SECTION BRC
BRAKE CONTROL SYSTEM

CONTENTS

ABS

VDC/TCS/ABS

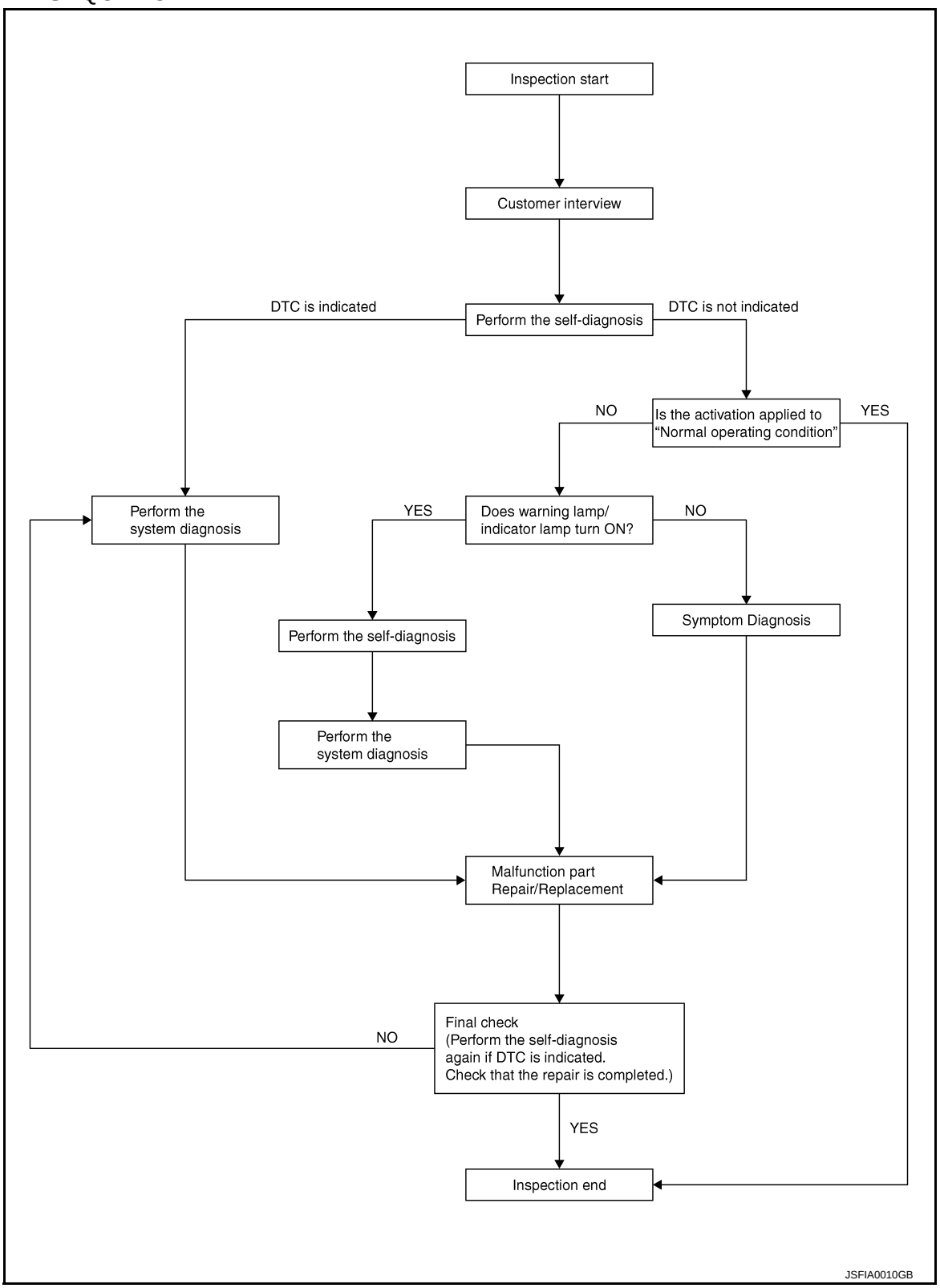
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000007350355

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

Perform self-diagnosis with CONSULT.

Is there any DTC displayed?

YES >> Record or print self-diagnosis results and freeze frame data (FFD). GO TO 3.
NO >> GO TO 4.

3.PERFORM THE SYSTEM DIAGNOSIS

Perform the diagnosis applicable to the displayed DTC of “ABS” with CONSULT. Refer to BRC-57, "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-63, "Description".

Is the symptom a normal operation?

YES >> GO TO 8.
NO >> GO TO 5.

5.CHECK THE WARNING LAMP FOR ILLUMINATION

Check that the warning lamp illuminate.

- ABS warning lamp: Refer to BRC-52, "Description".
- Brake warning lamp: Refer to BRC-53, "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 displayed DTC of “ABS” with CONSULT.

>> GO TO 7.

7.REPAIR OR REPLACE THE MALFUNCTIONING PARTS

Repair or replace the specified malfunctioning parts.

>> GO TO 8.

8.MEMORY CLEAR

Perform self-diagnosis memory clear for “ABS” with CONSULT.

>> GO TO 9.

9.FINAL CHECK

Perform the again, and check that the malfunction is repaired completely.

Is no other DTC present and the repair completed?

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

Diagnostic Work Sheet

INFOID:0000000007350356

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		

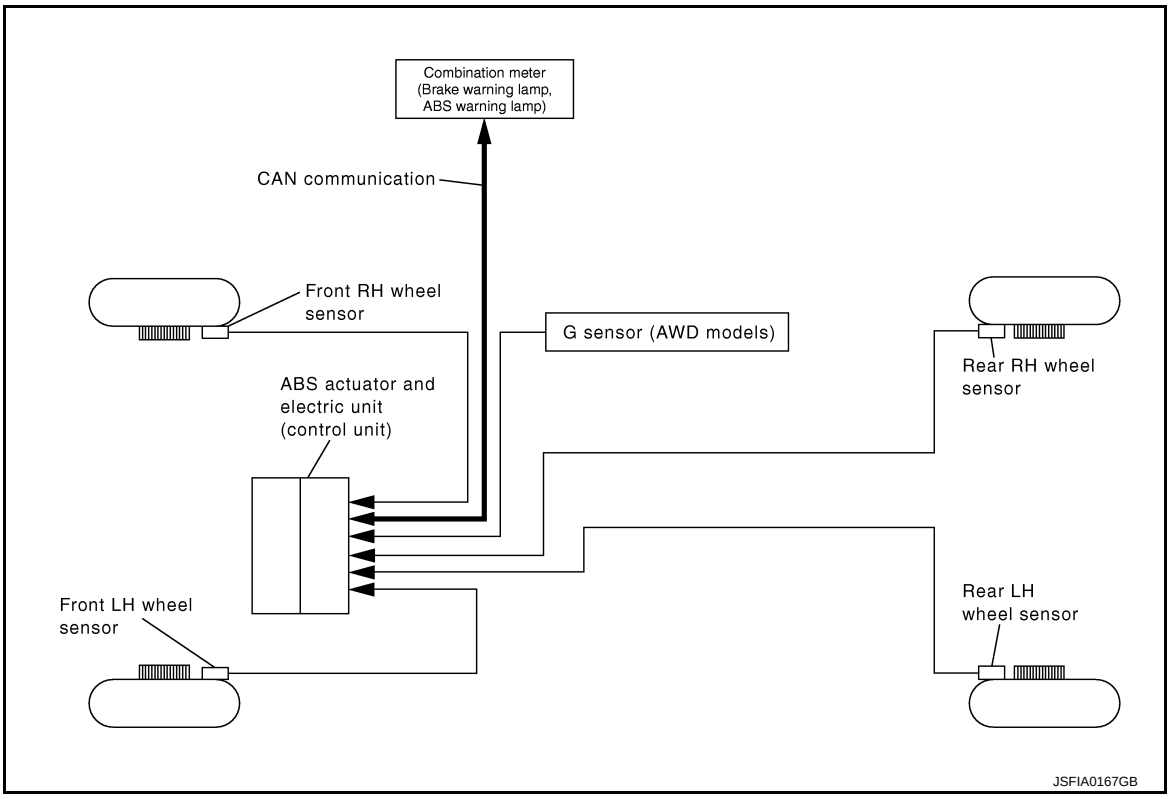
SFIA3264E

SYSTEM DESCRIPTION

ABS

System Diagram

INFOID:0000000007350357



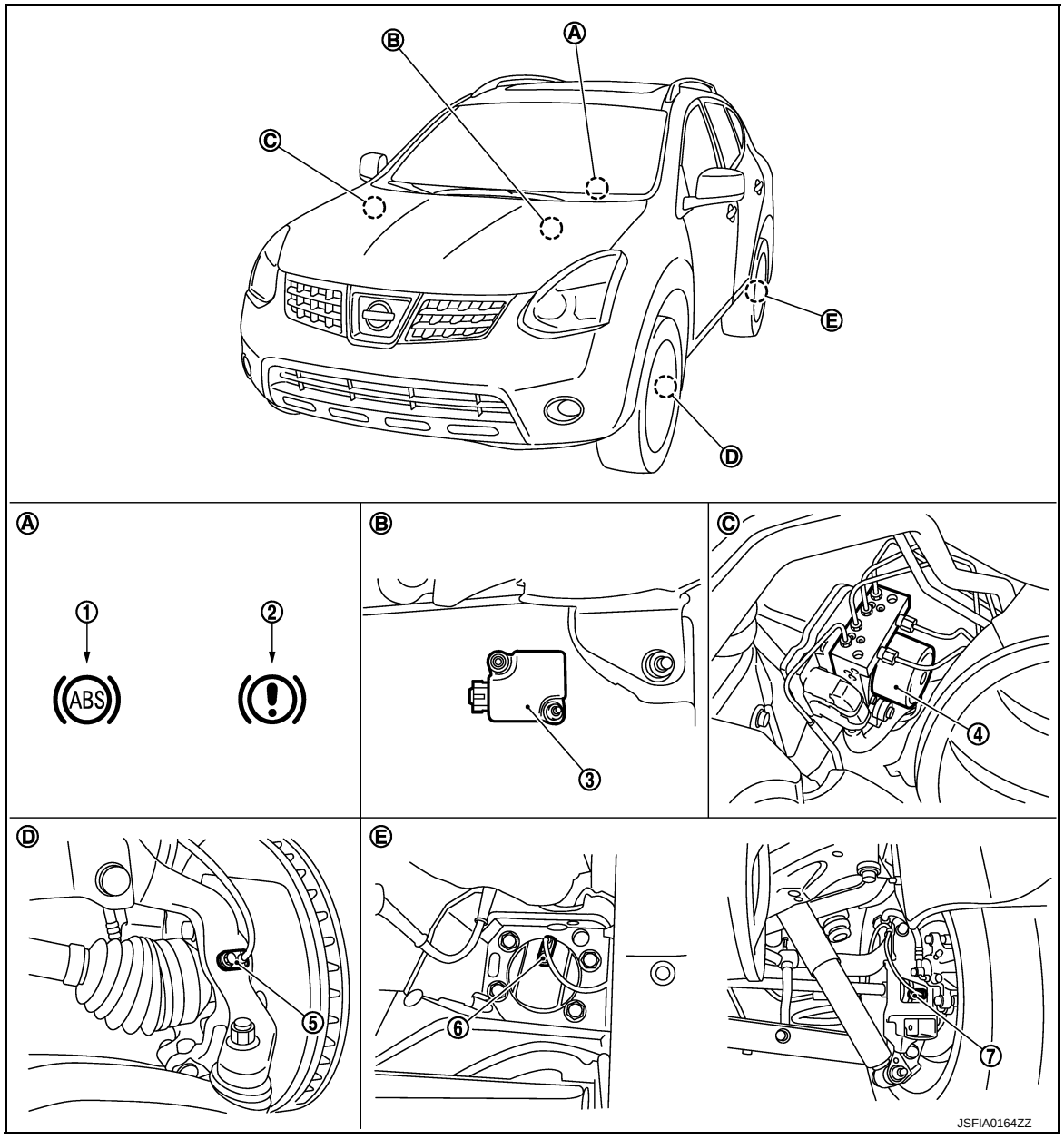
System Description

INFOID:0000000007350358

- 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 is available.

Component Parts Location

INFOID:0000000007350359



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

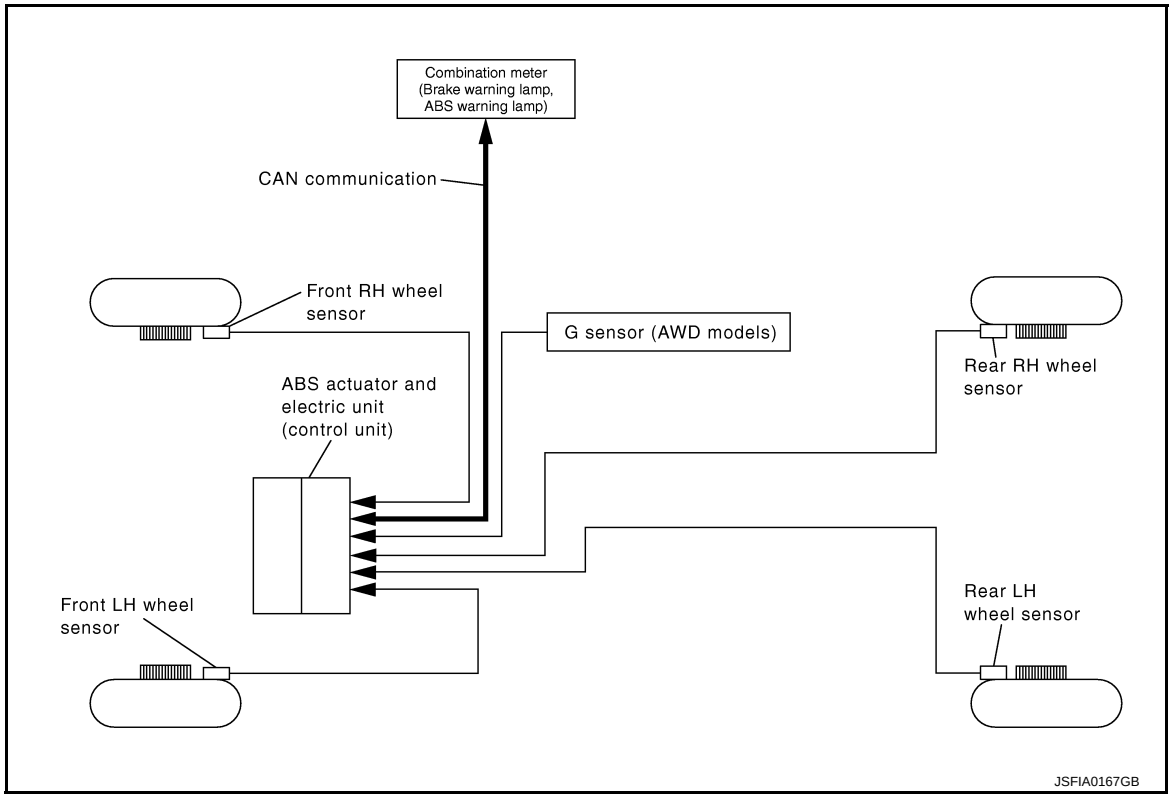
INFOID:0000000007350360

Component parts		Reference
ABS actuator and electric unit (control unit)	Pump	BRC-29, "Description"
	Motor	
	Actuator relay (Main relay)	BRC-42, "Description"
	Solenoid valve	BRC-38, "Description"
Wheel sensor		BRC-18, "Description"
G sensor (AWD models)		BRC-31, "Description"
ABS warning lamp		BRC-52, "Description"
Brake warning lamp		BRC-53, "Description"

EBD

System Diagram

INFOID:0000000007350361



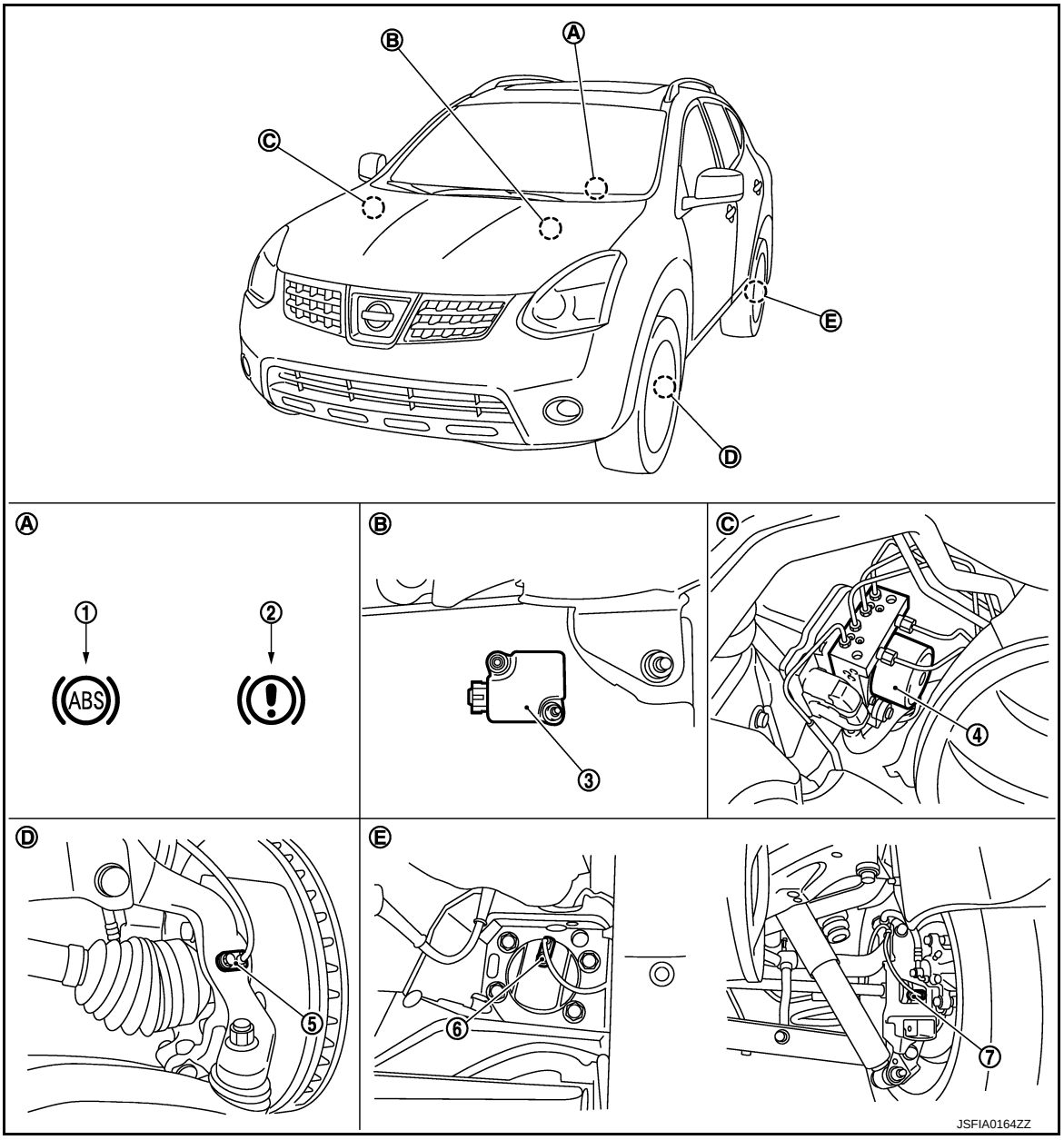
System Description

INFOID:0000000007350362

- 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 is available.

Component Parts Location

INFOID:0000000007350363



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:0000000007350364

Component parts		Reference
ABS actuator and electric unit (control unit)	Pump	BRC-29, "Description"
	Motor	
	Actuator relay (Main relay)	BRC-42, "Description"
	Solenoid valve	BRC-38, "Description"
Wheel sensor		BRC-18, "Description"
G sensor (AWD models)		BRC-31, "Description"
ABS warning lamp		BRC-52, "Description"
Brake warning lamp		BRC-53, "Description"

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

CONSULT Function

INFOID:0000000007350365

FUNCTION

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

Diagnostic test mode	Function
Self diagnostic result	Self-diagnostic results can be read and erased quickly.
Data monitor	Input/Output data in the ABS actuator and electric unit (control unit) can be read.
Active test	Diagnostic test mode is which CONSULT drives some actuators apart from the ABS actuator and electric unit (control unit) and also shifts some parameters in a specified range.
ECU identification	ABS actuator and electric unit (control unit) part number can be read.

SELF DIAGNOSTIC RESULT

Operation Procedure

Before performing the self-diagnosis for “ABS” with CONSULT, 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 for “ABS” with CONSULT, 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-57, "DTC Index".

DATA MONITOR

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

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” in “ABS” with CONSULT is displayed 10 seconds after operation start.
- After “TEST IS STOPPED” in “ABS” with CONSULT is displayed, to perform test again.

Test Item

ABS SOLENOID VALVE

- Select “Up”, “Keep” and “Down” of “ACTIVE TEST” in “ABS” with CONSULT. 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 select, and then Off.

ABS MOTOR

- Select “On” and “Off” of “ACTIVE TEST” in “ABS” with CONSULT 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 IDENTIFICATION

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

DTC/CIRCUIT DIAGNOSIS

C1101, C1102, C1103, C1104 WHEEL SENSOR

Description

INFOID:0000000007350366

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:0000000007350367

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.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

1. Start the engine and drive the vehicle at 30 km/h (19 MPH) or more for approximately 1 minute.
2. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1101”, “C1102”, “C1103” or “C1104” detected?

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

Diagnosis Procedure

INFOID:0000000007666579

CAUTION:
Never check between wheel sensor harness connector terminals.

1.CHECK WHEEL SENSOR

1. Turn the ignition switch OFF.
2. Check wheel sensor for damage.

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.REPLACE WHEEL SENSOR (1)

1. Replace wheel sensor.
- Front: Refer to BRC-66, "FRONT WHEEL SENSOR : Exploded View".
- Rear: Refer to BRC-67, "REAR WHEEL SENSOR : Exploded View".

2. Erase self-diagnosis result for “ABS”.
3. Turn the ignition switch OFF, and wait 10 seconds or more.
4. Start the engine.
5. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
6. Stop the vehicle.

7. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1101”, “C1102”, “C1103” or “C1104” detected?

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

3.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Check ABS actuator and electric unit (control unit) harness connector for disconnection or looseness.
3. Check wheel sensor harness connector for disconnection or looseness.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace error-detected parts, securely lock the harness connector, and GO TO 4.

4.PERFORM SELF-DIAGNOSIS (1)

1. Erase self-diagnosis result for “ABS” with CONSULT.
2. Turn the ignition switch OFF, and wait 10 seconds or more.
3. Start the engine.
4. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
5. Stop the vehicle.
6. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1101”, “C1102”, “C1103” or “C1104” detected?

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

5.CHECK TERMINAL

1. Turn the ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) harness connector and then check ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with harness connector.
3. Disconnect wheel sensor harness connector and check each wheel sensor pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair or replace error-detected parts and GO TO 6.

6.PERFORM SELF-DIAGNOSIS (2)

1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Connect wheel sensor harness connector.
3. Erase self-diagnosis result for “ABS”.
4. Turn the ignition switch OFF, and wait 10 seconds or more.
5. Start the engine.
6. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
7. Stop the vehicle.
8. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1101”, “C1102”, “C1103” or “C1104” detected?

YES >> GO TO 7.
NO >> INSPECTION END

7.CHECK WHEEL SENSOR HARNESS

1. Turn the ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) harness connector.
3. Disconnect wheel sensor harness connector.
4. Check continuity between ABS actuator and electric unit (control unit) harness connector and wheel sensor harness connector. (Check continuity when steering wheel is steered to RH and LH, or center harness in wheel housing is moved.)

Measurement connector and terminal for power supply circuit

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

Measurement connector and terminal for signal circuit

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

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair or replace error-detected parts and GO TO 8.

8. PERFORM SELF-DIAGNOSIS (3)

1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Connect wheel sensor harness connector.
3. Erase self-diagnosis result for “ABS”.
4. Turn the ignition switch OFF, and wait 10 seconds or more.
5. Start the engine.
6. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
7. Stop the vehicle.
8. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1101”, “C1102”, “C1103” or “C1104” detected?

YES >> GO TO 9.
NO >> INSPECTION END

9. REPLACE WHEEL SENSOR

1. Replace wheel sensor.
- Front: Refer to BRC-66, "FRONT WHEEL SENSOR : Exploded View".
- Rear: Refer to BRC-67, "REAR WHEEL SENSOR : Exploded View".
2. Erase self-diagnosis result for “ABS” with CONSULT.
3. Turn the ignition switch OFF, and wait 10 seconds or more.
4. Start the engine.
5. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
6. Stop the vehicle.
7. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1101”, “C1102”, “C1103” or “C1104” detected?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-69, "Exploded View".
NO >> INSPECTION END

C1105, C1106, C1107, C1108 WHEEL SENSOR

Description

INFOID:0000000007350370

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

DTC Logic

INFOID:0000000007350371

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 dynamometer • 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.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

1. Start the engine and drive the vehicle at 30 km/h (19 MPH) or more for approximately 1 minute.
2. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1105”, “C1106”, “C1107” or “C1108” detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-21, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007666580

CAUTION:
Never check between wheel sensor harness connector terminals.

1.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY SYSTEM

Check ABS actuator and electric unit (control unit) power supply system. Refer to BRC-46, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK TIRE

1. Turn the ignition switch OFF.
2. Check tire air pressure, wear and size. Refer to WT-49, "Tire Air Pressure".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Adjust air pressure or replace tire and GO TO 3.

3.CHECK DATA MONITOR (1)

1. Erase self-diagnosis result for “ABS” with CONSULT.
2. Turn the ignition switch OFF, and wait 10 seconds or more.
3. Start the engine.

4. Select “ABS” and “DATA MONITOR”, check “FR LH SENSOR”, “FR RH SENSOR”, “RR LH SENSOR” and “RR RH SENSOR” with CONSULT.
   NOTE:
   Set the “DATA MONITOR” recording speed to “10 msec”.
5. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.

Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

YES >> GO TO 4.
NO >> GO TO 5.

4. PERFORM SELF-DIAGNOSIS (1)

1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
2. Stop the vehicle.
3. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1105”, “C1106”, “C1107” or “C1108” detected?

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

5. CHECK WHEEL SENSOR

1. Turn the ignition switch OFF.
2. Check wheel sensor for damage.
3. Remove dust and foreign matter adhered to the sensor rotor with a vacuum dust collector through the wheel sensor mounting hole.
   CAUTION:
   Install wheel sensor with no backlash and float, and tighten the mounting bolt to the specified torque.
   - **Front: Refer to BRC-66, "FRONT WHEEL SENSOR : Exploded View".**
   - **Rear: Refer to BRC-67, "REAR WHEEL SENSOR : Exploded View".**

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 6.

6. REPLACE WHEEL SENSOR (1)

1. Replace wheel sensor.
- Front: Refer to BRC-66, "FRONT WHEEL SENSOR : Exploded View".
- Rear: Refer to BRC-67, "REAR WHEEL SENSOR : Exploded View".
2. Erase self-diagnosis result for “ABS” with CONSULT.
3. Turn the ignition switch OFF, and wait 10 seconds or more.
4. Start the engine.
5. Select “ABS” and “DATA MONITOR”, check “FR LH SENSOR”, “FR RH SENSOR”, “RR LH SENSOR” and “RR RH SENSOR” with CONSULT.
   NOTE:
   Set the “DATA MONITOR” recording speed to “10 msec”.
6. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.

Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

YES >> GO TO 7.
NO >> GO TO 19.

7. PERFORM SELF-DIAGNOSIS (2)

With CONSULT.
1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
2. Stop the vehicle.
3. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1105”, “C1106”, “C1107” or “C1108” detected?

YES >> GO TO 19.
NO >> INSPECTION END

8. CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Check ABS actuator and electric unit (control unit) harness connector for disconnection or looseness.
3. Check wheel sensor harness connector for disconnection or looseness.

Is the inspection result normal?

YES >> GO TO 11.
NO >> Repair or replace error-detected parts, securely lock the harness connector, and GO TO 9.

9. CHECK DATA MONITOR (2)

1. Erase self-diagnosis result for “ABS” with CONSULT.
2. Turn the ignition switch OFF, and wait 10 seconds or more.
3. Start the engine.
4. Select “ABS” and “DATA MONITOR”, check “FR LH SENSOR”, “FR RH SENSOR”, “RR LH SENSOR” and “RR RH SENSOR” with CONSULT.
   NOTE:
   Set the “DATA MONITOR” recording speed to “10 msec”.
5. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.

Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

YES >> GO TO 10.
NO >> GO TO 11.

10. PERFORM SELF-DIAGNOSIS (3)

1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
2. Stop the vehicle.
3. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1105”, “C1106”, “C1107” or “C1108” detected?

YES >> GO TO 11.
NO >> INSPECTION END

11. CHECK TERMINAL

1. Turn the ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) harness connector and then check ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with harness connector.
3. Disconnect wheel sensor harness connector and check each wheel sensor pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> GO TO 14.
NO >> Repair or replace error-detected parts and GO TO 12.

12. CHECK DATA MONITOR (3)

1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Connect wheel sensor harness connector.
3. Erase self-diagnosis result for “ABS” with CONSULT.
4. Turn the ignition switch OFF, and wait 10 seconds or more.
5. Start the engine.
6. Select “ABS” and “DATA MONITOR”, check “FR LH SENSOR”, “FR RH SENSOR”, “RR LH SENSOR” and “RR RH SENSOR” with CONSULT.
   NOTE:
   Set the “DATA MONITOR” recording speed to “10 msec”.
7. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.

Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

YES >> GO TO 13.
NO >> GO TO 14.

13. PERFORM SELF-DIAGNOSIS (4)

1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
2. Stop the vehicle.
3. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1105”, “C1106”, “C1107” or “C1108” detected?

YES >> GO TO 14.
NO >> INSPECTION END

14. CHECK WHEEL SENSOR HARNESS

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

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

Is the inspection result normal?

YES >> GO TO 15.
NO >> Repair or replace error-detected parts and GO TO 15.

15. CHECK DATA MONITOR (4)

1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Connect wheel sensor harness connector.
3. Erase self-diagnosis result for “ABS” with CONSULT.
4. Turn the ignition switch OFF, and wait 10 seconds or more.
5. Start the engine.
6. Select “ABS” and “DATA MONITOR”, check “FR LH SENSOR”, “FR RH SENSOR”, “RR LH SENSOR” and “RR RH SENSOR” with CONSULT.
   NOTE:
   Set the “DATA MONITOR” recording speed to “10 msec”.
7. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.

Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

YES >> GO TO 16.
NO >> GO TO 17.

16. PERFORM SELF-DIAGNOSIS (5)

1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
2. Stop the vehicle.
3. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1105”, “C1106”, “C1107” or “C1108” detected?

YES >> GO TO 17.
NO >> INSPECTION END

17. REPLACE WHEEL SENSOR

1. Replace wheel sensor.
- Front: Refer to BRC-66, "FRONT WHEEL SENSOR : Exploded View".
- Rear: Refer to BRC-67, "REAR WHEEL SENSOR : Exploded View".
2. Erase self-diagnosis result for “ABS” with CONSULT.
3. Turn the ignition switch OFF, and wait 10 seconds or more.
4. Start the engine.

5. Select “ABS” and “DATA MONITOR”, check “FR LH SENSOR”, “FR RH SENSOR”, “RR LH SENSOR” and “RR RH SENSOR” with CONSULT.
   NOTE:
   Set the “DATA MONITOR” recording speed to “10 msec”.
6. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.

Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

YES >> GO TO 18.
NO >> GO TO 19.

18. PERFORM SELF-DIAGNOSIS (6)

1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
2. Stop the vehicle.
3. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1105”, “C1106”, “C1107” or “C1108” detected?

YES >> GO TO 19.
NO >> INSPECTION END

19. REPLACE SENSOR ROTOR

1. Replace sensor rotor.
- Front: Refer to BRC-68, "FRONT SENSOR ROTOR : Exploded View".
- Rear: Refer to BRC-68, "REAR SENSOR ROTOR : Exploded View".
2. Erase self-diagnosis result for “ABS” with CONSULT.
3. Turn the ignition switch OFF, and wait 10 seconds or more.
4. Start the engine.
5. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
6. Stop the vehicle.
7. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1105”, “C1106”, “C1107” or “C1108” detected?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-69, "Exploded View".
NO >> INSPECTION END

C1109 POWER AND GROUND SYSTEM

Description

INFOID:0000000007350374

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

DTC Logic

INFOID:0000000007350375

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.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

1. Turn the ignition switch OFF to ON.
2. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1109” detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-26, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007350376

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) harness connector.
3. Check terminal for deformation, disconnection, looseness, etc.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

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

1. Check voltage between ABS actuator and electric unit (control unit) harness connector and ground.

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

2. Turn the ignition switch ON.
   CAUTION:
   Never start the engine.
3. Check voltage between ABS actuator and electric unit (control unit) harness connector and ground.

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

Is the inspection result normal?

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

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

1. Turn the ignition switch OFF.
2. Check 10A fusible link (59).
3. Disconnect IPDM E/R harness connector.
4. 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

Is the inspection result normal?

YES >> Perform trouble diagnosis for ignition power supply. Refer to PG-18, "Wiring Diagram - IGNITION POWER SUPPLY -".
NO >> Repair or replace error-detected parts.

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

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

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-69, "Exploded View".
NO >> Repair or replace error-detected parts (check ABS earth bolt for tightness and corrosion).

C1110 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Description

INFOID:0000000007350377

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

DTC Logic

INFOID:0000000007350378

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.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

1. Turn the ignition switch OFF to ON.
2. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1110” detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-28, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007350379

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). Refer to BRC-69, "Exploded View".

C1111 ABS MOTOR, MOTOR RELAY SYSTEM

Description

INFOID:0000000007350380

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:0000000007350381

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.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

1. Turn the ignition switch OFF to ON.
2. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1111” detected?

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

Diagnosis Procedure

INFOID:0000000007350382

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) harness connector.
3. Check terminal for deformation, disconnect, looseness, etc.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace or repair error-detected parts.

2.CHECK ABS MOTOR AND MOTOR RELAY POWER SUPPLY

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

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

Is the inspection result normal?

YES >> GO TO 3.

NO >> Perform trouble diagnosis for battery power supply. Refer to PG-6, "Wiring Diagram - BATTERY POWER SUPPLY -".

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

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

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-69, "Exploded View".
NO >> Repair or replace error-detected parts. (Check ABS each bolt for tightness and corrosion).

C1113 G SENSOR

Description

INFOID:0000000007350384

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:0000000007350385

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.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

1. Turn the ignition switch OFF to ON.
2. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1113” detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-31, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007350386

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) harness connector.
3. Disconnect G sensor harness connector.
4. Check terminal for deformation, disconnection, looseness, etc.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace or repair error-detected parts.

2.CHECK G SENSOR POWER SUPPLY

1. Check voltage between G sensor harness connector and ground.

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

2. Turn the ignition switch ON.
   CAUTION:
   Never start the engine.
3. Check voltage between G sensor harness connector and ground.

G sensor		—	Condition	Voltage
Connector	Terminal			
B32	1	Ground	Ignition switch: ON	Battery voltage

Is the inspection result normal?

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

3.CHECK G SENSOR POWER SUPPLY CIRCUIT

1. Turn the ignition switch OFF.
2. Check 10A fusible link (59).
3. Disconnect IPDM E/R harness connector.
4. Check continuity between G sensor harness connector and IPDM E/R.

G sensor		IPDM E/R		continuity
Connector	Terminal	Connector	Terminal	
B32	1	E15	59	Existed

Is the inspection result normal?

YES >> Perform trouble diagnosis for ignition power supply. Refer to PG-18, "Wiring Diagram - IGNITION POWER SUPPLY -".
NO >> Repair or replace error-detected parts.

4.CHECK G SENSOR HARNESS

Check continuity between G sensor harness connector and ABS actuator and electric unit (control unit) harness connector.

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 5.
NO >> Repair or replace error-detected parts.

5.REPLACE G SENSOR

1. Replace G sensor. Refer to BRC-71, "Exploded View".
2. Erase self-diagnosis result for “ABS” with CONSULT.
3. Turn the ignition switch OFF.
4. Turn the ignition switch ON.
   CAUTION:
   Never start the engine.
5. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1113” detected?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-69, "Exploded View".
NO >> INSPECTION END

C1115 WHEEL SENSOR

Description

INFOID:0000000007350388

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:0000000007350389

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.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

1. Start the engine and drive the vehicle at 30 km/h (19 MPH) or more for approximately 1 minute.
2. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1115”detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-33, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007666581

CAUTION:
For wheel sensor, never check between terminals.

1.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY SYSTEM

Check ABS actuator and electric unit (control unit) power supply system. Refer to BRC-46, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK TIRE

1. Turn the ignition switch OFF.
2. Check tire air pressure, wear and size. Refer to WT-49, "Tire Air Pressure".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Adjust air pressure or replace tire and GO TO 3.

3.CHECK DATA MONITOR (1)

1. Erase self-diagnosis result for “ABS” with CONSULT.
2. Turn the ignition switch OFF, and wait 10 seconds or more.
3. Start the engine.
4. Select “ABS” and “DATA MONITOR”, check “FR LH SENSOR”, “FR RH SENSOR”, “RR LH SENSOR” and “RR RH SENSOR” with CONSULT.
   NOTE:
   Set the “DATA MONITOR” recording speed to “10 msec”.

5. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.

Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

YES >> GO TO 4.
NO >> GO TO 5.

4. PERFORM SELF-DIAGNOSIS (1)

1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
2. Stop the vehicle.
3. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1115” detected?

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

5. CHECK WHEEL SENSOR

1. Turn the ignition switch OFF.
2. Check wheel sensor for damage.
3. Remove dust and foreign matter adhered to the sensor rotor with a vacuum dust collector through the wheel sensor mounting hole.

CAUTION:
Install wheel sensor with no backlash and float, and tighten the mounting bolt to the specified torque.
- **Front: Refer to BRC-66, "FRONT WHEEL SENSOR : Exploded View".**
- **Rear: Refer to BRC-67, "REAR WHEEL SENSOR : Exploded View".**

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 6.

6. REPLACE WHEEL SENSOR (1)

1. Replace wheel sensor.

- Front: Refer to BRC-66, "FRONT WHEEL SENSOR : Exploded View".
- Rear: Refer to BRC-67, "REAR WHEEL SENSOR : Exploded View".

2. Erase self-diagnosis result for “ABS” with CONSULT.
3. Turn the ignition switch OFF, and wait 10 seconds or more.
4. Start the engine.
5. Select “ABS” and “DATA MONITOR”, check “FR LH SENSOR”, “FR RH SENSOR”, “RR LH SENSOR” and “RR RH SENSOR” with CONSULT.

NOTE:
Set the “DATA MONITOR” recording speed to “10 msec”.

6. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.

Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

YES >> GO TO 7.
NO >> GO TO 19.

7. PERFORM SELF-DIAGNOSIS (2)

1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
2. Stop the vehicle.
3. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1115” detected?

YES >> GO TO 19.
NO >> INSPECTION END

8. CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Check ABS actuator and electric unit (control unit) harness connector for disconnection or looseness.
3. Check wheel sensor harness connector for disconnection or looseness.

Is the inspection result normal?

YES >> GO TO 11.
NO >> Repair or replace error-detected parts, securely lock the harness connector, and GO TO 9.

9. CHECK DATA MONITOR (2)

1. Erase self-diagnosis result for “ABS” with CONSULT.
2. Turn the ignition switch OFF, and wait 10 seconds or more.
3. Start the engine.
4. Select “ABS” and “DATA MONITOR”, check “FR LH SENSOR”, “FR RH SENSOR”, “RR LH SENSOR” and “RR RH SENSOR” with CONSULT.
   NOTE:
   Set the “DATA MONITOR” recording speed to “10 msec”.
5. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.

Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

YES >> GO TO 10.
NO >> GO TO 11.

10. PERFORM SELF-DIAGNOSIS (3)

1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
2. Stop the vehicle.
3. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1115” detected?

YES >> GO TO 11.
NO >> INSPECTION END

11. CHECK TERMINAL

1. Turn the ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) harness connector and then check ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with harness connector.
3. Disconnect wheel sensor harness connector and check each wheel sensor pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> GO TO 14.
NO >> Repair or replace error-detected parts and GO TO 12.

12. CHECK DATA MONITOR (3)

1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Connect wheel sensor harness connector.
3. Erase self-diagnosis result for “ABS” with CONSULT.
4. Turn the ignition switch OFF, and wait 10 seconds or more.
5. Start the engine.
6. Select “ABS” and “DATA MONITOR”, check “FR LH SENSOR”, “FR RH SENSOR”, “RR LH SENSOR” and “RR RH SENSOR” with CONSULT.
   NOTE:
   Set the “DATA MONITOR” recording speed to “10 msec”.
7. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.

Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

YES >> GO TO 13.
NO >> GO TO 14.

13. PERFORM SELF-DIAGNOSIS (4)

1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
2. Stop the vehicle.
3. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1115” detected?

YES >> GO TO 14.
NO >> INSPECTION END

14. CHECK WHEEL SENSOR HARNESS

1. Turn the ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) harness connector.
3. Disconnect wheel sensor harness connector.
4. Check continuity between ABS actuator and electric unit (control unit) harness connector and wheel sensor harness connector. (Check continuity when steering wheel is steered to RH and LH, or center harness in wheel housing is moved.)

Measurement connector and terminal for power supply circuit

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

Measurement connector and terminal for signal circuit

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

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

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

Is the inspection result normal?

YES >> GO TO 15.
NO >> Repair or replace error-detected parts and GO TO 15.

15. CHECK DATA MONITOR (4)

1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Connect wheel sensor harness connector.
3. Erase self-diagnosis result for “ABS” with CONSULT.
4. Turn the ignition switch OFF, and wait 10 seconds or more.
5. Start the engine.
6. Select “ABS” and “DATA MONITOR”, check “FR LH SENSOR”, “FR RH SENSOR”, “RR LH SENSOR” and “RR RH SENSOR” with CONSULT.
   NOTE:
   Set the “DATA MONITOR” recording speed to “10 msec”.
7. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.

Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

YES >> GO TO 16.
NO >> GO TO 17.

16. PERFORM SELF-DIAGNOSIS (5)

1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
2. Stop the vehicle.
3. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1115” detected?

YES >> GO TO 17.
NO >> INSPECTION END

17. REPLACE WHEEL SENSOR

1. Replace wheel sensor.
- Front: Refer to BRC-66, "FRONT WHEEL SENSOR : Exploded View".
- Rear: Refer to BRC-67, "REAR WHEEL SENSOR : Exploded View".
2. Erase self-diagnosis result for “ABS” with CONSULT.
3. Turn the ignition switch OFF, and wait 10 seconds or more.
4. Start the engine.
5. Select “ABS” and “DATA MONITOR”, check “FR LH SENSOR”, “FR RH SENSOR”, “RR LH SENSOR” and “RR RH SENSOR” with CONSULT.
   NOTE:
   Set the “DATA MONITOR” recording speed to “10 msec”.
6. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.

Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

YES >> GO TO 18.
NO >> GO TO 19.

18. PERFORM SELF-DIAGNOSIS (6)

1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
2. Stop the vehicle.
3. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1115” detected?

YES >> GO TO 19.
NO >> INSPECTION END

19. REPLACE SENSOR ROTOR

1. Replace sensor rotor.
- Front: Refer to BRC-68, "FRONT SENSOR ROTOR : Exploded View".
- Rear: Refer to BRC-68, "REAR SENSOR ROTOR : Exploded View".
2. Erase self-diagnosis result for “ABS”.
3. Turn the ignition switch OFF, and wait 10 seconds or more.
4. Start the engine.
5. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
6. Stop the vehicle.
7. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1115” detected?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-69, "Exploded View".
NO >> INSPECTION END

C1120, C1122, C1124, C1126 IN ABS SOL

Description

INFOID:0000000007350392

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:0000000007350393

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.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

1. Turn the ignition switch OFF to ON.
2. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1120”, “C1122”, “C1124” or “C1126” detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-38, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007350394

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) harness connector.
3. Check terminal for deformation, disconnection, looseness, etc.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace or repair error-detected parts.

2.CHECK SOLENOID VALVE POWER SUPPLY

Check voltage between ABS actuator and electric unit (control unit) harness connector 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 >> Perform trouble diagnosis for battery power supply. Refer to PG-6, "Wiring Diagram - BATTERY POWER SUPPLY -".

3.CHECK SOLENOID VALVE GROUND CIRCUIT

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

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-69, "Exploded View".
NO >> Repair or replace error-detected parts.

C1121, C1123, C1125, C1127 OUT ABS SOL

Description

INFOID:0000000007350396

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:0000000007350397

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.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

1. Turn the ignition switch OFF to ON.
2. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1121”, “C1123”, “C1125” or “C1127” detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-40, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007350398

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) harness connector.
3. Check terminal for deformation, disconnection, looseness, etc.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace or repair error-detected parts.

2.CHECK SOLENOID VALVE POWER SUPPLY

Check voltage between ABS actuator and electric unit (control unit) harness connector 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 >> Perform trouble diagnosis for battery power supply. Refer to PG-6, "Wiring Diagram - BATTERY POWER SUPPLY -".

3.CHECK SOLENOID VALVE GROUND CIRCUIT

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

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-69, "Exploded View".
NO >> Repair or replace error-detected parts.

C1140 ACTUATOR RELAY SYSTEM

Description

INFOID:0000000007350400

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

DTC Logic

INFOID:0000000007350401

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.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

1. Turn the ignition switch OFF to ON.
2. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1140” detected?

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

Diagnosis Procedure

INFOID:0000000007350402

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) harness connector.
3. Check terminal for deformation, disconnection, looseness, etc.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace or repair error-detected parts.

2.CHECK ACTUATOR RELAY POWER SUPPLY

Check voltage between ABS actuator and electric unit (control unit) harness connector 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 >> Perform trouble diagnosis for battery power supply. Refer to PG-6, "Wiring Diagram - BATTERY POWER SUPPLY -".

3.CHECK ACTUATOR RELAY GROUND CIRCUIT

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

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-69, "Exploded View".
NO >> Repair or replace error-detected parts.

U1000 CAN COMM CIRCUIT

Description

INFOID:0000000007350404

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:0000000007350405

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.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

1. Turn the ignition switch OFF to ON.
2. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “U1000” detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-44, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007350406

1.PERFORM ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) SELF-DIAGNOSIS

Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “U1000” detected?

YES >> Proceed to LAN-16, "Trouble Diagnosis Flow Chart".
NO >> INSPECTION END

U1010 CONTROL UNIT (CAN)

Description

INFOID:0000000007350407

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:0000000007350408

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.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

1. Turn the ignition switch OFF to ON.
2. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “U1010” detected?

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

Diagnosis Procedure

INFOID:0000000007350409

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-69, "Exploded View".
NO >> Repair or replace error-detected parts.

POWER SUPPLY AND GROUND CIRCUIT

Description

INFOID:0000000007667123

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

Diagnosis Procedure

INFOID:0000000007667124

1.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) IGNITION POWER SUPPLY

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E36	16	Ground	Approx. 0 V

4. Turn the ignition switch ON.
   CAUTION:
   Never start the engine.
5. Check the voltage between ABS actuator and electric unit (control unit) harness connector and ground.

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E36	16	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

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

1. Turn the ignition switch OFF.
2. Check 10A fuse (59).
3. Disconnect IPDM E/R harness connector.
4. Check continuity between ABS actuator and electric unit (control unit) harness connector and IPDM E/R harness connector.

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

Is the inspection result normal?

YES >> Perform trouble diagnosis for ignition power supply. Refer to PG-18, "Wiring Diagram - IGNITION POWER SUPPLY -".
NO >> Repair or replace error-detected parts.

3.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) BATTERY POWER SUPPLY

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E36	1	Ground	Battery voltage
	2		

3. Turn the ignition switch ON.
   CAUTION:

Never start the engine.

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E36	1	Ground	Battery voltage
	2		

Is the inspection result normal?

YES >> GO TO 4.
NO >> Perform trouble diagnosis for battery power supply. Refer to PG-6, "Wiring Diagram - BATTERY POWER SUPPLY -".

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

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

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

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair or replace error-detected parts.

BRAKE FLUID LEVEL SWITCH

Description

INFOID:0000000007350410

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:0000000007350411

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 >> Proceed to diagnosis procedure. Refer to BRC-48, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007350412

1.CHECK BRAKE FLUID LEVEL

Check brake fluid level. Refer to BR-11, "Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Refill brake fluid. Refer to BR-11, "Refilling".

2.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect brake fluid level switch harness connector and combination meter harness connector.
3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect harness connectors and then perform component function check. Refer to BRC-48, "Component Function Check".

Is the inspection result normal?

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

3.CHECK BRAKE FLUID LEVEL SWITCH

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

Brake fluid level switch Terminal	Condition	Continuity
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 4.
NO >> Brake fluid level switch is malfunction. Replace reservoir tank.

4.CHECK BRAKE FLUID LEVEL SWITCH CIRCUIT

1. Disconnect combination meter harness connector.
2. Check continuity between brake fluid level switch harness connector and combination meter harness connector.

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

3. Check continuity between combination meter harness connector and ground.

Combination meter		—	Continuity
Connector	Terminal		
M34	27	Ground	Not existed

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

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

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair or replace error-detected parts.

Component Inspection

INFOID:0000000007350413

1. CHECK BRAKE FLUID LEVEL SWITCH

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

Brake fluid level switch	Condition	Continuity
Terminal		
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. Refer to BR-28, "Disassembly and Assembly".

PARKING BRAKE SWITCH

Description

INFOID:0000000007350414

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:0000000007350415

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 >> Proceed to diagnosis procedure. Refer to BRC-50, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007350416

1.CHECK PARKING BRAKE SWITCH

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

Parking brake switch Terminal	—	Condition	Continuity
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-27, "CONSULT Function".

Is the inspection result normal?

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

Component Inspection

INFOID:0000000007350417

1.CHECK PARKING BRAKE SWITCH

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

Parking brake switch Terminal	—	Condition	Continuity
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:0000000007350418

×: 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:0000000007350419

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 >> Proceed to diagnosis procedure. Refer to BRC-52, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007350420

1.CHECK SELF-DIAGNOSIS

Perform self-diagnosis for “ABS” with CONSULT.

Is the inspection result normal?

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

2.CHECK COMBINATION METER

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-69, "Exploded View".
NO >> Repair or replace combination meter.

BRAKE WARNING LAMP

Description

INFOID:0000000007350421

×: 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:0000000007350422

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 >> Proceed to diagnosis procedure. Refer to BRC-53, "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-50, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007350423

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-50, "Diagnosis Procedure".

2.CHECK SELF-DIAGNOSIS

Perform self-diagnosis for “ABS” with CONSULT.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check items displayed by self-diagnosis.

3.CHECK COMBINATION METER

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-69, "Exploded View".
NO >> Repair or replace combination meter.

