SECTION BRC
BRAKE CONTROL SYSTEM

CONTENTS

ABS

VDC/TCS/ABS

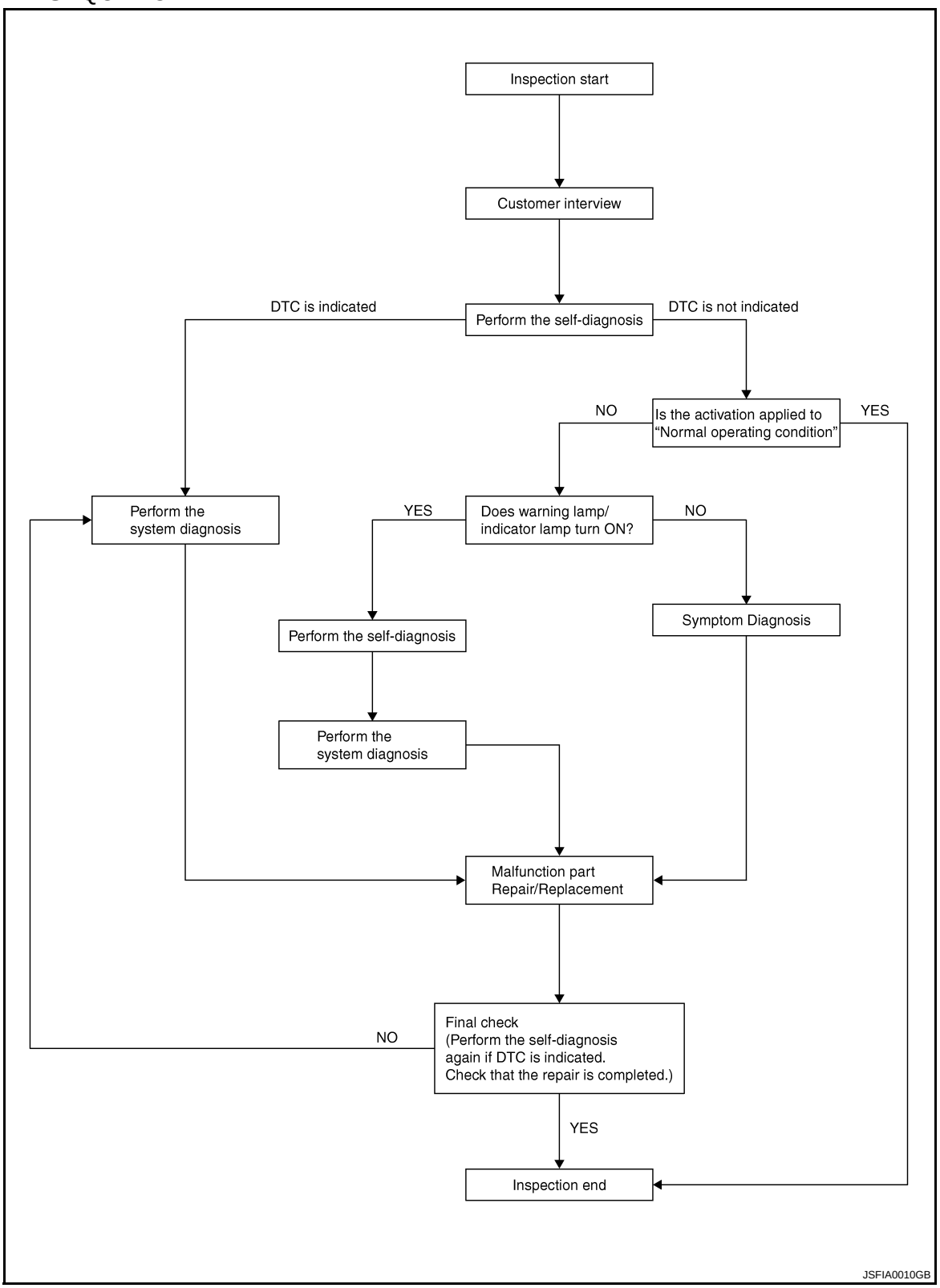
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000004231757

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-8, "Diagnostic Work Sheet".

>> GO TO 2.

2.PERFORM THE SELF-DIAGNOSIS

Check the DTC display with the self-diagnosis function. Refer to BRC-15, "CONSULT-III Function".

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-55, "DTC 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-61, "Description".

Is the symptom a normal operation?

YES >> INSPECTION END
NO >> GO TO 5.

5.CHECK THE WARNING LAMP FOR ILLUMINATION

Check that the warning lamp illuminate.
- ABS warning lamp: Refer to BRC-47, "Description".
- Brake warning lamp: Refer to BRC-48, "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 again, and check that the malfunction is repaired completely. After checking, erase the self-diagnosis memory. Refer to BRC-15, "CONSULT-III Function".

Is no other DTC present and the repair completed?

YES >> INSPECTION END
NO >> GO TO 3.

Diagnostic Work Sheet

INFOID:0000000004231758

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
	☐ 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		

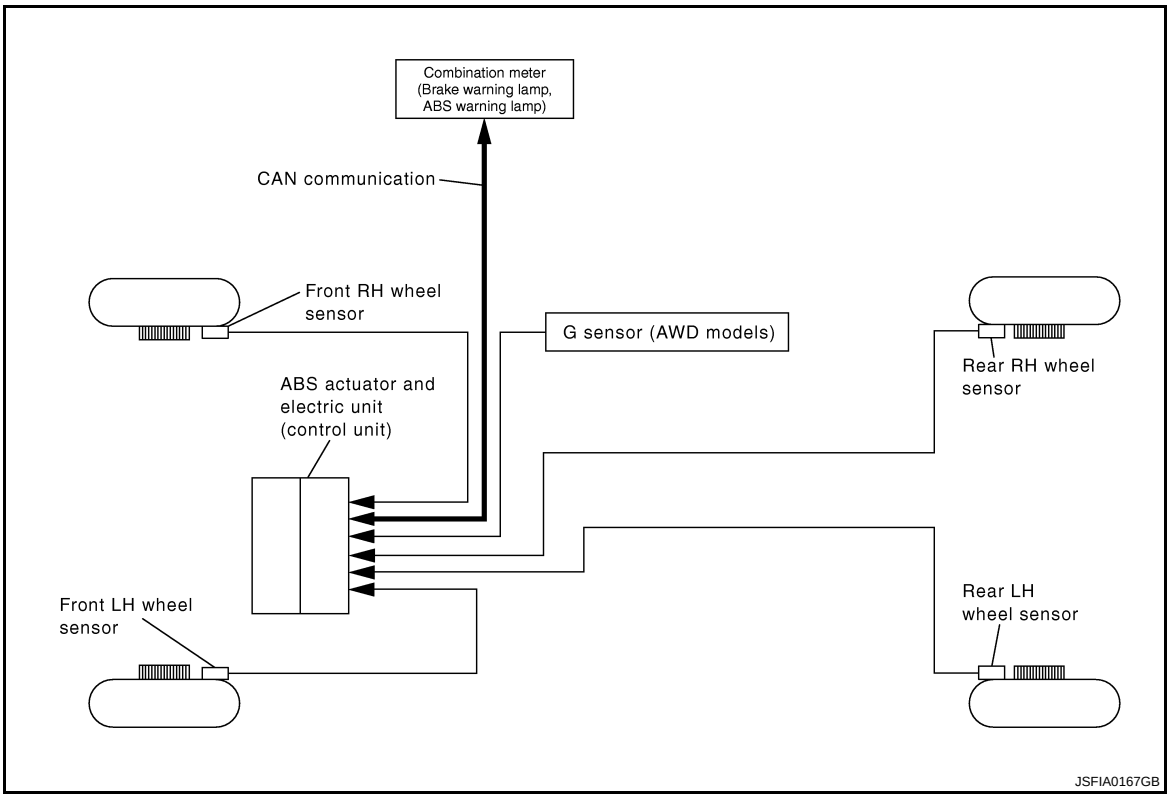
SFIA3264E

FUNCTION DIAGNOSIS

ABS

System Diagram

INFOID:0000000004231759



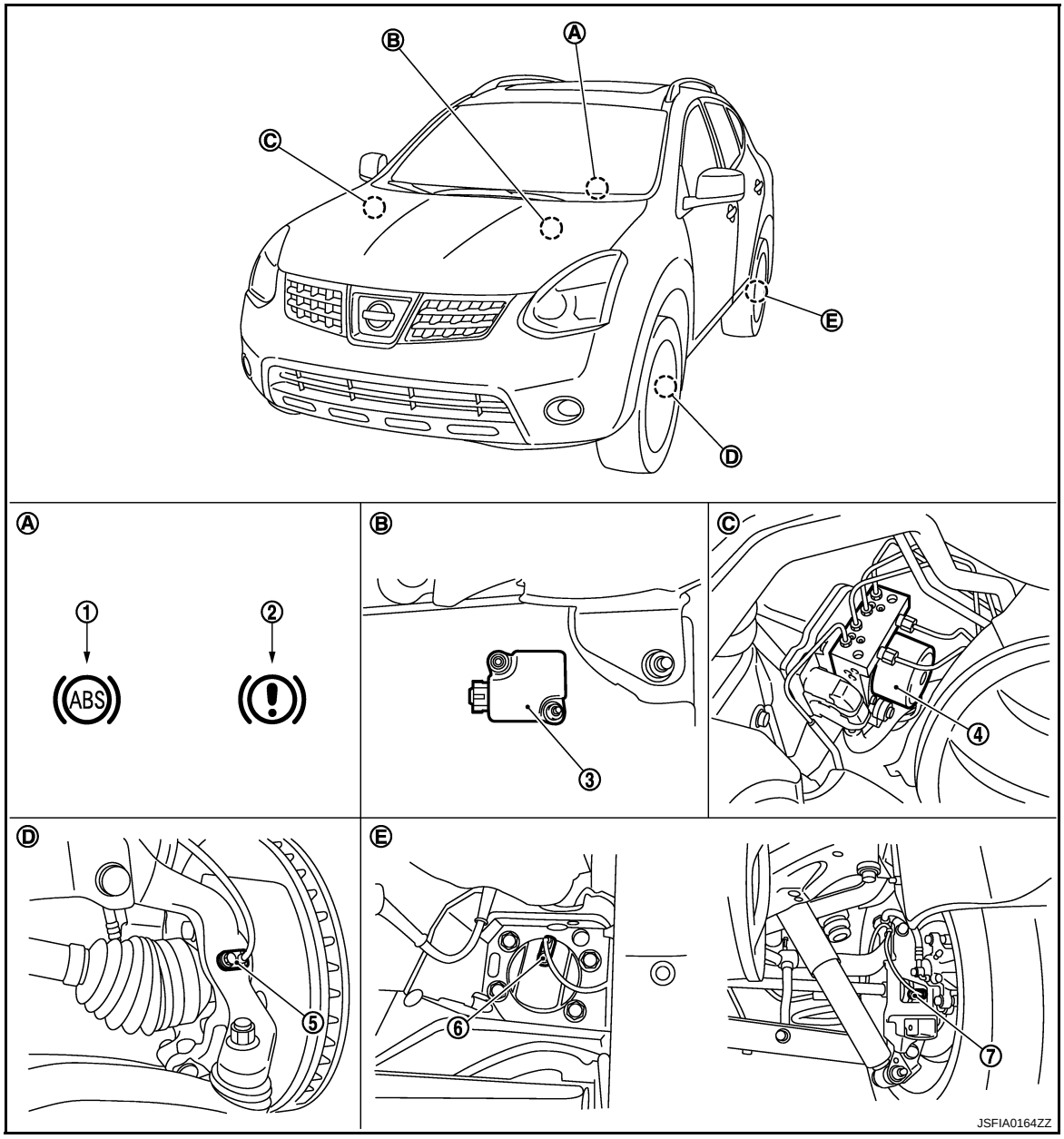
System Description

INFOID:0000000004231760

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

Component Parts Location

INFOID:0000000004231761



1. ABS warning lamp
2. Brake warning lamp
3. G sensor (AWD models)
4. ABS actuator and electric unit (control unit)
5. Front wheel sensor
6. Rear wheel sensor (2WD models)
7. Rear wheel sensor (AWD models)

A. Combination meter
B. Center console
C. Engine room (right side)
D. Steering knuckle
E. Rear axle

Component Description

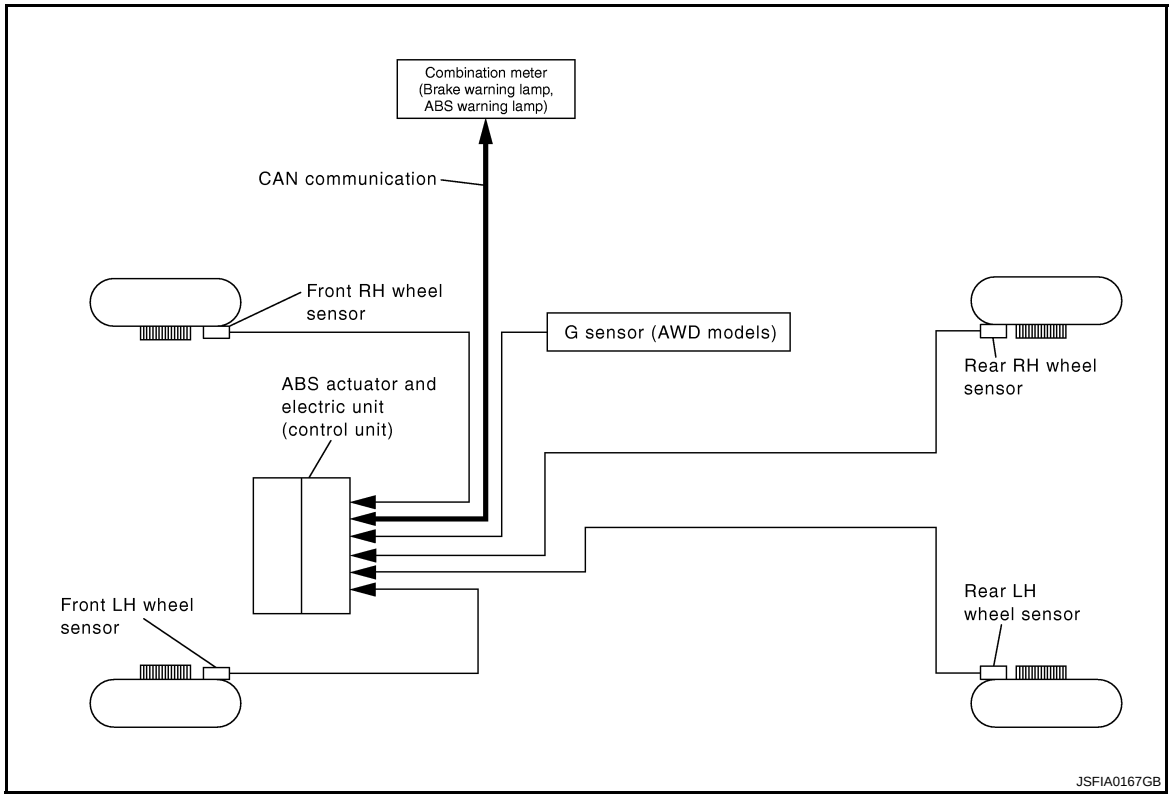
INFOID:0000000004231762

Component parts		Reference
ABS actuator and electric unit (control unit)	Pump	BRC-27, "Description"
	Motor	
	Actuator relay (Main relay)	BRC-39, "Description"
	Solenoid valve	BRC-35, "Description"
Wheel sensor		BRC-18, "Description"
G sensor (AWD models)		BRC-29, "Description"
ABS warning lamp		BRC-47, "Description"
Brake warning lamp		BRC-48, "Description"

EBD

System Diagram

INFOID:0000000004231763



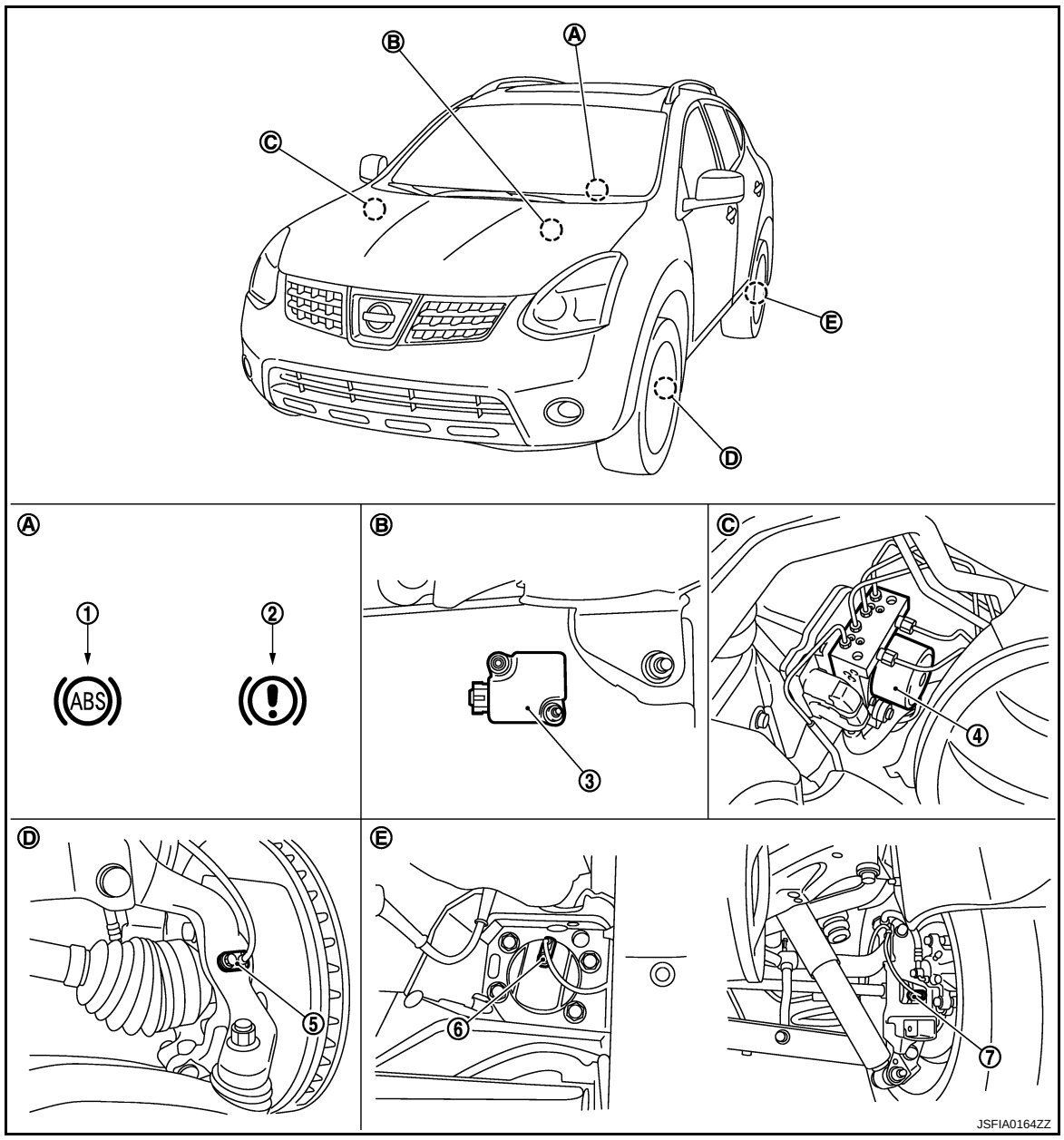
System Description

INFOID:0000000004231764

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

Component Parts Location

INFOID:0000000004231765



1. ABS warning lamp
2. Brake warning lamp
3. G sensor (AWD models)
4. ABS actuator and electric unit (control unit)
5. Front wheel sensor
6. Rear wheel sensor (2WD models)
7. Rear wheel sensor (AWD models)

A. Combination meter
B. Center console
C. Engine room (right side)
D. Steering knuckle
E. Rear axle

Component Description

INFOID:0000000004231766

Component parts		Reference
ABS actuator and electric unit (control unit)	Pump	BRC-27, "Description"
	Motor	
	Actuator relay (Main relay)	BRC-39, "Description"
	Solenoid valve	BRC-35, "Description"
Wheel sensor		BRC-18, "Description"
G sensor (AWD models)		BRC-29, "Description"
ABS warning lamp		BRC-47, "Description"
Brake warning lamp		BRC-48, "Description"

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

CONSULT-III Function

INFOID:0000000004231767

FUNCTION

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

Diagnostic test mode	Function
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.

SELF-DIAG RESULTS MODE

Operation Procedure

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

How to Erase Self-diagnosis Results

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

CAUTION:

If memory cannot be erased, perform applicable diagnosis.

NOTE:

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

Display Item List

Refer to BRC-55, "DTC Index".

DATA MONITOR MODE

Display Item List

×: Applicable ▼: Optional item

Monitor item (Unit)	SELECT MONITOR ITEM		Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	
FR LH SENSOR [km/h (MPH)]	×	×	Wheel speed
FR RH SENSOR [km/h (MPH)]	×	×	
RR LH SENSOR [km/h (MPH)]	×	×	
RR RH SENSOR [km/h (MPH)]	×	×	
STOP LAMP SW (On/Off)	×	×	Stop lamp switch signal status
BATTERY VOLT (V)	×	×	Battery voltage supplied to the ABS actuator and electric unit (control unit)

Monitor item (Unit)	SELECT MONITOR ITEM		Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	
DECEL G-SEN1 (On/Off) (AWD models)	×	×	Vehicle on level surface or on slope
DECEL G-SEN2 (On/Off) (AWD models)	×	×	
FR RH IN SOL (On/Off)	▼	×	Operation status of each solenoid valve
FR RH OUT SOL (On/Off)	▼	×	
FR LH IN SOL (On/Off)	▼	×	
FR LH OUT SOL (On/Off)	▼	×	
RR RH IN SOL (On/Off)	▼	×	
RR RH OUT SOL (On/Off)	▼	×	
RR LH IN SOL (On/Off)	▼	×	
RR LH OUT SOL (On/Off)	▼	×	
MOTOR RELAY (On/Off)	▼	×	Motor and motor relay operation
ACTUATOR RLY (On/Off)	▼	×	Actuator relay operation
ABS WARN LAMP (On/Off)	▼	×	ABS warning lamp
EBD SIGNAL (On/Off)	▼	▼	EBD operation
ABS SIGNAL (On/Off)	▼	▼	ABS operation
EBD FAIL SIG (On/Off)	▼	▼	EBD fail-safe signal
ABS FAIL SIG (On/Off)	▼	▼	ABS fail-safe signal

ACTIVE TEST MODE

CAUTION:

- **Never 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.**

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.

Test Item

ABS SOLENOID VALVE

- For ABS solenoid valve, touch “Up”, “Keep”, and “Down”. Then use screen monitor to check that solenoid valve operates as shown in solenoid valve operation chart.

Test item	Display item	Display		
		Up	Keep	Down
FR RH SOL	FR RH IN SOL	Off	On	On
	FR RH OUT SOL	Off	Off	On*
FR LH SOL	FR LH IN SOL	Off	On	On
	FR LH OUT SOL	Off	Off	On*
RR RH SOL	RR RH IN SOL	Off	On	On
	RR RH OUT SOL	Off	Off	On*
RR LH SOL	RR LH IN SOL	Off	On	On
	RR LH OUT SOL	Off	Off	On*

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

ABS MOTOR

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

Test item	Display item	Display	
		On	Off
ABS MOTOR	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.

ECU PART NUMBER

ABS actuator and electric unit (control unit) part number can be read.

COMPONENT DIAGNOSIS

C1101, C1102, C1103, C1104 WHEEL SENSOR-1

Description

INFOID:0000000004231768

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:0000000004231769

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 short circuit. Current signal from sensor is outside limits.	• Harness or connector • Wheel sensor • ABS actuator and electric unit (control unit)
C1102	RR LH SENSOR-1	Circuit of rear LH wheel sensor is open or short circuit. Current signal from sensor is outside limits.	
C1103	FR RH SENSOR-1	Circuit of front RH wheel sensor is open or short circuit. Current signal from sensor is outside limits.	
C1104	FR LH SENSOR-1	Circuit of front LH wheel sensor is open or short circuit. Current signal from sensor is outside limits.	

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-18, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000004231770

CAUTION:
Never check between wheel sensor terminals.

1.CHECK SENSOR AND SENSOR ROTOR

- Check that there is no damage or adherence of foreign matter on the sensor rotor surface.
- Check sensor rotor for damage.
- Check wheel sensor for damage, disconnection or looseness.
- Check that there is no deformation on the wheel sensor mounting surface.

Are the sensor and sensor rotor normal?

YES >> GO TO 2.
NO >> Repair wheel sensor mount or replace sensor rotor. Then perform the self-diagnosis.

2.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect malfunctioning wheel sensor connector.
4. Check terminal to see if it is deformed, disconnected, loose, etc., Repair or replace it if any malfunction condition is found.

5. Reconnect connectors and then perform the self-diagnosis.

Is any item indicated on the self-diagnosis display?

YES >> GO TO 3.
NO >> Poor connection of connector terminal. Repair or replace connector.

3. CHECK WHEEL SENSOR HARNESS

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect malfunctioning wheel sensor connector.
4. 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.)

Measurement terminal for signal circuit

ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
Connector	Terminal	Connector	Terminal	
E36	12	E39 (Front RH)	4	Existed
	27	E22 (Front LH)	2	
	15	B41 (Rear RH)	8	
	30	B44 (Rear LH)	6	

Measurement terminal for power supply circuit

ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
Connector	Terminal	Connector	Terminal	
E36	21	E39 (Front RH)	3	Existed
	23	E22 (Front LH)	1	
	11	B41 (Rear RH)	7	
	26	B44 (Rear LH)	5	

Measurement terminal for ground circuit

ABS actuator and electric unit (control unit)				Continuity
Connector	Terminal	Connector	Terminal	
E36	12, 21	E36	3, 4	Not existed
	27, 23			
	15, 11			
	30, 26			

5. Reconnect ABS actuator and electric unit (control unit) connector.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace malfunctioning components.

4. CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between wheel sensor harness connector power supply terminal and ground.

Wheel sensor		—	Voltage
Connector	Terminal		
E39 (Front RH)	3	Ground	Approx. 8 V or more
E22 (Front LH)	1		
B41 (Rear RH)	7		
B44 (Rear LH)	5		

Is the inspection result normal?

YES >> Replace applicable wheel sensor.
NO >> Replace ABS actuator and electric unit (control unit).

Component Inspection

INFOID:0000000004231771

1. CHECK DATA MONITOR

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

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

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-18, "Diagnosis Procedure".

C1105, C1106, C1107, C1108 WHEEL SENSOR-2

Description

INFOID:0000000004231772

ABS unit continually monitors wheel speed sensors to detect abnormal signals.

DTC Logic

INFOID:0000000004231773

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1105	RR RH SENSOR-2	Signal from rear RH wheel sensor does not match other 3 wheel speed signals.	• Sensor not installed currently • Sensor rotor or encoder damaged • Sensor rotor loose on axle • Electrical interference • Wheel not turning - e.g. vehicle driven on 2WD dyno • Sensor damaged • ABS unit damaged
C1106	RR LH SENSOR-2	Signal from rear LH wheel sensor does not match other 3 wheel speed signals.	
C1107	FR RH SENSOR-2	Signal from front RH wheel sensor does not match other 3 wheel speed signals.	
C1108	FR LH SENSOR-2	Signal from front LH wheel sensor does not match other 3 wheel speed signals.	

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-21, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000004231774

CAUTION:
Never check between wheel sensor terminals.

1.CHECK SENSOR AND SENSOR ROTOR

- Check that there is no damage or adherence of foreign matter on the sensor rotor surface.
- Check sensor rotor for damage.
- Check wheel sensor for damage, disconnection or looseness.
- Check that there is no deformation on the wheel sensor mounting surface.

Are the sensor and sensor rotor normal?

YES >> GO TO 2.
NO >> Repair wheel sensor mount or replace sensor rotor. Then perform the self-diagnosis.

2.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect malfunctioning wheel sensor connector.
4. Check terminal to see if it is deformed, disconnected, loose, etc., Repair or replace it if any malfunction condition is found.
5. Reconnect connectors and then perform the self-diagnosis.

Is any item indicated on the self-diagnosis display?

YES >> GO TO 3.

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

3.CHECK WHEEL SENSOR HARNESS

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect malfunctioning wheel sensor connector.
4. 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.)

Measurement terminal for signal circuit

ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
Connector	Terminal	Connector	Terminal	
E36	12	E39 (Front RH)	4	Existed
	27	E22 (Front LH)	2	
	15	B41 (Rear RH)	8	
	30	B44 (Rear LH)	6	

Measurement terminal for power supply circuit

ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
Connector	Terminal	Connector	Terminal	
E36	21	E39 (Front RH)	3	Existed
	23	E22 (Front LH)	1	
	11	B41 (Rear RH)	7	
	26	B44 (Rear LH)	5	

Measurement terminal for ground circuit

ABS actuator and electric unit (control unit)				Continuity
Connector	Terminal	Connector	Terminal	
E36	12, 21	E36	3, 4	Not existed
	27, 23			
	15, 11			
	30, 26			

5. Reconnect ABS actuator and electric unit (control unit) connector.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace malfunctioning components.

