SECTION BRC
BRAKE CONTROL SYSTEM

CONTENTS

WITH VDC

INTELLIGENT BRAKE ASSIST

PRECAUTION

PRECAUTIONS

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

INFOID:0000000008142267

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the “SRS AIR BAG” and “SEAT BELT” of this Service Manual.

WARNING:

Always observe the following items for preventing accidental activation.

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision that would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see “SRS AIR BAG”.**
- **Never use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

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

WARNING:

Always observe the following items for preventing accidental activation.

- **When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the ignition ON or engine running, never use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the ignition OFF, disconnect the 12V battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation after 12V Battery Disconnect

INFOID:0000000008142268

For vehicle with steering lock unit, if the 12V battery is disconnected or discharged, the steering wheel will lock and cannot be turned.
If turning the steering wheel is required with the 12V battery disconnected or discharged, follow the operation procedure below before starting the repair operation.

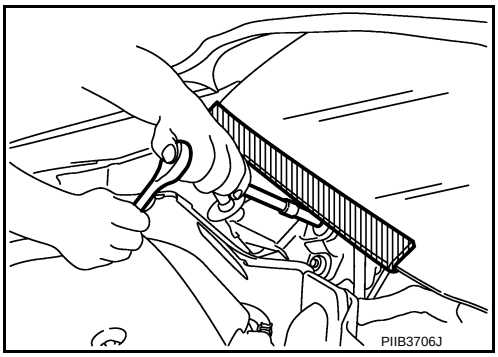
OPERATION PROCEDURE

1. Connect both 12V battery cables.
   NOTE:
   Supply power using jumper cables if 12V battery is discharged.
2. Turn the ignition switch to ACC position.
   (At this time, the steering lock will be released.)
3. Disconnect both 12V battery cables. The steering lock will remain released with both 12V battery cables disconnected and the steering wheel can be turned.
4. Perform the necessary repair operation.
5. When the repair work is completed, re-connect both 12V battery cables. With the brake pedal released, turn the ignition switch from ACC position to ON position, then to LOCK position. (The steering wheel will lock when the ignition switch is turned to LOCK position.)
6. Perform All DTC Reading using CONSULT and delete DTC.
   NOTE:
   Multiple DTCs are detected when 12V battery cable is disconnected while ignition switch is in ACC position.

Precaution for Procedure without Cowl Top Cover

INFOID:0000000008142269

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



Precautions Concerning On-board Servicing of Hybrid Systems

INFOID:0000000008142270

CAUTION:
Be sure to turn the ignition switch OFF before performing inspection and servicing inside the engine compartment or underneath the vehicle. If the ignition switch is ON (vehicle READY state), even if the engine is stopped, the conditions of the vehicle may cause the engine to start automatically.
If it is necessary to continually operate the engine during inspection or servicing, use the designated inspection mode. HBC-89, "Description".

Precaution for Removing 12V Battery

INFOID:0000000008142271

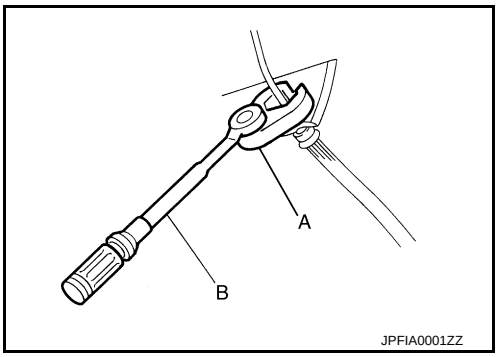
CAUTION:
When the 12V battery is removed, plural DTC may be detected.
After installing 12V battery, always perform "All DTC" with CONSULT and delete DTC.

Precaution for Brake System

INFOID:0000000008142272

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

- Brake fluid use refer to MA-10, "Fluids and Lubricants".
- Never reuse drained brake fluid.
- Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface.
- Always confirm the specified tightening torque when installing the brake pipes.
- After pressing the brake pedal more deeply or harder than normal driving, such as air bleeding, check each item of brake pedal. Adjust brake pedal if it is outside the standard value.
- Never use mineral oils such as gasoline or light oil to clean. They may damage rubber parts and cause improper operation.
- Always loosen the brake tube flare nut with a flare nut wrench.
- Tighten flare nut of brake tube to the specified torque using a crow-foot (A) and torque wrench (B).
- Turn the ignition switch OFF to exit CONSULT. Get out of the vehicle, close all doors (including trunk lid), and wait for 3 minutes or more without opening these doors. Disconnect the ABS actuator and electric unit (control unit) harness connector or the 12V battery negative terminal before performing the work. Refer to BRC-6, "Precaution for Removing 12V Battery".
- Check that no brake fluid leakage is present after replacing the parts.



Precaution for Brake Control System

INFOID:0000000008142273

- Slight vibrations are felt on the brake pedal and the operation noises occur, when VDC function, TCS function, ABS function, EBD function, brake limited slip differential (BLSD) function, brake assist function, Brake force distribution function, hill start assist function (function of electrically-driven intelligent brake), Rise-up &

Build-up function (function of electrically-driven intelligent brake) or Active Trace Control function (function of electrically-driven intelligent brake) operates. This is not a malfunction because it is caused by VDC function, TCS function, ABS function, EBD function, Brake force distribution function, hill start assist function (function of electrically-driven intelligent brake), Rise-up & Build-up function (function of electrically-driven intelligent brake) or Active Trace Control function (function of electrically-driven intelligent brake) that is normally operated.

- When vehicle to READY/starting engine or when starting vehicle just after vehicle to READY/starting engine, brake pedal may vibrate or motor operating noise may be heard from engine compartment. This is normal condition.
- Brake stopping distance may become longer than models without ABS function depending on the road conditions, when ABS function is operated on slippery road like rough road, gravel road or snowy road.
- When a malfunction is indicated, always collect information from the customer about conditions of occurrence, estimate cause, and perform operation. Check electrically-driven intelligent brake unit operation, brake fluid level, and brake fluid leakage, as well as electrical system.
- The optimum performance is achieved by control for VDC function, TCS function, ABS function, EBD function, brake limited slip differential (BLSD) function, brake assist function, Brake force distribution function, hill start assist function (function of electrically-driven intelligent brake), Rise-up & Build-up function (function of electrically-driven intelligent brake) and Active Trace Control function (function of electrically-driven intelligent brake), when all of brakes, suspensions and tires installed on the vehicle are the specified size and parts. Brake performance and controllability may be negatively affected when other parts than the specified are installed.
- Brake stopping distance may become longer and steering stability may be negatively affected, when tires in different size and combination or other parts than the specified are used.
- When a radio (including wiring), antenna and antenna lead line are located near ABS actuator and electric unit (control unit), a malfunction or improper operation may occur for the control of VDC function, TCS function, ABS function, EBD function, brake limited slip differential (BLSD) function, brake assist function, Brake force distribution function, hill start assist function (function of electrically-driven intelligent brake), Rise-up & Build-up function (function of electrically-driven intelligent brake) and Active Trace Control function (function of electrically-driven intelligent brake).
- When the following items are replaced by other parts than genuine parts or modified, ABS warning lamp, brake warning lamp and VDC warning lamp may turn ON, and the control may not operate normally for VDC function, TCS function, ABS function, EBD function, brake limited slip differential (BLSD) function, brake assist function, Brake force distribution function, hill start assist function (function of electrically-driven intelligent brake), Rise-up & Build-up function (function of electrically-driven intelligent brake) and Active Trace Control function (function of electrically-driven intelligent brake).
  - Suspension component parts (shock absorber, spring, bushing and others)
  - Tire and wheel (other than the specified size)
  - Brake component parts (brake pad, disc rotor, brake caliper and others)
  - Engine component parts (ECM, muffler and others)
  - Body reinforcement component parts (rollover bar, tower bar and others)
- When suspension, tire and brake related parts are excessively worn or deteriorated and the vehicle is driven, ABS warning lamp, brake warning lamp and VDC warning lamp may turn ON, and the control may not operate normally for VDC function, TCS function, ABS function, EBD function, brake limited slip differential (BLSD) function, brake assist function, Brake force distribution function, hill start assist function (function of electrically-driven intelligent brake), Rise-up & Build-up function (function of electrically-driven intelligent brake) and Active Trace Control function (function of electrically-driven intelligent brake).
- ABS warning lamp, brake warning lamp and VDC warning lamp may turn ON, when only front wheel or rear wheel is rotated using a free roller. This is not a malfunction, because it is caused by wheel speed difference between wheel that is rotated and wheel that is not rotated. In this case, perform self-diagnosis, check self-diagnosis results, and erase memory.

  CAUTION:
  - **Be sure to wait of 10 seconds after turning power switch OFF or ON.**
  - **Turn power switch from OFF → ON before self-diagnosis. Repeat two or more times.**
  - **Set the vehicle to READY/Start the engine.**
  - **Turn the power switch OFF → ON → OFF after erase self-diagnosis result.**
- When power supply voltage is not normal, ABS warning lamp, brake warning lamp and VDC warning lamp turn ON. ABS actuator and electric unit (control unit) stops control for VDC function, TCS function, ABS function, EBD function, brake limited slip differential (BLSD) function, brake assist function, Brake force distribution function, Rise-up & Build-up function (function of electrically-driven intelligent brake) and Active Trace Control function (function of electrically-driven intelligent brake). Ordinary brake operates. After power supply returns to normal, ABS warning lamp, brake warning lamp and VDC warning lamp turn OFF. The control

becomes operative for VDC function, TCS function, ABS function, EBD function, brake limited slip differential (BLSD) function, brake assist function, Brake force distribution function, Rise-up & Build-up function (function of electrically-driven intelligent brake) and Active Trace Control function (function of electrically-driven intelligent brake).

- Brake pedal vibrates and operation sound occurs during sudden acceleration and cornering, when VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function, Brake force distribution function, hill start assist function (function of electrically-driven intelligent brake), Rise-up & Build-up function (function of electrically-driven intelligent brake) or Active Trace Control function (function of electrically-driven intelligent brake) is operated. This is not a malfunction because it is caused by VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function, Brake force distribution function Rise-up & Build-up function (function of electrically-driven intelligent brake) or Active Trace Control function (function of electrically-driven intelligent brake) that is operated normally.
- VDC warning lamp may turn ON and VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function, Brake force distribution function Rise-up & Build-up function (function of electrically-driven intelligent brake) and Active Trace Control function (function of electrically-driven intelligent brake) may not normally operate, when driving on a special road the is extremely slanted (bank in a circuit course). This is not a malfunction if the status returns to normal for VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function, Brake force distribution function, Rise-up & Build-up function (function of electrically-driven intelligent brake) and Active Trace Control function (function of electrically-driven intelligent brake) after the engine is started again. In this case, perform self-diagnosis, check self-diagnosis results, and erase memory.

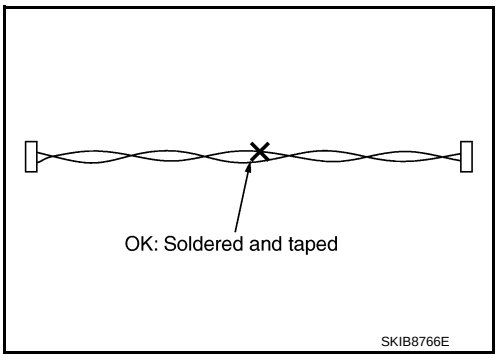
  CAUTION:
  - **Be sure to wait of 10 seconds after turning power switch OFF or ON.**
  - **Turn power switch from OFF → ON before self-diagnosis. Repeat two or more times.**
  - **Set the vehicle to READY/Start the engine.**
  - **Turn the power switch OFF → ON → OFF after erase self-diagnosis result.**
- A malfunction in yaw rate/side/decel G sensor system may be detected when the vehicle sharply turns during a spin turn, acceleration turn or drift driving while VDC function, TCS function, Rise-up & Build-up function, Brake force distribution function, Active Trace Control function Rise-up & Build-up function (function of electrically-driven intelligent brake) and Active Trace Control function (function of electrically-driven intelligent brake) are OFF (VDC OFF switch is pressed and VDC OFF indicator lamp is in ON status). This is not a malfunction if the status returns to normal for VDC function, TCS function, Rise-up & Build-up function, Brake force distribution function, Active Trace Control function Rise-up & Build-up function (function of electrically-driven intelligent brake) and Active Trace Control function (function of electrically-driven intelligent brake) after the engine is started again. In this case, perform self-diagnosis, check self-diagnosis results, and erase memory.

  CAUTION:
  - **Be sure to wait of 10 seconds after turning power switch OFF or ON.**
  - **Turn power switch from OFF → ON before self-diagnosis. Repeat two or more times.**
  - **Set the vehicle to READY/Start the engine.**
  - **Turn the power switch OFF → ON → OFF after erase self-diagnosis result.**

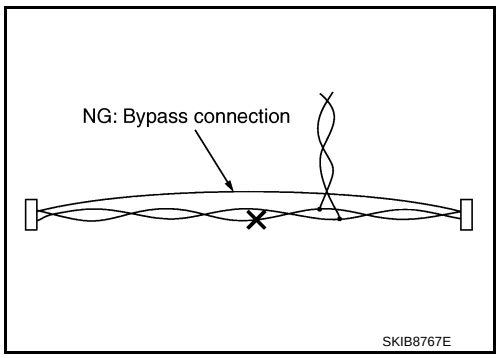
Precaution for Harness Repair

INFOID:0000000008142274

- Solder the repair part, and wrap it with tape. [Twisted wire fray must be 110 mm (4.33 in) or less.]



- Never bypass the repair point with wire. (If it is bypassed, the turn-out point cannot be separated and the twisted wire characteristics are lost.)

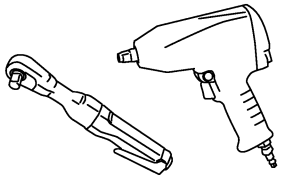


PREPARATION

PREPARATION

Commercial Service Tools

INFOID:0000000008142275

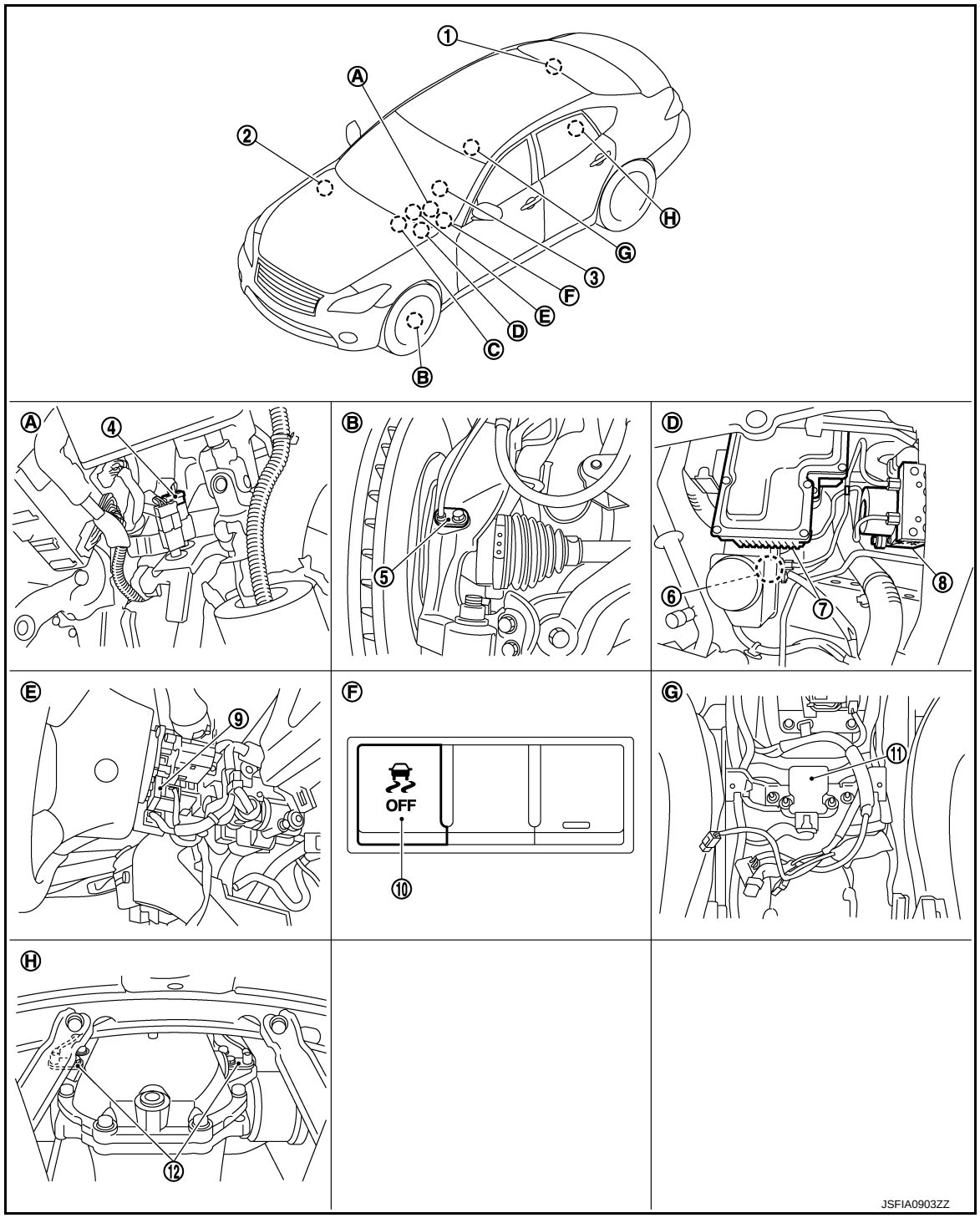
Tool name	Description
Power tool  PBIC0190E	Loosening bolts and nuts

SYSTEM DESCRIPTION

COMPONENT PARTS

Component Parts Location

INFOID:0000000008142276



1. HPCM
   Refer to HBC-13, "HYBRID CONTROL SYSTEM : Component Parts Location".
2. ECM
   Refer to EC-15, "ENGINE CONTROL SYSTEM : Component Parts Location".
3. Control valve &TCM
   Refer to TM-13, "A/T CONTROL SYSTEM : Component Parts Location"
4. Stop lamp switch
5. Front wheel sensor
6. Master cylinder pressure sensor2

7. Electrically-driven intelligent brake unit	8. ABS actuator and electric unit (control unit)	9. Steering angle sensor
10. VDC OFF switch	11. Yaw rate/side/decel G sensor	12. Rear wheel sensor
A. Brake pedal	B. Steering knuckle	C. ABS warning lamp, brake warning lamp, VDC warning lamp, VDC OFF indicator lamp (in combination meter)
D. Inside of brake master cylinder cover	E. Back of spiral cable assembly	F. Instrument driver lower panel
G. Under of center console	H. Rear final drive assembly	

Component Description

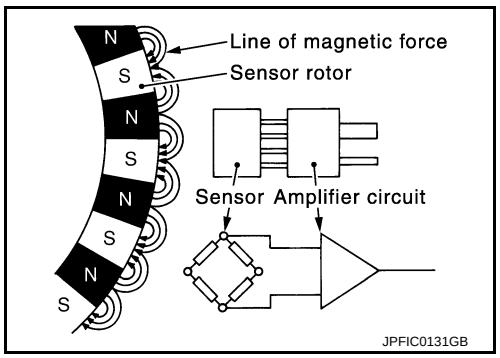
INFOID:0000000008142277

Component		Reference/Function
ABS actuator and electric unit (control unit)	Pump	BRC-13, "ABS Actuator and Electric Unit (Control Unit)"
	Motor	
	Actuator Relay (Main relay)	
	ABS IN valve	
	ABS OUT valve	
	Cut valve 1 (Primary line)	
	Cut valve 2 (Secondary line)	
	Suction Valve (Primary line)	
	Suction Valve (Secondary line)	
Wheel sensor		BRC-13, "Wheel Sensor and Sensor Rotor"
Master cylinder pressure sensor2		BRC-14, "Master Cylinder Pressure Sensor2"
Yaw rate/side/decel G sensor		BRC-14, "Yaw Rate/Side/Decel G Sensor"
Steering angle sensor		BRC-14, "Steering Angle Sensor"
Electrically-driven intelligent brake unit		Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • Electrically-driven intelligent brake control signal
Stop lamp switch		BRC-14, "Stop Lamp Switch"
VDC OFF switch		BRC-14, "VDC OFF Switch"
ABS warning lamp		BRC-16, "System Description"
Brake Warning Lamp		
VDC warning lamp		
VDC OFF indicator lamp		
ECM		Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • Accelerator pedal position signal • Engine speed signal Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. • Target throttle position signal
TCM		Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • Shift position signal
HPCM		Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • HPCM control signal

Wheel Sensor and Sensor Rotor

INFOID:0000000008142278

NOTE:
- Sensor rotor of front wheel is integrated in wheel hub assembly.
- Sensor rotor of rear wheel is installed on drive shaft (rear final drive side).
- Never measure resistance and voltage value using a tester because sensor is active sensor.
- Downsize and weight reduction is aimed. IC for detection portion and magnet for sensor rotor are adopted.
- Power supply is supplied to detection portion so that magnetic field line is read. Magnetic field that is detected is converted to current signal.
- When sensor rotor rotates, magnetic field changes. Magnetic field change is converted to current signals (rectangular wave) and is transmitted to ABS actuator and electric unit (control unit). Change of magnetic field is proportional to wheel speed.



ABS Actuator and Electric Unit (Control Unit)

INFOID:0000000008142279

Electric unit (control unit) is integrated with actuator and comprehensively controls VDC function, TCS function, ABS function, EBD function, brake limited slip differential (BLSD) function, brake assist function and Brake force distribution function.

ELECTRIC UNIT (CONTROL UNIT)

- Brake fluid pressure, engine/traction motor and transmission are controlled according to signals from each sensor.
- If malfunction is detected, the system enters fail-safe mode.

ACTUATOR

The following components are integrated with ABS actuator.

Pump
Returns the brake fluid reserved in reservoir to electrically-driven intelligent brake unit by reducing pressure.

Motor
Activates the pump according to signals from ABS actuator and electric unit (control unit).

Motor Relay
Operates the motor ON/OFF according to signals from ABS actuator and electric unit (control unit).

Actuator Relay
Operates each valve ON/OFF according to signals from ABS actuator and electric unit (control unit).

ABS IN Valve
Switches the fluid pressure line to increase or hold according to signals from control unit.
NOTE:
Valve is a solenoid valve.

ABS OUT Valve
Switches the fluid pressure line to increase, hold or decrease according to signals from control unit.
NOTE:
Valve is a solenoid valve.

Cut Valve 1 (Primary Line), Cut Valve 2 (Secondary Line)
Shuts off the ordinary brake line from electrically-driven intelligent brake unit, when VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function and Brake force distribution function are activated.
NOTE:
Valve is a solenoid valve.

Suction Valve 1 (Primary Line), Suction Valve 2 (Secondary Line)
Supplies the brake fluid from electrically-driven intelligent brake unit to the pump, when VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function and Brake force distribution function are activated.

Inlet Valve
Brake fluid sucked from the reservoir by the pump does not backflow.
NOTE:
Valve is a solenoid valve.

Outlet Valve
Brake fluid discharged from the pump does not backflow.
NOTE:
Valve is a solenoid valve.

Return Check Valve
Returns the brake fluid from brake caliper to electrically-driven intelligent brake unit by bypassing orifice of each valve when brake is released.

Reservoir
Temporarily reserves the brake fluid drained from brake caliper, so that pressure efficiently decreases when decreasing pressure of brake caliper.

Damper
Reduces the vibrations travelling to the brake pedal during the operation of the VDC function, TCS function, ABS function, EBD function, brake limited slip differential (BLSD) function, brake assist function and Brake force distribution function.

Master Cylinder Pressure Sensor2

INFOID:0000000008142280

Detects the brake fluid pressure and transmits signal to ABS actuator and electric unit (control unit).

Stop Lamp Switch

INFOID:0000000008142281

Detects the operation status of brake pedal and transmits converted electric signal to ABS actuator and electric unit (control unit).

Steering Angle Sensor

INFOID:0000000008142282

Detects the following information and transmits steering angle signal to ABS actuator and electric unit (control unit) via CAN communication.
- Steering wheel rotation amount
- Steering wheel rotation angular velocity
- Steering wheel rotation direction

Yaw Rate/Side/Decel G Sensor

INFOID:0000000008142283

Calculates the following information that affects the vehicle, and transmits a signal to ABS actuator and electric unit (control unit) via communication lines.
- Vehicle rotation angular velocity (yaw rate signal)
- Vehicle lateral acceleration (side G signal) and longitudinal acceleration (decel G signal)

Brake Fluid Level Switch

INFOID:0000000008142284

Detects the brake fluid level in reservoir tank and transmits converted electric signal from combination meter to ABS actuator and electric unit (control unit) via CAN communication, when brake fluid level is the specified level or less.

Parking Brake Switch

INFOID:0000000008142285

Detects the operation status of parking brake switch and transmits converted electric signal from combination meter to ABS actuator and electric unit (control unit).

VDC OFF Switch

INFOID:0000000008142286

- This is an integrated switch with switches for other functions.
- Non-operational status or standby status of the following functions can be selected using VDC OFF switch. VDC OFF indicator lamp indicates the operation status of function. (ON: Non-operational status, OFF: Standby status)
- VDC function

- TCS function

NOTE:

ABS function, EBD function and Brake limited slip differential (BLSD) function control operates.

- VDC OFF indicator lamp turns OFF (standby status) when the engine is started again after it is stopped once while VDC OFF indicator lamp is ON (non-operational status).

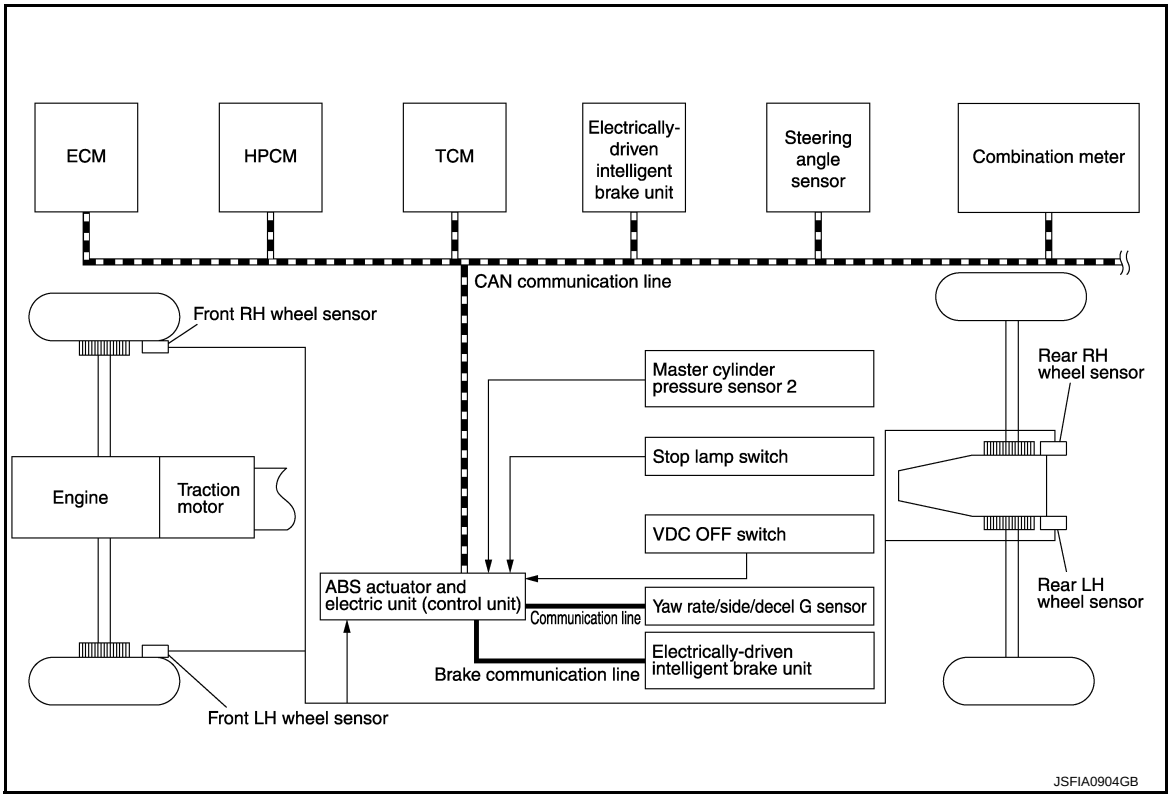
SYSTEM

System Description

INFOID:0000000008142287

- The system switches fluid pressure of each brake caliper to increase, to hold or to decrease according to signals from control unit in ABS actuator and electric unit (control unit). This control system is applied to VDC function, TCS function, ABS function, EBD function, brake limited slip differential (BLSD) function, brake assist function and Brake force distribution function.
- If a malfunction occurs in the electrically-driven intelligent brake unit, the VDC function performs control (boost operation).
- Fail-safe function is available for each function and is activated by each function when system malfunction occurs.

SYSTEM DIAGRAM



INPUT SIGNAL AND OUTPUT SIGNAL

Major signal transmission between each unit via communication lines is shown in the following table.

Component	Signal description
Yaw rate/side/decel G sensor	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via communication line*. • Yaw rate signal • Side G sensor signal • Decel G sensor signal
ECM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • Accelerator pedal position signal • Engine speed signal Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. • Target throttle position signal
HPCM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • HPCM control signal

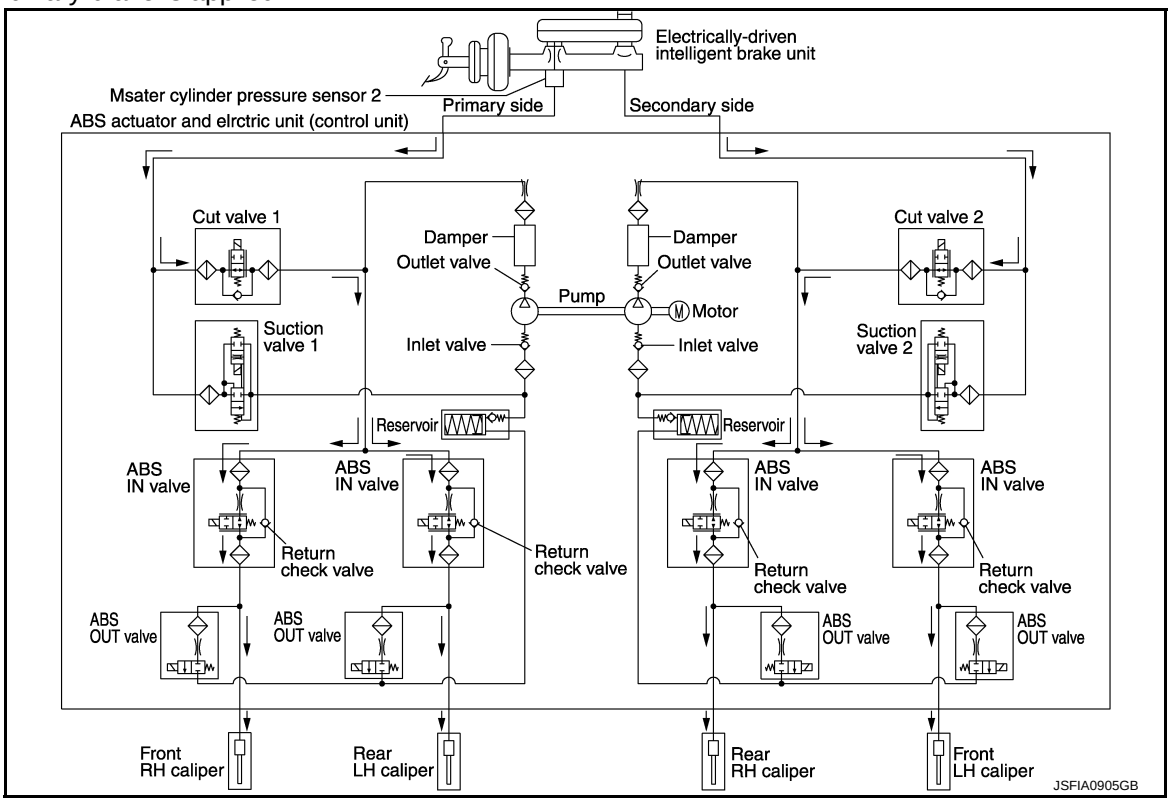
Component	Signal description
TCM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • Shift position signal
Electrically-driven intelligent brake unit	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • Electrically-driven intelligent brake control signal
Steering angle sensor	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • Steering angle sensor signal
Combination meter	Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. • Brake fluid level switch signal • ABS warning lamp signal • Brake warning lamp signal • VDC warning lamp signal • VDC OFF indicator lamp

*: Communication line between yaw rate/side/decel G sensor and ABS actuator and electric unit (control unit)

VALVE OPERATION (ABS AND EBD)

Each valve is operated and fluid pressure of brake caliper is controlled.

When ordinary brake is applied



Name	Not activated	When Pressure Increases
Cut valve 1	Power supply is not supplied (open)	Power supply is not supplied (open)
Cut valve 2	Power supply is not supplied (open)	Power supply is not supplied (open)
Suction valve 1	Power supply is not supplied (close)	Power supply is not supplied (close)
Suction valve 2	Power supply is not supplied (close)	Power supply is not supplied (close)
ABS IN valve	Power supply is not supplied (open)	Power supply is not supplied (open)
ABS OUT valve	Power supply is not supplied (close)	Power supply is not supplied (close)
Each caliper (fluid pressure)	—	Pressure increases

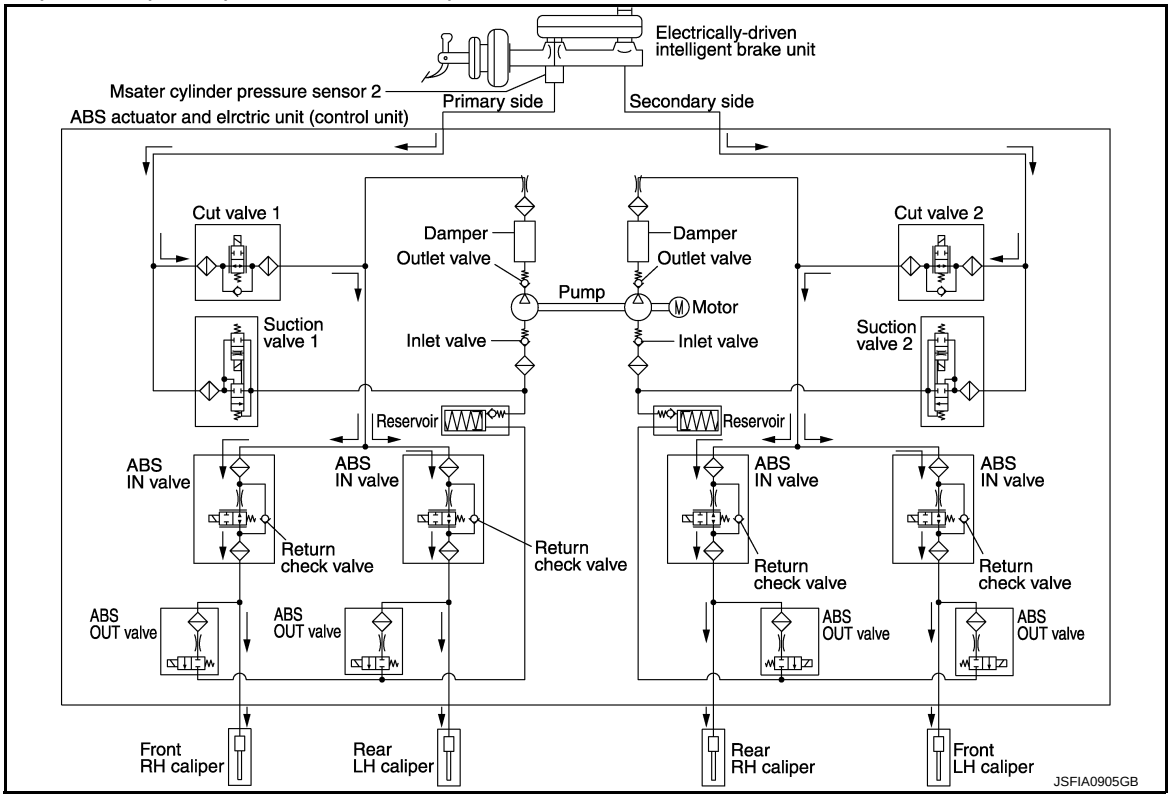
When front RH wheel caliper pressure increases
- When the cut valve 1 and the ABS IN valve opens, brake fluid is supplied to the front RH brake caliper from the electrically-driven intelligent brake unit through the ABS IN valve. Brake fluid does not flow into the reservoir because the ABS OUT valve is closed.

When front LH wheel caliper pressure increases
- When the cut valve 2 and the ABS IN valve opens, brake fluid is supplied to the front LH brake caliper from the electrically-driven intelligent brake unit through the ABS IN valve. Brake fluid does not flow into the reservoir because the ABS OUT valve is closed.

When rear RH wheel caliper pressure increases
- When the cut valve 2 and the ABS IN valve opens, brake fluid is supplied to the rear RH brake caliper from the electrically-driven intelligent brake unit through the ABS IN valve. Brake fluid does not flow into the reservoir because the ABS OUT valve is closed.

When rear LH wheel caliper pressure increases
- When the cut valve 1 and the ABS IN valve opens, brake fluid is supplied to the rear LH brake caliper from the electrically-driven intelligent brake unit through the ABS IN valve. Brake fluid does not flow into the reservoir because the ABS OUT valve is closed.

ABS is in operation (when pressure increases)



Name	Not activated	When Pressure Increases
Cut valve 1	Power supply is not supplied (open)	Power supply is not supplied (open)
Cut valve 2	Power supply is not supplied (open)	Power supply is not supplied (open)
Suction valve 1	Power supply is not supplied (close)	Power supply is not supplied (close)
Suction valve 2	Power supply is not supplied (close)	Power supply is not supplied (close)
ABS IN valve	Power supply is not supplied (open)	Power supply is not supplied (open)
ABS OUT valve	Power supply is not supplied (close)	Power supply is not supplied (close)
Each caliper (fluid pressure)	—	Pressure increases

When front RH wheel caliper pressure increases

- Brake fluid is supplied to the front RH brake caliper from the electrically-driven intelligent brake unit through the cut valve 1 and the ABS IN valve. Since the suction valve 1 and the ABS OUT valve is closed, the fluid does not flow into the reservoir. The amount of brake fluid supplied to the front RH brake caliper from the electrically-driven intelligent brake unit is controlled according to time that the ABS IN valve is not energized (time that the ABS IN valve is open).

When front LH wheel caliper pressure increases

- Brake fluid is supplied to the front RH brake caliper from the electrically-driven intelligent brake unit through the cut valve 2 and the ABS IN valve. Since the suction valve 2 and the ABS OUT valve is closed, the fluid does not flow into the reservoir. The amount of brake fluid supplied to the front LH brake caliper from the electrically-driven intelligent brake unit is controlled according to time that the ABS IN valve is not energized (time that the ABS IN valve is open).

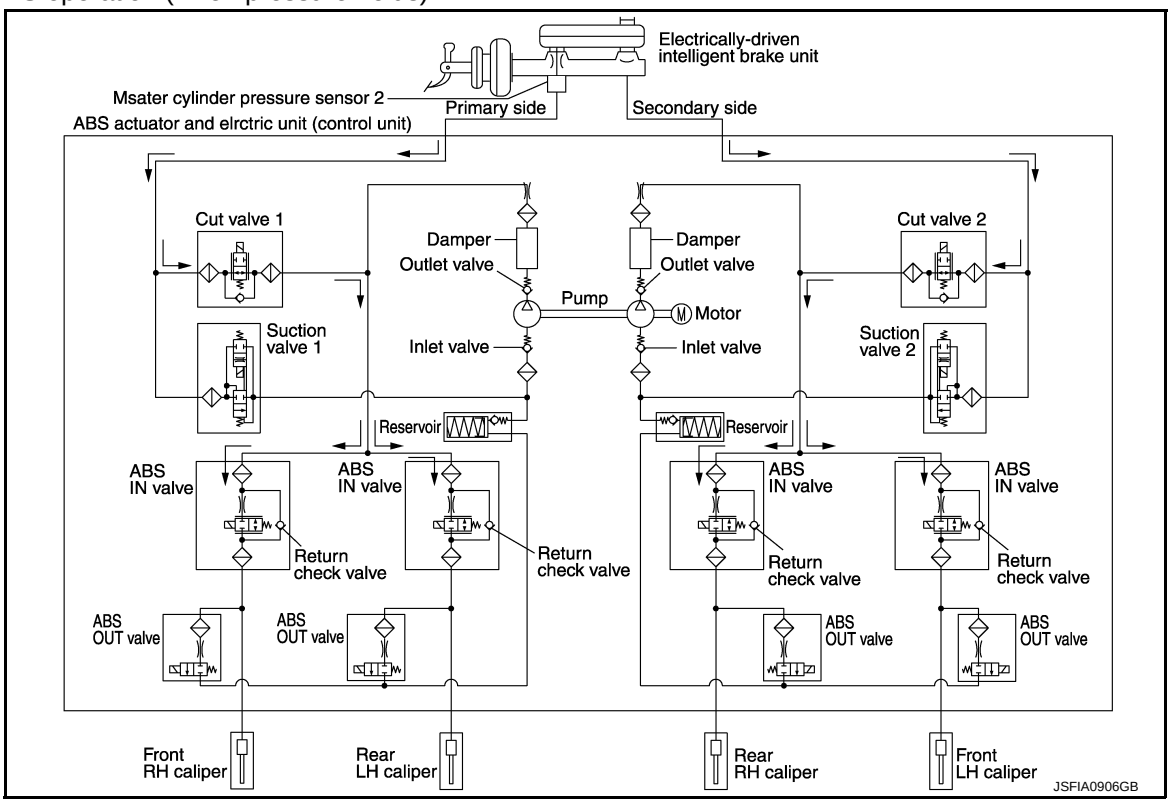
When rear RH wheel caliper pressure increases

- Brake fluid is supplied to the front RH brake caliper from the electrically-driven intelligent brake unit through the cut valve 2 and the ABS IN valve. Since the suction valve 2 and the ABS OUT valve is closed, the fluid does not flow into the reservoir. The amount of brake fluid supplied to the rear RH brake caliper from the electrically-driven intelligent brake unit is controlled according to time that the ABS IN valve is not energized (time that the ABS IN valve is open).

