SECTION BRC
BRAKE CONTROL SYSTEM

CONTENTS

ABS

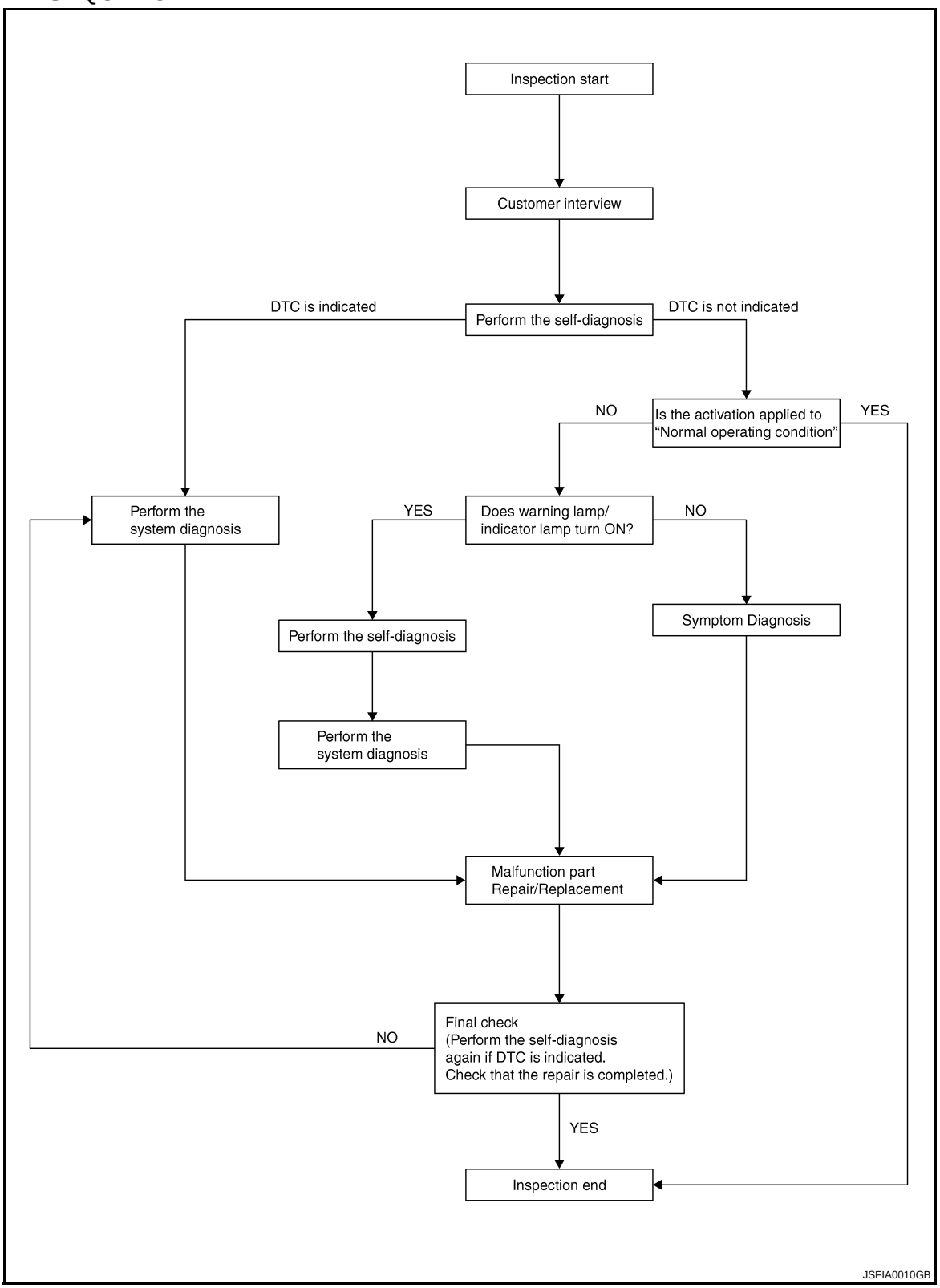
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000001115421

OVERALL SEQUENCE



DETAIED FLOW

1.COLLECT THE INFORMATION FROM THE CUSTOMER

Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using the diagnosis worksheet. Refer to BRC-8, "Diagnostic Work Sheet".

>> GO TO 2.

2.PERFORM THE SELF-DIAGNOSIS

Check the DTC display with the self-diagnosis function. Refer to BRC-17, "CONSULT-III Function (ABS)".

Is there any DTC displayed?

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

3.PERFORM THE SYSTEM DIAGNOSIS

Perform the diagnosis applicable to the displayed DTC. Refer to BRC-58, "DTC No. Index".

>> GO TO 7.

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

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

Is the symptom is a normal operation?

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

5.CHECK THE WARNING LAMP FOR ILLUMINATION

Check that the warning lamp illuminate.
- ABS warning lamp: Refer to BRC-49, "Description".
- Brake warning lamp: Refer to BRC-50, "Description".

Is ON/OFF timing normal?

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

6.PERFORM THE DIAGNOSIS BY SYMPTOM

Perform the diagnosis applicable to the symptom.

>> GO TO 7.

7.REPAIR OR REPLACE THE MALFUNCTIONING PARTS

Repair or replace the specified malfunctioning parts.

>> GO TO 8.

8.FINAL CHECK

Perform the self-diagnosis again, and check that the malfunction is repaired completely. After checking, erase the self-diagnosis memory. Refer to BRC-17, "CONSULT-III Function (ABS)".

Is no other DTC present and the repair completed?

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

Diagnostic Work Sheet

INFOID:0000000001115422

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

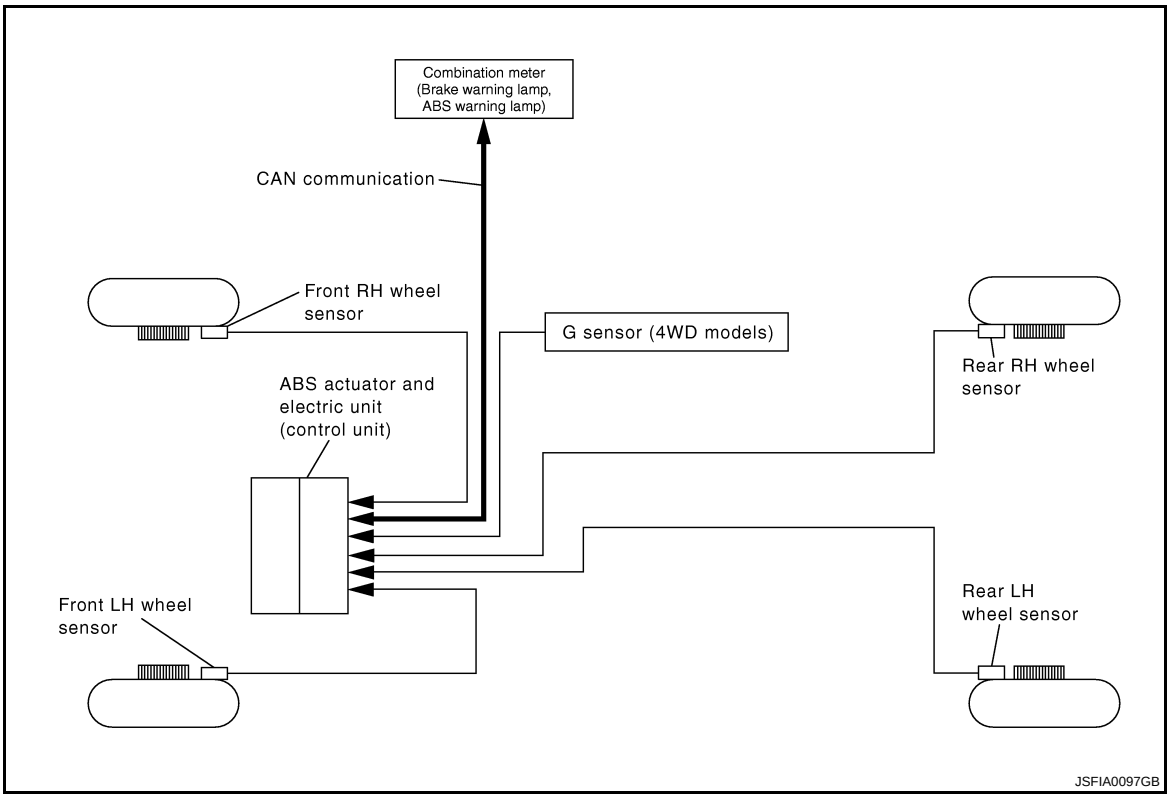
SFIA3264E

FUNCTION DIAGNOSIS

ABS

System Diagram

INFOID:0000000001115423



System Description

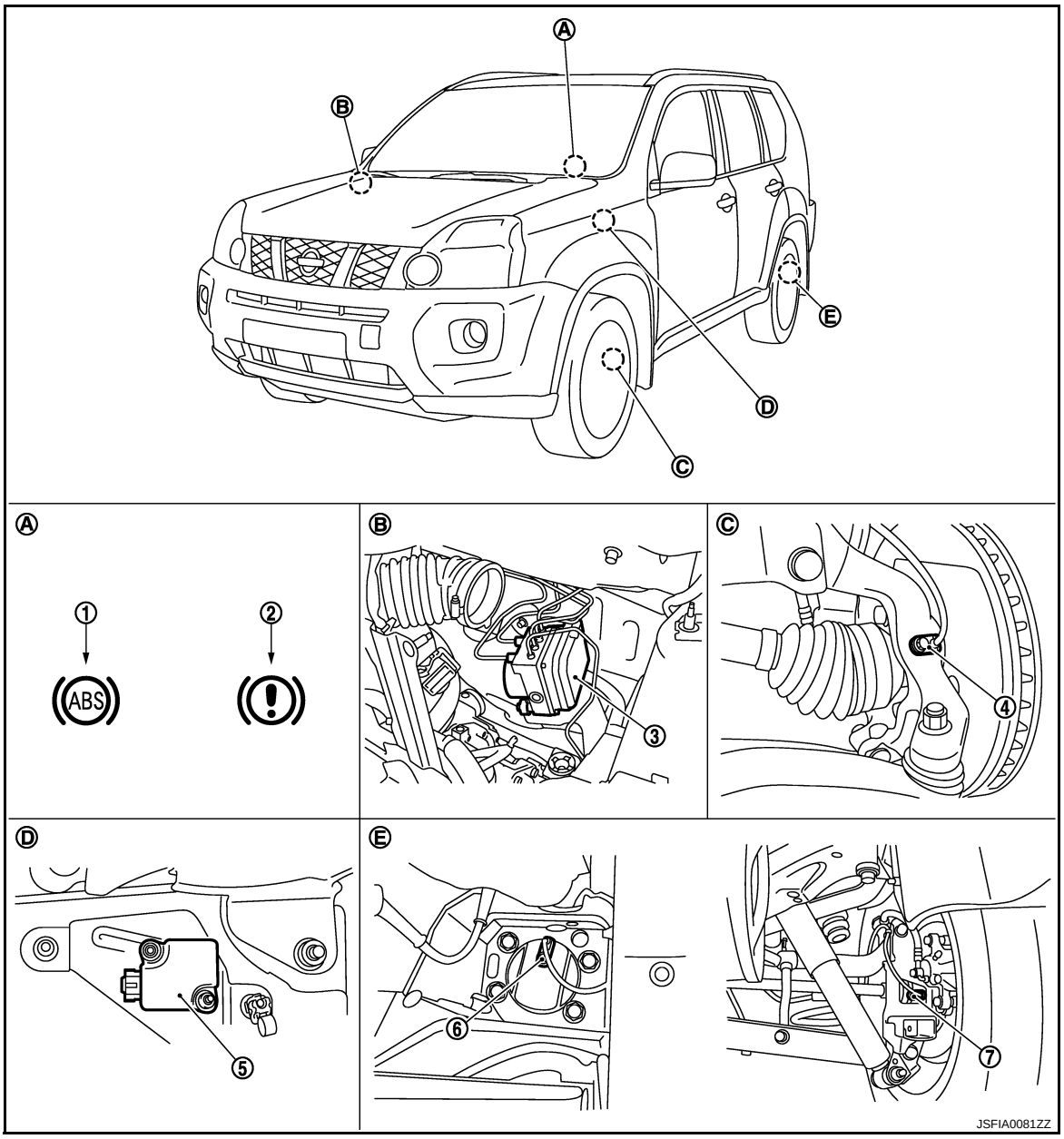
INFOID:0000000001115424

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

Component Parts Location

INFOID:0000000001115425

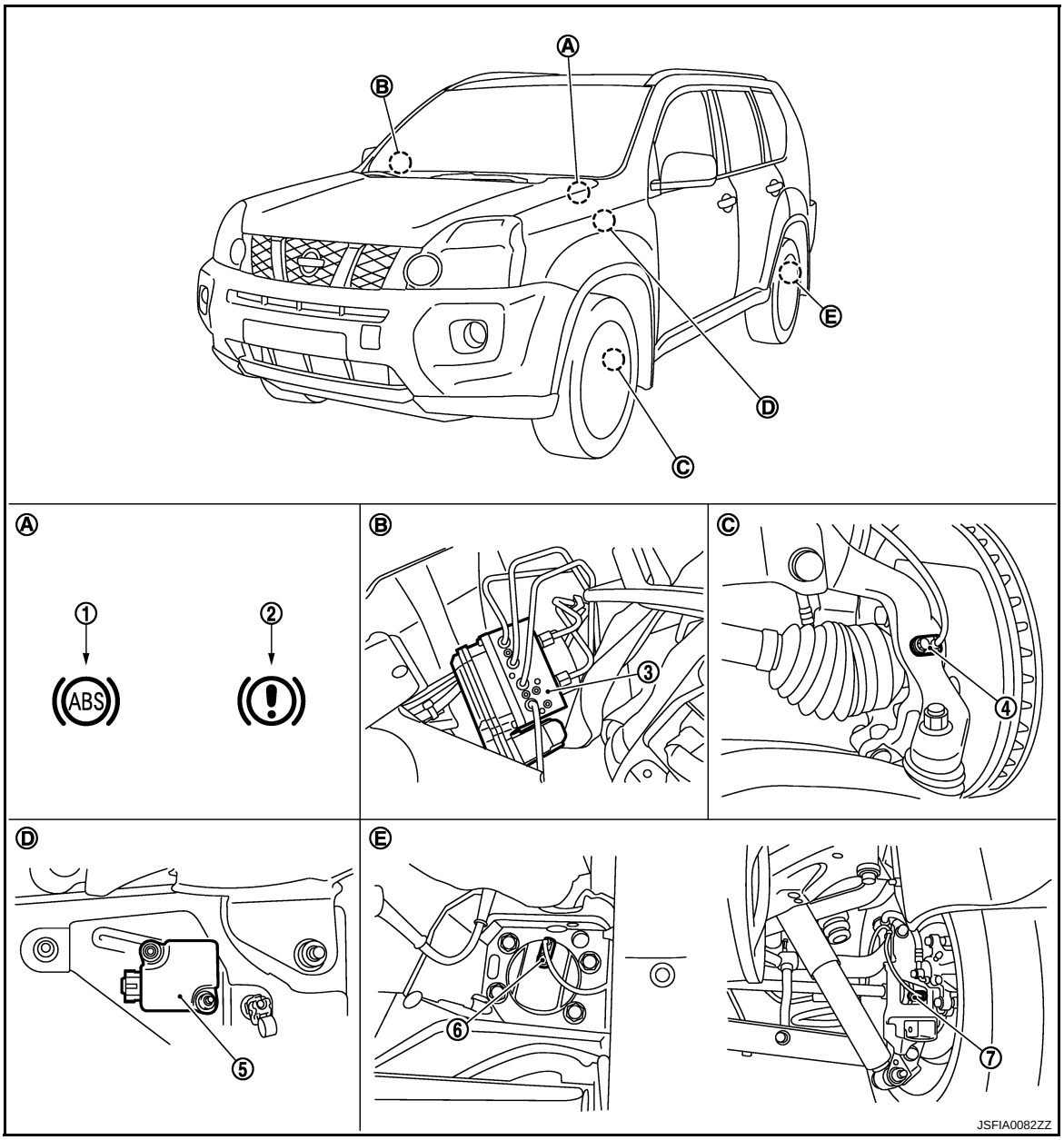
LHD models



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

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

RHD models



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

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

Component Description

INFOID:0000000001115426

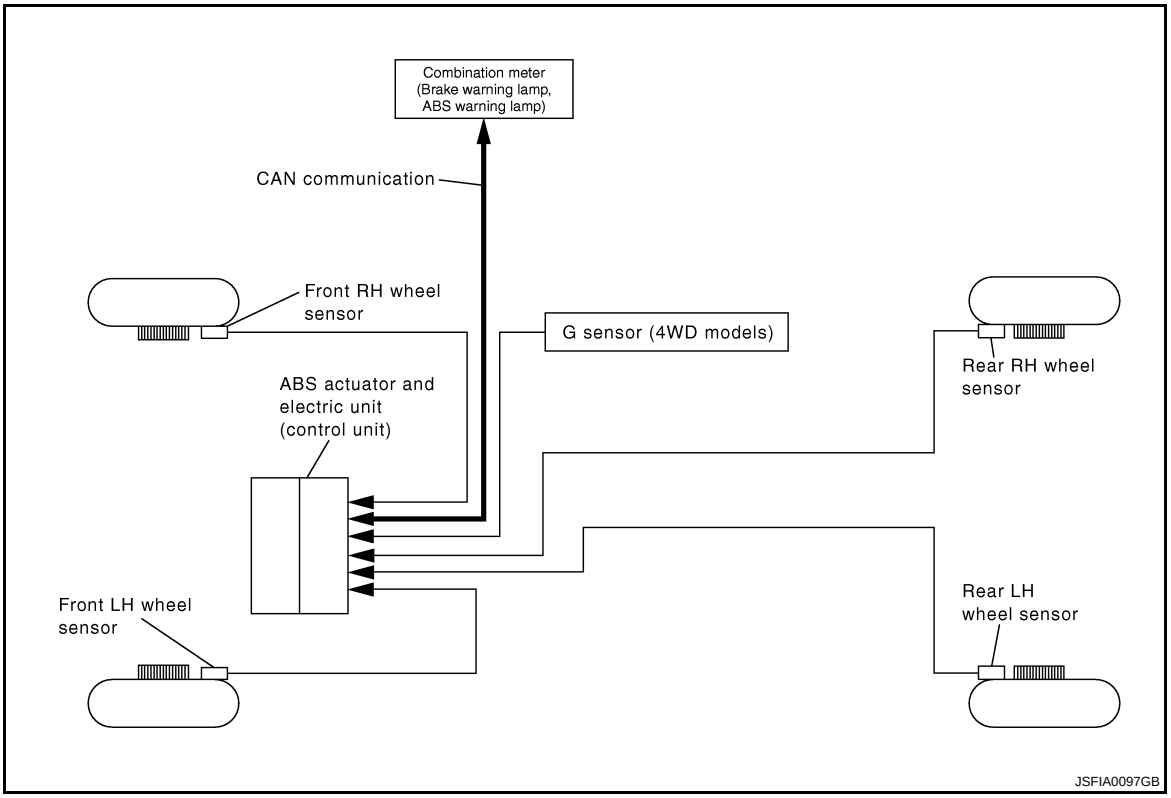
Component parts		Reference
ABS actuator and electric unit (control unit)	Pump	BRC-29, "Description"
	Motor	
	Actuator relay (Main relay)	BRC-41, "Description"
	Solenoid valve	BRC-37, "Description"
Wheel sensor		BRC-20, "Description"

Component parts	Reference
ABS warning lamp	BRC-49, "Description"
Brake warning lamp	BRC-50, "Description"

EBD

System Diagram

INFOID:0000000001117059



System Description

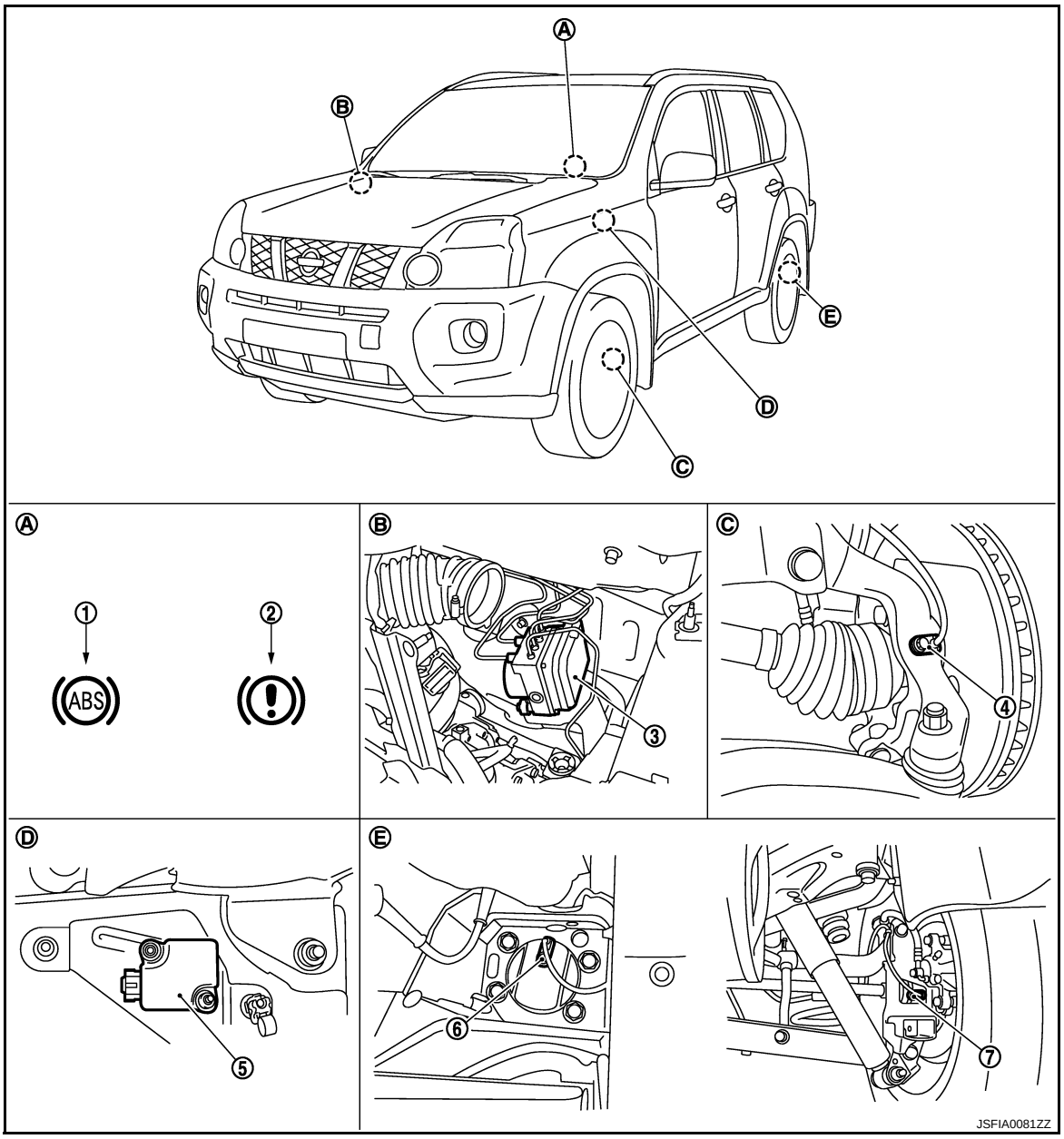
INFOID:0000000001115428

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

Component Parts Location

INFOID:0000000001117060

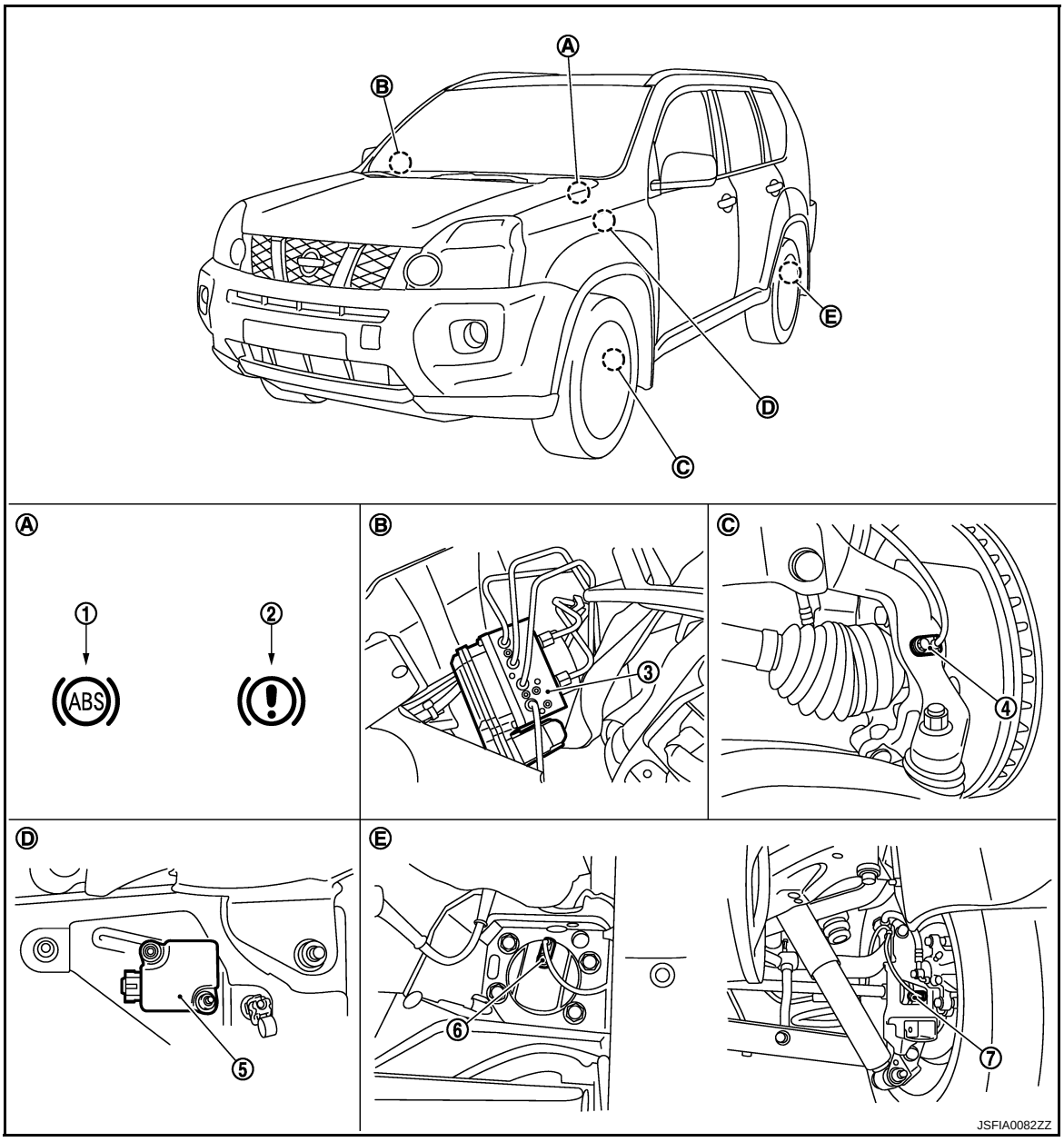
LHD models



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

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

RHD models



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

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

Component Description

INFOID:0000000001117061

Component parts		Reference
ABS actuator and electric unit (control unit)	Pump	BRC-29, "Description"
	Motor	
	Actuator relay (Main relay)	BRC-41, "Description"
	Solenoid valve	BRC-37, "Description"
Wheel sensor		BRC-20, "Description"

Component parts	Reference
ABS warning lamp	BRC-49, "Description"
Brake warning lamp	BRC-50, "Description"

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

CONSULT-III Function (ABS)

INFOID:0000000001115431

FUNCTION

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

Diagnostic test mode	Function
Self-diagnostic results	Self-diagnostic results can be read and erased quickly.
Data monitor	Input/Output data in the ABS actuator and electric unit (control unit) can be read.
Active test	Diagnostic test mode is which CONSULT-III drives some actuators apart from the ABS actuator and electric unit (control unit) and also shifts some parameters in a specified range.
ECU part number	ABS actuator and electric unit (control unit) part number can be read.
Function test	Performed by CONSULT-III instead of a technician to determine whether each system is “OK” or “NG”.
CAN diagnostic support monitor	The results of transmit/receive diagnosis of CAN communication can be read.

SELF-DIAG RESULTS MODE

Operation Procedure

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

How to Erase Self-diagnosis Results

1. After erasing DTC memory, start engine and drive vehicle at 30 km/h (19 MPH) or more for approximately 1 minute as the final inspection, and make sure that the ABS warning lamp and brake warning lamp turn OFF.
   CAUTION:
   If memory cannot be erased, perform applicably 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-58, "DTC No. Index".

DATA MONITOR MODE

Display Item List

×: Applicable ▼: Optional item

Monitor item (Unit)	SELECT MONITOR ITEM		Remarks
	ECU INPUT SIGNALS	MAIN SIGNLAS	
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

Monitor item (Unit)	SELECT MONITOR ITEM		Remarks
	ECU INPUT SIGNALS	MAIN SIGNLAS	
BATTERY VOLT (V)	×	×	Battery voltage supplied to the ABS actuator and electric unit (control unit)
DECEL G SENSOR 1 (G) (4WD models)	×	×	Vehicle on level surface or on slope
DECEL G SENSOR 2 (G) (4WD models)	×	×	
FR RH IN SOL (On/Off)	▼	×	Operation status of each solenoid valve
FR RH OUT SOL (On/Off)	▼	×	
FR LH IN SOL (On/Off)	▼	×	
FR LH OUT SOL (On/Off)	▼	×	
RR RH IN SOL (On/Off)	▼	×	
RR RH OUT SOL (On/Off)	▼	×	
RR LH IN SOL (On/Off)	▼	×	
RR LH OUT SOL (On/Off)	▼	×	
MOTOR RELAY (On/Off)	▼	×	Motor and motor relay operation
ACTUATOR RLY (On/Off)	▼	×	Actuator relay operation
ABS WARN LAMP (On/Off)	▼	×	ABS warning lamp
EBD SIGNAL (On/Off)	▼	▼	EBD operation
ABS SIGNAL (On/Off)	▼	▼	ABS operation
EBD FAIL SIG (On/Off)	▼	▼	EBD fail-safe signal
ABS FAIL SIG (On/Off)	▼	▼	ABS fail-safe signal

ACTIVE TEST MODE

CAUTION:

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

NOTE:

- When active test is performed while depressing the pedal, the pedal depression amount will change. This is normal. (Only solenoid valve and ABS motor.)
- “TEST IS STOPPED” is displayed 10 seconds after operation start.
- After “TEST IS STOPPED” is displayed, to perform test again, touch BACK and repeat step 3.

Test Item

ABS SOLENOID VALVE

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

Test item	Display item	Display		
		UP	KEEP	DOWN
FR RH SOL	FR RH IN SOL	OFF	ON	ON
	FR RH OUT SOL	OFF	OFF	ON*
FR LH SOL	FR LH IN SOL	OFF	ON	ON
	FR LH OUT SOL	OFF	OFF	ON*
RR RH SOL	RR RH IN SOL	OFF	ON	ON
	RR RH OUT SOL	OFF	OFF	ON*
RR LH SOL	RR LH IN SOL	OFF	ON	ON
	RR LH OUT SOL	OFF	OFF	ON*

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

ABS MOTOR

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

Test item	Display item	Display	
		ON	OFF
ABS MOTOR	MOTOR RELAY	ON	OFF
	ACTUATOR RLY (Note)	ON	ON

NOTE:

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

COMPONENT DIAGNOSIS

C1101, C1102, C1103, C1104 WHEEL SENSOR-1

Description

INFOID:0000000001116988

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:0000000001116989

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1101	RR RH SENSOR-1	Circuit of rear RH wheel circuit 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 circuit is open or short circuit. Current signal from sensor is outside limits.	
C1103	FR RH SENSOR-1	Circuit of front RH wheel circuit is open or short circuit. Current signal from sensor is outside limits.	
C1104	FR LH SENSOR-1	Circuit of front LH wheel circuit is open or short circuit. Current signal from sensor is outside limits.	

