SECTION BRC
BRAKE CONTROL SYSTEM

CONTENTS

VDC/TCS/ABS

PRECAUTION

PRECAUTIONS

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

INFOID:0000000012427241

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

WARNING:

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

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

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT 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 three minutes before performing any service.**

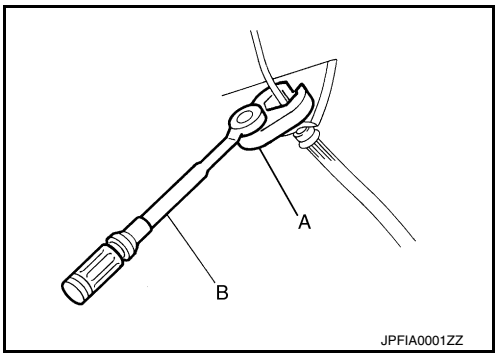
Precaution for Brake System

INFOID:0000000012427243

WARNING:

Clean any dust from the front brake and rear brake using a vacuum dust collector. Do not blow by compressed air.

- Brake fluid use refer to MA-11, "Fluids and Lubricants".
- Do not reuse drained brake fluid.
- Do not 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.
- Do not use mineral oils such as gasoline or light oil to clean. They may damage rubber parts and cause improper operation.
- Always loosen the brake tube flare nut with a flare nut wrench.
- Tighten the brake tube flare nut to the specified torque with a flare nut crowfoot (A) and torque wrench (B).
- Always connect the battery terminal when moving the vehicle.
- 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

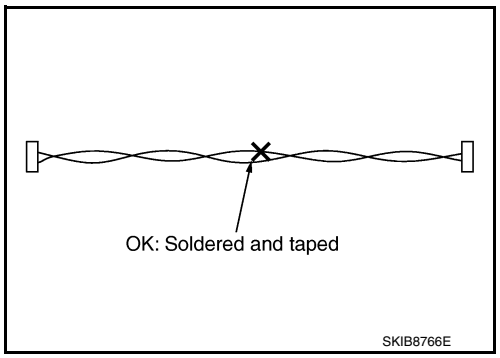
INFOID:0000000012427244

- Just after starting vehicle after ignition switch is ON, brake pedal may vibrate or motor operating noise may be heard from engine compartment. This is a normal condition.
- When an error is indicated by ABS or another warning lamp, collect all necessary information from customer (what symptoms are present under what conditions) and check for simple causes before starting diagnostic servicing. Besides electrical system inspection, check brake booster operation, brake fluid level and oil leaks.
- If tire size and type are used in an improper combination or brake pads are not Genuine NISSAN parts, stopping distance or steering stability may deteriorate.
- ABS might be out of order or malfunctions by putting a radio (wiring inclusive), an antenna and a lead-in wire near the control unit.
- If aftermarket parts (car stereo, CD player, etc.) have been installed, check for incidents such as harness pinches, open circuits, and improper wiring.
- VDC system may not operate normally or a VDC OFF indicator lamp or SLIP indicator lamp may light.
- When replacing the following parts with parts other than genuine parts or making modifications: Suspension-related parts (shock absorber, spring, bushing, etc.), tires, wheels (other than specified sizes), brake-related parts (pad, rotor, caliper, etc.), engine-related parts (muffler, ECM, etc.) and body reinforcement-related parts (roll bar, tower bar, etc.).
- When driving with worn or deteriorated suspension, tires and brake-related parts.

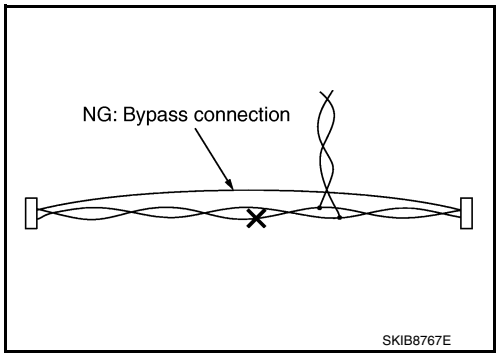
Precaution for Harness Repair

INFOID:0000000012427245

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



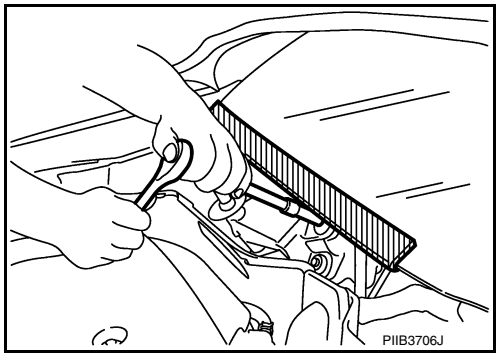
- Do not bypass the repair point with wire. (If it is bypassed, the turnout point cannot be separated and the twisted wire characteristics are lost.)



Precaution for Procedure without Cowl Top Cover

INFOID:0000000012427242

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



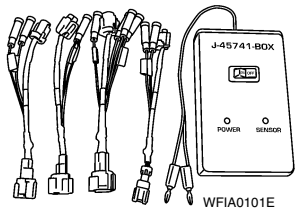
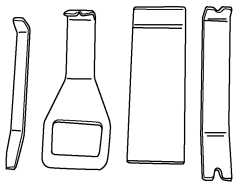
PREPARATION

PREPARATION

Special Service Tool

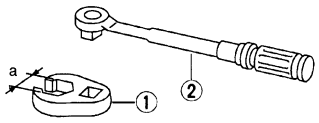
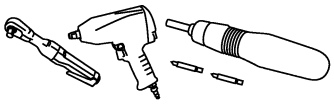
INFOID:0000000012427246

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

Tool number (TechMate No.) Tool name	Description
KV991J0080 (J-45741) ABS active wheel sensor tester  WFIA0101E	Checking operation of ABS active wheel sensors
— (J-46534) Trim Tool Set  AWJIA0483ZZ	Removing trim components

Commercial Service Tools

INFOID:0000000012427247

Tool name	Description
1. Flare nut crowfoot 2. Torque wrench  S-NT360	Tightening brake tube flare nuts **a: 10 mm (0.39 in)/12 mm (0.47 in)**
Power tool  PIIB1407E	Loosening nuts, screws and bolts

SYSTEM DESCRIPTION

COMPONENT PARTS

Component Parts Location

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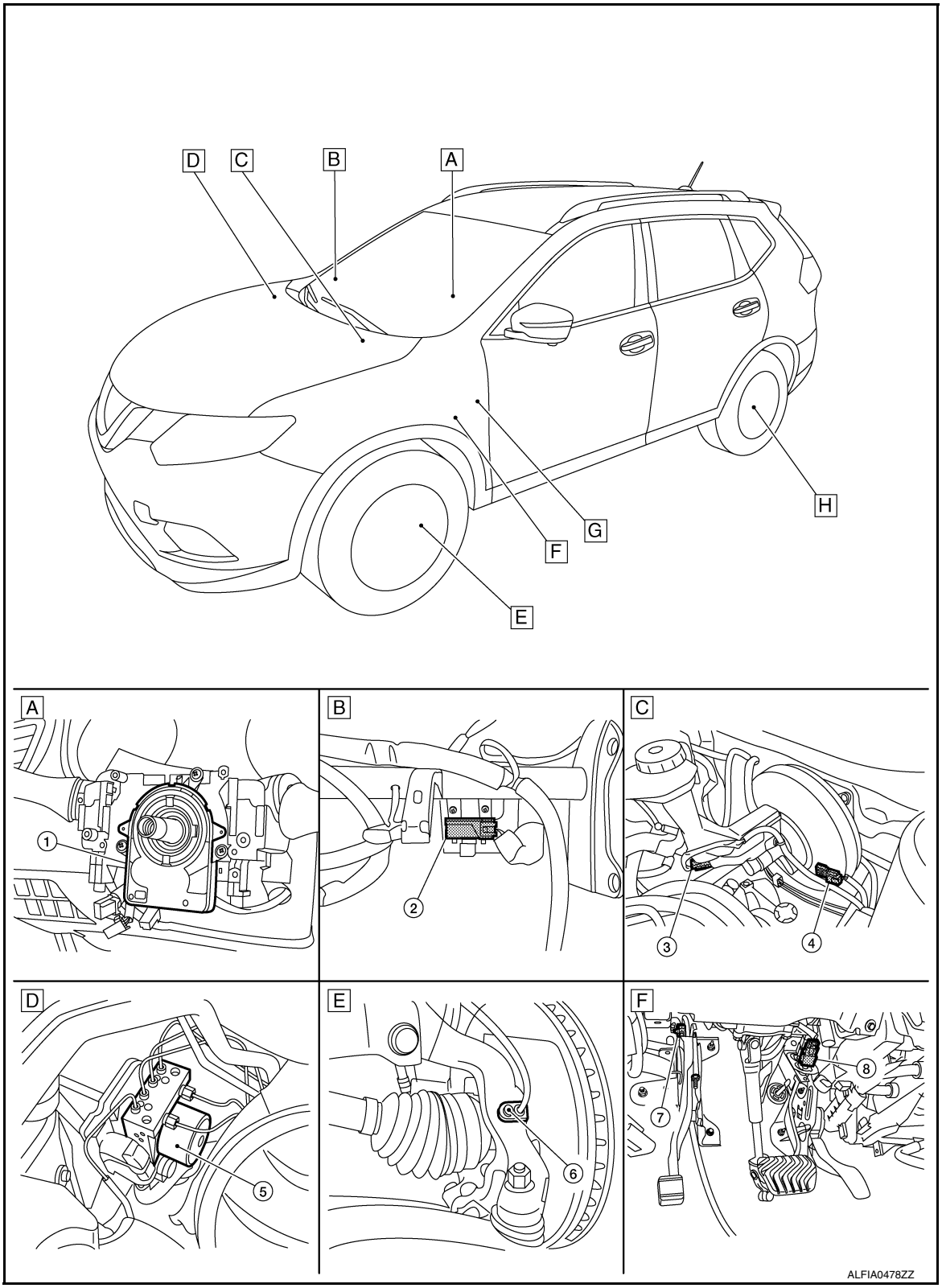
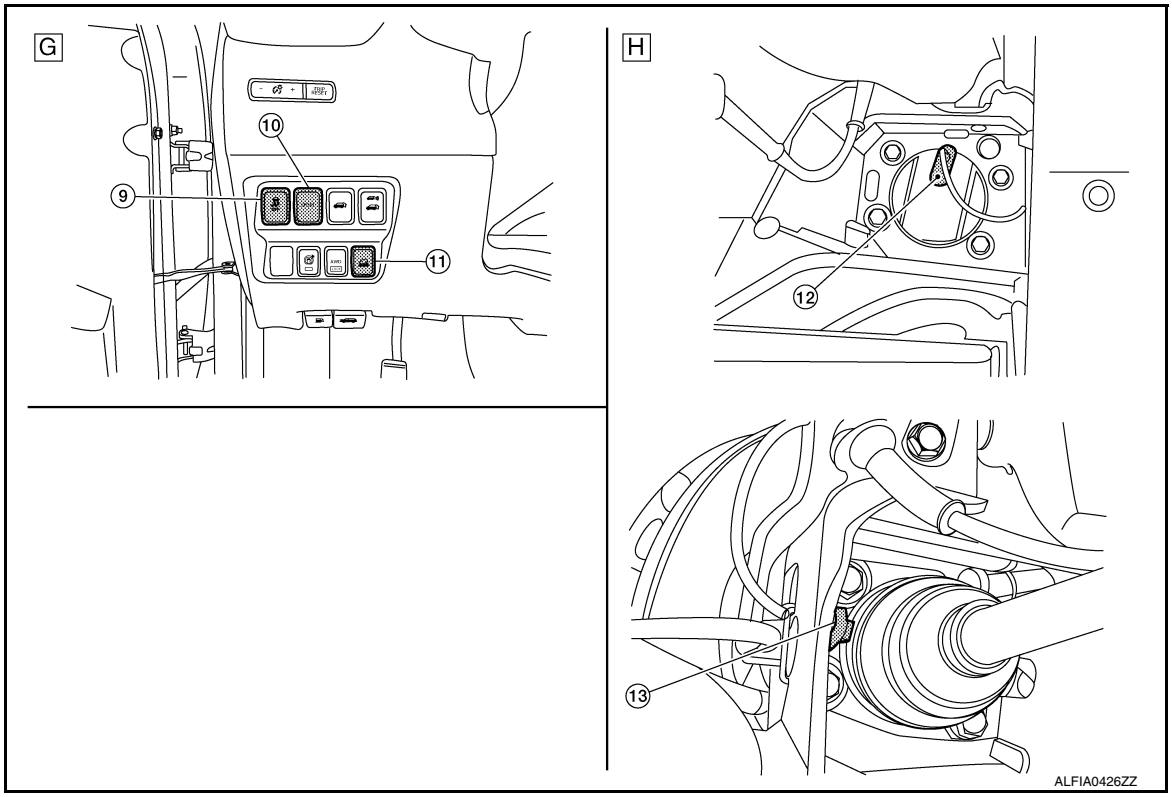




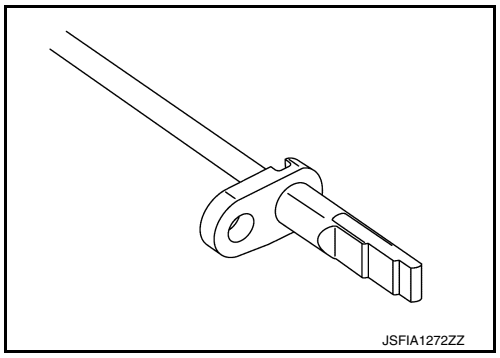
A. Steering column (view with steering wheel removed)
B. RH side of instrument panel (view with instrument panel removed)
C. LH side of engine compartment
D. RH side of engine compartment
E. Left front wheel area
F. Brake pedal area
G. Left side of instrument panel
H. Left rear wheel area

No.	Component parts	Function
1.	Steering angle sensor	BRC-12, "Steering Angle Sensor"
2.	Chassis control module	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication: • Drive mode signal • Active Trace Control signal • Brake hold status signal • Brake hold request signal Refer to DAS-131, "Component Parts Location" for detailed installation location.
3.	Brake fluid level switch	BRC-12, "Brake Fluid Level Switch"
4.	Vacuum sensor	BRC-13, "Vacuum Sensor"
5.	ABS actuator and electric unit (control unit)	BRC-11, "ABS Actuator and Electric Unit (Control Unit)"
6.	Front LH wheel sensor	BRC-11, "Wheel Sensor and Sensor Rotor"
7.	Parking brake switch	BRC-13, "Parking Brake Switch"
8.	Stop lamp switch	BRC-13, "Parking Brake Switch"
9.	VDC OFF switch	BRC-13, "VDC OFF Switch"
10.	Drive mode switch	DMS-6, "SPORT Mode Switch"
11.	Hill descent switch	BRC-13, "Hill Descent Control Switch"
12.	Rear wheel sensor LH (FWD models)	BRC-11, "Wheel Sensor and Sensor Rotor"
13.	Rear wheel sensor LH (AWD models)	BRC-11, "Wheel Sensor and Sensor Rotor"

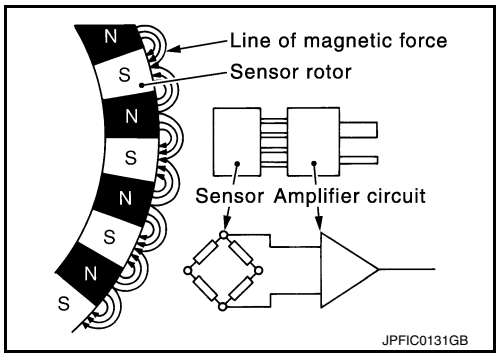
Wheel Sensor and Sensor Rotor

INFOID:0000000012427249

NOTE:
- Wheel sensor of front wheel is installed on steering knuckle.
- Sensor rotor of front wheel is integrated in wheel hub assembly.
- Wheel sensor of rear wheel is installed on rear final drive.
- 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.



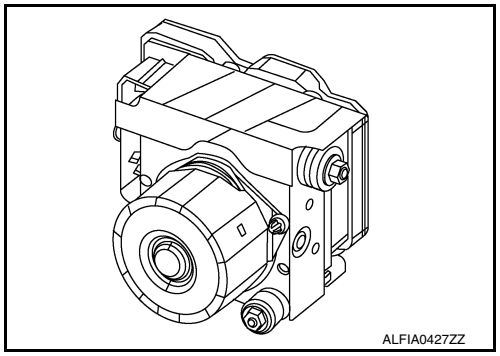
- Power supply is supplied to detection portion so that magnetic field line is read. Magnetic field that is detected is converted to current signal.
- When sensor rotor rotates, magnetic field changes. Magnetic field change is converted to current signals (rectangular wave) and is transmitted to ABS actuator and electric unit (control unit). Change of magnetic field is proportional to wheel speed.



ABS Actuator and Electric Unit (Control Unit)

INFOID:0000000012427250

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

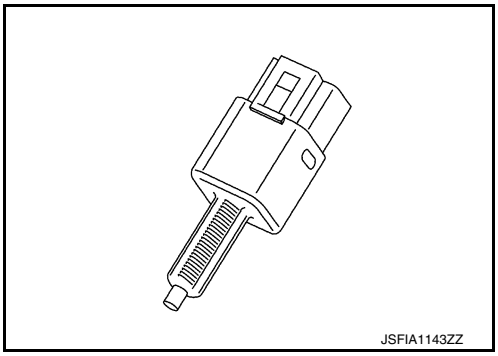
Cut Valve 1 (Primary Line), Cut Valve 2 (Secondary Line)
Shuts off the ordinary brake line from master cylinder, when VDC function, TCS function, Brake limited slip differential (BLSD) function, Brake assist function, hill start assist function and Brake force distribution function are activated.

Yaw Rate/Side/Decel G Sensor
Calculates the following information that affects the vehicle, and transmits a signal to ABS actuator and electric unit (control unit). [Yaw rate/side/decel G sensor is integrated in ABS actuator and electric unit (control unit).]
- Vehicle rotation angular velocity (yaw rate signal)
- Vehicle lateral acceleration (side G signal)
- Vehicle longitudinal acceleration (decel G signal)

Stop Lamp Switch

INFOID:0000000012427251

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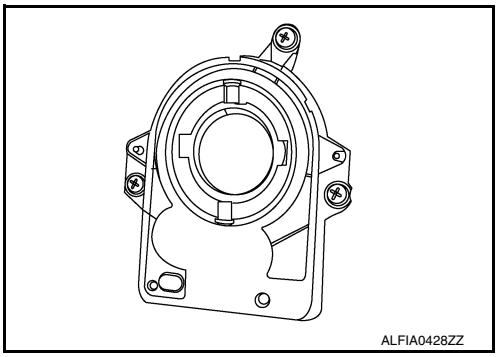
Steering Angle Sensor

INFOID:0000000012427252

Detects the following information and transmits steering angle signal to ABS actuator and electric unit (control unit) via CAN communication:
- Steering angle sensor malfunction signal
- Steering wheel rotation amount
- Steering wheel rotation angular velocity
- Steering wheel rotation direction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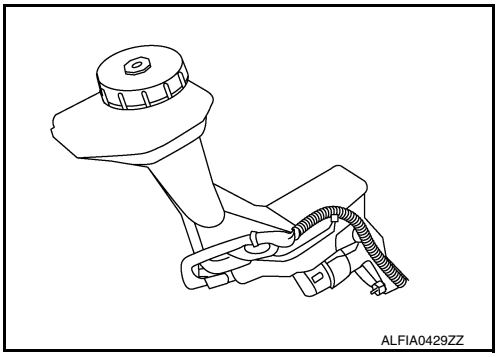
Brake Fluid Level Switch

INFOID:0000000012427253

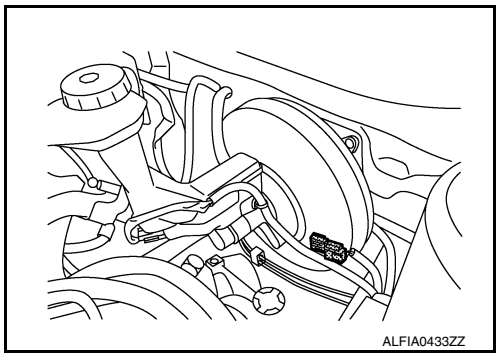
Detects the brake fluid level in reservoir tank and transmits converted electric signal from combination meter to ABS actuator and electric unit (control unit) via CAN communication, when brake fluid level is the specified level or less.


ALFIA0429ZZ

Vacuum Sensor

INFOID:0000000012427254

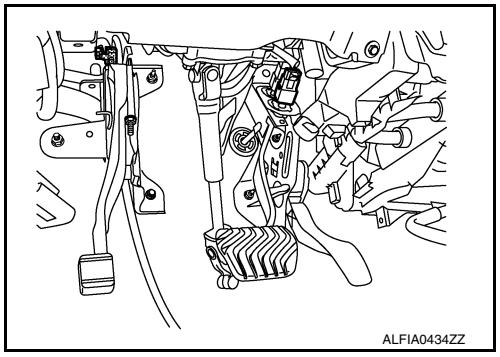
Detects the vacuum in brake booster and transmits converted electric signal to ABS actuator and electric unit (control unit).


ALFIA0433ZZ

Parking Brake Switch

INFOID:0000000012427255

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


ALFIA0434ZZ

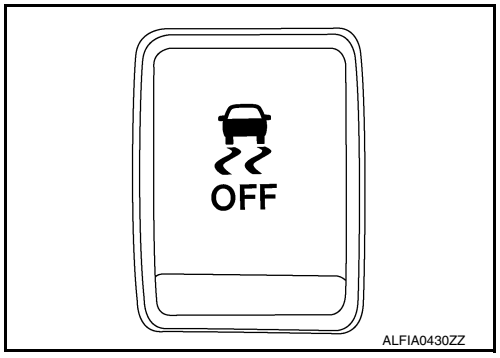
VDC OFF Switch

INFOID:0000000012427256

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

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

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



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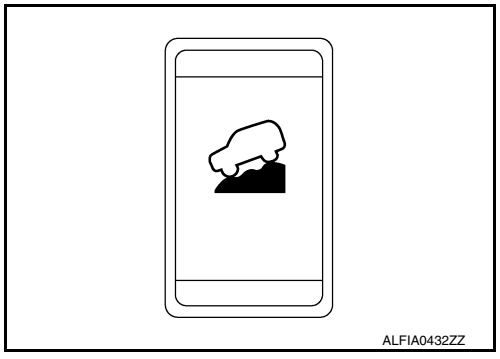
Hill Descent Control Switch

INFOID:0000000012427257

- The hill descent control system will help maintain vehicle speed on steeper downhill grades. Hill descent control will provide braking allowing the driver to concentrate on steering while reducing the burden and accelerator operation.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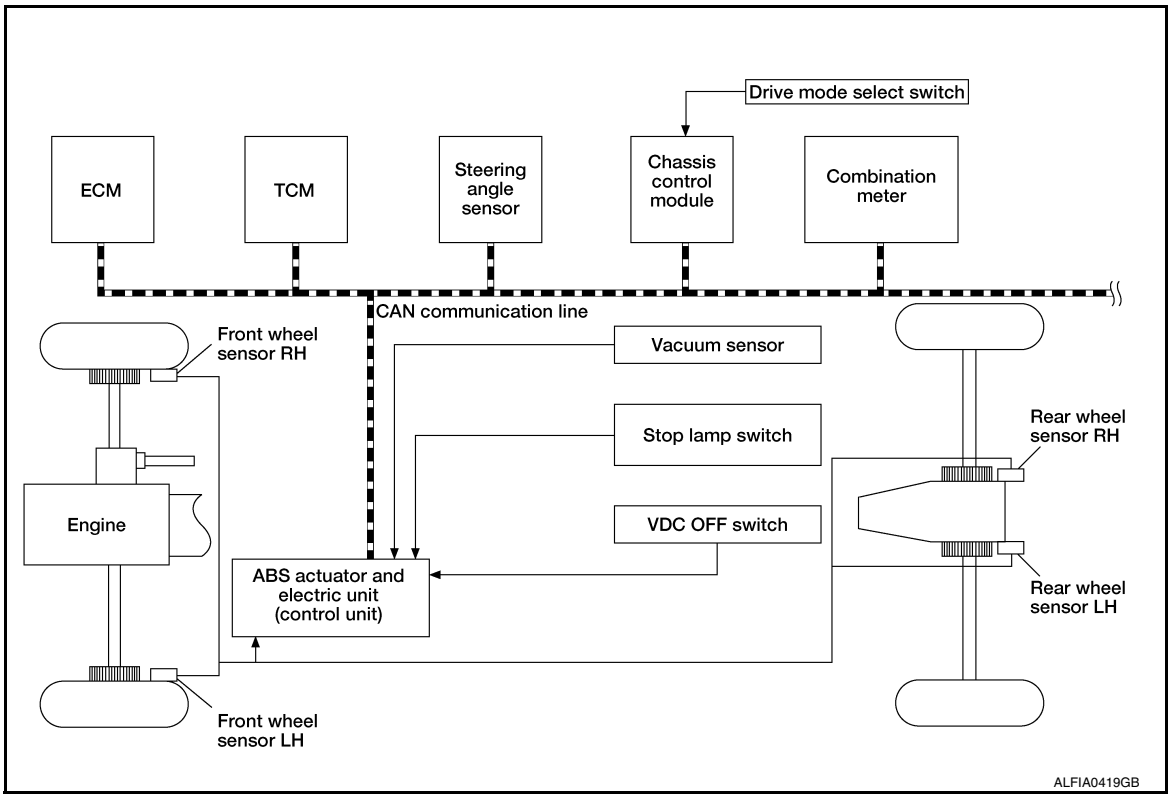
SYSTEM

System Description

INFOID:0000000012427258

- The system switches fluid pressure of each brake caliper to increase, to hold or to decrease according to signals from control unit in ABS actuator and electric unit (control unit). This control system is applied to VDC function, TCS function, ABS function, EBD function, brake limited slip differential (BLSD) function, brake assist function, hill start assist function and Brake force distribution 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.

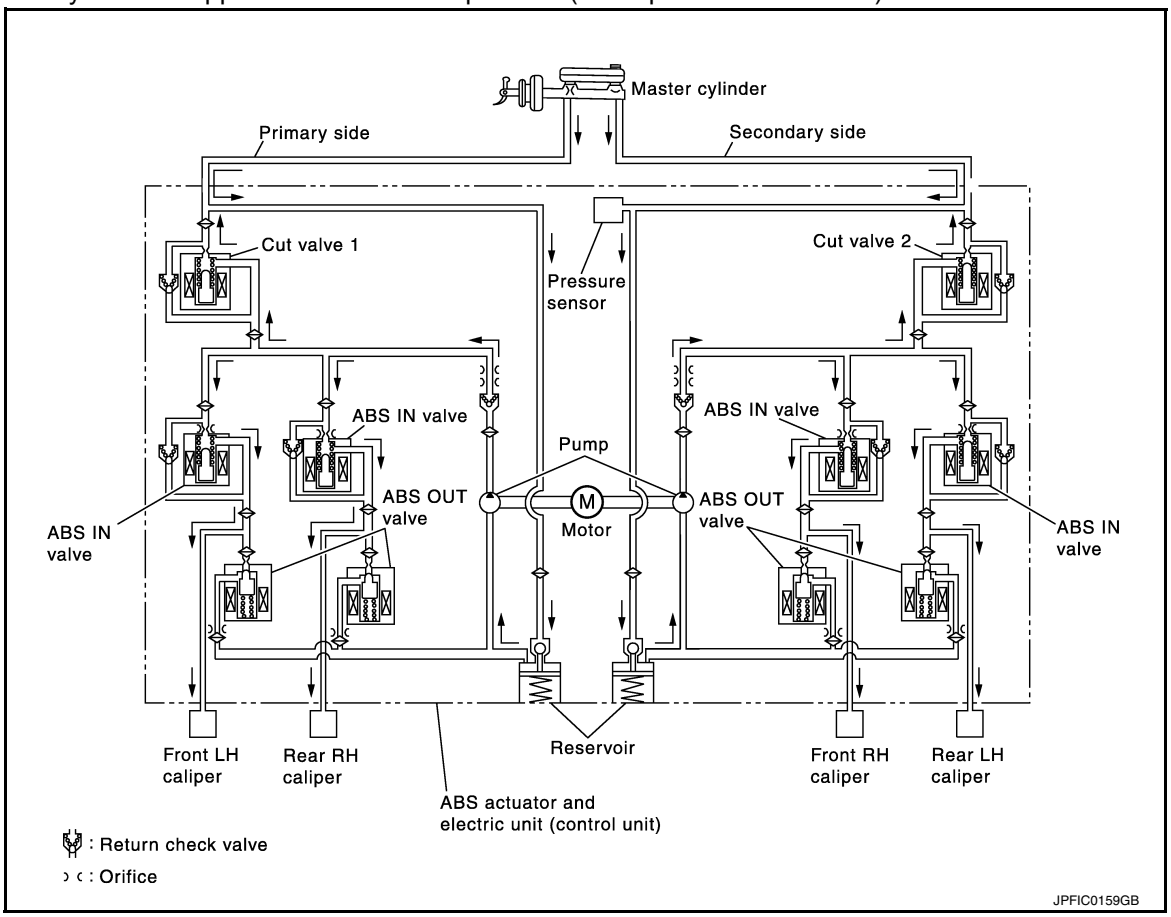
Component	Signal description
ECM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication: • Accelerator pedal position signal • Engine speed signal • Engine torque signal Mainly receives the following signal from ABS actuator and electric unit (control unit) via CAN communication: • Engine torque request signal
TCM	Mainly transmits the following signal to ABS actuator and electric unit (control unit) via CAN communication: • Current gear position signal
Chassis control module	Mainly transmits the following signal to ABS actuator and electric unit (control unit) via CAN communication: • Active trace control signal

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

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.

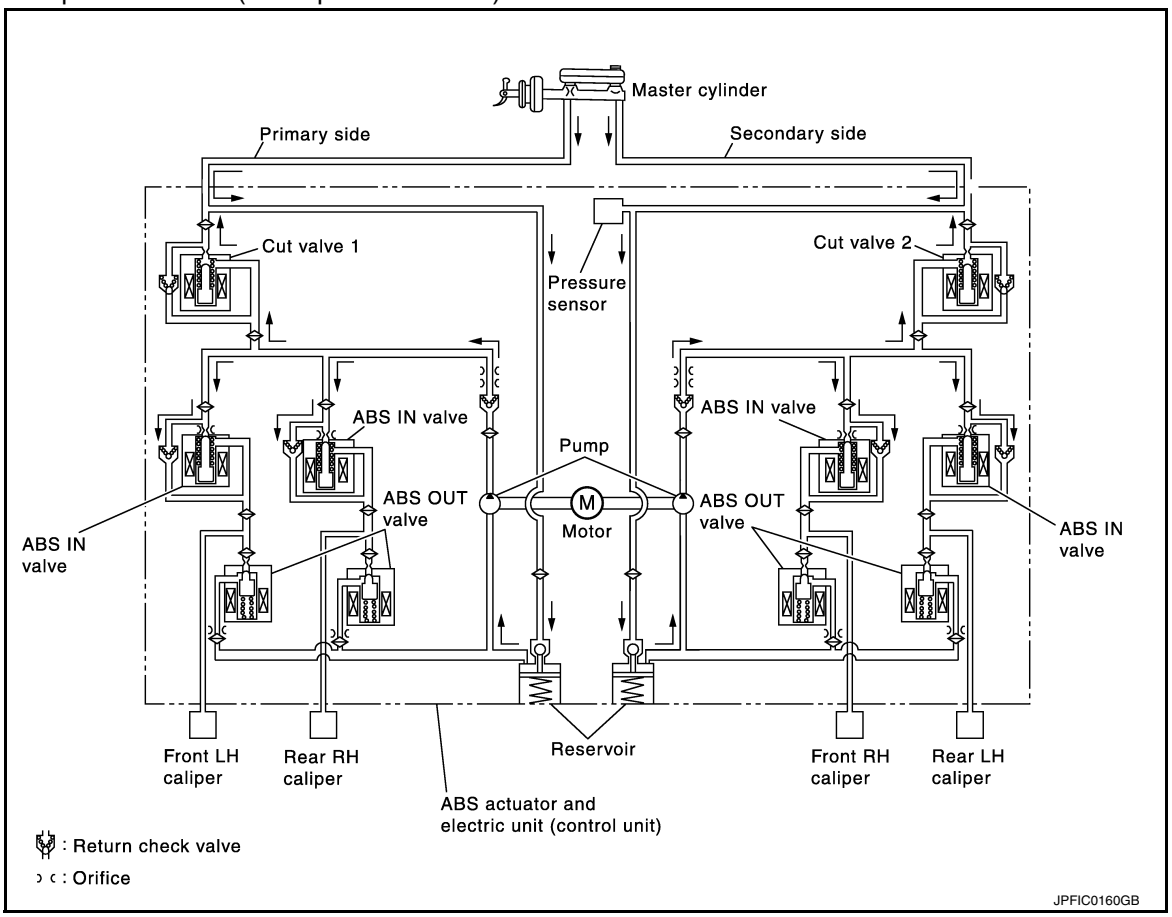
When rear RH wheel caliper pressure increases

- 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.

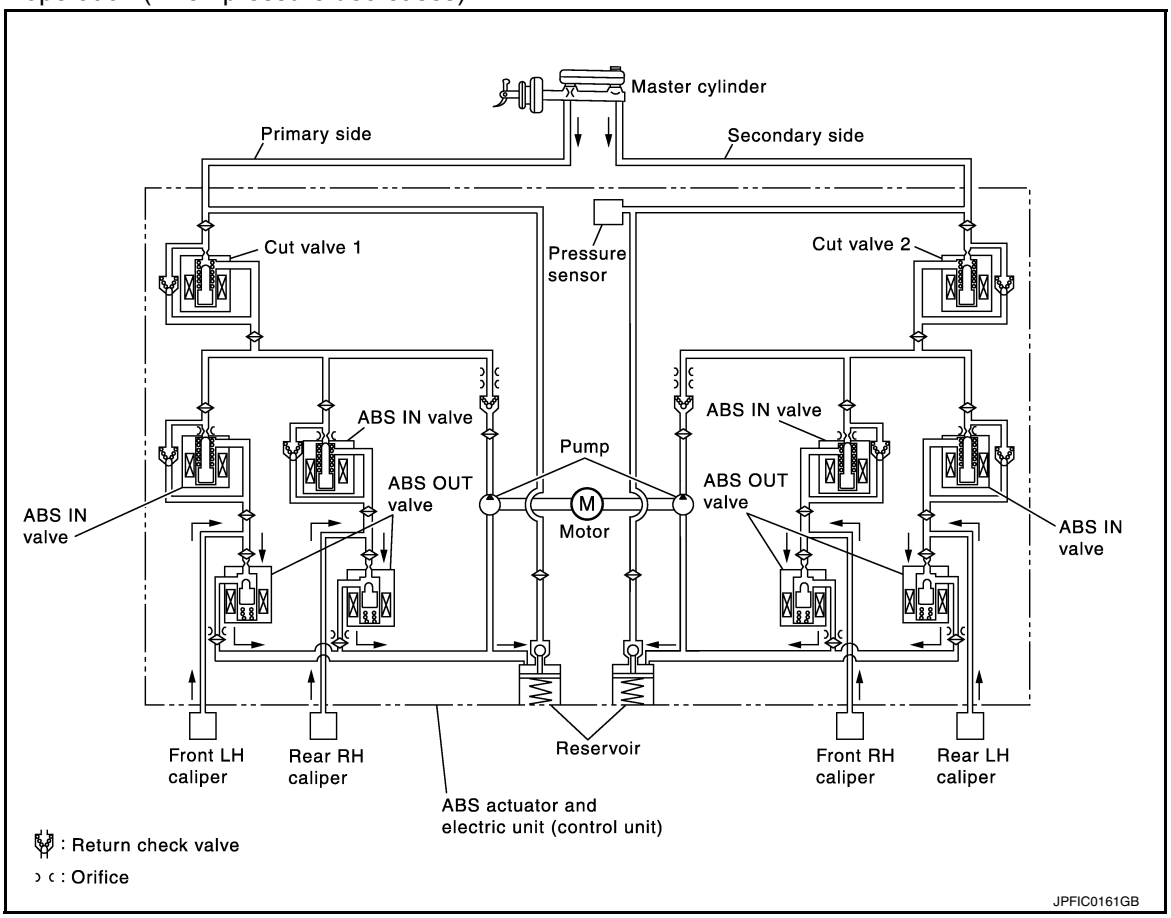
When front LH wheel caliper pressure holds

- 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.
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.

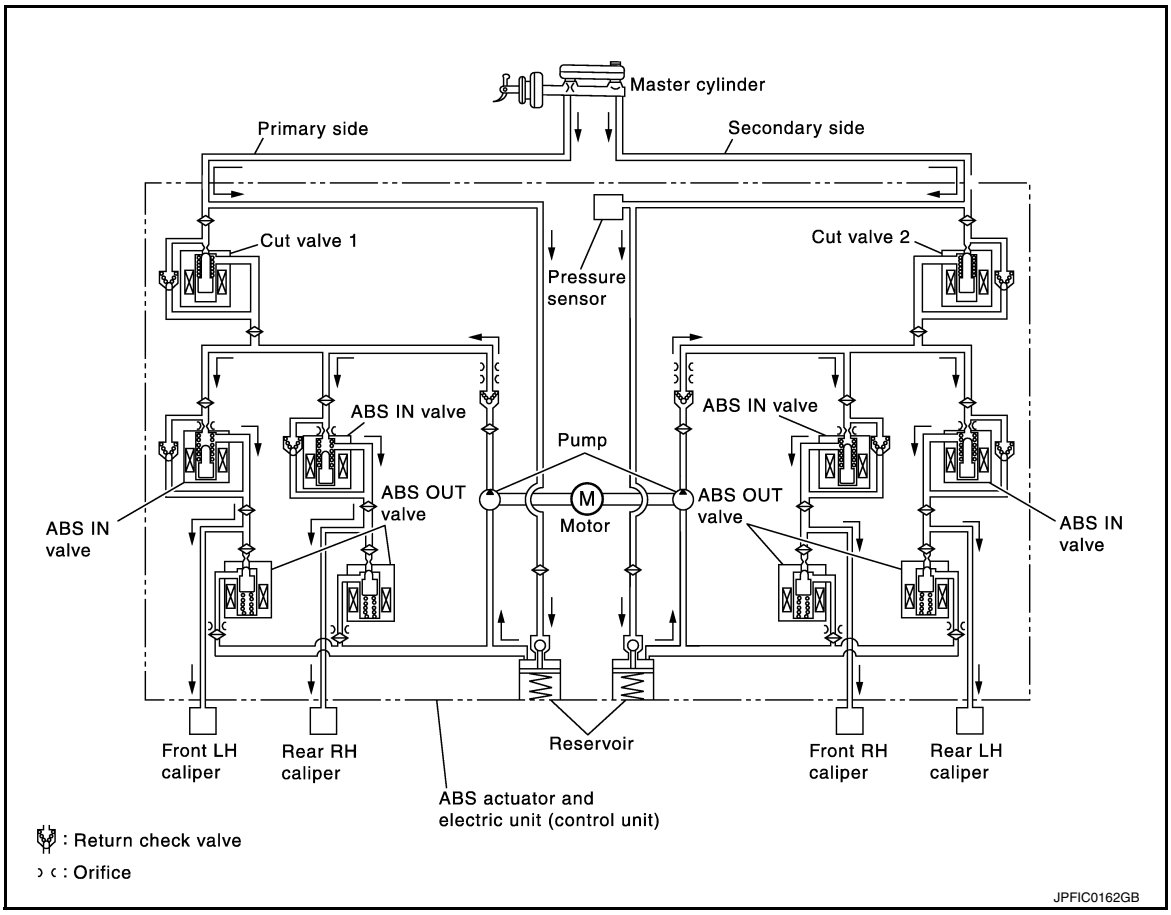
VALVE OPERATION (OTHER THAN ABS AND EBD)

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)
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

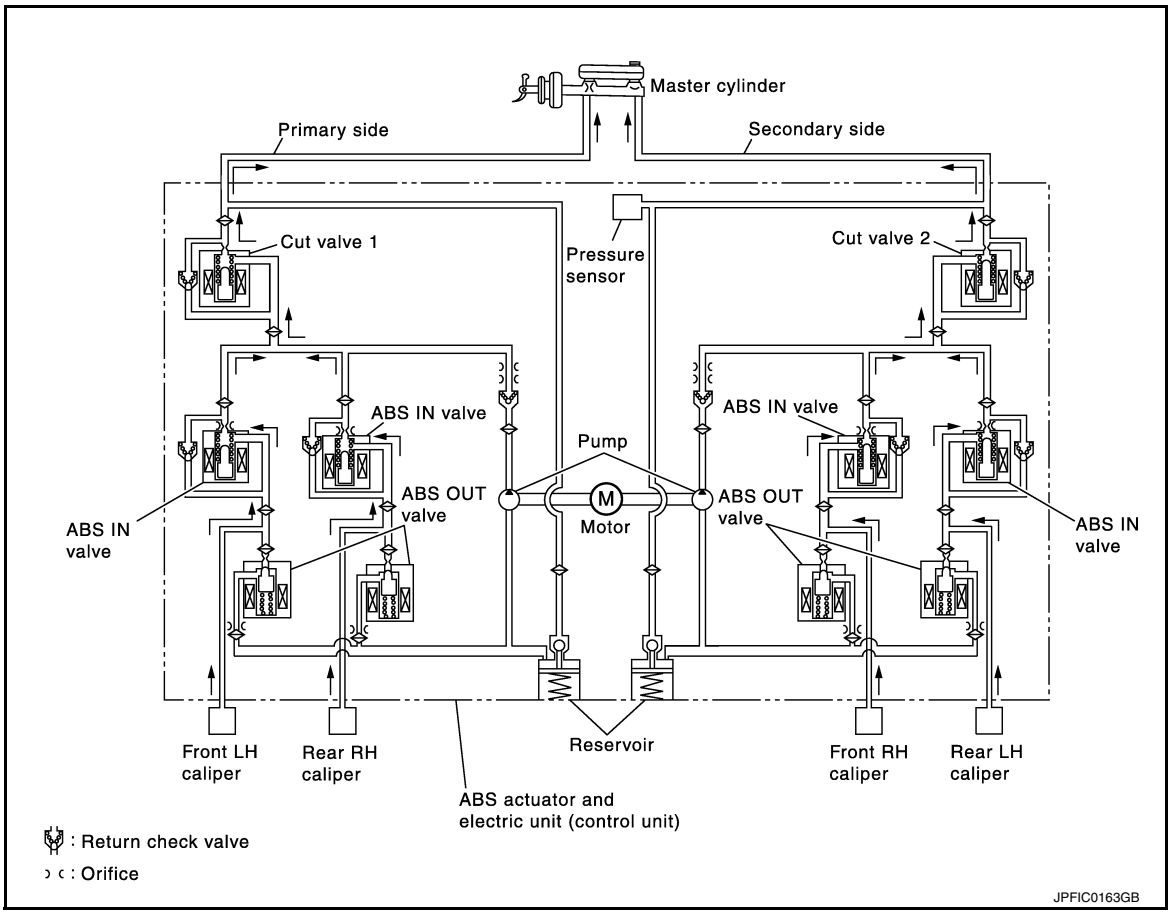
When front RH wheel caliper pressure increases
- Motor is activated. Brake fluid from pump is supplied to front RH wheel caliper through ABS IN valve. For other wheel, ABS IN valve is closed and brakes fluid is not supplied to caliper.

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 rear 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 rear 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.

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.

CONDITION FOR TURN ON THE WARNING LAMP

Turns ON when ignition switch turns ON and turns OFF when the system is normal, for bulb check purposes.

Condition (status)	ABS warning lamp	Brake warning lamp	VDC warning lamp
Ignition switch OFF.	OFF	OFF	OFF
For approx. 1 seconds after the ignition switch is turned ON	ON	ON	ON
Approx. 1 seconds after ignition switch is turned ON (when the system is in normal operation).	OFF	OFF	OFF
After engine starts	OFF	OFF	OFF
When brake fluid is less than the specified level (brake fluid level switch ON)	OFF	ON	OFF
When parking brake operates (parking brake switch ON)	OFF	ON	OFF
VDC function is malfunctioning	OFF	OFF	ON
TCS function is malfunctioning	OFF	OFF	ON
ABS function is malfunctioning	ON	OFF	ON
EBD function is malfunctioning	ON	ON	ON
Brake limited slip differential (BLSD) function is malfunctioning	OFF	OFF	ON
Brake assist function is malfunctioning	OFF	OFF	ON
hill start assist function is malfunctioning	OFF	OFF	ON
hill descent function is malfunctioning	ON	ON	OFF
Brake force distribution function is malfunctioning	OFF	OFF	ON
When brake booster vacuum decreases	OFF	ON	OFF
When vacuum sensor is malfunctioning	OFF	ON	OFF
VDC function is operating	OFF	OFF	Blinking
TCS function is operating	OFF	OFF	Blinking
ABS function is operating	OFF	OFF	OFF
EBD function is operating	OFF	OFF	OFF
Brake limited slip differential (BLSD) function is operating	OFF	OFF	Blinking
Brake assist function is operating	OFF	OFF	OFF
hill start assist function is operating	OFF	OFF	OFF
hill descent function is operating	OFF	OFF	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

Condition (status)	VDC OFF indicator lamp
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

CONDITION FOR TURN ON THE INDICATOR LAMP

Hill descent indicator lamp
- Turns ON by the hill descent switch.
- Turns ON when ignition switch turns ON and turns OFF when the system is normal, for bulb check purposes.

Condition (status)	Hill Descent 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 hill descent switch is ON.	ON
When hill descent control switch is on, but the system is not engaged.	Blinking

Fail-Safe

INFOID:0000000012427259

VDC FUNCTION, TCS FUNCTION, BRAKE LIMITED SLIP DIFFERENTIAL FUNCTION, BRAKE ASSIST FUNCTION, hill start assist FUNCTION, hill descent 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, Brake limited slip differential (BLSD) function, Brake assist function, hill start assist function and Brake force distribution function. The vehicle status becomes the same as models without VDC function, TCS function, Brake limited slip differential (BLSD) function, Brake assist function, hill start assist 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, Brake limited slip differential (BLSD) function, Brake assist function, hill start assist function and Brake force distribution function. The vehicle status becomes the same as models without VDC function, TCS function, ABS function, Brake limited slip differential (BLSD) function, Brake assist function, hill start assist 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, Brake limited slip differential (BLSD) function, Brake assist function, hill start assist function and Brake force distribution function. The vehicle status becomes the same as models without VDC function, TCS function, ABS function, EBD function, Brake limited slip differential (BLSD) function, Brake assist function, hill start assist function and Brake force distribution function.