When rear LH wheel caliper pressure increases

- Brake fluid is supplied to the front RH brake caliper from the electrically-driven intelligent brake unit through the cut valve 1 and the ABS IN valve. Since the suction valve 1 and the ABS OUT valve is closed, the fluid does not flow into the reservoir. The amount of brake fluid supplied to the rear LH brake caliper from the electrically-driven intelligent brake unit is controlled according to time that the ABS IN valve is not energized (time that the ABS IN valve is open).

When ABS operation (when pressure holds)



Name	Not activated	When pressure holds
Cut valve 1	Power supply is not supplied (open)	Power supply is not supplied (open)
Cut valve 2	Power supply is not supplied (open)	Power supply is not supplied (open)
Suction valve 1	Power supply is not supplied (close)	Power supply is not supplied (close)
Suction valve 2	Power supply is not supplied (close)	Power supply is not supplied (close)
ABS IN valve	Power supply is not supplied (open)	Power supply is supplied (close)

Name	Not activated	When pressure holds
ABS OUT valve	Power supply is not supplied (close)	Power supply is not supplied (close)
Each caliper (fluid pressure)	—	Pressure holds

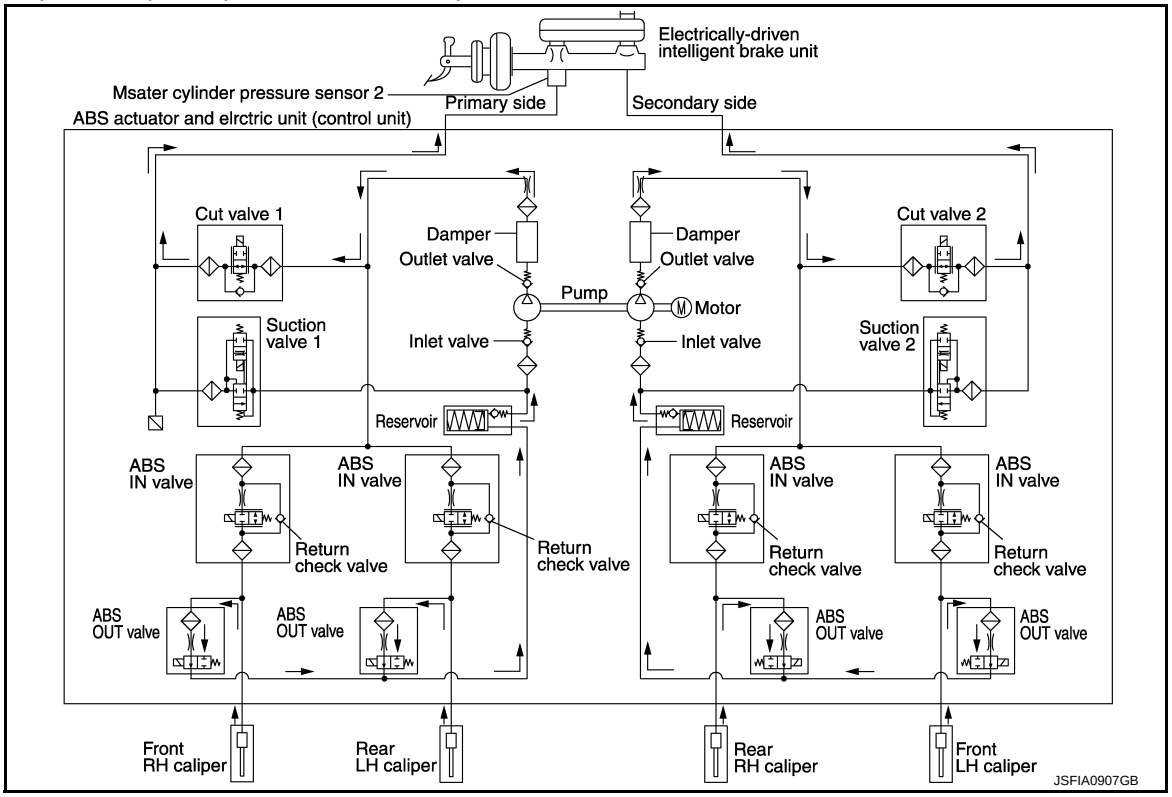
When front RH wheel caliper pressure holds
- Since the ABS IN valve and the ABS OUT valve are closed, the front RH brake caliper, electrically-driven intelligent brake unit, and reservoir are blocked. This maintains fluid pressure applied on the front RH brake caliper.

When front LH wheel caliper pressure holds
- Since the ABS IN valve and the ABS OUT valve are closed, the front LH brake caliper, electrically-driven intelligent brake unit, and reservoir are blocked. This maintains fluid pressure applied on the front RH brake caliper.

When rear RH wheel caliper pressure holds
- Since the ABS IN valve and the ABS OUT valve are closed, the rear RH brake caliper, electrically-driven intelligent brake unit, and reservoir are blocked. This maintains fluid pressure applied on the front RH brake caliper.

When rear LH wheel caliper pressure holds
- Since the ABS IN valve and the ABS OUT valve are closed, the rear LH brake caliper, electrically-driven intelligent brake unit, and reservoir are blocked. This maintains fluid pressure applied on the front RH brake caliper.

ABS is in operation (when pressure decreases)



Name	Not activated	When pressure decreases
Cut valve 1	Power supply is not supplied (open)	Power supply is not supplied (open)
Cut valve 2	Power supply is not supplied (open)	Power supply is not supplied (open)
Suction valve 1	Power supply is not supplied (close)	Power supply is not supplied (close)
Suction valve 2	Power supply is not supplied (close)	Power supply is not supplied (close)
ABS IN valve	Power supply is not supplied (open)	Power supply is supplied (close)

Name	Not activated	When pressure decreases
ABS OUT valve	Power supply is not supplied (close)	Power supply is supplied (open)
Each caliper (fluid pressure)	—	Pressure decreases

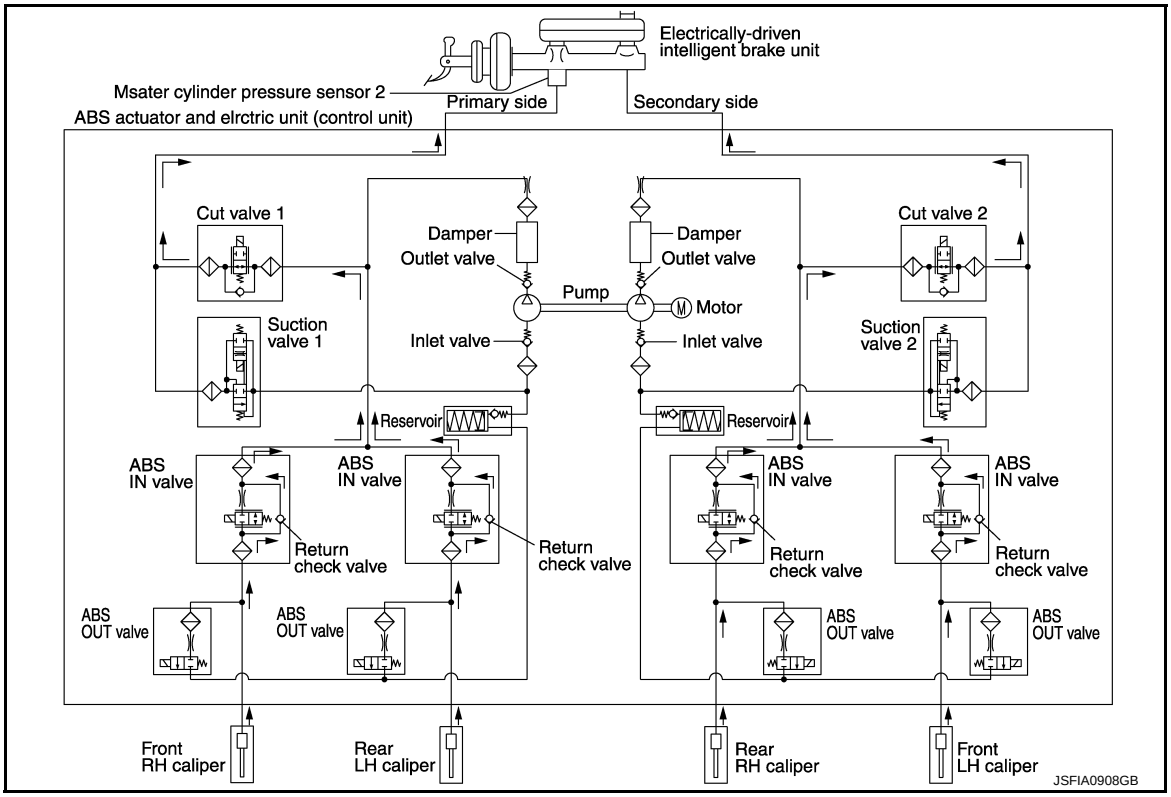
When front RH wheel caliper pressure decreases
- Since the ABS IN valve is closed and the ABS OUT valve is opened, fluid pressure applied on the front RH brake caliper is supplied to the reservoir through the ABS OUT valve. This fluid pressure decreases when sent to the electrically-driven intelligent brake unit by the pump.

When front LH wheel caliper pressure decreases
- Since the ABS IN valve is closed and the ABS OUT valve is opened, fluid pressure applied on the front LH brake caliper is supplied to the reservoir through the ABS OUT valve. This fluid pressure decreases when sent to the electrically-driven intelligent brake unit by the pump.

When rear RH wheel caliper pressure decreases
- Since the ABS IN valve is closed and the ABS OUT valve is opened, fluid pressure applied on the rear RH brake caliper is supplied to the reservoir through the ABS OUT valve. This fluid pressure decreases when sent to the electrically-driven intelligent brake unit by the pump.

When rear LH wheel caliper pressure decreases
- Since the ABS IN valve is closed and the ABS OUT valve is opened, fluid pressure applied on the rear LH brake caliper is supplied to the reservoir through the ABS OUT valve. This fluid pressure decreases when sent to the electrically-driven intelligent brake unit by the pump.

Released



Name	Not activated	When released
Cut valve 1	Power supply is not supplied (open)	Power supply is not supplied (open)
Cut valve 2	Power supply is not supplied (open)	Power supply is not supplied (open)
Suction valve 1	Power supply is not supplied (close)	Power supply is not supplied (close)
Suction valve 2	Power supply is not supplied (close)	Power supply is not supplied (close)
ABS IN valve	Power supply is not supplied (open)	Power supply is supplied (close)

Name	Not activated	When released
ABS OUT valve	Power supply is not supplied (close)	Power supply is not supplied (close)
Each caliper (fluid pressure)	—	Release

When front RH wheel caliper release
- Brake fluid is supplied to the front RH caliper through the return check valve of the ABS IN valve and the cut valve 1, and returns to the electrically-driven intelligent brake unit.

When front LH wheel caliper release
- Brake fluid is supplied to the front LH caliper through the return check valve of the ABS IN valve and the cut valve 2, and returns to the electrically-driven intelligent brake unit.

When rear RH wheel caliper release
- Brake fluid is supplied to the rear RH caliper through the return check valve of the ABS IN valve and the cut valve 2, and returns to the electrically-driven intelligent brake unit.

When rear LH wheel caliper release
- Brake fluid is supplied to the rear LH caliper through the return check valve of the ABS IN valve and the cut valve 1, and returns to the electrically-driven intelligent brake unit.

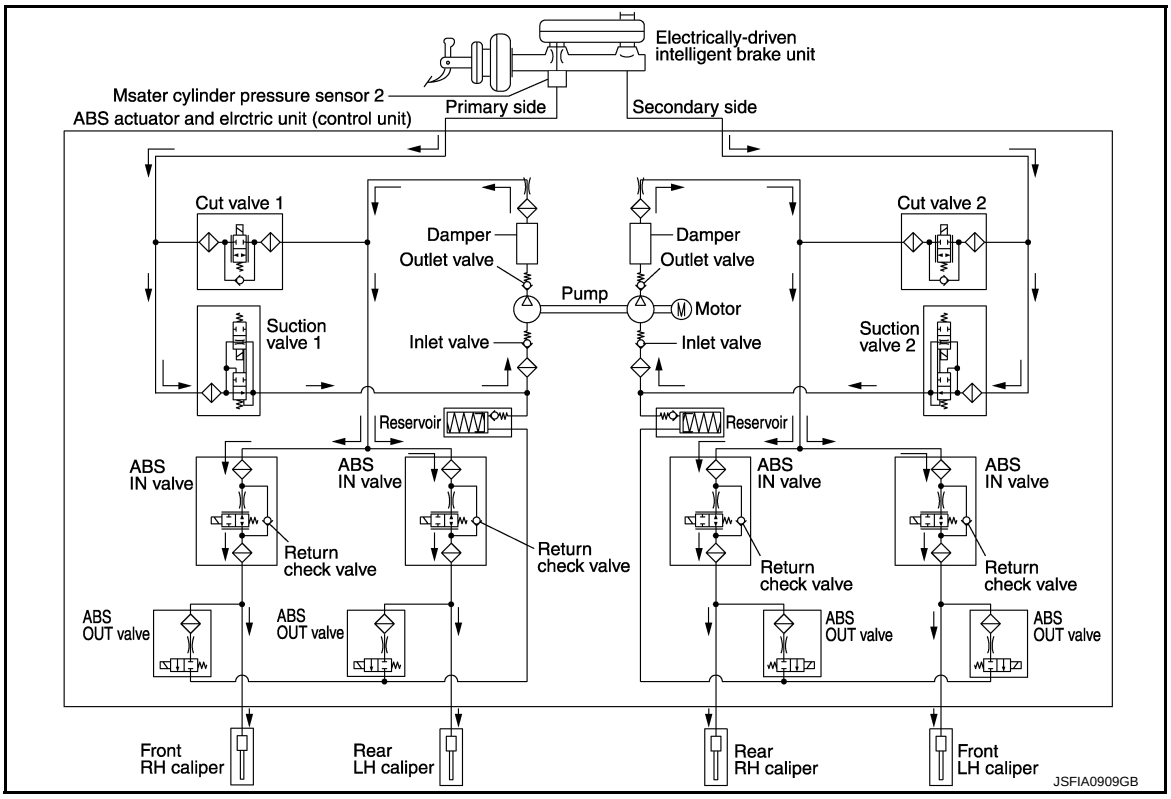
Component Parts and Function

Component	FUNCTION
Pump	Returns the brake fluid reserved in reservoir to electrically-driven intelligent brake unit by reducing pressure.
Motor	Activates the pump according to signals from ABS actuator and electric unit (control unit).
ABS IN valve	Switches the fluid pressure line to increase or hold according to signals from control unit.
ABS OUT valve	Switches the fluid pressure line to increase, hold or decrease according to signals from control unit.
Cut valve 1 Cut valve 2	Shuts off the ordinary brake line from electrically-driven intelligent brake unit.
Suction valve 1 Suction valve 2	Supplies the brake fluid from electrically-driven intelligent brake unit to the pump.
Inlet valve	Brake fluid sucked from the reservoir by the pump does not backflow.
Outlet valve	Brake fluid discharged from the pump does not backflow.
Return check valve	Returns the brake fluid from brake caliper to electrically-driven intelligent brake unit by bypassing orifice of each valve when brake is released.
Master cylinder pressure sensor2	Detects the brake fluid pressure and transmits signal to ABS actuator and electric unit (control unit).
Reservoir	Temporarily reserves the brake fluid drained from brake caliper, so that pressure efficiently decreases when decreasing pressure of brake caliper.
Damper	Reduces the vibrations travelling to the brake pedal during the operation of the VDC function, TCS function, ABS function, EBD function, brake limited slip differential (BLSD) function, brake assist function and Brake force distribution function.

VALVE OPERATION (OTHER THAN ABS AND EBD)

Each valve is operated and fluid pressure of brake caliper is controlled.

When Pressure Increases



Name	Not activated	When Pressure Increases
Cut valve 1	Power supply is not supplied (open)	Power supply is supplied (close)
Cut valve 2	Power supply is not supplied (open)	Power supply is supplied (close)
Suction valve 1	Power supply is not supplied (close)	Power supply is supplied (open)
Suction valve 2	Power supply is not supplied (close)	Power supply is supplied (open)
ABS IN valve	Power supply is not supplied (open)	Power supply is not supplied (open)
ABS OUT valve	Power supply is not supplied (close)	Power supply is not supplied (close)
Each caliper (fluid pressure)	—	Pressure increases

When front RH wheel caliper pressure increases
- Brake fluid is conveyed to the pump from the electrically-driven intelligent brake unit through suction valve 1 and is pressurized by the pump operation. The pressurized brake fluid is supplied to the front RH brake caliper through the ABS IN valve. For the left caliper, brake fluid pressure is maintained because the pressurization is unnecessary. The pressurization for the left caliper is controlled separately from the right caliper.

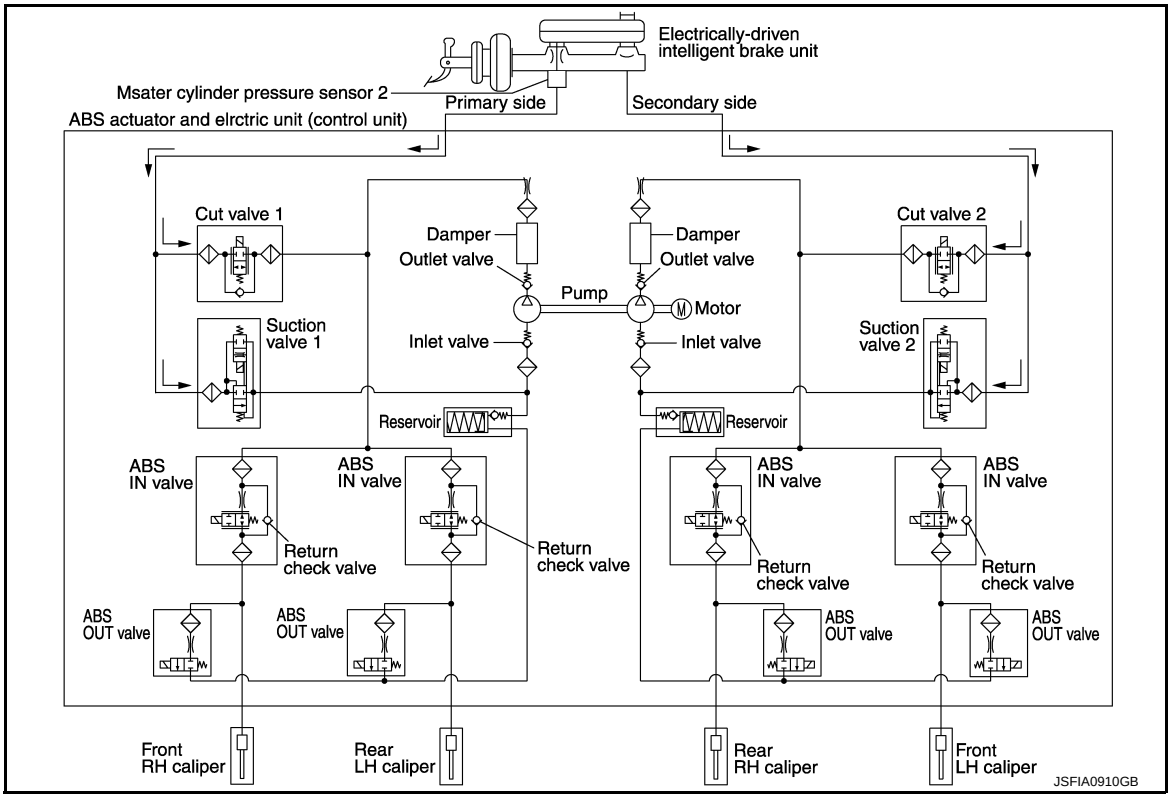
When front LH wheel caliper pressure increases
- Brake fluid is conveyed to the pump from the electrically-driven intelligent brake unit through suction valve 2 and is pressurized by the pump operation. The pressurized brake fluid is supplied to the front LH brake caliper through the ABS IN valve. For the left caliper, brake fluid pressure is maintained because the pressurization is unnecessary. The pressurization for the right caliper is controlled separately from the left caliper.

When rear RH wheel caliper pressure increases
- Brake fluid is conveyed to the pump from the electrically-driven intelligent brake unit through suction valve 2 and is pressurized by the pump operation. The pressurized brake fluid is supplied to the rear RH brake caliper through the ABS IN valve. For the left caliper, brake fluid pressure is maintained because the pressurization is unnecessary. The pressurization for the left caliper is controlled separately from the right caliper.

When rear LH wheel caliper pressure increases
- Brake fluid is conveyed to the pump from the electrically-driven intelligent brake unit through suction valve 1 and is pressurized by the pump operation. The pressurized brake fluid is supplied to the rear LH brake cali-

per through the ABS IN valve. For the left caliper, brake fluid pressure is maintained because the pressurization is unnecessary. The pressurization for the right caliper is controlled separately from the left caliper.

When pressure holds



Name	Not activated	When pressure holds
Cut valve 1	Power supply is not supplied (open)	Power supply is supplied (close)
Cut valve 2	Power supply is not supplied (open)	Power supply is supplied (close)
Suction valve 1	Power supply is not supplied (close)	Power supply is not supplied (close)
Suction valve 2	Power supply is not supplied (close)	Power supply is not supplied (close)
ABS IN valve	Power supply is not supplied (open)	Power supply is not supplied (open)
ABS OUT valve	Power supply is not supplied (close)	Power supply is not supplied (close)
Each caliper (fluid pressure)	—	Pressure holds

When front RH wheel caliper pressure holds

- Since the cut valve 1 and the suction valve 1 are closed, the front RH brake caliper, electrically-driven intelligent brake unit, and reservoir are blocked. This maintains fluid pressure applied on the front RH brake caliper. The pressurization for the left caliper is controlled separately from the right caliper.

When front LH wheel caliper pressure holds

- Since the cut valve 2 and the suction valve 2 are closed, the front LH brake caliper, electrically-driven intelligent brake unit, and reservoir are blocked. This maintains fluid pressure applied on the front LH brake caliper. The pressurization for the right caliper is controlled separately from the left caliper.

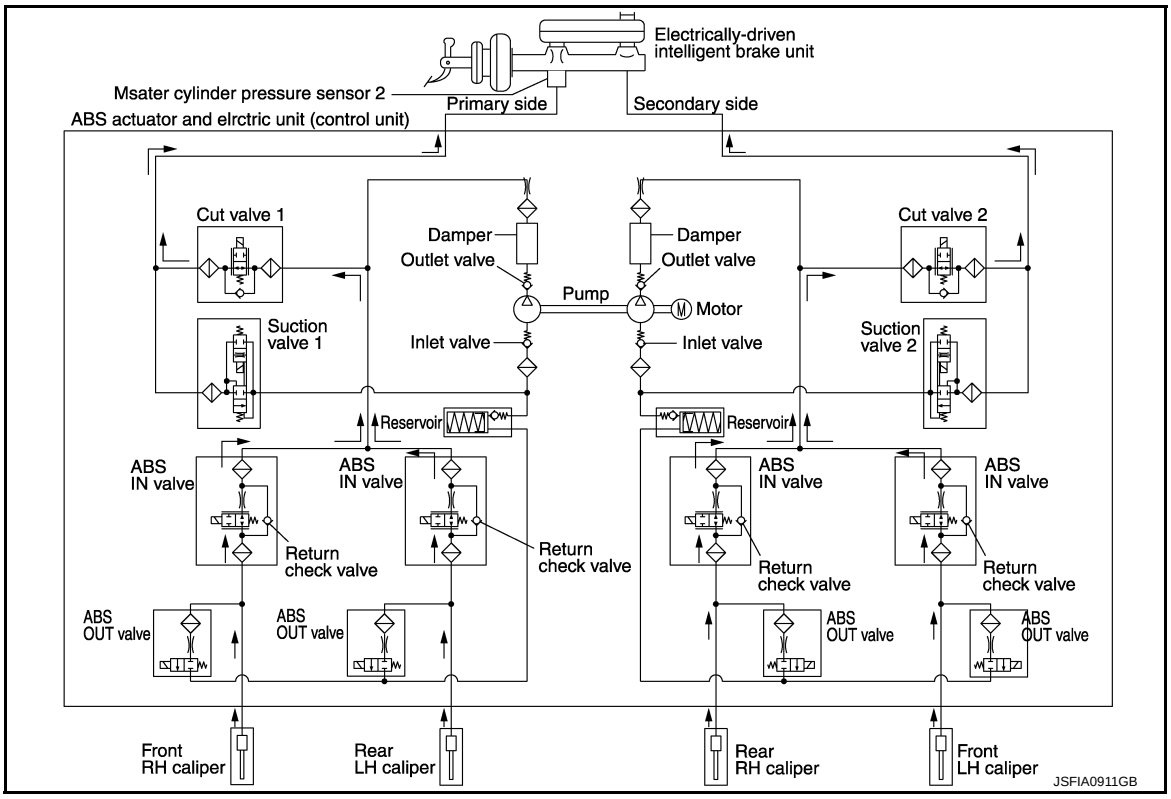
When rear RH wheel caliper pressure holds

- Since the cut valve 2 and the suction valve 2 are closed, the rear RH brake caliper, electrically-driven intelligent brake unit, and reservoir are blocked. This maintains fluid pressure applied on the rear RH brake caliper. The pressurization for the left caliper is controlled separately from the right caliper.

When rear LH wheel caliper pressure holds

- Since the cut valve 1 and the suction valve 1 are closed, the rear LH brake caliper, electrically-driven intelligent brake unit, and reservoir are blocked. This maintains fluid pressure applied on the rear LH brake caliper. The pressurization for the right caliper is controlled separately from the left caliper.

When pressure decreases



Name	Not activated	When pressure decreases
Cut valve 1	Power supply is not supplied (open)	Power supply is not supplied (open)
Cut valve 2	Power supply is not supplied (open)	Power supply is not supplied (open)
Suction valve 1	Power supply is not supplied (close)	Power supply is not supplied (close)
Suction valve 2	Power supply is not supplied (close)	Power supply is not supplied (close)
ABS IN valve	Power supply is not supplied (open)	Power supply is not supplied (open)
ABS OUT valve	Power supply is not supplied (close)	Power supply is not supplied (close)
Each caliper (fluid pressure)	—	Pressure decreases

When front RH wheel caliper pressure decreases
- Since the suction valve 1 and the ABS OUT valve close and the cut valve 1 and the ABS IN valve open, the fluid pressure applied on the front RH brake caliper is reduced by supplying the fluid pressure to the electrically-driven intelligent brake unit via the ABS IN valve and the cut valve 1. The pressurization for the right caliper is controlled separately from the left caliper.

When front LH wheel caliper pressure decreases
- Since the suction valve 2 and the ABS OUT valve close and the cut valve 2 and the ABS IN valve open, the fluid pressure applied on the front LH brake caliper is reduced by supplying the fluid pressure to the electrically-driven intelligent brake unit via the ABS IN valve and the cut valve 2. The pressurization for the left caliper is controlled separately from the right caliper.

When rear RH wheel caliper pressure decreases
- Since the suction valve 2 and the ABS OUT valve close and the cut valve 2 and the ABS IN valve open, the fluid pressure applied on the rear RH brake caliper is reduced by supplying the fluid pressure to the electrically-driven intelligent brake unit via the ABS IN valve and the cut valve 2. The pressurization for the right caliper is controlled separately from the left caliper.

When rear LH wheel caliper pressure decreases
- Since the suction valve 1 and the ABS OUT valve close and the cut valve 1 and the ABS IN valve open, the fluid pressure applied on the rear LH brake caliper is reduced by supplying the fluid pressure to the electri-

cally-driven intelligent brake unit via the ABS IN valve and the cut valve 1. The pressurization for the left caliper is controlled separately from the right caliper.

Component Parts and Function

Component	FUNCTION
Pump	Returns the brake fluid reserved in reservoir to electrically-driven intelligent brake unit by reducing pressure.
Motor	Activates the pump according to signals from ABS actuator and electric unit (control unit).
ABS IN valve	Switches the fluid pressure line to increase or hold according to signals from control unit.
ABS OUT valve	Switches the fluid pressure line to increase, hold or decrease according to signals from control unit.
Cut valve 1 Cut valve 2	Shuts off the ordinary brake line from electrically-driven intelligent brake unit.
Suction valve 1 Suction valve 2	Supplies the brake fluid from electrically-driven intelligent brake unit to the pump.
Inlet valve	Brake fluid sucked from the reservoir by the pump does not backflow.
Outlet valve	Brake fluid discharged from the pump does not backflow.
Return check valve	Returns the brake fluid from brake caliper to electrically-driven intelligent brake unit by bypassing orifice of each valve when brake is released.
Master cylinder pressure sensor2	Detects the brake fluid pressure and transmits signal to ABS actuator and electric unit (control unit).
Reservoir	Temporarily reserves the brake fluid drained from brake caliper, so that pressure efficiently decreases when decreasing pressure of brake caliper.
Damper	Reduces the vibrations travelling to the brake pedal during the operation of the VDC function, TCS function, ABS function, EBD function, brake limited slip differential (BLSD) function, brake assist function and Brake force distribution function.

CONDITION FOR TURN ON THE WARNING LAMP

ABS Warning Lamp

- Turns ON at the same time as VDC warning lamp when either ABS function or EBD function is malfunctioning.
- Turns ON when ignition switch turns ON and turns OFF when the system is normal, for bulb check purposes.

Condition (status)	ABS warning lamp
Ignition switch OFF	OFF
For several seconds after the ignition switch is turned ON	ON
Several seconds after ignition switch is turned ON (when the system is in normal operation)	OFF
ABS function is malfunctioning	ON
EBD function is malfunctioning	ON

Brake Warning Lamp

- Turns ON at the same time as ABS warning lamp and VDC warning lamp when EBD function is malfunctioning.
- Turns ON when ignition switch turns ON and turns OFF when the system is normal, for bulb check purposes.

Condition (status)	Brake warning lamp
Ignition switch OFF.	OFF
For several seconds after the ignition switch is turned ON	ON
Several seconds after ignition switch is turned ON (when the system is in normal operation).	OFF
After READY/engine starts	OFF
When parking brake operates (parking brake switch ON)	ON
Electrically-driven intelligent brake unit function is malfunctioning	ON

When brake fluid is less than the specified level (brake fluid level switch ON)	ON
ABS function is malfunctioning	OFF
EBD function is malfunctioning	ON

VDC Warning Lamp

- Turns ON when either VDC function, TCS function, ABS function, EBD function, brake limited slip differential (BLSD) function, brake assist function or Brake force distribution function are malfunctioning.
- Turns ON when ignition switch turns ON and turns OFF when the system is normal, for bulb check purposes.

Condition (status)	VDC warning lamp
Ignition switch OFF.	OFF
For several seconds after the ignition switch is turned ON	ON
Several seconds after ignition switch is turned ON (when the system is in normal operation).	OFF
VDC function is malfunctioning	ON
TCS function is malfunctioning	ON
ABS function is malfunctioning	ON
EBD function is malfunctioning	ON
Brake limited slip differential (BLSD) function	ON
Brake assist function	ON
Brake force distribution function	ON
VDC function is operating	Blinking
TCS function is operating	Blinking

CONDITION FOR TURN ON THE INDICATOR LAMP

VDC OFF indicator lamp

- Turns ON when VDC function and TCS function are switched to non-operational status (OFF) by VDC OFF switch.
- Turns ON when ignition switch turns ON and turns OFF when the system is normal, for bulb check purposes.

Condition (status)	VDC OFF indicator lamp
Ignition switch OFF.	OFF
For several seconds after the ignition switch is turned ON	ON
Several seconds after ignition switch is turned ON (when the system is in normal operation).	OFF
When VDC OFF switch is ON (VDC function and TCS function are OFF)	ON

Fail-Safe

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VDC FUNCTION, TCS FUNCTION, BRAKE LIMITED SLIP DIFFERENTIAL (BLSD) FUNCTION, BRAKE ASSIST FUNCTION, BRAKE FORCE DISTRIBUTION FUNCTION

VDC warning lamp in combination meter turn ON when a malfunction occurs in system [ABS actuator and electric unit (control unit)]. The control is suspended for VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function, Brake force distribution function, Rise-up & Build-up function (function of electrically-driven intelligent brake) and Active Trace Control function (function of electrically-driven intelligent brake). The vehicle status becomes the same as models without VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function, Brake force distribution function, Rise-up & Build-up function (function of electrically-driven intelligent brake) and Active Trace Control function (function of electrically-driven intelligent brake). However, ABS function and EBD function are operated normally.

ABS FUNCTION

ABS warning lamp and VDC warning lamp in combination meter turn ON when a malfunction occurs in system [ABS actuator and electric unit (control unit)]. The control is suspended for VDC function, TCS function, ABS

function, brake limited slip differential (BLSD) function, brake assist function, Brake force distribution function, Rise-up & Build-up function (function of electrically-driven intelligent brake) and Active Trace Control function (function of electrically-driven intelligent brake). The vehicle status becomes the same as models without VDC function, TCS function, ABS function, brake limited slip differential (BLSD) function, brake assist function, Brake force distribution function, Rise-up & Build-up function (function of electrically-driven intelligent brake) and Active Trace Control function (function of electrically-driven intelligent brake). However, EBD function is operated normally.

NOTE:

ABS self-diagnosis sound may be heard the same as in the normal condition, because self-diagnosis is performed when ignition switch turns ON and when vehicle initially starts.

EBD FUNCTION

ABS warning lamp, brake warning lamp and VDC warning lamp in combination meter turn ON when a malfunction occurs in system [ABS actuator and electric unit (control unit)]. The control is suspended for VDC function, TCS function, ABS function, EBD function, brake limited slip differential (BLSD) function, brake assist function, Brake force distribution function, Rise-up & Build-up function (function of electrically-driven intelligent brake) and Active Trace Control function (function of electrically-driven intelligent brake). The vehicle status becomes the same as models without VDC function, TCS function, ABS function, EBD function, brake limited slip differential (BLSD) function, brake assist function, Brake force distribution function, Rise-up & Build-up function (function of electrically-driven intelligent brake) and Active Trace Control function (function of electrically-driven intelligent brake).

DTC	Malfunction detected condition	Fail-safe condition
C1101	When an open circuit is detected in rear RH wheel sensor circuit.	The following functions are suspended. • VDC function • TCS function • ABS function • EBD function (only when both 2 rear wheels are malfunctioning) • Brake limited slip differential (BLSD) function • Brake assist function • Brake force distribution function • Rise-up & Build-up function (function of electrically-driven intelligent brake) • Active Trace Control function (function of electrically-driven intelligent brake)
C1102	When an open circuit is detected in rear LH wheel sensor circuit.	
C1103	When an open circuit is detected in front RH wheel sensor circuit.	
C1104	When an open circuit is detected in front LH wheel sensor circuit.	
C1105	• When power supply voltage of rear RH wheel sensor is low. • When distance between rear RH wheel sensor and rear RH wheel sensor rotor is large. • When installation of rear RH wheel sensor or rear RH wheel sensor rotor is not normal.	
C1106	• When power supply voltage of rear LH wheel sensor is low. • When distance between rear LH wheel sensor and rear LH wheel sensor rotor is large. • When installation of rear LH wheel sensor or rear LH wheel sensor rotor is not normal.	
C1107	• When power supply voltage of front RH wheel sensor is low. • When distance between front RH wheel sensor and front RH wheel sensor rotor is large. • When installation of front RH wheel sensor or front RH wheel sensor rotor is not normal.	
C1108	• When power supply voltage of front LRH wheel sensor is low. • When distance between front LH wheel sensor and front LH wheel sensor rotor is large. • When installation of front LH wheel sensor or front LH wheel sensor rotor is not normal.	
C1109	• When ignition voltage is 10 V or less. • When ignition voltage is 16 V or more.	The following functions are suspended. • VDC function • TCS function • ABS function • EBD function • Brake limited slip differential (BLSD) function • Brake assist function • Brake force distribution function • Rise-up & Build-up function (function of electrically-driven intelligent brake) • Active Trace Control function (function of electrically-driven intelligent brake)
C1110	When there is an internal malfunction in the ABS actuator and electric unit (control unit).	

DTC	Malfunction detected condition	Fail-safe condition
C1111	When a malfunction is detected in motor or motor relay.	The following functions are suspended. • VDC function • TCS function • ABS function • Brake limited slip differential (BLSD) function • Brake assist function • Brake force distribution function • Rise-up & Build-up function (function of electrically-driven intelligent brake) • Active Trace Control function (function of electrically-driven intelligent brake)
C1113	When a malfunction is detected in decel G signal.	The following functions are suspended. • VDC function • TCS function • Brake limited slip differential (BLSD) function • Brake assist function • Brake force distribution function • Rise-up & Build-up function (function of electrically-driven intelligent brake) • Active Trace Control function (function of electrically-driven intelligent brake)
C1115	When difference in wheel speed between any wheel and others is detected during the vehicle is driven, because of installation of other tires than specified.	The following functions are suspended. • VDC function • TCS function • ABS function • EBD function • Brake limited slip differential (BLSD) function • Brake assist function • Brake force distribution function • Rise-up & Build-up function (function of electrically-driven intelligent brake) • Active Trace Control function (function of electrically-driven intelligent brake)
C1116	When stop lamp switch signal is not input when brake pedal operates.	The following functions are suspended. • VDC function • TCS function • Brake limited slip differential (BLSD) function • Brake assist function • Brake force distribution function • Rise-up & Build-up function (function of electrically-driven intelligent brake) • Active Trace Control function (function of electrically-driven intelligent brake)
C1120	When a malfunction is detected in front LH ABS IN valve.	The following functions are suspended. • VDC function • TCS function • ABS function • EBD function • Brake limited slip differential (BLSD) function • Brake assist function • Brake force distribution function • Rise-up & Build-up function (function of electrically-driven intelligent brake) • Active Trace Control function (function of electrically-driven intelligent brake)
C1121	When a malfunction is detected in front LH ABS OUT valve.	
C1122	When a malfunction is detected in front RH ABS IN valve.	
C1123	When a malfunction is detected in front RH ABS OUT valve.	
C1124	When a malfunction is detected in rear LH ABS IN valve.	
C1125	When a malfunction is detected in rear LH ABS OUT valve.	
C1126	When a malfunction is detected in rear RH ABS IN valve.	
C1127	When a malfunction is detected in rear RH ABS OUT valve.	
C1140	When a malfunction is detected in actuator relay.	

