SECTION BRC
BRAKE CONTROL SYSTEM

CONTENTS

WITHOUT ICC

WITH ICC

PRECAUTION

PRECAUTIONS

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

INFOID:0000000011564762

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

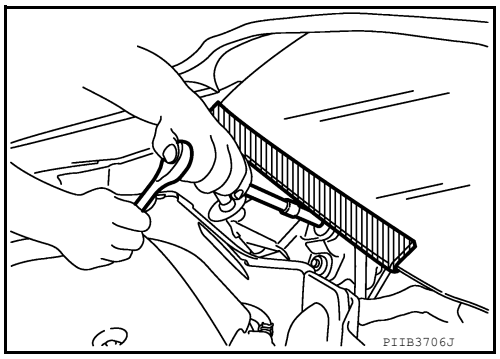
WARNING:

- **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:0000000011241047

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

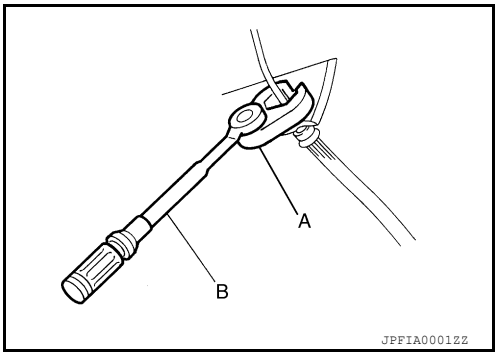
INFOID:0000000011241048

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

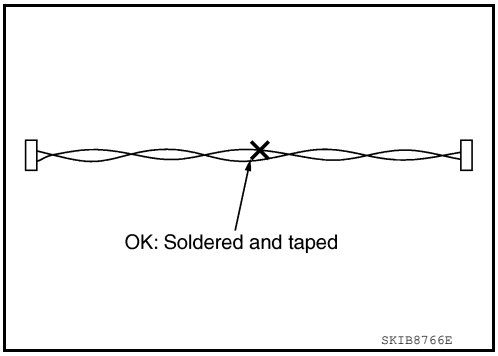
INFOID:0000000011241049

- 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.

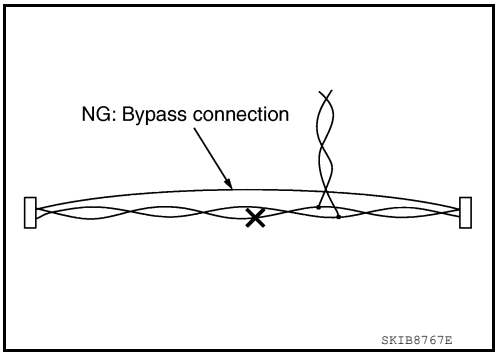
Precaution for Harness Repair

INFOID:0000000011241050

- 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.)



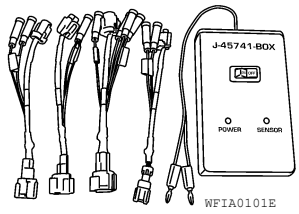
PREPARATION

PREPARATION

Special Service Tool

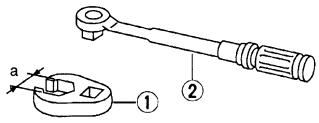
INFOID:0000000011241051

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

Commercial Service Tools

INFOID:0000000011241052

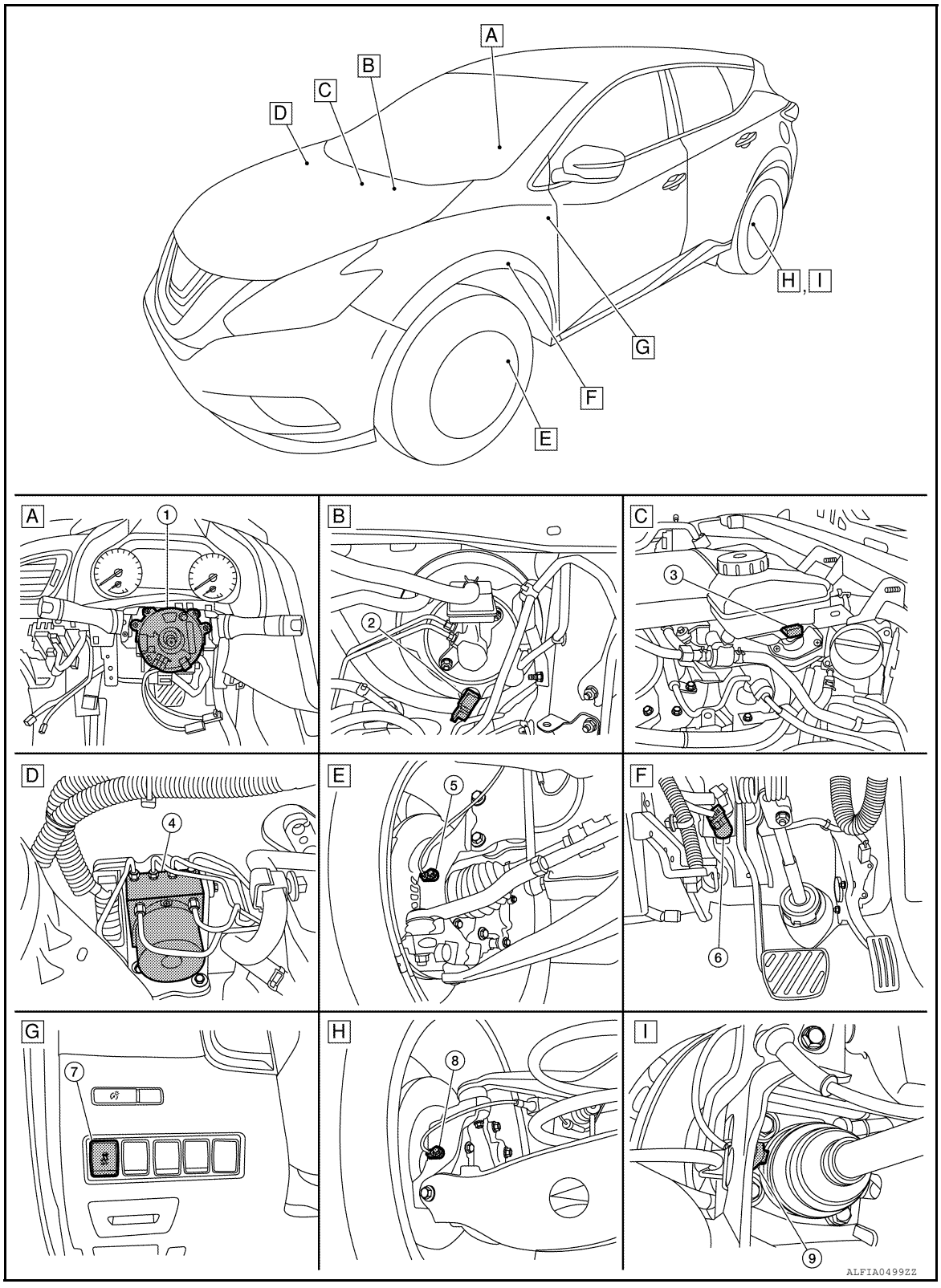
Tool name	Description
1. Flare nut crowfoot 2. Torque wrench  S-NT360	Tightening brake tube flare nuts **a: 10 mm (0.39 in)/12 mm (0.47 in)**
Power tool  PIIB1407E	Loosening nuts, screws and bolts

SYSTEM DESCRIPTION

COMPONENT PARTS

Component Parts Location

INFOID:0000000011241053



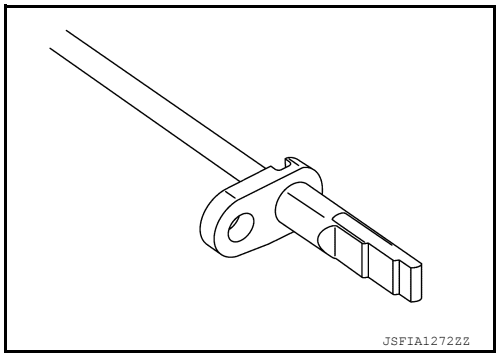
A. Steering column (view with steering wheel removed) B. Engine room left side C. Engine room left side
D. Engine room right side E. Right front wheel area F. Brake pedal area
G. Left side of instrument panel H. Left rear wheel area (FWD models) I. Left rear wheel area (AWD models)

No.	Component parts	Function
1.	Steering angle sensor	BRC-13, "Steering Angle Sensor"
2.	Vacuum sensor	BRC-13, "Vacuum Sensor"
3.	Brake fluid level switch	BRC-13, "Brake Fluid Level Switch"
4.	ABS actuator and electric unit (control unit)	BRC-12, "ABS Actuator and Electric Unit (Control Unit)"
5.	Front LH wheel sensor	BRC-11, "Wheel Sensor and Sensor Rotor"
6.	Stop lamp switch	BRC-13, "Parking Brake Switch"
7.	VDC OFF switch	BRC-13, "VDC OFF Switch"
8.	Rear LH wheel sensor (FWD models)	BRC-11, "Wheel Sensor and Sensor Rotor"
9.	Rear LH wheel sensor (AWD models)	BRC-11, "Wheel Sensor and Sensor Rotor"

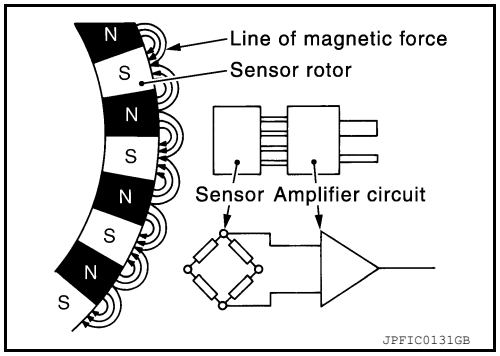
Wheel Sensor and Sensor Rotor

INFOID:0000000011241054

NOTE:
- Wheel sensor of front wheel is installed on steering knuckle.
- Sensor rotor of front wheel is integrated into the 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 an active sensor.



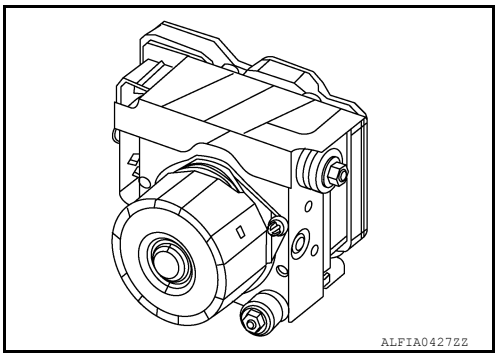
- Power supply is supplied to detection portion so that magnetic field line is read. Magnetic field that is detected is converted to current signal.
- When sensor rotor rotates, magnetic field changes. Magnetic field change is converted to current signals (rectangular wave) and is transmitted to ABS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



ABS Actuator and Electric Unit (Control Unit)

INFOID:0000000011241055

Electric unit (control unit) is integrated with actuator and comprehensively controls VDC function, TCS function, ABS function, EBD function, brake assist function and hill start assist 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 assist function, hill start assist function are activated.

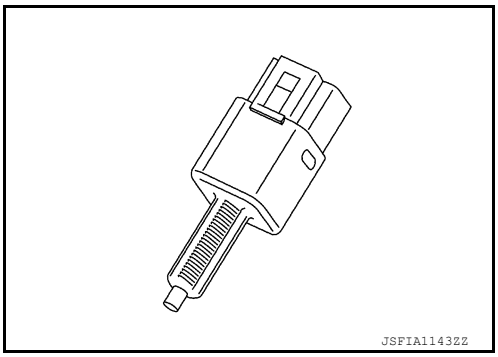
Yaw Rate/Side/Decel G Sensor
Calculates the following information that affects the vehicle and transmits a signal to ABS actuator and electric unit (control unit). [Yaw rate/side/decel G sensor is integrated into the ABS actuator and electric unit (control unit).]

- Vehicle rotation angular velocity (yaw rate signal)
- Vehicle lateral acceleration (side G signal)
- Vehicle longitudinal acceleration (decel G signal)

Stop Lamp Switch

INFOID:0000000011241056

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

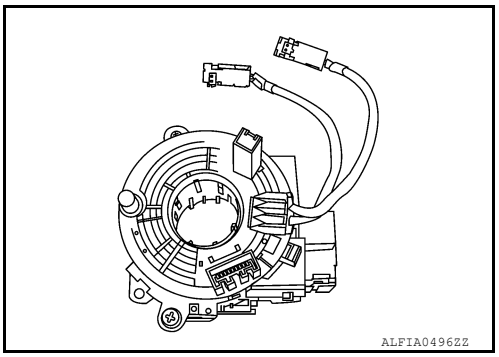


Steering Angle Sensor

INFOID:0000000011241057

Detects the following information and transmits steering angle signal to ABS actuator and electric unit (control unit) via CAN communication:

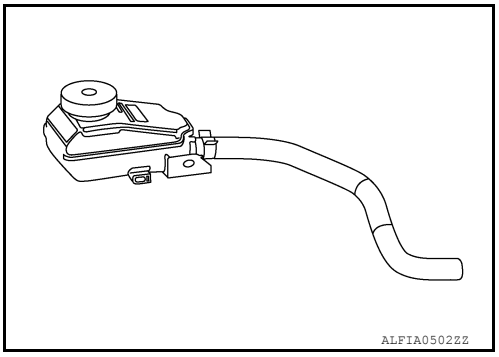
- Steering angle sensor malfunction signal
- Steering wheel rotation amount
- Steering wheel rotation angular velocity
- Steering wheel rotation direction



Brake Fluid Level Switch

INFOID:0000000011241058

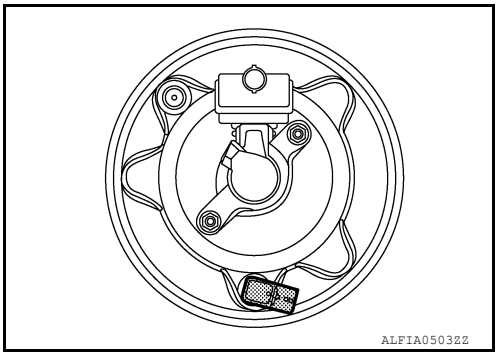
Detects the brake fluid level in reservoir tank and transmits converted electric signal from combination meter to ABS actuator and electric unit (control unit) via CAN communication when brake fluid level is the specified level or less.



Vacuum Sensor

INFOID:0000000011241059

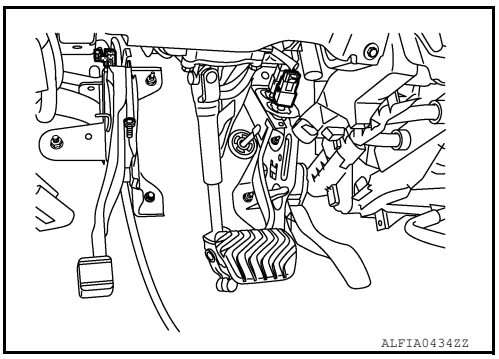
Detects the vacuum in brake booster and transmits converted electric signal to ABS actuator and electric unit (control unit).



Parking Brake Switch

INFOID:0000000011241060

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



VDC OFF Switch

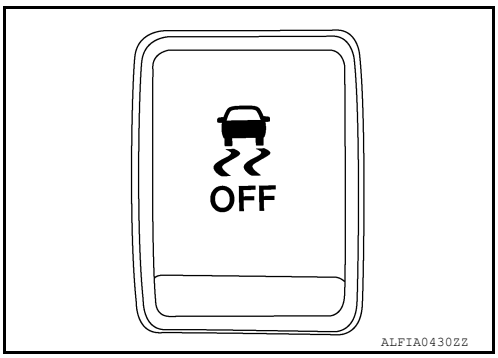
INFOID:0000000011241061

- 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).
- Vehicle Dynamic Control function
- Traction Control System function
- Forward Emergency Braking function

NOTE:
ABS function, EBD function operate.

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

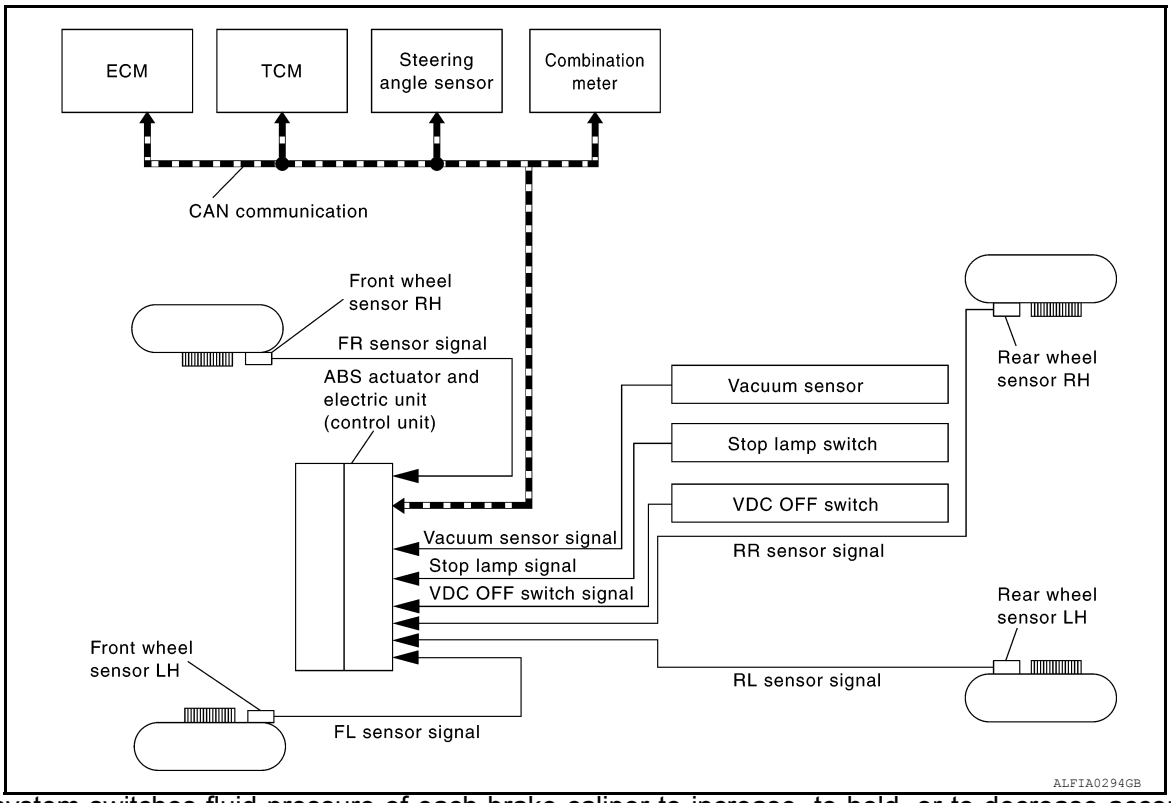


SYSTEM

System Description

INFOID:0000000011676134

SYSTEM DIAGRAM



- 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, TCS, ABS and EBD, hill start and brake assist functions.
- Fail-safe function is available for each function and is activated by each function when system malfunction occurs.

INPUT SIGNAL AND OUTPUT SIGNAL

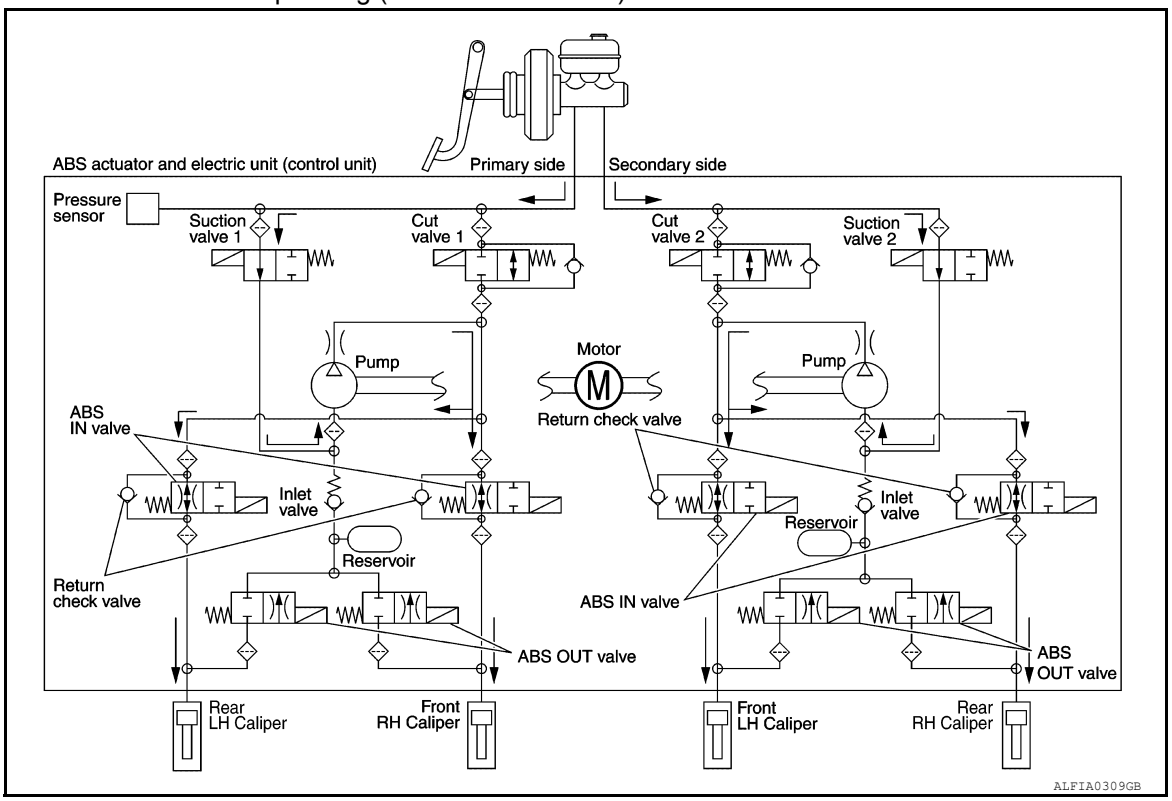
Major signal transmission between each unit via communication lines is shown in the following table.

Component	Signal description
Steering angle sensor	Transmits the steering angle sensor signal to ABS actuator and electric unit (control unit) via CAN communication.
ECM	Transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • Accelerator pedal position signal • Engine speed signal • Target throttle position signal
TCM	Transmits the current gear position signal to ABS actuator and electric unit (control unit) via CAN communication.
Combination meter	Transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • Brake fluid level switch signal • Parking brake switch signal Receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. • ABS warning lamp signal • Brake warning lamp signal • VDC OFF indicator lamp signal • Slip indicator lamp signal

VALVE OPERATION (VDC AND TCS FUNCTIONS)

The control unit built in the ABS actuator and electric unit (control unit) controls fluid pressure of the brake calipers by operating each valve.

VDC and TCS Functions are Operating (Pressure Increases)



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

Front RH brake caliper

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

Front LH brake caliper

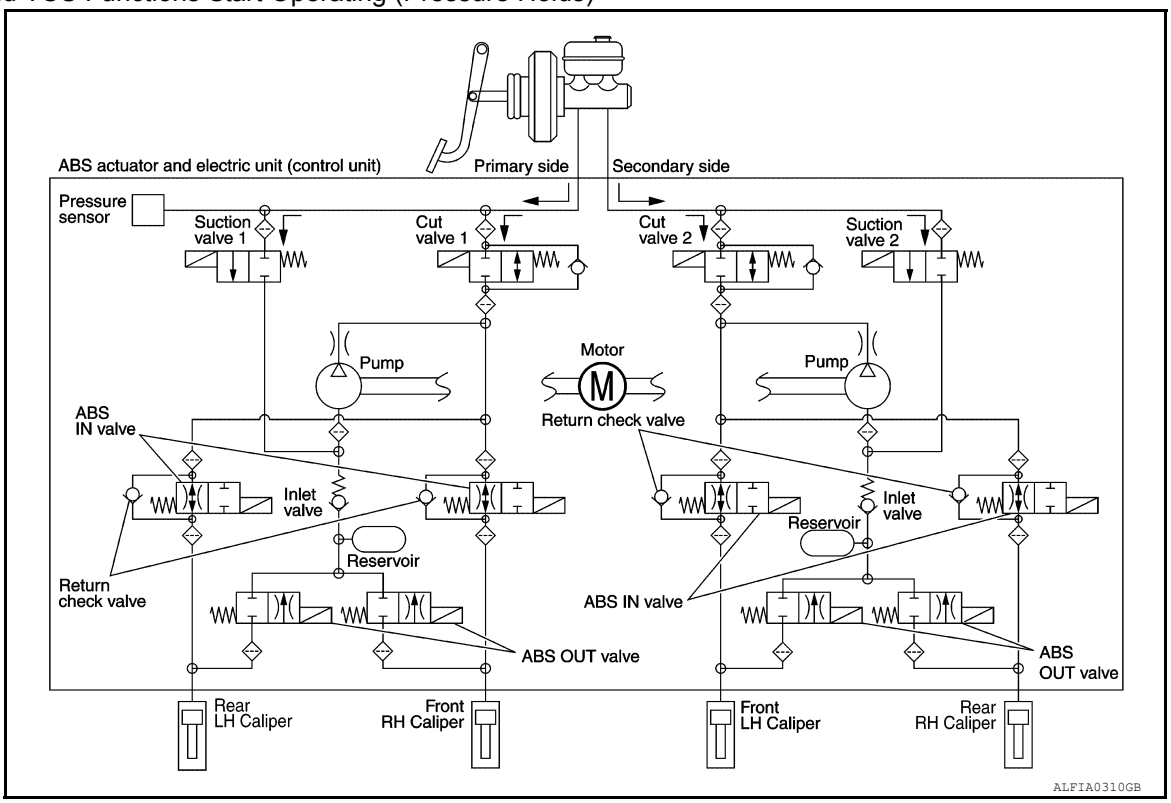
- Brake fluid is conveyed to the pump from the master cylinder through suction valve 2 and is pressurized by the pump operation. The pressurized brake fluid is supplied to the front LH brake caliper through the ABS IN valve. For the right caliper, brake fluid pressure is maintained because the pressurization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

Rear RH brake caliper

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

Rear LH brake caliper
- Brake fluid is conveyed to the pump from the master cylinder through suction valve 1 and is pressurized by the pump operation. The pressurized brake fluid is supplied to the rear LH brake caliper through the ABS IN valve. For the right caliper, brake fluid pressure is maintained because the pressurization is unnecessary. The pressurization for the right caliper is controlled separately from the left caliper.

VDC and TCS Functions Start Operating (Pressure Holds)



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

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

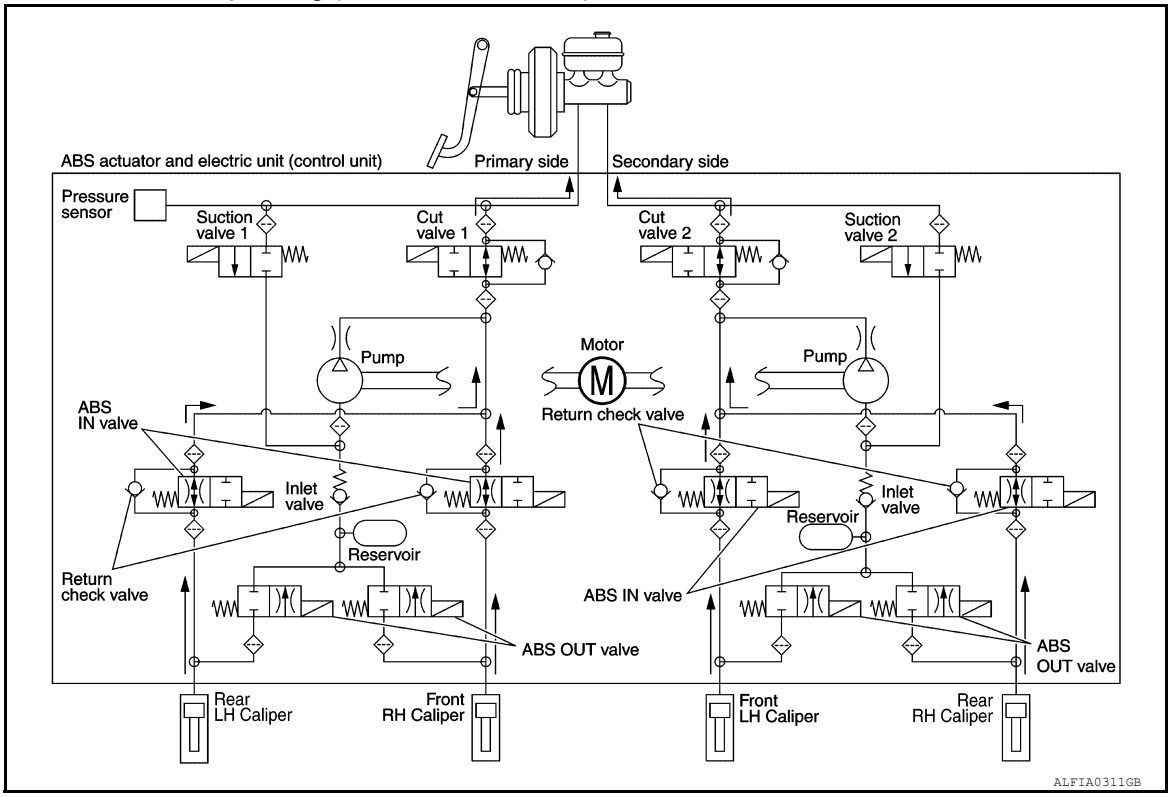
Front LH brake caliper
- Since the cut valve 2 and the suction valve 2 are closed, the front LH brake caliper, master cylinder, and reservoir are blocked. This maintains fluid pressure applied on the front LH brake caliper. The pressurization for the right caliper is controlled separately from the left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

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

Rear LH brake caliper

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

VDC and TCS Functions Operating (Pressure Decreases)



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

Front RH brake caliper

- Since the suction valve 1 and the ABS OUT valve are closed and the cut valve 1 and the ABS IN valve are open, the fluid pressure applied on the front RH brake caliper is reduced by supplying the fluid pressure to the master cylinder via the ABS IN valve and the cut valve 1. The pressurization for the right caliper is controlled separately from the left caliper.

Front LH brake caliper

- Since the suction valve 2 and the ABS OUT valve are closed and the cut valve 2 and the ABS IN valve are open, the fluid pressure applied on the front LH brake caliper is reduced by supplying the fluid pressure to the master cylinder via the ABS IN valve and the cut valve 2. The pressurization for the left caliper is controlled separately from the right caliper.

Rear RH brake caliper

- Since the suction valve 2 and the ABS OUT valve are closed and the cut valve 2 and the ABS IN valve are open, the fluid pressure applied on the rear RH brake caliper is reduced by supplying the fluid pressure to the master cylinder via the ABS IN valve and the cut valve 2. The pressurization for the right caliper is controlled separately from the left caliper.

Rear LH brake caliper
- Since the suction valve 1 and the ABS OUT valve are closed and the cut valve 1 and the ABS IN valve are open, the fluid pressure applied on the rear LH brake caliper is reduced by supplying the fluid pressure to the master cylinder via the ABS IN valve and the cut valve 1. The pressurization for the left caliper is controlled separately from the right caliper.

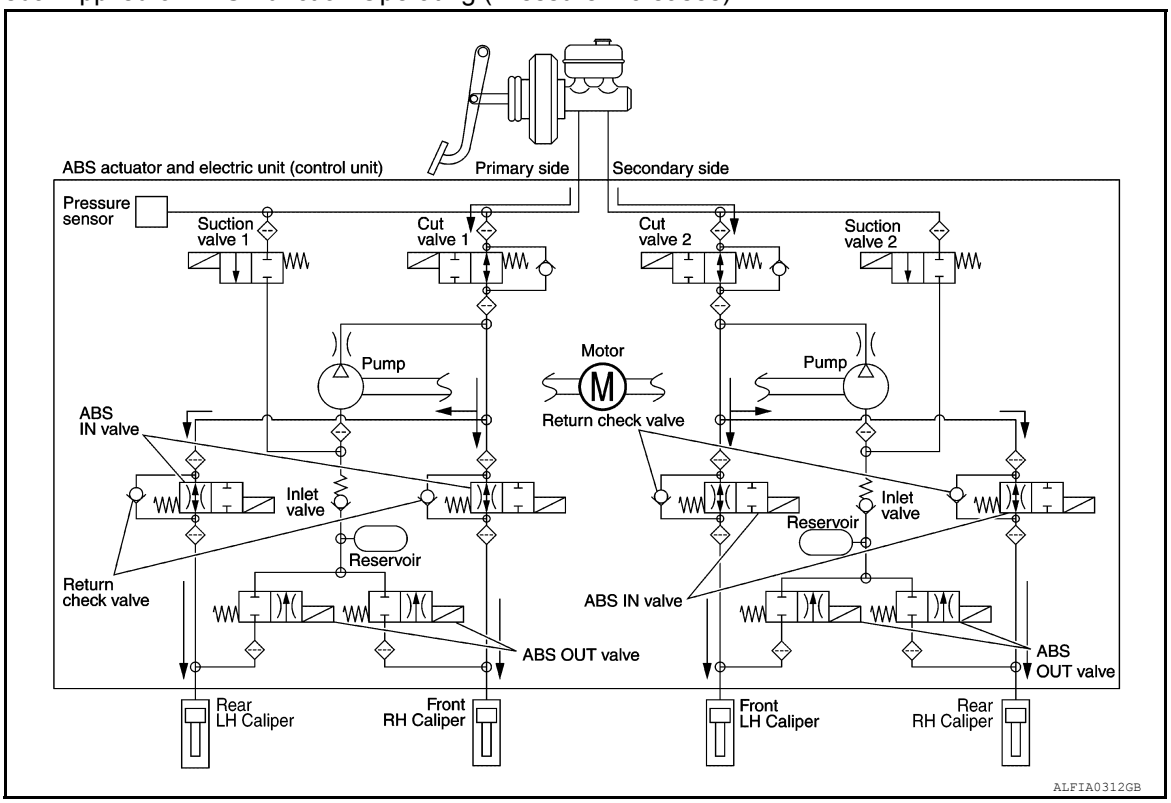
Component Parts and Function

Component	Function
Pump	Returns the brake fluid reserved in reservoir to master cylinder by reducing pressure.
Motor	Activates the pump according to signals from ABS actuator and electric unit (control unit).
Cut valve 1 Cut valve 2	Shuts off the ordinary brake line from master cylinder.
Suction valve 1 Suction valve 2	Supplies the brake fluid from master cylinder to the pump.
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.
Reservoir	Temporarily reserves the brake fluid drained from brake caliper, so that pressure efficiently decreases when decreasing pressure of brake caliper.
Pressure sensor	Detects the brake fluid pressure and transmits signal to ABS actuator and electric unit (control unit).

VALVE OPERATION (ABS AND EBD FUNCTIONS)

The control unit built into the ABS actuator and electric unit (control unit) controls fluid pressure of the brake calipers by operating each valve.

Brake Pedal Applied or ABS Function Operating (Pressure Increases)



Name	Not activated	During pressure increases
Cut valve 1	Power supply is not supplied (open)	Power supply is not supplied (open)
Cut valve 2	Power supply is not supplied (open)	Power supply is not supplied (open)
Suction valve 1	Power supply is not supplied (close)	Power supply is not supplied (close)

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

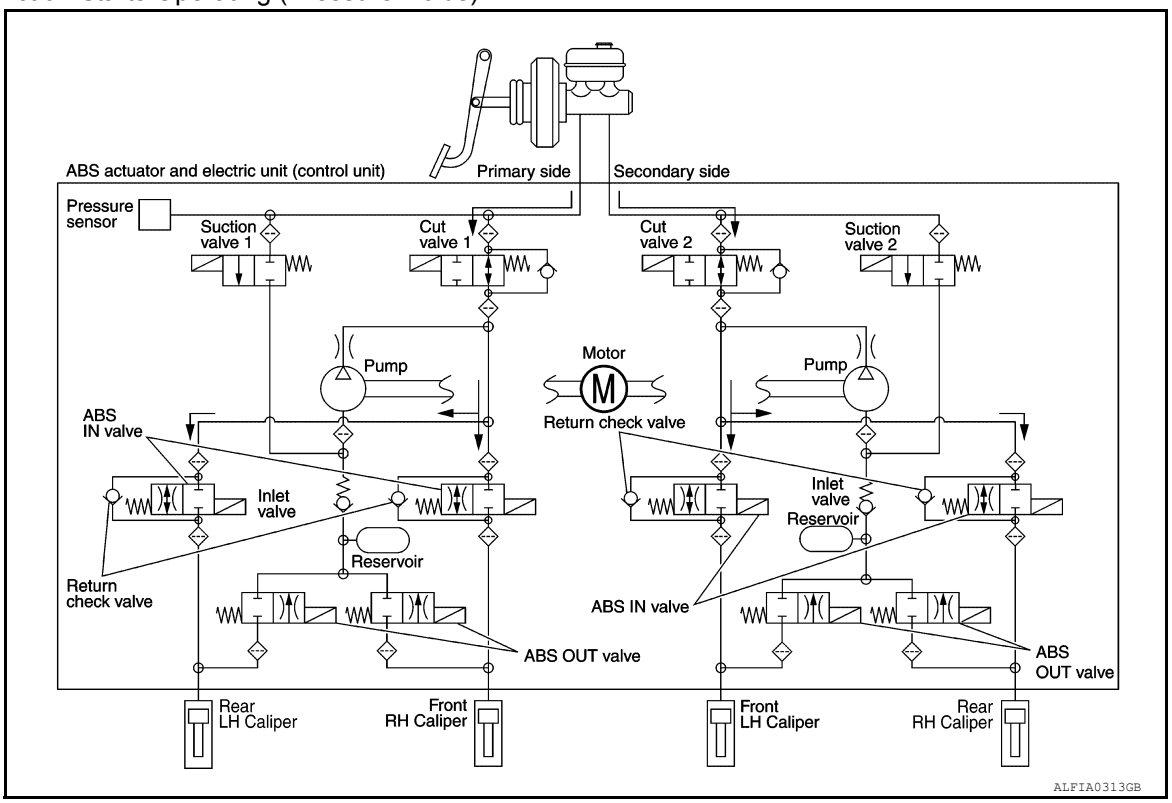
Front RH brake caliper
- When the cut valve 1 and the ABS IN valve opens, brake fluid is supplied to the front RH brake caliper from the master cylinder through the ABS IN valve. Brake fluid does not flow into the reservoir because the ABS OUT valve is closed.

Front LH brake caliper
- When the cut valve 2 and the ABS IN valve opens, brake fluid is supplied to the front LH brake caliper from the master cylinder through the ABS IN valve. Brake fluid does not flow into the reservoir because the ABS OUT valve is closed.

Rear RH brake caliper
- When the cut valve 2 and the ABS IN valve opens, brake fluid is supplied to the rear RH brake caliper from the master cylinder through the ABS IN valve. Brake fluid does not flow into the reservoir because the ABS OUT valve is closed.

Rear LH brake caliper
- When the cut valve 1 and the ABS IN valve opens, brake fluid is supplied to the rear LH brake caliper from the master cylinder through the ABS IN valve. Brake fluid does not flow into the reservoir because the ABS OUT valve is closed.

ABS Function Starts Operating (Pressure Holds)



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

Name	Not activated	During pressure holds
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 brake caliper (fluid pressure)	—	Pressure holds

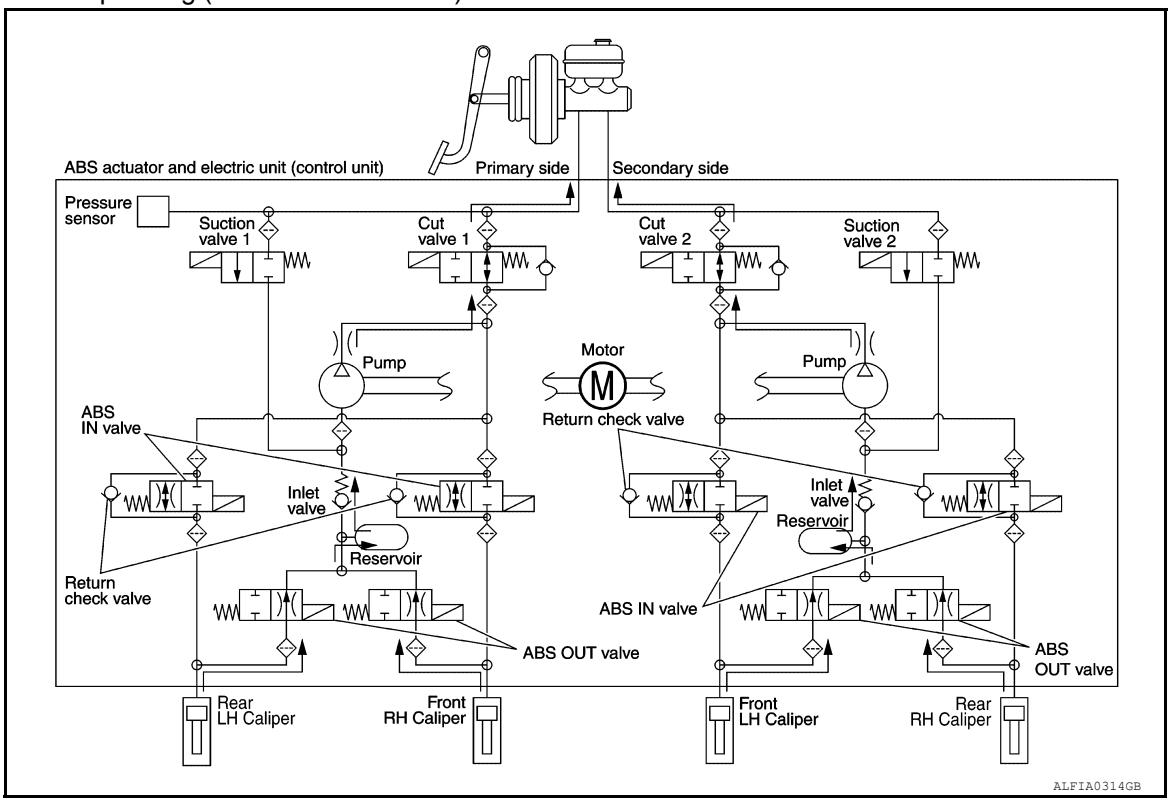
Front RH brake caliper
- Since the ABS IN valve and the ABS OUT valve are closed, the front RH brake caliper, master cylinder, and reservoir are blocked. This maintains fluid pressure applied on the front RH brake caliper.

Front LH brake caliper
- Since the ABS IN valve and the ABS OUT valve are closed, the front LH brake caliper, master cylinder, and reservoir are blocked. This maintains fluid pressure applied on the front LH brake caliper.

Rear RH brake caliper
- Since the ABS IN valve and the ABS OUT valve are closed, the rear RH brake caliper, master cylinder, and reservoir are blocked. This maintains fluid pressure applied on the rear RH brake caliper.

Rear LH brake caliper
- Since the ABS IN valve and the ABS OUT valve are closed, the rear LH brake caliper, master cylinder, and reservoir are blocked. This maintains fluid pressure applied on the rear LH brake caliper.

ABS Function Operating (Pressure Decreases)



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

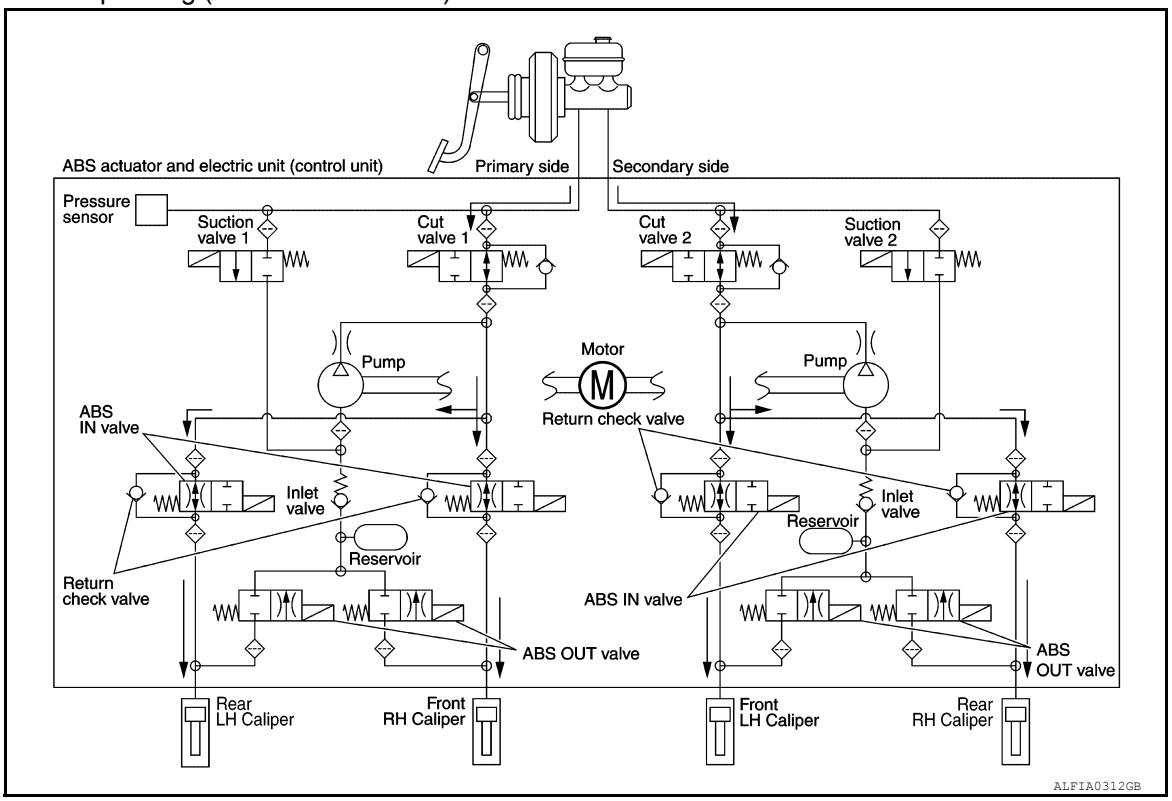
Front RH brake caliper
- Since the ABS IN valve is closed and the ABS OUT valve is opened, fluid pressure applied on the front RH brake caliper is supplied to the reservoir through the ABS OUT valve. This fluid pressure decreases when sent to the master cylinder by the pump.

Front LH brake caliper
- Since the ABS IN valve is closed and the ABS OUT valve is opened, fluid pressure applied on the front LH brake caliper is supplied to the reservoir through the ABS OUT valve. This fluid pressure decreases when sent to the master cylinder by the pump.

Rear RH brake caliper
- Since the ABS IN valve is closed and the ABS OUT valve is opened, fluid pressure applied on the rear RH brake caliper is supplied to the reservoir through the ABS OUT valve. This fluid pressure decreases when sent to the master cylinder by the pump.

Rear LH brake caliper
- Since the ABS IN valve is closed and the ABS OUT valve is opened, fluid pressure applied on the rear LH brake caliper is supplied to the reservoir through the ABS OUT valve. This fluid pressure decreases when sent to the master cylinder by the pump.

ABS Function Operating (Pressure Increases)



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

Front RH brake caliper
- Brake fluid is supplied to the front RH brake caliper from the master cylinder through the cut valve 1 and the ABS IN valve. Since the suction valve 1 and the ABS OUT valve is closed, the fluid does not flow into the

reservoir. The amount of brake fluid supplied to the front RH brake caliper from the master cylinder is controlled according to time that the ABS IN valve is not energized (time that the ABS IN valve is open).

Front LH brake caliper

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

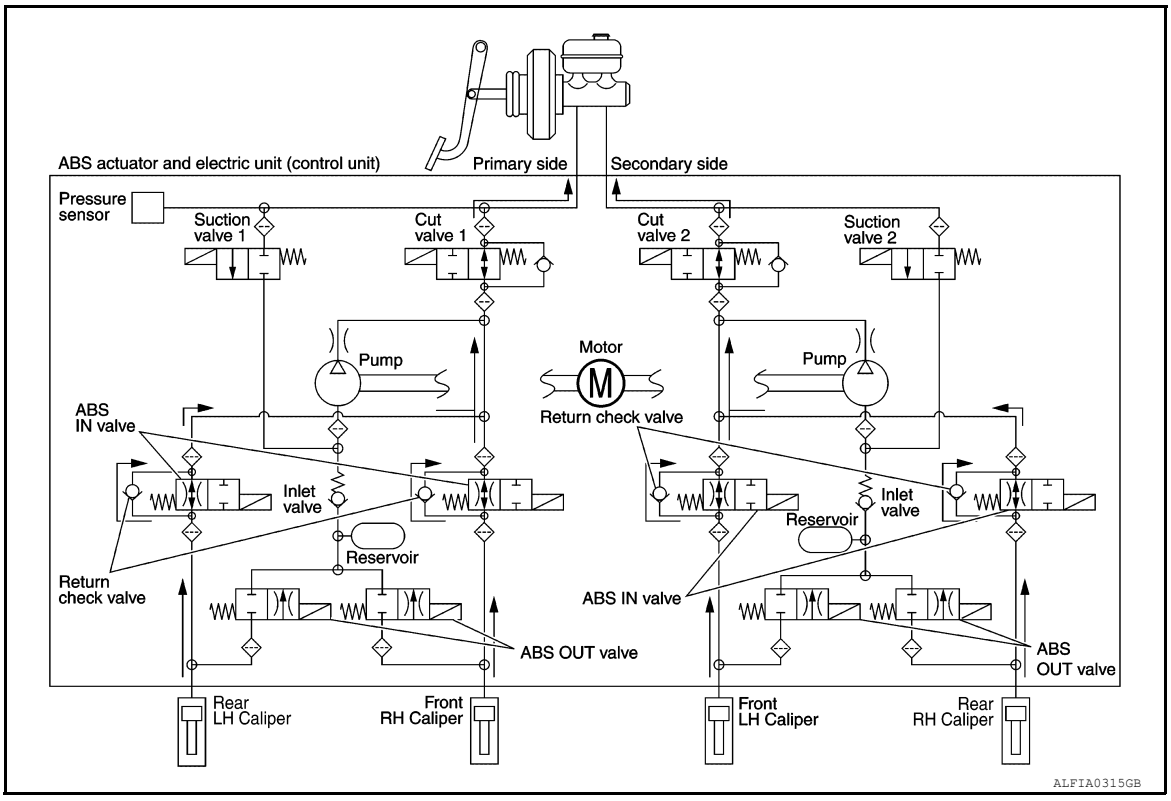
Rear RH brake caliper

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

Rear LH brake caliper

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

Brake Release



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

Front RH brake caliper

• Brake fluid is supplied to the front RH brake caliper through the return check valve of the ABS IN valve and the cut valve 1, and returns to the master cylinder.

Front LH brake caliper
• Brake fluid is supplied to the front LH brake caliper through the return check valve of the ABS IN valve and the cut valve 2, and returns to the master cylinder.

Rear RH brake caliper
• Brake fluid is supplied to the rear RH brake caliper through the return check valve of the ABS IN valve and the cut valve 2, and returns to the master cylinder.

Rear LH brake caliper
• Brake fluid is supplied to the rear LH brake caliper through the return check valve of the ABS IN valve and the cut valve 1, and returns to the master cylinder.

Component Parts and Function

Component	Function
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).
Cut valve 1 Cut valve 2	Shuts off the ordinary brake line from master cylinder.
Suction valve 1 Suction valve 2	Supplies the brake fluid from master cylinder to the pump.
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.
Reservoir	Temporarily reserves the brake fluid drained from brake caliper, so that pressure efficiently decreases when decreasing pressure of brake caliper.
Pressure sensor	Detects the brake fluid pressure and transmits signal to ABS actuator and electric unit (control unit).

CONDITIONS FOR INDICATOR LAMP ILLUMINATION

• Turns ON when VDC and TCS functions 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	Slip indicator lamp
Ignition switch OFF	OFF	OFF
For approx. 1 second after the ignition switch is turned ON	ON	ON
Approx. 2 seconds after ignition switch is turned ON (when the system is in normal operation)	OFF	OFF
When VDC OFF switch is ON (VDC function and TCS function are OFF)	ON	OFF
VDC function is malfunctioning	OFF	ON
TCS function is malfunctioning	OFF	ON

CONDITIONS FOR WARNING LAMP ILLUMINATION

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
Ignition switch OFF	OFF	OFF
For approx. 1 second after the ignition switch is turned ON	ON	ON

Condition (status)	ABS warning lamp	Brake warning lamp
Approx. 2 second after ignition switch is turned ON (when the system is in normal operation)	OFF	OFF
After engine starts	OFF	OFF
When parking brake operates (parking brake switch ON)	OFF	ON
When brake fluid is less than the specified level (brake fluid level switch ON)	OFF	ON
When vacuum sensor is malfunctioning	OFF	ON
VDC function is malfunctioning	OFF	OFF
TCS function is malfunctioning	OFF	OFF
ABS function is malfunctioning	ON	OFF
EBD function is malfunctioning	ON	ON
VDC function is operating	OFF	OFF
TCS function is operating	OFF	OFF
Hill start assist function	OFF	OFF
Brake assist	OFF	OFF

Fail-safe

INFOID:0000000011820454

VDC AND TCS FUNCTIONS

VDC warning lamp in combination meter turns ON when a malfunction occurs in system [ABS actuator and electric unit (control unit)]. The control is suspended for VDC and TCS functions. However, ABS and EBD functions operate normally.

ABS FUNCTION

ABS warning lamp and SLIP indicator 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, TCS and ABS functions. However, EBD functions operate normally.

EBD FUNCTION

ABS warning lamp, brake warning lamp and SLIP indicator 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, TCS, ABS and EBD functions.

DTC	Malfunction detected condition	Fail-safe condition
C1101	When an open circuit is detected in rear RH wheel sensor circuit.	The following functions are suspended: • VDC • ABS • EBD (only when both rear wheels are malfunctioning) • Brake assist function • Hill start assist function
C1102	When an open circuit is detected in rear LH wheel sensor circuit.	
C1103	When an open circuit is detected in front RH wheel sensor circuit.	
C1104	When an open circuit is detected in front LH wheel sensor circuit.	
C1105	• When a short circuit is detected in rear RH wheel sensor circuit. • When power supply voltage of rear RH wheel sensor is in following state. - Rear RH wheel sensor power supply voltage: 7.2 V ≥ Rear RH wheel sensor power supply voltage • When distance between rear RH wheel sensor and rear RH wheel sensor rotor is large. • When installation of rear RH wheel sensor or rear RH wheel sensor rotor is not normal.	
C1106	• When a short circuit is detected in rear LH wheel sensor circuit. • When power supply voltage of rear LH wheel sensor is in following state. - Rear LH wheel sensor power supply voltage: 7.2 V ≥ Rear LH wheel sensor power supply voltage • When distance between rear LH wheel sensor and rear LH wheel sensor rotor is large. • When installation of rear LH wheel sensor or rear LH wheel sensor rotor is not normal.	
C1107	• When a short circuit is detected in front RH wheel sensor circuit. • When power supply voltage of front RH wheel sensor is in following state. - Front RH wheel sensor power supply voltage: 7.2 V ≥ Front RH wheel sensor power supply voltage • When distance between front RH wheel sensor and front RH wheel sensor rotor is large. • When installation of front RH wheel sensor or front RH wheel sensor rotor is not normal.	
C1108	• When a short circuit is detected in front LH wheel sensor circuit. • When power supply voltage of front LH wheel sensor is in following state. - Front LH wheel sensor power supply voltage: 7.2 V ≥ Front LH wheel sensor power supply voltage • When distance between front LH wheel sensor and front LH wheel sensor rotor is large. • When installation of front LH wheel sensor or front LH wheel sensor rotor is not normal.	
C1109	• When ignition 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.	The following functions are suspended: • VDC • TCS • ABS • EBD • Brake assist function • Hill start assist function
C1110	When there is an internal malfunction in the ABS actuator and electric unit (control unit).	
C1111	When a malfunction is detected in motor or motor relay.	The following functions are suspended: • VDC • TCS • ABS • Brake assist function • Hill start assist function
C1113	When a malfunction is detected in longitudinal G signal.	The following functions are suspended: • VDC • TCS • Brake assist function • Hill start assist function

DTC	Malfunction detected condition	Fail-safe condition
C1115	When difference in wheel speed between any wheel and others is detected when the vehicle is driven, because of installation of tires other than specified.	The following functions are suspended: • VDC • TCS • ABS • EBD • Brake assist function • Hill start assist function
C1116	When stop lamp switch signal is not input when brake pedal operates.	The following functions are suspended: • VDC • TCS • Brake assist function • Hill start assist function
C1120	When a malfunction is detected in front LH ABS IN valve.	The following functions are suspended: • VDC • TCS • ABS • EBD • Brake assist function • Hill start assist function
C1121	When a malfunction is detected in front LH ABS OUT valve.	
C1122	When a malfunction is detected in front RH ABS IN valve.	
C1123	When a malfunction is detected in front RH ABS OUT valve.	
C1124	When a malfunction is detected in rear LH ABS IN valve.	
C1125	When a malfunction is detected in rear LH ABS OUT valve.	
C1126	When a malfunction is detected in rear RH ABS IN valve.	
C1127	When a malfunction is detected in rear RH ABS OUT valve.	
C1130	When a malfunction is detected in ECM system.	The following functions are suspended: • VDC • TCS • Hill start assist function
C1140	When a malfunction is detected in actuator relay.	The following functions are suspended: • VDC • TCS • ABS • EBD • Brake assist function • Hill start assist function
C1142	When a malfunction is detected in VDC pressure sensor.	The following functions are suspended: • VDC • TCS • Brake assist function • Hill start assist function
C1143	When a malfunction is detected in steering angle sensor.	
C1144	When neutral position adjustment of steering angle sensor is not complete.	
C1145	When a malfunction is detected in yaw rate signal, or signal line of yaw rate/side/decel G sensor is open or shorted.	
C1146	When a malfunction is detected in side G signal, or signal line of yaw rate/side/decel G sensor is open or shorted.	
C1153	When ABS actuator and electric unit (control unit) is malfunctioning. (Pressure increase is too much or too little.)	The following functions are suspended: • VDC • TCS • ABS • Brake assist function • Hill start assist function
C1154	When an open or short is detected between the ABS actuator and electrical unit (control unit) and TCM	

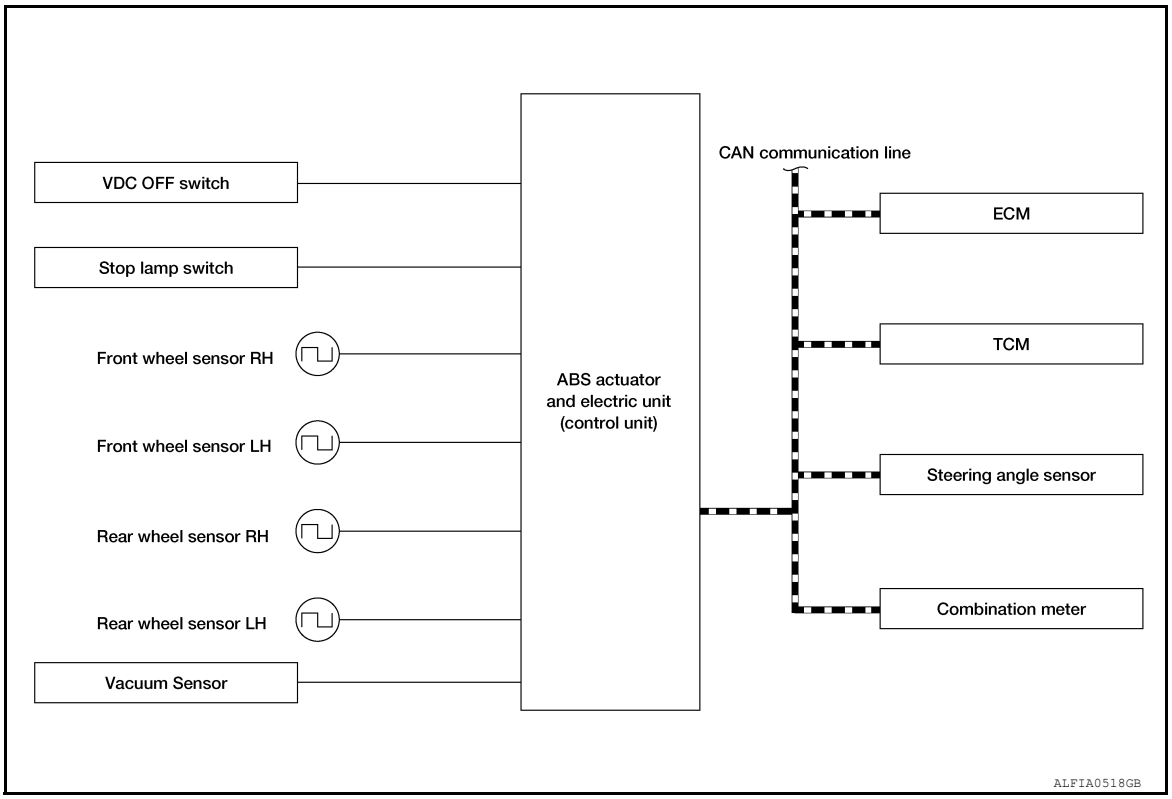
DTC	Malfunction detected condition	Fail-safe condition
C1155	When brake fluid level low signal is detected.	The following functions are suspended: • VDC • TCS • Brake assist function • Hill start assist function
C1160	When calibration of yaw rate/side/decel G sensor is not complete.	
C1164	When a malfunction is detected in cut valve 1.	
C1165	When a malfunction is detected in cut valve 2.	
C1166	When a malfunction is detected in suction valve 1.	
C1167	When a malfunction is detected in suction valve 2.	
C1170	When the information in ABS actuator and electric unit (control unit) is not the same.	The following functions are suspended: • VDC • TCS • ABS • Brake assist function • Hill start assist function
C1197	When a malfunction is detected in vacuum sensor.	Electrical vacuum assistance of brake booster is suspended.
C1198	• When an open circuit is detected in vacuum sensor circuit. • When a short circuit is detected in vacuum sensor circuit. • When a malfunction is detected in vacuum sensor noise.	
C1199	When brake booster vacuum is approx. 0 kPa (0 mmHg) during engine running.	—
C119A	When a malfunction is detected in supply power voltage of vacuum sensor.	Electrical vacuum assistance of brake booster is suspended.
U1000	When CAN communication signal is not continuously transmitted or received for 2 seconds or more.	The following functions are suspended: • VDC • TCS • Hill start assist function
U1002	When ABS actuator and electric unit (control unit) is not transmitting or receiving CAN communication signal for 2 seconds or less.	

