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BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow (INFOID:000000001341853

DESCRIPTION

Basic Concept

• The most important point to perform trouble diagnosis is to understand systems (control and mechanism) in vehicle thoroughly.

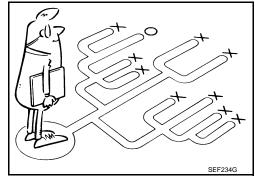
 It is also important to clarify customer complaints before inspection.

First of all, reproduce symptom, and understand it fully.

Ask customer about his/her complaints carefully. In some cases, they will be necessary to check symptom by driving vehicle with customer.

CAUTION:

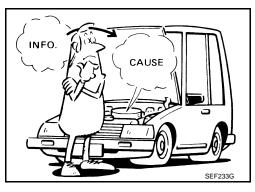
Customers are not professionals. Do not assume "maybe customer means..." or "maybe customer mentioned this symptom".



- It is essential to check symptoms right from the beginning in order to repair a malfunction completely.
 - For an intermittent malfunction, it is important to reproduce symptom based on interview with customer and past examples. Do not perform inspection on ad hoc basis. Most intermittent malfunctions are caused by poor contacts. In this case, it will be effective to shake suspected harness or connector by hand. When repairs are performed without any symptom check, no one can judge if malfunction has actually been eliminated.
- After diagnostic, make sure to perform "ERASE MEMORY". Refer to BRC-12, "CONSULT-III Function (ABS)".
- Always read "GI General Information" to confirm general precautions. Refer to <u>BRC-12</u>, "CONSULT-III Function (ABS)".

Asking Complaints

- Complaints against malfunction vary depending on each person. It is important to clarify customer complaints.
- Ask customer about what symptoms are present and under what conditions. Use information to reproduce symptom while driving.
- It is also important to use diagnostic sheet so as not to miss information.



KEY POINTS

WHAT Vehicle model
WHEN Date, Frequencies
WHERE Road conditions
HOW Operating conditions,

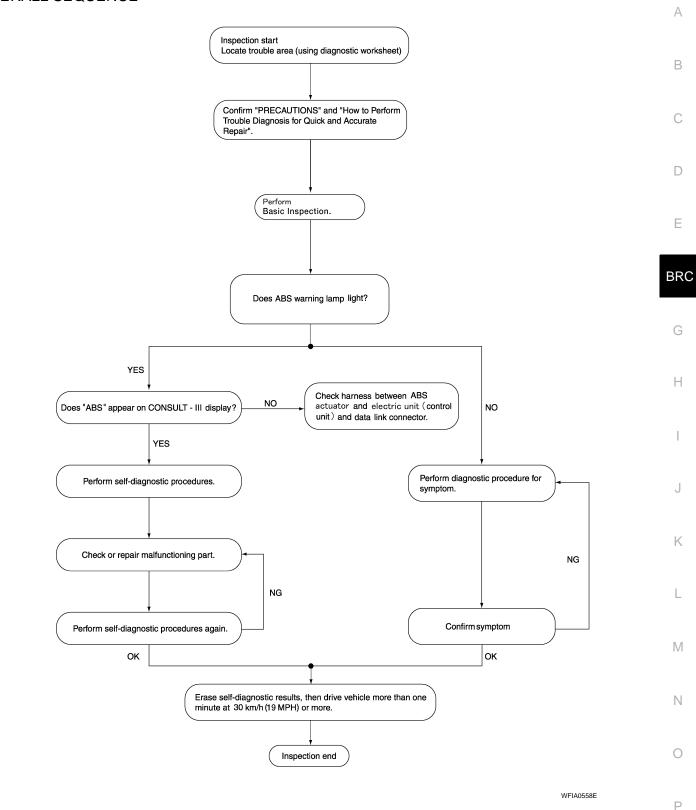
Weather conditions,

Symptoms

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< BASIC INSPECTION > [ABS]

OVERALL SEQUENCE



DIAGNOSIS AND REPAIR WORKFLOW

[ABS]

Diagnostic Work Sheet

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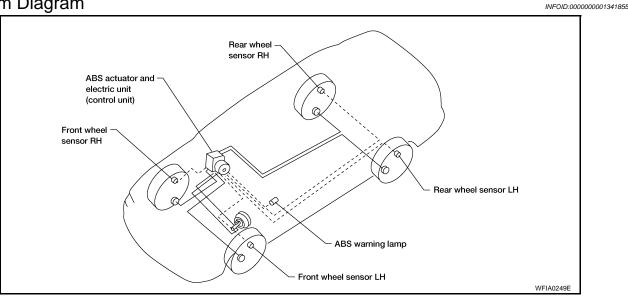
Customer name MR/MS	Model & Year		VIN	
Engine #	Trans.		Mileage	
Incident Date	Manuf. Date		In Service Date	9
Symptoms	□ Noise and vibration (from engine compartment) □ Noise and vibration (from axle)	☐ Warning / Indicator activate		☐ Firm pedal operation Large stroke pedal operation
	☐ ABS does not 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			

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FUNCTION DIAGNOSIS

ABS

System Diagram



System Description

ABS SYSTEM

In case of electrical malfunctions with the ABS, ABS warning lamp will turn ON and the condition of the vehicle will be fail-safe which is the same condition of vehicles without ABS system.

NOTE:

ABS self-diagnosis sound may be heard. That is a normal condition because a self-diagnosis for "Ignition switch ON" and "The first starting" are being performed.

CAUTION:

If the Fail-Safe function is activated, then perform self-diagnosis for ABS control system.

PURPOSE

The Anti-lock Brake System (ABS) consists of electronic and hydraulic components. It allows for control of braking force so that locking of the wheels can be avoided.

The ABS:

- Ensures proper tracking performance through steering wheel operation.
- Enables obstacles to be avoided through steering wheel operation.
- Enables vehicle stability by preventing flat spins.

OPERATION

- When the vehicle speed is less than 10 km/h (6 MPH) this system does not work.
- The ABS has self-test capabilities. The system turns on the ABS warning lamp for 2 seconds after turning
 the ignition switch ON. The system performs another test the first time the vehicle reaches 6 km/h (4 MPH).
 A mechanical noise may be heard a sthe ABS performs a self-test. This is a normal part of the self-test feature. If a malfunction is found during this check, the ABS warning lamp will come on.
- Dyring ABS operation, a mechanical noise may be heard. This is a normal condition.

FAIL SAFE

If trouble occurs in the ABS, the ABS warning lamp in the combination meter comes on. At the same time, the vehicle stops the ABS control and braking becomes the same as that of a vehicle without ABS.

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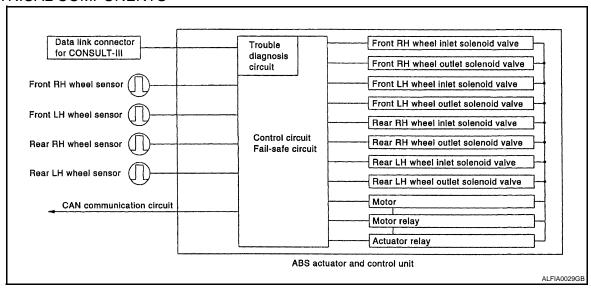
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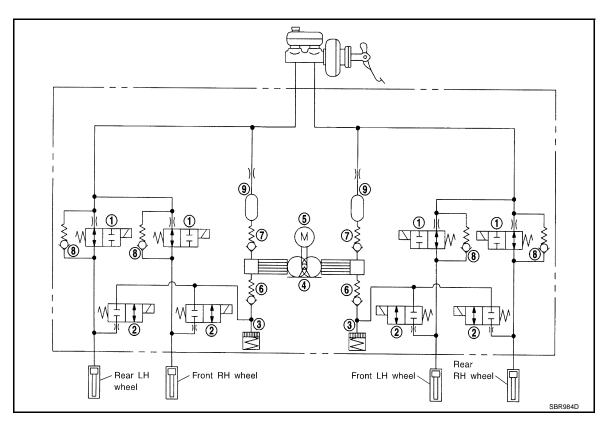
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ELECTRICAL COMPONENTS



HYDRAULIC CIRCUIT DIAGRAM



- 1. Inlet solenoid valve
- 2. Outlet solenoid valve
- 3. Reservoir

4. Pump

Motor

6. Inlet valve

Outlet valve

- 8. Bypass check valve
- 9. Damper

OPERATION THAT IS NOT "SYSTEM ERROR"

ABS

- When starting engine or just after starting vehicle, brake pedal may vibrate or the motor operating sound may be heard from engine room. This is a normal states of the operation check.
- During ABS operation, brake pedal lightly vibrates and a mechanical sound may be heard. This is normal.
- 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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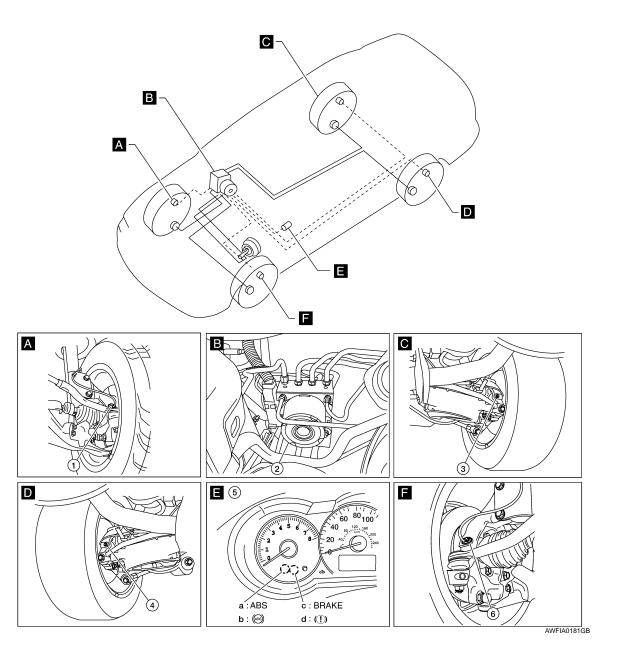
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CAN Communication

Refer to LAN-7, "System Description".

Component Parts Location

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- Front wheel sensor RH E41
- 4. Rear wheel sensor LH B43
- ABS actuator and electric unit (control 3. unit) E26
- 5. Combination meter M24
 - a. US models
 - b. Canada models
 - c. US models
 - d. Canada models

- 3. Rear wheel sensor RH B43
- 6. Front wheel sensor LH E19

Component Description

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Compo	Component parts		
	Pump	PPC 25 "Description"	
ABS actuator and electric unit (control unit)	Motor	BRC-25, "Description"	
	Actuator relay (Main relay)	BRC-27, "Description"	
	Solenoid valve	BRC-32, "Description"	
Wheel sensor		BRC-16, "Description"	
ABS warning lamp		BRC-37, "Description"	
Brake warning lamp		BRC-38, "Description"	

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.
Function test	Performed by CONSULT-III instead of a technician to determine whether each system is "OK" or "NG".
CAN diagnostic support monitor	The results of transmit/receive diagnosis of CAN communication can be read.

SELF-DIAGNOSIS RESULTS

Operation Procedure

- Turn ignition switch OFF.
- 2. Connect CONSULT-III to data link connector.
- Turn ignition switch ON.
- 4. Start engine and drive vehicle at 30 km/h (19 MPH) or more for approximately 1 minute.
- 5. After stopping vehicle, with the engine running, touch "ABS", "SELF-DIAG RESULTS" in order on the CONSULT-III screen.
- 6. The self-diagnostic results are displayed.
 - Check ABS warning lamp. If "NO FAILURE" is displayed. Refer to <u>BRC-37</u>, "Component Function <u>Check"</u>.
- 7. Perform the appropriate inspection from display item list, and repair or replace the malfunctioning component. Refer to "Display Item List".
- Start engine and drive vehicle at 30 km/h (19 MPH) or more for approximately 1 minute.

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 driven at approximately 30 km/h (19 MPH) or more for approximately 1 minute.

Erase Memory

- Turn ignition switch OFF.
- Start engine and touch "ABS", "SELF-DIAG RESULTS", "ERASE MEMORY" in order on the CONSULT-III screen to erase the diagnostic memory.
 If "ABS" is not indicated, go to GI-51, "CONSULT-III Data Link Connector (DLC) Circuit".

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CAUTION:

If the diagnostic memory is not erased, re-perform the operation from step 4.

- 3. Perform self-diagnosis again, and make sure that diagnostic memory is erased.
- 4. 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.

NOTE:

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

Display item	Malfunction detecting condition	Check item	
RR RH SENSOR-1 [C1101] ^{*1}	Circuit of rear RH wheel sensor is open. Or when the sensor power voltage is outside the standard.		_
RR LH SENSOR-1 [C1102] ^{*1}	Circuit of rear LH wheel sensor is open. Or when the sensor power voltage is outside the standard.	BRC-16, "Diagno- sis Procedure"	•
FR RH SENSOR-1 [C1103] ^{*1}	Circuit of front RH wheel sensor is open. Or when the sensor power voltage is outside the standard.	(Note 1)	
FR LH SENSOR-1 [C1104] ^{*1}	Circuit of front LH wheel sensor is open. Or when the sensor power voltage is outside the standard.		
RR RH SENSOR-2 [C1105] ^{*1}	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.		_
RR LH SENSOR-2 [C1106] ^{*1}	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.	BRC-19, "Diagno-	
FR RH SENSOR-2 [C1107] ^{*1}	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.	sis Procedure" (Note 1)	
FR LH SENSOR- 2 [C1108] ^{*1}	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.		
BATTERY VOLTAGE [ABNORMAL] [C1109]			_
CONTROLLER FAILURE [C1110] ^{*2}	When there is an internal malfunction in the ABS actuator and electric unit (control unit).	BRC-24, "Diagno- sis Procedure"	_
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.	BRC-25, "Diagno-	_
[C1111]	During the actuator motor operating with OFF, when the actuator motor turns ON, or when the control line for relay is shorted to ground.	sis Procedure"	
MAIN RELAY	During the actuator relay operating with OFF, when the actuator relay turns ON. Or when the control line for the relay is shorted to the ground.	BRC-27, "Diagno-	
[C1114]	During the actuator relay operating with ON, when the actuator relay turns OFF, or when the control line for the relay is open.	sis Procedure"	
ABS SENSOR [ABNORMAL SIGNAL] [C1115]	When wheel sensor input signal is malfunctioning.	BRC-29, "Diagno- sis Procedure" (Note 1)	
FR LH IN ABS SOL [C1120]	When the control unit detects a malfunction in the front left inlet solenoid circuit.	BRC-32, "Diagno- sis Procedure"	_
FR LH OUT ABS SOL [C1121]	When the control unit detects a malfunction in the front left outlet solenoid circuit.	BRC-34, "Diagno- sis Procedure"	_
FR RH IN ABS SOL [C1122]	When the control unit detects a malfunction in the front right inlet solenoid circuit.	BRC-32, "Diagno- sis Procedure"	

Display item	Malfunction detecting condition	Check item
FR RH OUT ABS SOL [C1123]	When the control unit detects a malfunction in the front right outlet solenoid circuit.	BRC-34, "Diagno- sis Procedure"
RR LH IN ABS SOL [C1124]	When the control unit detects a malfunction in the rear left inlet solenoid circuit.	BRC-32, "Diagno- sis Procedure"
RR LH OUT ABS SOL [C1125]	When the control unit detects a malfunction in the rear left outlet solenoid circuit.	BRC-34, "Diagno- sis Procedure"
RR RH IN ABS SOL [C1126]	When the control unit detects a malfunction in the rear right inlet solenoid circuit.	BRC-32, "Diagno- sis Procedure"
RR RH OUT ABS SOL [C1127]	When the control unit detects a malfunction in the rear right outlet solenoid circuit.	BRC-34, "Diagno- sis Procedure"
CAN COMM CIRCUIT [U1000]*3	When there is a malfunction in the CAN communication circuit.	BRC-36, "Diagno- sis Procedure"

^{*1:} Be sure to confirm the ABS warning lamp illuminates when the ignition switch is turned ON after repairing the shorted sensor circuit, but the lamp turns off when driving the vehicle over 30 km/h (19 MPH) for approximately 1 minute in accordance with SELF-DIAGNOSIS PROCEDURE.

DATA MONITOR

Display Item List

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.

Item	Data	monitor item sele	ection	
(Unit)	ECU INPUT SIGNALS	MAIN SIG- NALS	SELECTION FROM MENU	Remarks
FR LH SENSOR (km/h)	×	×	×	Wheel speed calculated by front LH wheel sensor signal is displayed.
FR RH SENSOR (km/h)	×	×	×	Wheel speed calculated by front RH wheel sensor signal is displayed.
RR LH SENSOR (km/h)	×	×	×	Wheel speed calculated by rear LH wheel sensor signal is displayed.
RR RH SENSOR (km/h)	×	×	×	Wheel speed calculated by rear RH wheel sensor signal is displayed.
STOP LAMP SW (ON/OFF)	×	×	×	Stop lamp switch (ON/OFF) status is displayed.
BATTERY VOLT (V)	×	×	×	Voltage supplied to ABS actuator and electric unit (control unit) 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.
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.

^{*2:} When "CONTROLLER FAILURE" is displayed, check to see if the ABS warning lamp is burned out, and check the circuit between the ABS warning lamp and ABS actuator and electric unit (control unit) for open or short. Then, check the ABS actuator and electric unit (control unit) and circuit.

^{*3:} When malfunctions are detected in several systems, including CAN communication circuit [U1000], troubleshoot CAN communication circuit first. Refer to BRC-36, "Diagnosis Procedure".

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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.
ABS WARN LAMP (ON/OFF)	_	×	×	ABS warning lamp (ON/OFF) status is displayed.

^{×:} Applicable

Note: A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

ACTIVE TEST

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 and brake warning lamp are ON.
- ABS warning lamp and brake warning lamp are ON during active test.

Operation Procedure

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" to restart the process.

Solenoid Valve

NOTE:

The example shown is for front right wheel. The procedure for the other wheels is the same as given below.

- 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 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 KEEP" and confirm that solenoid valves (IN, OUT) operate as shown in the table below.

Operation	ABS solenoid valve			ABS solenoid valve (ACT)		
(Note)	UP	KEEP	DOWN	UP	ACT UP	ACT KEEP
FR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
FR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF

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

Note: A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

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 (Note)	ON	ON

Note: A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

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^{-:} Not applicable

COMPONENT DIAGNOSIS

C1101, C1102, C1103, C1104 WHEEL SENSOR-1

Description INFOID:000000001341860

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.	Harness or connectorWheel sensor
C1103	FR RH SENSOR-1	Circuit of front RH wheel sensor is open. Or when the sensor power voltage is outside the standard.	ABS actuator and electric unit (control unit)
C1104	FR LH SENSOR-1	Circuit of front LH wheel sensor is open. Or when the sensor power voltage is outside the standard.	

DTC CONFIRMATION PROCEDURE

1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-16, "Diagnosis Procedure".

NO >> INSPECTION END

DTC Confirmation Procedure

Diagnosis Procedure

INFOID:0000000001341862

CAUTION:

Do not check between wheel sensor terminals.

INSPECTION PROCEDURE

1. CHECK CONNECTOR

Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26 and malfunctioning wheel sensor connector E41 (FR-RH), E19 (FR-LH), B43 (RR-RH and RR-LH). Check terminal to see if it is deformed, disconnected, loose, etc., Repair or replace it if any malfunction condition is found.

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

2.CHECK WHEEL SENSOR OUTPUT SIGNAL

- 1. Disconnect connectors from wheel sensor of malfunction code No.
- 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.

4. 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 wheel sensor. Refer to BRC-63, "Removal and Installation".

${f 3.}$ CHECK TIRE

Check air pressure, wear and size.

Are air pressure, wear and size within standard?

YES >> GO TO 4

NO >> • Adjust air pressure, or replace tire.

Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

4. CHECK WHEEL BEARINGS

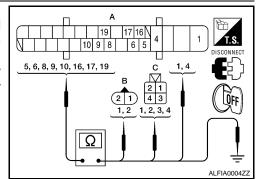
Check wheel bearing axial end play. Refer to <u>FAX-5</u>, "<u>Inspection</u>" (front) or <u>RAX-5</u>, "<u>On-vehicle Service</u>" (rear). <u>Is the inspection result normal?</u>

YES >> GO TO 5

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

5. CHECK WHEEL SENSOR HARNESS

- Turn ignition switch OFF and disconnect malfunctioning wheel sensor connector E41 (FR-RH), E19 (FR-LH), B43 (RR-RH and RR-LH) and ABS actuator and electric unit (control unit) connector E26.
- 2. Check continuity between terminals. (Also check continuity when steering wheel is turned right and left and when sensor harness inside the wheel house is moved.)



	Power sup	Power supply circuit Signal circuit Ground circuit		Signal circuit		round circuit
Wheel	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (Signal - Ground) (A)	ABS actuator and electric unit (control unit) (A) (Signal) - Body Ground
Front RH	9	1	10	2	9, 10 - 1, 4	9, 10 - Body ground
Front LH	16	1	5	2	16, 5 - 1, 4	16, 5 - Body ground
Rear RH	8	3	19	4	8, 19 - 1, 4	8, 19 - Body ground
Rear LH	6	1	17	2	6, 17 - 1, 4	6, 17 - Body ground

Power supply circuit : Continuity should exist.

Signal circuit : Continuity should exist.

Ground circuit : Continuity should not exist.

Is the inspection result normal?

YES >> GO TO 6

NO >> • Repair or replace malfunctioning components.

[ABS]

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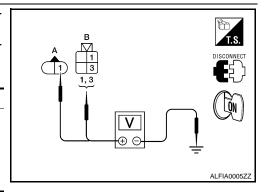
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• Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

6. CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

- Reconnect ABS actuator and electric unit (control unit) connector.
- 2. Turn ignition switch ON and check between wheel sensor harness connector power supply terminal and ground.

Wheel	Wheel sensor	Ground	Voltage
Front RH (A)			
Front LH (A)	1		8 V or more
Rear LH (B)		_	8 V OI IIIOIE
Rear RH (B)	3		



Is the inspection result normal?

YES >> Inspection end.

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

Component Inspection

INFOID:0000000001341863

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 BRC-16, "Diagnosis Procedure".

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C1105, C1106, C1107, C1108 WHEEL SENSOR-2

Description INFOID:000000001341864

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	Circuit of rear RH wheel sensor is open. Or when the sensor power voltage is outside the standard.	
C1106	RR LH SENSOR-2	Circuit of rear LH wheel sensor is open. Or when the sensor power voltage is outside the standard.	Harness or connectorWheel sensor
C1107	FR RH SENSOR-2	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)
C1108	FR LH SENSOR-2	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-2
RR LH SENSOR-2
FR RH SENSOR-2
FR LH SENSOR-2

Is above displayed on the self-diagnosis display?

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

NO >> INSPECTION END

Diagnosis Procedure

CAUTION:

Do not check between wheel sensor terminals.

INSPECTION PROCEDURE

1. CHECK CONNECTOR

Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26 and malfunctioning wheel sensor connector E41 (FR-RH), E19 (FR-LH), B43 (RR-RH and RR-LH). Check terminal to see if it is deformed, disconnected, loose, etc., Repair or replace it if any malfunction condition is found.

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

2.CHECK WHEEL SENSOR OUTPUT SIGNAL

- 1. Disconnect connectors from wheel sensor of malfunction code No.
- Connect ABS active wheel sensor tester (J-45741) to wheel sensor using appropriate adapter.
- 3. 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.

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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 wheel sensor. Refer to BRC-63, "Removal and Installation".

3.CHECK TIRE

Check air pressure, wear and size.

Are air pressure, wear and size within standard?

>> GO TO 4 YES

NO >> • Adjust air pressure, or replace tire.

Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

4. CHECK WHEEL BEARINGS

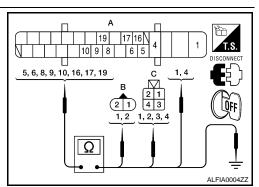
Check wheel bearing axial end play. Refer to FAX-5, "Inspection" (front) or RAX-5, "On-vehicle Service" (rear). Is the inspection result normal?

YES >> GO TO 5

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

5. CHECK WHEEL SENSOR HARNESS

- Turn ignition switch OFF and disconnect malfunctioning wheel sensor connector E41 (FR-RH), E19 (FR-LH), B43 (RR-RH and RR-LH) and ABS actuator and electric unit (control unit) connector E26.
- 2. Check continuity between terminals. (Also check continuity when steering wheel is turned right and left and when sensor harness inside the wheel house is moved.)



[ABS]

	Power sup	Power supply circuit Signal circuit Ground circuit		Signal circuit		round circuit
Wheel	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (Signal - Ground) (A)	ABS actuator and electric unit (control unit) (A) (Signal) - Body Ground
Front RH	9	1	10	2	9, 10 - 1, 4	9, 10 - Body ground
Front LH	16	1	5	2	16, 5 - 1, 4	16, 5 - Body ground
Rear RH	8	3	19	4	8, 19 - 1, 4	8, 19 - Body ground
Rear LH	6	1	17	2	6, 17 - 1, 4	6, 17 - Body ground

Power supply circuit : Continuity should exist. Signal circuit : Continuity should exist. **Ground circuit** : Continuity should not exist.

Is the inspection result normal?

YES >> GO TO 6

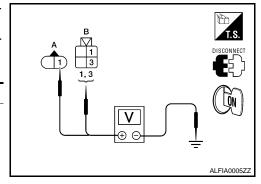
NO >> • Repair or replace malfunctioning components.

Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

6. CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

- Reconnect ABS actuator and electric unit (control unit) connector.
- 2. Turn ignition switch ON and check between wheel sensor harness connector power supply terminal and ground.

Wheel	Wheel sensor	Ground	Voltage
Front RH (A)			
Front LH (A)	1		8 V or more
Rear LH (B)		_	o v oi more
Rear RH (B)	3		



Is the inspection result normal?

YES >> Inspection end.

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

Component Inspection

INFOID:0000000001341867

[ABS]

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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 BRC-19, "Diagnosis Procedure".

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[ABS]

DTC C1109 BATTERY VOLTAGE [ABNORMAL]

Description INFOID:000000001341868

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 BRC-22, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001341870

INSPECTION PROCEDURE

1. CHECK CONNECTOR

- Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26, 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.

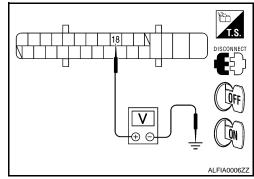
Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2

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

- 1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26.
- 2. Check voltage between ABS actuator and electric unit (control unit) harness connector E26 terminal 18 and ground.



DTC C1109 BATTERY VOLTAGE [ABNORMAL]

< COMPONENT DIAGNOSIS >

[AR9]	

ABS actuator and electric unit (control unit)	Ground	Condition	Voltage
18		Ignition switch ON	Battery voltage (Approx. 12 V)
10	_	Ignition switch OFF	Approx. 0 V

- Turn ignition switch OFF.
- Check continuity between ABS actuator and electric unit (control unit) harness connector E26 terminal 1, 4 and ground.

ABS actuator and electric unit (control unit)	Ground	Continuity
1, 4		Yes

Is the inspection result normal?

YES

- >> Check battery for terminal looseness, low voltage, etc. If any malfunction is found, repair malfunctioning
 - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".
- NO >> • Repair or replace malfunctioning components.
 - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

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DTC C1110 CONTROL FAILURE

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)

DTC CONFIRMATION PROCEDURE

1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
CONTROLLER FAILURE

Is above displayed on the self-diagnosis display?

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

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001341872

INSPECTION PROCEDURE

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

CAUTION:

Replace ABS actuator and electric unit (control unit) when self-diagnostic result shows items other than that applicable.

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

DTC C1111 PUMP MOTOR

Description INFOID:000000001341873

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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	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
	TOWN WOTOK	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 BRC-25, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001341875

INSPECTION PROCEDURE

1. CHECK CONNECTOR

1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26, 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.

Is the inspection result normal?

YES >> Inspection end.

NO >> GO TO 2

$2.\,$ CHECK ABS MOTOR AND MOTOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26.

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< COMPONENT DIAGNOSIS >

Check voltage between the ABS actuator and electric unit (control unit) harness connector E26 terminal 2 and ground.

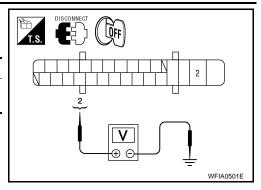
ABS actuator and electric unit (control unit)	Ground	Voltage
2	_	Battery voltage (Approx. 12 V)

Is the inspection result normal?

YES >> GO TO 3

NO >> • Repair

- >> Repair or replace malfunctioning components.
 - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".



3. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) GROUND CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) harness connector E26 terminal 1, 4 and ground.

ABS actuator and electric unit (control unit)	Ground	Continuity
1, 4	1	Yes

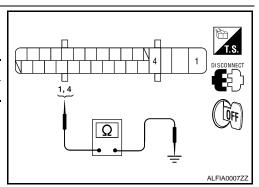
Is the inspection result normal?

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

• Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

>> • Repair or replace malfunctioning components.

 Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".



Component Inspection

INFOID:0000000001341876

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 (Note)	ON	ON

NOTE:

NO

A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to <u>BRC-25</u>, "<u>Diagnosis Procedure</u>".

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DTC C1114 MAIN RELAY

Description INFOID:000000001341877

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

DTC Logic INFOID:0000000001341878

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1114	MAIN RELAY	During the actuator relay operating with OFF, when the actuator relay turns ON, or when the control line for the relay is shorted to the ground.	Harness or connector ABS actuator and electric unit
	WAIN RELAT	During the actuator relay operating with ON, when the actuator relay turns ON, or when the control line for the relay is open.	(control unit)

DTC CONFIRMATION PROCEDURE

CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results MAIN RELAY

Is above displayed on the self-diagnosis display?

>> Proceed to diagnosis procedure. Refer to BRC-27, "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 E26, check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- Reconnect connector and perform self-diagnosis.

Is the inspection result normal?

YES >> Inspection end.

NO >> GO TO 2

2.CHECK SOLENOID AND ACTUATOR RELAY POWER SUPPLY CIRCUIT

Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26.

Check voltage between ABS actuator and electric unit (control unit) harness connector E26 terminal 3 and ground.

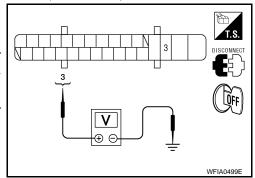
ABS actuator and electric unit (control unit)	Ground	Voltage
3		Battery voltage (Approx. 12 V)

Is the inspection result normal?

>> GO TO 3 YES

NO >> • Repair or replace malfunctioning components.

• Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".



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INFOID:0000000001341879

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

Check continuity between ABS actuator and electric unit (control unit) harness connector E26 terminal 1, 4 and ground.

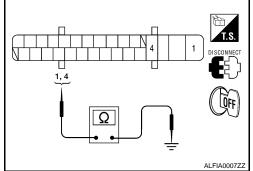
ABS actuator and electric unit (control unit)	Ground	Continuity
1, 4	_	Yes

Is the inspection result normal?

- >> Replace ABS actuator and electric unit (control unit).
 - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

NO

- >> Repair or replace malfunctioning components.
 - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".



Component Inspection

INFOID:0000000001341880

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 (Note)	ON	ON

NOTE:

A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

Is the inspection result normal?

YES

>> INSPECTION END

>> Go to diagnosis procedure. Refer to BRC-27, "Diagnosis Procedure". NO

DTC C1115 ABS SENSOR [ABNORMAL SIGNAL]

< COMPONENT DIAGNOSIS >

[ABS]

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DTC C1115 ABS SENSOR [ABNORMAL SIGNAL]

Description INFOID:000000001341881

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:0000000001341882

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

CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results ABS SENSOR [ABNORMAL SIGNAL]

Is above displayed on the self-diagnosis display?

>> Proceed to diagnosis procedure. Refer to BRC-29, "Diagnosis Procedure". YES

NO >> Inspection end.

Diagnosis Procedure

INFOID:0000000001341883

CAUTION:

Do not check between wheel sensor terminals.

INSPECTION PROCEDURE

1.CHECK TIRE

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Check air pressure, wear and size.

Are air pressure, wear and size within standard?

YES >> GO TO 2

NO >> • Adjust air pressure, or replace tire.

Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

2.CHECK SENSOR AND SENSOR ROTOR

- Check sensor rotor for damage.
- Check wheel sensor for damage, disconnection or looseness.

Is the inspection result normal?

YES >> GO TO 3

>> • Repair wheel sensor mount or replace sensor rotor. Then perform the self-diagnosis. NO

Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

3. CHECK CONNECTOR

- Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26 and malfunctioning wheel sensor connector E41 (FR-RH), E19 (FR-LH), B43 (RR-RH and RR-LH). Check terminal to see if it is deformed, disconnected, loose, etc., Repair or replace it if any malfunction condition is
- 2. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-12, "CONSULT-III Function (ABS)".

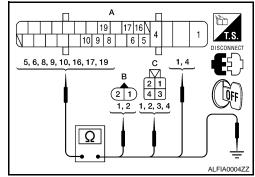
Is the inspection result normal?

YES >> Inspection end. NO >> GO TO 4

4. CHECK WHEEL SENSOR HARNESS

< COMPONENT DIAGNOSIS >

- Turn ignition switch OFF and disconnect malfunctioning wheel sensor connector E41 (FR-RH), E19 (FR-LH), B43 (RR-RH and RR-LH) and ABS actuator and electric unit (control unit) connector E26.
- 2. Check continuity between terminals. (Also check continuity when steering wheel is turned right and left and when sensor harness inside the wheel house is moved.)



[ABS]

	Power sup	Power supply circuit Signal circuit Ground circuit		Signal circuit		round circuit
Wheel	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (Signal - Ground) (A)	ABS actuator and electric unit (control unit) (A) (Signal) - Body Ground
Front RH	9	1	10	2	9, 10 - 1, 4	9, 10 - Body ground
Front LH	16	1	5	2	16, 5 - 1, 4	16, 5 - Body ground
Rear RH	8	3	19	4	8, 19 - 1, 4	8, 19 - Body ground
Rear LH	6	1	17	2	6, 17 - 1, 4	6, 17 - Body ground

Power supply circuit : Continuity should exist. Signal circuit : Continuity should exist. **Ground circuit** : Continuity should not exist.

Is the inspection result normal?

YES >> GO TO 5

NO >> • Repair or replace malfunctioning components.

• Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

${f 5}$.CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

- Replace wheel sensor that resulted in malfunction by self-diagnosis.
- Reconnect connectors, drive vehicle at 30 km/h (19 MPH) or more for approximately 1 minute, and then perform self-diagnosis.

Is above displayed on the self-diagnosis display?

YES >> Inspection end.

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

Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

Component Inspection

INFOID:0000000001341884

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)
--------------	------------------------------

OMPONENT DIAGNOSIS	115 ABS SENSOR [ABNORMAL SIGNAL]	[ABS]
FR LH SENSOR		
FR RH SENSOR	Nearly matches the speedometer dis-	
RR LH SENSOR	play (±10% or less)	
RR RH SENSOR		
he inspection result normal?	-	
ES >> Inspection end. O >> Go to diagnosis pro	ocedure. Refer to BRC-29, "Diagnosis Procedure".	
S SO to diagnosis pro	ocedure. Refer to BRC-29. Diagnosis Procedure.	

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C1120, C1122, C1124, C1126 IN ABS SOL

Description INFOID:000000001341885

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

DTC Logic (INFOID:000000001341886

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
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 BRC-32, "Diagnosis Procedure".

NO >> Inspection end.

Diagnosis Procedure

INFOID:0000000001341887

INSPECTION PROCEDURE

1. CHECK CONNECTOR

- Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26, 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.

Is the inspection result normal?

YES >> Inspection end.

NO >> GO TO 2

2.CHECK SOLENOID AND ACTUATOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26.

C1120, C1122, C1124, C1126 IN ABS SOL

< COMPONENT DIAGNOSIS >

[ABS]

Check voltage between ABS actuator and electric unit (control unit) harness connector E26 terminal 3 and ground.

ABS actuator and electric unit (control unit)	Ground	Voltage
3	_	Battery voltage (Approx. 12 V)

Is the inspection result normal?

YES >> GO TO 3

NO

NO

>> • Repair or replace malfunctioning components.

• Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

$3.\,$ CHECK SOLENOID AND ACTUATOR RELAY GROUND CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) harness connector E26 terminal 1, 4 and ground.

ABS actuator and electric unit (control unit)	Ground	Continuity
1, 4	_	Yes

OFF

Is the inspection result normal?

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

• Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

>> • Repair or replace malfunctioning components.

· Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

Component Inspection

1. CHECK ACTIVE TEST

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.

NOTE:

The example below is for front right wheel. The procedure for the other wheels is the same as given below.

Operation (Note)	ABS solenoid valve		
Operation (Note)	UP	KEEP	DOWN
FR RH IN SOL	OFF	ON	ON
FR RH OUT SOL	OFF	OFF	ON*

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

A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

Is the inspection result normal?

YES >> Inspection end.