DTC	Malfunction detected condition	Fail-safe condition
C1142	When a malfunction is detected in pressure sensor.	The following functions are suspended. • VDC function • TCS function • Brake limited slip differential (BLSD) function • Brake assist function • Brake force distribution function • Rise-up & Build-up function (function of electrically-driven intelligent brake) • Active Trace Control function (function of electrically-driven intelligent brake)
C1143	When a malfunction is detected in steering angle sensor.	
C1144	When neutral position adjustment of steering angle sensor is not complete.	
C1145	When a malfunction is detected in yaw rate signal.	
C1146	When a malfunction is detected in side/decel G signal.	The following functions are suspended. • VDC function • TCS function • ABS function • Brake limited slip differential (BLSD) function • Brake assist function • Brake force distribution function • Rise-up & Build-up function (function of electrically-driven intelligent brake) • Active Trace Control function (function of electrically-driven intelligent brake)
C1155	When brake fluid level low signal is detected.	
C1164	When a malfunction is detected in cut valve 1.	The following functions are suspended. • VDC function • TCS function • ABS function • EBD function • Brake limited slip differential (BLSD) function • Brake assist function • Brake force distribution function • Rise-up & Build-up function (function of electrically-driven intelligent brake) • Active Trace Control function (function of electrically-driven intelligent brake)
C1165	When a malfunction is detected in cut valve 2.	
C1166	When a malfunction is detected in suction valve 1.	
C1167	When a malfunction is detected in suction valve 2.	
C1176	When brake switch signal is not input when brake pedal operates.	The following functions are suspended. • VDC function • TCS function • Brake limited slip differential (BLSD) function • Brake assist function • Brake force distribution function • Rise-up & Build-up function (function of electrically-driven intelligent brake) • Active Trace Control function (function of electrically-driven intelligent brake)
C118A	When a malfunction is detected in electrically-driven intelligent brake system.	The following functions are suspended. • VDC function • TCS function • ABS function • EBD function • Brake limited slip differential (BLSD) function • Brake assist function • Brake force distribution function • Rise-up & Build-up function (function of electrically-driven intelligent brake) • Active Trace Control function (function of electrically-driven intelligent brake)

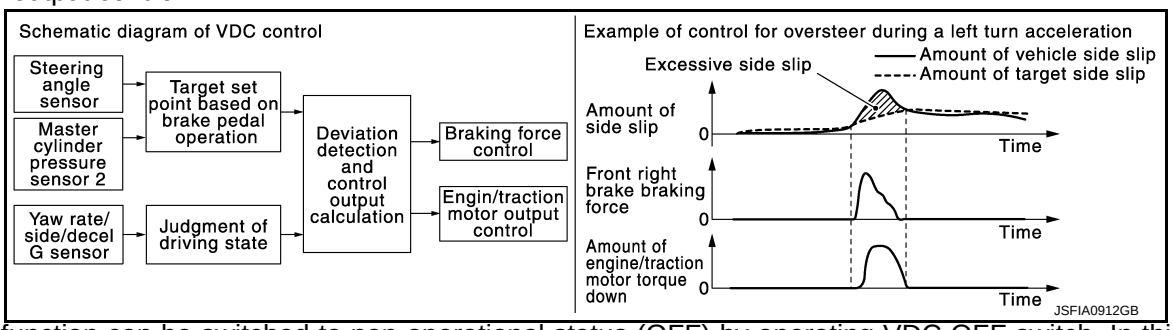
DTC	Malfunction detected condition	Fail-safe condition
C118C	When a malfunction is detected in HPCM system.	The following functions are suspended. • VDC function • TCS function • Brake limited slip differential (BLSD) function • Brake assist function • Brake force distribution function • Rise-up & Build-up function (function of electrically-driven intelligent brake) • Active Trace Control function (function of electrically-driven intelligent brake)
U1000	When CAN communication signal is not continuously received for 2 seconds or more.	
U1010	When detecting error during the initial diagnosis of CAN controller of ABS actuator and electric unit (control unit).	
U110D	When ABS actuator and electric unit (control unit) is not transmitting or receiving brake communication signal for 4 seconds or more.	The following functions are suspended. • VDC function • TCS function • ABS function • EBD function • Brake limited slip differential (BLSD) function • Brake assist function • Brake force distribution function • Rise-up & Build-up function (function of electrically-driven intelligent brake) • Active Trace Control function (function of electrically-driven intelligent brake)

VDC FUNCTION

VDC FUNCTION : System Description

INFOID:0000000008142289

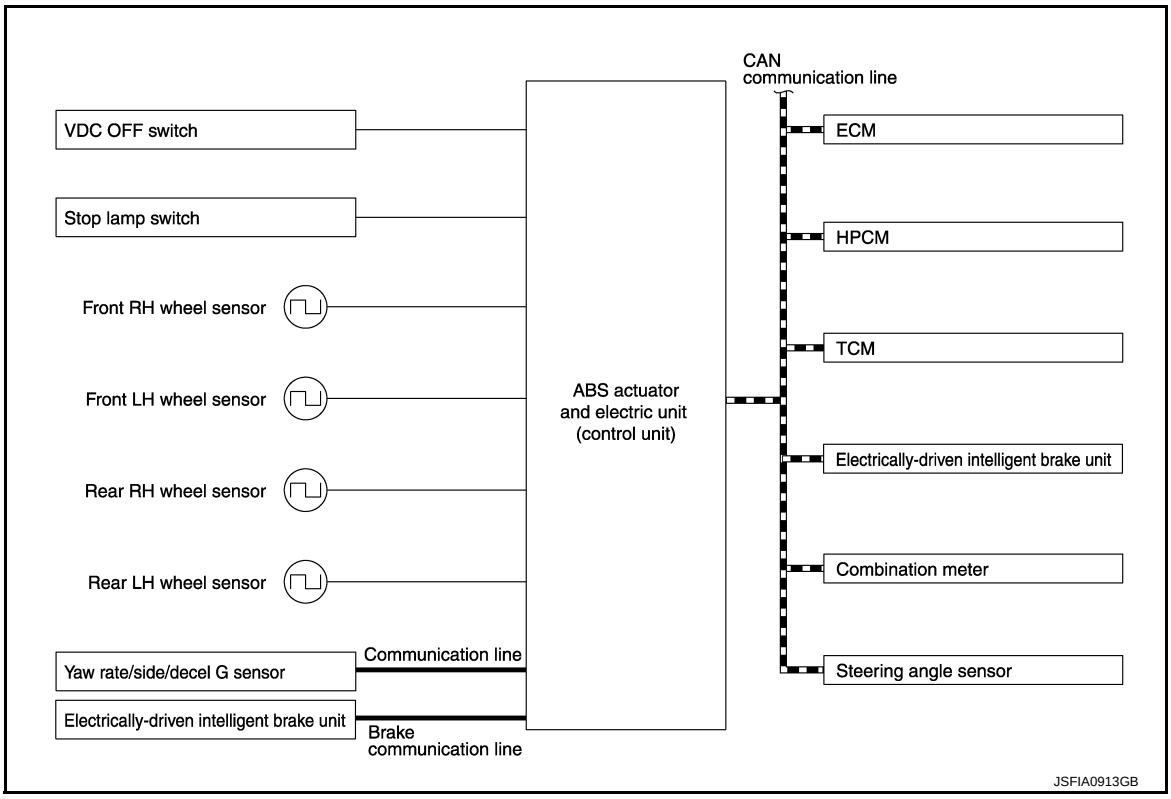
- Side slip or tail slip may occur while driving on a slippery road or intending an urgent evasive driving. VDC function detects side slip status using each sensor when side slip or tail slip is about to occur and improves vehicle stability by brake control and engine/traction motor output control during driving.
- In addition to ABS function, EBD function and TCS function, target side slip amount is calculated according to steering operation amount from steering angle sensor and brake operation amount from brake pressure sensor. By comparing this information with vehicle side slip amount that is calculated from information from yaw rate/side/decel G sensor and wheel sensor, vehicle driving conditions (conditions of understeer or oversteer) are judged and vehicle stability is improved by brake force control on all 4 wheels and engine/traction motor output control.



- VDC function can be switched to non-operational status (OFF) by operating VDC OFF switch. In this case, VDC OFF indicator lamp turns ON.
- Control unit portion automatically improves driving stability by performing brake force control as well as engine/traction motor output control, by transmitting drive signal to actuator portion according to difference between target side slip amount and vehicle side slip amount
- VDC warning lamp blinks while VDC function is in operation and indicates to the driver that the function is in operation.
- CONSULT can be used to diagnose the system diagnosis.
- Fail-safe function is adopted. When a malfunction occurs in VDC function, the control is suspended for VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function and Brake force distribution function. The vehicle status becomes the same as models without VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function and Brake force distribution function. However, ABS function and EBD function are operated normally. Refer to BRC-27, "Fail-Safe".

NOTE:
VDC has the characteristic as described here, This is not the device that helps reckless driving.

SYSTEM DIAGRAM



INPUT SIGNAL AND OUTPUT SIGNAL

Major signal transmission between each unit via communication lines is shown in the following table.

Component	Signal description
Yaw rate/side/decel G sensor	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via communication line*1. • Yaw rate signal • Side G sensor signal • Decel G sensor signal
ECM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • Acceleration pedal position signal • Engine speed signal Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. • Target throttle position signal
TCM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • Shift position signal
HPCM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • HPCM control signal
Electrically-driven intelligent brake unit	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication and brake communication line*2. • Electrically-driven intelligent brake control signal

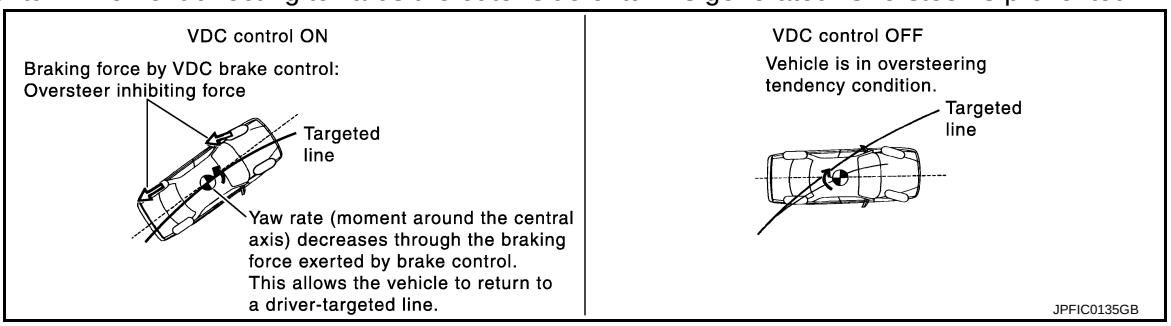
Component	Signal description
Steering angle sensor	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • Steering angle sensor signal
Combination meter	Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. • Brake fluid level switch signal • VDC warning lamp signal • VDC OFF indicator lamp signal

*1: Communication line between yaw rate/side/decel G sensor and ABS actuator and electric unit (control unit)
*2: Communication line between electrically-driven intelligent brake unit and ABS actuator and electric unit (control unit)

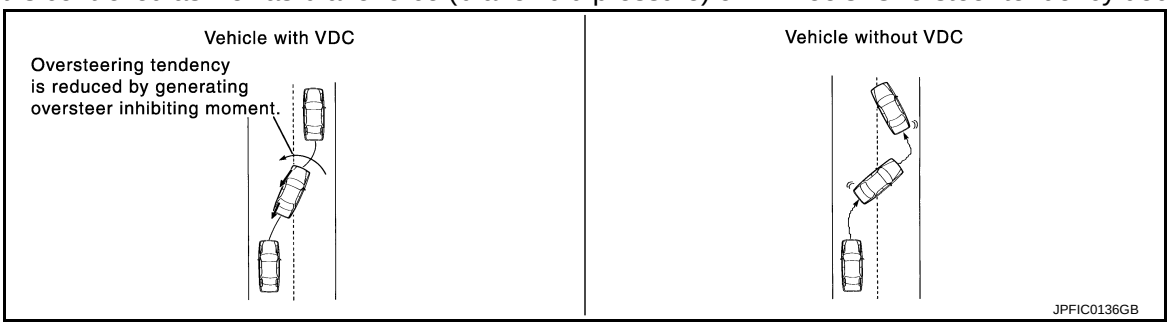
OPERATION CHARACTERISTICS

VDC Function That Prevents Oversteer Tendency

- During a cornering, brake force (brake fluid pressure) is applied on front wheel and rear wheel on the outer side of turn. Moment directing towards the outer side of turn is generated. Oversteer is prevented.

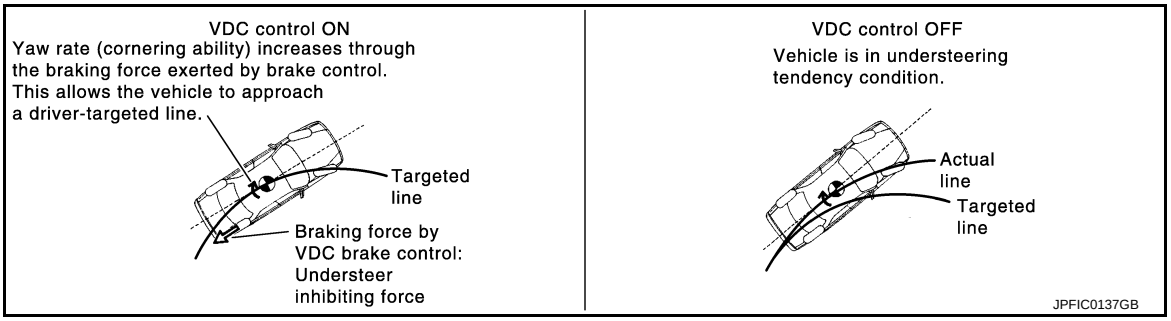


- Changing driving lane on a slippery road, when oversteer tendency is judged large, engine/traction motor output is controlled as well as brake force (brake fluid pressure) of 4 wheels. Oversteer tendency decreases.

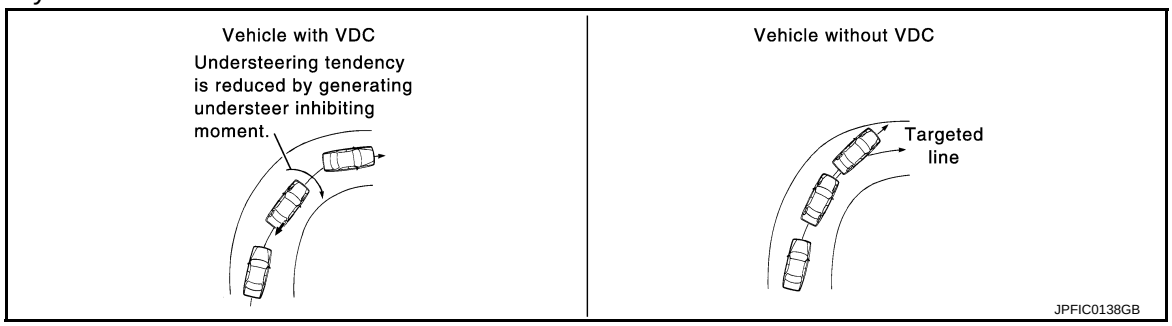


VDC Function That Prevents Understeer Tendency

- During a cornering, brake force (brake fluid pressure) is applied on front wheel and rear wheel on the inner side of turn. Moment directing towards the inner side of turn is generated. Understeer is prevented.



- Applying braking during a cornering on a slippery road, when understeer tendency is judged large, engine/traction motor output is controlled as well as brake force (brake fluid pressure) of four wheels. Understeer tendency decreases.

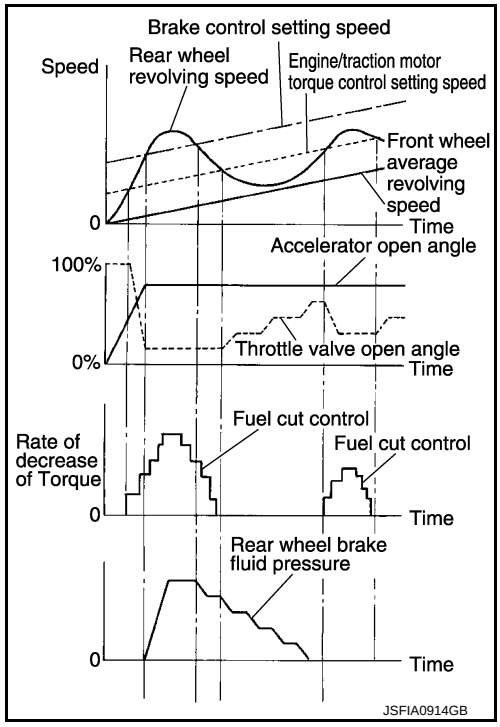


TCS FUNCTION

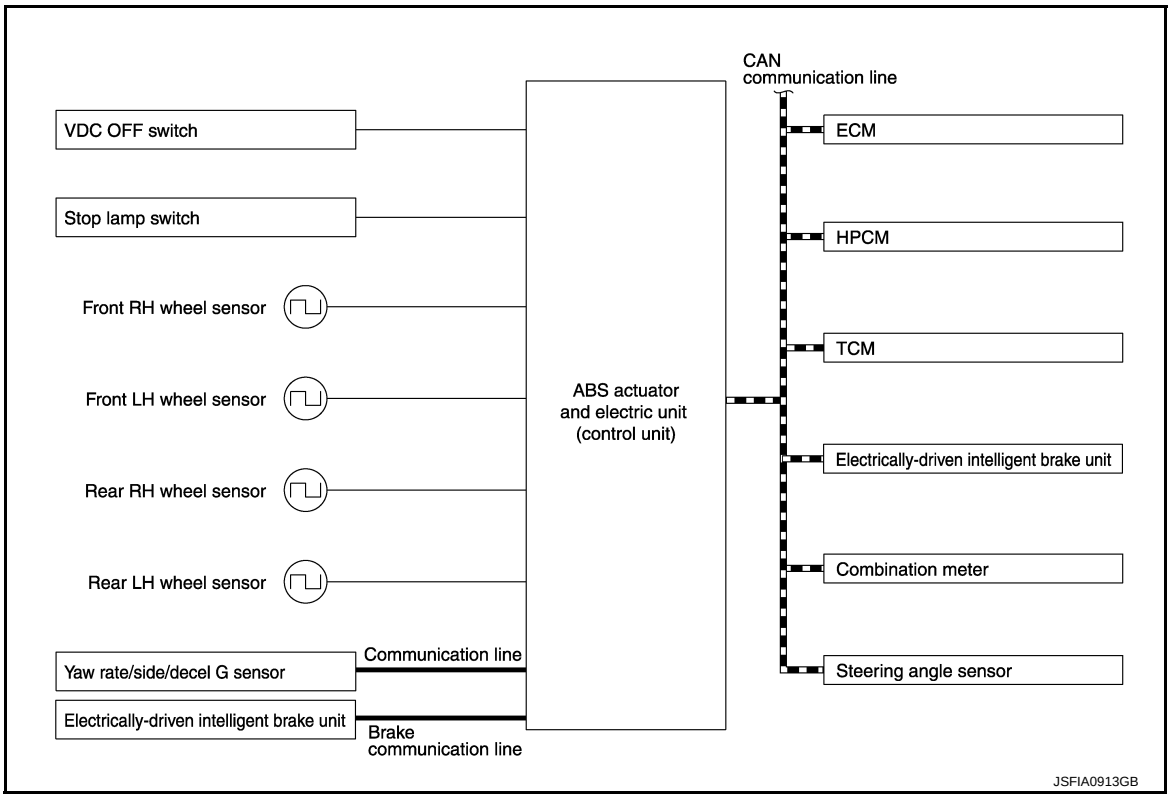
TCS FUNCTION : System Description

INFOID:0000000008142290

- Wheel spin status of drive wheel is detected by wheel sensor of 4 wheels. Engine/traction motor output and transmission shift status is controlled so that slip rate of drive wheels is in appropriate level. When wheel spin occurs on drive wheel, ABS actuator and electric unit (control unit) perform brake force control of LH and RH drive wheels (apply brake force by increasing brake fluid pressure of drive wheel) and decrease engine /traction motor torque by engine/traction motor torque control. Wheel spin amount decreases. Engine/traction motor torque is controlled to appropriate level.
- TCS function can be switched to non-operational status (OFF) by operating VDC OFF switch. In this case, VDC OFF indicator lamp turns ON.
- VDC warning lamp blinks while TCS function is in operation and indicates to the driver that the function is in operation.
- CONSULT can be used to diagnose the system diagnosis.
- Fail-safe function is adopted. When a malfunction occurs in TCS function, the control is suspended for VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function and Brake force distribution function. The vehicle status becomes the same as models without VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function and Brake force distribution function. However, ABS function and EBD function are operated normally. Refer to BRC-27, "Fail-Safe".



SYSTEM DIAGRAM



INPUT SIGNAL AND OUTPUT SIGNAL

Major signal transmission between each unit via communication lines is shown in the following table.

Component	Signal description
Yaw rate/side/decel G sensor	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via communication line*1. • Yaw rate signal • Side G sensor signal • Decel G sensor signal
ECM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • Acceleration pedal position signal • Engine speed signal Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. • Target throttle position signal
TCM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • Shift position signal
HPCM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • HPCM control signal
Electrically-driven intelligent brake unit	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication and brake communication line*2. • Electrically-driven intelligent brake control signal

Component	Signal description
Steering angle sensor	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • Steering angle sensor signal
Combination meter	Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. • Brake fluid level switch signal • VDC warning lamp signal • VDC OFF indicator lamp signal

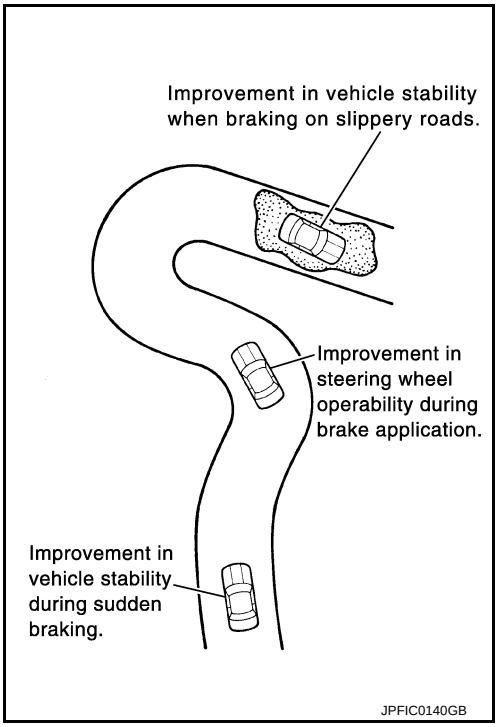
*1: Communication line between yaw rate/side/decel G sensor and ABS actuator and electric unit (control unit)
*2: Communication line between electrically-driven intelligent brake unit and ABS actuator and electric unit (control unit)

ABS FUNCTION

ABS FUNCTION : System Description

INFOID:0000000008142291

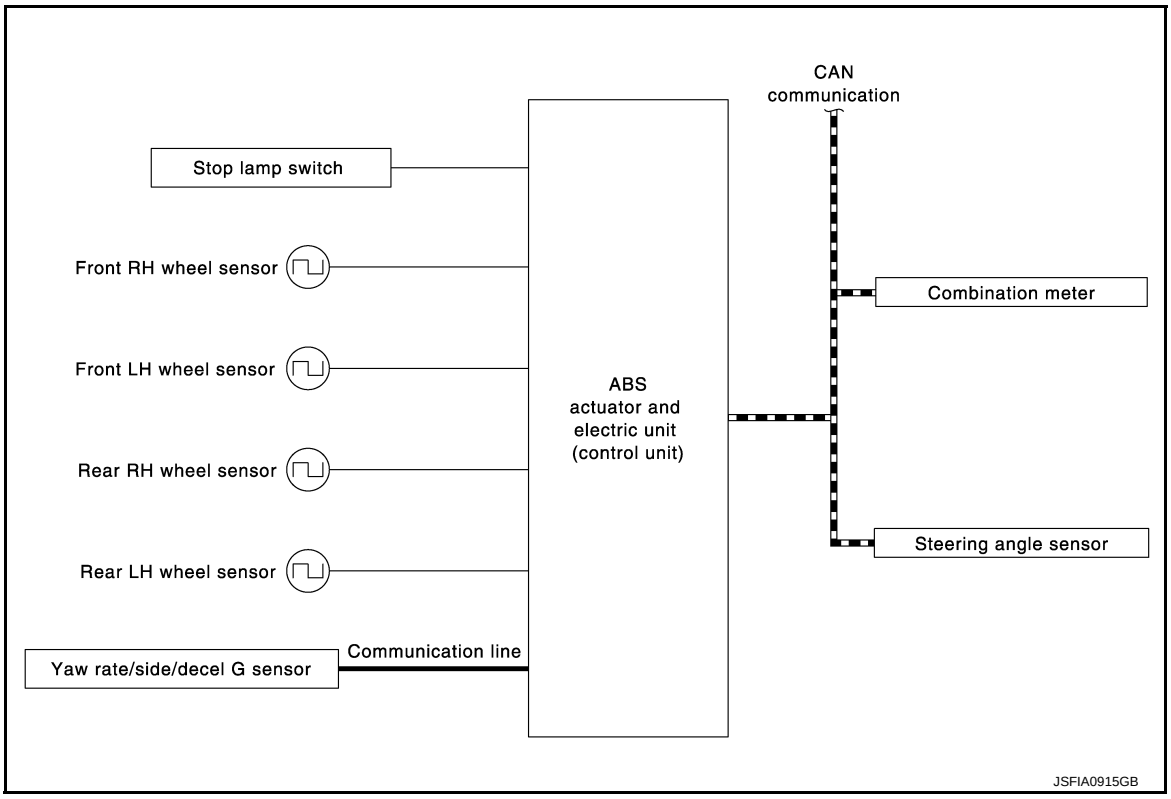
- By preventing wheel lock through brake force (brake fluid pressure) control that is electronically controlled by detecting wheel speed during braking, stability during emergency braking is improved so that obstacles can be easily bypassed by steering operation.
- During braking, control units calculates wheel speed and pseudo-vehicle speed, and transmits pressure increase, hold or decrease signals to actuator portion according to wheel slip status.
- The following effects are obtained by preventing wheel lock during braking.
- Vehicle tail slip is prevented during braking when driving straight.
- Understeer and oversteer tendencies are moderated during braking driving on a corner.
- Obstacles may be easily bypassed by steering operation during braking.
- CONSULT can be used to diagnose the system diagnosis.
- Fail-safe function is adopted. When a malfunction occurs in ABS function, the control is suspended for VDC function, TCS function, ABS function, brake limited slip differential (BLSD) function, brake assist function and Brake force distribution function. The vehicle status becomes the same as models without VDC function, TCS function, ABS function, brake limited slip differential (BLSD) function, brake assist function and Brake force distribution function. However, EBD function is operated normally. Refer to BRC-27, "Fail-Safe".



NOTE:

- ABS has the characteristic as described here, This is not the device that helps reckless driving.
- To stop vehicle efficiently, ABS does not operate and ordinary brake operates at low speed [approx. 10 km/h (6 MPH) or less, but differs subject to road conditions).
- Self-diagnosis is performed immediately after when engine starts/ vehicle to READY and when vehicle initially is driven [by vehicle speed approx. 15 km/h (9 MPH)]. Motor sounds are generated during self-diagnosis. In addition, brake pedal may be felt heavy when depressing brake pedal lightly. These symptoms are not malfunctions.

SYSTEM DIAGRAM



INPUT SIGNAL AND OUTPUT SIGNAL

Major signal transmission between each unit via communication lines is shown in the following table.

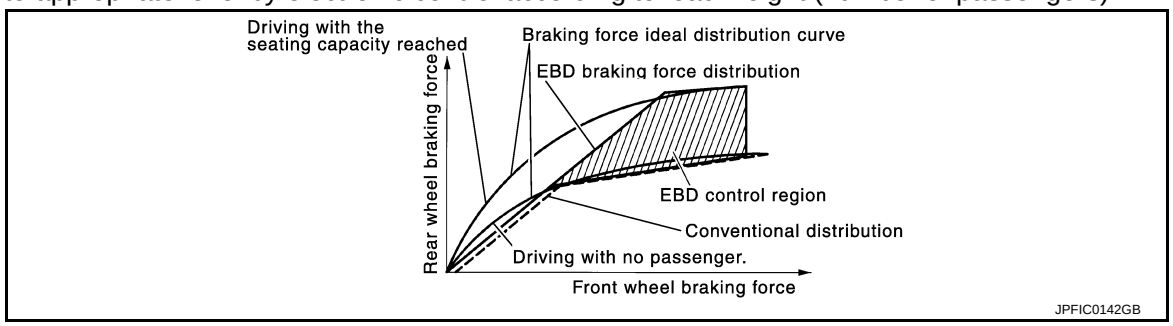
Component	Signal description
Steering angle sensor	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • Steering angle sensor signal
Combination meter	Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. • VDC warning lamp signal • ABS warning lamp signal

EBD FUNCTION

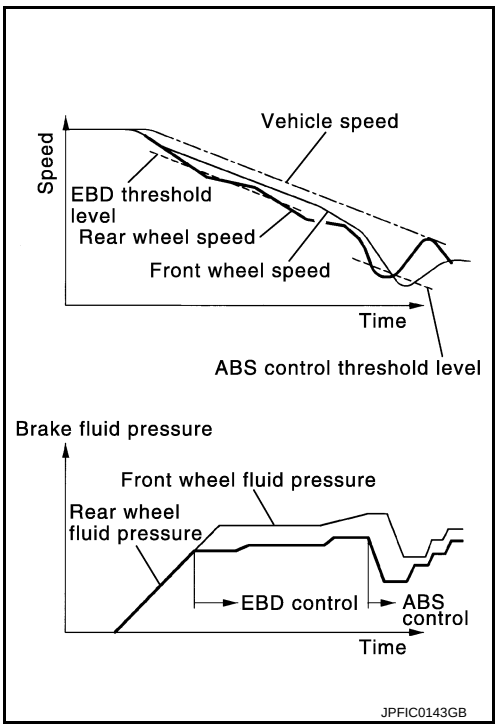
EBD FUNCTION : System Description

INFOID:0000000008142292

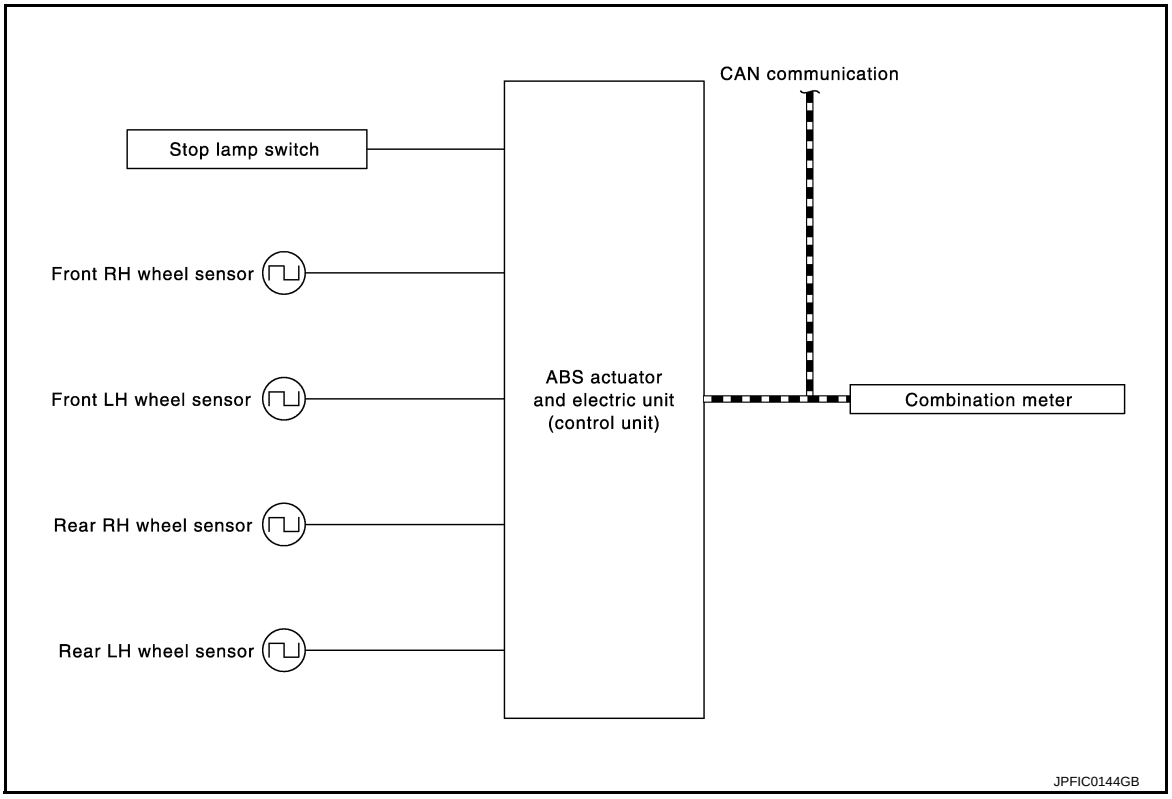
- By preventing rear wheel slip increase through rear wheel brake force (brake fluid pressure) control that is electronically controlled when slight skip on front and rear wheels are detected during braking, stability during braking is improved.
- EBD function is expanded and developed from conventional ABS function and corrects rear wheel brake force to appropriate level by electronic control according to load weight (number of passengers).



- During braking, control unit portion compares slight slip on front and rear wheels by wheel speed sensor signal, transmits drive signal to actuator portion when rear wheel slip exceeds front wheel slip for the specified value or more, and controls rear wheel brake force (brake fluid pressure) so that increase of rear wheel slip is prevented and slips on front wheel and rear wheel are nearly equalized. ABS control is applied when slip on each wheel increases and wheel speed is the threshold value of ABS control or less.
- CONSULT can be used to diagnose the system diagnosis.
- Fail-safe function is adopted. When a malfunction occurs in EBD function, the control is suspended for VDC function, TCS function, ABS function, EBD function, brake limited slip differential (BLSD) function, brake assist function and Brake force distribution function. The vehicle status becomes the same as models without VDC function, TCS function, ABS function, EBD function, brake limited slip differential (BLSD) function, brake assist function and Brake force distribution function. Refer to BRC-27, "Fail-Safe".



SYSTEM DIAGRAM



INPUT SIGNAL AND OUTPUT SIGNAL

Major signal transmission between each unit via communication lines is shown in the following table.

Component	Signal description
Combination meter	Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. • VDC warning lamp signal • ABS warning lamp signal • Brake warning lamp signal

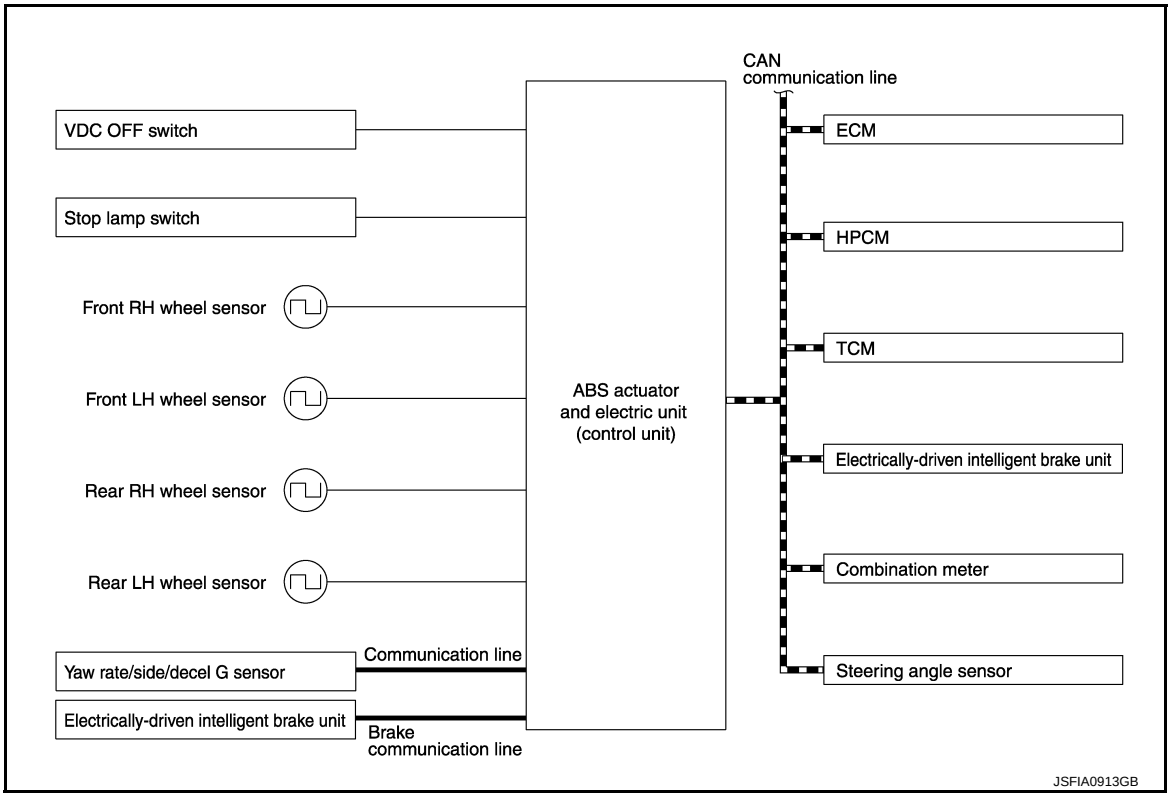
BRAKE LIMITED SLIP DIFFERENTIAL (BLSD) FUNCTION

BRAKE LIMITED SLIP DIFFERENTIAL (BLSD) FUNCTION : System Description

INFOID:0000000008142293

- LH and RH driving wheel spin is always monitored. If necessary, appropriate brake force is independently applied to LH or RH driving wheel so that one-sided wheel spin is avoided and traction is maintained. Mainly starting ability is improved.
- Brake limited slip differential (BLSD) function operates while VDC function is in non-operational status (OFF) by VDC OFF switch.
- VDC warning lamp blinking while brake limited slip differential (BLSD) function is in operation and indicates to the driver that the function is in operation.
- Slight vibrations are felt on the brake pedal and the operation noises occur, when brake limited slip differential (BLSD) function operates. This is not a malfunction because it is caused by brake limited slip differential (BLSD) function that is normally operated.
- Fail-safe function is adopted. When a malfunction occurs in brake limited slip differential (BLSD) function, the control is suspended for VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function and Brake force distribution function. The vehicle status becomes the same as models without VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function and Brake force distribution function. However, ABS function and EBD function are operated normally. Refer to BRC-27, "Fail-Safe".

SYSTEM DIAGRAM



INPUT SIGNAL AND OUTPUT SIGNAL

Major signal transmission between each unit via communication lines is shown in the following table.

Component	Signal description
Yaw rate/side/decel G sensor	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via communication line*1. • Yaw rate signal • Side G sensor signal • Decel G sensor signal
ECM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • Acceleration pedal position signal • Engine speed signal Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. • Target throttle position signal
TCM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • Shift position signal
HPCM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • HPCM control signal
Electrically-driven intelligent brake unit	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication and brake communication line*2. • Electrically-driven intelligent brake control signal
Steering angle sensor	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • Steering angle sensor signal
Combination meter	Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. • Brake fluid level switch signal • VDC warning lamp signal • VDC OFF indicator lamp signal

*1: Communication line between yaw rate/side/decel G sensor and ABS actuator and electric unit (control unit)
*2: Communication line between electrically-driven intelligent brake unit and ABS actuator and electric unit (control unit)

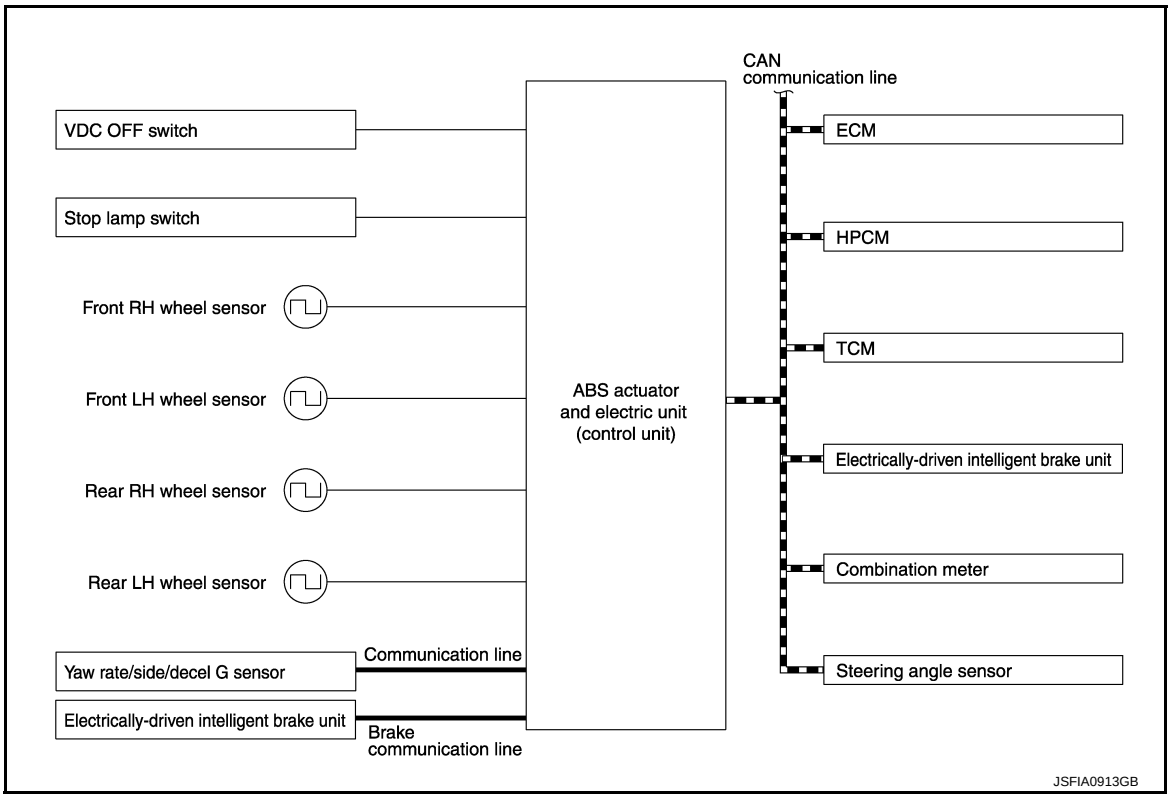
BRAKE ASSIST FUNCTION

BRAKE ASSIST FUNCTION : System Description

INFOID:0000000008142294

- When the driver brakes hard in an emergency, the stopping distance is reduced by increasing brake fluid pressure.
- Fail-safe function is adopted. When a malfunction occurs in brake assist function, the control is suspended for VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function and Brake force distribution function. The vehicle status becomes the same as models without VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function and Brake force distribution function. However, ABS function and EBD function are operated normally. Refer to BRC-27, "Fail-Safe".

SYSTEM DIAGRAM



INPUT SIGNAL AND OUTPUT SIGNAL

Major signal transmission between each unit via communication lines is shown in the following table.

