SECTION BRC
BRAKE CONTROL SYSTEM

CONTENTS

WITH VDC

PRECAUTION

PRECAUTIONS

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

INFOID:0000000012355860

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

WARNING:

Always observe the following items for preventing accidental activation.

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

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

WARNING:

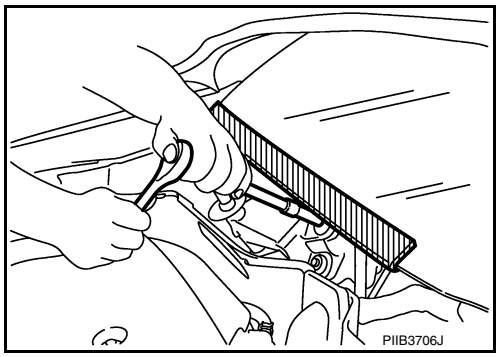
Always observe the following items for preventing accidental activation.

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

Precaution for Procedure without Cowl Top Cover

INFOID:0000000012355861

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



Precautions for Removing Battery Terminal

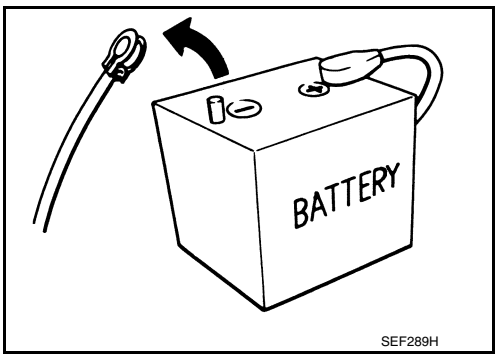
INFOID:0000000013042591

When disconnecting the battery terminal, pay attention to the following.

- Always use a 12V battery as power source.
- Never disconnect battery terminal while engine is running.

- When removing the 12V battery terminal, turn OFF the ignition switch and wait at least 30 seconds.
- For vehicles with the engine listed below, remove the battery terminal after a lapse of the specified time:

D4D engine	: 20 minutes	YS23DDT	: 4 minutes
HRA2DDT	: 12 minutes	YS23DDTT	: 4 minutes
K9K engine	: 4 minutes	ZD30DDTi	: 60 seconds
M9R engine	: 4 minutes	ZD30DDTT	: 60 seconds
R9M engine	: 4 minutes		
V9X engine	: 4 minutes		
YD25DDTi	: 2 minutes		



NOTE:
ECU may be active for several tens of seconds after the ignition switch is turned OFF. If the battery terminal is removed before ECU stops, then a DTC detection error or ECU data corruption may occur.

- After high-load driving, if the vehicle is equipped with the V9X engine, turn the ignition switch OFF and wait for at least 15 minutes to remove the battery terminal.

NOTE:
- Turbocharger cooling pump may operate in a few minutes after the ignition switch is turned OFF.
- Example of high-load driving
  - Driving for 30 minutes or more at 140 km/h (86 MPH) or more.
  - Driving for 30 minutes or more on a steep slope.

- For vehicles with the 2-batteries, be sure to connect the main battery and the sub battery before turning ON the ignition switch.

NOTE:
If the ignition switch is turned ON with any one of the terminals of main battery and sub battery disconnected, then DTC may be detected.

- After installing the 12V battery, always check "Self Diagnosis Result" of all ECUs and erase DTC.

NOTE:
The removal of 12V battery may cause a DTC detection error.

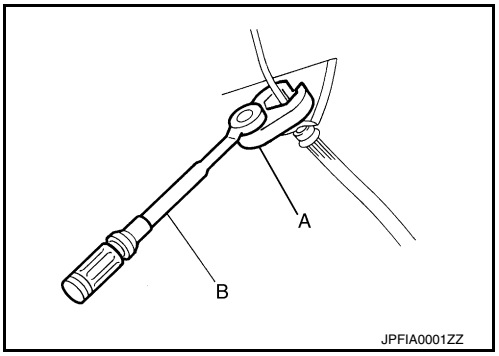
Precaution for Brake System

INFOID:0000000012355863

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.
  - FOR NORTH AMERICA: Refer to MA-16, "FOR NORTH AMERICA : Fluids and Lubricants".
  - FOR MEXICO: Refer to MA-18, "FOR MEXICO : Fluids and Lubricants".
- Never reuse drained brake fluid.
- Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface.
- 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.
- Never damage caliper (made by aluminum).
- Always loosen the brake tube flare nut with a flare nut wrench.

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



Precaution for Brake Control System

INFOID:0000000012355864

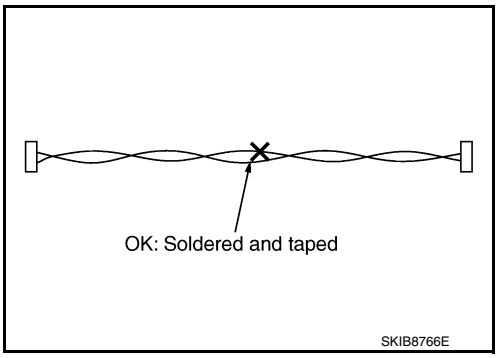
- Slight vibrations are felt on the brake pedal and the operation noises occur, when VDC function, TCS function, ABS function, EBD function, hill start assist function, Rise-up & Build-up function, Brake force distribution function or Active trace control function operates. This is not a malfunction because it is caused by VDC function, TCS function, ABS function, EBD function, hill start assist function, Rise-up & Build-up function, Brake force distribution function or Active trace control function that is normally operated.
- When starting engine or when starting vehicle just after starting engine, brake pedal may vibrate or motor operating noise may be heard from engine compartment. This is normal condition.
- 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 brake booster 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, hill start assist function, Rise-up & Build-up function, Brake force distribution function and Active trace control function, 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, hill start assist function, Rise-up & Build-up function, Brake force distribution function and Active trace control function.
- 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, hill start assist function, Rise-up & Build-up function, Brake force distribution function and Active trace control function.
  - 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, hill start assist function, Rise-up & Build-up function, Brake force distribution function and Active trace control function.
- 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.
- 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, hill start assist function, Rise-up & Build-up function, Brake force distribution function and Active trace control function. 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, hill start assist function, Rise-up & Build-up function, Brake force distribution function and Active trace control function.

- Brake pedal vibrates and operation sound occurs during sudden acceleration and cornering, when VDC function, TCS function, Rise-up & Build-up function, Brake force distribution function or Active trace control function is operated. This is not a malfunction because it is caused by VDC function, TCS function, Rise-up & Build-up function, Brake force distribution function or Active trace control function that is operated normally.
- VDC warning lamp may turn ON and VDC function, TCS function, Rise-up & Build-up function, Brake force distribution function and Active trace control function 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, Rise-up & Build-up function, Brake force distribution function and Active trace control function after the engine is started again. In this case, perform self-diagnosis, check self-diagnosis results, and erase memory.
- 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 and Active trace control function 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 and Active trace control function after the engine is started again. In this case, perform self-diagnosis, check self-diagnosis results, and erase memory.

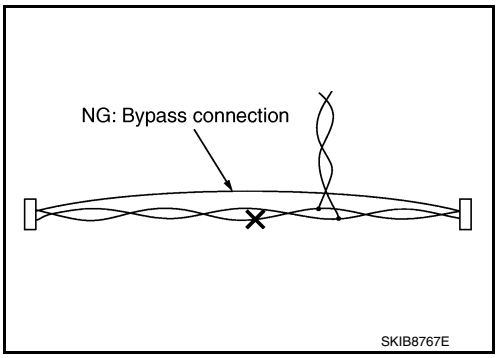
Precaution for Harness Repair

INFOID:0000000012355865

- 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 turnout point cannot be separated and the twisted wire characteristics are lost.)



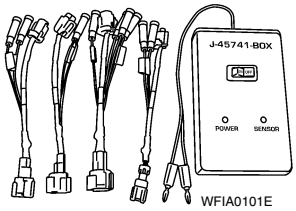
PREPARATION

PREPARATION

Special Service Tool

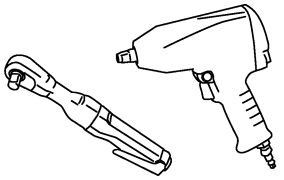
INFOID:0000000012471627

The actual shapes of the tools may differ from those illustrated here.

Tool number (TechMate No.) Tool name	Description
KV991J0080 (J-45741-A) ABS active wheel sensor tester  WFIA0101E	Checking operation of wheel sensors

Commercial Service Tools

INFOID:0000000012355866

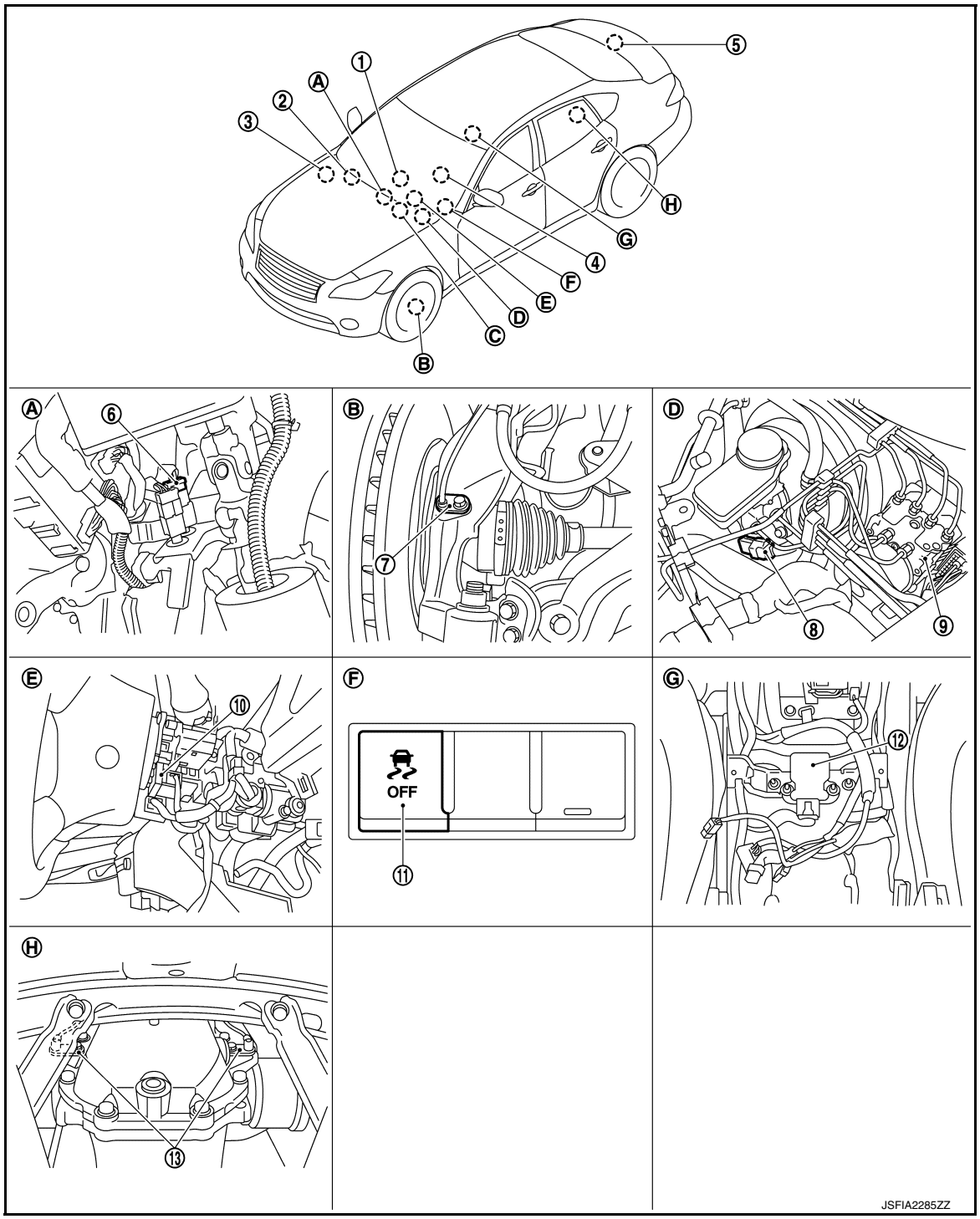
Tool name	Description
Power tool  PBIC0190E	Loosening bolts and nuts

SYSTEM DESCRIPTION

COMPONENT PARTS

Component Parts Location

INFOID:0000000012355867



1. Drive mode select switch
Refer to DMS-3, "Component Parts Location".
2. A/C auto AMP.
Refer to HAC-6, "AUTOMATIC AIR CONDITIONING SYSTEM : Component Parts Location" .
3. ECM
Refer to EC-37, "ENGINE CONTROL SYSTEM : Component Parts Location" (VQ37VHR FOR USA AND CANADA), EC-569, "ENGINE CONTROL SYSTEM : Component Parts Location"(VQ37VHR FOR MEXICO), EC-987, "ENGINE CONTROL SYSTEM : Component Parts Location" (VK56VD FOR USA AND CANADA),EC-1579, "ENGINE CONTROL SYSTEM : Component Parts Location" (VK56VD FOR MEXICO).
4. TCM
Refer to TM-11, "A/T CONTROL SYSTEM : Component Parts Location".
5. ADAS control unit*
Refer to DAS-12, "Component Parts Location".
6. Stop lamp switch
7. Front wheel sensor
8. Vacuum sensor
9. ABS actuator and electric unit (control unit)
10. Steering angle sensor
11. VDC OFF switch
12. Yaw rate/side/decel G sensor
13. 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

*: Models with ICC system

Component Description

INFOID:0000000012355868

Component		Reference/Function
ABS actuator and electric unit (control unit)	Pump	BRC-12, "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)	
	Pressure Sensor	
Wheel sensor		BRC-12, "Wheel Sensor and Sensor Rotor"
Yaw rate/side/decel G sensor		BRC-13, "Yaw Rate/Side/Decel G Sensor"
Steering angle sensor		BRC-13, "Steering Angle Sensor"
Vacuum sensor		BRC-13, "Vacuum Sensor"
Stop lamp switch		BRC-13, "Stop Lamp Switch"
VDC OFF switch		BRC-13, "VDC OFF Switch"
ABS warning lamp		BRC-14, "System Description"
Brake Warning Lamp		
VDC warning lamp		
VDC OFF indicator lamp		

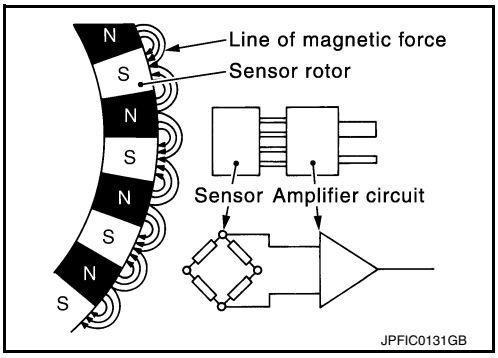
Component	Reference/Function
ECM	EC-57, "ENGINE CONTROL SYSTEM : System Description" (VQ37VHR FOR USA AND CANADA) EC-587, "ENGINE CONTROL SYSTEM : System Description" (VQ37VHR FOR MEXICO) EC-1008, "ENGINE CONTROL SYSTEM : System Description" (VK56VD FOR USA AND CANADA) EC-1599, "ENGINE CONTROL SYSTEM : System Description" (VK56VD FOR MEXICO)
TCM	TM-43, "A/T CONTROL SYSTEM : System Description"
ADAS control unit*	DAS-13, "System Description"
A/C auto AMP.	HAC-12, "AUTOMATIC AIR CONDITIONING SYSTEM : System Description" (Automatic air conditioning system)
Drive mode select switch	DMS-5, "Infiniti Drive Mode Selector : System Description"

*: Models with ICC system

Wheel Sensor and Sensor Rotor

INFOID:0000000012355869

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:0000000012355870

Electric unit (control unit) is integrated with actuator and comprehensively controls VDC function, TCS function, ABS function, EBD function, hill start assist function, Rise-up & Build-up function and Brake force distribution function.

ELECTRIC UNIT (CONTROL UNIT)

- Brake fluid pressure, engine 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 master cylinder 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 and ABS OUT Valve
Increases, holds or decreases the fluid pressure of each caliper according to signals from ABS actuator and electric unit (control unit).

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

Cut Valve 1 (Primary Line), Cut Valve 2 (Secondary Line)
Shuts off the ordinary brake line from master cylinder, when VDC function, TCS function, hill start assist function, Rise-up & Build-up function and Brake force distribution function are activated.

ADAS Control Unit

INFOID:0000000012355871

Controls Active trace control function in ADAS control unit and transmits Active trace control signal to ABS actuator and electric unit (control unit) via CAN communication.
NOTE:
Models with ICC system

Stop Lamp Switch

INFOID:0000000012355872

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

Steering Angle Sensor

INFOID:0000000012355873

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:0000000012355874

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:0000000012355875

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.

Vacuum Sensor

INFOID:0000000012355876

Detects the vacuum in brake booster and transmits converted electric signal to ABS actuator and electric unit (control unit).

Parking Brake Switch

INFOID:0000000012355877

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:0000000012355878

- 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
    NOTE:
    Brake limited slip differential (BLSD) control operates.
  - TCS function
  - Active trace control function
- 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).

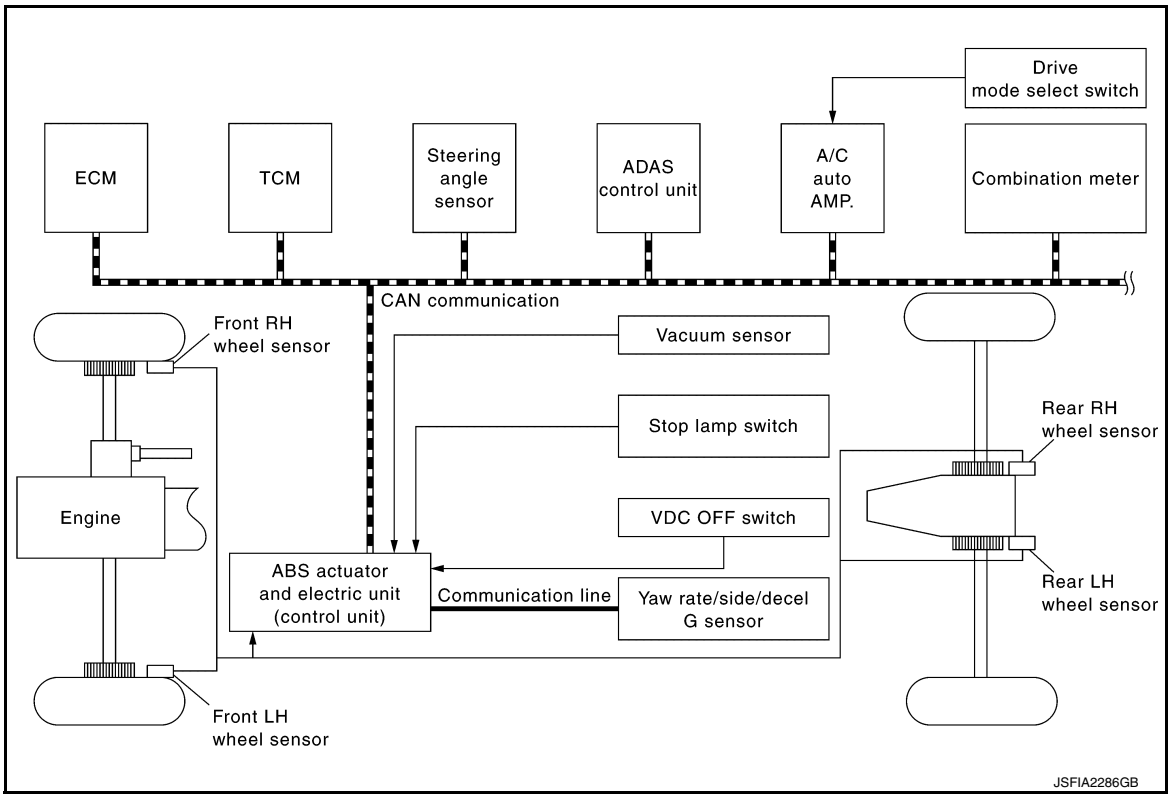
SYSTEM

System Description

INFOID:0000000012355879

- 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, hill start assist function, Rise-up & Build-up function, Brake force distribution function and Active trace control function.
- 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.

VDC function, TCS function, ABS function, EBD function, Rise-up & Build-up function and Brake force distribution function

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
TCM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • Shift position 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 transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • Brake fluid level switch signal • Parking brake switch signal Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. • 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)

Active trace control function

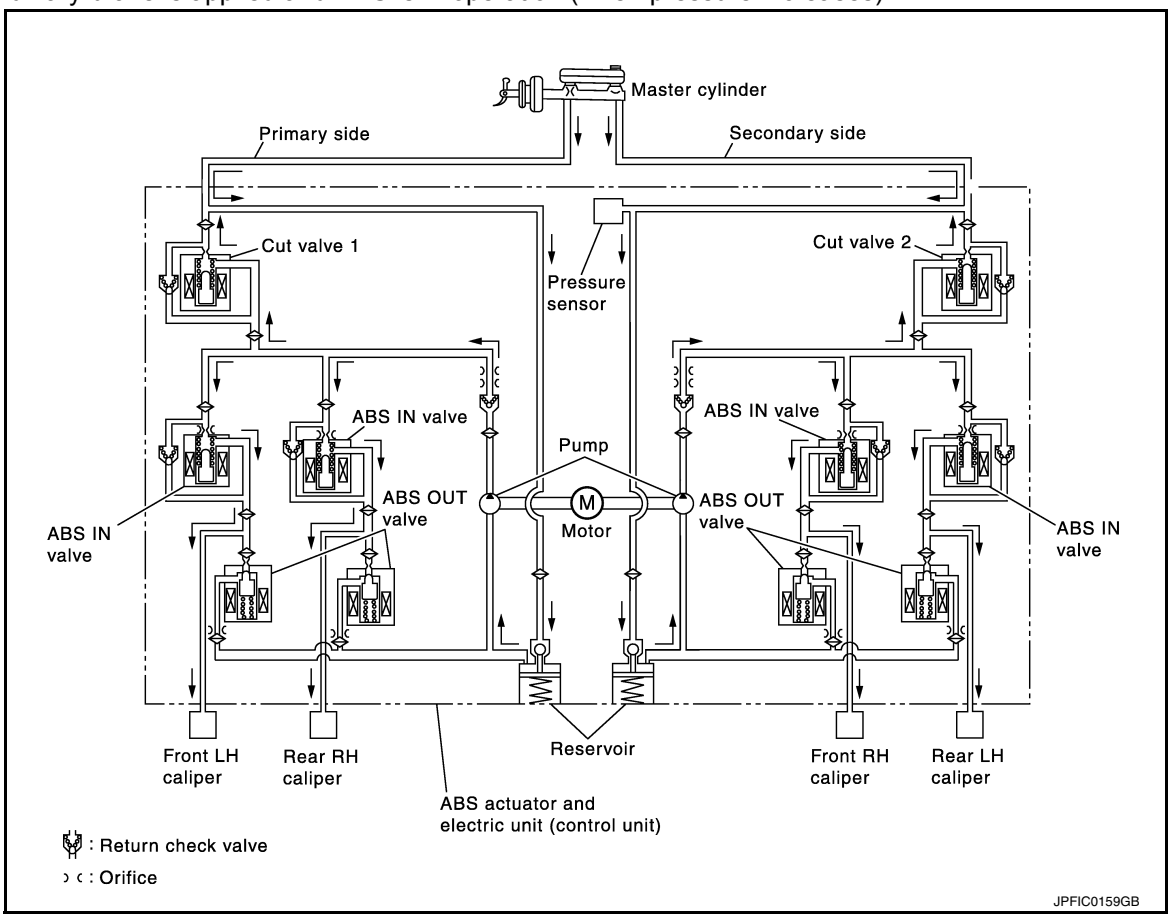
Component	Signal description
ADAS control unit	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • Active trace control signal
ECM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • 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
ABS actuator and electric unit (control unit)	Mainly transmits the following signals to ADAS control unit via CAN communication. • Vehicle speed signal (ABS) • Stop lamp switch signal (brake signal) • VDC OFF switch signal • Yaw rate signal • Side G sensor signal • Decel G sensor signal
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
Drive mode select switch	Outputs ON/OFF status of STANDARD, SPORT, ECO, SNOW mode to A/C auto AMP.
A/C auto AMP.	Mainly transmits the following signals to ADAS control unit via CAN communication. • Drive mode select switch signal
Steering angle sensor	Mainly transmits the following signals to ADAS 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 OFF indicator lamp signal • VDC warning lamp signal Mainly receives the following signals from ADAS control unit via CAN communication. • FEB warning lamp signal

*: 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 and 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)
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

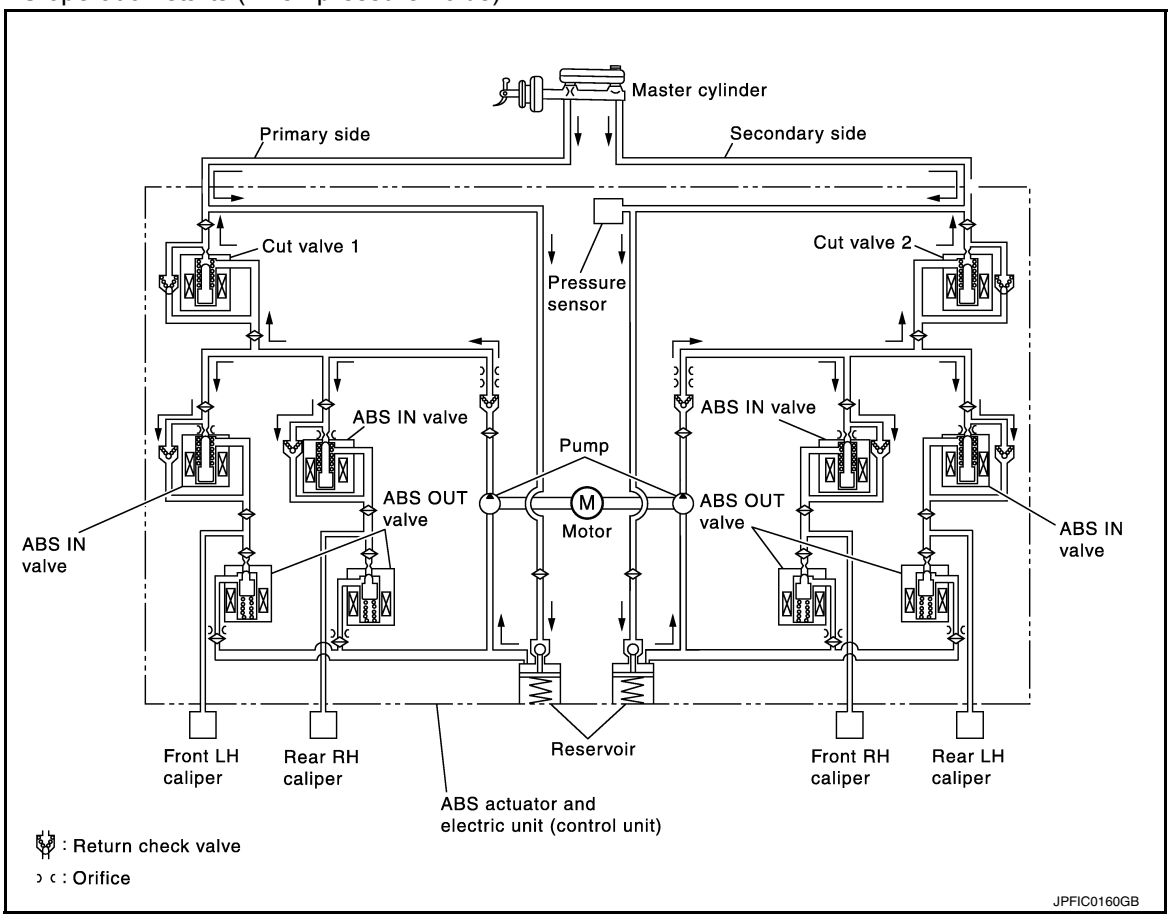
When front RH wheel caliper pressure increases
- Motor is activated. Brake fluid is pressurized by pump and is sent to secondary line through cut valve 2. At the same time, pressurized brake fluid is supplied to front RH caliper through ABS IN valve.

When front LH wheel caliper pressure increases
- Motor is activated. Brake fluid is pressurized by pump and is sent to primary line through cut valve 1. At the same time, pressurized brake fluid is supplied to front LH wheel caliper through ABS IN valve.

When rear RH wheel caliper pressure increases
- Motor is activated. Brake fluid is pressurized by pump and is sent to primary line through cut valve 1. At the same time, pressurized brake fluid is supplied to rear RH wheel caliper through ABS IN valve.

When rear LH wheel caliper pressure increases
- Motor is activated. Brake fluid is pressurized by pump and is sent to secondary line through cut valve 2. At the same time, pressurized brake fluid is supplied to rear LH wheel caliper through ABS IN valve.

When ABS operation starts (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)
ABS IN valve	Power supply is not supplied (open)	Power supply is supplied (close)
ABS OUT valve	Power supply is not supplied (close)	Power supply is not supplied (close)
Each caliper (fluid pressure)	—	Pressure holds

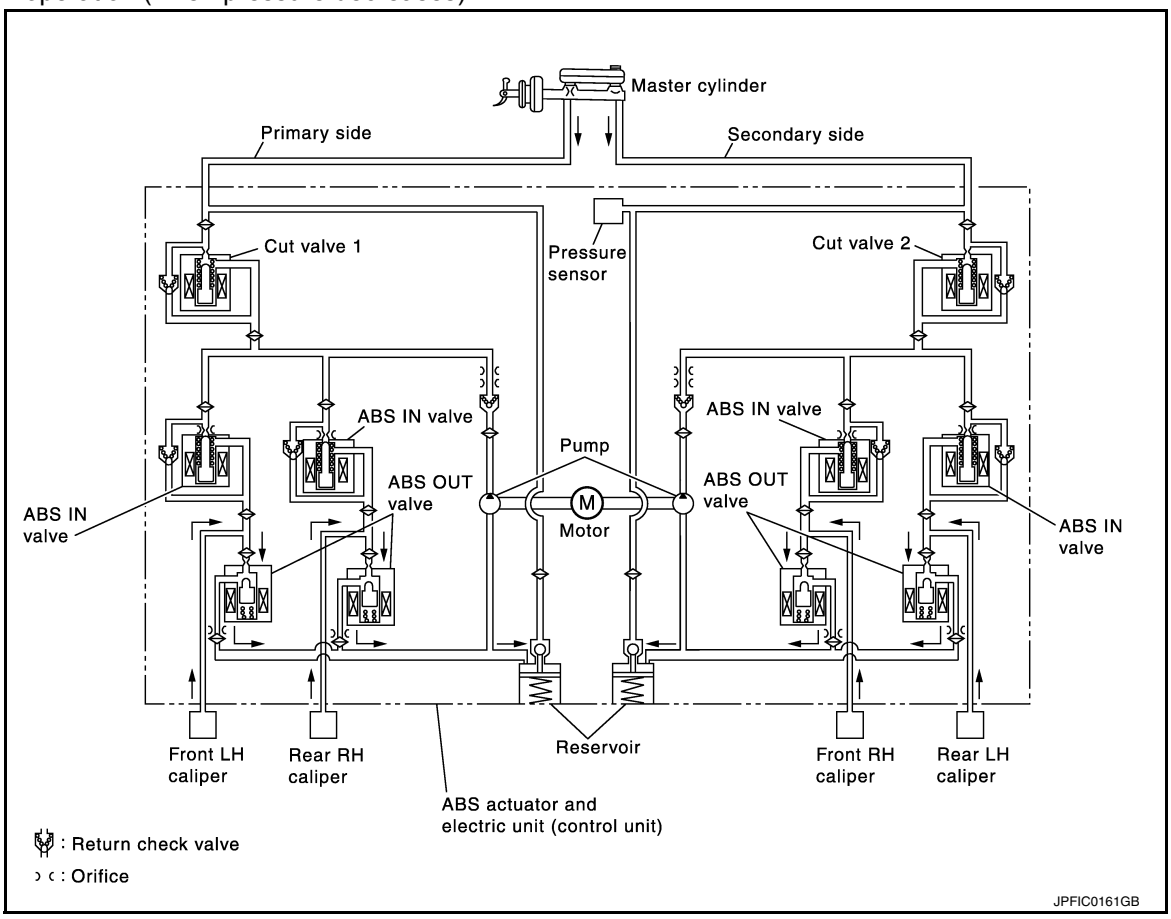
When front RH wheel caliper pressure holds
- Motor is activated. Brake fluid is pressurized by pump and is sent to secondary line through cut valve 2. At the same time, because ABS IN valve and ABS OUT vale are closed, fluid pressure holds.

When front LH wheel caliper pressure holds
- Motor is activated. Brake fluid is pressurized by pump and is sent to primary line through cut valve 1. At the same time, because ABS IN valve and ABS OUT vale are closed, fluid pressure holds.

When rear RH wheel caliper pressure holds
- Motor is activated. Brake fluid is pressurized by pump and is sent to primary line through cut valve 1. At the same time, because ABS IN valve and ABS OUT vale are closed, fluid pressure holds.

When rear LH wheel caliper pressure holds
- Motor is activated. Brake fluid is pressurized by pump and is sent to secondary line through cut valve 2. At the same time, because ABS IN valve and ABS OUT vale are closed, fluid pressure holds.

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)
ABS IN valve	Power supply is not supplied (open)	Power supply is supplied (close)
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
- Being supplied to reservoir through ABS OUT valve, the fluid pressure of brake caliper is decreased.

When front LH wheel caliper pressure decreases
- Being supplied to reservoir through ABS OUT valve, the fluid pressure of brake caliper is decreased.

When rear RH wheel caliper pressure decreases
- Being supplied to reservoir through ABS OUT valve, the fluid pressure of brake caliper is decreased.

When rear LH wheel caliper pressure decreases
- Being supplied to reservoir through ABS OUT valve, the fluid pressure of brake caliper is decreased.

Component Parts and Function

Component	FUNCTION
Reservoir	Temporarily reserves the brake fluid drained from brake caliper, so that pressure efficiently decreases when decreasing pressure of brake caliper.
Pump	Returns the brake fluid reserved in reservoir to master cylinder by reducing pressure.
Motor	Drives the pump according to signals from control unit.
ABS IN valve	Switches the fluid pressure line to increase or hold according to signals from control unit.

Component	FUNCTION
ABS OUT valve	Switches the fluid pressure line to increase, hold or decrease according to signals from control unit.
Return check valve	Returns the brake fluid from brake caliper to master cylinder by bypassing orifice of each valve when brake is released.
Cut valve 1 Cut valve 2	Performs the duty control of fluid pressure increased by pump according to signals from control unit.
Pressure Sensor	Detects the brake pedal operation amount.

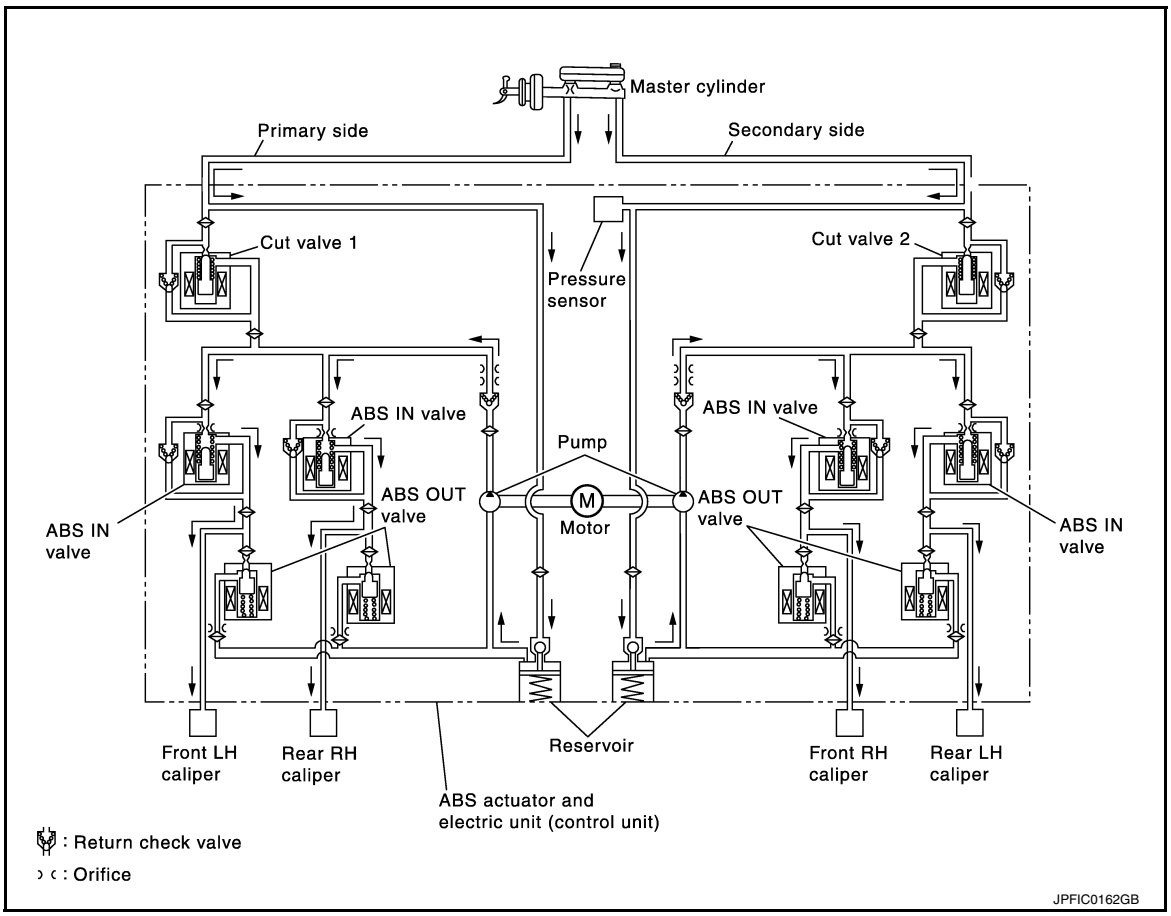
VALVE OPERATION (OTHER THAN ABS AND EBD)

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

NOTE:

There is no operation to hold and increase pressure for functions other than ABS and EBD.