NO >> Go to diagnosis procedure. Refer to BRC-32, "Diagnosis Procedure".

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INFOID:0000000001341888

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C1121, C1123, C1125, C1127 OUT ABS SOL

Description INFOID:000000001341889

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

DTC Logic (INFOID:000000001341890

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 BRC-34, "Diagnosis Procedure".

NO >> Inspection end.

Diagnosis Procedure

INFOID:0000000001341891

INSPECTION PROCEDURE

1. CHECK CONNECTOR

- Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26, check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- Reconnect connector and perform self-diagnosis.

Is the inspection result normal?

YES >> Inspection end.

NO >> GO TO 2

2.CHECK SOLENOID AND ACTUATOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26.

C1121, C1123, C1125, C1127 OUT ABS SOL

< COMPONENT DIAGNOSIS >

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2. Check voltage between ABS actuator and electric unit (control unit) harness connector E26 terminal 3 and ground.

ABS actuator and electric unit (control unit)	Ground	Voltage
3	_	Battery voltage (Approx. 12 V)

J.S. DISCONNECT WEIAD499E

Is the inspection result normal?

YES >> GO TO 3

NO

NO

>> • Repair or replace malfunctioning components.

 Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

3. CHECK SOLENOID AND ACTUATOR RELAY GROUND CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) harness connector E26 terminal 1, 4 and ground.

ABS actuator and electric unit (control unit)	Ground	Continuity
1, 4		Yes

1, 4 ALFIA0007ZZ

Is the inspection result normal?

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

 Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

>> • Repair or replace malfunctioning components.

 Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

Component Inspection

1. CHECK ACTIVE TEST

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.

NOTE:

The example below is for front right wheel. The procedure for the other wheels is the same as given below.

Operation (Note)	ABS solenoid valve		
	UP	KEEP	DOWN
FR RH IN SOL	OFF	ON	ON
FR RH OUT SOL	OFF	OFF	ON*

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

NOTE

A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

Is the inspection result normal?

YES >> Inspection end.

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

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INFOID:0000000001341892

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U1000 CAN COMM CIRCUIT

Description INFOID:000000001341893

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

DTC Logic (INFOID:000000001341894

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:0000000001341895

INSPECTION PROCEDURE

1. CHECK CONNECTOR

- 1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26, 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	_

Is above displayed on the self-diagnosis display?

YES >> Refer to GI-50, "Description".

NO >> Inspection end.

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ABS WARNING LAMP

Description INFOID:000000001341896

×: ON –: OFF

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

Component Function Check

INFOID:0000000001341897

1. CHECK ABS WARNING LAMP OPERATION

Check that the lamp illuminates for approximately 1 second after the ignition switch is turned ON.

Is the inspection result normal?
YES >> INSPECTION END

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

Diagnosis Procedure

INFOID:0000000001341898

1. CHECK SELF-DIAGNOSIS

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Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-12, "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-4, "Work Flow".

Is the inspection result normal?

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

NO >> Repair or replace combination meter.

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BRAKE WARNING LAMP

Description INFOID:000000001341899

×: ON -: OFF

Condition	Brake warning lamp (Note 1)
Ignition switch OFF	-
For 1 second after turning ON ignition switch	× (Note 2)
1 second later after turning ON ignition switch	× (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:0000000001341900

1.BRAKE WARNING LAMP OPERATION CHECK 1

Check that the lamp illuminates for approximately 1 second after the ignition switch is turned ON.

Is the inspection result normal?

YES >> GO TO 2

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

2 Brake warning LAMP OPERATION CHECK 2.

Check that the brake warning lamp in the combination meter turns ON/OFF correctly when operating the parking brake lever (M/T models) or the parking brake pedal (CVT models).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Check parking brake switch. Refer to BRC-195, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001341901

1. CHECK PARKING BRAKE SWITCH

Check that the brake warning lamp in the combination meter turns ON/OFF correctly when operating the parking brake lever (M/T models) or the parking brake pedal (CVT models).

Is the inspection result normal?

YES >> GO TO 2

NO >> Check parking brake switch. Refer to BRC-195, "Diagnosis Procedure".

2. CHECK SELF-DIAGNOSIS

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

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-4, "Work Flow". Is the inspection result normal?

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

NO >> Repair or replace combination meter.

< ECU DIAGNOSIS > [ABS]

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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 mo	nitor	
Monitor item	Display content	Condition	Reference value in normal operation	=
FR LH SENSOR		0 [km/h]	Vehicle stopped	-
FR RH SENSOR RR LH SENSOR RR RH SENSOR	Wheel speed	Nearly matches the speed meter display (± 10 % or less)	Vehicle running (Note 1)	
STOP LAMP SW	Brake pedal operation	When brake pedal is depressed	ON	
STOP LAWIF SW	Brake pedal operation	When brake pedal is not depressed	OFF	_
BATTERY VOLT	Battery voltage supplied to the ABS actuator and electric unit (control unit)	Ignition switch ON	10 – 16 V	_
SLCT LVR POSI	A/T shift position	P position R position N position D position	P R N D	=
PARK BRAKE SW	Darking brake quitab	Parking brake switch is active	ON	=
PARK BRAKE SW	Parking brake switch	Parking brake switch is inactive	OFF	-
FR LH IN SOL FR LH OUT SOL FR RH IN SOL FR RH OUT SOL RR LH IN SOL	Operation status of all solenoid valve	Actuator (solenoid valve) is active ("ACTIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON	=
RR LH OUT SOL RR RH IN SOL RR RH OUT SOL		When the actuator (sole- noid valve) is not active and actuator relay is ac- tive (ignition switch ON)	OFF	_
		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 aparation	When the actuator relay is operating	ON	-
(Note 2)	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 3)	When ABS warning lamp is OFF	OFF	=
ADC CICNIAL	ADC encyclics	ABS is active	ON	_
ABS SIGNAL	ABS operation	ABS is inactive	OFF	-

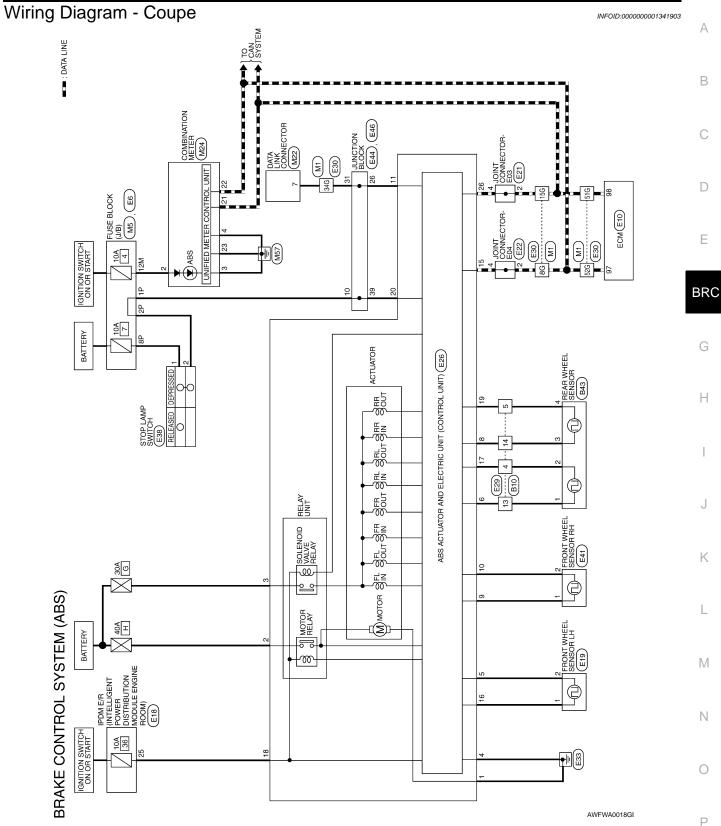
< ECU DIAGNOSIS > [ABS]

		Data monitor			
Monitor item	Display content	Condition	Reference value in normal operation		
ABS FAIL SIG AI	ABS fail-safe signal	In ABS fail-safe	ON		
	ADS Idil-Sale Signal	ABS is normal	OFF		

Note 1: Confirm tire pressure is normal.

Note 2: A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

Note 3: On and off timing for warning lamp and indicator lamp.Refer to BRC-12, "CONSULT-III Function (ABS)".



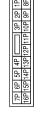
BRAKE CONTROL SYSTEM (ABS) CONNECTORS

Connector No. M5 Connector Name FUSE BLOCK (J/B)	Connector Color WHITE			12M11M10M9W			Terminal No. Wire Signal Name	12M P -			
or of Signal Name	- I		1 0	-	1						
Terminal No. Wire	8G	15G	34G	51G	52G						
Connector No. M1 Connector Name WIRE TO WIRE	Connector Color WHITE			\	176	286 280 200	002 004 004 004 004 004 004 005 005 005 005	880 570 580 540 500 500 570 570 570 570 570 570 570 57	226 776 705 180 805 807 807 807 807 807 807 807 807 807 807	918 928 939	

Signal Name

E6	Connector Name FUSE BLOCK (J/B)	WHITE	7P 6P 5P 4P 3P 2P 1P	46D15D17D13D13D13D11D11D10D 0D 0D
Connector No.	Connector Name	Connector Color WHITE		160





Signal Name	I	I	1
Color of wire	SB	R/G	Y/R
Terminal No.	1P	2P	8P

Signal Name	IGN	GND	GND	CAN-H	CAN-L	GND
Color of wire	0	В	В	٦	Ь	В
Ferminal No.	2	8	4	21	22	23



Connector Name | COMBINATION METER

Connector Name DATA LINK CONNECTOR

Connector No.

Connector Color WHITE

Connector No.

WHITE

Connector Color

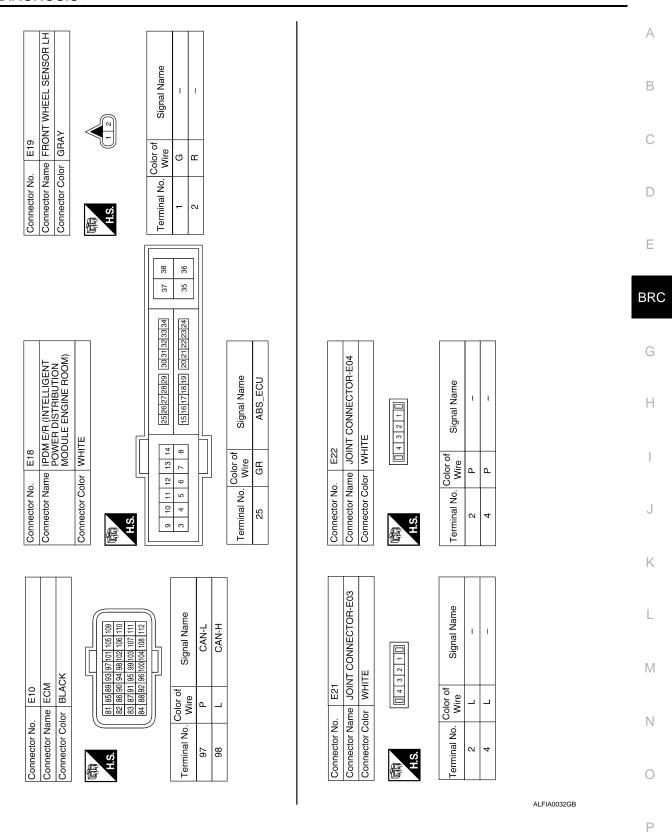




Signal Name	K-LINE
Color of wire	0
Terminal No.	7

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< ECU DIAGNOSIS > [ABS]



BRC-43

			7											
	E TO WIRE	12		3 2 1	3 12 11 10 9 8				Signal Name	1	ı	ı	ı	
E29	me WIR	or WHI		7 6 5	16 15 14 13			Color of	wire	B/W	B/R	Σ	W/R	
Connector No. E29	Connector Name WIRE TO WIRE	Connector Color WHITE			ď				Terminal No. wire	4	2	13	14	
Omoly longing	olgriai Narrie	DS FL	DP RL	DP RR	DP FR	DS FR	DIAG-K	CAN-L	DP FL	DS RL	IGN	DS RR	BLS	CAN-H
Color of	wire	ш	≥	W/R	В	>	0	۵	ŋ	B/W	GR	B/R	P/B	L
Color of	i erminai No.	5	9	∞	თ	10	7	15	16	17	18	19	20	26
								()	8 +					
	ACTUATOR AND	TRIC UNIT (CONTROL		X				2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	7 8 9 10 11 12 13 14			Signal Name	MGND	UB (MR)

Color of wire

Terminal No.

7

UB (MR) UB (VR)

G/R B/B В

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GND

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Connector Name ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

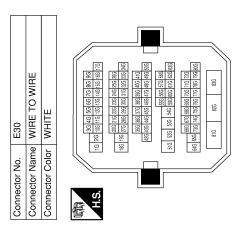
E26

Connector No.

Connector Color | BLACK

Connector No.). E38	8
Connector Name		STOP LAMP SWITCH (WITH CVT)
Connector Color		WHITE
品.S.		4 2 2
Terminal No.	Color of wire	Signal Name
-	Y/R	1
2	R/G	1

Signal Name	_	-	I	_	_	
Color of wire	Ь	٦	0	٦	Ь	
Terminal No.	8G	15G	34G	51G	52G	

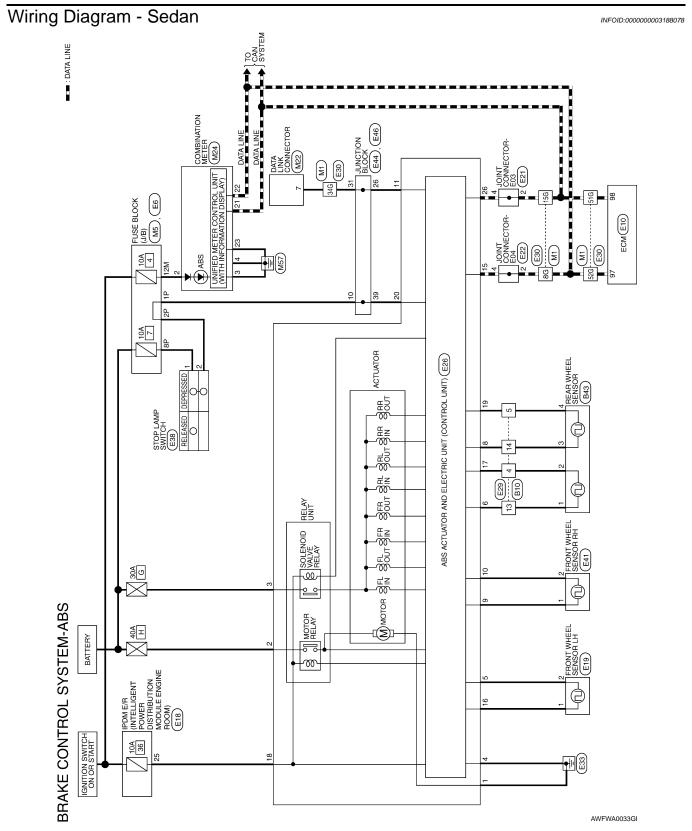


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< ECU DIAGNOSIS > [ABS]

Connector No. E38				A
Corrector No. E88 Corrector No. E84 Corrector No. E84 Corrector No. E44 Corrector No. E44 Corrector No. E45 Corrector No. E45 Corrector Color E45 Corrector Color E45 Corrector Color E45 Corrector No. E45 E4	ON BLOCK	Signal Name	Signal Name POWER_LH SIG_LH SIG_RH SIG_RH	
Connector Name STOP LAMP SWITCH Connector Name FEAT	E44 Inc.	Color of Wire SB		D
Connector No. E46 Connector No. E41 Connector No. E41 Connector No. E41 Connector No. E41 Connector No. E46 Connector No. E40 Connector No. E40	Connector No Connector Co Connector Co	Terminal No.	Connector No Connector No Connector No Connector O Connector O Connector O Connector O Connector No Connector	E
Connector No. E38 Connector Name STOP LAMP SWITCH Connector Color BLACK				BR
Connector No. E38 Connector Name STOP LAMP SWITCH (WITH M/T) Connector Color BLACK	WHEEL SENSOR RI	Signal Name	TO WIRE	
Connector No. E38 Connector Name STOP LAMP SWITCH (WITH M/T) Connector Color BLACK	ime FRONT		0. B10 ame WIRE	I
Connector No. E38	Connector No Connector No	Terminal No.	Connector N Connector C Connector C Terminal No 13 13	J
Connector No. E38 Connector Name STOP LA (WITH M Connector Color BLACK Terminal No. Wire Connector Name JUNCTI Connector Name JUNCTI Connector Color of Mire 2 R/G 2 B/G 31 0 39 P/B				K
Connector No. E38 Connector Name STOP LA (WITH M Connector Color BLACK Terminal No. Wire Connector Name JUNCTI Connector Name JUNCTI Connector Color of MITE Terminal No. Wire 2 R/G 31 0 31 0 0 31 0 0 39 P/B	SWITCH	Name I I I I	LOCK WING SEE SEE SEE SEE SEE SEE SEE SEE SEE SE	L
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BRAKE CONTROL SYSTEM CONNECTORS-ABS

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Connector No.	Connector Color WHITE			S.			Terminal No. Wire	12M			
				I]					
Signal Name	1	1	1	ı	ı						
Color of Wire	Ь	_	0	_	۵	-					
Terminal No. Wire	8G	15G	34G	51G	52G						
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Connector No.	Connector Color WHITE			S H				J		<u></u>	

					Г				ı	1		
	FUSE BLOCK (J/B)	TE	7P 6P 5P 4P] 3P 2P 1P 16P 15P 14P 13P 11P 10P 9P 8P			Signal Name	ı	ı	ı			
E6		or WH	7P 6P 5P 4P			color of Wire	SB	R/G	Y/R			
Connector No.	Connector Name	Connector Color WHITE	H.S.			Terminal No. Wire	1P	2P	8P			
				19 20								
	COMBINATION METER	TE		9 10 11 12 13 14 15 16 17 18 29 30 31 32 33 34 35 36 37 38		Signal Name	NSI	GND	GND	CAN-H	CAN-L	GND
M24		or WH		6 7 8 26 27 28		Solor of Wire	0	В	В	_	۵	В
Connector No.	Connector Name	Connector Color WHITE	H.S.	1 2 3 4 5 21 22 23 24 25		Terminal No. Wire	2	က	4	21	22	23
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	DATA LINK CONNECTOR	2	9 10 11 12 13 14 15 16 1			Signal Name	K-LINE					
M22	e DAT	Connector Color WHITE	9 10 11 1			olor of Wre	0					
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Connector No. E10 Connector No. E10 Connector Name ECM Connector Color BLACK E185 E185		Connector No. Connector Name Connector Color		PDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) WHITE		Connector No. E19 Connector Color GRAY MH.S.	Connector No. E19 Connector Color GRAY H.S.
Terminal No. Wire Signal Name 97 P CAN-L 98 L CAN-H	T D	9 10 11 3 4 5 5 Terminal No.	12 13 14 6 7 8 8 Color of Wire	ESEBETEBED 30 31 32 33 34	35 36	Terminal No. Wire 1 Golor of 2 R	Signal Name –
Connector No. E21 Connector Name JOINT CONNECTOR-E03 Connector Color WHITE	8 8 8	Connector No. Connector Name		E22 JOINT CONNECTOR-E04 WHITE			
斯 H.S.		H.S.	4	3 2 1 0			
Terminal No. Color of Wire Signal Name	E	Terminal No.	Color of Wire P	Signal Name			

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< ECU DIAGNOSIS > [ABS]

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onnector No.		Terminal No.	Color of wire	Signal Name	Connector Name WIRF TO WIRF
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onnector Color	r BLACK	ω	M/R	DP RR	
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1 2 3 4	5 6 7 8 9 10 11 12 13 14 15	16	ŋ	DP FL	Terminal No. Wire Signal Name
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٢	Jo roll	18	GR	IGN	5 B/R –
erminal No.	Wire Signal Name	19	B/R	DS RR	13 L/Y –
-	B MGND	20	P/B	BLS	14 W/R –
2	G/R UB (MR)	26	٦	CAN-H	
3	R/B UB (VR)				
4	B GND				
onnector No.	E30	Toriminal No	Color of	Signal Name	Connector No. E38
onnector Name	ne WIRE TO WIRE		Wire	Olgilal Nallie	Connector Name STOP LAMP SWITCH
onnector Color	r WHITE	8@	a	ı	(WITH CVT)
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	420 430 446 456 466 476 486 496 500				Terminal No. wire Signal Name
	516 526 536 546 586 810 810 820 830				1 Y/R –
	680 670 689 699 706 716 726				2 R/G –
	108 (30) (30) (30) (30) (30) (30) (30) (30)				
/	816 826 836				

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[ABS]

< ECU DIAGNOSIS >

TION BLOCK WN 3 2 1	Signal Name	B43 REAR WHEEL SENSOR	1	Signal Name	POWER_LH	SIG_LH	POWER_RH SIG RH
E44 JUNCTIC OF BROWN 5 4	Color of Wire SB	l e	or GRAY	Color of Wire	٨٦	W	W/R B/R
Connector No. E44	Terminal No.	Connector No.	Connector Color 研出。	Terminal No.	-	2 6	ω 4
Connector No. E41 Connector Name FRONT WHEEL SENSOR RH Connector Color GRAY H.S.	Terminal No. Wire Signal Name 1 B	Connector No. B10 Connector Name WIRE TO WIRE	Connector Color WHITE 2 3	Terminal No. Color of Signal Name			13 L/Y –
lame STOP LAMP SWITCH (WITH M/T)	Color of Signal Name 'Wire Signal Name 'Y/R - R/G -	Vo. E46 Vame JUNCTION BLOCK	WHITE Solution WHITE Solution Solu	Color of Signal Name	- 0	- 0	P/B –
Connector No. Connector Name Connector Color	Terminal No.	Connector No.	Connector Color	Terminal No.	56	31	36

INFOID:000000001341904

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ABS SYSTEM

Fail-Safe

In case of electrical malfunctions with ABS, the ABS warning lamp will turn on. Simultaneously, the ABS switches to the fail-safe mode.

• In case of a malfunction with ABS, the result of a fail-safe mode will be normal braking without the aid of ABS.

NOTE:

< ECU DIAGNOSIS > [ABS]

ABS self-diagnosis sound may be heard. That is a normal condition because a self-diagnosis for "Ignition switch ON" and "The first starting" are being performed.

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CAUTION:

If the Fail-Safe function is activated, then perform self-diagnosis for ABS control system.

DTC No. Index

CAUTION:

If the Fail-Safe function is activated, then perform self-diagnosis for VDC/TCS/ABS control system.

Display item	Malfunction detecting condition	Check item		
RR RH SENSOR-1 [C1101] ^{*1}	Circuit of rear RH wheel sensor is open. Or when the sensor power voltage is outside the standard.			
RR LH SENSOR-1 [C1102] ^{*1}	Circuit of rear LH wheel sensor is open. Or when the sensor power voltage is outside the standard.	BRC-16, "Diagno-		
FR RH SENSOR-1 [C1103] ^{*1}	Circuit of front RH wheel sensor is open. Or when the sensor power voltage is outside the standard.	(Note 1)		
FR LH SENSOR-1 [C1104] ^{*1}	Circuit of front LH wheel sensor is open. Or when the sensor power voltage is outside the standard.			
RR RH SENSOR-2 [C1105] ^{*1}	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.			
RR LH SENSOR-2 [C1106] ^{*1}	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.	BRC-19, "Diagno-sis Procedure"		
FR RH SENSOR-2 [C1107] ^{*1}	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.	(Note 1)		
FR LH SENSOR- 2 [C1108] ^{*1}	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.			
BATTERY VOLTAGE [ABNORMAL] [C1109]	When the ABS actuator and electric unit (control unit) power supply voltage is lower than normal.	BRC-22, "Diagnosis Procedure"		
CONTROLLER FAILURE [C1110] ^{*2}	When there is an internal malfunction in the ABS actuator and electric unit (control unit).	BRC-24, "Diagno- sis Procedure"		
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.			
[C1111]	During the actuator motor operating with OFF, when the actuator motor turns ON, or when the control line for relay is shorted to ground.	sis Procedure"		
MAIN RELAY	During the actuator relay operating with OFF, when the actuator relay turns ON. Or when the control line for the relay is shorted to the ground.	BRC-27, "Diagno-		
[C1114]	During the actuator relay operating with ON, when the actuator relay turns OFF, or when the control line for the relay is open.	sis Procedure"		
ABS SENSOR [ABNORMAL SIGNAL] [C1115]	When wheel sensor input signal is malfunctioning.	BRC-29, "Diagnosis Procedure" (Note 1)		
FR LH IN ABS SOL [C1120]	When the control unit detects a malfunction in the front left inlet solenoid circuit.	BRC-32, "Diagnosis Procedure"		
FR LH OUT ABS SOL [C1121]	When the control unit detects a malfunction in the front left outlet solenoid circuit.	BRC-34, "Diagnosis Procedure"		
FR RH IN ABS SOL [C1122]	When the control unit detects a malfunction in the front right inlet solenoid circuit.	BRC-32, "Diagnosis Procedure"		
FR RH OUT ABS SOL [C1123]	When the control unit detects a malfunction in the front right outlet solenoid circuit.	BRC-34, "Diagno- sis Procedure"		

< ECU DIAGNOSIS > [ABS]

Display item	Malfunction detecting condition	Check item
RR LH IN ABS SOL [C1124]	When the control unit detects a malfunction in the rear left inlet solenoid circuit.	BRC-32, "Diagno- sis Procedure"
RR LH OUT ABS SOL [C1125]	When the control unit detects a malfunction in the rear left outlet solenoid circuit.	BRC-34, "Diagno- sis Procedure"
RR RH IN ABS SOL [C1126]	When the control unit detects a malfunction in the rear right inlet solenoid circuit.	BRC-32, "Diagno- sis Procedure"
RR RH OUT ABS SOL [C1127]	When the control unit detects a malfunction in the rear right outlet solenoid circuit.	BRC-34, "Diagno- sis Procedure"
CAN COMM CIRCUIT [U1000]*3	When there is a malfunction in the CAN communication circuit.	BRC-36, "Diagno- sis Procedure"

^{*1:} Be sure to confirm the ABS warning lamp illuminates when the ignition switch is turned ON after repairing the shorted sensor circuit, but the lamp turns off when driving the vehicle over 30 km/h (19 MPH) for approximately 1 minute in accordance with SELF-DIAGNOSIS PROCEDURE.

^{*2:} When "CONTROLLER FAILURE" is displayed, check to see if the ABS warning lamp is burned out, and check the circuit between the ABS warning lamp and ABS actuator and electric unit (control unit) for open or short. Then, check the ABS actuator and electric unit (control unit) and circuit.

^{*3:} When malfunctions are detected in several systems, including CAN communication circuit [U1000], troubleshoot CAN communication circuit first. Refer to <u>LAN-7</u>, "System <u>Description</u>".

[ABS]

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SYMPTOM DIAGNOSIS

ABS

Symptom Table

INFOID:0000000001341906

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-54, "Diagno- sis Procedure"
4400)	Wheel sensor and rotor system	<u> </u>
Unavageted padal reaction	Brake pedal stroke	BRC-55, "Diagno-
Unexpected pedal reaction	Make sure the braking force is sufficient when the ABS is not operating.	sis Procedure"
The braking distance is long	Check stopping distance when the ABS is not operating.	BRC-56, "Diagno- sis Procedure"
ABS function does not operate (Note 1)	ABS actuator and electric unit (control unit)	BRC-57, "Diagno- sis Procedure"
Pedal vibration or ABS operation sound	Brake pedal	BRC-58, "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 (just place a foot on it). However, this is normal.
- When shifting gears
- When driving on slippery road
- During cornering at high speed
- When passing over bumps or grooves [at approximately 50 mm (1.97 in) or more]
- When pulling away just after starting engine [at approximately 10 km/h (6 MPH) or higher]

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[ABS]

EXCESSIVE ABS FUNCTION OPERATION FREQUENCY

Diagnosis Procedure

INFOID:0000000001341907

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-7</u>, "Removal and <u>Installation"</u>, Rear: <u>RAX-6</u>, "Removal and <u>Installation"</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.

· 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 inspection result normal?</u>

YES >> Normal

NO >> Perform self-diagnosis. Refer to BRC-9, "System Description".

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BRC-55

[ABS]

THE BRAKING DISTANCE IS LONG

Diagnosis Procedure

INFOID:0000000001341909

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 >> GO TO procedure 3 "CHECK WHEEL SENSOR AND SENSOR ROTOR" of symptom 1. Refer to BRC-53, "Symptom Table".

NO >> Check brake system.

ABS FUNCTION DOES NOT OPERATE

[ABS] < SYMPTOM DIAGNOSIS > **ABS FUNCTION DOES NOT OPERATE** Α Diagnosis Procedure INFOID:0000000001341910 **CAUTION:** В 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 >> GO TO procedure 3 "CHECK WHEEL SENSOR AND SENSOR ROTOR" of symptom 1. Refer to D BRC-53, "Symptom Table" NO >> Perform self-diagnosis. Refer to BRC-12, "CONSULT-III Function (ABS)". Е

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PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

< SYMPTOM DIAGNOSIS >

[ABS]

PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

Diagnosis Procedure

INFOID:0000000001341911

CAUTION:

Under the following conditions, ABS is activated and vibration is felt when brake pedal is lightly depressed (just place a foot on it). However, this is normal.

- When shifting gears
- When driving on slippery road
- During cornering at high speed
- When passing over bumps or grooves [at approximately 50 mm (1.97 in) or more]
- When pulling away just after starting engine [at approximately 10 km/h (6 MPH) or higher]

1.SYMPTOM CHECK 1

Check if there is pedal vibration or operation sound when the engine is started.

Do symptoms occur?

YES >> GO TO 2

NO >> Perform self -diagnosis. Refer to BRC-12, "CONSULT-III Function (ABS)".

2.SYMPTOM CHECK 2

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 >> GO TO procedure 3 "CHECK WHEEL SENSOR AND SENSOR ROTOR" of symptom 1. Refer to BRC-53, "Symptom Table".

NORMAL OPERATING CONDITION

< SYMPTOM DIAGNOSIS > [ABS]

NORMAL OPERATING CONDITION

Description INFOID:000000001341912

		В
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 ABS activation.	С
The brake pedal vibrates and motor operation noises occur from the engine room, after the engine starts and just after the vehicle starts.	This is a normal, and it is caused by the ABS operation check.	D

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< PRECAUTION > [ABS]

PRECAUTION

PRECAUTIONS

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

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.

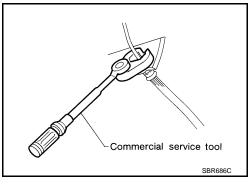
Precaution for Brake System

INFOID:0000000001341914

- Recommended fluid is brake fluid "DOT 3".
- Never reuse drained brake fluid.
- Be careful not to splash brake fluid on painted surface of body. If brake fluid is splashed on painted surfaces
 of body immediately wipe off then with cloth and then wash it away with water.
- Never use mineral oils such as gasoline or kerosene. They will ruin rubber parts of the hydraulic system.
- Use a flare nut wrench when removing flare nuts, and use a flare nut torque wrench when tighten brake tube flare nuts.
- When installing brake tubes, be sure to check torque.
- Brake system is an important safety part. If a brake fluid leak is detected, always disassemble the affected part. If a malfunction is detected, replace part with a new one.
- Before working, turn ignition switch OFF and disconnect connectors of ABS actuator and electric unit (control unit) or the battery cable from the negative terminal.

WARNING:

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



Precaution for Brake Control

INFOID:0000000001341915

- Just after starting vehicle after ignition switch ON, brake pedal may vibrate or motor operating noise may be heard from engine compartment. This is normal condition.
- When an error is indicated by ABS or another warning lamp, collect all necessary information from customer (what symptoms are present under what conditions) and check for simple causes before starting diagnostic servicing. Besides electrical system inspection, check brake booster operation, brake fluid level, and oil leaks.
- If tire size and type are used in an improper combination, or brake pads are not Genuine NISSAN parts, stopping distance or steering stability may deteriorate.
- ABS might be out of order or malfunctions by putting a radio (wiring inclusive), an antenna and a lead-in wire near the control unit.
- If aftermarket parts (car stereo, CD player, etc.) have been installed, check for incidents such as harness pinches, open circuits, and improper wiring.
- When replacing the following parts with parts other than genuine parts or making modifications: Suspension-related parts (shock absorber, spring, bushing, etc.), tires, wheels (other than specified sizes), brake-related

PRECAUTIONS

< PRECAUTION > [ABS]

parts (pad, rotor, caliper, etc.), engine-related parts (muffler, ECM, etc.) and body reinforcement-related parts (roll bar, tower bar, etc.).

- When driving with worn or deteriorated suspension, tires and brake-related parts.

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< PREPARATION > [ABS]

PREPARATION

PREPARATION

Special Service Tool

INFOID:0000000001341916

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	VFIA0101E	Checking operation of ABS active wheel sensor

Commercial Service Tool

INFOID:0000000001341917

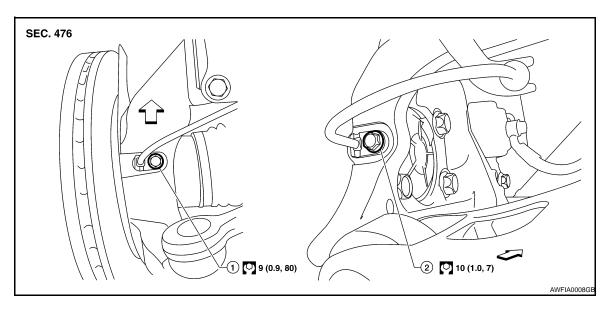
Tool name		Description
Flare nut crowfoot Torque wrench		Removing and installing brake piping a: 10mm (0.39 in)/12mm (0.47 in)
	S-NT360	

< ON-VEHICLE REPAIR > [ABS]

ON-VEHICLE REPAIR

WHEEL SENSORS

Removal and Installation



Front wheel sensor

Rear wheel sensor

← Front

CAUTION:

- Be careful not to damage wheel sensor edge and sensor rotor teeth.
- When removing the front or rear wheel hub assembly, first remove the wheel sensor from the assembly. Failure to do so may result in damage to the wheel sensor wires making the sensor inoperative.

CAUTION:

- Pull out the wheel sensor, being careful to turn it as little as possible. Do not pull on the wheel sensor harness.
- Installation should be performed while paying attention to the following, and then tighten bolts and nuts to the specified torque.
- Check if foreign objects such as iron fragments are adhered to the pick-up part of the sensor or to the inside of the hole for the wheel sensor, or if a foreign object is caught in the surface of the mating surface for the rotor. If something wrong is found, fix it and then install the wheel sensor.

REMOVAL

Front

- 1. Remove wheel and tire using power tool.
- Partially front wheel fender protector. Refer to <u>EXT-19</u>, "Removal and Installation".
- 3. Remove wheel sensor bolt and wheel sensor.
- Remove harness wire from mounts and disconnect wheel sensor harness connector.

Rear

NOTE:

Both rear wheel sensors share one harness and must be replaced as an assembly.

- 1. Remove wheel and tire using power tool.
- Remove wheel sensor bolts and wheel sensors from both rear wheels.
- Remove harness wire from mounts and harness wire clips from suspension member.

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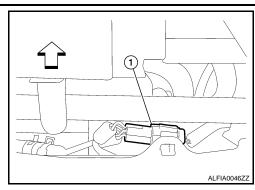
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4. Disconnect wheel sensor harness connector (1).



INSTALLATION

Installation is in the reverse order of removal.

• When installing wheel and tire, refer to WT-35, "Inspection".

SENSOR ROTOR

< ON-VEHICLE REPAIR > [ABS]

SENSOR ROTOR

Removal and Installation

INFOID:0000000001341920

The front and rear wheel sensor rotors are an integral part of the wheel hub assemblies and can not be disassembled. When replacing the sensor rotor, replace the wheel hub assembly. Refer to <u>FAX-7</u>, "Removal and <u>Installation"</u> (Front), <u>RAX-6</u>, "Removal and <u>Installation"</u> (Rear).

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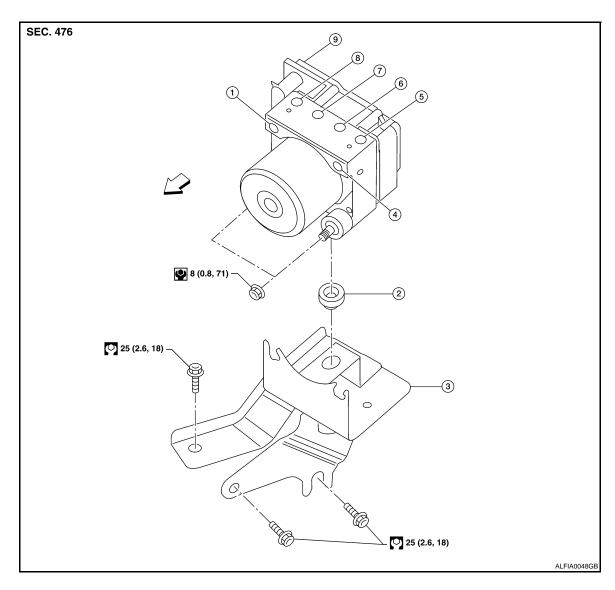
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[ABS]

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Exploded View INFOID:0000000001341921

COMPONENT



- 1. From master cylinder secondary side 2.
- Grommet
- **Bracket**

- 4. From master cylinder primary side
- 5. To front LH brake caliper
- To rear RH brake caliper

- To rear LH brake caliper
- To front RH brake caliper 8.
- ABS actuator and electric unit

Front

7.