ECU DIAGNOSIS INFORMATION

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Reference Value

INFOID:0000000007350424

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 G sensor	Changes according to an indication shown by the G sensor	On
			Off
DECEL G-SEN2 (Note 2)	Decel G detected by G sensor	Changes according to an indication shown by the G sensor	On
			Off
FR RH IN SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” in “ABS” with CONSULT)	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” in “ABS” with CONSULT)	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” in “ABS” with CONSULT)	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” in “ABS” with CONSULT)	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” in “ABS” with CONSULT)	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” in “ABS” with CONSULT)	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” in “ABS” with CONSULT)	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” in “ABS” with CONSULT)	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:

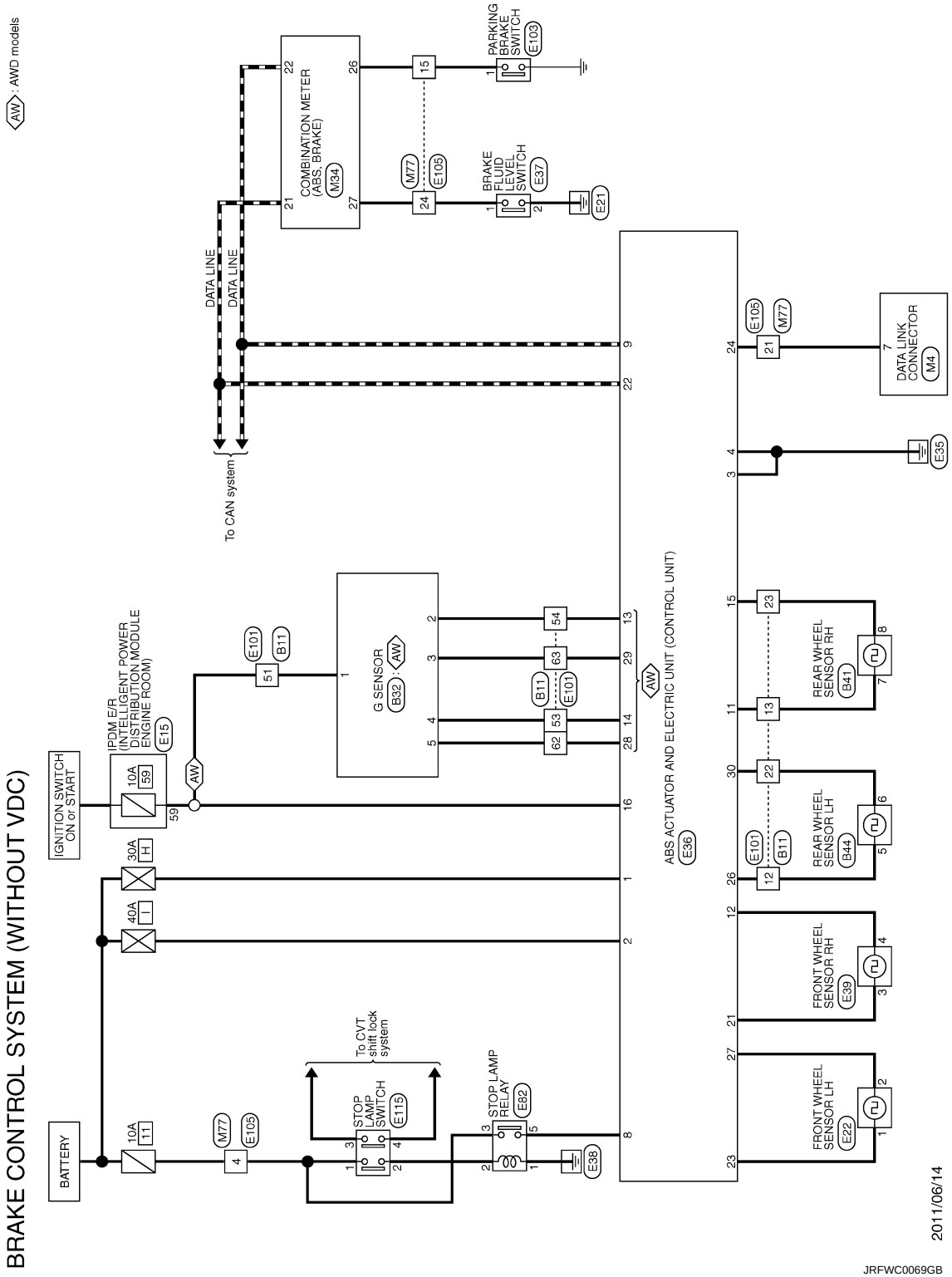
- 1: Confirm tire pressure is normal.
- 2: Only AWD models.
- 3: Every 20 seconds momentary switch to Off.
- 4: On and off timing for warning lamp and indicator lamp.

- ABS warning lamp: Refer to BRC-52, "Description".

Wiring Diagram -BRAKE CONTROL SYSTEM-

INFOID:0000000007350425

For connector terminal arrangements, harness layouts, and alphabets in a ⬡ (option abbreviation; if not described in wiring diagram), refer to GI-12, "Connector Information".



Fail-Safe

INFOID:0000000007350426

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:0000000007350427

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-26, "DTC Logic"
C1110	CONTROLLER FAILURE	BRC-28, "DTC Logic"
C1111	PUMP MOTOR	BRC-29, "DTC Logic"
C1113	G SENSOR	BRC-31, "DTC Logic"
C1115	ABS SENSOR [ABNORMAL SIGNAL]	BRC-33, "DTC Logic"
C1120	FR LH IN ABS SOL	BRC-38, "DTC Logic"
C1121	FR LH OUT ABS SOL	BRC-40, "DTC Logic"
C1122	FR RH IN ABS SOL	BRC-38, "DTC Logic"
C1123	FR RH OUT ABS SOL	BRC-40, "DTC Logic"
C1124	RR LH IN ABS SOL	BRC-38, "DTC Logic"
C1125	RR LH OUT ABS SOL	BRC-40, "DTC Logic"
C1126	RR RH IN ABS SOL	BRC-38, "DTC Logic"
C1127	RR RH OUT ABS SOL	BRC-40, "DTC Logic"
C1140	ACTUATOR RLY	BRC-42, "DTC Logic"
U1000	CAN COMM CIRCUIT	BRC-44, "DTC Logic"
U1010	CONTROL UNIT (CAN)	BRC-45, "DTC Logic"

SYMPTOM DIAGNOSIS

EXCESSIVE ABS FUNCTION OPERATION FREQUENCY

Diagnosis Procedure

INFOID:0000000007350428

1.CHECK START

Check front and rear brake force distribution using a brake tester. Refer to BR-48, "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-7, "Inspection".
  - AWD models: Refer to FAX-33, "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 error-detected parts.

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 for “ABS” with CONSULT.
NO >> Normal

UNEXPECTED PEDAL REACTION

Diagnosis Procedure

INFOID:0000000007350429

1.CHECK BRAKE PEDAL STROKE

Check brake pedal stroke. Refer to BR-8, "Inspection and Adjustment".

Is the stroke too large?

YES >> • Bleed air from brake tube and hose. Refer to BR-12, "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-8, "Inspection and Adjustment".
- Master cylinder: Refer to BR-13, "Inspection".
- Brake booster: Refer to BR-14, "Inspection".

NO >> GO TO 2.

2.CHECK FUNCTION

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

Is the inspection result normal?

YES >> Normal
NO >> Check brake system.

THE BRAKING DISTANCE IS LONG

Diagnosis Procedure

INFOID:0000000007350430

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

Is the inspection result normal?

YES >> Normal
NO >> Check brake system.

ABS FUNCTION DOES NOT OPERATE

Diagnosis Procedure

INFOID:0000000007350431

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 for “ABS” with CONSULT.

PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

Diagnosis Procedure

INFOID:0000000007350432

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 for “ABS” with CONSULT.

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:0000000007350433

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

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

INFOID:0000000007669014

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 AIR BAG” and “SEAT BELT” of this Service Manual.

WARNING:

Always observe the following items for preventing accidental activation.

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision that 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 “SRS AIR BAG”.**
- **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.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

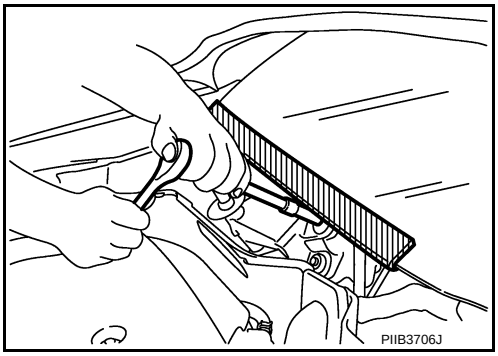
Always observe the following items for preventing accidental activation.

- **When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the ignition ON or engine running, never use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution for Procedure without Cowl Top Cover

INFOID:0000000007669016

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



Precaution for Brake System

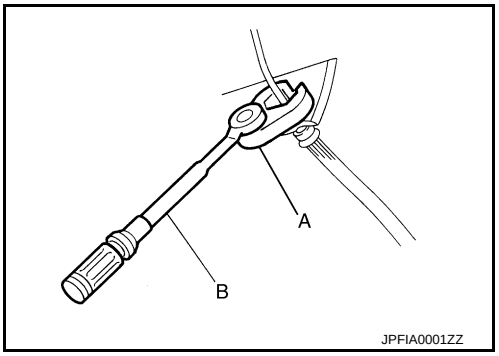
INFOID:0000000007350440

WARNING:

Since dust covering the front and rear brakes has an affect on human body, the dust must be removed with a dust collector. Never splatter the dust with an air blow gun.

- Brake fluid use refer to MA-15, "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) harness connector or the battery negative terminal before performing the work.
- Check that no brake fluid leakage is present after replacing the parts.



Precaution for Brake Control

INFOID:0000000007350441

- 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.

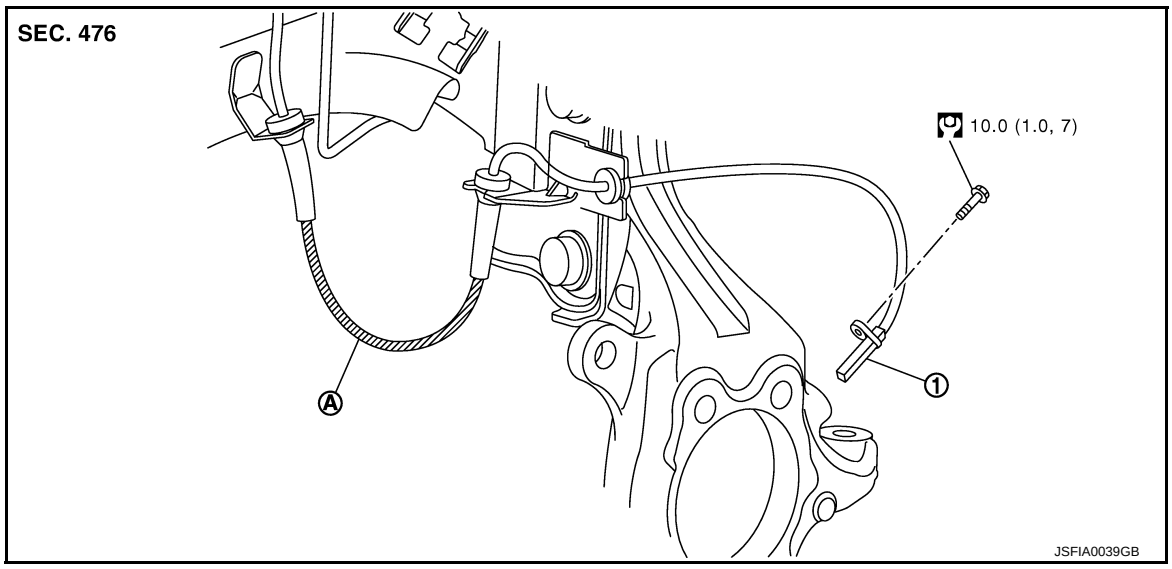
REMOVAL AND INSTALLATION

WHEEL SENSOR

FRONT WHEEL SENSOR

FRONT WHEEL SENSOR : Exploded View

INFOID:0000000007350442



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:0000000007350443

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

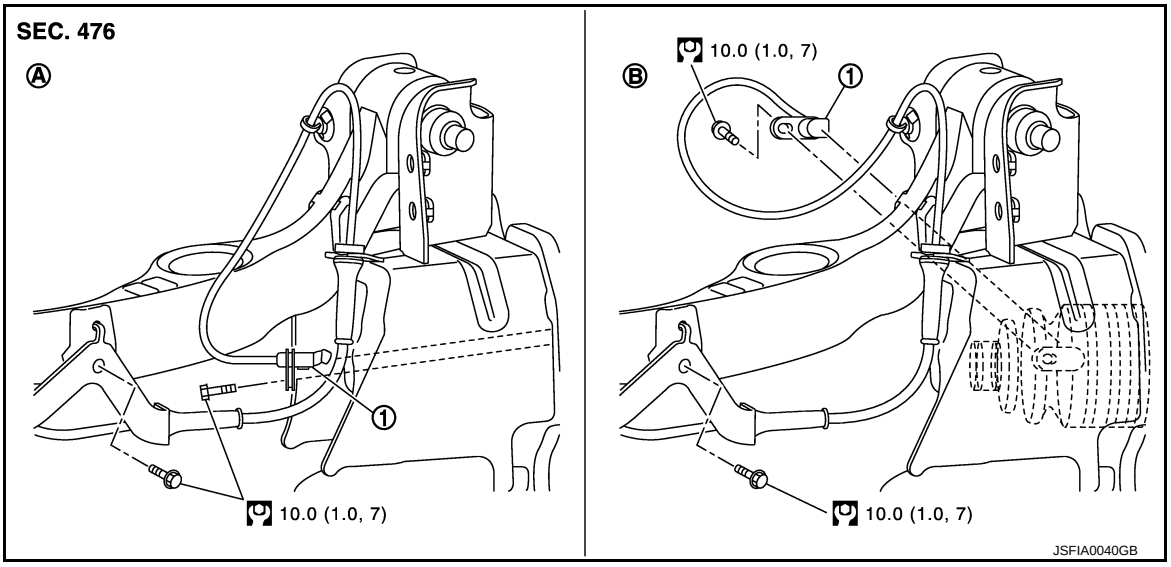
Pay attention to the following when installing wheel sensor. Tighten installation bolts to the specified torques.

- 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:0000000007350444



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:0000000007350445

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:0000000007350446

Refer to FAX-9, "Exploded View" (2WD models), FAX-35, "Exploded View" (AWD models).

FRONT SENSOR ROTOR : Removal and Installation

INFOID:0000000007350447

REMOVAL

Sensor rotor cannot be disassembled. Remove the sensor rotor together with hub and bearing assembly. Refer to FAX-9, "Removal and Installation" (2WD models), FAX-35, "Removal and Installation" (AWD models).

INSTALLATION

Sensor rotor cannot be disassembled. Installation the sensor rotor together with hub and bearing assembly. Refer to FAX-9, "Removal and Installation" (2WD models), FAX-35, "Removal and Installation" (AWD models).

REAR SENSOR ROTOR

REAR SENSOR ROTOR : Exploded View

INFOID:0000000007350448

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

REAR SENSOR ROTOR : Removal and Installation

INFOID:0000000007350449

2WD MODELS

Removal

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

Installation

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

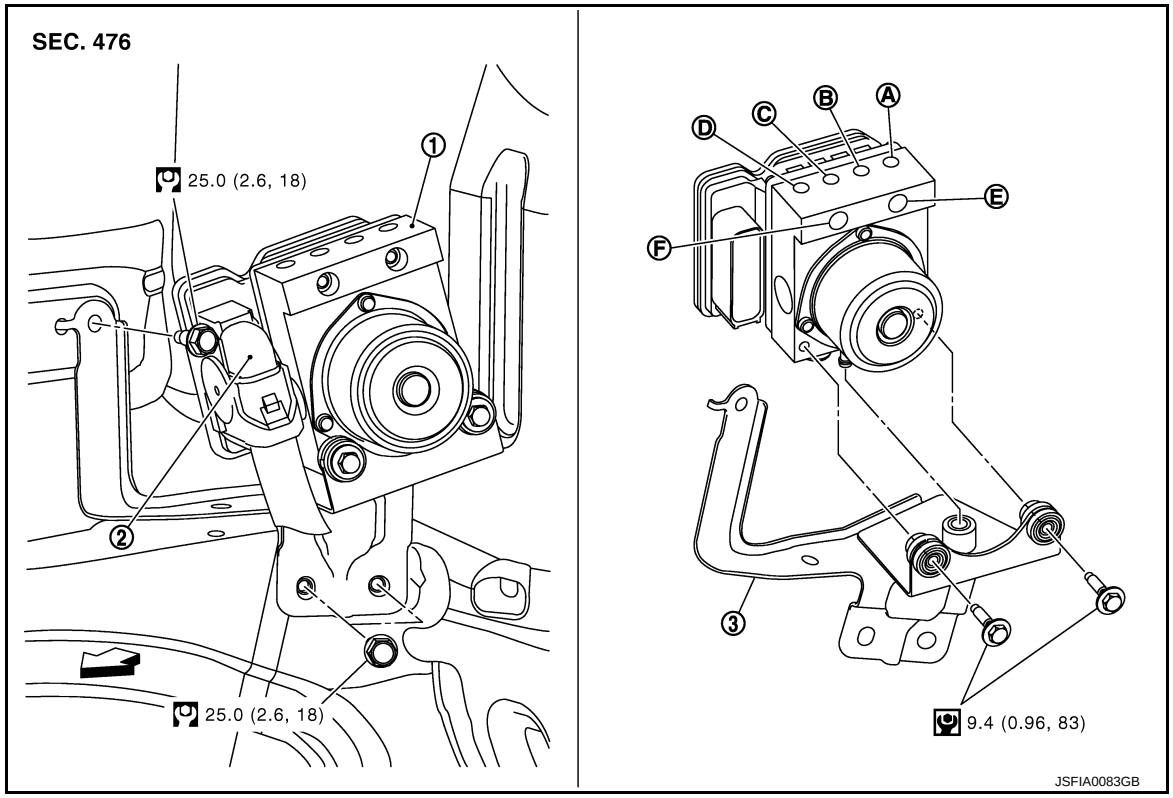
AWD MODELS

For removal and installation of sensor rotor, refer to RAX-17, "Disassembly and Assembly".

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Exploded View

INFOID:0000000007350450



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:0000000007350451

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-12, "Bleeding Brake System".**

1. Remove cowl top. Refer to EXT-20, "Exploded View".
2. Disconnect ABS actuator and electric unit (control unit) harness 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

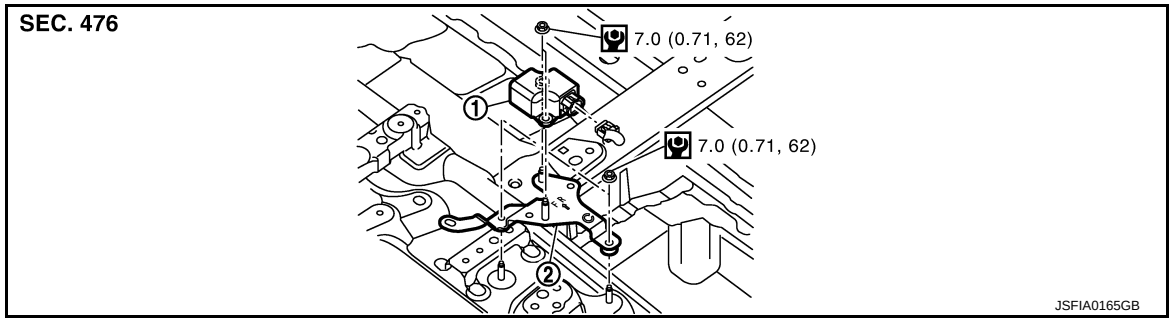
Note the following, and install in the reverse order of removal.

- 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-12, "Bleeding Brake System".
- After installing harness connector in the ABS actuator and electric unit (control unit), make sure harness connector is securely locked.

G SENSOR

Exploded View

INFOID:0000000007350452



1. G sensor
2. Bracket

⇦: Vehicle front

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

Removal and Installation

INFOID:0000000007350453

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-22, "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

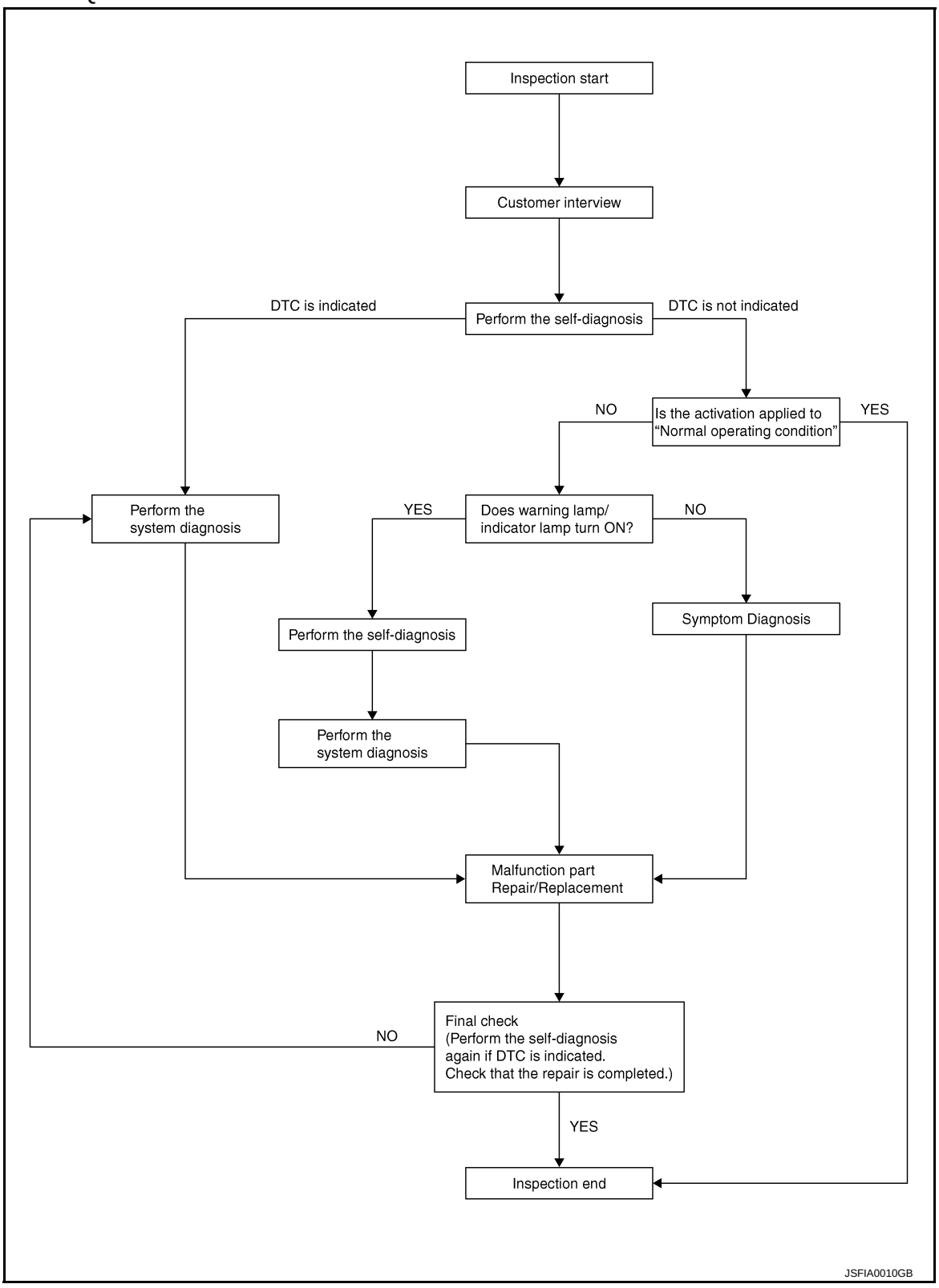
Work Flow

INFOID:0000000007350454

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-76, "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-75, "Diagnostic Work Sheet".

>> GO TO 2.

2.PERFORM THE SELF-DIAGNOSIS

Perform self-diagnosis with CONSULT.

Is there any DTC displayed?

YES >> Record or print self-diagnosis results and freeze frame data (FFD) GO TO 3.
NO >> GO TO 4.

3.PERFORM THE SYSTEM DIAGNOSIS

Perform the diagnosis applicable to the displayed DTC of “ABS” with CONSULT. Refer to BRC-166, "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-174, "Description".

Is the symptom a normal operation?

YES >> GO TO 8.
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-155, "Description".
- Brake warning lamp: Refer to BRC-156, "Description".
- VDC warning lamp: Refer to BRC-158, "Description".
- VDC OFF indicator lamp: Refer to BRC-159, "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 displayed DTC of “ABS” with CONSULT.

>> GO TO 7.

7.REPAIR OR REPLACE THE MALFUNCTIONING PARTS

Repair or replace the specified malfunctioning parts.

>> GO TO 8.

8.MEMORY CLEAR

Perform self-diagnosis memory clear for “ABS” with CONSULT.

>> GO TO 9.

9.FINAL CHECK

Perform the self-diagnosis again, and check that the malfunction is repaired completely.

Is no other DTC present and the repair completed?

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

Diagnostic Work Sheet

INFOID:0000000007350455

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:0000000007350456

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:0000000007350457

ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

CAUTION:

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

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. Select “ABS”, “WORK SUPPORT” and “ST ANGLE SENSOR ADJUSTMENT” in order with CONSULT.
2. Select “START”.
   CAUTION:
   Never touch steering wheel while adjusting steering angle sensor.
3. After approximately 10 seconds, select “END”.
   NOTE:
   After approximately 60 seconds, it ends automatically.
4. Turn the 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 “ABS”, “DATA MONITOR” and “STR ANGLE SIG” in order with CONSULT, and check steering angle sensor signal.

STR ANGLE SIG : 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 for “ABS” and “ENGINE” with CONSULT.
- “ABS”: Refer to BRC-94, "CONSULT Function".
- “ENGINE”: Refer to EC-107, "CONSULT Function".

Are the memories erased?