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-20, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001116990

CAUTION:
Do not check between wheel sensor terminals.

1.CHECK SENSOR AND SENSOR ROTOR

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

Are the sensor and sensor rotor normal?

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

2.CHECK CONNECTOR

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

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

Is any item indicated on the self-diagnosis display?

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

3. CHECK WHEEL SENSOR HARNESS

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect malfunctioning wheel sensor connector.
4. Check continuity between terminals. (Also check continuity when steering wheel is turned right and left and when sensor harness inside the wheel house is moved.)

Measurement terminal for signal circuit

ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
Connector	Terminal	Connector	Terminal	
E34	12	E39 (Front RH)	4	Existed
	27	E22 (Front LH)	2	
	15	B41 (Rear RH)	8	
	30	B44 (Rear LH)	6	

Measurement terminal for power supply circuit

ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
Connector	Terminal	Connector	Terminal	
E34	21	E39 (Front RH)	3	Existed
	23	E22 (Front LH)	1	
	11	B41 (Rear RH)	7	
	26	B44 (Rear LH)	5	

Measurement terminal for ground circuit

ABS actuator and electric unit (control unit)				Continuity
Connector	Terminal	Connector	Terminal	
E34	12, 21	E34	3, 4	Not existed
	27, 23			
	15, 11			
	30, 26			

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

Is the inspection result normal?

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

4. CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

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

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

Is the inspection result normal?

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

Component Inspection

INFOID:0000000001116991

1.CHECK DATA MONITOR

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

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

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-20, "Diagnosis Procedure".

C1105, C1106, C1107, C1108 WHEEL SENSOR-2

Description

INFOID:0000000001116992

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

DTC Logic

INFOID:0000000001116993

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-23, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001117052

CAUTION:
Do not check between wheel sensor terminals.

1.CHECK SENSOR AND SENSOR ROTOR

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

Are the sensor and sensor rotor normal?

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

2.CHECK CONNECTOR

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

Is any item indicated on the self-diagnosis display?

YES >> GO TO 3.

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

3.CHECK WHEEL SENSOR HARNESS

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect malfunctioning wheel sensor connector.
4. Check continuity between terminals. (Also check continuity when steering wheel is turned right and left and when sensor harness inside the wheel house is moved.)

Measurement terminal for signal circuit

ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
Connector	Terminal	Connector	Terminal	
E34	12	E39 (Front RH)	4	Existed
	27	E22 (Front LH)	2	
	15	B41 (Rear RH)	8	
	30	B44 (Rear LH)	6	

Measurement terminal for power supply circuit

ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
Connector	Terminal	Connector	Terminal	
E34	21	E39 (Front RH)	3	Existed
	23	E22 (Front LH)	1	
	11	B41 (Rear RH)	7	
	26	B44 (Rear LH)	5	

Measurement terminal for ground circuit

ABS actuator and electric unit (control unit)				Continuity
Connector	Terminal	Connector	Terminal	
E34	12, 21	E34	3, 4	Not existed
	27, 23			
	15, 11			
	30, 26			

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

Is the inspection result normal?

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

4.CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

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

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

Is the inspection result normal?

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

Component Inspection

INFOID:0000000001117053

1. CHECK DATA MONITOR

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

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

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-23, "Diagnosis Procedure".

C1109 POWER AND GROUND SYSTEM

Description

INFOID:0000000001116996

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

DTC Logic

INFOID:0000000001116997

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1109	BATTERY VOLTAGE [ABNORMAL]	When the ABS actuator and electric unit (control unit) power supply is lower than normal and vehicle speed is greater than 6km/h (4 MPH). Power supply is greater than normal limits.	• Harness or connector • ABS actuator and electric unit (control unit) • Fuse • Vehicle electrical power system

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
BATTERY VOLTAGE [ABNORMAL]

Is above displayed on the self-diagnosis display?

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

Diagnosis Procedure

INFOID:0000000001116998

1.CHECK CONNECTOR

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

Is any item indicated on the self-diagnosis display?

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

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

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

ABS actuator and electric unit (control unit)		—	Condition	Voltage
Connector	Terminal			
E34	16	Ground	Ignition switch: ON	Battery voltage
			Ignition switch: OFF	Approx. 0 V

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

Is the inspection result normal?

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

3.ABS POWER SUPPLY CHECK (UNDER LOAD CONDITIONS)

1. Use 12 V lamp (normal rating 10 to 20 W) connected between E34 terminals 16 and 4. With ignition switch ON check bulb illuminates correctly.
2. Check ABS motor supply under loaded condition (connector E34 terminals 1 and 2).

Is the inspection result normal?

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

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

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E34	3, 4	Ground	Existed

Is the inspection result normal?

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

C1110 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Description

INFOID:0000000001116999

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

DTC Logic

INFOID:0000000001117000

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

1. Check both ABS solenoid valve and motor supply and ground circuits using a suitable electrical load.
2. Check wheel speed sensor inputs.
3. Check the self-diagnosis results.

Self-diagnosis results
CONTROLLER FAILURE

Is above displayed on the self-diagnosis display?

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

Diagnosis Procedure

INFOID:0000000001117001

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

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

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

C1111 ABS MOTOR, MOTOR RELAY SYSTEM

Description

INFOID:0000000001117002

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:0000000001117003

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
PUMP MOTOR

Is above displayed on the self-diagnosis display?

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

Diagnosis Procedure

INFOID:0000000001117004

1.CHECK CONNECTOR

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

Is any item indicated on the self-diagnosis display?

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

2.CHECK ABS MOTOR AND MOTOR RELAY POWER SUPPLY CIRCUIT

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E34	1	Ground	Battery voltage

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

Is the inspection result normal?

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

3. ABS POWER SUPPLY CHECK (UNDER LOAD CONDITIONS)

Use 12 V lamp (normal rating 10 to 20 W) connected between E34 terminals 1 and 2. With ignition switch ON check bulb illuminates correctly.

Is the inspection result normal?

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

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

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E34	3, 4	Ground	Existed

Is the inspection result normal?

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

Component Inspection

INFOID:0000000001117005

1. CHECK ACTIVE TEST

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

Test item	Display item	Display	
		ON	OFF
ABS MOTOR	MOTOR RELAY	ON	OFF
	ACTUATOR RLY	ON	ON

Is the inspection result normal?

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

C1113 G SENSOR

Description

INFOID:0000000001117006

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:0000000001117007

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 4WD rolling road

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
G SENSOR

Is above displayed on the self-diagnosis display?

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

Diagnosis Procedure

INFOID:0000000001117008

1.CHECK CONNECTOR

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

Is any item indicated on the self-diagnosis display?

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

2.CHECK G SENSOR HARNESS

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

ABS actuator and electric unit (control unit)		G sensor		Continuity
Connector	Terminal	Connector	Terminal	
E34	13	B32	2	Existed
	29		3	
	14		4	
	28		5	

Is the inspection result normal?

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

3.CHECK G SENSOR POWER SUPPLY CIRCUIT

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

G sensor		—	Condition	Voltage
Connector	Terminal			
B32	5	Ground	Ignition switch: ON	Battery voltage
			Ignition switch: OFF	Approx. 0 V

Is the inspection result normal?

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

4.CHECK G SENSOR

1. Remove G sensor from the vehicle. Refer to BRC-73, "Exploded View".
2. Connect the following terminals between G sensor and connector.

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

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

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

Is the inspection result normal?

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

Component Inspection

INFOID:0000000001117009

1.CHECK DATA MONITOR

Select “DECEL G-SENSOR1” and “DECEL G-SENSOR2”, in “DATA MONITOR” and check G sensor signal.

Monitor item	Condition	DATA MONITOR
DECEL G-SENSOR1	Changes according to an indication shown by the decel G sensor	On
		Off
DECEL G-SENSOR2	Changes according to an indication shown by the decel G sensor	On
		Off

Is the inspection result normal?

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

C1115 WHEEL SENSOR

Description

INFOID:0000000001117014

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:0000000001117015

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
ABS SENSOR [ABNORMAL SIGNAL]

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-34, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001117056

CAUTION:
Do not check between wheel sensor terminals.

1.CHECK TIRES

Check air pressure, wear and size.

Are air pressure, wear and size within standard?

YES >> GO TO 2.
NO >> Adjust air pressure, or replace tire.

2.CHECK SENSOR AND SENSOR ROTOR

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

Are the sensor and sensor rotor normal?

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

3.CHECK WHEEL SENSOR HARNESS

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect malfunctioning wheel sensor connector.
4. Check continuity between terminals. (Also check continuity when steering wheel is turned right and left and when sensor harness inside the wheel house is moved.)

Measurement terminal for signal circuit

ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
Connector	Terminal	Connector	Terminal	
E34	12	E39 (Front RH)	4	Existed
	27	E22 (Front LH)	2	
	15	B41 (Rear RH)	8	
	30	B44 (Rear LH)	6	

Measurement terminal for power supply circuit

ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
Connector	Terminal	Connector	Terminal	
E34	21	E39 (Front RH)	3	Existed
	23	E22 (Front LH)	1	
	11	B41 (Rear RH)	7	
	26	B44 (Rear LH)	5	

Measurement terminal for ground circuit

ABS actuator and electric unit (control unit)				Continuity
Connector	Terminal	Connector	Terminal	
E34	12, 21	E34	3, 4	Not existed
	27, 23			
	15, 11			
	30, 26			

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

Is the inspection result normal?

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

4. CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

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

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

Is the inspection result normal?

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

Component Inspection

INFOID:0000000001524143

1. CHECK DATA MONITOR

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

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

Is the inspection result normal?

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

C1120, C1122, C1124, C1126 IN ABS SOL

Description

INFOID:0000000001117022

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:0000000001117023

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

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

Diagnosis Procedure

INFOID:0000000001117024

1.CHECK SENSOR AND SENSOR ROTOR

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

Are the sensor and sensor rotor normal?

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

2.CHECK CONNECTOR

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

Is any item indicated on the self-diagnosis display?

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

3.CHECK ACTUATOR RELAY POWER SUPPLY CIRCUIT

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E34	2	Ground	Battery voltage

Is the inspection result normal?

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

4.CHECK ACUATOR RELAY GROUND CIRCUIT

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E34	3, 4	Ground	Existed

Is the inspection result normal?

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

Component Inspection

INFOID:0000000001117025

1.CHECK ACTIVE TEST

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

Test item	Display item	Display		
		UP	KEEP	DOWN
FR RH SOL	FR RH IN SOL	OFF	ON	ON
	FR RH OUT SOL	OFF	OFF	ON*
FR LH SOL	FR LH IN SOL	OFF	ON	ON
	FR LH OUT SOL	OFF	OFF	ON*
RR RH SOL	RR RH IN SOL	OFF	ON	ON
	RR RH OUT SOL	OFF	OFF	ON*
RR LH SOL	RR LH IN SOL	OFF	ON	ON
	RR LH OUT SOL	OFF	OFF	ON*

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

Is the inspection result normal?

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

C1121, C1123, C1125, C1127 OUT ABS SOL

Description

INFOID:0000000001117026

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:0000000001117027

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

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

Diagnosis Procedure

INFOID:0000000001117054

1.CHECK SENSOR AND SENSOR ROTOR

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

Are the sensor and sensor rotor normal?

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

2.CHECK CONNECTOR

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

Is any item indicated on the self-diagnosis display?

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

3.CHECK ACTUATOR RELAY POWER SUPPLY CIRCUIT

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E34	2	Ground	Battery voltage

Is the inspection result normal?

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

4.CHECK ACUATOR RELAY GROUND CIRCUIT

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E34	3, 4	Ground	Existed

Is the inspection result normal?

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

Component Inspection

INFOID:0000000001117055

1.CHECK ACTIVE TEST

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

Test item	Display item	Display		
		UP	KEEP	DOWN
FR RH SOL	FR RH IN SOL	OFF	ON	ON
	FR RH OUT SOL	OFF	OFF	ON*
FR LH SOL	FR LH IN SOL	OFF	ON	ON
	FR LH OUT SOL	OFF	OFF	ON*
RR RH SOL	RR RH IN SOL	OFF	ON	ON
	RR RH OUT SOL	OFF	OFF	ON*
RR LH SOL	RR LH IN SOL	OFF	ON	ON
	RR LH OUT SOL	OFF	OFF	ON*

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

Is the inspection result normal?

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

C1140 ACTUATOR RELAY SYSTEM

Description

INFOID:0000000001117010

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

DTC Logic

INFOID:0000000001117011

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1140	ACTUATOR RLY	During the actuator relay operating with OFF, when the actuator relay turns ON, or when the control line for the relay is shorted to the ground.	• Harness or connector • ABS actuator and electric unit (control unit)
		During the actuator relay operating with ON, when the actuator relay turns ON, or when the control line for the relay is open.	

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
ACTUATOR RLY

Is above displayed on the self-diagnosis display?

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

Diagnosis Procedure

INFOID:0000000001117012

1.CHECK CONNECTOR

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

Is any item indicated on the self-diagnosis display?

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

2.CHECK ACTUATOR RELAY POWER SUPPLY CIRCUIT

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E34	2	Ground	Battery voltage

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

Is the inspection result normal?

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

3.ABS POWER SUPPLY CHECK (UNDER LOAD CONDITIONS)

Use 12 V lamp (normal rating 10 to 20 W) connected between E34 terminals 1 and 3. With ignition switch ON check bulb illuminates correctly.

Is the inspection result normal?

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

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

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E34	3, 4	Ground	Existed

Is the inspection result normal?

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

Component Inspection

INFOID:0000000001117013

1.CHECK ACTIVE TEST

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

Test item	Display item	Display	
		ON	OFF
ABS MOTOR	MOTOR RELAY	ON	OFF
	ACTUATOR RLY	ON	ON

Is the inspection result normal?

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

U1000 CAN COMM CIRCUIT

Description

INFOID:0000000001117030

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:0000000001117031

DTC DETECTION LOGIC

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

Diagnosis Procedure

INFOID:0000000001117032

1.CHECK CONNECTOR

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

Self-diagnosis results
CAN COMM CIRCUIT

Is above displayed on the self-diagnosis display?

YES >> Go to LAN-13, "Trouble Diagnosis Flow Chart".
NO >> INSPECTION END

U1010 CONTROL UNIT (CAN)

Description

INFOID:0000000001454790

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:0000000001454791

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.RECHECK DTC

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

Is DTC “U1010” detected?

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

Diagnosis Procedure

INFOID:0000000001454792

1.ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

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

Is the inspection result normal?

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

BRAKE FLUID LEVEL SWITCH

Description

INFOID:0000000001117033

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:0000000001117034

1.CHECK BRAKE FLUID LEVEL SWITCH OPERATION

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

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-47, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001117035

1.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect brake fluid level switch connector and combination meter connector.
3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
4. Reconnect connectors and then perform component function check. Refer to BRC-45, "Component Function Check".

Is the inspection result normal?

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

2.CHECK BRAKE FLUID LEVEL SWITCH

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

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

Is the inspection result normal?

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

3.CHECK BRAKE FLUID LEVEL SWITCH CIRCUIT

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

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

Combination meter		—	Continuity
Connector	Terminal		
M34	27	Ground	Not existed

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

Is the inspection result normal?

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

Component Inspection

INFOID:0000000001117036

1. CHECK BRAKE FLUID LEVEL SWITCH

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

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

Is the inspection result normal?

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

PARKING BRAKE SWITCH

Description

INFOID:0000000001117037

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:0000000001117038

1.CHECK PARKING BRAKE SWITCH OPERATION

Operate the parking brake pedal. Then check that the brake warning lamp in the combination meter turns on/off correctly.

Condition	Brake warning lamp illumination status
When the parking brake switch is operation	ON
When the parking brake switch is not operation.	OFF

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-47, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001117039

1.CHECK PARKING BRAKE SWITCH

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

Parking brake switch		Condition	Continuity
Connector	Terminal		
M103	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-24, "Diagnosis Description".

Is the inspection result normal?

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

Component Inspection

INFOID:0000000001117040

1.CHECK PARKING BRAKE SWITCH

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

Parking brake switch		Condition	Continuity
Connector	Terminal		
M103	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.

ABS WARNING LAMP

Description

INFOID:0000000001117041

×: ON –: OFF

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

Component Function Check

INFOID:0000000001117042

1.CHECK ABS WARNING LAMP OPERATION

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

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-49, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001117043

1.CHECK SELF-DIAGNOSIS

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

Is the inspection result normal?

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

2.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-24, "Diagnosis Description".

Is the inspection result normal?

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

BRAKE WARNING LAMP

Description

INFOID:0000000001117044

×: ON –: OFF

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

NOTE:

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

Component Function Check

INFOID:0000000001117045

1.BRAKE WARNING LAMP OPERATION CHECK 1

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

Is the inspection result normal?

YES >> GO TO 2.
NO >> Go to diagnosis procedure. Refer to BRC-50, "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-47, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001117046

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-47, "Diagnosis Procedure".

2.CHECK SELF-DIAGNOSIS

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

Is the inspection result normal?

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

3.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-24, "Diagnosis Description".

Is the inspection result normal?

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

ECU DIAGNOSIS

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Reference Value

INFOID:0000000001115491

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 SENSOR1 (Note 2)	Decel G detected by decel G sensor	Changes according to an indication shown by the decel G sensor	On
			Off
DECEL G SENSOR2 (Note 2)	Decel G detected by decel G sensor	Changes according to an indication shown by the decel G sensor	On
			Off
FR RH IN SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
FR RH OUT SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	On
		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 IN SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
FR LH OUT SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
RR RH IN SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
RR RH OUT SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
RR LH IN SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
RR LH OUT SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	On
		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

Monitor item	Display content	Data monitor	
		Condition	Reference value in normal operation
ABS FAIL SIG	ABS fail-safe signal	In ABS fail-safe	On
		ABS is normal	Off

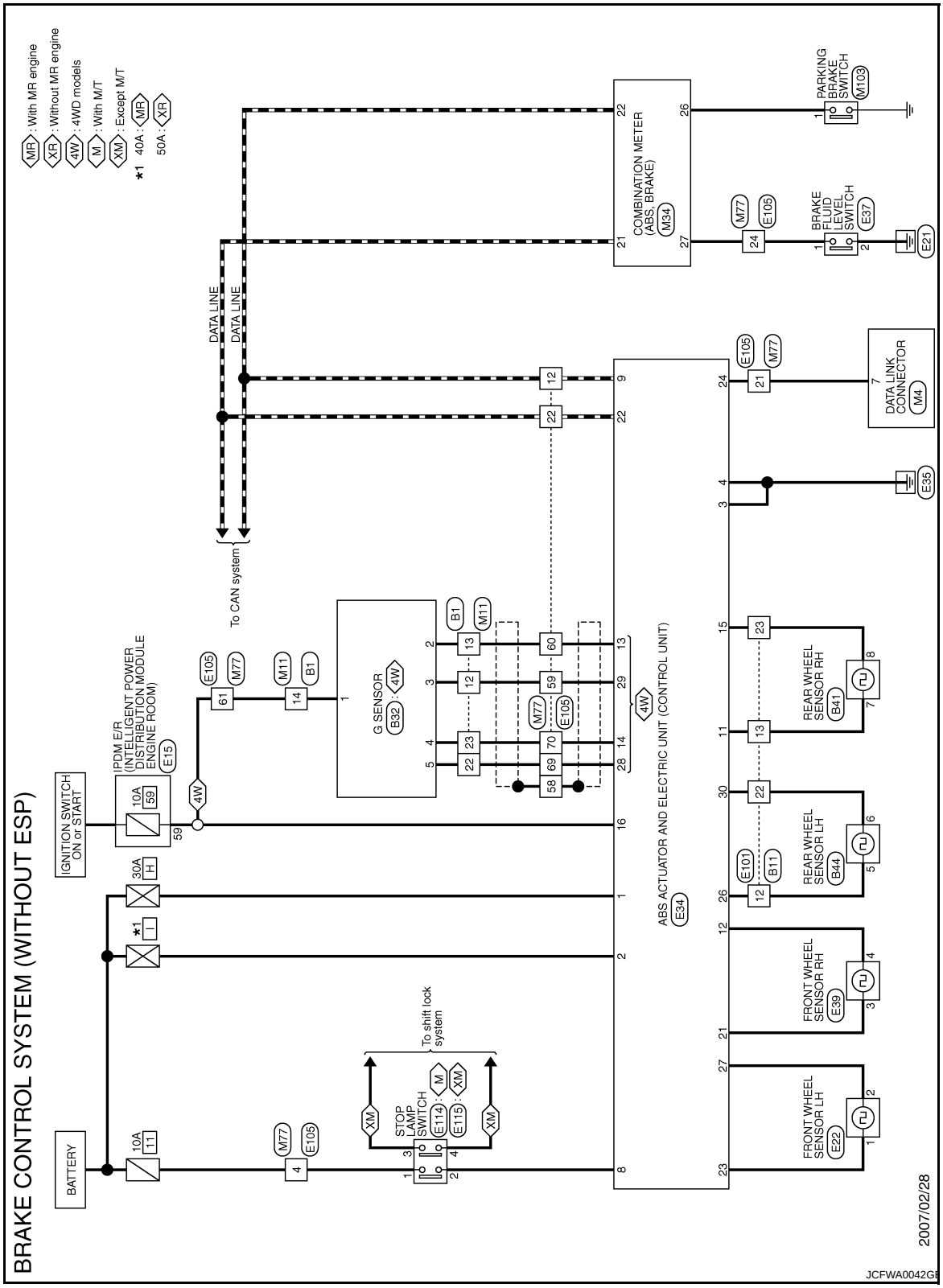
NOTE:

- 1: Confirm tire pressure is normal.
- 2: Only 4WD 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-49, "Description".

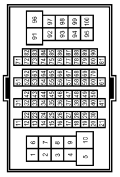
Wiring Diagram -BRAKE CONTROL SYSTEM-

INFOID:0000000001115492



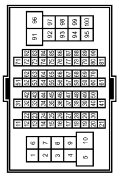
BRAKE CONTROL SYSTEM (WITHOUT ESP)

Connector No.	B1
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-CS16-TM4



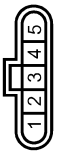
Terminal No.	Color of Wire	Signal Name [Specification]
12	R	–
13	B	–
14	GR	–
22	Y	–
23	L	–

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



Terminal No.	Color of Wire	Signal Name [Specification]
12	BR	–
13	O	–
22	G	–
23	SB	–

Connector No.	B32
Connector Name	G SENSOR
Connector Type	YDZ05FW



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

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

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

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

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

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

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

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

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

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BRAKE CONTROL SYSTEM (WITHOUT ESP)

Connector No.	E34
Connector Name	ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
Connector Type	RH28FB-NU4-DH

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

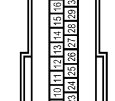
Connector No.	E37
Connector Name	BRAKE FLUID LEVEL SWITCH
Connector Type	YY02FGY

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

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

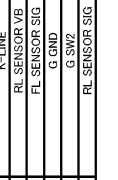
Terminal No.	Color of Wire	Signal Name [Specification]
3	G	–
4	LG	–

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



Terminal No.	Color of Wire	Signal Name [Specification]
12	BR	–
13	O	–
22	G	–
23	SB	–

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



Terminal No.	Color of Wire	Signal Name [Specification]
4	V	–
12	P	–
21	Y	–
22	L	–
24	LG	–
58	SHIELD	–
59	B	–
60	R	–
61	GR	–
69	Y	–
70	L	–

Connector No.	E114
Connector Name	STOP LAMP SWITCH
Connector Type	M02FB-LC

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

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

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	–
2	P	–
3	O	–
4	LG	–

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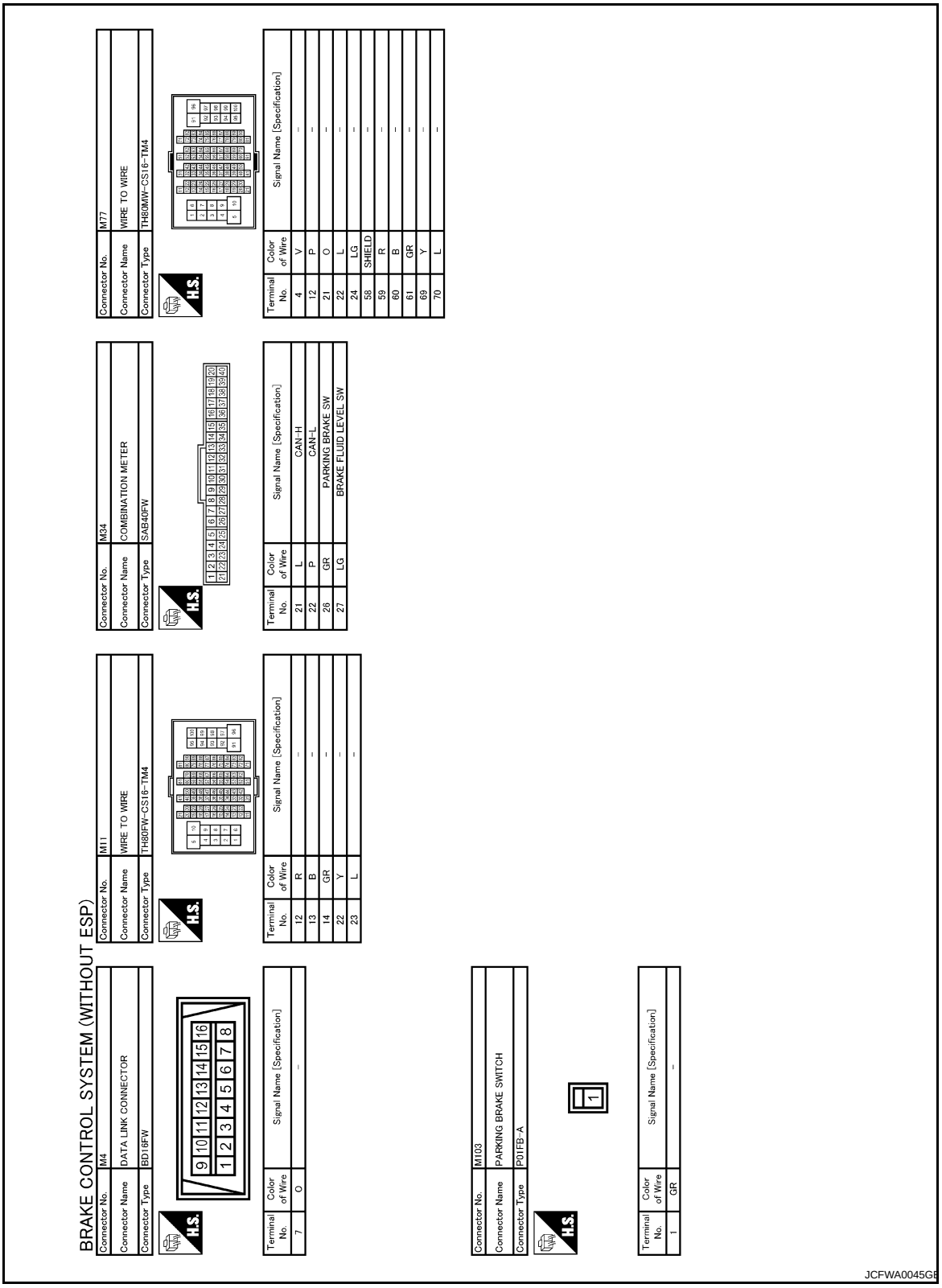


Fail-Safe

INFOID:0000000001115493

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 No. Index

INFOID:0000000001115494

Items (CONSULT screen terms)	DTC	Reference
RR RH SENSOR-1	C1101	BRC-20, "Description"
RR LH SENSOR-1	C1102	
FR RH SENSOR-1	C1103	
FR LH SENSOR-1	C1104	
RR RH SENSOR-2	C1105	BRC-23, "Description"
RR LH SENSOR-2	C1106	
FR RH SENSOR-2	C1107	
FR LH SENSOR-2	C1108	
BATTERY VOLTAGE [ABNORMAL]	C1109	BRC-26, "Description"
CONTROLLER FAILURE	C1110	BRC-28, "Description"
PUMP MOTOR	C1111	BRC-29, "Description"
G SENSOR	C1113	BRC-31, "Description"
ABS SENSOR [ABNORMAL SIGNAL]	C1115	BRC-34, "Description"
FR LH IN ABS SOL	C1120	BRC-37, "Description"
FR LH OUT ABS SOL	C1121	BRC-39, "Description"
FR RH IN ABS SOL	C1122	BRC-37, "Description"
FR RH OUT ABS SOL	C1123	BRC-39, "Description"
RR LH IN ABS SOL	C1124	BRC-37, "Description"
RR LH OUT ABS SOL	C1125	BRC-39, "Description"
RR RH IN ABS SOL	C1126	BRC-37, "Description"
RR RH OUT ABS SOL	C1127	BRC-39, "Description"
ACTUATOR RLY	C1140	BRC-41, "Description"
CAN COMM CIRCUIT	U1000	BRC-43, "Description"
CONTROL UNIT (CAN)	U1010	BRC-44, "Description"

SYMPTOM DIAGNOSIS

EXCESSIVE ABS FUNCTION OPERATION FREQUENCY

Diagnosis Procedure

INFOID:0000000001115495

1.CHECK START

Check front and rear brake force distribution using a brake tester.
- LHD models: Refer to BR-52, "General Specifications".
- RHD models: Refer to BR-99, "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".
  - 4WD models: Refer to FAX-40, "Inspection".
- Rear
  - 2WD models: Refer to RAX-3, "Inspection".
  - 4WD models: Refer to RAX-9, "Inspection".

Is the inspection result normal?

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

3.CHECK WHEEL SENSOR AND SENSOR ROTOR

Check the following.
- Wheel sensor installation for damage.
- Sensor rotor installation for damage.
- Wheel sensor connector connection.
- Wheel sensor harness inspection.

Is the inspection result normal?

YES >> GO TO 4.
NO >>
- Replace wheel sensor or sensor rotor.
- Repair harness.

4.CHECK ABS WARNING LAMP DISPLAY

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

Is the ABS warning lamp illuminated?

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

UNEXPECTED PEDAL REACTION

Diagnosis Procedure

INFOID:0000000001115496

1.CHECK BRAKE PEDAL STROKE

Check brake pedal stroke.
- LHD models: Refer to BR-8, "Inspection and Adjustment".
- RHD models: Refer to BR-58, "Inspection and Adjustment".

Is the stroke too large?

YES >>
- Bleed air from brake tube and hose.
  - LHD models: Refer to BR-12, "Bleeding Brake System".
  - RHD models: Refer to BR-62, "Bleeding Brake System".
- Check brake pedal, brake booster, and master cylinder for mount play, looseness, brake system fluid leakage, etc.
  - Brake pedal
    - LHD models: Refer to BR-8, "Inspection and Adjustment".
    - RHD models: Refer to BR-58, "Inspection and Adjustment".
  - Master cylinder
    - LHD models: Refer to BR-13, "Inspection".
    - RHD models Refer to BR-63, "Inspection".
  - Brake booster
    - LHD models: Refer to BR-14, "Inspection".
    - RHD models: Refer to BR-64, "Inspection".

NO >> GO TO 2.

2.CHECK FUNCTION

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

Is the inspection result normal?

YES >> Normal
NO >> Check brake system.

THE BRAKING DISTANCE IS LONG

Diagnosis Procedure

INFOID:0000000001115497

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

1.CHECK FUNCTION

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

Is the inspection result normal?

YES >> Normal
NO >> Check brake system.

ABS FUNCTION DOES NOT OPERATE

Diagnosis Procedure

INFOID:0000000001115498

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

1. CHECK ABS WARNING LAMP DISPLAY

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

Is the inspection result normal?

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

PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

Diagnosis Procedure

INFOID:0000000001115499

CAUTION:

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

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

1.SYMPTOM CHECK 1

Check that there are pedal vibrations when the engine is started.

Do vibrations occur?

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

2.SYMPTOM CHECK 2

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

Do the operation noises occur?

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

3.SYMPTOM CHECK 3

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

Do symptoms occur?