When Pressure Increases



Name	Not activated	When Pressure Increases
Cut valve 1	Power supply is not supplied (open)	Wheel other than the one that the pressure is to be increased: Power supply is not supplied (open) Only wheel that the pressure is to be increased: Power supply is supplied (close)
Cut valve 2	Power supply is not supplied (open)	Wheel other than the one that the pressure is to be increased: Power supply is not supplied (open) Only wheel that the pressure is to be increased: Power supply is supplied (close)

Name	Not activated	When Pressure Increases
ABS IN valve	Power supply is not supplied (open)	Only wheel that the pressure is to be increased: Power supply is not supplied (open) Wheel other than the one that the pressure is to be increased: Power supply is supplied (close)
ABS OUT valve	Power supply is not supplied (close)	Power supply is not supplied (close)
Each caliper (fluid pressure)	—	Pressure increases

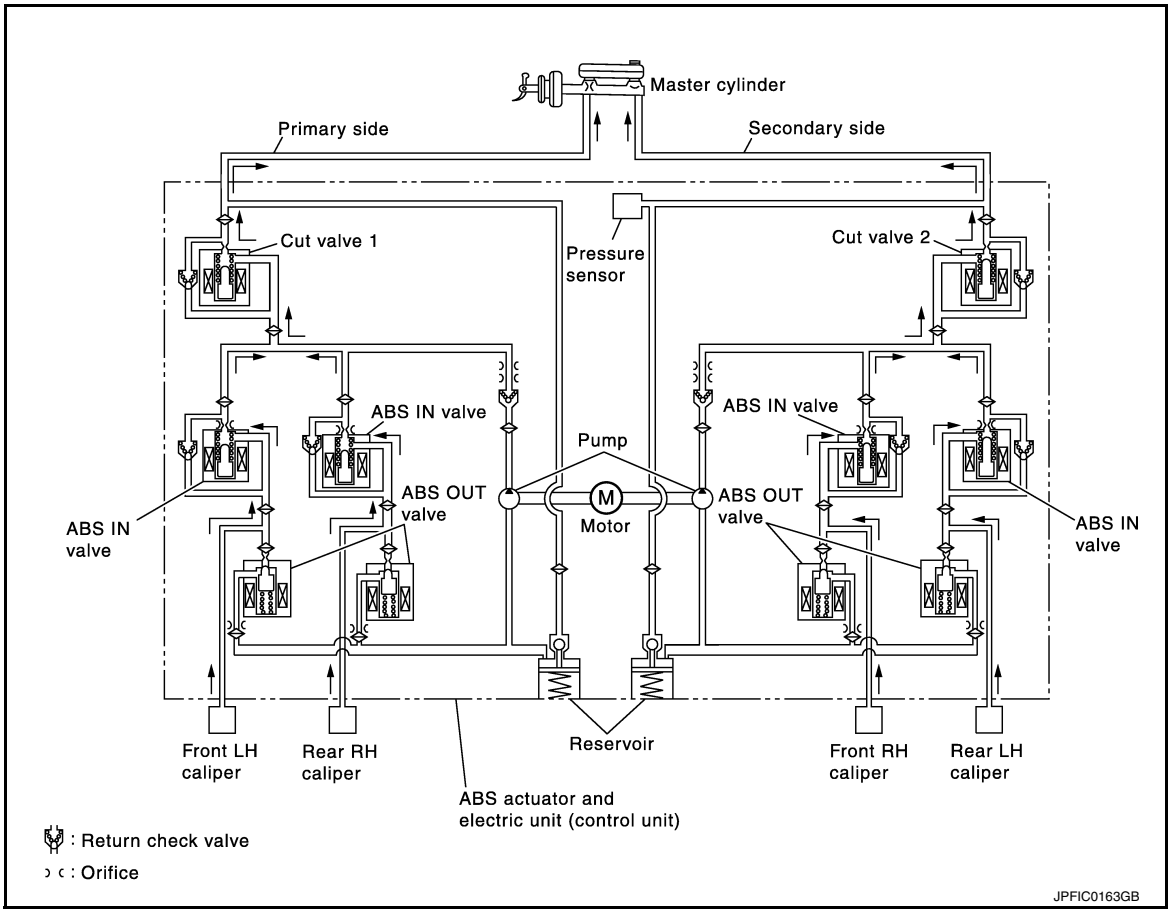
When front RH wheel caliper pressure increases
- Motor is activated. Brake fluid from pump is supplied to front RH wheel caliper through ABS IN valve. For other wheel, ABS IN valve is closed and brakes fluid is not supplied to caliper.

When front LH wheel caliper pressure increases
- Motor is activated. Brake fluid from pump is supplied to front LH wheel caliper through ABS IN valve. For other wheel, ABS IN valve is closed and brakes fluid is not supplied to caliper.

When rear RH wheel caliper pressure increases
- Motor is activated. Brake fluid from pump is supplied to front RH wheel caliper through ABS IN valve. For other wheel, ABS IN valve is closed and brakes fluid is not supplied to caliper.

When rear LH wheel caliper pressure increases
- Motor is activated. Brake fluid from pump is supplied to front LH wheel caliper through ABS IN valve. For other wheel, ABS IN valve is closed and brakes fluid is not supplied to caliper.

Released



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)
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 supplied (open)
Each caliper (fluid pressure)	—	Pressure decreases

When front RH wheel caliper pressure decreases
- Being returned to master cylinder through ABS IN valve, fluid pressure of brake caliper is decreased.

When front LH wheel caliper pressure decreases
- Being returned to master cylinder through ABS IN valve, fluid pressure of brake caliper is decreased.

When rear RH wheel caliper pressure decreases
- Being returned to master cylinder through ABS IN valve, fluid pressure of brake caliper is decreased.

When rear LH wheel caliper pressure decreases
- Being returned to master cylinder through ABS IN valve, fluid pressure of brake caliper is decreased.

Component Parts and Function

Component	Function
Reservoir	Temporarily reserves the brake fluid drained from brake caliper, so that pressure efficiently decreases when decreasing pressure of brake caliper.
Pump	Returns the brake fluid reserved in reservoir to master cylinder by reducing pressure.
Motor	Drives the pump according to signals from 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.
Return check valve	Returns the brake fluid from brake caliper to master cylinder by bypassing orifice of each valve when brake is released.
Cut valve 1 Cut valve 2	Performs the duty control of fluid pressure increased by pump according to signals from control unit.
Pressure Sensor	Detects the brake pedal operation amount.

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 approx. 1 seconds after the ignition switch is turned ON	ON
Approx. 1 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 approx. 1 seconds after the ignition switch is turned ON	ON
Approx. 1 seconds after ignition switch is turned ON (when the system is in normal operation).	OFF
After engine starts	OFF
When parking brake operates (parking brake switch ON)	ON
When brake booster vacuum decreases	ON
When vacuum sensor 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 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)	VDC warning lamp
Ignition switch OFF.	OFF
For approx. 1 seconds after the ignition switch is turned ON	ON
Approx. 1 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
VDC function is operating	Blinking
TCS function is operating	Blinking

FEB warning lamp
- Turns ON when Active trace control function is malfunctioning.

NOTE:
Turns ON when FEB function is OFF.

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 approx. 1 seconds after the ignition switch is turned ON	ON
Approx. 1 seconds after ignition switch is turned ON (when the system is in normal operation).	OFF
When VDC OFF switch is ON (VDC function, TCS function and Active trace control function are OFF)	ON

Fail-Safe

INFOID:0000000012355880

VDC FUNCTION, TCS FUNCTION, hill start assist FUNCTION, RISE-UP & BUILD-UP FUNCTION AND 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, hill start assist function, Rise-up & Build-up function and Brake force distribution function. The vehicle status becomes the same as models without VDC function, TCS function, hill start assist function, Rise-up & Build-up function and Brake force distribution function. 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, hill start assist function, Rise-up & Build-up function and Brake force distribution function. The vehicle status becomes the same as models without VDC function, TCS function, ABS function, hill start assist function, Rise-up & Build-up function and Brake force distribution function. 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, hill start assist function, Rise-up & Build-up function and Brake force distribution function. The vehicle status becomes the same as models without VDC function, TCS function, ABS function, EBD function, hill start assist function, Rise-up & Build-up function and Brake force distribution function.

ACTIVE TRACE CONTROL FUNCTION

- FEB warning lamp turns ON in combination meter when a malfunction occurs in system (ADAS control unit). The control is suspended for Active trace control function. The vehicle becomes the same as models without Active trace control function.
  CAUTION:
  Turn ON When FEB function is OFF.
- Mode is fixed to the mode when a malfunction occurs if CAN communication malfunction (DTC “U1000”, DTC “U1010”, DTC “U0424”) occurs between ADAS control unit and A/C auto AMP. The mode is fixed to STANDARD mode after ignition switch turns OFF to ON.

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) • hill start assist function • Rise-up & Build-up function • Brake force distribution function
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 LH 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	Malfunction detected condition	Fail-safe condition
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 • hill start assist function • Rise-up & Build-up function • Brake force distribution function
C1111	When a malfunction is detected in motor or motor relay.	
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 • hill start assist function • Rise-up & Build-up function • Brake force distribution function
C1116	When stop lamp switch signal is not input when brake pedal operates.	
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 • hill start assist function • Rise-up & Build-up function • Brake force distribution function
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.	
C1130	When a malfunction is detected in ECM system.	The following functions are suspended. • VDC function • TCS function • hill start assist function • Rise-up & Build-up function • Brake force distribution function
C1140	When a malfunction is detected in actuator relay.	The following functions are suspended. • VDC function • TCS function • ABS function • EBD function • hill start assist function • Rise-up & Build-up function • Brake force distribution function
C1142	When a malfunction is detected in pressure sensor.	The following functions are suspended. • VDC function • TCS function • hill start assist function • Rise-up & Build-up function • Brake force distribution function
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 • hill start assist function • Rise-up & Build-up function • Brake force distribution function
C1155	When brake fluid level low signal is detected.	

DTC	Malfunction detected condition	Fail-safe condition
C1160	When calibration of yaw rate/side/decel G sensor is not complete.	The following functions are suspended. • VDC function • TCS function • hill start assist function • Rise-up & Build-up function • Brake force distribution function
C1164	When a malfunction is detected in cut valve 1.	The following functions are suspended. • VDC function • TCS function • ABS function • EBD function • hill start assist function • Rise-up & Build-up function • Brake force distribution function
C1165	When a malfunction is detected in cut valve 2.	
C1170	When the information in ABS actuator and electric unit (control unit) is not the same.	
C1197	When a malfunction is detected in vacuum sensor.	Electrical vacuum assistance of brake booster is suspended.
C1198	• When an open circuit is detected in vacuum sensor circuit. • When a short circuit is detected in vacuum sensor circuit. • When a malfunction is detected in vacuum sensor noise.	
C1199	When brake booster vacuum is approx. 0 kPa (0 mmHg) during engine running.	—
C119A	When a malfunction is detected in supply power voltage of vacuum sensor.	Electrical vacuum assistance of brake booster is suspended.
U1000	When CAN communication signal is not continuously received for 2 seconds or more.	The following functions are suspended. • VDC function • TCS function • hill start assist function • Rise-up & Build-up function • Brake force distribution function
U0424*	When signal that is transmitted from A/C auto AMP. is not the latest information.	Mode is fixed to the mode when a malfunction of drive mode selector occurs. The mode is fixed to STANDARD mode after ignition switch turns OFF to ON.

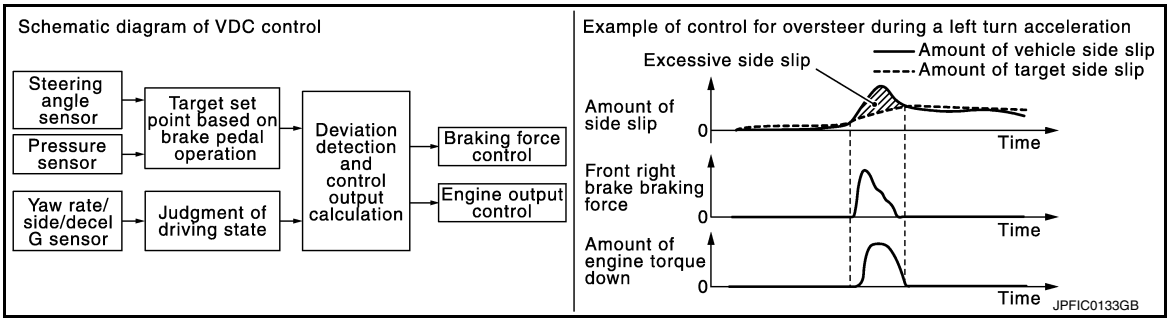
*: This is DTC that is detected in ADAS control unit side.

VDC FUNCTION

VDC FUNCTION : System Description

INFOID:0000000012355881

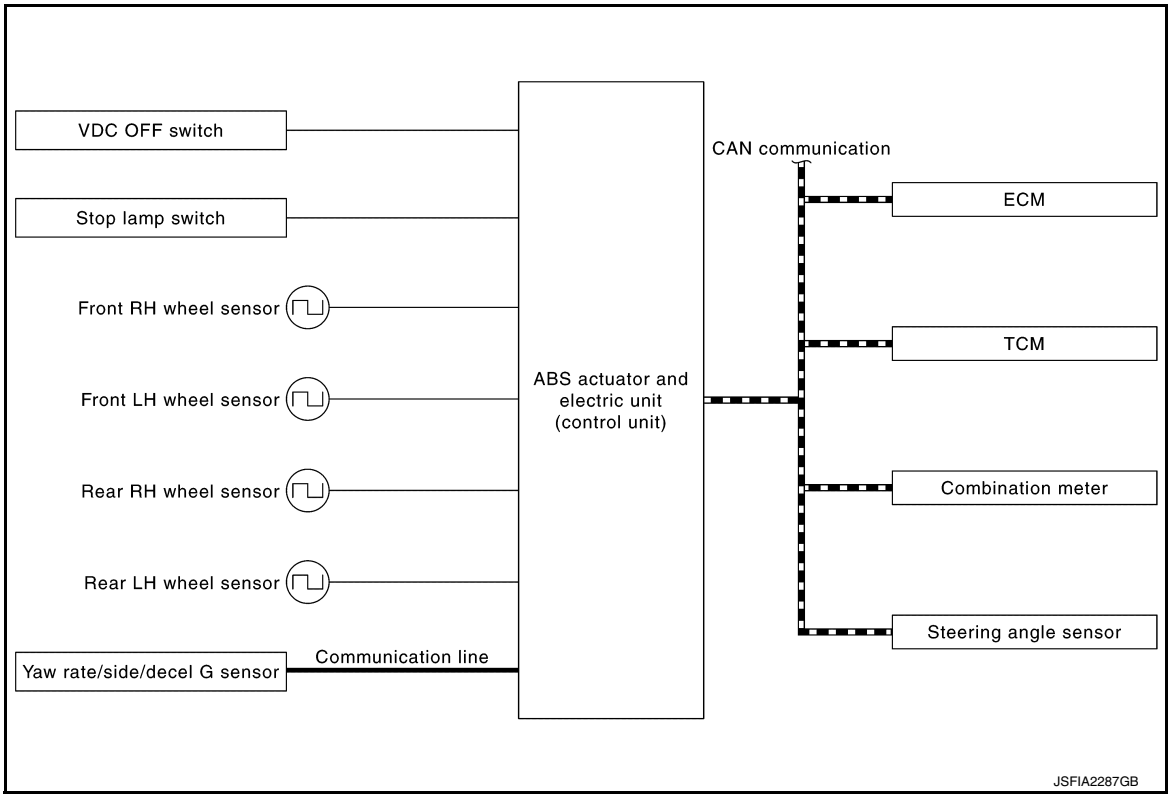
- Side slip or tail slip may occur while driving on a slippery road or intending an urgent evasive driving. VDC function detects side slip status using each sensor when side slip or tail slip is about to occur and improves vehicle stability by brake control and engine output control during driving.
- 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 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 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.
- VDC function has brake limited slip differential (BLSD) function. 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 turns ON when Brake limited slip differential (BLSD) function is in operation. Noises and vibration may be generated due to brake operation. This is not a malfunction.
- 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, hill start assist function, Rise-up & Build-up function, Brake force distribution function and Active trace control function. The vehicle status becomes the same as models without VDC function, TCS function, hill start assist function, Rise-up & Build-up function, Brake force distribution function and Active trace control function. However, ABS function and EBD function are operated normally. Refer to BRC-22, "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.

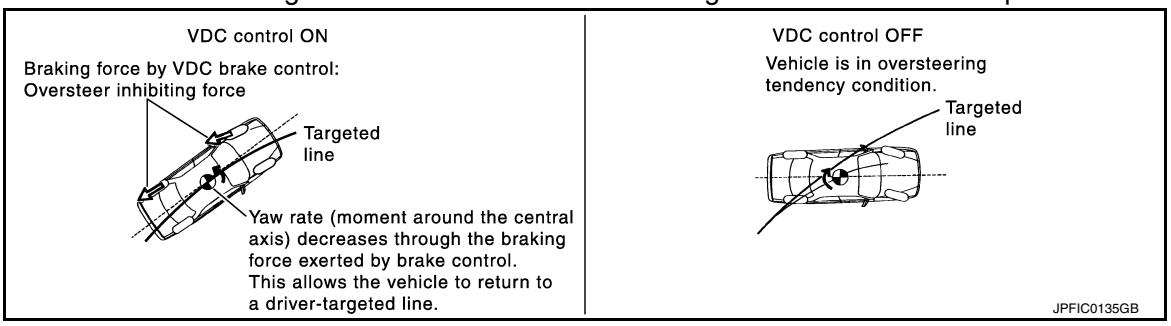
Component	Signal description
Yaw rate/side/decel G sensor	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via communication line*. • Yaw rate signal • Side G sensor signal • Decel G sensor signal
ECM	Mainly transmits the following signals to ABS actuator and electric 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
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 transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • Brake fluid level switch signal • Parking brake switch signal Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. • VDC warning lamp signal • VDC OFF indicator lamp signal

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

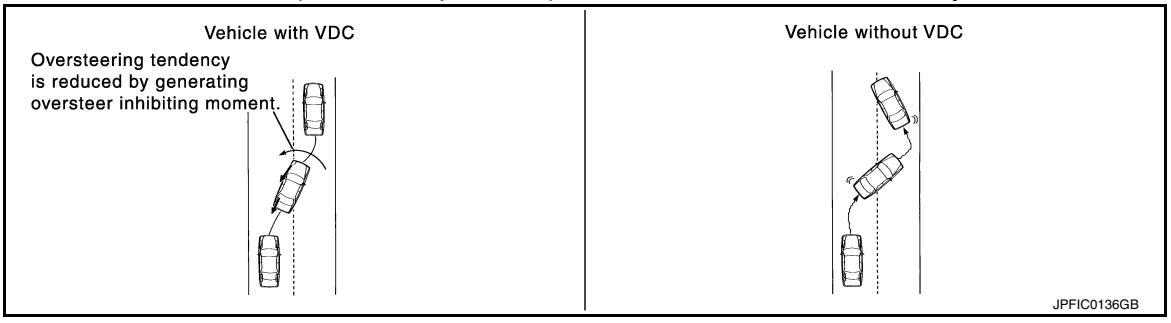
OPERATION CHARACTERISTICS

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.

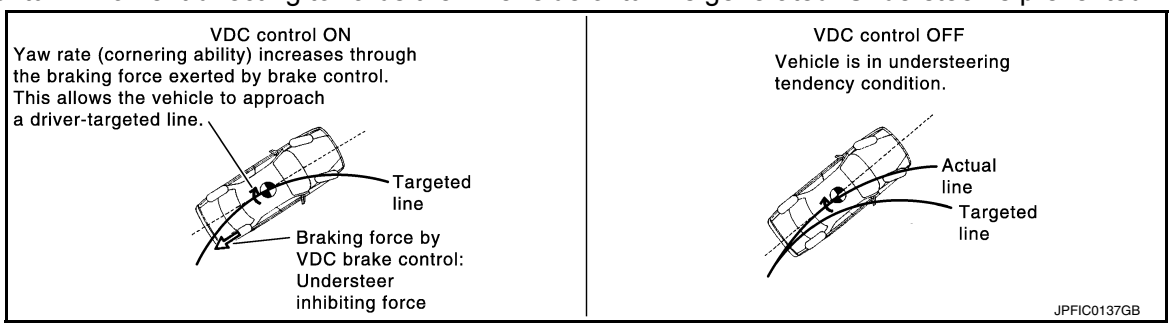


- Changing driving lane on a slippery road, when oversteer tendency is judged large, engine output is controlled as well as brake force (brake fluid pressure) of 4 wheels. Oversteer tendency decreases.

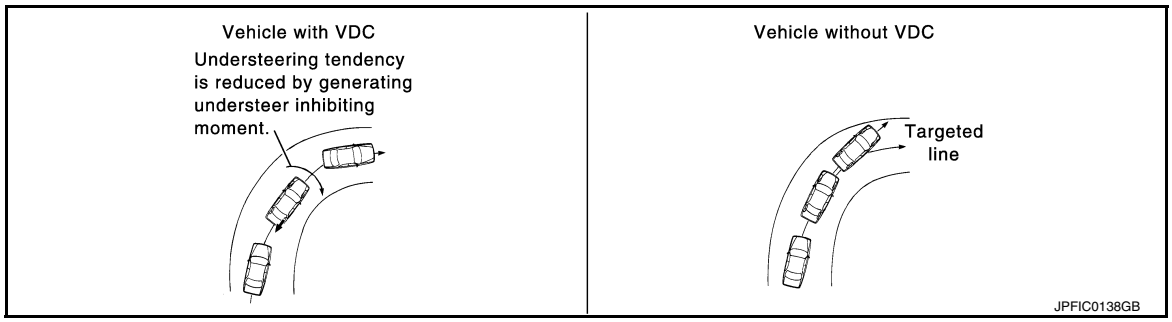


VDC Function That Prevents Understeer Tendency

- 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 output is controlled as well as brake force (brake fluid pressure) of four wheels. Understeer tendency decreases.

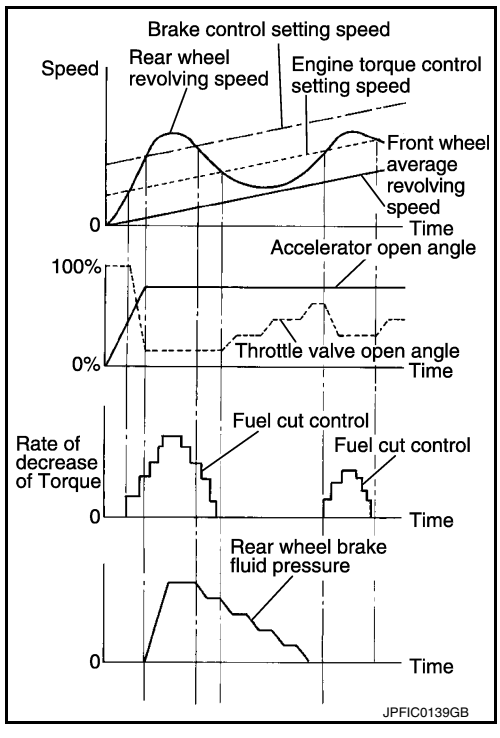


TCS FUNCTION

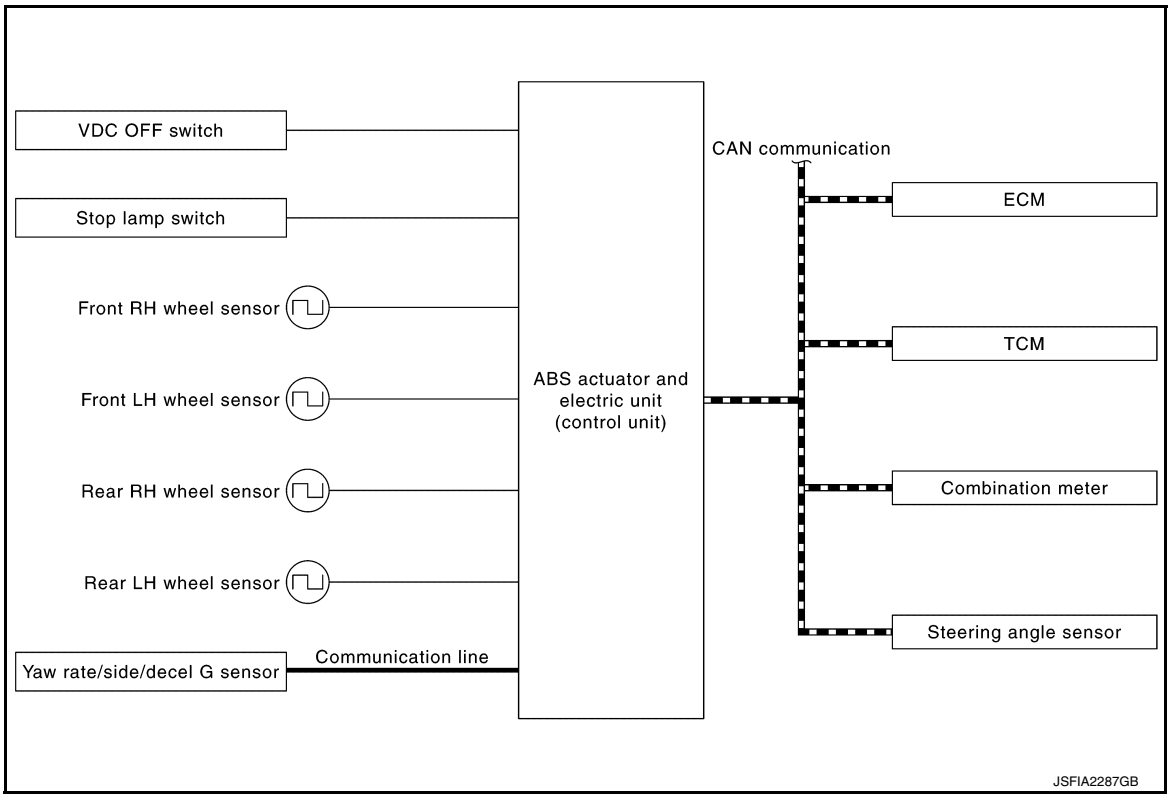
TCS FUNCTION : System Description

INFOID:0000000012355882

- Wheel spin status of drive wheel is detected by wheel sensor of 4 wheels. Engine 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 torque by engine torque control. Wheel spin amount decreases. Engine 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, hill start assist function, Rise-up & Build-up function, Brake force distribution function and Active trace control function. The vehicle status becomes the same as models without VDC function, TCS function, hill start assist function, Rise-up & Build-up function, Brake force distribution function and Active trace control function. However, ABS function and EBD function are operated normally. Refer to BRC-22, "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*. • 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
TCM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • Shift position 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 transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • Brake fluid level switch signal • Parking brake switch signal Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. • VDC warning lamp signal • VDC OFF indicator lamp signal

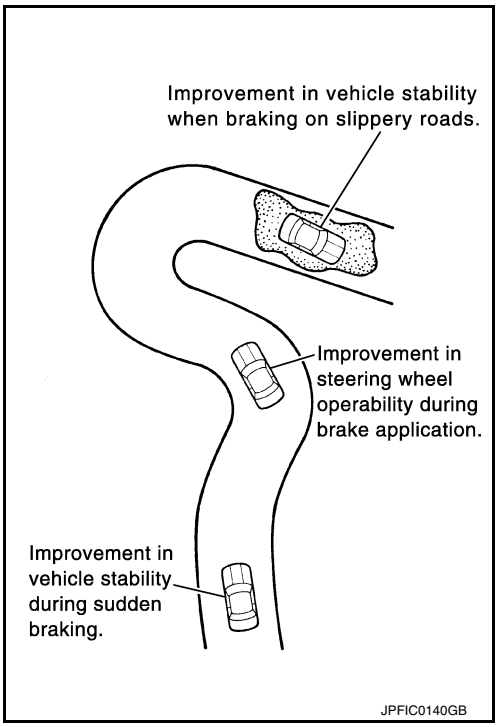
*: Communication line between yaw rate/side/decel G sensor and ABS actuator and electric unit (control unit)

ABS FUNCTION

ABS FUNCTION : System Description

INFOID:0000000012355883

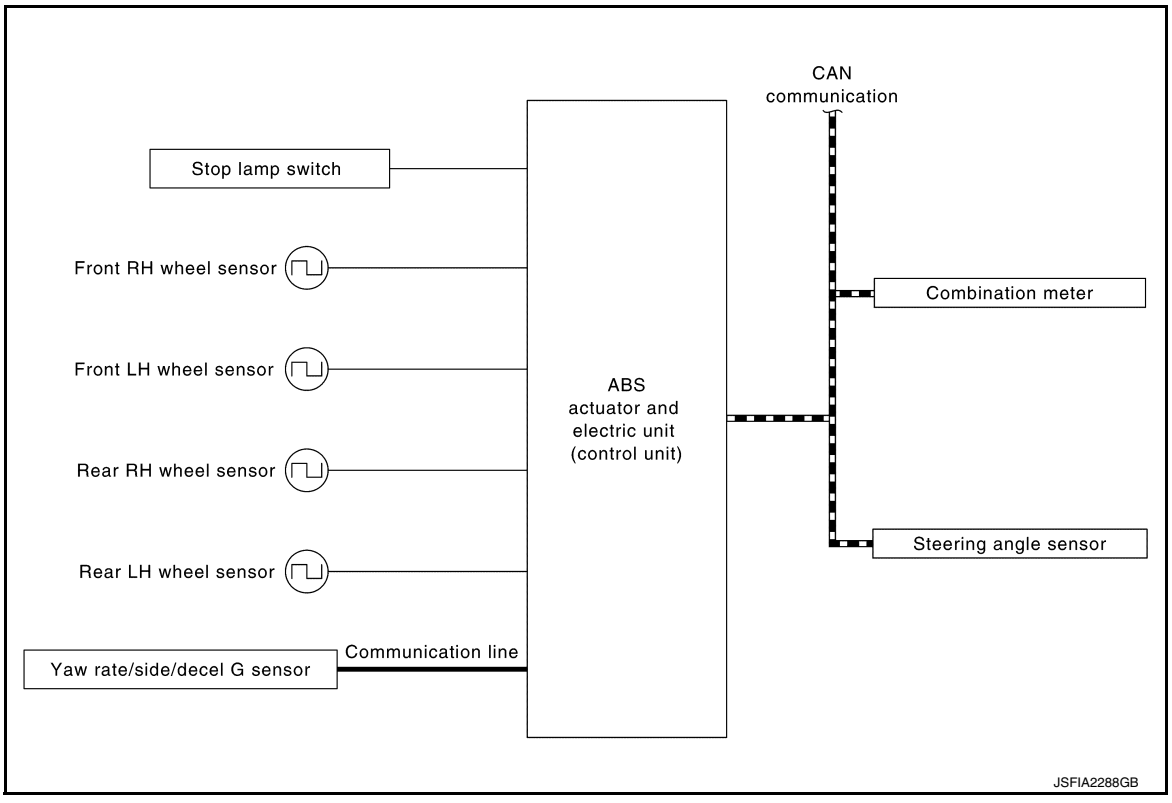
- By preventing wheel lock through brake force (brake fluid pressure) control that is electronically controlled by detecting wheel speed during braking, stability during emergency braking is improved so that obstacles can be easily bypassed by steering operation.
- During braking, control units calculates 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, hill start assist function, Rise-up & Build-up function, Brake force distribution function and Active trace control function. The vehicle status becomes the same as models without VDC function, TCS function, ABS function, hill start assist function, Rise-up & Build-up function, Brake force distribution function and Active trace control function. However, EBD function is operated normally. Refer to BRC-22, "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 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.

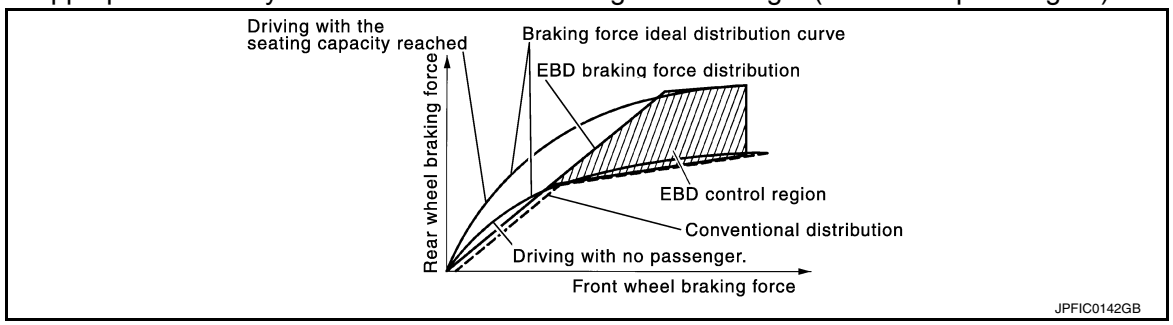
Component	Signal description
Steering angle sensor	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • Steering angle sensor signal
Combination meter	Mainly receives the following signals from ABS actuator and electric unit (control unit) via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

EBD FUNCTION

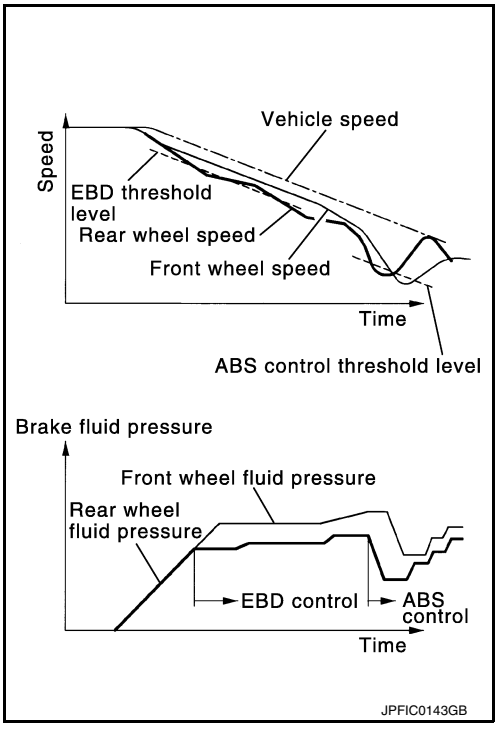
EBD FUNCTION : System Description

INFOID:0000000012355884

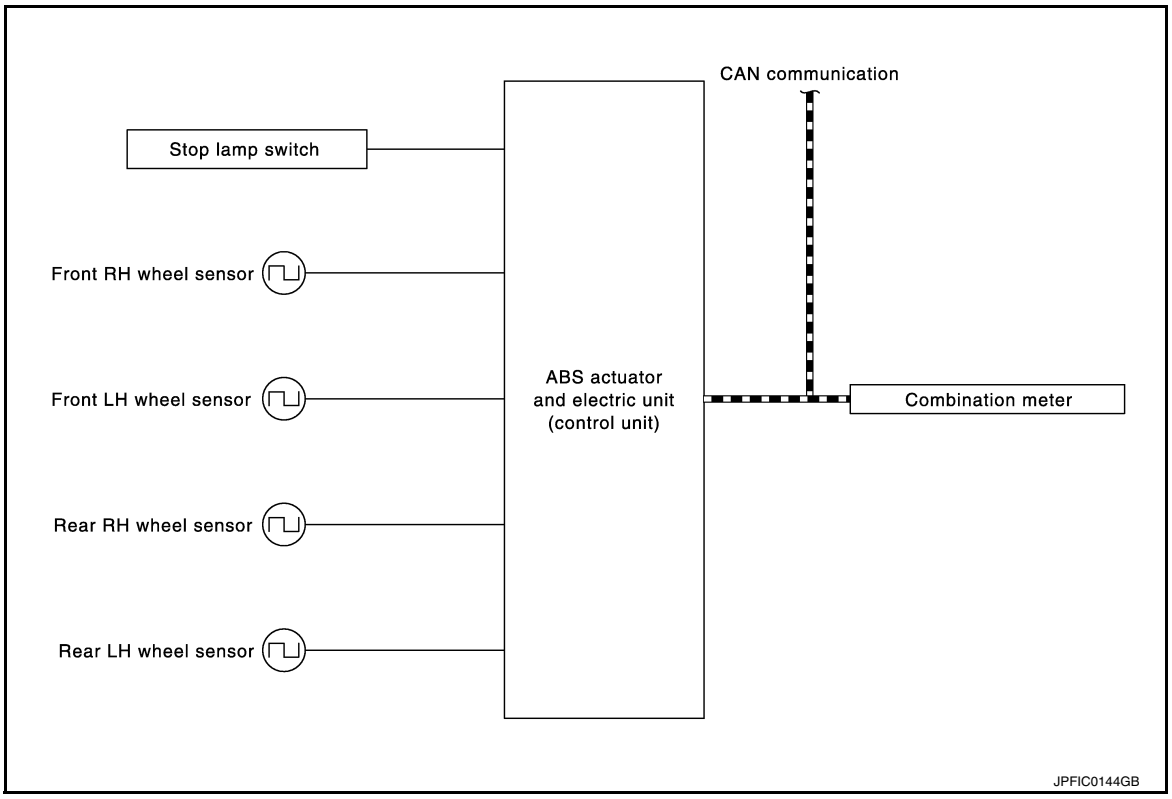
- By preventing rear wheel slip increase through rear wheel brake force (brake fluid pressure) control that is electronically controlled when slight skip on front and rear wheels are detected during braking, stability during braking is improved.
- EBD function is expanded and developed from conventional 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, hill start assist function, Rise-up & Build-up function, Brake force distribution function and Active trace control function. The vehicle status becomes the same as models without VDC function, TCS function, ABS function, EBD function, hill start assist function, Rise-up & Build-up function, Brake force distribution function and Active trace control function. Refer to BRC-22, "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. • Brake warning lamp signal • ABS warning lamp signal • VDC warning lamp signal

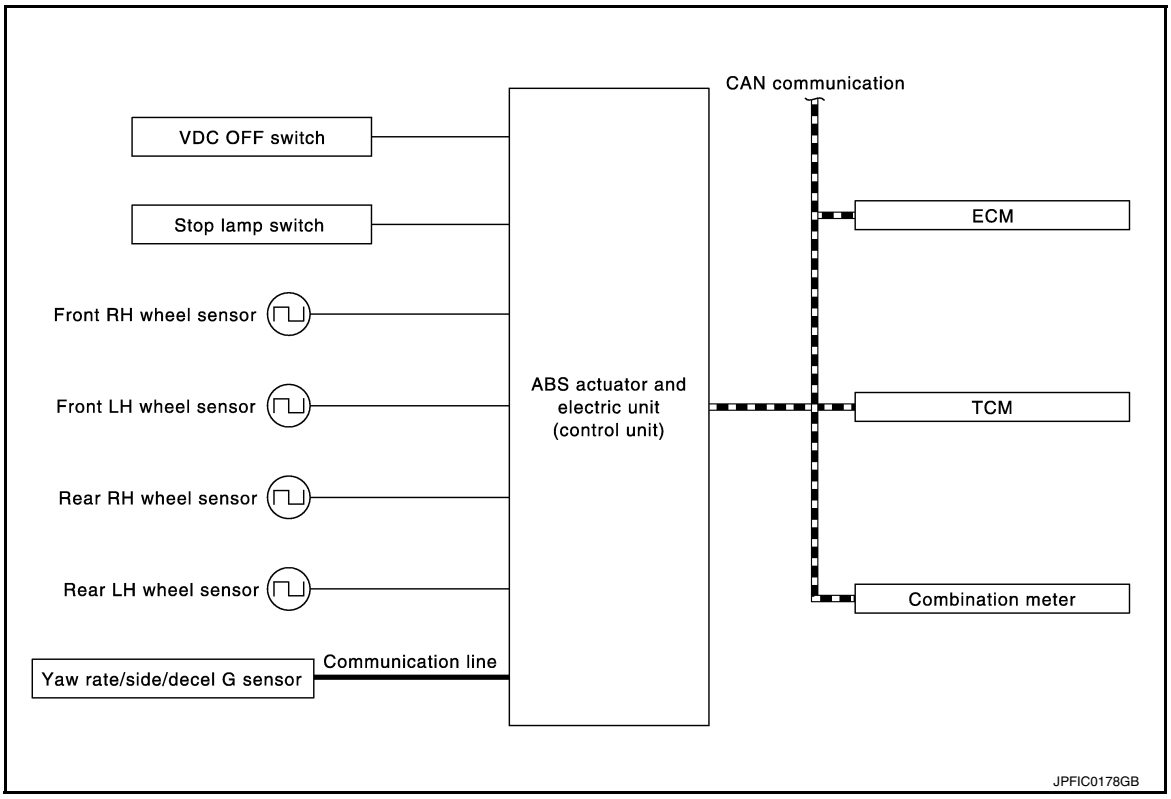
Hill start assist FUNCTION

Hill start assist FUNCTION : System Description

INFOID:0000000012355885

- This function maintains brake fluid pressure so that the vehicle does not move backwards even if brake pedal is released to depress accelerator pedal to start the vehicle while it is stopped on an uphill slope by depressing brake pedal.
- This function operates when the vehicle is in stop status on a uphill slope of slope ratio 10% or more and selector lever is in the position other than P or N.
- hill start assist function is only for the start aid. It maintains the brake fluid pressure for approx. 2 seconds after releasing the brake pedal, and then decreases the pressure gradually. If the vehicle can start by the accelerator operation, the brake is released automatically and a smooth start can be performed.
- Fail-safe function is adopted. When a malfunction occurs in hill start assist function, the control is suspended for VDC function, TCS function, hill start assist function, Rise-up & Build-up function, Brake force distribution function and Active trace control function. The vehicle status becomes the same as models without VDC function, TCS function, hill start assist function, Rise-up & Build-up function, Brake force distribution function and Active trace control function. However, ABS function and EBD function are operated normally. Refer to BRC-22, "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 *. • 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
TCM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • Shift position signal
Combination meter	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • Brake fluid level switch signal • Parking brake switch signal Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. • VDC warning lamp signal • VDC OFF indicator lamp signal

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

ACTIVE STABILITY ASSIST

ACTIVE STABILITY ASSIST : System Description

INFOID:0000000012355886

- Combination of Active trace control function, Rise-up & Build-up function and Brake force distribution function 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 for enjoyable driving with reliable feeling of the driver.