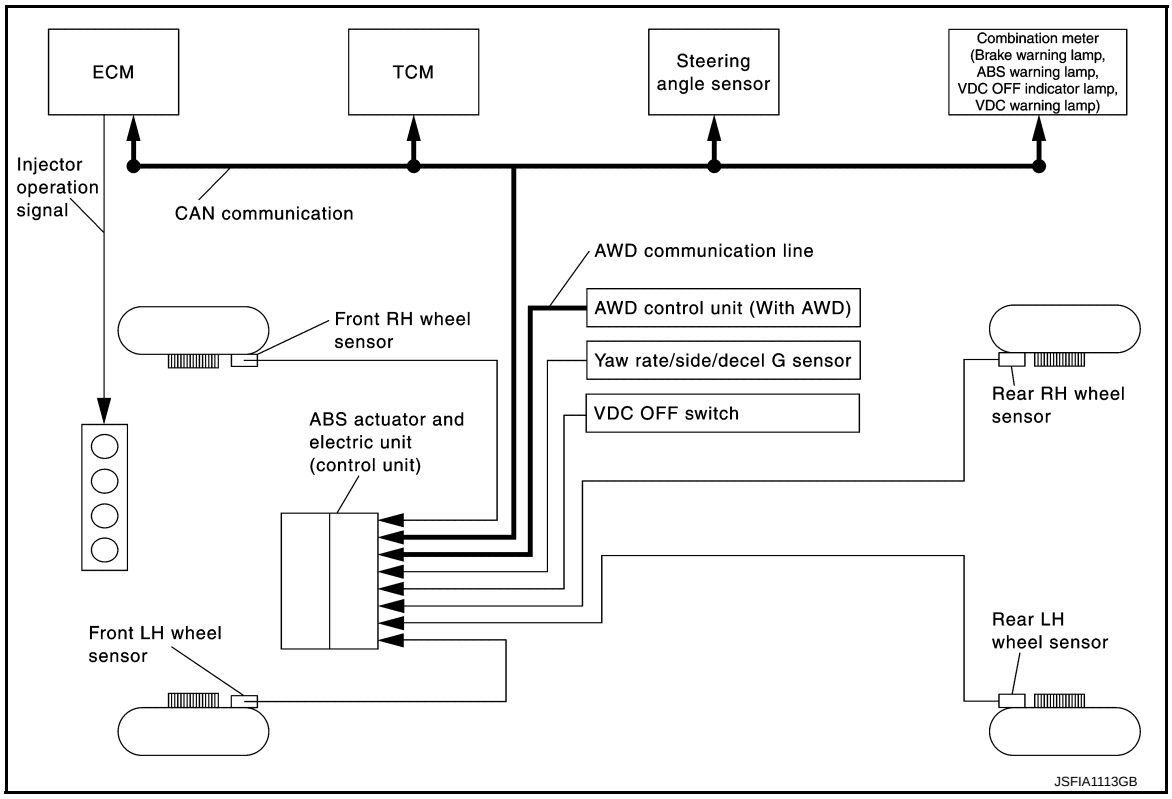
YES >> INSPECTION END
NO >> Check the items indicated by the self-diagnosis.

SYSTEM DESCRIPTION

VDC

System Diagram

INFOID:0000000007350458



System Description

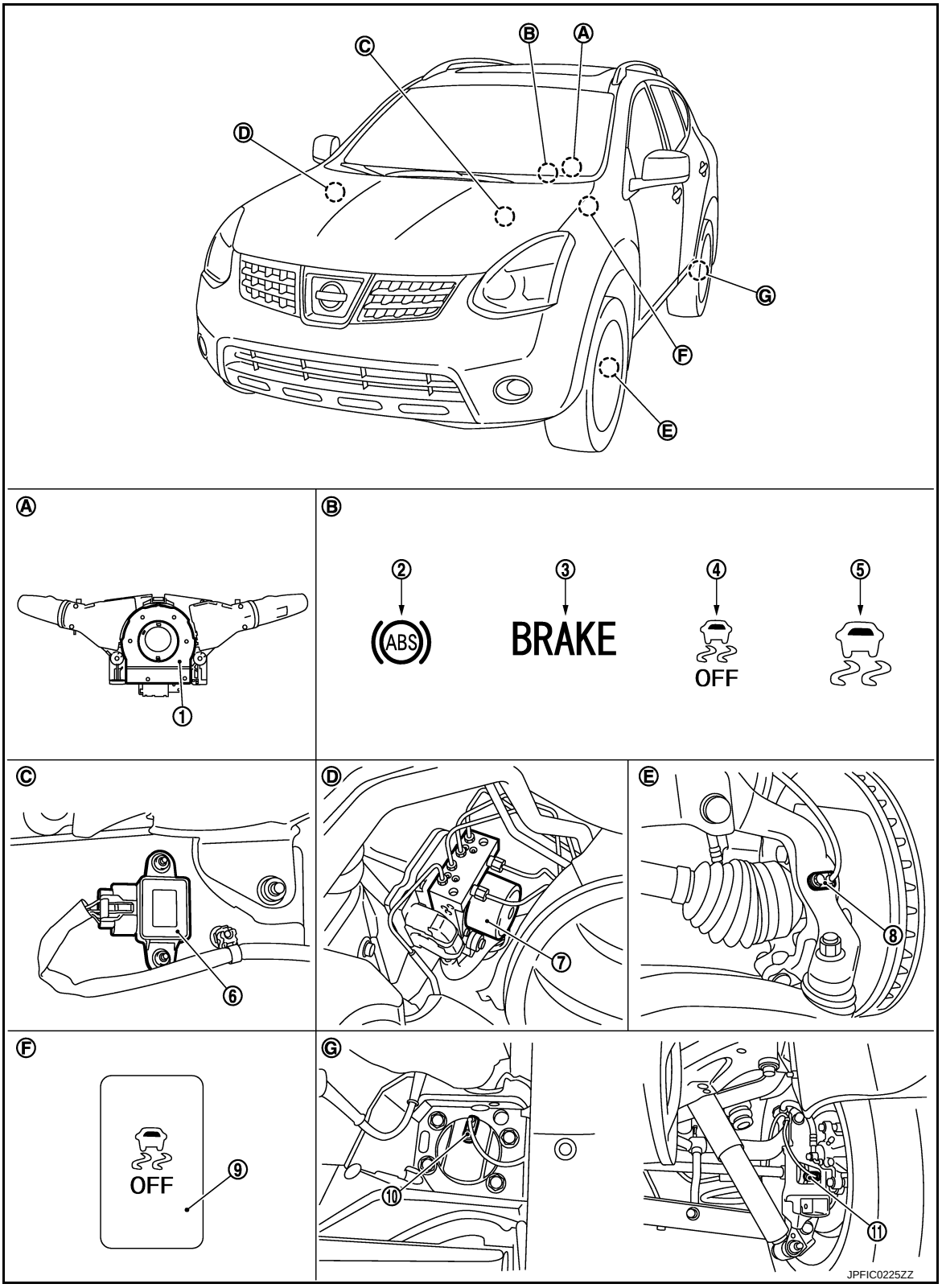
INFOID:0000000007350459

- 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 VDC warning lamp.
- Electrical system diagnosis by CONSULT is available.

Component Parts Location

INFOID:0000000007350460

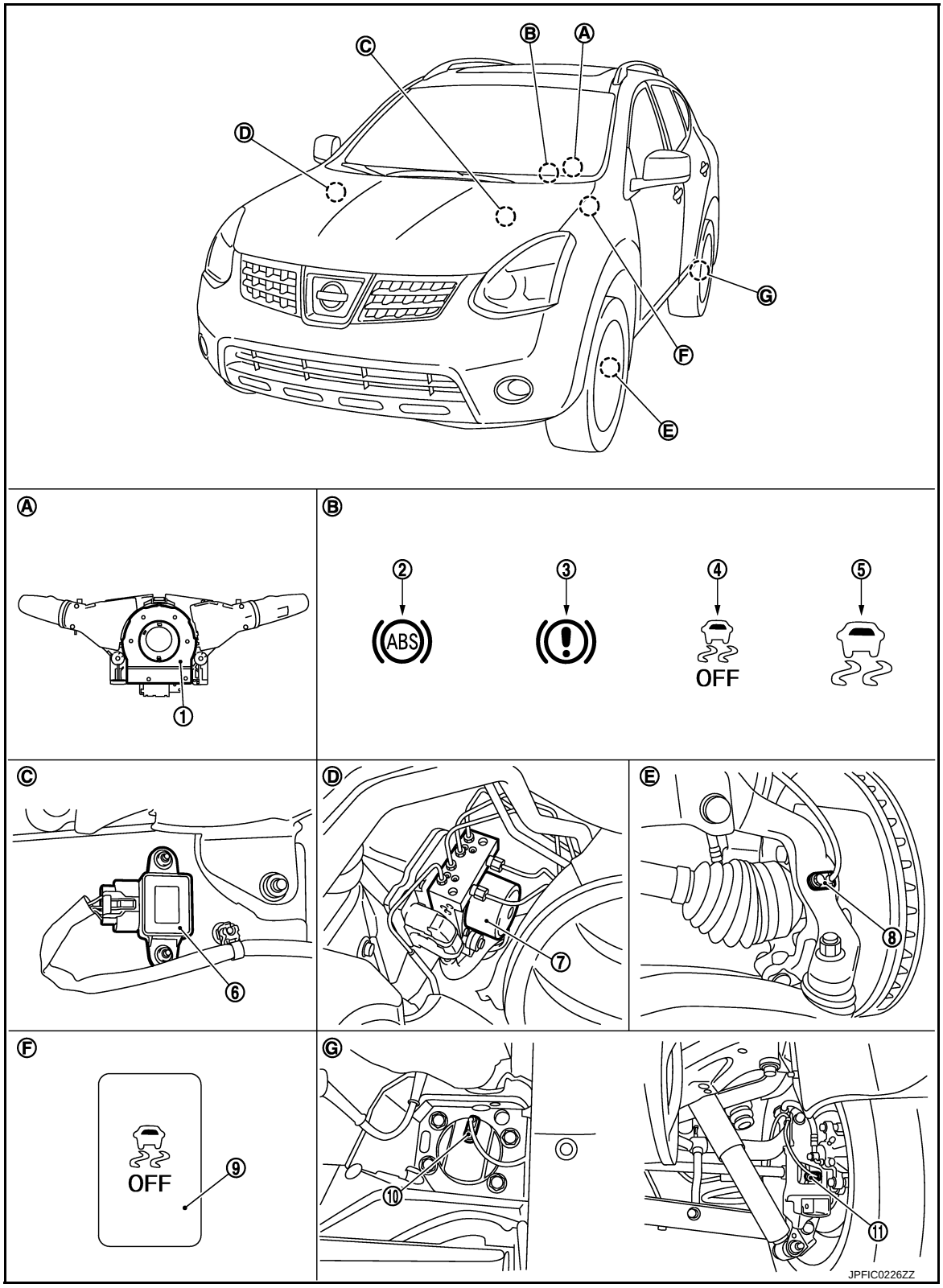
FOR USA



1. Steering angle sensor
2. ABS warning lamp
3. Brake warning lamp
4. VDC OFF indicator lamp
5. VDC warning 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. VDC warning 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

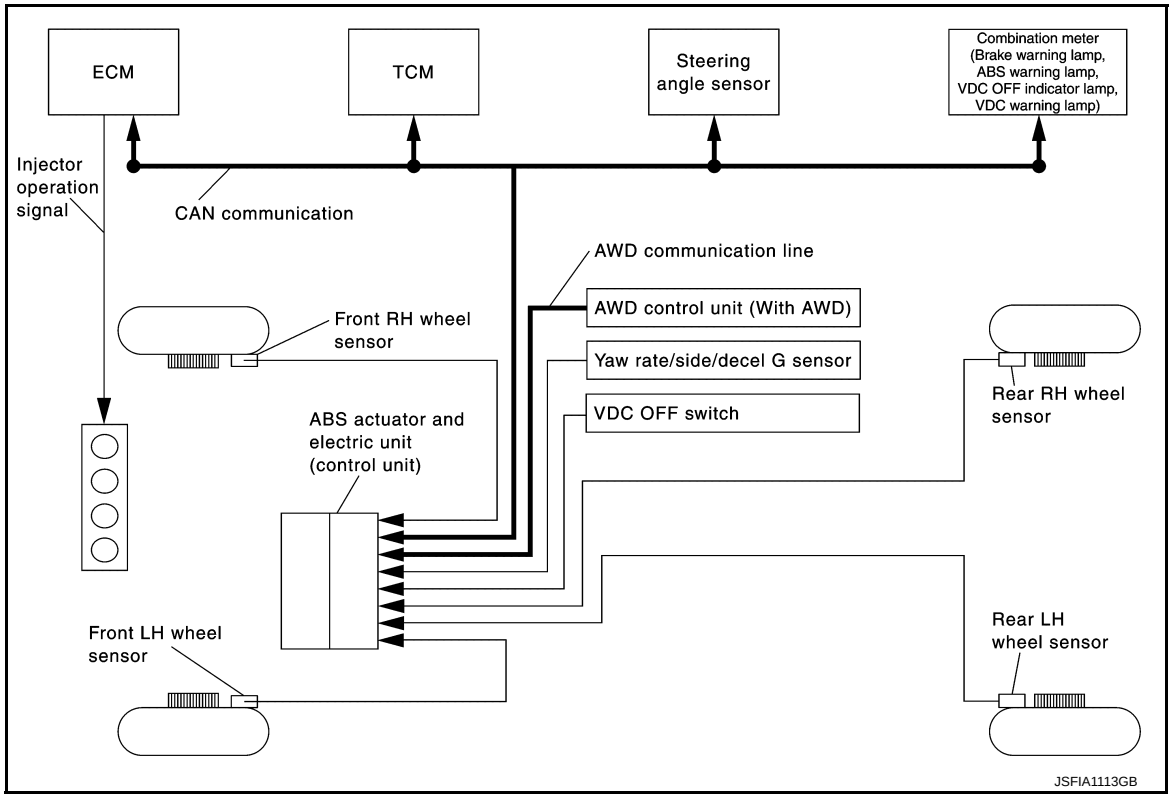
INFOID:0000000007350461

Component parts		Reference
ABS actuator and electric unit (control unit)	Pump	BRC-110, "Description"
	Motor	
	Actuator relay (Main relay)	BRC-132, "Description"
	Solenoid valve	BRC-127, "Description"
	VDC switch-over valve (CV1, CV2)	BRC-139, "Description"
	VDC switch-over valve (SV1, SV2)	BRC-141, "Description"
Wheel sensor		BRC-99, "Description"
Yaw rate/side/decel G sensor		BRC-112, "Description"
Steering angle sensor		BRC-134, "Description"
VDC OFF switch		BRC-153, "Description"
ABS warning lamp		BRC-155, "Description"
Brake warning lamp		BRC-156, "Description"
VDC OFF indicator lamp		BRC-159, "Description"
VDC warning lamp		BRC-158, "Description"

TCS

System Diagram

INFOID:0000000007350462



System Description

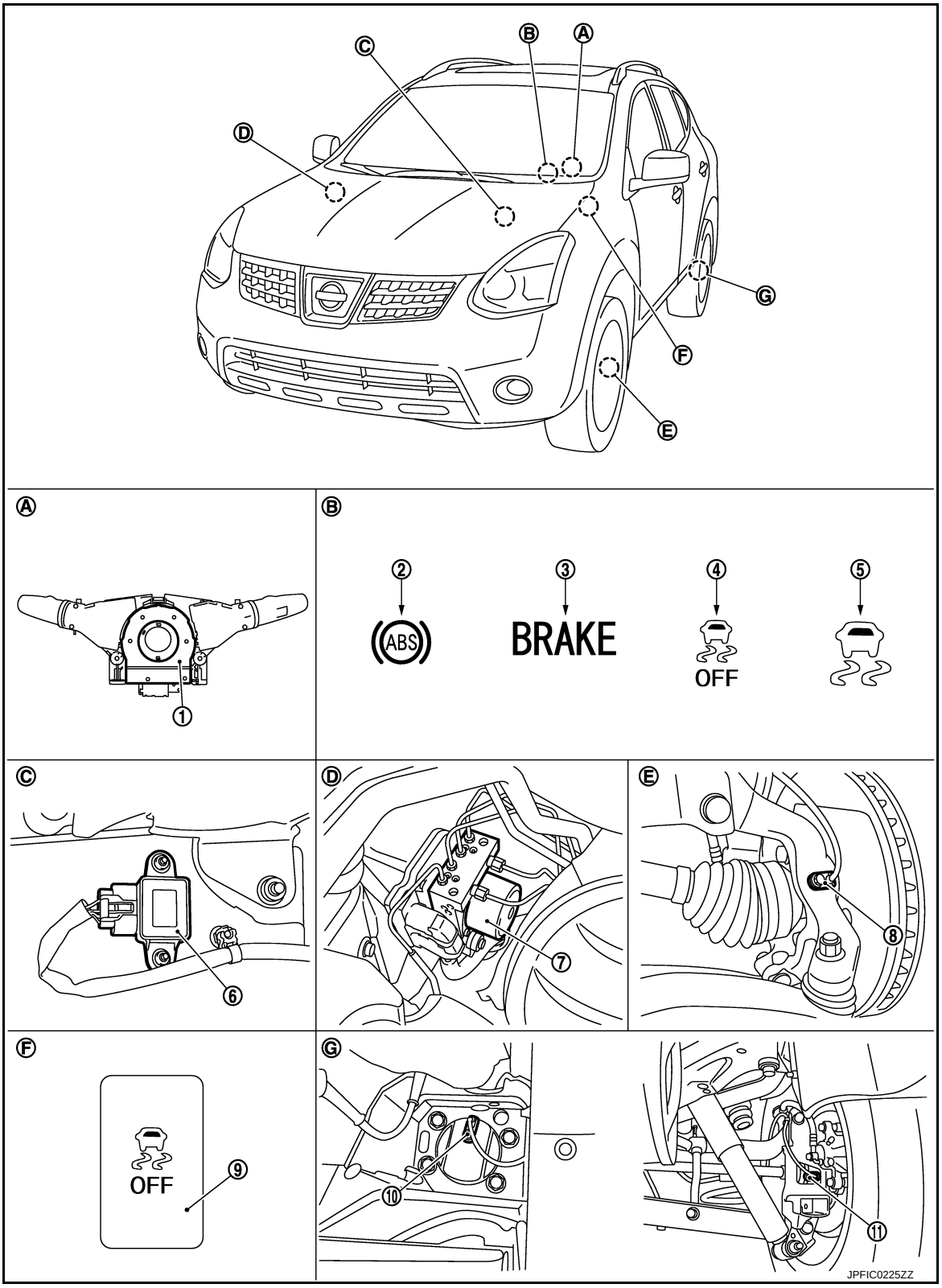
INFOID:0000000007350463

- 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 VDC warning lamp.
- Electrical system diagnosis by CONSULT is available.

Component Parts Location

INFOID:0000000007350464

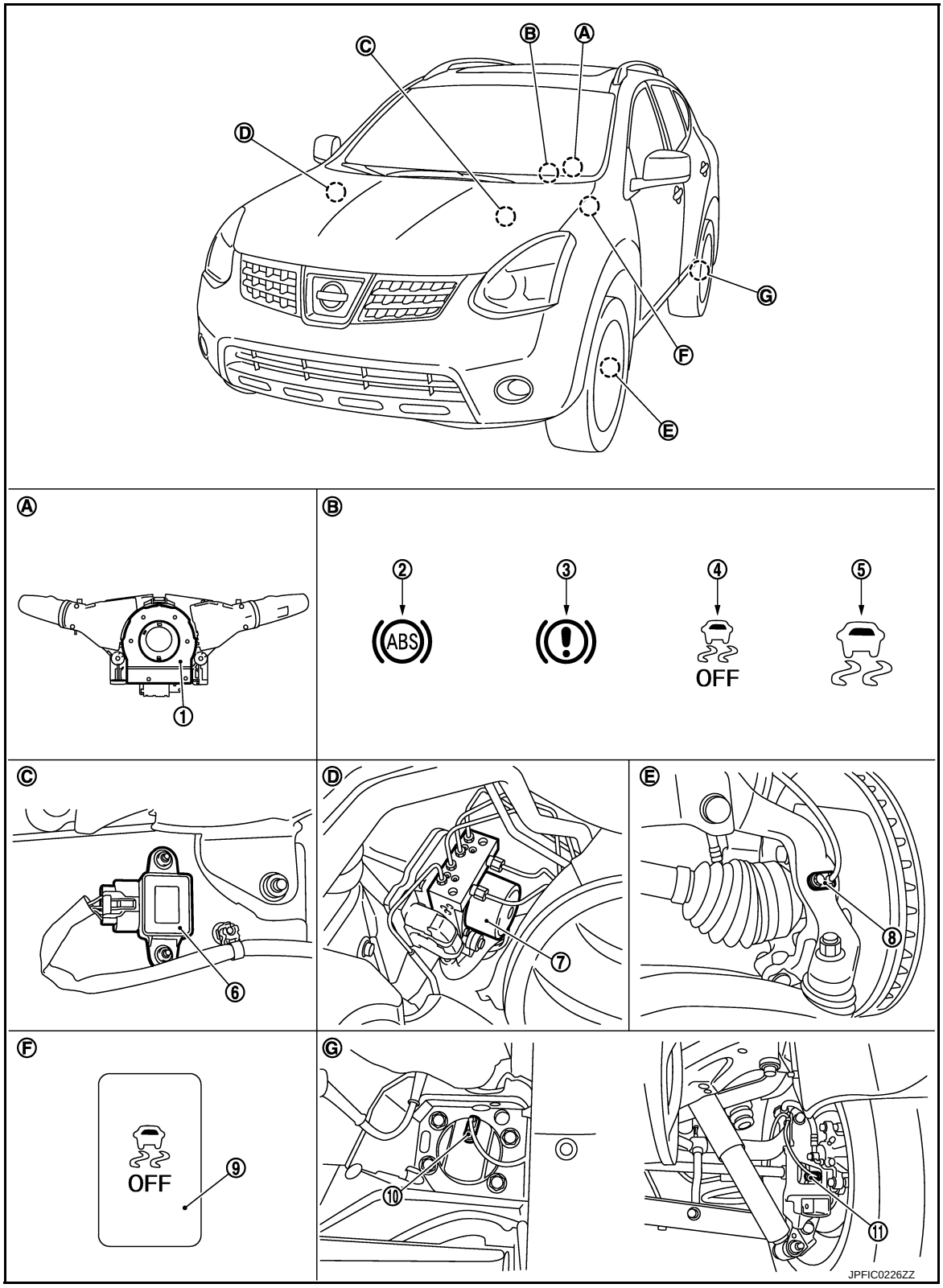
FOR USA



1. Steering angle sensor
2. ABS warning lamp
3. Brake warning lamp
4. VDC OFF indicator lamp
5. VDC warning 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. VDC warning 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

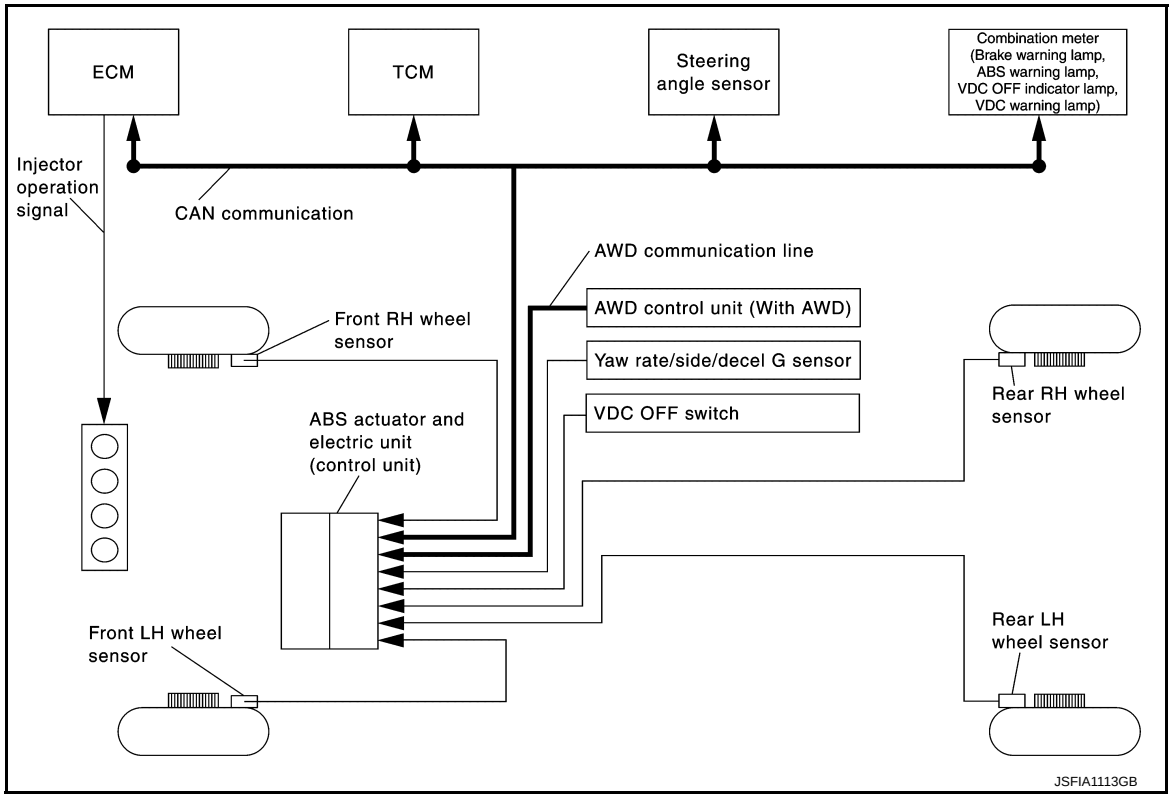
INFOID:0000000007350465

Component parts		Reference
ABS actuator and electric unit (control unit)	Pump	BRC-110, "Description"
	Motor	
	Actuator relay (Main relay)	BRC-132, "Description"
	Solenoid valve	BRC-127, "Description"
	VDC switch-over valve (CV1, CV2)	BRC-139, "Description"
	VDC switch-over valve (SV1, SV2)	BRC-141, "Description"
Wheel sensor		BRC-99, "Description"
Yaw rate/side/decel G sensor		BRC-112, "Description"
Steering angle sensor		BRC-134, "Description"
VDC OFF switch		BRC-153, "Description"
ABS warning lamp		BRC-155, "Description"
Brake warning lamp		BRC-156, "Description"
VDC OFF indicator lamp		BRC-159, "Description"
VDC warning lamp		BRC-158, "Description"

ABS

System Diagram

INFOID:0000000007350466



System Description

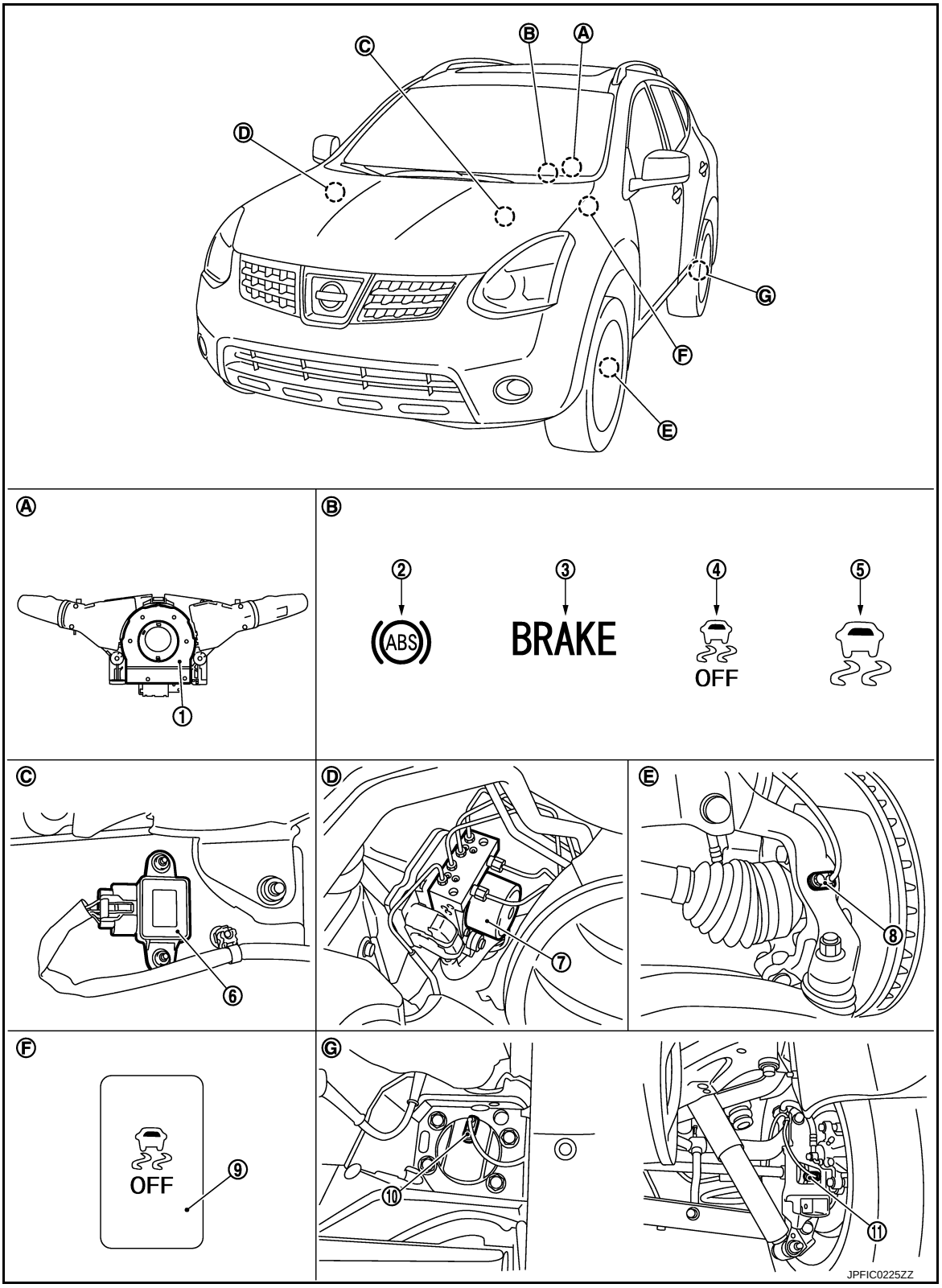
INFOID:0000000007350467

- 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 is available.