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

NORMAL OPERATING CONDITION

Description

INFOID:0000000001115500

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:0000000001505829

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the “SRS AIRBAG” and “SEAT BELT” of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the “SRS AIRBAG”.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

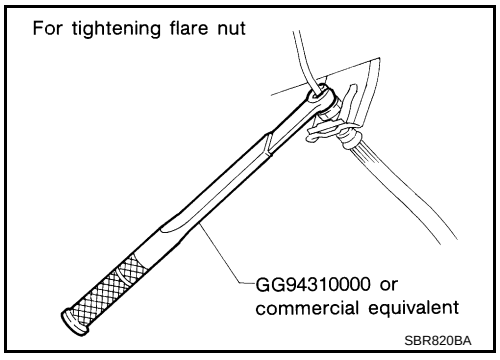
Precaution for Brake System

INFOID:0000000001115502

WARNING:

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

- Only use DOT 4 brake fluid. Refer to MA-22, "Fluids and Lubricants".
- Never to reuse drained brake fluid.
- Never to 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 to use mineral oils such as gasoline or light oil. 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 a flare nut torque wrench.
- Always conform the specified tightening torque when installing the brake pipes.
- Brake system is an important safety part. If a brake fluid leak is detected, always disassemble the affected part. If a malfunction is detected, replace part with a new one.
- Turn the ignition switch OFF and disconnect the ABS actuator and electric unit (control unit) connector or the battery negative terminal before performing the work.



Precaution for Brake Control

INFOID:0000000001115503

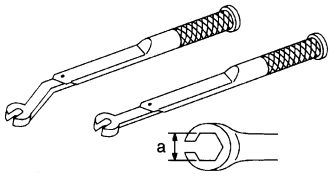
- Just after starting vehicle after ignition switch ON, brake pedal may vibrate or motor operating noise may be heard from engine compartment. This is normal condition.
- When an error is indicated by ABS or another warning lamp, collect all necessary information from customer (what symptoms are present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

PREPARATION

PREPARATION

Special Service Tool

INFOID:0000000001115504

Tool number Tool name		Description
GG94310000 Flare nut torque wrench a: 10 mm (0.39 in)/ 12 mm (0.47 in)	 S-NT406	Installing each brake piping

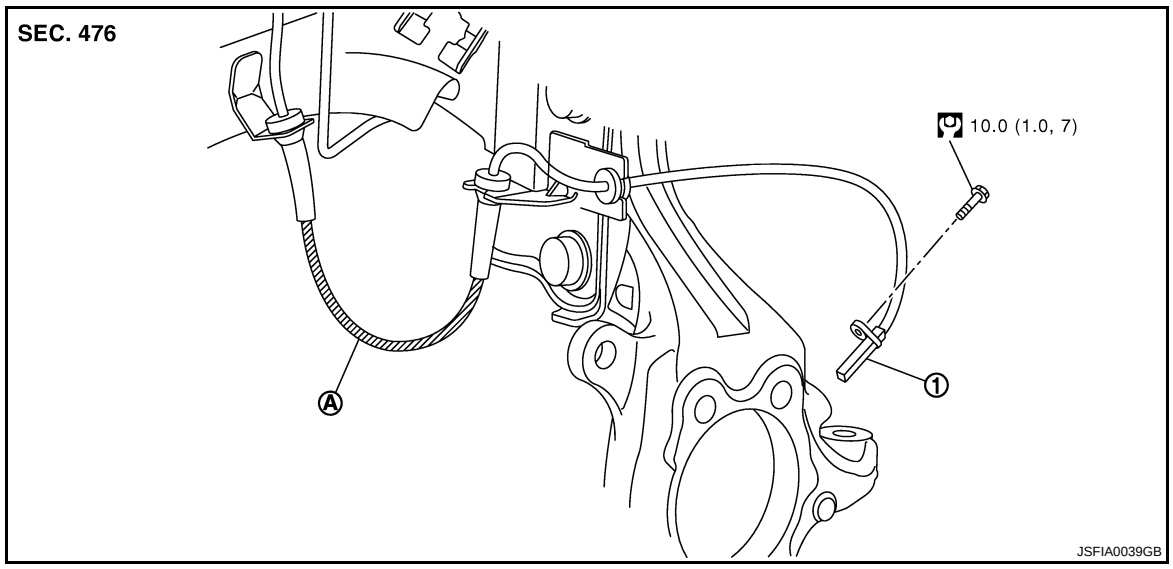
ON-VEHICLE REPAIR

WHEEL SENSOR

FRONT WHEEL SENSOR

FRONT WHEEL SENSOR : Exploded View

INFOID:0000000001115505



1. Front LH wheel sensor

A. White 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:0000000001115506

REMOVAL

Pay attention to the following when removing sensor.

CAUTION:

- **Do not twist sensor harness as much as possible, when removing it. Pull sensors out without pulling on 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 white lines (A) are not twisted.**

INSTALLATION

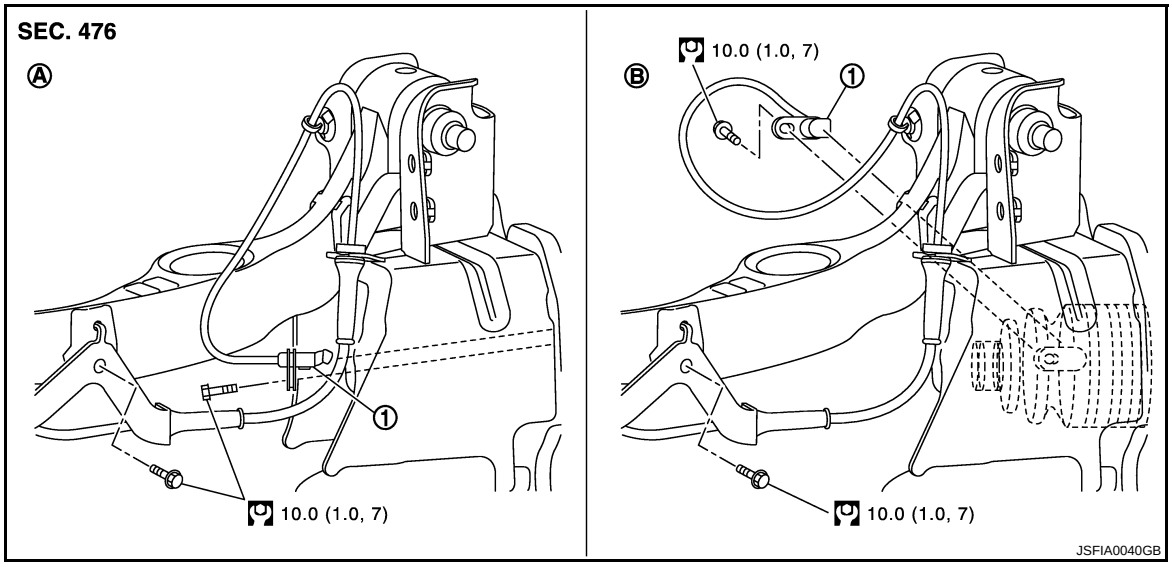
Pay attention to the following when installing wheel sensor. Tighten installation bolts to the specified torques. Refer to "COMPONENT".

- 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:0000000001115507



1. Rear LH wheel sensor

A. 2WD models B. 4WD 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:0000000001115508

REMOVAL

Pay attention to the following when removing sensor.

CAUTION:

- **Do not twist sensor harness as much as possible, when removing it. Pull sensors out without pulling on 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. Refer to "COMPONENT".

- 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:0000000001115509

Refer to FAX-9, "Exploded View" (2WD models), FAX-42, "Exploded View" (4WD models).

FRONT SENSOR ROTOR : Removal and Installation

INFOID:0000000001115510

REMOVAL

Sensor rotor cannot be disassembled. Remove the sensor rotor together with hub bearing assembly. Refer to FAX-9, "Removal and Installation" (2WD models), FAX-42, "Removal and Installation" (4WD models).

INSTALLATION

Sensor rotor cannot be disassembled. Installation the sensor rotor together with hub bearing assembly. Refer to FAX-9, "Removal and Installation" (2WD models), FAX-42, "Removal and Installation" (4WD models).

REAR SENSOR ROTOR

REAR SENSOR ROTOR : Exploded View

INFOID:0000000001115511

Refer to RAX-4, "Exploded View" (2WD models), RAX-13, "Exploded View" (4WD models).

REAR SENSOR ROTOR : Removal and Installation

INFOID:0000000001115512

2WD MODELS

Removal

Sensor rotor cannot be disassembled. Remove the sensor rotor together with hub bearing assembly. Refer to RAX-4, "Removal and Installation".

Installation

Sensor rotor cannot be disassembled. Installation the sensor rotor together with hub bearing assembly. Refer to RAX-4, "Removal and Installation".

4WD MODELS

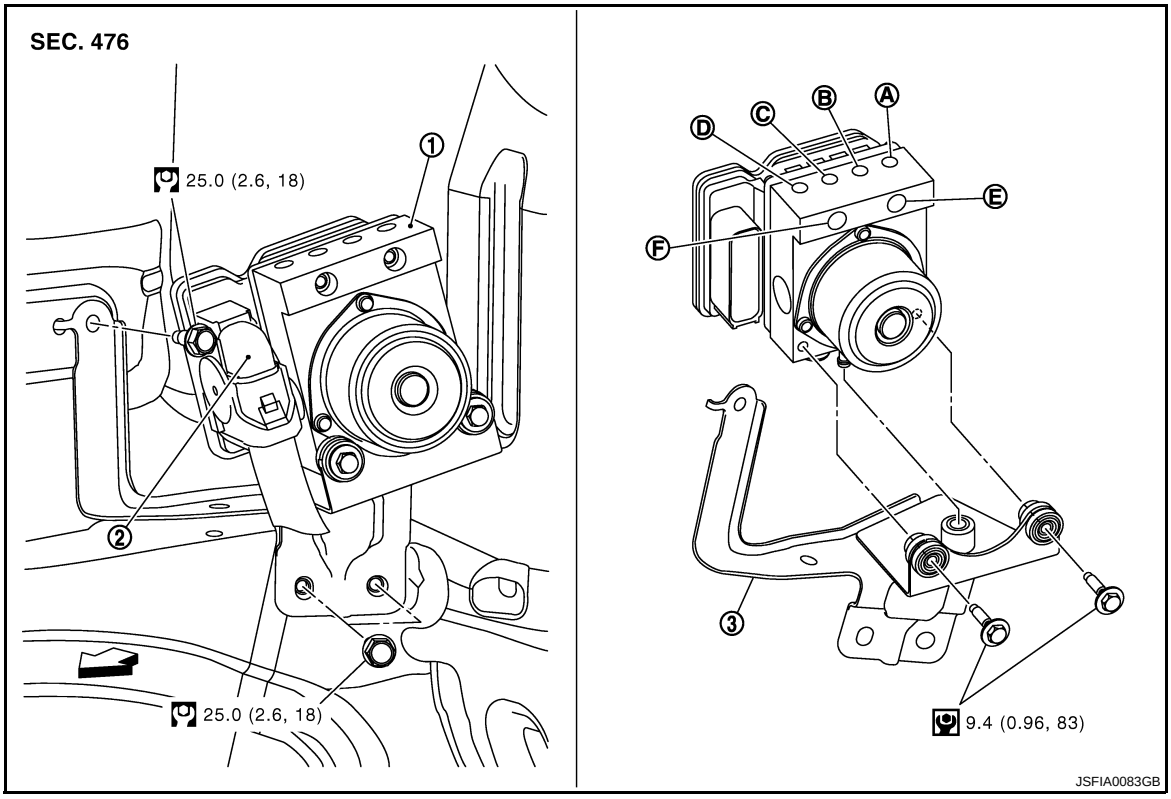
For removal and installation of sensor rotor, refer to RAX-14, "Disassembly and Assembly".

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Exploded View

INFOID:0000000001115513

LHD models

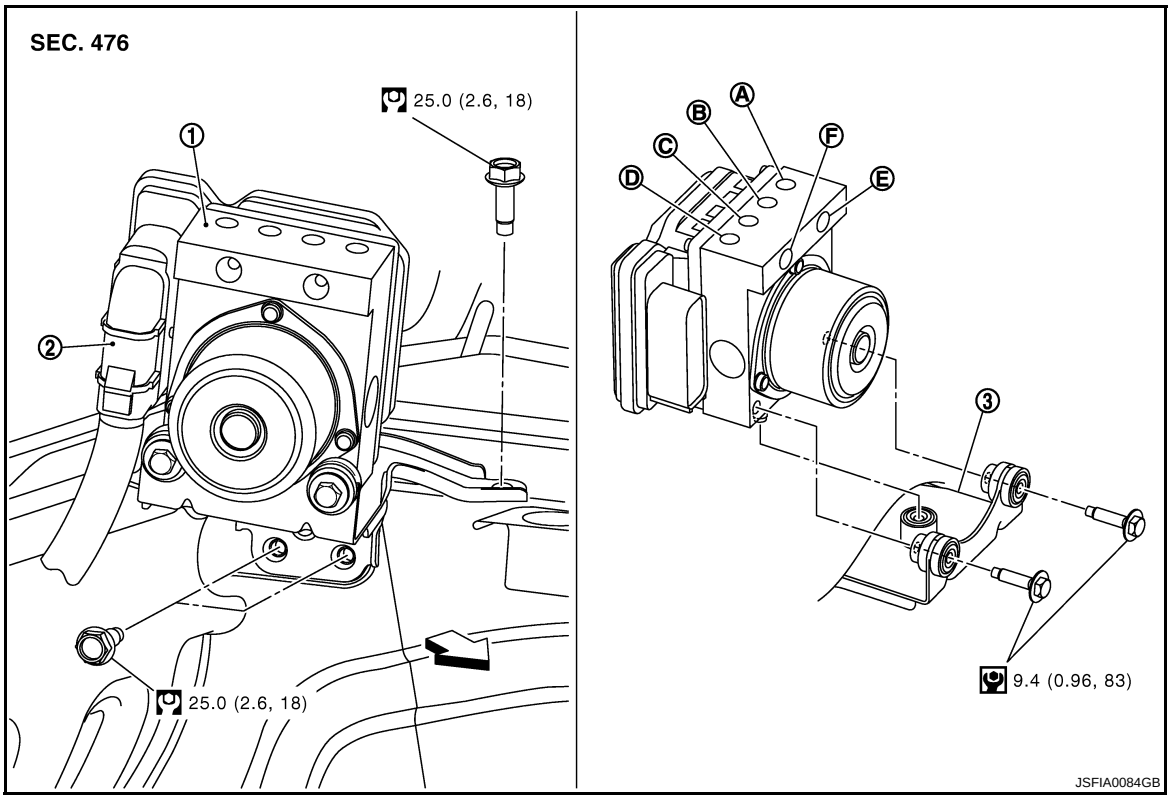


1.	ABS actuator and electric unit (control unit)	2.	Connector	3.	Bracket
A.	To front LH brake caliper	B.	To rear RH brake caliper	C.	To Rear LH brake caliper
D.	To front RH brake caliper	E.	From master cylinder primary side	F.	From master cylinder secondary side

⇦: Vehicle front

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

RHD models



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:0000000001115514

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.**
- **Do not apply excessive impact to ABS actuator and electric unit (control unit), such as dropping it.**
- **Do not remove and install actuator by holding harness.**
- **After work is completed, bleed air from brake tube. Refer to BR-12, "Bleeding Brake System" (LHD models), BR-62, "Bleeding Brake System" (RHD models).**

1. Remove cowl top. Refer to EXT-19, "Exploded View".
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Loosen brake tube flare nuts, then remove brake tubes from ABS actuator and electric unit (control unit).
4. Remove tire (front LH side).
5. Remove fender protector (rear): (front LH side). Refer to EXT-21, "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.

CAUTION:

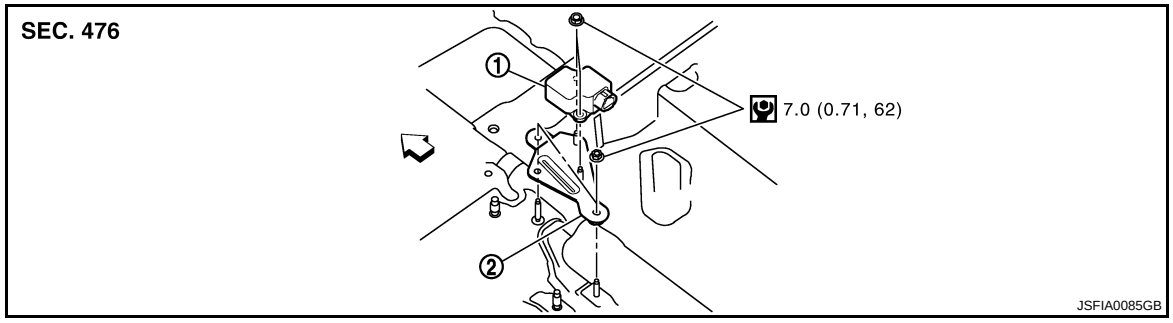
- **Before servicing, disconnect the battery cable from negative terminal.**

- **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.**
- **Do not apply excessive impact to ABS actuator and electric unit (control unit), such as dropping it.**
- **Do not remove and install actuator by holding harness.**
- **After work is completed, bleed air from brake tube. Refer to BR-12, "Bleeding Brake System" (LHD models), BR-62, "Bleeding Brake System" (RHD models).**
- **After installing harness connector in the ABS actuator and electric unit (control unit), make sure connector is securely locked.**

G SENSOR

Exploded View

INFOID:0000000001115515



1. G sensor
2. Bracket

⇦: Vehicle front

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

Removal and Installation

INFOID:0000000001115516

REMOVAL

CAUTION:

- **Do not drop or strike G sensor, because it has little endurance to impact.**
- **Do not use power tool etc., because G sensor is sensitive for the impact.**

1. Remove center console assembly. Refer to IP-21, "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.

CAUTION:

- **Do not drop or strike G sensor, because it has little endurance to impact.**
- **Do not use power tool etc., because G sensor is sensitive for the impact.**

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

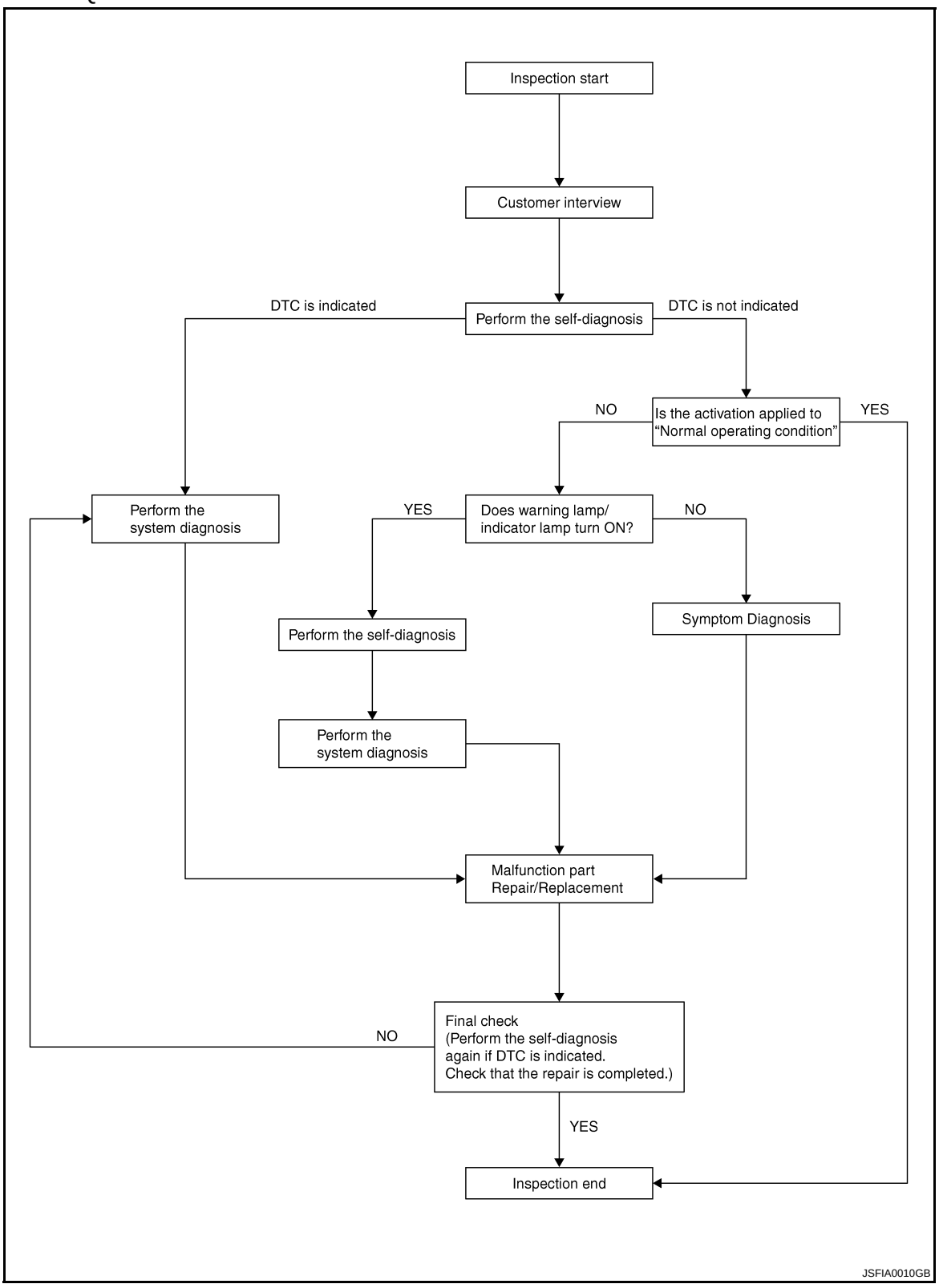
Work Flow

INFOID:0000000001115517

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-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

OVERALL SEQUENCE



DETAIED FLOW

1. COLLECT THE INFORMATION FROM THE CUSTOMER

Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using the diagnosis worksheet. Refer to BRC-77, "Diagnostic Work Sheet".

>> GO TO 2.

2.PERFORM THE SELF-DIAGNOSIS

Check the DTC display with the self-diagnosis function. Refer to BRC-104, "CONSULT-III Function (ABS)".

Is there any DTC displayed?

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

3.PERFORM THE SYSTEM DIAGNOSIS

Perform the diagnosis applicable to the displayed DTC. Refer to BRC-186, "DTC No. Index".

>> GO TO 7.

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

Check that the symptom is a normal operation that is not considered a system malfunction. Refer to BRC-194, "Description".

Is the symptom is a normal operation?

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

5.CHECK THE WARNING LAMP AND INDICATOR LAMP FOR ILLUMINATION

Check that the warning lamp and indicator lamp illuminate.

- ABS warning lamp: Refer to BRC-169, "Description".
- Brake warning lamp: Refer to BRC-170, "Description".
- ESP OFF indicator lamp: Refer to BRC-171, "Description".
- SLIP indicator lamp: Refer to BRC-172, "Description".
- HDC indicator lamp: Refer to BRC-173, "Description".

Is ON/OFF timing normal?

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

6.PERFORM THE DIAGNOSIS BY SYMPTOM

Perform the diagnosis applicable to the symptom.

>> GO TO 7.

7.REPAIR OR REPLACE THE MALFUNCTIONING PARTS

Repair or replace the specified malfunctioning parts.

>> GO TO 8.

8.FINAL CHECK

Perform the self-diagnosis again, and check that the malfunction is repaired completely. After checking, erase the self-diagnosis memory. Refer to BRC-104, "CONSULT-III Function (ABS)".

Is no other DTC present and the repair completed?

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

Diagnostic Work Sheet

INFOID:0000000001115518

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:0000000001115521

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:0000000001115522

ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

CAUTION:

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

1. ALIGN THE VEHICLE STATUS

Stop vehicle with front wheels in straight-ahead position.

>> GO TO 2.

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

1. On the CONSULT-III screen, touch "WORK SUPPORT" and "ST ANG SEN ADJUSTMENT" in order.
2. Touch “START”.
   CAUTION:
   Do not touch steering wheel while adjusting steering angle sensor.
3. After approximately 10 seconds, touch “END”.
   NOTE:
   After approximately 60 seconds, it ends automatically.
4. Turn ignition switch OFF, then turn it ON again.
   CAUTION:
   Be sure to perform above operation.

>> GO TO 3.

3. CHECK DATA MONITOR

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

Is the steering angle within the specified range?

YES >> GO TO 4.

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

4. ERASE THE SELF-DIAGNOSIS MEMORY

Erase the self-diagnosis memories of the ABS actuator and electric unit (control unit) and ECM.
- ABS actuator and electric unit (control unit): Refer to BRC-104, "CONSULT-III Function (ABS)".
- ECM
  - MR20DE: Refer to ECM-87, "CONSULT-III Function".
  - QR25DE: Refer to ECQ-89, "CONSULT-III Function".
  - M9R: Refer to ECR-97, "Diagnosis Description".

Are the memories erased?

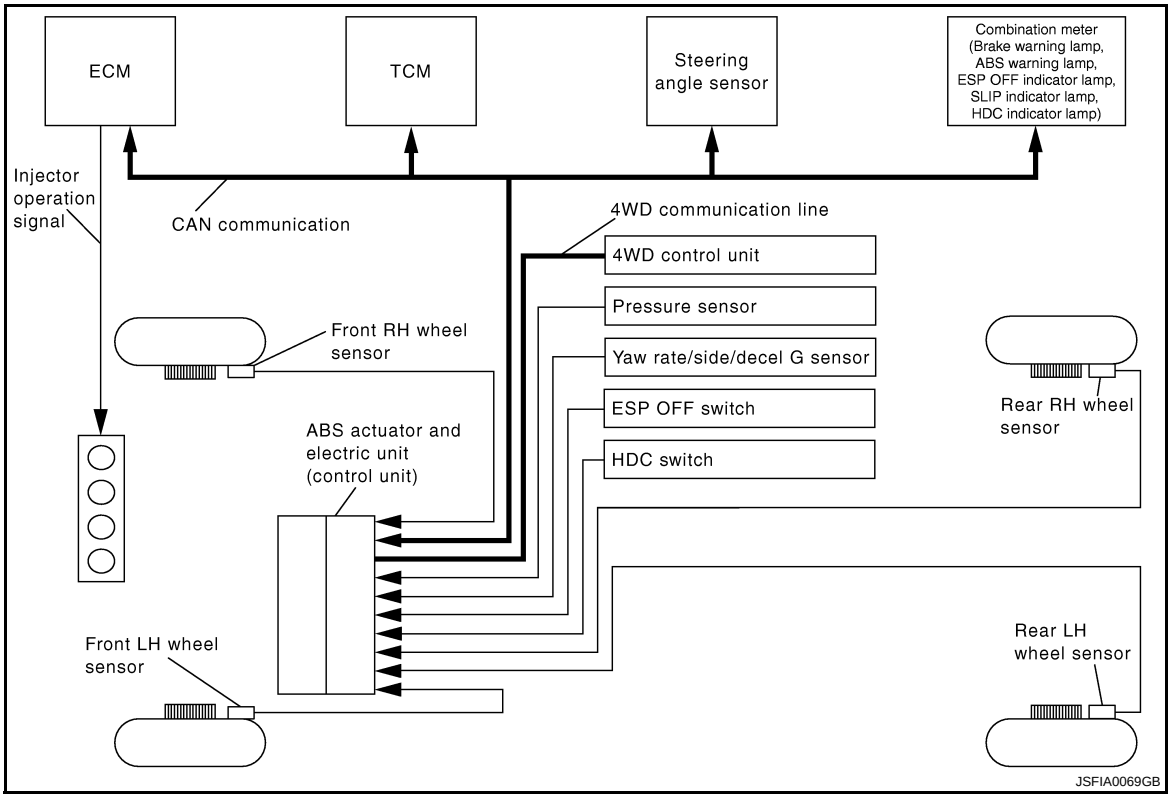
YES >> INSPECTION END
NO >> Check the items indicated by the self-diagnosis.

FUNCTION DIAGNOSIS

ESP

System Diagram

INFOID:0000000001115523



System Description

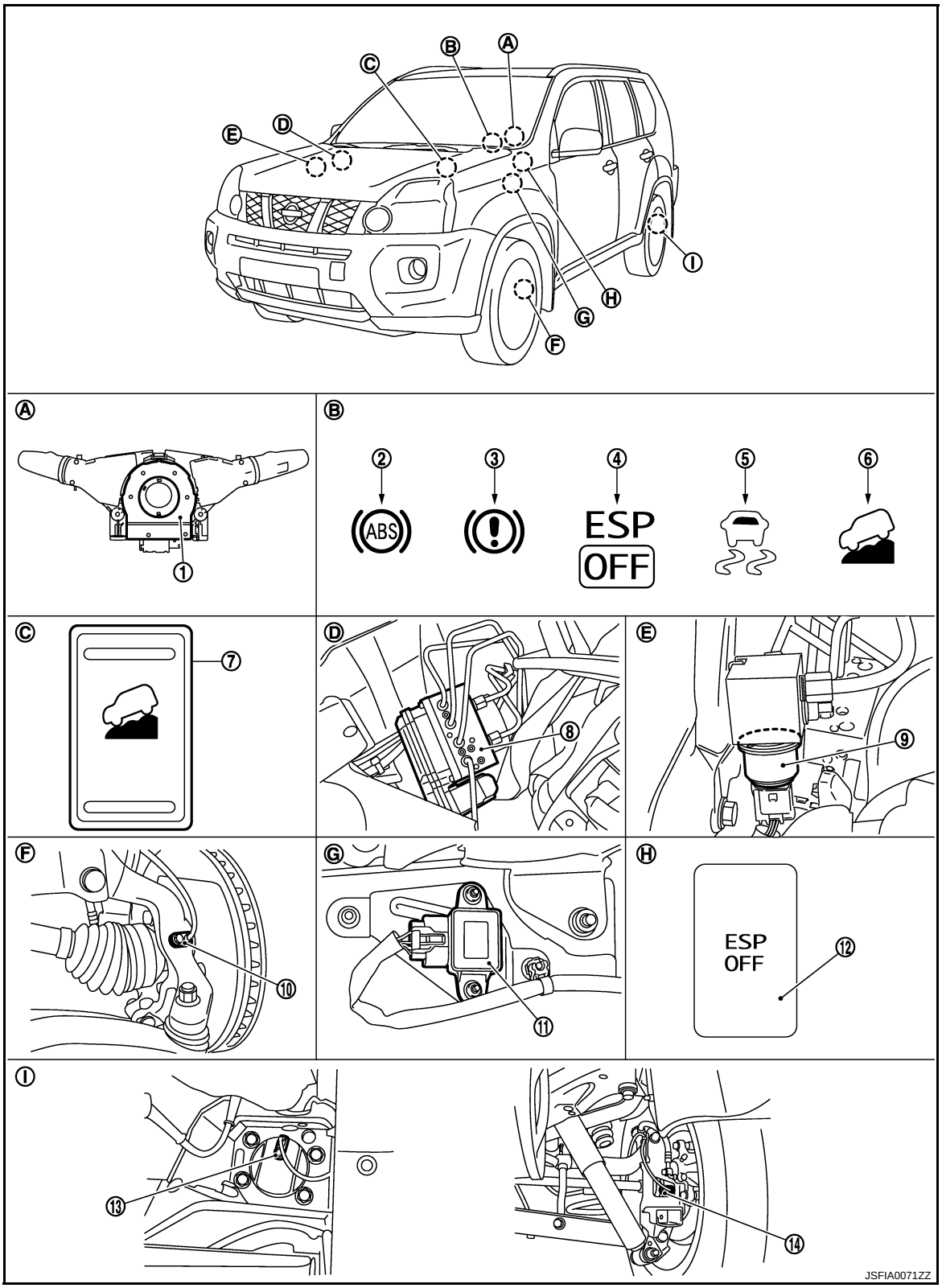
INFOID:0000000001115524

- Electronic Stability Program system detects driver's steering operation amount and brake pedal travel from steering angle sensor and pressure sensor. Using information from yaw rate sensor, G sensor and wheel sensor, ESP 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 ESP operation, it informs driver of system operation by flashing SLIP indicator lamp.
- Electrical system diagnosis by CONSULT-III is available.