VDC FUNCTION

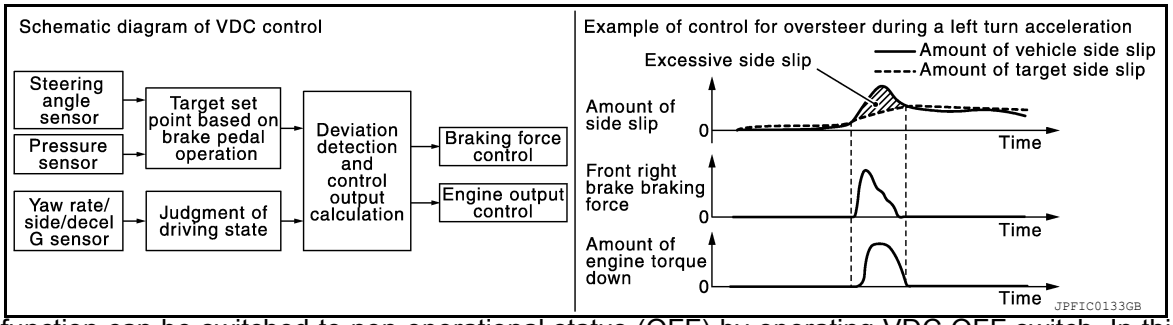
VDC FUNCTION : System Description

INFOID:0000000011241065

SYSTEM DIAGRAM



- Side slip or tail slip may occur while driving on a slippery road or intending 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 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 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 assist function and hill start assist function. However, ABS function and EBD function are operated normally. Refer to BRC-47, "Fail-Safe".

INPUT SIGNAL AND OUTPUT SIGNAL

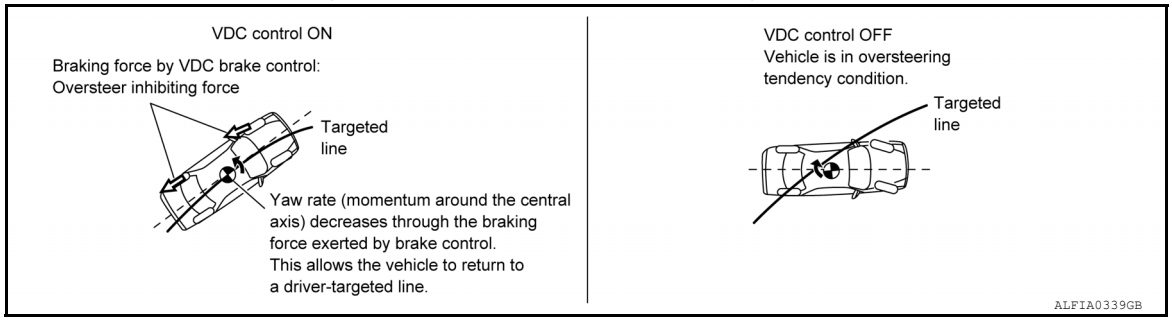
Major signal transmission between each unit via communication lines is shown in the following table:

Component	Signal description
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
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

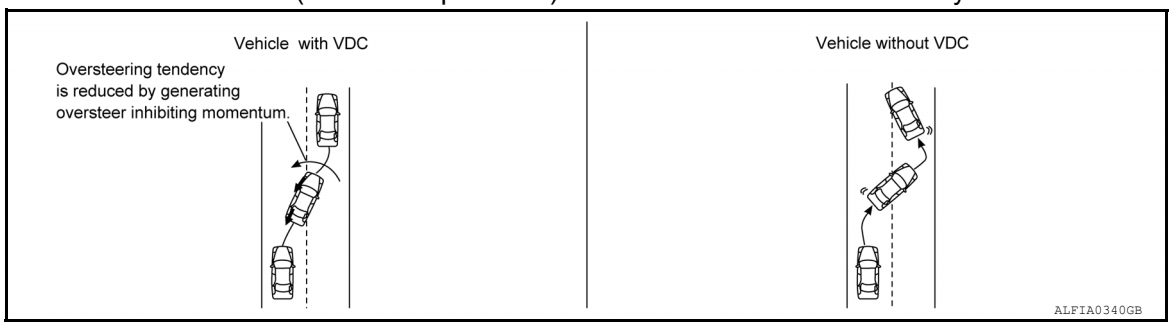
OPERATION CHARACTERISTICS

VDC Function That Prevents Oversteer Tendency

- During 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.

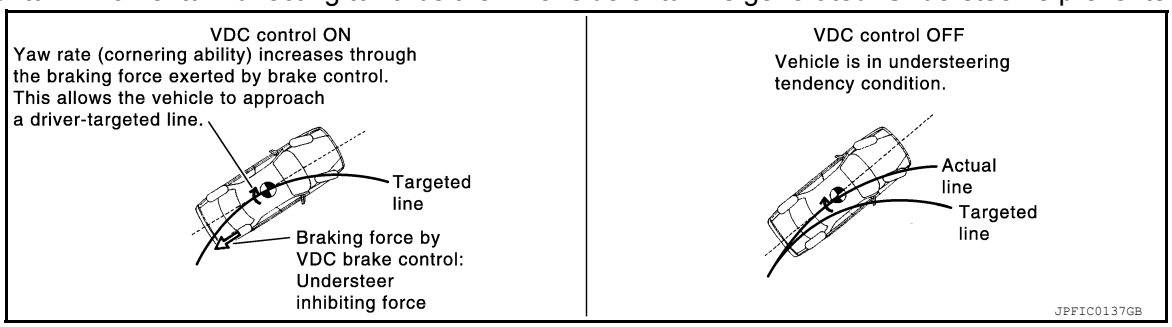


- Changing driving lane on a slippery road when oversteer tendency is judged large, engine output is controlled as well as brake force (brake fluid pressure) of 4 wheels. Oversteer tendency decreases.

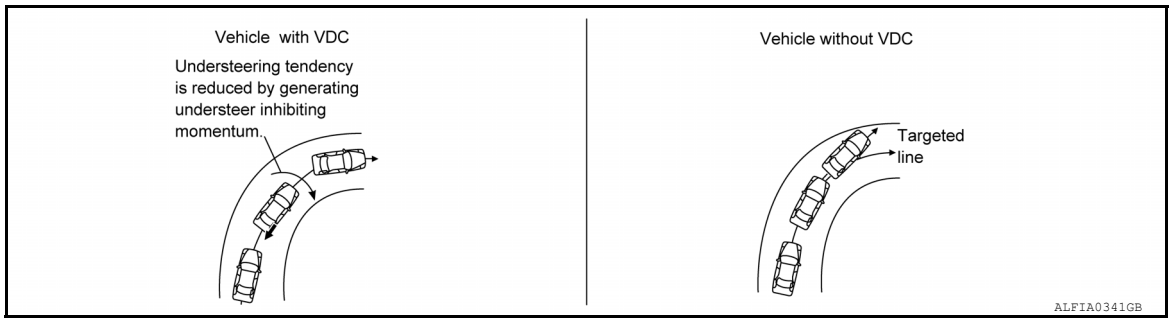


VDC Function That Prevents Understeer Tendency

- During 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 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.

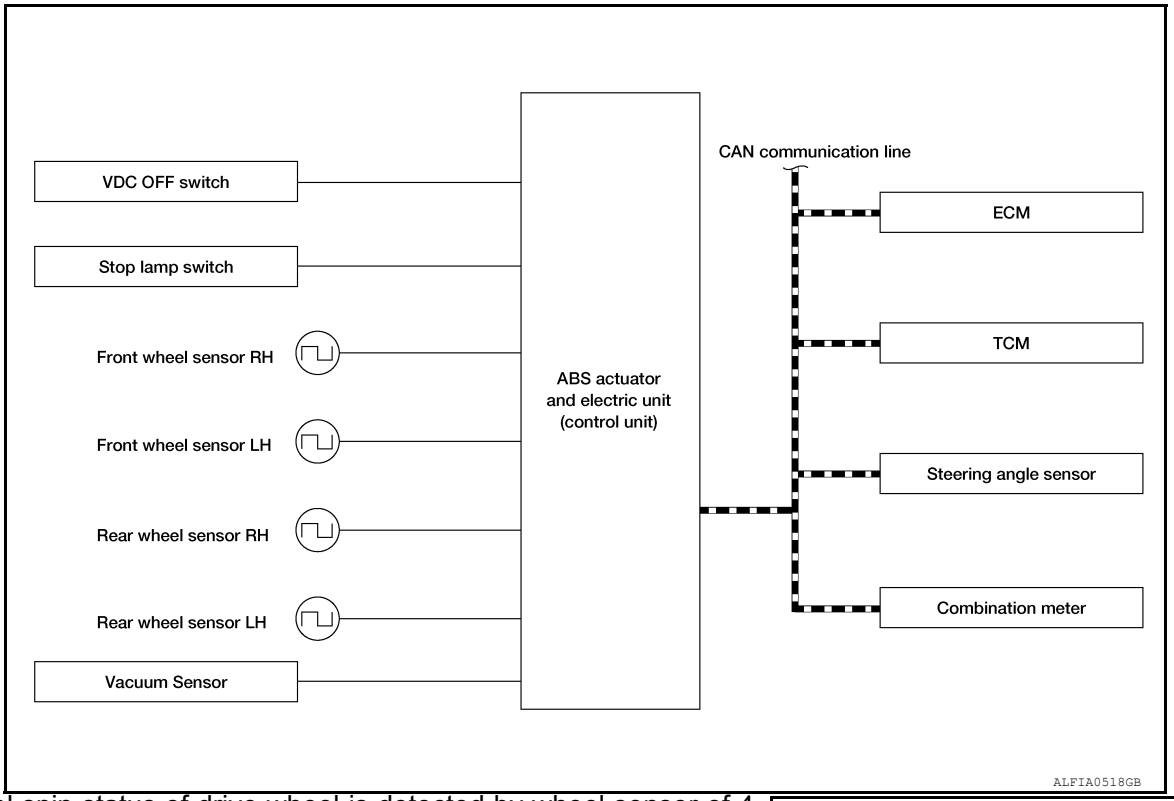


TCS FUNCTION

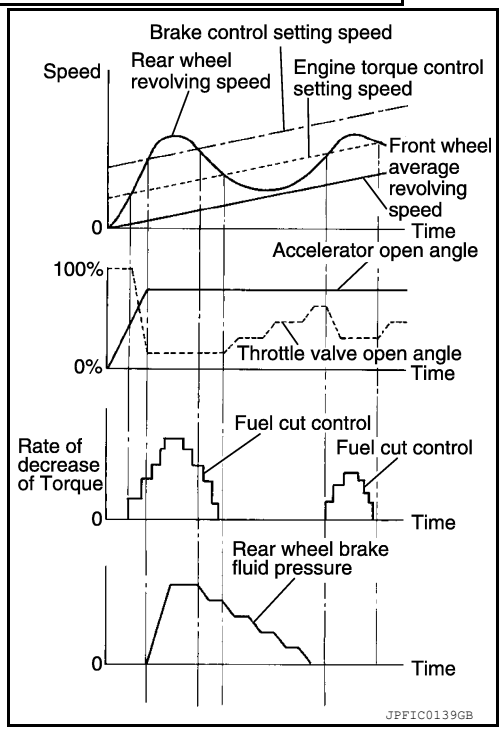
TCS FUNCTION : System Description

INFOID:0000000011241066

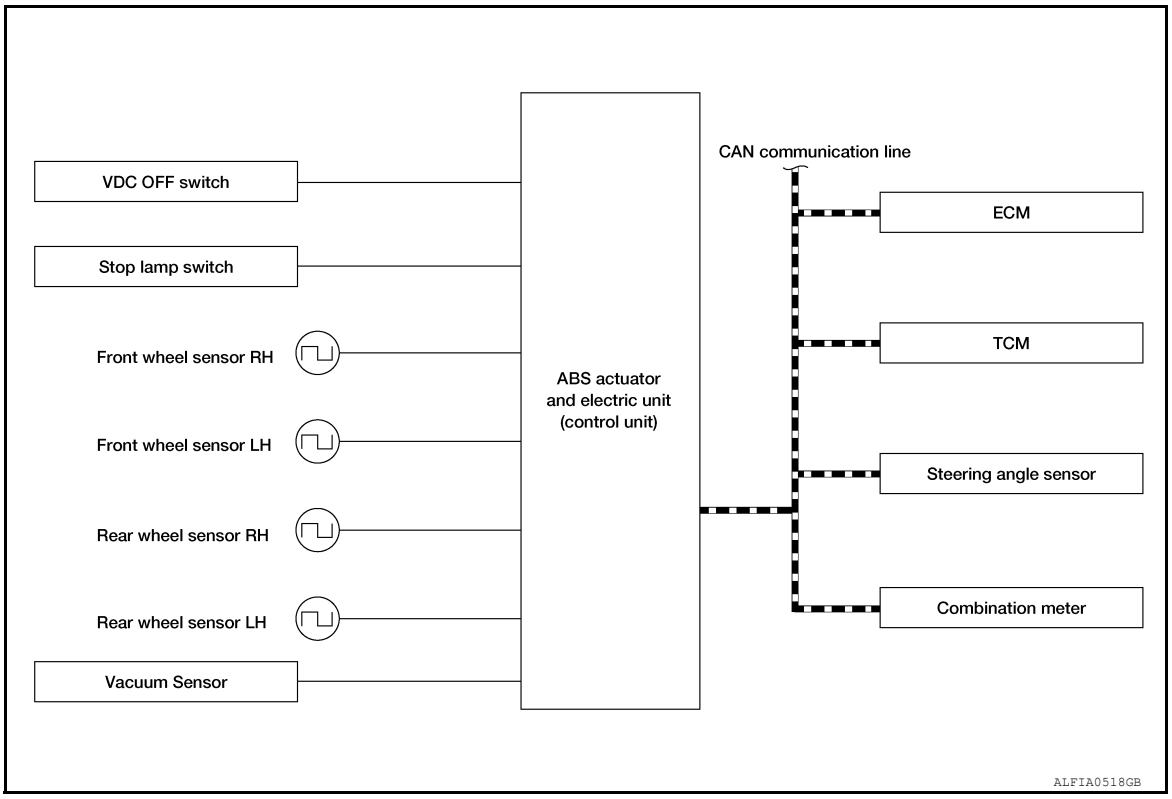
SYSTEM DIAGRAM



- Wheel spin status of drive wheel is detected by wheel sensor of 4 wheels. Engine output and transmission shift status are 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) performs brake force control of LH and RH drive wheels (applies brake force by increasing brake fluid pressure of drive wheel) and decreases 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 assist function and hill start assist function. The vehicle status becomes the same as models without VDC function, TCS function, brake assist function and hill start assist function. However, ABS function and EBD function are operated normally. Refer to BRC-47, "Fail-Safe".



SYSTEM DIAGRAM



INPUT SIGNAL AND OUTPUT SIGNAL

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

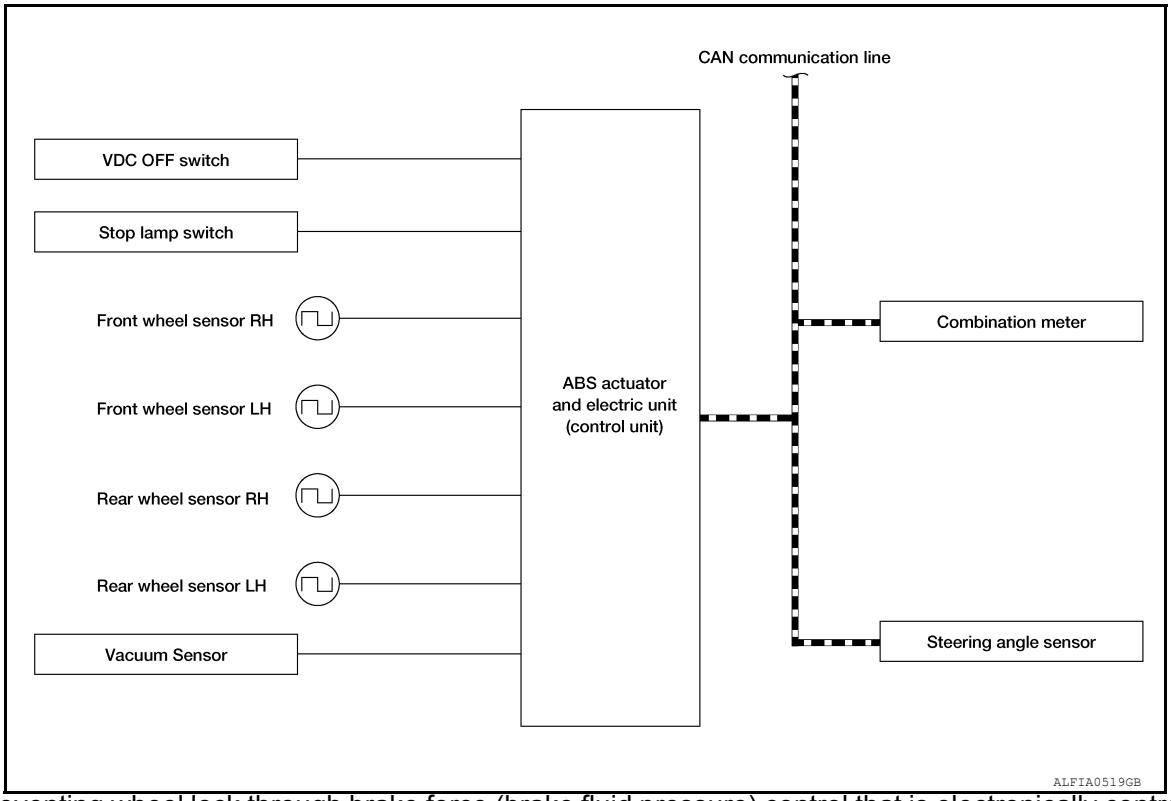
Component	Signal description
ECM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication: • Accelerator pedal position signal • Engine speed signal • Engine torque signal Mainly receives the following signal from ABS actuator and electric unit (control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

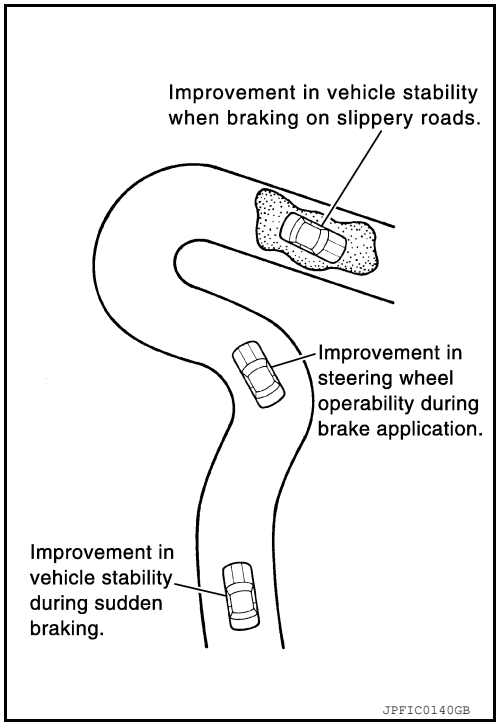
ABS FUNCTION : System Description

INFOID:0000000011241067

SYSTEM DIAGRAM



- 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 calculate 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 and hill start assist function. The vehicle status becomes the same as models without VDC function, TCS function, ABS function, brake assist function and hill start assist function. However, EBD function is operated normally. Refer to BRC-47, "Fail-Safe".



NOTE:

- ABS has the characteristics as described here. This is not a 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 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 feel heavy when depressing brake pedal lightly. These symptoms are not malfunctions.

INPUT SIGNAL AND OUTPUT SIGNAL

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

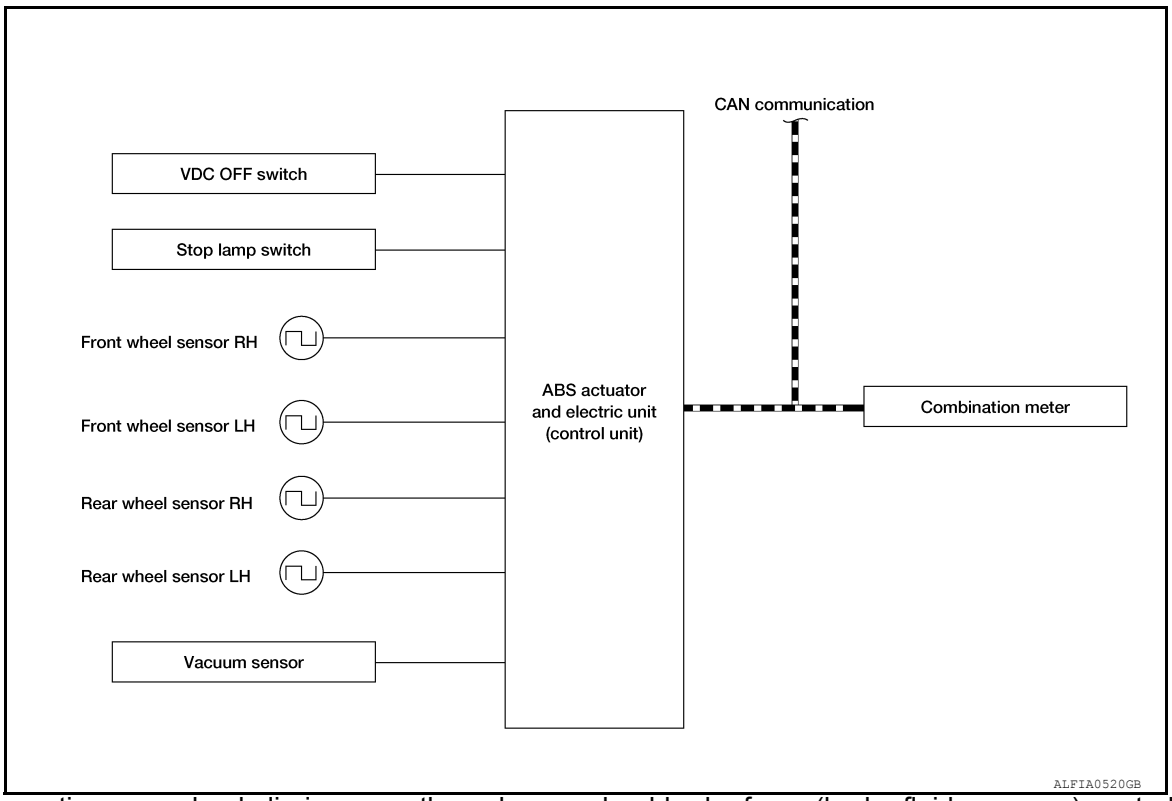
Component	Signal description
Combination meter	Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication: • Brake fluid level switch signal • Parking brake switch signal Mainly receives the following signals from ABS actuator and electric unit (control 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

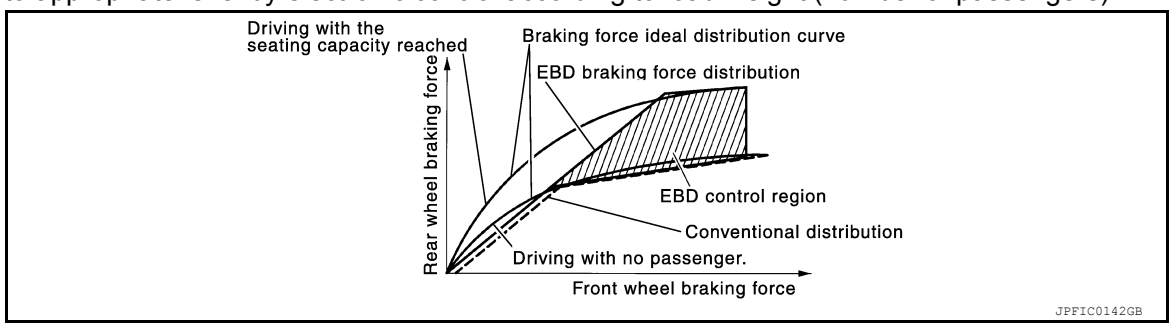
INFOID:0000000011241068

SYSTEM DIAGRAM

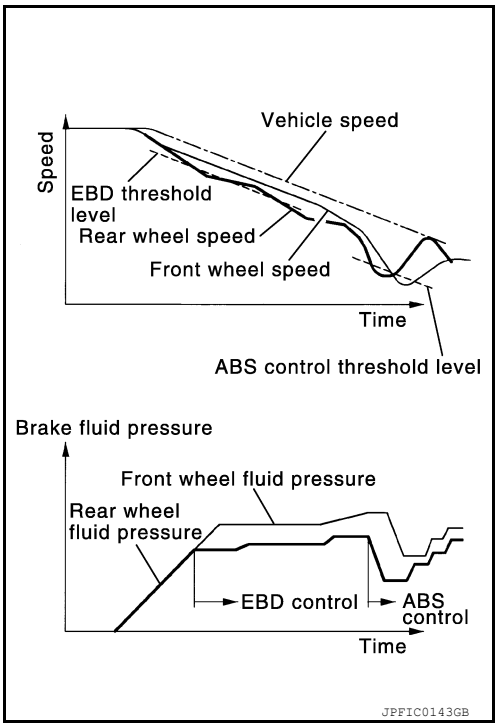


- By preventing rear wheel slip increase through rear wheel brake force (brake fluid pressure) control that is electronically controlled when slight slip on front and rear wheels is detected during braking, stability during braking is improved.

- 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 assist function and hill start assist function. The vehicle status becomes the same as models without VDC function, TCS function, ABS function, EBD function, brake assist function and hill start assist function. Refer to BRC-47, "Fail-Safe".



INPUT SIGNAL AND OUTPUT SIGNAL

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

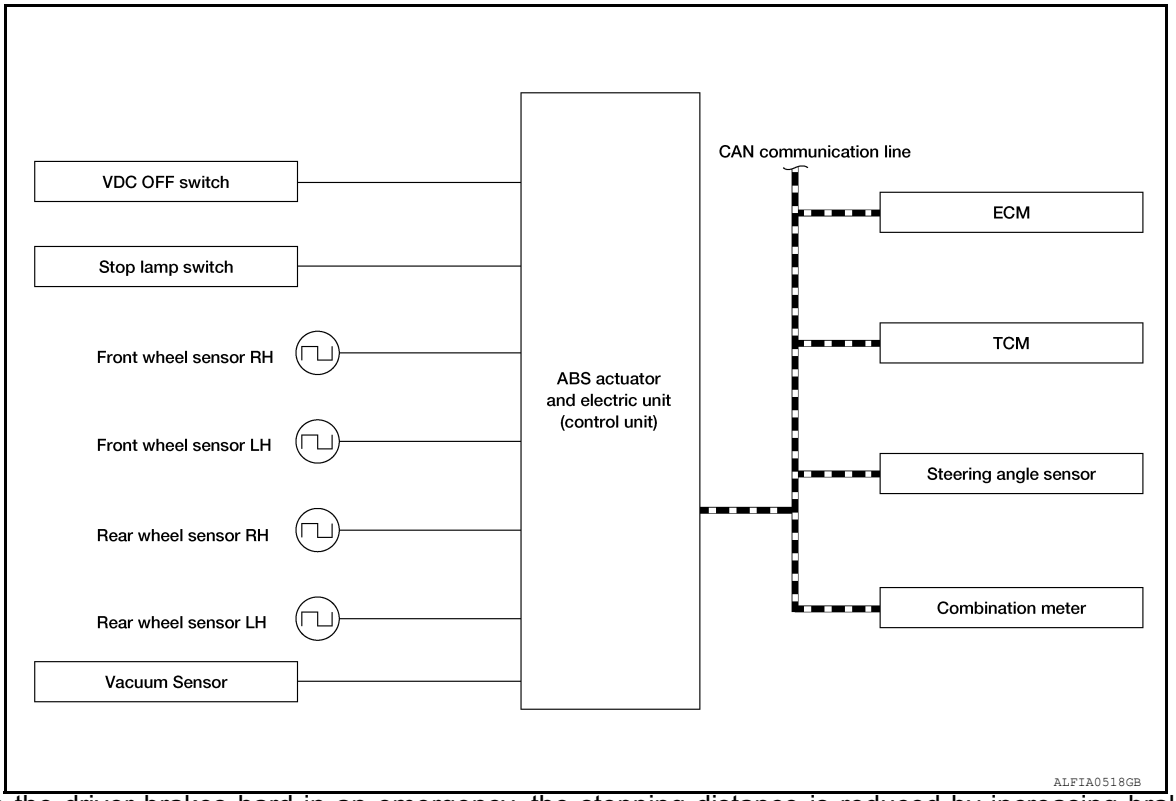
Component	Signal description
Combination meter	Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication: • VDC warning lamp signal • ABS warning lamp signal • Brake warning lamp signal

BRAKE ASSIST FUNCTION

BRAKE ASSIST FUNCTION : System Description

INFOID:0000000011241070

SYSTEM DIAGRAM



- 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 assist function and hill start assist function. The vehicle status becomes the same as models without VDC function, TCS function, brake assist function and hill start assist function. However, ABS function and EBD function are operated normally. Refer to BRC-47, "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
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

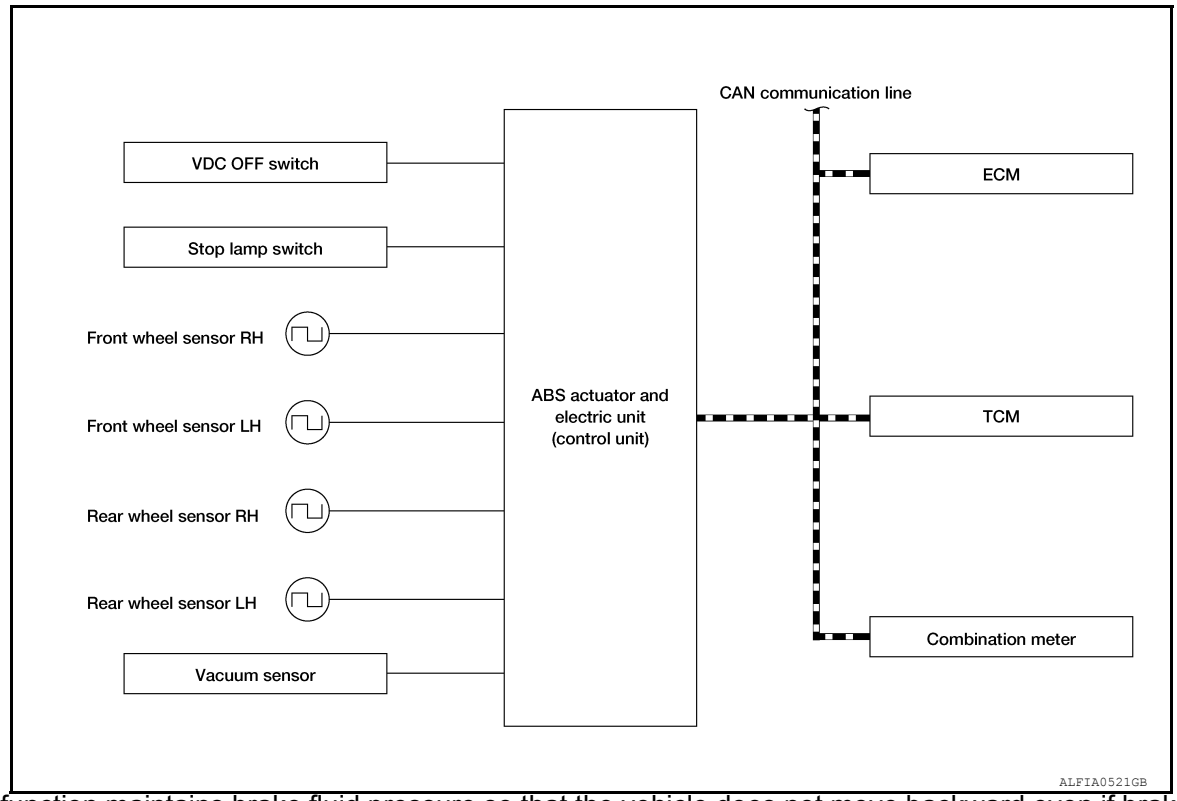
Component	Signal description
Combination meter	Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication: • Brake fluid level switch signal • Parking brake switch signal Mainly receives the following signals from ABS actuator and electric unit (control 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 start assist FUNCTION

hill start assist FUNCTION : System Description

INFOID:0000000011241073

SYSTEM DIAGRAM



- This function maintains brake fluid pressure so that the vehicle does not move backward 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 a position other than P or N.
- Hill start assist function is only for the start aid. It maintains the brake fluid pressure for approximately 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 assist function and hill start assist function. The vehicle status becomes the same as models without VDC function, TCS function, brake assist function and hill start assist function. However, ABS function and EBD function are operated normally. Refer to BRC-47, "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
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
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

WARNING/INDICATOR/CHIME LIST

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

INFOID:0000000011241076

Name	Design	Layout/Function
ABS warning lamp	ABS or 	For function: Refer to BRC-124, "Component Function Check".
Brake warning lamp	BRAKE or 	For function: Refer to BRC-125, "Component Function Check".
VDC OFF indicator lamp		For function: Refer to BRC-128, "Component Function Check".
VDC warning lamp		For function: Refer to BRC-127, "Component Function Check".

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

CONSULT Function

INFOID:0000000011241077

APPLICATION ITEMS

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

Mode	Function description
ECU Identification	Part number of ABS actuator and electric unit (control unit) can be read.
Self Diagnostic Result	Self-diagnostic results and freeze frame data can be read and erased quickly.*
Data Monitor	Input/Output data in the ABS actuator and electric unit (control unit) can be read.
Active Test	Diagnostic Test Mode in which CONSULT drives some actuators apart from the ABS actuator and electric unit (control unit) and also shifts some parameters in a specified range.
Work support	Components can be quickly and accurately adjusted.
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-50, "DTC Index".

When “CRNT” is displayed on self-diagnosis result

- The system is presently malfunctioning.

When “PAST” is displayed on self-diagnosis result

- System malfunction in the past was 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 was detected, but the system is presently normal. **NOTE:** Each time when ignition switch is turned OFF to ON, numerical number increases from 1 → 2 → 3...38 → 39. When the operation number of times exceeds 39, the number does 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 approximately 10 seconds after operation start.

- When performing active test again after “TEST IS STOPPED” is displayed, select “BACK”.
- ABS warning lamp, brake warning lamp and VDC warning lamp may turn ON during active test. This is not a malfunction.

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

Test item	Display Item	Display		
		Up	Keep	Down
FR RH SOL	FR RH IN SOL	Off	On*	On*
	FR RH OUT SOL	Off	Off	On*
FR LH SOL	FR LH IN SOL	Off	On*	On*
	FR LH OUT SOL	Off	Off	On*
RR RH SOL	RR RH IN SOL	Off	On*	On*
	RR RH OUT SOL	Off	Off	On*
RR LH SOL	RR LH IN SOL	Off	On*	On*
	RR LH OUT SOL	Off	Off	On*

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

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

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

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

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

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

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

DATA MONITOR

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

×: Applicable

Item (Unit)	Monitor item selection		Note
	INPUT SIGNALS	MAIN 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)
OFF SW (On/Off)	×	×	VDC OFF switch status is displayed.
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.

Item (Unit)	Monitor item selection		Note
	INPUT SIGNALS	MAIN SIGNALS	
GEAR	×	×	Current gear position judged from current gear position signal is displayed.
ENGINE SPEED (tr/min)	×	×	Engine speed status 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.
CV1 (On/Off)			Cut valve 1 status (On/Off) status is displayed
CV2 (On/Off)			Cut valve 2 status (On/Off) status 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.
USS SIG (Note 3) (On/Off)			hill start assist operation status is displayed.

Note 1: Refer to MWI-9, "METER SYSTEM : System Description" for ON/OFF conditions of each warning lamp and indicator lamp.
Note 2: AWD models

Note 3: 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.

CONFIGURATION

Configuration includes the following functions.

Function		Description
Read/Write Configuration	Before replacing ECU	Allows the reading of vehicle specification (TYPE ID) written in the ABS actuator and electrical unit (control unit) to store the specification in CONSULT.
	After replacing ECU	Allows the writing of vehicle information (TYPE ID) stored in the CONSULT into the ABS actuator and electrical unit (control unit).
Manual Configuration		Allows the writing of vehicle specification (TYPE ID) stored in the ABS actuator and electrical unit (control unit) by hand.

CAUTION:

Use “Manual Configuration”“TYPE ID” of ABS actuator and electric unit (control unit) cannot be read.

ECU DIAGNOSIS INFORMATION

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Reference Value

INFOID:0000000011822008

VALUES ON THE DIAGNOSIS TOOL

CAUTION:

The display shows the control unit calculation data, so a normal value might be displayed even in the event the output circuit (harness) is open or short-circuited.

Monitor item	Display content	Data monitor	
		Condition	Reference value in normal operation
FR LH SENSOR	Wheel speed	0 [km/h, mph]	Vehicle stopped
		Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)
FR RH SENSOR	Wheel speed	0 [km/h, mph]	Vehicle stopped
		Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)
RR LH SENSOR	Wheel speed	0 [km/h, mph]	Vehicle stopped
		Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)
RR RH SENSOR	Wheel speed	0 [km/h, mph]	Vehicle stopped
		Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)
DECEL G-SEN	Longitudinal acceleration detected by decel G sensor	Vehicle stopped	Approx. 0 G
		Vehicle running	-1.7 to 1.7 G
FR RH IN SOL	Operation status of all solenoid valves	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
FR RH OUT SOL	Operation status of all solenoid valves	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
FR LH IN SOL	Operation status of all solenoid valves	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
FR LH OUT SOL	Operation status of all solenoid valves	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off

Monitor item	Display content	Data monitor	
		Condition	Reference value in normal operation
RR RH IN SOL	Operation status of all solenoid valves	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
RR RH OUT SOL	Operation status of all solenoid valves	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
RR LH IN SOL	Operation status of all solenoid valves	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
RR LH OUT SOL	Operation status of all solenoid valves	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
EBD WARN LAMP	EBD warning lamp (Note 2)	When EBD warning lamp is ON	On
		When EBD warning lamp is OFF	Off
STOP LAMP SW	Brake pedal operation	When brake pedal is depressed	On
		When brake pedal is not depressed	Off
MOTOR RELAY	Motor and motor relay operation	When the motor relay and motor are operating	On
		When the motor relay and motor are not operating	Off
ACTUATOR RLY	Actuator relay operation	When the actuator relay is operating	On
		When the actuator relay is not operating	Off
ABS WARN LAMP	ABS warning lamp (Note 2)	When ABS warning lamp is ON	On
		When ABS warning lamp is OFF	Off
OFF LAMP	VDC OFF indicator lamp (Note 2)	When VDC OFF indicator lamp is ON	On
		When VDC OFF indicator lamp is OFF	Off
OFF SW	VDC OFF switch	When VDC OFF switch is ON	On
		When VDC OFF switch is OFF	Off
SLIP/VDC LAMP	SLIP indicator lamp (Note 2)	When SLIP indicator lamp is ON	On
		When SLIP indicator lamp is OFF	Off
BATTERY VOLT	Battery voltage supplied to the ABS actuator and electric unit (control unit)	Ignition switch ON	10 – 16 V
GEAR	Manual mode gear position determined by TCM	1st gear 2nd gear 3rd gear 4th gear 5th gear	1 2 3 4 5

Monitor item	Display content	Data monitor	
		Condition	Reference value in normal operation
ENGINE SPEED	With engine running	With engine stopped	0 RPM
		Engine running	Almost in accordance with tachometer display
YAW RATE SEN	Yaw rate detected by yaw rate/side G sensor	Vehicle stopped	Approx. 0 d/s
		Vehicle turning	-75 to 75 d/s
R POSI SIG	Transmission range switch signal ON/OFF condition	CVT shift position = R position	On
		CVT shift position = other than R position	Off
4WD MODE MON	Always (Note 3)	AUTO, LOCK, 2WD	AUTO, LOCK, 2WD (depending on AWD control status)
N POSI SIG	Transmission range switch signal ON/OFF condition	CVT shift position = N position	On
		CVT shift position = other than N position	Off
CV1	Cut valve 1 signal	When cut valve 1 is open or closed	On
			Off
CV2	Cut valve 2 signal	When cut valve 2 is open or closed	On
			Off
ACCEL POS SIG	Throttle actuator opening/closing is displayed (linked with accelerator pedal)	Accelerator pedal not depressed (ignition switch is ON)	0 %
		Depress accelerator pedal (ignition switch is ON)	0 - 100 %
SIDE G-SENSOR	Transverse G detected by side G sensor	Vehicle stopped	Approx. 0 m/s^2
		Vehicle turning right	Negative value (m/s^2)
		Vehicle turning left	Positive value (m/s^2)
STR ANGLE SIG	Steering angle detected by steering angle sensor	Straight-ahead	Approx. 0°
		Steering wheel turned	–720 to 720°
PRESS SENSOR	Brake fluid pressure detected by pressure sensor	With ignition switch turned ON and brake pedal released	Approx. 0 bar
		With ignition switch turned ON and brake pedal depressed	–40 to 300 bar
EBD SIGNAL	EBD operation	EBD is active	On
		EBD is inactive	Off
ABS SIGNAL	ABS operation	ABS is active	On
		ABS is inactive	Off
TCS SIGNAL	TCS operation	TCS is active	On
		TCS is inactive	Off
VDC SIGNAL	VDC operation	VDC is active	On
		VDC is inactive	Off
EBD FAIL SIG	EBD fail-safe signal	In EBD fail-safe	On
		EBD is normal	Off
ABS FAIL SIG	ABS fail-safe signal	In ABS fail-safe	On
		ABS is normal	Off

Monitor item	Display content	Data monitor	
		Condition	Reference value in normal operation
TCS FAIL SIG	TCS fail-safe signal	In TCS fail-safe	On
		TCS is normal	Off
VDC FAIL SIG	VDC fail-safe signal	In VDC fail-safe	On
		VDC is normal	Off
CRANKING SIG	Crank operation	Crank is active	On
		Crank is inactive	Off
FLUID LEV SW	Brake fluid level switch	When brake fluid level switch ON	On
		When brake fluid level switch OFF	Off
USS SIG (On/Off)	Hill start assist status (Note 4)	When hill start assist is active	On
		When hill start assist is not active	Off

Note 1: Confirm tire pressure is normal.

Note 2: On and off timing for warning lamps and indicator lamps.

Note 3: AWD models

Note 4: USS (Hill Start Assist)

- Refer to BRC-28, "VDC FUNCTION : System Description".
- Refer to BRC-31, "TCS FUNCTION : System Description".
- Refer to BRC-33, "ABS FUNCTION : System Description".
- Refer to BRC-34, "EBD FUNCTION : System Description".

Fail-Safe

INFOID:0000000011241079

VDC FUNCTION, TCS FUNCTION, BRAKE ASSIST FUNCTION and HILL START ASSIST 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 assist function and hill start assist function. The vehicle status becomes the same as models without VDC function, TCS function, brake assist function and hill start assist 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 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 and hill start assist 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 assist function and hill start assist function. The vehicle status becomes the same as models without VDC function, TCS function, ABS function, EBD function, brake assist function and hill start assist 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 rear wheels are malfunctioning) • Brake assist function • Hill start assist function
C1109 C1111 C1113	The following functions are suspended: • VDC function • TCS function • ABS function • EBD function • Brake assist function • Hill start assist function
C1115 C1116	The following functions are suspended: • VDC function • TCS function • ABS function • Brake assist function • Hill start assist function
C1120 C1121 C1122 C1123 C1124 C1125 C1126 C1127	The following functions are suspended: • VDC function • TCS function • ABS function • EBD function • Brake assist function • Hill start assist function
C1130	The following functions are suspended: • VDC function • TCS function • Hill start assist function
C1140	The following functions are suspended: • VDC function • TCS function • ABS function • EBD function • Brake assist function • Hill start assist function
C1142	The following functions are suspended: • VDC function • TCS function • Brake assist function • Hill start assist function
C1143 C1144	The following functions are suspended: • VDC function • TCS function • Hill start assist function

DTC	Fail-safe condition
C1145 C1146 C1153 C1154	The following functions are suspended: • VDC function • TCS function • ABS function • Brake assist function • Hill start assist function
C1155	The following functions are suspended: • VDC function • TCS function • Brake assist function • Hill start assist function
C1160	The following functions are suspended: • VDC function • TCS function • ABS function • Brake assist function • Hill start assist function
C1164 C1165 C1166 C1167	The following functions are suspended: • VDC function • TCS function • ABS function • EBD function • Brake assist function • Hill start assist function
C1170	The following functions are suspended: • VDC function • TCS function • ABS function • Brake assist function • Hill start assist function
C1197 C1198 C1199 C119A	Electrical vacuum assistance of brake booster is suspended.
U1000 U1002	The following functions are suspended: • VDC function • TCS function • Hill start assist function

DTC Inspection Priority Chart

INFOID:0000000011241080

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 • U1002 SYSTEM COMM (CAN)
2	• C1110 CONTROLLER FAILURE • C1153 EMERGENCY BRAKE • C1170 VARIANT CODING
3	• C1130 ENGINE SIGNAL 1 • C1144 ST ANG SEN SIGNAL
4	• C1109 BATTERY VOLTAGE [ABNOMAL] • C1110 CONTROLLER FAILURE • 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] • C1116 STOP LAMP SW • C1120 FR LH IN ABS SOL • C1121 FR LH OUT ABS SOL • C1122 FR RH IN ABS SOL • C1123 FR RH OUT ABS SOL • C1124 RR LH IN ABS SOL • C1125 RR LH OUT ABS SOL • C1126 RR RH IN ABS SOL • C1127 RR RH OUT ABS SOL • C1142 PRESS SEN CIRCUIT • C1143 ST ANG SEN CIRCUIT • C1145 YAW RATE SENSOR • C1146 SIDE G SEN CIRCUIT • C1153 EMERGENCY BRAKE • C1154 PNP POS SIG • 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

INFOID:0000000011241081

DTC	Display Item	VDC warning lamp	ABS warning lamp	Brake warning lamp	Refer to:
C1101	RR RH SENSOR-1	ON	ON	OFF	BRC-70, "DTC Logic"
C1102	RR LH SENSOR-1	ON	ON	OFF	
C1103	FR RH SENSOR-1	ON	ON	OFF	
C1104	FR LH SENSOR-1	ON	ON	OFF	
C1105	RR RH SENSOR-2	ON	ON	OFF	BRC-75, "DTC Logic"
C1106	RR LH SENSOR-2	ON	ON	OFF	
C1107	FR RH SENSOR-2	ON	ON	OFF	
C1108	FR LH SENSOR-2	ON	ON	OFF	
C1109	BATTERY VOLTAGE [ABNOMAL]	ON	ON	ON	BRC-77, "DTC Logic"
C1110	CONTROLLER FAILURE	ON	ON	ON	BRC-79, "DTC Logic"
C1111	PUMP MOTOR	ON	ON	ON	BRC-80, "DTC Logic"
C1113	G SENSOR	ON	ON	OFF	BRC-82, "DTC Logic"
C1115	ABS SENSOR [ABNORMAL SIGNAL]	ON	ON	OFF	BRC-84, "DTC Logic"
C1116	STOP LAMP SW				
C1120	FR LH IN ABS SOL	ON	ON	ON	BRC-89, "DTC Logic"

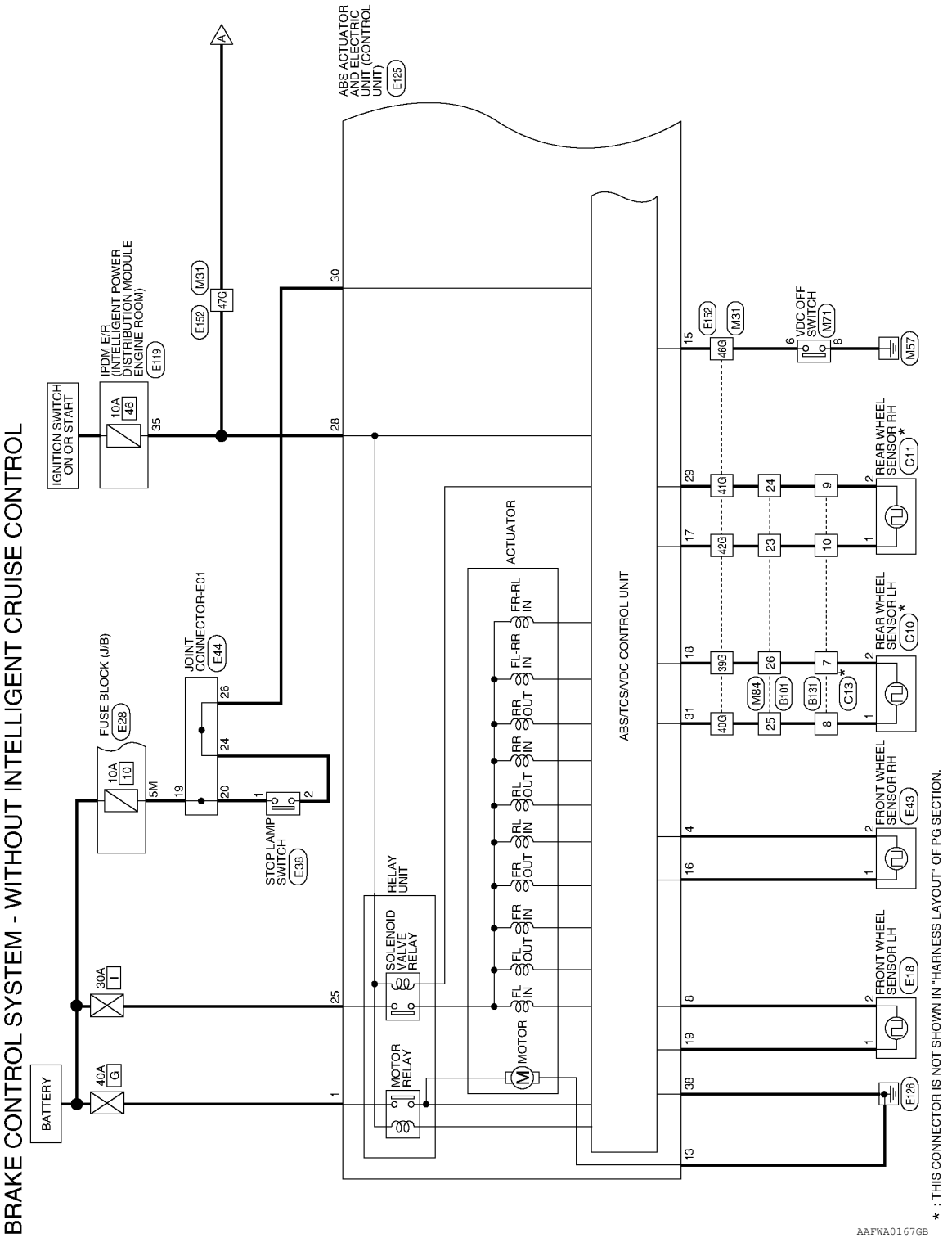
DTC	Display Item	VDC warning lamp	ABS warning lamp	Brake warning lamp	Refer to:
C1121	FR LH OUT ABS SOL	ON	ON	ON	BRC-91, "DTC Logic"
C1122	FR RH IN ABS SOL	ON	ON	ON	BRC-89, "DTC Logic"
C1123	FR RH OUT ABS SOL	ON	ON	ON	BRC-91, "DTC Logic"
C1124	RR LH IN ABS SOL	ON	ON	ON	BRC-89, "DTC Logic"
C1125	RR LH OUT ABS SOL	ON	ON	ON	BRC-91, "DTC Logic"
C1126	RR RH IN ABS SOL	ON	ON	ON	BRC-89, "DTC Logic"
C1127	RR RH OUT ABS SOL	ON	ON	ON	BRC-91, "DTC Logic"
C1130	ENGINE SIGNAL 1	ON	OFF	OFF	BRC-93, "DTC Logic"
C1140	ACTUATOR RLY	ON	ON	ON	BRC-95, "DTC Logic"
C1142	PRESS SEN CIRCUIT	ON	OFF	OFF	BRC-97, "DTC Logic"
C1143	ST ANG SEN CIRCUIT	ON	OFF	OFF	BRC-99, "DTC Logic"
C1144	ST ANG SEN SIGNAL	ON	OFF	OFF	BRC-101, "DTC Logic"
C1145	YAW RATE SENSOR	ON	ON	OFF	BRC-82, "DTC Logic"
C1146	SIDE G SEN CIRCUIT	ON	ON	OFF	
C1153	EMERGENCY BRAKE				
C1154	PNP POS SIG				
C1155	BR FLUID LEVEL LOW	ON	OFF	OFF	BRC-104, "DTC Logic"
C1160	DECEL G SEN SET	ON	ON	OFF	BRC-106, "DTC Logic"
C1164	CV 1	ON	ON	ON	BRC-107, "DTC Logic"
C1165	CV 2	ON	ON	ON	
C1166	SV 1	ON	ON	ON	BRC-107, "DTC Logic"
C1167	SV 2	ON	ON	ON	
C1170	VARIANT CODING	ON	ON	OFF	BRC-273, "DTC Logic"
C1197	VACUUM SENSOR	OFF	OFF	ON	BRC-109, "DTC Logic"
C1198	VACUUM SEN CIR	OFF	OFF	ON	BRC-111, "DTC Logic"
C1199	BRAKE BOOSTER	OFF	OFF	ON	BRC-113, "DTC Logic"
C119A	VACUUM SEN VOLT	OFF	OFF	ON	BRC-115, "DTC Logic"
U1000	CAN COMM CIRCUIT	ON	OFF	OFF	BRC-117, "Description"

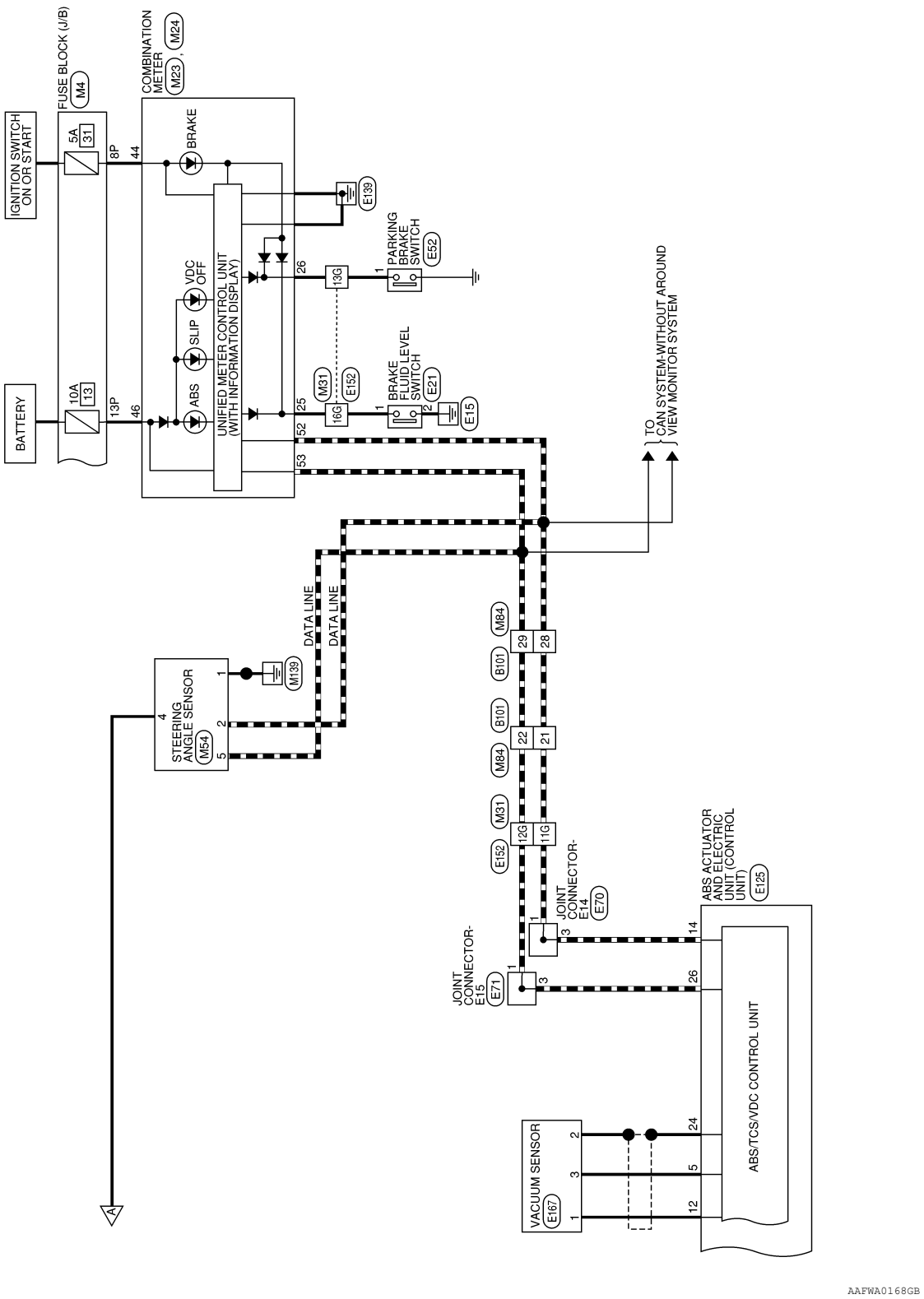
WIRING DIAGRAM

BRAKE CONTROL SYSTEM

Wiring Diagram

INFOID:0000000011552703





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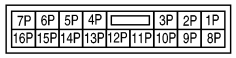
BRAKE CONTROL SYSTEM CONNECTORS - WITHOUT INTELLIGENT CRUISE CONTROL

Connector No.	M4
Connector Name	FUSE BLOCK (J/B)
Connector Color	WHITE

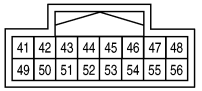
H.S.



Terminal No.	Color of Wire	Signal Name
8P	BG	–
13P	W	–

Connector No.	M23
Connector Name	COMBINATION METER
Connector Color	WHITE

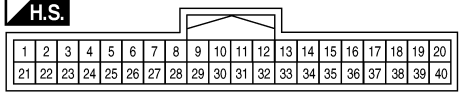
H.S.



Terminal No.	Color of Wire	Signal Name
43	B	GND1
44	BG	POWER (IGN)
45	B	GND2
46	W	POWER (BAT)
52	P	CAN-L
53	L	CAN-H

Connector No.	M24
Connector Name	COMBINATION METER
Connector Color	WHITE

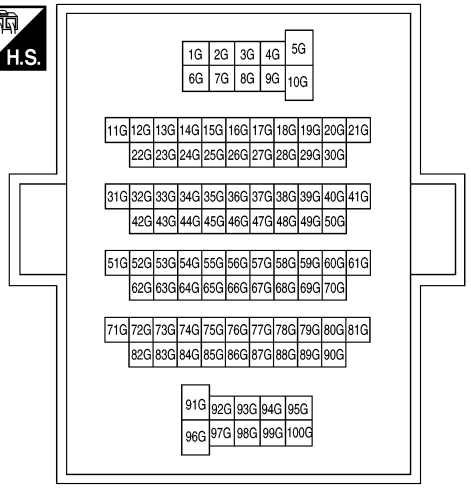
H.S.



Terminal No.	Color of Wire	Signal Name
25	G	BRAKE OIL SW
26	BR	PKB SW

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

H.S.



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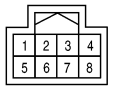
Terminal No.	Color of Wire	Signal Name
11G	P	–
12G	L	–
13G	BR	–
16G	G	–
39G	W	–
40G	B	–
41G	P	–
42G	V	–
46G	P	–
47G	G	–

Connector No.	M54
Connector Name	STEERING ANGLE SENSOR
Connector Color	WHITE

H.S.

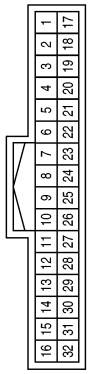


Terminal No.	Color of Wire	Signal Name
1	GR	STEERING SENSOR GND
2	P	CAN-L
4	G	STEERING SENSOR POWER SUPPLY
5	L	CAN-H

Terminal No.	Color of Wire	Signal Name
22	L	–
23	V	–
24	P	–
25	B	–
26	W	–
28	P	–
29	L	–

Connector No.	M84
Connector Name	WIRE TO WIRE
Connector Color	WHITE

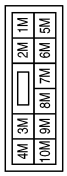
H.S.



Terminal No.	Color of Wire	Signal Name
21	P	–

Connector No.	E28
Connector Name	FUSE BLOCK (J/B)
Connector Color	WHITE

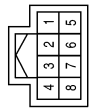
H.S.



Terminal No.	Color of Wire	Signal Name
5M	W	–

Connector No.	M71
Connector Name	VDC OFF SWITCH
Connector Color	BLACK

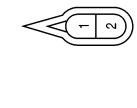
H.S.



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

Connector No.	E21
Connector Name	BRAKE FLUID LEVEL SWITCH
Connector Color	WHITE

H.S.



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

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

H.S.

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

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Connector No.	E38
Connector Name	STOP LAMP SWITCH
Connector Color	WHITE

H.S.

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

Connector No.	E43
Connector Name	FRONT WHEEL SENSOR RH
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	L	–
2	Y	–

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

H.S.

Terminal No.	Color of Wire	Signal Name
19	W	–
20	W	–
24	P	–
26	P	–

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

H.S.

Terminal No.	Color of Wire	Signal Name
1	LG	–

Connector No.	E70
Connector Name	JOINT CONNECTOR-E14
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	P	–
3	P	–

Connector No.	E71
Connector Name	JOINT CONNECTOR-E15
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	L	–
3	L	–

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Connector No.	E119
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	WHITE

H.S.

19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50

Terminal No.	Color of Wire	Signal Name
35	BR	ABS ECU

Connector No.	E125
Connector Name	ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) (WITHOUT INTELLIGENT CRUISE CONTROL)
Connector Color	BLACK

H.S.

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

Terminal No.	Color of Wire	Signal Name
1	W	UB MR
2	–	–
3	–	–
4	Y	WSS FR
5	B	U5V EXT
6	–	–
7	–	–
8	W	WSS FL
9	–	–
10	–	–
11	–	–
12	W	VAC
13	B/W	GND MR
14	P	CAN-L
15	R	VDC OFF
16	L	WSP FR
17	V	WSP RR
18	SB	WSS RL
19	G	WSP FL
20	–	–
21	–	–
22	–	–
23	–	–

Terminal No.	Color of Wire	Signal Name
24	SHIELD	GND EXT
25	R	UB VR
26	L	CAN-H
27	–	–
28	BR	WAU
29	SB	WSS RR
30	P	BLS
31	R	WSP RL
32	–	–
33	–	–
34	–	–
35	–	–
36	–	–
37	–	–
38	B	GND ECU

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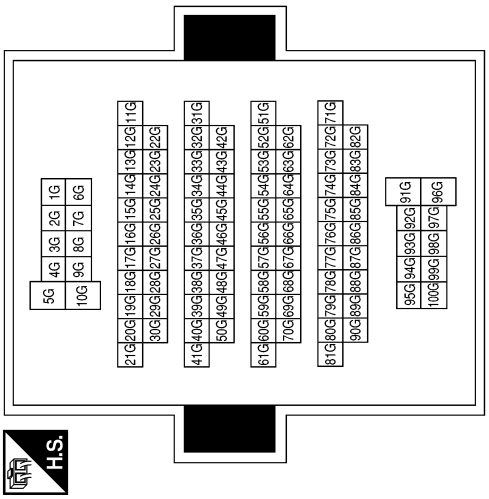
Connector No.	E152
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.



Terminal No.	Color of Wire	Signal Name
11G	P	–
12G	L	–
13G	LG	–
16G	W	–
39G	SB	–
40G	R	–
41G	SB	–
42G	V	–
46G	R	–
47G	BR	–

Connector No.	C10
Connector Name	REAR WHEEL SENSOR LH
Connector Color	BLACK

H.S.