Component Parts Location

INFOID:0000000007350468

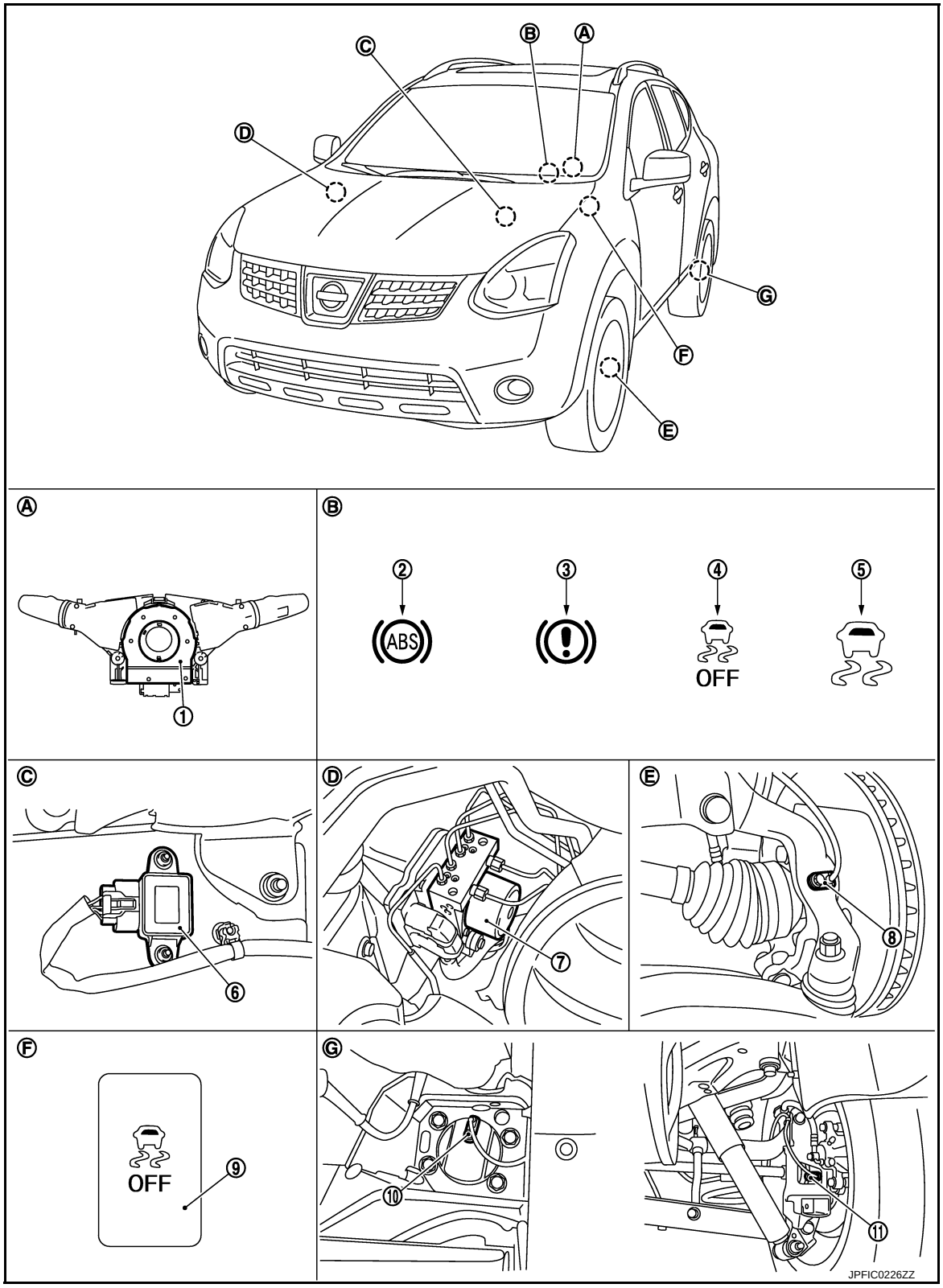
FOR USA



1. Steering angle sensor
2. ABS warning lamp
3. Brake warning lamp
4. VDC OFF indicator lamp
5. VDC warning 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. VDC warning 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

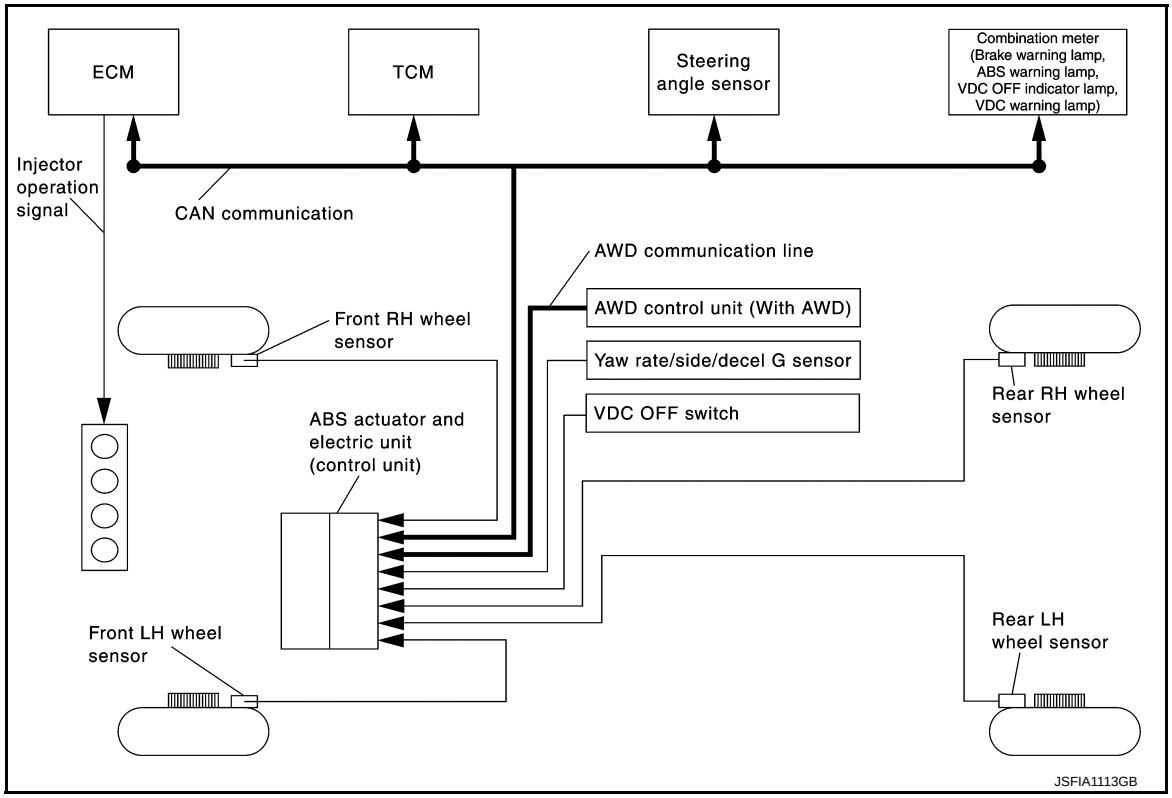
INFOID:0000000007350469

Component parts		Reference
ABS actuator and electric unit (control unit)	Pump	BRC-110, "Description"
	Motor	
	Actuator relay (Main relay)	BRC-132, "Description"
	Solenoid valve	BRC-127, "Description"
	VDC switch-over valve (CV1, CV2)	BRC-139, "Description"
	VDC switch-over valve (SV1, SV2)	BRC-141, "Description"
Wheel sensor		BRC-99, "Description"
Yaw rate/side/decel G sensor		BRC-112, "Description"
Steering angle sensor		BRC-134, "Description"
VDC OFF switch		BRC-153, "Description"
ABS warning lamp		BRC-155, "Description"
Brake warning lamp		BRC-156, "Description"
VDC OFF indicator lamp		BRC-159, "Description"
VDC warning lamp		BRC-158, "Description"

EBD

System Diagram

INFOID:0000000007350470



System Description

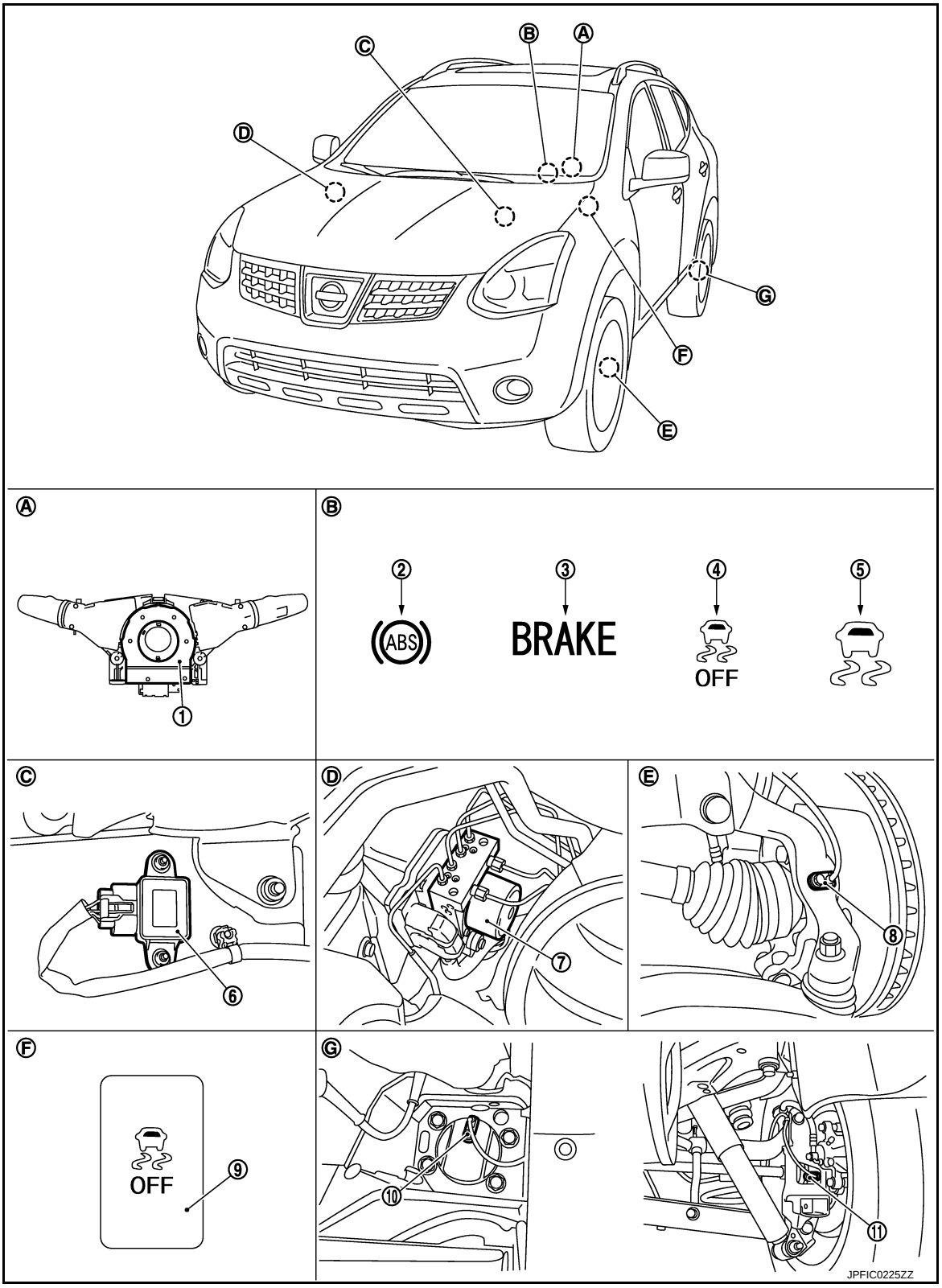
INFOID:0000000007350471

- 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 is available.

Component Parts Location

INFOID:0000000007350472

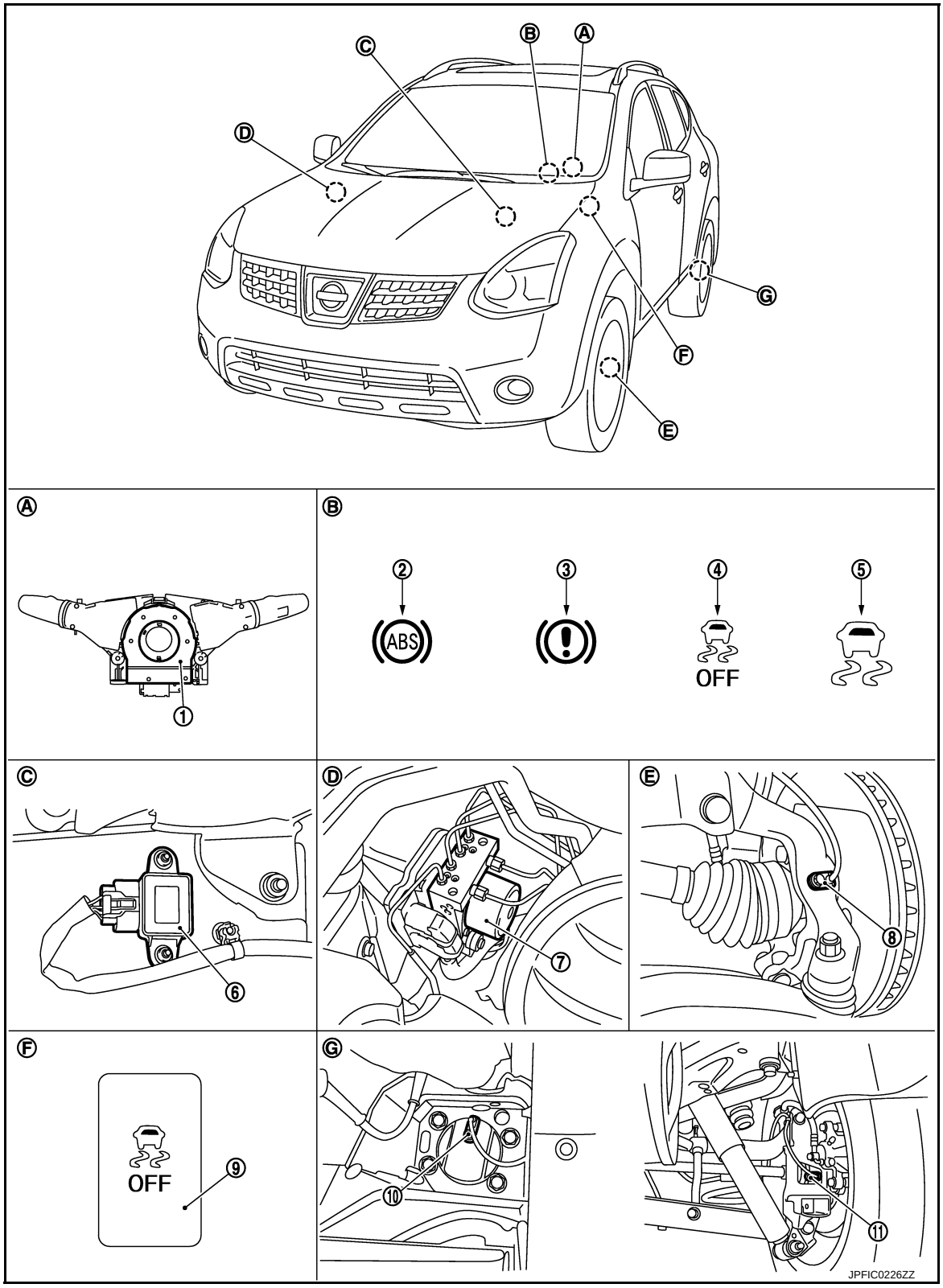
FOR USA



1. Steering angle sensor
2. ABS warning lamp
3. Brake warning lamp
4. VDC OFF indicator lamp
5. VDC warning 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. VDC warning 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:0000000007350473

Component parts		Reference
ABS actuator and electric unit (control unit)	Pump	BRC-110, "Description"
	Motor	
	Actuator relay (Main relay)	BRC-132, "Description"
	Solenoid valve	BRC-127, "Description"
	VDC switch-over valve (CV1, CV2)	BRC-139, "Description"
	VDC switch-over valve (SV1, SV2)	BRC-141, "Description"
Wheel sensor		BRC-99, "Description"
Yaw rate/side/decel G sensor		BRC-112, "Description"
Steering angle sensor		BRC-134, "Description"
VDC OFF switch		BRC-153, "Description"
ABS warning lamp		BRC-155, "Description"
Brake warning lamp		BRC-156, "Description"
VDC OFF indicator lamp		BRC-159, "Description"
VDC warning lamp		BRC-158, "Description"

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

CONSULT Function

INFOID:0000000007350474

FUNCTION

CONSULT 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.
Self diagnostic result	Self-diagnostic results can be read and erased quickly.
Data monitor	Input/Output data in the ABS actuator and electric unit (control unit) can be read.
Active test	Diagnostic test mode is which CONSULT drives some actuators apart from the ABS actuator and electric unit (control unit) and also shifts some parameters in a specified range.
ECU identification	ABS actuator and electric unit (control unit) part number can be read.

WORK SUPPORT

Item	Description
ST ANGLE SENSOR ADJUSTMENT	Adjusts the neutral position of the steering angle sensor.

SELF DIAGNOSTIC RESULT

Operation Procedure

Before performing the self-diagnosis for “ABS” with CONSULT, 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 for “ABS” with CONSULT, 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 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, VDC 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).
- VDC OFF switch should not stay “ON” position.

Display Item List

Refer to BRC-166, "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/VDC LAMP (On/Off)	▼	×	VDC warning 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 warning lamp and brake warning lamp are on.**
- **ABS warning lamp, VDC warning 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" in "ABS" with CONSULT is displayed 10 seconds after operation start.
- After "TEST IS STOPPED" in "ABS" with CONSULT is displayed, to perform test again.

Test Item

ABS SOLENOID VALVE
- Select "Up", "Keep" and "Down" of "ACTIVE TEST" in "ABS" with CONSULT. 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*
	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 select, and then Off.

ABS SOLENOID VALVE (ACT)
- Select "Up", "Keep" and "Down" of "ACTIVE TEST" in "ABS" with CONSULT. Then use screen monitor to check that solenoid valve operates as shown in solenoid valve operation chart.

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 select, and then Off.

ABS MOTOR

- Select “On” and “Off” of “ACTIVE TEST” in “ABS” with CONSULT 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

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 IDENTIFICATION

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

DTC/CIRCUIT DIAGNOSIS

C1101, C1102, C1103, C1104 WHEEL SENSOR

Description

INFOID:0000000007350475

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:0000000007350476

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.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

1. Start the engine and drive the vehicle at 30 km/h (19 MPH) or more for approximately 1 minute.
2. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1101”, “C1102”, “C1103” or “C1104” detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-99, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007666810

CAUTION:
Never check between wheel sensor harness connector terminals.

1.CHECK WHEEL SENSOR

1. Turn the ignition switch OFF.
2. Check wheel sensor for damage.

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.REPLACE WHEEL SENSOR (1)

1. Replace wheel sensor.
- Front: Refer to BRC-177, "FRONT WHEEL SENSOR : Exploded View".
- Rear: Refer to BRC-178, "REAR WHEEL SENSOR : Exploded View".

2. Erase self-diagnosis result for “ABS”.
3. Turn the ignition switch OFF, and wait 10 seconds or more.
4. Start the engine.
5. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
6. Stop the vehicle.

7. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1101”, “C1102”, “C1103” or “C1104” detected?

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

3.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Check ABS actuator and electric unit (control unit) harness connector for disconnection or looseness.
3. Check wheel sensor harness connector for disconnection or looseness.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace error-detected parts, securely lock the harness connector, and GO TO 4.

4.PERFORM SELF-DIAGNOSIS (1)

1. Erase self-diagnosis result for “ABS” with CONSULT.
2. Turn the ignition switch OFF, and wait 10 seconds or more.
3. Start the engine.
4. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
5. Stop the vehicle.
6. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1101”, “C1102”, “C1103” or “C1104” detected?

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

5.CHECK TERMINAL

1. Turn the ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) harness connector and then check ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with harness connector.
3. Disconnect wheel sensor harness connector and check each wheel sensor pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair or replace error-detected parts and GO TO 6.

6.PERFORM SELF-DIAGNOSIS (2)

1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Connect wheel sensor harness connector.
3. Erase self-diagnosis result for “ABS”.
4. Turn the ignition switch OFF, and wait 10 seconds or more.
5. Start the engine.
6. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
7. Stop the vehicle.
8. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1101”, “C1102”, “C1103” or “C1104” detected?

YES >> GO TO 7.
NO >> INSPECTION END

7.CHECK WHEEL SENSOR HARNESS

1. Turn the ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) harness connector.
3. Disconnect wheel sensor harness connector.
4. Check continuity between ABS actuator and electric unit (control unit) harness connector and wheel sensor harness connector. (Check continuity when steering wheel is steered to RH and LH, or center harness in wheel housing is moved.)

Measurement connector and terminal for power supply circuit

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

Measurement connector and terminal for signal circuit

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

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair or replace error-detected parts and GO TO 8.

8. PERFORM SELF-DIAGNOSIS (3)

1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Connect wheel sensor harness connector.
3. Erase self-diagnosis result for “ABS”.
4. Turn the ignition switch OFF, and wait 10 seconds or more.
5. Start the engine.
6. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
7. Stop the vehicle.
8. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1101”, “C1102”, “C1103” or “C1104” detected?

YES >> GO TO 9.
NO >> INSPECTION END

9. REPLACE WHEEL SENSOR

1. Replace wheel sensor.
- Front: Refer to BRC-177, "FRONT WHEEL SENSOR : Exploded View".
- Rear: Refer to BRC-178, "REAR WHEEL SENSOR : Exploded View".
2. Erase self-diagnosis result for “ABS” with CONSULT.
3. Turn the ignition switch OFF, and wait 10 seconds or more.
4. Start the engine.
5. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
6. Stop the vehicle.
7. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1101”, “C1102”, “C1103” or “C1104” detected?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-180, "Exploded View".
NO >> INSPECTION END

Special Repair Requirement

INFOID:0000000007350479

1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

C1105, C1106, C1107, C1108 WHEEL SENSOR

Description

INFOID:0000000007350480

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:0000000007350481

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 dynamometer • 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.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

1. Start the engine and drive the vehicle at 30 km/h (19 MPH) or more for approximately 1 minute.
2. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1105”, “C1106”, “C1107” or “C1108” detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-102, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007666815

CAUTION:
Never check between wheel sensor harness connector terminals.