4.CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between wheel sensor harness connector power supply terminal and ground.

Wheel sensor		—	Voltage
Connector	Terminal		
E39 (Front RH)	3	Ground	Approx. 8 V or more
E22 (Front LH)	1		
B41 (Rear RH)	7		
B44 (Rear LH)	5		

Is the inspection result normal?

YES >> Replace applicable wheel sensor.
NO >> Replace ABS actuator and electric unit (control unit).

Component Inspection

INFOID:0000000004231775

1. CHECK DATA MONITOR

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

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

Is the inspection result normal?

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

C1109 POWER AND GROUND SYSTEM

Description

INFOID:0000000004231776

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

DTC Logic

INFOID:0000000004231777

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 is lower than normal and vehicle speed is greater than 6km/h (4 MPH). Power supply is greater than normal limits.	• Harness or connector • ABS actuator and electric unit (control unit) • Fuse • Vehicle electrical power system

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-24, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000004231778

1.CHECK CONNECTOR

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

Is any item indicated on the self-diagnosis display?

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

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

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

ABS actuator and electric unit (control unit)		—	Condition	Voltage
Connector	Terminal			
E36	16	Ground	Ignition switch: ON	Battery voltage
			Ignition switch: OFF	Approx. 0 V

4. Check 10A fusible link (59).
5. Check continuity between ABS actuator and electric unit (control unit) harness connector and IPDM E/R.

ABS actuator and electric unit (control unit)		IPDM E/R		continuity
Connector	Terminal	Connector	Terminal	
E36	16	E15	59	Existed

6. Reconnect ABS actuator and electric unit (control unit) connector.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace malfunctioning components.

3. ABS POWER SUPPLY CHECK (UNDER LOAD CONDITIONS)

1. Use 12 V lamp (normal rating 10 to 20 W) connected between E36 terminals 16 and 4. With ignition switch ON check bulb illuminates correctly.
2. Check ABS motor supply under loaded condition (connector E36 terminals 1 and 3).

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check both power supply and ground circuit.

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

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E36	3, 4	Ground	Existed

Is the inspection result normal?

YES >> Check battery for terminal looseness, low voltage, etc. it any malfunction is found, repair malfunctioning parts.
NO >> Repair or replace malfunctioning components (check ABS earth bolt for tightness and corrosion).

C1110 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Description

INFOID:0000000004231779

ABS unit is continuously monitoring ECU hardware and software for correct operation.

DTC Logic

INFOID:0000000004231780

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1110	CONTROLLER FAILURE	Possible internal failure of control unit components.	Internal failure of control unit components. ABS solenoid valve or motor power supply/ ground abnormality.

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

1. Check both ABS solenoid valve and motor supply and ground circuits using a suitable electrical load.
2. Check wheel speed sensor inputs.
3. 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-26, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000004231781

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 those applicable.

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

C1111 ABS MOTOR, MOTOR RELAY SYSTEM

Description

INFOID:0000000004231782

PUMP

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

MOTOR

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

DTC Logic

INFOID:0000000004231783

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 (control unit)
		During the actuator motor operating with OFF, when the actuator motor turns ON, or when the control line for relay is shorted to ground.	

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-27, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000004231784

1.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check terminal for deformation, disconnect, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect connector and then perform the self-diagnosis.

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2.
NO >> Poor connection of connector terminal. Replace or repair connector.

2.CHECK ABS MOTOR AND MOTOR RELAY POWER SUPPLY CIRCUIT

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E36	1	Ground	Battery voltage

4. Reconnect ABS actuator and electric unit (control unit) connector.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace malfunctioning components.

3. ABS POWER SUPPLY CHECK (UNDER LOAD CONDITIONS)

Use 12 V lamp (normal rating 10 to 20 W) connected between E36 terminals 1 and 2. With ignition switch ON check bulb illuminates correctly.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check both power supply and ground circuit.

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

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E36	3, 4	Ground	Existed

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace malfunctioning components. (Check ABS each bolt for tightness and corrosion).

Component Inspection

INFOID:0000000004231785

1. CHECK ACTIVE TEST

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

Test item	Display item	Display	
		On	Off
ABS MOTOR	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-27, "Diagnosis Procedure".

C1113 G SENSOR

Description

INFOID:0000000004231786

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

DTC Logic

INFOID:0000000004231787

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1113	G SENSOR	G sensor is malfunctioning, or signal line of G sensor is open or shorted.	• Harness or connector • ABS actuator and electric unit (control unit) • G sensor • Electrical interference • Vehicle driven on AWD rolling road

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
G SENSOR

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-29, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000004231788

1.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect G sensor connector.
4. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
5. Reconnect connectors and then perform the self-diagnosis.

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2.
NO >> Poor connection of connector terminal. Replace or repair connector.

2.CHECK G SENSOR HARNESS

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect G sensor connector.
4. Check continuity between G sensor harness connector terminals and ABS actuator and electric unit (control unit) harness connector terminals.

ABS actuator and electric unit (control unit)		G sensor		Continuity
Connector	Terminal	Connector	Terminal	
E36	13	B32	2	Existed
	29		3	
	14		4	
	28		5	

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace malfunctioning components.

3.CHECK G SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between G sensor harness connector terminal and ground.

G sensor		—	Condition	Voltage
Connector	Terminal			
B32	1	Ground	Ignition switch: ON	Battery voltage
			Ignition switch: OFF	Approx. 0 V

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace malfunctioning components.

4.CHECK G SENSOR

1. Remove G sensor from the vehicle. Refer to BRC-70, "Exploded View".
2. Connect the following terminals between G sensor and connector.

G sensor	Harness connector	
Terminal	Connector	Terminal
1	B32	1
2		2
3		3
4		4
5		5

3. Turn ignition switch ON.
4. Check voltage between G sensor terminals.

Condition	G sensor	
	Terminals 4 – 5	Terminals 3 – 5
Horizontal	1.50 – 1.95 V	1.50 – 1.95 V
Longitudinally 20°	3.51 – 4.14 V	3.51 – 4.14 V
Longitudinally 40°	1.50 – 1.95 V	3.51 – 4.14 V

Is the inspection result normal?

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

Component Inspection

INFOID:0000000004231789

1.CHECK DATA MONITOR

Select “DECEL G-SEN1” and “DECEL G-SEN2”, in “DATA MONITOR” and check G sensor signal.

Monitor item	Condition	DATA MONITOR
DECEL G-SEN1	Changes according to an indication shown by the decel G sensor	On
		Off
DECEL G-SEN2	Changes according to an indication shown by the decel G sensor	On
		Off

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-29, "Diagnosis Procedure".

C1115 WHEEL SENSOR

Description

INFOID:0000000004231790

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:0000000004231791

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1115	ABS SENSOR [ABNORMAL SIGNAL]	Miss-match between the 4 wheel speed sensor signals.	Harness or connector not a possible cause. Other possible causes tire radius (due to wrong size or pressure) interference.

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-32, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000004231792

CAUTION:
Never check between wheel sensor terminals.

1.CHECK TIRES

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.

2.CHECK SENSOR AND SENSOR ROTOR

- Check that there is no damage or adherence of foreign matter on the sensor rotor surface.
- Check that there is no deformation, misalignment, float, and backlash on the wheel sensor and wheel sensor mounting surface.
- Check that the wheel sensor in installed with no misalignment and backlash.

Are the sensor and sensor rotor normal?

YES >> GO TO 3.
NO >> Repair wheel sensor mount or replace sensor rotor. Then perform the self-diagnosis.

3.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect malfunctioning wheel sensor connector.
4. Check terminal to see if it is deformed, disconnected, loose, etc., Repair or replace it if any malfunction condition is found.
5. Reconnect connectors and then perform the self-diagnosis.

Is any item indicated on the self-diagnosis display?

YES >> GO TO 4.
NO >> Poor connection of connector terminal. Repair or replace connector.

4. CHECK WHEEL SENSOR HARNESS

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect malfunctioning wheel sensor connector.
4. 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.)

Measurement terminal for signal circuit

ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
Connector	Terminal	Connector	Terminal	
E36	12	E39 (Front RH)	4	Existed
	27	E22 (Front LH)	2	
	15	B41 (Rear RH)	8	
	30	B44 (Rear LH)	6	

Measurement terminal for power supply circuit

ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
Connector	Terminal	Connector	Terminal	
E36	21	E39 (Front RH)	3	Existed
	23	E22 (Front LH)	1	
	11	B41 (Rear RH)	7	
	26	B44 (Rear LH)	5	

Measurement terminal for ground circuit

ABS actuator and electric unit (control unit)				Continuity
Connector	Terminal	Connector	Terminal	
E36	12, 21	E36	3, 4	Not existed
	27, 23			
	15, 11			
	30, 26			

5. Reconnect ABS actuator and electric unit (control unit) connector.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace malfunctioning components.

5. CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between wheel sensor harness connector power supply terminal and ground.

Wheel sensor		—	Voltage
Connector	Terminal		
E39 (Front RH)	3	Ground	Approx. 8 V or more
E22 (Front LH)	1		
B41 (Rear RH)	7		
B44 (Rear LH)	5		

Is the inspection result normal?

YES >> Replace applicable wheel sensor.
NO >> Replace ABS actuator and electric unit (control unit).

Component Inspection

INFOID:0000000004231793

1. CHECK DATA MONITOR

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

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

Is the inspection result normal?

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

C1120, C1122, C1124, C1126 IN ABS SOL

Description

INFOID:0000000004231794

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:0000000004231795

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.	ABS actuator and electric unit (control unit)
C1122	FR RH IN ABS SOL	When the control unit detects a malfunction in the front RH inlet solenoid circuit.	
C1124	RR LH IN ABS SOL	When the control unit detects a malfunction in the rear LH inlet solenoid circuit.	
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-35, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000004231796

1.CHECK SENSOR AND SENSOR ROTOR

- Check that there is no damage or adherence of foreign matter on the sensor rotor surface.
- Check sensor rotor for damage.
- Check wheel sensor for damage, disconnection or looseness.
- Check that there is no deformation on the wheel sensor mounting surface.

Are the sensor and sensor rotor normal?

YES >> GO TO 2.
NO >> Repair wheel sensor mount or replace sensor rotor. Then perform the self-diagnosis.

2.CHECK CONNECTOR

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

Is any item indicated on the self-diagnosis display?

YES >> GO TO 3.
NO >> Poor connection of connector terminal. Replace or repair connector.

3.CHECK ACTUATOR RELAY POWER SUPPLY CIRCUIT

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E36	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace malfunctioning components.

4.CHECK ACTUATOR RELAY GROUND CIRCUIT

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E36	3, 4	Ground	Existed

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace malfunctioning components.

Component Inspection

INFOID:0000000004231797

1.CHECK ACTIVE TEST

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

Test item	Display item	Display		
		Up	Keep	Down
FR RH SOL	FR RH IN SOL	Off	On	On
	FR RH OUT SOL	Off	Off	On*
FR LH SOL	FR LH IN SOL	Off	On	On
	FR LH OUT SOL	Off	Off	On*
RR RH SOL	RR RH IN SOL	Off	On	On
	RR RH OUT SOL	Off	Off	On*
RR LH SOL	RR LH IN SOL	Off	On	On
	RR LH OUT SOL	Off	Off	On*

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

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-35, "Diagnosis Procedure".

C1121, C1123, C1125, C1127 OUT ABS SOL

Description

INFOID:0000000004231798

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:0000000004231799

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.	ABS actuator and electric unit (control unit)
C1123	FR RH OUT ABS SOL	When the control unit detects a malfunction in the front RH outlet solenoid circuit.	
C1125	RR LH OUT ABS SOL	When the control unit detects a malfunction in the rear LH outlet solenoid circuit.	
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-37, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000004231800

1.CHECK SENSOR AND SENSOR ROTOR

- Check that there is no damage or adherence of foreign matter on the sensor rotor surface.
- Check sensor rotor for damage.
- Check wheel sensor for damage, disconnection or looseness.
- Check that there is no deformation on the wheel sensor mounting surface.

Are the sensor and sensor rotor normal?

YES >> GO TO 2.
NO >> Repair wheel sensor mount or replace sensor rotor. Then perform the self-diagnosis.

2.CHECK CONNECTOR

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

Is any item indicated on the self-diagnosis display?

YES >> GO TO 3.
NO >> Poor connection of connector terminal. Replace or repair connector.

3.CHECK ACTUATOR RELAY POWER SUPPLY CIRCUIT

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E36	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace malfunctioning components.

4.CHECK ACTUATOR RELAY GROUND CIRCUIT

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E36	3, 4	Ground	Existed

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace malfunctioning components.

Component Inspection

INFOID:0000000004231801

1.CHECK ACTIVE TEST

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

Test item	Display item	Display		
		Up	Keep	Down
FR RH SOL	FR RH IN SOL	Off	On	On
	FR RH OUT SOL	Off	Off	On*
FR LH SOL	FR LH IN SOL	Off	On	On
	FR LH OUT SOL	Off	Off	On*
RR RH SOL	RR RH IN SOL	Off	On	On
	RR RH OUT SOL	Off	Off	On*
RR LH SOL	RR LH IN SOL	Off	On	On
	RR LH OUT SOL	Off	Off	On*

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

Is the inspection result normal?

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

C1140 ACTUATOR RELAY SYSTEM

Description

INFOID:0000000004231802

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

DTC Logic

INFOID:0000000004231803

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1140	ACTUATOR RLY	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 (control unit)
		During the actuator relay operating with ON, when the actuator relay turns ON, or when the control line for the relay is open.	

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
ACTUATOR RLY

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-39, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000004231804

1.CHECK CONNECTOR

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

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2.
NO >> Poor connection of connector terminal. Replace or repair connector.

2.CHECK ACTUATOR RELAY POWER SUPPLY CIRCUIT

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E36	2	Ground	Battery voltage

4. Reconnect ABS actuator and electric unit (control unit) connector.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace malfunctioning components.

3.ABS POWER SUPPLY CHECK (UNDER LOAD CONDITIONS)

Use 12 V lamp (normal rating 10 to 20 W) connected between E36 terminals 1 and 3. With ignition switch ON check bulb illuminates correctly.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check both power supply and ground circuit.

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

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E36	3, 4	Ground	Existed

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace malfunctioning components. (Check ABS each bolt for tightness and corrosion).

Component Inspection

INFOID:0000000004231805

1.CHECK ACTIVE TEST

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

Test item	Display item	Display	
		On	Off
ABS MOTOR	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-27, "Diagnosis Procedure".

U1000 CAN COMM CIRCUIT

Description

INFOID:0000000004231806

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:0000000004231807

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)

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
CAN COMM CIRCUIT

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-41, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000004231808

1.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect connector and perform self-diagnosis.

Self-diagnosis results
CAN COMM CIRCUIT

Is above displayed on the self-diagnosis display?

YES >> Go to LAN-24, "CAN System Specification Chart".
NO >> INSPECTION END

U1010 CONTROL UNIT (CAN)

Description

INFOID:0000000004231809

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:0000000004231810

DTC DETECTION LOGIC

DTC	Items	Diagnostic item is detected when...	Possible cause
U1010	CONTROL UNIT (CAN)	When detecting error during the initial diagnosis of CAN controller of ABS actuator and electric unit (control unit).	ABS actuator and electric unit (control unit) error

DTC CONFIRMATION PROCEDURE

1.RECHECK DTC

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

Is DTC “U1010” detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-42, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000004231811

1.ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Check that there is no malfunction in ABS actuator and electric unit (control unit) harness connector or disconnection.

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace the harnesses and connectors.

BRAKE FLUID LEVEL SWITCH

Description

INFOID:0000000004231812

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).

Component Function Check

INFOID:0000000004231813

1.CHECK BRAKE FLUID LEVEL SWITCH OPERATION

Operate the brake fluid level switch. Then check that the brake warning lamp in the combination meter turns on/off correctly.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-43, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000004231814

1.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect brake fluid level switch connector and combination meter connector.
3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect connectors and then perform component function check. Refer to BRC-43, "Component Function Check".

Is the inspection result normal?

YES >> Poor connection of connector terminal. Replace or repair connector.
NO >> GO TO 2.

2.CHECK BRAKE FLUID LEVEL SWITCH

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

Brake fluid level switch		Condition	Continuity
Connector	Terminal		
E37	1 – 2	When brake fluid is full in the reservoir tank.	Not existed
		When brake fluid is empty in the reservoir tank.	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Brake fluid level switch is malfunction. Replace reservoir tank.

3.CHECK BRAKE FLUID LEVEL SWITCH CIRCUIT

1. Disconnect combination meter connector.
2. Check continuity between brake fluid level switch harness connector terminals and combination meter harness connector terminal and/or ground.

Combination meter		Brake fluid level switch		Continuity
Connector	Terminal	Connector	Terminal	
M34	27	E37	1	Existed

Combination meter		—	Continuity
Connector	Terminal		
M34	27	Ground	Not existed

Brake fluid level switch		—	Continuity
Connector	Terminal		
E37	2	Ground	Existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair or replace malfunctioning components.

Component Inspection

INFOID:0000000004231815

1. CHECK BRAKE FLUID LEVEL SWITCH

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

Brake fluid level switch		Condition	Continuity
Connector	Terminal		
E37	1 – 2	When brake fluid is full in the reservoir tank.	Not existed
		When brake fluid is empty in the reservoir tank.	Existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace reservoir tank.

PARKING BRAKE SWITCH

Description

INFOID:0000000004231816

The parking brake switch converts the status of the parking brake pedal to an electric signal and transmits it to the ABS actuator and electric unit (control unit).

Component Function Check

INFOID:0000000004231817

1.CHECK PARKING BRAKE SWITCH OPERATION

Operate the parking brake pedal. 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 switch is operation	ON
When the parking brake switch is not operation.	OFF

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-45, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000004231818

1.CHECK PARKING BRAKE SWITCH

1. Turn ignition switch OFF.
2. Disconnect parking brake switch connector.
3. Check continuity between parking brake switch connector terminal and ground.

Parking brake switch		Condition	Continuity
Connector	Terminal		
E103	1 – Ground	When the parking brake switch is operated.	Existed
		When the parking brake switch is not operated.	Not existed

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace parking brake switch.

2.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-32, "Diagnosis Description".

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair or replace combination meter.

Component Inspection

INFOID:0000000004231819

1.CHECK PARKING BRAKE SWITCH

1. Turn ignition switch OFF.
2. Disconnect parking brake switch connector.
3. Check continuity between parking brake switch connector terminal and ground.

Parking brake switch		Condition	Continuity
Connector	Terminal		
E103	1 – Ground	When the parking brake switch is operated.	Existed
		When the parking brake switch is not operated.	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace parking brake switch. Refer to PB-6, "Exploded View".

ABS WARNING LAMP

Description

INFOID:0000000004231820

×: ON –: OFF

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

Component Function Check

INFOID:0000000004231821

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-47, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000004231822

1.CHECK SELF-DIAGNOSIS

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

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check items displayed by self-diagnosis.

2.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-32, "Diagnosis Description".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace combination meter.

BRAKE WARNING LAMP

Description

INFOID:0000000004231823

×: ON –: OFF

Condition	Brake warning lamp (Note 1)
Ignition switch OFF	–
For 1 second after turning ignition switch ON	× (Note 2)
1 second later after turning ignition switch ON	× (Note 2)
EBD function is malfunctioning.	×

NOTE:

- 1: Brake warning lamp will turn on in case of parking brake operation (when switch is ON) or of brake fluid level switch operation (when brake fluid is insufficient).
- 2: After starting engine, brake warning lamp is turned off.

Component Function Check

INFOID:0000000004231824

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-48, "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 pedal.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Check parking brake switch. Refer to BRC-45, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000004231825

1.CHECK PARKING BRAKE SWITCH

Check that the brake warning lamp in the combination meter turns ON/OFF correctly when operating the parking brake pedal.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check parking brake switch. Refer to BRC-45, "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-32, "Diagnosis Description".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace combination meter.

ECU DIAGNOSIS

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Reference Value

INFOID:0000000004231826

VALUES ON THE DIAGNOSIS TOOL

CAUTION:

The display shows the control unit calculation data, so a normal value might be displayed even in the event the output circuit (harness) is open or short-circuited.

Monitor item	Display content	Data monitor	
		Condition	Reference value in normal operation
FR LH SENSOR	Wheel speed	Vehicle stopped	0 [km/h (MPH)]
		Vehicle running (Note 1)	Nearly matches the speed meter display (± 10% or less)
FR RH SENSOR	Wheel speed	Vehicle stopped	0 [km/h (MPH)]
		Vehicle running (Note 1)	Nearly matches the speed meter display (± 10% or less)
RR LH SENSOR	Wheel speed	Vehicle stopped	0 [km/h (MPH)]
		Vehicle running (Note 1)	Nearly matches the speed meter display (± 10% or less)
RR RH SENSOR	Wheel speed	Vehicle stopped	0 [km/h (MPH)]
		Vehicle running (Note 1)	Nearly matches the speed meter display (± 10% or less)
STOP LAMP SW	Stop lamp switch signal status	When brake pedal is depressed	On
		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
DECEL G-SEN1 (Note 2)	Decel G detected by decel G sensor	Changes according to an indication shown by the decel G sensor	On
			Off
DECEL G-SEN2 (Note 2)	Decel G detected by decel G sensor	Changes according to an indication shown by the decel G sensor	On
			Off
FR RH IN SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
FR RH OUT SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
FR LH IN SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off

Monitor item	Display content	Data monitor	
		Condition	Reference value in normal operation
FR LH OUT SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
RR RH IN SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
RR RH OUT SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
RR LH IN SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
RR LH OUT SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
MOTOR RELAY	Motor and motor relay operation	When the motor relay and motor are operating	On
		When the motor relay and motor are not operating	Off
ACTUATOR RLY (Note 3)	Actuator relay operation	When the actuator relay is operating	On
		When the actuator relay is not operating	Off
ABS WARN LAMP	ABS warning lamp (Note 4)	When ABS warning lamp is ON	On
		When ABS warning lamp is OFF	Off
EBD SIGNAL	EBD operation	EBD is active	On
		EBD is inactive	Off
ABS SIGNAL	ABS operation	ABS is active	On
		ABS is inactive	Off
EBD FAIL SIG	EBD fail-safe signal	In EBD fail-safe	On
		EBD is normal	Off
ABS FAIL SIG	ABS fail-safe signal	In ABS fail-safe	On
		ABS is normal	Off

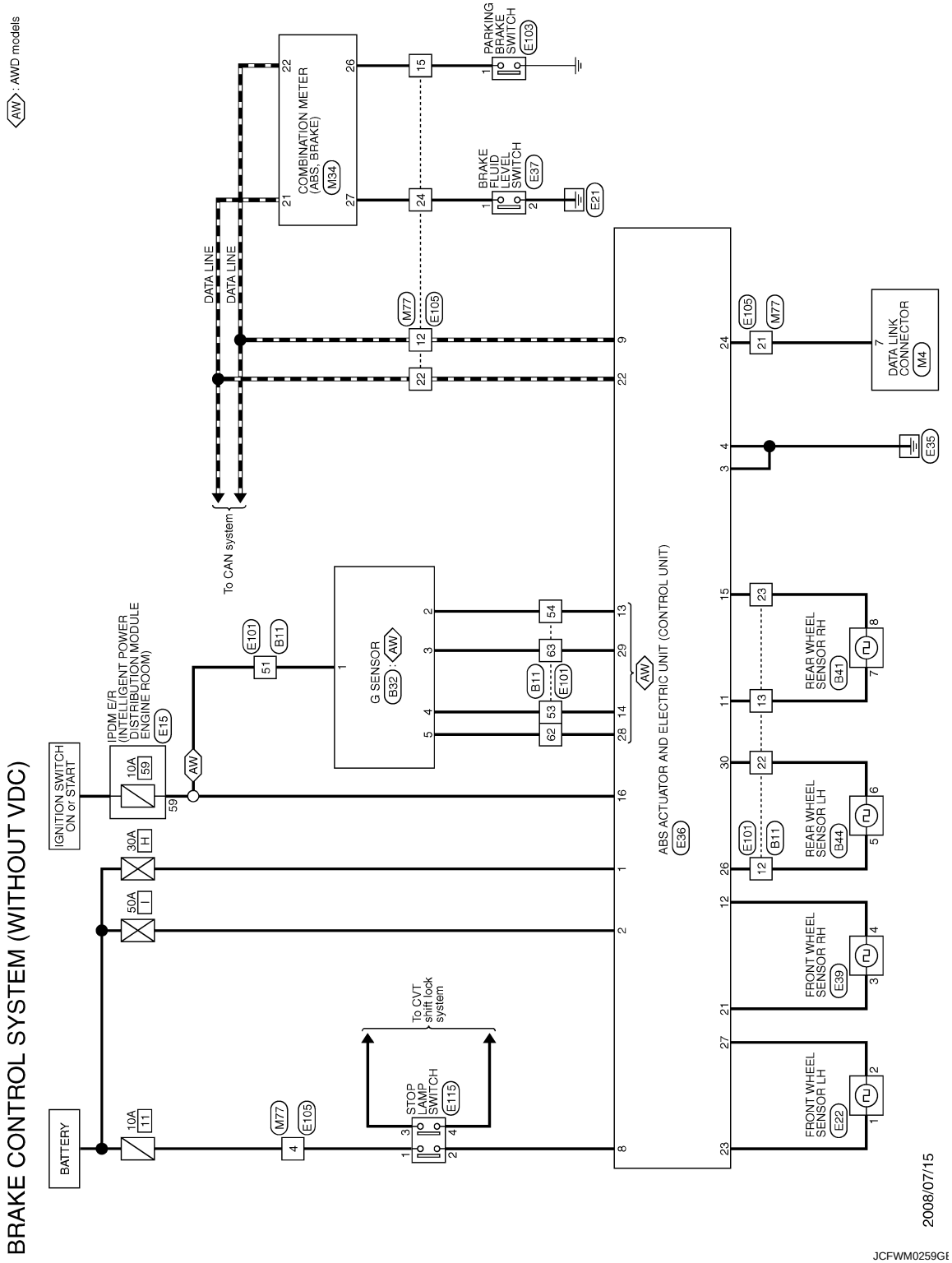
NOTE:

- 1: Confirm tire pressure is normal.
- 2: Only AWD models.
- 3: Every 20 seconds momentary switch to Off.
- 4: On and off timing for warning lamp and indicator lamp.

- ABS warning lamp: Refer to BRC-47, "Description".

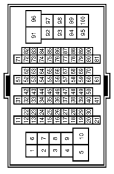
Wiring Diagram -BRAKE CONTROL SYSTEM-

INFOID:0000000004231827



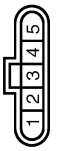
BRAKE CONTROL SYSTEM (WITHOUT VDC)

Connector No.	B11
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-CS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
12	BR	–
13	O	–
22	G	–
23	SB	–
51	GR	–
53	L	–
54	B	–
62	Y	–
63	R	–

Connector No.	B32
Connector Name	G SENSOR
Connector Type	YDZ06FW



Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	IGN
2	B	GST
3	R	GS2
4	L	GS1
5	Y	GND

Connector No.	B41
Connector Name	REAR WHEEL SENSOR RH
Connector Type	RK02FGY

Terminal No.	Color of Wire	Signal Name [Specification]
7	O	–
8	SB	–

Connector No.	B44
Connector Name	REAR WHEEL SENSOR LH
Connector Type	RK02FGY

Terminal No.	Color of Wire	Signal Name [Specification]
5	BR	–
6	G	–

Connector No.	E15
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS16FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
59	BR	–

Connector No.	E22
Connector Name	FRONT WHEEL SENSOR LH
Connector Type	RK02MGY

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	–
2	P	–

Connector No.	E36
Connector Name	ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
Connector Type	RH28FB-NU4-DH

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	MOTOR
2	BR	ACTR
3	B	GND A
4	B	GND M
8	SB	STOP LAMP SW
9	P	CAN L
11	O	RR SENSOR VB
12	R	FR SENSOR SIG
13	B	G CHECK
14	L	G SW1
15	SB	RR SENSOR SIG
16	BR	IGN
21	G	FR SENSOR VB
22	L	CAN H
23	W	FL SENSOR VB
24	GR	DIAG K
26	BR	RL SENSOR VB
27	P	FL SENSOR SIG
28	Y	G GND
29	R	G SW2
30	G	RL SENSOR SIG

JCFWM0260GB

BRAKE CONTROL SYSTEM (WITHOUT VDC)

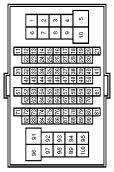
Connector No.	E37
Connector Name	BRAKE FLUID LEVEL SWITCH
Connector Type	YV02FGY

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	B	–

Connector No.	E39
Connector Name	FRONT WHEEL SENSOR RH
Connector Type	RK02MGY

Terminal No.	Color of Wire	Signal Name [Specification]
3	G	–
4	R	–

Connector No.	E101
Connector Name	WIRE TO WIRE
Connector Type	TH80FW-CS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
12	BR	–
13	O	–
22	G	–
23	SB	–
51	GR	–
53	L	–
54	B	–
62	Y	–
63	R	–

Connector No.	E103
Connector Name	PARKING BRAKE SWITCH
Connector Type	P01FB-A

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	–

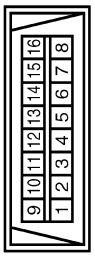
Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH80FW-CS16-TM4

Terminal No.	Color of Wire	Signal Name [Specification]
4	V	–
12	P	–
15	V	–
21	L	–
22	L	–
24	LG	–

Connector No.	E115
Connector Name	STOP LAMP SWITCH
Connector Type	M04FW-LC

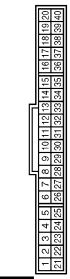
Terminal No.	Color of Wire	Signal Name [Specification]
1	V	–
2	Y	–
3	G	–
4	L	–

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW



Terminal No.	Color of Wire	Signal Name [Specification]
7	O	–

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW

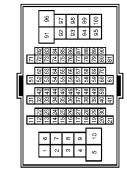


Terminal No.	Color of Wire	Signal Name [Specification]
21	L	CAN-H
22	P	CAN-L
26	V	PARKING BRAKE SW
27	BR	BRAKE FLUID LEVEL SE

JCFWM0261GE

BRAKE CONTROL SYSTEM (WITHOUT VDC)

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-CS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
4	Y	–
12	P	–
15	V	–
21	O	–
22	L	–
24	BR	–

JCFWM0262GE

Fail-Safe

INFOID:0000000004231828

ABS, EBD SYSTEM

In case of electrical malfunctions with the ABS, ABS warning lamp will turn ON. In case of electrical malfunctions with the EBD, brake warning lamp, ABS warning lamp will turn ON. Simultaneously, the 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 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 ABS, EBD system.