DTC	Fail-safe condition
C1101 C1102 C1103 C1104 C1105 C1106 C1107 C1108	The following functions are suspended: • VDC function • TCS function • ABS function • EBD function (only when both 2 rear wheels are malfunctioning) • Brake limited slip differential (BLSD) function • Brake assist function • hill start assist function • hill descent function • Brake force distribution function • Active trace control function (control of chassis control module)
C1109 C1110 C1111	The following functions are suspended: • VDC function • TCS function • ABS function • EBD function • Brake limited slip differential (BLSD) function • Brake assist function • hill start assist function • hill descent function • Brake force distribution function • Active trace control function (control of chassis control module)
C1113	The following functions are suspended: • VDC function • TCS function • ABS function • EBD function • Brake limited slip differential (BLSD) function • Brake assist function • hill start assist function • hill descent function • Brake force distribution function • Active trace control function (control of chassis control module)
C1115	The following functions are suspended: • VDC function • TCS function • ABS function • Brake limited slip differential (BLSD) function • Brake assist function • hill start assist function • hill descent function • Brake force distribution function • Active trace control function (control of chassis control module)
C1116	The following functions are suspended. • VDC function • TCS function • Brake limited slip differential (BLSD) function • Brake assist function • Brake force distribution function • hill start assist function • hill descent control function • Active trace control function (control of chassis control module)

DTC	Fail-safe condition
C1120 C1121 C1122 C1123 C1124 C1125 C1126 C1127	The following functions are suspended: • VDC function • TCS function • ABS function • EBD function • Brake limited slip differential (BLSD) function • Brake assist function • hill start assist function • hill descent function • Brake force distribution function • Active trace control function (control of chassis control module)
C1130	The following functions are suspended: • VDC function • TCS function • Brake limited slip differential (BLSD) function • hill start assist function • hill descent function • Brake force distribution function • Active trace control function (control of chassis control module)
C1140	The following functions are suspended: • VDC function • TCS function • ABS function • EBD function • Brake limited slip differential (BLSD) function • Brake assist function • hill start assist function • Brake force distribution function • Active trace control function (control of chassis control module)
C1142	The following functions are suspended: • VDC function • TCS function • Brake limited slip differential (BLSD) function • Brake assist function • hill start assist function • hill descent function • Brake force distribution function • Active trace control function (control of chassis control module)
C1143 C1144	The following functions are suspended: • VDC function • TCS function • Brake limited slip differential (BLSD) function • hill start assist function • hill descent function • Brake force distribution function • Active trace control function (control of chassis control module)
C1145 C1146	The following functions are suspended: • VDC function • TCS function • ABS function • Brake limited slip differential (BLSD) function • Brake assist function • hill start assist function • hill descent function • Brake force distribution function • Active trace control function (control of chassis control module)

DTC	Fail-safe condition
C1153	The following functions are suspended. • VDC function • TCS function • ABS function • Brake limited slip differential (BLSD) function • Brake assist function • Brake force distribution function • hill start assist function • hill descent control function • Active trace control function (control of chassis control module)
C1154	The following functions are suspended. • VDC function • TCS function • Brake limited slip differential (BLSD) function • Brake force distribution function • hill start assist function • hill descent control function • Active trace control function (control of chassis control module)
C1155	The following functions are suspended: • VDC function • TCS function • Brake limited slip differential (BLSD) function • Brake assist function • hill start assist function • hill descent function • Brake force distribution function • Active trace control function (control of chassis control module)
C1160	The following functions are suspended: • VDC function • TCS function • ABS function • Brake limited slip differential (BLSD) function • Brake assist function • hill start assist function • hill descent function • Brake force distribution function • Active trace control function (control of chassis control module)
C1164 C1165 C1166 C1167	The following functions are suspended: • VDC function • TCS function • ABS function • EBD function • Brake limited slip differential (BLSD) function • Brake assist function • hill start assist function • hill descent function • Brake force distribution function • Active trace control function (control of chassis control module)
C1170	The following functions are suspended: • VDC function • TCS function • ABS function • Brake limited slip differential (BLSD) function • Brake assist function • hill start assist function • hill descent function • Brake force distribution function • Active trace control function (control of chassis control module)
C1197 C1198	Electrical vacuum assistance of brake booster is suspended.
C1199	—

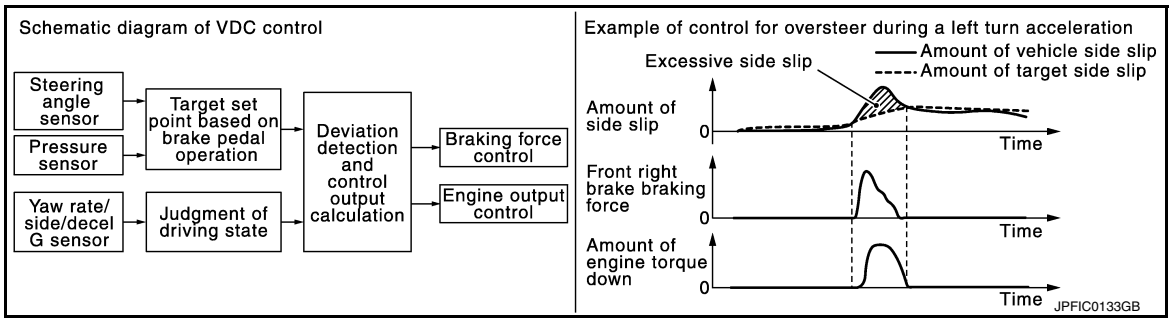
DTC	Fail-safe condition
C119A	Electrical vacuum assistance of brake booster is suspended.
U1000	The following functions are suspended: • VDC function • TCS function • Brake limited slip differential (BLSD) function • hill start assist function • hill descent function • Brake force distribution function • Active trace control function (control of chassis control module)

VDC FUNCTION

VDC FUNCTION : System Description

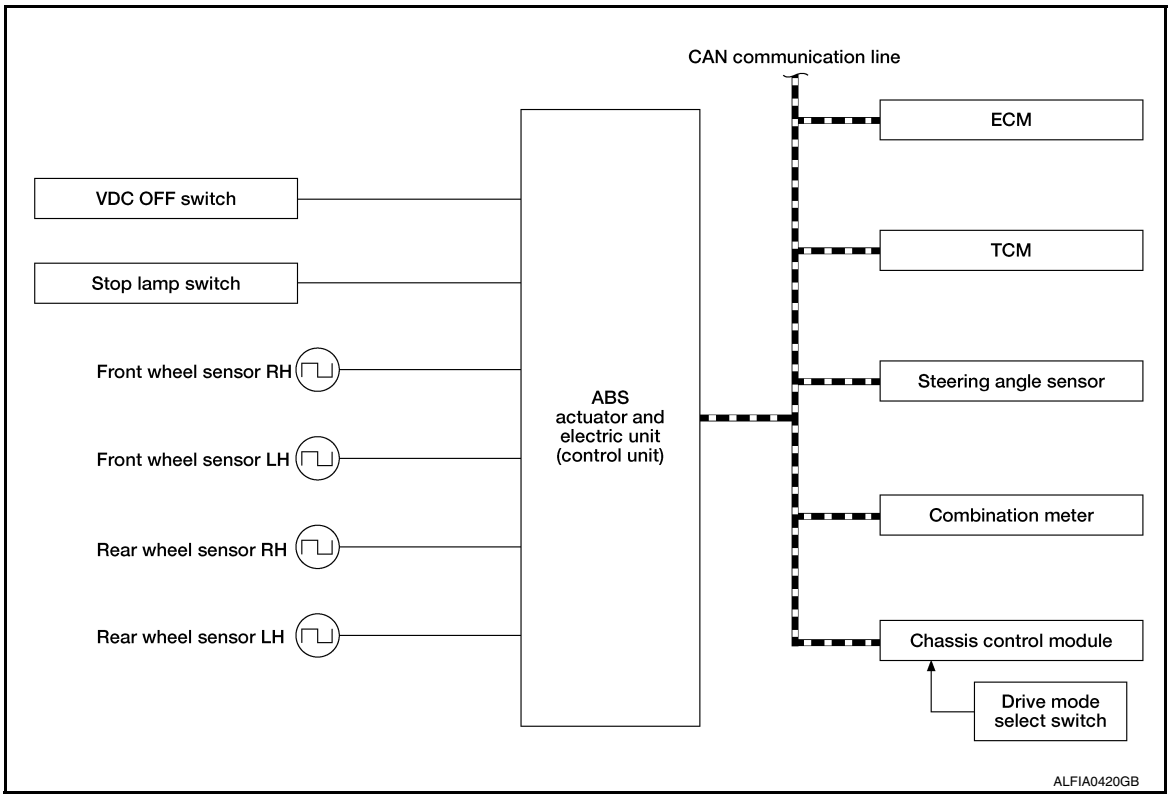
INFOID:0000000012427260

- 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.
- CONSULT can be used to diagnose the system diagnosis.
- Fail-safe function is adopted. When a malfunction occurs in VDC function, the control is suspended for VDC function, TCS function, Brake limited slip differential (BLSD) function, Brake assist function, hill start assist function and Brake force distribution function. The vehicle status becomes the same as models without VDC function, TCS function, Brake limited slip differential (BLSD) function, Brake assist function, hill start assist function and Brake force distribution function. However, ABS function and EBD function are operated normally. Refer to BRC-22, "Fail-Safe".

SYSTEM DIAGRAM



INPUT SIGNAL AND OUTPUT SIGNAL

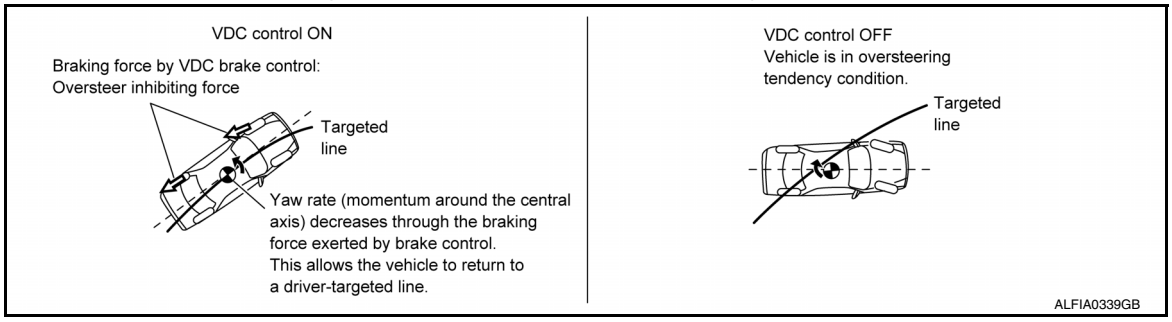
Major signal transmission between each unit via communication lines is shown in the following table.

Component	Signal description
ECM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication: • Accelerator pedal position signal • Engine speed signal • Engine torque signal Mainly receives the following signal from ABS actuator and electric unit (control unit) via CAN communication: • Engine torque request signal
TCM	Mainly transmits the following signal to ABS actuator and electric unit (control unit) via CAN communication: • Current gear position signal
Chassis control module	Mainly transmits the following signal to ABS actuator and electric unit (control unit) via CAN communication: • Active trace control signal
Combination meter	Mainly receives the following signals from 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
Steering angle sensor	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication: • Steering angle sensor signal • Steering angle sensor malfunction signal

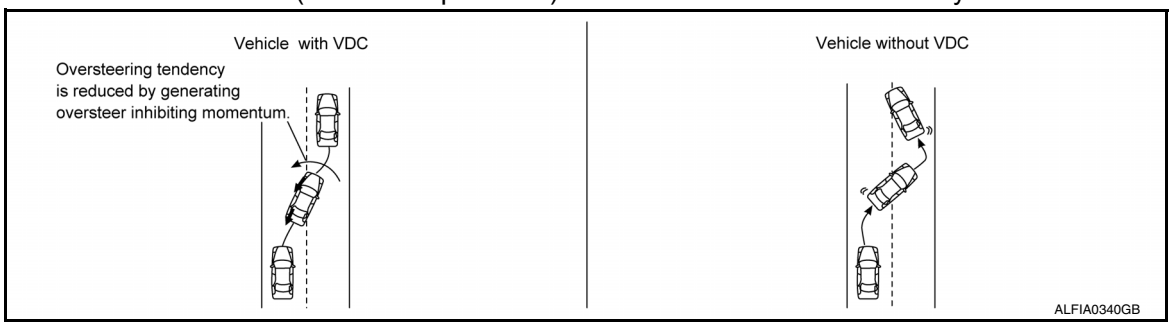
OPERATION CHARACTERISTICS

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. Momentum directing towards the outer side of turn is generated. Oversteer is prevented.

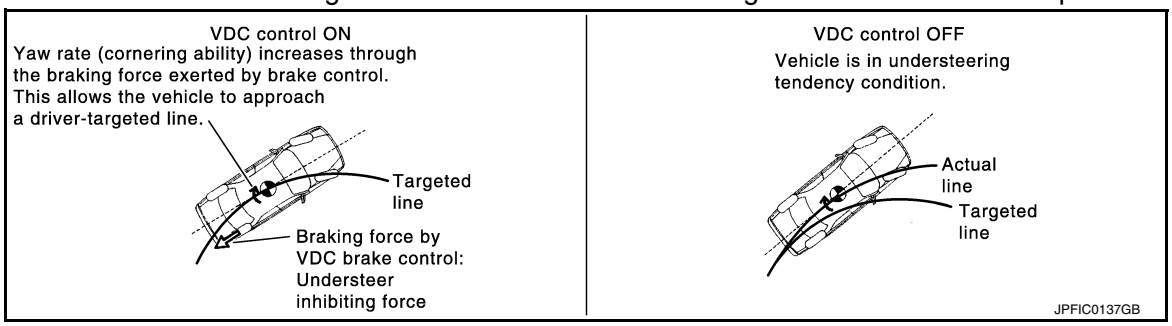


- Changing driving lane on a slippery road, when oversteer tendency is judged large, engine output is controlled as well as brake force (brake fluid pressure) of 4 wheels. Oversteer tendency decreases.

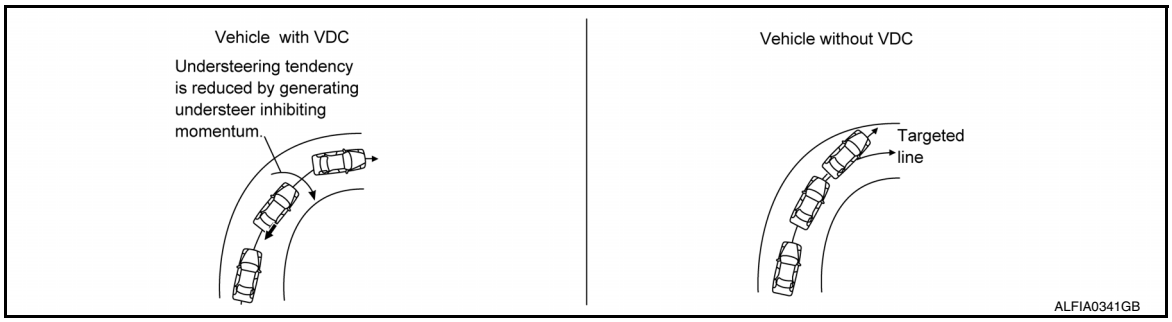


VDC Function That Prevents Understeer Tendency

- During a cornering, brake force (brake fluid pressure) is applied on front wheel and rear wheel on the inner side of turn. Momentum 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.

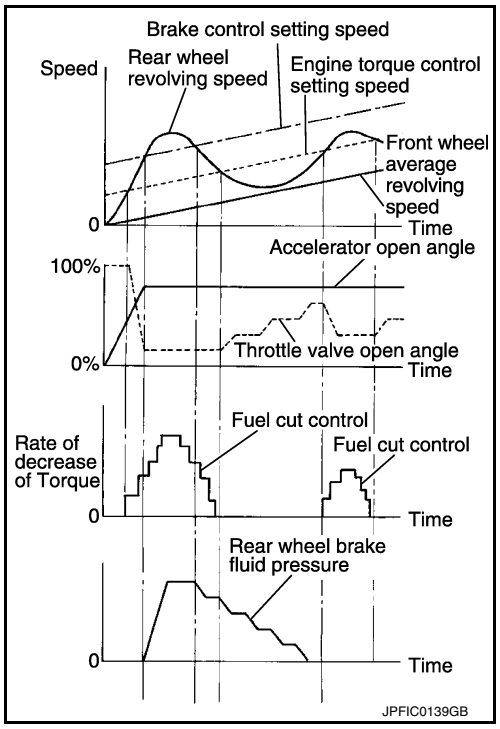


TCS FUNCTION

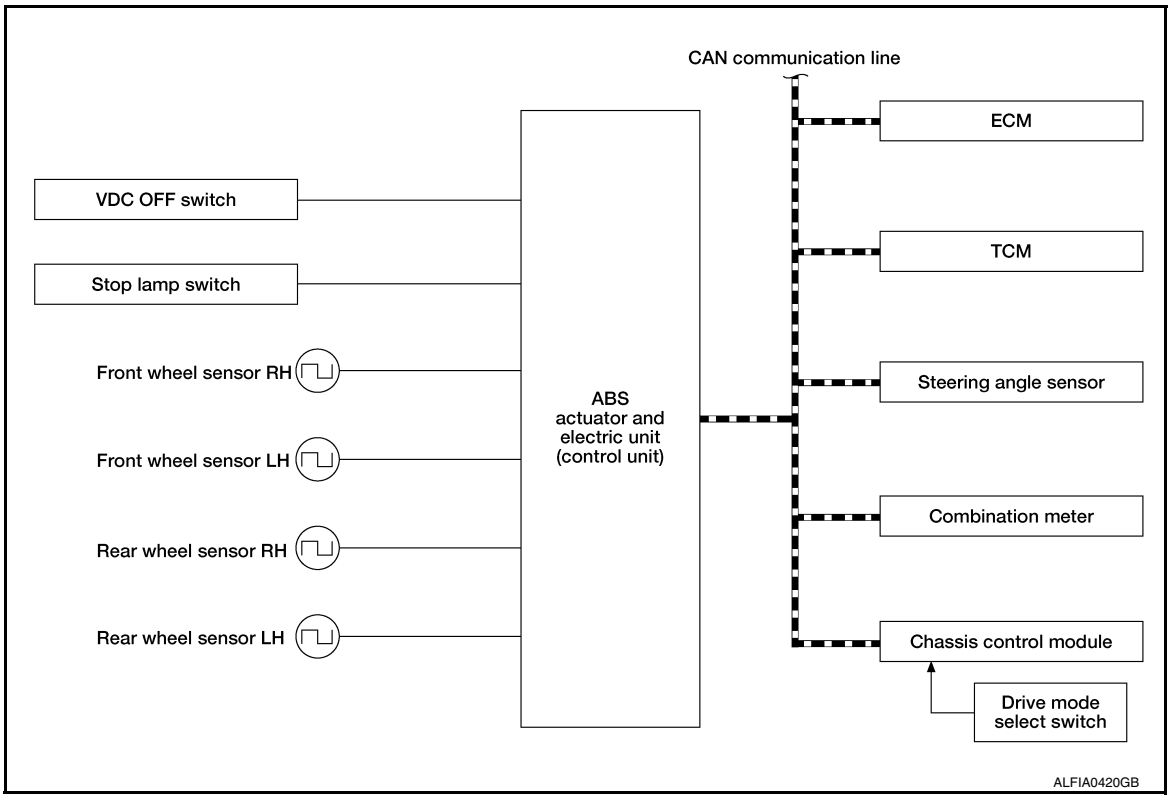
TCS FUNCTION : System Description

INFOID:0000000012427261

- 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, Brake limited slip differential (BLSD) function, Brake assist function, hill start assist function and Brake force distribution function The vehicle status becomes the same as models without VDC function, TCS function, Brake limited slip differential (BLSD) function, Brake assist function, hill start assist function and Brake force distribution 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.

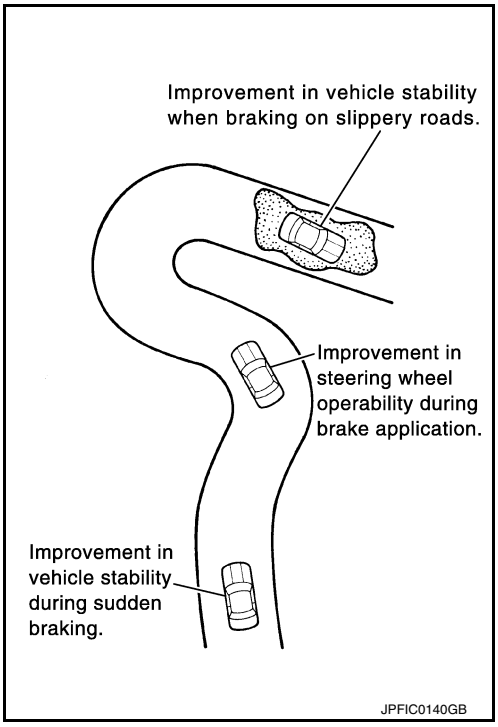
Component	Signal description
ECM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication: • Accelerator pedal position signal • Engine speed signal • Engine torque signal Mainly receives the following signal from ABS actuator and electric unit (control unit) via CAN communication: • Engine torque request signal
TCM	Mainly transmits the following signal to ABS actuator and electric unit (control unit) via CAN communication: • Current gear position signal
Chassis control module	Mainly transmits the following signal to ABS actuator and electric unit (control unit) via CAN communication: • Active trace control signal
Combination meter	Mainly receives the following signals from 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
Steering angle sensor	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication: • Steering angle sensor signal • Steering angle sensor malfunction signal

ABS FUNCTION

ABS FUNCTION : System Description

INFOID:0000000012427262

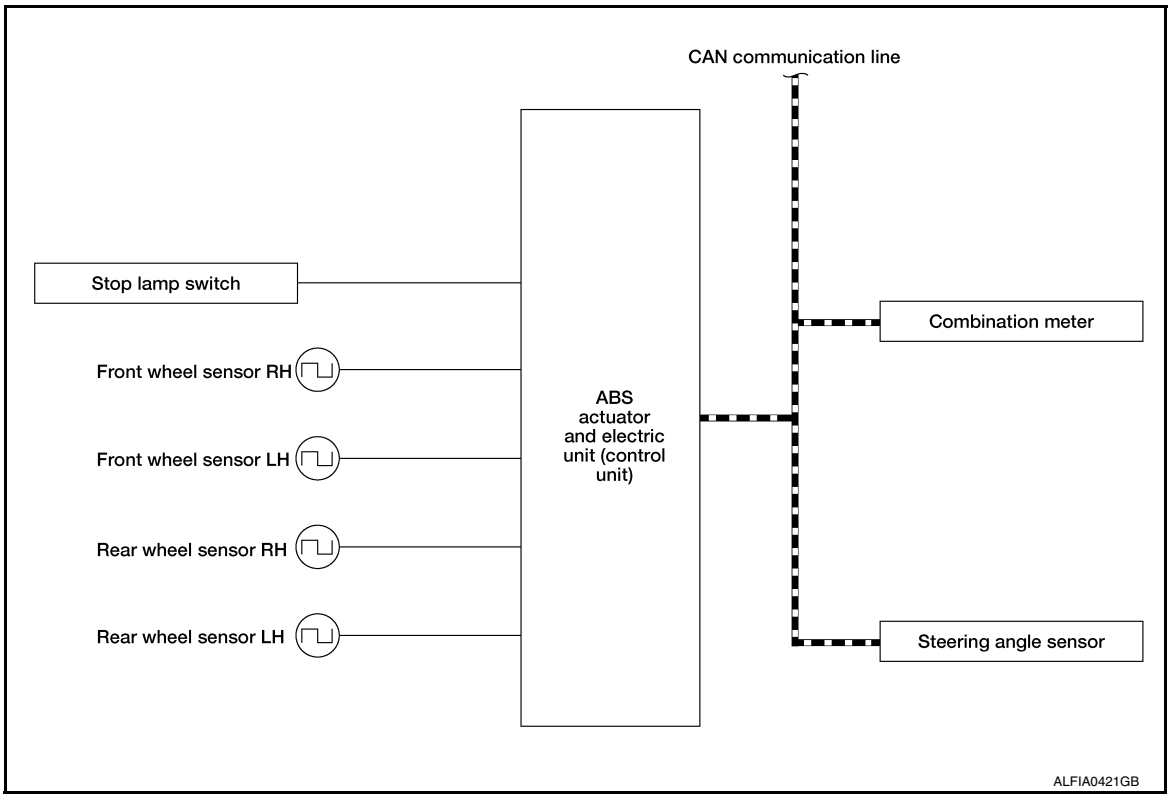
- By preventing wheel lock through brake force (brake fluid pressure) control that is electronically controlled by detecting wheel speed during braking, stability during emergency braking is improved so that obstacles can be easily bypassed by steering operation.
- During braking, control units calculates wheel speed and pseudo-vehicle speed, and transmits pressure increase, hold or decrease signals to actuator portion according to wheel slip status.
- The following effects are obtained by preventing wheel lock during braking:
- Vehicle tail slip is prevented during braking when driving straight.
- Understeer and oversteer tendencies are moderated during braking driving on a corner.
- Obstacles may be easily bypassed by steering operation during braking.
- CONSULT can be used to diagnose the system diagnosis.
- Fail-safe function is adopted. When a malfunction occurs in ABS function, the control is suspended for VDC function, TCS function, ABS function, Brake limited slip differential (BLSD) function, Brake assist function, hill start assist function and Brake force distribution function. The vehicle status becomes the same as models without VDC function, TCS function, ABS function, Brake limited slip differential (BLSD) function, Brake assist function, hill start assist function and Brake force distribution 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
Combination meter	Mainly receives the following signals from 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 • VDC warning lamp signal • VDC OFF indicator lamp signal
Steering angle sensor	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication: • Steering angle sensor signal • Steering angle sensor malfunction signal

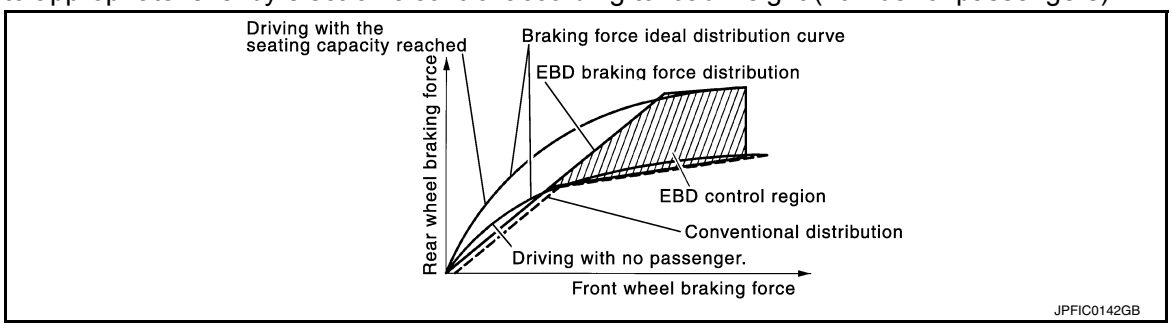
EBD FUNCTION

EBD FUNCTION : System Description

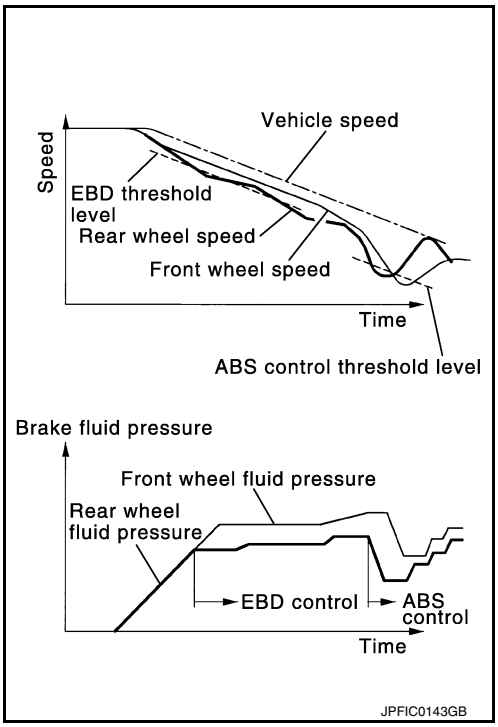
INFOID:0000000012427263

- By preventing rear wheel slip increase through rear wheel brake force (brake fluid pressure) control that is electronically controlled when slight skip on front and rear wheels are detected during braking, stability during braking is improved.

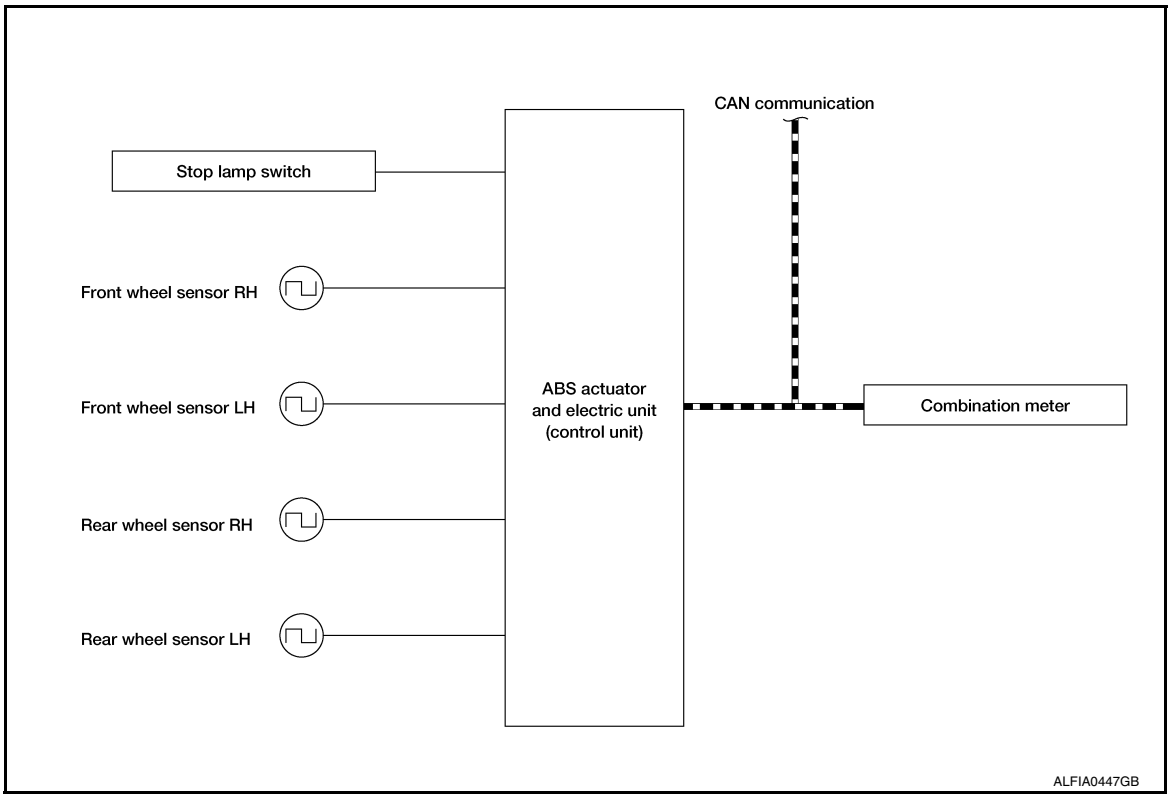
- EBD function is expanded and developed from conventional ABS function and corrects rear wheel brake force to appropriate level by electronic control according to load weight (number of passengers).



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

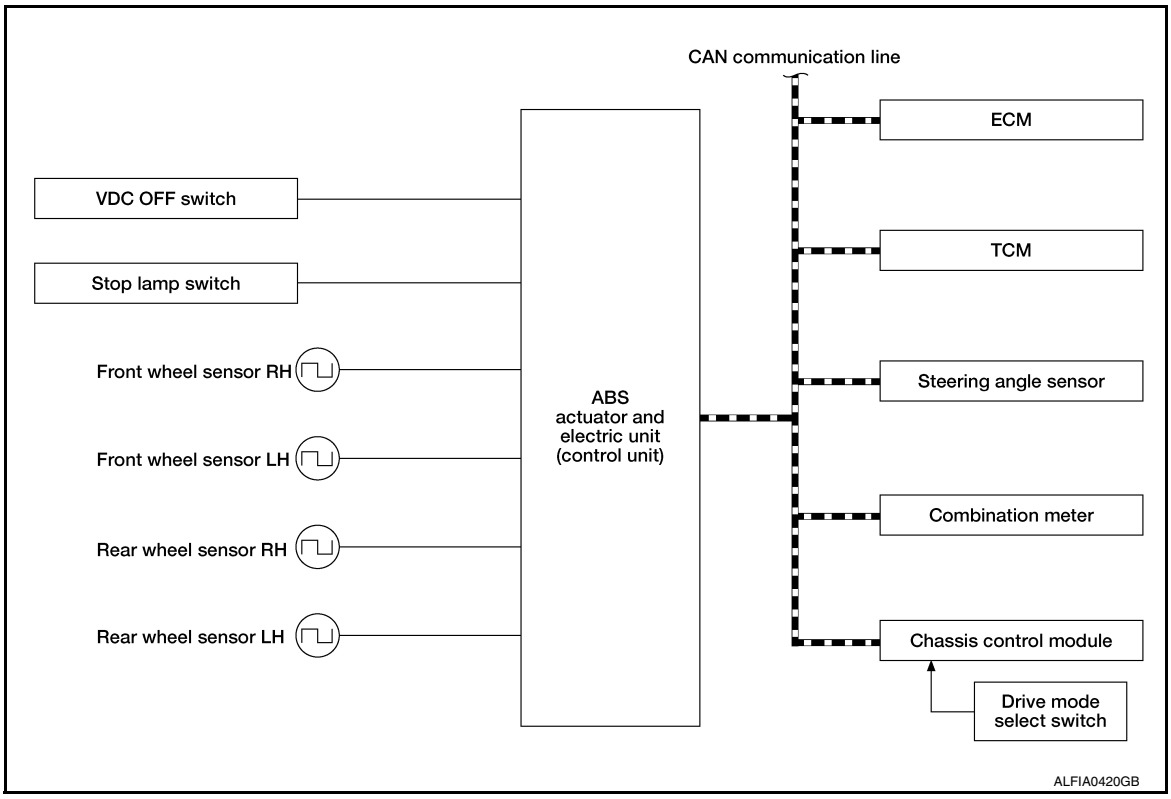
BRAKE LIMITED SLIP DIFFERENTIAL (BLSD) FUNCTION

BRAKE LIMITED SLIP DIFFERENTIAL (BLSD) FUNCTION : System Description

INFOID:0000000012427264

- LH and RH driving wheel spin is always monitored. If necessary, appropriate brake force is independently applied to LH or RH driving wheel so that one-sided wheel spin is avoided and traction is maintained. Mainly starting ability is improved.
- Brake limited slip differential (BLSD) function operates while VDC function is in non-operational status (OFF) by VDC OFF switch.
- VDC warning lamp blinking while Brake limited slip differential (BLSD) function is in operation and indicates to the driver that the function is in operation.
- Slight vibrations are felt on the Brake pedal and the operation noises occur, when Brake limited slip differential (BLSD) function operates. This is not a malfunction because it is caused by Brake limited slip differential (BLSD) function that is normally operated.
- Fail-safe function is adopted. When a malfunction occurs in brake limited slip differential (BLSD) function, the control is suspended for VDC function, TCS function, Brake limited slip differential (BLSD) function, Brake assist function, hill start assist function and Brake force distribution function. The vehicle status becomes the same as models without VDC function, TCS function, Brake limited slip differential (BLSD) function, Brake assist function, hill start assist function and Brake force distribution 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
ECM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication: • Accelerator pedal position signal • Engine speed signal • Engine torque signal Mainly receives the following signal from ABS actuator and electric unit (control unit) via CAN communication: • Engine torque request signal
TCM	Mainly transmits the following signal to ABS actuator and electric unit (control unit) via CAN communication: • Current gear position signal
Chassis control module	Mainly transmits the following signal to ABS actuator and electric unit (control unit) via CAN communication: • Active trace control signal
Combination meter	Mainly receives the following signals from 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
Steering angle sensor	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication: • Steering angle sensor signal • Steering angle sensor malfunction signal

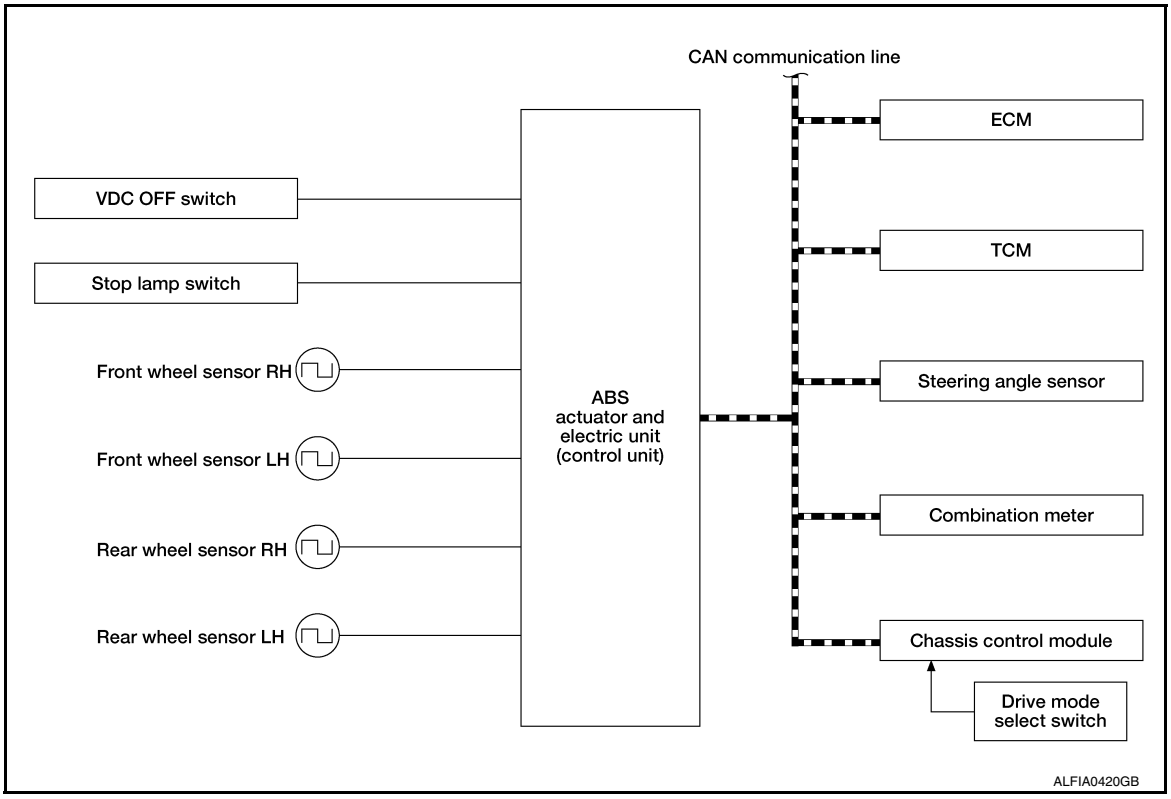
BRAKE ASSIST FUNCTION

BRAKE ASSIST FUNCTION : System Description

INFOID:0000000012427265

- When the driver brakes hard in an emergency, the stopping distance is reduced by increasing brake fluid pressure.
- Fail-safe function is adopted. When a malfunction occurs in Brake assist function, the control is suspended for VDC function, TCS function, Brake limited slip differential (BLSD) function, Brake assist function, hill start assist function and Brake force distribution function. The vehicle status becomes the same as models without VDC function, TCS function, Brake limited slip differential (BLSD) function, Brake assist function, hill start assist function and Brake force distribution 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.

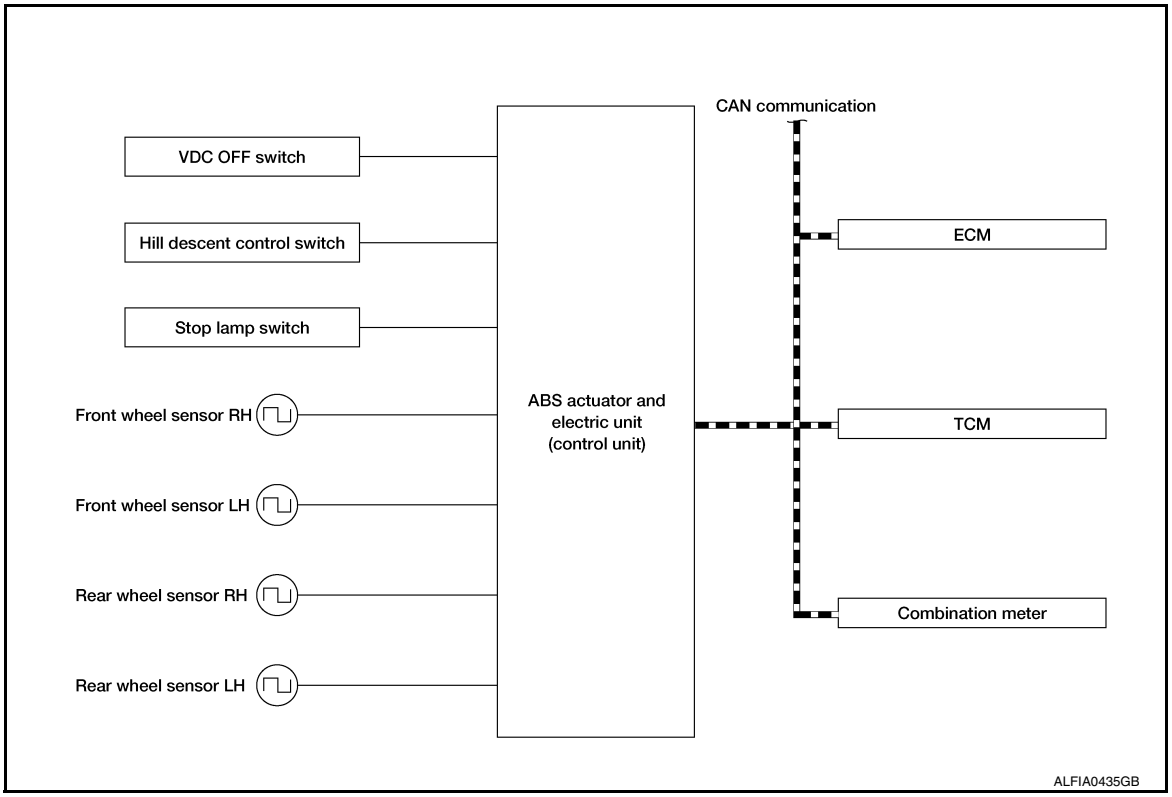
Component	Signal description
ECM	Mainly transmits the following signal to ABS actuator and electric unit (control unit) via CAN communication: • Accelerator pedal position signal • Engine speed signal • Engine torque signal Mainly receives the following signal from ABS actuator and electric unit (control unit) via CAN communication: • Engine torque request signal
TCM	Mainly transmits the following signal to ABS actuator and electric unit (control unit) via CAN communication: • Current gear position signal
Chassis control module	Mainly transmits the following signal to ABS actuator and electric unit (control unit) via CAN communication: • Active trace control signal

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

hill descent control (Downhill Drive Support) FUNCTION

hill descent control (Downhill Drive Support) FUNCTION : System Diagram

INFOID:0000000012427266



hill descent control (Downhill Drive Support) FUNCTION : System Description

INFOID:0000000012427267

- The hill descent control system will help maintain vehicle speed when driving on steeper downhill grades. Hill descent control will provide braking allowing the driver to concentrate on steering while reducing the burden of brake and accelerator operation.
- To operate the system, push the hill descent control switch. the hill descent control indicator in the combination meter will turn on
- 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 starts 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, 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, Brake force distribution function and Active trace control function. However, ABS function and EBD function are operated normally. Refer to BRC-53, "Fail-Safe".

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 signal from ABS actuator and electric unit (control unit) via CAN communication: • Target throttle position signal
TCM	Mainly transmits the following signal 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)

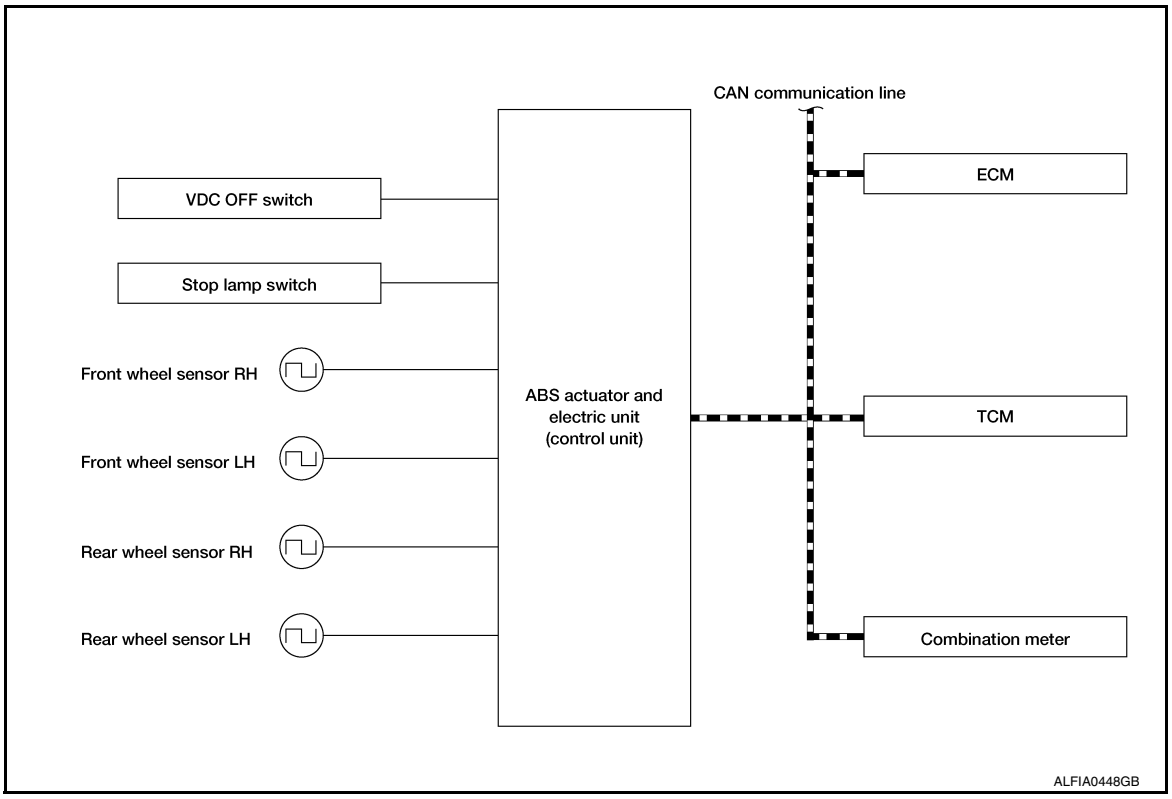
hill start assist FUNCTION

hill start assist FUNCTION : System Description

INFOID:0000000012427268

- 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, Brake limited slip differential (BLSD) function, Brake assist function, hill start assist function and Brake force distribution function. The vehicle status becomes the same as models without VDC function, TCS function, Brake limited slip differential (BLSD) function, Brake assist function, hill start assist function and Brake force distribution 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
ECM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication: • Accelerator pedal position signal • Engine speed signal • Engine torque signal Mainly receive: the following signal from ABS actuator and electric unit (control unit) via CAN communication: • Engine torque request signal
TCM	Mainly transmits the following signal to ABS actuator and electric unit (control unit) via CAN communication: • Current gear position signal
Combination meter	Mainly receives the following signals from 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

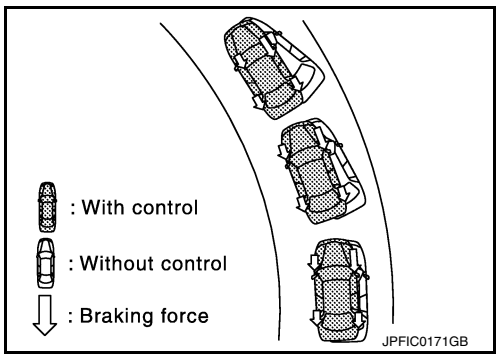
BRAKE FORCE DISTRIBUTION FUNCTION

BRAKE FORCE DISTRIBUTION FUNCTION : System Description

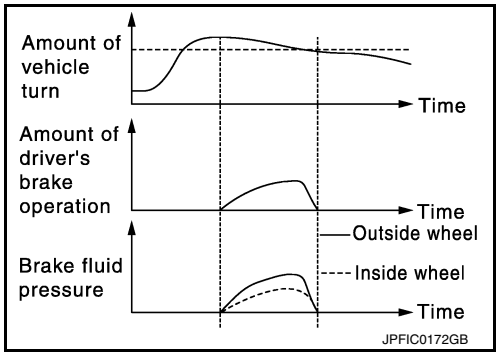
INFOID:0000000012427269

• Brake force distribution function is controlled by ABS actuator and electric unit (control unit).

- Brake force distribution function helps provide a more stable and secure feeling.