1.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY SYSTEM

Check ABS actuator and electric unit (control unit) power supply system. Refer to BRC-149, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK TIRE

1. Turn the ignition switch OFF.
2. Check tire air pressure, wear and size. Refer to WT-49, "Tire Air Pressure".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Adjust air pressure or replace tire and GO TO 3.

3.CHECK DATA MONITOR (1)

1. Erase self-diagnosis result for “ABS” with CONSULT.
2. Turn the ignition switch OFF, and wait 10 seconds or more.

3. Start the engine.
4. Select “ABS” and “DATA MONITOR”, check “FR LH SENSOR”, “FR RH SENSOR”, “RR LH SENSOR” and “RR RH SENSOR” with CONSULT.
   NOTE:
   Set the “DATA MONITOR” recording speed to “10 msec”.
5. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.

Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

YES >> GO TO 4.
NO >> GO TO 5.

4. PERFORM SELF-DIAGNOSIS (1)

1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
2. Stop the vehicle.
3. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1105”, “C1106”, “C1107” or “C1108” detected?

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

5. CHECK WHEEL SENSOR

1. Turn the ignition switch OFF.
2. Check wheel sensor for damage.
3. Remove dust and foreign matter adhered to the sensor rotor with a vacuum dust collector through the wheel sensor mounting hole.
   CAUTION:
   Install wheel sensor with no backlash and float, and tighten the mounting bolt to the specified torque.
   - **Front: Refer to BRC-177, "FRONT WHEEL SENSOR : Exploded View".**
   - **Rear: Refer to BRC-178, "REAR WHEEL SENSOR : Exploded View".**

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 6.

6. REPLACE WHEEL SENSOR (1)

1. Replace wheel sensor.
- Front: Refer to BRC-177, "FRONT WHEEL SENSOR : Exploded View".
- Rear: Refer to BRC-178, "REAR WHEEL SENSOR : Exploded View".
2. Erase self-diagnosis result for “ABS” with CONSULT.
3. Turn the ignition switch OFF, and wait 10 seconds or more.
4. Start the engine.
5. Select “ABS” and “DATA MONITOR”, check “FR LH SENSOR”, “FR RH SENSOR”, “RR LH SENSOR” and “RR RH SENSOR” with CONSULT.
   NOTE:
   Set the “DATA MONITOR” recording speed to “10 msec”.
6. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.

Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

YES >> GO TO 7.
NO >> GO TO 19.

7. PERFORM SELF-DIAGNOSIS (2)

With CONSULT.
1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
2. Stop the vehicle.
3. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1105”, “C1106”, “C1107” or “C1108” detected?

YES >> GO TO 19.

NO >> INSPECTION END

8.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Check ABS actuator and electric unit (control unit) harness connector for disconnection or looseness.
3. Check wheel sensor harness connector for disconnection or looseness.

Is the inspection result normal?

YES >> GO TO 11.
NO >> Repair or replace error-detected parts, securely lock the harness connector, and GO TO 9.

9.CHECK DATA MONITOR (2)

1. Erase self-diagnosis result for “ABS” with CONSULT.
2. Turn the ignition switch OFF, and wait 10 seconds or more.
3. Start the engine.
4. Select “ABS” and “DATA MONITOR”, check “FR LH SENSOR”, “FR RH SENSOR”, “RR LH SENSOR” and “RR RH SENSOR” with CONSULT.
   NOTE:
   Set the “DATA MONITOR” recording speed to “10 msec”.
5. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.

Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

YES >> GO TO 10.
NO >> GO TO 11.

10.PERFORM SELF-DIAGNOSIS (3)

1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
2. Stop the vehicle.
3. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1105”, “C1106”, “C1107” or “C1108” detected?

YES >> GO TO 11.
NO >> INSPECTION END

11.CHECK TERMINAL

1. Turn the ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) harness connector and then check ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with harness connector.
3. Disconnect wheel sensor harness connector and check each wheel sensor pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> GO TO 14.
NO >> Repair or replace error-detected parts and GO TO 12.

12.CHECK DATA MONITOR (3)

1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Connect wheel sensor harness connector.
3. Erase self-diagnosis result for “ABS” with CONSULT.
4. Turn the ignition switch OFF, and wait 10 seconds or more.
5. Start the engine.
6. Select “ABS” and “DATA MONITOR”, check “FR LH SENSOR”, “FR RH SENSOR”, “RR LH SENSOR” and “RR RH SENSOR” with CONSULT.
   NOTE:
   Set the “DATA MONITOR” recording speed to “10 msec”.
7. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.

Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

YES >> GO TO 13.
NO >> GO TO 14.

13. PERFORM SELF-DIAGNOSIS (4)

1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
2. Stop the vehicle.
3. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1105”, “C1106”, “C1107” or “C1108” detected?

YES >> GO TO 14.
NO >> INSPECTION END

14. CHECK WHEEL SENSOR HARNESS

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

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

Is the inspection result normal?

YES >> GO TO 15.
NO >> Repair or replace error-detected parts and GO TO 15.

15. CHECK DATA MONITOR (4)

1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Connect wheel sensor harness connector.
3. Erase self-diagnosis result for “ABS” with CONSULT.
4. Turn the ignition switch OFF, and wait 10 seconds or more.
5. Start the engine.
6. Select “ABS” and “DATA MONITOR”, check “FR LH SENSOR”, “FR RH SENSOR”, “RR LH SENSOR” and “RR RH SENSOR” with CONSULT.
   NOTE:
   Set the “DATA MONITOR” recording speed to “10 msec”.
7. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.

Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

YES >> GO TO 16.
NO >> GO TO 17.

16. PERFORM SELF-DIAGNOSIS (5)

1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
2. Stop the vehicle.
3. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1105”, “C1106”, “C1107” or “C1108” detected?

YES >> GO TO 17.
NO >> INSPECTION END

17. REPLACE WHEEL SENSOR

1. Replace wheel sensor.
- Front: Refer to BRC-177, "FRONT WHEEL SENSOR : Exploded View".
- Rear: Refer to BRC-178, "REAR WHEEL SENSOR : Exploded View".
2. Erase self-diagnosis result for “ABS” with CONSULT.
3. Turn the ignition switch OFF, and wait 10 seconds or more.
4. Start the engine.

5. Select “ABS” and “DATA MONITOR”, check “FR LH SENSOR”, “FR RH SENSOR”, “RR LH SENSOR” and “RR RH SENSOR” with CONSULT.
   NOTE:
   Set the “DATA MONITOR” recording speed to “10 msec”.
6. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.

Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

YES >> GO TO 18.
NO >> GO TO 19.

18. PERFORM SELF-DIAGNOSIS (6)

1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
2. Stop the vehicle.
3. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1105”, “C1106”, “C1107” or “C1108” detected?

YES >> GO TO 19.
NO >> INSPECTION END

19. REPLACE SENSOR ROTOR

1. Replace sensor rotor.
- Front: Refer to BRC-179, "FRONT SENSOR ROTOR : Exploded View".
- Rear: Refer to BRC-179, "REAR SENSOR ROTOR : Exploded View".
2. Erase self-diagnosis result for “ABS” with CONSULT.
3. Turn the ignition switch OFF, and wait 10 seconds or more.
4. Start the engine.
5. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
6. Stop the vehicle.
7. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1105”, “C1106”, “C1107” or “C1108” detected?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-180, "Exploded View".
NO >> INSPECTION END

Special Repair Requirement

INFOID:0000000007350484

1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

C1109 POWER AND GROUND SYSTEM

Description

INFOID:0000000007350485

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

DTC Logic

INFOID:0000000007350486

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.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

1. Turn the ignition switch OFF to ON.
2. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1109” detected?

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

Diagnosis Procedure

INFOID:0000000007350487

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) harness connector.
3. Check terminal for deformation, disconnection, looseness, etc.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

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

1. Check voltage between ABS actuator and electric unit (control unit) harness connector and ground.

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

2. Turn the ignition switch ON.
   CAUTION:
   Never start the engine.
3. Check voltage between ABS actuator and electric unit (control unit) harness connector and ground.

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

Is the inspection result normal?

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

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

1. Turn the ignition switch OFF.
2. Check 10A fusible link (59).
3. Disconnect IPDM E/R harness connector.
4. 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

Is the inspection result normal?

YES >> Perform trouble diagnosis for ignition power supply. Refer to PG-18, "Wiring Diagram - IGNITION POWER SUPPLY -".
NO >> Repair or replace error-detected parts.

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

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

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-180, "Exploded View".
NO >> Repair or replace error-detected parts (check ABS earth bolt for tightness and corrosion).

Special Repair Requirement

INFOID:0000000007666816

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

C1110 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Description

INFOID:0000000007350489

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

DTC Logic

INFOID:0000000007350490

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.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

1. Turn the ignition switch OFF to ON.
2. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1110” detected?

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

Diagnosis Procedure

INFOID:0000000007350491

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). Refer to BRC-180, "Exploded View".

Special Repair Requirement

INFOID:0000000007350492

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

C1111 ABS MOTOR, MOTOR RELAY SYSTEM

Description

INFOID:0000000007350493

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:0000000007350494

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.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

1. Turn the ignition switch OFF to ON.
2. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1111” detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-110, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007350495

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) harness connector.
3. Check terminal for deformation, disconnect, looseness, etc.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace or repair error-detected parts.

2.CHECK ABS MOTOR AND MOTOR RELAY POWER SUPPLY

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

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

Is the inspection result normal?

YES >> GO TO 3.

NO >> Perform trouble diagnosis for battery power supply. Refer to PG-6, "Wiring Diagram - BATTERY POWER SUPPLY -".

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

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

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-180, "Exploded View".
NO >> Repair or replace error-detected parts. (Check ABS each bolt for tightness and corrosion).

Special Repair Requirement

INFOID:0000000007350497

1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

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

Description

INFOID:0000000007350498

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:0000000007350499

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.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

1. Turn the ignition switch OFF to ON.
2. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1113”, “C1145” or “C1146” detected?

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

Diagnosis Procedure

INFOID:0000000007350500

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) harness connector.
3. Disconnect yaw rate/side/decel G sensor harness connector.
4. Check terminal for deformation, disconnection, looseness, etc.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace or repair error-detected parts.

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

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

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 error-detected parts.

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

Check continuity between yaw rate/side/decel G sensor harness connector and ground.

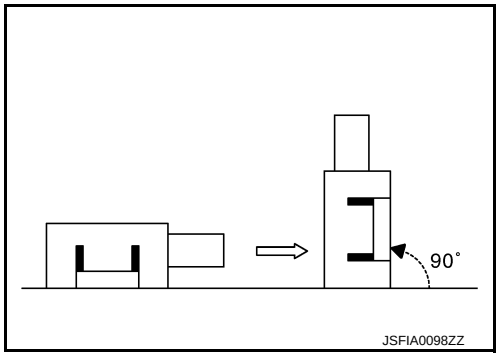
Yaw rate/side/decel G sensor		Continuity
Connector	Terminal	
B38	2 – 4	Not existed
	2 – 5	
	2 – 6	
	4 – 5	
	4 – 6	
	5 – 6	

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace error-detected parts.

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

1. Connect yaw rate/side/decel G sensor harness connector.
2. Connect ABS actuator and electric unit (control unit) harness connector.
3. Turn the ignition switch ON.
   CAUTION:
   Never start the engine.
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 “ABS”, “DATA MONITOR” and “DECEL G-SEN” in order with CONSULT.



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

Is the inspection result normal?

YES >> Replace yaw rate/side/decel G sensor. Refer to BRC-182, "Exploded View".
NO >> GO TO 5.

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

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

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

3. Turn the ignition switch ON.
4. Check voltage between yaw rate/side/decel G sensor harness connector.
   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) Refer to BRC-180, "Exploded View".
NO >> Replace yaw rate/side/decel G sensor. Refer to BRC-182, "Exploded View".

Special Repair Requirement

INFOID:0000000007350502

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

C1115 WHEEL SENSOR

Description

INFOID:0000000007350503

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:0000000007350504

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.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

1. Start the engine and drive the vehicle at 30 km/h (19 MPH) or more for approximately 1 minute.
2. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1115” detected?

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

Diagnosis Procedure

INFOID:0000000007666817

CAUTION:
For wheel sensor, never check between terminals.

1.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY SYSTEM

Check ABS actuator and electric unit (control unit) power supply system. Refer to BRC-149, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK TIRE

1. Turn the ignition switch OFF.
2. Check tire air pressure, wear and size. Refer to WT-49, "Tire Air Pressure".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Adjust air pressure or replace tire and GO TO 3.

3.CHECK DATA MONITOR (1)

1. Erase self-diagnosis result for “ABS” with CONSULT.
2. Turn the ignition switch OFF, and wait 10 seconds or more.
3. Start the engine.
4. Select “ABS” and “DATA MONITOR”, check “FR LH SENSOR”, “FR RH SENSOR”, “RR LH SENSOR” and “RR RH SENSOR” with CONSULT.
   NOTE:
   Set the “DATA MONITOR” recording speed to “10 msec”.

5. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.

Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

YES >> GO TO 4.
NO >> GO TO 5.

4. PERFORM SELF-DIAGNOSIS (1)

1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
2. Stop the vehicle.
3. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1115” detected?

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

5. CHECK WHEEL SENSOR

1. Turn the ignition switch OFF.
2. Check wheel sensor for damage.
3. Remove dust and foreign matter adhered to the sensor rotor with a vacuum dust collector through the wheel sensor mounting hole.

   CAUTION:

   Install wheel sensor with no backlash and float, and tighten the mounting bolt to the specified torque.

   - **Front: Refer to BRC-177, "FRONT WHEEL SENSOR : Exploded View".**
   - **Rear: Refer to BRC-178, "REAR WHEEL SENSOR : Exploded View".**

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 6.

6. REPLACE WHEEL SENSOR (1)

1. Replace wheel sensor.

- Front: Refer to BRC-177, "FRONT WHEEL SENSOR : Exploded View".
- Rear: Refer to BRC-178, "REAR WHEEL SENSOR : Exploded View".

2. Erase self-diagnosis result for “ABS” with CONSULT.
3. Turn the ignition switch OFF, and wait 10 seconds or more.
4. Start the engine.
5. Select “ABS” and “DATA MONITOR”, check “FR LH SENSOR”, “FR RH SENSOR”, “RR LH SENSOR” and “RR RH SENSOR” with CONSULT.

   NOTE:

   Set the “DATA MONITOR” recording speed to “10 msec”.
6. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.

Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

YES >> GO TO 7.
NO >> GO TO 19.

7. PERFORM SELF-DIAGNOSIS (2)

1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
2. Stop the vehicle.
3. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1115” detected?

YES >> GO TO 19.
NO >> INSPECTION END

8. CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Check ABS actuator and electric unit (control unit) harness connector for disconnection or looseness.
3. Check wheel sensor harness connector for disconnection or looseness.

Is the inspection result normal?

YES >> GO TO 11.
NO >> Repair or replace error-detected parts, securely lock the harness connector, and GO TO 9.

9. CHECK DATA MONITOR (2)

1. Erase self-diagnosis result for “ABS” with CONSULT.
2. Turn the ignition switch OFF, and wait 10 seconds or more.
3. Start the engine.
4. Select “ABS” and “DATA MONITOR”, check “FR LH SENSOR”, “FR RH SENSOR”, “RR LH SENSOR” and “RR RH SENSOR” with CONSULT.
   NOTE:
   Set the “DATA MONITOR” recording speed to “10 msec”.
5. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.

Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

YES >> GO TO 10.
NO >> GO TO 11.

10. PERFORM SELF-DIAGNOSIS (3)

1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
2. Stop the vehicle.
3. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1115” detected?

YES >> GO TO 11.
NO >> INSPECTION END

11. CHECK TERMINAL

1. Turn the ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) harness connector and then check ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with harness connector.
3. Disconnect wheel sensor harness connector and check each wheel sensor pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> GO TO 14.
NO >> Repair or replace error-detected parts and GO TO 12.

12. CHECK DATA MONITOR (3)

1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Connect wheel sensor harness connector.
3. Erase self-diagnosis result for “ABS” with CONSULT.
4. Turn the ignition switch OFF, and wait 10 seconds or more.
5. Start the engine.
6. Select “ABS” and “DATA MONITOR”, check “FR LH SENSOR”, “FR RH SENSOR”, “RR LH SENSOR” and “RR RH SENSOR” with CONSULT.
   NOTE:
   Set the “DATA MONITOR” recording speed to “10 msec”.
7. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.

Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

YES >> GO TO 13.
NO >> GO TO 14.

13. PERFORM SELF-DIAGNOSIS (4)

1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
2. Stop the vehicle.
3. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1115” detected?

YES >> GO TO 14.
NO >> INSPECTION END

14. CHECK WHEEL SENSOR HARNESS

1. Turn the ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) harness connector.
3. Disconnect wheel sensor harness connector.
4. Check continuity between ABS actuator and electric unit (control unit) harness connector and wheel sensor harness connector. (Check continuity when steering wheel is steered to RH and LH, or center harness in wheel housing is moved.)

Measurement connector and terminal for power supply circuit

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

Measurement connector and terminal for signal circuit

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

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

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

Is the inspection result normal?

YES >> GO TO 15.
NO >> Repair or replace error-detected parts and GO TO 15.

15. CHECK DATA MONITOR (4)

1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Connect wheel sensor harness connector.
3. Erase self-diagnosis result for “ABS” with CONSULT.
4. Turn the ignition switch OFF, and wait 10 seconds or more.
5. Start the engine.
6. Select “ABS” and “DATA MONITOR”, check “FR LH SENSOR”, “FR RH SENSOR”, “RR LH SENSOR” and “RR RH SENSOR” with CONSULT.
   NOTE:
   Set the “DATA MONITOR” recording speed to “10 msec”.
7. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.

Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

YES >> GO TO 16.
NO >> GO TO 17.

16. PERFORM SELF-DIAGNOSIS (5)

1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
2. Stop the vehicle.
3. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1115” detected?

YES >> GO TO 17.
NO >> INSPECTION END

17. REPLACE WHEEL SENSOR

1. Replace wheel sensor.
- Front: Refer to BRC-177, "FRONT WHEEL SENSOR : Exploded View".
- Rear: Refer to BRC-178, "REAR WHEEL SENSOR : Exploded View".
2. Erase self-diagnosis result for “ABS” with CONSULT.
3. Turn the ignition switch OFF, and wait 10 seconds or more.
4. Start the engine.
5. Select “ABS” and “DATA MONITOR”, check “FR LH SENSOR”, “FR RH SENSOR”, “RR LH SENSOR” and “RR RH SENSOR” with CONSULT.
   NOTE:
   Set the “DATA MONITOR” recording speed to “10 msec”.
6. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.

Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

YES >> GO TO 18.
NO >> GO TO 19.

18. PERFORM SELF-DIAGNOSIS (6)

1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
2. Stop the vehicle.
3. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1115” detected?

YES >> GO TO 19.
NO >> INSPECTION END

19. REPLACE SENSOR ROTOR

1. Replace sensor rotor.
- Front: Refer to BRC-179, "FRONT SENSOR ROTOR : Exploded View".
- Rear: Refer to BRC-179, "REAR SENSOR ROTOR : Exploded View".
2. Erase self-diagnosis result for “ABS”.
3. Turn the ignition switch OFF, and wait 10 seconds or more.
4. Start the engine.
5. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
6. Stop the vehicle.
7. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1115” detected?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-180, "Exploded View".
NO >> INSPECTION END

Special Repair Requirement

INFOID:0000000007350507

1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

C1116 STOP LAMP SWITCH

Description

INFOID:0000000007350508

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

DTC Logic

INFOID:0000000007350509

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1116	STOP LAMP SW	When a stop lamp switch signal is not input where the brake pedal is depressed.	• Harness or connector • Stop lamp switch • ABS actuator and electric unit (control unit)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

1. Turn the ignition switch OFF to ON.
2. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1116” detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-120, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007666821

NOTE:
DTC “C1116” may be detected when the brake pedal and the accelerator pedal are simultaneously depressed for 1 minute or more while driving the vehicle. This is not a malfunction.

1.INTERVIEW FROM THE CUSTOMER

Check if the brake pedal and the accelerator pedal are simultaneously depressed for 1 minute or more while driving the vehicle.

Is there such a history?

YES >> GO TO 2.
NO >> GO TO 3.

2.PERFORM SELF-DIAGNOSIS

1. Erase self-diagnosis result for “ABS” with CONSULT.
2. Turn the ignition switch OFF, and wait 10 seconds or more.
3. Start the engine.
   CAUTION:
   Never start the vehicle.
4. Depress the brake pedal several times.
5. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1116” detected?

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

3.STOP LAMP FOR ILLUMINATION

Depress brake pedal and check that stop lamp turns ON.

Does stop lamp turn ON?

YES >> GO TO 5.
NO >> Check stop lamp system. GO TO 4.
- Xenon type: Refer to EXL-79, "Wiring Diagram - BCM -".
- Halogen type: Refer to EXL-199, "Wiring Diagram - BCM -".

4. CHECK DATA MONITOR (1)

1. Erase self-diagnosis result for “ABS” with CONSULT.
2. Turn the ignition switch OFF, and wait 10 seconds or more.
3. Start the engine.
   CAUTION:
   Never start the vehicle.
4. Select “ABS”, “DATA MONITOR” and “STOP LAMP SW” according to this order with CONSULT. Check that data monitor displays “On” or “Off” when brake pedal is depress or release. Refer to BRC-161, "Reference Value".

Is the inspection result normal?

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

5. CHECK STOP LAMP SWITCH CLEARANCE

1. Turn the ignition switch OFF.
2. Check stop lamp switch clearance. Refer to BR-8, "Inspection and Adjustment".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Adjust stop lamp switch clearance. Refer to BR-8, "Inspection and Adjustment". GO TO 6.

6. CHECK DATA MONITOR (2)

1. Erase self-diagnosis result for “ABS” with CONSULT.
2. Turn the ignition switch OFF, and wait 10 seconds or more.
3. Start the engine.
   CAUTION:
   Never start the vehicle.
4. Select “ABS”, “DATA MONITOR” and “STOP LAMP SW” according to this order with CONSULT. Check that data monitor displays “On” or “Off” when brake pedal is depress or release. Refer to BRC-161, "Reference Value".

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 7.

7. CHECK STOP LAMP SWITCH

Check stop lamp switch. Refer to BRC-124, "Component Inspection (Stop Lamp Switch)".

Is the inspection result normal?

YES >> GO TO 9.
NO >> Replace stop lamp switch. Refer to BR-19, "Exploded View". GO TO 8.

8. CHECK DATA MONITOR (3)

1. Erase self-diagnosis result for “ABS” with CONSULT.
2. Turn the ignition switch OFF, and wait 10 seconds or more.
3. Start the engine.
   CAUTION:
   Never start the vehicle.
4. Select “ABS”, “DATA MONITOR” and “STOP LAMP SW” according to this order with CONSULT. Check that data monitor displays “On” or “Off” when brake pedal is depress or release. Refer to BRC-161, "Reference Value".

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 9.

9. CHECK STOP LAMP RELAY

Check stop lamp relay. Refer to BRC-124, "Component Inspection (Stop Lamp Relay)".

Is the inspection result normal?

YES >> GO TO 11.
NO >> Replace stop lamp relay. GO TO 10.

10. CHECK DATA MONITOR (4)

1. Erase self-diagnosis result for “ABS” with CONSULT.
2. Turn the ignition switch OFF, and wait 10 seconds or more.
3. Start the engine.
   CAUTION:
   Never start the vehicle.
4. Select “ABS”, “DATA MONITOR” and “STOP LAMP SW” according to this order with CONSULT. Check that data monitor displays “On” or “Off” when brake pedal is depress or release. Refer to BRC-161, "Reference Value".

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 11.

11. CHECK CONNECTOR AND TERMINAL

1. Turn the ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) harness connector.
3. Check ABS actuator and electric unit (control unit) harness connector for disconnection or looseness.
4. Check ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with harness connector.
5. Disconnect stop lamp switch harness connector.
6. Check stop lamp switch harness connector for disconnection or looseness.
7. Check stop lamp switch pin terminals for damage or loose connection with harness connector.
8. Disconnect stop lamp relay harness connector.
9. Check stop lamp relay harness connector for disconnection or looseness.
10. Check stop lamp relay pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> GO TO 13.
NO >> Repair or replace error-detected parts. GO TO 12.

12. CHECK DATA MONITOR (5)

1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Connect stop lamp switch harness connector.
3. Connect stop lamp relay harness connector.
4. Erase self-diagnosis result for “ABS” with CONSULT.
5. Turn the ignition switch OFF, and wait 10 seconds or more.
6. Start the engine.
   CAUTION:
   Never start the vehicle.
7. Select “ABS”, “DATA MONITOR” and “STOP LAMP SW” according to this order with CONSULT. Check that data monitor displays “On” or “Off” when brake pedal is depress or release. Refer to BRC-161, "Reference Value".

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 13.

13. CHECK STOP LAMP SWITCH CIRCUIT (1)

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

ABS actuator and electric unit (control unit)		—	Condition	Voltage
Connector	Terminal			
E36	8	Ground	Brake pedal depressed	Battery voltage
			Brake pedal not depressed	Approx. 0 V

4. Turn the ignition switch ON.
5. Check voltage between ABS actuator and electric unit (control unit) harness connector and ground.

ABS actuator and electric unit (control unit)		—	Condition	Voltage
Connector	Terminal			
E36	8	Ground	Brake pedal depressed	Battery voltage
			Brake pedal not depressed	Approx. 0 V

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-180, "Exploded View".
NO >> Repair or replace error-detected parts. GO TO 14.

14. CHECK STOP LAMP SWITCH CIRCUIT (2)

1. Disconnect stop lamp switch harness connector.
2. Check voltage between stop lamp switch harness connector and ground.

Stop lamp switch		—	Voltage
Connector	Terminal		
E115	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 15.
NO >> Repair or replace error-detected parts. GO TO 15.