DTC Index

INFOID:0000000004231829

DTC	Items (CONSULT screen terms)	Reference
C1101	RR RH SENSOR-1	BRC-18, "DTC Logic"
C1102	RR LH SENSOR-1	
C1103	FR RH SENSOR-1	
C1104	FR LH SENSOR-1	
C1105	RR RH SENSOR-2	BRC-21, "DTC Logic"
C1106	RR LH SENSOR-2	
C1107	FR RH SENSOR-2	
C1108	FR LH SENSOR-2	
C1109	BATTERY VOLTAGE [ABNORMAL]	BRC-24, "DTC Logic"
C1110	CONTROLLER FAILURE	BRC-26, "DTC Logic"
C1111	PUMP MOTOR	BRC-27, "DTC Logic"
C1113	G SENSOR	BRC-29, "DTC Logic"
C1115	ABS SENSOR [ABNORMAL SIGNAL]	BRC-32, "DTC Logic"
C1120	FR LH IN ABS SOL	BRC-35, "DTC Logic"
C1121	FR LH OUT ABS SOL	BRC-37, "DTC Logic"
C1122	FR RH IN ABS SOL	BRC-35, "DTC Logic"
C1123	FR RH OUT ABS SOL	BRC-37, "DTC Logic"
C1124	RR LH IN ABS SOL	BRC-35, "DTC Logic"
C1125	RR LH OUT ABS SOL	BRC-37, "DTC Logic"
C1126	RR RH IN ABS SOL	BRC-35, "DTC Logic"
C1127	RR RH OUT ABS SOL	BRC-37, "DTC Logic"
C1140	ACTUATOR RLY	BRC-39, "DTC Logic"
U1000	CAN COMM CIRCUIT	BRC-41, "DTC Logic"
U1010	CONTROL UNIT (CAN)	BRC-42, "DTC Logic"

SYMPTOM DIAGNOSIS

EXCESSIVE ABS FUNCTION OPERATION FREQUENCY

Diagnosis Procedure

INFOID:0000000004231830

1.CHECK START

Check front and rear brake force distribution using a brake tester. Refer to BR-47, "General Specifications".

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.

- Front
  - 2WD models: Refer to FAX-8, "Inspection".
  - AWD models: Refer to FAX-32, "Inspection".
- Rear
  - 2WD models: Refer to RAX-4, "Inspection".
  - AWD models: Refer to RAX-11, "Inspection".

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.

Is the ABS warning lamp illuminated?

YES >> Perform self-diagnosis.
NO >> Normal

UNEXPECTED PEDAL REACTION

Diagnosis Procedure

INFOID:0000000004231831

1.CHECK BRAKE PEDAL STROKE

Check brake pedal stroke. Refer to BR-9, "Inspection and Adjustment".

Is the stroke too large?

YES >> • Bleed air from brake tube and hose. Refer to BR-13, "Bleeding Brake System".
• Check brake pedal, brake booster, and master cylinder for mount play, looseness, brake system fluid leakage, etc.
- Brake pedal: Refer to BR-9, "Inspection and Adjustment".
- Master cylinder: Refer to BR-14, "Inspection".
- Brake booster: Refer to BR-15, "Inspection".

NO >> GO TO 2.

2.CHECK FUNCTION

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

Is the inspection result normal?

YES >> Normal
NO >> Check brake system.

THE BRAKING DISTANCE IS LONG

Diagnosis Procedure

INFOID:0000000004231832

CAUTION:

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

1.CHECK FUNCTION

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

Is the inspection result normal?

YES >> Normal
NO >> Check brake system.

ABS FUNCTION DOES NOT OPERATE

Diagnosis Procedure

INFOID:0000000004231833

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

1. CHECK ABS WARNING LAMP DISPLAY

Make sure that the ABS warning lamp turns OFF after ignition switch is turned ON or when driving.

Is the inspection result normal?

YES >> Normal
NO >> Perform self-diagnosis.

PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

Diagnosis Procedure

INFOID:0000000004231834

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 that there are pedal vibrations when the engine is started.

Do vibrations occur?

YES >> GO TO 2.
NO >> Inspect the brake pedal.

2.SYMPTOM CHECK 2

Check that there are ABS operation noises when the engine is started.

Do the operation noises occur?

YES >> GO TO 3.
NO >> Perform self -diagnosis.

3.SYMPTOM CHECK 3

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

Do symptoms occur?

YES >> Check if there is a radio, antenna, antenna lead wire, or wiring close to the control unit. If there is, move it farther away.
NO >> Normal

NORMAL OPERATING CONDITION

Description

INFOID:0000000004231835

Symptom	Result
Slight vibrations are felt on the brake pedal and the operation noises occur, when ABS is activated.	This is a normal condition due to the ABS activation.
Stopping distance is longer than that of vehicles without ABS when the vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.	
The brake pedal 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.

PRECAUTION

PRECAUTIONS

FOR USA AND CANADA

FOR USA AND CANADA : Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000004554001

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 “SRS AIRBAG” and “SEAT BELT” of this Service Manual.

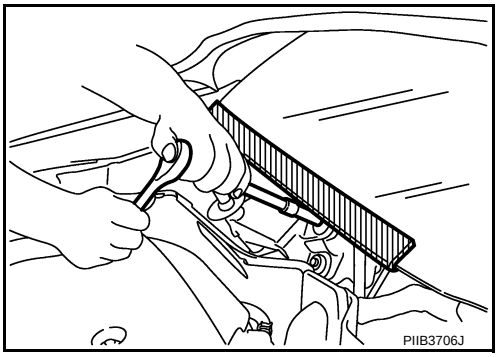
WARNING:

- **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 “SRS AIRBAG”.**
- **Never 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.**

FOR USA AND CANADA : Precaution for Procedure without Cowl Top Cover

INFOID:0000000004554003

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



FOR USA AND CANADA : Precaution for Brake System

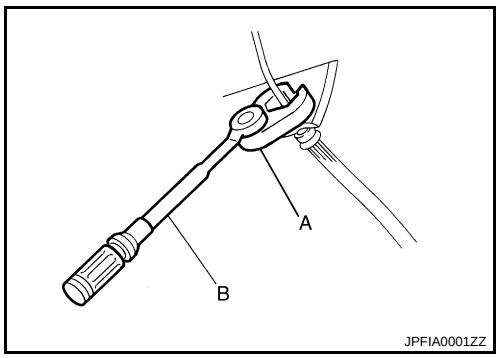
INFOID:0000000004231838

WARNING:

Clean any dust from the front brake and rear brake with a vacuum dust collector. Never blow with compressed air.

- Only use “DOT 3” brake fluid. Refer to MA-17, "FOR NORTH AMERICA : Fluids and Lubricants".
- Never reuse drained brake fluid.
- Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface.
- Never use mineral oils such as gasoline or light oil to clean. They may damage rubber parts and cause improper operation.
- Always loosen the brake tube flare nut with a flare nut wrench.

- Tighten the brake tube flare nut to the specified torque with crowfoot (A) and torque wrench (B).
- Always confirm the specified tightening torque when installing the brake pipes.
- Turn the ignition switch OFF and disconnect the ABS actuator and electric unit (control unit) connector or the battery negative terminal before performing the work.
- Check that no brake fluid leakage is present after replacing the parts.



FOR USA AND CANADA : Precaution for Brake Control

INFOID:0000000004231839

- When starting engine or when starting vehicle just after starting engine, 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 estimate 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.

FOR MEXICO

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

INFOID:0000000004554002

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. Information necessary to service the system safely is included in the “SRS AIRBAG” and “SEAT BELT” of this Service Manual.

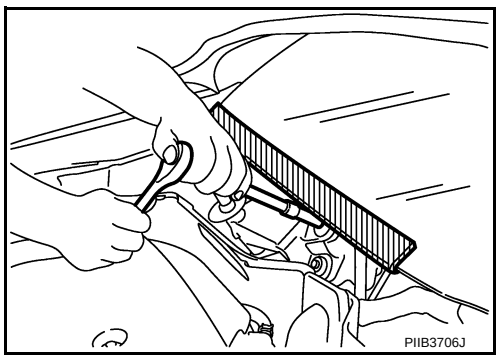
WARNING:

- **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 “SRS AIRBAG”.**
- **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.**

FOR MEXICO : Precaution for Procedure without Cowl Top Cover

INFOID:0000000004554004

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



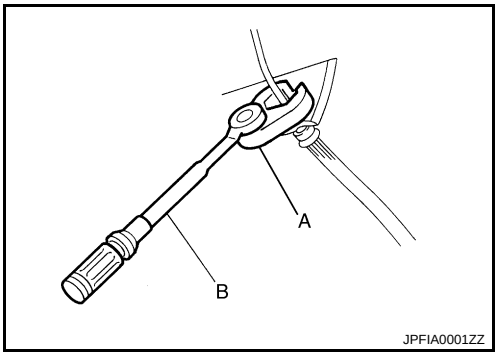
FOR MEXICO : Precaution for Brake System

INFOID:0000000004231842

WARNING:

Clean any dust from the front brake and rear brake with a vacuum dust collector. Never blow with compressed air.

- Only use “DOT 3” brake fluid. Refer to MA-18, "FOR MEXICO : Fluids and Lubricants".
- Never reuse drained brake fluid.
- Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface.
- Never use mineral oils such as gasoline or light oil to clean. They may damage rubber parts and cause improper operation.
- Always loosen the brake tube flare nut with a flare nut wrench.
- Tighten the brake tube flare nut to the specified torque with crowfoot (A) and torque wrench (B).
- Always confirm the specified tightening torque when installing the brake pipes.
- Turn the ignition switch OFF and disconnect the ABS actuator and electric unit (control unit) connector or the battery negative terminal before performing the work.
- Check that no brake fluid leakage is present after replacing the parts.



FOR MEXICO : Precaution for Brake Control

INFOID:0000000004231843

- When starting engine or when starting vehicle just after starting engine, 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 estimate 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.

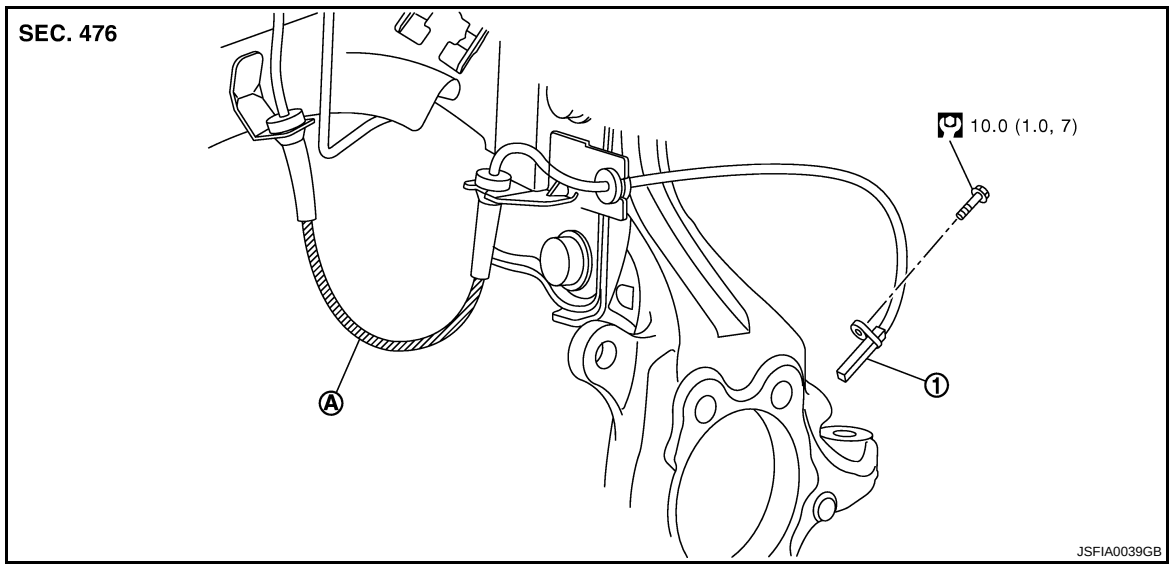
ON-VEHICLE REPAIR

WHEEL SENSOR

FRONT WHEEL SENSOR

FRONT WHEEL SENSOR : Exploded View

INFOID:0000000004231844



1. Front LH wheel sensor

A. Yellow line (slant line)

Refer to GI-4, "Components" for symbol in the figure.

NOTE:
The above figure (front side) shows left side. Right side is the mirror image.

FRONT WHEEL SENSOR : Removal and Installation

INFOID:0000000004231845

REMOVAL

Pay attention to the following when removing sensor.

CAUTION:

- **Never twist sensor harness as much as possible, when removing it. Pull sensors out without pulling sensor harness.**
- **Take care to avoid damaging sensor edges or rotor teeth. Remove wheel sensor first before removing front or rear wheel hub. This is to avoid damage to sensor wiring and loss of sensor function.**
- **When you see the harness of the wheel sensor from the front side of the vehicle ensure that the yellow lines (A) are not twisted.**

INSTALLATION

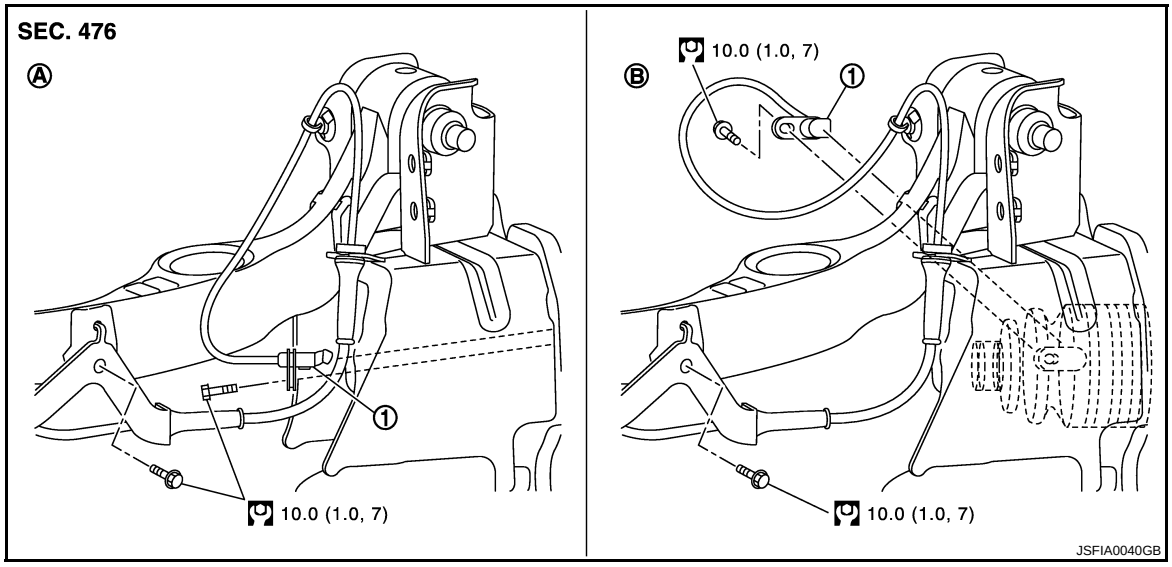
Pay attention to the following when installing wheel sensor. Tighten installation bolts to the specified torques.

- When installing, make sure there is no foreign material such as iron chips on and in the mounting hole of the wheel sensor. Make sure no foreign material has been caught in the sensor rotor. Remove any foreign material and clean the mount.
- When installing wheel sensor, be sure to press rubber grommets in until they lock at locations shown above in the figure. When installed, harness must not be twisted.

REAR WHEEL SENSOR

REAR WHEEL SENSOR : Exploded View

INFOID:0000000004231846



1. Rear LH wheel sensor

A. 2WD models B. AWD models

Refer to GI-4, "Components" for symbol in the figure.

NOTE:
The above figure (front side) shows left side. Right side is the mirror image.

REAR WHEEL SENSOR : Removal and Installation

INFOID:0000000004231847

REMOVAL

Pay attention to the following when removing sensor.

CAUTION:

- **Never twist sensor harness as much as possible, when removing it. Pull sensors out without pulling sensor harness.**
- **Take care to avoid damaging sensor edges or rotor teeth. Remove wheel sensor first before removing front or rear wheel hub. This is to avoid damage to sensor wiring and loss of sensor function.**

INSTALLATION

Pay attention to the following when installing wheel sensor. Tighten installation bolts to the specified torques.

- When installing, make sure there is no foreign material such as iron chips on and in the mounting hole of the wheel sensor. Make sure no foreign material has been caught in the sensor rotor. Remove any foreign material and clean the mount.
- When installing wheel sensor, be sure to press rubber grommets in until they lock at locations shown above in the figure. When installed, harness must not be twisted.

SENSOR ROTOR

FRONT SENSOR ROTOR

FRONT SENSOR ROTOR : Exploded View

INFOID:0000000004231848

Refer to FAX-10, "Exploded View" (2WD models), FAX-34, "Exploded View" (AWD models).

FRONT SENSOR ROTOR : Removal and Installation

INFOID:0000000004231849

REMOVAL

Sensor rotor cannot be disassembled. Remove the sensor rotor together with hub bearing assembly. Refer to FAX-10, "Removal and Installation" (2WD models), FAX-34, "Removal and Installation" (AWD models).

INSTALLATION

Sensor rotor cannot be disassembled. Installation the sensor rotor together with hub bearing assembly. Refer to FAX-10, "Removal and Installation" (2WD models), FAX-34, "Removal and Installation" (AWD models).

REAR SENSOR ROTOR

REAR SENSOR ROTOR : Exploded View

INFOID:0000000004231850

Refer to RAX-5, "Exploded View" (2WD models), RAX-13, "Exploded View" (AWD models).

REAR SENSOR ROTOR : Removal and Installation

INFOID:0000000004231851

2WD MODELS

Removal

Sensor rotor cannot be disassembled. Remove the sensor rotor together with hub bearing assembly. Refer to RAX-5, "Removal and Installation".

Installation

Sensor rotor cannot be disassembled. Installation the sensor rotor together with hub bearing assembly. Refer to RAX-5, "Removal and Installation".

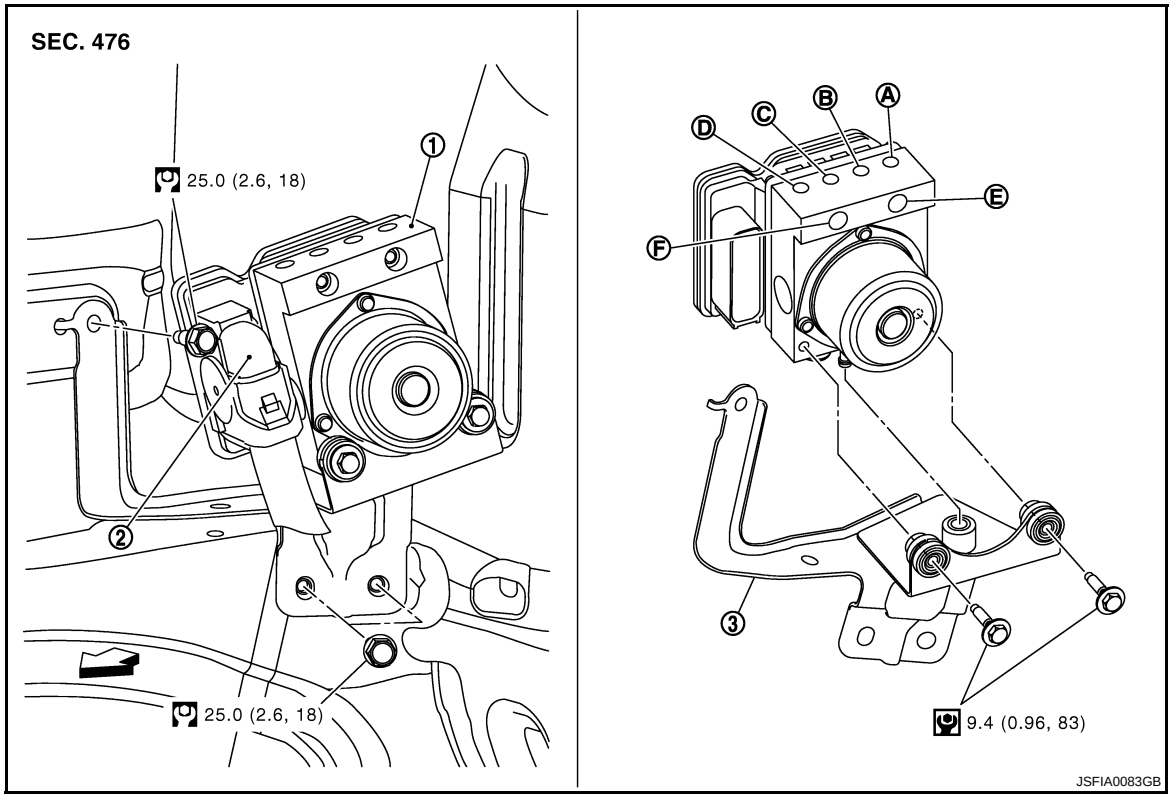
AWD MODELS

For removal and installation of sensor rotor, refer to RAX-16, "Disassembly and Assembly".

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Exploded View

INFOID:0000000004231852



1. ABS actuator and electric unit (control unit)
2. Connector
3. Bracket

A. To front LH brake caliper
B. To rear RH brake caliper
C. To Rear LH brake caliper
D. To front RH brake caliper
E. From master cylinder primary side
F. From master cylinder secondary side

⇦: Vehicle front

Refer to GI-4, "Components" for symbol in the figure.

Removal and Installation

INFOID:0000000004231853

REMOVAL

CAUTION:

- **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 crowfoot and torque wrench.**
- **Never apply excessive impact to ABS actuator and electric unit (control unit), such as dropping it.**
- **Never remove and install actuator by holding harness.**
- **After work is completed, bleed air from brake tube. Refer to BR-13, "Bleeding Brake System".**

1. Remove cowl top. Refer to EXT-20, "Exploded View".
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Loosen brake tube flare nuts, then remove brake tubes from ABS actuator and electric unit (control unit).
4. Remove tire (front LH side).
5. Remove fender protector (rear): (front LH side). Refer to EXT-22, "Exploded View".
6. Remove ABS actuator and electric unit (control unit) bracket mounting nut.
7. Remove ABS actuator and electric unit (control unit) from vehicle.

INSTALLATION

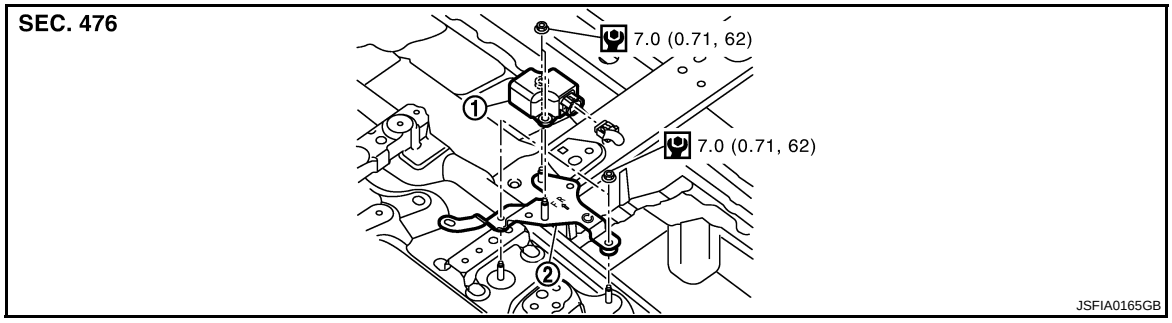
Note the following, and install in the reverse order of removal.

- 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 crowfoot and torque wrench.
- Never apply excessive impact to ABS actuator and electric unit (control unit), such as dropping it.
- Never remove and install actuator by holding harness.
- After work is completed, bleed air from brake tube. Refer to BR-13, "Bleeding Brake System".
- After installing harness connector in the ABS actuator and electric unit (control unit), make sure connector is securely locked.

G SENSOR

Exploded View

INFOID:0000000004231854



1. G sensor
2. Bracket

⇦: Vehicle front

Refer to GI-4, "Components" for symbol in the figure.

Removal and Installation

INFOID:0000000004231855

REMOVAL

CAUTION:

Never drop or strike G sensor, or never use power tool etc., because G sensor is sensitive to the impact.

1. Remove center console assembly. Refer to IP-20, "Exploded View".
2. Disconnect G sensor harness connector.
3. Remove mounting nuts. Remove G sensor.

INSTALLATION

Note the following, and install in the reverse order of removal.

- Never drop or strike G sensor, or never use power tool etc., because G sensor is sensitive to the impact.

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

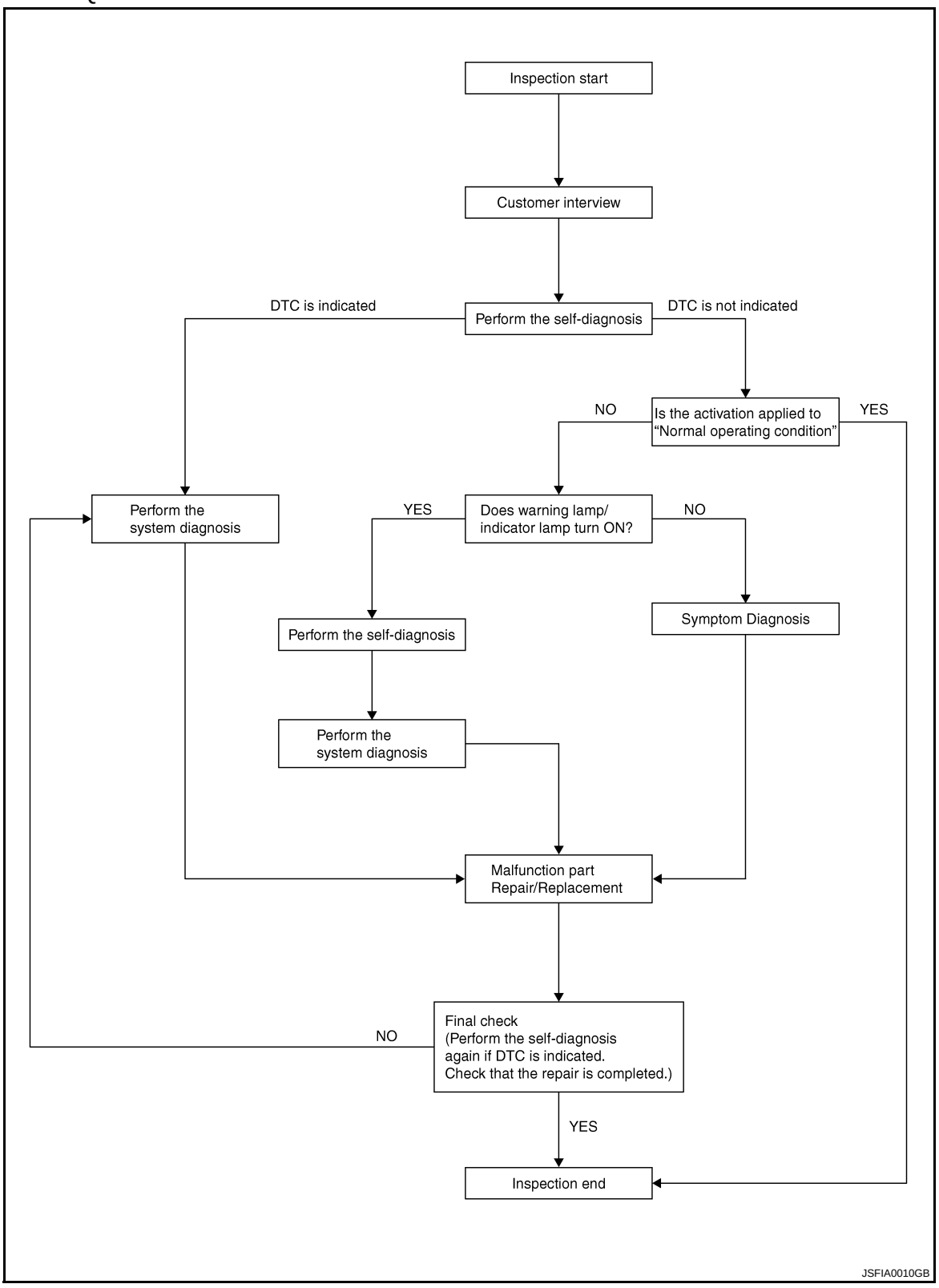
Work Flow

INFOID:0000000004231856

PRECAUTIONS FOR DIAGNOSIS

If steering angle sensor, steering system parts, suspension system parts, ABS actuator and electric unit (control unit) or tires have been replaced, or if wheel alignment has been adjusted, be sure to adjust neutral position of steering angle sensor before driving. Refer to BRC-75, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

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-74, "Diagnostic Work Sheet".