Component	Signal description
Yaw rate/side/decel G sensor	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via communication line*1. • Yaw rate signal • Side G sensor signal • Decel G sensor signal
ECM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • Acceleration pedal position signal • Engine speed signal Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. • Target throttle position signal
TCM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • Shift position signal
HPCM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • HPCM control signal
Electrically-driven intelligent brake unit	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication and brake communication line*2. • Electrically-driven intelligent brake control signal

Component	Signal description
Steering angle sensor	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • Steering angle sensor signal
Combination meter	Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. • Brake fluid level switch signal • VDC warning lamp signal • VDC OFF indicator lamp signal

*1: Communication line between yaw rate/side/decel G sensor and ABS actuator and electric unit (control unit)
*2: Communication line between electrically-driven intelligent brake unit and ABS actuator and electric unit (control unit)

ACTIVE STABILITY ASSIST

ACTIVE STABILITY ASSIST : System Description

INFOID:0000000008142295

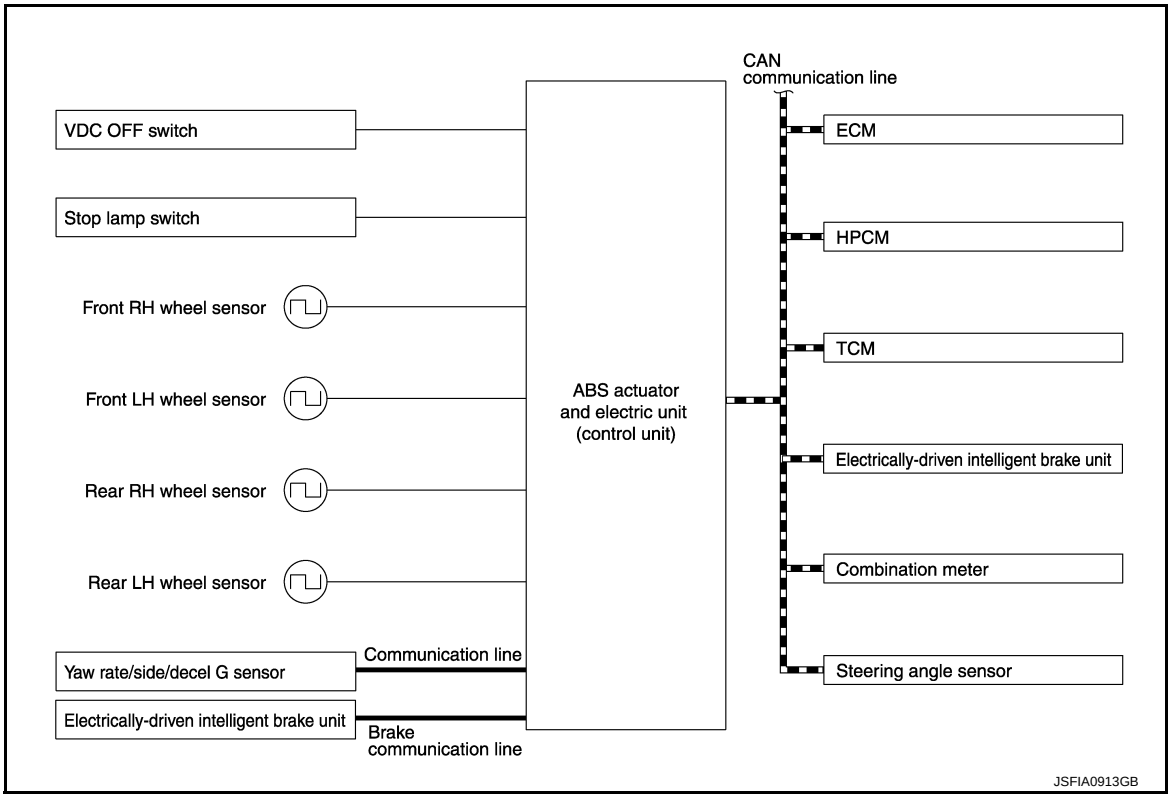
- Combination of Active Trace Control function (electrically-driven intelligent brake unit), Rise-up & Build-up function (electrically-driven intelligent brake unit) and Brake force distribution function [ABS actuator and electric unit (control unit)] is named to as Active stability assist. Active Trace Control function is available for models with ICC system.
- Active stability assist system is aimed to smooth the vehicle movement utilizing VDC function and electrically-driven intelligent brake function for enjoyable driving with reliable feeling of the driver.

- Active Trace Control function
- Active Trace Control function is refer to BR-28, "ACTIVE STABILITY ASSIST : Active Trace Control Function".

- Rise-up & Build-up function
- Rise-up & Build-up function is refer to BR-28, "ACTIVE STABILITY ASSIST : Rise-up & Build-up Function".

- Brake Force Distribution function
- During braking, Brake force Distribution optimizes the distribution of brake force to each of the four wheels depending on the state of the turn detected by driver's steering and some sensors. Brake force Distribution helps provide a more stable and secure feeling. Refer to BRC-43, "ACTIVE STABILITY ASSIST : Brake Force Distribution Function".

SYSTEM DIAGRAM



INPUT SIGNAL AND OUTPUT SIGNAL

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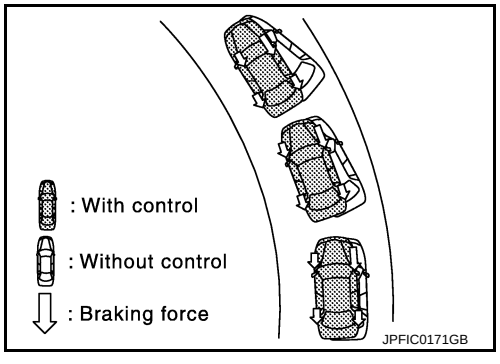
TCM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • Shift position signal
HPCM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • HPCM control signal
Electrically-driven intelligent brake unit	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication and brake communication line*2. • Electrically-driven intelligent brake control signal
Steering angle sensor	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • Steering angle sensor signal
Combination meter	Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. • Brake fluid level switch signal • VDC warning lamp signal • VDC OFF indicator lamp signal

*1: Communication line between yaw rate/side/decel G sensor and ABS actuator and electric unit (control unit)
*2: Communication line between electrically-driven intelligent brake unit and ABS actuator and electric unit (control unit)

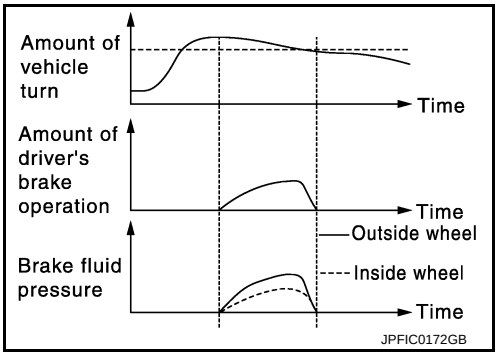
ACTIVE STABILITY ASSIST : Brake Force Distribution Function

INFOID:0000000008142296

- Brake force distribution function is controlled by ABS actuator and electric unit (control unit).
- Brake force distribution function helps provide a more stable and secure feeling.



- During cornering, when brake operation is performed brake fluid pressure of each wheel is controlled based on steering operation amount by the driver and vehicle cornering status amount detected by each sensor.
- Fail-safe function is adopted. When a malfunction occurs in Brake force distribution function, the control is suspended for VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function and Brake force distribution function. The vehicle status becomes the same as models without VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function and Brake force distribution function. However, ABS function and EBD function are operated normally. Refer to BRC-27, "Fail-Safe".



NOTE:
Brake force distribution function may not always be operates in all driving conditions.

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

CONSULT Function

INFOID:0000000008142297

APPLICATION ITEMS

CONSULT can display each diagnostic item using the diagnostic test modes as follows.

Mode	Function description
ECU identification	Parts number of ABS actuator and electric unit (control unit) can be read.
Self Diagnostic Result	Self-diagnostic results and freeze frame data 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 in which CONSULT drives some actuators apart from the ABS actuator and electric unit (control unit) and also shifts some parameters in a specified range.
WORK SUPPORT	Components can be quickly and accurately adjusted.

*: The following diagnosis information is erased by erasing.

- DTC
- Freeze frame data (FFD)

ECU IDENTIFICATION

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

SELF DIAGNOSTIC RESULT

Refer to BRC-57, "DTC Index".

When “CRNT” is displayed on self-diagnosis result,

- The system is presently malfunctioning.

When “PAST” is displayed on self-diagnosis result,

- System malfunction in the past is detected, but the system is presently normal.

Freeze frame data (FFD)

The following vehicle status is recorded when DTC is detected and is displayed on CONSULT.

Item name	Display item
IGN counter (0 – 39)	The number of times that ignition switch is turned ON after the DTC is detected is displayed. • When “0” is displayed: It indicates that the system is presently malfunctioning. • When except “0” is displayed: It indicates that system malfunction in the past is detected, but the system is presently normal. **NOTE:** Each time when ignition switch is turned OFF to ON, numerical number increases in 1 → 2 → 3...38 → 39. When the operation number of times exceeds 39, the number do not increase and “39” is displayed until self-diagnosis is erased.

DATA MONITOR

×: Applicable

Item (Unit)	Monitor item selection		Note
	INPUT SIGNALS	MAIN ITEMS	
FR LH SENSOR [km/h (MPH)]	×	×	Wheel speed calculated by front LH wheel sensor is displayed.
FR RH SENSOR [km/h (MPH)]	×	×	Wheel speed calculated by front RH wheel sensor is displayed.
RR LH SENSOR [km/h (MPH)]	×	×	Wheel speed calculated by rear LH wheel sensor is displayed.
RR RH SENSOR [km/h (MPH)]	×	×	Wheel speed calculated by rear RH wheel sensor is displayed.

Item (Unit)	Monitor item selection		Note
	INPUT SIGNALS	MAIN ITEMS	
BATTERY VOLT (V)	×	×	Voltage supplied to ABS actuator and electric unit (control unit) is displayed.
STOP LAMP SW (On/Off)	×	×	Stop lamp switch signal input status is displayed.
OFF SW (On/Off)	×	×	VDC OFF switch signal input status is displayed.
YAW RATE SEN (d/s)	×	×	Yaw rate detected by yaw rate sensor is displayed.
FR RH IN SOL (On/Off)		×	Operation status of front RH wheel ABS IN valve is displayed.
FR RH OUT SOL (On/Off)		×	Operation status of front RH wheel ABS OUT valve is displayed.
FR LH IN SOL (On/Off)		×	Operation status of front LH wheel ABS IN valve is displayed.
FR LH OUT SOL (On/Off)		×	Operation status of front LH wheel ABS OUT valve is displayed.
RR RH IN SOL (On/Off)		×	Operation status of rear RH wheel ABS IN valve is displayed.
RR RH OUT SOL (On/Off)		×	Operation status of rear RH wheel ABS OUT valve is displayed.
RR LH IN SOL (On/Off)		×	Operation status of rear LH wheel ABS IN valve is displayed.
RR LH OUT SOL (On/Off)		×	Operation status of rear LH wheel ABS OUT valve is displayed.
MOTOR RELAY (On/Off)		×	ABS motor and motor relay status is displayed.
ACTUATOR RLY (On/Off)		×	ABS actuator relay status is displayed.
ABS WARN LAMP (On/Off)		×	ABS warning lamp ON/OFF status is displayed. (Note 1)
OFF LAMP (On/Off)		×	VDC OFF indicator lamp ON/OFF status is displayed.(Note 1)
SLIP/VDC LAMP (On/Off)		×	VDC warning lamp ON/OFF status is displayed.(Note 1)
ACCEL POS SIG (%)	×		Displays the Accelerator pedal position
SIDE G -ENSOR (m/s^2))	×		Side G detected by side G sensor is displayed.
DECEL G-SEN (m/s^2))	×		Decel G detected by decel G sensor is displayed.
STR ANGLE SIG (°)	×		Steering angle detected by steering angle sensor is displayed.
PRESS SENSOR (bar)	×		Brake fluid pressure detected by pressure sensor is displayed.
FLUID LEV SW (On/Off)	×		Brake fluid level signal input status via CAN communication is displayed.
CV1 (On/Off)			Cut valve 1 operation status is displayed.
CV2 (On/Off)			Cut valve 2 operation status is displayed.

Item (Unit)	Monitor item selection		Note
	INPUT SIGNALS	MAIN ITEMS	
SV1 (On/Off)			Suction valve 1 operation status is displayed.
SV2 (On/Off)			Suction valve 2 operation status is displayed.
EBD SIGNAL (On/Off)			EBD operation status is displayed.
ABS SIGNAL (On/Off)			ABS operation status is displayed.
TCS SIGNAL (On/Off)			TCS operation status is displayed.
VDC SIGNAL (On/Off)			VDC operation status is displayed.
EBD FAIL SIG (On/Off)			EBD fail-safe signal status is displayed.
ABS FAIL SIG (On/Off)			ABS fail-safe signal status is displayed.
TCS FAIL SIG (On/Off)			TCS fail-safe signal status is displayed.
VDC FAIL SIG (On/Off)			VDC fail-safe signal status is displayed.
EBD WARN LAMP (On/Off)			Brake warning lamp ON/OFF status is displayed. (Note 1)
GEAR	×	×	Current gear position judged from current gear position signal is displayed.
N POSI SIG (On/Off)			N range signal input status judged from N range signal is displayed.
P POSI SIG (On/Off)			P range signal input status judged from P range signal is displayed.
R POSI SIG (On/Off)			R range signal input status judged from R range signal is displayed.
1ST GEAR SIG (On/Off)			1ST range signal input status judged from 1ST range signal is displayed.
USS SIG (Note 2) (On/Off)			hill start assist operation status is displayed.
STOP LAMP SW2 (On/Off)	×	×	Brake switch signal input status is displayed.

Note 1: Refer to BRC-16, "System Description" for ON/OFF conditions of each warning lamp and indicator lamp.
Note 2: “USS” means “hill start assist”

ACTIVE TEST

The active test is used to determine and identify details of a malfunction, based on self-diagnosis test results and data obtained in the DATA MONITOR. In response to instructions from CONSULT, instead of those from ABS actuator and electric unit (control unit) on the vehicle, a drive signal is sent to the actuator to check its operation.

CAUTION:
- **Never perform ACTIVE TEST while driving the vehicle.**
- **Always bleed air from brake system before active test.**
- **Never perform active test when system is malfunctioning.**

NOTE:
- When active test is performed while depressing the pedal, the pedal depressing stroke may change. This is not a malfunction.
- “TEST IS STOPPED” is displayed approx. 10 seconds after operation start.
- When performing active test again after “TEST IS STOPPED” is displayed, select “BACK”.

- ABS warning lamp, brake warning lamp and VDC warning lamp may turn ON during active test. This is not a malfunction.

ABS IN Valve and ABS OUT Valve
When “Up”, “Keep” or “Down” is selected on display screen, the following items are displayed when system is normal.

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 SPL	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*

*: Immediately after being selected, status is “On”. Status changes to “Off” after approx. 2 seconds.

ABS IN Valve (ACT) and ABS OUT Valve (ACT)
When “Up”, “ACT UP” or “ACT KEEP” is selected on display screen, the following items are displayed when system is normal.

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

*: Immediately after being selected, status is “On”. Status changes to “Off” after approx. 10 seconds.

ABS MOTOR
When “On” or “Off” is selected on display screen, the following items are displayed when system is normal.

Test item	Display Item	Display	
		On	Off
ABS MOTOR	MOTOR RELAY	On	Off
	ACTUATOR RLY(Note)	On	On

NOTE:
Display occasionally changes On/Off for a moment after ignition switch is turned ON. This is operation for checking purposes and is not a malfunction.

WORK SUPPORT

Conditions	Description
ST ANGLE SENSOR ADJUSTMENT	Perform neutral position adjustment of steering angle sensor.

ECU DIAGNOSIS INFORMATION

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Reference Value

INFOID:0000000008142298

CONSULT DATA MONITOR STANDARD VALUE

Monitor item	Condition	Reference values in normal operation
FR LH SENSOR	Vehicle stopped	0.00 km/h (MPH)
	When driving(Note 1)	Nearly matches the speedometer display (within ±10%)
FR RH SENSOR	Vehicle stopped	0.00 km/h (MPH)
	When driving(Note 1)	Nearly matches the speedometer display (within ±10%)
RR LH SENSOR	Vehicle stopped	0.00 km/h (MPH)
	When driving(Note 1)	Nearly matches the speedometer display (within ±10%)
RR RH SENSOR	Vehicle stopped	0.00 km/h (MPH)
	When driving(Note 1)	Nearly matches the speedometer display (within ±10%)
BATTERY VOLT	Ignition switch ON	10 – 16 V
STOP LAMP SW	Brake pedal depressed	On
	Brake pedal not depressed	Off
OFF SW	VDC OFF switch ON	On
	VDC OFF switch OFF	Off
YAW RATE SEN	Vehicle stopped	Approx. 0 d/s
	Turning right	Negative value
	Turning left	Positive value
FR RH IN SOL	Active	On
	Not activated	Off
FR RH OUT SOL	Active	On
	Not activated	Off
FR LH IN SOL	Active	On
	Not activated	Off
FR LH OUT SOL	Active	On
	Not activated	Off
RR RH IN SOL	Active	On
	Not activated	Off
RR RH OUT SOL	Active	On
	Not activated	Off
RR LH IN SOL	Active	On
	Not activated	Off
RR LH OUT SOL	Active	On
	Not activated	Off
MOTOR RELAY	Active	On
	Not activated	Off

Monitor item	Condition	Reference values in normal operation
ACTUATOR RLY	Active	On
	When not operating (in fail-safe mode)	Off
ABS WARN LAMP	When ABS warning lamp is ON(Note 2)	On
	When ABS warning lamp is OFF(Note 2)	Off
OFF LAMP	When VDC OFF indicator lamp is ON(Note 2)	On
	When VDC OFF indicator lamp is OFF(Note 2)	Off
SLIP/VDC LAMP	When VDC warning lamp is ON(Note 2)	On
	When VDC warning lamp is OFF(Note 2)	Off
ACCEL POS SIG	Never depress accelerator pedal (with ignition switch ON)	0%
	Depress accelerator pedal (with ignition switch ON)	0 – 100%
SIDE G-SENSOR	Vehicle stopped	Approx. 0 m/s^2
	Right turn	Negative value
	Left turn	Positive value
DECEL G-SEN	When stopped	Approx. 0 m/s^2
	During acceleration	Positive value
	During deceleration	Negative value
STR ANGLE SIG	When driving straight	0±2.5°
	When steering wheel is steered to LH by 90°	Approx. –90°
	When steering wheel is steered to RH by 90°	Approx. +90°
PRESS SENSOR	Brake pedal not depressed	Approx. 0 bar
	Brake pedal depressed	–0 – 25.5 bar
FLUID LEV SW	When brake fluid level switch is ON (brake fluid level is less than the specified level)	On
	When brake fluid level switch is OFF	Off
CV1	Active	On
	Not activated	Off
CV2	Active	On
	Not activated	Off
SV1	Active	On
	Not activated	Off
SV2	Active	On
	Not activated	Off
EBD SIGNAL	EBD activated	On
	EBD not activated	Off
ABS SIGNAL	ABS is activated	On
	ABS is not activated	Off
TCS SIGNAL	TCS activated	On
	TCS not activated	Off
VDC SIGNAL	VDC activated	On
	VDC not activated	Off
EBD FAIL SIG	In EBD fail-safe	On
	EBD is normal	Off

Monitor item	Condition	Reference values in normal operation
ABS FAIL SIG	In ABS fail-safe	On
	ABS is normal	Off
TCS FAIL SIG	In TCS fail-safe	On
	TCS is normal	Off
VDC FAIL SIG	In VDC fail-safe	On
	VDC is normal	Off
EBD WARN LAMP	When brake warning lamp is ON(Note 2)	On
	When brake warning lamp is OFF(Note 2)	Off
GEAR	Driving	1 – 7 Depending on shift status
N POSI SIG	When selector lever is in the N position	On
	When selector lever is in the other position than N	Off
P POSI SIG	When selector lever is in the P position	On
	When selector lever is in the other position than P	Off
R POSI SIG	When selector lever is in the R position	On
	When selector lever is in the other position than R	Off
1ST GEAR SIG	When selector lever is in the 1st position	On
	When selector lever is in the other position than 1st	Off
USS SIG(Note 3)	When hill start assist is active	On
	When hill start assist is not active	Off
STOP LAMP SW2	Brake pedal depressed	On
	Brake pedal not depressed	Off

Note 1: Confirm tire pressure is standard value.
Note 2: Refer to BRC-16, "System Description" for ON/OFF conditions of each warning lamp and indicator lamp.
Note 3: USS means “hill start assist”

Fail-Safe

INFOID:0000000008142299

VDC FUNCTION, TCS FUNCTION, BRAKE LIMITED SLIP DIFFERENTIAL (BLSD) FUNCTION, BRAKE ASSIST FUNCTION, BRAKE FORCE DISTRIBUTION FUNCTION

VDC warning lamp in combination meter turn ON when a malfunction occurs in system [ABS actuator and electric unit (control unit)]. The control is suspended for VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function, Brake force distribution function, Rise-up & Build-up function (function of electrically-driven intelligent brake) and Active Trace Control function (function of electrically-driven intelligent brake). The vehicle status becomes the same as models without VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function, Brake force distribution function, Rise-up & Build-up function (function of electrically-driven intelligent brake) and Active Trace Control function (function of electrically-driven intelligent brake). However, ABS function and EBD function are operated normally.

ABS FUNCTION

ABS warning lamp and VDC warning lamp in combination meter turn ON when a malfunction occurs in system [ABS actuator and electric unit (control unit)]. The control is suspended for VDC function, TCS function, ABS function, brake limited slip differential (BLSD) function, brake assist function, Brake force distribution function, Rise-up & Build-up function (function of electrically-driven intelligent brake) and Active Trace Control function (function of electrically-driven intelligent brake). The vehicle status becomes the same as models without VDC function, TCS function, ABS function, brake limited slip differential (BLSD) function, brake assist function, Brake force distribution function, Rise-up & Build-up function (function of electrically-driven intelligent brake) and Active Trace Control function (function of electrically-driven intelligent brake). However, EBD function is operated normally.

NOTE:

ABS self-diagnosis sound may be heard the same as in the normal condition, because self-diagnosis is performed when ignition switch turns ON and when vehicle initially starts.

EBD FUNCTION

ABS warning lamp, brake warning lamp and VDC warning lamp in combination meter turn ON when a malfunction occurs in system [ABS actuator and electric unit (control unit)]. The control is suspended for VDC function, TCS function, ABS function, EBD function, brake limited slip differential (BLSD) function, brake assist function, Brake force distribution function, Rise-up & Build-up function (function of electrically-driven intelligent brake) and Active Trace Control function (function of electrically-driven intelligent brake). The vehicle status becomes the same as models without VDC function, TCS function, ABS function, EBD function, brake limited slip differential (BLSD) function, brake assist function, Brake force distribution function, Rise-up & Build-up function (function of electrically-driven intelligent brake) and Active Trace Control function (function of electrically-driven intelligent brake).

DTC	Malfunction detected condition	Fail-safe condition
C1101	When an open circuit is detected in rear RH wheel sensor circuit.	The following functions are suspended. • VDC function • TCS function • ABS function • EBD function (only when both 2 rear wheels are malfunctioning) • Brake limited slip differential (BLSD) function • Brake assist function • Brake force distribution function • Rise-up & Build-up function (function of electrically-driven intelligent brake) • Active Trace Control function (function of electrically-driven intelligent brake)
C1102	When an open circuit is detected in rear LH wheel sensor circuit.	
C1103	When an open circuit is detected in front RH wheel sensor circuit.	
C1104	When an open circuit is detected in front LH wheel sensor circuit.	
C1105	• When power supply voltage of rear RH wheel sensor is low. • When distance between rear RH wheel sensor and rear RH wheel sensor rotor is large. • When installation of rear RH wheel sensor or rear RH wheel sensor rotor is not normal.	
C1106	• When power supply voltage of rear LH wheel sensor is low. • When distance between rear LH wheel sensor and rear LH wheel sensor rotor is large. • When installation of rear LH wheel sensor or rear LH wheel sensor rotor is not normal.	
C1107	• When power supply voltage of front RH wheel sensor is low. • When distance between front RH wheel sensor and front RH wheel sensor rotor is large. • When installation of front RH wheel sensor or front RH wheel sensor rotor is not normal.	
C1108	• When power supply voltage of front LRH wheel sensor is low. • When distance between front LH wheel sensor and front LH wheel sensor rotor is large. • When installation of front LH wheel sensor or front LH wheel sensor rotor is not normal.	
C1109	• When ignition voltage is 10 V or less. • When ignition voltage is 16 V or more.	The following functions are suspended. • VDC function • TCS function • ABS function • EBD function • Brake limited slip differential (BLSD) function • Brake assist function • Brake force distribution function • Rise-up & Build-up function (function of electrically-driven intelligent brake) • Active Trace Control function (function of electrically-driven intelligent brake)
C1110	When there is an internal malfunction in the ABS actuator and electric unit (control unit).	

DTC	Malfunction detected condition	Fail-safe condition
C1111	When a malfunction is detected in motor or motor relay.	The following functions are suspended. • VDC function • TCS function • ABS function • Brake limited slip differential (BLSD) function • Brake assist function • Brake force distribution function • Rise-up & Build-up function (function of electrically-driven intelligent brake) • Active Trace Control function (function of electrically-driven intelligent brake)
C1113	When a malfunction is detected in decel G signal.	The following functions are suspended. • VDC function • TCS function • Brake limited slip differential (BLSD) function • Brake assist function • Brake force distribution function • Rise-up & Build-up function (function of electrically-driven intelligent brake) • Active Trace Control function (function of electrically-driven intelligent brake)
C1115	When difference in wheel speed between any wheel and others is detected during the vehicle is driven, because of installation of other tires than specified.	The following functions are suspended. • VDC function • TCS function • ABS function • EBD function • Brake limited slip differential (BLSD) function • Brake assist function • Brake force distribution function • Rise-up & Build-up function (function of electrically-driven intelligent brake) • Active Trace Control function (function of electrically-driven intelligent brake)
C1116	When stop lamp switch signal is not input when brake pedal operates.	The following functions are suspended. • VDC function • TCS function • Brake limited slip differential (BLSD) function • Brake assist function • Brake force distribution function • Rise-up & Build-up function (function of electrically-driven intelligent brake) • Active Trace Control function (function of electrically-driven intelligent brake)
C1120	When a malfunction is detected in front LH ABS IN valve.	The following functions are suspended. • VDC function • TCS function • ABS function • EBD function • Brake limited slip differential (BLSD) function • Brake assist function • Brake force distribution function • Rise-up & Build-up function (function of electrically-driven intelligent brake) • Active Trace Control function (function of electrically-driven intelligent brake)
C1121	When a malfunction is detected in front LH ABS OUT valve.	
C1122	When a malfunction is detected in front RH ABS IN valve.	
C1123	When a malfunction is detected in front RH ABS OUT valve.	
C1124	When a malfunction is detected in rear LH ABS IN valve.	
C1125	When a malfunction is detected in rear LH ABS OUT valve.	
C1126	When a malfunction is detected in rear RH ABS IN valve.	
C1127	When a malfunction is detected in rear RH ABS OUT valve.	
C1140	When a malfunction is detected in actuator relay.	

DTC	Malfunction detected condition	Fail-safe condition
C1142	When a malfunction is detected in pressure sensor.	The following functions are suspended. • VDC function • TCS function • Brake limited slip differential (BLSD) function • Brake assist function • Brake force distribution function • Rise-up & Build-up function (function of electrically-driven intelligent brake) • Active Trace Control function (function of electrically-driven intelligent brake)
C1143	When a malfunction is detected in steering angle sensor.	
C1144	When neutral position adjustment of steering angle sensor is not complete.	
C1145	When a malfunction is detected in yaw rate signal.	
C1146	When a malfunction is detected in side/decel G signal.	The following functions are suspended. • VDC function • TCS function • ABS function • Brake limited slip differential (BLSD) function • Brake assist function • Brake force distribution function • Rise-up & Build-up function (function of electrically-driven intelligent brake) • Active Trace Control function (function of electrically-driven intelligent brake)
C1155	When brake fluid level low signal is detected.	
C1164	When a malfunction is detected in cut valve 1.	The following functions are suspended. • VDC function • TCS function • ABS function • EBD function • Brake limited slip differential (BLSD) function • Brake assist function • Brake force distribution function • Rise-up & Build-up function (function of electrically-driven intelligent brake) • Active Trace Control function (function of electrically-driven intelligent brake)
C1165	When a malfunction is detected in cut valve 2.	
C1166	When a malfunction is detected in suction valve 1.	
C1167	When a malfunction is detected in suction valve 2.	
C1176	When brake switch signal is not input when brake pedal operates.	The following functions are suspended. • VDC function • TCS function • Brake limited slip differential (BLSD) function • Brake assist function • Brake force distribution function • Rise-up & Build-up function (function of electrically-driven intelligent brake) • Active Trace Control function (function of electrically-driven intelligent brake)
C118A	When a malfunction is detected in electrically-driven intelligent brake system.	The following functions are suspended. • VDC function • TCS function • ABS function • EBD function • Brake limited slip differential (BLSD) function • Brake assist function • Brake force distribution function • Rise-up & Build-up function (function of electrically-driven intelligent brake) • Active Trace Control function (function of electrically-driven intelligent brake)

DTC	Malfunction detected condition	Fail-safe condition
C118C	When a malfunction is detected in HPCM system.	The following functions are suspended. • VDC function • TCS function • Brake limited slip differential (BLSD) function • Brake assist function • Brake force distribution function • Rise-up & Build-up function (function of electrically-driven intelligent brake) • Active Trace Control function (function of electrically-driven intelligent brake)
U1000	When CAN communication signal is not continuously received for 2 seconds or more.	
U1010	When detecting error during the initial diagnosis of CAN controller of ABS actuator and electric unit (control unit).	
U110D	When ABS actuator and electric unit (control unit) is not transmitting or receiving brake communication signal for 4 seconds or more.	The following functions are suspended. • VDC function • TCS function • ABS function • EBD function • Brake limited slip differential (BLSD) function • Brake assist function • Brake force distribution function • Rise-up & Build-up function (function of electrically-driven intelligent brake) • Active Trace Control function (function of electrically-driven intelligent brake)

DTC Inspection Priority Chart

INFOID:0000000008142300

When multiple DTCs are displayed simultaneously, check one by one depending on the following priority list.

Priority	Detected item (DTC)
1	• U1000 CAN COMM CIRCUIT • U1010 CONTROL UNIT (CAN) • U110D E-DRIVEN INTELLIGENT BRAKE COMM
2	• C1110 CONTROLLER FAILURE
3	• C1144 ST ANG SEN SIGNAL • C118A E-DRIVEN INTELLIGENT BRAKE SYSTEM • C118C EV/HEV SYSTEM
4	• C1109 BATTERY VOLTAGE [ABNOMAL] • C1111 PUMP MOTOR • C1140 ACTUATOR RLY

Priority	Detected item (DTC)
5	• C1101 RR RH SENSOR-1 • C1102 RR LH SENSOR-1 • C1103 FR RH SENSOR-1 • C1104 FR LH SENSOR-1 • C1105 RR RH SENSOR-2 • C1106 RR LH SENSOR-2 • C1107 FR RH SENSOR-2 • C1108 FR LH SENSOR-2 • C1113 G-SENSOR • C1115 ABS SENSOR [ABNORMAL SIGNAL] • C1116 STOP LAMP SW • C1120 FR LH IN ABS SOL • C1121 FR LH OUT ABS SOL • C1122 FR RH IN ABS SOL • C1123 FR RH OUT ABS SOL • C1124 RR LH IN ABS SOL • C1125 RR LH OUT ABS SOL • C1126 RR RH IN ABS SOL • C1127 RR RH OUT ABS SOL • C1142 PRESS SEN CIRCUIT • C1143 ST ANG SEN CIRCUIT • C1145 YAW RATE SENSOR • C1146 SIDE G SEN CIRCUIT • C1164 CV 1 • C1165 CV 2 • C1166 SV 1 • C1167 SV 2 • C1176 STOP LAMP SW2
6	• C1155 BR FLUID LEVEL LOW

DTC Index

INFOID:0000000008142301

DTC	Display Item	Refer to
C1101	RR RH SENSOR-1	BRC-69, "DTC Logic"
C1102	RR LH SENSOR-1	
C1103	FR RH SENSOR-1	
C1104	FR LH SENSOR-1	
C1105	RR RH SENSOR-2	BRC-73, "DTC Logic"
C1106	RR LH SENSOR-2	
C1107	FR RH SENSOR-2	
C1108	FR LH SENSOR-2	
C1109	BATTERY VOLTAGE [ABNOMAL]	BRC-79, "DTC Logic"
C1110	CONTROLLER FAILURE	BRC-82, "DTC Logic"
C1111	PUMP MOTOR	BRC-83, "DTC Logic"
C1113	G-SENSOR	BRC-86, "DTC Logic"
C1115	ABS SENSOR [ABNORMAL SIGNAL]	BRC-90, "DTC Logic"
C1116	STOP LAMP SW	BRC-97, "DTC Logic"
C1120	FR LH IN ABS SOL	BRC-103, "DTC Logic"
C1121	FR LH OUT ABS SOL	BRC-105, "DTC Logic"
C1122	FR RH IN ABS SOL	BRC-103, "DTC Logic"
C1123	FR RH OUT ABS SOL	BRC-105, "DTC Logic"
C1124	RR LH IN ABS SOL	BRC-103, "DTC Logic"
C1125	RR LH OUT ABS SOL	BRC-105, "DTC Logic"

DTC	Display Item	Refer to
C1126	RR RH IN ABS SOL	BRC-103, "DTC Logic"
C1127	RR RH OUT ABS SOL	BRC-105, "DTC Logic"
C1140	ACTUATOR RLY	BRC-107, "DTC Logic"
C1142	PRESS SEN CIRCUIT	BRC-109, "DTC Logic"
C1143	ST ANG SEN CIRCUIT	BRC-112, "DTC Logic"
C1144	ST ANG SEN SIGNAL	BRC-115, "DTC Logic"
C1145	YAW RATE SENSOR	BRC-86, "DTC Logic"
C1146	SIDE G SEN CIRCUIT	
C1155	BR FLUID LEVEL LOW	BRC-117, "DTC Logic"
C1164	CV 1	BRC-121, "DTC Logic"
C1165	CV 2	
C1166	SV1	BRC-123, "DTC Logic"
C1167	SV2	
C1176	STOP LAMP2	BRC-125, "DTC Logic"
C118A	E-DRIVEN INTELLIGENT BRAKE SYSTEM	BRC-130, "DTC Logic"
C118C	EV/HEV SYSTEM	BRC-132, "DTC Logic"
U1000	CAN COMM CIRCUIT	BRC-134, "DTC Logic"
U1010	CONTROL UNIT (CAN)	BRC-135, "DTC Logic"
U110D	E-DRIVEN INTELLIGENT BRAKE COMM	BRC-136, "DTC Logic"

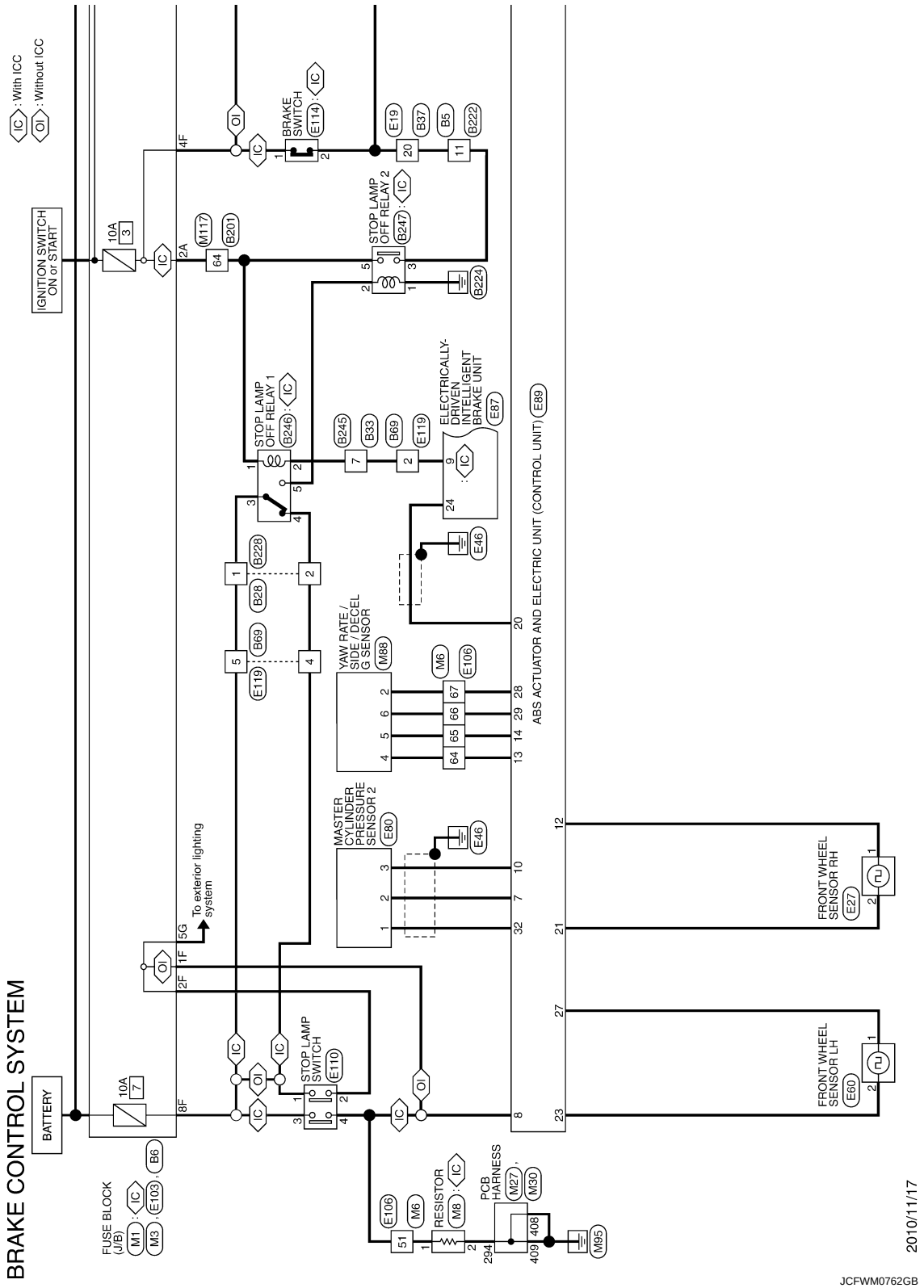
WIRING DIAGRAM

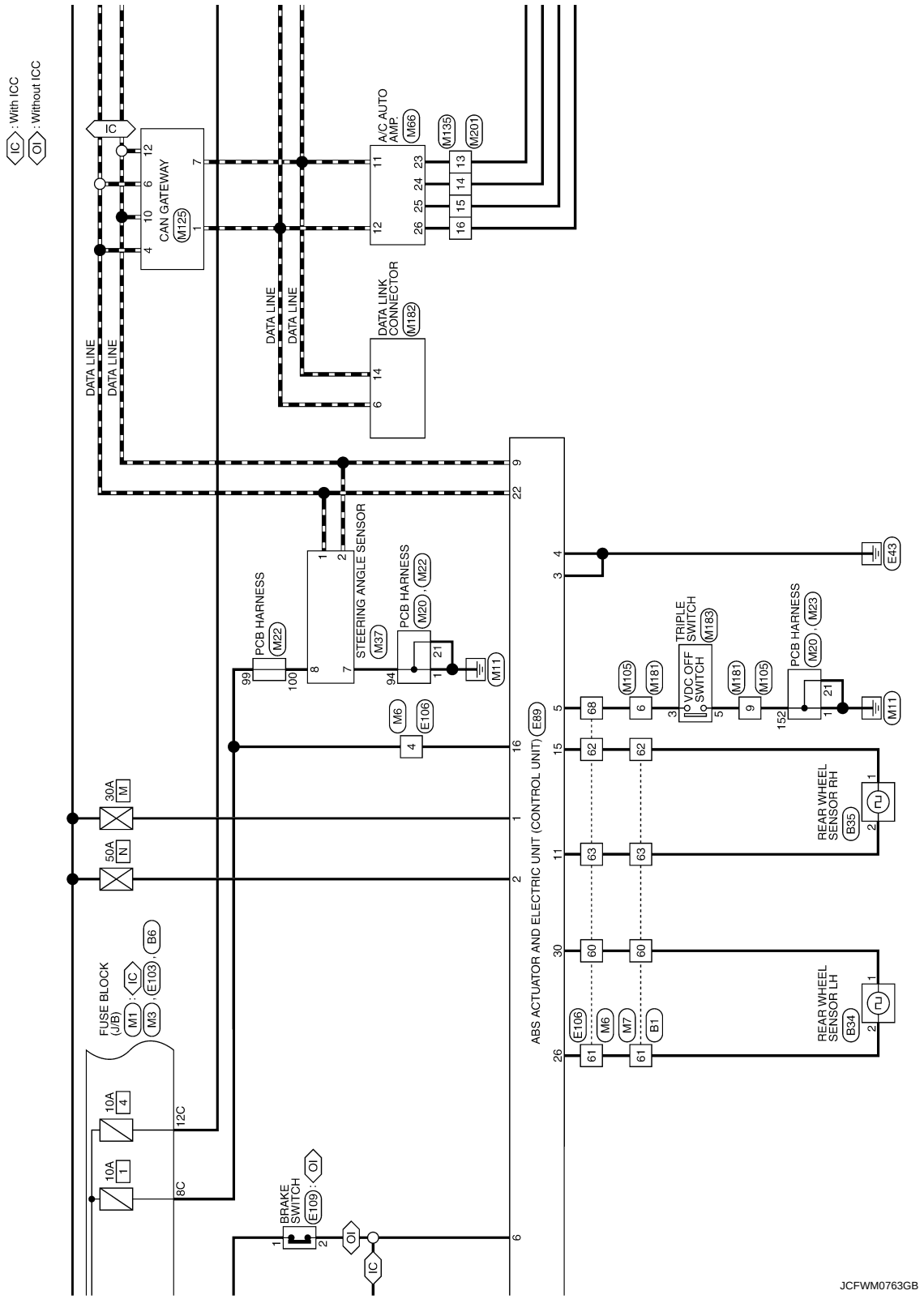
BRAKE CONTROL SYSTEM

Wiring Diagram

INFOID:0000000008142302

For connector terminal arrangements, harness layouts, and alphabets in a ⬡ (option abbreviation; if not described in wiring diagram), refer to GI-13, "Connector Information".