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

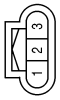
Connector No.	C11
Connector Name	REAR WHEEL SENSOR RH
Connector Color	GRAY

H.S.

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

Connector No.	E167
Connector Name	VACUUM SENSOR
Connector Color	BLACK

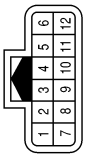
H.S.



Terminal No.	Color of Wire	Signal Name
1	W	–
2	SHIELD	–
3	B	–

Connector No.	C13
Connector Name	WIRE TO WIRE
Connector Color	BLACK

H.S.



Terminal No.	Color of Wire	Signal Name
7	W	–
8	B	–
9	P	–
10	V	–

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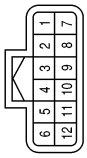
Connector No.	B131
Connector Name	WIRE TO WIRE
Connector Color	BLACK

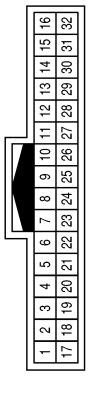
H.S.



Terminal No.	Color of Wire	Signal Name
7	W	–
8	B	–
9	P	–
10	V	–

Connector No.	B101
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.



Terminal No.	Color of Wire	Signal Name
21	P	–
22	L	–
23	V	–
24	P	–
25	B	–
26	W	–
28	P	–
29	L	–

AAFIA0348GB

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORK FLOW

Work Flow

INFOID:0000000011241083

DETAILED FLOW

1.INTERVIEW THE CUSTOMER

Clarify customer complaints before inspection. First of all, perform an interview utilizing BRC-61, "Diagnostic Work Sheet" and reproduce the symptom as well as fully understand it. Ask customer about his/her complaints carefully. Check symptoms by driving vehicle with customer if necessary.

CAUTION:

Customers are not professionals. Never assume that "maybe the customer means that..." or "maybe the customer mentions this symptom".

>> GO TO 2.

2.CHECK SYMPTOM

Reproduce the symptom that is indicated by the customer, based on the information from the customer obtained by interview. Also check that the symptom is not caused by fail-safe mode. Refer to BRC-47, "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 DIAGNOSTIC RESULT

CONSULT

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

Is DTC detected?

YES >> Record or print "Self Diagnostic Result" of "ABS" and freeze frame data (FFD). GO TO 4.
NO >> GO TO 6.

4.RECHECK THE SYMPTOM

CONSULT

1. Erase "Self Diagnostic Result" of "ABS".
2. Turn the ignition switch OFF → ON → OFF.
   CAUTION:
   Be sure to wait 10 seconds after turning ignition switch OFF or ON.
3. Perform DTC confirmation procedures for the error-detected system.
   NOTE:
   If some DTCs are detected at the same time, determine the order for performing the diagnosis based on BRC-49, "DTC Inspection Priority Chart".

Is any DTC detected?

YES >> GO TO 5.
NO >> Check harness and connectors based on the information obtained by interview. Refer to GI-42, "Intermittent Incident".

5.REPAIR OR REPLACE ERROR-DETECTED PARTS

1. Repair or replace error-detected parts.
2. Reconnect part or connector after repairing or replacing.
3. When DTC is detected, erase "Self Diagnostic Result" of "ABS".

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

>> GO TO 7.

6. IDENTIFY ERROR-DETECTED SYSTEM BY SYMPTOM DIAGNOSIS

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

Can the error-detected system be identified?

YES >> GO TO 7.
NO >> Check harness and connectors based on the information obtained by interview. Refer to GI-42, "Intermittent Incident".

7. FINAL CHECK

CONSULT
1. Check the reference value for "ABS".
2. Recheck the symptom and check that the symptom is not reproduced under the same conditions.

Is the symptom reproduced?

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

Diagnostic Work Sheet

INFOID:0000000011241084

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 and refer 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		Mileage	km (Mile)
Symptom		☐ Does not operate ( ) function			
		☐ Warning lamp for ( ) turns ON.			
		☐ Noise ☐ Vibration			
		☐ Other ( )			
First occurrence		☐ Recently ☐ Other ( )			
Frequency of occurrence		☐ Always ☐ Under certain conditions ☐ Sometimes (time(s)/day)			
Climate conditions		☐ Irrelevant			
	Weather	☐ Fine ☐ Cloud ☐ Rain ☐Snow ☐ Others ( )			
	Temperature	☐ Hot ☐Warm ☐ Cool ☐ Cold ☐ Temperature [Approx. °C (°F)]			
	Relative humidity	☐ High ☐ Moderate ☐ Low			
Road conditions		☐ Urban area ☐ Suburb area ☐ Highway ☐ Mountainous road (uphill or downhill) ☐ Rough road			
Operating condition, etc.		☐Irrelevant ☐When engine starts ☐ During idling ☐ During driving ☐ During acceleration ☐ At constant speed driving ☐ During deceleration ☐ During cornering (right curve or left curve) ☐ When steering wheel is steered (to right or to left)			

Interview sheet

Customer name	MR/MS	Registration number		Initial year registration	
		Vehicle type		VIN	
Storage date		Engine		Mileage	km (Mile)
Other conditions					

Memo

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

Description

INFOID:0000000011241085

- When replacing the ABS actuator and electric unit (control unit), perform configuration of the ABS actuator and electric unit (control unit). Refer to BRC-68, "Work Procedure".
- When replacing the ABS actuator and electric unit (control unit), adjust the neutral position of steering angle sensor. Refer to BRC-64, "Work Procedure".
- When replacing the ABS actuator and electric unit (control unit), perform calibration of the decel G sensor. Refer to BRC-66, "Work Procedure".

ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Description

INFOID:0000000011241086

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	×
Changing tires to new ones	—
Tire rotation	—
Adjusting wheel alignment	×

Work Procedure

INFOID:0000000011241087

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 DIAGNOSTIC RESULT 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-39, "CONSULT Function".

• ECM: Refer to EC-71, "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:0000000011241088

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:0000000011241089

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.**

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

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 RESULT MEMORY

CONSULT

Erase “Self Diagnostic 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:0000000011815316

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-142, "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-39, "CONSULT Function".

7.PERFORM SUPPLEMENTARY WORK

1. Perform air bleeding. Refer to BR-16, "Bleeding Brake System".
2. Perform adjustment of steering angle sensor neutral position. Refer to BRC-64, "Work Procedure".
3. Perform calibration of decel G sensor. Refer to BRC-66, "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 Logic

INFOID:0000000011734962

DTC DETECTION LOGIC

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

DTC	Display item	Malfunction detected condition	Possible cause	
			Past DTC	Current DTC
C1101	RR RH SENSOR-1	• When power supply voltage of rear wheel sensor RH is low. • When an open or shorted circuit is detected in rear wheel sensor RH circuit.	• Low battery voltage • Harness or connector	• Low battery voltage • Harness or connector • Wheel sensor • ABS actuator and electric unit (control unit)
C1102	RR LH SENSOR-1	• When power supply voltage of rear wheel sensor LH is low. • When an open or shorted circuit is detected in rear wheel sensor LH circuit.		
C1103	FR RH SENSOR-1	• When power supply voltage of front wheel sensor RH is low. • When an open or shorted circuit is detected in front wheel sensor RH circuit.		
C1104	FR LH SENSOR-1	• When power supply voltage of front wheel sensor LH is low. • When an open or shorted circuit is detected in front wheel sensor LH circuit.		

DTC CONFIRMATION PROCEDURE

1.CHECK SELF DIAGNOSTIC RESULT

1. Start engine and drive vehicle at approximately 21 km/h (13 MPH) or more for approximately 5 minutes.
2. Check for DTC using CONSULT.

Is the DTC detected?

YES (Current DTC)>>Refer to BRC-70, "Diagnosis Procedure".
YES (Past DTC)>>GO TO 2.
NO >> Inspection End.

2.ERASE SELF DIAGNOSTIC RESULT

Erase the DTC using CONSULT.

Can the DTC be erased?

YES >> Inspection End.
NO >> Refer to BRC-70, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000011734963

Regarding Wiring Diagram information, refer to BRC-52, "Wiring Diagram".

CAUTION:
Do not check between wheel sensor terminals.

1.CONFIRM DTC

With CONSULT
1. Perform “Self Diagnostic Result” of “ABS” and record all active DTCs.
2. Clear all DTCs.
3. Perform DTC confirmation procedure. Refer to BRC-70, "DTC Logic".

Does DTC C1101, C1102, C1103 or C1104 reset?

YES >> GO TO 2.
NO >> Refer to GI-42, "Intermittent Incident".

2.INSPECT WHEEL SENSOR

Inspect the suspect wheel sensor for damage or deformation.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace as necessary.

3.HARNESS AND CONNECTOR INSPECTION

1. Disconnect ABS actuator and electric unit (control unit) connector E125 and wheel sensor connector of suspect wheel.
2. Check harness, connectors and terminals for corrosion, deformation, disconnection, looseness or damage.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace as necessary. Refer to GI-42, "Intermittent Incident".

4.CHECK WHEEL SENSOR OUTPUT SIGNAL

1. Connect ABS active wheel sensor tester (J-45741) to wheel sensor using appropriate adapter.
2. Turn on the ABS active wheel sensor tester power switch.
   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.
3. 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 5.
NO >> Replace the wheel sensor. Refer to BRC-137, "FRONT WHEEL SENSOR : Removal and Installation" or BRC-139, "REAR WHEEL SENSOR : Removal and Installation".

5.CHECK WIRING HARNESS FOR SHORT TO VOLTAGE

1. Turn ignition switch ON.
2. Check voltage between wheel sensor harness connector terminals of suspect wheel and ground.

Wheel Sensor			Ground	Voltage
Wheel	Connector	Terminal		
Front LH	E18	1	—	0V
		2		
Front RH	E43	1		
		2		
Rear LH	C10	1		
		2		
Rear RH	C11	1		
		2		

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair the circuit.

6.CHECK WIRING HARNESS FOR SHORT TO GROUND

1. Turn ignition switch OFF.
2. Check continuity between wheel sensor harness connector terminals of suspect wheel and ground.

Wheel Sensor			Ground	Continuity
Wheel	Connector	Terminal		
Front LH	E18	1	—	No
		2		
Front RH	E43	1		
		2		
Rear LH	C10	1		
		2		
Rear RH	C11	1		
		2		

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair the circuit.

7.CHECK WIRING HARNESS FOR SHORT BETWEEN CIRCUITS

Check continuity between wheel sensor harness connector terminals of suspect wheel.

Wheel Sensor		(+)	(-)	Continuity
Wheel	Connector	Terminal	Terminal	
Front LH	E18	1	2	No
Front RH	E43			
Rear LH	C10			
Rear RH	C11			

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair the circuit.

8.CHECK WIRING HARNESS FOR OPEN CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) connector E125 and wheel sensor connector of wheel with DTC.

Wheel sensor	ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
	Connector	Terminal	Connector	Terminal	
Front LH	E125	8	E18	2	Yes
		19		1	
Front RH		4	E43	2	
		16		1	
Rear LH		18	C10	2	
		31		1	
Rear RH		29	C11	2	
		17		1	

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair the circuit.

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

1. Turn ignition switch ON.
2. Check voltage between ABS actuator and electric unit (control unit) harness connector E125 terminal and ground.

ABS actuator and electric unit (control unit)		Ground	Condition	Voltage (Approx.)
Connector	Terminal			
E125	28	—	Ignition switch ON	Battery voltage
			Ignition switch OFF	0V

Is the inspection result normal?

YES >> GO TO 10.
NO >> Check the following:
- 10A fuse No. 46 located in the IPDM E/R
- Harness between ABS actuator and electric unit (control unit) and IPDM E/R

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

1. Turn ignition switch OFF.
2. Check continuity between ABS actuator and electric unit (control unit) connector E125 terminals and ground.

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E125	13	Ground	Yes
	38		

Is the inspection result normal?

YES >> GO TO 11.
NO >> Repair or replace malfunctioning components.

11. CHECK WHEEL SENSOR INPUT VOLTAGE

1. Connect ABS actuator and electric unit (control unit) connector E125.
2. Turn ignition switch ON.
3. Check voltage between suspect wheel sensor harness connector terminals.

Wheel Sensor		(+)	(-)	Voltage (Approx.)
Wheel	Connector	Terminal	Terminal	
Front LH	E18	1	2	Battery voltage
Front RH	E43			
Rear LH	C10			
Rear RH	C11			

Is the inspection result normal?

YES >> Replace wheel sensor. Refer to BRC-137, "FRONT WHEEL SENSOR : Removal and Installation" or BRC-138, "REAR WHEEL SENSOR : Exploded View". Then, GO TO 12.
NO >> Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".

12. CONFIRM REPAIR

With CONSULT
1. Clear all DTCs.
2. Perform DTC confirmation procedure. Refer to BRC-70, "DTC Logic".

Does DTC C1101, C1102, C1103 or C1104 reset?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".

NO >> Inspection End.

C1105, C1106, C1107, C1108 WHEEL SENSOR

DTC Logic

INFOID:0000000011734964

DTC DETECTION LOGIC

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

DTC	Display item	Malfunction detected condition	Possible cause	
			Past DTC	Current DTC
C1105	RR RH SENSOR-2	• When distance between rear wheel sensor RH and rear wheel sensor RH rotor is large. • When installation of rear wheel sensor RH or rear wheel sensor RH rotor is not normal.	• Tire size • Contamination on sensor rotor • Position of sensor rotor and wheel sensor • Harness or connector • Wheel sensor mounting bolt loose • Vehicle has been operated on a 2-wheel dynamometer or towed using a 2-wheel dolly	• Tire size • Contamination on sensor rotor • Position of sensor rotor and wheel sensor • Harness or connector • Wheel sensor • Sensor rotor • ABS actuator and electric unit (control unit) • Wheel sensor mounting bolt loose • Vehicle has been operated on a 2-wheel dynamometer or towed using a 2-wheel dolly
C1106	RR LH SENSOR-2	• When distance between rear wheel sensor LH and rear wheel sensor LH rotor is large. • When installation of rear wheel sensor LH or rear wheel sensor LH rotor is not normal.		
C1107	FR RH SENSOR-2	• When distance between front wheel sensor RH and front wheel sensor RH rotor is large. • When installation of front wheel sensor RH or front wheel sensor RH rotor is not normal.		
C1108	FR LH SENSOR-2	• When distance between front wheel sensor LH and front wheel sensor LH rotor is large. • When installation of front wheel sensor LH or front wheel sensor LH rotor is not normal.		

DTC CONFIRMATION PROCEDURE

1.CHECK SELF DIAGNOSTIC RESULT

1. Start engine and drive vehicle at approximately 21 km/h (13 MPH) or more for approximately 5 minutes.
2. Check for DTC using CONSULT.

Is the DTC detected?

YES (Current DTC)>>Refer to BRC-75, "Diagnosis Procedure".
YES (Past DTC)>>GO TO 2.
NO >> Inspection End.

2.ERASE SELF DIAGNOSTIC RESULT

Erase the DTC using CONSULT.

Can the DTC be erased?

YES >> Inspection End.
NO >> Refer to BRC-75, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000011734965

Regarding Wiring Diagram information, refer to BRC-52, "Wiring Diagram".

CAUTION:
Do not check between wheel sensor terminals.

1.CONFIRM DTC

With CONSULT
1. Perform “Self Diagnostic Result” of “ABS” and record all active DTCs.
2. Clear all DTCs.
3. Perform DTC confirmation procedure. Refer to BRC-75, "DTC Logic".

Does DTC C1105, C1106, C1107 or C1108 reset?

YES >> GO TO 2.
NO >> Refer to GI-42, "Intermittent Incident".

2.CHECK TIRE PRESSURE AND TIRE WEAR

Check tires for excessive wear and proper inflation. Refer to WT-64, "Inspection".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace as necessary.

3.CHECK WHEEL SENSOR

Check wheel sensor for the following:
- Proper installation
- Physical damage
- Contamination

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace as necessary. Refer to BRC-137, "FRONT WHEEL SENSOR : Removal and Installation" or BRC-139, "REAR WHEEL SENSOR : Removal and Installation".

4.CHECK SENSOR ROTOR

Check sensor rotor for the following:
- Contamination
- Physical damage (missing teeth, cracks, etc.)
- Foreign material
- Looseness

Is the inspection result normal?

YES >> Replace the wheel sensor. Refer to BRC-137, "FRONT WHEEL SENSOR : Removal and Installation" or BRC-139, "REAR WHEEL SENSOR : Removal and Installation". Then, GO TO 5.
NO >> Repair or replace as necessary.

5.CONFIRM REPAIR

With CONSULT
1. Clear all DTCs.
2. Perform DTC confirmation procedure. Refer to BRC-75, "DTC Logic".

Does DTC C1105, C1106, C1107 or C1108 reset?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".
NO >> Inspection End.

C1109 POWER AND GROUND SYSTEM

DTC Logic

INFOID:0000000011734966

DTC DETECTION LOGIC

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

DTC	Display item	Malfunction detected condition	Possible cause	
			Past DTC	Current DTC
C1109	BATTERY VOLTAGE [ABNORMAL]	• When ignition voltage is 10 V or less. • When ignition voltage is 16 V or more.	• Battery • Harness or connector • Intermitten incident	• Fuse • Battery • Ignition power supply system • Harness or connector • ABS actuator and electric unit (control unit) • Intermitten incident

DTC CONFIRMATION PROCEDURE

1.CHECK SELF DIAGNOSTIC RESULT

1. Turn ignition switch ON.
2. Check for DTC using CONSULT.

Is the DTC detected?

YES (Current DTC)>>Refer to BRC-77, "Diagnosis Procedure".
YES (Past DTC)>>GO TO 2.
NO >> Inspection End.

2.ERASE SELF DIAGNOSTIC RESULT

Erase the DTC using CONSULT.

Can the DTC be erased?

YES >> Inspection End.
NO >> Refer to BRC-77, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000011734967

Regarding Wiring Diagram information, refer to BRC-52, "Wiring Diagram".

1.CONNECTOR INSPECTION

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connectors.
3. Check connectors and terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace as necessary.

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

Check voltage between ABS actuator and electric unit (control unit) connector E125 terminal 28 and ground.

ABS actuator and electric unit (control unit)		Ground	Condition	Voltage
Connector	Terminal			

E125	28	—	Ignition switch ON	Battery voltage
			Ignition switch OFF	0V

Is the inspection result normal?

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

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

1. Turn ignition switch OFF.
2. Check continuity between ABS actuator and electric unit (control unit) connector E125 terminals 13, 38 and ground.

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E125	13	Ground	Yes
	38		

Is the inspection result normal?

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

4.INTERMITTENT CHECK

Check for intermittent incident. Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".
NO >> Repair or replace malfunctioning components.

C1110, C1153, C1170 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

DTC Logic

INFOID:0000000011734968

DTC DETECTION LOGIC

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

DTC	Display item	Malfunction detected condition	Possible cause	
			Past DTC	Current DTC
C1110	CONTROLLER FAILURE	When there is an internal malfunction in the ABS actuator and electric unit (control unit).	Electromagnetic interference	• Electromagnetic interference • ABS actuator and electric unit (control unit)
C1153	EMERGENCY BRAKE	When ABS actuator and electric unit (control unit) is malfunctioning. (Pressure increase is too much or too little)		
C1170	VARIANT CODING	In a case where VARIANT CODING is different.		

DTC CONFIRMATION PROCEDURE

1.CHECK SELF DIAGNOSTIC RESULT

1. Turn ignition switch ON.
2. Check for DTC using CONSULT.

Is the DTC detected?

YES (Current DTC)>>Refer to BRC-79, "Diagnosis Procedure".
YES (Past DTC)>>GO TO 2.
NO >> Inspection End.

2.ERASE SELF DIAGNOSTIC RESULT

Erase the DTC using CONSULT.

Can the DTC be erased?

YES >> Inspection End.
NO >> Refer to BRC-79, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000011734969

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

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

>> Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".

C1111 PUMP MOTOR

DTC Logic

INFOID:0000000011241096

DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1111	PUMP MOTOR	Diagnosis condition	When ignition is ON.
		Signal (terminal)	Motor relay power supply (terminal 1) Motor relay ground circuit (terminals 13 and 38)
		Threshold	When a malfunction is detected in motor or motor relay
		Diagnosis delay time	—

POSSIBLE CAUSE

- Harness or connector
- ABS actuator and electric unit (control unit)
- Fusible link
- Battery power supply system

FAIL-SAFE

—

DTC CONFIRMATION PROCEDURE

1.CHECK SELF DIAGNOSTIC RESULT

With CONSULT

1. Turn ignition switch OFF.
2. Depress brake pedal 20 times or more.
3. Start the engine and wait for 3 minutes or more.
4. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC C1111 detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-80, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000011241097

Regarding Wiring Diagram information, refer to BRC-52, "Wiring Diagram".

1.CONNECTOR INSPECTION

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connectors.
3. Check connectors and terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace as necessary.

2.CHECK ABS MOTOR AND MOTOR RELAY BATTERY POWER SUPPLY

Check voltage between ABS actuator and electric unit (control unit) connector E125 terminal 1 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 3.
NO >> Repair or replace malfunctioning components.

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

Check continuity between ABS actuator and electric unit (control unit) connector E125 terminals 13 and 38 and ground.

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E125	13	Ground	Yes
	38		

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".
NO >> Repair or replace harness.

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

DTC Logic

INFOID:0000000011569058

DTC DETECTION LOGIC

DTC No.	Display Item	DTC detection condition	
C1113	G SENSOR	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	—
		Threshold	When a malfunction is detected in longitudinal G sensor signal
		Diagnosis delay time	—
C1145	YAW RATE SENSOR	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	—
		Threshold	When a malfunction is detected in yaw rate signal. When yaw rate signal is not continuously received for 2 seconds or more When side G signal is not continuously received for 2 seconds or more When decel G signal is not continuously received for 2 seconds or more
		Diagnosis delay time	—
C1146	SIDE G-SEN CIRCUIT	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	—
		Threshold	When a malfunction is detected in side/decel G signal
		Diagnosis delay time	—

POSSIBLE CAUSE

- Harness or connector
- ABS actuator and electric unit (control unit)
- Fuse
- Yaw rate/side/decel G sensor

FAIL-SAFE

—

DTC CONFIRMATION PROCEDURE

1.CHECK SELF DIAGNOSTIC RESULT

With CONSULT

1. Turn ignition switch OFF to ON.
2. Perform “Self Diagnostic Result” mode of “ABS”.
3. Check DTC.

Is DTC C1113, C1145 or C1146 detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-82, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000011241099

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

Replace ABS actuator and electric unit (control unit).

>> Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".

C1115 ABS SENSOR [ABNORMAL SIGNAL]

DTC Logic

INFOID:0000000011734970

DTC DETECTION LOGIC

NOTE:

Confirm if DTC is PAST or CURRENT. If DTC is CURRENT, proceed with Diagnosis Procedure. If DTC is PAST, clear DTC. Do not replace ABS actuator and electric unit (control unit) or wheel sensor for a PAST DTC.

DTC	Display item	Malfunction detected condition	Possible cause	
			Past DTC	Current DTC
C1115	ABS SENSOR [ABNORMAL SIGNAL]	When difference in wheel speed between any wheel and others is detected while the vehicle is driven, because of installation of tires other than specified.	• Low battery voltage • Tire size • Contamination on sensor rotor • Position of sensor rotor and wheel sensor • Wheel sensor mounting bolt loose • Vehicle has been operated on 2-wheel dynamometer or towed using a 2-wheel dolly	• Low battery voltage • Tire size • Contamination on sensor rotor • Position of sensor rotor and wheel sensor • Harness or connector • Wheel sensor • Sensor rotor • ABS actuator and electric unit (control unit) • Wheel sensor mounting bolt loose • Vehicle has been operated on 2-wheel dynamometer or towed using a 2-wheel dolly

DTC CONFIRMATION PROCEDURE

1.CHECK SELF DIAGNOSTIC RESULT

1. Start engine and drive vehicle at approximately 21 km/h (13 MPH) or more for approximately 5 minutes.
2. Check for DTC using CONSULT.

Is the DTC detected?

YES (Current DTC)>>Refer to BRC-84, "Diagnosis Procedure".
YES (Past DTC)>>GO TO 2.
NO >> Inspection End.

2.ERASE SELF DIAGNOSTIC RESULT

Erase the DTC using CONSULT.

Can the DTC be erased?

YES >> Inspection End.
NO >> Refer to BRC-84, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000011734971

Regarding Wiring Diagram information, refer to BRC-52, "Wiring Diagram".

CAUTION:

Do not check between wheel sensor terminals.

1.CONNECTOR INSPECTION

1. Disconnect ABS actuator and electric unit (control unit) connector E125 and wheel sensor connector of wheel with DTC.
2. Check terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace as necessary.

2.CHECK WHEEL SENSOR OUTPUT SIGNAL

1. Connect ABS active wheel sensor tester (J-45741) to wheel sensor using appropriate adapter.
2. Turn on the ABS active wheel sensor tester power switch.
   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.
3. 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 5.
NO >> GO TO 3.

3.CHECK WHEEL SENSOR

Check wheel sensor for the following:
- Proper installation
- Physical damage
- Contamination

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace as necessary.

4.CHECK SENSOR ROTOR

Check sensor rotor for the following:
- Contamination
- Physical damage (missing teeth, cracks, etc.)
- Foreign material
- Looseness

Is the inspection result normal?

YES >> Replace the wheel sensor. Refer to BRC-137, "FRONT WHEEL SENSOR : Removal and Installation" or BRC-139, "REAR WHEEL SENSOR : Removal and Installation".
NO >> Repair or replace as necessary.

5.CHECK TIRES

Check the inflation pressure, wear and size of each tire.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Adjust tire pressure, or replace tire(s).

6.CHECK WIRING HARNESS FOR SHORT CIRCUIT

Check continuity between wheel sensor connector terminals and ground of wheel with DTC.

Wheel Sensor			Ground	Continuity
Wheel	Connector	Terminal		

Front LH	E18	1	—	No
		2		
Front RH	E43	1		
		2		
Rear LH	C10	1		
		2		
Rear RH	C11	1		
		2		

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair the circuit.

7. CHECK WIRING HARNESS FOR OPEN CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) connector E125 and wheel sensor connector of wheel with DTC.

Wheel sensor	ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
	Connector	Terminal	Connector	Terminal	
Front LH	E125	8	E18	2	Yes
		19		1	
Front RH		4	E43	2	
		16		1	
Rear LH		18	C10	2	
		31		1	
Rear RH		29	C11	2	
		17		1	

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".
NO >> Repair the circuit.

C1116 STOP LAMP SWITCH

DTC Logic

INFOID:0000000011734972

DTC DETECTION LOGIC

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

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF DIAGNOSTIC RESULT

1. Turn ignition switch ON.
2. Check for DTC using CONSULT.

Is the DTC detected?

YES (Current DTC)>>Refer to BRC-87, "Diagnosis Procedure".
YES (Past DTC)>>GO TO 2.
NO >> Inspection End.

2.ERASE SELF DIAGNOSTIC RESULT

Erase the DTC using CONSULT.

Can the DTC be erased?

YES >> Inspection End.
NO >> Refer to BRC-87, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000011734973

Regarding Wiring Diagram information, refer to BRC-52, "Wiring Diagram".

1.CONNECTOR INSPECTION

1. Disconnect stop lamp relay connector and ABS actuator and electric unit (control unit) connector.
2. Check terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace as necessary.

2.CHECK STOP LAMP SWITCH CIRCUIT

1. Connect stop lamp switch connector.
2. Check voltage between ABS actuator and electric unit (control unit) connector E125 terminal 30 and ground.

ABS actuator and electric unit (control unit)		Ground	Condition	Voltage (Approx.)
Connector	Terminal			
E125	30	—	Brake pedal depressed	Battery voltage
			Brake pedal released	0V

Is the inspection result normal?

YES >> Adjust stop lamp switch. Refer to BR-15, "Adjustment".
NO >> GO TO 3.

3.CHECK STOP LAMP SWITCH CIRCUIT FOR OPEN

1. Disconnect stop lamp switch connector.
2. Check continuity between ABS actuator and electric unit (control unit) connector E125 terminal 30 and stop lamp switch connector E38 terminal 2.

ABS actuator and electric unit (control unit)		Stop lamp switch		Continuity
Connector	Terminal	Connector	Terminal	
E125	30	E38	2	Yes

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace as necessary.

4.CHECK STOP LAMP SWITCH CIRCUIT FOR SHORT

Check continuity between ABS actuator and electric unit (control unit) connector E125 terminal 30 and ground.

ABS actuator and electric unit (control unit)		Ground	Continuity
Connector	Terminal		
E125	30	—	No

Is the inspection result normal?

YES >> Refer to BRC-60, "Work Flow".
NO >> Repair harness or connectors.

Component Inspection

INFOID:0000000011742498

1.CHECK STOP LAMP SWITCH

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

Stop lamp switch	Condition	Continuity
Terminal		
1 – 2	When stop lamp switch is pressed (When brake pedal is depressed)	Yes
	When stop lamp switch is released (When brake pedal is released)	No

Is the inspection result normal?

YES >> Inspection End.
NO >> Replace stop lamp switch. Refer to BR-20, "Exploded View".

C1120, C1122, C1124, C1126 ABS IN VALVE SYSTEM

DTC Logic

INFOID:0000000011569068

DTC DETECTION LOGIC

DTC No.	Display Item	DTC detection condition	
C1120	FR LH IN ABS SOL	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	—
		Threshold	When a malfunction is detected in front LH ABS IN valve
		Diagnosis delay time	—
C1122	FR RH IN ABS SOL	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	—
		Threshold	When a malfunction is detected in front RH ABS IN valve
		Diagnosis delay time	—
C1124	RR LH IN ABS SOL	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	—
		Threshold	When a malfunction is detected in rear LH ABS IN valve
		Diagnosis delay time	—
C1126	RR RH IN ABS SOL	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	—
		Threshold	When a malfunction is detected in rear RH ABS IN valve
		Diagnosis delay time	—

POSSIBLE CAUSE

- Harness or connector
- ABS actuator and electric unit (control unit)
- Fusible link
- Battery power supply system

FAIL-SAFE

—

DTC CONFIRMATION PROCEDURE

1.CHECK SELF DIAGNOSTIC RESULT

With CONSULT

1. Turn ignition switch OFF to ON.
2. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC C1120, C1122, C1124 or C1126 detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-89, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000011241103

Regarding Wiring Diagram information, refer to BRC-52, "Wiring Diagram".

1.CONNECTOR INSPECTION

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connectors.
3. Check connectors and terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace as necessary.

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

Check voltage between ABS actuator and electric unit (control unit) connector E125 terminal 25 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 3.
NO >> Repair or replace malfunctioning components.

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

Check continuity between ABS actuator and electric unit (control unit) connector E125 terminals 13 and 38 and ground.

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E125	13	Ground	Yes
	38		

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".
NO >> Repair or replace malfunctioning components.

C1121, C1123, C1125, C1127 ABS OUT VALVE SYSTEM

DTC Logic

INFOID:0000000011569073

DTC DETECTION LOGIC

DTC No.	Display Item	DTC detection condition	
C1121	FR LH OUT ABS SOL	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	—
		Threshold	When a malfunction is detected in front LH ABS OUT valve
		Diagnosis delay time	—
C1123	FR RH OUT ABS SOL	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	—
		Threshold	When a malfunction is detected in front RH ABS OUT valve
		Diagnosis delay time	—
C1125	RR LH OUT ABS SOL	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When a malfunction is detected in rear LH ABS OUT valve
		Diagnosis delay time	—
C1127	RR RH OUT ABS SOL	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	—
		Threshold	When a malfunction is detected in rear RH ABS OUT valve
		Diagnosis delay time	—

POSSIBLE CAUSE

- Harness or connector
- ABS actuator and electric unit (control unit)
- Fusible link
- Battery power supply system

FAIL-SAFE

—

DTC CONFIRMATION PROCEDURE

1.CHECK SELF DIAGNOSTIC RESULT

With CONSULT

1. Turn ignition switch OFF to ON.
2. Perform “Self Diagnostic Result” mode of “ABS”.
3. Check DTC.

Is DTC C1121, C1123, C1125 or C1127 detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-91, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000011241105

Regarding Wiring Diagram information, refer to BRC-52, "Wiring Diagram".

1.CONNECTOR INSPECTION

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connectors.
3. Check connectors and terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace as necessary.

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

Check voltage between ABS actuator and electric unit (control unit) connector E125 terminal 25 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 3.
NO >> Repair or replace malfunctioning components.

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

Check continuity between ABS actuator and electric unit (control unit) connector E125 terminals 13 and 38 and ground.

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E125	13	Ground	Yes
	38		

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".
NO >> Repair or replace malfunctioning components.

C1130 ENGINE SIGNAL

DTC Logic

INFOID:0000000011734974

DTC DETECTION LOGIC

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

DTC	Display item	Malfunction detected condition	Possible cause	
			Past DTC	Current DTC
C1130	ENGINE SIGNAL 1	When a malfunction is detected in ECM system.	• Low battery voltage • Harness or connector • CAN communication line	• Low battery voltage • CAN communication line • ECM • ABS actuator and electric unit (control unit)

DTC CONFIRMATION PROCEDURE

1.CHECK SELF DIAGNOSTIC RESULT

1. Turn ignition switch ON.
2. Check for DTC using CONSULT.

Is the DTC detected?

YES (Current DTC)>>Refer to BRC-93, "Diagnosis Procedure".
YES (Past DTC)>>GO TO 2.
NO >> Inspection End.

2.ERASE SELF DIAGNOSTIC RESULT

Erase the DTC using CONSULT.

Can the DTC be erased?

YES >> Inspection End.
NO >> Refer to BRC-93, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000011734975

1.CHECK SELF DIAGNOSTIC RESULT FOR ENGINE SYSTEM

With CONSULT.
Perform “Self Diagnostic Result”. Refer to EC-71, "CONSULT Function".

Are any ECM DTCs detected?

YES >> Refer to EC-107, "DTC Index".
NO >> GO TO 2.

2.CHECK SELF DIAGNOSTIC RESULT FOR ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

With CONSULT.
1. Perform “Self Diagnostic Result” and erase DTCs.
2. Turn ignition switch OFF.
3. Start engine and drive vehicle for a short period of time.
4. Check that malfunction indicator lamp (MIL) turns OFF.
5. Stop vehicle and perform “Self Diagnostic Result”.

Is DTC C1130 detected?

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

3.CHECK TERMINALS

Check pin terminals and connection of connectors for abnormal conditions.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace malfunctioning components.

4. CHECK SELF DIAGNOSTIC RESULT FOR ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

With CONSULT.

1. Perform “Self Diagnostic Result” and erase DTCs.
2. Turn ignition switch OFF.
3. Start engine and drive vehicle for a short period of time.
4. Check that malfunction indicator lamp (MIL) turns OFF.
5. Stop vehicle and perform “Self Diagnostic Result”.

Is DTC C1130 detected?

YES (Past DTC)>>Inspection End.

YES (Current DTC)>>Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".

NO >> Inspection End.

C1140 ACTUATOR RELAY SYSTEM

DTC Logic

INFOID:0000000011569095

DTC DETECTION LOGIC

DTC No.	Display Item	DTC detection condition	Possible causes
C1140	ACTUATOR RLY	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	—
		Threshold	When a malfunction is detected in actuator relay
		Diagnosis delay time	—

POSSIBLE CAUSE

- Harness or connector
- ABS actuator and electric unit (control unit)
- Fusible link
- Battery power supply system

FAIL-SAFE

—

DTC CONFIRMATION PROCEDURE

1.CHECK SELF DIAGNOSTIC RESULT

CONSULT

1. Turn ignition switch OFF to ON.
2. Perform “Self Diagnostic Result” mode of “ABS”.
3. Check DTC.

Is DTC C1140 detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-95, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000011241109

Regarding Wiring Diagram information, refer to BRC-52, "Wiring Diagram".

1.CONNECTOR INSPECTION

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connectors.
3. Check connectors and terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace as necessary.

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

Check voltage between ABS actuator and electric unit (control unit) connector E125 terminals 1 and 25 and ground.

ABS actuator and electric unit (control unit)		—	Voltage (Approx.)
Connector	Terminal		
E125	1	Ground	Battery voltage
	25		

Is the inspection result normal?

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

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

Check continuity between ABS actuator and electric unit (control unit) connector E125 terminals 13 and 38 and ground.

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E125	13	Ground	Yes
	38		

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".
NO >> Repair or replace malfunctioning components.

C1142 PRESS SENSOR

DTC Logic

INFOID:0000000011734976

DTC DETECTION LOGIC

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

DTC	Display item	Malfunction detected condition	Possible cause	
			Past DTC	Current DTC
C1142	PRESS SEN CIRCUIT	When a malfunction is detected in master cylinder pressure sensor.	• Harness or connector • Stop lamp switch system • Trapped air in hydraulic brake system	• Stop lamp switch system • Brake system • Trapped air in hydraulic brake system • ABS actuator and electric unit (control unit)

DTC CONFIRMATION PROCEDURE

1.CHECK SELF DIAGNOSTIC RESULT

1. Turn ignition switch ON.
2. Check for DTC using CONSULT.

Is the DTC detected?

YES (Current DTC)>>Refer to BRC-97, "Diagnosis Procedure".
YES (Past DTC)>>GO TO 2.
NO >> Inspection End.

2.ERASE SELF DIAGNOSTIC RESULT

Erase the DTC using CONSULT.

Can the DTC be erased?

YES >> Inspection End.
NO >> Refer to BRC-97, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000011734977

1.CHECK STOP LAMP SWITCH SYSTEM

Check stop lamp switch system. Refer to BRC-87, "Diagnosis Procedure".

Is the inspection result normal?

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

2.CHECK BRAKE FLUID LEAKAGE

Check brake fluid leakage. Refer to BR-8, "Inspection".

Is the inspection result normal?

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

3.CHECK BRAKE PEDAL AND ADJUST STOP LAMP SWITCH

Check brake pedal and adjust stop lamp switch. Refer to BR-15, "Adjustment".

Is the inspection result normal?

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

4.CHECK SELF DIAGNOSTIC RESULT

With CONSULT.
1. Turn ignition switch ON.

2. Perform “Self Diagnostic Result”.
3. Erase DTCs.
4. Start engine and drive vehicle for a short period of time.
5. Turn ignition switch ON.
6. Perform “Self Diagnostic Result”.

Is DTC C1142 detected?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".

NO >> Inspection End.

C1143 STEERING ANGLE SENSOR

DTC Logic

INFOID:0000000011569099

DTC DETECTION LOGIC

DTC No.	Display Item	DTC detection condition	
C1143	ST ANG SEN CIRCUIT	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	—
		Threshold	When a malfunction is detected in steering angle sensor
		Diagnosis delay time	—

POSSIBLE CAUSE

- Harness or connector
- ABS actuator and electric unit (control unit)
- Steering angle sensor
- Fuse
- Ignition power supply system
- CAN communication line

FAIL-SAFE

—

DTC CONFIRMATION PROCEDURE

1.CHECK SELF DIAGNOSTIC RESULT

CONSULT

1. Turn ignition switch OFF to ON.
2. Perform “Self Diagnostic Result” mode of “ABS”.
3. Check DTC.

Is DTC C1143 detected?

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

Diagnosis Procedure

INFOID:0000000011241113

Regarding Wiring Diagram information, refer to BRC-52, "Wiring Diagram".

1.CONNECTOR INSPECTION

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) and steering angle sensor connectors.
3. Check connectors and terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace as necessary.

2.CHECK STEERING ANGLE SENSOR MOUNTING CONDITION

Check steering angle sensor mounting condition.

Is the inspection result normal?

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

3.CHECK STEERING ANGLE SENSOR POWER SUPPLY

1. Turn ignition switch OFF.

2. Disconnect steering angle sensor connector.
3. Turn ignition switch ON.
4. Check voltage between steering angle sensor connector M54 terminal 4 and ground.

Steering angle sensor		—	Voltage (Approx.)
Connector	Terminal		
M54	4	Ground	Battery voltage

Is the inspection result normal?

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

4. CHECK STEERING ANGLE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector E119.
3. Check continuity between steering angle sensor connector M54 terminal 4 and IPDM E/R connector E119 terminal 35.

Steering angle sensor		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
M54	4	E119	35	Yes

4. Check continuity between steering angle sensor connector M54 terminal 4 and ground.

Steering angle sensor		—	Continuity
Connector	Terminal		
M54	4	Ground	No

Is the inspection result normal?

YES >> Perform trouble diagnosis for ignition power supply.
NO >> Repair or replace malfunctioning components.

5. CHECK STEERING ANGLE SENSOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check continuity between steering angle sensor connector M54 terminal 1 and ground.

Steering angle sensor		—	Continuity
Connector	Terminal		
M54	1	Ground	Yes

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace malfunctioning components.

6. CHECK CAN COMMUNICATION LINE

Check “STRG BRANCH LINE CIRCUIT”. Refer to LAN-136, "Diagnosis Procedure" (Type 1) or LAN-154, "Diagnosis Procedure" (Type 2).

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".
NO >> Repair or replace malfunctioning components.

C1144 INCOMPLETE STEERING ANGLE SENSOR ADJUSTMENT

DTC Logic

INFOID:0000000011569101

DTC DETECTION LOGIC

DTC No.	Display Item	DTC detection condition	
C1144	ST ANG SEN SIGNAL	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	—
		Threshold	When neutral position adjustment of steering angle sensor is not complete
		Diagnosis delay time	—

POSSIBLE CAUSE

- Harness or connector
- ABS actuator and electric unit (control unit)
- Steering angle sensor
- Incomplete neutral position adjustment of steering angle sensor

FAIL-SAFE

—

DTC CONFIRMATION PROCEDURE

1.CHECK SELF DIAGNOSTIC RESULT

CONSULT

1. Turn ignition switch OFF to ON.
2. Perform “Self Diagnostic Result” mode of “ABS”.
3. Check DTC.

Is DTC C1144 detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-101, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000011241115

1.ADJUST THE NEUTRAL POSITION OF STEERING ANGLE SENSOR

Perform neutral position adjustment of steering angle sensor. Refer to BRC-101, "Diagnosis Procedure".

>> GO TO 2.

2.CHECK SELF DIAGNOSTIC RESULT

CONSULT

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

Is DTC C1144 detected?

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

3.CHECK STEERING ANGLE SENSOR SYSTEM

Check steering angle sensor system. Refer to BRC-99, "Diagnosis Procedure".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".
NO >> Repair or replace malfunctioning components.

C1154 PNP SWITCH

Description

INFOID:0000000011734978

The transmission range switch signal is transmitted to the ABS actuator and electric unit (control unit) using the CAN communication lines.

DTC Logic

INFOID:0000000011734979

DTC DETECTION LOGIC

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

DTC	Display item	Malfunction detected condition	Possible cause	
			Past DTC	Current DTC
C1154	PNP POS SIG	Transmission range switch signal or communication line between the ABS actuator and electric unit (control unit) and TCM is open or shorted.	• Harness or connector • Transmission range switch	• Harness or connector • Transmission range switch

DTC CONFIRMATION PROCEDURE

1.CHECK SELF DIAGNOSTIC RESULT

1. Turn ignition switch ON.
2. Check for DTC using CONSULT.

Is the DTC detected?

YES (Current DTC)>>Refer to BRC-102, "Diagnosis Procedure".
YES (Past DTC)>>GO TO 2.
NO >> Inspection End.

2.ERASE SELF DIAGNOSTIC RESULT

Erase the DTC using CONSULT.

Can the DTC be erased?

YES >> Inspection End.
NO >> Refer to BRC-102, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000011734980

1.CHECK TRANSMISSION RANGE SWITCH

Perform transmission range switch inspection. Refer to TM-13, "CVT CONTROL SYSTEM : Transmission Range Switch".

Is the inspection result normal?

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

2.CHECK DATA MONITOR

Select “SLCT LVR POSI” in “Data Monitor” and check transmission range switch signal.

Selector lever position	SLCT LVR POSI (Data monitor)
P position	P
R position	R
N position	N
D position	D

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".

NO >> Check damage or loose connection of CAN communication line harness connector terminals.

Special Repair Requirement

INFOID:0000000011734981

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to BRC-64, "Description".

>> Inspection End.

C1155 BR FLUID LEVEL LOW

DTC Logic

INFOID:0000000011734982

DTC DETECTION LOGIC

NOTE:

- Check brake fluid level in brake reservoir tank before starting inspection.
- Confirm if DTC is PAST or CURRENT. If DTC is CURRENT, proceed with Diagnosis Procedure. If DTC is PAST, clear DTC. Do not replace ABS actuator and electric unit (control unit) for a PAST DTC.

DTC	Display item	Malfunction detected condition	Possible cause	
			Past DTC	Current DTC
C1155	BR FLUID LEVEL LOW	Brake fluid level is low or communication line between the ABS actuator and electric unit (control unit) and brake fluid level switch is open or shorted.	• Brake fluid level • Harness or connector • Brake fluid level switch	• Brake fluid level • Harness or connector • Brake fluid level switch

DTC CONFIRMATION PROCEDURE

1.CHECK BRAKE FLUID LEVEL

Check brake fluid level. Refer to BR-8, "Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Fill brake fluid to proper level. Refer to BR-8, "Inspection". GO TO 2.

2.CHECK SELF DIAGNOSTIC RESULT

1. Turn ignition switch ON.
2. Check for DTC using CONSULT.

Is the DTC detected?

YES (Current DTC)>>Refer to BRC-104, "Diagnosis Procedure".
YES (Past DTC)>>GO TO 3.
NO >> Inspection End.

3.ERASE SELF DIAGNOSTIC RESULT

Erase the DTC using CONSULT.

Can the DTC be erased?

YES >> Inspection End.
NO >> Refer to BRC-104, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000011734983

Regarding Wiring Diagram information, refer to BRC-52, "Wiring Diagram".

1.CONNECTOR INSPECTION

1. Turn ignition switch OFF.
2. Disconnect combination meter and brake fluid level switch connectors.
3. Check connectors and terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace as necessary.

2.CHECK BRAKE FLUID LEVEL SWITCH

Perform the brake fluid level switch component inspection. Refer to BRC-105, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Replace brake fluid level switch. Refer to BR-29, "Exploded View".

3.CHECK BRAKE FLUID LEVEL SWITCH HARNESS

1. Check continuity between combination meter connector M24 terminal 25 and brake fluid level switch connector E21 terminal 1.

Combination meter		Brake fluid level switch		Continuity
Connector	Terminal	Connector	Terminal	
M24	25	E21	1	Yes

2. Check continuity between combination meter connector and ground.

Combination meter		—	Continuity
Connector	Terminal		
M24	25	Ground	No

Is the inspection result normal?

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

4.CHECK BRAKE FLUID LEVEL SWITCH GROUND CIRCUIT

Check continuity between brake fluid level switch connector E21 terminal 2 and ground.

Brake fluid level switch		—	Continuity
Connector	Terminal		
E21	2	Ground	Yes

Is the inspection result normal?

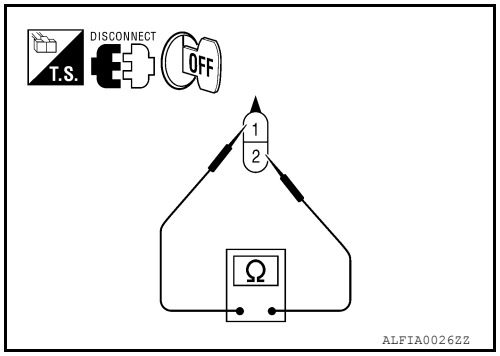
YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation"
NO >> Repair or replace malfunctioning components.

Component Inspection

INFOID:0000000011734984

1.CHECK BRAKE FLUID LEVEL SWITCH

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



Brake fluid level switch terminals	Condition	Continuity
1— 2	Brake fluid reservoir full	No
	Brake fluid reservoir empty	Yes

Is the inspection result normal?

YES >> Inspection End.
NO >> Replace brake fluid level switch. Refer to BR-29, "Exploded View".

C1160 DECEL G SEN SET

DTC Logic

INFOID:0000000011569109

DTC DETECTION LOGIC

DTC No.	Display Item	DTC detection condition	
C1160	DECEL G SEN SET	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	—
		Threshold	When calibration of yaw rate/side/decel G sensor is not complete
		Diagnosis delay time	—

POSSIBLE CAUSE

- Harness or connector
- ABS actuator and electric unit (control unit)
- Yaw rate/side/decel G sensor
- Decel G sensor calibration is not performed

FAIL-SAFE

—

DTC CONFIRMATION PROCEDURE

1.CHECK SELF DIAGNOSTIC RESULT

CONSULT

1. Turn ignition switch OFF to ON.
2. Perform “Self Diagnostic Result” mode of “ABS”.
3. Check DTC.

Is DTC C1160 detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-106, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000011241120

1.DECEL G SENSOR CALIBRATION

Perform decel G sensor calibration. Refer to BRC-66, "Work Procedure".

>> GO TO 2.

2.CHECK SELF DIAGNOSTIC RESULT

With CONSULT

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

Is DTC C1160 detected?

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

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

Check yaw rate/side/decel G sensor system. Refer to BRC-82, "Diagnosis Procedure".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".
NO >> Repair or replace malfunctioning components.

C1164, C1165, C1166, C1167 CV/SV SYSTEM

DTC Logic

INFOID:0000000011734985

DTC DETECTION LOGIC

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

DTC	Display item	Malfunction detected condition	Possible cause	
			Past DTC	Current DTC
C1164	CV 1	When a malfunction is detected in cut valve 1.	• Battery power supply system • Harness or connector	• Fusible link • Battery power supply system • Harness or connector • ABS actuator and electric unit (control unit)
C1165	CV 2	When a malfunction is detected in cut valve 2.		
C1166	SV 1	When a malfunction is detected in suction valve 1.		
C1167	SV 2	When a malfunction is detected in suction valve 2.		

DTC CONFIRMATION PROCEDURE

1.CHECK SELF DIAGNOSTIC RESULT

1. Turn ignition switch ON.
2. Check for DTC using CONSULT.

Is the DTC detected?

YES (Current DTC)>>Refer to BRC-107, "Diagnosis Procedure".
YES (Past DTC)>>GO TO 2.
NO >> Inspection End.

2.ERASE SELF DIAGNOSTIC RESULT

Erase the DTC using CONSULT.

Can the DTC be erased?

YES >> Inspection End.
NO >> Refer to BRC-107, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000011734986

Regarding Wiring Diagram information, refer to BRC-52, "Wiring Diagram".

1.CONNECTOR INSPECTION

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check connector and terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace as necessary.

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

Check voltage between ABS actuator and electric unit (control unit) connector E125 terminal 25 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 3.
NO >> Repair or replace malfunctioning components.

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

Check continuity between ABS actuator and electric unit (control unit) connector E125 terminals 13, 38 and ground.

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E125	13	Ground	Yes
	38		

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".
NO >> Repair or replace malfunctioning components.

C1197 VACUUM SENSOR

DTC Logic

INFOID:0000000011569121

DTC DETECTION LOGIC

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

DTC	Display Item	DTC detection condition	
C1197	VACUUM SENSOR	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	—
		Threshold	When the information in ABS actuator and electric unit (control unit) is not the same
		Diagnosis delay time	—

POSSIBLE CAUSE

- Harness or connector
- Vacuum sensor (brake booster)
- Vacuum piping
- ABS actuator and electric unit (control unit)

FAIL-SAFE

—

DTC CONFIRMATION PROCEDURE

1.CHECK SELF DIAGNOSTIC RESULT

CONSULT.
1. Turn ignition switch OFF to ON.
2. Perform “Self Diagnostic Result” mode of “ABS”.
3. Check DTC.

Is DTC C1197 detected?

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

Diagnosis Procedure

INFOID:0000000011241126

Regarding Wiring Diagram information, refer to BRC-52, "Wiring Diagram").

1.CHECK BRAKE BOOSTER

1. Turn the ignition switch OFF.
2. Check brake booster. Refer to BR-10, "Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace brake booster. Refer to BR-32, "Removal and Installation".

2.CHECK VACUUM PIPING

Check vacuum piping. Refer to BR-22, "FRONT : Exploded View" and BR-26, "REAR : Exploded View".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Replace vacuum piping. Refer to BR-24, "FRONT : Removal and Installation" or BR-27, "REAR : Removal and Installation".

3.CHECK VACUUM SENSOR CIRCUIT

1. Disconnect vacuum sensor harness connector.
2. Disconnect ABS actuator and electric unit (control unit) harness connector.
3. Check 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	

4. Check 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 or replace malfunctioning components.

4.CHECK TERMINAL

- Check vacuum sensor pin terminals for damage or loose connection with harness connector.
- Check 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 or replace malfunctioning components.

5.REPLACE VACUUM SENSOR

With CONSULT

1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Replace vacuum sensor. Refer to BR-32, "Exploded View".
   CAUTION:
   Always replace brake booster because vacuum sensor cannot be disassembled.
3. Erase “Self Diagnostic Result” mode of “ABS”.
4. Turn the ignition switch OFF.
5. Start engine.
6. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC C1197 detected?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".
NO >> Inspection End.

C1198 VACUUM SENSOR

DTC Logic

INFOID:0000000011569138

DTC DETECTION LOGIC

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

DTC No.	Display Item	DTC detection condition	
C1198	VACUUM SENSOR	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	—
		Threshold	When an open circuit is detected in vacuum sensor. When a short circuit is detected in vacuum sensor circuit. When a malfunction is detected in vacuum sensor
		Diagnosis delay time	—

POSSIBLE CAUSE

- Harness or connector
- Vacuum sensor (brake booster)
- ABS actuator and electric unit (control unit)

FAIL-SAFE

—

DTC CONFIRMATION PROCEDURE

1.CHECK SELF DIAGNOSTIC RESULT

With CONSULT
1. Turn ignition switch OFF to ON.
2. Perform “Self Diagnostic Result” mode of “ABS”.
3. Check DTC.

Is DTC C1198 detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-111, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000011241128

Regarding Wiring Diagram information, refer to BRC-52, "Wiring Diagram".

1.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 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 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 2.
NO >> Repair or replace malfunctioning components.

2.CHECK TERMINAL

- Check vacuum sensor pin terminals for damage or loose connection with harness connector.
- Check 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 or replace malfunctioning components.

3.REPLACE VACUUM SENSOR

With CONSULT
1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Replace vacuum sensor. Refer to BR-32, "Exploded View".
   CAUTION:
   Always replace brake booster because vacuum sensor cannot be disassembled.
3. Erase “Self Diagnostic Result” mode of “ABS”.
4. Turn the ignition switch OFF.
5. Start engine.
6. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC C1198 detected?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".
NO >> Inspection End.

C1199 BRAKE BOOSTER

DTC Logic

INFOID:0000000011569139

DTC DETECTION LOGIC

DTC No.	Display Item	DTC detection condition	
C1199	BRAKE BOOSTER	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	—
		Threshold	When brake booster vacuum is approx. 0 kPa (0 mm-Hg) during engine running
		Diagnosis delay time	—

POSSIBLE CAUSE

- Harness or connector
- Vacuum sensor (brake booster)
- Vacuum piping
- ABS actuator and electric unit (control unit)

FAIL-SAFE

—

DTC CONFIRMATION PROCEDURE

1.CHECK SELF DIAGNOSTIC RESULT

CONSULT

1. Turn ignition switch OFF to ON.
2. Perform “Self Diagnostic Result” mode of “ABS”.
3. Check DTC.

Is DTC C1199 detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-113, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000011241130

Regarding Wiring Diagram information, refer to BRC-52, "Wiring Diagram".

1.CHECK BRAKE BOOSTER

1. Turn the ignition switch OFF.
2. Check brake booster. Refer to BR-10, "Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace brake booster. Refer to BR-32, "Removal and Installation".

2.CHECK VACUUM PIPING

Check vacuum piping. Refer to BR-22, "FRONT : Exploded View" and BR-26, "REAR : Exploded View".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Replace vacuum piping. Refer to BR-24, "FRONT : Removal and Installation" or BR-27, "REAR : Removal and Installation".

3.CHECK VACUUM SENSOR CIRCUIT

1. Disconnect vacuum sensor harness connector.
2. Disconnect ABS actuator and electric unit (control unit) harness connector.

3. Check 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	

4. Check 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 or replace malfunctioning components.

4. CHECK TERMINAL

- Check vacuum sensor pin terminals for damage or loose connection with harness connector.
- Check 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 or replace malfunctioning components.

5. REPLACE VACUUM SENSOR

With CONSULT

1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Replace vacuum sensor. Refer to BR-32, "Removal and Installation".
   CAUTION:
   Always replace brake booster because vacuum sensor cannot be disassembled.
3. Erase “Self Diagnostic Result” mode of “ABS”.
4. Turn the ignition switch OFF.
5. Start engine.
6. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC C1199 detected?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".
NO >> Inspection End.

C119A VACUUM SENSOR

DTC Logic

INFOID:0000000011734987

DTC DETECTION LOGIC

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

DTC	Display item	Malfunction detected condition	Possible cause	
			Past DTC	Current DTC
C119A	VACUUM SEN VOLT	When a malfunction is detected in supply power voltage of vacuum sensor.	• Low battery voltage • Harness or connector	• Low battery voltage • Harness or connector • Vacuum sensor (brake booster) • ABS actuator and electric unit (control unit)

DTC CONFIRMATION PROCEDURE

1.CHECK SELF DIAGNOSTIC RESULT

1. Turn ignition switch ON.
2. Check for DTC using CONSULT.

Is the DTC detected?

YES (Current DTC)>>Refer to BRC-115, "Diagnosis Procedure".
YES (Past DTC)>>GO TO 2.
NO >> Inspection End.

2.ERASE SELF DIAGNOSTIC RESULT

Erase the DTC using CONSULT.

Can the DTC be erased?

YES >> Inspection End.
NO >> Refer to BRC-115, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000011734988

Regarding Wiring Diagram information, refer to BRC-52, "Wiring Diagram".

1.CHECK VACUUM SENSOR POWER SUPPLY

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

Vacuum sensor		—	Voltage (Approx.)
Connector	Terminal		
E167	3	Ground	0 V

4. Turn the ignition switch ON.
   CAUTION:
   Never start engine.
5. Check voltage between vacuum sensor harness connector and ground.

Vacuum sensor		—	Voltage (Approx.)
Connector	Terminal		
E167	3	Ground	4.75 V – 5.25 V

Is the inspection result normal?

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

2.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 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	21	Yes

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

Vacuum sensor		—	Continuity
Connector	Terminal		
E167	3	Ground	No

Is the inspection result normal?

YES >> Perform diagnosis of ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to BRC-77, "Diagnosis Procedure".
NO >> Repair or replace malfunctioning components.

3.CHECK VACUUM SENSOR GROUND CIRCUIT

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

Vacuum sensor		—	Continuity
Connector	Terminal		
E167	2	Ground	Yes

Is the inspection result normal?

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

4.CHECK TERMINAL

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".
NO >> Repair or replace malfunctioning components.

U1000 CAN COMM CIRCUIT

Description

INFOID:0000000011241133

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

DTC Logic

INFOID:0000000011569143

DTC DETECTION LOGIC

DTC No.	Display Item	DTC detection condition	
U1000	CAN COMM CIRCUIT	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	—
		Threshold	When CAN communication signal is not continuously received for 2 seconds or more.
		Diagnosis delay time	—

POSSIBLE CAUSE

- CAN communication system malfunction

FAIL-SAFE

—

Diagnosis Procedure

INFOID:0000000011241135

1.CHECK SELF DIAGNOSTIC RESULT

CONSULT

1. Turn ignition switch ON.
2. Perform “Self Diagnostic Result” mode of “ABS”.
3. Check DTC.

Is DTC U1000 detected?

YES >> Proceed to diagnosis procedure. Refer to LAN-21, "Trouble Diagnosis Flow Chart".
NO >> Refer to GI-42, "Intermittent Incident".

U1002 SYSTEM COMM (CAN)

DTC Logic

INFOID:0000000011815526

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
U1002	SYSTEM COMM(CAN)	When ABS actuator and electric unit (control unit) is not transmitting or receiving CAN communication signal for 2 seconds or less.	• CAN communication line • ABS actuator and electric unit (control unit)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

With CONSULT
1. Turn the ignition switch ON.
2. Perform self diagnosis for “ABS”.

Is DTC “U1002” detected?

YES >> Proceed to BRC-118, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000011815527

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

1. Select “ABS” and “CAN Diagnosis Support Monitor” in order with CONSULT.
2. Check malfunction history between each control unit connected to ABS actuator and electric unit (control unit).

Check the result of “PAST”?

All items are “OK”>>Refer to GI-42, "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 14 and 26 for damage or loose connection.

Is the inspection result normal?

YES >> Erase self-diagnosis results. Then perform self-diagnosis for “ABS” with CONSULT.
NO >> Recheck terminals for damage or loose connection.

3.CHECK APPLICABLE CONTROL UNIT

Check damage or loose connection of each CAN communication line harness connector terminals.

Is the inspection result normal?

YES >> Erase self-diagnosis results. Then perform self-diagnosis for applicable control unit with CONSULT.
NO >> Recheck terminals for damage or loose connection.

POWER SUPPLY AND GROUND CIRCUIT

Diagnosis Procedure

INFOID:0000000011573882

Regarding Wiring Diagram information, refer to PCS-23, "Wiring Diagram".

1. CHECK FUSIBLE LINKS

Check that the following fusible links are not blown.

Signal name	Fusible link No.
Battery power supply	E (80A)
	A (250A), C (80A)
	A (250A), B (100A), N (40A)

Is the fusible link blown?

YES >> Replace the blown fusible link after repairing the affected circuit.
NO >> GO TO 2.

2. CHECK POWER SUPPLY CIRCUIT

1. Disconnect IPDM E/R connectors E118 and E120.
2. Check voltage between IPDM E/R connectors and ground.

IPDM E/R		Ground	Voltage (Approx.)
Connector	Terminal		
E118	1	—	Battery voltage
	2		
E120	3		

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness or connectors.

3. CHECK GROUND CIRCUIT

1. Disconnect IPDM E/R connectors E119 and E121.
2. Check continuity between IPDM E/R connectors and ground.

IPDM E/R		Ground	Continuity
Connector	Terminal		
E121	7	—	Yes
E119	41		

Is the inspection result normal?

YES >> Inspection End.
NO >> Repair or replace harness or connectors.

PARKING BRAKE SWITCH

Component Function Check

INFOID:0000000011241137

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-120, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000011241138

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	M24	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-10, "Removal and Installation".

3.CHECK PARKING BRAKE SWITCH SIGNAL

With CONSULT

1. Select “Data Monitor”
2. Select “PARK BRAKE SW”.
3. Check that the function operates normally according to the following conditions:

Condition	Data Monitor
Operate parking brake	On
Release 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-20, "CONSULT Function (METER/M&A)".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace combination meter. Refer to MWI-78, "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-142, "Removal and Installation".
NO >> Repair or replace error-detected parts.

Component Inspection

INFOID:0000000011241139

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-10, "Removal and Installation".

VDC OFF SWITCH

Component Function Check

INFOID:0000000011241140

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-122, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000011241141

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.

