customer

Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using the diagnosis worksheet. Refer to BRC-9, "Diagnostic Work Sheet".

>> GO TO 2

# 2.PERFORM THE SELF-DIAGNOSIS

Check the DTC display with the self-diagnosis function. Refer to BRC-16, "CONSULT-III Function (ABS)".

#### Is there any DTC displayed?

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

# 3.PERFORM THE SYSTEM DIAGNOSIS

Perform the diagnosis applicable to the displayed DTC. Refer to BRC-51, "DTC No. Index".

>> GO TO 7

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

Check that the symptom is a normal operation that is not considered a system malfunction. Refer to BRC-58. "Description".

#### Is the symptom a normal operation?

YES >> Inspection End

NO >> GO TO 5

# ${f 5.}$ 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-41</u>, "<u>Description</u>".
- Brake warning lamp: Refer to <u>BRC-42</u>, "<u>Description</u>".

#### Is ON/OFF timing normal?

YES >> GO TO 6

>> GO TO 2 NO

#### $oldsymbol{6}$ .PERFORM THE DIAGNOSIS BY SYMPTOM

Perform the diagnosis applicable to the symptom.

>> GO TO 7

# 7.REPAIR OR REPLACE THE MALFUNCTIONING PARTS

Repair or replace the specified malfunctioning parts.

>> GO TO 8

# 8. FINAL CHECK

Perform the self-diagnosis again, and check that the malfunction is repaired completely. After checking, erase the self-diagnosis memory. Refer to BRC-16, "CONSULT-III Function (ABS)".

#### Is no other DTC present and the repair completed?

YES >> Inspection End

>> GO TO 3 NO

# **DIAGNOSIS AND REPAIR WORKFLOW**

< BASIC INSPECTION >

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Customer name	Model & Year		VIN	
Engine #	Trans.		Mileage	
Incident Date	Manuf. Date		In Service Date	
Symptoms	□ Noise and vibration (from engine compartment) □ Noise and vibration (from axle) □ ABS does not work (wheels lock when braking)	□ ABS warning lamp activates □ ABS does not work (wheels slip when braking)	☐ Pedal operation ☐ Large stroke pedal operation ☐ Firm pedal ☐ Lack of sense of acceleration	
English and distance				
Engine conditions  Road conditions	☐ When starting ☐ After sta			
Driving conditions	☐ Full-acceleration ☐ High speed cornering ☐ Vehicle speed: Greater than 10 km/h (6 MPH) ☐ Vehicle speed: 10 km/h (6 MPH) or less ☐ Vehicle is stopped			
Applying brake conditions	☐ Suddenly ☐ Gradually			
Other conditions	☐ Operation of electrical equipment ☐ Shift change ☐ Other descriptions			
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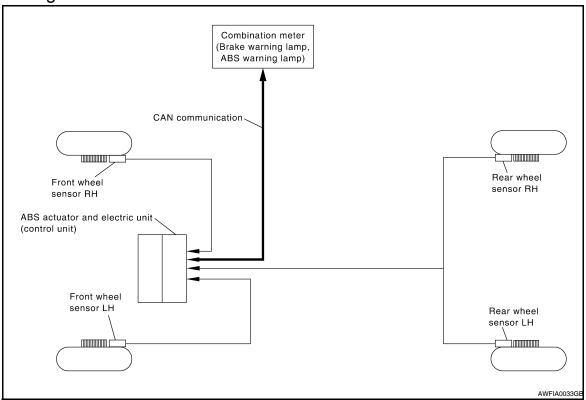
BRC-9

# **FUNCTION DIAGNOSIS**

**ABS** 

System Diagram

INFOID:0000000003788447



# System Description

INFOID:0000000003788448

- 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.

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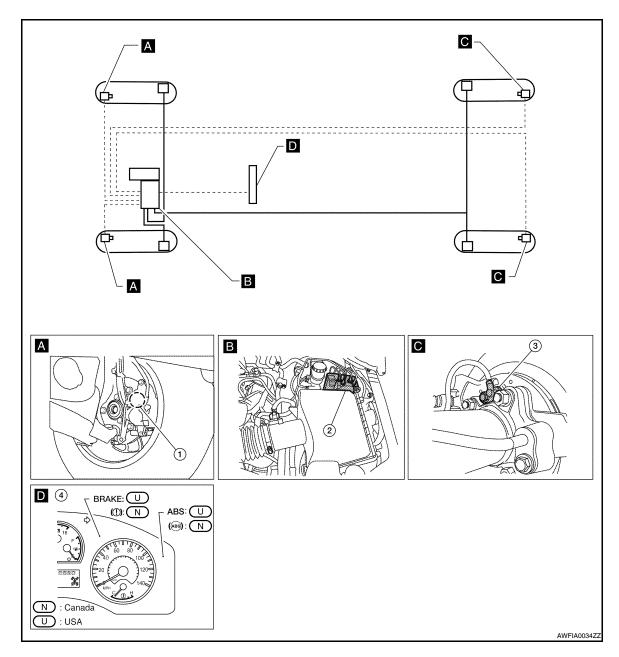
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# **Component Parts Location**

INFOID:0000000003788449



- Front wheel sensor LH E18
   Front wheel sensor RH E117
- 4. Combination meter M24
- 2. ABS actuator and electric unit (control unit) E125
- Rear wheel sensor LH C11
  Rear wheel sensor RH C10

# **Component Description**

INFOID:0000000003788450

Component parts		Reference
ABS actuator and electric unit (control unit)	Pump	BRC-28, "Description"
	Motor	BIXO-20, Description
	Actuator relay	BRC-38, "Description"
	Solenoid valve	BRC-34, "Description"
Wheel sensor		BRC-19, "Description"

# **ABS**

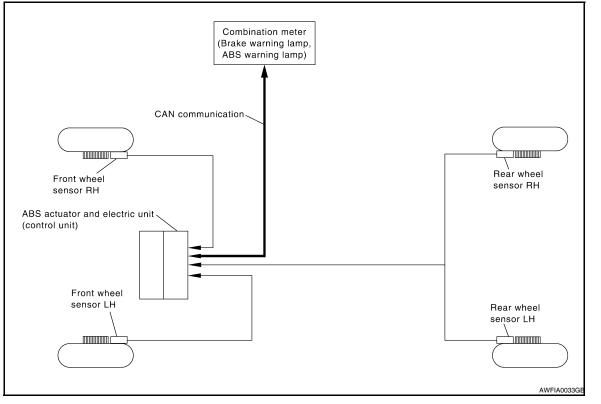
< FUNCTION DIAGNOSIS >

[ABS]

Component parts	Reference
ABS warning lamp	BRC-41, "Description"
Brake warning lamp	BRC-42, "Description"

**EBD** 

System Diagram



# **System Description**

INFOID:0000000003788452

 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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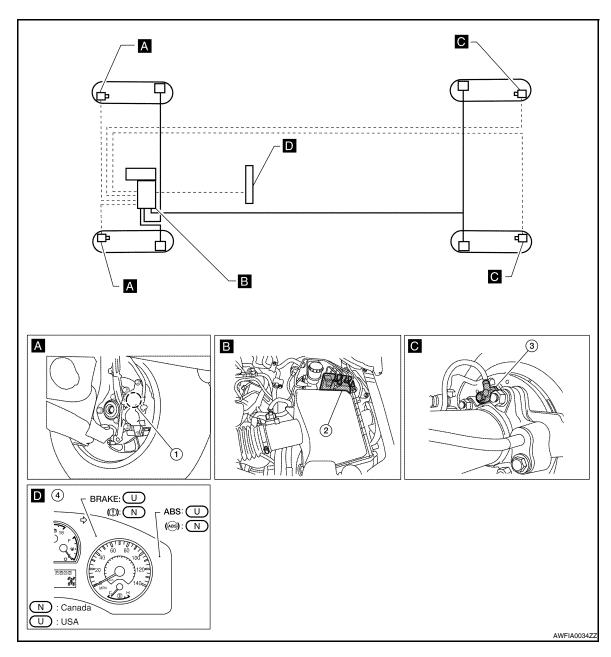
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# Component Parts Location

INFOID:0000000004113214



- 1. Front wheel sensor LH E18
  Front wheel sensor RH E117
- 4. Combination meter M24
- ABS actuator and electric unit (control unit) E125
- Rear wheel sensor LH C11 Rear wheel sensor RH C10

# **Component Description**

INFOID:0000000003788454

Component parts		Reference
ABS actuator and electric unit (control unit)	Pump	BRC-28, "Description"
	Motor	BIXO-20, Description
	Actuator relay	BRC-38, "Description"
	Solenoid valve	BRC-34, "Description"
Wheel sensor		BRC-19, "Description"

# **EBD**

< FUNCTION DIAGNOSIS >

[ABS]

Component parts	Reference
ABS warning lamp	BRC-41, "Description"
Brake warning lamp	BRC-42. "Description"

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

< FUNCTION DIAGNOSIS > [ABS]

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

CONSULT-III Function (ABS)

INFOID:0000000003788455

#### **FUNCTION**

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

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

#### SELF-DIAG RESULTS MODE

#### Operation Procedure

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

#### How to Erase Self-diagnosis Results

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 BRC-51, "DTC No. Index".

#### DATA MONITOR MODE

Display Item List

Item	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 displayed.

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

< FUNCTION DIAGNOSIS > [ABS]

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Item	Data monitor item selection			
(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.
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.
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.
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.

<sup>×:</sup> Applicable

#### **ACTIVE TEST**

#### **CAUTION:**

• Do not perform active test while driving.

- Make sure to completely bleed air from the brake system.
- The ABS and brake warning lamps turn on during the active test.

Solenoid Valve Operation Chart

		AE	ABS solenoid valve			ABS solenoid valve (ACT)		
Ор	peration	UP	KEEP	DOWN	UP	ACTUA- TOR UP	ACTUA- TOR KEEP	
FR RH SOL	FR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF	
FR RH ABS SOLE- NOID (ACT)	FR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF	
FR LH SOL	FR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF	
FR LH ABS SOLE- NOID (ACT)	FR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF	
REAR SOL	REAR IN SOL	OFF	ON	ON	OFF	OFF	OFF	
	REAR OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF	

<sup>\*:</sup> ON for 1 to 2 seconds after the touch, and then OFF

#### NOTE:

<sup>-:</sup> Not applicable

<sup>•</sup> If active test is performed with brake pedal depressed, pedal stroke may change. This is normal.

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

#### < FUNCTION DIAGNOSIS >

[ABS]

- "TEST IS STOPPED" is displayed approximately 10 seconds after operation starts.
  After "TEST IS STOPPED" is displayed, to perform test again, repeat Step 6.

#### **ABS Motor**

Touch "ON" and "OFF" on the screen. Check that ABS motor relay operates as shown in table below.

Operation	ON	OFF
ABS actuator relay	ON	ON
ABS motor relay	ON	OFF

#### NOTE:

- If active test is performed with brake pedal depressed, pedal stroke may change. This is normal.
- "TEST IS STOPPED" is displayed approximately 10 seconds after operation starts.

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# COMPONENT DIAGNOSIS

C1101, C1102, C1103, C1104 WHEEL SENSOR-1

Description INFOID:0000000003788456

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:0000000003788457

#### 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.	<ul><li>Harness or connector</li><li>Wheel sensor</li></ul>
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?

>> Proceed to diagnosis procedure. Refer to BRC-19, "Diagnosis Procedure". YES

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 E125 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

- 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.

**BRC-19** 

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INFOID:0000000003788458

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#### < COMPONENT DIAGNOSIS >

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 BRC-62, "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) or <u>RAX-5</u>, "On-Vehicle Inspection" (rear).

#### Is the inspection result normal?

YES >> GO TO 5

NO >> Repair or replace as necessary. Refer to <u>FAX-6, "Removal and Installation"</u> (front) or <u>RAX-7, "Removal and Installation"</u> (rear).

# CHECK WIRING HARNESS FOR SHORT CIRCUIT

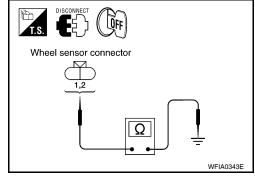
- Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No.
- 2. Check continuity between wheel sensor harness connector terminals and ground.

#### 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 E125 and the malfunctioning wheel sensor harness connector E18, E117, C10, or C11.

Wheel sensor	ABS actuato electric unit (cor		Wheel sensor		Continuity
	Connector	Terminal	Connector	Terminal	
Front LH		45	E18	1	
FIORE LA		46	E18	2	
Front RH		34 E117	1		
	E125	33	EIII	2	Yes
Rear LH	E125	37	C11 2 1 2 C10 2 1	2	
Real LH		36		1	
Rear RH		42		2	
		43		1	

#### Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <a href="BRC-64">BRC-64</a>, "Removal and Installation".

NO >> Repair the circuit.

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

#### < COMPONENT DIAGNOSIS >

[ABS]

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# **Component Inspection**

INFOID:0000000003788459

# 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 <a href="BRC-19">BRC-19</a>, "Diagnosis Procedure".

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

Description INFOID:000000003788460

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

#### 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-circuited. 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-circuited. 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.	<ul><li> Harness or connector</li><li> Wheel sensor</li></ul>
C1107	FR RH SENSOR-2	When the circuit in the front RH wheel sensor is short-circuited. 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-circuited. 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 <a href="BRC-22">BRC-22</a>, "Diagnosis Procedure".

NO >> Inspection End

# Diagnosis Procedure

INFOID:0000000003788462

#### **CAUTION:**

Do not check between wheel sensor terminals.

INSPECTION PROCEDURE

1. CONNECTOR INSPECTION

Disconnect the ABS actuator and electric unit (control unit) connector E125 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.

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

< COMPONENT DIAGNOSIS >

[ABS]

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# $\overline{2}$ .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-62</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) or <u>RAX-5</u>, "On-Vehicle Inspection" (rear).

#### Is the inspection result normal?

YES >> GO TO 5

NO >> Repair or replace as necessary. Refer to <u>FAX-6</u>, "<u>Removal and Installation</u>" (front) or <u>RAX-7</u>, "<u>Removal and Installation</u>" (rear).

Wheel sensor connector

# 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.

#### 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 E125 and the malfunctioning wheel sensor harness connector E18, E117, C10, or C11.

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Wheel sensor	ABS actuato electric unit (cor	Wheel sensor		sor	Continuity
	Connector	Terminal	Connector	Terminal	
Front LH		45	E18	1	
FIOIIL LE		46	L10	2	
Front RH		34	E117	1	Yes
	E125	33		2	
Rear LH	E125	37	C11 2 1 2 C10 1	2	
Rear LH		36		1	
Rear RH		42		2	
		43		1	

#### Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <a href="BRC-64">BRC-64</a>, "Removal and Installation".

NO >> Repair the circuit.

# Component Inspection

INFOID:0000000003788463

# 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 <a href="BRC-22">BRC-22</a>, "Diagnosis Procedure".

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# C1109 POWER AND GROUND SYSTEM

Description INFOID:000000003788464

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

**DTC** Logic INFOID:0000000003788465

#### 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 <a href="BRC-25">BRC-25</a>, "Diagnosis Procedure".

>> Inspection End NO

# Diagnosis Procedure

INFOID:0000000003788466

#### INSPECTION PROCEDURE

# 1. CHECK CONNECTOR

- Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or 3. replace terminal.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-16, "CONSULT-III Function (ABS)".

#### Is any item indicated on the self-diagnosis display?

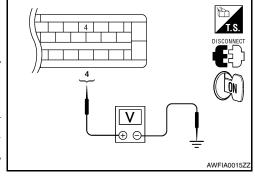
YES >> GO TO 2

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

# 2.check abs actuator and electric unit (control unit) power supply circuit and **GROUND CIRCUIT**

- Turn ignition switch OFF.
- 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			
F125	4	Ground	Ignition switch: ON	Battery voltage
	4	Ground	Ignition switch: OFF	Approx. 0V



Turn ignition switch OFF.

**BRC-25** 

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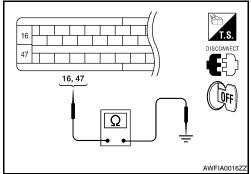
#### **C1109 POWER AND GROUND SYSTEM**

#### < COMPONENT DIAGNOSIS >

[ABS]

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



#### 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 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) [ABS] < COMPONENT DIAGNOSIS > C1110, C1113 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) Α **DTC Logic** INFOID:0000000003788467 DTC DETECTION LOGIC В DTC Malfunction detected condition Possible cause Display item When there is an internal malfunction in the ABS actuator C1110 **CONTROLLER FAILURE** · ABS actuator and electric unit and electric unit (control unit). (control unit) C1113 **G-SENSOR** G-sensor is malfunctioning. D DTC CONFIRMATION PROCEDURE 1. CHECK SELF-DIAGNOSIS RESULTS Е Check the self-diagnosis results. Self-diagnosis results BRC **CONTROLLER FAILURE G-SENSOR** Is above displayed on the self-diagnosis display? >> Proceed to diagnosis procedure. Refer to <a href="BRC-27">BRC-27</a>, "Diagnosis Procedure". YES NO >> Inspection End Diagnosis Procedure INFOID:0000000003788468 INSPECTION PROCEDURE 1. REPLACE ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) >> Replace ABS actuator and electric unit (control unit). Refer to BRC-64, "Removal and Installation". K

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# C1111 ABS MOTOR, MOTOR RELAY SYSTEM

Description INFOID.000000003788469

#### **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	PUMP MOTOR	During the actuator motor operating with ON, when the actuator motor turns OFF, or when the control line for actuator motor relay is open.	Harness or connector     ABS actuator and electric un	
	T GWII WIGTOR	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 <a href="BRC-28">BRC-28</a>, "Diagnosis Procedure".

NO >> Inspection End

# Diagnosis Procedure

INFOID:0000000003788471

#### 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 BRC-16, "CONSULT-III Function (ABS)".

#### Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

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

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

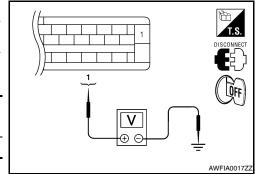
#### C1111 ABS MOTOR, MOTOR RELAY SYSTEM

#### < COMPONENT DIAGNOSIS >

[ABS]

- Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connec-
- 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?

>> GO TO 3 YES

NO >> Repair or replace malfunctioning components.

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

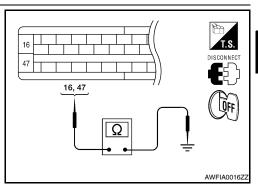
Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

ABS actuator and 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 BRC-64, "Removal and Installation".

NO >> Repair or replace malfunctioning components.



#### Component Inspection

# 1. CHECK ACTIVE TEST

- On "ACTIVE TEST", select "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

#### Is the inspection result normal?

YES >> Inspection End

>> Go to diagnosis procedure. Refer to BRC-28, "Diagnosis Procedure". NO

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#### C1115 WHEEL SENSOR

Description INFOID:000000003788473

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

#### 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 <a href="BRC-30">BRC-30</a>, "Diagnosis Procedure".

NO >> Inspection End

#### Diagnosis Procedure

INFOID:0000000003788475

#### **CAUTION:**

Do not check between wheel sensor terminals.

#### INSPECTION PROCEDURE

1. CONNECTOR INSPECTION

Disconnect the ABS actuator and electric unit (control unit) connector E125 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.

 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 BRC-62, "Removal and Installation".

3. CHECK TIRES

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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) or <u>RAX-5</u>, "On-Vehicle Inspection" (rear).

#### Is the inspection result normal?

YES >> GO TO 5

NO >> Repair or replace as necessary. Refer to <u>FAX-6</u>, "<u>Removal and Installation</u>" (front) or <u>RAX-7</u>, "<u>Removal and Installation</u>" (rear).

# 5. CHECK WIRING HARNESS FOR SHORT CIRCUIT

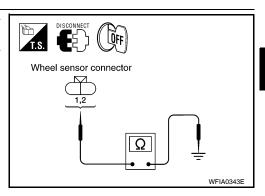
- 1. Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No.
- 2. Check continuity between wheel sensor harness connector terminals and ground.

#### 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 E125 and the malfunctioning wheel sensor harness connector E18, E117, C10, or C11.

Wheel sensor	ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
	Connector	Terminal	Connector	Terminal	
Front III		45	E18	1	
Front LH	F405	46		2	Yes
Front RH		34	E117	1	
FIUIL KIT		33		2	
Rear LH	E125	37	C11	2	res
Real Ln		36	- 011	1	
Rear RH		42	0.40	2	
Real RIT		43	C10	1	

#### Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <a href="BRC-64">BRC-64</a>, "Removal and Installation".

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 SENSOR", and check the vehicle speed.

Wheel sensor	Vehicle speed (DATA MONITOR)
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INFOID:0000000003788476

#### **C1115 WHEEL SENSOR**

< COMPONENT DIAGNOSIS > [ABS]

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 <a href="BRC-30">BRC-30</a>, "Diagnosis Procedure".

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#### C1116 STOP LAMP SWITCH

Description INFOID:0000000003788477

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

DTC Logic

#### DTC DETECTION LOGIC

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

#### DTC CONFIRMATION PROCEDURE

#### 1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
STOP LAMP SW

#### Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-33</u>. "<u>Diagnosis Procedure</u>".

NO >> Inspection End

# Diagnosis Procedure

INSPECTION PROCEDURE

# 1. CONNECTOR INSPECTION

- 1. Disconnect the ABS actuator and electric unit (control unit) connector E125 and stop lamp switch connector E38 (column shift) or E42 (floor shift).
- 2. 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.stop Lamp switch inspection

Check the voltage between the ABS actuator and electric unit (control unit) harness connector E125 terminal 41 and body ground.

Brake pedal depressed : Battery voltage

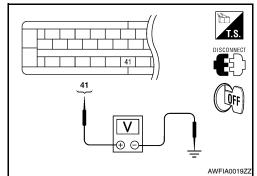
(approx. 12V)

Brake pedal not depressed : Approx. 0V

#### Is the inspection result normal?

YES >> Perform self-diagnosis again. If the same results appear, replace ABS actuator and electric unit (control unit). Refer to <a href="mailto:BRC-64">BRC-64</a>, "Removal and Installation".

NO >> Refer to EXL-4, "Work Flow".



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# C1120, C1122, C1190 IN ABS SOL

Description INFOID:000000003788480

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 (control unit)
C1190	R-EV	When the control unit detects a malfunction in the rear 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
R-EV

#### Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-34, "Diagnosis Procedure".

NO >> Inspection End

# Diagnosis Procedure

INFOID:0000000003788482

#### 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-16, "CONSULT-III Function (ABS)"</u>.

#### Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

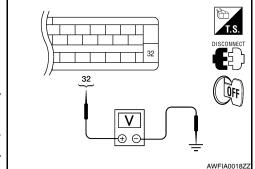
NO >> Poor connection of connector terminal. Repair or replace connector.

# 2.CHECK SOLENOID AND ACTUATOR RELAY POWER SUPPLY CIRCUIT

#### < COMPONENT DIAGNOSIS >

- Turn ignition switch OFF.
- Disconnect ABS actuator and electric unit (control unit) connec-
- 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.

# 3. CHECK SOLENOID AND ACUATOR 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 BRC-64, "Removal and Installation".

NO >> Repair or replace malfunctioning components.

# 16, 47

#### INFOID:0000000003788483

# Component Inspection

# 1. CHECK ACTIVE TEST

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

Operation		ABS solenoid valve			ABS solenoid valve (ACT)		
		UP	KEEP	DOWN	UP	ACTUA- TOR UP	ACTUA- TOR KEEP
FR RH SOL	FR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
FR RH ABS SOLE- NOID (ACT)	FR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
FR LH SOL	FR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
FR LH ABS SOLE- NOID (ACT)	FR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
	RR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
REAR SOL	RR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
NLAN SOL	RR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
	RR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF

<sup>\*:</sup> ON for 1 to 2 seconds after the touch, and then OFF

#### Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to BRC-34, "Diagnosis Procedure".

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# 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

#### 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 <a href="BRC-36">BRC-36</a>, "Diagnosis Procedure".

NO >> Inspection End

# Diagnosis Procedure

INFOID:0000000003788486

#### 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-16</u>, "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.

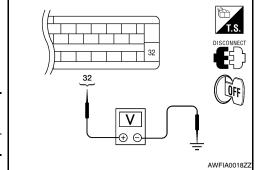
# 2.CHECK SOLENOID AND ACTUATOR RELAY POWER SUPPLY CIRCUIT

### C1121, C1123, C1191 OUT ABS SOL

#### < COMPONENT DIAGNOSIS >

- Turn ignition switch OFF.
- Disconnect ABS actuator and electric unit (control unit) connec-
- 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		voitage
E125	32	Ground	Battery voltage



#### Is the inspection result normal?

>> GO TO 3 YES

NO >> Repair or replace malfunctioning components.

## 3. CHECK SOLENOID AND ACUATOR RELAY GROUND CIRCUIT

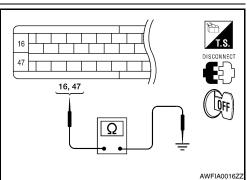
Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

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

### Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-64, "Removal and Installation".

NO >> Repair or replace malfunctioning components.



#### INFOID:0000000003788487

## Component Inspection

## 1. CHECK ACTIVE TEST

Select each test menu item on "ACTIVE TEST".

On the display, touch "UP", "KEEP", and "DOWN", and check that the system operates as shown in the table below.

Operation		ABS solenoid valve		ABS solenoid valve (ACT)			
		UP	KEEP	DOWN	UP	ACTUA- TOR UP	ACTUA- TOR KEEP
FR RH SOL	FR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
FR RH ABS SOLE- NOID (ACT)	FR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
FR LH SOL	FR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
FR LH ABS SOLE- NOID (ACT)	FR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
	RR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
REAR SOL	RR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
NEAN GOL	RR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
	RR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF

<sup>\*:</sup> ON for 1 to 2 seconds after the touch, and then OFF

#### Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to BRC-36, "Diagnosis Procedure".

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### C1140 ACTUATOR RLY

Description INFOID:000000003788488

Activates or deactivates each solenoid valve 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
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 <a href="BRC-38">BRC-38</a>, "Diagnosis Procedure".

NO >> Inspection End

## Diagnosis Procedure

INFOID:0000000003788490

### INSPECTION PROCEDURE

## 1. CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 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-16</u>, "CONSULT-III Function (ABS)".

#### Is any item indicated on the self-diagnosis display?

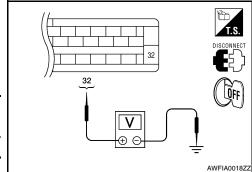
YES >> GO TO 2

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

## 2.CHECK SOLENOID 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.

3.CHECK SOLENOID AND ACUATOR RELAY GROUND CIRCUIT

### **C1140 ACTUATOR RLY**

#### < COMPONENT DIAGNOSIS >

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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	_ Continu	
E125	16, 47	Ground	Yes

# 47 16, 47

#### Is the inspection result normal?

>> Replace ABS actuator and electric unit (control unit). YES Refer to BRC-64, "Removal and Installation".

NO >> Repair or replace malfunctioning components.

## Component Inspection

INFOID:0000000003788491

## 1. CHECK ACTIVE TEST

- On "ACTIVE TEST", select "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

#### Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to BRC-38, "Diagnosis Procedure".

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### U1000 CAN COMM CIRCUIT

Description INFOID:000000003788492

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

#### 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

INFOID:0000000003788494

#### INSPECTION PROCEDURE

## 1. CHECK CONNECTOR

- 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.
- 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.

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### **ABS WARNING LAMP**

Description INFOID:0000000003788495

×: 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:0000000003788496

## 1. CHECK ABS WARNING 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 <a href="BRC-41">BRC-41</a>, "Diagnosis Procedure".

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## Diagnosis Procedure

1. CHECK SELF-DIAGNOSIS

INFOID:0000000003788497

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-16</u>, "CONSULT-III Function (ABS)".

#### Is the inspection result normal?

YES >> GO TO 2

NO >> Check items displayed by self-diagnosis.

## 2.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to <u>MWI-27</u>, "<u>Diagnosis Description</u>".

#### Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <a href="BRC-64">BRC-64</a>, "Removal and Installation".

NO >> Replace combination meter. Refer to MWI-103, "Removal and Installation".

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### **BRAKE WARNING LAMP**

Description INFOID:000000003788498

×: 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:0000000003788499

## 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 <a href="BRC-42">BRC-42</a>, "Diagnosis Procedure".

## Diagnosis Procedure

INFOID:0000000003788500

## 1. CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to BRC-16, "CONSULT-III Function (ABS)".

#### Is the inspection result normal?

YES >> GO TO 2

NO >> Check items displayed by self-diagnosis.

## 2. CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-27, "Diagnosis Description".

#### Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <a href="BRC-64">BRC-64</a>, "Removal and Installation".

NO >> Replace combination meter. Refer to MWI-103, "Removal and Installation".

## ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

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## **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.