Removal and Installation

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REMOVAL

CAUTION:

Be careful of the following.

- Before servicing, disconnect the battery cable from negative terminal.
- To remove brake tube, use a flare nut wrench to prevent flare nuts and brake tube from being damaged. To install, use flare nut torque wrench.
- Do not apply excessive impact to ABS actuator and electric unit (control unit), such as dropping it.
- Do not remove and install actuator by holding harness.
- After work is completed, bleed air from brake tube. Refer to BR-15, "Bleeding Brake System".

< ON-VEHICLE REPAIR > [ABS]

- 1. Remove front wiper arms. Refer to WW-40, "FRONT WIPER ARMS: Removal and Installation".
- 2. Remove cowl top. Refer to EXT-18, "Removal and Installation".
- Disconnect washer hose.
- 4. Remove tower bar, if equipped. Refer to FSU-11, "Exploded View".
- 5. Disconnect ABS actuator and electric unit (control unit) connector.
- 6. Loosen brake tube flare nuts, then remove brake tubes from ABS actuator and electric unit (control unit).
- 7. Remove ABS actuator and electric unit (control unit) nuts.
- 8. Remove ABS actuator and electric unit (control unit) from vehicle.
- Remove bracket as necessary.

INSTALLATION

CAUTION:

Be careful of the following.

- Before servicing, disconnect the battery cable from negative terminal.
- To remove brake tube, use a flare nut wrench to prevent flare nuts and brake tube from being damaged. To install, use flare nut torque wrench.
- . Do not apply excessive impact to ABS actuator and electric unit (control unit), such as dropping it.
- Do not remove and install actuator by holding harness.
- After work is completed, bleed air from brake tube. Refer to <u>BR-15, "Bleeding Brake System"</u>.
- After installing harness connector in the ABS actuator and electric unit (control unit), make sure connector is securely locked.

Installation is in the reverse order of removal.

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BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow INFOID:0000000001341923

DESCRIPTION

Basic Concept

• The most important point to perform trouble diagnosis is to understand systems (control and mechanism) in vehicle thoroughly.

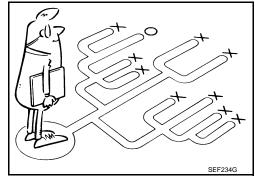
• It is also important to clarify customer complaints before inspec-

First of all, reproduce symptom, and understand it fully.

Ask customer about his/her complaints carefully. In some cases, they will be necessary to check symptom by driving vehicle with customer.

CAUTION:

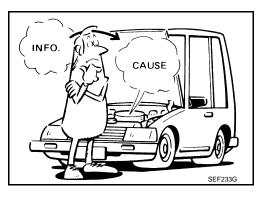
Customers are not professionals. Do not assume "maybe customer means..." or "maybe customer mentioned this symptom".



- It is essential to check symptoms right from beginning in order to repair a malfunction completely.
 - For an intermittent malfunction, it is important to reproduce symptom based on interview with customer and past examples. Do not perform inspection on ad hoc basis. Most intermittent malfunctions are caused by poor contacts. In this case, it will be effective to shake suspected harness or connector by hand. When repairs are performed without any symptom check, no one can judge if malfunction has actually been eliminated.
- · After diagnostic, make sure to perform "ERASE MEMORY". Refer to BRC-76, "CONSULT-III Function (ABS)".
- Always read "GI General Information" to confirm general precautions. Refer to GI-28, "General Precautions".

Asking Complaints

- Complaints against malfunction vary depending on each person. It is important to clarify customer complaints.
- Ask customer about what symptoms are present and under what conditions. Use information to reproduce symptom while driving.
- It is also important to use diagnostic sheet so as not to miss information.



KEY POINTS

WHAT Vehicle model WHEN Date, Frequencies WHERE Road conditions HOW Operating conditions,

> Weather conditions. **Symptoms**

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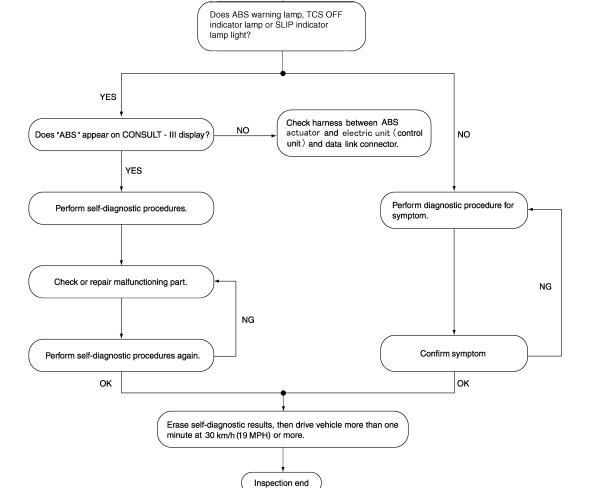
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DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

[TCS/ABS]

Diagnostic Work Sheet

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Customer name MR/MS	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)	☐ Warning / Indicator activate		☐ Firm pedal operation Large stroke pedal operation
	☐ TCS does not work (Rear wheels slip when accelerating)	☐ 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			

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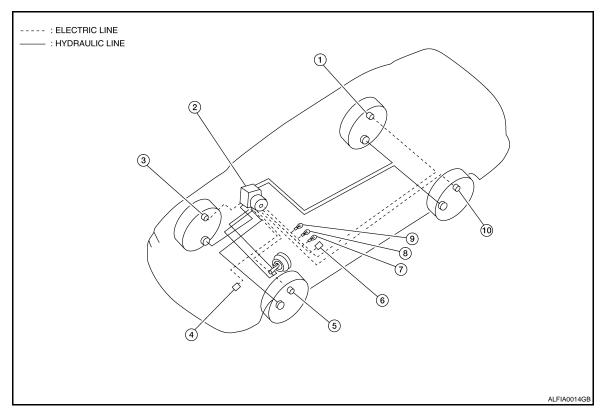
[TCS/ABS]

INFOID:0000000001341925

FUNCTION DIAGNOSIS

TCS

System Diagram



- 1. Rear RH wheel sensor
- 4. ECM
- 7. ABS Warning lamp indicator (combination meter)
- 10. Rear LH wheel sensor
- ABS actuator and electric unit (control unit)
- 5. Front LH wheel sensor
- 8. SLIP indicator lamp (combination meter)
- Front RH wheel sensor
- 6. TCF OFF switch
- TCS OFF indicator lamp (combination meter)

System Description

CAUTION:

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

ABS/EBD SYSTEM

In case of an electrical malfunction with the ABS, the ABS warning 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 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 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 or EBD system.

TCS SYSTEM

In case of TCS system malfunction, the SLIP indicator lamp is turned on and the condition of the vehicle is the same as the condition of vehicles without TCS system. In case of an electrical malfunction with the TCS system, the ABS control continues to operate normally without TCS control.

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PURPOSE

The Anti-lock Brake System (ABS) consists of electronic and hydraulic components. It allows for control of braking force so that locking of the wheels can be avoided.

The ABS:

- Ensures proper tracking performance through steering wheel operation.
- Enables obstacles to be avoided through steering wheel operation.
- Enables vehicle stability by preventing flat spins.

OPERATION

- When the vehicle speed is less than 10 km/h (6 MPH) this system does not work.
- The ABS has self-test capabilities. The system turns on the ABS warning lamp for 2 seconds after turning
 the ignition switch ON. The system performs another test the first time the vehicle reaches 6 km/h (4 MPH).
 A mechanical noise may be heard a sthe ABS performs a self-test. This is a normal part of the self-test feature. If a malfunction is found during this check, the ABS warning lamp will come on.
- During ABS operation, a mechanical noise may be heard. This is a normal condition.

FAIL SAFE

If trouble occurs in the ABS or TCS, the ABS warning lamp in the combination meter comes on. At the same time, the vehicle stops the ABS control and braking becomes the same as that of a vehicle without ABS.

ABS FUNCTION

- The Anti-Lock Brake System detects wheel revolution while braking and improves handling stability during sudden braking by electrically preventing wheel lockup. Maneuverability is also improved for avoiding obstacles.
- If the electrical system malfunctions, the Fail-Safe function is activated, the ABS becomes inoperative and the ABS warning lamp turns on.
- The electrical system can be diagnosed using CONSULT-III.
- During ABS operation, the brake pedal may vibrate lightly and a mechanical noise may be heard. This is normal.
- Just after starting the 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.

EBD FUNCTION

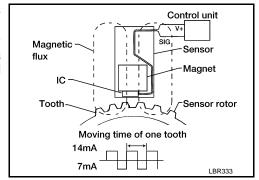
- Electronic Brake Distribution is a function that detects subtle slippages between the front and rear wheels during braking, and it improves handling stability by electronically controlling the brake fluid pressure which results in reduced rear wheel slippage.
- If the electrical system malfunctions, the Fail-Safe function is activated, the EBD and ABS become inoperative, and the ABS warning lamp and BRAKE warning lamp are turned on.
- The electrical system can be diagnosed using CONSULT-III.
- During EBD operation, the brake pedal may vibrate lightly and a mechanical noise may be heard. This is normal.
- Just after starting the 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 EBD when vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.

TCS FUNCTION

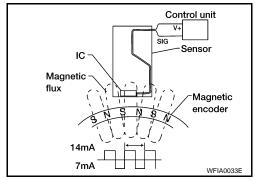
- Spinning of the drive wheels is detected by the ABS/TCS control unit using inputs from the wheel speed sensors. If wheel spin occurs, the drive wheel right and left brake fluid pressure control and engine fuel cut are conducted while the throttle value is restricted to reduce the engine torque and decrease the amount of wheel spin. In addition, the throttle opening is controlled to achieve the optimum engine torque.
- Depending on road condition, the vehicle may have a sluggish feel. This is normal, because optimum traction has the highest priority during TCS operation.
- TCS may be activated during sudden vehicle acceleration, wide open throttle acceleration, sudden transmission shifts or when the vehicle is driven on a road with a varying surface friction coefficient.
- The SLIP indicator lamp flashes to inform the driver of TCS operation.

WHEEL SENSORS

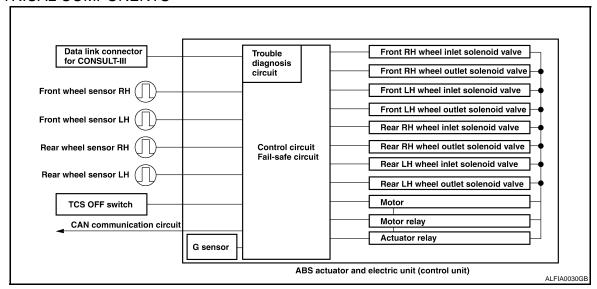
The front sensor units consist of a gear-shaped sensor rotor and a sensor element. The element contains a magnet around which a coil is wound. The front wheel sensors are installed on the front of the wheel knuckles. As the wheel rotates, the sensor generates a square-wave signal. The frequency increases as the wheel speed increases.



The rear sensor units consist of wheel hubs with a series of internal magnets and a sensor element. The rear wheel sensors are installed on the inner side of the wheel knuckles. As the wheel rotates, the sensor generates a square-wave signal. The frequency increases as the wheel speed increases.



ELECTRICAL COMPONENTS



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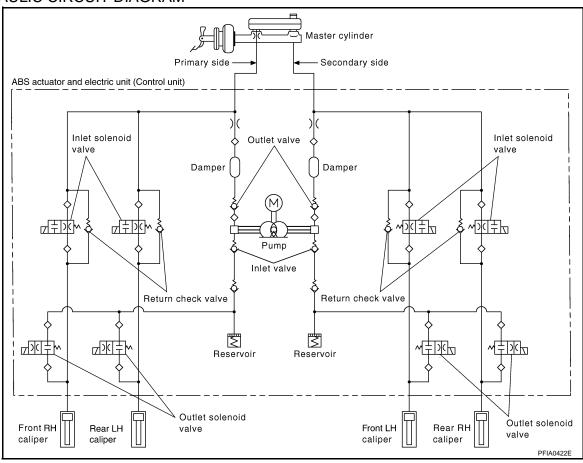
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HYDRAULIC CIRCUIT DIAGRAM



OPERATION THAT IS NOT "SYSTEM ERROR"

ABS/TCS

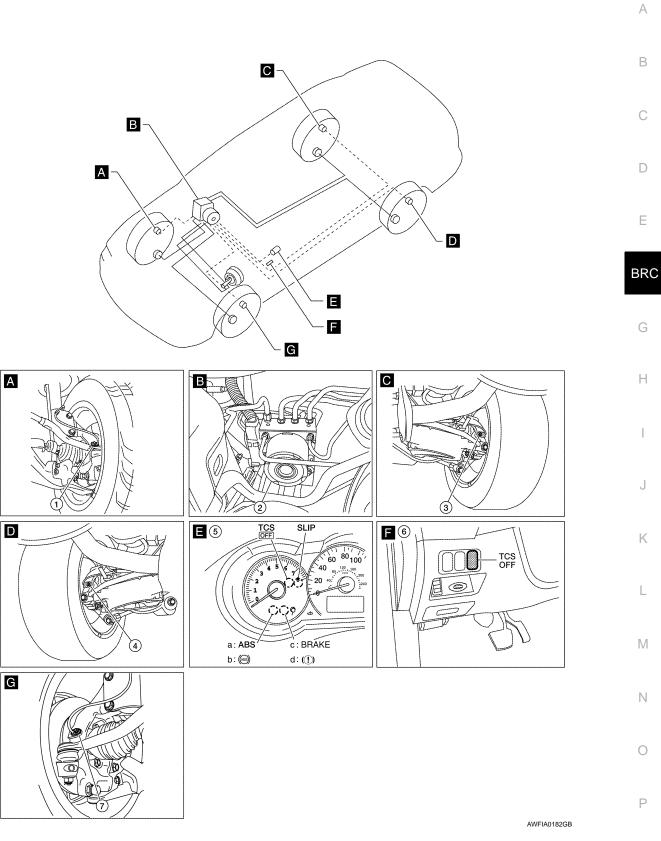
- When starting engine or just after starting vehicle, brake pedal may vibrate or the motor operating sound may be heard from engine room. This is a normal states of the operation check.
- During ABS operation, brake pedal lightly vibrates and a mechanical sound may be heard. This is normal.
- Stopping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

CAN Communication

Refer to LAN-7, "System Description".

Component Parts Location

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- 1. Front wheel sensor RH E41
- ABS actuator and electric unit (control 3. unit) E26 (engine removed for clarity)
- Rear wheel sensor RH B43

TCS ON/OFF switch M72

- 4. Rear wheel sensor LH B43
- 5. Combination meter M24
 - a: US models
 - b: Canada models
 - c: US models
 - d: Canada models
- 7. Front wheel sensor LH E19

Component Description

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Compo	Reference	
ADC activities and all activities with (acceptable with)	Pump	BRC-90, "Description"
	Motor	BICC-90, Description
ABS actuator and electric unit (control unit)	Actuator relay (Main relay)	BRC-92, "Description"
	Solenoid valve	BRC-97, "Description"
Wheel sensor	BRC-81, "Description"	
TCS OFF switch	BRC-105, "Description"	
ABS warning lamp	BRC-103, "Description"	
Brake warning lamp	BRC-104, "Description"	

CONSULT-III Function (ABS)

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SELF-DIAGNOSIS RESULTS

Operation Procedure

- 1. Turn ignition switch ON.
- 2. Start engine and drive vehicle at 30 km/h (19 MPH) or more for approximately 1 minute.
- After stopping vehicle, with the engine running, touch "ABS", "SELF-DIAG RESULTS" in order on the CONSULT-III screen.
- The self-diagnostic results are displayed.
 - Check ABS warning lamp, TCS OFF indicator lamp, SLIP indicator lamp and brake warning lamp turn
 off. If "NO FAILURE" is displayed, refer to <u>BRC-103</u>, "<u>Description</u>".
- 5. Perform the appropriate inspection from display item list, and repair or replace the malfunctioning component.Refer to "Display Item List".
- 6. Start engine and drive vehicle at 30 km/h (19 MPH) or more for approximately 1 minute.

CAUTION:

When the wheel sensor malfunctions, after inspecting the wheel sensor system, the ABS warning lamp, SLIP indicator lamp and brake warning lamp will not turn off even when the system is normal unless the vehicle is driving at approximately 30 km/h (19 MPH) or more for approximately 1 minute.

Erase Memory

- Turn ignition switch OFF.
- Start engine and touch "ABS", "SELF-DIAG RESULTS", "ERASE MEMORY" in order on the CONSULT-III screen to erase the diagnostic memory.
 If "ABS" is not indicated, go to GI-50, "Description".

CAUTION:

If the diagnostic memory is not erased, re-perform the operation from step 6 above.

- Perform self-diagnosis again, and make sure that diagnostic memory is erased.
- 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, TCS OFF indicator lamp, SLIP indicator lamp and brake warning lamp turn off.

NOTE:

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- Brake warning lamp will turn on in case of parking brake operation (when switch is ON) or with brake fluid level switch operation (when brake fluid is insufficient).
- TCS OFF switch should not stay in the "ON" position.

Display Item List

Display item	Malfunction detecting condition	Check item
RR RH SENSOR-1 [C1101]	Circuit of rear RH wheel sensor is open. Or when the sensor power voltage is outside the standard.	
RR LH SENSOR-1 [C1102]	Circuit of rear LH wheel sensor is open. Or when the sensor power voltage is outside the standard.	
FR RH SENSOR-1 [C1103]	Circuit of front RH wheel sensor is open. Or when the sensor power voltage is outside the standard.	
FR LH SENSOR-1 [C1104]	Circuit of front LH wheel sensor is open. Or when the sensor power voltage is outside the standard.	
RR RH SENSOR-2 [C1105]	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.	
RR LH SENSOR-2 [C1106]	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.	
FR RH SENSOR-2 [C1107]	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.	
FR LH SENSOR- 2 [C1108]	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.	
BATTERY VOLTAGE [ABNORMAL] [C1109]	When the ABS actuator and electric unit (control unit) power supply voltage is lower than normal.	BRC-87, "Diagnosis Procedure"
CONTROLLER FAILURE [C1110]	When there is an internal malfunction in the ABS actuator and electric unit (control unit).	BRC-89, "Diagno- sis Procedure"
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.	BRC-90, "Diagno-
[C1111]	During the actuator motor operating with OFF, when the actuator motor turns ON, or when the control line for relay is shorted to ground.	sis Procedure"
MAIN RELAY [C1114]	Actuator solenoid valve relay is ON, even if control unit sends OFF signal. Actuator solenoid valve relay is OFF, even if control unit sends ON signal.	BRC-92, "Diagno- sis Procedure"
ABS SENSOR [C1115]	Teeth damage on sensor rotor or improper installation of wheel sensor.	BRC-94, "Diagno- sis Procedure"
FR LH IN ABS SOL [C1120]	When the control unit detects a malfunction in the front left inlet solenoid circuit.	BRC-97, "Diagno- sis Procedure"
FR LH OUT ABS SOL [C1121]	When the control unit detects a malfunction in the front left outlet solenoid circuit.	BRC-99, "Diagno- sis Procedure"
FR RH IN ABS SOL [C1122]	When the control unit detects a malfunction in the front right inlet solenoid circuit.	BRC-97, "Diagno- sis Procedure"
FR RH OUT ABS SOL [C1123]	When the control unit detects a malfunction in the front right outlet solenoid circuit.	BRC-99, "Diagno- sis Procedure"
RR LH IN ABS SOL [C1124]	When the control unit detects a malfunction in the rear left inlet solenoid circuit.	BRC-97, "Diagno- sis Procedure"
RR LH OUT ABS SOL [C1125]	When the control unit detects a malfunction in the rear left outlet solenoid circuit.	BRC-99, "Diagno- sis Procedure"
RR RH IN ABS SOL [C1126]	When the control unit detects a malfunction in the rear right inlet solenoid circuit.	BRC-97, "Diagno- sis Procedure"
RR RH OUT ABS SOL [C1127]	When the control unit detects a malfunction in the rear right outlet solenoid circuit.	BRC-99, "Diagno- sis Procedure"

Display item	Malfunction detecting condition	Check item
ENGINE SIGNAL 1 [C1130]	Fuel cut control abnormal.	
ENGINE SIGNAL 2 [C1131]	Electric throttle control abnormal.	BRC-101, "Diagno-
ENGINE SIGNAL 3 [C1132]	ECM CAN communication abnormal.	sis Procedure"
ENGINE SIGNAL 4 [C1133]	ECM communication to ABS actuator and electric unit (control unit) abnormal.	
CAN COMM CIRCUIT [U1000]	When there is a malfunction in the CAN communication circuit.	BRC-102, "Diagno- sis Procedure"

Note: After completing repairs of shorted sensor circuit, when ignition switch is turned ON, ABS warning lamp turns on. Make sure that ABS warning lamp turns off while driving vehicle at 30 km/h (19 MPH) or more for approximately 1 minute according to self-diagnosis procedure. In addition, if wheel sensor 2 is displayed for wheels, check wheel sensor circuit and also check control unit power voltage.

DATA MONITOR

Display Item List

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.

Item	Data	monitor item sel	ection	
(Unit)	ECU INPUT SIGNALS	MAIN SIG- NALS	SELECTION FROM MENU	Remarks
FR LH SENSOR (km/h)	×	×	×	Wheel speed calculated by front LH wheel sensor signal is displayed.
FR RH SENSOR (km/h)	×	×	×	Wheel speed calculated by front RH wheel sensor signal is displayed.
RR LH SENSOR (km/h)	×	×	×	Wheel speed calculated by rear LH wheel sensor signal is displayed.
RR RH SENSOR (km/h)	×	×	×	Wheel speed calculated by rear RH wheel sensor signal is displayed.
STOP LAMP SW (ON/OFF)	×	×	×	Stop lamp switch (ON/OFF) status is displayed.
BATTERY VOLT (V)	×	×	×	Voltage supplied to ABS actuator and electric unit (control unit) is displayed.
GEAR	×	×	×	Gear position judged by PNP switch signal is displayed.
SLCT LVR POSI	×	×	×	Shift position judged by PNP switch signal.
OFF SW (ON/OFF)	×	×	×	TCS OFF switch (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.
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.

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.
ABS WARN LAMP (ON/OFF)	_	×	×	ABS warning lamp (ON/OFF) status is displayed.
OFF LAMP (ON/OFF)	_	×	×	TCS OFF lamp (ON/OFF) status is displayed.
SLIP LAMP (ON/OFF)	_	×	×	SLIP indicator lamp (ON/OFF) status is displayed.

^{×:} Applicable

Note: A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

ACTIVE TEST

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, TCS indicator lamp, SLIP indicator lamp and brake warning lamp are on.
- ABS warning lamp, TCS OFF indicator lamp, SLIP indicator lamp and brake warning lamp are on during active test.

Operation Procedure

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" to restart the process.

Solenoid Valve

NOTE:

The example shown is for front right wheel. The procedure for the other wheels is the same as given below.

- 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 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 (IN, OUT) operate as shown in the table below.

Operation	ABS solenoid valve			ABS solenoid valve (ACT)		
(Note)	UP	KEEP	DOWN	UP	ACT UP	ACT KEEP
FR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
FR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF

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

Note: A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

ABS Motor

Touch "ON" and "OFF" on screen. Make sure motor relay and actuator relay operates as shown in table below.

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^{-:} Not applicable

Operation	ON	OFF
MOTOR RELAY	ON	OFF
ACTUATOR RLY (Note)	ON	ON

Note: A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

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COMPONENT DIAGNOSIS

C1101, C1102, C1103, C1104 WHEEL SENSOR-1

Description INFOID:0000000001341930

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:0000000001341931

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

>> Proceed to diagnosis procedure. Refer to BRC-81, "Diagnosis Procedure". YES

NO >> INSPECTION END

DTC Confirmation Procedure

Diagnosis Procedure

CAUTION:

Do not check between wheel sensor terminals.

1. CHECK CONNECTOR

INSPECTION PROCEDURE

Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26 and malfunctioning wheel sensor connector E41 (FR-RH), E19 (FR-LH), B43 (RR-RH and RR-LH). Check terminal to see if it is deformed, disconnected, loose, etc., Repair or replace it if any malfunction condition is found.

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

2.check wheel sensor output signal

- Disconnect connectors from wheel sensor of malfunction code No.
- Connect ABS active wheel sensor tester (J-45741) to wheel sensor using appropriate adapter.
- Turn on the ABS active wheel sensor tester power switch.

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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.

4. 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 wheel sensor. Refer to BRC-133, "Removal and Installation".

3.CHECK TIRE

Check air pressure, wear and size.

Are air pressure, wear and size within standard?

YES >> GO TO 4

NO >> • Adjust air pressure, or replace tire.

Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

4.CHECK WHEEL BEARINGS

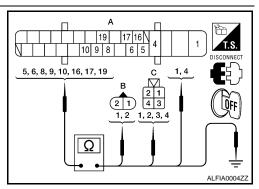
Check wheel bearing axial end play. Refer to <u>FAX-5</u>, "<u>Inspection</u>" (front) or <u>RAX-5</u>, "<u>On-vehicle Service</u>" (rear). <u>Is the inspection result normal?</u>

YES >> GO TO 5

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

5. CHECK WHEEL SENSOR HARNESS

- Turn ignition switch OFF and disconnect malfunctioning wheel sensor connector E41 (FR-RH), E19 (FR-LH), B43 (RR-RH and RR-LH) and ABS actuator and electric unit (control unit) connector E26.
- Check continuity between terminals. (Also check continuity when steering wheel is turned right and left and when sensor harness inside the wheel house is moved.)



	Power sup	oply circuit	Signal	Signal circuit		round circuit
Wheel	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (Signal - Ground) (A)	ABS actuator and electric unit (control unit) (A) (Signal) - Body Ground
Front RH	9	1	10	2	9, 10 - 1, 4	9, 10 - Body ground
Front LH	16	1	5	2	16, 5 - 1, 4	16, 5 - Body ground
Rear RH	8	3	19	4	8, 19 - 1, 4	8, 19 - Body ground
Rear LH	6	1	17	2	6, 17 - 1, 4	6, 17 - Body ground

Power supply circuit : Continuity should exist.

Signal circuit : Continuity should exist.

Ground circuit : Continuity should not exist.

Is the inspection result normal?

YES >> GO TO 6

NO >> • Repair or replace malfunctioning components.

< COMPONENT DIAGNOSIS >

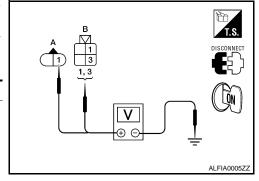
[TCS/ABS]

• Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

6.CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

- Reconnect ABS actuator and electric unit (control unit) connec-
- 2. Turn ignition switch ON and check between wheel sensor harness connector power supply terminal and ground.

Wheel	Wheel sensor	Ground	Voltage
Front RH (A)			
Front LH (A)	1		8 V or more
Rear LH (B)		_	8 v di more
Rear RH (B)	3		



Is the inspection result normal?

YES >> Inspection end.

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

Component Inspection

INFOID:0000000001341933

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 BRC-81, "Diagnosis Procedure". **BRC**

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C1105, C1106, C1107, C1108 WHEEL SENSOR-2

Description INFOID:000000001341934

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	Circuit of rear RH wheel sensor is open. Or when the sensor power voltage is outside the standard.	
C1106	RR LH SENSOR-2	Circuit of rear LH wheel sensor is open. Or when the sensor power voltage is outside the standard.	Harness or connectorWheel sensor
C1107	FR RH SENSOR-2	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)
C1108	FR LH SENSOR-2	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-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-84, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001341936

CAUTION:

Do not check between wheel sensor terminals.

INSPECTION PROCEDURE

1. CHECK CONNECTOR

Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26 and malfunctioning wheel sensor connector E41 (FR-RH), E19 (FR-LH), B43 (RR-RH and RR-LH). Check terminal to see if it is deformed, disconnected, loose, etc., Repair or replace it if any malfunction condition is found.

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

2.CHECK WHEEL SENSOR OUTPUT SIGNAL

- 1. Disconnect connectors from wheel sensor of malfunction code No.
- Connect ABS active wheel sensor tester (J-45741) to wheel sensor using appropriate adapter.
- 3. 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.

4. 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 wheel sensor. Refer to <u>BRC-133</u>, "Removal and Installation".

3. CHECK TIRE

Check air pressure, wear and size.

Are air pressure, wear and size within standard?

YES >> GO TO 4

NO >> • Adjust air pressure, or replace tire.

• Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

4. CHECK WHEEL BEARINGS

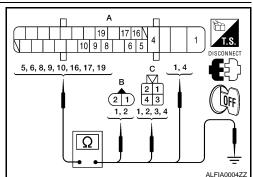
Check wheel bearing axial end play. Refer to <u>FAX-5</u>, "<u>Inspection</u>" (front) or <u>RAX-5</u>, "<u>On-vehicle Service</u>" (rear). <u>Is the inspection result normal?</u>

YES >> GO TO 5

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

5. CHECK WHEEL SENSOR HARNESS

- Turn ignition switch OFF and disconnect malfunctioning wheel sensor connector E41 (FR-RH), E19 (FR-LH), B43 (RR-RH and RR-LH) and ABS actuator and electric unit (control unit) connector E26.
- Check continuity between terminals. (Also check continuity when steering wheel is turned right and left and when sensor harness inside the wheel house is moved.)



	Power sup	oply circuit	Signal	circuit	G	round circuit
Wheel	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (Signal - Ground) (A)	ABS actuator and electric unit (control unit) (A) (Signal) - Body Ground
Front RH	9	1	10	2	9, 10 - 1, 4	9, 10 - Body ground
Front LH	16	1	5	2	16, 5 - 1, 4	16, 5 - Body ground
Rear RH	8	3	19	4	8, 19 - 1, 4	8, 19 - Body ground
Rear LH	6	1	17	2	6, 17 - 1, 4	6, 17 - Body ground

Power supply circuit : Continuity should exist.

Signal circuit : Continuity should exist.

Ground circuit : Continuity should not exist.

Is the inspection result normal?

YES >> GO TO 6

NO >> • Repair or replace malfunctioning components.

Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

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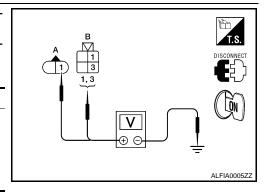
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6. CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

- Reconnect ABS actuator and electric unit (control unit) connector
- 2. Turn ignition switch ON and check between wheel sensor harness connector power supply terminal and ground.

Wheel	Wheel sensor	Ground	Voltage
Front RH (A)			
Front LH (A)	1		8 V or more
Rear LH (B)		— 8 V OF MC	
Rear RH (B)	3		



Is the inspection result normal?

YES >> Inspection end.

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

Component Inspection

INFOID:0000000001341937

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 BRC-84, "Diagnosis Procedure".

DTC C1109 BATTERY VOLTAGE [ABNORMAL]

< COMPONENT DIAGNOSIS >

[TCS/ABS]

DTC C1109 BATTERY VOLTAGE [ABNORMAL]

Description INFOID:0000000001341938

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 <u>BRC-87</u>, "<u>Diagnosis Procedure</u>".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001341940

INSPECTION PROCEDURE

1. CHECK CONNECTOR

- 1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26, 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.

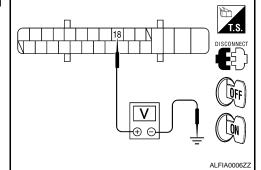
Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2

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

- 1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26.
- 2. Check voltage between ABS actuator and electric unit (control unit) harness connector E26 terminal 18 and ground.



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DTC C1109 BATTERY VOLTAGE [ABNORMAL]

< COMPONENT DIAGNOSIS >

[TCS/ABS]

ABS actuator and electric unit (control unit)	Ground	Condition	Voltage
18	_	Ignition switch ON	Battery voltage (Approx. 12 V)
10		Ignition switch OFF	Approx. 0 V

- 3. Turn ignition switch OFF.
- 4. Check continuity between ABS actuator and electric unit (control unit) harness connector E26 terminal 1, 4 and ground.

ABS actuator and electric unit (control unit)	Ground	Continuity
1, 4		Yes

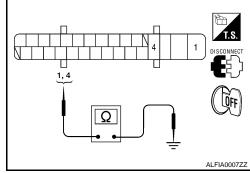
Is the inspection result normal?

YES

- >> Check battery for terminal looseness, low voltage, etc. If any malfunction is found, repair malfunctioning parts.
 - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".



- >> Repair or replace malfunctioning components.
 - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".



DTC C1110 CONTROL FAILURE

< COMPONENT DIAGNOSIS >	
< COMPONENT DIAGNOSIS >	

[TCS/ABS]

DTC C1110 CONTROL FAILURE

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)

DTC CONFIRMATION PROCEDURE

1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
CONTROLLER FAILURE

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-89, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001341942

INSPECTION PROCEDURE

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

CAUTION:

Replace ABS actuator and electric unit (control unit) when self-diagnostic result shows items other than that applicable.

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

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DTC C1111 PUMP MOTOR

Description INFOID:000000001341943

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
	T GWI WOTOK	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-90</u>, "<u>Diagnosis Procedure</u>".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001341945

INSPECTION PROCEDURE

1. CHECK CONNECTOR

- Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26, 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.

Is the inspection result normal?

YES >> Inspection end.

NO >> GO TO 2

2. CHECK ABS MOTOR AND MOTOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26.

DTC C1111 PUMP MOTOR

< COMPONENT DIAGNOSIS >

[TCS/ABS]

Check voltage between the ABS actuator and electric unit (control unit) harness connector E26 terminal 2 and ground.

ABS actuator and electric unit (control unit)	Ground	Voltage
2	_	Battery voltage (Approx. 12 V)

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Is the inspection result normal?

YES >> GO TO 3

NO

NO

>> • Repair or replace malfunctioning components.

• Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

$3.\,$ CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) GROUND CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) harness connector E26 terminal 1, 4 and ground.

ABS actuator and electric unit (control unit)	Ground	Continuity
1, 4	_	Yes

OFF

Is the inspection result normal?

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

> • Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

>> • Repair or replace malfunctioning components.

· Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

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 (Note)	ON	ON

NOTE:

A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to BRC-90, "Diagnosis Procedure".

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DTC C1114 MAIN RELAY

Description INFOID:000000001341947

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	
C1114 MAIN RELAY		During the actuator relay operating with OFF, when the actuator relay turns ON, or when the control line for the relay is shorted to the ground.	Harness or connector ABS actuator and electric unit	
01114	IVIAIIV NELAT	During the actuator relay operating with ON, when the actuator relay turns ON, or when the control line for the relay is open.	(control unit)	

DTC CONFIRMATION PROCEDURE

1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results	
MAIN RELAY	

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-92, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001341949

INSPECTION PROCEDURE

1. CHECK CONNECTOR

- Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26, 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.

Is the inspection result normal?

YES >> Inspection end.

NO >> GO TO 2

2.CHECK SOLENOID AND ACTUATOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26.

2. Check voltage between ABS actuator and electric unit (control unit) harness connector E26 terminal 3 and ground.

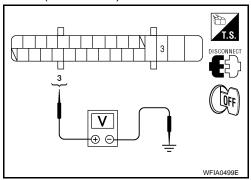
ABS actuator and electric unit (control unit)	Ground	Voltage
3	_	Battery voltage (Approx. 12 V)

Is the inspection result normal?

YES >> GO TO 3

NO

- >> Repair or replace malfunctioning components.
 - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".



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

Check continuity between ABS actuator and electric unit (control unit) harness connector E26 terminal 1, 4 and ground.

ABS actuator and electric unit (control unit)	Ground	Continuity
1, 4	_	Yes

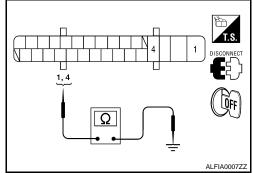
Is the inspection result normal?

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

 Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

>> • Repair or replace malfunctioning components.

 Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".



INFOID:0000000001341950

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 (Note)	ON	ON

NOTE:

NO

A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to BRC-92, "Diagnosis Procedure".

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DTC C1115 ABS SENSOR [ABNORMAL SIGNAL]

Description INFOID:000000001341951

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 BRC-94, "Diagnosis Procedure".

NO >> Inspection end.

Diagnosis Procedure

INFOID:0000000001341953

CAUTION:

Do not check between wheel sensor terminals.