Component Parts Location

INFOID:0000000001115525

LHD models

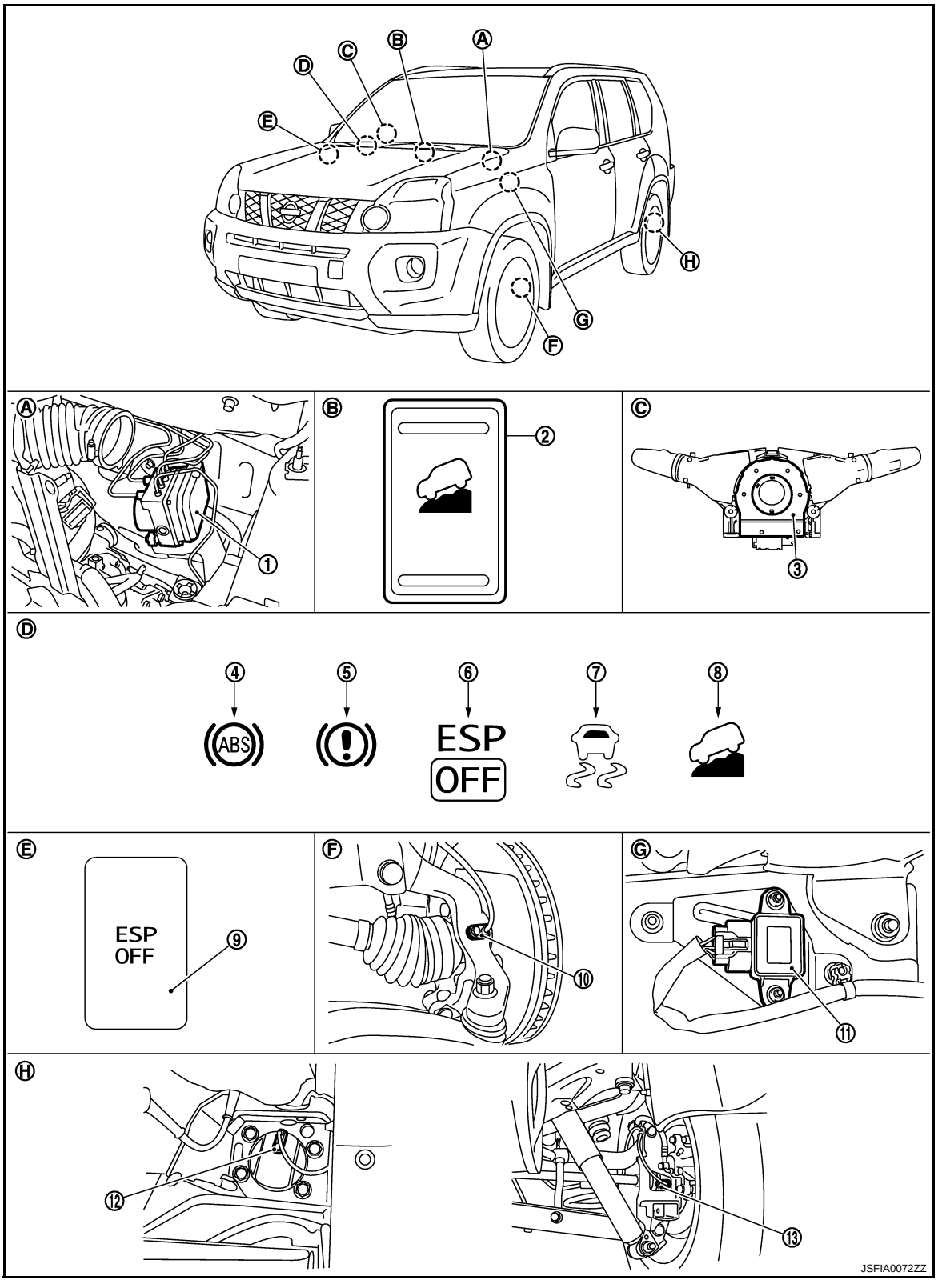


1. Steering angle sensor
2. ABS warning lamp
3. Brake warning lamp
4. ESP OFF indicator lamp
5. SLIP indicator lamp
6. HDC indicator lamp
7. HDC switch
8. ABS actuator and electric unit (control unit)
9. Pressure sensor

10. Front wheel sensor
11. Yaw rate/side/decel G sensor
12. ESP OFF switch
13. Rear wheel sensor (2WD models)
14. Rear wheel sensor (4WD models)

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

RHD models



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

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

Component Description

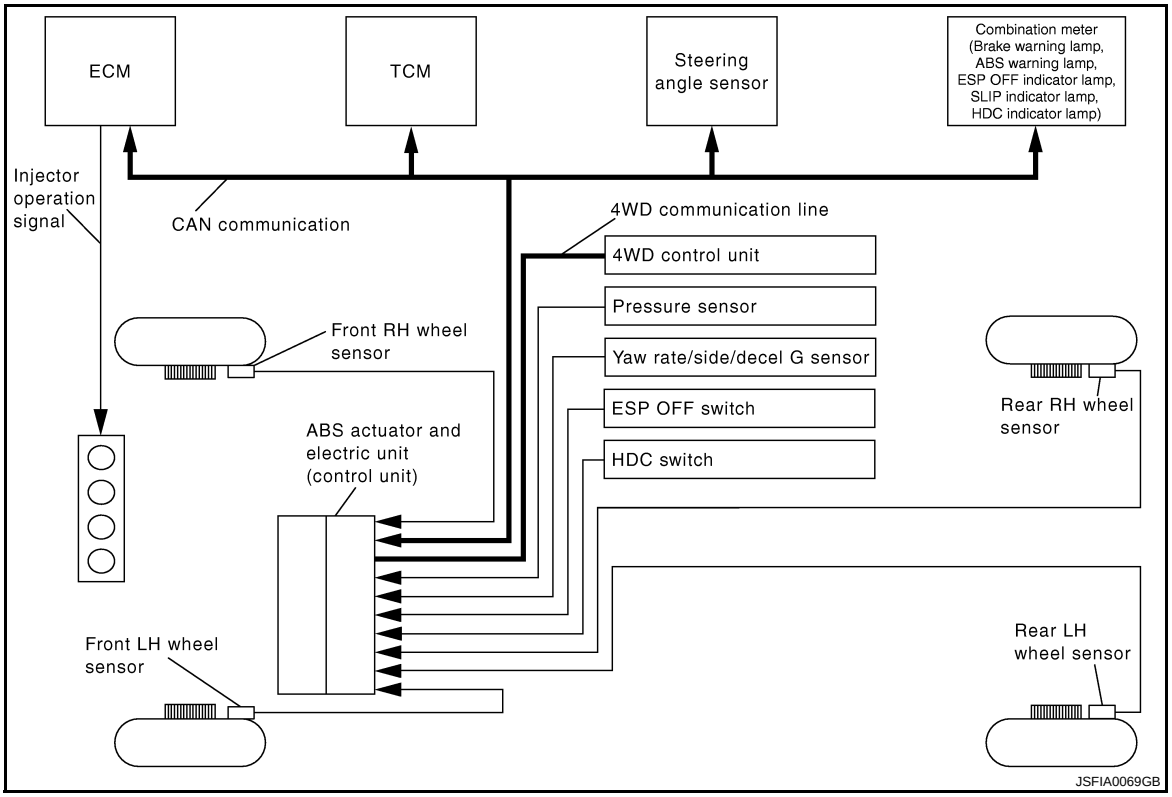
INFOID:0000000001115526

Component parts		Reference
ABS actuator and electric unit (control unit)	Pump	BRC-118, "Description"
	Motor	
	Actuator relay (Main relay)	BRC-136, "Description"
	Solenoid valve	BRC-129, "Description"
	Pressure sensor	BRC-138, "Description"
	ESP switch-over valve (CV1, CV2)	BRC-155, "Description"
	ESP switch-over valve (SV1, SV2)	BRC-157, "Description"
Wheel sensor		BRC-109, "Description"
Yaw rate sensor		BRC-143, "Description"
G sensor		BRC-146, "Description"
Steering angle sensor		BRC-141, "Description"
ESP OFF switch		BRC-165, "Description"
HDC switch		BRC-167, "Description"
ABS warning lamp		BRC-169, "Description"
Brake warning lamp		BRC-170, "Description"
ESP OFF indicator lamp		BRC-171, "Description"
SLIP indicator lamp		BRC-172, "Description"
HDC indicator lamp		BRC-173, "Description"

TCS

System Diagram

INFOID:0000000001116349



System Description

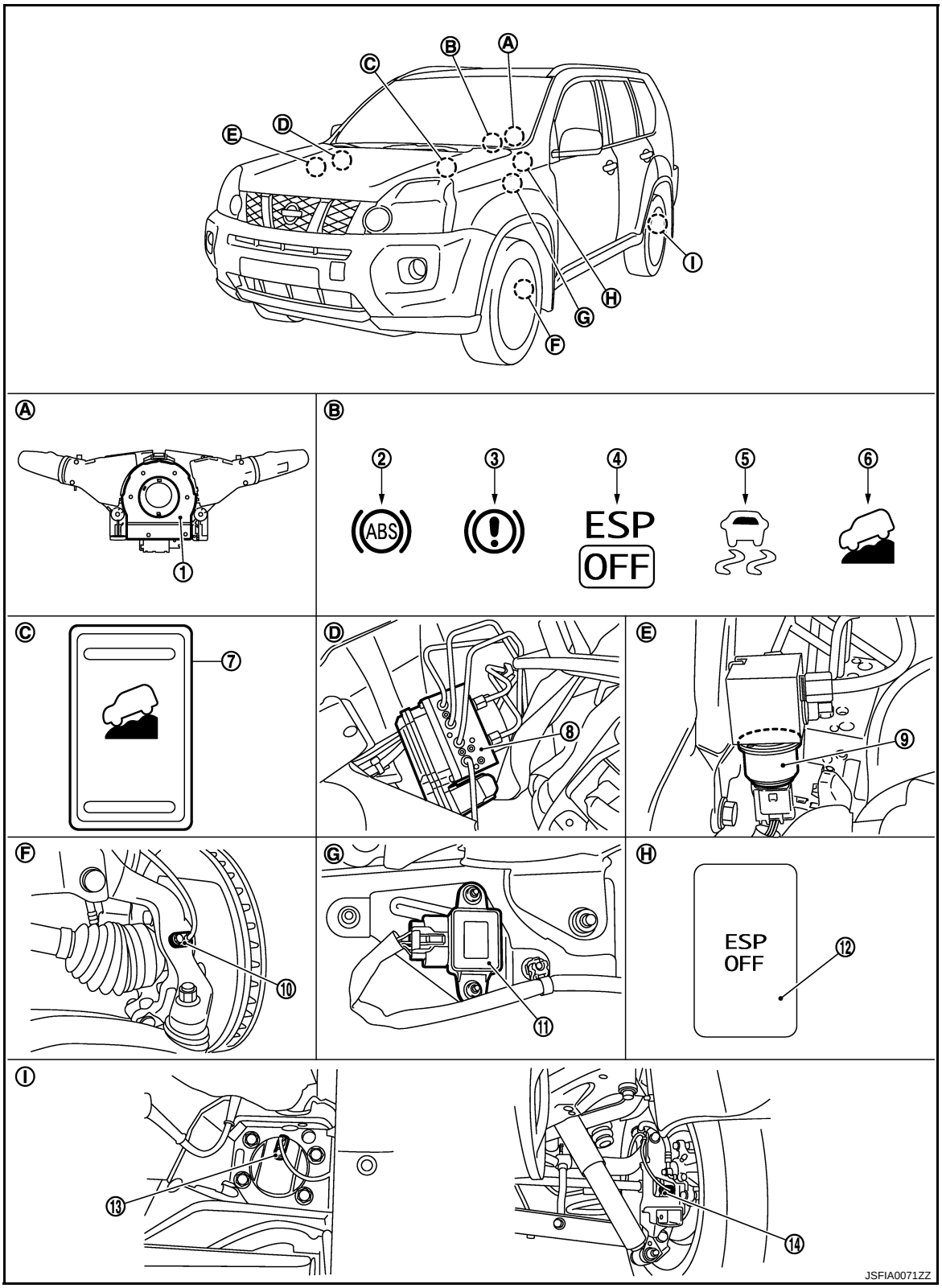
INFOID:0000000001115528

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

Component Parts Location

INFOID:0000000001116350

LHD models

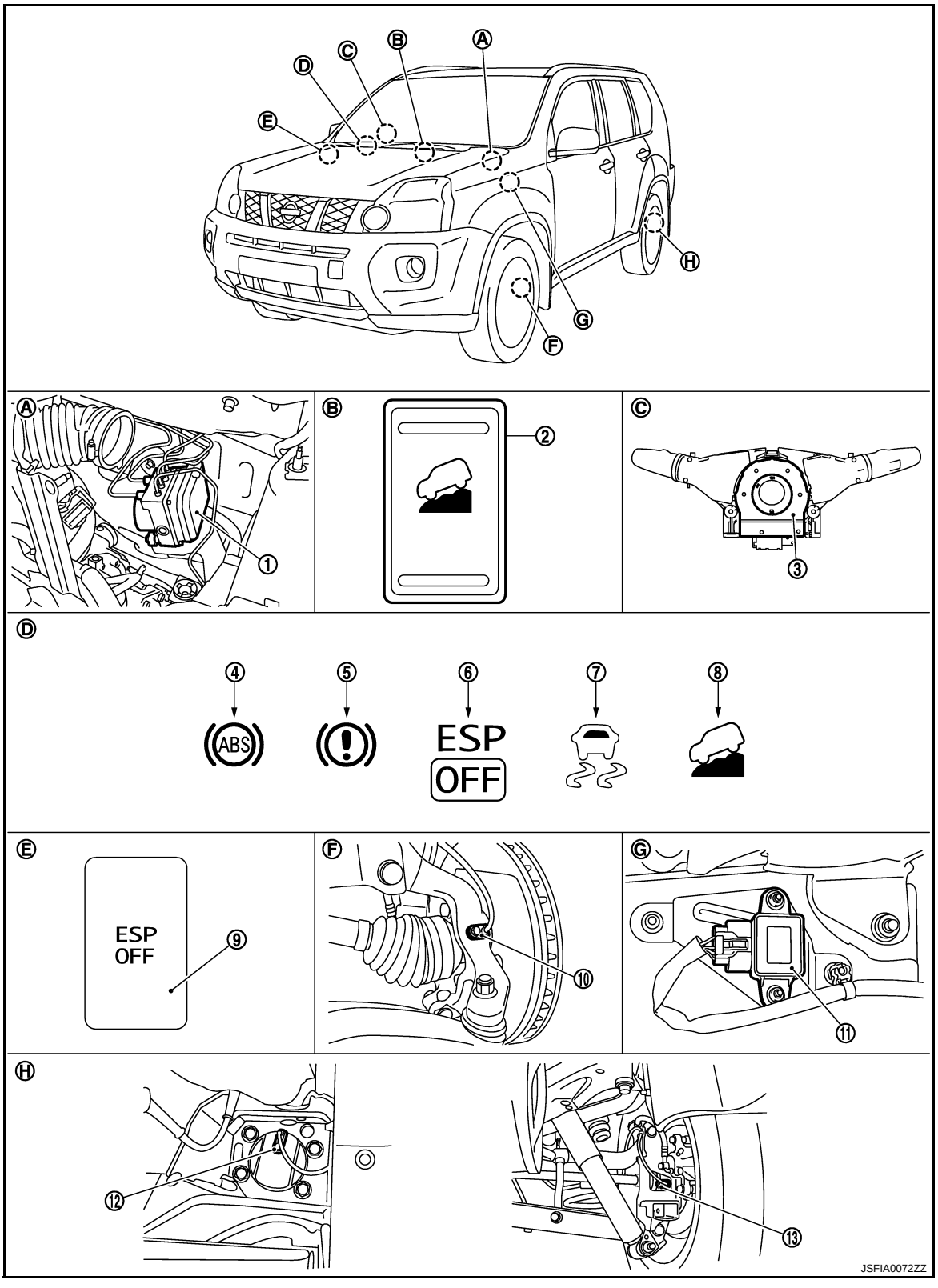


1. Steering angle sensor
2. ABS warning lamp
3. Brake warning lamp
4. ESP OFF indicator lamp
5. SLIP indicator lamp
6. HDC indicator lamp
7. HDC switch
8. ABS actuator and electric unit (control unit)
9. Pressure sensor

10. Front wheel sensor
11. Yaw rate/side/decel G sensor
12. ESP OFF switch
13. Rear wheel sensor (2WD models)
14. Rear wheel sensor (4WD models)

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

RHD models



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

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

Component Description

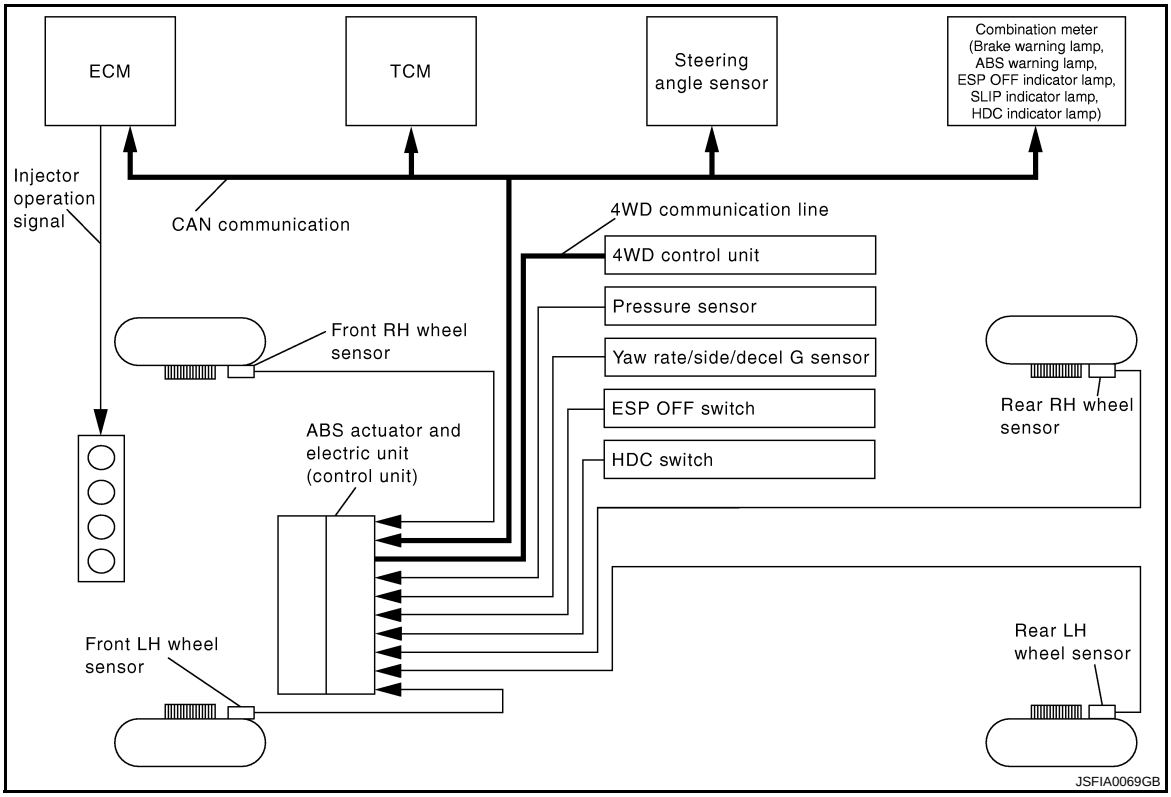
INFOID:0000000001116351

Component parts		Reference
ABS actuator and electric unit (control unit)	Pump	BRC-118, "Description"
	Motor	
	Actuator relay (Main relay)	BRC-136, "Description"
	Solenoid valve	BRC-129, "Description"
	Pressure sensor	BRC-138, "Description"
	ESP switch-over valve (CV1, CV2)	BRC-155, "Description"
	ESP switch-over valve (SV1, SV2)	BRC-157, "Description"
Wheel sensor		BRC-109, "Description"
Yaw rate sensor		BRC-143, "Description"
G sensor		BRC-146, "Description"
Steering angle sensor		BRC-141, "Description"
ESP OFF switch		BRC-165, "Description"
HDC switch		BRC-167, "Description"
ABS warning lamp		BRC-169, "Description"
Brake warning lamp		BRC-170, "Description"
ESP OFF indicator lamp		BRC-171, "Description"
SLIP indicator lamp		BRC-172, "Description"
HDC indicator lamp		BRC-173, "Description"

ABS

System Diagram

INFOID:0000000001507071



System Description

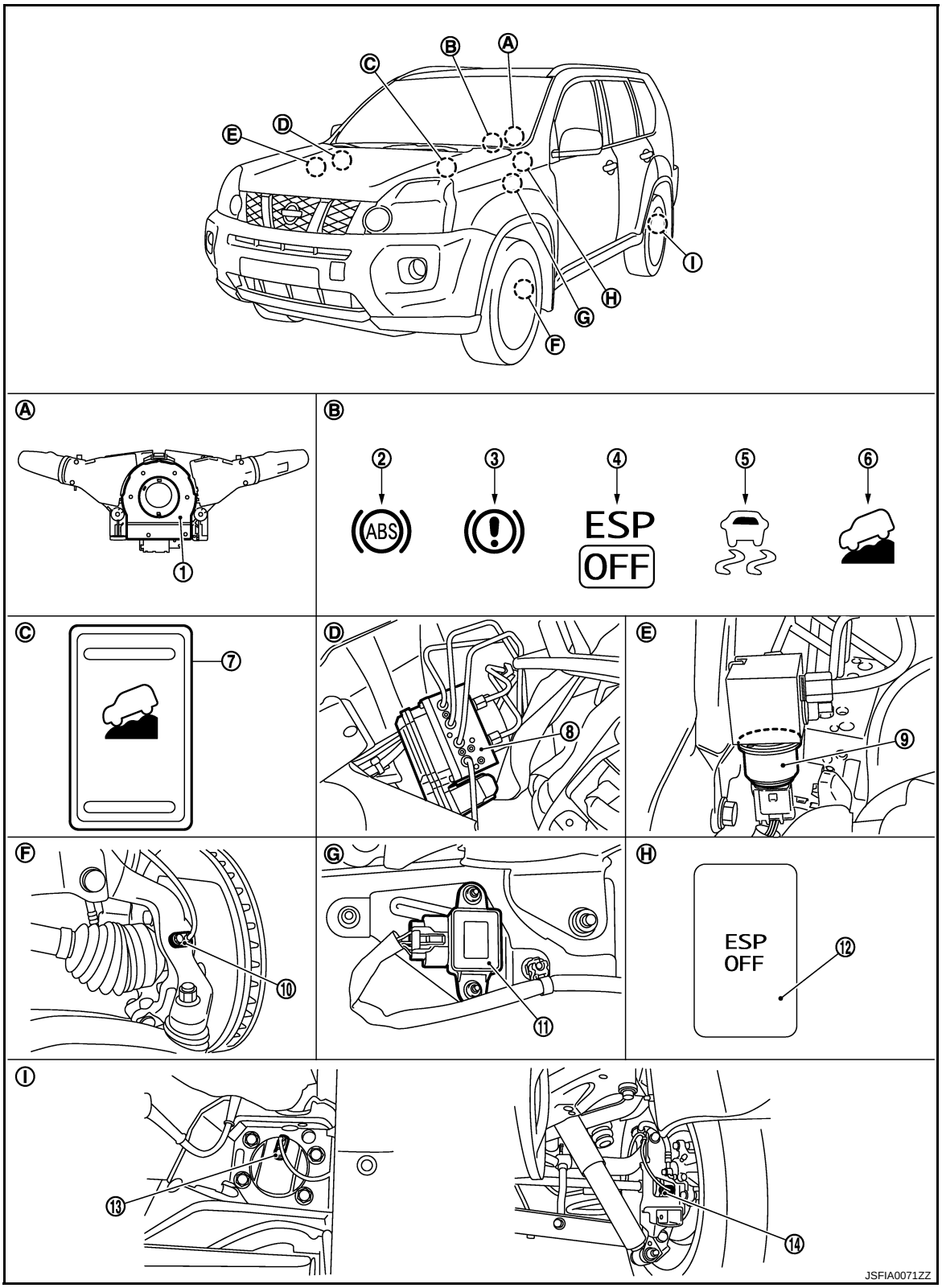
INFOID:0000000001115532

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

Component Parts Location

INFOID:0000000001116353

LHD models

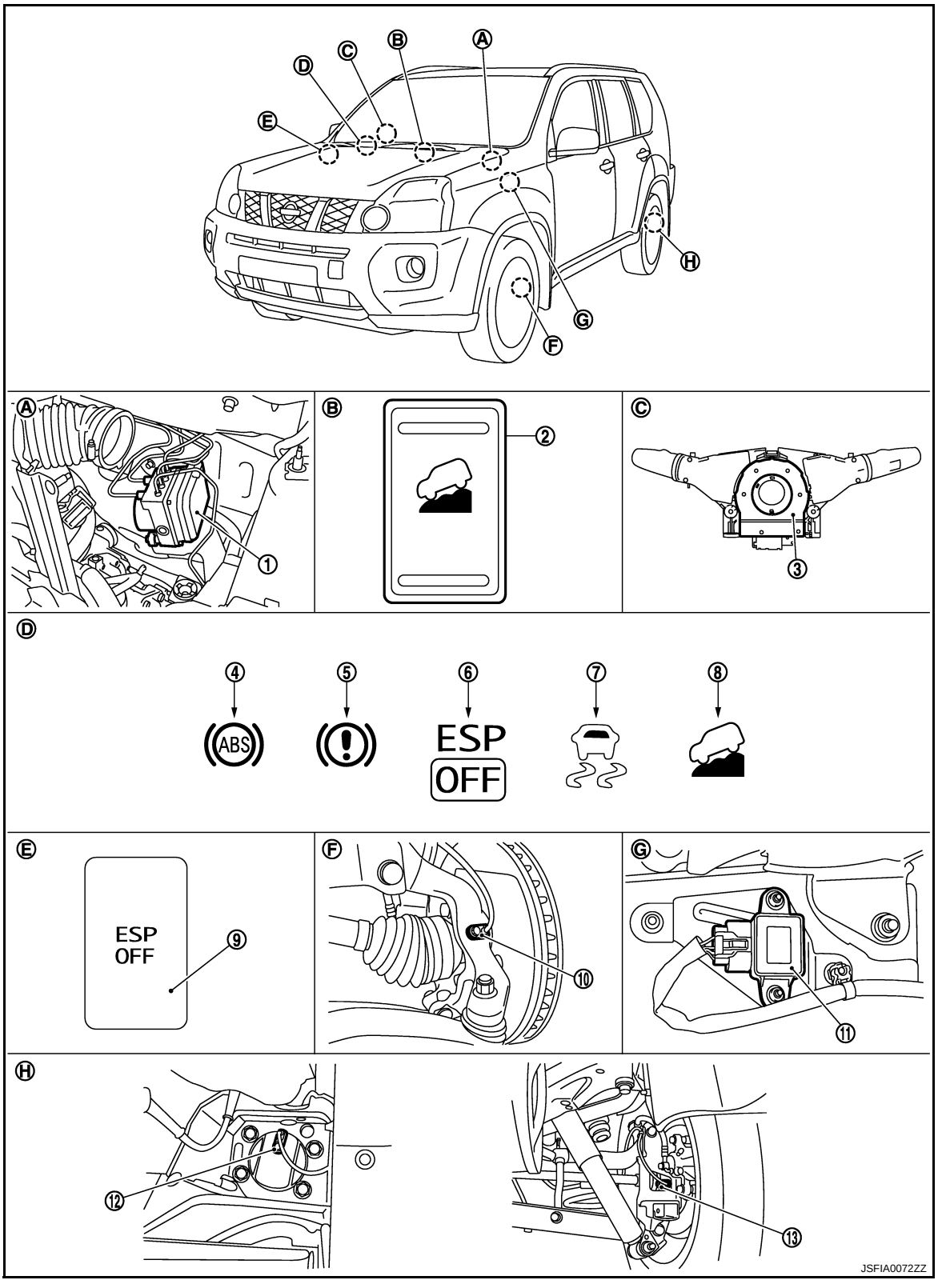


1. Steering angle sensor
2. ABS warning lamp
3. Brake warning lamp
4. ESP OFF indicator lamp
5. SLIP indicator lamp
6. HDC indicator lamp
7. HDC switch
8. ABS actuator and electric unit (control unit)
9. Pressure sensor

10. Front wheel sensor
11. Yaw rate/side/decel G sensor
12. ESP OFF switch
13. Rear wheel sensor (2WD models)
14. Rear wheel sensor (4WD models)

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

RHD models



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

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

Component Description

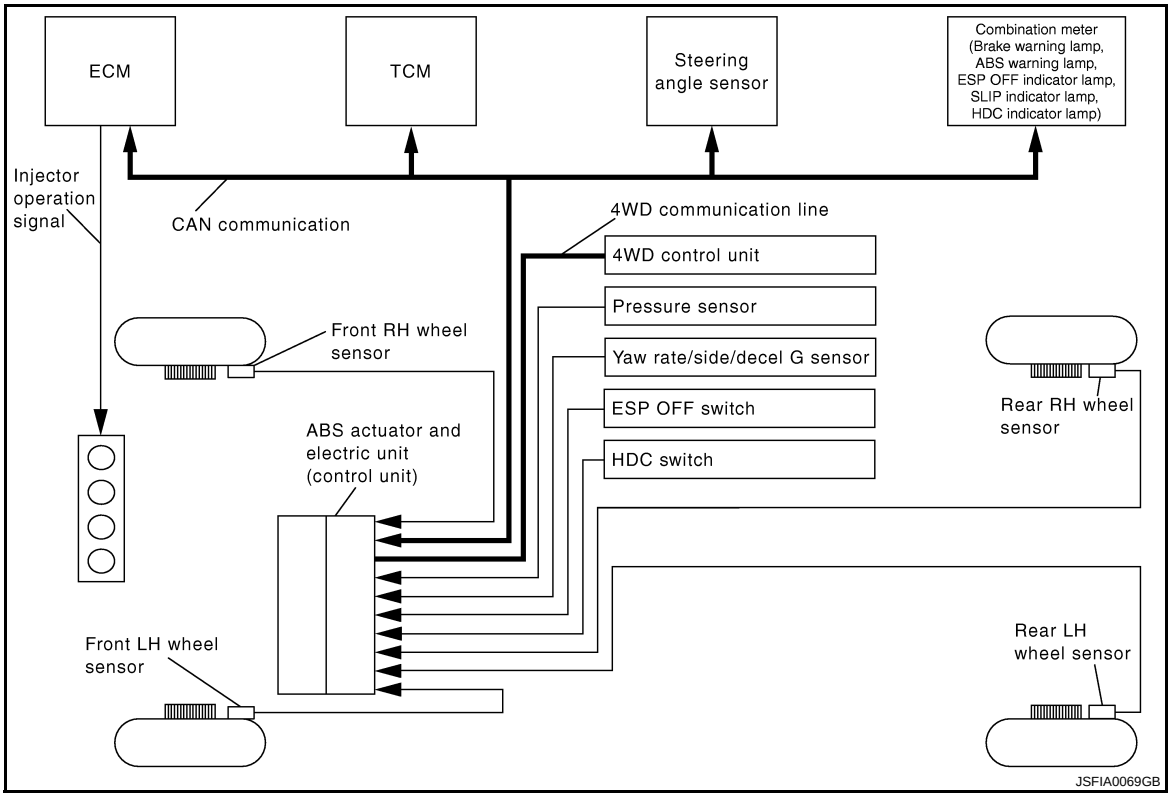
INFOID:0000000001505886

Component parts		Reference
ABS actuator and electric unit (control unit)	Pump	BRC-118, "Description"
	Motor	
	Actuator relay (Main relay)	BRC-136, "Description"
	Solenoid valve	BRC-129, "Description"
	Pressure sensor	BRC-138, "Description"
	ESP switch-over valve (CV1, CV2)	BRC-155, "Description"
	ESP switch-over valve (SV1, SV2)	BRC-157, "Description"
Wheel sensor		BRC-109, "Description"
Yaw rate sensor		BRC-143, "Description"
G sensor		BRC-146, "Description"
Steering angle sensor		BRC-141, "Description"
ESP OFF switch		BRC-165, "Description"
HDC switch		BRC-167, "Description"
ABS warning lamp		BRC-169, "Description"
Brake warning lamp		BRC-170, "Description"
ESP OFF indicator lamp		BRC-171, "Description"
SLIP indicator lamp		BRC-172, "Description"
HDC indicator lamp		BRC-173, "Description"