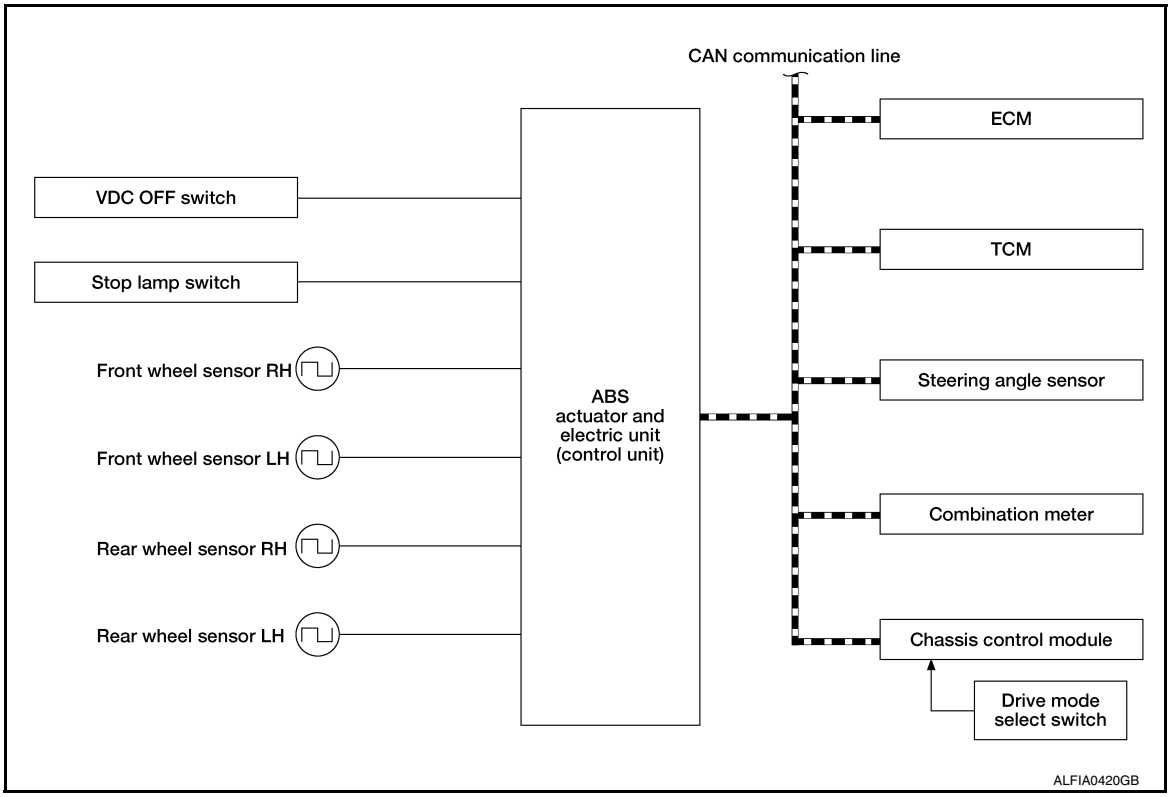


- During cornering, when brake operation is performed brake fluid pressure of each wheel is controlled based on steering operation amount by the driver and vehicle cornering status amount detected by each sensor.
- Fail-safe function is adopted. When a malfunction occurs in Brake force distribution function, the control is suspended for VDC function, TCS function, Brake limited slip differential (BLSD) function, Brake assist function, hill start assist function and Brake force distribution function. The vehicle status becomes the same as models without VDC function, TCS function, Brake limited slip differential (BLSD) function, Brake assist function, hill start assist function and Brake force distribution function. However, ABS function and EBD function are operated normally. Refer to BRC-22, "Fail-Safe".



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

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
ECM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication: • Accelerator pedal position signal • Engine speed signal • Engine torque signal Mainly receives the following signal from ABS actuator and electric unit (control unit) via CAN communication: • Engine torque request signal
TCM	Mainly transmits the following signal to ABS actuator and electric unit (control unit) via CAN communication: • Current gear position signal
Chassis control module	Mainly transmits the following signal to ABS actuator and electric unit (control unit) via CAN communication: • Active trace control signal
Combination meter	Mainly receives the following signals from 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: • Brake warning lamp signal • ABS warning lamp signal • VDC warning lamp signal • VDC OFF indicator lamp signal
Steering angle sensor	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication: • Steering angle sensor signal • Steering angle sensor malfunction signal

ACTIVE TRACE CONTROL FUNCTION

ACTIVE TRACE CONTROL FUNCTION : System Description

INFOID:0000000012427270

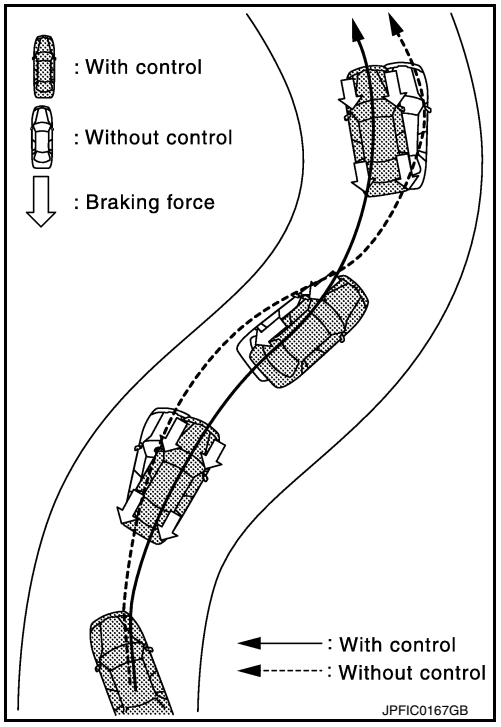
- Active trace control function controls the braking utilizing the ABS actuator and electric unit (control unit), depending on cornering condition calculated from driver's steering input and plural sensors.
- Active trace control function is aimed to enhance traceability at corners and smooth the vehicle movement to provide confident driving.
- When the drive mode select switch is set to the “SPORT” mode, the amount of brake control provided by active trace control is reduced.
- For “PERSONAL” mode, the active trace control can be selected ON or OFF. Refer to BRC-40, "ACTIVE TRACE CONTROL FUNCTION : System Description".
- When the VDC OFF switch is used to turn OFF the VDC system, the active trace control system is also turned OFF.
- When the active trace control is operated, active trace control graphics are shown on the information display of combination meter. These are shown only when “Chassis control” is selected on the information display. Refer to DAS-133, "System Description - Chassis Control".
- When the active trace control is not functioning properly, the master warning lamp illuminates. Warning message “Chassis control” will also appear on information display.

NOTE:

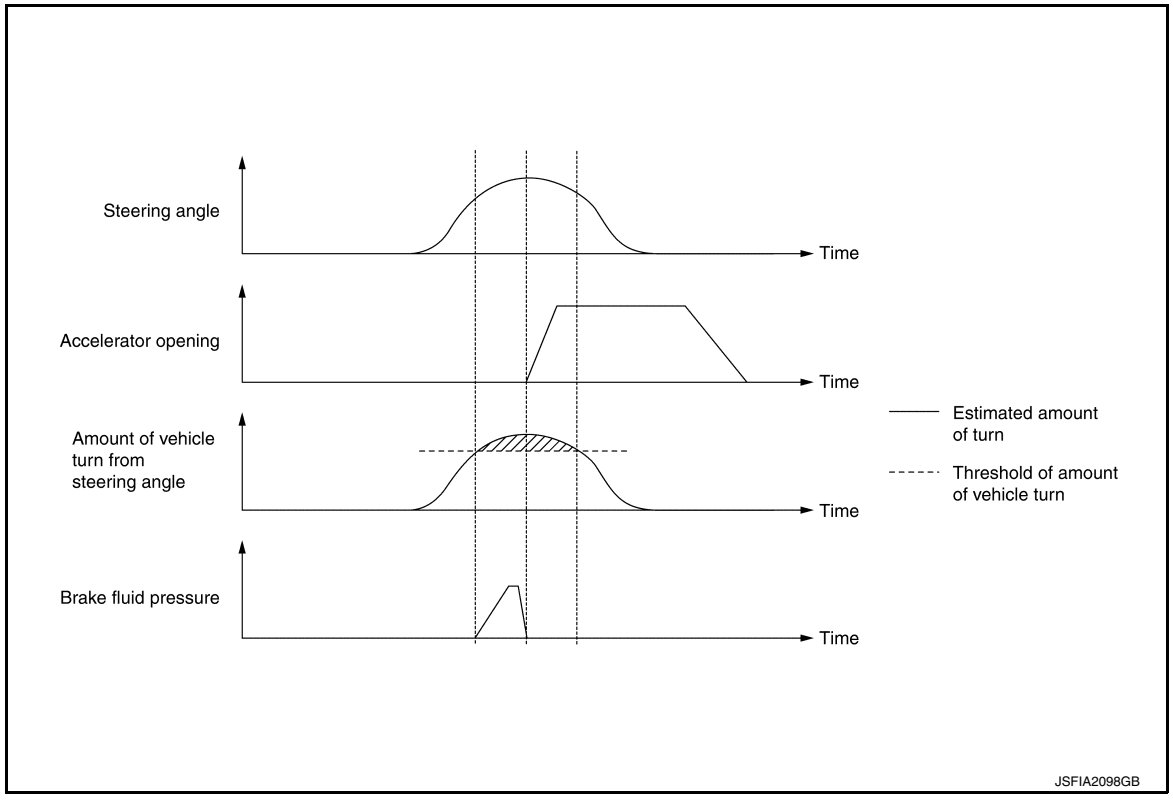
- The active trace control may not be effective depending on the driving condition. Always driving carefully and attentively.
- Brake pedal may vibrate and brake pedal feel may change during active trace control operation. Also operation noise may be noticeable during operation. These are not abnormal conditions.
- When the active trace control is selected OFF, some functions will be kept ON to assist driver. (For example, avoidance condition.)

OPERATION CHARACTERISTICS

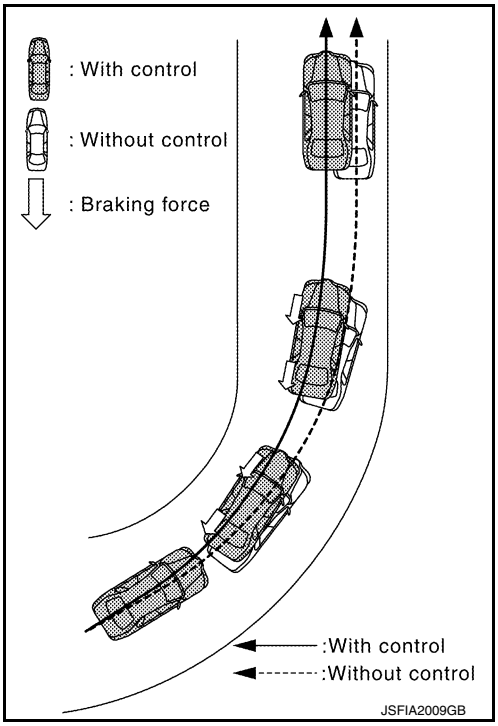
Active trace control helps enhance the transition from braking into and then accelerating out of corners. Active trace control utilizes the vehicle′s electrically-driven intelligent brake system to help improve cornering feel by automatically applying brakes. Furthermore, Active trace control will apply 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 momentum and help turn the vehicle.



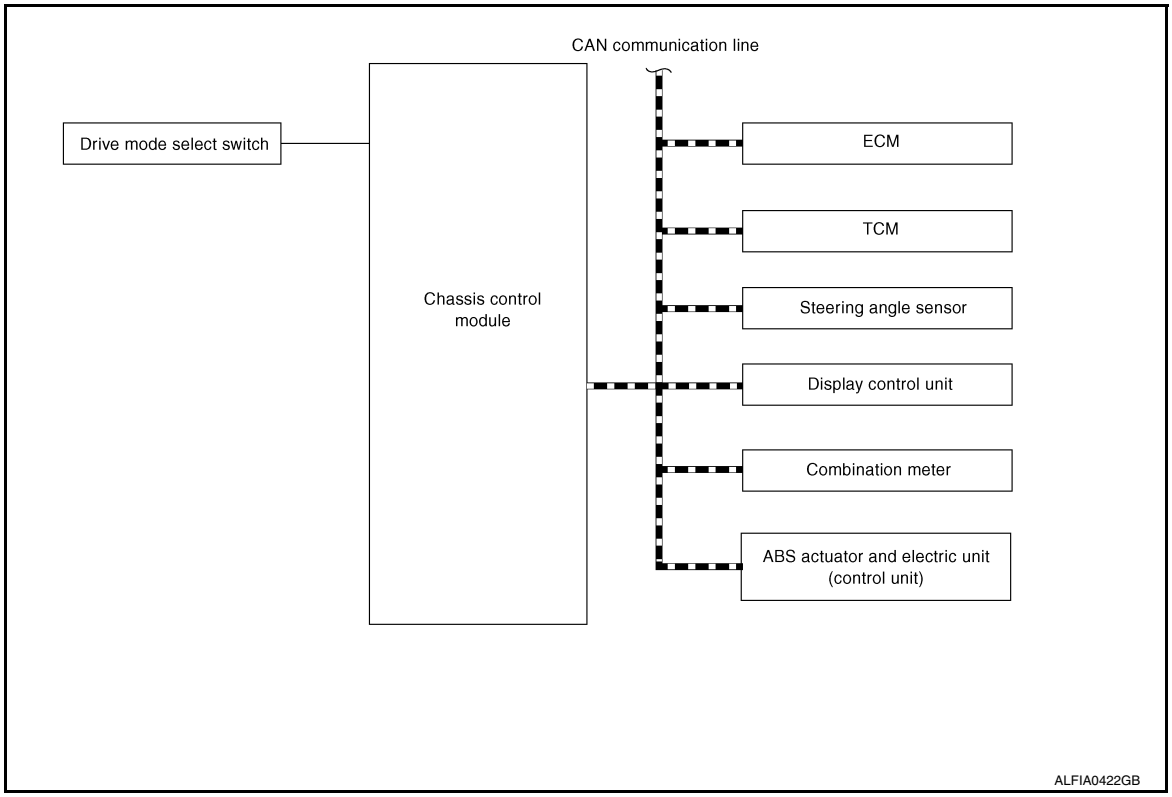
- Brake control amount is controlled according to steering operation status by the driver and vehicle cornering status.



- During cornering, the brake control system limits changes in steering angle by controlling the inner ring brakes according to accelerator pedal operation and allows smooth movement of the vehicle to achieve stable cornering.



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
ECM	Mainly transmits the following signals to chassis control module via CAN communication: • Accelerator pedal position signal • Engine torque signal • Engine speed signal
TCM	Mainly transmits the following signal to chassis control module via CAN communication: • Current gear position signal
ABS actuator and electric unit (control unit)	Mainly transmits the following signals to chassis control module via CAN communication: • Front LH wheel speed signal • Front RH wheel speed signal • Rear LH wheel speed signal • Rear RH wheel speed signal • ABS operation signal • TCS operation signal • VDC operation signal • Stop lamp switch signal • Vehicle speed signal (ABS) • Yaw rate signal • Side G signal • Decel G signal • VDC OFF switch signal • Brake fluid pressure signal • Steering angle sensor signal Mainly receives the following signal from chassis control module via CAN communication: • Active trace control signal
Steering angle sensor	Mainly transmits the following signal to chassis control module via CAN communication: • Steering angle sensor signal
Chassis control module	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication: • Active Trace Control signal • Drive mode signal
Display control unit	Mainly transmits the following signal to chassis control module via CAN communication line: • System selection signal
Combination meter	Mainly receives the following signals from chassis control module via CAN communication: • Chassis control malfunction signal • Active trace control display signal
Drive mode select switch	Mainly transmits the following signal to chassis control module: • Drive mode signal

WARNING/INDICATOR/CHIME LIST

WARNING/INDICATOR/CHIME LIST : Warning Lamp/Indicator Lamp

INFOID:0000000012427271

Name	Design	Layout/Function
ABS warning lamp	ABS or 	For function: Refer to BRC-167, "Component Function Check".
Brake warning lamp	BRAKE or 	For function: Refer to BRC-168, "Component Function Check".
VDC OFF indicator lamp		For function: Refer to BRC-171, "Component Function Check".
VDC warning lamp		For function: Refer to BRC-170, "Component Function Check".

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

CONSULT Function

INFOID:0000000012427272

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 Result” 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.
Re/programming, Configuration	• Read and save the vehicle specification (TYPE ID). • Write the vehicle specification (TYPE ID) when replacing ABS actuator and electric unit (control unit).

*: The following diagnosis information is erased by erasing.

- DTC
- Freeze frame data (FFD)

ECU IDENTIFICATION

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

SELF DIAGNOSTIC RESULT

Refer to BRC-57, "DTC Index".

When “CRNT” is displayed on “Self Diagnostic Result”,
- The system is presently malfunctioning.

When “PAST” is displayed on “Self Diagnostic 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*
	HSV FR-RL	Off	Off	Off
FR LH SOL	FR LH IN SOL	Off	On*	On*
	FR LH OUT SOL	Off	Off	On*
	USV FL-RR	Off	Off	Off
RR RH SOL	RR RH IN SOL	Off	On*	On*
	RR RH OUT SOL	Off	Off	On*
	USV FL-RR	Off	Off	Off
RR LH SOL	RR LH IN SOL	Off	On*	On*
	RR LH OUT SOL	Off	Off	On*
	HSV FR-RL	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
	HSV FR-RL	Off	On*	On*
FR LH SOL (ACT)	FR LH IN SOL	Off	Off	Off
	FR LH OUT SOL	Off	Off	Off
	USV FL-RR	Off	On*	On*
RR RH SOL (ACT)	RR RH IN SOL	Off	Off	Off
	RR RH OUT SOL	Off	Off	Off
	USV FL-RR	Off	On*	On*
RR LH SOL (ACT)	RR LH IN SOL	Off	Off	Off
	RR LH OUT SOL	Off	Off	Off
	HSV FR-RL	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 SIGNALS	
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.
DECEL G-SEN (m/s^2)	×	×	Decel G detected by decel G 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.
EBD WARN LAMP (On/Off)			Brake warning lamp ON/OFF status is displayed. (Note 1)
STOP LAMP SW (On/Off)	×	×	Stop lamp switch signal input status 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)
BATTERY VOLT (V)	×	×	Voltage supplied to ABS actuator and electric unit (control unit) is displayed.
GEAR	×	×	Current gear position judged from current gear position signal is displayed.

Item (Unit)	Monitor item selection		Note
	INPUT SIGNALS	MAIN SIGNALS	
SLCT LVR POSI	×	×	Current gear position judged from current gear position signal is displayed.
YAW RATE SEN (d/s)	×	×	Yaw rate detected by yaw rate sensor 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.
N POSI SIG (On/Off)			N range signal input status judged from N range signal is displayed.
P POSI SIG (On/Off)			P range signal input status judged from P range signal is displayed.
ACCEL POS SIG (%)	×		Displays the Accelerator pedal position
SIDE G-SENSOR (m/s^2))	×		Side G detected by side G sensor is displayed.
STR ANGLE SIG	×		Steering angle detected by steering angle sensor is displayed.
PRESS SENSOR (bar)	×		Brake fluid pressure detected by pressure sensor is displayed.
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.
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.
USV[FL-RR] (On/Off)			Primary side USV solenoid valve (On/Off) status is displayed.
USV[FR-RL] (On/Off)			Secondary side USV solenoid valve (On/Off) status is displayed.
HSV[FL-RR] (On/Off)			Primary side HSV solenoid valve (On/Off) status is displayed.
HSV[FR-RL] (On/Off)			Secondary side HSV solenoid valve (On/Off) status is displayed.

Item (Unit)	Monitor item selection		Note
	INPUT SIGNALS	MAIN SIGNALS	
V/R OUTPUT (On/Off)			Valve relay operation signal (On/Off) status is displayed.
M/R OUTPUT (On/Off)			Motor relay operation signal (On/Off) status is displayed.
ENGINE RPM (tr/min)	×		Engine speed status is displayed.
STP ON RLY			Stop lamp relay signal (On/Off) status is displayed.
DDS SW(Note 3)			Downhill Drive Support switch status is displayed.
DDS SIG(Note 3)			Downhill Drive Support operation status is displayed.
USS SIG (Note 4) (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: DDS (Downhill Drive Support)
Note 4: USS (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:0000000012427273

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. ±0.01 G
	During acceleration	Positive value
	During deceleration	Negative value
STR ANGLE SIG	When driving straight	0±3.5°
	When steering wheel is steered to RH by 90°	Approx. +90°
	When steering wheel is steered to LH by 90°	Approx. –90°
ENGINE RPM	Engine stopped	0 tr/min
	Engine running	Almost same reading as tachometer
PRESS SENSOR	Brake pedal not depressed	Approx. 0 bar
	Brake pedal depressed	(−40) – (+300 bar)
FLUID LEV SW	When brake fluid level switch is ON (brake fluid level is less than the specified level)	On
	When brake fluid level switch is OFF	Off
PARK BRAKE SW	When parking brake is active	On
	Parking brake is released	Off
USV [FL-RR]	Active	On
	Not activated	Off
HSV [FR-RL]	Active	On
	Not activated	Off
USV [FL-RR]	Active	On
	Not activated	Off
HSV [FR-RL]	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

Monitor item	Condition	Reference values in normal operation
TCS SIGNAL	TCS activated	On
	TCS not activated	Off
VDC SIGNAL	VDC activated	On
	VDC not activated	Off
EBD FAIL SIG	In EBD fail-safe	On
	EBD is normal	Off
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
SLCT LVR POSI	Vehicle stopped	N/P
N POSI SIG	When selector lever is in the N position	On
	When selector lever is in the other position than N	Off
P POSI SIG	When selector lever is in the P position	On
	When selector lever is in the other position than P	Off
4WD MODE MON(Note 3)	Always	AUTO, LOCK, 2WD (depending on AWD control status)
V/R OUTPUT	When the solenoid valve relay is active (when ignition is OFF)	On
	When the solenoid valve relay is not active (in the fail-safe mode)	Off
M/R OUTPUT	When the actuator motor and motor relay are active (“ACTIVE TEST” with CONSULT)	On
	When the actuator motor and motor relay are inactive	Off
STP ON RLY	When stop lamp relay is active	On
	When stop lamp relay is not active	Off
DDS SW(Note 4) (On/Off)	Hill descent switch ON	On
	Hill Descent switch OFF	Off
DDS SW(Note 4) (On/Off)	Hill descent switch ON	On
	Hill Descent switch OFF	Off
DDS SIG(Note 4) (On/Off)	When hill descent control is active	On
	When hill descent control is inactive	Off
USS SIG(Note 5)	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: DDS (Downhill Drive Support)
Note 5: USS (Hill Start Assist)

Fail-Safe

INFOID:0000000012427274

VDC FUNCTION, TCS FUNCTION, BRAKE LIMITED SLIP DIFFERENTIAL FUNCTION, BRAKE ASSIST FUNCTION, hill start assist FUNCTION, hill descent 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, Brake limited slip differential (BLSD) function, Brake assist function, hill start assist function and Brake force distribution function. The vehicle status becomes the same as models without VDC function, TCS function, Brake limited slip differential (BLSD) function, Brake assist function, hill start assist 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, Brake limited slip differential (BLSD) function, Brake assist function, hill start assist function and Brake force distribution function. The vehicle status becomes the same as models without VDC function, TCS function, ABS function, Brake limited slip differential (BLSD) function, Brake assist function, hill start assist 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, Brake limited slip differential (BLSD) function, Brake assist function, hill start assist function and Brake force distribution function. The vehicle status becomes the same as models without VDC function, TCS function, ABS function, EBD function, Brake limited slip differential (BLSD) function, Brake assist function, hill start assist function and Brake force distribution function.

DTC	Fail-safe condition
C1101 C1102 C1103 C1104 C1105 C1106 C1107 C1108	The following functions are suspended: • VDC function • TCS function • ABS function • EBD function (only when both 2 rear wheels are malfunctioning) • Brake limited slip differential (BLSD) function • Brake assist function • hill start assist function • hill descent function • Brake force distribution function • Active trace control function (control of chassis control module)
C1109 C1110 C1111	The following functions are suspended: • VDC function • TCS function • ABS function • EBD function • Brake limited slip differential (BLSD) function • Brake assist function • hill start assist function • hill descent function • Brake force distribution function • Active trace control function (control of chassis control module)

DTC	Fail-safe condition
C1113	The following functions are suspended: • VDC function • TCS function • ABS function • EBD function • Brake limited slip differential (BLSD) function • Brake assist function • hill start assist function • hill descent function • Brake force distribution function • Active trace control function (control of chassis control module)
C1115	The following functions are suspended: • VDC function • TCS function • ABS function • Brake limited slip differential (BLSD) function • Brake assist function • hill start assist function • hill descent function • Brake force distribution function • Active trace control function (control of chassis control module)
C1116	The following functions are suspended. • VDC function • TCS function • Brake limited slip differential (BLSD) function • Brake assist function • Brake force distribution function • hill start assist function • hill descent control function • Active trace control function (control of chassis control module)
C1120 C1121 C1122 C1123 C1124 C1125 C1126 C1127	The following functions are suspended: • VDC function • TCS function • ABS function • EBD function • Brake limited slip differential (BLSD) function • Brake assist function • hill start assist function • hill descent function • Brake force distribution function • Active trace control function (control of chassis control module)
C1130	The following functions are suspended: • VDC function • TCS function • Brake limited slip differential (BLSD) function • hill start assist function • hill descent function • Brake force distribution function • Active trace control function (control of chassis control module)
C1140	The following functions are suspended: • VDC function • TCS function • ABS function • EBD function • Brake limited slip differential (BLSD) function • Brake assist function • hill start assist function • Brake force distribution function • Active trace control function (control of chassis control module)

DTC	Fail-safe condition
C1142	The following functions are suspended: • VDC function • TCS function • Brake limited slip differential (BLSD) function • Brake assist function • hill start assist function • hill descent function • Brake force distribution function • Active trace control function (control of chassis control module)
C1143 C1144	The following functions are suspended: • VDC function • TCS function • Brake limited slip differential (BLSD) function • hill start assist function • hill descent function • Brake force distribution function • Active trace control function (control of chassis control module)
C1145 C1146	The following functions are suspended: • VDC function • TCS function • ABS function • Brake limited slip differential (BLSD) function • Brake assist function • hill start assist function • hill descent function • Brake force distribution function • Active trace control function (control of chassis control module)
C1153	The following functions are suspended. • VDC function • TCS function • ABS function • Brake limited slip differential (BLSD) function • Brake assist function • Brake force distribution function • hill start assist function • hill descent control function • Active trace control function (control of chassis control module)
C1154	The following functions are suspended. • VDC function • TCS function • Brake limited slip differential (BLSD) function • Brake force distribution function • hill start assist function • hill descent control function • Active trace control function (control of chassis control module)
C1155	The following functions are suspended: • VDC function • TCS function • Brake limited slip differential (BLSD) function • Brake assist function • hill start assist function • hill descent function • Brake force distribution function • Active trace control function (control of chassis control module)

DTC	Fail-safe condition
C1160	The following functions are suspended: • VDC function • TCS function • ABS function • Brake limited slip differential (BLSD) function • Brake assist function • hill start assist function • hill descent function • Brake force distribution function • Active trace control function (control of chassis control module)
C1164 C1165 C1166 C1167	The following functions are suspended: • VDC function • TCS function • ABS function • EBD function • Brake limited slip differential (BLSD) function • Brake assist function • hill start assist function • hill descent function • Brake force distribution function • Active trace control function (control of chassis control module)
C1170	The following functions are suspended: • VDC function • TCS function • ABS function • Brake limited slip differential (BLSD) function • Brake assist function • hill start assist function • hill descent function • Brake force distribution function • Active trace control function (control of chassis control module)
C1197 C1198	Electrical vacuum assistance of brake booster is suspended.
C1199	—
C119A	Electrical vacuum assistance of brake booster is suspended.
U1000	The following functions are suspended: • VDC function • TCS function • Brake limited slip differential (BLSD) function • hill start assist function • hill descent function • Brake force distribution function • Active trace control function (control of chassis control module)

DTC Inspection Priority Chart

INFOID:0000000012427275

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
2	• C1110 CONTROLLER FAILURE • C1153 EMERGENCY BRAKE • C1170 VARIANT CODING
3	• C1130 ENGINE SIGNAL 1 • C1144 ST ANG SEN SIGNAL • C1138 4WAS CIRCUIT
4	• C1109 BATTERY VOLTAGE [ABNOMAL] • C1111 PUMP MOTOR • C1140 ACTUATOR RLY

Priority	Detected item (DTC)
5	• C1101 RR RH SENSOR-1 • C1102 RR LH SENSOR-1 • C1103 FR RH SENSOR-1 • C1104 FR LH SENSOR-1 • C1105 RR RH SENSOR-2 • C1106 RR LH SENSOR-2 • C1107 FR RH SENSOR-2 • C1108 FR LH SENSOR-2 • C1113 G SENSOR • C1115 ABS SENSOR [ABNORMAL SIGNAL] • C1116 STOP LAMP SWITCH • 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 • C1154 PNP SWITCH • C1160 DECEL G SEN SET • C1164 CV 1 • C1165 CV 2 • C1166 SV 1 • C1167 SV 2 • C1197 VACUUM SENSOR • C1198 VACUUM SEN CIR • C1199 BRAKE BOOSTER • C119A VACUUM SEN VOLT
6	• C1155 BR FLUID LEVEL LOW

DTC Index

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DTC	Items (CONSULT screen terms)	Reference
C1101	RR RH SENSOR-1	BRC-78, "DTC Description"
C1102	RR LH SENSOR-1	
C1103	FR RH SENSOR-1	
C1104	FR LH SENSOR-1	
C1105	RR RH SENSOR-2	BRC-83, "DTC Description"
C1106	RR LH SENSOR-2	
C1107	FR RH SENSOR-2	
C1108	FR LH SENSOR-2	
C1109	BATTERY VOLTAGE [ABNORMAL]	BRC-90, "DTC Description"
C1110	CONTROLLER FAILURE	BRC-92, "DTC Description"
C1111	PUMP MOTOR	BRC-94, "DTC Description"
C1113	G SENSOR	BRC-97, "DTC Description"
C1115	ABS SENSOR [ABNORMAL SIGNAL]	BRC-99, "DTC Description"
C1116	STOP LAMP SW	BRC-106, "DTC Description"
C1118	4WD SYSTEM	BRC-108, "DTC Description"
C1120	FR LH IN ABS SOL	BRC-110, "DTC Description"
C1121	FR LH OUT ABS SOL	BRC-112, "DTC Description"

DTC	Items (CONSULT screen terms)	Reference
C1122	FR RH IN ABS SOL	BRC-110, "DTC Description"
C1123	FR RH OUT ABS SOL	BRC-112, "DTC Description"
C1124	RR LH IN ABS SOL	BRC-110, "DTC Description"
C1125	RR LH OUT ABS SOL	BRC-112, "DTC Description"
C1126	RR RH IN ABS SOL	BRC-110, "DTC Description"
C1127	RR RH OUT ABS SOL	BRC-112, "DTC Description"
C1130	ENGINE SIGNAL 1	BRC-114, "DTC Description"
C1140	ACTUATOR RLY	BRC-116, "DTC Description"
C1142	PRESS SEN CIRCUIT	BRC-118, "DTC Description"
C1143	ST ANG SEN CIRCUIT	BRC-121, "DTC Description"
C1144	ST ANG SEN SIGNAL	BRC-125, "DTC Description"
C1145	YAW RATE SENSOR	BRC-97, "DTC Description"
C1146	SIDE G-SEN CIRCUIT	
C1153	EMERGENCY BRAKE	BRC-92, "DTC Description"
C1154	PNP POSI SIG	BRC-127, "DTC Description"
C1155	BR FLUID LEVEL LOW	BRC-129, "DTC Description"
C1160	DECEL G SEN SET	BRC-133, "DTC Description"
C1164	CV 1	BRC-135, "DTC Description"
C1165	CV 2	
C1166	SV 1	BRC-137, "DTC Description"
C1167	SV 2	
C1170	VARIANT CODING	BRC-139, "DTC Description"
C1197	VACUUM SENSOR	BRC-141, "DTC Description"
C1198	VACUUM SEN CIR	BRC-144, "DTC Description"
C1199	BRAKE BOOSTER	BRC-146, "DTC Description"
C119A	VACUUM SEN VOLT	BRC-149, "DTC Description"
C1B60	EXTERNAL CONTROL MODULE	BRC-152, "DTC Description"
U1000	CAN COMM CIRCUIT	BRC-154, "DTC Description"
U1002	SYSTEM COMM (CAN)	BRC-155, "DTC Description"
U1010	CONTROL UNIT (CAN)	BRC-157, "DTC Description"

WIRING DIAGRAM

BRAKE CONTROL SYSTEM

Wiring Diagram

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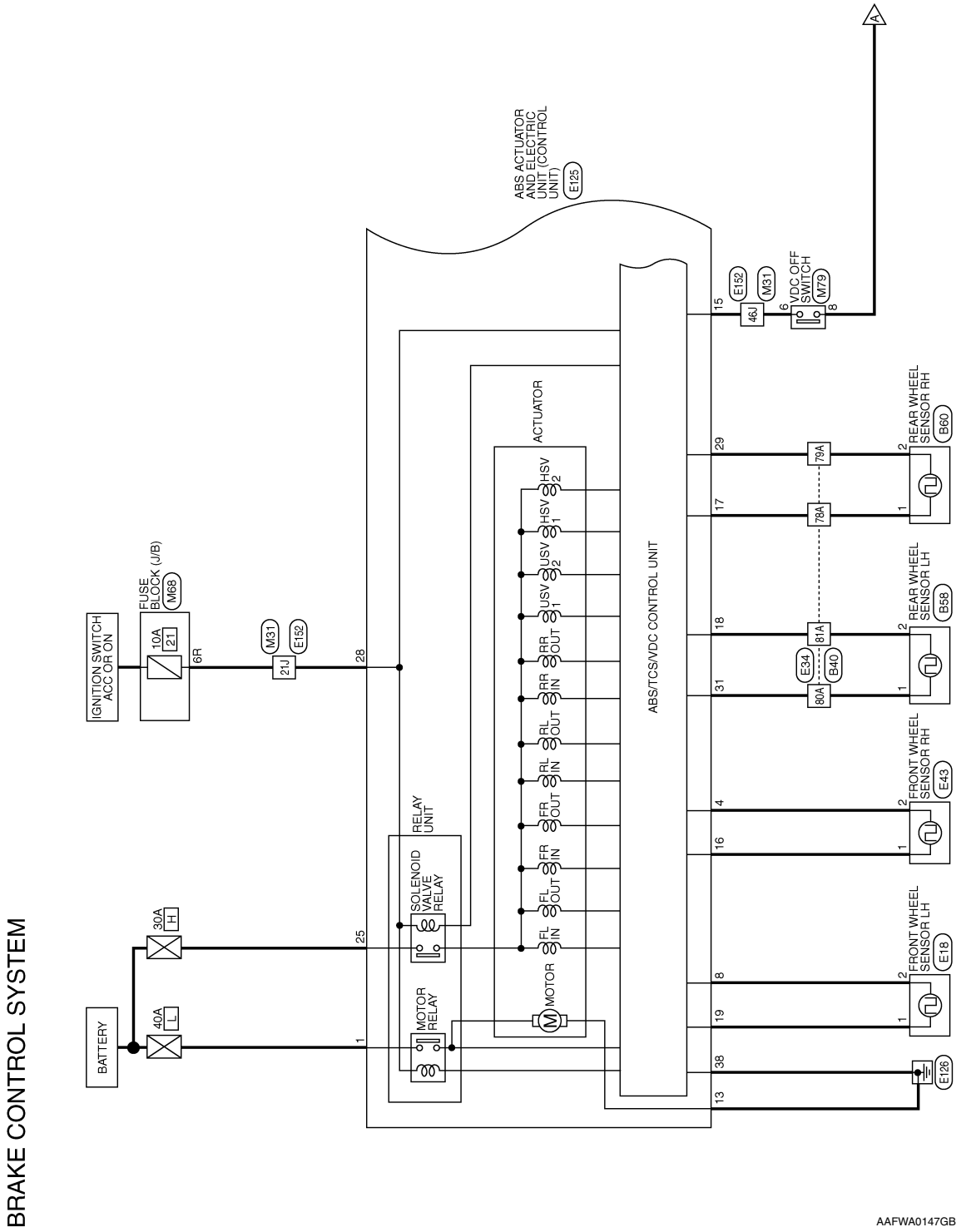

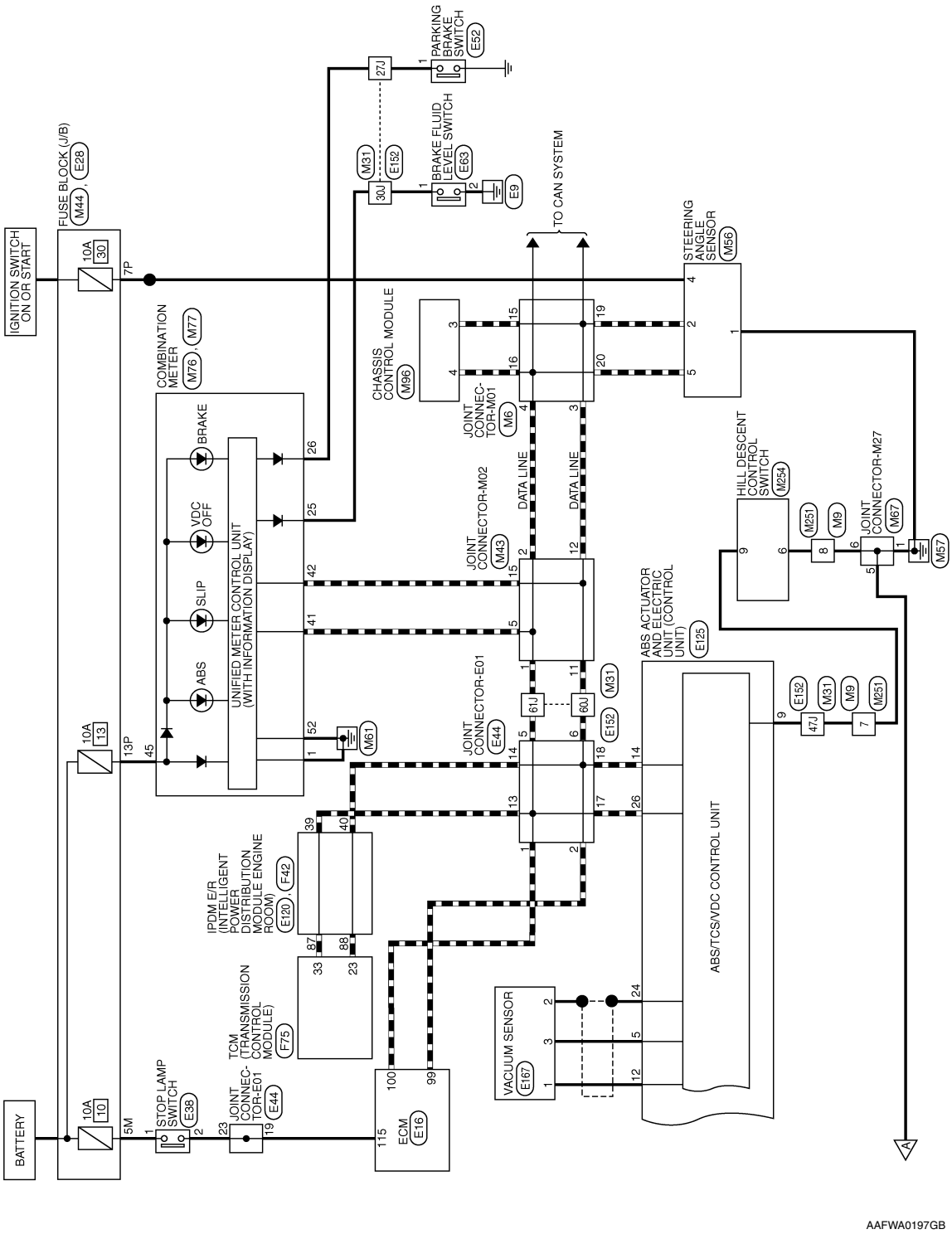
IGNITION SWITCH ON OR START
FUSE BLOCK (J/B) M44, E28
10A 30
7P
PARKING BRAKE SWITCH E52
27J
BRAKE FLUID LEVEL SWITCH E63
30J
M31
E152
E9
TO CAN SYSTEM
STEERING ANGLE SENSOR M56
COMBINATION METER M76, M77
BRAKE
VDC OFF
SLIP
ABS
UNIFIED METER CONTROL UNIT (WITH INFORMATION DISPLAY)
CHASSIS CONTROL MODULE M96
JOINT CONNEC-TOR-M01 M6
DATA LINE
JOINT CONNECTOR-M02 M43
HILL DESCENT CONTROL SWITCH M254
JOINT CONNECTOR-M27 M67
M251
M9
M57
ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) E125
JOINT CONNECTOR-E01 E44
61J
60J
M61
10A 13
13P
45
52
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) E120, F42
TCM (TRANSMISSION CONTROL MODULE) F75
VACUUM SENSOR E167
ABS/TCS/VDC CONTROL UNIT
47J
7
BATTERY
10A 10
5M
STOP LAMP SWITCH E38
JOINT CONNEC-TOR-E01 E44
ECM E16
A
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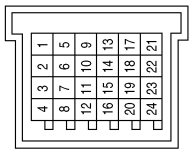
BRAKE CONTROL SYSTEM CONNECTORS

Connector No.	M6
Connector Name	JOINT CONNECTOR-M01
Connector Color	GRAY

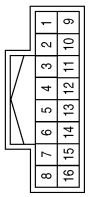
H.S.



Terminal No.	Color of Wire	Signal Name
3	P	–
4	L	–
15	P	–
16	L	–
19	P	–
20	L	–

Connector No.	M9
Connector Name	WIRE TO WIRE
Connector Color	WHITE

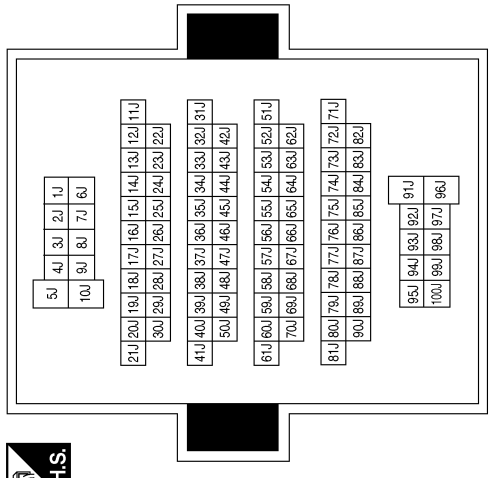
H.S.



Terminal No.	Color of Wire	Signal Name
7	LA/L	–
8	B	–

Connector No.	M31
Connector Name	WIRE TO WIRE
Connector Color	WHITE

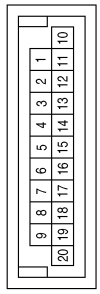
H.S.



Terminal No.	Color of Wire	Signal Name
21J	LA/L	–
27J	G	–
30J	V	–
46J	BR	–
47J	LA/L	–
60J	P	–
61J	L	–

Connector No.	M43
Connector Name	JOINT CONNECTOR-M02
Connector Color	BLUE

H.S.



Terminal No.	Color of Wire	Signal Name
1	L	–
2	L	–
5	L	–
11	P	–
12	P	–
15	P	–

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Connector No.	M44
Connector Name	FUSE BLOCK (J/B)
Connector Color	WHITE

H.S.

7P	6P	5P	4P	3P	2P	1P
16P	15P	14P	13P	12P	11P	10P	9P	8P

Terminal No.	Color of Wire	Signal Name
7P	Y	–
13P	LA/G	–

Connector No.	M56
Connector Name	STEERING ANGLE SENSOR
Connector Color	GRAY

H.S.

1	2	3	4
5	6	7	8

Terminal No.	Color of Wire	Signal Name
1	B	–
2	P	–
4	G	–
5	L	–

Connector No.	M67
Connector Name	JOINT CONNECTOR-M27
Connector Color	WHITE

H.S.

8	7	6	5	4	3	2	1

Terminal No.	Color of Wire	Signal Name
1	B	–
5	B	–
6	B	–

Connector No.	M68
Connector Name	FUSE BLOCK (J/B)
Connector Color	BROWN

H.S.

7R	6R	5R	4R	3R	2R	1R
16R	15R	14R	13R	12R	11R	10R	9R	8R

Terminal No.	Color of Wire	Signal Name
6R	LA/L	–

Connector No.	M76
Connector Name	COMBINATION METER
Connector Color	WHITE

H.S.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

Terminal No.	Color of Wire	Signal Name
1	B	GND
25	V	BRAKE OIL SW
26	G	PKB SW

Connector No.	M77
Connector Name	COMBINATION METER
Connector Color	WHITE

H.S.

41	42	43	44	45	46
47	48	49	50	51	52

Terminal No.	Color of Wire	Signal Name
41	L	CAN-H
42	P	CAN-L
45	LA/G	BAT
52	B	G1

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Connector No.	M251
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16

Terminal No.	Color of Wire	Signal Name
7	L	–
8	B	–

Connector No.	M96
Connector Name	CHASSIS CONTROL MODULE
Connector Color	WHITE

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name
3	P	CAN-L
4	L	CAN-H

Connector No.	M79
Connector Name	VDC OFF SWITCH
Connector Color	BLACK

H.S.

4	3	2	1
8	7	6	5

Terminal No.	Color of Wire	Signal Name
6	BR	–
8	B	–

Connector No.	E18
Connector Name	FRONT WHEEL SENSOR LH
Connector Color	GRAY

H.S.

1	2

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

Connector No.	E16
Connector Name	ECM
Connector Color	BLACK

H.S.

97	101	105	109	113	117	121	125
98	102	106	110	114	118	122	126
99	103	107	111	115	119	123	127
100	104	108	112	116	120	124	128

Terminal No.	Color of Wire	Signal Name
99	P	CAN-L
100	L	CAN-H
115	V	STOP LAMP SWITCH

Connector No.	M254
Connector Name	HILL DESCENT CONTROL SWITCH
Connector Color	GRAY

H.S.

5	4	3	2	1
10	9	8	7	6

Terminal No.	Color of Wire	Signal Name
6	B	–
9	L	–

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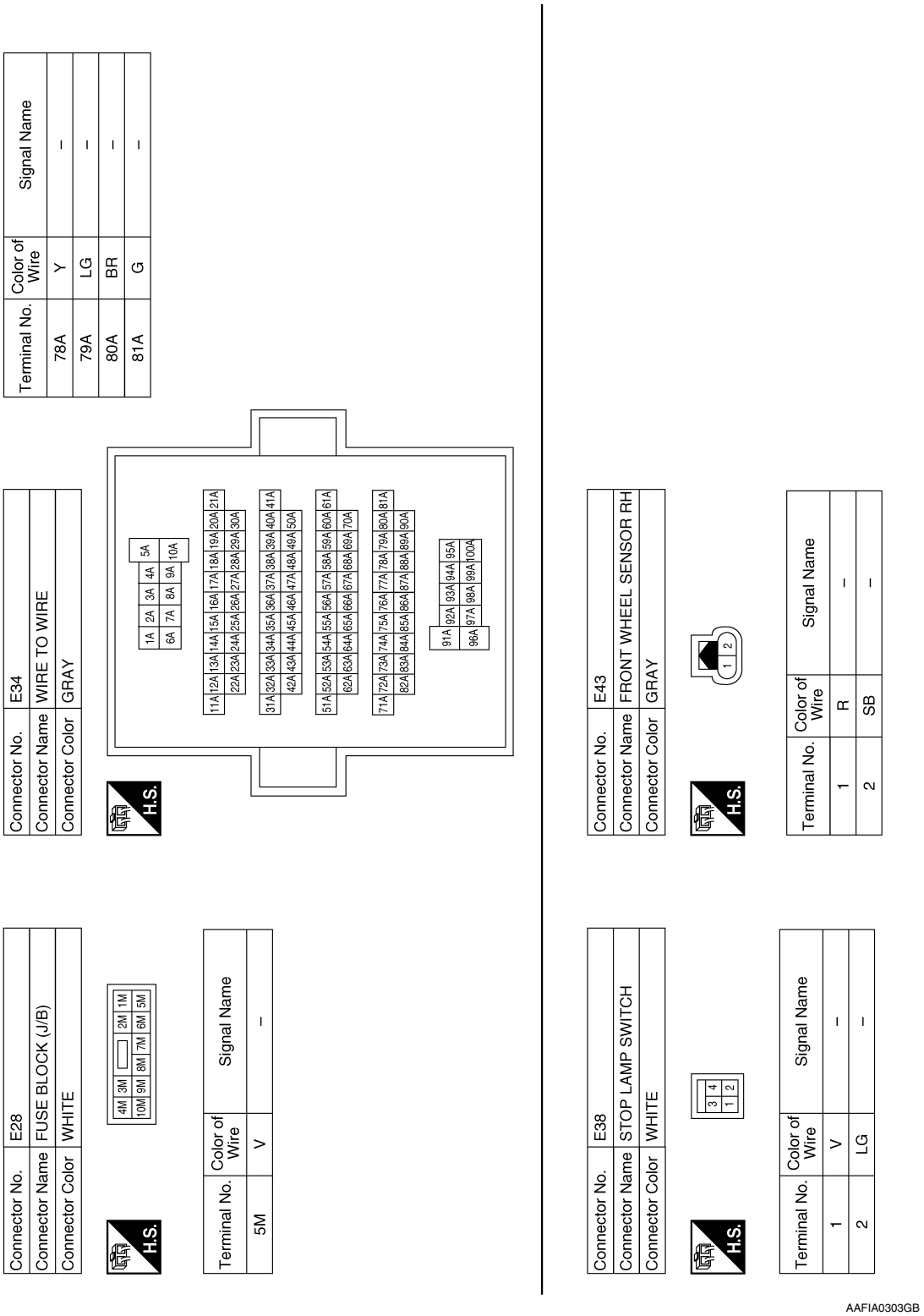

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Connector No.	E52
Connector Name	PARKING BRAKE SWITCH
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	G	–

Terminal No.	Color of Wire	Signal Name
1	L	–
2	P	–
5	L	–
6	P	–
13	L	–
14	P	–
17	L	–
18	P	–
19	V	–
23	LG	–

Connector No.	E44
Connector Name	JOINT CONNECTOR-E01
Connector Color	WHITE

H.S.

Connector No.	E120
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	GRAY

H.S.