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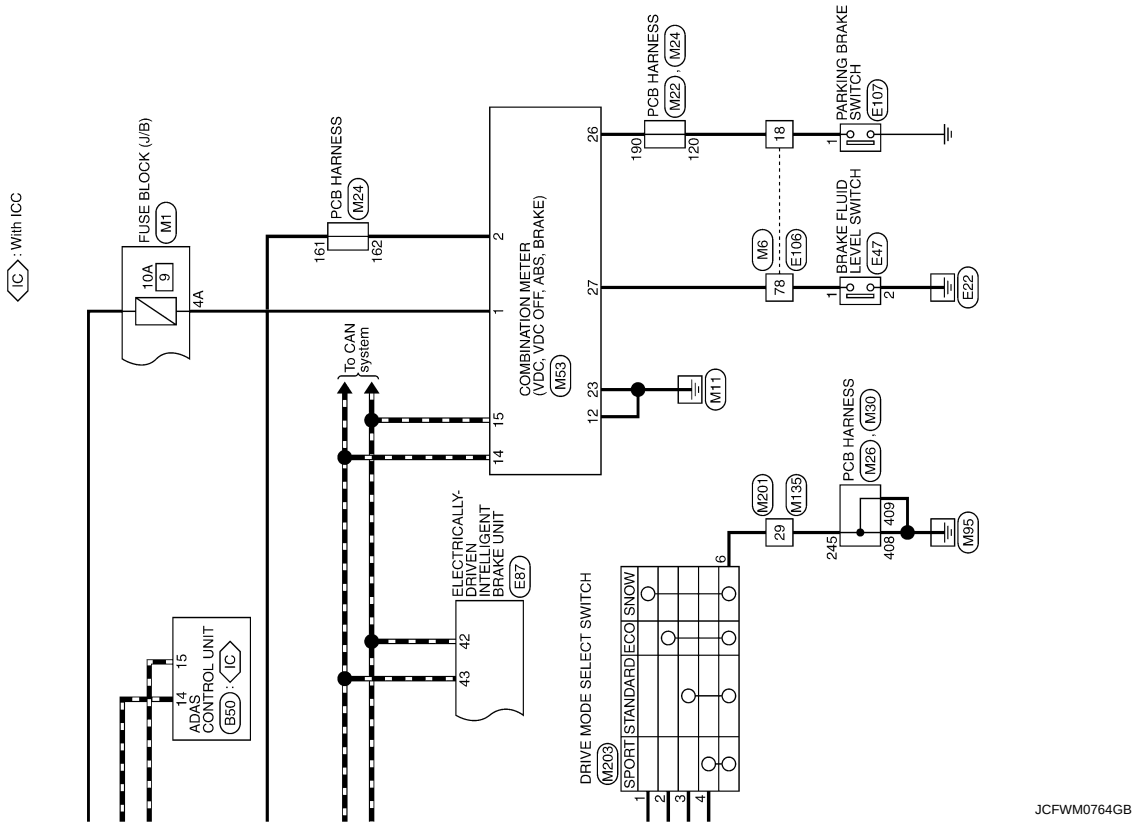
OI : Without ICC
CAN GATEWAY M125
A/C AUTO AMP. M66
M135
M201
DATA LINK CONNECTOR M182
DATA LINE
STEERING ANGLE SENSOR M37
PCB HARNESS M22
PCB HARNESS M20, M22
M11
M6 E106
TRIPLE SWITCH M183
VDC OFF SWITCH
M105 M181
PCB HARNESS M20, M23
E43
ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) E89
REAR WHEEL SENSOR RH B35
REAR WHEEL SENSOR LH B34
M7 B1
30A M
50A N
FUSE BLOCK (J/B) M1, M3, E103, B6
10A 4
10A 1
12C
8C
BRAKE SWITCH E109
JCFWM0763GB


IC : With ICC
FUSE BLOCK (J/B)
M1
10A
9
4A
PCB HARNESS
M24
161
162
To CAN system
COMBINATION METER
(VDC, VDC OFF, ABS, BRAKE)
M53
2
1
15
14
23
12
26
27
M11
PCB HARNESS
M22
M24
190
120
18
PARKING BRAKE SWITCH
E107
M6
E106
78
BRAKE FLUID LEVEL SWITCH
E47
E22
PCB HARNESS
M26
M30
M201
M135
29
245
408
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BASIC INSPECTION

DIAGNOSIS AND REPAIR WORK FLOW

Work Flow

INFOID:0000000008142303

DETAILED FLOW

1.INTERVIEW FROM THE CUSTOMER

Clarify customer complaints before inspection. First of all, perform an interview utilizing BRC-63, "Diagnostic Work Sheet" and reproduce the symptom as well as fully understand it. Ask customer about his/her complaints carefully. Check symptoms by driving vehicle with customer, if necessary.

CAUTION:

Customers are not professional. Never guess easily like “maybe the customer means that...,” or “ maybe the customer mentions this symptom”.

>> GO TO 2.

2.CHECK SYMPTOM

Reproduce the symptom that is indicated by the customer, based on the information from the customer obtained by interview. Also check that the symptom is not caused by fail-safe mode. Refer to BRC-52, "Fail-Safe".

CAUTION:

When the symptom is caused by normal operation, fully inspect each portion and obtain the understanding of customer that the symptom is not caused by a malfunction.

>> GO TO 3.

3.PERFORM THE SELF-DIAGNOSIS

With CONSULT

1. Turn the ignition switch OFF → ON.
   CAUTION:
   Be sure to wait of 10 seconds after turning power switch OFF or ON.
2. Repeat step 1 two or more times.
3. Perform self-diagnosis.

Is any DTC detected?

YES >> Record or print self-diagnosis results and freeze frame data (FFD). GO TO 4.
NO >> GO TO 6.

4.RECHECK THE SYMPTOM

With CONSULT

1. Erase self-diagnostic results for “ABS”.
2. Turn the ignition switch OFF → ON → OFF.
   CAUTION:
   Be sure to wait of 10 seconds after turning power switch OFF or ON.
3. Perform DTC confirmation procedures for the error-detected system.
   NOTE:
   If some DTCs are detected at the some time, determine the order for performing the diagnosis based on BRC-56, "DTC Inspection Priority Chart".

Is any DTC detected?

YES >> GO TO 5.
NO >> Check harness and connectors based on the information obtained by interview. Refer to GI-49, "Intermittent Incident".

5.REPAIR OR REPLACE ERROR-DETECTED PART

- Repair or replace error-detected parts.
- Reconnect part or connector after repairing or replacing.
- When DTC is detected, erase self-diagnostic result for “ABS”.

CAUTION:
- **Turn the power switch OFF → ON → OFF after erase self-diagnosis result.**
- **Be sure to wait of 10 seconds after turning power switch OFF or ON.**

>> GO TO 7.

6. IDENTIFY ERROR-DETECTED SYSTEM BY SYMPTOM DIAGNOSIS

Estimate error-detected system based on symptom diagnosis and perform inspection.

Can the error-detected system be identified?

YES >> GO TO 7.
NO >> Check harness and connectors based on the information obtained by interview. Refer to GI-49, "Intermittent Incident".

7. FINAL CHECK

With CONSULT
1. Check the reference value for “ABS”.
2. Recheck the symptom and check that the symptom is not reproduced on the same conditions.

Is the symptom reproduced?

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

Diagnostic Work Sheet

INFOID:0000000008142304

Description

- In general, customers have their own criteria for a problem. Therefore, it is important to understand the symptom and status well enough by asking the customer about his/her concerns carefully. To systemize all the information for the diagnosis, prepare the interview sheet referring to the interview points.
- In some cases, multiple conditions that appear simultaneously may cause a DTC to be detected.

INTERVIEW SHEET SAMPLE

Interview sheet					
Customer name	MR/MS	Registration number		Initial year registration	
		Vehicle type		VIN	
Storage date		Engine/traction Motor		Mileage	km (Mile)
Symptom		☐ Does not operate ( ) function			
		☐ Warning lamp for ( ) turns ON.			
		☐ Noise ☐ Vibration			
		☐ Other ( )			
First occurrence		☐ Recently ☐ Other ( )			
Frequency of occurrence		☐ Always ☐ Under a certain conditions of ☐ Sometimes (time(s)/day)			
Climate conditions		☐ Irrelevant			
	Weather	☐ Fine ☐ Cloud ☐ Rain ☐Snow ☐ Others ( )			
	Temperature	☐ Hot ☐Warm ☐ Cool ☐ Cold ☐ Temperature [Approx. °C (°F)]			
	Relative humidity	☐ High ☐ Moderate ☐ Low			
Road conditions		☐ Urban area ☐ Suburb area ☐ Highway ☐ Mountainous road (uphill or downhill) ☐ Rough road			

Interview sheet

Customer name	MR/MS	Registration number		Initial year registration	
		Vehicle type		VIN	
Storage date		Engine/traction Motor		Mileage	km (Mile)
Operating condition, etc.		☐Irrelevant ☐When engine/traction motor starts ☐ During idling ☐ During driving ☐ During acceleration ☐ At constant speed driving ☐ During deceleration ☐ During cornering (right curve or left curve) ☐ When steering wheel is steered (to right or to left)			
Other conditions					

Memo

ADDITIONAL SERVICE WHEN REPLACING ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Description

INFOID:0000000008142305

When replaced the ABS actuator and electric unit (control unit), Perform steering angle sensor neutral position. Refer to BRC-66, "Work Procedure".

ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Description

INFOID:0000000008142306

Always adjust the neutral position of steering angle sensor before driving when the following operation is performed.

×: Required —: Not required

Procedure	Adjust the neutral position of steering angle sensor
Removing/ installing ABS actuator and electric unit (control unit)	—
Replacing ABS actuator and electric unit (control unit)	×
Removing/installing steering angle sensor	×
Replacing steering angle sensor	×
Removing/installing steering components	×
Replacing steering components	×
Removing/installing suspension components	×
Replacing suspension components	×
Removing/installing tire	—
Replacing tire	—
Tire rotation	—
Adjusting wheel alignment	×

Work Procedure

INFOID:0000000008142307

ADJUST THE NEUTRAL POSITION OF STEERING ANGLE SENSOR

CAUTION:

Always use CONSULT when adjusting the neutral position of steering angle sensor. (It cannot be adjusted other than with CONSULT.)

1.CHECK THE VEHICLE STATUS (1)

Stop vehicle with front wheels in the straight-ahead position.

Does the vehicle stay in the straight-ahead position?

YES >> GO TO 2.
NO >> Steer the steering wheel to the straight-ahead position. Stop the vehicle.

2.ADJUST NEUTRAL POSITION OF STEERING ANGLE SENSOR

With CONSULT

1. Turn the ignition switch ON.
   CAUTION:
   Never set the vehicle to READY/Never start the engine.
2. Select “ABS”, “WORK SUPPORT” and “ST ANGLE SENSOR ADJUSTMENT” in this order.
3. Select “START”.
   CAUTION:
   Never touch steering wheel while adjusting steering angle sensor.
4. After approx. 10 seconds, select “END”.
5. turn the ignition switch OFF, and then turn it ON again.
   CAUTION:
   Be sure to perform the operation above.

>> GO TO 3.

3.CHECK DATA MONITOR (1)

With CONSULT

1. The vehicle is either pointing straight ahead, or the vehicle needs to be moved. Stop when it is pointing straight ahead.

2. Select “ABS”, “DATA MONITOR”, “ECU INPUT SIGNALS” and “STR ANGLE SIG” in the order. Check that the signal is within the specified value.

STR ANGLE SIG : 0±2.5°

Is the inspection result normal?

YES >> GO TO 10.
NO >> GO TO 4.

4. CHECK STEERING COMPONENT PARTS

Check the installation conditions of steering component parts.
- With heated steering wheel: Refer to ST-28, "Inspection".
- Without heated steering wheel: Refer to ST-55, "Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace error-detected parts. GO TO 5.

5. CHECK SUSPENSION COMPONENT PARTS

Check the installation conditions of suspension component parts.
- Front: Refer to FSU-6, "Inspection".
- Rear: Refer to RSU-5, "Inspection".

Is the inspection result normal?

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

6. CHECK WHEEL ALIGNMENT

Check the wheel alignment.
- Front: Refer to FSU-7, "Inspection".
- Rear: Refer to RSU-6, "Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Adjust the wheel alignment. GO TO 7.
- Front: Refer to FSU-7, "Inspection".
- Rear: Refer to RSU-6, "Adjustment".

7. CHECK THE VEHICLE STATUS (2)

Check the vehicle stay in the straight-ahead position.
- With heated steering wheel: Refer to ST-12, "Inspection".
- Without heated steering wheel: Refer to ST-51, "Inspection".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Adjust the vehicle stay in the straight-ahead position. GO TO 8.

8. CHECK DATA MONITOR (2)

With CONSULT
1. The vehicle is either pointing straight ahead, or the vehicle needs to be moved. Stop when it is pointing straight ahead.
2. Select “ABS”, “DATA MONITOR”, “ECU INPUT SIGNALS” and “STR ANGLE SIG” in the order. Check that the signal is within the specified value.

STR ANGLE SIG : 0±2.5°

Is the inspection result normal?

YES >> GO TO 10.
NO >> GO TO 9.

9. CHECK DATA MONITOR (1)

With CONSULT
1. The vehicle is either pointing straight ahead, or the vehicle needs to be moved.

CAUTION:
- **Drive the vehicle at approx. 30 km/h (19 MPH) or more for 300 m (985 ft) or more.**
- **Never use tester.**

2. The vehicle is either pointing straight ahead, or the vehicle needs to be moved. Stop when it is pointing straight ahead.
3. Select “ABS”, “DATA MONITOR”, “ECU INPUT SIGNALS” and “STR ANGLE SIG” in the order. Check that the signal is within the specified value.

STR ANGLE SIG : 0±2.5°

Is the inspection result normal?

YES >> GO TO 10.
NO >> GO TO 1.

10. ERASE SELF-DIAGNOSIS MEMORY

With CONSULT

1. Erase self-diagnosis result of “ABS”.
2. Turn the ignition switch OFF → ON → OFF.

CAUTION:
Be sure to wait for 10 seconds or more after turning the ignition switch OFF or ON.

Are the memories erased?

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

DTC/CIRCUIT DIAGNOSIS

C1101, C1102, C1103, C1104 WHEEL SENSOR

DTC Logic

INFOID:0000000008142308

DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1101	RR RH SENSOR-1	When an open circuit is detected in rear RH wheel sensor circuit.	• Harness or connector • Wheel sensor • ABS actuator and electric unit (control unit)
C1102	RR LH SENSOR-1	When an open circuit is detected in rear LH wheel sensor circuit.	
C1103	FR RH SENSOR-1	When an open circuit is detected in front RH wheel sensor circuit.	
C1104	FR LH SENSOR-1	When an open circuit is detected in front LH wheel sensor circuit.	

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

With CONSULT
1. Set the vehicle to READY/Start the engine.
2. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
3. Stop the vehicle.
4. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
5. Repeat step 4 two or more times.
6. Perform self-diagnosis for “ABS”.

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

YES >> Proceed to BRC-69, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008142309

CAUTION:
Never check between wheel sensor harness connector terminals.

1. CHECK WHEEL SENSOR

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

Is the inspection result normal?

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

2. REPLACE WHEEL SENSOR (1)

With CONSULT
1. Replace wheel sensor.

- Front: Refer to BRC-159, "FRONT WHEEL SENSOR : Removal and Installation".
- Rear: Refer to BRC-160, "REAR WHEEL SENSOR : Removal and Installation".

2. Erase self-diagnosis result for “ABS”.
3. Turn the ignition switch OFF → ON → OFF.
   CAUTION:
   Be sure to wait of 10 seconds after turning ignition switch OFF or ON.
4. Set the vehicle to READY/Start the engine.
5. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
6. Stop the vehicle.
7. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
8. Repeat step 7 two or more times.
9. Perform self-diagnosis for “ABS”.

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

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

3.CHECK CONNECTOR

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

Is the inspection result normal?

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

4.PERFORM SELF-DIAGNOSIS (1)

With CONSULT
1. Erase self-diagnosis result for “ABS”.
2. Turn the ignition switch OFF → ON → OFF.
   CAUTION:
   Be sure to wait of 10 seconds after turning ignition switch OFF or ON.
3. Set the vehicle to READY/Start the engine.
4. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
5. Stop the vehicle.
6. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
7. Repeat step 6 two or more times.
8. Perform self-diagnosis for “ABS”.

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

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

5.CHECK TERMINAL

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

Is the inspection result normal?

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

6.PERFORM SELF-DIAGNOSIS (2)

With CONSULT
1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Connect wheel sensor harness connector.
3. Erase self-diagnosis result for “ABS”.

4. Turn the ignition switch OFF → ON → OFF.
   CAUTION:
   Be sure to wait of 10 seconds after turning ignition switch OFF or ON.
5. Set the vehicle to READY/Start the engine.
6. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
7. Stop the vehicle.
8. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
9. Repeat step 8 two or more times.
10. Perform self-diagnosis for “ABS”.

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

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

7. CHECK WHEEL SENSOR HARNESS

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

Measurement connector and terminal for power supply circuit

ABS actuator and electric unit (control unit)		Wheel sensor			Continuity
Connector	Terminal	Connector		Terminal	
E89	21	E27	(Front RH wheel)	2	Existed
	23	E60	(Front LH wheel)		
	11	B35	(Rear RH wheel)		
	26	B34	(Rear LH wheel)		

Measurement connector and terminal for signal circuit

ABS actuator and electric unit (control unit)		Wheel sensor			Continuity
Connector	Terminal	Connector		Terminal	
E89	12	E27	(Front RH wheel)	1	Existed
	27	E60	(Front LH wheel)		
	15	B35	(Rear RH wheel)		
	30	B34	(Rear LH wheel)		

Is the inspection result normal?

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

8. PERFORM SELF-DIAGNOSIS (3)

With CONSULT
1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Connect wheel sensor harness connector.
3. Erase self-diagnosis result for “ABS”.
4. Turn the ignition switch OFF → ON → OFF.
   CAUTION:
   Be sure to wait of 10 seconds after turning ignition switch OFF or ON.
5. Set the vehicle to READY/Start the engine.
6. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
7. Stop the vehicle.
8. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**

- **Set the vehicle to READY/Start the engine.**

9. Repeat step 8 two or more times.
10. Perform self-diagnosis for “ABS”.

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

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

9.REPLACE WHEEL SENSOR

With CONSULT

1. Replace wheel sensor.

- Front: Refer to BRC-159, "FRONT WHEEL SENSOR : Removal and Installation".
- Rear: Refer to BRC-160, "REAR WHEEL SENSOR : Removal and Installation".

2. Erase self-diagnosis result for “ABS”.
3. Turn the ignition switch OFF → ON → OFF.

CAUTION:
Be sure to wait of 10 seconds after turning ignition switch OFF or ON.

4. Set the vehicle to READY/Start the engine.
5. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
6. Stop the vehicle.
7. Turn the ignition switch OFF → ON.

CAUTION:
- **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
- **Set the vehicle to READY/Start the engine.**

8. Repeat step 7 two or more times.
9. Perform self-diagnosis for “ABS”.

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

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-163, "Removal and Installation".
NO >> INSPECTION END

C1105, C1106, C1107, C1108 WHEEL SENSOR

DTC Logic

INFOID:0000000008142310

DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1105	RR RH SENSOR-2	• When power supply voltage of rear RH wheel sensor is low. • When distance between rear RH wheel sensor and rear RH wheel sensor rotor is large. • When installation of rear RH wheel sensor or rear RH wheel sensor rotor is not normal.	• Harness or connector • Wheel sensor • ABS actuator and electric unit (control unit) • Sensor rotor
C1106	RR LH SENSOR-2	• When power supply voltage of rear RH wheel sensor is low. • When distance between rear LH wheel sensor and rear LH wheel sensor rotor is large. • When installation of rear LH wheel sensor or rear LH wheel sensor rotor is not normal.	
C1107	FR RH SENSOR-2	• When power supply voltage of rear RH wheel sensor is low. • When distance between front RH wheel sensor and front RH wheel sensor rotor is large. • When installation of front RH wheel sensor or front RH wheel sensor rotor is not normal.	
C1108	FR LH SENSOR-2	• When power supply voltage of rear RH wheel sensor is low. • When distance between front LH wheel sensor and front LH wheel sensor rotor is large. • When installation of front LH wheel sensor or front LH wheel sensor rotor is not normal.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Set the vehicle to READY/Start the engine.
2. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
3. Stop the vehicle.
4. Turn the ignition switch OFF → ON.

CAUTION:

- **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
- **Set the vehicle to READY/Start the engine.**

5. Repeat step 4 two or more times.
6. Perform self-diagnosis for “ABS”.

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

YES >> Proceed to BRC-73, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008142311

CAUTION:
Never check between wheel sensor harness connector terminals.

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

Check ABS actuator and electric unit (control unit) power supply system. Refer to BRC-138, "Diagnosis Procedure".

Is the inspection result normal?

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

2. CHECK TIRE

1. Turn the ignition switch OFF.
2. Check tire air pressure, wear and size. Refer to WT-64, "Tire Air Pressure".

Is the inspection result normal?

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

3. CHECK DATA MONITOR (1)

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

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

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

4. PERFORM SELF-DIAGNOSIS (1)

With CONSULT
1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
2. Stop the vehicle.
3. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
4. Repeat step 3 two or more times.
5. Perform self-diagnosis for “ABS”.

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

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

5. CHECK WHEEL SENSOR

1. Turn the ignition switch OFF.
2. Check wheel sensor for damage.
3. Remove dust and foreign matter adhered to the sensor rotor with a vacuum dust collector through the wheel sensor mounting hole.
   CAUTION:
   Install wheel sensor with no backlash and float, and tighten the mounting bolt to the specified torque.
   - **Front: Refer to BRC-159, "FRONT WHEEL SENSOR : Exploded View".**
   - **Rear: Refer to BRC-160, "REAR WHEEL SENSOR : Exploded View".**

Is the inspection result normal?

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

6. REPLACE WHEEL SENSOR (1)

With CONSULT
1. Replace wheel sensor.
- Front: Refer to BRC-159, "FRONT WHEEL SENSOR : Removal and Installation".
- Rear: Refer to BRC-160, "REAR WHEEL SENSOR : Removal and Installation".
2. Erase self-diagnosis result for “ABS”.
3. Turn the ignition switch OFF → ON → OFF.
CAUTION:
Be sure to wait of 10 seconds after turning ignition switch OFF or ON.
4. Set the vehicle to READY/Start the engine.
5. Select “ABS” and “DATA MONITOR”, check “FR LH SENSOR”, “FR RH SENSOR”, “RR LH SENSOR” and “RR RH SENSOR”.
NOTE:
Set the “DATA MONITOR” recording speed to “10 msec”.
6. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.

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

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

7. PERFORM SELF-DIAGNOSIS (2)

With CONSULT
1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
2. Stop the vehicle.
3. Turn the ignition switch OFF → ON.
CAUTION:
- **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
- **Set the vehicle to READY/Start the engine.**
4. Repeat step 3 two or more times.
5. Perform self-diagnosis for “ABS”.

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

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

8. CHECK CONNECTOR

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

Is the inspection result normal?

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

9. CHECK DATA MONITOR (2)

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

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

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

10. PERFORM SELF-DIAGNOSIS (3)

With CONSULT
1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
2. Stop the vehicle.
3. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
4. Repeat step 3 two or more times.
5. Perform self-diagnosis for “ABS”.

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

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

11. CHECK TERMINAL

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

Is the inspection result normal?

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

12. CHECK DATA MONITOR (3)

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

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

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

13. PERFORM SELF-DIAGNOSIS (4)

With CONSULT
1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
2. Stop the vehicle.
3. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
4. Repeat step 3 two or more times.

5. Perform self-diagnosis for “ABS”.

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

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

14. CHECK WHEEL SENSOR HARNESS

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E89	12, 21	Ground	Not existed
	23, 27		
	11, 15		
	26, 30		

Is the inspection result normal?

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

15. CHECK DATA MONITOR (4)

With CONSULT

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

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

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

16. PERFORM SELF-DIAGNOSIS (5)

With CONSULT

1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
2. Stop the vehicle.
3. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
4. Repeat step 3 two or more times.
5. Perform self-diagnosis for “ABS”.

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

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

17. REPLACE WHEEL SENSOR (2)

With CONSULT
1. Replace wheel sensor.
- Front: Refer to BRC-159, "FRONT WHEEL SENSOR : Removal and Installation".
- Rear: Refer to BRC-160, "REAR WHEEL SENSOR : Removal and Installation".
2. Erase self-diagnosis result for “ABS”.
3. Turn the ignition switch OFF → ON → OFF.
   CAUTION:
   Be sure to wait of 10 seconds after turning ignition switch OFF or ON.
4. Set the vehicle to READY/Start the engine.
5. Select “ABS” and “DATA MONITOR”, check “FR LH SENSOR”, “FR RH SENSOR”, “RR LH SENSOR” and “RR RH SENSOR”.
   NOTE:
   Set the “DATA MONITOR” recording speed to “10 msec”.
6. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.

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

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

18. PERFORM SELF-DIAGNOSIS (6)

With CONSULT
1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
2. Stop the vehicle.
3. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
4. Repeat step 3 two or more times.
5. Perform self-diagnosis for “ABS”.

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

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

19. REPLACE SENSOR ROTOR

With CONSULT
1. Replace sensor rotor.
- Front: Refer to BRC-162, "FRONT SENSOR ROTOR : Removal and Installation".
- Rear: Refer to BRC-162, "REAR SENSOR ROTOR : Removal and Installation".
2. Erase self-diagnosis result for “ABS”.
3. Turn the ignition switch OFF → ON → OFF.
   CAUTION:
   Be sure to wait of 10 seconds after turning ignition switch OFF or ON.
4. Set the vehicle to READY/Start the engine.
5. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
6. Stop the vehicle.
7. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
8. Repeat step 7 two or more times.
9. Perform self-diagnosis for “ABS”.

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

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-163, "Removal and Installation".
NO >> INSPECTION END

C1109 POWER AND GROUND SYSTEM

DTC Logic

INFOID:0000000008142312

DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1109	BATTERY VOLTAGE [ABNORMAL]	When ignition power supply voltage is in following state. • Ignition power supply voltage: 10 V ≥ ignition power supply voltage. • Ignition power supply voltage: 16 V ≤ ignition power supply voltage.	• Harness or connector • ABS actuator and electric unit (control unit) • Fuse • ignition power supply system • 12V battery

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
2. Repeat step 1 two or more times.
3. Perform self-diagnosis for “ABS”.

Is DTC “C1109” detected?

YES >> Proceed to BRC-79, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008142313

1.CHECK CONNECTOR

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

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace error-detected parts, securely lock the connector, and GO TO 2.

2.PERFORM SELF-DIAGNOSIS

1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
2. Repeat step 1 two or more times.
3. Perform self-diagnosis for “ABS”.

Is DTC “C1109” detected?

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

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

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E89	16	Ground	Approx. 0 V

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E89	16	Ground	10 – 16 V

Is the inspection result normal?

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

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

1. Turn the ignition switch OFF.
2. Check 10A fuse (#1).
3. Disconnect fuse block (J/B) harness connector.
4. Check continuity between ABS actuator and electric unit (control unit) harness connector and fuse block (J/B).

ABS actuator and electric unit (control unit)		Fuse block (J/B)		Continuity
Connector	Terminal	Connector	Terminal	
E89	16	M3	8C	Existed

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E89	16	Ground	No existed

Is the inspection result normal?

YES >> Perform trouble diagnosis for ignition power supply. Refer to PG-30, "Wiring Diagram - IGNITION POWER SUPPLY -".
NO >> Repair or replace error-detected parts.

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

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E89	3	Ground	Existed
	4		

Is the inspection result normal?

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

6. CHECK TERMINAL

1. Check ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with harness connector.
2. Check fuse block (J/B) pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-163, "Removal and Installation".

NO >> Repair or replace error-detected parts.

C1110 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

DTC Logic

INFOID:0000000008142314

DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1110	CONTROLLER FAILURE	When there is an internal malfunction in the ABS actuator and electric unit (control unit).	ABS actuator and electric unit (control unit)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
2. Repeat step 1 two or more times.
3. Perform self-diagnosis for “ABS”.

Is DTC “C1110” detected?

YES >> Proceed to BRC-82, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008142315

1.CHECK SELF-DIAGNOSIS RESULTS

Replace ABS actuator and electric unit (control unit) even if other display than “C1110” is displayed in self-diagnosis for “ABS”.

>> Replace ABS actuator and electric unit (control unit). Refer to BRC-163, "Removal and Installation".

C1111 ABS MOTOR, MOTOR RELAY SYSTEM

DTC Logic

INFOID:0000000008142316

DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1111	PUMP MOTOR	When a malfunction is detected in motor or motor relay.	• Harness or connector • ABS actuator and electric unit (control unit) • Fusible link • 12V battery power supply system

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF → ON, and wait 30 seconds.
2. Drive the vehicle at approx. 30 km/h (19MPH) or more for approx. 1 minute.
3. Stop the vehicle.
4. Turn the ignition switch OFF → ON.

CAUTION:

- **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
- **Set the vehicle to READY/Start the engine.**

5. Repeat step 4 two or more times.
6. Perform self-diagnosis for “ABS”.

Is DTC “C1111” detected?

YES >> Proceed to BRC-83, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008142317

1.CHECK CONNECTOR

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

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace error-detected parts, securely lock the connector, and GO TO 2.

2.PERFORM SELF-DIAGNOSIS

With CONSULT

1. Turn the ignition switch OFF → ON, and wait 30 seconds.
2. Drive the vehicle at approx. 30 km/h (19MPH) or more for approx. 1 minute.
3. Stop the vehicle.
4. Turn the ignition switch OFF → ON.

CAUTION:

- **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
- **Set the vehicle to READY/Start the engine.**

5. Repeat step 4 two or more times.
6. Perform self-diagnosis for “ABS”.

Is DTC “C1111” detected?

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

3.CHECK ABS MOTOR AND MOTOR RELAY POWER SUPPLY

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E89	1	Ground	Battery voltage

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E89	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 4.

4.CHECK ABS MOTOR AND MOTOR RELAY POWER SUPPLY CIRCUIT

1. Turn the ignition switch OFF.
2. Check 30A fusible link (#M).
3. Check continuity and short circuit between ABS actuator and electric unit (control unit) harness connector terminal (1) and 30A fusible link (#M).

Is the inspection result normal?

YES >> Perform trouble diagnosis for 12V battery power supply. Refer to PG-14, "Wiring Diagram - BATTERY POWER SUPPLY -".
NO >> Repair or replace error-detected parts. GO TO 5.

5.ERASE SELF-DIAGNOSIS RESULT (1)

With CONSULT
1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
2. Stop the vehicle.
3. Erase self-diagnosis result for “ABS”.
4. Turn the ignition switch OFF → ON → OFF.
   CAUTION:
   Be sure to wait of 10 seconds after turning ignition switch OFF or ON.

>> INSPECTION END

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

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E89	3	Ground	Existed
	4		

Is the inspection result normal?

YES >> GO TO 8.

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

7. ERASE SELF-DIAGNOSIS RESULT (2)

With CONSULT
1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
2. Stop the vehicle.
3. Erase self-diagnosis result for “ABS”.
4. Turn the ignition switch OFF → ON → OFF.

CAUTION:
Be sure to wait of 10 seconds after turning ignition switch OFF or ON.

>> INSPECTION END

8. CHECK TERMINAL

1. Turn the ignition switch OFF.
2. Check ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-163, "Removal and Installation".

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

9. ERASE SELF-DIAGNOSIS RESULT (3)

With CONSULT
1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
2. Stop the vehicle.
3. Erase self-diagnosis result for “ABS”.
4. Turn the ignition switch OFF → ON → OFF.

CAUTION:
Be sure to wait of 10 seconds after turning ignition switch OFF or ON.

>> INSPECTION END

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

DTC Logic

INFOID:0000000008142318

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1113	G-SENSOR	When a malfunction is detected in decel G signal.	• Harness or connector • Yaw rate/side/decel G sensor • ABS actuator and electric unit (control unit)
C1145	YAW RATE SENSOR	• When a malfunction is detected in yaw rate signal. • When a signal line of yaw rate/side/decel G sensor is open or shorted. • When power supply voltage of yaw rate/side/decel G sensor is in following state. - Yaw rate/side/decel G sensor power supply voltage: 4.8 V ≥ yaw rate/side/decel G sensor power supply voltage - Yaw rate/side/decel G sensor power supply voltage: 5.2 V ≤ yaw rate/side/decel G sensor power supply voltage	
C1146	SIDE G-SEN CIRCUIT	When a malfunction is detected in side G signal.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
2. Repeat step 1 two or more times.
3. Perform self-diagnosis for “ABS”.

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

YES >> Proceed to BRC-86, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008142319

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

Check ABS actuator and electric unit (control unit) power supply system. Refer to BRC-138, "Diagnosis Procedure".

Is the inspection result normal?

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

2.CHECK CONNECTOR

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

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace error-detected parts, securely lock the connector, and GO TO 3.

3. PERFORM SELF-DIAGNOSIS

1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
2. Repeat step 1 two or more times.
3. Perform self-diagnosis for “ABS”.

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

YES >> GO TO 4.
NO >> INSPECTION END

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

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

Yaw rate/side/decel G sensor		ABS actuator and electric unit (control unit)		Continuity
Connector	Terminal	Connector	Terminal	
M88	4	E89	13	Existed

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace error-detected parts.

5. CHECK YAW RATE/SIDE/DECEL G SENSOR GROUND CIRCUIT

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

Yaw rate/side/decel G sensor		ABS actuator and electric unit (control unit)		Continuity
Connector	Terminal	Connector	Terminal	
M88	2	E89	28	Existed

Is the inspection result normal?

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

6. CHECK YAW RATE/SIDE/DECEL G SENSOR SIGNAL CIRCUIT

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

Yaw rate/side/decel G sensor		ABS actuator and electric unit (control unit)		Continuity
Connector	Terminal	Connector	Terminal	
M88	5	E89	14	Existed
	6		29	

Is the inspection result normal?

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

7. CHECK YAW RATE/SIDE/DECEL G SENSOR CIRCUIT

Check continuity between each terminals of yaw rate/side/decel G sensor harness connector.

Yaw rate/side/decel G sensor		Continuity
Connector	Terminal	
M88	2 – 4	Not existed
	2 – 5	
	2 – 6	
	4 – 5	
	4 – 6	
	5 – 6	

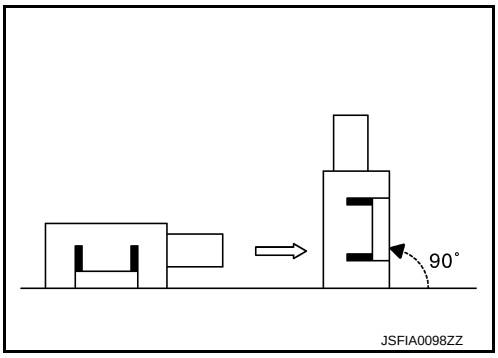
Is the inspection result normal?

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

8. CHECK YAW RATE/SIDE/DECEL G SENSOR (1)

With CONSULT

1. Connect yaw rate/side/decel G sensor harness connector.
2. Connect ABS actuator and electric unit (control unit) harness connector.
3. Turn the ignition switch ON.
   CAUTION:
   Never set the vehicle to READY/Never start the engine.
4. Select “ABS”, “DATA MONITOR” and “DECEL G-SEN” in order.
5. Move yaw rate/side/decel G sensor as shown in the figure to check the output of before and after moving the sensor.



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

Is the inspection result normal?

YES >> GO TO 9.
NO >> Replace yaw rate/side/decel G sensor. Refer to BRC-165, "Removal and Installation".

9. CHECK YAW RATE/SIDE/DECEL G SENSOR (2)

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

Yaw rate/side/decel G sensor	Harness connector	
	Connector	Terminal
2	M88	2
4		4
5		5
6		6

3. Turn the ignition switch ON.
   CAUTION:
   Never set the vehicle to READY/Never start the engine.
4. Check voltage between yaw rate/side/decel G sensor harness connector terminals.
   CAUTION:
   Never short out the terminals while measuring voltages.

Yaw rate/side/decel G sensor		Voltage
connector	Terminal	
M88	5 – 2	2.5 – 4.5 V
	6 – 2	0.5 – 2.5 V

Is the inspection result normal?

YES >> Replace ABS actuator end electric unit (control unit). Refer to BRC-163, "Removal and Installation".

NO >> Replace yaw rate/side/decel G sensor. Refer to BRC-165, "Removal and Installation".

C1115 WHEEL SENSOR

DTC Logic

INFOID:0000000008142320

DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1115	ABS SENSOR [ABNORMAL SIGNAL]	When difference in wheel speed between any wheel and others is detected the vehicle is driven, because of installation of other tires than specified.	• Harness or connector • Wheel sensor • Sensor rotor • ABS actuator and electric unit (control unit)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT
1. Set the vehicle to READY/Start the engine.
2. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
3. Stop the vehicle.
4. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
5. Repeat step 4 two or more times.
6. Perform self-diagnosis for “ABS”.

Is DTC “C1115” detected?

YES >> Proceed to BRC-90, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008142321

CAUTION:
For wheel sensor, never check between terminals.

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

Check ABS actuator and electric unit (control unit) power supply system. Refer to BRC-138, "Diagnosis Procedure".

Is the inspection result normal?

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

2.CHECK TIRE

1. Turn the ignition switch OFF.
2. Check tire air pressure, wear and size. Refer to WT-64, "Tire Air Pressure".

Is the inspection result normal?

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

3.CHECK DATA MONITOR (1)

With CONSULT
1. Erase self-diagnosis result for “ABS”.
2. Turn the ignition switch OFF → ON → OFF.

CAUTION:
Be sure to wait of 10 seconds after turning ignition switch OFF or ON.

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

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

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

4. PERFORM SELF-DIAGNOSIS (1)

With CONSULT

1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
2. Stop the vehicle.
3. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
4. Repeat step 3 two or more times.
5. Perform self-diagnosis for “ABS”.

Is DTC “C1115” detected?

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

5. CHECK WHEEL SENSOR

1. Turn the ignition switch OFF.
2. Check wheel sensor for damage.
3. Remove dust and foreign matter adhered to the sensor rotor with a vacuum dust collector through the wheel sensor mounting hole.
   CAUTION:
   Install wheel sensor with no backlash and float, and tighten the mounting bolt to the specified torque.
   - **Front: Refer to BRC-159, "FRONT WHEEL SENSOR : Exploded View".**
   - **Rear: Refer to BRC-160, "REAR WHEEL SENSOR : Exploded View".**

Is the inspection result normal?

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

6. REPLACE WHEEL SENSOR (1)

With CONSULT

1. Replace wheel sensor.
- Front: Refer to BRC-159, "FRONT WHEEL SENSOR : Removal and Installation".
- Rear: Refer to BRC-160, "REAR WHEEL SENSOR : Removal and Installation".

2. Erase self-diagnosis result for “ABS”.
3. Turn the ignition switch OFF → ON → OFF.
   CAUTION:
   Be sure to wait of 10 seconds after turning ignition switch OFF or ON.
4. Set the vehicle to READY/Start the engine.
5. Select “ABS” and “DATA MONITOR”, check “FR LH SENSOR”, “FR RH SENSOR”, “RR LH SENSOR” and “RR RH SENSOR”.
   NOTE:
   Set the “DATA MONITOR” recording speed to “10 msec”.
6. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.

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

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

7. PERFORM SELF-DIAGNOSIS (2)

With CONSULT
1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
2. Stop the vehicle.
3. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
4. Repeat step 3 two or more times.
5. Perform self-diagnosis for “ABS”.

Is DTC “C1115” detected?

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

8. CHECK CONNECTOR

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

Is the inspection result normal?

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

9. CHECK DATA MONITOR (2)

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

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

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

10. PERFORM SELF-DIAGNOSIS (3)

With CONSULT
1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
2. Stop the vehicle.
3. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
4. Repeat step 3 two or more times.
5. Perform self-diagnosis for “ABS”.

Is DTC “C1115” detected?

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

11. CHECK TERMINAL

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

Is the inspection result normal?

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

12. CHECK DATA MONITOR (3)

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

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

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

13. PERFORM SELF-DIAGNOSIS (4)

With CONSULT
1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
2. Stop the vehicle.
3. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
4. Repeat step 3 two or more times.
5. Perform self-diagnosis for “ABS”.

Is DTC “C1115” detected?

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

14. CHECK WHEEL SENSOR HARNESS

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

Measurement connector and terminal for power supply circuit

ABS actuator and electric unit (control unit)		Wheel sensor			Continuity
Connector	Terminal	Connector		Terminal	
E89	21	E27	(Front RH wheel)	2	Existed
	23	E60	(Front LH wheel)		
	11	B35	(Rear RH wheel)		
	26	B34	(Rear LH wheel)		

Measurement connector and terminal for signal circuit

ABS actuator and electric unit (control unit)		Wheel sensor			Continuity
Connector	Terminal	Connector		Terminal	
E89	12	E27	(Front RH wheel)	1	Existed
	27	E60	(Front LH wheel)		
	15	B35	(Rear RH wheel)		
	30	B34	(Rear LH wheel)		

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E89	21, 12	Ground	Not existed
	23, 27		
	11, 15		
	26, 30		

Is the inspection result normal?