- Active trace control function

- Active Trace Control helps enhance the transition from braking into and then accelerating out of corners. Active Trace Control utilizes the vehicle′s VDC system to help improve cornering feel by automatically applying brakes. Furthermore, Active Trace Control will apply selective braking to help create increased steering response in S-turns. For example, if driving through an S-turn that starts with steering to the right, the right-side brakes are engaged to create a yaw moment and help turn the vehicle. When steering back to the left, left-side brakes are engaged. Refer to BRC-35, "ACTIVE STABILITY ASSIST : Active Trace Control Function".

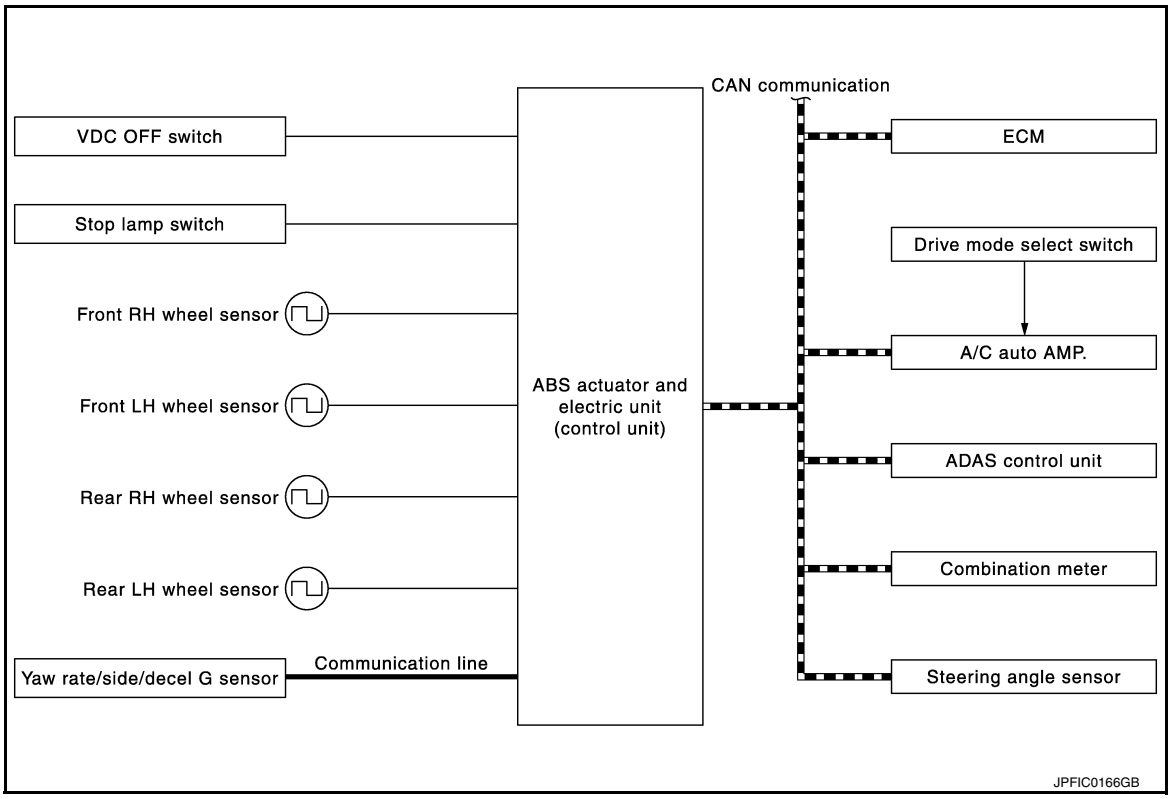
- Rise-up & Build-up function

- Rise-up & Build-up gives the drivers secure brake feeling with optimized braking characteristics according to the amount of brake operation and the behavior of vehicle. Refer to BRC-36, "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-37, "ACTIVE STABILITY ASSIST : Brake Force Distribution Function".
- Active trace control can be switched to operational status or non-operational status by operating VDC OFF switch to ON/OFF.

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
ADAS control unit	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • Active trace control 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
ABS actuator and electric unit (control unit)	Mainly transmits the following signals to ADAS control unit via CAN communication. • Vehicle speed signal (ABS) • Stop lamp switch signal (brake signal) • VDC OFF switch signal • Yaw rate signal • Side G sensor signal • Decel G sensor signal
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
Drive mode select switch	Outputs ON/OFF status of STANDARD, SPORT, ECO, SNOW mode to A/C auto AMP.
A/C auto AMP	Mainly transmits the following signals to ADAS control unit via CAN communication. • Drive mode select switch signal
Steering angle sensor	Mainly transmits the following signals to ADAS control unit via CAN communication. • Steering angle sensor signal
Combination meter	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • Brake fluid level switch signal • Parking brake switch signal Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. • VDC OFF indicator lamp signal • VDC warning lamp signal Mainly receives the following signals from ADAS control unit via CAN communication. • FEB warning lamp signal

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

ACTIVE STABILITY ASSIST : Active Trace Control Function

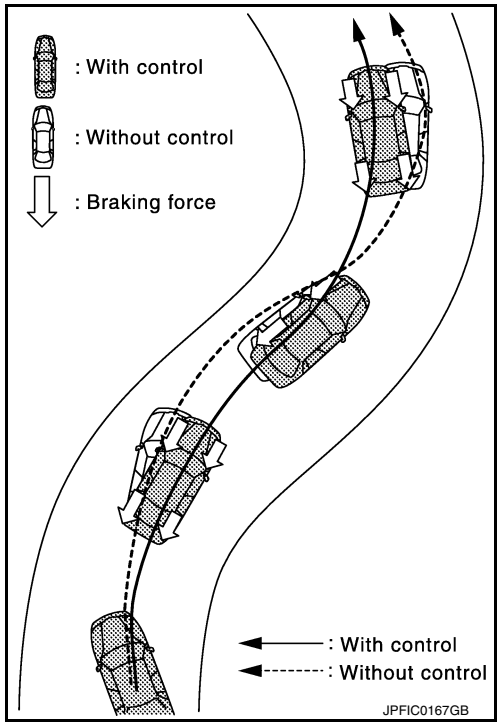
INFOID:0000000012355887

- Active trace control function is calculated by ADAS control unit and transmits command to ABS actuator and electric unit (control unit).
- This system senses driving based on the driver′s steering and acceleration/braking patterns, and individually controls the braking to each of the four wheels to help smooth vehicle response.
- When the drive mode selector switch is set to the “SPORT” mode, the amount of brake control provided by Active trace control function is reduced.
- When the VDC OFF switch is turn OFF the VDC function, the Active trace control function is also turned OFF.
- Active trace control function is malfunctioning properly, the FEB warning lamp turns ON.

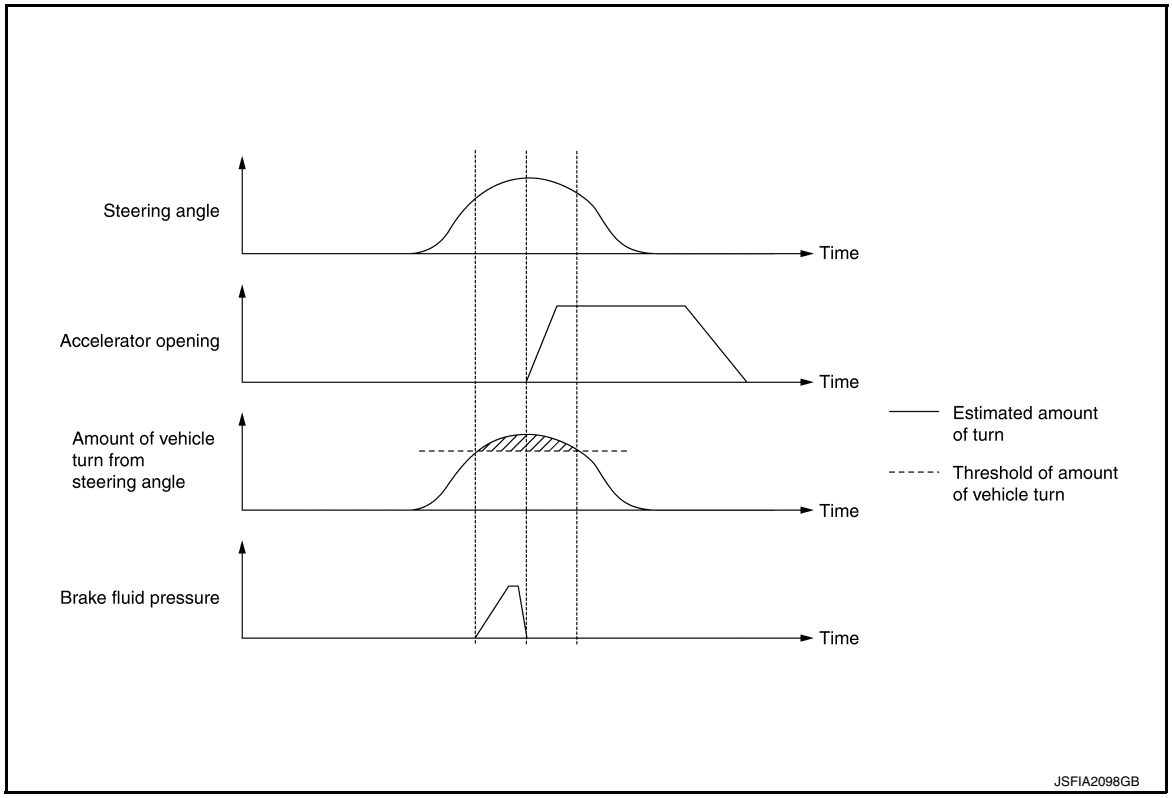
NOTE:
Effect to decrease delay of vehicle yaw rate in response to steering operation may not always be obtained in all driving conditions (example: when road surface resistance is low).

OPERATION CHARACTERISTICS

Active Trace Control helps enhance the transition from braking into and then accelerating out of corners. Active Trace Control utilizes the vehicle′s VDC system to help improve cornering feel by automatically applying brakes. Furthermore, Active Trace Control will apply selective braking to help create increased steering response in S-turns. For example, if driving through an S-turn that starts with steering to the right, the right-side brakes are engaged to create a yaw moment and help turn the vehicle.



- Brake control amount is controlled according to steering operation status by the driver and vehicle cornering status.

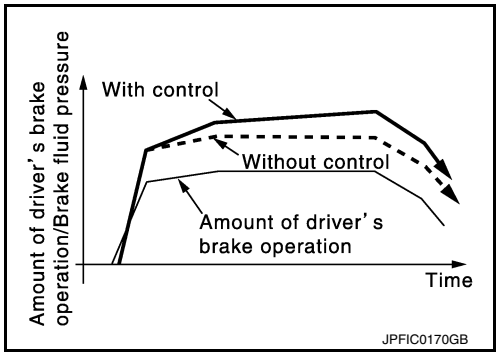


ACTIVE STABILITY ASSIST : Rise-up & Build-up Function

INFOID:0000000012355888

- Rise-up & Build-up function is controlled by ABS actuator and electric unit (control unit).

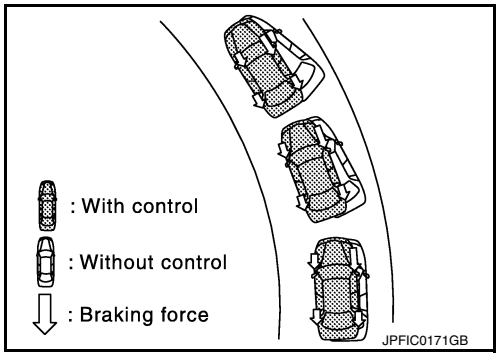
- The system gradually adjusts braking power during normal braking to help provide an enhanced brake feel.
- VDC warning lamp turns ON when Rise-up & Build-up function is malfunctioning.



ACTIVE STABILITY ASSIST : Brake Force Distribution Function

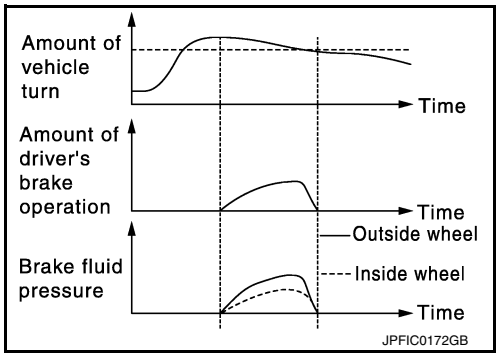
INFOID:0000000012355889

- 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.
- VDC warning lamp turn ON when Brake force distribution function is malfunctioning.

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:0000000012355890

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-49, "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.

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*
	CV2	Off	Off	Off
FR LH SPL	FR LH IN SOL	Off	On*	On*
	FR LH OUT SOL	Off	Off	On*
	CV1	Off	Off	Off
RR RH SOL	RR RH IN SOL	Off	On*	On*
	RR RH OUT SOL	Off	Off	On*
	CV1	Off	Off	Off
RR LH SOL	RR LH IN SOL	Off	On*	On*
	RR LH OUT SOL	Off	Off	On*
	CV2	Off	Off	Off

*: 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
	CV2	Off	On*	On*
FR LH SOL (ACT)	FR LH IN SOL	Off	Off	Off
	FR LH OUT SOL	Off	Off	Off
	CV1	Off	On*	On*
RR RH SOL (ACT)	RR RH IN SOL	Off	Off	Off
	RR RH OUT SOL	Off	Off	Off
	CV1	Off	On*	On*
RR LH SOL (ACT)	RR LH IN SOL	Off	Off	Off
	RR LH OUT SOL	Off	Off	Off
	CV2	Off	On*	On*

*: 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.

DATA MONITOR

NOTE:
The following table includes information (items) inapplicable to this vehicle. For information (items) applicable to this vehicle, refer to CONSULT display items.

×: 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.
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

Item (Unit)	Monitor item selection		Note
	INPUT SIGNALS	MAIN ITEMS	
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.
ENGINE SPEED (tr/min)	×		Engine speed status 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.
PARK BRAKE SW (On/Off)	×		Parking brake switch 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.
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.
CRANKING SIG (On/Off)			Cranking 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.
R POSI SIG (On/Off)			R range signal input status judged from R range signal is displayed.
4WD MODE MON (Note 2) (AUTO/LOCK/2WD)	×	×	AWD control status is displayed.
USS SIG (Note 3) (On/Off)			hill start assist operation status is displayed.

Note 1: Refer to BRC-14, "System Description" for ON/OFF conditions of each warning lamp and indicator lamp.
Note 2: AWD models

Note 3: USS means “hill start assist”

WORK SUPPORT

Conditions	Description
ST ANGLE SENSOR ADJUSTMENT	Perform neutral position adjustment of steering angle sensor.
DECEL G SEN CALIBRATION	Perform decel G sensor calibration.

ECU DIAGNOSIS INFORMATION

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Reference Value

INFOID:0000000012355891

CONSULT DATA MONITOR STANDARD VALUE

NOTE:

The following table includes information (items) inapplicable to this vehicle. For information (items) applicable to this vehicle, refer to CONSULT display items.

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

Monitor item	Condition	Reference values in normal operation
MOTOR RELAY	Active	On
	Not activated	Off
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°
ENGINE SPEED	Engine stopped	0 tr/min
	Engine running	Almost same reading as tachometer
PRESS SENSOR	Brake pedal not depressed	Approx. 0 bar
	Brake pedal depressed	Increases between 0 - 255 bar according depth of brake pedal
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
PARK BRAKE SW	When parking brake is active	On
	Parking brake is released	Off
CV1	Active	On
	Not activated	Off
CV2	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

Monitor item	Condition	Reference values in normal operation
VDC SIGNAL	VDC activated	On
	VDC not activated	Off
EBD FAIL SIG	In EBD fail-safe	On
	EBD is normal	Off
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
CRANKING SIG	At cranking	On
	Other than at cranking	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
R POSI SIG	When selector lever is in the R position	On
	When selector lever is in the other position than R	Off
4WD MODE MON (Note 3)	Always	AUTO, LOCK, 2WD (depending on AWD control status)
USS SIG (Note 4)	When hill start assist is active	On
	When hill start assist is not active	Off

Note 1: Confirm tire pressure is standard value.
Note 2: Refer to BRC-14, "System Description" for ON/OFF conditions of each warning lamp and indicator lamp.
Note 3: AWD models
Note 4: USS means “hill start assist”

Fail-Safe

INFOID:0000000012355892

VDC FUNCTION, TCS FUNCTION, hill start assist FUNCTION, RISE-UP & BUILD-UP FUNCTION AND 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, hill start assist function, Rise-up & Build-up function and Brake force distribution function. The vehicle status becomes the same as models without VDC function, TCS function, hill start assist function, Rise-up & Build-up function and Brake force distribution function. 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, hill start assist function, Rise-up & Build-up function and Brake force distribution function. The vehicle status becomes the same as models without VDC function, TCS function, ABS function, hill start assist function, Rise-up & Build-up function and Brake force distribution function. 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, hill start assist function, Rise-up & Build-up function and Brake force distribution function. The vehicle status becomes the same as models without VDC function, TCS function, ABS function, EBD function, hill start assist function, Rise-up & Build-up function and Brake force distribution function.

ACTIVE TRACE CONTROL FUNCTION

- FEB warning lamp turns ON in combination meter when a malfunction occurs in system (ADAS control unit). The control is suspended for Active trace control function. The vehicle becomes the same as models without Active trace control function.
  CAUTION:
  Turn ON When FEB function is OFF.
- Mode is fixed to the mode when a malfunction occurs if CAN communication malfunction (DTC “U1000”, DTC “U1010”, DTC “U0424”) occurs between ADAS control unit and A/C auto AMP. The mode is fixed to STANDARD mode after ignition switch turns OFF to ON.

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) • hill start assist function • Rise-up & Build-up function • Brake force distribution function
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 LH 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 • hill start assist function • Rise-up & Build-up function • Brake force distribution function
C1111	When a malfunction is detected in motor or motor relay.	
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 • hill start assist function • Rise-up & Build-up function • Brake force distribution function
C1116	When stop lamp switch signal is not input when brake pedal operates.	

DTC	Malfunction detected condition	Fail-safe condition
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 • hill start assist function • Rise-up & Build-up function • Brake force distribution function
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.	
C1130	When a malfunction is detected in ECM system.	The following functions are suspended. • VDC function • TCS function • hill start assist function • Rise-up & Build-up function • Brake force distribution function
C1140	When a malfunction is detected in actuator relay.	The following functions are suspended. • VDC function • TCS function • ABS function • EBD function • hill start assist function • Rise-up & Build-up function • Brake force distribution function
C1142	When a malfunction is detected in pressure sensor.	The following functions are suspended. • VDC function • TCS function • hill start assist function • Rise-up & Build-up function • Brake force distribution function
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 • hill start assist function • Rise-up & Build-up function • Brake force distribution function
C1155	When brake fluid level low signal is detected.	
C1160	When calibration of yaw rate/side/decel G sensor is not complete.	The following functions are suspended. • VDC function • TCS function • hill start assist function • Rise-up & Build-up function • Brake force distribution function
C1164	When a malfunction is detected in cut valve 1.	The following functions are suspended. • VDC function • TCS function • ABS function • EBD function • hill start assist function • Rise-up & Build-up function • Brake force distribution function
C1165	When a malfunction is detected in cut valve 2.	
C1170	When the information in ABS actuator and electric unit (control unit) is not the same.	

DTC	Malfunction detected condition	Fail-safe condition
C1197	When a malfunction is detected in vacuum sensor.	Electrical vacuum assistance of brake booster is suspended.
C1198	• When an open circuit is detected in vacuum sensor circuit. • When a short circuit is detected in vacuum sensor circuit. • When a malfunction is detected in vacuum sensor noise.	
C1199	When brake booster vacuum is approx. 0 kPa (0 mmHg) during engine running.	—
C119A	When a malfunction is detected in supply power voltage of vacuum sensor.	Electrical vacuum assistance of brake booster is suspended.
U1000	When CAN communication signal is not continuously received for 2 seconds or more.	The following functions are suspended. • VDC function • TCS function • hill start assist function • Rise-up & Build-up function • Brake force distribution function
U0424*	When signal that is transmitted from A/C auto AMP. is not the latest information.	Mode is fixed to the mode when a malfunction of drive mode selector occurs. The mode is fixed to STANDARD mode after ignition switch turns OFF to ON.

*: This is DTC that is detected in ADAS control unit side.

DTC Inspection Priority Chart

INFOID:0000000012355893

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 • U0424 HVAC CAN CIR 1*
2	• C1170 VARIANT CODING
3	• C1130 ENGINE SIGNAL 1 • C1144 ST ANG SEN SIGNAL
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 • 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 • C1160 DECEL G SEN SET • C1164 CV 1 • C1165 CV 2 • C1197 VACUUM SENSOR • C1198 VACUUM SEN CIR • C1199 BRAKE BOOSTER • C119A VACUUM SEN VOLT
6	• C1155 BR FLUID LEVEL LOW

*: This is DTC that is detected in ADAS control unit side.

DTC Index

INFOID:0000000012355894

DTC	Display Item	Refer to
C1101	RR RH SENSOR-1	BRC-71, "DTC Logic"
C1102	RR LH SENSOR-1	
C1103	FR RH SENSOR-1	
C1104	FR LH SENSOR-1	
C1105	RR RH SENSOR-2	BRC-76, "DTC Logic"
C1106	RR LH SENSOR-2	
C1107	FR RH SENSOR-2	
C1108	FR LH SENSOR-2	
C1109	BATTERY VOLTAGE [ABNOMAL]	BRC-83, "DTC Logic"
C1111	PUMP MOTOR	BRC-85, "DTC Logic"
C1115	ABS SENSOR [ABNORMAL SIGNAL]	BRC-88, "DTC Logic"
C1116	STOP LAMP SW	BRC-95, "DTC Logic"
C1120	FR LH IN ABS SOL	BRC-101, "DTC Logic"
C1121	FR LH OUT ABS SOL	BRC-103, "DTC Logic"
C1122	FR RH IN ABS SOL	BRC-101, "DTC Logic"
C1123	FR RH OUT ABS SOL	BRC-103, "DTC Logic"
C1124	RR LH IN ABS SOL	BRC-101, "DTC Logic"
C1125	RR LH OUT ABS SOL	BRC-103, "DTC Logic"
C1126	RR RH IN ABS SOL	BRC-101, "DTC Logic"

DTC	Display Item	Refer to
C1127	RR RH OUT ABS SOL	BRC-103, "DTC Logic"
C1130	ENGINE SIGNAL 1	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-116, "DTC Logic"
C1145	YAW RATE SENSOR	BRC-118, "DTC Logic"
C1146	SIDE G SEN CIRCUIT	
C1155	BR FLUID LEVEL LOW	BRC-121, "DTC Logic"
C1160	DECEL G SEN SET	BRC-125, "DTC Logic"
C1164	CV 1	BRC-127, "DTC Logic"
C1165	CV 2	
C1170	VARIANT CODING	BRC-129, "DTC Logic"
C1197	VACUUM SENSOR	BRC-130, "DTC Logic"
C1198	VACUUM SEN CIR	BRC-135, "DTC Logic"
C1199	BRAKE BOOSTER	BRC-135, "DTC Logic"
C119A	VACUUM SEN VOLT	BRC-138, "DTC Logic"
U1000	CAN COMM CIRCUIT	BRC-141, "DTC Logic"
U0424*	HVAC CAN CIR 1	BRC-142, "DTC Logic"

*: This is DTC that is detected in ADAS control unit.

ADAS CONTROL UNIT

List of ECU Reference

INFOID:0000000012355895

ECU name	Refer to
ADAS control unit	DAS-33, "Reference Value"
	DAS-38, "Fail-safe (ADAS Control Unit)"
	DAS-39, "DTC Inspection Priority Chart"
	DAS-40, "DTC Index"

ACTIVE TRACE CONTROL FUNCTION

FEB warning lamp turns ON when a malfunction occurs in system (ADAS control unit). The control is suspended for Active trace control function. The vehicle becomes the same as models without Active trace control function. Refer to DAS-13, "System Description" for ON/OFF conditions of each warning lamp and indicator lamp.

CAUTION:

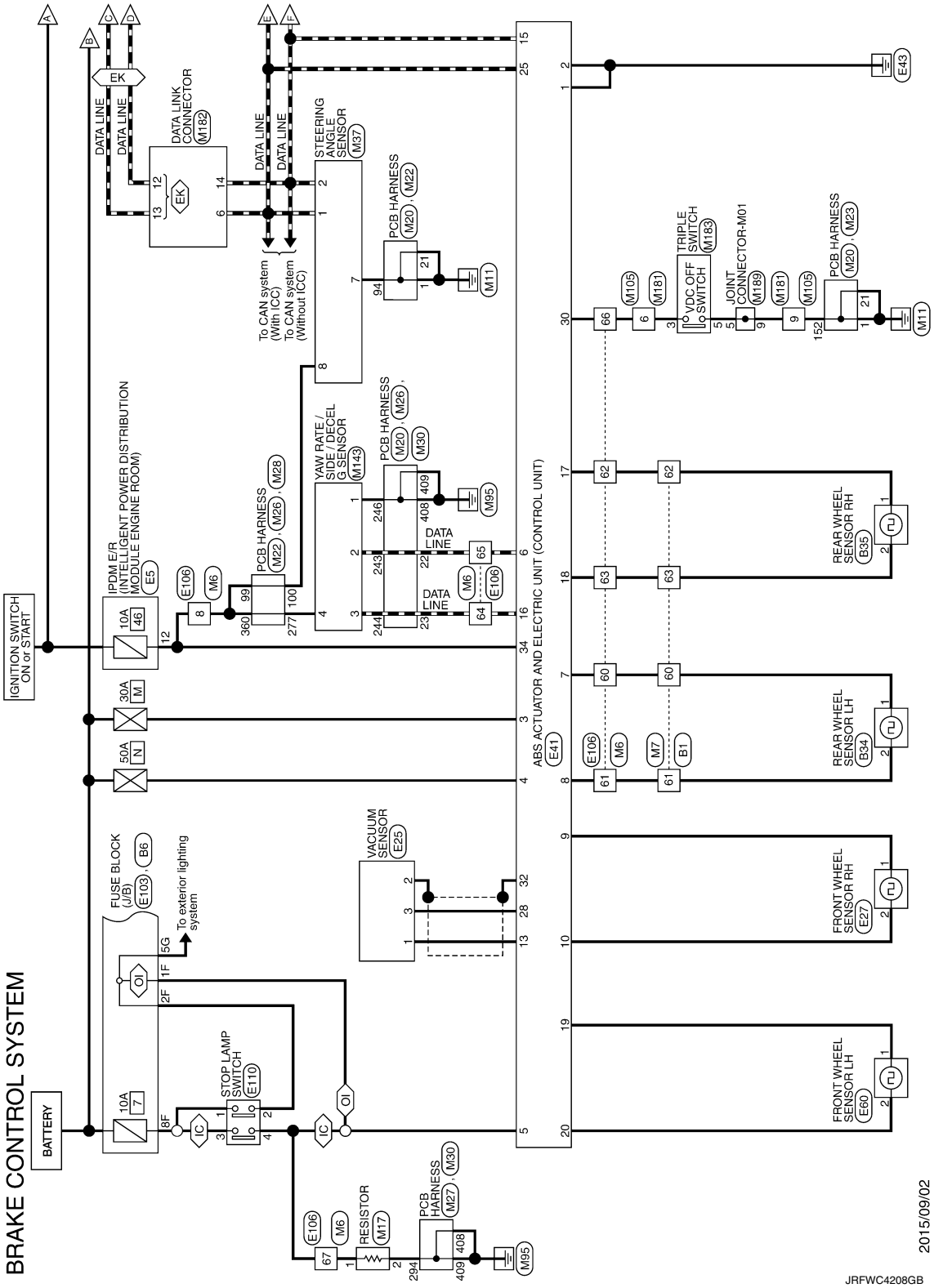
Turn ON when FEB function is OFF.

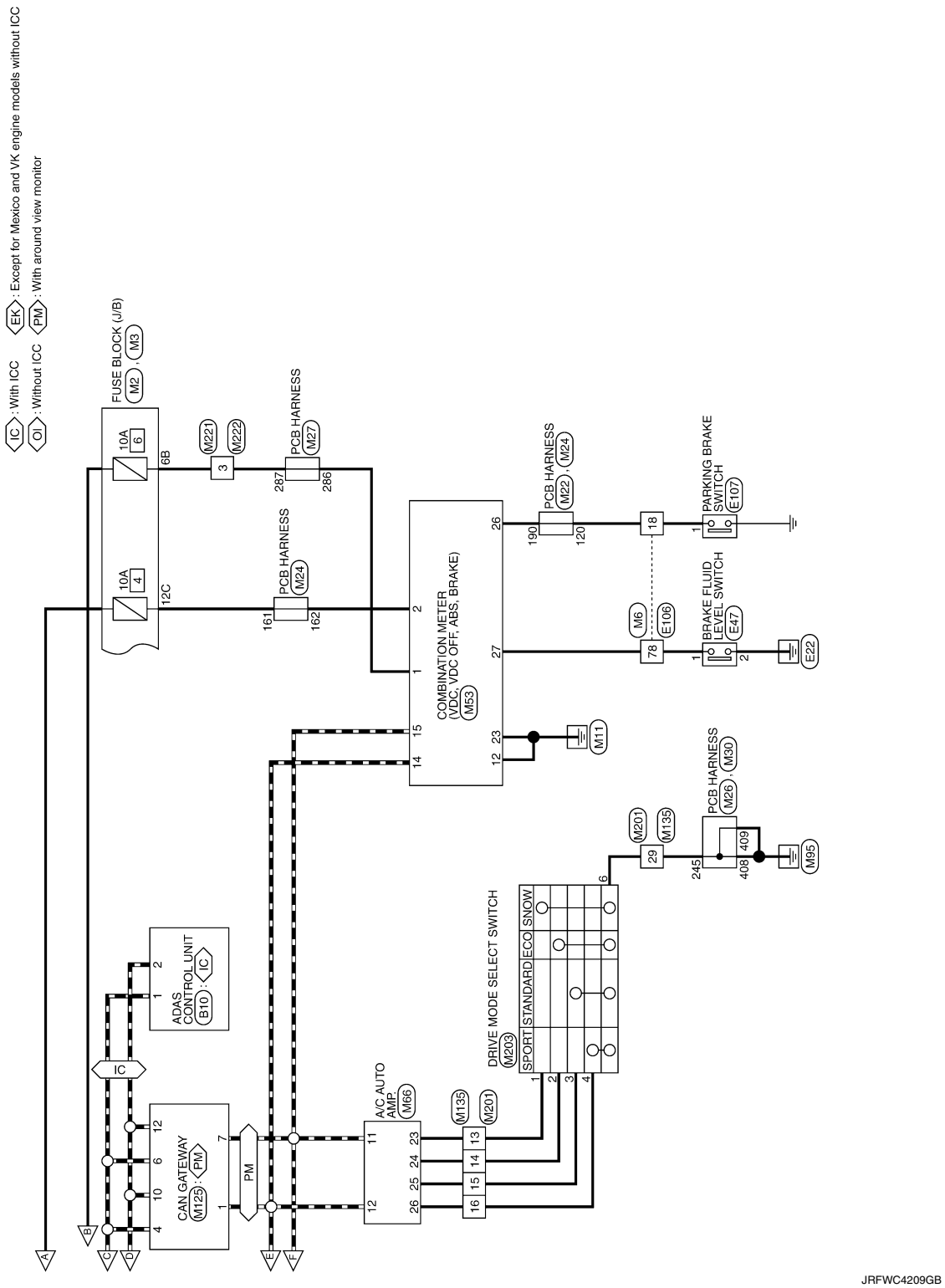
WIRING DIAGRAM

BRAKE CONTROL SYSTEM

Wiring Diagram

INFOID:0000000012355896

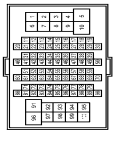



IC : With ICC
OI : Without ICC
EK : Except for Mexico and VK engine models without ICC
PM : With around view monitor
FUSE BLOCK (J/B)
M2
M3
10A 6
10A 4
6B
12C
M221
M222
3
PCB HARNESS
M27
287
286
PCB HARNESS
M24
161
162
PCB HARNESS
M22
M24
190
120
PARKING BRAKE SWITCH
E107
M6
E106
78
BRAKE FLUID LEVEL SWITCH
E47
E22
COMBINATION METER
(VDC, VDC OFF, ABS, BRAKE)
M53
M11
PCB HARNESS
M26
M30
M201
M135
245
408
409
M95
DRIVE MODE SELECT SWITCH
M203
SPORT
STANDARD
ECO
SNOW
ADAS CONTROL UNIT
B10
IC
CAN GATEWAY
M125
PM
A/C AUTO AMP
M66
JRFWC4209GB

BRAKE CONTROL SYSTEM

Connector No.	B1
Connector Name	WIRE TO WIRE
Connector Type	TH80FW-CS16-TM4

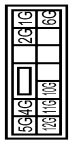
H.S.



Terminal No.	Color Of Wire	Signal Name [Specification]
1	R	-
2	W	-
4	LG	-
5	P	-
7	GR	-
8	Y	-
9	LG	-
10	V	-
11	GR	- [With climate controlled seat]
11	L	- [With heated seat]
12	GR	- [With heated seat]
12	P	- [With climate controlled seat]
13	BR	-
14	R	-
15	O	-
16	V	-
17	B	-
18	R	-
19	W	-
20	L	-
21	B	-
22	LG	-
23	V	-
24	Y	-
25	G	-
26	GR	-
27	SB	-
28	L/O	-
29	W/L	-
30	SHIELD	-
32	L	-
33	R	-
36	G	-
37	SB	-
40	SHIELD	-
41	GR/V	-
42	W/L	-
43	L	-
44	B	-
47	O	-
48	Y	-
49	BR	-
50	SB	-
51	V	-
52	LG	-
53	G	-
56	P	-
57	BR	-
58	LG	-
59	Y	-
60	W	-
61	B	-
62	LG	-
63	V	-
65	O	-
66	BR	-
67	V	-
68	LG	-
69	GR	-
70	R	-
72	L	-
73	P	-
74	L	-
75	P	-
76	Y	-
77	R	-
78	W	-
79	G	-
81	LG	-
82	BR	-
83	SB	-
84	Y	-
85	W	-
86	R	-
87	G	-
88	GR	-
91	SB	-
92	G	-
96	Y	-
97	O	-
98	SB	-
99	LG	-

Connector No.	B6
Connector Name	FUSE BLOCK (J/B)
Connector Type	NS12FBR-CS

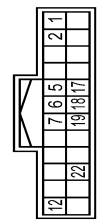
H.S.



Terminal No.	Color Of Wire	Signal Name [Specification]
10G	W	-
11G	W	-
12G	GR	-
1G	GR	-
2G	G/R	-
4G	L	-
5G	P/L	-
6G	G	-

Connector No.	B10
Connector Name	ADAS CONTROL UNIT
Connector Type	TH24FW-NH

H.S.