>> GO TO 2.

2.PERFORM THE SELF-DIAGNOSIS

Check the DTC display with the self-diagnosis function. Refer to BRC-93, "CONSULT-III Function".

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-156, "DTC 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-164, "Description".

Is the symptom a normal operation?

YES >> INSPECTION END
NO >> GO TO 5.

5.CHECK THE WARNING LAMP AND INDICATOR LAMP FOR ILLUMINATION

Check that the warning lamp and indicator lamp illuminate.
- ABS warning lamp: Refer to BRC-144, "Description".
- Brake warning lamp: Refer to BRC-145, "Description".
- VDC OFF indicator lamp: Refer to BRC-146, "Description".
- SLIP indicator lamp: Refer to BRC-147, "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 BRC-93, "CONSULT-III Function".

Is no other DTC present and the repair completed?

YES >> INSPECTION END
NO >> GO TO 3.

Diagnostic Work Sheet

INFOID:0000000004231857

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		

SFIA3265E

INSPECTION AND ADJUSTMENT

ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description

INFOID:0000000004231858

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

×: Required –: Not required

Situation	Adjustment of steering angle sensor neutral position
Removing/Installing steering angle sensor	×
Replacing steering angle sensor	×
Removing/Installing steering wheel	×
Replacing steering wheel	×
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:0000000004231859

ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

CAUTION:

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

1. ALIGN THE VEHICLE STATUS

Stop vehicle with front wheels in straight-ahead position.

>> GO TO 2.

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

1. On the CONSULT-III screen, touch "WORK SUPPORT" and "ST ANG SEN ADJUSTMENT" in order.
2. Touch “START”.
   CAUTION:
   Never touch steering wheel while adjusting steering angle sensor.
3. After approximately 10 seconds, touch “END”.
   NOTE:
   After approximately 60 seconds, it ends automatically.
4. Turn ignition switch OFF, then turn it ON again.
   CAUTION:
   Be sure to perform above operation.

>> GO TO 3.

3. CHECK DATA MONITOR

1. Run vehicle with front wheels in straight-ahead position, then stop.
2. Select “DATA MONITOR”. Then make sure “STR ANGLE SIG” is within 0±2.5°.

Is the steering angle within the specified range?

YES >> GO TO 4.

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

4. ERASE THE SELF-DIAGNOSIS MEMORY

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

- ABS actuator and electric unit (control unit): Refer to BRC-93, "CONSULT-III Function".
- ECM
  - For CALIFORNIA: Refer to EC-105, "CONSULT-III Function".
  - For USA (FEDERAL) and CANADA: Refer to EC-576, "CONSULT-III Function".
  - For MEXICO: Refer to EC-1003, "CONSULT-III Function".

Are the memories erased?

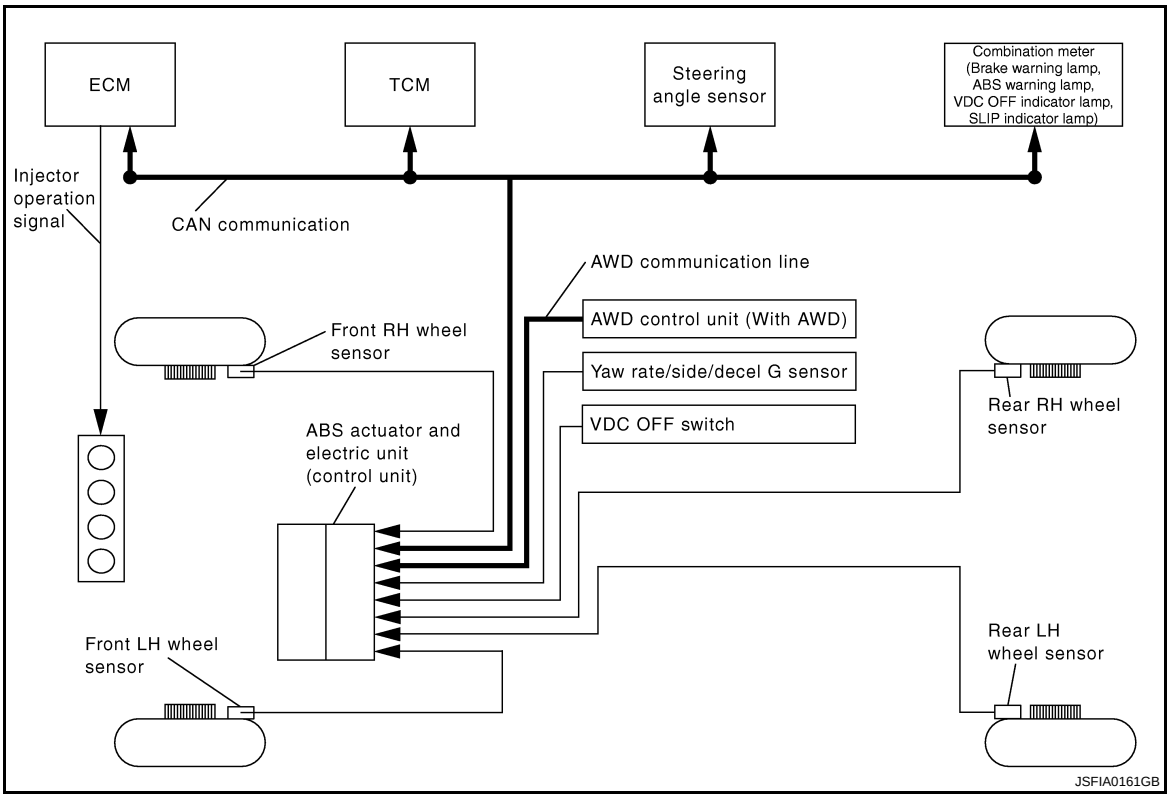
YES >> INSPECTION END
NO >> Check the items indicated by the self-diagnosis.

FUNCTION DIAGNOSIS

VDC

System Diagram

INFOID:0000000004231860



System Description

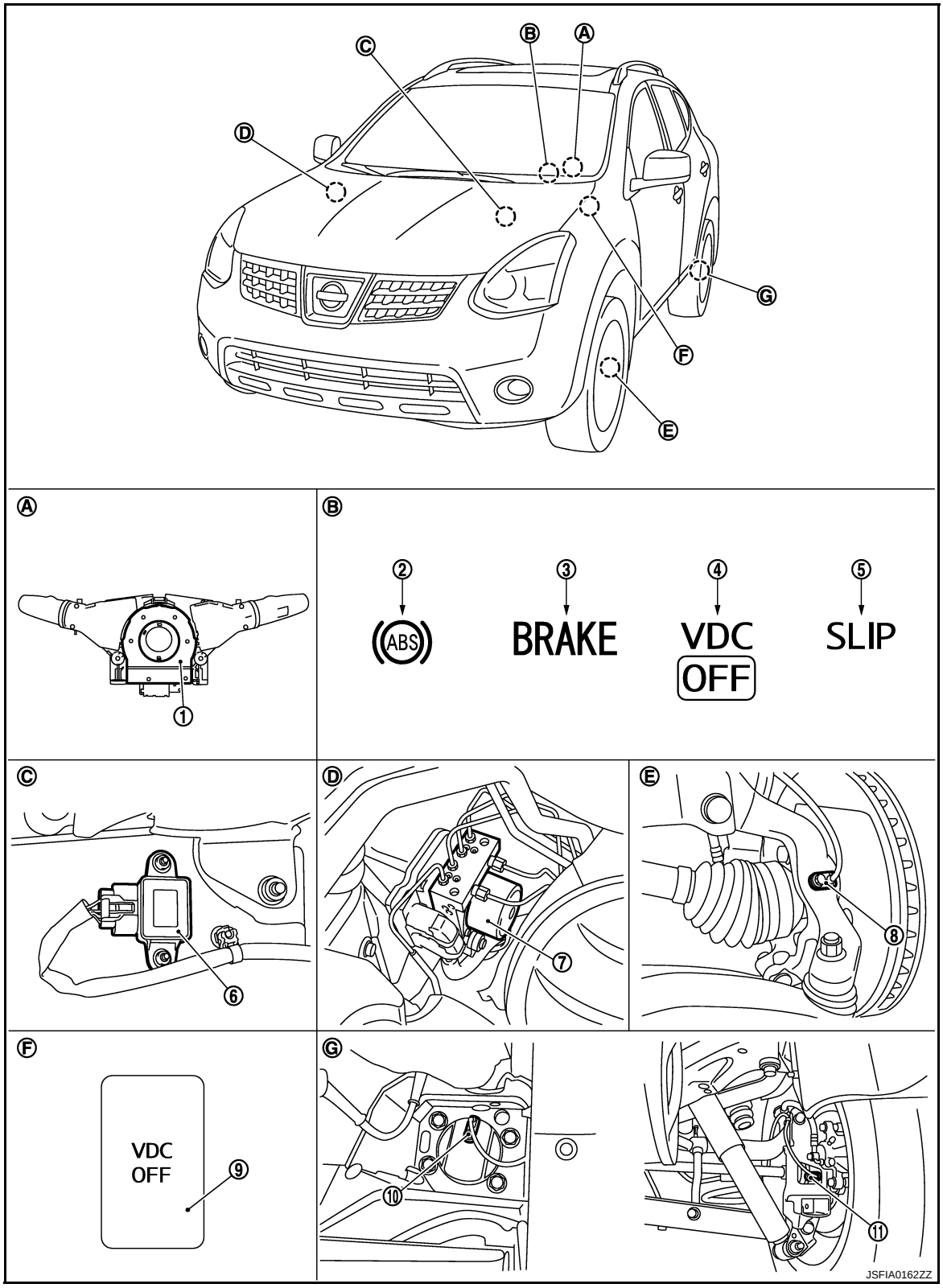
INFOID:0000000004231861

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

Component Parts Location

INFOID:0000000004231862

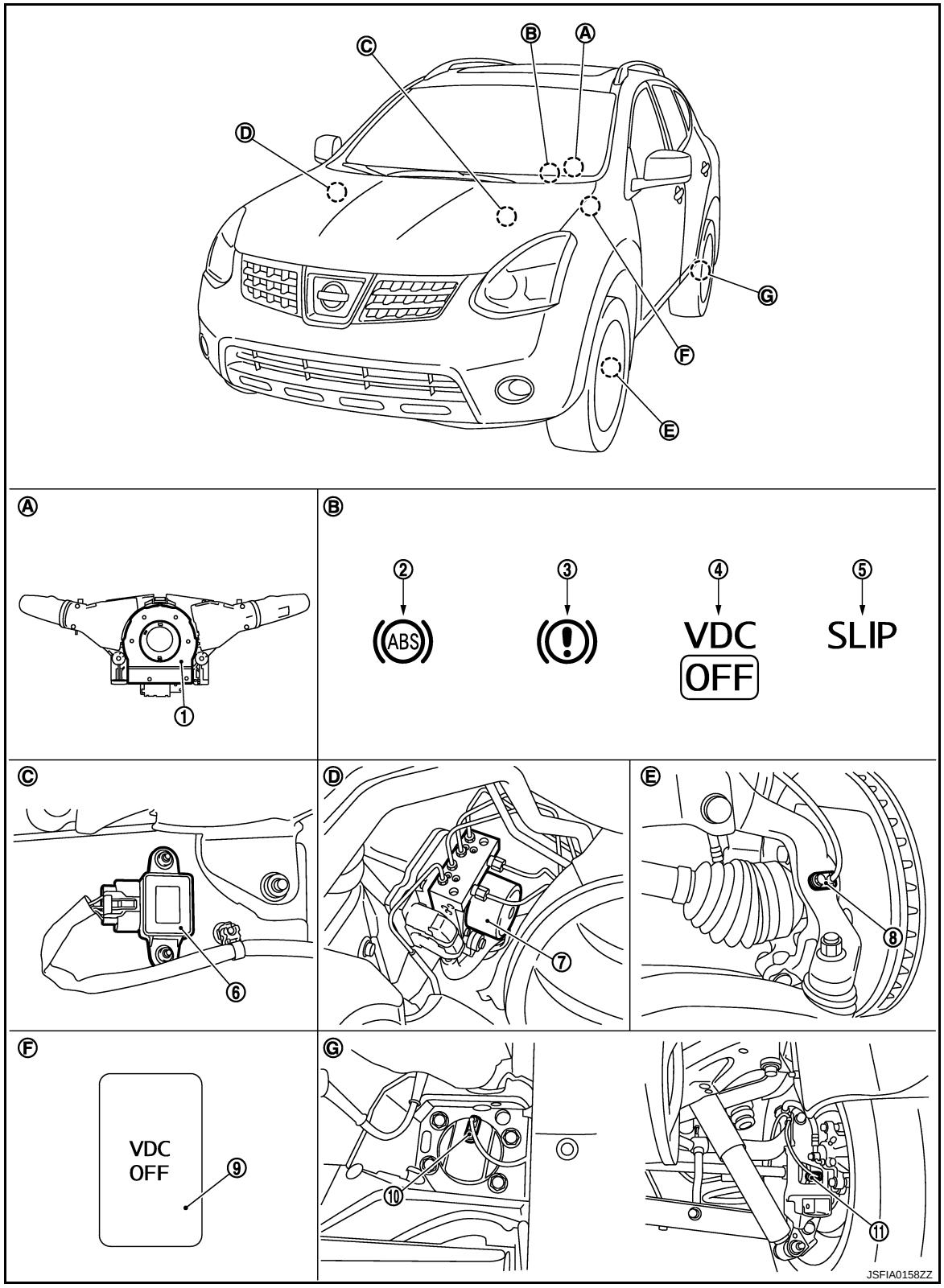
FOR USA



1. Steering angle sensor
2. ABS warning lamp
3. Brake warning lamp
4. VDC OFF indicator lamp
5. SLIP indicator lamp
6. Yaw rate/side/decel G sensor
7. ABS actuator and electric unit (control unit)
8. Front wheel sensor
9. VDC OFF switch
10. Rear wheel sensor (2WD models)
11. Rear wheel sensor (AWD models)

A. Back of spiral cable assembly
B. Combination meter
C. Center console
D. Engine room (right side)
E. Steering knuckle
F. Instrument driver lower panel
G. Rear axle

EXCEPT FOR USA



1. Steering angle sensor
2. ABS warning lamp
3. Brake warning lamp
4. VDC OFF indicator lamp
5. SLIP indicator lamp
6. Yaw rate/side/decel G sensor

7. ABS actuator and electric unit (control unit)
8. Front wheel sensor
9. VDC OFF switch
10. Rear wheel sensor (2WD models)
11. Rear wheel sensor (AWD models)

A. Back of spiral cable assembly
B. Combination meter
C. Center console
D. Engine room (right side)
E. Steering knuckle
F. Instrument driver lower panel
G. Rear axle

Component Description

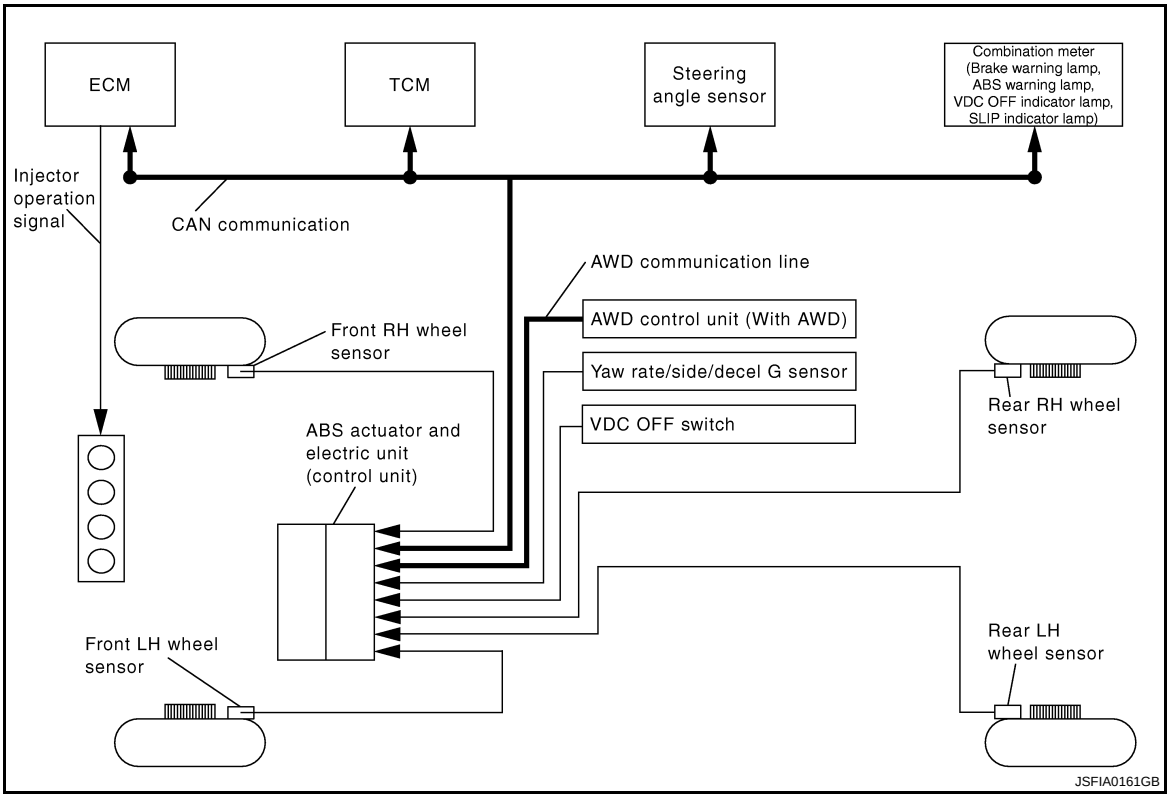
INFOID:0000000004231863

Component parts		Reference
ABS actuator and electric unit (control unit)	Pump	BRC-107, "Description"
	Motor	
	Actuator relay (Main relay)	BRC-125, "Description"
	Solenoid valve	BRC-118, "Description"
	VDC switch-over valve (CV1, CV2)	BRC-132, "Description"
	VDC switch-over valve (SV1, SV2)	BRC-134, "Description"
Wheel sensor		BRC-98, "Description"
Yaw rate/side/decel G sensor		BRC-109, "Description"
Steering angle sensor		BRC-127, "Description"
VDC OFF switch		BRC-142, "Description"
ABS warning lamp		BRC-144, "Description"
Brake warning lamp		BRC-145, "Description"
VDC OFF indicator lamp		BRC-146, "Description"
SLIP indicator lamp		BRC-147, "Description"

TCS

System Diagram

INFOID:0000000004231864



System Description

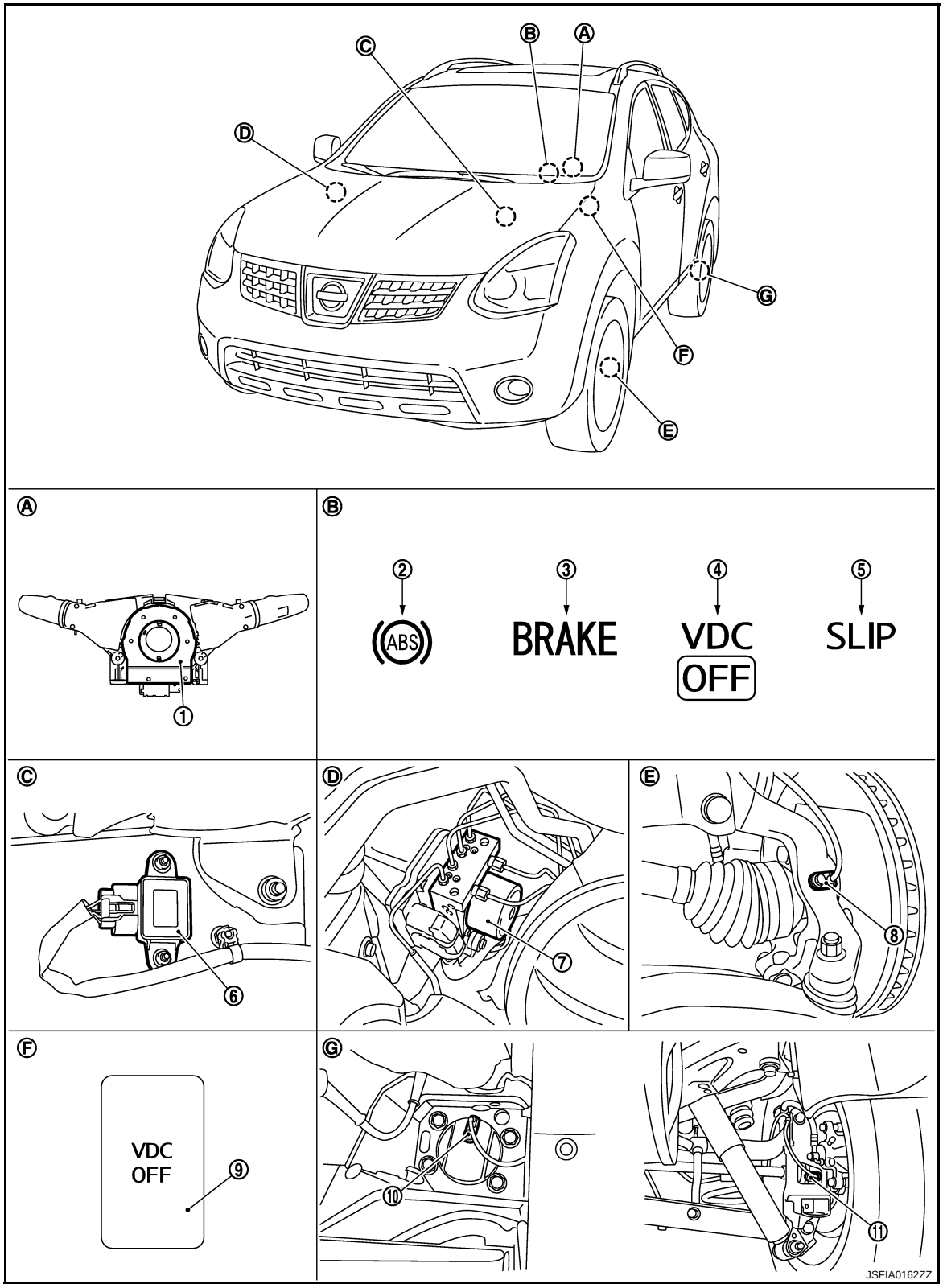
INFOID:0000000004231865

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

Component Parts Location

INFOID:0000000004231866

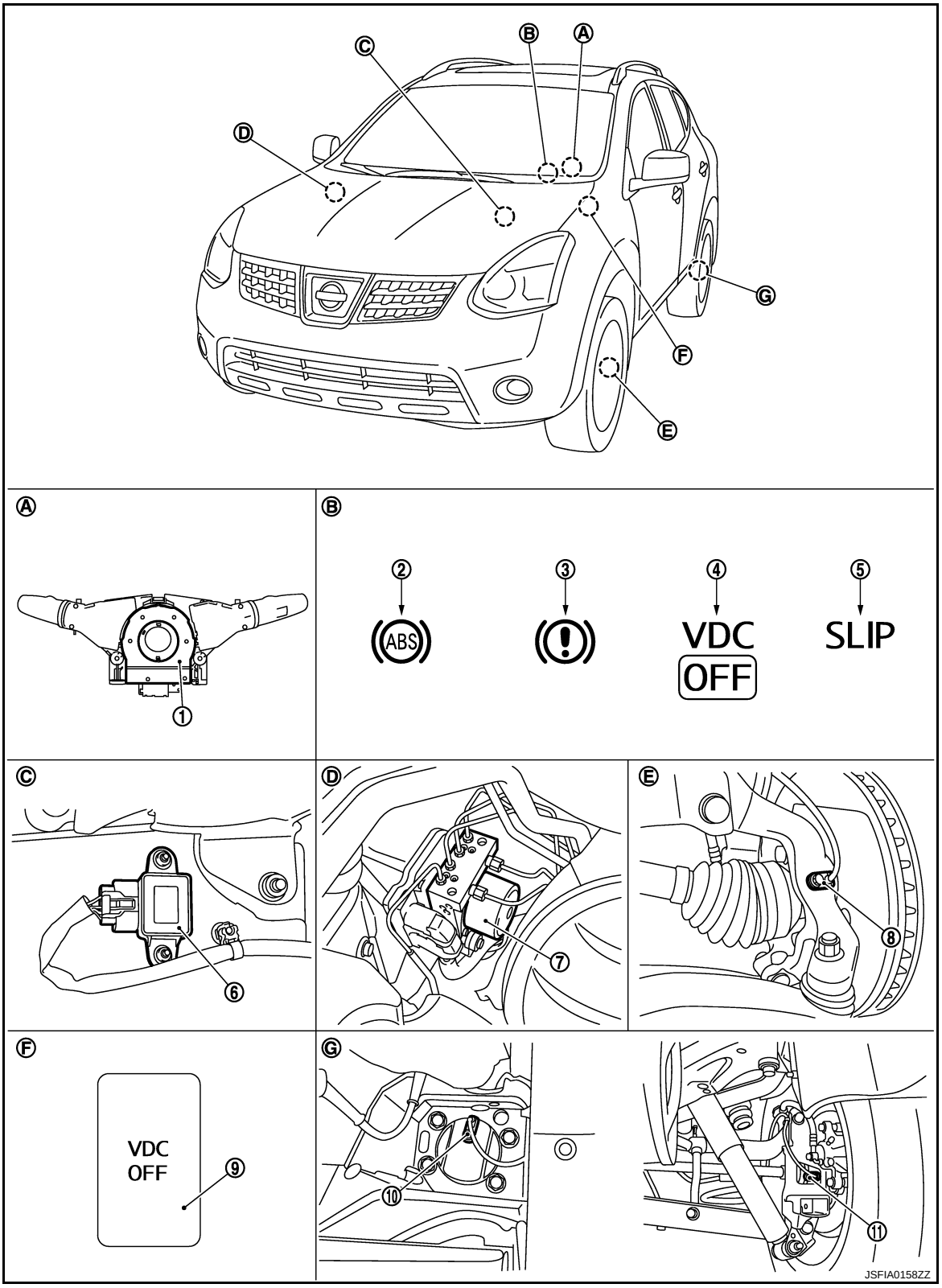
FOR USA



1. Steering angle sensor
2. ABS warning lamp
3. Brake warning lamp
4. VDC OFF indicator lamp
5. SLIP indicator lamp
6. Yaw rate/side/decel G sensor
7. ABS actuator and electric unit (control unit)
8. Front wheel sensor
9. VDC OFF switch
10. Rear wheel sensor (2WD models)
11. Rear wheel sensor (AWD models)

A. Back of spiral cable assembly
B. Combination meter
C. Center console
D. Engine room (right side)
E. Steering knuckle
F. Instrument driver lower panel
G. Rear axle

EXCEPT FOR USA



1. Steering angle sensor
2. ABS warning lamp
3. Brake warning lamp
4. VDC OFF indicator lamp
5. SLIP indicator lamp
6. Yaw rate/side/decel G sensor

7. ABS actuator and electric unit (control unit)
8. Front wheel sensor
9. VDC OFF switch
10. Rear wheel sensor (2WD models)
11. Rear wheel sensor (AWD models)

A. Back of spiral cable assembly
B. Combination meter
C. Center console
D. Engine room (right side)
E. Steering knuckle
F. Instrument driver lower panel
G. Rear axle