		Data monitor		D
Monitor item	Display content	Condition	Reference value in normal operation	E
		0 [km/h (MPH)]	Vehicle stopped	
FR LH SENSOR	Wheel speed	Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)	BR
		0 [km/h (MPH)]	Vehicle stopped	
FR RH SENSOR	Wheel speed	Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)	G
		0 [km/h (MPH)]	Vehicle stopped	
RR LH SENSOR	Wheel speed	Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)	Н
		0 [km/h (MPH)]	Vehicle stopped	
RR RH SENSOR	Wheel speed	Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)	I
STOP LAMP SW	Stop lamp quitch gignel status	When brake pedal is depressed	ON	
STOP LAIMP SW	Stop lamp switch signal status	When brake pedal is released	OFF	ı
BATTERY VOLT	Battery voltage supplied to the ABS actuator and electric unit (control unit)	Ignition switch ON	10 – 16 V	J
ED DILIN COL		Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON	K
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	L
ED DIL OLIT COL	Operation status of each calculated value	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON	M
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	N
ED LILINI COL	Operation status of each calenaid value	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON	О
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	Р
FR LH OUT SOL	Operation status of each colonoid valve	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON	
I K 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	

## **ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)**

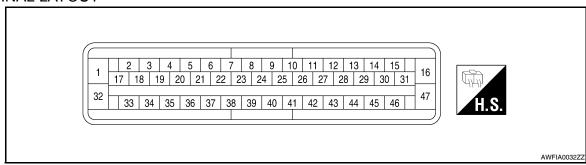
< ECU DIAGNOSIS > [ABS]

		Data monitor						
Monitor item	Display content	Condition	Reference value in normal operation					
REAR IN SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON					
REAR 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					
REAR OUT SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON					
NEAN OUT SOE	Operation status of each solehold valve	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					
MOTOR RELAY	Motor and motor relay operation	When the motor relay and motor are not operating	OFF					
ACTUATOR RLY	Actuator relay operation	When the actuator relay is operating	ON					
ACTUATOR REI	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 WARIN LAWIP	(Note 2)	When ABS warning lamp is OFF	OFF					
EBD SIGNAL	EBD operation	EBD is active	ON					
EBD SIGNAL	EBD operation	EBD is inactive	OFF					
ABS SIGNAL	APS operation	ABS is active	ON					
ADS SIGNAL	ABS operation	ABS is inactive	OFF					
EBD FAIL SIG	EBD fail-safe signal	In EBD fail-safe	ON					
LDD I AIL SIG	LDD Idii-sale sigilal	EBD is normal	OFF					
ABS FAIL SIG	ABS fail-safe signal	In ABS fail-safe	ON					
ADO I AIL OIG	ADO Idii-sale signal	ABS is normal	OFF					

#### NOTE:

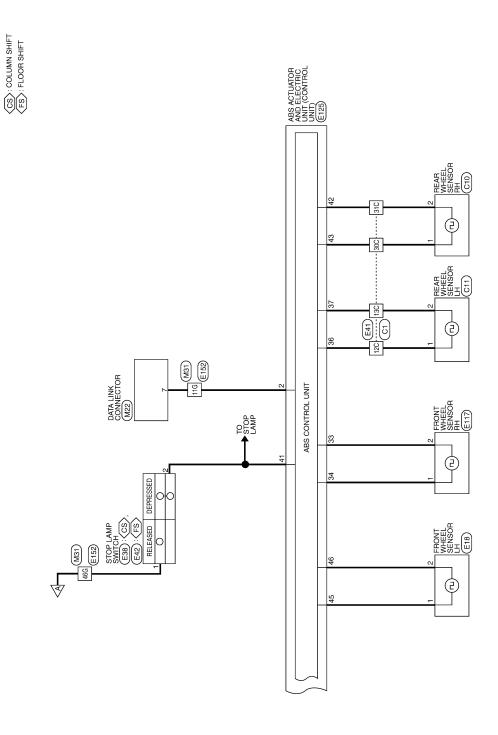
- 1: Confirm tire pressure is normal.
- 2: On and off timing for warning lamp and indicator lamp. Refer to <a href="BRC-41">BRC-41</a>, "Description".

### **TERMINAL LAYOUT**



[ABS] < ECU DIAGNOSIS > Wiring Diagram INFOID:0000000003788502 Α ■ : DATA LINE В C IPDM E/R I(INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) D Е 10A COMBINATION METER M24 BRC GOUT GIN GOUT G UNIFIED METER CONTROL UNIT (WITH INFORMATION DISPLAY) - Tile [9] Н Per Pr ABS (\*) BRAKE ABS CONTROL UNIT FUSE BLOCK (J/B) (M4), (M60) <u>\_</u> IGNITION SWITCH ON OR START 10A J 4 DA IGNITION SWITCH ACC OR ON M31 E152 Κ 10A **BRAKE CONTROL SYSTEM - ABS** 10A 20 L M MOTOR **€**□ BATTERY Ν 0

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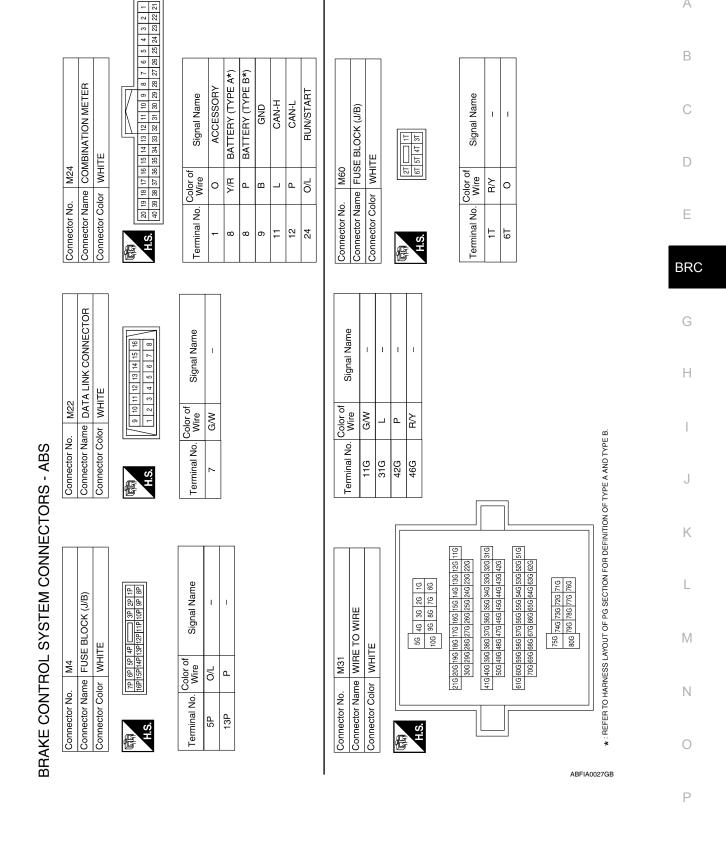


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[ABS] < ECU DIAGNOSIS >

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Signal Name

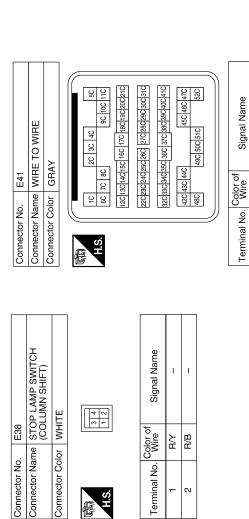
Terminal No.

Connector No.

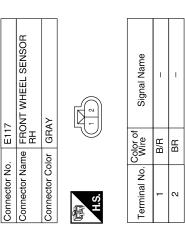
Connector Name FRONT WHEEL SENSOR LH

E18

Connector No.

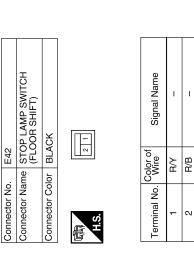


							,		
ı	ı	ı	ı	6	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)	WHITE	7 6 5 4 3	Signal Name	ABS IGN SUPPLY
_	۵	G/Y	>	E119			9 8 17 11	Color of Wire	GR
12C	13C	30C	31C	Connector No.	Connector Name	Connector Color	H.S.	Terminal No.	15



Connector Color GRAY	olor GR,	٩Y
画 H.S.		
Terminal No. Wire	Color of Wire	Signal Name
1	0/9	1
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Terminal No.



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## ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS > [ABS]

Signal Name	I	1	1	VALVE ECU SUPPLY	WSS FR PWR	WSS FR SIG	ı	WSS RL PWR	WSS RL SIG	ı	ı	ı	BLS	WSS RR SIG	WSS RR PWR	ı	WSS FL PWR	WSS FL SIG	MOTOR GND
Color of Wire	1	1	1	>	BR	B/B	1	_	۵	1	ı	ı	B/G	>	G/Y	ı	G/O	BR/W	В
Terminal No.	26	27	28	32	33	34	35	36	37	38	33	40	41	42	43	44	45	46	47

Signal Name	ı	I	CAN-H	I	ı	I	CAN-L	VALVE ECU GND	ı	I	I	1	ı	_	-	_	ı	_	_	I
Color of Wire	1	_	7	1	1	1	Ь	В	-	ı	-	_	_	_	_	_	_	_	_	I
Terminal No.	6	10	Ξ	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28

connector No.	E125
connector Name	Sonnector Name ELECTRIC UNIT (CONTROL UNIT) (WITHOUT VDC)
Sonnector Color BLACK	BLACK



Signal Name	MOTOR SUPPLY	DIAG_K	1	IGN	_	ı	1	I
Color of Wire	B∕Y	۵	I	GR	-	I	I	I
Terminal No. Wire	-	2	3	4	5	9	7	8

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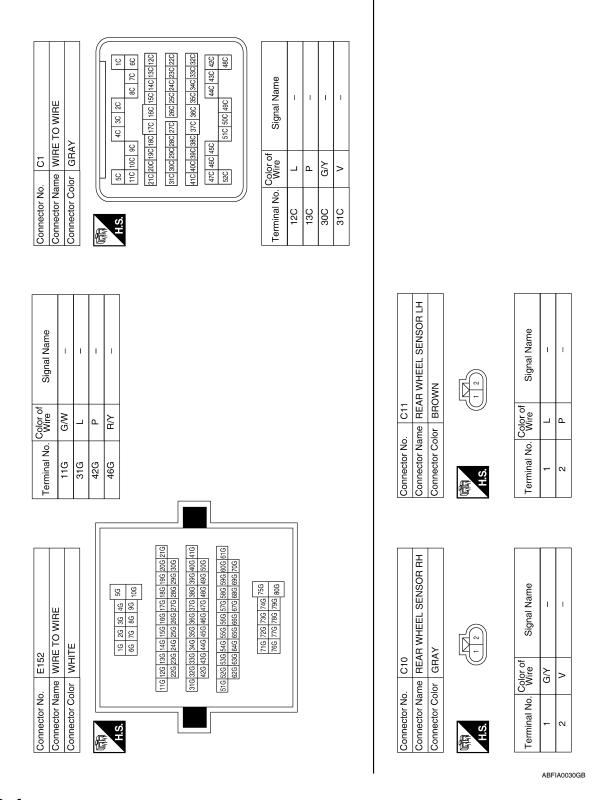
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Fail-Safe

#### **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 ABS warning lamp will turn on.

## ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

[ABS] < 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 INFOID:0000000003788504

DTC	Items (CONSULT screen terms)	Reference	
C1101	RR RH SENSOR-1		_
C1102	RR LH SENSOR-1		D
C1103	FR RH SENSOR-1	BRC-19, "Description"	
C1104	FR LH SENSOR-1		E
C1105	RR RH SENSOR-2		
C1106	RR LH SENSOR-2		
C1107	FR RH SENSOR-2	BRC-22, "Description"	BRC
C1108	FR LH SENSOR-2		
C1109	BATTERY VOLTAGE [ABNORMAL]	BRC-25, "Description"	G
C1110	CONTROLLER FAILURE	BRC-27, "DTC Logic"	_
C1111	PUMP MOTOR	BRC-28, "Description"	
C1113	G-SENSOR	BRC-27, "DTC Logic"	Н
C1115	ABS SENSOR [ABNORMAL SIGNAL]	BRC-30, "Description"	
C1116	STOP LAMP SW	BRC-33, "Description"	_
C1120	FR LH IN ABS SOL	BRC-34, "Description"	_ '
C1121	FR LH OUT ABS SOL	BRC-36, "Description"	_
C1122	FR RH IN ABS SOL	BRC-34, "Description"	J
C1123	FR RH OUT ABS SOL	BRC-36, "Description"	_
C1140	ACTUATOR RLY	BRC-38, "Description"	
C1190	REAR IN ABS SOL	BRC-34, "Description"	– K
C1191	REAR OUT ABS SOL	BRC-36, "Description"	<del></del>
U1000	CAN COMM CIRCUIT	BRC-40, "Description"	L

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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	DD0 50 HD:	
Excessive ABS function operation frequency	Looseness of front and rear axle	BRC-53, "Diagno- sis Procedure"	
13	Wheel sensor and rotor system		
Unexpected pedal reaction	Brake pedal stroke	BRC-54, "Diagno-	
Onexpected 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-55, "Diagno- sis Procedure"	
ABS function does not operate (Note 1)	ABS actuator and electric unit (control unit)	BRC-56, "Diagno- sis Procedure"	
Pedal vibration or ABS operation sound	Brake pedal	BRC-57, "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**

[ABS] < SYMPTOM DIAGNOSIS > **EXCESSIVE ABS FUNCTION OPERATION FREQUENCY** Α Diagnosis Procedure INFOID:0000000003788506 1.CHECK START В 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 D Make sure that there is no excessive play in the front and rear axles. Refer to front: FAX-5, "On-Vehicle Inspection and Service", Rear: RAX-5, "On-Vehicle Inspection". Is the inspection result normal? Е >> GO TO 3 YES NO >> Repair or replace malfunctioning components. 3.check wheel sensor and sensor rotor **BRC** 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? Н YES >> GO TO 4 NO >> • Replace wheel sensor or sensor rotor. Refer to BRC-62, "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. Is the ABS warning lamp illuminated? YES >> Perform self-diagnosis. Refer to BRC-16, "CONSULT-III Function (ABS)". NO >> Normal K L M Ν Р

### **UNEXPECTED PEDAL REACTION**

## Diagnosis Procedure

INFOID:0000000003788507

## 1. CHECK BRAKE PEDAL STROKE

Check brake pedal stroke. Refer to <u>BR-14</u>, "<u>Inspection and Adjustment - Standard Pedal"</u>. <u>Is the stroke too large?</u>

YES

- >> Bleed air from brake tube and hose. Refer to <a href="BR-17">BR-17</a>, "Bleeding Brake System".
  - Check brake pedal, brake booster, and master cylinder for mount play, looseness, brake system fluid leakage, etc. Refer to <u>BR-14</u>, "<u>Inspection and Adjustment Standard Pedal"</u> (brake pedal), <u>BR-10</u>, "<u>On Board Inspection</u>" (master cylinder), <u>BR-8</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

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?

>> Check brake system.

>> Normal

YES

NO

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### **ABS FUNCTION DOES NOT OPERATE**

< SYMPTOM DIAGNOSIS > [ABS]

## **ABS FUNCTION DOES NOT OPERATE**

Diagnosis Procedure

INFOID:0000000003788509

#### **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 <a href="https://example.com/BRC-16">BRC-16</a>, "CONSULT-III Function (ABS)".

#### PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

[ABS] < SYMPTOM DIAGNOSIS > PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS Α Diagnosis Procedure INFOID:0000000003788510 **CAUTION:** В 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] D 1.SYMPTOM CHECK 1 Check that there are pedal vibrations when the engine is started. Е Do vibrations occur? YES >> GO TO 2 NO >> Inspect the brake pedal. BRC 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 <a href="https://example.com/BRC-16">BRC-16</a>, "CONSULT-III Function (ABS)". 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. NO >> Normal J K L M Ν 0 Р

## **NORMAL OPERATING CONDITION**

< SYMPTOM DIAGNOSIS > [ABS]

## NORMAL OPERATING CONDITION

Description INFOID:000000003788511

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.	

< PRECAUTION > [ABS]

## **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:**

- Always use recommended brake fluid. Refer to MA-10, "Fluids and Lubricants".
- 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-34</u>, "<u>Brake Burnishing Procedure"</u> (front disc brake) or <u>BR-38</u>, "<u>Removal and Installation of Brake Pad"</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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Commercial service tool

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< PRECAUTION > [ABS]

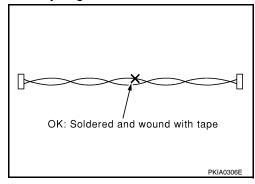
• When an error is indicated by ABS or another warning lamp, collect all necessary information from customer (what symptoms are present under what conditions) and check for simple causes before starting diagnosis. Besides electrical system inspection, check booster operation, brake fluid level, and fluid 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.

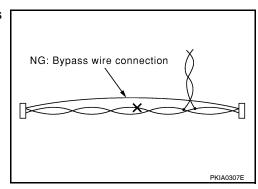
## Precaution for CAN System

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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 > [ABS]

## **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
(J-45741) ABS active wheel sensor tester	J-45741-BOX  POINT BITMEN  WFIA0101E	Checking operation of ABS active wheel sensors

## **Commercial Service Tool**

INFOID:0000000003788517

INFOID:0000000003788516

Tool name		Description	
Flare nut crowfoot     Torque wrench		Removing and installing brake piping a: 10mm (0.39 in)/12mm (0.47 in)	
	S-NT360		

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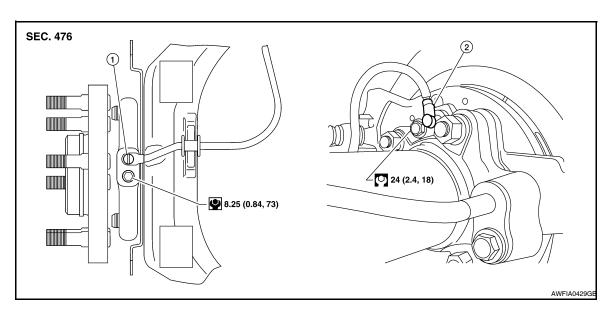
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## REMOVAL AND INSTALLATION

### WHEEL SENSORS

### Removal and Installation



1. Front wheel sensor

2. Rear wheel sensor

#### REMOVAL

- Remove wheel sensor bolt.
  - When removing the front wheel sensor, first remove the disc rotor to gain access to the front wheel sensor bolt. Refer to <u>BR-35</u>, "Removal and Installation of Brake Caliper and Rotor".
- 2. Pull out the sensor, being careful to turn it as little as possible.

#### **CAUTION:**

- · Be careful not to damage sensor edge and sensor rotor teeth.
- · Do not pull on the sensor harness.
- 3. Disconnect wheel sensor harness electrical connector, then remove harness from attaching points.

#### INSTALLATION

Installation is in the reverse order of removal.

#### **CAUTION:**

- · Inspect wheel sensor O-ring, replace sensor assembly if damaged.
- Clean wheel sensor hole and mounting surface with brake cleaner and a lint-free shop rag. Be careful that dirt and debris do not enter the axle.
- · Apply a coat of suitable grease to the wheel sensor O-ring and mounting hole.

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## SENSOR ROTOR

#### Removal and Installation

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#### FRONT WHEEL SENSOR ROTOR

Removal and Installation

The front wheel sensor rotor is built into the front wheel hub and bearing assembly and is not removable. If damaged, replace the front wheel hub and bearing assembly. Refer to FAX-6, "Removal and Installation".

#### REAR WHEEL SENSOR ROTOR

Removal

Remove the rear axle shaft assembly. Refer to RAX-8, "Removal and Installation".

NOTE:

It is necessary to disassemble the rear axle shaft assembly to replace the rear wheel sensor rotor.

Installation

Installation is in the reverse order of removal.

#### **CAUTION:**

- Do not reuse the old rear wheel sensor rotor.
- Do not reuse the rear axle oil seal. The rear axle oil seal must be replaced every time the rear axle shaft assembly is removed from the rear axle shaft housing.

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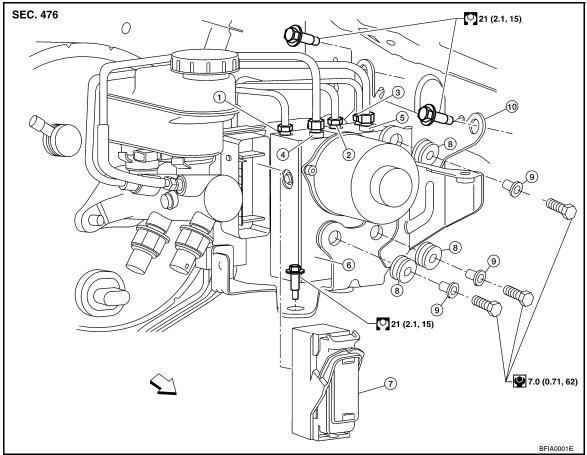
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## ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

#### Removal and Installation

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- 1. To rear calipers 13 N·m (1.3 kg-m, 10 ft-lb)
- 4. From the master cylinder secondary side 5. 18.2 N·m (1.9 kg-m, 13 ft-lb)
- 7. Harness connector
- 10. Bracket

- 2. To front left caliper 13 N·m (1.3 kg-m, 10 ft-lb)
- 5. From the master cylinder primary side 6. 18.2 N·m (1.9 kg-m, 13 ft-lb)
- 8. Grommet
- < Front

- 3. To front right caliper 13 N·m (1.3 kg-m, 10 ft-lb)
  - ABS actuator and electric unit (control unit)
- Collar

#### **REMOVAL**

- Disconnect the battery negative terminal.
- 2. Remove the cowl top extension. Refer to EXT-19, "Removal and Installation".
- 3. Drain the brake fluid. Refer to BR-17, "Drain and Refill".
- Disconnect the actuator harness connector from the ABS actuator and electric unit (control unit).
   CAUTION:
  - To remove the brake tubes, use a flare nut crowfoot and torque wrench to prevent the flare nuts and brake tubes from being damaged.
  - 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.
- 5. Disconnect the brake tubes.
- Remove the three bolts and remove the ABS actuator and electric unit (control unit).

## INSTALLATION

Installation is in the reverse order of removal.

#### **CAUTION:**

To install, use a flare nut crowfoot and torque wrench (commercial service tools).

## **ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)**

## < REMOVAL AND INSTALLATION >

- Always tighten brake tubes to specification when installing.
- Never reuse drained brake fluid.
- Refill brake system with new brake fluid. Then bleed the air from the system. Refer to <a href="BR-17">BR-17</a>, "Bleeding Brake System".

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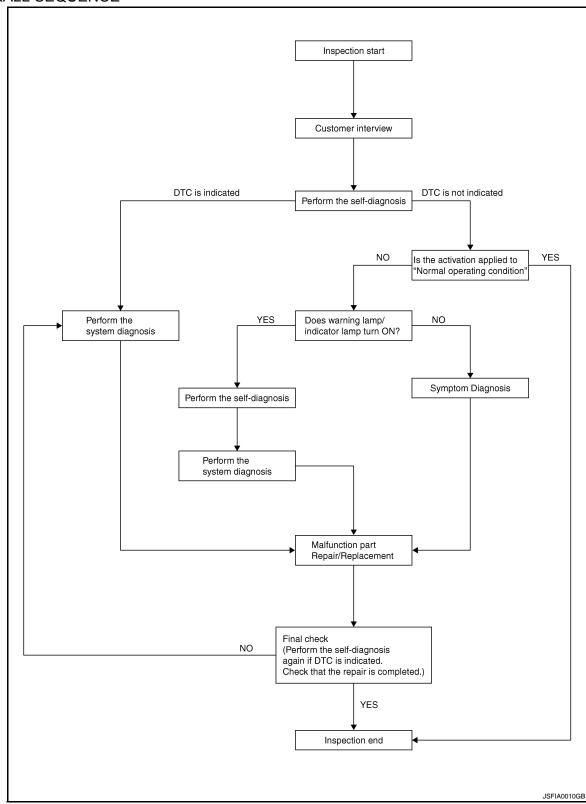
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## **BASIC INSPECTION**

## DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

#### **OVERALL SEQUENCE**



### **DIAGNOSIS AND REPAIR WORKFLOW**

[ABLS/ABS] < BASIC INSPECTION > 1.collect the information from the customer Α Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using the diagnosis worksheet. Refer to BRC-68, "Diagnostic Work Sheet". В >> GO TO 2 2.PERFORM THE SELF-DIAGNOSIS Check the DTC display with the self-diagnosis function. Refer to BRC-78, "CONSULT-III Function (ABS)". Is there any DTC displayed? YES >> GO TO 3 D NO >> GO TO 4 3.PERFORM THE SYSTEM DIAGNOSIS Perform the diagnosis applicable to the displayed DTC, Refer to BRC-129, "DTC No. Index", >> GO TO 7 **BRC** f 4.CHECK THE SYMPTOM THAT IS NOT CONSIDERED A SYSTEM MALFUNCTION Check that the symptom is a normal operation that is not considered a system malfunction. Refer to BRC-137. "Description". Is the symptom a normal operation? YES >> Inspection End NO >> GO TO 5 Н  ${f 5.}$ CHECK THE WARNING LAMP AND INDICATOR LAMP FOR ILLUMINATION Check that the warning lamp and indicator lamp illuminate. · ABS warning lamp: Refer to BRC-116, "Description". Brake warning lamp: Refer to BRC-117, "Description". SLIP indicator lamp: Refer to BRC-118, "Description". Is ON/OFF timing normal? >> GO TO 6 YES NO >> GO TO 2 K O.PERFORM THE DIAGNOSIS BY SYMPTOM Perform the diagnosis applicable to the symptom. >> GO TO 7 .REPAIR OR REPLACE THE MALFUNCTIONING PARTS Repair or replace the specified malfunctioning parts. >> GO TO 8 N 8. FINAL CHECK Perform the self-diagnosis again, and check that the malfunction is repaired completely. After checking, erase the self-diagnosis memory. Refer to BRC-78, "CONSULT-III Function (ABS)". Is no other DTC present and the repair completed? YES >> Inspection End Р NO >> GO TO 3

## **DIAGNOSIS AND REPAIR WORKFLOW**

< BASIC INSPECTION >

[ABLS/ABS]

## Diagnostic Work Sheet

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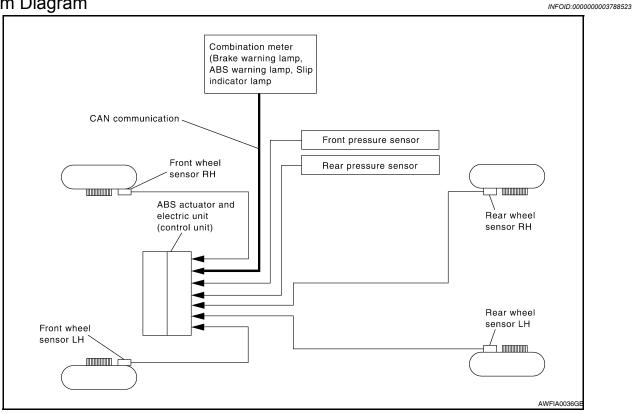
Customer name	Model & Year		VIN		
Engine #	Trans.		Mileage		
Incident Date	Manuf. Date		In Service Date		
Symptoms	☐ Noise and vibration (from engine compartment) ☐ Noise and vibration (from axle)	ABS warning lamp activates		<ul><li>□ Pedal operation</li><li>□ Large stroke pedal operation</li><li>□ Firm pedal</li></ul>	
	ABS does not work (wheels lock when braking)	ABS does not work (wheels slip 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/h (6 MPH)     □ Vehicle speed: 10 km/h (6 MPH) or less     □ Vehicle is stopped				
Applying brake conditions	☐ Suddenly ☐ Gradually				
Other conditions	☐ Operation of electrical equipment☐ Shift change☐ Other descriptions	t			

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## **FUNCTION DIAGNOSIS**

## **ABLS**

System Diagram



## 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.

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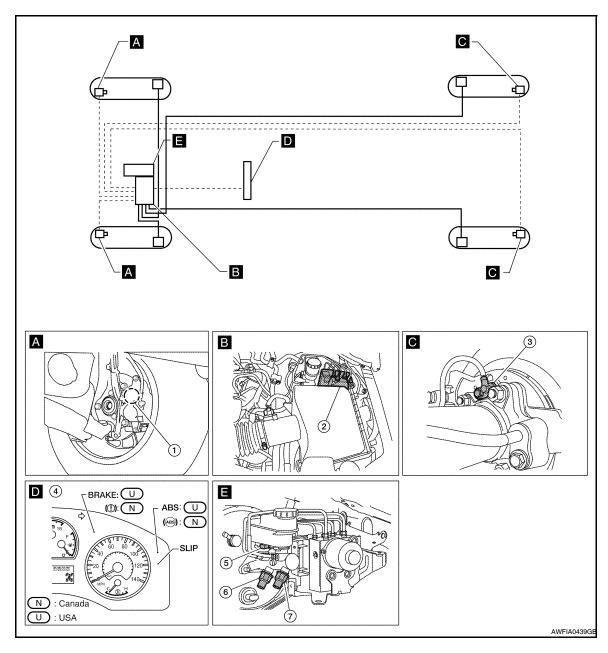
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## Component Parts Location

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- 1. Front wheel sensor LH E18 Front wheel sensor RH E117
- 4. Combination meter M24
- 7. Rear pressure sensor E32
- ABS actuator and electric unit (control unit) E125
- 5. Brake fluid level switch E21
- Rear wheel sensor LH C11 Rear wheel sensor RH C10
- 6. Front pressure sensor E31

## [ABLS/ABS]

## **Component Description**

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Component parts		Reference	_	
ABS actuator and electric unit (control unit)	Pump	PDC 01 "Description"	В	
	Motor	BRC-91, "Description"		
	Actuator relay	BRC-104, "Description"	_	
	Solenoid valve	BRC-97, "Description"	- 0	
	Switch-over valve (CV1, CV2, SV1, SV2)	BRC-111, "Description"	D	
Wheel sensor		BRC-82, "Description"		
ABS warning lamp		BRC-116, "Description"	_	
Brake warning lamp		BRC-117, "Description"	Е	
SLIP indicator lamp		BRC-118, "Description"		
Front pressure sensor		BRC-106, "Description"	BRC	
Rear pressure sensor	BRC-100, Description	BRC		

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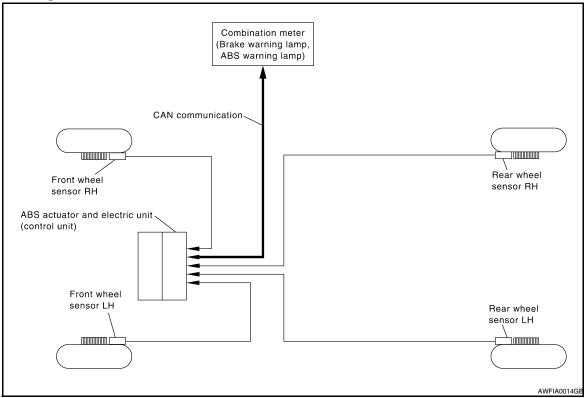
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## **ABS**