INSPECTION PROCEDURE

1.CHECK TIRE

Check air pressure, wear and size.

Are air pressure, wear and size within standard?

YES >> GO TO 2

NO >> • Adjust air pressure, or replace tire.

• Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

2. CHECK SENSOR AND SENSOR ROTOR

- · Check sensor rotor for damage.
- Check wheel sensor for damage, disconnection or looseness.

Is the inspection result normal?

YES >> GO TO 3

NO >> • Repair wheel sensor mount or replace sensor rotor. Then perform the self-diagnosis.

Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

3. CHECK CONNECTOR

- Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26 and malfunctioning wheel sensor connector E41 (FR-RH), E19 (FR-LH), B43 (RR-RH and RR-LH). Check terminal to see if it is deformed, disconnected, loose, etc., Repair or replace it if any malfunction condition is found.
- 2. Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-76, "CONSULT-III Function (ABS)"</u>.

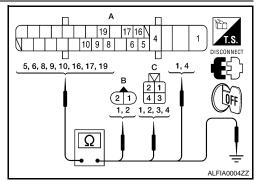
Is the inspection result normal?

YES >> Inspection end.

NO >> GO TO 4

4. CHECK WHEEL SENSOR HARNESS

- Turn ignition switch OFF and disconnect malfunctioning wheel sensor connector E41 (FR-RH), E19 (FR-LH), B43 (RR-RH and RR-LH) and ABS actuator and electric unit (control unit) connector E26.
- 2. Check continuity between terminals. (Also check continuity when steering wheel is turned right and left and when sensor harness inside the wheel house is moved.)



[TCS/ABS]

	Power sup	oply circuit	Signal	circuit	G	round circuit
Wheel	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (Signal - Ground) (A)	ABS actuator and electric unit (control unit) (A) (Signal) - Body Ground
Front RH	9	1	10	2	9, 10 - 1, 4	9, 10 - Body ground
Front LH	16	1	5	2	16, 5 - 1, 4	16, 5 - Body ground
Rear RH	8	3	19	4	8, 19 - 1, 4	8, 19 - Body ground
Rear LH	6	1	17	2	6, 17 - 1, 4	6, 17 - Body ground

Power supply circuit : Continuity should exist. Signal circuit : Continuity should exist. **Ground circuit** : Continuity should not exist.

Is the inspection result normal?

YES >> GO TO 5 NO

>> • Repair or replace malfunctioning components.

Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

${f 5}$.CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

Replace wheel sensor that resulted in malfunction by self-diagnosis.

Reconnect connectors, drive vehicle at 30 km/h (19 MPH) or more for approximately 1 minute, and then perform self-diagnosis.

Is above displayed on the self-diagnosis display?

YES >> Inspection end.

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

Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

Component Inspection

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)
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INFOID:0000000001341954

DTC C1115 ABS SENSOR [ABNORMAL SIGNAL]

< COMPONENT DIAGNOSIS > [TCS/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 <u>BRC-94</u>, "<u>Diagnosis Procedure</u>".

C1120, C1122, C1124, C1126 IN ABS SOL

Description INFOID:0000000001341955

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

DTC Logic INFOID:0000000001341956

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
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?

>> Proceed to diagnosis procedure. Refer to BRC-97, "Diagnosis Procedure". YES

NO >> Inspection end.

Diagnosis Procedure

INFOID:0000000001341957

INSPECTION PROCEDURE

1. CHECK CONNECTOR

Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26, check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.

Reconnect connector and perform self-diagnosis.

Is the inspection result normal?

YES >> Inspection end.

NO >> GO TO 2

2.CHECK SOLENOID AND ACTUATOR RELAY POWER SUPPLY CIRCUIT

Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26.

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< COMPONENT DIAGNOSIS >

[TCS/ABS]

Check voltage between ABS actuator and electric unit (control unit) harness connector E26 terminal 3 and ground.

ABS actuator and electric unit (control unit)	Ground	Voltage
3	_	Battery voltage (Approx. 12 V)

Is the inspection result normal?

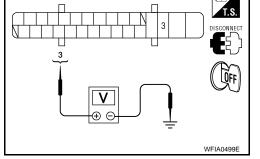
YES >> GO TO 3

NO

NO

>> • Repair or replace malfunctioning components.

• Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".



$3.\,$ CHECK SOLENOID AND ACTUATOR RELAY GROUND CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) harness connector E26 terminal 1, 4 and ground.

ABS actuator and electric unit (control unit)	Ground	Continuity
1, 4	1	Yes

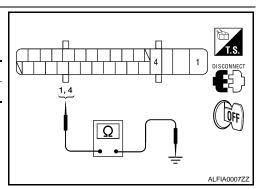
Is the inspection result normal?

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

• Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

>> • Repair or replace malfunctioning components.

• Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".



Component Inspection

INFOID:0000000001341958

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.

NOTE:

The example below is for front right wheel. The procedure for the other wheels is the same as given below.

Operation (Note)	ABS solenoid valve		
	UP	KEEP	DOWN
FR RH IN SOL	OFF	ON	ON
FR RH OUT SOL	OFF	OFF	ON*

^{*:} ON for 1 to 2 seconds after the touch, and then OFF.

A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

Is the inspection result normal?

YES >> Inspection end.

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

C1121, C1123, C1125, C1127 OUT ABS SOL

Description (INFOID:000000001341959)

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-99</u>, "<u>Diagnosis Procedure</u>".

NO >> Inspection end.

Diagnosis Procedure

INSPECTION PROCEDURE

1. CHECK CONNECTOR

1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26, 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.

Is the inspection result normal?

YES >> Inspection end.

NO >> GO TO 2

2.CHECK SOLENOID AND ACTUATOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26.

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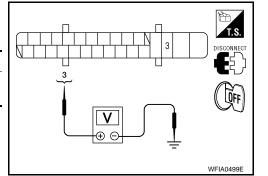
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< COMPONENT DIAGNOSIS >

[TCS/ABS]

Check voltage between ABS actuator and electric unit (control unit) harness connector E26 terminal 3 and ground.

ABS actuator and electric unit (control unit)	Ground	Voltage
3	_	Battery voltage (Approx. 12 V)



Is the inspection result normal?

YES >> GO TO 3

NO

NO

- >> Repair or replace malfunctioning components.
 - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

$3.\,$ CHECK SOLENOID AND ACTUATOR RELAY GROUND CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) harness connector E26 terminal 1, 4 and ground.

ABS actuator and electric unit (control unit)	Ground	Continuity
1, 4		Yes

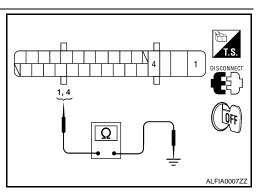
Is the inspection result normal?

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

• Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

>> • Repair or replace malfunctioning components.

• Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".



Component Inspection

INFOID:0000000001341962

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.

NOTE:

The example below is for front right wheel. The procedure for the other wheels is the same as given below.

Operation (Note)	ABS solenoid valve		
Operation (Note)	UP	KEEP	DOWN
FR RH IN SOL	OFF	ON	ON
FR RH OUT SOL	OFF	OFF	ON*

^{*:} ON for 1 to 2 seconds after the touch, and then OFF.

A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

Is the inspection result normal?

YES >> Inspection end.

NO >> Go to diagnosis procedure. Refer to BRC-99, "Diagnosis Procedure".

C1130, C1131, C1132, C1133 ENGINE SIGNAL [TCS/ABS] < COMPONENT DIAGNOSIS > C1130, C1131, C1132, C1133 ENGINE SIGNAL Α Description INFOID:0000000001341963 **DTC** Logic INFOID:0000000001341964 DTC DETECTION LOGIC **DTC Detection Logic** DTC CONFIRMATION PROCEDURE **DTC Confirmation Procedure** D Diagnosis Procedure INFOID:0000000001341965 INSPECTION PROCEDURE Е 1. CHECK SELF-DIAGNOSIS RESULTS Check self-diagnosis results. BRC Self-diagnosis results **ENGINE SIGNAL 1 ENGINE SIGNAL 2 ENGINE SIGNAL 3 ENGINE SIGNAL 4** Is above displayed on the self-diagnosis display? YES >> GO TO 2 NO >> Inspection end. 2. CHECK ENGINE SYSTEM Perform ECM self-diagnosis. Repair or replace items indicated, then perform ECM self-diagnosis again. Refer to EC-1110, "Diagnosis Description". Perform ABS actuator and electric unit (control unit) self-diagnosis.

Is the inspection result normal?

YES >> Inspection end.

NO >> • Repair or replace malfunctioning components.

Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

Component Inspection & Special Repair Requirement

INFOID:0000000001341966

COMPONENT INSPECTION

Component Inspection

SPECIAL REPAIR REQUIREMENT

Special Repair Requirement

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U1000 CAN COMM CIRCUIT

Description INFOID:000000001341967

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

DTC Logic INFOID:000000001341968

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:0000000001341969

INSPECTION PROCEDURE

1. CHECK CONNECTOR

- 1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26, 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	1
CAN COMM CIRCUIT	

Is above displayed on the self-diagnosis display?

YES >> Refer to LAN-25, "CAN System Specification Chart".

NO >> Inspection end.

ABS WARNING LAMP

Description INFOID:000000001341970

×: ON –: OFF

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

Component Function Check

INFOID:0000000001341971

1. CHECK ABS WARNING LAMP OPERATION

Check that the lamp illuminates for approximately 1 second after the ignition switch is turned ON.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to BRC-103, "Diagnosis Procedure".

INFOID:0000000001341972

Diagnosis Procedure

1. CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-76</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-38, "Diagnosis Description".

Is the inspection result normal?

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

NO >> Repair or replace combination meter.

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BRAKE WARNING LAMP

Description INFOID:000000001341973

 \times : ON -: OFF

Condition	Brake warning lamp (Note 1)
Ignition switch OFF	-
For 1 second after turning ON ignition switch	× (Note 2)
1 second later after turning ON ignition switch	× (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:0000000001341974

1.BRAKE WARNING LAMP OPERATION CHECK 1

Check that the lamp illuminates for approximately 1 second after the ignition switch is turned ON.

Is the inspection result normal?

YES >> GO TO 2

NO >> Go to diagnosis procedure. Refer to BRC-104, "Diagnosis Procedure".

2 Brake warning LAMP OPERATION CHECK 2.

Check that the brake warning lamp in the combination meter turns ON/OFF correctly when operating the parking brake lever (M/T models) or the parking brake pedal (CVT models).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Check parking brake switch. Refer to BRC-195, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001341975

1. CHECK PARKING BRAKE SWITCH

Check that the brake warning lamp in the combination meter turns ON/OFF correctly when operating the parking brake lever (M/T models) or the parking brake pedal (CVT models).

Is the inspection result normal?

YES >> GO TO 2

NO >> Check parking brake switch. Refer to MWI-49, "Diagnosis Procedure".

2. CHECK SELF-DIAGNOSIS

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

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-38, "Diagnosis Description".

Is the inspection result normal?

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

NO >> Repair or replace combination meter.

INFOID:0000000001341977

INFOID:0000000001341978

TCS OFF SWITCH

Description INFOID:000000001341976

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

Component Function Check

1. CHECK TCS OFF SWITCH OPERATION

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

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to BRC-105, "Diagnosis Procedure".

Diagnosis Procedure

INSPECTION PROCEDURE

1. CHECK TCS OFF SWITCH

1. Turn ignition switch OFF and disconnect TCS OFF switch connector M72.

Check continuity between TCS OFF switch connector M72 terminal 1 and 2.

TCS OFF switch	Condition	Continuity
1. 2	TCS OFF switch ON	Yes
1, 2	TCS OFF switch OFF	No

Is the inspection result normal?

YES >> GO TO 2

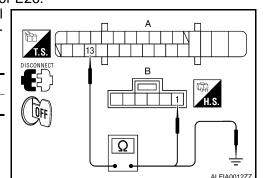
NO >> TCS OFF switch is malfunctioning. Replace TCS OFF switch.

2.CHECK TCS OFF SWITCH HARNESS

Disconnect ABS actuator and electric unit (control unit) connector E26.

 Check continuity between ABS actuator and electric unit (control unit) connector (A) E26 terminal 13 and TCS OFF switch connector M72 terminal 1.

ABS actuator and electric unit (control unit)	TCS OFF switch	Continuity
13	1	Yes



TCS OFF switch connector

Check continuity between ABS actuator and electric unit (control unit) connector (A) E26 terminal 13 and ground.

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ABS actuator and electric unit (control unit)	Body ground	Continuity
13	Ground	No

Is the inspection result normal?

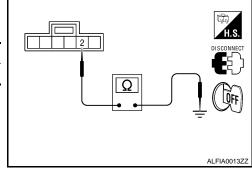
YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

3.check tcs off switch ground

Check continuity between TCS OFF switch connector M72 terminal 2 and ground.

TCS OFF switch	Body ground	Continuity
2	Ground	Yes



Is the inspection result normal?

YES >> Inspection end.

NO >> Repair or replace malfunctioning components.

Component Inspection

INFOID:0000000001341979

INSPECTION PROCEDURE

1. CHECK TCS OFF SWITCH

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

TCS OF	FF switch	Condition	Continuity	
Connector	Terminals	Condition	Continuity	
M72 1 – 2		When TCS OFF switch is pressed ON.	Exists	
10172	When TCS OFF switch is released OFF.	Does not exist		

Is the inspection result normal?

YES >> Inspection end.

NO >> Replace TCS OFF switch.

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS > [TCS/ABS]

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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	
Monitor item	Monitor item Display content		Reference value in normal operation
FR LH SENSOR		0 [km/h]	Vehicle stopped
FR RH SENSOR RR LH SENSOR RR RH SENSOR	Wheel speed	Nearly matches the speed meter display (± 10 % or less)	Vehicle running (Note 1)
STOP LAMP SW	Praka nadal aparation	When brake pedal is de- pressed	ON
STOP LAWIP SW	Brake pedal operation	When brake pedal is not depressed	OFF
BATTERY VOLT	Battery voltage supplied to the ABS actuator and electric unit (control unit)	Ignition switch ON	10 – 16 V
OFF SW	TCS OFF switch ON/OFF	TCS OFF switch ON (When TCS OFF indicator lamp is ON)	ON
OFF SW	TCS OFF SWILCH ON/OFF	TCS OFF switch OFF (When TCS OFF indica- tor lamp is OFF)	OFF
		With engine stopped	0 rpm
ENGINE RPM With engine running	With engine running	Engine running	Almost in accor- dance with tachome- ter display
FR LH IN SOL FR LH OUT SOL FR RH IN SOL FR RH OUT SOL	Operation status of all solenoid valve	Actuator (solenoid valve) is active ("ACTIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON
RR LH IN SOL RR LH OUT SOL RR RH IN SOL RR RH OUT SOL		When the actuator (sole- noid valve) is not active and actuator relay is ac- tive (ignition switch ON)	OFF
		When the motor relay and motor are operating	ON
MOTOR RELAY Motor	Motor and motor relay operation	When the motor relay and motor are not operating	OFF
ACTUATOR RLY	Actuator rolay operation	When the actuator relay is operating	ON
(Note 2)	Actuator relay operation	When the actuator relay is not operating	OFF
ADC MADNI AMD	ABS warning lamp	When ABS warning lamp is ON	ON
ABS WARN LAMP	(Note 3)	When ABS warning lamp is OFF	OFF

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS > [TCS/ABS]

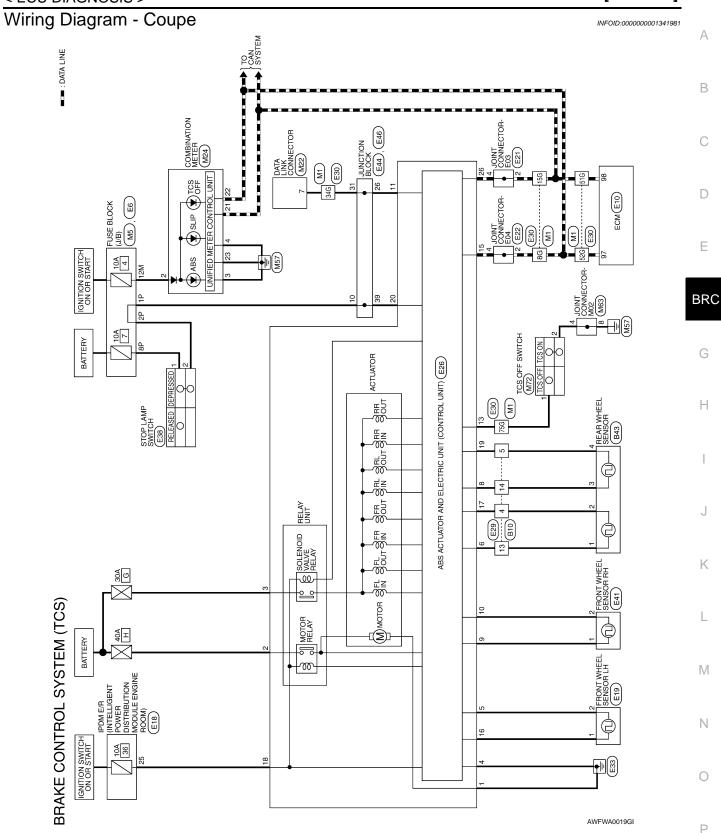
Monitor item		Data mo	Data monitor	
	Display content	Condition	Reference value in normal operation	
OFF LAMP	TCS OFF indicator lamp	When TCS OFF indicator lamp is ON	ON	
OFF LAMP	(Note 3)	When TCS OFF indicator lamp is OFF	OFF	
SLIP LAMP SLIP ind (Note 3)	SLIP indicator lamp	When SLIP indicator lamp is ON	ON	
	(Note 3)	When SLIP indicator lamp is OFF	OFF	

Note 1: Confirm tire pressure is normal.

Note 2: A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

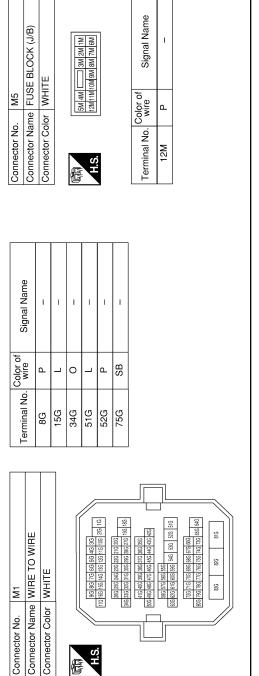
Note 3: On and off timing for warning lamp and indicator lamp. Refer to BRC-76, "CONSULT-III Function (ABS)".

< ECU DIAGNOSIS > [TCS/ABS]

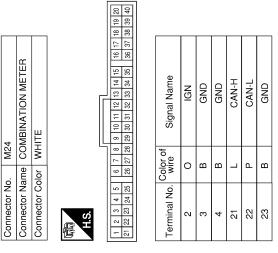


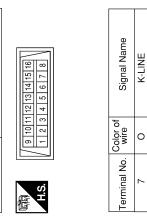
BRAKE CONTROL SYSTEM (TCS) CONNECTORS

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. M63		lor BLUE	8 6 0	Color of wire	В	В
Connector No.	Connector Name	Connector Color	H.S. [121110	Terminal No.	4	8
			· · · · · · · · · · · · · · · · · · ·			





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Connector Name DATA LINK CONNECTOR

Connector No.

Connector Color | WHITE

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

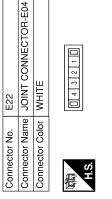
< ECU DIAGNOSIS > [TCS/ABS]

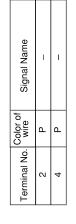
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nector No.	H.S. (81 85 88 99 88 99 88 99 89 97 P P P P P P P P P P P P P P P P P P	Connector No. Connector Color Connector Color H.S. Terminal No. Color 2 2 4	D
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E6 FUSE BLOCK (J/B) WHITE	10 10 10 10 10 10 10 10	FRONT WHEEL SENSOR LH GRAY GRAY 1 2	BRO
Connector No. E6 Connector Name FUSE E	Terminal No. Wire 1P SB R/G SP V/R SP V/R	Connector No. E19 Connector Color GRAY Connector Color GRAY H.S. Color of 1 Golor of 2 R	Н
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		M) M) D311222333334	K
WITCH	Signal Name	E18 IPDM E/R (INTELLIGENT MODULE ENGINE ROOM) WHITE WHITE 2588272889 305	ABS_ECU
M72 TCS OFF SWITCH GRAY	4 C	E18 IPDM E/R (III MODULE E) WHITE 13 14	IVI
Connector No. Connector Name Connector Color	No. Co.		No. Wire
Con	Termii 1	Conne Gonne H.S.	ALFIA0035GB

[TCS/ABS]

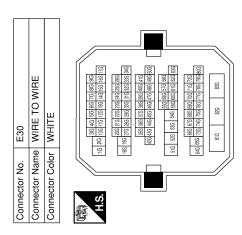
Signal Name	DS FL	DP RL	DP RR	DP FR	DS FR	DIAG-K	ASR AUS (TCS)	CAN-L	DP FL	DS RL	IGN	DS RR	BLS	CAN-H
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		lor BLACK		F	4 16 6	Color of wire	В	G/R	B/B	В	
Connector No.	Connector Name	Connector Color	唇		1 2 3	Terminal No.	-	2	3	4	





Signal Name	1	1	ı	1	1	_
Color of wire	Ь	7	0	7	Ъ	SB
Terminal No.	98	15G	34G	51G	52G	75G



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Signal Name	1	1	-	Í
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ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS > [TCS/ABS]

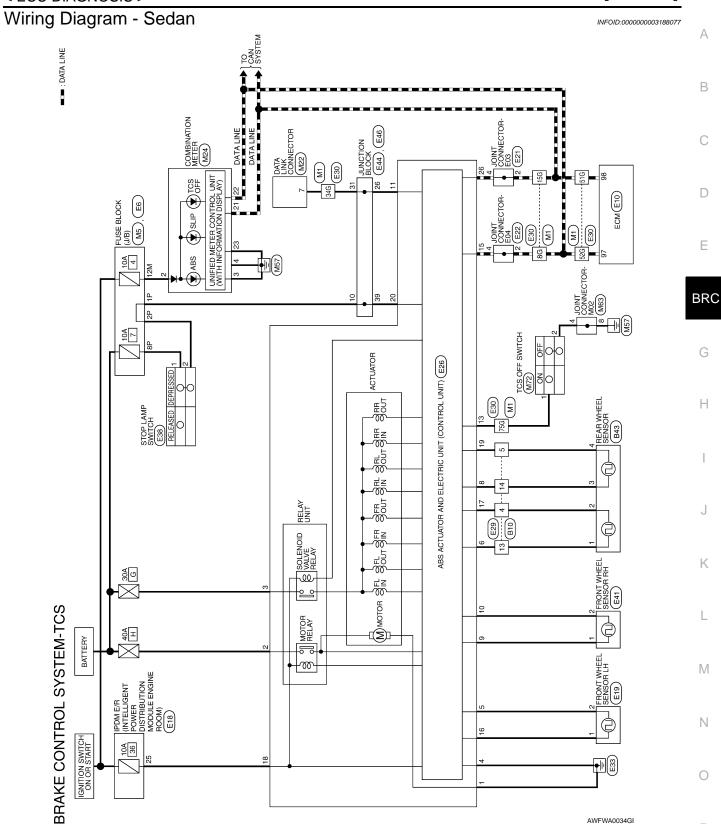
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Connector Color WHITE	Connector Color			Connector Color	olor GRAY		
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Connector No. E44 Connector Name JUNCTION BLOCK	Connector Name		X	Connector Name	- 1	WIRE TO WIRE	
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5 4 3 2 1 12 11 10 9 8 7 6	H.S.	31 30 29 28 (CCC) 27 26 25 40 39 38 37 36 35 34 33 32	<u></u>	E H.S.	8 9 10 11	3	
Terminal No. Wire Signal Name	Terminal No.	Color of Signal Name	ame	Terminal No.	Color of Wire	Signal Name	
SB	56	0		4	R/W	ı	
	31	0		5	B/R	1	
	39	P/B		13	S	1	
				14	W/R	1	
L M	J	Н	G	E BR	D	С	А

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Connector Name | COMBINATION METER

Connector No.

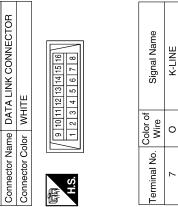
Connector Color WHITE

BRAKE CONTROL SYSTEM CONNECTORS-TCS

Connector No. M5 Connector Name FUSE BLOCK (J/B)	Connector Color WHITE		AN MC MC MC MAN AND	12M 11M 10M 9M 8M 7M			Terminal No. Wire Signal Name	12M O	
Signal Name	ı	1	1	ı	ı	ı			
Color of Wire	۵	7	0	_	۵	SB			
Terminal No.	86	15G	34G	51G	52G	75G			
Connector No. M1	Connector Color WHITE			96 86 76 86 56 46 36	176 166 156 146 136 126 116 106 26 16	266 256 246 256 246 256 216 206 256 216 206 256 246 256 256 256 256 256 256 256 256 256 25	500 500 500 500 500 500 500 500 500 500	586 570 586 556 586 570 586 586 586 586 586 586 586 586 586 586	9 9

3	JOINT CONNECTOR-M02	ال الا	7 6 5 4 3 2 1	Signal Name	I	-
. M63		lor BLUE		Color of Wire	В	m
Connector No.	Connector Name	Connector Color	H.S.	Terminal No.	4	8

Signal Name	NÐI	GNĐ	GNĐ	CAN-H	CAN-L	GND
Color of Wire	0	В	В	Γ	Ь	В
Terminal No.	7	3	7	21	22	23

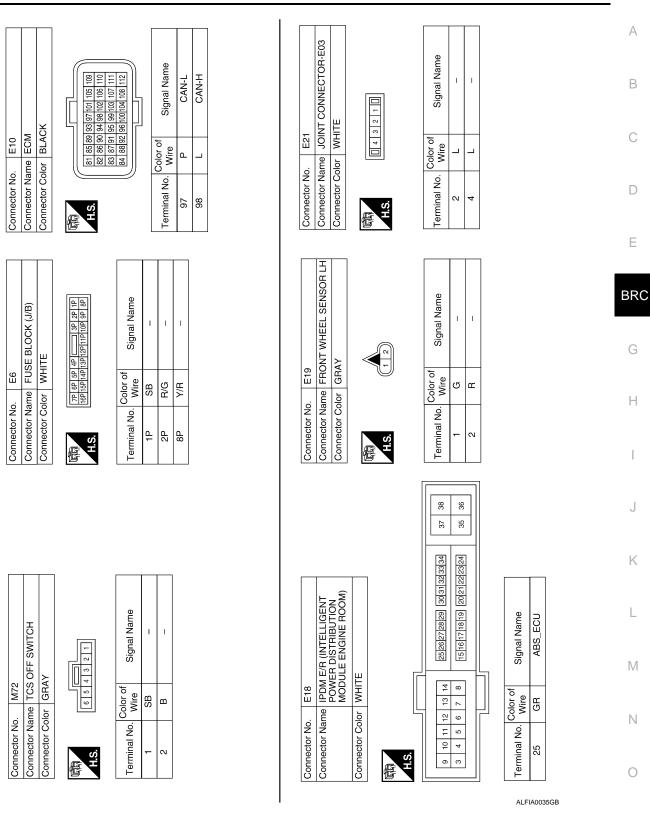


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Connector No.

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS > [TCS/ABS]



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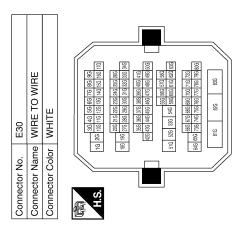
[TCS/ABS]

	_		_		_	_	_	_	_		_	_	_	_
Signal Name	DS FL	DP RL	DP RR	DP FR	DS FR	DIAG-K	ASR AUS (TCS)	CAN-L	DP FL	DS RL	ZN	DS RR	BLS	CAN-H
Color of Wire	Ж	₹	W/R	В	>	0	SB	۵	В	B/W	GR	B/R	P/B	Г
Terminal No.	5	9	8	6	10	Ξ	13	15	16	17	18	19	20	56

				25 26						
	ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)	CK		7 8 9 10 11 12 13 14	Signal Name	MGND	UB (MR)	UB (VR)	GND	
. E26		lor BLACK	F	4 16	Color of Wire	В	G/R	B/B	В	
Connector No.	Connector Name	Connector Color	<u>.</u>	1 2 3	Terminal No.	-	2	3	4	

01	JOINT CONNECTOR-E04	WHITE	4 3 2 1 1	Signal Name	1
). E22				Color of Wire	Ь
Connector No.	Connector Name	Connector Color	用.S.	Terminal No.	2

Signal Name	-	1	I	-	_	-
Color of Wire	Ь	٦	0	٦	Ь	SB
Terminal No.	8G	15G	34G	51G	52G	75G



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Signal Name	I	-	_	I
Color of Wire	B/W	B/R	Λ	W/R
Terminal No.	4	2	13	14

AWFIA0143GB

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< ECU DIAGNOSIS > [TCS/ABS]

WITH M/T) Connector Color GRAY Connector Color GRAY	Color of Wire Signal Name V/R - P/G - P/G -	Connector No. E46 Connector No. B10 Connector Name JUNCTION BLOCK Connector Name WIRE TO WIRE Connector Color WHITE Connector Color WHITE	13 30 28 28 28 28 28 28 29 30 31 31 32 32 33 34 34 35 34 34 35 34 34	Color of Wire Signal Name Terminal No. Color of Wire Signal Name O - 4 R/W - O - 5 B/R - P/B - 13 L/Y - 14 W/R - -	
Connector Name STOP LAMP SWITCH CONNECTOR Name (WITH CVT) Connector Color WHITE	Terminal No. Color of Wire Signal Name Terminal No. 1 Y/R - 1 2 R/G - 2	Connector No. E44 Connector No. Connector No. Connector Name JUNCTION BLOCK Connector Color Connector Color	5 4	Terminal No. Wire Signal Name Terminal No. 10 SB - 26 31 39	

Fail-Safe

ABS, EBD SYSTEM

In case of electrical malfunctions with the ABS, ABS warning lamp, TCS OFF indicator lamp, SLIP indicator lamp will turn on. In case of electrical malfunctions with the EBD, brake warning lamp, ABS warning lamp, TCS OFF indicator lamp and SLIP indicator lamp will turn on. Simultaneously, the TCS/ABS become one of the following conditions of the fail-safe function.

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS > [TCS/ABS]

• For malfunction of ABS, only the EBD is activated and the condition of vehicle is the same condition of vehicles without TCS/ABS system.

NOTE:

ABS self-diagnosis sound may be heard. That is a normal condition because a self-diagnosis for "Ignition switch ON" and "The first starting" tests are being performed.

• For malfunction of EBD, EBD and ABS become inoperative, and the condition of vehicle is the same as the condition of vehicles without TCS/ABS, EBD system.

TCS

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

CAUTION:

If the Fail-Safe function is activated, then perform self-diagnosis for TCS/ABS control system.

DTC No. Index

Display item	Malfunction detecting condition	Check item
RR RH SENSOR-1 [C1101]	Circuit of rear RH wheel sensor is open. Or when the sensor power voltage is outside the standard.	
RR LH SENSOR-1 [C1102]	Circuit of rear LH wheel sensor is open. Or when the sensor power voltage is outside the standard.	
FR RH SENSOR-1 [C1103]	Circuit of front RH wheel sensor is open. Or when the sensor power voltage is outside the standard.	
FR LH SENSOR-1 [C1104]	Circuit of front LH wheel sensor is open. Or when the sensor power voltage is outside the standard.	
RR RH SENSOR-2 [C1105]	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.	BRC-81, "Diagno- sis Procedure" (Note)
RR LH SENSOR-2 [C1106]	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.	
FR RH SENSOR-2 [C1107]	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.	
FR LH SENSOR- 2 [C1108]	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.	
BATTERY VOLTAGE [ABNORMAL] [C1109]	When the ABS actuator and electric unit (control unit) power supply voltage is lower than normal.	BRC-87, "Diagno- sis Procedure"
CONTROLLER FAILURE [C1110]	When there is an internal malfunction in the ABS actuator and electric unit (control unit).	BRC-89, "Diagno- sis Procedure"
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.	BRC-90, "Diagno-
[C1111]	During the actuator motor operating with OFF, when the actuator motor turns ON, or when the control line for relay is shorted to ground.	sis Procedure"
MAIN RELAY [C1114]	Actuator solenoid valve relay is ON, even if control unit sends OFF signal. Actuator solenoid valve relay is OFF, even if control unit sends ON signal.	BRC-92, "Diagno- sis Procedure"
ABS SENSOR [C1115]	Teeth damage on sensor rotor or improper installation of wheel sensor.	BRC-94, "Diagno- sis Procedure"
FR LH IN ABS SOL [C1120]	When the control unit detects a malfunction in the front left inlet solenoid circuit.	BRC-97, "Diagno- sis Procedure"
FR LH OUT ABS SOL [C1121]	When the control unit detects a malfunction in the front left outlet solenoid circuit.	BRC-99, "Diagno- sis Procedure"
FR RH IN ABS SOL [C1122]	When the control unit detects a malfunction in the front right inlet solenoid circuit.	BRC-97, "Diagno- sis Procedure"

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS > [TCS/ABS]

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Display item	Malfunction detecting condition	Check item
FR RH OUT ABS SOL [C1123]	When the control unit detects a malfunction in the front right outlet solenoid circuit.	BRC-99, "Diagnosis Procedure"
RR LH IN ABS SOL [C1124]	When the control unit detects a malfunction in the rear left inlet solenoid circuit.	BRC-97, "Diagnosis Procedure"
RR LH OUT ABS SOL [C1125]	When the control unit detects a malfunction in the rear left outlet solenoid circuit.	BRC-99, "Diagno- sis Procedure"
RR RH IN ABS SOL [C1126]	When the control unit detects a malfunction in the rear right inlet solenoid circuit.	BRC-97, "Diagno- sis Procedure"
RR RH OUT ABS SOL [C1127]	When the control unit detects a malfunction in the rear right outlet solenoid circuit.	BRC-99, "Diagno- sis Procedure"
ENGINE SIGNAL 1 [C1130]	Fuel cut control abnormal.	
ENGINE SIGNAL 2 [C1131]	Electric throttle control abnormal.	BRC-101, "Diagno-
ENGINE SIGNAL 3 [C1132]	ECM CAN communication abnormal.	sis Procedure"
ENGINE SIGNAL 4 [C1133]	ECM communication to ABS actuator and electric unit (control unit) abnormal.	
CAN COMM CIRCUIT [U1000]	When there is a malfunction in the CAN communication circuit.	BRC-102, "Diagno- sis Procedure"

Note: After completing repairs of shorted sensor circuit, when ignition switch is turned ON, ABS warning lamp turns on. Make sure that ABS warning lamp turns off while driving vehicle at 30 km/h (19 MPH) or more for approximately 1 minute according to self-diagnosis procedure. In addition, if wheel sensor 2 is displayed for wheels, check wheel sensor circuit and also check control unit power voltage.

BRC-121

SYMPTOM DIAGNOSIS

TCS

Symptom Table

INFOID:0000000001341984

If ABS warning lamp, TCS 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-123, "Diag- nosis Procedure"
144 - 57	Wheel sensor and rotor system	
Unexpected pedal reaction	Brake pedal stroke	BRC-124, "Diag-
	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-125, "Diag- nosis Procedure"
ABS function does not operate (Note 1)	ABS actuator and electric unit (control unit)	BRC-126, "Diag- nosis Procedure"
Pedal vibration or ABS operation sound	Brake pedal	BRC-127, "Diag-
occurs (Note 2)	ABS actuator and electric unit (control unit)	nosis Procedure"
Vehicle jerks during TCS/ABS control	ABS actuator and electric unit (control unit)	BRC-128, "Diag-
vernole jerns daring 100/ADS control	ECM	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 (just place a foot on it). However, this is normal.
- When shifting gears
- When driving on slippery road
- During cornering at high speed
- When passing over bumps or grooves [at approximately 50 mm (1.97 in) or more]
- When pulling away just after starting engine [at approximately 10 km/h (6 MPH) or higher]

EXCESSIVE ABS FUNCTION OPERATION FREQUENCY

EXCESSIVE ABS FUNCTION OPERATION FREQUENCY	
< SYMPTOM DIAGNOSIS > [TCS/ABS] EXCESSIVE ABS FUNCTION OPERATION FREQUENCY	<u>-</u>
	Α
Diagnosis Procedure	15
1.check start	В
Check front and rear brake force distribution using a brake tester.	_
Is the inspection result normal? YES >> GO TO 2	С
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: <u>FAX-5</u> , " <u>Inspection</u> ", Rear <u>RAX-5</u> , " <u>On-vehicle Service</u> ".	:
Is the inspection result normal?	Е
YES >> GO TO 3 NO >> Repair or replace malfunctioning components.	
3.CHECK WHEEL SENSOR AND SENSOR ROTOR	BRC
Check the following. • Wheel sensor installation for damage.	G
Sensor rotor installation for damage.Wheel sensor connector connection.	
Wheel sensor harness inspection.	Н
Is the inspection result normal? YES >> GO TO 4	
NO >> • Replace wheel sensor or sensor rotor.	1
• Repair harness.	1
4. CHECK ABS WARNING LAMP DISPLAY Make ourse that the ABS warning lamp is turned off after the impition switch in turned ON or when driving	- ,
Make sure that the ABS warning lamp is turned off after the ignition switch is turned ON or when driving. Is the inspection result normal?	J
YES >> System normal.	
NO >> Perform self-diagnosis. Refer to <u>BRC-12</u> . "CONSULT-III Function (ABS)".	K
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[TCS/ABS]

UNEXPECTED PEDAL REACTION

Diagnosis Procedure

INFOID:0000000001341986

1. CHECK BRAKE PEDAL STROKE

Check brake pedal stroke. Refer to BR-12, "Inspection and Adjustment".