Without Intelligent Cruise Control

ABS actuator and electric unit (control unit)		VDC OFF switch		Continuity
Connector	Terminal	Connector	Terminal	
E125	15	M71	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		
M71	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-123, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace the VDC OFF switch. Refer to BRC-144, "Removal and Installation".

4.CHECK VDC OFF SWITCH SIGNAL

CONSULT

1. Select “Data Monitor” mode of “ABS”.
2. Select “OFF SW”.
3. Check that the function operates normally according to the following conditions:

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-142, "Removal and Installation".
NO >> Repair or replace error-detected parts.

Component Inspection

INFOID:0000000011241142

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	Condition	Continuity
Terminal		
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-144, "Removal and Installation".

ABS WARNING LAMP

Component Function Check

INFOID:0000000011241143

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-124, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000011241144

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-124, "Diagnosis Procedure".

Is the inspection result normal?

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

2.PERFORM SELF DIAGNOSTIC RESULT

CONSULT

1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait 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” for “ABS”.

Is any DTC detected?

YES >> Check the DTC. Refer to BRC-50, "DTC Index".
NO >> GO TO 3.

3.CHECK ABS WARNING LAMP SIGNAL

CONSULT

1. Select “ABS”, “Data Monitor” and “ABS WARN LAMP” in 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-78, "Removal and Installation".
NO >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".

BRAKE WARNING LAMP

Component Function Check

INFOID:0000000011241145

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-125, "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-120, "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 within 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-29, "Exploded View".

Diagnosis Procedure

INFOID:0000000011241146

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-119, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2.PERFORM THE SELF DIAGNOSTIC RESULT

CONSULT

1. Turn the ignition switch OFF → ON.

   CAUTION:

   - **Be sure to wait 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” mode of “ABS”.

Is any DTC detected?

YES >> Check the DTC. Refer to BRC-50, "DTC Index".

NO >> GO TO 3.

3.CHECK BRAKE WARNING LAMP SIGNAL

CONSULT

1. Select “ABS”, “Data Monitor” and “EBD WARN LAMP” in 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-78, "Removal and Installation".
NO >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".

VDC WARNING LAMP

Component Function Check

INFOID:0000000011241147

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-127, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000011241148

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-119, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2.PERFORM THE SELF DIAGNOSTIC RESULT

CONSULT

1. Turn the ignition switch OFF → ON.

   CAUTION:

   - **Be sure to wait 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” mode of “ABS”.

Is any DTC detected?

YES >> Check the DTC. Refer to BRC-50, "DTC Index".

NO >> GO TO 3.

3.CHECK VDC WARNING LAMP SIGNAL

CONSULT

1. Select “ABS”, “Data Monitor” and “SLIP/VDC LAMP” in this order.
2. Turn the ignition switch OFF.
3. Check that data monitor displays “On” for approximately 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-78, "Removal and Installation".

NO >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".

VDC OFF INDICATOR LAMP

Component Function Check

INFOID:0000000011241149

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-128, "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-122, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000011241150

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-119, "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” in 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-142, "Removal and Installation".

3.CHECK VDC OFF INDICATOR LAMP SIGNAL

CONSULT

1. Select “ABS”, “Data Monitor” and “OFF LAMP” in this order.
2. Check that data monitor displays “On” or “Off” each time VDC OFF switch is operated.

Is the inspection result normal?

YES >> Replace the combination meter. Refer to MWI-78, "Removal and Installation".
NO >> Check the VDC OFF switch system. Refer to BRC-122, "Diagnosis Procedure".

SYMPTOM DIAGNOSIS

EXCESSIVE OPERATION FREQUENCY

Description

INFOID:0000000011241151

VDC function, TCS function, ABS function, EBD function, brake assist function or hill start assist function operates in excessive operation frequency.

Diagnosis Procedure

INFOID:0000000011241152

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-7, "Inspection" (rear).
- AWD: Refer to FAX-7, "Inspection" (front) or DLN-88, "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-137, "FRONT WHEEL SENSOR : Removal and Installation".
- Rear wheel sensor: Refer to BRC-139, "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-141, "FRONT SENSOR ROTOR : Removal and Installation - Front Sensor Rotor".
- Rear sensor rotor: Refer to BRC-141, "REAR SENSOR ROTOR : Removal and Installation - Rear Sensor Rotor".

5. CHECK THAT WARNING LAMP TURNS OFF

Check that ABS warning lamp, brake warning lamp and VDC warning lamp turn OFF approximately 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 RESULT

CONSULT

1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait 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” mode of “ABS”.

Is any DTC detected?

YES >> Check the DTC. Refer to BRC-50, "DTC Index".
NO >> Inspection End.

UNEXPECTED BRAKE PEDAL REACTION

Description

INFOID:0000000011241153

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

Diagnosis Procedure

INFOID:0000000011241154

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-7, "Inspection" (rear).
- AWD: Refer to FAX-7, "Inspection" (front) or DLN-88, "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-11, "DISC BRAKE ROTOR : Inspection".
- Rear: Refer to BR-13, "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-8, "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-7, "Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Adjust each item of brake pedal. Refer to BR-15, "Adjustment".

5.CHECK BRAKING FORCE

Check brake force using a brake tester.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Check each component 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 component of brake system.

THE BRAKING DISTANCE IS LONG

Description

INFOID:0000000011241155

Brake stopping distance is long when ABS function is operated.

Diagnosis Procedure

INFOID:0000000011241156

CAUTION:

Brake stopping distance on a slippery road like a 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 component 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 component of brake system.

DOES NOT OPERATE

Description

INFOID:0000000011241157

VDC function, TCS function, ABS function, EBD function, brake assist function or hill start assist function does not operate.

Diagnosis Procedure

INFOID:0000000011241158

CAUTION:
- **VDC function, TCS function, ABS function, EBD function, brake assist function and hill start assist function never operate when the vehicle speed is 10 km/h (6.2 MPH) or less. However, TCS function, and hill start assist function operate 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 approximately 1 second after key switch is turned ON. Check that ABS warning lamp, brake warning lamp and VDC warning lamp 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 RESULT

CONSULT
1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait 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” mode of “ABS” with CONSULT.

Is any DTC detected?

YES >> Check the DTC. Refer to BRC-50, "DTC Index".
NO >> Inspection End.

BRAKE PEDAL VIBRATION OR OPERATION SOUND OCCURS

Description

INFOID:0000000011241159

- 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 when 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 speeds**
- **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:0000000011241160

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-15, "Adjustment".

2.SYMPTOM CHECK 2

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

Does the operation sound occur?

YES >> GO TO 3.
NO >> Perform “Self Diagnostic Result” mode 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

CONSULT

1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait 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” mode of “ABS”.

Is any DTC detected?

YES >> Check the DTC. Refer to BRC-50, "DTC Index".
NO >> Inspection End.

VEHICLE JERKS DURING

Description

INFOID:0000000011241161

The vehicle jerks when VDC function, TCS function, ABS function, EBD function, brake assist function or hill start assist function operates.

Diagnosis Procedure

INFOID:0000000011241162

1.CHECK SYMPTOM

Check that the vehicle jerks when VDC function, TCS function, ABS function, EBD function, brake assist function or hill start assist 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 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” mode of “ABS”.

Is any DTC detected?

YES >> Check the DTC. Refer to BRC-50, "DTC Index".
NO >> GO TO 3.

3.CHECK CONNECTOR

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

Is the inspection result normal?

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

4.PERFORM THE SELF DIAGNOSTIC RESULT

CONSULT

1. Connect harness connector.
2. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait 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” mode of “ABS”.

Is any DTC detected?

YES >> Check the DTC. Refer to BRC-50, "DTC Index".
NO >> GO TO 5.

5.PERFORM THE SELF DIAGNOSTIC RESULT

CONSULT

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

Is any DTC detected?

YES >> Check the DTC.
NO >> Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".

NORMAL OPERATING CONDITION

Description

INFOID:0000000011241163

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 assist function, hill start assist function operates.	This is not a malfunction, because it is caused by VDC function, TCS function, ABS function, EBD function, brake assist function, hill start assist 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 a slippery road, 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 feel 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.)

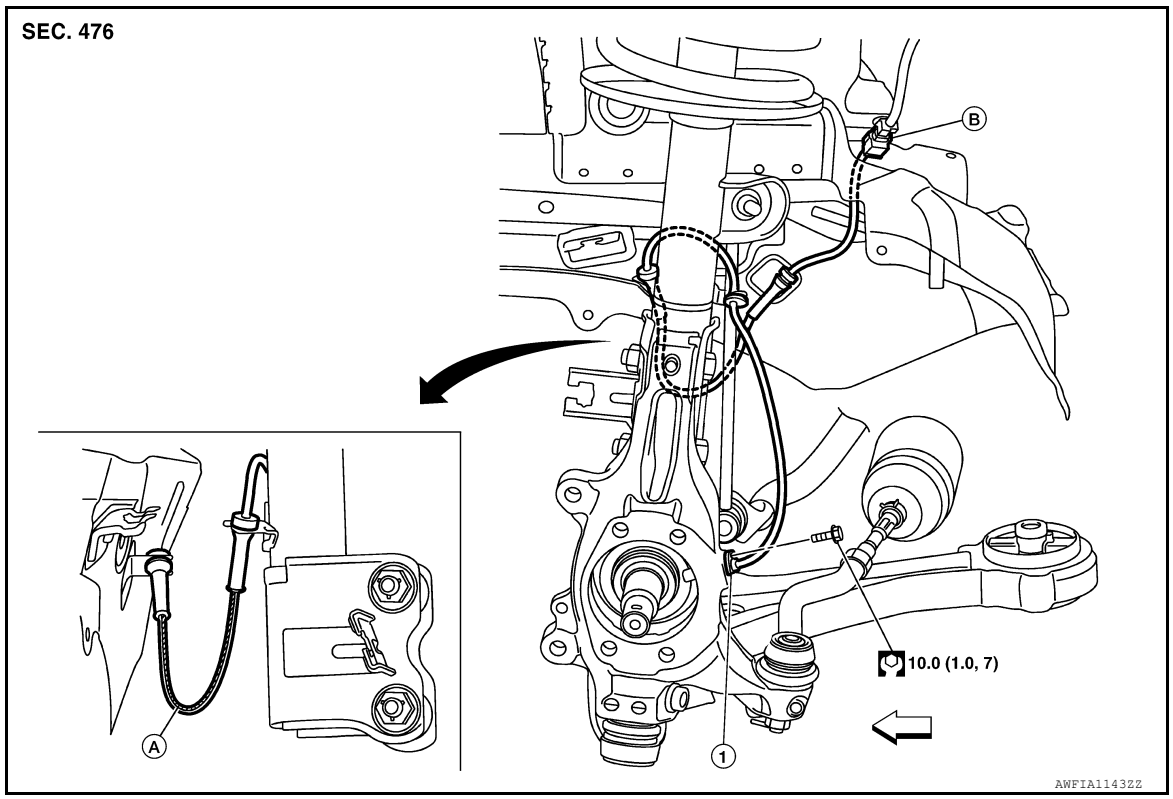
REMOVAL AND INSTALLATION

WHEEL SENSOR

FRONT WHEEL SENSOR

FRONT WHEEL SENSOR : Exploded View

INFOID:0000000011241164



1. Front wheel sensor
A. Color line (slant line)
B. Front wheel sensor harness connector
⇦ Front

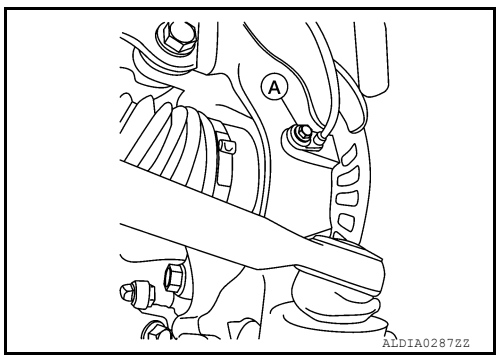
FRONT WHEEL SENSOR : Removal and Installation

INFOID:0000000011241165

CAUTION:
Do not damage the front wheel sensor or sensor rotor.

REMOVAL

1. Remove front wheel and tire using power tool. Refer to WT-65, "Balancing Wheels".
2. Remove fender protector retaining pin to gain access to wheel sensor harness connector.
3. Disconnect harness connector from front wheel sensor.
4. Remove front wheel sensor bolt (A) from wheel hub and bearing.
CAUTION:
Pull out the front wheel sensor being careful to turn it as little as possible. Do not pull on the front wheel sensor harness.



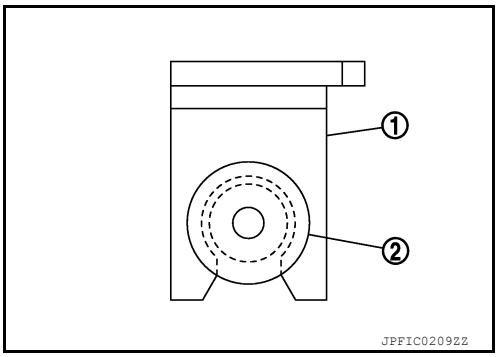
5. Remove front wheel sensor from strut bracket.
6. Remove front wheel sensor from steering knuckle.
   CAUTION:
   Pull out the front wheel sensor being careful to turn it as little as possible. Do not pull on the front wheel sensor harness.

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

- **Before installing, make sure there is no foreign material, such as iron fragments, adhered to the pick-up part of the front wheel sensor.**
- **When installing, make sure there is no foreign material, such as iron fragments, 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.**

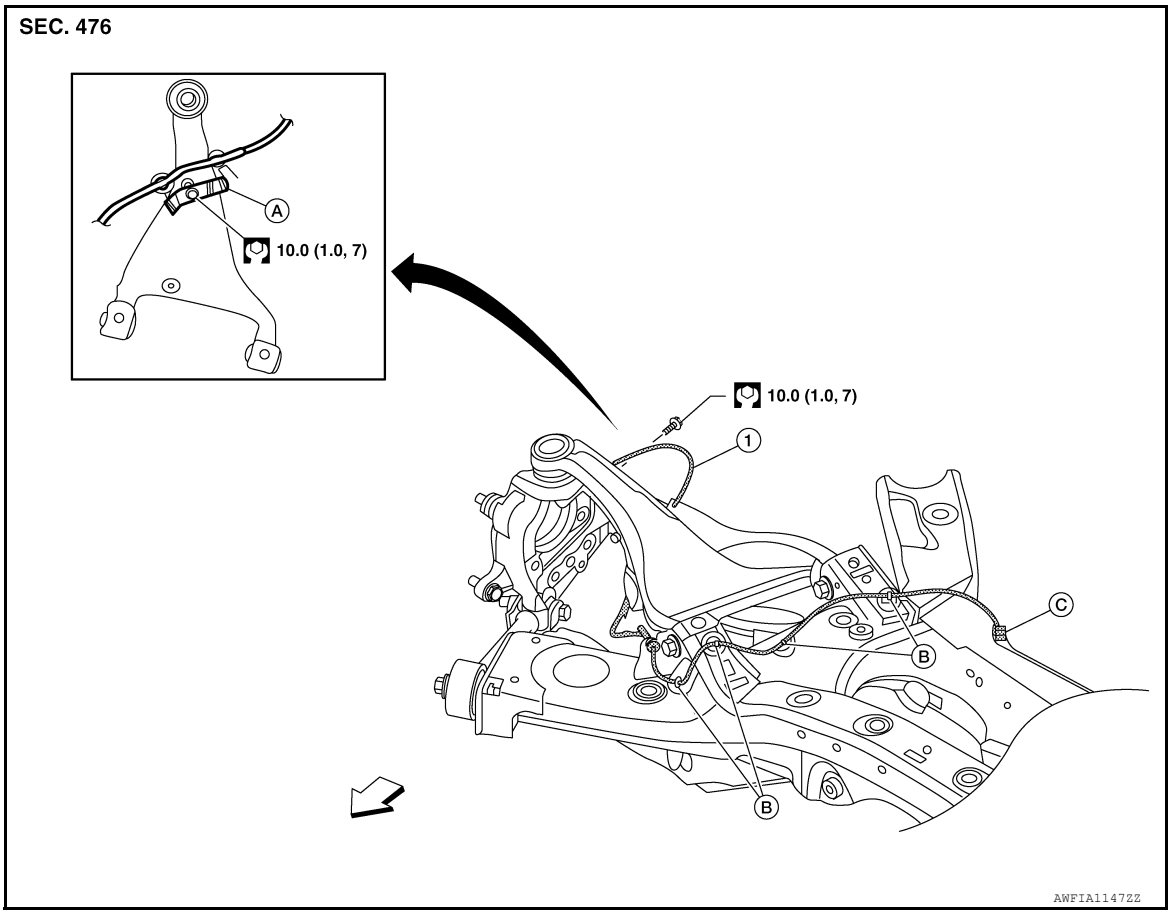


REAR WHEEL SENSOR

REAR WHEEL SENSOR : Exploded View

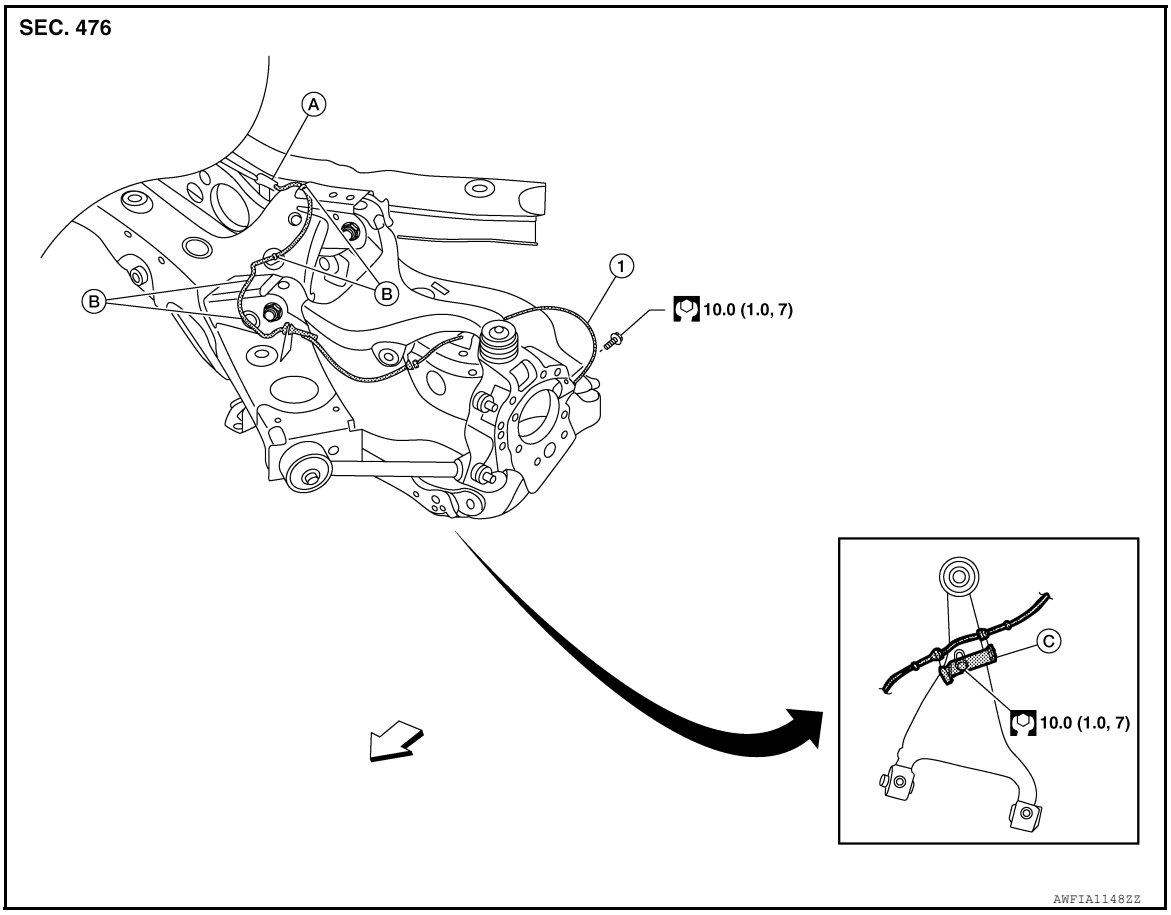
INFOID:0000000011241166

RH Side



1. Rear wheel sensor
A. Rear wheel sensor bracket
B. Clip
C. Rear wheel sensor connector
⇦ Front

LH Side



1. Rear wheel sensor
A. Rear wheel sensor connector
B. Clip
C. Rear wheel sensor bracket
⇦ Front

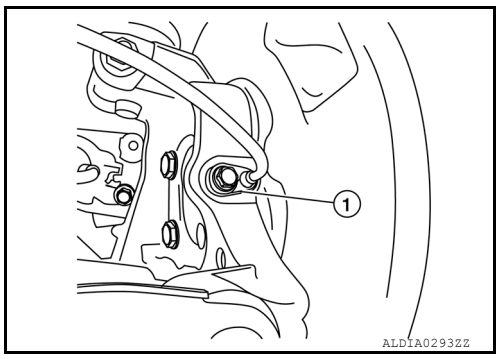
REAR WHEEL SENSOR : Removal and Installation

INFOID:0000000011241167

CAUTION:
Do not damage rear wheel sensor or sensor rotor.

REMOVAL

1. Remove rear under cover. Refer to EXT-40, "REAR UNDER COVER : Removal and Installation"
2. Remove rear wheel and tire using power tool. Refer to WT-68, "Removal and Installation".
3. Remove rear wheel sensor bolt (1).
   CAUTION:
   Pull out the rear wheel sensor being careful to turn it as little as possible. Do not pull on the rear wheel sensor harness.



4. Disconnect harness connector from rear wheel sensor.

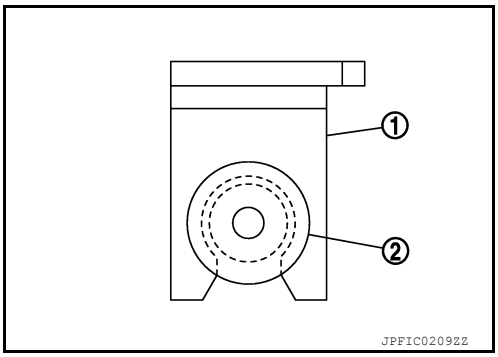
5. Remove rear wheel sensor from sensor brackets.
6. Remove rear wheel sensor from rear knuckle.
   CAUTION:
   Pull out the rear wheel sensor being careful to turn it as little as possible. Do not pull on the rear wheel sensor harness.

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

- **Before installing, make sure there is no foreign material, such as iron fragments, adhered to the pick-up part of the rear wheel sensor.**
- **When installing, make sure there is no foreign material, such as iron fragments, on and in the hole in the rear knuckle 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:0000000011241168

The front wheel sensor rotor is an integral part of the wheel hub and bearing and cannot be disassembled. Refer to FAX-8, "Removal and Installation".

REAR SENSOR ROTOR

REAR SENSOR ROTOR : Removal and Installation - Rear Sensor Rotor

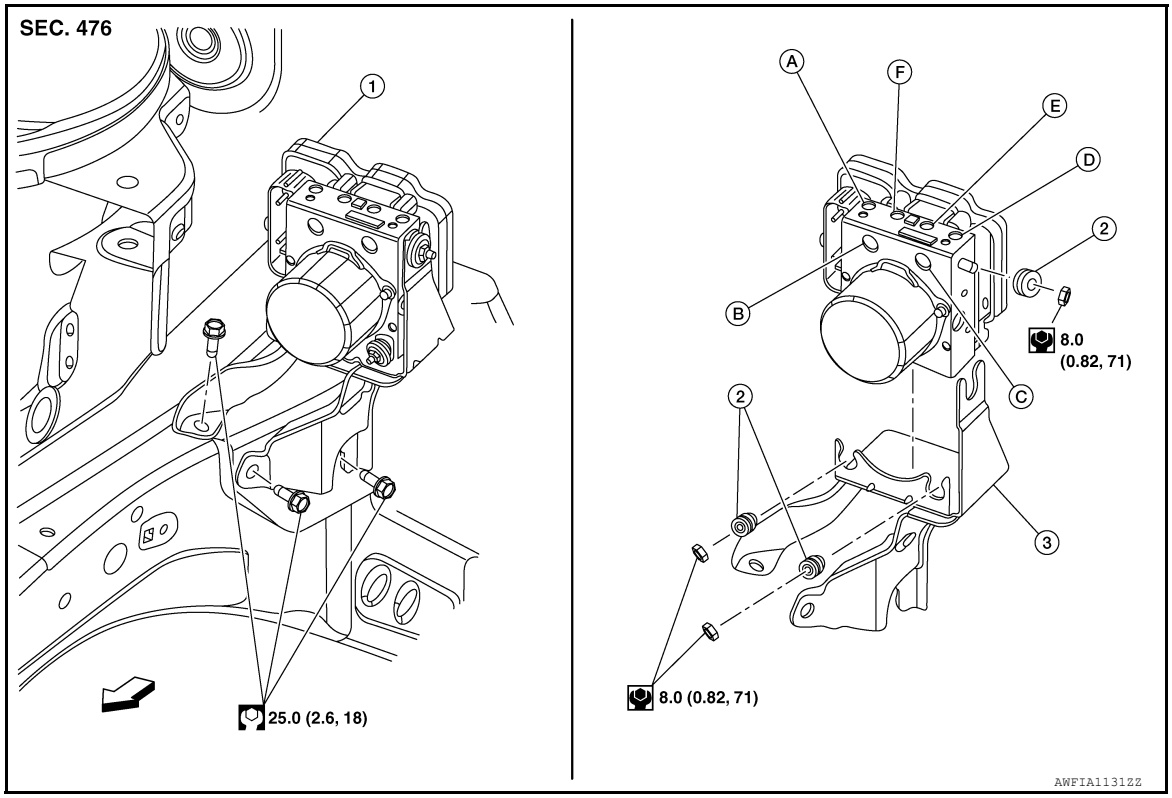
INFOID:0000000011241169

The rear wheel sensor rotor is an integral part of the wheel hub and bearing and cannot be disassembled. Refer to RAX-8, "Removal and Installation".

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Exploded View

INFOID:0000000011241170



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

Removal and Installation

INFOID:0000000011241171

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-68, "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-86, "Exploded View".
2. Remove cowl top cover. Refer to EXT-34, "Removal and Installation - Cowl Top Cover".
3. Remove cowl top extension. Refer to EXT-35, "Removal and Installation - Cowl Top Extension".
4. Separate brake tubes from ABS actuator and electric unit (control unit). Refer to BR-22, "FRONT : Exploded View".
5. Disconnect harness connector from ABS actuator and electric unit (control unit).
6. Remove ABS actuator and electric unit (control unit) bracket nuts, bolts and bushings.
7. 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-68, "Work Procedure".

Installation is in the reverse order of removal.

- After work is completed, bleed air from brake tube. Refer to BR-16, "Bleeding Brake System".
- Adjust the neutral position of steering angle sensor. Refer to BRC-64, "Work Procedure".
- Perform calibration of the decel G sensor. Refer to BRC-66, "Work Procedure".

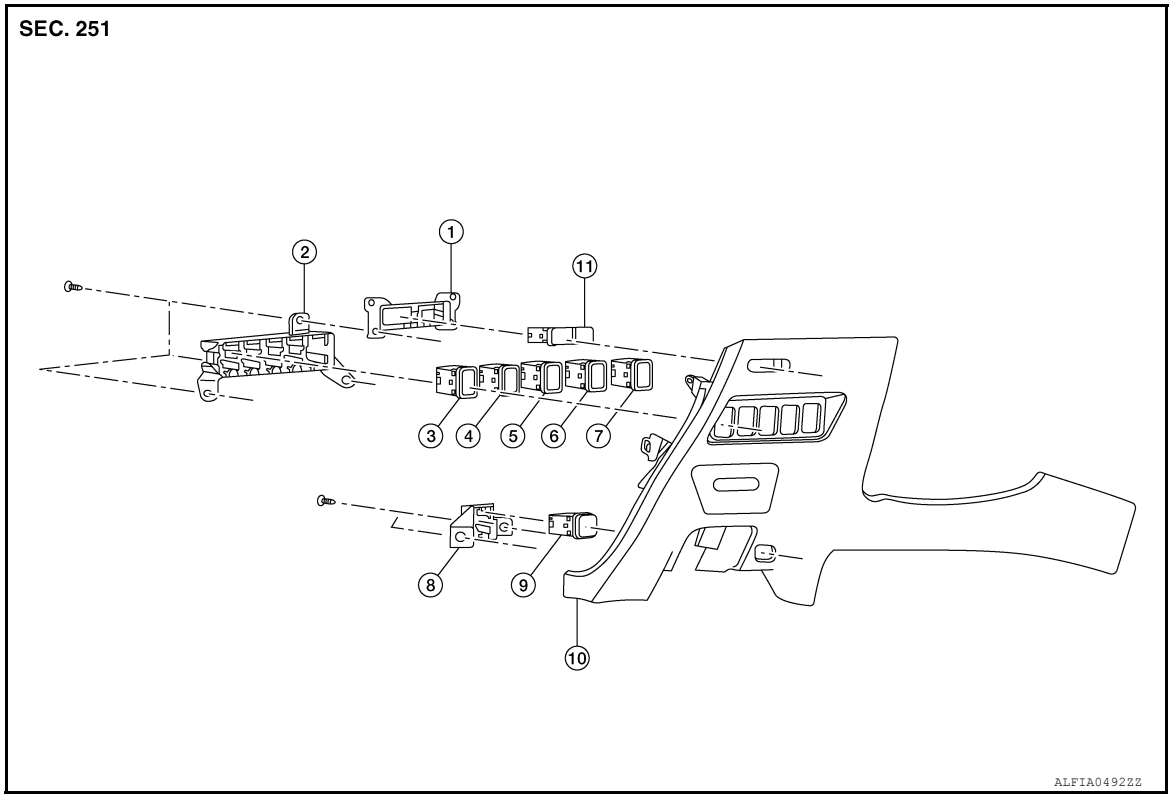
CAUTION:

- **To install, use flare nut crowfoot and torque wrench.**
- **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:0000000011544960



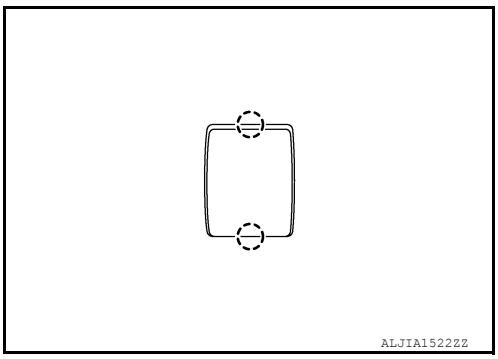
1. Upper switch carrier
2. Middle switch carrier
3. VDC OFF switch
4. Mask
5. Automatic back door switch
6. Heated steering wheel switch
7. Mask
8. Lower switch carrier
9. Front power return switch
10. Instrument lower panel LH
11. Illumination control switch

Removal and Installation

INFOID:0000000011241172

REMOVAL

1. Remove instrument lower panel LH. Refer to IP-24, "Removal and Installation".
2. Remove screws and middle switch carrier from instrument lower panel LH.
3. Release pawls using suitable tool and remove VDC OFF switch from middle switch carrier.
   ◌: Pawl



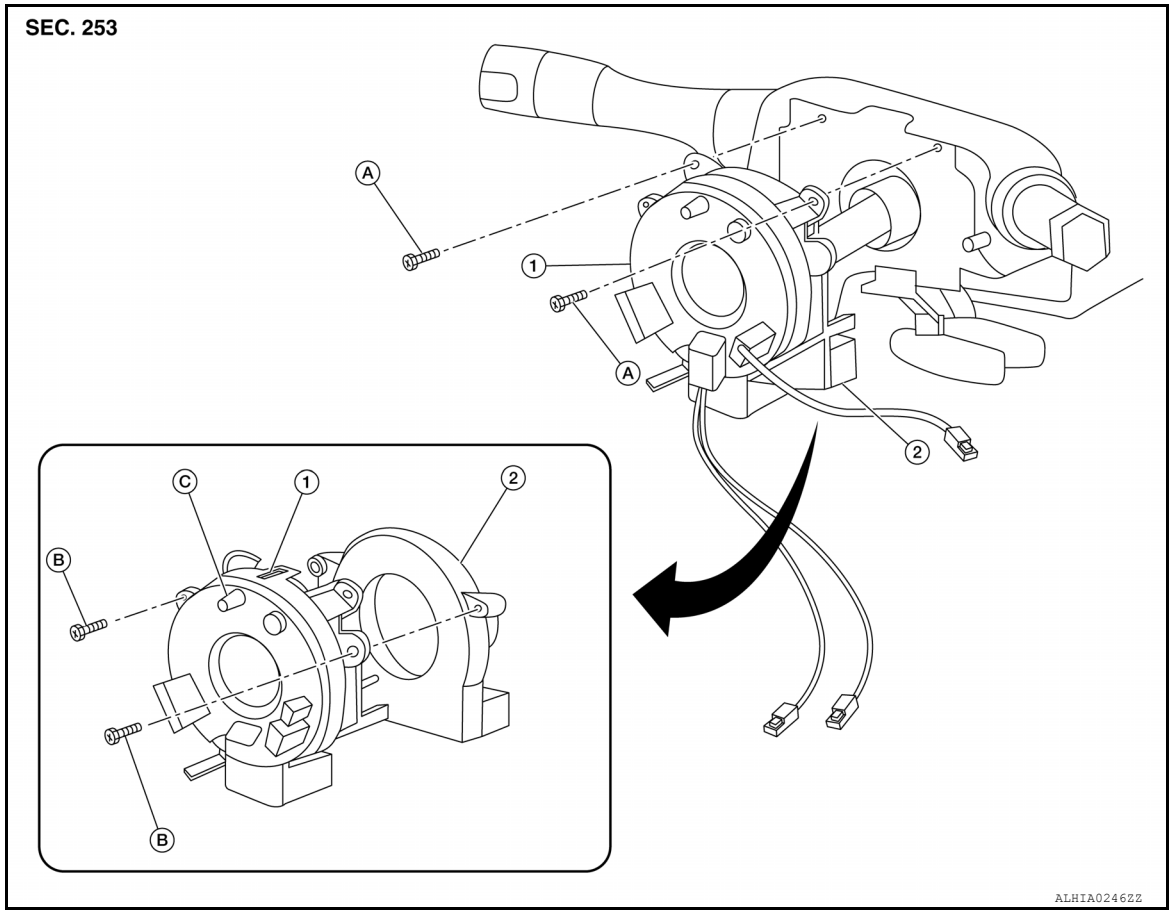
INSTALLATION

Installation is in the reverse order of removal.

STEERING ANGLE SENSOR

Exploded View

INFOID:0000000011241173



1. Spiral cable
2. Steering angle sensor
A. Spiral cable screws
B. Steering angle sensor screws
C. Locating pin

Removal and Installation

INFOID:0000000011241174

To remove and install the steering angle sensor, remove and install the spiral cable. Refer to SR-15, "Removal and Installation".

PRECAUTION

PRECAUTIONS

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

INFOID:0000000011578452

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

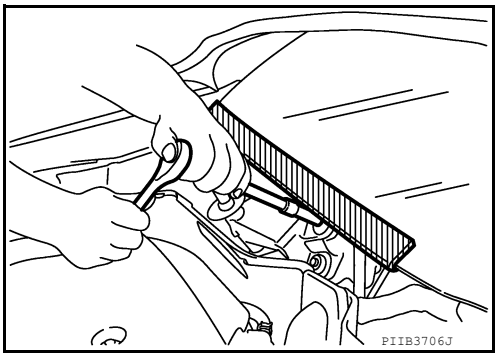
WARNING:

- **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:0000000011578453

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

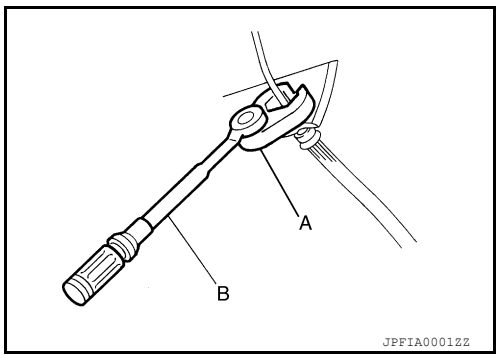
INFOID:0000000011578454

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 BR-8, "Inspection".
- 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

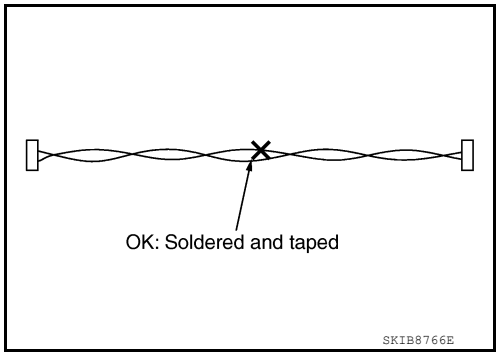
INFOID:0000000011578455

- 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.

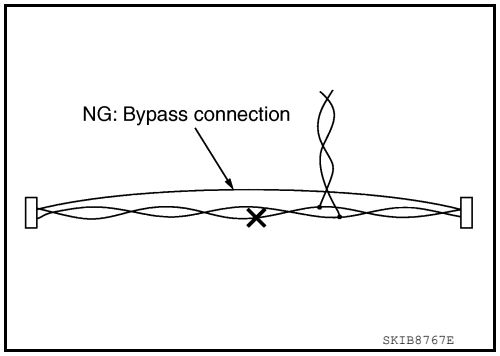
Precaution for Harness Repair

INFOID:0000000011578456

- 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:0000000011555499

CAUTION:

- **Never use the ICC sensor removed from vehicle. Never disassemble or remodel.**
- **Erase DTC when replacing parts of ICC system. Then check the operation of ICC system after radar alignment if necessary.**
- **Never change FEB system state ON/OFF without the consent of the customer.**
- **Turn the FEB system OFF in conditions similar to driving, such as free rollers or a chassis dynamometer.**

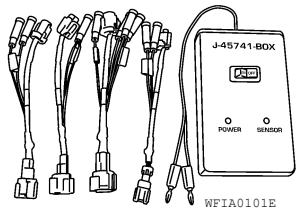
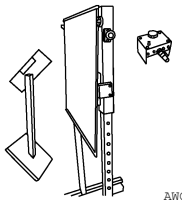
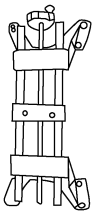
PREPARATION

PREPARATION

Special Service Tool

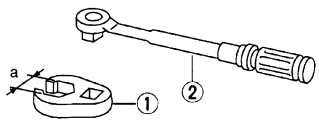
INFOID:0000000011578457

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
— (1-20-2851-1) ICC Alignment Kit	 AWOIA0016ZZ	Adjusting ICC sensor
— (1-20-2722-1-IF) Wheel Adaptor	 AWOIA0017ZZ	Adjusting ICC sensor

Commercial Service Tools

INFOID:0000000011578458

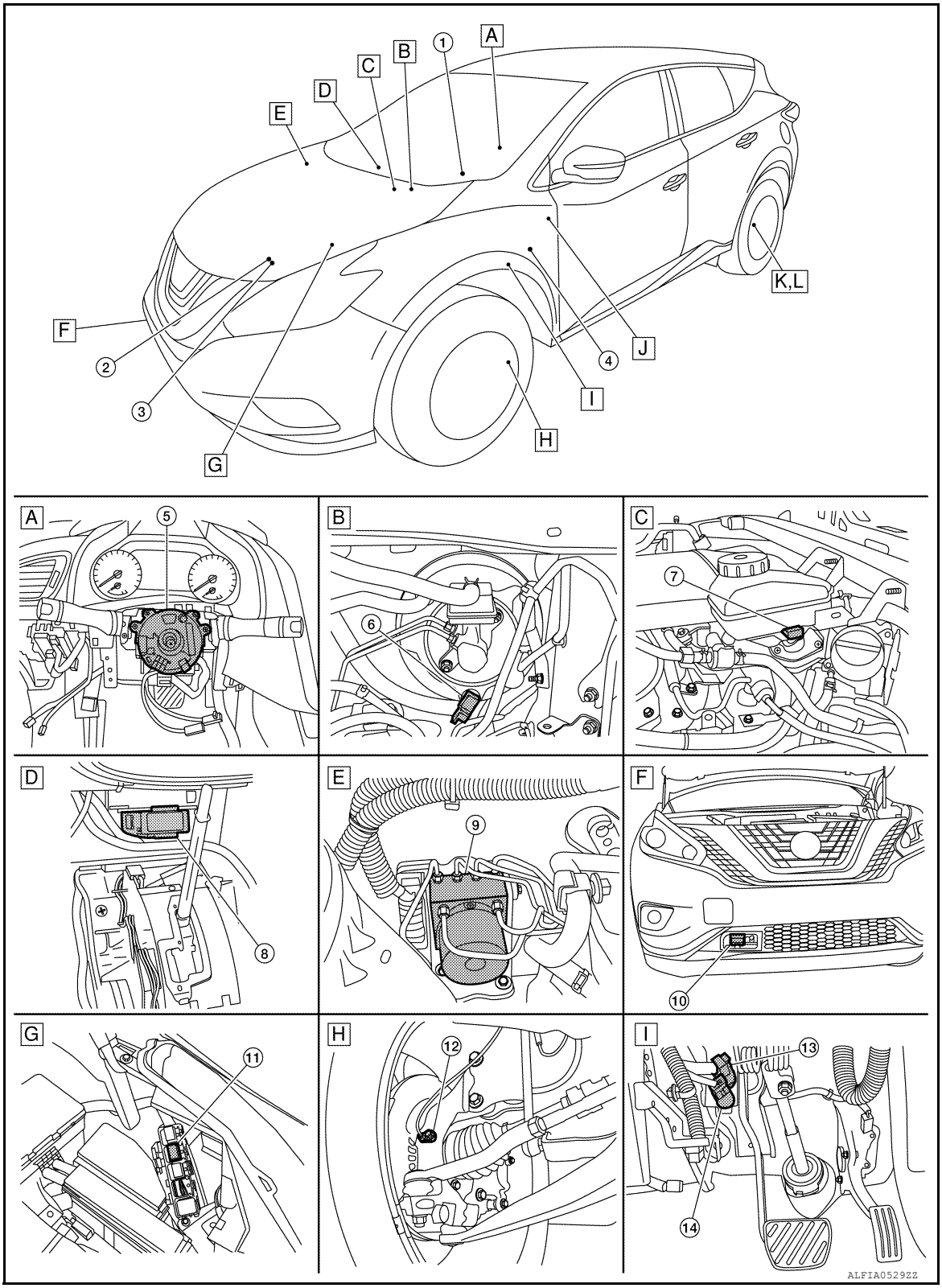
Tool name	Description
1. Flare nut crowfoot 2. Torque wrench  S-NT360	Tightening brake tube flare nuts **a: 10 mm (0.39 in)/12 mm (0.47 in)**
Power tool  PIIB1407E	Loosening nuts, screws and bolts

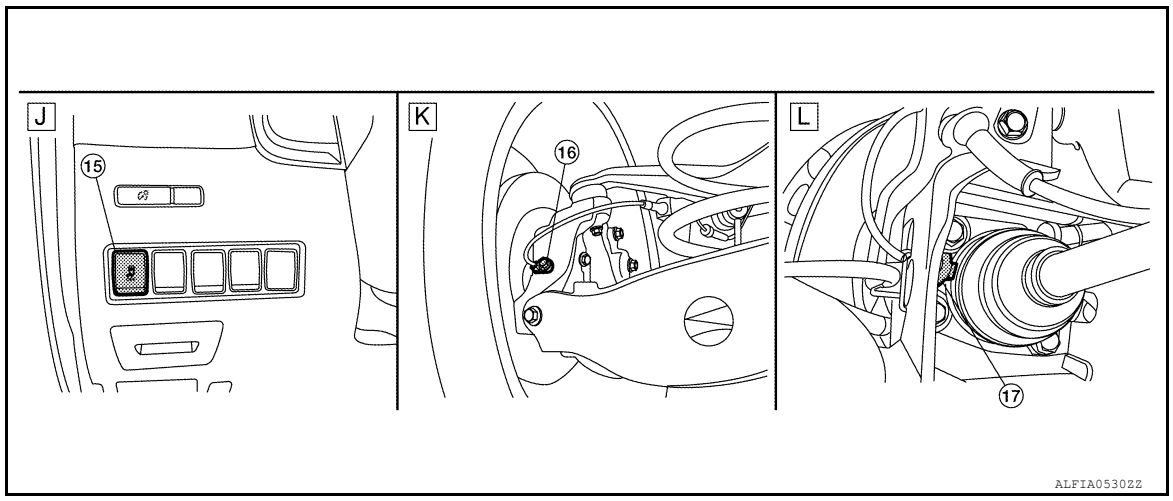
SYSTEM DESCRIPTION

COMPONENT PARTS

Component Parts Location

INFOID:0000000011555500





A. Steering column (view with steering wheel removed)	B. Engine room (LH)	C. Engine room (LH)
D. Instrument panel (Center)	E. Engine room (RH)	F. Front bumper (RH)
G. Engine room (LH)	H. Left front wheel area	I. Brake pedal area
J. Left side of instrument panel	K. Left rear wheel area (FWD models)	L. Left rear wheel area (AWD models)

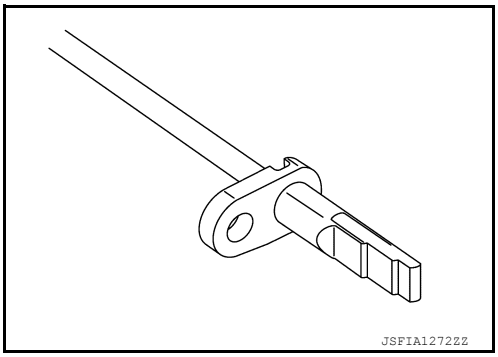
No.	Component	Description
1.	Combination meter	• Performs the following operations using the signals received from the ADAS control unit via the CAN communication - Displays the FEB system operation status using the meter display signal - Illuminates the FEB warning lamp using the FEB warning lamp signal • Refer to MWI-5, "METER SYSTEM : Component Parts Location" for detailed installation location.
2.	TCM	• TCM transmits the signal related to CVT control to ADAS control unit via CAN communication • Refer to TM-13, "CVT CONTROL SYSTEM : TCM" for detailed installation location.
3.	ECM	• ECM transmits the accelerator pedal position signal via CAN communication • Refer to EC-15, "ENGINE CONTROL SYSTEM : Component Parts Location" for detailed installation location.
4.	Driver assistance buzzer	Refer to BRC-156, "Warning Buzzer".
5.	Steering angle sensor	Refer to BRC-153, "Steering Angle Sensor"
6.	Vacuum sensor	Refer to BRC-154, "Vacuum Sensor"
7.	Brake fluid level switch	Refer to BRC-154, "Brake Fluid Level Switch"
8.	ADAS control unit (view with center console removed)	• Refer to BRC-155, "ADAS Control Unit". • Refer to DAS-6, "Component Parts Location" for detailed installation location.
9.	ABS actuator and electric unit (control unit)	• ABS actuator and electric unit (control unit) transmits the vehicle speed signal (wheel speed), stop lamp signal and VDC/TCS/ABS system operation condition to ADAS control unit via CAN communication • ABS actuator and electric unit (control unit) controls the brake, based on a brake fluid pressure control signal received from ADAS control unit via CAN communication • Refer to BRC-142, "Removal and Installation" for detailed installation location.
10.	ICC sensor	Refer to BRC-155, "ICC Sensor".
11.	ICC brake hold relay	Refer to BRC-156, "ICC Brake Hold Relay".
12.	Front LH wheel sensor	Refer to BRC-152, "Wheel Sensor and Sensor Rotor"
13.	Stop lamp switch	Refer to BRC-155, "Brake Pedal Position Switch / Stop Lamp Switch".
14.	Brake pedal position switch	
15.	VDC off switch	Refer to BRC-154, "VDC OFF Switch"

No.	Component	Description
16.	Rear LH wheel sensor (FWD models)	Refer to BRC-152, "Wheel Sensor and Sensor Rotor"
17.	Rear LH wheel sensor (AWD models)	Refer to BRC-152, "Wheel Sensor and Sensor Rotor"

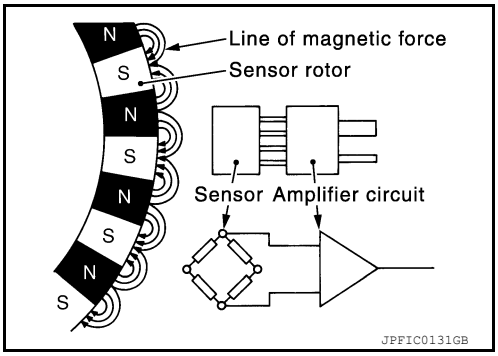
Wheel Sensor and Sensor Rotor

INFOID:0000000011815126

NOTE:
- Wheel sensor of front wheel is installed on steering knuckle.
- Sensor rotor of front wheel is integrated into the 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 an active sensor.



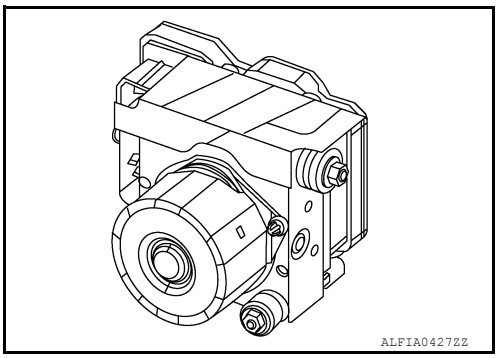
- Power supply is supplied to detection portion so that magnetic field line is read. Magnetic field that is detected is converted to current signal.
- When sensor rotor rotates, magnetic field changes. Magnetic field change is converted to current signals (rectangular wave) and is transmitted to ABS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



ABS Actuator and Electric Unit (Control Unit)

INFOID:0000000011815127

Electric unit (control unit) is integrated with actuator and comprehensively controls VDC function, TCS function, ABS function, EBD function, brake assist function and hill start assist 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).

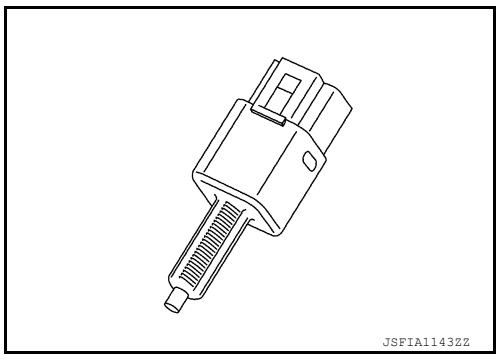
Cut Valve 1 (Primary Line), Cut Valve 2 (Secondary Line)
Shuts off the ordinary brake line from master cylinder when VDC function, TCS function, brake assist function, hill start assist function are activated.

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 into the 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:0000000011815128

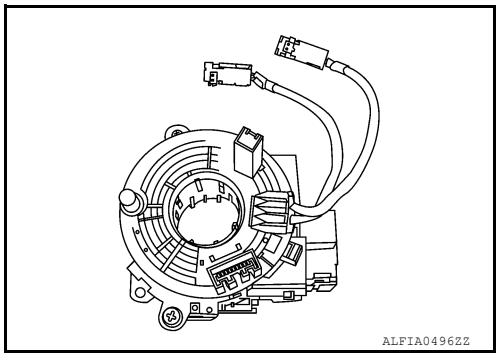
Detects the operation status of brake pedal and transmits converted electric signal to ABS actuator and electric unit (control unit).



Steering Angle Sensor

INFOID:0000000011815129

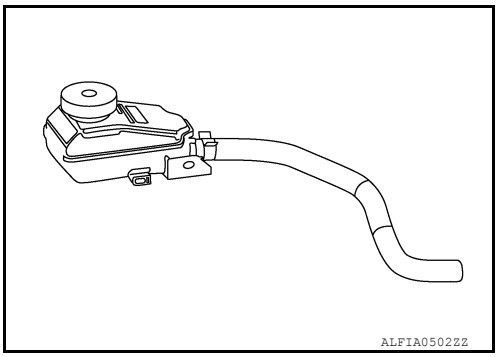
Detects the following information and transmits steering angle signal to ABS actuator and electric unit (control unit) via CAN communication:
- Steering angle sensor malfunction signal
- Steering wheel rotation amount
- Steering wheel rotation angular velocity
- Steering wheel rotation direction



Brake Fluid Level Switch

INFOID:0000000011815130

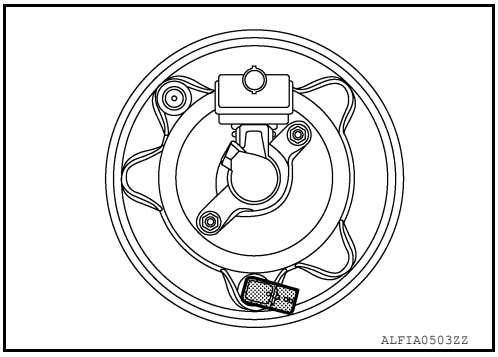
Detects the brake fluid level in reservoir tank and transmits converted electric signal from combination meter to ABS actuator and electric unit (control unit) via CAN communication when brake fluid level is the specified level or less.



Vacuum Sensor

INFOID:0000000011815131

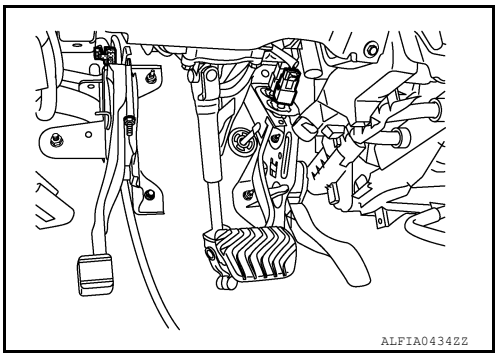
Detects the vacuum in brake booster and transmits converted electric signal to ABS actuator and electric unit (control unit).



Parking Brake Switch

INFOID:0000000011815132

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



VDC OFF Switch

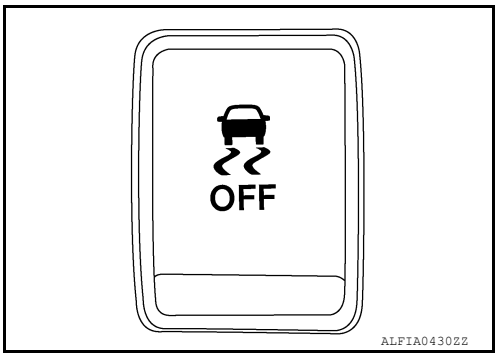
INFOID:0000000011815133

- 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).

- Vehicle Dynamic Control function
- Traction Control System function
- Forward Emergency Braking function

NOTE:
ABS function, EBD function operate.

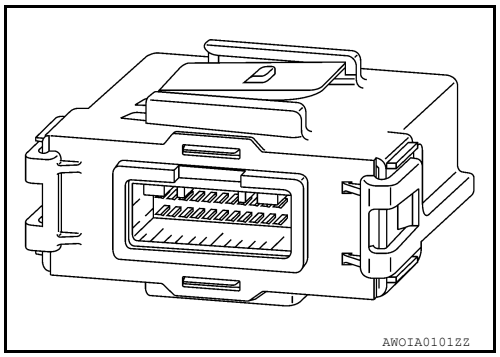
- VDC OFF indicator lamp turns OFF (standby status) when the engine is started again after it is stopped once while VDC OFF indicator lamp is ON (non-operational status).



ADAS Control Unit

INFOID:0000000011555501

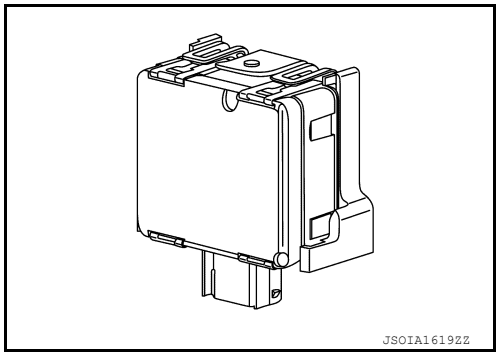
- ADAS control unit is at the front of center console.
- Communicates with each control unit via CAN communication/ITS communication/Chassis communication.
- ADAS control unit included gateway function, and necessary for system control signals are transmitted to each control unit between CAN communication and ITS communication by the ADAS control unit.
- ADAS control unit controls the each system, based on ITS communication signal, CAN communication signal, and chassis communication signal from each control unit.



ICC Sensor

INFOID:0000000011555502

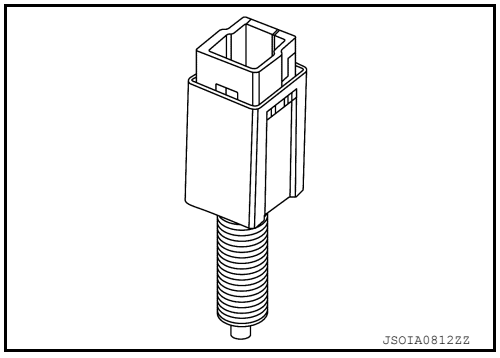
- ICC sensor is installed on the front of the vehicle and detects a vehicle ahead by using millimeter waves.
- ICC sensor detects radar reflected from a vehicle ahead by irradiating radar forward and calculates a distance from the vehicle ahead and relative speed, based on the detected signal.
- ICC sensor transmits information for ICC from the vehicle to ADAS control unit via ITS communication.



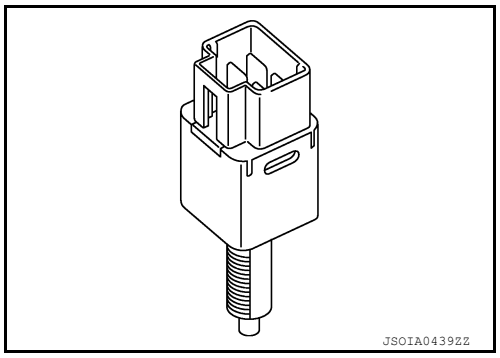
Brake Pedal Position Switch / Stop Lamp Switch

INFOID:0000000011555503

- Brake pedal position switch is installed at the upper part of the brake pedal and detects a brake operation performed by the driver.



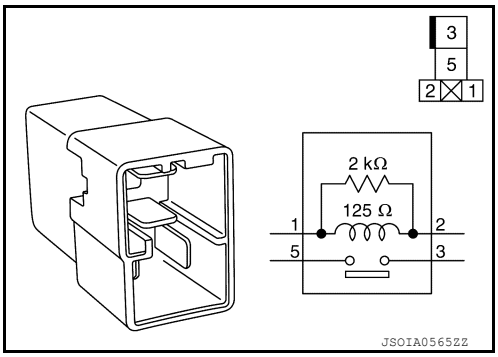
- Brake pedal position switch is turned OFF when depressing the brake pedal.
- Brake pedal position switch signal is input to ECM. Brake pedal position switch signal is transmitted from ECM to ADAS control unit via CAN communication.
- Stop lamp switch is installed at the upper part of the brake pedal and detects a brake operation performed by the driver.
- Stop lamp switch is turned ON, when depressing the brake pedal.
- Stop lamp switch signal is input to ECM and ABS actuator and electric unit (control unit). Stop lamp switch signals are transmitted from ECM and ABS actuator and electric unit (control unit) to ADAS control unit via CAN communication.



ICC Brake Hold Relay

INFOID:0000000011555504

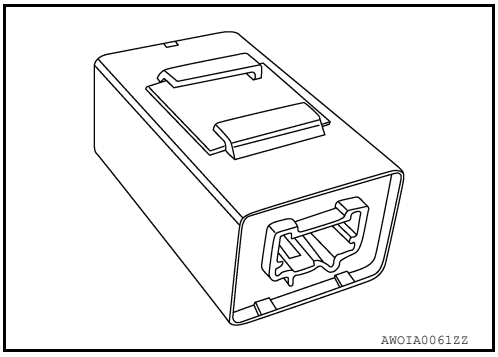
- ICC brake hold relay is installed in the engine room (right side).
- When the brake is activated by the system, the ICC brake hold relay turns ON the stop lamp by bypassing the circuit of the stop lamp, according to a signal transmitted from the ADAS control unit.



Warning Buzzer

INFOID:0000000011555507

- Warning buzzer is installed behind the finisher to the left of the left knee airbag module.
- When a warning buzzer signal is received from the ADAS control module, the warning buzzer sounds a buzzer.