Terminal No.	Color Of Wire	Signal Name [Specification]
1	L	CAN-H
2	R	CAN-L
5	B/R	GROUND
6	L	ITS COMM-H
7	P	ITS COMM-L
12	GR	IGNITION
17	SB	BRAKE HOLD RLY DRIVE SIGNAL
18	Y	WARNING SYSTEMS SW
19	O	WARNING SYSTEMS CN IND
22	BR	BCI SW

Connector No.	B34
Connector Name	REAR WHEEL SENSOR LH
Connector Type	RH02FB

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
1	W	-
2	B	-

Connector No.	B35
Connector Name	REAR WHEEL SENSOR RH
Connector Type	RH02FGY

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
1	LG	-
2	V	-

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BRAKE CONTROL SYSTEM

Connector No.	E5
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	TH20FW-CS12-M4-1V

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
4	W	ENG_SOL
5	P	IGN_COIL
6	R	ECM_VB [With VQ37 engine]
6	SB	ECM_VB [With VK56 engine]
7	R	ETC [With VK56 engine]
7	Y	ETC [With VQ37 engine]
8	L/Y	A/C_COMP [With VK56 engine]
8	P	A/C_COMP [With VQ37 engine]
10	V	ECM_BAT
11	B	P-GND
12	G	ABS_ECU
13	GR	FUEL_PUMP [With VQ37 engine]
13	W	FUEL_PUMP [With VK56 engine]
16	V	WIPER_AUTOSTOP
18	Y	IGN_SIGNAL
22	BR	ALT-C
23	P	DTRL_RLY
24	O	HOOD_SW
25	LG	SUB_ECU
30	BR	PUSH_START_SW
31	BR	NP_SW [With VK56 engine]
31	W	NP_SW [With VQ37 engine]
36	GR	F/L_IGN_SW

Connector No.	E25
Connector Name	VACUUM SENSOR
Connector Type	RH03FB

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
1	LG	OUTPUT SIGNAL
2	SHIELD	GND
3	V	VCC (+5V)

Connector No.	E27
Connector Name	FRONT WHEEL SENSOR RH
Connector Type	RH02FB

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
1	BR	-
2	B	-

Connector No.	E41
Connector Name	ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
Connector Type	SAZ30FB-SJZ4-U

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
1	B/W	ECU(GND)
2	B	MOTOR(GND)
3	Y	SOLENOID(POWER)
4	G	MOTOR(POWER)
5	SB	STOP LAMP SW
6	Y	CANM2(-)
7	W	Rr-LH SEN(SIGNAL)
8	G	Rr-LH SEN(POWER)
9	BR	Fr-RH SEN(SIGNAL)
10	B	Fr-RH SEN(POWER)
13	LG	VAC SEN(SIGNAL)
15	P	CAN-L
16	B	CANM2(+)
17	Y	Rr-RH SEN(SIGNAL)
18	BR	Rr-RH SEN(POWER)
19	SB	Fr-LH SEN(SIGNAL)
20	O	Fr-LH SEN(POWER)
25	L	CAN-H
28	V	VAC SEN(POWER)
30	R	VDC OFF SW
32	SHIELD	VAC SEN(GND)
34	G	IGN(POWER)

Connector No.	E47
Connector Name	BRAKE FLUID LEVEL SWITCH
Connector Type	YV02FGY

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
1	SB	-
2	B	-

Connector No.	E60
Connector Name	FRONT WHEEL SENSOR LH
Connector Type	RH02FB

H.S.

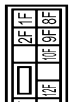
Terminal No.	Color Of Wire	Signal Name [Specification]
1	SB	-
2	O	-

JRFWC4211GB

BRAKE CONTROL SYSTEM

Connector No.	E103
Connector Name	FUSE BLOCK (J/B)
Connector Type	NS16FW-CS

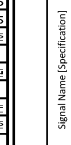
H.S.



Terminal No.	Color Of Wire	Signal Name [Specification]
10F	GR	-
12F	Y	-
14F	W	-
15F	V	-
1F	SB	-
2F	LG	-
4F	G	-
6F	O	-
8F	BR	-
9F	R	-

Connector No.	E106
Connector Name	WIRE TO WIRE
Connector Type	TH80FW-CS16-TM4

H.S.



Terminal No.	Color Of Wire	Signal Name [Specification]
1	P	-
2	W	-
3	SB	-
4	LG	-
5	O	-
6	W	-
7	GR	-
8	G	-
9	Y	-
10	BR	-
11	SB	-
12	L	-
13	GR	-
14	GR	-
15	V	-
16	Y	-
17	GR	-
18	V	-
20	BR	-
21	P	-
22	L	-
23	P	-
27	SHIELD	-
28	L/O	-
29	W/L	-
31	BR	-
32	G	-
33	O	-
34	Y	-
36	G	-
37	V	-
41	BR	-
44	W	-
45	L	-
46	GR	-
47	V	-
48	G	-
49	O	-
50	LG	-
54	R	-
55	B	-
60	W	-
61	G	-
62	Y	-
63	BR	-
64	B	-
65	Y	-
66	R	-
67	SB	-
68	G	-
69	SHIELD	-
70	W	-
71	W	-
72	R	-
73	G	-
74	Y	-
75	B	-
76	SHIELD	-
77	O	-
78	SB	-
80	V	-
82	SB	-
83	GR	-
84	Y	-
85	Y	-
86	L	-
87	V	-
88	BR	-
89	LG	-
90	W	-
91	W	-
92	P	-
93	LG	-
94	BR	-
95	W	-
97	R	-
98	Y	-
99	V	-
100	V	-

Connector No.	E107
Connector Name	PARKING BRAKE SWITCH
Connector Type	TB01FW-LC

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
1	V	-

Connector No.	E110
Connector Name	STOP LAMP SWITCH
Connector Type	M04FW-LC

H.S.

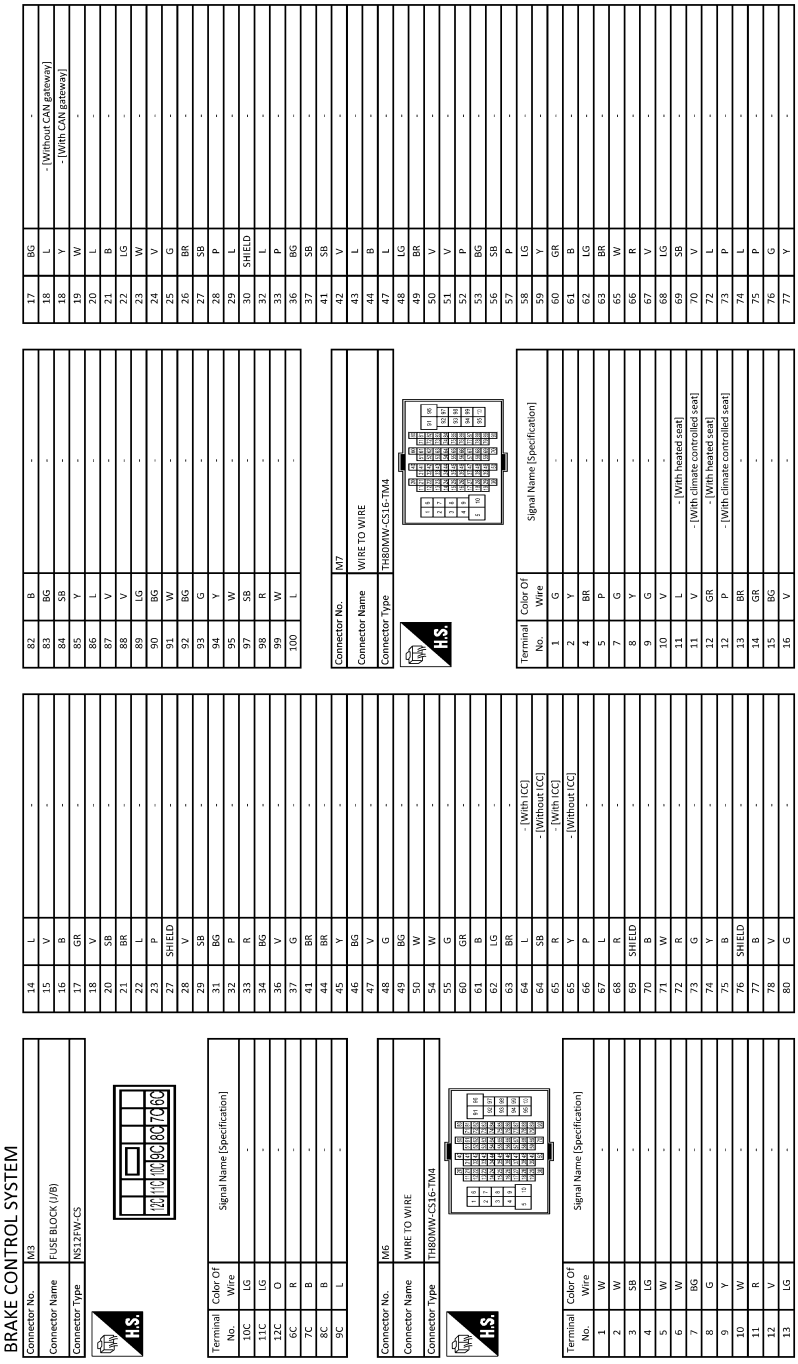
Terminal No.	Color Of Wire	Signal Name [Specification]
1	W	-
2	V	-
3	G	- [Without ICC]
3	W	- [With ICC]
4	SB	-

Connector No.	M2
Connector Name	FUSE BLOCK (J/B)
Connector Type	NS10FW-CS

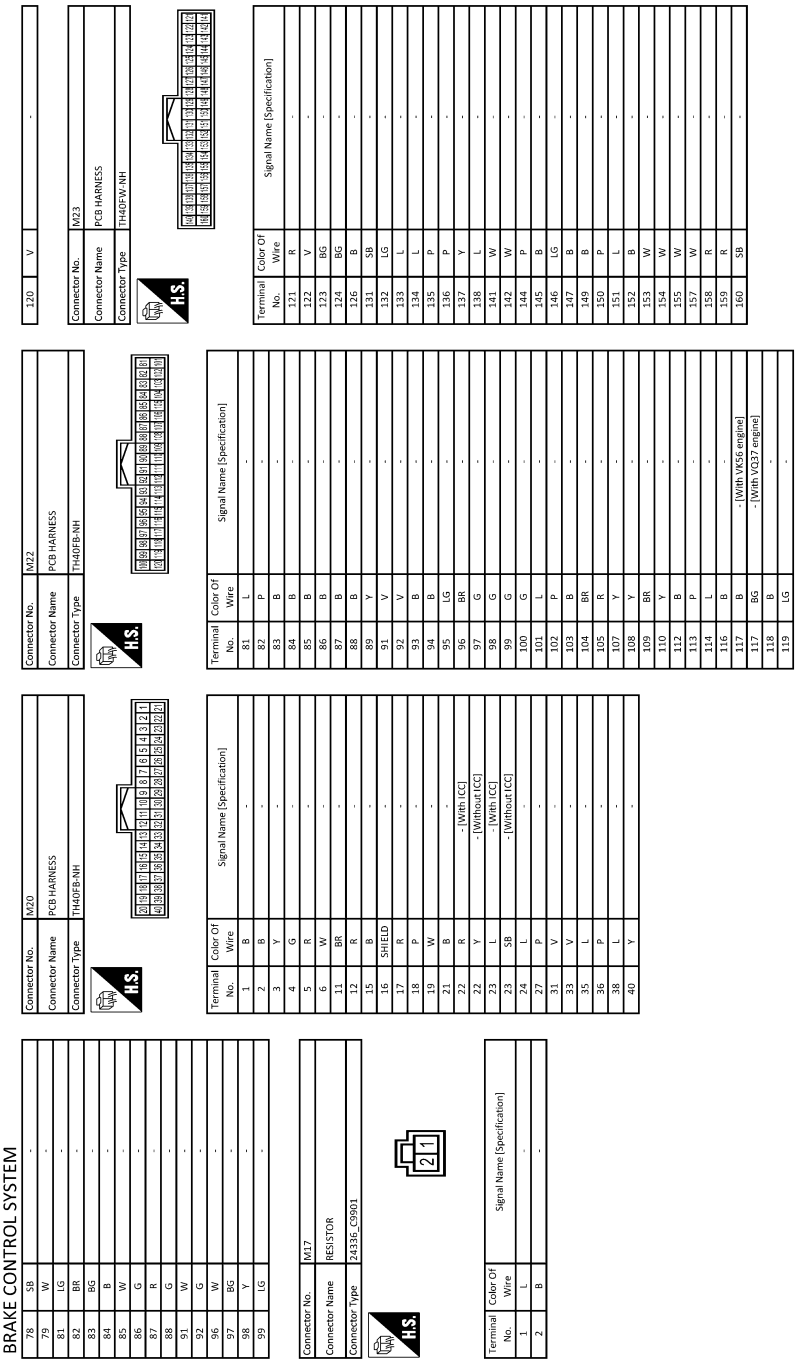
H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
1B	R	-
3B	P	-
4B	G	-
5B	SB	-
6B	W	- [With VQ37 engine]
6B	Y	- [With VK56 engine]
7B	P	-
8B	R	-
9B	R	-

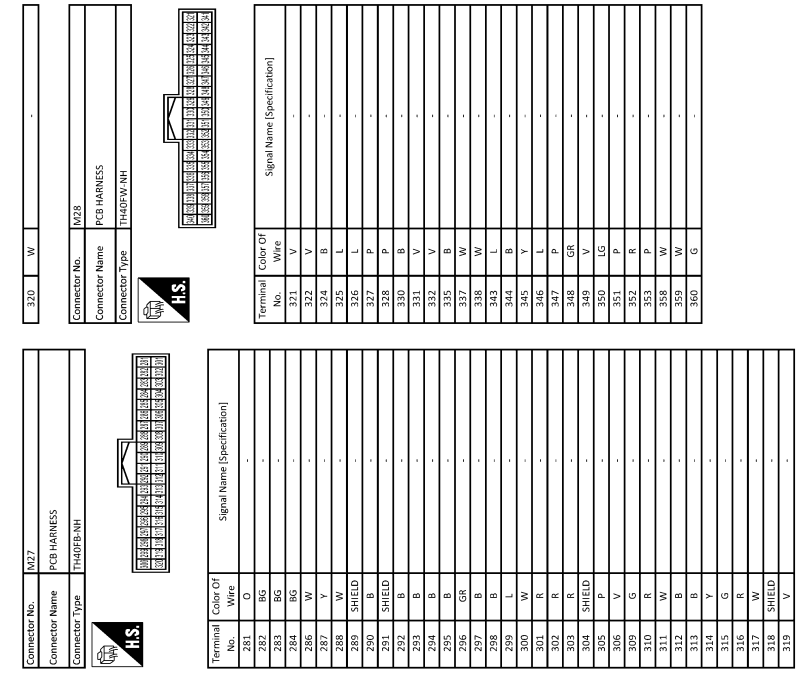
JRFWC4212GB



JRFWC4213GB



JRFWC4214GB



Terminal No.	Color Of Wire	Signal Name [Specification]
161	BG	-
162	BG	-
164	V	-
165	V	-
166	R	-
167	LG	-
169	R	-
171	BG	-
172	B	-
174	W	-
176	L	-
177	P	-
178	Y	-
179	L	-
180	LG	-
182	BR	- [With VQ37 engine or with VK56 engine without ICC]
182	R	- [With VK56 engine with ICC]
183	G	-
184	V	-
185	P	-
186	R	-
187	L	- [Without CAN gateway]
187	Y	- [With CAN gateway]
188	L	-
189	B	-
190	V	-
191	LG	-
192	B	-
193	SB	-
194	BR	-
195	SB	-
198	R	-
199	B	-
200	SB	-

Terminal No.	Color Of Wire	Signal Name [Specification]
241	L	-
242	L	-
243	R	- [With ICC]
243	Y	- [Without ICC]
244	L	- [With ICC]
244	SB	- [Without ICC]
245	B	-
246	B	-
247	B	-
248	SHIELD	-
251	SHIELD	-
252	B	-
253	B	-
254	B	[With heated seat]
254	W	- [With climate controlled seat]
255	B	-
258	R	-
259	L	-
260	BG	-
261	P	-
262	P	-
267	P	-
268	Y	-
269	G	-
270	Y	-
271	BR	-
272	G	-
273	R	-
274	R	-
275	Y	-
276	B	-
277	G	-
278	R	-
279	R	-
280	Y	-

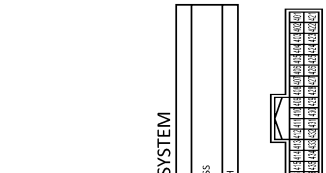
Terminal No.	Color Of Wire	Signal Name [Specification]
281	O	-
282	BG	-
283	BG	-
284	W	-
286	W	-
287	Y	-
288	W	-
289	SHIELD	-
290	B	-
291	SHIELD	-
292	B	-
293	B	-
294	B	-
295	B	-
296	GR	-
297	B	-
298	B	-
299	L	-
300	W	-
301	R	-
302	R	-
303	R	-
304	SHIELD	-
305	P	-
306	V	-
309	G	-
310	R	-
311	W	-
312	B	-
313	B	-
314	Y	-
315	G	-
316	R	-
317	W	-
318	SHIELD	-
319	V	-

Terminal No.	Color Of Wire	Signal Name [Specification]
321	V	-
322	V	-
324	B	-
325	L	-
326	L	-
327	P	-
328	P	-
330	B	-
331	V	-
332	V	-
335	B	-
337	W	-
338	W	-
343	L	-
344	B	-
345	Y	-
346	L	-
347	P	-
348	GR	-
349	V	-
350	LG	-
351	P	-
352	R	-
353	P	-
358	W	-
359	W	-
360	G	-

JRFWC4215GB

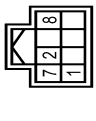
BRAKE CONTROL SYSTEM

Connector No.	M30
Connector Name	PCB HARNESS
Connector Type	TH40FW-NH



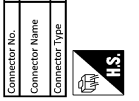
Terminal No.	Color Of Wire	Signal Name [Specification]
402	R	-
403	R	-
406	B	-
407	V	-
408	B	-
409	B	-
410	B	-
411	B	-
413	Y	-
414	BR	-
416	LG	-
417	B	-
419	SB	-
420	SHIELD	-
422	V	-
427	P	-
428	V	-
429	P	-
430	LG	-
431	B	-
432	Y	-
435	V	-
436	BG	-
437	B	-
438	P	-
439	L	-
440	B	-

Connector No.	M37
Connector Name	STEERING ANGLE SENSOR
Connector Type	TH08FW-NH



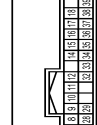
Terminal No.	Color Of Wire	Signal Name [Specification]
1	L	CAN-H
2	P	CAN-L
7	B	GND
8	G	IGN

Connector No.	M53
Connector Name	COMBINATION METER
Connector Type	TH40FW-NH



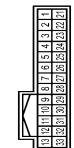
Terminal No.	Color Of Wire	Signal Name [Specification]
1	W	BATTERY POWER SUPPLY
2	BG	IGNITION SIGNAL
3	GR	VEHICLE SPEED SIGNAL (2-PULSE)
4	R	VEHICLE SPEED SIGNAL (8-PULSE)
5	B	ILLUMINATION CONTROL SIGNAL
6	B	METER CONTROL SWITCH GROUND
7	SB	ENTER SWITCH SIGNAL
8	LG	SELECT SWITCH SIGNAL
9	G	ILLUMINATION CONTROL SWITCH SIGNAL (+)
10	GR	ILLUMINATION CONTROL SWITCH SIGNAL (-)
11	L	TRIP RESET SWITCH SIGNAL
12	B	GROUND
14	L	CAN-H
15	P	CAN-L
16	R	AIR BAG SIGNAL
17	G	LED HEADLAMP (RH) WARNING SIGNAL
18	V	LED HEADLAMP (LH) WARNING SIGNAL
23	B	GROUND
24	B	FUEL LEVEL SENSOR GROUND
25	W	ALTERNATOR SIGNAL
26	V	PARKING BRAKE SWITCH SIGNAL
27	V	BRAKE FLUID LEVEL SWITCH SIGNAL
28	G	SECURITY SIGNAL
29	L	WASHER LEVEL SWITCH SIGNAL
32	G	PADDLE SHIFTER SHIFT DOWN SIGNAL
33	BG	PADDLE SHIFTER SHIFT UP SIGNAL
34	G	FUEL LEVEL SENSOR SIGNAL
35	W	SEAT BELT BUCKLE SWITCH SIGNAL (DRIVER SIDE)
36	G	PASSENGER SEAT BELT WARNING SIGNAL
37	G	NON-MANUAL MODE SIGNAL
38	V	MANUAL MODE SHIFT DOWN SIGNAL
39	L	MANUAL MODE SHIFT UP SIGNAL
40	W	MANUAL MODE SIGNAL

Connector No.	M66
Connector Name	A/C AUTO AMP.
Connector Type	TH20FW-TB6



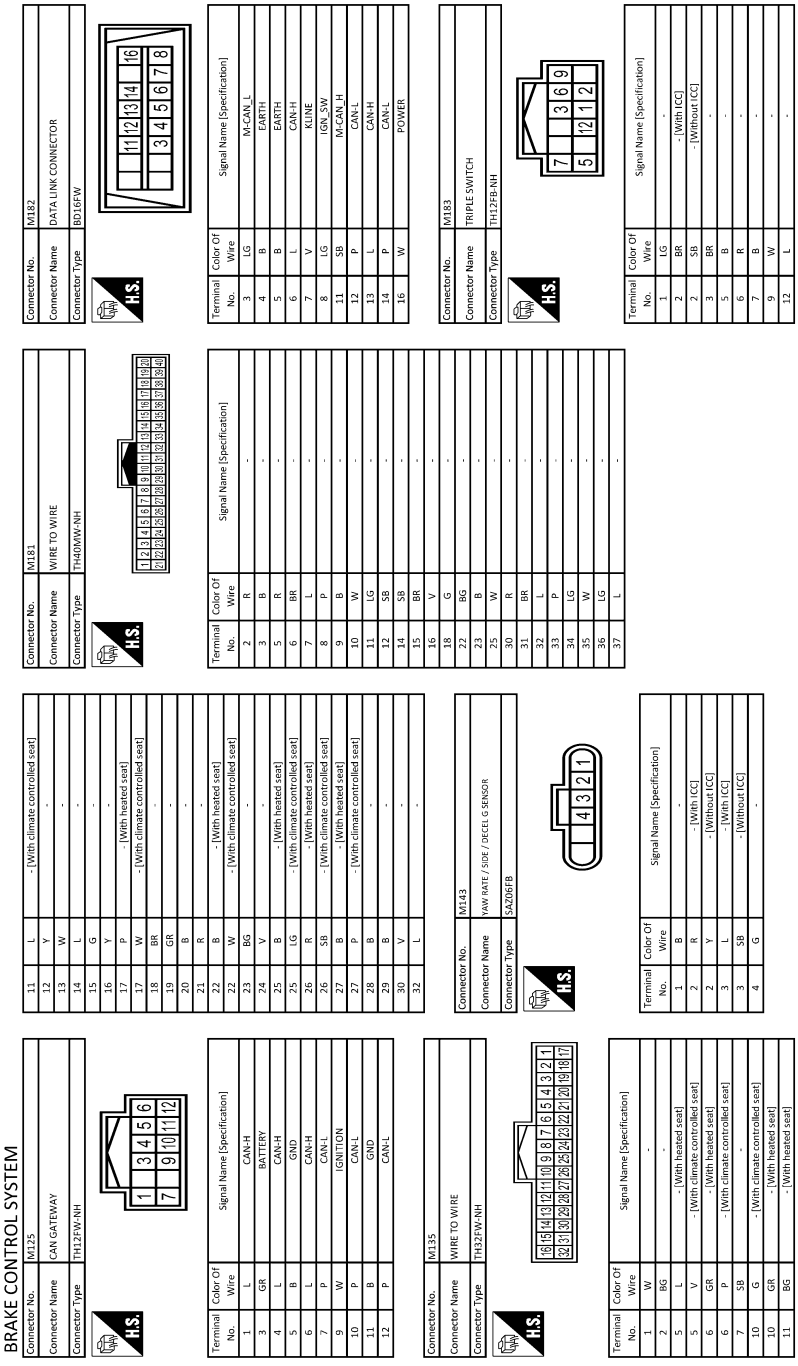
Terminal No.	Color Of Wire	Signal Name [Specification]
1	L	BATTERY POWER SUPPLY
2	W	IGNITION POWER SUPPLY
6	R	BLOWER MOTOR F/B SIGNAL
7	L	POWER TRANSISTOR CONTROL SIGNAL
10	B	GROUND
11	P	CAN-L
12	L	CAN-H
13	V	ACC POWER SUPPLY
17	BG	ECV CONTROL SIGNAL
23	W	DRIVE MODE SELECT SW (SNOW)
24	L	DRIVE MODE SELECT SW (ECO)
25	G	DRIVE MODE SELECT SW (STANDARD)
26	Y	DRIVE MODE SELECT SW (SPORT)

Connector No.	M105
Connector Name	WIRE TO WIRE
Connector Type	TH40FW-NH



Terminal No.	Color Of Wire	Signal Name [Specification]
2	R	-
3	B	-
5	LG	-
6	P	-
7	L	-
8	P	-
9	B	-
10	W	-
11	W	-
12	SB	-
14	SB	-
15	BR	-
16	V	-
18	G	-
22	BG	-
23	B	-
25	W	-
30	R	-
31	BR	-
32	L	-
33	P	-
34	LG	-
35	W	-
36	LG	-
37	L	-

JRFWC4216GB

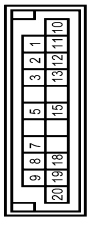


JRFWC4217GB

BRAKE CONTROL SYSTEM

Connector No.	M189
Connector Name	JOINT CONNECTOR-M01
Connector Type	NH20FL-DC

H.S.



Terminal No.	Color Of Wire	Signal Name [Specification]
1	B	-
2	B	-
3	B	-
5	B	-
7	B	-
8	B	-
9	B	-
10	B	-
11	B	-
12	B	-
13	B	-
15	B	-
18	LG	-
19	LG	-
20	LG	-

Connector No.	M201
Connector Name	WIRE TO WIRE
Connector Type	TH32MW-NH

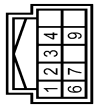
H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
1	Y	-
2	BG	-
5	V	-
6	P	-
7	SB	-

10	G	-
11	L	-
12	R	-
13	W	-
14	L	-
15	G	-
16	Y	-
17	W	-
18	BR	-
19	GR	-
20	B	-
21	R	-
22	B	-
23	BG	-
24	V	-
25	B	-
26	R	-
27	B	[With climate controlled seat] - [With heated seat]
27	R	-
28	B	-
29	B	-
30	B	-
32	R	-

Connector No.	M203
Connector Name	DRIVE MODE SELECT SWITCH
Connector Type	TH10FB-NH

H.S.



Terminal No.	Color Of Wire	Signal Name [Specification]
1	W	-
2	L	-
3	G	-
4	Y	-
6	B	-
7	B	-
9	R	-

Connector No.	M221
Connector Name	WIRE TO WIRE
Connector Type	M03FW-LC

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
1	W	-
2	R	-
3	W	-

Connector No.	M222
Connector Name	WIRE TO WIRE
Connector Type	M03MW-LC

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
1	W	-
2	R	-
3	Y	-

JRFWC4218GB

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORK FLOW

Work Flow

INFOID:0000000012471630

DETAILED FLOW

1.INTERVIEW FROM THE CUSTOMER

Clarify customer complaints before inspection. First of all, perform an interview utilizing BRC-64, "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-45, "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 ignition switch OFF or ON.
2. Perform self-diagnosis for “ABS”.

Is 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 ignition 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-48, "DTC Inspection Priority Chart".

Is DTC detected?

YES >> GO TO 5.
NO >> Check harness and connectors based on the information obtained by interview. Refer to GI-45, "Intermittent Incident".

5.REPAIR OR REPLACE ERROR-DETECTED PART

With CONSULT

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

CAUTION:
- **Turn the ignition switch OFF → ON → OFF after erase self-diagnosis result.**
- **Be sure to wait of 10 seconds after turning ignition 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-45, "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:0000000012471631

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 turns ON. ☐ ABS or  ☐ BRAKE or  ☐  ☐ 			
		☐ Other ( )			
		☐ Noise (Location:) ☐ Vibration (Location:)			
		☐ 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		☐ Ordinary road ☐ 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 ☐ Immediately before stop [Vehicle speed: Approx. km/h (MPH)] ☐ During cornering (right curve or left curve) ☐ When steering wheel is steered (to right or to left)			
Other conditions	VDC OFF switch operation	☐ Yes ☐ No			
	Use of other functions (ex. ICC)	☐ Yes ☐ No ( )			
	Presence of non-genuine parts installation	☐ Yes ☐ No ( )			
Memo					

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

Description

INFOID:0000000012355899

When replaced the ABS actuator and electric unit (control unit), Perform decel G sensor calibration. Refer to BRC-69, "Description".

ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Description

INFOID:0000000012355900

Always adjust the neutral position of steering angle sensor before driving when the following operation is performed. Refer to BRC-67, "Work Procedure".

×: 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:0000000012355901

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

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 start 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

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 4.
NO >> GO TO 1.

4. ERASE SELF-DIAGNOSIS MEMORY

With CONSULT
Erase self-diagnosis result of “ABS”.

Are the memories erased?

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

CALIBRATION OF DECEL G SENSOR

Description

INFOID:0000000012355902

CAUTION:
Always perform the decel G sensor calibration before driving when the following operation is performed. Refer to BRC-69, "Work Procedure".
NOTE:
Yaw rate/side/decel G sensor calibration is performed when performing the decel G sensor calibration.

×: Required —: Not required

Procedure	Decel G sensor calibration
Removing/ installing ABS actuator and electric unit (control unit)	—
Replacing ABS actuator and electric unit (control unit)	×
Removing/installing steering components	—
Replacing steering components	—
Removing/installing suspension components	—
Replacing suspension components	—
Removing/installing tire	—
Replacing tire	—
Tire rotation	—
Adjusting wheel alignment.	—
Removing/installing yaw rate/side/decel G sensor	×
Replacing yaw rate/side/decel G sensor	×

Work Procedure

INFOID:0000000012355903

Decel G sensor calibration

CAUTION:
Always use CONSULT for the decel G sensor calibration. (It cannot be adjusted other than with CONSULT.)
NOTE:
Yaw rate/side/decel G sensor calibration is performed when performing the decel G sensor calibration.

1.CHECK THE VEHICLE STATUS

1. Steer the steering wheel to the straight-ahead position. Stop the vehicle on level surface.
2. Stop the engine.
3. Turn the ignition switch OFF.

Is the vehicle stopped in the straight-ahead position on level surface?

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

2.PERFORM DECEL G SENSOR CALIBRATION

CAUTION:
- **Never allow passenger or load on the vehicle.**
- **Never apply vibration to the vehicle body when opening or closing door during calibration.**

With CONSULT
1. Turn the ignition switch ON.
   CAUTION:
   Never start engine.
2. Select “ABS”, “WORK SUPPORT”, “DECEL G SENSOR CALIBRATION” in this order.
3. Select “START”.
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

With CONSULT

1. Drive the vehicle. Steer the steering wheel to the straight-ahead position. Stop the vehicle on level surface.
2. Select “ABS”, “DATA MONITOR”, “ECU INPUT SIGNALS” and “DECEL G SENSOR” in this order. Check that the signal is within the specified value.

DECEL G SENSOR : Approx. 0 m/s^2

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 1.

4.ERASE SELF-DIAGNOSIS MEMORY

With CONSULT

Erase self-diagnosis result of “ABS”.

Are the memories erased?

YES >> GO TO 5.
NO >> Check the items indicated by the self-diagnosis.

5.PERFORM DECEL G SENSOR CALIBRATION (TRANSMISSION)

Perform decel G sensor calibration. Refer to TM-99, "Special Repair Requirement".

>> INSPECTION END

DTC/CIRCUIT DIAGNOSIS

C1101, C1102, C1103, C1104 WHEEL SENSOR

DTC Logic

INFOID:0000000012471633

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C1101	RR RH SENSOR-1 (Rear RH wheel sensor-1)	When an open circuit is detected in rear RH wheel sensor circuit.
C1102	RR LH SENSOR-1 (Rear LH wheel sensor-1)	When an open circuit is detected in rear LH wheel sensor circuit.
C1103	FR RH SENSOR-1 (Front RH wheel sensor-1)	When an open circuit is detected in front RH wheel sensor circuit.
C1104	FR LH SENSOR-1 (Front LH wheel sensor-1)	When an open circuit is detected in front LH wheel sensor circuit.

POSSIBLE CAUSE

NOTE:
Confirm if DTC is PAST or CRNT. If DTC is CRNT, proceed with Diagnosis Procedure. If DTC is PAST, clear DTC. Do not replace the ABS actuator and electric unit (control unit) for a PAST DTC.

PAST DTC	CRNT DTC
• Harness or connector • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery	• Harness or connector • Wheel sensor • ABS actuator and electric unit (control unit) • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery • Vehicle was not driven after previous repair

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. Start the engine.
2. Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes.
3. Stop the vehicle.
4. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
5. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
6. Perform self-diagnosis for “ABS”.

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

YES-1 >> “C1101”, “C1102”, “C1103” or “C1104” is displayed by “CRNT”: Proceed to BRC-72, "Diagnosis Procedure".

YES-2 >> “C1101”, “C1102”, “C1103” and “C1104” are displayed by “PAST”: INSPECTION END (Erase the memory of self-diagnosis results.)
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000012471634

CAUTION:
Never check between wheel sensor harness connector terminals.

1.CHECK WHEEL SENSOR

1. Turn the ignition switch OFF.
2. Check the 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 the wheel sensor.
- Front: Refer to BRC-161, "FRONT WHEEL SENSOR : Removal and Installation".
- Rear: Refer to BRC-162, "REAR WHEEL SENSOR : Removal and Installation".
2. Erase self-diagnosis result for “ABS”.
3. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
4. Start the engine.
5. Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes.
   NOTE:
   Vehicle must be driven after repair or replacement to erase the previous DTCs.
6. Stop the vehicle.
7. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
8. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
9. Perform self-diagnosis for “ABS”.

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

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

3.CHECK CONNECTOR

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

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair / replace harness or connector, 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.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
3. Start the engine.
4. Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes.
   NOTE:
   Vehicle must be driven after repair or replacement to erase the previous DTCs.

5. Stop the vehicle.
6. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
7. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
8. Perform self-diagnosis for “ABS”.

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

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

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

Check the ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to BRC-143, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair / replace harness, connector, fuse, or fusible link.

6. CHECK TERMINAL

1. Turn the ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) harness connector and then check the 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 8.
NO >> Repair / replace harness, connector, or terminal, and GO TO 7.

7. 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.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
5. Start the engine.
6. Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes.
   NOTE:
   Vehicle must be driven after repair or replacement to erase the previous DTCs.
7. Stop the vehicle.
8. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
9. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
10. Perform self-diagnosis for “ABS”.

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

YES >> GO TO 8.
NO >> INSPECTION END

8. 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 the continuity between ABS actuator and electric unit (control unit) harness connector and wheel sensor harness connector. (Check the continuity while turning steering wheel left and right, or while moving center harness in wheel housing.)

- Measurement connector and terminal for power supply circuit

ABS actuator and electric unit (control unit)		Wheel sensor			Continuity
Connector	Terminal	Connector		Terminal	
E41	19	E60	(Front LH wheel)	1	Existed
	9	E27	(Front RH wheel)		
	7	B34	(Rear LH wheel)		
	17	B35	(Rear RH wheel)		

- Measurement connector and terminal for signal circuit

ABS actuator and electric unit (control unit)		Wheel sensor			Continuity
Connector	Terminal	Connector		Terminal	
E41	20	E60	(Front LH wheel)	2	Existed
	10	E27	(Front RH wheel)		
	8	B34	(Rear LH wheel)		
	18	B35	(Rear RH wheel)		

Is the inspection result normal?

YES >> GO TO 10.
NO >> Repair / replace harness or connector, and GO TO 9.

9. 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.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
5. Start the engine.
6. Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes.
   NOTE:
   Vehicle must be driven after repair or replacement to erase the previous DTCs.
7. Stop the vehicle.
8. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
9. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
10. Perform self-diagnosis for “ABS”.

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

YES >> GO TO 10.
NO >> INSPECTION END

10. CHECK WHEEL SENSOR OUTPUT SIGNAL

1. Disconnect ABS actuator and electric unit (control unit) harness connector.
2. Disconnect wheel sensor harness connector.
3. Connect ABS active wheel sensor tester (SST: J-45741-A) to wheel sensor using appropriate adapter.
4. Turn the ABS active wheel sensor tester power switch ON.
   NOTE:
   The green POWER indicator should illuminate. If the POWER indicator does not illuminate, replace the battery in the ABS active wheel sensor tester before proceeding.

5. Spin the wheel of the vehicle by hand and observe the red SENSOR indicator on the ABS active wheel sensor tester. The red SENSOR indicator should flash ON and OFF to indicate an output signal.
NOTE:
If the red SENSOR indicator illuminates but does not flash, reverse the polarity of the tester leads and retest.

Does the ABS active wheel sensor tester detect a signal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".
NO >> GO TO 11.

11. REPLACE WHEEL SENSOR

With CONSULT
1. Replace the wheel sensor.
- Front: Refer to BRC-161, "FRONT WHEEL SENSOR : Removal and Installation".
- Rear: Refer to BRC-162, "REAR WHEEL SENSOR : Removal and Installation".
2. Connect ABS actuator and electric unit (control unit) harness connector.
3. Erase self-diagnosis result for “ABS”.
4. Turn the ignition switch OFF → ON → OFF.
NOTE:
Wait at least 10 seconds after turning ignition switch OFF or ON.
5. Start the engine.
6. Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes.
NOTE:
Vehicle must be driven after repair or replacement to erase the previous DTCs.
7. Stop the vehicle.
8. Turn the ignition switch OFF.
NOTE:
Wait at least 10 seconds after turning ignition switch OFF.
9. Start the engine.
NOTE:
Wait at least 10 seconds after start the engine.
10. Perform self-diagnosis for “ABS”.

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

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".
NO >> INSPECTION END

C1105, C1106, C1107, C1108 WHEEL SENSOR

DTC Logic

INFOID:0000000012471635

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C1105	RR RH SENSOR-2 (Rear RH wheel 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. • When there is contamination on or damage to the rear RH wheel sensor or rear RH sensor rotor.
C1106	RR LH SENSOR-2 (Rear LH wheel sensor-2)	• 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. • When there is contamination on or damage to the rear LH wheel sensor or rear LH sensor rotor.
C1107	FR RH SENSOR-2 (Front RH wheel sensor-2)	• 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. • When there is contamination on or damage to the front RH wheel sensor or front RH sensor rotor.
C1108	FR LH SENSOR-2 (Front LH wheel sensor-2)	• When power supply voltage of front LH 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. • When there is contamination on or damage to the front LH wheel sensor or front LH sensor rotor.

POSSIBLE CAUSE

NOTE:
Confirm if DTC is PAST or CRNT. If DTC is CRNT, proceed with Diagnosis Procedure. If DTC is PAST, clear DTC. Do not replace the ABS actuator and electric unit (control unit) for a PAST DTC.

PAST DTC	CRNT DTC
• Harness or connector • Wheel sensor • Sensor rotor • Tire size • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery	• Harness or connector • Wheel sensor • Sensor rotor • ABS actuator and electric unit (control unit) • Tire size • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery • Vehicle was not driven after previous repair

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. Start the engine.
2. Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes.
3. Stop the vehicle.
4. Turn the ignition switch OFF.