Component Description

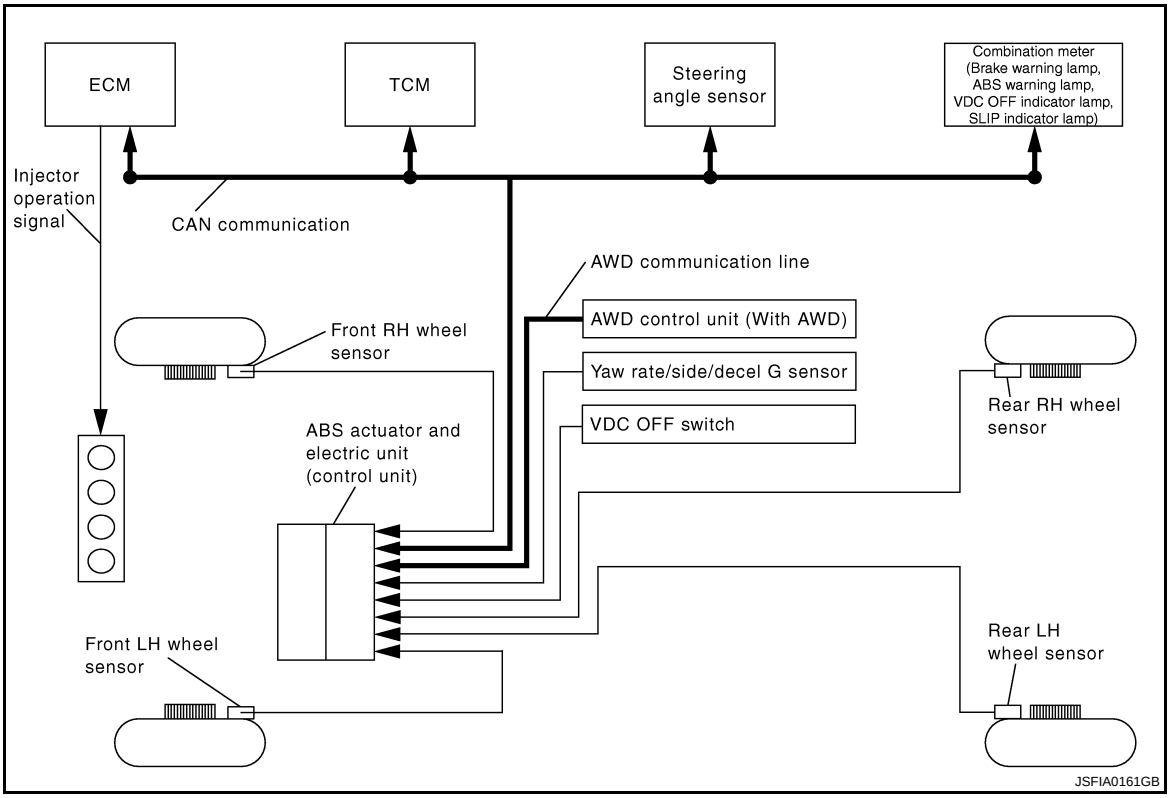
INFOID:0000000004231867

Component parts		Reference
ABS actuator and electric unit (control unit)	Pump	BRC-107, "Description"
	Motor	
	Actuator relay (Main relay)	BRC-125, "Description"
	Solenoid valve	BRC-118, "Description"
	VDC switch-over valve (CV1, CV2)	BRC-132, "Description"
	VDC switch-over valve (SV1, SV2)	BRC-134, "Description"
Wheel sensor		BRC-98, "Description"
Yaw rate/side/decel G sensor		BRC-109, "Description"
Steering angle sensor		BRC-127, "Description"
VDC OFF switch		BRC-142, "Description"
ABS warning lamp		BRC-144, "Description"
Brake warning lamp		BRC-145, "Description"
VDC OFF indicator lamp		BRC-146, "Description"
SLIP indicator lamp		BRC-147, "Description"

ABS

System Diagram

INFOID:0000000004231868



System Description

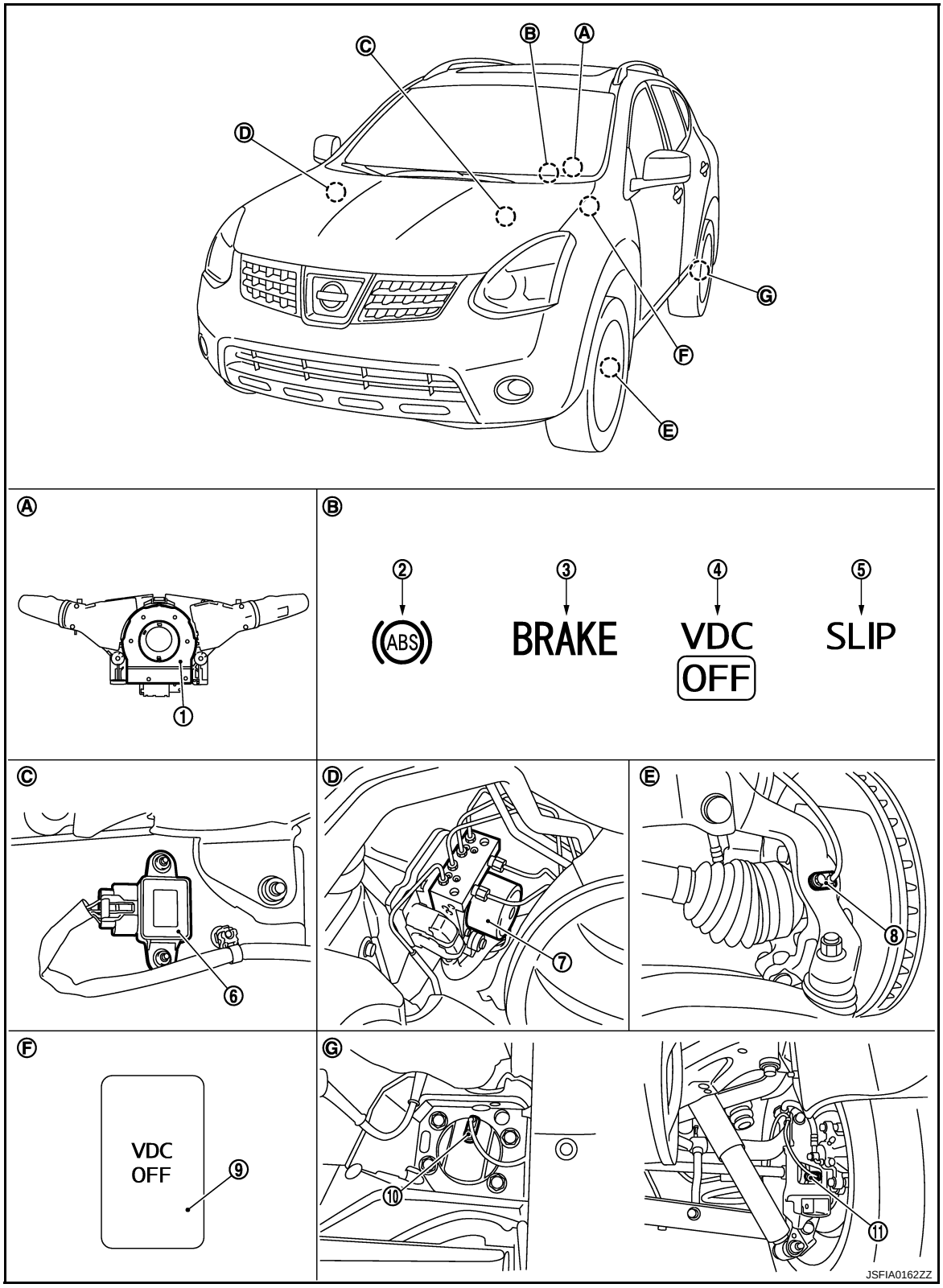
INFOID:0000000004231869

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

Component Parts Location

INFOID:0000000004231870

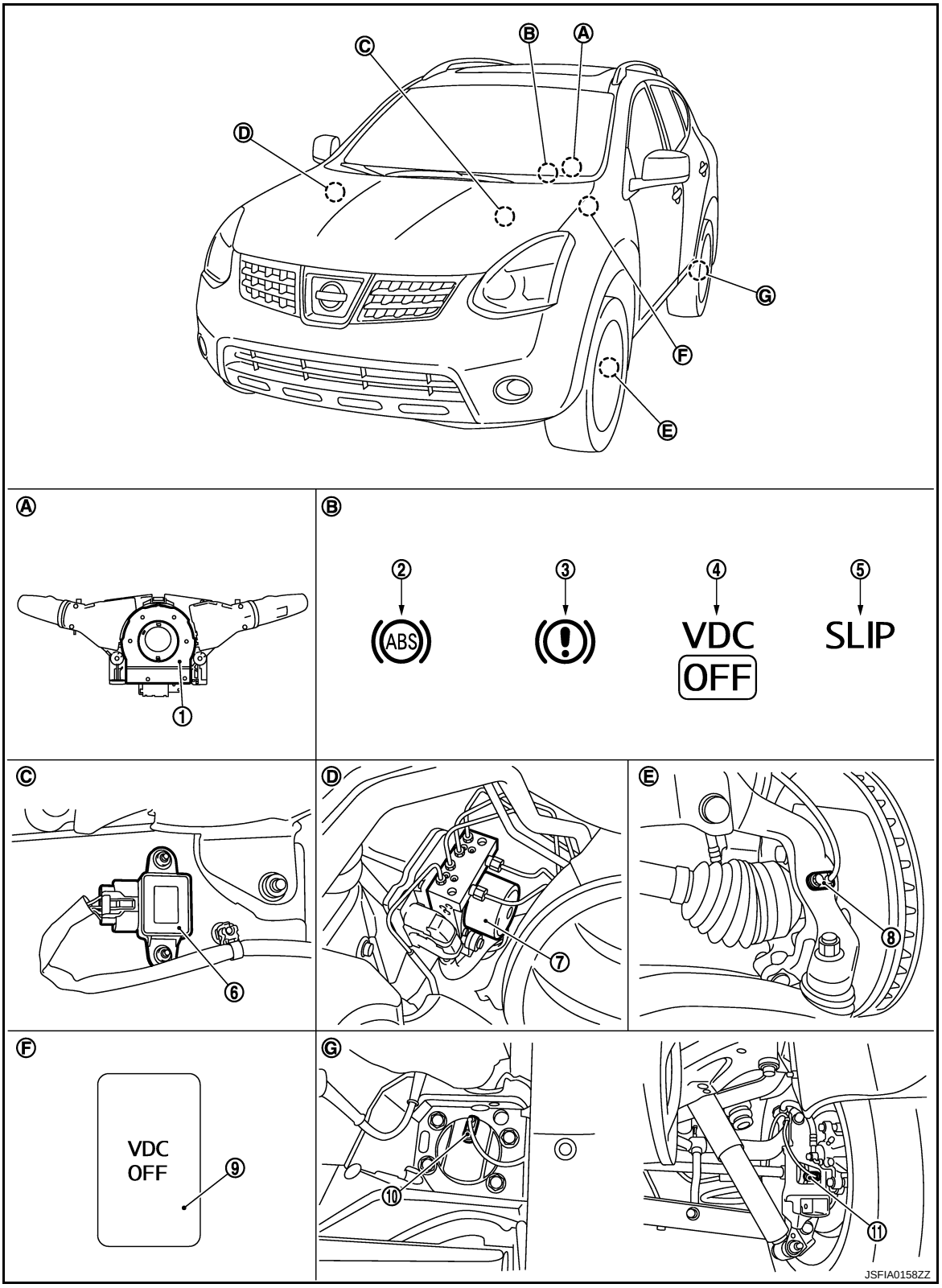
FOR USA



1. Steering angle sensor
2. ABS warning lamp
3. Brake warning lamp
4. VDC OFF indicator lamp
5. SLIP indicator lamp
6. Yaw rate/side/decel G sensor
7. ABS actuator and electric unit (control unit)
8. Front wheel sensor
9. VDC OFF switch
10. Rear wheel sensor (2WD models)
11. Rear wheel sensor (AWD models)

A. Back of spiral cable assembly
B. Combination meter
C. Center console
D. Engine room (right side)
E. Steering knuckle
F. Instrument driver lower panel
G. Rear axle

EXCEPT FOR USA



1. Steering angle sensor
2. ABS warning lamp
3. Brake warning lamp
4. VDC OFF indicator lamp
5. SLIP indicator lamp
6. Yaw rate/side/decel G sensor

7. ABS actuator and electric unit (control unit)
8. Front wheel sensor
9. VDC OFF switch
10. Rear wheel sensor (2WD models)
11. Rear wheel sensor (AWD models)

A. Back of spiral cable assembly
B. Combination meter
C. Center console
D. Engine room (right side)
E. Steering knuckle
F. Instrument driver lower panel
G. Rear axle

Component Description

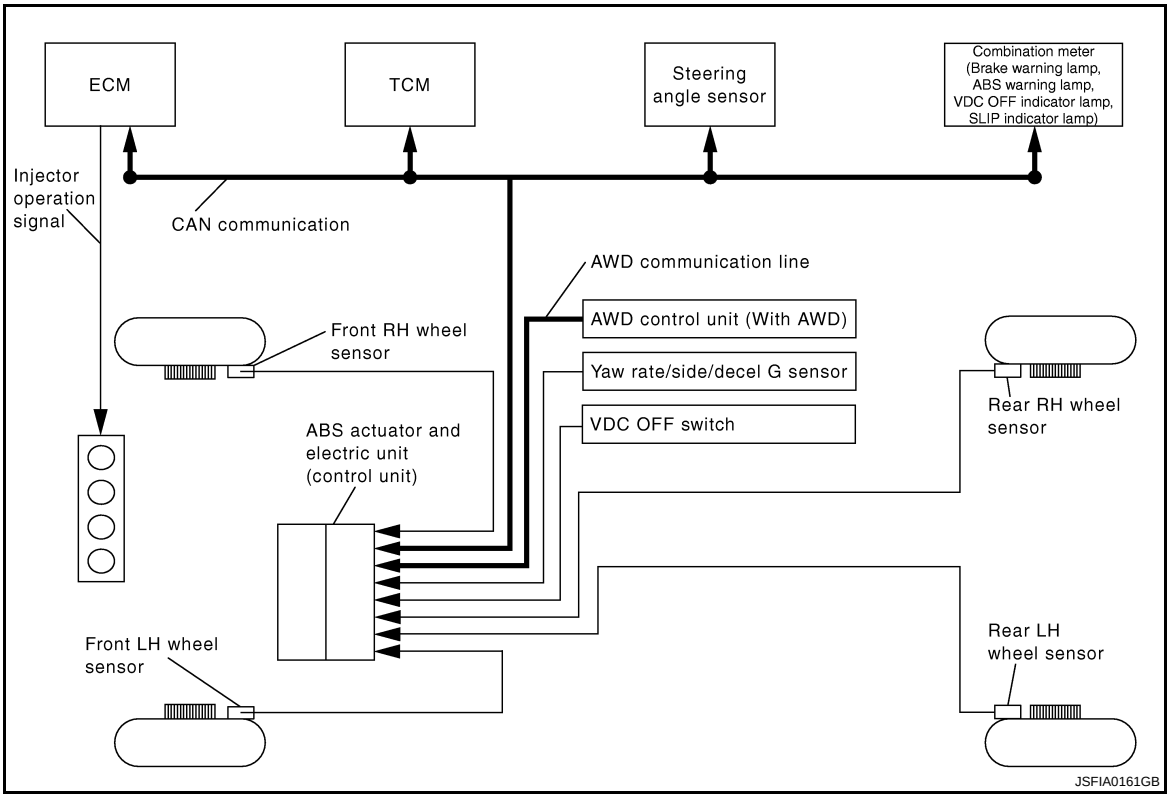
INFOID:0000000004231871

Component parts		Reference
ABS actuator and electric unit (control unit)	Pump	BRC-107, "Description"
	Motor	
	Actuator relay (Main relay)	BRC-125, "Description"
	Solenoid valve	BRC-118, "Description"
	VDC switch-over valve (CV1, CV2)	BRC-132, "Description"
	VDC switch-over valve (SV1, SV2)	BRC-134, "Description"
Wheel sensor		BRC-98, "Description"
Yaw rate/side/decel G sensor		BRC-109, "Description"
Steering angle sensor		BRC-127, "Description"
VDC OFF switch		BRC-142, "Description"
ABS warning lamp		BRC-144, "Description"
Brake warning lamp		BRC-145, "Description"
VDC OFF indicator lamp		BRC-146, "Description"
SLIP indicator lamp		BRC-147, "Description"

EBD

System Diagram

INFOID:0000000004231872



System Description

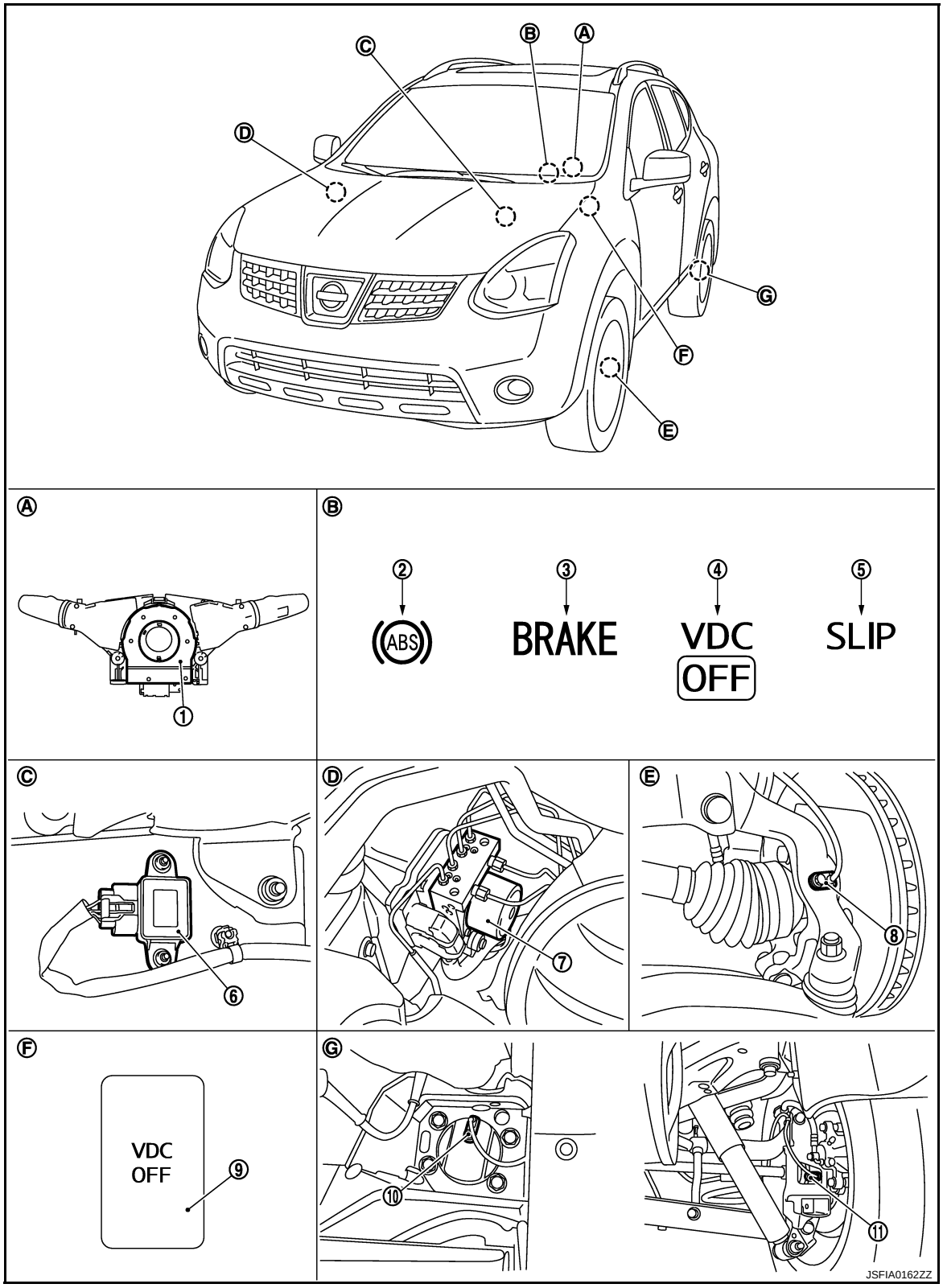
INFOID:0000000004231873

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

Component Parts Location

INFOID:0000000004231874

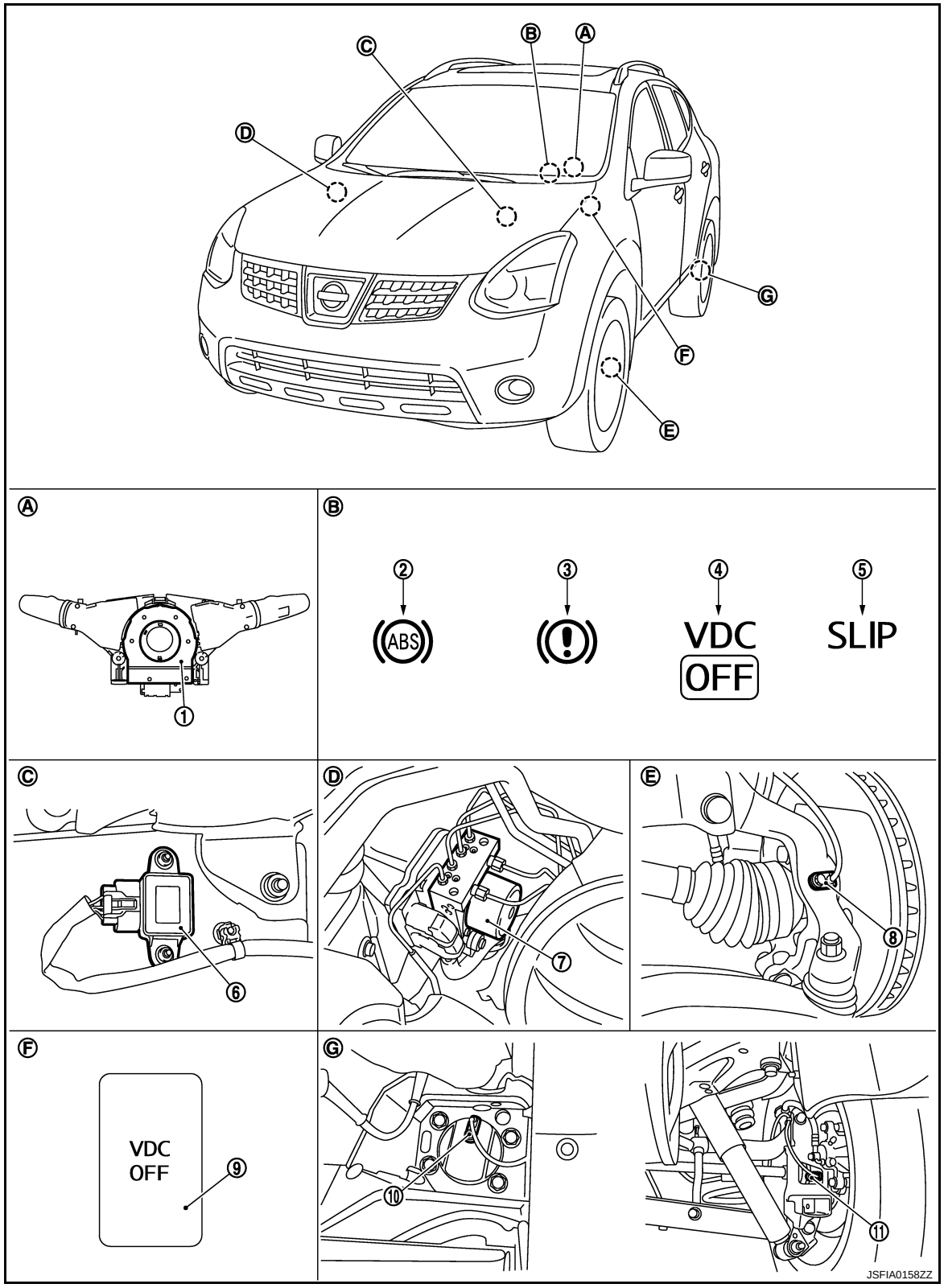
FOR USA



1. Steering angle sensor
2. ABS warning lamp
3. Brake warning lamp
4. VDC OFF indicator lamp
5. SLIP indicator lamp
6. Yaw rate/side/decel G sensor
7. ABS actuator and electric unit (control unit)
8. Front wheel sensor
9. VDC OFF switch
10. Rear wheel sensor (2WD models)
11. Rear wheel sensor (AWD models)

A. Back of spiral cable assembly
B. Combination meter
C. Center console
D. Engine room (right side)
E. Steering knuckle
F. Instrument driver lower panel
G. Rear axle

EXCEPT FOR USA



1. Steering angle sensor
2. ABS warning lamp
3. Brake warning lamp
4. VDC OFF indicator lamp
5. SLIP indicator lamp
6. Yaw rate/side/decel G sensor

7. ABS actuator and electric unit (control unit)
8. Front wheel sensor
9. VDC OFF switch
10. Rear wheel sensor (2WD models)
11. Rear wheel sensor (AWD models)

A. Back of spiral cable assembly
B. Combination meter
C. Center console
D. Engine room (right side)
E. Steering knuckle
F. Instrument driver lower panel
G. Rear axle

Component Description

INFOID:0000000004231875

Component parts		Reference
ABS actuator and electric unit (control unit)	Pump	BRC-107, "Description"
	Motor	
	Actuator relay (Main relay)	BRC-125, "Description"
	Solenoid valve	BRC-118, "Description"
	VDC switch-over valve (CV1, CV2)	BRC-132, "Description"
	VDC switch-over valve (SV1, SV2)	BRC-134, "Description"
Wheel sensor		BRC-98, "Description"
Yaw rate/side/decel G sensor		BRC-109, "Description"
Steering angle sensor		BRC-127, "Description"
VDC OFF switch		BRC-142, "Description"
ABS warning lamp		BRC-144, "Description"
Brake warning lamp		BRC-145, "Description"
VDC OFF indicator lamp		BRC-146, "Description"
SLIP indicator lamp		BRC-147, "Description"

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

CONSULT-III Function

INFOID:0000000004231876

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.

WORK SUPPORT

Item	Description
ST ANG SEN ADJUSTMENT	Adjusts the neutral position of the steering angle sensor.

SELF DIAGNOSTIC RESULT

Operation Procedure

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

How to Erase Self-diagnosis Results

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

CAUTION:

If memory cannot be erased, perform applicable diagnosis.

NOTE:

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

Display Item List

Refer to BRC-156, "DTC Index".

DATA MONITOR MODE

Display Item List

×: Applicable ▼: Optional item

Monitor item (Unit)	SELECT MONITOR ITEM		Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	
FR LH SENSOR [km/h (MPH)]	×	×	Wheel speed
FR RH SENSOR [km/h (MPH)]	×	×	
RR LH SENSOR [km/h (MPH)]	×	×	
RR RH SENSOR [km/h (MPH)]	×	×	
STOP LAMP SW (On/Off)	×	×	Stop lamp switch signal status
BATTERY VOLT (V)	×	×	Battery voltage supplied to the ABS actuator and electric unit (control unit)
GEAR	×	×	Gear position determined by TCM
OFF SW (On/Off)	×	×	VDC OFF switch
YAW RATE SEN (d/s)	×	×	Yaw rate detected by yaw rate/side/decel G sensor
DECEL G-SEN (G)	×	×	Decel G detected by yaw rate/side/decel G sensor
ACCEL POS SIG (%)	×	▼	Throttle actuator opening/closing is displayed (Linked with accelerator pedal)
SIDE G-SENSOR (m/s^2)	×	▼	Transverse G detected by yaw rate/side/decel G sensor
STR ANGLE SIG (°)	×	▼	Steering angle detected by steering angle sensor
ENGINE RPM [tr/min (rpm)]	×	▼	Engine speed
FLUID LEV SW (On/Off)	×	▼	Brake fluid level switch signal status
FR RH IN SOL (On/Off)	▼	×	Operation status of each solenoid valve
FR RH OUT SOL (On/Off)	▼	×	
FR LH IN SOL (On/Off)	▼	×	
FR LH OUT SOL (On/Off)	▼	×	
RR RH IN SOL (On/Off)	▼	×	
RR RH OUT SOL (On/Off)	▼	×	
RR LH IN SOL (On/Off)	▼	×	
RR LH OUT SOL (On/Off)	▼	×	
MOTOR RELAY (On/Off)	▼	×	Motor and motor relay operation
ACTUATOR RLY (On/Off)	▼	×	Actuator relay operation

Monitor item (Unit)	SELECT MONITOR ITEM		Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	
ABS WARN LAMP (On/Off)	▼	×	ABS warning lamp
OFF LAMP (On/Off)	▼	×	VDC OFF indicator lamp
SLIP LAMP (On/Off)	▼	×	SLIP indicator lamp
N POSI SIG (On/Off)	▼	▼	N range status
P POSI SIG (On/Off)	▼	▼	P range status
R POSI SIG (On/Off)	▼	▼	R range status
CRAKING SIG (On/Off)	▼	▼	CAN mask request for cranking
CV1 (On/Off)	▼	▼	Cut valve 1 monitor
CV2 (On/Off)	▼	▼	Cut valve 2 monitor
SV1 (On/Off)	▼	▼	Suction valve 1 monitor
SV2 (On/Off)	▼	▼	Suction valve 2 monitor
STOP LAMP SW2 (On/Off)	▼	▼	ASCD brake switch signal status
EBD SIGNAL (On/Off)	▼	▼	EBD operation
ABS SIGNAL (On/Off)	▼	▼	ABS operation
TCS SIGNAL (On/Off)	▼	▼	TCS operation
VDC SIGNAL (On/Off)	▼	▼	VDC operation
EBD FAIL SIG (On/Off)	▼	▼	EBD fail-safe status
ABS FAIL SIG (On/Off)	▼	▼	ABS fail-safe status
TCS FAIL SIG (On/Off)	▼	▼	TCS fail-safe status
VDC FAIL SIG (On/Off)	▼	▼	VDC fail-safe status
4WD MODE MON (On/Off)	▼	▼	AWD mode monitor

ACTIVE TEST MODE

CAUTION:

- **Never perform active test while driving vehicle.**
- **Make sure to completely bleed air from brake system.**
- **The active test cannot be performed with the ABS warning lamp, VDC OFF indicator lamp, SLIP indicator lamp 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.**
- **Erase memory of ICC system after implementing 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.