System Diagram

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## System Description

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- 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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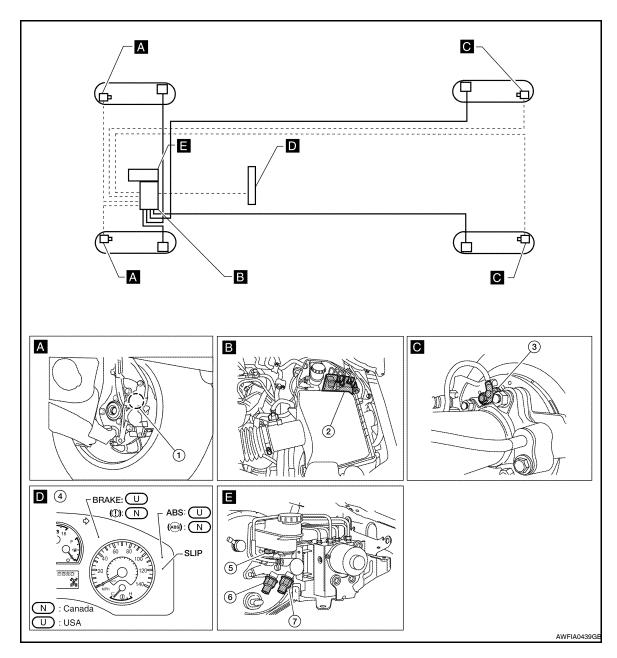
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- Front wheel sensor LH E18
   Front wheel sensor RH E117
- 4. Combination meter M24
- 7. Rear pressure sensor E32
- ABS actuator and electric unit (control unit) E125
- 5. Brake fluid level switch E21
- Rear wheel sensor LH C11
  Rear wheel sensor RH C10
- . Front pressure sensor E31

# Component Description

INFOID:0000000003788530

Component parts		Reference
ABS actuator and electric unit (control unit)	Pump	RPC 01 "Description"
	Motor	BRC-91, "Description"
	Actuator relay	BRC-104, "Description"
	Solenoid valve	BRC-97, "Description"
Wheel sensor	BRC-82, "Description"	

# **ABS**

# < FUNCTION DIAGNOSIS >

[ABLS/ABS]

Component parts	Reference
ABS warning lamp	BRC-116, "Description"
Brake warning lamp	BRC-117, "Description"

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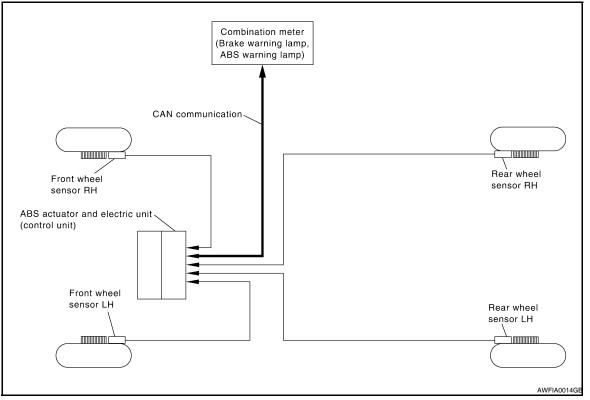
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**EBD** 

System Diagram



**System Description** 

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• 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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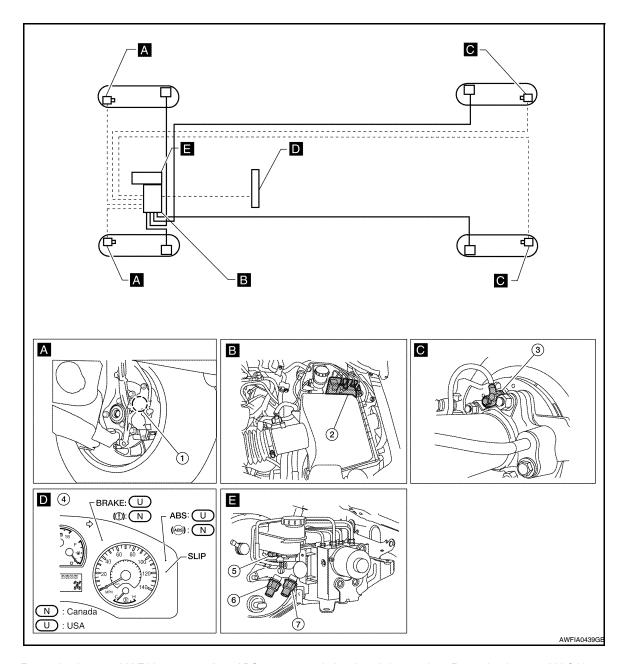
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# Component Parts Location

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- 1. Front wheel sensor LH E18 Front wheel sensor RH E117
- 4. Combination meter M24
- 7. Rear pressure sensor E32
- ABS actuator and electric unit (control unit) E125
- 5. Brake fluid level switch E21
- Rear wheel sensor LH C11 Rear wheel sensor RH C10
- 6. Front pressure sensor E31

# **Component Description**

INFOID:0000000003788534

Component parts		Reference
ABS actuator and electric unit (control unit)	Pump	BRC-91, "Description"
	Motor	BRC-91, Description
	Actuator relay	BRC-104, "Description"
	Solenoid valve	BRC-97, "Description"
Wheel sensor	BRC-82, "Description"	

# **EBD**

# < FUNCTION DIAGNOSIS >

# [ABLS/ABS]

Component parts	Reference
ABS warning lamp	BRC-116, "Description"
Brake warning lamp	BRC-117, "Description"

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< FUNCTION DIAGNOSIS >

[ABLS/ABS]

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

CONSULT-III Function (ABS)

INFOID:0000000003788535

#### **FUNCTION**

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

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

#### SELF-DIAG RESULTS MODE

#### Operation Procedure

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

#### How to Erase Self-diagnosis Results

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 BRC-129, "DTC No. Index".

#### DATA MONITOR MODE

Display Item List

Item	Data	a monitor item sele		
(Unit)	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	Remarks
GEAR (1, 2, 3, 4, R)	×	×	×	Gear position judged by PNP switch signal 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.

< FUNCTION DIAGNOSIS >

[ABLS/ABS]

Item		a monitor item sele		Domorka	
(Unit)	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	Remarks	
BATTERY VOLT (V)	×	×	×	Voltage supplied to ABS actuator and electric unit (control unit) is displayed.	
N POSI SIG (ON/OFF)	-	-	×	Shift position (ON/OFF) judged by PNP switch signal.	
P POSI SIG (ON/OFF)	-	-	×	Shift position (ON/OFF) 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 communication signal is displayed.	
DECEL G-SEN (d/s)	×	×	×	Longitudinal acceleration detected by decel G-sensor 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) 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.	
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.	

< FUNCTION DIAGNOSIS >

[ABLS/ABS]

Itama	Data	a monitor item sele	ection	
Item (Unit)	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	Remarks
TCS FAIL SIG (ON/OFF)	-	_	×	ABLS 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)	-	-	×	ABLS operation (ON/OFF) status is displayed.
EBD WARN LAMP (ON/OFF)	-	-	×	Brake warning lamp (ON/OFF) status is displayed.
SLCT LVR POSI (P, R, N, D, 4, 3, 2, 1)	×	×	×	Selector lever position judged by PNP switch signal.
R POSI SIG (ON/OFF)	-	-	×	Shift position (ON/OFF) judged by PNP switch signal.
2WD/4WD (2WD/4WD)	-	-	×	It recognizes on software whether it is 2WD and whether it is in 4WD state.
PRESS SENSOR (bar)	×	-	×	Brake pressure detected by pressure sensor is displayed (bar).
CRANKING SIG (ON/OFF)	-	-	×	The input state of the key SW START position signal (ON/OFF) is displayed.
PRESS SEN 2 (bar)	-	_	×	Brake pressure detected by pressure sensor is displayed (bar).

<sup>×:</sup> Applicable

#### **ACTIVE TEST**

#### **CAUTION:**

- Do not perform active test while driving.
- Make sure to completely bleed air from the brake system.
- The ABS and brake warning lamps turn on during the active test.

Solenoid Valve Operation Chart

Operation		ABS solenoid valve			ABS solenoid valve (ACT)		
		UP	KEEP	DOWN	UP	ACTUA- TOR UP	ACTUA- TOR KEEP
FR RH SOL	FR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
FR RH ABS SOLE- NOID (ACT)	FR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
FR LH SOL	FR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
FR LH ABS SOLE- NOID (ACT)	FR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
RR RH SOL	RR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
RR RH ABS SOLE- NOID (ACT)	RR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF

<sup>-:</sup> Not applicable

#### < FUNCTION DIAGNOSIS >

[ABLS/ABS]

Operation		ABS solenoid valve			ABS solenoid valve (ACT)		
		UP	KEEP	DOWN	UP	ACTUA- TOR UP	ACTUA- TOR KEEP
RR LH SOL	RR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
RR LH ABS SOLE- NOID (ACT)	RR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
	RR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
REAR SOL	RR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
REAR SUL	RR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
	RR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF

<sup>\*:</sup> ON for 1 to 2 seconds after the touch, and then OFF

#### NOTE:

- If active test is performed with brake pedal depressed, pedal stroke may change. This is normal.
- "TEST IS STOPPED" is displayed approximately 10 seconds after operation starts.
- After "TEST IS STOPPED" is displayed, to perform test again, repeat Step 6.

#### ABS Motor

Touch "ON" and "OFF" on the screen. Check that ABS motor relay operates as shown in table below.

Operation	ON	OFF
ABS actuator relay	ON	ON
ABS motor relay	ON	OFF

#### NOTE:

- If active test is performed with brake pedal depressed, pedal stroke may change. This is normal.
- "TEST IS STOPPED" is displayed approximately 10 seconds after operation starts.

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# COMPONENT DIAGNOSIS

C1101, C1102, C1103, C1104 WHEEL SENSOR-1

Description INFOID:000000003788536

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

#### 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.	<ul><li>Harness or connector</li><li>Wheel sensor</li></ul>
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 BRC-82, "Diagnosis Procedure".

NO >> Inspection End

# Diagnosis Procedure

INFOID:0000000003788538

#### **CAUTION:**

Do not check between wheel sensor terminals.

#### INSPECTION PROCEDURE

# 1. CONNECTOR INSPECTION

Disconnect the ABS actuator and electric unit (control unit) connector E125 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.

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 BRC-141, "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) or <u>RAX-5</u>, "On-Vehicle Inspection" (rear).

#### Is the inspection result normal?

YES >> GO TO 5

NO >> Repair or replace as necessary. Refer to <u>FAX-6</u>, "<u>Removal and Installation</u>" (front) or <u>RAX-7</u>, "<u>Removal and Installation</u>" (rear).

# ${f 5}$ .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.

# Wheel sensor connector Wriao343E

# 6. CHECK WIRING HARNESS FOR OPEN CIRCUIT

1. Check continuity between ABS actuator and electric unit (control unit) harness connector E125 and the malfunctioning wheel sensor harness connector E18, E117, C10, or C11.

Wheel sensor	ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
	Connector	Terminal	Connector	Terminal	,
Front LH		45	45 46 E18	1	
	E125	46		2	Yes
Front RH		34	E117	1	
		33		2	
Rear LH		37	044	2	165
Real Ln		36	C11	1	
Rear RH		42	C10	2	
	43	43		1	

#### Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <a href="mailto:BRC-143">BRC-143</a>, "Removal and Installation".

NO >> Repair the circuit.

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

#### < COMPONENT DIAGNOSIS >

[ABLS/ABS]

# **Component Inspection**

INFOID:0000000003788539

# 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 <a href="BRC-82">BRC-82</a>, "Diagnosis Procedure".

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INFOID:0000000003788542

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

Description INFOID:000000003788540

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

#### 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-circuited. 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-circuited. 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)
C1107	FR RH SENSOR-2	When the circuit in the front RH wheel sensor is short-circuited. 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.	
C1108	FR LH SENSOR-2	When the circuit in the front LH wheel sensor is short-circuited. 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 <a href="BRC-85">BRC-85</a>, "Diagnosis Procedure".

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 E125 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-85** 

# $\overline{2}$ .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-141</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) or <u>RAX-5</u>, "On-Vehicle Inspection" (rear).

#### Is the inspection result normal?

YES >> GO TO 5

NO >> Repair or replace as necessary. Refer to <u>FAX-6, "Removal and Installation"</u> (front) or <u>RAX-7, "Removal and Installation"</u> (rear).

# 5.check wiring harness for short circuit

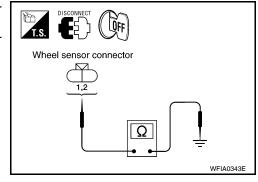
- 1. Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No.
- Check continuity between wheel sensor harness connector terminals and ground.

#### 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 E125 and the malfunctioning wheel sensor harness connector E18, E117, C10, or C11.

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

#### < COMPONENT DIAGNOSIS >

[ABLS/ABS]

INFOID:0000000003788543

Wheel sensor	ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
	Connector	Terminal	Connector	Terminal	
Front LH	E425	45	E18	1	
FIOIIL LIT		46	E10	2	Yes
Front RH		34	E117	1	
		33		2	
Poor I H	E125  Pear LH  Pear RH  E125  37  C11  42  C10	C11	2	165	
Real Ln		36	CII	1	
Rear RH		42	C10	2	
		43		1	

#### Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-143, "Removal and Installation".

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?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <a href="BRC-85">BRC-85</a>, "Diagnosis Procedure".

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# C1109 POWER AND GROUND SYSTEM

Description INFOID:000000003788544

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

DTC Logic

#### 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 <a href="BRC-88">BRC-88</a>, "Diagnosis Procedure".

NO >> Inspection End

# Diagnosis Procedure

INFOID:0000000003788546

#### INSPECTION PROCEDURE

# 1. CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-78, "CONSULT-III Function (ABS)".

#### Is any item indicated on the self-diagnosis display?

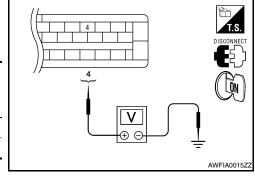
YES >> GO TO 2

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

# $2. \mathsf{CHECK}$ ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY CIRCUIT AND GROUND CIRCUIT

- 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.

ABS actuator and elec- tric unit (control unit)		_	Condition	Voltage
Connector T	Terminal			
F125	4	Ground	Ignition switch: ON	Battery voltage
E125 4	Glound	Ignition switch: OFF	Approx. 0V	



Turn ignition switch OFF.

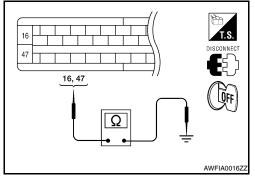
#### **C1109 POWER AND GROUND SYSTEM**

#### < COMPONENT DIAGNOSIS >

[ABLS/ABS]

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



#### 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, C1160, C1170 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< COMPONENT DIAGNOSIS >

[ABLS/ABS]

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

DTC Logic

#### 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).	
C1113	G-SENSOR	G-sensor is malfunctioning.	ABS actuator and electric unit (control unit)
C1160	DECEL G SEN SET	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
DECEL G SEN SET
VARIANT CODING

#### Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <a href="BRC-90">BRC-90</a>, "Diagnosis Procedure".

NO >> Inspection End

# Diagnosis Procedure

INFOID:0000000003788548

#### INSPECTION PROCEDURE

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

<sup>&</sup>gt;> Replace ABS actuator and electric unit (control unit). Refer to <a href="BRC-143">BRC-143</a>, "Removal and Installation".

#### C1111 ABS MOTOR, MOTOR RELAY SYSTEM

< COMPONENT DIAGNOSIS >

[ABLS/ABS]

## C1111 ABS MOTOR, MOTOR RELAY SYSTEM

Description INFOID:0000000003788549

**PUMP** 

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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		During the actuator motor operating with ON, when the actuator motor turns OFF, or when the control line for actuator motor relay is open.	Harness or connector     ABS actuator and electric unit
	T GIVII WIGTOR	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)

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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 <a href="BRC-91">BRC-91</a>, "Diagnosis Procedure".

NO >> Inspection End

Diagnosis Procedure

INFOID:0000000003788551

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 BRC-78, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

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

2.CHECK ABS MOTOR AND MOTOR RELAY POWER SUPPLY CIRCUIT

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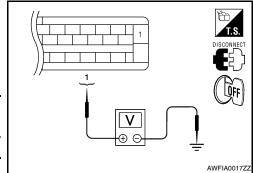
#### C1111 ABS MOTOR, MOTOR RELAY SYSTEM

#### < COMPONENT DIAGNOSIS >

[ABLS/ABS]

- 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.

# 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	ectric unit (control unit)		Continuity
Connector	Terminal		Continuity
E125	16, 47	Ground	Yes

# 16, 47 Ω

#### Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-143, "Removal and Installation".

NO >> Repair or replace malfunctioning components.

# Component Inspection

INFOID:0000000003788552

AWFIA0016ZZ

# 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 BRC-91, "Diagnosis Procedure".

#### C1115 WHEEL SENSOR

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

#### DTC DETECTION LOGIC

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

#### 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-93</u>, "<u>Diagnosis Procedure</u>".

NO >> Inspection End

## Diagnosis Procedure

INFOID:0000000003788555

#### **CAUTION:**

Do not check between wheel sensor terminals.

#### INSPECTION PROCEDURE

# 1. CONNECTOR INSPECTION

Disconnect the ABS actuator and electric unit (control unit) connector E125 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:

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.

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-141</u>, "Removal and Installation".

3.CHECK TIRES

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BRC-93

#### < 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</u>, "<u>On-Vehicle Inspection and Service</u>" (front) or <u>RAX-5</u>, "<u>On-Vehicle Inspection</u>" (rear).

#### Is the inspection result normal?

YES >> GO TO 5

NO >> Repair or replace as necessary. Refer to <u>FAX-6</u>, "<u>Removal and Installation</u>" (front) or <u>RAX-7</u>, "<u>Removal and Installation</u>" (rear).

# 5. CHECK WIRING HARNESS FOR SHORT CIRCUIT

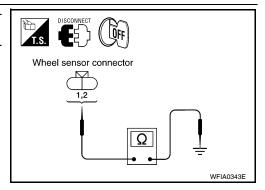
- 1. Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No.
- 2. Check continuity between wheel sensor harness connector terminals and ground.

#### 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 E125 and the malfunctioning wheel sensor harness connector E18, E117, C10, or C11.

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	E125	37	C11	2	
		36		1	
Rear RH		42	C10	2	
		43	G10	1	

#### Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <a href="mailto:BRC-143">BRC-143</a>, "Removal and Installation".

NO >> Repair the circuit.

# **Component Inspection**

INFOID:0000000003788556

# 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.

< COMPONENT DIAGNOSIS >	C1115 WHEEL SENSOR	[ABLS/ABS]
		<u> </u>
FR LH SENSOR		А
FR RH SENSOR	Nearly matches the speedometer dis-	
RR LH SENSOR	play (±10% or less)	
RR RH SENSOR		В
Is the inspection result normal?		
YES >> Inspection End NO >> Go to diagnosis proce	edure. Refer to BRC-93, "Diagnosis Procedure".	С
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#### C1116 STOP LAMP SWITCH

Description INFOID.000000003788557

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

DTC Logic

#### DTC DETECTION LOGIC

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

#### DTC CONFIRMATION PROCEDURE

#### 1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis	results
STOP LAMP	SW

#### Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-96</u>, "<u>Diagnosis Procedure</u>".

NO >> Inspection End

# Diagnosis Procedure

INFOID:0000000003788559

#### INSPECTION PROCEDURE

# 1. CONNECTOR INSPECTION

- 1. Disconnect the ABS actuator and electric unit (control unit) connector E125 and stop lamp switch connector E38 (column shift) or E42 (floor shift).
- 2. Check the terminals for deformation, disconnection, looseness or damage.

#### Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

# $2.\mathsf{stop}$ lamp switch inspection

Check the voltage between the ABS actuator and electric unit (control unit) harness connector E125 terminal 41 and body ground.

Brake pedal depressed : Battery voltage

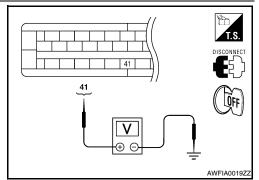
(approx. 12V)

Brake pedal not depressed : Approx. 0V

#### Is the inspection result normal?

YES >> Perform self-diagnosis again. If the same results appear, replace ABS actuator and electric unit (control unit). Refer to <a href="mailto:BRC-143">BRC-143</a>, "Removal and Installation".

NO >> Refer to EXL-4, "Work Flow".



# 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 uni
C1124	RR LH IN ABS SOL	When the control unit detects a malfunction in the rear LH inlet solenoid circuit.	(control unit)
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 <a href="BRC-97">BRC-97</a>, "Diagnosis Procedure".

NO >> Inspection End

# Diagnosis Procedure

INSPECTION PROCEDURE

# 1. CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 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-78</u>, "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

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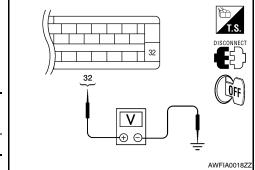
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< COMPONENT DIAGNOSIS > 1. Turn ignition switch OFF.

- 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		voitage	
E125	32	Ground	Battery voltage	



#### Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

# 3.check solenoid, switch-over valve and acuator relay ground circuit

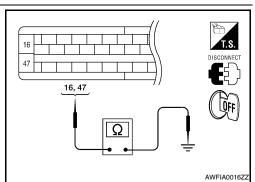
Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

ABS actuator and 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-143</u>, "Removal and Installation".

NO >> Repair or replace malfunctioning components.



INFOID:0000000003788563

[ABLS/ABS]

# 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		AE	S solenoid va	alve	ABS solenoid valve (ACT)		
		UP	KEEP	DOWN	UP	ACTUA- TOR UP	ACTUA- TOR KEEP
FR RH SOL	FR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
FR RH ABS SOLE- NOID (ACT)	FR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
FR LH SOL	FR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
FR LH ABS SOLE- NOID (ACT)	FR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
RR RH SOL	RR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
RR RH ABS SOLE- NOID (ACT)	RR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
RR LH SOL	RR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
RR LH ABS SOLE- NOID (ACT)	RR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
	RR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
REAR SOL	RR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
REAR OOL	RR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
	RR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF

<sup>\*:</sup> ON for 1 to 2 seconds after the touch, and then OFF

#### Is the inspection result normal?

YES >> Inspection End

# C1120, C1122, C1124, C1126 IN ABS SOL

< COMPONENT DIAGNOSIS >

[ABLS/ABS]

NO >> Go to diagnosis procedure. Refer to <u>BRC-97, "Diagnosis Procedure"</u>.

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# C1121, C1123, C1125, C1127 OUT ABS SOL

Description INFOID:000000003788564

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
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 <a href="BRC-100">BRC-100</a>, "Diagnosis Procedure".

NO >> Inspection End

# Diagnosis Procedure

INFOID:0000000003788566

#### INSPECTION PROCEDURE

# 1. CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 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 <a href="BRC-78">BRC-78</a>, "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

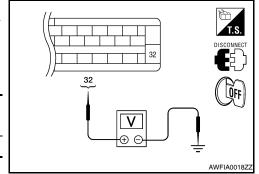
#### C1121, C1123, C1125, C1127 OUT ABS SOL

#### < COMPONENT DIAGNOSIS >

[ABLS/ABS]

- 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.

# 3.check solenoid, switch-over valve and acuator relay ground circuit

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

ABS actuator and 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-143</u>, "Removal and Installation".

NO >> Repair or replace malfunctioning components.

# 16, 47 16, 47 AWFIA0016ZZ

# 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		AE	S solenoid va	alve	ABS solenoid valve (ACT)		
		UP	KEEP	DOWN	UP	ACTUA- TOR UP	ACTUA- TOR KEEP
FR RH SOL	FR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
FR RH ABS SOLE- NOID (ACT)	FR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
FR LH SOL	FR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
FR LH ABS SOLE- NOID (ACT)	FR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
RR RH SOL RR RH ABS SOLE- NOID (ACT)	RR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
	RR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
RR LH SOL	RR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
RR LH ABS SOLE- NOID (ACT)	RR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
	RR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
REAR SOL	RR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
REAR SUL	RR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
	RR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF

<sup>\*:</sup> ON for 1 to 2 seconds after the touch, and then OFF

#### Is the inspection result normal?

YES >> Inspection End

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

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# C1130, C1131, C1136 ENGINE SIGNAL

**Description** 

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

DTC Logic

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
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	<ul> <li>ABS actuator and electric unit (control unit)</li> </ul>
C1136	ENGINE SIGNAL 6	malfunctioning.	<ul><li> ECM</li><li> CAN communication line</li></ul>

#### 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

#### Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-103, "Diagnosis Procedure"</u>.

NO >> Inspection End

# Diagnosis Procedure

INFOID:0000000003788570

#### INSPECTION PROCEDURE

# 1. CHECK ENGINE SYSTEM

- 1. Perform ECM self-diagnosis. Repair or replace items indicated, then perform ECM self-diagnosis again. Refer to EC-67, "CONSULT-III Function (ENGINE)".
- 2. Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-78</u>, "CONSULT-III Function (ABS)".

#### 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 INFOID:000000003788571

Activates or deactivates each solenoid valve 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
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 <a href="BRC-104">BRC-104</a>, "Diagnosis Procedure".

NO >> Inspection End

## Diagnosis Procedure

INFOID:0000000003788573

#### INSPECTION PROCEDURE

# 1. CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 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-78</u>, "CONSULT-III Function (ABS)".

#### Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

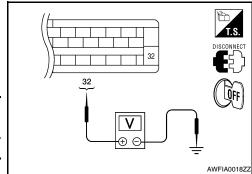
NO >> Poor connection of connector terminal. Repair or replace connector.

# 2.check solenoid, switch-over valve and actuator relay power supply circuit

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	
E125	32	Ground	Battery voltage	



#### Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

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

#### **C1140 ACTUATOR RLY**

#### < COMPONENT DIAGNOSIS >

[ABLS/ABS]

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-143, "Removal and Installation".

>> Repair or replace malfunctioning components. NO

# 47 16, 47 AWFIA0016ZZ

INFOID:0000000003788574

# Component Inspection

# 1. CHECK ACTIVE TEST

Select each test menu item on "ACTIVE TEST".

On the display, touch "UP", "KEEP", and "DOWN", and check that the system operates as shown in the table below.

Operation		ABS solenoid valve		ABS solenoid valve (ACT)			
		UP	KEEP	DOWN	UP	ACTUA- TOR UP	ACTUA- TOR KEEP
FR RH SOL	FR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
FR RH ABS SOLE- NOID (ACT)	FR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
FR LH SOL	FR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
FR LH ABS SOLE- NOID (ACT)	FR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
RR RH SOL	RR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
RR RH ABS SOLE- NOID (ACT)	RR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
RR LH SOL	RR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
RR LH ABS SOLE- NOID (ACT)	RR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
	RR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
REAR SOL	RR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
NEAR OOL	RR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
	RR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF

<sup>\*:</sup> 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 <a href="BRC-104">BRC-104</a>, "Diagnosis Procedure". **BRC** 

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#### C1142 PRESS SENSOR

Description INFOID:000000003788575

The front and rear pressure sensors convert the brake fluid pressure to an electric signal and transmit it to the ABS actuator and electric unit (control unit).

DTC Logic

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1142	PRESS SEN CIRCUIT	Pressure sensor signal line is open or shorted, or pressure sensor is malfunctioning.	Harness or connector     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?

YES >> Proceed to diagnosis procedure. Refer to <a href="BRC-106">BRC-106</a>, "Diagnosis Procedure".

NO >> Inspection End

## Diagnosis Procedure

INFOID:0000000003788577

#### FRONT PRESSURE SENSOR INSPECTION PROCEDURE

# 1. CONNECTOR INSPECTION

- 1. Turn the ignition switch OFF.
- 2. Disconnect the front pressure sensor connector E31 and ABS actuator and electric unit (control unit) connector E125 and inspect the terminals for deformation, disconnection, looseness, or damage.

#### Is the inspection result normal?

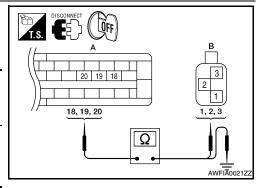
YES >> GO TO 2

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) and front pressure sensor harness connector E31 (B).

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



Measure the continuity between the ABS actuator and electric unit (control unit) harness connector E125

 (A) and body ground.

#### < COMPONENT DIAGNOSIS >

ABS actuator and electric unit (control unit)		_	Continuity
Connector	Terminal		
	18		
A: E125	19	Ground	No
	20		

#### Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace harness or connector.

# 3. FRONT PRESSURE SENSOR INSPECTION

- Reconnect the front pressure sensor and ABS actuator and electric unit (control unit) connectors.
- 2. Use "DATA MONITOR" to check if the status of "PRESS SENSOR" is normal.

Condition	PRESS SENSOR (DATA MONITOR)
With ignition switch turned ON and brake pedal released.	Approx. 0 bar
With ignition switch turned ON and brake pedal depressed.	Positive value

#### Is the inspection result normal?

YES >> Inspection End.

NO >> Replace the front pressure sensor.

#### REAR PRESSURE SENSOR INSPECTION PROCEDURE

# 1. CONNECTOR INSPECTION

- 1. Turn the ignition switch OFF.
- 2. Disconnect the rear pressure sensor connector E32 and ABS actuator and electric unit (control unit) connector E125 and inspect the terminals for deformation, disconnection, looseness, or damage.

#### Is the inspection result normal?

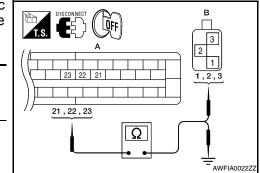
YES >> GO TO 2

NO >> Repair connector.

# 2.REAR PRESSURE SENSOR CIRCUIT INSPECTION

1. Measure the continuity between the ABS actuator and electric unit (control unit) harness connector E125 (A) and rear pressure sensor harness connector E32 (B).

ABS actuator and electric unit (control unit)		Rear pressure sensor		Continuity
Connector	Terminal	Connector	Terminal	
	21		1	
A: E125	22	B: E32	3	Yes
	23		2	



Measure the continuity between the ABS actuator and electric unit (control unit) harness connector E125

 (A) and body ground.