Terminal No.	Color of Wire	Signal Name
39	L	CAN-H
40	P	CAN-L

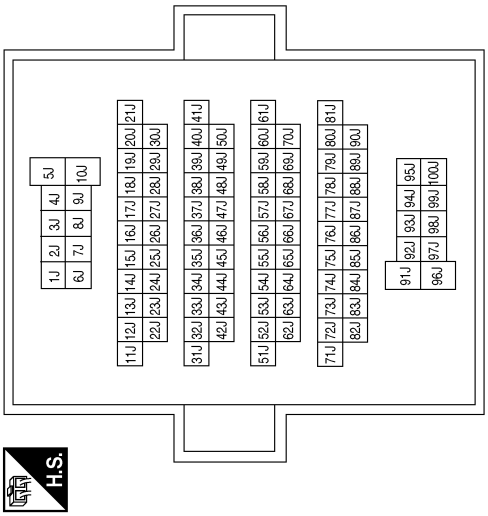
Connector No.	E63
Connector Name	BRAKE FLUID LEVEL SWITCH
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	V	–
2	BR	–

AAFIA0450GB

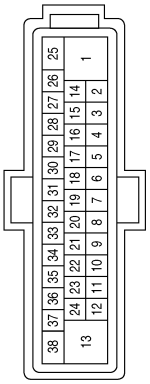
Connector No.	E152
Connector Name	WIRE TO WIRE
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
21J	GR	–
27J	G	–
30J	V	–
46J	BR	–
47J	Y	–
60J	P	–
61J	L	–

Terminal No.	Color of Wire	Signal Name
15	BR	VDC OFF
16	R	WSP FR
17	Y	WSP RR
18	G	WSS RL
19	W	WSP FL
20	–	–
21	–	–
22	–	–
23	–	–
24	SHIELD	GND EXT
25	BR	UB VR
26	L	CAN-H
27	–	–
28	GR	WAU
29	LG	WSS RR
30	–	–
31	BR	WSP RL
32	–	–
33	–	–
34	–	–
35	–	–
36	–	–
37	–	–
38	B	GND ECU

Connector No.	E125
Connector Name	ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
Connector Color	BLACK



Terminal No.	Color of Wire	Signal Name
1	Y	UB MR
2	–	–
3	–	–
4	SB	WSS FR
5	V	U5V EXT
6	–	–
7	–	–
8	P	WSS FL
9	Y	HDC
10	–	–
11	–	–
12	LG	VAC
13	B	GND MR
14	P	CAN-L

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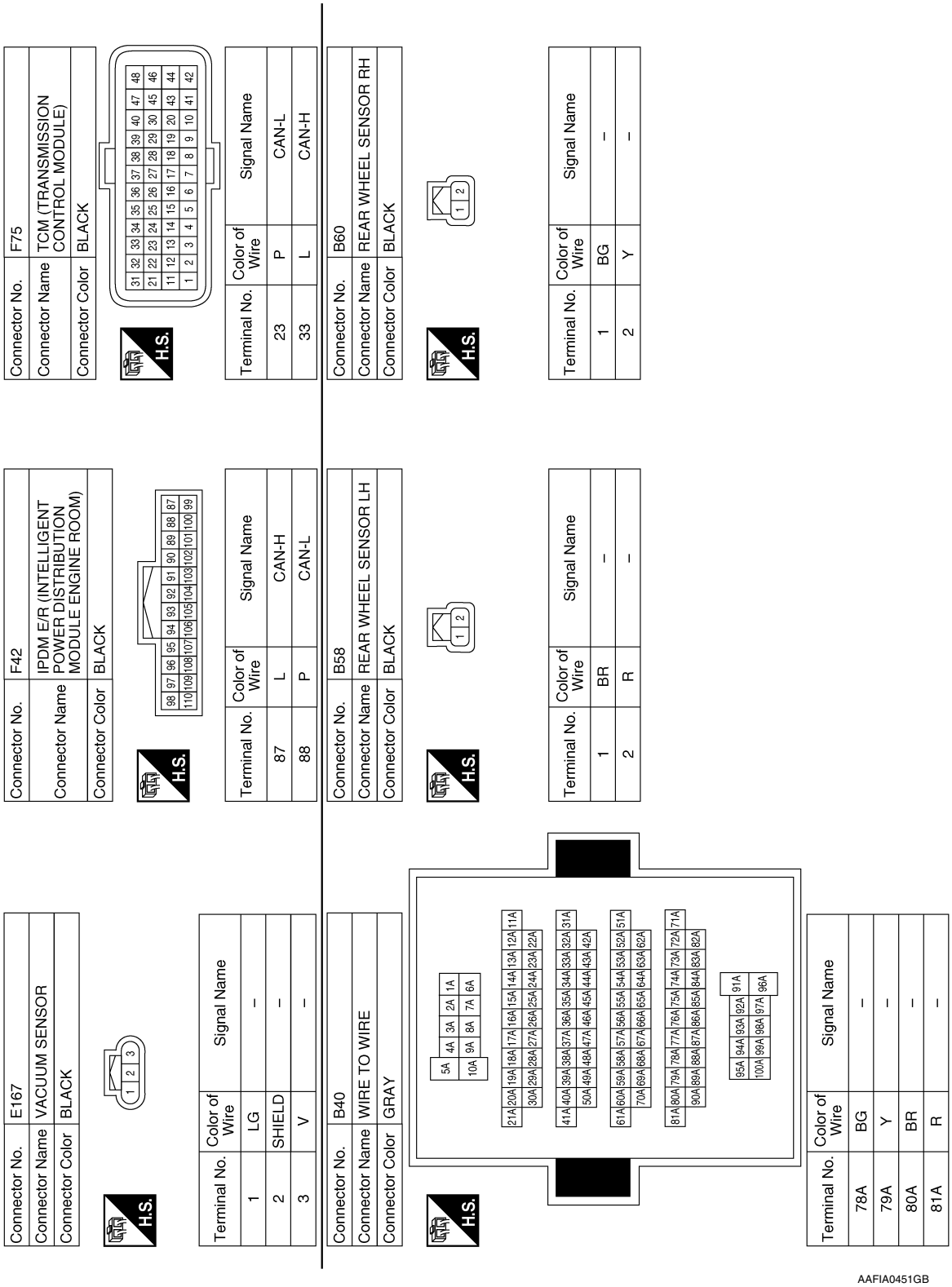

Connector No. E167
Connector Name VACUUM SENSOR
Connector Color BLACK
H.S.
1 2 3
Terminal No. Color of Wire Signal Name
1 LG –
2 SHIELD –
3 V –
Connector No. F42
Connector Name IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color BLACK
H.S.
98 97 96 95 94 93 92 91 90 89 88 87
110 109 108 107 106 105 104 103 102 101 100 99
Terminal No. Color of Wire Signal Name
87 L CAN-H
88 P CAN-L
Connector No. F75
Connector Name TCM (TRANSMISSION CONTROL MODULE)
Connector Color BLACK
H.S.
31 32 33 34 35 36 37 38 39 40 47 48
21 22 23 24 25 26 27 28 29 30 45 46
11 12 13 14 15 16 17 18 19 20 43 44
1 2 3 4 5 6 7 8 9 10 41 42
Terminal No. Color of Wire Signal Name
23 P CAN-L
33 L CAN-H
Connector No. B40
Connector Name WIRE TO WIRE
Connector Color GRAY
H.S.
5A 4A 3A 2A 1A
10A 9A 8A 7A 6A
21A 20A 19A 18A 17A 16A 15A 14A 13A 12A 11A
30A 29A 28A 27A 26A 25A 24A 23A 22A
41A 40A 39A 38A 37A 36A 35A 34A 33A 32A 31A
50A 49A 48A 47A 46A 45A 44A 43A 42A
61A 60A 59A 58A 57A 56A 55A 54A 53A 52A 51A
70A 69A 68A 67A 66A 65A 64A 63A 62A
81A 80A 79A 78A 77A 76A 75A 74A 73A 72A 71A
90A 89A 88A 87A 86A 85A 84A 83A 82A
95A 94A 93A 92A 91A
100A 99A 98A 97A 96A
Terminal No. Color of Wire Signal Name
78A BG –
79A Y –
80A BR –
81A R –
Connector No. B58
Connector Name REAR WHEEL SENSOR LH
Connector Color BLACK
H.S.
1 2
Terminal No. Color of Wire Signal Name
1 BR –
2 R –
Connector No. B60
Connector Name REAR WHEEL SENSOR RH
Connector Color BLACK
H.S.
1 2
Terminal No. Color of Wire Signal Name
1 BG –
2 Y –
AAFIA0451GB

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORK FLOW

Work Flow

INFOID:0000000012427278

DETAILED FLOW

1.INTERVIEW THE CUSTOMER

Clarify customer concerns before inspection. First of all, perform an interview utilizing BRC-69, "Diagnostic Work Sheet" and reproduce the symptom as well as fully understand it. Ask customer about his/her concerns 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 in the interview. Also check that the symptom is not caused by fail-safe mode. Refer to BRC-53, "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 Diagnostic Result” mode of “ABS”.

Is DTC detected?

YES >> Record or print Self Diagnostic Results and Freeze Frame Data (FFD). GO TO 4.
NO >> GO TO 6.

4.RECHECK THE SYMPTOM

With CONSULT

1. Erase “Self Diagnostic Result” mode of “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 malfunctioning system.
   NOTE:
   If some DTCs are detected at the some time, determine the order for performing the diagnosis based on BRC-56, "DTC Inspection Priority Chart".

Is DTC detected?

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

5.REPAIR OR REPLACE MALFUNCTIONING COMPONENT

1. Repair or replace malfunctioning components.
2. Reconnect component or connector after repairing or replacing.
3. When DTC is detected, erase “Self Diagnostic Result” mode of “ABS”.
   CAUTION:

- **Turn the ignition switch OFF → ON → OFF after erasing Self Diagnostic Result.**
- **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**

>> GO TO 7.

6. IDENTIFY MALFUNCTIONING SYSTEM BY SYMPTOM DIAGNOSIS

Identify malfunctioning system based on symptom diagnosis and perform inspection.

Can the malfunctioning system be identified?

YES >> GO TO 7.
NO >> Check harness and connectors based on the information obtained in the interview. Refer to GI-45, "Intermittent Incident".

7. FINAL CHECK

With CONSULT
1. Select “Data Monitor” mode of “ABS”
2. Check the reference values. Refer to BRC-50, "Reference Value".
3. 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:0000000012427279

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 ☐ ☐ OFF ☐ 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:0000000012427280

- When replaced the ABS actuator and electric unit (control unit), perform adjust the neutral position of steering angle sensor. Refer to BRC-76, "Work Procedure".
- When replaced the ABS actuator and electric unit (control unit), perform calibration of the decel G sensor. Refer to BRC-74, "Work Procedure".

ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Description

INFOID:0000000012427281

Refer to the table below to determine if adjustment of steering angle sensor neutral position is required.

×: Required –: Not required

Situation	Adjustment of steering angle sensor neutral position
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	×
Change tires to new ones	—
Tire rotation	—
Adjusting wheel alignment	×

Work Procedure

INFOID:0000000012427282

ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

CAUTION:

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

1.ALIGN THE VEHICLE STATUS

Stop vehicle with front wheels in straight-ahead position.

>> GO TO 2.

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

1. On the CONSULT screen, touch “Work support” and “ST ANGLE SENSOR ADJUSTMENT” in order.
2. Touch “Start”.
   CAUTION:
   Do not touch steering wheel while adjusting steering angle sensor.
3. After approximately 10 seconds, touch “End”.
   NOTE:
   After approximately 60 seconds, it ends automatically.
4. Turn ignition switch OFF, then turn it ON again.
   CAUTION:
   Be sure to perform above operation.

>> GO TO 3.

3.CHECK DATA MONITOR

1. Run vehicle with front wheels in straight-ahead position, then stop.
2. Select “Data Monitor”. Then make sure “STR ANGLE SIG” is within 0±3.5°.

Is the steering angle within the specified range?

YES >> GO TO 4.
NO >> Perform the neutral position adjustment for the steering angle sensor again, GO TO 1.

4.ERASE THE SELF-DIAGNOSIS MEMORY

Erase the “Self Diagnostic Result” memory of the ABS actuator and electric unit (control unit) and ECM.
• ABS actuator and electric unit (control unit): Refer to BRC-45, "CONSULT Function".

• ECM: Refer to EC-69, "CONSULT Function".

Are the memories erased?

YES >> Inspection End.
NO >> Check the items indicated by the “Self Diagnostic Result”.

CALIBRATION OF DECEL G SENSOR

Description

INFOID:0000000012427283

CAUTION:
Always perform the decel G sensor calibration before driving when the following operation is performed.
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.	—

Work Procedure

INFOID:0000000012427284

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 SEN CALIBRATION” in this order.
3. Select “Start”.
4. After approx. 10 seconds, select “End”.
5. Turn 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. ± 0.01 G

Is the inspection result normal?

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

4.ERASE SELF DIAGNOSTIC MEMORY

With CONSULT
Erase “Self Diagnosis Result” of “ABS”.

Are the memories erased?

YES >> Inspection End.
NO >> Check the items indicated by the “Self Diagnostic Result”.

CONFIGURATION [ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)]

Work Procedure

INFOID:0000000012427285

NOTE:
- After configuration, turn the ignition switch from OFF to ON and check that the VDC warning lamp turns OFF after staying illuminated for approximately two seconds.
- If an error occurs during configuration, start over from the beginning.

1.CHECK TYPE ID (1)

CONSULT
1. Using CONSULT, select “ECU Identification” of “ABS”.
2. Write down “ECU PART NUMBER” displayed on the CONSULT screen. This is the ABS actuator and electric unit (control unit) “Type ID”.

Is “Type ID” displayed?

YES-1 >> When replacing ABS actuator and electric unit (control unit): GO TO 3.
YES-2 >> When re-configuring existing ABS actuator and electric unit (control unit): GO TO 4.
NO >> GO TO 2.

2.CHECK TYPE ID (2)

1. Use FAST (service parts catalog) to search ABS actuator and electric unit (control unit) of the applicable vehicle and find “Type ID”.
2. Write down “Type ID”.

>> • When replacing ABS actuator and electric unit (control unit): GO TO 3.
• When re-configuring existing ABS actuator and electric unit (control unit): GO TO 4.

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

Replace ABS actuator and electric unit (control unit). Refer to BRC-185, "Removal and Installation".

CAUTION:
Do not perform the following work items at this time. These items must be performed after configuration is complete.
- **Air bleeding**
- **Adjustment of steering angle sensor neutral position**
- **Calibration of decel G sensor**

>> GO TO 4.

4.WRITE CONFIGURATION

CONSULT Configuration
1. Select “Manual Configuration”.
2. Select the “Type ID” found using CONSULT “ECU Identification” or FAST (service parts catalog) to write the “Type ID” into the ABS actuator and electric unit (control unit).

>> GO TO 5.

5.VERIFY TYPE ID

Compare the “Type ID” written into the ABS actuator and electric unit (control unit) with the one found using CONSULT “ECU Identification” or FAST (service parts catalog) to confirm they match.

Do Type IDs match?

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

6.CHECK VDC WARNING LAMP

1. Turn the ignition switch OFF.
2. Turn the ignition switch ON and check that the VDC warning lamp turns OFF after staying illuminated for approximately two seconds.

NOTE:
Do not start the engine.

Is the inspection result normal?

YES >> GO TO 7.
NO >> Perform self-diagnosis of “ABS”. Refer to BRC-45, "CONSULT Function".

7.PERFORM SUPPLEMENTARY WORK

1. Perform air bleeding. Refer to BR-14, "Bleeding Brake System".
2. Perform adjustment of steering angle sensor neutral position. Refer to BRC-72, "Work Procedure".
3. Perform calibration of decel G sensor. Refer to BRC-74, "Work Procedure".
4. Perform self-diagnosis of all systems.
5. Erase self-diagnosis results.

>> Work End.

DTC/CIRCUIT DIAGNOSIS

C1101, C1102, C1103, C1104 WHEEL SENSOR

DTC Description

INFOID:0000000012427286

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 the 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

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 starting the engine.
6. Perform “Self Diagnostic Result” of “ABS”.

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

YES-1 >> “C1101”, “C1102”, “C1103” or “C1104” is displayed as “CRNT”: Proceed to BRC-79, "Diagnosis Procedure".

YES-2 >> “C1101”, “C1102”, “C1103” or “C1104” is displayed as “PAST”: Inspection End (Erase “Self Diagnostic Result” of “ABS”).
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012427287

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)

CONSULT
1. Replace the wheel sensor.
- Front: Refer to BRC-181, "FRONT WHEEL SENSOR : Removal and Installation".
- Rear: Refer to BRC-183, "REAR WHEEL SENSOR : Removal and Installation".
2. Erase “Self Diagnostic Result” mode of “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 starting the engine.
9. Perform “Self Diagnostic Result” mode of “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)

CONSULT
1. Erase “Self Diagnostic Result” mode of “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 starting the engine.
8. Perform “Self Diagnostic Result” mode of “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 circuits. Refer to BRC-158, "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 terminal 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)

CONSULT
1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Connect wheel sensor harness connector.
3. Erase “Self Diagnostic Result” mode of “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 starting the engine.
10. Perform “Self Diagnostic Result” mode of “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.)

Power Supply Circuit

ABS actuator and electric unit (control unit)		Wheel sensor			Continuity
Connector	Terminal	Connector		Terminal	
E125	19	E18	(Front LH wheel)	1	Yes
	16	E43	(Front RH wheel)		
	31	B58	(Rear LH wheel)		
	17	B60	(Rear RH wheel)		

Signal Circuit

ABS actuator and electric unit (control unit)		Wheel sensor			Continuity
Connector	Terminal	Connector		Terminal	
E125	8	E18	(Front LH wheel)	2	Yes
	4	E43	(Front RH wheel)		
	18	B58	(Rear LH wheel)		
	29	B60	(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)

CONSULT

1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Connect wheel sensor harness connector.
3. Erase “Self Diagnostic Result” mode of “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 starting the engine.
10. Perform “Self Diagnostic Result” mode of “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) 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-185, "Removal and Installation".

NO >> GO TO 11.

11. REPLACE WHEEL SENSOR

CONSULT

1. Replace the wheel sensor.
- Front: Refer to BRC-181, "FRONT WHEEL SENSOR : Removal and Installation".
- Rear: Refer to BRC-183, "REAR WHEEL SENSOR : Removal and Installation".
2. Connect ABS actuator and electric unit (control unit) harness connector.
3. Erase “Self Diagnostic Result” mode of “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 starting the engine.
10. Perform “Self Diagnostic Result” mode of “ABS”.

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

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-185, "Removal and Installation".

NO >> Inspection End.

C1105, C1106, C1107, C1108 WHEEL SENSOR

DTC Description

INFOID:0000000012427288

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 the 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

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 starting the engine.

6. Perform “Self Diagnostic Result” mode of “ABS”.

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

YES-1 >> “C1105”, “C1106”, “C1107” or “C1108” is displayed as “CRNT”: Proceed to BRC-84, "Diagnosis Procedure".
YES-2 >> “C1105”, “C1106”, “C1107” or “C1108” is displayed as “PAST”: Inspection End (Erase “Self Diagnostic Result” of “ABS”).
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012427289

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: Refer to FAX-7, "Inspection" (FWD) or FAX-45, "Inspection" (AWD).
- Rear: Refer to RAX-6, "Inspection" (FWD) or RAX-14, "Inspection" (AWD).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace the wheel hub assembly, and GO TO 2.
- Front: Refer to FAX-9, "Removal and Installation" (FWD) or FAX-47, "Removal and Installation" (AWD).
- Rear: Refer to RAX-7, "Removal and Installation" (FWD) or RAX-16, "Removal and Installation" (AWD).

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 circuits. Refer to BRC-158, "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-82, "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)

CONSULT
1. Erase “Self Diagnostic Result” mode of “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 “Data Monitor” of “ABS”, 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 the values (wheel speed) of both the normal wheel sensors and malfunctioning 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 malfunctioning 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)

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 Diagnostic Result” mode of “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-181, "FRONT WHEEL SENSOR : Removal and Installation".**
   - **Rear: Refer to BRC-183, "REAR WHEEL SENSOR : Removal and Installation".**

>> 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) 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)

CONSULT

1. Replace the wheel sensor.
- Front: Refer to BRC-181, "FRONT WHEEL SENSOR : Removal and Installation".
- Rear: Refer to BRC-183, "REAR WHEEL SENSOR : Removal and Installation".
2. Connect ABS actuator and electric unit (control unit) harness connector.
3. Erase “Self Diagnostic Result” of “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 “Data Monitor” of “ABS”, 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 the values (wheel speed) of both the normal wheel sensors and malfunctioning 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 malfunctioning 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)

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 Diagnostic Result” mode of “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)

CONSULT
1. Erase “Self Diagnostic Result”of “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 “Data Monitor” of “ABS”, 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 the values (wheel speed) of both the normal wheel sensors and malfunctioning 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 malfunctioning 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)

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 Diagnostic Result” of “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)

CONSULT
1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Connect wheel sensor harness connector.
3. Erase “Self Diagnostic Result” of “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 “Data Monitor” of “ABS”, 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 the values (wheel speed) of both the normal wheel sensors and malfunctioning 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 malfunctioning 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)

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 Diagnostic Result” mode of “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 ground.

Power Supply Circuit

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E125	19	Ground	No
	16		
	31		
	17		

Is the inspection result normal?

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

18. CHECK DATA MONITOR (4)

CONSULT
1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Connect wheel sensor harness connector.
3. Erase “Self Diagnostic Result” mode of “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 “Data Monitor” of “ABS”, 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 the values (wheel speed) of both the normal wheel sensors and malfunctioning 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 malfunctioning 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-185, "Removal and Installation".

19. PERFORM SELF-DIAGNOSIS (5)

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 Diagnostic Result” of “ABS”.

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

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-185, "Removal and Installation".

NO >> Inspection End.

20. REPLACE SENSOR ROTOR

CONSULT

1. Replace the sensor rotor.
- Front: Refer to BRC-184, "FRONT SENSOR ROTOR : Removal and Installation - Front Sensor Rotor".
- Rear: Refer to BRC-184, "REAR SENSOR ROTOR : Removal and Installation - Rear Sensor Rotor".
2. Erase “Self Diagnostic Result” mode of “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 Diagnostic Result” mode of “ABS”.

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

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-185, "Removal and Installation".

NO >> Inspection End.

C1109 POWER AND GROUND SYSTEM

DTC Description

INFOID:0000000012427290

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 the 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) • Fuse block J/B • 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

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 starting the engine.
3. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1109” detected?

YES-1 >> “C1109” is displayed as “CRNT”: Proceed to BRC-90, "Diagnosis Procedure".
YES-2 >> “C1109” is displayed as “PAST”: Inspection End (Erase “Self Diagnostic Result” mode of “ABS”).
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012427291

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

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 starting the engine.
3. Perform “Self Diagnostic Result” mode of “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 circuits. Refer to BRC-158, "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 fuse block J/B 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-185, "Removal and Installation".
NO >> Repair / replace harness, connector, or terminal.

C1110, C1153 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

DTC Description

INFOID:0000000012427292

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C1110	CONTROLLER FAILURE (Controller failure)	When there is an internal malfunction in the ABS actuator and electric unit (control unit).
C1153	EMERGENCY BRAKE (Emergency brake)	When ABS actuator and electric unit (control unit) is malfunctioning (Pressure increase is too much or too little).

POSSIBLE CAUSE

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

DTC	PAST DTC	CRNT DTC
C1110	• The vehicle travels near high-voltage electrical power lines. • Motor built-in the ABS actuator and electric unit (control unit) operates temporarily without a break. • Harness or connector • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery	• ABS actuator and electric unit (control unit) • Harness or connector • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery
C1153	• The vehicle travels near high-voltage electrical power lines. • ABS operates for a long time (e.g. travel under a tire hydroplaning condition).	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

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 starting the engine.
3. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1110” or “C1153” detected?

YES-1 >> “C1110” or “C1153” is displayed as “CRNT”: Proceed to BRC-93, "Diagnosis Procedure".
YES-2 >> “C1110” or “C1153” is displayed as “PAST”: Inspection End (Erase “Self Diagnostic Result” of “ABS”).
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012427293

1.ADJUST THE NEUTRAL POSITION OF STEERING ANGLE SENSOR

CONSULT
Perform neutral position adjustment of steering angle sensor. Refer to BRC-72, "Description".

Was neutral position adjustment of steering angle sensor finished?

YES >> GO TO 2.
NO >> Check the steering angle sensor system. Refer to BRC-121, "Diagnosis Procedure".

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 circuits. Refer to BRC-158, "Diagnosis Procedure".

Is the inspection result normal?

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

3.PERFORM SELF-DIAGNOSIS

CONSULT
Perform “Self Diagnostic Result” mode of “ABS”.

NOTE:
Replace the ABS actuator and electric unit (control unit) even if other DTCs are displayed along with “C1110” or “C1153” in “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1110” or “C1153” detected?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-185, "Removal and Installation".
NO >> Inspection End. (Although motor built-in the ABS actuator and electric unit (control unit) operates temporarily without a break, this is not a malfunction. Erase “Self Diagnostic Result” of “ABS”.)

C1111 ABS MOTOR, MOTOR RELAY SYSTEM

DTC Description

INFOID:0000000012427294

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 the 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

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 Diagnostic Result” mode of “ABS”.

Is DTC “C1111” detected?

YES-1 >> “C1111” is displayed as “CRNT”: Proceed to BRC-94, "Diagnosis Procedure".
YES-2 >> “C1111” is displayed as “PAST”: Inspection End (Erase “Self Diagnostic Result” of “ABS”).
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012427295

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

CONSULT
1. Turn the ignition switch OFF → ON, and wait 30 seconds.
2. Start the engine.
3. 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.
4. Stop the vehicle.
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 starting the engine.
7. Perform “Self Diagnostic Result” mode of “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 circuits. Refer to BRC-158, "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)

CONSULT
1. Start the engine.
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. Erase “Self Diagnostic Result” mode of “ABS”.
5. 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-185, "Removal and Installation".
NO >> Repair / replace harness or connector, and GO TO 6.

6.ERASE SELF-DIAGNOSIS RESULT (2)

CONSULT
1. Start the engine.
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. Erase “Self Diagnostic Result” of “ABS”.

5. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.

   >> Inspection End.

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

DTC Description

INFOID:0000000012427296

DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C1113	G-SENSOR (Decel G sensor circuit)	When a malfunction is detected in the longitudinal G sensor internal to the ABS actuator and electric unit (control unit).
C1145	YAW RATE SENSOR (Yaw rate sensor circuit)	When a malfunction is detected in the yaw rate sensor internal to the ABS actuator and electric unit (control unit).
C1146	SIDE G-SEN CIRCUIT (Side G sensor circuit)	When a malfunction is detected in side G sensor internal to the ABS actuator and electric unit (control unit).

POSSIBLE CAUSE

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

DTC	PAST DTC	CRNT DTC
C1113	• ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery • Change in vehicle posture (e.g. different tire sizes on front and rear, overload)	• ABS actuator and electric unit (control unit) • Change in vehicle posture (e.g. different tire sizes on front and rear, overload)
C1145 C1146	• ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery	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

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 starting the engine.
3. Perform “Self Diagnostic Result” mode of “ABS”.

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

YES-1 >> “C1113”, “C1145”, or “C1146” is displayed as “CRNT”: Proceed to BRC-98, "Diagnosis Procedure".
YES-2 >> “C1113”, “C1145”, or “C1146” is displayed as “PAST”: Inspection End (Erase “Self Diagnostic Result” of “ABS”).
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012427297

1.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-158, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair / replace harness, connector, fuse, or fusible link.

2.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 3.

3.PERFORM SELF-DIAGNOSIS

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 Diagnostic Result” mode of “ABS”.

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

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-185, "Removal and Installation".
NO >> Inspection End.

C1115 WHEEL SENSOR

DTC Description

INFOID:0000000012427298

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 when 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 the 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

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 starting the engine.
6. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1115” detected?

YES-1 >> “C1115” is displayed as “CRNT”: Proceed to BRC-99, "Diagnosis Procedure".
YES-2 >> “C1115” is displayed as “PAST”: Inspection End (Erase “Self Diagnostic Result” of “ABS”).
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012427299

CAUTION:
Never check between wheel sensor harness connector terminals.

1.CHECK TIRE

Check the tire air pressure, wear and size. Refer to WT-82, "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)

CONSULT
1. Erase “Self Diagnostic Result” mode of “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 “Data Monitor” of “ABS”, 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 the values (wheel speed) of both the normal wheel sensors and malfunctioning 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 malfunctioning 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)

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 starting the engine.
4. Perform “Self Diagnostic Result” mode of “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 circuits. Refer to BRC-158, "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-181, "FRONT WHEEL SENSOR : Exploded View".**
   - **Rear: Refer to BRC-182, "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)

CONSULT

1. Replace the wheel sensor.
- Front: Refer to BRC-181, "FRONT WHEEL SENSOR : Removal and Installation".
- Rear: Refer to BRC-183, "REAR WHEEL SENSOR : Removal and Installation".
2. Connect ABS actuator and electric unit (control unit) harness connector.
3. Erase “Self Diagnostic Result” of “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 “Data Monitor” of “ABS”, 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 the values (wheel speed) of both the normal wheel sensors and malfunctioning 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 malfunctioning 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)

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 starting the engine.
4. Perform “Self Diagnostic Result” mode of “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)

CONSULT
1. Erase “Self Diagnostic Result” of “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 “Data Monitor” of “ABS”, 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 the values (wheel speed) of both the normal wheel sensors and malfunctioning 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 malfunctioning 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)

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 starting the engine.
4. Perform “Self Diagnostic Result” mode of “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)

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

2. Connect wheel sensor harness connector.
3. Erase “Self Diagnostic Result” mode of “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 “Data Monitor” of “ABS”, 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 the values (wheel speed) of both the normal wheel sensors and malfunctioning 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 malfunctioning 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)

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 starting the engine.
4. Perform “Self Diagnostic Result” mode of “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 the continuity while turning steering wheel left and right, or while moving center harness in wheel housing.)

Power Supply Circuit

ABS actuator and electric unit (control unit)		Wheel sensor			Continuity
Connector	Terminal	Connector		Terminal	
E125	19	E18	(Front LH wheel)	1	Yes
	16	E43	(Front RH wheel)		
	31	B58	(Rear LH wheel)		
	17	B60	(Rear RH wheel)		

Signal Circuit

ABS actuator and electric unit (control unit)		Wheel sensor			Continuity
Connector	Terminal	Connector		Terminal	
E125	8	E18	(Front LH wheel)	2	Yes
	4	E43	(Front RH wheel)		
	18	B58	(Rear LH wheel)		
	29	B60	(Rear RH wheel)		

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

Power Supply Circuit

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E125	19	Ground	No
	16		
	31		
	17		

Is the inspection result normal?

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

17. CHECK DATA MONITOR (4)

CONSULT
1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Connect wheel sensor harness connector.
3. Erase “Self Diagnostic Result” of “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 “Data Monitor” of “ABS”, 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 the values (wheel speed) of both the normal wheel sensors and malfunctioning 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 malfunctioning 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-185, "Removal and Installation".

18. PERFORM SELF-DIAGNOSIS (5)

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 starting the engine.
4. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1115” detected?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-185, "Removal and Installation".
NO >> Inspection End.

19. REPLACE SENSOR ROTOR

CONSULT
1. Replace the sensor rotor.
- Front: Refer to BRC-184, "FRONT SENSOR ROTOR : Removal and Installation - Front Sensor Rotor".
- Rear: Refer to BRC-184, "REAR SENSOR ROTOR : Removal and Installation - Rear Sensor Rotor".

2. Erase “Self Diagnostic Result” mode of “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 starting the engine.
9. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1115” detected?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-185, "Removal and Installation".

NO >> Inspection End.

C1116 STOP LAMP SWITCH

DTC Description

INFOID:0000000012427300

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 the DTC. Do not replace the ABS actuator and electric unit (control unit) for a PAST DTC.

PAST DTC	CRNT DTC
• Harness or connector	• Harness or connector • ABS actuator and electric unit (control unit) • Stop lamp switch • BCM

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

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 starting the engine.
3. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1116” detected?

YES-1 >> “C1116” is displayed as “CRNT”: Proceed to BRC-106, "Diagnosis Procedure".
YES-2 >> “C1116” is displayed as “PAST”: Inspection End (Erase “Self Diagnostic Result” of “ABS”).
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012427301

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

CONSULT
1. Erase “Self Diagnostic Result” mode of “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 starting the engine.
7. Perform “Self Diagnostic Result” of “ABS”.

Is DTC “C1116” detected?

YES >> GO TO 3.
NO >> Inspection End.

3.CHECK BCM SYSTEM

CONSULT
Perform “Self Diagnostic Result” mode of “BCM”.

Is any DTC detected?

YES >> Check the DTC. Refer to BCS-48, "DTC Index" (WITH INTELLIGENT KEY SYSTEM) or BCS-109, "DTC Index" (WITHOUT INTELLIGENT KEY SYSTEM).
NO >> GO TO 4.

4.PERFORM SELF-DIAGNOSIS (1)

CONSULT
1. Erase “Self Diagnostic Result” mode of “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 and drive the vehicle for a short period of time.
   NOTE:
   Wait at least 10 seconds after starting the engine.
4. Stop the vehicle.
5. Vehicle stopped, perform “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1116” detected?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-185, "Removal and Installation".
NO >> Check pin terminals and connection of each harness connector. Repair / replace harness, connector, or terminal.

C1118 4WD SYSTEM

DTC Description

INFOID:0000000012427302

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C1118	4WD SYSTEM (4WD system)	When a malfunction is detected in 4WD system.

POSSIBLE CAUSE

NOTE:
Confirm if DTC is PAST or CRNT. If DTC is CRNT, proceed with Diagnosis Procedure. If DTC is PAST, clear the 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	• Transfer control unit • ABS actuator and electric unit (control unit) • CAN communication line

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

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 starting the engine.
3. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1118” detected?

YES-1 >> “C1118” is displayed as “CRNT”: Proceed to BRC-108, "Diagnosis Procedure".
YES-2 >> “C1118” is displayed as “PAST”: Inspection End (Erase “Self Diagnostic Result” of “ABS”).
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012427303

1.CHECK 4WD SYSTEM

CONSULT
Perform “Self Diagnostic Result” mode of “ALL MODE AWD/4WD”.

Is DTC detected?

YES >> Check the DTC. Refer to DLN-23, "DTC Index".
NO >> GO TO 2.

2.PERFORM SELF-DIAGNOSIS

CONSULT
1. Erase “Self Diagnostic Result” of “ABS”.
2. Turn the ignition switch OFF, and wait 10 seconds or more.
3. 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.
4. Stop the vehicle.
5. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1118” detected?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-185, "Removal and Installation".

NO >> Check pin terminals and connection of each harness connector for abnormal conditions. Repair / replace harness, connector, or terminal.

C1120, C1122, C1124, C1126 ABS IN VALVE SYSTEM

DTC Description

INFOID:0000000012427304

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 the 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

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 starting the engine.
3. Perform “Self Diagnostic Result” mode of “ABS”.

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

YES-1 >> “C1120”, “C1122”, “C1124” or “C1126” is displayed as “CRNT”: Proceed to BRC-110, "Diagnosis Procedure".
YES-2 >> “C1120”, “C1122”, “C1124” or “C1126” is displayed as “PAST”: Inspection End (Erase “Self Diagnostic Result” of “ABS”).
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012427305

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

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 starting the engine.
3. Perform “Self Diagnostic Result” of “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 circuits. Refer to BRC-158, "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-185, "Removal and Installation".
NO >> Repair / replace harness, connector, or terminal.

C1121, C1123, C1125, C1127 ABS OUT VALVE SYSTEM

DTC Description

INFOID:0000000012427306

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 the 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

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 starting the engine.
3. Perform “Self Diagnostic Result” mode of “ABS”.

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

YES-1 >> “C1121”, “C1123”, “C1125” or “C1127” is displayed as “CRNT”: Proceed to BRC-112, "Diagnosis Procedure".
YES-2 >> “C1121”, “C1123”, “C1125” or “C1127” is displayed as “PAST”: Inspection End (Erase “Self Diagnostic Result” of “ABS”).
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012427307

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

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 starting the engine.
3. Perform “Self Diagnostic Result” mode of “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 circuits. Refer to BRC-158, "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-185, "Removal and Installation".
NO >> Repair / replace harness, connector, or terminal.

C1130 ENGINE SIGNAL

DTC Description

INFOID:0000000012427308

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 the 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

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 starting the engine.
3. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1130” detected?

YES-1 >> “C1130” is displayed as “CRNT”: Proceed to BRC-114, "Diagnosis Procedure".
YES-2 >> “C1130” is displayed as “PAST”: Inspection End (Erase “Self Diagnostic Result” of “ABS”).
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012427309

1.CHECK ENGINE SYSTEM

CONSULT

Perform “Self Diagnostic Result” mode of “ENGINE”.

Is DTC detected?

YES >> Check the DTC. Refer to EC-96, "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 circuits. Refer to BRC-158, "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)

CONSULT

1. Connect ECM harness connector.
2. Connect ABS actuator and electric unit (control unit) harness connector.
3. Erase “Self Diagnostic Result” of “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 starting the engine.
6. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1130” or “U1000” detected?

YES (“C1130”)>>GO TO 1.
YES (“U1000”)>>Refer to LAN-20, "Trouble Diagnosis Flow Chart".
NO >> Inspection End.

C1140 ACTUATOR RELAY SYSTEM

DTC Description

INFOID:0000000012427310

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 the 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

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 starting the engine.
3. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1140” detected?

YES-1 >> “C1140” is displayed as “CRNT”: Proceed to BRC-116, "Diagnosis Procedure".
YES-2 >> “C1140” is displayed as “PAST”: Inspection End (Erase “Self Diagnostic Result” of “ABS”).
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012427311

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

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 starting the engine.
3. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1140” detected?

YES >> GO TO 3.
NO >> Inspection Ed.

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 circuits. Refer to BRC-158, "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-185, "Removal and Installation".
NO >> Repair / replace harness, connector, or terminal.

C1142 PRESS SENSOR

DTC Description

INFOID:0000000012427312

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 the 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

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 starting the engine.
3. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1142” detected?

YES-1 >> “C1142” is displayed as “CRNT”: Proceed to BRC-118, "Diagnosis Procedure".
YES-2 >> “C1142” is displayed as “PAST”: Inspection End (Erase “Self Diagnostic Result” of “ABS”).
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012427313

1.STOP LAMP SWITCH SYSTEM

Check the stop lamp switch system. Refer to BRC-106, "Diagnosis Procedure".

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. Refer to BR-13, "Inspection".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace brake piping.
- Front: Refer to BR-22, "FRONT : Removal and Installation".
- Rear: Refer to BR-25, "REAR : Removal and Installation".

4. CHECK BRAKE PEDAL

Check the brake pedal.
- Brake pedal height: Refer to BR-11, "Inspection".
- Brake pedal assembly: Refer to BR-19, "Exploded View".

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-11, "Adjustment".
- Replace the brake pedal: Refer to BR-19, "Removal and Installation".

5. CHECK BRAKE MASTER CYLINDER

Check the brake master cylinder. Refer to BR-7, "Inspection".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace brake master cylinder. Refer to BR-27, "Removal and Installation".

6. CHECK BRAKE BOOSTER

Check the brake booster. Refer to BR-8, "Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair or replace brake booster. Refer to BR-30, "Removal and installation"

7. CHECK VACUUM PIPING

Check the vacuum piping. Refer to BR-32, "Exploded View".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair or replace vacuum piping. Refer to BR-32, "Removal and Installation".

8. CHECK FRONT DISC BRAKE

Check the front disc brake caliper. Refer to BR-37, "BRAKE CALIPER ASSEMBLY (1 PISTON TYPE) : Exploded View" (1 PISTON TYPE) or BR-41, "BRAKE CALIPER ASSEMBLY (2 PISTON TYPE) : Exploded View" (2 PISTON TYPE).

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair or replace front disc brake caliper. Refer to BR-37, "BRAKE CALIPER ASSEMBLY (1 PISTON TYPE) : Removal and Installation" (1 PISTON TYPE) or BR-41, "BRAKE CALIPER ASSEMBLY (2 PISTON TYPE) : Removal and Installation" (2 PISTON TYPE).

9. CHECK REAR DISC BRAKE

Check the rear disc brake. Refer to BR-46, "BRAKE CALIPER ASSEMBLY : Exploded View".

Is the inspection result normal?

YES >> GO TO 10.
NO >> Repair or replace rear disc brake. Refer to BR-46, "BRAKE CALIPER ASSEMBLY : 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 circuits. Refer to BRC-158, "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)

CONSULT

1. Erase “Self Diagnostic Result” of “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 starting 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 Diagnostic Result” mode of “ABS”.

Is DTC “C1142” detected?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-185, "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 Description

INFOID:0000000012427314

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 the 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) • Fuse block J/B • 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

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 starting the engine.
3. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1143” detected?

YES-1 >> “C1143” is displayed as “CRNT”: Proceed to BRC-121, "Diagnosis Procedure".
YES-2 >> “C1143” is displayed as “PAST”: Inspection End (Erase “Self Diagnostic Result” of “ABS”).
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012427315

1.ADJUST THE NEUTRAL POSITION OF STEERING ANGLE SENSOR

CONSULT

Perform neutral position adjustment of steering angle sensor. Refer to BRC-72, "Description".

>> GO TO 2.

2.PERFORM SELF-DIAGNOSIS (1)

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 starting the engine.
3. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1143” detected?

YES-1 >> “C1143” is displayed as “CRNT”: GO TO 3.
YES-2 >> “C1143” is displayed as “PAST”: Inspection End (Erase “Self Diagnostic Result” of “ABS”).
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)

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 starting the engine.
3. Perform “Self Diagnostic Result” mode of “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.

Steering angle sensor		—	Voltage (Approx.)
Connector	Terminal		
M56	4	Ground	0 V

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

Steering angle sensor		—	Voltage (Approx.)
Connector	Terminal		
M56	4	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 fuse 30 (10A).
3. Disconnect fuse block (J/B) harness connector.
4. Check the continuity between steering angle sensor harness connector and fuse block (J/B) harness connector.

Steering angle sensor		Fuse block (J/B)		Continuity
Connector	Terminal	Connector	Terminal	
M56	4	M44	7P	Yes

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

Steering angle sensor		—	Continuity
Connector	Terminal		
M56	4	Ground	No

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		
M56	1	Ground	Yes

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 circuits. Refer to BRC-158, "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 fuse block J/B 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

Check the CAN communication line. Refer to LAN-20, "Trouble Diagnosis Flow Chart".

Is the inspection result normal?

YES >> GO TO 11.
NO >> Repair / replace harness or connector.

11.CHECK DATA MONITOR

CONSULT

1. Select “Data Monitor” of “ABS”, check “STR ANGLE SIG”.
2. Check that the indication changes with the steering angle when the steering wheel is turned left/right from the neutral position. Refer to BRC-50, "Reference Value".

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-185, "Removal and Installation".

NO >> Replace the steering angle sensor. Refer to BRC-189, "Removal and Installation".

C1144 INCOMPLETE STEERING ANGLE SENSOR ADJUSTMENT

DTC Description

INFOID:0000000012427316

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 the 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

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 starting the engine.
3. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1144” detected?

YES-1 >> “C1144” is displayed as “CRNT”: Proceed to BRC-125, "Diagnosis Procedure".
YES-2 >> “C1144” is displayed as “PAST”: Inspection End (Erase “Self Diagnostic Result” of “ABS”).
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012427317

1.ADJUST THE NEUTRAL POSITION OF STEERING ANGLE SENSOR

Perform neutral position adjustment of steering angle sensor. Refer to BRC-72, "Description".

>> GO TO 2.

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

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 starting the engine.
3. Perform “Self Diagnostic Result” mode of “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-121, "Diagnosis Procedure".

Is the inspection result normal?

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

4.CHECK DATA MONITOR

CONSULT
1. Select “Data Monitor” of “ABS”, check “STR ANGLE SIG”.
2. Check that the indication changes with the steering angle when the steering wheel is turned left/right from the neutral position. Refer to BRC-50, "Reference Value".

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-185, "Removal and Installation".
NO >> Replace the steering angle sensor. Refer to BRC-189, "Removal and Installation".

C1154 TRANSMISSION RANGE SWITCH

DTC Description

INFOID:0000000012427318

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C1154	PNP POSI SIG (PNP position signal)	When a malfunction is detected in TCM system.

POSSIBLE CAUSE

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

PAST DTC	CRNT DTC
• Harness or connector • Transmission range switch	• Harness or connector • ABS actuator and electric unit (control unit) • TCM • Transmission range switch

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

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 starting the engine.
3. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1154” detected?

YES-1 >> “C1154” is displayed as “CRNT”: Proceed to BRC-127, "Diagnosis Procedure".
YES-2 >> “C1154” is displayed as “PAST”: Inspection End (Erase “Self Diagnostic Result” of “ABS”).
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012427319

CAUTION:
“C1154” may be detected when going up a slope, being towed with ignition switch ON and the shift selector in a position other than R position. This is not a shift position error. The system returns to normal once the vehicle is stopped, parked on level ground and the engine is started.

1.CHECK CVT SYSTEM

CONSULT
Perform “Self Diagnostic Result” of “TRANSMISSION”.

Is DTC detected?

YES >> Check the DTC. Refer to TM-63, "DTC Index".
NO >> GO TO 2.

2.PERFORM SELF-DIAGNOSIS

CONSULT
1. Erase “Self Diagnostic Result” of “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 starting the engine.
4. 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 Diagnostic Result” mode of “ABS”.

Is DTC “C1154” detected?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-185, "Removal and Installation".

NO >> Check pin terminals and connection of each harness connector for abnormal conditions. Repair / replace harness, connector, or terminal.

C1155 BRAKE FLUID LEVEL SWITCH

DTC Description

INFOID:0000000012427320

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 the 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

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 starting the engine.
3. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1155” detected?

YES-1 >> “C1155” is displayed as “CRNT”: Proceed to BRC-129, "Diagnosis Procedure".
YES-2 >> “C1155” is displayed as “PAST”: Inspection End (Erase “Self Diagnostic Result” of “ABS”).
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012427321

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, "Drain and Refill". GO TO 2.

2.PERFORM SELF-DIAGNOSIS (1)

CONSULT
1. Erase “Self Diagnostic Result” of “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 starting the engine.
4. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1155” detected?

YES >> GO TO 3.
NO >> Inspection End.

3.CHECK CONNECTOR

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

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 starting the engine.
3. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1155” detected?

YES >> GO TO 5.
NO >> Inspection End.

5.CHECK BRAKE FLUID LEVEL SWITCH

Check the brake fluid level switch. Refer to BR-27, "Exploded View".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Replace the reservoir tank. Refer to BR-27, "Exploded View". GO TO 6.

6.PERFORM SELF-DIAGNOSIS (3)

CONSULT
1. Erase “Self Diagnostic Result” mode of “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 starting the engine.
4. Perform “Self Diagnostic Result” mode of “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)

CONSULT
1. Erase “Self Diagnostic Result” of “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 starting the engine.
4. Perform “Self Diagnostic Result” of “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	
E63	1	M76	25	Yes

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

Brake fluid level switch		—	Continuity
Connector	Terminal		
E63	1	Ground	No

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		
E63	2	Ground	Yes

Is the inspection result normal?

YES >> GO TO 11.
NO >> Repair / replace harness or connector, and GO TO 11.

11. CHECK COMBINATION METER

Check the combination meter. Refer to MWI-21, "CONSULT Function (METER/M&A)".

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-185, "Removal and Installation".

NO >> Repair or replace combination meter. Refer to MWI-84, "Removal and Installation".

Component Inspection

INFOID:0000000012427322

1.CHECK BRAKE FLUID LEVEL SWITCH

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

Brake fluid level switch	Condition	Continuity
Terminal		
1 – 2	When brake fluid level in reservoir tank is within the specified level.	No
	When brake fluid level in reservoir tank is less than the specified level.	Yes

Is the inspection result normal?

YES >> Inspection End.
NO >> Replace the reservoir tank. Refer to BR-27, "Exploded View".

C1160 INCOMPLETE DECEL G SENSOR CALIBRATION

DTC Description

INFOID:0000000012427323

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 the 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)

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

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 starting the engine.
3. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1160” detected?

YES-1 >> “C1160” is displayed as “CRNT”: Proceed to BRC-133, "Diagnosis Procedure".
YES-2 >> “C1160” is displayed as “PAST”: Inspection End (Erase “Self Diagnostic Result” of “ABS”).
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012427324

1.CALIBRATION OF DECEL G SENSOR

Perform calibration of decel G sensor. Refer to BRC-74, "Description".

>> GO TO 2.

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

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 starting the engine.
3. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1160” detected?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-185, "Removal and Installation".

NO >> Inspection End.