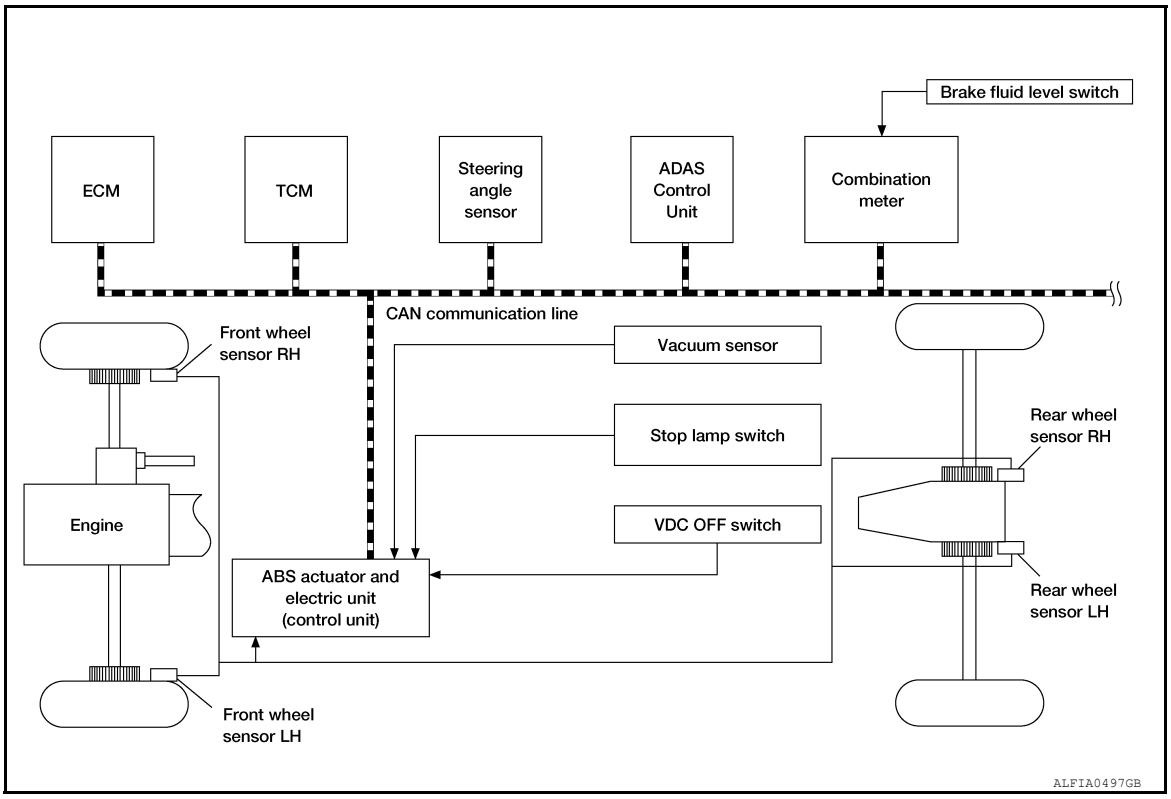
SYSTEM

System Description

INFOID:0000000011675172

- The system switches fluid pressure of each brake caliper to increase, hold or 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 assist function, hill start assist function and forward emergency braking 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:

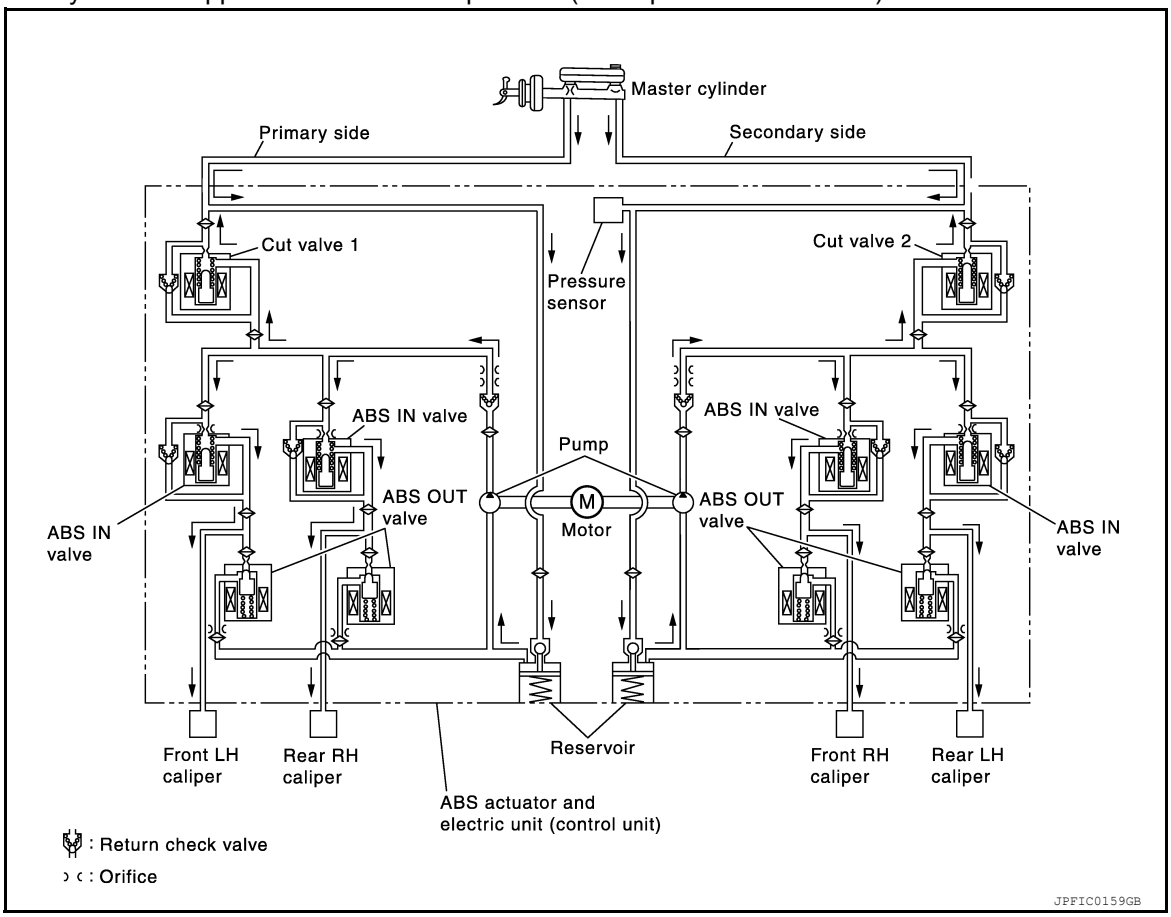
Component	Signal description
ECM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication: • Accelerator pedal position signal • Engine speed signal • Engine torque signal Mainly receives the following signal from ABS actuator and electric unit (control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

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.

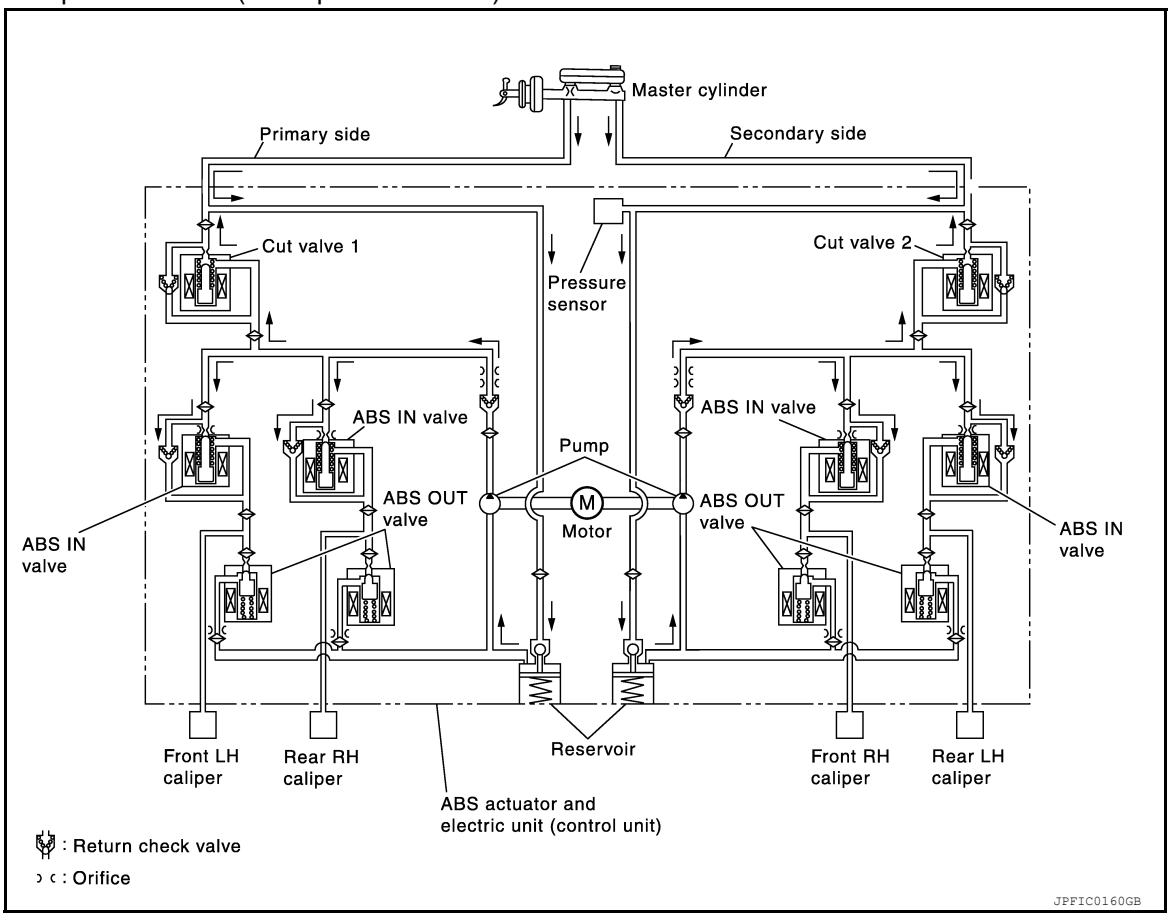
When rear RH wheel caliper pressure increases

- 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 valve are closed, fluid pressure holds.

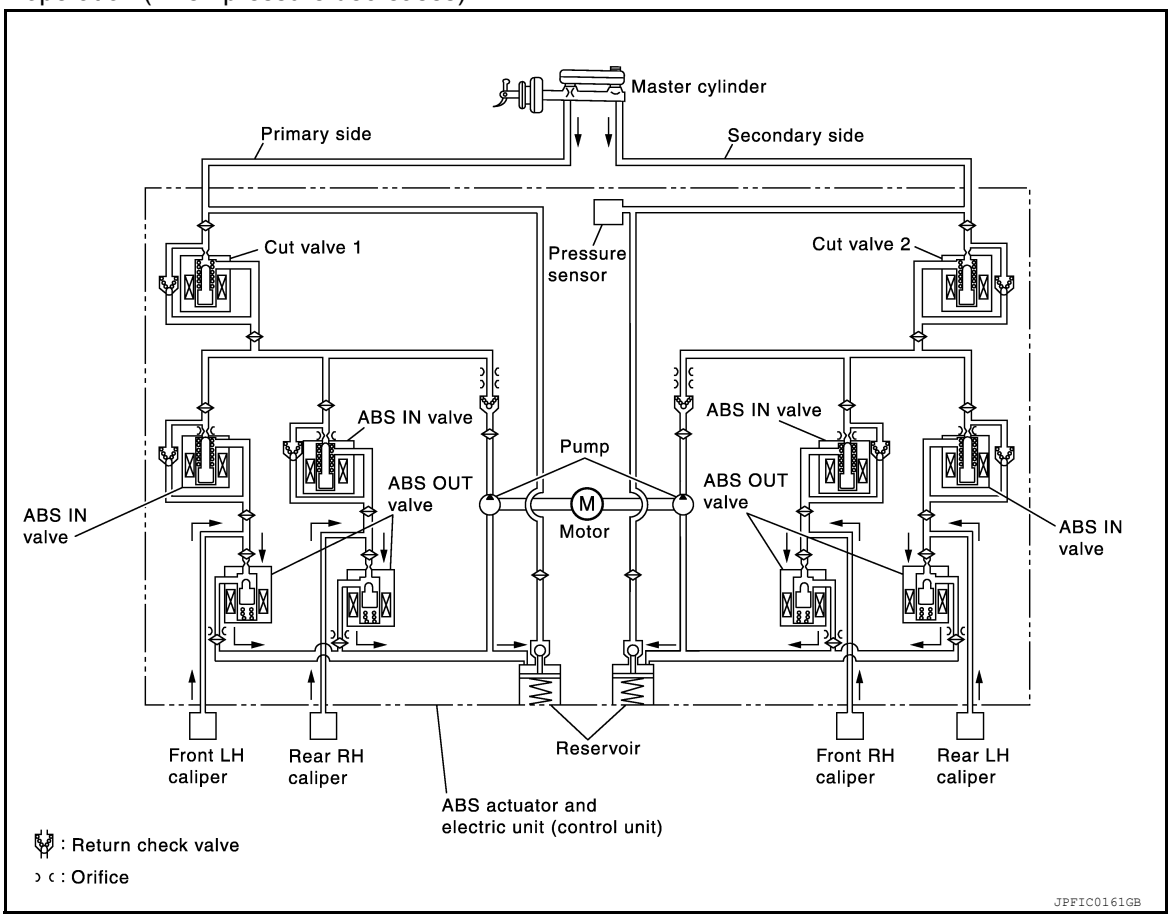
When front LH wheel caliper pressure holds

- 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 valve 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 valve 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 valve 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.

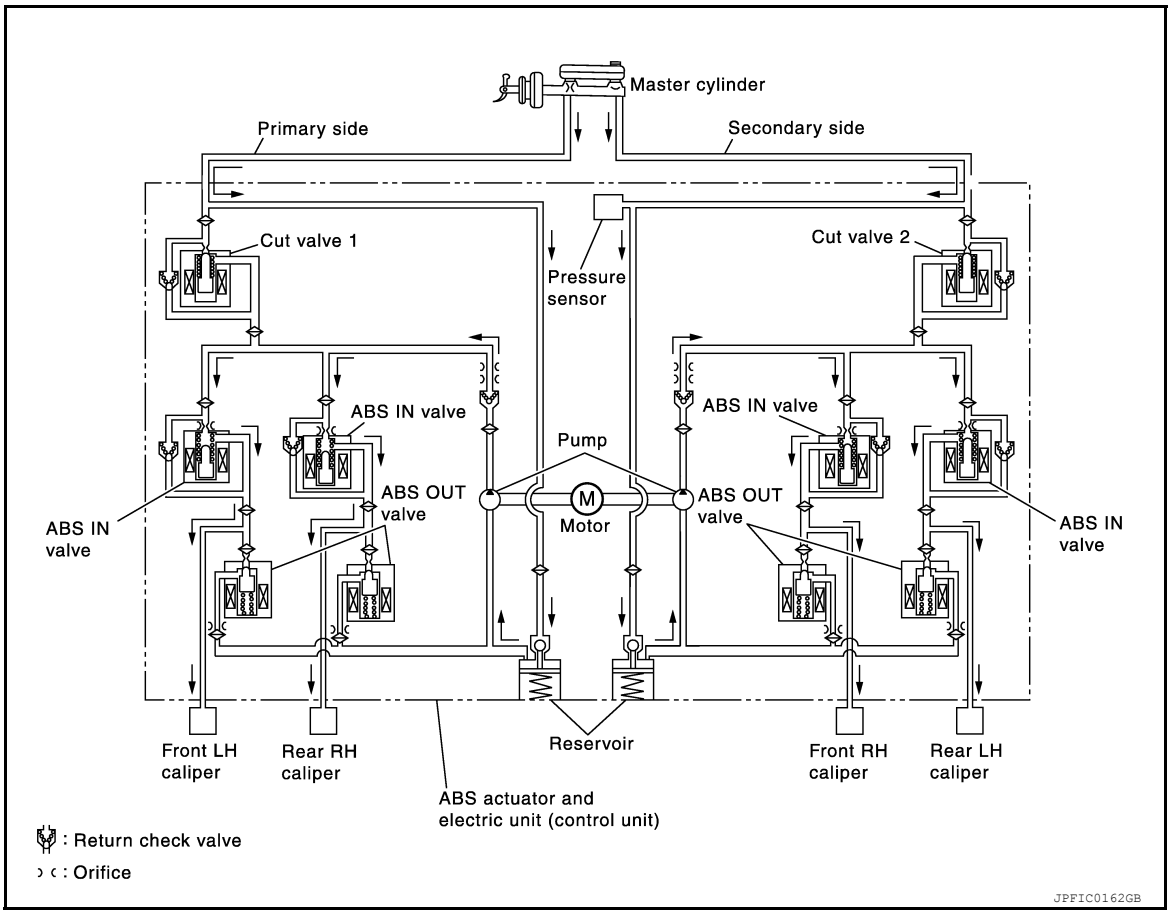
VALVE OPERATION (OTHER THAN ABS AND EBD)

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)	Wheel other than the one that the pressure is to be increased: Power supply is supplied (close) Only wheel that the pressure is to be increased: 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

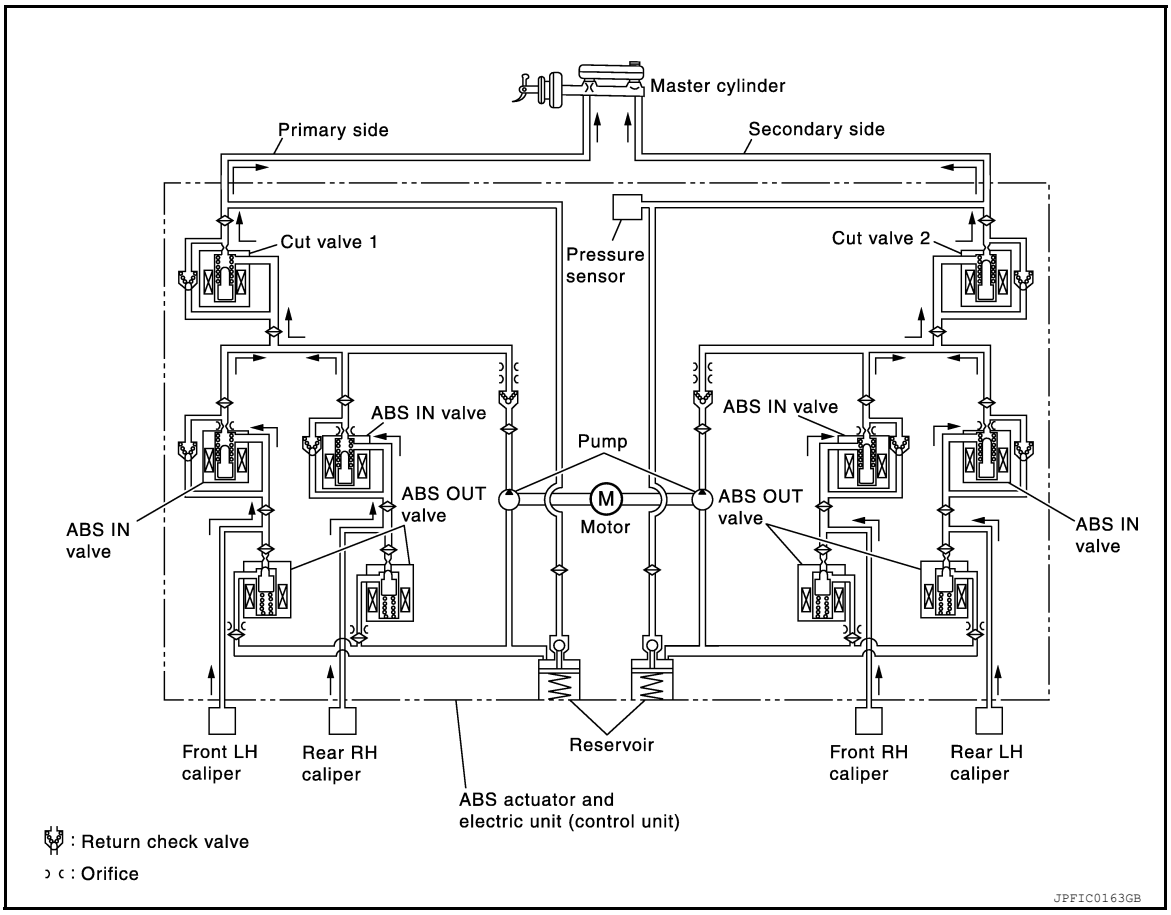
When front RH wheel caliper pressure increases
- Motor is activated. Brake fluid from pump is supplied to front RH wheel caliper through ABS IN valve. For other wheels, ABS IN valve is closed and brake fluid is not supplied to caliper.

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 wheels, ABS IN valve is closed and brake 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 wheels, ABS IN valve is closed and brake 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 wheels, ABS IN valve is closed and brake 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 TO 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	FEB warning lamp	VDC warning lamp
Ignition switch OFF	OFF	OFF	OFF	OFF
For approx. 1 second after the ignition switch is turned ON	ON	ON	ON	ON
Approx. 2 seconds after ignition switch is turned ON (when the system is in normal operation)	OFF	OFF	OFF	OFF
After engine starts	OFF	OFF	OFF	OFF
When brake fluid is less than the specified level (brake fluid level switch ON)	OFF	ON	OFF	OFF
When parking brake operates (parking brake switch ON)	OFF	ON	OFF	OFF
VDC function is malfunctioning	OFF	OFF	OFF	ON
TCS function is malfunctioning	OFF	OFF	OFF	ON
ABS function is malfunctioning	ON	OFF	OFF	ON
EBD function is malfunctioning	ON	ON	OFF	ON
FEB function is malfunctioning	OFF	OFF	ON	OFF
Brake assist function is malfunctioning	OFF	OFF	OFF	ON
Hill start assist function is malfunctioning	OFF	OFF	OFF	ON
Brake force distribution function is malfunctioning	OFF	OFF	OFF	ON
When brake booster vacuum decreases	OFF	ON	OFF	OFF
When vacuum sensor is malfunctioning	OFF	ON	OFF	OFF
VDC function is operating	OFF	OFF	OFF	Blinking
TCS function is operating	OFF	OFF	OFF	Blinking
ABS function is operating	OFF	OFF	OFF	OFF
EBD function is operating	OFF	OFF	OFF	OFF
FEB function is operating	OFF	OFF	Blinking	OFF
Brake assist function is operating	OFF	OFF	OFF	OFF
Hill start assist function is operating	OFF	OFF	OFF	OFF

CONDITION TO 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 second after the ignition switch is turned ON	ON

Condition (status)	VDC OFF indicator lamp
Approx. 1 second after ignition switch is turned ON (when the system is in normal operation).	OFF
When VDC OFF switch is ON (VDC function TCS function are OFF)	ON

Fail-Safe

INFOID:0000000011815825

VDC FUNCTION, TCS FUNCTION, BRAKE ASSIST FUNCTION AND HILL START ASSIST FUNCTION

VDC warning lamp in combination meter turns ON when a malfunction occurs in system [ABS actuator and electric unit (control unit)]. The control is suspended for VDC function, TCS function, brake assist function and hill start assist function. The vehicle status becomes the same as models without VDC function, TCS function, brake assist function and hill start assist 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 assist function and hill start assist function. The vehicle status becomes the same as models without VDC function, TCS function, ABS function, brake assist function and hill start assist 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 assist function and hill start assist function. The vehicle status becomes the same as models without VDC function, TCS function, ABS function, EBD function, brake assist function and hill start assist 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 rear wheels are malfunctioning) • Brake assist function • Hill start assist function
C1109 C1111	The following functions are suspended: • VDC function • TCS function • ABS function • EBD function • Brake assist function • Hill start assist function
C1113	The following functions are suspended: • VDC function • TCS function • ABS function • EBD function • Brake assist function • Hill start assist function

DTC	Fail-safe condition
C1115	The following functions are suspended: • VDC function • TCS function • ABS function • Brake assist function • Hill start assist function
C1116	
C1120	The following functions are suspended: • VDC function • TCS function • ABS function • EBD function • Brake assist function • Hill start assist function
C1121	
C1122	
C1123	
C1124	
C1125	
C1126	
C1127	
C1130	The following functions are suspended: • VDC function • TCS function • Hill start assist function
C1140	The following functions are suspended: • VDC function • TCS function • ABS function • EBD function • Brake assist function • Hill start assist function
C1142	The following functions are suspended: • VDC function • TCS function • Brake assist function • Hill start assist function
C1143	The following functions are suspended: • VDC function • TCS function • Hill start assist function
C1144	
C1145	The following functions are suspended: • VDC function • TCS function • ABS function • Brake assist function • Hill start assist function
C1146	
C1153	The following functions are suspended: • VDC function • TCS function • Brake assist function • Hill start assist function
C1154	
C1155	
C1160	The following functions are suspended: • VDC function • TCS function • ABS function • Brake assist function • Hill start assist function
C1164	The following functions are suspended: • VDC function • TCS function • ABS function • EBD function • Brake assist function • Hill start assist function
C1165	
C1166	
C1167	

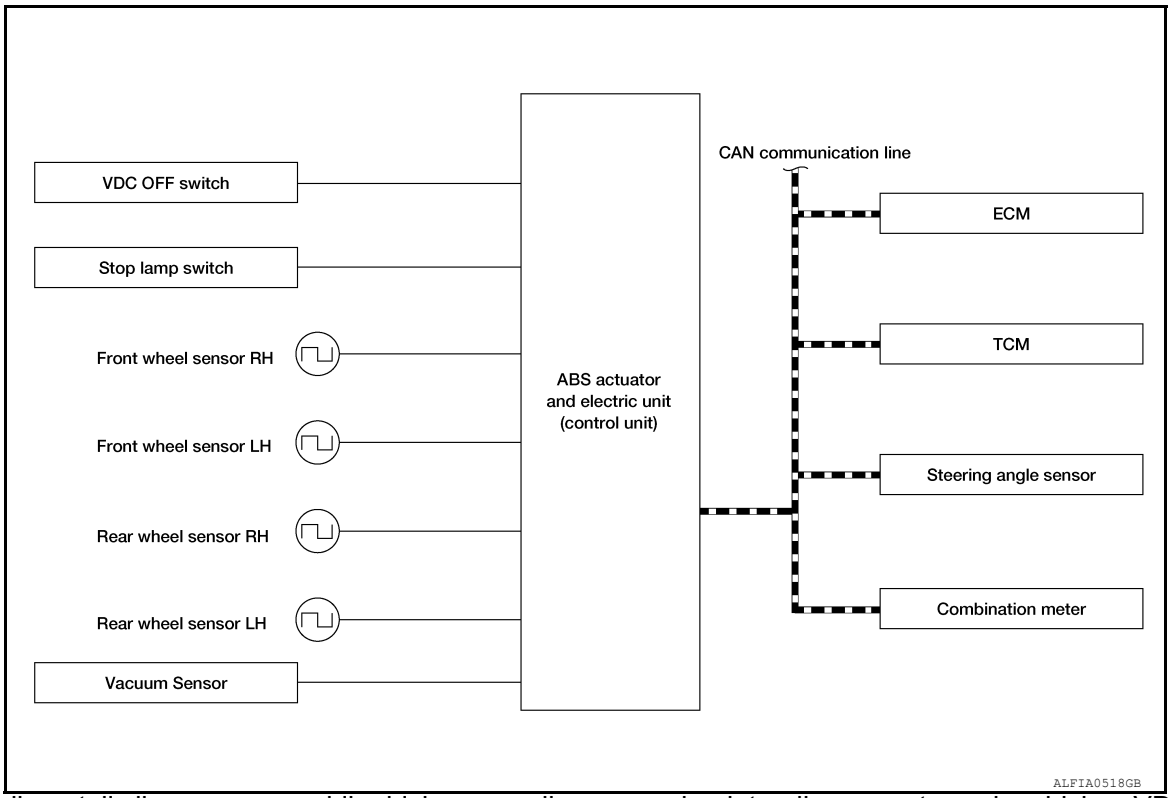
DTC	Fail-safe condition
C1170	The following functions are suspended: • VDC function • TCS function • ABS function • Brake assist function • Hill start assist function
C1197	Electrical vacuum assistance of brake booster is suspended.
C1198	
C1199	—
C119A	Electrical vacuum assistance of brake booster is suspended.
U1000	The following functions are suspended: • VDC function • TCS function • Hill start assist function
U1002	The following functions are suspended: • VDC function • TCS function • Hill start assist function

VDC FUNCTION

VDC FUNCTION : System Description

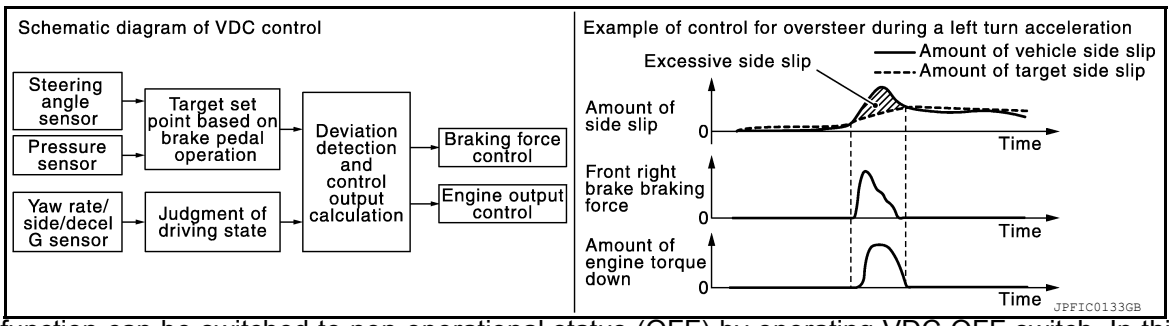
INFOID:0000000011821275

SYSTEM DIAGRAM



- Side slip or tail slip may occur while driving on a slippery road or intending 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 over-

steer) are judged and vehicle stability is improved by brake force control on all 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 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 assist function and hill start assist function. However, ABS function and EBD function are operated normally. Refer to BRC-47, "Fail-Safe".

INPUT SIGNAL AND OUTPUT SIGNAL

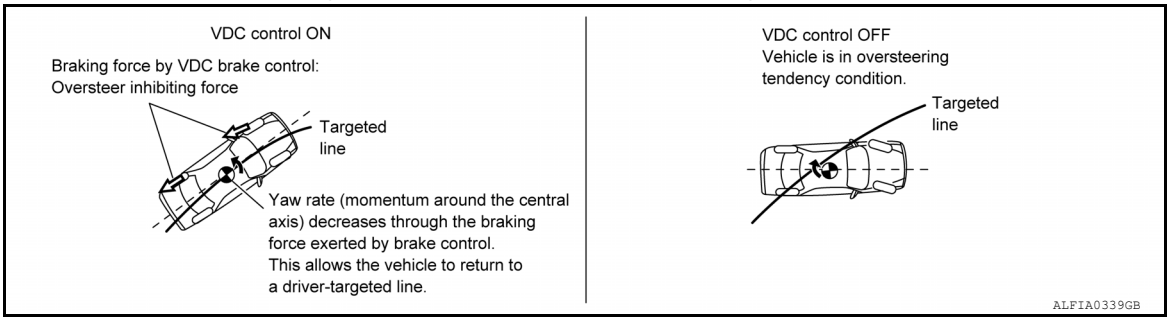
Major signal transmission between each unit via communication lines is shown in the following table:

Component	Signal description
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
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

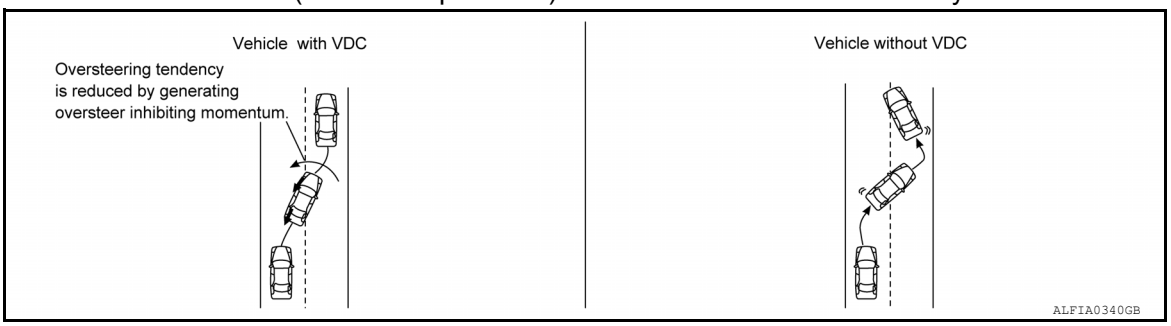
OPERATION CHARACTERISTICS

VDC Function That Prevents Oversteer Tendency

- During 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.

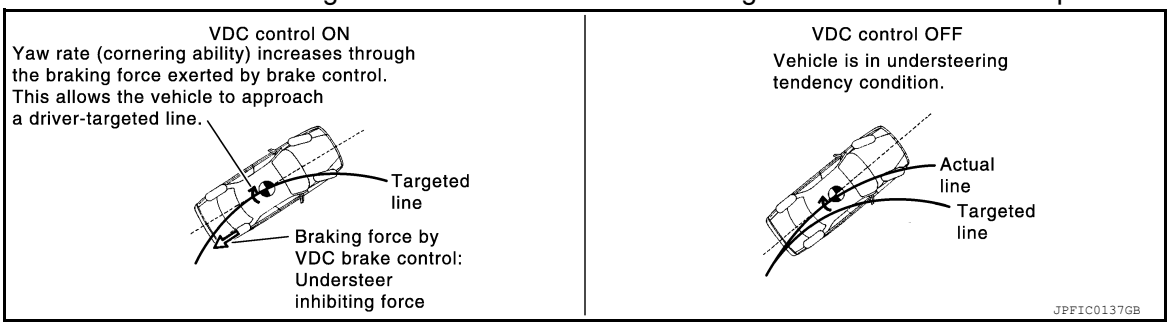


- Changing driving lane on a slippery road when oversteer tendency is judged large, engine output is controlled as well as brake force (brake fluid pressure) of 4 wheels. Oversteer tendency decreases.

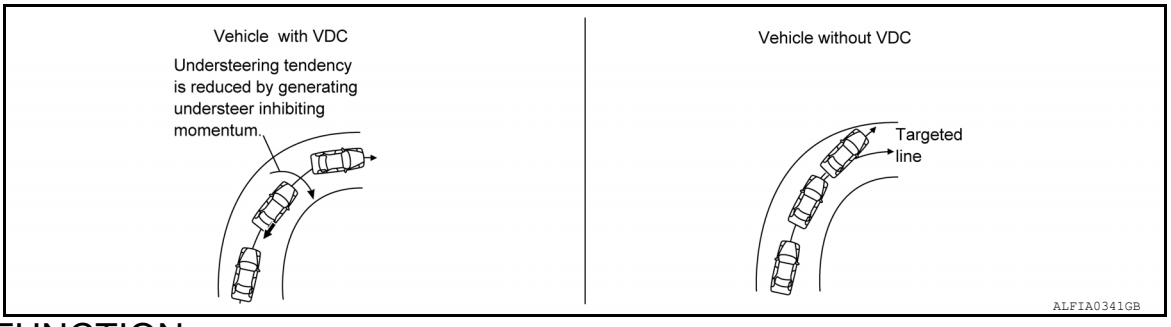


VDC Function That Prevents Understeer Tendency

- During 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 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.

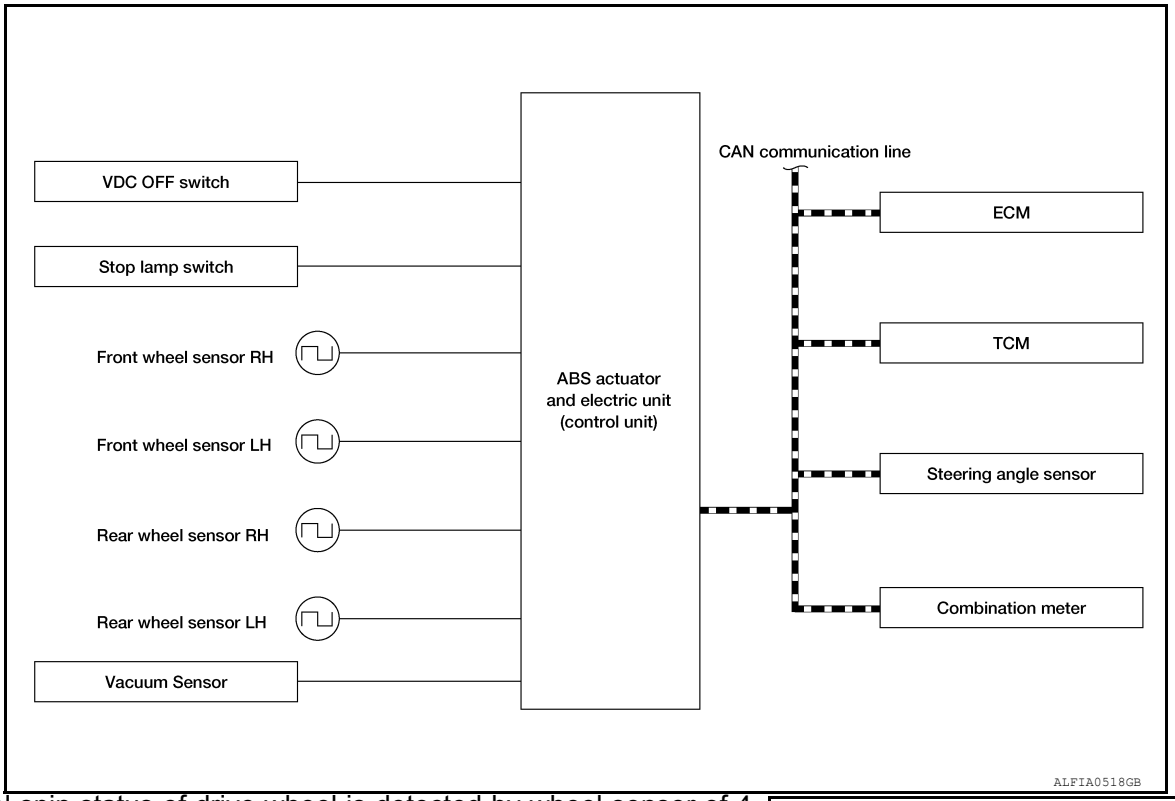


TCS FUNCTION

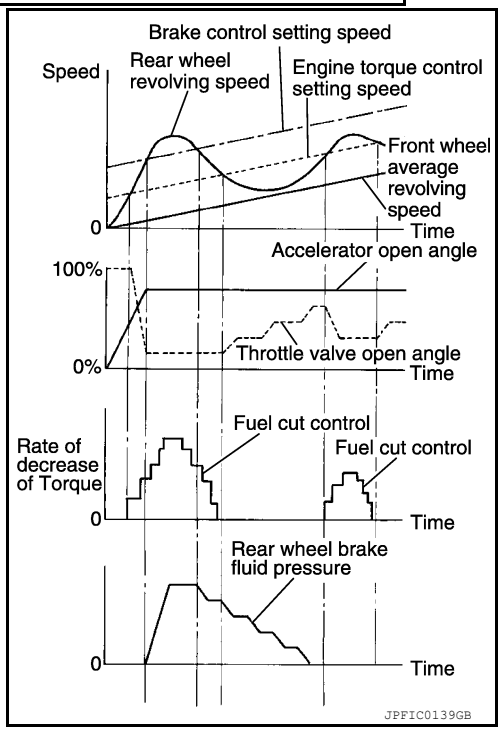
TCS FUNCTION : System Description

INFOID:0000000011821276

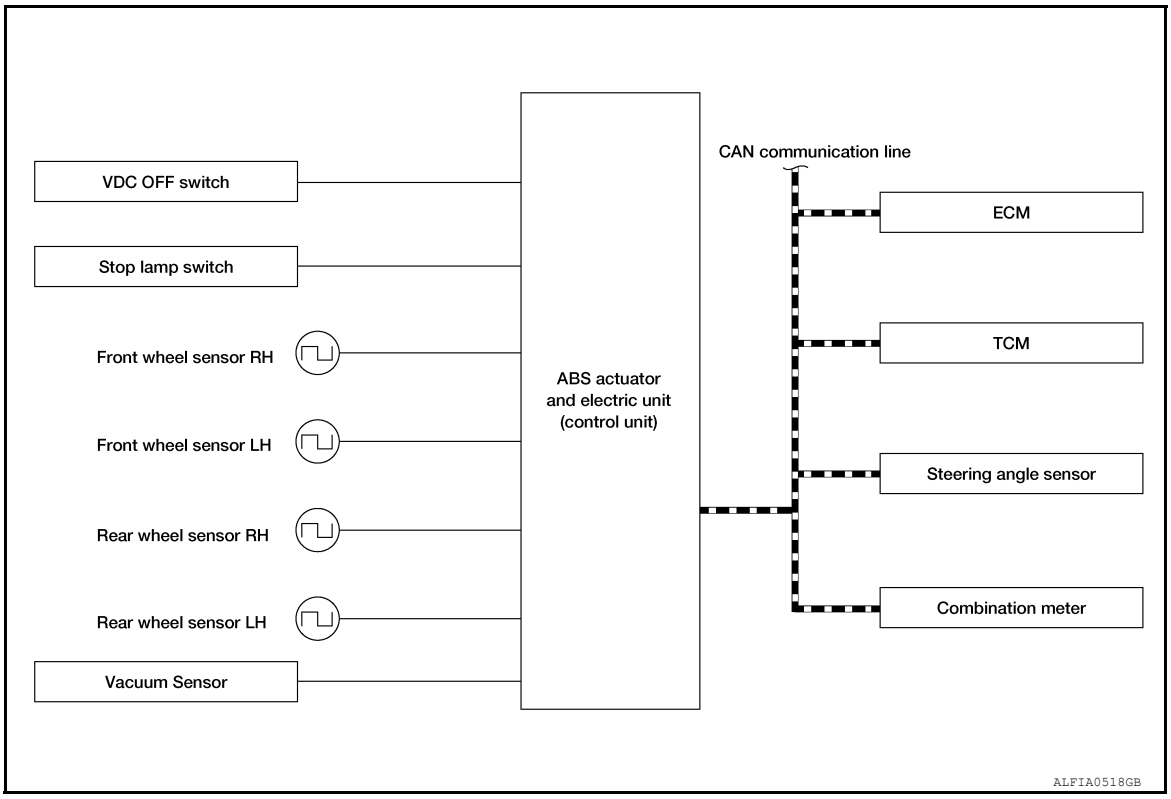
SYSTEM DIAGRAM



- Wheel spin status of drive wheel is detected by wheel sensor of 4 wheels. Engine output and transmission shift status are 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) performs brake force control of LH and RH drive wheels (applies brake force by increasing brake fluid pressure of drive wheel) and decreases 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 assist function and hill start assist function. The vehicle status becomes the same as models without VDC function, TCS function, brake assist function and hill start assist function. However, ABS function and EBD function are operated normally. Refer to BRC-47, "Fail-Safe".



SYSTEM DIAGRAM



INPUT SIGNAL AND OUTPUT SIGNAL

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

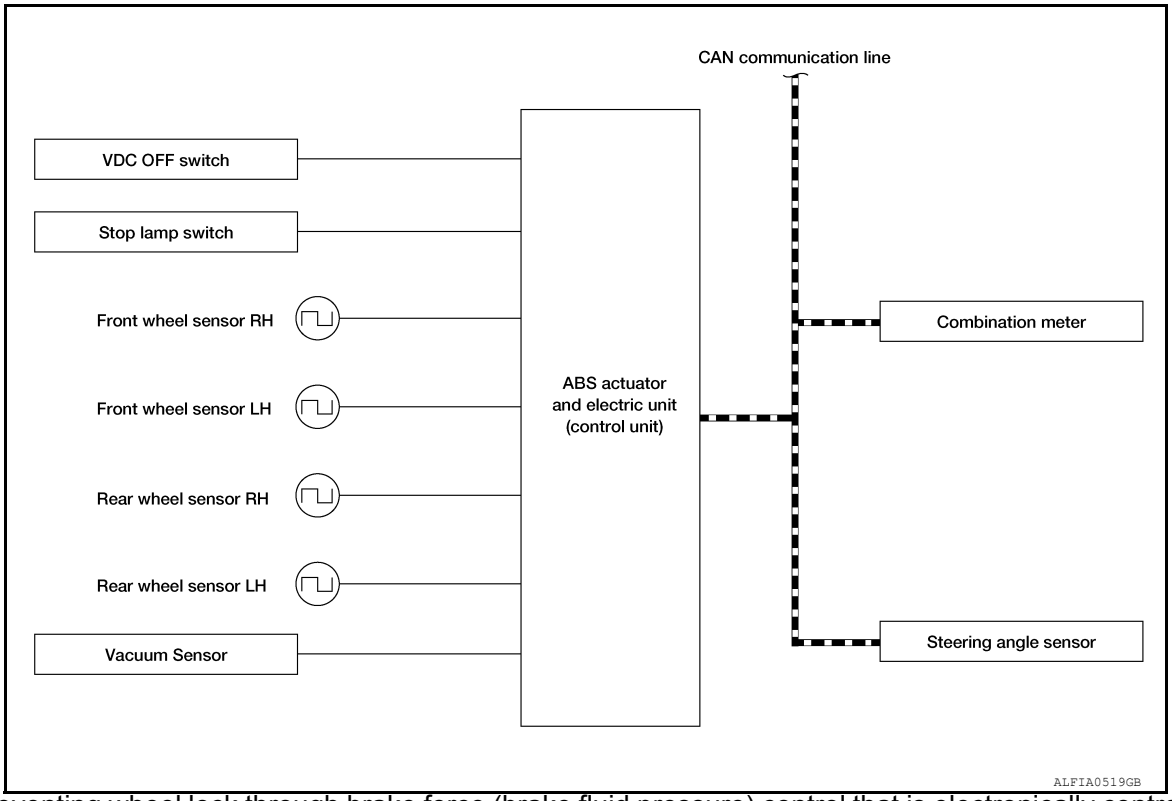
Component	Signal description
ECM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication: • Accelerator pedal position signal • Engine speed signal • Engine torque signal Mainly receives the following signal from ABS actuator and electric unit (control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

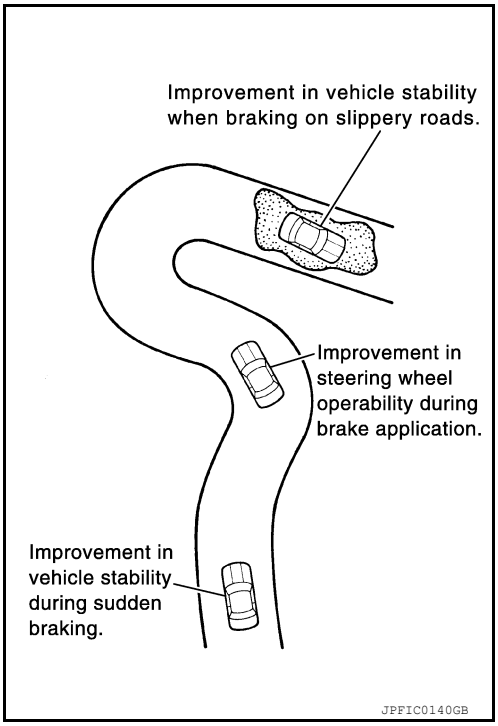
ABS FUNCTION : System Description

INFOID:0000000011821277

SYSTEM DIAGRAM



- 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 calculate 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 and hill start assist function. The vehicle status becomes the same as models without VDC function, TCS function, ABS function, brake assist function and hill start assist function. However, EBD function is operated normally. Refer to BRC-195, "Fail-Safe".



NOTE:

- ABS has the characteristics as described here. This is not a 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 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 feel heavy when depressing brake pedal lightly. These symptoms are not malfunctions.

INPUT SIGNAL AND OUTPUT SIGNAL

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

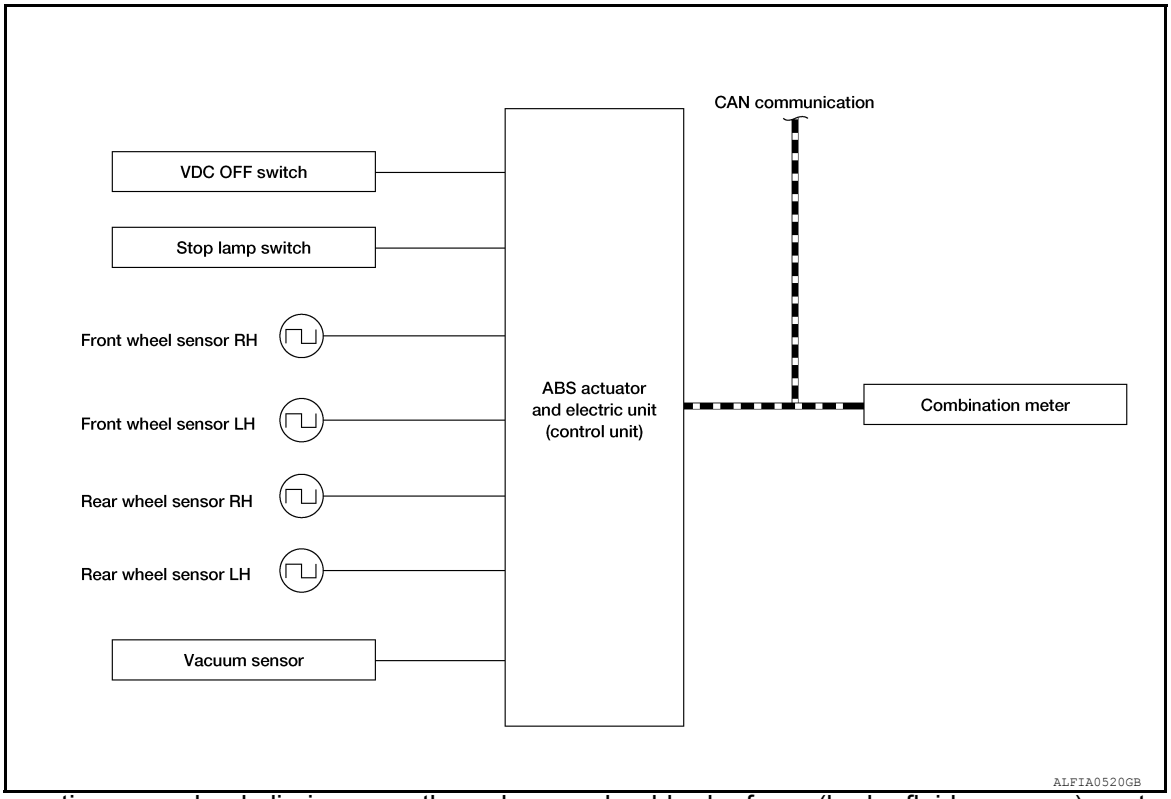
Component	Signal description
Combination meter	Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication: • Brake fluid level switch signal • Parking brake switch signal Mainly receives the following signals from ABS actuator and electric unit (control 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

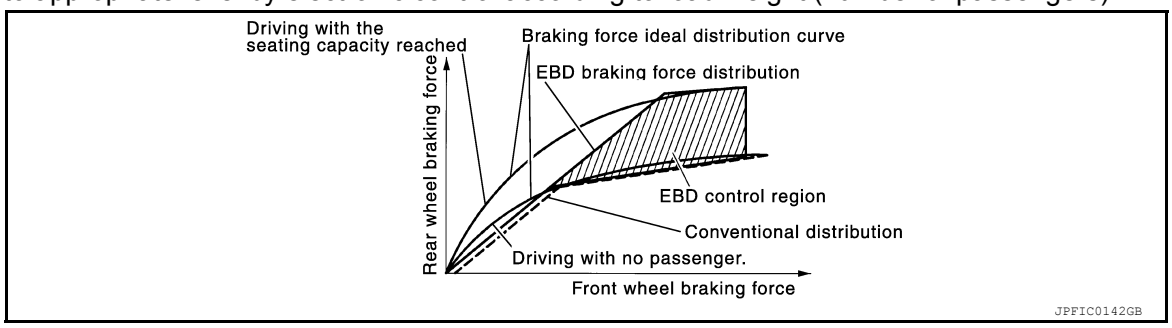
INFOID:0000000011821278

SYSTEM DIAGRAM

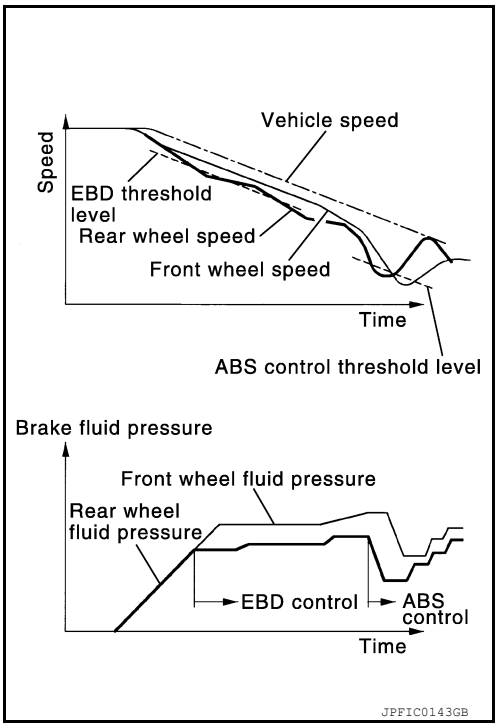


- By preventing rear wheel slip increase through rear wheel brake force (brake fluid pressure) control that is electronically controlled when slight slip on front and rear wheels is detected during braking, stability during braking is improved.

- 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 assist function and hill start assist function. The vehicle status becomes the same as models without VDC function, TCS function, ABS function, EBD function, brake assist function and hill start assist function. Refer to BRC-195, "Fail-Safe".



INPUT SIGNAL AND OUTPUT SIGNAL

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

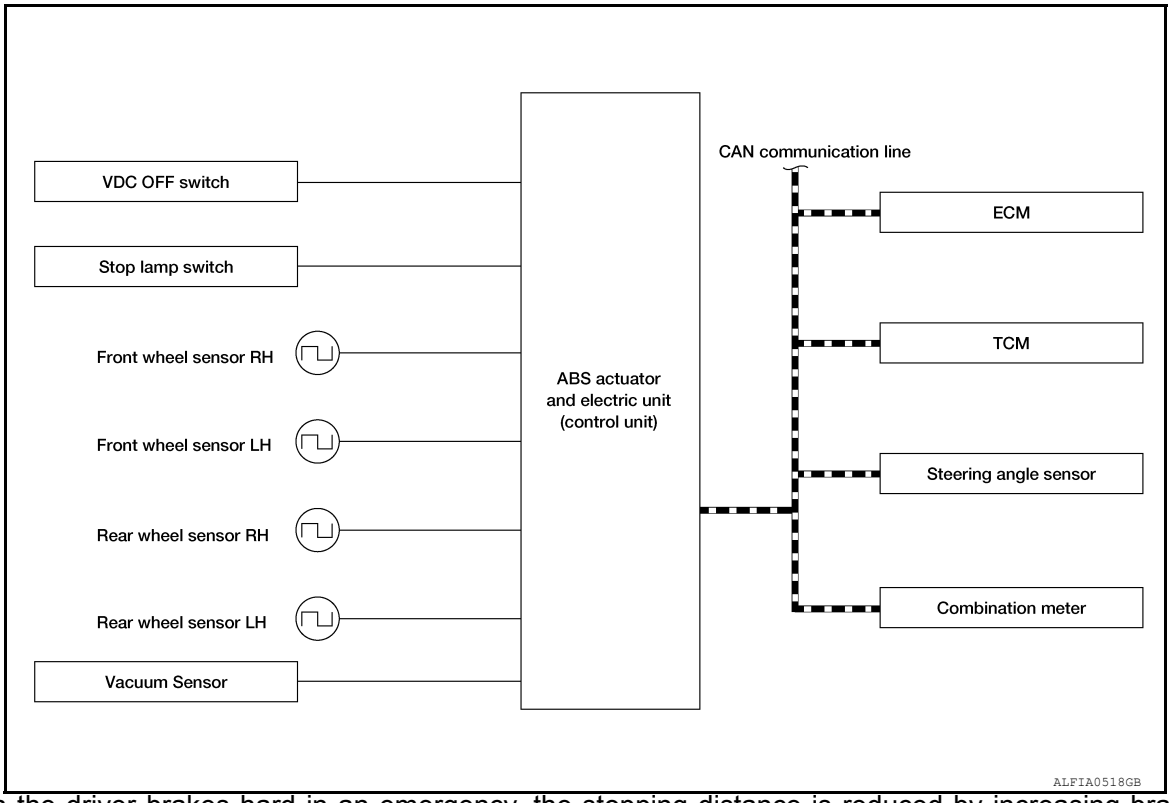
Component	Signal description
Combination meter	Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication: • VDC warning lamp signal • ABS warning lamp signal • Brake warning lamp signal

BRAKE ASSIST (WITHOUT PREVIEW FUNCTION)

BRAKE ASSIST (WITHOUT PREVIEW FUNCTION) : System Description

INFOID:0000000011821279

SYSTEM DIAGRAM



- 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 assist function and hill start assist function. The vehicle status becomes the same as models without VDC function, TCS function, brake assist function and hill start assist function. However, ABS function and EBD function are operated normally. Refer to BRC-195, "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
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

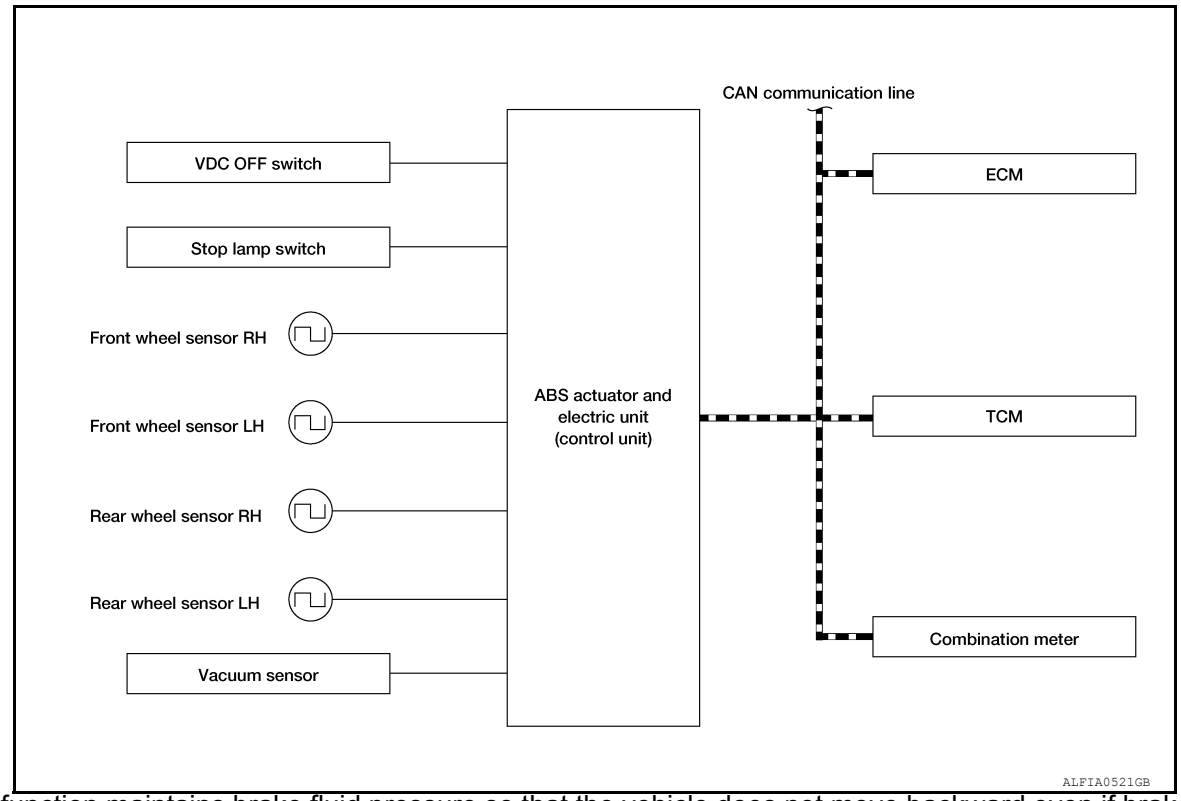
Component	Signal description
Combination meter	Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication: • Brake fluid level switch signal • Parking brake switch signal Mainly receives the following signals from ABS actuator and electric unit (control 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 start assist FUNCTION

hill start assist FUNCTION : System Description

INFOID:0000000011821280

SYSTEM DIAGRAM



- This function maintains brake fluid pressure so that the vehicle does not move backward 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 a position other than P or N.
- Hill start assist function is only for the start aid. It maintains the brake fluid pressure for approximately 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 assist function and hill start assist function. The vehicle status becomes the same as models without VDC function, TCS function, brake assist function and hill start assist function. However, ABS function and EBD function are operated normally. Refer to BRC-195, "Fail-Safe".

INPUT SIGNAL AND OUTPUT SIGNAL

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

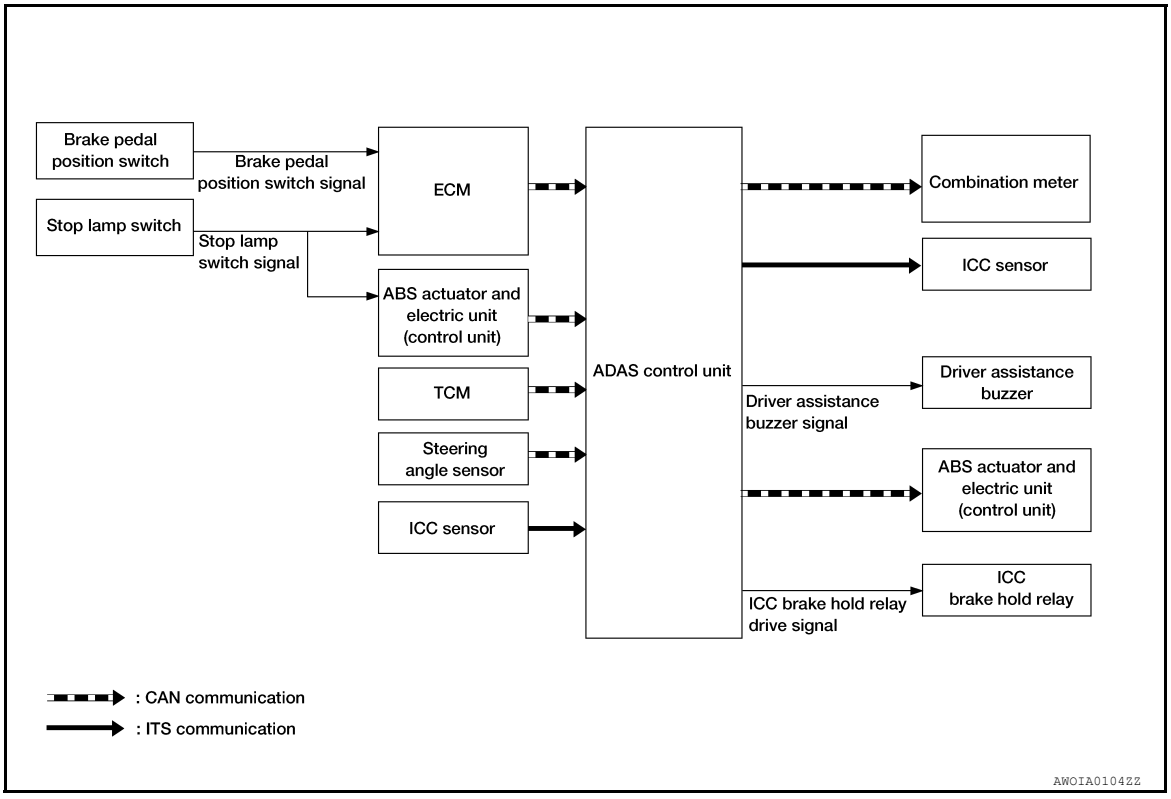
Component	Signal description
ECM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication: • Accelerator pedal position signal • Engine speed signal • Engine torque signal Mainly receives the following signal from ABS actuator and electric unit (control 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
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 ASSIST (WITH PREVIEW FUNCTION)

BRAKE ASSIST (WITH PREVIEW FUNCTION) : System Description-Forward Emergency Braking

INFOID:0000000011555508

SYSTEM DIAGRAM



ADAS CONTROL UNIT INPUT/OUTPUT SIGNAL ITEM

Input Signal Item

Transmit unit	Signal name		Description
ECM	CAN communication	Closed throttle position signal	Receives idle position state (ON/OFF)
		Accelerator pedal position signal	Receives accelerator pedal position (angle)
		Engine speed signal	Receives engine speed
		Stop lamp switch signal	Receives an operational state of the brake pedal
		Brake pedal position switch signal	Receives an operational state of the brake pedal
TCM	CAN communication	Input speed signal	Receives the number of revolutions of input shaft
		Current gear position signal	Receives a current gear position
		Shift position signal	Receives a selector lever position
		Output shaft revolution signal	Receives the number of revolutions of output shaft
ABS actuator and electric unit (control unit)	CAN communication	ABS malfunction signal	Receives a malfunction state of ABS
		ABS operation signal	Receives an operational state of ABS
		ABS warning lamp signal	Receives an ON/OFF state of ABS warning lamp
		TCS malfunction signal	Receives a malfunction state of TCS
		TCS operation signal	Receives an operational state of TCS
		VDC OFF switch signal	Receives an ON/OFF state of VDC
		VDC malfunction signal	Receives a malfunction state of VDC
		VDC operation signal	Receives an operational state of VDC
		Vehicle speed signal (ABS)	Receives wheel speeds of four wheels
		Yaw rate signal	Receives yaw rate acting on the vehicle
		Stop lamp switch signal	Receives an operational state of the brake pedal
Steering angle sensor	CAN communication	Steering angle sensor malfunction signal	Receives a malfunction state of steering angle sensor
		Steering angle sensor signal	Receives the number of revolutions, turning direction of the steering wheel
		Steering angle speed signal	Receives the turning angle speed of the steering wheel
ICC sensor	ITS communication	ICC sensor signal	Receives detection results, such as the presence or absence of a leading vehicle and distance from the vehicle

Output Signal Item

Reception unit	Signal name			Description
ABS actuator and electric unit (control unit)	CAN communication	Brake fluid pressure control signal		Transmits a brake fluid pressure control signal to activates the brake
Combination meter	CAN communication	Meter display signal	Vehicle ahead detection indicator signal	Transmits a signal to display a state of the system on the information display
			FEB/PFCW system display signal	
			FEB warning signal	
ICC sensor	ITS communication	Vehicle speed signal		Transmits a vehicle speed calculated by the ADAS control unit
		Steering angle sensor signal		Transmits a steering angle sensor signal received from the steering angle sensor
ICC brake hold relay	ICC brake hold relay drive signal			Activates the brake hold relay and turns ON the stop lamp

DESCRIPTION

- Forward emergency braking (FEB) system can assist the driver when there is a forward collision with the vehicle ahead in the traveling lane.