ABS actuator and electric unit (control unit)		_	Continuity
Connector	Terminal		
	21		
A: E125	22	Ground	No
	23		

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#### < COMPONENT DIAGNOSIS >

#### Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace harness or connector.

# 3.rear pressure sensor inspection

- 1. Reconnect the rear pressure sensor and ABS actuator and electric unit (control unit) connectors.
- 2. Use "DATA MONITOR" to check if the status of "PRESS SEN2" is normal.

Condition	PRESS SEN2 (DATA MONITOR)
With ignition switch turned ON and brake pedal released.	Approx. 0 bar
With ignition switch turned ON and brake pedal depressed.	Positive value

#### Is the inspection result normal?

YES >> Inspection End.

NO >> Replace the rear pressure sensor.

# **Component Inspection**

1. CHECK DATA MONITOR

On "DATA MONITOR", select "PRESS SENSOR" and "PRESS SEN2" and check the brake fluid pressure.

Condition	PRESS SENSOR and PRESS SEN2 (DATA MONITOR)
With ignition switch turned ON and brake pedal released.	Approx. 0 bar
With ignition switch turned ON and brake pedal depressed.	Positive value

#### Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <a href="BRC-106">BRC-106</a>, "Diagnosis Procedure".

## C1155 BRAKE FLUID LEVEL SWITCH

Description INFOID:000000003788579

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

#### 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 connector     Brake fluid level switch     Brake 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 <a href="BRC-109">BRC-109</a>, "Diagnosis Procedure".

NO >> Inspection End

## Diagnosis Procedure

#### INSPECTION PROCEDURE

# 1. CONNECTOR INSPECTION

- Disconnect ABS actuator and electric unit (control unit) connector E125 and brake fluid level switch connector E21.
- 2. 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)

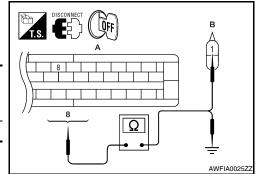
1. Check continuity between ABS actuator and electric unit (control unit) harness connector E125 (A) and brake fluid level switch harness connector E21 (B).

	and electric unit ol unit)	Brake fluid	Continuity	
Connector	Terminal	Connector		
A: E125	8	B: E21	1	Yes

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

ABS actuator and ele	ectric unit (control unit)		Continuity	
Connector	Terminal	_	Continuity	
A: E125	8	Ground	No	

Is the inspection result normal?



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#### < COMPONENT DIAGNOSIS >

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

## 3.CHECK BRAKE FLUID LEVEL SWITCH GROUND

Check continuity between brake fluid level switch harness connector E21 and ground.

Brake fluid	level switch	_	Continuity	
Connector	Terminal		Continuity	
E21	2	Ground	Yes	

# AWFIA0026ZZ

#### Is the inspection result normal?

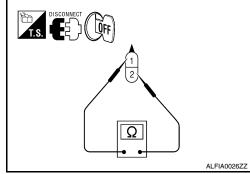
YES >> GO TO 4

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		
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?

Installation".

NO >> Replace brake fluid level switch.

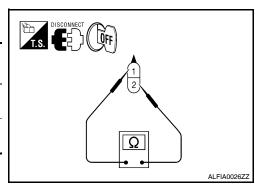
## Component Inspection

INFOID:0000000003788582

# 1. CHECK BRAKE FLUID LEVEL SWITCH

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

Brake fluid level switch	Condition	Continuity	
Terminal	Condition		
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.

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INFOID:0000000003788585

## 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

#### 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 shorted 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 shorted 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 shorted 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 shorted 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 <a href="BRC-111">BRC-111</a>, "Diagnosis Procedure".

NO >> Inspection End

## Diagnosis Procedure

INSPECTION PROCEDURE

## 1. CHECK CONNECTOR

- 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-78</u>, "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.

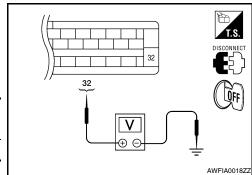
**BRC-111** 

#### < COMPONENT DIAGNOSIS >

# $\overline{2.}$ CHECK SOLENOID, 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	ctric unit (control unit)		Voltage	
Connector	Terminal	_		
E125	32	Ground	Battery voltage	



#### Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

# 3.check solenoid, switch-over valve and acuator relay ground circuit

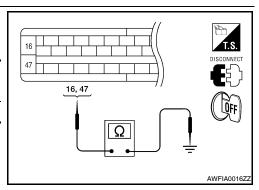
Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

ABS actuator and 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-143</u>, "Removal and Installation".

NO >> Repair or replace malfunctioning components.



INFOID:0000000003788586

## 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.

		AE	3S solenoid va	alve	ABS	solenoid valv	e (ACT)
Operation		UP	KEEP	DOWN	UP	ACTUA- TOR UP	ACTUA- TOR KEEP
FR RH SOL	FR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
FR RH ABS SOLE- NOID (ACT)	FR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
FR LH SOL	FR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
FR LH ABS SOLE- NOID (ACT)	FR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
RR RH SOL	RR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
RR RH ABS SOLE- NOID (ACT)	RR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
RR LH SOL	RR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
RR LH ABS SOLE- NOID (ACT)	RR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
	RR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
REAR SOL	RR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
NEAR OOL	RR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
	RR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF

<sup>\*:</sup> ON for 1 to 2 seconds after the touch, and then OFF

C1164, C1165, C1166, C1167 CV/SV SYSTEM [ABLS/ABS] < COMPONENT DIAGNOSIS > Is the inspection result normal? YES >> Inspection End >> Go to diagnosis procedure. Refer to <u>BRC-111, "Diagnosis Procedure"</u>. NO BRC

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## C1187 DIFFERENTIAL LOCK CONTROL UNIT

Description INFOID:000000003788587

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

#### 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
Och diagnosis results
ABS DIFLOCK CONTROLLER NG
ABO BII EOOK OON TROLLEK NO

#### Is above displayed on the self-diagnosis display?

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

NO >> Inspection End

## Diagnosis Procedure

INFOID:0000000003788589

#### INSPECTION PROCEDURE

## 1. CHECK CONNECTOR

- Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E125, 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 INFOID:000000003788590

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

#### 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.	

## Diagnosis Procedure

INFOID:0000000003788592

#### INSPECTION PROCEDURE

## 1. CHECK CONNECTOR

 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.

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.

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## **ABS WARNING LAMP**

Description INFOID:0000000003788593

 $\times$ : 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:0000000003788594

## 1. CHECK ABS WARNING 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 <a href="BRC-116">BRC-116</a>, "Diagnosis Procedure".

## Diagnosis Procedure

INFOID:0000000003788595

## 1. CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-78</u>, "CONSULT-III Function (ABS)".

#### Is the inspection result normal?

YES >> GO TO 2

NO >> Check items displayed by self-diagnosis.

## 2. CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-27, "Diagnosis Description".

#### Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <a href="mailto:BRC-143">BRC-143</a>, "Removal and Installation".

NO >> Replace combination meter. Refer to MWI-103, "Removal and Installation".

## **BRAKE WARNING LAMP**

Description INFOID:0000000003788596

×: ON –: OFF

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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:0000000003788597

## 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 <a href="BRC-117">BRC-117</a>, "Diagnosis Procedure".

## Diagnosis Procedure

INFOID:0000000003788598

## 1. CHECK SELF-DIAGNOSIS

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

#### Is the inspection result normal?

YES >> GO TO 2

NO >> Check items displayed by self-diagnosis.

## 2.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-27, "Diagnosis Description".

#### Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <a href="BRC-143">BRC-143</a>, "Removal and Installation".

NO >> Replace combination meter. Refer to <a href="MWI-103">MWI-103</a>, "Removal and Installation".

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## SLIP INDICATOR LAMP

Description INFOID:0000000003788599

×: ON -: OFF

Condition	SLIP indicator lamp
Ignition switch OFF	-
For 2 seconds after turning ON ignition switch	×
2 seconds later after turning ON ignition switch	-
ABLS function is active.	×

## Component Function Check

INFOID:0000000003788600

## 1. CHECK SLIP 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 <a href="BRC-118">BRC-118</a>, "Diagnosis Procedure".

## Diagnosis Procedure

INFOID:0000000003788601

## 1. CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-78</u>, "CONSULT-III Function (ABS)".

#### Is the inspection result normal?

YES >> GO TO 2

NO >> Check items displayed by self-diagnosis.

## 2. CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to <a href="MWI-27">MWI-27</a>, "Diagnosis Description".

#### Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <a href="mailto:BRC-143">BRC-143</a>, "Removal and Installation".

NO >> Replace combination meter. Refer to MWI-103, "Removal and Installation".

## ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

[ABLS/ABS] < ECU DIAGNOSIS >

## **ECU DIAGNOSIS**

# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Reference Value INFOID:0000000003788602

#### 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.

		Data monitor	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 (± 10% or less)	Vehicle running (Note 1)		
		0 [km/h (MPH)]	Vehicle stopped	
R RH SENSOR	Wheel speed	Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)	
		0 [km/h (MPH)]	Vehicle stopped	
RR LH SENSOR	Wheel speed	Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)	
		0 [km/h (MPH)]	Vehicle stopped	
RR RH SENSOR	Wheel speed	Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)	
TOP LAMP SW	Stop Jamp switch signal status	When brake pedal is depressed	ON	
TOP LAIVIP 3VV	Stop lamp switch signal status	When brake pedal is released	OFF	
ATTERY VOLT	Battery voltage supplied to the ABS actuator and electric unit (control unit)	Ignition switch ON	10 – 16 V	
BEAR	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	
ACCEL POS SIG Throttle actuate	Throttle actuator opening/closing is dis-	Accelerator pedal not depressed (ignition switch is ON)	0 %	
100EE F 03 316	played (linked with accelerator pedal)	Accelerator pedal depressed (ignition switch is ON)	0 - 100 %	
DESS SENSOR	Brake fluid pressure detected by front pressure sensor	With ignition switch turned ON and brake pedal released	Approx. 0 bar	
PRESS SENSOR		With ignition switch turned ON and brake pedal depressed	–40 to 300 bar	
		With engine stopped	0 rpm	
ENGINE SPEED With en	With engine running	Engine running	Almost in accor- dance with tachome- ter display	
LUID LEV SW	Brake fluid level switch signal status	When brake fluid level switch ON	ON	
FOID FEA 200	Diake liulu level Switch Signal Status	When brake fluid level switch OFF	OFF	

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< ECU DIAGNOSIS > [ABLS/ABS]

CECU DIAGNOS	510 -		[ABLO/ABO]	
Marchaelle	Display content	Data monitor		
Monitor item	Display content	Condition	Reference value in normal operation	
FR RH IN SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON	
TRATITOOL	Operation status of each solehold 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 actuator relay is inactive (in fail-safe mode)	ON	
TICKITOOT 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 actuator relay is inactive (in fail-safe mode)	ON	
TIVELTIN GOL	Operation status of each solehold valve	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 actuator relay is inactive (in fail-safe mode)	ON	
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF	
RR RH IN SOL O	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON	
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF	
		Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator 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	
DD I H IN SOI	Operation status of each calencid valve	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator 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 actuator relay is inactive (in fail-safe mode)	ON	
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF	
MOTOR RELAY		When the motor relay and motor are operating	ON	
MOTOR RELAY Motor and motor relay operation		When the motor relay and motor are not operating	OFF	
ACTUATOR RLY	Actuator relay operation	When the actuator relay is operating	ON	
		When the actuator relay is not operating	OFF	

# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS > [ABLS/ABS]

	Display content	Data monitor	
Monitor item		Condition	Reference value in normal operation
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
SLIP LAMP	SLIP indicator lamp	When SLIP indicator lamp is ON	ON
SLIP LAWIP	(Note 2)	When SLIP indicator lamp is OFF	OFF
EBD SIGNAL	EBD energian	EBD is active	ON
EBD SIGNAL	EBD operation	EBD is inactive	OFF
ADC CICNIAL	ADC anaration	ABS is active	ON
ABS SIGNAL	ABS operation	ABS is inactive	OFF
TOO CIONIAI	ADI Concretion	ABLS is active	ON
TCS SIGNAL	ABLS operation	ABLS is inactive	OFF
EDD FAIL SIG	EPD fail cofe signal	In EBD fail-safe	ON
EBD FAIL SIG	EBD fail-safe signal	EBD is normal	OFF
ABC EAU CIO	ADS fail and airmal	In ABS fail-safe	ON
ABS FAIL SIG	ABS fail-safe signal	ABS is normal	OFF
TOO FAIL OLO	ADI C fail cafe signal	In ABLS fail-safe	ON
TCS FAIL SIG	ABLS fail-safe signal	ABLS is normal	OFF
		Crank is active	ON
CRANKING SIG	Crank operation	Crank is inactive	OFF
CV1 Switch-over valve	Switch-over valve	When actuator (switch-over valve) is active ("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 Switch-o	Switch-over valve	When actuator (switch-over valve) is active ("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 Switch-over valve	Switch-over valve	When actuator (switch-over valve) is active ("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	Switch-over valve	When actuator (switch-over valve) is active ("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 C SEN	Longitudinal acceleration detected by Decel	Vehicle stopped	Approx. 0 G
DECEL G-SEN	G-Sensor	Vehicle running	-1.7 to 1.7 G

## ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

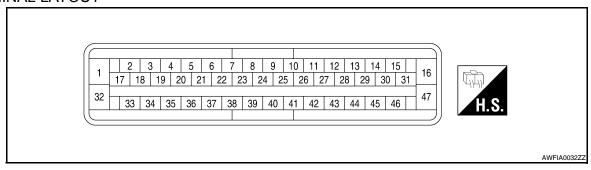
< ECU DIAGNOSIS > [ABLS/ABS]

	Display content	Data monitor	
Monitor item		Condition	Reference value in normal operation
EBD WARN LAMP	EBD warning lamp (Note 2)	When EBD warning lamp is ON	ON
EDD WARN LAWP		When EBD warning lamp is OFF	OFF
N POSI SIG	DND quitch signal ON/OFF condition	A/T shift position = N position	ON
N POSI SIG	PNP switch signal ON/OFF condition	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
		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
OMD/AMD	Drive axle	2WD model	2WD
2WD/4WD		4WD model	4WD
PRESS SEN2	Brake fluid pressure detected by rear pressure sensor	With ignition switch turned ON and brake pedal released	Approx. 0 bar
		With ignition switch turned ON and brake pedal depressed	-40 to 300 bar

#### NOTE:

- 1: Confirm tire pressure is normal.
- 2: On and off timing for warning lamp and indicator lamp.
- ABS warning lamp: Refer to BRC-116, "Description".
- Brake warning lamp: Refer to BRC-117, "Description".
- SLIP indicator lamp: Refer to BRC-118, "Description".

#### **TERMINAL LAYOUT**



**ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)** [ABLS/ABS] < ECU DIAGNOSIS > Wiring Diagram INFOID:0000000003788603 Α ■: DATA LINE В С IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) (E119) D Susv<sub>1</sub> 10A Е SUSV2 (MC2) BRC COMBINATION METER (M24) SHSV1 (MC1) <u>\_</u> G HSV2 (MC2) Sent Sir UNIFIED METER CONTROL UNIT (WITH INFORMATION DISPLAY) Н ABS SLIP BRAKE ABS/ABLS CONTROL UNIT Seur Sir FUSE BLOCK (J/B) (M4),(M60) GNITION SWITCH ON OR START J لي ۳ 10A Κ 40E IGNITION SWITCH ACC OR ON M31 E152 BRAKE CONTROL SYSTEM - ABLS L 10A M 30A

40A -

BATTERY

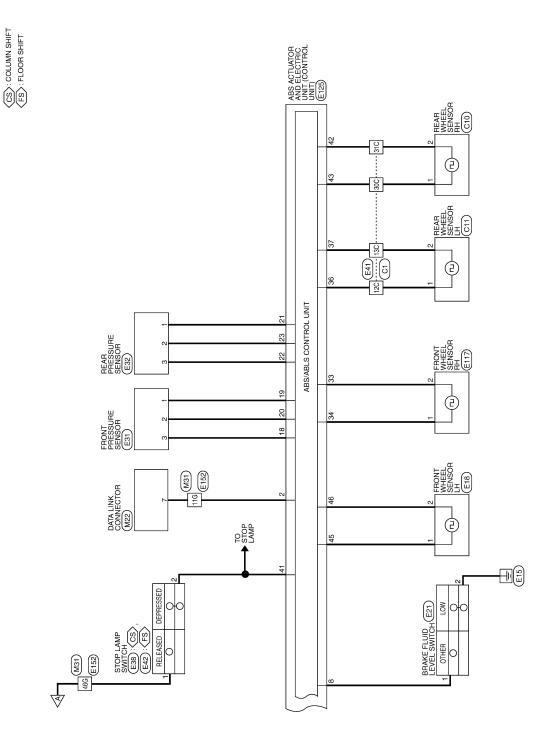
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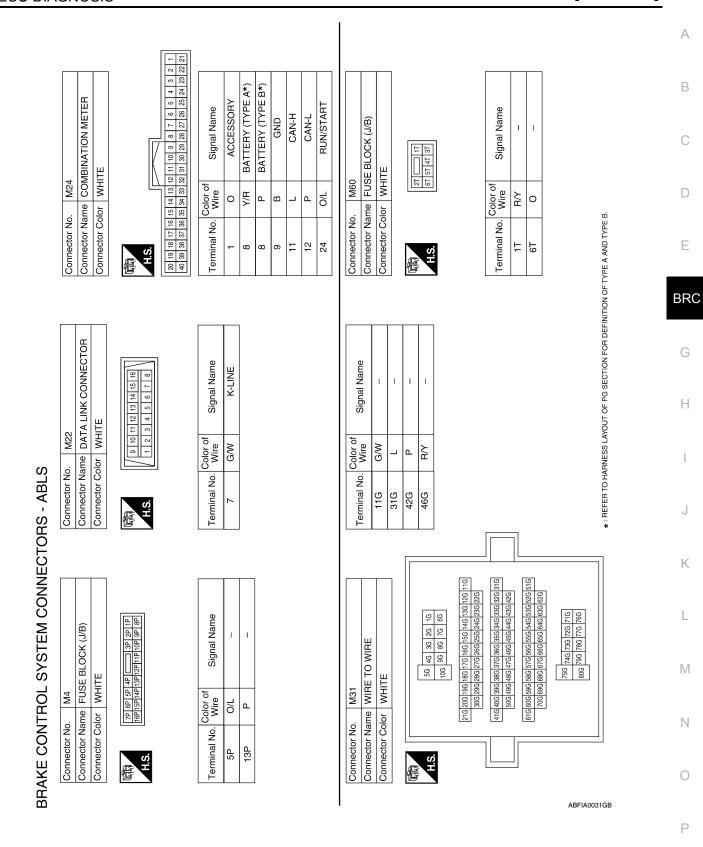
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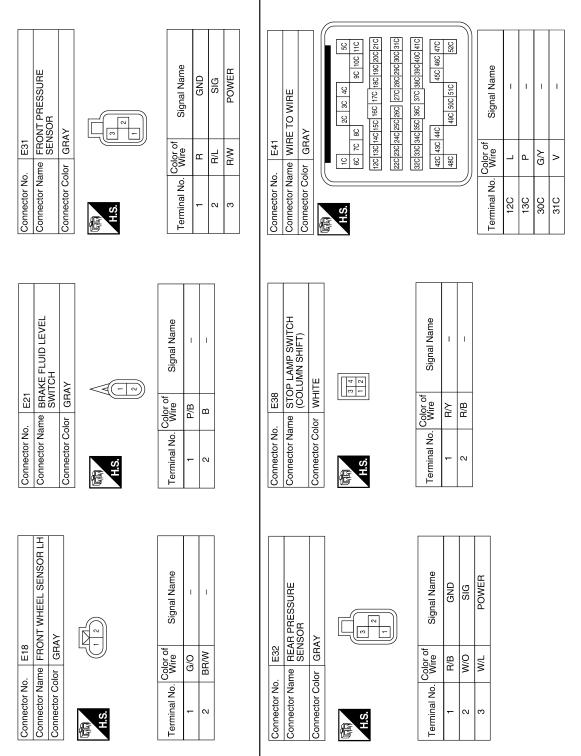
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< ECU DIAGNOSIS >



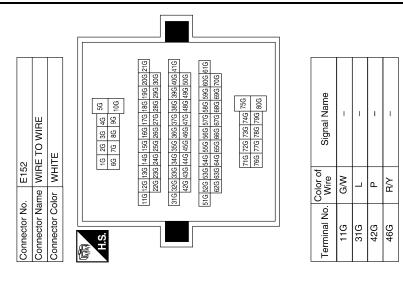
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# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS > [ABLS/ABS]

		Α
SENT TION ACOOM)	SOS LH SOS	В
E119 POWER DISTRIBUTION MODULE ENGINE ROOM) WHITE  If of the tension of the tensi	C11 BROWN  or of Signal Name	С
		D
Connector No.  Connector Color  Connector Color  H.S.  15  Gol	Connector No. Connector Color Terminal No.  1 2 1	Е
		BRC
SENSOR	INSOR RH	G
FRONT WHEEL SENSOR RH GRAY  r of Signal Name R R R	C10 REAR WHEEL SENSOR RH GRAY  or of Signal Name	Н
		I
Connector Name Connector Color H.S. H.S.  Terminal No. Color  2 E	Connector Name Connector Color Terminal No. W	J
		K
MP SWITCH SHIFT) Signal Name	C1   C1   C1   C1   C1   C1   C1   C1	L
	Connector No.   C1	M
	No.   C1   C1   C1   C2   C2   C3   C4   C4   C4   C4   C4   C5   C4   C5   C4   C5   C5	Ν
Connector Name Connector Color H.S.  Terminal No. Color  2 P	Connector No.  Connector Name Connector Name  Example 112  Terminal No.  Tac  13C  13C  13C  31C  31C	0
	ABFIA0033GB	

< ECU DIAGNOSIS > [ABLS/ABS]



Signal Name	PS1 SUPPLY	PS1 GND	PS1 SIGNAL	PS2 GND	PS2 SUPPLY	PS2 SIGNAL	1	1	ı	1	ı	1	ı	1	VALVE ECU SUPPLY	WSS FR SIG	WSS FR PWR	1	WSS RL PWR	WSS RL SIG	1	_	-	BLS	WSS RR SIG	WSS RR PWR	I	WSS FL PWR	WSS FL SIG	MOTOR GND
Color of Wire	R/W	ш	B/L	B/B	M/L	O/M	ı	ı	ı	ı	ı	ı	ı	1	В/У	BR	B/R	I	_	Ь	I	_	_	B/B	>	G/Y	I	G/O	BR/W	В
Terminal No.	18	19	20	21	22	23	24	25	56	27	28	59	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47

Connector No.		2
Connector Name		ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) (WITHOUT VDC)
Connector Cc	Color BLA	BLACK
H.S.		
1 2 3 4	20 21 22	23 24 25 26 27 28 29 30 31
32 34 35	36 37	38 39 40 41 42 43 44 45 46 47
Terminal No.	Color of Wire	Signal Name
1	<b>\</b>	MOTOR SUPPLY
2	G/W	DIAG_K
3	_	1
4	G/R	IGN
5	_	1
9	-	ı
7	_	ı
8	P/B	FLUID LEVEL SW
6	1	ı
10	-	ı
11	Г	CAN-H
12	1	ı
13	_	ı
14	-	ı
15	Ь	CAN-L
16	В	VALVE ECU GND
17	-	1

ABFIA0053GB

#### Fail-Safe

INFOID:0000000003788604

#### **CAUTION:**

If the Fail-Safe function is activated, perform the 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.

## **ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)**

< ECU DIAGNOSIS > [ABLS/ABS]

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/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.

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#### ABLS SYSTEM

In case of an ABLS system malfunction, the ABS warning lamp will turn on and only the EBD is operative. The condition of the vehicle is the same as the condition of vehicles without ABS/ABLS system.

DTC No. Index

Items (CONSULT screen terms)	Reference
` '	Reference
RH SENSOR-1	E
LH SENSOR-1	BRC-82, "Description"
RH SENSOR-1	P.D.
LH SENSOR-1	BRO
RH SENSOR-2	
LH SENSOR-2	BRC-85, "Description" G
RH SENSOR-2	
LH SENSOR-2	
TTERY VOLTAGE [ABNORMAL]	BRC-88, "Description"
NTROLLER FAILURE	BRC-90, "DTC Logic"
MP MOTOR	BRC-91, "Description"
SENSOR	BRC-90, "DTC Logic"
S SENSOR [ABNORMAL SIGNAL]	BRC-93, "Description"
OP LAMP SW	BRC-96, "Description"
LH IN ABS SOL	BRC-97, "Description"
LH OUT ABS SOL	BRC-100, "Description"
RH IN ABS SOL	BRC-97, "Description" K
RH OUT ABS SOL	BRC-100, "Description"
LH IN ABS SOL	BRC-97, "Description"
LH OUT ABS SOL	BRC-100, "Description"
RH IN ABS SOL	BRC-97, "Description"
RH OUT ABS SOL	BRC-100, "Description"
GINE SIGNAL 1	
GINE SIGNAL 2	BRC-103, "Description"
GINE SIGNAL 6	N
TUATOR RLY	BRC-104, "Description"
ESS SEN CIRCUIT	BRC-106, "Description"
FLUID LEVEL LOW E	BRC-109, "Description"
	BRC-90, "DTC Logic"
1	P
2	
<u> </u>	BRC-111, "Description"
2	
	BRC-90, "DTC Logic"

## ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS > [ABLS/ABS]

DTC	Items (CONSULT screen terms)	Reference
C1187	ABS DIFLOCK CONTROLLER NG	BRC-114, "Description"
U1000	CAN COMM CIRCUIT	BRC-115, "Description"

< SYMPTOM DIAGNOSIS > [ABLS/ABS]

# SYMPTOM DIAGNOSIS

## ABLS/ABS

Symptom Table

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

Symptom	Check item	Reference	
	Brake force distribution		
Excessive ABS function operation frequency	Looseness of front and rear axle	BRC-132, "Diag- nosis Procedure"	
question	Wheel sensor and rotor system	noois i roocaare	
Unavacated nodel reaction	Brake pedal stroke	BRC-133, "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-134, "Diag- nosis Procedure"	
ABS function does not operate (Note 1)	ABS actuator and electric unit (control unit)	BRC-135, "Diag- nosis Procedure"	
Pedal vibration or ABS operation sound	Brake pedal	BRC-136, "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]

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#### **EXCESSIVE ABS FUNCTION OPERATION FREQUENCY**

< SYMPTOM DIAGNOSIS >

[ABLS/ABS]

## **EXCESSIVE ABS FUNCTION OPERATION FREQUENCY**

## Diagnosis Procedure

INFOID:0000000003788607

## 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 Inspection and Service</u>", Rear: <u>RAX-5</u>, "<u>On-Vehicle Inspection</u>".

## 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-141, "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. <u>Is the ABS warning lamp illuminated?</u>

YES >> Perform self-diagnosis. Refer to <u>BRC-78</u>, "CONSULT-III Function (ABS)".

NO >> Normal

**UNEXPECTED PEDAL REACTION** [ABLS/ABS] < SYMPTOM DIAGNOSIS > **UNEXPECTED PEDAL REACTION** Α Diagnosis Procedure INFOID:0000000003788608 1. CHECK BRAKE PEDAL STROKE В Check brake pedal stroke. Refer to BR-14, "Inspection and Adjustment - Standard Pedal". Is the stroke too large? C YES >> • Bleed air from brake tube and hose. Refer to <u>BR-17, "Bleeding Brake System"</u>. · Check brake pedal, brake booster, and master cylinder for mount play, looseness, brake system fluid leakage, etc. Refer to BR-14, "Inspection and Adjustment - Standard Pedal" (brake pedal), BR-10, "On Board Inspection" (master cylinder), BR-8, "Inspection" (brake booster). D NO >> GO TO 2 2. CHECK FUNCTION Е 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

< SYMPTOM DIAGNOSIS >

[ABLS/ABS]

## THE BRAKING DISTANCE IS LONG

## Diagnosis Procedure

INFOID:0000000003788609

#### **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**

[ABLS/ABS] < SYMPTOM DIAGNOSIS > ABS FUNCTION DOES NOT OPERATE Α Diagnosis Procedure INFOID:0000000003788610 **CAUTION:** В ABS does not operate when speed is 10 km/h (6 MPH) or lower. 1. CHECK ABS WARNING LAMP DISPLAY С 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  $\mathsf{D}$ NO >> Perform self-diagnosis. Refer to BRC-78, "CONSULT-III Function (ABS)". Е BRC Н J K L M Ν 0

#### PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

< SYMPTOM DIAGNOSIS > [ABLS/ABS]

INFOID:0000000003788611

#### 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 <a href="https://example.com/BRC-78">BRC-78</a>, "CONSULT-III Function (ABS)".

## 3.SYMPTOM CHECK 3

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

#### Do symptoms occur?

YES >> Check if there is a radio, antenna, antenna lead wire, or wiring close to the control unit. If there is, move it farther away.

NO >> Normal

## **NORMAL OPERATING CONDITION**

< SYMPTOM DIAGNOSIS > [ABLS/ABS]

# NORMAL OPERATING CONDITION

Description INFOID:0000000003788612

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 ABLS or 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.	

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< PRECAUTION > [ABLS/ABS]

## **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:**

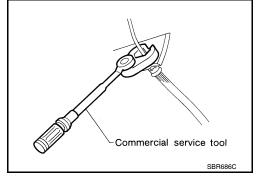
- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.
- Improper maintenance, including incorrect removal and installation 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

INFOID:0000000003788614

#### **CAUTION:**

- Always use recommended brake fluid. Refer to MA-10, "Fluids and Lubricants".
- 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-34</u>, "<u>Brake Burnishing Procedure"</u> (front disc brake) or <u>BR-38</u>, "<u>Removal and Installation of Brake Pad"</u> (rear disc brake).