Is the stroke too big?

YES

- >> Bleed air from brake tube and hose. Refer to BR-15, "Bleeding Brake System".
 - Check brake pedal, brake booster, and master cylinder for mount play, looseness, brake system fluid leakage, etc. Refer to brake pedal: <u>BR-12</u>, "<u>Inspection and Adjustment</u>", brake booster and master cylinder: <u>BR-10</u>, "<u>Inspection</u>".

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 >> GO TO procedure 3 "CHECK WHEEL SENSOR AND SENSOR ROTOR" of symptom 1. Refer to BRC-54, "Diagnosis Procedure".

NO >> Check brake system.

THE BRAKING DISTANCE IS LONG

< SYMPTOM DIAGNOSIS > THE BRAKING DISTANCE IS LONG Α Diagnosis Procedure INFOID:0000000001341987 **CAUTION:** В The stopping distance on slippery road surfaces might be longer with the ABS operating than when the ABS is not operating. 1. CHECK FUNCTION C 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? D

>> GO TO procedure 3 "CHECK WHEEL SENSOR AND SENSOR ROTOR" of symptom 1. Refer to

YES

NO

BRC-54, "Diagnosis Procedure".

>> Check brake system.

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ABS FUNCTION DOES NOT OPERATE

< SYMPTOM DIAGNOSIS >

[TCS/ABS]

ABS FUNCTION DOES NOT OPERATE

Diagnosis Procedure

INFOID:0000000001341988

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 >> GO TO procedure 3 "CHECK WHEEL SENSOR AND SENSOR ROTOR" of symptom 1. Refer to BRC-54, "Diagnosis Procedure".

NO >> Perform self-diagnosis. Refer to BRC-12, "CONSULT-III Function (ABS)".

PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

[TCS/ABS] < SYMPTOM DIAGNOSIS > PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS Α Diagnosis Procedure INFOID:0000000001341989 **CAUTION:** В Under the following conditions, ABS is activated and vibration is felt when brake pedal is lightly depressed (just place a foot on it). However, this is normal. When shifting gears When driving on slippery road During cornering at high speed When passing over bumps or grooves [at approximately 50 mm (1.97 in) or more] When pulling away just after starting engine [at approximately 10 km/h (6 MPH) or higher] D 1.SYMPTOM CHECK 1 Check if there is pedal vibration or operation sound when the engine is started. Е Do symptoms occur? YES >> GO TO 2 NO >> Perform self -diagnosis. Refer to BRC-76, "CONSULT-III Function (ABS)". BRC 2.SYMPTOM CHECK 2 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 >> GO TO procedure 3 "CHECK WHEEL SENSOR AND SENSOR ROTOR" of symptom 1. Refer to BRC-12, "CONSULT-III Function (ABS)". K L M Ν

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[TCS/ABS]

VEHICLE JERKS DURING TCS/ABS CONTROL

Diagnosis Procedure

INFOID:0000000001341990

1.SYMPTOM CHECK

Check if the vehicle jerks during TCS/ABS control.

Is the inspection result normal?

YES >> Normal. NO >> GO TO 2

2.CHECK SELF-DIAGNOSIS RESULTS

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

Are self-diagnosis results indicated?

YES >> Check corresponding items, make repairs, and perform ABS actuator and electric unit (control unit) self-diagnosis.

NO >> GO TO 3

3. CHECK CONNECTOR

- Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector and check terminal for deformation, disconnection, looseness, etc.
- Securely connect connectors and perform ABS actuator and electric unit (control unit) self-diagnosis.

Are self-diagnosis results indicated?

YES >> If poor contact, damage, open or short circuit of connector terminal is found, repair or replace.

NO >> GO TO 4

4. CHECK ECM AND CVT SELF-DIAGNOSIS RESULTS

Perform ECM and CVT self-diagnosis.

Are self-diagnosis results indicated?

YES

- >> Check the corresponding items.
 - ECM: Refer to <u>EC-1123</u>, "CONSULT-III Function".
 - CVT: Refer to TM-117, "Diagnosis Description".

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

NORMAL OPERATING CONDITION

< SYMPTOM DIAGNOSIS > [TCS/ABS]

NORMAL OPERATING CONDITION

Description INFOID:000000001341991

Symptom	Result
Slight vibrations are felt on the brake pedal and the operation noises occur, when TCS or ABS is activated.	This is a second secoli
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 TCS or ABS activation.
The brake pedal moves and generates noises, when TCS is activated due to rapid acceleration or sharp turn.	
The brake pedal vibrates and motor operation noises occur from the engine room, after the engine starts and just after the vehicle starts.	This is a normal, and it is caused by the ABS operation check.
Depending on the road conditions, the driver may experience a sluggish feel.	This is normal, because
TCS 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 and SLIP indicator lamp may turn ON when the vehicle is subject to strong shaking or large vibration, such as when the vehicle is rotating on a turntable or located on a ship while the engine is running.	In this case, restart the engine on a normal road. If the normal con-
The ABS warning lamp, TCS 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).	dition is restored, there is no malfunction. At 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 TCS function before performing an inspection on a chassis dynamometer.)
TCS OFF indicator lamp and SLIP indicator lamp may simultaneously turn on when low tire pressure warning lamp turns on.	This is not a TCS system error but results from characteristic change of tire.

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< PRECAUTION > [TCS/ABS]

PRECAUTION

PRECAUTIONS

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

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.

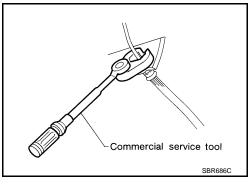
Precaution for Brake System

INFOID:0000000001341993

- Recommended fluid is brake fluid "DOT 3".
- Never reuse drained brake fluid.
- Be careful not to splash brake fluid on painted surface of body. If brake fluid is splashed on painted surfaces
 of body immediately wipe off then with cloth and then wash it away with water.
- Never use mineral oils such as gasoline or kerosene. They will ruin rubber parts of the hydraulic system.
- Use a flare nut wrench when removing flare nuts, and use a flare nut torque wrench when tighten brake tube flare nuts.
- When installing brake tubes, be sure to check torque.
- Brake system is an important safety part. If a brake fluid leak is detected, always disassemble the affected part. If a malfunction is detected, replace part with a new one.
- Before working, turn ignition switch OFF and disconnect connectors of ABS actuator and electric unit (control unit) or the battery cable from the negative terminal.

WARNING:

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



Precaution for Brake Control

INFOID:0000000001341994

- Just after starting vehicle after ignition switch ON, brake pedal may vibrate or motor operating noise may be heard from engine compartment. This is normal condition.
- When an error is indicated by ABS or another warning lamp, collect all necessary information from customer (what symptoms are present under what conditions) and check for simple causes before starting diagnostic servicing. Besides electrical system inspection, check brake booster operation, brake fluid level, and oil leaks.
- If tire size and type are used in an improper combination, or brake pads are not Genuine NISSAN parts, stopping distance or steering stability may deteriorate.
- ABS might be out of order or malfunctions by putting a radio (wiring inclusive), an antenna and a lead-in wire near the control unit.
- If aftermarket parts (car stereo, CD player, etc.) have been installed, check for incidents such as harness pinches, open circuits, and improper wiring.
- When replacing the following parts with parts other than genuine parts or making modifications: Suspension-related parts (shock absorber, spring, bushing, etc.), tires, wheels (other than specified sizes), brake-related

PRECAUTIONS

< PRECAUTION > [TCS/ABS]

parts (pad, rotor, caliper, etc.), engine-related parts (muffler, ECM, etc.) and body reinforcement-related parts (roll bar, tower bar, etc.).

- When driving with worn or deteriorated suspension, tires and brake-related parts.

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< PREPARATION > [TCS/ABS]

PREPARATION

PREPARATION

Special Service Tool

INFOID:0000000001341995

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-BCX POWER BARRIER WFIA0101E	Checking operation of ABS active wheel sensor

Commercial Service Tool

INFOID:0000000001341996

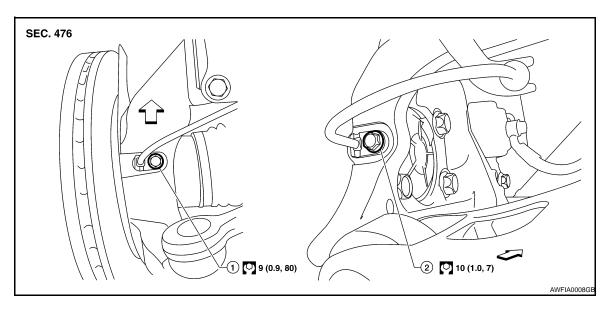
Tool name		Description
Flare nut crowfoot Torque wrench		Removing and installing brake piping a: 10mm (0.39 in)/12mm (0.47 in)
	S-NT360	

[TCS/ABS] < ON-VEHICLE REPAIR >

ON-VEHICLE REPAIR

WHEEL SENSORS

Removal and Installation



1. Front wheel sensor

Rear wheel sensor

Front

CAUTION:

Be careful not to damage wheel sensor edge and sensor rotor teeth.

 When removing the front or rear wheel hub assembly, first remove the wheel sensor from the assembly. Failure to do so may result in damage to the wheel sensor wires making the sensor inoperative.

CAUTION:

- Pull out the wheel sensor, being careful to turn it as little as possible. Do not pull on the wheel sensor harness.
- Installation should be performed while paying attention to the following, and then tighten bolts and nuts to the specified torque.
- Check if foreign objects such as iron fragments are adhered to the pick-up part of the sensor or to the inside of the hole for the wheel sensor, or if a foreign object is caught in the surface of the mating surface for the rotor. If something wrong is found, fix it and then install the wheel sensor.

REMOVAL

Front

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

Rear

NOTE:

Both rear wheel sensors share one harness and must be replaced as an assembly.

- Remove wheel and tire using power tool.
- 2. Remove wheel sensor bolts and wheel sensors from both rear wheels.
- Remove harness wire from mounts and harness wire clips from suspension member.

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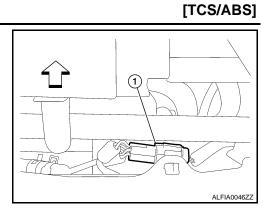
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4. Disconnect wheel sensor harness connector (1).



INSTALLATION

Installation is in the reverse order of removal.

• When installing wheel and tire, refer to WT-37, "Adjustment".

SENSOR ROTOR

< ON-VEHICLE REPAIR > [TCS/ABS]

SENSOR ROTOR

Removal and Installation

INFOID:0000000001341999

The front and rear wheel sensor rotors are an integral part of the wheel hub assemblies and can not be disassembled. When replacing the sensor rotor, replace the wheel hub assembly. Refer to <u>FAX-7</u>, "Removal and <u>Installation"</u> (Front), <u>RAX-6</u>, "Removal and <u>Installation"</u> (Rear).

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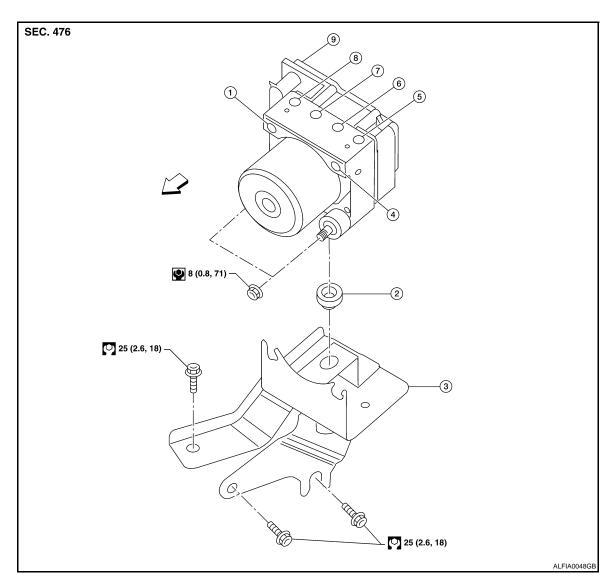
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[TCS/ABS]

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Exploded View INFOID:0000000001342000

COMPONENT



- 1. From master cylinder secondary side 2.
- Grommet
- Bracket

- 4. From master cylinder primary side
- To front LH brake caliper 6.
- To rear RH brake caliper

- To rear LH brake caliper 7.
- 8.
- To front RH brake caliper 9. ABS actuator and electric unit

Front

Removal and Installation

INFOID:0000000001342001

REMOVAL

CAUTION:

Be careful of the following.

- Before servicing, disconnect the battery cable from negative terminal.
- To remove brake tube, use a flare nut wrench to prevent flare nuts and brake tube from being damaged. To install, use flare nut torque wrench.
- Do not apply excessive impact to ABS actuator and electric unit (control unit), such as dropping it.
- Do not remove and install actuator by holding harness.
- After work is completed, bleed air from brake tube. Refer to BR-15, "Bleeding Brake System".

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ON-VEHICLE REPAIR > [TCS/ABS]

- 1. Remove front wiper arms. Refer to WW-40, "FRONT WIPER ARMS: Removal and Installation".
- 2. Remove cowl top. Refer to EXT-18, "Removal and Installation".
- Disconnect washer hose.
- 4. Remove tower bar, if equipped. Refer to FSU-11, "Exploded View".
- 5. Disconnect ABS actuator and electric unit (control unit) connector.
- 6. Loosen brake tube flare nuts, then remove brake tubes from ABS actuator and electric unit (control unit).
- 7. Remove ABS actuator and electric unit (control unit) nuts.
- 8. Remove ABS actuator and electric unit (control unit) from vehicle.
- Remove bracket as necessary.

INSTALLATION

CAUTION:

Be careful of the following.

- Before servicing, disconnect the battery cable from negative terminal.
- To remove brake tube, use a flare nut wrench to prevent flare nuts and brake tube from being damaged. To install, use flare nut torque wrench.
- . Do not apply excessive impact to ABS actuator and electric unit (control unit), such as dropping it.
- Do not remove and install actuator by holding harness.
- After work is completed, bleed air from brake tube. Refer to <u>BR-15, "Bleeding Brake System"</u>.
- After installing harness connector in the ABS actuator and electric unit (control unit), make sure connector is securely locked.

Installation is in the reverse order of removal.

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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 ajusted, be sure to adjust neutral position of steering angle sensor before driving. Refer to BRC-142, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

DESCRIPTION

Basic Concept

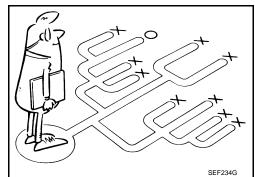
- The most important point to perform trouble diagnosis is to understand systems (control and mechanism) in vehicle thoroughly.
- It is also important to clarify customer complaints before inspection.

First of all, reproduce symptom, and understand it fully.

Ask customer about his/her complaints carefully. In some cases, they will be necessary to check symptom by driving vehicle with customer.

CAUTION:

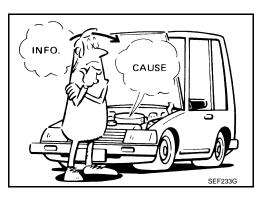
Customers are not professionals. Do not assume "maybe customer means..." or "maybe customer mentioned this symptom".



- It is essential to check symptoms right from beginning in order to repair a malfunction completely.
 - For an intermittent malfunction, it is important to reproduce symptom based on interview with customer and past examples. Do not perform inspection on ad hoc basis. Most intermittent malfunctions are caused by poor contacts. In this case, it will be effective to shake suspected harness or connector by hand. When repairs are performed without any symptom check, no one can judge if malfunction has actually been eliminated.
- After diagnostic, make sure to perform "ERASE MEMORY". Refer to <u>BRC-148</u>, "CONSULT-III Function (ABS)".
- Always read "GI General Information" to confirm general precautions. Refer to GI-3.

Asking Complaints

- Complaints against malfunction vary depending on each person. It is important to clarify customer complaints.
- Ask customer about what symptoms are present and under what conditions. Use information to reproduce symptom while driving.
- It is also important to use diagnostic sheet so as not to miss information.



KEY POINTS

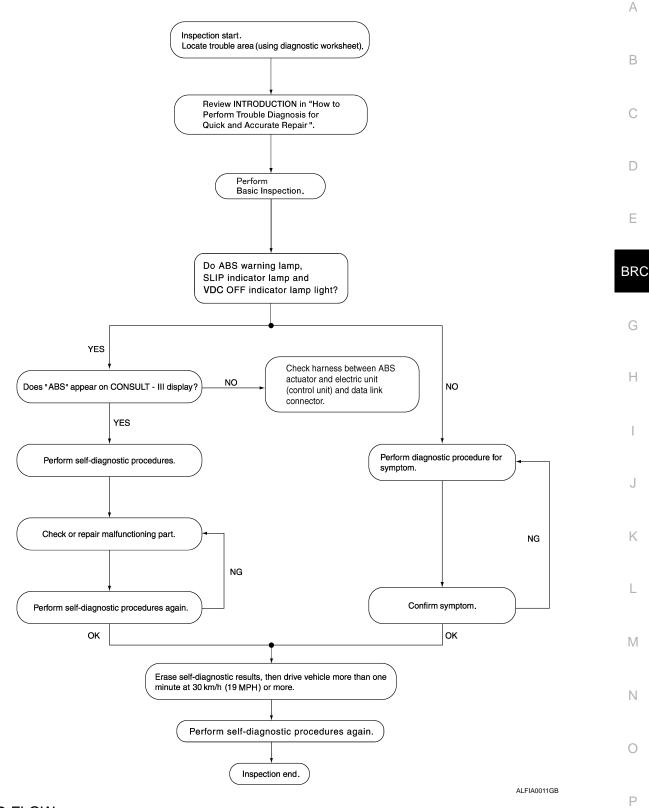
WHAT Vehicle model
WHEN Date, Frequencies
WHERE Road conditions
HOW Operating conditions,

Weather conditions,

Symptoms

SBR339B

< BASIC INSPECTION > **OVERALL SEQUENCE**



DETAILED FLOW

1. COLLECT THE INFORMATION FROM THE CUSTOMER

Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using the diagnosis worksheet. Refer to BRC-141, "Diagnostic Work Sheet".

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 BRC-148, "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-222, "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-148, <a href="CONSULT-III Function (ABS)".

Is the symptom is a normal operation?

YES >> INSPECTION END

NO >> GO TO 5.

5. CHECK THE WARNING LAMP AND INDICATOR LAMP FOR ILLUMINATION

Check that the warning lamp and indicator lamp illuminate.

- ABS warning lamp: Refer to BRC-199, "Description".
- Brake warning lamp: Refer to BRC-200, "Description".
- VDC OFF indicator lamp: Refer to BRC-201, "Description".
- SLIP indicator lamp: Refer to BRC-202, "Description".

Is ON/OFF timing normal?

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

6.PERFORM THE DIAGNOSIS BY SYMPTOM

Perform the diagnosis applicable to the 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-148</u>, "CONSULT-III Function (ABS)".

Is no other DTC present and the repair completed?

YES >> INSPACTION END

NO >> GO TO 3.

DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

[VDC/TCS/ABS]

Diagnostic Work Sheet

INFOID:0000000001342003

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Customer name MR/MS	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)	☐ Warning / Indicator activate		Firm pedal operation Large stroke pedal operation
	☐ TCS does not work (Rear wheels slip when accelerating)	☐ ABS does not work (Wheels lock when braking)		☐ Lack of sense of acceleration
Engine conditions	☐ When starting ☐ After starting			
Road conditions	□ Low friction road (□Snow □Gravel □Other) □ Bumps / potholes			
Driving conditions	□ Full-acceleration □ High speed cornering □ Vehicle speed: Greater than 10 km/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-141

< BASIC INSPECTION >

INSPECTION AND ADJUSTMENT ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT: Description

INFOID:000000001342004

[VDC/TCS/ABS]

After replacing the ABS actuator and electric unit (control unit), perform the neutral position adjustment for the steering angle sensor.

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT: Special Repair Requirement INFOID:0000000001342005

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

Perform the neutral position adjustment for the steering angle sensor.

>> Refer to BRC-142, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

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

In case of doing work that applies to the list below, make sure to adjust neutral position of steering angle sensor before running vehicle.

x: Required -: Not required

Situation	Adjustment of steering angle sensor neutral position		
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 4WAS components	×		
Replacing 4WAS components	×		
Removing/Installing steering components	×		
Replacing steering components	×		
Removing/Installing suspension components	×		
Replacing suspension components	×		
Change tires to new ones	_		
Tire rotation	_		
Adjusting wheel alignment	×		

ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Special Repair Requirement INFOID:0000000001342007

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)

ALIGN THE VEHICLE STATUS

Stop vehicle with front wheels in straight-ahead position.

>> GO TO 2.

2 Perform the neutral position adjustment for the steering angle sensor

INSPECTION AND ADJUSTMENT

[VDC/TCS/ABS] < BASIC INSPECTION > On the CONSULT-III screen, touch "WORK SUPPORT", then "ST ANG SEN ADJUSTMENT". Touch "START". Α **CAUTION:** Do not touch steering wheel while adjusting steering angle sensor. 3. After approximately 10 seconds, touch "END". В NOTE: After approximately 60 seconds, the adjustment ends automatically. 4. Turn ignition switch OFF, then turn it ON again. **CAUTION:** Be sure to perform above operation. >> GO TO 3. D 3. CHECK DATA MONITOR Run vehicle with front wheels in straight-ahead position, then stop. Е Select "DATA MONITOR". Then make sure "STR ANGLE SIG" is within 0±2.5°. 2. Is the steering angle within the specified range? YES >> GO TO 4. BRC NO >> Perform the neutral position adjustment for the steering angle sensor again, GO TO 1. 4. ERASE THE SELF-DIAGNOSIS MEMORY Erase the self-diagnosis memories of the ABS actuator and electric unit (control unit) and ECM. ABS actuator and electric unit (control unit): Refer to <u>BRC-148, "CONSULT-III Function (ABS)"</u>. • ECM: Refer to BRC-148, "CONSULT-III Function (ABS)". Are the memories erased? Н YES >> INSPECTION END NO >> Check the items indicated by the self-diagnosis. K L M Ν Р

INFOID:0000000001342008

FUNCTION DIAGNOSIS

VDC/TCS/ABS

System Diagram

ELECTRIC LINE
: HYDRAULIC LINE

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1. Rear RH wheel sensor

(6)

- 4. Front RH wheel sensor
- 7. Front LH wheel sensor
- 10. Steering angle sensor

- Yaw rate/side/decel G sensor
- 5. TCM
- 8. VDC OFF switch
- 11. Rear LH wheel sensor
- ABS actuator and electric unit (control unit)

ALFIA0044GE

- 6. ECM
- ABS, SLIP, VDC OFF and BRAKE indicator lamps (combination meter)

System Description

INFOID:0000000001342009

ABS, EBD SYSTEM

In case of electrical malfunctions with the ABS, ABS warning lamp, VDC OFF indicator lamp, SLIP indicator lamp will turn on. In case of electrical malfunctions with the EBD, brake warning lamp, ABS warning lamp, VDC OFF indicator lamp and SLIP indicator lamp will turn on. Simultaneously, the VDC/TCS/ABS become one of the following conditions of the fail-safe function.

For malfunction of ABS, only the EBD is activated and the condition of vehicle is the same condition of vehicles without TCS/ABS system.

NOTE:

ABS self-diagnosis sound may be heard. That is a normal condition because a self-diagnosis for "Ignition switch ON" and "The first starting" are being performed.

 For malfunction of EBD, EBD and ABS become inoperative, and the condition of vehicle is the same as the condition of vehicles without TCS/ABS, EBD system.

VDC / TCS

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

If the Fail-Safe function is activated, then perform self-diagnosis for VDC/TCS/ABS control system.

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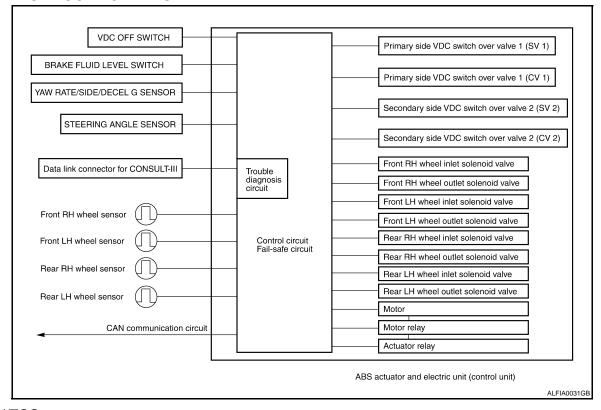
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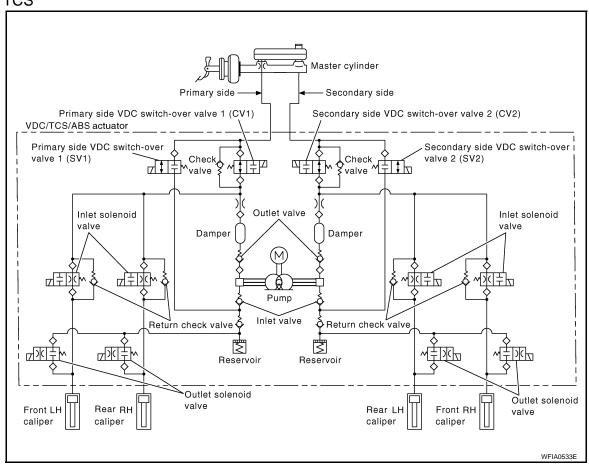
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ELECTRICAL COMPONENTS



VDC / TCS



OPERATION THAT IS NOT "SYSTEM ERROR"

Operation That Is Not "System Error"

ABS

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

TCS

- Depending on road circumstances, driver may have a sluggish feel. This is normal, because optimum traction has highest priority under TCS operation.
- When vehicle is passing through a road where surface friction varies, downshifting or depressing accelerator pedal fully may activate TCS temporarily.

VDC

- During VDC operation, body and brake pedal lightly vibrate and mechanical sounds may be heard. This is normal.
- If vehicle is rotated on turn table, or rolled and rocked on ship, ABS warning lamp, VDC OFF indicator lamp, and SLIP indicator lamp may turn on. In this case, start engine on normal road again. If ABS warning lamp, VDC OFF indicator lamp, and SLIP indicator lamp turn off after restart, it is normal.
- When starting TCS or VDC under rapid acceleration or hard turn, operating sound by brake pedal is generated. However, this is not malfunction. This is because TCS and VDC are functioning normally.
- VDC may not operate normally or ABS warning lamp, VDC OFF indicator lamp and SLIP indicator lamp may
 turn on when driving special roads with extremely steep slant (banks on circuit road and so on.) However, it
 is not malfunction when returning to a normal state after restarting the engine. In that case, be sure to erase
 the memory of self-diagnosis. Refer to BRC-148, "CONSULT-III Function (ABS)".
- Yaw rate /side G sensor malfunction may occur under hard turn like spin turn, rapid acceleration turn, drift run, etc., when VDC function is OFF (VDC OFF switch is turned on). It is not malfunction if it is possible to return to a normal position after restarting engine. Then erase the memory of self-diagnosis. Refer to <u>BRC-148</u>, "CONSULT-III Function (ABS)".
- 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 tires.

CAN Communication

Refer to LAN-7, "System Description".

Component Parts Location

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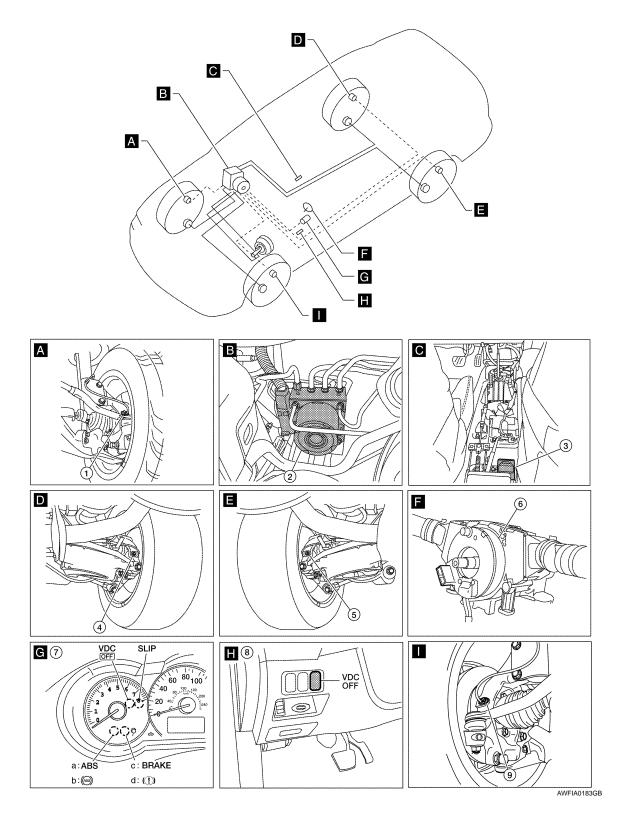
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- 1. Front wheel sensor RH E41
- 2. ABS actuator and electric unit (control unit) E26
- 3. Yaw rate/side/decel G sensor M55

< FUNCTION DIAGNOSIS >

- 4. Rear wheel sensor RH B43
- 5. Rear wheel sensor LH B43

8.

 Steering angle sensor (behind spiral cable) (Steering wheel removed for clarity) M53

- 7. Combination meter M24
 - a: US models
 - b: Canada models
 - c: US models
 - d: Canada models

- VDC OFF switch M72 9. Front v
- Pront wheel sensor LH E19

Component Description

INFOID:0000000001342011

Compo	Reference		
	Pump	PDC 464 "Description"	
	Motor	BRC-164, "Description"	
ADC activator and algebria unit (acestral unit)	Actuator relay (Main relay)	BRC-166, "Description"	
ABS actuator and electric unit (control unit)	Solenoid valve	BRC-173, "Description"	
	Pressure sensor	BRC-179, "Description"	
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-197, "Description"	
Wheel sensor	Wheel sensor		
Yaw rate/side G sensor	BRC-183, "Description"		
Steering angle sensor	BRC-181, "Description"		
VDC OFF switch		BRC-197, "Description"	
ABS warning lamp		BRC-199, "Description"	
Brake warning lamp	BRC-200, "Description"		
Parking brake switch	BRC-195, "Description"		
VDC OFF indicator lamp	BRC-201, "Description"		
SLIP indicator lamp		BRC-202, "Description"	

CONSULT-III Function (ABS)

INFOID:0000000001342012

APPLICATION ITEM ABS

BASIC OPERATION PROCEDURE

WORK SUPPORT

Operation Procedure

In case of doing work that applies to the list below, make sure to adjust neutral position of steering angle sensor before running vehicle.

Situation	Adjustment of Steering Angle Sensor Neutral Position
Removing/Installing ABS actuator and electric unit (control unit)	-
Replacing ABS actuator and electric unit (control unit)	×
Removing/Installing steering angle sensor	×
Removing/Installing steering components	×
Removing/Installing suspension components	×
Change tires to new ones	-
Tire rotation	-
Adjusting wheel alignment	×

^{×:} Required

^{-:} Not required

CAUTION:

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

- 1. Stop vehicle with front wheels in straight-ahead position.
- 2. Turn ignition switch ON and touch the CONSULT-III screen in the order of "ABS", "WORK SUPPORT" and "ST ANG SEN ADJUSTMENT".
- 3. Touch "START".

CAUTION:

Do not touch steering wheel while adjusting steering angle sensor.

- After approximately 10 seconds, touch "END". (After approximately 60 seconds, it ends automatically.)
- 5. Turn ignition switch OFF, then turn it ON again.

CAUTION:

Be sure to perform above operation.

- 6. Run vehicle with front wheels in straight-ahead position, then stop.
- 7. Select "DATA MONITOR", "ECU INPUT SIGNALS", and "STR ANGLE SIG" on CONSULT-III screen. Then make sure "STR ANGLE SIG" is within 0±2.5°. If value is more than specification, repeat steps 1 to 6.
- 8. Erase memory of ABS actuator and electric unit (control unit) and ECM. ABS actuator and electric unit (control unit): Refer to BRC-148, "CONSULT-III Function (ABS)". ECM: Refer to EC-1012, "Work Flow".
- Turn ignition switch OFF.

SELF-DIAGNOSIS RESULTS

Operation Procedure

- 1. Start engine and drive vehicle at 30 km/h (19 MPH) or more for approximately 1 minute.
- 2. After stopping vehicle, with the engine running, touch "ABS", "SELF-DIAG RESULTS" in order on the CONSULT-III screen.
- 3. The self-diagnostic results are displayed.
 - Check ABS warning lamp, VDC OFF indicator lamp and SLIP indicator lamp if "NO FAILURE" is displayed. Refer to BRC-225, "Symptom Table".
- 4. Perform the appropriate inspection from display item list, and repair or replace the malfunctioning component.Refer to "Display Item List".
- Start engine and drive vehicle at 30 km/h (19 MPH) or more for approximately 1 minute.

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.

Erase Memory

- 1. Turn ignition switch OFF.
- 2. Start engine and touch "ABS", "SELF-DIAG RESULTS", "ERASE MEMORY" in order on the CONSULT-III screen to erase the diagnostic memory.

If "ABS" is not indicated, go to GI-50, "Description".

CAUTION:

If the diagnostic memory is not erased, re-perform the operation procedure starting with step 1.

- Perform self-diagnosis again, and make sure that diagnostic memory is erased.
- 4. 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.