- FEB system operate at speeds above approximately 5 km/h (3 mph)

FUNCTION DESCRIPTION

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

Operation Condition

- FEB is ON.
- Vehicle speed: approximately 5 km/h (3 mph) and above..
- There is a possibility of a collision with the vehicle ahead.

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.

BRAKE ASSIST (WITH PREVIEW FUNCTION) : Fail-safe (ICC RADAR)

INFOID:0000000011675180

If a malfunction occurs in each system, ADAS control unit cancels each control, sounds a beep, and turns ON the warning or indicator lamp.

System	Buzzer	Warning lamp/Warning display	Description
Intelligent Cruise Control (ICC)	High-pitched tone	ICC system warning	Cancel
Conventional (fixed speed) cruise control mode	High-pitched tone	ICC system warning	Cancel
Forward Emergency Braking (FEB)	High-pitched tone	FEB warning lamp (Yellow)	Cancel
Predictive Forward Collision Warning (PFCW)	High-pitched tone	FEB warning lamp (Yellow)	Cancel
Blind Spot Warning (BSW)	Low-pitched tone	BSW system warning (Orange)	Cancel

WARNING/INDICATOR/CHIME LIST

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

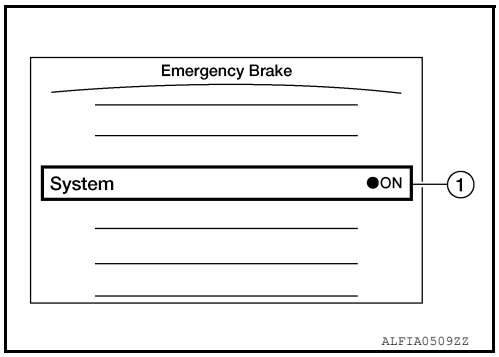
INFOID:0000000011555510

Name	Design	Function
FEB warning lamp	 ALFIA0508ZZ	• For layout, refer to MWI-6, "METER SYSTEM : Design".

OPERATION

Switch Name and Function

INFOID:0000000011555511

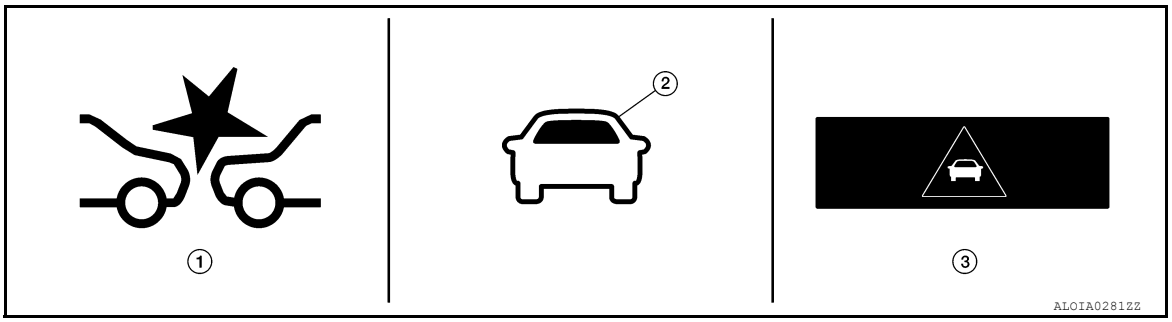


No.	Switch name	Description
①	FEB system setting screen (Integral switch settings screen)	The setting of FEB/PFCW system can be switched between ON and OFF

Menu Displayed by Pressing Each Switch

INFOID:0000000011555512

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.	Vehicle ahead detection indicator	• Indicates whether it detects a vehicle ahead • Blinks when approaching vehicle ahead
3.	FEB warning	Displays immediately before the harder brake operates

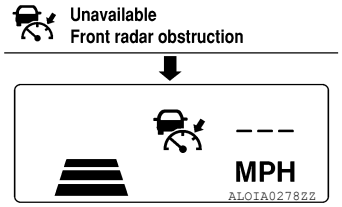
DISPLAY AND WARNING

Warning Display

System status	Condition	Display on combination meter	FEB warning lamp	Buzzer
FEB/PFCW OFF	—	—	OFF	—

System status	Condition	Display on combination meter	FEB warning lamp	Buzzer
FEB/PFCW ON	System ON	 ALFIA0531ZZ	ON	—
FEB/PFCW system malfunction	The FEB/PFCW system is automatically canceled. **NOTE:** The system operates if the ignition switch is turned OFF⇒ON after the condition improves	Malfunction See Owner's Manual	ON	Beep

Warning Operation

Condition	Action	Display on combination meter	FEB warning lamp	Chime
There is a possibility of a collision with the vehicle ahead	• Accelerator pedal actuation • Operates brake (Partial)	 ALFIA0532ZZ	FLASHING	Beep
An obstacle ahead is avoided due to the system applying braking.	Operates brake (Emergency)	 JSOIA0957ZZ	ON	Continuous beeps
Dirt around the ICC sensor	The FEB system is automatically canceled. **NOTE:** The system operates if the ignition switch is turned OFF⇒ON after the condition improves	 ALOIA0278ZZ	ON	—

HANDLING PRECAUTION

Description

INFOID:0000000011555513

PRECAUTIONS FOR FORWARD EMERGENCY BRAKING

- The forward emergency braking system is a supplemental aid to the driver. It is not a replacement for the driver′s attention to traffic conditions or responsibility to drive safely. It cannot prevent accidents due to carelessness or dangerous driving techniques.
- The forward emergency braking system does not function in all driving, traffic, weather and road conditions.
- The automatic braking will cease under the following conditions:
  - When the steering wheel is turned as far as necessary to avoid a collision.
  - When the accelerator pedal is depressed.
  - When there is no longer a vehicle detected ahead.
- If the forward emergency braking system has stopped the vehicle, the vehicle will remain at a standstill for approximately 2 seconds before the brakes are released.
- The system will not detect the following objects:
  - Pedestrians, animals, or obstacles in the roadway
  - Oncoming vehicles in the same lane
  - Crossing vehicles
- The radar sensor has some performance limitations. For stationary vehicles, the forward emergency braking system can function at speeds up to approximately 80 km/h (50 MPH).
- The radar sensor may not detect a vehicle ahead in the following conditions:
  - Dirt, ice, snow or other material covering the radar sensor.
  - Interference by other radar sources.
  - Snow or road spray from traveling vehicles.
  - If the vehicle ahead is narrow (e.g.motorcycle)
  - When driving on a steep downhill slope or roads with sharp curves.
- In some road or traffic conditions, the forward emergency braking system may unexpectedly 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.
- When towing a trailer.

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

CONSULT Function

INFOID:0000000011675181

APPLICATION ITEMS

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

Mode	Function description
ECU Identification	Part number of ABS actuator and electric unit (control unit) can be read.
Self Diagnostic Result	Self-diagnostic results and freeze frame data can be read and erased quickly.*
Data Monitor	Input/Output data in the ABS actuator and electric unit (control unit) can be read.
Active Test	Diagnostic Test Mode in which CONSULT drives some actuators apart from the ABS actuator and electric unit (control unit) and also shifts some parameters in a specified range.
Work support	Components can be quickly and accurately adjusted.
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-50, "DTC Index".

When “CRNT” is displayed on self-diagnosis result

- The system is presently malfunctioning.

When “PAST” is displayed on self-diagnosis result

- System malfunction in the past was 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 was detected, but the system is presently normal. **NOTE:** Each time when ignition switch is turned OFF to ON, numerical number increases from 1 → 2 → 3...38 → 39. When the operation number of times exceeds 39, the number does 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 approximately 10 seconds after operation start.

- When performing active test again after “TEST IS STOPPED” is displayed, select “BACK”.
- ABS warning lamp, brake warning lamp and VDC warning lamp may turn ON during active test. This is not a malfunction.

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

Test item	Display Item	Display		
		Up	Keep	Down
FR RH SOL	FR RH IN SOL	Off	On*	On*
	FR RH OUT SOL	Off	Off	On*
FR LH SOL	FR LH IN SOL	Off	On*	On*
	FR LH OUT SOL	Off	Off	On*
RR RH SOL	RR RH IN SOL	Off	On*	On*
	RR RH OUT SOL	Off	Off	On*
RR LH SOL	RR LH IN SOL	Off	On*	On*
	RR LH OUT SOL	Off	Off	On*

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

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

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

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

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

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

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

DATA MONITOR

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

×: Applicable

Item (Unit)	Monitor item selection		Note
	INPUT SIGNALS	MAIN 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)
OFF SW (On/Off)	×	×	VDC OFF switch status is displayed.
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.

Item (Unit)	Monitor item selection		Note
	INPUT SIGNALS	MAIN SIGNALS	
GEAR	×	×	Current gear position judged from current gear position signal is displayed.
ENGINE SPEED (tr/min)	×	×	Engine speed status is displayed.
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.
CV1 (On/Off)			Cut valve 1 (On/Off) status is displayed.
CV2 (On/Off)			Cut valve 2 (On/Off) status 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.
USS SIG (Note 3) (On/Off)			hill start assist operation status is displayed.

Note 1: Refer to BRC-179, "WARNING/INDICATOR/CHIME LIST : Warning Lamp/Indicator Lamp" for ON/OFF conditions of each warning lamp and indicator lamp.
Note 2: AWD models
Note 3: 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.

CONFIGURATION

Configuration inculdes the following functions:

Function		Description
Read/Write Configuration	Before replacing ECU	Allows the reading of vehicle specification (Type ID) written in the ABS actuator and electric unit (control unit) to store the specification in CONSULT.
	After replacing ECU	Allows the writing of vehicle information (Type ID) stored in CONSULT into the ABS actuator and electric unit (control unit).
Manual Configuration		Allows the writing of vehicle information (Type ID) into the ABS actuator and electric unit (control unit) by hand.

CAUTION:
Use “Manual Configuration”“TYPE ID”

DIAGNOSIS SYSTEM (ICC SENSOR)

CONSULT Function (LASER/RADAR)

INFOID:0000000011867256

CAUTION:
After disconnecting the CONSULT vehicle interface (VI) from the data link connector, the ignition must be cycled OFF → ON (for at least 5 seconds) → OFF. If this step is not performed, the BCM may not go to "sleep mode", potentially causing a discharged battery and a no-start condition.

APPLICATION ITEMS

CONSULT performs the following functions via CAN communication with ADAS control unit and the communication with ICC sensor.

Diagnosis mode	Description
Self Diagnostic Result	Displays malfunctioning system memorized in ICC sensor
Data Monitor	Displays real-time input/output data of ICC sensor
Work support	It can monitor the adjustment direction indication in order to perform the radar adjustment operation smoothly
ECU Identification	Displays ICC sensor part number
CAN Diag Support Monitor	The results of transmit/receive diagnosis of ITS communication can be read.

SELF DIAGNOSTIC RESULT

Refer to CCS-51, "DTC Index".

DATA MONITOR

Monitored item [Unit]	Description
VHCL SPEED SE [km/h] or [mph]	Vehicle speed judged from a vehicle speed signal read by the ICC sensor via ITS communication is displayed [ADAS control unit receives a vehicle speed signal from ABS actuator and electric unit (control unit) via CAN communication and transmits the calculated vehicle speed to ICC sensor via ITS communication].
YAW RATE [deg/s]	Indicates yaw rate read from ADAS control unit through ITS communication [ADAS control unit receives yaw rate signal from ABS actuator and electric unit (control unit) via CAN communication and transmits yaw rate calculated by the ADAS control unit] Yaw rate judged from a yaw rate signal read by ICC sensor via ITS communication is displayed [ADAS control unit receives a yaw rate signal from ABS actuator and electric unit (control unit) via CAN communication and transmits the calculated yaw rate to ICC sensor via ITS communication].
PWR SUP MONI [V]	Indicates IGN voltage input by ICC sensor
DISTANCE [m]	Indicates the distance from the vehicle ahead
RELATIVE SPD [m/s]	Indicates the relative speed of the vehicle ahead
RADAR OFFSET [m]	**NOTE:** The item is indicated but not used.
RADAR 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

Monitored item [Unit]	Description
FCW SYSTEM ON	NOTE: The item is indicated, but not used.
FCW SELECT	NOTE: The item is indicated, but not used.
PFCW SELECT	NOTE: The item is indicated, but not used.
FEB SW	NOTE: The item is indicated, but not used.
FEB SELECT	Indicates [ON/OFF] state of the PFCW system.
MAIN SW	Indicates [ON/OFF] status as judged from ICC steering switch.
ICC/ASCD MODE	NOTE: The item is indicated, but not used.
SET/COAST SW	Indicates [ON/OFF] status as judged from ICC steering switch.
CANCEL SW	Indicates [ON/OFF] status as judged from ICC steering switch.
RESUME/ACC SW	Indicates [ON/OFF] status as judged from ICC steering switch.
DISTANCE SW	Indicates [ON/OFF] status as judged from ICC steering switch.
BRAKE SW	Indicates [ON/OFF] status as judged from brake pedal position switch signal [ECM transmits brake pedal position switch signal through CAN communication].
STOP LAMP SW	Indicates [ON/OFF] status as judged from stop lamp switch signal [ABS actuator and electric unit (control unit) transmits stop lamp switch signal through CAN communication].
IDLE SW	Indicates [ON/OFF] status of idle switch read from ICC sensor through CAN communication (ECM transmits ON/OFF status through CAN communication.
CRUISE LAMP	Indicates [ON/OFF] status of MAIN switch indicator output.
OWN VHCL	NOTE: The item is indicated, but not used.
VHCL AHEAD	Indicates [ON/OFF] status of vehicle ahead detection indicator output.
SET DISTANCE	Indicates set distance memorized in ADAS control unit.
SET VHCL SPD [km/h] or [mph]	NOTE: The item is indicated, but not used.
THRTL SENSOR [%]	Indicates throttle position read from ISS sensor through CAN communication (ECM transmits accelerator pedal position signal through CAN communication).
VEHICLE AHEAD DETECT	Indicates [ON/OFF] status of vehicle ahead detection indicator output.
STATIC OBSTACLE DETECT	Indicates [ON/OFF] status of static obstacle detection.
BUZZER O/P	[ON/OFF] Indicates [On/Off] status of warning chime output.
FUNC ITEM (FCW)	NOTE: The item is indicated, but not used.
FUNC ITEM (PFCW)	Indicates systems status
FUNC ITEM (FEB)	Indicates systems status
FUNC ITEM (ICC)	Indicates systems status
PRESS_ORDER [bar]	Indicates status as judged from brake fluid pressure signal [ABS actuator and electric unit (control unit) transmits brake fluid pressure signal through CAN communication].
D RANGE SW	Indicates [ON/OFF] status as judged from D position switch signal (TCM transmits shift position signal through CAN communication).
NP RANGE SW	Indicates [ON/OFF] status as judged from N/P position switch signal (TCM transmits shift position signal through CAN communication).
PKB SW	Parking brake switch status [ON/OFF] judges from the parking brake switch signal that ADAS control unit readout via CAN communication is displayed (combination meter transmits the parking brake switch signal via CAN communication)

Monitored item [Unit]	Description
VHCL SPD AT	NOTE: The item is indicated, but not used.
Shift position	Indicates shift position read from ADAS control unit though CAN communication (TCM transmits shift position signal through CAN communication).
Turn signal	NOTE: The item is indicated, but not used.
SYSTEM CANCEL MESSAGE	Indicates [ON/OFF] status of system cancel display output.
DISP VHCL SPD [km/h] or [mph]	NOTE: The item is indicated, but not used.
VHCL SPD UNIT	Indicates vehicle speed unit read from ICC sensor through CAN communication (combination meter transmits vehicle speed unit through CAN communications).
ADAS AVAILABLE COND	NOTE: The item is indicated, but not used.
ICC SET STATUS	NOTE: The item is indicated, but not used.
ICC MALF	NOTE: The item is indicated, but not used.
ADAS MALF	Indicates [ON/OFF] status of ADAS malfunction.
STOP LAMP RELAY ON	Indicates [ON/OFF] status of stop lamp relay fixed on.
STOP LAMP RELAY OFF	Indicates [ON/OFF] status of stop lamp relay fixed off.
ICC CANCEL	
ACCEL COM VALUE 1 [m/s2]	Indicates accel command calculated from set speed and information of ahead vehicle.
ICC STATUS	Indicates ICC status.
ACCEL COM VALUE 2	NOTE: The item is indicated, but not used.

WORK SUPPORT

Work support items	Description
MILLIWAVE RADAR ADJUST	Outputs millimeter waves, calculates the displacement in radar direction, and indicates an adjustment direction
CAUSE OF AUTO-CANCEL	Displays causes of automatic cancellation occurred during Intelligent Cruise Control system.

ICC sensor Adjust
Refer to CCS-71, "Description".

ECU IDENTIFICATION

ICC sensor part number is displayed.

CAUSE OF AUTO CANCEL

Work support items	Description
OPERATING ABS	ABS function was operated.
OPERATING TCS	TCS function was operated.
OPERATING VDC	VDC function was operated.
ECM CIRCUIT	ECM did not permit ICC operation.
OP SW VOLT CIRC	The ICC steering switch input voltage is not within standard range.
OP SW DOUBLE TOUCH	The ICC steering switches were pressed at the same time.
VHCL SPD DOWN	Vehicle speed is lower than the speed as follows: • Vehicle to vehicle control mode is 24 km/h (15 mph). • Conventional (fixed speed) cruise control mode is 32 km/h (20 mph).

Work support items	Description
WHL SPD ELEC NOISE	Wheel speed sensor signal caught electromagnetic noise.
VDC/TCS OFF SW	VDC OFF switch was pressed.
VHCL SPD UNMATCH	Wheel speed became different from A/T vehicle speed.
TIRE SLIP	Wheel slipped.
IGN LOW VOLT	Decrease in ICC sensor ignition voltage.
PARKING BRAKE ON	The parking brake is operating.
WHEEL SPD UNMATCH	The wheel speed of all four wheels are out of the specified values.
INCHING LOST	a vehicle ahead is not detected during the following driving when the vehicle speed is approximately 24 km/h (15mph) or less.
CAN COMM ERROR	ICC sensor recieved an abnormal signal with CAN communication.
ABS/TCS/VDC CIRC	An abnormal condition occurs in VDC/TCS/ABS system.
ECD CIRCUIT	An abnormal condition occurs in ECD system.
ASCD VHCL SPD DTAC	Vehicle speed is detatched from the set vehicle speed.
ASCD DOUBLE COMD	Cancel switch and operation switch are detected simultaneously.
FEB OPERATED	FEB activated.
VHL AHAD LOST (CLSE RANGE)	A vehicle ahead lost close range.
NO RECORD	—

ECU DIAGNOSIS INFORMATION

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Reference Value

INFOID:0000000011821281

VALUES ON THE DIAGNOSIS TOOL

CAUTION:

The display shows the control unit calculation data, so a normal value might be displayed even in the event the output circuit (harness) is open or short-circuited.

Monitor item	Display content	Data monitor	
		Condition	Reference value in normal operation
FR LH SENSOR	Wheel speed	0 [km/h, mph]	Vehicle stopped
		Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)
FR RH SENSOR	Wheel speed	0 [km/h, mph]	Vehicle stopped
		Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)
RR LH SENSOR	Wheel speed	0 [km/h, mph]	Vehicle stopped
		Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)
RR RH SENSOR	Wheel speed	0 [km/h, mph]	Vehicle stopped
		Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)
DECEL G-SEN	Longitudinal acceleration detected by decel G sensor	Vehicle stopped	Approx. 0 G
		Vehicle running	-1.7 to 1.7 G
FR RH IN SOL	Operation status of all solenoid valves	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
FR RH OUT SOL	Operation status of all solenoid valves	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
FR LH IN SOL	Operation status of all solenoid valves	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
FR LH OUT SOL	Operation status of all solenoid valves	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off

Monitor item	Display content	Data monitor	
		Condition	Reference value in normal operation
RR RH IN SOL	Operation status of all solenoid valves	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
RR RH OUT SOL	Operation status of all solenoid valves	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
RR LH IN SOL	Operation status of all solenoid valves	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
RR LH OUT SOL	Operation status of all solenoid valves	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
EBD WARN LAMP	EBD warning lamp (Note 2)	When EBD warning lamp is ON	On
		When EBD warning lamp is OFF	Off
STOP LAMP SW	Brake pedal operation	When brake pedal is depressed	On
		When brake pedal is not depressed	Off
MOTOR RELAY	Motor and motor relay operation	When the motor relay and motor are operating	On
		When the motor relay and motor are not operating	Off
ACTUATOR RLY	Actuator relay operation	When the actuator relay is operating	On
		When the actuator relay is not operating	Off
ABS WARN LAMP	ABS warning lamp (Note 2)	When ABS warning lamp is ON	On
		When ABS warning lamp is OFF	Off
OFF LAMP	VDC OFF indicator lamp (Note 2)	When VDC OFF indicator lamp is ON	On
		When VDC OFF indicator lamp is OFF	Off
OFF SW	VDC OFF switch	When VDC OFF switch is ON	On
		When VDC OFF switch is OFF	Off
SLIP/VDC LAMP	SLIP indicator lamp (Note 2)	When SLIP indicator lamp is ON	On
		When SLIP indicator lamp is OFF	Off
BATTERY VOLT	Battery voltage supplied to the ABS actuator and electric unit (control unit)	Ignition switch ON	10 – 16 V
GEAR	Manual mode gear position determined by TCM	1st gear 2nd gear 3rd gear 4th gear 5th gear	1 2 3 4 5

Monitor item	Display content	Data monitor	
		Condition	Reference value in normal operation
ENGINE SPEED	With engine running	With engine stopped	0 RPM
		Engine running	Almost in accordance with tachometer display
YAW RATE SEN	Yaw rate detected by yaw rate/side G sensor	Vehicle stopped	Approx. 0 d/s
		Vehicle turning	-75 to 75 d/s
R POSI SIG	Transmission range switch signal ON/OFF condition	CVT shift position = R position	On
		CVT shift position = other than R position	Off
4WD MODE MON	Always (Note 3)	AUTO, LOCK, 2WD	AUTO, LOCK, 2WD (depending on AWD control status)
N POSI SIG	Transmission range switch signal ON/OFF condition	CVT shift position = N position	On
		CVT shift position = other than N position	Off
CV1	Cut valve 1 signal	When cut valve 1 is open or closed	On
			Off
CV2	Cut valve 2 signal	When cut valve 2 is open or closed	On
			Off
ACCEL POS SIG	Throttle actuator opening/closing is displayed (linked with accelerator pedal)	Accelerator pedal not depressed (ignition switch is ON)	0 %
		Depress accelerator pedal (ignition switch is ON)	0 - 100 %
SIDE G-SENSOR	Transverse G detected by side G sensor	Vehicle stopped	Approx. 0 m/s^2
		Vehicle turning right	Negative value (m/s^2)
		Vehicle turning left	Positive value (m/s^2)
STR ANGLE SIG	Steering angle detected by steering angle sensor	Straight-ahead	Approx. 0°
		Steering wheel turned	–720 to 720°
PRESS SENSOR	Brake fluid pressure detected by pressure sensor	With ignition switch turned ON and brake pedal released	Approx. 0 bar
		With ignition switch turned ON and brake pedal depressed	–40 to 300 bar
EBD SIGNAL	EBD operation	EBD is active	On
		EBD is inactive	Off
ABS SIGNAL	ABS operation	ABS is active	On
		ABS is inactive	Off
TCS SIGNAL	TCS operation	TCS is active	On
		TCS is inactive	Off
VDC SIGNAL	VDC operation	VDC is active	On
		VDC is inactive	Off
EBD FAIL SIG	EBD fail-safe signal	In EBD fail-safe	On
		EBD is normal	Off
ABS FAIL SIG	ABS fail-safe signal	In ABS fail-safe	On
		ABS is normal	Off

Monitor item	Display content	Data monitor	
		Condition	Reference value in normal operation
TCS FAIL SIG	TCS fail-safe signal	In TCS fail-safe	On
		TCS is normal	Off
VDC FAIL SIG	VDC fail-safe signal	In VDC fail-safe	On
		VDC is normal	Off
CRANKING SIG	Crank operation	Crank is active	On
		Crank is inactive	Off
FLUID LEV SW	Brake fluid level switch	When brake fluid level switch ON	On
		When brake fluid level switch OFF	Off
USS SIG (On/Off)	Hill start assist status (Note 4)	When hill start assist is active	On
		When hill start assist is not active	Off

Note 1: Confirm tire pressure is normal.

Note 2: On and off timing for warning lamps and indicator lamps.

Note 3: AWD models

Note 4: USS (Hill Start Assist)

- Refer to BRC-28, "VDC FUNCTION : System Description".
- Refer to BRC-31, "TCS FUNCTION : System Description".
- Refer to BRC-33, "ABS FUNCTION : System Description".
- Refer to BRC-34, "EBD FUNCTION : System Description".

Fail-Safe

INFOID:0000000011822463

VDC FUNCTION, TCS FUNCTION, BRAKE ASSIST FUNCTION and HILL START ASSIST 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 assist function and hill start assist function. The vehicle status becomes the same as models without VDC function, TCS function, brake assist function and hill start assist 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 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 and hill start assist 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 assist function and hill start assist function. The vehicle status becomes the same as models without VDC function, TCS function, ABS function, EBD function, brake assist function and hill start assist function.

DTC	Fail-safe condition
C1101	The following functions are suspended: • VDC function • TCS function • ABS function • EBD function (only when both rear wheels are malfunctioning) • Brake assist function • Hill start assist function
C1102	
C1103	
C1104	
C1105	
C1106	
C1107	
C1108	
C1109	The following functions are suspended: • VDC function • TCS function • ABS function • EBD function • Brake assist function • Hill start assist function
C1110	
C1111	
C1113	
C1115	The following functions are suspended: • VDC function • TCS function • ABS function • Brake assist function • Hill start assist function
C1116	
C1120	The following functions are suspended: • VDC function • TCS function • ABS function • EBD function • Brake assist function • Hill start assist function
C1121	
C1122	
C1123	
C1124	
C1125	
C1126	
C1127	
C1130	The following functions are suspended: • VDC function • TCS function • Hill start assist function
C1140	The following functions are suspended: • VDC function • TCS function • ABS function • EBD function • Brake assist function • Hill start assist function
C1142	The following functions are suspended: • VDC function • TCS function • Brake assist function • Hill start assist function
C1143	The following functions are suspended: • VDC function • TCS function • Hill start assist function
C1144	

DTC	Fail-safe condition
C1145 C1146 C1153 C1154	The following functions are suspended: • VDC function • TCS function • ABS function • Brake assist function • Hill start assist function
C1155	The following functions are suspended: • VDC function • TCS function • Brake assist function • Hill start assist function
C1160	The following functions are suspended: • VDC function • TCS function • ABS function • Brake assist function • Hill start assist function
C1164 C1165 C1166 C1167	The following functions are suspended: • VDC function • TCS function • ABS function • EBD function • Brake assist function • Hill start assist function
C1170	The following functions are suspended: • VDC function • TCS function • ABS function • Brake assist function • Hill start assist function
C1197 C1198 C1199 C119A	Electrical vacuum assistance of brake booster is suspended.
U1000 U1002	The following functions are suspended: • VDC function • TCS function • Hill start assist function

DTC Inspection Priority Chart

INFOID:0000000011675184

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	• C1170 VARIANT CODING
3	• C1130 ENGINE SIGNAL 1 • C1144 ST ANG SEN SIGNAL
4	• C1109 BATTERY VOLTAGE [ABNORMAL] • C1109 BATTERY VOLTAGE [ABNORMAL] • C1110 CONTROLLER FAILURE • 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] • C1116 STOP LAMP SW • C1120 FR LH IN ABS SOL • C1121 FR LH OUT ABS SOL • C1122 FR RH IN ABS SOL • C1123 FR RH OUT ABS SOL • C1124 RR LH IN ABS SOL • C1125 RR LH OUT ABS SOL • C1126 RR RH IN ABS SOL • C1127 RR RH OUT ABS SOL • C1142 PRESS SEN CIRCUIT • C1143 ST ANG SEN CIRCUIT • C1145 YAW RATE SENSOR • C1146 SIDE G SEN CIRCUIT • C1160 DECEL G SEN SET • C1164 CV 1 • C1165 CV 2 • C1197 VACUUM SENSOR • C1198 VACUUM SEN CIR • C1199 BRAKE BOOSTER • C119A VACUUM SEN VOLT
6	• C1155 BR FLUID LEVEL LOW

DTC Index

INFOID:0000000011675185

DTC	Display Item	VDC warning lamp	ABS warning lamp	Brake warning lamp	Refer to:
C1101	RR RH SENSOR-1	ON	ON	OFF	BRC-70, "DTC Logic"
C1102	RR LH SENSOR-1	ON	ON	OFF	
C1103	FR RH SENSOR-1	ON	ON	OFF	
C1104	FR LH SENSOR-1	ON	ON	OFF	
C1105	RR RH SENSOR-2	ON	ON	OFF	BRC-75, "DTC Logic"
C1106	RR LH SENSOR-2	ON	ON	OFF	
C1107	FR RH SENSOR-2	ON	ON	OFF	
C1108	FR LH SENSOR-2	ON	ON	OFF	
C1109	BATTERY VOLTAGE [ABNOMAL]	ON	ON	ON	BRC-77, "DTC Logic"
C1110	CONTROLLER FAILURE	ON	ON	ON	BRC-79, "DTC Logic"
C1111	PUMP MOTOR	ON	ON	ON	BRC-80, "DTC Logic"
C1113	G SENSOR	ON	ON	OFF	BRC-82, "DTC Logic"
C1115	ABS SENSOR [ABNORMAL SIGNAL]	ON	ON	OFF	BRC-84, "DTC Logic"
C1120	FR LH IN ABS SOL	ON	ON	ON	BRC-89, "DTC Logic"
C1121	FR LH OUT ABS SOL	ON	ON	ON	BRC-91, "DTC Logic"
C1122	FR RH IN ABS SOL	ON	ON	ON	BRC-89, "DTC Logic"
C1123	FR RH OUT ABS SOL	ON	ON	ON	BRC-91, "DTC Logic"
C1124	RR LH IN ABS SOL	ON	ON	ON	BRC-89, "DTC Logic"

DTC	Display Item	VDC warning lamp	ABS warning lamp	Brake warning lamp	Refer to:
C1125	RR LH OUT ABS SOL	ON	ON	ON	BRC-91, "DTC Logic"
C1126	RR RH IN ABS SOL	ON	ON	ON	BRC-89, "DTC Logic"
C1127	RR RH OUT ABS SOL	ON	ON	ON	BRC-91, "DTC Logic"
C1130	ENGINE SIGNAL 1	ON	OFF	OFF	BRC-93, "DTC Logic"
C1140	ACTUATOR RLY	ON	ON	ON	BRC-95, "DTC Logic"
C1142	PRESS SEN CIRCUIT	ON	OFF	OFF	BRC-97, "DTC Logic"
C1143	ST ANG SEN CIRCUIT	ON	OFF	OFF	BRC-99, "DTC Logic"
C1144	ST ANG SEN SIGNAL	ON	OFF	OFF	BRC-101, "DTC Logic"
C1145	YAW RATE SENSOR	ON	ON	OFF	BRC-82, "DTC Logic"
C1146	SIDE G SEN CIRCUIT	ON	ON	OFF	
C1155	BR FLUID LEVEL LOW	ON	OFF	OFF	BRC-104, "DTC Logic"
C1160	DECEL G SEN SET	ON	ON	OFF	BRC-106, "DTC Logic"
C1164	CV 1	ON	ON	ON	BRC-107, "DTC Logic"
C1165	CV 2	ON	ON	ON	
C1166	SV 1	ON	ON	ON	
C1167	SV 2	ON	ON	ON	
C1170	VARIANT CODING	ON	ON	OFF	BRC-79, "DTC Logic"
C1197	VACUUM SENSOR	OFF	OFF	ON	BRC-109, "DTC Logic"
C1198	VACUUM SEN CIR	OFF	OFF	ON	BRC-111, "DTC Logic"
C1199	BRAKE BOOSTER	OFF	OFF	ON	BRC-113, "DTC Logic"
C119A	VACUUM SEN VOLT	OFF	OFF	ON	BRC-115, "DTC Logic"
U1000	CAN COMM CIRCUIT	ON	OFF	OFF	BRC-117, "DTC Logic"
U1002	SYSTEM COMM (CAN)	ON	OFF	OFF	BRC-118, "DTC Logic"

ADAS CONTROL UNIT

Reference Value

INFOID:0000000011581119

VALUES ON THE DIAGNOSIS TOOL

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

Monitor item	Condition		Value/Status
MAIN SW	Ignition switch ON	When MAIN (ON/OFF) switch is pressed.	On
		When MAIN (ON/OFF) switch is not pressed.	Off
SET/COAST SW	Ignition switch ON	When SET/COAST switch is pressed.	On
		When SET/COAST switch is not pressed.	Off
CANCEL SW	Ignition switch ON	When CANCEL switch is pressed.	On
		When CANCEL switch is not pressed.	Off
RESUME/ACC SW	Ignition switch ON	When RESUME/ACCELERATE switch is pressed.	On
		When RESUME/ACCELERATE switch is not pressed.	Off
DISTANCE SW	Ignition switch ON	When DISTANCE switch is pressed.	On
		When DISTANCE switch is not pressed.	Off
CRUISE OPE	Drive the vehicle and activate the vehicle-to-vehicle distance control mode	When ICC system is controlling.	On
		When ICC system is not controlling.	Off
BRAKE SW	Ignition switch ON	When brake or clutch pedal is depressed.	Off
		When brake or clutch pedal is not depressed.	On
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
SET DISTANCE	• Start the engine and turn the ICC system ON • Press the DISTANCE switch to change the vehicle-to-vehicle distance setting	When set to “long”	Long
		When set to “middle”	Mid
		When set to “short”	Short
CRUISE LAMP	Start the engine and press MAIN switch	ICC system ON (MAIN switch indicator ON).	On
		ICC system OFF (MAIN switch indicator OFF).	Off
OWN VHCL	**NOTE:** The item is indicated, but not monitored		Off
VHCL AHEAD	Drive the vehicle and activate the vehicle-to-vehicle distance control mode	When a vehicle ahead is detected (vehicle ahead detection indicator ON).	On
		When a vehicle ahead is not detected (vehicle ahead detection indicator OFF).	Off
ICC WARNING	Start the engine and press MAIN switch	When ICC system is malfunctioning (ICC system malfunction ON).	On
		When ICC system is normal (ICC system malfunction OFF).	Off

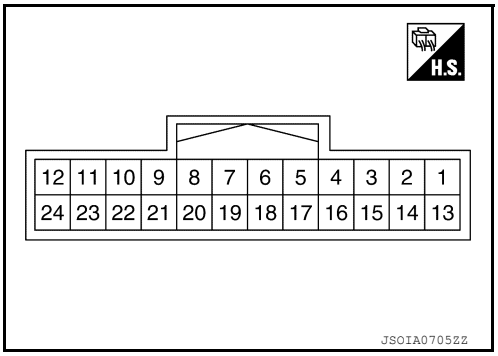
Monitor item	Condition		Value/Status
VHCL SPEED SE	While driving		Displays the vehicle speed calculated by ADAS control unit
SET VHCL SPD	While driving	When vehicle speed is set.	Displays the set vehicle speed
BUZZER O/P	Engine running	When the buzzer of the following system operates: • Vehicle-to-vehicle distance control mode. • PFCW system • FEB system	On
		When the buzzer of the following system not operates: • Vehicle-to-vehicle distance control mode • PFCW system • FEB system	Off
THRTL SENSOR	**NOTE:** The item is indicated, but not monitored.		0.0
ENGINE RPM	Engine running		Equivalent to tachometer reading
WIPER SW	Ignition switch ON	Wiper not operating.	Off
		Wiper LO operation.	Low
		Wiper HI operation.	High
YAW RATE	**NOTE:** The item is indicated, but not monitored.		0.0
BA WARNING	Engine running	FEB OFF indicator lamp ON. • When FEB system is malfunctioning. • When FEB system is turned to OFF.	On
		FEB OFF indicator lamp OFF. • When FEB system is normal. • When FEB system is turned to ON.	Off
STP LMP DRIVE	Drive the vehicle and activate the vehicle-to-vehicle distance control mode	When ICC brake hold relay is activated.	On
		When ICC brake hold relay is not activated.	Off
D POSITION SW	Engine running	When the selector lever is in “D” position or manual mode.	On
		When the selector lever is in any position other than “D” or manual mode.	Off
NP RANGE SW	Engine running	When the selector lever is in “N”, “P” position.	On
		When the selector lever is in any position other than “N”, “P”.	Off
PKB SW	Ignition switch ON	When the parking brake is applied.	On
		When the parking brake is released.	Off
PWR SUP MONI	Engine running		Power supply voltage value of ADAS control unit
VHCL SPD AT	While driving		Value of CVT vehicle speed sensor signal
THRTL OPENING	Engine running	Depress accelerator pedal.	Displays the throttle position
GEAR	While driving		Displays the gear position

Monitor item	Condition		Value/Status
CLUTCH SW SIG	Ignition switch ON	When clutch or brake pedal is depressed.	On
		When clutch or brake pedal is not depressed.	Off
NP SW SIG	Ignition switch ON	When the shift lever is in neutral position.	On
		When the shift lever is in any position other than neutral.	Off
MODE SIG	Start the engine and press MAIN switch	When ICC system is deactivated.	Off
		When vehicle-to-vehicle distance control mode is activated.	ICC
		When conventional (fixed speed) cruise control mode is activated.	ASCD
SET DISP IND	• Drive the vehicle and activate the conventional (fixed speed) cruise control mode • Press SET/COAST switch	SET switch indicator ON.	On
		SET switch indicator OFF.	Off
DISTANCE	Drive the vehicle and activate the vehicle-to-vehicle distance control mode	When a vehicle ahead is detected.	Displays the distance from the preceding vehicle
		When a vehicle ahead is not detected.	0.0
RELATIVE SPD	Drive the vehicle and activate the vehicle-to-vehicle distance control mode	When a vehicle ahead is detected.	Displays the relative speed.
		When a vehicle ahead is not detected.	0.0
ON ROOT GUIDE	**NOTE:** The item is indicated, but not monitored.		Off
FCW SYSTEM ON	Ignition switch ON	When the PFCW system is ON.	On
		When the PFCW system is OFF.	Off
Shift position	• Engine running • While driving		Displays the shift position
Turn signal	Turn signal lamps OFF.		Off
	Turn signal lamp LH blinking.		LH
	Turn signal lamp RH blinking.		RH
	Turn signal lamp LH and RH blinking.		LH&RH
SIDE G	While driving	Vehicle turning right.	Negative value
		Vehicle turning left.	Positive value
FUNC ITEM	Ignition switch ON		FUNC3
FUNC ITEM (FCW)	Engine running		On
FUNC ITEM (BSW)	Engine running		On
FUNC ITEM (NV-ICC)	**NOTE:** The item is indicated, but not monitored		Off
FCW SELECT	Ignition switch ON	“Forward Emergency Braking” set with the integral switch is ON.	On
		“Forward Emergency Braking” set with the integral switch is OFF.	Off
BSW SELECT	Ignition switch ON	“Blind Spot Warning” set with the integral switch is ON.	On
		“Blind Spot Warning” set with the integral switch is OFF.	Off
NAVI ICC SELECT	**NOTE:** The item is indicated, but not monitored.		Off
SYS SELECTABILITY	Ignition switch ON	Items set with the integral switch can be switched normally.	On
		Items set with the integral switch cannot be switched normally.	Off

Monitor item	Condition		Value/Status
BSW WARN LMP	Engine running	When the BSW system is malfunctioning.	On
		When the BSW system is normal.	Off
BSW SYSTEM ON	Ignition switch ON	When the BSW system is ON.	On
		When the BSW system is OFF.	Off
FCW SYSTEM ON	Engine running	When the FEB/PFCW system is ON.	On
		When the FEB/PFCW system is OFF.	Off
BATTERY CIRCUIT OFF	**NOTE:** The item is indicated, but not used.		Off
SYSTEM CANCEL MESSAGE	Engine running	System cancel display ON.	On
		System cancel display OFF.	Off
BSW ON INDICATOR	Engine running	BSW system display ON.	On
		BSW system display OFF.	Off
SIDE RADAR BLOCK COND	Engine running	Front bumper or side radar is dirty.	On
		Front bumper and side radar is clean.	Off
BSW IND BRIGHT-NESS	Ignition switch ON	BSW system OFF.	Nothing
		Blind Spot Warning indicator brightness bright.	Bright
		Blind Spot Warning indicator brightness normal.	Normal
		Blind Spot Warning indicator brightness dark.	Dark
SL MAIN SW	Engine running	When speed limiter MAIN switch is pressed.	On
		When speed limiter MAIN switch is not pressed.	Off
FUNC ITEM (FEB)	Engine running		On
FEB SELECT	Ignition switch ON	“Forward Emergency Braking” set with the integral switch is ON.	On
		“Forward Emergency Braking” set with the integral switch is OFF.	Off
FEB SW	Engine running	FEB system ON.	On
		FEB system OFF.	Off
SL TARGET VEHI-CLE SPEED	While driving	When vehicle speed is set.	Displays the set vehicle speed
SL SET LAMP	• Drive the vehicle and activate the speed limiter • Press speed limiter MAIN switch	Speed limiter SET indicator ON.	On
		Speed limiter SET indicator OFF.	Off
SL LIMIT LAMP	• Drive the vehicle and activate the speed limiter • Press speed limiter MAIN switch	Speed limiter system ON.	On
		Speed limiter system OFF.	Off
ASCD CANCEL (LOW SPEED)	Drive the vehicle and activate the ASCD	ASCD cancelled by low vehicle speed.	On
		Other than above.	Off
ASCD CANCEL (SPEED DIFF)	Drive the vehicle and activate the ASCD	ASCD cancelled by difference between set speed and vehicle speed.	On
		Other than above.	Off
KICK DOWN	Drive the vehicle and activate the speed limiter	When accelerator pedal is full depressed.	On
		Other than above.	Off

TERMINAL LAYOUT

PHYSICAL VALUES



Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	−	Signal name	Input/ Output			
1 (B)	Ground	Ground	Input	—		0 V
2 (L)		ITS communication-High	—	—		—
3 (LG)		Ignition power supply	Input	Ignition switch ON		Battery voltage
4 (V)		Warning buzzer signal	Output	Ignition switch ON	Warning buzzer operation	Battery voltage
					Warning buzzer not operating	0 V
5 (Y)		ITS communication-Low	—	—		—
6 (Y)		3rd CAN Low	Input	—		—
9 (L)		CAN high	—	—		—
10 (P)		CAN low	—	—		—
14 (L)		ICC brake hold relay drive signal	Output	Ignition switch ON	—	Battery voltage
18 (L)		3rd CAN High	Input	—	—	0 V

Fail-safe (ADAS Control Unit)

INFOID:0000000011581120

If a malfunction occurs in each system, ADAS control unit cancels each control, sounds a beep, and turns ON the warning or indicator lamp.

System	Buzzer	Warning lamp/Warning display	Description
Intelligent Cruise Control (ICC)	High-pitched tone	ICC system warning	Cancel
Forward Emergency Braking (FEB)	High-pitched tone	FEB warning lamp (Yellow)	Cancel
Predictive Forward Collision Warning (PFCW)	High-pitched tone	FEB warning lamp (Yellow)	Cancel
Blind Spot Warning (BSW)	Low-pitched tone	BSW system warning	Cancel
Rear Cross Traffic Alert (BSW)	—	BSW system warning	Cancel

DTC Inspection Priority Chart

INFOID:0000000011581121

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

Priority	Detected items (DTC)
1	• U1507: LOST COMM (SIDE RDR R) • U1508: LOST COMM (SIDE RDR L)
2	• U1000: CAN COMM CIRCUIT • U1321: CONFIGURATION
3	• C1A17: ICC SENSOR MALF • C1B53: SIDE RDR R MALF • C1B54: SIDE RDR L MALF
4	• C1A01: POWER SUPPLY CIR • C1A02: POWER SUPPLY CIR 2 • C1A13: STOP LAMP RLY FIX • C1A14: ECM CIRCUIT • C1A34: COMMAND ERROR • U0121: VDC CAN CIR 2 • U0235: ICC SENSOR CAN CIRC 1 • U0401: ECM CAN CIR 1 • U0402: TCM CAN CIR 1 • U0415: VDC CAN CIR 1 • U0433: ICC SENSOR CAN CIRC 2 • U1503: SIDE RDR L CAN CIR 2 • U1504: SIDE RDR L CAN CIR 1 • U1505: SIDE RDR R CAN CIR 2 • U1506: SIDE RDR R CAN CIR 1
5	• C1A03: VHCL SPEED SE CIRC
6	• C1A00: CONTROL UNIT

DTC Index

INFOID:0000000011581122

Systems for fail-safe
- A: Intelligent Cruise Control (ICC)
- B: Forward Emergency Braking (FEB)
- C: Predictive Forward Collision Warning (PFCW)
- D: Blind Spot Warning (BSW)
- E: Rear Cross Traffic Alert (RCTA)

DTC	CONSULT display	Fail-safe	Reference
CONSULT		System	
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED	NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED	—	—
U1507	LOST COMM (SIDE RDR R)	D, E	DAS-81
U1508	LOST COMM (SIDE RDR L)	D, E	DAS-82
U1000[NOTE]	CAN COMM CIRCUIT	A, B, C, D, E	DAS-70
U1321	CONFIGURATION	A, B, C, D, E	DAS-73
C1A17	ICC SENSOR MALF	A, B, C	DAS-54
C1B53	SIDE RDR R MALF	D, E	DAS-58
C1B54	SIDE RDR L MALF	D, E	DAS-59
C1A01	POWER SUPPLY CIR	A, B, C, D, E	DAS-44
C1A02	POWER SUPPLY CIR 2	A, B, C, D, E	DAS-44

Systems for fail-safe
- A: Intelligent Cruise Control (ICC)
- B: Forward Emergency Braking (FEB)
- C: Predictive Forward Collision Warning (PFCW)
- D: Blind Spot Warning (BSW)
- E: Rear Cross Traffic Alert (RCTA)

DTC	CONSULT display	Fail-safe	Reference
CONSULT		System	
C1A13	STOP LAMP RLY FIX	A, B, C	DAS-47
C1A14	ECM CIRCUIT	A, B, C	DAS-54
C1A34	COMMAND ERROR	A, B, C	DAS-57
U0121	VDC CAN CIR 2	A, B, C, D, E	DAS-60
U0235	ICC SENSOR CAN CIRC 1	A, C, D, E	DAS-62
U0401	ECM CAN CIR 1	A, B, C, D, E	DAS-63
U0402	TCM CAN CIR 1	A, B, C, D, E	DAS-65
U0415	VDC CAN CIR 1	A, B, C, D, E	DAS-67
U0433	ICC SENSOR CAN CIRC 2	A, B, C	DAS-69
U1503	SIDE RDR L CAN CIR 2	D, E	DAS-73
U1504	SIDE RDR L CAN CIR 1	D, E	DAS-75
U1505	SIDE RDR R CAN CIR 2	D, E	DAS-77
U1506	SIDE RDR R CAN CIR 1	D, E	DAS-79
C1A03	VHCL SPEED SE CIRC	D, E	DAS-45
C1A00	CONTROL UNIT	A, B, C, D, E	DAS-43

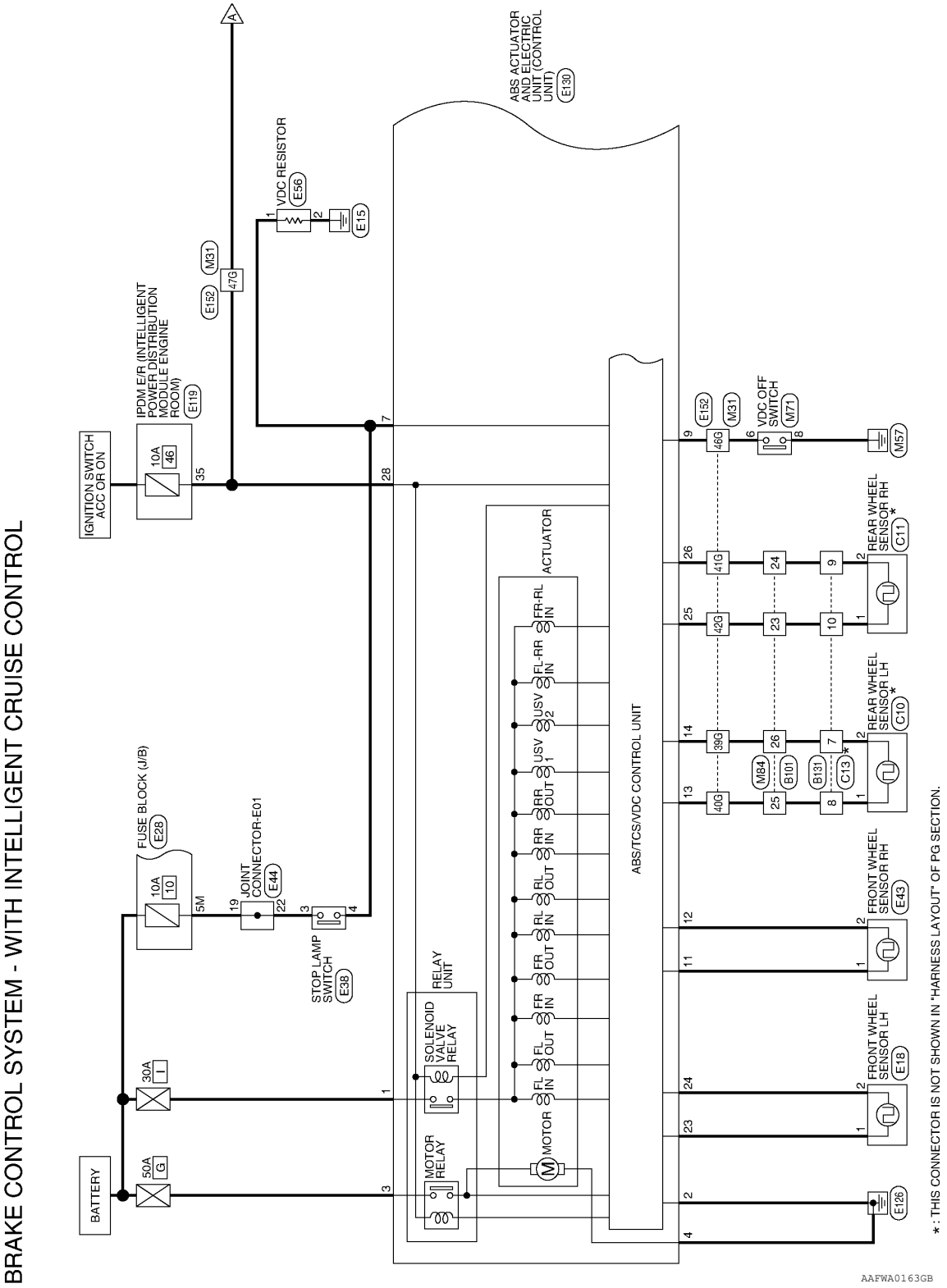
NOTE:
With the detection of “U1000” some systems do not perform the fail-safe operation.
A system controlling based on a signal received from the control unit performs fail-safe operation when the communication with the ADAS control unit becomes inoperable.

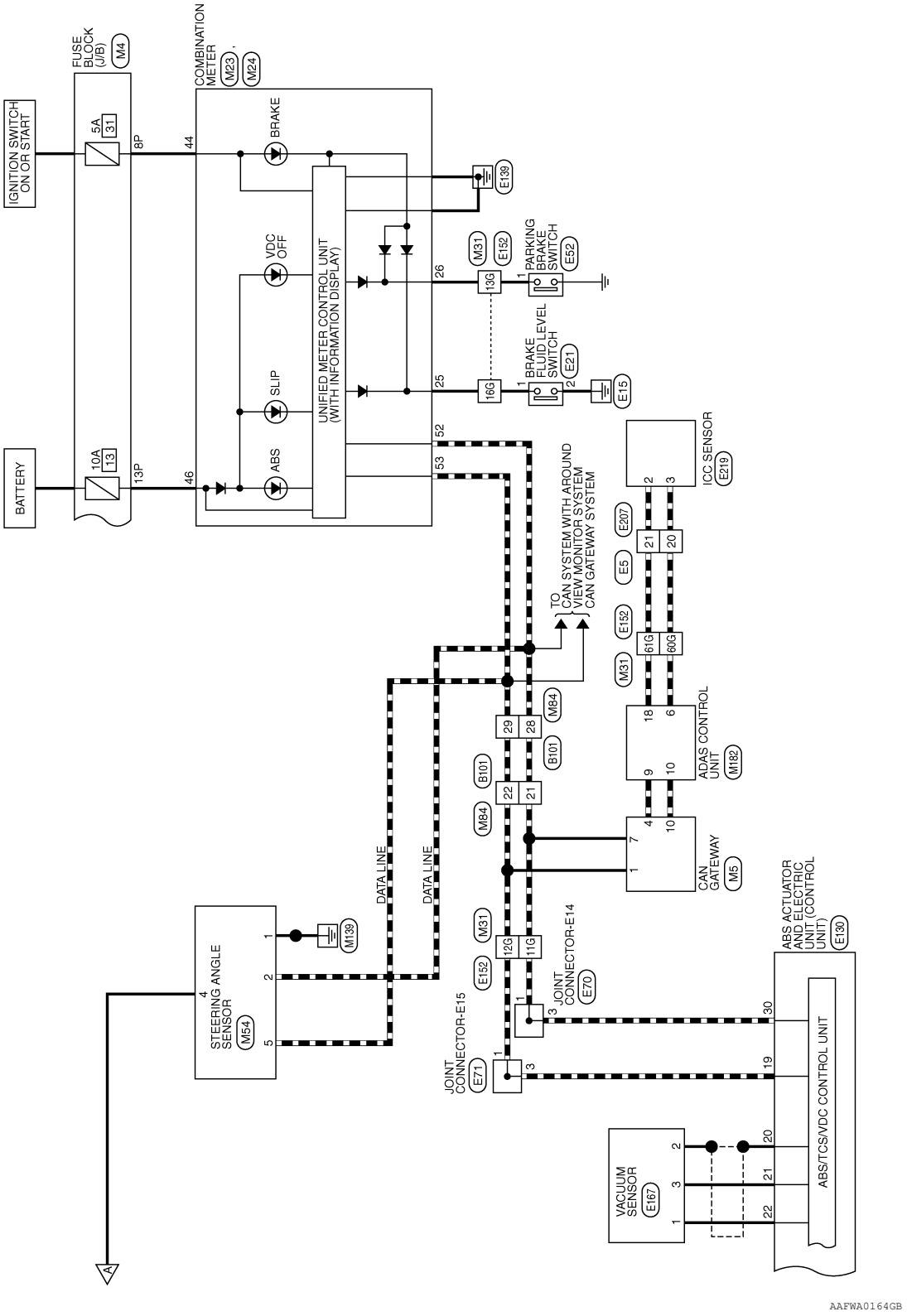
WIRING DIAGRAM

BRAKE CONTROL SYSTEM

Wiring Diagram

INFOID:0000000011568141




IGNITION SWITCH ON OR START
BATTERY
FUSE BLOCK (J/B) M4
5A 31
10A 13
8P
13P
COMBINATION METER M23, M24
BRAKE
VDC OFF
SLIP
ABS
UNIFIED METER CONTROL UNIT (WITH INFORMATION DISPLAY)
44
46
52
53
26
25
E139
M31
E152
13G
PARKING BRAKE SWITCH
E52
16G
BRAKE FLUID LEVEL SWITCH
E21
E15
ICC SENSOR
E219
E207
E5
61G
60G
TO CAN SYSTEM WITH AROUND VIEW MONITOR SYSTEM CAN GATEWAY SYSTEM
M84
B101
29
28
22
21
ADAS CONTROL UNIT
M182
CAN GATEWAY
M5
DATA LINE
DATA LINE
STEERING ANGLE SENSOR
M54
M139
12G
11G
JOINT CONNECTOR-E14
E70
JOINT CONNECTOR-E15
E71
ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
E130
ABS/TCS/VDC CONTROL UNIT
30
19
20
21
22
VACUUM SENSOR
E167
AAFWA0164GB

BRAKE CONTROL SYSTEM - WITH INTELLIGENT CRUISE CONTROL CONNECTORS

Connector No.	M4
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
8P	BG	–
13P	W	–

Connector No.	M5
Connector Name	CAN GATEWAY
Connector Color	WHITE

H.S.

1	2	3	4	5	6
7	8	9	10	11	12

Terminal No.	Color of Wire	Signal Name
1	L	–
4	L	–
7	P	–
10	P	–

Connector No.	M23
Connector Name	COMBINATION METER
Connector Color	WHITE

H.S.

41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56

Terminal No.	Color of Wire	Signal Name
43	B	GND1
44	BG	POWER (IGN)
45	B	GND2
46	W	POWER (BAT)
52	P	CAN-L
53	L	CAN-H

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

H.S.

																		1G	2G	3G	4G	5G
																		6G	7G	8G	9G	10G
11G	12G	13G	14G	15G	16G	17G	18G	19G	20G	21G												
22G	23G	24G	25G	26G	27G	28G	29G	30G														
31G	32G	33G	34G	35G	36G	37G	38G	39G	40G	41G												
42G	43G	44G	45G	46G	47G	48G	49G	50G														
51G	52G	53G	54G	55G	56G	57G	58G	59G	60G	61G												
62G	63G	64G	65G	66G	67G	68G	69G	70G														
71G	72G	73G	74G	75G	76G	77G	78G	79G	80G	81G												
82G	83G	84G	85G	86G	87G	88G	89G	90G														
																		91G	92G	93G	94G	95G
																		96G	97G	98G	99G	100G

Terminal No.	Color of Wire	Signal Name
11G	P	–
12G	L	–
13G	BR	–
16G	G	–
39G	W	–
40G	B	–
41G	P	–
42G	V	–
46G	P	–
47G	G	–
60G	P	–
61G	L	–

Connector No.	M24
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
25	G	BRAKE OIL SW
26	BR	PKB SW

AAFIA0335GB

Connector No.	M54
Connector Name	STEERING ANGLE SENSOR
Connector Color	WHITE

H.S.

1	2	3	4
5	6	7	8

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

Connector No.	M71
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	P	–
8	B	–

Connector No.	M84
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

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

Terminal No.	Color of Wire	Signal Name
21	P	–
22	L	–
23	V	–
24	P	–
25	B	–
26	W	–
28	P	–
29	L	–

Connector No.	M182
Connector Name	ADAS CONTROL UNIT
Connector Color	WHITE

H.S.

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

Terminal No.	Color of Wire	Signal Name
6	Y	CAN-L
9	L	CAN-H
10	P	CAN-L
18	Y	CAN-H

Connector No.	E5
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	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name
20	P	CAN-L
21	L	CAN-H

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

H.S.

1	2

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

AAFIA0336GB

Connector No.	E21
Connector Name	BRAKE FLUID LEVEL SWITCH
Connector Color	GRAY

H.S.

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

Connector No.	E28
Connector Name	FUSE BLOCK (J/B)
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
5M	W	–

Connector No.	E38
Connector Name	STOP LAMP SWITCH
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
3	W	–
4	G	–

Connector No.	E43
Connector Name	FRONT WHEEL SENSOR RH
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	L	–
2	Y	–

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

H.S.

Terminal No.	Color of Wire	Signal Name
19	W	–
22	W	–

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

H.S.

Terminal No.	Color of Wire	Signal Name
1	LG	–

AAFIA0337GB

Connector No.	E56
Connector Name	VDC RESISTOR
Connector Color	BROWN

H.S.

Terminal No.	Color of Wire	Signal Name
1	G	–
2	B	–

Connector No.	E70
Connector Name	JOINT CONNECTOR-E14
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	P	–
3	P	–

Connector No.	E71
Connector Name	JOINT CONNECTOR-E15
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	L	–
3	L	–

Connector No.	E119
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
35	BR	ABS ECU

AAFIA0338GB

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

H.S.

Terminal No.	Color of Wire	Signal Name
11G	P	–
12G	L	–
13G	LG	–
16G	W	–
39G	SB	–
40G	R	–
41G	SB	–
42G	V	–
46G	R	–
47G	BR	–
60G	P	–
61G	L	–

Terminal No.	Color of Wire	Signal Name
19	L	CAN-H
20	SHIELD	GND EXT
21	B	U5V EXT
22	W	VAC
23	G	WSP FL
24	W	WSS FL
25	V	WSP RR
26	SB	WSS FR
27	–	–
28	BR	WAU
29	–	–
30	P	CAN-L
31	–	–
32	–	–
33	–	–
34	–	–
35	–	–
36	–	–
37	–	–
38	–	–

Connector No.	E130
Connector Name	ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	R	UB VR
2	B	GND ECU
3	W	UB MR
4	B/W	GND MR
5	–	–
6	–	–
7	G	BLS
8	–	–
9	R	VDC OFF
10	–	–
11	L	WSP FR
12	Y	WSS FR
13	R	WSP RL
14	SB	WSS RL
15	–	–
16	–	–
17	–	–
18	–	–

AAFIA0339GB

Connector No.	E167
Connector Name	VACUUM SENSOR
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	W	–
2	SHIELD	–
3	B	–

Connector No.	E207
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
20	Y	CAN-L
21	L	CAN-H

Connector No.	E219
Connector Name	ICC SENSOR
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
2	L	CAN-H
3	L/R	CAN-L

Connector No.	C10
Connector Name	REAR WHEEL SENSOR LH
Connector Color	BLACK

H.S.

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

Connector No.	C11
Connector Name	REAR WHEEL SENSOR RH
Connector Color	GRAY

H.S.

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

Connector No.	C13
Connector Name	WIRE TO WIRE
Connector Color	BLACK

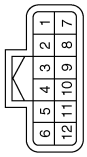
H.S.

Terminal No.	Color of Wire	Signal Name
7	W	–
8	B	–
9	P	–
10	V	–

AAFIA0340GB

Connector No.	B131
Connector Name	WIRE TO WIRE
Connector Color	BLACK

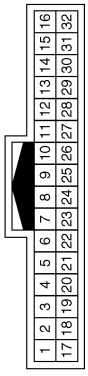
H.S.