Test Item

ABS SOLENOID VALVE
- For ABS solenoid valve, touch “Up”, “Keep” and “Down”. Then use screen monitor to check that solenoid valve operates as shown in the table below.

Test item	Display item	Display		
		Up	Keep	Down
FR RH SOL	FR RH IN SOL	Off	On	On
	FR RH OUT SOL	Off	Off	On*
	CV1	Off	Off	Off
	SV1	Off	Off	Off
FR LH SOL	FR LH IN SOL	Off	On	On
	FR LH OUT SOL	Off	Off	On*
	CV2	Off	Off	Off
	SV2	Off	Off	Off
RR RH SOL	RR RH IN SOL	Off	On	On
	RR RH OUT SOL	Off	Off	On*
	CV2	Off	Off	Off
	SV2	Off	Off	Off
RR LH SOL	RR LH IN SOL	Off	On	On
	RR LH OUT SOL	Off	Off	On*
	CV1	Off	Off	Off
	SV1	Off	Off	Off

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

ABS SOLENOID VALVE (ACT)
- For ABS solenoid valve (ACT), touch “Up”, “ACT UP” and “ACT KEEP”. Then use screen monitor to check that solenoid valve operates as shown in the table below.

Test item	Display item	Display		
		Up	ACT UP	ACT KEEP
FR RH ABS SOLENOID (ACT)	FR RH IN SOL	Off	Off	Off
	FR RH OUT SOL	Off	Off	Off
	CV1	Off	On	On
	SV1	Off	On*	Off
FR LH ABS SOLENOID (ACT)	FR LH IN SOL	Off	Off	Off
	FR LH OUT SOL	Off	Off	Off
	CV2	Off	On	On
	SV2	Off	On*	Off
RR RH ABS SOLENOID (ACT)	RR RH IN SOL	Off	Off	Off
	RR RH OUT SOL	Off	Off	Off
	CV2	Off	On	On
	SV2	Off	On*	Off

Test item	Display item	Display		
		Up	ACT UP	ACT KEEP
RR LH ABS SOLENOID (ACT)	RR LH IN SOL	Off	Off	Off
	RR LH OUT SOL	Off	Off	Off
	CV1	Off	On	On
	SV1	Off	On*	Off

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

ABS MOTOR
- Touch “On” and “Off” on screen. Make sure motor relay and actuator relay operates as shown in table below.

Test item	Display item	Display	
		On	Off
ABS MOTOR	MOTOR RELAY	On	Off
	ACTUATOR RLY	On	On

ECU PART NUMBER

ABS actuator and electric unit (control unit) part number can be read.

COMPONENT DIAGNOSIS

C1101, C1102, C1103, C1104 WHEEL SENSOR-1

Description

INFOID:0000000004231877

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:0000000004231878

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 short circuit. Current signal from sensor is outside limits.	• Harness or connector • Wheel sensor • ABS actuator and electric unit (control unit)
C1102	RR LH SENSOR-1	Circuit of rear LH wheel sensor is open or short circuit. Current signal from sensor is outside limits.	
C1103	FR RH SENSOR-1	Circuit of front RH wheel sensor is open or short circuit. Current signal from sensor is outside limits.	
C1104	FR LH SENSOR-1	Circuit of front LH wheel sensor is open or short circuit. Current signal from sensor is outside limits.	

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-98, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000004231879

CAUTION:
Never check between wheel sensor terminals.

1.CHECK SENSOR AND SENSOR ROTOR

- Check that there is no damage or adherence of foreign matter on the sensor rotor surface.
- Check sensor rotor for damage.
- Check wheel sensor for damage, disconnection or looseness.
- Check that there is no deformation on the wheel sensor mounting surface.

Are the sensor and sensor rotor normal?

YES >> GO TO 2.
NO >> Repair wheel sensor mount or replace sensor rotor. Then perform the self-diagnosis.

2.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect malfunctioning wheel sensor connector.
4. Check terminal to see if it is deformed, disconnected, loose, etc., Repair or replace it if any malfunction condition is found.

5. Reconnect connectors and then perform the self-diagnosis.

Is any item indicated on the self-diagnosis display?

YES >> GO TO 3.
NO >> Poor connection of connector terminal. Repair or replace connector.

3. CHECK WHEEL SENSOR HARNESS

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect malfunctioning wheel sensor connector.
4. 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.)

Measurement terminal for signal circuit

ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
Connector	Terminal	Connector	Terminal	
E36	12	E39 (Front RH)	4	Existed
	27	E22 (Front LH)	2	
	15	B41 (Rear RH)	8	
	30	B44 (Rear LH)	6	

Measurement terminal for power supply circuit

ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
Connector	Terminal	Connector	Terminal	
E36	21	E39 (Front RH)	3	Existed
	23	E22 (Front LH)	1	
	11	B41 (Rear RH)	7	
	26	B44 (Rear LH)	5	

Measurement terminal for ground circuit

ABS actuator and electric unit (control unit)				Continuity
Connector	Terminal	Connector	Terminal	
E36	12, 21	E36	3, 4	Not existed
	27, 23			
	15, 11			
	30, 26			

5. Reconnect ABS actuator and electric unit (control unit) connector.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace malfunctioning components.

4. CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between wheel sensor harness connector power supply terminal and ground.

Wheel sensor		—	Voltage
Connector	Terminal		
E39 (Front RH)	3	Ground	Approx. 8 V or more
E22 (Front LH)	1		
B41 (Rear RH)	7		
B44 (Rear LH)	5		

Is the inspection result normal?

YES >> Replace applicable wheel sensor.
NO >> Replace ABS actuator and electric unit (control unit).

Component Inspection

INFOID:0000000004231880

1.CHECK DATA MONITOR

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

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

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-98, "Diagnosis Procedure".

C1105, C1106, C1107, C1108 WHEEL SENSOR-2

Description

INFOID:0000000004231881

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:0000000004231882

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1105	RR RH SENSOR-2	Signal from rear RH wheel sensor does not match other 3 wheel speed signal.	• Sensor not installed currently • Sensor rotor or encoder damaged • Sensor rotor loose on axle • Electrical interference • Wheel not turning - e.g. vehicle driven on 2WD dyno • Sensor damaged • ABS unit damaged
C1106	RR LH SENSOR-2	Signal from rear LH wheel sensor does not match other 3 wheel speed signal.	
C1107	FR RH SENSOR-2	Signal from front RH wheel sensor does not match other 3 wheel speed signal.	
C1108	FR LH SENSOR-2	Signal from front LH wheel sensor does not match other 3 wheel speed signal.	

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-101, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000004231883

CAUTION:
Never check between wheel sensor terminals.

1.CHECK SENSOR AND SENSOR ROTOR

- Check that there is no damage or adherence of foreign matter on the sensor rotor surface.
- Check sensor rotor for damage.
- Check wheel sensor for damage, disconnection or looseness.
- Check that there is no deformation on the wheel sensor mounting surface.

Are the sensor and sensor rotor normal?

YES >> GO TO 2.
NO >> Repair wheel sensor mount or replace sensor rotor. Then perform the self-diagnosis.

2.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect malfunctioning wheel sensor connector.
4. Check terminal to see if it is deformed, disconnected, loose, etc., Repair or replace it if any malfunction condition is found.
5. Reconnect connectors and then perform the self-diagnosis.

Is any item indicated on the self-diagnosis display?

YES >> GO TO 3.
NO >> Poor connection of connector terminal. Repair or replace connector.

3.CHECK WHEEL SENSOR HARNESS

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect malfunctioning wheel sensor connector.
4. 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.)

Measurement terminal for signal circuit

ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
Connector	Terminal	Connector	Terminal	
E36	12	E39 (Front RH)	4	Existed
	27	E22 (Front LH)	2	
	15	B41 (Rear RH)	8	
	30	B44 (Rear LH)	6	

Measurement terminal for power supply circuit

ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
Connector	Terminal	Connector	Terminal	
E36	21	E39 (Front RH)	3	Existed
	23	E22 (Front LH)	1	
	11	B41 (Rear RH)	7	
	26	B44 (Rear LH)	5	

Measurement terminal for ground circuit

ABS actuator and electric unit (control unit)				Continuity
Connector	Terminal	Connector	Terminal	
E36	12, 21	E36	3, 4	Not existed
	27, 23			
	15, 11			
	30, 26			

5. Reconnect ABS actuator and electric unit (control unit) connector.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace malfunctioning components.

4.CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between wheel sensor harness connector power supply terminal and ground.

Wheel sensor		—	Voltage
Connector	Terminal		
E39 (Front RH)	3	Ground	Approx. 8 V or more
E22 (Front LH)	1		
B41 (Rear RH)	7		
B44 (Rear LH)	5		

Is the inspection result normal?

YES >> Replace applicable wheel sensor.
NO >> Replace ABS actuator and electric unit (control unit).

Component Inspection

INFOID:0000000004231884

1. CHECK DATA MONITOR

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

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

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-101, "Diagnosis Procedure".

C1109 POWER AND GROUND SYSTEM

Description

INFOID:0000000004231885

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

DTC Logic

INFOID:0000000004231886

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 is lower than normal. Power supply is greater than normal limits.	• Harness or connector • ABS unit • Fuse • Vehicle electrical power system

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-104, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000004231887

1.CHECK CONNECTOR

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

Is any item indicated on the self-diagnosis display?

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

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

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

ABS actuator and electric unit (control unit)		—	Condition	Voltage
Connector	Terminal			
E36	16	Ground	Ignition switch: ON	Battery voltage
			Ignition switch: OFF	Approx. 0 V

4. Check 10A fusible link (59).
5. Check continuity between ABS actuator and electric unit (control unit) harness connector and IPDM E/R.

ABS actuator and electric unit (control unit)		IPDM E/R		continuity
Connector	Terminal	Connector	Terminal	
E36	16	E15	59	Existed

6. Reconnect ABS actuator and electric unit (control unit) connector.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace malfunctioning components.

3. ABS POWER SUPPLY CHECK (UNDER LOAD CONDITIONS)

1. Use 12 V lamp (normal rating 10 to 20 W) connected between E36 terminals 16 and 4. With ignition switch ON check bulb illuminates correctly.
2. Check ABS motor supply under loaded condition (connector E36 terminals 1 and 3).

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check both power supply and ground circuit.

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

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E36	3, 4	Ground	Existed

Is the inspection result normal?

YES >> Check battery for terminal looseness, low voltage, etc. it any malfunction is found, repair malfunctioning parts.
NO >> Repair or replace malfunctioning components. (Check ABS earth bolt for tightness and corrosion.)

C1110 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Description

INFOID:0000000004231888

ABS unit is continuously monitoring ECU hardware and software for correct operation.

DTC Logic

INFOID:0000000004231889

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1110	CONTROLLER FAILURE	Possible internal failure of control unit components.	Internal failure of control unit components. ABS solenoid valve or motor power supply / ground abnormal.

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

1. Check both ABS solenoid valve and motor supply and ground circuits using a suitable electrical load.
2. Check wheel speed sensor inputs.
3. 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-106, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000004231890

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 those applicable.

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

C1111 ABS MOTOR, MOTOR RELAY SYSTEM

Description

INFOID:0000000004231891

PUMP

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

MOTOR

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

DTC Logic

INFOID:0000000004231892

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 (control unit)
		During the actuator motor operating with OFF, when the actuator motor turns ON, or when the control line for relay is shorted to ground.	

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-107, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000004231893

1.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check terminal for deformation, disconnect, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect connector and then perform the self-diagnosis.

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2.
NO >> Poor connection of connector terminal. Replace or repair connector.

2.CHECK ABS MOTOR AND MOTOR RELAY POWER SUPPLY CIRCUIT

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E36	1	Ground	Battery voltage

4. Reconnect ABS actuator and electric unit (control unit) connector.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace malfunctioning components.

3. ABS POWER SUPPLY CHECK (UNDER LOAD CONDITION)

Use 12 V lamp (normal rating 10 to 20 W) connected between E36 terminals 2 and 3. With ignition switch ON check bulb illuminates correctly.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check both power supply and ground circuit.

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

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E36	3, 4	Ground	Existed

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace malfunctioning components. (Check ABS each bolt for tightness and corrosion.)

Component Inspection

INFOID:0000000004231894

1. CHECK ACTIVE TEST

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

Test item	Display item	Display	
		On	Off
ABS MOTOR	MOTOR RELAY	On	Off
	ACTUATOR RLY	On	On

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-107, "Diagnosis Procedure".

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

Description

INFOID:0000000004231895

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

DTC Logic

INFOID:0000000004231896

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1113	G SENSOR	Yaw rate/side/decel G sensor is malfunctioning, or signal line of yaw rate/side/decel G sensor is open or shorted.	• Harness or connector • ABS actuator and electric unit (control unit) • Yaw rate/side/decel G sensor • Electrical interference • Vehicle driven on AWD rolling road
C1145	YAW RATE SENSOR		
C1146	SIDE G-SEN CIRCUIT		

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-109, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000004231897

1.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect yaw rate/side/decel G sensor connector.
4. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
5. Reconnect connectors and then perform the self-diagnosis.

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2.
NO >> Poor connection of connector terminal. Replace or repair connector.

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

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect yaw rate/side/decel G sensor connector.
4. Check continuity between yaw rate/side/decel G sensor harness connector terminals and ABS actuator and electric unit (control unit) harness connector terminals.

ABS actuator and electric unit (control unit)		Yaw rate/side/decel G sensor		Continuity
Connector	Terminal	Connector	Terminal	
E36	13	B38	4	Existed
	14		5	
	28		2	
	29		6	

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace malfunctioning components.

3.CHECK YAW RATE/SIDE/DECEL G SENSOR HARNESS CONNECTOR

Check continuity between G sensor harness connector terminal and ground.

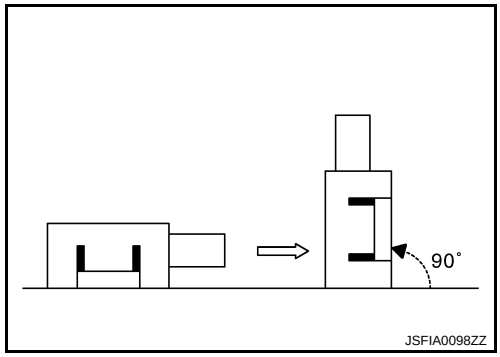
Yaw rate/side/decel G sensor		Continuity
Connector	Terminal	
B38	2 – 4	Not existed
	2 – 5	
	2 – 6	
	4 – 5	
	4 – 6	
	5 – 6	

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace malfunctioning components.

4.CHECK YAW RATE/SIDE/DECEL G SENSOR 1

1. Connect yaw rate/side/decel G sensor connector.
2. Connect ABS actuator and electric unit (control unit) connector.
3. Turn ignition switch ON.
4. Move yaw rate/side/decel G sensor as shown in the figure to check the output of before and after moving the sensor with the CONSULT-III data monitor.



Condition	DATA MONITAOR
Horizontal	Approx. 0 G
Vertical	Approx. +1 G

Is the inspection result normal?

YES >> Replace yaw rate/side/decel G sensor.
NO >> GO TO 5.

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

1. Turn ignition switch OFF.
2. Connect following terminals between yaw rate/side/decel G sensor and connector.

Yaw rate/side/decel G sensor	Harness connector	
	Connector	Terminal
2	B38	2
4		4
5		5
6		6

3. Turn ignition switch ON.
4. Check voltage between yaw rate/side/decel G sensor harness connector terminals.

CAUTION:
Never short out the terminals while measuring voltages.

Yaw rate/side/decel G sensor		Voltage
connector	Terminal	
B38	5 – 2	2.5 – 4.5 V
	6 – 2	0.5 – 2.5 V

Is the inspection result normal?

YES >> Replace ABS actuator end electric unit (control unit). Perform self-diagnosis again.
NO >> Replace yaw rate/side/decel G sensor. Perform self-diagnosis again.

Component Inspection

INFOID:0000000004231898

1. CHECK DATA MONITOR

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

YAW RATE SENSOR

Vehicle condition	DATA MONITOR
Vehicle stopped	Approx. 0 d/s
Vehicle turning	–100 to 100 d/s

SIDE G SENSOR

Vehicle condition	DATA MONITOR
Vehicle stopped	Approx. 0 m/s^2
Vehicle turning right	Negative value
Vehicle turning left	Positive value

DECEL G SENSOR

Vehicle condition	DATA MONITOR
Vehicle stopped	–0.11 to +0.11 G
During acceleration	Negative value
During deceleration	Positive value

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-109, "Diagnosis Procedure".

C1115 WHEEL SENSOR

Description

INFOID:0000000004231899

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:0000000004231900

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1115	ABS SENSOR [ABNORMAL SIGNAL]	Miss-match between the 4 wheel speed sensor signals.	Harness or connector not a possible cause. Other possible causes tire radius (due to wrong size or pressure) interference.

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-112, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000004231901

CAUTION:
Never check between wheel sensor terminals.

1.CHECK TIRES

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.

2.CHECK SENSOR AND SENSOR ROTOR

- Check that there is no damage or adherence of foreign matter on the sensor rotor surface.
- Check that there is no deformation, misalignment, float, and backlash on the wheel sensor and wheel sensor mounting surface.
- Check that the wheel sensor in installed with no misalignment and backlash.

Are the sensor and sensor rotor normal?

YES >> GO TO 3.
NO >> Repair wheel sensor mount or replace sensor rotor. Then perform the self-diagnosis.

3.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect malfunctioning wheel sensor connector.
4. Check terminal to see if it is deformed, disconnected, loose, etc., Repair or replace it if any malfunction condition is found.
5. Reconnect connectors and then perform the self-diagnosis.

Is any item indicated on the self-diagnosis display?

YES >> GO TO 4.
NO >> Poor connection of connector terminal. Repair or replace connector.

4. CHECK WHEEL SENSOR HARNESS

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect malfunctioning wheel sensor connector.
4. 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.)

Measurement terminal for signal circuit

ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
Connector	Terminal	Connector	Terminal	
E36	12	E39 (Front RH)	4	Existed
	27	E22 (Front LH)	2	
	15	B41 (Rear RH)	8	
	30	B44 (Rear LH)	6	

Measurement terminal for power supply circuit

ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
Connector	Terminal	Connector	Terminal	
E36	21	E39 (Front RH)	3	Existed
	23	E22 (Front LH)	1	
	11	B41 (Rear RH)	7	
	26	B44 (Rear LH)	5	

Measurement terminal for ground circuit

ABS actuator and electric unit (control unit)				Continuity
Connector	Terminal	Connector	Terminal	
E36	12, 21	E36	3, 4	Not existed
	27, 23			
	15, 11			
	30, 26			

5. Reconnect ABS actuator and electric unit (control unit) connector.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace malfunctioning components.

5. CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between wheel sensor harness connector power supply terminal and ground.

Wheel sensor		—	Voltage
Connector	Terminal		
E39 (Front RH)	3	Ground	Approx. 8 V or more
E22 (Front LH)	1		
B41 (Rear RH)	7		
B44 (Rear LH)	5		

Is the inspection result normal?

YES >> Replace applicable wheel sensor.
NO >> Replace ABS actuator and electric unit (control unit).

Component Inspection

INFOID:0000000004231902

1. CHECK DATA MONITOR

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

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

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-112, "Diagnosis Procedure".

C1116 STOP LAMP SWITCH

Description

INFOID:0000000004231903

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

DTC Logic

INFOID:0000000004231904

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
STOP LAMP SW

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-115, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000004231905

1.CHECK STOP LAMP ILLUMINATE

Check stop lamps illuminate when brake pedal is pressed.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check stop lamp circuit.

2.CHECK CONNECTOR

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

Is any item indicated in the self-diagnosis display?

YES >> GO TO 3.
NO >> Poor connection of connector terminal. Replace or repair connector.

3.CHECK STOP LAMP SWITCH CIRCUIT

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

ABS actuator and electric unit (control unit)		—	Condition	Voltage
Connector	Terminal			
E36	8	Ground	Brake pedal is depressed	Battery voltage
			Brake pedal is released	Approx. 0 V

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair or replace malfunctioning components.

Component Inspection

INFOID:0000000004231906

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
Terminal		
1 – 2	Release stop lamp switch (When brake pedal is depressed.)	Existed
	Push stop lamp switch (When brake pedal is released.)	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace stop lamp switch. Refer to BR-18, "Exploded View".

C1118 AWD SYSTEM

Description

INFOID:0000000004231907

It transmits the value calculated by AWD control unit to ABS actuator and electric unit (control unit) with AWD communication line (line for AWD system only). ABS actuator and electric unit (control unit) controls AWD solenoid valve according to the received command value.

DTC Logic

INFOID:0000000004231908

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1118	4WD SYSTEM	An error is detected on AWD control unit side. (AWD control unit fail-safe mode)	• Harness or connector • AWD communication line • AWD 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
4WD SYSTEM

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-117, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000004231909

1.CHECK AWD CONTROL UNIT

Perform AWD control unit self-diagnosis.

Is any error system detected?

YES >> Check the error system. Refer to DLN-39, "DTC Index".
NO >> Replace ABS actuator and electric unit (control unit).

C1120, C1122, C1124, C1126 IN ABS SOL

Description

INFOID:0000000004231910

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:0000000004231911

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.	ABS actuator and electric unit (control unit)
C1122	FR RH IN ABS SOL	When the control unit detects a malfunction in the front RH inlet solenoid circuit.	
C1124	RR LH IN ABS SOL	When the control unit detects a malfunction in the rear LH inlet solenoid circuit.	
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-118, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000004231912

1.CHECK SENSOR AND SENSOR ROTOR

- Check that there is no damage or adherence of foreign matter on the sensor rotor surface.
- Check sensor rotor for damage.
- Check wheel sensor for damage, disconnection or looseness.
- Check that there is no deformation on the wheel sensor mounting surface.

Are the sensor and sensor rotor normal?

YES >> GO TO 2.
NO >> Repair wheel sensor mount or replace sensor rotor. Then perform the self-diagnosis.

2.CHECK CONNECTOR

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

Is any item indicated on the self-diagnosis display?

YES >> GO TO 3.
NO >> Poor connection of connector terminal. Replace or repair connector.

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

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E36	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace malfunctioning components.

4.CHECK SOLENOID, VDC SWITCH-OVER VALVE AND ACTUATOR RELAY GROUND CIRCUIT

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E36	3, 4	Ground	Existed

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace malfunctioning components.

Component Inspection

INFOID:0000000004231913

1.CHECK ACTIVE TEST

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

Test item	Display item	Display		
		Up	Keep	Down
FR RH SOL	FR RH IN SOL	Off	On	On
	FR RH OUT SOL	Off	Off	On*
	CV1	Off	Off	Off
	SV1	Off	Off	Off
FR LH SOL	FR LH IN SOL	Off	On	On
	FR LH OUT SOL	Off	Off	On*
	CV2	Off	Off	Off
	SV2	Off	Off	Off
RR RH SOL	RR RH IN SOL	Off	On	On
	RR RH OUT SOL	Off	Off	On*
	CV2	Off	Off	Off
	SV2	Off	Off	Off
RR LH SOL	RR LH IN SOL	Off	On	On
	RR LH OUT SOL	Off	Off	On*
	CV1	Off	Off	Off
	SV1	Off	Off	Off

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

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-118, "Diagnosis Procedure".

C1121, C1123, C1125, C1127 OUT ABS SOL

Description

INFOID:0000000004231914

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:0000000004231915

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.	ABS actuator and electric unit (control unit)
C1123	FR RH OUT ABS SOL	When the control unit detects a malfunction in the front RH outlet solenoid circuit.	
C1125	RR LH OUT ABS SOL	When the control unit detects a malfunction in the rear LH outlet solenoid circuit.	
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-121, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000004231916

1.CHECK SENSOR AND SENSOR ROTOR

- Check that there is no damage or adherence of foreign matter on the sensor rotor surface.
- Check sensor rotor for damage.
- Check wheel sensor for damage, disconnection or looseness.
- Check that there is no deformation on the wheel sensor mounting surface.

Are the sensor and sensor rotor normal?

YES >> GO TO 2.
NO >> Repair wheel sensor mount or replace sensor rotor. Then perform the self-diagnosis.

2.CHECK CONNECTOR

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

Is any item indicated on the self-diagnosis display?

YES >> GO TO 3.
NO >> Poor connection of connector terminal. Replace or repair connector.

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

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E36	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace malfunctioning components.

4.CHECK SOLENOID, VDC SWITCH-OVER VALVE AND ACTUATOR RELAY GROUND CIRCUIT

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E36	3, 4	Ground	Existed

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace malfunctioning components.

Component Inspection

INFOID:0000000004231917

1.CHECK ACTIVE TEST

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

Test item	Display item	Display		
		Up	Keep	Down
FR RH SOL	FR RH IN SOL	Off	On	On
	FR RH OUT SOL	Off	Off	On*
	CV1	Off	Off	Off
	SV1	Off	Off	Off
FR LH SOL	FR LH IN SOL	Off	On	On
	FR LH OUT SOL	Off	Off	On*
	CV2	Off	Off	Off
	SV2	Off	Off	Off
RR RH SOL	RR RH IN SOL	Off	On	On
	RR RH OUT SOL	Off	Off	On*
	CV2	Off	Off	Off
	SV2	Off	Off	Off
RR LH SOL	RR LH IN SOL	Off	On	On
	RR LH OUT SOL	Off	Off	On*
	CV1	Off	Off	Off
	SV1	Off	Off	Off

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

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-121, "Diagnosis Procedure".

C1130 ENGINE SIGNAL

Description

INFOID:0000000004231918

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

DTC Logic

INFOID:0000000004231919

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1130	ENGINE SIGNAL 1	ECM signals are invalid or ECM self diagnosis indicates a fault that prevents correct TCS operation.	• Harness or connector • ABS actuator and electric unit (control unit) • ECM • CAN communication line

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
ENGINE SIGNAL 1

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-124, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000004231920

1.CHECK ENGINE SYSTEM

1. Perform ECM self-diagnosis. Repair or replace items indicated, then perform ECM self-diagnosis again.
2. Perform ABS actuator and electric unit (control unit) self-diagnosis.

Is any item indicated on the self-diagnosis display?

YES >> Repair or replace the affected part.
NO >> INSPECTION END

C1140 ACTUATOR RELAY SYSTEM

Description

INFOID:0000000004231921

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

DTC Logic

INFOID:0000000004231922

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1140	ACTUATOR RLY	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 (control unit)
		During the actuator relay operating with ON, when the actuator relay turns ON, or when the control line for the relay is open.	

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
ACTUATOR RLY

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-125, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000004231923

1.CHECK CONNECTOR

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

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2.
NO >> Poor connection of connector terminal. Replace or repair connector.

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

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E36	2	Ground	Battery voltage

4. Reconnect ABS actuator and electric unit (control unit) connector.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace malfunctioning components.

3.ABS POWER SUPPLY CHECK (UNDER LOAD CONDITION)

Use 12 V lamp (normal rating 10 to 20 W) connected between E36 terminals 1 and 3. With ignition switch ON check bulb illuminates correctly.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check both power supply and ground circuit.

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

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E36	3, 4	Ground	Existed

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace malfunctioning components. (Check ABS each bolt for tightness and corrosion.)

Component Inspection

INFOID:0000000004231924

1.CHECK ACTIVE TEST

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

Test item	Display item	Display	
		On	Off
ABS MOTOR	MOTOR RELAY	On	Off
	ACTUATOR RLY	On	On

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-107, "Diagnosis Procedure".

C1143, C1144 STEERING ANGLE SENSOR

Description

INFOID:0000000004231925

The steering angle sensor detects the rotation amount, angular velocity and direction of the steering wheel, and transmits the data to the ABS actuator and electric unit (control unit) via CAN communication.

DTC Logic

INFOID:0000000004231926

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 • ABS actuator and electric unit (control unit)
C1144	ST ANG SEN SIGNAL	Neutral position of steering angle sensor is not finished.	

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-127, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000004231927

1.CHECK VEHICLE STATE

Check vehicle for any suspension/steering misalignment or damage.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Correct any damage found.

2.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect steering angle sensor connector.
4. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
5. Reconnect connectors and then perform the self-diagnosis.

Is any item indicated on the self-diagnosis display?

YES >> GO TO 3.
NO >> Poor connection of connector terminal. Replace or repair connector.

3.CHECK STEERING ANGLE SENSOR HARNESS

1. Turn ignition switch OFF.
2. Disconnect steering angle sensor connector.
3. Check continuity between steering angle sensor harness connector terminal and ground.

Steering angle sensor		—	Continuity
Connector	Terminal		
M30	3	Ground	Existed

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

Steering angle sensor		—	Voltage
Connector	Terminal		
M30	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace malfunctioning components.

4.CHECK DATA MONITOR

1. Connect the steering angle sensor connector and ABS actuator and electric unit (control unit) connector.
2. Select “STR ANGLE SIG” in “DATA MONITOR” and check steering angle sensor signal.

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

Is the inspection result normal?

YES >> GO TO 5.
NO >> Adjust neutral position of steering angle sensor.

5.CHECK FOR BACKLASH

1. Check for backlash [turn wheel to left then straight then right then straight (approx. 90°)].
2. Check straight position is always similar value.