NOTE:

- 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

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< FUNCTION DIAGNOSIS >

Display item	Malfunction detecting condition	Check item
RR RH SENSOR-1 [C1101]	Circuit of rear RH wheel sensor is open. Or when the sensor power voltage is outside the standard.	
RR LH SENSOR-1 [C1102]	Circuit of rear LH wheel sensor is open. Or when the sensor power voltage is outside the standard.	
FR RH SENSOR-1 [C1103]	Circuit of front RH wheel sensor is open. Or when the sensor power voltage is outside the standard.	
FR LH SENSOR-1 [C1104]	Circuit of front LH wheel sensor is open. Or when the sensor power voltage is outside the standard.	
RR RH SENSOR-2 [C1105]	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.	BRC-155, "De- scription" (Note 1)
RR LH SENSOR-2 [C1106]	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.	
FR RH SENSOR-2 [C1107]	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.	
FR LH SENSOR- 2 [C1108]	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.	
BATTERY VOLTAGE [ABNORMAL] [C1109]	When the ABS actuator and electric unit (control unit) power supply voltage is lower than normal.	BRC-161, "De- scription"
CONTROLLER FAILURE [C1110]	When there is an internal malfunction in the ABS actuator and electric unit (control unit).	BRC-163, "Diagnosis Procedure"
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.	BRC-164, "De-
[C1111]	During the actuator motor operating with OFF, when the actuator motor turns ON, or when the control line for relay is shorted to ground.	scription"
MAIN RELAY	During the actuator relay operating with OFF, when the actuator relay turns ON. Or when the control line for the relay is shorted to the ground.	BRC-166, "De-
[C1114]	During the actuator relay operating with ON, when the actuator relay turns OFF, or when the control line for the relay is open.	scription"
ABS SENSOR [ABNORMAL SIGNAL] [C1115]	NAL] When wheel sensor input signal is malfunctioning.	
STOP LAMP SW [C1116]	When stop lamp switch circuit is open.	BRC-171, "De- scription"

< FUNCTION DIAGNOSIS >

[VDC/TCS/ABS]

Display item	Malfunction detecting condition	Check item	_
FR LH IN ABS SOL [C1120]	When the control unit detects a malfunction in the front left inlet solenoid circuit.		_
FR LH OUT ABS SOL [C1121]	When the control unit detects a malfunction in the front left outlet solenoid circuit.		
FR RH IN ABS SOL [C1122]	When the control unit detects a malfunction in the front right inlet solenoid circuit.		
FR RH OUT ABS SOL [C1123]	When the control unit detects a malfunction in the front right outlet solenoid circuit.	BRC-173, "De-	
RR LH IN ABS SOL [C1124]	When the control unit detects a malfunction in the rear left inlet solenoid circuit.	scription"	
RR LH OUT ABS SOL [C1125]	When the control unit detects a malfunction in the rear left outlet solenoid circuit.		
RR RH IN ABS SOL [C1126]	When the control unit detects a malfunction in the rear right inlet solenoid circuit.		
RR RH OUT ABS SOL [C1127]	When the control unit detects a malfunction in the rear right outlet solenoid circuit.		E
ENGINE SIGNAL 1 [C1130]			
ENGINE SIGNAL 2 [C1131]			
ENGINE SIGNAL 3 [C1132]	Major engine components are malfunctioning.	BRC-177, "De- scription"	
ENGINE SIGNAL 4 [C1133]			
ENGINE SIGNAL 6 [C1136]			
PRESS SEN CIRCUIT [C1142]	Pressure sensor signal line is open or shorted, or pressure sensor is malfunctioning.	BRC-179, "De- scription"	
ST ANG SEN CIRCUIT [C1143]	Neutral position of steering angle sensor is dislocated, or the steering angle sensor is malfunctioning.	BRC-181, "De-	_
ST ANG SEN SIGNAL [C1144]	Neutral position correction of steering angle sensor is not finished.	scription"	
YAW RATE SENSOR [C1145]	Yaw rate sensor is malfunctioning, or the yaw rate sensor signal line is open or shorted.	BRC-183, "De-	
SIDE G-SEN CIRCUIT [C1146]	Side G sensor is malfunctioning, or circuit of side G sensor is open or shorted.	scription"	
USV LINE [FL-RR] [C1147]	VDC switch-over solenoid valve (USV1) on the primary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground.		_
USV LINE [FR-RL] [C1148]	VDC switch-over solenoid valve (USV2) on the secondary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground.	BRC-186, "De-	
HSV LINE [FL-RR] [C1149]	VDC switch-over solenoid valve (HSV1) on the primary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground.	scription"	
HSV LINE [FR-RL] [C1150]	VDC switch-over solenoid valve (HSV2) on the secondary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground.		
PNP POS SIG [C1154]	TCM or ABS actuator and electric unit (control unit) internal malfunction.	BRC-189, "De- scription"	_
BR FLUID LEVEL LOW [C1155]	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.	BRC-190, "De- scription"	_
ST ANG SEN COM CIR [C1156]	CAN communication circuit or steering angle sensor is malfunctioning.	BRC-193, "De- scription"	-
CAN COMM CIRCUIT [U1000]	When there is a malfunction in the CAN communication circuit.	BRC-194, "De- scription" (Note 2)	_

< FUNCTION DIAGNOSIS >

Note 1: After completing repairs of shorted sensor circuit, when ignition switch is turned ON, ABS warning lamp turns on. Make sure that ABS warning lamp turns off while driving vehicle at 30 km/h (19 MPH) or more for approximately 1 minute according to self-diagnosis procedure. In addition, if wheel sensor 2 is displayed for wheels, check wheel sensor circuit and also check control unit power voltage. Note 2: When malfunctions are detected in several systems, including CAN communication circuit [U1000], troubleshoot CAN communication circuit. Refer to LAN-16, "Trouble Diagnosis Procedure".

DATA MONITOR

Display Item List

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.

Item	Data	monitor item sele	ection	
(Unit)	ECU INPUT SIGNALS	MAIN SIG- NALS	SELECTION FROM MENU	Remarks
FR LH SENSOR (km/h)	×	×	×	Wheel speed calculated by front LH wheel sensor signal is displayed.
FR RH SENSOR (km/h)	×	×	×	Wheel speed calculated by front RH wheel sensor signal is displayed.
RR LH SENSOR (km/h)	×	×	×	Wheel speed calculated by rear LH wheel sensor signal is displayed.
RR RH SENSOR (km/h)	×	×	×	Wheel speed calculated by rear RH wheel sensor signal is displayed.
STOP LAMP SW (ON/OFF)	×	×	×	Stop lamp switch (ON/OFF) status is displayed.
BATTERY VOLT (V)	×	×	×	Voltage supplied to ABS actuator and electric unit (control unit) is displayed.
GEAR	×	×	×	Gear position judged by PNP switch signal is displayed.
SLCT LVR POSI	×	×	×	Shift position judged by PNP switch signal.
OFF SW (ON/OFF)	×	×	×	VDC OFF switch (ON/OFF) status is displayed.
ACCEL POS SIG (%)	×	_	×	Throttle valve open/close status judged by CAN communication signal is displayed.
SIDE G-SENSOR (m/s ²)	×	_	×	Lateral acceleration detected by side G sensor is displayed.
STR ANGLE SIG	×	_	×	Steering angle detected by steering angle sensor is displayed.
PRESS SENSOR (bar)	×	_	×	Brake fluid pressure detected by pressure sensor is displayed.
ENGINE RPM (rpm)	×	_	×	Engine speed judged by CAN communication signal is displayed.
YAW RATE SEN (d/s)	×	×	×	Yaw rate detected by yaw rate sensor is displayed.
FLUID LEV SW (ON/OFF)	×	_	×	Brake fluid level switch (ON/OFF) status is displayed.
PARK BRAKE SW (ON/OFF)	×	_	×	Parking brake switch (ON/OFF) status is displayed.
4WD MODE MON	×	×	×	AWD activated.
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.
FR LH IN SOL (ON/OFF)	_	×	×	Front LH IN ABS solenoid (ON/OFF) status is displayed.

*** ***********************************	0.100.07			
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.
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.
ABS WARN LAMP (ON/OFF)	_	×	×	ABS warning lamp (ON/OFF) status is displayed.
OFF LAMP (ON/OFF)	_	×	×	VDC OFF lamp (ON/OFF) status is displayed.
SLIP LAMP (ON/OFF)	_	×	×	SLIP indicator lamp (ON/OFF) status is displayed.
M-MODE SIG (ON/OFF)	_	_	×	M mode (ON/OFF) status judged by CAN communication signal 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 FAIL SIG (ON/OFF)	_	_	×	EBD fail signal (ON/OFF) status is displayed.
ABS FAIL SIG (ON/OFF)	_	_	×	ABS fail signal (ON/OFF) status is displayed.
TCS FAIL SIG (ON/OFF)	_	_	×	TCS fail signal (ON/OFF) status is displayed.
VDC FAIL SIG (ON/OFF)	_	_	×	VDC fail signal (ON/OFF) status is displayed.
CRANKING SIG (ON/OFF)	_	_	×	Cranking condition (ON/OFF) status is displayed.
USV [FL-RR] (ON/OFF)	_	_	×	Primary side USV solenoid valve (ON/OFF) status is displayed.
USV [FR-RL] (ON/OFF)	_	_	×	Secondary side USV solenoid valve (ON/OFF) status is displayed.
HSV [FL-RR] (ON/OFF)	_	_	×	Primary side HSV solenoid valve (ON/OFF) status is displayed.
HSV [FR-RL] (ON/OFF)	_	_	×	Secondary side HSV solenoid valve (ON/OFF) status is displayed.
V/R OUTPUT (ON/OFF) (Note)	_	_	×	Valve relay operation signal (ON/OFF) status is displayed.
M/R OUTPUT (ON/OFF)	_	_	×	Motor relay operation signal (ON/OFF) status is displayed.

^{×:} Applicable

^{-:} Not applicable

< FUNCTION DIAGNOSIS >

Note: A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

ACTIVE TEST

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 indicator lamp, SLIP indicator lamp and brake warning lamp are on.
- ABS warning lamp, VDC OFF indicator lamp, SLIP indicator lamp and brake warning lamp are on during active test.

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" and repeat step 3.

Solenoid Valve

NOTE:

The example shown is for front right wheel. The procedure for the other wheels is the same as given below.

- 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 (IN, OUT, USV, HSV) operate as shown in the table below.

Operation	ABS solenoid valve			ABS solenoid valve (ACT)		
(Note)	UP	KEEP	DOWN	UP	ACT UP	ACT KEEP
FR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
FR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
USV [FR-RL]	OFF	OFF	OFF	OFF	ON	ON
HSV [FR-RL]	OFF	OFF	OFF	OFF	ON*	OFF

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

Note: A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

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 (Note)	ON	ON

Note: A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

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INFOID:0000000001342015

COMPONENT DIAGNOSIS

C1101, C1102, C1103, C1104 WHEEL SENSOR-1

Description INFOID:000000001342013

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.	Harness or connectorWheel sensor
C1103	FR RH SENSOR-1	Circuit of front RH wheel sensor is open. Or when the sensor power voltage is outside the standard.	ABS actuator and electric unit (control unit)
C1104	FR LH SENSOR-1	Circuit of front LH wheel sensor is open. Or when the sensor power voltage is outside the standard.	

DTC CONFIRMATION PROCEDURE

1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-155</u>, "<u>Diagnosis Procedure</u>".

NO >> INSPECTION END

DTC Confirmation Procedure

Diagnosis Procedure

CAUTION:

Do not check between wheel sensor terminals.

INSPECTION PROCEDURE

1. CHECK CONNECTOR

Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26 and malfunctioning wheel sensor connector E41 (FR-RH), E19 (FR-LH), B43 (RR-RH and RR-LH). Check terminal to see if it is deformed, disconnected, loose, etc., Repair or replace it if any malfunction condition is found.

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

2.check wheel sensor output signal

- 1. Disconnect connectors from wheel sensor of malfunction code No.
- 2. 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:

BRC-155

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.

4. 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 wheel sensor. Refer to BRC-235, "Removal and Installation".

3.CHECK TIRE

Check air pressure, wear and size.

Are air pressure, wear and size within standard?

YES >> GO TO 4

NO >> • Adjust air pressure, or replace tire.

Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

4. CHECK WHEEL BEARINGS

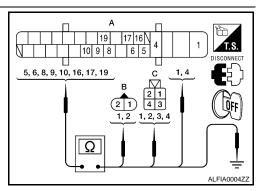
Check wheel bearing axial end play. Refer to <u>FAX-5</u>, "<u>Inspection</u>" (front) or <u>RAX-5</u>, "<u>On-vehicle Service</u>" (rear). <u>Is the inspection result normal?</u>

YES >> GO TO 5

NO >> Repair or replace as necessary. Refer to <u>FAX-7</u>, "<u>Removal and Installation</u>" (front) or <u>RAX-8</u>, "<u>Wheel Bearing (Rear)</u>" (rear).

5. CHECK WHEEL SENSOR HARNESS

- Turn ignition switch OFF and disconnect malfunctioning wheel sensor connector E41 (FR-RH), E19 (FR-LH), B43 (RR-RH and RR-LH) and ABS actuator and electric unit (control unit) connector E26.
- Check continuity between terminals. (Also check continuity when steering wheel is turned right and left and when sensor harness inside the wheel house is moved.)



	Power sup	Power supply circuit		Signal circuit		round circuit
Wheel	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (Signal - Ground) (A)	ABS actuator and electric unit (control unit) (A) (Signal) - Body Ground
Front RH	9	1	10	2	9, 10 - 1, 4	9, 10 - Body ground
Front LH	16	1	5	2	16, 5 - 1, 4	16, 5 - Body ground
Rear RH	8	3	19	4	8, 19 - 1, 4	8, 19 - Body ground
Rear LH	6	1	17	2	6, 17 - 1, 4	6, 17 - Body ground

Power supply circuit : Continuity should exist.

Signal circuit : Continuity should exist.

Ground circuit : Continuity should not exist.

Is the inspection result normal?

YES >> GO TO 6

NO >> • Repair or replace malfunctioning components.

< COMPONENT DIAGNOSIS >

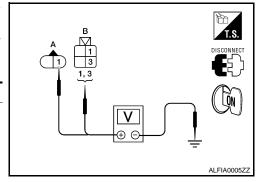
[VDC/TCS/ABS]

• Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

6.check wheel sensor power supply circuit

- Reconnect ABS actuator and electric unit (control unit) connector.
- 2. Turn ignition switch ON and check between wheel sensor harness connector power supply terminal and ground.

Wheel	Wheel sensor	Voltage	
Front RH (A)			
Front LH (A)	1		8 V or more
Rear LH (B)		_	8 V OI IIIOIE
Rear RH (B)	3		



Is the inspection result normal?

YES >> Inspection end.

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

Component Inspection

INFOID:0000000001342016

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 BRC-155, "Diagnosis Procedure".

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C1105, C1106, C1107, C1108 WHEEL SENSOR-2

Description INFOID:000000001342017

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:0000000001342018

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1105	RR RH SENSOR-2	Circuit of rear RH wheel sensor is open. Or when the sensor power voltage is outside the standard.	
C1106	RR LH SENSOR-2	Circuit of rear LH wheel sensor is open. Or when the sensor power voltage is outside the standard.	Harness or connectorWheel sensor
C1107	FR RH SENSOR-2	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)
C1108	FR LH SENSOR-2	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-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-158, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001342019

CAUTION:

Do not check between wheel sensor terminals.

INSPECTION PROCEDURE

1. CHECK CONNECTOR

Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26 and malfunctioning wheel sensor connector E41 (FR-RH), E19 (FR-LH), B43 (RR-RH and RR-LH). Check terminal to see if it is deformed, disconnected, loose, etc., Repair or replace it if any malfunction condition is found.

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

2.CHECK WHEEL SENSOR OUTPUT SIGNAL

- 1. Disconnect connectors from wheel sensor of malfunction code No.
- Connect ABS active wheel sensor tester (J-45741) to wheel sensor using appropriate adapter.
- 3. 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.

< COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

 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 wheel sensor. Refer to <u>BRC-235</u>, "Removal and Installation".

3. CHECK TIRE

Check air pressure, wear and size.

Are air pressure, wear and size within standard?

YES >> GO TO 4

NO >> • Adjust air pressure, or replace tire.

• Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

4. CHECK WHEEL BEARINGS

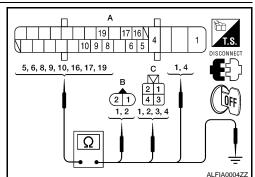
Check wheel bearing axial end play. Refer to <u>FAX-5</u>, "<u>Inspection</u>" (front) or <u>RAX-5</u>, "<u>On-vehicle Service</u>" (rear). <u>Is the inspection result normal?</u>

YES >> GO TO 5

NO >> Repair or replace as necessary. Refer to <u>FAX-7</u>, "<u>Removal and Installation</u>" (front) or <u>RAX-8</u>, "<u>Wheel Bearing (Rear)</u>" (rear).

5. CHECK WHEEL SENSOR HARNESS

- Turn ignition switch OFF and disconnect malfunctioning wheel sensor connector E41 (FR-RH), E19 (FR-LH), B43 (RR-RH and RR-LH) and ABS actuator and electric unit (control unit) connector E26.
- Check continuity between terminals. (Also check continuity when steering wheel is turned right and left and when sensor harness inside the wheel house is moved.)



	Power sup	oply circuit	Signal	circuit	G	round circuit
Wheel	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (Signal - Ground) (A)	ABS actuator and electric unit (control unit) (A) (Signal) - Body Ground
Front RH	9	1	10	2	9, 10 - 1, 4	9, 10 - Body ground
Front LH	16	1	5	2	16, 5 - 1, 4	16, 5 - Body ground
Rear RH	8	3	19	4	8, 19 - 1, 4	8, 19 - Body ground
Rear LH	6	1	17	2	6, 17 - 1, 4	6, 17 - Body ground

Power supply circuit : Continuity should exist.

Signal circuit : Continuity should exist.

Ground circuit : Continuity should not exist.

Is the inspection result normal?

YES >> GO TO 6

NO >> • Repair or replace malfunctioning components.

Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

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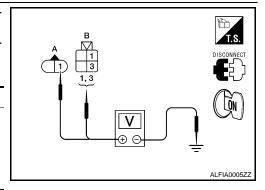
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6. CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

- Reconnect ABS actuator and electric unit (control unit) connector
- 2. Turn ignition switch ON and check between wheel sensor harness connector power supply terminal and ground.

Wheel	Wheel sensor	Ground	Voltage
Front RH (A)			
Front LH (A)	1		0.1/ 0.5 50 0.50
Rear LH (B)		_	8 V or more
Rear RH (B)	3		



Is the inspection result normal?

YES >> Inspection end.

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

Component Inspection

INFOID:0000000001342020

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 BRC-158, "Diagnosis Procedure".

DTC C1109 BATTERY VOLTAGE [ABNORMAL]

< COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

DTC C1109 BATTERY VOLTAGE [ABNORMAL]

Description INFOID:000000001342021

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

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 BRC-161, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001342023

INSPECTION PROCEDURE

1. CHECK CONNECTOR

- 1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26, 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.

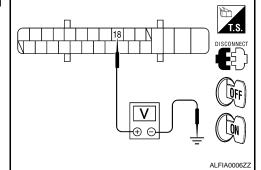
Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2

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

- 1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26.
- 2. Check voltage between ABS actuator and electric unit (control unit) harness connector E26 terminal 18 and ground.



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DTC C1109 BATTERY VOLTAGE [ABNORMAL]

< COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

ABS actuator and electric unit (control unit)	Ground	Condition	Voltage
18	_	Ignition switch ON	Battery voltage (Approx. 12 V)
16		Ignition switch OFF	Approx. 0 V

- 3. Turn ignition switch OFF.
- 4. Check continuity between ABS actuator and electric unit (control unit) harness connector E26 terminal 1, 4 and ground.

ABS actuator and electric unit (control unit)	Ground	Continuity
1, 4	1	Yes

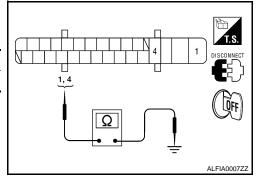
Is the inspection result normal?

YES

- >> Check battery for terminal looseness, low voltage, etc. If any malfunction is found, repair malfunctioning parts.
 - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".



- >> Repair or replace malfunctioning components.
 - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".



[VDC/TCS/ABS] < COMPONENT DIAGNOSIS > C1110, C1153, C1170 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) **DTC Logic** INFOID:0000000001342024 В DTC DETECTION LOGIC DTC Display item Malfunction detected condition Possible cause When there is an internal malfunction in the ABS actuator C1110 **CONTROLLER FAILURE** and electric unit (control unit). · ABS actuator and electric unit D When ABS actuator and electric unit (control unit) is mal-C1153 **EMERGENCY BRAKE** (control unit) functioning. (Pressure increase is too much or too little) C1170 **VARIANT CODING** In a case where VARIANT CODING is different. Е DTC CONFIRMATION PROCEDURE 1. CHECK SELF-DIAGNOSIS RESULTS **BRC** Check the self-diagnosis results. Self-diagnosis results CONTROLLER FAILURE **EMERGENCY BRAKE VARIANT CODING** Is above displayed on the self-diagnosis display? YES >> Proceed to diagnosis procedure. Refer to BRC-163, "Diagnosis Procedure". >> INSPECTION END NO Diagnosis Procedure INFOID:0000000001342025 INSPECTION PROCEDURE ${f 1}$.REPLACE ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) Replace ABS actuator and electric unit (control unit) when self-diagnostic result shows items other than that applicable. L >> Replace ABS actuator and electric unit (control unit). Special Repair Requirement INFOID:0000000001342026 ${f 1}$. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actua-Ν tor and electric unit (control unit). Refer to BRC-241, "Removal and Installation". >> END Р

C1110, C1153, C1170 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

DTC C1111 PUMP MOTOR

Description INFOID:000000001342027

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	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
	T GWI WOTOK	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-164</u>, "<u>Diagnosis Procedure</u>".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001342029

INSPECTION PROCEDURE

1. CHECK CONNECTOR

- Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26, 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.

Is the inspection result normal?

YES >> Inspection end.

NO >> GO TO 2

2. CHECK ABS MOTOR AND MOTOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26.

DTC C1111 PUMP MOTOR

< COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

Check voltage between the ABS actuator and electric unit (control unit) harness connector E26 terminal 2 and ground.

ABS actuator and electric unit (control unit)	Ground	Voltage
2	_	Battery voltage (Approx. 12 V)

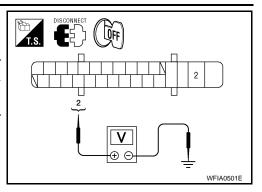
Is the inspection result normal? YES >> GO TO 3

NO

NO

>> • Repair or replace malfunctioning components.

• Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".



$3.\,$ CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) GROUND CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) harness connector E26 terminal 1, 4 and ground.

ABS actuator and electric unit (control unit)	Ground	Continuity
1, 4		Yes

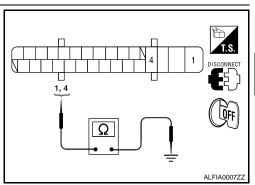
Is the inspection result normal?

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

• Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

>> • Repair or replace malfunctioning components.

· Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".



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 (Note)	ON	ON

NOTE:

A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

Is the inspection result normal?

YES >> INSPECTION END

>> Go to diagnosis procedure. Refer to <u>BRC-164</u>, "<u>Diagnosis Procedure</u>". NO

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INFOID:0000000001342030

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DTC C1114 MAIN RELAY

Description INFOID:000000001342031

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
C1114	MAIN RELAY	During the actuator relay operating with OFF, when the actuator relay turns ON, or when the control line for the relay is shorted to the ground.	Harness or connector ABS actuator and electric unit
01114	IVAIN INLLAT	During the actuator relay operating with ON, when the actuator relay turns ON, or when the control line for the relay is open.	(control unit)

DTC CONFIRMATION PROCEDURE

1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results	
 MAIN RELAY	

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-166, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001342033

INSPECTION PROCEDURE

1. CHECK CONNECTOR

- Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26, 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.

Is the inspection result normal?

YES >> Inspection end.

NO >> GO TO 2

2.CHECK SOLENOID AND ACTUATOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26.

2. Check voltage between ABS actuator and electric unit (control unit) harness connector E26 terminal 3 and ground.

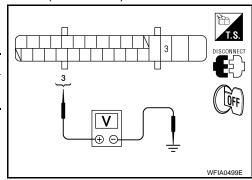
ABS actuator and electric unit (control unit)	Ground	Voltage
3	_	Battery voltage (Approx. 12 V)

Is the inspection result normal?

YES >> GO TO 3

NO

- >> Repair or replace malfunctioning components.
 - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".



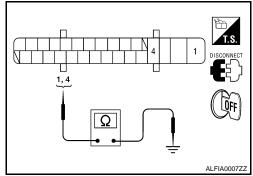
${f 3.}$ CHECK SOLENOID AND ACTUATOR RELAY GROUND CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) harness connector E26 terminal 1, 4 and ground.

ABS actuator and electric unit (control unit)	Ground	Continuity
1, 4	_	Yes

Is the inspection result normal?

- >> Replace ABS actuator and electric unit (control unit).
 - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".
- >> Repair or replace malfunctioning components.
 - · Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".



INFOID:0000000001342034

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 (Note)	ON	ON

NOTE:

NO

A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to BRC-166, "Diagnosis Procedure". BRC

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DTC C1115 ABS SENSOR [ABNORMAL SIGNAL]

< COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

DTC C1115 ABS SENSOR [ABNORMAL SIGNAL]

Description INFOID:000000001342035

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:000000001342036

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

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 BRC-168, "Diagnosis Procedure".

NO >> Inspection end.

Diagnosis Procedure

INFOID:0000000001342037

CAUTION:

Do not check between wheel sensor terminals.

INSPECTION PROCEDURE

1.CHECK TIRE

Check air pressure, wear and size.

Are air pressure, wear and size within standard?

YES >> GO TO 2

NO >> • Adjust air pressure, or replace tire.

• Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

2.CHECK SENSOR AND SENSOR ROTOR

- Check sensor rotor for damage.
- Check wheel sensor for damage, disconnection or looseness.

Is the inspection result normal?

YES >> GO TO 3

NO >> • Repair wheel sensor mount or replace sensor rotor. Then perform the self-diagnosis.

Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

3. CHECK CONNECTOR

- Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26 and malfunctioning wheel sensor connector E41 (FR-RH), E19 (FR-LH), B43 (RR-RH and RR-LH). Check terminal to see if it is deformed, disconnected, loose, etc., Repair or replace it if any malfunction condition is found.
- 2. Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-148, "CONSULT-III Function (ABS)"</u>.

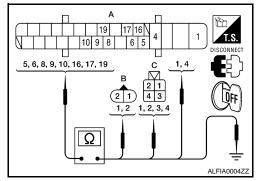
Is the inspection result normal?

YES >> Inspection end.

NO >> GO TO 4

4. CHECK WHEEL SENSOR HARNESS

- Turn ignition switch OFF and disconnect malfunctioning wheel sensor connector E41 (FR-RH), E19 (FR-LH), B43 (RR-RH and RR-LH) and ABS actuator and electric unit (control unit) connector E26.
- Check continuity between terminals. (Also check continuity when steering wheel is turned right and left and when sensor harness inside the wheel house is moved.)



	Power sup	oply circuit	Signal	circuit	G	round circuit
Wheel	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (Signal - Ground) (A)	ABS actuator and electric unit (control unit) (A) (Signal) - Body Ground
Front RH	9	1	10	2	9, 10 - 1, 4	9, 10 - Body ground
Front LH	16	1	5	2	16, 5 - 1, 4	16, 5 - Body ground
Rear RH	8	3	19	4	8, 19 - 1, 4	8, 19 - Body ground
Rear LH	6	1	17	2	6, 17 - 1, 4	6, 17 - Body ground

Power supply circuit : Continuity should exist.

Signal circuit : Continuity should exist.

Ground circuit : Continuity should not exist.

Is the inspection result normal?

YES >> GO TO 5

NO

NO

>> • Repair or replace malfunctioning components.

Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

${f 5}$.CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

1. Replace wheel sensor that resulted in malfunction by self-diagnosis.

2. Reconnect connectors, drive vehicle at 30 km/h (19 MPH) or more for approximately 1 minute, and then perform self-diagnosis.

Is above displayed on the self-diagnosis display?

YES >> Inspection end.

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

Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

Component Inspection

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:0000000001342038

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DTC C1115 ABS SENSOR [ABNORMAL SIGNAL]

[VDC/TCS/ABS]

< COMPONENT DIAGNOSIS >

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-168. "Diagnosis Procedure"</u>.

DTC C1116 STOP LAMP SW

Description INFOID:000000001342039

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 SWITCH

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-171</u>. "<u>Diagnosis Procedure</u>".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001342041

INSPECTION PROCEDURE

1. CHECK CONNECTOR

- 1. Turn ignition switch OFF and disconnect stop lamp switch connector E38 and ABS actuator and electric unit (control unit) connector E26, check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 2. Reconnect connectors securely.
- 3. Start engine.
- 4. Repeat pumping brake pedal carefully several times, and perform self-diagnosis.

Is the inspection result normal?

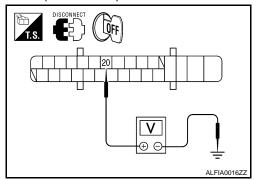
YES >> Inspection end.

NO >> GO TO 2

2. CHECK STOP LAMP SWITCH CIRCUIT

1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26.

2. Check voltage between ABS actuator and electric unit (control unit) harness connector E26 terminal 20 and ground.



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ABS actuator and electric unit (control unit)	Ground	Condition	Voltage
20		Brake pedal depressed	Battery voltage (Approx. 12 V)
20 —		Brake pedal not depressed	Approx. 0V

Is the inspection result normal?

YES >> Perform self-diagnosis.

NO >> • Repai

- >> Repair or replace stop lamp switch circuit.
 - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

Component Inspection

INFOID:0000000001342042

1. CHECK STOP LAMP SWITCH

- 1. Turn ignition switch OFF.
- 2. Disconnect stop lamp switch connector.
- 3. Check continuity between stop lamp switch connector terminals.

Stop lamp switch		Condition	Continuity
Connector	Terminals	Condition	Continuity
E38 1 – 2	1 2	Release stop lamp switch (When brake pedal is depressed.)	Yes
	Push stop lamp switch (When brake pedal is released.)	No	

Is the inspection result normal?

YES >> INSPECTION END.

NO >> Replace stop lamp switch.

SPECIAL REPAIR REQUIREMENT

1.adjustment of steering angle sensor neutral position

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to BRC-142, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

>> END

C1120, C1122, C1124, C1126 IN ABS SOL

Description INFOID:000000001342043

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
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 BRC-173, "Diagnosis Procedure".

NO >> Inspection end.

Diagnosis Procedure

INSPECTION PROCEDURE

1. CHECK CONNECTOR

1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26, 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.

Is the inspection result normal?

YES >> Inspection end.

NO >> GO TO 2

2.CHECK SOLENOID AND ACTUATOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26.

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C1120, C1122, C1124, C1126 IN ABS SOL

< COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

WFIA0499E

Check voltage between ABS actuator and electric unit (control unit) harness connector E26 terminal 3 and ground.

ABS actuator and electric unit (control unit)	Ground	Voltage
3	_	Battery voltage (Approx. 12 V)

3 V

Is the inspection result normal?

YES >> G

NO

>> GO TO 3

- >> Repair or replace malfunctioning components.
 - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

3. CHECK SOLENOID AND ACTUATOR RELAY GROUND CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) harness connector E26 terminal 1, 4 and ground.

ABS actuator and electric unit (control unit)	Ground	Continuity
1, 4	_	Yes

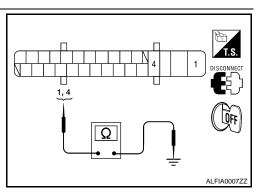
Is the inspection result normal?

YES

- >> Replace ABS actuator and electric unit (control unit).
 - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

NO >> • Repair or replace malfunctioning components.

 Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".



Component Inspection

INFOID:0000000001342046

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.

NOTE:

The example below is for front right wheel. The procedure for the other wheels is the same as given below.

Operation (Note)	ABS solenoid valve		
	UP	KEEP	DOWN
FR RH IN SOL	OFF	ON	ON
FR RH OUT SOL	OFF	OFF	ON*

^{*:} ON for 1 to 2 seconds after the touch, and then OFF.

NOTE:

A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

Is the inspection result normal?

YES >> Inspection end.

NO >> Go to diagnosis procedure. Refer to <u>BRC-173</u>, "<u>Diagnosis Procedure</u>".

C1121, C1123, C1125, C1127 OUT ABS SOL

Description INFOID:000000001342047

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 BRC-175, "Diagnosis Procedure".

NO >> Inspection end.

Diagnosis Procedure

INSPECTION PROCEDURE

1. CHECK CONNECTOR

1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26, 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.

Is the inspection result normal?

YES >> Inspection end.

NO >> GO TO 2

2.CHECK SOLENOID AND ACTUATOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26.

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INFOID:0000000001342049

C1121, C1123, C1125, C1127 OUT ABS SOL

< COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

Check voltage between ABS actuator and electric unit (control unit) harness connector E26 terminal 3 and ground.

ABS actuator and electric unit (control unit)	Ground	Voltage
3	_	Battery voltage (Approx. 12 V)

Is the inspection result normal?

WFIA0499E

YES >> GO TO 3

NO

- >> Repair or replace malfunctioning components.
 - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

$3.\,$ CHECK SOLENOID AND ACTUATOR RELAY GROUND CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) harness connector E26 terminal 1, 4 and ground.

ABS actuator and electric unit (control unit)	Ground	Continuity
1, 4	_	Yes

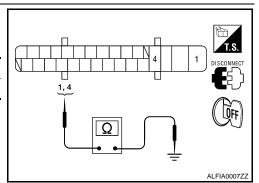
Is the inspection result normal?

YES

- >> Replace ABS actuator and electric unit (control unit).
 - · Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

NO

- >> Repair or replace malfunctioning components.
 - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".



Component Inspection

INFOID:0000000001342050

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.

NOTE:

The example below is for front right wheel. The procedure for the other wheels is the same as given below.

Operation (Note)	ABS solenoid valve		
Operation (Note)	UP	KEEP	DOWN
FR RH IN SOL	OFF	ON	ON
FR RH OUT SOL	OFF	OFF	ON*

^{*:} ON for 1 to 2 seconds after the touch, and then OFF.

A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

Is the inspection result normal?

YES >> Inspection end.

NO >> Go to diagnosis procedure. Refer to <u>BRC-175</u>, "<u>Diagnosis Procedure</u>".

C1130, C1131, C1132, C1133, C1136 ENGINE SIGNAL

< COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

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C1130, C1131, C1132, C1133, C1136 ENGINE SIGNAL

Description INFOID:0000000001342051

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	Major engine components are malfunctioning.	Harness or connector ABS actuator and electric unit (control unit) ECM CAN communication line
C1131	ENGINE SIGNAL 2		
C1132	ENGINE SIGNAL 3		
C1133	ENGINE SIGNAL 4		
C1136	ENGINE SIGNAL 6		G. 11 CO

DTC CONFIRMATION PROCEDURE

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-177, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001342053

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-1012, "Work Flow".
- Perform ABS actuator and electric unit (control unit) self-diagnosis.

Is the inspection result normal?

YES >> Inspection end.

NO

>> • Repair or replace malfunctioning components.

Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

Special Repair Requirement

INFOID:0000000001342054

SPECIAL REPAIR REQUIREMENT

1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-142</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

BRC-177

C1130, C1131, C1132, C1133, C1136 ENGINE SIGNAL

< COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

>> END

DTC C1142 PRESS SEN CIRCUIT

Description INFOID:0000000001342055

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

DTC Logic INFOID:0000000001342056

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1142	PRESS SEN CIRCUIT	Pressre sensor signal line is open or shorted, or pressre sensor is malfunctioning.	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 PRESS SEN CIRCUIT

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-179, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001342057

INSPECTION PROCEDURE

1. CHECK STOP LAMP SWITCH CONNECTOR

- Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- Disconnect stop lamp switch connector.
- Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- Reconnect connectors securely.
- Start engine.
- Repeat pumping brake pedal carefully several times, and perform self-diagnosis.

Is the inspection result normal?

YES >> GO TO 2

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

2.CHECK STOP LAMP SWITCH

- Turn ignition switch OFF.
- 2. Disconnect stop lamp switch connector.
- Check continuity between stop lamp switch connector terminals. 3.

Stop lamp switch		Condition	Continuity
Connector	Terminal	Condition	Continuity
E38	1-2	Release stop lamp switch (When brake pedal is depressed.)	Yes
E30	1 – 2	Push stop lamp switch (When brake pedal is released.)	No

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< COMPONENT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 3

NO >> Replace stop lamp switch.

3.check stop lamp switch circuit

- 1. Disconnect ABS actuator and electric unit (control unit) connector.
- 2. Connect stop lamp switch connector.
- 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	Condition	voltage
	20	Brake pedal is depressed	Battery voltage
LZO	20	Brake pedal is released	Approx. 0 V

Is the inspection result normal?

YES >> GO TO 4

NO >> Repair or replace malfunctioning components.

4. CHECK SELF-DIAGNOSIS RESULTS

Check self-diagnosis results.

Self-diagnosis results	
PRESS SEN CIRCUIT	

Is above displayed on the self-diagnosis display?

YES

- >> Replace ABS actuator and electric unit (control unit).
 - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

NO >> Inspection end.

Component Inspection

INFOID:0000000001342058

1. CHECK DATA MONITOR

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

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.	- 40 to 300 bar

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to BRC-179, "Diagnosis Procedure".

Special Repair Requirement

INFOID:0000000001342059

${f 1}$. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to BRC-142, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

>> END

C1143, C1144 STEERING ANGLE SENSOR

Description INFOID:000000001342060

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.	 ABS actuator and electric unit (control unit)

DTC CONFIRMATION PROCEDURE

1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-181, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001342062

INSPECTION PROCEDURE

1. CHECK CONNECTOR

- 1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26, 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.

Is the inspection result normal?

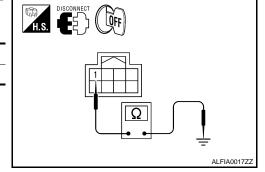
YES >> Inspection end.

NO >> GO TO 2

2.CHECK STEERING ANGLE SENSOR HARNESS

- 1. Check CAN communication system. Refer to LAN-16, "Trouble Diagnosis Flow Chart".
- 2. Turn ignition switch OFF and disconnect steering angle sensor connector.
- Check continuity between steering angle sensor harness connector M53 terminal 1 and ground.

_	Steering angle sensor	Ground	Continuity
	1	_	Yes



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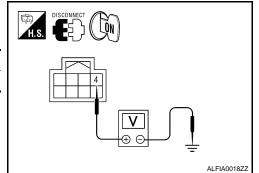
4. Turn ignition switch ON and check voltage between steering angle sensor harness connector M53 terminal 4 and ground.

Steering angle sensor	Ground	Voltage
4		Battery voltage (Approx. 12 V)

Is the inspection result normal?

YES NO >> GO TO 3

- >> Repair or replace malfunctioning components.
 - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".



3. CHECK DATA MONITOR

- 1. Turn ignition switch OFF and 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 ° to + 2.5 °
Turn 90° to right	Approx.+ 90 °
Turn 90° to left	Approx.– 90 °

Is the inspection result normal?

YES NO >> Perform self-diagnosis.

- >> Replace spiral cable (steering angle sensor) and adjust neutral position of steering angle sensor. Refer to BRC-241, "Removal and Installation".
 - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

Component Inspection

INFOID:000000001342063

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 <u>BRC-181</u>, "<u>Diagnosis Procedure</u>".