Terminal No.	Color of Wire	Signal Name
7	W	–
8	B	–
9	P	–
10	V	–

Connector No.	B101
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.



Terminal No.	Color of Wire	Signal Name
21	P	–
22	L	–
23	V	–
24	P	–
25	B	–
26	W	–
28	P	–
29	L	–

AAFIA0341GB

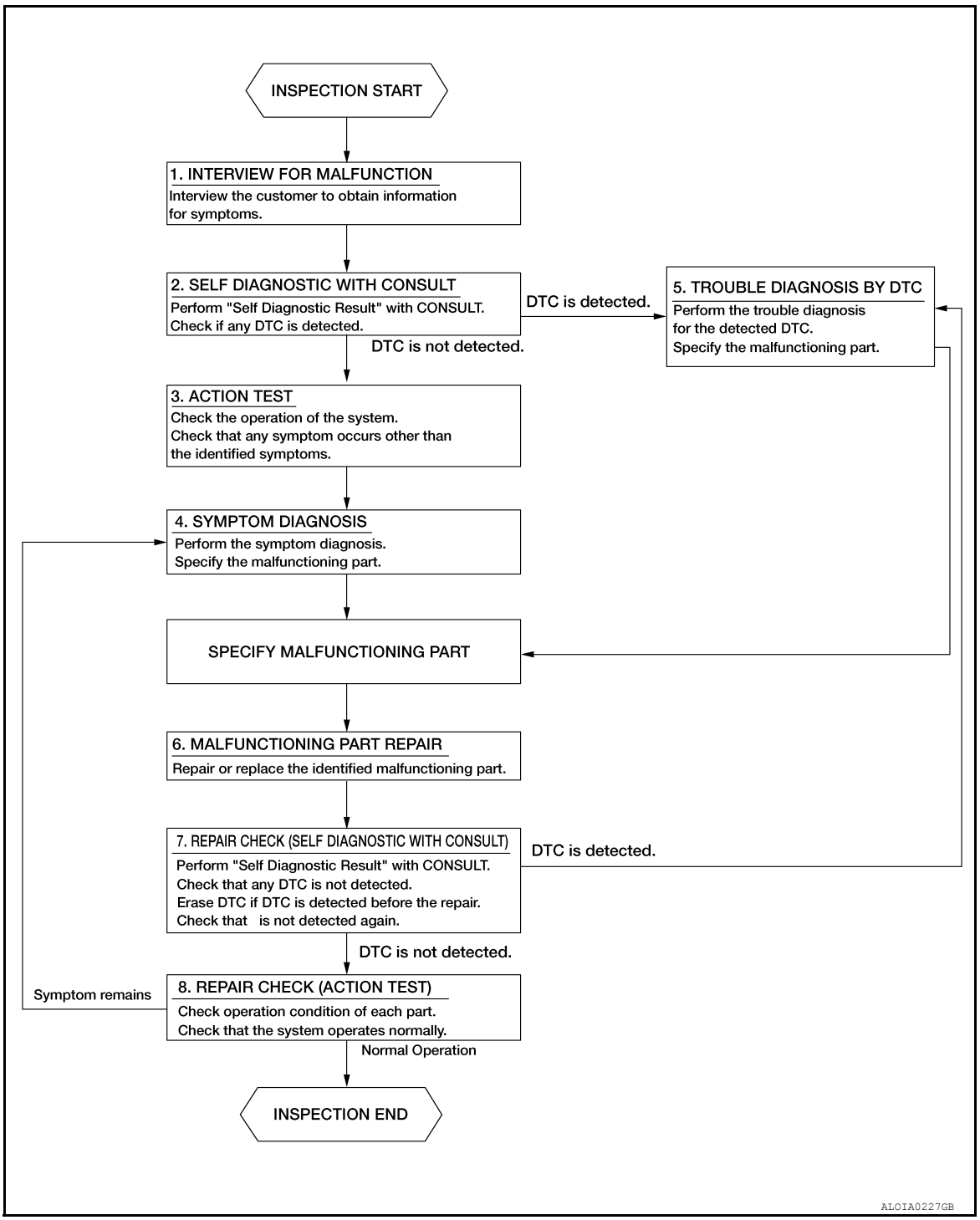
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORK FLOW

Work Flow

INFOID:0000000011583466

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 DIAGNOSTIC RESULT WITH CONSULT

1. Perform “All DTC Reading” with CONSULT.
2. Check if the DTC is detected on the “Self Diagnostic Result” 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-294, "Symptom Table".

>> GO TO 6.

5.TROUBLE DIAGNOSIS BY DTC

1. Check the DTC in the “Self-Diagnostic Result”.
2. Perform trouble diagnosis for the detected DTC. Refer to BRC-198, "DTC Index".

>> GO TO 6.

6.MALFUNCTIONING PART REPAIR

Repair or replace the identified malfunctioning parts.

>> GO TO 7.

7.REPAIR CHECK (SELF DIAGNOSTIC RESULT WITH CONSULT)

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

Is any DTC detected?

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

8.REPAIR CHECK (ACTION TEST)

Perform the FEB 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 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Description

INFOID:0000000011804833

- When replacing the ABS actuator and electric unit (control unit), perform configuration of the ABS actuator and electric unit (control unit). Refer to BRC-224, "Work Procedure".
- When replacing the ABS actuator and electric unit (control unit), adjust the neutral position of steering angle sensor. Refer to BRC-220, "Work Procedure".
- When replacing the ABS actuator and electric unit (control unit), perform calibration of the decel G sensor. Refer to BRC-222, "Work Procedure".

ADDITIONAL SERVICE WHEN REPLACING ICC SENSOR

Description

INFOID:0000000011583489

- Always perform the radar alignment aiming adjustment after removing and installing or replacing the ICC sensor.
  CAUTION:
  The system does not operate normally unless the ICC sensor is aligned properly.
- Perform the ICC system action test to check that the ICC system operates normally.

Work Procedure

INFOID:0000000011583490

1.RADAR ALIGNMENT ADJUSTMENT

Adjust the radar alignment. Refer to BRC-228, "Description".

>> GO TO 2.

2.ICC SYSTEM ACTION TEST

1. Perform the ICC system action test. Refer to CCS-78, "Description".
2. Check that the ICC system operates normally.

>> Inspection End.

ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Description

INFOID:0000000011804834

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	×
Changing tires to new ones	—
Tire rotation	—
Adjusting wheel alignment	×

Work Procedure

INFOID:0000000011804835

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 DIAGNOSTIC RESULT 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-39, "CONSULT Function".

• ECM: Refer to EC-71, "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:0000000011804836

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:0000000011804837

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.**

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

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 RESULT MEMORY

CONSULT
Erase “Self Diagnostic 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:0000000011804839

CAUTION:
- **Use "Manual Configuration" only when "TYPE ID" of ABS actuator and electric unit (control unit) cannot be read.**
- **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. CHECKING TYPE ID (1)

Use FAST (service parts catalog) to search ABS actuator and electric unit (control unit) of the applicable vehicle and find "Type ID".

>> Print out "Type ID" and GO TO 2.

2. CHECKING TYPE ID (2)

CONSULT Configuration
1. Select "Before Replace ECU" of "Read/Write Configuration".
2. Check that "Type ID" is displayed on the CONSULT screen.

Is "Type ID" displayed?

YES >> GO TO 3.
NO >> Configuration must be performed manually. GO TO 7.

3. VERIFYING TYPE ID (1)

CONSULT Configuration
Compare the "Type ID" displayed on the CONSULT screen with the one found using the FAST (service parts catalog) to confirm that they match.
NOTE:
Use the last five digits of the "Type ID" found using the FAST (service parts catalog).

Do the "Type IDs" match?

YES >> GO TO 4.
NO >> Configuration must be performed manually. GO TO 7.

4. SAVING TYPE ID

CONSULT Configuration
Save "Type ID" on CONSULT.

>> GO TO 5.

5. REPLACING ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) (1)

Replace ABS actuator and electric unit (control unit). Refer to BRC-311, "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 6.

6. WRITING (AUTOMATIC WRITING)

CONSULT Configuration
1. Select "After Replace ECU" of "Read / Write Configuration".

2. Select the “Type ID” that matches the one stored on CONSULT and the one found using the FAST (service parts catalog) to write the “Type ID” into the ABS actuator and electric unit (control unit).
NOTE:
Use the last five digits of the “Type ID” found using the FAST (service parts catalog).

>> GO TO 9.

7. REPLACING ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) (2)

Replace ABS actuator and electric unit (control unit). Refer to BRC-311, "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 8.

8. WRITING (MANUAL WRITING)

CONSULT Configuration
1. Select “Manual Configuration”.
2. Select the “Type ID” found using the FAST (service parts catalog) to write the “Type ID” into the ABS actuator and electric unit (control unit).
NOTE:
Use the last five digits of the “Type ID” found using the FAST (service parts catalog).

>> GO TO 9.

9. VERIFYING TYPE ID (2)

Compare the “Type ID” written into the ABS actuator and electric unit (control unit) with the one found using the FAST (service parts catalog) to confirm they match.
NOTE:
Use the last five digits of the “Type ID” found using the FAST (service parts catalog).

>> GO TO 10.

10. CHECKING 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.
CAUTION:
Do not start the engine.

Is the inspection result normal?

YES >> GO TO 11.
NO >> Perform self-diagnosis of “ABS”. Refer to BRC-183, "CONSULT Function".

11. PERFORMING SUPPLEMENTARY WORK

1. Perform air bleeding. Refer to BR-16, "Bleeding Brake System".
2. Perform adjustment of steering angle sensor neutral position. Refer to BRC-220, "Work Procedure".
3. Perform calibration of decel G sensor. Refer to BRC-222, "Work Procedure".
4. Perform self-diagnosis of all systems.
5. Erase self-diagnosis results.

>> Work End.

ICC SENSOR INITIAL VERTICAL ALIGNMENT

Description

INFOID:0000000011779903

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 ICC SENSOR INITIAL ALIGNMENT PROCEDURE

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

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

1. Required tools, refer to BRC-226, "Required Tools".
2. Preparation, refer to BRC-226, "Preparation".
3. ICC sensor initial vertical alignment, refer to BRC-227, "ICC Sensor Initial Vertical Alignment".

CAUTIONARY POINT FOR DISTANCE SENSOR ALIGNMENT PROCEDURE

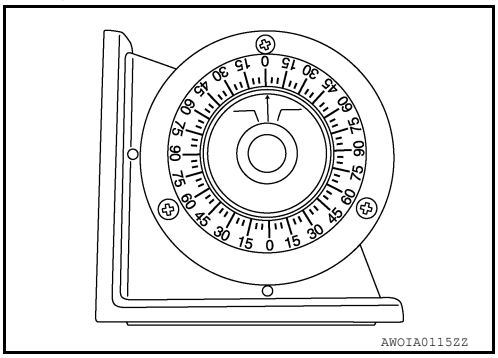
CAUTION:
- **For Distance sensor alignment procedure, choose a level location with a few feet of working space in front and surrounding the vehicle.**
- **Vehicle must be stationary and unoccupied during the whole alignment procedure.**
- **Never enter the vehicle during ICC sensor alignment.**
- **For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

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

Required Tools

INFOID:0000000011779904

The following tool is necessary to perform the ICC sensor initial vertical alignment:
- Small level or angle meter.



Preparation

INFOID:0000000011779905

1. PREPARATION FOR ICC SENSOR INITIAL VERTICAL ALIGNMENT PROCEDURE

1. Verify correct vehicle suspension height. Refer to FSU-26, "Wheelarch Height (Unladen*)".
2. Repair or replace any damaged body components.
3. Verify proper tire inflation pressures. Refer to WT-74, "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.

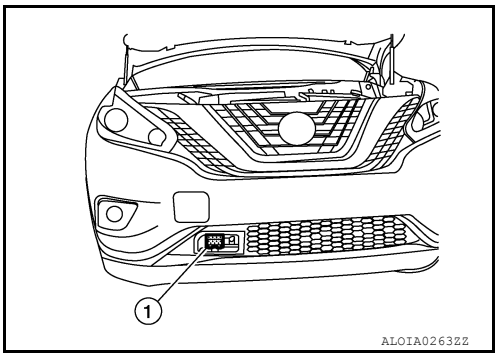
>> Refer to BRC-227, "ICC Sensor Initial Vertical Alignment".

ICC Sensor Initial Vertical Alignment

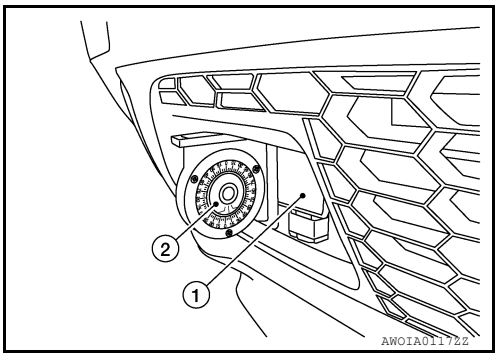
INFOID:0000000011779906

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

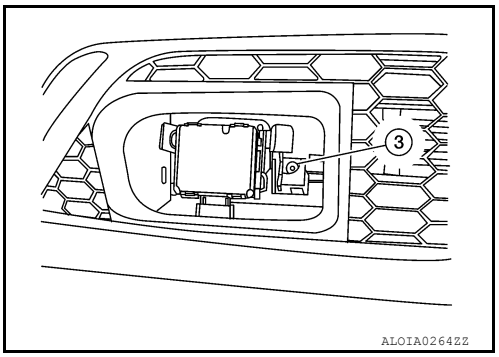
1. The ICC sensor (1) is located near the right front head lamp behind the front bumper fascia.



2. Place the small level or angle meter (2) against the face of the ICC sensor (1).



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



4. Ensure the ICC sensor electrical connector located on the bottom of the sensor is connected.
5. Perform the ICC sensor alignment procedure. Refer to BRC-228, "Description".

ICC SENSOR ALIGNMENT

Description

INFOID:0000000011863831

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 ICC SENSOR ALIGNMENT PROCEDURE

- A 4-wheel vehicle alignment must be performed before proceeding with ICC sensor alignment procedure.
- Always perform the ICC sensor alignment after removing and installing or replacing the ICC sensor.
- If the ICC sensor was removed and installed or replaced, first perform ICC Sensor Initial Vertical Alignment, refer to BRC-226, "Description".

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

1. Required tools, refer to BRC-228, "Required Tools".
2. Preparation, refer to BRC-229, "Preparation".
3. Vehicle set up, refer to BRC-230, "Vehicle Set Up".
4. Setting the ICC target board, refer to BRC-232, "Setting The ICC Target Board".
5. ICC sensor adjustment, refer to BRC-233, "ICC Sensor Adjustment".

CAUTIONARY POINT FOR ICC SENSOR ALIGNMENT PROCEDURE

CAUTION:

- **For ICC 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.**
- **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 ICC target board must be set in front of the vehicle facing the sensor.**
- **Adjust the ICC sensor alignment with CONSULT. (The ICC sensor alignment procedure cannot be adjusted without CONSULT.)**
- **Never enter the vehicle during ICC sensor alignment.**
- **Never block the area between the ICC sensor and the ICC target board at any time during the alignment process.**
- **Never break the laser beam between the laser assembly and front ICC 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 ICC 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.**

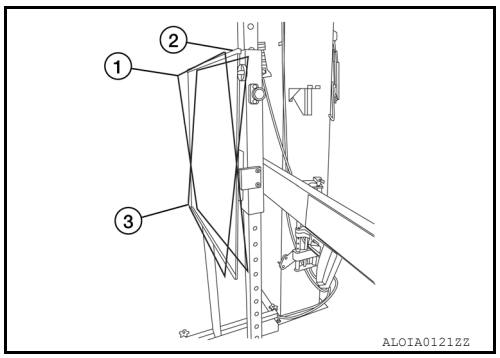
Required Tools

INFOID:0000000011863832

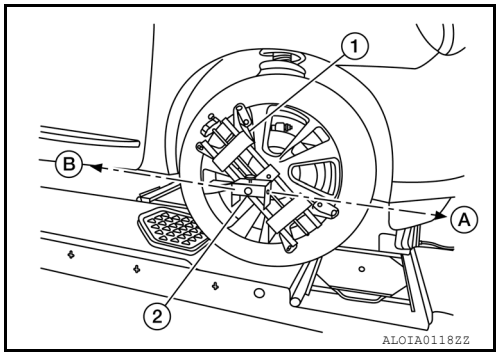
- ICC alignment kit 1-20-2721-1-IF in addition to one of the following:
  a) Hunter self-centering wheel adapter (Hunter wheel alignment tool)
  b) Special Service Tool kit 1-20-2722-1-IF (kit SCA W/Tire Clamp-ICC Aiming)

The following ICC alignment kit 1-20-2721-1-IF is necessary to perform the ICC sensor alignment:

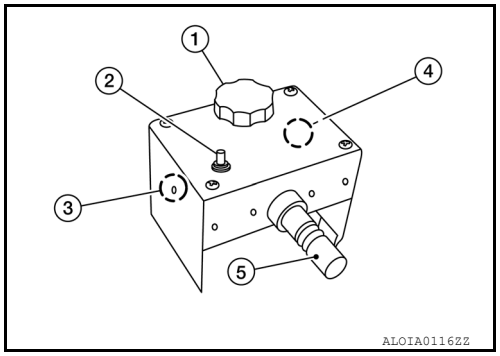
- ICC target board.
- Position 1, with top tilted 2° toward vehicle (1).
- Position 2, vertical (2).
- Position 3, with top tilted 2° away from vehicle (3).



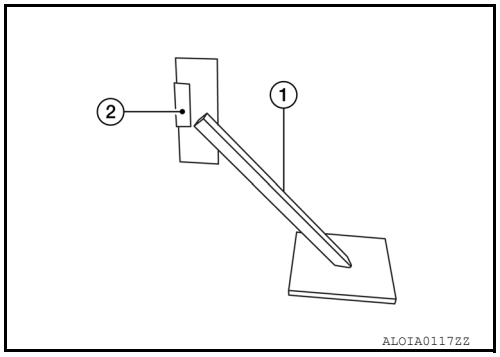
- Hunter self-centering wheel adapter (1) [shown with laser assembly (2) installed] (Hunter alignment rack head may be substituted).
NOTE:
Retailers that are not equipped with a Hunter self-centering wheel adapter will require the following kit:
Part No. 1-20-2722-1-IF (kit SCA W/Tire Clamp-ICC Aiming)



- 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).

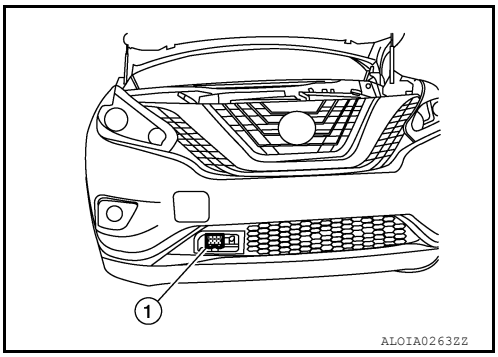
Preparation

INFOID:0000000011863833

1. ADVANCE PREPARATION FOR ICC SENSOR ALIGNMENT PROCEDURE

1. Adjust all tire pressure 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 front of the ICC sensor.

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



1 : ICC sensor

>> Refer to BRC-230, "Vehicle Set Up".

Vehicle Set Up

INFOID:0000000011863834

DESCRIPTION

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

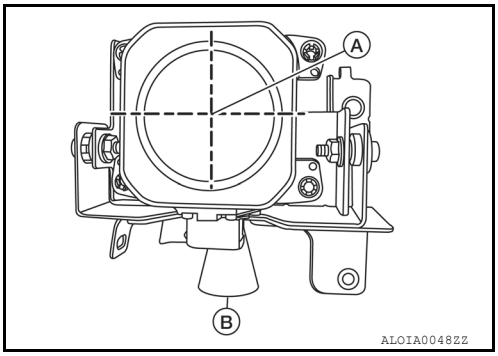
CAUTION:

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

1.PREPOSITION TARGET BOARD

NOTE:

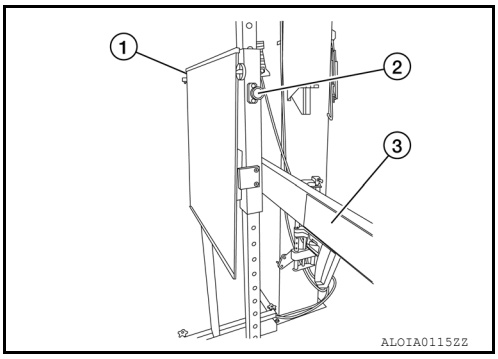
- The center of the sensor wave axis (A) is located at the center of the front lens.



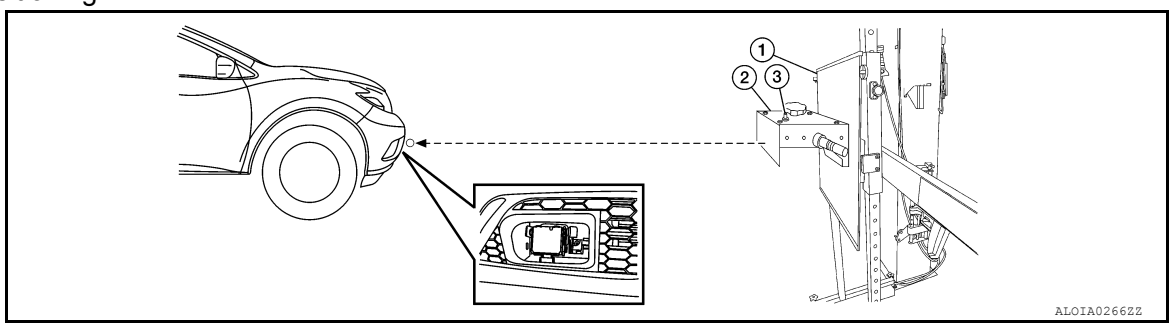
B : Up-down direction adjusting screw

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

1. Position the ICC 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 ICC target board (1) 1200 mm (47.2 in.) ± 625 mm(24.6 in) facing the ICC sensor.
- Adjust the height of the ICC target board using the adjustable nut (2) to achieve the proper height. The up/down tolerance is ± 80 mm (3.15 in).
- Adjust the ICC target board lateral position aligning the marked center of the board horizontally with the center of the ICC sensor front lens. The right/left tolerance is ± 80 mm (3.15 in).
2. Extend the machined arm of the ICC 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 ICC 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 ICC sensor.
5. Move the ICC target board (1) as necessary so that center of ICC target board aligns with center of ICC sensor.
6. Turn the laser assembly OFF when done.

Are you using Hunter alignment equipment?

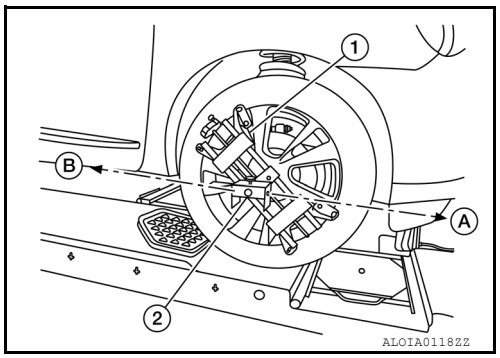
YES >> Refer to Hunter's equipment instructions for complete vehicle set up and ICC target board setting. Then, refer to BRC-233, "ICC Sensor Adjustment".

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.

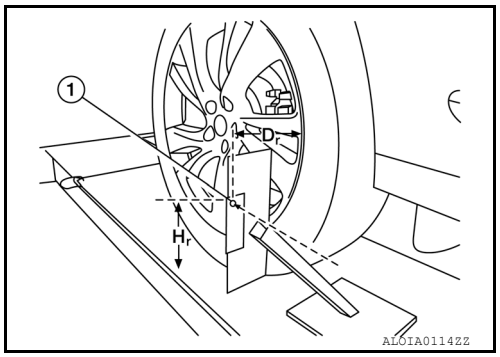
1. Install the wheel adapter (1) on the right front wheel.
2. Mount the laser assembly (2) to the wheel adapter (1) as shown in the figure.
   NOTE:
   When the power switch is turned ON, the front laser signal (A) will be emitted toward the front ICC target board, and the rear laser signal (B) will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



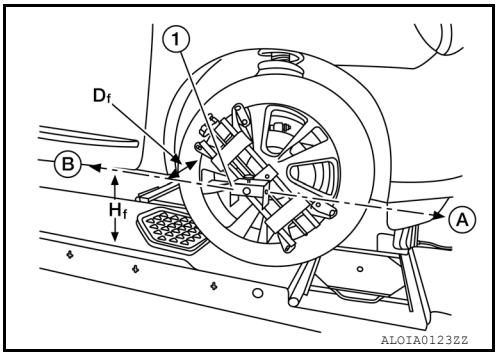
>> GO TO 3.

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-232, "Setting The ICC Target Board".

Setting The ICC Target Board

INFOID:0000000011863835

DESCRIPTION

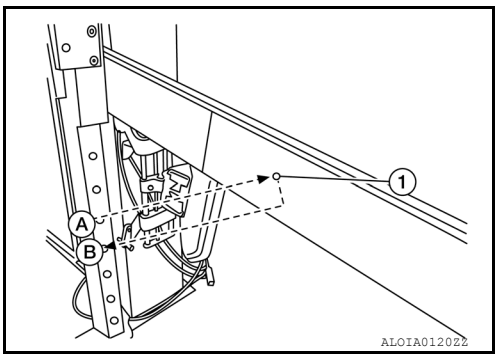
Accurate adjustment of the ICC sensor alignment requires that the ICC target board be accurately positioned.

CAUTION:

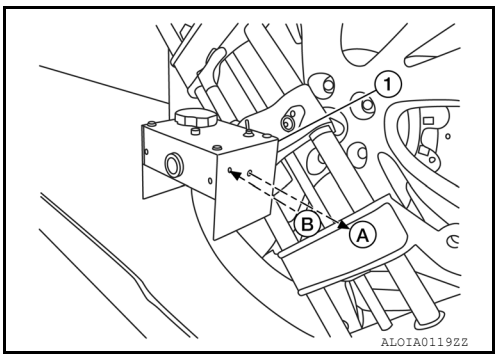
If the ICC sensor alignment is adjusted with the ICC target board in the incorrect position, the ICC system will not function properly or the alignment procedure may not be completed successfully.

1.ICC TARGET BOARD FINAL SETTING

1. With the ICC 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 ICC target board to achieve the necessary horizontal adjustment.
3. Adjust the ICC target board leveling screws to achieve the necessary vertical adjustment.



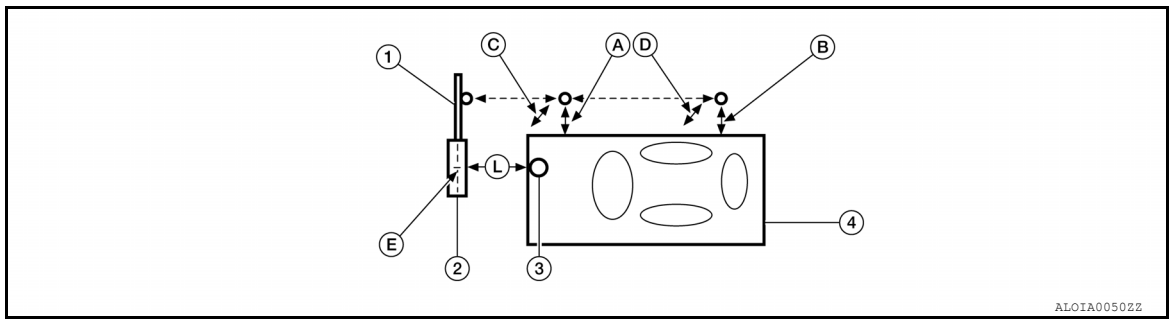
4. The figure shown illustrates the laser beam (A) emitted by the laser assembly (1) and its reflection (B) off of the ICC target board arm.



>> GO TO 2.

2.CHECK THE POSITION OF THE ICC TARGET BOARD

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



1. ICC target board arm
2. ICC target board
3. ICC 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. ICC target board center position (Position 2)
L. 1 - 1.5 m (39.3 - 59 in.)

>> Refer to BRC-233, "ICC Sensor Adjustment".

ICC Sensor Adjustment

INFOID:0000000011863836

DESCRIPTION

- Adjust the ICC sensor alignment in a vertical direction with CONSULT as per the following.
- The ICC sensor alignment in the horizontal direction is performed automatically and cannot be adjusted manually.

CAUTION:

- **Never look directly into or block the ICC sensor source (between the front fascia and ICC target board) during the ICC sensor alignment procedure.**
- **Perform all necessary work for ICC sensor alignment procedure until the adjustment completes as shown in the procedure. If the procedure is started but not completed, the ICC system is rendered inoperable.**

1.SET CONSULT TO THE ICC SENSOR ALIGNMENT MODE

1. Place ignition switch in the ON position.
2. Connect CONSULT and select “LASER/RADAR”, then “Work support”.
3. Select “RADAR Alignment”.
4. Select “Start” after the “RADAR Alignment” screen is displayed.

NOTE:

If the adjustment screen does not appear or an error appears within approximately 10 seconds after “RADAR Alignment” is selected, the following causes are possible.

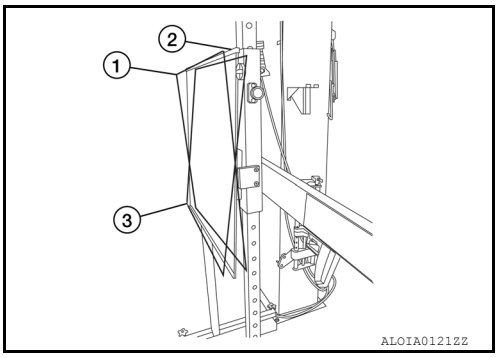
- The ICC target board is not installed in the correct position.
- Adequate space is not secured around the ICC target board.
- The ICC sensor alignment procedure exceeds its proper installation range.
  - Deformation of vehicle body.
  - Deformation of unit.
  - Deformation of bracket.
- The area is not suitable for the adjustment work.
- Right front side of fascia (ICC sensor view) is not clean.
- The ICC system warning lamp illuminates.
- Battery voltage is low.
- The extended arm and mirror are not stationary.

>> GO TO 2.

2.ICC SENSOR ALIGNMENT

1. Once the ICC sensor alignment procedure is started, you will be prompted by the CONSULT for the next instruction.
2. Follow all the instructions exactly as requested by the CONSULT which will include the following:

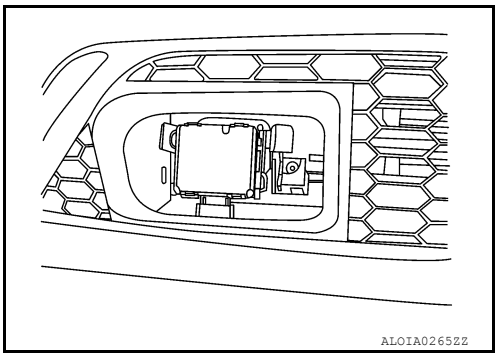
- Adjust ICC target board to position 1 (top tilted toward vehicle)
- Adjust ICC target board to position 2 (vertical position)
- Adjust ICC target board to position 3 (top tilted away from vehicle)



3. You will be prompted with specific instructions to perform physical adjustment to the sensor which may include turning the adjustment screw by a certain number of turns in increments of 0.25 in either direction.

NOTE:
The CONSULT is not live and will not automatically update while turning the tool.

CAUTION:
Be careful not to cover the right front side of the fascia (ICC sensor view) with a hand or any other body part during adjustment.



>> GO TO 3.

3. ICC SENSOR ALIGNMENT CONFIRMATION

1. When the “U/D CORRECT” value is executed and the "ADJ VALUE" has been performed, touch "END".
2. When “COMPLETED THE VERTICAL AIMING OF LASER BEAM” display appears, touch “END”.
   CAUTION:
   Always check that the value of “U/D CORRECT” remains accurate (within specification) when the ICC sensor is left alone for at least 2 seconds.
3. Check that “ADJUSTING AUTOMATIC HORIZONTAL LASER BEAM AIMING” is displayed and wait for a short period of time. (The maximum: Approx. 10 seconds).
4. Check that “Normally Completed” is displayed, and select “End” to end “RADAR Alignment”.
   CAUTION:
   Once “RADAR Alignment” is started with CONSULT, always continue the work until the ICC sensor alignment is completed successfully. If the job is stopped midway, the ICC sensor alignment is not completed and the ICC system is rendered inoperative.
5. Confirm proper ICC sensor alignment by following CONSULT steps until it shows "ADJ VALUE" to be 0.00 turn.

>> Alignment End.

ACTION TEST

Description

INFOID:0000000011583477

- Perform action test to verify the customer's concern.
- Perform action test and check the system operation after system diagnosis.

Inspection Procedure

INFOID:0000000011583478

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

C1101, C1102, C1103, C1104 WHEEL SENSOR

DTC Logic

INFOID:0000000011742524

DTC DETECTION LOGIC

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

DTC	Display item	Malfunction detected condition	Possible cause	
			Past DTC	Current DTC
C1101	RR RH SENSOR-1	• When power supply voltage of rear wheel sensor RH is low. • When an open or shorted circuit is detected in rear wheel sensor RH circuit.	• Low battery voltage • Harness or connector	• Low battery voltage • Harness or connector • Wheel sensor • ABS actuator and electric unit (control unit)
C1102	RR LH SENSOR-1	• When power supply voltage of rear wheel sensor LH is low. • When an open or shorted circuit is detected in rear wheel sensor LH circuit.		
C1103	FR RH SENSOR-1	• When power supply voltage of front wheel sensor RH is low. • When an open or shorted circuit is detected in front wheel sensor RH circuit.		
C1104	FR LH SENSOR-1	• When power supply voltage of front wheel sensor LH is low. • When an open or shorted circuit is detected in front wheel sensor LH circuit.		

DTC CONFIRMATION PROCEDURE

1.CHECK SELF DIAGNOSTIC RESULT

1. Start engine and drive vehicle at approximately 21 km/h (13 MPH) or more for approximately 5 minutes.
2. Check for DTC using CONSULT.

Is the DTC detected?

YES (Current DTC)>>Refer to BRC-236, "Diagnosis Procedure".
YES (Past DTC)>>GO TO 2.
NO >> Inspection End.

2.ERASE SELF DIAGNOSTIC RESULT

Erase the DTC using CONSULT.

Can the DTC be erased?

YES >> Inspection End.
NO >> Refer to BRC-236, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000011742525

Regarding Wiring Diagram information, refer to BRC-52, "Wiring Diagram".

CAUTION:
Do not check between wheel sensor terminals.

1.CONFIRM DTC

With CONSULT
1. Perform “Self Diagnostic Result” of “ABS” and record all active DTCs.
2. Clear all DTCs.
3. Perform DTC confirmation procedure. Refer to BRC-236, "DTC Logic".

Does DTC C1101, C1102, C1103 or C1104 reset?

YES >> GO TO 2.
NO >> Refer to GI-42, "Intermittent Incident".

2.INSPECT WHEEL SENSOR

Inspect the suspect wheel sensor for damage or deformation.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace as necessary.

3.HARNESS AND CONNECTOR INSPECTION

1. Disconnect ABS actuator and electric unit (control unit) connector E130 and wheel sensor connector of suspect wheel.
2. Check harness, connectors and terminals for corrosion, deformation, disconnection, looseness or damage. Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace as necessary.

4.CHECK WHEEL SENSOR OUTPUT SIGNAL

1. Connect ABS active wheel sensor tester (J-45741) to wheel sensor using appropriate adapter.
2. Turn on the ABS active wheel sensor tester power switch.
   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.
3. 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 5.
NO >> Replace the wheel sensor. Refer to BRC-137, "FRONT WHEEL SENSOR : Removal and Installation" or BRC-139, "REAR WHEEL SENSOR : Removal and Installation".

5.CHECK WIRING HARNESS FOR SHORT TO VOLTAGE

1. Turn ignition switch ON.
2. Check voltage between wheel sensor harness connector terminals of suspect wheel and ground.

Wheel Sensor			Ground	Voltage
Wheel	Connector	Terminal		
Front LH	E18	1	—	0V
		2		
Front RH	E43	1		
		2		
Rear LH	C10	1		
		2		
Rear RH	C11	1		
		2		

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair the circuit.

6.CHECK WIRING HARNESS FOR SHORT TO GROUND

1. Turn ignition switch OFF.
2. Check continuity between wheel sensor harness connector terminals of suspect wheel and ground.

Wheel Sensor			Ground	Continuity
Wheel	Connector	Terminal		
Front LH	E18	1	—	No
		2		
Front RH	E43	1		
		2		
Rear LH	C10	1		
		2		
Rear RH	C11	1		
		2		

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair the circuit.

7.CHECK WIRING HARNESS FOR SHORT BETWEEN CIRCUITS

Check continuity between wheel sensor harness connector terminals of suspect wheel.

Wheel Sensor		(+)	(-)	Continuity
Wheel	Connector	Terminal	Terminal	
Front LH	E18	1	2	No
Front RH	E43			
Rear LH	C10			
Rear RH	C11			

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair the circuit.

8.CHECK WIRING HARNESS FOR OPEN CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) connector E130 and wheel sensor connector of wheel with DTC.

Wheel sensor	ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
	Connector	Terminal	Connector	Terminal	
Front LH	E130	24	E18	2	Yes
		23		1	
Front RH		12	E43	2	
		11		1	
Rear LH		14	C10	2	
		13		1	
Rear RH		26	C11	2	
		25		1	

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair the circuit.

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

1. Turn ignition switch ON.
2. Check voltage between ABS actuator and electric unit (control unit) harness connector E130 terminal 28 and ground.

ABS actuator and electric unit (control unit)		Ground	Condition	Voltage (Approx.)
Connector	Terminal			
E130	28	—	Ignition switch ON	Battery voltage
			Ignition switch OFF	0V

Is the inspection result normal?

YES >> GO TO 10.
NO >> Check the following:
- 10A fuse No. 46 located in the IPDM E/R
- Harness between ABS actuator and electric unit (control unit) and IPDM E/R

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

1. Turn ignition switch OFF.
2. Check continuity between ABS actuator and electric unit (control unit) connector E130 terminals 4,2 and ground.

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E130	4	Ground	Yes
	2		

Is the inspection result normal?

YES >> GO TO 11.
NO >> Repair or replace malfunctioning components.

11. CHECK WHEEL SENSOR INPUT VOLTAGE

1. Connect ABS actuator and electric unit (control unit) connector E130.
2. Turn ignition switch ON.
3. Check voltage between suspect wheel sensor harness connector terminals.

Wheel Sensor		(+)	(-)	Voltage (Approx.)
Wheel	Connector	Terminal	Terminal	
Front LH	E18	1	2	Battery voltage
Front RH	E43			
Rear LH	C10			
Rear RH	C11			

Is the inspection result normal?

YES >> Replace wheel sensor. Refer to BRC-137, "FRONT WHEEL SENSOR : Removal and Installation" or BRC-138, "REAR WHEEL SENSOR : Exploded View". Then, GO TO 12.
NO >> Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".

12. CONFIRM REPAIR

With CONSULT
1. Clear all DTCs.
2. Perform DTC confirmation procedure. Refer to BRC-236, "DTC Logic".

Does DTC C1101, C1102, C1103 or C1104 reset?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".

NO >> Inspection End.

C1105, C1106, C1107, C1108 WHEEL SENSOR

DTC Logic

INFOID:0000000011742526

DTC DETECTION LOGIC

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

DTC	Display item	Malfunction detected condition	Possible cause	
			Past DTC	Current DTC
C1105	RR RH SENSOR-2	• When distance between rear wheel sensor RH and rear wheel sensor RH rotor is large. • When installation of rear wheel sensor RH or rear wheel sensor RH rotor is not normal.	• Tire size • Contamination on sensor rotor • Position of sensor rotor and wheel sensor • Harness or connector • Vehicle has been operated on a 2-wheel dynamometer or towed using a 2 wheel dolly • Wheel speed sensor mounting bolt loose	• Tire size • Contamination on sensor rotor • Position of sensor rotor and wheel sensor • Harness or connector • Wheel sensor • Sensor rotor • ABS actuator and electric unit (control unit) • Vehicle has been operated on a 2-wheel dynamometer or towed using a 2 wheel dolly • Wheel speed sensor mounting bolt loose
C1106	RR LH SENSOR-2	• When distance between rear wheel sensor LH and rear wheel sensor LH rotor is large. • When installation of rear wheel sensor LH or rear wheel sensor LH rotor is not normal.		
C1107	FR RH SENSOR-2	• When distance between front wheel sensor RH and front wheel sensor RH rotor is large. • When installation of front wheel sensor RH or front wheel sensor RH rotor is not normal.		
C1108	FR LH SENSOR-2	• When distance between front wheel sensor LH and front wheel sensor LH rotor is large. • When installation of front wheel sensor LH or front wheel sensor LH rotor is not normal.		

DTC CONFIRMATION PROCEDURE

1.CHECK SELF DIAGNOSTIC RESULT

1. Start engine and drive vehicle at approximately 21 km/h (13 MPH) or more for approximately 5 minutes.
2. Check for DTC using CONSULT.

Is the DTC detected?

YES (Current DTC)>>Refer to BRC-241, "Diagnosis Procedure".
YES (Past DTC)>>GO TO 2.
NO >> Inspection End.

2.ERASE SELF DIAGNOSTIC RESULT

Erase the DTC using CONSULT.

Can the DTC be erased?

YES >> Inspection End.
NO >> Refer to BRC-241, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000011742527

Regarding Wiring Diagram information, refer to BRC-52, "Wiring Diagram".

CAUTION:
Do not check between wheel sensor terminals.

1.CONFIRM DTC

With CONSULT
1. Perform “Self Diagnostic Result” of “ABS” and record all active DTCs.
2. Clear all DTCs.
3. Perform DTC confirmation procedure. Refer to BRC-241, "DTC Logic".

Does DTC C1105, C1106, C1107 or C1108 reset?

YES >> GO TO 2.
NO >> Refer to GI-42, "Intermittent Incident".

2.CHECK TIRE PRESSURE AND TIRE WEAR

Check tires for excessive wear and proper inflation. Refer to WT-64, "Inspection".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace as necessary.

3.CHECK WHEEL SENSOR OUTPUT SIGNAL

1. Connect ABS active wheel sensor tester (J-45741) to wheel sensor using appropriate adapter.
2. Turn on the ABS active wheel sensor tester power switch.
   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.
3. 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 6.
NO >> GO TO 4.

4.CHECK WHEEL SENSOR

Check wheel sensor for the following:
- Proper installation
- Physical damage
- Contamination

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace as necessary. Refer to BRC-306, "FRONT WHEEL SENSOR : Removal and Installation" or BRC-308, "REAR WHEEL SENSOR : Removal and Installation".

5.CHECK SENSOR ROTOR

Check sensor rotor for the following:
- Contamination
- Physical damage (missing teeth, cracks, etc.)
- Foreign material
- Looseness

Is the inspection result normal?

YES >> Replace the wheel sensor. Refer to BRC-137, "FRONT WHEEL SENSOR : Removal and Installation" or BRC-139, "REAR WHEEL SENSOR : Removal and Installation". Then, GO TO 6.
NO >> Repair or replace as necessary.

6.CONFIRM REPAIR

With CONSULT
1. Clear all DTCs.
2. Perform DTC confirmation procedure. Refer to BRC-241, "DTC Logic".

Does DTC C1105, C1106, C1107 or C1108 reset?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".

NO >> Inspection End.

C1109 POWER AND GROUND SYSTEM

DTC Logic

INFOID:0000000011742540

DTC DETECTION LOGIC

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

DTC	Display item	Malfunction detected condition	Possible cause	
			Past DTC	Current DTC
C1109	BATTERY VOLTAGE [ABNORMAL]	• When ignition voltage is 10 V or less. • When ignition voltage is 16 V or more.	• Battery • Harness or connector • Intermittent incident	• Fuse • Battery • Ignition power supply system • Harness or connector • ABS actuator and electric unit (control unit) • Intermittent incident

DTC CONFIRMATION PROCEDURE

1.CHECK SELF DIAGNOSTIC RESULT

1. Turn ignition switch ON.
2. Check for DTC using CONSULT.

Is the DTC detected?

YES (Current DTC)>>Refer to BRC-244, "Diagnosis Procedure".
YES (Past DTC)>>GO TO 2.
NO >> Inspection End.

2.ERASE SELF DIAGNOSTIC RESULT

Erase the DTC using CONSULT.

Can the DTC be erased?

YES >> Inspection End.
NO >> Refer to BRC-244, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000011742541

Regarding Wiring Diagram information, refer to BRC-52, "Wiring Diagram".

1.CONNECTOR INSPECTION

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connectors.
3. Check connectors and terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace as necessary.

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

Check voltage between ABS actuator and electric unit (control unit) connector E130 terminal 28 and ground.

ABS actuator and electric unit (control unit)		Ground	Condition	Voltage
Connector	Terminal			

E130	28	—	Ignition switch ON	Battery voltage
			Ignition switch OFF	0V

Is the inspection result normal?

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

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

1. Turn ignition switch OFF.
2. Check continuity between ABS actuator and electric unit (control unit) connector E130 terminals 13, 38 and ground.

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E130	4	Ground	Yes
	2		

Is the inspection result normal?

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

4.INTERMITTENT CHECK

Check for intermittent incident. Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".
NO >> Repair or replace malfunctioning components.

C1111 PUMP MOTOR

DTC Logic

INFOID:0000000011675192

DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1111	PUMP MOTOR	Diagnosis condition	When ignition is ON.
		Signal (terminal)	Motor relay power supply (terminal 3) Motor relay ground circuit (terminals 4 and 2)
		Threshold	When a malfunction is detected in motor or motor relay
		Diagnosis delay time	—

POSSIBLE CAUSE

- Harness or connector
- ABS actuator and electric unit (control unit)
- Fusible link
- Battery power supply system

FAIL-SAFE

—

DTC CONFIRMATION PROCEDURE

1.CHECK SELF DIAGNOSTIC RESULT

With CONSULT

1. Turn ignition switch OFF.
2. Depress brake pedal 20 times or more.
3. Start the engine and wait for 3 minutes or more.
4. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC C1111 detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-246, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000011675193

Regarding Wiring Diagram information, refer to BRC-207, "Wiring Diagram" with ICC.

1.CONNECTOR INSPECTION

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connectors.
3. Check connectors and terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace as necessary.

2.CHECK ABS MOTOR AND MOTOR RELAY BATTERY POWER SUPPLY

Check voltage between ABS actuator and electric unit (control unit) connector E130 terminal 3 and ground.

ABS actuator and electric unit (control unit)		—	Voltage (Approx.)
Connector	Terminal		
E130	3	Ground	Battery voltage

Is the inspection result normal?

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

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

Check continuity between ABS actuator and electric unit (control unit) connector E130 terminals 4 and 2 and ground.

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E130	4	Ground	Yes
	2		

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".
NO >> Repair or replace harness.

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

DTC Logic

INFOID:0000000011675194

DTC DETECTION LOGIC

DTC No.	Display Item	DTC detection condition	
C1113	G SENSOR	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	—
		Threshold	When a malfunction is detected in longitudinal G sensor signal
		Diagnosis delay time	—
C1145	YAW RATE SENSOR	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	—
		Threshold	When a malfunction is detected in yaw rate signal. When yaw rate signal is not continuously received for 2 seconds or more When side G signal is not continuously received for 2 seconds or more When decel G signal is not continuously received for 2 seconds or more
		Diagnosis delay time	—
C1146	SIDE G-SEN CIRCUIT	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	—
		Threshold	When a malfunction is detected in side/decel G signal
		Diagnosis delay time	—

POSSIBLE CAUSE

- Harness or connector
- ABS actuator and electric unit (control unit)
- Fuse
- Yaw rate/side/decel G sensor

FAIL-SAFE

—

DTC CONFIRMATION PROCEDURE

1.CHECK SELF DIAGNOSTIC RESULT

With CONSULT

1. Turn ignition switch OFF to ON.
2. Perform “Self Diagnostic Result” mode of “ABS”.
3. Check DTC.

Is DTC C1113, C1145 or C1146 detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-248, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000011675195

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

Replace ABS actuator and electric unit (control unit).

>> Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".

C1115 ABS SENSOR [ABNORMAL SIGNAL]

DTC Logic

INFOID:0000000011742532

DTC DETECTION LOGIC

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

DTC	Display item	Malfunction detected condition	Possible cause	
			Past DTC	Current DTC
C1115	ABS SENSOR [ABNORMAL SIGNAL]	When difference in wheel speed between any wheel and others is detected while the vehicle is driven, because of installation of tires other than specified.	• Low battery voltage • Tire size • Contamination on sensor rotor • Position of sensor rotor and wheel sensor • Wheel sensor mounting bolts loose • Vehicle has been operated on 2-wheel dynamometer or towed using a 2-wheel dolly	• Low battery voltage • Tire size • Contamination on sensor rotor • Position of sensor rotor and wheel sensor • Harness or connector • Wheel sensor • Sensor rotor • ABS actuator and electric unit (control unit) • Wheel sensor mounting bolts loose • Vehicle has been operated on 2-wheel dynamometer or towed using a 2-wheel dolly

DTC CONFIRMATION PROCEDURE

1.CHECK SELF DIAGNOSTIC RESULT

1. Start engine and drive vehicle at approximately 21 km/h (13 MPH) or more for approximately 5 minutes.
2. Check for DTC using CONSULT.

Is the DTC detected?

YES (Current DTC)>>Refer to BRC-250, "Diagnosis Procedure".
YES (Past DTC)>>GO TO 2.
NO >> Inspection End.

2.ERASE SELF DIAGNOSTIC RESULT

Erase the DTC using CONSULT.

Can the DTC be erased?

YES >> Inspection End.
NO >> Refer to BRC-250, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000011742533

Regarding Wiring Diagram information, refer to BRC-52, "Wiring Diagram".

CAUTION:
Do not check between wheel sensor terminals.

1.CONNECTOR INSPECTION

1. Disconnect ABS actuator and electric unit (control unit) connector E130 and wheel sensor connector of wheel with DTC.
2. Check terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace as necessary.

2.CHECK WHEEL SENSOR OUTPUT SIGNAL

1. Connect ABS active wheel sensor tester (J-45741) to wheel sensor using appropriate adapter.
2. Turn on the ABS active wheel sensor tester power switch.
   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.
3. 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 5.
NO >> GO TO 3.

3.CHECK WHEEL SENSOR

Check wheel sensor for the following:
- Proper installation
- Physical damage
- Contamination

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace as necessary.

4.CHECK SENSOR ROTOR

Check sensor rotor for the following:
- Contamination
- Physical damage (missing teeth, cracks, etc.)
- Foreign material
- Looseness

Is the inspection result normal?

YES >> Replace the wheel sensor. Refer to BRC-137, "FRONT WHEEL SENSOR : Removal and Installation" or BRC-139, "REAR WHEEL SENSOR : Removal and Installation".
NO >> Repair or replace as necessary.

5.CHECK TIRES

Check the inflation pressure, wear and size of each tire.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Adjust tire pressure, or replace tire(s).

6.CHECK WIRING HARNESS FOR SHORT CIRCUIT

Check continuity between wheel sensor connector terminals and ground of wheel with DTC.

Wheel Sensor			Ground	Continuity
Wheel	Connector	Terminal		

Front LH	E18	1	—	No
		2		
Front RH	E43	1		
		2		
Rear LH	C10	1		
		2		
Rear RH	C11	1		
		2		

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair the circuit.

7. CHECK WIRING HARNESS FOR OPEN CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) connector E130 and wheel sensor connector of wheel with DTC.

Wheel sensor	ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
	Connector	Terminal	Connector	Terminal	
Front LH	E130	24	E18	2	Yes
		23		1	
Front RH		12	E43	2	
		11		1	
Rear LH		14	C10	2	
		13		1	
Rear RH		26	C11	2	
		25		1	

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".
NO >> Repair the circuit.

C1116 STOP LAMP SWITCH

DTC Logic

INFOID:0000000011742534

DTC DETECTION LOGIC

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

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF DIAGNOSTIC RESULT

1. Turn ignition switch ON.
2. Check for DTC using CONSULT.

Is the DTC detected?

YES (Current DTC)>>Refer to BRC-253, "Diagnosis Procedure".
YES (Past DTC)>>GO TO 2.
NO >> Inspection End.

2.ERASE SELF DIAGNOSTIC RESULT

Erase the DTC using CONSULT.

Can the DTC be erased?

YES >> Inspection End.
NO >> Refer to BRC-253, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000011742535

Regarding Wiring Diagram information, refer to BRC-52, "Wiring Diagram".

1.CONNECTOR INSPECTION

1. Disconnect stop lamp relay connector and ABS actuator and electric unit (control unit) connector.
2. Check terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace as necessary.

2.CHECK STOP LAMP SWITCH CIRCUIT

1. Connect stop lamp switch connector.
2. Check voltage between ABS actuator and electric unit (control unit) connector E130 terminal 7 and ground.

ABS actuator and electric unit (control unit)		Ground	Condition	Voltage (Approx.)
Connector	Terminal			
E130	7	—	Brake pedal depressed	Battery voltage
			Brake pedal released	0V

Is the inspection result normal?

YES >> Adjust stop lamp switch. Refer to BR-15, "Adjustment".
NO >> GO TO 3.

3.CHECK STOP LAMP SWITCH CIRCUIT FOR OPEN

1. Disconnect stop lamp switch connector.
2. Check continuity between ABS actuator and electric unit (control unit) connector E130 terminal 7 and stop lamp switch connector E38 terminal 4.

ABS actuator and electric unit (control unit)		Stop lamp switch		Continuity
Connector	Terminal	Connector	Terminal	
E130	7	E38	4	Yes

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace as necessary.

4.CHECK STOP LAMP SWITCH CIRCUIT FOR SHORT

Check continuity between ABS actuator and electric unit (control unit) connector E130 terminal 7 and ground.

ABS actuator and electric unit (control unit)		Ground	Continuity
Connector	Terminal		
E130	7	—	No

Is the inspection result normal?

YES >> Refer to BRC-60, "Work Flow".
NO >> Repair harness or connectors.

Component Inspection

INFOID:0000000011742536

1.CHECK STOP LAMP SWITCH

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

Stop lamp switch	Condition	Continuity
Terminal		
3 – 4	When stop lamp switch is pressed (When brake pedal is depressed)	Yes
	When stop lamp switch is released (When brake pedal is released)	No

Is the inspection result normal?

YES >> Inspection End.
NO >> Replace stop lamp switch. Refer to BR-20, "Exploded View".

C1120, C1122, C1124, C1126 ABS IN VALVE SYSTEM

DTC Logic

INFOID:0000000011675198

DTC DETECTION LOGIC

DTC No.	Display Item	DTC detection condition	
C1120	FR LH IN ABS SOL	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	—
		Threshold	When a malfunction is detected in front LH ABS IN valve
		Diagnosis delay time	—
C1122	FR RH IN ABS SOL	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	—
		Threshold	When a malfunction is detected in front RH ABS IN valve
		Diagnosis delay time	—
C1124	RR LH IN ABS SOL	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	—
		Threshold	When a malfunction is detected in rear LH ABS IN valve
		Diagnosis delay time	—
C1126	RR RH IN ABS SOL	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	—
		Threshold	When a malfunction is detected in rear RH ABS IN valve
		Diagnosis delay time	—

POSSIBLE CAUSE

- Harness or connector
- ABS actuator and electric unit (control unit)
- Fusible link
- Battery power supply system

FAIL-SAFE

—

DTC CONFIRMATION PROCEDURE

1.CHECK SELF DIAGNOSTIC RESULT

With CONSULT

1. Turn ignition switch OFF to ON.
2. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC C1120, C1122, C1124 or C1126 detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-255, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000011675199

Regarding Wiring Diagram information, refer to BRC-207, "Wiring Diagram".

1.CONNECTOR INSPECTION

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connectors.
3. Check connectors and terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace as necessary.

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

Check voltage between ABS actuator and electric unit (control unit) connector E130 terminal 1 and ground.

ABS actuator and electric unit (control unit)		—	Voltage (Approx.)
Connector	Terminal		
E130	1	Ground	Battery voltage

Is the inspection result normal?

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

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

Check continuity between ABS actuator and electric unit (control unit) connector E130 terminals 4 and 2 and ground.

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E130	4	Ground	Yes
	2		

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".
NO >> Repair or replace malfunctioning components.

C1121, C1123, C1125, C1127 ABS OUT VALVE SYSTEM

DTC Logic

INFOID:0000000011675200

DTC DETECTION LOGIC

DTC No.	Display Item	DTC detection condition	
C1121	FR LH OUT ABS SOL	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	—
		Threshold	When a malfunction is detected in front LH ABS OUT valve
		Diagnosis delay time	—
C1123	FR RH OUT ABS SOL	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	—
		Threshold	When a malfunction is detected in front RH ABS OUT valve
		Diagnosis delay time	—
C1125	RR LH OUT ABS SOL	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When a malfunction is detected in rear LH ABS OUT valve
		Diagnosis delay time	—
C1127	RR RH OUT ABS SOL	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	—
		Threshold	When a malfunction is detected in rear RH ABS OUT valve
		Diagnosis delay time	—

POSSIBLE CAUSE

- Harness or connector
- ABS actuator and electric unit (control unit)
- Fusible link
- Battery power supply system

FAIL-SAFE

—

DTC CONFIRMATION PROCEDURE

1.CHECK SELF DIAGNOSTIC RESULT

With CONSULT

1. Turn ignition switch OFF to ON.
2. Perform “Self Diagnostic Result” mode of “ABS”.
3. Check DTC.

Is DTC C1121, C1123, C1125 or C1127 detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-257, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000011675201

Regarding Wiring Diagram information, refer to BRC-207, "Wiring Diagram" (with ICC).

1.CONNECTOR INSPECTION

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connectors.
3. Check connectors and terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace as necessary.

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

Check voltage between ABS actuator and electric unit (control unit) connector E130 terminal 1 (with ICC) and ground.

ABS actuator and electric unit (control unit)		—	Voltage (Approx.)
Connector	Terminal		
E130	1	Ground	Battery voltage

Is the inspection result normal?

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

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

Check continuity between ABS actuator and electric unit (control unit) connector E130 terminals 4 and 2 (with ICC) and ground.

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E130	4	Ground	Yes
	2		

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".
NO >> Repair or replace malfunctioning components.

C1130 ENGINE SIGNAL

DTC Logic

INFOID:0000000011742530

DTC DETECTION LOGIC

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

DTC	Display item	Malfunction detected condition	Possible cause	
			Past DTC	Current DTC
C1130	ENGINE SIGNAL 1	When a malfunction is detected in ECM system.	• Low battery voltage • Harness or connector • CAN communication line	• Low battery voltage • CAN communication line • ECM • ABS actuator and electric unit (control unit)

DTC CONFIRMATION PROCEDURE

1. CHECK SELF DIAGNOSTIC RESULT

1. Turn ignition switch ON.
2. Check for DTC using CONSULT.

Is the DTC detected?

YES (Current DTC)>>Refer to BRC-259, "Diagnosis Procedure".
YES (Past DTC)>>GO TO 2.
NO >> Inspection End.

2. ERASE SELF DIAGNOSTIC RESULT

Erase the DTC using CONSULT.

Can the DTC be erased?

YES >> Inspection End.
NO >> Refer to BRC-259, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000011742531

1. CHECK SELF DIAGNOSTIC RESULT FOR ENGINE SYSTEM

With CONSULT.
Perform “Self Diagnostic Result”. Refer to EC-71, "CONSULT Function".

Are any ECM DTCs detected?

YES >> Refer to EC-107, "DTC Index".
NO >> GO TO 2.

2. CHECK SELF DIAGNOSTIC RESULT FOR ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

With CONSULT.
1. Perform “Self Diagnostic Result” and erase DTCs.
2. Turn ignition switch OFF.
3. Start engine and drive vehicle for a short period of time.
4. Check that malfunction indicator lamp (MIL) turns OFF.
5. Stop vehicle and perform “Self Diagnostic Result”.

Is DTC C1130 detected?

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

3. CHECK TERMINALS

Check pin terminals and connection of connectors for abnormal conditions.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace malfunctioning components.

4. CHECK SELF DIAGNOSTIC RESULT FOR ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

With CONSULT.

1. Perform “Self Diagnostic Result” and erase DTCs.
2. Turn ignition switch OFF.
3. Start engine and drive vehicle for a short period of time.
4. Check that malfunction indicator lamp (MIL) turns OFF.
5. Stop vehicle and perform “Self Diagnostic Result”.

Is DTC C1130 detected?

YES (Past DTC)>>Inspection End.

YES (Current DTC)>>Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".

NO >> Inspection End.

C1140 ACTUATOR RELAY SYSTEM

DTC Logic

INFOID:0000000011675204

DTC DETECTION LOGIC

DTC No.	Display Item	DTC detection condition	Possible causes
C1140	ACTUATOR RLY	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	—
		Threshold	When a malfunction is detected in actuator relay
		Diagnosis delay time	—

POSSIBLE CAUSE

- Harness or connector
- ABS actuator and electric unit (control unit)
- Fusible link
- Battery power supply system

FAIL-SAFE

—

DTC CONFIRMATION PROCEDURE

1.CHECK SELF DIAGNOSTIC RESULT

CONSULT

1. Turn ignition switch OFF to ON.
2. Perform “Self Diagnostic Result” mode of “ABS”.
3. Check DTC.

Is DTC C1140 detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-261, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000011675205

Regarding Wiring Diagram information, refer to BRC-207, "Wiring Diagram" (with ICC).

1.CONNECTOR INSPECTION

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connectors.
3. Check connectors and terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace as necessary.

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

Check voltage between ABS actuator and electric unit (control unit) connector E130 terminals 3 and 1 and ground.

ABS actuator and electric unit (control unit)		—	Voltage (Approx.)
Connector	Terminal		
E130	3	Ground	Battery voltage
	1		

Is the inspection result normal?

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

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

Check continuity between ABS actuator and electric unit (control unit) connector E130 terminals 4 and 2 and ground.

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E130	4	Ground	Yes
	2		

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".
NO >> Repair or replace malfunctioning components.

C1142 PRESS SENSOR

DTC Logic

INFOID:0000000011742528

DTC DETECTION LOGIC

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

DTC	Display item	Malfunction detected condition	Possible cause	
			Past DTC	Current DTC
C1142	PRESS SEN CIRCUIT	When a malfunction is detected in master cylinder pressure sensor.	• Harness or connector • Stop lamp switch system • Trapped air in hydraulic brake system	• Stop lamp switch system • Brake system • Trapped air in hydraulic brake system • ABS actuator and electric unit (control unit)

DTC CONFIRMATION PROCEDURE

1.CHECK SELF DIAGNOSTIC RESULT

1. Turn ignition switch ON.
2. Check for DTC using CONSULT.

Is the DTC detected?

YES (Current DTC)>>Refer to BRC-263, "Diagnosis Procedure".
YES (Past DTC)>>GO TO 2.
NO >> Inspection End.

2.ERASE SELF DIAGNOSTIC RESULT

Erase the DTC using CONSULT.

Can the DTC be erased?