EBD

System Diagram

INFOID:0000000001507070



System Description

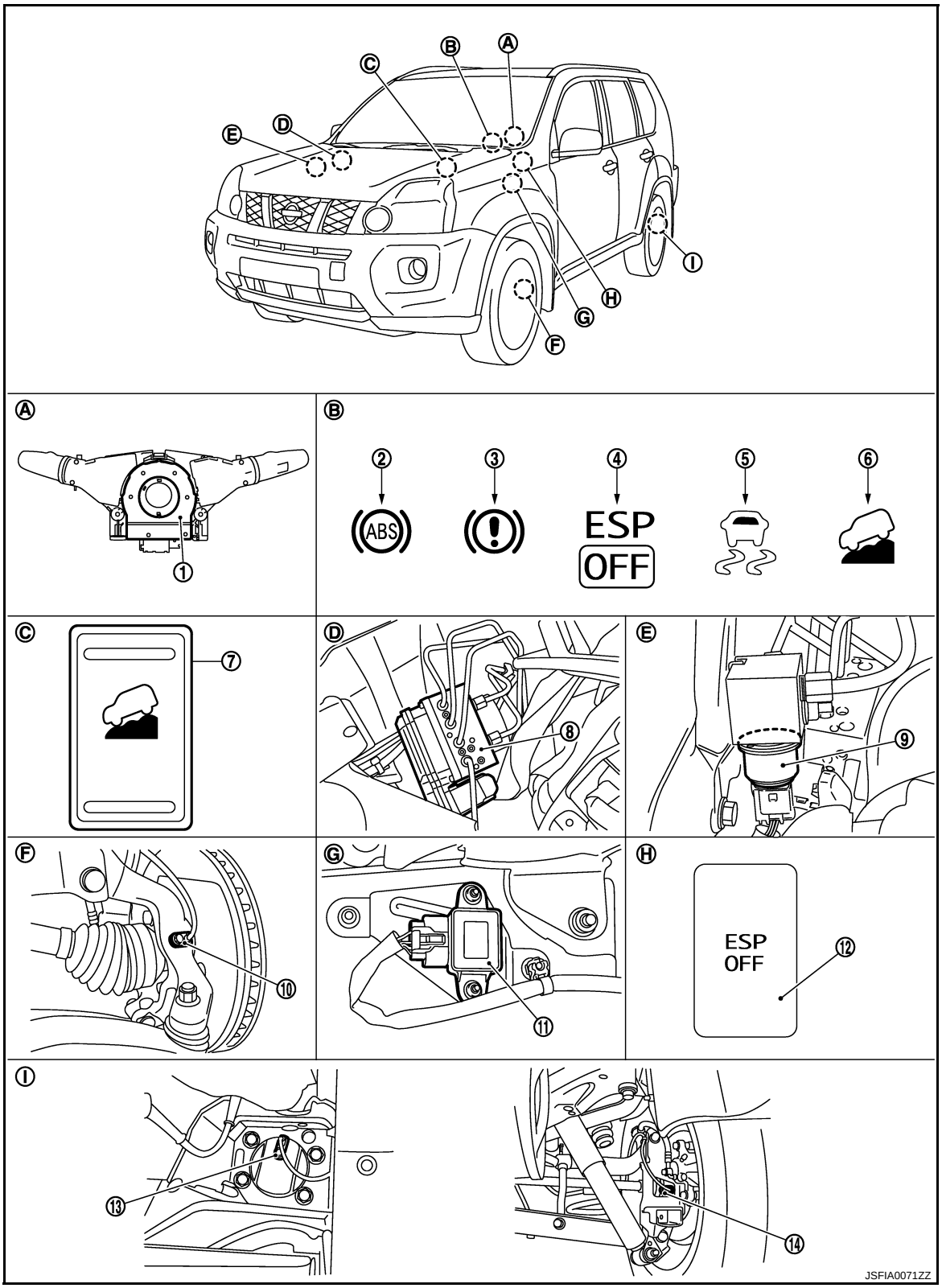
INFOID:0000000001115536

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

Component Parts Location

INFOID:0000000001116354

LHD models

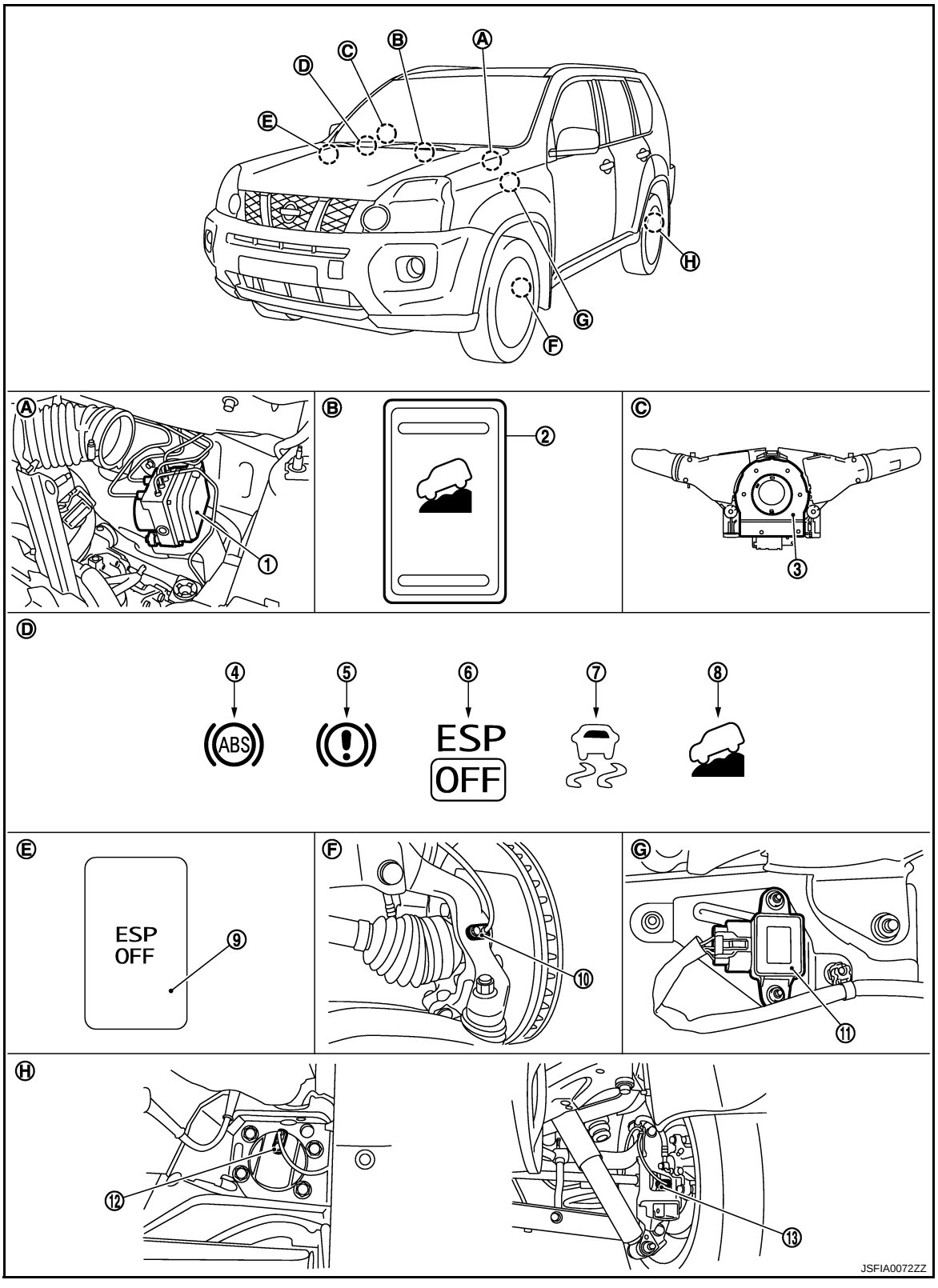


1. Steering angle sensor
2. ABS warning lamp
3. Brake warning lamp
4. ESP OFF indicator lamp
5. SLIP indicator lamp
6. HDC indicator lamp
7. HDC switch
8. ABS actuator and electric unit (control unit)
9. Pressure sensor

10. Front wheel sensor
11. Yaw rate/side/decel G sensor
12. ESP OFF switch
13. Rear wheel sensor (2WD models)
14. Rear wheel sensor (4WD models)

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

RHD models



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

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

Component Description

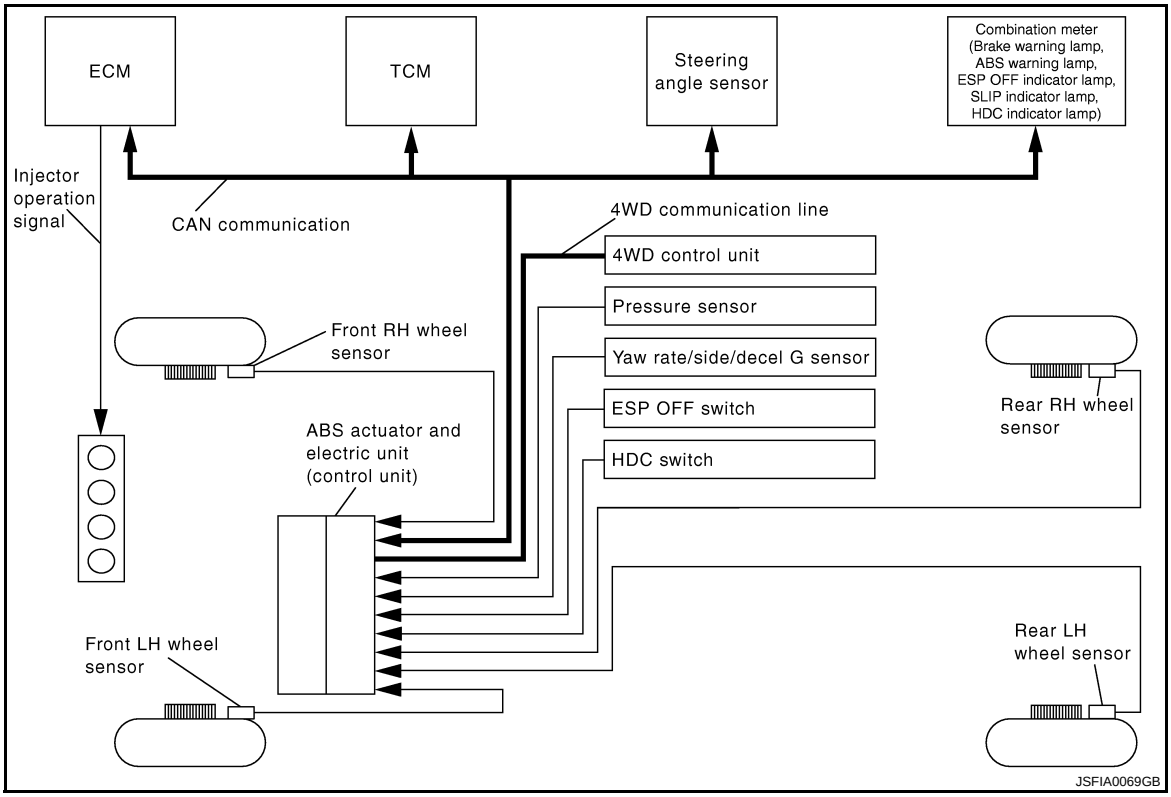
INFOID:0000000001505880

Component parts		Reference
ABS actuator and electric unit (control unit)	Pump	BRC-118, "Description"
	Motor	
	Actuator relay (Main relay)	BRC-136, "Description"
	Solenoid valve	BRC-129, "Description"
	Pressure sensor	BRC-138, "Description"
	ESP switch-over valve (CV1, CV2)	BRC-155, "Description"
	ESP switch-over valve (SV1, SV2)	BRC-157, "Description"
Wheel sensor		BRC-109, "Description"
Yaw rate sensor		BRC-143, "Description"
G sensor		BRC-146, "Description"
Steering angle sensor		BRC-141, "Description"
ESP OFF switch		BRC-165, "Description"
HDC switch		BRC-167, "Description"
ABS warning lamp		BRC-169, "Description"
Brake warning lamp		BRC-170, "Description"
ESP OFF indicator lamp		BRC-171, "Description"
SLIP indicator lamp		BRC-172, "Description"
HDC indicator lamp		BRC-173, "Description"

HDC

System Diagram

INFOID:0000000001116837



System Description

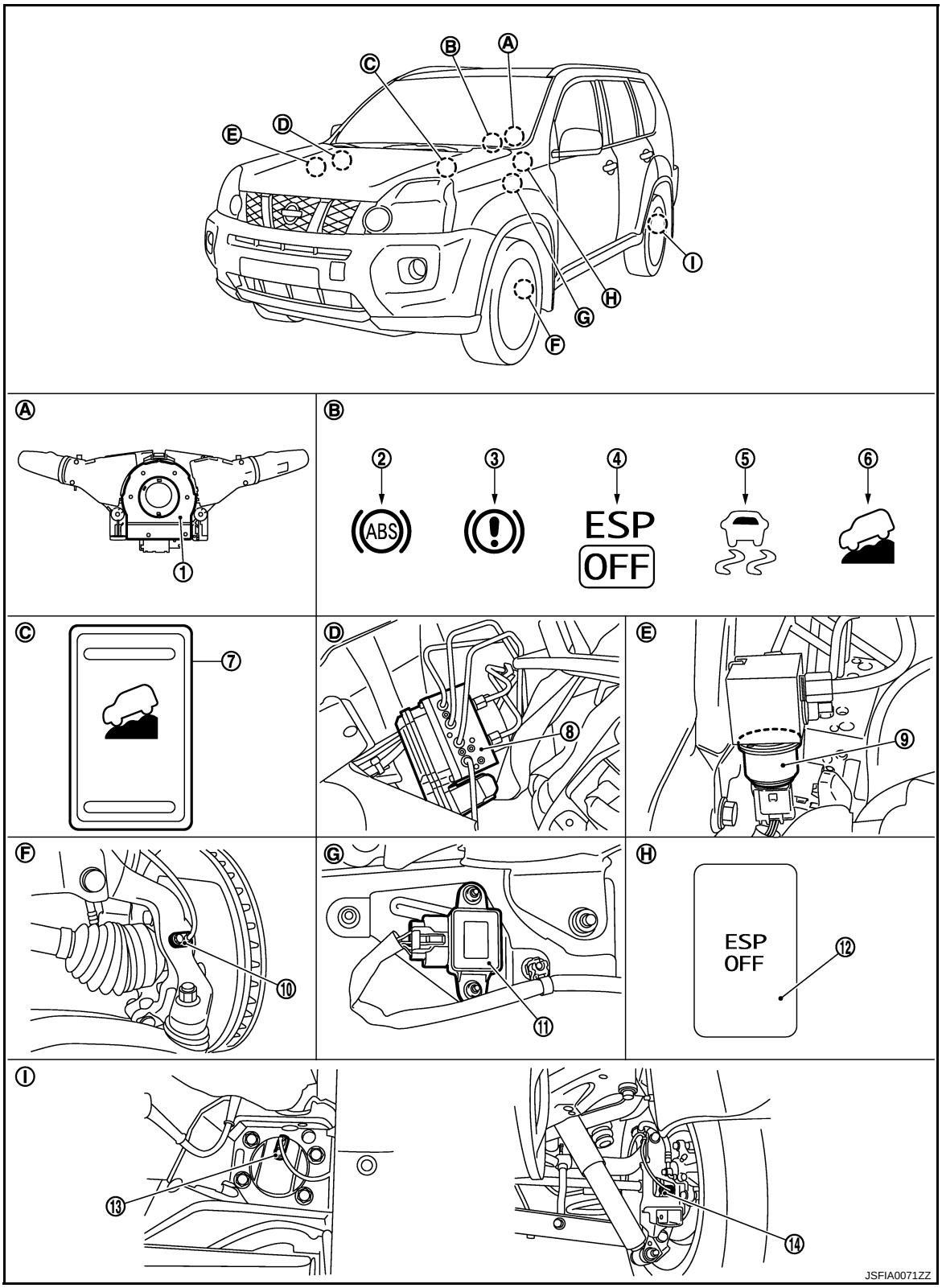
INFOID:0000000001116838

- The Hill Descent Control system will help maintain vehicle speed when driving under 25 km/h (15 MPH) on steeper downhill grades. HDC will provide braking allowing the driver to concentrate on steering while reducing the burden of brake and accelerator operation.
- To operate the system, set the 4WD switch to LOCK and push the HDC switch. The HDC indicator in the combination meter will turn ON. While HDC is operating, the stop lamp will illuminate.
- If the accelerator or brake pedal is depressed while the HDC system is ON, the system will stop operating.
- During HDC operation, a mechanical noise may be heard. This is normal.

Component Parts Location

INFOID:0000000001116839

LHD models

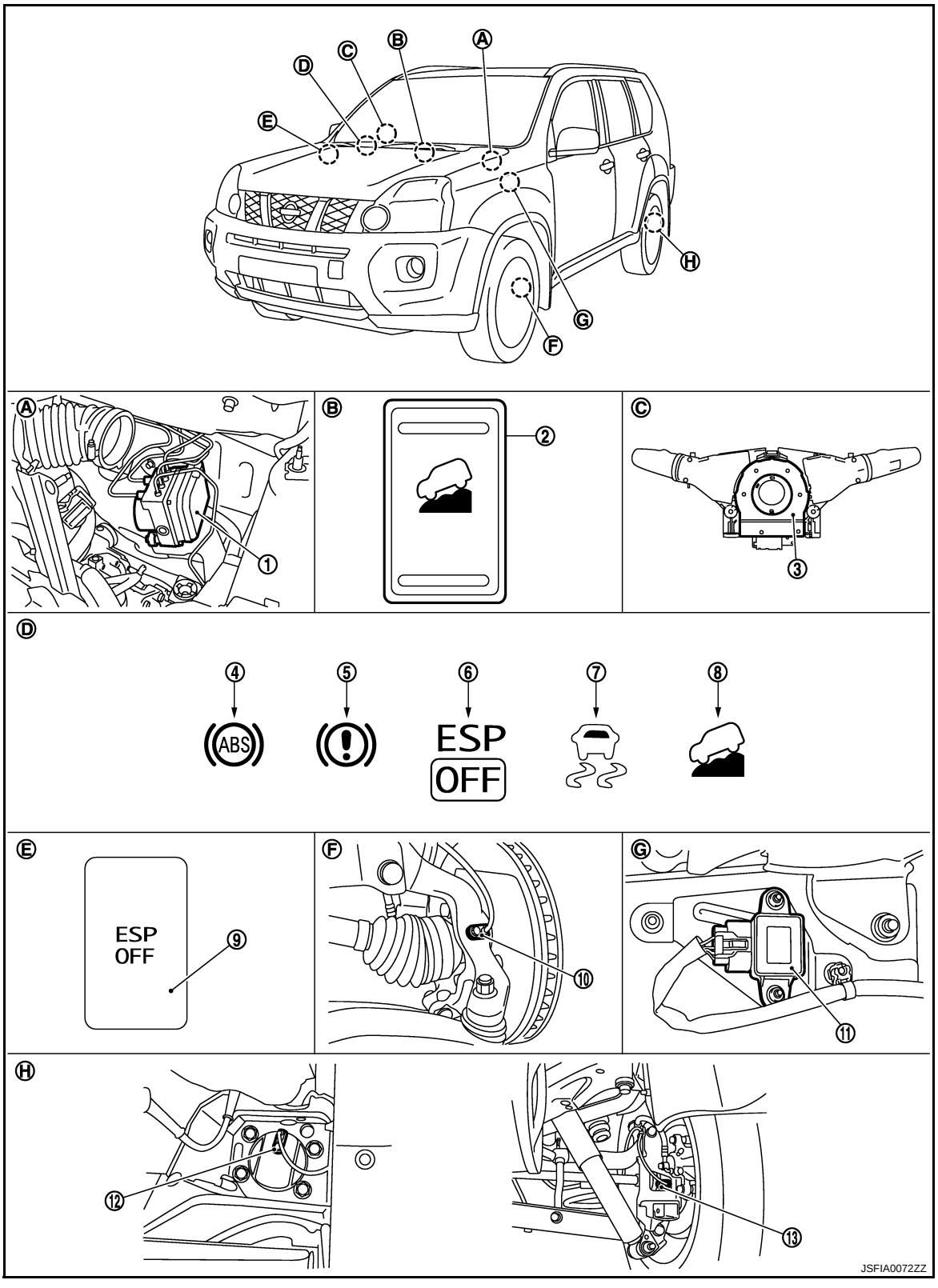


1. Steering angle sensor
2. ABS warning lamp
3. Brake warning lamp
4. ESP OFF indicator lamp
5. SLIP indicator lamp
6. HDC indicator lamp
7. HDC switch
8. ABS actuator and electric unit (control unit)
9. Pressure sensor

10. Front wheel sensor
11. Yaw rate/side/decel G sensor
12. ESP OFF switch
13. Rear wheel sensor (2WD models)
14. Rear wheel sensor (4WD models)

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

RHD models



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

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

Component Description

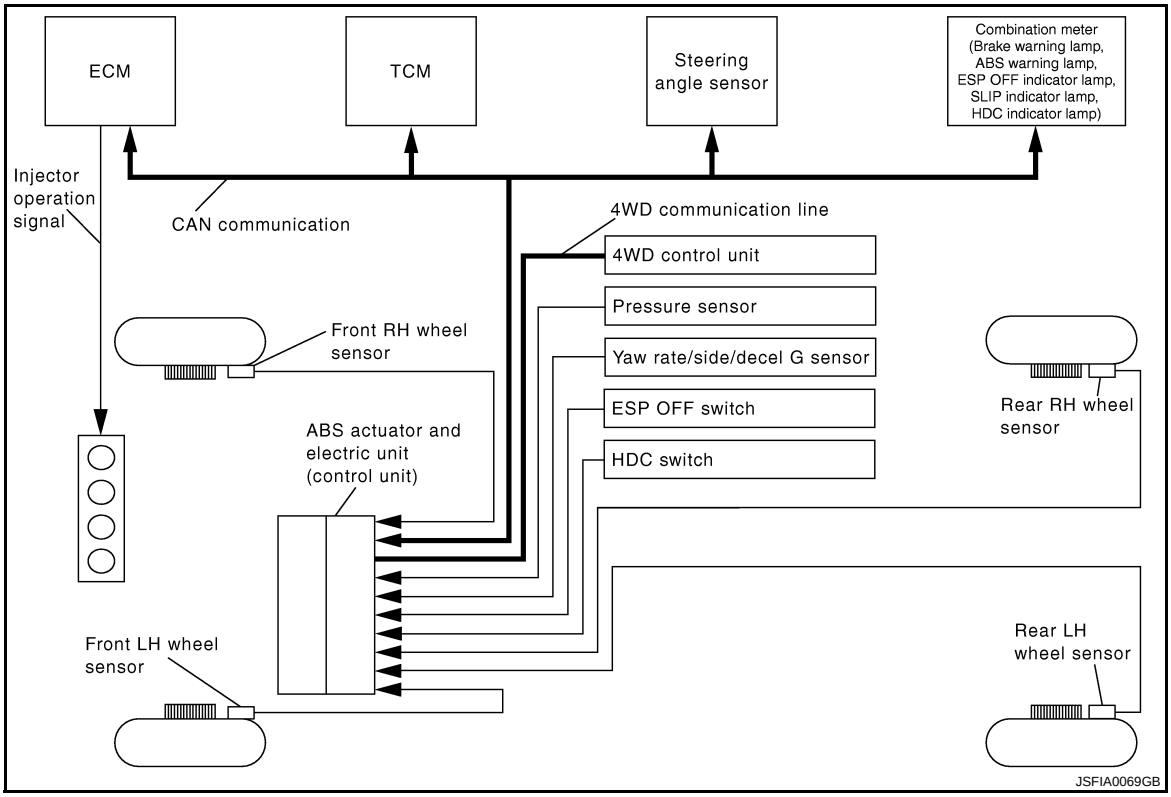
INFOID:0000000001116840

Component parts		Reference
ABS actuator and electric unit (control unit)	Pump	BRC-118, "Description"
	Motor	
	Actuator relay (Main relay)	BRC-136, "Description"
	Solenoid valve	BRC-129, "Description"
	Pressure sensor	BRC-138, "Description"
	ESP switch-over valve (CV1, CV2)	BRC-155, "Description"
	ESP switch-over valve (SV1, SV2)	BRC-157, "Description"
Wheel sensor		BRC-109, "Description"
Yaw rate sensor		BRC-143, "Description"
G sensor		BRC-146, "Description"
Steering angle sensor		BRC-141, "Description"
ESP OFF switch		BRC-165, "Description"
HDC switch		BRC-167, "Description"
ABS warning lamp		BRC-169, "Description"
Brake warning lamp		BRC-170, "Description"
ESP OFF indicator lamp		BRC-171, "Description"
SLIP indicator lamp		BRC-172, "Description"
HDC indicator lamp		BRC-173, "Description"

HSA

System Diagram

INFOID:0000000001116841



System Description

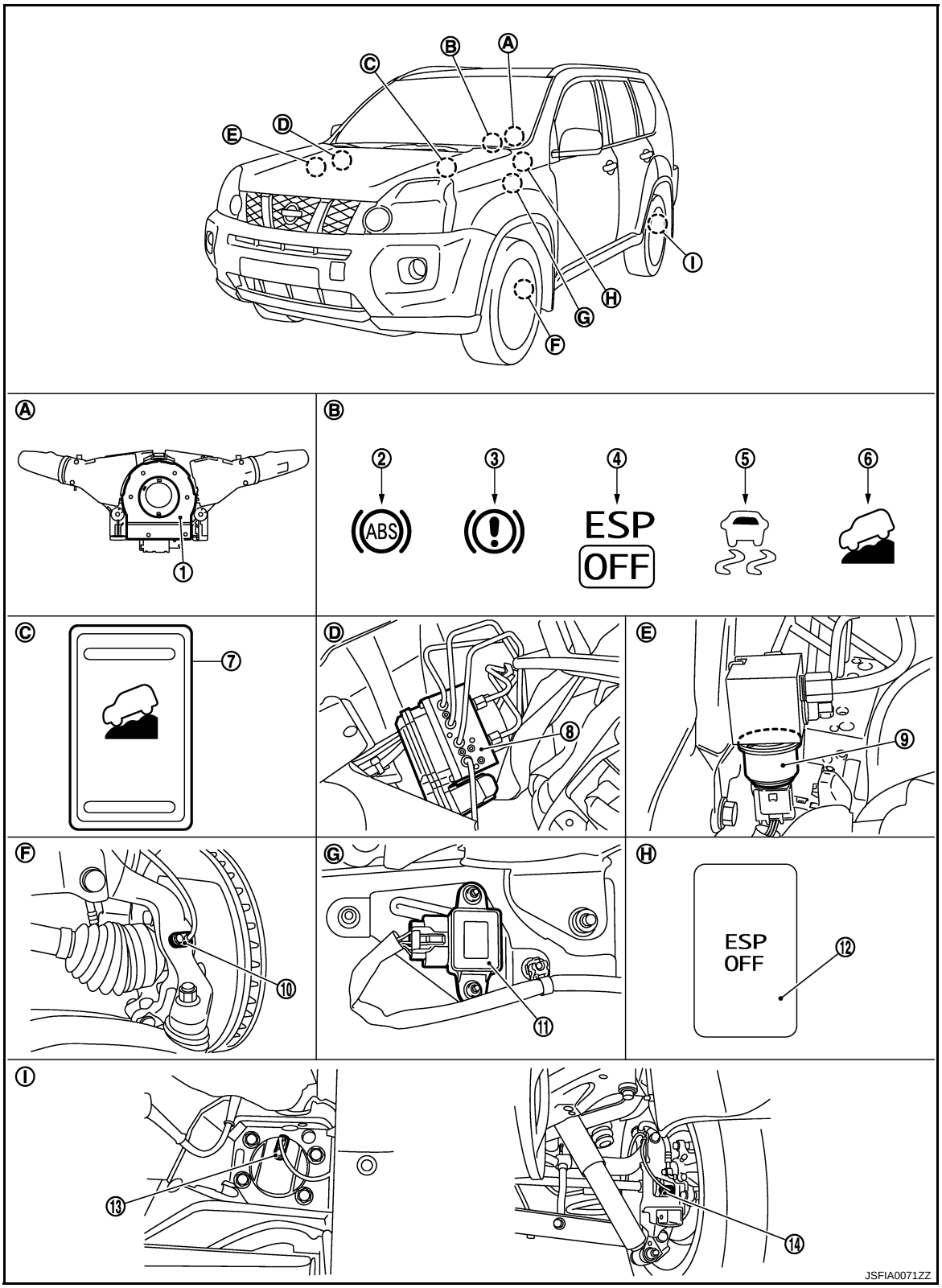
INFOID:0000000001116842

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

Component Parts Location

INFOID:0000000001116843

LHD models

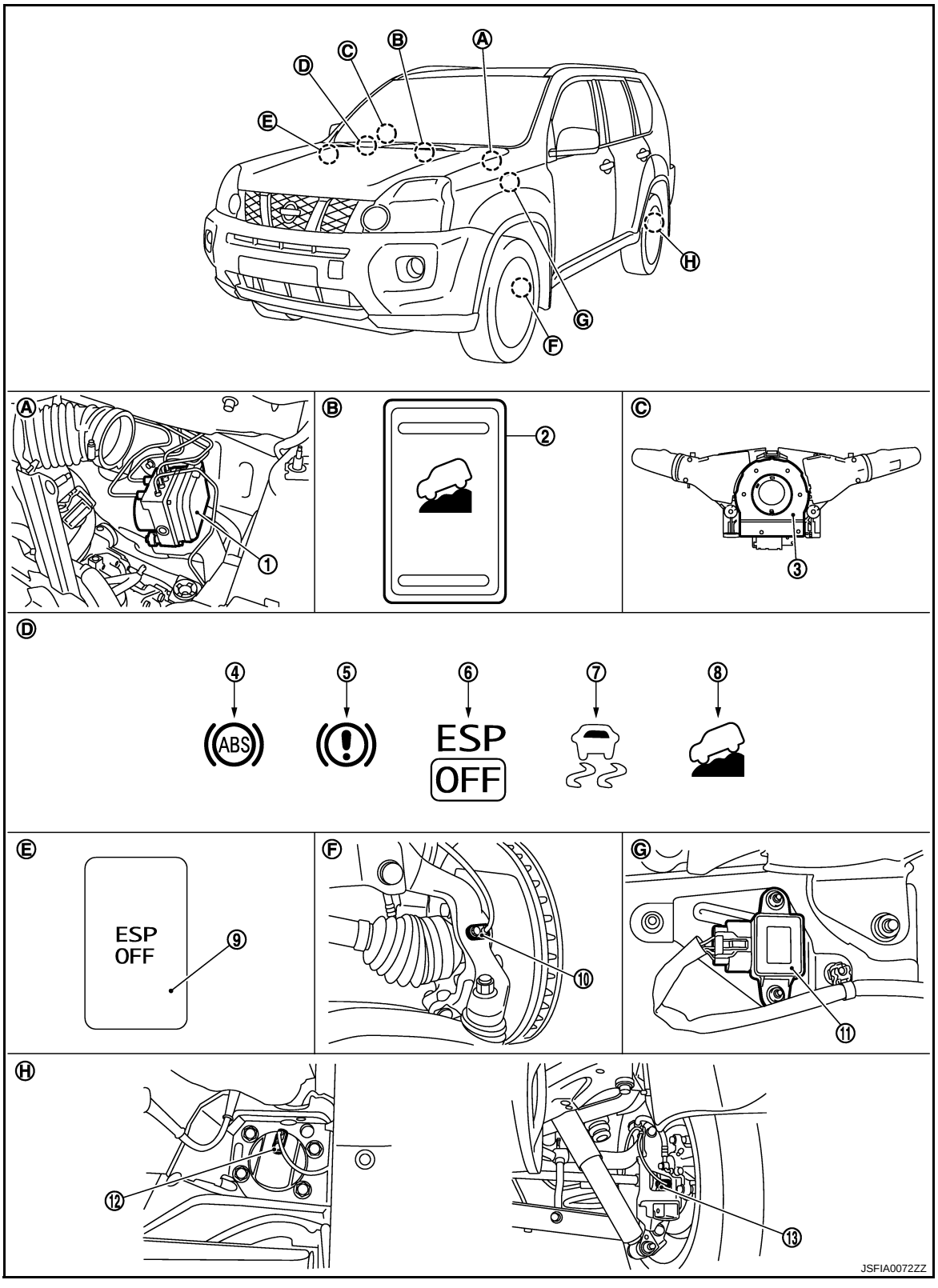


1. Steering angle sensor
2. ABS warning lamp
3. Brake warning lamp
4. ESP OFF indicator lamp
5. SLIP indicator lamp
6. HDC indicator lamp
7. HDC switch
8. ABS actuator and electric unit (control unit)
9. Pressure sensor

10. Front wheel sensor
11. Yaw rate/side/decel G sensor
12. ESP OFF switch
13. Rear wheel sensor (2WD models)
14. Rear wheel sensor (4WD models)

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

RHD models



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

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

Component Description

INFOID:0000000001116844

Component parts		Reference
ABS actuator and electric unit (control unit)	Pump	BRC-118, "Description"
	Motor	
	Actuator relay (Main relay)	BRC-136, "Description"
	Solenoid valve	BRC-129, "Description"
	Pressure sensor	BRC-138, "Description"
	ESP switch-over valve (CV1, CV2)	BRC-155, "Description"
	ESP switch-over valve (SV1, SV2)	BRC-157, "Description"
Wheel sensor		BRC-109, "Description"
Yaw rate sensor		BRC-143, "Description"
G sensor		BRC-146, "Description"
Steering angle sensor		BRC-141, "Description"
ESP OFF switch		BRC-165, "Description"
HDC switch		BRC-167, "Description"
ABS warning lamp		BRC-169, "Description"
Brake warning lamp		BRC-170, "Description"
ESP OFF indicator lamp		BRC-171, "Description"
SLIP indicator lamp		BRC-172, "Description"
HDC indicator lamp		BRC-173, "Description"

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

CONSULT-III Function (ABS)

INFOID:0000000001115539

FUNCTION

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

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

SELF-DIAG RESULTS MODE

Operation Procedure

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

How to Erase Self-diagnosis Results

1. After erasing DTC memory, start engine and drive vehicle at 30 km/h (19 MPH) or more for approximately 1 minute as the final inspection, and make sure that the ABS warning lamp, ESP OFF indicator lamp, SLIP indicator lamp and brake warning lamp turn OFF.
   CAUTION:
   If memory cannot be erased, perform applicably diagnosis.
   NOTE:
   - When the wheel sensor malfunctions, after inspecting the wheel sensor system, the ABS warning lamp, ESP OFF indicator lamp, SLIP indicator lamp and brake warning lamp will not turn OFF even when the system is normal unless the vehicle is driving at approximately 30 km/h (19 MPH) or more for approximately 1 minute.
   - Brake warning lamp will turn ON in case of parking brake operation (when switch is ON) or of brake fluid level switch operation (when brake fluid is insufficient).
   - ESP OFF switch should not stay “ON” position.