#### **WARNING:**

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

#### Precaution for Brake Control

INFOID:0000000003788615

- 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 > [ABLS/ABS]

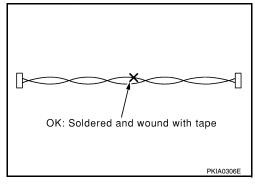
 When an error is indicated by ABS or another warning lamp, collect all necessary information from customer (what symptoms are present under what conditions) and check for simple causes before starting diagnosis. Besides electrical system inspection, check booster operation, brake fluid level, and fluid 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.

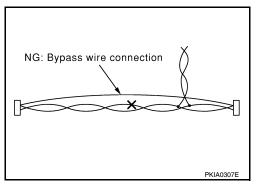
## Precaution for CAN System

• 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.)



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< PREPARATION > [ABLS/ABS]

# **PREPARATION**

## **PREPARATION**

# Special Service Tool

INFOID:0000000003788617

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
(J-45741) ABS active wheel sensor tester	J-43741-BOX DD ONE DATE OF THE PROPERTY OF THE	Checking operation of ABS active wheel sensors

## **Commercial Service Tool**

INFOID:0000000003788618

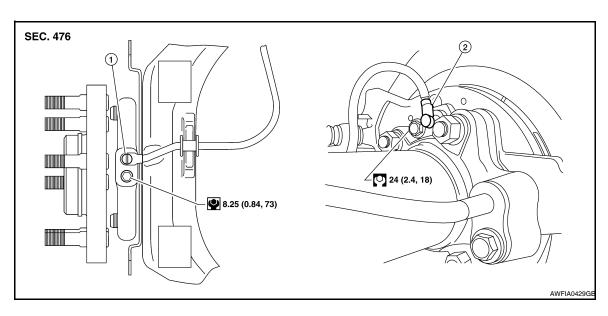
Tool name		Description
Flare nut crowfoot     Torque wrench		Removing and installing brake piping a: 10mm (0.39 in)/12mm (0.47 in)
	S-NT360	

INFOID:0000000004095784

# REMOVAL AND INSTALLATION

## WHEEL SENSORS

Removal and Installation



1. Front wheel sensor

2. Rear wheel sensor

#### REMOVAL

- Remove wheel sensor bolt.
  - When removing the front wheel sensor, first remove the disc rotor to gain access to the front wheel sensor bolt. Refer to <u>BR-35</u>, "Removal and Installation of Brake Caliper and Rotor".
- 2. Pull out the sensor, being careful to turn it as little as possible.

#### **CAUTION:**

- Be careful not to damage sensor edge and sensor rotor teeth.
- · Do not pull on the sensor harness.
- 3. Disconnect wheel sensor harness electrical connector, then remove harness from attaching points.

#### INSTALLATION

Installation is in the reverse order of removal.

#### **CAUTION:**

- Inspect wheel sensor O-ring, replace sensor assembly if damaged.
- Clean wheel sensor hole and mounting surface with brake cleaner and a lint-free shop rag. Be careful that dirt and debris do not enter the axle.
- Apply a coat of suitable grease to the wheel sensor O-ring and mounting hole.

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## SENSOR ROTOR

### Removal and Installation

INFOID:0000000004095785

#### FRONT WHEEL SENSOR ROTOR

Removal and Installation

The front wheel sensor rotor is built into the front wheel hub and bearing assembly and is not removable. If damaged, replace the front wheel hub and bearing assembly. Refer to FAX-6, "Removal and Installation".

#### REAR WHEEL SENSOR ROTOR

Removal

Remove the rear axle shaft assembly. Refer to RAX-8, "Removal and Installation".

#### NOTE:

It is necessary to disassemble the rear axle shaft assembly to replace the rear wheel sensor rotor.

Installation

Installation is in the reverse order of removal.

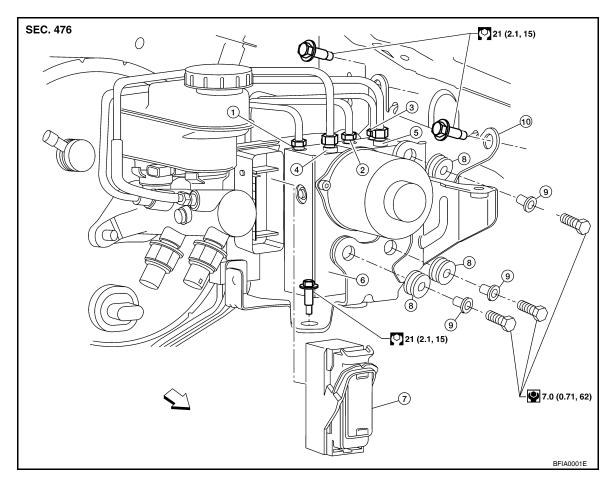
#### **CAUTION:**

- Do not reuse the old rear wheel sensor rotor.
- Do not reuse the rear axle oil seal. The rear axle oil seal must be replaced every time the rear axle shaft assembly is removed from the rear axle shaft housing.

INFOID:0000000004095786

## ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

#### Removal and Installation



- 1. To rear calipers 13 N·m (1.3 kg-m, 10 ft-lb)
- 4. From the master cylinder secondary side 5. 18.2 N·m (1.9 kg-m, 13 ft-lb)
- Harness connector
- 10. Bracket

- 2. To front left caliper 13 N·m (1.3 kg-m, 10 ft-lb)
- 5. From the master cylinder primary side 6. 18.2 N·m (1.9 kg-m, 13 ft-lb)
- 8. Grommet
- <□ Front

- . To front right caliper 13 N·m (1.3 kg-m, 10 ft-lb)
- ABS actuator and electric unit (control unit)
- 9. Collar

#### **REMOVAL**

- 1. Disconnect the battery negative terminal.
- 2. Remove the cowl top extension. Refer to EXT-19, "Removal and Installation".
- 3. Drain the brake fluid. Refer to BR-17, "Drain and Refill".
- Disconnect the actuator harness connector from the ABS actuator and electric unit (control unit).
   CAUTION:
  - To remove the brake tubes, use a flare nut crowfoot and torque wrench to prevent the flare nuts and brake tubes from being damaged.
  - 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.
- 5. Disconnect the brake tubes.
- Remove the three bolts and remove the ABS actuator and electric unit (control unit).

#### INSTALLATION

Installation is in the reverse order of removal.

#### **CAUTION:**

To install, use a flare nut crowfoot and torque wrench (commercial service tools).

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## **ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)**

< REMOVAL AND INSTALLATION >

[ABLS/ABS]

- · Always tighten brake tubes to specification when installing.
- Never reuse drained brake fluid.
- Refill brake system with new brake fluid. Then bleed the air from the system. Refer to <u>BR-17</u>, "<u>Bleeding Brake System</u>".

#### **DIAGNOSIS AND REPAIR WORKFLOW**

< BASIC INSPECTION > [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 <a href="https://example.com/BRC-149">BRC-149</a>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

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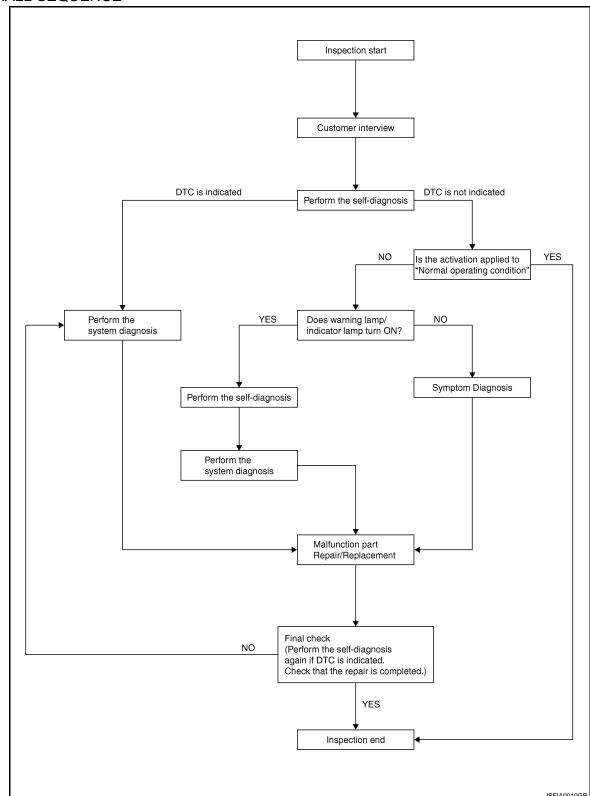
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#### **OVERALL SEQUENCE**



# **DETAIED FLOW**

# 1. COLLECT THE INFORMATION FROM THE CUSTOMER

Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using the diagnosis worksheet. Refer to <a href="BRC-148">BRC-148</a>, "Diagnostic Work Sheet".

# **DIAGNOSIS AND REPAIR WORKFLOW**

DIAGNOSIS AND REPAIR WORKFLOW
< BASIC INSPECTION > [VDC/TCS/ABS]
>> GO TO 2
2.PERFORM THE SELF-DIAGNOSIS
Check the DTC display with the self-diagnosis function. Refer to <a href="BRC-164">BRC-164</a> , "CONSULT-III Function (ABS)".
Is there any DTC displayed?
YES >> GO TO 3
NO >> GO TO 4
3.PERFORM THE SYSTEM DIAGNOSIS
Perform the diagnosis applicable to the displayed DTC. Refer to BRC-239, "DTC No. Index".
>> GO TO 7
4. CHECK THE SYMPTOM THAT IS NOT CONSIDERED A SYSTEM MALFUNCTION
Check that the symptom is a normal operation that is not considered a system malfunction. Refer to BRC-248
"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-222, "Description"</u> .      Description   Proceedings   Procedure   Procedure
<ul> <li>Brake warning lamp: Refer to <u>BRC-223, "Description"</u>.</li> <li>VDC OFF indicator lamp: Refer to <u>BRC-224, "Description"</u>.</li> </ul>
SLIP indicator lamp: Refer to <u>BRC-225, "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-164</u> , "CONSULT-III Function (ABS)".
Is no other DTC present and the repair completed?
YES >> Inspection End
NO >> GO TO 3

# **DIAGNOSIS AND REPAIR WORKFLOW**

< BASIC INSPECTION >

[VDC/TCS/ABS]

# Diagnostic Work Sheet

INFOID:0000000003788623

Customer name MR/MS	Model & Year		VIN	
Engine #	Trans.		Mileage	
Incident Date	Manuf. Date		In Service Date	е
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☐ Bumps / potholes	□Other)		
Driving conditions	☐ Full-acceleration ☐ High speed cornering ☐ Vehicle speed: Greater than 10 km/h ☐ Vehicle speed: 10 km/h (6 MPH) or le ☐ Vehicle is stopped			
Applying brake conditions	☐ Suddenly ☐ Gradually			
Other conditions	☐ Operation of electrical equipment☐ Shift change☐ Other descriptions			

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ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT: Description

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After replacing the ABS actuator and electric unit (control unit), perform the following procedures:

- Neutral position adjustment for the steering angle sensor
- Calibration of the decel G sensor

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT: Special Repair Requirement INFOID:0000000003788625

 ${f 1}$  . PERFORM THE NEUTRAL POSITION ADJUSTMENT FOR THE STEERING ANGLE SENSOR

Perform the neutral position adjustment for the steering angle sensor.

>> Refer to BRC-149, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL Special Repair Requirement", GO TO 2

2.PERFORM CALIBRATION OF THE DECEL G SENSOR

Perform calibration of the decel G sensor.

>> Refer to BRC-150, "CALIBRATION OF DECEL G SENSOR: Special Repair Requirement". ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description

INFOID:0000000003788626

Refer to the table below to determine if adjustment of steering angle sensor neutral position is required.

x: Required -: Not required

	and the state of t
Situation	Adjustment of steering angle sensor neutral position
Removing/Installing ABS actuator and electric unit (control unit)	<del>-</del>
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	<del>-</del>
Adjusting wheel alignment	×
Battery disconnection	×

ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Special Repair Requirement INFOID:0000000003788627

ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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

 ${f 1}$  . ALIGN THE VEHICLE STATUS

Stop vehicle with front wheels in straight-ahead position.

**BRC-149** 

>> 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-164, "CONSULT-III Function (ABS)"</u>.
- ECM: Refer to EC-67, "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

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

x: Required -: Not required

INFOID:0000000003788628

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:0000000003788629

#### CALIBRATION OF DECEL G SENSOR

#### **CAUTION:**

To calibrate the decel G sensor, make sure to use CONSULT-III

# **INSPECTION AND ADJUSTMENT**

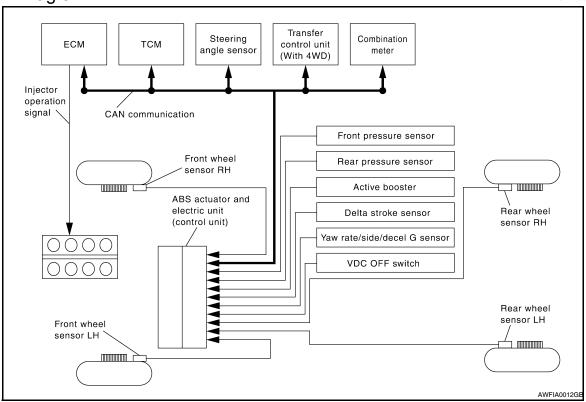
INSPECTION AND ADJUSTMENT	
< BASIC INSPECTION > [VDC/TCS/ABS	S]
(Calibration cannot be done without CONSULT-III)	
1.ALIGN THE VEHICLE STATUS	
Stop vehicle with front wheels in straight-ahead position.	
00 TO 0	
>> GO TO 2	
2.PERFORM CALIBRATION OF DECEL G SENSOR	
<ol> <li>On the CONSULT-III screen, touch "WORK SUPPORT" and "DECEL G SEN CALIBRATION" in order.</li> <li>Touch "START".</li> </ol>	
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.	
De sale to perform above operation.	
>> GO TO 3	
3. CHECK DATA MONITOR	
Run vehicle with front wheels in straight-ahead position, then stop.	
2. 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.	_
<ul> <li>ABS actuator and electric unit (control unit): Refer to <u>BRC-164, "CONSULT-III Function (ABS)"</u>.</li> <li>ECM: Refer to <u>EC-67, "CONSULT-III Function (ENGINE)"</u>.</li> </ul>	
Are the memories erased?	
YES >> Inspection End NO >> Check the items indicated by the self-diagnosis.	
NO >> Check the items indicated by the self-diagnosis.	

# **FUNCTION DIAGNOSIS**

**VDC** 

System Diagram

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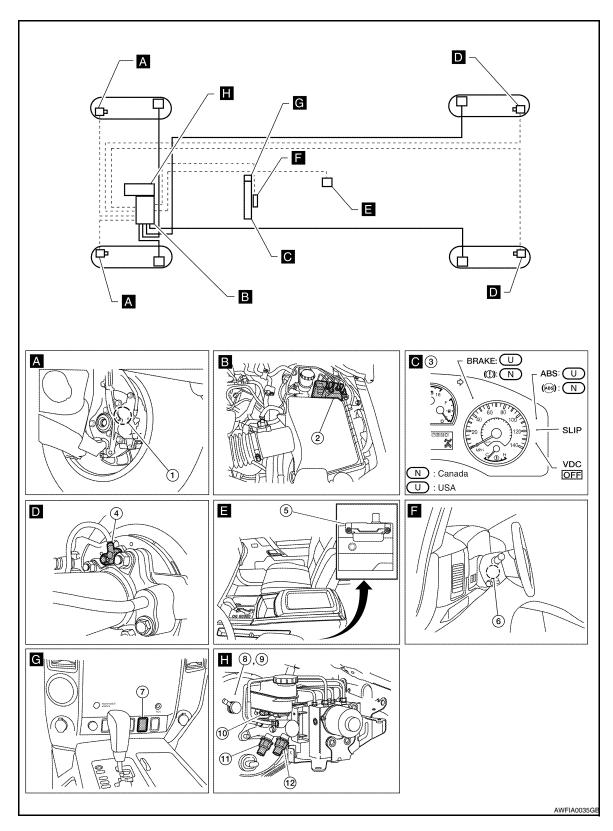


# System Description

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

# **Component Parts Location**

INFOID:0000000003788632



- Front wheel sensor LH E18
   Front wheel sensor RH E117
- Rear wheel sensor LH C11 Rear wheel sensor RH C10
- ABS actuator and electric unit (control unit) E126
- 5. Yaw rate/side/decel G sensor M108 6.
- Combination meter M24
- Steering angle sensor M17

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- 7. VDC OFF switch M148
- 8. Active booster E49
- 11. Front pressure sensor E31
- 9. Delta stroke sensor E114
- 12. Rear pressure sensor E32

# **Component Description**

10. Brake fluid level switch E21

Compo	nent parts	Reference
	Pump	DDC 179 "Description"
	Motor	BRC-178, "Description"
ABS actuator and electric unit (control unit)	Actuator relay	BRC-196, "Description"
	Solenoid valve	BRC-188, "Description"
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-210, "Description"
Wheel sensor		BRC-169, "Description"
Yaw rate/side/decel G sensor		BRC-180, "Description"
Steering angle sensor		BRC-201, "Description"
VDC OFF switch		BRC-220, "Description"
ABS warning lamp		BRC-222, "Description"
Brake warning lamp		BRC-223, "Description"
VDC OFF indicator lamp		BRC-224, "Description"
SLIP indicator lamp		BRC-225. "Description"
Front pressure sensor		PDC 100 "Deceription"
lear pressure sensor		BRC-198, "Description"
ctive booster		BRC-213, "Description"
Delta stroke sensor		BRC-216, "Description"

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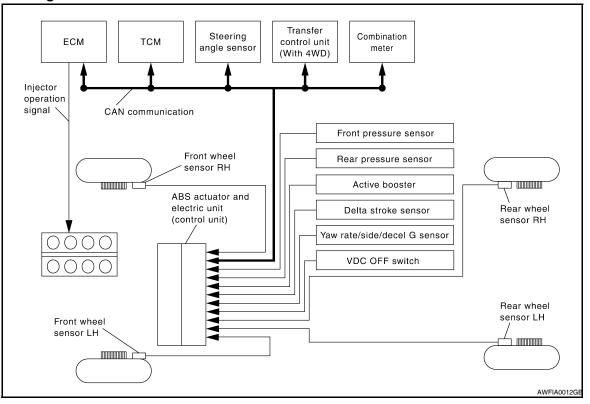
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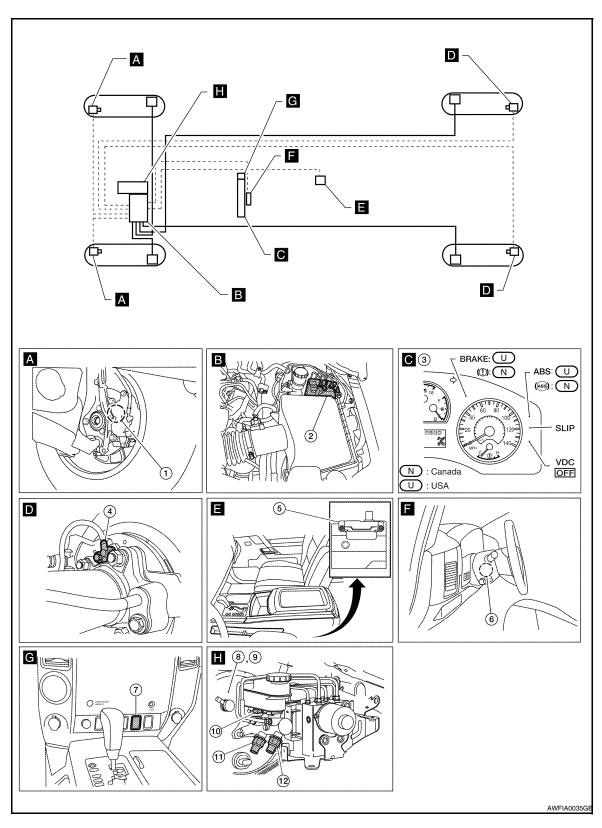
System Diagram



# System Description

- 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 pressure are controlled, while fuel being cut to engine and throttle valve being closed to reduce engine torque by the control unit. Further more, throttle position is continuously controlled to ensure the optimum engine torque at all times.
- During TCS operation, it informs driver of system operation by flashing SLIP indicator lamp.
- Electrical system diagnosis by CONSULT-III is available.

# **Component Parts Location**



- Front wheel sensor LH E18
   Front wheel sensor RH E117
- Rear wheel sensor LH C11 Rear wheel sensor RH C10
- ABS actuator and electric unit (control unit) E126
- 5. Yaw rate/side/decel G sensor M108 6.
- Combination meter M24
- Steering angle sensor M17

# [VDC/TCS/ABS]

- 7. VDC OFF switch M148
- O Dunley flerial level socitals FO4
  - 11 Front proceure concer F
- 9. Delta stroke sensor E114

- 10. Brake fluid level switch E21
- 11. Front pressure sensor E31

Active booster E49

12. Rear pressure sensor E32

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# **Component Description**

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Compo	nent parts	Reference	
	Pump	BRC-178, "Description"	
	Motor	BRC-176, Description	
ABS actuator and electric unit (control unit)	Actuator relay	BRC-196, "Description"	
The detactor and discense and (control and)	Solenoid valve	BRC-188, "Description"	
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-210, "Description"	
Wheel sensor		BRC-169, "Description"	
Yaw rate/side/decel G sensor		BRC-180, "Description"	
Steering angle sensor		BRC-201, "Description"	
VDC OFF switch		BRC-220, "Description"	
ABS warning lamp		BRC-222, "Description"	
Brake warning lamp		BRC-223, "Description"	
VDC OFF indicator lamp		BRC-224, "Description"	
SLIP indicator lamp		BRC-225, "Description"	
Front pressure sensor		DDC 100 "Deceriation"	
Rear pressure sensor		BRC-198, "Description"	
Active booster		BRC-213, "Description"	
Delta stroke sensor		BRC-216, "Description"	_

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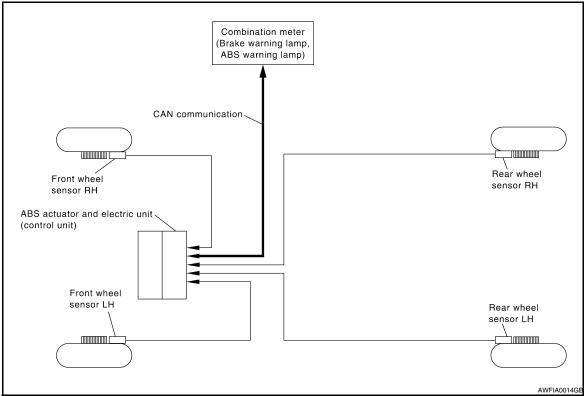
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# **ABS**

System Diagram

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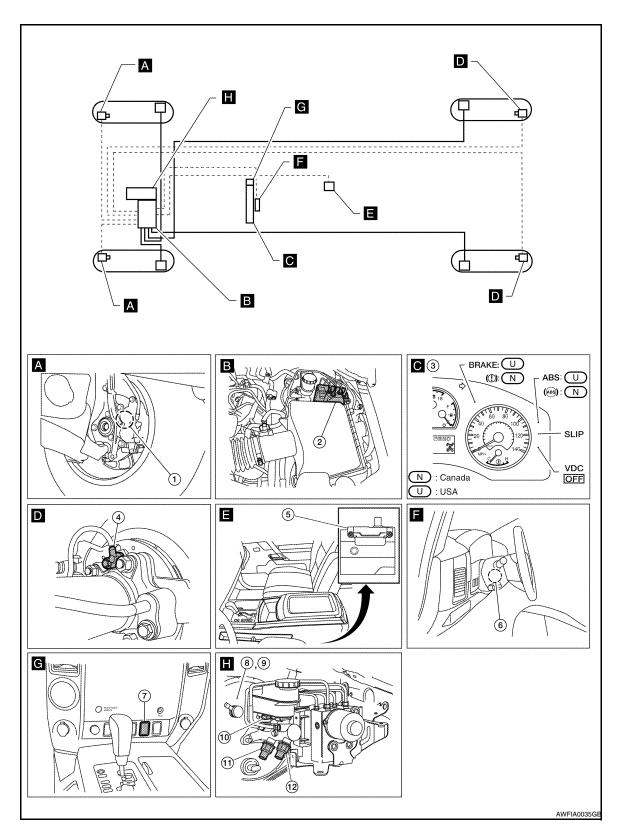


# **System Description**

- 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:0000000004115454



- Front wheel sensor LH E18
   Front wheel sensor RH E117
- Rear wheel sensor LH C11 Rear wheel sensor RH C10
- ABS actuator and electric unit (control unit) E126
- 5. Yaw rate/side/decel G sensor M108 6.
- Combination meter M24
- Steering angle sensor M17

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- 7. VDC OFF switch M148
- Active booster E49
  - 11. Front pressure sensor E31
- 9. Delta stroke sensor E114
- 12. Rear pressure sensor E32

# **Component Description**

10. Brake fluid level switch E21

Compo	nent parts	Reference
	Pump	BRC-178, "Description"
ADC naturator and planting unit (control unit)	Motor	BRC-176, Description
ABS actuator and electric unit (control unit)	Actuator relay	BRC-196, "Description"
	Solenoid valve	BRC-188, "Description"
Wheel sensor		BRC-169, "Description"
ABS warning lamp		BRC-222, "Description"
Brake warning lamp		BRC-223, "Description"

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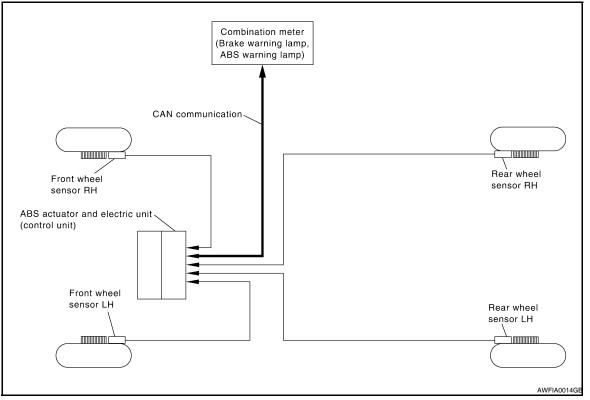
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## **EBD**

System Diagram



# **System Description**

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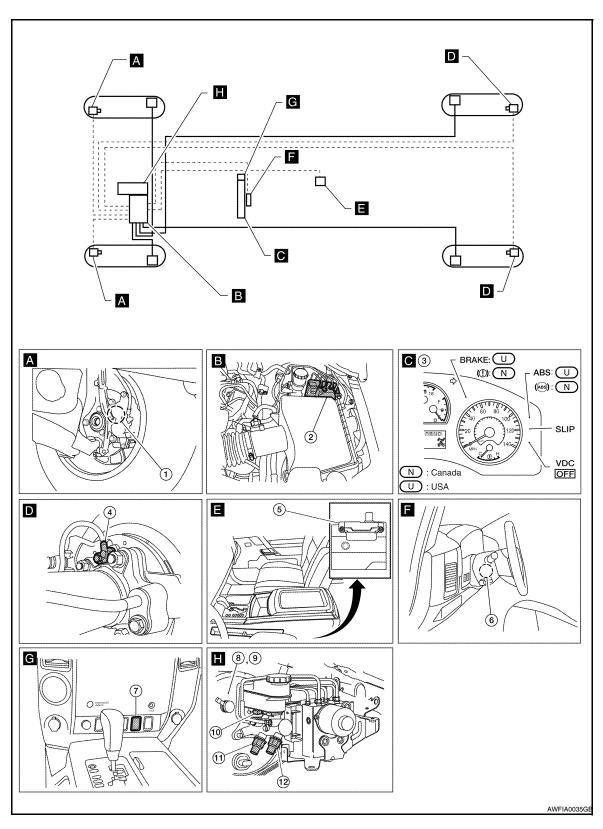
• Electric Brake force Distribution is a following function. ABS actuator and electric unit (control unit) detects subtle slippages between the front and rear wheels during braking. Then it electronically controls the rear braking force (brake fluid pressure) to reduce rear wheel slippage. Accordingly,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

Electrical system diagnosis by CONSULT-III is available.

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# **Component Parts Location**



- Front wheel sensor LH E18
   Front wheel sensor RH E117
- 4. Rear wheel sensor LH C11 Rear wheel sensor RH C10
- ABS actuator and electric unit (control unit) E126
- 5. Yaw rate/side/decel G sensor M108 6.
- Combination meter M24
- Steering angle sensor M17

#### **EBD**

# < FUNCTION DIAGNOSIS >

[VDC/TCS/ABS]

- 7. VDC OFF switch M148
- 8. Active booster E49
- 9. Delta stroke sensor E114

- 10. Brake fluid level switch E21
- 11. Front pressure sensor E31
- 12. Rear pressure sensor E32

# **Component Description**

INFOID:0000000003788645

Compo	nent parts	Reference	
	Pump	BRC-178, "Description"	С
ARS actuator and electric unit (control unit)	Motor	BIC-170, Description	
ABS actuator and electric unit (control unit)	Actuator relay	BRC-196, "Description"	
	Solenoid valve	BRC-188, "Description"	D
Wheel sensor		BRC-169, "Description"	
ABS warning lamp		BRC-222, "Description"	F
Brake warning lamp		BRC-223, "Description"	_

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< FUNCTION DIAGNOSIS >

[VDC/TCS/ABS]

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

CONSULT-III Function (ABS)

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#### **FUNCTION**

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

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

#### SELF-DIAG RESULTS MODE

#### Operation Procedure

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

#### How to Erase Self-diagnosis Results

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 BRC-239, "DTC No. Index",

#### DATA MONITOR MODE

Display Item List

Item	Dat	a monitor item sele	ction	
(Unit)	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	Remarks
GEAR (1, 2, 3, 4, R)	×	×	×	Gear position judged by PNP switch signal 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.