YES >> Inspection End.
NO >> Refer to BRC-263, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000011742529

1.CHECK STOP LAMP SWITCH SYSTEM

Check stop lamp switch system. Refer to BRC-253, "Diagnosis Procedure".

Is the inspection result normal?

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

2.CHECK BRAKE FLUID LEAKAGE

Check brake fluid leakage. Refer to BR-8, "Inspection".

Is the inspection result normal?

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

3.CHECK BRAKE PEDAL AND ADJUST STOP LAMP SWITCH

Check brake pedal and adjust stop lamp switch. Refer to BR-15, "Adjustment".

Is the inspection result normal?

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

4.CHECK SELF DIAGNOSTIC RESULT

With CONSULT.
1. Turn ignition switch ON.

2. Perform “Self Diagnostic Result”.
3. Erase DTCs.
4. Start engine and drive vehicle for a short period of time.
5. Turn ignition switch ON.
6. Perform “Self Diagnostic Result”.

Is DTC C1142 detected?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".

NO >> Inspection End.

C1143 STEERING ANGLE SENSOR

DTC Logic

INFOID:0000000011675208

DTC DETECTION LOGIC

DTC No.	Display Item	DTC detection condition	
C1143	ST ANG SEN CIRCUIT	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	—
		Threshold	When a malfunction is detected in steering angle sensor
		Diagnosis delay time	—

POSSIBLE CAUSE

- Harness or connector
- ABS actuator and electric unit (control unit)
- Steering angle sensor
- Fuse
- Ignition power supply system
- CAN communication line

FAIL-SAFE

—

DTC CONFIRMATION PROCEDURE

1.CHECK SELF DIAGNOSTIC RESULT

CONSULT

1. Turn ignition switch OFF to ON.
2. Perform “Self Diagnostic Result” mode of “ABS”.
3. Check DTC.

Is DTC C1143 detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-265, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000011675209

Regarding Wiring Diagram information, refer to BRC-207, "Wiring Diagram".

1.CONNECTOR INSPECTION

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) and steering angle sensor connectors.
3. Check connectors and terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace as necessary.

2.CHECK STEERING ANGLE SENSOR MOUNTING CONDITION

Check steering angle sensor mounting condition.

Is the inspection result normal?

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

3.CHECK STEERING ANGLE SENSOR POWER SUPPLY

1. Turn ignition switch OFF.

2. Disconnect steering angle sensor connector.
3. Turn ignition switch ON.
4. Check voltage between steering angle sensor connector M54 terminal 4 and ground.

Steering angle sensor		—	Voltage (Approx.)
Connector	Terminal		
M54	4	Ground	Battery voltage

Is the inspection result normal?

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

4. CHECK STEERING ANGLE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector E119.
3. Check continuity between steering angle sensor connector M54 terminal 4 and IPDM E/R connector E119 terminal 35.

Steering angle sensor		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
M54	4	E119	35	Yes

4. Check continuity between steering angle sensor connector M54 terminal 4 and ground.

Steering angle sensor		—	Continuity
Connector	Terminal		
M54	4	Ground	No

Is the inspection result normal?

YES >> Perform trouble diagnosis for ignition power supply.
NO >> Repair or replace malfunctioning components.

5. CHECK STEERING ANGLE SENSOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check continuity between steering angle sensor connector M54 terminal 1 and ground.

Steering angle sensor		—	Continuity
Connector	Terminal		
M54	1	Ground	Yes

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace malfunctioning components.

6. CHECK CAN COMMUNICATION LINE

Check “STRG BRANCH LINE CIRCUIT”. Refer to LAN-136, "Diagnosis Procedure" (Type 1) or LAN-154, "Diagnosis Procedure" (Type 2).

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".
NO >> Repair or replace malfunctioning components.

C1144 INCOMPLETE STEERING ANGLE SENSOR ADJUSTMENT

DTC Logic

INFOID:0000000011675210

DTC DETECTION LOGIC

DTC No.	Display Item	DTC detection condition	
C1144	ST ANG SEN SIGNAL	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	—
		Threshold	When neutral position adjustment of steering angle sensor is not complete
		Diagnosis delay time	—

POSSIBLE CAUSE

- Harness or connector
- ABS actuator and electric unit (control unit)
- Steering angle sensor
- Incomplete neutral position adjustment of steering angle sensor

FAIL-SAFE

—

DTC CONFIRMATION PROCEDURE

1.CHECK SELF DIAGNOSTIC RESULT

CONSULT

1. Turn ignition switch OFF to ON.
2. Perform “Self Diagnostic Result” mode of “ABS”.
3. Check DTC.

Is DTC C1144 detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-267, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000011675211

1.ADJUST THE NEUTRAL POSITION OF STEERING ANGLE SENSOR

Perform neutral position adjustment of steering angle sensor. Refer to BRC-267, "Diagnosis Procedure".

>> GO TO 2.

2.CHECK SELF DIAGNOSTIC RESULT

CONSULT

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

Is DTC C1144 detected?

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

3.CHECK STEERING ANGLE SENSOR SYSTEM

Check steering angle sensor system. Refer to BRC-265, "Diagnosis Procedure".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".
NO >> Repair or replace malfunctioning components.

C1155 BR FLUID LEVEL LOW

DTC Logic

INFOID:0000000011742537

DTC DETECTION LOGIC

NOTE:

- Check brake fluid level in brake reservoir tank before starting inspection.
- Confirm if DTC is PAST or CURRENT. If DTC is CURRENT, proceed with Diagnosis Procedure. If DTC is PAST, clear DTC. Do not replace ABS actuator and electric unit (control unit) for a PAST DTC.

DTC	Display item	Malfunction detected condition	Possible cause	
			Past DTC	Current DTC
C1155	BR FLUID LEVEL LOW	Brake fluid level is low or communication line between the ABS actuator and electric unit (control unit) and brake fluid level switch is open or shorted.	• Brake fluid level • Harness or connector • Brake fluid level switch	• Brake fluid level • Harness or connector • Brake fluid level switch

DTC CONFIRMATION PROCEDURE

1.CHECK BRAKE FLUID LEVEL

Check brake fluid level. Refer to BR-8, "Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Fill brake fluid to proper level. Refer to BR-8, "Inspection". GO TO 2.

2.CHECK SELF DIAGNOSTIC RESULT

1. Turn ignition switch ON.
2. Check for DTC using CONSULT.

Is the DTC detected?

YES (Current DTC)>>Refer to BRC-268, "Diagnosis Procedure".
YES (Past DTC)>>GO TO 3.
NO >> Inspection End.

3.ERASE SELF DIAGNOSTIC RESULT

Erase the DTC using CONSULT.

Can the DTC be erased?

YES >> Inspection End.
NO >> Refer to BRC-268, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000011742538

Regarding Wiring Diagram information, refer to BRC-52, "Wiring Diagram".

1.CONNECTOR INSPECTION

1. Turn ignition switch OFF.
2. Disconnect combination meter and brake fluid level switch connectors.
3. Check connectors and terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace as necessary.

2.CHECK BRAKE FLUID LEVEL SWITCH

Perform the brake fluid level switch component inspection. Refer to BRC-269, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Replace brake fluid level switch. Refer to BR-29, "Exploded View".

3.CHECK BRAKE FLUID LEVEL SWITCH HARNESS

1. Check continuity between combination meter connector M24 terminal 25 and brake fluid level switch connector E24 terminal 1.

Combination meter		Brake fluid level switch		Continuity
Connector	Terminal	Connector	Terminal	
M24	25	E21	1	Yes

2. Check continuity between combination meter connector and ground.

Combination meter		—	Continuity
Connector	Terminal		
M24	25	Ground	No

Is the inspection result normal?

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

4.CHECK BRAKE FLUID LEVEL SWITCH GROUND CIRCUIT

Check continuity between brake fluid level switch connector E24 terminal 2 and ground.

Brake fluid level switch		—	Continuity
Connector	Terminal		
E24	2	Ground	Yes

Is the inspection result normal?

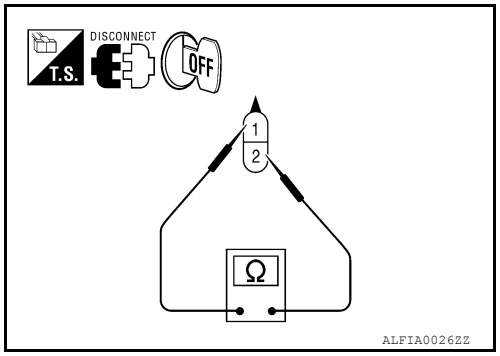
YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation"
NO >> Repair or replace malfunctioning components.

Component Inspection

INFOID:0000000011742539

1.CHECK BRAKE FLUID LEVEL SWITCH

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



Brake fluid level switch terminals	Condition	Continuity
1— 2	Brake fluid reservoir full	No
	Brake fluid reservoir empty	Yes

Is the inspection result normal?

YES >> Inspection End.
NO >> Replace brake fluid level switch. Refer to BR-29, "Exploded View".

C1160 DECEL G SEN SET

DTC Logic

INFOID:0000000011675215

DTC DETECTION LOGIC

DTC No.	Display Item	DTC detection condition	
C1160	DECEL G SEN SET	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	—
		Threshold	When calibration of yaw rate/ side/decel G sensor is not complete
		Diagnosis delay time	—

POSSIBLE CAUSE

- Harness or connector
- ABS actuator and electric unit (control unit)
- Yaw rate/side/decel G sensor
- Decel G sensor calibration is not performed

FAIL-SAFE

—

DTC CONFIRMATION PROCEDURE

1.CHECK SELF DIAGNOSTIC RESULT

CONSULT

1. Turn ignition switch OFF to ON.
2. Perform “Self Diagnostic Result” mode of “ABS”.
3. Check DTC.

Is DTC C1160 detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-270, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000011675216

1.DECEL G SENSOR CALIBRATION

Perform decel G sensor calibration. Refer to BRC-66, "Work Procedure".

>> GO TO 2.

2.CHECK SELF DIAGNOSTIC RESULT

With CONSULT

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

Is DTC C1160 detected?

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

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

Check yaw rate/side/decel G sensor system. Refer to BRC-248, "Diagnosis Procedure".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".
NO >> Repair or replace malfunctioning components.

C1164, C1165 CV SYSTEM

DTC Logic

INFOID:0000000011675217

DTC DETECTION LOGIC

DTC No.	Display Item	DTC detection condition	
C1164	CV 1	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	—
		Threshold	When a malfunction is detected in cut valve 1
		Diagnosis delay time	—
C1165	CV 2	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	—
		Threshold	When a malfunction is detected in cut valve 2
		Diagnosis delay time	—

POSSIBLE CAUSE

- Harness or connector
- ABS actuator and electric unit (control unit)
- Fusible link
- Battery power supply system

FAIL-SAFE

—

DTC CONFIRMATION PROCEDURE

1.CHECK SELF DIAGNOSTIC RESULT

With CONSULT

1. Turn ignition switch OFF to ON.
2. Perform “Self Diagnostic Result” mode of “ABS”.
3. Check DTC.

Is DTC C1164 or 1165 detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-271, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000011675218

Regarding Wiring Diagram information, refer to BRC-207, "Wiring Diagram" (with ICC) or BRC-52, "Wiring Diagram" (without ICC).

1.CONNECTOR INSPECTION

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connectors.
3. Check connectors and terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace as necessary.

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

Check voltage between ABS actuator and electric unit (control unit) connector E130 terminals 3 and 1 and ground.

ABS actuator and electric unit (control unit)		—	Voltage (Approx.)
Connector	Terminal		
E130	3	Ground	Battery voltage
	1		

Is the inspection result normal?

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

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

Check continuity between ABS actuator and electric unit (control unit) connector E130 terminals 4 and 2 (with ICC) and ground.

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E130	4	Ground	Yes
	2		

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".
NO >> Repair or replace malfunctioning components.

C1170 VARIANT CODING

DTC Logic

INFOID:0000000011675219

DTC DETECTION LOGIC

DTC No.	Display Item	DTC detection condition	Possible causes
C1170	VARIANT CODING	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	—
		Threshold	When the information in ABS actuator and electric unit (control unit) is not the same
		Diagnosis delay time	—

POSSIBLE CAUSE

- ABS actuator and electric unit (control unit)

FAIL-SAFE

—

DTC CONFIRMATION PROCEDURE

1.CHECK SELF DIAGNOSTIC RESULT

With CONSULT

1. Turn ignition switch OFF to ON.
2. Perform “Self Diagnostic Result” mode of “ABS”.
3. Check DTC.

Is DTC C1170 detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-273, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000011675220

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

Replace ABS actuator and electric unit (control unit) even if other DTCs are displayed with “VARIANT CODING” in self diagnostic result.

>> Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".

C1197 VACUUM SENSOR

DTC Logic

INFOID:0000000011675221

DTC DETECTION LOGIC

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

DTC	Display Item	DTC detection condition	
C1197	VACUUM SENSOR	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	—
		Threshold	When the information in ABS actuator and electric unit (control unit) is not the same
		Diagnosis delay time	—

POSSIBLE CAUSE

- Harness or connector
- Vacuum sensor (brake booster)
- Vacuum piping
- ABS actuator and electric unit (control unit)

FAIL-SAFE

—

DTC CONFIRMATION PROCEDURE

1.CHECK SELF DIAGNOSTIC RESULT

CONSULT.
1. Turn ignition switch OFF to ON.
2. Perform “Self Diagnostic Result” mode of “ABS”.
3. Check DTC.

Is DTC C1197 detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-274, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000011675222

Regarding Wiring Diagram information, refer to BRC-207, "Wiring Diagram".

1.CHECK BRAKE BOOSTER

1. Turn the ignition switch OFF.
2. Check brake booster. Refer to BR-10, "Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace brake booster. Refer to BR-32, "Removal and Installation".

2.CHECK VACUUM PIPING

Check vacuum piping. Refer to BR-22, "FRONT : Exploded View" and BR-26, "REAR : Exploded View".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Replace vacuum piping. Refer to BR-24, "FRONT : Removal and Installation" or BR-27, "REAR : Removal and Installation".

3.CHECK VACUUM SENSOR CIRCUIT

1. Disconnect vacuum sensor harness connector.
2. Disconnect ABS actuator and electric unit (control unit) harness connector.
3. Check 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	E130	22	Yes
	2		20	
	3		21	

4. Check 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 or replace malfunctioning components.

4.CHECK TERMINAL

- Check vacuum sensor pin terminals for damage or loose connection with harness connector.
- Check 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 or replace malfunctioning components.

5.REPLACE VACUUM SENSOR

With CONSULT

1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Replace vacuum sensor. Refer to BR-32, "Exploded View".
   CAUTION:
   Always replace brake booster because vacuum sensor cannot be disassembled.
3. Erase “Self Diagnostic Result” mode of “ABS”.
4. Turn the ignition switch OFF.
5. Start engine.
6. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC C1197 detected?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".
NO >> Inspection End.

C1198 VACUUM SENSOR

DTC Logic

INFOID:0000000011675223

DTC DETECTION LOGIC

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

DTC No.	Display Item	DTC detection condition	
C1198	VACUUM SENSOR	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	—
		Threshold	When an open circuit is detected in vacuum sensor. When a short circuit is detected in vacuum sensor circuit. When a malfunction is detected in vacuum sensor
		Diagnosis delay time	—

POSSIBLE CAUSE

- Harness or connector
- Vacuum sensor (brake booster)
- ABS actuator and electric unit (control unit)

FAIL-SAFE

—

DTC CONFIRMATION PROCEDURE

1.CHECK SELF DIAGNOSTIC RESULT

With CONSULT
1. Turn ignition switch OFF to ON.
2. Perform “Self Diagnostic Result” mode of “ABS”.
3. Check DTC.

Is DTC C1198 detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-276, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000011675224

Regarding Wiring Diagram information, refer to BRC-207, "Wiring Diagram".

1.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 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	E130	22	Yes
	2		20	
	3		21	

5. Check 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 2.
NO >> Repair or replace malfunctioning components.

2.CHECK TERMINAL

- Check vacuum sensor pin terminals for damage or loose connection with harness connector.
- Check 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 or replace malfunctioning components.

3.REPLACE VACUUM SENSOR

With CONSULT

1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Replace vacuum sensor. Refer to BR-32, "Exploded View".
   CAUTION:
   Always replace brake booster because vacuum sensor cannot be disassembled.
3. Erase “Self Diagnostic Result” mode of “ABS”.
4. Turn the ignition switch OFF.
5. Start engine.
6. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC C1198 detected?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".
NO >> Inspection End.

C1199 BRAKE BOOSTER

DTC Logic

INFOID:0000000011675225

DTC DETECTION LOGIC

DTC No.	Display Item	DTC detection condition	
C1199	BRAKE BOOSTER	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	—
		Threshold	When brake booster vacuum is approx. 0 kPa (0 mm-Hg) during engine running
		Diagnosis delay time	—

POSSIBLE CAUSE

- Harness or connector
- Vacuum sensor (brake booster)
- Vacuum piping
- ABS actuator and electric unit (control unit)

FAIL-SAFE

—

DTC CONFIRMATION PROCEDURE

1.CHECK SELF DIAGNOSTIC RESULT

CONSULT

1. Turn ignition switch OFF to ON.
2. Perform “Self Diagnostic Result” mode of “ABS”.
3. Check DTC.

Is DTC C1199 detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-278, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000011675226

Regarding Wiring Diagram information, refer to BRC-207, "Wiring Diagram".

1.CHECK BRAKE BOOSTER

1. Turn the ignition switch OFF.
2. Check brake booster. Refer to BR-10, "Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace brake booster. Refer to BR-32, "Removal and Installation".

2.CHECK VACUUM PIPING

Check vacuum piping. Refer to BR-22, "FRONT : Exploded View" and BR-26, "REAR : Exploded View".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Replace vacuum piping. Refer to BR-24, "FRONT : Removal and Installation" or BR-27, "REAR : Removal and Installation".

3.CHECK VACUUM SENSOR CIRCUIT

1. Disconnect vacuum sensor harness connector.
2. Disconnect ABS actuator and electric unit (control unit) harness connector.

3. Check 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	E130	22	Yes
	2		20	
	3		21	

4. Check 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 or replace malfunctioning components.

4. CHECK TERMINAL

- Check vacuum sensor pin terminals for damage or loose connection with harness connector.
- Check 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 or replace malfunctioning components.

5. REPLACE VACUUM SENSOR

With CONSULT

1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Replace vacuum sensor. Refer to BR-32, "Removal and Installation".
   CAUTION:
   Always replace brake booster because vacuum sensor cannot be disassembled.
3. Erase “Self Diagnostic Result” mode of “ABS”.
4. Turn the ignition switch OFF.
5. Start engine.
6. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC C1199 detected?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".
NO >> Inspection End.

C119A VACUUM SENSOR

DTC Logic

INFOID:0000000011675227

DTC DETECTION LOGIC

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

DTC No.	Display Item	DTC detection condition	
C119A	VACUUM SEN VOLT	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	—
		Threshold	When a malfunction is detected in supply in power voltage of vacuum
		Diagnosis delay time	—

POSSIBLE CAUSE

- Harness or connector
- Vacuum sensor (brake booster)
- ABS actuator and electric unit (control unit)

FAIL-SAFE

—

DTC CONFIRMATION PROCEDURE

1.CHECK SELF DIAGNOSTIC RESULT

CONSULT
1. Turn ignition switch OFF to ON.
2. Perform “Self Diagnostic Result” mode of “ABS”.
3. Check DTC.

Is DTC C119A detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-280, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000011675228

Regarding Wiring Diagram information, refer to BRC-207, "Wiring Diagram".

1.CHECK VACUUM SENSOR POWER SUPPLY

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

Vacuum sensor		—	Voltage (Approx.)
Connector	Terminal		
E167	3	Ground	0 V

4. Turn the ignition switch ON.
   CAUTION:
   Never start engine.
5. Check voltage between vacuum sensor harness connector and ground.

Vacuum sensor		—	Voltage (Approx.)
Connector	Terminal		
E167	3	Ground	4.75 V – 5.25 V

Is the inspection result normal?

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

2.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 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	E130	21	Yes

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

Vacuum sensor		—	Continuity
Connector	Terminal		
E167	3	Ground	No

Is the inspection result normal?

YES >> Perform diagnosis of ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to BRC-77, "Diagnosis Procedure".
NO >> Repair or replace malfunctioning components.

3.CHECK VACUUM SENSOR GROUND CIRCUIT

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

Vacuum sensor		—	Continuity
Connector	Terminal		
E167	2	Ground	Yes

Is the inspection result normal?

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

4.CHECK TERMINAL

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".
NO >> Repair or replace malfunctioning components.

U1000 CAN COMM CIRCUIT

Description

INFOID:0000000011675229

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

DTC Logic

INFOID:0000000011675230

DTC DETECTION LOGIC

DTC No.	Display Item	DTC detection condition	
U1000	CAN COMM CIRCUIT	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	—
		Threshold	When CAN communication signal is not continuously received for 2 seconds or more.
		Diagnosis delay time	—

POSSIBLE CAUSE

- CAN communication system malfunction

FAIL-SAFE

—

Diagnosis Procedure

INFOID:0000000011675231

1.CHECK SELF DIAGNOSTIC RESULT

CONSULT

1. Turn ignition switch ON.
2. Perform “Self Diagnostic Result” mode of “ABS”.
3. Check DTC.

Is DTC U1000 detected?

YES >> Proceed to diagnosis procedure. Refer to LAN-21, "Trouble Diagnosis Flow Chart".
NO >> Refer to GI-42, "Intermittent Incident".

POWER SUPPLY AND GROUND CIRCUIT

Diagnosis Procedure

INFOID:0000000011675232

Regarding Wiring Diagram information, refer to PCS-23, "Wiring Diagram".

1. CHECK FUSIBLE LINKS

Check that the following fusible links are not blown.

Signal name	Fusible link No.
Battery power supply	E (80A)
	A (250A), C (80A)
	A (250A), B (100A), N (40A)

Is the fusible link blown?

YES >> Replace the blown fusible link after repairing the affected circuit.
NO >> GO TO 2.

2. CHECK POWER SUPPLY CIRCUIT

1. Disconnect IPDM E/R connectors E118 and E120.
2. Check voltage between IPDM E/R connectors and ground.

IPDM E/R		Ground	Voltage (Approx.)
Connector	Terminal		
E118	1	—	Battery voltage
	2		
E120	3		

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness or connectors.

3. CHECK GROUND CIRCUIT

1. Disconnect IPDM E/R connectors E119 and E121.
2. Check continuity between IPDM E/R connectors and ground.

IPDM E/R		Ground	Continuity
Connector	Terminal		
E121	7	—	Yes
E119	41		

Is the inspection result normal?

YES >> Inspection End.
NO >> Repair or replace harness or connectors.

PARKING BRAKE SWITCH

Component Function Check

INFOID:0000000011675233

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-284, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000011675234

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	M24	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-10, "Removal and Installation".

3.CHECK PARKING BRAKE SWITCH SIGNAL

With CONSULT

1. Select “Data Monitor”
2. Select “PARK BRAKE SW”.
3. Check that the function operates normally according to the following conditions:

Condition	Data Monitor
Operate parking brake	On
Release 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-20, "CONSULT Function (METER/M&A)".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace combination meter. Refer to MWI-78, "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-142, "Removal and Installation".
NO >> Repair or replace error-detected parts.

Component Inspection

INFOID:0000000011675235

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	—	Condition	Continuity
Terminal			
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-10, "Removal and Installation".

VDC OFF SWITCH

Component Function Check

INFOID:0000000011675236

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-286, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000011675237

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	
E130	9	M71	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		
E130	9	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		
M71	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-287, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace the VDC OFF switch. Refer to BRC-144, "Removal and Installation".

4.CHECK VDC OFF SWITCH SIGNAL

CONSULT

1. Select “Data Monitor” mode of “ABS”.
2. Select “OFF SW”.
3. Check that the function operates normally according to the following conditions:

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-142, "Removal and Installation".
NO >> Repair or replace error-detected parts.

Component Inspection

INFOID:0000000011675238

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-144, "Removal and Installation".

ABS WARNING LAMP

Component Function Check

INFOID:0000000011675239

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-288, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000011675240

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-288, "Diagnosis Procedure".

Is the inspection result normal?

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

2.PERFORM SELF DIAGNOSTIC RESULT

CONSULT

1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait 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” for “ABS”.

Is any DTC detected?

YES >> Check the DTC. Refer to BRC-50, "DTC Index".
NO >> GO TO 3.

3.CHECK ABS WARNING LAMP SIGNAL

CONSULT

1. Select “ABS”, “Data Monitor” and “ABS WARN LAMP” in 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-78, "Removal and Installation".
NO >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".

BRAKE WARNING LAMP

Component Function Check

INFOID:0000000011675241

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-289, "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-284, "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 within 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-29, "Exploded View".

Diagnosis Procedure

INFOID:0000000011675242

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-283, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2.PERFORM THE SELF DIAGNOSTIC RESULT

CONSULT

1. Turn the ignition switch OFF → ON.

   CAUTION:

   - **Be sure to wait 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” mode of “ABS”.

Is any DTC detected?

YES >> Check the DTC. Refer to BRC-50, "DTC Index".

NO >> GO TO 3.

3.CHECK BRAKE WARNING LAMP SIGNAL

CONSULT

1. Select “ABS”, “Data Monitor” and “EBD WARN LAMP” in 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-78, "Removal and Installation".
NO >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".

VDC WARNING LAMP

Component Function Check

INFOID:0000000011675243

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-291, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000011675244

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-283, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2.PERFORM THE SELF DIAGNOSTIC RESULT

CONSULT

1. Turn the ignition switch OFF → ON.

   CAUTION:

   - **Be sure to wait 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” mode of “ABS”.

Is any DTC detected?

YES >> Check the DTC. Refer to BRC-50, "DTC Index".

NO >> GO TO 3.

3.CHECK VDC WARNING LAMP SIGNAL

CONSULT

1. Select “ABS”, “Data Monitor” and “SLIP/VDC LAMP” in this order.
2. Turn the ignition switch OFF.
3. Check that data monitor displays “On” for approximately 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-78, "Removal and Installation".

NO >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".

VDC OFF INDICATOR LAMP

Component Function Check

INFOID:0000000011675245

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-292, "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-286, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000011675246

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-283, "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” in 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-142, "Removal and Installation".

3.CHECK VDC OFF INDICATOR LAMP SIGNAL

CONSULT
1. Select “ABS”, “Data Monitor” and “OFF LAMP” in this order.
2. Check that data monitor displays “On” or “Off” each time VDC OFF switch is operated.

Is the inspection result normal?

YES >> Replace the combination meter. Refer to MWI-78, "Removal and Installation".
NO >> Check the VDC OFF switch system. Refer to BRC-286, "Diagnosis Procedure".

FORWARD EMERGENCY BRAKING

Diagnosis Procedure

INFOID:0000000011555518

1.FORWARD EMERGENCY BRAKING DIAGNOSIS

- The system will be cancelled automatically with a beep sound and FEB warning lamp on the combination meter will illuminate, when the system will not operate properly.
- When the FEB warning lamp continues to illuminate even if the FEB system is turned on after the engine restarts, perform the trouble-diagnosis.

>> Go to ICC. Refer to CCS-66, "Work Flow".

SYMPTOM DIAGNOSIS

DRIVER ASSISTANCE SYSTEM SYMPTOMS

Symptom Table

INFOID:0000000011583493

Before performing diagnosis, check that it is not a symptom caused by normal operation. Refer to BRC-177, "BRAKE ASSIST (WITH PREVIEW FUNCTION) : System Description-Forward Emergency Braking".

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-295, "Diagnosis Procedure"
	Other information display is not illuminated	Combination meter Refer to MWI-29, "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-295, "Diagnosis Procedure"
	Other information display is not illuminated	Combination meter Refer to MWI-29, "DTC Index"
FEB warning buzzer is not sounding (Warning display is functioning normally)	—	Chime does not sound. Refer to CCS-138, "Description".

SYSTEM SETTINGS CANNOT BE TURNED ON/OFF ON THE INTEGRAL SWITCH

Symptom Table

INFOID:0000000011555519

CAUTION:
Perform the "Self Diagnostic Result" 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 integral switch	BRC-295, "Diagnosis Procedure"

Description

INFOID:0000000011555520

FEB system does not turn ON/OFF.
- FEB warning lamp does not illuminate even if the integral switch is operated when FEB warning lamp is not illuminated.
- FEB warning lamp does not turn off even if the integral 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:0000000011555521

1.PERFORM SELF DIAGNOSTIC RESULT (LASER/RADAR)

1. Perform "Self Diagnostic Result" mode of "ICC/ADAS" with CONSULT.
2. Check if the DTC is detected in "Self Diagnostic Result" mode of "ICC/ADAS" with CONSULT. Refer to CCS-51, "DTC Index".

Is any DTC detected?

YES >> GO TO 9.
NO >> GO TO 2.

2.STEERING SWITCH INSPECTION

1. Start the engine.
2. Check that "FEB SELECT" operates normally in "Data Monitor" of "LASER/RADAR" with CONSULT.

Is inspection result normal?

YES >> GO TO 6.
NO >> GO TO 3.

3.CHECK STEERING SWITCH RESISTANCE

Check resistance between the following steering switch terminals:

Steering switches			Condition	Resistance (Ω) (Approx.)
Terminal		Signal name		
17	19	Display	Depress ▷ switch.	2023
		Back	Depress ◁ switch.	723
16		Enter	Depress OK switch.	2023
		Menu Up	Depress △ switch.	121
		Menu Down	Depress ▽ switch.	321

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace steering wheel switch. Refer to AV-66, "Removal and Installation".

4.CHECK SPIRAL CABLE

Check continuity between the following spiral cable terminals:

Spiral cable		Continuity
Terminal		
16	9	Yes
17	8	
19	11	

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace spiral cable. Refer to SR-15, "Removal and Installation".

5.CHECK STEERING SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect combination meter harness connector M24 and spiral cable harness connector M30.
3. Check continuity between combination meter harness connector M24 and spiral cable harness connector M30.

Combination meter		Spiral cable		Continuity
Connector	Terminal	Connector	Terminal	
M24	21	M30	11	Yes
	22		9	
	23		8	

4. Check continuity between combination meter harness connector M24 and ground.

Combination meter		Ground	Continuity
Connector	Terminal		
M24	21	Ground	No
	22		
	23		

Is the inspection result normal?

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

6.PERFORM THE DIAGNOSTIC RESULT (METER/M&A)

1. Perform “Self Diagnostic Result” mode of “METER/M&A” with CONSULT.
2. Check if the DTC is detected in “Self Diagnostic Result” mode of “METER/M&A” with CONSULT. Refer to CCS-51, "DTC Index".

Is any DTC detected?

YES >> GO TO 9.
NO >> GO TO 7.

7.FEB WARNING LAMP

1. Select the active test item “METER LAMP” of “ICC/ADAS”.
2. Check if the FEB warning lamp illuminates when the test item is operated.

Is inspection result normal?

YES >> Refer to CCS-66, "Work Flow".
NO >> GO TO 8.

8.CHECK DATA MONITOR OF COMBINATION METER

Check that “BA W/L operates normally in “Data Monitor”“METER/M&A”.

Is inspection result normal?

YES >> Replace the combination meter. Refer to MWI-78, "Removal and Installation".
NO >> Replace the ICC sensor. Refer to MWI-78, "Removal and Installation".

9.REPAIR OR REPLACE MALFUNCTIONING PARTS

Repair or replace malfunctioning parts.

>> GO TO 10.

10.CHECK FEB SYSTEM

Check that FEB warning lamp turned ON⇔OFF, when operating steering switch.

>> Inspection End.

EXCESSIVE OPERATION FREQUENCY

Description

INFOID:0000000011804840

VDC function, TCS function, ABS function, EBD function, brake assist function or hill start assist function operates in excessive operation frequency.

Diagnosis Procedure

INFOID:0000000011804841

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-7, "Inspection" (rear).
- AWD: Refer to FAX-7, "Inspection" (front) or DLN-88, "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-137, "FRONT WHEEL SENSOR : Removal and Installation".
- Rear wheel sensor: Refer to BRC-139, "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-141, "FRONT SENSOR ROTOR : Removal and Installation - Front Sensor Rotor".
- Rear sensor rotor: Refer to BRC-141, "REAR SENSOR ROTOR : Removal and Installation - Rear Sensor Rotor".

5.CHECK THAT WARNING LAMP TURNS OFF

Check that ABS warning lamp, brake warning lamp and VDC warning lamp turn OFF approximately 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 RESULT

CONSULT
1. Turn the ignition switch OFF → ON.

CAUTION:

- **Be sure to wait 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” mode of “ABS”.

Is any DTC detected?

YES >> Check the DTC. Refer to BRC-50, "DTC Index".
NO >> Inspection End.

UNEXPECTED BRAKE PEDAL REACTION

Description

INFOID:0000000011804842

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

Diagnosis Procedure

INFOID:0000000011804843

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-7, "Inspection" (rear).
- AWD: Refer to FAX-7, "Inspection" (front) or DLN-88, "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-11, "DISC BRAKE ROTOR : Inspection".
- Rear: Refer to BR-13, "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-8, "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-7, "Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Adjust each item of brake pedal. Refer to BR-15, "Adjustment".

5.CHECK BRAKING FORCE

Check brake force using a brake tester.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Check each component 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 component of brake system.

THE BRAKING DISTANCE IS LONG

Description

INFOID:0000000011804844

Brake stopping distance is long when ABS function is operated.

Diagnosis Procedure

INFOID:0000000011804845

CAUTION:
Brake stopping distance on a slippery road like a 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 component 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 component of brake system.

DOES NOT OPERATE

Description

INFOID:0000000011804846

VDC function, TCS function, ABS function, EBD function, brake assist function or hill start assist function does not operate.

Diagnosis Procedure

INFOID:0000000011804847

CAUTION:

- **VDC function, TCS function, ABS function, EBD function, brake assist function and hill start assist 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 operate 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 approximately 1 second after key switch is turned ON. Check that ABS warning lamp, brake warning lamp and VDC warning lamp 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 RESULT

CONSULT

1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait 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” mode of “ABS” with CONSULT.

Is any DTC detected?

YES >> Check the DTC. Refer to BRC-50, "DTC Index".
NO >> Inspection End.

BRAKE PEDAL VIBRATION OR OPERATION SOUND OCCURS

Description

INFOID:0000000011804848

- 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 when 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 speeds**
- **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:0000000011804849

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-15, "Adjustment".

2.SYMPTOM CHECK 2

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

Does the operation sound occur?

YES >> GO TO 3.
NO >> Perform “Self Diagnostic Result” mode 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

CONSULT

1. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait 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” mode of “ABS”.

Is any DTC detected?

YES >> Check the DTC. Refer to BRC-50, "DTC Index".
NO >> Inspection End.

VEHICLE JERKS DURING

Description

INFOID:0000000011804850

The vehicle jerks when VDC function, TCS function, ABS function, EBD function, brake assist function or hill start assist function operates.

Diagnosis Procedure

INFOID:0000000011804851

1.CHECK SYMPTOM

Check that the vehicle jerks when VDC function, TCS function, ABS function, EBD function, brake assist function or hill start assist 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 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” mode of “ABS”.

Is any DTC detected?

YES >> Check the DTC. Refer to BRC-50, "DTC Index".
NO >> GO TO 3.

3.CHECK CONNECTOR

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

Is the inspection result normal?

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

4.PERFORM THE SELF DIAGNOSTIC RESULT

CONSULT
1. Connect harness connector.
2. Turn the ignition switch OFF → ON.
   CAUTION:
   - **Be sure to wait 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” mode of “ABS”.

Is any DTC detected?

YES >> Check the DTC. Refer to BRC-50, "DTC Index".
NO >> GO TO 5.

5.PERFORM THE SELF DIAGNOSTIC RESULT

CONSULT
Perform “Self Diagnostic Result” mode of “ENGINE” and “TRANSMISSION”.

Is any DTC detected?

YES >> Check the DTC.
NO >> Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation".

NORMAL OPERATING CONDITION

Description

INFOID:0000000011804852

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 assist function, hill start assist function operates.	This is not a malfunction, because it is caused by VDC function, TCS function, ABS function, EBD function, brake assist function, hill start assist 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 a slippery road, 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 feel 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.)

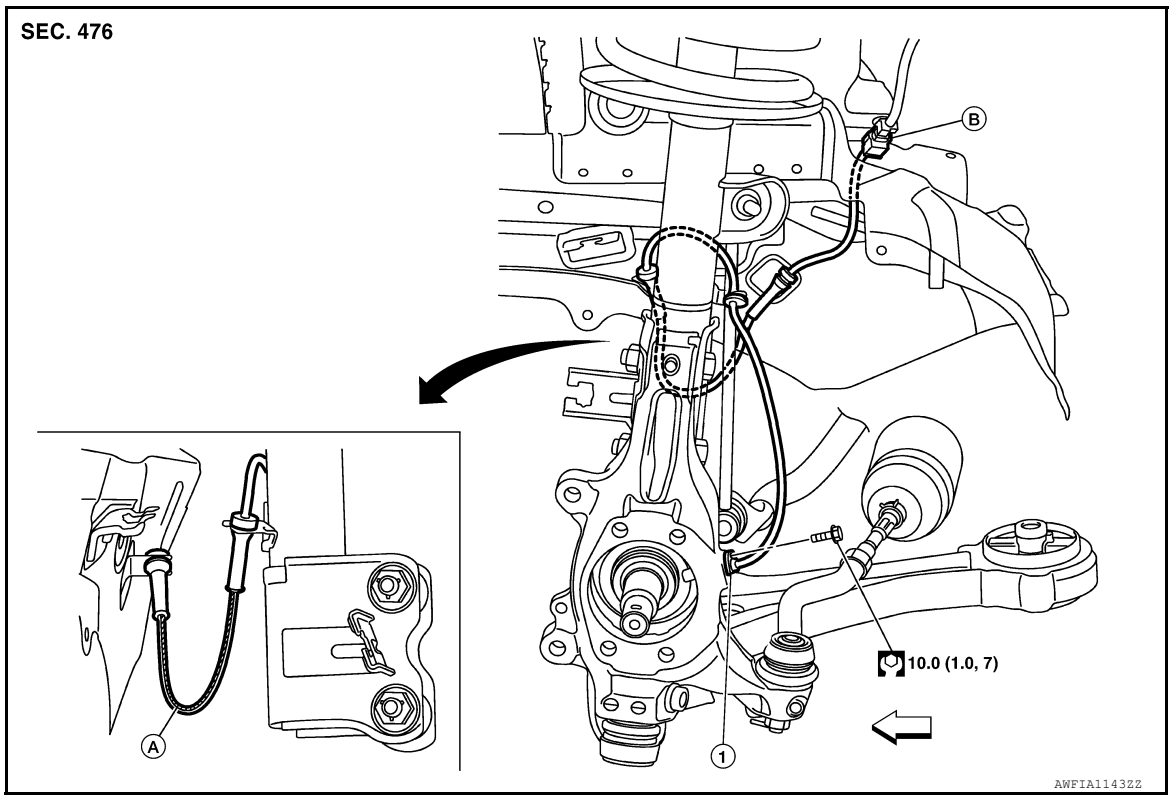
REMOVAL AND INSTALLATION

WHEEL SENSOR

FRONT WHEEL SENSOR

FRONT WHEEL SENSOR : Exploded View

INFOID:0000000011578387



1. Front wheel sensor
A. Color line (slant line)
B. Front wheel sensor harness connector
⇦ Front

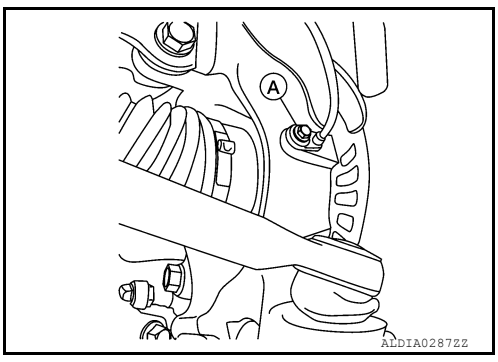
FRONT WHEEL SENSOR : Removal and Installation

INFOID:0000000011578388

CAUTION:
Do not damage the front wheel sensor or sensor rotor.

REMOVAL

1. Remove front wheel and tire using power tool. Refer to WT-65, "Balancing Wheels".
2. Remove fender protector retaining pin to gain access to wheel sensor harness connector.
3. Disconnect harness connector from front wheel sensor.
4. Remove front wheel sensor bolt (A) from wheel hub and bearing.
   CAUTION:
   Pull out the front wheel sensor being careful to turn it as little as possible. Do not pull on the front wheel sensor harness.



5. Remove front wheel sensor from strut bracket.
6. Remove front wheel sensor from steering knuckle.

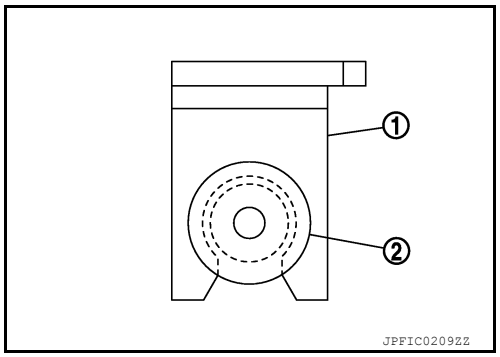
CAUTION:
Pull out the front wheel sensor being careful to turn it as little as possible. Do not pull on the front wheel sensor harness.

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

- **Before installing, make sure there is no foreign material, such as iron fragments, adhered to the pick-up part of the front wheel sensor.**
- **When installing, make sure there is no foreign material, such as iron fragments, 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.**

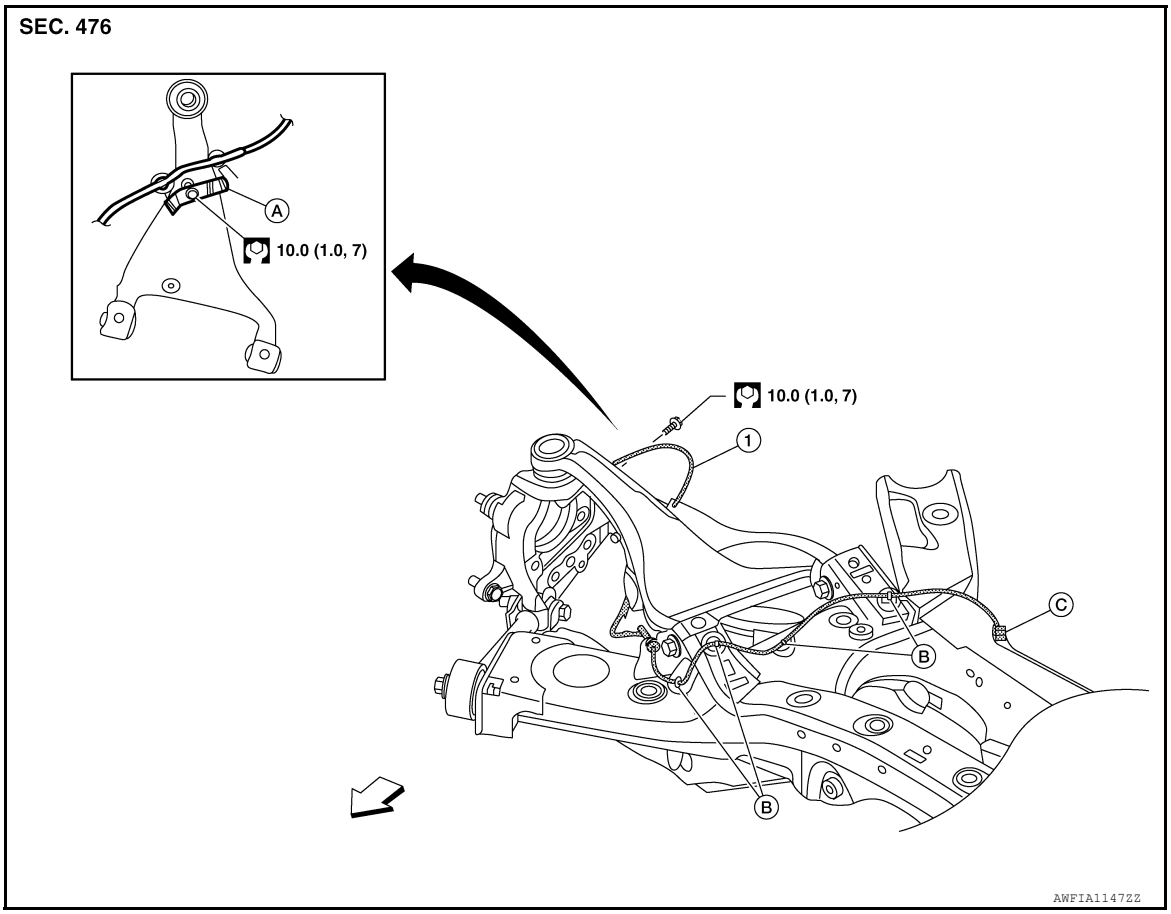


REAR WHEEL SENSOR

REAR WHEEL SENSOR : Exploded View

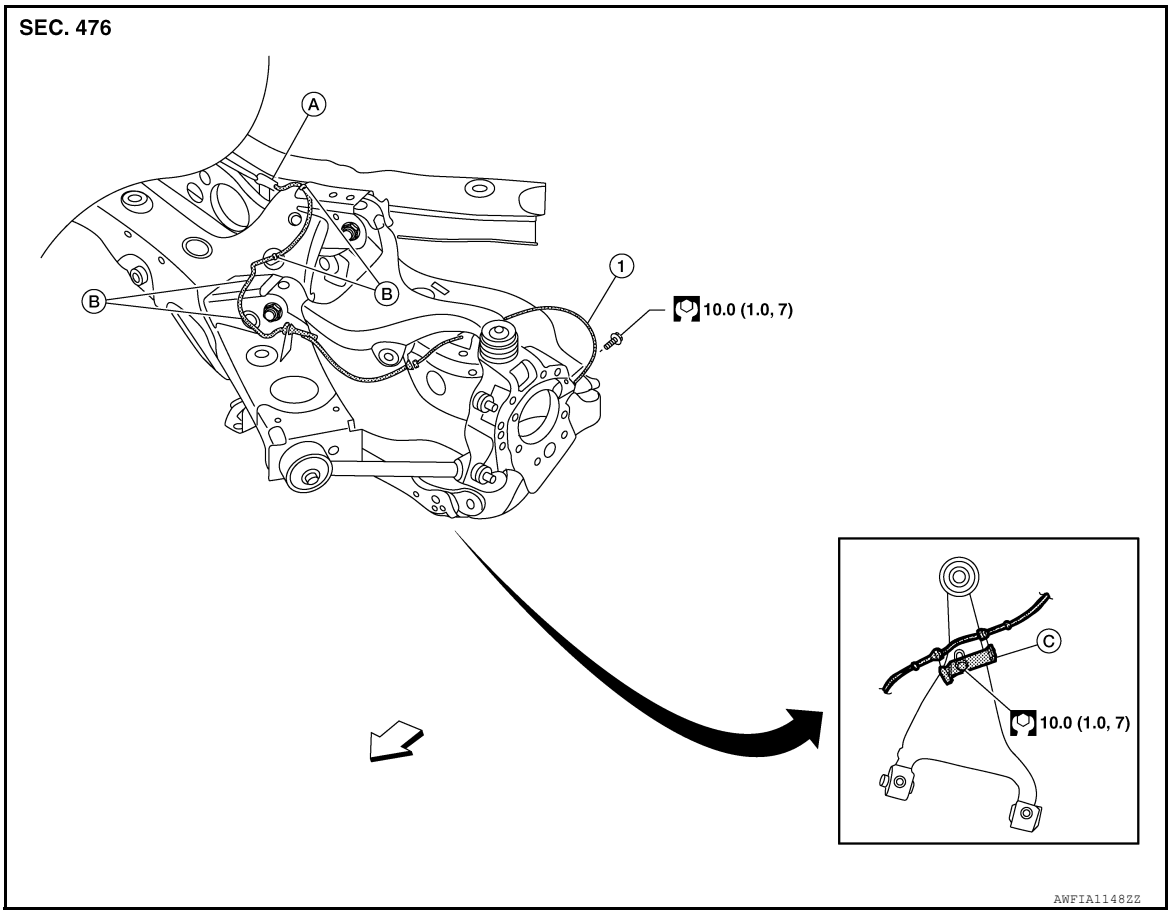
INFOID:0000000011578389

RH Side



1. Rear wheel sensor
A. Rear wheel sensor bracket
B. Clip
C. Rear wheel sensor connector
⇦ Front

LH Side



1. Rear wheel sensor
A. Rear wheel sensor connector
B. Clip
C. Rear wheel sensor bracket
⇦ Front

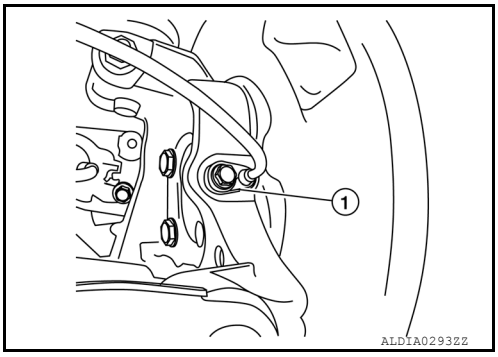
REAR WHEEL SENSOR : Removal and Installation

INFOID:0000000011578390

CAUTION:
Do not damage rear wheel sensor or sensor rotor.

REMOVAL

1. Remove rear under cover. Refer to EXT-40, "REAR UNDER COVER : Removal and Installation".
2. Remove rear wheel and tire using power tool. Refer to WT-68, "Removal and Installation".
3. Remove rear wheel sensor bolt (1).
   CAUTION:
   Pull out the rear wheel sensor being careful to turn it as little as possible. Do not pull on the rear wheel sensor harness.



4. Disconnect harness connector from rear wheel sensor.

5. Remove rear wheel sensor from sensor brackets.
6. Remove rear wheel sensor from rear knuckle.

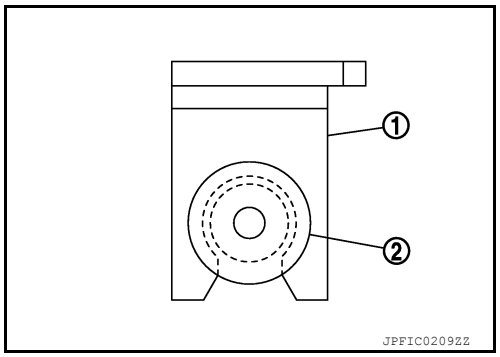
CAUTION:
Pull out the rear wheel sensor being careful to turn it as little as possible. Do not pull on the rear wheel sensor harness.

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

- **Before installing, make sure there is no foreign material, such as iron fragments, adhered to the pick-up part of the rear wheel sensor**
- **When installing, make sure there is no foreign material, such as iron fragments, on and in the hole in the rear knuckle 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:0000000011578391

The front wheel sensor rotor is an integral part of the wheel hub and bearing and cannot be disassembled. Refer to FAX-8, "Removal and Installation".

REAR SENSOR ROTOR

REAR SENSOR ROTOR : Removal and Installation - Rear Sensor Rotor

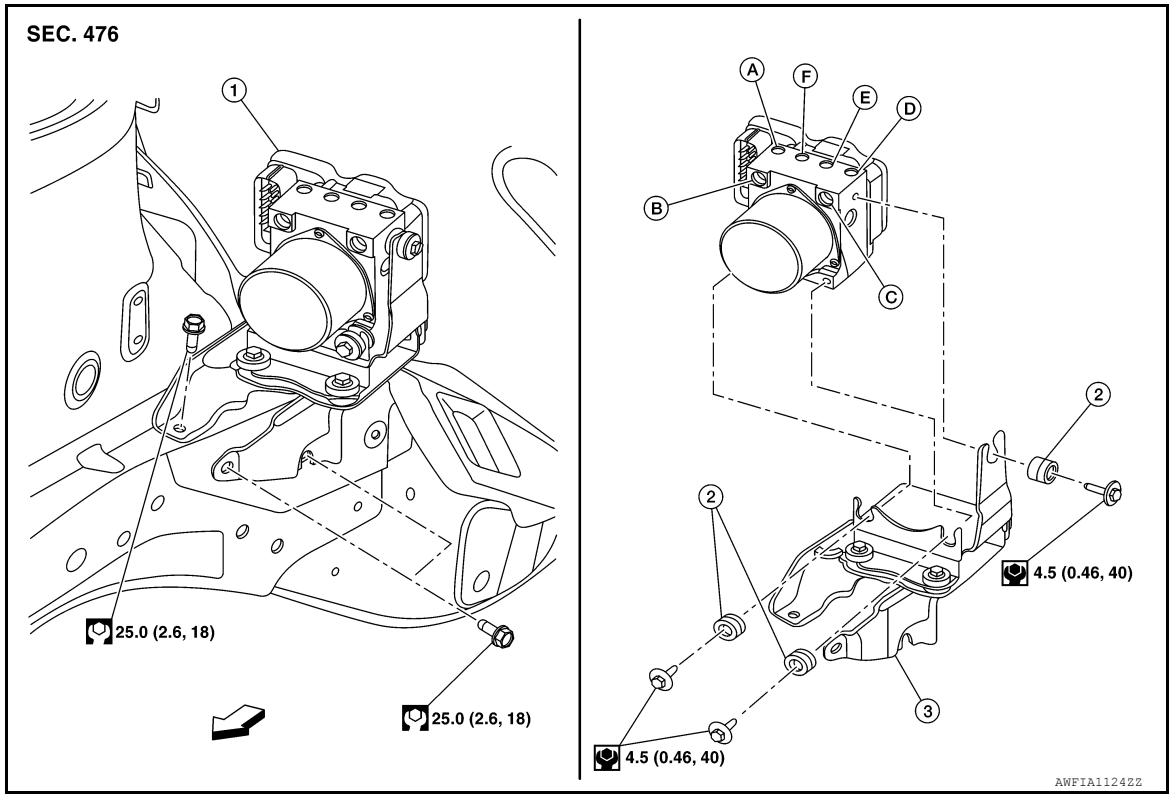
INFOID:0000000011578392

The rear wheel sensor rotor is an integral part of the wheel hub and bearing and cannot be disassembled. Refer to RAX-8, "Removal and Installation".

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Exploded View

INFOID:0000000011578393



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

⇦ Front

Removal and Installation

INFOID:0000000011578394

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-224, "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-86, "Exploded View".
2. Remove cowl top cover. Refer to EXT-34, "Removal and Installation - Cowl Top Cover".
3. Remove cowl top extension. Refer to EXT-35, "Removal and Installation - Cowl Top Extension".
4. Separate brake tubes from ABS actuator and electric unit (control unit). Refer to BR-22, "FRONT : Exploded View".
5. Disconnect harness connector from ABS actuator and electric unit (control unit).
6. Remove ABS actuator and electric unit (control unit) bracket bolts and bushings.
7. 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-224, "Work Procedure".

Installation is in the reverse order of removal.

- After work is completed, bleed air from brake tube. Refer to BR-16, "Bleeding Brake System".
- Adjust the neutral position of steering angle sensor. Refer to BRC-64, "Work Procedure".
- Perform calibration of the decel G sensor. Refer to BRC-66, "Work Procedure".

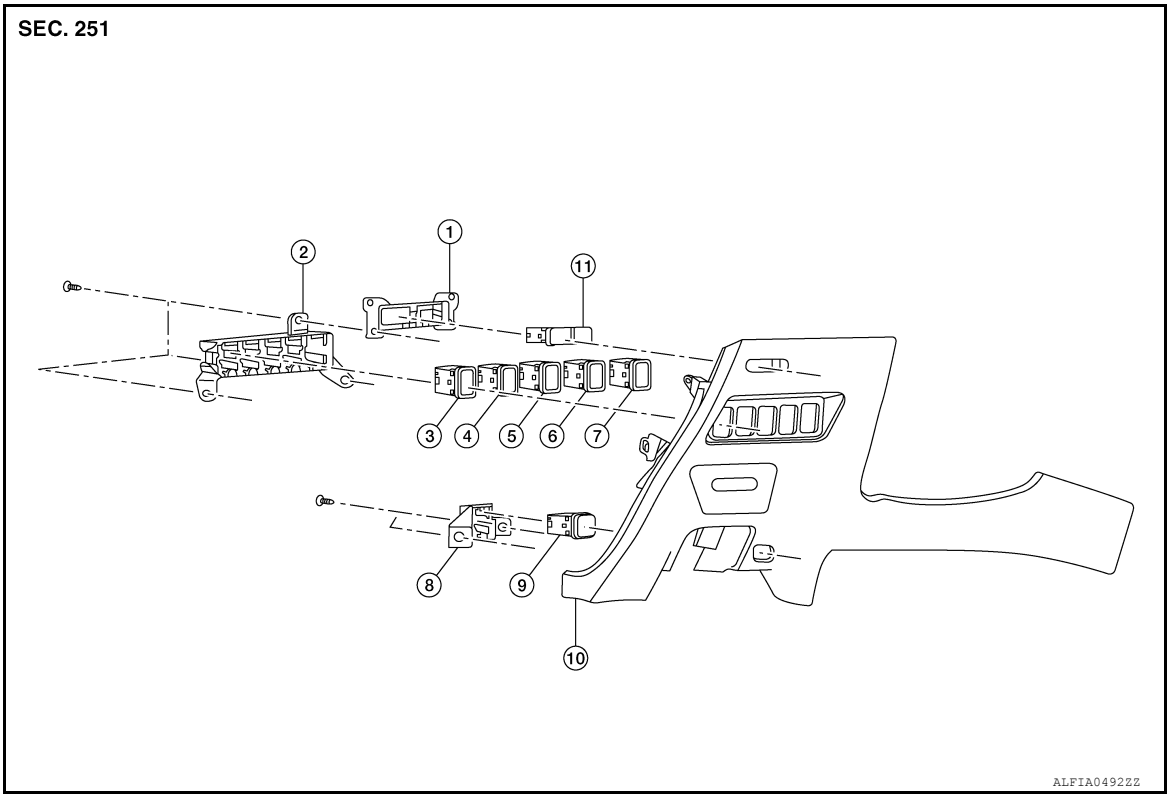
CAUTION:

- **To install, use flare nut crowfoot and torque wrench.**
- **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:0000000011578395



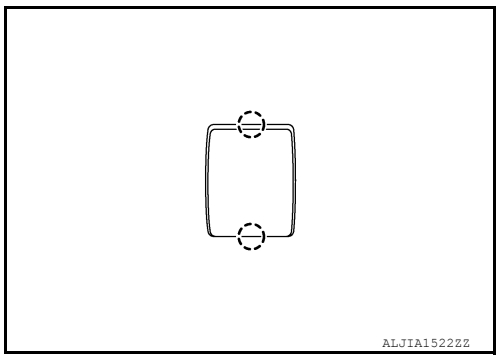
1. Upper switch carrier
2. Middle switch carrier
3. VDC OFF switch
4. Mask
5. Automatic back door switch
6. Heated steering wheel switch
7. Mask
8. Lower switch carrier
9. Front power return switch
10. Instrument lower panel LH
11. Illumination control switch

Removal and Installation

INFOID:0000000011578396

REMOVAL

1. Remove instrument lower panel LH. Refer to IP-24, "Removal and Installation".
2. Remove screws and middle switch carrier from instrument lower panel LH.
3. Release pawls using suitable tool and remove VDC OFF switch from the middle switch carrier.
   ◌: Pawl



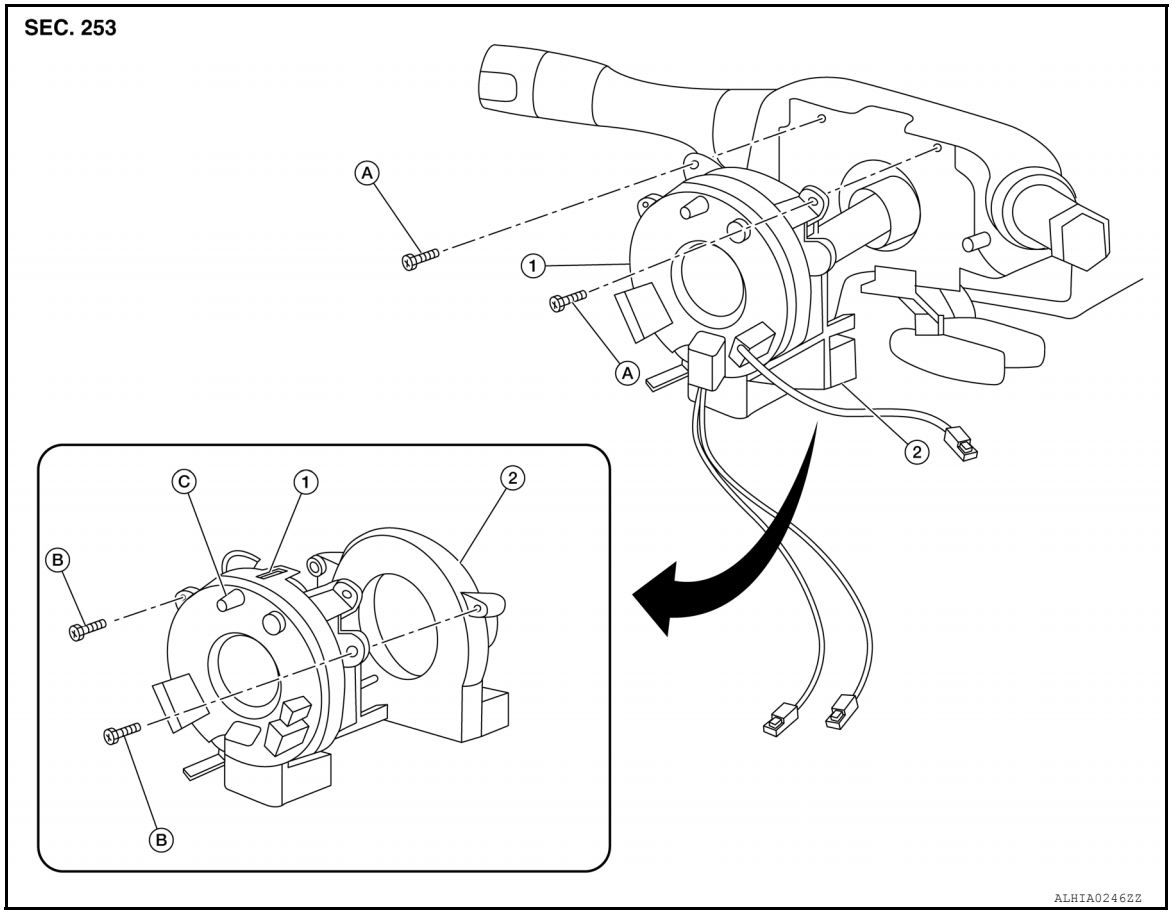
INSTALLATION

Installation is in the reverse order of removal.

STEERING ANGLE SENSOR

Exploded View

INFOID:0000000011578397



1. Spiral cable
2. Steering angle sensor
A. Spiral cable screws
B. Steering angle sensor screws
C. Locating pin

Removal and Installation

INFOID:0000000011578398

To remove and install the steering angle sensor, remove and install the spiral cable. Refer to SR-15, "Removal and Installation".