Is there noticeable backlash?

YES >> Check sensor is correctly fitted to combination switch.
NO >> Check sensor output is correct from lock to lock.

Component Inspection

INFOID:0000000004231928

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 BRC-127, "Diagnosis Procedure".

Special Repair Requirement

INFOID:0000000004231929

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the “ST ANG SEN ADJUSTMENT” in “WORK SUPPORT”, when replacing the steering angle sensor.

>> END

C1155 BRAKE FLUID LEVEL SWITCH

Description

INFOID:0000000004231930

Brake fluid level switch contacts close when brake fluid level is low. This is detected by the combination meter which sends the status of fluid level to the VDC unit via the CAN bus.

DTC Logic

INFOID:0000000004231931

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1155	BR FLUID LEVEL LOW	Ignition switch ON and brake fluid signal low or not available for 10 seconds.	• Brake fluid level low • Brake fluid level switch failure • Wiring to brake fluid level switch short circuit • CAN bus failure • Combination meter failure

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-129, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000004231932

1.CHECK BRAKE FLUID LEVEL

Check the brake fluid level.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Investigate and fix.

2.CHECK BRAKE WARNING LAMP 1

Check that the brake warning lamp illuminates after the ignition switch is turned ON.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check wiring to brake fluid level sensor and brake fluid level sensor.

3.CHECK BRAKE WARNING LAMP 2

Check that the brake warning lamp in the combination meter turns ON/OFF correctly when operating the parking brake.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check parking brake switch.

4.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect brake fluid level switch connector and combination meter connector.
3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect connectors and then perform the self-diagnosis.

Is any item indicated on the self-diagnosis display?

YES >> GO TO 5.
NO >> Poor connection of connector terminal. Replace or repair connector.

5.CHECK BRAKE FLUID LEVEL SWITCH

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

Brake fluid level switch		Condition	Continuity
Connector	Terminal		
E37	1 – 2	When brake fluid is full in the reservoir tank.	Not existed
		When brake fluid is empty in the reservoir tank.	Existed

Is the inspection result normal?

YES >> GO TO 6.
NO >> Brake fluid level switch is malfunction. Replace reservoir tank.

6.CHECK BRAKE FLUID LEVEL SWITCH CIRCUIT

1. Disconnect combination meter connector.
2. Check continuity between brake fluid level switch harness connector terminals and combination meter harness connector terminal and/or ground.

Combination meter		Brake fluid level switch		Continuity
Connector	Terminal	Connector	Terminal	
M34	27	E37	1	Existed

Combination meter		—	Continuity
Connector	Terminal		
M34	27	Ground	Not existed

Brake fluid level switch		—	Continuity
Connector	Terminal		
E37	2	Ground	Existed

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace malfunctioning components.

Component Inspection

INFOID:0000000004231933

1.CHECK BRAKE FLUID LEVEL SWITCH

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

Brake fluid level switch		Condition	Continuity
Connector	Terminal		
E37	1 – 2	When brake fluid is full in the reservoir tank.	Not existed
		When brake fluid is empty in the reservoir tank.	Existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-129, "Diagnosis Procedure".

C1164, C1165 CV SYSTEM

Description

INFOID:0000000004231934

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

DTC Logic

INFOID:0000000004231935

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1164	CV1	VDC switch-over solenoid valve (CV1) on the primary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground.	• Harness or connector • ABS actuator and electric unit (control unit)
C1165	CV2	VDC switch-over solenoid valve (CV2) on the secondary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground.	

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
CV1
CV2

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-132, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000004231936

1.CHECK CONNECTOR

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

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2.
NO >> Poor connection of connector terminal. Replace or repair connector.

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

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E36	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace malfunctioning components.

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

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E36	3, 4	Ground	Existed

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace malfunctioning components.

Component Inspection

INFOID:0000000004231937

1. CHECK ACTIVE TEST

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

Test item	Display item	Display		
		Up	ACT UP	ACT KEEP
FR RH ABS SOLENOID (ACT)	FR RH IN SOL	Off	Off	Off
	FR RH OUT SOL	Off	Off	Off
	CV1	Off	On	On
	SV1	Off	On*	Off
FR LH ABS SOLENOID (ACT)	FR LH IN SOL	Off	Off	Off
	FR LH OUT SOL	Off	Off	Off
	CV2	Off	On	On
	SV2	Off	On*	Off
RR RH ABS SOLENOID (ACT)	RR RH IN SOL	Off	Off	Off
	RR RH OUT SOL	Off	Off	Off
	CV2	Off	On	On
	SV2	Off	On*	Off
RR LH ABS SOLENOID (ACT)	RR LH IN SOL	Off	Off	Off
	RR LH OUT SOL	Off	Off	Off
	CV1	Off	On	On
	SV1	Off	On*	Off

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

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-132, "Diagnosis Procedure".

C1166, C1167 SV SYSTEM

Description

INFOID:0000000004231938

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

DTC Logic

INFOID:0000000004231939

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1166	SV1	VDC switch-over solenoid valve (SV1) on the primary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground.	• Harness or connector • ABS actuator and electric unit (control unit)
C1167	SV2	VDC switch-over solenoid valve (SV2) on the secondary 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
SV1
SV2

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-134, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000004231940

1.CHECK CONNECTOR

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

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2.
NO >> Poor connection of connector terminal. Replace or repair connector.

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

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E36	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace malfunctioning components.

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

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E36	3, 4	Ground	Existed

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace malfunctioning components.

Component Inspection

INFOID:0000000004231941

1. CHECK ACTIVE TEST

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

Test item	Display item	Display		
		Up	ACT UP	ACT KEEP
FR RH ABS SOLENOID (ACT)	FR RH IN SOL	Off	Off	Off
	FR RH OUT SOL	Off	Off	Off
	CV1	Off	On	On
	SV1	Off	On*	Off
FR LH ABS SOLENOID (ACT)	FR LH IN SOL	Off	Off	Off
	FR LH OUT SOL	Off	Off	Off
	CV2	Off	On	On
	SV2	Off	On*	Off
RR RH ABS SOLENOID (ACT)	RR RH IN SOL	Off	Off	Off
	RR RH OUT SOL	Off	Off	Off
	CV2	Off	On	On
	SV2	Off	On*	Off
RR LH ABS SOLENOID (ACT)	RR LH IN SOL	Off	Off	Off
	RR LH OUT SOL	Off	Off	Off
	CV1	Off	On	On
	SV1	Off	On*	Off

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

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-134, "Diagnosis Procedure".

C1176 STOP LAMP SW2

Description

INFOID:0000000004231942

When the brake pedal is depressed, ASCD brake switch is turned OFF and stop lamp switch is turned ON.

DTC Logic

INFOID:0000000004231943

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1176	STOP LAMP SW2	When ASCD brake switch circuit is open.	• Harness or connector • ASCD brake 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 SW2

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-136, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000004231944

1.CHECK CONNECTOR

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

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2.
NO >> Poor connection of connector terminal. Replace or repair connector.

2.CHECK ASCD BRAKE SWITCH

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch connector.
3. Check continuity between ASCD brake switch connector terminals.

ASCD brake switch Terminal	Condition	Continuity
1 – 2	Brake pedal is fully released.	Existed
	Brake pedal is slightly depressed.	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Replace ASCD brake switch.

3.CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch connector.
3. Turn ignition switch ON.

4. Check voltage between ASCD brake switch harness connector and ground.

ASCD brake switch		—	Voltage
Connector	Terminal		
E112	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace malfunctioning components.

4. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check continuity between ASCD brake switch harness connector and ABS actuator and electric unit (control unit) harness connector.

ASCD brake switch		ABS actuator and electric unit (control unit)		Continuity
Connector	Terminal	Connector	Terminal	
E112	2	E36	6	Existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair or replace malfunctioning components.

Component Inspection

INFOID:0000000004231945

1. CHECK ASCD BRAKE SWITCH

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch connector.
3. Check continuity between ASCD brake switch connector terminals.

ASCD brake switch	Condition	Continuity
Terminal		
1 – 2	Brake pedal is fully released.	Existed
	Brake pedal is slightly depressed.	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace ASCD brake switch. Refer to BR-18, "Exploded View".

U1000 CAN COMM CIRCUIT

Description

INFOID:0000000004231946

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:0000000004231947

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)

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
CAN COMM CIRCUIT

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-138, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000004231948

1.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect connector and perform self-diagnosis.

Self-diagnosis results
CAN COMM CIRCUIT

Is above displayed on the self-diagnosis display?

YES >> Go to LAN-24, "CAN System Specification Chart".
NO >> INSPECTION END

U1010 CONTROL UNIT (CAN)

Description

INFOID:0000000004231949

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:0000000004231950

DTC DETECTION LOGIC

DTC	Items	Diagnostic item is detected when...	Possible cause
U1010	CONTROL UNIT (CAN)	When detecting error during the initial diagnosis of CAN controller of ABS actuator and electric unit (control unit).	ABS actuator and electric unit (control unit) error

DTC CONFIRMATION PROCEDURE

1.RECHECK DTC

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

Is DTC “U1010” detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-139, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000004231951

1.ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Check that there is no malfunction in ABS actuator and electric unit (control unit) harness connector or disconnection.

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-171, "Exploded View".
NO >> Repair or replace the harnesses and connectors.

PARKING BRAKE SWITCH

Description

INFOID:0000000004231952

The parking brake switch converts the status of the parking brake pedal to an electric signal and transmits it to the ABS actuator and electric unit (control unit).

Component Function Check

INFOID:0000000004231953

1.CHECK PARKING BRAKE SWITCH OPERATION

Operate the parking brake pedal. 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 switch is operation	ON
When the parking brake switch is not operation.	OFF

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-140, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000004231954

1.CHECK PARKING BRAKE SWITCH

1. Turn ignition switch OFF.
2. Disconnect parking brake switch connector.
3. Check continuity between parking brake switch connector terminal and ground.

Parking brake switch		—	Condition	Continuity
Connector	Terminal			
E103	1	Ground	When the parking brake switch is operated.	Existed
			When the parking brake switch is not operated.	Not existed

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace parking brake switch.

2.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-32, "Diagnosis Description".

Is the inspection result normal?

YES >> INSPECTION END
NO >> Check ABS actuator and electric unit (control unit). Refer to BRC-93, "CONSULT-III Function".

Component Inspection

INFOID:0000000004231955

1.CHECK PARKING BRAKE SWITCH

1. Turn ignition switch OFF.
2. Disconnect parking brake switch connector.
3. Check continuity between parking brake switch connector terminal and ground.

Parking brake switch		—	Condition	Continuity
Connector	Terminal			
E103	1	Ground	When the parking brake switch is operated.	Existed
			When the parking brake switch is not operated.	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace parking brake switch. Refer to PB-6, "Exploded View".

VDC OFF SWITCH

Description

INFOID:0000000004231956

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

Component Function Check

INFOID:0000000004231957

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-142, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000004231958

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	Condition	Continuity
Terminal		
1 – 2	When VDC OFF switch is hold pressed.	Existed
	When releasing VDC OFF switch.	Not existed

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

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Check continuity between VDC OFF switch connector terminals and ABS actuator and electric unit (control unit) connector terminal and/or ground.

ABS actuator and electric unit (control unit)		VDC OFF switch		Continuity
Connector	Terminal	Connector	Terminal	
E36	5	M5	1	Existed

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E36	5	Ground	Not existed

VDC OFF switch		—	Continuity
Connector	Terminal		
M5	2	Ground	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> If the open or short in harness, repair or replace harness.

3.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-32, "Diagnosis Description".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace combination meter.

Component Inspection

INFOID:0000000004231959

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 Terminal	Condition	Condition
1 – 2	When VDC OFF switch is hold pressed.	Existed
	When releasing VDC OFF switch.	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace VDC OFF switch.

ABS WARNING LAMP

Description

INFOID:0000000004231960

×: ON –: OFF

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

Component Function Check

INFOID:0000000004231961

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-144, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000004231962

1.CHECK SELF-DIAGNOSIS

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

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check items displayed by self-diagnosis.

2.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-32, "Diagnosis Description".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace combination meter.

BRAKE WARNING LAMP

Description

INFOID:0000000004231963

×: ON –: OFF

Condition	Brake warning lamp (Note 1)
Ignition switch OFF	–
For 1 second after turning ignition switch ON	× (Note 2)
1 second later after turning ignition switch ON	× (Note 2)
EBD function is malfunctioning.	×

NOTE:

- 1: Brake warning lamp will turn on in case of parking brake operation (when switch is ON) or of brake fluid level switch operation (when brake fluid is insufficient).
- 2: After starting engine, brake warning lamp is turned off.

Component Function Check

INFOID:0000000004231964

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-145, "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 pedal.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Check parking brake switch. Refer to BRC-140, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000004231965

1.CHECK PARKING BRAKE SWITCH

Check that the brake warning lamp in the combination meter turns ON/OFF correctly when operating the parking brake pedal.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check parking brake switch. Refer to BRC-140, "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-32, "Diagnosis Description".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace combination meter.

VDC OFF INDICATOR LAMP

Description

INFOID:0000000004231966

×: ON –: OFF

Condition	VDC OFF indicator lamp
Ignition switch OFF	–
For 1 second after turning ignition switch ON	×
1 second later after turning ignition switch ON	–
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:0000000004231967

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-146, "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-142, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000004231968

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-142, "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-32, "Diagnosis Description".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace combination meter.

SLIP INDICATOR LAMP

Description

INFOID:0000000004231969

×: ON –: OFF

Condition	SLIP indicator lamp
Ignition switch OFF	–
For 1 second after turning ignition switch ON	×
1 second later after turning ignition switch ON	–
VDC/TCS function is malfunctioning.	×
ABS function is malfunctioning.	×
EBD function is malfunctioning.	×

Component Function Check

INFOID:0000000004231970

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-147, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000004231971

1.CHECK SELF-DIAGNOSIS

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

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check items displayed by self-diagnosis.

2.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-32, "Diagnosis Description".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> Repair or replace combination meter.

ECU DIAGNOSIS

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Reference Value

INFOID:0000000004231972

VALUES ON THE DIAGNOSIS TOOL

CAUTION:

The display shows the control unit calculation data, so a normal value might be displayed even in the event the output circuit (harness) is open or short-circuited.

Monitor item	Display content	Data monitor	
		Condition	Reference value in normal operation
FR LH SENSOR	Wheel speed	Vehicle stopped	0 [km/h (MPH)]
		Vehicle running (Note 1)	Nearly matches the speed meter display (± 10% or less)
FR RH SENSOR	Wheel speed	Vehicle stopped	0 [km/h (MPH)]
		Vehicle running (Note 1)	Nearly matches the speed meter display (± 10% or less)
RR LH SENSOR	Wheel speed	Vehicle stopped	0 [km/h (MPH)]
		Vehicle running (Note 1)	Nearly matches the speed meter display (± 10% or less)
RR RH SENSOR	Wheel speed	Vehicle stopped	0 [km/h (MPH)]
		Vehicle running (Note 1)	Nearly matches the speed meter display (± 10% or less)
STOP LAMP SW	Stop lamp switch signal status	When brake pedal is depressed	On
		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
GEAR	Gear position determined by TCM	1st gear 2nd gear 3rd gear 4th gear 5th gear 6th gear	1 2 3 4 5 6
OFF SW	VDC OFF switch ON/OFF	VDC OFF switch ON (When VDC OFF indicator lamp is ON)	On
		VDC OFF switch OFF (When VDC OFF indicator lamp is OFF)	Off
YAW RATE SEN	Yaw rate detected by yaw rate sensor	Vehicle stopped	Approx. 0 d/s
		Vehicle turning	–100 to 100 d/s
DECEL G-SEN	Decel G detected by decel G sensor	Vehicle stopped	–0.11 – +0.11 G
		During acceleration	Negative value
		During deceleration	Positive value
ACCEL POS SIG	Throttle actuator opening/closing is displayed (linked with accelerator pedal)	Accelerator pedal not depressed (ignition switch is ON)	0 %
		Depress accelerator pedal (ignition switch is ON)	0 - 100 %

Monitor item	Display content	Data monitor	
		Condition	Reference value in normal operation
SIDE G-SENSOR	Transverse G detected by side G sensor	Vehicle stopped	Approx. 0 m/s^2
		Vehicle turning right	Negative value
		Vehicle turning left	Positive value
STR ANGLE SIG	Steering angle detected by steering angle sensor	During straight	Approx. 0°
		Steering wheel turned	–720 to 720°
ENGINE SPEED	With engine running	With engine stopped	0 [tr/min (rpm)]
		Engine running	Almost in accordance with tachometer display
FLUID LEV SW	Brake fluid level switch signal status	When brake fluid level switch ON	On
		When brake fluid level switch OFF	Off
FR RH IN SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
FR RH OUT SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
FR LH IN SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
FR LH OUT SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
RR RH IN SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
RR RH OUT SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
RR LH IN SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
RR LH OUT SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off

Monitor item	Display content	Data monitor	
		Condition	Reference value in normal operation
MOTOR RELAY	Motor and motor relay operation	When the motor relay and motor are operating	On
		When the motor relay and motor are not operating	Off
ACTUATOR RLY	Actuator relay operation	When the actuator relay is operating	On
		When the actuator relay is not operating	Off
ABS WARN LAMP	ABS warning lamp (Note 2)	When ABS warning lamp is ON	On
		When ABS warning lamp is OFF	Off
OFF LAMP	VDC OFF indicator lamp (Note 2)	When VDC OFF indicator lamp is ON	On
		When VDC OFF indicator lamp is OFF	Off
SLIP LAMP	SLIP indicator lamp (Note 2)	When SLIP indicator lamp is ON	On
		When SLIP indicator lamp is OFF	Off
EBD SIGNAL	EBD operation	EBD is active	On
		EBD is inactive	Off
ABS SIGNAL	ABS operation	ABS is active	On
		ABS is inactive	Off
TCS SIGNAL	TCS operation	TCS is active	On
		TCS is inactive	Off
VDC SIGNAL	VDC operation	VDC is active	On
		VDC is inactive	Off
EBD FAIL SIG	EBD fail-safe signal	In EBD fail-safe	On
		EBD is normal	Off
ABS FAIL SIG	ABS fail-safe signal	In ABS fail-safe	On
		ABS is normal	Off
TCS FAIL SIG	TCS fail-safe signal	In TCS fail-safe	On
		TCS is normal	Off
VDC FAIL SIG	VDC fail-safe signal	In VDC fail-safe	On
		VDC is normal	Off
CRANKING SIG	Crank operation	Crank is active	On
		Crank is inactive	Off
N POSI SIG	N position signal	For N range	On
		Except for N range	Off
P POSI SIG	P position signal	For P range	On
		Except for P range	Off
R POSI SIG	R position signal	For R range	On
		Except for R range	Off
4WD MODE MON	Axle condition	AUTO is active	AUTO
		LOCK is active	LOCK
		2WD is active	2WD
CV1	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off

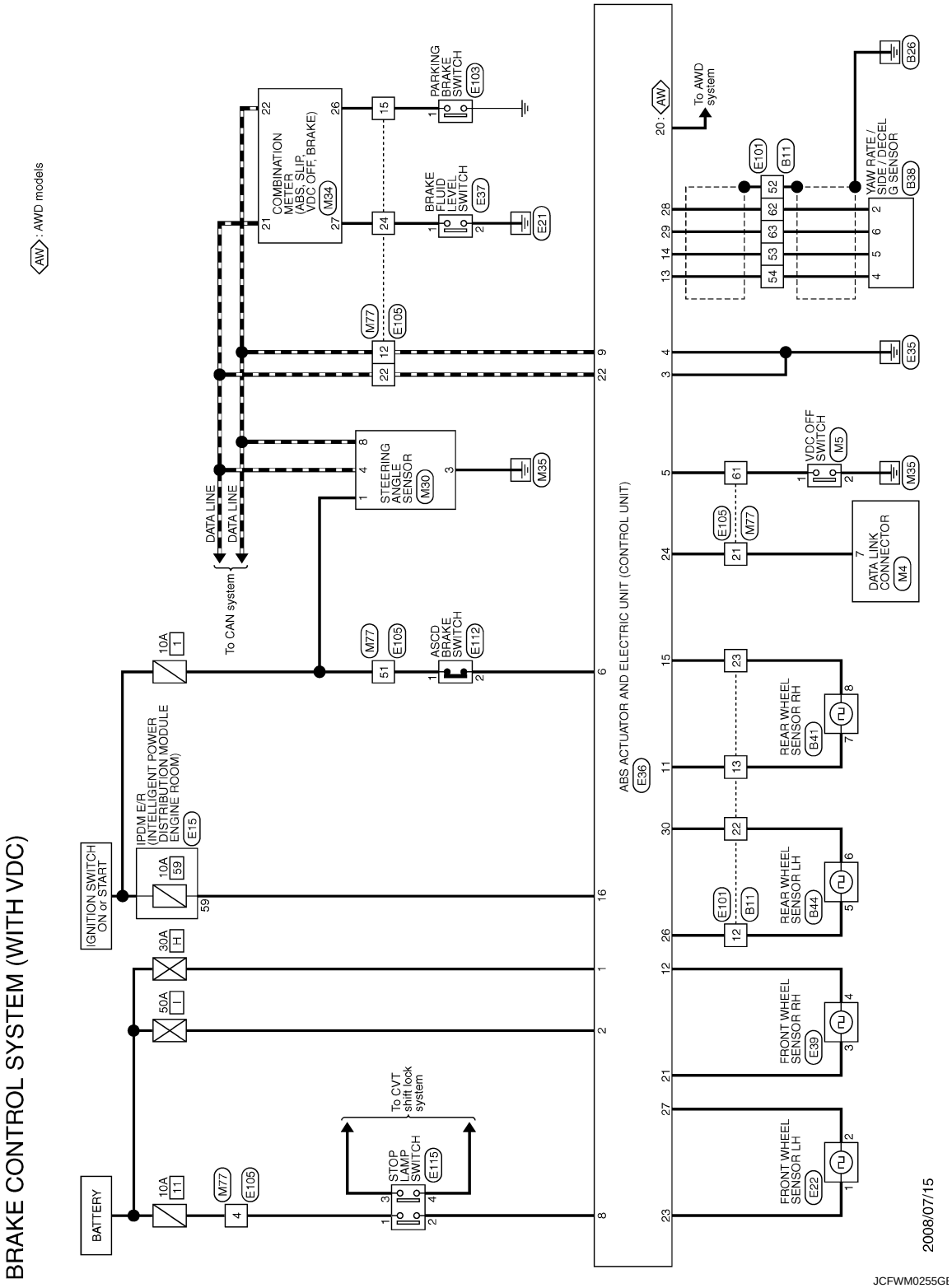
Monitor item	Display content	Data monitor	
		Condition	Reference value in normal operation
CV2	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
SV1	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
SV2	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
STOP LAMP SW2	Stop lamp switch signal status	When brake pedal is depressed	On
		When brake pedal is not depressed	Off

NOTE:

- 1: Confirm tire pressure is normal.
- 2: On and off timing for warning lamp and indicator lamp.
- ABS warning lamp: Refer to BRC-144, "Description".
- Brake warning lamp: Refer to BRC-145, "Description".
- VDC OFF indicator lamp: Refer to BRC-146, "Description".
- SLIP indicator lamp: Refer to BRC-147, "Description".

Wiring Diagram -BRAKE CONTROL SYSTEM-

INFOID:0000000004231973

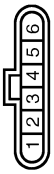


BRAKE CONTROL SYSTEM (WITH VDC)

Connector No.	B11
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-CS16-TM4

Terminal No.	Color of Wire	Signal Name [Specification]
12	BR	–
13	O	–
22	G	–
23	SB	–
52	SHIELD	–
53	L	–
54	B	–
62	Y	–
63	R	–

Connector No.	B38
Connector Name	YAW RATE / SIDE / DECEL G SENSOR
Connector Type	SCZ06FB



Terminal No.	Color of Wire	Signal Name [Specification]
2	Y	GND
4	B	VCC(POWER)
5	L	SERIAL+
6	R	SERIAL–

Connector No.	B41
Connector Name	REAR WHEEL SENSOR RH
Connector Type	RK02FGY

Terminal No.	Color of Wire	Signal Name [Specification]
7	O	–
8	SB	–

Connector No.	B44
Connector Name	REAR WHEEL SENSOR LH
Connector Type	RK02FGY

Terminal No.	Color of Wire	Signal Name [Specification]
5	BR	–
6	G	–

Connector No.	E15
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS16FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
59	BR	–

Connector No.	E22
Connector Name	FRONT WHEEL SENSOR LH
Connector Type	RK02MGY

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	–
2	P	–

Connector No.	E36
Connector Name	ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
Connector Type	RH28FB-NU4-DH

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	MOTOR
2	BR	ACTR
3	B	GND A
4	B	GND M
5	BR	VDC OFF SW
6	GR	ASCD CANCEL SW
8	SB	STOP LAMP SW
9	P	CAN L
11	O	RR SENSOR VB
12	R	FR SENSOR SIG
13	B	G CHECK
14	L	G SW1
15	SB	RR SENSOR SIG
16	BR	IGN
20	Y	4WD COMM
21	G	FR SENSOR VB
22	L	CAN H
23	W	FL SENSOR VB
24	GR	DIAG K
26	BR	RL SENSOR VB
27	P	FL SENSOR SIG
28	Y	G GND
29	R	G SW2
30	G	RL SENSOR SIG

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BRAKE CONTROL SYSTEM (WITH VDC)

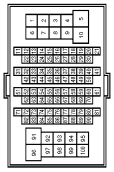
Connector No.	E37
Connector Name	BRAKE FLUID LEVEL SWITCH
Connector Type	YV02FGY

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–
2	B	–

Connector No.	E39
Connector Name	FRONT WHEEL SENSOR RH
Connector Type	RK02MGY

Terminal No.	Color of Wire	Signal Name [Specification]
3	G	–
4	R	–

Connector No.	E101
Connector Name	WIRE TO WIRE
Connector Type	TH80FW-CS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
12	BR	–
13	O	–
22	G	–
23	SB	–
52	SHIELD	–
53	L	–
54	B	–
62	Y	–
63	R	–

Connector No.	E103
Connector Name	PARKING BRAKE SWITCH
Connector Type	P01FB-A

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	–

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH80FW-CS16-TM4

Terminal No.	Color of Wire	Signal Name [Specification]
4	V	–
12	P	–
15	V	–
21	L	–
22	L	–
24	LG	–
51	L	–
61	BR	–

Connector No.	E112
Connector Name	ASCD BRAKE SWITCH
Connector Type	M02FBR-LC

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	–
2	GR	–

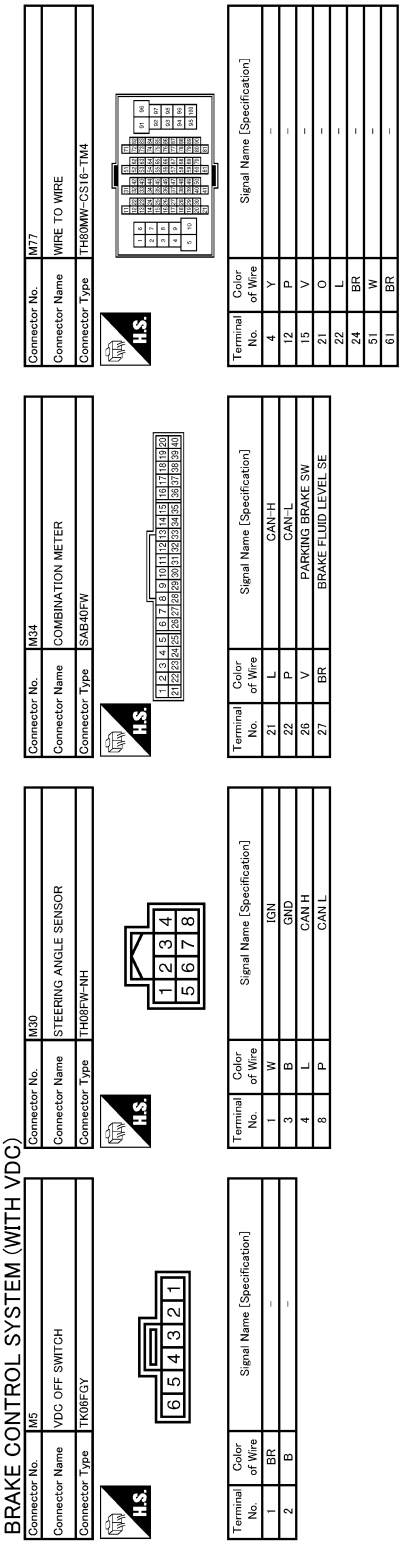
Connector No.	E115
Connector Name	STOP LAMP SWITCH
Connector Type	M04FW-LC

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	–
2	Y	–
3	G	–
4	L	–

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

Terminal No.	Color of Wire	Signal Name [Specification]
7	O	–

JCFWM0257GB



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Fail-Safe

INFOID:0000000004231974

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.