< FUNCTION DIAGNOSIS >

[VDC/TCS/ABS]

Item	Data monitor item selection			
(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 (ON/OFF) judged by PNP switch signal.
P POSI SIG (ON/OFF)	-	-	×	Shift position (ON/OFF) 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 communication 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 sensor is displayed.
SIDE G-SENSOR (m/s <sup>2</sup> )	×	-	×	Transverse acceleration detected by side G-sensor is displayed.
DECEL G-SEN (G)	×	×	×	Longitudinal acceleration detected by decel 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) 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.
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.

**BRC-165** 

< FUNCTION DIAGNOSIS >

[VDC/TCS/ABS]

	Data	a monitor item sel		
Item (Unit)	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	Remarks
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.
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) status is displayed.
SLCT LVR POSI (P, R, N, D, 4, 3, 2, 1)	×	×	×	Selector lever position judged by PNP switch signal.
R POSI SIG (ON/OFF)	-	_	×	Shift position (ON/OFF) judged by PNP switch signal.
2WD/4WD (2WD/4WD)	-	-	×	It recognizes on software whether it is 2WD and whether it is in 4WD state.
BST OPER SIG (ON/OFF)	_	_	×	Active booster operation (ON/OFF) status is displayed.
PRESS SENSOR (bar)	×	_	×	Brake pressure detected by pressure sensor is displayed (bar).
CRANKING SIG (ON/OFF)	-	-	×	The input state of the key SW START position signal (ON/OFF) is displayed.
PRESS SEN 2 (bar)	-	-	×	Brake pressure detected by pressure sensor is displayed (bar).

#### < FUNCTION DIAGNOSIS >

[VDC/TCS/ABS]

Item	Data	a monitor item sele	ection	
(Unit)	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	Remarks
DELTA S SEN (mm)	-	_	×	The amount of stroke sensor movements in the active booster detected by DELTA S SEN is displayed (mm).
RELEASE SW NO (ON/OFF)	-	_	×	Release switch signal (ON/OFF) status is displayed. "ON" indicates that the brake pedal is depressed. "OFF" is that the brake pedal is released.
RELEASE SW NC (ON/OFF)	-	_	×	Release switch signal (ON/OFF) status is displayed. "OFF" indicates that the brake pedal is depressed on. "ON" is that the brake pedal is released.
OHB FAIL (ON/OFF)	-	_	×	OHB fail status (ON/OFF) is displayed.
HBA FAIL (ON/OFF)	-	_	×	HBA fail status (ON/OFF) is displayed.
OHB SIG (ON/OFF)	-	_	×	OHB operation (ON/OFF) status is displayed.
HBA SIG (ON/OFF)	-	-	×	HBA operation (ON/OFF) status is displayed.
DLOCK SW (ON/OFF)	-	_	×	Differential lock switch (ON/OFF) status is displayed.
DLOCK CHG SW (ON/OFF)	-	_	×	Differential lock operation (ON/OFF) status is displayed.
STP OFF RLY (ON/OFF)	_	_	×	Stop lamp relay signal (ON/OFF) status is displayed.

x: 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, 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.

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Not applicable

< FUNCTION DIAGNOSIS >

[VDC/TCS/ABS]

		AE	3S solenoid va	alve	ABS	ABS solenoid valve (ACT)		
Operation		UP	KEEP	DOWN	UP	ACTUA- TOR UP	ACTUA- TOR KEEP	
FR RH SOL	FR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF	
FR RH ABS SOLE- NOID (ACT)	FR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF	
FR LH SOL	FR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF	
FR LH ABS SOLE- NOID (ACT)	FR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF	
RR RH SOL	RR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF	
RR RH ABS SOLE- NOID (ACT)	RR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF	
RR LH SOL	RR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF	
RR LH ABS SOLE- NOID (ACT)	RR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF	
	RR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF	
REAR SOL	RR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF	
NEAN SOL	RR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF	
	RR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF	

<sup>\*:</sup> 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

#### **BOOSTER DRIVE**

• Touch "UP" and "DOWN" on the screen. Check that booster drive operates as shown in table below.

CAUTION:

Perform active test subject to the conditions below.

- Do not operate brake pedal during active test.
- Make sure the engine revolution is over 500 rpm.
- Make sure the vehicle is not moving.

Operation	UP	DOWN
STOP LAMP SW	ON	OFF
BST OPER SIG	ON	OFF
PRESS SENSOR	50 ± 5 bar	0 bar
PRESS SEN 2	50 ± 5 bar	0 bar
STP OFF RLY	OFF	OFF

[VDC/TCS/ABS]

# COMPONENT DIAGNOSIS

C1101, C1102, C1103, C1104 WHEEL SENSOR-1

Description INFOID:0000000003788647

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:0000000003788648

#### 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.	<ul><li>Harness or connector</li><li>Wheel sensor</li></ul>
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?

>> Proceed to diagnosis procedure. Refer to BRC-169, "Diagnosis Procedure". YES

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 E126 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

- 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.

**BRC-169** 

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[VDC/TCS/ABS]

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 BRC-252, "Removal and Installation".

# 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) or <u>RAX-5</u>, "On-Vehicle Inspection" (rear).

#### Is the inspection result normal?

YES >> GO TO 5

NO >> Repair or replace as necessary. Refer to <u>FAX-6</u>, "<u>Removal and Installation</u>" (front) or <u>RAX-7</u>, "<u>Removal and Installation</u>" (rear).

# CHECK WIRING HARNESS FOR SHORT CIRCUIT

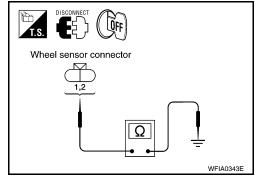
- Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No.
- 2. Check continuity between wheel sensor harness connector terminals and ground.

#### 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 E126 and the malfunctioning wheel sensor harness connector E18, E117, C10, or C11.

Wheel sensor	ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
	Connector	Terminal	Connector	Terminal	·
Front LH		45	E18	1	
I TOTAL LIT		46	E10	2	
Front RH	E126	34	E117	1	Yes
		33		2	
Rear LH	E120	37	C11	2	165
incai Li i		36	CII	1	
Rear RH		42	2		
		43	- C10	1	

#### Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <a href="BRC-254">BRC-254</a>, "Removal and Installation".

NO >> Repair the circuit.

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

#### < COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

# Component Inspection

#### INFOID:0000000003788650

# 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 <a href="BRC-169">BRC-169</a>, "Diagnosis Procedure".

# Special Repair Requirement

#### INFOID:0000000003788651

# 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 <a href="https://example.com/BRC-149">BRC-149</a>, "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-150, "CALIBRATION OF DECEL G SENSOR: Description".

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[VDC/TCS/ABS]

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

Description INFOID:000000003788652

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

#### 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-circuited. 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-circuited. 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.	<ul><li> Harness or connector</li><li> Wheel sensor</li></ul>
C1107	FR RH SENSOR-2	When the circuit in the front RH wheel sensor is short-circuited. 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	21108 FR LH SENSOR-2	When the circuit in the front LH wheel sensor is short-circuited. 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 BRC-172, "Diagnosis Procedure".

NO >> Inspection End

# Diagnosis Procedure

INFOID:0000000003788654

#### **CAUTION:**

Do not check between wheel sensor terminals.

INSPECTION PROCEDURE

1. CONNECTOR INSPECTION

Disconnect the ABS actuator and electric unit (control unit) connector E126 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.

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

< COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

# $\overline{2}$ .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-252</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) or <u>RAX-5</u>, "On-Vehicle Inspection" (rear).

#### Is the inspection result normal?

YES >> GO TO 5

NO >> Repair or replace as necessary. Refer to <u>FAX-6</u>, "<u>Removal and Installation</u>" (front) or <u>RAX-7</u>, "<u>Removal and Installation</u>" (rear).

# 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.

#### Continuity should not exist.

#### Is the inspection result normal?

YES >> GO TO 6

NO >> Repair the circuit.

# 4

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

1. Check continuity between ABS actuator and electric unit (control unit) harness connector E126 and the malfunctioning wheel sensor harness connector E18, E117, C10, or C11.

Wheel sensor connector

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Wheel sensor	ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
	Connector	Terminal	Connector	Terminal	
Front LH		45	E18	1	
FIONL LTI	E126	46		2	
Front RH		34	E117	1	
		33		2	Yes
Rear LH	E120	37	C11	2	Tes
кеаг сп		36		1	
Rear RH		42	C10	2	
		43		1	

#### Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <a href="mailto:BRC-254">BRC-254</a>, "Removal and Installation".

NO >> Repair the circuit.

# Component Inspection

INFOID:0000000003788655

# 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-172, "Diagnosis Procedure"</u>.

# Special Repair Requirement

INFOID:0000000003788656

# 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 <a href="https://example.com/BRC-149">BRC-149</a>, "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-150, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

## **C1109 POWER AND GROUND SYSTEM**

< COMPONENT DIAGNOSIS >

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INFOID:0000000003788659

# C1109 POWER AND GROUND SYSTEM

Description INFOID:000000003788657

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

DTC Logic

#### 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 <a href="BRC-175">BRC-175</a>, "Diagnosis Procedure".

NO >> Inspection End

# Diagnosis Procedure

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#### 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-164, "CONSULT-III Function (ABS)"</u>.

#### Is any item indicated on the self-diagnosis display?

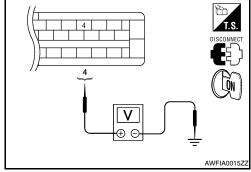
YES >> GO TO 2

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

	ABS actuator and electric unit (control unit)		_	Condition	Voltage
	Connector	Terminal			
	F126	4	Ground	Ignition switch: ON	Battery voltage
Ignition switch: OFF Approx. 0V	L120 4		Ground	Ignition switch: OFF	Approx. 0V



4. Turn ignition switch OFF.

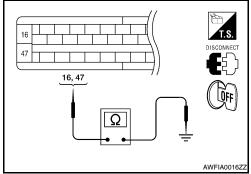
#### C1109 POWER AND GROUND SYSTEM

#### < COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

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		
E126	16, 47	Ground	Yes



#### 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.

# Special Repair Requirement

INFOID:0000000003788660

# 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 <a href="https://example.com/BRC-149">BRC-149</a>, "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 <a href="https://example.com/BRC-150">BRC-150</a>, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

# C1110, C1170 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) < COMPONENT DIAGNOSIS > [VDC/TCS/ABS]

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

DTC Logic

#### 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.	(control drift)

#### 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-177</u>, "<u>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 <a href="BRC-254">BRC-254</a>, "Removal and Installation".

# Special Repair Requirement

# ${f 1}$ .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-149</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). Refer to BRC-150, "CALIBRATION OF DECEL G SENSOR: Description".

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[VDC/TCS/ABS]

# C1111 ABS MOTOR, MOTOR RELAY SYSTEM

Description INFOID:000000003788664

#### **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 actuator motor relay is open.	Harness or connector     ABS actuator and electric unit
CTITI POWF WOTOR	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-178</u>, "<u>Diagnosis Procedure</u>".

NO >> Inspection End

# Diagnosis Procedure

INFOID:0000000003788666

#### 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-164, "CONSULT-III Function (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

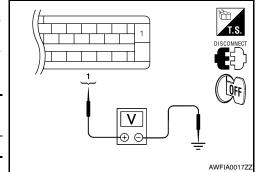
## C1111 ABS MOTOR, MOTOR RELAY SYSTEM

#### < COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

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

ABS actuator and electric unit (control unit)		_	Voltage
Connector	Terminal	_	voltage
E126	1	Ground	Battery voltage



#### Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

# 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
E126	16, 47	Ground	Yes

# DISCONNEC

#### Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-254</u>, "Removal and Installation".

NO >> Repair or replace malfunctioning components.

# Component Inspection

# 1. CHECK ACTIVE TEST

- 1. On "ACTIVE TEST", select "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

#### Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to BRC-178, "Diagnosis Procedure".

# Special Repair Requirement

# ${f 1}$ .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-149</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). Refer to <a href="https://example.com/BRC-150">BRC-150</a>, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

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

< COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

INFOID:0000000003788671

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

Description INFOID.000000003788669

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

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
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.	<ul> <li>ABS actuator and electric un (control unit)</li> </ul>
C1146	SIDE G-SEN CIRCUIT	Side G sensor is malfunctioning, or circuit of side G sensor is open or shorted.	Yaw rate/side/decel G sensor

#### DTC CONFIRMATION PROCEDURE

## CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

#### Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-180, "Diagnosis Procedure".

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 E126 and yaw rate/side/decel G sensor connector M108.

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

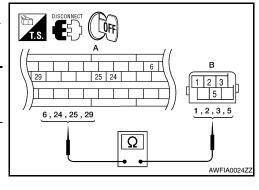
### C1113, C1145, C1146 YAW RATE/SIDE/DECEL G SENSOR

### < COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

Check continuity between the ABS actuator and electric unit (control unit) connector E126 (A) and the yaw rate/side/decel G sensor connector M108 (B).

	and electric unit ol unit)	Yaw rate/side/decel G sensor		Continuity
Connector	Terminal	Connector Terminal		
	6	B: M108	3	
A: E126	24		5	Yes
	25		1	res
	29		2	



### Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace as necessary.

# 3.YAW RATE/SIDE/DECEL G SENSOR INSPECTION

 Connect the yaw rate/side/decel G sensor connector M108 and ABS actuator and electric unit (control unit) connector E126.

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

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	-0.11 G to +0.11 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 <a href="mailto:BRC-254">BRC-254</a>, "Removal and Installation".

NO >> Replace the yaw rate/side/decel G sensor and perform calibration of decel G-sensor. Refer to BRC-257, "Removal and Installation".

# Component Inspection

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	-0.11 G to +0.11 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 <a href="BRC-180">BRC-180</a>, "Diagnosis Procedure".

# Special Repair Requirement

INFOID:0000000003788673

1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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

# < COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-149</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). Refer to <a href="https://example.com/BRC-150">BRC-150</a>, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

### C1115 WHEEL SENSOR

Description INFOID:000000003788674

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

### DTC DETECTION LOGIC

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

### 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-183. "Diagnosis Procedure"</u>.

NO >> Inspection End

### Diagnosis Procedure

INFOID:0000000003788676

### **CAUTION:**

Do not check between wheel sensor terminals.

### INSPECTION PROCEDURE

# 1.CONNECTOR INSPECTION

Disconnect the ABS actuator and electric unit (control unit) connector E126 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

- 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 <a href="BRC-252">BRC-252</a>, "Removal and Installation".

3.CHECK TIRES

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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) or <u>RAX-5</u>, "On-Vehicle Inspection" (rear).

### Is the inspection result normal?

YES >> GO TO 5

NO >> Repair or replace as necessary. Refer to <u>FAX-6</u>, "<u>Removal and Installation</u>" (front) or <u>RAX-7</u>, "<u>Removal and Installation</u>" (rear).

# 5. CHECK WIRING HARNESS FOR SHORT CIRCUIT

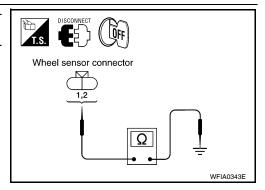
- 1. Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No.
- 2. Check continuity between wheel sensor harness connector terminals and ground.

### 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 E126 and the malfunctioning wheel sensor harness connector E18, E117, C10, or C11.

Wheel sensor	ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
	Connector	Terminal	Connector	Terminal	•
Front LH		45	E18	1	Yes
FIONL LM	E126	46		2	
Front RH		34	E117	1	
		33		2	
Rear LH		37	C11	2	
Rear RH		36		1	
		42	C10	2	
		43	010	1	

### Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <a href="mailto:BRC-254">BRC-254</a>, "Removal and Installation".

NO >> Repair the circuit.

# Component Inspection

INFOID:0000000003788677

# 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.

	C1115 WHEEL SENSOR	
< COMPONENT DIAGNOSIS >	[VDC/TCS/ABS]	
FR LH SENSOR		^
FR RH SENSOR	Nearly matches the speedometer dis-	Α
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 BRC-183, "Diagnosis Procedure".	
Special Repair Requirement	nt INFOID:0000000003788678	
1.ADJUSTMENT OF STEERING	ANGLE SENSOR NEUTRAL POSITION	D
	djustment for the steering angle sensor when replacing the ABS actuator of the steering angle sensor when replacing the ABS actuator of the steering angle sensor when replacing the ABS actuator of the steering angle sensor when replacing the ABS actuator of the steering angle sensor when replacing the ABS actuator of the steering angle sensor when replacing the ABS actuator of the steering angle sensor when replacing the ABS actuator of the steering angle sensor when replacing the ABS actuator of the steering angle sensor when replacing the ABS actuator of the steering angle sensor when replacing the ABS actuator of the steering angle sensor when replacing the ABS actuator of the steering angle sensor of the steering angle sensor when replacing the ABS actuator of the steering angle sensor of the steering angle sensor of the steering and steering at the steering at the steerin	Е
>> GO TO 2		BF
2.CALIBRATION OF DECEL G S		
	el G sensor when replacing the ABS actuator and electric unit (control unit).  NOF DECEL G SENSOR: Description".	C
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### C1116 STOP LAMP SWITCH

Description INFOID:000000003788679

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

DTC Logic

### DTC DETECTION LOGIC

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

### DTC CONFIRMATION PROCEDURE

# 1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results	_
STOP LAMP SW	

### Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <a href="BRC-186">BRC-186</a>, "Diagnosis Procedure".

NO >> Inspection End

### Diagnosis Procedure

INFOID:0000000003788681

### INSPECTION PROCEDURE

# 1. CONNECTOR INSPECTION

- 1. Disconnect the ABS actuator and electric unit (control unit) connector and stop lamp switch connector.
- 2. Check the terminals for deformation, disconnection, looseness or damage.

### Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

## $\mathbf{2}$ . STOP LAMP SWITCH INSPECTION

Check the voltage between the ABS actuator and electric unit (control unit) harness connector E126 terminal 41 and body ground.

Brake pedal depressed : Battery voltage

(approx. 12V)

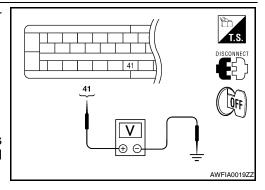
Brake pedal not depressed : Approx. 0V

### Is the inspection result normal?

YES >> Perform self-diagnosis again. If the same results appear, replace ABS actuator and electric unit (control unit). Refer to BRC-254, "Removal and Installation".

NO >> GO TO 3

 $3.\mathsf{stop}$  Lamp relay circuit inspection



### C1116 STOP LAMP SWITCH

### < COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

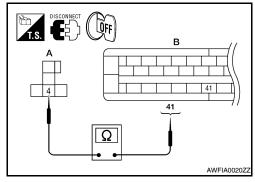
- 1. Disconnect the stop lamp relay harness connector.
- Check the continuity between the ABS actuator and electric unit (control unit) harness connector E126 (B) terminal 41 and stop lamp relay harness connector E12 (A) terminal 4.

### Continuity should exist.

### Is the inspection result normal?

YES >> Refer to EXL-4, "Work Flow".

NO >> Repair or replace malfunctioning components.



### INFOID:0000000003788682

# 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 <a href="https://example.com/BRC-149">BRC-149</a>, "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 <a href="https://example.com/BRC-150">BRC-150</a>, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

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# C1120, C1122, C1124, C1126 IN ABS SOL

Description INFOID:000000003788683

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	Display item Malfunction detected condition	
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
C1124	RR LH IN ABS SOL	When the control unit detects a malfunction in the rear LH inlet solenoid circuit.	(control unit)
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 <a href="BRC-188">BRC-188</a>, "Diagnosis Procedure".

NO >> Inspection End

# Diagnosis Procedure

INFOID:0000000003788685

### INSPECTION PROCEDURE

# 1. CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 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 <a href="BRC-164">BRC-164</a>, "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, VDC SWITCH-OVER VALVE AND ACTUATOR RELAY POWER SUPPLY CIRCUIT

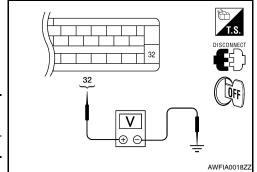
### C1120, C1122, C1124, C1126 IN ABS SOL

### < COMPONENT DIAGNOSIS >

### [VDC/TCS/ABS]

- 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
E126	32	Ground	Battery voltage



### Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

# $3. \mathrm{check}$ solenoid, vdc switch-over valve and acuator relay ground circuit

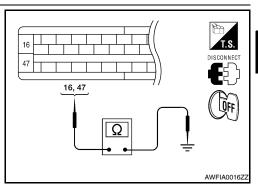
Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

ABS actuator and ele	ectric unit (control unit)	_	Continuity	
Connector	Terminal	_	Continuity	
E126	16, 47	Ground	Yes	

### Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-254</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".
- 2. On the display, touch "UP", "KEEP", and "DOWN", and check that the system operates as shown in the table below.

	AE	SS solenoid va	alve	ABS solenoid valve (ACT)			
Operation		UP	KEEP	DOWN	UP	ACTUA- TOR UP	ACTUA- TOR KEEP
FR RH SOL	FR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
FR RH ABS SOLE- NOID (ACT)	FR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
FR LH SOL	FR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
FR LH ABS SOLE- NOID (ACT)	FR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
RR RH SOL	RR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
RR RH ABS SOLE- NOID (ACT)	RR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
RR LH SOL	RR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
RR LH ABS SOLE- NOID (ACT)	RR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
	RR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
REAR SOL	RR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
	RR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
	RR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF

<sup>\*:</sup> ON for 1 to 2 seconds after the touch, and then OFF

### Is the inspection result normal?

YES >> Inspection End

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### C1120, C1122, C1124, C1126 IN ABS SOL

### < COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

NO >> Go to diagnosis procedure. Refer to <a href="mailto:BRC-188">BRC-188</a>, "Diagnosis Procedure".

### Special Repair Requirement

INFOID:0000000003788687

# 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 <a href="https://example.com/BRC-149">BRC-149</a>, "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-150, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

# 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
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-191, "Diagnosis Procedure"</u>.

NO >> Inspection End

### Diagnosis Procedure

INSPECTION PROCEDURE

## 1. CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 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 <a href="BRC-164">BRC-164</a>, "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, VDC SWITCH-OVER VALVE AND ACTUATOR RELAY POWER SUPPLY CIRCUIT

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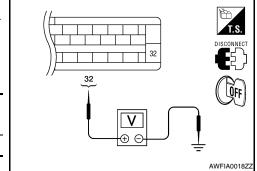
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**BRC-191** 

- 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	_	vollage	
E126	32	Ground	Battery voltage	



### Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

# 3.check solenoid, vdc switch-over valve and acuator relay ground circuit

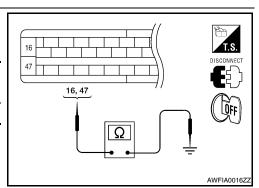
Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

ABS actuator and ele	ectric unit (control unit)		Continuity	
Connector	Terminal	_	Continuity	
E126	16, 47	Ground	Yes	

# Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-254</u>, "Removal and Installation".

NO >> Repair or replace malfunctioning components.



INFOID:0000000003788691

# Component Inspection

# 1. CHECK ACTIVE TEST

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

Operation		AE	SS solenoid va	alve	ABS solenoid valve (ACT)		
		UP	KEEP	DOWN	UP	ACTUA- TOR UP	ACTUA- TOR KEEP
FR RH SOL	FR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
FR RH ABS SOLE- NOID (ACT)	FR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
FR LH SOL	FR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
FR LH ABS SOLE- NOID (ACT)	FR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
RR RH SOL	RR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
RR RH ABS SOLE- NOID (ACT)	RR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
RR LH SOL	RR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
RR LH ABS SOLE- NOID (ACT)	RR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
	RR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
REAR SOL	RR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
NEAN OOL	RR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
	RR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF

<sup>\*:</sup> ON for 1 to 2 seconds after the touch, and then OFF

### Is the inspection result normal?

YES >> Inspection End

## C1121, C1123, C1125, C1127 OUT ABS SOL

# COMPONENT DIAGNOSIS > [VDC/TCS/ABS] 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 actuator and electric unit (control unit). Refer to BRC-149, "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-150, "CALIBRATION OF DECEL G SENSOR: Description".

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# C1130, C1131, C1132, C1133, C1136 ENGINE SIGNAL

Description INFOID.000000003788693

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

DTC Logic

### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	
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.	Based on the signal from ECM, ABS actuator and electric unit (control unit) judges that engine fuel cut system is (control unit)	<ul><li>Harness or connector</li><li>ABS actuator and electric unit</li></ul>
C1132	ENGINE SIGNAL 3			(control unit)
C1133	ENGINE SIGNAL 4		ECM     CAN communication line	
C1136	ENGINE SIGNAL 6			

### 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

### Is above displayed on the self-diagnosis display?

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

NO >> Inspection End

# Diagnosis Procedure

INFOID:0000000003788695

### INSPECTION PROCEDURE

# 1. CHECK ENGINE SYSTEM

- Perform ECM self-diagnosis. Repair or replace items indicated, then perform ECM self-diagnosis again. Refer to EC-67, "CONSULT-III Function (ENGINE)".
- Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-164, "CONSULT-III 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:0000000003788696

# ${f 1}$ .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 <a href="https://example.com/BRC-149">BRC-149</a>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

>> GO TO 2

# C1130, C1131, C1132, C1133, C1136 ENGINE SIGNAL

< COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

# 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 <a href="https://example.com/BRC-150">BRC-150</a>, "CALIBRATION OF DECEL G SENSOR: Description".

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### C1140 ACTUATOR RLY

Description INFOID.000000003788697

Activates or deactivates each solenoid valve 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
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 <a href="BRC-196">BRC-196</a>, "Diagnosis Procedure".

NO >> Inspection End

### Diagnosis Procedure

INFOID:0000000003788699

### INSPECTION PROCEDURE

# 1. CHECK CONNECTOR

- Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-164, "CONSULT-III Function (ABS)".

### Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

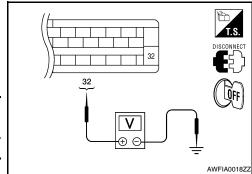
NO >> Poor connection of connector terminal. Repair or replace connector.

# 2.CHECK SOLENOID, 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		vollage	
E126	E126 32		Battery voltage	



### Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

3.check solenoid, vdc switch-over valve and acuator relay ground circuit

### C1140 ACTUATOR RLY

### < COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

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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
E126	16, 47	Ground	Yes

# 47 16, 47

### Is the inspection result normal?

>> Replace ABS actuator and electric unit (control unit). YES Refer to BRC-254, "Removal and Installation".

NO >> Repair or replace malfunctioning components.

## Component Inspection

INFOID:0000000003788700

# 1. CHECK ACTIVE TEST

- On "ACTIVE TEST", select "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

### Is the inspection result normal?

YES >> Inspection End

>> Go to diagnosis procedure. Refer to BRC-196, "Diagnosis Procedure". NO

### Special Repair Requirement

INFOID:0000000003788701

# ${f 1}$ . 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-149, "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-150, "CALIBRATION OF DECEL G SENSOR: Description".

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# C1142 PRESS SENSOR

Description INFOID:000000003788702

The front and rear pressure sensors convert the brake fluid pressure to an electric signal and transmit it to the ABS actuator and electric unit (control unit).

DTC Logic

### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1142	PRESS SEN CIRCUIT	Pressure sensor signal line is open or shorted, or pressure sensor is malfunctioning.	Harness or connector     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?

YES >> Proceed to diagnosis procedure. Refer to <a href="BRC-198">BRC-198</a>, "Diagnosis Procedure".

NO >> Inspection End

### Diagnosis Procedure

INFOID:0000000003788704

### FRONT PRESSURE SENSOR INSPECTION PROCEDURE

# 1. CONNECTOR INSPECTION

- 1. Turn the ignition switch OFF.
- 2. Disconnect the front pressure sensor connector E31 and ABS actuator and electric unit (control unit) connector E126 and inspect the terminals for deformation, disconnection, looseness, or damage.

### Is the inspection result normal?

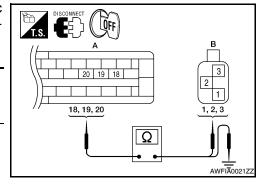
YES >> GO TO 2

NO >> Repair connector.

# 2.front pressure sensor circuit inspection

1. Measure the continuity between the ABS actuator and electric unit (control unit) harness connector E126 (A) and front pressure sensor harness connector E31 (B).

	and electric unit	Front pressure sensor		Continuity
Connector	Terminal	Connector	Terminal	Continuity
	18		3	
A: E126	19	B: E31	1	Yes
	20		2	



Measure the continuity between the ABS actuator and electric unit (control unit) harness connector E126

 (A) and body ground.

### < COMPONENT DIAGNOSIS >

ABS actuator and electric unit (control unit)		_	Continuity
Connector	Terminal		
	18		
A: E126	19	Ground	No
	20		

### Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace harness or connector.

# 3. FRONT PRESSURE SENSOR INSPECTION

- 1. Reconnect the front pressure sensor and ABS actuator and electric unit (control unit) connectors.
- 2. Use "DATA MONITOR" to check if the status of "PRESS SENSOR" is normal.

Condition	PRESS SENSOR (DATA MONITOR)
With ignition switch turned ON and brake pedal released.	Approx. 0 bar
With ignition switch turned ON and brake pedal depressed.	Positive value

### Is the inspection result normal?

YES >> Inspection End.

NO >> Replace the front pressure sensor.

### REAR PRESSURE SENSOR INSPECTION PROCEDURE

# 1. CONNECTOR INSPECTION

- 1. Turn the ignition switch OFF.
- 2. Disconnect the rear pressure sensor connector E32 and ABS actuator and electric unit (control unit) connector E126 and inspect the terminals for deformation, disconnection, looseness, or damage.

### Is the inspection result normal?

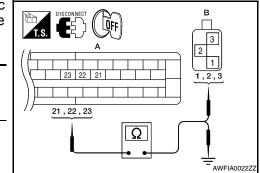
YES >> GO TO 2

NO >> Repair connector.