Special Repair Requirement

INFOID:0000000001342064

1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to BRC-241, "Removal and Installation".

>> END

C1145, C1146 YAW RATE/SIDE G SENSOR

< COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

C1145, C1146 YAW RATE/SIDE G SENSOR

Description INFOID:000000001342065

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	
	C1145	YAW RATE SENSOR	Yaw rate sensor is malfunctioning, or the yaw rate sensor signal line is open or shorted.	Harness or connector ABS actuator and electric unit	
	C1146	SIDE G-SEN CIRCUIT	Side G sensor is malfunctioning, or circuit of side G sensor is open or shorted.	(control unit)Yaw rate/side G sensor	

DTC CONFIRMATION PROCEDURE

1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-183. "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

CAUTION:

- Sudden turns (such as spin turns, acceleration turns), drifting, etc., when VDC function is off (VDC OFF switch "ON") may cause yaw rate/side/decel G sensor system to indicate a malfunction. However, this is not a malfunction, if normal operation can be resumed after restarting engine. Then erase memory of self-diagnosis.
- 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. And after doing spin turns or acceleration turns with VDC function is being off (VDC OFF switch "ON"), too, the results will return to a normal condition by re-starting vehicle.

INSPECTION PROCEDURE

1. CHECK CONNECTOR

- 1. Turn ignition switch OFF and disconnect yaw rate/side/decel G sensor connector M55 and ABS actuator and electric unit (control unit) connector E26, 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.

Is the inspection result normal?

YES >> Inspection end.

NO >> GO TO 2

2. CHECK YAW RATE/SIDE/DECEL G SENSOR POWER SUPPLY CIRCUIT

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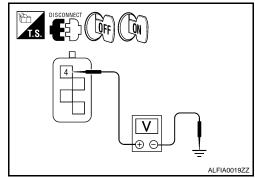
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Turn ignition switch ON, then OFF and check voltage between yaw rate/side/decel G sensor harness connector M55 terminal 4 and ground.



Yaw rate/side/decel G sensor	Ground	Condition	Voltage
4	_	Ignition switch ON	Battery voltage (Approx. 12 V)
7		Ignition switch OFF	Approx. 0V

Is the inspection result normal?

YES >> GO TO 3

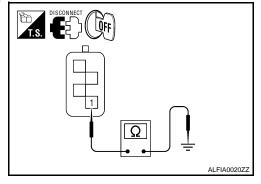
NO >> • Repair or replace malfunctioning components.

• Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

$3. \mathsf{CHECK}\ \mathsf{YAW}\ \mathsf{RATE/SIDE/DECEL}\ \mathsf{G}\ \mathsf{SENSOR}\ \mathsf{GROUND}\ \mathsf{SUPPLY}\ \mathsf{CIRCUIT}$

Turn ignition switch OFF and check resistance between yaw rate/side/decel G sensor harness connector M55 terminal 1 and ground.

Yaw rate/side/decel G sensor	Ground	Condition	Continuity
1	_	Ignition switch OFF	Yes



Is the inspection result normal?

YES >> GO TO 4

NO >> • Repair or replace malfunctioning components.

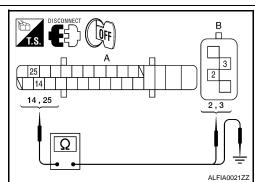
Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

4. CHECK YAW RATE/SIDE/DECEL G SENSOR HARNESS

1. Check continuity between ABS actuator and electric unit (control unit) harness connector (A) E26 and yaw rate/side/decel G sensor harness connector (B) M55.

ABS actuator and electric unit (control unit)	Yaw rate/side/decel G sensor	Continuity
14	2	Yes
25	3	163

Check continuity between ABS actuator and electric unit (control unit) harness connector (A) E26 and ground.



C1145, C1146 YAW RATE/SIDE G SENSOR

< COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

ABS actuator and electric unit (control unit)	Ground	Continuity
14		No
25	_	INO

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Is the inspection result normal?

YES >> GO TO 5

NO >> • Repair or replace malfunctioning components.

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Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

5. CHECK DATA MONITOR

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

2. Select "YAW RATE SEN", "SIDE G-SENSOR" in "Data Monitor" and check Yaw rate/side/decel G sensor signal.

Vehicle condition	Yaw rate sensor (Data monitor)	Side G sensor (Data monitor)
Stopped	Approx. 0 d/s	Approx. 0 m/s ²
Turning right	Negative value	Negative value
Turning left	Positive value	Positive value

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Is the inspection result normal?

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

Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

NO >> • Replace Yaw rate/side/decel G sensor.

• Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

Component Inspection

INFOID:0000000001342068

1. CHECK DATA MONITOR

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

Vehicle condition	YAW RATE SEN (DATA MONITOR)	SIDE G-SENSOR (DATA MONITOR)
Stopped	Approx. 0 d/s	Approx. 0 m/s ²
Turning right	Negative value	Negative value
Turning left	Positive value	Positive value

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Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to BRC-183, "Diagnosis Procedure".

Special Repair Requirement

INFOID:0000000001342069

1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-241</u>, "Removal and Installation".

>> END

[VDC/TCS/ABS]

C1147, C1148, C1149, C1150 USV/HSV LINE

Description INFOID:000000001342070

USV1, USV2 (CUT VALVE)

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

HSV1, HSV2 (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
C1147	USV LINE[FL-RR]	VDC switch-over solenoid valve (USV1) on the primary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground.	
C1148	USV LINE[FR-RL]	VDC switch-over solenoid valve (USV2) 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
C1149	HSV LINE[FL-RR]	VDC switch-over solenoid valve (HSV1) 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)
C1150	HSV LINE[FR-RL]	VDC switch-over solenoid valve (HSV2) 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
USV LINE[FL-RR]
USV LINE[FR-RL]
HSV LINE[FL-RR]
HSV LINE[FR-RL]

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-186, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001342072

INSPECTION PROCEDURE

1. CHECK CONNECTOR

- 1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26, 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.

Is the inspection result normal?

YES >> Inspection end.

NO >> GO TO 2

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

1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26.

C1147, C1148, C1149, C1150 USV/HSV LINE

< COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

Check voltage between ABS actuator and electric unit (control unit) harness connector E26 terminal 3 and ground.

ABS actuator and electric unit (control unit)	Ground	Voltage
3	_	Battery voltage (Approx. 12 V)

J.S. DISCONNECT WELLOWS

Is the inspection result normal?

YES >> GO TO 3

NO >> • Repair or replace malfunctioning components.

 Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

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

Check continuity between ABS actuator and electric unit (control unit) harness connector E26 terminal 1, 4 and ground.

ABS actuator and electric unit (control unit)	Ground	Continuity
1, 4	1	Yes

TIS. DISCONNECT 1, 4 1 OFF

Is the inspection result normal?

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

 Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

>> • Repair or replace malfunctioning components.

 Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

Component Inspection

1. CHECK ACTIVE TEST

Select each test menu item on "ACTIVE TEST".

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

NOTE:

NO

The example shown is for front right wheel. The procedure for the other wheels is the same as given below.

Operation (Note)	ABS solenoid valve (ACT)		
Operation (Note)	UP	ACT UP	ACT KEEP
FR RH IN SOL	OFF	OFF	OFF
FR RH OUT SOL	OFF	OFF	OFF
USV [FR-RL]	OFF	ON	ON
HSV [FR-RL]	OFF	ON*	OFF

^{*:} ON for 1 to 2 seconds after the touch, and then OFF.

NOTE:

A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to BRC-186, "Diagnosis Procedure".

Special Repair Requirement

INFOID:0000000001342074

 ${f 1}$. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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C1147, C1148, C1149, C1150 USV/HSV LINE

< COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to BRC-142, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

>> END

[VDC/TCS/ABS]

DTC C1154 PNP POS SIG

Description INFOID:0000000001342075

The park/neutral position switch signal is transmitted to the ABS actuator and electric unit (control unit) using the CAN communication lines.

DTC Logic INFOID:0000000001342076

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	D
C1154	PNP POS SIG	Park/Neutral position signal or communication line between the ABS actuator and electric unit (control unit) and TCM is open or shorted.	Harness or connector PNP switch	E

DTC CONFIRMATION PROCEDURE

1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results PNP POS SIG

Is above displayed on the self-diagnosis display?

>> Proceed to diagnosis procedure. Refer to BRC-189, "Diagnosis Procedure". YES

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001342077

INSPECTION PROCEDURE

1. CHECK DATA MONITOR

Select "SLCT LVR POSI" in "Data Monitor" and check Park/Neutral position switch signal.

Selector lever position	SLCT LVR POSI (Data monitor)
P position	Р
R position	R
N position	N
D position	D

Is the inspection result normal?

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

Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

NO >> GO TO 2

2.CHECK PARK/NEUTRAL POSITION (PNP) SWITCH

Perform Park/Neutral position switch inspection. Refer to TM-129, "Description".

Is the inspection result normal?

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

Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

>> • Repair or replace malfunctioning components. NO

• Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

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BRC-189

DTC C1155 BR FLUID LEVEL LOW

Description INFOID:000000001342078

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

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-190, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001342080

CAUTION:

Check brake fluid level in brake reservoir tank before starting inspection.

INSPECTION PROCEDURE

1. CHECK CONNECTOR

- 1. Turn ignition switch OFF and disconnect brake fluid level switch connector E24 and combination meter connector M24, check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- Reconnect connector and perform self-diagnosis.

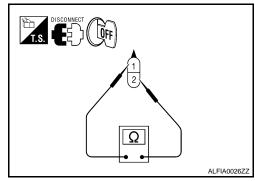
Is the inspection result normal?

YES >> Inspection end.

NO >> GO TO 2

2.CHECK BRAKE FLUID LEVEL SWITCH

- Turn ignition switch OFF and disconnect brake fluid level switch connector E24.
- Check continuity between brake fluid level switch connector E24 terminals 1 and 2.



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

Is the inspection result normal?

YES >> GO TO 3

NO >> • Brake fluid level switch is malfunctioning. Replace reservoir tank. Refer to <u>BR-33, "Exploded View"</u>.

Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

3.CHECK BRAKE FLUID LEVEL SWITCH HARNESS

- 1. Disconnect combination meter connector M24.
- Check continuity between combination meter connector M24 (A) terminal 27 and brake fluid level switch connector E24 (B) terminal 1.

27 - 1 : Continuity should exist.

Check continuity between combination meter connector M24 (A) terminal 27 and ground.

27 - Ground : Continuity should not exist.

Is the inspection result normal?

YES >> GO TO 4

NO >> • Repair or replace malfunctioning components.

Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

4.CHECK BRAKE FLUID LEVEL SWITCH GROUND CIRCUIT

Check continuity between brake fluid level switch connector E24 (B) terminal 2 and ground.

2 - Ground : Continuity should exist.

Is the inspection result normal?

YES >> Brake fluid level switch circuit is OK.

NO >> • Repair or replace malfunctioning components.

 Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

DISCONNECT OFF

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 connector terminals.

Brake fluid level switch		Condition	Continuity	
Connector	Terminals	Condition	Continuity	
E24	1 – 2	When brake fluid is full in the reservoir tank.	No	
E24		When brake fluid is empty in the reservoir tank.	Yes	

Is the inspection result normal?

YES >> INSPECTION END.

NO >> Replace reservoir tank.

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DTC C1155 BR FLUID LEVEL LOW

< COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

Special Repair Requirement

INFOID:0000000001342082

1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-241</u>, "Removal and Installation".

>> END

[VDC/TCS/ABS]

DTC C1156 ST ANG SEN COM CIR

Description INFOID:0000000001342083

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).	 Harness or connector CAN communication line Steering angle sensor ABS actuator and electric unit (control unit)

DTC CONFIRMATION PROCEDURE

1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results	
ST ANG SEN COM CIR	

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-193, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INSPECTION PROCEDURE

1. CHECK CONNECTOR

- 1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26, check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 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-6, "Precautions for Trouble Diagnosis".

NO >> Inspection end.

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INFOID:0000000001342085

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U1000 CAN COMM CIRCUIT

Description INFOID:000000001342086

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

DTC Logic INFOID:000000001342087

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:0000000001342088

INSPECTION PROCEDURE

1. CHECK CONNECTOR

- 1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26, 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	

Is above displayed on the self-diagnosis display?

YES >> Refer to LAN-6, "Precautions for Trouble Diagnosis".

NO >> Inspection end.

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PARKING BRAKE SWITCH

Description INFOID:0000000001342089

The parking brake switch converts the status of the parking brake pedal to an electric signal and transmits it to the combination meter. Then, through CAN communication, the signal is carried to the ABS actuator and electric unit (control unit).

Component Function Check

CHECK PARKING BRAKE SWITCH OPERATION

Operate the parking brake. Then check that the brake warning lamp in the combination meter turns on/off correctly.

Condition	Brake warning lamp illumination status	
When the parking brake is engaged	ON	
When the parking brake is not engaged	OFF	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to BRC-195, "Diagnosis Procedure".

Diagnosis Procedure

1. CHECK PARKING BRAKE SWITCH CIRCUIT

- Disconnect combination meter connector and parking brake switch connector.
- Check continuity between combination meter harness connector M24 (A) terminal 26 and parking brake switch harness connector M73 (B) terminal 1.

26 - 1 : Continuity should exist.

3. Check continuity between combination meter harness connector M24 (A) terminal 26 and ground.

: Continuity should not exist. 26 - Ground

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair harness or connector.

2.CHECK PARKING BRAKE SWITCH

Check continuity between parking brake switch terminal 1 and switch case ground.

Component	Terminal	Condition	Continuity
Parking brake switch	1	Parking brake applied	Yes
Tarking brake switch		Parking brake released	No

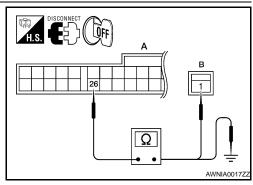
Is the inspection result normal?

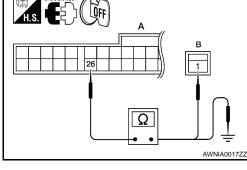
YES >> Check parking brake switch case ground condition.

NO >> Replace parking brake switch.

Component Inspection

INSPECTION PROCEDURE





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PARKING BRAKE SWITCH

< COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

1. CHECK PARKING BRAKE SWITCH

- 1. Turn ignition switch OFF.
- 2.
- Disconnect parking brake switch connector.

 Check continuity between parking brake switch terminal 1 and ground.

Parking brake switch			Condition	Continuity	
Connector	Terminal	_	Condition	Continuity	
M73 1	Ground	When the parking brake is engaged.	Yes		
	1	Ground	When the parking brake is released.	No	

Is the inspection result normal?

YES >> INSPECTION END.

>> Replace parking brake switch. NO

INFOID:0000000001342094

INFOID:0000000001342095

VDC OFF SWITCH

Description INFOID:000000001342093

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

Component Function Check

1. CHECK VDC OFF SWITCH OPERATION

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

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

Is the inspection result normal?

YES >> INSPECTION END

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

Diagnosis Procedure

INSPECTION PROCEDURE

1. CHECK VDC OFF SWITCH

- 1. Turn ignition switch OFF and disconnect VDC OFF switch connector M72.
- Check continuity between VDC OFF switch connector M72 terminals 1 and 2.

VDC OFF switch	Condition	Continuity	
1 2	VDC OFF switch ON	Yes	
1, 2	VDC OFF switch OFF	No	

Is the inspection result normal?

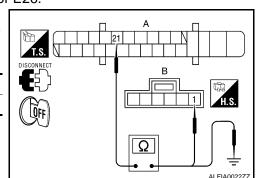
YES >> GO TO 2

NO >> VDC OFF switch is malfunctioning. Replace VDC OFF switch.

2.CHECK VDC OFF SWITCH HARNESS

- Disconnect ABS actuator and electric unit (control unit) connector E26.
- Check continuity between ABS actuator and electric unit (control unit) connector E26 (A) terminal 21 and VDC OFF switch connector M72 (B) terminal 1.

ABS actuator and electric unit (control unit)	VDC OFF switch	Continuity
21	1	Yes



VDC OFF switch connector

4 3 2 1

Check continuity between ABS actuator and electric unit (control unit) connector E26 (A) terminal 21 and ground.

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ABS actuator and electric unit (control unit)	Body ground	Continuity
21	Ground	No

Is the inspection result normal?

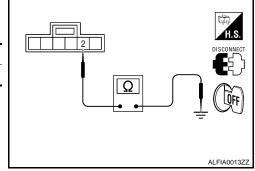
YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

3.check vdc off switch ground

Check continuity between VDC OFF switch connector M72 terminal 2 and ground.

VDC OFF switch	Body ground	Continuity
2	Ground	Yes



Is the inspection result normal?

YES >> Inspection end.

NO >> Repair or replace malfunctioning components.

Component Inspection

INFOID:0000000001342096

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 connector terminals.

VDC OFF switch Connector Terminals		Condition	Continuity	
		Condition		
M72	1 – 2	When VDC OFF switch is pressed ON.	Exists	
		When VDC OFF switch is released OFF.	Does not exist	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace VDC OFF switch.

ABS WARNING LAMP

Description INFOID:0000000001342097

 \times : ON -: OFF

INFOID:0000000001342098

INFOID:0000000001342099

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

Component Function Check

1. CHECK ABS WARNING LAMP OPERATION

Check that the lamp illuminates for approximately 1 second after the ignition switch is turned ON.

Is the inspection result normal?

>> INSPECTION END YES

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

Diagnosis Procedure

1. CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to BRC-148, "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-4, "Work Flow".

Is the inspection result normal?

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

NO >> Repair or replace combination meter.

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BRAKE WARNING LAMP

Description INFOID:0000000001342100

×: ON -: OFF

Condition	Brake warning lamp (Note 1)
Ignition switch OFF	-
For 1 second after turning ON ignition switch	× (Note 2)
1 second later after turning ON ignition switch	× (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:0000000001342101

1.BRAKE WARNING LAMP OPERATION CHECK 1

Check that the lamp illuminates for approximately 1 second after the ignition switch is turned ON.

Is the inspection result normal?

YES >> GO TO 2

NO >> Go to diagnosis procedure. Refer to BRC-200, "Diagnosis Procedure".

2.BRAKE WARNING LAMP OPERATION CHECK 2

Check that the brake warning lamp in the combination meter turns ON/OFF correctly when operating the parking brakes.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Check parking brake switch. Refer to MWI-49, "Description".

Diagnosis Procedure

INFOID:0000000001342102

1. CHECK PARKING BRAKE SWITCH

Check that the brake warning lamp in the combination meter turns ON/OFF correctly when operating the parking brakes.

Is the inspection result normal?

YES >> GO TO 2

NO >> Check parking brake switch. Refer to MWI-49, "Description".

2. CHECK SELF-DIAGNOSIS

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

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 <u>MWI-4, "Work Flow"</u>. Is the inspection result normal?

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

NO >> Repair or replace combination meter.

[VDC/TCS/ABS]

VDC OFF INDICATOR LAMP

Description

×: ON –: OFF

Condition	VDC OFF indicator lamp
Ignition switch OFF	-
For 1 second after turning ON ignition switch	×
1 second 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:0000000001342104

1.VDC OFF INDICATOR LAMP OPERATION CHECK 1

Check that the lamp illuminates for approximately 1 second after the ignition switch is turned ON.

Is the inspection result normal?

YES >> GO TO 2

NO >> Go to diagnosis procedure. Refer to BRC-201, "Diagnosis Procedure".

2.VDC OFF INDICATOR LAMP OPERATION CHECK 2

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Check VDC OFF switch. Refer to BRC-197, "Description".

Diagnosis Procedure

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-197, "Diagnosis Procedure".

CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-148, "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-4, "Work Flow".

Is the inspection result normal?

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

NO >> Repair or replace combination meter.

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SLIP INDICATOR LAMP

Description INFOID:0000000001342106

×: ON -: OFF

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

Component Function Check

INFOID:0000000001342107

1. CHECK SLIP INDICATOR LAMP OPERATION

Check that the lamp illuminates for approximately 1 second after the ignition switch is turned ON.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to BRC-202, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001342108

1. CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-148, "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-4</u>, "Work Flow". Is the inspection result normal?

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

NO >> Repair or replace combination meter.

< ECU DIAGNOSIS > [VDC/TCS/ABS]

ECU DIAGNOSIS

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Reference Value

Α

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 mo	nitor
Monitor item	Display content	Condition	Reference value in normal operation
FR LH SENSOR		0 [km/h]	Vehicle stopped
FR RH SENSOR RR LH SENSOR RR RH SENSOR	Wheel speed	Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)
STOP LAMP SW	Brake pedal operation	When brake pedal is depressed	ON
STOP LAWF SW	Brake pedar operation	When brake pedal is not depressed	OFF
BATTERY VOLT	Battery voltage supplied to the ABS actuator and electric unit (control unit)	Ignition switch ON	10 – 16 V
SLCT LVR POSI	A/T shift position	P position R position N position D position	P R N D
OFF SW	VDC OFF with ONOFF	VDC OFF switch ON (When VDC OFF indica- tor lamp is ON)	ON
	VDC OFF switch ON/OFF	VDC OFF switch OFF (When VDC OFF indica- tor lamp is OFF)	OFF
VAMA DATE CENT	Vous rate detected by your rate/aids Coopers	When vehicle stop	Approx. 0 d/s
YAW RATE SEN	Yaw rate detected by yaw rate/side G sensor	When vehicle turning	-75 to 75 d/s
ACCEL POS SIG	Throttle actuator opening/closing is displayed (linked with	Accelerator pedal not depressed (ignition switch is ON)	0 %
	accelerator pedal)	Depress accelerator ped- al (ignition switch is ON)	0 - 100 %
		Vehicle stopped	Approx. 0 m/s ²
SIDE G-SENSOR	Transverse G detected by side G sensor	Vehicle turning right	Negative value (m/s²)
		Vehicle turning left	Positive value (m/s ²)
STR ANGLE SIG	Steering angle detected by steering angle concer	Straight-ahead	Approx. 0°
STR ANGLE SIG	Steering angle detected by steering angle sensor	Steering wheel turned	-720 to 720°
PRESS SENSOR	Broke fluid proceure detected by proceure concer	With ignition switch turned ON and brake pedal released	Approx. 0 bar
FNESS SENSUK	Brake fluid pressure detected by pressure sensor	With ignition switch turned ON and brake pedal depressed	-40 to 300 bar

< ECU DIAGNOSIS > [VDC/TCS/ABS]

	5	Data mo	Data monitor			
Monitor item	Display content	Condition	Reference value in normal operation			
		With engine stopped	0 rpm			
ENGINE RPM	With engine running	Engine running	Almost in accor- dance with tachome ter display			
FLUID LEV CW	Brake fluid level switch	When brake fluid level switch ON	ON			
FLUID LEV SW	Brake Iluid level Switch	When brake fluid level switch OFF	OFF			
DADK DDAKE OM	Dadin a baska switch	Parking brake switch is active	ON			
PARK BRAKE SW	Parking brake switch	Parking brake switch is inactive	OFF			
FR LH IN SOL FR LH OUT SOL FR RH IN SOL FR RH OUT SOL Operation status of all solenoid valve		Actuator (solenoid valve) is active ("ACTIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON			
RR LH IN SOL RR LH OUT SOL RR RH IN SOL RR RH OUT SOL		When the actuator (sole- noid valve) is not active and actuator relay is ac- tive (ignition switch ON)	OFF			
		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			
(Note 2)	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 WAININ LAWIF	(Note 3)	When ABS warning lamp is OFF	OFF			
OFF LAMP	VDC OFF indicator lamp	When VDC OFF indicator lamp is ON	ON			
OFF LAWIE	(Note 3)	When VDC OFF indicator lamp is OFF	OFF			
CLID I AMD	SLIP indicator lamp	When SLIP indicator lamp is ON	ON			
SLIP LAMP	(Note 3)	When SLIP indicator lamp is OFF	OFF			
	Snow made quitab	When snow mode switch is ON	ON			
SNOW MODE SW	Snow mode switch	When snow mode switch is OFF	OFF			
BST OPER SIG	Not applied but displayed	_	OFF			
M MODE SIG	Manual made activated	When the manual mode is active	ON			
M-MODE SIG	Manual mode activated	When the manual mode is inactive	OFF			

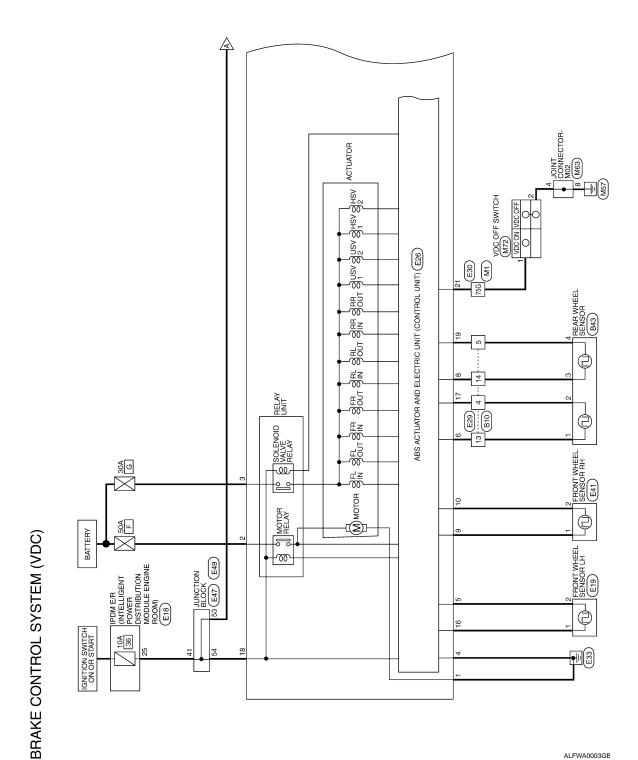
< ECU DIAGNOSIS > [VDC/TCS/ABS]

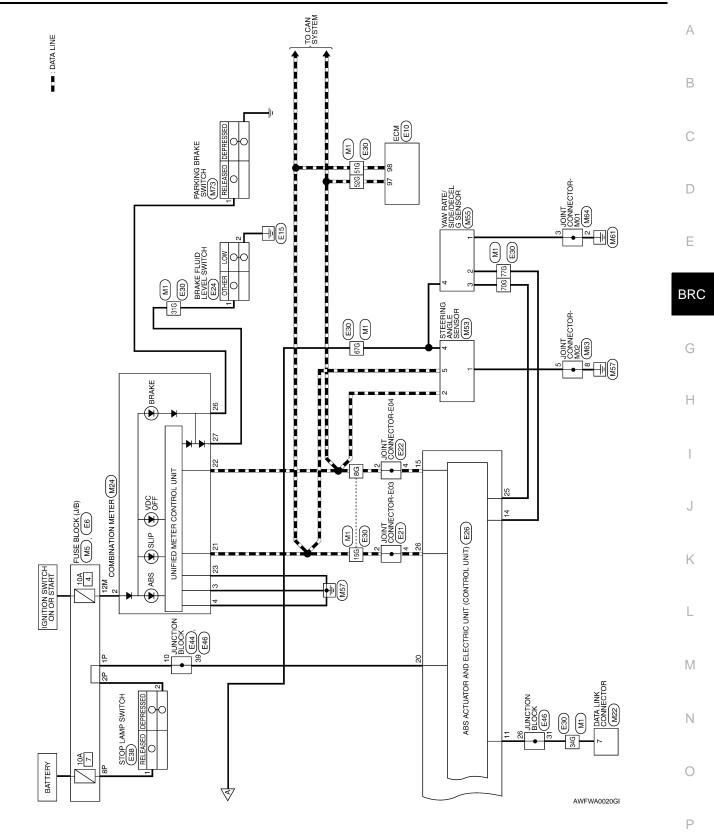
		Data mo	Data monitor			
Monitor item	Display content	Condition	Reference value in normal operation			
EDD CIONAL	EDDtio	EBD is active	ON			
EBD SIGNAL	EBD operation	EBD is inactive	OFF			
ADO CIONAL	ADQ	ABS is active	ON			
ABS SIGNAL	ABS operation	ABS is inactive	OFF			
TOO CLONIAL	TOO	TCS is active	ON			
TCS SIGNAL	TCS operation	TCS is inactive	OFF			
, (D.O. O.) O.) (A)	VDC	VDC is active	ON			
VDC SIGNAL	VDC operation	VDC is inactive	OFF ON OFF			
		In EBD fail-safe	ON			
EBD FAIL SIG	EBD fail-safe signal	EBD is normal	OFF			
		In ABS fail-safe	ON			
ABS FAIL SIG	ABS fail-safe signal	ABS is normal	OFF			
TCS FAIL SIG		In TCS fail-safe	ON			
ICS FAIL SIG	TCS fail-safe signal	TCS is normal	OFF			
VDC FAIL CIC		In VDC fail-safe	ON			
VDC FAIL SIG	VDC fail-safe signal	VDC is normal	OFF			
		Crank is active	ON			
CRANKING SIG	Crank operation	Crank is inactive	OFF			
USV HSV (FL-RR, FR-RL)	VDC switch-over valve	When actuator (switch- over valve) is active ("AC- TIVE TEST" with CON- SULT-III) or actuator relay is inactive (when in fail-safe mode)	ON			
(Note 2)		When actuator (switch- over valve) is not active and actuator relay is ac- tive (ignition switch ON)	OFF			
V/R OUTPUT	Solenoid valve relay activated	When the solenoid valve relay is active (When ignition switch OFF)	ON			
(Note 2)	Colonida valve relay activated	When the solenoid valve relay is not active (in the fail-safe mode)	OFF			
M/R OUTPUT	Actuator motor and motor relay activated	When the actuator motor and motor relay are active ("ACTIVE TEST" with CONSULT-III)	ON			
		When the actuator motor and motor relay are inactive	OFF			

Note 1: Confirm tire pressure is normal.

Note 2: A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

Note 3: On and off timing for warning lamp and indicator lamp. Refer to BRC-144, "System Description".





BRAKE CONTROL SYSTEM (VDC) CONNECTORS

Connector No. M5
Connector Name FUSE BLOCK (J/B)

Connector Color WHITE

Signal Name	ı	ı	ı	ı	ı	ı	1	1	ı	1	
Color of Wire	۵	_	>	0	_	۵	GR	>	SB	Y/B	
Terminal No. Wire	8G	15G	31G	34G	51G	52G	67G	70G	75G	776	
Connector No. M1 Connector Name WIRE TO WIRE	Connector Color WHITE			96 86 76 66 56 46 36	176	26G 25G 20G 20G 20G 20G 20G 20G 20G 20G 20G 20	A1G A4G 89G 89G 85G 85G	SOC 495 470 450 470 450 450 450	386 570 889 586 586 586 516 516	See Just Jose Just Just,	519 559 552 552 552 553 553 553 553 553 553 553

Signal Name

Terminal No. Wire

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12M

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

3	STEERING ANGLE SENSOR	HTE	2 1 2 3 4 8 Z 3 4 8 Z 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	Signal Name	GND	CAN-L	ß	CAN-H
. M53		lor		Color of Wire	В	▄	GR	_
Connector No.	Connector Name	Connector Color WHITE	明.S.	Terminal No. Wire	-	2	4	5
			16 17 18 19 20 36 37 38 39 40				1	
.4	COMBINATION METER	WHITE	9 10 11 12 13 14 15	Signal Name	IGN	GND	GND	CAN-H
. M24		lor W	6 7 8 26 27 28	Color of Wire	0	В	В	_
Connector No.	Connector Name	Connector Color	H.S. 1 2 3 4 5 5 21 22 23 24 25	Terminal No.	2	3	4	21

Signal Name K-LINE

Color of Wire

Terminal No.

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BRAKE OIL IN

B/B/

22 23 23 24 27 27

GND PKB

Connector Name DATA LINK CONNECTOR

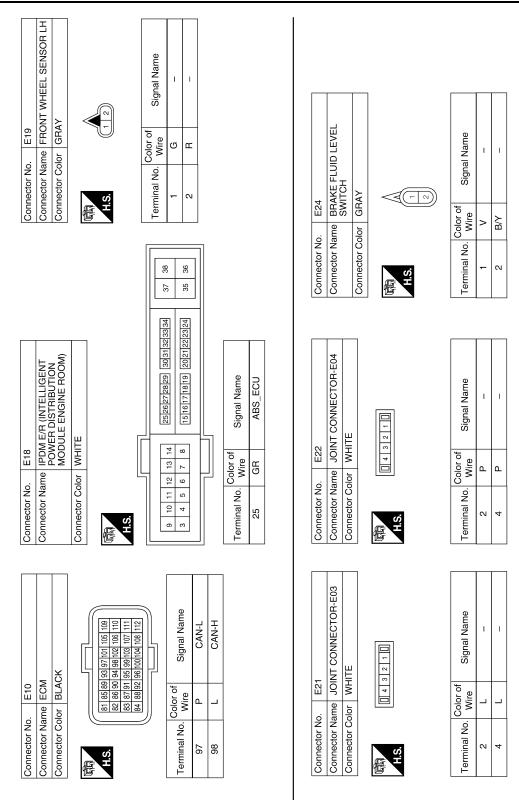
Connector No.

Connector Color WHITE

[VDC/TCS/ABS] < ECU DIAGNOSIS >

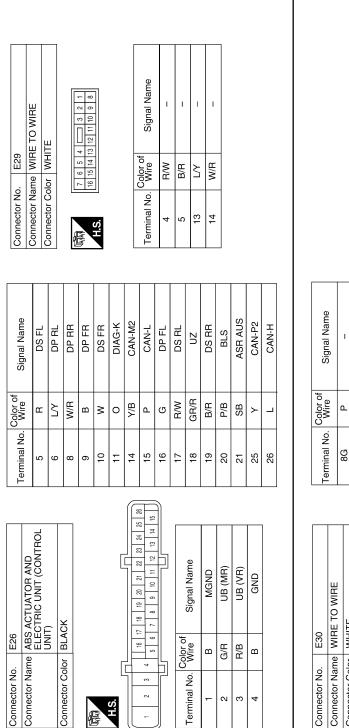
Connector No. M64 Connector Name JOINT CONNECTOR-M01 Connector Color GRAY	Terminal No. Color of Signal Name 2 B 3 B	Connector No. E6 Connector Name FUSE BLOCK (J/B) Connector Color WHITE TP 6P 5P 4P TP TP 6P 5P 4P TP TP TP TP TP TP T	inal No. Color of Signal Name IP SB - 2P R/G - 3P Y/R -	A B C
Connector No. M63 Connector Name JOINT CONNECTOR-M02 Connector Color BLUE	Terminal No. Color of Wire Signal Name 4 B - 5 B - 8 B -	Connector No. M73 Connector Name PARKING BRAKE SWITCH Connector Color BLACK	erminal No. Color of Wire - A/Wire - A/	G H
Connector No. M55 Connector Name YAW RATE/SIDE/DECEL G SENSOR Connector Color BLACK	Terminal No. Color of Wire Signal Name 1 B GND 2 Y/B CAN-L 3 Y CAN-H 4 GR IG	Connector No. M72 Connector Name VDC OFF SWITCH Connector Color GRAY	minal No. Color of Signal Name 1 SB	K L M

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[VDC/TCS/ABS] < ECU DIAGNOSIS >



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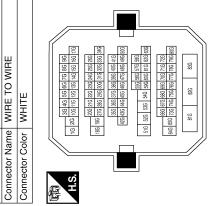
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Terminal No.

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Connector No.

Signal Name	ı	I	ı	ı	ı	ı	I	I	ı	I
Color of Wire	۵	_	>	0	_	۵	GR	٨	SB	A//B
Terminal No.	86	15G	31G	34G	51G	52G	67G	50Z	75G	77G



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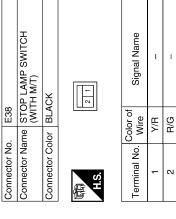
BRC-211

Connector No.