15. CHECK STOP LAMP SWITCH CIRCUIT (3)

1. Turn the ignition switch OFF.
2. Disconnect stop lamp relay harness connector.
3. Check continuity between ABS actuator and electric unit (control unit) harness connector and stop lamp relay harness connector.

ABS actuator and electric unit (control unit)		Stop lamp relay		Continuity
Connector	Terminal	Connector	Terminal	
E36	8	E82	5	Existed

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E36	8	Ground	Not existed

Is the inspection result normal?

YES >> GO TO 16.
NO >> Repair or replace error-detected parts. GO TO 16.

16. CHECK STOP LAMP SWITCH CIRCUIT (4)

Check continuity and short circuit between stop lamp relay harness connector terminal (3) and 10 A fuse (11).

Is the inspection result normal?

YES >> GO TO 17.
NO >> Repair or replace error-detected parts. GO TO 17.

17. CHECK STOP LAMP SWITCH CIRCUIT (5)

1. Check continuity between stop lamp switch harness connector and stop lamp relay harness connector.

Stop lamp switch		Stop lamp relay		Continuity
Connector	Terminal	Connector	Terminal	
E115	2	E82	2	Existed

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

Stop lamp switch		—	Continuity
Connector	Terminal		
E115	2	Ground	Not existed

Is the inspection result normal?

YES >> GO TO 18.
NO >> Repair or replace error-detected parts. GO TO 18.

18. CHECK DATA MONITOR (6)

1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Connect stop lamp switch harness connector.
3. Connect stop lamp relay harness connector.
4. Erase self-diagnosis result for “ABS” with CONSULT.
5. Turn the ignition switch OFF, and wait 10 seconds or more.
6. Start the engine.
   CAUTION:
   Never start the vehicle.
7. Select “ABS”, “DATA MONITOR” and “STOP LAMP SW” according to this order with CONSULT. Check that data monitor displays “On” or “Off” when brake pedal is depress or release. Refer to BRC-161, "Reference Value".

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace ABS actuator and electric unit (control unit). Refer to BRC-180, "Exploded View".

Component Inspection (Stop Lamp Switch)

INFOID:0000000007350511

1. CHECK STOP LAMP SWITCH

1. Turn the ignition switch OFF.
2. Disconnect stop lamp switch harness 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-19, "Exploded View".

Component Inspection (Stop Lamp Relay)

INFOID:0000000007678385

1. CHECK STOP LAMP RELAY

1. Turn the ignition switch OFF.
2. Disconnect stop lamp relay harness connector.
3. Apply 12 V to stop lamp relay connector terminal (2 and 1).
   CAUTION:

- **Never make the terminals short.**
- **Connect the fuse between the terminals when applying the voltage.**

4. Check continuity between stop lamp relay connector terminals.

Stop lamp relay Terminal	Condition	Continuity
3 – 5	Apply 12 V to stop lamp relay connector terminal (2 and 1)	Existed
	Do not apply 12 V to stop lamp relay connector terminal (2 and 1)	Not existed

5. Check resistance between stop lamp relay connector terminals.

Stop lamp relay Terminal	Resistance
1 – 2	Approx. 50 Ω

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace stop lamp relay.

Special Repair Requirement

INFOID:0000000007666818

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

C1118 AWD SYSTEM

Description

INFOID:0000000007350513

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:0000000007350514

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.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

1. Turn the ignition switch OFF to ON.
2. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1118” detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-126, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007350515

1.CHECK AWD CONTROL UNIT

Perform self-diagnosis for “ALL MODE AWD/4WD” with CONSULT.

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). Refer to BRC-180, "Exploded View".

Special Repair Requirement

INFOID:0000000007350516

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

C1120, C1122, C1124, C1126 IN ABS SOL

Description

INFOID:0000000007350517

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:0000000007350518

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.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

1. Turn the ignition switch OFF to ON.
2. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1120”, “C1122”, “C1124” or “C1126” detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-127, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007350519

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) harness connector.
3. Check terminal for deformation, disconnect, looseness, etc.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace or repair error-detected parts.

2.CHECK ABS MOTOR AND MOTOR RELAY POWER SUPPLY

Check voltage between the ABS actuator and electric unit (control unit) harness connector 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 >> Perform trouble diagnosis for battery power supply. Refer to PG-6, "Wiring Diagram - BATTERY POWER SUPPLY -".

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

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

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-180, "Exploded View".
NO >> Repair or replace error-detected parts. (Check ABS each bolt for tightness and corrosion).

Special Repair Requirement

INFOID:0000000007350521

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

C1121, C1123, C1125, C1127 OUT ABS SOL

Description

INFOID:0000000007350522

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:0000000007350523

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.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

1. Turn the ignition switch OFF to ON.
2. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1121”,C“C1123”,C“C1125” or “C1127” detected?

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

Diagnosis Procedure

INFOID:0000000007350524

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) harness connector.
3. Check terminal for deformation, disconnect, looseness, etc.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace or repair error-detected parts.

2.CHECK ABS MOTOR AND MOTOR RELAY POWER SUPPLY

Check voltage between the ABS actuator and electric unit (control unit) harness connector 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 >> Perform trouble diagnosis for battery power supply. Refer to PG-6, "Wiring Diagram - BATTERY POWER SUPPLY -".

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

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

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-180, "Exploded View".
NO >> Repair or replace error-detected parts. (Check ABS each bolt for tightness and corrosion).

Special Repair Requirement

INFOID:0000000007350526

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

C1130 ENGINE SIGNAL

Description

INFOID:0000000007350527

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

DTC Logic

INFOID:0000000007350528

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.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

1. Turn the ignition switch OFF to ON.
2. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1130” detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-131, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007350529

1.CHECK ENGINE SYSTEM

1. Perform self-diagnosis for “ENGINE” with CONSULT. Repair or replace items indicated, then Perform self-diagnosis for “ENGINE” with CONSULT.
2. Perform self-diagnosis for “ABS” with CONSULT.

Is any item indicated on the self-diagnosis display?

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

Special Repair Requirement

INFOID:0000000007666819

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

C1140 ACTUATOR RELAY SYSTEM

Description

INFOID:0000000007350531

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

DTC Logic

INFOID:0000000007350532

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.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

1. Turn the ignition switch OFF to ON.
2. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1140” detected?

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

Diagnosis Procedure

INFOID:0000000007350533

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) harness connector.
3. Check terminal for deformation, disconnect, looseness, etc.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace or repair error-detected parts.

2.CHECK ABS MOTOR AND MOTOR RELAY POWER SUPPLY

Check voltage between the ABS actuator and electric unit (control unit) harness connector 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 >> Perform trouble diagnosis for battery power supply. Refer to PG-6, "Wiring Diagram - BATTERY POWER SUPPLY -".

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

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

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-180, "Exploded View".
NO >> Repair or replace error-detected parts. (Check ABS each bolt for tightness and corrosion).

Special Repair Requirement

INFOID:0000000007350535

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

C1143, C1144 STEERING ANGLE SENSOR

Description

INFOID:0000000007350536

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:0000000007350537

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.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

1. Turn the ignition switch OFF to ON.
2. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1143” or “C1144” detected?

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

Diagnosis Procedure

INFOID:0000000007350538

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 the ignition switch OFF.
2. Disconnect steering angle sensor harness connector.
3. Check terminal for deformation, disconnection, looseness, etc.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace error-detected parts.

3.CHECK STEERING ANGLE SENSOR POWER SUPPLY

1. Check voltage between steering angle sensor harness connector and ground.

Steering angle sensor		—	Voltage
Connector	Terminal		
M30	1	Ground	Approx. 0 V

2. Turn the ignition switch ON.
   CAUTION:
   Never start the engine.

3. Check voltage between steering angle sensor harness connector and ground.

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

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 4.

4. CHECK STEERING ANGLE SENSOR POWER SUPPLY CIRCUIT

1. Turn the ignition switch OFF.
2. Check 10 A fuse (1).
3. Check continuity and short circuit between steering angle sensor harness connector terminal (1) and 10 A fuse (1).

Is the inspection result normal?

YES >> Perform trouble diagnosis for ignition power supply. Refer to PG-18, "Wiring Diagram - IGNITION POWER SUPPLY -".
NO >> Repair or replace error-detected parts.

5. CHECK STEERING ANGLE SENSOR GROUND CIRCUIT

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

Steering angle sensor		—	Continuity
Connector	Terminal		
M30	1	Ground	Exist

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace error-detected parts.

6. CHECK CAN COMUNICATION LINE

Check “STRG BRANCH LINE CIRCUIT”. Refer to LAN-39, "Diagnosis Procedure".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-180, "Exploded View".
NO >> Repair or replace error-detected parts.

Special Repair Requirement

INFOID:0000000007350540

1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

C1155 BRAKE FLUID LEVEL SWITCH

Description

INFOID:0000000007350541

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:0000000007350542

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.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

1. Turn the ignition switch OFF to ON.
2. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1155” detected?

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

Diagnosis Procedure

INFOID:0000000007666820

1.CHECK BRAKE FLUID LEVEL

1. Turn the ignition switch OFF.
2. Check the brake fluid level. Refer to BR-11, "Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Refill the brake fluid. Refer to BR-11, "Refilling".

2.PERFORM SELF-DIAGNOSIS (1)

1. Erase self-diagnosis result for “ABS” with CONSULT.
2. Turn the ignition switch OFF, and wait 10 seconds or more.
3. Turn the ignition switch ON.
   CAUTION:
   Never start the engine.
4. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1155” detected?

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

3.CHECK BRAKE FLUID LEVEL SWITCH

Check brake fluid level switch. Refer to BRC-138, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace reservoir tank. Refer to BR-27, "Exploded View". GO TO 4.

4. PERFORM SELF-DIAGNOSIS (2)

1. Erase self-diagnosis result for “ABS” with CONSULT.
2. Turn the ignition switch OFF, and wait 10 seconds or more.
3. Turn the ignition switch ON.
   CAUTION:
   Never start the engine.
4. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1155” detected?

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

5. CHECK CONNECTOR AND TERMINAL

1. Turn the ignition switch OFF.
2. Disconnect brake fluid level switch harness connector.
3. Check brake fluid level switch harness connector for disconnection or looseness.
4. Check brake fluid level switch pin terminals for damage or loose connection with harness connector.
5. Disconnect combination meter harness connector.
6. Check combination meter harness connector for disconnection or looseness.
7. Check combination meter pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair or replace error-detected parts. GO TO 6.

6. PERFORM SELF-DIAGNOSIS (3)

1. Connect brake fluid level switch harness connector.
2. Connect combination meter harness connector.
3. Erase self-diagnosis result for “ABS” with CONSULT.
4. Turn the ignition switch OFF, and wait 10 seconds or more.
5. Turn the ignition switch ON.
   CAUTION:
   Never start the engine.
6. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1155” detected?

YES >> INSPECTION END
NO >> GO TO 7.

7. CHECK BRAKE FLUID LEVEL SWITCH CIRCUIT

1. Turn the ignition switch OFF.
2. Disconnect brake fluid level switch harness connector.
3. Disconnect ABS actuator and electric unit (control unit) harness connector.
4. Disconnect combination meter harness connector.
5. Check the continuity between brake fluid level switch harness connector and combination meter harness connector.

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

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

Brake fluid level switch		—	Continuity
Connector	Terminal		
E37	1	Ground	No existed

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair or replace error-detected parts.

8.CHECK BRAKE FLUID LEVEL SWITCH GROUND

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

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

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair or replace error-detected parts.

9.CHECK COMBINATION METER

Check combination meter. Refer to MWI-27, "CONSULT Function".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-180, "Exploded View".
NO >> Repair or replace combination meter. Refer to MWI-69, "Exploded View".

Component Inspection

INFOID:0000000007350544

1.CHECK BRAKE FLUID LEVEL SWITCH

1. Turn the 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. Refer to BR-27, "Exploded View".

Special Repair Requirement

INFOID:0000000007350545

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

C1164, C1165 CV SYSTEM

Description

INFOID:0000000007350546

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

DTC Logic

INFOID:0000000007350547

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.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

1. Turn the ignition switch OFF to ON.
2. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1164” or “C1165” detected?

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

Diagnosis Procedure

INFOID:0000000007350548

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) harness connector.
3. Check terminal for deformation, disconnect, looseness, etc.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace or repair error-detected parts.

2.CHECK VDC SWITCH VALVE POWER SUPPLY

Check voltage between the ABS actuator and electric unit (control unit) harness connector 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 >> Perform trouble diagnosis for battery power supply. Refer to PG-6, "Wiring Diagram - BATTERY POWER SUPPLY -".

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

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

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-180, "Exploded View".
NO >> Repair or replace error-detected parts. (Check ABS each bolt for tightness and corrosion).

Special Repair Requirement

INFOID:0000000007350550

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

C1166, C1167 SV SYSTEM

Description

INFOID:0000000007350551

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

DTC Logic

INFOID:0000000007350552

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.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

1. Turn the ignition switch OFF to ON.
2. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1166” or “C1167” detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-141, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007350553

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) harness connector.
3. Check terminal for deformation, disconnect, looseness, etc.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace or repair error-detected parts.

2.CHECK VDC SWITCH VALVE POWER SUPPLY

Check voltage between the ABS actuator and electric unit (control unit) harness connector 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 >> Perform trouble diagnosis for battery power supply. Refer to PG-6, "Wiring Diagram - BATTERY POWER SUPPLY -".

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

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

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-180, "Exploded View".
NO >> Repair or replace error-detected parts. (Check ABS each bolt for tightness and corrosion).

Special Repair Requirement

INFOID:0000000007350555

1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

C1176 STOP LAMP SW2

Description

INFOID:0000000007350556

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

DTC Logic

INFOID:0000000007350557

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1176	STOP LAMP SW2	When a ASCD brake switch signal is not input where the brake pedal is depressed.	• Harness or connector • ASCD brake switch • ABS actuator and electric unit (control unit)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

1. Turn the ignition switch OFF to ON.
2. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1176” detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-143, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007666822

NOTE:
DTC “C1176” may be detected when the brake pedal and the accelerator pedal are simultaneously depressed for 1 minute or more while driving the vehicle. This is not a malfunction.

1.INTERVIEW FROM THE CUSTOMER

Check if the brake pedal and the accelerator pedal are simultaneously depressed for 1 minute or more while driving the vehicle.

Is there such a history?

YES >> GO TO 2.
NO >> GO TO 3.

2.PERFORM SELF-DIAGNOSIS

1. Erase self-diagnosis result for “ABS” with CONSULT.
2. Turn the ignition switch OFF, and wait 10 seconds or more.
3. Start the engine.
   CAUTION:
   Never start the vehicle.
4. Depress the brake pedal several times.
5. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “C1176” detected?

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

3.CHECK ASCD BRAKE SWITCH CLEARANCE

1. Turn the ignition switch OFF.
2. Check ASCD brake switch clearance. Refer to BR-8, "Inspection and Adjustment".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Adjust ASCD brake switch clearance. Refer to BR-8, "Inspection and Adjustment". GO TO 4.

4. CHECK DATA MONITOR (2)

1. Erase self-diagnosis result for “ABS” with CONSULT.
2. Turn the ignition switch OFF, and wait 10 seconds or more.
3. Start the engine.
   CAUTION:
   Never start the vehicle.
4. Select “ABS”, “DATA MONITOR” and “STOP LAMP SW2” according to this order with CONSULT. Check that data monitor displays “On” or “Off” when brake pedal is depress or release. Refer to BRC-161, "Reference Value".

Is the inspection result normal?

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

5. CHECK ASCD BRAKE SWITCH

Check ASCD brake switch. Refer to BRC-146, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Replace ASCD brake switch. Refer to BR-19, "Exploded View". GO TO 6.

6. CHECK DATA MONITOR (3)

1. Erase self-diagnosis result for “ABS” with CONSULT.
2. Turn the ignition switch OFF, and wait 10 seconds or more.
3. Start the engine.
   CAUTION:
   Never start the vehicle.
4. Select “ABS”, “DATA MONITOR” and “STOP LAMP SW2” according to this order with CONSULT. Check that data monitor displays “On” or “Off” when brake pedal is depress or release. Refer to BRC-161, "Reference Value".

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 7.

7. CHECK CONNECTOR AND TERMINAL

1. Turn the ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) harness connector.
3. Check ABS actuator and electric unit (control unit) harness connector for disconnection or looseness.
4. Check ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with harness connector.
5. Disconnect ASCD brake switch harness connector.
6. Check ASCD brake switch harness connector for disconnection or looseness.
7. Check ASCD brake switch pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair or replace error-detected parts. GO TO 8.

8. CHECK DATA MONITOR (4)

1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Connect ASCD brake switch harness connector.
3. Erase self-diagnosis result for “ABS” with CONSULT.
4. Turn the ignition switch OFF, and wait 10 seconds or more.
5. Start the engine.
   CAUTION:
   Never start the vehicle.

6. Select “ABS”, “DATA MONITOR” and “STOP LAMP SW2” according to this order with CONSULT. Check that data monitor displays “On” or “Off” when brake pedal is depress or release. Refer to BRC-161, "Reference Value".

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 9.

9. CHECK ASCD BRAKE SWITCH CIRCUIT (1)

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

ABS actuator and electric unit (control unit)		—	Condition	Voltage
Connector	Terminal			
E36	6	Ground	Brake pedal depressed	Approx. 0 V
			Brake pedal not depressed	

4. Turn the ignition switch ON.
5. Check voltage between ABS actuator and electric unit (control unit) harness connector and ground.

ABS actuator and electric unit (control unit)		—	Condition	Voltage
Connector	Terminal			
E36	6	Ground	Brake pedal depressed	Approx. 0 V
			Brake pedal not depressed	Battery voltage

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-180, "Exploded View".
NO >> Repair or replace error-detected parts. GO TO 10.

10. CHECK ASCD BRAKE SWITCH CIRCUIT (2)

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

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

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E36	6	Ground	Not existed

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-180, "Exploded View".
NO >> Repair or replace error-detected parts. GO TO 11.

11. CHECK DATA MONITOR (5)

1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Connect ASCD brake switch harness connector.
3. Erase self-diagnosis result for “ABS” with CONSULT.
4. Turn the ignition switch OFF, and wait 10 seconds or more.
5. Start the engine.

CAUTION:
Never start the vehicle.

6. Select “ABS”, “DATA MONITOR” and “STOP LAMP SW2” according to this order with CONSULT. Check that data monitor displays “On” or “Off” when brake pedal is depress or release. Refer to BRC-161, "Reference Value".

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace ABS actuator and electric unit (control unit). Refer to BRC-180, "Exploded View".

Component Inspection

INFOID:0000000007350559

1. CHECK ASCD BRAKE SWITCH

1. Turn the 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 >> INSPECTION END
NO >> Replace ASCD brake switch. Refer to BR-19, "Exploded View".

Special Repair Requirement

INFOID:0000000007350560

1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

U1000 CAN COMM CIRCUIT

Description

INFOID:0000000007350561

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:0000000007350562

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.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

1. Turn the ignition switch OFF to ON.
2. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “U1000” detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-147, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007350563

1.PERFORM ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) SELF-DIAGNOSIS

Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “U1000” detected?

YES >> Proceed to LAN-16, "Trouble Diagnosis Flow Chart".
NO >> INSPECTION END

Special Repair Requirement

INFOID:0000000007350564

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

U1010 CONTROL UNIT (CAN)

Description

INFOID:0000000007350565

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:0000000007350566

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.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

1. Turn the ignition switch OFF to ON.
2. Perform self-diagnosis for “ABS” with CONSULT.

Is DTC “U1010” detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-148, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007350567

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-180, "Exploded View".
NO >> Repair or replace the harnesses and connectors.

Special Repair Requirement

INFOID:0000000007350568

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.

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-180, "Exploded View".
NO >> Repair or replace error-detected parts.

POWER SUPPLY AND GROUND CIRCUIT

Description

INFOID:0000000007666811

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

Diagnosis Procedure

INFOID:0000000007666812

1.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) IGNITION POWER SUPPLY

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E36	16	Ground	Approx. 0 V

4. Turn the ignition switch ON.
   CAUTION:
   Never start the engine.
5. Check the voltage between ABS actuator and electric unit (control unit) harness connector and ground.

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E36	16	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

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

1. Turn the ignition switch OFF.
2. Check 10A fuse (59).
3. Disconnect IPDM E/R harness connector.
4. Check continuity between ABS actuator and electric unit (control unit) harness connector and IPDM E/R harness connector.

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

Is the inspection result normal?

YES >> Perform trouble diagnosis for ignition power supply. Refer to PG-18, "Wiring Diagram - IGNITION POWER SUPPLY -".
NO >> Repair or replace error-detected parts.

3.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) BATTERY POWER SUPPLY

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E36	1	Ground	Battery voltage
	2		

3. Turn the ignition switch ON.
   CAUTION:

Never start the engine.

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E36	1	Ground	Battery voltage
	2		

Is the inspection result normal?

YES >> GO TO 4.
NO >> Perform trouble diagnosis for battery power supply. Refer to PG-6, "Wiring Diagram - BATTERY POWER SUPPLY -".

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

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

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

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair or replace error-detected parts.

Special Repair Requirement

INFOID:0000000007666814

1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

PARKING BRAKE SWITCH

Description

INFOID:0000000007350569

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:0000000007350570

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 >> Proceed to diagnosis procedure. Refer to BRC-151, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007350571

1.CHECK PARKING BRAKE SWITCH

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

Parking brake switch	—	Condition	Continuity
Terminal			
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-27, "CONSULT Function".

Is the inspection result normal?

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

Component Inspection

INFOID:0000000007350572

1.CHECK PARKING BRAKE SWITCH

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

Parking brake switch Terminal	—	Condition	Continuity
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:0000000007350573

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

Component Function Check

INFOID:0000000007350574

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 >> Proceed to diagnosis procedure. Refer to BRC-153, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007350575

1.CHECK VDC OFF SWITCH

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

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

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

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

4. Check continuity between VDC OFF switch harness connector and ground.

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-27, "CONSULT Function".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-180, "Exploded View".
NO >> Repair or replace combination meter.

Component Inspection

INFOID:0000000007350576

1.CHECK VDC OFF SWITCH

1. Turn the ignition switch OFF.
2. Disconnect VDC OFF switch harness connector.
3. Check continuity between VDC OFF switch connector terminals.

VDC OFF switch	Condition	Condition
Terminal		
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.

Special Repair Requirement

INFOID:0000000007350577

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

ABS WARNING LAMP

Description

INFOID:0000000007350578

×: 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:0000000007350579

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 >> Proceed to diagnosis procedure. Refer to BRC-155, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007350580

1.CHECK SELF-DIAGNOSIS

Perform self-diagnosis for “ABS” with CONSULT.

Is the inspection result normal?

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

2.CHECK COMBINATION METER

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-180, "Exploded View".
NO >> Repair or replace combination meter.

Special Repair Requirement

INFOID:0000000007350581

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

BRAKE WARNING LAMP

Description

INFOID:0000000007350582

×: 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:0000000007350583

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 >> Proceed to diagnosis procedure. Refer to BRC-156, "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-151, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007350584

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-151, "Diagnosis Procedure".

2.CHECK SELF-DIAGNOSIS

Perform self-diagnosis for “ABS” with CONSULT.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check items displayed by self-diagnosis.

3.CHECK COMBINATION METER

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-180, "Exploded View".
NO >> Repair or replace combination meter.

Special Repair Requirement

INFOID:0000000007350585

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

VDC WARNING LAMP

Description

INFOID:0000000007350590

×: ON △: Blink –: OFF

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

Component Function Check

INFOID:0000000007350591

1.CHECK VDC 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 >> Proceed to diagnosis procedure. Refer to BRC-158, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007350592

1.CHECK SELF-DIAGNOSIS

Perform self-diagnosis for “ABS” with CONSULT.

Is the inspection result normal?

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

2.CHECK COMBINATION METER

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-180, "Exploded View".
NO >> Repair or replace combination meter.

Special Repair Requirement

INFOID:0000000007350593

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

VDC OFF INDICATOR LAMP

Description

INFOID:0000000007350586

×: 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.)	×

Component Function Check

INFOID:0000000007350587

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 >> Proceed to diagnosis procedure. Refer to BRC-159, "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-153, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007350588

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-153, "Diagnosis Procedure".

2.CHECK SELF-DIAGNOSIS

Perform self-diagnosis for “ABS” with CONSULT.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check items displayed by self-diagnosis.

3.CHECK COMBINATION METER

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-180, "Exploded View".
NO >> Repair or replace combination meter.