# 2.REAR PRESSURE SENSOR CIRCUIT INSPECTION

 Measure the continuity between the ABS actuator and electric unit (control unit) harness connector E126 (A) and rear pressure sensor harness connector E32 (B).

	and electric unit ol unit)	Rear pressure sensor		Continuity
Connector	Terminal	Connector	Terminal	
	21		1	
A: E126	22	B: E32	3	Yes
	23		2	



2. Measure the continuity between the ABS actuator and electric unit (control unit) harness connector E126 (A) and body ground.

ABS actuator and electric unit (control unit)		_	Continuity
Connector	Terminal		
	21		
A: E126	22	Ground	No
	23		

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### < COMPONENT DIAGNOSIS >

### Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace harness or connector.

# 3. REAR PRESSURE SENSOR INSPECTION

- 1. Reconnect the rear pressure sensor and ABS actuator and electric unit (control unit) connectors.
- 2. Use "DATA MONITOR" to check if the status of "PRESS SEN2" is normal.

Condition	PRESS SEN2 (DATA MONITOR)
With ignition switch turned ON and brake pedal released.	Approx. 0 bar
With ignition switch turned ON and brake pedal depressed.	Positive value

### Is the inspection result normal?

YES >> Inspection End.

NO >> Replace the rear pressure sensor.

# Component Inspection

# 1. CHECK DATA MONITOR

On "DATA MONITOR", select "PRESS SENSOR" and "PRESS SEN2" and check the brake fluid pressure.

Condition	PRESS SENSOR and PRESS SEN2 (DATA MONITOR)
With ignition switch turned ON and brake pedal released.	Approx. 0 bar
With ignition switch turned ON and brake pedal depressed.	Positive value

### Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <a href="BRC-198">BRC-198</a>, "Diagnosis Procedure".

# Special Repair Requirement

INFOID:0000000003788706

INFOID:0000000003788705

# 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 <a href="https://example.com/BRC-149">BRC-149</a>, "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 <a href="https://example.com/BRC-150">BRC-150</a>, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

### C1143, C1144 STEERING ANGLE SENSOR

< COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

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# 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

### DTC DETECTION LOGIC

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

### DTC CONFIRMATION PROCEDURE

### CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

### Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-201, "Diagnosis Procedure".

NO >> Inspection End

# Diagnosis Procedure

INFOID:0000000003788709

### 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.
- 5. Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-164, "CONSULT-III Function (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

- Turn ignition switch OFF.
- Disconnect steering angle sensor connector.

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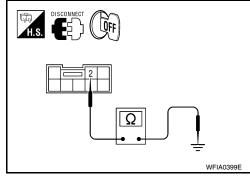
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### < COMPONENT DIAGNOSIS >

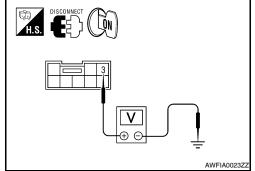
Check continuity between steering angle sensor harness connector terminal and ground.

Steering angle sensor			Continuity
Connector	Terminal		Continuity
M17	2	Ground	Yes



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

Steering angle sensor			Voltage
Connector	Terminal		voltage
M17	3	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.
- Select "STR ANGLE SIG" in "DATA MONITOR" and check steering angle sensor signal.

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

### Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-254</u>, "Removal and Installation".
- NO >> Replace steering angle sensor and adjust neutral position of steering angle sensor. Refer to <a href="BRC-256">BRC-256</a>, "Removal and Installation".

# Component Inspection

INFOID:0000000003788710

# 1. CHECK DATA MONITOR

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

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

### Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <a href="BRC-201">BRC-201</a>, "Diagnosis Procedure".

# Special Repair Requirement

INFOID:0000000003788711

1.adjustment of steering angle sensor neutral position

## C1143, C1144 STEERING ANGLE SENSOR

### < COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <a href="https://example.com/BRC-149">BRC-149</a>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

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>> 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 <a href="https://example.com/BRC-150">BRC-150</a>, "CALIBRATION OF DECEL G SENSOR: Description".

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# C1155 BRAKE FLUID LEVEL SWITCH

Description INFOID:000000003788712

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

### 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.	<ul><li> Harness or connector</li><li> Brake fluid level switch</li><li> Brake fluid level</li></ul>

### DTC CONFIRMATION PROCEDURE

# 1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results	
BR FLUID LEVEL LOW	

### Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-204, "Diagnosis Procedure".

NO >> Inspection End

# Diagnosis Procedure

INFOID:0000000003788714

### INSPECTION PROCEDURE

# 1. CONNECTOR INSPECTION

- Disconnect ABS actuator and electric unit (control unit) connector E126 and brake fluid level switch connector E21.
- 2. 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)

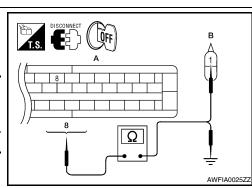
1. Check continuity between ABS actuator and electric unit (control unit) harness connector E126 (A) and brake fluid level switch harness connector E21 (B).

	and electric unit ol unit)	Brake fluid level switch		Continuity
Connector	Terminal	Connector	Terminal	
A: E126	8	B: E21	1	Yes

2. Check continuity between ABS actuator and electric unit (control unit) harness connector E126 (A) and ground.

ABS actuator and electric unit (control unit)		_	Continuity
Connector	Terminal	<u> </u>	Continuity
A: E126	8	Ground	No

Is the inspection result normal?



### C1155 BRAKE FLUID LEVEL SWITCH

### < COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

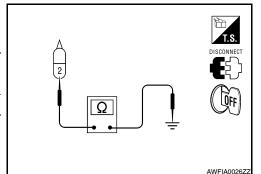
YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

## 3.CHECK BRAKE FLUID LEVEL SWITCH GROUND

Check continuity between brake fluid level switch harness connector E21 and ground.

Brake fluid level switch			Continuity
Connector	Terminal		Continuity
E21	2	Ground	Yes



### Is the inspection result normal?

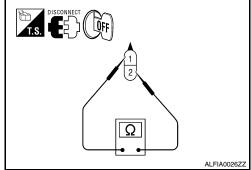
YES >> GO TO 4

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?

YES >> Perform self-diagnosis again. If the same results appear, replace ABS actuator and electric unit (control unit). Refer to <a href="mailto:bRC-254">BRC-254</a>, "Removal and Installation".

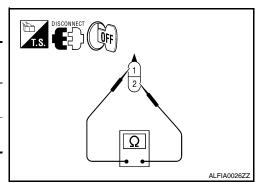
NO >> Replace brake fluid level switch.

# **Component Inspection**

# 1. CHECK BRAKE FLUID LEVEL SWITCH

- 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
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### 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-149</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

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### C1155 BRAKE FLUID LEVEL SWITCH

< COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

>> GO TO 2

# $2. \hbox{\it calibration of decel $G$ sensor}$

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <a href="https://example.com/BRC-150">BRC-150</a>, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

### 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

### 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).	<ul> <li>Harness or connector</li> <li>CAN communication line</li> <li>Steering angle sensor</li> <li>ABS actuator and electric unit (control unit)</li> </ul>	

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 <a href="BRC-207">BRC-207</a>, "Diagnosis Procedure".

NO >> Inspection End

# Diagnosis Procedure

INSPECTION PROCEDURE

# 1. CHECK CONNECTOR

- Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E126, 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

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### C1160 DECEL G SEN SET

Description INFOID:000000003788720

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

### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
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)

### DTC CONFIRMATION PROCEDURE

### 1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results	
DECEL G SEN SET	

### Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <a href="BRC-208">BRC-208</a>, "Diagnosis Procedure".

NO >> Inspection End

### Diagnosis Procedure

INFOID:0000000003788722

### INSPECTION PROCEDURE

## 1.PERFORM SELF-DIAGNOSIS

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

Self-diagnosis results	
DECEL G SEN SET	

### Do self-diagnosis results indicate anything other than shown above?

YES >> Perform repair or replacement for the item indicated.

NO >> Perform calibration of decel G sensor. Refer to <a href="https://example.com/BRC-150">BRC-150</a>, "CALIBRATION OF DECEL G SENSOR : Description". GO TO 2

# 2.PERFORM SELF-DIAGNOSIS AGAIN

- 1. Turn the ignition switch to OFF and then to ON and erase self-diagnosis results.
- 2. Perform ABS actuator and electric unit (control unit) self-diagnosis again.

### Are any self-diagnosis results displayed?

YES >> Replace yaw rate/side/decel G sensor. Refer to <u>BRC-257</u>, "Removal and Installation".

NO >> Inspection End

### C1163 ST ANGLE SEN SAFE

Description INFOID:0000000003788723

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:0000000003788724

### 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?

>> Proceed to diagnosis procedure. Refer to BRC-209, "Diagnosis Procedure". YES

NO >> Inspection End

# Diagnosis Procedure

INSPECTION PROCEDURE

1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Adjust steering angle sensor neutral position. Refer to BRC-149, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

>> 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 BRC-164, "CON-SULT-III Function (ABS)".

**BRC-209** 

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# C1164, C1165, C1166, C1167 CV/SV SYSTEM

Description INFOID:000000003788726

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

### DTC DETECTION LOGIC

DTC	Display item Malfunction detected condition		Possible cause
C1164	CV1	VDC switch-over solenoid valve (CV1) on the primary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground.	
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.	Harness or connector     ABS actuator and electric unit
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.	(control unit)
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.	

### 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 <a href="BRC-210">BRC-210</a>, "Diagnosis Procedure".

NO >> Inspection End

# Diagnosis Procedure

INFOID:0000000003788728

### INSPECTION PROCEDURE

# 1. CHECK CONNECTOR

- Turn ignition switch OFF.
- 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-164, "CONSULT-III Function</u> (ABS)".

### Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

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

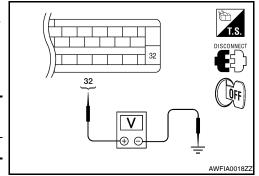
### < COMPONENT DIAGNOSIS >

### [VDC/TCS/ABS]

# $\overline{2.}$ CHECK SOLENOID, VDC 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	
E126	32	Ground	Battery voltage	



### Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

# 3.check solenoid, vdc switch-over valve and acuator relay ground circuit

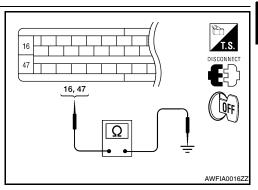
Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

ABS actuator and ele	ectric unit (control unit)		Continuity	
Connector	Terminal			
E126	16, 47	Ground	Yes	

### Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-254</u>, "Removal and Installation".

NO >> Repair or replace malfunctioning components.



### INFOID:0000000003788729

# 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			ABS solenoid valve (ACT)		
		UP	KEEP	DOWN	UP	ACTUA- TOR UP	ACTUA- TOR KEEP
FR RH SOL	FR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
FR RH ABS SOLE- NOID (ACT)	FR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
FR LH SOL	FR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
FR LH ABS SOLE- NOID (ACT)	FR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
RR RH SOL	RR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
RR RH ABS SOLE- NOID (ACT)	RR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
RR LH SOL	RR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
RR LH ABS SOLE- NOID (ACT)	RR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
	RR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
REAR SOL	RR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
NEAR GOL	RR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
	RR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF

<sup>\*:</sup> ON for 1 to 2 seconds after the touch, and then OFF

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### C1164, C1165, C1166, C1167 CV/SV SYSTEM

### < COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

### Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <a href="BRC-210">BRC-210</a>. "Diagnosis Procedure".

### Special Repair Requirement

INFOID:0000000003788730

# 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 <a href="https://example.com/BRC-149">BRC-149</a>, "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-150, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

# C1178, C1181, C1184, C1189 ABS ACTIVE BOOSTER

< COMPONENT DIAGNOSIS >

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# C1178, C1181, C1184, C1189 ABS ACTIVE BOOSTER

Description INFOID:0000000003788731

The active brake booster consists of a vacuum booster, an active booster control group and a delta stroke sensor. If a brake booster system malfunction occurs due to loss of vacuum, the delta stroke sensor will signal the ABS actuator and electric unit (control unit) that a booster malfunction has occurred. The active booster then applies supplemental force to the master cylinder relative to the amount of force exerted on the brake pedal.

DTC Logic

### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1178	ABS ACTIVE BOOSTER SV NG	Active booster solenoid is malfunctioning, or signal line of active booster servo is open or shorted.	
C1181	ABS ACTIVE BOOSTER RE- SPONSE NG	Active booster response is malfunctioning, or signal line of active booster response is open or shorted.	<ul><li>Harness or connector</li><li>Active booster</li></ul>
C1184	ABS BRAKE RELEASE SW NG	Brake release switch is malfunctioning, or signal line of brake release switch is open or shorted.	ABS actuator and electric unit (control unit)
C1189	ABS BRAKE BOOSTER DE- FECT	Brake booster is defective or malfunctioning.	

### DTC CONFIRMATION PROCEDURE

## 1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results		
ABS ACTIVE BOOSTER SV NG		
ABS ACTIVE BOOSTER RESPONSE NG		
ABS BRAKE RELEASE SW NG		
ABS BRAKE BOOSTER DEFECT		

### Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <a href="BRC-213">BRC-213</a>, "Diagnosis Procedure".

NO >> Inspection End

# Diagnosis Procedure

INFOID:0000000003788733

### INSPECTION PROCEDURE

# 1. CONNECTOR INSPECTION

Turn the ignition switch OFF.

2. Disconnect the active booster connector E49 and ABS actuator and electric unit (control unit) connector E126 and inspect the terminals for deformation, disconnection, looseness, or damage.

### Is the inspection result normal?

YES >> GO TO 2

NO >> Repair connector.

# 2.ACTIVE BOOSTER CIRCUIT INSPECTION

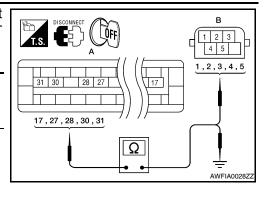
**BRC-213** 

# < COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

 Measure the continuity between ABS actuator and electric unit (control unit) harness connector E126 (A) and active booster harness connector E49 (B).

ABS actuator and electric unit (control unit)		Active booster		Continuity
Connector	Terminal	Connector Terminal		
	17	B: E49	3	
	27		1	
A: E126	28		5	Yes
	30		2	
	31		4	



2. Measure the continuity between ABS actuator and electric unit (control unit) harness connector E126 (A) and body ground.

ABS actuator and electric unit (control unit)		_	Continuity
Connector	Connector Terminal		
	17		No
	27	Ground	
A: E126	28		
	30		
	31		

### Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace harness or connector.

# 3. ACTIVE BOOSTER INSPECTION

- 1. Reconnect the active booster and ABS actuator and electric unit (control unit) connectors.
- Use "DATA MONITOR" to check if the status of "RELEASE SWITCH NO" and "RELEASE SWITCH NC" is normal.

Condition	RELEASE SWITCH NO (DATA MONITOR)	RELEASE SWITCH NC (DATA MONITOR)	
When brake pedal is depressed.	ON	OFF	
When brake pedal is released.	OFF	ON	

### Is the inspection result normal?

- YES >> Replace the ABS actuator and electric unit (control unit). Refer to <a href="BRC-254">BRC-254</a>, "Removal and Installation".
- NO >> Replace the active booster. Refer to <a href="mailto:BR-30">BR-30</a>, "Removal and Installation".

# Component Inspection

INFOID:0000000003788734

# 1. CHECK DATA MONITOR

Use "DATA MONITOR" to check if the status of "RELEASE SWITCH NO" and "RELEASE SWITCH NC" is normal.

Condition	RELEASE SWITCH NO (DATA MONITOR)	RELEASE SWITCH NC (DATA MONITOR)
When brake pedal is depressed.	ON	OFF
When brake pedal is released.	OFF	ON

### C1178, C1181, C1184, C1189 ABS ACTIVE BOOSTER

### [VDC/TCS/ABS] < COMPONENT DIAGNOSIS > Is the inspection result normal? Α YES >> Inspection End NO >> Go to diagnosis procedure. Refer to <a href="BRC-213">BRC-213</a>, "Diagnosis Procedure". Special Repair Requirement INFOID:0000000003788735 В 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-149, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION: Description". D >> 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-150, "CALIBRATION OF DECEL G SENSOR: Description".

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BRC-215

# C1179 ABS DELTA S SEN NG

Description INFOID:000000003788736

The active brake booster consists of a vacuum booster, an active booster control group and a delta stroke sensor. If a brake booster system malfunction occurs due to loss of vacuum, the delta stroke sensor will signal the ABS actuator and electric unit (control unit) that a booster malfunction has occurred. The active booster then applies supplemental force to the master cylinder relative to the amount of force exerted on the brake pedal.

DTC Logic

### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1179	ABS DELTA S SEN NG	Delta stroke sensor is malfunctioning, or signal line of delta stroke sensor is open or shorted.	Harness or connector     Delta stroke 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 DELTA S SEN NG	

### Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-216, "Diagnosis Procedure".

NO >> Inspection End

# Diagnosis Procedure

INFOID:0000000003788738

### INSPECTION PROCEDURE

# 1. CONNECTOR INSPECTION

- Turn the ignition switch OFF.
- Disconnect the delta stroke sensor connector E114 and ABS actuator and electric unit (control unit) connector E126 and inspect the terminals for deformation, disconnection, looseness, or damage.

### Is the inspection result normal?

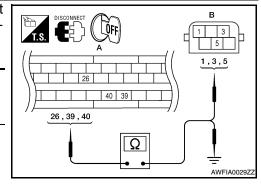
YES >> GO TO 2

NO >> Repair connector.

# 2. DELTA STROKE SENSOR CIRCUIT INSPECTION

 Measure the continuity between ABS actuator and electric unit (control unit) harness connector E126 (A) and delta stroke sensor harness connector E114 (B).

ABS actuator and electric unit (control unit)		Delta stroke sensor		Continuity
Connector	Terminal	Connector Terminal		
	26		1	
A: E126	39	B: E114	3	Yes
	40		5	



Measure the continuity between ABS actuator and electric unit (control unit) harness connector E126 (A) and body ground.

ABS actuator and electric unit (control unit)		_	Continuity
Connector	Terminal		
	26	Ground	No
A: E126	39		
	40		

### Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace harness or connector.

### 3.delta stroke sensor inspection

- Reconnect the delta stroke sensor and ABS actuator and electric unit (control unit) connectors.
- Use "DATA MONITOR" to check if the status of "DELTA S SEN" is normal.

Condition	DELTA S SEN (DATA MONITOR)	
When brake pedal is depressed.	1.05–1.80 mm	
When brake pedal is released.	0.00 mm (+0.6/-0.4)	

### Is the inspection result normal?

>> Replace the ABS actuator and electric unit (control unit). Refer to BRC-254, "Removal and Instal-YES

NO >> Replace the delta stroke sensor.

### Component Inspection

### 1. CHECK DATA MONITOR

Use "DATA MONITOR" to check if the status of "DELTA S SEN" is normal.

Condition	DELTA S SEN (DATA MONITOR)	
When brake pedal is depressed.	1.05–1.80 mm	
When brake pedal is released.	0.00 mm (+0.6/-0.4)	

### Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-216</u>, "Diagnosis Procedure".

### Special Repair Requirement

### ${f 1}$ . 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-149, "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-150, "CALIBRATION OF DECEL G SENSOR: Description".

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[VDC/TCS/ABS]

### C1187 DIFFERENTIAL LOCK CONTROL UNIT

Description INFOID.000000004219678

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

### 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	
Cen diagnosis results	
ABS DIFLOCK CONTROLLER NG	

### Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-218, "Diagnosis Procedure".

NO >> Inspection End

### Diagnosis Procedure

INFOID:0000000004219680

### INSPECTION PROCEDURE

### 1. CHECK CONNECTOR

- Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E125, 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

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### U1000 CAN COMM CIRCUIT

Description INFOID:0000000003788741

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

### 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.	

### Diagnosis Procedure

INFOID:0000000003788743

INFOID:0000000003788744

### 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.

### 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-149</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). Refer to BRC-150, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

### BRC-219

### **VDC OFF SWITCH**

Description INFOID:000000003788745

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

### Component Function Check

INFOID:0000000003788746

### 1. CHECK VDC OFF SWITCH OPERATION

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

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

### Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <a href="BRC-220">BRC-220</a>, "Diagnosis Procedure".

### Diagnosis Procedure

INFOID:0000000003788747

### 1. CHECK VDC OFF SWITCH

Perform the VDC OFF switch component inspection. Refer to BRC-221, "Component Inspection".

### Is the inspection result normal?

YES >> GO TO 2

NO >> Replace VDC OFF switch.

### 2. CHECK VDC OFF SWITCH HARNESS

- Disconnect ABS actuator and electric unit (control unit) connector.
- Check continuity between ABS actuator and electric unit (control unit) connector E126 (A) and VDC OFF switch connector M148 (B).

ABS actuator and electric unit (control unit)		VDC OFF switch		Continuity
Connector	Terminal	Connector	Terminal	
A: E126	38	B: M148	1	Yes

3. Check continuity between ABS actuator and electric unit (control unit) connector E126 (A) and ground.

	T.S. DISCONNECT H.S.
	38
-	
_	AWFIA0430ZZ

ABS actuator and electric unit (control unit)			Continuity
Connector	Terminal		Continuity
A: E126	38	Ground	No

### Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace harness.

3.CHECK VDC OFF SWITCH GROUND

### **VDC OFF SWITCH**

### < COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

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Check continuity between VDC OFF switch connector M148 and ground.

VDC OFF switch		_	Continuity
Connector	Terminal		Continuity
M148	2	Ground	Yes

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### 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-27, "Diagnosis Description"</u>.

### Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <a href="mailto:BRC-254">BRC-254</a>, "Removal and Installation".

NO >> Replace combination meter. Refer to MWI-103, "Removal and Installation".

### Component Inspection

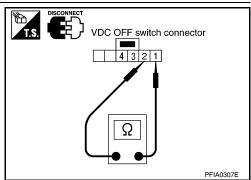
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### INSPECTION PROCEDURE

### 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.

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### **ABS WARNING LAMP**

Description INFOID:000000003788749

x: 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:0000000003788750

### 1. CHECK ABS WARNING 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 <a href="BRC-222">BRC-222</a>, "Diagnosis Procedure".

### Diagnosis Procedure

INFOID:0000000003788751

### 1. CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-164, "CONSULT-III Function (ABS)"</u>.

### Is the inspection result normal?

YES >> GO TO 2

NO >> Check items displayed by self-diagnosis.

### 2. CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-27, "Diagnosis Description".

### Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <a href="mailto:BRC-254">BRC-254</a>, "Removal and Installation".

NO >> Replace combination meter. Refer to <a href="MWI-103">MWI-103</a>, "Removal and Installation".

[VDC/TCS/ABS]

### **BRAKE WARNING LAMP**

Description INFOID:0000000003788752

×: ON –: OFF

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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:0000000003788753

INFOID:0000000003788754

### 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 <a href="BRC-223">BRC-223</a>, "Diagnosis Procedure".

### Diagnosis Procedure

1. CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-164, "CONSULT-III Function (ABS)"</u>.

### Is the inspection result normal?

YES >> GO TO 2

NO >> Check items displayed by self-diagnosis.

### 2. CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-27, "Diagnosis Description".

### Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <a href="BRC-254">BRC-254</a>, "Removal and Installation".

NO >> Replace combination meter. Refer to MWI-103, "Removal and Installation".

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### VDC OFF INDICATOR LAMP

Description INFOID:000000003788755

x: 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.	×
EBD function is malfunctioning.	×

### Component Function Check

INFOID:0000000003788756

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

Check that the lamp illuminates for approximately 2 seconds after the ignition switch is turned ON.

### Is the inspection result normal?

YES >> GO TO 2

NO >> Go to diagnosis procedure. Refer to <a href="BRC-224">BRC-224</a>, "Diagnosis Procedure".

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

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

### Is the inspection result normal?

YES >> Inspection End

NO >> Check VDC OFF switch. Refer to <a href="mailto:BRC-220">BRC-220</a>, "Diagnosis Procedure".

### Diagnosis Procedure

INFOID:0000000003788757

### 1. CHECK VDC OFF SWITCH

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

### Is the inspection result normal?

YES >> GO TO 2

NO >> Check VDC OFF switch. Refer to BRC-220, "Diagnosis Procedure".

### CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-164, "CONSULT-III Function (ABS)"</u>.

### Is the inspection result normal?

YES >> GO TO 3

NO >> Check items displayed by self-diagnosis.

### 3. CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-27, "Diagnosis Description".

### Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <a href="mailto:BRC-254">BRC-254</a>, "Removal and Installation".

NO >> Replace combination meter. Refer to MWI-103, "Removal and Installation".

[VDC/TCS/ABS]

### SLIP INDICATOR LAMP

Description INFOID:0000000003788758

×: ON –: OFF

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Condition	SLIP indicator lamp
Ignition switch OFF	-
For 2 seconds after turning ON ignition switch	×
2 seconds later after turning ON ignition switch	-
VDC/TCS function is malfunctioning.	×
ABS function is malfunctioning.	×
EBD function is malfunctioning.	×

### Component Function Check

INFOID:0000000003788759

### 1. CHECK SLIP 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 <a href="BRC-225">BRC-225</a>, "Diagnosis Procedure".

### Diagnosis Procedure

INFOID:0000000003788760

### 1. CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-164, "CONSULT-III Function (ABS)"</u>.

### 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-27, "Diagnosis Description"</u>.

### Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-254, "Removal and Installation".</u>

NO >> Replace combination meter. Refer to <a href="MWI-103">MWI-103</a>, "Removal and Installation".

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< ECU DIAGNOSIS > [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	
		0 [km/h (MPH)]	Vehicle stopped	
FR LH SENSOR	Wheel speed	Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)	
		0 [km/h (MPH)]	Vehicle stopped	
FR RH SENSOR	Wheel speed	Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)	
		0 [km/h (MPH)]	Vehicle stopped	
RR LH SENSOR	Wheel speed	Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)	
		0 [km/h (MPH)]	Vehicle stopped	
RR RH SENSOR	Wheel speed	Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)	
CTOD LAMB CW	Characteristics airport 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	
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	
OFF SW	VDC OFF quitab ON/OFF	VDC OFF switch ON (When VDC OFF indicator lamp is ON)	ON	
OFF SW	VDC OFF switch ON/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	
IAW KAIE SEN	sensor	When vehicle turning	-75 to 75 d/s	
ACCEL DOS SIG	Throttle actuator opening/closing is dis-	Accelerator pedal not depressed (ignition switch is ON)	0 %	
ACCEL POS SIG	played (linked with accelerator pedal)	Accelerator pedal depressed (ignition switch is ON)	0 - 100 %	

< ECU DIAGNOSIS > [VDC/TCS/ABS]

ECU DIAGNOS			[VDO/TOO/ABO]	
		Data monitor		
Monitor item	Display content	Condition	Reference value in normal operation	
		Vehicle stopped	Approx. 0 m/s <sup>2</sup>	
SIDE G-SENSOR	Transverse G detected by side G sensor	Vehicle turning right	Negative value (m/s <sup>2</sup> )	
		Vehicle turning left	Positive value (m/s <sup>2</sup> )	
OTD ANOLE SIG	Steering angle detected by steering angle	Straight-ahead	Approx. 0°	
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	
TRESS 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 accordance with tachometer display	
	Droke fluid level quitab cianal status	When brake fluid level switch ON	ON	
FLUID LEV SW	Brake fluid level switch signal status	When brake fluid level switch OFF	OFF	
-D DILIN GOL	R RH IN SOL Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON	
FR RH IN SOL		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF	
	Operation status of each calculated value	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator 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	
ED LILIN COL	Operation status of each calculated value	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator 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	
ED I H OUT SO!	Operation status of each coloneid value	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator 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	
	Operation status of each colonsid valve	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON	
RR 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	

< ECU DIAGNOSIS > [VDC/TCS/ABS]

	Di di di	Data monitor		
Monitor item	Display content	Condition	Reference value in normal operation	
RR RH OUT SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("ACTIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON	
MANITOOT GOL	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 IN SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("ACTIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON	
IXIX EIT IIV GOL	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 ("ACTIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON	
TAX EIT OUT GOL	Operation states of each solenous valve	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	
WIOTOTCHELAT	Wotor and motor relay operation	When the motor relay and motor are not operating	OFF	
ACTUATOR RLY	NV Astronomica	When the actuator relay is operating	ON	
ACTUATOR RET	Actuator relay operation	When the actuator relay is not operating	OFF	
ADC MADALLAMD	ABS warning lamp	When ABS warning lamp is ON	ON	
ABS WARN LAMP	(Note 2)	When ABS warning lamp is OFF	OFF	
OFF LAMP	VDC OFF indicator lamp	When VDC OFF indicator lamp is ON	ON	
OFF LAIVIP	(Note 2)	When VDC OFF indicator lamp is OFF	OFF	
SLIP LAMP	SLIP indicator lamp	When SLIP indicator lamp is ON	ON	
SLIP LAWIP	(Note 2)	When SLIP indicator lamp is OFF	OFF	
DOT ODED SIG	Active booster energies	Active booster is active	ON	
BST OPER SIG	Active booster operation	Active booster is inactive	OFF	
EBD SIGNAL	EPD operation	EBD is active	ON	
LDD SIGNAL	EBD operation	EBD is inactive	OFF	
ABS SIGNAL	ABS operation	ABS is active	ON	
ADO SIGNAL	Abo operation	ABS is inactive	OFF	
TCS SIGNAL	TCS operation	TCS is active	ON	
100 GIGINAL	100 operation	TCS is inactive	OFF	
VDC SIGNAL	VDC operation	VDC is active	ON	
VDO SIGNAL	VDO operation	VDC is inactive	OFF	
EBD FAIL SIG	EBD fail-safe signal	In EBD fail-safe	ON	
LDD FAIL SIG	LDD Idii-Sale Signal	EBD is normal	OFF	
ABS FAIL SIG	ARS fail-safe signal	In ABS fail-safe	ON	
ADO I AIL OIG	ABS fail-safe signal	ABS is normal	OFF	
TCS FAIL SIG	TCS fail-safe signal	In TCS fail-safe	ON	
103 FAIL SIG	TCS fail-safe signal	TCS is normal	OFF	

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
[VDC/TCS/ABS] < ECU DIAGNOSIS >

		Data monitor		
Monitor item	Display content	Condition	Reference value in normal operation	
DC FAIL CIC	VDC fail acfo signal	In VDC fail-safe	ON	
DC FAIL SIG	VDC fail-safe signal	VDC is normal	OFF	
ADANIKING GIG	One of the control of	Crank is active	ON	
RANKING SIG	Crank operation	Crank is inactive	OFF	
CV1	VDC switch-over valve	When actuator (switch-over valve) is active ("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 active ("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 active ("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 active ("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	
ECEL G-SEN	G-Sensor	Vehicle running	-1.7 to 1.7 G	
BD WARN LAMP	EBD warning lamp	When EBD warning lamp is ON	ON	
טט vvakin LAIVIP	(Note 2)	When EBD warning lamp is OFF	OFF	
POSI SIG	DND quitch signal ON/OFF and differ	A/T shift position = N position	ON	
F 031 31G	PNP switch signal ON/OFF condition	A/T shift position = other than N position	OFF	
DOSI SIC	DND quitch signal ON/OFF and the	A/T shift position = P position	ON	
POSI SIG	PNP switch signal ON/OFF condition	A/T shift position = other than P position	OFF	
DOOL CLO	DND switch size of ON/OFF	A/T shift position = R position	ON	
POSI SIG	PNP switch signal ON/OFF condition	A/T shift position = other than R position	OFF	
ND (A)ND	Drive and	2WD model	2WD	
ND/4WD	Drive axle	4WD model	4WD	
RESS SEN2	Brake fluid pressure detected by rear pres-	With ignition switch turned ON and brake pedal released	Approx. 0 bar	
OO OLINZ	sure sensor	With ignition switch turned ON and brake pedal depressed	-40 to 300 bar	
DELTA S SEN	Value detected by delta stroke sensor	When brake pedal is depressed	1.05 - 1.80 mm	
- <del> •</del>		When brake pedal is released	0.00 mm (+0.6/-0.4)	

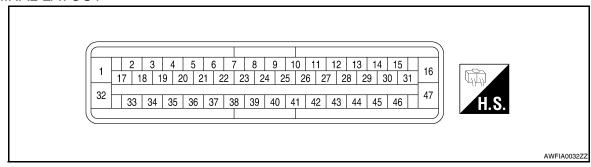
< ECU DIAGNOSIS > [VDC/TCS/ABS]

		Data monitor		
Monitor item	Display content	Condition	Reference value in normal operation	
RELEASE SWITCH	Active booster signal status	When brake pedal is depressed	ON	
NO	Active booster signal status	When brake pedal is released	OFF	
RELEASE SWITCH	Active booster signal status	When brake pedal is depressed	OFF	
NC		When brake pedal is released	ON	
OTD OFF DLV	Stop lamp relay signal	When stop lamp relay is ON	ON	
STP OFF RLY		When stop lamp relay 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-222, "Description".
- Brake warning lamp: Refer to BRC-223, "Description".
- VDC OFF indicator lamp: Refer to BRC-224, "Description".
- SLIP indicator lamp: Refer to BRC-225, "Description".