Display Item List

Refer to BRC-186, "DTC No. Index".

DATA MONITOR MODE

Display Item List

×: Applicable ▼: Optional item

Monitor item (Unit)	SELECT MONITOR ITEM		Remarks
	ECU INPUT SIGNALS	MAIN SIGNLAS	
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)]	×	×	

Monitor item (Unit)	SELECT MONITOR ITEM		Remarks
	ECU INPUT SIGNALS	MAIN SIGNLAS	
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)	×	×	ESP OFF switch
YAW RATE SEN (°/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
PRESS SENSOR (bar)	×	▼	Brake fluid pressure detected by pressure 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
ABS WARN LAMP (On/Off)	▼	×	ABS warning lamp
OFF LAMP (On/Off)	▼	×	ESP OFF indicator lamp
SLIP LAMP (On/Off)	▼	×	SLIP indicator lamp
1ST GEAR SIG (On/Off)	▼	▼	1st gear status

Monitor item (Unit)	SELECT MONITOR ITEM		Remarks
	ECU INPUT SIGNALS	MAIN SIGNLAS	
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
STP ON RLY (On/Off)	▼	▼	Stop lamp on relay operation
EBD WARN LAMP (On/Off)	▼	▼	Brake warning lamp
HDC SW (On/Off)	▼	▼	HDC switch
EBD SIGNAL (On/Off)	▼	▼	EBD operation
ABS SIGNAL (On/Off)	▼	▼	ABS operation
TCS SIGNAL (On/Off)	▼	▼	TCS operation
VDC SIGNAL (On/Off)	▼	▼	ESP operation
HSA SIGNAL (On/Off)	▼	▼	HSA operation
HDC SIGNAL (On/Off)	▼	▼	HDC 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)	▼	▼	ESP fail-safe status
4WD MODE MONI (On/Off)	▼	▼	4WD mode monitor

ACTIVE TEST MODE

CAUTION:

- **Do not perform active test while driving vehicle.**
- **Make sure to completely bleed air from brake system.**

- **The active test cannot be performed with the ABS warning lamp, ESP OFF indicator lamp, SLIP indicator lamp and brake warning lamp are on.**
- **ABS warning lamp, ESP OFF indicator lamp, SLIP indicator lamp and brake warning lamp are on during active test.**
- **Erase memory of ICC system after implementing active test.**

NOTE:
- When active test is performed while depressing the pedal, the pedal depression amount will change. This is normal. (Only solenoid valve and ABS motor.)
- "TEST IS STOPPED" is displayed 10 seconds after operation start.
- After "TEST IS STOPPED" is displayed, to perform test again, touch BACK and repeat step 3.

Test Item

ABS SOLENOID VALVE
- For ABS solenoid valve, touch "UP", "KEEP" and "DOWN". Then use screen monitor to check that solenoid valve operates as shown in the table below.

Test item	Display item	Display		
		UP	KEEP	DOWN
FR RH SOL	FR RH IN SOL	OFF	ON	ON
	FR RH OUT SOL	OFF	OFF	ON*
	CV1	OFF	OFF	OFF
	SV1	OFF	OFF	OFF
FR LH SOL	FR LH IN SOL	OFF	ON	ON
	FR LH OUT SOL	OFF	OFF	ON*
	CV2	OFF	OFF	OFF
	SV2	OFF	OFF	OFF
RR RH SOL	RR RH IN SOL	OFF	ON	ON
	RR RH OUT SOL	OFF	OFF	ON*
	CV2	OFF	OFF	OFF
	SV2	OFF	OFF	OFF
RR LH SOL	RR LH IN SOL	OFF	ON	ON
	RR LH OUT SOL	OFF	OFF	ON*
	CV1	OFF	OFF	OFF
	SV1	OFF	OFF	OFF

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

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

Test item	Display item	Display		
		UP	ACT UP	ACT KEEP
FR RH SOL	FR RH IN SOL	OFF	OFF	OFF
	FR RH OUT SOL	OFF	OFF	OFF
	CV1	OFF	ON	ON
	SV1	OFF	ON*	OFF
FR LH SOL	FR LH IN SOL	OFF	OFF	OFF
	FR LH OUT SOL	OFF	OFF	OFF
	CV2	OFF	ON	ON
	SV2	OFF	ON*	OFF

Test item	Display item	Display		
		UP	ACT UP	ACT KEEP
RR RH SOL	RR RH IN SOL	OFF	OFF	OFF
	RR RH OUT SOL	OFF	OFF	OFF
	CV2	OFF	ON	ON
	SV2	OFF	ON*	OFF
RR LH SOL	RR LH IN SOL	OFF	OFF	OFF
	RR LH OUT SOL	OFF	OFF	OFF
	CV1	OFF	ON	ON
	SV1	OFF	ON*	OFF

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

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

Test item	Display item	Display	
		ON	OFF
ABS MOTOR	MOTOR RELAY	ON	OFF
	ACTUATOR RLY	ON	ON

STOP LAMP ON RELAY
- Touch “ON” and “OFF” on screen. Make sure stop lamp on relay operates as shown in table below.

Test item	Display item	Display	
		ON	OFF
STP ON RLY	STP ON RLY	ON	OFF

COMPONENT DIAGNOSIS

C1101, C1102, C1103, C1104 WHEEL SENSOR-1

Description

INFOID:0000000001116850

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:0000000001116851

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1101	RR RH SENSOR-1	Circuit of rear RH wheel sensor is open or short circuit. Current signal from sensor is outside limits.	• Harness or connector • Wheel sensor • ABS actuator and electric unit (control unit)
C1102	RR LH SENSOR-1	Circuit of rear LH wheel sensor is open or short circuit. Current signal from sensor is outside limits.	
C1103	FR RH SENSOR-1	Circuit of front RH wheel sensor is open or short circuit. Current signal from sensor is outside limits.	
C1104	FR LH SENSOR-1	Circuit of front LH wheel sensor is open or short circuit. Current signal from sensor is outside limits.	

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

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

Diagnosis Procedure

INFOID:0000000001116852

CAUTION:
Do not check between wheel sensor terminals.

1.CHECK SENSOR AND SENSOR ROTOR

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

Are the sensor and sensor rotor normal?

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

2.CHECK CONNECTOR

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

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

Is any item indicated on the self-diagnosis display?

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

3. CHECK WHEEL SENSOR HARNESS

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect malfunctioning wheel sensor connector.
4. Check continuity between terminals. (Also check continuity when steering wheel is turned right and left and when sensor harness inside the wheel house is moved.)

Measurement terminal for signal circuit

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

Measurement terminal for power supply circuit

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

Measurement terminal for ground circuit

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

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

Is the inspection result normal?

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

4. CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

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

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

Is the inspection result normal?

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

Component Inspection

INFOID:0000000001116853

1.CHECK DATA MONITOR

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

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

Is the inspection result normal?

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

C1105, C1106, C1107, C1108 WHEEL SENSOR-2

Description

INFOID:0000000001116855

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

DTC Logic

INFOID:0000000001116856

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

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

Diagnosis Procedure

INFOID:0000000001282351

CAUTION:
Do not check between wheel sensor terminals.

1.CHECK SENSOR AND SENSOR ROTOR

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

Are the sensor and sensor rotor normal?

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

2.CHECK CONNECTOR

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

Is any item indicated on the self-diagnosis display?

YES >> GO TO 3.

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

3. CHECK WHEEL SENSOR HARNESS

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect malfunctioning wheel sensor connector.
4. Check continuity between terminals. (Also check continuity when steering wheel is turned right and left and when sensor harness inside the wheel house is moved.)

Measurement terminal for signal circuit

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

Measurement terminal for power supply circuit

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

Measurement terminal for ground circuit

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

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

Is the inspection result normal?

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

4. CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

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

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

Is the inspection result normal?

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

Component Inspection

INFOID:0000000001282352

1. CHECK DATA MONITOR

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

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

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-123, "Diagnosis Procedure".

C1109 POWER AND GROUND SYSTEM

Description

INFOID:0000000001116860

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

DTC Logic

INFOID:0000000001116861

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1109	BATTERY VOLTAGE [ABNORMAL]	When the ABS actuator and electric unit (control unit) power supply is lower than normal. Power supply is greater than normal limits.	• Harness or connector • ABS unit • Fuse • Vehicle electrical power system

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
BATTERY VOLTAGE [ABNORMAL]

Is above displayed on the self-diagnosis display?

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

Diagnosis Procedure

INFOID:0000000001116862

1.CHECK CONNECTOR

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

Is any item indicated on the self-diagnosis display?

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

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

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

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

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

Is the inspection result normal?

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

3. ABS POWER SUPPLY CHECK (UNDER LOAD CONDITIONS)

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

Is the inspection result normal?

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

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

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

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

Is the inspection result normal?

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

C1110 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Description

INFOID:0000000001116864

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

DTC Logic

INFOID:0000000001116865

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

1. Check both ABS solenoid valve and motor supply and ground circuits using a suitable electrical load.
2. Check wheel speed sensor inputs.
3. Check the self-diagnosis results.

Self-diagnosis results
CONTROLLER FAILURE

Is above displayed on the self-diagnosis display?

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

Diagnosis Procedure

INFOID:0000000001116866

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

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

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

C1111 ABS MOTOR, MOTOR RELAY SYSTEM

Description

INFOID:0000000001116868

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:0000000001116869

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
PUMP MOTOR

Is above displayed on the self-diagnosis display?

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

Diagnosis Procedure

INFOID:0000000001116870

1.CHECK CONNECTOR

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

Is any item indicated on the self-diagnosis display?

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

2.CHECK ABS MOTOR AND MOTOR RELAY POWER SUPPLY CIRCUIT

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

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

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

Is the inspection result normal?

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

3. ABS POWER SUPPLY CHECK (UNDER LOAD CONDITION)

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

Is the inspection result normal?

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

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

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

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

Is the inspection result normal?

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

Component Inspection

INFOID:0000000001116871

1. CHECK ACTIVE TEST

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

Test item	Display item	Display	
		ON	OFF
ABS MOTOR	MOTOR RELAY	ON	OFF
	ACTUATOR RLY	ON	ON

Is the inspection result normal?

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

C1113 G SENSOR

Description

INFOID:0000000001470549

Yaw rate/side/decel 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:0000000001470550

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 4WD rolling road

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
G SENSOR

Is above displayed on the self-diagnosis display?

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

Diagnosis Procedure

INFOID:0000000001470551

1.CHECK CONNECTOR

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

Is any item indicated on the self-diagnosis display?

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

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

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

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

Is the inspection result normal?

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

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

Check continuity between G sensor harness connector terminal and ground.

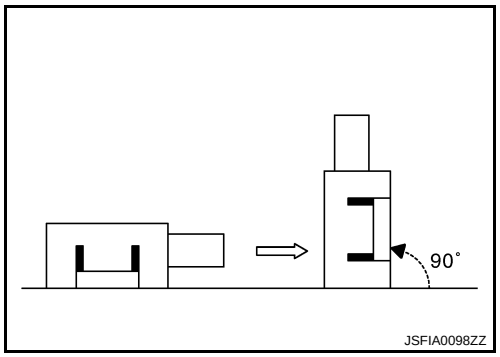
Yaw rate/side/decel G sensor		Continuity
Connector	Terminal	
B38	2 – 4	Not existed
	2 – 5	
	2 – 6	
	4 – 5	
	4 – 6	
	5 – 6	

Is the inspection result normal?

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

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

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



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

Is the inspection result normal?

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

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

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

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

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

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

Is the inspection result normal?

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

Component Inspection

INFOID:0000000001470552

1.CHECK DATA MONITOR

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

YAW RATE SENSOR

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

SIDE G SENSOR

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

DECEL G SENSOR

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

Is the inspection result normal?

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

C1115 WHEEL SENSOR

Description

INFOID:0000000001116878

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:0000000001116879

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
ABS SENSOR [ABNORMAL SIGNAL]

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-123, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001282354

CAUTION:
Do not check between wheel sensor terminals.

1.CHECK TIRES

Check air pressure, wear and size.

Are air pressure, wear and size within standard?

YES >> GO TO 2.
NO >> Adjust air pressure, or replace tire.

2.CHECK SENSOR AND SENSOR ROTOR

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

Are the sensor and sensor rotor normal?

YES >> GO TO 3.
NO >> Repair wheel sensor mount or replace sensor rotor.

3.CHECK WHEEL SENSOR HARNESS

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect malfunctioning wheel sensor connector.
4. Check continuity between terminals. (Also check continuity when steering wheel is turned right and left and when sensor harness inside the wheel house is moved.)

Measurement terminal for signal circuit

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

Measurement terminal for power supply circuit

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

Measurement terminal for ground circuit

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

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

Is the inspection result normal?

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

4. CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

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

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

Is the inspection result normal?

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

Component Inspection

INFOID:0000000001524144

1. CHECK DATA MONITOR

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

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

Is the inspection result normal?

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

C1116 STOP LAMP SWITCH

Description

INFOID:0000000001116883

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

DTC Logic

INFOID:0000000001116884

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
STOP LAMP SW

Is above displayed on the self-diagnosis display?

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

Diagnosis Procedure

INFOID:0000000001116885

1.CHECK STOP LAMP ILLUMINATE

Check stop lamps illuminate when brake pedal is pressed.

Is the inspection result normal?

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

2.CHECK CONNECTOR

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

Is any item indicated in the self-diagnosis display?

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

3.CHECK STOP LAMP SWITCH CIRCUIT

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

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

Is the inspection result normal?

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

Component Inspection

INFOID:0000000001116886

1.CHECK STOP LAMP SWITCH

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

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

Is the inspection result normal?

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

C1118 4WD SYSTEM

Description

INFOID:0000000001115811

It transmits the value calculated by 4WD control unit to ABS actuator and electric unit (control unit) with 4WD communication line (line for 4WD system only). ABS actuator and electric unit (control unit) controls 4WD solenoid valve according to the received command value.

DTC Logic

INFOID:0000000001115812

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
4WD SYSTEM

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-128, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001115813

1.CHECK 4WD CONTROL UNIT

Perform 4WD control unit self-diagnosis. Refer to DLN-13, "CONSULT-III Function (ALL MODE AWD/4WD)".

Is DTC “C1211” or “C1212” detected?

YES-1 >> When C1211 is display: Refer to DLN-26, "Diagnosis Procedure".
YES-2 >> When C1212 is display: Refer to DLN-28, "Diagnosis Procedure".
NO >> Replace ABS actuator and electric unit (control unit).

C1120, C1122, C1124, C1126 IN ABS SOL

Description

INFOID:0000000001116888

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:0000000001116889

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

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

Diagnosis Procedure

INFOID:0000000001116890

1.CHECK SENSOR AND SENSOR ROTOR

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

Are the sensor and sensor rotor normal?

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

2.CHECK CONNECTOR

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

Is any item indicated on the self-diagnosis display?

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

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

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

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

Is the inspection result normal?

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

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

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

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

Is the inspection result normal?

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

Component Inspection

INFOID:0000000001116891

1.CHECK ACTIVE TEST

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

Test item	Display item	Display		
		UP	KEEP	DOWN
FR RH SOL	FR RH IN SOL	OFF	ON	ON
	FR RH OUT SOL	OFF	OFF	ON*
	CV1	OFF	OFF	OFF
	SV1	OFF	OFF	OFF
FR LH SOL	FR LH IN SOL	OFF	ON	ON
	FR LH OUT SOL	OFF	OFF	ON*
	CV2	OFF	OFF	OFF
	SV2	OFF	OFF	OFF
RR RH SOL	RR RH IN SOL	OFF	ON	ON
	RR RH OUT SOL	OFF	OFF	ON*
	CV2	OFF	OFF	OFF
	SV2	OFF	OFF	OFF
RR LH SOL	RR LH IN SOL	OFF	ON	ON
	RR LH OUT SOL	OFF	OFF	ON*
	CV1	OFF	OFF	OFF
	SV1	OFF	OFF	OFF

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

Is the inspection result normal?

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

C1121, C1123, C1125, C1127 OUT ABS SOL

Description

INFOID:0000000001116893

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:0000000001116894

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

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

Diagnosis Procedure

INFOID:0000000001282357

1.CHECK SENSOR AND SENSOR ROTOR

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

Are the sensor and sensor rotor normal?

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

2.CHECK CONNECTOR

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

Is any item indicated on the self-diagnosis display?

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

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

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

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

Is the inspection result normal?

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

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

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

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

Is the inspection result normal?

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

Component Inspection

INFOID:0000000001282358

1.CHECK ACTIVE TEST

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

Test item	Display item	Display		
		UP	KEEP	DOWN
FR RH SOL	FR RH IN SOL	OFF	ON	ON
	FR RH OUT SOL	OFF	OFF	ON*
	CV1	OFF	OFF	OFF
	SV1	OFF	OFF	OFF
FR LH SOL	FR LH IN SOL	OFF	ON	ON
	FR LH OUT SOL	OFF	OFF	ON*
	CV2	OFF	OFF	OFF
	SV2	OFF	OFF	OFF
RR RH SOL	RR RH IN SOL	OFF	ON	ON
	RR RH OUT SOL	OFF	OFF	ON*
	CV2	OFF	OFF	OFF
	SV2	OFF	OFF	OFF
RR LH SOL	RR LH IN SOL	OFF	ON	ON
	RR LH OUT SOL	OFF	OFF	ON*
	CV1	OFF	OFF	OFF
	SV1	OFF	OFF	OFF

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

Is the inspection result normal?

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

C1130 ENGINE SIGNAL

Description

INFOID:0000000001116898

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

DTC Logic

INFOID:0000000001116899

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
ENGINE SIGNAL 1

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-135, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001116900

1.CHECK ENGINE SYSTEM

1. Perform ECM self-diagnosis. Repair or replace items indicated, then perform ECM self-diagnosis again.
- MR20DE: ECM-87, "CONSULT-III Function".
- QR25DE: ECQ-89, "CONSULT-III Function".
- M9R: ECR-97, "Diagnosis Description".
2. Perform ABS actuator and electric unit (control unit) self-diagnosis.

Is any item indicated on the self-diagnosis display?

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

C1140 ACTUATOR RELAY SYSTEM

Description

INFOID:0000000001116873

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

DTC Logic

INFOID:0000000001116874

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1140	ACTUATOR RLY	During the actuator relay operating with OFF, when the actuator relay turns ON, or when the control line for the relay is shorted to the ground.	• Harness or connector • ABS actuator and electric unit (control unit)
		During the actuator relay operating with ON, when the actuator relay turns ON, or when the control line for the relay is open.	

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
ACTUATOR RLY

Is above displayed on the self-diagnosis display?

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

Diagnosis Procedure

INFOID:0000000001116875

1.CHECK CONNECTOR

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

Is any item indicated on the self-diagnosis display?

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

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

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

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

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

Is the inspection result normal?

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

3. ABS POWER SUPPLY CHECK (UNDER LOAD CONDITION)

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

Is the inspection result normal?

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

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

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

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

Is the inspection result normal?

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

Component Inspection

INFOID:0000000001116876

1. CHECK ACTIVE TEST

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

Test item	Display item	Display	
		ON	OFF
ABS MOTOR	MOTOR RELAY	ON	OFF
	ACTUATOR RLY	ON	ON

Is the inspection result normal?

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

C1142 PRESS SENSOR

Description

INFOID:0000000001116902

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

DTC Logic

INFOID:0000000001116903

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
PRESS SEN CIRCUIT

Is above displayed on the self-diagnosis display?

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

Diagnosis Procedure

INFOID:0000000001116904

1.CHECK CONNECTOR

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

Is any item indicated on the self-diagnosis display?

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

2.CHECK HARNESS

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

ABS actuator and electric unit (control unit)		Pressure sensor		Continuity
Connector	Terminal	Connector	Terminal	
E36	10	E31	1	Not existed
	10		2	Not existed
	10		3	Existed
	7		1	Not existed
	7		2	Existed
	7		3	Not existed
	32		1	Existed
	32		2	Not existed
	32		3	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace malfunctioning components. Perform self-diagnosis again.

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

1. Connect ABS actuator and electric unit (control unit) connector.
   NOTE:
   With pressure sensor harness connector disconnected.
2. Turn ignition switch ON.
3. Check voltage between pressure sensor harness connector terminals.

Pressure sensor		Voltage
Connector	Terminal	
E31	1 – 2	Approx. 5 V

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace ABS actuator and electric unit (control unit).

4. CHECK PRESSURE SENSOR

1. Turn ignition switch OFF.
2. Connect following terminals between pressure sensor and connector.

Pressure sensor	Connector	
	Connector	Terminal
1	E31	1
2		2
3		3

3. Turn ignition switch ON.
4. In 1 second or more after ignition switch ON, check pressure sensor voltage under the following conditions: (1) with brake pedal depressed, (2) with brake pedal not depressed.

Pressure sensor		Condition	Voltage
connector	Terminal		
E31	1 – 2	When brake pedal is not depressed.	Approx. 0.5 V
		When brake pedal is depressed.	0.5 – 4.5 V (Note)

NOTE:
Voltage changes according to the degree of the application of the brake pedal.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace pressure sensor.

Component Inspection

INFOID:0000000001116905

1. CHECK DATA MONITOR

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

Condition	PRESS SENSOR (DATA MONITOR)
With ignition switch turned ON and brake pedal released.	Approx. 0 bar
With ignition switch turned ON and brake pedal depressed.	0 to 200 bar

Is the inspection result normal?

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

C1143, C1144 STEERING ANGLE SENSOR

Description

INFOID:0000000001116907

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:0000000001116908

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

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

Diagnosis Procedure

INFOID:0000000001116909

1.CHECK VEHICLE STATE

Check vehicle for any suspension/steering misalignment or damage.

Is the inspection result normal?

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

2.CHECK CONNECTOR

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

Is any item indicated on the self-diagnosis display?

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

3.CHECK STEERING ANGLE SENSOR HARNESS

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

Steering angle sensor		—	Continuity
Connector	Terminal		
M30	3	Ground	Existed

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

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

Is the inspection result normal?

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

4.CHECK DATA MONITOR

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

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

Is the inspection result normal?

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

5.CHECK FOR BACKLASH

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

Is there noticeable backlash?

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

Component Inspection

INFOID:0000000001116910

1.CHECK DATA MONITOR

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

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

Is the inspection result normal?

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

Special Repair Requirement

INFOID:0000000001116911

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the steering angle sensor. Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> END

C1145 YAW RATE SENSOR

Description

INFOID:0000000001116912

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

DTC Logic

INFOID:0000000001116913

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1145	YAW RATE SENSOR	Yaw rate/side/decel G sensor is malfunctioning, or the yaw rate/side/decel G sensor signal line is open or shorted.	• Harness or connector • ABS actuator and electric unit (control unit) • Yaw rate/side/decel G sensor

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
YAW RATE SENSOR

Is above displayed on the self-diagnosis display?

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

Diagnosis Procedure

INFOID:0000000001495310

1.CHECK CONNECTOR

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

Is any item indicated on the self-diagnosis display?

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

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

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

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

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace malfunctioning components.

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

Check continuity between G sensor harness connector terminal and ground.

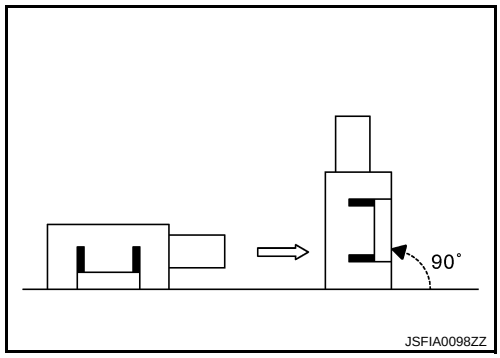
Yaw rate/side/decel G sensor		Continuity
Connector	Terminal	
B38	2 – 4	Not existed
	2 – 5	
	2 – 6	
	4 – 5	
	4 – 6	
	5 – 6	

Is the inspection result normal?

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

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

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



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

Is the inspection result normal?

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

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

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

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

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

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

Is the inspection result normal?

YES >> Replace ABS actuator end electric unit (control unit). Perform self-diagnosis again.

NO >> Replace yaw rate/side/decel G sensor. Perform self-diagnosis again.

Component Inspection

INFOID:0000000001116915

1.CHECK DATA MONITOR

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

Vehicle condition	YAW RATE SEN (DATA MONITOR)
Vehicle stopped	Approx. 0 d/s
Vehicle turning	–75 to 75 d/s

Is the inspection result normal?

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

C1146 SIDE G SENSOR

Description

INFOID:0000000001116917

Yaw rate/side/decel 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:0000000001116918

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1146	SIDE G-SEN CIRCUIT	Yaw rate/side/decel G sensor is malfunctioning, or circuit 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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
SIDE G-SEN CIRCUIT

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-146, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001495309

1.CHECK CONNECTOR

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

Is any item indicated on the self-diagnosis display?

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

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

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

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

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace malfunctioning components.

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

Check continuity between G sensor harness connector terminal and ground.

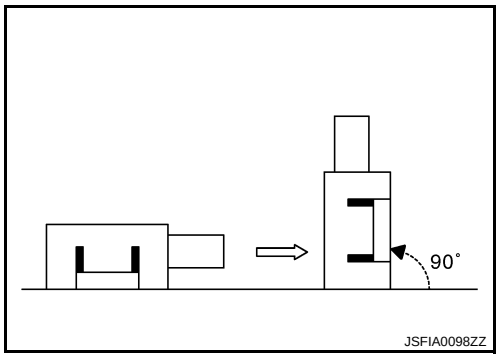
Yaw rate/side/decel G sensor		Continuity
Connector	Terminal	
B38	2 – 4	Not existed
	2 – 5	
	2 – 6	
	4 – 5	
	4 – 6	
	5 – 6	

Is the inspection result normal?

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

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

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



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

Is the inspection result normal?

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

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

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

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

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

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

Is the inspection result normal?

YES >> Replace ABS actuator end electric unit (control unit). Perform self-diagnosis again.

NO >> Replace yaw rate/side/decel G sensor. Perform self-diagnosis again.

Component Inspection

INFOID:0000000001116920

1.CHECK DATA MONITOR

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

Vehicle condition	SIDE G-SENSOR (DATA MONITOR)
Vehicle stopped	Approx. 0 m/s^2
Vehicle turning right	Negative value
Vehicle turning left	Positive value

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-146, "Diagnosis Procedure".

C1154 PNP SWITCH

Description

INFOID:0000000001351212

1ST GEAR POSITION SWITCH

1st gear position switch detects 1st gear to transmit its data as an analog signal to the ABS actuator and electric unit (control unit).

BACK-UP LAMP SWITCH

Back-up lamp switch detects R range to transmit its data as an analog signal to the ABS actuator and electric unit (control unit).

PARK/NEUTRAL POSITION SWITCH

Park/neutral position switch detects N range to transmit its data as an analog signal to the ABS actuator and electric unit (control unit).

DTC Logic

INFOID:0000000001351213

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1154	PNP POSI SIG	When 1st gear position switch, park/neutral position switch and back-up lamp switch circuit is open.	• Harness or connector • 1st gear position switch • Back-up lamp switch • Park/neutral position switch • ABS actuator and electric unit (control unit)

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
PNP POSI SIG

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-149, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001351214

CAUTION:

- **Regarding vehicles with M/T, “PNP POSI SIG” may be detected when holding the gear for a long time in the center between the 1st position and N/R position. This is not an error if the system returns to normal after restarting the engine.**
- **“PNP POSI SIG” may be detected when going up a slope, being toed with ignition switch ON and the gear in a shift position other than R position. This is not a shift position error. The system returns to normal when parking on level ground after stopping the traction and restarting the engine.**

1.CEHCK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect 1st gear position switch connector.
4. Disconnect back-up lamp switch connector.
5. Disconnect park/neutral position switch connector.
6. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
7. Reconnect connectors and then perform the self-diagnosis.

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2.

NO >> Poor connection of connector terminal. Replace or repair connector.

2.CHECK EACH SWITCH

Select “1ST GEAR SIG”, “N POSI SIG” and “R POSI SIG” in “DATA MONITOR” and check 1st gear position switch, park/neutral position switch and back-up lamp switch signal.

Gear position	DATA MONITOR		
	1ST GEAR SIG	N POSI SIG	R POSI SIG
R	Off	Off	On
N	Off	On	Off
1	On	Off	Off

Is the inspection result normal?

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

3.CHECK HARNESS 1

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect 1st gear position switch connector.
4. Check continuity between ABS actuator and electric unit (control unit) harness connector terminal and 1st gear position switch harness connector terminal.

ABS actuator and electric unit (control unit)		1st gear position switch		Continuity
Connector	Terminal	Connector	Terminal	
E36	31	F58	1	Existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace or repair malfunctioning components.

4.CHECK HARNESS 2

1. Disconnect back-up lamp switch connector.
2. Check continuity between ABS actuator and electric unit (control unit) harness connector terminal and back-up lamp switch harness connector terminal.

ABS actuator and electric unit (control unit)		Back-up lamp switch		Continuity
Connector	Terminal	Connector	Terminal	
E36	17	F51	1	Existed

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace or repair malfunctioning components.

5.CHECK HARNESS 3

1. Disconnect park/neutral position switch connector.
2. Check continuity between ABS actuator and electric unit (control unit) harness connector terminal and park/neutral position switch harness connector terminal.