NOTE:
Wait at least 10 seconds after turning ignition switch OFF.

5. Start the engine.

NOTE:
Wait at least 10 seconds after start the engine.

6. Perform self-diagnosis for “ABS”.

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

YES-1 >> “C1105”, “C1106”, “C1107” or “C1108” is displayed by “CRNT”: Proceed to BRC-77, "Diagnosis Procedure".
YES-2 >> “C1105”, “C1106”, “C1107” and “C1108” are displayed by “PAST”: INSPECTION END (Erase the memory of self-diagnosis results.)
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000012471636

CAUTION:
Never check between wheel sensor harness connector terminals.

1.CHECK WHEEL HUB ASSEMBLY

Check that there is no excessive looseness in wheel hub assembly.
- Front
  - 2WD models: Refer to FAX-9, "Inspection".
  - AWD models: Refer to FAX-19, "Inspection".
- Rear: Refer to RAX-10, "Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace the wheel hub assembly, and GO TO 2.
- Front
  - 2WD models: Refer to FAX-8, "Removal and Installation".
  - AWD models: Refer to FAX-18, "Removal and Installation".
- Rear: Refer to RAX-8, "Removal and Installation".

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

Check the ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to BRC-143, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair / replace harness, connector, fuse, or fusible link.

3.CHECK TIRE

1. Turn the ignition switch OFF.
2. Check the tire air pressure, wear and size. Refer to WT-70, "Tire Air Pressure".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Adjust air pressure or replace tire, and 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.

NOTE:
Wait at least 10 seconds after turning ignition switch OFF or ON.

3. 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.
NOTE:
Vehicle must be driven after repair or replacement to erase the previous DTCs.

Note the difference at 50 km/h (31 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 5.
NO >> GO TO 6.

5.PERFORM SELF-DIAGNOSIS (1)

With CONSULT
1. Stop the vehicle.
2. Turn the ignition switch OFF.
NOTE:
Wait at least 10 seconds after turning ignition switch OFF.
3. Start the engine.
NOTE:
Wait at least 10 seconds after start the engine.
4. Perform self-diagnosis for “ABS”.

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

YES >> GO TO 6.
NO >> INSPECTION END

6.CHECK WHEEL SENSOR AND SENSOR ROTOR

1. Turn the ignition switch OFF.
2. Disconnect wheel sensor harness connector.
3. Remove dust and foreign matter adhered to the wheel sensor and 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-161, "FRONT WHEEL SENSOR : Exploded View".**
- **Rear: Refer to BRC-162, "REAR WHEEL SENSOR : Exploded View".**

>> GO TO 7.

7.CHECK WHEEL SENSOR

Check the wheel sensor for damage.

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 9.

8.CHECK WHEEL SENSOR OUTPUT SIGNAL

1. Disconnect ABS actuator and electric unit (control unit) harness connector.
2. Connect ABS active wheel sensor tester (SST: J-45741-A) to wheel sensor using appropriate adapter.
3. Turn the ABS active wheel sensor tester power switch ON.
NOTE:
The green POWER indicator should illuminate. If the POWER indicator does not illuminate, replace the battery in the ABS active wheel sensor tester before proceeding.
4. Spin the wheel of the vehicle by hand and observe the red SENSOR indicator on the ABS active wheel sensor tester. The red SENSOR indicator should flash ON and OFF to indicate an output signal.
NOTE:
If the red SENSOR indicator illuminates but does not flash, reverse the polarity of the tester leads and retest.

Does the ABS active wheel sensor tester detect a signal?

YES >> GO TO 12.
NO >> GO TO 9.

9.REPLACE WHEEL SENSOR (1)

With CONSULT
1. Replace the wheel sensor.
- Front: Refer to BRC-161, "FRONT WHEEL SENSOR : Removal and Installation".
- Rear: Refer to BRC-162, "REAR WHEEL SENSOR : Removal and Installation".
2. Connect ABS actuator and electric unit (control unit) harness connector.
3. Erase self-diagnosis result for “ABS”.
4. Turn the ignition switch OFF → ON → OFF.
NOTE:
Wait at least 10 seconds after turning ignition switch OFF or ON.
5. 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.
NOTE:
Vehicle must be driven after repair or replacement to erase the previous DTCs.

Note the difference at 50 km/h (31 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 20.

10. PERFORM SELF-DIAGNOSIS (2)

With CONSULT
1. Stop the vehicle.
2. Turn the ignition switch OFF.
NOTE:
Wait at least 10 seconds after turning ignition switch OFF.
3. Start the engine.
NOTE:
Wait at least 10 seconds after start the engine.
4. Perform self-diagnosis for “ABS”.

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

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

11. CHECK CONNECTOR

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

Is the inspection result normal?

YES >> GO TO 14.
NO >> Repair / replace harness or connector, securely lock the connector, and GO TO 12.

12. CHECK DATA MONITOR (2)

With CONSULT
1. Erase self-diagnosis result for “ABS”.
2. Turn the ignition switch OFF → ON → OFF.
NOTE:
Wait at least 10 seconds after turning ignition switch OFF or ON.
3. 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.
NOTE:
Vehicle must be driven after repair or replacement to erase the previous DTCs.

Note the difference at 50 km/h (31 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 (3)

With CONSULT
1. Stop the vehicle.
2. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
3. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
4. Perform self-diagnosis for “ABS”.

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

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

14. CHECK TERMINAL

1. Turn the ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) harness connector and then check the 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 17.
NO >> Repair / replace harness, connector, or terminal, and GO TO 15.

15. 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.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
5. 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.
   NOTE:
   Vehicle must be driven after repair or replacement to erase the previous DTCs.

Note the difference at 50 km/h (31 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 (4)

With CONSULT
1. Stop the vehicle.
2. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
3. Start the engine.

NOTE:
Wait at least 10 seconds after start the engine.

4. Perform self-diagnosis for “ABS”.

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

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

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E41	19, 20	Ground	Not existed
	9, 10		
	7, 8		
	17, 18		

Is the inspection result normal?

YES >> GO TO 18.
NO >> Repair / replace harness or connector, and GO TO 18.

18. 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.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
5. 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.
   NOTE:
   Vehicle must be driven after repair or replacement to erase the previous DTCs.

Note the difference at 50 km/h (31 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 19.
NO >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".

19. PERFORM SELF-DIAGNOSIS (5)

With CONSULT

1. Stop the vehicle.
2. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
3. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
4. Perform self-diagnosis for “ABS”.

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

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".

NO >> INSPECTION END

20. REPLACE SENSOR ROTOR

With CONSULT

1. Replace the sensor rotor.
- Front: Refer to BRC-164, "FRONT SENSOR ROTOR : Removal and Installation".
- Rear: Refer to BRC-164, "REAR SENSOR ROTOR : Removal and Installation".
2. Erase self-diagnosis result for “ABS”.
3. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
4. Start the engine.
5. Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes.
   NOTE:
   Vehicle must be driven after repair or replacement to erase the previous DTCs.
6. Stop the vehicle.
7. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
8. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
9. Perform self-diagnosis for “ABS”.

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

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".

NO >> INSPECTION END

C1109 POWER AND GROUND SYSTEM

Description

INFOID:0000000012471637

Ignition power supply is supplied to ABS actuator and electric unit (control unit).

DTC Logic

INFOID:0000000012471638

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C1109	BATTERY VOLTAGE [ABNORMAL] (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.

POSSIBLE CAUSE

NOTE:
Confirm if DTC is PAST or CRNT. If DTC is CRNT, proceed with Diagnosis Procedure. If DTC is PAST, clear DTC. Do not replace the ABS actuator and electric unit (control unit) for a PAST DTC.

PAST DTC	CRNT DTC
• Harness or connector • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery • Charge system	• Harness or connector • ABS actuator and electric unit (control unit) • IPDM E/R • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery • Charge 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.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Perform self-diagnosis for “ABS”.

Is DTC “C1109” detected?

YES-1 >> “CRNT” is displayed: Proceed to BRC-83, "Diagnosis Procedure".
YES-2 >> “PAST” is displayed: INSPECTION END (Erase the memory of self-diagnosis results.)
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000012471639

1.CHECK CONNECTOR

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

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair / replace harness or connector, securely lock the connector, and GO TO 2.

2.PERFORM SELF-DIAGNOSIS

With CONSULT

1. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
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) POWER SUPPLY AND GROUND CIRCUIT

Check the ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to BRC-143, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair / replace harness, connector, fuse, or fusible link.

4.CHECK TERMINAL

1. Check the ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with harness connector.
2. Check the IPDM E/R pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".
NO >> Repair / replace harness, connector, or terminal.

C1111 ABS MOTOR, MOTOR RELAY SYSTEM

DTC Logic

INFOID:0000000012471640

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C1111	PUMP MOTOR (Pump motor and motor relay)	When a malfunction is detected in motor or motor relay.

POSSIBLE CAUSE

NOTE:
Confirm if DTC is PAST or CRNT. If DTC is CRNT, proceed with Diagnosis Procedure. If DTC is PAST, clear DTC. Do not replace the ABS actuator and electric unit (control unit) for a PAST DTC.

PAST DTC	CRNT DTC
• Harness or connector • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery	• Harness or connector • ABS actuator and electric unit (control unit) • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • 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, and wait 30 seconds.
2. Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes.
3. Stop the vehicle.
4. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
5. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
6. Perform self-diagnosis for “ABS”.

Is DTC “C1111” detected?

YES-1 >> “CRNT” is displayed: Proceed to BRC-85, "Diagnosis Procedure".
YES-2 >> “PAST” is displayed: INSPECTION END (Erase the memory of self-diagnosis results.)
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000012471641

1.CHECK CONNECTOR

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

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair / replace harness or connector, 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. 50 km/h (31 MPH) or more for approx. 2 minutes.
   NOTE:
   Vehicle must be driven after repair or replacement to erase the previous DTCs.
3. Stop the vehicle.
4. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
5. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
6. Perform self-diagnosis for “ABS”.

Is DTC “C1111” detected?

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

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

Check the ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to BRC-143, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair / replace harness, connector, or fuse, and GO TO 4.

4.ERASE SELF-DIAGNOSIS RESULT (1)

With CONSULT
1. Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes.
   NOTE:
   Vehicle must be driven after repair or replacement to erase the previous DTCs.
2. Stop the vehicle.
3. Erase self-diagnosis result for “ABS”.
4. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.

>> INSPECTION END

5.CHECK TERMINAL

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

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".
NO >> Repair / replace harness or connector, and GO TO 6.

6.ERASE SELF-DIAGNOSIS RESULT (2)

With CONSULT
1. Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes.
   NOTE:
   Vehicle must be driven after repair or replacement to erase the previous DTCs.
2. Stop the vehicle.
3. Erase self-diagnosis result for “ABS”.
4. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.

>> INSPECTION END

C1115 WHEEL SENSOR

DTC Logic

INFOID:0000000012471642

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C1115	ABS SENSOR [ABNORMAL SIGNAL] (Wheel 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.

POSSIBLE CAUSE

NOTE:
Confirm if DTC is PAST or CRNT. If DTC is CRNT, proceed with Diagnosis Procedure. If DTC is PAST, clear DTC. Do not replace the ABS actuator and electric unit (control unit) for a PAST DTC.

PAST DTC	CRNT DTC
• Harness or connector • Wheel sensor • Sensor rotor • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery	• Harness or connector • Wheel sensor • Sensor rotor • ABS actuator and electric unit (control unit) • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery • Tire size

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. Start the engine.
2. Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes.
3. Stop the vehicle.
4. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
5. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
6. Perform self-diagnosis for “ABS”.

Is DTC “C1115” detected?

YES-1 >> “CRNT” is displayed: Proceed to BRC-88, "Diagnosis Procedure".
YES-2 >> “PAST” is displayed: INSPECTION END (Erase the memory of self-diagnosis results.)
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000012471643

CAUTION:
Never check between wheel sensor harness connector terminals.

1.CHECK TIRE

Check the tire air pressure, wear and size. Refer to WT-70, "Tire Air Pressure".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Adjust air pressure or replace tire and GO TO 2.

2.CHECK DATA MONITOR (1)

With CONSULT
1. Erase self-diagnosis result for “ABS”.
2. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
3. 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.
   NOTE:
   Vehicle must be driven after repair or replacement to erase the previous DTCs.

Note the difference at 50 km/h (31 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 3.
NO >> GO TO 4.

3.PERFORM SELF-DIAGNOSIS (1)

With CONSULT
1. Stop the vehicle.
2. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
3. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
4. Perform self-diagnosis for “ABS”.

Is DTC “C1115” detected?

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

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

Check the ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to BRC-143, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair / replace harness, connector, fuse, or fusible link.

5.CHECK WHEEL SENSOR AND SENSOR ROTOR

1. Turn the ignition switch OFF.
2. Disconnect wheel sensor harness connector.
3. Remove dust and foreign matter adhered to the wheel sensor and 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-161, "FRONT WHEEL SENSOR : Exploded View".**
   - **Rear: Refer to BRC-162, "REAR WHEEL SENSOR : Exploded View".**

>> GO TO 6.

6.CHECK WHEEL SENSOR

Check the wheel sensor for damage.

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 8.

7.CHECK WHEEL SENSOR OUTPUT SIGNAL

1. Disconnect ABS actuator and electric unit (control unit) harness connector.
2. Connect ABS active wheel sensor tester (SST: J-45741-A) to wheel sensor using appropriate adapter.
3. Turn the ABS active wheel sensor tester power switch ON.
   NOTE:
   The green POWER indicator should illuminate. If the POWER indicator does not illuminate, replace the battery in the ABS active wheel sensor tester before proceeding.
4. Spin the wheel of the vehicle by hand and observe the red SENSOR indicator on the ABS active wheel sensor tester. The red SENSOR indicator should flash ON and OFF to indicate an output signal.
   NOTE:
   If the red SENSOR indicator illuminates but does not flash, reverse the polarity of the tester leads and retest.

Does the ABS active wheel sensor tester detect a signal?

YES >> GO TO 11.
NO >> GO TO 8.

8.REPLACE WHEEL SENSOR (1)

With CONSULT
1. Replace the wheel sensor.
- Front: Refer to BRC-161, "FRONT WHEEL SENSOR : Removal and Installation".
- Rear: Refer to BRC-162, "REAR WHEEL SENSOR : Removal and Installation".
2. Connect ABS actuator and electric unit (control unit) harness connector.
3. Erase self-diagnosis result for “ABS”.
4. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
5. 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.
   NOTE:
   Vehicle must be driven after repair or replacement to erase the previous DTCs.

Note the difference at 50 km/h (31 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 9.
NO >> GO TO 19.

9.PERFORM SELF-DIAGNOSIS (2)

With CONSULT
1. Stop the vehicle.
2. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
3. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
4. Perform self-diagnosis for “ABS”.

Is DTC “C1115” detected?

YES >> GO TO 10.
NO >> INSPECTION END

10.CHECK CONNECTOR

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

Is the inspection result normal?

YES >> GO TO 12.
NO >> Repair / replace harness or connector, securely lock the connector, and GO TO 11.

11.CHECK DATA MONITOR (2)

With CONSULT
1. Erase self-diagnosis result for “ABS”.
2. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
3. 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.
   NOTE:
   Vehicle must be driven after repair or replacement to erase the previous DTCs.

Note the difference at 50 km/h (31 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 12.
NO >> GO TO 13.

12.PERFORM SELF-DIAGNOSIS (3)

With CONSULT
1. Stop the vehicle.
2. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
3. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
4. Perform self-diagnosis for “ABS”.

Is DTC “C1115” detected?

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

13.CHECK TERMINAL

1. Turn the ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) harness connector and then check the 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 16.
NO >> Repair / replace harness, connector, or terminal, and GO TO 14.

14.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.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
5. 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.
   NOTE:
   Vehicle must be driven after repair or replacement to erase the previous DTCs.

Note the difference at 50 km/h (31 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 15.
NO >> GO TO 16.

15. PERFORM SELF-DIAGNOSIS (4)

With CONSULT
1. Stop the vehicle.
2. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
3. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
4. Perform self-diagnosis for “ABS”.

Is DTC “C1115” detected?

YES >> GO TO 16.
NO >> INSPECTION END

16. 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 the continuity between ABS actuator and electric unit (control unit) harness connector and wheel sensor harness connector. (Check continuity while turning steering wheel left and right, or while moving center harness in wheel housing.)

- Measurement connector and terminal for power supply circuit

ABS actuator and electric unit (control unit)		Wheel sensor			Continuity
Connector	Terminal	Connector		Terminal	
E41	19	E60	(Front LH wheel)	1	Existed
	9	E27	(Front RH wheel)		
	7	B34	(Rear LH wheel)		
	17	B35	(Rear RH wheel)		

- Measurement connector and terminal for signal circuit

ABS actuator and electric unit (control unit)		Wheel sensor			Continuity
Connector	Terminal	Connector		Terminal	
E41	20	E60	(Front LH wheel)	2	Existed
	10	E27	(Front RH wheel)		
	8	B34	(Rear LH wheel)		
	18	B35	(Rear RH wheel)		

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E41	19, 20	Ground	Not existed
	9, 10		
	7, 8		
	17, 18		

Is the inspection result normal?

YES >> GO TO 17.
NO >> Repair / replace harness or connector, and GO TO 17.

17. 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.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
5. 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.
   NOTE:
   Vehicle must be driven after repair or replacement to erase the previous DTCs.

Note the difference at 50 km/h (31 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 >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".

18. PERFORM SELF-DIAGNOSIS (5)

With CONSULT
1. Stop the vehicle.
2. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
3. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
4. Perform self-diagnosis for “ABS”.

Is DTC “C1115” detected?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".
NO >> INSPECTION END

19. REPLACE SENSOR ROTOR

With CONSULT

1. Replace the sensor rotor.
- Front: Refer to BRC-164, "FRONT SENSOR ROTOR : Removal and Installation".
- Rear: Refer to BRC-164, "REAR SENSOR ROTOR : Removal and Installation".
2. Erase self-diagnosis result for “ABS”.
3. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
4. Start the engine.
5. Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes.
   NOTE:
   Vehicle must be driven after repair or replacement to erase the previous DTCs.
6. Stop the vehicle.
7. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
8. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
9. Perform self-diagnosis for “ABS”.

Is DTC “C1115” detected?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".
NO >> INSPECTION END

C1116 STOP LAMP SWITCH

DTC Logic

INFOID:0000000012471644

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C1116	STOP LAMP SW (Stop lamp switch)	When stop lamp switch signal is not input when brake pedal operates.

POSSIBLE CAUSE

NOTE:
Confirm if DTC is PAST or CRNT. If DTC is CRNT, proceed with Diagnosis Procedure. If DTC is PAST, clear DTC. Do not replace the ABS actuator and electric unit (control unit) for a PAST DTC.

PAST DTC	CRNT DTC
• Harness or connector • Stop lamp switch signal circuit	• Harness or connector • Stop lamp switch • ABS actuator and electric unit (control unit) • Resistor (models with ICC) • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • 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, and wait 10 seconds or more.
2. Start the engine.
   NOTE:
   Stop the vehicle.
3. Wait 1 minute or more.
   NOTE:
   Never depress brake pedal.
4. Depress brake pedal by 100 mm (3.94 in) 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 to 5 ten or more times.
7. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
8. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
9. Perform self-diagnosis for “ABS”.

Is DTC “C1116” detected?

YES-1 >> “CRNT” is displayed: Proceed to BRC-96, "Diagnosis Procedure".
YES-2 >> “PAST” is displayed: INSPECTION END (Erase the memory of self-diagnosis results.)
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000012471645

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.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
3. Start the engine.
   NOTE:
   Stop the vehicle.
4. Depress the brake pedal several times.
5. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
6. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
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 the stop lamp system circuit. 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.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
3. Start the engine.
   NOTE:
   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 depressed or released. Refer to BRC-43, "Reference Value".
5. Select “ABS”, “DATA MONITOR” and “PRESS SENSOR” according to this order. Check that data monitor displays “5 bar” or less when brake pedal is depressed. Refer to BRC-43, "Reference Value".

Is the inspection result normal?

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

5.CHECK CONNECTOR

1. Turn the ignition switch OFF.

2. Check the ABS actuator and electric unit (control unit) harness connector for disconnection or looseness.
3. Check the stop lamp switch harness connector for disconnection or looseness.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair / replace harness or connector, and GO TO 6.

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

Check the ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to BRC-96, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair / replace harness, connector, fuse, or fusible link.

7. CHECK STOP LAMP SWITCH CLEARANCE

1. Turn the ignition switch OFF.
2. Check the stop lamp switch clearance. Refer to BR-22, "Inspection and Adjustment".

Is the inspection result normal?

YES >> GO TO 9.
NO >> Adjust stop lamp switch clearance. Refer to BR-22, "Inspection and Adjustment". GO TO 8.

8. CHECK DATA MONITOR (2)

With CONSULT
1. Erase self-diagnosis result for “ABS”.
2. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
3. Start the engine.
   NOTE:
   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 depressed or released. Refer to BRC-43, "Reference Value".
5. Select “ABS”, “DATA MONITOR” and “PRESS SENSOR” according to this order. Check that data monitor displays “5 bar” or less when brake pedal is depressed. Refer to BRC-43, "Reference Value".

Is the inspection result normal?

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

9. CHECK STOP LAMP SWITCH

Check the stop lamp switch. Refer to BRC-100, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 10.
NO >> Replace the stop lamp switch. Refer to BR-21, "Removal and Installation". GO TO 10.

10. CHECK DATA MONITOR (3)

With CONSULT
1. Erase self-diagnosis result for “ABS”.
2. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
3. Start the engine.
   NOTE:
   Start 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 depressed or released. Refer to BRC-43, "Reference Value".
5. Select “ABS”, “DATA MONITOR” and “PRESS SENSOR” according to this order. Check that data monitor displays “5 bar” or less when brake pedal is depressed. Refer to BRC-43, "Reference Value".

Is the inspection result normal?

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

11. CHECK CONNECTOR AND TERMINAL

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

Is the inspection result normal?

YES >> GO TO 13.
NO >> Repair / replace harness, connector, or terminal, and GO TO 12.

12. 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. Connect resistor harness connector. (Models with ICC)
4. Erase self-diagnosis result for “ABS”.
5. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
6. Start the engine.
   NOTE:
   Stop the vehicle.
7. Select “ABS”, “DATA MONITOR” and “STOP LAMP SW” according to this order. Check that data monitor displays “On” or “Off” when brake pedal is depressed or released. Refer to BRC-43, "Reference Value".
8. Select “ABS”, “DATA MONITOR” and “PRESS SENSOR” according to this order. Check that data monitor displays “5 bar” or less when brake pedal is depressed. Refer to BRC-43, "Reference Value".

Is the inspection result normal?

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

13. CHECK STOP LAMP SWITCH CIRCUIT (1)

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

+		−	Condition	Voltage
ABS actuator and electric unit (control unit)				
Connector	Terminal			
E41	5	Ground	Brake pedal depressed	Battery voltage
			Brake pedal not depressed	Approx. 0 V

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".
NO (Models with ICC)>>Repair / replace harness or connector, and GO TO 14.
NO (Models without ICC)>>Repair / replace harness or connector, and GO TO 15.

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

1. Turn the ignition switch OFF.

2. Disconnect stop lamp switch harness connector.
3. Disconnect resister harness connector.
4. Check the 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	
E41	5	E110	4	Existed

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

ABS actuator and electric unit (control unit)		Resister		Continuity
Connector	Terminal	Connector	Terminal	
E41	5	M17	1	Existed

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E41	5	Ground	Not existed

7. Check the continuity between resister and the ground.

Resister		—	Continuity
Connector	Terminal		
M17	1	Ground	Not existed
	2		Existed

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".

NO >> Repair / replace harness or connector, and GO TO 16.

15. CHECK STOP LAMP SWITCH CIRCUIT (2) (MODELS WITHOUT ICC)

1. Turn the ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check the 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	
E41	5	E110	2	Existed

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E41	5	Ground	Not existed

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".

NO >> Repair / replace harness or connector, and GO TO 16.

16. CHECK DATA MONITOR (5)

With CONSULT
1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Connect stop lamp switch harness connector.
3. Connect resister harness connector. (Models with ICC)
4. Erase self-diagnosis result for “ABS”.
5. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
6. Start the engine.
   NOTE:
   Stop the vehicle.
7. Select “ABS”, “DATA MONITOR” and “STOP LAMP SW” according to this order. Check that data monitor displays “On” or “Off” when brake pedal is depressed or released. Refer to BRC-43, "Reference Value".
8. Select “ABS”, “DATA MONITOR” and “PRESS SENSOR” according to this order. Check that data monitor displays “5 bar” or less when brake pedal is depressed. Refer to BRC-43, "Reference Value".

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".

Component Inspection

INFOID:0000000012471646

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
3 – 4*1 1 – 2*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: With ICC
*2: Without ICC

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace stop lamp switch. Refer to BR-21, "Removal and Installation".

C1120, C1122, C1124, C1126 ABS IN VALVE SYSTEM

DTC Logic

INFOID:0000000012471647

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C1120	FR LH IN ABS SOL (Front LH ABS IN solenoid valve)	When a malfunction is detected in front LH ABS IN valve.
C1122	FR RH IN ABS SOL (Front RH ABS IN solenoid valve)	When a malfunction is detected in front RH ABS IN valve.
C1124	RR LH IN ABS SOL (Rear LH ABS IN solenoid valve)	When a malfunction is detected in rear LH ABS IN valve.
C1126	RR RH IN ABS SOL (Rear RH ABS IN solenoid valve)	When a malfunction is detected in rear RH ABS IN valve.

POSSIBLE CAUSE

NOTE:
Confirm if DTC is PAST or CRNT. If DTC is CRNT, proceed with Diagnosis Procedure. If DTC is PAST, clear DTC. Do not replace the ABS actuator and electric unit (control unit) for a PAST DTC.

PAST DTC	CRNT DTC
• Harness or connector • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery	• Harness or connector • ABS actuator and electric unit (control unit) • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • 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.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Perform self-diagnosis for “ABS”.

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

YES-1 >> “C1120”, “C1122”, “C1124” or “C1126” is displayed by “CRNT”: Proceed to BRC-101, "Diagnosis Procedure".
YES-2 >> “C1120”, “C1122”, “C1124” or “C1126” is displayed by “PAST”: INSPECTION END (Erase the memory of self-diagnosis results.)
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000012471648

1.CHECK CONNECTOR

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

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair / replace harness or connector, securely lock the connector, and GO TO 2.

2.PERFORM SELF-DIAGNOSIS

With CONSULT
1. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Perform self-diagnosis for “ABS”.

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

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

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

Check the ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to BRC-143, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair / replace harness, connector, fuse, or fusible link.

4.CHECK TERMINAL

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

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".
NO >> Repair / replace harness, connector, or terminal.

C1121, C1123, C1125, C1127 ABS OUT VALVE SYSTEM

DTC Logic

INFOID:0000000012471649

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C1121	FR LH OUT ABS SOL (Front LH ABS OUT solenoid valve)	When a malfunction is detected in front LH ABS OUT valve.
C1123	FR RH OUT ABS SOL (Front RH ABS OUT solenoid valve)	When a malfunction is detected in front RH ABS OUT valve.
C1125	RR LH OUT ABS SOL (Rear LH ABS OUT solenoid valve)	When a malfunction is detected in rear LH ABS OUT valve.
C1127	RR RH OUT ABS SOL (Rear RH ABS OUT solenoid valve)	When a malfunction is detected in rear RH ABS OUT valve.

POSSIBLE CAUSE

NOTE:
Confirm if DTC is PAST or CRNT. If DTC is CRNT, proceed with Diagnosis Procedure. If DTC is PAST, clear DTC. Do not replace the ABS actuator and electric unit (control unit) for a PAST DTC.

PAST DTC	CRNT DTC
• Harness or connector • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery	• Harness or connector • ABS actuator and electric unit (control unit) • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • 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.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Perform self-diagnosis for “ABS”.

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

YES-1 >> “C1121”, “C1123”, “C1125” or “C1127” is displayed by “CRNT”: Proceed to BRC-103, "Diagnosis Procedure".
YES-2 >> “C1121”, “C1123”, “C1125” and “C1127” are displayed by “PAST”: INSPECTION END (Erase the memory of self-diagnosis results.)
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000012471650

1.CHECK CONNECTOR

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

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair / replace harness or connector, securely lock the connector, and GO TO 2.

2.PERFORM SELF-DIAGNOSIS

With CONSULT
1. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Perform self-diagnosis for “ABS”.

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

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

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

Check the ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to BRC-143, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair / replace harness, connector, fuse, or fusible link.

4.CHECK TERMINAL

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

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".
NO >> Repair / replace harness, connector, or terminal.

C1130 ENGINE SIGNAL

DTC Logic

INFOID:0000000012471651

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C1130	ENGINE SIGNAL 1 (Engine system signal)	When a malfunction is detected in ECM system.

POSSIBLE CAUSE

NOTE:
Confirm if DTC is PAST or CRNT. If DTC is CRNT, proceed with Diagnosis Procedure. If DTC is PAST, clear DTC. Do not replace the ABS actuator and electric unit (control unit) for a PAST DTC.

PAST DTC	CRNT DTC
• Harness or connector • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery • CAN communication line	• Harness or connector • ECM • ABS actuator and electric unit (control unit) • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery • 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.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Perform self-diagnosis for “ABS”.

Is DTC “C1130” detected?

YES-1 >> “CRNT” is displayed: Proceed to BRC-105, "Diagnosis Procedure".
YES-2 >> “PAST” is displayed: INSPECTION END (Erase the memory of self-diagnosis results.)
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000012471652

1.CHECK ENGINE SYSTEM

With CONSULT

Perform self-diagnosis for “ENGINE”.

- VQ37VHR for USA and Canada: Refer to EC-86, "CONSULT Function".
- VQ37VHR for Mexico: Refer to EC-614, "CONSULT Function".
- VK56VD for USA and Canada: Refer to EC-1040, "CONSULT Function".
- VK56VD for Mexico: Refer to EC-1628, "CONSULT Function".

Is DTC detected?

YES >> Check the DTC.
- VQ37VHR for USA and Canada: Refer to EC-116, "DTC Index".
- VQ37VHR for Mexico: Refer to EC-640, "DTC Index".
- VK56VD for USA and Canada: Refer to EC-1079, "DTC Index".
- VK56VD for Mexico: Refer to EC-1663, "DTC Index".

NO >> GO TO 2.

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

Check the ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to BRC-143, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair / replace harness, connector, fuse, or fusible link.

3. CHECK CONNECTOR AND TERMINAL

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

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair / replace harness, connector, or terminal, securely lock the connector, and GO TO 4.

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

With CONSULT

1. Connect ECM harness connector.
2. Connect ABS actuator and electric unit (control unit) harness connector.
3. Erase self-diagnosis result for “ABS”.
4. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
5. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
6. Perform self-diagnosis for “ABS”.

Is DTC “C1130” or “U1000”detected?

YES (“C1130”)>>Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".
YES (“U1000”)>>Refer to LAN-27, "Trouble Diagnosis Flow Chart".
NO >> INSPECTION END

C1140 ACTUATOR RELAY SYSTEM

DTC Logic

INFOID:0000000012471653

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C1140	ACTUATOR RLY (Actuator relay)	When a malfunction is detected in actuator relay.

POSSIBLE CAUSE

NOTE:
Confirm if DTC is PAST or CRNT. If DTC is CRNT, proceed with Diagnosis Procedure. If DTC is PAST, clear DTC. Do not replace the ABS actuator and electric unit (control unit) for a PAST DTC.

PAST DTC	CRNT DTC
• Harness or connector • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery	• Harness or connector • ABS actuator and electric unit (control unit) • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • 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.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Perform self-diagnosis for “ABS”.

Is DTC “C1140” detected?

YES-1 >> “CRNT” is displayed: Proceed to BRC-107, "Diagnosis Procedure".
YES-2 >> “PAST” is displayed: INSPECTION END (Erase the memory of self-diagnosis results.)
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000012471654

1.CHECK CONNECTOR

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

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair / replace harness or connector, securely lock the connector, and GO TO 2.

2.PERFORM SELF-DIAGNOSIS

With CONSULT

1. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Perform self-diagnosis for “ABS”.

Is DTC “C1140” detected?

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

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

Check the ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to BRC-143, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair / replace harness, connector, fuse, or fusible link.

4. CHECK TERMINAL

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

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".
NO >> Repair / replace harness, connector, or terminal.

C1142 PRESS SENSOR

DTC Logic

INFOID:0000000012471655

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C1142	PRESS SEN CIRCUIT (Pressure sensor circuit)	When a malfunction is detected in pressure sensor.

POSSIBLE CAUSE

NOTE:
Confirm if DTC is PAST or CRNT. If DTC is CRNT, proceed with Diagnosis Procedure. If DTC is PAST, clear DTC. Do not replace the ABS actuator and electric unit (control unit) for a PAST DTC.

PAST DTC	CRNT DTC
• Harness or connector • Air inclusion in the brake piping • Stop lamp switch system • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery	• Stop lamp switch system • ABS actuator and electric unit (control unit) • Brake system • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery • Air inclusion in the brake piping

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.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Perform self-diagnosis for “ABS”.

Is DTC “C1142” detected?

YES-1 >> “CRNT” is displayed: Proceed to BRC-109, "Diagnosis Procedure".
YES-2 >> “PAST” is displayed: INSPECTION END (Erase the memory of self-diagnosis results.)
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000012471656

1.STOP LAMP SWITCH SYSTEM

Check the stop lamp switch system. Refer to BRC-95, "DTC Logic".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace stop lamp switch system.

2.CHECK BRAKE FLUID LEAKAGE

Check the brake fluid leakage. Refer to BR-13, "Inspection".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace brake fluid leakage part.

3. CHECK BRAKE PIPING

Check the brake piping.
- Front: Refer to BR-29, "FRONT : Inspection".
- Rear: Refer to BR-34, "REAR : Inspection".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace brake piping.
- Front: Refer to BR-27, "FRONT : Removal and Installation".
- Rear: Refer to BR-32, "REAR : Removal and Installation".

4. CHECK BRAKE PEDAL

Check the brake pedal.
- Brake pedal height: Refer to BR-22, "Inspection and Adjustment".
- Brake pedal assembly: Refer to BR-22, "Inspection and Adjustment".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Adjust the brake pedal height or replace brake pedal assembly.
- Adjust the brake pedal: Refer to BR-22, "Inspection and Adjustment".
- Replace the brake pedal: Refer to BR-21, "Removal and Installation".

5. CHECK BRAKE MASTER CYLINDER

Check the brake master cylinder. Refer to BR-37, "Inspection".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace brake master cylinder. Refer to BR-35, "Removal and Installation".

6. CHECK BRAKE BOOSTER

Check the brake booster. Refer to BR-39, "Inspection and Adjustment".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair or replace brake booster. Refer to BR-38, "Removal and Installation".

7. CHECK VACUUM PIPING

Check the vacuum piping. Refer to BR-42, "Inspection".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair or replace vacuum piping. Refer to BR-42, "Removal and Installation".

8. CHECK FRONT DISC BRAKE

Check the front disc brake.
- Brake caliper 2 piston type: Refer to BR-44, "BRAKE PAD (2 PISTON TYPE) : Inspection".
- Brake caliper 4 piston type: Refer to BR-47, "BRAKE PAD (4 PISTON TYPE) : Inspection".

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair or replace front disc brake.
- Brake caliper 2 piston type: Refer to BR-43, "BRAKE PAD (2 PISTON TYPE) : Removal and Installation".
- Brake caliper 4 piston type: Refer to BR-45, "BRAKE PAD (4 PISTON TYPE) : Removal and Installation".

9. CHECK REAR DISC BRAKE

Check the rear disc brake.
- Brake caliper 1 piston type: Refer to BR-56, "BRAKE PAD (1 PISTON TYPE) : Inspection".

• Brake caliper 2 piston type: Refer to BR-59, "BRAKE PAD (2 PISTON TYPE) : Inspection".

Is the inspection result normal?

YES >> GO TO 10.
NO >> Repair or replace rear disc brake.
• Brake caliper 1 piston type: Refer to BR-55, "BRAKE PAD (1 PISTON TYPE) : Removal and Installation".
• Brake caliper 2 piston type: Refer to BR-57, "BRAKE PAD (2 PISTON TYPE) : Removal and Installation".

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

Check the ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to BRC-143, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 11.
NO >> Repair / replace harness, connector, fuse, or fusible link.

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

With CONSULT

1. Erase self-diagnosis result for “ABS”.
2. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
3. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
4. Start the engine and drive the vehicle for a short period of time.
   NOTE:
   Vehicle must be driven after repair or replacement to erase the previous DTCs.
5. Stop the vehicle.
6. Perform self-diagnosis for “ABS”.

Is DTC “C1142” detected?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".
NO >> Check the ABS actuator and electric unit (control unit) harness connector and terminal for damage, looseness and disconnection. Repair / replace harness, connector, or terminal.

C1143 STEERING ANGLE SENSOR

DTC Logic

INFOID:0000000012471657

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C1143	ST ANG SEN CIRCUIT (Steering angle sensor circuit)	When a malfunction is detected in steering angle sensor.

POSSIBLE CAUSE

NOTE:
Confirm if DTC is PAST or CRNT. If DTC is CRNT, proceed with Diagnosis Procedure. If DTC is PAST, clear DTC. Do not replace the ABS actuator and electric unit (control unit) for a PAST DTC.

PAST DTC	CRNT DTC
• Harness or connector • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery • CAN communication line • Incomplete neutral position adjustment of steering angle sensor • Improper installation of steering angle sensor	• Harness or connector • Steering angle sensor • ABS actuator and electric unit (control unit) • IPDM E/R • CAN communication line • Wheel alignment • Incomplete neutral position adjustment of steering angle sensor • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • 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.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Perform self-diagnosis for “ABS”.

Is DTC “C1143” detected?

YES-1 >> “CRNT” is displayed: Proceed to BRC-112, "Diagnosis Procedure".
YES-2 >> “PAST” is displayed: INSPECTION END (Erase the memory of self-diagnosis results.)
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000012471658

1.ADJUST THE NEUTRAL POSITION OF STEERING ANGLE SENSOR

With CONSULT

Perform neutral position adjustment of steering angle sensor. Refer to BRC-67, "Description".

>> GO TO 2.

2.PERFORM SELF-DIAGNOSIS (1)

With CONSULT
1. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Perform self-diagnosis for “ABS”.

Is DTC “C1143” detected?

YES-1 >> “CRNT” is displayed: GO TO 3.
YES-2 >> “PAST” is displayed: INSPECTION END (Erase the memory of self-diagnosis results.)
NO >> INSPECTION END

3.CHECK CONNECTOR

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

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair / replace harness or connector, securely lock the connector, and GO TO 4.