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

15. CHECK DATA MONITOR (4)

With CONSULT

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

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

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

16. PERFORM SELF-DIAGNOSIS (5)

With CONSULT

1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
2. Stop the vehicle.
3. Turn the ignition switch OFF → ON.
   CAUTION:

- **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
- **Set the vehicle to READY/Start the engine.**

4. Repeat step 3 two or more times.
5. Perform self-diagnosis for “ABS”.

Is DTC “C1115” detected?

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

17. REPLACE WHEEL SENSOR

With CONSULT

1. Replace wheel sensor.
- Front: Refer to BRC-159, "FRONT WHEEL SENSOR : Removal and Installation".
- Rear: Refer to BRC-160, "REAR WHEEL SENSOR : Removal and Installation".
2. Erase self-diagnosis result for “ABS”.
3. Turn the ignition switch OFF → ON → OFF.
   CAUTION:
   Be sure to wait of 10 seconds after turning ignition switch OFF or ON.
4. Set the vehicle to READY/Start the engine.
5. Select “ABS” and “DATA MONITOR”, check “FR LH SENSOR”, “FR RH SENSOR”, “RR LH SENSOR” and “RR RH SENSOR”.
   NOTE:
   Set the “DATA MONITOR” recording speed to “10 msec”.
6. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.

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

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

18. PERFORM SELF-DIAGNOSIS (6)

With CONSULT

1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
2. Stop the vehicle.
3. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
4. Repeat step 3 two or more times.
5. Perform self-diagnosis for “ABS”.

Is DTC “C1115” detected?

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

19. REPLACE SENSOR ROTOR

With CONSULT

1. Replace sensor rotor.
- Front: Refer to BRC-162, "FRONT SENSOR ROTOR : Removal and Installation".
- Rear: Refer to BRC-162, "REAR SENSOR ROTOR : Removal and Installation".
2. Erase self-diagnosis result for “ABS”.
3. Turn the ignition switch OFF → ON → OFF.
   CAUTION:
   Be sure to wait of 10 seconds after turning ignition switch OFF or ON.
4. Set the vehicle to READY/Start the engine.
5. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
6. Stop the vehicle.
7. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**

8. Repeat step 7 two or more times.
9. Perform self-diagnosis for “ABS”.

Is DTC “C1115” detected?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-163, "Removal and Installation".

NO >> INSPECTION END

C1116 STOP LAMP SWITCH

DTC Logic

INFOID:0000000008142322

DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1116	STOP LAMP SW	When stop lamp switch signal is not input when brake pedal operates.	• Harness or connector • Stop lamp switch • ABS actuator and electric unit (control unit) • Resistor (models with ICC) • 12V battery power supply system

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF, and wait 10 seconds or more.
2. Set the vehicle to READY/Start the engine.
   CAUTION:
   Stop the vehicle.
3. Wait 1 minute or more.
   CAUTION:
   Never depress brake pedal.
4. Depress brake pedal by 100 mm or more, and maintain at that position for a minimum of 1 minute or more.
5. Release brake pedal, and wait 1 minute or more.
6. Repeat step 4 – 5 ten or more times.
7. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
8. Repeat step 4 two or more times.
9. Perform self-diagnosis for “ABS”.

Is DTC “C1116” detected?

YES >> Proceed to BRC-97, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008142323

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

1.INTERVIEW FROM THE CUSTOMER

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

Is there such a history?

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

2.PERFORM SELF-DIAGNOSIS

With CONSULT
1. Erase self-diagnosis result for “ABS”.
2. Turn the ignition switch OFF → ON → OFF.
   CAUTION:
   Be sure to wait of 10 seconds after turning ignition switch OFF or ON.
3. Set the vehicle to READY/Start the engine.
   CAUTION:
   Stop the vehicle.
4. Depress the brake pedal several times.
5. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
6. Repeat step 5 two or more times.
7. Perform self-diagnosis for “ABS”.

Is DTC “C1116” detected?

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

3.STOP LAMP FOR ILLUMINATION

Depress brake pedal and check that stop lamp turns ON.

Does stop lamp turn ON?

YES >> GO TO 5.
NO >> Check stop lamp system. Refer to EXL-42, "EXTERIOR LIGHTING SYSTEM : Wiring Diagram". GO TO 4.

4.CHECK DATA MONITOR (1)

With CONSULT
1. Erase self-diagnosis result for “ABS”.
2. Turn the ignition switch OFF → ON → OFF.
   CAUTION:
   Be sure to wait of 10 seconds after turning ignition switch OFF or ON.
3. Set the vehicle to READY/Start the engine.
   CAUTION:
   Stop the vehicle.
4. Select “ABS”, “DATA MONITOR” and “STOP LAMP SW” according to this order. Check that data monitor displays “On” or “Off” when brake pedal is depress or release. Refer to BRC-50, "Reference Value".
5. Select “ABS”, “DATA MONITOR” and “PRESSURE SENSOR” according to this order. Check that data monitor displays “5 bar” or less when brake pedal is depress. Refer to BRC-50, "Reference Value".

Is the inspection result normal?

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

5.CHECK STOP LAMP SWITCH CLEARANCE

1. Turn the ignition switch OFF.
2. Check stop lamp switch clearance. Refer to BR-270, "Inspection and Adjustment".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Adjust stop lamp switch clearance. Refer to BR-270, "Inspection and Adjustment". GO TO 6.

6.CHECK DATA MONITOR (2)

With CONSULT
1. Erase self-diagnosis result for “ABS”.
2. Turn the ignition switch OFF → ON → OFF.
   CAUTION:
   Be sure to wait of 10 seconds after turning ignition switch OFF or ON.
3. Set the vehicle to READY/Start the engine.

CAUTION:
Stop the vehicle.

4. Select “ABS”, “DATA MONITOR” and “STOP LAMP SW” according to this order. Check that data monitor displays “On” or “Off” when brake pedal is depress or release. Refer to BRC-50, "Reference Value".
5. Select “ABS”, “DATA MONITOR” and “PRESSURE SENSOR” according to this order. Check that data monitor displays “5 bar” or less when brake pedal is depress. Refer to BRC-50, "Reference Value".

Is the inspection result normal?

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

7. CHECK STOP LAMP SWITCH

Check stop lamp switch. Refer to BRC-102, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 9.
NO >> Replace stop lamp switch. Refer to BR-280, "Removal and Installation". GO TO 8.

8. CHECK DATA MONITOR (3)

With CONSULT

1. Erase self-diagnosis result for “ABS”.
2. Turn the ignition switch OFF → ON → OFF.

CAUTION:
Be sure to wait of 10 seconds after turning ignition switch OFF or ON.

3. Set the vehicle to READY/Start the engine.

CAUTION:
Stop the vehicle.

4. Select “ABS”, “DATA MONITOR” and “STOP LAMP SW” according to this order. Check that data monitor displays “On” or “Off” when brake pedal is depress or release. Refer to BRC-50, "Reference Value".
5. Select “ABS”, “DATA MONITOR” and “PRESSURE SENSOR” according to this order. Check that data monitor displays “5 bar” or less when brake pedal is depress. Refer to BRC-50, "Reference Value".

Is the inspection result normal?

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

9. CHECK CONNECTOR AND TERMINAL

1. Turn the ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) harness connector.
3. Check ABS actuator and electric unit (control unit) harness connector for disconnection or looseness.
4. Check ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with harness connector.
5. Disconnect stop lamp switch harness connector.
6. Check stop lamp switch harness connector for disconnection or looseness.
7. Check stop lamp switch pin terminals for damage or loose connection with harness connector.
8. Disconnect fuse block (J/B) harness connector. (Models without ICC)
9. Check fuse block (J/B) harness connector for disconnection or looseness. (Models without ICC)
10. Check fuse block (J/B) pin terminals for damage or loose connection with harness connector. (Models without ICC)
11. Disconnect resistor harness connector. (Models with ICC)
12. Check resistor harness connector for disconnection or looseness. (Models with ICC)
13. Check resistor pin terminals for damage or loose connection with harness connector. (Models with ICC)

Is the inspection result normal?

YES >> GO TO 11.
NO >> Repair or replace error-detected parts. GO TO 10.

10. CHECK DATA MONITOR (4)

With CONSULT

1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Connect stop lamp switch harness connector.
3. Erase self-diagnosis result for “ABS”.
4. Turn the ignition switch OFF → ON → OFF.

CAUTION:
Be sure to wait of 10 seconds after turning ignition switch OFF or ON.

5. Set the vehicle to READY/Start the engine.

CAUTION:
Stop the vehicle.

6. Select “ABS”, “DATA MONITOR” and “STOP LAMP SW” according to this order. Check that data monitor displays “On” or “Off” when brake pedal is depress or release. Refer to BRC-50, "Reference Value".
7. Select “ABS”, “DATA MONITOR” and “PRESSURE SENSOR” according to this order. Check that data monitor displays “5 bar” or less when brake pedal is depress. Refer to BRC-50, "Reference Value".

Is the inspection result normal?

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

11. CHECK STOP LAMP SWITCH CIRCUIT (1)

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

ABS actuator and electric unit (control unit)		—	Condition	Voltage
Connector	Terminal			
E89	8	Ground	Brake pedal depressed	10 – 16 V
			Brake pedal not depressed	Approx. 0 V

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

ABS actuator and electric unit (control unit)		—	Condition	Voltage
Connector	Terminal			
E89	8	Ground	Brake pedal depressed	10 – 16 V
			Brake pedal not depressed	Approx. 0 V

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-163, "Removal and Installation".
NO (Models with ICC)>>Repair or replace error-detected parts. GO TO 12.
NO (Models without ICC)>>Repair or replace error-detected parts. GO TO 13.

12. CHECK STOP LAMP SWITCH CIRCUIT (2) (MODELS WITH ICC)

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

ABS actuator and electric unit (control unit)		Stop lamp switch		Continuity
Connector	Terminal	Connector	Terminal	
E89	8	E110	4	Existed

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

ABS actuator and electric unit (control unit)		Resistor		Continuity
Connector	Terminal	Connector	Terminal	
E89	8	M8	1	Existed

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E89	8	Ground	Not existed

6. Check continuity between resistor and the ground.

Resistor		—	Continuity
Connector	Terminal		
M8	1	Ground	Not existed
	2		Existed

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-163, "Removal and Installation".

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

13. CHECK STOP LAMP SWITCH CIRCUIT (3) (MODELS WITHOUT ICC)

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

ABS actuator and electric unit (control unit)		Stop lamp switch		Continuity
Connector	Terminal	Connector	Terminal	
E89	8	E110	2	Existed

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E89	8	Ground	Not existed

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-163, "Removal and Installation".

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

14. CHECK DATA MONITOR (5)

With CONSULT

1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Erase self-diagnosis result for “ABS”.
3. Turn the ignition switch OFF → ON → OFF.
   CAUTION:
   Be sure to wait of 10 seconds after turning ignition switch OFF or ON.
4. Set the vehicle to READY/Start the engine.
   CAUTION:
   Stop the vehicle.
5. Select “ABS”, “DATA MONITOR” and “STOP LAMP SW” according to this order. Check that data monitor displays “On” or “Off” when brake pedal is depress or release. Refer to BRC-50, "Reference Value".
6. Select “ABS”, “DATA MONITOR” and “PRESSURE SENSOR” according to this order. Check that data monitor displays “5 bar” or less when brake pedal is depress. Refer to BRC-50, "Reference Value".

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace ABS actuator and electric unit (control unit). Refer to BRC-163, "Removal and Installation".

Component Inspection

INFOID:0000000008142324

1. CHECK STOP LAMP SWITCH

1. Turn the ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check continuity when stop lamp switch is operated.

Stop lamp switch Terminal	Condition	Continuity
1 – 2*1 3 – 4*2	When stop lamp switch is released (When brake pedal is depressed)	Existed
	When stop lamp switch is pressed (When brake pedal is released)	Not existed

*1: Models without ICC
*2: Models with ICC

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace stop lamp switch. Refer to BR-280, "Removal and Installation".

C1120, C1122, C1124, C1126 ABS IN VALVE SYSTEM

DTC Logic

INFOID:0000000008142325

DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1120	FR LH IN ABS SOL	When a malfunction is detected in front LH ABS IN valve.	• Harness or connector • ABS actuator and electric unit (control unit) • Fusible link • 12V battery power supply system
C1122	FR RH IN ABS SOL	When a malfunction is detected in front RH ABS IN valve.	
C1124	RR LH IN ABS SOL	When a malfunction is detected in rear LH ABS IN valve.	
C1126	RR RH IN ABS SOL	When a malfunction is detected in rear RH ABS IN valve.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
2. Repeat step 1 two or more times.
3. Perform self-diagnosis for “ABS”.

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

YES >> Proceed to BRC-103, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008142326

1.CHECK CONNECTOR

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

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace error-detected parts, securely lock the connector, and GO TO 2.

2.PERFORM SELF-DIAGNOSIS

1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
2. Repeat step 1 two or more times.
3. Perform self-diagnosis for “ABS”.

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

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

3.CHECK ABS IN VALVE POWER SUPPLY

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E89	2	Ground	Battery voltage

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E89	2	Ground	Battery voltage

Is the inspection result normal?

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

4. CHECK ABS IN VALVE POWER SUPPLY CIRCUIT

1. Turn the ignition switch OFF.
2. Check 50A fusible link (#N).
3. Check continuity and short circuit between ABS actuator and electric unit (control unit) harness connector terminal (2) and 50A fusible link (#N).

Is the inspection result normal?

YES >> Perform trouble diagnosis for 12V battery power supply. Refer to PG-14, "Wiring Diagram - BATTERY POWER SUPPLY -".
NO >> Repair or replace error-detected parts.

5. CHECK ABS IN VALVE GROUND CIRCUIT

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E89	3	Ground	Existed
	4		

Is the inspection result normal?

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

6. CHECK TERMINAL

Check ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-163, "Removal and Installation".
NO >> Repair or replace error-detected parts.

C1121, C1123, C1125, C1127 ABS OUT VALVE SYSTEM

DTC Logic

INFOID:0000000008142327

DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1121	FR LH OUT ABS SOL	When a malfunction is detected in front LH ABS OUT valve.	• Harness or connector • ABS actuator and electric unit (control unit) • Fusible link • 12V battery power supply system
C1123	FR RH OUT ABS SOL	When a malfunction is detected in front RH ABS OUT valve.	
C1125	RR LH OUT ABS SOL	When a malfunction is detected in rear LH ABS OUT valve.	
C1127	RR RH OUT ABS SOL	When a malfunction is detected in rear RH ABS OUT valve.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
2. Repeat step 1 two or more times.
3. Perform self-diagnosis for “ABS”.

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

YES >> Proceed to BRC-105, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008142328

1.CHECK CONNECTOR

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

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace error-detected parts, securely lock the connector, and GO TO 2.

2.PERFORM SELF-DIAGNOSIS

1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
2. Repeat step 1 two or more times.
3. Perform self-diagnosis for “ABS”.

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

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

3.CHECK ABS OUT VALVE POWER SUPPLY

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E89	2	Ground	Battery voltage

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E89	2	Ground	Battery voltage

Is the inspection result normal?

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

4. CHECK ABS OUT VALVE POWER SUPPLY CIRCUIT

1. Turn the ignition switch OFF.
2. Check 50A fusible link (#N).
3. Check continuity and short circuit between ABS actuator and electric unit (control unit) harness connector terminal (2) and 50A fusible link (#N).

Is the inspection result normal?

YES >> Perform trouble diagnosis for 12V battery power supply. Refer to PG-14, "Wiring Diagram - BATTERY POWER SUPPLY -".
NO >> Repair or replace error-detected parts.

5. CHECK ABS OUT VALVE GROUND CIRCUIT

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E89	3	Ground	Existed
	4		

Is the inspection result normal?

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

6. CHECK TERMINAL

Check ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-163, "Removal and Installation".
NO >> Repair or replace error-detected parts.

C1140 ACTUATOR RELAY SYSTEM

DTC Logic

INFOID:0000000008142329

DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1140	ACTUATOR RLY	When a malfunction is detected in actuator relay.	• Harness or connector • ABS actuator and electric unit (control unit) • Fusible link • 12V battery power supply system

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
2. Repeat step 1 two or more times.
3. Perform self-diagnosis for “ABS”.

Is DTC “C1140” detected?

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

Diagnosis Procedure

INFOID:0000000008142330

1.CHECK CONNECTOR

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

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace error-detected parts, securely lock the connector, and GO TO 2.

2.PERFORM SELF-DIAGNOSIS

1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
2. Repeat step 1 two or more times.
3. Perform self-diagnosis for “ABS”.

Is DTC “C1140” detected?

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

3.CHECK ACTUATOR RELAY POWER SUPPLY

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E89	2	Ground	Battery voltage

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E89	2	Ground	Battery voltage

Is the inspection result normal?

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

4. CHECK ACTUATOR RELAY POWER SUPPLY CIRCUIT

1. Turn the ignition switch OFF.
2. Check 50A fusible link (#N).
3. Check continuity and short circuit between ABS actuator and electric unit (control unit) harness connector terminal (2) and 50A fusible link (#N).

Is the inspection result normal?

YES >> Perform trouble diagnosis for 12V battery power supply. Refer to PG-14, "Wiring Diagram - BATTERY POWER SUPPLY -".
NO >> Repair or replace error-detected parts.

5. CHECK ACTUATOR RELAY GROUND CIRCUIT

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E89	3	Ground	Existed
	4		

Is the inspection result normal?

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

6. CHECK TERMINAL

Check ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-163, "Removal and Installation".
NO >> Repair or replace error-detected parts.

C1142 PRESS SENSOR

DTC Logic

INFOID:0000000008142331

DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1142	PRESS SEN CIRCUIT	When a malfunction is detected in master cylinder pressure sensor2.	• Stop lamp switch system • ABS actuator and electric unit (control unit) • Brake system • Master cylinder pressure sensor2

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
2. Repeat step 1 two or more times.
3. Perform self-diagnosis for “ABS”.

Is DTC “C1142” detected?

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

Diagnosis Procedure

INFOID:0000000008142332

1.CHECK CONNECTOR

1. Turn the ignition switch OFF
2. Check ABS actuator and electric unit (control unit) harness connector for disconnection or looseness.
3. Check master cylinder pressure sensor2 harness connector for disconnection or looseness.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace error-detected parts, securely lock the connector, and GO TO 2.

2.PERFORM SELF-DIAGNOSIS (1)

1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
2. Repeat step 1 two or more times.
3. Perform self-diagnosis for “ABS”.

Is DTC“C1142” detected?

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

3.CHECK MASTER CYLINDER PRESSURE SENSOR2 CIRCUIT

1. Turn the ignition switch OFF
2. Disconnect ABS actuator and electric unit (control unit) harness connector.

3. Disconnect master cylinder pressure sensor2 harness connector.
4. Check continuity between master cylinder pressure sensor2 harness connector and ABS actuator and electric unit (control unit) harness connector.

ABS actuator and electric unit (control unit)		Master cylinder pressure sensor2		Continuity
Connector	Terminal	Connector	Terminal	
E89	10	E80	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 4.
NO >> Repair or replace error-detected parts.

4. CHECK MASTER CYLINDER PRESSURE SENSOR2 POWER SUPPLY

1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Turn the ignition switch ON.
   CAUTION:
   Never set the vehicle to READY/Never start the engine.
3. Check voltage master cylinder pressure sensor2 harness connector terminals.

Master cylinder pressure sensor2		Voltage
Connector	Terminal	
E80	1 – 3	Battery voltage

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace ABS actuator and electric unit (control unit). Refer to BRC-163, "Removal and Installation".

5. CHECK DATA MONITOR

With CONSULT
1. Turn the ignition switch OFF.
2. Connect master cylinder pressure sensor2 harness connector.
3. “ABS”, “DATA MONITOR” and “ PRESSURE SENSOR” according to this order.
4. Check that the indication changes with the depth of pedal depression. Refer to BRC-50, "Reference Value".

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 7.

6. PERFORM SELF-DIAGNOSIS (2)

1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
2. Repeat step 1 two or more times.
3. Perform self-diagnosis for “ABS”.

Is DTC“C1142” detected?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-163, "Removal and Installation".
NO >> INSPECTION END

7. CHECK MASTER CYLINDER PRESSURE SENSOR2

1. Turn the ignition switch OFF.
2. Connect following terminals between master cylinder pressure sensor2 and harness connector (test harness).

Master cylinder pressure sensor2	Harness connector	
	Connector	Terminal
1	E80	1
2		2
3		3

3. Turn the ignition switch ON.
CAUTION:
Never set the vehicle to READY/Never start the engine.
4. Check that the voltage between master cylinder pressure sensor2 harness connectors changes with the depth of pedal depression.
CAUTION:
Never short out the terminals while measuring voltages.

Master cylinder pressure sensor2		Voltage
Connector	Terminal	
E32	1 – 2	0.5 – 4.5 V

Is the inspection result normal?

YES >> Replace ABS actuator end electric unit (control unit). Refer to BRC-163, "Removal and Installation".
NO >> Replace master cylinder pressure sensor2. Refer to BR-288, "Removal and installation".

C1143 STEERING ANGLE SENSOR

DTC Logic

INFOID:0000000008142333

DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1143	ST ANG SEN CIRCUIT	When a malfunction is detected in steering angle sensor.	• Harness or connector • Steering angle sensor • ABS actuator and electric unit (control unit) • Fuse • Ignition power supply system • CAN communication line

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
2. Repeat step 1 two or more times.
3. Perform self-diagnosis for “ABS”.

Is DTC “C1143” detected?

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

Diagnosis Procedure

INFOID:0000000008142334

1.CHECK CONNECTOR

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

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace error-detected parts, securely lock the connector, and GO TO 2.

2.PERFORM SELF-DIAGNOSIS

With CONSULT

1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
2. Repeat step 1 two or more times.
3. Perform self-diagnosis for “ABS”.

Is DTC “C1143” detected?

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

3.CHECK STEERING ANGLE SENSOR POWER SUPPLY

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

Steering angle sensor		—	Voltage
Connector	Terminal		
M37	8	Ground	Approx. 0 V

4. Turn the ignition switch ON.
   CAUTION:
   Never set the vehicle to READY/Never start the engine.
5. Check voltage between steering angle sensor harness connector and ground.

Steering angle sensor		—	Voltage
Connector	Terminal		
M37	8	Ground	10 – 16 V

Is the inspection result normal?

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

4. CHECK STEERING ANGLE SENSOR IGNITION POWER SUPPLY CIRCUIT

1. Turn the ignition switch OFF.
2. Check 10A fuse (#1).
3. Disconnect fuse block (J/B) harness connector.
4. Check continuity between ABS actuator and electric unit (control unit) harness connector and fuse block (J/B).

Steering angle sensor		Fuse block (J/B)		Continuity
Connector	Terminal	Connector	Terminal	
M37	8	M3	8C	Existed

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

Steering angle sensor		—	Continuity
Connector	Terminal		
M37	8	Ground	No existed

Is the inspection result normal?

YES >> Perform trouble diagnosis for ignition power supply. Refer to PG-30, "Wiring Diagram - IGNITION POWER SUPPLY -".
NO >> Repair or replace error-detected parts.

5. CHECK STEERING ANGLE SENSOR GROUND CIRCUIT

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

Steering angle sensor		—	Continuity
Connector	Terminal		
M37	7	Ground	Existed

Is the inspection result normal?

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

6. CHECK TERMINAL

1. Check steering angle sensor pin terminals for damage or loose connection with harness connector.

2. Check use block (J/B) pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

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

7. CHECK CAN COMMUNICATION LINE

Check “STRG BRANCH LINE CIRCUIT”. Refer to LAN-91, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair or replace error-detected parts. Refer to LAN-27, "Precautions for Harness Repair".

8. CHECK DATA MONITOR

With CONSULT

1. “ABS”, “DATA MONITOR” and “STR ANGLE SIG” according to this order.
2. Check that the indication changes with the steering angle when the steering wheel is turned left/right from the neutral position. Refer to BRC-50, "Reference Value".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-163, "Removal and Installation".
NO >> Replace steering angle sensor. Refer to BRC-166, "Removal and Installation".

C1144 INCOMPLETE STEERING ANGLE SENSOR ADJUSTMENT

DTC Logic

INFOID:0000000008142335

DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1144	ST ANG SEN SIGNAL	When neutral position adjustment of steering angle sensor is not complete.	• Harness or connector • Steering angle sensor • ABS actuator and electric unit (control unit) • Incomplete neutral position adjustment of steering angle sensor

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
2. Repeat step 1 two or more times.
3. Perform self-diagnosis for “ABS”.

Is DTC “C1144” detected?

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

Diagnosis Procedure

INFOID:0000000008142336

1.ADJUST THE NEUTRAL POSITION OF STEERING ANGLE SENSOR

Perform neutral position adjustment of steering angle sensor. Refer to BRC-66, "Work Procedure".

>> GO TO 2.

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

With CONSULT

1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
2. Repeat step 1 two or more times.
3. Perform self-diagnosis for “ABS”.

Is DTC “C1144” detected?

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

3.CHECK STEERING ANGLE SENSOR SYSTEM

1. Turn the ignition switch OFF.
2. Check steering angle sensor system. Refer to BRC-112, "Diagnosis Procedure".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-163, "Removal and Installation".

NO >> Repair or replace error-detected parts.

C1155 BRAKE FLUID LEVEL SWITCH

DTC Logic

INFOID:0000000008142337

DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1155	BR FLUID LEVEL LOW	When brake fluid level low signal is detected.	• Harness or connector • ABS actuator and electric unit (control unit) • Brake fluid level switch • Combination meter

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
2. Repeat step 1 two or more times.
3. Perform self-diagnosis for “ABS”.

Is DTC “C1155” detected?

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

Diagnosis Procedure

INFOID:0000000008142338

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) harness connector.
3. Disconnect brake fluid level switch harness connector.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace error-detected parts. GO TO 2.

2.PERFORM SELF-DIAGNOSIS (1)

With CONSULT

1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
2. Repeat step 1 two or more times.
3. Perform self-diagnosis for “ABS”.

Is DTC “C1155” detected?

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

3.CHECK BRAKE FLUID LEVEL

1. Turn the ignition switch OFF.
2. Check brake fluid level. Refer to BR-273, "Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Refill brake fluid. Refer to BR-273, "Refilling". GO TO 4.

4. PERFORM SELF-DIAGNOSIS (2)

With CONSULT

1. Erase self-diagnosis result for “ABS”.
2. Turn the ignition switch OFF → ON → OFF.
   CAUTION:
   Be sure to wait of 10 seconds after turning ignition switch OFF or ON.
3. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
4. Repeat step 3 two or more times.
5. Perform self-diagnosis for “ABS”.

Is DTC “C1155” detected?

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

5. CHECK BRAKE FLUID LEVEL SWITCH

Check brake fluids level switch. Refer to BRC-119, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Replace electrically-driven intelligent brake unit. Refer to BR-288, "Removal and installation". GO TO 6.

6. PERFORM SELF-DIAGNOSIS (3)

With CONSULT

1. Erase self-diagnosis result for “ABS”.
2. Turn the ignition switch OFF → ON → OFF.
   CAUTION:
   Be sure to wait of 10 seconds after turning ignition switch OFF or ON.
3. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
4. Repeat step 3 two or more times.
5. Perform self-diagnosis for “ABS”.

Is DTC “C1155” detected?

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

7. CHECK CONNECTOR AND TERMINAL

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

Is the inspection result normal?

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

8. PERFORM SELF-DIAGNOSIS (4)

With CONSULT

1. Erase self-diagnosis result for “ABS”.

2. Turn the ignition switch OFF → ON → OFF.
   CAUTION:
   Be sure to wait of 10 seconds after turning ignition switch OFF or ON.
3. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
4. Repeat step 3 two or more times.
5. Perform self-diagnosis for “ABS”.

Is DTC “C1155” detected?

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

9.CHECK BRAKE FLUID LEVEL SWITCH HARNESS

1. Turn the ignition switch OFF.
2. Disconnect brake fluid level switch harness connector.
3. Disconnect combination meter harness connector.
4. Check continuity between brake fluid level switch harness connector and combination meter harness connector.

Brake fluid level switch		Combination meter		Continuity
Connector	Terminal	Connector	Terminal	
E47	1	M53	27	Existed

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

Brake fluid level switch		—	Continuity
Connector	Terminal		
E47	1	Ground	Not existed

Is the inspection result normal?

YES >> GO TO 10.
NO >> Repair or replace error-detected parts. GO TO 8.

10.CHECK BRAKE FLUID LEVEL SWITCH GROUND

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

Brake fluid level switch		—	Continuity
Connector	Terminal		
E47	2	Ground	Existed

Is the inspection result normal?

YES >> GO TO 11.
NO >> Repair or replace error-detected parts. GO TO 11.

11.CHECK COMBINATION METER

Check combination meter. Refer to MWI-36, "CONSULT Function".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-163, "Removal and Installation".
NO >> Repair or replace combination meter. Refer to MWI-81, "Removal and Installation".

Component Inspection

INFOID:0000000008142339

1.CHECK BRAKE FLUID LEVEL SWITCH

1. Turn the ignition switch OFF.
2. Disconnect brake fluid level switch harness connector.

3. Check continuity between terminals of brake fluid level switch.

Brake fluid level switch Terminal	Condition	Continuity
1 – 2	When brake fluid level in reservoir tank is within the specified level.	Not existed
	When brake fluid level in reservoir tank is less than the specified level.	Existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace electrically-driven intelligent brake unit. Refer to BR-288, "Removal and installation".

C1164, C1165 CV SYSTEM

DTC Logic

INFOID:0000000008142340

DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1164	CV 1	When a malfunction is detected in cut valve 1.	• Harness or connector • ABS actuator and electric unit (control unit) • Fusible link • 12V battery power supply system
C1165	CV 2	When a malfunction is detected in cut valve 2.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
2. Repeat step 1 two or more times.
3. Perform self-diagnosis for “ABS”.

Is any DTC “C1164” or “C1165” detected?

YES >> Proceed to BRC-121, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008142341

1.CHECK CONNECTOR

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

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace error-detected parts, securely lock the connector, and GO TO 2.

2.PERFORM SELF-DIAGNOSIS (1)

With CONSULT

1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
2. Repeat step 1 two or more times.
3. Perform self-diagnosis for “ABS”.

Is any “C1164” or “C1165” detected?

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

3.CHECK CUT VALVE POWER SUPPLY

1. Turn the ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) harness connector.

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E89	2	Ground	Battery voltage

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E89	2	Ground	Battery voltage

Is the inspection result normal?

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

4. CHECK CUT VALVE POWER SUPPLY CIRCUIT

1. Turn the ignition switch OFF.
2. Check 50A fusible link (#N).
3. Check continuity and short circuit between ABS actuator and electric unit (control unit) harness connector terminal (2) and 50A fusible link (#N).

Is the inspection result normal?

YES >> Perform trouble diagnosis for 12V battery power supply. Refer to PG-14, "Wiring Diagram - BATTERY POWER SUPPLY -".
NO >> Repair or replace error-detected parts.

5. CHECK CUT VALVE GROUND CIRCUIT

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E89	3	Ground	Existed
	4		

Is the inspection result normal?

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

6. CHECK TERMINAL

Check ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-163, "Removal and Installation".
NO >> Repair or replace error-detected parts.

C1166, C1167 SV SYSTEM

DTC Logic

INFOID:0000000008142342

DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1166	SV 1	When a malfunction is detected in suction valve 1.	• Harness or connector • ABS actuator and electric unit (control unit) • Fusible link • 12V battery power supply system
C1167	SV 2	When a malfunction is detected in suction valve 2.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
2. Repeat step 1 two or more times.
3. Perform self-diagnosis for “ABS”.

Is any DTC “C1166” or “C1167” detected?

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

Diagnosis Procedure

INFOID:0000000008142343

1.CHECK CONNECTOR

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

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace error-detected parts, securely lock the connector, and GO TO 2.

2.PERFORM SELF-DIAGNOSIS (1)

With CONSULT

1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
2. Repeat step 1 two or more times.
3. Perform self-diagnosis for “ABS”.

Is any “C1166” or “C1167” detected?

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

3.CHECK SUCTION VALVE POWER SUPPLY

1. Turn the ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) harness connector.

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E89	2	Ground	Battery voltage

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E89	2	Ground	Battery voltage

Is the inspection result normal?

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

4. CHECK SUCTION VALVE POWER SUPPLY CIRCUIT

1. Turn the ignition switch OFF.
2. Check 50A fusible link (#N).
3. Check continuity and short circuit between ABS actuator and electric unit (control unit) harness connector terminal (2) and 50A fusible link (#N).

Is the inspection result normal?

YES >> Perform trouble diagnosis for 12V battery power supply. Refer to PG-14, "Wiring Diagram - BATTERY POWER SUPPLY -".
NO >> Repair or replace error-detected parts.

5. CHECK SUCTION VALVE GROUND CIRCUIT

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E89	3	Ground	Existed
	4		

Is the inspection result normal?

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

6. CHECK TERMINAL

Check ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-163, "Removal and Installation".
NO >> Repair or replace error-detected parts.

C1176 STOP LAMP SW2

DTC Logic

INFOID:0000000008142344

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1176	STOP LAMP SW2	When brake switch signal is not input when brake pedal operates.	• Harness or connector • Brake switch • ABS actuator and electric unit (control unit) • Stop lamp OFF relay 1 • Stop lamp OFF relay 2 • Ignition power supply system

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF, and wait 10 seconds or more.
2. Set the vehicle to READY/Start the engine.
   CAUTION:
   Stop the vehicle.
3. Depress the brake pedal several time.
4. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
5. Repeat step 4 two or more times.
6. Perform self-diagnosis for “ABS”.

Is DTC “C1176” detected?

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

Diagnosis Procedure

INFOID:0000000008142345

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

1.INTERVIEW FROM THE CUSTOMER

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

Is there such a history?

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

2.CHECK CONNECTOR

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

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace error-detected parts. GO TO 3.

3. PERFORM SELF-DIAGNOSIS (1)

With CONSULT
1. Erase self-diagnosis result for “ABS”.
2. Turn the ignition switch OFF → ON → OFF.
   CAUTION:
   Be sure to wait of 10 seconds after turning ignition switch OFF or ON.
3. Set the vehicle to READY/Start the engine.
   CAUTION:
   Stop the vehicle.
4. Depress the brake pedal several times.
5. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
6. Repeat step 5 two or more times.
7. Perform self-diagnosis for “ABS”.

Is DTC “C1176” detected?

YES >> GO TO 4.
NO >> INSPECTION END

4. PERFORM SELF-DIAGNOSIS (ELECTRICALLY-DRIVEN INTELLIGENT BRAKE)

With CONSULT
Perform self-diagnosis for “BRAKE”. Refer to BR-30, "CONSULT Function".

Is DTC “C1A68” detected?

YES >> Proceed to BR-132, "Diagnosis Procedure".
NO >> GO TO 5.

5. CHECK BRAKE SWITCH CLEARANCE

1. Turn the ignition switch OFF.
2. Check brake switch clearance. Refer to BR-270, "Inspection and Adjustment".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Adjust brake switch clearance. Refer to BR-270, "Inspection and Adjustment". GO TO 6.

6. CHECK DATA MONITOR (1)

With CONSULT
1. Erase self-diagnosis result for “ABS”.
2. Turn the ignition switch OFF → ON → OFF.
   CAUTION:
   Be sure to wait of 10 seconds after turning ignition switch OFF or ON.
3. Set the vehicle to READY/Start the engine.
   CAUTION:
   Stop the vehicle.
4. Select “ABS”, “DATA MONITOR” and “STOP LAMP SW2” according to this order. Check that data monitor displays “On” or “Off” when brake pedal is depress or release. Refer to BRC-50, "Reference Value".
5. Select “ABS”, “DATA MONITOR” and “PRESSURE SENSOR” according to this order. Check that data monitor displays “5 bar” or less when brake pedal is depress. Refer to BRC-50, "Reference Value".

Is the inspection result normal?

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

7. CHECK BRAKE SWITCH

Check brake switch. Refer to BRC-102, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 9.
NO >> Replace brake switch. Refer to BR-280, "Removal and Installation". GO TO 8.

8. CHECK DATA MONITOR (2)

With CONSULT
1. Erase self-diagnosis result for “ABS”.
2. Turn the ignition switch OFF, and wait 10 seconds or more.
3. Set the vehicle to READY/Start the engine.
   CAUTION:
   Stop the vehicle.
4. Select “ABS”, “DATA MONITOR” and “STOP LAMP SW2” according to this order. Check that data monitor displays “On” or “Off” when brake pedal is depress or release. Refer to BRC-50, "Reference Value".
5. Select “ABS”, “DATA MONITOR” and “PRESSURE SENSOR” according to this order. Check that data monitor displays “5 bar” or less when brake pedal is depress. Refer to BRC-50, "Reference Value".

Is the inspection result normal?

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

9. CHECK CONNECTOR AND TERMINAL

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

Is the inspection result normal?

YES >> GO TO 11.
NO >> Repair or replace error-detected parts. GO TO 10.

10. CHECK DATA MONITOR (3)

With CONSULT
1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Connect brake switch harness connector.
3. Erase self-diagnosis result for “ABS”.
4. Turn the ignition switch OFF → ON → OFF.
   CAUTION:
   Be sure to wait of 10 seconds after turning ignition switch OFF or ON.
5. Turn the ignition switch ON.
   CAUTION:
   Never set the vehicle to READY/Never start the engine.
6. Select “ABS”, “DATA MONITOR” and “STOP LAMP SW2” according to this order. Check that data monitor displays “On” or “Off” when brake pedal is depress or release. Refer to BRC-50, "Reference Value".
7. Select “ABS”, “DATA MONITOR” and “PRESSURE SENSOR” according to this order. Check that data monitor displays “5 bar” or less when brake pedal is depress. Refer to BRC-50, "Reference Value".

Is the inspection result normal?

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

11. CHECK BRAKE SWITCH CIRCUIT (1)

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

ABS actuator and electric unit (control unit)		—	Condition	Voltage
Connector	Terminal			
E89	6	Ground	Brake pedal depressed	Approx. 0 V
			Brake pedal not depressed	Approx. 0 V

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

ABS actuator and electric unit (control unit)		—	Condition	Voltage
Connector	Terminal			
E89	6	Ground	Brake pedal depressed	Approx. 0 V
			Brake pedal not depressed	10 – 16 V

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-163, "Removal and Installation".
NO (with ICC)>>Repair or replace error-detected parts. GO TO 12.
NO (without ICC)>>Repair or replace error-detected parts. GO TO 13.

12. CHECK BRAKE SWITCH CIRCUIT (2) (WITH ICC)

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

ABS actuator and electric unit (control unit)		Brake switch		Continuity
Connector	Terminal	Connector	Terminal	
E89	6	E14	2	Existed

4. Check continuity between ABS actuator and electric unit (control unit) harness connector and stop lamp OFF relay 2 harness connector.

ABS actuator and electric unit (control unit)		Stop lamp OFF relay 2		Continuity
Connector	Terminal	Connector	Terminal	
E89	6	B247	3	Existed

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E89	6	Ground	Not existed

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-163, "Removal and Installation".
NO >> Repair or replace error-detected parts. GO TO 13.

13. CHECK BRAKE SWITCH CIRCUIT (2) (WITHOUT ICC)

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

ABS actuator and electric unit (control unit)		Brake switch		Continuity
Connector	Terminal	Connector	Terminal	
E89	6	E109	2	Existed

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E89	6	Ground	Not existed

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-163, "Removal and Installation".

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

14. CHECK DATA MONITOR (4)

With CONSULT

1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Connect brake switch/brake pedal position switch harness connector.
3. Erase self-diagnosis result for “ABS”.
4. Turn the ignition switch OFF → ON → OFF.
   CAUTION:
   Be sure to wait of 10 seconds after turning ignition switch OFF or ON.
5. Set the vehicle to READY/Start the engine.
   CAUTION:
   Stop the vehicle.
6. Select “ABS”, “DATA MONITOR” and “STOP LAMP SW2” according to this order. Check that data monitor displays “On” or “Off” when brake pedal is depress or release. Refer to BRC-50, "Reference Value".
7. Select “ABS”, “DATA MONITOR” and “PRESSURE SENSOR” according to this order. Check that data monitor displays “5 bar” or less when brake pedal is depress. Refer to BRC-50, "Reference Value".

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace ABS actuator and electric unit (control unit). Refer to BRC-163, "Removal and Installation".

Component Inspection

INFOID:0000000008142346

1. CHECK BRAKE SWITCH

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

Brake switch	Condition	Continuity
Terminal		
1 – 2	When brake switch is release. (When brake pedal is slightly depressed.)	Not existed
	When brake switch is pressed. (When brake pedal is fully released.)	Existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace brake switch. Refer to BR-280, "Removal and Installation".

C118A ELECTRICALLY-DRIVEN INTELLIGENT BRAKE SYSTEM

DTC Logic

INFOID:0000000008142347

DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C118A	E-DRIVEN INTELLIGENT BRAKE SYSTEM	When a malfunction is detected in electrically-driven intelligent brake system.	• Electrically-driven intelligent brake • ABS actuator and electric unit (control unit) • CAN communication line

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
2. Repeat step 1 two or more times.
3. Perform self-diagnosis for “ABS”.

Is DTC “C118A” detected?