DTC Index

INFOID:0000000004231975

DTC	Items (CONSULT screen terms)	Reference
C1101	RR RH SENSOR-1	BRC-98, "DTC Logic"
C1102	RR LH SENSOR-1	
C1103	FR RH SENSOR-1	
C1104	FR LH SENSOR-1	
C1105	RR RH SENSOR-2	BRC-101, "DTC Logic"
C1106	RR LH SENSOR-2	
C1107	FR RH SENSOR-2	
C1108	FR LH SENSOR-2	
C1109	BATTERY VOLTAGE [ABNORMAL]	BRC-104, "DTC Logic"
C1110	CONTROLLER FAILURE	BRC-106, "DTC Logic"
C1111	PUMP MOTOR	BRC-107, "DTC Logic"
C1113	G SENSOR	BRC-109, "DTC Logic"
C1115	ABS SENSOR [ABNORMAL SIGNAL]	BRC-112, "DTC Logic"
C1116	STOP LAMP SW	BRC-115, "DTC Logic"
C1118	4WD SYSTEM	BRC-117, "DTC Logic"
C1120	FR LH IN ABS SOL	BRC-118, "DTC Logic"
C1121	FR LH OUT ABS SOL	BRC-121, "DTC Logic"
C1122	FR RH IN ABS SOL	BRC-118, "DTC Logic"
C1123	FR RH OUT ABS SOL	BRC-121, "DTC Logic"
C1124	RR LH IN ABS SOL	BRC-118, "DTC Logic"
C1125	RR LH OUT ABS SOL	BRC-121, "DTC Logic"
C1126	RR RH IN ABS SOL	BRC-118, "DTC Logic"
C1127	RR RH OUT ABS SOL	BRC-121, "DTC Logic"
C1130	ENGINE SIGNAL 1	BRC-124, "DTC Logic"
C1140	ACTUATOR RLY	BRC-125, "DTC Logic"
C1143	ST ANG SEN CIRCUIT	BRC-127, "DTC Logic"
C1144	ST ANG SEN SIGNAL	
C1145	YAW RATE SENSOR	BRC-109, "DTC Logic"
C1146	SIDE G-SEN CIRCUIT	
C1155	BR FLUID LEVEL LOW	BRC-129, "DTC Logic"
C1164	CV1	BRC-132, "DTC Logic"
C1165	CV2	

DTC	Items (CONSULT screen terms)	Reference
C1166	SV1	BRC-134, "DTC Logic"
C1167	SV2	
C1176	STOP LAMP SW2	BRC-136, "DTC Logic"
U1000	CAN COMM CIRCUIT	BRC-138, "DTC Logic"
U1010	CONTROL UNIT(CAN)	BRC-139, "DTC Logic"

SYMPTOM DIAGNOSIS

EXCESSIVE ABS FUNCTION OPERATION FREQUENCY

Diagnosis Procedure

INFOID:0000000004231976

1.CHECK START

Check front and rear brake force distribution using a brake tester. Refer to BR-47, "General Specifications".

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.

- Front
  - 2WD models: Refer to FAX-8, "Inspection".
  - AWD models: Refer to FAX-32, "Inspection".
- Rear
  - 2WD models: Refer to RAX-4, "Inspection".
  - AWD models: Refer to RAX-11, "Inspection".

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.

Is the ABS warning lamp illuminated?

YES >> Perform self-diagnosis.
NO >> Normal

UNEXPECTED PEDAL REACTION

Diagnosis Procedure

INFOID:0000000004231977

1.CHECK BRAKE PEDAL STROKE

Check brake pedal stroke. Refer to BR-9, "Inspection and Adjustment".

Is the stroke too large?

YES >> • Bleed air from brake tube and hose. Refer to BR-13, "Bleeding Brake System".
• Check brake pedal, brake booster, and master cylinder for mount play, looseness, brake system fluid leakage, etc.
- Brake pedal: Refer to BR-9, "Inspection and Adjustment".
- Master cylinder: Refer to BR-14, "Inspection".
- Brake booster: Refer to BR-15, "Inspection".

NO >> GO TO 2.

2.CHECK FUNCTION

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

Is the inspection result normal?

YES >> Normal
NO >> Check brake system.

THE BRAKING DISTANCE IS LONG

Diagnosis Procedure

INFOID:0000000004231978

CAUTION:

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

1.CHECK FUNCTION

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

Is the inspection result normal?

YES >> Normal
NO >> Check brake system.

ABS FUNCTION DOES NOT OPERATE

Diagnosis Procedure

INFOID:0000000004231979

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

1. CHECK ABS WARNING LAMP DISPLAY

Make sure that the ABS warning lamp turns OFF after ignition switch is turned ON or when driving.

Is the inspection result normal?

YES >> Normal
NO >> Perform self-diagnosis.

PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

Diagnosis Procedure

INFOID:0000000004231980

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 that there are pedal vibrations when the engine is started.

Do vibrations occur?

YES >> GO TO 2.
NO >> Inspect the brake pedal.

2.SYMPTOM CHECK 2

Check that there are ABS operation noises when the engine is started.

Do the operation noises occur?

YES >> GO TO 3.
NO >> Perform self -diagnosis.

3.SYMPTOM CHECK 3

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

Do symptoms occur?

YES >> Check if there is a radio, antenna, antenna lead wire, or wiring close to the control unit. If there is, move it farther away.
NO >> Normal

VEHICLE JERKS DURING VDC/TCS/ABS CONTROL

Diagnosis Procedure

INFOID:0000000004231981

1.SYMPTOM CHECK

Check if the vehicle jerks during VDC/TCS/ABS control.

Is the inspection result normal?

YES >> Normal.
NO >> GO TO 2.

2.CHECK SELF-DIAGNOSIS RESULTS

Perform self-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 TCM SELF-DIAGNOSIS RESULTS

Perform ECM self-diagnosis and TCM self-diagnosis.

Are self-diagnosis results indicated?

YES >> Check the corresponding items.
- ECM
  - For CALIFORNIA: Refer to EC-92, "Diagnosis Description".
  - For USA (FEDERAL) and CANADA: Refer to EC-563, "Diagnosis Description".
  - For MEXICO: Refer to EC-990, "Diagnosis Description".
- TCM: Refer to TM-42, "Diagnosis Description".

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

NORMAL OPERATING CONDITION

Description

INFOID:0000000004231982

Symptom	Result
Slight vibrations are felt on the brake pedal and the operation noises occur, when VDC, TCS or ABS is activated.	This is a normal condition due to the VDC, TCS or ABS activation.
Stopping distance is longer than that of vehicles without ABS when the vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.	
The brake pedal moves and generates noises, when TCS or VDC is activated due to rapid acceleration or sharp turn.	
The brake pedal vibrates and motor operation noises occur from the engine room, after the engine starts and just after the vehicle starts.	This is 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 places the highest priority on the optimum traction (stability).
TCS may activate momentarily if wheel speed changes when driving over location where friction coefficient varies, when downshifting, or when fully depressing accelerator pedal.	
The ABS warning lamp, VDC OFF indicator lamp and SLIP indicator lamp may turn ON when the vehicle is subject to strong shaking or large vibration, such as when the vehicle is rotating on a turntable or located on a ship while the engine is running.	In this case, restart the engine on a normal road. If the normal condition is restored, there is no malfunction. At that time, erase the self-diagnosis memory.
VDC may not operate normally or the ABS warning lamp, VDC OFF indicator lamp, and SLIP indicator lamp may illuminate, when running on a special road that is extremely slanted (e.g. bank in a circuit course).	
A malfunction may occur in the yaw rate/side G sensor system, when the vehicle turns sharply, such as during a spin turn, axle turn, or drift driving, while the VDC function is off (VDC OFF indicator lamp illuminated).	
The vehicle speed will not increase even though the accelerator pedal is depressed, when inspecting the speedometer on a 2-wheel chassis dynamometer.	Normal (Deactivate the VDC/TCS function before performing an inspection on a chassis dynamometer.)

PRECAUTION

PRECAUTIONS

FOR USA AND CANADA

FOR USA AND CANADA : Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000004554007

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 “SRS AIRBAG” and “SEAT BELT” of this Service Manual.

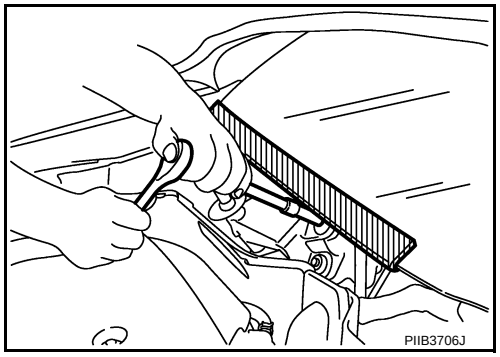
WARNING:

- **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 “SRS AIRBAG”.**
- **Never 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.**

FOR USA AND CANADA : Precaution for Procedure without Cowl Top Cover

INFOID:0000000004554009

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



FOR USA AND CANADA : Precaution for Brake System

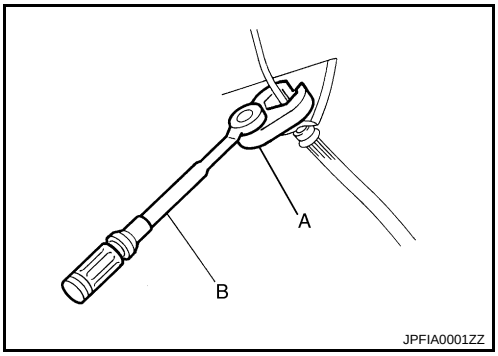
INFOID:0000000004231985

WARNING:

Clean any dust from the front brake and rear brake with a vacuum dust collector. Never blow with compressed air.

- Only use “DOT 3” brake fluid. Refer to MA-17, "FOR NORTH AMERICA : Fluids and Lubricants".
- Never reuse drained brake fluid.
- Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface.
- Never use mineral oils such as gasoline or light oil to clean. They may damage rubber parts and cause improper operation.
- Always loosen the brake tube flare nut with a flare nut wrench.
- Tighten the brake tube flare nut to the specified torque with crowfoot (A) and torque wrench (B).

•
• Always confirm the specified tightening torque when installing the brake pipes.
• Turn the ignition switch OFF and disconnect the ABS actuator and electric unit (control unit) connector or the battery negative terminal before performing the work.
• Check that no brake fluid leakage is present after replacing the parts.



FOR USA AND CANADA : Precaution for Brake Control

INFOID:0000000004231986

• When starting engine or when starting vehicle just after starting engine, 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 estimate 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.
- 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 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.

FOR MEXICO

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

INFOID:0000000004554008

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. Information necessary to service the system safely is included in the “SRS AIRBAG” and “SEAT BELT” of this Service Manual.

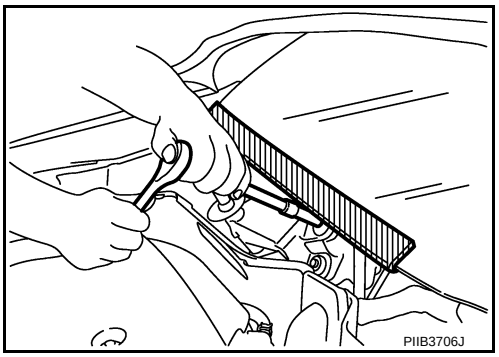
WARNING:

- **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 “SRS AIRBAG”.**
- **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.**

FOR MEXICO : Precaution for Procedure without Cowl Top Cover

INFOID:0000000004554011

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



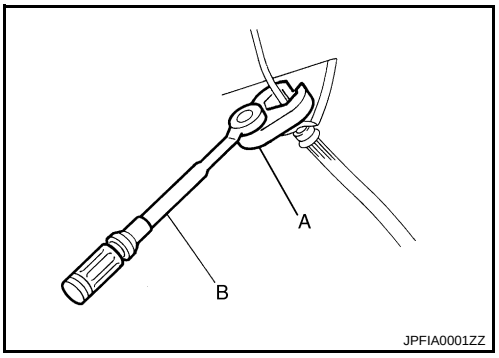
FOR MEXICO : Precaution for Brake System

INFOID:0000000004231989

WARNING:

Clean any dust from the front brake and rear brake with a vacuum dust collector. Never blow with compressed air.

- Only use “DOT 3” brake fluid. Refer to MA-18, "FOR MEXICO : Fluids and Lubricants".
- Never reuse drained brake fluid.
- Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface.
- Never use mineral oils such as gasoline or light oil to clean. They may damage rubber parts and cause improper operation.
- Always loosen the brake tube flare nut with a flare nut wrench.
- Tighten the brake tube flare nut to the specified torque with crowfoot (A) and torque wrench (B).
- Always confirm the specified tightening torque when installing the brake pipes.
- Turn the ignition switch OFF and disconnect the ABS actuator and electric unit (control unit) connector or the battery negative terminal before performing the work.
- Check that no brake fluid leakage is present after replacing the parts.



FOR MEXICO : Precaution for Brake Control

INFOID:0000000004231990

- When starting engine or when starting vehicle just after starting engine, 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 estimate 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.
- 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 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.

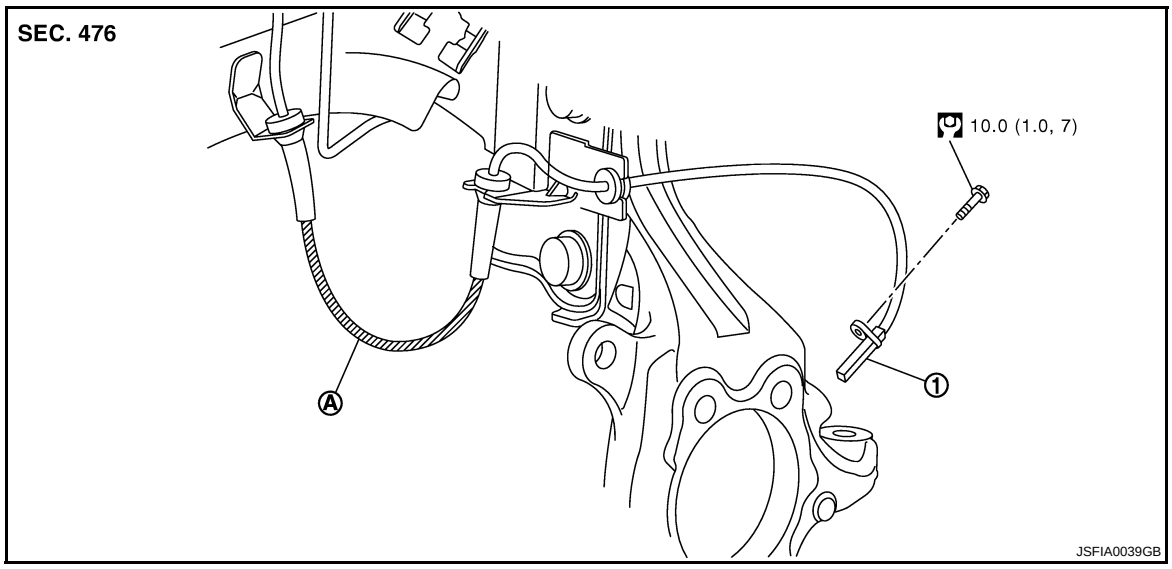
ON-VEHICLE REPAIR

WHEEL SENSOR

FRONT WHEEL SENSOR

FRONT WHEEL SENSOR : Exploded View

INFOID:0000000004231991



1. Front LH wheel sensor

A. Yellow line (slant line)

Refer to GI-4, "Components" for symbol in the figure.

NOTE:
The above figure (front side) shows left side. Right side is the mirror image.

FRONT WHEEL SENSOR : Removal and Installation

INFOID:0000000004231992

REMOVAL

Pay attention to the following when removing sensor.

CAUTION:

- **Never twist sensor harness as much as possible, when removing it. Pull sensors out without pulling sensor harness.**
- **Take care to avoid damaging sensor edges or rotor teeth. Remove wheel sensor first before removing front or rear wheel hub. This is to avoid damage to sensor wiring and loss of sensor function.**
- **When you see the harness of the wheel sensor from the front side of the vehicle ensure that the yellow lines (A) are not twisted.**

INSTALLATION

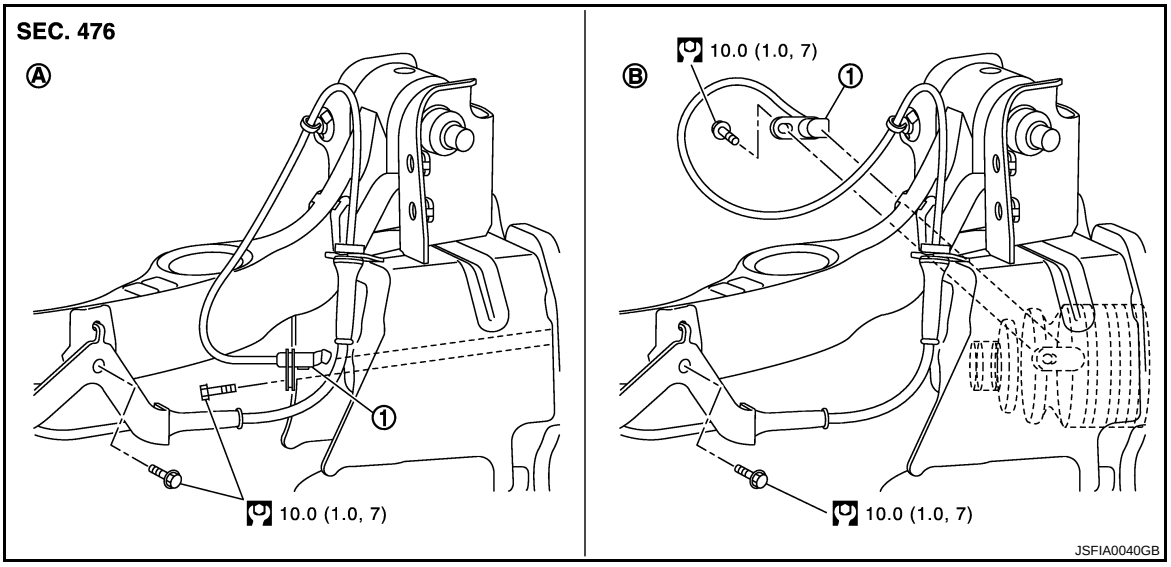
Pay attention to the following when installing wheel sensor. Tighten installation bolts to the specified torques.

- When installing, make sure there is no foreign material such as iron chips on and in the mounting hole of the wheel sensor. Make sure no foreign material has been caught in the sensor rotor. Remove any foreign material and clean the mount.
- When installing wheel sensor, be sure to press rubber grommets in until they lock at locations shown above in the figure. When installed, harness must not be twisted.

REAR WHEEL SENSOR

REAR WHEEL SENSOR : Exploded View

INFOID:0000000004231993



1. Rear LH wheel sensor

A. 2WD models B. AWD models

Refer to GI-4, "Components" for symbol in the figure.

NOTE:
The above figure (front side) shows left side. Right side is the mirror image.

REAR WHEEL SENSOR : Removal and Installation

INFOID:0000000004231994

REMOVAL

Pay attention to the following when removing sensor.

CAUTION:

- **Never twist sensor harness as much as possible, when removing it. Pull sensors out without pulling sensor harness.**
- **Take care to avoid damaging sensor edges or rotor teeth. Remove wheel sensor first before removing front or rear wheel hub. This is to avoid damage to sensor wiring and loss of sensor function.**

INSTALLATION

Pay attention to the following when installing wheel sensor. Tighten installation bolts to the specified torques.

- When installing, make sure there is no foreign material such as iron chips on and in the mounting hole of the wheel sensor. Make sure no foreign material has been caught in the sensor rotor. Remove any foreign material and clean the mount.
- When installing wheel sensor, be sure to press rubber grommets in until they lock at locations shown above in the figure. When installed, harness must not be twisted.

SENSOR ROTOR

FRONT SENSOR ROTOR

FRONT SENSOR ROTOR : Exploded View

INFOID:0000000004231995

Refer to FAX-10, "Exploded View" (2WD models), FAX-34, "Exploded View" (AWD models).

FRONT SENSOR ROTOR : Removal and Installation

INFOID:0000000004231996

REMOVAL

Sensor rotor cannot be disassembled. Remove the sensor rotor together with hub bearing assembly. Refer to FAX-10, "Removal and Installation" (2WD models), FAX-34, "Removal and Installation" (AWD models).

INSTALLATION

Sensor rotor cannot be disassembled. Installation the sensor rotor together with hub bearing assembly. Refer to FAX-34, "Removal and Installation" (2WD models), FAX-34, "Removal and Installation" (AWD models).

REAR SENSOR ROTOR

REAR SENSOR ROTOR : Exploded View

INFOID:0000000004231997

Refer to RAX-5, "Exploded View" (2WD models), RAX-13, "Exploded View" (AWD models).

REAR SENSOR ROTOR : Removal and Installation

INFOID:0000000004231998

2WD MODELS

Removal

Sensor rotor cannot be disassembled. Remove the sensor rotor together with hub bearing assembly. Refer to RAX-5, "Removal and Installation".

Installation

Sensor rotor cannot be disassembled. Installation the sensor rotor together with hub bearing assembly. Refer to RAX-5, "Removal and Installation".

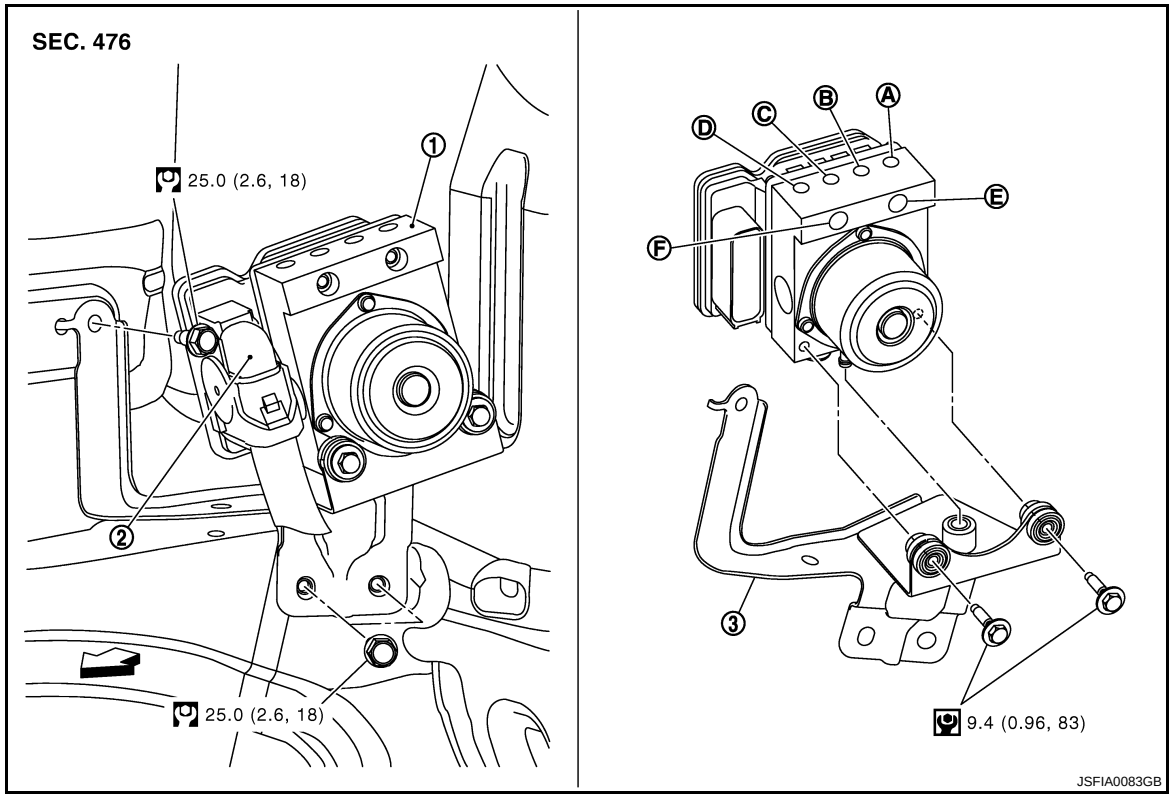
AWD MODELS

For removal and installation of sensor rotor, refer to RAX-16, "Disassembly and Assembly".

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Exploded View

INFOID:0000000004231999



1. ABS actuator and electric unit (control unit)
2. Connector
3. Bracket

A. To front LH brake caliper
B. To rear RH brake caliper
C. To Rear LH brake caliper
D. To front RH brake caliper
E. From master cylinder primary side
F. From master cylinder secondary side

⇦: Vehicle front

Refer to GI-4, "Components" for symbol in the figure.

Removal and Installation

INFOID:0000000004232000

REMOVAL

CAUTION:

- **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 crowfoot and torque wrench.**
- **Never apply excessive impact to ABS actuator and electric unit (control unit), such as dropping it.**
- **Never remove and install actuator by holding harness.**
- **After work is completed, bleed air from brake tube. Refer to BR-13, "Bleeding Brake System".**

1. Remove cowl top. Refer to EXT-20, "Exploded View".
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Loosen brake tube flare nuts, then remove brake tubes from ABS actuator and electric unit (control unit).
4. Remove tire (front LH side).
5. Remove fender protector (rear): (front LH side). Refer to EXT-22, "Exploded View".
6. Remove ABS actuator and electric unit (control unit) bracket mounting nut.
7. Remove ABS actuator and electric unit (control unit) from vehicle.

INSTALLATION

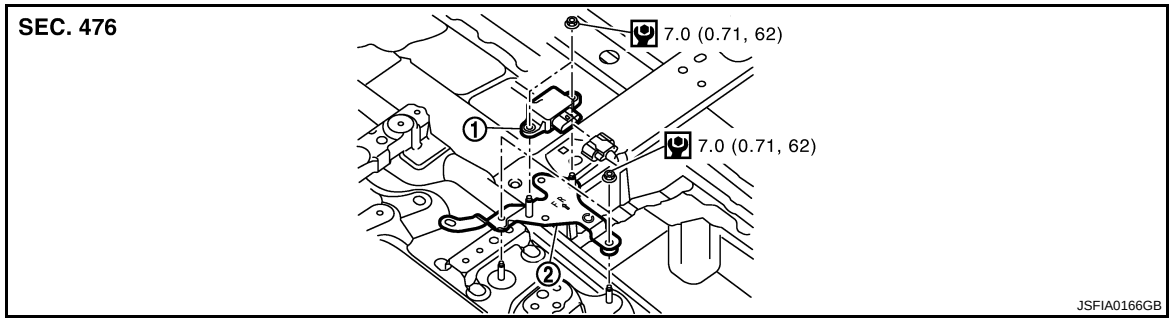
Note the following, and install in the reverse order of removal.

- 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 crowfoot and torque wrench.
- Never apply excessive impact to ABS actuator and electric unit (control unit), such as dropping it.
- Never remove and install actuator by holding harness.
- After work is completed, bleed air from brake tube. Refer to BR-13, "Bleeding Brake System".
- After installing harness connector in the ABS actuator and electric unit (control unit), make sure connector is securely locked.

G SENSOR

Exploded View

INFOID:0000000004232001



1. yaw rate/side/decel G sensor
2. Bracket

⇦: Vehicle front

Refer to GI-4, "Components" for symbol in the figure.

Removal and Installation

INFOID:0000000004232002

REMOVAL

CAUTION:

Never drop or strike yaw rate/side/decel G sensor, or never use power tool etc., because yaw rate/side/decel G sensor is sensitive to the impact.

1. Remove center console assembly. Refer to IP-20, "Exploded View".
2. Disconnect yaw rate/side/decel G sensor harness connector.
3. Remove mounting bolts. Remove yaw rate/side/decel G sensor.

INSTALLATION

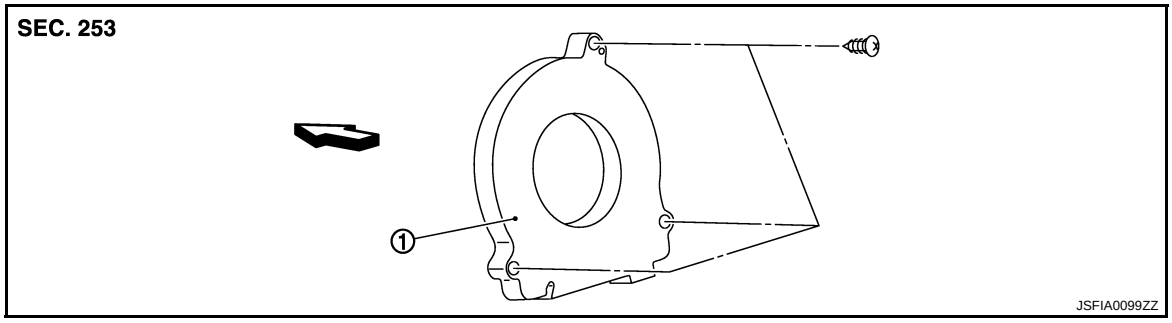
Note the following, and install in the reverse order of removal.

- Never drop or strike yaw rate/side/decel G sensor, or never use power tool etc., because yaw rate/side/decel G sensor is sensitive to the impact.

STEERING ANGLE SENSOR

Exploded View

INFOID:0000000004232003



1. Steering angle sensor

⇦: Vehicle front

Removal and Installation

INFOID:0000000004232004

REMOVAL

1. Remove spiral cable assembly. Refer to SR-8, "Exploded View" (for USA and Canada), SR-27, "Exploded View" (for Mexico).
2. Remove steering angle sensor from spiral cable assembly.

INSTALLATION

Note the following, and install in the reverse order of removal.

- After work, make sure to adjust neutral position of steering angle sensor. Refer to BRC-75, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".