C1164, C1165 CV SYSTEM

DTC Description

INFOID:0000000012427325

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 the 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

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 starting the engine.
3. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1164” or “C1165” detected?

YES-1 >> “C1164” or “C1165” is displayed as “CRNT”: Proceed to BRC-135, "Diagnosis Procedure".
YES-2 >> “C1164” or “C1165” is displayed as “PAST”: Inspection End (Erase “Self Diagnostic Result” of “ABS”).
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012427326

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

CONSULT
Perform “Self Diagnostic Result” mode of “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 circuits. Refer to BRC-158, "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-185, "Removal and Installation".
NO >> Repair / replace harness, connector, or terminal.

C1166, C1167 SV SYSTEM

DTC Description

INFOID:0000000012427327

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C1166	SV 1 (Suction valve 1)	When a malfunction is detected in suction valve 1.
C1167	SV 2 (Suction valve 2)	When a malfunction is detected in suction 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 the 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

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 starting the engine.
3. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1166” or “C1167” detected?

YES-1 >> “C1166” or “C1167” is displayed as “CRNT”: Proceed to BRC-137, "Diagnosis Procedure".
YES-2 >> “C1166” or “C1167” is displayed as “PAST”: Inspection End (Erase “Self Diagnostic Result” of “ABS”).
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012427328

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

CONSULT
Perform “Self Diagnostic Result” mode of “ABS” again.

Is DTC “C1166” or “C1167” 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 circuits. Refer to BRC-158, "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-185, "Removal and Installation".
NO >> Repair / replace harness, connector, or terminal.

C1170 VARIANT CODING

DTC Description

INFOID:0000000012427329

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 the 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) • ABS actuator and electric unit (control unit) is not configured

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

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 starting the engine.
3. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1170” detected?

YES-1 >> “C1170” is displayed as “CRNT”: Proceed to BRC-139, "Diagnosis Procedure".
YES-2 >> “C1170” is displayed as “PAST”: Inspection End (Erase “Self Diagnostic Result” of “ABS”).
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012427330

1.CONFIGURATION OF ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Perform configuration of ABS actuator and electric unit (control unit). Refer to BRC-76, "Work Procedure".
CAUTION:
Never replace the ABS actuator and electric unit (control unit).

>> GO TO 2.

2.CHECK SELF-DIAGNOSIS RESULTS

CONSULT
Replace the ABS actuator and electric unit (control unit) even if other DTC are displayed along with “C1170” in “Self Diagnostic Result” of “ABS”.

>> Replace the ABS actuator and electric unit (control unit). Refer to BRC-185, "Removal and Installation".

C1197 VACUUM SENSOR

DTC Description

INFOID:0000000012427331

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 the 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

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 starting the engine.
3. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1197” detected?

YES-1 >> “C1197” is displayed as “CRNT”: Proceed to BRC-141, "Diagnosis Procedure".
YES-2 >> “C1197” is displayed as “PAST”: Inspection End (Erase “Self Diagnostic Result” of “ABS”).
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012427332

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-8, "Inspection".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Replace the brake booster. Refer to BR-30, "Removal and installation".

3.CHECK VACUUM PIPING

Check the vacuum piping. Refer to BR-32, "Exploded View".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace the vacuum piping. Refer to BR-32, "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	
E167	1	E125	12	Yes
	2		24	
	3		5	

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

Vacuum sensor		—	Continuity
Connector	Terminal		
E167	1	Ground	No
	2		
	3		

Is the inspection result normal?

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

6.REPLACE VACUUM SENSOR

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-30, "Removal and installation".
3. Erase “Self Diagnostic Result” mode of “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 starting the engine.
6. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1197” detected?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-185, "Removal and Installation".

NO >> Inspection End.

C1198 VACUUM SENSOR

DTC Description

INFOID:0000000012427333

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 the 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

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 starting the engine.
3. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1198” detected?

YES-1 >> “CRNT” is displayed: Proceed to BRC-144, "Diagnosis Procedure".
YES-2 >> “PAST” is displayed: Inspection End (Erase “Self Diagnostic Result” of “ABS”).
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012427334

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	
E167	1	E125	12	Yes
	2		24	
	3		5	

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

Vacuum sensor		—	Continuity
Connector	Terminal		
E167	1	Ground	No
	2		
	3		

Is the inspection result normal?

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

4.REPLACE VACUUM SENSOR

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-30, "Removal and installation".
3. Erase “Self Diagnostic Result” of “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 starting the engine.
6. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1198” detected?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-185, "Removal and Installation".
NO >> Inspection End.

C1199 BRAKE BOOSTER

DTC Description

INFOID:0000000012427335

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 mm Hg) 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 the 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

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 starting the engine.
3. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1199” detected?

YES-1 >> “CRNT” is displayed: Proceed to BRC-146, "Diagnosis Procedure".
YES-2 >> “PAST” is displayed: Inspection End (Erase “Self Diagnostic Result” of “ABS”).
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012427336

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-8, "Inspection".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Replace the brake booster. Refer to BR-30, "Removal and installation".

3.CHECK VACUUM PIPING

Check the vacuum piping. Refer to BR-32, "Exploded View".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace the vacuum piping. Refer to BR-32, "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	
E167	1	E125	12	Yes
	2		24	
	3		5	

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

Vacuum sensor		—	Continuity
Connector	Terminal		
E167	1	Ground	No
	2		
	3		

Is the inspection result normal?

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

6.REPLACE VACUUM SENSOR

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-30, "Removal and installation".
3. Erase “Self Diagnostic Result” of “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 starting the engine.

6. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1199” detected?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-185, "Removal and Installation".

NO >> Inspection End.

C119A VACUUM SENSOR

DTC Description

INFOID:0000000012427337

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 the 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

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 starting the engine.
3. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC “C119A” detected?

YES-1 >> “CRNT” is displayed: Proceed to BRC-149, "Diagnosis Procedure".
YES-2 >> “PAST” is displayed: Inspection End (Erase “Self Diagnostic Result” of “ABS”).
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident"
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012427338

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 3.
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.

Vacuum sensor		—	Voltage (Approx.)
Connector	Terminal		
E167	5	Ground	0 V

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

Vacuum sensor		—	Voltage (Approx.)
Connector	Terminal		
E167	3	Ground	5 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	
E167	3	E125	5	Yes

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

Vacuum sensor		—	Continuity
Connector	Terminal		
E167	3	Ground	No

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		
E167	2	Ground	No

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 circuits. Refer to BRC-158, "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-185, "Removal and Installation".
NO >> Repair / replace harness, connector, or terminal.

C1B60 CHASSIS CONTROL SYSTEM

DTC Description

INFOID:0000000012427339

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C1B60	EXTERNAL CONTROL MODULE (External control module)	When a malfunction is detected in chassis control system.

POSSIBLE CAUSE

NOTE:
Confirm if DTC is PAST or CRNT. If DTC is CRNT, proceed with Diagnosis Procedure. If DTC is PAST, clear the 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	• Chassis control module • ABS actuator and electric unit (control unit) • CAN communication line

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

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 starting the engine.
3. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1118” detected?

YES-1 >> “C1B60” is displayed as “CRNT”: Proceed to BRC-152, "Diagnosis Procedure".
YES-2 >> “C1B60” is displayed as “PAST”: Inspection End (Erase “Self Diagnostic Result” of “ABS”).
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012427340

1.CHECK 4WD SYSTEM

CONSULT
Perform “Self Diagnostic Result” of “CHASSIS CONTROL”.

Is DTC detected?

YES >> Check the DTC. Refer to DAS-151, "DTC Index".
NO >> GO TO 2.

2.CHECK CONNECTOR AND TERMINALS

1. Turn the ignition switch OFF.

2. Disconnect the chassis control module harness connector.
3. Check the chassis control module harness connector for disconnection or looseness.
4. Check the chassis control module pin terminals for damage or loose connection with harness.
5. Disconnect the ABS actuator and electric unit (control unit) harness connector.
6. Check the ABS actuator and electric unit (control unit) harness connector for disconnection or looseness.
7. Check the ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with harness.

Is the inspection result normal?

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

3. PERFORM SELF-DIAGNOSIS

CONSULT
1. Erase “Self Diagnostic Result” of “ABS”.
2. Turn the ignition switch OFF, and wait 10 seconds or more.
3. 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.
4. Stop the vehicle.
5. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1B60” detected?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-185, "Removal and Installation".
NO >> Check pin terminals and connection of each harness connector for abnormal conditions. Repair / replace harness, connector, or terminal.

U1000 CAN COMM CIRCUIT

DTC Description

INFOID:0000000012427341

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 the 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

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 starting the engine.
3. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC “U1000” detected?

YES-1 >> “CRNT” is displayed: Proceed to BRC-154, "Diagnosis Procedure".
YES-2 >> “PAST” is displayed: Inspection End (Erase “Self Diagnostic Result” of “ABS”).
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012427342

Proceed to LAN-20, "Trouble Diagnosis Flow Chart".

U1002 SYSTEM COMM (CAN)

DTC Description

INFOID:0000000012427343

DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
U1002	SYSTEM COMM (CAN) (CAN system communication)	When ABS actuator and electric unit (control unit) is not transmitting or receiving CAN communication signal for 2 seconds or less.

POSSIBLE CAUSE

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

PAST DTC	CRNT DTC
• CAN communication line • Harness or connector	• CAN communication line • ABS actuator and electric unit (control unit) • 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.DTC REPRODUCTION PROCEDURE

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 starting the engine.
3. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC “U1002” detected?

YES-1 >> “U1002” is displayed as “CRNT”: Proceed to BRC-155, "Diagnosis Procedure".
YES-2 >> “U1002” is displayed as “PAST”: Inspection End (Erase “Self Diagnostic Result” of “ABS”).
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012427344

CAUTION:
- **Never apply 7.0 V or more to the measurement terminal.**
- **Use a tester with open terminal voltage of 7.0 V or less.**
- **Turn the ignition switch OFF and disconnect the battery cable from the negative terminal when checking the harness.**

1.CHECK CAN DIAGNOSIS SUPPORT MONITOR

CONSULT
1. Perform “CAN Diagnosis Support Monitor” of “ABS”.
2. Check the malfunction history between each control unit connected to ABS actuator and electric unit (control unit).

Check the result of “PAST”?

All items are “OK”>>Check the intermittent incident. Refer to GI-45, "Intermittent Incident".
“TRANSMIT DIAG” is other than “OK”>>GO TO 2.
A control unit other than ABS actuator and electric unit (control unit) is anything other than “OK”>>GO TO 3.

2.CHECK TRANSMITTING SIDE UNIT

Check the ABS actuator and electric unit (control unit) harness connector terminals No. 14 and 26 for damage or loose connection.

Is the inspection result normal?

YES >> Erase “Self Diagnostic Result” of “ABS”. Then perform “Self Diagnostic Result” of “ABS” mode using CONSULT.
NO >> Recheck the terminals for damage or loose connection.

3.CHECK APPLICABLE CONTROL UNIT

Check the terminals of each harness connector for damage or loose connection.

Is the inspection result normal?

YES >> Erase “Self Diagnostic Result” of applicable control unit. Then perform “Self Diagnostic Result” mode of applicable control unit using CONSULT.
NO >> Recheck the terminals for damage or loose connection.

U1010 CONTROL UNIT (CAN)

DTC Description

INFOID:0000000012427345

DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
U1010	CONTROL UNIT (CAN) (Control unit [CAN communication])	When detecting error during the initial diagnosis of CAN controller of ABS actuator and electric unit (control unit).

POSSIBLE CAUSE

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

PAST DTC	CRNT DTC
• CAN communication line • Harness or connector	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

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 starting the engine.
3. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC “U1010” detected?

YES-1 >> “U1010” is displayed as “CRNT”: Proceed to BRC-157, "Diagnosis Procedure".
YES-2 >> “U1010” is displayed as “PAST”: Inspection End (Erase “Self Diagnostic Result” of “ABS”).
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012427346

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

Check the ABS actuator and electric unit (control unit) harness connector for disconnection and deformation.

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-185, "Removal and Installation".
NO >> Repair / replace harness, connector, or terminal.

POWER SUPPLY AND GROUND CIRCUIT

Diagnosis Procedure

INFOID:0000000012427347

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.

ABS actuator and electric unit (control unit)		—	Voltage (Approx.)
Connector	Terminal		
E125	28	Ground	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.

ABS actuator and electric unit (control unit)		—	Voltage (Approx.)
Connector	Terminal		
E125	28	Ground	Battery voltage

Is the inspection result normal?

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

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

1. Turn the ignition switch OFF.
2. Check the 10A fuse (21).
3. Disconnect fuse block (J/B) harness connector.
4. Check the continuity between ABS actuator and electric unit (control unit) harness connector and fuse block (J/B).

ABS actuator and electric unit (control unit)		Fuse block (J/B)		Continuity
Connector	Terminal	Connector	Terminal	
E125	28	M68	6R	Yes

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		
E125	28	Ground	No

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.

ABS actuator and electric unit (control unit)		—	Voltage (Approx.)
Connector	Terminal		
E125	1	Ground	Battery voltage

3. Turn the ignition switch ON.
   NOTE:

Start the engine.

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

ABS actuator and electric unit (control unit)		—	Voltage (Approx.)
Connector	Terminal		
E125	1	Ground	Battery voltage

Is the inspection result normal?

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

4. CHECK MOTOR AND MOTOR RELAY POWER SUPPLY CIRCUIT

1. Turn the ignition switch OFF.
2. Check the 40A fusible link (L).
3. Check the continuity and short circuit between ABS actuator and electric unit (control unit) harness connector terminal 1 and 40A fusible link (L).

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.

ABS actuator and electric unit (control unit)		—	Voltage (Approx.)
Connector	Terminal		
E125	25	Ground	Battery voltage

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

ABS actuator and electric unit (control unit)		—	Voltage (Approx.)
Connector	Terminal		
E125	25	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 (H).
3. Check the continuity and short circuit between ABS actuator and electric unit (control unit) harness connector terminal 25 and 30A fusible link (H).

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		
E125	13	Ground	Yes
	38		

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 fuse block J/B 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-185, "Removal and Installation".
NO >> Repair / replace harness, connector, or terminal.

PARKING BRAKE SWITCH

Component Function Check

INFOID:0000000012427348

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 BRC-161, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000012427349

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 the continuity between parking brake switch harness connector and combination meter harness connector.

Parking brake switch		Combination meter		Continuity
Connector	Terminal	Connector	Terminal	
E52	1	M76	26	Yes

5. Check the continuity between parking brake switch harness connector and ground.

Parking brake switch		—	Continuity
Connector	Terminal		
E52	1	Ground	No

Is the inspection result normal?

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

2.CHECK PARKING BRAKE SWITCH

Check the parking brake switch. Refer to PB-4, "Inspection and Adjustment".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Replace the parking brake switch. Refer to PB-7, "Exploded View".

3.CHECK PARKING BRAKE SWITCH SIGNAL

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 the 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 the combination meter. Refer to MWI-21, "CONSULT Function (METER/M&A)".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace combination meter. Refer to MWI-84, "Removal and Installation".

5.CHECK TERMINAL

1. Check the combination meter pin terminals for damage or loose connection with harness connector.
2. Check the parking brake switch 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-185, "Removal and Installation".
NO >> Repair or replace error-detected parts.

Component Inspection

INFOID:0000000012427350

1.CHECK PARKING BRAKE SWITCH

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

Parking brake switch Terminal	—	Condition	Continuity
1	Ground	When parking brake switch is pressed	Yes
		When parking brake switch is released	No

Is the inspection result normal?

YES >> Inspection End.
NO >> Replace the parking brake switch. Refer to PB-7, "Exploded View".

VDC OFF SWITCH

Component Function Check

INFOID:0000000012427351

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 BRC-163, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000012427352

1.CHECK VDC OFF SWITCH CIRCUIT

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

ABS actuator and electric unit (control unit)		VDC OFF switch		Continuity
Connector	Terminal	Connector	Terminal	
E125	15	M79	6	Yes

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		
E125	15	Ground	No

Is the inspection result normal?

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

2.CHECK VDC OFF SWITCH GROUND CIRCUIT

Check the continuity between VDC OFF switch harness connector and ground.

VDC OFF switch		—	Continuity
Connector	Terminal		
M79	8	Ground	Yes

Is the inspection result normal?

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

3.CHECK VDC OFF SWITCH

Check the VDC OFF switch. Refer to BRC-164, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace the VDC OFF switch. Refer to BRC-187, "Removal and Installation".

4.CHECK VDC OFF SWITCH SIGNAL

CONSULT

1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Connect VDC OFF switch harness connector.
3. Select “ABS”, “Data Monitor” and “OFF SW” according to this order. Check the VDC OFF switch signal.

Condition	DATA MONITOR
When VDC OFF switch is pressed and VDC OFF indicator lamp in combination meter is in ON status	On
When VDC OFF switch is pressed and VDC OFF indicator lamp in combination meter is in OFF status	Off

Is the inspection result normal?

YES >> Inspection End.
NO >> GO TO 5.

5.CHECK TERMINAL

1. Check the ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with harness connector.
2. Check the VDC OFF switch 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-185, "Removal and Installation".
NO >> Repair or replace error-detected parts.

Component Inspection

INFOID:0000000012427353

1.CHECK VDC OFF SWITCH

1. Turn the ignition switch OFF.
2. Disconnect VDC OFF switch harness connector.
3. Check the continuity between terminals of VDC OFF switch connector.

VDC OFF switch Terminal	Condition	Continuity
6– 8	When VDC OFF switch is pressed	Yes
	When VDC OFF switch is not pressed	No

Is the inspection result normal?

YES >> Inspection End.
NO >> Replace the VDC OFF switch. Refer to BRC-187, "Removal and Installation".

HILL DESCENT CONTROL SWITCH

Component Function Check

INFOID:0000000012427354

1.CHECK HILL DESCENT CONTROL SWITCH OPERATION

Check that hill descent control indicator lamp in combination meter turns ON/OFF/Blinking when hill descent control switch is operated.

- ON: hill descent control switch is ON and the operational conditions are satisfied
- Blinking: hill descent control switch is ON and the operational conditions are not satisfied
- OFF: hill descent control switch is OFF

Is the inspection result normal?

YES >> Inspection End.
NO >> Proceed to BRC-165, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000012427355

1.CHECK HILL DESCENT CONTROL SWITCH CIRCUIT

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

ABS actuator and electric unit (control unit)		Hill descent control switch		Continuity
Connector	Terminal	Connector	Terminal	
E125	9	M254	9	Yes

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		
E125	9	Ground	Yes

Is the inspection result normal?

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

2.CHECK HILL DESCENT CONTROL SWITCH GROUND CIRCUIT

Check the continuity between hill descent control switch harness connector and the ground.

Hill descent control switch		—	Continuity
Connector	Terminal		
M254	6	Ground	Yes

Is the inspection result normal?

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

3.CHECK HILL DESCENT CONTROL SWITCH

Check the hill descent control switch. Refer to BRC-166, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace the hill descent control switch. Refer to BRC-190, "Removal and Installation".

4.CHECK HILL DESCENT CONTROL SWITCH SIGNAL

CONSULT
1. Connect the ABS actuator and electric unit (control unit) harness connector.
2. Connect the hill descent control switch harness connector.
3. Select “Data Monitor” of “ABS”, check “DDS SW”. Check hill descent control switch signal.

Condition	DATA MONITOR
When hill descent control switch is pressed and hill descent control indicator lamp in combination meter is in ON status	On
When hill descent control switch is pressed and hill descent control indicator lamp in combination meter is in OFF status	Off

Is the inspection result normal?

YES >> Inspection End.
NO >> GO TO 5.

5.CHECK TERMINAL

1. Check ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with harness connector.
2. Check hill descent control switch 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-185, "Removal and Installation".
NO >> Repair or replace malfunctioning components.

Component Inspection

INFOID:0000000012427356

1.CHECK HILL DESCENT CONTROL SWITCH

1. Turn the ignition switch OFF.
2. Remove the hill descent control switch. Refer to BRC-190, "Removal and Installation".
3. Check the continuity between hill descent control switch connector terminals.

hill descent control switch Terminal	Condition	Continuity
9 – 6	hill descent control switch is ON	Yes
	hill descent control switch is OFF	No

Is the inspection result normal?

YES >> Inspection End.
NO >> Replace the hill descent control switch. Refer to BRC-190, "Removal and Installation".

ABS WARNING LAMP

Component Function Check

INFOID:0000000012427357

1.CHECK ABS WARNING LAMP FUNCTION

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

CAUTION:

Never start the engine.

Is the inspection result normal?

YES >> Inspection End.

NO >> Proceed to BRC-167, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000012427358

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

Perform the trouble diagnosis for ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to BRC-167, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2.PERFORM SELF DIAGNOSTIC

CONSULT

1. Turn the ignition switch OFF → ON.

   CAUTION:

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

2. Repeat step 1 two or more times.
3. Perform “Self Diagnostic Result” of “ABS”.

Is any DTC detected?

YES >> Check the DTC. Refer to BRC-57, "DTC Index".

NO >> GO TO 3.

3.CHECK ABS WARNING LAMP SIGNAL

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 1 second after ignition switch is turned ON and then changes to “Off”.

   CAUTION:

   Never start the engine.

Is the inspection result normal?

YES >> Replace the combination meter. Refer to MWI-84, "Removal and Installation".

NO >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-185, "Removal and Installation".

BRAKE WARNING LAMP

Component Function Check

INFOID:0000000012427359

1.CHECK BRAKE WARNING LAMP FUNCTION

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

CAUTION:

Never start the engine.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Proceed to BRC-168, "Diagnosis Procedure".

2.CHECK BRAKE WARNING LAMP FUNCTION

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 the parking brake switch system. Refer to BRC-161, "Diagnosis Procedure".

3.CHECK BRAKE WARNING LAMP FUNCTION

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 the brake fluid level switch system. Refer to BR-27, "Exploded View".

Diagnosis Procedure

INFOID:0000000012427360

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

Perform the trouble diagnosis for ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to BRC-168, "Diagnosis Procedure".

Is the inspection result normal?

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

2.PERFORM THE SELF DIAGNOSTIC

CONSULT

1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Start the engine.**
2. Repeat step 1 two or more times.
3. Perform “Self Diagnostic Result” of “ABS”.

Is any DTC detected?

YES >> Check the DTC. Refer to BRC-57, "DTC Index".
NO >> GO TO 3.

3.CHECK BRAKE WARNING LAMP SIGNAL

CONSULT

1. Select “ABS”, “Data Monitor” and “EBD WARN LAMP” according to this order.
2. Turn the ignition switch OFF.

3. Check that data monitor displays “On” for 1 second after ignition switch is turned ON and then changes to “Off”.

CAUTION:
Never start the engine.

Is the inspection result normal?

YES >> Replace the combination meter. Refer to MWI-84, "Removal and Installation".
NO >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-185, "Removal and Installation".

VDC WARNING LAMP

Component Function Check

INFOID:0000000012427361

1.CHECK VDC WARNING LAMP FUNCTION

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

CAUTION:

Never start the engine.

Is the inspection result normal?

YES >> Inspection End.
NO >> Proceed to BRC-170, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000012427362

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

Perform the trouble diagnosis for ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to BRC-170, "Diagnosis Procedure".

Is the inspection result normal?

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

2.PERFORM THE SELF DIAGNOSTIC

CONSULT

1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Start the engine.**
2. Repeat step 1 two or more times.
3. Perform “Self Diagnostic Result” of “ABS”.

Is any DTC detected?

YES >> Check the DTC. Refer to BRC-57, "DTC Index".
NO >> GO TO 3.

3.CHECK VDC WARNING LAMP SIGNAL

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 the engine.

Is the inspection result normal?

YES >> Replace the combination meter. Refer to MWI-84, "Removal and Installation".
NO >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-185, "Removal and Installation".

VDC OFF INDICATOR LAMP

Component Function Check

INFOID:0000000012427363

1.CHECK VDC OFF INDICATOR LAMP FUNCTION (1)

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

CAUTION:
Never start the engine.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Proceed to BRC-171, "Diagnosis Procedure".

2.CHECK VDC OFF INDICATOR LAMP FUNCTION (2)

Check that VDC OFF indicator lamp in combination meter turns ON/OFF when VDC OFF switch is operated.

Is the inspection result normal?

YES >> Inspection End.
NO >> Check the VDC OFF switch system. Refer to BRC-163, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000012427364

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

Perform the trouble diagnosis for ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to BRC-171, "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

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 1 second after ignition switch is turned ON, and then changes to “Off”.

CAUTION:
Never start the engine.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-185, "Removal and Installation".

3.CHECK VDC OFF INDICATOR LAMP SIGNAL

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 >> Replace the combination meter. Refer to MWI-84, "Removal and Installation".
NO >> Check the VDC OFF switch system. Refer to BRC-163, "Diagnosis Procedure".

HILL DESCENT CONTROL INDICATOR LAMP

Component Function Check

INFOID:0000000012427365

1.CHECK HILL DESCENT CONTROL INDICATOR LAMP FUNCTION (1)

Check that hill descent control indicator lamp in combination meter 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 BRC-172, "Diagnosis Procedure".

2.CHECK HILL DESCENT CONTROL INDICATOR LAMP FUNCTION (2)

Check that hill descent control indicator lamp in combination meter turns ON/OFF when VDC OFF switch is operated.

Is the inspection result normal?

YES >> Inspection End.
NO >> Check hill descent control switch system. Refer to BRC-165, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000012427366

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

Perform the trouble diagnosis for ABS actuator and electric unit (control unit) power supply and ground circuits. Refer to BRC-158, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace malfunctioning components.

2.PERFORM SELF-DIAGNOSIS

CONSULT
Perform “Self Diagnostic Result” of “ABS”.

Is any DTC detected?

YES >> Check the DTC. Refer to BRC-57, "DTC Index".
NO >> Replace the combination meter. Refer to MWI-84, "Removal and Installation".

SYMPTOM DIAGNOSIS

EXCESSIVE OPERATION FREQUENCY

Description

INFOID:0000000012427367

VDC function, TCS function, ABS function, EBD function, Brake limited slip differential (BLSD) function, Brake assist function, hill start assist function or Brake force distribution function operates in excessive operation frequency.

Diagnosis Procedure

INFOID:0000000012427368

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.
- 2WD: Refer to FAX-7, "Inspection" (front) or RAX-6, "Inspection" (rear).
- AWD: Refer to FAX-45, "Inspection" (front) or RAX-14, "Inspection" (rear).

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-181, "FRONT WHEEL SENSOR : Removal and Installation".
- Rear wheel sensor: Refer to BRC-183, "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-184, "FRONT SENSOR ROTOR : Removal and Installation - Front Sensor Rotor".
- Rear sensor rotor: Refer to BRC-184, "REAR SENSOR ROTOR : Removal and Installation - Rear Sensor Rotor".

5. CHECK WARNING LAMP TURNS OFF

Check that ABS warning lamp, brake warning lamp and VDC warning lamp turn OFF approx. 1 second after key switch is turned ON and stay in OFF status during driving.

CAUTION:

Brake warning lamp turns ON when parking brake is operated (parking brake switch is ON) or brake fluid is less than the specified level (brake fluid level switch is ON).

Is the inspection result normal?

YES >> Normal
NO >> GO TO 6.

6. PERFORM THE SELF DIAGNOSTIC

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

Is any DTC detected?

YES >> Check the DTC. Refer to BRC-57, "DTC Index".
NO >> Inspection End.

UNEXPECTED BRAKE PEDAL REACTION

Description

INFOID:0000000012427369

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

Diagnosis Procedure

INFOID:0000000012427370

1.CHECK FRONT AND REAR AXLE

Check that there is no excessive looseness in front and rear axle.
- 2WD: Refer to FAX-7, "Inspection" (front) or RAX-6, "Inspection" (rear).
- AWD: Refer to FAX-45, "Inspection" (front) or RAX-14, "Inspection" (rear).

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-15, "DISC BRAKE ROTOR : Inspection".
- Rear: Refer to BR-17, "DISC BRAKE ROTOR : Inspection".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Refinish the disc rotor.

3.CHECK BRAKE FLUID LEAKAGE

Check fluid leakage.
Refer to BR-13, "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-11, "Adjustment".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Adjust each item of brake pedal. Refer to BR-11, "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:0000000012427371

Brake stopping distance is long when ABS function is operated.

Diagnosis Procedure

INFOID:0000000012427372

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:0000000012427373

VDC function, TCS function, ABS function, EBD function, Brake limited slip differential (BLSD) function, Brake assist function, hill start assist function or Brake force distribution function does not operate.

Diagnosis Procedure

INFOID:0000000012427374

CAUTION:
- **VDC function, TCS function, ABS function, EBD function, Brake limited slip differential (BLSD) function, Brake assist function, hill start assist function and Brake force distribution function never operate when the vehicle speed is 10 km/h (6.2 MPH) or less. However, TCS function, Brake limited slip differential (BLSD) function and 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 >> GO TO 2.

2.PERFORM SELF DIAGNOSTIC

CONSULT
1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Start the engine.**
2. Repeat step 1 two or more times.
3. Perform “Self Diagnostic Result” of “ABS” with CONSULT.

Is any DTC detected?

YES >> Check the DTC. Refer to BRC-57, "DTC Index".
NO >> Inspection End.

BRAKE PEDAL VIBRATION OR OPERATION SOUND OCCURS

Description

INFOID:0000000012427375

- 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:0000000012427376

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-11, "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 Diagnostic Result” of “ABS” with CONSULT.

3.SYMPTOM CHECK 3

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

Does the symptom occur?

YES >> Check that radio (including wiring), antenna and antenna lead-in wires are not located near ABS actuator and electric unit (control unit). Move them if they are located near ABS actuator and electric unit (control unit).
NO >> GO TO 4.

4.PERFORM SELF DIAGNOSTIC RESULT

With CONSULT

1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Start the engine.**
2. Repeat step 1 two or more times.
3. Perform “Self Diagnostic Result” of “ABS”.

Is any DTC detected?

YES >> Check the DTC. Refer to BRC-57, "DTC Index".
NO >> Inspection End.

VEHICLE JERKS DURING

Description

INFOID:0000000012427377

The vehicle jerks when VDC function, TCS function, ABS function, EBD function, Brake limited slip differential (BLSD) function, Brake assist function, hill start assist function or Brake force distribution function operates.

Diagnosis Procedure

INFOID:0000000012427378

1.CHECK SYMPTOM

Check that the vehicle jerks when VDC function, TCS function, ABS function, EBD function, Brake limited slip differential (BLSD) function, Brake assist function, hill start assist function or Brake force distribution function operates.

Is the inspection result normal?

YES >> Normal
NO >> GO TO 2.

2.PERFORM THE SELF DIAGNOSTIC RESULT

With CONSULT
1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Start the engine.**
2. Repeat step 1 two or more times.
3. Perform “Self Diagnostic Result” of “ABS”.

Is any DTC detected?

YES >> Check the DTC. Refer to BRC-57, "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.

Is the inspection result normal?

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

4.PERFORM THE SELF DIAGNOSTIC RESULT

With CONSULT
1. Connect harness connector.
2. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**
   - **Start the engine.**
3. Repeat step 2 two or more times.
4. Perform “Self Diagnostic Result” of “ABS”.

Is any DTC detected?

YES >> Check the DTC. Refer to BRC-57, "DTC Index".
NO >> GO TO 5.

5.PERFORM THE SELF DIAGNOSTIC RESULT

With CONSULT
Perform “Self Diagnostic Result” of “ENGINE”, “TRANSMISSION”.

Is any DTC detected?

YES >> Check the DTC.
NO >> Replace ABS actuator and electric unit (control unit). Refer to BRC-185, "Removal and Installation".

NORMAL OPERATING CONDITION

Description

INFOID:0000000012427379

Symptom	Result
Brake pedal slightly vibrates and operation sound (motor sound and sound from suspension) occurs when VDC function, TCS function, ABS function, EBD function, Brake limited slip differential (BLSD) function, Brake assist function, hill start assist function or Brake force distribution function operates.	This is not a malfunction, because it is caused by VDC function, TCS function, ABS function, EBD function, Brake limited slip differential (BLSD) function, Brake assist function, hill start assist function and Brake force distribution function that are normally operated.
Brake stopping distance may become longer than models without ABS function depending on the road conditions, when ABS function is operated on slippery road like rough road, gravel road or snowy road.	
Brake pedal vibrates and operation sound occurs during sudden acceleration and cornering, when VDC function, TCS function, Brake assist function or Brake force distribution 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 OFF indicator 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, Brake assist function, and Brake force distribution function may not normally operate, when driving on a special road the is extremely slanted (bank in a circuit course).	
A malfunction in yaw rate/side/decel G sensor system may be detected when the vehicle sharply turns during a spin turn, acceleration turn or drift driving while VDC function, TCS function, 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.)

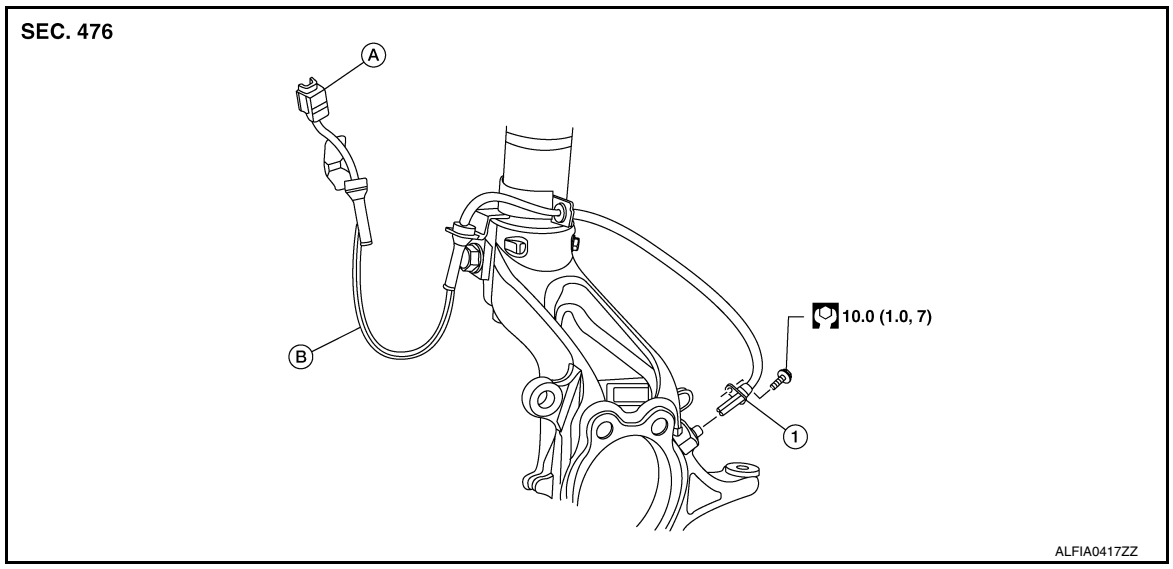
REMOVAL AND INSTALLATION

WHEEL SENSOR

FRONT WHEEL SENSOR

FRONT WHEEL SENSOR : Exploded View

INFOID:0000000012427380



1. Front LH wheel sensor
A. Harness connector
B. Slant line

FRONT WHEEL SENSOR : Removal and Installation

INFOID:0000000012427381

CAUTION:
- **Be careful not to damage front wheel sensor edge and sensor rotor teeth.**
- **When removing the front wheel hub and bearing, first remove the front wheel sensor from the steering knuckle. Failure to do so may result in damage to the front wheel sensor wires making the front wheel sensor inoperative.**
- **Pull out the front wheel sensor, being careful to turn it as little as possible. Do not pull on the front wheel sensor harness.**
- **Before installation, check if foreign objects such as iron fragments are adhered to the pick-up part of the front wheel sensor or to the inside of the hole in the steering knuckle for the front wheel sensor, or if a foreign object is caught in the surface of the sensor rotor. Fix as necessary and then install the front wheel sensor.**

REMOVAL

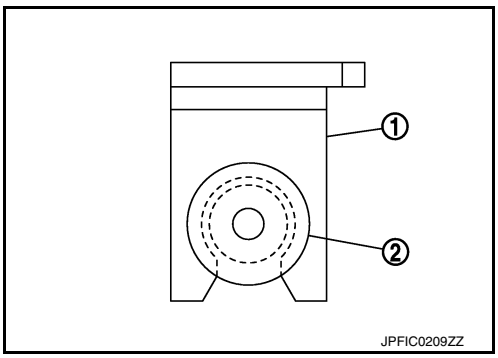
1. Remove the front wheel and tire using power tool. Refer to WT-64, "Adjustment".
2. Partially remove the fender protector to gain access to the wheel sensor harness connector. Refer to EXT-29, "FENDER PROTECTOR : Removal and Installation".
3. Disconnect the harness connector from the front wheel sensor.
4. Remove the front wheel sensor bolt from the wheel hub and bearing.
5. Remove the front wheel sensor from the strut bracket.
6. Remove the front wheel sensor from the steering knuckle.

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:
- **When installing, make sure there is no foreign material such as iron chips on and in the hole in the steering knuckle for the front wheel sensor. Make sure no foreign material has been caught in the sensor rotor. Remove any foreign material and clean the mount.**

- **Do not twist front wheel sensor harness when installing front wheel sensor. Check that grommet (2) is fully inserted to bracket (1). Check that front wheel sensor harness is not twisted after installation.**

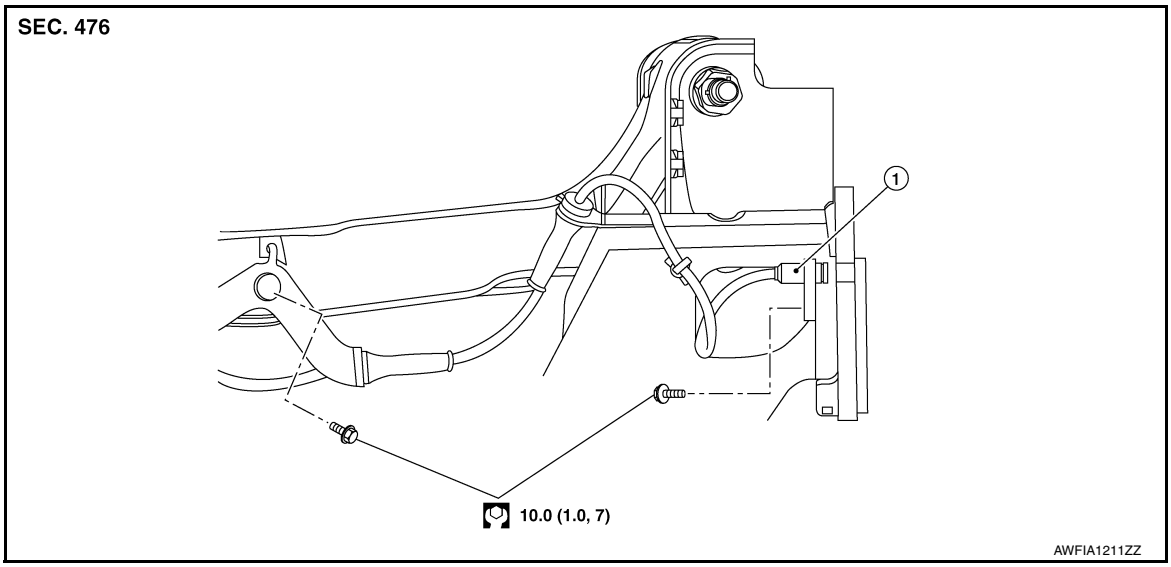


REAR WHEEL SENSOR

REAR WHEEL SENSOR : Exploded View

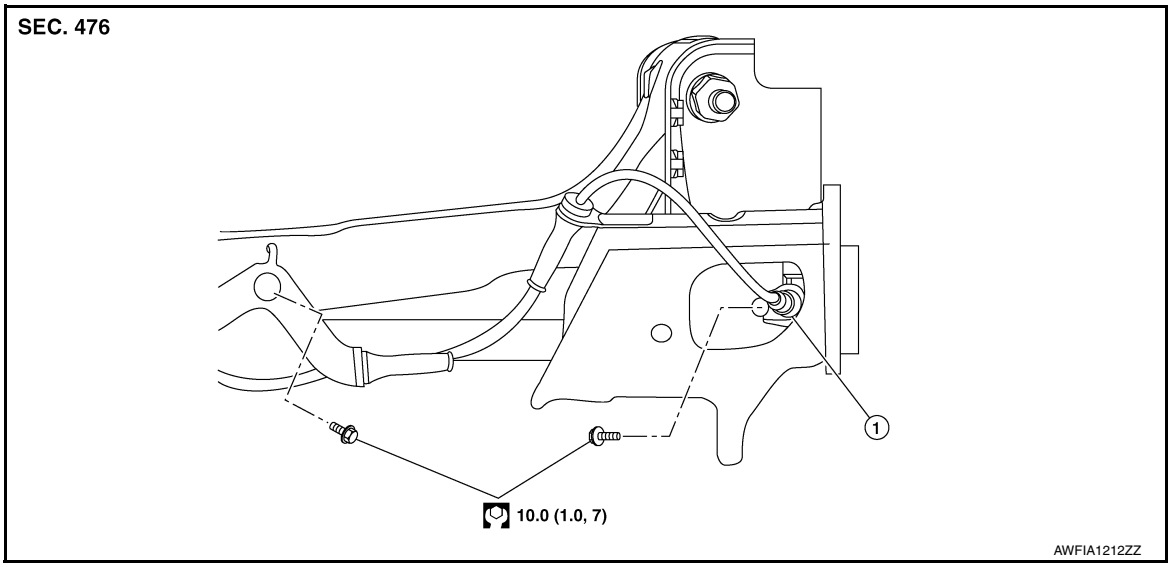
INFOID:0000000012427382

FWD



1. Rear LH wheel sensor

AWD



1. Rear LH wheel sensor

REAR WHEEL SENSOR : Removal and Installation

INFOID:0000000012427383

CAUTION:

- **Be careful not to damage rear wheel sensor edge and sensor rotor teeth.**
- **When removing the rear wheel hub and bearing, first remove the rear wheel sensor from the rear wheel hub and bearing (FWD) or the rear axle housing (AWD). Failure to do so may result in damage to the rear wheel sensor making the rear wheel sensor inoperative.**
- **Pull out the rear wheel sensor, being careful to turn it as little as possible. Do not pull on the rear wheel sensor harness.**
- **Before installation, check if foreign objects such as iron fragments are adhered to the pick-up part of the rear wheel sensor or to the inside of the hole in the rear wheel hub and bearing (FWD) or the rear axle housing (AWD) for the rear wheel sensor, or if a foreign object is caught in the surface of the sensor rotor. Fix as necessary and then install the rear wheel sensor.**

REMOVAL

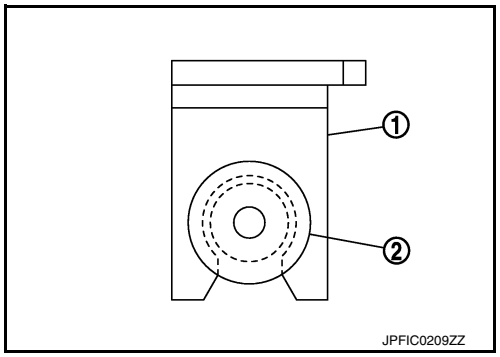
1. Remove the rear wheel and tire using power tool. Refer to WT-64, "Adjustment".
2. Remove the rear wheel sensor bolt.
3. Disconnect the harness connector from the rear wheel sensor.
4. Remove the rear wheel sensor from the wheel hub and bearing (FWD) or the rear axle housing (AWD).
5. Remove the rear wheel sensor harness grommet from the bracket.
6. Remove the bolt, the rear wheel sensor harness, and the rear wheel sensor from the bracket.

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

- **When installing, make sure there is no foreign material such as iron chips on and in the hole in the rear wheel hub and bearing (FWD) or the rear axle housing (AWD) for the rear wheel sensor. Make sure no foreign material has been caught in the sensor rotor. Remove any foreign material and clean the mount.**
- **Do not twist rear wheel sensor harness when installing rear wheel sensor. Check that grommet (2) is fully inserted to bracket (1). Check that rear wheel sensor harness is not twisted after installation.**



SENSOR ROTOR

FRONT SENSOR ROTOR

FRONT SENSOR ROTOR : Removal and Installation - Front Sensor Rotor

INFOID:0000000012427384

The front wheel sensor rotor is an integral part of the wheel hub and bearing and cannot be disassembled. Refer to FAX-9, "Removal and Installation" (FWD) or FAX-47, "Removal and Installation" (AWD).

REAR SENSOR ROTOR

REAR SENSOR ROTOR : Removal and Installation - Rear Sensor Rotor

INFOID:0000000012427385

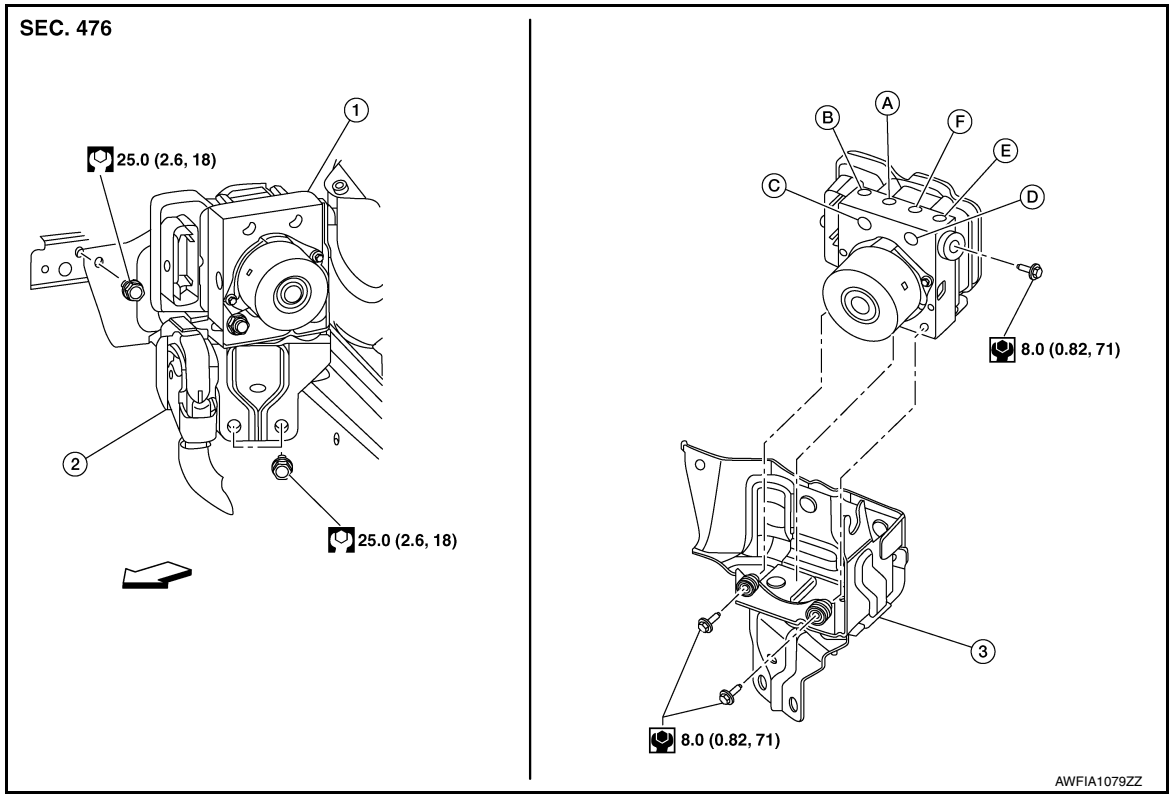
For FWD vehicles, the rear wheel sensor rotor is an integral part of the wheel hub and bearing and cannot be disassembled. Refer to RAX-7, "Removal and Installation" (FWD).

For AWD vehicles, the rear wheel sensor rotor is pressed on the rear drive shaft and can be disassembled. Refer to RAX-21, "Disassembly and Assembly" (AWD).

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Exploded View

INFOID:0000000012427386



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

Removal and Installation

INFOID:0000000012427387

REMOVAL

CAUTION:

- **To remove brake tube, use a flare nut wrench to prevent flare nuts and brake tube from being damaged.**
- **Do not remove actuator by holding harness.**

NOTE:

- Before replacing ABS actuator and electric unit (control unit), perform “Before Replace ECU” of “Read / Write Configuration” to save or print current vehicle specification. Refer to BRC-76, "Work Procedure".
- When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

1. Disconnect negative battery terminal. Refer to PG-82, "Exploded View".
2. Remove the cowl top cover and cowl top extension. Refer to EXT-26, "Removal and Installation".
3. Separate brake tubes from ABS actuator and electric unit (control unit). Refer to BR-21, "FRONT : Exploded View".
4. Remove the brake booster vacuum hose. Refer to BR-32, "Removal and Installation".
5. Separate the brake booster vacuum tube and place aside. Refer to BR-22, "FRONT : Removal and Installation".
6. Disconnect the harness connector from the ABS actuator and electric unit (control unit).
7. Remove ABS actuator and electric unit (control unit) bracket bolts and bushings.