ABS actuator and electric unit (control unit)		Park/neutral position switch		Continuity
Connector	Terminal	Connector	Terminal	
E36	25	F48	1	Existed

Is the inspection result normal?

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

Component Inspection

INFOID:0000000001351215

1.CHECK EACH SWITCH

Select “1ST GEAR SIG”, “N POSI SIG” and “R POSI SIG” in “DATA MONITOR” and check 1st gear position switch, park/neutral position switch and back-up lamp switch signal.

Gear position	DATA MONITOR		
	1ST GEAR SIG	N POSI SIG	R POSI SIG
R	Off	Off	On
N	Off	On	Off
1	On	Off	Off

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-149, "Diagnosis Procedure".

C1155 BRAKE FLUID LEVEL SWITCH

Description

INFOID:0000000001116927

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 ESP unit via the CAN bus.

DTC Logic

INFOID:0000000001116928

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
BR FLUID LEVEL LOW

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-152, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001116929

1.CHECK BRAKE FLUID LEVEL

Check the brake fluid level.

Is the inspection result normal?

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

2.CHECK BRAKE WARNING LAMP 1

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

Is the inspection result normal?

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

3.CHECK BRAKE WARNING LAMP 2

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

Is the inspection result normal?

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

4.CHECK CONNECTOR

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

Is any item indicated on the self-diagnosis display?

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

5.CHECK BRAKE FLUID LEVEL SWITCH

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

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

Is the inspection result normal?

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

6.CHECK BRAKE FLUID LEVEL SWITCH CIRCUIT

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

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

Combination meter		—	Continuity
Connector	Terminal		
M34	27	Ground	Not existed

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

Is the inspection result normal?

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

Component Inspection

INFOID:0000000001116930

1.CHECK BRAKE FLUID LEVEL SWITCH

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

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

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-152, "Diagnosis Procedure".

C1164, C1165 CV SYSTEM

Description

INFOID:0000000001115612

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

DTC Logic

INFOID:0000000001115613

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1164	CV1	ESP 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	ESP switch-over solenoid valve (CV2) on the primary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground.	

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
CV1
CV2

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-155, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001115614

1.CHECK CONNECTOR

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

Is any item indicated on the self-diagnosis display?

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

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

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

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

Is the inspection result normal?

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

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

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

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

Is the inspection result normal?

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

Component Inspection

INFOID:0000000001115615

1.CHECK ACTIVE TEST

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

Test item	Display item	Display		
		UP	ACT UP	ACT KEEP
FR RH SOL	FR RH IN SOL	OFF	OFF	OFF
	FR RH OUT SOL	OFF	OFF	OFF
	CV1	OFF	ON	ON
	SV1	OFF	ON*	OFF
FR LH SOL	FR LH IN SOL	OFF	OFF	OFF
	FR LH OUT SOL	OFF	OFF	OFF
	CV2	OFF	ON	ON
	SV2	OFF	ON*	OFF
RR RH SOL	RR RH IN SOL	OFF	OFF	OFF
	RR RH OUT SOL	OFF	OFF	OFF
	CV2	OFF	ON	ON
	SV2	OFF	ON*	OFF
RR LH SOL	RR LH IN SOL	OFF	OFF	OFF
	RR LH OUT SOL	OFF	OFF	OFF
	CV1	OFF	ON	ON
	SV1	OFF	ON*	OFF

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

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-155, "Diagnosis Procedure".

C1166, C1167 SV SYSTEM

Description

INFOID:0000000001115828

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

DTC Logic

INFOID:0000000001115829

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1166	SV1	ESP 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	ESP switch-over solenoid valve (SV2) on the primary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground.	

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
SV1
SV2

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-157, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001116368

1.CHECK CONNECTOR

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

Is any item indicated on the self-diagnosis display?

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

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

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

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

Is the inspection result normal?

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

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

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

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

Is the inspection result normal?

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

Component Inspection

INFOID:0000000001116369

1.CHECK ACTIVE TEST

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

Test item	Display item	Display		
		UP	ACT UP	ACT KEEP
FR RH SOL	FR RH IN SOL	OFF	OFF	OFF
	FR RH OUT SOL	OFF	OFF	OFF
	CV1	OFF	ON	ON
	SV1	OFF	ON*	OFF
FR LH SOL	FR LH IN SOL	OFF	OFF	OFF
	FR LH OUT SOL	OFF	OFF	OFF
	CV2	OFF	ON	ON
	SV2	OFF	ON*	OFF
RR RH SOL	RR RH IN SOL	OFF	OFF	OFF
	RR RH OUT SOL	OFF	OFF	OFF
	CV2	OFF	ON	ON
	SV2	OFF	ON*	OFF
RR LH SOL	RR LH IN SOL	OFF	OFF	OFF
	RR LH OUT SOL	OFF	OFF	OFF
	CV1	OFF	ON	ON
	SV1	OFF	ON*	OFF

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

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-155, "Diagnosis Procedure".

C1176 STOP LAMP SW2

Description

INFOID:0000000001115833

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

DTC Logic

INFOID:0000000001115834

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1176	STOP LAMP SW2	When ASCD brake switch circuit is open.	• Harness or connector • ASCD brake switch • ABS actuator and electric unit (control unit)

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
STOP LAMP SW2

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-159, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001115835

1.CHECK CONNECTOR

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

Is any item indicated on the self-diagnosis display?

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

2.CHECK ASCD BRAKE SWITCH

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

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

Is the inspection result normal?

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

3.CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

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

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

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

Is the inspection result normal?

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

4.CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT

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

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

Is the inspection result normal?

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

Component Inspection

INFOID:0000000001115836

1.CHECK ASCD BRAKE SWITCH

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

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

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace ASCD brake switch.

U1000 CAN COMM CIRCUIT

Description

INFOID:0000000001115622

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:0000000001115623

DTC DETECTION LOGIC

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

Diagnosis Procedure

INFOID:0000000001115624

1.CHECK CONNECTOR

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

Self-diagnosis results
CAN COMM CIRCUIT

Is above displayed on the self-diagnosis display?

YES >> Go to LAN-21, "CAN System Specification Chart".
NO >> INSPECTION END

U1010 CONTROL UNIT (CAN)

Description

INFOID:0000000001115842

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:0000000001115843

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.RECHECK DTC

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

Is DTC “U1010” detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-162, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000001115844

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-201, "Exploded View".
NO >> Repair or replace the harnesses and connectors.

PARKING BRAKE SWITCH

Description

INFOID:0000000001116936

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:0000000001116937

1.CHECK PARKING BRAKE SWITCH OPERATION

Operate the parking brake pedal. Then check that the brake warning lamp in the combination meter turns on/off correctly.

Condition	Brake warning lamp illumination status
When the parking brake switch is operation	ON
When the parking brake switch is not operation.	OFF

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-163, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001116938

1.CHECK PARKING BRAKE SWITCH

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

Parking brake switch		—	Condition	Continuity
Connector	Terminal			
M103	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-24, "Diagnosis Description".

Is the inspection result normal?

YES >> INSPECTION END
NO >> Check ABS actuator and electric unit (control unit). Refer to BRC-104, "CONSULT-III Function (ABS)".

Component Inspection

INFOID:0000000001116939

1.CHECK PARKING BRAKE SWITCH

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

Parking brake switch		—	Condition	Continuity
Connector	Terminal			
M103	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.

ESP OFF SWITCH

Description

INFOID:0000000001116940

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

Component Function Check

INFOID:0000000001116941

1.CHECK ESP OFF SWITCH OPERATION

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

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

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-165, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001116942

1.CHECK ESP OFF SWITCH

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

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

Is the inspection result normal?

YES >> GO TO 2.
NO >> ESP OFF switch is malfunctioning. Replace ESP OFF switch.

2.CHECK ESP OFF SWITCH HARNESS

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

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

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

ESP 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-24, "Diagnosis Description".

Is the inspection result normal?

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

Component Inspection

INFOID:0000000001116943

1.CHECK ESP OFF SWITCH

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

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

Is the inspection result normal?

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

HDC SWITCH

Description

INFOID:0000000001116974

HDC switch can activate the HDC function by pressing the HDC switch.

Component Function Check

INFOID:0000000001116975

1.CHECK HDC SWITCH OPERATION

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

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

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-167, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001116976

1.CHECK HDC SWITCH

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

HDC switch	Condition	Continuity
Terminal		
1 – 2	HDC switch: ON	Existed
	HDC switch: OFF	Not existed

Is the inspection result normal?

YES >> GO TO 2.
NO >> HDC switch is malfunctioning. Replace HDC switch.

2.CHECK HDC SWITCH HARNESS

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

ABS actuator and electric unit (control unit)		HDC switch		Continuity
Connector	Terminal	Connector	Terminal	
E36	18	M39	1	Existed

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E36	18	Ground	Not existed

HDC switch		—	Continuity
Connector	Terminal		
M39	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-24, "Diagnosis Description".

Is the inspection result normal?

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

Component Inspection

INFOID:0000000001116977

1.CHECK HDC SWITCH

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

HDC switch	Condition	Continuity
Terminal		
1 – 2	HDC switch: ON	Existed
	HDC switch: OFF	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace HDC switch.

ABS WARNING LAMP

Description

INFOID:0000000001116944

×: ON –: OFF

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

Component Function Check

INFOID:0000000001116945

1.CHECK ABS WARNING LAMP OPERATION

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

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-169, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001116946

1.CHECK SELF-DIAGNOSIS

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

Is the inspection result normal?

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

2.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-24, "Diagnosis Description".

Is the inspection result normal?

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

BRAKE WARNING LAMP

Description

INFOID:0000000001116947

×: ON –: OFF

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

NOTE:

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

Component Function Check

INFOID:0000000001116948

1.BRAKE WARNING LAMP OPERATION CHECK 1

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

Is the inspection result normal?

YES >> GO TO 2.
NO >> Go to diagnosis procedure. Refer to BRC-170, "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-163, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001116949

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-163, "Diagnosis Procedure".

2.CHECK SELF-DIAGNOSIS

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

Is the inspection result normal?

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

3.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-24, "Diagnosis Description".

Is the inspection result normal?

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

ESP OFF INDICATOR LAMP

Description

INFOID:0000000001116950

×: ON –: OFF

Condition	ESP OFF indicator lamp
Ignition switch OFF	–
For 1 second after turning ON ignition switch	×
1 second later after turning ON ignition switch	–
ESP OFF switch turned ON. (ESP function is OFF.)	×
ESP/TCS function is malfunctioning.	×
ABS function is malfunctioning.	×
EBD function is malfunctioning.	×
HDC function is malfunctioning.	×

Component Function Check

INFOID:0000000001116951

1.ESP OFF INDICATOR LAMP OPERATION CHECK 1

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

Is the inspection result normal?

YES >> GO TO 2.
NO >> Go to diagnosis procedure. Refer to BRC-171, "Diagnosis Procedure".

2.ESP OFF INDICATOR LAMP OPERATION CHECK 2

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

Is the inspection result normal?

YES >> INSPECTION END
NO >> Check ESP OFF switch. Refer to BRC-165, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001116952

1.CHECK ESP OFF SWITCH

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

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check ESP OFF switch. Refer to BRC-165, "Diagnosis Procedure".

2.CHECK SELF-DIAGNOSIS

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

Is the inspection result normal?

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

3.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-24, "Diagnosis Description".

Is the inspection result normal?

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

SLIP INDICATOR LAMP

Description

INFOID:0000000001116953

×: ON –: OFF

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

Component Function Check

INFOID:0000000001116954

1.CHECK SLIP INDICATOR LAMP OPERATION

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

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-172, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001116955

1.CHECK SELF-DIAGNOSIS

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

Is the inspection result normal?

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

2.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-24, "Diagnosis Description".

Is the inspection result normal?

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

HDC INDICATOR LAMP

Description

INFOID:0000000001116845

×: ON –: OFF

Condition	HDC indicator lamp
Ignition switch OFF	–
For 1 second after turning ON ignition switch	×
1 second later after turning ON ignition switch	–
VDC/TCS function is malfunctioning.	×
HDC function is malfunctioning.	–
HDC switch is pressed (HDC function ON)	× (Note)

NOTE:

- When all HDC control conditions are satisfied: ON
- When HDC control conditions are not satisfied: BLINK

Component Function Check

INFOID:0000000001116846

1.CHECK HDC INDICATOR LAMP OPERATION

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

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to BRC-173, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001116847

1.CHECK SELF-DIAGNOSIS

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

Is the inspection result normal?

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

2.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-24, "Diagnosis Description".

Is the inspection result normal?

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

ECU DIAGNOSIS

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Reference Value

INFOID:0000000001115646

VALUES ON THE DIAGNOSIS TOOL

CAUTION:

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

Monitor item	Display content	Data monitor	
		Condition	Reference value in normal operation
FR LH SENSOR	Wheel speed	Vehicle stopped	0 [km/h (MPH)]
		Vehicle running (Note 1)	Nearly matches the speed meter display (± 10% or less)
FR RH SENSOR	Wheel speed	Vehicle stopped	0 [km/h (MPH)]
		Vehicle running (Note 1)	Nearly matches the speed meter display (± 10% or less)
RR LH SENSOR	Wheel speed	Vehicle stopped	0 [km/h (MPH)]
		Vehicle running (Note 1)	Nearly matches the speed meter display (± 10% or less)
RR RH SENSOR	Wheel speed	Vehicle stopped	0 [km/h (MPH)]
		Vehicle running (Note 1)	Nearly matches the speed meter display (± 10% or less)
STOP LAMP SW	Stop lamp switch signal status	When brake pedal is depressed	On
		When brake pedal is not depressed	Off
BATTERY VOLT	Battery voltage supplied to the ABS actuator and electric unit (control unit)	Ignition switch ON	10 – 16 V
GEAR	Gear position determined by TCM	1st gear 2nd gear 3rd gear 4th gear 5th gear 6th gear	1 2 3 4 5 6
OFF SW	ESP OFF switch ON/OFF	ESP OFF switch ON (When ESP OFF indicator lamp is ON)	On
		ESP OFF switch OFF (When ESP OFF indicator lamp is OFF)	Off
YAW RATE SEN	Yaw rate detected by yaw rate sensor	Vehicle stop	Approx. 0 d/s
		Vehicle turning	–100 to 100 d/s
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 %
SIDE G-SENSOR	Transverse G detected by side G sensor	Vehicle stopped	Approx. 0 m/s^2
		Vehicle turning right	Negative value
		Vehicle turning left	Positive value

Monitor item	Display content	Data monitor	
		Condition	Reference value in normal operation
STR ANGLE SIG	Steering angle detected by steering angle sensor	During straight	Approx. 0°
		Steering wheel turned	–720 to 720°
PRESS SENSOR	Brake fluid pressure detected by pressure sensor	With ignition switch turned ON and brake pedal released	Approx. 0 bar
		With ignition switch turned ON and brake pedal depressed	0 to 200 bar
ENGINE RPM	With engine running	With engine stopped	0 rpm
		Engine running	Almost in accordance with tachometer display
FLUID LEV SW	Brake fluid level switch signal status	When brake fluid level switch ON	On
		When brake fluid level switch OFF	Off
FR RH IN SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
FR RH OUT SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
FR LH IN SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
FR LH OUT SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
RR RH IN SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
RR RH OUT SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	On
		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
RR LH IN SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
RR LH OUT SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
MOTOR RELAY	Motor and motor relay operation	When the motor relay and motor are operating	On
		When the motor relay and motor are not operating	Off
ACTUATOR RLY	Actuator relay operation	When the actuator relay is operating	On
		When the actuator relay is not operating	Off
ABS WARN LAMP	ABS warning lamp (Note 2)	When ABS warning lamp is ON	On
		When ABS warning lamp is OFF	Off
OFF LAMP	ESP OFF indicator lamp (Note 2)	When ESP OFF indicator lamp is ON	On
		When ESP OFF indicator lamp is OFF	Off
SLIP LAMP	SLIP indicator lamp (Note 2)	When SLIP indicator lamp is ON	On
		When SLIP indicator lamp is OFF	Off
DECEL G-SEN	Decel G detected by decel G sensor	Vehicle stopped	–0.11 – +0.11 G
		During acceleration	Negative value
		During deceleration	Positive value
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	ESP operation	ESP is active	On
		ESP is inactive	Off
HSA SIGNAL	HSA operation	HSA is active	On
		HSA is inactive	Off
HDC SIGNAL	HDC operation	HDC is active	On
		HDC 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

Monitor item	Display content	Data monitor	
		Condition	Reference value in normal operation
VDC FAIL SIG	ESP fail-safe signal	In ESP fail-safe	On
		ESP is normal	Off
CRANKING SIG	Crank operation	Crank is active	On
		Crank is inactive	Off
1ST GEAR SIG	1st gear operation	With 1st gear	On
		Without 1st gear	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 MONI	Axle condition	AUTO is active	AUTO
		LOCK is active	LOCK
		2WD is active	2WD
CV1	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
CV2	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
SV1	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
SV2	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	On
		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
STOP ON RLY	Stop lamp on relay operation	Stop lamp on relay is active	On
		Stop lamp on relay is inactive	Off
HDC SW	HDC switch ON/OFF status	HDC switch ON (HDC indicator lamp is ON)	On
		HDC switch OFF (HDC indicator lamp is OFF)	Off

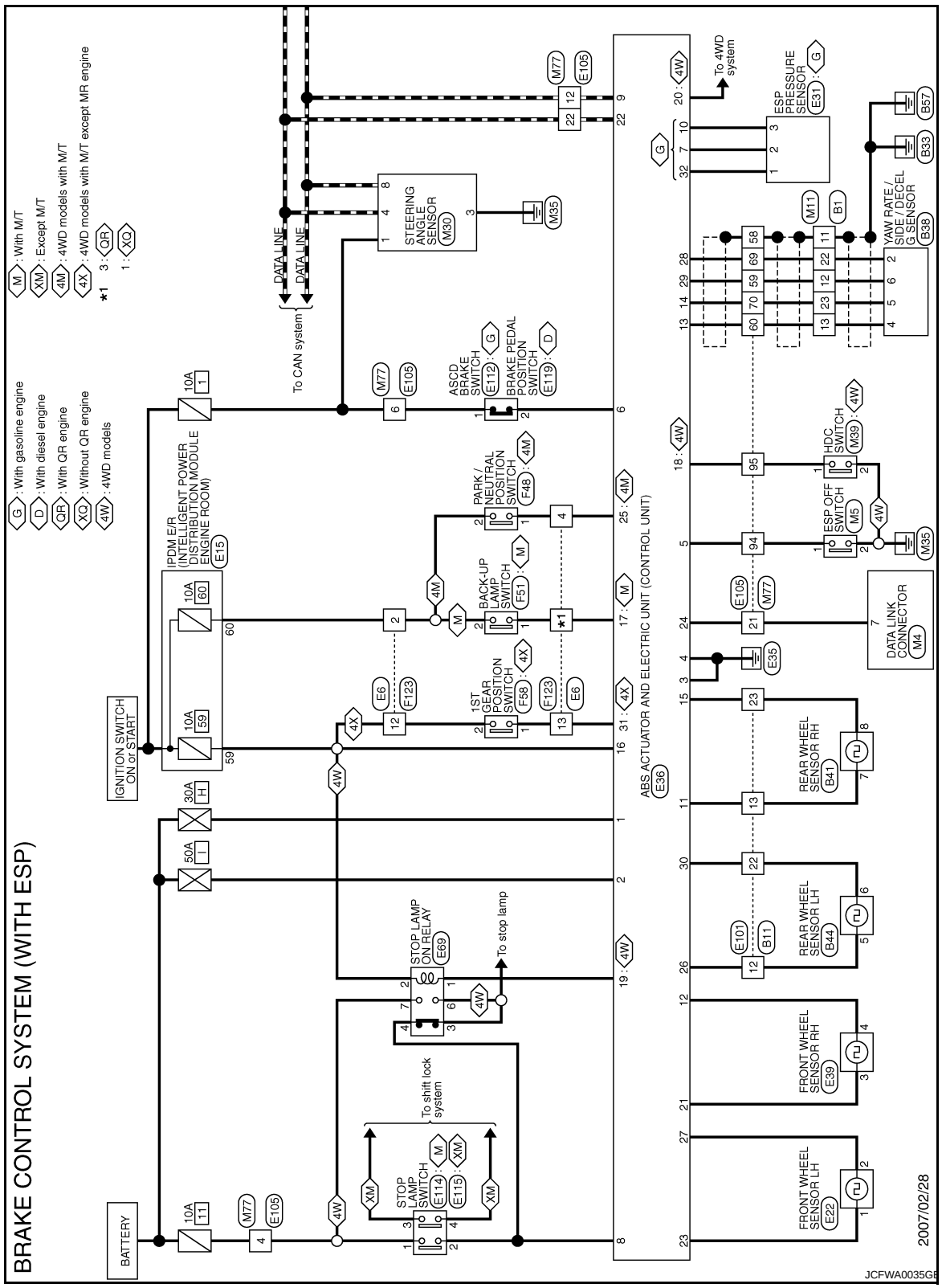
Monitor item	Display content	Data monitor	
		Condition	Reference value in normal operation
EBD WARN LAMP	Brake warning lamp (Note 2), (Note 3)	When brake warning lamp is ON	On
		When brake warning lamp is OFF	Off

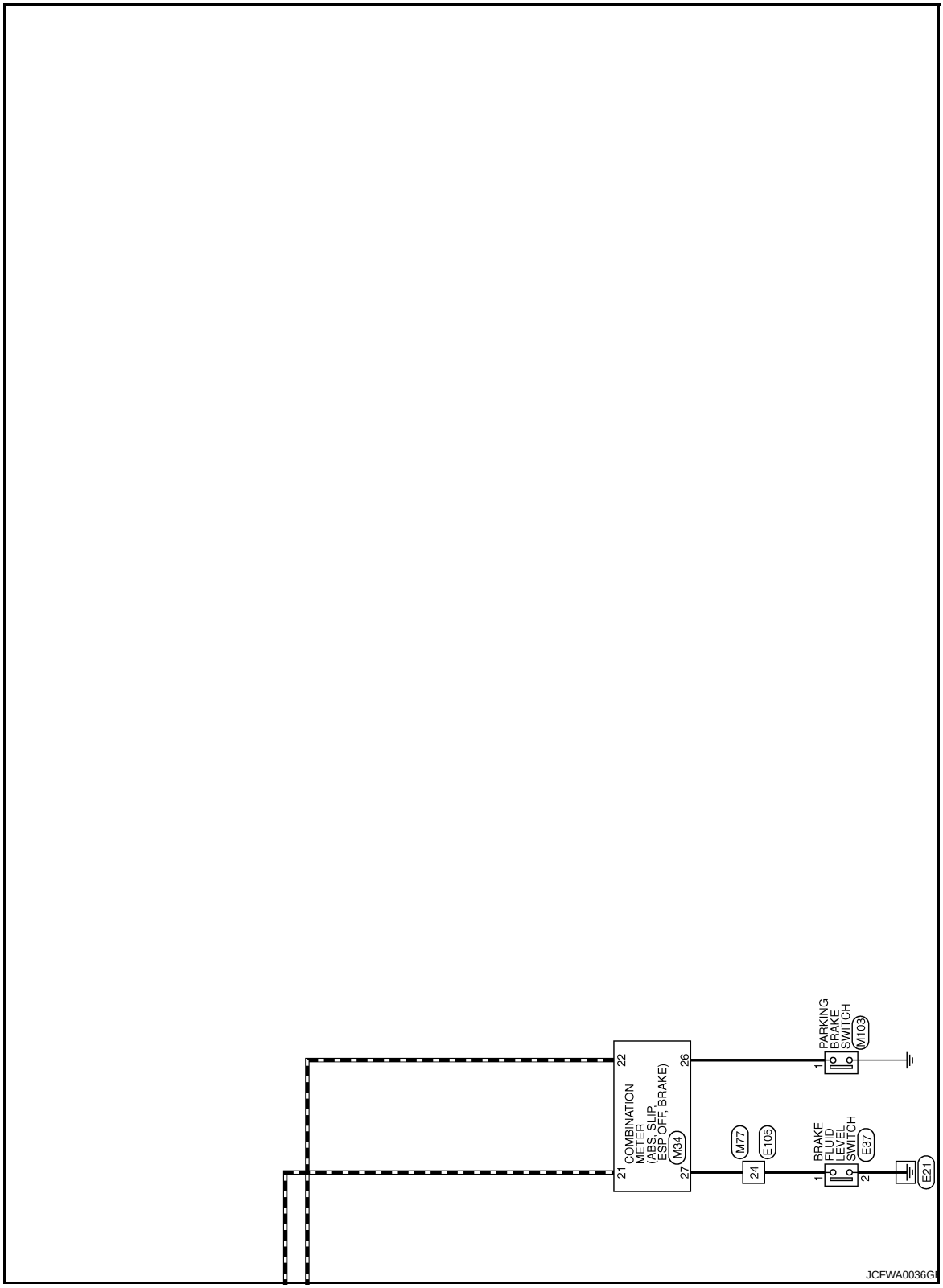
NOTE:

- 1: Confirm tire pressure is normal.
- 2: On and off timing for warning lamp and indicator lamp.
- ABS warning lamp: Refer to BRC-169, "Description".
- Brake warning lamp: Refer to BRC-170, "Description".
- ESP OFF indicator lamp: Refer to BRC-171, "Description".
- SLIP indicator lamp: Refer to BRC-172, "Description".
- HDC indicator lamp: Refer to BRC-173, "Description".
- 3: Serves as EBD warning lamp.

Wiring Diagram -BRAKE CONTROL SYSTEM-

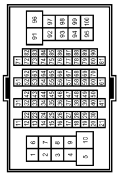
INFOID:0000000001115647




PARKING BRAKE SWITCH
M103
1
22
26
COMBINATION METER (ABS, SLIP, ESP OFF, BRAKE)
M34
21
27
M77
E105
24
BRAKE FLUID LEVEL SWITCH
E37
1
2
E21
JCFWA0036GB

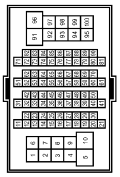
BRAKE CONTROL SYSTEM (WITH ESP)

Connector No.	B1
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-CS16-TM4



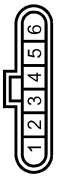
Terminal No.	Color of Wire	Signal Name [Specification]
11	SHIELD	–
12	R	–
13	B	–
22	Y	–
23	L	–

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



Terminal No.	Color of Wire	Signal Name [Specification]
12	BR	–
13	O	–
22	G	–
23	SB	–

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



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

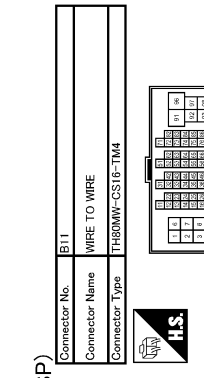
Connector No.	B41
Connector Name	REAR WHEEL SENSOR RH
Connector Type	RK02FGY

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

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

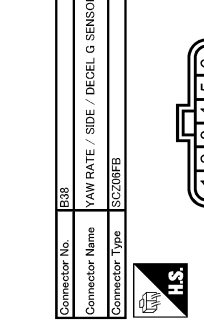
Terminal No.	Color of Wire	Signal Name [Specification]
5	BR	–
6	G	–

Connector No.	E6
Connector Name	WIRE TO WIRE
Connector Type	TK24MW-1Y



Terminal No.	Color of Wire	Signal Name [Specification]
1	G	–[Without QR engine]
2	SB	–
3	G	–[With QR engine]
4	L	–[4WD models with M/T]
12	GR	–[4WD models with M/T except MR engine]
13	BR	–[4WD models with M/T except MR engine]

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



Terminal No.	Color of Wire	Signal Name [Specification]
59	GR	–
60	SB	–

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

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

JCFWA0037GB

BRAKE CONTROL SYSTEM (WITH ESP)

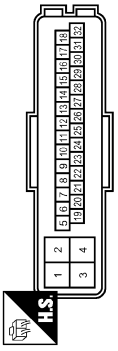
Connector No.	E31
Connector Name	ESP PRESSURE SENSOR
Connector Type	AAZ03FB2

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	P	GND
2	V	OUTPUT
3	Y	POWER(+)

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

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	MOTOR
2	BR	ACTR
3	B	GND A
4	B	GND M
5	BR	VDC OFF SW
6	GR	ASCD CANCEL SW
7	V	PRESS SEN SIG
8	SB	STOP LAMP SW
9	P	CAN L
10	Y	PRESS SEM VCC
11	O	RR SENSOR VB
12	LG	FR SENSOR SIG
13	R	VCC
14	L	SERIAL+
15	SB	RR SENSOR SIG
16	GR	IGN
17	LG	REVERSE SW
18	V	HDC SW
19	L	STOP LAMP SW ON
20	Y	4WD COMM
21	G	FR SENSOR VB
22	L	CAN H
23	W	FL SENSOR VB
24	GR	DIAG K
25	L	N RANGE SW
26	BR	RL SENSOR VB
27	P	FL SENSOR SIG
28	Y	GND Y
29	B	SERIAL-
30	G	RL SENSOR SIG
31	BR	1ST GEAR SW
32	P	PRESS SEN GND

Connector No.	E37
Connector Name	BRAKE FLUID LEVEL SWITCH
Connector Type	YY02FGY

H.S.

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

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

H.S.