### **TERMINAL LAYOUT**



[VDC/TCS/ABS] < ECU DIAGNOSIS > Wiring Diagram INFOID:0000000003788762 Α ■ : DATA LINE ABS ACTUATOR AND ELECTRIC UNIT UNIT) В С D DATA LINE Е M31 E152 EZ6 M91 BRC 10A COMBINATION METER (M24) G BRL BIN BUT MC1) ABS/TCS/VDC CONTROL UNIT Н SLIP VDC BRAKE SHSV1 SUSV2 (MC1) S(MC2) UNIFIED METER CONTROL UNIT (WITH INFORMATION DISPLAY) Ser Ser Ser FUSE BLOCK (J/B) (M4),(M60) HSV2 (MC2) J ABS ( Ę ĘŠ IGNITION SWITCH ON OR START Per | 10A K 40A لچ BRAKE CONTROL SYSTEM - VDC IGNITION SWITCH ACC OR ON L 10A 10A 20 M ₩ H Ν MOTOR

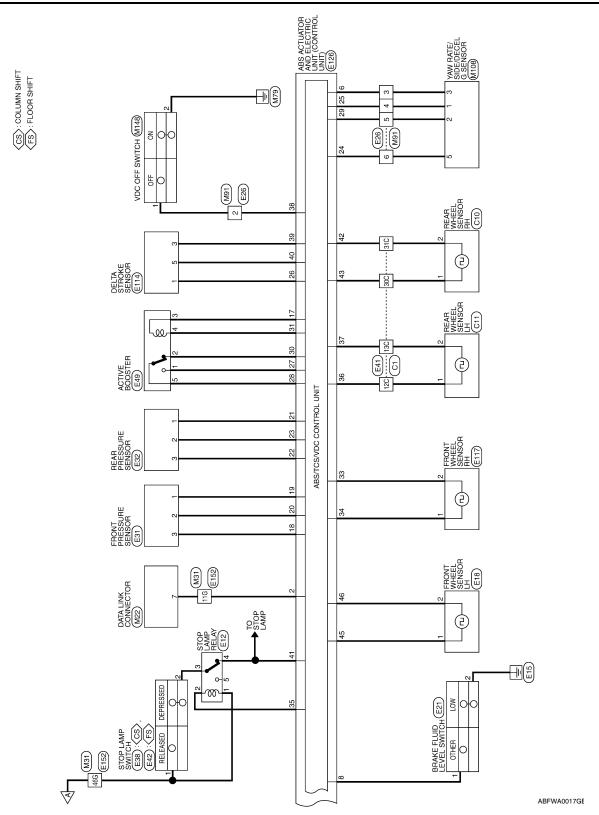
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< ECU DIAGNOSIS > [VDC/TCS/ABS]

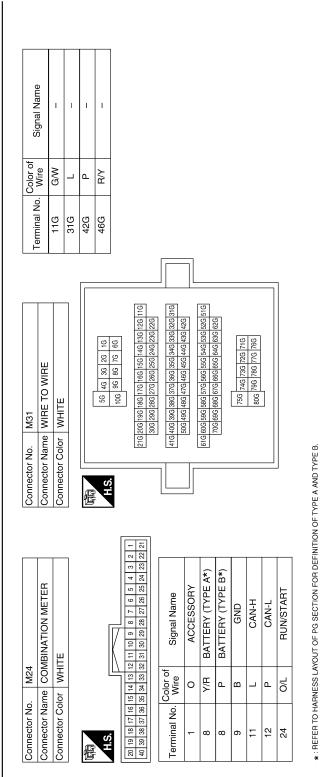
# BRAKE CONTROL SYSTEM CONNECTORS - VDC

Connector No. M22	Connector Name DATA LINK CONNECTOR	Connector Color WHITE	9 10 11 12 13 14 15 16 T 8 T 8 T 8 T 8 T 8 T 8 T 8 T 8 T 8 T	Terminal No. Wire Signal Name	7 G/W K-LINE		
Conne	Conne	Conne	哥 H.S.	Termir			
	Œ.		1				
7	Connector Name STEERING ANGLE SENSOR	HTE		f Signal Name	GND	POWER	CAN-H
o. M1	ame ST	olor	4	Color o	В	Ø/W	٦
Connector No. M17	Connector Na	Connector Color WHITE	原动 H.S.	Terminal No. Wire	2	င	4
	SE BLOCK (J/B)	ITE	4P (	Signal Name	ı	I	
Ψ	me FUS	or WH	7P 6P 5P 16P 15P 14P	Color of Wire	0/L	۵	
Connector No.	Connector Name FUS	Connector Color WHI	原 H.S.	Color of Terminal No. Wire	5P	13P	

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Connector Name | WIRE TO WIRE

M91

Connector No.

Connector Color WHITE



Signal Name

Color of Wire Ø. ₩ W Ϋ́R g/R G/W ۵

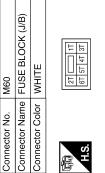
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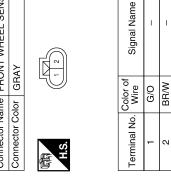






Signal Name	ı	_
Color of Wire	R/Υ	0
Terminal No.	1	19





STOP LAMP RELA	3LACK	2 4 1
S	B	

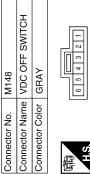
E12

Connector No.

Connector Name Connector Color



Signal Name	I	ı	1	ı	I
Color of Wire	R/Y	MΠ	R/G	B/B	ı
Terminal No.	-	2	က	4	5







Signal Name	ı	_	
Color of Wire	M/A	В	
Terminal No.	-	2	

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< ECU DIAGNOSIS > [VDC/TCS/ABS]

Vo. E31  Name FRONT PRESSURE SENSOR  Solor GRAY		Color of Signal Name	SB GND	R/L SIG	LG POWER				Vo. E41	Connector Name WIRE TO WIRE Connector Color GRAY		10   20   30   40   50   60   70   110	42C 43C 44C 45C 46C 47C	48C 49C 51C 52C		Color of Signal Name	-	1	- C/Y	>	
Connector Name Connector Color	原 H.S.	Terminal No.	-	2	ო				Connector No.	Connector Name Connector Color		用.S.				Terminal No.	12C	13C	30C	31C	
E26 WIRE TO WIRE WHITE	8 9 10 11 12 13 14 15 16	Signal Name	1	_	I	ı	1	1		STOP LAMP SWITCH (COLUMN SHIFT)		©   -	Signal Name	1	1						•
Connector No. E26 Connector Name WIRE T Connector Color WHITE	H.S.	Terminal No. Wire	1 LG/B	2 B/W	3 Y/R		0	6 P	Connector No. E38		Connector Color   WHITE	(本)	Terminal No. Wire	1 B/Y	2 R/G						
											]			<u> </u>							
E21 BRAKE FLUID LEVEL SWITCH GRAY		Signal Name	1	I						REAR PRESSURE SENSOR GRAY			Signal Name	GND	SIG	POWER					
Connector Name BRAKE SWITC Connector Color GRAY	H.S.	Color of Wire		2 B					Connector No. E32	Connector Name REAR Connector Color GRAY		S'S'T	Terminal No. Wire	1 R/G	2 W/O	3 W/L					
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**BRC-235** 

[VDC/TCS/ABS] < ECU DIAGNOSIS >

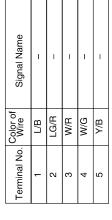


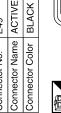


Signal Name	DELS_PWR	DELS_GND	DELS_SIG
Color of Wire	N/M	G/B	R/Υ
Terminal No.	1	3	2



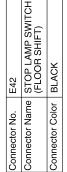






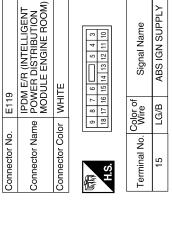


Signal Name	ı	_
Color of Wire	R/Y	R/G
Terminal No.	-	2



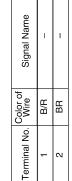






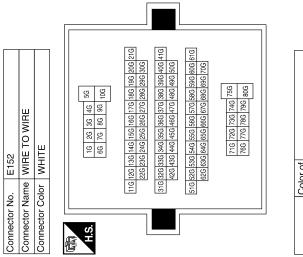
	Connector Name   FRONT WHEEL SENSOR   RH		
E117	FRONI	GRAY	
Connector No.	Connector Name	Connector Color GRAY	





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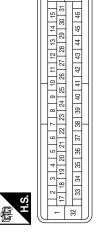
< ECU DIAGNOSIS > [VDC/TCS/ABS]



Signal Name	ı	-	1	_	
Color of Wire	G/W	٦	Ь	R/Y	
Terminal No.	11G	31G	42G	46G	

Terminal No.	Color of Wire	Signal Name
19	SB	PS1 GND
20	R/L	PS1 SIGNAL
21	B/G	PS2 GND
22	M/L	PS2 SUPPLY
23	O/M	PS2 SIGNAL
24	۵	CLUSTER_GND
25	G/R	CAN2 L
26	N/W	DEL S SUPPLY
27	L/B	BST NO
28	Y/B	BST SIG
29	G/W	CAN2 H
30	LG/R	BST NC
31	M/G	BST GND
32	В/У	VALVE ECU SUPPLY
33	BR	WSS FR SIG
34	B/R	WSS FR PWR
35	M	BRL OUT
36	7	WSS RL PWR
37	۵	WSS RL SIG
38	R/W	VDC OFF SW
39	G/B	DEL S GND
40	R/Y	DEL S SIGNAL
41	B/B	BLS
42	>	WSS RR SIG
43	ďγ	WSS RR PWR
44	1	1
45	G/O	WSS FL PWR
46	BR/W	WSS FL SIG
47	В	MOTOR GND

Connector No.	E126
Connector Name	Connector Name ELECTRIC UNIT (CONTROL UNIT) (WITH VDC)
Connector Color BLACK	BLACK



Signal Name	MOTOR SUPPLY	DIAG_K	I	NSI	I	CLUSTER SUPPLY	I	FLUID LEVEL SW	ı	I	CAN-H	-	1	1	CAN-L	VALVE ECU GND	BST SUPPLY	PS1 SUPPLY
Color of Wire	>	>	ı	LG/B	ı	Y/R	ı	P/B	ı	ı	٦	-	ı	1	Ь	В	W/R	ГG
Terminal No.	-	2	င	4	9	9	2	8	6	10	11	12	13	14	15	16	11	18

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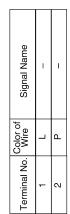
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< ECU DIAGNOSIS > [VDC/TCS/ABS]

Connector No.	C11
Connector Name	Connector Name   REAR WHEEL SENSOR LH
Connector Color   BROWN	BROWN







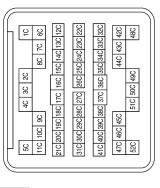
Connector No.	C10
Connector Name	Connector Name   REAR WHEEL SENSOR RH
Connector Color GRAY	GRAY



Signal Nam	_	-
Color of Wire	G/Y	۸
Terminal No.	-	2



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



Signal Name	-	I	I	I
Color of Wire	Т	Д	G/Y	^
Terminal No.	12C	13C	30C	31C

ABFIA0040GB

Fail-Safe

INFOID:0000000003788763

### **CAUTION:**

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

ABS/EBD SYSTEM

< ECU DIAGNOSIS > [VDC/TCS/ABS]

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.

- 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.
- 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.

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### 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

BRO	Reference	Items (CONSULT screen terms)	DTC
		RR RH SENSOR-1	C1101
	DDC 460 "Description"	RR LH SENSOR-1	C1102
G	BRC-169, "Description"	FR RH SENSOR-1	C1103
		FR LH SENSOR-1	C1104
— Н		RR RH SENSOR-2	C1105
	DDC 470 IIDaaariatianII	RR LH SENSOR-2	C1106
	BRC-172, "Description"	FR RH SENSOR-2	C1107
-		FR LH SENSOR-2	C1108
	BRC-175, "Description"	BATTERY VOLTAGE [ABNORMAL]	C1109
_	BRC-177, "DTC Logic"	CONTROLLER FAILURE	C1110
J	BRC-178, "Description"	PUMP MOTOR	C1111
	BRC-180, "Description"	G-SENSOR	C1113
K	BRC-183, "Description"	ABS SENSOR [ABNORMAL SIGNAL]	C1115
	BRC-186, "Description"	STOP LAMP SW	C1116
	BRC-188, "Description"	FR LH IN ABS SOL	C1120
<u> </u>	BRC-191, "Description"	FR LH OUT ABS SOL	C1121
	BRC-188, "Description"	FR RH IN ABS SOL	C1122
M	BRC-191, "Description"	FR RH OUT ABS SOL	C1123
	BRC-188, "Description"	RR LH IN ABS SOL	C1124
	BRC-191, "Description"	RR LH OUT ABS SOL	C1125
N	BRC-188, "Description"	RR RH IN ABS SOL	C1126
	BRC-191, "Description"	RR RH OUT ABS SOL	C1127
0		ENGINE SIGNAL 1	C1130
		ENGINE SIGNAL 2	C1131
	BRC-194, "Description"	ENGINE SIGNAL 3	C1132
Р		ENGINE SIGNAL 4	C1133
		ENGINE SIGNAL 6	C1136
	BRC-196, "Description"	ACTUATOR RLY	C1140
	BRC-198, "Description"	PRESS SEN CIRCUIT	C1142
	DDC 204 "Decembrica"	ST ANG SEN CIRCUIT	C1143
	BRC-201, "Description"	ST ANG SEN SIGNAL	C1144

< ECU DIAGNOSIS > [VDC/TCS/ABS]

DTC	Items (CONSULT screen terms)	Reference
C1145	YAW RATE SENSOR	DDC 190 "Description"
C1146	SIDE G-SEN CIRCUIT	BRC-180, "Description"
C1155	BR FLUID LEVEL LOW	BRC-204, "Description"
C1156	ST ANG SEN COM CIR	BRC-207, "Description"
C1160	DECEL G SEN SET	BRC-208, "Description"
C1163	ST ANGL SEN SAFE	BRC-209, "Description"
C1164	CV1	
C1165	CV2	DDC 240 "Deceription"
C1166	SV1	BRC-210, "Description"
C1167	SV2	
C1170	VARIANT CODING	BRC-177, "DTC Logic"
C1178	ABS ACTIVE BOOSTER SV NG	BRC-213, "Description"
C1179	ABS DELTA S SEN NG	BRC-216, "Description"
C1181	ABS ACTIVE BOOSTER RESPONSE NG	DDC 242 "Deceription"
C1184	ABS BRAKE RELEASE SW NG	BRC-213, "Description"
C1187	ABS DIFLOCK CONTROLLER NG	BRC-218, "Description"
C1189	ABS BRAKE BOOSTER DEFECT	BRC-213, "Description"
U1000	CAN COMM CIRCUIT	BRC-219, "Description"

### SYMPTOM DIAGNOSIS

### VDC/TCS/ABS

Symptom Table

INFOID:0000000003788765

If ABS warning lamp, VDC OFF indicator lamp and SLIP indicator lamp turn ON, perform self-diagnosis.

Symptom	Check item	Reference
	Brake force distribution	
Excessive ABS function operation frequency	Looseness of front and rear axle	BRC-242, "Diag- nosis Procedure"
	Wheel sensor and rotor system	1100101110004410
Unaversated padal regetion	Brake pedal stroke	BRC-243, "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-244, "Diag- nosis Procedure"
ABS function does not operate (Note 1)	ABS actuator and electric unit (control unit)	BRC-245, "Diag- nosis Procedure"
Pedal vibration or ABS operation sound	Brake pedal	BRC-246, "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 con- trol	TCM	BRC-247, "Diag- nosis Procedure"
	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 >

[VDC/TCS/ABS]

### **EXCESSIVE ABS FUNCTION OPERATION FREQUENCY**

### Diagnosis Procedure

INFOID:0000000003788766

### 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 Inspection and Service</u>", Rear: <u>RAX-5</u>, "<u>On-Vehicle Inspection</u>".

### 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-252</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 <a href="https://example.com/BRC-164">BRC-164</a>, "CONSULT-III Function (ABS)".

NO >> Normal

### **UNEXPECTED PEDAL REACTION**

[VDC/TCS/ABS] < SYMPTOM DIAGNOSIS > **UNEXPECTED PEDAL REACTION** Α Diagnosis Procedure INFOID:0000000003788767 1. CHECK BRAKE PEDAL STROKE В Check brake pedal stroke. Refer to BR-14, "Inspection and Adjustment - Standard Pedal". Is the stroke too large? C YES >> • Bleed air from brake tube and hose. Refer to <u>BR-17, "Bleeding Brake System"</u>. · Check brake pedal, brake booster, and master cylinder for mount play, looseness, brake system fluid leakage, etc. Refer to BR-14, "Inspection and Adjustment - Standard Pedal" (brake pedal), BR-28, "Removal and Installation" (master cylinder), BR-8, "Inspection" (brake booster). D NO >> GO TO 2 2. CHECK FUNCTION Е 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

< SYMPTOM DIAGNOSIS >

[VDC/TCS/ABS]

### THE BRAKING DISTANCE IS LONG

### Diagnosis Procedure

INFOID:0000000003788768

### **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** [VDC/TCS/ABS] < SYMPTOM DIAGNOSIS > ABS FUNCTION DOES NOT OPERATE Α Diagnosis Procedure INFOID:0000000003788769 **CAUTION:** В ABS does not operate when speed is 10 km/h (6 MPH) or lower. 1. CHECK ABS WARNING LAMP DISPLAY С 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 D NO >> Perform self-diagnosis. Refer to BRC-164, "CONSULT-III Function (ABS)". Е

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### PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

< SYMPTOM DIAGNOSIS >

[VDC/TCS/ABS]

### PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

### Diagnosis Procedure

INFOID:0000000003788770

### **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-164, "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

### VEHICLE JERKS DURING VDC/TCS/ABS CONTROL

**IVDC/TCS/ABS1** < SYMPTOM DIAGNOSIS > VEHICLE JERKS DURING VDC/TCS/ABS CONTROL Α Diagnosis Procedure INFOID:0000000003788771 1.SYMPTOM CHECK В 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 D Perform self-diagnosis of ABS actuator and electric unit (control unit). Refer to BRC-164, "CONSULT-III Function (ABS)". Are self-diagnosis results indicated? Е >> Check corresponding items, make repairs, and perform ABS actuator and electric unit (control unit) self-diagnosis. NO >> GO TO 3 BRC 3. CHECK CONNECTOR Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector and check terminal for deformation, disconnection, looseness, etc. Securely connect connectors and perform ABS actuator and electric unit (control unit) self-diagnosis. Are self-diagnosis results indicated? Н YES >> If poor contact, damage, open or short circuit of connector terminal is found, repair or replace. NO >> GO TO 4 f 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-67</u>, "<u>CONSULT-III Function (ENGINE)</u>". TCM: Refer to TM-35, "CONSULT-III Function (TRANSMISSION)". NO >> Replace ABS actuator and electric unit (control unit). Refer to BRC-254, "Removal and Installa-K tion". L M N

[VDC/TCS/ABS]

### < SYMPTOM DIAGNOSIS >

### NORMAL OPERATING CONDITION

Description INFOID:0000000003788772

Symptom	Result	
Slight vibrations are felt on the brake pedal and the operation noises occur, when VDC, TCS 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 condition due to the VDC, TCS or ABS activation.	
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 before performing an inspection on a chassis dynamometer.)	
VDC OFF indicator lamp and SLIP indicator lamp may simultaneously turn on when low tire pressure warning lamp turns on.	This is not a VDC system error but results from characteristic change of tire.	

[VDC/TCS/ABS] < PRECAUTION >

### **PRECAUTION**

### **PRECAUTIONS**

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRF-TFNSIONER"

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 Baq 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:

- Always use recommended brake fluid. Refer to MA-10, "Fluids and Lubricants".
- 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 sys-
- · Use flare nut wrench when removing and installing brake
- 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 BR-34, "Brake Burnishing Procedure" (front disc brake) or BR-38, "Removal and Installation of Brake Pad" (rear disc brake).

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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Commercial service tool

< PRECAUTION > [VDC/TCS/ABS]

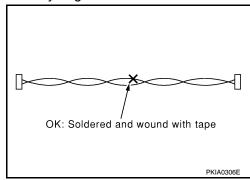
• When an error is indicated by ABS or another warning lamp, collect all necessary information from customer (what symptoms are present under what conditions) and check for simple causes before starting diagnosis. Besides electrical system inspection, check booster operation, brake fluid level, and fluid 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.

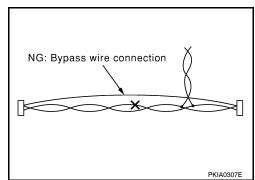
### Precaution for CAN System

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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 > [VDC/TCS/ABS]

# **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	J-45741-BOX O POWER SCHOOL	Checking operation of ABS active wheel sensors

### **Commercial Service Tool**

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INFOID:0000000003788777

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		

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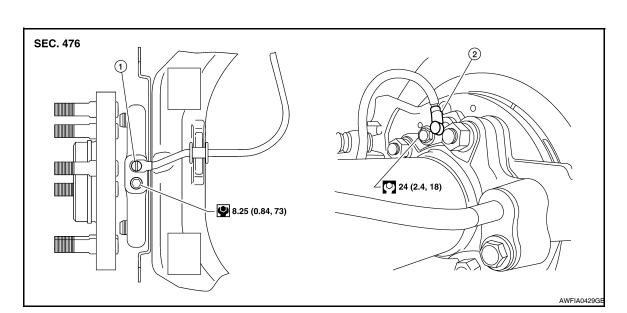
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# REMOVAL AND INSTALLATION

### WHEEL SENSORS

### Removal and Installation



1. Front wheel sensor

2. Rear wheel sensor

### REMOVAL

- 1. Remove wheel sensor bolt.
  - When removing the front wheel sensor, first remove the disc rotor to gain access to the front wheel sensor bolt. Refer to <u>BR-35</u>, "Removal and Installation of Brake Caliper and Rotor".
- 2. Pull out the sensor, being careful to turn it as little as possible.

### **CAUTION:**

- Be careful not to damage sensor edge and sensor rotor teeth.
- · Do not pull on the sensor harness.
- 3. Disconnect wheel sensor harness electrical connector, then remove harness from attaching points.

### INSTALLATION

Installation is in the reverse order of removal.

### **CAUTION:**

- · Inspect wheel sensor O-ring, replace sensor assembly if damaged.
- Clean wheel sensor hole and mounting surface with brake cleaner and a lint-free shop rag. Be careful that dirt and debris do not enter the axle.
- Apply a coat of suitable grease to the wheel sensor O-ring and mounting hole.

### SENSOR ROTOR

### Removal and Installation

INFOID:0000000004109544

### FRONT WHEEL SENSOR ROTOR

Removal and Installation

The front wheel sensor rotor is built into the front wheel hub and bearing assembly and is not removable. If damaged, replace the front wheel hub and bearing assembly. Refer to FAX-6, "Removal and Installation".

### REAR WHEEL SENSOR ROTOR

Removal

Remove the rear axle shaft assembly. Refer to RAX-8, "Removal and Installation".

### NOTE:

It is necessary to disassemble the rear axle shaft assembly to replace the rear wheel sensor rotor.

Installation

Installation is in the reverse order of removal.

### **CAUTION:**

- Do not reuse the old rear wheel sensor rotor.
- Do not reuse the rear axle oil seal. The rear axle oil seal must be replaced every time the rear axle shaft assembly is removed from the rear axle shaft housing.

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# ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

### Removal and Installation

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7.0 (0.71, 62)

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Pront

Rem (kg-m, ft-lb)

1. To rear left caliper 13 N·m (1.3 kg-m, 10 ft-lb)

② : N·m (kg-m, in-lb)

- 4. To front right caliper 13 N·m (1.3 kg-m, 10 ft-lb)
- 7. ABS actuator and electric unit 8. (control unit)
- 2. To rear right caliper 13 N·m (1.3 kg-m, 10 ft-lb)
- From the master cylinder secondary side 6.18.2 N·m (1.9 kg-m, 13 ft-lb)
  - Actuator harness connector
- To front left caliper
   13 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)

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### **REMOVAL**

- 1. Disconnect the negative battery terminal.
- Remove the cowl top extension. Refer to <u>EXT-19</u>, "Removal and Installation".
- 3. Drain the brake fluid. Refer to BR-17, "Drain and Refill".
- Disconnect the actuator harness connector 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; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.
- Disconnect the brake tubes.
- Remove the three bolts and remove the ABS actuator and electric unit (control unit).

### INSTALLATION

Installation is in the reverse order of removal.

### **CAUTION:**

To install, use a flare nut crowfoot and torque wrench (commercial service tools).

### **ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)**

### < REMOVAL AND INSTALLATION >

[VDC/TCS/ABS]

- · Always tighten brake tubes to specification when installing.
- Never reuse drained brake fluid.
- After installation of the ABS actuator and electric unit (control unit), perform the following.
- Refill brake system with new brake fluid. Then bleed the air from the system. Refer to <u>BR-17</u>, "<u>Bleed-ing Brake System</u>".
- Adjust the steering angle sensor. Refer to <u>BRC-149</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR <u>NEUTRAL POSITION: Special Repair Requirement"</u>.
- Calibrate the decel G sensor. Refer to <u>BRC-150</u>, <u>"CALIBRATION OF DECEL G SENSOR : Special Repair Requirement"</u>.

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### STEERING ANGLE SENSOR

< REMOVAL AND INSTALLATION >

[VDC/TCS/ABS]

### STEERING ANGLE SENSOR

### Removal and Installation

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### **REMOVAL**

- 1. Remove spiral cable. Refer to SR-6, "Removal and Installation".
- 2. Remove the screws and remove the steering angle sensor.

### **INSTALLATION**

Installation is in the reverse order of removal.

### **CAUTION:**

After installation of spiral cable, adjust steering angle sensor. Refer to <u>BRC-149</u>, "<u>ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION</u>: <u>Special Repair Requirement"</u>.

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### **G** SENSOR

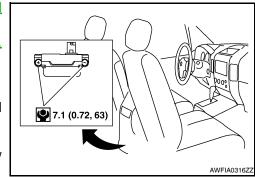
### Removal and Installation

### **REMOVAL**

- 1. If equipped, remove center console. Refer to <u>IP-18</u>, "Removal and Installation".
- 2. If equipped, remove the front center seat. Refer to <u>SE-31.</u> "Removal and Installation".
- 3. Remove yaw rate/side/decel G sensor nuts.

### **CAUTION:**

- Do not use power tools to remove the yaw rate/side/decel G sensor.
- Do not drop or strike the yaw rate/side/decel G sensor.
- 4. Disconnect harness connector and remove the yaw rate/side/ decel G sensor.



### **INSTALLATION**

Installation is in the reverse order of removal.

### **CAUTION:**

- Do not drop or strike the yaw rate/side/decel G sensor.
- After installation, calibrate the yaw rate/side/decel G sensor. Refer to <u>BRC-150</u>, "<u>CALIBRATION OF DECEL G SENSOR</u>: <u>Description</u>".

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