4.PERFORM SELF-DIAGNOSIS (2)

With CONSULT
1. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Perform self-diagnosis for “ABS”.

Is DTC “C1143” detected?

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

5.CHECK STEERING ANGLE SENSOR POWER SUPPLY

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

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

4. Turn the ignition switch ON.
   NOTE:
   Start the engine.
5. Check the voltage between steering angle sensor harness connector and ground.

+		–	Voltage
Steering angle sensor			
Connector	Terminal		
M37	8	Ground	Battery voltage

Is the inspection result normal?

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

6.CHECK STEERING ANGLE SENSOR POWER SUPPLY CIRCUIT

1. Turn the ignition switch OFF.
2. Check the 10A fuse (#46).
3. Disconnect IPDM E/R harness connector.
4. Check the continuity between steering angle sensor harness connector and IPDM E/R harness connector.

Steering angle sensor		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
M37	8	E5	12	Existed

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

Steering angle sensor		—	Continuity
Connector	Terminal		
M37	8	Ground	Not existed

Is the inspection result normal?

YES >> Perform trouble diagnosis for ignition power supply.
NO >> Repair / replace harness, connector, or fuse.

7.CHECK STEERING ANGLE SENSOR GROUND CIRCUIT

1. Turn the ignition switch OFF.
2. Check the 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 8.
NO >> Repair / replace harness or connector.

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

Check the ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to BRC-143, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair / replace harness, connector, fuse, or fusible link.

9.CHECK TERMINAL

1. Check the steering angle sensor pin terminals for damage or loose connection with harness connector.
2. Check the IPDM E/R pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> GO TO 10.
NO >> Repair / replace harness, connector, or terminal.

10.CHECK CAN COMMUNICATION LINE

1. Connect steering angle sensor harness connector.
2. Connect IPDM E/R harness connector.
3. Check the CAN communication line. Refer to LAN-27, "Trouble Diagnosis Flow Chart".

Is the inspection result normal?

YES >> GO TO 11.
NO >> Repair / replace harness or connector. Refer to BRC-8, "Precaution for Harness Repair".

11.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-43, "Reference Value".

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".

NO >> Replace the steering angle sensor. Refer to BRC-168, "Removal and Installation".

C1144 INCOMPLETE STEERING ANGLE SENSOR ADJUSTMENT

DTC Logic

INFOID:0000000012471659

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C1144	ST ANG SEN SIGNAL (Steering angle sensor not complete)	When neutral position adjustment of steering angle sensor is not complete.

POSSIBLE CAUSE

NOTE:
Confirm if DTC is PAST or CRNT. If DTC is CRNT, proceed with Diagnosis Procedure. If DTC is PAST, clear DTC. Do not replace the ABS actuator and electric unit (control unit) for a PAST DTC.

PAST DTC	CRNT DTC
Incomplete neutral position adjustment of steering angle sensor	• 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.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Perform self-diagnosis for “ABS”.

Is DTC “C1144” detected?

YES-1 >> “CRNT” is displayed: Proceed to BRC-116, "Diagnosis Procedure".
YES-2 >> “PAST” is displayed: INSPECTION END (Erase the memory of self-diagnosis results.)
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000012471660

1.ADJUST THE NEUTRAL POSITION OF STEERING ANGLE SENSOR

Perform neutral position adjustment of steering angle sensor. Refer to BRC-67, "Description".

>> GO TO 2.

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

With CONSULT

1. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.

2. Start the engine.
NOTE:
Wait at least 10 seconds after start the engine.
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 the steering angle sensor system. Refer to BRC-116, "DTC Logic".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair / replace harness, connector, or terminal.

4.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-43, "Reference Value".

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".
NO >> Replace the steering angle sensor. Refer to BRC-168, "Removal and Installation".

C1145, C1146 YAW RATE/SIDE/DECEL G SENSOR

DTC Logic

INFOID:0000000012471661

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C1145	YAW RATE SENSOR (Yaw rate sensor circuit)	• When a malfunction is detected in yaw rate signal. • When a signal line of yaw rate/side/decel G sensor is open or shorted.
C1146	SIDE G SEN CIRCUIT (Side G sensor circuit)	• When a malfunction is detected in side/decel G signal. • When a signal line of yaw rate/side/decel G sensor is open or shorted.

POSSIBLE CAUSE

NOTE:
Confirm if DTC is PAST or CRNT. If DTC is CRNT, proceed with Diagnosis Procedure. If DTC is PAST, clear DTC. Do not replace the ABS actuator and electric unit (control unit) for a PAST DTC.

PAST DTC	CRNT DTC
• Harness or connector • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery	• Harness or connector • Yaw rate/side/decel G sensor • ABS actuator and electric unit (control unit) • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • 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.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Perform self-diagnosis for “ABS”.

Is DTC “C1145” or “C1146” detected?

YES-1 >> “C1145” or “C1146” is displayed by “CRNT”: Proceed to BRC-118, "Diagnosis Procedure".
YES-2 >> “C1145” and “C1146” are displayed by “PAST”: INSPECTION END (Erase the memory of self-diagnosis results.)
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000012471662

CAUTION:

- **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 is OFF (VDC OFF indicator lamp is in ON status). This is not a malfunction if the status returns to normal after engine is started again. In that case, erase self-diagnosis result memory using CONSULT.**

- **When the engine is in running status and the vehicle is on a turntable at the entrance of parking lot or on a moving unit, VDC warning lamp may turn ON and "ABS" self-diagnosis may display "YAW RATE SENSOR". In this case, yaw rate sensor is not malfunctioning. The status returns to normal when the vehicle is left from the turntable or moving unit and the engine is started again. In that case, erase self-diagnosis result memory using CONSULT.**

1.CHECK YAW RATE/SIDE/DECEL G SENSOR POWER SUPPLY

1. Turn the ignition switch OFF.
2. Disconnect yaw rate/side/decel G sensor harness connector.
3. Check the voltage between yaw rate/side/decel G sensor harness connector and ground.

+		–	Voltage
Yaw rate/side/decel G sensor			
Connector	Terminal		
M143	4	Ground	Approx. 0 V

4. Turn the ignition switch ON.
   NOTE:
   Never start engine.
5. Check the voltage between yaw rate/side/decel G sensor harness connector and ground.

+		–	Voltage
Yaw rate/side/decel G sensor			
Connector	Terminal		
M143	4	Ground	Battery voltage

Is the inspection result normal?

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

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

1. Turn the ignition switch OFF.
2. Check the 10A fuse (#46).
3. Disconnect IPDM E/R harness connector.
4. Check the continuity between yaw rate/side/decel G sensor harness connector and IPDM E/R harness connector.

Yaw rate/side/decel G sensor		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
M143	4	E5	12	Existed

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

Yaw rate/side/decel G sensor		—	Continuity
Connector	Terminal		
M143	4	Ground	Not existed

Is the inspection result normal?

YES >> Perform trouble diagnosis for ignition power supply.
NO >> Repair / replace harness, connector, or fuse.

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

1. Turn the ignition switch OFF.
2. Check the continuity between yaw rate/side/decel G sensor harness connector and ground.

Yaw rate/side/decel G sensor		—	Continuity
Connector	Terminal		
M143	1	Ground	Existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair / replace harness or connector.

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

Check the ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to BRC-143, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair / replace harness, connector, fuse, or fusible link.

5. CHECK COMMUNICATION LINE

Check the 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	
M143	2	E41	6	Existed
	3		16	

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair / replace harness or connector. Refer to BRC-8, "Precaution for Harness Repair".

6. CHECK TERMINAL

1. Check the ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with harness connector.
2. Check the yaw rate/side/decel G sensor pin terminals for damage or loose connection with harness connector.
3. Check the IPDM E/R pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair / replace harness, connector, or terminal.

7. REPLACE YAW RATE/SIDE/DECEL G SENSOR

With CONSULT.

1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Replace the yaw rate/side/decel G sensor. Refer to BRC-167, "Removal and Installation".
3. Erase self-diagnosis result for “ABS”.
4. Turn the ignition switch OFF.
5. Turn the ignition switch ON.
   NOTE:
   Never start engine.
6. Perform self-diagnosis for “ABS”.

Is DTC “C1145” or “C1146” detected?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".
NO >> INSPECTION END

C1155 BRAKE FLUID LEVEL SWITCH

DTC Logic

INFOID:0000000012471663

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C1155	BR FLUID LEVEL LOW (Brake fluid level low)	• When brake fluid level low signal is detected. • When an open circuit is detected in brake fluid level switch circuit.

POSSIBLE CAUSE

NOTE:
Confirm if DTC is PAST or CRNT. If DTC is CRNT, proceed with Diagnosis Procedure. If DTC is PAST, clear DTC. Do not replace the ABS actuator and electric unit (control unit) for a PAST DTC.

PAST DTC	CRNT DTC
• Harness or connector • Brake fluid level is low	• Harness or connector • ABS actuator and electric unit (control unit) • Brake fluid level switch • Combination meter • Brake fluid level is low

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.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Perform self-diagnosis for “ABS”.

Is DTC “C1155” detected?

YES-1 >> “CRNT” is displayed: Proceed to BRC-121, "Diagnosis Procedure".
YES-2 >> “PAST” is displayed: INSPECTION END (Erase the memory of self-diagnosis results.)
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000012471664

1.CHECK BRAKE FLUID LEVEL

1. Turn the ignition switch OFF.
2. Check the brake fluid level. Refer to BR-13, "Inspection".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Refill brake fluid. Refer to BR-13, "Refilling". GO TO 2.

2.PERFORM SELF-DIAGNOSIS (1)

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

2. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
3. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
4. Perform self-diagnosis for “ABS”.

Is DTC “C1155” detected?

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

3.CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Check the brake fluid level switch harness connector for disconnection or looseness.
3. Check the combination meter harness connector for disconnection or looseness.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair / replace harness or connector, and GO TO 4.

4.PERFORM SELF-DIAGNOSIS (2)

With CONSULT
1. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Perform self-diagnosis for “ABS”.

Is DTC “C1155” detected?

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

5.CHECK BRAKE FLUID LEVEL SWITCH

Check the brake fluids level switch. Refer to BRC-124, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Replace the reservoir tank. Refer to BR-36, "Disassembly and Assembly". 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.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
3. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
4. 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 brake fluid level switch harness connector.
3. Check the brake fluid level switch harness connector for disconnection or looseness.
4. Check the brake fluid level switch pin terminals for damage or loose connection with harness connector.
5. Disconnect combination meter harness connector.

6. Check the combination meter harness connector for disconnection or looseness.
7. Check the combination meter pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair / replace harness, connector, or terminal, and GO TO 8.

8. PERFORM SELF-DIAGNOSIS (4)

With CONSULT

1. Connect brake fluid level switch harness connector.
2. Connect combination meter harness connector.
3. Erase self-diagnosis result for “ABS”.
4. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
5. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
6. Perform self-diagnosis for “ABS”.

Is DTC “C1155” detected?

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

9. CHECK BRAKE FLUID LEVEL SWITCH CIRCUIT

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

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

5. Check the 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 / replace harness or connector, and GO TO 10.

10. CHECK BRAKE FLUID LEVEL SWITCH GROUND CIRCUIT

Check the 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 / replace harness or connector, and GO TO 11.

11. CHECK COMBINATION METER

1. Connect brake fluid level switch harness connector.
2. Connect combination meter harness connector.
3. Check the combination meter. Refer to MWI-31, "On Board Diagnosis Function".

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".

NO >> Repair or replace combination meter. Refer to MWI-95, "Removal and Installation".

Component Inspection

INFOID:0000000012471665

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 reservoir tank. Refer to BR-36, "Disassembly and Assembly".

C1160 INCOMPLETE DECEL G SENSOR CALIBRATION

DTC Logic

INFOID:0000000012471666

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C1160	DECEL G SEN SET (Decel G sensor set)	When calibration of yaw rate/side/decel G sensor is not complete.

POSSIBLE CAUSE

NOTE:
Confirm if DTC is PAST or CRNT. If DTC is CRNT, proceed with Diagnosis Procedure. If DTC is PAST, clear DTC. Do not replace the ABS actuator and electric unit (control unit) for a PAST DTC.

PAST DTC	CRNT DTC
• Harness or connector • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery	• Incomplete calibration of decel G sensor • ABS actuator and electric unit (control unit) • Yaw rate/side/decel G sensor • Harness or connector

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.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Perform self-diagnosis for “ABS”.

Is DTC “C1160” detected?

YES-1 >> “CRNT” is displayed: Proceed to BRC-125, "Diagnosis Procedure".
YES-2 >> “PAST” is displayed: INSPECTION END (Erase the memory of self-diagnosis results.)
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000012471667

1.DECEL G SENSOR CALIBRATION

Perform decel G sensor calibration. Refer to BRC-67, "Description".

>> GO TO 2.

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

With CONSULT
Perform self-diagnosis for “ABS”.

Is DTC “C1160” detected?

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

3. CHECK YAW RATE/SIDE/DECEL G SENSOR SYSTEM

1. Turn the ignition switch OFF.
2. Check the yaw rate/side/decel G sensor system. Refer to BRC-118, "DTC Logic".

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".
NO >> Replace the yaw rate/side/decel G sensor. Refer to BRC-167, "Removal and Installation".

C1164, C1165 CV SYSTEM

DTC Logic

INFOID:0000000012471668

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C1164	CV 1 (Cut valve 1)	When a malfunction is detected in cut valve 1.
C1165	CV 2 (Cut valve 2)	When a malfunction is detected in cut valve 2.

POSSIBLE CAUSE

NOTE:
Confirm if DTC is PAST or CRNT. If DTC is CRNT, proceed with Diagnosis Procedure. If DTC is PAST, clear DTC. Do not replace the ABS actuator and electric unit (control unit) for a PAST DTC.

PAST DTC	CRNT DTC
• Harness or connector • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery	• Harness or connector • ABS actuator and electric unit (control unit) • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • 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.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Perform self-diagnosis for “ABS”.

Is DTC “C1164” or “C1165” detected?

YES-1 >> “C1164” or “C1165” is displayed by “CRNT”: Proceed to BRC-127, "Diagnosis Procedure".
YES-2 >> “C1164” and “C1165” are displayed by “PAST”: INSPECTION END (Erase the memory of self-diagnosis results.)
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000012471669

1.CHECK CONNECTOR

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

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair / replace harness or connector, securely lock the connector, and GO TO 2.

2.PERFORM SELF-DIAGNOSIS

With CONSULT
Perform self-diagnosis for “ABS” again.

Is DTC “C1164” or “C1165” detected?

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

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

Check the ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to BRC-143, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair / replace harness, connector, fuse, or fusible link.

4.CHECK TERMINAL

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

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".
NO >> Repair / replace harness, connector, or terminal.

C1170 VARIANT CODING

DTC Logic

INFOID:0000000012471670

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C1170	VARIANT CODING (Variant coding)	When the information in ABS actuator and electric unit (control unit) is not the same.

POSSIBLE CAUSE

NOTE:
Confirm if DTC is PAST or CRNT. If DTC is CRNT, proceed with Diagnosis Procedure. If DTC is PAST, clear DTC. Do not replace the ABS actuator and electric unit (control unit) for a PAST DTC.

PAST DTC	CRNT DTC
—	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.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Perform self-diagnosis for “ABS”.

Is DTC “C1170” detected?

YES-1 >> “CRNT” is displayed: Proceed to BRC-129, "Diagnosis Procedure".
YES-2 >> “PAST” is displayed: INSPECTION END (Erase the memory of self-diagnosis results.)
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000012471671

1.CHECK SELF-DIAGNOSIS RESULTS

With CONSULT

Replace the ABS actuator and electric unit (control unit) even if other DTC are displayed along with “C1170” in self-diagnosis for “ABS”.

>> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".

C1197 VACUUM SENSOR

DTC Logic

INFOID:0000000012471672

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C1197	VACUUM SENSOR (Vacuum sensor)	When a malfunction is detected in vacuum sensor.

POSSIBLE CAUSE

NOTE:
Confirm if DTC is PAST or CRNT. If DTC is CRNT, proceed with Diagnosis Procedure. If DTC is PAST, clear DTC. Do not replace the ABS actuator and electric unit (control unit) for a PAST DTC.

PAST DTC	CRNT DTC
• Harness or connector • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery	• Harness or connector • Vacuum sensor (brake booster) • Vacuum piping • 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.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Perform self-diagnosis for “ABS”.

Is DTC “C1197” detected?

YES-1 >> “CRNT” is displayed: Proceed to BRC-130, "Diagnosis Procedure".
YES-2 >> “PAST” is displayed: INSPECTION END (Erase the memory of self-diagnosis results.)
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000012471673

1.CHECK CONNECTOR

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

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair / replace harness or connector, and GO TO 2.

2.CHECK BRAKE BOOSTER

1. Turn the ignition switch OFF.

2. Check the brake booster. Refer to BR-39, "Inspection and Adjustment".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Replace the brake booster. Refer to BR-38, "Removal and Installation".

3.CHECK VACUUM PIPING

Check the vacuum piping. Refer to BR-42, "Inspection".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace the vacuum piping. Refer to BR-42, "Removal and Installation".

4.CHECK TERMINAL

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

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair / replace harness, connector, or terminal.

5.CHECK VACUUM SENSOR CIRCUIT

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

Vacuum sensor		ABS actuator and electric unit (control unit)		Continuity
Connector	Terminal	Connector	Terminal	
E25	1	E41	13	Existed
	2		32	
	3		28	

5. Check the continuity between vacuum sensor harness connector and ground.

Vacuum sensor		—	Continuity
Connector	Terminal		
E25	1	Ground	Not existed
	2		
	3		

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair / replace harness or connector.

6.REPLACE VACUUM SENSOR

With CONSULT

1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Replace the vacuum sensor.
   CAUTION:
   Always replace brake booster because vacuum sensor cannot be disassembled. Refer to BR-38, "Removal and Installation".
3. Erase self-diagnosis result for “ABS”.
4. Turn the ignition switch OFF → ON → OFF.
   NOTE:

Wait at least 10 seconds after turning ignition switch OFF or ON.

5. Start engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
6. Perform self-diagnosis for “ABS”.

Is DTC “C1197” detected?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".

NO >> INSPECTION END

C1198 VACUUM SENSOR

DTC Logic

INFOID:0000000012471674

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C1198	VACUUM SEN CIR (Vacuum sensor circuit)	• When an open circuit is detected in vacuum sensor circuit. • When a short circuit is detected in vacuum sensor circuit. • When a malfunction is detected in vacuum sensor noise.

POSSIBLE CAUSE

NOTE:
Confirm if DTC is PAST or CRNT. If DTC is CRNT, proceed with Diagnosis Procedure. If DTC is PAST, clear DTC. Do not replace the ABS actuator and electric unit (control unit) for a PAST DTC.

PAST DTC	CRNT DTC
• Harness or connector • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery	• Harness or connector • Vacuum sensor (brake booster) • 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.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Perform self-diagnosis for “ABS”.

Is DTC “C1198” detected?

YES-1 >> “CRNT” is displayed: Proceed to BRC-133, "Diagnosis Procedure".
YES-2 >> “PAST” is displayed: INSPECTION END (Erase the memory of self-diagnosis results.)
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000012471675

1.CHECK CONNECTOR

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

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair / replace harness or connector, and GO TO 2.

2.CHECK TERMINAL

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

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair / replace harness, connector, or terminal.

3.CHECK VACUUM SENSOR CIRCUIT

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

Vacuum sensor		ABS actuator and electric unit (control unit)		Continuity
Connector	Terminal	Connector	Terminal	
E25	1	E41	13	Existed
	2		32	
	3		28	

5. Check the continuity between vacuum sensor harness connector and ground.

Vacuum sensor		—	Continuity
Connector	Terminal		
E25	1	Ground	Not existed
	2		
	3		

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair / replace harness or connector.

4.REPLACE VACUUM SENSOR

With CONSULT
1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Replace the vacuum sensor.
   CAUTION:
   Always replace brake booster because vacuum sensor cannot be disassembled. Refer to BR-38, "Removal and Installation".
3. Erase self-diagnosis result for “ABS”.
4. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
5. Start engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
6. Perform self-diagnosis for “ABS”.

Is DTC “C1198” detected?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".
NO >> INSPECTION END

C1199 BRAKE BOOSTER

DTC Logic

INFOID:0000000012471676

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C1199	BRAKE BOOSTER (Brake booster)	When brake booster vacuum is approx. 0 kPa (0 mmHg) during engine running.

POSSIBLE CAUSE

NOTE:
Confirm if DTC is PAST or CRNT. If DTC is CRNT, proceed with Diagnosis Procedure. If DTC is PAST, clear DTC. Do not replace the ABS actuator and electric unit (control unit) for a PAST DTC.

PAST DTC	CRNT DTC
• Harness or connector • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery	• Harness or connector • Vacuum sensor (brake booster) • Vacuum piping • 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.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Perform self-diagnosis for “ABS”.

Is DTC “C1199” detected?

YES-1 >> “CRNT” is displayed: Proceed to BRC-135, "Diagnosis Procedure".
YES-2 >> “PAST” is displayed: INSPECTION END (Erase the memory of self-diagnosis results.)
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000012471677

1.CHECK CONNECTOR

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

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair / replace harness or connector, and GO TO 2.

2.CHECK BRAKE BOOSTER

1. Turn the ignition switch OFF.
2. Check the brake booster. Refer to BR-39, "Inspection and Adjustment".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Replace the brake booster. Refer to BR-38, "Removal and Installation".

3.CHECK VACUUM PIPING

Check the vacuum piping. Refer to BR-42, "Inspection".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace the vacuum piping. Refer to BR-42, "Removal and Installation".

4.CHECK TERMINAL

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

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair / replace harness, connector, or terminal.

5.CHECK VACUUM SENSOR CIRCUIT

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

Vacuum sensor		ABS actuator and electric unit (control unit)		Continuity
Connector	Terminal	Connector	Terminal	
E25	1	E41	13	Existed
	2		32	
	3		28	

5. Check the continuity between vacuum sensor harness connector and ground.

Vacuum sensor		—	Continuity
Connector	Terminal		
E25	1	Ground	Not existed
	2		
	3		

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair / replace harness or connector.

6.REPLACE VACUUM SENSOR

With CONSULT

1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Replace the vacuum sensor.
   CAUTION:
   Always replace brake booster because vacuum sensor cannot be disassembled. Refer to BR-38, "Removal and Installation"
3. Erase self-diagnosis result for “ABS”.
4. Turn the ignition switch OFF → ON → OFF.

NOTE:
Wait at least 10 seconds after turning ignition switch OFF or ON.

5. Start engine.

NOTE:
Wait at least 10 seconds after start the engine.

6. Perform self-diagnosis for “ABS”.

Is DTC “C1199” detected?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".

NO >> INSPECTION END

C119A VACUUM SENSOR

DTC Logic

INFOID:0000000012471678

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C119A	VACUUM SEN VOLT (Vacuum sensor voltage)	When a malfunction is detected in supply power voltage of vacuum sensor.

POSSIBLE CAUSE

NOTE:
Confirm if DTC is PAST or CRNT. If DTC is CRNT, proceed with Diagnosis Procedure. If DTC is PAST, clear DTC. Do not replace the ABS actuator and electric unit (control unit) for a PAST DTC.

PAST DTC	CRNT DTC
• Harness or connector • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery	• Harness or connector • Vacuum sensor (brake booster) • ABS actuator and electric unit (control unit) • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • 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.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Perform self-diagnosis for “ABS”.

Is DTC “C119A” detected?

YES-1 >> “CRNT” is displayed: Proceed to BRC-138, "Diagnosis Procedure".
YES-2 >> “PAST” is displayed: INSPECTION END (Erase the memory of self-diagnosis results.)
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000012471679

1.CHECK CONNECTOR

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

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair / replace harness or connector, and GO TO 2.

2.CHECK VACUUM SENSOR POWER SUPPLY

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

+		−	Voltage
Vacuum sensor			
Connector	Terminal		
E25	3	Ground	Approx. 0 V

4. Turn the ignition switch ON.
   NOTE:
   Start the engine.
5. Check the voltage between vacuum sensor harness connector and ground.

+		−	Voltage
Vacuum sensor			
Connector	Terminal		
E25	3	Ground	4.75 – 5.25 V

Is the inspection result normal?

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

3.CHECK VACUUM SENSOR POWER SUPPLY CIRCUIT

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

Vacuum sensor		ABS actuator and electric unit (control unit)		Continuity
Connector	Terminal	Connector	Terminal	
E25	3	E41	28	Existed

4. Check the continuity between vacuum sensor harness connector and ground.

Vacuum sensor		—	Continuity
Connector	Terminal		
E25	3	Ground	Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair / replace harness or connector.

4.CHECK VACUUM SENSOR GROUND CIRCUIT

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

Vacuum sensor		—	Continuity
Connector	Terminal		
E25	2	Ground	Not existed

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair / replace harness or connector.

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

Check the ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to BRC-143, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair / replace harness, connector, fuse, or fusible link.

6. CHECK TERMINAL

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

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".
NO >> Repair / replace harness, connector, or terminal.

U1000 CAN COMM CIRCUIT

Description

INFOID:0000000012471680

CAN communication allows a high rate of information transmission through the two communication lines (CAN-H line and CAN-L line) connecting various control units in the system. Each control unit transmits/ receives data but selectively reads required data only.

DTC Logic

INFOID:0000000012471681

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
U1000	CAN COMM CIRCUIT (CAN communication circuit)	When CAN communication signal is not continuously transmitted or received for 2 seconds or more.

POSSIBLE CAUSE

NOTE:
Confirm if DTC is PAST or CRNT. If DTC is CRNT, proceed with Diagnosis Procedure. If DTC is PAST, clear DTC. Do not replace the ABS actuator and electric unit (control unit) for a PAST DTC.

PAST DTC	CRNT DTC
• Harness or connector • CAN communication line	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.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Perform self-diagnosis for “ABS”.

Is DTC “U1000” detected?

YES-1 >> “CRNT” is displayed: Proceed to BRC-141, "Diagnosis Procedure".
YES-2 >> “PAST” is displayed: INSPECTION END (Erase the memory of self-diagnosis results.)
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000012471682

Proceed to LAN-27, "Trouble Diagnosis Flow Chart".

U0424 HVAC CAN CIRCUIT 1

Description

INFOID:0000000012471683

ADUS control unit reads status of signal that is transmitted from A/C auto AMP. to ADAS control unit.

DTC Logic

INFOID:0000000012471684

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
U0424	HVAC CAN CIR 1 (HVAC CAN circuit 1)	When signal that is transmitted from A/C auto AMP. is not the latest information

POSSIBLE CAUSE

NOTE:
Confirm if DTC is PAST or CRNT. If DTC is CRNT, proceed with Diagnosis Procedure. If DTC is PAST, clear DTC. Do not replace the ADAS control unit for a PAST DTC.

PAST DTC	CRNT DTC
• Harness or connector • CAN communication line	• Harness or connector • A/C auto AMP. • ADAS 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 (ADAS CONTROL UNIT)

1. Turn the ignition switch OFF to ON.
2. Perform “DTC CONFIRMATION PROCEDURE”. Refer to BRC-142, "DTC Logic".

Is DTC “U0424” detected?

YES-1 >> “CRNT” is displayed: Proceed to BRC-142, "Diagnosis Procedure".
YES-2 >> “PAST” is displayed: INSPECTION END (Erase the memory of self-diagnosis results.)
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000012471685

Proceed to BRC-142, "Diagnosis Procedure".

POWER SUPPLY AND GROUND CIRCUIT

Description

INFOID:0000000012471686

ABS actuator and electric unit (control unit) power supply

Diagnosis Procedure

INFOID:0000000012471687

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

+		–	Voltage
ABS actuator and electric unit (control unit)			
Connector	Terminal		
E41	34	Ground	Approx. 0 V

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

+		–	Voltage
ABS actuator and electric unit (control unit)			
Connector	Terminal		
E41	34	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 the 10A fuse (#46).
3. Disconnect IPDM E/R harness connector.
4. Check the continuity between ABS actuator and electric unit (control unit) harness connector and IPDM E/R harness connector.

ABS actuator and electric unit (control unit)		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
E41	34	E5	12	Existed

5. 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		
E41	34	Ground	No existed

Is the inspection result normal?

YES >> Perform trouble diagnosis for ignition power supply.
NO >> Repair / replace harness, connector, or fuse.

3.CHECK MOTOR AND MOTOR RELAY POWER SUPPLY

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

+		–	Voltage
ABS actuator and electric unit (control unit)			
Connector	Terminal		
E41	4	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 the 50A fusible link (#N).
3. Check the continuity and short circuit between ABS actuator and electric unit (control unit) harness connector terminal (4) and 50A fusible link (#N).

Is the inspection result normal?

YES >> Perform trouble diagnosis for battery power supply.
NO >> Repair / replace harness, connector, or fusible link.

5.CHECK ACTUATOR RELAY, ABS IN VALVE, ABS OUT VALVE POWER SUPPLY

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

+		–	Voltage
ABS actuator and electric unit (control unit)			
Connector	Terminal		
E41	3	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 the 30A fusible link (#M).
3. Check the continuity and short circuit between ABS actuator and electric unit (control unit) harness connector terminal (3) and 30A fusible link (#M).

Is the inspection result normal?

YES >> Perform trouble diagnosis for battery power supply.
NO >> Repair / replace harness, connector, or fusible link.

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

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E41	1	Ground	Existed
	2		

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair / replace harness, connector, or terminal.

8.CHECK TERMINAL

1. Check the ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with harness connector.
2. Check the IPDM E/R pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".

NO >> Repair / replace harness, connector, or terminal.

PARKING BRAKE SWITCH

Component Function Check

INFOID:0000000012355959

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-146, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000012355960

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-147, "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-32, "CONSULT Function".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace combination meter. Refer to MWI-96, "Removal and Installation".

5. CHECK TERMINAL

- Check combination meter pin terminals for damage or loose connection with harness connector.
- 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-165, "Removal and Installation".
NO >> Repair or replace error-detected parts.

Component Inspection

INFOID:0000000012355961

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:0000000012355962

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-148, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000012355963

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 triple 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	
E41	30	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		
E41	30	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-149, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace VDC OFF switch. Refer to BRC-169, "Removal and Installation".

4.CHECK VDC OFF SWITCH SIGNAL

With CONSULT

1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Connect triple 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

- Check ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with harness connector.
- Check triple 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-165, "Removal and Installation".
NO >> Repair or replace error-detected parts.

Component Inspection

INFOID:0000000012355964

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-169, "Removal and Installation".

ABS WARNING LAMP

Component Function Check

INFOID:0000000012355965

1.CHECK ABS WARNING LAMP FUNCTION

Check that ABS warning lamp turns ON for approx. 1 second after ignition switch is turned ON.

CAUTION:

Never start engine.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to diagnosis procedure. Refer to BRC-150, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000012355966

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

Perform diagnosis of ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to BRC-143, "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

Perform self-diagnosis for “ABS”.

Is any DTC detected?

YES >> Check the DTC. Refer to BRC-49, "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 approx. 1 second after ignition switch is turned ON, and then changes to “Off”.

   CAUTION:

   Never start engine.

Is the inspection result normal?

YES >> Check combination meter. Refer to MWI-32, "CONSULT Function".

NO >> Replace ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".

BRAKE WARNING LAMP

Component Function Check

INFOID:0000000012355967

1.CHECK BRAKE WARNING LAMP FUNCTION (1)

Check that brake warning lamp turns ON for approx. 1 second after ignition switch is turned ON.

CAUTION:

Never start engine.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Proceed to diagnosis procedure. Refer to BRC-151, "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 brake fluid level switch system. Refer to BRC-146, "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-121, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000012355968

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

Perform diagnosis of ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to BRC-143, "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

Perform self-diagnosis for “ABS”.

Is any DTC detected?

YES >> Check the DTC. Refer to BRC-49, "DTC Index".

NO >> GO TO 3.

3.CHECK THAT BRAKE WARNING LAMP TURNS ON

Check combination meter. Refer to MWI-32, "CONSULT Function".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".

NO >> Replace combination meter. Refer to MWI-95, "Removal and Installation".

VDC WARNING LAMP

Component Function Check

INFOID:0000000012355969

1.CHECK VDC WARNING LAMP FUNCTION

Check that VDC warning lamp turns ON for approx. 1 second after ignition switch is turned ON.

CAUTION:

Never start engine.

Is the inspection result normal?

YES >> INSPECTION END

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

Diagnosis Procedure

INFOID:0000000012355970

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

Perform diagnosis of ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to BRC-143, "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

Perform self-diagnosis for “ABS”.

Is any DTC detected?

YES >> Check the DTC. Refer to BRC-49, "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. 1 second after ignition switch is turned ON, and then changes to “Off”.

   CAUTION:

   Never start engine.

Is the inspection result normal?

YES >> Check combination meter. Refer to MWI-32, "CONSULT Function".

NO >> Replace ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".

VDC OFF INDICATOR LAMP

Component Function Check

INFOID:0000000012355971

1.CHECK VDC OFF INDICATOR LAMP FUNCTION (1)

Check that VDC OFF indicator lamp turns ON for approx. 1 second after ignition switch is turned ON.

CAUTION:

Never start engine.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Proceed to diagnosis procedure. Refer to BRC-153, "Diagnosis Procedure".

2.CHECK VDC WARNING LAMP FUNCTION (2)

Check that VDC OFF indicator lamp 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-148, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000012355972

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

Perform diagnosis of ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to BRC-143, "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 approx. 1 second after ignition switch is turned ON, and then changes to “Off”.

   CAUTION:

   Never start engine.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Replace ABS actuator and electric unit (control unit). Refer to BRC-165, "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-32, "CONSULT Function".

NO >> Check VDC OFF switch system. Refer to BRC-148, "Diagnosis Procedure".

SYMPTOM DIAGNOSIS

EXCESSIVE OPERATION FREQUENCY

Description

INFOID:0000000012355973

VDC function, TCS function, ABS function, EBD function, hill start assist function, Rise-up & Build-up function or Brake force distribution function operates in excessive operation frequency.

Diagnosis Procedure

INFOID:0000000012355974

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
  - 2WD: Refer to FAX-7, "Inspection".
  - AWD: Refer to FAX-16, "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-161, "FRONT WHEEL SENSOR : Removal and Installation".
- Rear wheel sensor: Refer to BRC-162, "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-164, "FRONT SENSOR ROTOR : Removal and Installation".
- Rear sensor rotor: Refer to BRC-164, "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 >> Perform self-diagnosis for “ABS” with CONSULT.

UNEXPECTED BRAKE PEDAL REACTION

Description

INFOID:0000000012355975

A malfunction of brake pedal feel (height or others) is detected when brake pedal is depressed.

Diagnosis Procedure

INFOID:0000000012355976

1.CHECK FRONT AND REAR AXLE

Check that there is no excessive looseness in front and rear axle.
- Front axle
- 2WD: Refer to FAX-7, "Inspection".
- AWD: Refer to FAX-16, "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-17, "DISC ROTOR : Inspection and Adjustment".
- Rear: Refer to BR-19, "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-29, "FRONT : Inspection".
- Rear: Refer to BR-34, "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-10, "Inspection and Adjustment".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Adjust each item of brake pedal. Refer to BR-10, "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:0000000012355977

Brake stopping distance is long when ABS function is operated.

Diagnosis Procedure

INFOID:0000000012355978

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.

DOES NOT OPERATE

Description

INFOID:0000000012355979

VDC function, TCS function, ABS function, EBD function, hill start assist function, Rise-up & Build-up function or Brake force distribution function does not operate.

Diagnosis Procedure

INFOID:0000000012355980

CAUTION:

- **VDC function, TCS function, ABS function, EBD function, hill start assist function, Rise-up & Build-up function and Brake force distribution function never operate when the vehicle speed is 10 km/h (6.2 MPH) or less. However, hill start assist 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 >> Perform self-diagnosis for “ABS” with CONSULT.

BRAKE PEDAL VIBRATION OR OPERATION SOUND OCCURS

Description

INFOID:0000000012355981

- Brake pedal vibrates and motor sound from ABS actuator and electric unit (control unit) occurs, when the engine starts.
- 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:0000000012355982

1.SYMPTOM CHECK 1

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

Do vibrations occur?

YES >> GO TO 2.
NO >> Check brake pedal. Refer to BR-22, "Inspection and Adjustment".

2.SYMPTOM CHECK 2

Check that motor sound from ABS actuator occurs when the engine starts.

Does the operation sound occur?

YES >> GO TO 3.
NO >> Perform self-diagnosis for “ABS” with CONSULT.

3.SYMPTOM CHECK 3

Check symptoms when electrical component (head lamps, 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 >> Normal

VEHICLE JERKS DURING

Description

INFOID:0000000012355983

The vehicle jerks when VDC function, TCS function, ABS function, EBD function, hill start assist function, Rise-up & Build-up function or Brake force distribution function operates.

Diagnosis Procedure

INFOID:0000000012355984

1.CHECK SYMPTOM

Check that the vehicle jerks when VDC function, TCS function, ABS function, EBD function, hill start assist function, Rise-up & Build-up function or Brake force distribution function operates.

Is the inspection result normal?

YES >> Normal
NO >> GO TO 2.

2.PERFORM THE SELF-DIAGNOSIS

With CONSULT
Perform self-diagnosis for “ABS”.

Is any DTC detected?

YES >> Check the DTC. Refer to BRC-49, "DTC Index".
NO >> GO TO 3.

3.CHECK CONNECTOR

With CONSULT
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.
4. Connect harness connector and perform self-diagnosis for “ABS” again.

Is the inspection result normal?

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

4.CHECK ECM AND TCM SELF-DIAGNOSIS RESULTS

With CONSULT
Perform self-diagnosis for “ENGINE” and “TRANSMISSION”.

Is any DTC detected?

YES >> Check the DTC.
NO >> Replace ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".

NORMAL OPERATING CONDITION

Description

INFOID:0000000012355985

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, hill start assist function, Rise-up & Build-up function, Brake force distribution function or Active trace control function operates.	This is not a malfunction, because it is caused by VDC function, TCS function, ABS function, EBD function, hill start assist function, Rise-up & Build-up function, Brake force distribution function and Active trace control 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, Rise-up & Build-up function, Brake force distribution function or Active trace control function is operated.	
Brake pedal vibrates and motor sound from the engine room occurs, when the engine starts 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.	
ABS warning lamp and 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.	In this case, restart the engine 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.
VDC warning lamp may turn ON and VDC function, TCS function, Rise-up & Build-up function, Brake force distribution function and Active trace control 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, Rise-up & Build-up function, Brake force distribution function and Active trace control 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.)