YES >> Proceed to BRC-130, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008142348

1.CHECK ELECTRICALLY-DRIVEN INTELLIGENT BRAKE SYSTEM (1)

With CONSULT

Perform self-diagnosis for “BRAKE”.

Is any DTC detected?

YES >> Check the DTC. Refer to BR-38, "DTC Index".
NO >> GO TO 2.

2.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Get out of the vehicle, close all doors (including trunk lid), and wait for 3 minutes or more without opening these doors.
3. Disconnect ABS actuator and electric unit (control unit) harness connector.
4. Disconnect electrically-driven intelligent brake unit harness.
5. Check connector for disconnection or looseness.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace error-detected parts, securely lock the connector, and GO TO 3.

3.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) (1)

With CONSULT

1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Connect electrically-driven intelligent brake unit harness.
3. Turn the ignition switch OFF → ON.

CAUTION:
- **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
- **Set the vehicle to READY/Start the engine.**

4. Repeat step 3 two or more times.
5. Perform self-diagnosis for “ABS”.

Is DTC “C118A” detected?

YES >> GO TO 4.
NO >> INSPECTION END

4.CHECK CAN COMMUNICATION

Check CAN communication line. Refer to LAN-19, "Trouble Diagnosis Flow Chart".

>> GO TO 5.

5.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) (2)

With CONSULT
1. Turn the ignition switch OFF.
2. Get out of the vehicle, close all doors (including trunk lid), and wait for 3 minutes or more without opening these doors.
3. Turn the ignition switch OFF → ON.

CAUTION:
- **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
- **Set the vehicle to READY/Start the engine.**

4. Repeat step 3 two or more times.
5. Perform self-diagnosis for “ABS”.

Is DTC “C118A” detected?

YES >> GO TO 6.
NO >> INSPECTION END

6.CHECK ELECTRICALLY-DRIVEN INTELLIGENT BRAKE SYSTEM (2)

With CONSULT
Perform self-diagnosis for “BRAKE”.

Is any DTC detected?

YES >> Check the DTC. Refer to BR-38, "DTC Index".
NO >> GO TO 7.

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

With CONSULT
1. Turn the ignition switch OFF → ON.

CAUTION:
- **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
- **Set the vehicle to READY/Start the engine.**

2. Repeat step 1 two or more times.
3. Perform self-diagnosis for “ABS”.

Is DTC “C118A” detected?

YES >> GO TO 4.
NO >> INSPECTION END

C118C HEV SYSTEM

DTC Logic

INFOID:0000000008142349

DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C118C	EV/HEV SYSTEM	When a malfunction is detected in HPCM system.	• HPCM • ABS actuator and electric unit (control unit) • CAN communication line

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
2. Repeat step 1 two or more times.
3. Perform self-diagnosis for “ABS”.

Is DTC “C118C” detected?

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

Diagnosis Procedure

INFOID:0000000008142350

1.CHECK HEV SYSTEM

With CONSULT

Perform self-diagnosis for “EV/HEV”.

Is any DTC detected?

YES >> Check the DTC. Refer to HBC-71, "DTC Index".
NO >> GO TO 2.

2.CHECK CAN COMMUNICATION

Check CAN communication line. Refer to LAN-19, "Trouble Diagnosis Flow Chart".

>> GO TO 3.

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

With CONSULT

1. Erase self-diagnosis result for “ABS”.
2. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
3. Repeat step 2 two or more times.
4. Perform self-diagnosis for “ABS”.

Is any DTC “C118C” or “U1000” detected?

YES (“C118C”)>>GO TO 1.

YES (“U1000”)>>Refer to LAN-19, "Trouble Diagnosis Flow Chart".
NO >> INSPETTION END

U1000 CAN COMM CIRCUIT

Description

INFOID:0000000008142351

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:0000000008142352

DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
U1000	CAN COMM CIRCUIT	When CAN communication signal is not continuously transmitted or received for 2 seconds or more.	CAN communication system malfunction

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
2. Repeat step 1 two or more times.
3. Perform self-diagnosis for “ABS”.

Is DTC “U1000” detected?

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

Diagnosis Procedure

INFOID:0000000008142353

Proceed to LAN-19, "Trouble Diagnosis Flow Chart".

U1010 CONTROL UNIT (CAN)

Description

INFOID:0000000008142354

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:0000000008142355

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible causes
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)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
2. Repeat step 1 two or more times.
3. Perform self-diagnosis for “ABS”.

Is DTC “U1010” detected?

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

Diagnosis Procedure

INFOID:0000000008142356

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

Check ABS actuator and electric unit (control unit) harness connector for disconnection and deformation.

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-163, "Removal and Installation".
NO >> Repair or replace error-detected parts.

U110D ELECTRICALLY-DRIVEN INTELLIGENT BRAKE COMMUNICATION

Description

INFOID:0000000008142357

ABS actuator and electric unit (control unit) and electrically-driven intelligent brake unit transmit/receive information to/from each other for optimum control of the ABS actuator and electric unit (control unit) with the specified brake communication line.

DTC Logic

INFOID:0000000008142358

DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
U110D	E-DRIVEN INTELLIGENT BRAKE COMM	When ABS actuator and electric unit (control unit) is not transmitting or receiving brake communication signal for 4 seconds or more.	• ABS actuator and electric unit (control unit) • Brake communication line* • Electrically-driven intelligent brake unit

*:Brake communication line between ABS actuator and electric unit (control unit) and electrically-driven intelligent brake unit.

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
2. Repeat step 1 two or more times.
3. Perform self-diagnosis for “ABS”.

Is DTC “U110D” detected?

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

Diagnosis Procedure

INFOID:0000000008142359

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Get out of the vehicle, close all doors (including trunk lid), and wait for 3 minutes or more without opening these doors.
3. Disconnect 12V battery cable from negative terminal. Refer to BRC-6, "Precaution for Removing 12V Battery".
4. Disconnect ABS actuator and electric unit (control unit) harness connector.
5. Disconnect electrically-driven intelligent brake unit harness.
6. Check connector for disconnection or looseness.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace error-detected parts, securely lock the connector, and GO TO 2.

2.CHECK BRAKE COMMUNICATION LINE

1. Check the continuity between ABS actuator and electric unit (control unit) harness connector and electrically-driven intelligent brake unit harness connector.

ABS actuator and electric unit (control unit)		Electrically-driven intelligent brake unit		Continuity
Connector	Terminal	Connector	Terminal	
E89	20	E87	24	Existed

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E89	20	Ground	Not existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace the harnesses and connectors. Refer to BRC-8, "Precaution for Harness Repair". GO TO 3.

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

With CONSULT
1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Connect electrically-driven intelligent brake unit harness.
3. Connect 12V battery cable from negative terminal.
4. Get out of the vehicle, close all doors (including trunk lid), and wait for 3 minutes or more without opening these doors.
5. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
6. Repeat step 5 two or more times.
7. Perform self-diagnosis for “ABS”.

Is DTC “C118A”, “U1000” or “U110D” detected?

YES (“C118A”)>>Refer to BRC-130, "Diagnosis Procedure".
YES (“U1000”)>>Refer to BRC-134, "Diagnosis Procedure".
YES (“U110D”)>>GO TO 4.
NO >> INSPECTION END

4. PERFORM ELECTRICALLY-DRIVEN INTELLIGENT BRAKE UNIT SELF-DIAGNOSIS

With CONSULT
Perform self-diagnosis for “BRAKE”.

Is any DTC detected?

YES >> Check the DTC. Refer to BR-38, "DTC Index".
NO >> GO TO 5.

5. PERFORM ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) SELF-DIAGNOSIS (2)

With CONSULT
1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
2. Repeat step 1 two or more times.
3. Perform self-diagnosis for “ABS”.

Is DTC “U110D” detected?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-163, "Removal and Installation".
NO >> INSPECTION END

POWER SUPPLY AND GROUND CIRCUIT

Diagnosis Procedure

INFOID:0000000008142360

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

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E89	16	Ground	Approx. 0 V

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E89	16	Ground	10 – 16 V

Is the inspection result normal?

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

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

1. Turn the ignition switch OFF.
2. Check 10A fuse (#1).
3. Disconnect fuse block (J/B) harness connector.
4. Check continuity between ABS actuator and electric unit (control unit) harness connector and fuse block (J/B).

ABS actuator and electric unit (control unit)		Fuse block (J/B)		Continuity
Connector	Terminal	Connector	Terminal	
E89	16	M3	8C	Existed

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E89	16	Ground	No existed

Is the inspection result normal?

YES >> Perform trouble diagnosis for ignition power supply. Refer to PG-30, "Wiring Diagram - IGNITION POWER SUPPLY -".
NO >> Repair or replace error-detected parts.

3.CHECK MOTOR AND MOTOR RELAY POWER SUPPLY

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E89	1	Ground	Battery voltage

3. Turn the ignition switch ON.

CAUTION:
Never set the vehicle to READY/Never start the engine.

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E89	1	Ground	Battery voltage

Is the inspection result normal?

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

4. CHECK MOTOR AND MOTOR RELAY POWER SUPPLY CIRCUIT

1. Turn the ignition switch OFF.
2. Check 30A fusible link (#M).
3. Check continuity and short circuit between ABS actuator and electric unit (control unit) harness connector terminal (1) and 30A fusible link (#M).

Is the inspection result normal?

YES >> Perform trouble diagnosis for 12V battery power supply. Refer to PG-14, "Wiring Diagram - BATTERY POWER SUPPLY -".
NO >> Repair or replace error-detected parts.

5. CHECK ACTUATOR RELAY, ABS IN VALVE, ABS OUT VALVE POWER SUPPLY

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E89	2	Ground	Battery voltage

3. Turn the ignition switch ON

CAUTION:
Never set the vehicle to READY/Never start the engine.

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E89	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6.

6. CHECK ACTUATOR RELAY, ABS IN VALVE, ABS OUT VALVE POWER SUPPLY CIRCUIT

1. Turn the ignition switch OFF.
2. Check 50A fusible link (#N).
3. Check continuity and short circuit between ABS actuator and electric unit (control unit) harness connector terminal (2) and 50A fusible link (#N).

Is the inspection result normal?

YES >> Perform trouble diagnosis for 12V battery power supply. Refer to PG-14, "Wiring Diagram - BATTERY POWER SUPPLY -".
NO >> Repair or replace error-detected parts.

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

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E89	3	Ground	Existed
	4		

Is the inspection result normal?

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

8.CHECK TERMINAL

1. Check ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with harness connector.
2. Check fuse block (J/B) pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-163, "Removal and Installation".
NO >> Repair or replace error-detected parts.

PARKING BRAKE SWITCH

Component Function Check

INFOID:0000000008142361

1.CHECK PARKING BRAKE SWITCH OPERATION

Check that brake warning lamp in combination meter turns ON/OFF when parking brake is operated.

Is the inspection result normal?

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

Diagnosis Procedure

INFOID:0000000008142362

1.CHECK PARKING BRAKE SWITCH CIRCUIT

1. Turn the ignition switch OFF.
2. Disconnect parking brake switch harness connector.
3. Disconnect combination meter harness connector.
4. Check continuity between parking brake switch harness connector and combination meter harness connector.

Parking brake switch		Combination meter		Continuity
Connector	Terminal	Connector	Terminal	
E107	1	M53	26	Existed

5. Check continuity between parking brake switch harness connector and ground.

Parking brake switch		—	Continuity
Connector	Terminal		
E107	1	Ground	Not existed

Is the inspection result normal?

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

2.CHECK PARKING BRAKE SWITCH

Check parking brake switch. Refer to BRC-142, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Replace parking brake switch. Refer to PB-7, "Removal and Installation".

3.CHECK PARKING BRAKE SWITCH SIGNAL

With CONSULT

1. Connect parking brake switch harness connector.
2. Connect combination meter harness connector.
3. Select “ABS”, “DATA MONITOR” and “PARK BRAKE SW” according to this order. Check parking brake switch signal.

Condition	DATA MONITOR
Operate parking brake	On
Release the parking brake	Off

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 4.

4.CHECK COMBINATION METER

Check combination meter. Refer to MWI-36, "CONSULT Function".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace combination meter. Refer to MWI-81, "Removal and Installation".

5. CHECK TERMINAL

1. Check combination meter pin terminals for damage or loose connection with harness connector.
2. Check parking brake switch pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-163, "Removal and Installation".
NO >> Repair or replace error-detected parts.

Component Inspection

INFOID:0000000008142363

1. CHECK PARKING BRAKE SWITCH

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

Parking brake switch Terminal	—	Condition	Continuity
1	Ground	When parking brake switch is pressed	Existed
		When parking brake switch is released	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace parking brake switch. Refer to PB-7, "Removal and Installation".

VDC OFF SWITCH

Component Function Check

INFOID:0000000008142364

1.CHECK VDC OFF SWITCH OPERATION

Check that VDC OFF indicator lamp in combination meter turns ON/OFF when VDC OFF switch is operated.

Is the inspection result normal?

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

Diagnosis Procedure

INFOID:0000000008142365

1.CHECK VDC OFF SWITCH CIRCUIT

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

ABS actuator and electric unit (control unit)		Triple switch		Continuity
Connector	Terminal	Connector	Terminal	
E89	5	M183	3	Existed

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E89	5	Ground	Not existed

Is the inspection result normal?

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

2.CHECK VDC OFF SWITCH GROUND CIRCUIT

Check continuity between triple switch harness connector and ground.

Triple switch		—	Continuity
Connector	Terminal		
M183	5	Ground	Existed

Is the inspection result normal?

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

3.CHECK VDC OFF SWITCH

Check VDC OFF switch. Refer to BRC-144, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace VDC OFF switch. Refer to BRC-167, "Removal and Installation".

4.CHECK VDC OFF SWITCH SIGNAL

With CONSULT

1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Connect VDC OFF switch harness connector.
3. Select “ABS”, “DATA MONITOR” and “OFF SW” according to this order. Check VDC OFF switch signal.

Condition	DATA MONITOR
When VDC OFF switch is pressed and VDC OFF indicator lamp in combination meter is in ON status	On
When VDC OFF switch is pressed and VDC OFF indicator lamp in combination meter is in OFF status	Off

Is the inspection result normal?

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

5.CHECK TERMINAL

1. Check ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with harness connector.
2. Check VDC OFF switch pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-163, "Removal and Installation".
NO >> Repair or replace error-detected parts.

Component Inspection

INFOID:0000000008142366

1.CHECK VDC OFF SWITCH

1. Turn the ignition switch OFF.
2. Disconnect triple switch harness connector.
3. Check continuity between terminals of triple switch connector.

Triple switch Terminal	Condition	Continuity
3 – 5	When VDC OFF switch is pressed	Existed
	When VDC OFF switch is not pressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace VDC OFF switch. Refer to BRC-167, "Removal and Installation".

ABS WARNING LAMP

Component Function Check

INFOID:0000000008142367

1.CHECK ABS WARNING LAMP FUNCTION

Check that ABS warning lamp in combination meter turns ON for several seconds after ignition switch is turned ON.

CAUTION:

Never set the vehicle to READY/Never start the engine.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to BRC-145, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000008142368

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

Perform the trouble diagnosis for ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to BRC-138, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2.PERFORM SELF-DIAGNOSIS

With CONSULT

1. Turn the ignition switch OFF → ON.

   CAUTION:

   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**

2. Repeat step 1 two or more times.
3. Perform self-diagnosis for “ABS”.

Is any DTC detected?

YES >> Check the DTC. Refer to BRC-57, "DTC Index".

NO >> GO TO 3.

3.CHECK ABS WARNING LAMP SIGNAL

With CONSULT

1. Select “ABS”, “DATA MONITOR” and “ABS WARN LAMP” according to this order.
2. Turn the ignition switch OFF.
3. Check that data monitor displays “On” for several seconds after ignition switch is turned ON and then changes to “Off”.

   CAUTION:

   Never set the vehicle to READY/Never start the engine.

Is the inspection result normal?

YES >> Check combination meter. Refer to MWI-36, "CONSULT Function".

NO >> Replace ABS actuator and electric unit (control unit). Refer to BRC-163, "Removal and Installation".

BRAKE WARNING LAMP

Component Function Check

INFOID:0000000008142369

1.CHECK BRAKE WARNING LAMP FUNCTION (1)

Check that brake warning lamp in combination meter turns ON for several seconds after ignition switch is turned ON.

CAUTION:

Never set the vehicle to READY/Never start the engine.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Proceed to BRC-146, "Diagnosis Procedure".

2.CHECK BRAKE WARNING LAMP FUNCTION (2)

Check that brake warning lamp turns ON/OFF when parking brake is operated.

NOTE:

Brake warning lamp turns ON when parking brake is operated (when parking brake switch is ON).

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check parking brake switch system. Refer to BRC-141, "Diagnosis Procedure".

3.CHECK BRAKE WARNING LAMP FUNCTION (3)

Check that brake warning lamp in combination meter turns ON/OFF when brake fluid level switch is operated while brake fluid level in reservoir tank is with the specified level.

NOTE:

Brake warning lamp turns ON when brake fluid is less than the specified level (when brake fluid level switch is ON).

Is the inspection result normal?

YES >> INSPECTION END
NO >> Check brake fluid level switch system. Refer to BRC-117, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000008142370

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

Perform the trouble diagnosis for ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to BRC-138, "Diagnosis Procedure".

Is the inspection result normal?

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

2.PERFORM THE SELF-DIAGNOSIS

With CONSULT

1. Turn the ignition switch OFF → ON.

   CAUTION:

   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**

2. Repeat step 1 two or more times.
3. Perform self-diagnosis for “ABS”.

Is any DTC detected?

YES >> Check the DTC. Refer to BRC-57, "DTC Index".
NO >> GO TO 3.

3.CHECK COMBINATION METER

Check combination meter. Refer to MWI-36, "CONSULT Function".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-163, "Removal and Installation".

NO >> Repair or replace combination meter. Refer to MWI-81, "Removal and Installation".

VDC WARNING LAMP

Component Function Check

INFOID:0000000008142371

1.CHECK VDC WARNING LAMP FUNCTION

Check that VDC warning lamp in combination meter turns ON for several seconds after ignition switch is turned ON.

CAUTION:

Never set the vehicle to READY/Never start the engine.

Is the inspection result normal?

YES >> INSPECTION END

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

Diagnosis Procedure

INFOID:0000000008142372

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

Perform the trouble diagnosis for ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to BRC-138, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2.PERFORM THE SELF-DIAGNOSIS

With CONSULT

1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
2. Repeat step 1 two or more times.
3. Perform self-diagnosis for “ABS”.

Is any DTC detected?

YES >> Check the DTC. Refer to BRC-57, "DTC Index".

NO >> GO TO 3.

3.CHECK VDC WARNING LAMP SIGNAL

With CONSULT

1. Select “ABS”, “DATA MONITOR” and “SLIP/VDC LAMP” according to this order.
2. Turn the ignition switch OFF.
3. Check that data monitor displays “On” for approx. several seconds after ignition switch is turned ON, and then changes to “Off”.
   CAUTION:
   Never set the vehicle to READY/Never start the engine.

Is the inspection result normal?

YES >> Check combination meter. Refer to MWI-36, "CONSULT Function".

NO >> Replace ABS actuator and electric unit (control unit). Refer to BRC-163, "Removal and Installation".

VDC OFF INDICATOR LAMP

Component Function Check

INFOID:0000000008142373

1.CHECK VDC OFF INDICATOR LAMP FUNCTION (1)

Check that VDC OFF indicator lamp in combination meter turns ON for several seconds after ignition switch is turned ON.

CAUTION:

Never set the vehicle to READY/Never start the engine.

Is the inspection result normal?

YES >> GO TO 2.

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

2.CHECK VDC OFF INDICATOR LAMP FUNCTION (2)

Check that VDC OFF indicator lamp in combination meter turns ON/OFF when VDC OFF switch is operated.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Check VDC OFF switch system. Refer to BRC-143, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000008142374

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

Perform the trouble diagnosis for ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to BRC-138, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2.CHECK VDC OFF INDICATOR LAMP SIGNAL (1)

With CONSULT

1. Select “ABS”, “DATA MONITOR” and “OFF LAMP” according to this order.
2. Turn the ignition switch OFF.
3. Check that data monitor displays “On” for several seconds after ignition switch is turned ON, and then changes to “Off”.

   CAUTION:

   Never set the vehicle to READY/Never start the engine.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Replace ABS actuator and electric unit (control unit). Refer to BRC-163, "Removal and Installation".

3.CHECK VDC OFF INDICATOR LAMP SIGNAL (2)

With CONSULT

1. Select “ABS”, “DATA MONITOR” and “OFF LAMP” according to this order.
2. Check that data monitor displays “On” or “Off” each time when VDC OFF switch is operated.

Is the inspection result normal?

YES >> Check combination meter. Refer to MWI-36, "CONSULT Function".

NO >> Check VDC OFF switch system. Refer to BRC-143, "Diagnosis Procedure".

SYMPTOM DIAGNOSIS

EXCESSIVE OPERATION FREQUENCY

Description

INFOID:0000000008142375

VDC function, TCS function, ABS function, EBD function, brake limited slip differential (BLSD) function, brake assist function or Brake force distribution function operates in excessive operation frequency.

Diagnosis Procedure

INFOID:0000000008142376

1.CHECK BRAKING FORCE

Check brake force using a brake tester.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check brake system.

2.CHECK FRONT AND REAR AXLE

Check that there is no excessive looseness in front and rear axle.
- Front axle: Refer to FAX-6, "Inspection".
- Rear axle: Refer to RAX-6, "Inspection".

Is the inspection result normal?

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

3.CHECK WHEEL SENSOR

Check wheel sensor.
- Check installation and damage of wheel sensor.
- Check connection of wheel sensor harness connector.
- Check terminal of wheel sensor harness connector.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair installation or replace wheel sensor.
- Front wheel sensor: Refer to BRC-159, "FRONT WHEEL SENSOR : Removal and Installation".
- Rear wheel sensor: Refer to BRC-160, "REAR WHEEL SENSOR : Removal and Installation".

4.CHECK SENSOR ROTOR

Check that there is no looseness, damage or foreign material on sensor rotor.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair installation or replace sensor rotor.
- Front sensor rotor: Refer to BRC-162, "FRONT SENSOR ROTOR : Removal and Installation".
- Rear sensor rotor: Refer to BRC-162, "REAR SENSOR ROTOR : Removal and Installation".

5.CHECK WARNING LAMP TURNS OFF

Check that ABS warning lamp, brake warning lamp and VDC warning lamp turn OFF approx. 1 second after key switch is turned ON and stay in OFF status during driving.

CAUTION:

Brake warning lamp turns ON when parking brake is operated (parking brake switch is ON) or brake fluid is less than the specified level (brake fluid level switch is ON).

Is the inspection result normal?

YES >> Normal
NO >> GO TO 6.

6.PERFORM THE SELF-DIAGNOSIS

With CONSULT

1. Turn the ignition switch OFF → ON.

CAUTION:

- **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
- **Set the vehicle to READY/Start the engine.**

2. Repeat step 1 two or more times.
3. Perform self-diagnosis for “ABS”.

Is any DTC detected?

YES >> Check the DTC. Refer to BRC-57, "DTC Index".
NO >> INSPECTION END

UNEXPECTED BRAKE PEDAL REACTION

Description

INFOID:0000000008142377

A malfunction of brake pedal feel (height or others) is detected when brake pedal is depressed.

Diagnosis Procedure

INFOID:0000000008142378

1.CHECK FRONT AND REAR AXLE

Check that there is no excessive looseness in front and rear axle.
- Front axle: Refer to FAX-6, "Inspection".
- Rear axle: Refer to RAX-6, "Inspection".

Is the inspection result normal?

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

2.CHECK DISC ROTOR

Check disc rotor runout.
- Front: Refer to BR-276, "DISC ROTOR : Inspection and Adjustment".
- Rear: Refer to BR-278, "DISC ROTOR : Inspection and Adjustment".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Refinish the disc rotor.

3.CHECK BRAKE FLUID LEAKAGE

Check fluid leakage.
- Front: Refer to BR-284, "FRONT : Inspection".
- Rear: Refer to BR-287, "REAR : Inspection".

Is the inspection result normal?

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

4.CHECK BRAKE PEDAL

Check each item of brake pedal. Refer to BR-270, "Inspection and Adjustment".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Adjust each item of brake pedal. Refer to BR-270, "Inspection and Adjustment".

5.CHECK BRAKING FORCE

Check brake force using a brake tester.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Check each components of brake system.

6.CHECK BRAKE PERFORMANCE

Disconnect ABS actuator and electric unit (control unit) connector so that ABS does not operate. Check that brake force is normal in this condition. Connect harness connectors after checking.

Is the inspection result normal?

YES >> Normal
NO >> Check each components of brake system.

THE BRAKING DISTANCE IS LONG

Description

INFOID:0000000008142379

Brake stopping distance is long when ABS function is operated.

Diagnosis Procedure

INFOID:0000000008142380

CAUTION:
Brake stopping distance on slippery road like rough road, gravel road or snowy road may become longer when ABS is operated than when ABS is not operated.

1.CHECK BRAKING FORCE

Check brake force using a brake tester.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check each components of brake system.

2.CHECK BRAKE PERFORMANCE

Disconnect ABS actuator and electric unit (control unit) connector so that ABS does not operate. Check brake stopping distance in this condition. Connect harness connectors after checking.

Is the inspection result normal?

YES >> Normal
NO >> Check each components of brake system.

ABS FUNCTION DOES NOT OPERATE

Description

INFOID:0000000008142381

VDC function, TCS function, ABS function, EBD function, brake limited slip differential (BLSD) function, brake assist function or Brake force distribution function does not operate.

Diagnosis Procedure

INFOID:0000000008142382

CAUTION:
- **VDC function, ABS function, EBD function, brake assist function and Brake force distribution function never operate when the vehicle speed is 10 km/h (6.2 MPH) or less. However, TCS function and brake limited slip differential (BLSD) function operates when the vehicle speed is 0 km/h (0 MPH) (the vehicle is in stop status).**
- **VDC function and TCS function never operate when VDC OFF switch is operated (when VDC OFF indicator lamp turns ON).**

1. CHECK ABS WARNING LAMP

Check that ABS warning lamp, brake warning lamp and VDC warning lamp turn ON and turn OFF approx. 1 second after key switch is turned ON. Check that ABS warning lamp, brake warning lamp and VDC warning lamp and stay in OFF status during driving.

CAUTION:

Brake warning lamp turns ON when parking brake is operated (parking brake switch is ON) or brake fluid is less than the specified level (brake fluid level switch is ON).

Is the inspection result normal?

YES >> Normal
NO >> GO TO 2.

2. PERFORM THE SELF-DIAGNOSIS

With CONSULT

1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
2. Repeat step 1 two or more times.
3. Perform self-diagnosis for “ABS”.

Is any DTC detected?

YES >> Check the DTC. Refer to BRC-57, "DTC Index".
NO >> INSPECTION END

BRAKE PEDAL VIBRATION OR OPERATION SOUND OCCURS

Description

INFOID:0000000008142383

- Brake pedal vibrates and motor sound from ABS actuator and electric unit (control unit) occurs, when the engine starts/vehicle to READY.
- Brake pedal vibrates during braking.

CAUTION:

Vibration may be felt during brake pedal is lightly depressed (just placing a foot on it) in the following conditions. This is normal.

- **When shifting gears**
- **When driving on slippery road**
- **During cornering at high speed**
- **When passing over bumps or grooves [Approx. 50 mm (1.97 in) or more]**
- **When pulling away just after starting engine [at approx. 10 km/h (6.2 MPH) or higher]**

Diagnosis Procedure

INFOID:0000000008142384

1.SYMPTOM CHECK 1

Check that there are pedal vibrations when the engine is started/vehicle to READY.

Do vibrations occur?

YES >> GO TO 2.
NO >> Check brake pedal. Refer to BR-281, "Inspection and Adjustment".

2.SYMPTOM CHECK 2

Check that motor sound from ABS actuator occurs when the engine starts/vehicle to READY.

Does the operation sound occur?

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

3.SYMPTOM CHECK 3

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

Does the symptom occur?

YES >> Check that radio (including wiring), antenna and antenna lead-in wires are not located near ABS actuator and electric unit (control unit). Move them if they are located near ABS actuator and electric unit (control unit).
NO >> GO TO 4.

4.PERFORM THE SELF-DIAGNOSIS

With CONSULT

1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
2. Repeat step 1 two or more times.
3. Perform self-diagnosis for “ABS”.

Is any DTC detected?

YES >> Check the DTC. Refer to BRC-57, "DTC Index".
NO >> INSPECTION END

VEHICLE JERKS DURING

Description

INFOID:0000000008142385

The vehicle jerks when VDC function, TCS function, ABS function, EBD function, brake limited slip differential (BLSD) function, brake assist function or Brake force distribution function operates.

Diagnosis Procedure

INFOID:0000000008142386

1.CHECK SYMPTOM

Check that the vehicle jerks when VDC function, TCS function, ABS function, EBD function, brake limited slip differential (BLSD) function, brake assist function or Brake force distribution function operates.

Is the inspection result normal?

YES >> Normal
NO >> GO TO 2.

2.PERFORM THE SELF-DIAGNOSIS [ABS ACTUATIO AND ELECTRIC UNIT (CONTROL UNIT)] (1)

With CONSULT
1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
2. Repeat step 1 two or more times.
3. Perform self-diagnosis for “ABS”.

Is any DTC detected?

YES >> Check the DTC. Refer to BRC-57, "DTC Index".
NO >> GO TO 3.

3.CHECK CONNECTOR

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

Is the inspection result normal?

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

4.PERFORM THE SELF-DIAGNOSIS [ABS ACTUATIO AND ELECTRIC UNIT (CONTROL UNIT)] (2)

With CONSULT
1. Connect harness connector.
2. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
3. Repeat step 1 two or more times.
4. Perform self-diagnosis for “ABS”.

Is any DTC detected?

YES >> Check the DTC. Refer to BRC-57, "DTC Index".
NO >> GO TO 5.

5.PERFORM THE SELF-DIAGNOSIS (ECM, HPCM, TCM)

With CONSULT
Perform self-diagnosis for “ENGINE”, “EV/HEV”, “TRANSMISSION”.

Is any DTC detected?

YES >> Check the DTC.
NO >> Replace ABS actuator and electric unit (control unit). Refer to BRC-163, "Removal and Installation".

THE DRIVING WHEELS SKID GREATLY ON ACCELERATION

Description

INFOID:0000000008142387

The driving wheels skid greatly on acceleration.

Diagnosis Procedure

INFOID:0000000008142388

1.STOP LAMP FOR ILLUMINATION

Depress brake pedal and check that stop lamp turns ON.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check stop lamp system. Refer to EXL-42, "EXTERIOR LIGHTING SYSTEM : Wiring Diagram".

2.PERFORM THE SELF-DIAGNOSIS

With CONSULT

1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Set the vehicle to READY/Start the engine.**
2. Repeat step 1 two or more times.
3. Perform self-diagnosis for “ABS”.

Is any DTC detected?

YES >> Check the DTC. Refer to BRC-57, "DTC Index".
NO >> INSPECTION END

NORMAL OPERATING CONDITION

Description

INFOID:0000000008142389

Symptom	Result
Brake pedal slightly vibrates and operation sound (motor sound and sound from suspension) occurs when VDC function, TCS function, ABS function, EBD function, brake limited slip differential (BLSD) function, brake assist function or Brake force distribution function operates.	This is not a malfunction, because it is caused by VDC function, TCS function, ABS function, EBD function, brake limited slip differential (BLSD) function, brake assist function, Brake force distribution and function that are normally operated.
Brake stopping distance may become longer than models without ABS function depending on the road conditions, when ABS function is operated on slippery road like rough road, gravel road or snowy road.	
Brake pedal vibrates and operation sound occurs during sudden acceleration and cornering, when VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function or Brake force distribution function is operated.	
Brake pedal vibrates and motor sound from the engine room occurs, when the engine starts/vehicle to READY or the vehicle starts just after starting the engine.	This is not a malfunction, because it is caused by operation check of ABS actuator and electric unit (control unit).
Acceleration may be felt insufficient depending on the road conditions.	This is not a malfunction, because it is caused by TCS function that puts the highest priority to obtain the optimum traction (stability).
TCS function may operate momentarily, while driving on a road where friction coefficient varies, or when downshifting, or fully depressing accelerator pedal.	
VDC warning lamp may turn ON, when the vehicle is on a rotating turntable or is given a strong shaking or large vibrations on a ship while the engine is running/vehicle to READY.	In this case, restart the engine/vehicle to READY on a normal road. If the normal condition is restored, there is no malfunction. In that case, erase “ABS” self-diagnosis result memory with CONSULT. **CAUTION:** • **Turn the power switch OFF → ON → OFF after erase self-diagnosis result.** • **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
VDC warning lamp may turn ON and VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function and Brake force distribution function may not normally operate, when driving on a special road the is extremely slanted (bank in a circuit course).	
A malfunction in yaw rate/side/decel G sensor system may be detected when the vehicle sharply turns during a spin turn, acceleration turn or drift driving while VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function and Brake force distribution function are OFF (VDC OFF switch is pressed and VDC OFF indicator lamp is in ON status).	
The vehicle speed does not increase, when the accelerator pedal is depressed while the vehicle is on a 2-wheel chassis dynamometer for speedometer check.	This is normal. (When checking the vehicle on a chassis dynamometer, operate VDC OFF switch so that TCS function is OFF.)

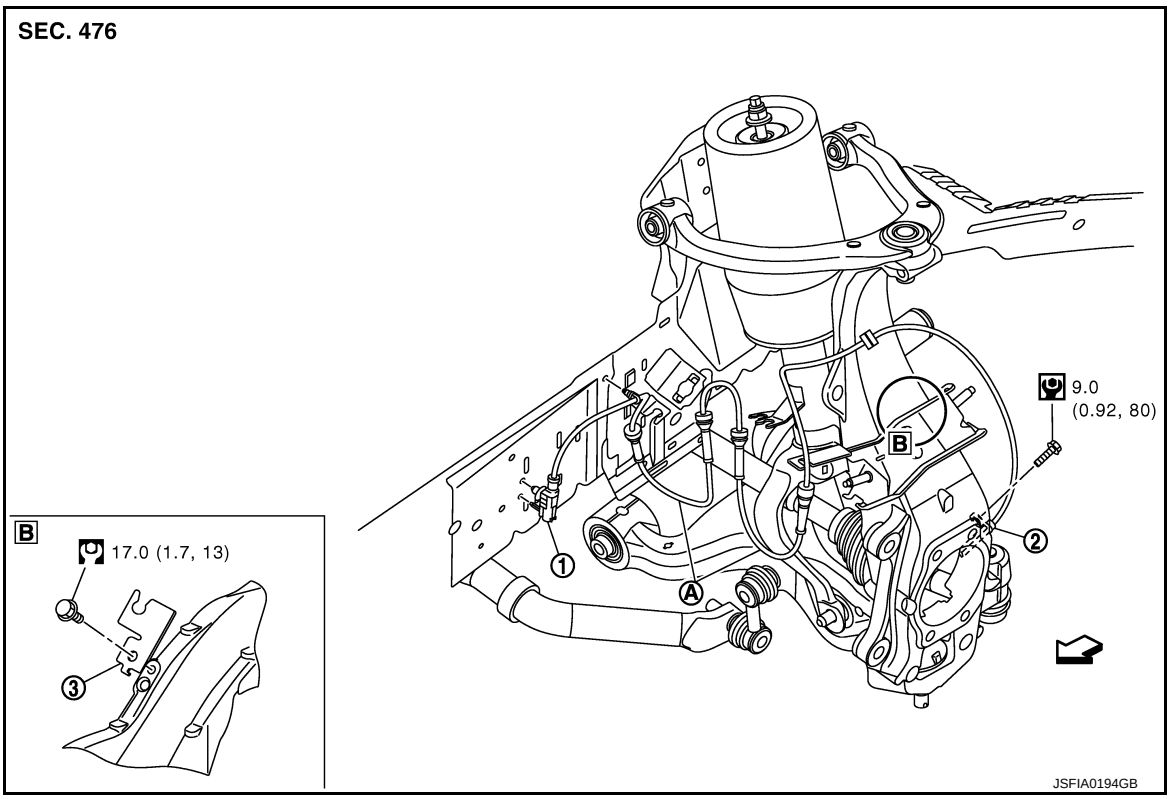
REMOVAL AND INSTALLATION

WHEEL SENSOR

FRONT WHEEL SENSOR

FRONT WHEEL SENSOR : Exploded View

INFOID:0000000008142390



1. Front LH wheel sensor harness connector
2. Front LH wheel sensor
3. Bracket

A: Identification line

⇦: Vehicle front

Refer to GI-5, "Components" for symbols in the figure.

NOTE:
Front RH wheel sensor is symmetrically opposite of LH.

FRONT WHEEL SENSOR : Removal and Installation

INFOID:0000000008142391

REMOVAL

1. Remove tires with power tool.
2. Remove the fender protector (front). Refer to EXT-24, "FENDER PROTECTOR : Removal and Installation".
3. Remove front wheel sensor from steering knuckle.
   CAUTION:
   Never rotate and never pull front wheel sensor as much as possible, when pulling out.
4. Remove front wheel sensor harness from the vehicle.
   CAUTION:
   Never twist or pull front wheel sensor harness, when removing.

INSTALLATION

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

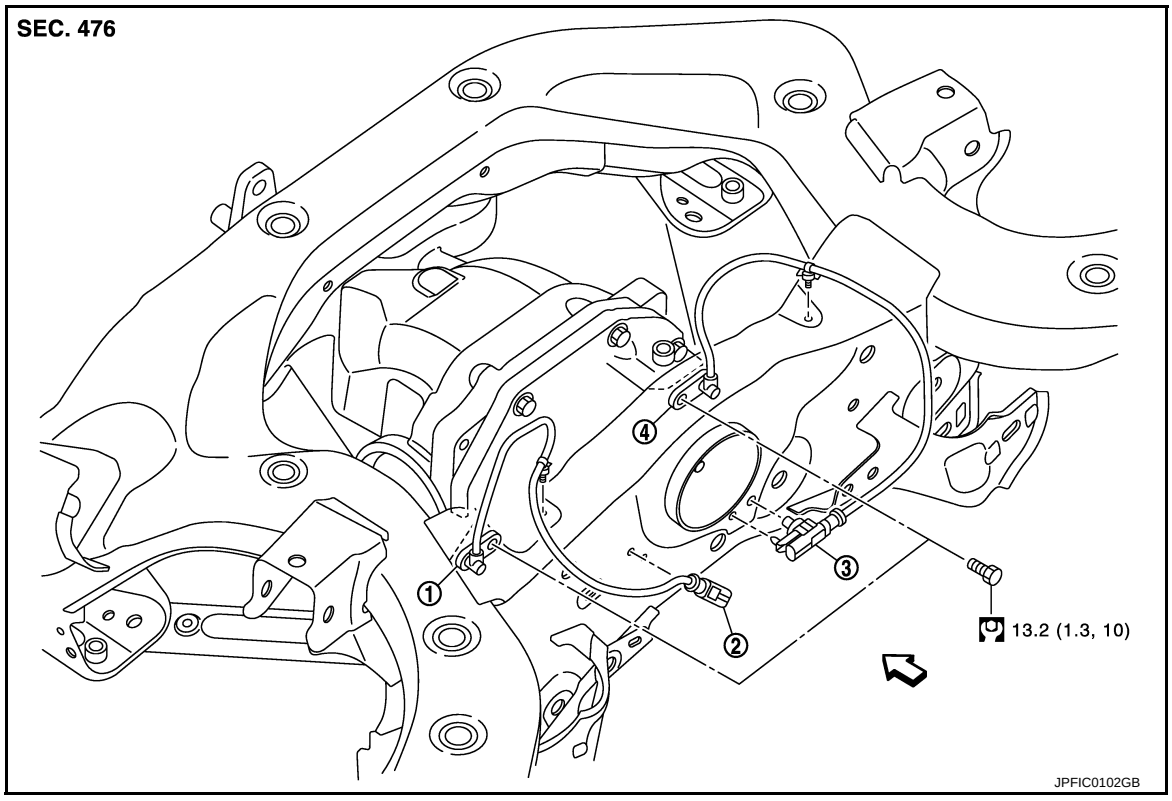
- Check that there is no foreign material like iron powder or damage on inner surface of front wheel sensor mounting hole of steering knuckle and sensor rotor. Install after cleaning when there are foreign material like iron powder, or replace when there is a malfunction.
- Never twist front wheel sensor harness when installing front wheel sensor. Check that grommet is fully inserted to bracket. Check that front wheel sensor harness is not twisted after installation.

CAUTION:
Check that front wheel sensor identification line faces toward the vehicle front.

REAR WHEEL SENSOR

REAR WHEEL SENSOR : Exploded View

INFOID:0000000008142392



1. Rear LH wheel sensor
2. Rear LH wheel sensor harness connector
3. Rear RH wheel sensor harness connector
4. Rear RH wheel sensor

⇦: Vehicle front

Refer to GI-5, "Components" for symbols in the figure.

REAR WHEEL SENSOR : Removal and Installation

INFOID:0000000008142393

REMOVAL

1. Remove rear wheel sensor from rear final drive.
   CAUTION:
   Never rotate or pull rear wheel sensor as much as possible, when pulling out.
2. Remove rear wheel sensor harness from the vehicle.
   CAUTION:
   Never twist and never pull rear wheel sensor harness, when removing.

INSTALLATION

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

- Check that there is no foreign material like iron powder or damage on inner surface of rear wheel sensor mounting hole of rear final drive and sensor rotor. Install after cleaning when there are foreign material like iron powder, or replace when there is a malfunction.