8. Remove ABS actuator and electric unit (control unit) from vehicle.

INSTALLATION

CAUTION:

Be sure to perform "After Replace ECU" of "Read / Write Configuration" or "Manual Configuration" when replacing ABS actuator and electric unit (control unit). Refer to BRC-76, "Work Procedure".

Installation is in the reverse order of removal.

- After work is completed, bleed air from brake tube. Refer to BR-14, "Bleeding Brake System".
- Adjust the neutral position of steering angle sensor. Refer to BRC-72, "Description".
- Perform calibration of the decel G sensor. Refer to BRC-74, "Description".

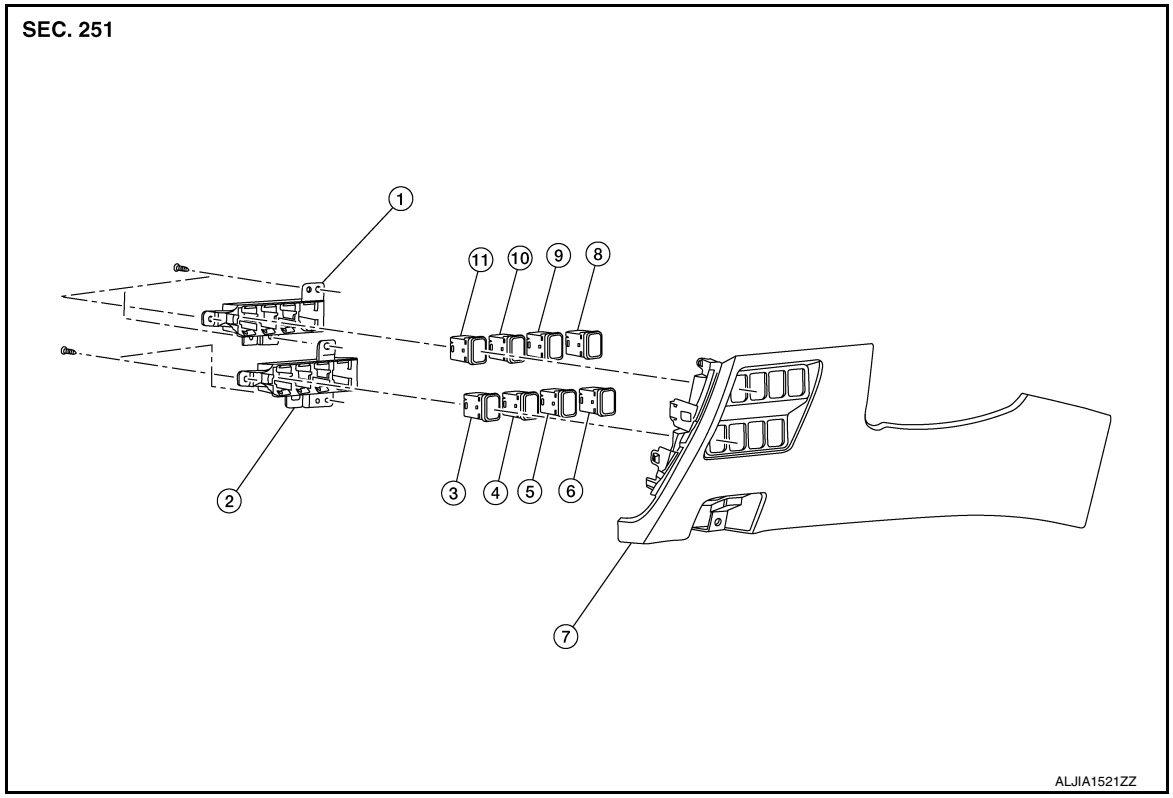
CAUTION:

- **To install, use flare nut crowfoot and torque wrench.**
- **Do not reuse the bushings.**
- **Replace the ABS actuator if it has been dropped or sustained an impact.**
- **Do not install actuator by holding harness.**
- **After installing harness connector in the ABS actuator and electric unit (control unit), make sure connector is securely locked.**

VDC OFF SWITCH

Exploded View

INFOID:0000000012427388



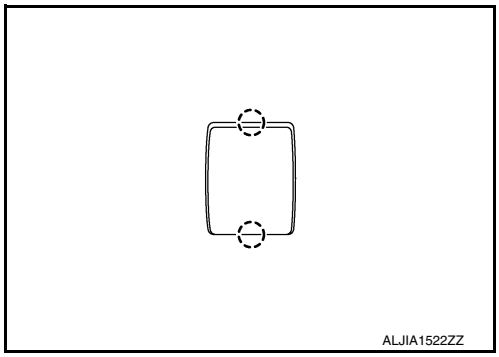
1. Upper switch carrier
2. Lower switch carrier
3. ECO mode switch
4. Warning system switch
5. AWD lock switch (if equipped)
6. Hill descent control switch (if equipped)
7. Instrument lower panel LH
8. Automatic back door main switch (if equipped)
9. Automatic back door switch (if equipped)
10. SPORT mode switch
11. VDC OFF switch

Removal and Installation

INFOID:0000000012427389

REMOVAL

1. Remove the instrument lower panel LH. Refer to IP-23, "Removal and Installation".
2. Disconnect the harness connector from the VDC OFF switch.
3. Remove the screws from the upper switch carrier.
4. Remove the upper switch carrier from the instrument lower panel LH.
5. Release pawls using suitable tool and remove the VDC OFF switch from the upper switch carrier.
   ◌: Pawl



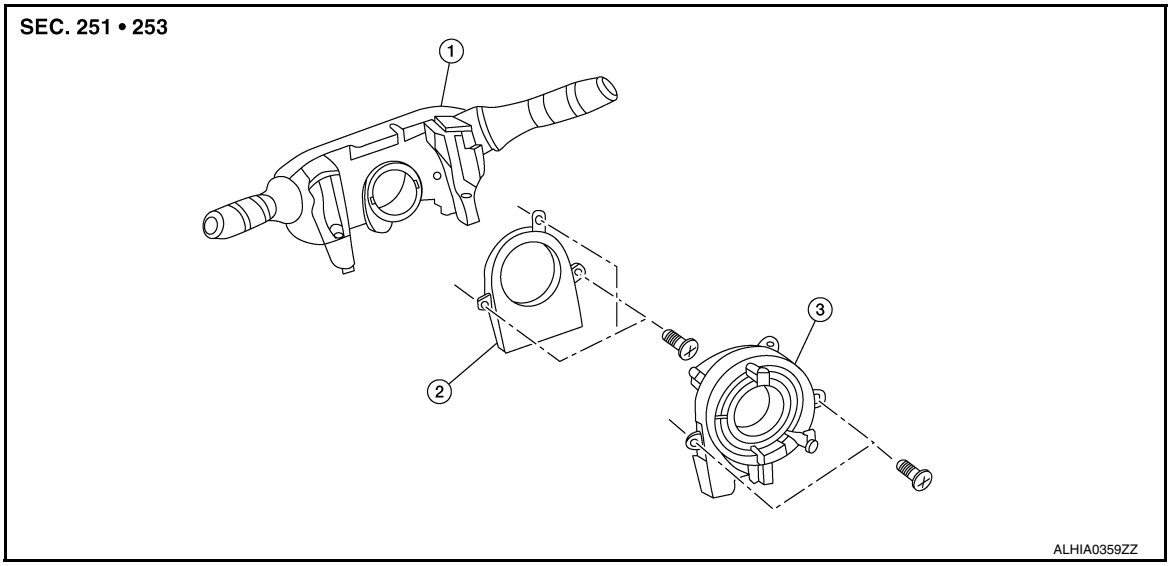
INSTALLATION

Installation is in the reverse order of removal.

STEERING ANGLE SENSOR

Exploded View

INFOID:0000000012427390



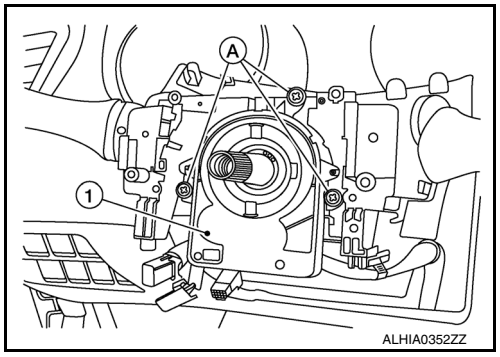
1. Combination switch
2. Steering angle sensor
3. Spiral cable

Removal and Installation

INFOID:0000000012427391

Removal and Installation

1. Remove the spiral cable. Refer to SR-15, "Removal and Installation".
2. Remove screws (A) and then remove steering angle sensor (1).



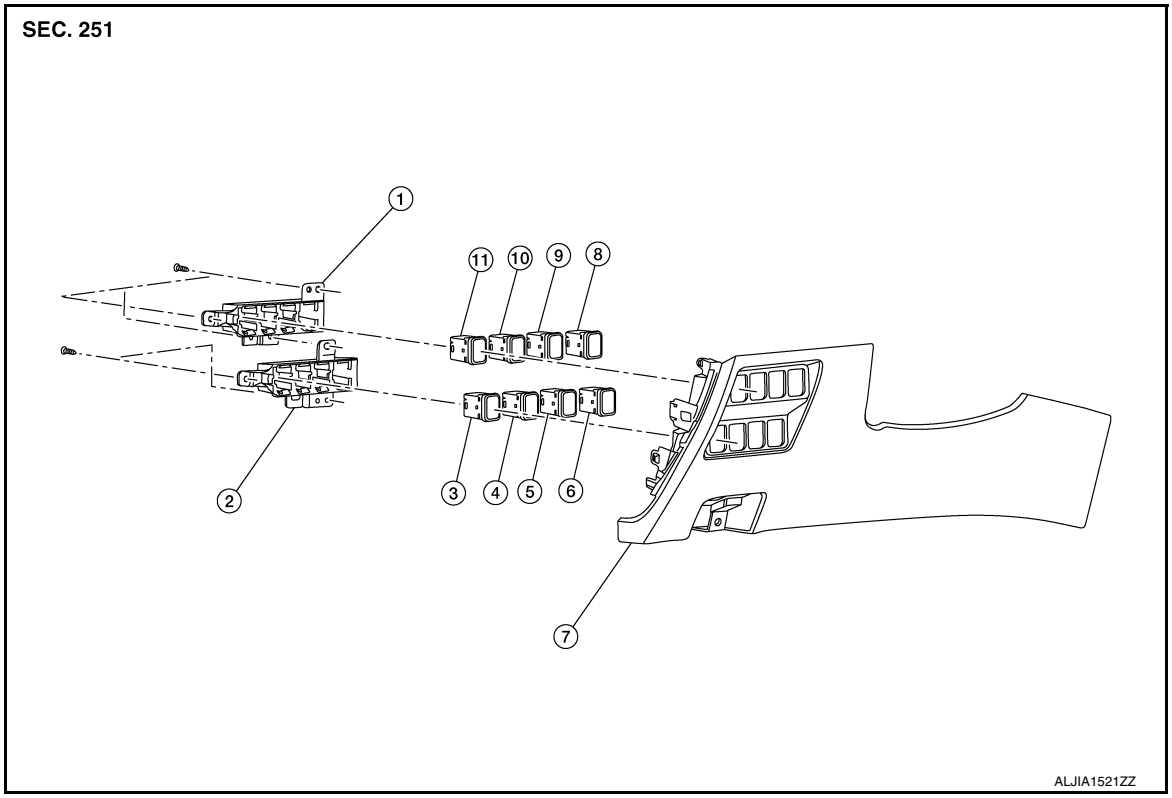
INSTALLATION

Installation is in the reverse order of removal.

HILL DESCENT CONTROL SWITCH

Exploded View

INFOID:0000000012427392



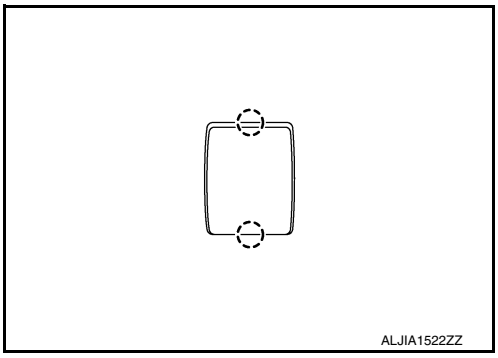
1. Upper switch carrier
2. Lower switch carrier
3. ECO mode switch
4. Warning system switch
5. AWD lock switch
6. Hill descent control switch
7. Instrument lower panel LH
8. Automatic back door main switch (if equipped)
9. Automatic back door switch (if equipped)
10. SPORT mode switch
11. VDC OFF switch

Removal and Installation

INFOID:0000000012427393

REMOVAL

1. Remove instrument lower panel LH. Refer to IP-23, "Removal and Installation".
2. Disconnect the harness connector from the hill descent control switch.
3. Remove the screws from the lower switch carrier.
4. Remove the lower switch carrier from the instrument lower panel LH.
5. Release pawls using suitable tool and remove the hill descent control switch from the lower switch carrier.
   ◌: Pawl



INSTALLATION

Installation in the reverse order of removal.

PRECAUTION

PRECAUTIONS

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

INFOID:0000000012760410

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

WARNING:

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

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

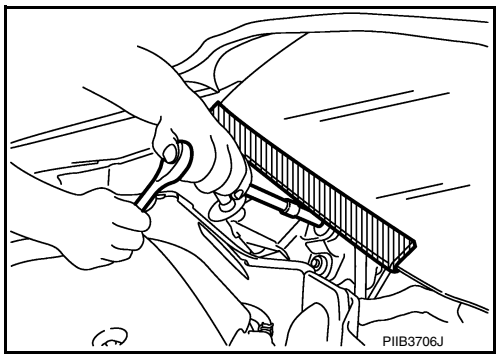
WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT 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 three minutes before performing any service.**

Precaution for Procedure without Cowl Top Cover

INFOID:0000000012760411

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



Precaution for Brake System

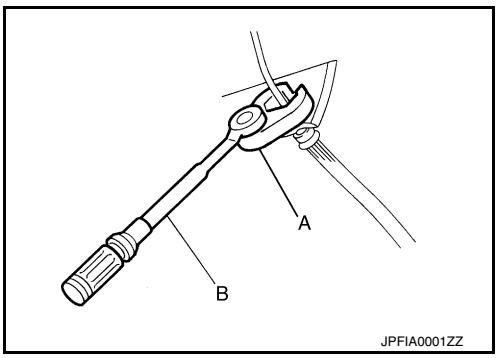
INFOID:0000000012760412

WARNING:

Clean any dust from the front brake and rear brake using a vacuum dust collector. Do not blow by compressed air.

- Brake fluid use refer to MA-11, "Fluids and Lubricants".
- Do not reuse drained brake fluid.
- Do not 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.
- Do not use mineral oils such as gasoline or light oil to clean. They may damage rubber parts and cause improper operation.
- Always loosen the brake tube flare nut with a flare nut wrench.

- Tighten the brake tube flare nut to the specified torque with a flare nut crowfoot (A) and torque wrench (B).
- Always connect the battery terminal when moving the vehicle.
- 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

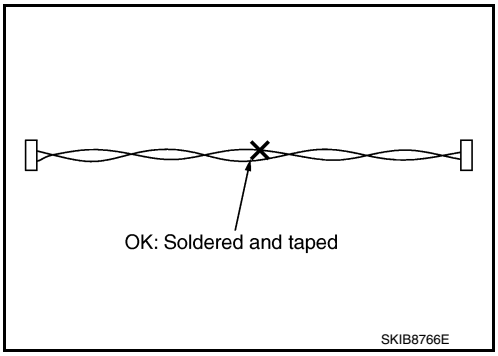
INFOID:0000000012760413

- Just after starting vehicle after ignition switch is ON, brake pedal may vibrate or motor operating noise may be heard from engine compartment. This is a normal condition.
- When an error is indicated by ABS or another warning lamp, collect all necessary information from customer (what symptoms are present under what conditions) and check for simple causes before starting diagnostic servicing. Besides electrical system inspection, check brake booster operation, brake fluid level and oil leaks.
- If tire size and type are used in an improper combination or brake pads are not Genuine NISSAN parts, stopping distance or steering stability may deteriorate.
- ABS might be out of order or malfunctions by putting a radio (wiring inclusive), an antenna and a lead-in wire near the control unit.
- If aftermarket parts (car stereo, CD player, etc.) have been installed, check for incidents such as harness pinches, open circuits, and improper wiring.
- VDC system may not operate normally or a VDC OFF indicator lamp or SLIP indicator lamp may light.
- When replacing the following parts with parts other than genuine parts or making modifications: Suspension-related parts (shock absorber, spring, bushing, etc.), tires, wheels (other than specified sizes), brake-related parts (pad, rotor, caliper, etc.), engine-related parts (muffler, ECM, etc.) and body reinforcement-related parts (roll bar, tower bar, etc.).
- When driving with worn or deteriorated suspension, tires and brake-related parts.

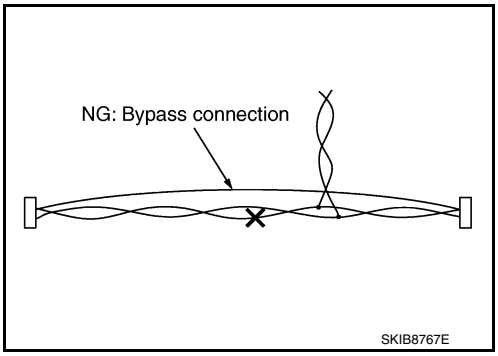
Precaution for Harness Repair

INFOID:0000000012760414

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



- Do not bypass the repair point with wire. (If it is bypassed, the turn-out point cannot be separated and the twisted wire characteristics are lost.)



Precautions for FEB System Service

INFOID:0000000012714096

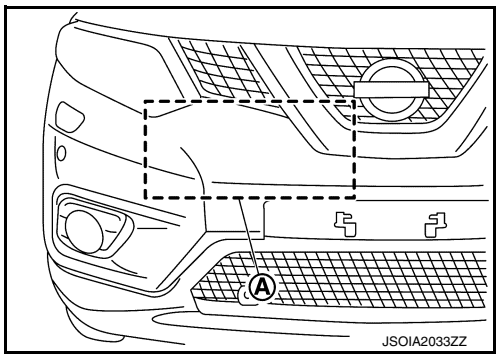
CAUTION:

- **Never use the distance sensor removed from vehicle. Never disassemble or remodel.**
- **Erase DTC when replacing parts of FEB system. Then check the operation of FEB 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 DISTANCE SENSOR

- Never use the distance 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 distance 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 FEB function stop and DTC is detected.



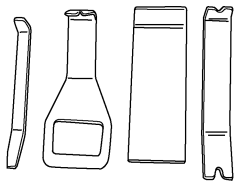
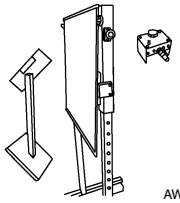
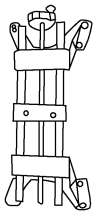
PREPARATION

PREPARATION

Special Service Tools

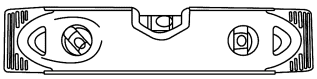
INFOID:0000000012714097

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

Tool number (TechMate No.) Tool name	Description
— (J-46534) Trim Tool Set  AWJIA0483ZZ	Removing trim components
— (1-20-2851-1) Distance Sensor Alignment Kit  AWOIA0016ZZ	Adjusting distance sensor
— (1-20-2722-1-IF) Wheel Adapter  AWOIA0017ZZ	Adjusting distance sensor

Commercial Service Tools

INFOID:0000000012714098

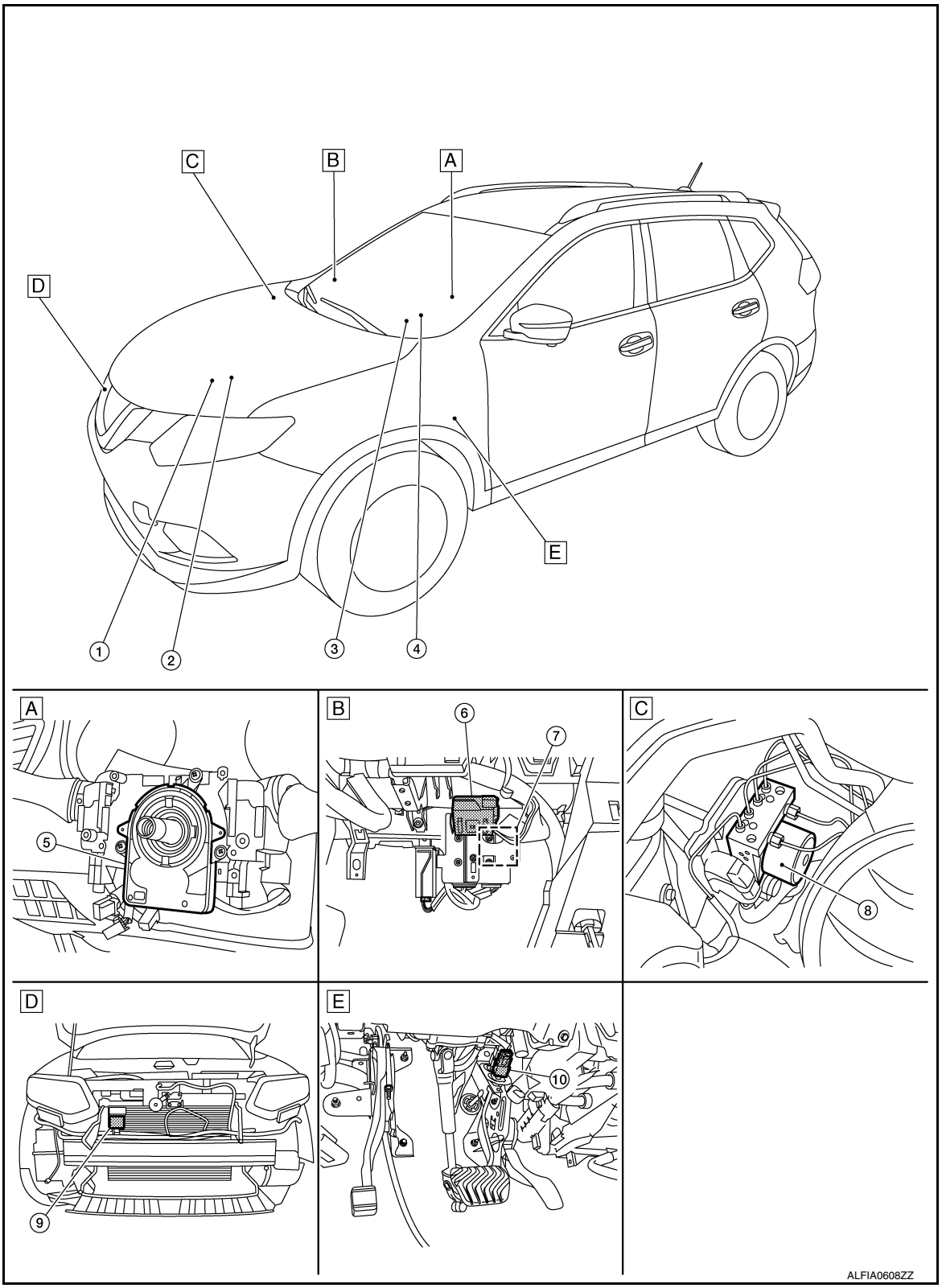
Tool name	Description
Spirit level  JSOIA1620ZZ	Uses for distance sensor initial vertical alignment.

SYSTEM DESCRIPTION

COMPONENT PARTS

Component Parts Location

INFOID:0000000012714099



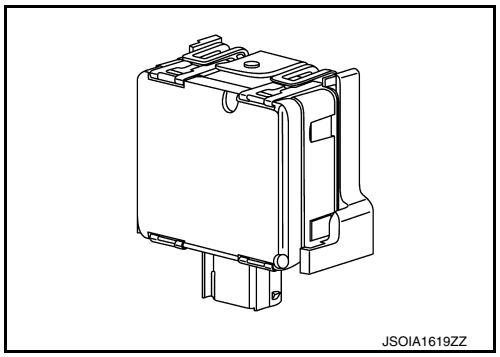
A. Steering column (view with steering wheel removed) B. RH side of instrument panel (view with instrument panel removed) C. RH side of engine compartment
D. Back side of front bumper E. Brake pedal area

No.	Component parts	Function
1.	TCM	• CVT control related signal is transmitted to distance sensor via CAN communication. • Refer to TM-12, "CVT CONTROL SYSTEM : Component Parts Location" for detailed installation location.
2.	ECM	• When Forward Emergency Braking operates, an engine torque down request signal is received from the distance sensor. • Refer to EC-14, "Component Parts Location" for detailed installation location. (QR25DE engine models)
3.	BCM	• Stop lamp switch signal is transmitted to the distance sensor via CAN communication. • Refer to BCS-7, "BODY CONTROL SYSTEM : Component Parts Location" (with intelligent key system) or BCS-80, "BODY CONTROL SYSTEM : Component Parts Location" (without intelligent key system) for detailed installation location.
4.	Combination meter	• Performs the following operations using the signals received from the distance sensor via the CAN communication - Description: Displays the FEB operation status - System display and warning: BRC-203, "Menu Displayed by Pressing Each Switch" • Refer to MWI-6, "METER SYSTEM : Component Parts Location" for detailed installation location.
5.	Steering angle sensor	Steering angle sensor signal is transmitted to distance sensor via CAN communication.
6.	Chassis control unit	• Brake fluid pressure control signal is received from distance sensor via chassis communication. • Brake fluid pressure control signal is transmitted to ABS actuator electric unit (control unit) via CAN communication. • Refer to DAS-131, "Component Parts Location" for detailed installation location.
7.	ADAS control unit	Refer to BRC-197, "ADAS Control Unit".
8.	ABS actuator and electric unit (control unit)	• Vehicle speed signal and the operation statuses of the VDC, TCS and ABS systems, etc. are transmitted to the distance sensor via CAN communication. • Refer to BRC-9, "Component Parts Location" for detailed installation location.
9.	Distance sensor	• Distance 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. • Refer to BRC-9, "Component Parts Location" for detailed installation location.
10.	Stop lamp switch	• Stop lamp switch is installed at the upper part of the brake pedal and detects a brake operation performed by the driver. • Refer to BRC-9, "Component Parts Location" for detailed installation location.

Distance Sensor

INFOID:0000000012714100

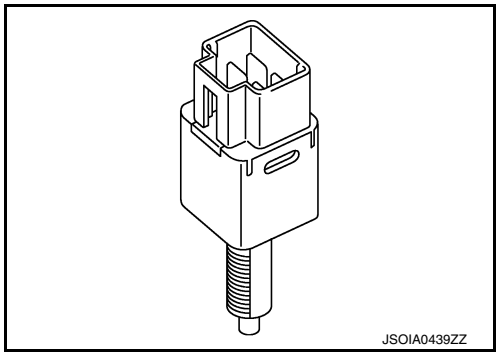
- Distance sensor is installed on the back of the front bumper and detects a vehicle ahead by using millimeter waves.
- Distance sensor detects radar reflected from a vehicle ahead by irradiating radar forward and calculates a distance from the vehicle ahead and relative speed, based on the detected signal.
- When judging the danger of crash according to the distance from the vehicle ahead and the relative speed, the distance sensor transmits a signal to ABS actuator and electric unit (control unit).


JSOIA1619ZZ

Stop Lamp Switch

INFOID:0000000012714101

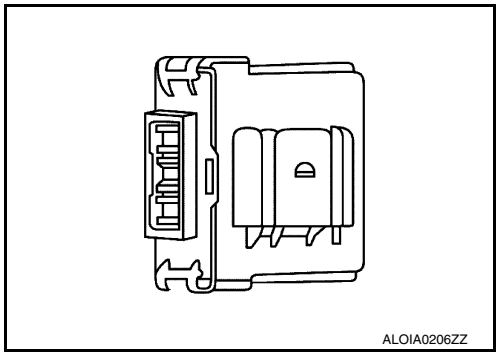
- Stop lamp switch is installed at the upper part of the brake pedal and detects a brake operation performed by the driver.
- Stop lamp switch is turned ON, when depressing the brake pedal.
- Stop lamp switch signal is input to BCM. Stop lamp switch signals are transmitted from BCM to distance sensor via CAN communication.


JSOIA0439ZZ

Chassis Control Module

INFOID:0000000012781912

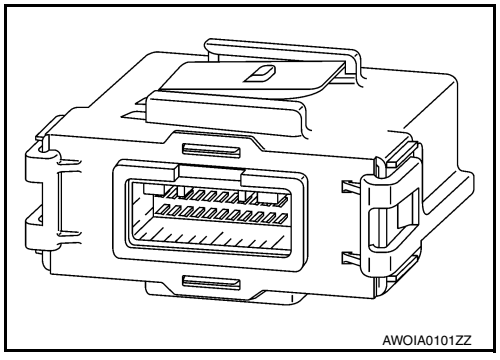
Chassis control module monitors brake fluid pressure from the distance sensor via chassis communication:


ALOIA0206ZZ

ADAS Control Unit

INFOID:0000000012781913

- ADAS control unit is installed behind the glove box assembly.
- Communicates with each control unit via CAN communication and ITS communication.
- ADAS control unit controls each system, based on ITS communication signals and CAN communication signals from each control unit.
- ADAS control unit transmits FED system status to the combination meter.


AWOIA0101ZZ

Combination Meter

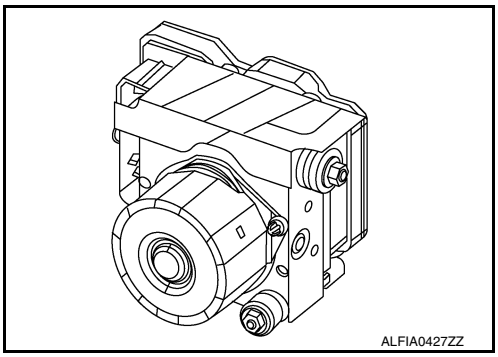
INFOID:0000000012781914

- Receives meter display signal from the ADAS control unit via CAN communication.
- Displays FEB system status according to the signal received from the ADAS control unit.

ABS Actuator and Electric Unit (Control Unit)

INFOID:0000000012781915

ABS actuator and electric unit (control unit) monitors vehicle speed and operation statuses of the VDC, TCS and ABS systems are transmitted to the distance sensor via CAN communication.

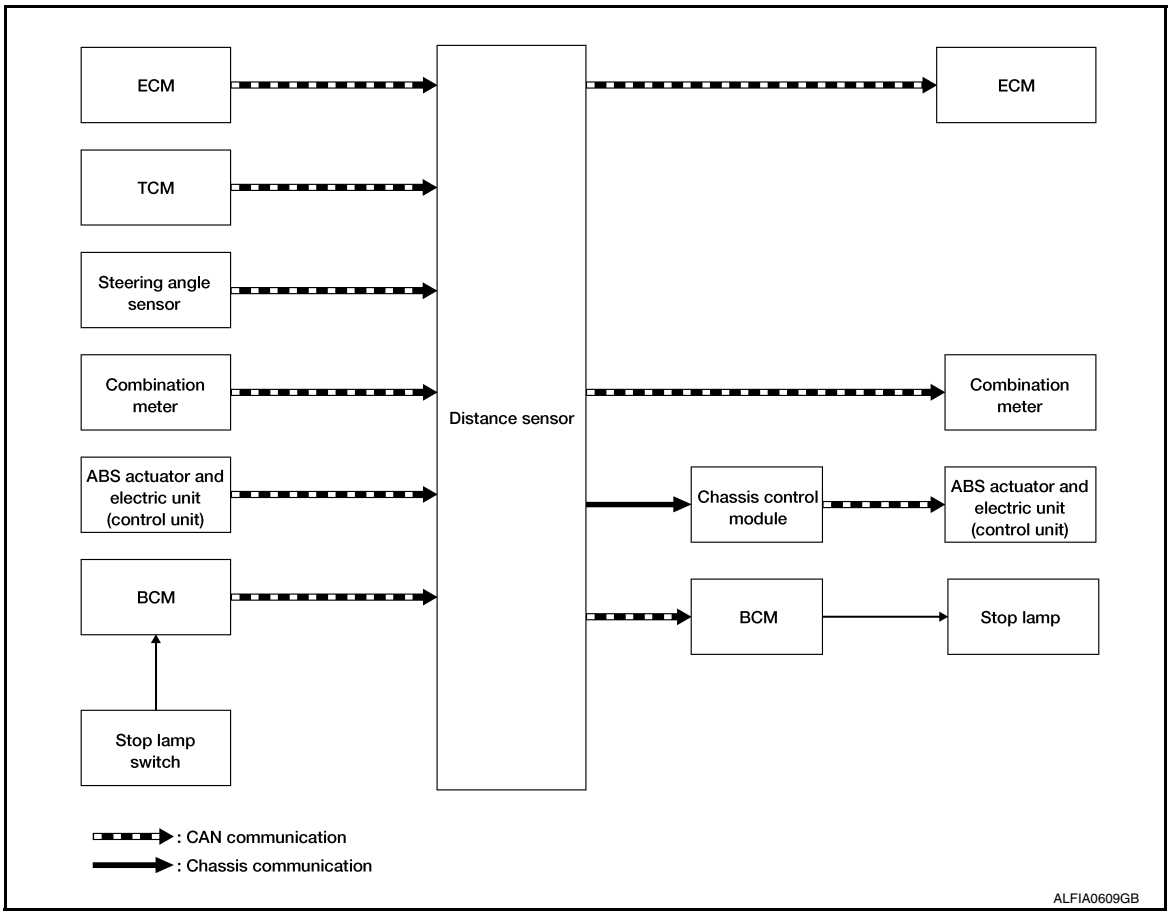


SYSTEM

System Description

INFOID:0000000012714102

SYSTEM DIAGRAM



DISTANCE SENSOR 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
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
BCM	CAN communication	Stop lamp switch signal	Receives an operational state of the brake pedal

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
Steering angle sensor	CAN communication	Steering angle sensor signal	Receives the number of revolutions, turning direction, turning angle speed of the steering wheel
Combination meter	CAN communication	System selection signal	Receives a selection state of Forward Emergency Brake
Stop lamp switch	Stop lamp switch signal		Transmits a operational state of the brake pedal to the BCM

Output Signal Item

Reception unit	Signal name			Description
ECM	CAN communication	Engine torque down request signal		Transmits a signal to control the engine torque.
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 via chassis control module
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 system display signal	
			FEB warning signal	
		FEB warning lamp signal		Transmits a signal to illuminate the FEB warning lamp
BCM	CAN communication	Stop lamp drive signal		Transmits a signal to active the stop lamp.

DESCRIPTION

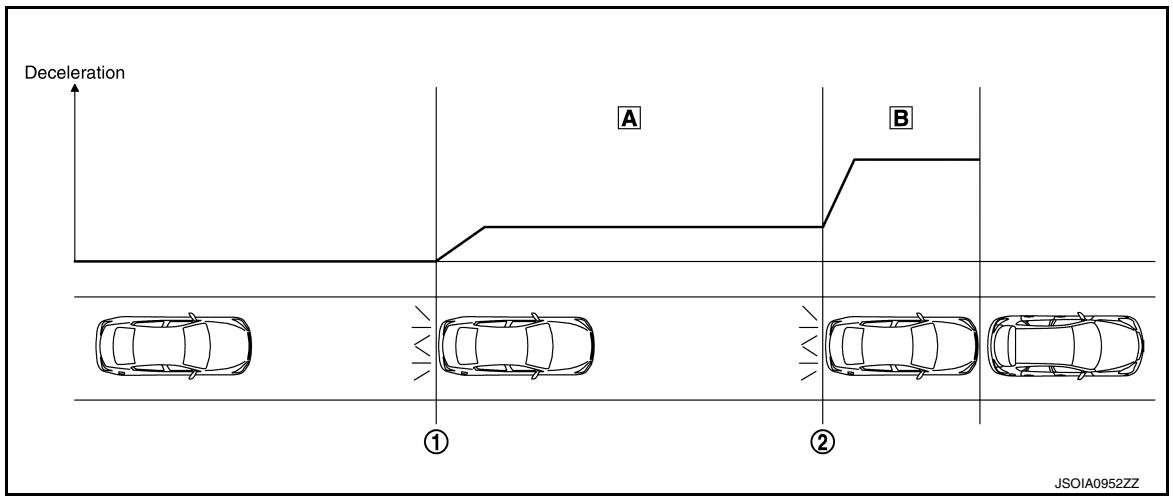
- Forward emergency braking (FEB) system can assist the driver when there is a risk of a forward collision with the vehicle ahead in the traveling lane.
- FEB system operate at speeds above approximately 5km/h (3 MPH).

FUNCTION DESCRIPTION

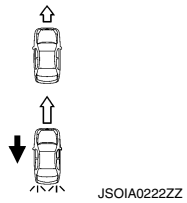
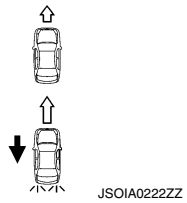
- The FEB system uses a distance sensor to measure the distance to the vehicle ahead in the traveling lane.
- If there is a risk of a collision, FEB issues a visual and audible warning signal to the combination meter via CAN communication.
- If the driver does not take action, FEB issues the second visual and audible warning.
- And if the risk of a collision becomes imminent, FEB system applies braking command to ABS actuator and electric unit (control unit) via CAN communication.

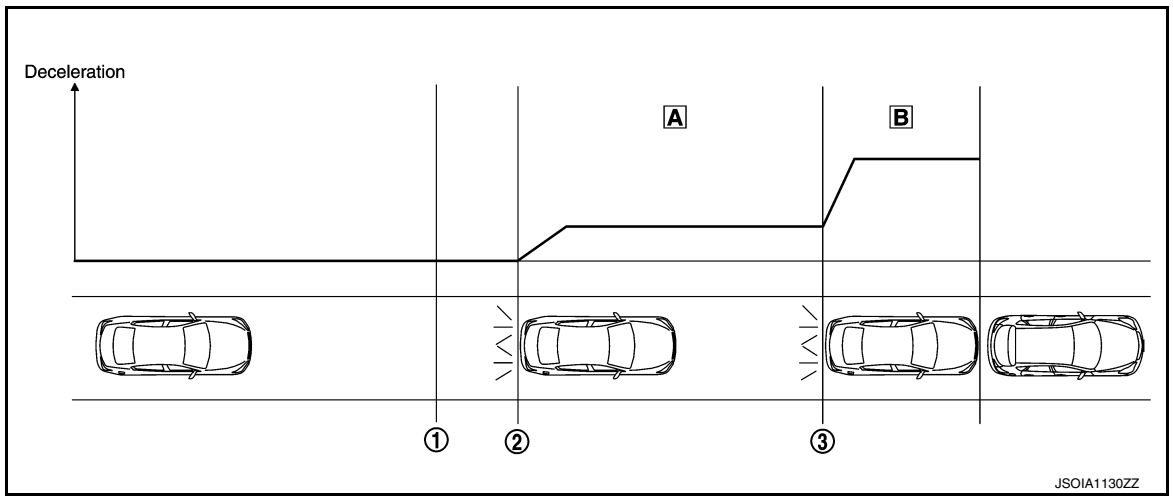
FEB Operating Condition

- FEB setting is ON (FEB warning lamp OFF)
- Vehicle speed: Approximately 5km/h (3 MPH) and above

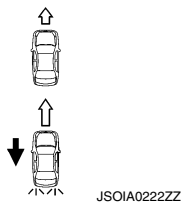
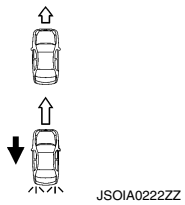


① Start of warning and partial brake
② Start of harder brake
A Partial brake
B Harder brake

Situation		Brake	Warning
No obstacle approached		No operation	—
①	Start of warning and partial brake	Partial brake  JSOIA0222ZZ	• Sounds the buzzer • Blinks vehicle ahead indicator
②	Start of harder brake	Harder brake  JSOIA0222ZZ	• Sounds the buzzer (Higher pitched buzzer) • Indicates FEB warning



① Start of warning ② Start of partial brake ③ Start of harder brake
Ⓐ Partial brake Ⓑ Harder brake

Situation		Brake	Warning
No obstacle approached		No operation	—
①	Start of warning	No operation	• Sounds the buzzer • Blinks vehicle ahead indicator
②	Start of partial brake	Partial brake  JSOIA0222ZZ	• Sounds the buzzer (Higher pitched buzzer) • Indicates FEB warning
③	Start of harder brake	Harder brake  JSOIA0222ZZ	• 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.

Fail-safe (Distance Sensor)

INFOID:0000000012714104

If a malfunction occurs in the distance sensor cancels control, sounds a beep, and turns ON the FEB system warning and warning lamp.

System	Buzzer	Warning lamp/Indicator lamp	Description
Forward Emergency Braking (FEB)	Beep	• FEB system display: Yellow • FEB warning lamp: On	Cancel

WARNING/INDICATOR/CHIME LIST

WARNING/INDICATOR/CHIME LIST : Warning Lamp/Indicator Lamp

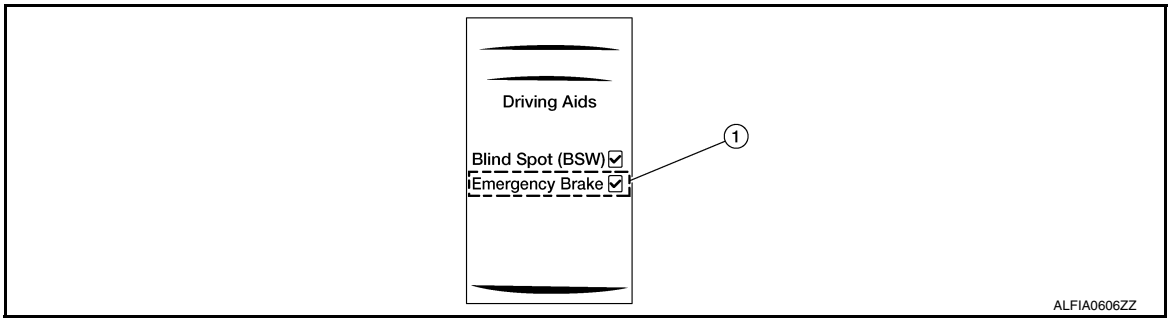
INFOID:0000000012714105

Name	Design	Function
FEB warning lamp	 ALFIA0508ZZ	• For layout, refer to MWI-7, "METER SYSTEM : Design".

OPERATION

Switch Name and Function

INFOID:0000000012714106

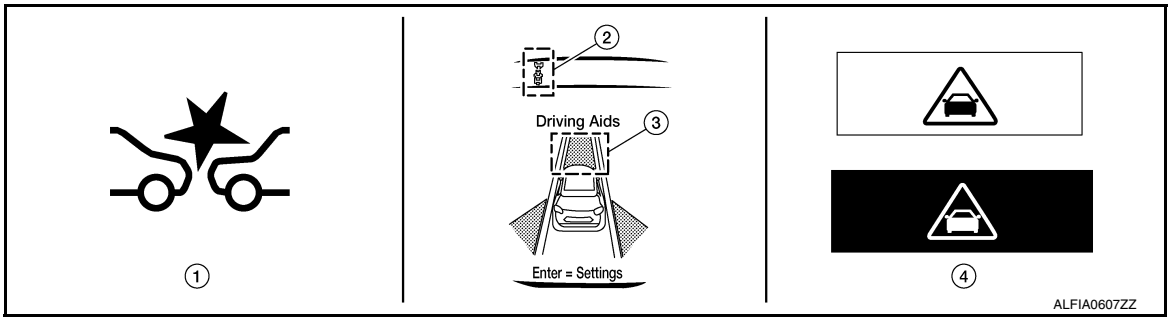


No.	Switch name	Description
①	FEB system setting screen (Information display)	The setting of FEB system can be switched between ON and OFF

Menu Displayed by Pressing Each Switch

INFOID:0000000012714107

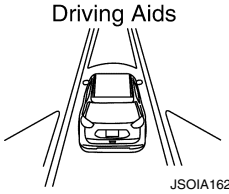
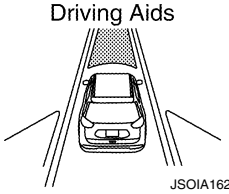
SYSTEM DISPLAY



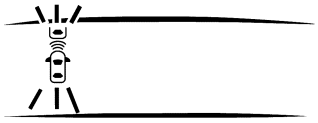
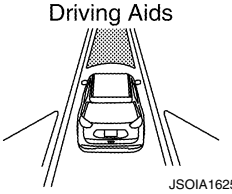
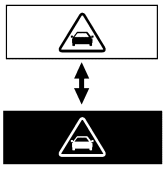
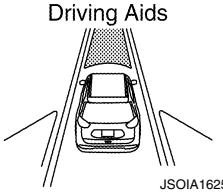
No.	Switch name	Description
①	FEB warning lamp	• FEB warning lamp indicates that an abnormal condition is present in FEB system • When the FEB system turns OFF, the FEB warning lamp will illuminate.
②	FEB system indicator (Warning systems indicator)	• Indicates that FEB system is ON • Blinks when approaching vehicle ahead
③	FEB system indicator “Forward” position	• Indicates that FEB system is ON • Blinks when approaching vehicle ahead
④	FEB warning	Displays immediately before the harder brake operates

DISPLAY AND WARNING

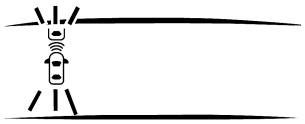
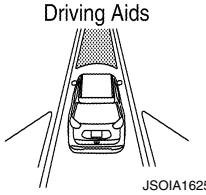
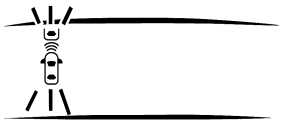
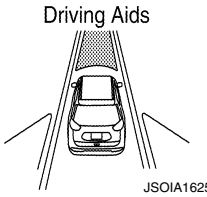
Setting Display

System status	Condition	Display on combination meter	Display on combination meter	FEB warning lamp	Buzzer
		Upper part	Middle part		
FEB OFF	—	—	Driving Aids  JSOIA1624ZZ		—
FEB ON	System ON	White  JSOIA1428ZZ	White Driving Aids  JSOIA1625ZZ	OFF	—

Warning Operation

System status	Action	Display on combination meter	Display on combination meter	FEB warning lamp	Buzzer
		Upper part	Middle part		
There is a possibility of a collision with the vehicle ahead	Partial brake	Yellow (Blink)  JSOIA1290ZZ	Yellow (Blink) Driving Aids  JSOIA1625ZZ		Short continuous beeps
An obstacle ahead is avoided due to the system applying braking.	Harder brake	Red⇔White  JSOIA1477ZZ	Yellow (Blink) Driving Aids  JSOIA1625ZZ		Continuous beeps

Warning Display

System status	Condition	Display on combination meter	Display on combination meter	FEB warning lamp	Master warning lamp	Buzzer
		Upper part	Middle part			
FEB system malfunction	The FEB system is automatically canceled.*	Yellow (Blink)  JSOIA1290ZZ	Yellow Driving Aids  JSOIA1625ZZ	 ALFIA0508ZZ	Yellow 	Beep
Dirt around the distance sensor		Yellow (Blink)  JSOIA1290ZZ	Yellow Driving Aids  JSOIA1625ZZ	 ALFIA0508ZZ	Yellow 	Beep

NOTE:
*: The system operates if the ignition switch is turned OFF⇒ON after the condition improves

HANDLING PRECAUTION

Description

INFOID:0000000012714108

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 radar sensor has some performance limitations. If a stationary vehicle is in the vehicle's path, the forward emergency braking system will not function when the vehicle is driven at speeds over approximately 80 km/h (50 MPH).
- The distance sensor does not detect the following objects:
  - Pedestrians, animals, or obstacles in the roadway
  - Oncoming vehicles
  - Crossing vehicles
- The distance 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.
  - When towing a trailer.
- In some road or traffic conditions, the forward emergency braking system may unexpectedly 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.
- The system is designed to automatically check the sensor's functionality, within certain limitations. The system may not detect some forms of obstruction of the sensor area of the front bumper such as ice, snow, stickers, for example. In these cases, the system may not be able to warn the driver properly. Be sure that check, clean and clear the sensor area of the front bumper regularly.

DIAGNOSIS SYSTEM (DISTANCE SENSOR)

CONSULT Function (LASER/RADAR)

INFOID:0000000012714109

APPLICATION ITEMS

CONSULT performs the following functions via CAN communication with Distance sensor.

Diagnosis mode	Description
Self Diagnostic Result	Displays malfunctioning system memorized in Distance sensor.
Data Monitor	Displays real-time input/output data of Distance sensor.
Active Test	Distance sensor activates outputs to components.
Work support	It can monitor the adjustment direction indication in order to perform the radar alignment operation smoothly.
ECU Identification	Displays Distance sensor part number.
CAN Diag Support Monitor	Monitor the reception status of CAN communication viewed from Distance sensor.

SELF DIAGNOSTIC RESULT

Refer to BRC-212, "DTC Index".