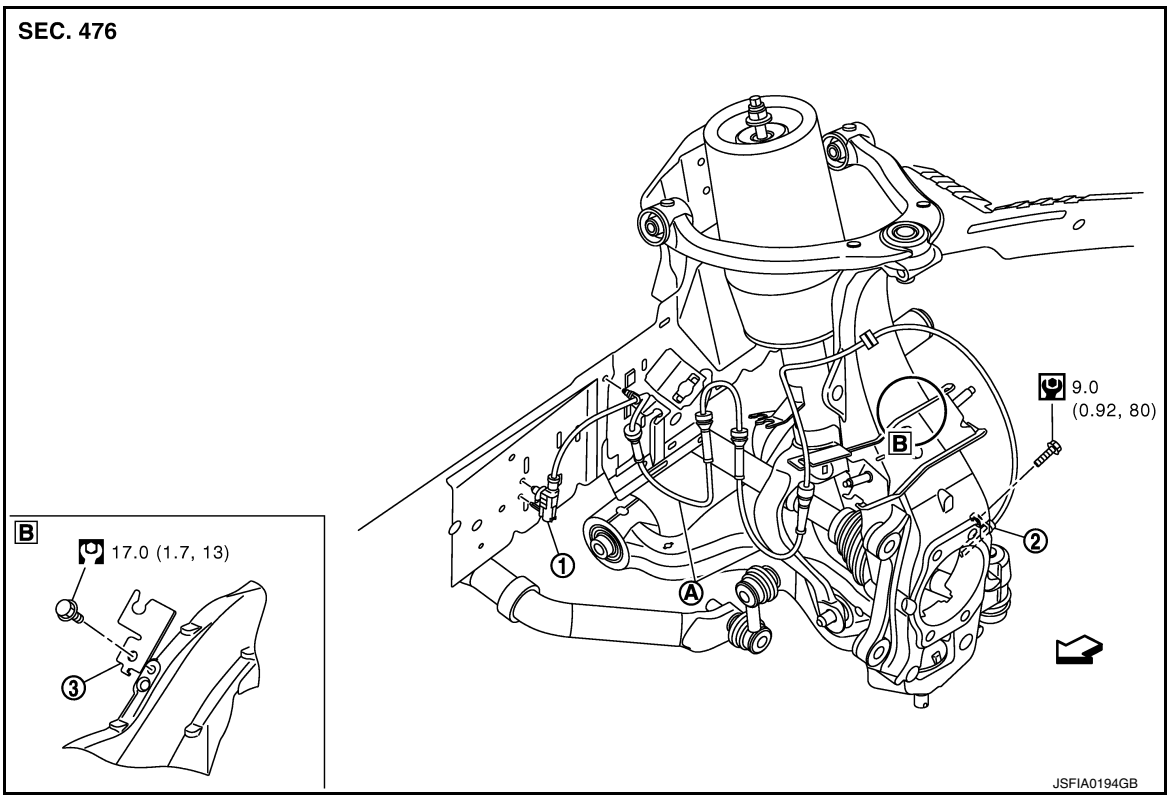
REMOVAL AND INSTALLATION

WHEEL SENSOR

FRONT WHEEL SENSOR

FRONT WHEEL SENSOR : Exploded View

INFOID:0000000012355986



① Front LH wheel sensor harness connector ② Front LH wheel sensor ③ Bracket

Ⓐ Identification line

⇦ : Vehicle front

:N·m (kg-m, ft-lb)

:N·m (kg-m, in-lb)

NOTE:
Front RH wheel sensor is symmetrically opposite of LH.

FRONT WHEEL SENSOR : Removal and Installation

INFOID:0000000012355987

REMOVAL

1. Remove tires with power tool.
2. Remove the fender protector (front). Refer to EXT-26, "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.

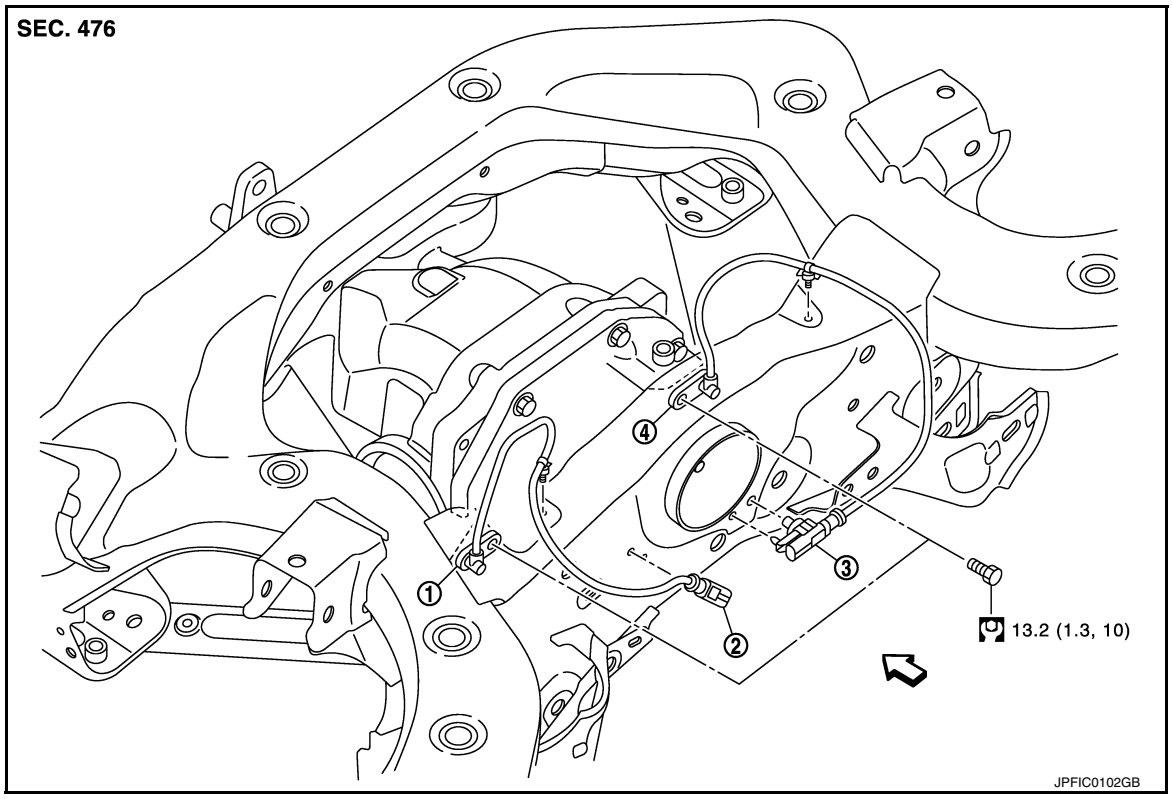
CAUTION:

Check that front wheel sensor identification line faces toward the vehicle front.

REAR WHEEL SENSOR

REAR WHEEL SENSOR : Exploded View

INFOID:0000000012355988



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
: N·m (kg-m, ft-lb)

REAR WHEEL SENSOR : Removal and Installation

INFOID:0000000012355989

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:0000000012355990

REMOVAL

Replace wheel hub as an assembly when replacing because sensor rotor cannot be disassembled. Refer to FAX-8, "Removal and Installation" (2WD models), FAX-18, "Removal and Installation" (AWD models).

INSTALLATION

Replace wheel hub as an assembly when replacing because sensor rotor cannot be disassembled. Refer to FAX-8, "Removal and Installation" (2WD models), FAX-18, "Removal and Installation" (AWD models).

REAR SENSOR ROTOR

REAR SENSOR ROTOR : Removal and Installation

INFOID:0000000012355991

REMOVAL

1. Remove drive shaft. Refer to RAX-13, "Removal and Installation".
2. Remove sensor rotor from rear drive shaft. Refer to RAX-17, "FINAL DRIVE SIDE : Disassembly and Assembly".

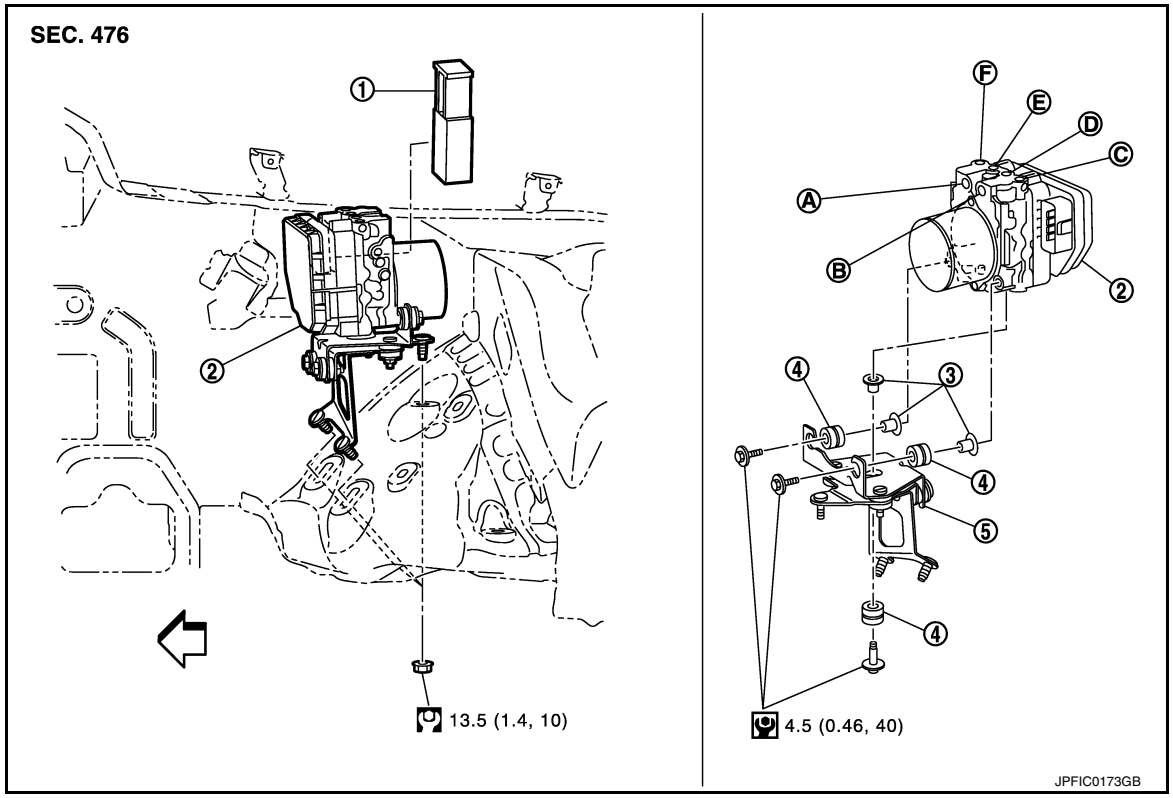
INSTALLATION

Installation is the reverse order of removal.

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Exploded View

INFOID:0000000012355992



① ABS actuator and electric unit (control unit) harness connector	② ABS actuator and electric unit (control unit)	③ Collar
④ Bushing	⑤ Bracket	
Ⓐ To master cylinder secondary side	Ⓑ To master cylinder primary side	Ⓒ To front LH caliper
Ⓓ To rear RH caliper	Ⓔ To rear LH caliper	Ⓕ To front RH caliper

⇦ : Vehicle front

:N·m (kg-m, ft-lb)

:N·m (kg-m, in-lb)

Removal and Installation

INFOID:0000000012355993

REMOVAL

1. Disconnect battery cable from negative terminal.
2. Remove brake master cylinder cover and hood ledge cover. Refer to EXT-23, "Removal and Installation".
3. Drain brake fluid. Refer to BR-13, "Draining".
4. Disconnect ABS actuator and electric unit (control unit) harness connector.
5. 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-23, "FRONT : Exploded View".
6. Remove front RH tire with power tool.
7. Remove fender protector (rear) (front RH wheel). Refer to EXT-26, "FENDER PROTECTOR : Removal and Installation".
8. 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.**

9. Remove bracket, bushing and collar from ABS actuator and electric unit (control unit).

INSTALLATION

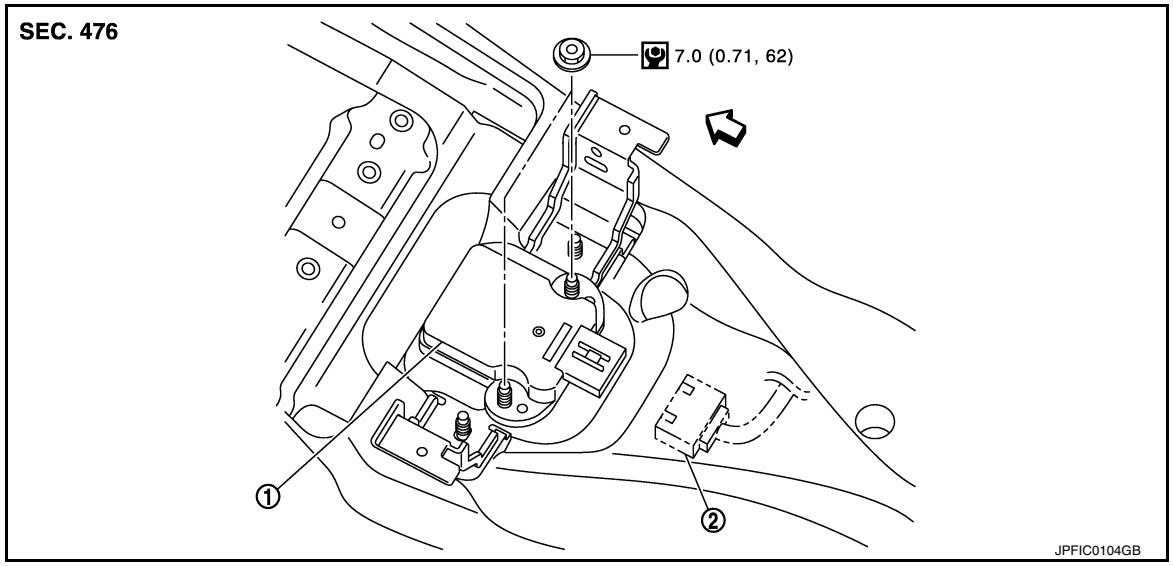
Note the following, and install in the reverse order of removal.

- 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-23, "FRONT : Exploded View".
- Never remove and install actuator by holding actuator harness.
- Bleed air from brake piping after installation. Refer to BR-14, "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 decel G sensor calibration when ABS actuator and electric unit (control unit) is replaced. Refer to BRC-69, "Description".

YAW RATE/SIDE/DECEL G SENSOR

Exploded View

INFOID:0000000012355994



① Yaw rate/side/decel G sensor

② Yaw rate/side/decel G sensor harness connector

⇦ : Vehicle front

:N·m (kg-m, in-lb)

Removal and Installation

INFOID:0000000012355995

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.
- Perform decel G sensor calibration when yaw rate/side/decel G sensor is replaced. Refer to BRC-69, "Description".

STEERING ANGLE SENSOR

Removal and Installation

INFOID:0000000012355996

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.

VDC OFF SWITCH

Removal and Installation

INFOID:0000000012355997

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.
3. Remove VDC OFF switch.

INSTALLATION

Installation is the reverse order of removal.

PRECAUTION

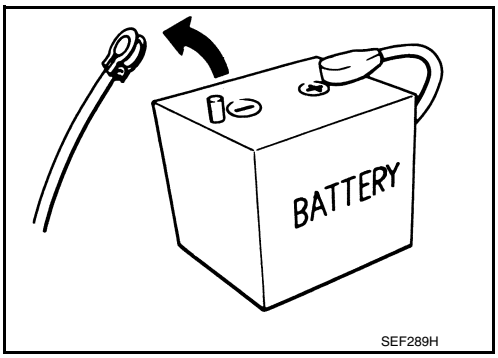
PRECAUTIONS

Precautions for Removing Battery Terminal

INFOID:0000000013051262

When disconnecting the battery terminal, pay attention to the following.
- Always use a 12V battery as power source.
- Never disconnect battery terminal while engine is running.
- When removing the 12V battery terminal, turn OFF the ignition switch and wait at least 30 seconds.
- For vehicles with the engine listed below, remove the battery terminal after a lapse of the specified time:

D4D engine	: 20 minutes	YS23DDT	: 4 minutes
HRA2DDT	: 12 minutes	YS23DDTT	: 4 minutes
K9K engine	: 4 minutes	ZD30DDTi	: 60 seconds
M9R engine	: 4 minutes	ZD30DDTT	: 60 seconds
R9M engine	: 4 minutes		
V9X engine	: 4 minutes		
YD25DDTi	: 2 minutes		



NOTE:
ECU may be active for several tens of seconds after the ignition switch is turned OFF. If the battery terminal is removed before ECU stops, then a DTC detection error or ECU data corruption may occur.
- After high-load driving, if the vehicle is equipped with the V9X engine, turn the ignition switch OFF and wait for at least 15 minutes to remove the battery terminal.

NOTE:
- Turbocharger cooling pump may operate in a few minutes after the ignition switch is turned OFF.
- Example of high-load driving
  - Driving for 30 minutes or more at 140 km/h (86 MPH) or more.
  - Driving for 30 minutes or more on a steep slope.
- For vehicles with the 2-batteries, be sure to connect the main battery and the sub battery before turning ON the ignition switch.

NOTE:
If the ignition switch is turned ON with any one of the terminals of main battery and sub battery disconnected, then DTC may be detected.
- After installing the 12V battery, always check "Self Diagnosis Result" of all ECUs and erase DTC.

NOTE:
The removal of 12V battery may cause a DTC detection error.

Precautions for FEB System Service

INFOID:0000000012355999

CAUTION:
- **Erase DTC when replacing parts of ICC system. Then check the operation of ICC system after radar alignment if necessary.**
- **Never change FEB system state ON/OFF without the consent of the customer.**
- **Turn the FEB system OFF in conditions similar to driving, such as free rollers or a chassis dynamometer.**

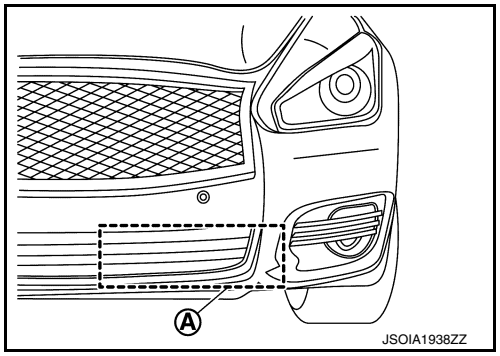
PRECAUTION FOR ISS SENSOR

- Never use the ICC sensor removed from vehicle. Never disassemble or remodel.

- Never install a part that the radar irradiation range Ⓐ is interfered with.
- If a part interferes with the radar irradiation range, then the following conditions are caused:

- The condition of ICC sensor becomes equal to an unclean condition, and this makes it difficult to measure the distance between cars.
- When it is impossible to measure the distance between cars, the following functions stop and DTC is detected.

- Forward Emergency Braking (FEB)
- Intelligent Cruise Control (ICC)
- Distance Control Assist (DCA)
- Predictive Forward Collision Warning (PFCW)

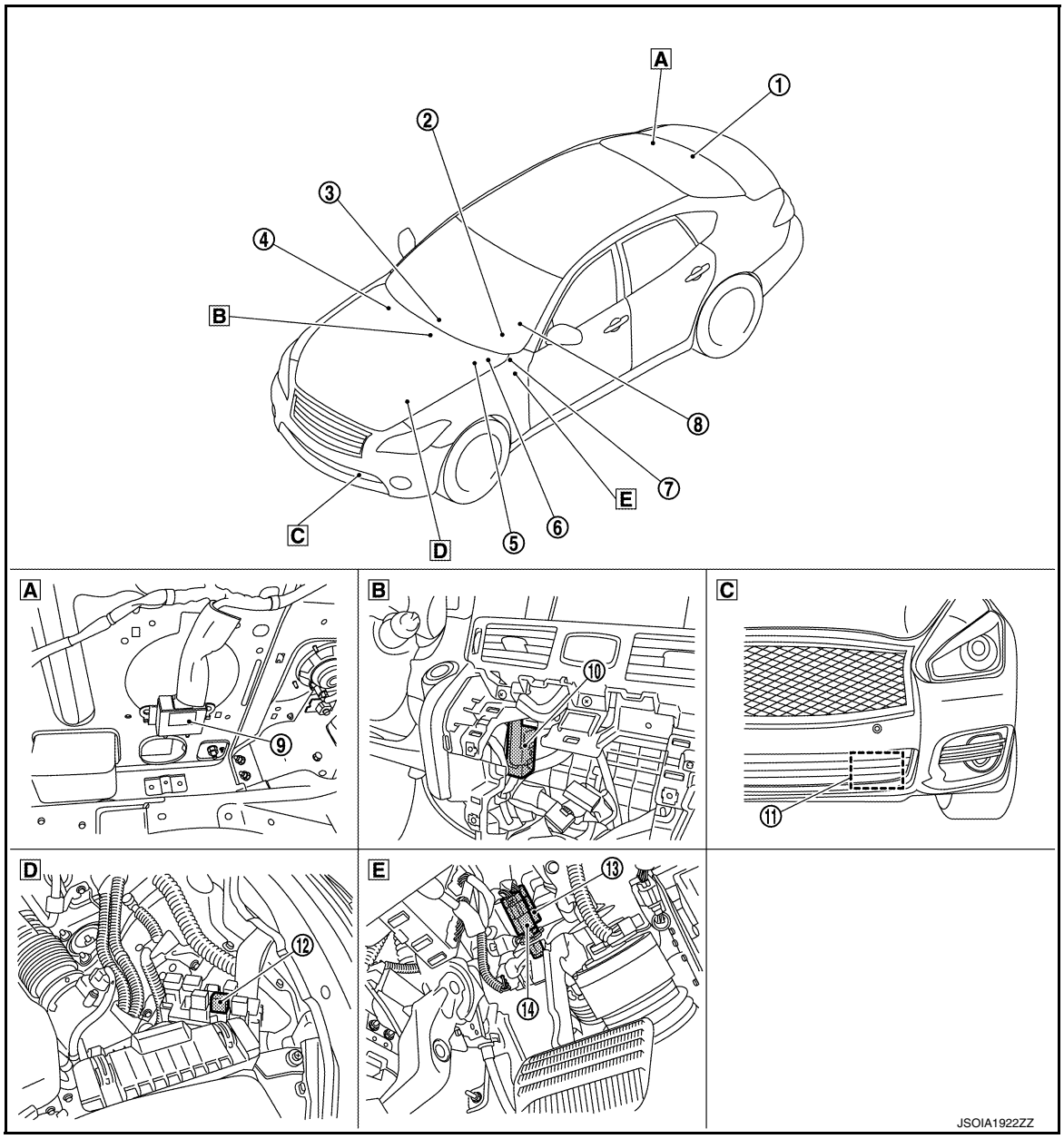


SYSTEM DESCRIPTION

COMPONENT PARTS

Component Parts Location

INFOID:0000000012356000



A Trunk side of rear parcel shelf (RH)
B Behind of AV control unit
C Front bumper (LH)
D Engine room (LH)
E Upper side of brake pedal

No.	Component	Description
①	ADAS control unit	• Refer to BRC-173, "ADAS Control Unit" • Refer to DAS-12, "Component Parts Location" for detailed installation location.
②	Combination meter	• Performs the following operations using the signals received from the ADAS control unit via the CAN communication - Displays the FEB system operation status using the meter display signal - Illuminates the FEB warning lamp using the FEB warning lamp signal • Refer to MWI-7, "METER SYSTEM : Component Parts Location" for detailed installation location.
③	AV control unit	• AV control unit transmits the system selection signal to the ADAS control unit via CAN communication • Refer to AV-13, "Component Parts Location" (Base audio without navigation), or AV-150, "Component Parts Location" (BOSE audio with navigation) for detailed installation location.
④	ECM	• ECM transmits the accelerator pedal position signal via CAN communication • Refer to EC-37, "ENGINE CONTROL SYSTEM : Component Parts Location" (VQ37VHR for USA and Canada), EC-569, "ENGINE CONTROL SYSTEM : Component Parts Location" (VQ37VHR for Mexico), EC-987, "ENGINE CONTROL SYSTEM : Component Parts Location" (VK56VD for USA and Canada), EC-1579, "ENGINE CONTROL SYSTEM : Component Parts Location" (VK56VD for Mexico) for detailed installation location.
⑤	ABS actuator and electric unit (control unit)	• ABS actuator and electric unit (control unit) transmits the vehicle speed signal (wheel speed), stop lamp signal and VDC/TCS/ABS system operation condition to ADAS control unit via CAN communication • ABS actuator and electric unit (control unit) controls the brake, based on a brake fluid pressure control signal received from ADAS control unit via CAN communication • Refer to BRC-10, "Component Parts Location" for detailed installation location.
⑥	TCM	• TCM transmits the signal related to A/T control to ADAS control unit via CAN communication • Refer to TM-11, "A/T CONTROL SYSTEM : Component Parts Location" for detailed installation location.
⑦	Accelerator pedal actuator	Accelerator pedal actuator receives an accelerator pedal feedback force control signal from the ADAS control unit via ITS communication and pushes back the accelerator pedal
⑧	Steering angle sensor	• Measures the rotation amount, rotation speed, and rotation direction of steering wheel, and then transmits them o ADAS control unit via CAN communication • Refer to BRC-10, "Component Parts Location" for detailed installation location.
⑨	Driver assistance buzzer control module	Refer to BRC-174, "Driver Assistance Buzzer Control Module"
⑩	Driver assistance buzzer	Refer to BRC-174, "Driver Assistance Buzzer"
⑪	ICC sensor	Refer to BRC-173, "ICC Sensor"
⑫	ICC brake hold relay	Refer to BRC-174, "ICC Brake Hold Relay"
⑬	Stop lamp switch	Refer to BRC-174, "ICC Brake Switch / Stop Lamp Switch"
⑭	ICC brake switch	

ADAS Control Unit

INFOID:0000000012356001

- ADAS control unit is installed at trunk side of rear parcel shelf (center).
- Communicates with each control unit via CAN communication and ITS communication.
- ADAS control unit included gateway function, and necessary for system control signals are transmitted to each control unit between CAN communication and ITS communication by the ADAS control unit.
- ADAS control unit controls the each system, based on ITS communication signal and CAN communication signal from each control unit.

ICC Sensor

INFOID:0000000012356002

- ICC sensor is installed on the back of the front bumper and detects a vehicle ahead by using millimeter waves.

- ICC sensor detects radar reflected from a vehicle ahead by irradiating radar forward and calculates a distance from the vehicle ahead and 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.

ICC Brake Switch / Stop Lamp Switch

INFOID:0000000012356003

- ICC brake switch is installed at the upper part of the brake pedal and detects a brake operation performed by the driver.
- ICC brake switch is turned OFF when depressing the brake pedal.
- ICC brake switch signal is input to ECM. ICC brake switch signal is transmitted from ECM to ADAS control unit via CAN communication.
- Stop lamp switch is installed at the upper part of the brake pedal and detects a brake operation performed by the driver.
- Stop lamp switch is turned ON, when depressing the brake pedal.
- Stop lamp switch signal is input to ECM and ABS actuator and electric unit (control unit). Stop lamp switch signals are transmitted from ECM and ABS actuator and electric unit (control unit) to ADAS control unit via CAN communication.

ICC Brake Hold Relay

INFOID:0000000012356004

- ICC brake hold relay is installed in the engine room (right side).
- When the brake is activated by the ICC system, the ICC brake hold relay turns ON the stop lamp by bypassing the circuit of the stop lamp, according to a signal transmitted from the ADAS control unit.

Accelerator Pedal Actuator

INFOID:0000000012356005

- Installed to the upper portion of the accelerator pedal, this consists of the accelerator pedal actuator together with the accelerator pedal position sensor, and is linked with the accelerator pedal.
- If accelerator pedal feedback force control signal is received from ADAS control unit via ITS communication, it operates the integrated motor for applying control to move the accelerator pedal upward.

Driver Assistance Buzzer Control Module

INFOID:0000000012356006

- Driver assistance buzzer control module is installed at trunk side of rear parcel shelf (right side).
- When driver assistance buzzer signal is received from the ADAS control unit, the driver assistance buzzer control module transmits the warning buzzer signal to driver assistance buzzer.

Driver Assistance Buzzer

INFOID:0000000012356007

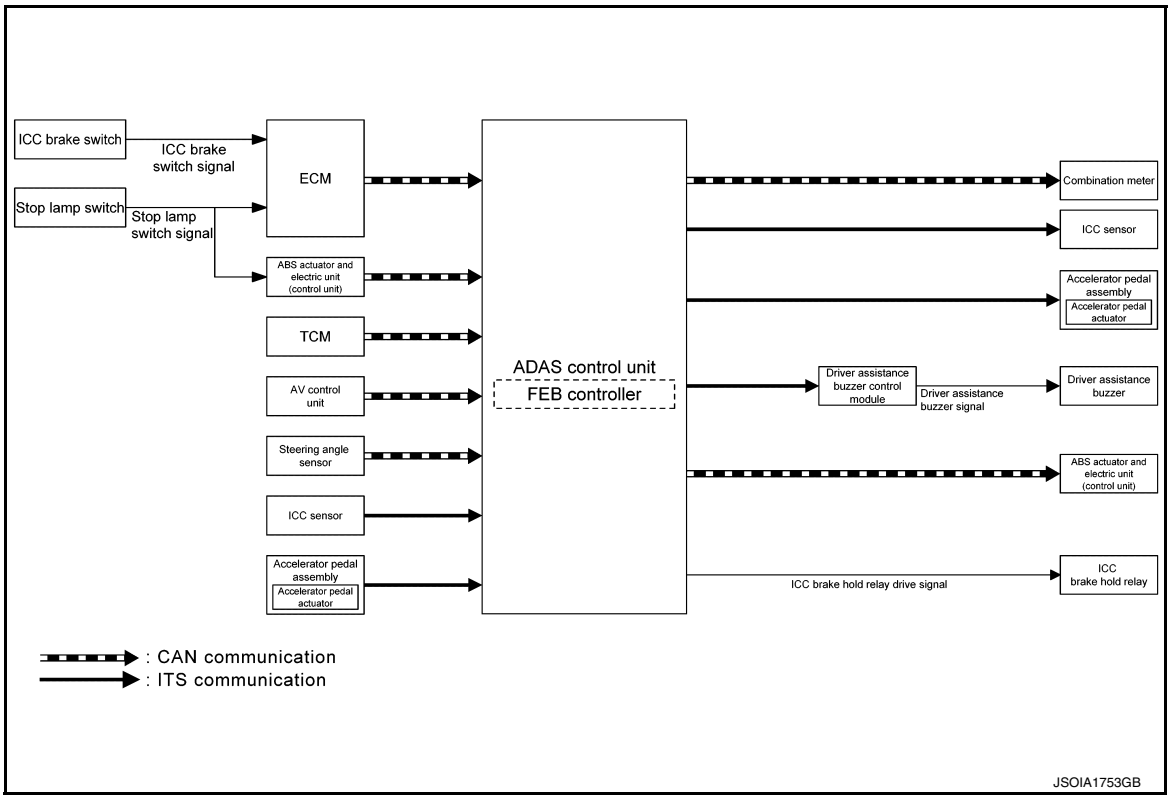
- Driver assistance buzzer is installed at the behind the AV control unit.
- When a warning buzzer signal is received from the driver assistance buzzer control module, the driver assistance buzzer sounds a buzzer.

SYSTEM

System Description

INFOID:0000000012356008

SYSTEM DIAGRAM



ADAS CONTROL UNIT INPUT/OUTPUT SIGNAL ITEM

Input Signal Item

Transmit unit	Signal name		Description
ECM	CAN communication	Closed throttle position signal	Receives idle position state (ON/OFF)
		Accelerator pedal position signal	Receives accelerator pedal position (angle)
		Engine speed signal	Receives engine speed
		Stop lamp switch signal	Receives an operational state of the brake pedal
		ICC brake switch signal	Receives an operational state of the brake pedal
TCM	CAN communication	Input speed signal	Receives the number of revolutions of input shaft
		Current gear position signal	Receives a current gear position
		Shift position signal	Receives a selector lever position
		Output shaft revolution signal	Receives the number of revolutions of output shaft

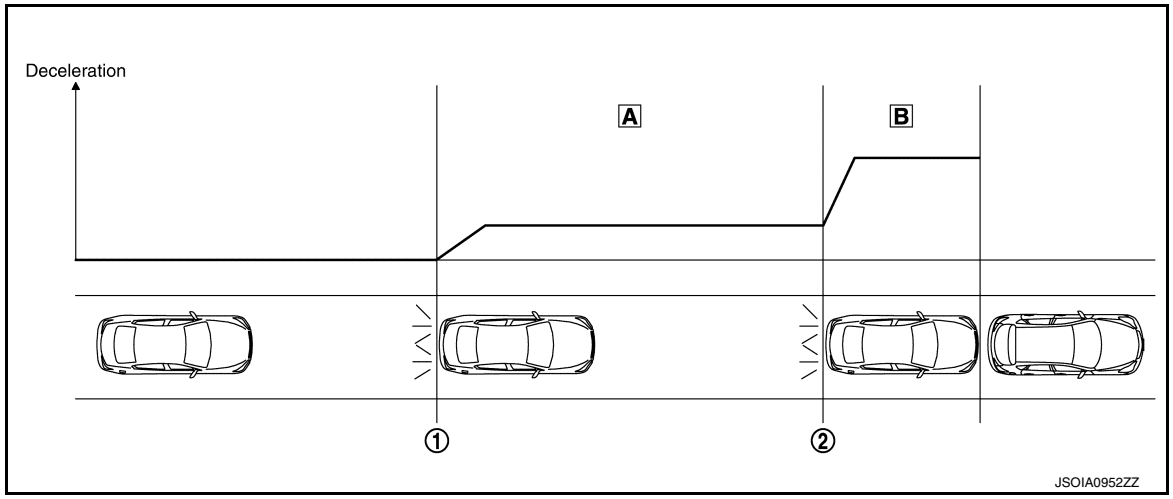
Transmit unit	Signal name		Description
ABS actuator and electric unit (control unit)	CAN communication	ABS malfunction signal	Receives a malfunction state of ABS
		ABS operation signal	Receives an operational state of ABS
		ABS warning lamp signal	Receives an ON/OFF state of ABS warning lamp
		TCS malfunction signal	Receives a malfunction state of TCS
		TCS operation signal	Receives an operational state of TCS
		VDC OFF switch signal	Receives an ON/OFF state of VDC
		VDC malfunction signal	Receives a malfunction state of VDC
		VDC operation signal	Receives an operational state of VDC
		Vehicle speed signal (ABS)	Receives wheel speeds of four wheels
		Yaw rate signal	Receives yaw rate acting on the vehicle
		Stop lamp switch signal	Receives an operational state of the brake pedal
AV control unit	CAN communication	System selection signal	Receives a selection state of each item in “Driver Assistance” selected with the navigation screen
Steering angle sensor	CAN communication	Steering angle sensor malfunction signal	Receives a malfunction of steering angle sensor
		Steering angle sensor signal	Receives the number of revolutions, turning direction of the steering wheel
		Steering angle speed signal	Receives the turning angle speed of the steering wheel
ICC sensor	ITS communication	ICC sensor signal	Receives detection results, such as the presence or absence of a leading vehicle and distance from the vehicle
Accelerator pedal actuator	ITS communication	Accelerator pedal actuator operation status signal	Receives an operational state of accelerator pedal actuator

Output Signal Item

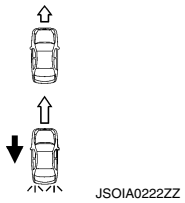
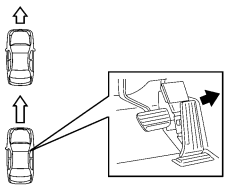
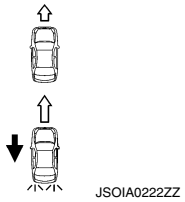
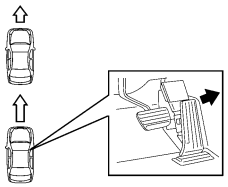
Reception unit	Signal name			Description
ABS actuator and electric unit (control unit)	CAN communication	Brake fluid pressure control signal		Transmits a brake fluid pressure control signal to activates the brake
Combination meter	CAN communication	Meter display signal	Vehicle ahead detection indicator signal	Transmits a signal to display a state of the system on the information display
			FEB/PFCW system display signal	
			FEB warning signal	
ICC sensor	ITS communication	Vehicle speed signal		Transmits a vehicle speed calculated by the ADAS control unit
		Steering angle sensor signal		Transmits a steering angle sensor signal received from the steering angle sensor
Accelerator pedal actuator	ITS communication	Accelerator pedal position signal		Transmits an accelerator pedal angle calculated by the ADAS control unit
		Accelerator pedal feedback force control signal		Transmits a target actuation force value calculated by the ADAS control unit
Driver assistance buzzer control module	ITS communication	Driver assistance buzzer signal		Transmits a driver assistance buzzer signal to active the buzzer
ICC brake hold relay	ICC brake hold relay drive signal			Activates the brake hold relay and turns ON the stop lamp

FUNCTION DESCRIPTION

- The FEB system measures the distance from a vehicle ahead using the ICC sensor installed in the front bumper.
- When the system judges that a vehicle is being approached, “approach warning” is displayed in the combination meter and at the same time a warning buzzer sounds, the accelerator pedal is moved upward, and the brake is operated.
- When it is further judged that the vehicle may collide with the vehicle ahead, the system operates the brake strongly to avoid collision while it displays FEB warning on the combination meter and rings a warning chime.



① Start of operation
② End of operation
A Applies partial braking and moves the accelerator pedal to upward direction
B Harder brake

Situation		Brake	Accelerator pedal actuator	Warning
No obstacle approached		No operation	No operation	—
①	Start of warning and partial brake	Partial brake  JSOIA0222ZZ	Operation  JSOIA0094ZZ	• Sounds the buzzer • Blinks vehicle ahead indicator
②	Start of harder brake	Harder brake  JSOIA0222ZZ	Operation  JSOIA0094ZZ	• Sounds the buzzer (Higher pitched buzzer) • Indicates FEB warning

CAUTION:
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 FEB system shares component parts and diagnosis with the ICC/DCA system.

OPERATION DESCRIPTION

- The ICC sensor measures the distance from the obstacle ahead and transmits the ICC sensor signal to the ADAS control unit.
- The ADAS control unit judges the possibility of a collision from the ICC sensor signal and the vehicle speed.

• The ADAS control unit performs the following operations according to the degree of possibility of a collision.
- Transmits the driver assistance buzzer signal to the driver assistance buzzer control module and sounds the buzzer.
- Transmits the meter display signal to the combination meter and displays the FEB warning.
- Transmits the accelerator pedal feedback force signal to the accelerator pedal actuator and moves the accelerator pedal upward to assist the driver to release the accelerator pedal.
- Transmits the brake fluid pressure control signal to the ABS actuator and electric unit (control unit) via CAN communication and performs the brake control.
- Transmits the ICC brake hold relay drive signal to the ICC brake hold relay and turns ON the stop lamp.