< ECU DIAGNOSIS > [VDC/TCS/ABS]

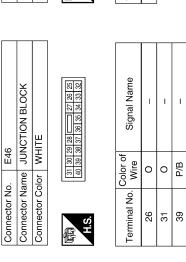
	Connector No.	E41
SWITCH	Connector Name	Connector Name FRONT WHEEL SENSOR RH
	Connector Color GRAN	GRAY

П				_
		Signal Name	-	
		Color of Wire	В	W
	原 H.S.	Terminal No.	1	c



m	STOP LAMP SWITCH (WITH CVT)	WHITE	1 3 4	Signal Name	_	ı	1	_
. E38		_		Color of Wire	Y/R	B/G	G/R	B/W
Connector No.	Connector Name	Connector Color	用.S.	Terminal No.	1	2	က	4

2	JUNCTION BLOCK	WHITE	42 11 41 42 44 43	Signal Name	1
). E47	ume JU		42 46	Color of Wire	GR
Connector No.	Connector Name	Connector Color	off) H.S.	Terminal No.	41



Connector No		
Connector Na	me JUN	Connector Name JUNCTION BLOCK
Connector Color BROWN	lor BR0	NMC
唇	5 4	3 2 1
H.S.	12 11 10	9 8 7 6
Terminal No.	Color of Wire	Signal Name
10	SB	1

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[VDC/TCS/ABS] < ECU DIAGNOSIS >

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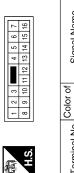
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	OR				I		I	
	REAR WHEEL SENSOR	AY		 Signal Name	POWER_LH	SIG_LH	POWER_RH	AR PIS
. B43		lor GRAY		Color of Wire	ΛЛ	R/W	W/R	B/B
Connector No.	Connector Name	Connector Color	原 H.S.	Terminal No.	1	2	ဗ	4





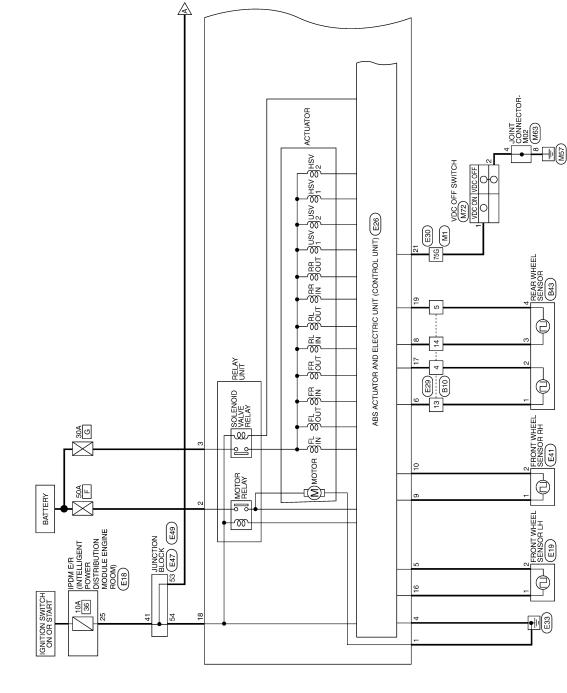
Signal Nam	ı	-	-	ı
Color of Wire	B/W	B/R	\sim	W/R
Terminal No.	4	5	13	14

Connector No.	E49
Connector Name	JUNCTION BLOCK
Connector Color	BROWN
顾 E.S.	54 53 52 51

54 53 52 51	Signal Name	I	ı
142	Color of Wire	GR	GR/R
H.S.	Terminal No.	53	54

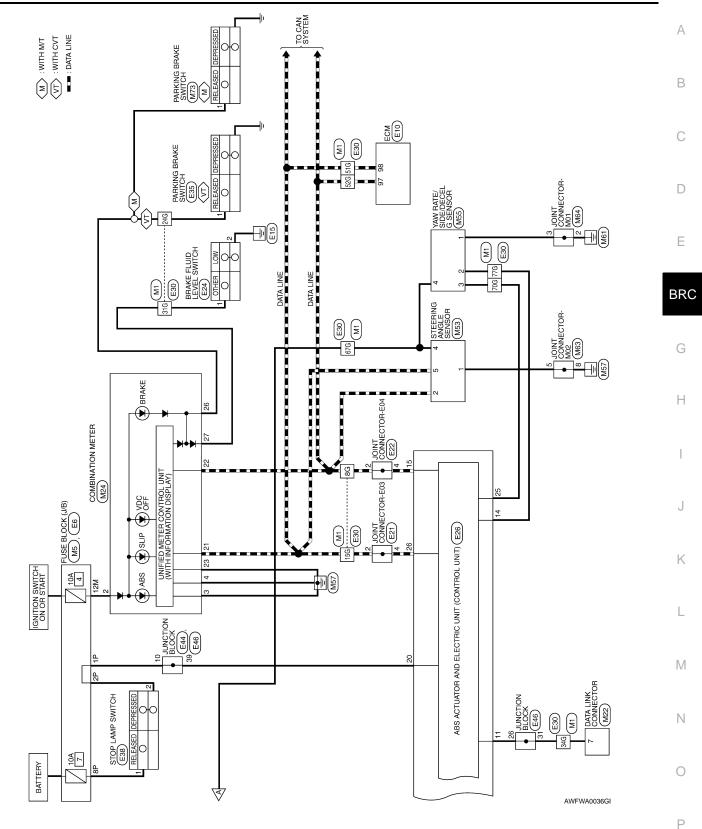
Wiring Diagram - Sedan

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BRAKE CONTROL SYSTEM-VDC

AWFWA0035GI



M53

Connector No.

BRAKE CONTROL SYSTEM CONNECTORS-VDC

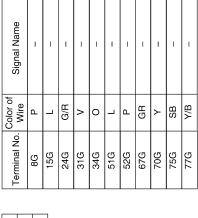
Connector No.	M1	Terminal No	Color o
Connector Name	Connector Name WIRE TO WIRE	- dillia	Wire
	1	C	١
Connector Color WHITE	WHITE	5	L
		(1,	
		15G	_

Connector Name | FUSE BLOCK (J/B)

M5

Connector No.

Connector Color WHITE

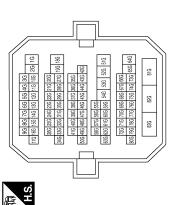


Signal Name

Color of Wire

Terminal No. 12M

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M24	Connector Name COMBINATION METER	WHITE
Connector No.	Connector Name	Connector Color WHITE





Connector Name STEERING ANGLE SENSOR	WHITE	5 1 2 3 4 4 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	Signal Name	GND	CAN-L	DI DI
me ST			Color of Wire	В	۵	GR
Connector Na	Connector Color	H.S.	Terminal No.	1	2	4
	•					

21 25 25 24 25 20 27 26 28 30 31 35 35 34 35 30 31 31 32 33 34 35 36 36 37 36 38 40	101 05 00 00 00 00 00 00 00 00 00 00	Signal Name	NSI	GND	GND	CAN-H	CAN-L	GND	PKB	BRAKE OIL IN
67 97 77 0		Color of Wire	0	В	В	٦	Ь	В	G/R	>
7 02 67 77 75 75 75 75 75 75		Terminal No.	2	3	4	21	22	23	26	27

CAN-H

Signal Nam	K-LINE	
Color of Wire	0	
Terminal No.	7	

AWFIA0145GB

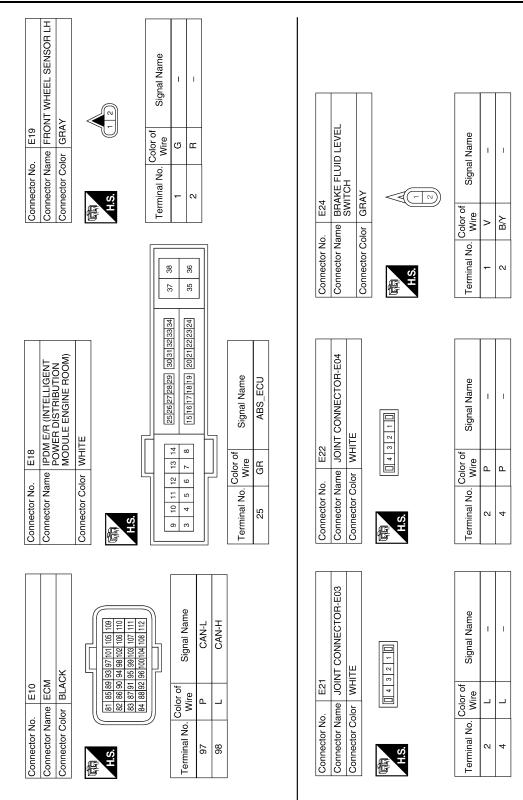
Connector No.

< ECU DIAGNOSIS > [VDC/TCS/ABS]

			А
STOR-M01		ame same	В
Connector No. M64 Connector Name JOINT CONNECTOR-M01 Connector Color GRAY 6 5 4 3 2 1 Terminal No. Color of Signal Name		E6 RUSE BLOCK (J/B) NHITE Signal Name Signal Nam	С
No. M64 Name JOINT Color GRAY 6 5 4 Color of State	ω ω	Name	D
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			BR
Connector No. M63 Connector Name JOINT CONNECTOR-M02 Connector Color BLUE H.S. Terminal No. Color of Signal Name Signal Name	1 1 1	Connector No. M73 Connector Name PARKING BRAKE SWITCH (WITH M/T) Connector Color BLACK Terminal No. Wire Signal Name 1 G/R -	G
M63 JOINT CONN BLUE		M73 PARKING BF (WITH M/T) BLACK or of Sign	Н
Connector No. M63 Connector Name JOINT Connector Color BLUE H.S. [[2] [1] [1] [9] [8] 7 [6] Terminal No. Wire		Connector No. M73 Connector Name PARF (WI) Connector Color BLA H.S. Color of Wire 1 G/R	I
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	Signal Name GND CAN-L CAN-H IG	Signal Signal	M
9 5	Color of Wire Wire A/B Y/B Y/B GR	Connector No. M72 Connector Name VDC OFF SWITCH Connector Color GRAY LS. ESTITE Signal Nar Terminal No. Wire Signal Nar 2 B	N
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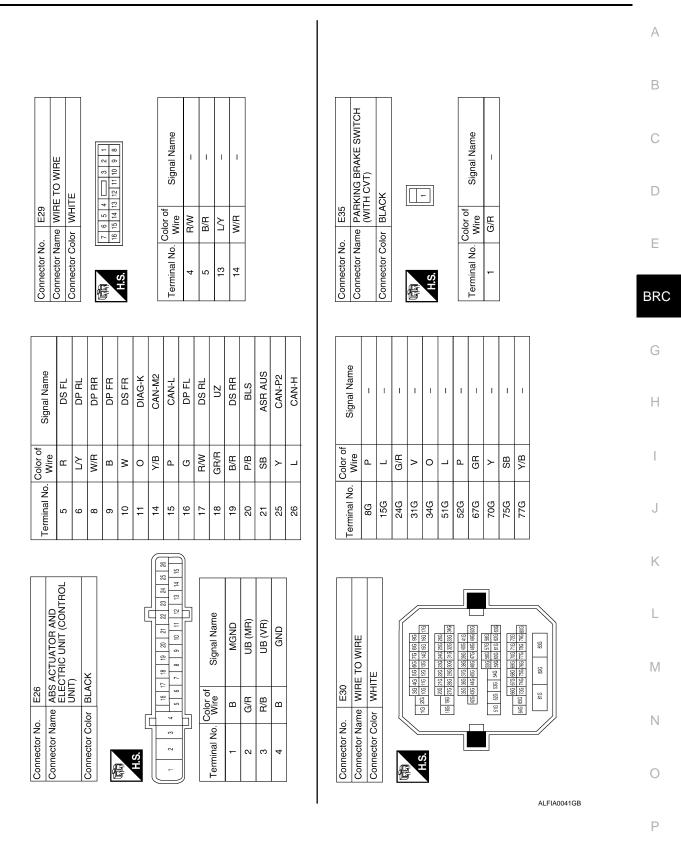
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< ECU DIAGNOSIS > [VDC/TCS/ABS]



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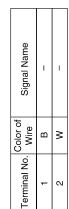
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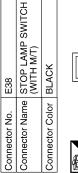
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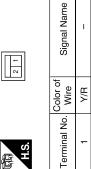
Connector No.	E41
Connector Name	Connector Name FRONT WHEEL SENSOR RH
Connector Color GRAY	GRAY











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E38	Connector Name STOP LAMP SWITCH (WITH CVT)	WHITE	
Connector No.	Connector Name	Connector Color	





Signal Name	1	_	
Color of Wire	Y/R	R/G	
Terminal No.	1	2	

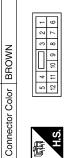
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2	JUNCTION BLOCK	WHITE	45 44 43	Signal Name	_
). E47			42	Color of Wire	GB
Connector No.	Connector Name	Connector Color	「 H.S.	Terminal No.	41

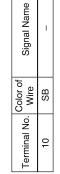
Connector No. E46	Connector Name JUNCTION BLOCK	Connector Color WHITE	31 30 29 28 <u> </u>
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Signal N	_	_	-
Color of Wire	0	0	P/B
Terminal No.	56	31	39

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E44	JUNCTION B	BROWN	5 4
Connector No.	Connector Name JUNCTION BLOCK	Connector Color BROWN	H.S.





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[VDC/TCS/ABS] < ECU DIAGNOSIS >

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ALFIA0043GB

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B10 WIRE TO WIRI WHITE Signal	B10 B10	nector No. B10 nector Name WIRE T nector Color WHITE 1	Name	Signal Name Signal Name		7 16	Name				
	minal No.	minal No.	Connector No LOCK Connector No Terminal No. 13 13 14	Signal Name R AND Connector No Connector No Connector Co Connector No Terminal No. 13 13 14	B10 WIRE TO WIRE	2 3 6 4 5 6 9 10 11 12 13 14 15					

Fail-Safe INFOID:0000000001342111

ABS, EBD SYSTEM

In case of electrical malfunctions with the ABS, ABS warning lamp, VDC OFF indicator lamp, SLIP indicator lamp will turn on. In case of electrical malfunctions with the EBD, brake warning lamp, ABS warning lamp, VDC OFF indicator lamp and SLIP indicator lamp will turn on. Simultaneously, the VDC/TCS/ABS become one of the following conditions of the fail-safe function.

< ECU DIAGNOSIS > [VDC/TCS/ABS]

• For malfunction of ABS, only the EBD is activated and the condition of vehicle is the same condition of vehicles without TCS/ABS system.

NOTE:

ABS self-diagnosis sound may be heard. That is a normal condition because a self-diagnosis for "Ignition switch ON" and "The first starting" are being performed.

• For malfunction of EBD, EBD and ABS become inoperative, and the condition of vehicle is the same as the condition of vehicles without TCS/ABS, EBD system.

VDC / TCS

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

CAUTION:

If the Fail-Safe function is activated, then perform self-diagnosis for VDC/TCS/ABS control system.

DTC No. Index

Display item	Malfunction detecting condition	Check item
RR RH SENSOR-1 [C1101]	Circuit of rear RH wheel sensor is open. Or when the sensor power voltage is outside the standard.	
RR LH SENSOR-1 [C1102]	Circuit of rear LH wheel sensor is open. Or when the sensor power voltage is outside the standard.	BRC-155, "Diagno-
FR RH SENSOR-1 [C1103]	Circuit of front RH wheel sensor is open. Or when the sensor power voltage is outside the standard.	(Note 1)
FR LH SENSOR-1 [C1104]	Circuit of front LH wheel sensor is open. Or when the sensor power voltage is outside the standard.	
RR RH SENSOR-2 [C1105]	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.	
RR LH SENSOR-2 [C1106]	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.	BRC-158, "Diagno-sis Procedure"
FR RH SENSOR-2 [C1107]	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.	(Note 1)
FR LH SENSOR- 2 [C1108]	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.	
BATTERY VOLTAGE [ABNORMAL] [C1109]	When the ABS actuator and electric unit (control unit) power supply voltage is lower than normal.	BRC-161, "Diagno- sis Procedure"
CONTROLLER FAILURE [C1110]	When there is an internal malfunction in the ABS actuator and electric unit (control unit).	BRC-163, "Diagno- sis Procedure"
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.	BRC-164, "Diagno-
[C1111]	During the actuator motor operating with OFF, when the actuator motor turns ON, or when the control line for relay is shorted to ground.	sis Procedure"
MAIN RELAY	During the actuator relay operating with OFF, when the actuator relay turns ON. Or when the control line for the relay is shorted to the ground.	BRC-166, "Diagno-
[C1114]	During the actuator relay operating with ON, when the actuator relay turns OFF, or when the control line for the relay is open.	sis Procedure"
ABS SENSOR [ABNORMAL SIGNAL] [C1115]	When wheel sensor input signal is malfunctioning.	BRC-168, "Diagnosis Procedure" (Note 1)
STOP LAMP SW [C1116]	When stop lamp switch circuit is open.	BRC-171, "Diagno- sis Procedure"

< ECU DIAGNOSIS > [VDC/TCS/ABS]

Display item	Malfunction detecting condition	Check item	
FR LH IN ABS SOL [C1120]	When the control unit detects a malfunction in the front left inlet solenoid circuit.		
FR RH IN ABS SOL [C1122]	When the control unit detects a malfunction in the front right inlet solenoid circuit.	BRC-173, "Diagno-	
RR LH IN ABS SOL [C1124]	When the control unit detects a malfunction in the rear left inlet solenoid circuit.	sis Procedure"	
RR RH IN ABS SOL [C1126]	When the control unit detects a malfunction in the rear right inlet solenoid circuit.		
FR LH OUT ABS SOL [C1121]	When the control unit detects a malfunction in the front left outlet solenoid circuit.		
FR RH OUT ABS SOL [C1123]	When the control unit detects a malfunction in the front right outlet solenoid circuit.	BRC-175, "Diagno-	
RR LH OUT ABS SOL [C1125]	When the control unit detects a malfunction in the rear left outlet solenoid circuit.	sis Procedure"	
RR RH OUT ABS SOL [C1127]	When the control unit detects a malfunction in the rear right outlet solenoid circuit.		
ENGINE SIGNAL 1 [C1130]			
ENGINE SIGNAL 2 [C1131]			
ENGINE SIGNAL 3 [C1132]	Major engine components are malfunctioning.	BRC-177, "Diagno- sis Procedure"	
ENGINE SIGNAL 4 [C1133]			
ENGINE SIGNAL 6 [C1136]			
PRESS SEN CIRCUIT [C1142]	Pressure sensor signal line is open or shorted, or pressure sensor is malfunctioning.	BRC-179, "Diagno- sis Procedure"	
ST ANG SEN CIRCUIT [C1143]	Neutral position of steering angle sensor is dislocated, or the steering angle sensor is malfunctioning.	BRC-181, "Diagno-	
ST ANG SEN SIGNAL [C1144]	Neutral position correction of steering angle sensor is not finished.	sis Procedure"	
YAW RATE SENSOR [C1145]	Yaw rate sensor is malfunctioning, or the yaw rate sensor signal line is open or shorted.	BRC-183, "Diagno-	
SIDE G-SEN CIRCUIT [C1146]	Side G sensor is malfunctioning, or circuit of side G sensor is open or shorted.	sis Procedure"	
USV LINE [FL-RR] [C1147]	VDC switch-over solenoid valve (USV1) on the primary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground.		
USV LINE [FR-RL] [C1148]	VDC switch-over solenoid valve (USV2) on the secondary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground.	BRC-186, "Diagno-	
HSV LINE [FL-RR] [C1149]	VDC switch-over solenoid valve (HSV1) on the primary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground.	sis Procedure"	
HSV LINE [FR-RL] [C1150]	VDC switch-over solenoid valve (HSV2) on the secondary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground.		
EMERGENCY BRAKE [C1153]	When ABS actuator and electric unit (control unit) is malfunctioning. (Pressure increase is too much or too little)	BRC-163, "Diagno- sis Procedure"	
PNP POS SIG [C1154]	TCM or ABS actuator and electric unit (control unit) internal malfunction.	BRC-189, "Diagno- sis Procedure"	
BR FLUID LEVEL LOW [C1155]	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.	BRC-190, "Diagno- sis Procedure"	
ST ANG SEN COM CIR [C1156]	CAN communication circuit or steering angle sensor is malfunctioning.	BRC-193, "Diagno- sis Procedure"	

< ECU DIAGNOSIS > [VDC/TCS/ABS]

Display item	Malfunction detecting condition	Check item
VARIANT CODING [C1170]	In a case where VARIANT CODING is different.	BRC-163, "Diagno- sis Procedure"
CAN COMM CIRCUIT [U1000]	When there is a malfunction in the CAN communication circuit.	BRC-194, "Diagnosis Procedure" (Note 2)

Note 1: After completing repairs of shorted sensor circuit, when ignition switch is turned ON, ABS warning lamp turns on. Make sure that ABS warning lamp turns off while driving vehicle at 30 km/h (19 MPH) or more for approximately 1 minute according to self-diagnosis procedure. In addition, if wheel sensor 2 is displayed for wheels, check wheel sensor circuit and also check control unit power voltage. Note 2: When malfunctions are detected in several systems, including CAN communication circuit [U1000], troubleshoot CAN communication circuit. Refer to BRC-194, "Diagnosis Procedure".

SYMPTOM DIAGNOSIS

VDC/TCS/ABS

Symptom Table

INFOID:0000000001342113

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

Symptom	Check item	Reference
Excessive ABS function operation frequency	Brake force distribution	
	Looseness of front and rear axle	BRC-226, "Diag- nosis Procedure"
	Wheel sensor and rotor system	
Unexpected pedal reaction	Brake pedal stroke	BRC-227, "Diag-
	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-228, "Diag- nosis Procedure"
ABS function does not operate (Note 1)	ABS actuator and electric unit (control unit)	BRC-229, "Diag- nosis Procedure"
Pedal vibration or ABS operation sound occurs (Note 2)	Brake pedal	BRC-230, "Diag-
	ABS actuator and electric unit (control unit)	nosis Procedure"
Vehicle jerks during VDC/TCS/ABS control	ABS actuator and electric unit (control unit)	
	ТСМ	BRC-231, "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 (just place a foot on it). However, this is normal.
- When shifting gears
- When driving on slippery road
- During cornering at high speed
- When passing over bumps or grooves [at approximately 50 mm (1.97 in) or more]
- When pulling away just after starting engine [at approximately 10 km/h (6 MPH) or higher]

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EXCESSIVE ABS FUNCTION OPERATION FREQUENCY

< SYMPTOM DIAGNOSIS >

[VDC/TCS/ABS]

EXCESSIVE ABS FUNCTION OPERATION FREQUENCY

Diagnosis Procedure

INFOID:0000000001342114

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>, "Inspection", Rear: <u>RAX-5</u>, "On-vehicle Service".

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

3.CHECK WHEEL SENSOR AND SENSOR ROTOR

Check the following.

- · Wheel sensor installation for damage.
- Sensor rotor installation for damage.
- Wheel sensor connector connection.
- · Wheel sensor harness inspection.

Is the inspection result normal?

YES >> GO TO 4

NO >> • Replace wheel sensor or sensor rotor.

· Repair harness.

4. CHECK ABS WARNING LAMP DISPLAY

Make sure that the ABS warning lamp is turned off after the ignition switch is turned ON or when driving. <u>Is the inspection result normal?</u>

YES >> Normal

NO >> Perform self-diagnosis. Refer to <u>BRC-148</u>, "CONSULT-III Function (ABS)".

UNEXPECTED PEDAL REACTION [VDC/TCS/ABS] < SYMPTOM DIAGNOSIS > UNEXPECTED PEDAL REACTION Α Diagnosis Procedure INFOID:0000000001342115 1. CHECK BRAKE PEDAL STROKE В Check brake pedal stroke. Refer to BR-12, "Inspection and Adjustment". Is the stroke too big? C YES >> • Bleed air from brake tube and hose. Refer to BR-15, "Bleeding Brake System". • Check brake pedal, brake booster, and master cylinder for mount play, looseness, brake system fluid leakage, etc. Refer to brake pedal: BR-12, "Inspection and Adjustment", brake booster and master cylinder. 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? **BRC** >> GO TO procedure 3 "CHECK WHEEL SENSOR AND SENSOR ROTOR" of symptom 1. Refer to YES BRC-226, "Diagnosis Procedure". NO >> Check brake system. Н K L M Ν

BRC-227

THE BRAKING DISTANCE IS LONG

< SYMPTOM DIAGNOSIS >

[VDC/TCS/ABS]

THE BRAKING DISTANCE IS LONG

Diagnosis Procedure

INFOID:0000000001342116

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 >> GO TO procedure "CHECK WHEEL SENSOR AND SENSOR ROTOR" of symptom. Refer to BRC-226. "Diagnosis Procedure".

NO >> Check brake system.

ABS FUNCTION DOES NOT OPERATE

[VDC/TCS/ABS] < SYMPTOM DIAGNOSIS > ABS FUNCTION DOES NOT OPERATE Α Diagnosis Procedure INFOID:0000000001342117 **CAUTION:** В 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? >> GO TO procedure "CHECK WHEEL SENSOR AND SENSOR ROTOR" of symptom. Refer to YES D BRC-226, "Diagnosis Procedure". NO >> Perform self-diagnosis. Refer to BRC-148, "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:0000000001342118

CAUTION:

Under the following conditions, ABS is activated and vibration is felt when brake pedal is lightly depressed (just place a foot on it). However, this is normal.

- When shifting gears
- When driving on slippery road
- During cornering at high speed
- When passing over bumps or grooves [at approximately 50 mm (1.97 in) or more]
- When pulling away just after starting engine [at approximately 10 km/h (6 MPH) or higher]

1.SYMPTOM CHECK 1

Check if there is pedal vibration or operation sound when the engine is started.

Do symptoms occur?

YES >> GO TO 2

NO >> Perform self -diagnosis. Refer to BRC-148, "CONSULT-III Function (ABS)".

2.SYMPTOM CHECK 2

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 >> GO TO procedure "CHECK WHEEL SENSOR AND SENSOR ROTOR" of symptom. Refer to BRC-226, "Diagnosis Procedure".

VEHICLE JERKS DURING VDC/TCS/ABS CONTROL

[VDC/TCS/ABS] < SYMPTOM DIAGNOSIS > VEHICLE JERKS DURING VDC/TCS/ABS CONTROL Α Diagnosis Procedure INFOID:0000000001342119 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-diagnostic of ABS actuator and electric unit (control unit). Are self-diagnosis results indicated? YES >> Check corresponding items, make repairs, and perform ABS actuator and electric unit (control unit) self-diagnosis. NO >> GO TO 3 3. CHECK CONNECTOR **BRC** 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? YES >> If poor contact, damage, open or short circuit of connector terminal is found, repair or replace. Н NO >> GO TO 4 4. CHECK ECM AND A/T SELF-DIAGNOSIS RESULTS Perform ECM and CVT self-diagnosis. Are self-diagnosis results indicated? >> Check the corresponding items. YES • ECM: Refer to EC-1012. • CVT: Refer to TM-85. NO >> Replace ABS actuator and electric unit (control unit). K L M Ν Р

< PRECAUTION > [VDC/TCS/ABS]

PRECAUTION

PRECAUTIONS

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

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.

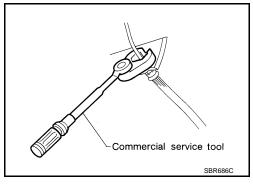
Precaution for Brake System

INFOID:0000000001342121

- Recommended fluid is brake fluid "DOT 3".
- Never reuse drained brake fluid.
- Be careful not to splash brake fluid on painted surface of body. If brake fluid is splashed on painted surfaces
 of body immediately wipe off then with cloth and then wash it away with water.
- Never use mineral oils such as gasoline or kerosene. They will ruin rubber parts of the hydraulic system.
- Use a flare nut wrench when removing flare nuts, and use a flare nut torque wrench when tighten brake tube flare nuts.
- When installing brake tubes, be sure to check torque.
- Brake system is an important safety part. If a brake fluid leak is detected, always disassemble the affected part. If a malfunction is detected, replace part with a new one.
- Before working, turn ignition switch OFF and disconnect connectors of ABS actuator and electric unit (control unit) or the battery cable from the negative terminal.

WARNING:

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



Precaution for Brake Control

INFOID:0000000001342122

- Just after starting vehicle after ignition switch ON, brake pedal may vibrate or motor operating noise may be heard from engine compartment. This is normal condition.
- When an error is indicated by ABS or another warning lamp, collect all necessary information from customer (what symptoms are present under what conditions) and check for simple causes before starting diagnostic servicing. Besides electrical system inspection, check brake booster operation, brake fluid level, and oil leaks
- If tire size and type are used in an improper combination, or brake pads are not Genuine NISSAN parts, stopping distance or steering stability may deteriorate.
- ABS might be out of order or malfunctions by putting a radio (wiring inclusive), an antenna and a lead-in wire near the control unit.
- If aftermarket parts (car stereo, CD player, etc.) have been installed, check for incidents such as harness pinches, open circuits, and improper wiring.
- VDC system may not operate normally or a VDC OFF indicator lamp or SLIP indicator lamp may light.

PRECAUTIONS

[VDC/TCS/ABS] < PRECAUTION >

- When replacing the following parts with parts other than genuine parts or making modifications: Suspensionrelated parts (shock absorber, spring, bushing, etc.), tires, wheels (other than specified sizes), brake-related parts (pad, rotor, caliper, etc.), engine-related parts (muffler, ECM, etc.) and body reinforcement-related parts (roll bar, tower bar, etc.).

- When driving with worn or deteriorated suspension, tires and brake-related parts.

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< PREPARATION > [VDC/TCS/ABS]

PREPARATION

PREPARATION

Special Service Tool

INFOID:0000000001342123

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-BCX POWER BARRIER WFIA0101E	Checking operation of ABS active wheel sensor

Commercial Service Tool

INFOID:0000000001342124

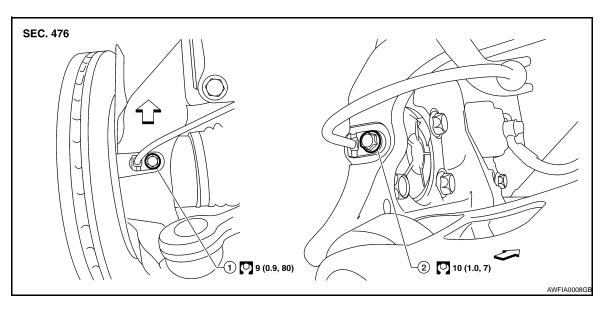
Tool name		Description
Flare nut crowfoot Torque wrench		Removing and installing brake piping a: 10mm (0.39 in)/12mm (0.47 in)
	S-NT360	

< ON-VEHICLE REPAIR > [VDC/TCS/ABS]

ON-VEHICLE REPAIR

WHEEL SENSORS

Removal and Installation



Front wheel sensor

2. Rear wheel sensor

← Front

CAUTION:

- Be careful not to damage wheel sensor edge and sensor rotor teeth.
- When removing the front or rear wheel hub assembly, first remove the wheel sensor from the assembly. Failure to do so may result in damage to the wheel sensor wires making the sensor inoperative.

CAUTION:

- Pull out the wheel sensor, being careful to turn it as little as possible. Do not pull on the wheel sensor harness.
- Installation should be performed while paying attention to the following, and then tighten bolts and nuts to the specified torque.
- Check if foreign objects such as iron fragments are adhered to the pick-up part of the sensor or to the inside of the hole for the wheel sensor, or if a foreign object is caught in the surface of the mating surface for the rotor. If something wrong is found, fix it and then install the wheel sensor.

REMOVAL

Front

- 1. Remove wheel and tire using power tool.
- Partially front wheel fender protector. Refer to <u>EXT-19</u>, "Removal and Installation".
- 3. Remove wheel sensor bolt and wheel sensor.
- Remove harness wire from mounts and disconnect wheel sensor harness connector.

Rear

NOTE:

Both rear wheel sensors share one harness and must be replaced as an assembly.

- 1. Remove wheel and tire using power tool.
- Remove wheel sensor bolts and wheel sensors from both rear wheels.
- 3. Remove harness wire from mounts and harness wire clips from suspension member.

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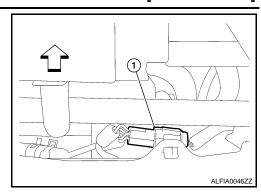
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4. Disconnect wheel sensor harness connector (1).



INSTALLATION

Installation is in the reverse order of removal.

• When installing wheel and tire, refer to WT-37, "Adjustment".

SENSOR ROTOR

< ON-VEHICLE REPAIR > [VDC/TCS/ABS]

SENSOR ROTOR

Removal and Installation

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The front and rear wheel sensor rotors are an integral part of the wheel hub assemblies and can not be disassembled. When replacing the sensor rotor, replace the wheel hub assembly. Refer to <u>FAX-7</u>, "Removal and <u>Installation"</u> (Front), <u>RAX-6</u>, "Removal and <u>Installation"</u> (Rear).

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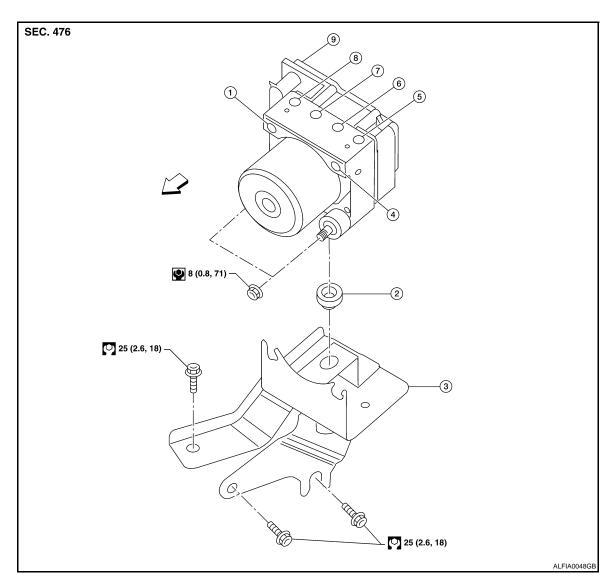
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Exploded View

COMPONENT



- 1. From master cylinder secondary side 2.
- 4. From master cylinder primary side
- 7. To rear LH brake caliper
- Grommet
- To front LH brake caliper
- 8. To front RH brake caliper

⊢ Front

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

- 3. Bracket
- 6. To rear RH brake caliper
- 9. ABS actuator and electric unit

Removal and Installation

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REMOVAL

CAUTION:

Be careful of the following.

- · Before servicing, disconnect the battery cable from negative terminal.
- To remove brake tube, use a flare nut wrench to prevent flare nuts and brake tube from being damaged. To install, use flare nut torque wrench.
- Do not apply excessive impact to ABS actuator and electric unit (control unit), such as dropping it.
- Do not remove and install actuator by holding harness.
- After work is completed, bleed air from brake tube. Refer to BR-15, "Bleeding Brake System".

< ON-VEHICLE REPAIR > [VDC/TCS/ABS]

- 1. Remove front wiper arms. Refer to WW-40, "FRONT WIPER ARMS: Removal and Installation".
- Remove cowl top. Refer to <u>EXT-18</u>, "Removal and Installation".
- 3. Disconnect washer hose.
- 4. Remove tower bar, if equipped. Refer to FSU-11, "Exploded View".
- 5. Disconnect ABS actuator and electric unit (control unit) connector.
- 6. Loosen brake tube flare nuts, then remove brake tubes from ABS actuator and electric unit (control unit).
- 7. Remove ABS actuator and electric unit (control unit) nuts.
- 8. Remove ABS actuator and electric unit (control unit) from vehicle.
- Remove bracket as necessary.

INSTALLATION

CAUTION:

Be careful of the following.

- Before servicing, disconnect the battery cable from negative terminal.
- To remove brake tube, use a flare nut wrench to prevent flare nuts and brake tube from being damaged. To install, use flare nut torque wrench.
- . Do not apply excessive impact to ABS actuator and electric unit (control unit), such as dropping it.
- Do not remove and install actuator by holding harness.
- After work is completed, bleed air from brake tube. Refer to <u>BR-15, "Bleeding Brake System"</u>.
- After installing harness connector in the ABS actuator and electric unit (control unit), make sure connector is securely locked.

Installation is in the reverse order of removal.

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< ON-VEHICLE REPAIR > [VDC/TCS/ABS]

G SENSOR

Removal and Installation

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REMOVAL

CAUTION:

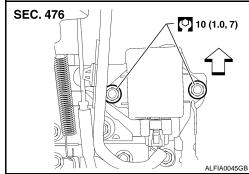
- Do not drop or strike yaw rate/side G sensor, because it has little endurance to impact.
- Do not use power tool etc., because yaw rate/side G sensor is sensitive for the impact.
- 1. Remove center console. Refer to IP-16, "Exploded View".
- 2. Disconnect yaw rate/side G sensor harness connector.
- 3. Remove nuts. Remove yaw rate/side G sensor.

INSTALLATION

CAUTION:

- Do not drop or strike yaw rate/side G sensor, because it has little endurance to impact.
- Do not use power tool etc., because yaw rate/side G sensor is sensitive for the impact.

Installation is in the reverse order of removal.



[VDC/TCS/ABS]

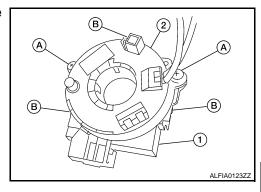
STEERING ANGLE SENSOR

Removal and Installation

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REMOVAL

- Remove the spiral cable. Refer to <u>SR-6</u>, "Removal and Installation".
- 2. Remove the screws (A) and release clips (B) to remove the steering angle sensor (1) from spiral cable (2).



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CAUTION:

In the case that the ABS actuator and electronic unit (control unit) is replaced, make sure to adjust position of steering angle sensor. Refer to BRC-142, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Special Repair Requirement".

INSTALLATION

1. Installation is in the reverse order of removal.