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

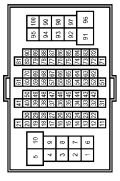
Connector No.	E69
Connector Name	STOP LAMP ON RELAY
Connector Type	M06FGY-R-US

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	–
2	GR	–
3	R	–
4	P	–
6	LG	–
7	BR	–

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

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
12	BR	–
13	O	–
22	G	–
23	SB	–

JCFWA0038GB

BRAKE CONTROL SYSTEM (WITH ESP)

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

Terminal No.	Color of Wire	Signal Name [Specification]
4	V	–
6	W	–
12	P	–
21	Y	–
22	L	–
24	LG	–
58	SHIELD	–
59	B	–
60	R	–
69	Y	–
70	L	–

94	BR	–
95	V	–

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

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	–
2	GR	–[With ESP]

Connector No.	E114
Connector Name	STOP LAMP SWITCH
Connector Type	M02FB-LC

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

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

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	–
2	P	–
3	O	–
4	LG	–

Connector No.	E119
Connector Name	BRAKE PEDAL POSITION SWITCH
Connector Type	M02FBR-LC

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

Connector No.	F48
Connector Name	PARK / NEUTRAL POSITION SWITCH
Connector Type	RK02FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	–[With gasoline engine]
1	Y	–[With diesel engine]
2	SB	–

Connector No.	F51
Connector Name	BACK-UP LAMP SWITCH
Connector Type	RK02FB

Terminal No.	Color of Wire	Signal Name [Specification]
1	G	–
2	SB	–

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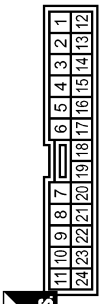
BRAKE CONTROL SYSTEM (WITH ESP)

Connector No.	F58
Connector Name	1ST GEAR POSITION SWITCH
Connector Type	RK02FB

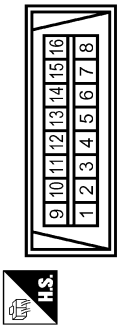
Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	–
2	GR	–

Connector No.	F123
Connector Name	WIRE TO WIRE
Connector Type	TK24FW-1V



Terminal No.	Color of Wire	Signal Name [Specification]
1	G	–[Without QR engine]
2	SB	–
3	G	–[With QR engine]
4	L	–
12	GR	–[4WD models with M/T except MR engine]
13	BR	–[4WD models with M/T except MR engine]

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



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

Connector No.	M5
Connector Name	ESP OFF SWITCH
Connector Type	TK06FGY

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

Connector No.	M11
Connector Name	WIRE TO WIRE
Connector Type	TH80FW-CS16-TM4

Terminal No.	Color of Wire	Signal Name [Specification]
11	SHIELD	–
12	R	–
13	B	–
22	Y	–
23	L	–

Connector No.	M30
Connector Name	STEERING ANGLE SENSOR
Connector Type	TH08FW-NH

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	IGN
3	B	GND
4	L	CAN H
8	P	CAN L

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW

Terminal No.	Color of Wire	Signal Name [Specification]
21	L	CAN–H
22	P	CAN–L
26	GR	PARKING BRAKE SW
27	LG	BRAKE FLUID LEVEL SW

Connector No.	M39
Connector Name	HDC SWITCH
Connector Type	TK08FW

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	FLASHER B
2	B	+IGN

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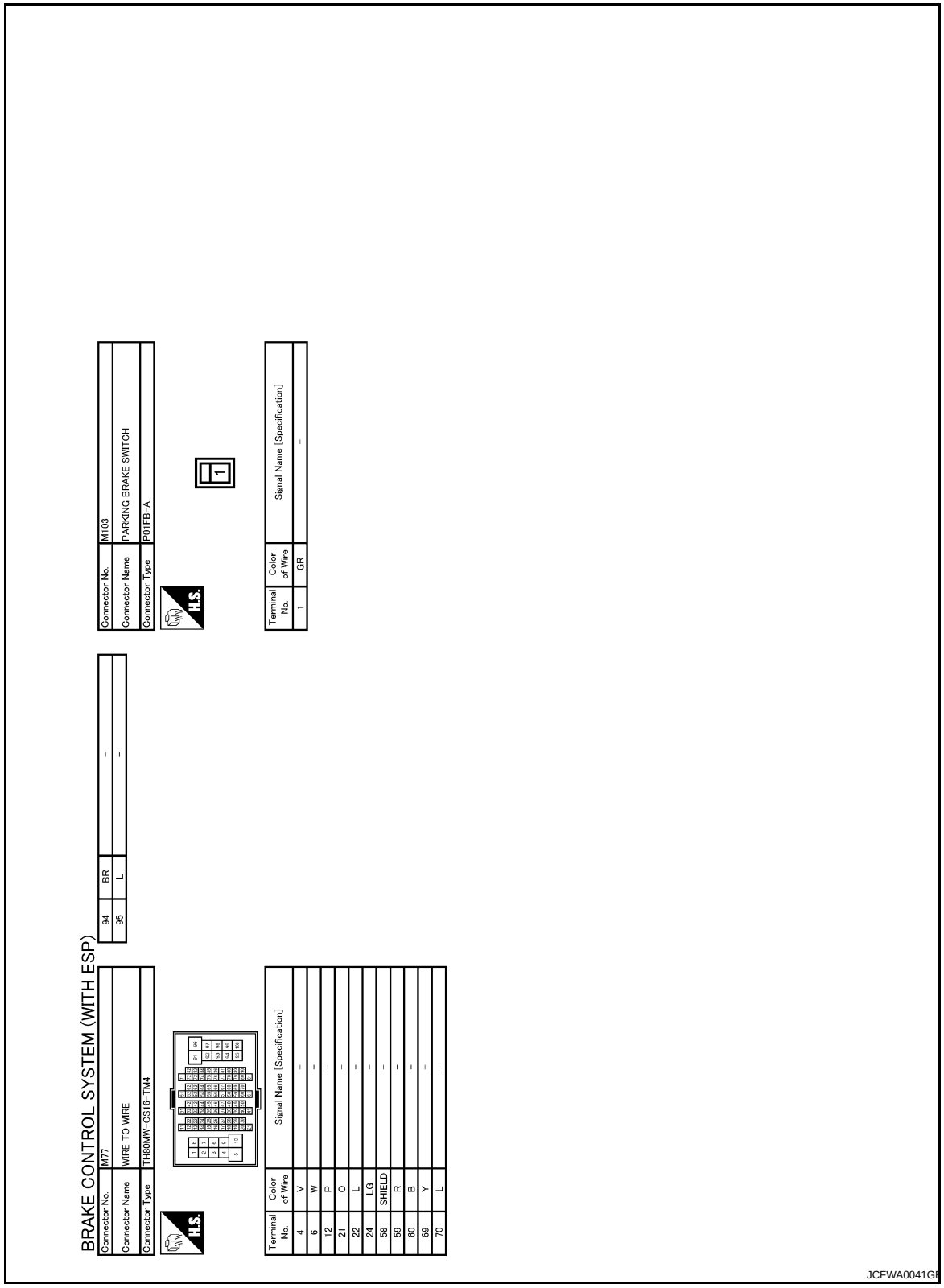


Fail-Safe

INFOID:0000000001115648

ABS, EBD SYSTEM

In case of electrical malfunctions with the ABS, ABS warning lamp, ESP OFF indicator lamp, SLIP indicator lamp will turn on. In case of electrical malfunctions with the EBD, brake warning lamp, ABS warning lamp, ESP OFF indicator lamp and SLIP indicator lamp will turn on. Simultaneously, the ESP/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.

ESP/TCS

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

CAUTION:

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

HDC/HSA

- In case of HDC system malfunction, the HDC indicator lamp will remain off even though the HDC switch is operated and the condition of the vehicle is the same as the condition of vehicles without HDC system.
- In case of HSA system malfunction, the VDC OFF and SLIP indicator lamps are turned ON and the condition of the vehicle is the same as the condition of vehicles without HSA system.

DTC No. Index

INFOID:0000000001115649

DTC	Items (CONSULT screen terms)	Reference
C1101	RR RH SENSOR-1	BRC-109, "Description"
C1102	RR LH SENSOR-1	
C1103	FR RH SENSOR-1	
C1104	FR LH SENSOR-1	
C1105	RR RH SENSOR-2	BRC-112, "Description"
C1106	RR LH SENSOR-2	
C1107	FR RH SENSOR-2	
C1108	FR LH SENSOR-2	
C1109	BATTERY VOLTAGE [ABNORMAL]	BRC-115, "Description"
C1110	CONTROLLER FAILURE	BRC-117, "Description"
C1111	PUMP MOTOR	BRC-118, "Description"
C1113	G SENSOR	BRC-120, "Description"
C1115	ABS SENSOR [ABNORMAL SIGNAL]	BRC-123, "Description"
C1116	STOP LAMP SW	BRC-126, "Description"
C1118	4WD SYSTEM	BRC-128, "Description"
C1120	FR LH IN ABS SOL	BRC-129, "Description"
C1121	FR LH OUT ABS SOL	BRC-132, "Description"
C1122	FR RH IN ABS SOL	BRC-129, "Description"
C1123	FR RH OUT ABS SOL	BRC-132, "Description"
C1124	RR LH IN ABS SOL	BRC-129, "Description"
C1125	RR LH OUT ABS SOL	BRC-132, "Description"
C1126	RR RH IN ABS SOL	BRC-129, "Description"
C1127	RR RH OUT ABS SOL	BRC-132, "Description"
C1130	ENGINE SIGNAL 1	BRC-135, "Description"
C1140	ACTUATOR RLY	BRC-136, "Description"
C1142	PRESS SEN CIRCUIT	BRC-138, "Description"
C1143	ST ANG SEN CIRCUIT	BRC-141, "Description"
C1144	ST ANG SEN SIGNAL	

DTC	Items (CONSULT screen terms)	Reference
C1145	YAW RATE SENSOR	BRC-143, "Description"
C1146	SIDE G-SEN CIRCUIT	BRC-146, "Description"
C1154	PNP POSI SIG	BRC-149, "Description"
C1155	BR FLUID LEVEL LOW	BRC-152, "Description"
C1164	CV 1	BRC-155, "Description"
C1165	CV 2	
C1166	SV 1	BRC-157, "Description"
C1167	SV 2	
C1176	STOP LAMP SW2	BRC-159, "Description"
U1000	CAN COMM CIRCUIT	BRC-161, "Description"
U1010	CONTROL UNIT(CAN)	BRC-162, "Description"

SYMPTOM DIAGNOSIS

EXCESSIVE ABS FUNCTION OPERATION FREQUENCY

Diagnosis Procedure

INFOID:0000000001115651

1.CHECK START

Check front and rear brake force distribution using a brake tester.
- LHD models: Refer to BR-52, "General Specifications".
- RHD models: Refer to BR-99, "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".
  - 4WD models: Refer to FAX-40, "Inspection".
- Rear
  - 2WD models: Refer to RAX-3, "Inspection".
  - 4WD models: Refer to RAX-9, "Inspection".

Is the inspection result normal?

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

3.CHECK WHEEL SENSOR AND SENSOR ROTOR

Check the following.
- Wheel sensor installation for damage.
- Sensor rotor installation for damage.
- Wheel sensor connector connection.
- Wheel sensor harness inspection.

Is the inspection result normal?

YES >> GO TO 4.
NO >>
- Replace wheel sensor or sensor rotor.
- Repair harness.

4.CHECK ABS WARNING LAMP DISPLAY

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

Is the ABS warning lamp illuminated?

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

UNEXPECTED PEDAL REACTION

Diagnosis Procedure

INFOID:0000000001505832

1.CHECK BRAKE PEDAL STROKE

Check brake pedal stroke.
- LHD models: Refer to BR-8, "Inspection and Adjustment".
- RHD models: Refer to BR-58, "Inspection and Adjustment".

Is the stroke too large?

YES >>
- Bleed air from brake tube and hose.
  - LHD models: Refer to BR-12, "Bleeding Brake System".
  - RHD models: Refer to BR-62, "Bleeding Brake System".
- Check brake pedal, brake booster, and master cylinder for mount play, looseness, brake system fluid leakage, etc.
  - Brake pedal
    - LHD models: Refer to BR-8, "Inspection and Adjustment".
    - RHD models: Refer to BR-58, "Inspection and Adjustment".
  - Master cylinder
    - LHD models: Refer to BR-13, "Inspection".
    - RHD models Refer to BR-63, "Inspection".
  - Brake booster
    - LHD models: Refer to BR-14, "Inspection".
    - RHD models: Refer to BR-64, "Inspection".

NO >> GO TO 2.

2.CHECK FUNCTION

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

Is the inspection result normal?

YES >> Normal
NO >> Check brake system.

THE BRAKING DISTANCE IS LONG

Diagnosis Procedure

INFOID:0000000001115653

CAUTION:

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

1.CHECK FUNCTION

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

Is the inspection result normal?

YES >> Normal
NO >> Check brake system.

ABS FUNCTION DOES NOT OPERATE

Diagnosis Procedure

INFOID:0000000001115654

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

1. CHECK ABS WARNING LAMP DISPLAY

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

Is the inspection result normal?

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

PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

Diagnosis Procedure

INFOID:0000000001115655

CAUTION:

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

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

1.SYMPTOM CHECK 1

Check that there are pedal vibrations when the engine is started.

Do vibrations occur?

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

2.SYMPTOM CHECK 2

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

Do the operation noises occur?

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

3.SYMPTOM CHECK 3

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

Do symptoms occur?

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

VEHICLE JERKS DURING ESP/TCS/ABS CONTROL

Diagnosis Procedure

INFOID:0000000001115656

1.SYMPTOM CHECK

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

Is the inspection result normal?

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

2.CHECK SELF-DIAGNOSIS RESULTS

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

Are self-diagnosis results indicated?

YES >> Check corresponding items, make repairs, and perform ABS actuator and electric unit (control unit) self-diagnosis.
NO >> GO TO 3.

3.CHECK CONNECTOR

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

Are self-diagnosis results indicated?

YES >> If poor contact, damage, open or short circuit of connector terminal is found, repair or replace.
NO >> GO TO 4.

4.CHECK ECM AND TCM SELF-DIAGNOSIS RESULTS

Perform ECM and TCM self-diagnosis.

Are self-diagnosis results indicated?

YES >> Check the corresponding items.
- ECM
  - MR20DE: Refer to ECM-87, "CONSULT-III Function".
  - QR25DE: Refer to ECO-89, "CONSULT-III Function".
  - M9R: Refer to ECR-97, "Diagnosis Description".
- TCM
  - AT: Refer to TM-218, "CONSULT-III Function (TRANSMISSION)".
  - CVT: Refer to TM-394, "CONSULT-III Function (TRANSMISSION)".

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

NORMAL OPERATING CONDITION

Description

INFOID:0000000001115657

Symptom	Result
Slight vibrations are felt on the brake pedal and the operation noises occur, when ESP, TCS or ABS is activated.	This is a normal condition due to the ESP, 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 ESP 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, ESP OFF indicator lamp and SLIP indicator lamp may turn ON when the vehicle is subject to strong shaking or large vibration, such as when the vehicle is rotating on a turntable or located on a ship while the engine is running.	In this case, restart the engine on a normal road. If the normal condition is restored, there is no malfunction. At that time, erase the self-diagnosis memory.
ESP may not operate normally or the ABS warning lamp, ESP OFF indicator lamp, and SLIP indicator lamp may illuminate, when running on a special road that is extremely slanted (e.g. bank in a circuit course).	
A malfunction may occur in the yaw rate/side G sensor system, when the vehicle turns sharply, such as during a spin turn, axle turn, or drift driving, while the ESP function is off (ESP OFF indicator lamp illuminated).	
The vehicle speed will not increase even though the accelerator pedal is depressed, when inspecting the speedometer on a 2-wheel chassis dynamometer.	Normal (Deactivate the ESP/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:0000000001505831

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the “SRS AIRBAG” and “SEAT BELT” of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the “SRS AIRBAG”.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

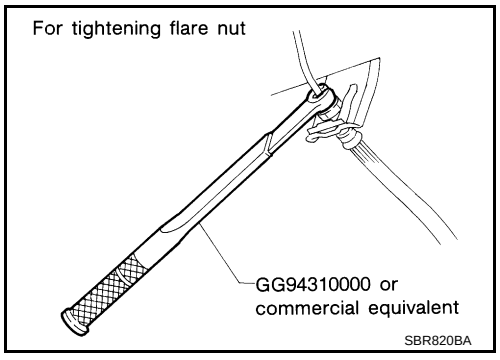
Precaution for Brake System

INFOID:0000000001115659

WARNING:

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

- Only use DOT 4 brake fluid. Refer to MA-22, "Fluids and Lubricants".
- Never to reuse drained brake fluid.
- Never to 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 to use mineral oils such as gasoline or light oil. 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 a flare nut torque wrench.
- Always conform the specified tightening torque when installing the brake pipes.
- Brake system is an important safety part. If a brake fluid leak is detected, always disassemble the affected part. If a malfunction is detected, replace part with a new one.
- Turn the ignition switch OFF and disconnect the ABS actuator and electric unit (control unit) connector or the battery negative terminal before performing the work.



Precaution for Brake Control

INFOID:0000000001115660

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

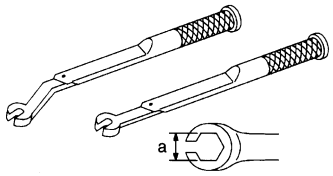
- When replacing the following parts with parts other than genuine parts or making modifications: Suspension-related parts (shock absorber, spring, bushing, etc.), tires, wheels (other than specified sizes), brake-related parts (pad, rotor, caliper, etc.), engine-related parts (muffler, ECM, etc.) and body reinforcement-related parts (roll bar, tower bar, etc.).
- When driving with worn or deteriorated suspension, tires and brake-related parts.

PREPARATION

PREPARATION

Special Service Tool

INFOID:0000000001117077

Tool number Tool name		Description
GG94310000 Flare nut torque wrench a: 10 mm (0.39 in)/ 12 mm (0.47 in)	 S-NT406	Installing each brake piping

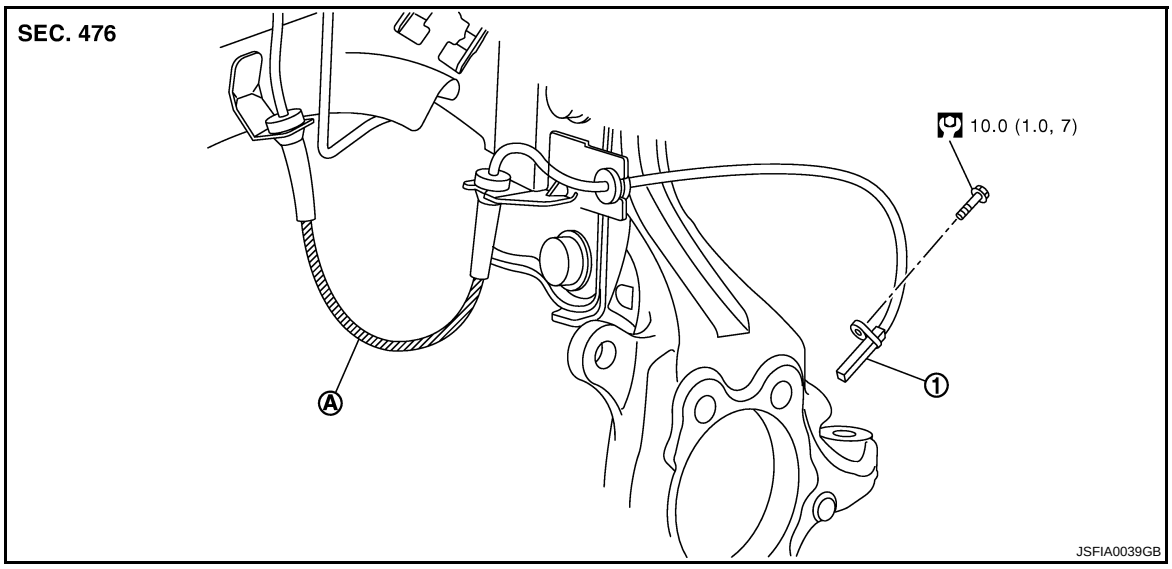
ON-VEHICLE REPAIR

WHEEL SENSOR

FRONT WHEEL SENSOR

FRONT WHEEL SENSOR : Exploded View

INFOID:0000000001117067



1. Front LH wheel sensor

A. White 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:0000000001117068

REMOVAL

Pay attention to the following when removing sensor.

CAUTION:

- **Do not twist sensor harness as much as possible, when removing it. Pull sensors out without pulling on 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 white lines (A) are not twisted.**

INSTALLATION

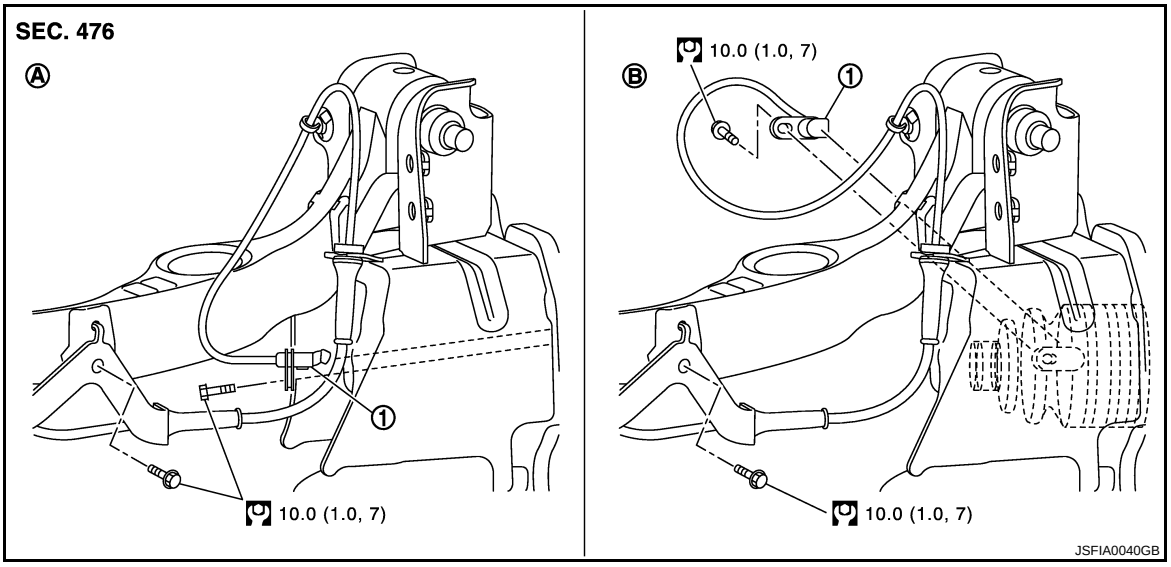
Pay attention to the following when installing wheel sensor. Tighten installation bolts to the specified torques. Refer to "COMPONENT".

- 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:0000000001117069



1. Rear LH wheel sensor

A. 2WD models B. 4WD 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:0000000001117070

REMOVAL

Pay attention to the following when removing sensor.

CAUTION:

- **Do not twist sensor harness as much as possible, when removing it. Pull sensors out without pulling on 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. Refer to "COMPONENT".

- 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:0000000001117071

Refer to FAX-9, "Exploded View" (2WD models), FAX-42, "Exploded View" (4WD models).

FRONT SENSOR ROTOR : Removal and Installation

INFOID:0000000001117072

REMOVAL

Sensor rotor cannot be disassembled. Remove the sensor rotor together with hub bearing assembly. Refer to FAX-9, "Removal and Installation" (2WD models), FAX-42, "Removal and Installation" (4WD models).

INSTALLATION

Sensor rotor cannot be disassembled. Installation the sensor rotor together with hub bearing assembly. Refer to FAX-9, "Removal and Installation" (2WD models), FAX-42, "Removal and Installation" (4WD models).

REAR SENSOR ROTOR

REAR SENSOR ROTOR : Exploded View

INFOID:0000000001117073

Refer to RAX-4, "Exploded View" (2WD models), RAX-13, "Exploded View" (4WD models).

REAR SENSOR ROTOR : Removal and Installation

INFOID:0000000001117074

2WD MODELS

Removal

Sensor rotor cannot be disassembled. Remove the sensor rotor together with hub bearing assembly. Refer to RAX-4, "Removal and Installation".

Installation

Sensor rotor cannot be disassembled. Installation the sensor rotor together with hub bearing assembly. Refer to RAX-4, "Removal and Installation".

4WD MODELS

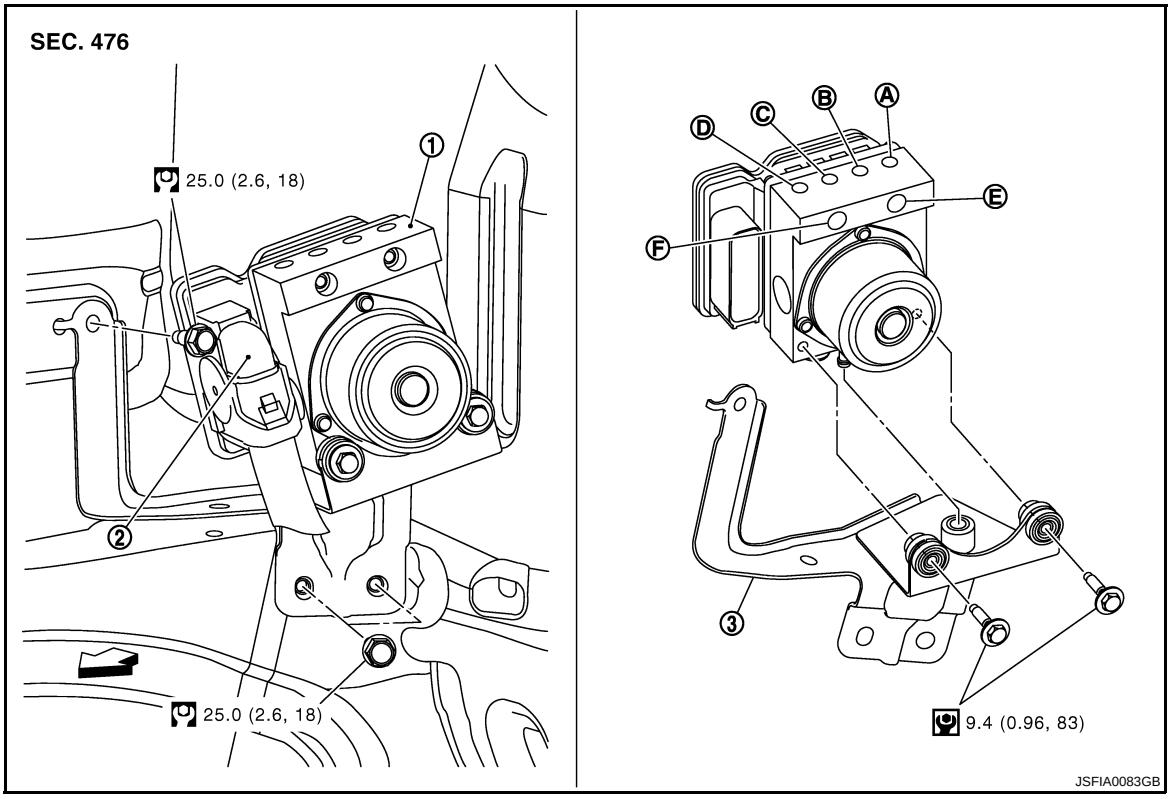
For removal and installation of sensor rotor, refer to RAX-14, "Disassembly and Assembly".

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Exploded View

INFOID:0000000001117075

LHD models



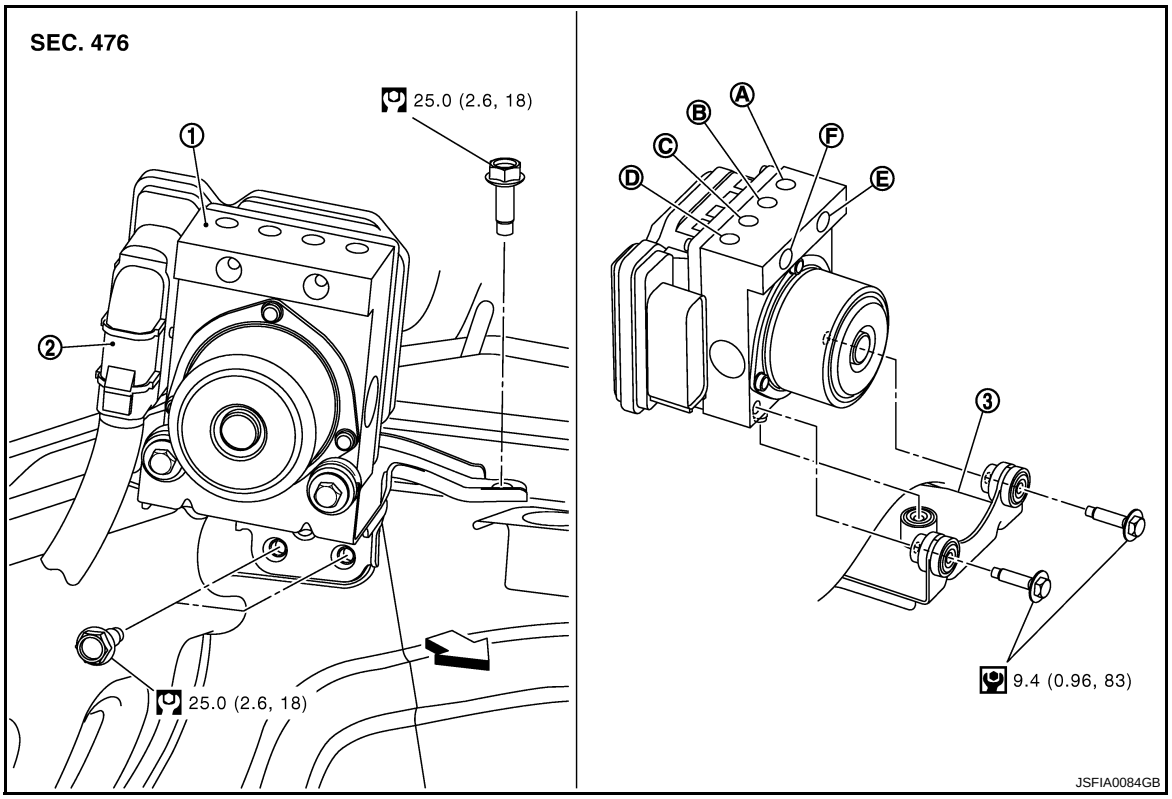
1. ABS actuator and electric unit (control unit)	2. Connector	3. Bracket

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.

RHD models



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:0000000001117076

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.**
- **Do not apply excessive impact to ABS actuator and electric unit (control unit), such as dropping it.**
- **Do not remove and install actuator by holding harness.**
- **After work is completed, bleed air from brake tube. Refer to BR-12, "Bleeding Brake System" (LHD models), BR-62, "Bleeding Brake System" (RHD models).**

1. Remove cowl top. Refer to EXT-19, "Exploded View".
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Loosen brake tube flare nuts, then remove brake tubes from ABS actuator and electric unit (control unit).
4. Remove tire (front LH side).
5. Remove fender protector (rear): (front LH side). Refer to EXT-21, "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.

CAUTION:

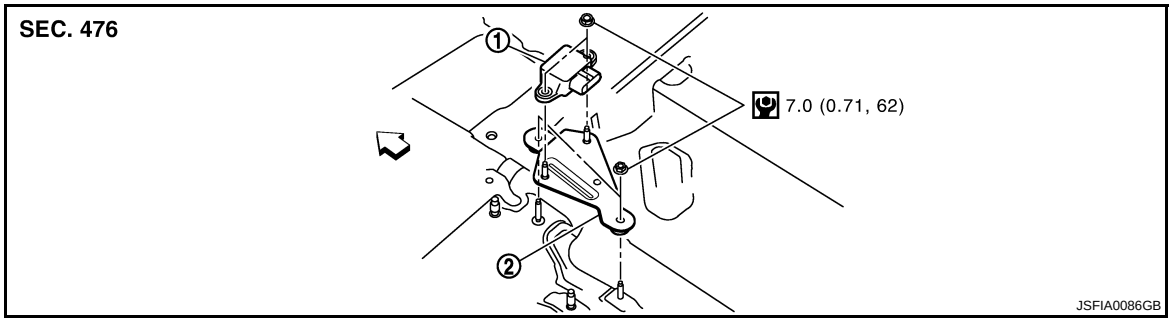
- **Before servicing, disconnect the battery cable from negative terminal.**

- **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.**
- **Do not apply excessive impact to ABS actuator and electric unit (control unit), such as dropping it.**
- **Do not remove and install actuator by holding harness.**
- **After work is completed, bleed air from brake tube. Refer to BR-12, "Bleeding Brake System" (LHD models), BR-62, "Bleeding Brake System" (RHD models).**
- **After installing harness connector in the ABS actuator and electric unit (control unit), make sure connector is securely locked.**

G SENSOR

Exploded View

INFOID:0000000001115672



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:0000000001115673

REMOVAL

CAUTION:

- **Do not drop or strike yaw rate/side/decel G sensor, because it has little endurance to impact.**
- **Do not use power tool etc., because yaw rate/side/decel G sensor is sensitive for the impact.**

1. Remove center console assembly. Refer to IP-21, "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.

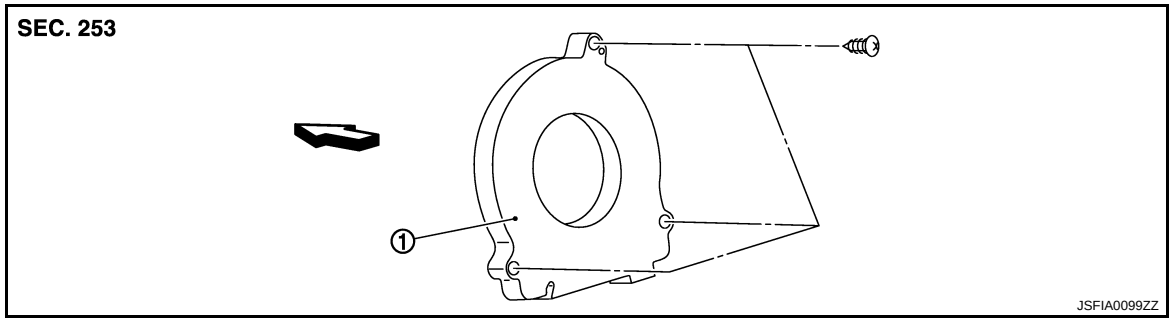
CAUTION:

- **Do not drop or strike yaw rate/side/decel G sensor, because it has little endurance to impact.**
- **Do not use power tool etc., because yaw rate/side/decel G sensor is sensitive for the impact.**

STEERING ANGLE SENSOR

Exploded View

INFOID:0000000001115674



1. Steering angle sensor

⇦: Vehicle front

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

Removal and Installation

INFOID:0000000001115675

REMOVAL

1. Remove spiral cable assembly. Refer to SR-7, "Exploded View".
2. Remove steering angle sensor from spiral cable assembly.

INSTALLATION

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

CAUTION:

After work, make sure to adjust neutral position of steering angle sensor. Refer to BRC-78, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".