NOTE:
• ON/OFF of FEB/PFCW system is performed with the navigation screen.
• The FEB system will be automatically turned ON when the engine is restarted.
• The FEB system operates under the following conditions.
- The FEB system will function when the vehicle is driven at speeds of approximately 5 km/h (3 MPH) and above, and when the vehicle′s speed is approximately 5 km/h (3 MPH) faster than that of the vehicle ahead.

Operation Condition
ADAS control unit performs the control when the following conditions are satisfied.
• When the FEB system setting on the navigation screen is ON.
• When the vehicle speed is above approximately 5 km/h (3 MPH).
• There is a possibility of a collision with the vehicle ahead.

No Operation Condition
The ADAS control unit is not operate when the system is under the conditions of the no operation condition.
• When the FEB/PFCW system setting on the navigation screen is OFF.
• When the vehicle ahead is not detected.
• When the vehicle speed is below approximately 5 km/h (3 MPH).

Operation Cancellation Condition
The ADAS control unit cancels the operation when the system is under any conditions of the operation cancellation condition.
• When the system judges that the vehicle comes to a standstill by the system control.
• When the system malfunction occurs.
• When the ICC sensor area of the front bumper is dirty and the measurement of the distance between the vehicles becomes difficult.

Fail-safe (ADAS Control Unit)

INFOID:0000000012356009

If a malfunction occurs in each system, ADAS control unit cancels each control, sounds a beep, and turns ON the warning or indicator lamp.

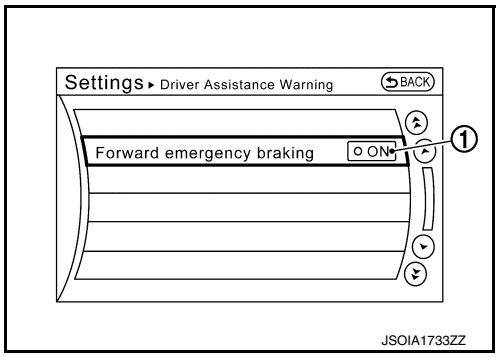
System	Buzzer	Warning lamp/Indicator lamp	Description
Vehicle-to-vehicle distance control mode	High-pitched tone	ICC system warning lamp	Cancel
Conventional (fixed speed) cruise control mode	High-pitched tone	ICC system warning lamp	Cancel
Forward Emergency Braking (FEB)	High-pitched tone	FEB warning lamp	Cancel
Predictive Forward Collision Warning (PFCW)	High-pitched tone	FEB warning lamp	Cancel
Distance Control Assist (DCA)	High-pitched tone	ICC system warning lamp	Cancel
Lane Departure Warning (LDW)	—	Lane departure warning lamp	Cancel
Lane Departure Prevention (LDP)	Low-pitched tone	Lane departure warning lamp	Cancel

System	Buzzer	Warning lamp/Indicator lamp	Description
Blind Spot Warning (BSW)	—	Blind Spot Warning/Blind spot Intervention warning lamp	Cancel
Blind Spot Intervention	Low-pitched tone	Blind Spot Warning/Blind spot Intervention warning lamp	Cancel
Back-up Collision Intervention (BCI)	High-pitched tone	BCI malfunction indicator	Cancel
Active trace control function	—	FEB warning lamp	• Cancel • If a communication error occurs between the A/C auto amp. and CAN communication line, a mode at the instant of error occurrence is maintained until the mode is fixed to STANDARD after turning the ignition switch from OFF to ON

OPERATION

Switch Name and Function

INFOID:0000000012356010

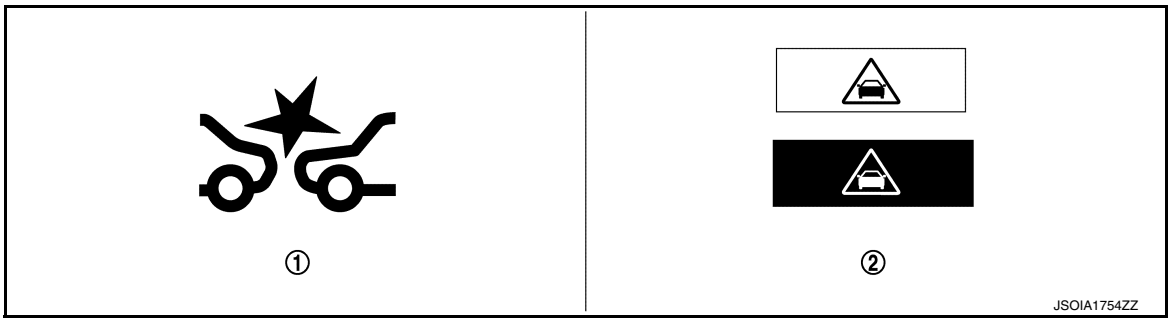


No.	Switch name	Description
①	FEB system setting screen (navigation system settings screen)	The setting of FEB/PFCW system can be switched between ON and OFF

Menu Displayed by Pressing Each Switch

INFOID:0000000012356011

SYSTEM DISPLAY



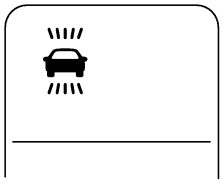
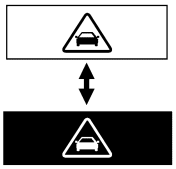
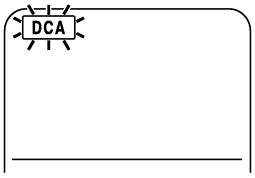
No.	Switch name	Description
①	FEB warning lamp	• FEB warning lamp indicates that an abnormal condition is present in FEB system • When the FEB system turns OFF, the FEB warning lamp will illuminate.
②	FEB warning	Displays immediately before the harder brake operates

DISPLAY AND WARNING

Warning Display

System status	Condition	Display on combination meter	FEB warning lamp	Buzzer
FEB OFF	—	—	ON	—
FEB ON	System ON	—	OFF	—
FEB system malfunction	The FEB system is automatically canceled. **NOTE:** The system operates if the ignition switch is turned OFF⇒ON after the condition improves	—	ON	Beep

Warning Operation

Condition	Action	Display on combination meter	FEB warning lamp	Buzzer
There is a possibility of a collision with the vehicle ahead	• Accelerator pedal actuation • Operates brake (Partial)	 JSOIA0134ZZ	OFF	Beep
An obstacle ahead is avoided due to the system applying braking.	Operates brake (Emergency)	 JSOIA1477ZZ	OFF	Continuous beeps
Dirt around the ICC sensor	The FEB system is automatically canceled. **NOTE:** The system operates if the ignition switch is turned OFF⇒ON after the condition improves	FRONT RADAR OBSTRUCTION JSOIA1755ZZ	ON	Beep
Accelerator pedal high temperature	The FEB system is automatically canceled. **NOTE:** The system operates if the ignition switch is turned OFF⇒ON after the condition improves	 JSOIA0210ZZ	ON	Beep

HANDLING PRECAUTION

Description

INFOID:0000000012356012

PRECAUTIONS FOR FORWARD EMERGENCY BRAKING

- The forward emergency braking system is a supplemental aid to the driver. It is not a replacement for the driver′s attention to traffic conditions or responsibility to drive safely. It cannot prevent accidents due to carelessness or dangerous driving techniques.
- The forward emergency braking system does not function in all driving, traffic, weather and road conditions.
- The automatic braking will cease under the following conditions:
  - When the steering wheel is turned as far as necessary to avoid a collision.
  - When the accelerator pedal is depressed.
  - When there is no longer a vehicle detected ahead.
- If the forward emergency braking system has stopped the vehicle, the vehicle will remain at a standstill for approximately 2 seconds before the brakes are released.
- The system will not detect the following objects:
  - Pedestrians, animals, or obstacles in the roadway
  - Oncoming vehicles in the same lane
  - Crossing vehicles
- The radar sensor has some performance limitations. For stationary vehicles, the forward emergency braking system can function at speeds up to approximately 70 km/h (45 MPH).
- The radar sensor may not detect a vehicle ahead in the following conditions:
  - Dirt, ice, snow or other material covering the radar sensor.
  - Interference by other radar sources.
  - Snow or road spray from traveling vehicles.
  - If the vehicle ahead is narrow (e.g.motorcycle)
  - When driving on a steep downhill slope or roads with sharp curves.
- In some road or traffic conditions, the forward emergency braking system may unexpectedly push the accelerator pedal up or apply partial braking. When acceleration is necessary, continue to depress the accelerator pedal to override the system.
- Braking distances increase on slippery surfaces.
- Excessive noise will interfere with the warning chime sound, and the chime may not be heard.

ECU DIAGNOSIS INFORMATION

ADAS CONTROL UNIT

Reference Value

INFOID:0000000012356013

VALUES ON THE DIAGNOSIS TOOL

NOTE:
The following table includes information (items) inapplicable to this vehicle. For information (items) applicable to this vehicle, refer to CONSULT display items.

Monitor item	Condition		Value/Status
MAIN SW	Ignition switch ON	When MAIN switch is pressed	On
		When MAIN switch is not pressed	Off
SET/COAST SW	Ignition switch ON	When SET/COAST switch is pressed	On
		When SET/COAST switch is not pressed	Off
CANCEL SW	Ignition switch ON	When CANCEL switch is pressed	On
		When CANCEL switch is not pressed	Off
RESUME/ACC SW	Ignition switch ON	When RESUME/ACCELERATE switch is pressed	On
		When RESUME/ACCELERATE switch is not pressed	Off
DISTANCE SW	Ignition switch ON	When DISTANCE switch is pressed	On
		When DISTANCE switch is not pressed	Off
CRUISE OPE	Drive the vehicle and activate the vehicle-to-vehicle distance control mode	When ICC system is controlling	On
		When ICC system is not controlling	Off
ON ROOT GUIDANCE	**NOTE:** The item is displayed, but not used		Off
BRAKE SW	Ignition switch ON	When brake pedal is depressed	Off
		When brake pedal is not depressed	On
STOP LAMP SW	Ignition switch ON	When brake pedal is depressed	On
		When brake pedal is not depressed	Off
CLUTCH SW SIG	**NOTE:** The item is displayed, but not used		Off
IDLE SW	Engine running	Idling	On
		Except idling (depress accelerator pedal)	Off
SET DISTANCE	• Start the engine and turn the ICC system ON • Press the DISTANCE switch to change the vehicle-to-vehicle distance setting	When set to “long”	Long
		When set to “middle”	Mid
		When set to “short”	Short
CRUISE LAMP	Start the engine and press MAIN switch	ICC system ON (MAIN switch indicator ON)	On
		ICC system OFF (MAIN switch indicator OFF)	Off
OWN VHCL	Start the engine and press MAIN switch	ICC system ON (Own vehicle indicator ON)	Off
		ICC system OFF (Own vehicle indicator OFF)	Off
VHCL AHEAD	Drive the vehicle and activate the vehicle-to-vehicle distance control mode	When a vehicle ahead is detected (vehicle ahead detection indicator ON)	On
		When a vehicle ahead is not detected (vehicle ahead detection indicator OFF)	Off

Monitor item	Condition		Value/Status
ICC WARNING	Start the engine and press MAIN switch	When ICC system is malfunctioning	On
		When ICC system is normal	Off
VHCL SPEED SE	While driving		Displays the vehicle speed calculated by ADAS control unit
SET VHCL SPD	While driving	When vehicle speed is set	Displays the set vehicle speed
BUZZER O/P	Engine running	When the buzzer of the following system operates • Vehicle-to-vehicle distance control mode • DCA system • PFCW system • FEB system	On
		When the buzzer of the following system not operates • Vehicle-to-vehicle distance control mode • DCA system • PFCW system • FEB system	Off
THRTL SENSOR	**NOTE:** The item is displayed, but not used		0.0
ENGINE RPM	Engine running		Equivalent to tachometer reading
WIPER SW	Ignition switch ON	Wiper not operating	Off
		Wiper LO operation	Low
		Wiper HI operation	High
NAVI-ICC DISP	**NOTE:** The item is displayed, but not used		Off
YAW RATE	**NOTE:** The item is displayed, but not used		0.0
BA WARNING	Engine running	FEB warning lamp ON • When FEB system is malfunctioning • When FEB system is turned to OFF	On
		FEB warning lamp OFF • When FEB system is normal • When FEB system is turned to ON	Off
STP LMP DRIVE	Drive the vehicle and activate the vehicle-to-vehicle distance control mode	When ICC brake hold relay is activated	On
		When ICC brake hold relay is not activated	Off
D RANGE SW	Engine running	When the selector lever is in “D” position or manual mode	On
		When the selector lever is in any position other than “D” or manual mode	Off
NP RANGE SW	Engine running	When the selector lever is in “N”, “P” position	On
		When the selector lever is in any position other than “N”, “P”	Off
PKB SW	Ignition switch ON	When the parking brake is applied	On
		When the parking brake is released	Off
PWR SUP MONI	Engine running		Power supply voltage value of ADAS control unit

Monitor item	Condition		Value/Status
VHCL SPD AT	While driving		Value of A/T vehicle speed sensor signal
THRTL OPENING	Engine running	Depress accelerator pedal	Displays the throttle position
GEAR	While driving		Displays the gear position
NP SW SIG	**NOTE:** The item is displayed, but not used		Off
MODE SIG	Start the engine and press MAIN switch	When ICC system is deactivated	Off
		When vehicle-to-vehicle distance control mode is activated	ICC
		When conventional (fixed speed) cruise control mode is activated	ASCD
SET DISP IND	• Drive the vehicle and activate the conventional (fixed speed) cruise control mode • Press SET/COAST switch	SET switch indicator ON	On
		SET switch indicator OFF	Off
DISTANCE	Drive the vehicle and activate the vehicle-to-vehicle distance control mode	When a vehicle ahead is detected	Displays the distance from the preceding vehicle
		When a vehicle ahead is not detected	0.0
RELATIVE SPD	Drive the vehicle and activate the vehicle-to-vehicle distance control mode	When a vehicle ahead is detected	Displays the relative speed.
		When a vehicle ahead is not detected	0.0
DYNA ASIST SW	Ignition switch ON	When dynamic driver assistance switch is pressed	On
		When dynamic driver assistance switch is not pressed	Off
DCA ON IND	Start the engine and press dynamic driver assistance switch (When DCA setting is ON)	DCA system OFF	Off
		DCA system ON	On
DCA VHL AHED	Drive the vehicle and activate the DCA system	When a vehicle ahead is not detected (vehicle ahead detection indicator OFF)	Off
		When a vehicle ahead is detected (vehicle ahead detection indicator ON)	On
IBA SW	**NOTE:** The item is displayed, but not used		Off
FCW SYSTEM ON	Ignition switch ON	When the PFCW system is ON	On
		When the PFCW system is OFF	Off
APA TEMP	Engine running		Display the accelerator pedal actuator integrated motor temperature
APA PWR	Ignition switch ON		Power supply voltage value of accelerator pedal actuator
LDW SYSTEM ON	Ignition switch ON	When the LDW system is ON	On
		When the LDW system is OFF	Off
LDW ON LAMP	Ignition switch ON	When the LDW system is ON	On
		When the LDW system is OFF	Off

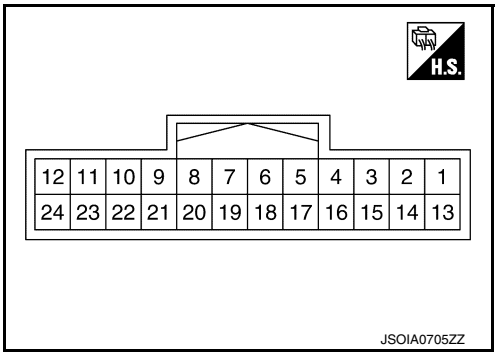
Monitor item	Condition		Value/Status
LDP ON IND	Start the engine and press dynamic driver assistance switch (When LDP system setting is ON)	When the LDW system is ON	On
		When the LDW system is OFF	Off
LANE DPRT W/L	Drive the vehicle and activate the LDW system or LDP system	Lane departure warning ON	On
		Lane departure warning OFF	Off
LDW BUZZER OUTPUT	Drive the vehicle and activate the LDW/LDP system or Blind Spot Warning/Blind Spot Intervention system	When the buzzer of the following system operates • LDW/LDP system • Blind Spot Warning/Blind Spot Intervention system	On
		When the buzzer of the following system does not operate • LDW/LDP system • Blind Spot Warning/Blind Spot Intervention system	Off
LDP SYSTEM ON	Start the engine and press dynamic driver assistance switch (When LDP system setting is ON)	When the LDP system is ON	On
		When the LDP system is OFF	Off
WARN REQ	Drive the vehicle and activate the LDP system	Lane departure warning is operating	On
		Lane departure warning is not operating	Off
READY signal	Start the engine and press dynamic driver assistance switch (When LDP system setting is ON)	When the LDP system is ON	On
		When the LDP system is OFF	Off
Camera lost	Drive the vehicle and activate the LDW system, LDP system or Blind Spot Intervention system	Both side lane markers are detected	Detect
		Deviate side lane marker is lost	Deviate
		Both side lane markers are lost	Both
Shift position	• Engine running • While driving		Displays the shift position
Turn signal	Turn signal lamps OFF		Off
	Turn signal lamp LH blinking		LH
	Turn signal lamp RH blinking		RH
	Turn signal lamp LH and RH blinking		LH&RH
SIDE G	While driving	Vehicle turning right	Negative value
		Vehicle turning left	Positive value
STATUS signal	Drive the vehicle and activate the LDP system	When the LDP system is ON	Stnby
		When the LDP system is operating	Warn
		When the LDP system is canceled	Cancl
		When the LDP system is OFF	Off
Lane unclear	While driving	Lane marker is unclear	On
		Lane marker is clear	Off
FUNC ITEM	Ignition switch ON		FUNC3
FUNC ITEM (NV-ICC)	**NOTE:** The item is displayed, but not used		Off
FUNC ITEM (NV-DCA)	**NOTE:** The item is displayed, but not used		Off
DCA SELECT	Ignition switch ON	"Distance Control Assist" set with the navigation screen is ON	On
		"Distance Control Assist" set with the navigation screen is OFF	Off

Monitor item	Condition		Value/Status
LDP SELECT	Ignition switch ON	"Lane Departure Prevention" set with the navigation screen is ON	On
		"Lane Departure Prevention" set with the navigation screen is OFF	Off
BSI SELECT	Ignition switch ON	"Blind Spot Intervention" set with the navigation screen is ON	On
		"Blind Spot Intervention" set with the navigation screen is OFF	Off
BSW SELECT	Ignition switch ON	"Blind Spot Warning" set with the navigation screen is ON	On
		"Blind Spot Warning" set with the navigation screen is OFF	Off
NAVI ICC SELECT	**NOTE:** The item is displayed, but not used		Off
NAVI DCA SELECT	**NOTE:** The item is displayed, but not used		Off
SYS SELECTABILITY	Ignition switch ON	Items set with the navigation screen can be switched normally	On
		Items set with the navigation screen cannot be switched normally	Off
DRIVE MODE STATS	Ignition switch ON	When drive mode select switch position is STANDARD	STD
		When drive mode select switch position is in SPORT	SPORT
		When drive mode select switch position is in ECO	ECO
		When drive mode select switch position is in SNOW	SNOW
		When position of drive mode select switch is in following states • In the middle of SNOW-ECO • In the middle of ECO-STANDARD • In the middle of STANDARD-SPORT	MID
		A signal other than those above is input	ERROR
WARN SYS SW	Ignition switch ON	When warning systems switch is pressed	On
		When warning systems switch is not pressed	Off
BSW/BSI WARN LMP	Ignition switch ON	When the BSW system is malfunctioning	On
		When the BSW system is normal	Off
BSI ON IND	Ignition switch ON	Blind Spot Intervention warning ON	On
		Blind Spot Intervention warning OFF	Off
BSW SYSTEM ON	Ignition switch ON	When the BSW system is ON	On
		When the BSW system is OFF	Off
BSI SYSTEM ON	Start the engine and press dynamic driver assistance switch (When Blind Spot Intervention system setting is ON)	When the Blind Spot Intervention system is ON	On
		When the Blind Spot Intervention system is OFF	Off
BCI SYSTEM ON	Engine running	When the BCI system is ON	On
		When the BCI system is OFF	Off
BCI SWITCH	Ignition switch ON	When BCI switch is pressed	On
		When BCI switch is not pressed	Off
BCI ON IND	Ignition switch ON	When BCI ON indicator is ON	On
		When BCI ON indicator is OFF	Off
BCI OFF IND	Ignition switch ON	When BCI OFF indicator is ON	On
		When BCI OFF indicator is OFF	Off

Monitor item	Condition		Value/Status
BCI WARNING IND	Ignition switch ON	When BCI malfunction indicator is ON	On
		When BCI malfunction indicator is OFF	Off
BCI HI TEMP WARN IND	Ignition switch ON	When BCI not available indicator is ON	On
		When BCI not available indicator is OFF	Off

TERMINAL LAYOUT

PHYSICAL VALUES



Terminal No. (Wire color)		Description		Condition		Standard value	Reference value
+	−	Signal name	Input/ Output				
1 (L)	—	CAN -H	—	—		—	—
2 (R)	—	CAN -L	—	—		—	—
5 (B/R)	Ground	Ground	—	Ignition switch ON		0 - 0.1 V	Approx. 0 V
6 (L)	—	ITS communication-H	—	—		—	—
7 (P)	—	ITS communication-L	—	—		—	—
12 (GR)	5 (B/R)	Ignition power supply	Input	Ignition switch ON	—	10 - 16 V	Battery voltage
17 (SB)		ICC brake hold relay drive signal	Output	Ignition switch ON	—	10 - 16 V	Approx. 12 V
					At “STOP LAMP” test of “Active test”	0 - 0.1 V	Approx. 0 V
18 (Y)		Warning systems switch	Input	Ignition switch ON	When warning systems switch is not pressed	10 - 16 V	Approx. 12 V
					When warning systems switch is pressed	0 - 0.1 V	Approx. 0 V
19 (O)		Warning systems ON indicator	Output	Ignition switch ON	Warning systems ON indicator ON	10 - 16 V	Approx. 12 V
					Warning systems ON indicator OFF	0 - 0.1 V	Approx. 0 V
22 (BR)		BCI switch	Input	Ignition switch ON	When BCI OFF switch is not pressed	10 - 16 V	Approx. 12 V
					When BCI OFF switch is pressed	0 - 0.1 V	Approx. 0 V

Fail-safe (ADAS Control Unit)

INFOID:0000000012356014

If a malfunction occurs in each system, ADAS control unit cancels each control, sounds a beep, and turns ON the warning or indicator lamp.

System	Buzzer	Warning lamp/Indicator lamp	Description
Vehicle-to-vehicle distance control mode	High-pitched tone	ICC system warning lamp	Cancel
Conventional (fixed speed) cruise control mode	High-pitched tone	ICC system warning lamp	Cancel
Forward Emergency Braking (FEB)	High-pitched tone	FEB warning lamp	Cancel
Predictive Forward Collision Warning (PFCW)	High-pitched tone	FEB warning lamp	Cancel
Distance Control Assist (DCA)	High-pitched tone	ICC system warning lamp	Cancel
Lane Departure Warning (LDW)	—	Lane departure warning lamp	Cancel
Lane Departure Prevention (LDP)	Low-pitched tone	Lane departure warning lamp	Cancel
Blind Spot Warning (BSW)	—	Blind Spot Warning/Blind spot Intervention warning lamp	Cancel
Blind Spot Intervention	Low-pitched tone	Blind Spot Warning/Blind spot Intervention warning lamp	Cancel
Back-up Collision Intervention (BCI)	High-pitched tone	BCI malfunction indicator	Cancel
Active trace control function	—	FEB warning lamp	• Cancel • If a communication error occurs between the A/C auto amp. and CAN communication line, a mode at the instant of error occurrence is maintained until the mode is fixed to STANDARD after turning the ignition switch from OFF to ON

DTC Inspection Priority Chart

INFOID:0000000012356015

If multiple DTCs are detected simultaneously, check them one by one depending on the following DTC inspection priority chart.

Priority	Detected items (DTC)
1	• U1507: LOST COMM(SIDE RDR R) • U1508: LOST COMM(SIDE RDR L)
2	• C1A0A: CONFIG UNFINISHED • U1000: CAN COMM CIRCUIT • U1010: CONTROL UNIT (CAN)
3	• C1B00: CAMERA UNIT MALF • C1F02: APA C/U MALF • C1B53: SIDE RDR R MALF • C1B54: SIDE RDR L MALF • C1B84: DIST SEN MALFUNCTION

Priority	Detected items (DTC)	
4	• C1A01: POWER SUPPLY CIR • C1A02: POWER SUPPLY CIR 2 • C1A04: ABS/TCS/VDC CIRC • C1A05: BRAKE SW/STOP L SW • C1A06: OPERATION SW CIRC • C1A13: STOP LAMP RLY FIX • C1A14: ECM CIRCUIT • C1A24: NP RANGE • C1A26: ECD MODE MALF • C1A27: ECD PWR SUPLY CIR • C1A33: CAN TRANSMISSION ERR • C1A34: COMMAND ERROR • C1A35: APA CIR • C1A36: APA CAN COMM CIR • C1A37: APA CAN CIR2 • C1A38: APA CAN CIR1 • C1A39: STRG SEN CIR • C1B01: CAM AIMING INCMP • C1B03: CAM ABNRMAL TMP DETCT • C1B5D: FEB OPE COUNT LIMIT • C1B56: SONAR CIRCUIT • C1B57: AVM CIRCUIT • C1B58: DR ASSIST BUZZER CIRCUIT • C1B82: DIST SEN OFF-CENTER • C1B83: DIST SEN BLOCKED • C1B85: DIST SEN ABNORMAL TEMP • C1B86: DIST SEN PWR SUP CIR • C1F01: APA MOTOR MALF • C1F05: APA PWR SUPLY CIR	• U0121: VDC CAN CIR2 • U0126: STRG SEN CAN CIR1 • U0235: ICC SENSOR CAN CIRC 1 • U0401: ECM CAN CIR1 • U0402: TCM CAN CIR1 • U0415: VDC CAN CIR1 • U0424: HVAC CAN CIR 1 • U0428: STRG SEN CAN CIR2 • U150B: ECM CAN CIRC 3 • U150C: VDC CAN CIRC 3 • U150D: TCM CAN CIRC 3 • U150E: BCM CAN CIRC 3 • U150F: AV CAN CIRC 3 • U1500: CAM CAN CIR 2 • U1501: CAM CAN CIR 1 • U1502: ICC SEN CAN COMM CIR • U1503: SIDE RDR L CAN CIR 2 • U1504: SIDE RDR L CAN CIR 1 • U1505: SIDE RDR R CAN CIR 2 • U1506: SIDE RDR R CAN CIR 1 • U1512: HVAC CAN CIRC 3 • U1513: METER CAN CIRC 3 • U1514: STRG SEN CAN CIRC 3 • U1515: ICC SENSOR CAN CIRC 3 • U1516: CAM CAN CIRC 3 • U1517: APA CAN CIRC 3 • U1518: SIDE RDR L CAN CIRC 3 • U1519: SIDE RDR R CAN CIRC 3 • U1521: SONAR CAN COMMUNICATION 2 • U1522: SONAR CAN COMMUNICATION 1 • U1523: SONAR CAN COMMUNICATION 3 • U1524: AVM CAN COMMUNICATION 1 • U1525: AVM CAN COMMUNICATION 3 • U1530: DR ASSIST BUZZER CAN CIR 1
5	• C1A03: VHCL SPEED SE CIRC	
6	• C1A15: GEAR POSITION	
7	• C1A00: CONTROL UNIT	

DTC Index

INFOID:0000000012356016

NOTE:

• The details of time display are as per the following.
- CRNT: A malfunction is detected now
- PAST: A malfunction was detected in the past

• IGN counter is displayed on FFD (Freeze Frame Data).
- 0: The malfunctions that are detected now
  CAN communication system (U1000, U1010)
- 1 - 39: It increases like 0 → 1 → 2 ··· 38 → 39 after returning to the normal condition whenever the ignition switch OFF → ON. It returns to 0 when a malfunction is detected again in the process.
- If it is over 39, it is fixed to 39 until the self-diagnosis results are erased.
  Other than CAN communication system (Other than U1000, U1010)
- 1 - 49: It increases like 0 → 1 → 2 ··· 38 → 49 after returning to the normal condition whenever the ignition switch OFF → ON. It returns to 0 when a malfunction is detected again in the process.
- If it is over 49, it is fixed to 49 until the self-diagnosis results are erased.

Systems for fail-safe
- A: Vehicle-to-vehicle distance control mode
- B: Conventional (fixed speed) cruise control mode
- C: Distance Control Assist (DCA)
- D: Forward Emergency Braking (FEB)
- E: Predictive Forward Collision Warning (PFCW)
- F: Lane Departure Warning (LDW)/Lane Departure Prevention (LDP)
- G: Blind Spot Warning (BSW)/Blind Spot Intervention
- H: Back-up Collision Intervention (BCI)
- I: Active trace control function

DTC		CONSULT display	Fail-safe	Reference
CONSULT	On board display		System	
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED	55	NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED	—	—
C1A0A	41	CONFIG UNFINISHED	A, B, C, D, E, F, G, H, I	DAS-66
C1A00	0	CONTROL UNIT	A, B, C, D, E, F, G, H, I	DAS-67
C1A01	1	POWER SUPPLY CIR	A, B, C, D, E, F, G, H, I	DAS-68
C1A02	2	POWER SUPPLY CIR 2	A, B, C, D, E, F, G, H, I	DAS-68
C1A03	3	VHCL SPEED SE CIRC	A, B, C, D, E, F, G, H, I	DAS-69
C1A04	4	ABS/TCS/VDC CIRC	A, B, C, D, E, F, G, H, I	DAS-71
C1A05	5	BRAKE SW/STOP L SW	A, B, C, D, E, F, G, H	DAS-72
C1A06	6	OPERATION SW CIRC	A, B, C, F, G	DAS-77
C1A13	13	STOP LAMP RLY FIX	A, B, C, D, E, H	DAS-80
C1A14	14	ECM CIRCUIT	A, B, C, D, E	DAS-87
C1A15	15	GEAR POSITION	A, B, C, D, E	DAS-89
C1A24	24	NP RANGE	A, B, C, D, E, F, G, H	DAS-91
C1A26	26	ECD MODE MALF	A, B, C, D, E, I	DAS-93
C1A27	27	ECD PWR SUPLY CIR	A, B, C, D, E	DAS-95
C1A33	33	CAN TRANSMISSION ERR	A, B, C, D, E, I	DAS-97
C1A34	34	COMMAND ERROR	A, B, C, D, E, I	DAS-98
C1A35	35	APA CIR	A, C, D, E	DAS-99
C1A36	36	APA CAN COMM CIR	A, C, D, E	DAS-100
C1A37	133	APA CAN CIR2	A, C, D, E	DAS-101
C1A38	132	APA CAN CIR1	A, C, D, E	DAS-102
C1A39	39	STRG SEN CIR	A, B, C, D, E, G, H, I	DAS-103
C1B00	81	CAMERA UNIT MALF	F, G	DAS-104
C1B01	82	CAM AIMING INCMP	F, G	DAS-105
C1B03	83	CAM ABNRML TMP DETCT	F, G	DAS-106
C1B5D	198	FEB OPE COUNT LIMIT	C, D, E	DAS-107
C1B53	84	SIDE RDR R MALF	G, H	DAS-108
C1B54	85	SIDE RDR L MALF	G, H	DAS-109
C1B56	86	SONAR CIRCUIT	H	DAS-110
C1B57	87	AVM CIRCUIT	H	DAS-111
C1A58	182	DR ASSIST BUZZER CIRCUIT	—	DAS-112
C1B82	12	DIST SEN OFF-CENTER	A, C, D, E	DAS-113

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- I: Active trace control function

DTC		CONSULT display	Fail-safe	Reference
CONSULT	On board display		System	
C1B83	16	DIST SEN BLOCKED	A, C, D, E	DAS-114
C1B84	17	DIST SEN MALFUNCTION	A, C, D, E	DAS-115
C1B85	21	DIST SEN ABNORMAL TEMP	A, C, D, E	DAS-116
C1B86	80	DIST SEN PWR SUP CIR	A, C, D, E	DAS-117
C1F01	91	APA MOTOR MALF	A, C, D, E, H	DAS-119
C1F02	92	APA C/U MALF	A, C, D, E, H	DAS-120
C1F05	95	APA PWR SUPLY CIR	A, C, D, E, H	DAS-121
U0121	127	VDC CAN CIR2	A, B, C, D, E, F, G, H, I	DAS-122
U0126	130	STRG SEN CAN CIR1	A, B, C, D, E, G, H, I	DAS-123
U0235	144	ICC SENSOR CAN CIRC 1	A, C, D, E	DAS-124
U0401	120	ECM CAN CIR1	A, B, C, D, E, G, H	DAS-125
U0402	122	TCM CAN CIR1	A, B, C, D, E, F, G, H	DAS-126
U0415	126	VDC CAN CIR1	A, B, C, D, E, F, G, H, I	DAS-127
U0424	156	HACV CAN CIR 1	—	DAS-128
U0428	131	STRG SEN CAN CIR2	A, B, C, D, E, G, H, I	DAS-129
U1000[NOTE]	100	CAN COMM CIRCUIT	A, B, C, D, E, F, G, H, I	DAS-130
U1010	110	CONTROL UNIT (CAN)	A, B, C, D, E, F, G, H, I	DAS-132
U150B	157	ECM CAN CIRC 3	A, B, C, D, E, F, G, H	DAS-133
U150C	158	VDC CAN CIRC 3	A, B, C, D, E, F, G, H, I	DAS-135
U150D	159	TCM CAN CIRC 3	A, B, C, D, E, F, G, H	DAS-136
U150E	160	BCM CAN CIRC 3	A, B, C, F, G, H	DAS-137
U150F	161	AV CAN CIRC 3	—	DAS-138
U1500	145	CAM CAN CIR2	F, G	DAS-139
U1501	146	CAM CAN CIR 1	F, G	DAS-140
U1502	147	ICC SEN CAN COMM CIR	A, C, D, E	DAS-141
U1503	150	SIDE RDR L CAN CIR 2	G, H	DAS-142
U1504	151	SIDE RDR L CAN CIR 1	G, H	DAS-143
U1505	152	SIDE RDR R CAN CIR 2	G, H	DAS-144
U1506	153	SIDE RDR R CAN CIR 1	G, H	DAS-145
U1507	154	LOST COMM(SIDE RDR R)	G, H	DAS-146
U1508	155	LOST COMM(SIDE RDR L)	G, H	DAS-147
U1512	162	HVAC CAN CIRC 3	F, G	DAS-148
U1513	163	METER CAN CIRC 3	A, B, C, D, E, F, G, H	DAS-149
U1514	164	STRG SEN CAN CIRC 3	A, B, C, D, E, G, H, I	DAS-150
U1515	165	ICC SENSOR CAN CIRC 3	A, C, D, E	DAS-151

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- F: Lane Departure Warning (LDW)/Lane Departure Prevention (LDP)
- G: Blind Spot Warning (BSW)/Blind Spot Intervention
- H: Back-up Collision Intervention (BCI)
- I: Active trace control function

DTC		CONSULT display	Fail-safe	Reference
CONSULT	On board display		System	
U1516	166	CAM CAN CIRC 3	F, G	DAS-152
U1517	167	APA CAN CIRC 3	A, C, D, E	DAS-153
U1518	168	SIDE RDR L CAN CIRC 3	G, H	DAS-154
U1519	169	SIDE RDR R CAN CIRC 3	G, H	DAS-155
U1521	177	SONAR CAN COMMUNICATION 2	H	DAS-156
U1522	178	SONAR CAN COMMUNICATION 1	H	DAS-157
U1523	179	SONAR CAN COMMUNICATION 3	H	DAS-158
U1524	180	AVM CAN COMMUNICATION 1	H	DAS-159
U1525	181	AVM CAN COMMUNICATION 3	H	DAS-160
U1530	183	DR ASSIST BUZZER CAN CIR 1	—	DAS-161

NOTE:
With the detection of “U1000” some systems do not perform the fail-safe operation.
A system controlling based on a signal received from the control unit performs fail-safe operation when the communication with the ADAS control unit becomes inoperable.

DTC/CIRCUIT DIAGNOSIS

FORWARD EMERGENCY BRAKING

Diagnosis Procedure

INFOID:0000000012356017

1.FORWARD EMERGENCY BRAKE DIAGNOSIS

- The system will be cancelled automatically with a beep sound and FEB warning lamp on the combination meter will illuminate, when the system will not operate properly.
- When the FEB warning lamp continues to illuminate even if the FEB system is turned on after the engine restarts, perform the trouble-diagnosis.

>> Go to ICC. Refer to CCS-78, "Work Flow".

SYMPTOM DIAGNOSIS

SYSTEM SETTINGS CANNOT BE TURNED ON/OFF ON THE NAVIGATION SCREEN

Description

INFOID:0000000012356018

CAUTION:
Perform the self-diagnosis with CONSULT before the symptom diagnosis. Perform the trouble diagnosis if any DTC is detected.
FEB system does not turn on/off.
- FEB warning lamp does not illuminate even if the navigation screen is operated when FEB warning lamp is not illuminated.
- FEB warning lamp does not turn off even if the navigation screen is operated when FEB warning lamp is illuminated.

NOTE:
The FEB system will be automatically turned ON when the engine is restarted.

Diagnosis Procedure

INFOID:0000000012356019

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 BRC-190, "DTC Index".

Is any DTC detected?

YES >> GO TO 5.
NO >> GO TO 2.

2.PERFORM SELF-DIAGNOSIS OF DISPLAY CONTROL UNIT

Check if any DTC is detected in “Self Diagnostic Result” of “MULTI AV”. Refer to AV-42, "DTC Index" (Base audio without navigation), AV-210, "DTC Index" (BOSE audio with navigation).

Is any DTC detected?

YES >> Repair or replace the malfunctioning parts identified by the self-diagnosis result.
NO >> GO TO 3.

3.FEB WARNING LAMP

1. Select the active test item “METER LAMP” for “ICC/ADAS” with CONSULT.
2. Check if the FEB warning lamp illuminates when the test item is operated.

Is the inspection result normal?

YES >> Refer to CCS-78, "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 FEB setting ON by navigation screen.

Is the inspection result normal?

YES >> Replace the combination meter. Refer to MWI-95, "Removal and Installation".
NO >> Replace the ADAS control unit. Refer to DAS-163, "Removal and Installation".

5.REPAIR OR REPLACE MALFUNCTIONING PARTS

Repair or replace malfunctioning parts.

>> GO TO 6.

6.CHECK FEB SYSTEM

Check that FEB warning lamp turned ON⇔OFF, when operating navigation screen.

>> INSPECTION END