Special Repair Requirement

INFOID:0000000007350589

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit) or steering angle sensor and removing steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

ECU DIAGNOSIS INFORMATION

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Reference Value

INFOID:0000000007350594

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	First gear (1GR) Second gear (2GR) Third gear (3GR) Forth gear (4GR) Fifth gear (5GR) Sixth gear (6GR)	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/side/decel G sensor	Vehicle stopped	Approx. 0 d/s
		Vehicle turning	–100 to 100 d/s
DECEL G-SEN	Decel G detected by yaw rate/side/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	Side G detected by yaw rate/side/decel 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” in “ABS” with CONSULT)	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” in “ABS” with CONSULT)	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” in “ABS” with CONSULT)	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” in “ABS” with CONSULT)	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” in “ABS” with CONSULT)	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” in “ABS” with CONSULT)	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” in “ABS” with CONSULT)	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” in “ABS” with CONSULT)	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 (Note 2)	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 3)	When ABS warning lamp is ON	On
		When ABS warning lamp is OFF	Off
OFF LAMP	VDC OFF indicator lamp (Note 3)	When VDC OFF indicator lamp is ON	On
		When VDC OFF indicator lamp is OFF	Off
SLIP/VDC LAMP	VDC warning lamp (Note 3)	When VDC warning lamp is ON	On
		When VDC 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
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” in “ABS” with CONSULT)	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” in “ABS” with CONSULT)	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” in “ABS” with CONSULT)	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” in “ABS” with CONSULT)	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:

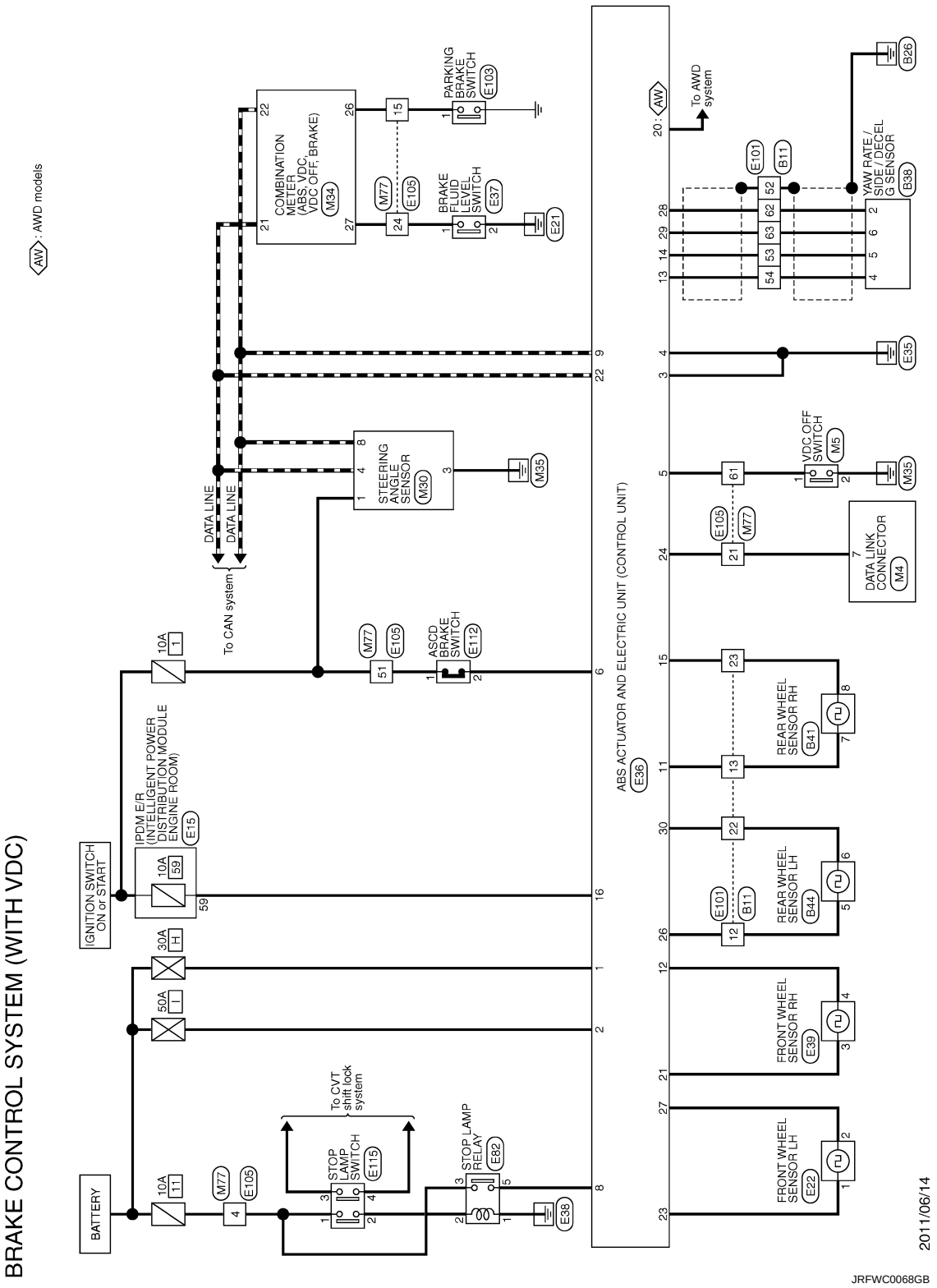
- 1: Confirm tire pressure is normal.
- 2: Every 20 seconds momentary switch to Off.
- 3: On and off timing for warning lamp and indicator lamp.

- ABS warning lamp: Refer to BRC-155, "Description".
- VDC warning lamp: Refer to BRC-158, "Description".
- VDC OFF indicator lamp: Refer to BRC-159, "Description".

Wiring Diagram -BRAKE CONTROL SYSTEM-

INFOID:0000000007350595

For connector terminal arrangements, harness layouts, and alphabets in a ⬡ (option abbreviation; if not described in wiring diagram), refer to GI-12, "Connector Information".



Fail-Safe

INFOID:0000000007350596

ABS, EBD SYSTEM

In case of electrical malfunctions with the ABS, ABS warning lamp and VDC warning lamp will turn on. In case of electrical malfunctions with the EBD, brake warning lamp, ABS warning lamp and VDC warning 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 warning 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 “ABS” with CONSULT.

DTC Index

INFOID:0000000007350597

DTC	Items (CONSULT screen terms)	Reference
C1101	RR RH SENSOR-1	BRC-99, "DTC Logic"
C1102	RR LH SENSOR-1	
C1103	FR RH SENSOR-1	
C1104	FR LH SENSOR-1	
C1105	RR RH SENSOR-2	BRC-102, "DTC Logic"
C1106	RR LH SENSOR-2	
C1107	FR RH SENSOR-2	
C1108	FR LH SENSOR-2	
C1109	BATTERY VOLTAGE [ABNORMAL]	BRC-107, "DTC Logic"
C1110	CONTROLLER FAILURE	BRC-109, "DTC Logic"
C1111	PUMP MOTOR	BRC-110, "DTC Logic"
C1113	G SENSOR	BRC-112, "DTC Logic"
C1115	ABS SENSOR [ABNORMAL SIGNAL]	BRC-115, "DTC Logic"
C1116	STOP LAMP SW	BRC-120, "DTC Logic"
C1118	4WD SYSTEM	BRC-126, "DTC Logic"
C1120	FR LH IN ABS SOL	BRC-127, "DTC Logic"
C1121	FR LH OUT ABS SOL	BRC-129, "DTC Logic"
C1122	FR RH IN ABS SOL	BRC-127, "DTC Logic"
C1123	FR RH OUT ABS SOL	BRC-129, "DTC Logic"
C1124	RR LH IN ABS SOL	BRC-127, "DTC Logic"
C1125	RR LH OUT ABS SOL	BRC-129, "DTC Logic"
C1126	RR RH IN ABS SOL	BRC-127, "DTC Logic"
C1127	RR RH OUT ABS SOL	BRC-129, "DTC Logic"
C1130	ENGINE SIGNAL 1	BRC-131, "DTC Logic"
C1140	ACTUATOR RLY	BRC-132, "DTC Logic"
C1143	ST ANG SEN CIRCUIT	BRC-134, "DTC Logic"
C1144	ST ANG SEN SIGNAL	
C1145	YAW RATE SENSOR	BRC-112, "DTC Logic"
C1146	SIDE G-SEN CIRCUIT	
C1155	BR FLUID LEVEL LOW	BRC-136, "DTC Logic"
C1164	CV1	BRC-139, "DTC Logic"
C1165	CV2	

DTC	Items (CONSULT screen terms)	Reference
C1166	SV1	BRC-141, "DTC Logic"
C1167	SV2	
C1176	STOP LAMP SW2	BRC-143, "DTC Logic"
U1000	CAN COMM CIRCUIT	BRC-147, "DTC Logic"
U1010	CONTROL UNIT(CAN)	BRC-148, "DTC Logic"

SYMPTOM DIAGNOSIS

EXCESSIVE ABS FUNCTION OPERATION FREQUENCY

Diagnosis Procedure

INFOID:0000000007350598

1.CHECK START

Check front and rear brake force distribution using a brake tester. Refer to BR-48, "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-7, "Inspection".
  - AWD models: Refer to FAX-33, "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 error-detected parts.

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 for “ABS” with CONSULT.
NO >> Normal

UNEXPECTED PEDAL REACTION

Diagnosis Procedure

INFOID:0000000007350599

1.CHECK BRAKE PEDAL STROKE

Check brake pedal stroke. Refer to BR-8, "Inspection and Adjustment".

Is the stroke too large?

YES >> • Bleed air from brake tube and hose. Refer to BR-12, "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-8, "Inspection and Adjustment".
- Master cylinder: Refer to BR-13, "Inspection".
- Brake booster: Refer to BR-14, "Inspection".

NO >> GO TO 2.

2.CHECK FUNCTION

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

Is the inspection result normal?

YES >> Normal
NO >> Check brake system.

THE BRAKING DISTANCE IS LONG

Diagnosis Procedure

INFOID:0000000007350600

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

Is the inspection result normal?

YES >> Normal
NO >> Check brake system.

ABS FUNCTION DOES NOT OPERATE

Diagnosis Procedure

INFOID:0000000007350601

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 for “ABS” with CONSULT.

PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

Diagnosis Procedure

INFOID:0000000007350602

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 for “ABS” with CONSULT.

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

Diagnosis Procedure

INFOID:0000000007350603

1.SYMPTOM CHECK

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

Is the inspection result normal?

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

2.CHECK SELF-DIAGNOSIS RESULTS

Perform self-diagnosis for “ABS” with CONSULT.

Are self-diagnosis results indicated?

YES >> Check corresponding items, make repairs, and perform self-diagnosis for “ABS” with CONSULT.
NO >> GO TO 3.

3.CHECK CONNECTOR

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

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 self-diagnosis for “ENGINE” and “TRANSMISSION” with CONSULT.

Are self-diagnosis results indicated?

YES >> Check the corresponding items.
- “ENGINE”: Refer to EC-107, "CONSULT Function".
- “TRANSMISSION”: Refer to TM-46, "CONSULT Function".

NO >> Replace ABS actuator and electric unit (control unit). Refer to BRC-180, "Exploded View".

NORMAL OPERATING CONDITION

Description

INFOID:0000000007350604

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 and VDC warning lamp may turn ON when the vehicle is subject to strong shaking or large vibration, such as when the vehicle is rotating on a turntable or located on a ship while the engine is running.	In this case, restart the engine on a normal 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 and VDC warning 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 warning 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

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

INFOID:0000000007669019

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 AIR BAG” and “SEAT BELT” of this Service Manual.

WARNING:

Always observe the following items for preventing accidental activation.

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision that 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 “SRS AIR BAG”.**
- **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.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

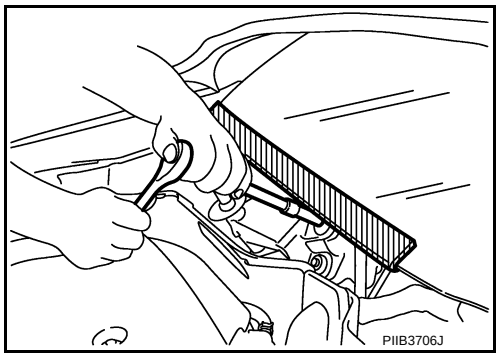
Always observe the following items for preventing accidental activation.

- **When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the ignition ON or engine running, never use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution for Procedure without Cowl Top Cover

INFOID:0000000007669020

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



Precaution for Brake System

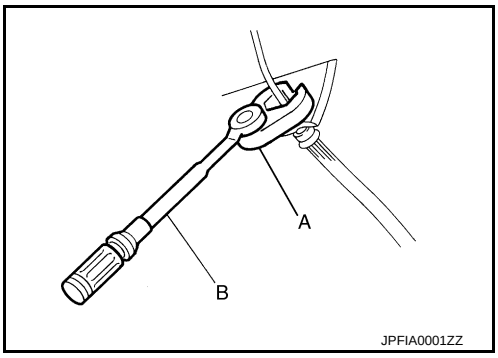
INFOID:0000000007350607

WARNING:

Since dust covering the front and rear brakes has an affect on human body, the dust must be removed with a dust collector. Never splatter the dust with an air blow gun.

- Brake fluid use refer to MA-15, "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 crow-foot (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) harness connector or the battery negative terminal before performing the work.
- Check that no brake fluid leakage is present after replacing the parts.



Precaution for Brake Control

INFOID:0000000007350608

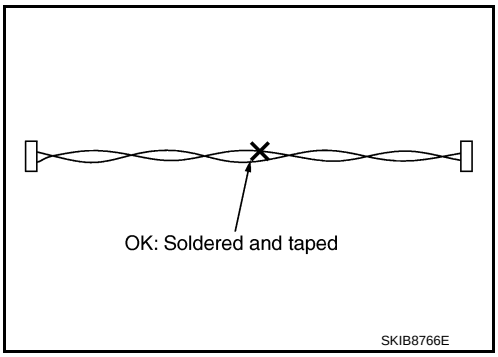
- When starting engine or when starting vehicle just after starting engine, brake pedal may vibrate or motor operating noise may be heard from engine compartment. This is normal condition.
- When an error is indicated by ABS or another warning lamp, collect all necessary information from customer (what 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.
- VDC system may not operate normally or a VDC warning 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.

Precautions for Harness Repair

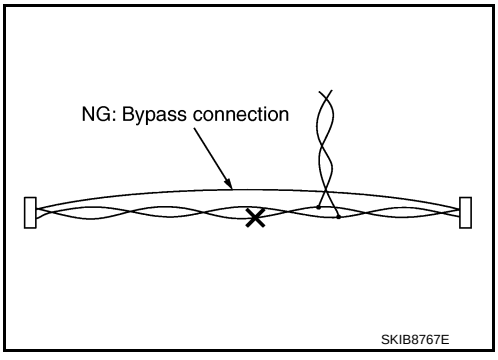
INFOID:0000000007350609

COMMUNICATION LINE

- Solder the repaired area and wrap tape around the soldered area.
  NOTE:
  A fray of twisted lines must be within 110 mm (4.33 in).



- Bypass connection is never allowed at the repaired area.
  NOTE:
  Bypass connection may cause communication error as spliced wires that are separate from the main line or twisted lines lose noise immunity.
- Replace the applicable harness as an assembly if error is detected on the shield lines of communication line.



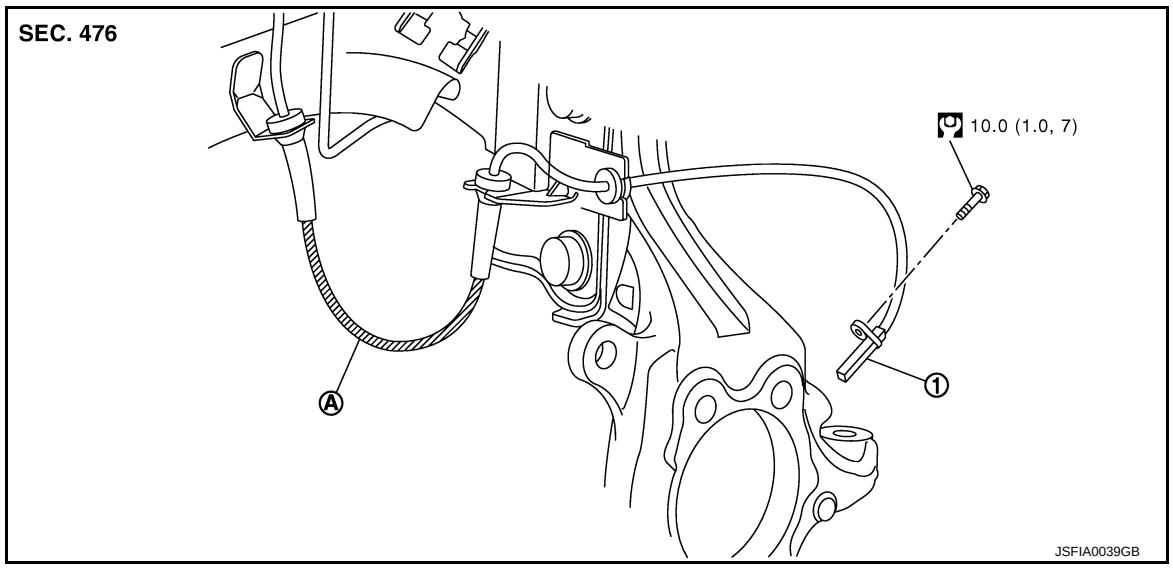
REMOVAL AND INSTALLATION

WHEEL SENSOR

FRONT WHEEL SENSOR

FRONT WHEEL SENSOR : Exploded View

INFOID:0000000007350615



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:0000000007350616

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

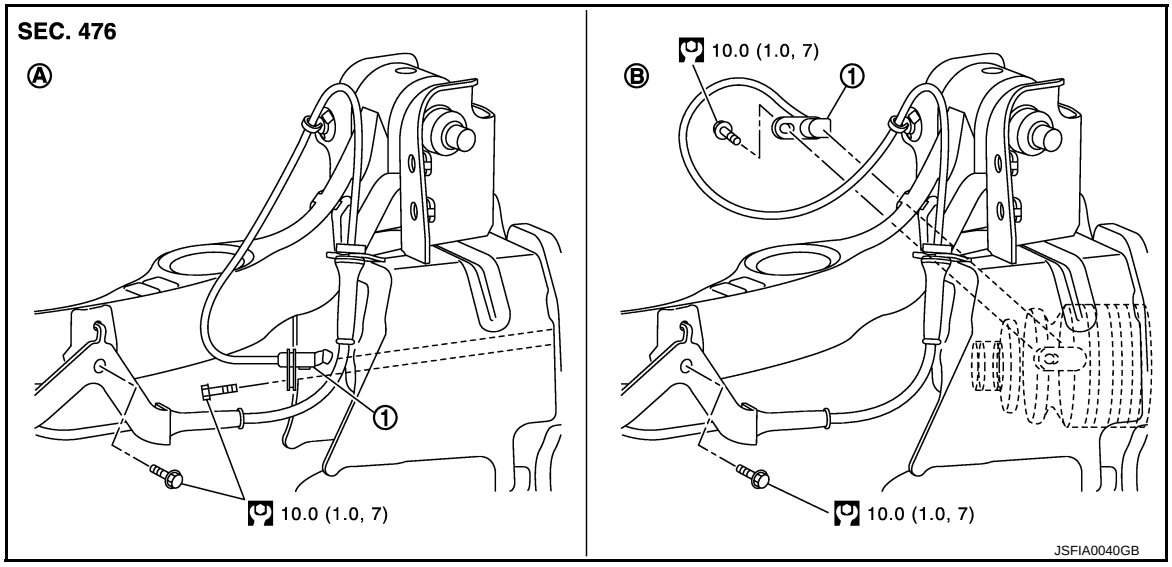
Pay attention to the following when installing wheel sensor. Tighten installation bolts to the specified torques.

- 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:0000000007350617



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:0000000007350618

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:0000000007350619

Refer to FAX-9, "Exploded View" (2WD models), FAX-35, "Exploded View" (AWD models).

FRONT SENSOR ROTOR : Removal and Installation

INFOID:0000000007350620

REMOVAL

Sensor rotor cannot be disassembled. Remove the sensor rotor together with hub and bearing assembly. Refer to FAX-9, "Removal and Installation" (2WD models), FAX-35, "Removal and Installation" (AWD models).

INSTALLATION

Sensor rotor cannot be disassembled. Installation the sensor rotor together with hub and bearing assembly. Refer to FAX-9, "Removal and Installation" (2WD models), FAX-35, "Removal and Installation" (AWD models).

REAR SENSOR ROTOR

REAR SENSOR ROTOR : Exploded View

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Refer to RAX-5, "Exploded View" (2WD models), RAX-16, "Exploded View" (AWD models).

REAR SENSOR ROTOR : Removal and Installation

INFOID:0000000007350622

2WD MODELS

Removal

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

Installation

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

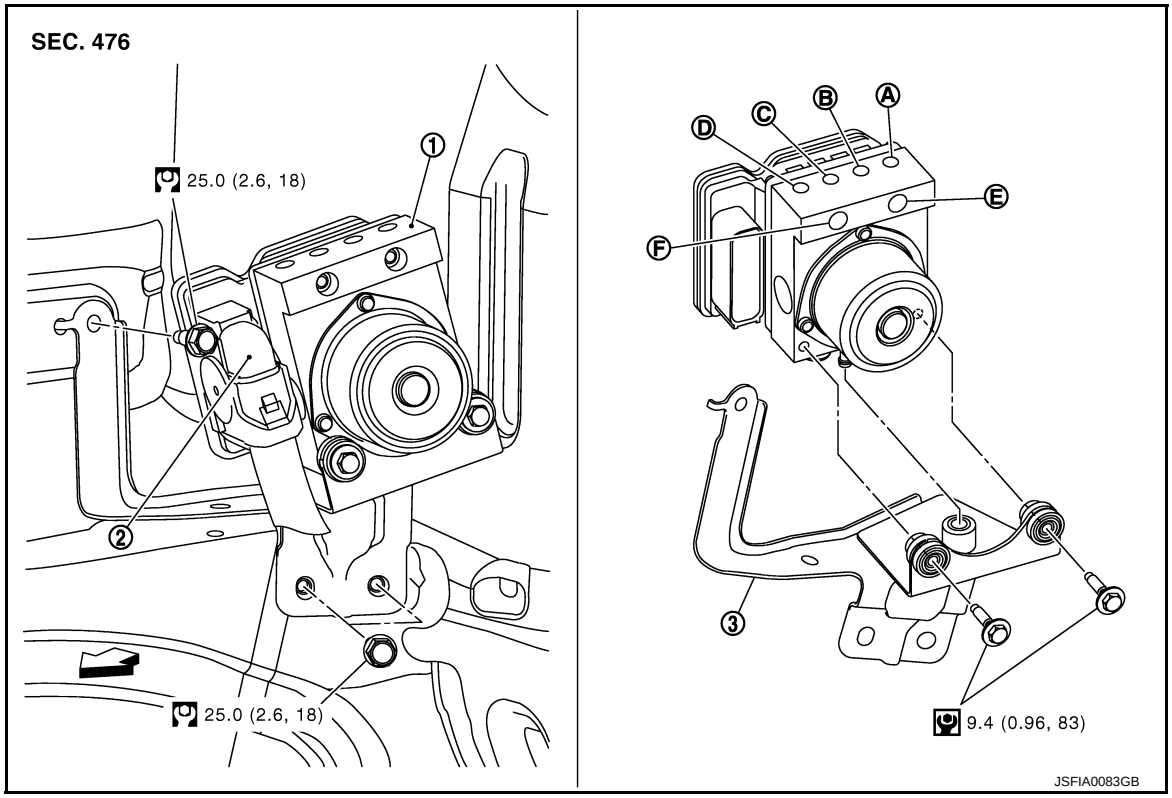
AWD MODELS

For removal and installation of sensor rotor, refer to RAX-17, "Disassembly and Assembly".

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Exploded View

INFOID:0000000007350623



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:0000000007350624

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-12, "Bleeding Brake System".**

1. Remove cowl top. Refer to EXT-20, "Exploded View".
2. Disconnect ABS actuator and electric unit (control unit) harness 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

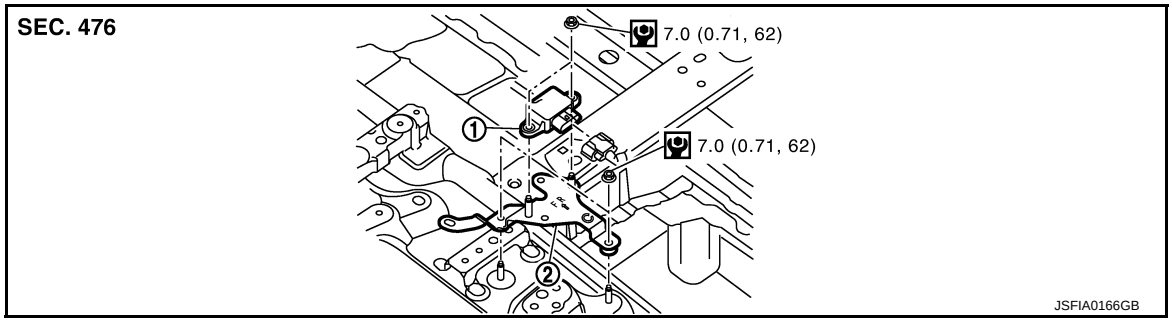
Note the following, and install in the reverse order of removal.

- 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-12, "Bleeding Brake System".
- After installing harness connector in the ABS actuator and electric unit (control unit), make sure harness connector is securely locked.
- When replacing ABS actuator and electric unit (control unit), make sure adjust neutral position of steering angle sensor. Refer to BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

YAW RATE/SIDE/DECEL G SENSOR

Exploded View

INFOID:0000000007350625



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:0000000007350626

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-22, "Exploded View".
2. Disconnect yaw rate/side/decel G sensor harness connector.
3. Remove mounting bolts. Remove yaw rate/side/decel G sensor.

INSTALLATION

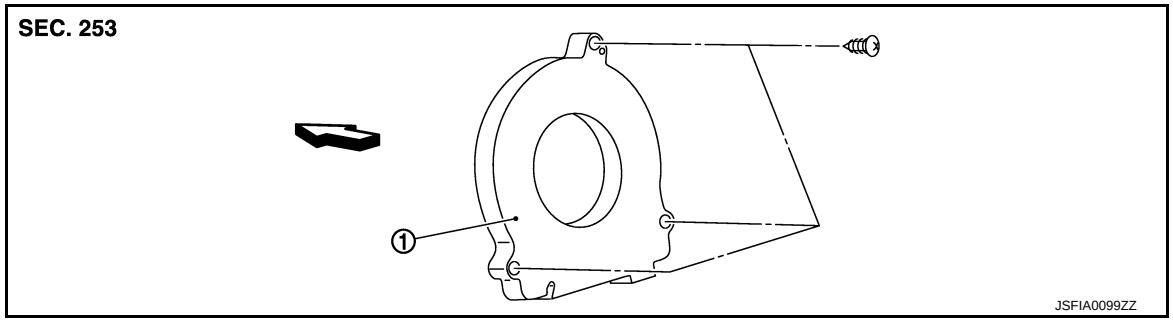
Note the following, and install in the reverse order of removal.

- 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:0000000007350627



1. Steering angle sensor

⇦: Vehicle front

Removal and Installation

INFOID:0000000007350628

REMOVAL

1. Remove spiral cable assembly. Refer to SR-14, "Exploded View".
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-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".