- Never twist rear wheel sensor harness when installing rear wheel sensor. Check that grommet is fully inserted to bracket. Check that rear wheel sensor harness is not twisted after installation.

SENSOR ROTOR

FRONT SENSOR ROTOR

FRONT SENSOR ROTOR : Removal and Installation

INFOID:0000000008142394

REMOVAL

Replace wheel hub as an assembly when replacing because sensor rotor cannot be disassembled. Refer to FAX-7, "Removal and Installation".

INSTALLATION

Replace wheel hub as an assembly when replacing because sensor rotor cannot be disassembled. Refer to FAX-7, "Removal and Installation".

REAR SENSOR ROTOR

REAR SENSOR ROTOR : Removal and Installation

INFOID:0000000008142395

REMOVAL

1. Remove drive shaft. Refer to RAX-12, "Removal and Installation".
2. Remove sensor rotor from rear drive shaft. Refer to RAX-16, "FINAL DRIVE SIDE : Disassembly and Assembly".

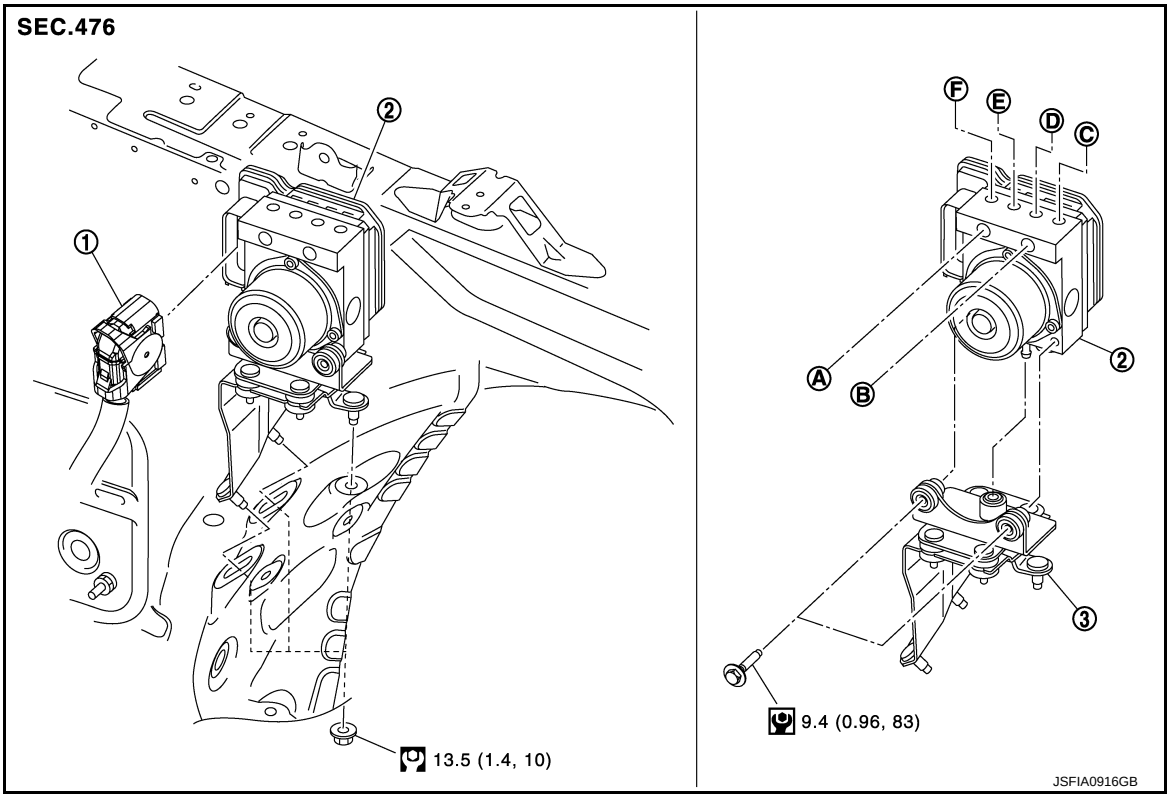
INSTALLATION

Installation is the reverse order of removal.

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Exploded View

INFOID:0000000008142396



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

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

⇦: Vehicle front

Refer to GI-5, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000008142397

REMOVAL

1. Get out of the vehicle, close all doors (including trunk lid), and wait for 3 minutes or more without opening these doors.
2. Disconnect 12V battery cable from negative terminal. Refer to BRC-6, "Precaution for Removing 12V Battery".
3. Remove brake master cylinder cover and hood ledge cover. Refer to EXT-21, "Removal and Installation".
4. Drain brake fluid. Refer to BR-273, "Draining".
5. Disconnect ABS actuator and electric unit (control unit) harness connector.
6. Loosen flare nut of brake tube using a flare nut wrench, and then remove brake tube from ABS actuator and electric unit (control unit). Refer to BR-282, "FRONT : Exploded View".
7. Remove front LH tire with power tool.
8. Remove fender protector (rear) (front LH wheel). Refer to EXT-24, "FENDER PROTECTOR : Removal and Installation".
9. Remove ABS actuator and electric unit (control unit) and bracket.
   CAUTION:
   - **Never remove and never install ABS actuator and electric unit (control unit) by holding harness connector.**

- **Be careful not to drop ABS actuator and electric unit (control unit) and apply excessive impact to it.**

10. Remove bracket, bushing and collar from ABS actuator and electric unit (control unit).

INSTALLATION

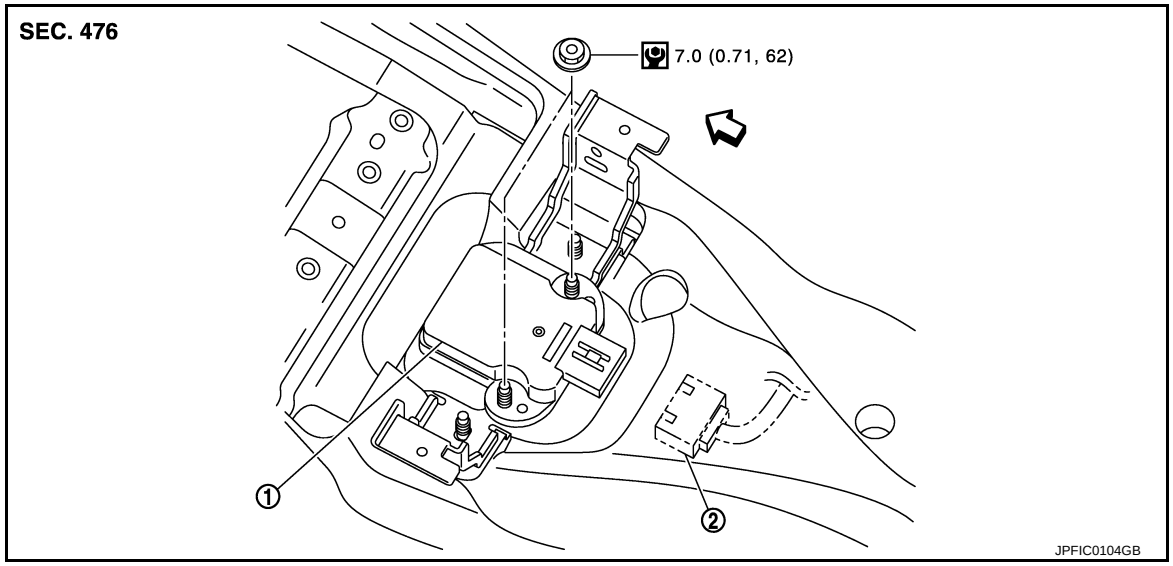
Note the following, and install in the reverse order of removal.

- When installing brake tube, tighten to the specified torque using a crowfoot and torque wrench so that flare nut and brake tube are not damaged. Refer to BR-282, "FRONT : Exploded View".
- Never remove and install actuator by holding actuator harness.
- Bleed air from brake piping after installation. Refer to BR-274, "Bleeding Brake System".
- Never apply excessive impact to actuator, such as by dropping it.
- Check that connector is fully locked after ABS actuator and electric unit (control unit) harness connector is installed.
- Perform steering angle sensor neutral position adjustment when ABS actuator and electric unit (control unit) is replaced. Refer to BRC-66, "Work Procedure".

YAW RATE/SIDE/DECEL G SENSOR

Exploded View

INFOID:0000000008142398



1. Yaw rate/side/decel G sensor
2. Yaw rate/side/decel G sensor harness connector

⇦: Vehicle front

Refer to GI-5, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000008142399

REMOVAL

CAUTION:

Never drop or strike yaw rate/side/decel G sensor, because it has little endurance to impact. Never use a pneumatic tool.

1. Remove center console. Refer to IP-24, "Removal and Installation".
2. Disconnect yaw rate/side/decel G sensor harness connector.
3. Remove yaw rate/side/decel G sensor.

INSTALLATION

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

- Never drop or strike yaw rate/transverse/decel G sensor, because it has little endurance to impact. Never use a power tool.

STEERING ANGLE SENSOR

Removal and Installation

INFOID:0000000008142400

REMOVAL

1. Remove spiral cable assembly. Refer to SR-14, "Removal and Installation".
2. Remove steering angle sensor.

INSTALLATION

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

- Perform steering angle sensor neutral position adjustment when steering angle sensor is removed and installed, or replaced. Refer to BRC-66, "Work Procedure".

VDC OFF SWITCH

Removal and Installation

INFOID:0000000008142401

NOTE:
This is an integrated switch with switches for other functions.

REMOVAL

1. Remove lower instrument panel LH. Refer to IP-13, "Removal and Installation".
2. Remove switch panel. Refer to IP-13, "Removal and Installation".
3. Remove VDC OFF switch.

INSTALLATION

Installation is the reverse order of removal.

PRECAUTION

PRECAUTIONS

Precautions for Preview Function Service

INFOID:0000000008142402

CAUTION:

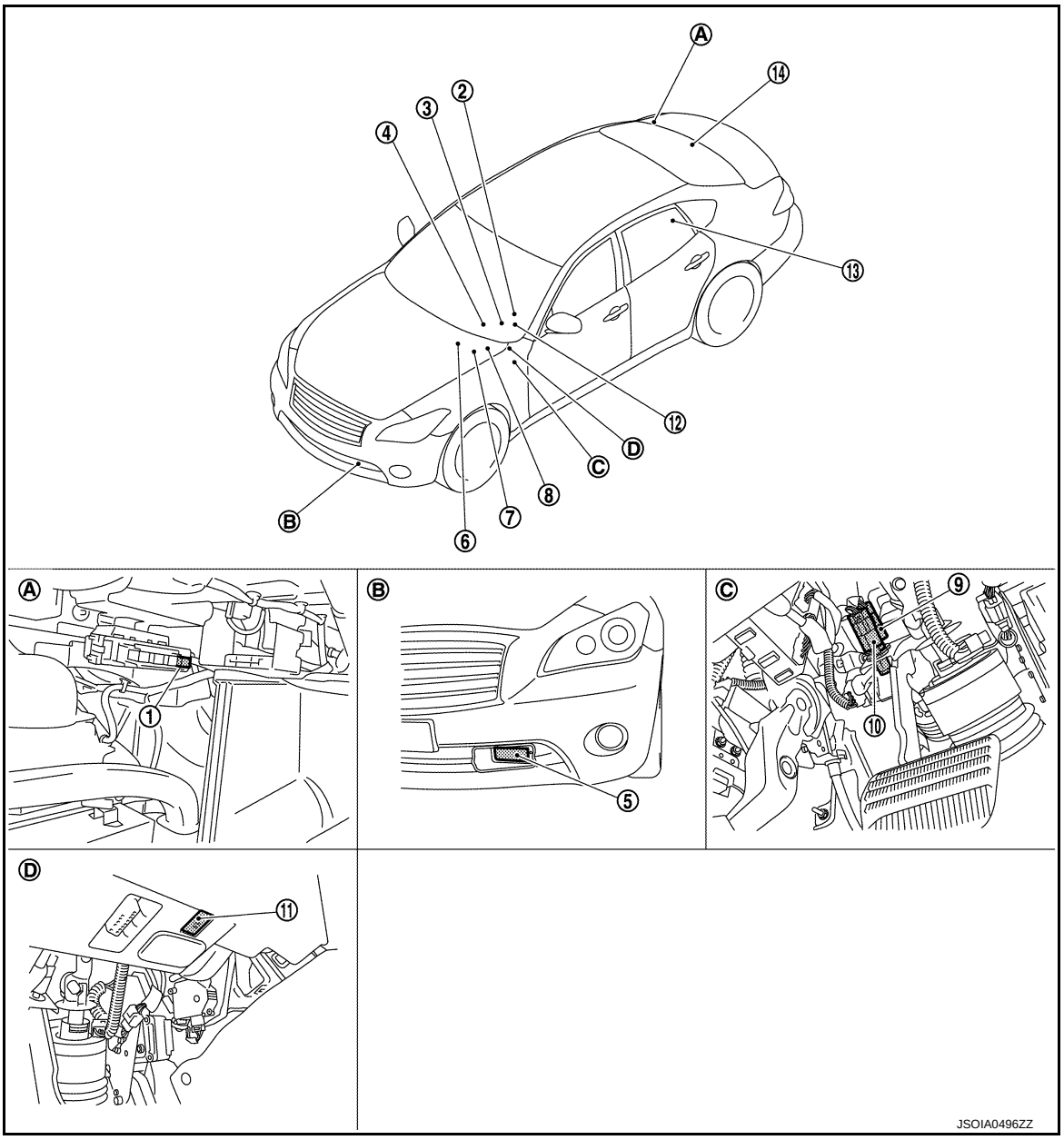
- **To prevent blindness from occurring, never look straight into the laser beam discharger when adjusting laser beam aiming.**
- **To prevent malfunction, never use the ICC sensor removed from vehicle. Never disassemble or remodel.**
- **After an ICC part is replaced, to prevent a system malfunction, erase DTC and adjust the laser beam aiming before performing an operational checkup.**

SYSTEM DESCRIPTION

COMPONENT PARTS

Component Parts Location

INFOID:0000000008142403



1. ICC brake hold relay
2. ICC steering switch
3. Information display, ICC system warning lamp, IBA OFF indicator lamp, buzzer (On the combination meter)
4. BCM Refer to BCS-4, "BODY CONTROL SYSTEM : Component Parts Location"
5. ICC sensor
6. TCM Refer to TM-13, "A/T CONTROL SYSTEM : Component Parts Location"
7. ABS actuator and electric unit (control unit) Refer to BRC-11, "Component Parts Location"
8. Electrically-driven intelligent brake unit Refer to BR-10, "Component Parts Location"
9. Stop lamp switch

10. Brake switch
11. IBA OFF switch
12. Steering angle sensor
Refer to BRC-11, "Component Parts Location"
13. HPCM
Refer to HBC-13, "HYBRID CONTROL SYSTEM : Component Parts Location"
14. ADAS control unit
Refer to DAS-14, "Component Parts Location"

A. Trunk room (RH)
B. Front bumper (LH)
C. Upper side of brake pedal
D. Instrument lower panel (LH)

Component Description

INFOID:0000000008142404

×: Applicable

Component	Function			Description
	Vehicle-to-vehicle distance control mode	Intelligent Brake Assist (IBA)	Brake Assist (with preview function)	
ADAS control unit	×	×	×	• ADAS control unit calculates a target distance between vehicles and a target speed, based on signals received from each sensor and switch to transmit a drive torque command value to HPCM and a brake fluid pressure control signal to electrically-driven intelligent brake unit via CAN communication • ADAS control unit transmits buzzer output signal to combination meter via CAN communication
ICC sensor	×	×	×	• ICC sensor detects light reflected from a vehicle ahead by irradiating laser forward and calculates a distance from the vehicle ahead and a relative speed, based on the detected signal • ICC sensor transmits the presence/absence of vehicle ahead and the distance from the vehicle to ADAS control unit via ITS communication
HPCM	×	×	×	• HPCM transmits the accelerator pedal position signal, brake switch signal, stop lamp switch signal, ICC steering switch signal, etc. to ADAS control unit via CAN communication • HPCM controls the drive torque based on the drive torque command signal received from the ADAS control unit via CAN communication
Electrically-driven intelligent brake unit	×	×	×	• Electrically-driven intelligent brake unit controls the brake, based on a brake fluid pressure control signal received from ADAS control unit via CAN communication • Electrically-driven intelligent brake unit detects driver's brake operation and transmits a driver brake operation detection signal to the ADAS control unit via CAN communication
ABS actuator and electric unit (control unit)	×	×	×	ABS actuator and electric unit (control unit) transmits the wheel speed signal, stop lamp signal and VDC/TCS/ABS system operation condition to ADAS control unit via CAN communication
BCM	×			Transmits the front wiper request signal to ADAS control unit via CAN communication
TCM	×			TCM transmits the signal related to A/T control to ADAS control unit via CAN communication

Component	Function			Description
	Vehicle-to-vehicle distance control mode	Intelligent Brake Assist (IBA)	Brake Assist (with preview function)	
Combination meter	×	×	×	Performs the following operations using the signals received from the ADAS control unit via the CAN communication • Displays the ICC system operation status using the meter display signal • Illuminates the ICC system warning lamp using the ICC warning lamp signal • Illuminates the IBA OFF indicator lamp using the IBA OFF indicator lamp signal • Operates the buzzer (ICC warning chime) using the buzzer output signal
ICC steering switch	×			• ICC steering switch allows the ON/OFF of the Intelligent Cruise Control and the settings of a vehicle speed and distance between vehicles • ICC steering switch signal is transmitted to HPCM. HPCM transmits the signal to the ADAS control unit via CAN communication
Brake switch	×	×	×	• Brake switch is turned OFF and stop lamp switch is turned ON, when depressing the brake pedal • Brake switch signal is input to HPCM. These signals are transmitted from HPCM to ADAS control unit via CAN communication • Stop lamp switch signal is input to HPCM and ABS actuator and electric unit (control unit). These signals are transmitted from HPCM and ABS actuator and electric unit (control unit) to ADAS control unit via CAN communication
Stop lamp switch	×	×	×	
ICC brake hold relay	×	×		ICC brake hold relay activates the stop lamp by ICC brake hold relay drive signal (stop lamp drive signal) outputted by the ADAS control unit
IBA OFF switch		×Note		IBA OFF switch signal is input to the ADAS control unit
Steering angle sensor	×			Measures the rotation amount, rotation speed, and rotation direction of steering wheel, and then transmits them to ADAS control unit via CAN communication

NOTE:
Only IBA system uses

SYSTEM
BRAKE ASSIST (WITH PREVIEW FUNCTION)
BRAKE ASSIST (WITH PREVIEW FUNCTION) : System Description

INFOID:0000000008142405

FUNCTION DESCRIPTION

When the Preview Function identifies the need to apply emergency braking by sensing a vehicle ahead in the same lane and the distance and relative speed from it, it applies the brake pre-pressure before the driver depress the brake pedal and helps improve brake response by reducing pedal free play.
The Preview Function shares component parts and diagnosis with the Intelligent Cruise Control (ICC) system.

CAUTION:

This system is only an aid to assist braking operation and is not a collision warning or avoidance device. It is the driver′s responsibility to stay alert, drive safely and be in control of the vehicle at all times.

OPERATION DESCRIPTION

- The system detects the distance to the vehicle in front with the ICC sensor of ICC and judges the necessity of emergency braking.
- The system detects the accelerator pedal release operation of the driver by the accelerator pedal position sensor and estimates the driver's brake operation intention.
- If the system is judged that the emergency braking is necessary and that the driver has the intention to operate the brake, the electrically-driven intelligent brake unit applies pre-pressure to reduce brake pedal play

NOTE:

This system will not operate when the vehicle is moving at approximately 32 km/h (20 MPH) or less.

END OF OPERATION

The pre-pressure function ceases when the following conditions are met:

1. When the driver depresses the accelerator pedal or the brake pedal.
2. If the driver does not operate the accelerator pedal or brake pedal within approximately 1 second.

DTC/CIRCUIT DIAGNOSIS

BRAKE ASSIST (WITH PREVIEW FUNCTION)

Diagnosis Procedure

INFOID:0000000008142406

1.PREVIEW FUNCTION DIAGNOSIS

When the preview function is not operating properly, the buzzer sounds and the preview function warning lamp will come on.

NOTE:

The preview function warning lamp shares the ICC system warning lamp.

>> Go to ICC. Refer to CCS-60, "Work Flow".

SYMPTOM DIAGNOSIS

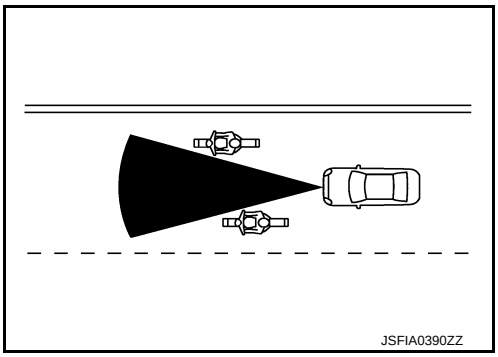
NORMAL OPERATING CONDITION

Description

INFOID:0000000008142407

PRECAUTIONS FOR PREVIEW FUNCTION

- This system is only an aid to assist braking operation and is not a collision warning or avoidance device. It is the driver′s responsibility to stay alert, drive safely and be in control of the vehicle at all times.
- As there is a performance limit to the Preview Function, never rely solely on this system. This system does not correct careless inattentive or absent-minded driving, or overcome poor visibility in rain, fog, or other bad weather. Reduce vehicle speed by depressing the brake pedal, in order to maintain a safe distance between vehicles.
- The system may not detect a vehicle ahead, depending on road or weather conditions. While the vehicle still travels and the Brake Assist System operates under normal conditions, the Preview Function may operate improperly under the following conditions:
- When rain, snow or dirt adhere to the system sensor
- When strong light (for example, at sunrise or sunset) is directly shining on the front of the vehicle
- Winding or hilly roads may cause the sensor to temporarily not detect a vehicle in the same lane or may detect objects or vehicles in other lanes.
- Vehicle position in the lane may cause the sensor to temporarily not detect a vehicle in the same lane or may detect objects or vehicles in other lanes.
- The system will not detect:
- Pedestrians or objects in the roadway
- Oncoming vehicles in the same lane
- Motorcycles traveling offset in the travel lane as illustrated



PRECAUTION

PRECAUTIONS

Precautions for IBA System Service

INFOID:0000000008142408

CAUTION:

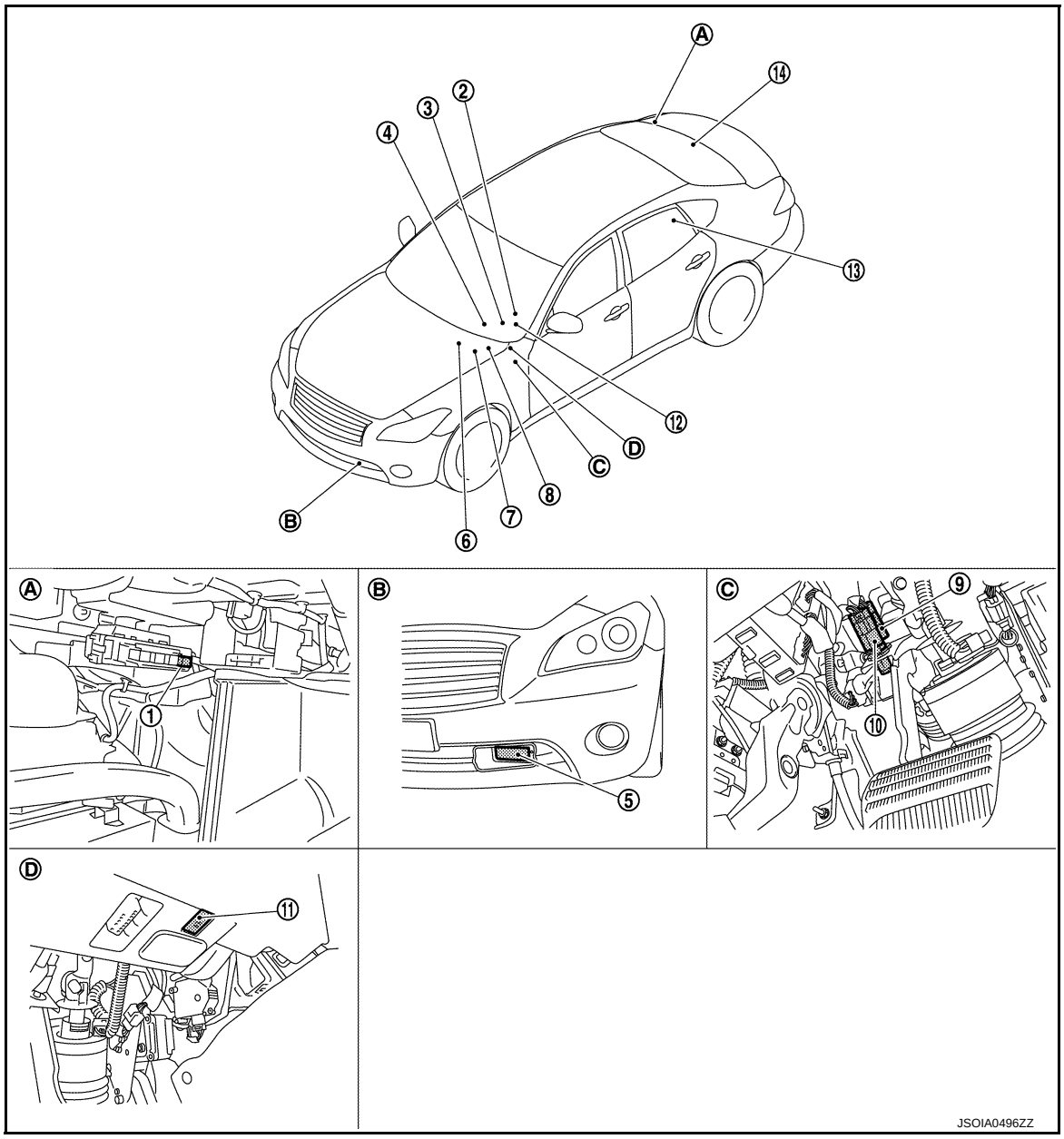
- **To prevent blindness from occurring, never look straight into the laser beam discharger when adjusting laser beam aiming.**
- **To prevent mulfunction, never use the ICC sensor removed from vehicle. Never disassemble or remodel.**
- **After an ICC part is replaced, to prevent a system malfunction, erase DTC and adjust the laser beam aiming before performing an operational checkup.**
- **Never change IBA system state ON/OFF without the consent of the customer.**

SYSTEM DESCRIPTION

COMPONENT PARTS

Component Parts Location

INFOID:0000000008142409



1. ICC brake hold relay
2. ICC steering switch
3. Information display, ICC system warning lamp, IBA OFF indicator lamp, buzzer (On the combination meter)
4. BCM Refer to BCS-4, "BODY CONTROL SYSTEM : Component Parts Location"
5. ICC sensor
6. TCM Refer to TM-13, "A/T CONTROL SYSTEM : Component Parts Location"
7. ABS actuator and electric unit (control unit) Refer to BRC-11, "Component Parts Location"
8. Electrically-driven intelligent brake unit Refer to BR-10, "Component Parts Location"
9. Stop lamp switch

10. Brake switch
11. IBA OFF switch
12. Steering angle sensor
Refer to BRC-11, "Component Parts Location"
13. HPCM
Refer to HBC-13, "HYBRID CONTROL SYSTEM : Component Parts Location"
14. ADAS control unit
Refer to DAS-14, "Component Parts Location"

A. Trunk room (RH)
B. Front bumper (LH)
C. Upper side of brake pedal
D. Instrument lower panel (LH)

Component Description

INFOID:0000000008142410

×: Applicable

Component	Function			Description
	Vehicle-to-vehicle distance control mode	Intelligent Brake Assist (IBA)	Brake Assist (with preview function)	
ADAS control unit	×	×	×	• ADAS control unit calculates a target distance between vehicles and a target speed, based on signals received from each sensor and switch to transmit a drive torque command value to HPCM and a brake fluid pressure control signal to electrically-driven intelligent brake unit via CAN communication • ADAS control unit transmits buzzer output signal to combination meter via CAN communication
ICC sensor	×	×	×	• ICC sensor detects light reflected from a vehicle ahead by irradiating laser forward and calculates a distance from the vehicle ahead and a relative speed, based on the detected signal • ICC sensor transmits the presence/absence of vehicle ahead and the distance from the vehicle to ADAS control unit via ITS communication
HPCM	×	×	×	• HPCM transmits the accelerator pedal position signal, brake switch signal, stop lamp switch signal, ICC steering switch signal, etc. to ADAS control unit via CAN communication • HPCM controls the drive torque based on the drive torque command signal received from the ADAS control unit via CAN communication
Electrically-driven intelligent brake unit	×	×	×	• Electrically-driven intelligent brake unit controls the brake, based on a brake fluid pressure control signal received from ADAS control unit via CAN communication • Electrically-driven intelligent brake unit detects driver's brake operation and transmits a driver brake operation detection signal to the ADAS control unit via CAN communication
ABS actuator and electric unit (control unit)	×	×	×	ABS actuator and electric unit (control unit) transmits the wheel speed signal, stop lamp signal and VDC/TCS/ABS system operation condition to ADAS control unit via CAN communication
BCM	×			Transmits the front wiper request signal to ADAS control unit via CAN communication
TCM	×			TCM transmits the signal related to A/T control to ADAS control unit via CAN communication

Component	Function			Description
	Vehicle-to-vehicle distance control mode	Intelligent Brake Assist (IBA)	Brake Assist (with preview function)	
Combination meter	×	×	×	Performs the following operations using the signals received from the ADAS control unit via the CAN communication • Displays the ICC system operation status using the meter display signal • Illuminates the ICC system warning lamp using the ICC warning lamp signal • Illuminates the IBA OFF indicator lamp using the IBA OFF indicator lamp signal • Operates the buzzer (ICC warning chime) using the buzzer output signal
ICC steering switch	×			• ICC steering switch allows the ON/OFF of the Intelligent Cruise Control and the settings of a vehicle speed and distance between vehicles • ICC steering switch signal is transmitted to HPCM. HPCM transmits the signal to the ADAS control unit via CAN communication
Brake switch	×	×	×	• Brake switch is turned OFF and stop lamp switch is turned ON, when depressing the brake pedal • Brake switch signal is input to HPCM. These signals are transmitted from HPCM to ADAS control unit via CAN communication • Stop lamp switch signal is input to HPCM and ABS actuator and electric unit (control unit). These signals are transmitted from HPCM and ABS actuator and electric unit (control unit) to ADAS control unit via CAN communication
Stop lamp switch	×	×	×	
ICC brake hold relay	×	×		ICC brake hold relay activates the stop lamp by ICC brake hold relay drive signal (stop lamp drive signal) outputted by the ADAS control unit
IBA OFF switch		×Note		IBA OFF switch signal is input to the ADAS control unit
Steering angle sensor	×			Measures the rotation amount, rotation speed, and rotation direction of steering wheel, and then transmits them to ADAS control unit via CAN communication

NOTE:
Only IBA system uses

SYSTEM
INTELLIGENT BRAKE ASSIST
INTELLIGENT BRAKE ASSIST : System Description

INFOID:0000000008142411

FUNCTION DESCRIPTION

Intelligent Brake Assist (IBA) system warns the driver by a vehicle ahead detection indicator and chime when there is a risk of a collision with the vehicle ahead in the traveling lane and the driver must take avoidance action immediately. The system helps reduce the rear-end collision speed by applying the brakes when it judges a collision can not be avoided.

CAUTION:

The IBA system is a not collision avoidance system. It is the driver′s responsibility to stay alert, drive safely and be in control of the vehicle at all times. As there is a performance limit, it may not provide a warning or brake in certain conditions.

NOTE:

- The IBA system shares component parts and diagnosis with the Intelligent Cruise Control (ICC) system. New parts added to the IBA system is the IBA OFF indicator lamp in the combination meter and the IBA OFF switch on the instrument lower panel.
- The IBA system will operate even when the ICC system is turned to OFF.

OPERATION DESCRIPTION

The IBA system uses a ICC sensor located below the front bumper to measure the distance to a vehicle ahead. When the system judges that the distance gets shorter, the vehicle ahead detection indicator on the combination meter blinks and the warning chime sounds.

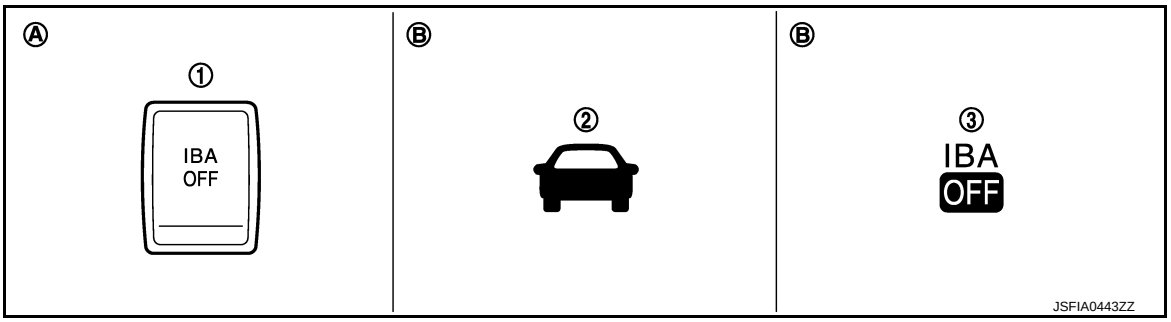
To turn the system OFF/ON, push and hold the IBA OFF switch after set the vehicle to READY for more than 1 second.

NOTE:

- The system ON/OFF condition will be memorized even if the ignition switch turns OFF.
- The IBA system operates under the following conditions.

- The IBA system will function when the vehicle is driven at speeds of approximately 15 km/h (10 MPH) and above, and when the vehicle′s speed is approximately 15 km/h (10 MPH) faster than that of the vehicle ahead.

Switch and Indicators



1. IBA OFF switch
2. Vehicle ahead detection indicator
3. IBA OFF indicator lamp
A. Under side of instrument lower panel (LH)
B. On the combination meter

Fail-safe Indication

Condition	Description	Indication on the combination meter
• When the sensor window is dirty • When the system malfunction	The system will be cancelled automatically with a beep sound.	IBA OFF JSFIA0392ZZ
When driving into a strong light (i.e. sunlight)	The system is temporary unavailable. (Without the warning chime)	

NOTE:
When the IBA turns OFF, the IBA OFF indicator lamp will illuminate.

DTC/CIRCUIT DIAGNOSIS

INTELLIGENT BRAKE ASSIST

Diagnosis Procedure

INFOID:0000000008142412

1.INTELLIGENT BRAKE ASSIST DIAGNOSIS

- The system will be cancelled automatically with a beep sound and IBA OFF indicator lamp on the combination meter will illuminate, when the system will not operate properly.
- When the IBA OFF indicator lamp continues to illuminate even if the IBA system is turned on after setting the vehicle to READY, perform the trouble-diagnosis.

NOTE:
IBA system automatically returns to ON, when erasing self-diagnosis result of “ICC/ADAS” with CONSULT.

>> Go to ICC. Refer to CCS-60, "Work Flow".

SYMPTOM DIAGNOSIS

SWITCH DOES NOT TURN ON / SWITCH DOES NOT TURN OFF

Symptom Table

INFOID:0000000008142413

NOTE:
Perform the self-diagnosis with CONSULT before the symptom diagnosis. Perform the trouble diagnosis if any DTC is detected.

Symptom		Inspection item/Reference page
IBA system does not turn ON/OFF	IBA OFF indicator lamp is not turned ON⇔OFF when operating IBA OFF switch	BRC-182, "Diagnosis Procedure"

Description

INFOID:0000000008142414

IBA system does not turn on/off.
- IBA OFF indicator lamp does not illuminate even if the IBA OFF switch is depressed when IBA OFF indicator lamp is not illuminated.
- IBA OFF indicator lamp does not turn off even if the IBA OFF switch is depressed when IBA OFF indicator lamp is illuminated.

NOTE:
- To turn the system OFF⇔ON, push and hold the IBA OFF switch after set the vehicle to READY. for more than 1 second.
- The system ON/OFF condition will be memorized even if the ignition switch turns OFF.

Diagnosis Procedure

INFOID:0000000008142415

1.PERFORM THE SELF-DIAGNOSIS

1. Perform “All DTC Reading” with CONSULT.
2. Check if the DTC is detected in self-diagnosis results for “ICC/ADAS” with CONSULT. Refer to DAS-42, "DTC Index".

Is any DTC detected?

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

2.IBA OFF SWITCH INSPECTION

1. Set the vehicle to READY.
2. Check that “IBA SW” operates normally in “DATA MONITOR” for “ICC/ADAS” with CONSULT.

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 5.

3.CHECK IBA OFF INDICATOR CIRCUIT

1. Set the vehicle to READY.
2. Select the active test item “METER LAMP” for “ICC/ADAS” with CONSULT.
3. Check if the IBA OFF indicator lamp illuminates when the test item is operated.

Is the inspection result normal?

YES >> Refer to CCS-60, "Work Flow".
NO >> GO TO 4.

4.CHECK DATA MONITOR OF COMBINATION METER

Check that “BA W/L” operates normally in “DATA MONITOR” for “METER/M&A” with CONSULT, when the IBA OFF switch is pushed and hold for more than 1 second.

Is the inspection result normal?

YES >> Replace the combination meter. Refer to MWI-81, "Removal and Installation".
NO >> Replace the ADAS control unit. Refer to DAS-56, "Removal and Installation".

5.CHECK IBA OFF SWITCH

Check IBA OFF switch. Refer to CCS-116, "Component Inspection (IBA OFF Switch)".

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6.

6.REPAIR OR REPLACE MALFUNCTIONING PARTS

Repair or replace malfunctioning parts.

>> GO TO 7.

7.CHECK IBA SYSTEM

Check that IBA OFF indicator lamp turned ON⇔OFF, when operating IBA OFF switch.

>> INSPECTION END

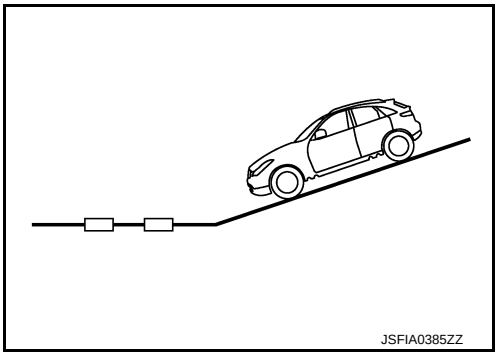
NORMAL OPERATING CONDITION

Description

INFOID:0000000008142416

PRECAUTIONS FOR INTELLIGENT BRAKE ASSIST

- The IBA system is a not collision avoidance system. It is the driver′s responsibility to stay alert, drive safely and be in control of the vehicle at all times.
- As there is a performance limit, it may not provide a warning or brake in certain conditions.
- The system will not detect the following objects:
- Pedestrians, animals, or obstacles in the roadway
- Oncoming vehicles in the same lane
- The system will not detect under the following conditions:
- When the sensor gets dirty and it is impossible to detect the distance from the vehicle ahead.
- When driving into a strong light (i.e. sunlight)
- The sensor generally detects the signals returned from the reflectors on a vehicle ahead. Therefore, the system may not function properly under the following conditions:
- When the reflectors of the vehicle ahead are positioned high or close each other (including a small vehicle such as motorcycles).
- When the sensor gets dirty or and it is impossible to detect the distance from the vehicle ahead.
- When the reflectors on the vehicle ahead is missing, damaged or covered.
- When the reflector of the vehicle ahead is covered with dirt, snow and road spray.
- When visibility is low (such as rain, fog, snow, etc.).
- When snow or road spray from traveling vehicles are raised up.
- When dense exhaust or other smoke (black smoke) from vehicles reduces the sensor visibility.
- When excessively heavy baggage is loaded in the rear seat or the luggage room of vehicle.
- When abruptly accelerating or decelerating.
- On steep downhill or roads with sharp curves.
- When there is a highly reflective object near the vehicle ahead (i.e. very close to other vehicle, signboard, etc.).
- While towing a trailer or other vehicle.
- Depending on certain road conditions (curved, beginning of a curve), vehicle conditions (steering position, vehicle position), or preceding vehicle′s conditions (position in lane, etc.), the system may not function properly.
- The system may not function in offset conditions.
- The system may not function when the distance to the vehicle ahead is extremely close.
- The system detect highly reflective objects such as reflectors, signs, white markers, and other stationary objects on the road or near the traveling lane, and when in extreme conditions, detection of these objects may cause the system to function.
- The system is designed to automatically check the sensor′s functionality. If the sensor is covered with ice, a transparent or translucent plastic bag, etc., the system may not detect them. In these instances the system may not be able to warn properly. Be sure to check and clean the sensor regularly.
- Excessive noise will interfere with the warning chime sound, and the chime may not be heard.
- Never step in under the brake pedal to avoid an accident when IBA system turns ON.



- Sudden appearance of the vehicle in front (i.e. it abruptly cuts in) may not be detected and the system may not warn soon enough.
- The system will be cancelled automatically with a beep sound and the IBA OFF indicator lamp will illuminate under the following conditions:
- When the sensor window is dirty
- When the system malfunctions

REMOVAL AND INSTALLATION

IBA OFF SWITCH

Removal and Installation

INFOID:0000000008142417

REMOVAL

1. Remove instrument lower panel (LH). Refer to IP-12, "Exploded View".
2. Disengage the pawl. Then remove IBA OFF switch.

INSTALLATION

Install in the reverse order of removal.