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.

Monitored item [Unit]	Description
VHCL SPEED SE [km/h]	Vehicle speed signal received from ABS actuator and electric unit (control unit) via CAN communication.
YAW RATE [deg/s]	Yaw rate signal received from ABS actuator and electric unit (control unit) via CAN communication.
PWR SUP MONI [V]	Indicates IGN voltage input by Distance sensor.
DISTANCE [m]	Indicates the distance from the vehicle ahead.
RELATIVE SPD [m/s]	Indicates the relative speed of the vehicle ahead.
LASER OFFSET [m]	**NOTE:** The item is indicated, but not used.
LASER HEIGHT [m]	**NOTE:** The item is indicated, but not used.
STEERING ANGLE [deg]	The steering angle is displayed.
STRG ANGLE SPEED [deg/s]	The steering angle speed is displayed.
L/R ADJUST [deg]	Indicates a horizontal correction value of the radar.
U/D ADJUST [deg]	Indicates a vertical correction value of the radar.
FCW SYSTEM ON [On/Off]	**NOTE:** The item is indicated, but not used.
FCW SELECT [On/Off]	**NOTE:** The item is indicated, but not used.
FEB SW [On/Off]	Indicates [On/Off] status of FEB system

Monitored item [Unit]	Description
FEB SELECT [On/Off]	Indicates an ON/OFF state of the FEB system.
BRAKE SW [On/Off]	Indicates [On/Off] status as judged from brake pedal position switch signal (BCM transmits brake pedal position switch signal through CAN communication)
IDLE SW [On/Off]	Indicates [On/Off] status of idle switch read from distance sensor through CAN communication (ECM transmits On/Off status through CAN communication)
THRTL SENSOR [On/Off]	**NOTE:** The item is indicated, but not used.
VEHICLE AHEAD DETECT [On/Off]	Indicates [On/Off] status of vehicle ahead detection indicator output
STATIC OBSTACLE DETECT [On/Off]	Indicates [On/Off] status of static obstacle detection
BUZZER O/P [On/Off]	Indicates [On/Off] status of warning chime output
FUNC ITEM (FCW) [Without FCW/With FCW]	**NOTE:** The item is indicated, but not used.
FUNC ITEM (FEB)	Indicates systems which can be set to ON/OFF by selecting FEB.
PRESS ORDER	Indicates status as judged from brake fluid pressure signal [ABS actuator and electric unit (control unit) transmits brake fluid pressure signal through CAN communication].
Shift position	Indicates shift position read from ADAS control unit through CAN communication (TCM transmits shift position signal through CAN communication).
Turn signal	**NOTE:** The item is indicated, but not used.
ADAS MALF	Indicates [On/Off] status of ADAS malfunction
MILEAGE	Indicates [On/Off] status of ADAS malfunction

WORK SUPPORT

Work support items	Description
MILLIWAVE RADAR ADJUST	Outputs millimeter waves, calculates dislocation of the millimeter waves, and indicates adjustment direction.
FEB DEFAULT SETTING	Changes the FEB system to default settings.
FEB OPERATION MILEAGE	The mileage information for FEB operation is displayed.

ACTIVE TEST

Test item	Description
BRAKE ACTUATOR	Activates the brake by an arbitrary operation
ICC BUZZER	This test is able to check FEB warning chime operation [On/Off] in the combination meter.
METER LAMP	This test is able to check FEB warning indicator operation [On/Off] in the combination meter information display.

ECU DIAGNOSIS INFORMATION

DISTANCE SENSOR

Reference Value

INFOID:0000000012714110

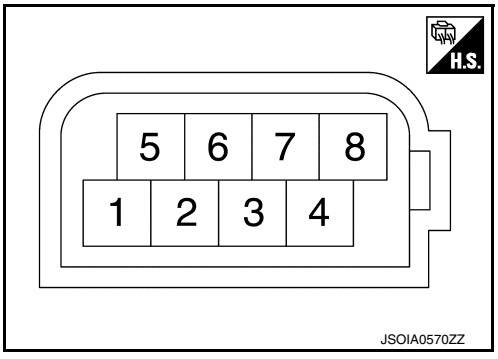
VALUES ON THE DIAGNOSIS TOOL

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
VHCL SPEED SE	While driving		Value of vehicle speed signal (wheel speed)
YAW RATE	While driving	Vehicle stopped	0.0
		Vehicle turning right	Positive value
		Vehicle turning left	Negative value
PWR SUP MONI	Ignition switch ON		Power supply voltage value of distance sensor
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
LASER OFFSET	**NOTE:** The item is indicated, but not used		—
LASER HEIGHT	**NOTE:** The item is indicated, but not used		—
STEERING ANGLE	Ignition switch ON	When setting the steering wheel in straight-ahead position	0.0
		When turning the steering wheel 90° rightward	+90
		When turning the steering wheel 90° leftward	-90
STRG ANGLE SPEED	Ignition switch ON	At the time of turning the steering wheel	Steering wheel turning speed is displayed
L/R ADJUST	Ignition switch ON	At the completion of radar alignment adjustment	Horizontal correction value is displayed
U/D ADJUST	Ignition switch ON	At the completion of radar alignment adjustment	Vertical correction value is displayed
FCW SYSTEM ON	Engine running	When the FEB system is ON	On
		When the FEB system is OFF	Off
FCW SELECT	Ignition switch ON	FEB system set with the information display is ON	On
		FEB system set with the information display is OFF	Off
FEB SW	Engine running	FEB system ON	On
		FEB system OFF	Off
FEB SELECT	Ignition switch ON	FEB system set with the information display is ON	On
		FEB system set with the information display is OFF	Off

Monitor item	Condition		Value/Status
BRAKE SW	Ignition switch ON	When brake pedal is depressed	On
		When brake pedal is not depressed	Off
STOP LAMP SW	Ignition switch ON	When brake pedal is depressed	On
		When brake pedal is not depressed	Off
IDLE SW	Engine running	Idling	On
		Except idling (depress accelerator pedal)	Off
THRTL SENSOR	**NOTE:** The item is indicated, but not used		Off
VEHICLE AHEAD DETECT	Drive the vehicle	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
STATIC OBSTACLE DETECT	Drive the vehicle	When a vehicle static obstacle is detected	On
		When a vehicle static obstacle is not detected	Off
BUZZER O/P	Engine running	When the buzzer of the FEB system operates	On
		When the buzzer of the FEB system not operates	Off
FUNC ITEM (FCW)	Engine running	FEB system set with the integral switch ON	On
		FEB system set with the integral switch OFF	Off
FUNC ITEM (FEB)	Engine running	FEB system set with the integral switch ON	On
		FEB system set with the integral switch OFF	Off
PRESS ORDER	When brake pedal is depressed		Approx. 0 bar
	When brake pedal is not depressed		0 – 255 bar
Shift position	• Engine running • While driving		Displays the shift position
Turn signal	**NOTE:** The item is indicated, but not used		Off
ADAS MALF	Engine running	ADAS is malfunctioning	On
		ADAS is not malfunctioning	Off
MILEAGE	• Engine running • While driving	When the FEB system is activated	Displays the speed at which the FEB system is activated

TERMINAL LAYOUT



PHYSICAL VALUES

Terminal No. (Wire color)		Description		Condition	Standard value	Reference value
+	–	Signal name	Input/ Output			
1 (P)	Ground	Ignition power supply	Input	Ignition switch ON	10 - 16 V	Battery voltage
—	—	—	—	—	—	—
3 (W)	—	CAN communication-L	—	—	—	—
4 (L)	—	CAN communication-H	—	—	—	—
—	—	—	—	—	—	—
6 (R)	—	ITS CAN communication-L	—	—	—	—
7 (L)	—	ITS CAN communication-H	—	—	—	—
8 (B)	Ground	Ground	—	Ignition switch ON	0 - 0.1 V	Approx. 0 V

Fail-safe (Distance Sensor)

INFOID:0000000012714111

If a malfunction occurs in the distance sensor cancels control, sounds a beep, and turns ON the FEB system warning and warning lamp.

System	Buzzer	Warning lamp/Indicator lamp	Description
Forward Emergency Braking (FEB)	Beep	• FEB system display: Yellow • FEB warning lamp: On	Cancel

DTC Inspection Priority Chart

INFOID:0000000012714112

If multiple DTCs are detected simultaneously, check them one by one depending on the following DTC inspection priority chart.

Priority	Detected items (DTC)
1	• U1000: CAN COMM CIRCUIT • U1010: CONTROL UNIT (CAN)
2	• C10B7: YAW RATE SENSOR • C1A01: POWER SUPPLY CIR • C1A02: POWER SUPPLY CIR 2 • C1A03: VHCL SPEED SE CIRC • C1A04: ABS/TCS/VDC CIRC • C1A05: BRAKE SW/STOP L SW • C1A07: CVT CIRCUIT • C1A12: LASER BEAM OFF CNTR • C1A14: ECM CIRCUIT • C1A15: GEAR POSITION • C1A16: RADAR STAIN • C1A17: ICC SENSOR MALF • C1A18: LASER AIMING INCMP • C1A21: UNIT HIGH TEMP • C1A24: NP RANGE • C1A26: ECD MODE MALF • C1A39: STRG SEN CIR • C1B5D: FEB OPE COUNT LIMIT • U0121: VDC CAN CIR 2 • U0126: STRG SEN CAN CIR 1 • U0401: ECM CAN CIR 1 • U0415: VDC CAN CIR 1 • U0428: STRG SEN CAN CIR 2 • U1527: CCM CAN CIR 1 • U153F: CCM CAN CIR 2

DTC Index

INFOID:0000000012714113

DTC CONSULT	CONSULT display	Reference
C10B7	YAW RATE SENSOR	BRC-227, "DTC Logic"
C1A01	POWER SUPPLY CIR	BRC-228, "DTC Logic"
C1A02	POWER SUPPLY CIR 2	BRC-229, "DTC Logic"
C1A03	VHCL SPEED SE CIRC	BRC-229, "DTC Logic"
C1A04	ABS/TCS/VDC CIRC	BRC-231, "DTC Logic"
C1A05	BRAKE SW/STOP L SW	BRC-232, "DTC Logic"
C1A07	CVT CIRCUIT	BRC-234, "DTC Logic"
C1A12	LASER BEAM OFF CNTR	BRC-235, "DTC Logic"
C1A14	ECM CIRCUIT	BRC-236, "DTC Logic"
C1A15	GEAR POSITION	BRC-237, "DTC Logic"
C1A16	RADAR STAIN	BRC-239, "DTC Logic"
C1A17	ICC SENSOR MALF	BRC-241, "DTC Logic"
C1A18	LASER AIMING INCMP	BRC-242, "DTC Logic"
C1A21	UNIT HIGH TEMP	BRC-243, "DTC Logic"
C1A24	NP RANGE	BRC-244, "DTC Logic"
C1A26	ECD MODE MALF	BRC-246, "DTC Logic"
C1A39	STRG SEN CIR	BRC-247, "DTC Logic"
C1A50	ADAS MALFUNCTION	BRC-248, "DTC Logic"
C1A0C	ADAS CIRCUIT CIR1	BRC-250, "DTC Logic"
C1B5D	FEB OPE COUNT LIMIT	BRC-250, "DTC Logic"

DTC CONSULT	CONSULT display	Reference
U0121	VDC CAN CIR 2	BRC-251, "DTC Logic"
U0126	STRG SEN CAN CIR 1	BRC-252, "DTC Logic"
U0401	ECM CAN CIR 1	BRC-253, "DTC Logic"
U0415	VDC CAN CIR 1	BRC-254, "DTC Logic"
U0428	STRG SEN CAN CIR 2	BRC-255, "DTC Logic"
U1000	CAN COMM CIRCUIT	BRC-256, "DTC Logic"
U1010	CONTROL UNIT (CAN)	BRC-257, "DTC Logic"
U1527	CCM CAN CIR 1	BRC-258, "DTC Logic"
U153F	CCM CAN CIR 2	BRC-259, "DTC Logic"

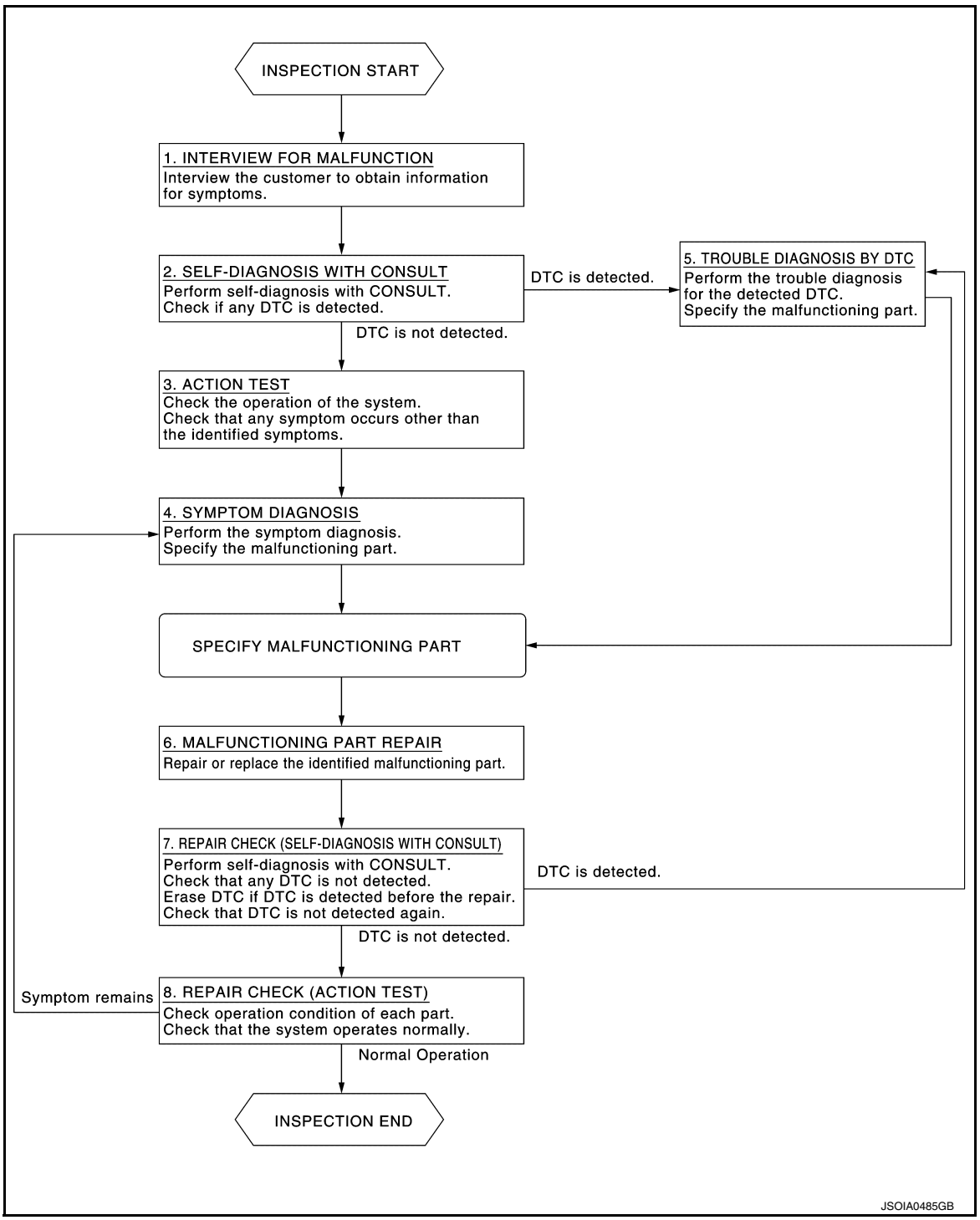
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORK FLOW

Work Flow

INFOID:0000000012714115

OVERALL SEQUENCE



DETAILED FLOW

1. INTERVIEW FOR MALFUNCTION

It is also important to clarify the customer concerns before starting the inspection. Interview the customer about the concerns carefully and understand the symptoms fully.

NOTE:
The customers are not professionals. Never assume that “maybe the customer means···” or “maybe the customer mentioned this symptom”.

>> GO TO 2.

2.SELF-DIAGNOSIS WITH CONSULT

1. Perform “All DTC Reading” with CONSULT.
2. Check if the DTC is detected on the “Self-Diagnostic Results” of “LASER/RADAR”

Is any DTC detected?

YES >> GO TO 5.
NO >> GO TO 3.

3.ACTION TEST

Perform the FEB system action test to check the system operation. Check if any other malfunctions occur.

>> GO TO 4.

4.SYMPTOM DIAGNOSIS

Perform the applicable diagnosis according to the diagnosis chart by symptom. Refer to BRC-261, "Symptom Table".

>> GO TO 6.

5.TROUBLE DIAGNOSIS BY DTC

1. Check the DTC in the “Self-Diagnostic Results”.
2. Perform trouble diagnosis for the detected DTC. Refer to BRC-212, "DTC Index".

>> GO TO 6.

6.MALFUNCTIONING PART REPAIR

Repair or replace the identified malfunctioning parts.

>> GO TO 7.

7.REPAIR CHECK (SELF-DIAGNOSIS WITH CONSULT)

1. Erases self-diagnosis results.
2. Perform “All DTC Reading” again after repairing or replacing the specific items.
3. Check if any DTC is detected in self-diagnosis results of “LASER/RADAR”.

Is any DTC detected?

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

8.REPAIR CHECK (ACTION TEST)

Perform the following system action test. Check that the malfunction symptom is solved or no other symptoms occur.

Is there a malfunction symptom?

YES >> GO TO 4.
NO >> Inspection End.

ADDITIONAL SERVICE WHEN REPLACING DISTANCE SENSOR

Description

INFOID:0000000012714116

Always perform the following after removing and installing or replacing the distance sensor:
1. Distance sensor initial vertical alignment
2. Distance sensor alignment

Refer to BRC-216, "Work Procedure".

CAUTION:

The system does not operate normally unless the distance sensor is aligned properly.

Work Procedure

INFOID:0000000012714117

1. DISTANCE SENSOR INITIAL VERTICAL ALIGNMENT

Perform the distance sensor initial vertical alignment. Refer to BRC-217, "Description".

>> GO TO 2.

2. DISTANCE SENSOR ALIGNMENT

Perform the distance sensor alignment. Refer to BRC-217, "Description".

>> Work End.

DISTANCE SENSOR INITIAL VERTICAL ALIGNMENT

Description

INFOID:0000000012797896

WARNING:
Radio waves could adversely affect electric medical equipment. Those who use a pacemaker should contact the electric medical equipment manufacturer for the possible influences before use.

OUTLINE OF DISTANCE SENSOR INITIAL ALIGNMENT PROCEDURE

- Always perform the Distance sensor initial vertical alignment after removing and installing or replacing the Distance sensor.

CAUTION:
The system does not operate normally unless the Distance sensor is aligned properly.

1. Required tools, refer to BRC-217, "Required Tools".
2. Preparation, refer to BRC-217, "Preparation".
3. Distance sensor initial vertical alignment, refer to BRC-218, "Distance Sensor Initial Vertical Alignment".

CAUTIONARY POINT FOR DISTANCE SENSOR ALIGNMENT PROCEDURE

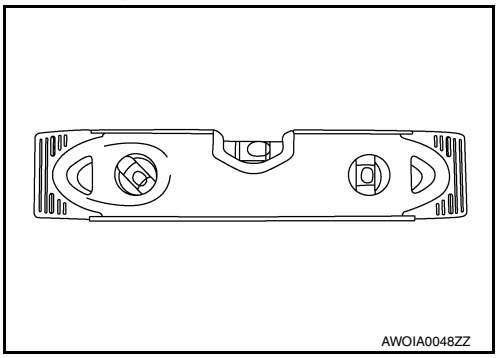
CAUTION:
- **For Distance sensor alignment procedure, choose a level location with a few feet of working space in front and surrounding the vehicle.**
- **Vehicle must be stationary and unoccupied during the whole alignment procedure.**
- **Never enter the vehicle during distance sensor alignment.**
- **For proper system operation and adjustment, all vehicle wheels must be the original factory size.**

The Distance sensor requires alignment whenever the Distance sensor is removed and reinstalled and whenever front end structural repairs are performed. Distance sensor alignment consists of performing the mechanical vertical alignment (Distance sensor initial vertical alignment) described in the following procedure, followed by the electronic horizontal alignment (Distance sensor alignment) that is performed using CONSULT and the appropriate special service tools.

Required Tools

INFOID:0000000012797897

The following tool is necessary to perform the Distance sensor initial vertical alignment:
- Carpenters level.



Preparation

INFOID:0000000012797898

1. PREPARATION FOR DISTANCE SENSOR INITIAL VERTICAL ALIGNMENT PROCEDURE

1. Verify correct vehicle suspension height. Refer to FSU-28, "Wheelarch Height (Unladen*)".
2. Repair or replace any damaged body components.
3. Verify proper tire inflation pressures. Refer to WT-82, "Tire Air Pressure".
4. Remove any accumulations of mud, snow or ice from the vehicle underbody.
5. Verify that there is no load in the vehicle (cargo or passenger).
6. Place the vehicle on a known level horizontal surface such as a wheel or frame alignment rack to achieve satisfactory sensor vertical alignment results.
7. Remove front fascia. Refer to EXT-17, "Removal and Installation".

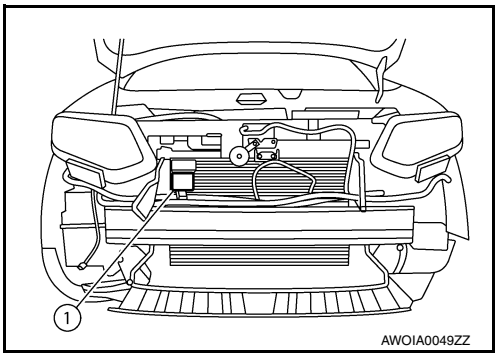
>> Refer to BRC-218, "Distance Sensor Initial Vertical Alignment".

Distance Sensor Initial Vertical Alignment

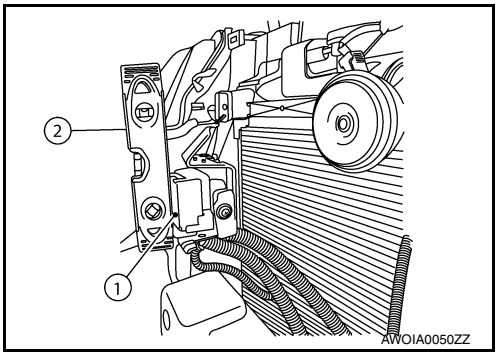
INFOID:0000000012797899

NOTE:
The Distance sensor initial vertical alignment procedure must be performed anytime the Distance sensor is removed and reinstalled.

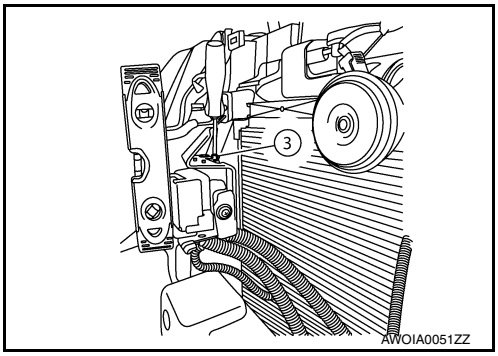
1. The Distance sensor (1) is located near the right front head lamp behind the front bumper fascia.



2. Place the carpenters level (2) against the face of the Distance sensor (1).



3. Turn the Distance sensor adjustment screw (3) to level the sensor.



4. Ensure the Distance sensor electrical connector located on the bottom of the sensor is connected.
5. Reinstall the front bumper fascia.
6. Perform the Distance sensor alignment procedure. Refer to BRC-219, "Description".

DISTANCE SENSOR ALIGNMENT

Description

INFOID:0000000012797900

WARNING:
Radio waves could adversely affect electric medical equipment. Those who use a pacemaker should contact the electric medical equipment manufacturer for the possible influences before use.

OUTLINE OF RADAR ALIGNMENT PROCEDURE

- A 4-wheel vehicle alignment must be performed before proceeding with radar alignment procedure.
- Always perform the radar alignment after removing and installing or replacing the Distance sensor.
- If the Distance sensor was removed and installed or replaced, first perform Distance Sensor Initial Vertical Alignment, refer to BRC-217, "Description".

CAUTION:
The system does not operate normally unless the Distance sensor is aligned properly.

1. Required tools, refer to BRC-219, "Required Tools".
2. Preparation, refer to BRC-220, "Preparation".
3. Vehicle set up, refer to BRC-221, "Vehicle Set Up".
4. Setting the Distance sensor target board, refer to BRC-223, "Setting The Distance Sensor Target Board".
5. Distance sensor adjustment, refer to BRC-224, "Distance Sensor Adjustment".

CAUTIONARY POINT FOR RADAR ALIGNMENT PROCEDURE

CAUTION:

- **For radar alignment procedure, choose a level location with a few feet of working space in front and surrounding the vehicle.**
- **Vehicle must be stationary and unoccupied during the whole alignment procedure.**
- **Any slight vibration during the alignment procedure can cause the test to fail. If this happens, you will have to restart the alignment process.**
- **The ignition switch must be in the ON position.**
- **The battery voltage must not fall below 12 volts during the whole alignment procedure. Failure to maintain adequate battery voltage will cause the test to fail. If this happens, you will have to restart the alignment process.**
- **The Distance sensor target board must be set in front of the vehicle facing the sensor.**
- **Adjust the radar alignment with CONSULT. (The radar alignment procedure cannot be adjusted without CONSULT.)**
- **Never enter the vehicle during radar alignment.**
- **Never block the area between the radar and the Distance sensor target board at any time during the alignment process.**
- **Never break the laser beam between the laser assembly and front Distance sensor target board or rear reflector at any time during alignment.**
- **Accurate steering wheel setting is crucial. Once set, do not disturb the steering wheel for the remainder of the alignment procedure.**
- **To avoid physical damage, the Distance sensor adjustment screw must not be forced to either clockwise or counter-clockwise limit. For proper adjustment procedure, follow the directions of the CONSULT exactly as instructed.**
- **For proper system operation and adjustment, all vehicle wheels must be of the same size.**

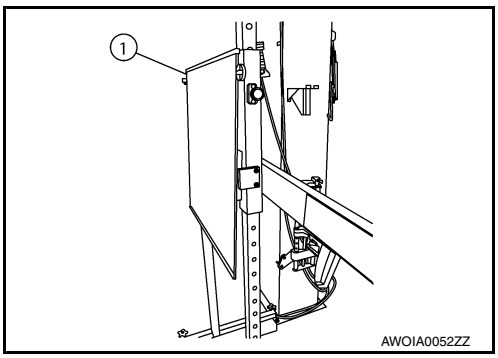
Required Tools

INFOID:0000000012797901

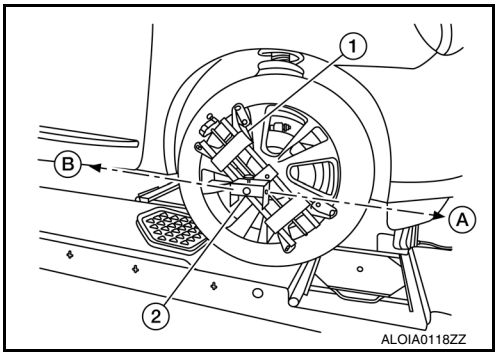
- Distance sensor alignment kit 1-20-2851-1 in addition to one of the following:
  a) Hunter self-centering wheel adapter (Hunter wheel alignment tool)
  b) Special Service Tool kit 1-20-2722-1 (kit SCA W/Tire Clamp-ICC Aiming)

The following Distance sensor alignment kit (1-20-2851-1) is necessary to perform the Distance sensor alignment:

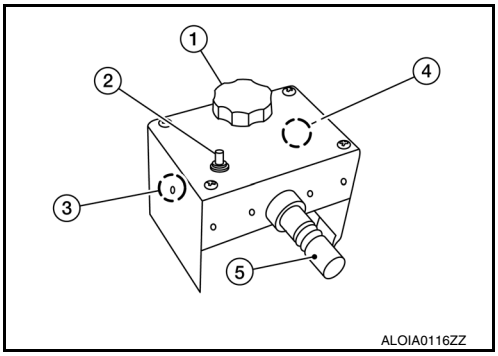
- Distance sensor target board (1).



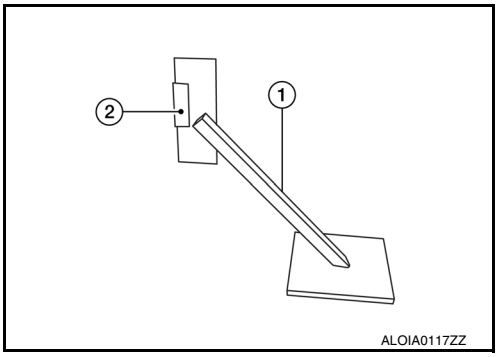
- Hunter self-centering wheel adapter (1) [shown with laser assembly (2) installed] (Hunter alignment rack head may be substituted).
  NOTE:
  Dealers that are not equipped with a Hunter self-centering wheel adapter will require the following kit:
  Part No. 1-20-2722-1-IF (kit SCA W/Tire Clamp-Distance Sensor Aiming)



- Laser assembly (with bi-directional laser beam) as shown in the illustration.
- Tightening knob (1)
- Power ON/OFF button (2)
- Front laser beam opening (3)
- Rear laser beam opening (4)
- Attaching shaft (5)



- Stationary target as shown in the illustration.
- Stationary target (1)
- Laser signal reception plate (2)



- Distance chain (not shown).

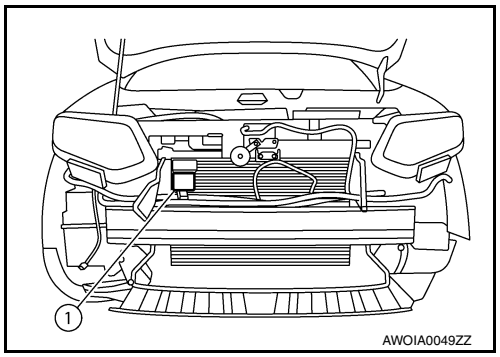
Preparation

INFOID:0000000012797902

1.ADVANCE PREPARATION FOR RADAR ALIGNMENT PROCEDURE

1. Adjust all tire pressures to the specified value.
2. Empty the vehicle. (Remove any luggage from the passenger compartment, luggage room, etc.)
3. Shift the selector lever to “P” position, and release the parking brake.
4. Fully fill the fuel tank, and then check that the coolant and oils are filled up to correct level.
5. Clean off the right front side of the fascia in front of the Distance sensor.

NOTE:
The Distance sensor is located behind the fascia and it is not exposed to the elements. Therefore it should not require any cleaning.



1 : Distance sensor

>> Refer to BRC-221, "Vehicle Set Up".

Vehicle Set Up

INFOID:0000000012797903

DESCRIPTION

Accurate adjustment of the radar alignment requires that the Distance sensor target board, wheel adapter, laser assembly, and stationary target be properly positioned.

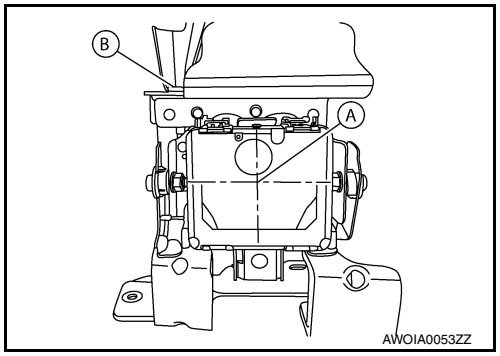
CAUTION:

If the radar alignment is adjusted with the Distance sensor target board, wheel adapter, laser assembly, or stationary target in the incorrect position, the Distance system will not function properly or the alignment procedure may not be completed successfully.

1.PREPOSITION TARGET BOARD

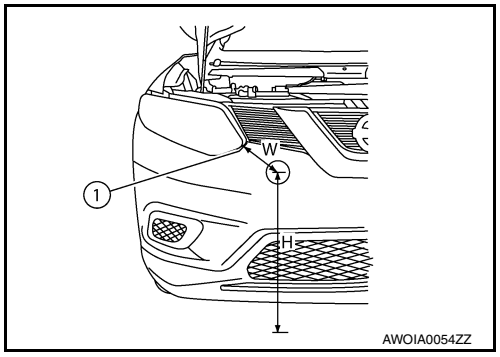
NOTE:

- The center of the distance sensor (A).



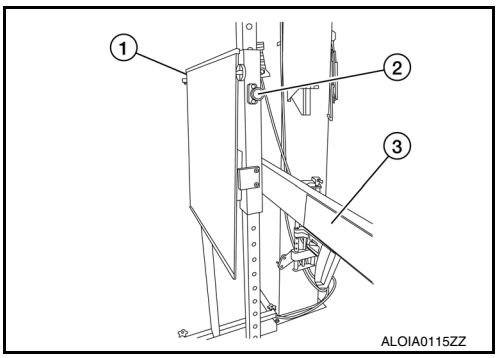
B : Up-down direction adjusting screw

- To locate the center of the distance sensor (A) easily, on a flat level surface measure 27 in (685 mm) (H) up from the floor, and 7 in (178 mm) (W) to the right from the point of the right front head lamp (1) when viewed from the front of the vehicle.

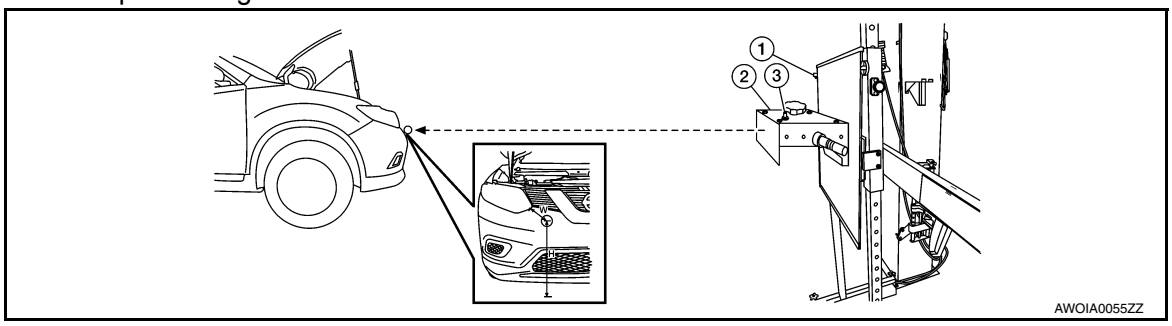


- Initial distance sensor target board setting must be in the center position.

1. Position the distance sensor target board in front facing the right front side of the vehicle:
- Using the full length of the supplied chain for distance, place the marked center of the distance sensor target board (1) 1375 mm (54.1 in.) ± 625 mm(24.6 in) facing the distance sensor.
- Adjust the height of the distance sensor target board using the adjustable nut (2) to achieve the proper height. The up/down tolerance is ± 80 mm (3.15 in).
- Adjust the distance sensor target board lateral position aligning the marked center of the board horizontally with the center of the distance sensor front. The right/left tolerance is ± 80 mm (3.15 in).



2. Extend the machined arm of the distance sensor target board exposing the reflective surface (3) to the right front side of the vehicle.
3. Place one side of the laser assembly (2) flush against the center of the distance sensor target board (1) to assist in the positioning.



4. Turn the laser assembly ON (3) allowing the laser beam to emit through the opening of the laser assembly toward the center of the distance sensor.
5. Move the distance sensor target board (1) as necessary so that center of distance sensor target board aligns with center of distance sensor.
6. Turn the laser assembly OFF when done.

Are you using Hunter alignment equipment?

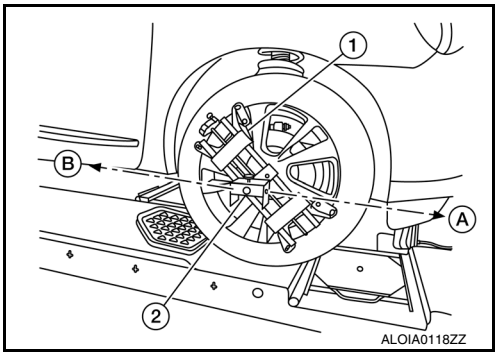
YES >> Refer to Hunter's equipment instructions for complete vehicle set up and distance sensor target board setting. Then, refer to BRC-224, "Distance Sensor Adjustment".

NO >> GO TO 2.

2. INSTALLING LASER ASSEMBLY

NOTE:
- Insure the steering wheel is positioned in the center straight forward position.
- Insure all 4 vehicle wheels do not contain any physical damage.

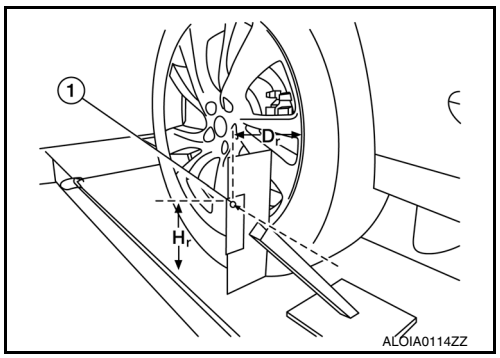
1. Install the wheel adapter (1) on the right front wheel.
2. Mount the laser assembly (2) to the wheel adapter (1) as shown in the figure.
   NOTE:
   When the power switch is turned ON, the front laser signal (A) will be emitted toward the front distance sensor target board, and the rear laser signal (B) will be emitted toward the rear of the vehicle.



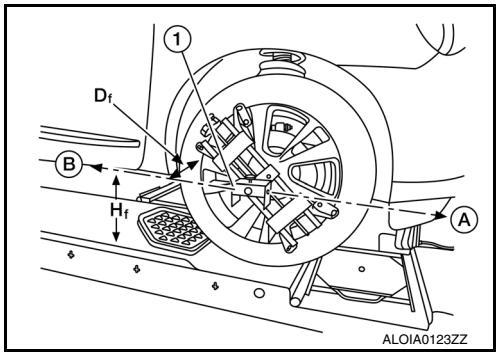
>> GO TO 3.

3. SETTING UP STATIONARY TARGET

1. Place the stationary target next to the right rear tire as shown in the figure.
2. Turn the laser assembly ON allowing the laser beam to be emitted through the front and rear laser assembly openings.
3. Measure and record the distance (D_r) between the edge of the right rear wheel and the laser beam (1) on the stationary target (horizontal line).
4. Measure and record the height (H_r) between the laser beam (1) on the stationary target and ground level (vertical line).



5. Measure and record the distance (D_f) between the edge of the right front wheel and the laser beam signal/opening (1) on the laser assembly (horizontal line).
6. Measure and record the height (H_f) between the laser beam signal/opening (1) on the laser assembly and ground level (vertical line).
   NOTE:
   - Horizontal adjustment [front distance (D_f) and rear distance (D_r)] is accomplished by slowly turning the steering wheel until the 2 distances are the same.
   - Vertical adjustment [front height (H_f) and rear height (H_r)] is accomplished by rotating the laser assembly around its axis until the two heights are the same.
   - Directional arrows (A) and (B) are shown to illustrate the direction of the laser assembly beams.
7. Adjust laser beam as necessary until the two distances match and the two heights match.
   NOTE:
   You will have to verify both horizontal and vertical adjustments anytime one adjustment is made.



>> Refer to BRC-223, "Setting The Distance Sensor Target Board".

Setting The Distance Sensor Target Board

INFOID:0000000012797904

DESCRIPTION

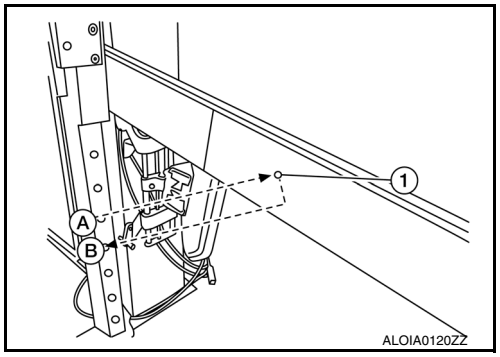
Accurate adjustment of the radar alignment requires that the distance sensor target board be accurately positioned.

CAUTION:

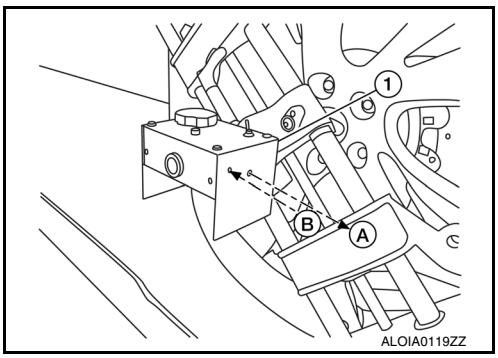
If the radar alignment is adjusted with the distance sensor target board in the incorrect position, the distance system will not function properly or the alignment procedure may not be completed successfully.

1. DISTANCE SENSOR TARGET BOARD FINAL SETTING

1. With the distance sensor target board arm extended, the laser beam (1) emitted by the laser assembly (A) will be reflected back (B) toward the laser assembly.
   NOTE:
   When adjusted properly, reflected laser beam (B) must align with emitted laser beam (A) and the two laser beams will be seen as one.
2. Rotate the distance sensor target board to achieve the necessary horizontal adjustment.
3. Adjust the distance sensor target board leveling screws to achieve the necessary vertical adjustment.



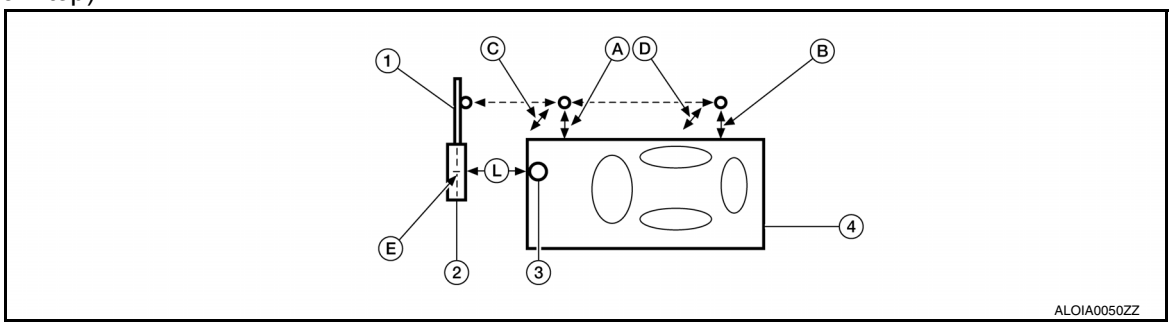
4. The figure shown illustrates the laser beam (A) emitted by the laser assembly (1) and its reflection (B) off of the distance sensor target board arm.



>> GO TO 2.

2.CHECK THE POSITION OF THE DISTANCE SENSOR TARGET BOARD

Do not place anything other than the distance sensor target board in the space shown in front of the vehicle (view from top).



1.	Distance sensor target board arm	2.	Distance sensor target board	3.	Distance sensor
4.	Vehicle	A.	Distance between front wheel and laser beam (D_f)	B.	Distance between rear wheel and laser beam (D_r)
C.	Height between front laser beam and ground (H_f)	D.	Height between rear laser beam and ground (H_r)	E.	Distance sensor target board center position (Position 2)
L.	1 - 1.5 m (39.3 - 59 in.)				

>> Refer to BRC-224, "Distance Sensor Adjustment".

Distance Sensor Adjustment

INFOID:0000000012797905

DESCRIPTION

The radar alignment is performed automatically with CONSULT.

CAUTION:

Perform all necessary work for radar alignment until the adjustment completes as shown in the procedure. If the procedure does not complete, the FCW system is inoperable.

1.PERFORM RADAR ALIGNMENT

1. Start the engine.
2. Connect CONSULT and select “Work support” of “LASER/RADAR”.
3. Select “MILLIWAVE RADAR ADJUST” after the “Work support” screen is displayed.
   NOTE:
   Confirm the following items;
   - The target should be accurately placed.
   - The vehicle should be stopped.
4. Select “Start” after the “MILLIWAVE RADAR ADJUST” screen is displayed.
   CAUTION:
   Never select “Start” when the target is not accurately placed.
5. Select “Start” after the preparation information is displayed.
6. Select “Next” after the “Starting alignment.” screen is displayed.

NOTE:
If the radar is in alignment at this time, “Alignment in progress” is displayed. It may take several 10s of seconds until the result is displayed.

7. Confirm the displayed item.

- “Alignment completed.”: Go to 8.
- Except “Alignment completed.”: Perform the following services.

Displayed item	Possible cause	Service procedure
Alignment condition is not ready.	• DTC is detected (Except C1A12). • The position of the Distance sensor target board is not correct. • Vehicle is moving.	Check the vehicle condition and perform radar alignment again.
Alignment condition is not ready. (Stop the vehicle.)	Vehicle is moving.	Stop the vehicle and perform radar alignment again.
Target is not detected.	• A target is not-yet-placed. (The Distance sensor cannot detect target) • The position of the Distance sensor target board is not correct. • The position of the Distance sensor is not correct.	Check the target board condition and perform radar alignment again.
Sensor malfunction.	Distance sensor malfunction.	Check the vehicle condition and perform radar alignment again.

NOTE:
Replace Distance sensor if “Sensor malfunction.” is repeatedly indicated.

8. Confirm displayed value.

Displayed item	Monitor item	Reference value
Alignment completed.	FACTORY AIM L/R	Less than 3.00 deg
	FACTORY AIM U/D	Less than 3.00 deg
	AIMING VALUE L/R	Less than 3.00 deg
	AIMING VALUE U/D	Less than 3.00 deg

- Within reference value: Go to 9.
- Outside of reference value: Check the target board condition and perform radar alignment again.

NOTE:
- Check the condition of the Distance sensor installation.
- Check the vehicle for damage.
- Replace Distance sensor if it is outside the reference value, even when Distance sensor installation is installed normally and the vehicle is not damaged.

9. Select “OK” after the “No error detected.” is displayed.
10. Select “OK” after the “End of alignment.” is displayed.

CAUTION:
Once “MILLIWAVE RADAR ADJUST” is started with CONSULT, always continue the work until the horizontal radar alignment is completed successfully. If the job is stopped midway, the radar alignment is not adjusted and the FCW system cannot operate.

>> RADAR ALIGNMENT END

ACTION TEST

Description

INFOID:0000000012714133

- Perform action test to verify the customer's concern.
- Perform action test and check the system operation after system diagnosis. Refer to BRC-226, "Inspection Procedure".

Inspection Procedure

INFOID:0000000012714134

1.CHECK FEB SYSTEM SETTING

1. Start the engine.
2. Check that the FEB system setting can be enabled/disabled on the vehicle information display.
3. Turn OFF the ignition switch and wait for 30 seconds or more.
4. Check that the previous setting is saved when the engine starts again.

>> GO TO 2.

2.CHECK FEB SYSTEM

1. Enable the setting of the FEB system on the vehicle information display.
2. Check FEB warning lamp is OFF.

>> Inspection End.

DTC/CIRCUIT DIAGNOSIS

C10B7 YAW RATE SENSOR

DTC Logic

INFOID:0000000012788324

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
C10B7	YAW RATE SENSOR (Yaw rate sensor)	Yaw rate/side/decel G sensor calibration incorrect.

POSSIBLE CAUSE

- Calibration of yaw rate/side/decel G sensor not performed.
- Interruption in yaw rate/side/decel G sensor calibration.

FAIL-SAFE

FEB system is canceled.

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

1. Start the engine.
2. Turn the FEB system ON.
3. Perform “All DTC Reading” with CONSULT.
4. Check if the “C10B7” is detected as the current malfunction in “Self Diagnostic Result” mode of “LASER/RADAR”.

Is “C10B7” detected as the current malfunction?

YES >> Refer to BRC-227, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012788325

1. PERFORM YAW RATE/SIDE/DECEL G SENSOR CALIBRATION

1. Perform calibration of yaw rate/side/decel G sensor. Refer to BRC-74, "Work Procedure".
2. Erase DTCs using CONSULT.
3. Perform “Self Diagnostic Result” mode of “LASER/RADAR” using CONSULT.

Are any DTCs detected?

YES >> Replace the distance sensor. Refer to DAS-122, "Removal and Installation".
NO >> Inspection End.

C1A01 POWER SUPPLY CIRCUIT 1, C1A02 POWER SUPPLY CIRCUIT 2

DTC Logic

INFOID:0000000012788326

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
C1A01	POWER SUPPLY CIR (Power supply circuit)	The battery voltage sent to distance sensor remains less than 7.9 V for 5 seconds
C1A02	POWER SUPPLY CIR 2 (Power supply circuit 2)	The battery voltage sent to distance sensor remains more than 19.3 V for 5 seconds

POSSIBLE CAUSE

- Connector, harness, fuse
- Distance sensor

FAIL-SAFE

FEB system is canceled.

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Start the engine.
2. Turn the FEB system ON.
3. Perform “All DTC Reading” with CONSULT.
4. Check if the “C1A01” or “C1A02” is detected as the current malfunction in “Self Diagnostic Result” mode of “RADAR”.

Is “C1A01” or “C1A02” detected as the current malfunction?

YES >> Refer to BRC-228, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012788327

1.CHECK DISTANCE SENSOR POWER SUPPLY AND GROUND CIRCUIT

Check power supply and ground circuit of distance sensor. Refer to BRC-260, "Diagnosis Procedure".

Is the inspection result normal?

YES >> Replace the distance sensor. Refer to BRC-264, "Removal and Installation".
NO >> Repair or replace the malfunctioning parts.

C1A03 VEHICLE SPEED SENSOR

DTC Logic

INFOID:0000000012788328

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
C1A03	VHCL SPEED SE CIRC (Vehicle speed sensor circuit)	If the vehicle speed signal (wheel speed) from ABS actuator and electric unit (control unit) and the CVT vehicle speed sensor signal (output shaft revolution signal) from TCM, received by the distance sensor via CAN communication, are inconsistent

POSSIBLE CAUSE

- Wheel speed sensor
- ABS actuator and electric unit (control unit)
- Vehicle speed sensor CVT (output speed sensor)
- TCM
- Distance sensor

FAIL-SAFE

FEB system is canceled.

DTC CONFIRMATION PROCEDURE

1.CHECK DTC PRIORITY

If DTC “C1A03” is displayed with DTC “U1000” or “C1A04”, first diagnose the DTC “U1000” or “C1A04”.

Is applicable DTC detected?

YES >> Perform diagnosis of applicable.
- U1000: Refer to BRC-256, "DTC Logic"
- C1A04: Refer to BRC-231, "DTC Logic"

NO >> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start the engine.
2. Turn the FEB system ON.
3. Drive the vehicle at 30 km/h (19 MPH) or more.
   CAUTION:
   Always drive safely.
4. Stop the vehicle.
5. Perform “All DTC Reading” with CONSULT.
6. Check if the “C1A03” is detected as the current malfunction in “Self Diagnostic Result” mode of “LASER/RADAR”.

Is “C1A03” detected as the current malfunction?

YES >> Refer to BRC-229, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012788329

1.CHECK DTC PRIORITY

If DTC “C1A03” is displayed with DTC “U1000” or “C1A04”, first diagnose the DTC “U1000” or “C1A04”.

Is applicable DTC detected?

YES >> Perform diagnosis of applicable.
- U1000: Refer to BRC-256, "DTC Logic"
- C1A04: Refer to BRC-231, "DTC Logic"

NO >> GO TO 2.

2.CHECK DATA MONITOR

1. Start the engine.

2. Drive the vehicle.
3. Check that the value of “VSP SENSOR” in “Data Monitor“ of ”TRANSMISSION” is almost the same as the value of “VHCL SPEED SE” in “Data Monitor” mode of “LASER/RADAR”.

CAUTION:
Be careful of the vehicle speed.

Is the inspection result normal?

YES >> Replace the distance sensor. Refer to BRC-264, "Removal and Installation".
NO >> GO TO 3.

3. CHECK TCM SELF-DIAGNOSIS RESULTS

1. Perform “All DTC Reading”.
2. Check if any DTC is detected in “Self Diagnostic Result” mode of “TRANSMISSION”.

Is any DTC detected?

YES >> Perform diagnosis on the detected DTC and repair or replace the malfunctioning parts. Refer to TM-63, "DTC Index".
NO >> GO TO 4.

4. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) SELF-DIAGNOSIS RESULTS

Check if any DTC is detected in “Self Diagnostic Result” mode of “ABS”.

Is any DTC detected?

YES >> Perform diagnosis on the detected DTC and repair or replace the malfunctioning parts. Refer to BRC-57, "DTC Index".
NO >> Replace the distance sensor. Refer to BRC-264, "Removal and Installation".

C1A04 ABS/TCS/VDC SYSTEM

DTC Logic

INFOID:0000000012788330

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
C1A04	ABS/TCS/VDC CIRC (ABS/TCS/VDC circuit)	If a malfunction occurs in the VDC/TCS/ABS system

POSSIBLE CAUSE

ABS actuator and electric unit (control unit)

FAIL-SAFE

FEB system is canceled.

DTC CONFIRMATION PROCEDURE

1.CHECK DTC PRIORITY

If DTC “C1A04” is displayed with DTC “U1000”, first diagnose the DTC “U1000”.

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to BRC-256, "DTC Logic".
NO >> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start the engine.
2. Turn the FEB system ON.
3. Perform “All DTC Reading” with CONSULT.
4. Check if the “C1A04” is detected as the current malfunction in “Self Diagnostic Result” mode of “LASER/RADAR”.

Is “C1A04” detected as the current malfunction?

YES >> Refer to BRC-231, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012788331

1.CHECK DTC PRIORITY

If DTC “C1A04” is displayed with DTC “U1000”, first diagnose the DTC “U1000”.

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to BRC-256, "DTC Logic".
NO >> GO TO 2.

2.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) SELF-DIAGNOSIS RESULTS

Check if any DTC is detected in “Self Diagnostic Result” mode of “ABS”.

Is any DTC detected?

YES >> Perform diagnosis on the detected DTC and repair or replace the malfunctioning parts. Refer to BRC-57, "DTC Index".
NO >> Replace the distance sensor. Refer to BRC-264, "Removal and Installation".

C1A05 BRAKE SW/STOP LAMP SW

DTC Logic

INFOID:0000000012788332

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
C1A05	BRAKE SW/STOP L SW (Brake switch/Stop lamp switch)	Stop lamp switch signal received from BCM is abnormal

POSSIBLE CAUSE

- Stop lamp switch circuit
- Stop lamp switch
- Incorrect stop lamp switch installation
- BCM

FAIL-SAFE

FEB system is canceled.

DTC CONFIRMATION PROCEDURE

1.CHECK DTC PRIORITY

If DTC “C1A05” is displayed with DTC “U1000”, first diagnose the DTC “U1000”.

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to BRC-256, "DTC Logic".
NO >> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start the engine.
2. Turn the FEB system ON.
3. Perform “All DTC Reading” with CONSULT.
4. Check if the “C1A05” is detected as the current malfunction in “Self Diagnostic Result” mode of “LASER/RADAR”.

Is “C1A05” detected as the current malfunction?

YES >> Refer to BRC-232, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection

Diagnosis Procedure

INFOID:0000000012788333

1.CHECK DTC PRIORITY

If DTC “C1A05” is displayed with DTC “U1000”, first diagnose the DTC “U1000”.

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to BRC-256, "DTC Logic".
NO >> GO TO 2.

2.CHECK STOP LAMP

Check the stop lamp when brake pedal is depressed/not depressed.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the stop lamp. Refer to EXL-241, "Symptom Table" (LED headlamp) or EXL-108, "Symptom Table" (Halogen headlamp)

3.CHECK STOP LAMP CIRCUIT

1. Turn ignition switch ON.
2. Perform “STOP LAMP” on “Active test” of “BCM-HEADLAMP” with CONSULT.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Check the stop lamp circuit. Refer to EXL-241, "Symptom Table" (LED headlamp) or EXL-108, "Symptom Table" (Halogen headlamp)

4. PERFORM SELF-DIAGNOSIS OF CHASSIS CONTROL MODULE

1. Perform “All DTC Reading”.
2. Check if any DTC is detected in “Self Diagnostic Result” mode of “CHASSIS CONTROL”. Refer to DAS-151, "DTC Index".

Is any DTC detected?

YES >> Repair or replace the malfunctioning parts identified by the self-diagnosis result.
NO >> GO TO 5.

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

1. Perform “All DTC Reading”.
2. Check if any DTC is detected in “Self Diagnostic Result” mode of “ABS”. Refer to BRC-57, "DTC Index".

Is any DTC detected?

YES >> Repair or replace the malfunctioning parts identified by the self-diagnosis result.
NO >> GO TO 6.

6. PERFORM SELF-DIAGNOSIS OF BCM

1. Perform “All DTC Reading”.
2. Check if any DTC is detected in “Self Diagnostic Result” mode of “BCM”. Refer to BCS-48, "DTC Index" (with intelligent key system) or BCS-109, "DTC Index" (without intelligent key system).

Is any DTC detected?

YES >> Repair or replace the malfunctioning parts identified by the self-diagnosis result.
NO >> GO TO 7.

7. PERFORM SELF-DIAGNOSIS OF DISTANCE SENSOR

Check if any DTC is detected in “Self Diagnostic Result” mode of “LASER/RADAR”. Refer to BRC-212, "DTC Index".

Is any DTC detected?

YES >> Repair or replace the malfunctioning parts identified by the self-diagnosis result.
NO >> Inspection End.

C1A07 CVT

DTC Logic

INFOID:0000000012788334

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detection condition
C1A07	CVT CIRCUIT (CVT circuit)	If CVT is malfunctioning

POSSIBLE CAUSE

- Transmission assembly
- TCM

FAIL-SAFE

FEB system is canceled.

DTC CONFIRMATION PROCEDURE

1.CHECK DTC PRIORITY

If DTC “C1A07” is displayed with DTC “U1000”, first diagnose the DTC “U1000”.

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to BRC-256, "DTC Logic".
NO >> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start the engine.
2. Turn ON FEB system and drive.
   CAUTION:
   Always drive safely.
3. Stop the vehicle.
4. Perform “All DTC Reading” with CONSULT.
5. Check if the “C1A07” is detected as the current malfunction in “Self Diagnostic Result” mode of “LASER/RADAR”.

Is “C1A07” detected as the current malfunction?

YES >> Refer to BRC-234, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012788335

1.CHECK DTC PRIORITY

If DTC “C1A07” is displayed with DTC “U1000”, first diagnose the DTC “U1000”.

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to BRC-256, "DTC Logic".
NO >> GO TO 2.

2.PERFORM SELF-DIAGNOSIS OF TCM

Check if any DTC is detected in “Self Diagnostic Result” mode of “TRANSMISSION”.

Is any DTC detected?

YES >> Perform diagnosis on the detected DTC and repair or replace the malfunctioning parts. Refer to TM-63, "DTC Index".
NO >> Replace the distance sensor. Refer to DAS-122, "Removal and Installation".

C1A12 RADAR OFF-CENTER

DTC Logic

INFOID:0000000012788336

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
C1A12	RADAR OFF-CENTER (Radar off-center)	Radar of distance sensor is off the aiming point

POSSIBLE CAUSE

Radar is off the aiming point

FAIL-SAFE

The following systems are canceled.

- Vehicle-to-vehicle distance control mode
- Forward Emergency Braking (FEB)

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Start the engine.
2. Turn the FEB system ON.
3. Perform “All DTC Reading” with CONSULT.
4. Check if the “C1A12” is detected as the current malfunction in “Self Diagnostic Result” mode of “LASER/RADAR”.

Is “C1A12” detected as the current malfunction?

YES >> Refer to BRC-235, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012788337

1.ADJUST RADAR AIMING

1. Adjust the radar beam aiming with CONSULT. Refer to BRC-217, "Description".
2. Perform “All DTC Reading”.
3. Check if the “C1A12” is detected in “Self Diagnostic Result” mode of “LASER/RADAR”.

Is “C1A12” detected?

YES >> Replace the distance sensor. Refer to DAS-122, "Removal and Installation".
NO >> Inspection End.

C1A14 ECM

DTC Logic

INFOID:0000000012788338

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
C1A14	ECM CIRCUIT (ECM circuit)	If ECM is malfunctioning

POSSIBLE CAUSE

- Accelerator pedal position sensor
- ECM
- Distance sensor

FAIL-SAFE

FEB system is canceled.

DTC CONFIRMATION PROCEDURE

1.CHECK DTC PRIORITY

If DTC “C1A14” is displayed with DTC “U1000”, first diagnose the DTC “U1000”.

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to BRC-256, "DTC Logic".
NO >> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start the engine.
2. Operate the FEB system and drive.
   CAUTION:
   Always drive safely.
3. Stop the vehicle.
4. Perform “All DTC Reading” with CONSULT.
5. Check if the “C1A14” is detected as the current malfunction in “Self Diagnostic Result” mode of “LASER/RADAR”.

Is “C1A14” detected as the current malfunction?

YES >> Refer to BRC-236, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012788339

1.CHECK DTC PRIORITY

If DTC “C1A14” is displayed with DTC “U1000”, first diagnose the DTC “U1000”.

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to BRC-256, "DTC Logic".
NO >> GO TO 2.

2.PERFORM SELF-DIAGNOSIS OF ECM

Check if any DTC is detected in “Self Diagnostic Result” mode of “ENGINE”.

Is any DTC detected?

YES >> Perform diagnosis on the detected DTC and repair or replace the malfunctioning parts. Refer to EC-96, "DTC Index" (QR25DE).
NO >> Replace the distance sensor. Refer to DAS-122, "Removal and Installation".

C1A15 GEAR POSITION

DTC Logic

INFOID:0000000012788340

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
C1A15	GEAR POSITION (Gear position)	A mismatch between an current gear position signal transmitted from TCM via ECM and a gear position calculated by the distance sensor continues for approximately 11 minutes or more

POSSIBLE CAUSE

- Input speed sensor
- Vehicle speed sensor CVT (output speed sensor)
- TCM

FAIL-SAFE

FEB system is canceled.

DTC CONFIRMATION PROCEDURE

1.CHECK DTC PRIORITY

If DTC “C1A15” is displayed with DTC “U1000”, “C1A03” or “C1A04” first diagnose the DTC “U1000”, “C1A03” or “C1A04”

Is applicable DTC detected?

YES >> Perform diagnosis of applicable.
- U1000: Refer to BRC-256, "DTC Logic"
- C1A03: Refer to BRC-229, "DTC Logic"
- C1A04: Refer to BRC-231, "DTC Logic"

NO >> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start the engine.
2. Turn the FEB system ON.
3. Drive the vehicle at 10 km/h (6 MPH) or faster for approximately 15 minutes or more.
   CAUTION:
   Always drive safely.
4. Stop the vehicle.
5. Perform “All DTC Reading” with CONSULT.
6. Check if “C1A15” is detected as the current malfunction in the “Self Diagnostic Result” mode of “LASER/RADAR”.

Is “C1A15” detected as the current malfunction?

YES >> Refer to BRC-237, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012788341

1.CHECK DTC PRIORITY

If DTC “C1A15” is displayed with DTC “U1000”, “C1A03” or “C1A04” first diagnose the DTC “U1000”, “C1A03” or “C1A04”

Is applicable DTC detected?

YES >> Perform diagnosis of applicable.
- U1000: Refer to BRC-256, "DTC Logic"
- C1A03: Refer to BRC-229, "DTC Logic"
- C1A04: Refer to BRC-231, "DTC Logic"

NO >> GO TO 2.

2.CHECK VEHICLE SPEED SIGNAL

Check that “VHCL SPEED SE” operates normally in “Data Monitor” mode of “LASER/RADAR”.

CAUTION:

Be careful of the vehicle speed.

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 7.

3.CHECK GEAR POSITION

Check that “GEAR” operates normally in “Data Monitor” mode of “LASER/RADAR”.

CAUTION:

Be careful of the vehicle speed.

Is the inspection result normal?

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

4.CHECK GEAR POSITION SIGNAL

Check that “GEAR” operates normally in “Data Monitor” mode of “TRANSMISSION”.

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 6.

5.CHECK INPUT SPEED SENSOR SIGNAL

Check that “INPUT SPEED” operates normally in “Data Monitor” mode of “TRANSMISSION”.

Is the inspection result normal?

YES >> Replace the distance sensor. Refer to DAS-122, "Removal and Installation".
NO >> GO TO 6.

6.CHECK TCM SELF-DIAGNOSIS RESULTS

1. Perform “All DTC Reading”.
2. Check if any DTC is detected in “Self Diagnostic Result” mode of “TRANSMISSION”.

Is any DTC detected?

YES >> Perform diagnosis on the detected DTC and repair or replace the malfunctioning parts. Refer to TM-63, "DTC Index".
NO >> Replace the distance sensor. Refer to DAS-122, "Removal and Installation".

7.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) SELF-DIAGNOSIS RESULTS

1. Perform “All DTC Reading”.
2. Check if any DTC is detected in “Self Diagnostic Result” mode of “ABS”.

Is any DTC detected?

YES >> Perform diagnosis on the detected DTC and repair or replace the malfunctioning parts. Refer to BRC-57, "DTC Index".
NO >> Replace the distance sensor. Refer to DAS-122, "Removal and Installation".

C1A16 RADAR BLOCKED

DTC Logic

INFOID:0000000012788342

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
C1A16	RADAR BLOCKED (Radar blocked)	Inclusion of dirt or stains on the distance sensor area of the front bumper

NOTE:
DTC “C1A16” may be detected under the following conditions. (Explain to the customer about the difference between the contamination detection function and the indication when the malfunction is detected and tell them “This is not malfunction”.)
- When contamination or foreign materials adhere to the distance sensor area of the front bumper
- When driving while it is snowing or when frost forms on the distance sensor area of the front bumper
- When distance sensor area of the front bumper is temporarily fogged

POSSIBLE CAUSE
- Stain or foreign materials is deposited
- Cracks or scratches exist

FAIL-SAFE
FEB system is canceled.

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Start the engine.
2. Turn the FEB system ON.
3. Perform “All DTC Reading” with CONSULT.
4. Check if the “C1A16” is detected as the current malfunction in “Self Diagnostic Result” mode of “LASER/RADAR”.

Is “C1A16” detected as the current malfunction?

YES >> Refer to BRC-239, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012788343

1.VISUAL CHECK 1

Check the contamination and foreign matter on the distance sensor area of the front bumper.

Does contamination or foreign materials adhere?

YES >> Wipe out the contamination and foreign matter on the distance sensor area of the front bumper.
NO >> GO TO 2.

2.VISUAL CHECK 2

1. Remove the front bumper. Refer to EXT-17, "Removal and Installation".
2. Check distance sensor for contamination and foreign matter.

Does contamination or foreign matter adhere?

YES >> Wipe out the contamination and foreign matter from the distance sensor.
NO >> GO TO 3.

3.VISUAL CHECK 3

Check distance sensor for cracks and scratches.

Is it found?

YES >> Replace the distance sensor. Refer to DAS-122, "Removal and Installation".
NO >> GO TO 4.

4. PERFORM RADAR ALIGNMENT

1. Adjust the radar alignment with CONSULT. Refer to BRC-217, "Description".
2. Perform FEB system action test to check the operation status. Refer to BRC-226, "Description".
3. Perform “All DTC Reading”.
4. Check the “C1A16” is detected in “Self Diagnostic Result” mode of “LASER/RADAR”.

Is “C1A16” detected?

YES >> Replace the distance sensor. Refer to DAS-122, "Removal and Installation".
NO >> GO TO 5.

5. INTERVIEW

1. Ask if there is any trace of contamination or foreign materials adhering to the distance sensor area of the front bumper.
2. Ask if distance sensor area of the front bumper was frosted during driving or if vehicle was driven in snow.
3. Ask if distance sensor area of the front bumper was temporarily fogged. (Windshield glass may also tend to fog, etc.)

Is any of above conditions seen?

YES >> Explain to the customer about the difference between the contamination detection function and the indication when the malfunction is detected and tell them “This is not malfunction”.
NO >> Replace the distance sensor. Refer to BRC-264, "Removal and Installation".

C1A17 DISTANCE SENSOR

DTC Logic

INFOID:0000000012788344

DTC DETECTION LOGIC

NOTE:
If DTC C1A17 is displayed with DTC U1000, first perform the trouble diagnosis for DTC U1000. Refer to BRC-256, "DTC Logic".

DTC	Trouble diagnosis name	DTC detecting condition
C1A17	ICC SENSOR MALF (distance sensor malfunction)	Distance sensor is malfunctioning.

POSSIBLE CAUSE

Distance sensor

FAIL-SAFE

FEB system is canceled.

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn the ignition switch OFF.
2. Wait for 10 minutes or more.
3. Start the engine.
4. Turn the FEB system ON.
5. Perform “All DTC Reading” with CONSULT.
6. Check if the “C1A17” is detected as the current malfunction in “Self Diagnostic Result” mode of “LASER/RADAR”.

Is “C1A17” detected as the current malfunction?

YES >> Refer to BRC-241, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012788345

1.REPLACE DISTANCE SENSOR

>> Replace distance sensor. Refer to DAS-122, "Removal and Installation".

C1A18 RADAR AIMING INCMP

DTC Logic

INFOID:0000000012788346

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
C1A18	LASER AIMING INCMP (Laser aiming incomplete)	Distance sensor not adjusted.

POSSIBLE CAUSE

- Distance sensor aiming adjustment not performed.
- Distance sensor aiming adjustment interrupted.

FAIL-SAFE

FEB system is canceled.

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn the ignition switch OFF.
2. Wait for 10 minutes or more.
3. Start the engine.
4. Turn the FEB system ON.
5. Perform “All DTC Reading” with CONSULT.
6. Check if the “C1A18” is detected as the current malfunction in “Self Diagnostic Result” mode of “LASER/RADAR”.

Is “C1A18” detected as the current malfunction?

YES >> Refer to BRC-242, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012788347

1.ADJUST DISTANCE SENSOR

Perform distance sensor Initial vertical alignment and distance sensor alignment.

>> Refer to BRC-217, "Description" (Distance sensor Initial vertical alignment) and BRC-219, "Description" (Distance sensor alignment).

C1A21 UNIT HIGH TEMP

DTC Logic

INFOID:0000000012788348

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
C1A21	UNIT HIGH TEMP (Unit high temperature)	Temperature detected by the temperature sensor integrated in distance sensor remains more than 105 °C (221 °F) for 5 seconds or more

POSSIBLE CAUSE

Temperature around the distance sensor becomes extremely low or high

FAIL-SAFE

FEB system is canceled.

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn the ignition switch OFF.
2. Wait for 10 minutes or more.
3. Start the engine.
4. Turn the FEB system ON.
5. Perform “All DTC Reading” with CONSULT.
6. Check if the “C1A21” is detected as the current malfunction in “Self Diagnostic Result” mode of “LASER/RADAR”.

Is “C1A21” detected as the current malfunction?

YES >> Refer to BRC-243, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012788349

1.CHECK ENGINE COOLING SYSTEM

Check for any malfunctions in engine cooling system.

Is engine cooling system normal?

YES >> Replace the distance sensor. Refer to BRC-264, "Removal and Installation".
NO >> Repair engine cooling system.

C1A24 NP RANGE

DTC Logic

INFOID:0000000012788350

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
C1A24	NP RANGE (NP range)	A mismatch between a shift position signal transmitted from TCM via ECM and an current gear position signal continues for 60 seconds or more

POSSIBLE CAUSE

- TCM
- Transmission range switch

FAIL-SAFE

FEB system is canceled.

DTC CONFIRMATION PROCEDURE

1.CHECK DTC PRIORITY

If DTC “C1A24” is displayed with DTC “U1000”, first diagnose the DTC “U1000”.

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to BRC-256, "DTC Logic".
NO >> GO TO 2.

2.CHECK DTC REPRODUCE (1)

1. Start the engine.
2. Turn the FEB system ON.
3. Wait for approximately 5 minutes or more after shifting the selector lever to “P” position.
4. Perform “All DTC Reading” with CONSULT.
5. Check if the “C1A24” is detected as the current malfunction in “Self Diagnostic Result” mode of “LASER/RADAR”.

Is “C1A24” detected as the current malfunction?

YES >> Refer to BRC-244, "Diagnosis Procedure".
NO >> GO TO 3.

3.CHECK DTC REPRODUCE (2)

1. Wait for approximately 5 minutes or more after shifting the selector lever to “N” position.
2. Perform “All DTC Reading”.
3. Check if the “C1A24” is detected as the current malfunction in “Self Diagnostic Result” mode of “LASER/RADAR”.

Is “C1A24” detected as the current malfunction?

YES >> Refer to BRC-244, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012788351

1.CHECK DTC PRIORITY

If DTC “C1A24” is displayed with DTC “U1000”, first diagnose the DTC “U1000”.

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to BRC-256, "DTC Logic".
NO >> GO TO 2.

2.CHECK TCM DATA MONITOR

Check that “SLCT LVR POSI” operates normally in “Data Monitor” of “TRANSMISSION”.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Perform diagnosis for transmission range switch circuit and repair or replace the malfunctioning parts. Refer to TM-106, "Diagnosis Procedure".

3.PERFORM TCM SELF-DIAGNOSIS

1. Perform “All DTC Reading”.
2. Check if any DTC is detected in “Self Diagnostic Result” mode of “TRANSMISSION”.

Is any DTC detected?

YES >> Perform diagnosis on the detected DTC and repair or replace the malfunctioning parts. Refer to TM-63, "DTC Index".

NO >> Replace the distance sensor. Refer to DAS-122, "Removal and Installation".

C1A26 ECD MODE MALFUNCTION

DTC Logic

INFOID:0000000012788352

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
C1A26	ECD MODE MALF (ECD mode malfunction)	If an abnormal condition occurs with ECD system

POSSIBLE CAUSE

ABS actuator and electric unit (control unit)

FAIL-SAFE

FEB system is canceled.

DTC CONFIRMATION PROCEDURE

1.CHECK DTC PRIORITY

If DTC “C1A26” is displayed with DTC “U1000”, “U0415” or “U0121” first diagnose the DTC “U1000”, “U0415” or “U0121”

Is applicable DTC detected?

YES >> Perform diagnosis of applicable.
- U1000: Refer to BRC-256, "DTC Logic"
- U0415: Refer to BRC-254, "DTC Logic"
- U0121: Refer to BRC-251, "DTC Logic"

NO >> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start the engine.
2. Wait for approximately 1 minute after turning the FEB system ON.
3. Perform “All DTC Reading” with CONSULT.
4. Check if the “C1A26” is detected as the current malfunction in “Self Diagnostic Result” mode of “LASER/RADAR”.

Is “C1A26” detected as the current malfunction?

YES >> Refer to BRC-246, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012788353

1.CHECK DTC PRIORITY

If DTC “C1A26” is displayed with DTC “U1000”, “U0415” or “U0121” first diagnose the DTC “U1000”, “U0415” or “U0121”

Is applicable DTC detected?

YES >> Perform diagnosis of applicable.
- U1000: Refer to BRC-256, "DTC Logic"
- U0415: Refer to BRC-254, "DTC Logic"
- U0121: Refer to BRC-251, "DTC Logic"

NO >> GO TO 2.

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

Check if any DTC is detected in “Self Diagnostic Result” mode of “ABS”.

Is any DTC detected?

YES >> Perform diagnosis on the detected DTC and repair or replace the malfunctioning parts. Refer to BRC-57, "DTC Index".
NO >> Replace distance sensor. Refer to DAS-122, "Removal and Installation".

C1A39 STEERING ANGLE SENSOR

DTC Logic

INFOID:0000000012788354

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
C1A39	STRG SEN CIR (Steering angle sensor circuit)	If the steering angle sensor is malfunction

POSSIBLE CAUSE

Steering angle sensor

FAIL-SAFE

FEB system is canceled.

DTC CONFIRMATION PROCEDURE

1.CHECK DTC PRIORITY

If DTC “C1A39” is displayed with DTC “U1000”, first diagnose the DTC “U1000”.

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to BRC-256, "DTC Logic".
NO >> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start the engine.
2. Turn the FEB system ON.
3. Perform “All DTC Reading” with CONSULT.
4. Check if the “C1A39” is detected as the current malfunction in “Self Diagnostic Result” mode of “LASER/RADAR”.

Is “C1A39” detected as the current malfunction?

YES >> Refer to BRC-247, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012788355

1.CHECK DTC PRIORITY

If DTC “C1A39” is displayed with DTC “U1000”, first diagnose the DTC “U1000”.

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to BRC-256, "DTC Logic".
NO >> GO TO 2.

2.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) SELF-DIAGNOSIS RESULTS

Check if any DTC is detected in “Self Diagnostic Result” mode of “ABS”.

Is any DTC detected?

YES >> Perform diagnosis on the detected DTC and repair or replace the malfunctioning parts. Refer to BRC-57, "DTC Index".
NO >> Replace the distance sensor. Refer to DAS-122, "Removal and Installation".

C1A50 ADAS CONTROL UNIT

DTC Logic

INFOID:0000000012788376

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detection condition
C1A50	ADAS MALFUNCTION	If ADAS control unit is malfunctioning

NOTE:
If DTC “C1A50” is detected along with DTC “U1000” or “C1A0C” first diagnose the DTC “U1000” or “C1A0C”. Refer to BRC-256, "DTC Logic" or BRC-249, "DTC Logic".

POSSIBLE CAUSE

- ADAS control unit

FAIL-SAFE

The following systems are canceled:
- Intelligent Cruise Control
- Forward Emergency Braking (FEB)

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Start the engine.
2. Turn the MAIN switch of ICC system ON.
3. Perform “All DTC Reading” with CONSULT.
4. Check if the “C1A50” is detected as the current malfunction in “Self Diagnostic Result” mode of “LASER/RADAR”.

Is “C1A50” detected as the current malfunction?

YES >> Refer to BRC-248, "Diagnosis Procedure".
NO >> Refer to GI-45, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000012788377

1.CHECK DISTANCE SENSOR SELF-DIAGNOSIS RESULTS

If DTC “C1A50” is displayed with “U1000” diagnose the DTC “U1000” before “C1A0C”.

Is “U1000” detected?

YES >> Perform diagnosis of applicable DTC. Refer to BRC-256, "DTC Logic" or BRC-249, "DTC Logic".
NO >> GO TO 2.

2.CHECK ADAS CONTROL UNIT SELF-DIAGNOSIS RESULTS

Check if any DTC is detected in “Self Diagnostic Result” mode of “ICC/ADAS”.

Is any DTC detected?

YES >> Perform diagnosis on the detected DTC and repair or replace the malfunctioning parts. Refer to DAS-32, "DTC Index".
NO >> Replace the Distance sensor. Refer to DAS-122, "Removal and Installation".

C1A0C ADAS MESSAGE COUNTER FAILURE

DTC Logic

INFOID:0000000012788378

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detection condition
C1A0C	ADAS MSG COUNTER	If distance sensor is malfunctioning

POSSIBLE CAUSE

- Distance Sensor

FAIL-SAFE

The following systems are canceled:

- Intelligent Cruise Control
- Forward Emergency Braking (FEB)
- Predictive Forward Collision Warning (PFCW)

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Start the engine.
2. Perform “All DTC Reading” with CONSULT.
3. Check if the “C1A0C” is detected as the current malfunction in “Self Diagnostic Result” mode of “LASER/RADAR”.

Is “C1A0C” detected as the current malfunction?

YES >> Refer to BRC-249, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000012788379

1.CHECK DISTANCE SENSOR SELF DIAGNOSTIC RESULT

Check if “U1000” is also detected with “C1A0C” in “Self Diagnostic Result” mode of “LASER/RADAR”.

Is “U1000” detected?

YES >> Perform the CAN communication system inspection. Repair or replace the malfunctioning parts. Refer to BRC-256, "DTC Logic".
NO >> GO TO 2.

2.CHECK ADAS CONTROL UNIT SELF DIAGNOSTIC RESULT

Check if any DTC is detected in “Self Diagnostic Result” mode of “ICC/ADAS”.

Is any DTC detected?

YES >> Perform diagnosis on the detected DTC and repair or replace the malfunctioning parts. Refer to DAS-32, "DTC Index".
NO >> Replace the distance sensor. Refer to DAS-122, "Removal and Installation".

C1B5D FEB OPE COUNT LIMIT

DTC Logic

INFOID:0000000012788356

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
C1B5D	FEB OPE COUNT LIMIT (Forward Emergency Braking operation count limit)	FEB system operated 3 times within ignition switch ON.

NOTE:
If “C1B5D” detected, perform the FEB system action test and check FEB system operates normally.

POSSIBLE CAUSE
FEB system operated 3 times within ignition switch ON.

FAIL-SAFE
FEB system is canceled.

DTC CONFIRMATION PROCEDURE

1.PERFORM FEB SYSTEM ACTION TEST

Perform the FEB system action test.

Is there any malfunction symptom?

YES >> Refer to BRC-250, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000012788357

1.DTC CHECK SELF-DIAGNOSIS RESULTS

1. Turn ignition switch OFF.
2. Turn ignition switch ON.
3. Perform “All DTC Reading” with CONSULT.
4. Check if the “C1B5D” is detected as the current malfunction in “Self Diagnostic Result” mode of “LASER/RADAR”.

Is C1B5D detected as current malfunction?

YES >> Replace the distance sensor. Refer to DAS-122, "Removal and Installation".
NO >> Perform FEB system action test. Refer to BRC-226, "Description".

U0121 VDC CAN 2

DTC Logic

INFOID:0000000012788358

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
U0121	VDC CAN CIR2 (VDC CAN circuit2)	If distance sensor detects an error signal that is received from ABS actuator and electric unit (control unit) via CAN communication

POSSIBLE CAUSE

ABS actuator and electric unit (control unit)

FAIL-SAFE

FEB system is canceled.

DTC CONFIRMATION PROCEDURE

1.CHECK DTC PRIORITY

If DTC “U0121” is displayed with DTC “U1000”, first diagnose the DTC “U1000”.

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to BRC-256, "DTC Logic".
NO >> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start the engine.
2. Turn the FEB system ON.
3. Perform “All DTC Reading” with CONSULT.
4. Check if the “U0121” is detected as the current malfunction in “Self Diagnostic Result” mode of “LASER/RADAR”.

Is “U0121” detected as the current malfunction?

YES >> Refer to BRC-251, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012788359

1.CHECK DTC PRIORITY

If DTC “U0121” is displayed with DTC “U1000”, first diagnose the DTC “U1000”.

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to BRC-256, "DTC Logic".
NO >> GO TO 2.

2.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) SELF-DIAGNOSIS RESULTS

Check if any DTC is detected in “Self Diagnostic Result” mode of “ABS”.

Is any DTC detected?

YES >> Perform diagnosis on the detected DTC and repair or replace the malfunctioning parts. Refer to BRC-57, "DTC Index".
NO >> Replace the distance sensor. Refer to DAS-122, "Removal and Installation".

U0126 STRG SEN CAN 1

DTC Logic

INFOID:0000000012788360

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
U0126	STRG SEN CAN CIR1 (Steering sensor CAN circuit1)	If distance sensor detects an error signal that is received from steering angle sensor via CAN communication

POSSIBLE CAUSE
Steering angle sensor

FAIL-SAFE
FEB system is canceled.

DTC CONFIRMATION PROCEDURE

1.CHECK DTC PRIORITY

If DTC “U0126” is displayed with DTC “U1000”, first diagnose the DTC “U1000”.

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to BRC-256, "DTC Logic".
NO >> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start the engine.
2. Turn the FEB system ON.
3. Perform “All DTC Reading” with CONSULT.
4. Check if the “U0126” is detected as the current malfunction in “Self Diagnostic Result” mode of “LASER/RADAR”.

Is “U0126” detected as the current malfunction?

YES >> Refer to BRC-252, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012788361

1.CHECK DTC PRIORITY

If DTC “U0126” is displayed with DTC “U1000”, first diagnose the DTC “U1000”.

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to BRC-256, "Diagnosis Procedure".
NO >> GO TO 2.

2.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) SELF-DIAGNOSIS RESULTS

Check if any DTC is detected in “Self Diagnostic Result” mode of “ABS”.

Is any DTC detected?

YES >> Perform diagnosis on the detected DTC and repair or replace the malfunctioning parts. Refer to BRC-57, "DTC Index".
NO >> Replace the distance sensor. Refer to DAS-122, "Removal and Installation".

U0401 ECM CAN 1

DTC Logic

INFOID:0000000012788362

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
U0401	ECM CAN CIR1 (ECM CAN circuit1)	If distance sensor detects an error signal that is received from ECM via CAN communication

POSSIBLE CAUSE

ECM

FAIL-SAFE

FEB system is canceled.

DTC CONFIRMATION PROCEDURE

1.CHECK DTC PRIORITY

If DTC “U0401” is displayed with DTC “U1000”, first diagnose the DTC “U1000”.

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to BRC-256, "DTC Logic".
NO >> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start the engine.
2. Turn the FEB system ON.
3. Perform “All DTC Reading” with CONSULT.
4. Check if the “U0401” is detected as the current malfunction in “Self Diagnostic Result” mode of “LASER/RADAR”.

Is “U0401” detected as the current malfunction?

YES >> Refer to BRC-253, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012788363

1.CHECK DTC PRIORITY

If DTC “U0401” is displayed with DTC “U1000”, first diagnose the DTC “U1000”.

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to BRC-256, "DTC Logic".
NO >> GO TO 2.

2.CHECK ECM SELF-DIAGNOSIS RESULTS

Check if any DTC is detected in “Self Diagnostic Result” mode of “ENGINE”.

Is any DTC detected?

YES >> Perform diagnosis on the detected DTC and repair or replace the malfunctioning parts. Refer to EC-96, "DTC Index"(QR25DE)

U0415 VDC CAN 1

DTC Logic

INFOID:0000000012788364

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
U0415	VDC CAN CIR1 (VDC CAN circuit1)	If distance sensor detects an error signal that is received from ABS actuator and electric unit (control unit) via CAN communication

POSSIBLE CAUSE

ABS actuator and electric unit (control unit)

FAIL-SAFE

FEB system is canceled.

DTC CONFIRMATION PROCEDURE

1.CHECK DTC PRIORITY

If DTC “U0415” is displayed with DTC “U1000”, first diagnose the DTC “U1000”.

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to BRC-256, "DTC Logic".
NO >> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start the engine.
2. Turn the FEB system ON.
3. Perform “All DTC Reading” with CONSULT.
4. Check if the “U0415” is detected as the current malfunction in “Self Diagnostic Result” mode of “LASER/RADAR”.

Is “U0415” detected as the current malfunction?

YES >> Refer to BRC-254, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.5

Diagnosis Procedure

INFOID:0000000012788365

1.CHECK DTC PRIORITY

If DTC “U0415” is displayed with DTC “U1000”, first diagnose the DTC “U1000”.

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to BRC-256, "DTC Logic".
NO >> GO TO 2.

2.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) SELF-DIAGNOSIS RESULTS

Check if any DTC is detected in “Self Diagnostic Result” mode of “ABS”.

Is any DTC detected?

YES >> Perform diagnosis on the detected DTC and repair or replace the malfunctioning parts. Refer to BRC-57, "DTC Index".
NO >> Replace the distance sensor. Refer to DAS-122, "Removal and Installation".

U0428 STRG SEN CAN 2

DTC Logic

INFOID:0000000012788366

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
U0428	STRG SEN CAN CIR2 (Steering sensor CAN circuit2)	If distance sensor detects an error signal that is received from steering angle sensor via CAN communication

POSSIBLE CAUSE

Steering angle sensor

FAIL-SAFE

FEB system is canceled.

DTC CONFIRMATION PROCEDURE

1.CHECK DTC PRIORITY

If DTC “U0428” is displayed with DTC “U1000”, first diagnose the DTC “U1000”.

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to BRC-256, "DTC Logic".
NO >> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start the engine.
2. Turn the FEB system ON.
3. Perform “All DTC Reading” with CONSULT.
4. Check if the “U0428” is detected as the current malfunction in “Self Diagnostic Result” mode of “LASER/RADAR”.

Is “U0428” detected as the current malfunction?

YES >> Refer to BRC-255, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012788367

1.CHECK DTC PRIORITY

If DTC “U0428” is displayed with DTC “U1000”, first diagnose the DTC “U1000”.

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to BRC-256, "DTC Logic".
NO >> GO TO 2.

2.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) SELF-DIAGNOSIS RESULTS

Check if any DTC is detected in “Self Diagnostic Result” mode of “ABS”.

Is any DTC detected?

YES >> Perform diagnosis on the detected DTC and repair or replace the malfunctioning parts. Refer to BRC-57, "DTC Index".
NO >> Replace the distance sensor. Refer to DAS-122, "Removal and Installation".

U1000 CAN COMM CIRCUIT

DTC Logic

INFOID:0000000012788368

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
U1000	CAN COMM CIRCUIT (CAN communication circuit)	If distance sensor is not transmitting or receiving CAN communication signal for 2 seconds or more

POSSIBLE CAUSE

ITS communication system

FAIL-SAFE

FEB system is canceled.

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Start the engine.
2. Turn the FEB system ON.
3. Perform “All DTC Reading” with CONSULT.
4. Check if the “U1000” is detected as the current malfunction in “Self Diagnostic Result” mode of “LASER/RADAR”.

Is “U1000” detected as the current malfunction?

YES >> Refer to BRC-256, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012788369

1.PERFORM THE SELF-DIAGNOSIS

1. Turn the ignition switch ON.
2. Turn the FEB system ON, and then wait for 2 seconds or more.
3. Perform “All DTC Reading” with CONSULT.
4. Check if the “U1000” is detected as the current malfunction in “Self Diagnostic Result” mode of “LASER/RADAR”.

Is “U1000” detected as the current malfunction?

YES >> Refer to LAN-20, "Trouble Diagnosis Flow Chart".
NO >> Inspection End.

U1010 CONTROL UNIT (CAN)

DTC Logic

INFOID:0000000012788370

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
U1010	CONTROL UNIT (CAN) [Control unit (CAN)]	If distance sensor detects malfunction by CAN controller initial diagnosis

POSSIBLE CAUSE

Distance sensor

FAIL-SAFE

FEB system is canceled.

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Start the engine.
2. Turn the FEB system ON.
3. Perform “All DTC Reading” with CONSULT.
4. Check if the “U1010” is detected as the current malfunction in “Self Diagnostic Result” mode of “LASER/RADAR”.

Is “U1010” detected as the current malfunction?

YES >> Refer to BRC-257, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012788371

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn the FEB system ON.
2. Perform “All DTC Reading” with CONSULT.
3. Check if the “U1010” is detected as the current malfunction in “Self Diagnostic Result” mode of “LASER/RADAR”.

Is “U1010” detected as the current malfunction?

YES >> Replace the distance sensor. Refer to DAS-122, "Removal and Installation".
NO >> Inspection End.

U1527 CCM CAN 1

DTC Logic

INFOID:0000000012788372

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
U1527	CCM CAN CIR 1 (Chassis control module CAN circuit 1)	Distance sensor detects that chassis control module has a malfunction.

POSSIBLE CAUSE
Chassis control module

FAIL-SAFE
FEB system is canceled.

DTC CONFIRMATION PROCEDURE

1.CHECK DTC PRIORITY

If DTC “U1527” is displayed with DTC “U1000”, first diagnose the DTC “U1000”.

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to BRC-256, "DTC Logic".
NO >> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start the engine.
2. Turn the FEB system ON.
3. Perform “All DTC Reading” with CONSULT.
4. Check if the “U1527” is detected as the current malfunction in “Self Diagnostic Result” mode of “LASER/RADAR”.

Is “U1527” detected as the current malfunction?

YES >> Refer to BRC-258, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012788373

1.CHECK DTC PRIORITY

If DTC “U1527” is displayed with DTC “U1000”, first diagnose the DTC “U1000”.

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to BRC-256, "DTC Logic".
NO >> GO TO 2.

2.CHECK SELF-DIAGNOSIS RESULTS

Check if any DTC is detected in “Self Diagnostic Result” mode of “CHASSIS CONTROL MODULE”.

Is any DTC detected?

YES >> Perform diagnosis on the detected DTC and repair or replace the malfunctioning parts. Refer to DAS-151, "DTC Index".
NO >> Replace the distance sensor. Refer to DAS-122, "Removal and Installation".

U153F CCM CAN 2

DTC Logic

INFOID:0000000012788374

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
U153F	CCM CAN CIR 2 (Chassis control module CAN circuit 2)	Distance sensor detects an error signal that is received from chassis control module via CAN communication

POSSIBLE CAUSE

Chassis control module

FAIL-SAFE

FEB system is canceled.

DTC CONFIRMATION PROCEDURE

1.CHECK DTC PRIORITY

If DTC “U153F” is displayed with DTC “U1000”, first diagnose the DTC “U1000”.

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to BRC-256, "DTC Logic".
NO >> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start the engine.
2. Turn the FEB system ON.
3. Perform “All DTC Reading” with CONSULT.
4. Check if the “U153F” is detected as the current malfunction in “Self Diagnostic Result” mode of “LASER/RADAR”.

Is “U153F” detected as the current malfunction?

YES >> Refer to BRC-259, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-45, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012788375

1.CHECK DTC PRIORITY

If DTC “U153F” is displayed with DTC “U1000”, first diagnose the DTC “U1000”.

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to BRC-256, "DTC Logic".
NO >> GO TO 2.

2.CHECK CHASSIS CONTROL MODULE SELF-DIAGNOSIS RESULTS

Check if any DTC is detected in “Self Diagnostic Result” mode of “CHASSIS CONTROL”.

Is any DTC detected?

YES >> Perform diagnosis on the detected DTC and repair or replace the malfunctioning parts. Refer to DAS-151, "DTC Index".
NO >> Replace the distance sensor. Refer to DAS-122, "Removal and Installation".

POWER SUPPLY AND GROUND CIRCUIT

Diagnosis Procedure

INFOID:0000000012714187

Regarding Wiring Diagram information, refer to DAS-43, "Wiring Diagram"

1.CHECK FUSES.

Check if any of the following fuses are blown:

Signal name	Fuse No.
Ignition power supply	30

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace the blown fuse after repairing the affected circuit if a fuse is blown.

2.CHECK DISTANCE SENSOR POWER SUPPLY CIRCUIT

Check voltage between distance sensor harness connector and ground.

Terminal			Condition	Voltage (Approx.)
(+)		(–)		
Distance sensor		Ground	Ignition switch	
Connector	Terminal			
E21	1		OFF	0 V
			ON	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the distance sensor power supply circuit.

3.CHECK DISTANCE SENSOR GROUND CIRCUIT

1. Turn the ignition switch OFF.
2. Disconnect the distance sensor connector.
3. Check for continuity between distance sensor harness connector and ground.

Distance sensor		Ground	Continuity
Connector	Terminal		
E21	8		Yes

Is the inspection result normal?

YES >> Inspection End.
NO >> Repair the distance sensor ground circuit.

SYMPTOM DIAGNOSIS

DRIVER ASSISTANCE SYSTEM SYMPTOMS

Symptom Table

INFOID:0000000012714188

Before performing diagnosis, check that it is not a symptom caused by normal operation. Refer to BRC-199, "System Description".

Symptom	Confirmation item	Inspection item/Reference page
FEB system display does not illuminate	All of system display does not illuminate	System settings cannot be turned ON/OFF Refer to BRC-262, "Diagnosis Procedure"
	Other information display is not illuminated	Combination meter Refer to MWI-31, "DTC Index"
FEB warning lamp does not illuminate	All of system display does not illuminate	System settings cannot be turned ON/OFF Refer to BRC-262, "Diagnosis Procedure"
	Other information display is not illuminated	Combination meter Refer to MWI-31, "DTC Index"
FEB warning buzzer is not sounding (Warning display is functioning normally)	—	Chime does not sound. Refer to WCS-49, "Symptom Table"

SYSTEM SETTINGS CANNOT BE TURNED ON/OFF

Symptom Table

INFOID:0000000012714189

CAUTION:
Perform the self-diagnosis with CONSULT before the symptom diagnosis. Perform the trouble diagnosis if any DTC is detected.

Symptom		Inspection item/Reference page
FEB system does not turn ON/OFF	FEB warning lamp is not turned ON⇔OFF when operating steering switch	BRC-262, "Diagnosis Procedure"

Description

INFOID:0000000012714190

FEB system does not turn on/off.
- FEB warning lamp does not illuminate even if the steering switch is operated when FEB warning lamp is not illuminated.
- FEB warning lamp does not turn off even if the steering switch is operated when FEB warning lamp is illuminated.

NOTE:
The system ON/OFF condition will be memorized even if the ignition switch turns OFF.

Diagnosis Procedure

INFOID:0000000012714191

1.PERFORM THE SELF-DIAGNOSIS

1. Perform “All DTC Reading” with CONSULT.
2. Check if the DTC is detected in self-diagnosis results for “LASER/RADAR” with CONSULT.

Is any DTC detected?

YES >> GO TO 5.
NO >> GO TO 2.

2.STEERING SWITCH INSPECTION

1. Turn ignition switch ON.
2. Check that “FEB SELECT” operates normally in “Data Monitor” for “LASER/RADAR” with CONSULT.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Replace the distance sensor. Refer to BRC-264, "Removal and Installation".

3.FEB WARNING LAMP

1. Select the Active Test item “FEB SELECT” for “LASER/RADAR” with CONSULT.
2. Check if the FEB warning lamp illuminates when the test item is operated.

Is the inspection result normal?

YES >> Refer to BRC-214, "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 steering switch.

Is the inspection result normal?

YES >> Replace the combination meter. MWI-84, "Removal and Installation".
NO >> Replace the distance sensor. Refer to BRC-264, "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 steering switch.

>> Inspection End.

REMOVAL AND INSTALLATION

DISTANCE SENSOR

Removal and Installation

INFOID:0000000012714193

To remove and install the distance sensor, refer to DAS-122, "Removal and Installation".